Draft ENVIRONMENTAL ASSESSMENT

Majestic Chino Heritage

City of Chino, San Bernardino County, California

Lead Agency

U.S Army Corps of Engineers, Los Angeles District

915 Wilshire Blvd, Suite 930

Los Angeles, CA 90017

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Table of Contents

Tables

Exhibits

Appendices

Acronyms and Abbreviations

AIA	Airport Influence Area
ALUCP	Airport Land Use Compatibility Plan
AMSL	Above mean sea level
APE	Area of potential effect
BMPs	Best Practice Management
CBSC	California Building Standard Code
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulation
City	City of Chino
CMB	Crushed Miscellaneous Base
CNDDB	California Natural Diversity Data Base
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	Carbon monoxide
Corps	United States Army Corps of Engineers
CSUF	California State University, Fullerton
CY	Cubic Yards
dBA	Decibel A-weighted scale
DIF	Development Impact Fee
EC	Environmental Commitment
EI	Expansion Index
EIC	Eastern Information Center
EIR	Environmental Impact Report
Ft	Feet
GLA	Glenn Lukos Associates
I-15	Interstate 15
IEUA	Inland Empire Utility Agency
L50	Median noise levels
Leq	Equivalent sound level
Lmax	Maximum noise level
NGVD	National Geodetic Vertical Datum
NO2	Nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NRHP	Natural Register of Historic Places
O&M	Operation and Maintenance
ONT	Ontario International Airport
PCE	Passenger car equivalent
Pm10	Particulate matter 10 microns or less in diameter
Pm2.5	Particulate matter 2.5 microns or less in diameter
RP-5	Regional Water Recycling Plant No. 5
SCAG	Southern California Associations of Governments
SCCIC	South Central Coastal Information Center

SF	Square Feet
SR-60	State Route 60
SR-71	State Route 71
SR-83	Euclid Avenue
SWPPP	Stormwater Pollution Prevention Plan
UCR	University of California at Riverside
WQMP	Water Quality Management Plan

1.0 INTRODUCTION

1.1 Background

This Environmental Assessment (EA) describes the affected resources and evaluates the potential environmental consequences of a proposal by Majestic Realty Co. (Project Applicant) to develop two industrial/warehouse buildings and associated features on approximately 97 acres of lands in the City of Chino, located at the southeast corner of Mountain Avenue and Bickmore Avenue. As part of the development, import of fill to the site from local surrounding areas is required to elevate the site above the 566-foot elevation and offset that volume by removing fill material at lower elevations within the Prado Dam basin and thus a license agreement is needed from the Corps to remove borrow fill from lands within the Prado Dam basin (Proposed Project or Proposed Action). Additionally, various construction approvals, easement(s), and consent would be needed from the Corps for the overall proposed development as detailed in the EA.

As the lead agency, the Corps has prepared this EA in accordance with the requirements of the National Environmental Policy Act (NEPA) 42 United States Code (USC) 4321, et seq., Council on Environmental Quality (CEQ) regulations at 40 Code of Federal Regulations (CFR) parts 1500-1508[1] , Corps' regulations at 33 CFR Part 230, and Corps guidance in Engineer Regulation (ER) 200-2-2, Procedures for Implementing NEPA, and other environmental laws. This EA has been prepared by RVA Inc. on behalf of the Corps and has been independently reviewed by Corps staff. The scope of the document, methods of analysis, and conclusions represent the independent judgment of the Corps. Staff members from the Corps and others who helped prepare this EA are identified in Chapter 8, *List of Preparers and Reviewers*.

In a separate and ongoing action, the Corps and the Orange County Flood Control District (OCFCD), as the non-federal sponsor, are raising the height of the Prado Dam and spillway to increase its flood control capabilities and to increase the storage capacity of the reservoir behind the Prado Dam. Following the completion of this project, flood waters could potentially reach an elevation of 566 feet above mean sea level (amsl) within the Prado Dam Reservoir during an approximately 190 year event. The proposed location for the development of the two industrial buildings lie below 566 feet amsl would be subject to potential inundation during a 190-year flood event once the spillway is raised.

The proposed development site and all the proposed borrow sites are vacant, unimproved lands and are located within the Prado Dam basin area, below the 566-foot contour elevation, and as such, the proposed buildings' finished floor elevations would be built at an elevation of 567 feet NGVD. To attain these proposed elevations, the proposed Project area would require approximately 608,896 cubic yards of fill that would be obtained from up to five proposed borrow site sources, all within the 566-foot elevation NGVD of the basin area and potential undefined sources up to five miles from the proposed Project area. The sources outside the basin would be utilized should specific material not found within the basin be needed. Majestic Realty Co. has an agreement for the development of the Project with the Orange County Flood Control District (OCFCD), who is the land owner of the

[1] New NEPA regulations issued by CEQ apply to NEPA processes begun after 14 Sep 2020, but federal agencies have discretion to apply the new NEPA regulations to on-going NEPA processes or proceed to apply the prior CEQ regulations. The NEPA process in this instance started before 14 Sep 2020, and the Corps has decided to proceed to apply the prior CEQ regulations.

proposed Project area and the five proposed borrow sites. This EA will be used to inform decision makers and the public about the environmental effects of the request.

The proposed Project area generally sheet flows from north to south at an approximately 0.5 percent average grade slope. The proposed borrow site locations 2-5 are vacant, unimproved lands with generally the same flow pattern in the north to south direction at an approximately one percent average grade slope. Proposed borrow site 1 currently has existing structures on site; which are slated for demolition as part of the Proposed Action.

1.2 Location

The proposed Project area is located in the southern portion of the City, which is located southwest of the City of Ontario, east of the City of Chino Hills, west of the City of Eastvale, and northwest of the City of Corona in the southwestern portion of San Bernardino County, California. As shown on Exhibit 1.1, Regional Map, the Proposed Action project area is approximately 1.0-mile east of State Route 71 (SR-71), approximately 6.5 miles west of Interstate 15 (I-15), and approximately 5.0 miles south of State Route (SR-60). The Chino Airport is located approximately 1.6 miles to the northeast of the Proposed Action project area.

Exhibit 1.2, Vicinity Map, shows the proposed Project area and borrow sites and the 566-foot Prado Dam inundation area within the City of Chino. At the local scale, the proposed Project area is located at the southeast corner of the intersection of Mountain Avenue and Bickmore Avenue (see Exhibit 1.2, Vicinity Map) which includes the following 11 Assessor Parcel Numbers (APNs): 1027-241-01, -02; 1027-231-01; 1027-371-01; 1027-381-01, -02; 1056-201-01; 1056-331-01, -06, -07; 1056-341-01. Additionally, the APNs for all five proposed borrow sites, a section of the El Prado Golf Course near the Cypress Channel, and the Mill Creek Wetlands near Borrow Site 4 are as follows:

Borrow Site 1 APNs: 1056-392-02, -03, -04, -05, -06, - 11, -12

Borrow Site 2 APNs: 1057-191-01, -02

Borrow Site 3 APNs: 1057-201-05, - 06, -07, -08

Borrow Site 4 APNs: 1057-212-10

Borrow Site 5 APNs: 1057-181-24

Section of El Prado Golf Course near Cypress Channel APN: 1056-351-02, -01

Mill Creek Wetlands APNs: 1057-212-09, -11

1.3 Scope and Content of the EA

The analyses contained in this EA were conducted based on professional judgment regarding the nature of the Proposed Act and the Corps' standard National Environmental Policy Act (NEPA) practices. The following resources are evaluated in this EA:

1. Biological Resources
2. Air Quality
3. Noise
4. Cultural Resources
5. Earth Resources

6. Water Resources and Hydrology
7. Public Safety (Hazardous Materials and Emergency Response)
8. Recreation
9. Aesthetics
10. Traffic and Circulation
11. Utilities
12. Land Use
13. Socioeconomic and Environmental Justice

These issues are discussed and analyzed in Chapters 3 and 4.

1.3.1 NEPA Scope of Analysis

As part of the NEPA process, the Corps is responsible for establishing the NEPA scope of analysis pursuant to 33 CFR Part 230. The Corps' NEPA scope of analysis encompasses the entire 97-acre Project site, as well as the 5 proposed borrow sites that are part of the proposed Project, which total approximately 265 acres, located in portions of the Prado Dam Flood Control Basin[2]. The Project area is discussed and graphically shown in Chapter 2.

1.3.2 Agency and Public Input

This document is available for public review and comment for a period of thirty (30) days, beginning January 25, 2021 through February 24, 2021. Comments should be mailed to:

U.S. Army Corps of Engineers
Los Angeles District, Planning Division (PDR-N)
Attn: Megan Wong
915 Wilshire Boulevard, Suite 930
Los Angeles, California 90017

and via electronic submission to: Megan.T.Wong@usace.army.mil

If you have questions or would like additional information, please contact Megan Wong, Environmental Coordinator, Ecosystem Planning Section at (213) 448-4517.

1.4 Purpose and Need

In accordance with CEQ regulations, the Purpose and Need section "shall briefly specify the underlying purpose and need to which the agency is responding in proposing alternatives including the proposed action" (40 CFR 1502.13).

The Purpose and Need of the Proposed Action is as follows:

- **Purpose:** issue a license agreement to the Project Applicant for the development of two industrial/warehouse buildings and associated features as part of the proposed Majestic Chino Heritage Project. As part of the proposed Project, the Corps will be granting a new easement for the storm drain proposed on Corps land leased by San Bernardino County Regional Parks within the adjacent El Prado Golf Course, issuing a license to excavate on

[2] The Prado Dam Flood Control Basin was constructed pursuant to the Flood Control Act of June 22, 1936 (Public Law [PL] 74-738), as amended. Dam construction was completed in May 1941. The Dam's primary purpose is flood risk management for the Santa Ana River watershed. The Dam is also operated for water conservation.

Corps owned land adjacent to the Mill Creek Wetlands on Borrow Site 4 to maintain the current drainage pattern (further discussed below), issuing a consent to remove borrow material from the five (5) OCFCD owned Borrow Sites 1-5 within the Prado Dam basin, and a consent to park vehicles below the reservoir height. Additionally, letters of No Objection or Approval will be provided by the Corps to OCFCD for activities conducted within OCFCD-owned properties.

- **Need:** The Project Applicant is proposing to construct two industrial/warehouse buildings within the Prado Basin and the site would need to be elevated above the 566-foot flood inundation elevation.

Exhibit 1.1 – Regional Map

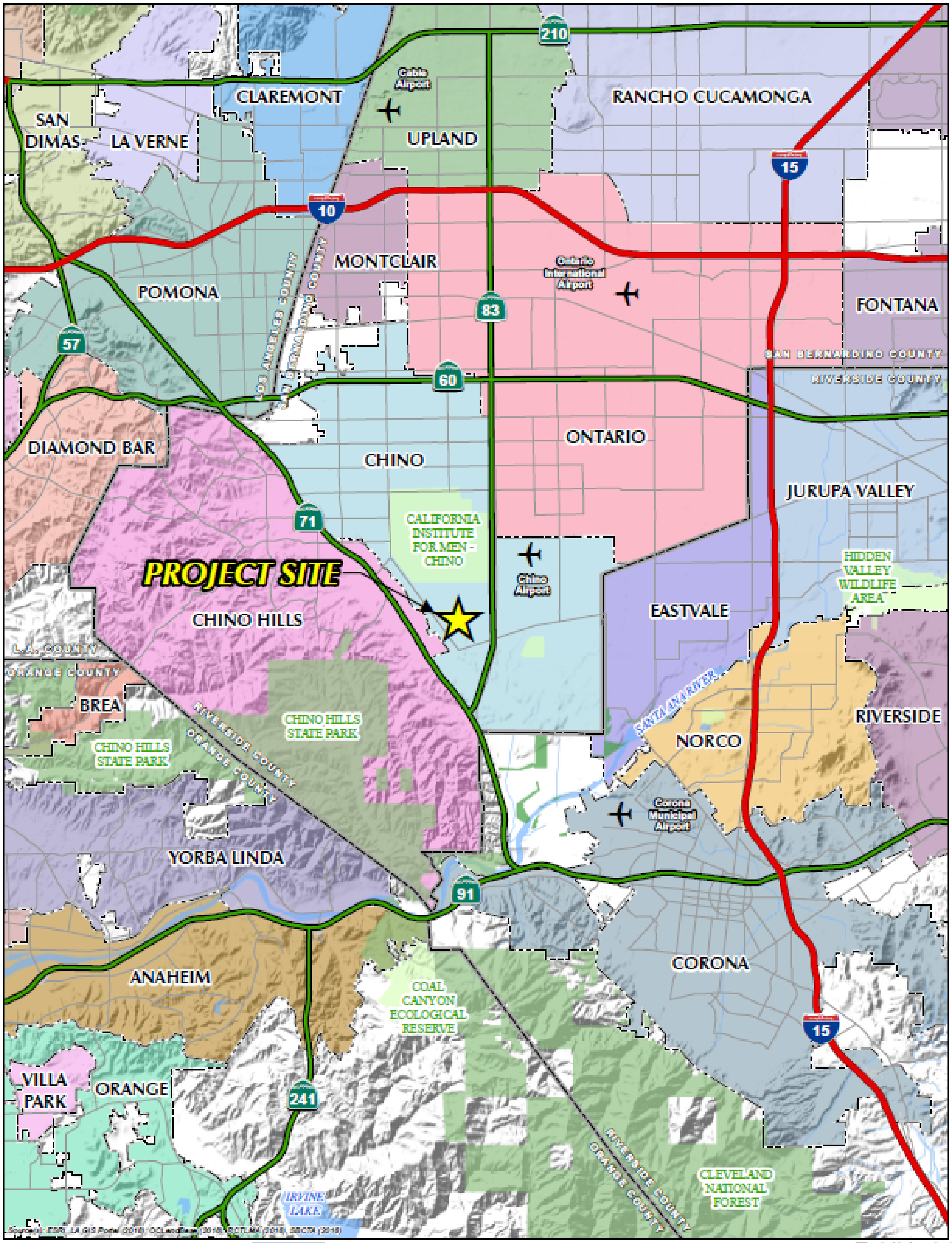


Exhibit 1.1

REGIONAL MAP

Exhibit 1.2 – Vicinity Map

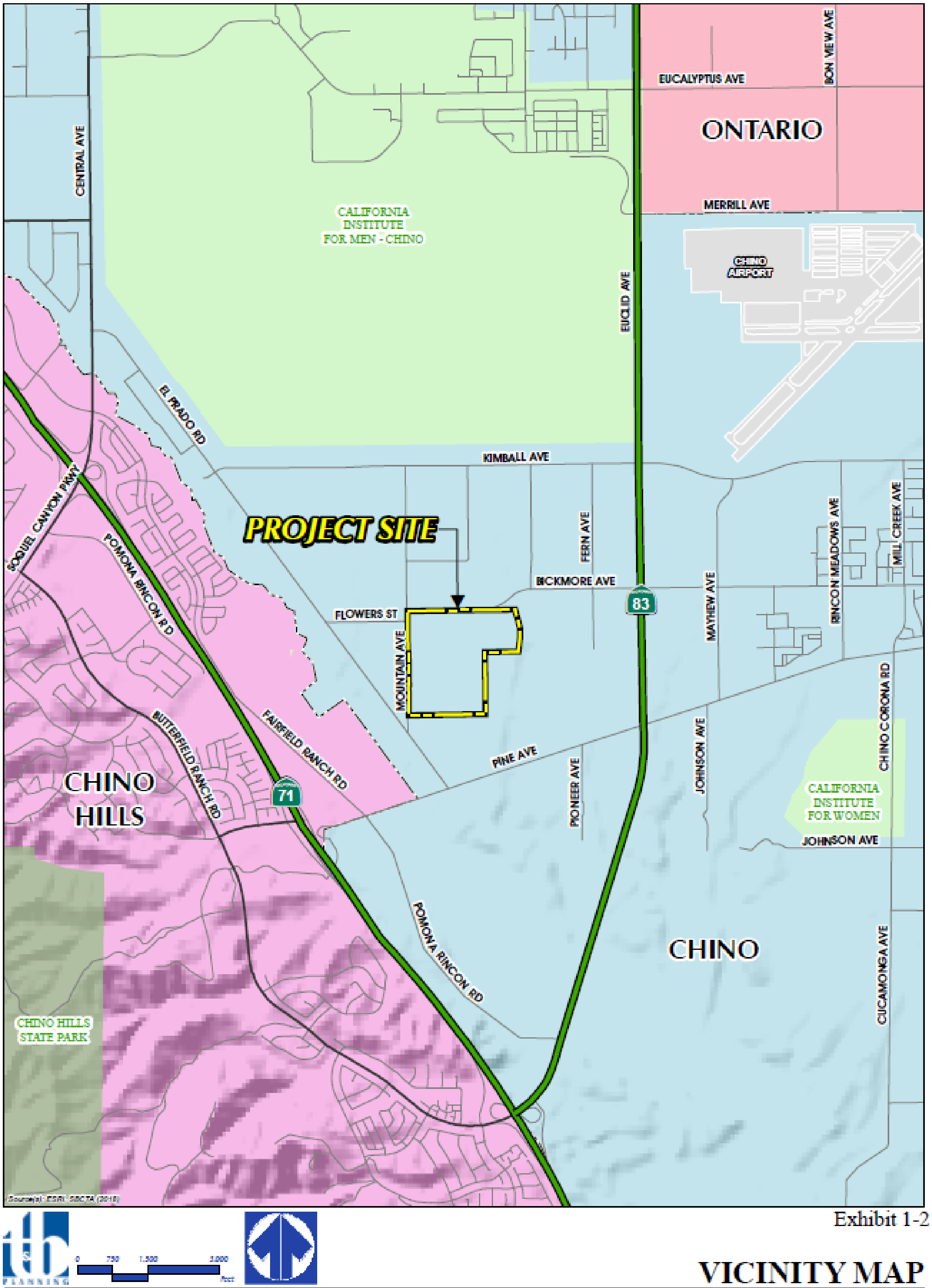


Exhibit 1.3 – Overall Project with Borrow Sites

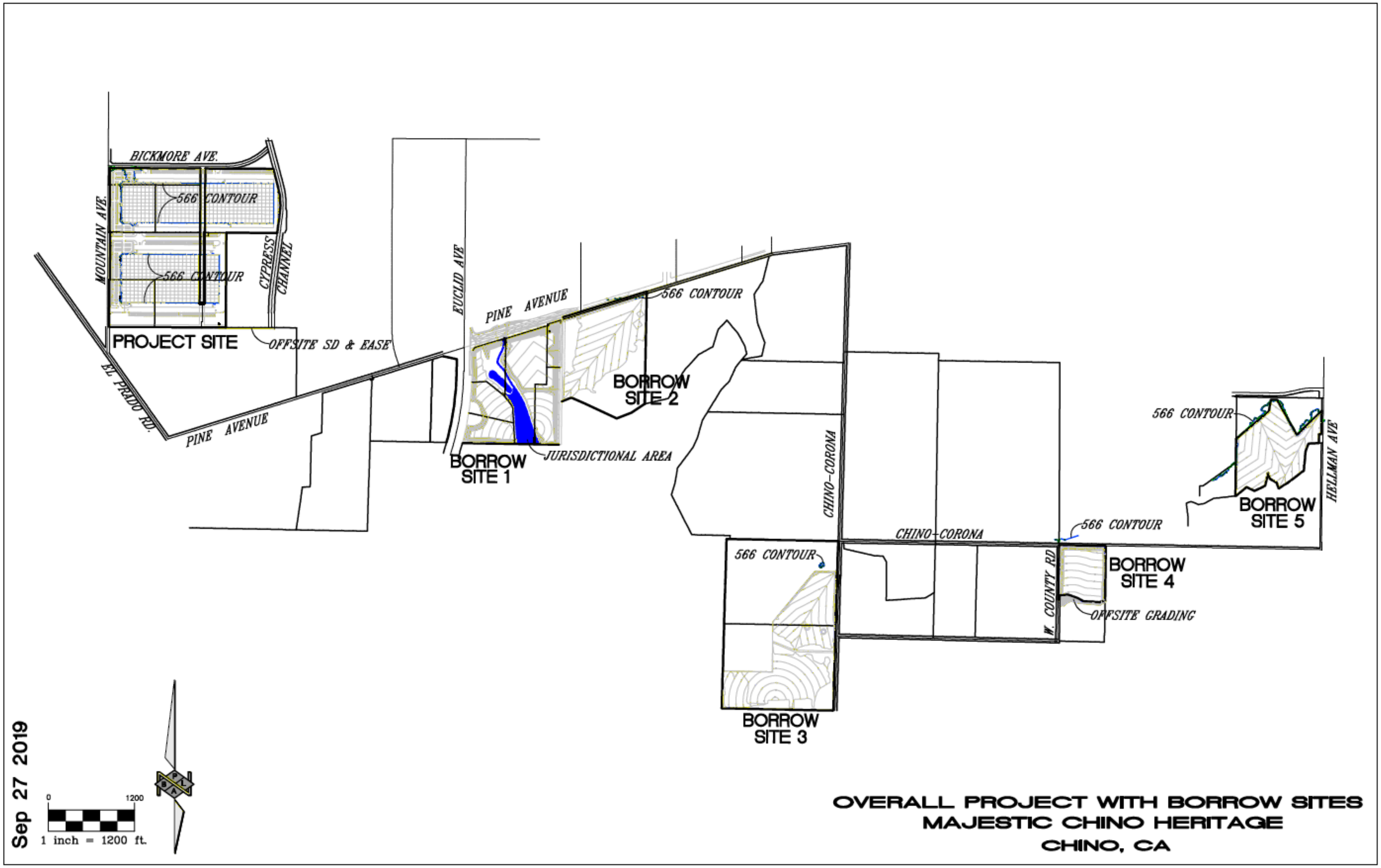


Exhibit 1.4 – Proposed Borrow Sites Locations Map with Acreages

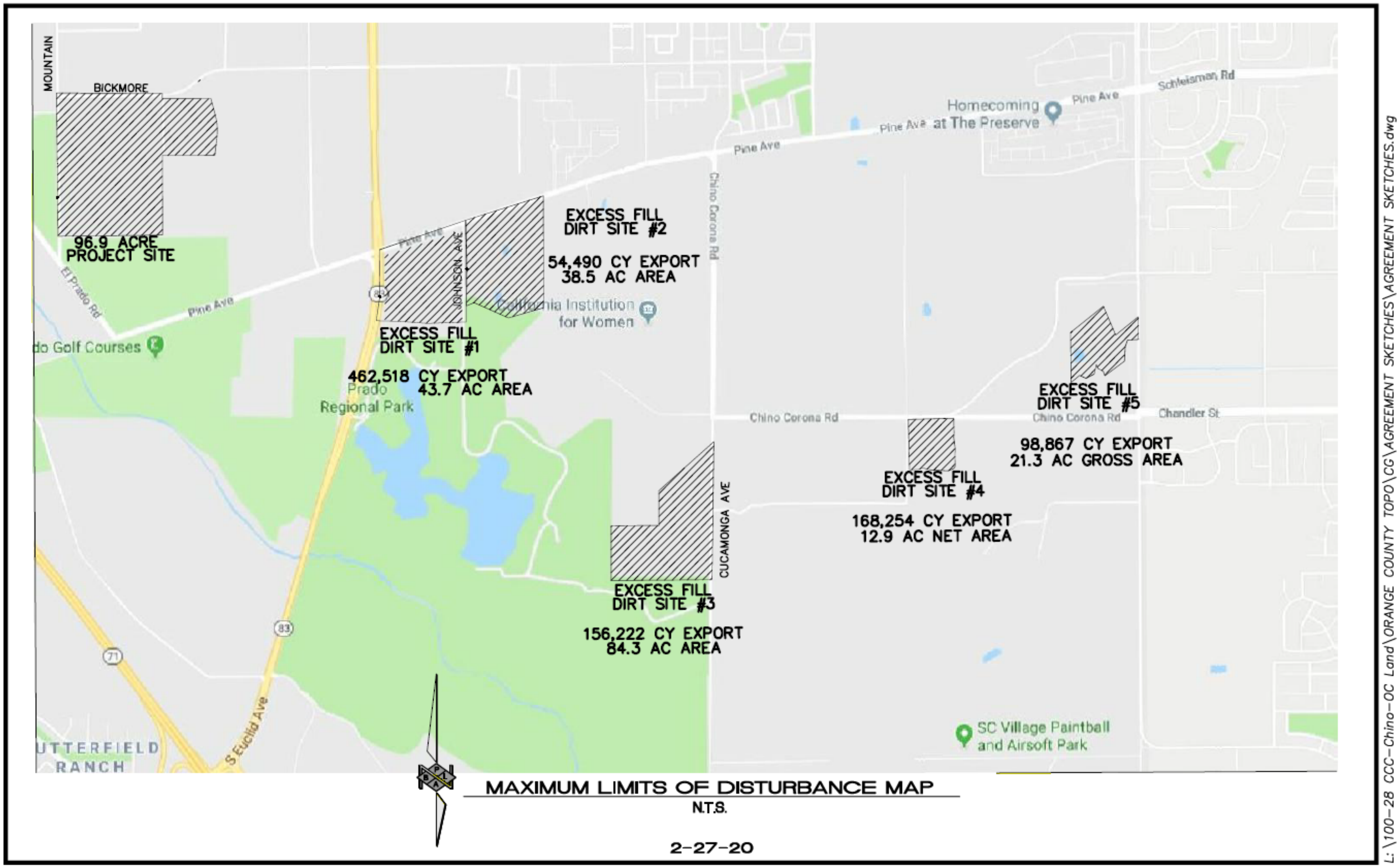
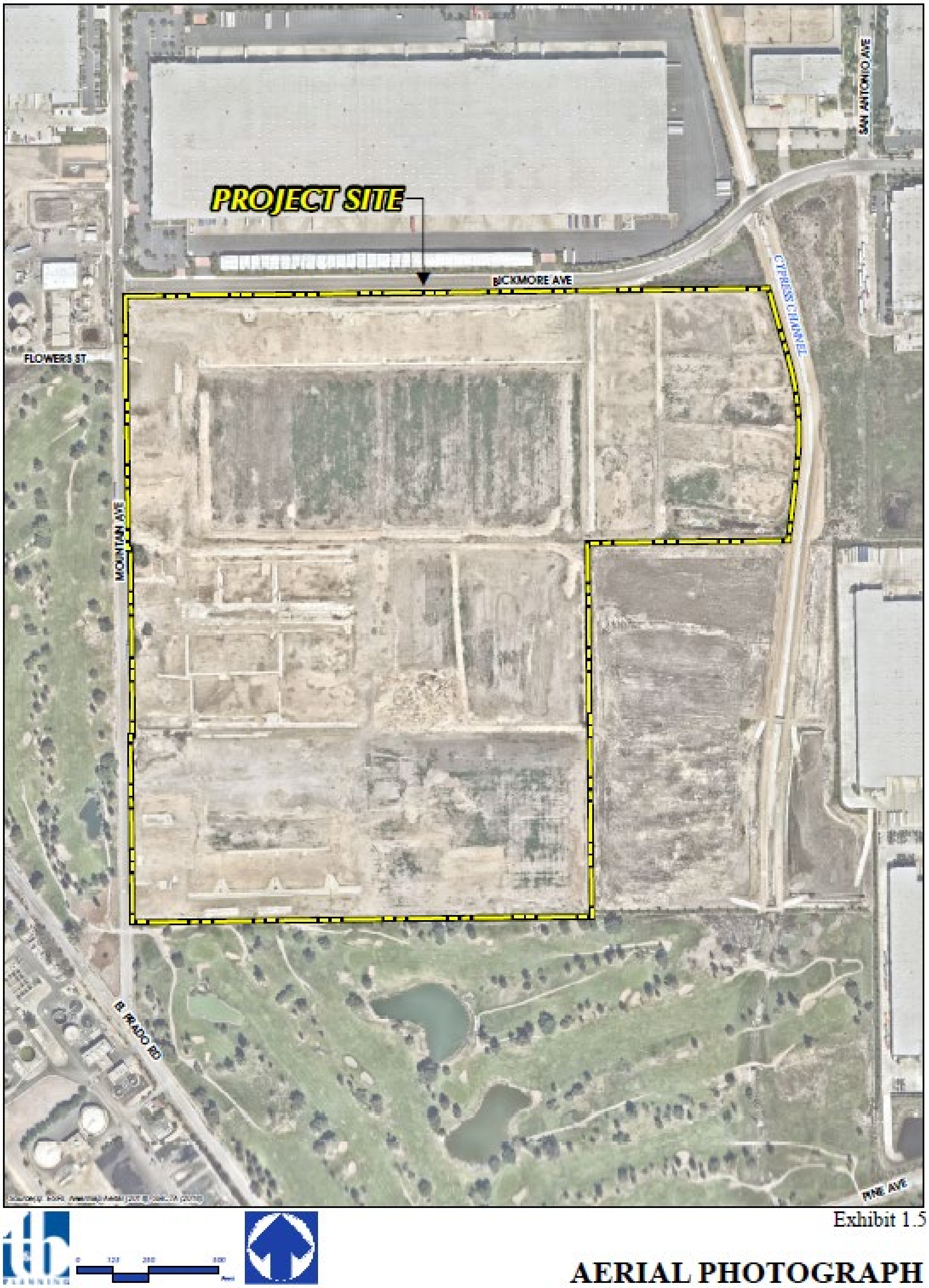


Exhibit 1.5 – Aerial Photo Map



2.0 ALTERNATIVES

Per the Council on Environmental Quality (CEQ) NEPA guidance, only reasonable alternatives should be discussed in detail (40 CFR §1502.14). This document evaluates two alternatives: The No Action Alternative and the Preferred Alternative, as described below.

Alternative 1: No Action Alternative. Alternative 1 is the No Action Alternative and is a no Federal action alternative. Under the No Action Alternative, the Corps would not issue a license agreement and associated requests for the removal of fill from the proposed borrow sites on land owned by OCFCD within the Prado Dam Basin's 566-foot elevation inundation line and the construction of the two industrial/warehouse buildings and associated features would not occur.

Alternative 2: Preferred Alternative/Proposed Project. Alternative 2 is the Proposed Project/Proposed Action. As part of the Proposed Action, the Corps would issue a license agreement to the Project Applicant for the removal of fill from the proposed borrow sites on land owned by OCFCD within the Prado Dam Basin's 566-foot elevation inundation line. Additionally, various construction approvals, easement(s), and consent would be needed from the Corps for the overall proposed development. The Proposed Action would allow the construction and operation of two industrial/warehouse buildings consisting of approximately 1,168,710 square feet (SF) and 914,040 SF, respectively, on an approximately 97-acre Project Site property. Other physical improvements associated with the proposed Project would include elements such as: increased flood inundation capacity, automobile and truck parking areas, vehicle drive aisles, landscaping, a water quality/detention basin, public street and utility infrastructure, exterior lighting, and signage. Further, the proposed Project would implement environmental commitment measures to ensure potential Project impacts are minimized or avoided. These environmental commitment measuresare listed in full in Section 7.0 of this document.

<u>Proposed Project area</u>

Most of the proposed Project area's ground surface elevation is below the 566-foot elevation within the Prado Dam basin. In order to develop the proposed Project as designed, the ground surface elevations of the proposed buildings' footprints would need to be raised above the flood inundation elevation level for Prado Dam while simultaneously lowering the elevations of other sites within the basin area in order to maintain the basin area's overall capacity to hold water that may back up behind the dam during rare, extreme storm events. Accordingly, the proposed Project entails the moving of approximately 608,896 cubic yards (CY) of fill materials from five proposed borrow sites within the basin area to the proposed Project area in order to raise the proposed buildings' footprints above the 566-foot elevation NGVD inundation line and create additional free flow flood water holding capacity at the proposed borrow sites. Long term operations for the proposed Project would include the presence of employees working in the buildings, the transportation of items to and from the buildings, and other typical operations of an industrial building. Maintenance for the proposed Project area would include routine trash pickup, sediment and debris removal from the water quality/detention basin following each storm or deposition of material, and routine maintenance on and around the roadway, buildings and landscaping of the proposed Project area.

<u>Proposed Borrow Sites</u>

The proposed Project requires fill material to raise the proposed building finished floor elevations so that they are at 567 feet elevation. In addition, the dirt that is imported must be from a source location that is currently below the 566-foot elevation so that the net impact of the proposed Project does not adversely impact the existing flood basin capacity below the 566-foot elevation. To accomplish this, the proposed Project has identified five nearby proposed borrow sites that can provide export to be used as import for the proposed Project area while also providing a 566-foot elevation capacity offset simultaneously. These proposed borrow sites along with the proposed Project area are identified on Exhibit 1.4, Proposed Borrow Sites Location Map. A brief description of the proposed borrow sites includes:

- Proposed Borrow Site 1 is an approximately 43.7-acre parcel located at the southeast corner of Euclid Ave and Pine Ave.
- Proposed Borrow Site 2 is an approximately 38.5-acre parcel located at the southeast corner of Johnson Ave and Pine Ave.
- Proposed Borrow Site 3 is an approximately 84.3-acre area located on the west side of Cucamonga Ave. south of the California Institution for Women.
- Proposed Borrow Site 4 is an approximately 12.9-acre parcel located at the southeast corner of Chino Corona Road and Comet Ave.
- Proposed Borrow Site 5 is an approximately 21.3-acre parcel located at the southwest corner of Legacy Park Street and Hellman Ave.

After construction activities are completed, the borrow sites would have native plant hydroseed at the areas of ground disturbance from grading activities.

Proposed Other Features

Moreover, the proposed Project area abuts an off-site concrete flood control channel, Cypress Channel, along a portion of its eastern boundary. Cypress Channel is a San Bernardino County Flood Control District facility which flows in a north to south direction for 2,527 feet. The proposed Project entails the construction of an underground 775 linear feet 48-inch storm drain line that would connect the proposed on-site stormwater drainage facilities (located along the southern edge of the proposed Project area) across the northern edge of the El Prado Golf Course to the Cypress Channel, which is located east of the proposed Project area. This area of improvement is referred to as the Off-Site Storm Drain Improvement, which would require a permanent 40-foot wide easement totaling 0.74 acre that would include that area needed for initial construction, long term operations and maintenance, and emergency repairs. A new outlet would be constructed within the Cypress Channel to receive stormwater runoff discharged via the new storm drain line. Cypress Channel is not a Corps constructed facility; however, the southern area of the concrete Cypress Channel is owned by the Corps as well as the earthen drainage that flows into the El Prado Golf Course to the south. The storm drain connection at the Cypress Channel will be constructed primarily from the west side (back side) of the concrete wing wall on the west side of the Cypress channel. A tarp will be installed above the ‘Ordinary High Water Mark’ (OHWM) on the east face of this concrete wing wall to prevent construction debris from entering into the Cypress Channel during the construction process. Further, access into the channel during the construction process will be limited to workers on foot utilizing hand tools, and no mechanized equipment will be brought into the channel. After construction, the Off-Site Storm Drain Improvement area’s operations and maintenance would include routine maintenance to clear debris from the storm drain area as needed.

Additionally, proposed Borrow Site 4 would require a construction approval from the Corps in order to grade a small area of Corps land adjacent to proposed Borrow Site 4 to maintain the current drainage pattern. This area of Corps land totals approximately 0.97 acre.

Construction

Construction of the proposed Project area would require the import of approximately 608,896 CY of dirt (after shrinkage) from the nearby proposed borrow sites. However, the total export from proposed borrow sites 1, 3, and 4 will be approximately 786,994 CY of dirt due to projected shrinkage. In the event of shrinkage such that additional import is required, proposed Borrow Site 5 is available to provide up to approximately 98,867 CY, followed by the use of import of fill from Borrow Site 2. In addition to the grading considerations above, the quality of the soil at all five proposed borrow sites was examined and found the soil to be of moderate to poor quality. "Moderate Quality" soil is defined as soil with an Expansion Index (EI) less than 80 while "Poor Quality" soil is defined as soil with an EI equal to or greater than 80. There is very little "Good Quality" soil on these sites which would have an EI less than approximately 40. In order to provide proper structural support for the proposed buildings and paving areas, the applicant has developed a strategy with a qualified Geotechnical Engineer that allows the proposed Project to utilize Moderate Quality dirt under the building slab, building footings and paving. The dirt itself would be used in its current condition and would not be processed. During construction, a qualified geotechnical engineer would analyze the quality of the dirt and determine the use of the dirt based on the quality assessed. This strategy involves grading the site in such a manner to have a minimum of four feet of Moderate Quality dirt under the building footings and building slab and a minimum of two feet of Moderate Quality dirt under the paving areas.

The grading operations for the proposed Project area as well as the various proposed borrow sites would not need any specific comprehensive traffic control plans or measures. The haul routes from the proposed borrow sites to the proposed Project area would be along streets within the City and nearby highways with no need for special provisions. The widening of Mountain Avenue (and Bickmore Avenue, as applicable) along the Project area frontage would require some form of traffic control to construct the proposed improvements such as stop signs at the egress areas of the proposed Project area. A Traffic Control Plan would be developed during the finalization of the engineering plans for the public road improvements.

Employee trips are estimated based on the number of employees anticipated throughout the various stages of construction. The number of employees on-site would vary depending on the phase of construction but would range from up to 18 employees during grading activities and up to 890 employees during building construction. Each employee is assumed to drive to and from the construction site each day. It has been assumed that employees would arrive up to 30 minutes prior to the workday and would leave up to 30 minutes after the workday ends.

It is anticipated that the majority of employees would arrive and depart from the site between 5:00 PM and 6:00 PM for nighttime hauling or between 6:00 AM and 7:00 AM for daytime hauling. Employee trips are based on the number of employees estimated to be on site during different points throughout construction of the proposed Project. Initially, parking for employees and company-owned vehicles can be accommodated near the construction staging area of the Project area. Once the on-site roadway network is constructed, employee parking can be accommodated on the Project area.

It is estimated that approximately 522-600 haul truck loads would be required per day for the duration of the soil import activities. Each truck would generate one inbound and one outbound trip, accounting for a total of two truck trips per load of material imported. Thus, a total of approximately 1,044 to 1,200 haul trucks (two-way) per day would be generated, which translates to approximately 131-150 haul trips (two-way) per hour, which are anticipated to occur outside of the AM and PM peak periods. In the event that soil hauling activity is to occur during AM or PM peak periods, hauling activity should be limited to no more than 16 trucks trips per hour (8 trucks in and 8 trucks out) during the hours of 6:00 AM to 9:00 AM and 3:00 PM to 6:00 PM to ensure that haul activity would not significantly impact the intersections along the haul route.

The import activities from the proposed borrow sites would not overlap with another but will occur sequentially (i.e., hauling activity at one site is independent from other sites). Soil import activities could occur during typical construction daytime (7:00 AM – 3:00 PM) or off-peak/nighttime (6:00 PM – 2:00 AM) hours. The off-road construction equipment is also not anticipated to operate for more than 8 hours per day.

Equipment

Heavy equipment to be utilized on site during construction includes, but is not limited to: flat beds, dozers, scrapers, graders, track hoes, dump trucks, forklifts, cranes, cement trucks, pavers, rollers, water trucks, rolling container trucks and bobcats. Heavy equipment would be delivered and removed from the site throughout the construction phase. As most heavy equipment is typically not authorized to operate on a public roadway, most of the equipment would be delivered and removed from the site via large flatbed trucks. It is anticipated that delivery of heavy equipment would not occur on a daily basis, but rather periodically throughout the construction phase based on need.

The delivery and removal of heavy equipment is anticipated to occur outside of the morning and evening peak hours in order to have nominal impacts to traffic and circulation near the vicinity of the proposed Project. In order to minimize the impact of the flatbed truck traffic to the surrounding roadway network, it is anticipated that these delivery trucks utilize the most direct route between the proposed Project and the SR-71 Freeway via Euclid Avenue (SR-83). It is anticipated that traffic impacts associated with the delivery and removal of heavy equipment would be less than significant and would be temporary. All proposed Project access points are assumed to allow full access. Regional access to the proposed Project Site is provided via the SR-60 Freeway and the SR-71 Freeway. Roadway improvements necessary to provide site access and on-site circulation are assumed to be constructed in conjunction with site development.

Site Preparation

Prior to grading, the proposed Project area and borrow sites would be cleared of trash, debris, and any remaining foundations or pavements.

Construction Duration

Construction is planned to last approximately 18-24 months beginning in the spring/summer of 2021.

Staging Area

Staging areas would be located at the proposed Project area as well as each borrow site when grading activities are occurring on one of the borrow sites. As mentioned above, no soil would need to be processed at the borrow sites.

Access Routes/Roads

The haul routes to be used from the borrow sites to the proposed Project area would be:

- Borrow Site 1: Pine Avenue to El Prado Road to Mountain Avenue.
- Borrow Site 2: Pine Avenue to El Prado Road to Mountain Avenue.
- Borrow Site 3: Cucamonga Avenue/Chino Corona Road to Pine Avenue to El Prado Road to Mountain Avenue.
- Borrow Site 4: Chino Corona Road to Chino Corona Road to Pine Avenue to El Prado Road to Mountain Avenue.
- Borrow Site 5: Hellman Avenue to Pine Avenue to El Prado Road to Mountain Avenue.

Utilities

The proposed Project would include installation of new utility service facilities as necessary to serve the proposed Project area but would not require new utility service facilities at the proposed borrow sites and the proposed Other Features. The proposed Project area would result in operational consumption of natural gas and electricity. Natural gas would be supplied to the proposed Project area by Southern California Gas Company and electricity would be supplied to the proposed Project area by Southern California Edison.

In regard to water and sewage, conveyance services are provided to the Project area by the City of Chino. Under existing conditions, water lines are installed beneath Bickmore Avenue and Mountain Avenue, and a sewer line is installed beneath Mountain Avenue. In the proposed Project area, the City of Chino conveys wastewater flows to the Inland Empire Utility Agency (IEUA) for treatment at Regional Water Recycling Plant No. 5 (RP-5), which is located immediately northwest of the proposed Project area. Solid waste from the proposed Project area is expected to be disposed at the El Sobrante Landfill.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Biological Resources

3.1.1 Affected Environment

Historically, the proposed Project area and proposed borrow sites were used for livestock farming and dairy operation, with some remnants of building foundations remaining within portions of each site. Each site has been heavily disturbed as part of ongoing agriculture and ranching uses for several decades. Due to the highly disturbed conditions of the sites, vegetation present is relatively sparse and reflects ornamental plantings or spontaneous, herb dominated species strongly adapted to human disturbances. A general description of the proposed Project area and each of the proposed borrow sites and proposed Other Features is listed below. Acreages listed below have been rounded to one decimal place to remain consistent with Exhibit 1.4 while reference acreages listed in the proposed Project's Biological Technical Report (Appendix A) are rounded to two decimal places.

Proposed Project area

The proposed Project area totals approximately 97 acres. The surrounding landscape consists of developed industrial areas to the north, northwest, and east, and an existing golf course to the south and west. The proposed Project area is slightly sloped from north to southeast, with elevations ranging from 558 feet above mean sea level (AMSL) to 536 feet AMSL, respectively. The proposed Project area abuts Cypress Channel, a concrete flood control channel, along a portion of its eastern boundary. Cypress Channel is a San Bernardino Flood Control District facility, which flows in a north to south direction for 2,527 feet. The soils mapped on the proposed Project area are Chino Silt Loam, Chualar Clay Loam, 0 to 2 Percent Slopes, and Chualar Clay Loam, 2 to 9 Percent Slopes (Exhibit 3.1 – Soils Map).

Proposed Borrow Sites

Proposed Borrow Site 1

Proposed Borrow Site 1 totals approximately 43.7 acres. The surrounding landscape consists of developed industrial areas to the northwest, an existing golf course to the west across Euclid Avenue, ranching operations to the north and east, and undeveloped park land in the Prado Basin to the south. The site is generally sloped from north to south, with elevations ranging from 561 feet AMSL to 521 feet AMSL, respectively. Proposed Borrow Site 1 contains a drainage course supporting wetland and riparian habitat, which flows in a north to south direction for 1,645 feet. The soils mapped in proposed Borrow Site 1 are Chino Silt Loam, Chualar Clay Loam, 2 to 9 Percent Slopes, Chualar Clay Loam, 9 to 15 Percent Slopes, and Grangeville Fine Sandy Loam (Exhibit 3.1 – Soils Map).

Proposed Borrow Site 2

Proposed Borrow Site 2 totals approximately 38.5 acres. The surrounding landscape consists of ranching operations to the north and east, undeveloped land and the Prado Basin to the west and south, and a correctional facility to the east. The site is generally sloped from northeast to southwest, with elevations ranging from 569 feet ASML to 548 feet AMSL, respectively. Proposed Borrow Site 2 does not contain a drainage course; only a roadside ditch and former waste treatment facilities are present. The soil mapped in proposed Borrow Site 2 is Chino Silt Loam (Exhibit 3.1 – Soils Map).

Proposed Borrow Site 3

Proposed Borrow Site 3 totals approximately 84.3 acres. The surrounding landscape consists of Prado Basin to the south, Prado Basin and a recreational vehicle campground to the west, a ranching operation to the east, and a correctional facility to the north. The site is generally sloped from northeast to south/southwest, with elevations ranging from 563 feet AMSL to 543 feet AMSL, respectively. Proposed Borrow Site 3 contains no drainages; only former waste treatment facilities are present. The soils mapped in proposed Borrow Site 3 are Chualar Clay Loam, 0 to 2 Percent Slopes and Chualar Clay Loam, 2 to 9 Percent Slopes (Exhibit 3.1 – Soils Map).

Proposed Borrow Site 4

Proposed Borrow Site 4 totals approximately 12.9 acres. The surrounding landscape consists of ranching operations to the north and west, and undeveloped land associated with the Mill Creek Wetlands to the south and east. The site is generally sloped from north to south, with elevations ranging from 564 feet AMSL to 544 feet AMSL, respectively. Proposed Borrow Site 4 does not contain a drainage course. The soils mapped in proposed Borrow Site 4 are Chualar Clay Loam, 0 to 2 Percent Slopes, Chualar Clay Loam, 2 to 9 Percent Slopes, and Chualar Clay Loam, 9 to 15 Percent Slopes (Exhibit 3.1 – Soils Map).

Proposed Borrow Site 5

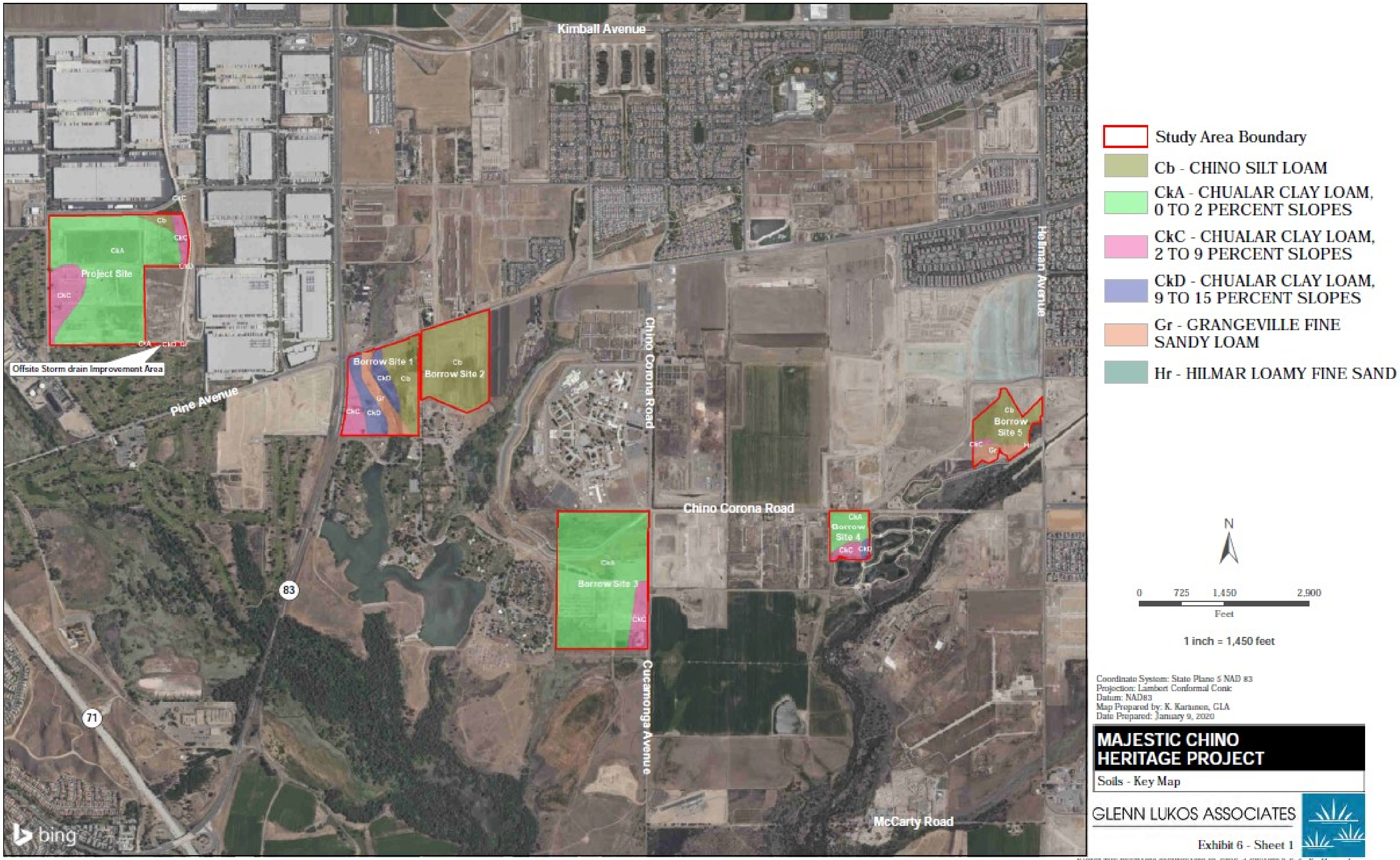
Proposed Borrow Site 5 totals approximately 21.3 acres. The surrounding landscape consists of ranching operations to the north and east, undeveloped land and the Prado Basin to the west and south. The site is generally sloped from northeast to southwest, with elevations ranging from 569 feet AMSL to 550 feet AMSL, respectively. Proposed Borrow Site 5 does not contain a drainage course; only former waste treatment facilities are present. The soils mapped in Proposed Borrow Site 5 are Chino Silt Loam, Chualar Clay Loam, 2 to 9 Percent Slopes, and Grangeville Fine Sandy Loam (Exhibit 3.1 – Soils Map).

<u>Proposed Other Features</u>

Proposed Off-Site Storm Drain Improvement Area

The proposed Off-Site Storm Drain Improvement area totals approximately 0.34 acre. This area is bordered by the proposed Project area to the north, the El Prado Golf Course to the south and west, and industrial uses to the east. Additionally, the proposed Off-Site Storm Drain Improvement area includes a small portion of Cypress Channel that is concrete lined. This portion of Cypress Channel is included within the Off-Site Storm Drain Improvement area because the storm drain will terminate within the concrete headwall structure of Cypress Channel. Cypress Channel is a San Bernardino Flood Control District facility which flows in a north to south direction immediately east of the proposed Project area. This area is referred to as the Off-Site Storm Drain Improvement area. The soils mapped on these sites are Grangeville Fine Sandy Loam, Chualar Clay Loam, 0 to 2 Percent Slopes, Chualar Clay Loam, 2 to 9 Percent Slopes, and Chualar Clay Loam, 9 to 15 Percent Slopes (Exhibit 3.1 – Soils Map).

Exhibit 3.1 – Soil Map



3.1.1.1 Vegetation

Proposed Project area

During vegetation mapping of the proposed Project area, one vegetation/land use type was identified. Table 3.1-1 provides a summary of vegetation/land uses and the corresponding acreage. Detailed descriptions of each vegetation type follow the table and Exhibit 3.2 (below) depicting the Vegetation Map. Site photographs depicting site conditions and various vegetation types at the proposed Project area are included in Appendix A (Biological Technical Report).

Table 3.1-1. Summary of Vegetation/Land Use Types for the Proposed Project area

Vegetation Type/ Land Use Type	Acreage
Ruderal/Disturbed	96.9
TOTAL	96.9

Ruderal/Disturbed. Approximately 97 acres of the proposed Project area consist of ruderal/disturbed habitat. Vegetation within the proposed Project area consists of Aleppo pine (*Pinus halepensis*), ash (*Fraxinus sp*), Bermuda grass (*Cynodon dactylon*), black willow (*Salix gooddingii*), blue elderberry (*Sambucus nigra ssp. Caerulea*), chaparral yucca (*Hesperoyucca whipplei*), cheeseweed mallow (*Malva parviflora*), clover (*Trifolium sp*), common dandelion (*Taraxacum officinale*), common fiddleneck (*Amsinckia intermedia*), common Mediterranean grass (*Schismus barbatus*), common sunflower (*Helianthus annuus*), curly dock (*Rumex crispus*), desert brittlebush (*Encelia farinosa*), dwarf nettle (*Urtica urens*), field bindweed (*Convolvulus arvensis*), foxtail barley (*Hordeum murinum*), golden crownbeard (*Verbesina enceliodes*), lamb's quarters (*Chenopodium album*), London rocket (*Sisymbrium irio*), Mexican fan palm (*Washingtonia robusta*), milk thistle (*Silybum marianum*), millet (*Eleusine sp.*), mission cactus (*Opuntia ficus-indica*), Peruvian pepper tree (*Schinus molle*), prostrate knotweed (*Polygonum aviculare*), red brome (*Bromus madritensis*), red stemmed filaree (*Erodium cicutarium*), Russian thistle (*Salsola tragus*), salt cedar (*Tamarix ramosissima*), silver puffs (*Uropappus lindleyi*), southern cattail (*Typha domingensis*), spiny sowthistle (*Sonchus asper*), summer mustard (*Hirschfeldia incana*), tree tobacco (*Nicotiana glauca*), western ragweed (*Ambrosia psilostachya*), and white horehound (*Marrubium vulgare*). Since the time of the September 2019 Biological Technical Report, a majority of the non-native trees were removed from the proposed Project area and the site has been disked.

Proposed Borrow Sites

Proposed Borrow Site 1

During vegetation mapping of proposed Borrow Site 1, three vegetation types were identified. Table 3.1-2 provides a summary of vegetation/land uses and the corresponding acreage. Detailed descriptions of each vegetation type follow the table. A Vegetation Map (Exhibit 3.2) is included below and Site photographs depicting the conditions and various vegetation types at proposed Borrow Site 1 are included in Appendix A (Biological Technical Report).

Table 3.1-2. Summary of Vegetation/Land Use Types for Proposed Borrow Site 1

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	39.05
Freshwater Marsh/Disturbed Freshwater Marsh	4.46
Southern Willow Scrub	0.16
TOTAL	43.7

Ruderal/Disturbed. Approximately 39.05 acres of land consists of ruderal/disturbed habitat within proposed Borrow Site 1. Vegetation consists of jimson weed (*Datura wrightii*), mulefat (*Baccharis salicifolia*), common sunflower (*Helianthus annuus*), Canada horseweed (*Erigeron canadensis*), nightshade (*Solanum sp.*), Russian thistle (*Salsola tragus*), nettle leaf goosefoot (*Chenopodium murale*), tumbleweed (*Amaranthus albus*), cheeseweed mallow (*Malva parviflora*), prickly lettuce (*Lactuca serriola*), milk thistle (*Silybum marianum*), London rocket (*Sisymbrium irio*), Bermuda grass (*Cynodon dactylon*), red stemmed filaree (*Erodium cicutarium*), prostrate knotweed (*Polygonum aviculare*), tree of heaven (*Ailanthus altissima*), Mexican fan palm (*Washingtonia robusta*), common Mediterranean grass (*Schismus barbatus*), goldentop grass (*Lamarckia aurea*), annual stinging nettle (*Urtica urens*), tree tobacco (*Nicotiana glauca*), mission cactus (*Opuntia ficus-indica*), creeping bentgrass (*Agrostic gigantea*) agave (*Agave attenuata*), and perennial pepperweed (*Lepidium latifolium*).

Freshwater Marsh/Disturbed Freshwater Marsh. Approximately 4.46 acres of land consist of freshwater marsh and disturbed freshwater marsh habitat within proposed Borrow Site 1. Vegetation consists of southern cattail (*Typha domingensis*), yerba mansa (*Anemopsis californica*), Canada horseweed (*Erigeron canadensis*), Mexican sprangletop grass (*Leptochloa fusca ssp. Uninervia*), common sunflower (*Helianthus annuus*), salt marsh sand spurry (*Spergularia marina*), common knotweed (*Persicaria lapathifolia*), nettle leaf goosefoot (*Chenopodium murale*), flax-leaved horseweed (Erigeron bonariensis), summer mustard (Hirschfeldia incana), wild radish (*Raphanus sativus*), cheeseweed mallow (*Malva parviflora*), rabbitsfoot grass (*Polypogon monspeliensis*) spiny sowthistle (*Sonchus asper*), sweet clover (*Melilotus sp.*), London rocket (*Sisymbrium irio*), Bermuda grass (*Cynodon dactylon*), tree tobacco (*Nicotiana glauca*), Mexican fan palm (*Washingtonia robusta*), golden crownbeard (*Verbesina encelioides*), and perennial pepperweed (*Lepidium latifolium*).

Southern Willow Scrub. Approximately 0.16 acre of land consists of southern willow scrub habitat within proposed Borrow Site 1. Vegetation consists of black willow (*Salix gooddingii*) and salt cedar (*Tamarix ramosissima*).

Proposed Borrow Site 2

During vegetation mapping of proposed Borrow Site 2, one vegetation type was identified. Table 3.1-3 provides a summary of vegetation/land uses and the corresponding acreage. Detailed descriptions of each vegetation type follow the table and a Vegetation Map (Exhibit 3.2) is included below.

Table 3.1-3. Summary of Vegetation/Land Use Types for Proposed Borrow Site 2

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	38.51
TOTAL	**38.5**

Ruderal/Disturbed. All 38.5 acres of proposed Borrow Site 2 consist of ruderal/disturbed habitat. Vegetation within proposed Borrow Site 2 consists of Chinese parsley (*Heliotropium curassavicum*), telegraph weed (*Heterotheca grandiflora*), Russian thistle (*Salsola tragus*), spiny sowthistle (*Sonchus asper*), nettle leaf goosefoot (*Chenopodium murale*), cheeseweed mallow (*Malva parviflora*), Italian rye grass (*Festuca perennis*), poison hemlock (*Conium maculatum*), prickly lettuce (*Lactuca serriola*), London rocket (*Sisymbrium irio*), flax-leaved horseweed (*Erigeron bonariensis*), Bermuda grass (*Cynodon dactylon*), bull thistle (*Cirsium vulgare*), bristly ox-tongue (*Helminthotheca echioides*), prostrate knotweed (*Polygonum aviculare*), shamel ash (*Fraxinus uhdei*), field bindweed (*Convolvulus arvensis*), curly dock (*Rumex crispus*), sweet clover (*Melilotus sp.*), and Asian ponyfoot (*Dichondra micrantha*).

Proposed Borrow Site 3

During vegetation mapping of the proposed Borrow Site 3, one vegetation type was identified. Table 3.1-4 provides a summary of vegetation/land uses and the corresponding acreage. Detailed descriptions of each vegetation type follow the table. A Vegetation Map (Exhibit 3.2) is included below and Site photographs depicting the conditions and various vegetation types at proposed Borrow Site 3 are included in Appendix A (Biological Technical Report).

Table 3.1-4. Summary of Vegetation/Land Use Types for Proposed Borrow Site 3

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	84.25
TOTAL	**84.3**

Ruderal/Disturbed. All 84.3 acres of proposed Borrow Site 3 consist of ruderal/disturbed habitat. Vegetation within proposed Borrow Site 3 consists of Mexican fireweed (*Bassia scoparia*), five-hook bassia (*Bassia hyssopifolia*), prickly lettuce (*Lactuca serriola*), Russian thistle (*Salsola tragus*), soft chess (*Bromus tectorum*), wild oat (*Avena fatua*), goldentop grass (*Lamarkia aurea*), sunflower (*Heliantus annuus*), cheeseweed mallow (*Malva parviflora*), coyote brush (*Baccharis pilularis*), London rocket (*Sisymbrium irio*), Italian thistle (*Carduus sp.*), Bermuda grass (*Cynodon dactylon*), tumbleweed (*Amaranthus albus*), prickly sow-thistle (*Sonchus asper*), rabbitsfoot grass (*Polypogon monspeliensis*), common knotgrass (*Polygonum aviculare*), Australian saltbush (*Atriplex semibaccata*), big saltbush (*Atriplex lentiformis*), purple needlegrass (*Stipa pulchra*), salt heliotrope (*Heliotropium curassavicum*), Italian rye grass (*Festuca perennis*), wall barley (*Hordeum marinum*), pigweed (*Chenopodium album*), London rocket (*Sysimbrium irio*), Mediterranean grass (*Schismus barbatus*), perennial pepperweed (*Lepidium latifolium*), milk thistle (*Silybum marianum*), golden crownbeard (*Verbesina encelioides*), and California brittlebrush (*Encilia californica*).

Proposed Borrow Site 4

During vegetation mapping of proposed Borrow Site 4, two vegetation types were identified. Table 3.1-5 provides a summary of vegetation/land uses and the corresponding acreage. Detailed descriptions of each vegetation type follow the table. A Vegetation Map (Exhibit 3.2) is included below and Site photographs depicting the conditions and various vegetation types at proposed Borrow Site 4 are included in Appendix A (Biological Technical Report).

Table 3.1-5. Summary of Vegetation/Land Use Types for Proposed Borrow Site 4

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	11.83
Coastal Sage Scrub	1.09
TOTAL	12.9

Ruderal/Disturbed. Approximately 11.83 acres of proposed Borrow Site 4 consist of ruderal/disturbed habitat. Vegetation within Borrow Site 4 consists of coyote brush (*Baccharis pilularis*), coast goldenbush (*Isocoma menziesii*), common sunflower (*Helianthus annuus*), toyon (*Heteromeles arbutifolia*), lemonadeberry (*Rhus integrifolia*), creeping wild rye (*Elymus triticoides*), laurel sumac (*Malosma laurina*), deergrass (*Muhlenbergia rigens*), California sagebrush (*Artemisia californica*), Spanish lotus (*Acmispon americanus*), brittlebush (*Encelia farinosa*), mulefat (*Baccharis salicifolia*), saltgrass (*Distichlis spicata*), cheeseweed mallow (*Malva parviflora*), curly dock (*Rumex crispus*), Russian thistle (*Salsola tragus*), nettle leaf goosefoot (*Chenopodium murale*), London rocket (*Sisymbrium irio*), flax-leaved horseweed (*Erigeron bonariensis*), tumbleweed (*Amaranthus albus*), common red sage (*Kochia scoparia*), annual stinging nettle (*Urtica urens*), prickly lettuce (*Lactuca serriola*), Peruvian pepper tree (*Schinus molle*), Mexican fan palm (*Washingtonia robusta*), and Bermuda grass (*Cynodon dactylon*).

Coastal Sage Scrub. Approximately 1.09 acres along the southern and eastern boundaries of proposed Borrow Site 4 consist of a coastal sage scrub (CSS) vegetation community. This area is part of a native restoration effort and is dominated with native species including coast goldenbush (*Isocoma menziesii*), California sagebrush (*Artemisia californica*), golden crownbeard (*Verbesina encelioides*), California brittlebush (*Encelia californica*), and coyote brush (*Baccharis pilularis*). Scattered trees also occur throughout this area including toyon (*Heteromeles arbutifolia*), lemonade berry (*Rhus integrifolia*), laurel sumac (*Malosma laurina*), and coast live oak (*Quercus agrifolia*).

Proposed Borrow Site 5

During vegetation mapping of the proposed Borrow Site 5, one vegetation type was identified. Table 3.1-6 provides a summary of vegetation/land uses and the corresponding acreage. Detailed descriptions of each vegetation type follow the table. A Vegetation Map (Exhibit 3.2) is included below and site photographs depicting the conditions and various vegetation types at proposed Borrow Site 1 are included in Appendix A (Biological Technical Report).

Table 3.1-6. Summary of Vegetation/Land Use Types for Proposed Borrow Site 5

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	21.28
TOTAL	21.3

Ruderal/Disturbed. All 21.3 acres of proposed Borrow Site 5 consist of ruderal/disturbed habitat. Vegetation within Borrow Site 5 consists of common sunflower (*Helianthus annuus*), Russian thistle (*Salsola tragus*), common red sage (*Kochia scoparia*), spiny sowthistle (*Sonchus asper*), nettle leaf goosefoot (Chenopodium murale), cheeseweed mallow (Malva parviflora), foxtail barley (Hordeum *murinum*), prickly lettuce (*Lactuca serriola*), London rocket (*Sisymbrium irio*), milk thistle (*Silybum marianum*), flax-leaved horseweed (*Erigeron bonariensis*), Bermuda grass (*Cynodon dactylon*), and annual stinging nettle (*Urtica urens*).

Proposed Other Features

Off-Site Storm Drain Improvement Area

During vegetation mapping of the proposed Off-Site Storm Drain Improvement area, two vegetation types were identified. Table 3.1-7 provides a summary of vegetation/land uses and the corresponding acreage. Detailed descriptions of each vegetation type follow the table. A Vegetation Map (Exhibit 3.2) is included below and Site photographs depicting the conditions and various vegetation types at proposed Borrow Site 1 are included in Appendix A (Biological Technical Report).

Table 3.1-7. Summary of Vegetation/Land Use Types for Proposed Off-Site Storm Drain Improvement Area

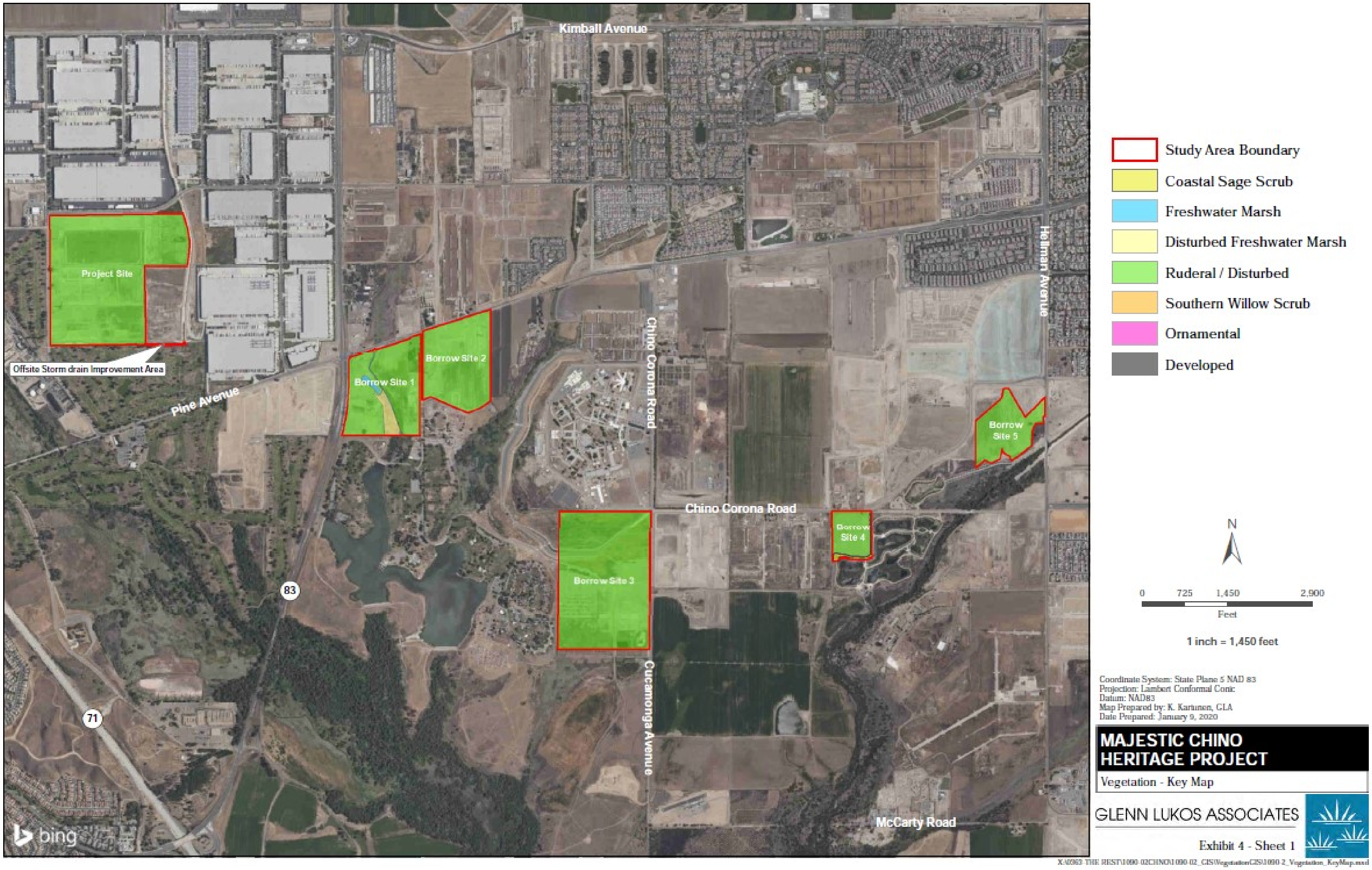
VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ornamental	0.30
Developed	0.03
Ruderal/Disturbed	0.01
TOTAL	0.34

Ornamental. Approximately 0.30 acre of the Off-Site Storm Drain Improvement area consists of ornamental habitat. Vegetation within the area appears to be maintained and ornamentally planted species dominated by coyote brush (*Baccharis pilularis*), with a few planted ornamental pines (Pinus sp.) and oak (Quercus sp.). Other species identified include salt cedar (*Tamarix ramosissima*), milk thistle (*Silybum marianum*), morning glory (*Ipomoea sp.*), and black nightshade (*Solanum americanum*).

Developed. Approximately 0.03 acres are considered developed and consists of an earthen road over Cypress Channel and a concrete headwall structure (headwall, wingwalls, and bottom) conveying the channel beneath the earthen road.

Ruderal/Disturbed. Approximately 0.01 acre of ruderal/disturbed habitat occurs east of the concrete headwall of Cypress Channel. Vegetation consists of foxtail barley (*Hordeum murinum*), London rocket (*Sisymbrium irio*), red stemmed filaree (*Erodium cicutarium*), and Russian thistle (*Salsola tragus*).

Exhibit 3.2 – Vegetation Map



3.1.1.2 Special-Status Vegetation Communities

The California Natural Diversity Data Base (CNDDB) identifies the following 11 special-status vegetation communities for the Black Star Canyon, Corona North, Corona South, Guasti, Ontario, Orange, Prado Dam, San Dimas, and Yorba Linda quadrangle maps: Southern California Arroyo Chub/Santa Ana Sucker Stream, Riversidian Alluvial Fan Sage Scrub, Southern Riparian Forest, Southern Coast Live Oak Riparian Forest, Southern Cottonwood Willow Riparian Forest, Southern Sycamore Alder Riparian Woodland, Southern Riparian Scrub, Southern Willow Scrub, California Walnut Woodland, Walnut Forest, and Southern Interior Cypress Forest.

Proposed Borrow Site 1

Proposed Borrow Site 1 contains two special-status vegetation types: southern willow scrub and freshwater marsh/disturbed freshwater marsh habitat. A total of 0.16 acre of southern willow scrub habitat is present and a total of 4.46 acres of freshwater marsh/disturbed freshwater marsh habitat is present.

No other areas within the proposed Project area, proposed borrow sites, or proposed Other Features contain special-status vegetation communities.

3.1.1.3 Special-Status Plants

No special-status plants were detected within the proposed Project area, proposed borrow sites, or proposed Other Features, and none are expected to occur within these sites. Species within Table 4-8 of the Biological Technical Report (Appendix A) provide a list of special-status plants evaluated for the proposed Project area, proposed borrow sites, and proposed Other Features through a general biological survey and habitat assessment. Species were evaluated based on the following factors: 1) species identified by the CNDDB and California Native Plant Society (CNPS) as occurring (either currently or historically) on or in the vicinity of the proposed Project area, proposed borrow sites, or proposed Other Features and 2) any other special-status plants that are known to occur within the vicinity of the proposed Project area, proposed borrow sites, or proposed Other Features or for which potentially suitable habitat occurs within these sites. As the sites have either been a working farm or dairy operation for several decades, and while there are lands that are dominated by non-native grasses and forbs, there is no potential for the lands to function as natural vegetation communities that would support special-status plants.

3.1.1.4 Special-Status Animals

Table 4-9 of the Biological Technical Report (Appendix A) provides a list of special-status animals evaluated for the proposed Project area, proposed borrow sites, and proposed Other Features through general biological surveys, habitat assessments, and focused surveys. Species were evaluated based on the following factors, including: 1) species identified by the CNDDB as occurring (either currently or historically) on or in the vicinity of the proposed Project, proposed borrow sites, or proposed Other Features, and 2) any other special-status animals that are known to occur within the vicinity of the proposed Project area, proposed borrow sites, or proposed Other Features for which potentially suitable habitat occurs on the site.

Special-Status Wildlife Species Observed within the Proposed Project

Three special-status wildlife species were detected within the proposed Project. These species are the burrowing owl, least Bell's vireo, and tricolored blackbird.

Burrowing Owl (Athene cunicularia). The burrowing owl is a California Species of Special Concern whose habitat requirements include shortgrass prairies, grasslands, lowland scrub, agricultural lands (particularly rangelands), coastal dunes, desert floors, and some artificial open areas. This species is known to occupy abandoned ground squirrel burrows and artificial structures such as culverts and underpasses. There is potential for burrowing owls to occur within an approximate 298.19-acre portion of the proposed Project, except for the 0.03-acre developed portion of the Off-Site Storm Drain Improvement area.

Least Bell's Vireo (Vireo bellii pusillus). The least Bell's vireo is a State and Federally listed endangered species whose habitat requirements include dense riparian habitats with a stratified canopy, including southern willow scrub, mule fat scrub, and riparian forest. There is potential for least Bell's vireo to occur within an approximate 4.62-acre portion of the proposed Project within Borrow Site 1. There is no suitable habitat within the proposed Project area, proposed borrow sites 2 through 5, or the Off-Site Storm Drain Improvement area.

Tricolored Blackbird (Agelaius tricolor). The tricolored blackbird is a State listed Threatened species whose habitat requirements include nearby water sources and open-range foraging habitat of natural grassland, woodland, or agricultural cropland. There is potential for tricolored blackbird to occur within an approximate 10.58-acre portion of the proposed Project and Borrow Site 4. There is no suitable habitat within the proposed Project area, proposed borrow sites 1, 2, 3, and 5, or the Off-Site Storm Drain Improvement area.

<u>Proposed Project area</u>

Burrowing Owl (Athene cunicularia). Focused surveys for the burrowing owl were conducted for the proposed Project area on February 26, 2019; April 23, 2019; May 22, 2019; and July 2, 2019. Two burrowing owls were detected within proposed Project area within a remnant dairy portion of the proposed Project area (see Exhibit 3.3 – Burrowing Owl Survey Map). Based upon their presence during the breeding season, the two owls detected are thought to be a breeding pair. Additionally, the two owls occur within a portion of the proposed Project area that is outside of the Resources Management Plan (RMP) for the Prado Basin, which addresses mitigation requirements for impacts to burrowing owls.

Least Bell's Vireo (Vireo bellii pusillus). Focused surveys for the least Bell's vireo were conducted on April 11 and 25; May 8, 20, and 31; June 11 and 27; and July 8, 2019 according to survey protocol for the species. The least Bell's vireo was not detected within the proposed Project area, which contains ruderal/disturbed vegetation that does not support suitable habitat for the species.

Tricolored Blackbird (Agelaius tricolor). Surveys for the tricolored blackbird for all suitable habitat areas within the proposed Project area were conducted on March 12 and 13, 2019 as part of the general biological surveys performed for the proposed Project. The tricolored blackbird was not detected within the proposed Project area, which does not support suitable foraging or breeding habitat.

<u>Proposed Borrow Sites</u>

Burrowing Owl (Athene cunicularia). Focused surveys for the burrowing owl were conducted for proposed borrow sites 1 and 2 on February 26, 2019; April 16, 2019; May 21, 2019; and July 2, 2019. Focused surveys were conducted for proposed Borrow Site 3 on February 28, 2019; April 16, 2019; May 22, 2019; and July 3, 2019. The focused surveys for proposed borrow sites 4 and 5 were conducted on February 27, 2019; April 16, 2019; May 22, 2019; and July 3, 2019. No burrowing owls were detected within proposed borrow sites 1 through 5.

Least Bell's Vireo (Vireo bellii pusillus). Focused surveys for the least Bell's vireo were conducted on April 11 and 25; May 8, 20, and 31; June 11 and 27; and July 8, 2019 according to survey protocol for the species. The least Bell's vireo was detected within proposed Borrow Site 1 within the southern willow scrub habitat. The least Bell's vireo was also detected within the vicinity of proposed Borrow Sites 2 and 5; however, it was not detected within Borrow Site 2 or 5. The least Bell's vireo was not detected within proposed borrow sites 2, 3, 4, and 5, which do not support suitable habitat for the species.

It is assumed that the least Bell's vireo may be nesting within approximately 0.16 acre of southern willow scrub habitat and foraging within 4.46 acres of freshwater marsh/disturbed freshwater marsh habitat within proposed Borrow Site 1 (containing black willow thickets, tamarisk thickets, and cattail marshes). As mentioned above, there is no foraging habitat for the vireo present within proposed borrow sites 2, 3, 4, or 5.

Tricolored Blackbird (Agelaius tricolor). Surveys for the tricolored blackbird for all suitable habitat areas within the proposed borrow sites were conducted on March 12 and 13, 2019 as part of the general biological surveys performed for the proposed Project. The tricolored blackbird was observed foraging within and adjacent to proposed Borrow Site 4 near a known population of blackbirds associated with the Mill Creek Wetlands. Tricolored blackbirds were not detected in proposed borrow sites 1, 2, 3, or 5.

<u>Proposed Other Features</u>

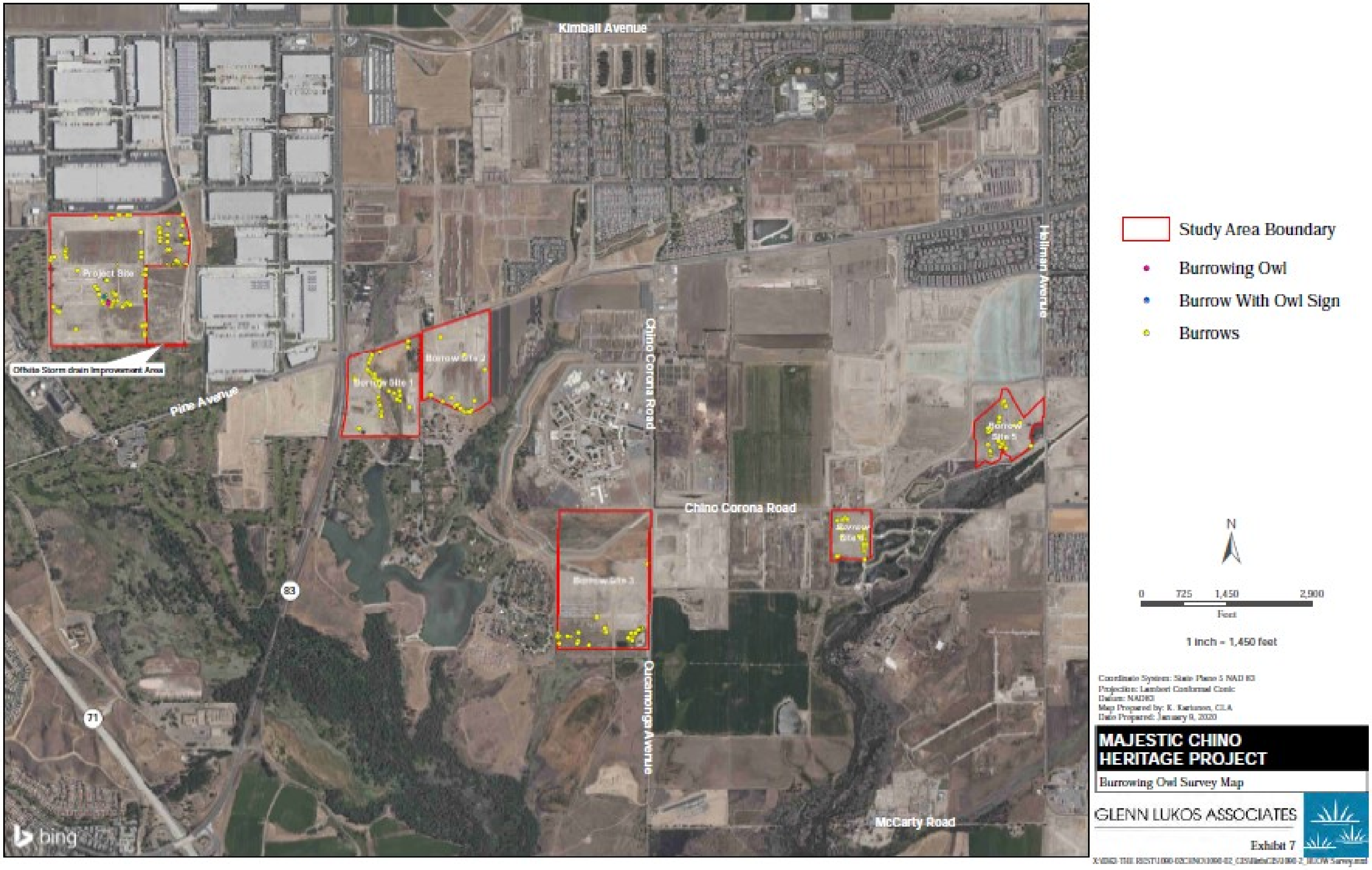
Off-Site Storm Drain Improvement Area

Burrowing Owl (Athene cunicularia). Focused surveys for the burrowing owl were conducted at the proposed Off-Site Storm Drain Improvement area on February 26, 2019; April 23, 2019; May 22, 2019; and July 2, 2019. No burrowing owls were detected within this site.

Least Bell's Vireo (Vireo bellii pusillus). Focused surveys for the least Bell's vireo were conducted on April 11 and 25; May 8, 20, and 31; June 11 and 27; and July 8, 2019 according to survey protocol for the species. The least Bell's vireo was not detected within the proposed Off-Site Storm Drain Improvement area, which traverses through a golf course and contains a developed concrete-lined channel and ornamental vegetation, all of which have very low potential to support vireo due to lack of suitable habitat.

Tricolored Blackbird (Agelaius tricolor). Surveys for the tricolored blackbird for all suitable habitat areas within the proposed Off-Site Storm Drain Improvement area were conducted on March 12 and 13, 2019 as part of the general biological surveys performed for the Project. No tricolored blackbirds were detected within this site

Exhibit 3.3 – Burrowing Owl Survey



Special-Status Wildlife Species Not Observed but with a Potential to Occur

Yellow Warbler. There is potential for the state Species of Special Concern yellow warbler (*Setophaga petechia*) to occur as this species' habitat requirements generally overlap with those of the least Bell's vireo. However, the proposed Project area, proposed Off-Site Storm Drain Improvement area, and proposed borrow sites 2, 3, 4 and 5 do no support suitable habitat for this species. Moreover, the proposed Project area and proposed Off-Site Storm Drain Improvement area lack suitable nesting habitat, and superior nesting habitat is present near off-site areas such as the Prado Basin. The yellow warbler was not detected on site during any of the focused surveys conducted for the least Bell's vireo.

Yellow-Breasted Chat. There is potential for the state Species of Special Concern yellow-breasted chat (*Icteria virens*) to occur as this species' habitat requirements generally overlap with those of the least Bell's vireo. However, the yellow-breasted chat was not detected during any of the focused surveys conducted for the least Bell's vireo. The proposed Project area, proposed Off-Site Storm Drain Improvement area, and proposed borrow sites 2, 3, 4 and 5 do not support suitable habitat for the species. Moreover, the proposed Project area and proposed Off-Site Storm Drain Improvement area lack suitable nesting habitat, and superior nesting habitat is present near off-site areas such as the Prado Basin.

White-Tailed Kite. There is moderate potential for the state Fully Protected white-tailed kite (*Elanus leucurus*) to nest within large ornamental trees and forage within the proposed Project area, but not within proposed borrow sites 1 through 5.

Bald Eagle. The state listed as Endangered bald eagle (*Haliaeetus leucocephalus*) has the potential to forage within the proposed Project; however, this species is not expected to nest within proposed Project as the proposed Project is located approximately one-half to one mile from the nearest large body of open water.

Swainson's Hawk. The state listed as Threatened Swainson's hawk (*Buteo swainsoni*) has the potential to forage within the proposed Project; however, the proposed Project is located outside of the nesting range for this species.

Golden Eagle. The state Fully Protected golden eagle (*Aquila chrysaetos*) has the potential to forage within the proposed Project; however, the proposed Project does not contain the high cliffs and rocky escarpments used for nesting by this species.

American Peregrine Falcon. The state Fully Protected American peregrine falcon (*Falco peregrinus anatum*) has the potential to forage within the proposed Project; however, the proposed Project does not contain the high cliffs, tall buildings, and bridges used for nesting by this species.

Bat Species. Five special-status bats have potential to forage within the proposed Project; these bat species are the: big free-tailed bat (*Nyctinomops macrotis*), pallid bat (*Antrozous pallidus*), western mastiff bat (*Eumops perotis californicus*), western yellow bat (*Lasiurus xanthinus*), and Yuma myotis (*Myotis yumanensis*). None of these species are state or federally listed but four of the five are state Species of Special Concern. Of these, the western yellow bat has the potential to roost within ornamental trees within the proposed Project area and the two sycamore trees within proposed Borrow Site 5. No suitable habitat is present within the remainder of the proposed Project.

3.1.1.5 Critical Habitat

Proposed Project area

The proposed Project area is not located within USFWS-designated critical habitat areas. Exhibit 3.4, Critical Habitat, depicts where critical habitat does occur within the proposed Project.

Proposed Borrow Sites

Proposed borrow sites 2 and 4 are not located within the USFWS-designated critical habitat areas. Proposed borrow sites 1, 3, and 5 are within mapped designated critical habitat for the state and federally listed endangered least Bell's vireo. During a 2019 focused survey, one detection of least Bell's vireo was made at the southern boundary of Borrow Site 1 within the freshwater marsh and southern willow scrub habitat. Borrow sites 3 and 5 are comprised of ruderal and disturbed habitat that do not contain the primary constituent elements or physical/biological attributes which could be utilized by the vireo for foraging or nesting activities. Exhibit 3.4, Critical Habitat, depicts where critical habitat occurs within these proposed borrow sites, and Exhibit 3.5, Least Bell's Survey Map, depicts the location of the vireo territory within proposed Borrow Site 1.

Proposed Other Features

Off-Site Storm Drain Improvement area

The proposed Off-Site Storm Drain Improvement area is within the mapped designated critical habitat for the state and federally listed endangered least Bell's vireo. The Off-Site Storm Drain Improvement area contains ornamental and ruderal/disturbed vegetation that does not contain the primary constituent elements or physical/biological attributes which could be utilized by the vireo for foraging or nesting activities. Exhibit 3.4, Critical Habitat, depicts where critical habitat occurs in this proposed Other Feature.

Exhibit 3.4 – Critical Habitat Map

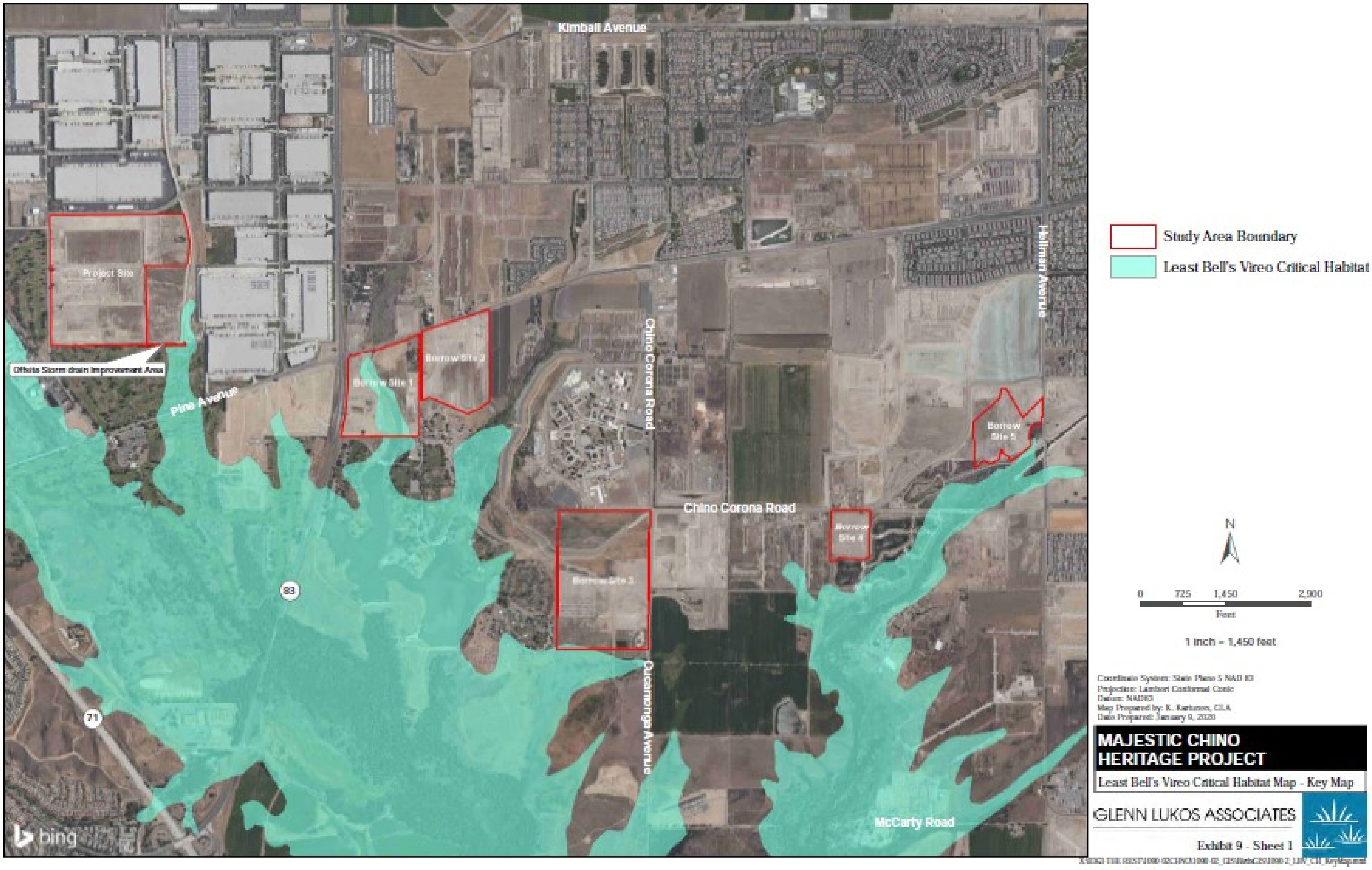
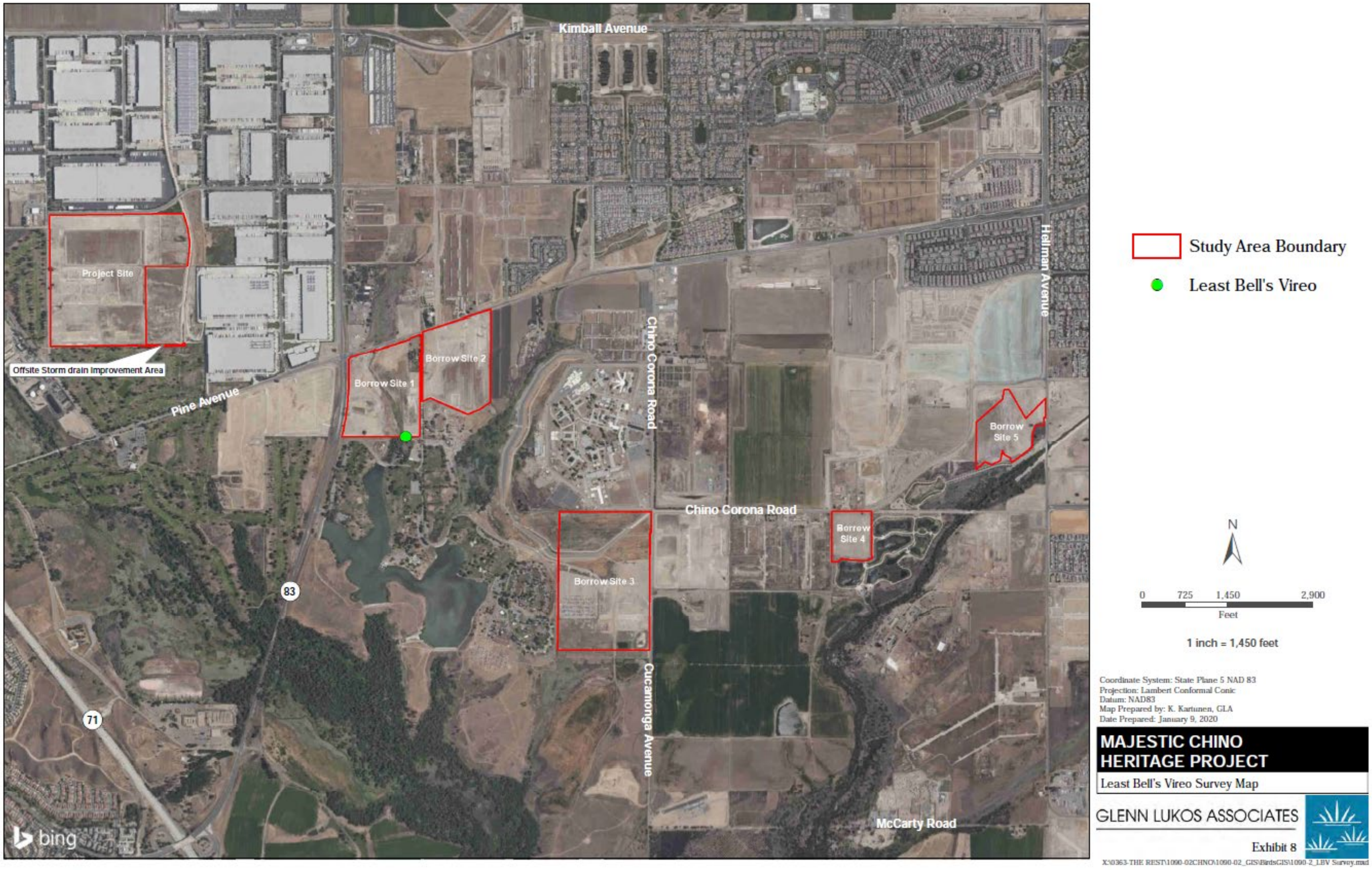


Exhibit 3.5 – Least Bell's Vireo Survey Map



3.1.1.6 Wildlife Linkages/Corridors & Nurseries

Habitat linkages are areas which provide a communication between two or more other habitat areas which are often larger or superior in quality to the linkage. Such linkage sites can be quite small or constricted but can be vital to the long-term health of connected habitats. Linkage values are often addressed in terms of "gene flow" between populations, with movement taking potentially many generations.

Corridors are similar to linkages but provide specific opportunities for individual animals to disperse or migrate between areas, generally extensive but otherwise partially or wholly separated regions. Adequate cover and tolerably low levels of disturbance are common requirements for corridors. Habitat in corridors may be quite different than that in the connected areas, but if used by the wildlife species of interest, the corridor will still function as desired.

The proposed Project does not support any habitat linkage or wildlife corridor.

Wildlife nurseries are sites where wildlife concentrate for hatching and/or raising young, such as rookeries, spawning areas, and bat colonies. Nurseries can be important to both special-status species as well as commonly occurring species.

The proposed Project does not support a wildlife nursery.

3.1.1.7 Jurisdictional Delineation

Corps jurisdiction within the proposed Project area is limited to one concrete flood control channel (Cypress Channel) contained within the Off-Site Storm Drain Improvement area (Exhibit 3.6.1 – Corps/Regional Board Jurisdictional Delineation Map – Off Site Storm Drain Improvement Area) and one drainage, Drainage 1, within Borrow Site 1 (Exhibit 3.6.2 – Corps/Regional Board Jurisdictional Delineation Map – Proposed borrow sites 1&2). There are no Corps jurisdictional waters located within the Project area or at Borrow Sites 2, 3, 4, or 5.

Corps jurisdiction within the proposed Project is 4.60 acres, of which 4.59 acres consists of jurisdictional wetlands. A total of 4,033 linear feet of stream is present. Table 3.1-8 depicts a summary of existing jurisdictional WoUS resources.

Table 3.1-8. Summary of WoUS Existing Resources

Location	WoUS EXISTING RESOURCE
Project area	0
Off-Site Improvement area	0.01 ac; 22 LF
Borrow Site 1	4.59 ac; 1,645 LF
Borrow Site 2	0
Borrow Site 3	0
Borrow Site 4	0
Borrow Site 5	0
TOTAL	**4.6 ac; 1,667 LF**

The proposed Project Jurisdictional Delineation Report is in Appendix A and a copy of the delineation impact memorandum is attached within Appendix A as well.

Proposed Project area

There are no jurisdictional WoUS associated with the proposed Project area. The riparian trees/shrubs identified in the Project area include salt cedar (*Tamarix ramosissima*), mulefat (*Baccharis salicifolia*), and black willow (*Salix gooddingii*), which are all located within several non-jurisdictional waste treatment ponds constructed within the Project area. As stated in Corps regulations, "Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 123.11(m) which also meet the criteria of this definition) are not waters of the United States." Therefore, the waste treatment ponds at the Project area would not be jurisdictional under Section 404 of the Clean Water Act.

Proposed Borrow Sites

Proposed Borrow Site 1

Drainage 1 is a natural, intermittent channel located in the central portion of proposed Borrow Site 1. Drainage 1 enters proposed Borrow Site 1 from under the roadway through a drainage pipeline beneath Pine Avenue from the north and flows in a north to south direction for 1,645 feet before leaving proposed Borrow Site 1 and entering the Prado Basin. Drainage 1 is contained in a defined channel. The OHWM within Drainage 1 ranges from 10 to 16 feet in width. Approximately 4.59 acres of Corps jurisdiction is present within Drainage 1, all of which consists of jurisdictional wetlands. A total of 1,645 linear feet of Corps stream is present.

Proposed Borrow Site 2

There is no Corps jurisdiction associated with Borrow Site 2. Borrow Site 2 previously supported a dairy operation which was recently abandoned, and approximately three waste treatment ponds remain from that dairy operation. Waste treatment ponds are designed to meet the requirements of the Clean Water Act and are not waters of the U.S.

Borrow Site 2 also conveys a roadside ditch, Ditch 1, located parallel to Johnson Avenue within proposed Borrow Site 2. Ditch 1 enters the proposed Project beneath Pine Avenue to the north and flows in a north to south direction for 2,366 feet before leaving proposed Borrow Site 2 and entering the Prado Basin. There is no Corps jurisdiction within Ditch 1 as it would not be regulated under 33 CFR Section 328.3 of the Clean Water Rule per the definition of non-jurisdictional waters provided in Section 328.3(b)(5).

Proposed Borrow Site 3

Proposed Borrow Site 3 does not contain any Corps jurisdiction. The site does not contain any drainages, only former waste treatment facilities, which would not be jurisdictional under Section 404 of the Clean Water Act.

Proposed Borrow Site 4

No Corps jurisdiction is associated with proposed Borrow Site 4. The site does not contain a drainage course, and while the site previously supported a dairy operation that was recently abandoned, no waste treatment ponds remain and no jurisdictional waters are present. Though proposed Borrow

Site 4 is located adjacent to the Mill Creek Wetlands, there is no Corps jurisdiction within the proposed Borrow Site.

Proposed Borrow Site 5

Proposed Borrow Site 5 previously supported a dairy operation that was recently abandoned, and approximately two to three (2-3) waste treatment ponds remain from that operation. However, these wastewater treatment ponds would not be jurisdictional under Section 404 of the Clean Water Act; therefore, no Corps jurisdiction is present within proposed Borrow Site 5.

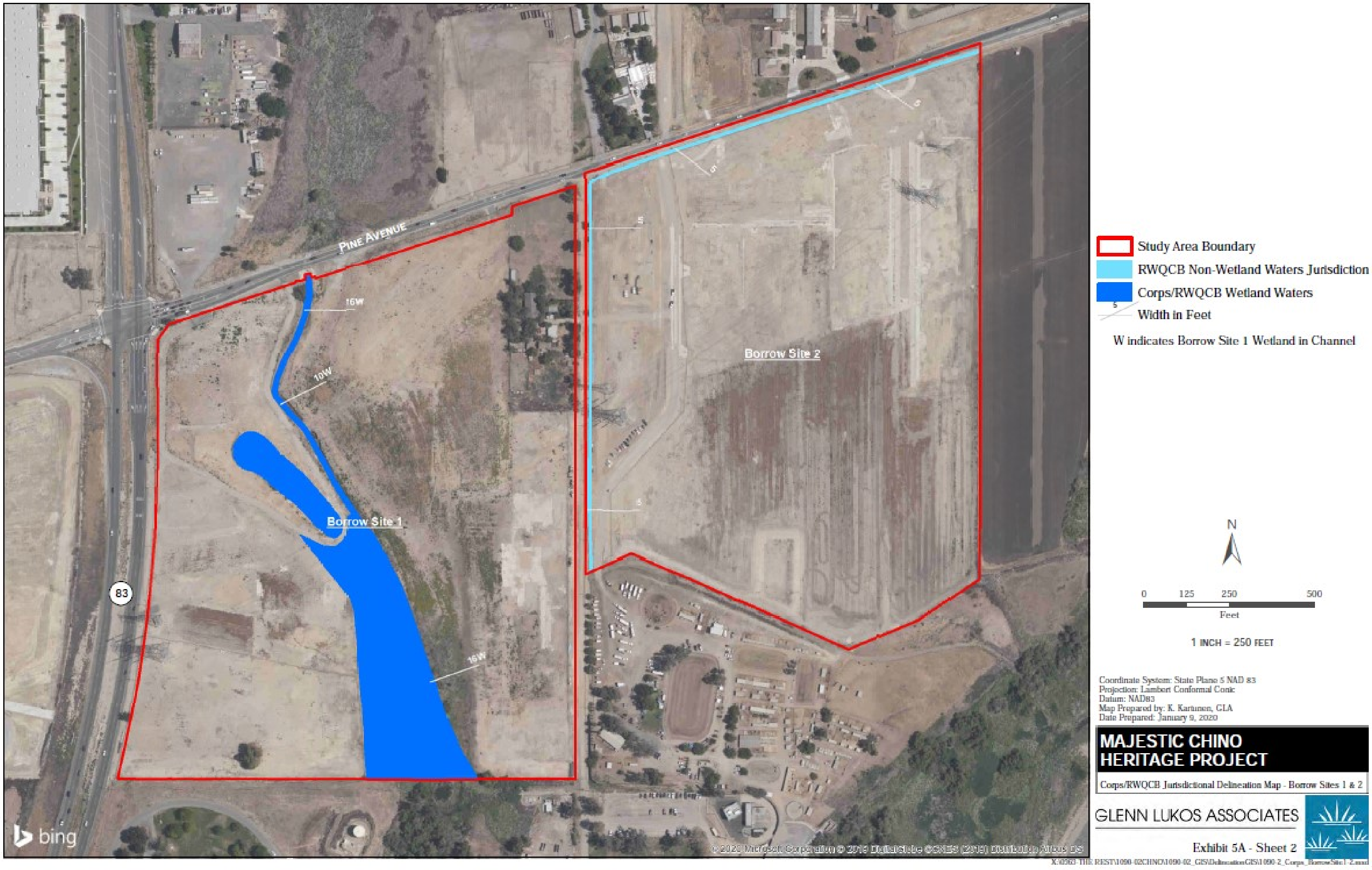
<u>Proposed Other Features</u>

Off-Site Storm Drain Improvement Area

A portion of the proposed Off-Site Storm Drain Improvement area includes a section of Cypress Channel. Cypress Channel is a concrete-lined, concrete-bottomed flood control channel that flows in a north to south direction immediately east of the proposed Project area. The only portion of Cypress Channel that is included in the proposed Project is where the channel outlets from beneath an earthen road. At this location, Cypress Channel conveys perennial flows for 22 linear feet through a 28-foot wide headwall structure that consists of a concrete headwall, vertical wingwalls, and the bottom channel. Further downstream, Cypress Channel enters the Prado Basin. Approximately 0.01 acre of Corps jurisdiction is present within Cypress Channel. A total of 22 linear feet of Corps stream is present.

Exhibit 3.6.1 – Corps/Regional Board Jurisdictional Delineation Map – Off-Site Storm Drain Improvement Area

Exhibit 3.6.2 – Corps/Regional Board Jurisdictional Delineation Map – Borrow Sites 1 & 2



3.1.2 Significance Criteria

An impact to biological resources would be considered significant if a proposed Project results in:

- A direct adverse effect on a population of a threatened, endangered, or candidate species or the unmitigated loss of designated critical habitat for a listed or candidate species, to the extent that the regional population is diminished.
- An unmitigated, net loss in the habitat value of a sensitive biological habitat or area of special biological significance.
- Significant impedance to the wildlife movement.
- Significant loss to the population of any native wildlife or vegetation.
- Significant loss in overall diversity of the ecosystem.

3.1.3 Environmental Commitments

The following environmental commitments would be implemented to avoid or minimize potential effects to the biological resources.

EC BIO-1: Once borrow activities within proposed borrow sites 1 through 5 have been completed, the Project Applicant will include application of a native hydroseed mix to each proposed Borrow Site to minimize the spread of non-native, invasive plant species and for erosion control purposes post-construction. The application(s) of all hydroseeding will be performed as close as possible to the rainy season to allow the seed mix to establish and have the best possibility to succeed.

EC BIO-2: Temporary impacts to 0.76 acre of CSS habitat within proposed Borrow Site 4 will be offset by restoring native habitat within the construction footprint by the Project Applicant. The southern and eastern boundary of proposed Borrow Site 4, where temporary impacts would occur, will be reseeded with a specific CSS seed mix comprising of the same species currently present. The application(s) of all hydroseeding will be performed as close as possible to the rainy season to allow the seed mix to establish and have the best possibility to succeed. The Project Applicant or their designee will conduct annual maintenance for three years within the 0.76-acre area at proposed Borrow Site 4 hydroseeded as CSS.

EC BIO-3:

(1) Prior to construction, the Project Applicant will conduct a preconstruction burrowing owl survey in accordance with burrowing owl survey requirements. The guidelines stipulate that four focused survey visits be conducted between February 15 and July 15, with the first visit occurring between February 15 and April 15. The remaining three visits will be conducted three weeks apart from each other, with at least one visit occurring between June 15 and July 15. If burrowing owl(s) is/are detected on site, the owl(s) will be handled as indicated by the Resources Management Plan (RMP) and/or the CDFW's 2012 protocol. The RMP addresses mitigation requirements for impacts to burrowing owls. The RMP states that the 1995 CDFG Staff Report on Burrowing Owl Mitigation (as supplemented by the RMP) shall be followed when burrowing owls are detected on properties. If avoidance of occupied habitat is infeasible, provisions will be made to passively relocate owls from sites in accordance with the current 2012 CDFG Staff Report (supersedes 1995 CDFG Staff Report).

Consistent with the RMP, the following measures will apply to the proposed Project area regarding burrowing owl mitigation:

- Prior to disturbance of the occupied burrows, suitable and unoccupied replacement burrows will be provided at a ratio of 2:1 within the City-designated relocation area (e.g. the NTS basins). A qualified biologist through coordination with the City will confirm that the artificial burrows are currently unoccupied and suitable for use by owls.
- If a Project area-specific exclusion and translocation plan for burrowing owl has not already been approved by CDFW, the Project Applicant will retain a qualified biologist to prepare such a plan for review and approval by CDFW. This plan will identify the procedures to be followed to exclude and/or translocate burrowing owls from the Project area, with separate procedures identified for during the breeding season and outside of the breeding season. For translocated owls, natural or artificial burrows will be provided at a 2:1 ratio at an off-site relocation area.
- Until suitable replacement burrows have been provided/confirmed within the City-designated relocation area (e.g. the NTS basins), no ground disturbance (clearing, grubbing, grading) will occur within 50 meters (approximately 160 feet) of occupied burrows during the nonbreeding season (September 1 through January 31) or within 100 meters (approximately 250 feet) during the breeding season (February 1 through August 31) until the owls have fledged or have been relocated per the CDFW-approved exclusion and translocation plan._ All occupied burrows will have a visible marker placed near them to ensure that ground-disturbing equipment and machinery do not come within the specified distance to prevent disturbance of the owls or collapse of the burrows.
- Owls will not be excluded or translocated from occupied burrows and should not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist approved by CDFW verifies that juveniles from the occupied burrows are foraging independently and are capable of independent survival.
- Pursuant to mitigation measure B-3(8) of The Preserve Environmental Impact Report (EIR), and as noted on Page 4-39 of the RMP, the proposed Project will pay the required mitigation fee. One priority for funding supported by the mitigation fees is the establishment and long-term management of burrowing owl habitat within the Drainage Area B conservation area.

The proposed Project's implementation of these measures would minimize potential effects to burrowing owls and impacts would be less than significant.

(2) If there is more than a 14-day window between when the focused survey is performed and ground disturbance, a qualified biologist would conduct a pre-construction presence/absence survey for burrowing owls within 14 days prior to site disturbance and again within 48 hours of disturbance. If burrowing owls are detected on site, the owls would be relocated/excluded from the site outside of the breeding season following accepted protocols, and subject to the approval of CDFW (as described above).

EC BIO-4: The Project Applicant will retain a qualified biologist (hereafter "Project Biologist") to conduct training and monitoring activities for the Proposed Project.

EC BIO-5: Vegetation clearing will be conducted outside of the general passerine nesting season (February 1 through August 31). If avoidance of the nesting season is not feasible, then the Project Biologist will conduct a nesting bird survey, including suitable habitat within a 500-foot radius, within three days prior any disturbance of the site, including disking, demolition activities, and grading. If active nests are identified, the biologist will establish suitable buffers around the nests, and the buffer areas will be avoided until the nests are no longer occupied and the juvenile birds can survive independently from the nests.

If the survey identifies the presence of active nests, then the Project Biologist would notify the Corps Biologist staff immediately (Megan Wong at 213-448-4517)and provide a copy of maps showing the location of all active nests and a species-appropriate buffer zone around each active nest sufficient to protect the nest from substantial adverse direct and/or indirect impacts. The Project Biologist may make other recommendations to determine the size of the buffer zone (such as the installation of temporary noise barriers). The size and location of all buffer zones, if required, would be determined by the qualified biologist and subject to review and approval by the Corps. The locations of any active nests and the size and location of all buffer zones determined by the qualified biologist and approved by the Corps would be indicated on the grading plan as reference.

The approved buffer zones (i.e., active bird nest protection zones) would be marked in the field with construction fencing. No construction vehicles would be permitted within these zones unless directly related to the management or protection of the legally protected bird species, until all nestlings have fledged and left the nest (or the nest has failed) as confirmed by a professional biological monitor. The biological monitor will have authority to redirect construction activities if nesting pairs exhibit signs of disturbance.

In the event that a nest is abandoned despite the established buffer as determined by the Project Biologist , if the nestlings are still alive, the Project Applicant/Developer or its designee would contact the California Department of Fish and Wildlife (CDFW) and, subject to CDFW approval, fund the recovery and hacking (controlled release of captive reared young) of the nestling(s).

EC BIO-6: No direct impact to vireo habitat where the species was detected at Borrow Site 1 will occur. Borrow/grading activities will occur outside of the nesting season for the vireo (March 15th to September 15th) to the greatest extent practicable. If grading activities extend into the nesting season, a sound wall barrier, such as hay bales or other noise attenuation methods will be constructed along the edge of the work area (a minimum of 125 feet from occupied habitat) prior to March 15 to avoid adverse effects related to construction noise. The Project Biologist will conduct noise monitoring for the duration of construction activities during the nesting season to ensure LBVI are not exposed to construction noise that exceeds 60 dBA Leq. 60 dBA Leq noise threshold level is used for Santa Ana River Mainstem (SARM) projects in the vicinity and so it is also proposed for this project. If noise thresholds are exceeded, then additional measures will be implemented, which may include shifting activities further away from habitat, modifying construction equipment and procedures, or halting work in this area until after the nesting season, or until the Project Biologist confirms that LBVI are no longer present.

EC BIO-7: Construction and/or borrow activities within Borrow Site 4 will occur outside of the nesting season for the tricolored blackbird (March 15th to September 15th) to the greatest extent practicable. If avoidance of the nesting season is not practicable, then the Project Biologist will conduct a nesting bird survey within three days prior any disturbance of the site, including disking, demolition activities, and grading. If active nests are identified, the biologist will establish suitable buffers around the nests, including sound walls, hay bales, or other measures designed to reduce potential indirect noise effects and to ensure noise levels are below the 60 dBA Leq level at these buffer area locations. The buffer areas would be avoided until the nests are no longer occupied and the juvenile birds can survive independently from the nests.

EC BIO-8: Based on the presence of the least Bell's vireo at the southern boundary of Borrow Site 1 and its presence within the vicinity of borrow sites 2 and 5, and the presence of the tricolored blackbird (in a foraging role) in Borrow Site 4, night lighting will be shielded and directed away from foraging or nesting habitat areas, and will be placed in a manner that would not cause a significant effect on sensitive wildlife species at least 500 feet from known vireo territories in Borrow Site 1 and in the vicinity of borrow sites 2 and 5, and known nesting locations of the tricolored blackbird in Borrow Site 4. Additionally, no night work will be conducted within Borrow Site 1 during LBVI nesting season.

3.1.4 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the Corps would not issue a license agreement or Section 404 permit to the applicant. The applicant would not modify the Federal channel or affect WoUS. Based on the above, there would be no impacts to biological resources located within the area encompassing the proposed project.

Preferred Alternative/Proposed Project

Under the Preferred Alternative, the Proposed Action would not permanently impact WoUS. The storm drain outlet would enter Cypress Channel above the OHWM and would therefore not permanently impact Corps jurisdictional waters or aquatic resources. Construction of the storm drain connection would occur primarily from the upland west side of the Cypress Channel concrete wing wall and access into the channel during construction activities would be limited to workers on foot with hand tools. Temporary impacts to WoUS would occur as a result of a temporary construction footprint to implement spill prevention control design features for the storm drain construction at the Cypress Channel. Moreover, under the Preferred Alternative, the Corps would not issue a Section 408 permit; rather, the Preferred Alternative would consist of a Real Estate action with Section 408-level review for the proposed Project.

Vegetation Impacts

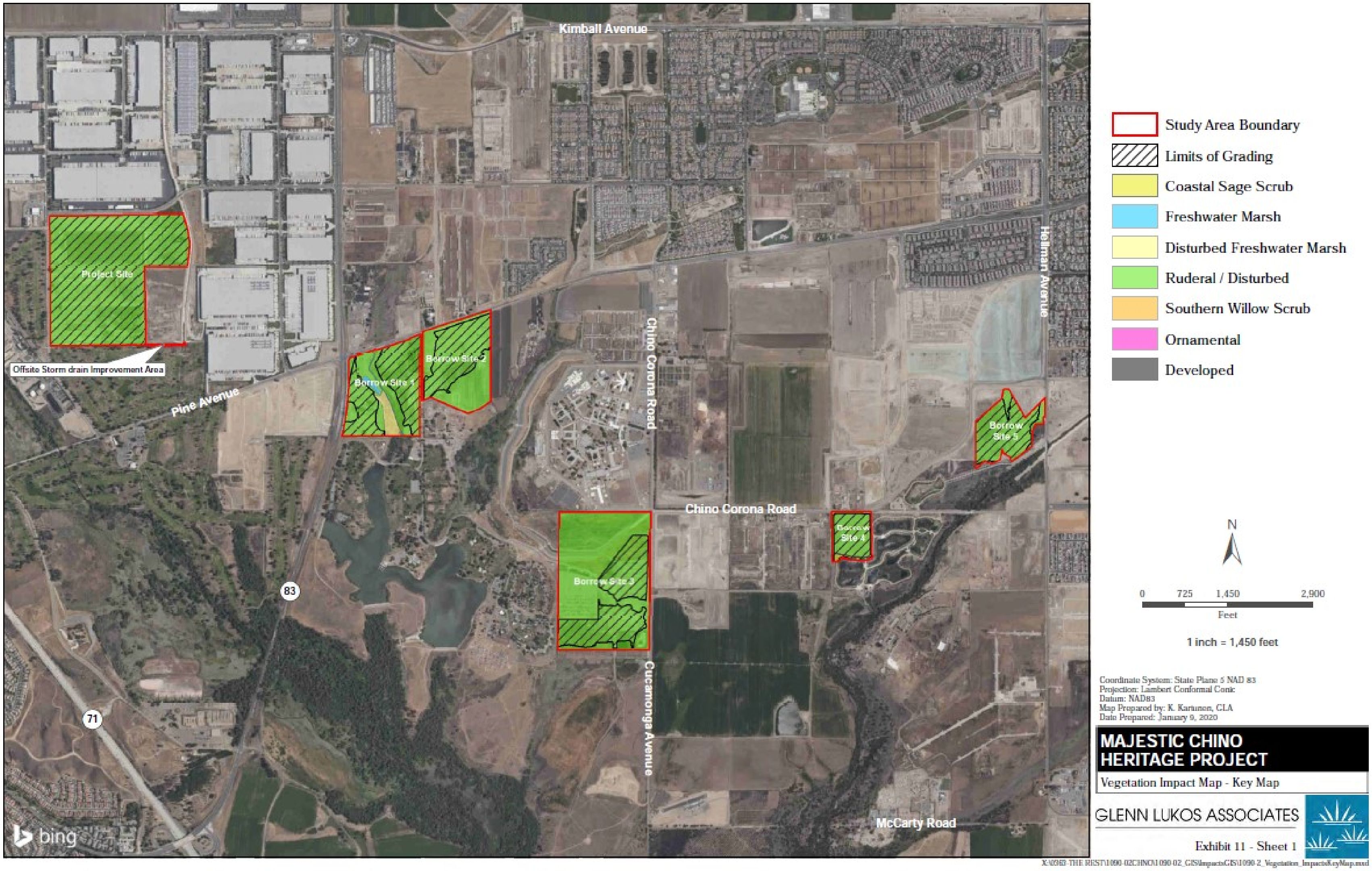
The analysis below is based on the Biological Technical Report (Appendix A) prepared for the proposed Project dated September 2019 and updated in January 2020. Avoidance and minimization measures to sensitive biological resources have been developed for borrow site 1. Table 3.1-9 below summarizes vegetation acreage distribution and grading impacts.

Table 3.1-9. Summary of Vegetation Distribution and Grading Impact Acreages

	TOTAL ACREAGE	GRADING IMPACT ACREAGE	CRITICAL HABITAT LBVI	FORAGING HABITAT TRICOLORED BLACKBIRD
Project area	96.9	96.9	0	0
Off-Site Improvement area	0.34	0.32	0.14	0
Borrow Site 1	43.67	28.51	0.23	0
Borrow Site 2	38.51	20.79	0	0
Borrow Site 3	84.25	31.97	0	0
Borrow Site 4	12.92	11.34	0	11.34
Borrow Site 5	21.28	18.58	0	0
TOTAL	297.87	208.41	0.37	11.34

Vegetation Communities. There are three native vegetation communities present within the proposed Project: freshwater marsh/disturbed freshwater marsh, southern willow scrub, and coastal sage scrub habitat. Proposed Project impacts to coastal sage scrub (temporary impacts) and other vegetation types are discussed below; no impact to freshwater marsh/disturbed freshwater marsh or southern willow scrub habitat is proposed. The proposed Project will permanently impact up to 207.99 acres of non-native vegetation/ornamental vegetation in the form of 207.69 acres of ruderal/disturbed habitat and 0.30 acre of ornamental habitat for a total permanent impact of up to 207.99 acres of disturbed lands. A Vegetation Impact Map is included as Exhibit 3.7, and Tables 3.1-10 through 3.1-16 provide a summary of vegetation community impacts.

Exhibit 3.7 – Vegetation Impacts Map



Proposed Project area

The proposed Project will permanently impact 96.9 acres of non-native vegetation in the form of ruderal/disturbed habitat within the proposed Project area. As previously discussed, the ruderal/disturbed habitat is not a natural vegetation community but rather consists of lands dominated by several non-native grass and forbs species. The removal of approximately 97 acres of ruderal/disturbed habitat from within the proposed Project area would not result in significant direct or indirect impacts to vegetation as these lands are not expected to support quality habitat for native plants and animals due to the decades of disking and pasture use by dairy cattle. Therefore, the change of sensitive biological habitat value, impact to vegetation or loss in overall diversity of the ecosystem would not occur as a result of the proposed Project.

Table 3.1-10. Summary of Vegetation/Land Use Impacts, Proposed Project area

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	96.9
TOTAL	96.9

Proposed Borrow Sites

Proposed Borrow Site 1

The proposed Project will result in permanent impacts of up to 28.51 acres of disturbance to ruderal/disturbed habitat within proposed Borrow Site 1. As similarly discussed above, the removal of 28.51 acres of ruderal/disturbed habitat from within proposed Borrow Site 1 would not result in significant impacts to vegetation as this habitat type is dominated by non-native grass and forb species and the lands are not expected to support quality habitat for native plants and animals. Further, as per EC BIO-1, once borrow activities are completed within proposed borrow sites 1 through 5, a native hydroseed mix will be applied to each proposed Borrow Site to avoid infestation or the spread of invasive species. Therefore, the change of sensitive biological habitat value, impact to vegetation or loss in overall diversity of the ecosystem would not occur as a result of the proposed Project.

Table 3.1-11. Summary of Vegetation/Land Use Impacts, Proposed Borrow Site 1

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	28.51
TOTAL	28.51

Proposed Borrow Site 2

The proposed Project will result in permanent impacts of up to 20.79 acres of disturbance to ruderal/disturbed habitat within proposed Borrow Site 2 while no impacts to native habitat communities will occur within proposed Borrow Site 2. The removal of 20.79 acres of ruderal/disturbed habitat within proposed Borrow Site 2 would not result in significant impacts to vegetation. As previously discussed, ruderal/disturbed habitat consists of lands dominated by non-native grass and forb species and the lands are not expected to support quality habitat for native plants and animals due to decades of disking and dairy cattle pasture use. Further, as per EC BIO-1, once borrow activities are completed within proposed borrow sites 1 through 5, a native hydroseed mix will be applied to each proposed Borrow Site to avoid infestation or the spread of invasive species. Therefore, the change of sensitive biological habitat value, impact to vegetation or loss in overall diversity of the ecosystem would not occur as a result of the proposed Project.

Table 3.1-12. Summary of Vegetation/Land Use Impacts, Proposed Borrow Site 2

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	20.79
TOTAL	20.79

Proposed Borrow Site 3

The proposed Project will result in permanent impacts of up to 31.97 acres of disturbance to ruderal/disturbed habitat within proposed Borrow Site 3. No impacts to native habitat will occur within proposed Borrow Site 3 as a result of the proposed Project. As similarly discussed above, the removal of 31.97 acres of ruderal/disturbed habitat within proposed Borrow Site 3 would not result in direct or indirect significant impacts to vegetation as this habitat type is dominated by non-native grasses and forbs, and the lands are not expected to support quality habitat for native plants and animals due to its history of disking and pasture use. Further, as per EC BIO-1, once borrow activities are completed within proposed borrow sites 1 through 5, a native hydroseed mix will be applied to each proposed Borrow Site to avoid infestation or the spread of invasive species. Therefore, the change of sensitive biological habitat value, impact to vegetation or loss in overall diversity of the ecosystem would not occur as a result of the proposed Project.

Table 3.1-13. Summary of Vegetation/Land Use Impacts, Proposed Borrow Site 3

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	31.97
TOTAL	31.97

Proposed Borrow Site 4

The proposed Project will result in permanent impacts of up to 10.58 acres of disturbance to ruderal/disturbed habitat and temporary impacts of up to 0.76 acres of disturbance to CSS habitat within proposed Borrow Site 4. The removal of 10.58 acres of ruderal/disturbed habitat from within proposed Borrow Site 4 would not result in significant impacts to vegetation as a result of the proposed Project. The ruderal/disturbed habitat is dominated by non-native grasses and forbs and the lands are not expected to support quality habitat for native plants and animals due to its history of disking and pasture use. The project would result in temporary impacts associated with the removal of up to 0.76 acre of CSS habitat. With the implementation of EC BIO-2, the impacts would be reduced to a less than significant level with post-construction reseeding of the impacted area with a specific CSS seed mix comprising of the same species currently present followed by three years of maintenance. In addition, as Per EC BIO-1, once borrow activities are completed within borrow sites 1 through 5, a native hydroseed mix will be applied to each proposed Borrow Site to avoid infestation or the spread of invasive species. Therefore, the change of sensitive biological habitat value, impact to vegetation or loss in overall diversity of the ecosystem would be less than significant as a result of the proposed Project.

Table 3.1-14. Summary of Vegetation/Land Use Impacts, Proposed Borrow Site 4

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	10.58
CSS	0.76 (temporary)
TOTAL	11.34

Proposed Borrow Site 5

The proposed Project will permanently impact up to 18.58 acres of ruderal/disturbed habitat. The removal of 18.58 acres of ruderal/disturbed habitat from within proposed Borrow Site 5 would not result in significant impacts to vegetation as this habitat type is dominated by non-native grasses and forbs, and the lands are not expected to support quality habitat for native plants and animals due to its history of disking and pasture use. Per EC BIO-1, once borrow activities are completed within borrow sites 1 through 5, a native hydroseed mix will be applied to each proposed Borrow Site to avoid infestation or the spread of invasive species. Therefore, the change of sensitive biological habitat value, impact to vegetation or loss in overall diversity of the ecosystem would not occur as a result of the proposed Project.

Table 3.1-15. Summary of Vegetation/Land Use Impacts, Proposed Borrow Site 5

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	18.58
TOTAL	18.58

Proposed Other Features

Off-Site Storm Drain Improvement Area

The proposed Project will permanently impact up to 0.30 acre of ornamental habitat and temporarily impact up to 0.007 acre of the developed area that pertains to the connection to the concrete headwall. Temporary impacts would result from the temporary construction footprint for the connection of the off-site storm drain to the developed/disturbed land. The storm drain connection would terminate within the concrete headwall structure and the headwall structure would remain in the same location post-construction. No impacts to native habitat communities within the proposed Off-Site Storm Drain Improvement area would occur. As previously discussed, vegetation within the ornamental habitat consists of ornamentally planted and maintained species, and these lands are not expected to support quality habitat for plants and animals. Moreover, no vegetation is present within the developed area as the area consists of a concrete-sided, concrete-bottomed flood control channel (the Cypress Channel). Therefore, the change of sensitive biological habitat value, impact to vegetation or loss in overall diversity of the ecosystem would not occur as a result of the proposed Project.

Table 3.1-16. Summary of Vegetation/Land Use Impacts, Proposed Off-Site Storm Drain Improvement Area

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ornamental	0.30
Developed	0.007 (Connection to the Concrete Headwall only)
TOTAL	0.31

Special Status Plants

No special-status plants were detected for the proposed Project. Table 4-8 of the attached Biological Technical Report (Appendix A) provides a list of special-status plants evaluated for the proposed Project (including the proposed Project area, proposed borrow sites 1-5, and the proposed Off-Site Storm Drain Improvement area) through a general biological survey and habitat assessment. Of the special-status plants evaluated for the proposed Project, the occurrence status for all plants were determined to be either “Does not occur” (i.e., the site does not contain habitat for the species and/or the site does not occur within the geographic range of the species) or “Absent” (i.e., the site contains suitable habitat for the species, but the species has been confirmed absent through focused surveys).

The proposed Project has been either a working farm or dairy operation for several decades and although there are lands that are dominated by non-native grasses and forbs, there is no potential for the lands to function as a natural vegetation community that would support special-status plants with the exception of freshwater marsh, including disturbed freshwater marsh. Therefore, the proposed Project will not affect or result in the loss of special-status plants, native vegetation population, or overall diversity of the ecosystem.

Special Status Wildlife Species

Burrowing Owl. The proposed Project has the potential to impact burrowing owl if this species is present during construction.

Least Bell’s Vireo. The proposed Project has the potential to impact least Bell’s vireo if this species is present during construction.

Tricolored Blackbird. The proposed Project has the potential to impact tricolored blackbird if this species is present during construction.

Proposed Project area

Burrowing Owl. As discussed in Section 3.1.1.5 Special Status Animals above, there are burrows on the proposed Project area that are potentially suitable for burrowing owl and one burrowing owl pair has been observed within the proposed Project area. Although a single burrowing owl pair was detected within the proposed Project area, the owls are assumed to be breeding based on their presence during the breeding season and occurrence within the portion of the proposed Project area located outside of the RMP. The possible presence of the burrowing owl is a potentially significant impact if this species is present during construction; however, with the implementation of EC BIO-3, the level of impact would be less than significant and would not result in the loss of native wildlife or overall diversity of the ecosystem.

Least Bell's Vireo. The least Bell's vireo was not detected within the proposed Project area during the focused surveys conducted for the species. It is expected that the proposed Project would have no effect on vireo as a result of construction activities taking place within the proposed Project area as the proposed Project area primarily consists of ruderal/disturbed vegetation and does not support suitable habitat for the vireo. However, suitable nesting and foraging habitat are present within off-site areas, such as the Prado Basin. Thus, due to the lack of suitable habitat and absence of the vireo within or immediately adjacent to the proposed Project area, and with the implementation of EC BIO-4 and EC BIO-5, no effect to the Federally listed least Bell's vireo would occur within the proposed Project area and there would not be a loss of native wildlife or diversity of the ecosystem as a result of the proposed Project.

Tricolored Blackbird. The proposed Project area does not support suitable foraging or nesting habitat for the tricolored blackbird and the species was not detected within the proposed Project area during biological surveys conducted for the species. Therefore, there is a low potential for impacts to the tricolored blackbird to occur within the proposed Project area and the loss of native wildlife or overall diversity of the ecosystem would not occur.

Proposed Borrow Sites

Burrowing Owl. No burrowing owls were detected during the focused surveys conducted at proposed borrow sites 1 through 5; however, potentially suitable burrows for burrowing owls were observed in proposed borrow sites 1 through 5. The presence of burrowing owl is a potentially significant impact if this species is present during construction; however, with the implementation of EC BIO-3, impacts to the loss of native wildlife or diversity of the ecosystem would be less than significant.

Least Bell's Vireo. A least Bell's vireo was detected within proposed Borrow Site 1 at the southern boundary of the borrow site, within the freshwater marsh and southern willow scrub habitat. It is assumed that the vireo may be nesting within approximately 0.16 acre of southern willow scrub and foraging within 4.46 acres of freshwater marsh/disturbed freshwater marsh habitat (within black willow thickets, tamarisk thickets, and cattail marshes) within Borrow Site 1. As previously discussed, vegetation impacts within proposed Borrow Site 1 would occur within ruderal/disturbed habitat and no impacts to southern willow scrub or freshwater marsh/disturbed freshwater marsh within proposed Borrow Site 1 would occur. Grading was redesigned to avoid areas within and immediately adjacent to the riparian habitat and grading activities would occur outside of the freshwater marsh and southern willow scrub habitat. Additionally, indirect effects from grading on Borrow Site 1 will be avoided as the drainage flows and hydrology of the site will be substantially the same as the existing condition of the site. The grading design on proposed Borrow Site 1 has been designed to maintain flows draining to the same areas in the same manner as existing conditions per requirements from the Corps. Upon completion of grading activities at proposed Borrow Site 1, the proposed Project will conduct best management practices for erosion control that may include, but are not limited to, applying a native hydroseed to bare soils per environmental commitment EC BIO-1, use of a soil stabilizer, and/or placement of erosion control blankets.

Moreover, the proposed Project's Noise Impact Analysis (Appendix C) notes that the Equivalent Continuous (Average) Sound Level during construction activity ranges from 34.2 to 83.2 Leq in open space receiver locations. The threshold for special status wildlife species as per literature search, including LBVI is 60 dBA Leq, which would be exceeded during construction soil import/export operations at proposed Borrow Site 1. Thus, EC BIO-6 would be implemented, which would include the implementation of sound attenuation measures if grading activities within proposed Borrow Site 1 are expected to extend into the nesting season. Additionally, per EC BIO-8, no night work will be conducted within Borrow Site 1 during LBVI nesting season.

Further, the ruderal/disturbed habitat that would be impacted is not expected to support quality habitat for native plants and animals. With implementation of EC BIO-4, EC BIO-5, EC BIO-6, and EC BIO-8 vegetation impacts within proposed Borrow Site 1 may affect, but are not likely to adversely affect the least Bell's vireo.

While least Bell's vireo was detected within the vicinity of proposed borrow sites 2 and 5, these proposed borrow sites do not contain foraging habitat for the species. Additional foraging habitat, however, is present in the project vicinity within the Prado Basin. Proposed borrow sites 3 and 4 also do not support suitable habitat for the vireo. Therefore, projects grading activities in borrow sites 2, 3, 4 and 5 would have no effect on vireo.

Tricolored Blackbird. Proposed borrow sites 1, 2, 3, and 5 do not support suitable foraging or nesting habitat for the tricolored blackbird, nor was this species detected within these sites during the biological surveys conducted. Tricolored blackbirds were detected within proposed Borrow Site 4 and a total of 10.58 acres of foraging habitat within proposed Borrow Site 4 would be impacted by the proposed Project. However, the blackbirds that were detected were only foraging and not nesting; therefore, the potential to impact the species is low given that more suitable habitat occurs within the Mill Creek Wetlands located adjacent to the proposed Project. With the implementation of EC BIO-6, EC BIO-7, and EC BIO-8, potential impacts to tricolored blackbird, loss of native wildlife or diversity of the ecosystem would be less than significant.

<u>Proposed Other Features</u>

Off-Site Storm Drain Improvement Area

Burrowing Owl. No burrowing owls or potentially suitable burrows for the species were detected during the focused surveys conducted at the proposed Off-Site Storm Drain Improvement area and therefore impacts to burrowing owls, loss of native wildlife or diversity of the ecosystem are not anticipated.

Least Bell's Vireo. The least Bell's vireo was not detected within the proposed Off-Site Storm Drain Improvement area during the focused surveys conducted for the species. While a total of 0.14 acre of lands designated as critical habitat would be impacted within this site through the permanent removal of up to 0.30 acre of ornamental vegetation within the proposed Off-Site Storm Drain Improvement area, these lands have been disturbed and are, as noted, dominated by ornamental vegetation. This ornamental habitat does not contain the primary constituent elements or physical/biological characteristics (i.e., riparian woodland habitat containing both canopy and shrub layers) that could be utilized for foraging or nesting by the vireo. Thus, as the vireo was not detected within the location during focused surveys, the 0.14 acre of critical habitat being impacted lacks primary constituent elements for vireo, and with the implementation of EC BIO-4 and EC BIO-5, the vegetation removal activities within the proposed Off-Site Storm Drain Improvement area may affect, but are not likely to adversely affect the least Bell's vireo at this location.

Tricolored Blackbird. The tricolored blackbird was not detected within the proposed Off-Site Storm Drain Improvement area, and the site does not support suitable foraging or nesting habitat for the species. Therefore, there is a low potential for the blackbird to occur within this site and impacts are not expected to occur. Additionally, with implementation of EC BIO-6 any potential impacts to blackbird would be less than significant.

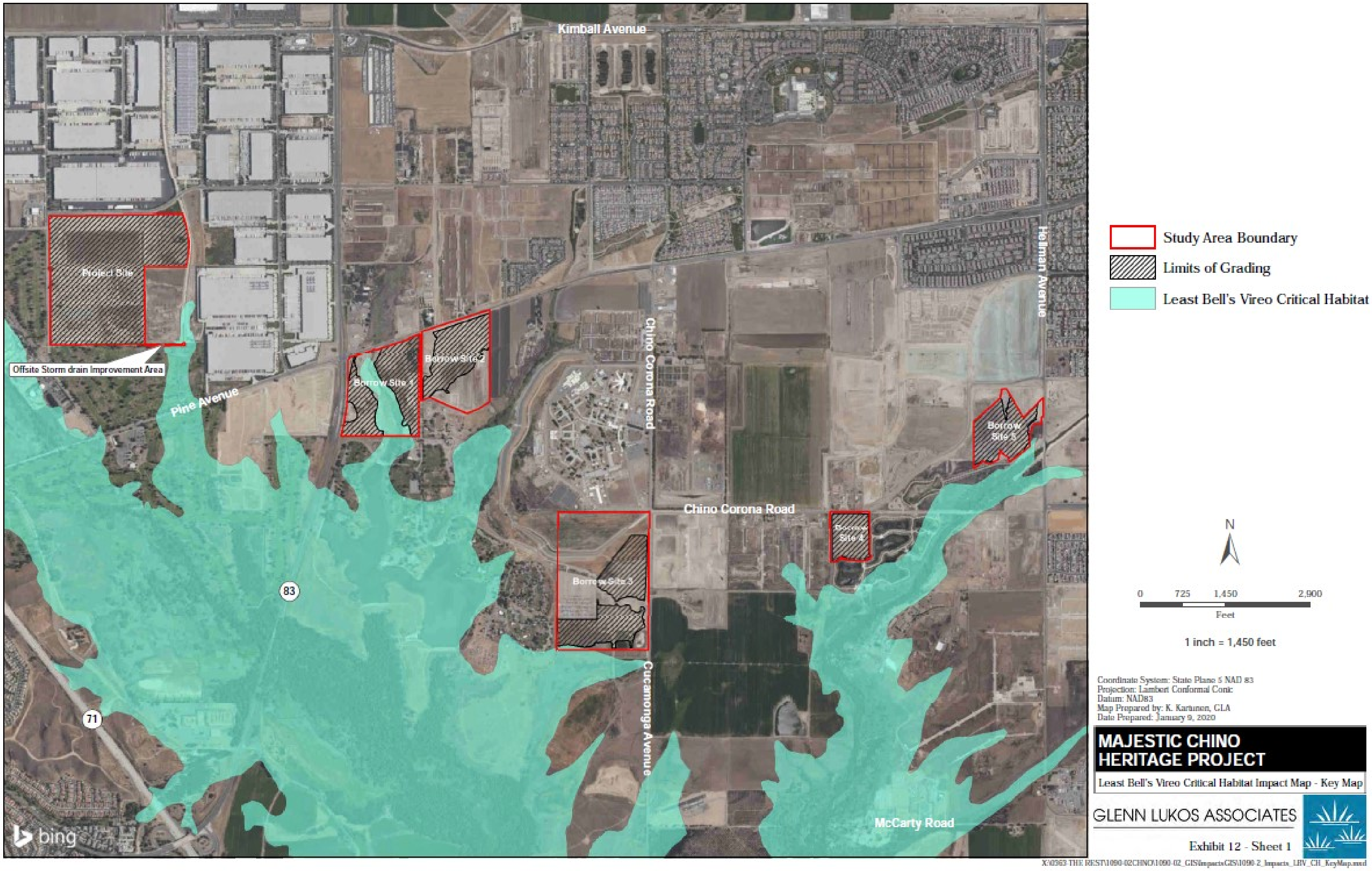
Critical Habitat

Proposed Project Area, Off-Site Storm Drain Improvement Area, and Borrow Sites

The proposed Project area, as well as Borrow Sites 2 and 4, are not located within USFWS-designated critical habitat areas, but the Off Site Storm Drain Improvement Area, and Borrow Sites 1, 3, and 5 are within mapped designated critical habitat for the least Bell's vireo. Project grading activities would avoid critical habitat areas within borrow sites 3 and 5 and therefore no effect to vireo critical habitat would occur for these two borrow sites.

The proposed Project contains two areas that are designated vireo critical habitat that would be affected by grading activities: Off-Site Storm Drain Improvement Area (0.14 acre) and proposed Borrow Site 1 (0.23 acre). Although the area at the Off-Site Storm Drain Improvement Area is designated as critical habitat for vireo, the vegetation consists of ornamental habitat that is maintained by the El Prado Golf Course and Cypress Channel is concrete-lined and includes an earthen maintenance road over the channel. Borrow Site 1 designated critical habitat that would be affected contains ruderal habitat with vegetation species such as jimson weed, mulefat, common sunflower, Canada horseweed, nightshade, and many other non-native invasive species (Exhibit 11 – Sheet 3). These two areas do not contain the primary constituent elements (PCEs) or physical/biological attributes (riparian woodland habitat that generally contains both canopy and shrub layers) which would be utilized by vireo for foraging or nesting. The proposed Project will include implementation of EC BIO-1, application of a native seed mix to the 28.51 acres at Borrow Site 1 where borrow activities would be conducted to avoid the spread of non-native, invasive plant species post construction. While the Corps is initiating Section 7 informal consultation with the U.S. Fish and Wildlife Service, it is expected that no additional measures beyond the application of native hydroseed at these locations would be required to offset impacts to vireo critical habitat within the proposed Borrow Site 1 area. Thus, proposed Project activities may affect, but is not likely to adversely affect least Bell's vireo critical habitat within these two locations.

Exhibit 3.8 – Least Bell's Vireo Critical Habitat Impact Map



Wildlife Linkages

The proposed Project would not interfere or impact the movement of native resident or migratory fish or wildlife species or established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites. The proposed Project lacks migratory wildlife corridors and wildlife nursery sites. Therefore, no impacts to wildlife linkages are expected to occur.

Jurisdictional Impacts

The proposed Project has been designed to avoid permanent impacts to all areas of jurisdictional waters; thus, no permanent impacts to jurisdictional waters are expected to occur. Up to 0.007 acre, 22 linear feet (LF) of temporary impacts to WoUS would occur as a result of a temporary construction footprint within the proposed Off-Site Storm Drain Improvement area. Table 3.1-17 depicts a summary of existing jurisdictional WoUS resources and permanent and temporary impacts to WoUS from implementation of the proposed Project.

Table 3.1-17. Summary of Existing Jurisdictional Resources and Impacts to Jurisdictional Resources

	WoUS EXISTING RESOURCE	WoUS TEMPORARY IMPACTS	WoUS PERMANENT IMPACTS
Project area	0	0	0
Off-Site Improvement area	0.01 ac; 22 LF	0.007 ac; 22 LF	0
Borrow Site 1	4.59 ac; 1,645 LF	0	0
Borrow Site 2	0	0	0
Borrow Site 3	0	0	0
Borrow Site 4	0	0	0
Borrow Site 5	0	0	0
TOTAL	4.6 ac; 1,667 LF	0.007 ac; 22 LF	0

Waters of the U.S.

Based on the current site plan, the proposed Project will not result in any permanent impacts to Corps jurisdictional waters or aquatic features under Section 404. Further, the proposed Project has additionally been designed to minimize temporary impacts to Corps jurisdictional features within Cypress Channel. Temporary impacts of 0.007 acre, 22 LF to WoUS within the Cypress Channel would occur as a result of a temporary construction footprint to implement spill prevention control design features for the storm drain construction at the Cypress Channel. As previously discussed, the storm drain at the Cypress Channel will be constructed primarily from the west side of the concrete wing wall on the west side of the Channel. A tarp will be installed above the OHWM on the east face of the concrete wing wall to prevent construction debris from spilling/entering into the Cypress Channel during construction of the storm drain. Further, access into the Channel during the construction will be limited to workers on foot using hand tools; no mechanized equipment would be used. Thus, temporary impacts would not be significant under this analysis.

Operation and Maintenance

As previously discussed, operations for the proposed Project area would include those typical of industrial buildings, such as employee presence and the transport of items to and from the proposed buildings. Maintenance for the proposed Project area would include routine trash pickup, sediment and debris removal from the water quality/detention basin following each storm or deposition of material, and routine maintenance on and around the roadway, buildings and landscaping of the proposed Project area. Moreover, per EC BIO-1, the proposed borrow sites would have native plant hydroseed at the areas of ground disturbance from grading activities. Thereafter, the sites would remain vacant and undisturbed as in pre-Project conditions. Further, the Off-Site Storm Drain Improvement area's operations and maintenance would include routine clearing of debris from the storm drain area as-needed. Therefore, potential operation and maintenance impacts associated with the proposed Project to biological resources would be less than significant. No effect to listed species or critical habitat would occur. There would be no net loss of sensitive biological habitat value; no impact to wildlife movement or loss of native wildlife or vegetation or loss in overall diversity of the ecosystem.

Exhibit 3.9 – Impacts to Corps/Regional Board Jurisdiction Map – Proposed Project area

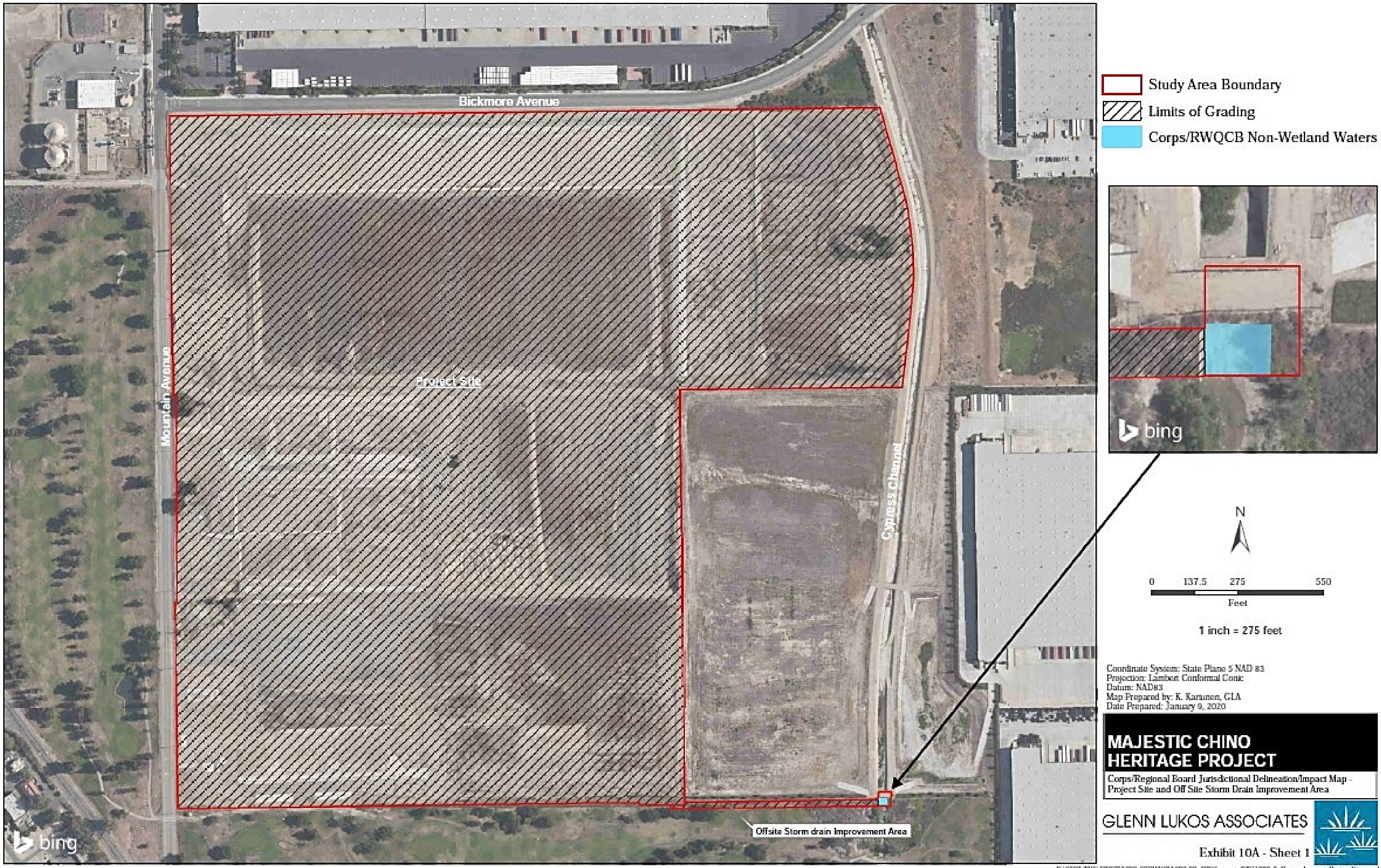
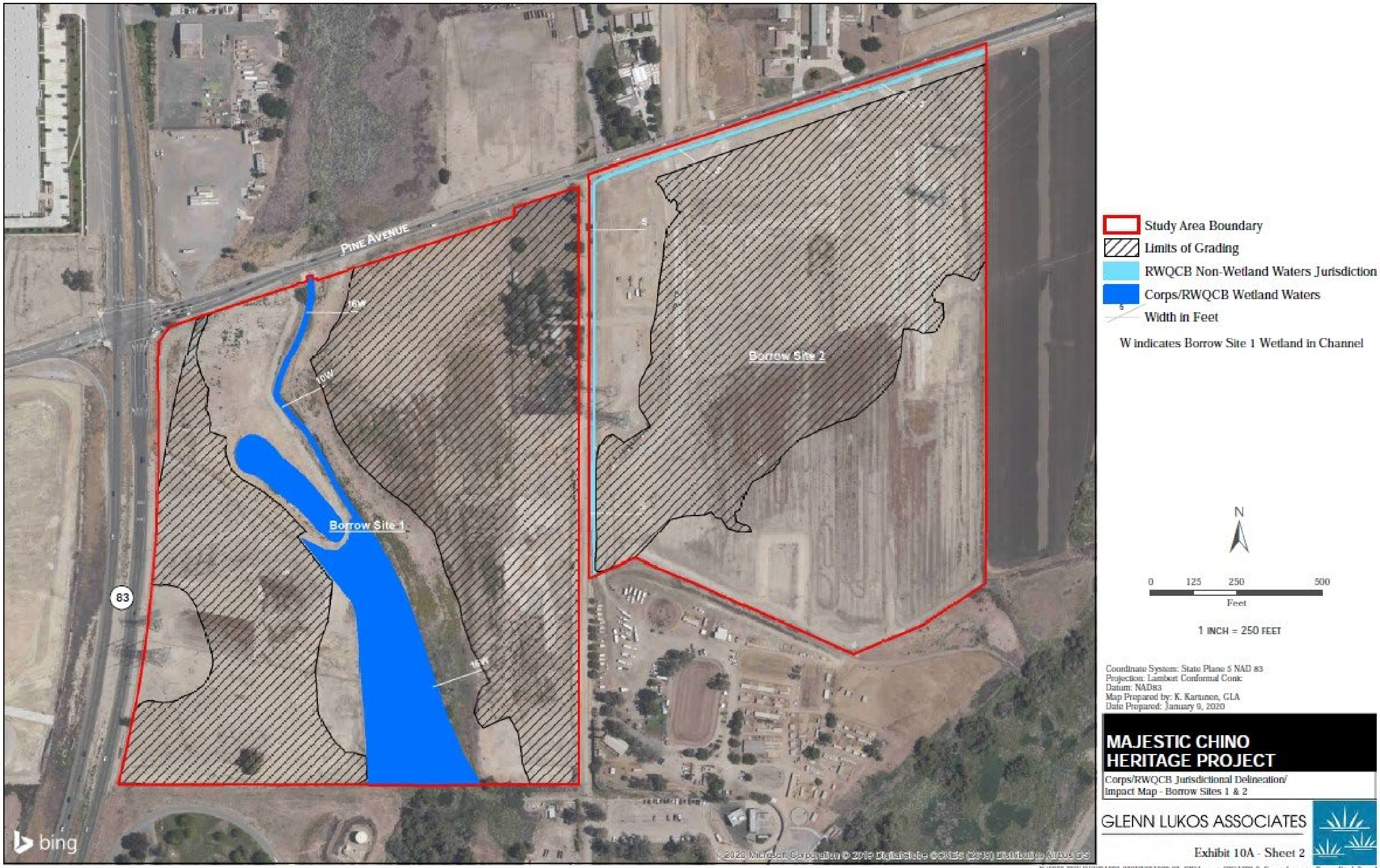


Exhibit 3.10 – Impacts to Corps/Regional Board Jurisdiction Map – Proposed Borrow Sites 1 & 2



3.2 Air Quality

3.2.1 Affected Environment

An Air Quality and Greenhouse Gas Analysis was prepared for the proposed Project and is included in Appendix B.

National Ambient Air Quality Standards

The Clean Air Act identified and established the National Ambient Air Quality Standards (NAAQS) for a number of criteria pollutants in order to protect the public health and welfare. The criteria pollutants include ozone (O3), carbon monoxide (CO), suspended particulate matter (PM), sulfur dioxide (SO2), nitrogen dioxide (NO2), and lead (Pb). PM emissions are regulated in two size classes: Particulates up to 10 microns in diameter (PM10) and particulates up to 2.5 microns in diameter (PM2.5).

A region is given the status of "attainment" or "unclassified" if the NAAQS have not been exceeded. A status of "nonattainment" for particular criteria pollutants is assigned if the NAAQS have been exceeded. Once designated as nonattainment, attainment status may be achieved after three years of data showing non-exceedance of the standard. When an area is reclassified from nonattainment to attainment, it is designated as a "maintenance area," indicating the requirement to establish and enforce a plan to maintain attainment of the standard.

General Conformity Rule

Section 176(c) of the federal Clean Air Act states that a federal agency cannot issue a permit for, or support an activity within, a nonattainment or maintenance area unless the agency determines it will conform to the most recent U.S. Environmental Protection Agency approved State Implementation Plan (SIP). A conformity determination is required for each criteria pollutant or precursor where the total of direct and indirect emissions of the criteria pollutant or precursor in a nonattainment or maintenance area caused by the federal action would equal or exceed the General Conformity applicability rates specified in 40 C.F.R. section 93.153. Operation and maintenance emissions are considered exempt under 40 C.F.R. 93.153, therefore they are not included in the total direct and indirect effects of the federal action.

The proposed Project area is in the South Coast Air Basin (SCAB). The SCAB is composed of Orange County and the urban, non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. The climate of the SCAB is determined primarily by terrain and geography. Local climactic conditions are characterized by warm summers, mild winters, infrequent rainfall, moderate daytime on-shore breezes, and moderate humidity. The SCAB's normally mild climate is occasionally interrupted by periods of hot weather, winter storms, and hot easterly Santa Ana winds.

Table 3.2-1 summarizes the federal attainment status of criteria pollutants in the SCAB.

Table 3.2-1: Attainment Status of Criteria Pollutants in the SCAB

Criteria Pollutant	State Designation	Federal Designation	General Conformity Applicability Rates (tons/year)
Ozone (VOC)	Nonattainment	Nonattainment	10
PM_{10}	Nonattainment	Attainment	100
$PM_{2.5}$	Nonattainment	Nonattainment	100
CO	Attainment	Unclassifiable/Attainment	100
NO2	Attainment	Unclassifiable/Attainment	100
SO2	Unclassifiable/Attainment	Unclassifiable/Attainment	100
Pb	Attainment	Unclassifiable/Attainment	25

Based on the present attainment designation for the SCAB, a federal action would conform to the SIP if annual emissions are below 100 tons of CO, PM2.5, PM10, or N02, 10 tons of VOC, or 25 tons of lead.

3.2.2 Significance Criteria

Impacts would be significant if the proposed Project would cause one or more of the following conditions to occur:

- Exceeds General Conformity Rule Applicability Rates.

3.2.3 Environmental Commitments

None required or proposed.

3.2.4 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed Project area would remain in pre-project conditions. No construction would occur with no impacts related to air quality.

Preferred Alternative/Proposed Project

<u>Proposed Project area, Borrow Sites, and Other Features</u>

General Conformity

The excavation and filling earthwork activities associated with the proposed Project would involve the operation of heavy construction equipment that would produce fuel combustion exhaust emissions. As part of the environmental review of the federal action, a general conformity evaluation has been completed pursuant to 40 C.F.R. 93.153 for the direct effects from construction as related to construction emissions. The general conformity regulations apply because the proposed Project is situated in San Bernardino County within the SCAB, and the County is designated as a nonattainment area for ozone, and PM2.5, as well as an attainment/maintenance area for PM10, NO2, CO and Pb.

Table 3.2-2 summarizes the annual construction air quality emissions and associated General Conformity Applicability Rates. The emission from activity can be either direct or indirect emissions. The type of equipment needed for the activity, the duration it is needed and when during the construction phase it would be used. Particulate emissions from building and road construction may significantly affect local air quality for a temporary period. Construction activities include land clearing, drilling and blasting, ground excavation, cut and fill operations (i.e., earth moving), and construction of a given facility. The amount of particulate emissions is proportional to the area of land being worked on and the level of construction activity. Equipment traffic is a major contributor of emissions. The table indicates the expected emissions from construction activities in comparison to the general conformity rate.

Table 3.2-2: Comparison of Estimated Annual Construction Emissions to General Conformity Applicability Rates

Pollutant	General Conformity Applicability Rates (tons/year)	Estimated Construction Emissions (tons/year)	
		2021	2022
Ozone (VOC)	10	0.36	6.33
CO	100	5.86	12.60
NO2	100	11.46	10.46
SO2	100	0.02	0.05
PM10	100	1.30	3.26
PM2.5	100	0.23	1.00
Pb	25	0	0

Table 3.2-3 summarizes the annual operational air quality emissions and associated General Conformity Applicability Rates. The table indicates the expected emissions from operational activities in comparison to the general conformity rate.

Table 3.2-3: Comparison of Estimated Annual Operational Emissions to General Conformity Applicability Rates

Pollutant	General Conformity Applicability Rates (tons/year)	Estimated Operational Emissions (tons/year)
Ozone (VOC)	10	9.31
CO	100	24.48
NO2	100	31.74
SO2	100	0.17
PM10	100	9.25
PM2.5	100	2.64
Pb	25	0

For all pollutants, the emissions associated with construction of the federal action would be less than the applicability rates; therefore, a general conformity determination is not required. Little to no quantifiable and foreseeable lead emissions would be generated by the construction or operations of the proposed Project. Based on the Air Quality and Greenhouse Gas Analysis results, the proposed Project would not cause or contribute to any new violation of a NAAQS and would not increase the frequency or severity of any existing violation. Additionally, the proposed Project would not delay the timely attainment of any standard, interim emission reduction, or other milestone.

GHG Emissions

Per discussion of greenhouse gas (GHG) above, the estimated GHG emissions are included for the purpose of disclosure under NEPA. Table 3.2-4 identifies the estimated annual GHG emissions metric ton (MT) per year and comparing the two construction years along with the estimated operational emissions. The table indicates that the second construction year increases approximately two times from the first year.

Table 3.2-4: Comparison of Estimated Annual GHG Emissions (Metric Tons/Year)

Pollutant	Estimated Construction Emissions (MT/year)		Estimated Operational Emissions (MT/year)
	2021	2022	
GHGs (CO2e)	2,048.99	4,404.23	20,285.56

3.3 Noise

3.3.1 Affected Environment

The noise measurements presented below focus on the average or equivalent sound levels (Leq). The equivalent sound level (Leq) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. Table 3.3-1 identifies the hourly daytime (7:00

a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) noise levels at each noise level measurement location. Additional median noise levels (L_{50}) are provided on Table 3.3-1 consistent with applicable Municipal Code exterior noise level standards. A summary of the existing ambient noise level locations is described below:

Proposed Project area and Proposed Other Features

- Location L1 represents the noise levels near a Big-League Dreams sports park and Fairfield Ranch Park, west of the proposed Project area. The noise level measurements collected show an overall 24-hour exterior noise level of 57.8 dBA Community Noise Equivalent Level (CNEL). The energy (logarithmic) average daytime noise level was calculated at 53.9 dBA Leq with an average nighttime noise level of 50.3 dBA Leq.
- Location L2 represents the noise levels on Mountain Avenue, north of El Prado Road south of the proposed Project area boundary. The noise level measurements collected show an overall 24-hour exterior noise level of 62.1 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 59.0 dBA Leq with an average nighttime noise level of 54.4 dBA Leq.

Proposed Borrow Sites

- Location L3 represents the noise levels on Pine Avenue, near Lizze Custom Processing, southeast of the proposed Project area. The 24-hour CNEL indicates that the overall exterior noise level is 67.9 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 62.6 dBA Leq with an average nighttime noise level of 61.0 dBA Leq.
- Location L4 represents the noise levels on Johnson Avenue, near Prado Park Equestrian Center, southeast of the proposed Project area. The noise level measurements collected show an overall 24-hour exterior noise level of 58.3 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 53.9 dBA Leq with an average nighttime noise level of 50.9 dBA Leq.
- Location L5 represents the noise levels on Meadowhouse Avenue, near Meadow Square Apartment Homes, east of the proposed Project area. The noise level measurements collected show an overall 24-hour exterior noise level of 65.5 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 60.5 dBA Leq with an average nighttime noise level of 58.3 dBA Leq.
- Location L6 represents the noise levels in Prado Regional Park near campground areas. The noise level measurements collected show an overall 24-hour exterior noise level of 56.3 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 53.8 dBA Leq with an average nighttime noise level of 48.3 dBA Leq.
- Location L7 represents the noise levels on Cucamonga Road, near Vermontes Mulch, southeast of the proposed Project area. The noise level measurements collected show an overall 24-hour exterior noise level of 58.1 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 57.0 dBA Leq with an average nighttime noise level of 48.9 dBA Leq.
- Location L8 represents the noise levels on Chino Corona Road, near County Road, adjacent to existing rural residential homes. The noise level measurements collected show an overall 24-hour exterior noise level of 66.1 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 62.7 dBA Leq with an average nighttime noise level of 58.7 dBA Leq.

- Location L9 represents the noise levels on Hereford Road, near residential construction and a vacant area, east of the proposed Project area. The 24-hour CNEL indicates that the overall exterior noise level is 61.8 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 60.2 dBA Leq with an average nighttime noise level of 53.3 dBA Leq.
- Location L10 represents the noise levels at Walters Street and Hellman Avenue, adjacent to existing residential homes. The noise level measurements collected show an overall 24-hour exterior noise level of 79.7 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 75.4 dBA Leq with an average nighttime noise level of 72.6 dBA Leq.
- Location L11 represents the noise levels on Chandler Street, near a vacant area and existing residential neighborhood. The noise level measurements collected show an overall 24-hour exterior noise level of 65.4 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 61.9 dBA Leq with an average nighttime noise level of 57.7 dBA Leq.

Table 3.3-1 provides the (energy average) noise levels used to describe the daytime and nighttime ambient conditions. These daytime and nighttime energy average noise levels represent the average of all hourly noise levels observed during these time periods expressed as a single number.

The background ambient noise levels in the proposed Project area is dominated by the transportation-related noise associated with the arterial roadway network and background Chino Airport aircraft flyover events. The 24-hour existing noise level measurements shown on Table 3.3-1 present the existing ambient noise conditions.

Table 3.3-1: 24-hour Ambient Noise Level Measurements

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]		Average Median Noise Level (dBA L_{50})[2]		CNEL
		Daytime	Nighttime	Daytime	Nighttime	
L1	Located near a Big League Dreams sports park and Fairfield Ranch Park, west of the proposed Project area.	53.9	50.3	51.7	48.8	57.8
L2	Located on Mountain Avenue, north of El Prado Road south of the proposed Project area boundary.	59.0	54.4	52.9	47.9	62.1
L3	Located on Pine Avenue, near Lizze Custom Processing, southeast of the proposed Project area.	62.6	61.0	58.5	53.2	67.9
L4	Located on Johnson Avenue, near Prado Park Equestrian Center, southeast of the proposed Project area.	53.9	50.9	49.2	47.1	58.3
L5	Located on Meadowhouse Avenue, near Meadow Square Apartment Homes, east of the proposed Project area.	60.5	58.3	56.6	51.9	65.5
L6	Located in Prado Regional Park near campground areas.	53.8	48.3	48.1	45.9	56.3
L7	Located on Cucamonga Road, near Vermontes Mulch, southeast of the proposed Project area.	57.0	48.9	49.1	43.7	58.1

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]		Average Median Noise Level (dBA L_{50})[2]		CNEL
		Daytime	Nighttime	Daytime	Nighttime	
L8	Located on Chino Corona Road, near County Road, adjacent to existing rural residential homes.	62.7	58.7	47.7	43.7	66.1
L9	Located on Hereford Road, near residential construction and a vacant area, east of the proposed Project area.	60.2	53.3	51.5	45.1	61.8
L10	Located at Walters Street and Hellman Avenue, adjacent to existing residential homes.	75.4	72.6	68.9	53.4	79.7
L11	Located on Chandler Street, near a vacant area and existing residential neighborhood.	61.9	57.7	51.1	45.8	65.4

[1] See Exhibit 5-A for the noise level measurement locations.
[2] Energy (logarithmic) average hourly levels. The long-term 24-hour measurement worksheets are included in Appendix 5.".
"Daytime" = 7:00 a.m. to 10:00 p.m"; "Nighttime" = 10:00 p.m. to 7:00 a.m.

City of Chino Municipal Code – 15.44.030 – Construction Hours

A) Construction shall occur only between the hours of 7 a.m. and 8 p.m. Monday through Saturday, with no construction allowed on Sundays and federal holidays. For the purposes of this section, construction shall mean any manmade change to improved or unimproved real estate, including but not limited to buildings or other structures, streets and other paving, utilities, filling, grading, excavation, mining, dredging, drilling operations, or pile driving.
B) The director of community development may approve exceptions to the hours of construction noted in Subsection A of this section, provided that the change in hours does not adversely impact the adjacent neighborhood.

3.3.2 Significance Criteria

Impacts would be significant if the proposed Project would cause one or more of the following conditions to occur:

- Conduct construction outside of allowable hours per the City of Chino Municipal Code without obtaining a variance or exception.
- A significant increase in ambient noise levels for adjacent sensitive receptors.
- Generate excessive groundborne vibration or groundborne noise levels.

3.3.3 Environmental Commitments

None required or proposed.

3.3.4 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed Project area would remain in pre-project conditions. No construction would occur, and noise-related impacts would not occur.

Preferred Alternative/Proposed Project

<u>Proposed Project area, Borrow Sites, and Other Features</u>

A noise study was completed for the proposed Project to analyze construction and operations impacts related to noise; see Appendix C. Noise generated by the proposed Project construction equipment will include a combination of trucks, power tools, concrete mixers, and portable generators that when combined can reach high levels. The number and mix of construction equipment are expected to occur in the following stages:

- Soil Import/Export Process
- Grading
- Building Construction
- Paving
- Architectural Coating

Noise levels generated by heavy construction equipment can range from approximately 68 dBA to in excess of 80 dBA when measured at 50 feet. Based on the reference construction noise levels, the proposed Project-related construction noise levels when the highest reference noise level is operating at the edge of primary construction activity nearest each sensitive receiver location will range from 28.9 to 67.5 dBA Leq at the sensitive receiver locations, as detailed in the noise study. Under the City of Chino Municipal Code, construction activity within 500 feet of existing residences is exempt from the Noise Ordinance if the construction activity occurs between the hours from 8:00 AM to 7:00 PM on weekdays and Saturdays. The proposed Project construction activities would mostly occur within those time periods and a construction variance/exception will be obtained from the City of Chino to conduct construction outside of allowable hours. Import activities from the proposed borrow sites will not overlap with another (i.e., hauling activity at one site is independent from other sites). The construction noise levels would be temporary and would not be considered significant to the surrounding locations.

The Project-related short-term construction noise levels are expected to range approach 38.0 dBA Leq and will not exceed the 65 dBA Leq City of Chino construction noise level threshold at the nearby sensitive receiver locations. Based on the results of this analysis, all nearby sensitive receiver locations will not be experiencing a significant increase in ambient noise levels.

Additionally, construction activities can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from proposed Project construction activities would cause only intermittent, localized intrusion and that the proposed Project related construction vibration levels do not represent levels capable of causing building damage to nearby residential homes. Moreover, the impacts at the site of the closest sensitive receivers are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating adjacent to the proposed Project area perimeter.

In regard to operational noise levels, the closest noise-sensitive receiver locations to the proposed Project area are located greater than 2,000 feet west of the proposed Project area in the City of Chino Hills. An additional noise-sensitive receiver location is identified east of the proposed Project area, at over 4,000 feet from the proposed Project area, in the City of Chino. The operational noise analysis shows that the proposed Project-related stationary-source noise levels at the nearby sensitive receiver locations will satisfy the City of Chino exterior noise level standards and, overall, would not be considered significant.

3.4 Cultural Resources

This section describes the existing cultural resources setting and potential effects associated with the alternatives.

Section 106 of the National Historic Preservation Act (NHPA) requires Federal agencies to consider the effects of their undertakings on properties listed on or eligible for listing on the National Register of Historic Places (NRHP) (historic properties) and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on any undertaking that would adversely affect historic properties. The NRHP is the official list of cultural resources recognized for their national, state, and local significance in American history, architecture, archaeology, engineering, and culture, and worthy of preservation. To be eligible for listing in the NRHP, a cultural resource must meet one of the four significance criteria, listed as items a-d below, specified at 36 CFR 60.4, which reads as follows: The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and

a. that are associated with events that have made a significant contribution to the broad patterns of our history; or

b. that are associated with the lives of persons significant in our past; or

c. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

d. that have yielded, or may be likely to yield, information important in prehistory or history.

There is also a general requirement that properties be older than 50 years.

The Federal agency first determines if it has an undertaking that is a type of activity that could affect historic properties, and if so, the agency determines the area of potential effects (APE) and the scope of appropriate identification efforts. The agency then proceeds to identify historic properties in the APE through various methods, including consultation. If no historic properties are present or affected, the agency provides documentation to the State Historic Preservation Office (SHPO) and tribes, and, barring any objection in 30 days, proceeds with its undertaking. If historic properties are present, the agency proceeds to assess possible adverse effects on the identified historic properties based on criteria found in the ACHP regulations, in consultation with the SHPO/THPO. If they agree that there will be "no adverse effect," consultation is completed. If they find that there is an "adverse effect," or if the parties cannot agree and ACHP determines within 15 days that there is an adverse effect, the agency begins consultation to seek ways to avoid, minimize, or mitigate the adverse effects.

Mitigation under Section 106 of the NHPA is defined as a measure to resolve specific adverse effects to historic properties. Resolution of adverse effects is referenced in the NEPA review and documented in a Memorandum of Agreement (MOA) developed in consultation with the Section 106 consulting parties.

Per 36 CFR 800.16(d), the area of potential effect (APE) is the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." The Corps has defined the APE as the 265.2-acres which consists of the approximately 97-acre proposed Project area and the five proposed borrow sites. This is consistent with the area evaluated in the proposed Project's EIR.

3.4.1 Affected Environment

Proposed Project area, Borrow Sites, and Other Features

A Cultural Resource Study of the APE was completed for the proposed Project by Brian F. Smith and Associates, Inc. (BFSA). The historic resource investigation of the undertaking included a review of archaeological records search information provided by the South Central Coastal Information Center (SCCIC) at California State University, Fullerton (CSU Fullerton) and the Eastern information Center (EIC) at the University of California at Riverside (UCR). The records search provided information regarding previous archaeological studies in the area and any previously recorded sites within, or in the immediate vicinity of, the APE.

In addition to the record search, a Class III cultural resources survey of the APE was conducted on March 14 and 15, 2019 and described in the report entitled A Section 106 (NHPA) Historic Properties Study for the Majestic Chino Heritage Project, on file at the Corps Los Angeles District. The majority of the property has been disturbed and cultivated in the past, and previous impacts include dairy operations, the establishment of dirt roads, and general agricultural use. A total of thirteen cultural resource sites were identified within the APE during the survey and/or record search. Seven of these sites had previously been recorded, CA-SBR-2845, CA-SBR-5241, CA-SBR-12573H, CA-SBR-12613H, P-36-029722, CA-SBR-29791H, and P-36-029792. Of these seven previously-recorded sites, six had been either recommended as ineligible for the NRHP or were determined to be not eligible for the California Register of Historic Places. As part of their assessment, BFSA re-examined these six sites and also recommended them as ineligible for the NRHP under all criteria. The seventh previously recorded site, CA-SBR-12573H, is a historic ditch known to have been in existence in 1888. The records search indicates a 430-foot portion of the ditch should be located within the southeast corner of Borrow Site Five; however, BFSA did not identify the presence of any portion of the historic era ditch remaining within the APE. Historical aerial photographs indicate that portions of the ditch in the APE were likely destroyed prior to 1938.

During their Class III cultural resources survey, BFSA identified six additional sites in the APE. Of the six newly recorded sites, five are foundation remnants of demolished buildings and structures, CA-SBR-33112H, CA-SBR-33113H, CA-SBR-33115H, CA-SBR-33116H, and CA-SBR-33117H. All five are associated with the region's dairy history. None of these sites retain enough integrity to be eligible under Criteria A-C. Further, since the burning of garbage was outlawed in 1939 and garbage collection was available in the early 1950s, it is unlikely that trash deposits associated with these foundations are present. The remaining site, P-36-033114, consists of a single-family residence built between 1948 and 1959 and a detached garage built between 1967 and 1980. There is also a modern shed and modern cabin built after 1980. The residence and garage lack essential integrity. Neither structure is representative of any specific architectural style or are associated with events or individuals.

The Corps has determined that the 12 sites still extant in the APE are not eligible for the NRHP under any criteria. The historic ditch, CA-SBR-12573H, is a long linear site and where it is still extant it may be eligible; however, it is no longer present within the APE. The Corps is currently consulting with the SHPO regarding their determinations of eligibility.

CEQA Native American Consultation

On October 15, 2018, BFSA requested a Sacred Lands File (SLF) Search for the Project from the California Native American Heritage Commission (NAHC). A return response by the NAHC was received on October 26, 2018 and indicated that the APE was negative for the presence of recorded sacred sites or locations of religious or ceremonial importance. The NAHC nonetheless recommended contacting Native American individuals and groups in the region of the APE and provided a list of contacts. BFSA subsequently contacted the individuals and groups on the NAHC-provided list via postal and email communications on November 6, 2018 and two responses were received.

The Morongo Band of Mission Indians indicated they have no additional information to provide at this time. Additionally, the Agua Caliente Band of Cahuilla Indians indicated the APE is not located within their Traditional Use Area and deferred to other tribes in the area. Copies of the Native American consultation documentation are provided in Appendix D.

Section 106 Native American Consultation

The Corps has initiated consultation under Section 106 of the NHPA, via letters dated August 6, 2020, with the following Federally recognized and non-Federally recognized Tribes. Fernandeño Tataviam Band of Mission Indians; Gabrieleno Band of Mission Indians - Kizh Nation; Gabrieleno/Tongva San Gabriel Band of Mission Indians; Gabrielino /Tongva Nation; Gabrielino Tongva Indians of California Tribal Council; Gabrielino-Tongva Tribe; San Fernando Band of Mission Indians; Soboba Band of Luiseno Indians. The Corps has provided the Federally recognized and non-Federally recognized Tribes a copy of the cultural resource report and has sought their assistance in identifying any properties which are of religious or cultural significance that may be affected by the project (pursuant to 36 C.F.R 800.4(a)(4)).

The Gabrieleno Band of Mission Indians - Kizh Nation (Kizh Nation) requested to consult on the undertaking. The Corps had a consultation meeting with Kizh Nation on September 2, 2020. Kizh Nation requested to monitor all ground disturbing activities. The Corps has required the applicant to notify Kitz Nation a minimum of 14 days prior to ground disturbing activities; to allow a tribal representative to attend the pre-grading meeting with the City and Project construction contractors; and to provide an opportunity for them to monitor ground disturbance as safety protocols allow. The San Fernando Band of Mission Indians has also responded to the Corps letter saying that the project does not fall within their traditional or ancestral territory, and that they will defer consultation to other local Tribes.

3.4.2 Significance Criteria

Under NEPA, significance is determined based on 'context' and 'intensity'. For cultural resources, context is often viewed in terms of how important the resource may or may not be, while intensity is viewed in terms of the severity of the impacts to the resource. While cultural resources that are not eligible for the NRHP are still considered as part of the NEPA review, once that resource fails to meet the criteria for eligibility for inclusion on the NRHP its 'context' is found to be lacking. The phrase "adverse effect" (used in the NHPA) and "significant impact" (used in NEPA) are not equivalent terms but are similar in concept. Under the NHPA, impacts to cultural resources are typically examined in terms of how the project would affect the characteristics that make the property eligible for the National Register. Such impacts are referred to as adverse effects in the NHPA's implementing regulations. Impacts would be significant if the proposed Project would cause one or more of the following conditions to occur:

- The undertaking would result in a significant adverse effect to a historic property such that the implementation of the alternative would result in the destruction of a historic property or the loss of a property's eligibility.

3.4.3 Environmental Commitments

With the implementation of the following environmental commitment for the proposed Project, potential impacts to cultural resources would be reduced to a less than significant level.

EC CUL-1: Pursuant to 36 CFR section 800.13, in the event of any discoveries during construction of either human remains, archeological deposits, or any other type of historic property, the proposed Project Applicant shall notify the Corps Archaeology Staff within 24 hours (Danielle Storey at 213-452-3855 OR Meg McDonald at 213-452-3849). The proposed Project Applicant will immediately suspend all work in any area(s) where potential cultural resources are discovered. The proposed Project shall not resume construction in the area surrounding the potential cultural resources until the Corps re-authorizes project construction, per 36 C.F.R. section 800.13. Additionally, the Corps will consult with the appropriate tribes and would allow tribal monitoring during ground disturbing activities if requested.

EC CUL-2: The proposed Project Applicant will retain a qualified archaeologist (hereafter "Project Archaeologist") to conduct training and monitoring activities described in EC CUL-3 and EC CUL-4.

EC CUL-3: The proposed Project Applicant or construction contractor shall ensure the construction site supervisors and crew members involved with grading and trenching operations have received training by the Project Archaeologist to recognize historical and archaeological resources should such resources be unearthed during ground-disturbing construction activities. The training will include a brief review of the cultural sensitivity of the area; what resources could potentially be identified during earthmoving activities; the requirements of the monitoring program; the protocols that apply in the event inadvertent discoveries of cultural resources are identified, including who to contact and appropriate avoidance measures until the find(s) can be properly evaluated; and any other appropriate protocols. All new supervisorial construction personnel involved with grading and trenching operations that begin work on the proposed Project area, borrow sites, or Other Features sites following the initial training session must take the training prior to beginning work.

EC CUL-4: The Project Archaeologist shall conduct monitoring in the locations shown on Exhibit 3.12 through Exhibit 3.17. The Project Archaeologist shall be equipped to salvage artifacts if they are unearthed to avoid construction delays. Within the areas where full-time monitoring is required, monitoring shall occur during all grading, trenching, and excavation activities between zero and four feet below the existing ground surface. Within the areas where periodic monitoring is required, monitoring shall occur one to two times per week only during active grading, trenching, or excavation activities up to four feet below the existing ground surface. No monitoring – either periodic or full-time – is required deeper than four feet below the existing ground surface. Should the Project Archaeologist determine that there are no archaeological resources within the proposed Project's disturbance area or should the archaeological sensitivity be reduced to low during construction activities, archaeological monitoring activities shall be allowed to cease.

EC CUL-5- The Project Applicant shall notify the Gabrieleno Band of Mission Indians - Kizh Nation (Kizh Nation) a minimum of 14 days prior to the start of ground disturbing activities and provide an opportunity to monitor construction as safety protocols allow. They shall be notified of and allowed to attend the pre-grading meeting with the City and Project construction contractors.

3.4.4 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed Project area and proposed borrow sites would remain in pre-Project conditions. No construction would occur, and impacts related to NRHP structures, NRHP eligible structures, and sensitive cultural resources would not occur.

Preferred Alternative/Proposed Project

<u>Proposed Project area, Borrow Sites, and Other Features</u>

Cultural Resources

The cultural resources study for the proposed Project identified 13 cultural resources within the APE. The Corps has determined that twelve of these sites are not eligible for the NRHP under any criteria. The thirteenth cultural resource is no longer present within the APE and therefore would not be affected by the proposed Project. The Corps has found that the undertaking would result in no affect to historic properties and the SHPO has concurred with the Corps determinations and findings (Appendix D). Because there are no historic properties present in the APE, the proposed Project would not result in a significant adverse effect to a historic property such that the implementation of the alternative would result in the destruction of a historic property or the loss of a property's eligibility. Effects associated with the proposed alternative would be less than significant under NEPA. In order to address the residual risk that construction activities associated with the proposed Project may unearth buried or masked historic properties, EC CUL-1 through EC CUL-5 would be implemented to further reduce less than significant impacts.

Exhibit 3.12 – Cultural Monitoring Location Map: Project area

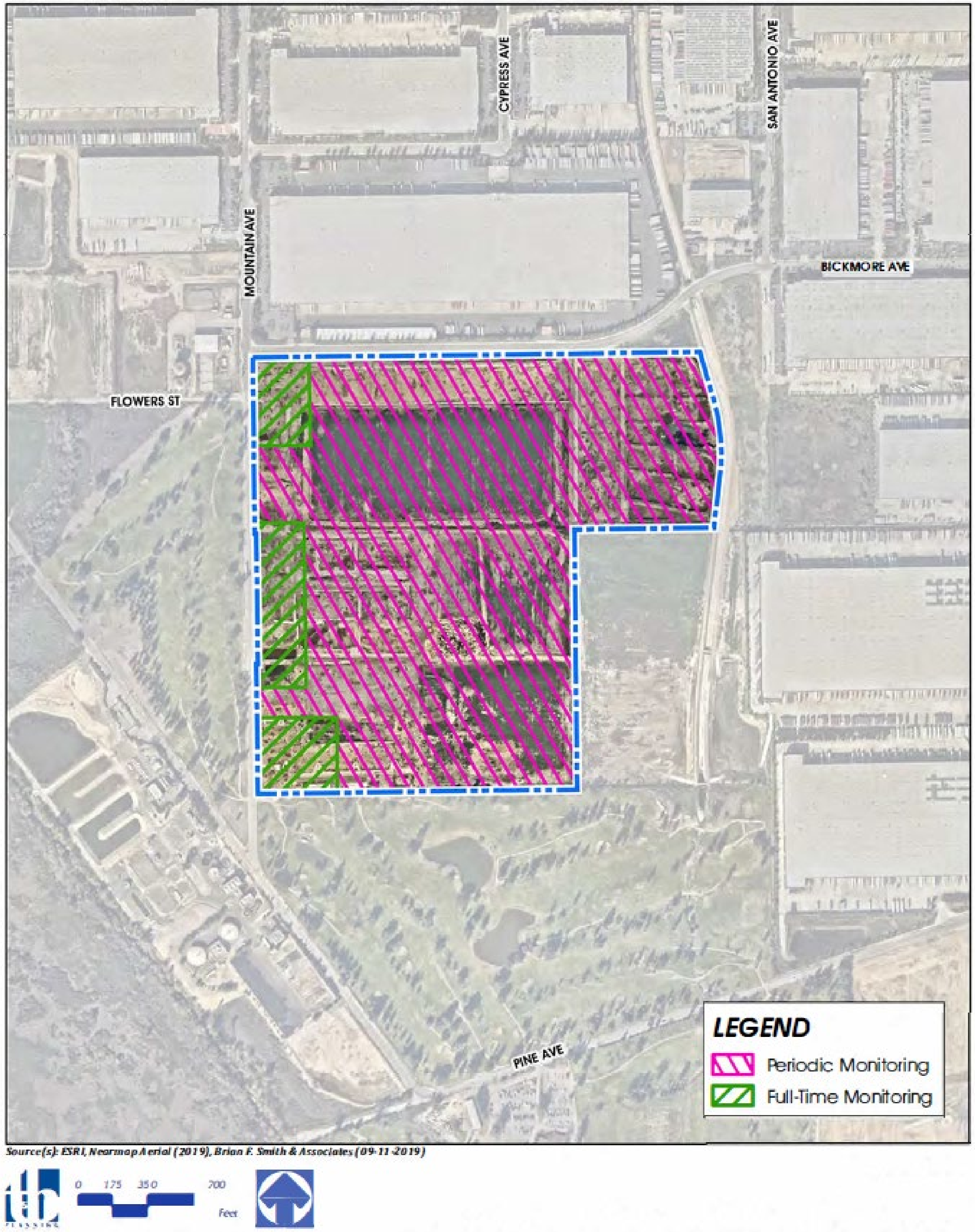


Exhibit 3.13 – Cultural Monitoring Location Map: Borrow Site 1

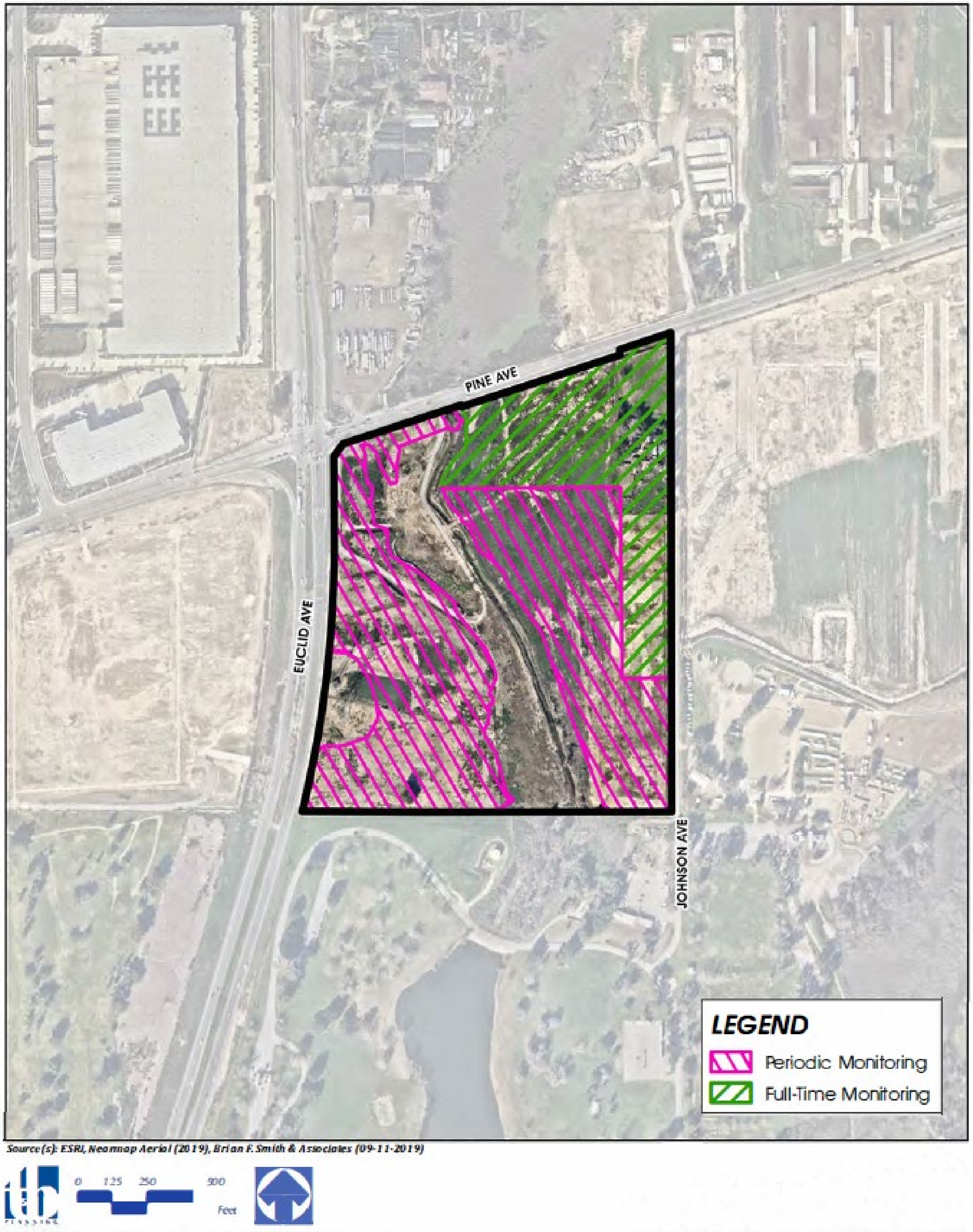


Exhibit 3.14 – Cultural Monitoring Location Map: Borrow Site 2

Exhibit 3.15 – Cultural Monitoring Location Map: Borrow Site 3

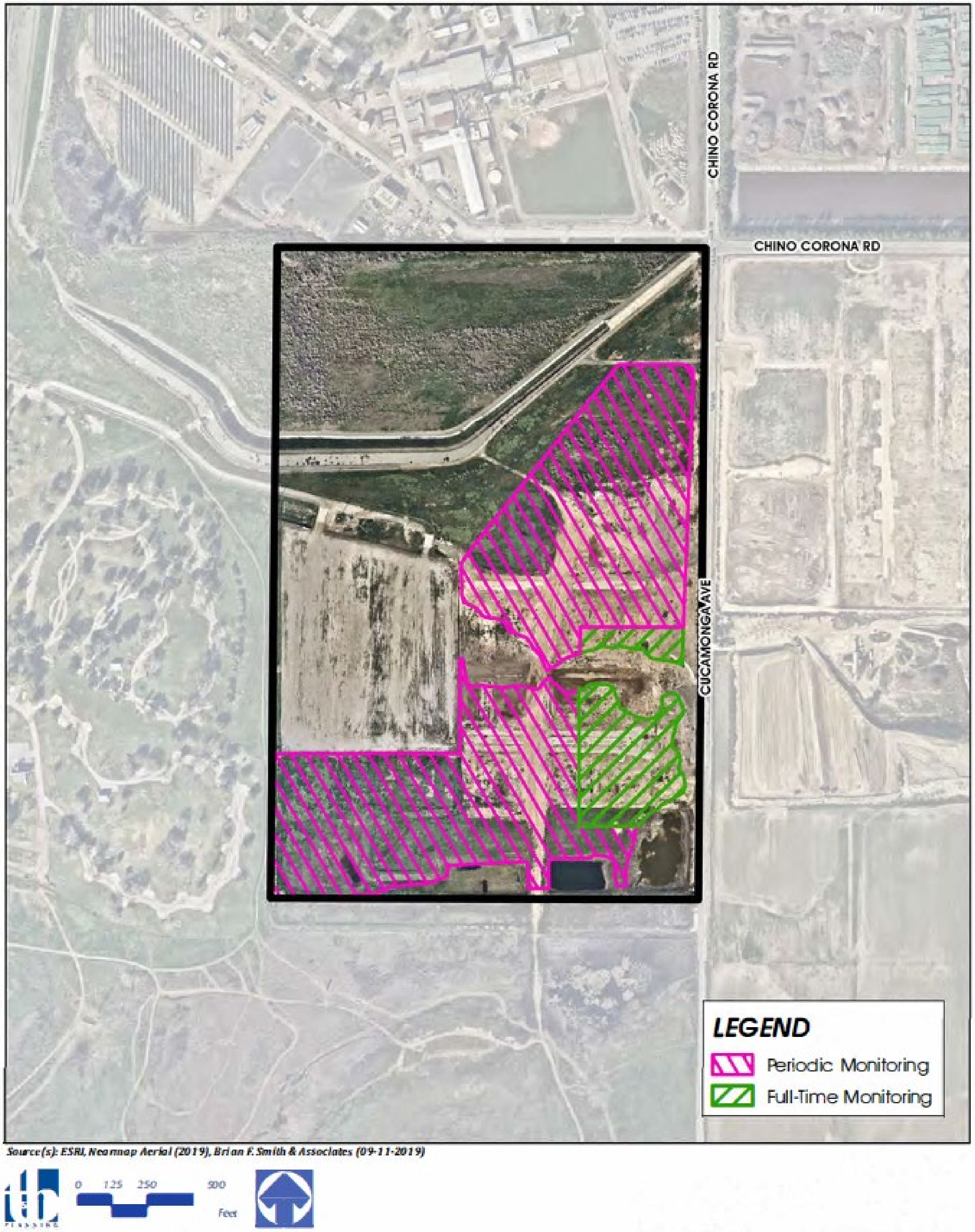
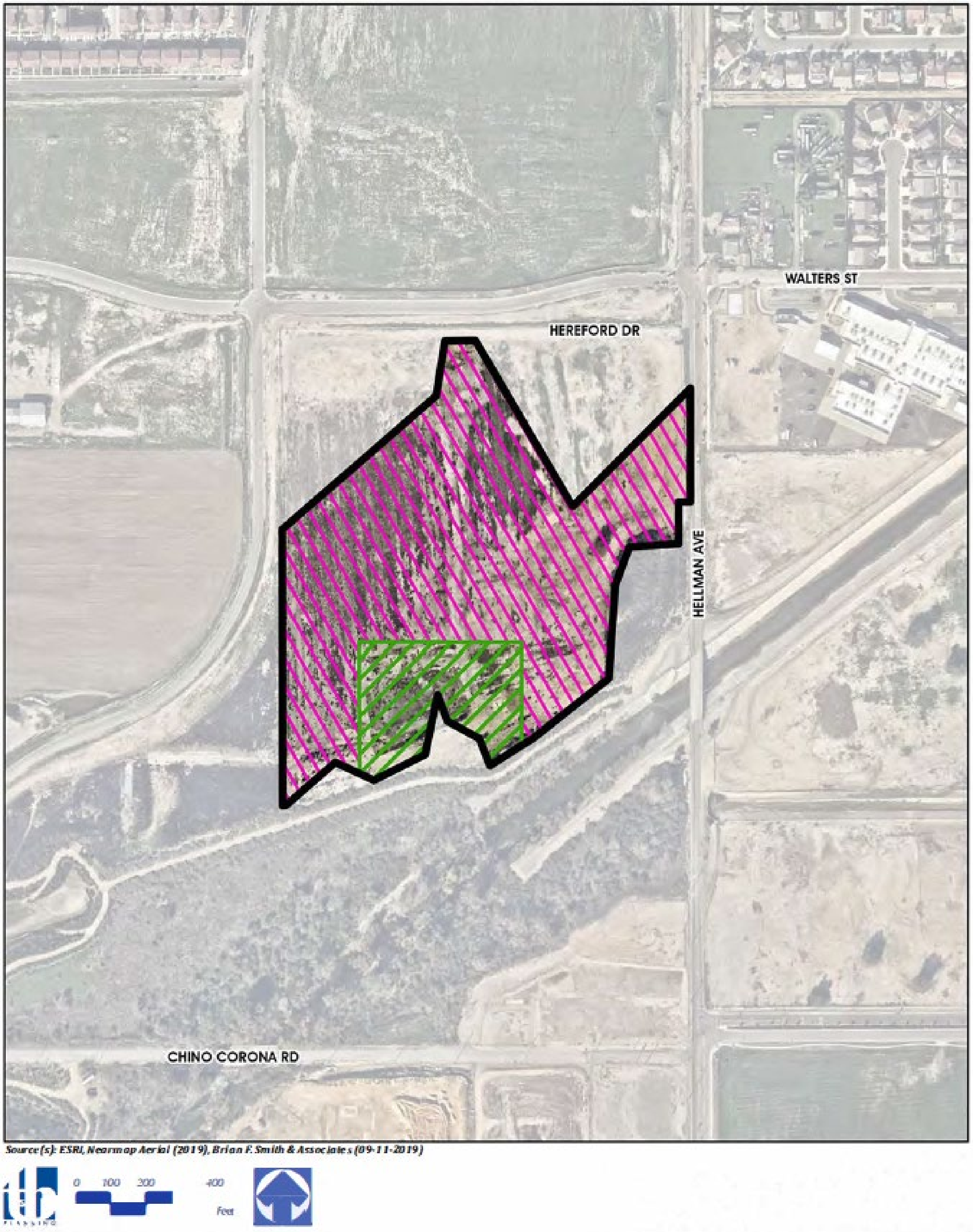


Exhibit 3.16 – Cultural Monitoring Location Map: Borrow Site 4

Exhibit 3.17 – Cultural Monitoring Location Map: Borrow Site 5



3.5 Earth Resources

3.5.1 Affected Environment

The below is based on Geotechnical Studies prepared for the proposed Project and is included in Appendix E.

Geological Setting

Regionally, the proposed Project area, proposed borrow sites, and proposed Other Features are located in the Peninsular Ranges geomorphic province, a prominent natural geomorphic province that extends from the Santa Monica Mountains approximately 900 miles south to the tip of Baja California, Mexico, and is bounded to the east by the Colorado Desert. The Peninsular Ranges province is composed of plutonic and metamorphic rock, lesser amounts of Tertiary Volcanic and sedimentary rock, and Quaternary drainage in-fills and sedimentary veneers.

The geologic structure of the entire southern California area is dominated mainly by northwest-trending faults associated with the San Andreas system. Similar to other properties throughout southern California, the subject properties are located within a seismically active region and are subject to ground shaking during seismic events; however, no known active faults exist on or near the proposed Project area, proposed borrow sites, or proposed Other Features, nor are the sites situated within an “Alquist-Priolo” Earthquake Fault Zone. A segment of the Chino Avenue Fault traverses the southwest portion of the proposed Project area; however, this fault has not moved in the previous 11,000 years and is presumed to be inactive. Further, there are no active or potentially active faults occurring on proposed borrow sites 1 through 5, and no known faults are mapped trending through or toward any of these sites.

<u>Proposed Project area</u>

The proposed Project area is presently vacant, and the buildings and cattle shelters from the past have been removed. However, many of the slabs on grade and foundations are still in place. The dominant features of the site are the many berms/levees that were constructed across the site. Many of these berms appear to have been constructed by pushing on-site soils into piles; however, the upper portion of some of the berms include imported soils. Within the northeast corner of the proposed Project area, some of the berms are fitted with concrete spillways. Most of the berms have heights in the range of 3 to 6 feet and consist of relatively loose undocumented fill. The northeast corner of the site contains several water detention basins that are 3 to 5 feet deep; most of these basins have concrete-lined spillways. Within the same area, there is a relatively deep pond (roughly 80 to 100 feet wide, 200 feet long and 12 to 20 feet deep) containing vegetation and trash; this pond retains water during several months of the year. Two relatively smaller ponds were observed adjacent to Mountain Avenue; these ponds also retain stormwater for several months of the year until the water evaporates. These ponds are about 10 to 12 feet deep. The site generally slopes gently from north to south with elevations ranging from about 565 to 553 feet. Along the east property line, within the southeast portion of the site, there is a slope descending about 10 to 13 feet to a flood basin area. This slope gradually decreases in height in the north direction until it reaches to about 5 feet. Within the eastern portion of the proposed Project area, there is an area measuring about 200 by 200 feet that was used to place import material. Several truckloads of soils were brought in and dumped in place without spreading. The average thickness of dumped material is on the order of 2.5 to 3 feet.

Proposed Borrow Sites

Proposed Borrow Site 1

The main topographic feature of proposed Borrow Site 1 is a creek/drainage channel that flows southerly and divides the property in two parts. The jurisdictional boundary of the creek ranges in width from about 30 to 60 feet. On the west side of the creek, the ground surface generally slopes moderately toward the creek except for the area immediately adjacent to the creek which is relatively level and subject to flooding. There is also relatively level ground immediately adjacent to Euclid Avenue to the west. The ground elevations hover around 560 feet along Euclid Avenue and range between about 530 and 540 feet (NAVD88) along the west side of the creek. On the east side of the creek, the highest area is located in the northeast corner portion of the site where there is relatively flat ground with elevations between about 559 and 560 feet. The ground surface generally slopes between elevations 560 and 550 feet, toward the south, along Johnson Avenue. Within the southern one-half of the site, west of Johnson Avenue, there is a relatively level area with elevations ranging from about 547 to 557 over a width of 280 to 330 feet. On the west side of this area, the ground surface slopes toward the creek. Within the northern portion of the site and east of the creek, the ground surface generally slopes west toward the creek within a distance of about 250 feet from the creek. The grades along the creek generally ranges from 530 to 540 feet.

Other features of proposed Borrow Site 1 include above ground structures, which encompass a caretaker residence located within the northeast corner of the site. There is still a small area located in the vicinity of the caretaker residence being used for farming purpose. Along Johnson Avenue, there are several slabs at grade that appear to be the remains of former buildings. High voltage overhead power lines, which are supported by steel towers, cross the site from east to west.

There is some evidence that prior grading has occurred at the site. There are four small retaining walls located in the northwest corner of the site along with a remaining driveway ramp. There is an access road that begins along Pine Avenue, passes parallel to Euclid Avenue and loops down along the west side of the creek. A small retaining wall and a slope was built to support a portion of that loop road. On the east side of the creek, the main past grading appears to be near the south end of the site where up to about 15 feet of fill may have been placed to raise the grades in the vicinity of the creek. Some grading also appears to have been performed to bury the foundation of some buildings that have been removed. There are concentrations of large shrubs along the east side of the creek within the southern portion of the site.

Proposed Borrow Site 2

Proposed Borrow Site 2 in its present state has been cleared of the past structures such as buildings, animal shelters, and other above ground ancillary facilities; however, it appears that several foundations and slab on grade are still in place. The dominant features of the site are a few berms, a water pond that was constructed near the south end of the site, and power line towers. Many of the berms appear to have been constructed by pushing on-site soils into piles. Most of the berms have heights in the range of 3 to 5 feet and consist of relatively loose undocumented fill.

Near the southern end of the site, there is a detention basin approximately 100 feet long, 30 feet wide and 5 feet deep. High voltage overhead power lines, which are supported by steel towers, cross the site from east to west.

Proposed Borrow Site 3

No buildings are present on proposed Borrow Site 3, but there are remnants of concrete slabs on grade in various locations. Power lines supported on pile foundations cross the site about 100 feet north of West County Road. Portions of the site support irrigation lines that are being used to water recent seeding and other grass areas. More than one-half of the site is devoid of vegetation and the remainder of the site contains mostly sparse to dense grass vegetation.

The southern portion of proposed Borrow Site 3 contains several water storage ponds that range in depth mostly from about 3 to 7 feet. The ponds appear to have been created by excavating and mounding the native soils around the excavations. There are localized grass areas and low shrubs near the ponds.

The northern portion of the site slopes gently to the southwest while the southern portion generally slopes gently to the south. The existing elevations range between about 545 feet at the south end to 566 feet at the northeast corner of the site (NAVD88).

Proposed Borrow Site 4

Except for localized areas where concrete is exposed, the ground surface of proposed Borrow Site 4 is predominantly bare soils. There are some concrete slabs remaining at the southwest corner of the site and near the southeastern boundary along with an asphalt paved driveway in the northeastern portion of the site. The site has been cleared of trees as well as past structures such as buildings, animal shelters, and other above ground ancillary facilities. The site generally slopes to the south between about elevations 563 and 555 feet except for the south end of the site that has a 10-foot high slope dipping toward an existing retention pond.

Proposed Borrow Site 5

In its present state, proposed Borrow Site 5 has been cleared of all past structures such as buildings, shelters, and above ground ancillary facilities; however, it appears that several foundations, slabs on grade, and underground conduits are still in place. There are overhead powerlines present on site, trending north-south, west of Hellman Ave and roughly 60 feet into the property. The dominant features of the site are the many small berms and unpaved roads that were constructed across the site. Many of the berms appear to have been constructed by pushing on-site soils into piles. Most of the berms have heights in the range of 1 to 2 feet and consist of relatively loose undocumented fill. The site has exposed bare ground with a few trees and shrubs along Hellman Avenue and around seasonal water ponds.

The south side of the site contains a 4 to 6-foot-deep water detention basin; the basin has an entry ramp in the northeast corner. Little vegetation and trash were found within the basin.

The site generally slopes gently from north to south with elevations ranging for the most part from about 555 to 545 feet. Along the east property line, within the southeast portion of the site, there is a gentle slope descending about 8 to 11 feet to the Cucamonga Creek.

3.5.2 Significance Criteria

Impacts would be significant if the proposed Project would cause one or more of the following conditions to occur:

- Cause significant erosion or siltation;
- Expose people or structures to major geologic hazards, unstable earth conditions or changes in geologic substructure;
- Interfere significantly with groundwater recharge.

3.5.3 Environmental Commitments

With the implementation of the following environmental commitments for the proposed Project, potential impacts to earth resources would be reduced to a less than significant level.

EC GEO-1: The proposed Project would be required to adhere to the City's regulatory requirements, including, but not limited to, requirements imposed by the City's National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater Permit, and Project-specific Stormwater Pollution Prevention Plan (SWPPP), and Water Quality Management Plan (WQMP) to minimize water pollutants including erosion and sedimentation in stormwater runoff.

3.5.4 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed Project area would remain in pre-project conditions. No construction would occur, and impacts related to water erosion, sedimentation, groundwater percolation or infiltration would not occur.

Preferred Alternative/Proposed Project

<u>Proposed Project area, Borrow Sites, and Other Features</u>

Erosion and Sedimentation

The proposed Project construction activities would involve earth movement and the exposure of soil, which would increase erosion and siltation susceptibility, but the impacts would be short term. Temporary indirect impacts may also occur due to heavy construction equipment tracking soil to offsite locations. Storm water could also carry loosened sediment beyond the project limits. Per EC GEO-1, the proposed Project would be required to adhere to the City's regulatory requirements, including, but not limited to, requirements imposed by the City's NPDES Municipal Stormwater Permit, a Project-specific SWPPP and WQMP to minimize water pollutants including erosion and sedimentation in stormwater runoff. With the implementation of EC GEO-1, potential impacts from erosion or siltation would be less than significant.

Geologic Hazards

The proposed Project is located in the seismically active area of Southern California and is expected to experience moderate to severe ground shaking during the lifetime of the proposed Project. The risk is not considered significantly different than that of other similar properties in the Southern California Area. The grading activities for the proposed Project would occur on relatively flat land with gentle slopes. Based on the geotechnical design, the proposed Project would not result in unstable earth conditions or changes in geologic substructure nor expose people or structures to major geologic hazards.

Groundwater

The proposed Project would be served with potable water from the City of Chino and does not propose the use of any wells or other groundwater extraction activities. Therefore, the proposed Project would not directly draw water from the groundwater table. Development of the proposed Project area would increase the extent of impervious surfaces on site, which could reduce the amount of water that directly infiltrates into the ground and reaches the groundwater table. However, a majority of the groundwater recharge in the Chino groundwater basin occurs in the northern portion of the Basin, north of the City of Chino, within percolation basins located throughout San Bernardino County. The proposed Project area is located in the southern portion of the Chino groundwater basin and would not physically impact any of the major groundwater recharge facilities in the Basin and, therefore, would not result in significant, adverse effects to local groundwater levels. Additionally, the proposed Project area would include the installation of a water quality basin and permeable landscape areas to maximize the percolation of on-site stormwater runoff into the groundwater basin. Accordingly, buildout of the proposed Project with these design features would not interfere significantly with groundwater recharge. The removal of dirt from the off-site proposed borrow sites also would not have an adverse effect on groundwater because the surface permeability of the sites would not be affected.

Operations and Maintenance

Operations for the proposed Project area would include those typical of industrial buildings, such as employee presence and the transport of items to and from the proposed buildings. Maintenance for the proposed Project area would include routine trash pickup, sediment and debris removal from the water quality/detention basin following each storm or deposition of material, and routine maintenance on and around the roadway, buildings and landscaping of the proposed Project area. The sites would remain vacant and undisturbed, which would be the same as the existing condition. Further, the Off-Site Storm Drain Improvement area's routine operation and maintenance would include clearing debris from the storm drain area as needed. Therefore, potential operation and maintenance impacts associated with the proposed Project would not be significant. Overall, impacts to erosion, sedimentation and groundwater are not significant and would not be considered significant.

3.6 Water Resources and Hydrology

3.6.1 Affected Environment

Proposed Project area, Borrow Sites, and Other Features

The proposed Project area is located within the Prado Dam basin. As mentioned in Section 3.1 above, the proposed Project contains two drainages which include the Cypress Channel and Drainage 1. The Cypress Channel is concrete lined and eventually transitions to unlined and flows make their way downstream into Prado Dam basin. The Cypress Channel is impaired by pollutants (i.e., trash, metals, bacteria, nutrients) mainly because of the watershed's large, dense population and the amount of impervious ground surface that prevents large quantities of runoff from infiltrating into the soils. Drainage 1 is within proposed Borrow Site 1 and is a drainage course supporting wetland and riparian habitat, which flows in a north to south direction for 1,645 feet before leaving proposed Borrow Site 1. The Cypress Channel and Drainage 1 are not listed on the Federal water quality impairment 303(d) list.

The Cypress Channel is within the vicinity of the proposed Project area. The sides of the channel are trapezoidal and concrete-lined to control flood events. The proposed Project area is located at the southeast corner of Mountain Avenue and Bickmore Avenue and is directly adjacent to the western side of the channel. Due to the improvements that exist on the perimeter of the proposed Project area and the existing topography, there are no tributary areas that direct runoff to the proposed Project area. The proposed Project is currently located within the Prado Dam basin area and below the 566-foot elevation. Most of the proposed Project is located within the basin area for the Prado Dam and the southwest portion of the proposed Project site contains a small sliver of land that is mapped as being located within the FEMA-mapped "Zone AE," which is considered a 100-year flood hazard area.

3.6.2 Significance Criteria

Impacts would be significant if the proposed Project would cause one or more of the following conditions to occur:

- Significantly alter drainage patterns or the rate and amount of surface runoff;
- Cause or result in significant flooding;
- Significantly degrade water quality.

3.6.3 Environmental Commitments

None required or proposed.

3.6.4 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed Project area would remain in pre-project conditions. No construction would occur, and impacts related to altering drainage patterns and surface runoffs, flooding, and water quality would not occur.

Preferred Alternative/Proposed Project

<u>Proposed Project area, Borrow Sites, and Other Features</u>

Implementation of the proposed Project would involve demolition, clearing, grading, paving, utility installation, building construction, and landscaping activities, which could result in the generation of water quality pollutants such as silt, debris, chemicals, paints, and other solvents with the potential to adversely affect water quality. As such, minor short-term water quality impacts have the potential to occur during construction of the proposed Project. However, the proposed Project would require that Best Management Practices (BMPs) be implemented during construction to address water pollutants and that they be identified and addressed in the final water quality management plan.

A preliminary water quality management plan (PWQMP) has been completed for the proposed Project and is included in Appendix F. Runoff from the proposed Project area under post-development conditions could contain some water pollutants, but not at levels that would be considered significant. The PWQMP identifies all applicable BMPs typical of the type of proposed development, including a centrally located stormwater treatment basin designed as a water quality/detention basin be constructed. The water quality/detention basin would incorporate vegetative cover and preselected fill bottom material and sub-drain arrays to treat the required design volume as well as to draw down the design capture volume within the requisite timeframes. The proposed Project would not have impacts related to water quality that would be considered significant.

As part of the overall proposed Project's construction process, the proposed finished building floor surfaces would be raised in elevation to be above the 566-foot elevation inundation area. Other portions of the proposed Project area (e.g., parking lots, detention/water quality basins) may remain within the Prado Dam's basin area upon the completion of the proposed Project construction. The fill material to raise the buildings' site above the 566-foot elevation would be excavated from multiple proposed borrow sites, as explained above, that are owned by the Orange County Flood Control District and located within the 566-foot elevation or lower within the Prado Dam basin. Ultimately, a net increase of approximately 191,000 cubic yards (124 acre-feet) of flood capacity within the Prado Dam basin would result from the proposed Project. Thus, the proposed Project would not result in additional flood risk within the Prado Dam basin and would not result in a significant additional flood storage capacity. The proposed Project would not cause or result in significant flooding to areas that were not already part of the Prado Dam basin flood area.

During construction, on-site surface flows from the proposed Project area and laydown areas would be required to implement standard BMPs, as specified in the SWPPP, which would ensure that surface runoff rates and amounts would not result in flooding to either on- or off-site areas. Each of the five proposed borrow sites would be graded to drain similar to the way the site currently drains. Construction of the proposed Project would not significantly alter the existing drainage patterns or hydrology of the proposed Project area.

After construction, the proposed Project area would have a water quality/detention basin at the southern portion of the property. This basin would address water quality of stormwater runoff and drainage from the proposed Project area. The water from the water quality/detention basin would eventually drain into the Cypress Channel via a new storm drain, which is part of the proposed Project's Off-Site Storm Drain Improvement. After construction, the proposed Project area's finished building floor surfaces would be above the 566-foot elevation as well as other portions of the site. Because the borrow sites are currently located within the Prado Dam basin area and below the 566-foot elevation, post-construction, the borrow sites that were graded would have overall increased flood capacity. This would be considered an incidental benefit to the public because of increased flood capacity within the Prado Dam backwater area.

The proposed Project would not indirectly impact drainage patterns or the rate and amount of surface runoff, increase flooding or degrade water quality.

As previously discussed, operations for the proposed Project area would include those typical of industrial buildings, such as employee presence and the transport of items to and from the proposed buildings. Maintenance for the proposed Project area would include routine trash pickup, sediment and debris removal from the water quality/detention basin following each storm or deposition of material, and routine maintenance on and around the roadway, buildings and landscaping of the proposed Project area. The sites would remain vacant and undisturbed after construction is completed, which would be the same as the existing condition. Further, the Off-Site Storm Drain Improvement area's routine operation and maintenance would include clearing debris from the storm drain area as needed. Therefore, potential operation and maintenance impacts associated with the proposed Project to water resources and hydrology would not be significant.

3.7 Public Safety (Hazardous Materials and Emergency Response)

3.7.1 Affected Environment

Proposed Project area and Other Features

A Phase I Environmental Site Assessment (Phase I) was completed for the proposed Project area and the associated proposed borrow sites and are included in Appendix G. For the proposed Project area, historical land uses in the general area have included agriculture, dairy farming, golf courses, wastewater treatment, and commercial developments. No hazardous substances or hazardous wastes were observed at the proposed Project area during the site inspection. No recognized environmental conditions (RECs) were noted during the site inspection or identified during the review of regulatory database and other historical records. Regulatory database information identified few known and suspected contamination sites in the area surrounding the proposed Project property. Based on the available information, it is unlikely that any of these sites have affected the environmental condition of the proposed Project property.

Proposed Borrow Sites

For proposed Borrow Site 2, no hazardous substances or hazardous wastes were observed at proposed Borrow Site 2 during the site inspection. No RECs were noted during the site inspection or identified during the review of regulatory database information. In 1971, an underground fuel storage tank was removed from the Rocha Dairy Property located at 7311-7433 Pine Avenue. No environmental sampling was conducted during tank removal activities. In 2009, soil samples collected at the former tank location confirmed the presence of weathered gasoline constituents. The confirmed presence of residual gasoline is defined as a REC for the proposed Borrow Site 2 property. The tank was removed in 1971 and the extent of soil/groundwater impacts were defined; MTBE was not detected, and that future land use will exclude residential development. As a result, the Santa Ana RWQCB issued a 'No Further Action Letter' to the Rocha Dairy (dated July 2, 2009). However, since residual gasoline constituents are present, the Phase I assessment considers the contamination to be a controlled recognized environmental condition (CREC). Regulatory database information identified few known and suspected contamination sites in the area surrounding the proposed Borrow Site 2 property. Based on the available information, it is unlikely that any of these contamination sites have affected the environmental condition of proposed Borrow Site 2.

For all other proposed borrow sites, historical land uses in the general area have included agriculture, dairy farming, equestrian, state prison, etc. No hazardous substances or hazardous wastes were observed at the proposed Project Borrow Site properties during the site inspections. No RECs were noted during the site inspections or identified during the review of regulatory databases and other historical records. Regulatory database information identified few known and suspected contamination sites in the area surrounding the proposed Project Borrow Site properties. Based on the available information, it is unlikely that any of these sites have affected the environmental condition of the proposed Project Borrow Site properties.

3.7.2 Significance Criteria

Impacts would be significant if the proposed Project would cause one or more of the following conditions to occur:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan;
- Expose people or structures to a significant risk of loss, injury or death involving wild land fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

3.7.3 Environmental Commitments

With the implementation of the following environmental commitments for the proposed Project, potential impacts to public safety (hazardous materials and emergency response) would be reduced to a less than significant level.

EC HAZ-1: During construction and operation of the Project, all local, state, and federal regulations would be complied with regarding the transportation, handling, and storage of hazardous substances.

EC HAZ-2: At each work area involving the operation of heavy equipment and handling and storage of hazardous substances, a Hazardous Material Spill Prevention Plan would be prepared. The Hazardous Material Spill Prevention Plan shall contain contingency plans in the event of an accidental release into the environment.

EC HAZ-3: Prior to the start of construction, the applicant would prepare an Emergency Evacuation Plan that contains procedures for the demobilization of construction equipment and evacuation of personnel from the study area in the event of a pending significant storm or other emergency that jeopardizes the safety of personnel or equipment.

3.7.4 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed Project area would remain in pre-project conditions. No construction would occur, and impacts related to public safety would not occur.

Preferred Alternative/Proposed Project

Proposed Project area

For the proposed Project area, the Phase I assessment has revealed no evidence of current conditions indicative of releases or threatened releases of hazardous substances. Therefore, further environmental investigation is not recommended by the Phase I.

The proposed Project would entail the construction of two industrial buildings on the proposed Project area, which would require the need for emergency access to-and-from the site. During construction, limited amounts of hazardous materials used in typical of construction activities would be stored, used, and transported to the proposed Project area (fuel, architectural coatings, etc.). While the proposed Project is not expected to result in the release of hazardous substances into the environment, potential direct and indirect impacts could result from the use of heavy equipment in the transport of fill from the proposed borrow sites to the proposed Project area. These potential impacts could occur through incidental release of hazardous substances, such as fuels and oil, during construction-related transport activities. Additionally, though future building user(s) are unknown at this time, hazardous materials may be used and stored on the proposed Project area as part of routine building occupant operations. However, the occupant would be required to follow applicable federal, state, and local laws for use and/or storage of hazardous materials. Further, with the implementation of EC HAZ-1 and EC HAZ-2, potential impacts would be less than significant. As a mandatory condition of the proposed Project's approval, the proposed industrial buildings are required to be constructed in accordance with the California Building Standards Code (CBSC), also known as California Code of Regulations (CCR), Title 24 (Part 2), and the Chino Building Code, which is based on the CBSC with local amendments. The CBSC and Chino Building Code have been specifically tailored for California earthquake conditions and provide standards that must be met to safeguard life or limb, health, property, and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of all buildings and structures.

During construction and long-term operation, the proposed Project would be required to maintain adequate emergency access for emergency vehicles as required by the City. As mentioned above, the proposed Project is located in the City of Chino and as such, during the course of the City's design review process, the City will review the proposed site plan to ensure that the proposed Project provides adequate access to-and-from the proposed Project area for emergency vehicles. The City also will review the layout of the proposed Project's industrial buildings, drive aisles, parking lots, and truck courts provide adequate on-site circulation for emergency vehicles. The proposed Project's proposed driveways would connect directly to Mountain Avenue and Bickmore Avenue. Further, with the implementation of EC HAZ-3, which would require the preparation of an Emergency Evacuation Plan, potential impacts would be less than significant.

Maintenance for the proposed Project area would include routine trash pickup, sediment and debris removal from the water quality/detention basin following each storm or deposition of material, and routine maintenance on and around the roadway, buildings and landscaping of the proposed Project area. Potential operation and maintenance impacts associated with the proposed Project area would not be significant.

<u>Proposed Borrow Sites and Other Features</u>

For proposed Borrow Site 2, the Phase I assessment has revealed evidence of current conditions indicative of releases or threatened releases of hazardous substances. It is not anticipated that Borrow Site 2 would be needed for soil export and, thus, it is considered a 'last-case scenario' option as the last Borrow Site to be used in the sequencing if needed. Although further environmental investigation is not recommended by the Phase I, any soil excavated in the former tank area would be properly characterized prior to removal from the proposed Borrow Site 2 property.

For the rest of the proposed borrow sites and Other Features, the Phase I assessment has revealed no evidence of current conditions indicative of releases or threatened releases of hazardous substances. Therefore, further environmental investigation is not recommended by the Phase I. Impacts to public safety are not anticipated as a result of the proposed Project.

The sites would remain vacant and undisturbed after construction, which would be the same as the existing condition. Further, the Off-Site Storm Drain Improvement area's operations and maintenance would include routine maintenance to clear debris from the storm drain area as needed. Therefore, potential operation and maintenance impacts associated with the proposed Project would not be significant.

3.8 Recreation

3.8.1 Affected Environment

<u>Proposed Project area, Borrow Sites and Other Features</u>

There are several parks and recreational facilities adjacent to the proposed Project area, but not within the Project area. These parks are as follows: Fairfield Ranch Park, Chino Creek Wetlands and Educational Park, Pinehurst Park, Little Chino Skatepark, Big League Dreams Chino Hills, Prado Regional Park, and El Prado Golf Course.

3.8.2 Significance Criteria

Impacts would be significant if the proposed Project would cause one or more of the following conditions to occur:

- Increase the use of existing neighborhood and regional parks or other recreation facilities such that significant physical deterioration of the facility would occur or be accelerated.

3.8.3 Environmental Commitments

None required or proposed.

3.8.4 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed Project area would remain in pre-project conditions. No construction would occur and therefore recreational impacts would not occur.

Preferred Alternative/Proposed Project

<u>Proposed Project area, Borrow Sites and Other Features</u>

The proposed Project does not propose any type of residential use or other land use that may generate a population that would increase the use of existing neighborhood and regional parks or other recreational facilities.

Operations and maintenance activities for the proposed Project include routine trash pickup, sediment and debris removal from the water quality/detention basin following each storm or deposition of material, and routine maintenance on and around the roadway, buildings and landscaping of the proposed Project area. No impact would occur to recreation resources.

3.9 Aesthetics

3.9.1 Affected Environment

Proposed Project area, Borrow Sites and Other Features

The proposed Project area is located in the City of Chino, which lies on relatively flat and gently sloping topography. No designated scenic vistas or scenic corridors are located in the vicinity of the proposed Project area (Chino, 2010, p. CC-21). Distant views of the Chino Hills to the west and south are available from public viewing areas in the proposed Project area vicinity; however, these views are not prominent from the proposed Project area and are available in numerous locales in the City. The proposed Project was formerly used for factory dairy farm operations that included dirt livestock pens (corrals) for the holding and separation of cattle intended for milking and slaughter and ancillary features such as hay/milking barns and open-air wastewater collection ponds. Structures proposed on the proposed Project area would be less than 60 feet tall. Other features including, but not limited to, ancillary structures, walls, fencing, landscaping, and parking areas would be lower in profile and at grade. Other visual resources include distant views of the Chino Hills to the west and south are available from public viewing areas in the proposed Project area vicinity.

3.9.2 Significance Criteria

Impacts would be significant if the proposed Project would cause one or more of the following conditions to occur:

- Have a significant adverse effect on a scenic vista;
- Create a new source of significant light or glare which would adversely affect day or nighttime views in the area.

3.9.3 Environmental Commitments

None required or proposed.

3.9.4 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed Project area would remain in pre-project conditions. No construction would occur and impacts related to aesthetics would not occur.

Preferred Alternative/Proposed Project.

Proposed Project area, Borrow Sites and Other Features

As mentioned above, the proposed Project was formerly used for factory dairy farm operations that included dirt livestock pens (corrals) for the holding and separation of cattle intended for milking and slaughter and ancillary features such as hay/milking barns and open-air wastewater collection ponds. Implementation of the proposed Project would convert the proposed Project area from vacant land to an industrial development with two large industrial buildings as well as ancillary improvements such as parking lots, drive aisles, utility infrastructure, landscaping, exterior lighting, signage, and water quality/detention basins. The proposed Project would be compatible with the size, scale, height, and aesthetic qualities of other large industrial buildings constructed in the immediate vicinity of the proposed Project area and would be required to comply with the Chino Development Code that mandates the compliance with standards that regulate the visual quality of development. Further, the proposed borrow sites would include grading activities on vacant land that contains minimal aesthetic value. The proposed borrow sites contain predominately exposed bare ground where grading activities would occur. After grading, the proposed borrow sites would have less soil volume than their current state, but the aesthetics of the sites would be similar to existing conditions. Therefore, the proposed Project, borrow sites, and other features do not have a significant adverse effect on a scenic vista within Prado Basin and the surrounding areas.

The City of Chino Municipal Code includes design standards for outdoor lighting that apply to all development in the City (Chino, 2018, § 20.10.090). The Municipal Code lighting standards govern the placement and design of outdoor lighting fixtures to ensure adequate lighting for public safety while also minimizing light pollution and glare and precluding public nuisances (e.g., blinking/flashing lights, unusually high intensity or bright lighting). As a standard condition of approval, the proposed Project would be required to comply with the Chino Municipal Code, including provisions applicable to outdoor lighting. Mandatory compliance with the City of Chino Municipal Code would ensure that the proposed Project does not create a new source of significant light or glare that would adversely affect day or nighttime views in the area.

3.10 Traffic and Circulation

3.10.1 Affected Environment

Proposed Project area, Borrow Sites and Other Features

A Traffic Impact Analysis (TIA) was completed for the proposed Project and is included in Appendix H. Major streets serving the proposed Project are listed below. Sidewalks are generally available in the vicinity of the project area. The roadway classifications and planned roadway cross-sections of the major roadways within the proposed Project area are also described below. The TIA study area includes a total of 43 existing and future intersections. Exhibit 3.11 illustrates the proposed Project intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

Currently, there are State truck routes and other truck routes throughout the City of Chino. The designated truck routes within the study area are El Prado Road, Mountain Avenue, Bickmore Avenue, Riverside Drive, Kimball Avenue, Flight Avenue, Merrill Avenue, Hellman Avenue, and Pine Avenue; while Euclid Avenue (SR-83) is a designated State Truck Route. Other large truck routes in the study area include Central Avenue and Edison Avenue. The designated truck routes are utilized to route truck traffic from both the proposed Project and future cumulative development projects throughout the study area.

3.10.2 Significance Criteria

Impacts would be significant if the proposed Project would cause one or more of the following conditions to occur:

- Cause an increase in traffic which is significant in relation to the existing traffic load and capacity of the street system (i.e., result in a significant increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections).
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses.

3.10.3 Environmental Commitments

With the implementation of the following environmental commitments for the proposed Project, potential impacts to traffic and circulation would be reduced to a less than significant level.

EC TRAF-1: At time of issuance of each building's certificate of occupancy, the proposed Project Applicant shall participate in the City's city-wide Development Impact Fee (DIF) program by paying the requisite DIF fee on a per building basis for Building 1 and Building 2, DIF fees may be reduced or off-set based on the cost DIF eligible facilities constructed by the proposed Project Applicant.

EC TRAF-2: Prior to the issuance of each building's certificate of occupancy, the proposed Project Applicant shall pay the proposed Project's fair share amount of $27,445 for Building 1 and $21,464 for Building 2 (total of $48,909) for the improvements identified at intersections located within the City of Chino.

EC TRAF-3: The TIA includes intersections that either share a mutual border with or are wholly located within the City of Ontario, City of Chino Hills and City of Eastvale, or are subject to the jurisdiction of Caltrans that have recommended improvements which are not covered by DIF. Because the City does not have plenary control over intersections that share a border with these other agencies, the City cannot guarantee that such improvements will be constructed. Thus, the following additional measure is required: The City shall participate in a multi-jurisdictional effort with the City of Ontario, City of Chino Hills, City of Eastvale, and Caltrans to develop a study to identify fair share contribution funding sources attributable to and paid from private and public development to supplement other regional and State funding sources necessary to implement the improvements identified in the TIA, that are located in these other jurisdictions. The study shall include fair share contributions related to private and or public development and, to this end, the study shall recognize that impacts attributable to the City of Ontario, City of Chino Hills, City of Eastvale, and Caltrans facilities that are not attributable to development located within the City are not paying in excess of such developments' fair share obligations. The study shall set forth a timeline and other agreed upon relevant criteria for implementation of the recommendations contained within the study to the extent the other agencies agree to participate in the fee study program. Because the City and these other agencies have the responsibility of implementing this measure, the developer shall have no compliance obligations with respect to this measure.

EC TRAF-4: The developer's fair share amount for the intersections that either share a mutual border with or are wholly located within the City of Ontario, City of Chino Hills, and the City of Eastvale or are subject to the jurisdiction of Caltrans that have recommended improvements which are not covered by DIF are as follows:

- City of Ontario: $33,635 for Building 1 and $26,306 for Building 2 (total of $59,941)
- City of Chino Hills: $13,919 for Building 1 and $10,886 for Building 2 (total of $24,805)
- City of Eastvale: $344 for Building 1 and $268 for Building 2 (total of $612)
- Caltrans: $2,991 for Building 1 and $2,338 for Building 2 (total of $5,329)

The developer shall be required to pay the amount shown above to the City prior to the issuance of the Project's final certificate of occupancy. The City shall hold 'Developer's Fair Share' contribution in trust and shall apply 'Developer's Fair Share Contribution' to any fee program adopted or agreed upon by the City and other agencies as a result of implementation of TRAF EC-3. If, within five years of the date of collection of 'Developer's Fair Share Contribution', the City and other agencies do not comply with TRAF EC-3, then 'Developer's Fair Share Contribution' shall be returned to the developer.

EC TRAF-5: The proposed Project Applicant will be required to develop and implement a Corps and City-approved Construction Traffic Management Plan addressing potential construction-related traffic detours and disruptions. In general, the Construction Traffic Management Plan would ensure that to the extent practical, construction traffic would access the proposed Project area during off peak hours or limited access during the peak hours; and that construction traffic would be routed to avoid travel through, or proximate to, sensitive land uses.

EC TRAF-6: The delivery and removal of heavy equipment is recommended to minimize the heavy truck activity during the morning and evening peak periods (6:00 AM to 9:00 AM and 3:00 PM to 6:00 PM) in order to have nominal impacts to traffic and circulation near the vicinity of the proposed Project.

EC TRAF-7: During the site grading, the proposed Project shall limit soil import activity between the proposed Project area and excess dirt fill sites during the hours of 6:00 AM – 9:00 AM (morning peak period) and 3:00 PM – 6:00 PM (evening peak period) to fewer than the equivalent of 50 passenger car equivalent (PCE) truck trips per hour. 50 PCE truck trips equates to approximately 16 total trucks (8 trucks in and 8 trucks out) during the peak periods specified above in order to limit the potential impacts of haul truck activity during these busy commute times: 50 PCE truck trips / 3.0 PCE factor = 16 total trucks during the peak hour.

3.10.4 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed Project area would remain in pre-project conditions. No construction would occur and impacts related to traffic and circulation would not occur.

Preferred Alternative/Proposed Project

<u>Proposed Project area, Borrow Sites and Other Features</u>

As mentioned above, a TIA was prepared for the proposed Project, which is attached in Appendix H. Per the TIA, the proposed Project would have some impacts to intersections that would require some environmental commitments to reduce impacts to an acceptable level. The proposed Project is estimated to generate a net total of 4,440 trip-ends per day (actual vehicles) on a typical weekday with approximately 252 net AM peak hour trips and 338 net PM peak hour trips. The assumptions and methods used to estimate the proposed Project's trip generation characteristics are discussed in greater detail in the TIA. Additionally, the proposed Project would not create increased hazards due to a design feature or incompatible use. With the implementation of TRAF EC-1 to TRAF EC-7, traffic and circulation impacts will be less than significant.

Operation and Maintenance

Operations for the proposed Project area would include employee presence and the transport of items to and from the proposed buildings. Maintenance for the proposed Project area would include routine trash pickup, sediment and debris removal from the water quality/detention basin following each storm or deposition of material, and routine maintenance on and around the roadway, buildings and landscaping of the proposed Project area. Further, the Off-Site Storm Drain Improvement area's operations and maintenance would include routine maintenance to clear debris from the storm drain area as-needed. Therefore, potential operation and maintenance impacts associated with the proposed Project to traffic would not be significant; there would not be an increase in existing traffic loads.

3.11 Utilities

3.11.1 Affected Environment

Proposed Project area, Borrow Sites and Other Features

A variety of utilities such as power lines, telecommunications, and stormwater lines are adjacent to the proposed Project area. The City's Bureau of Sanitation and private waste management companies manage the collection, transfer, and disposal of municipal solid waste. Powerlines currently exist on the west site of the proposed Project area and run parallel with the site. There are also powerlines running north of Pine Ave, and south of Johnson Ave but which do not transverse into Borrow Site 1 and 2. Borrow Site 3 has a powerline on the east of the site running along Cucamonga Ave and Borrow Site 4 has a powerline north of the site on Chino Corona Road. Borrow Site 5 does not have powerlines on the street surrounding the site. Water and sewer conveyance services are provided to the Project area by the City of Chino. Under existing conditions, water lines are installed beneath Bickmore Avenue and Mountain Avenue, and a sewer line is installed beneath Mountain Avenue. In the proposed Project area, the City of Chino conveys wastewater flows to the Inland Empire Utility Agency (IEUA) for treatment at Regional Water Recycling Plant No. 5 (RP-5), which is located immediately northwest of the Project area. Solid waste from the Project area is expected to be disposed at the El Sobrante Landfill.

3.11.2 Significance Criteria

Impacts would be significant if the proposed Project would cause one or more of the following conditions to occur:

- If existing utility systems would be adversely affected by the proposed construction activities.
- If there is any unplanned disruption of utility service or physical impact to existing utility lines.

3.11.3 Environmental Commitments

None required or proposed.

3.11.4 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed Project area would remain in pre-project conditions. No construction would occur and impacts related to the existing utility, disruption of utility service or physical impact to utility lines would not occur.

Preferred Alternative/Proposed Project.

<u>Proposed Project area, Borrow Sites and Other Features</u>

The proposed Project would include installation of new utility service facilities as necessary to serve the proposed Project area but would not require new utility service facilities at the proposed borrow sites and the proposed Other Features. New utility service facilities on the proposed Project area would be required to follow local and state laws. The proposed Project area would result in operational consumption of natural gas and electricity. Natural gas would be supplied to the proposed Project area by Southern California Gas Company and electricity would be supplied by Southern California Edison. Regarding solid waste, the proposed Project would be required to comply with the City of Chino's waste reduction programs, including recycling and other diversion programs to divert the amount of solid waste deposited in landfills. Additionally, in accordance with the California Solid Waste Reuse and Recycling Act of 1991 (Cal Pub Res. Code § 42911), the proposed Project would provide adequate areas for collecting and loading recyclable materials where solid waste is collected. The collection areas are required to be shown on construction drawings and be in place before occupancy permits are issued. The implementation of these programs would reduce the amount of solid waste generated by the proposed Project and diverted to landfills, which in turn will aid in the extension of the life of affected disposal sites. There is no expectation of any unplanned disturbance on existing utility lines; however, improvements on existing utility lines may be necessary for off-site improvements.

Operation and Maintenance

As previously discussed, operations for the proposed Project area would include those typical of industrial buildings, such as employee presence and the transport of items to and from the proposed buildings. Maintenance for the proposed Project area would include routine trash pickup, sediment and debris removal from the water quality/detention basin following each storm or deposition of material, and routine maintenance on and around the roadway, buildings and landscaping of the proposed Project area. Further, the Off-Site Storm Drain Improvement area's operations and maintenance would include routine maintenance to clear debris from the storm drain area as-needed. Therefore, potential operation and maintenance impacts associated with the proposed Project to utilities would not be significant. No impacts related to the existing utility, disruption of utility service or physical impact to utility lines would occur.

3.12 Land Use

3.12.1 Affected Environment

<u>Proposed Project area and Other Features</u>

The proposed Project area is located in an area that was historically used for agriculture and factory dairy operations and is transitioning to a cluster of employment uses. The property to the north and east contains large light industrial/warehouse buildings. The property located to the south and west is occupied by the El Prado golf course. The IEUA and the Regional Water RP-5 are also located to the northeast of the proposed Project. The Chino Airport is located approximately 1.2 miles to the northeast of the site. Land uses surrounding the proposed Project area include Property located to the north of the proposed Project area is occupied by large industrial/warehouse buildings to the north, El Prado golf course to the south, Mountain Avenue to the west, and Cypress Channel to the east.

The proposed Project area is located approximately 1.2 miles southwest of the nearest runways at the Chino Airport and is located approximately 7.1 miles southwest of the nearest runway at the Ontario International Airport (ONT). The proposed Project area is not located within the Airport Influence Area (AIA) for the ONT Airport, and as such would not be exposed to airport safety hazards associated with this facility (Ontario, 2011, Map 2-1). At present, there is no Airport Land Use Compatibility Plan (ALUCP) that addresses the current Master Plan for the Chino Airport (the most recent ALUCP, adopted in 1991, does not reflect the current Airport Master Plan for this facility). Based on the 1991 ALUCP, the Project is located within Safety Zones II and III of the Chino Airport's AIA.

The proposed Off-Site Storm Drain Improvement area totals approximately 2.98 acres. This area is bordered by the proposed Project area to the north, the El Prado Golf Course to the south and west, and Cypress Channel to the east. The proposed Project area abuts an off-site concrete flood control channel along a portion of its eastern boundary, which is adjacent to the site in the northeast and flows in a north to south direction.

Proposed Borrow Sites

Proposed Borrow Site 1 totals approximately 43.67 acres. The surrounding landscape consists of developed industrial areas to the northwest, an existing golf course to the west, ranching operations to the north and east, undeveloped land in the Prado Basin to the south, and a correctional facility to the east.

Proposed Borrow Site 2 totals approximately 38.51 acres. The surrounding landscape consists of ranching operations to the north and east, undeveloped land and the Prado Basin to the west and south, and a correctional facility to the east.

Proposed Borrow Site 3 totals approximately 84.25 acres. The surrounding landscape consists of Prado Basin to the south, Prado Basin and a recreational vehicle campground to the west, a ranching operation to the east, and a correctional facility to the north.

Proposed Borrow Site 4 totals approximately 12.94 acres. The surrounding landscape consists of ranching operations to the north and west, and undeveloped land associated with the Mill Creek Wetlands to the south and east.

Proposed Borrow Site 5 totals approximately 21.28 acres. The surrounding landscape consists of ranching operations to the north and east, undeveloped land and the Prado Basin to the west and south, and a correctional facility to the east.

3.12.2 Significance Criteria

Impacts would be significant if the proposed Project would cause one or more of the following conditions to:

- Physically divide an established community;
- Be incompatible with existing land uses;

- Be in conflict with applicable plans or policies.

3.12.3 Environmental Commitments

None required or proposed.

3.12.4 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed Project area would remain in pre-project conditions. No changes to land use in the area or construction would occur and no impacts related to division of a community or conflict with applicable plans, policies, or regulations would occur.

Preferred Alternative/Proposed Project

Proposed Project area, Borrow Sites and Other Features

The proposed Project consists of sites that are vacant and undeveloped, and no residences or established communities abut the proposed Project. The proposed Project area does not provide access to established communities and would not isolate any established communities or residences from neighboring communities. The proposed Project would allow for the future development of industrial land uses on the proposed Project area. Proposed GPA (PL18-0090) would amend the General Plan land use designation for the proposed Project area from "Agriculture (AG)" and "Recreation/Open Space (R/OS)" to "General Industrial (GI)." Proposed CZ (PL18-0091) would change the zoning designation for the proposed Project Site from "General Agriculture (AG)" and "Open Space-Natural (OS-2)" to "General Industrial (M2)." With its proximity to the Chino Airport, the proposed Project would ensure full compliance with the Federal Aviation Administration. The proposed Projected would comply with applicable plans and polices. Surrounding land uses include already established buildings with industrial uses which the proposed Project would be compatible with.

Construction and the future operation and maintenance of the proposed Project would thus not physically disrupt or divide the arrangement of an established community or conflict with applicable plans, policies, or regulations; therefore, no impacts to land use would occur.

3.13 Socioeconomic and Environmental Justice

3.13.1 Affected Environment

Proposed Project area, Borrow Sites and Other Features

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations requires federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations.

The proposed Project area is located in Census Tract 1.15 of San Bernardino County and adjacent to four census tracts. The total population within these five census tracks, according to 2017 U.S. Census data (5 Year Estimate), is 60,697 persons. Tract 122 includes a California State prison which is north of the proposed Project area. Selected demographic information from the 2017 U.S. Census and 2014 American Community Survey for the five census tracts are indicated in Table 3.13-1.

Table 3.13-1: Socioeconomic Data

Census Tracts	Total Population /a/	Minority (Non-White) /b/	Average Household Size /b/	Median Household Income /d/	Below Poverty Level /c/
Tract Including Proposed Project area					
1.15	7,386	55.24%	3.53	$106,585	4.9%
Tracts Adjacent to Project area					
North – 122*	18,959	66.92%	50.1	$100,980	18.8%
East—19.03	10,546	56.23%	5.79	$92,957	11.8%
South – 1.16	12,396	51.7%	3.79	$106,585	3.7%
West – 1.13	11,410	23.28%	3.48	$71,994	11.5%
Average of Census Tracts Adjacent to Proposed Project area		49.5%	4.34 (Excluding prison)	$93,129	11.45%

/a/ U.S Census Bureau, 2013-2017 American Community Survey 5-Year Estimates. Age and Sex Table S0101
/b/ U.S Census Bureau, 2013-2017 American Community Survey 5-Year Estimates. H13
/c/ U.S Census Bureau, 2013-2017 American Community Survey 5-Year Estimates. S1701
/d/ U.S Census Bureau, 2013-2017 American Community Survey 5-Year Estimates. B19013
*** Tract 122 includes a California State Prison**

Source: U.S Census Bureau, American Fact Finder, available at http://data.census.gov accessed April 8, 2019.

Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, require federal agencies to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income population." Section 1-101 of the Executive Order 12898 requires federal agencies to identify and address "disproportionately high and adverse human health or environmental effects" of programs on minority and low-income populations (Executive Order 1994).

The EPA has lead responsibility for implementation of Executive Order 12898. In exercising its responsibility, the EPA developed EJSCREEN, an online environmental justice screening and mapping tool, to assist federal agencies.

The Council on Environmental Quality (CEQ) has oversight of the federal government's compliance with this Executive Order and NEPA. The CEQ, in consultation with the EPA and other agencies, has prepared guidance to assist federal agencies in NEPA compliance in its Environmental Justice: Guidance under the National Environmental Policy Act (CEQ Guidance). The CEQ Guidance provides an overview of Executive Order 12898; summarizes its relationship to NEPA; recommends methods for the integration of environmental justice analysis into NEPA documents; and definitions of key terms and concepts contained in the order.

Per the CEQ Guidance, minority refers to people who are Hispanic or Latino of any race, as well as those who are non-Hispanic or Latino of a race other than White or European-American. The same CEQ Guidance suggests low-income populations be identified using the national poverty thresholds from the U.S. Census Bureau.

Methodology

Demographic data from the EPA's EJSCREEN, an online environmental justice screening and mapping tool, served as the source data for evaluation. EJSCREEN incorporates demographic data from the

U.S. Census Bureau. Two analyses recommended by the CEQ Guidance, Meaningfully Greater analysis and Fifty Percent analysis, were used to determine whether cities adjacent to the dam had a notable presence of minority or low-income population. Notable presence of either population would require either of the following results:

- Fifty Percent Analysis: The ratio of minority or low-income population of the area of analysis equals to or exceeds 50% of the total population of the area of analysis.

- Meaningfully Greater Analysis: The percentage of minority or low-income population relative of the area of analysis equals to or exceeds 50 % relative to the surrounding area.

The area of analysis is defined as a 1-mile radius around the project area. The reference area is defined as the cities of Redlands and Mentone. EJSCREEN analysis was conducted on each city. The percentage of minority and low-income populations for each city were collected and used to quantify the 50th percentile value for the reference area. The percentages of these groups within the area of analysis were then compared to the 50th percentile of the reference area. See Appendix I for all EJSCREEN output, including area of analysis and each city within the reference area.

ENVIRONMENTAL JUSTICE

Table 3.13-2 provides a summary of the minority and low-income population demographics for the affected area in the city of Chino and the State of California. Complete EJScreen Reports can be found in Appendix I. As shown in the table 3-13.2, the aggregate population percentage in the affected area is greater than 50%. Therefore, the affected area contains a minority population greater than the state of California.

As shown in the table 3.13-2, 15% of the individuals in the affected area are considered below the poverty level. This percentage in the affected area does not exceed 50%. In addition, the affected area of low-income population percentage is lower than the state of California, which is 34%. Therefore, the affected area does not contain a high concentration of a low-income population.

Table 3.13-2: Minority Population and Low-Income Population Demographics

Demographics	City of Chino	State
Minority Population	79%	62%
Low-income Population	15%	34%

3.13.2 Significance Criteria

Impacts would be significant if the proposed Project would cause one or more of the following conditions to occur:

- Result in significant shifts in population trends or adversely affect regional spending and earning patterns.
- Have disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.

3.13.3 Environmental Commitments

None required or proposed.

3.13.4 Environmental Consequences

No Action Alternative

Under the No Action Alternative, the proposed Project area would remain in pre-project conditions. No construction would occur, and impacts related to the displacement of people, adverse effects on minority and low-income populations, and changes in the existing socioeconomic profile would not occur.

Preferred Alternative/Proposed Project

Proposed Project area, Borrow Sites and Other Features

The proposed Project would result in development of the subject property with industrial land uses that would add employment opportunities to the area. It is anticipated that the employment base for both the construction and operational phases of the proposed Project would come from the existing population in the Inland Empire, which comprises western Riverside County and southwestern San Bernardino County. According to the Bureau of Labor Statistics, the Riverside-San Bernardino-Ontario region's civilian labor force exceeded 2,000,000 persons with more than 1,900,000 people employed and an unemployment rate of approximately 4 percent (approximately 86,000 persons). Accordingly, the proposed Project region already contains an ample supply of potential employees under existing conditions and the proposed Project's labor demand is not expected to draw significant numbers of new residents to the area. Furthermore, approximately 89 percent of City of Chino residents commute outside of the City for work (SCAG, 2019), with more homes currently under construction within The Preserve area; the proposed Project would provide job opportunities closer to home for existing and future Chino residents.

There are no components of the proposed Project that would reasonably result in indirect or unplanned population growth because the surrounding area is mostly developed under existing conditions or is planned for development and is in the process of developing pursuant to an approved land plan (i.e., The Preserve Specific Plan). The proposed Project would install new/expanded infrastructure; however, this infrastructure would either be master-planned facilities (meaning the facilities would be installed with or without the proposed Project) or would be private facilities for the sole use of the proposed Project (meaning they would not be available for general public use). Thus, no significant indirect impacts associated with population growth would result from any proposed Project-related improvements as the proposed Project and its required improvements would not induce significant growth on surrounding properties.

Based on the foregoing analysis, neither the proposed Project nor any proposed Project-related component would result in significant, direct, or indirect population growth that would cause a significant direct or indirect impact to the local economy or populations. Impacts would not be significant.

The minority population (55.24 percent) for the census tract that includes the proposed Project area is slightly higher than the average minority population (49.5 percent) for the four census tracts adjacent to the proposed Project area. The median household income ($93,129) for the census tract that includes the proposed Project area is higher than the average median household income ($43,160) and its poverty rate (9.1 percent) is significantly lower than the average poverty rate (27.8 percent) for the four census tracts adjacent to the proposed Project area. The majority of these employment opportunities would be expected to be filled by currently employed and unemployed labor force participants from the local and surrounding area and would not generate significant new increases in population levels. Therefore, the proposed Project would not result in significant shifts in population trends or adversely affect regional spending and earning patterns nor significantly change the existing socioeconomic profile of the area.

The demographics within a 1-mile radius of the proposed project area is identified with 79% minority population and 15% low-income population. Although the minority population exceeds the state percentage, the proposed Project area and its surroundings are mostly undeveloped with existing land use zoned for industrial development. There is no residential or planned residential zoning within the proposed Project area. Therefore, the proposed Project would not have a disproportionately high and adverse human health or environmental effects on minority and/or low-income populations.

4.0 CUMULATIVE IMPACTS

Pursuant to 40 CFR Parts 1500-1508, cumulative impacts of a proposed Project must be assessed. A cumulative impact is "an impact on the environment which results from the incremental impact of the proposed Project when added to other past, present, and reasonably foreseeable future actions" (40 CFR § 1508.7). The intent is to identify impacts of other past, present, and reasonably foreseeable future projects that, when considered together with the proposed Project, may significantly compound or increase environmental impacts. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Infrastructure, industrial, commercial, residential, and other projects in proximity to the proposed Project are considered to have the potential for creating cumulative impacts in association with the proposed Project. CEQ's guidance for considering cumulative effects states that NEPA documents "should compare the cumulative effects of multiple actions with appropriate national, regional, state, or community goals to determine whether the total effect is significant" (CEQ 1997).

For the cumulative impacts analysis, the cumulative study area primarily includes the City of Chino, City of Eastvale, City of Ontario, and City of Chino Hills. These four cities encompass portions of southwestern San Bernardino County and northwestern Riverside County that have similar environmental characteristics as the proposed Project area. The selected study area has historically featured rural, commercial dairy, and/or other agricultural uses but in recent decades has transitioned to residential and industrial development. Table 4.1-1 lists past, present, and future projects within the proposed Project area that were considered in the cumulative analysis.

Past Actions: The proposed Project area was previously used for factory dairy farm operations that included dirt livestock pens (corrals) for the holding and separation of cattle intended for milking and slaughter and ancillary features such as hay/milking barns and open-air wastewater collection ponds. Dairy operations on the proposed Project area ceased between 2013 and 2014; all structures associated with the former dairy operations have since been demolished. The proposed Project area has also historically consisted of agriculture and dairy farming land uses. As a result of past land use approvals, the proposed Project area has transitioned from agriculture and dairy uses to more urbanized land uses. The area has experienced a substantial amount of growth, which has resulted in cumulative adverse effects on traffic, air quality and water quality and increased demands on water and land resources within the proposed Project area. Additionally, past development within and around the proposed Project area has also increased the introduction of invasive species, pollutants, and human disturbance within the natural areas, such as Mill Creek.

Present Conditions: The proposed Project area is located in an area that was historically used for agriculture and factory dairy operations but is transitioning to a cluster of employment uses. Remnants of the former dairy activities (e.g., concrete pads/foundations) are still present on portions of the Project area. Under existing conditions, most of the proposed Project area lies within the Prado Dam's basin area (i.e., areas at or below 566 feet AMSL), meaning the proposed building footprints would need to be raised above the 566-foot elevation AMSL in order to be developed as proposed.

Future Actions: The surrounding area of the proposed Project is developed with large industrial/warehouse buildings to the north, El Prado golf course to the south, Mountain Avenue and El Prado golf course and the Regional Water RP-5 Solids Handling Facility to the west, and Cypress Channel and large industrial/warehouse buildings to the east. The proposed Project's potential cumulative impacts were considered with other probable future projects occurring in the area. The future projects considered in the cumulative analysis are located in the cities of Eastvale, Chino, and Corona. These projects are in various stages of approvals and can reasonably be expected to be developed and be operational during the implementation period of the proposed Project. Future development projects would be evaluated for potential impacts to the environment and would be required to comply with state and federal environmental laws and where needed, implement measures to minimize potential adverse effects to the environment. Overall, the proposed Project would not significantly impact the environment from incremental impact of the proposed Project when added to other past, present, and reasonably foreseeable future actions.

Table 4.1-1 – Cumulative Project List

Project No.	Lead Agency	Name	Location	Project Type	Project Description	Status
1	US Army Corps of Engineers	Flood Risk Management	Prado Dam basin areas including: Alcoa Dike Phase II, minor improve-ments to existing dikes, Norco Bluffs, River Road Dike	Flood Risk Management	Corps involvement with the Santa Ana River Mainstem Project for construction and improvements to Corps flood risk management structures and facilities within areas of the Prado Dam basin. Construction of these features will continue for the next several years.	Planning, Environmental Assessment (under development)
2	US Army Corps of Engineers	Flood Risk Management	City of Corona	Flood Risk Management	Raising the Prado Dam spillway is the last major project component of the Prado Dam Separable Element of the Santa Ana River Mainstem Project.	Planning, Environmental Assessment (under development)

					Construction is currently scheduled to begin in 2021 or 2022.	
3	US Army Corps of Engineers	Flood Risk Management	City of Corona	Flood Risk Management	The Corps is currently conducting a Dam Safety Modification Study (DSMS) to evaluate alternatives for long term risk reduction.	Planning, Environmental Assessment (under development)
4	US Army Corps of Engineers	Flood Risk Management	City of Corona	Flood Risk Management	The Corps is considering modification of an existing flowage easement within the Prado Dam Flood Control Basin to facilitate the development of the Rancho Miramonte Residential and Commercial Development Project.	Planning, Environmental Assessment (under development)
5	City of Corona	Santa Ana River Trail	City of Corona	Recreation	The 22-mile Santa Ana River trail is divided into three sections: Lower, Middle, and Upper, and includes bicycle trails and hiking/equestrian trails. The Upper trail consists of proposed trail alignments that would cross adjacent the Lower Norco Bluffs Project area.	Planning
6	City of Chino	Rancho Miramonte	City of Eastvale	Easement/ Development	Implementation of the project includes modifying an existing flowage easement within the Prado Dam Flood Control Basin to facilitate development of the Rancho Miramonte Residential and Commercial Development Project.	Planning, Environmental Assessment (under development)
7	City of Chino	Pine Avenue Extension	City of Chino	Development	City of Chino is proposing to connect Pine Avenue west of SR-71 to Pine Avenue east of SR-71. As part of the extension project, Pine Avenue would be widened from a 2-lane roadway to a 4-lane roadway to match the existing 4-lane roadway east of SR-71 when connected, as well as elevated to above the 50-year flood level for Prado Basin and the 100-year flood level for Chino Creek and Cypress Channel.	Planning, Environmental Assessment (under development)
8	City of Chino	Altitude Business Centre	City of Chino	Redevelopment/ Development	Implementation of the project includes demolition of the property's existing	Planning, Final EIR published in September 2019

					residential and agricultural/dairy structures, and construction and operation of a business center complex with up to 25 light industrial buildings.	
9	City of Chino	Rodriguez Warehouse Project	City of Chino	Redevelopment/ Development	Implementation of the project includes a General Plan amendment and a Specific Plan amendment to the (The Preserve Specific Plan) to re-designate the project from Open Space - Agriculture within an Agricultural Overlay to Light Industrial (M1); and Site Plan approval for the 3.28-acre site to allow the development of the site. The project site is located in an area of transition from agricultural to light industrial uses.	Planning, Initial Project published April 2019
10	City of Chino	Chino Parcel Delivery Facility	City of Chino	Development	The project involves the development of a distribution hub facility for a parcel delivery services company on an approximately 74.4-acre site.	Planning, Final EIR published in May 2019
11	City of Chino	Block 4 – TTM 20164	City of Chino	Development	The project includes Master Site Approval and multiple Tentative Tract Maps for a total 388 homes and a three-acre park on the project site, also known as South of Pine Block 4 (Tract No. 20164) and is located within the eastern portion of the South of Pine component of the Preserve Specific Plan. The project's residential uses are comprised of single-family detached homes, autocourt detached condominium units arranged around a shared driveway/autocourt, and four-pack detached condominium units accessed by a shared paseo that leads to front entries with shared alleys that lead to garages.	Planning, Addendum published in May 2019
12	City of Chino	Euclid Business Center Project	City of Chino	Development	The project involves the development of an approximately 18.5-acre	Planning, Addendum published June 2019

					property located at the northeast corner of the Euclid Avenue/Bickmore Avenue intersection in the City of Chino, San Bernardino County, California. The Project Applicant proposes to develop a business center with eight (8) buildings that could support warehouse, light industrial, and business park land uses. The project would develop up to 363,626 sf of floor area, with buildings ranging in size from 13,050 sf. to 206,118 sf	
13	City of Chino	Lot 11 Preserve	City of Chino	Development	The project includes MSA and TTM 20223 (PL18-0049 & PL-18-0050 respectively) for development of a total of 176 homes, consisting of 70 Townhome (3-story) units and 106 Triplex Townhome (3-story) units on the 9.77-acre Property.	Planning, Addendum published April 2019
14	City of Chino	Van Vilet – Tract No. 20161	City of Chino	Development	The project includes up to 494 homes consisting of 102 single family units and 392 multi-family units.	Planning, Addendum published July 2019
15	City of Chino	Watson Industrial Park	City of Chino	Redevelopment/ Development	Under existing conditions, the approximately 211.9-acre project site is used by three dairy operations. The proposed project involves the demolition and removal of the existing onsite improvements, grading and preparation of the property for development, and the construction and operation of eight industrial buildings with loading docks suitable for a variety of tenants. No building tenants are yet identified, but could include industrial, distribution warehousing, manufacturing, assembly, e-commerce, and similar uses. Associated improvements to the property would include, but are not limited to, surface parking areas, vehicle drive aisles, truck courts, utility	Partially Complete/Construction, Final EIR published November 2015

					infrastructure, landscaping, exterior lighting, signage, and water quality/detention basins. The proposed buildings would collectively contain a maximum of approximately 3,872,000 square feet (s.f.) of total building space. The project also involves the construction of an offsite segment of Hellman Avenue, between the southern project site boundary and Kimball Avenue, and the installation of an underground storm drain line in the paved section of Hellman Avenue between Kimball and Autumn Path Street.	
16	City of Eastvale	The Homestead Industrial Project by Orbis Real Estate Partners	City of Eastvale	Development	The project would involve the development of an industrial park on an approximately 56-acre site. The project would also involve traffic and utility improvements.	Planning, Notice of Preparation of EIR published September 2019
17	City of Eastvale	Eastvale Crossings Project	City of Eastvale	Development	The project would subdivide the project site to facilitate the development of a 218,100-square-foot commercial retail center on the 24.78-acre project site. The retail center would be anchored by a 192,000-square-foot Walmart store and feature smaller retail, restaurant, and fuel station uses totaling 26,100 square feet. The proposed project would have a Floor Area Ratio of 0.22. The project requires approval of a General Plan Amendment, Zone Change, Major Development Plan, Tentative Tract Map, Conditional Use Permits, Sign Program, and Variance.	Planning, Draft EIR published September 2016
18	City of Eastvale	VantagePoint Church	City of Eastvale	Development	The City of Eastvale is processing an application for a Major Development Plan for the VantagePoint Church (proposed project), which consists of construction of a 1,200-seat	Planning, Draft IS/MND published February 2018

					church facility, a high-school building, and a children's building totaling approximately 122,000-square-feet on approximately 10.5 acres.	
19	City of Eastvale	The Merge Project	City of Eastvale	Development	The project proposes construction and operation of approximately 336,501 square feet of light industrial and 71,100 square feet of commercial/retail uses (407,601 total square feet) within an approximately 26.28-acre site located in the northwest portion of the City of Eastvale.	Planning, Draft EIR published September 2018
Sources: City of Chino, 2019a; 2019b; 2019c; 2019d; 2019e; 2019f; 2019g; 2019h; 2019i, City of Eastvale, 2019a; 2019b; 2019c; 2019d.						

4.1 Analysis of Cumulative Impacts

4.1.1 Biological Resources

No Action Alternative

Under the No Action Alternative, there would be no development of the two proposed warehouse buildings. No borrowing of dirt fill from the proposed borrow sites, and the proposed Project area would remain in pre-project conditions. Therefore, there would be no earth disturbances and no potential for direct or indirect impacts to occur biological resources that would result in cumulative impacts to biological resources.

Proposed Project

Implementation of the proposed Project would not result in significant cumulative impacts to biological resources (See Section 3.1). The proposed Project is site specific on mostly open or developed land consisting of ruderal/disturbed habitat and would not result in incremental cumulative impacts to biological resources through increased human encroachment (e.g., removal of habitat, degradation of habitat through trampling, increased noise, or decreased water quality). Thus, the proposed Project would not significantly impact sensitive habitat or species or native wildlife such that it would result in a cumulative impacts to biological resources in the region. At the conclusion of construction, the proposed Project area or applicable habitat area would be restored to pre-project condition with the appropriate native hydroseed mix. Impacts of the proposed Project would be reduced to less than significant levels and effects of this proposed Project would not be considered cumulatively significant.

4.1.2 Air Quality

No Action Alternative

Under the No Action Alternative, there would be no development of the two proposed warehouse buildings and no borrowing of dirt fill from the proposed borrow sites, and the proposed Project area would remain in pre-project conditions. Thus, no construction equipment emissions would occur that would potentially result in cumulative air quality impacts.

Proposed Project

Implementation of the proposed Project would not result in significant cumulative impacts to air quality. With respect to nearby projects whose construction activities may be concurrent to the proposed Project's construction, the construction and operational emissions of the Alcoa Dike Project were analyzed along with those of the proposed Project to determine potential cumulative air quality impacts to the area. As shown in Tables 4.1-2 and 4.1-3 below, the proposed Project would not cumulatively contribute to the total estimated construction and operational emissions of the nearby Alcoa Dike Project in such a way as would exceed General Conformity Applicability Rates. Further, as previously discussed in Section 3.2.2, the proposed Project would not result in any significant impacts under the air quality impact significance criteria analyzed. It is therefore expected that the proposed Project would not contribute to or result in cumulatively significant impacts to air quality.

Table 4.1-2 – Cumulative Annual Construction Emissions Comparison to General Conformity Applicability Rates

Pollutant	General Conformity Applicability Rates (tons/year)	Estimated Construction Emissions (tons/year)		
		Proposed Project	Alcoa Dike	Total Cumulative
O_3 (VOC)	10	6.33	0.57	6.90
CO	100	12.60	3.84	16.44
NO_2	100	11.46	5.79	17.25
SO_2	100	0.05	0.007	0.06
PM_{10}	100	3.26	1.10	4.36
$PM_{2.5}$	100	1.00	0.67	1.67
Pb	25	0	0	0

Table 4.1-3 – Cumulative Annual Operational Emissions Comparison to General Applicability Rates

Pollutant	General Conformity Applicability Rates (tons/year)	Proposed Project Estimated Operational Emissions (tons/year)	Alcoa Dike Estimated Operational Emissions (tons/year)	Total Cumulative
O_3 (VOC)	10	9.31	Negligible	9.31
CO	100	24.48	Negligible	24.48
NO_2	100	31.74	Negligible	31.74
SO_2	100	0.17	Negligible	0.17
PM_{10}	100	9.25	Negligible	9.25
$PM_{2.5}$	100	2.64	Negligible	2.64
Pb	25	0	Negligible	0

4.1.3 Noise

No Action Alternative

Under the No Action Alternative, there would be no development of the two proposed warehouse buildings and no borrowing of dirt fill from the proposed borrow sites, and the proposed Project area would remain in pre-project conditions. Therefore, there would not be use of construction equipment or construction vehicles that would result in potential cumulative impacts.

Proposed Project

Cumulative noise and vibration effects typically occur when multiple projects affect the same geographic areas simultaneously or when sequential projects extend the duration of noise and vibration impacts on a given area over a longer period. With regard to a cumulative increase in temporary noise levels of the proposed Project construction in conjunction with construction of cumulative projects identified in Table 4.1-1, the proposed Project construction would temporarily increase ambient noise levels in the vicinity of the proposed Project area. As discussed in Section 3.3, the closest noise-sensitive receiver locations to the proposed Project area are located greater than 2,000 feet west of the proposed Project area in the City of Chino Hills. An additional noise-sensitive receiver location is identified east of the proposed Project area, at over 4,000 feet from the proposed Project area, in the City of Chino. Construction activities associated with other projects in close proximity to the proposed Project could potentially occur at the same time as the proposed Project and further increase noise levels at these sensitive receptor locations. However, due to the distances and construction timing of projects identified in Table 4.1-1, and the distances of the nearest sensitive receptors, it is unlikely that construction noise from the proposed Project would combine with construction noise from those projects to increase potential cumulative construction noise impacts to sensitive receptors. In the event this occurred, these impacts would be temporary and of short duration. While mobile construction vehicles bringing construction supplies to cumulative project sites could share travel routes with the Proposed Action, it is assumed these shared routes would be limited to regional access roadways. Due to the traffic volumes on these roadways, no significant cumulative noise from mobile construction sources would occur to sensitive receptors along shared travel routes.

As discussed in Section 3.3, the operational noise analysis shows that the proposed Project-related stationary-source noise levels at the nearby sensitive receiver locations will satisfy the City of Chino exterior noise level standards and, overall, would not be considered significant. Therefore, while overall development of the proposed Project area could result in cumulative temporary increases to existing ambient noise levels, the proposed Project would have a minimal cumulative contribution to these potential noise impacts. Therefore, noise impacts of the proposed Project would not combine with impacts of present and reasonably foreseeable projects to result in a significant cumulative impact.

4.1.4 Cultural Resources

No Action Alternative

Under the No Action Alternative, there would be no development of the two proposed warehouse buildings and no borrowing of dirt fill from the proposed borrow sites, and the proposed Project area would remain in pre-project conditions. Thus, there would be no project-associated earthwork activities, earth disturbances, and no potential to effect unknown cultural resources that might be present.

Proposed Project

As discussed in Section 3.4, the historic resources identified within the proposed Project are not considered eligible for nomination to the NRHP and are not independently significant in accordance with the criteria identified in 36 CFR 60.4. Moreover, there is a low likelihood of encountering archaeological resources during construction activities as no archaeological resources were identified during the field survey conducted for the proposed Project, nor are any human remains known to exist in the Project area. It is therefore expected that the proposed Project in conjunction with ongoing and future actions would not contribute significantly to the loss of cultural values or data within the basin.

4.1.5 Earth Resources

No Action Alternative

Under the No Action Alternative, there would be no development of the two proposed warehouse buildings and no borrowing of dirt fill from the proposed borrow sites, and the proposed Project area would remain in pre-project conditions. Therefore, there would be no uncovering of soils, earthwork activities, and no potential erosion, siltation, impacts. Additionally, no habitable structures would be constructed that could be subject to seismic risks. There would be no potential cumulative impacts to earth resources.

Proposed Project

The proposed Project would not result in significant erosion or siltation and would be required to adhere to the City's regulatory requirements, including, but not limited to, requirements imposed by the City's NPDES Municipal Stormwater Permit, a Project-specific SWPPP and WQMP to minimize water pollutants including erosion and sedimentation in stormwater runoff. Additionally, the proposed Project, located in the southern portion of the Chino groundwater basin, would not directly draw water from the groundwater table and would not physically impact any of the major groundwater recharge facilities in the Basin. Therefore, erosion, sedimentation, and groundwater impacts of the proposed Project would not combine with impacts of present and reasonably foreseeable projects to result in a significant cumulative impact.

The proposed Project is located in the seismically active area of Southern California, but it does not contain major geologic hazards. Further, Geologic and seismic impacts typically are tied to site specific conditions and the geotechnical hazards that are present which do not combine with other sites to become cumulatively significant. The proposed Project does not include the construction of habitable structures and therefore, would not cumulatively increase the potential for habitable structures within the project area to be adversely affected by seismic impacts.

4.1.6 Water Resources and Hydrology

No Action Alternative

Under the No Action Alternative, there would be no development of the two proposed warehouse buildings and no borrowing of dirt fill from the proposed borrow sites, and the proposed Project area would remain in pre-project conditions. Therefore, there would be no uncovering of soils and no potential for erosion impacts and sedimentation impacts. No impervious surfaces would be constructed and no increased rates of runoff would occur that would affect capacities of existing drainage facilities.

Proposed Project

As discussed in Section 3.6, implementation of the proposed Project would involve demolition, clearing, grading, paving, utility installation, building construction, and landscaping activities, which could result in the generation of water quality pollutants such as silt, debris, chemicals, paints, and other solvents with the potential to adversely affect water quality. As such, minor short-term water quality impacts have the potential to occur during construction of the proposed Project. However, the proposed Project would require that BMPs be implemented during construction to address water pollutants and that they be identified and addressed in the final water quality management plan. Moreover, the proposed Project would not cause or result in significant flooding to areas that were not already part of the Prado Dam basin flood inundation area, nor would construction of the proposed Project significantly alter the existing drainage patterns or hydrology of the proposed Project area. As such, potential water resources and hydrology impacts of the proposed Project would not combine cumulatively with similar impacts of other projects.

4.1.7 Public Safety (Hazardous Materials and Emergency Response)

No Action Alternative

Under the No Action Alternative, there would be no development of the two proposed warehouse buildings and no borrowing of dirt fill from the proposed borrow sites, and the proposed Project area would remain in pre-project conditions. Therefore, there would be no on-site construction equipment, handling of hazardous materials, or risks to public safety.

Proposed Project

As discussed in Section 3.7, the proposed Project would not result in increased risks to public safety. The two proposed industrial buildings are required to be constructed in accordance with the CBSC, also known as CCR, Title 24 (Part 2), and the Chino Building Code, which is based on the CBSC with local amendments. Moreover, the Phase I assessment for the proposed Project revealed no evidence of current conditions indicative of releases or threatened releases of hazardous substances, and the future occupant would be required to follow applicable federal, state, and local laws for use and/or storage of hazardous materials.

Construction operations associated with the proposed Project, residential, commercial, and industrial developments within vicinity of the project area, off-site drainage improvement area, and borrow site area could involve operation of heavy construction equipment and the handling of incidental amounts of hazardous materials, such fuels, oil and solvents, which could have the potential to be inadvertently released into the environment. The operation of heavy construction equipment for the proposed Project and other activities in the area would be required to comply with Federal, State and local laws and regulations regarding the handling of hazardous materials. With compliance with Federal, State and local laws, proposed Project combined with other activities in the vicinity would avoid the potential for significant cumulative hazardous impacts resulting in public safety concerns.

4.1.8 Recreation

No Action Alternative

Under the No Action Alternative, there would be no development of the two proposed warehouse buildings and no borrowing of dirt fill from the proposed borrow sites, and the proposed Project area would remain in pre-project conditions. Therefore, there would be no effect to recreation facilities that would result in potential cumulative impacts to recreation.

Proposed Project

The proposed Project would be consistent with the General Plan, Zoning Ordinance, other applicable plans, policies, and regulations. Thus, the impacts to recreation from the proposed Project are not anticipated, and therefore, no contribution to cumulative impacts in the region would occur.

4.1.9 Aesthetics

No Action Alternative

Under the No Action Alternative, there would be no development of the two proposed warehouse buildings and no borrowing of dirt fill from the proposed borrow sites, and the proposed Project area would remain in pre-project conditions. Thus, there would be no construction activity that would result in aesthetic resource impacts cumulatively.

Proposed Project

As discussed in Section 3.9, given that the proposed Project area is not a scenic vista, is not located near a designated scenic resource, prominent and scenic views would not be obscured by the proposed Project there were would be no significant adverse effect on aesthetic resources. The proposed Project would also not create a new source of significant light or glare which would adversely affect day or nighttime views in the area. As such, no cumulative aesthetics impacts would occur.

4.1.10 Traffic and Circulation

No Action Alternative

Under the No Action Alternative, there would be no development of the two proposed warehouse buildings and no borrowing of dirt fill from the proposed borrow sites, and the proposed Project area would remain in pre-project conditions. Thus, no impacts to traffic would occur that would result in potential cumulative impacts to traffic and circulation.

Proposed Project

Cumulative projects within the area (as identified in Table 4.1-1) will generate trips to and from the respective project sites using local roadways. The combined contribution of these vehicle trips could result in an increase to existing roadway network levels of service. However, each project identified in Table 4.1-1 would be required to comply with the performance standards identified in their respective General Plans. While development of cumulative projects identified in Table 4.1-1 will result in a cumulative addition to traffic volumes on study area roadways, the proposed Project's contribution to this impact would be minimal during both construction and operation (refer to Section 3.9). Therefore, the contribution of the proposed Project to cumulative impacts would be less than significant.

4.1.11 Utilities

No Action Alternative

Under the No Action Alternative, there would be no development of the two proposed warehouse buildings and no borrowing of dirt fill from the proposed borrow sites, and the proposed Project area would remain in pre-project conditions. Therefore, there would be no demands on public services and utilities that would result in potential cumulative impacts to utilities.

Proposed Project

As discussed in Section 3.11, utilities would not be significantly impacted as a result of the proposed Project as there is no expectation of any unplanned disturbance on existing utility lines, and new utility service facilities on the proposed Project area would be required to follow local and state laws. As such, the proposed Project would not contribute to a cumulative impact to utilities.

4.1.12 Land Use

No Action Alternative

Under the No Action Alternative, there would be no development of the two proposed warehouse buildings and no borrowing of dirt fill from the proposed borrow sites, and the proposed Project area would remain in pre-project conditions. Thus, there would be no potential land use conflicts that would result in cumulative impacts to land use.

Proposed Project

Land use impacts tend to be localized, affecting properties in the immediate vicinity of the project. As discussed in Section 3.12, the proposed Project consists of sites that are vacant and undeveloped, and no residences or established communities abut the proposed Project. Moreover, surrounding land uses include already established buildings with industrial uses with which the proposed Project would be compatible. As no land use impacts would occur as a result of the proposed Project, the proposed Project would not contribute to a cumulative impact to land uses.

4.1.13 Socioeconomic and Environmental Justice

No Action Alternative

Under the No Action Alternative, there would be no development of the two proposed warehouse buildings and no borrowing of dirt fill from the proposed borrow sites, and the proposed Project area would remain in pre-project conditions. Therefore, there would be no construction activity combined with the other activities occurring in the project area that could have the potential to result in disproportionally high and adverse effects to minority households. There would be no cumulative socioeconomic and environmental justice impacts.

Proposed Project

As discussed in Section 3.13, impacts on Socioeconomic and Environmental Justice factors would not be significantly impacted as a result of the proposed Project as there will not be a significant shift in population trends or adversely affect regional spending and earning patterns. As such, the proposed Project would not contribute to a cumulative impact to Socioeconomic and Environmental Justice.

5.0 APPLICABLE ENVIRONMENTAL LAWS AND REGULATIONS

Clean Air Act of 1972, as amended, 42 U.S.C. 7401, et seq. 'Under Section 176(c) of the Clean Air Act Amendments (CAAA) of 1990, the Lead Agency is required to make a determination of whether the proposed Project "conforms" with the SIP. Conformity is defined in Section 176(c) of the CAAA as compliance with the SIP's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards. If the total direct and indirect emissions of the criteria pollutant or precursor in a nonattainment or maintenance area caused by a Federal action would equal or exceed the applicability rates at 40 CFR 93.153(b), a conformity determination is not required. The proposed Project would be in full compliance as the total direct and indirect emissions of the federal action would not equal or exceed the USEPA's applicability rates; therefore, a general conformity determination is not required.

Clean Water Act of 1972, as amended, 33 U.S.C. 1251, et seq. The proposed Project is in compliance with 40 CFR Part 230, regulations promulgated by the USEPA pursuant to Section 404(b)(1) of the Clean Water Act (CWA). The proposed Project would not modify a Federal channel or result in any permanent impacts to Corps jurisdictional waters or aquatic features under Section 404, nor would the proposed Project result in any permanent impacts to jurisdictional waters under Section 401. Permits under both Sections 404 and 401 for temporary impacts to jurisdictional WoUS within the proposed Off-Site Storm Drain Improvement area are being obtained for the proposed Project. Additionally, the proposed Project would adhere to NPDES requirements under Section 402 as well as the City's regulatory requirements, including, but not limited to, requirements imposed by the City's NPDES Municipal Stormwater Permit, a Project-specific SWPPP and WQMP to minimize water pollutants including erosion and sedimentation in stormwater runoff. Thus, as permits are being obtained for the Project under applicable sections of the CWA, the proposed Project is in compliance with the CWA.

Endangered Species Act of 1973, as amended, 16 U.S.C. 1531, et seq. The proposed Project may affect but is not likely to adversely affect up to 0.23 acre of designated critical habitat within proposed Borrow Site 1 for the least Bell's vireo. Although vireo critical habitat will be affected, the areas lack the primary constituent elements to provide suitable habitat to support vireos. ECs BIO-5 and 6, would be implemented to include application of native hydroseed to the entirety of proposed Borrow Site 1 to offset any adverse effects to vireo critical habitat and borrow activities would occur outside of vireo nesting season (March 15 to September 15) to the greatest extent practicable. Additional measures (i.e. noise monitoring and, if necessary, erect sound wall(s), hay bales) would be implemented prior to the nesting season if grading activities extend into the nesting season. The Corps is initiating Section 7 informal consultation with the U.S. Fish and Wildlife Service. It is not expected that additional measures would be required to address potential effects to vireo or vireo critical habitat, as the application of native hydroseed mix post construction would more than offset effects to the 0.23 of critical habitat impacted within proposed Borrow Site 1. In addition, the implementation of environmental commitments would further reduce potential effects to the species or critical habitat. Thus, with implementation of the above, the Corps has determined that there would be a "not likely to adversely affect" to least Bell's vireo and its critical habitat. The Corps has sent out a Section 7 informal consultation letter to the U.S. Fish and Wildlife Service for a "not likely to adversely affect" determination on January 22, 2021 and would obtain concurrence from the USFWS prior to finalization of the EA. The Project would be in compliance with the Endangered Species Act.

Fish and Wildlife Coordination Act. This Act requires Federal agencies consult with the USFWS and the fish and wildlife agencies of States where the "waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted . . . or otherwise controlled or modified" by any agency under a Federal permit or license. Consultation is to be undertaken for the purpose of "preventing loss of and damage to wildlife resources." The intent is to give fish and wildlife conservation equal consideration with other purposes of water resources development projects. As the proposed Project does not involve the control or use of water as described, the proposed Project does not require a Fish and Wildlife Coordination Act Report. The proposed Project does not involve any diversion or impoundment of water; all water will flow in the same state as it currently exists. Therefore, a Fish and Wildlife Coordination Act Report is not required. This Project is in compliance with the Fish and Wildlife Coordination Act.

Migratory Bird Treaty Act. The Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-711) makes it unlawful to possess, buy, sell, purchase, barter or "take" any migratory bird listed in Title 50 of the Code of Federal Regulations Part 10. "Take" is defined as possession or destruction of migratory birds, their nests or eggs. In accordance with the requirements of the Migratory Bird Treaty Act, the applicant is required to remove vegetation outside of the bird nesting season and additional avoidance and minimization measures have been developed to avoid impacts to migratory birds, their nests, or eggs. Therefore, the proposed Project is in compliance with the Migratory Bird Treaty Act.

Bald and Golden Eagle Protection Act, as Amended. The Bald and Golden Eagle Protection Act of 1940, as amended, protects bald and golden eagles by prohibiting the taking, possession, and commerce of such birds and nests without a permit and establishes civil penalties for violation of this Act. Take of bald and golden eagles is defined as follows: "disturb means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by s significantly interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by significantly interfering with normal breeding, feeding, or sheltering behavior'' (72 FR 31132; 50 CFR 22.3). While both the Bald Eagle and Golden Eagle have the potential to forage within the proposed Project, both species are not expected to nest within the proposed Project as the Project areas lack species-specific required nesting features, such as close proximity to the nearest large body of water (Bald Eagles) and high cliffs and rocky escarpments (Golden Eagles). Moreover, the implementation of EC-BIO-2 would minimize and/or avoid any potential impacts. Therefore, the proposed Project is in compliance with the Bald and Golden Eagle Protection Act, as amended.

Noise Control Act of 1972, as amended (42 U.S.C. 4901 et seq.). Noise generated by any activity, which may affect human health or welfare on Federal, state, county, local, or private lands, must comply with noise limits specified in the Noise Control Act. The proposed Project would not have significant impacts to noise levels in the area. Noise would continue to be regulated with Federal, state, and local laws and ordinances. The proposed Project is in compliance with the Act.

Executive Order 13112, Invasive Species. Federal agencies are to expand and coordinate efforts to prevent the introduction and spread of invasive plant species and to minimize the economic, ecological, and human health impacts that invasive species may cause. Eradication/maintenance of invasive species and the future replacement of non-native ornamental trees and other plant material per USACE guidance, may be carried out with other future projects and the intent of the EO is met. The proposed Project would include the application of native hydroseed mix to areas in which the proposed Project activities would involve the removal of vegetation, including ruderal/disturbed and ornamental vegetation. The proposed Project is in compliance with this Executive Order.

National Environmental Policy Act of 1969, as amended, 42 U.S.C. 4321, et seq. This Environmental Assessment (EA) has been prepared in accordance with the NEPA, the purposes of which are to, "declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality." The proposed Project will be in full compliance with NEPA upon execution of the FONSI.

National Historic Preservation Act of 1966, as amended, 54 U.S.C. 100101 et seq.

The National Historic Preservation Act (NHPA) and its implementing regulations 36 CFR Part 800 provide a regulatory framework for the identification, documentation, and evaluation of cultural resources that may be affected by Federal undertakings. Under the Act, Federal agencies must take into account the effects of their undertakings on historic properties (cultural resources that have been found to be eligible for listing or which are listed in the NRHP) and afford the Advisory Council on Historic Properties a reasonable opportunity to comment on such undertaking.

Pursuant to 36 C.F.R. 800.4, the Corps has determined and documented the APE in consultation with the SHPO (Appendix D) and has reviewed existing information on historic properties within the APE, including data concerning possible historic properties not yet identified. A cultural resources survey of the APE was conducted on March 14 and 15, 2019 and described in the report entitled A Section 106 (NHPA) Historic Properties Study for the Majestic Chino Heritage Project, on file at the Corps Los Angeles District. A total of thirteen cultural resource sites were identified within the APE during the survey and/or record search. Seven of these sites had previously been recorded, CA-SBR-2845, CA-SBR-5241, CA-SBR-12573H, CA-SBR-12613H, P-36-029722, CA-SBR-29791H, and P-36-029792. Of these seven previously-recorded sites, six had been either recommended as ineligible for the NRHP or were determined to be not eligible for the California Register of Historic Places. The consultant completing the cultural resource survey also recommended these six sites as ineligible for the NRHP under all criteria. The seventh previously recorded site, CA-SBR-12573H, is a historic ditch known to have been in existence in 1888. No evidence of the ditch was found during the survey and historical aerial photographs indicate that portions of the ditch in the APE were likely destroyed prior to 1938. Of the six newly recorded sites, five are foundation remnants of demolished buildings and structures, CA-SBR-33112H, CA-SBR-33113H, CA-SBR-33115H, CA-SBR-33116H, and CA-SBR-33117H. All five are associated with the region's dairy history. None of these sites retain enough integrity to be eligible for the NRHP. The remaining site, P-36-033114, consists of a single-family residence built between 1948 and 1959 and a detached garage built between 1967 and 1980.

As part of their historic property identification efforts, the Corps has consulted with the following Federally recognized and non-Federally recognized Tribes. Fernandeño Tataviam Band of Mission Indians; Gabrieleno Band of Mission Indians - Kizh Nation; Gabrieleno/Tongva San Gabriel Band of Mission Indians; Gabrielino /Tongva Nation; Gabrielino Tongva Indians of California Tribal Council; Gabrielino-Tongva Tribe; San Fernando Band of Mission Indians; Soboba Band of Luiseno Indians. The Corps has provided the Federally recognized and non-Federally recognized Tribes a copy of the cultural resource report and has sought their assistance in identifying any properties which are of religious or cultural significance that may be affected by the project (pursuant to 36 C.F.R 800.4(a)(4)).

The Corps has determined that the 12 sites still extant in the APE are not eligible for the NRHP under any criteria. The historic ditch, CA-SBR-12573H, is a long linear site and where it is still extant it may be eligible; however it is no longer present within the APE. The Corps has found that the project would result in no historic properties affected. The Corps has consulted with the SHPO regarding its determinations and findings and the SHPO has concurred (Appendix D). The Corps is in compliance with the Act.

Executive Order 11988: Floodplain Management. Executive Order 11988, signed by President Jimmy Carter on 24 May 1977, and published in 42 FR 26351. Its purpose is to "…avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative." The proposed Project would avoid development in the Prado basin to the extent practicable to reduce flood hazards and human safety and health risks. Therefore, the proposed Project is in compliance with this Executive Order.

Executive Order 12088, Federal Compliance with Pollution Control Standards. Federal Agencies are responsible for ensuring that all necessary actions are taken for the prevention, control, and abatement of environmental pollution with respect to Federal facilities and activities under control of the agency. The proposed Project does not significantly affect the natural and beneficial values of the Prado Basin as the lands below the 566-foot backwater area of the basin conserve and protect existing natural areas from further development. The proposed Project is in compliance with the EO.

Executive Order 12898, Environmental Justice Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. Full compliance. Executive Order 1289 (Federal Actions to Address Environmental Justice in Minority and Low-Income Populations) was signed on February 11, 1994. This order directs Federal agencies to make achieving environmental justice part of its mission by identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the U.S. Based on the evaluation in Section 3.13.2, the proposed Project would not result in disproportionate adverse human health or environmental effects on minority and/or low-income populations. Therefore, the proposed Project is in compliance with this Executive Order.

6.0 AGENCY COORDINATION

An Initial Study and public notice were made available on March 23, 2019 for the preparation of an Environmental Assessment for the proposed Project. The Corps is in coordination and informally consulting with the USFWS to obtain concurrence for a “not likely to adversely affect” determination on the Proposed Action. A letter has been mailed to the USFWS on January 22, 2021 to initiate Section 7 informal consultation. The Corps is expecting to receive a letter of concurrence from the USFWS prior to finalization of the EA.

7.0 ENVIRONMENTAL COMMITMENT MEASURES

The following is a list of the Environmental Commitment measures required to be implemented as part of the proposed Project:

Biological Resources

EC BIO-1: Once borrow activities within proposed borrow sites 1 through 5 have been completed, the Project Applicant will include application of a native hydroseed mix to each proposed Borrow Site to minimize the spread of non-native, invasive plant species and for erosion control purposes post-construction. The application(s) of all hydroseeding will be performed as close as possible to the rainy season to allow the seed mix to establish and have the best possibility to succeed.

EC BIO-2: Temporary impacts to 0.76 acre of CSS habitat within proposed Borrow Site 4 will be offset by restoring native habitat within the construction footprint by the Project Applicant. The southern and eastern boundary of proposed Borrow Site 4, where temporary impacts would occur, will be reseeded with a specific CSS seed mix comprising of the same species currently present. The application(s) of all hydroseeding will be performed as close as possible to the rainy season to allow the seed mix to establish and have the best possibility to succeed. The Project Applicant or their designee will conduct annual maintenance for three years within the 0.76-acre area at proposed Borrow Site 4 hydroseeded as CSS.

EC BIO-3:

(3) Prior to construction, the Project Applicant will conduct a preconstruction burrowing owl survey in accordance with burrowing owl survey requirements. The guidelines stipulate that four focused survey visits be conducted between February 15 and July 15, with the first visit occurring between February 15 and April 15. The remaining three visits will be conducted three weeks apart from each other, with at least one visit occurring between June 15 and July 15. If burrowing owl(s) is/are detected on site, the owl(s) will be handled as indicated by the Resources Management Plan (RMP) and/or the CDFW's 2012 protocol. The RMP addresses mitigation requirements for impacts to burrowing owls. The RMP states that the 1995 CDFG Staff Report on Burrowing Owl Mitigation (as supplemented by the RMP) shall be followed when burrowing owls are detected on properties. If avoidance of occupied habitat is infeasible, provisions would be made to passively relocate owls from sites in accordance with the current 2012 CDFG Staff Report (supersedes 1995 CDFG Staff Report).

Consistent with the RMP, the following measures will apply to the proposed Project area regarding burrowing owl mitigation:

- Prior to disturbance of the occupied burrows, suitable and unoccupied replacement burrows will be provided at a ratio of 2:1 within the City-designated relocation area (e.g. the NTS basins). A qualified biologist through coordination with the City will confirm that the artificial burrows are currently unoccupied and suitable for use by owls.
- If a Project area-specific exclusion and translocation plan for burrowing owl has not already been approved by CDFW, the Project Applicant will retain a qualified biologist to prepare such a plan for review and approval by CDFW. This plan will identify the procedures to be followed to exclude and/or translocate burrowing owls from the Project area, with separate procedures identified for during the breeding season and outside of the breeding season. For

translocated owls, natural or artificial burrows will be provided at a 2:1 ratio at an off-site relocation area.

- Until suitable replacement burrows have been provided/confirmed within the City-designated relocation area (e.g. the NTS basins), no ground disturbance (clearing, grubbing, grading) will occur within 50 meters (approximately 160 feet) of occupied burrows during the nonbreeding season (September 1 through January 31) or within 100 meters (approximately 250 feet) during the breeding season (February 1 through August 31) until the owls have fledged or have been relocated per the CDFW-approved exclusion and translocation plan._ All occupied burrows will have a visible marker placed near them to ensure that ground-disturbing equipment and machinery do not come within the specified distance to prevent disturbance of the owls or collapse of the burrows.
- Owls will not be excluded or translocated from occupied burrows and should not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist approved by CDFW verifies that juveniles from the occupied burrows are foraging independently and are capable of independent survival.
- Pursuant to mitigation measure B-3(8) of The Preserve Environmental Impact Report (EIR), and as noted on Page 4-39 of the RMP, the proposed Project will pay the required mitigation fee. One priority for funding supported by the mitigation fees is the establishment and long-term management of burrowing owl habitat within the Drainage Area B conservation area.

The proposed Project's implementation of these measures would minimize potential effects to burrowing owls and impacts would be less than significant.

(4) If there is more than a 14-day window between when the focused survey is performed and ground disturbance, a qualified biologist would conduct a pre-construction presence/absence survey for burrowing owls within 14 days prior to site disturbance and again within 48 hours of disturbance. If burrowing owls are detected on site, the owls would be relocated/excluded from the site outside of the breeding season following accepted protocols, and subject to the approval of CDFW (as described above).

EC BIO-4: The Project Applicant will retain a qualified biologist (hereafter "Project Biologist") to conduct training and monitoring activities for the Proposed Project

EC BIO-5: Vegetation clearing will be conducted outside of the general passerine nesting season (February 1 through August 31). If avoidance of the nesting season is not feasible, then the Project Biologist will conduct a nesting bird survey, including suitable habitat within a 500-foot radius, within three days prior any disturbance of the site, including disking, demolition activities, and grading. If active nests are identified, the biologist will establish suitable buffers around the nests, and the buffer areas will be avoided until the nests are no longer occupied and the juvenile birds can survive independently from the nests.

If the survey identifies the presence of active nests, then the Project Biologist would notify the Corps Biologist staff immediately (Megan Wong at 213-448-4517)and provide a copy of maps showing the location of all active nests and a species-appropriate buffer zone around each active nest sufficient to protect the nest from substantial adverse direct and/or indirect impacts. The Project Biologist may make other recommendations to determine the size of the buffer zone (such as the installation of temporary noise barriers). The size and location of all buffer zones, if required, would be determined by the qualified biologist and subject to review and approval by the Corps. The locations of any active nests and the size and location of all buffer zones determined by the qualified biologist and approved by the Corps would be indicated on the grading plan as reference.

The approved buffer zones (i.e., active bird nest protection zones) would be marked in the field with construction fencing. No construction vehicles would be permitted within these zones unless directly related to the management or protection of the legally protected bird species, until all nestlings have fledged and left the nest (or the nest has failed) as confirmed by a professional biological monitor. The biological monitor will have authority to redirect construction activities if nesting pairs exhibit signs of disturbance.

In the event that a nest is abandoned despite the established buffer as determined by the Project Biologist , if the nestlings are still alive, the Project Applicant/Developer or its designee would contact the California Department of Fish and Wildlife (CDFW) and, subject to CDFW approval, fund the recovery and hacking (controlled release of captive reared young) of the nestling(s).

EC BIO-6: No direct impact to vireo habitat where the species was detected at Borrow Site 1 will occur. Borrow/grading activities will occur outside of the nesting season for the vireo (March 15th to September 15th) to the greatest extent practicable. If grading activities extend into the nesting season, a sound wall barrier, such as hay bales or other noise attenuation methods will be constructed along the edge of the work area (a minimum of 125 feet from occupied habitat) prior to March 15 to avoid adverse effects related to construction noise. The Project Biologist will conduct noise monitoring for the duration of construction activities during the nesting season to ensure LBVI are not exposed to construction noise that exceeds 60 dBA Leq. 60 dBA Leq noise threshold level is used for Santa Ana River Mainstem (SARM) projects in the vicinity and so it is also proposed for this project. If noise thresholds are exceeded, then additional measures will be implemented, which may include shifting activities further away from habitat, modifying construction equipment and procedures, or halting work in this area until after the nesting season, or until the Project Biologist confirms that LBVI are no longer present.

EC BIO-7: Construction and/or borrow activities within Borrow Site 4 will occur outside of the nesting season for the tricolored blackbird (March 15th to September 15th) to the greatest extent practicable. If avoidance of the nesting season is not practicable, then the Project Biologist will conduct a nesting bird survey within three days prior any disturbance of the site, including disking, demolition activities, and grading. If active nests are identified, the biologist will establish suitable buffers around the nests, including sound walls, hay bales, or other measures designed to reduce potential indirect noise effects and to ensure noise levels are below the 60 dBA Leq level at these buffer area locations. The buffer areas would be avoided until the nests are no longer occupied and the juvenile birds can survive independently from the nests.

EC BIO-8: Based on the presence of the least Bell's vireo at the southern boundary of Borrow Site 1 and its presence within the vicinity of borrow sites 2 and 5, and the presence of the tricolored blackbird (in a foraging role) in Borrow Site 4, night lighting will be shielded and directed away from foraging or nesting habitat areas, and will be placed in a manner that would not cause a significant effect on sensitive wildlife species at least 500 feet from known vireo territories in Borrow Site 1 and in the vicinity of borrow sites 2 and 5, and known nesting locations of the tricolored blackbird in

Borrow Site 4. Additionally, no night work will be conducted within Borrow Site 1 during LBVI nesting season.

Cultural Resources

EC CUL-1: Pursuant to 36 CFR section 800.13, in the event of any discoveries during construction of either human remains, archeological deposits, or any other type of historic property, the proposed Project Applicant shall notify the Corps Archeology Staff within 24 hours (Danielle Storey at 213-452-3855). The proposed Project Applicant shall immediately suspend all work in any area(s) where potential cultural resources are discovered. The proposed Project shall not resume construction in the area surrounding the potential cultural resources until the Corps re-authorizes project construction, per 36 C.F.R. section 800.13.

EC CUL-2: The proposed Project Applicant shall retain a qualified archaeologist (hereafter "Project Archaeologist") to conduct training and monitoring activities described in EC CUL-3 and EC CUL-4.

EC CUL-3: The proposed Project Applicant or construction contractor shall ensure the construction site supervisors and crew members involved with grading and trenching operations have received training by the Project Archaeologist to recognize historical and archaeological resources should such resources be unearthed during ground-disturbing construction activities. The training will include a brief review of the cultural sensitivity of the area; what resources could potentially be identified during earthmoving activities; the requirements of the monitoring program; the protocols that apply in the event inadvertent discoveries of cultural resources are identified, including who to contact and appropriate avoidance measures until the find(s) can be properly evaluated; and any other appropriate protocols. All new supervisorial construction personnel involved with grading and trenching operations that begin work on the proposed Project area, borrow sites, or Other Features sites following the initial training session must take the training prior to beginning work.

EC CUL-4: The Project Archaeologist shall conduct monitoring in the locations shown on Exhibit 3.12 through Exhibit 3.17. The Project Archaeologist shall be equipped to salvage artifacts if they are unearthed to avoid construction delays. Within the areas where full-time monitoring is required, monitoring shall occur during all grading, trenching, and excavation activities between zero and four feet below the existing ground surface. Within the areas where periodic monitoring is required, monitoring shall occur one to two times per week only during active grading, trenching, or excavation activities up to four feet below the existing ground surface. No monitoring – either periodic or full-time – is required deeper than four feet below the existing ground surface. Should the Project Archaeologist determine that there are no archaeological resources within the proposed Project's disturbance area, or should the archaeological sensitivity be reduced to low during construction activities, archaeological monitoring activities shall be allowed to cease.

EC CUL-5- The Project Applicant shall notify the Gabrieleno Band of Mission Indians - Kizh Nation (Kizh Nation) a minimum of 14 days prior to the start of ground disturbing activities and provide an opportunity to monitor construction as safety protocols allow. They shall be notified of and allowed to attend the pre-grading meeting with the City and Project construction contractors.

Earth Resources

EC GEO-1: The proposed Project would be required to adhere to the City's regulatory requirements, including, but not limited to, requirements imposed by the City's NPDES Municipal Stormwater Permit, and Project-specific SWPPP, and WQMP to minimize water pollutants including erosion and sedimentation in stormwater runoff.

Public Safety (Hazardous Materials and Emergency Response)

EC HAZ-1: During construction and operation of the Project, all local, state, and federal regulations would be complied with regarding the transportation, handling, and storage of hazardous substances.

EC HAZ-2: At each work area involving the operation of heavy equipment and handling and storage of hazardous substances, a Hazardous Material Spill Prevention Plan would be prepared. The Hazardous Material Spill Prevention Plan shall contain contingency plans in the event of an accidental release into the environment.

EC HAZ-3: Prior to the start of construction, the applicant would prepare an Emergency Evacuation Plan that contains procedures for the demobilization of construction equipment and evacuation of personnel from the study area in the event of a pending significant storm or other emergency that jeopardizes the safety of personnel or equipment.

Traffic and Circulation

EC TRAF-1: Prior to the issuance of each occupancy permits, the Project Applicant shall participate in the City's DIF program by paying the requisite DIF fee in the amount of $5,973,184; or where applicable, the City may require proposed Project to construct Off-Site improvements. The construction of facilities by the Project Applicant would be eligible for DIF credit and reimbursement if the construction exceeds the proposed Project's fair share, as identified on Table 1-3.

EC TRAF-2: Prior to the issuance of each occupancy permits, the Project Applicant shall pay the proposed Project's fair share amount of $48,909 for the improvements identified on Table 1-3 at intersections located within the City of Chino, or as agreed to by the City and Project Applicant.

EC TRAF-3: Table 1-3 of the TIA includes intersections that either share a mutual border with or are wholly located within the City of Ontario, City of Chino Hills, City of Eastvale, and Caltrans that have recommended improvements which are not covered by DIF. Because the City of Chino does not have plenary control over intersections that share a border with these other agencies, the City cannot guarantee that such improvements will be constructed. Thus, the following additional mitigation measure is required: The City of Chino shall participate in a multi-jurisdictional effort with the City of Ontario, City of Chino Hills, City of Eastvale, and Caltrans to develop a study to identify fair share contribution funding sources attributable to and paid from private and public development to supplement other regional and State funding sources necessary to implement the improvements identified on Table 1-3 of the TIA, that are located in these other jurisdictions. The study shall include fair-share contributions related to private and or public development based on nexus requirements contained in the Mitigation Fee Act (Govt. Code § 66000 et seq.) and 14 Cal. Code of Regs. § 15126.4(a)(4) and, to this end, the study shall recognize that impacts attributable to the City of Ontario, City of Chino Hills, City of Eastvale, and Caltrans facilities that are not attributable to development located within the City of Chino are not paying in excess of such developments' fair share obligations. The fee study shall also be compliant with Government Code § 66001(g) and any other applicable provisions of law. The study shall set forth a timeline and other agreed-upon relevant criteria for implementation of the recommendations contained within the study to the extent the other agencies agree to participate in the fee study program. Because the City and these other agencies have the responsibility of implementing this measure, the developer shall have no compliance obligations with respect to this measure.

EC TRAF-4: The Developer's fair-share amount for the intersections that either share a mutual border with or are wholly located within the City of Ontario, City of Chino Hills, City of Eastvale, and Caltrans that have recommended improvements which are not covered by DIF are as follows:

- City of Ontario: $59,941
- City of Chino Hills: $24,805
- City of Eastvale: $612
- Caltrans: $5,329

Developer shall be required to pay the amount shown above to the City of Chino prior to the issuance of the proposed Project's certificate of occupancy. The City of Chino shall hold Developer's Fair Share contribution in trust and shall apply Developer's Fair Share Contribution to any fee program adopted or agreed upon by the City of Chino and other agencies as a result of implementation of Mitigation Measure 3.1. If, within five years of the date of collection of Developer's Fair Share Contribution, the City of Chino and other agencies do not comply with Mitigation Measure 3.1, then Developer's Fair Share Contribution shall be returned to the Developer.

EC TRAF-5: The Project Applicant will be required to develop and implement a City-approved Construction Traffic Management Plan addressing potential construction-related traffic detours and disruptions. In general, the Construction Traffic Management Plan would ensure that to the extent practical, construction traffic would access the proposed Project area during off-peak hours or limited access during the peak hours; and that construction traffic would be routed to avoid travel through, or proximate to, sensitive land uses.

EC TRAF-6: The delivery and removal of heavy equipment is recommended to minimize the heavy truck activity during the morning and evening peak periods (6:00 AM to 9:00 AM and 3:00 PM to 6:00 PM) in order to have nominal impacts to traffic and circulation near the vicinity of the Project.

EC TRAF-7: During the site grading, the proposed Project shall limit soil import activity between the proposed Project area and proposed borrow sites during the hours of 6:00 AM – 9:00 AM (morning peak period) and 3:00 PM – 6:00 PM (evening peak period) to fewer than the equivalent of 50 passenger car equivalent (PCE) truck trips per hour. 50 PCE truck trips equates to approximately 16 total trucks (8 trucks in and 8 trucks out) during the peak periods specified above in order to limit the potential impacts of haul truck activity during these busy commute times:

50 PCE truck trips / 3.0 PCE factor = 16 total trucks during the peak hour

8.0 LIST OF PREPARERS & REVIEWERS

<u>Ruth Villalobos & Associates, Inc.</u>

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Appendix A

Biological Technical Report

BIOLOGICAL TECHNICAL REPORT

FOR

MAJESTIC CHINO HERITAGE PROJECT

LOCATED IN THE CITY OF CHINO, SAN BERNARDINO, CALIFORNIA

Prepared For:

Commerce Construction Company, L.P.
13191 Crossroads Parkway North
Sixth Floor
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Contact: John Burroughs
Phone: (562) 948-4380

Prepared By:

Glenn Lukos Associates, Inc.
29 Orchard
Lake Forest, California 92630
Phone: (949) 340-3851
Report Preparers: Martin Rasnick

May 16, 2019
Revised September 25, 2019

INFORMATION SUMMARY

A. **Report Date:** May 16, 2019
Revised September 25, 2019

B. **Report Title:** Biotechnical Report for the Majestic Chino Heritage Project

C. **Project Site Location:**

The Majestic Chino Heritage Development Project (Project) totals approximately 96.91 acres and is located at latitude 33.957541 and longitude -117.662515 in the City of Chino, San Bernardino County, California [Exhibit 1] within an unsectioned area and Section 31, Township 2 South, and Range 7 West, and Section 36, Township 2 South, and Range 8 West of the U.S. Geological Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. The Project site is bordered by Bickmore Avenue to the north, the El Prado Golf Course to the south, Cypress Channel to the east, and Mountain Avenue to the west.

The Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site totals approximately 2.98 acres and is located at latitude 33.954018 and longitude 659439 in the City of Chino, San Bernardino County, California [Exhibit 1] within an unsectioned area of Township 2 South and Range 7 West of the U.S. Geological Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. This area is bordered by the Project to the north, the El Prado Golf Course to the south and west, and the Cypress Channel to the east.

Borrow Site One (Borrow 1) totals approximately 43.67 acres and is located at latitude 33.952213 and longitude -117.648256 in the City of Chino, San Bernardino County, California [Exhibit 1] within an unsectioned area of Township 2 South and Range 7 West, of the U.S. Geological Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 1 is bordered by Pine Avenue to the north, the Prado Regional Park to the south, Johnson Avenue to the east, and Euclid Avenue to the west.

Borrow Site Two (Borrow 2) totals approximately 38.51 acres and is located at latitude 33.952641 and longitude -117.644448 in the City of Chino, San Bernardino County, California [Exhibit 1] within an unsectioned area of Township 2 South and Range 7 West, of the U.S. Geological Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 2 is bordered by Pine Avenue to the north, the Prado Regional Park and the Prado Equestrian Center to the south, the California Institute for Women to the east, and Johnson Avenue to the west.

Borrow Site Three (Borrow 3) totals approximately 84.25 acres and is located at latitude 33.941462 and longitude -117.635815 in the City of Chino, San Bernardino County, California [Exhibit 1] within Section 5, Township 3 South, and Range 7 West, of the U.S. Geological Survey (USGS) 7.5” quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 3 is bordered by the California Institute for Women to the north, the Prado Basin to the south and west, and Cucamonga Avenue to the east.

Borrow Site Four (Borrow 4) totals approximately 12.94 acres and is located at latitude 33.945011 and longitude -117.622304 in the City of Chino, San Bernardino County, California [Exhibit 1] within Section 4, Township 3 South, and Range 7 West of the U.S. Geological Survey (USGS) 7.5” quadrangle map Corona North (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 4 is bordered by Chino-Corona Road to the north, the Mill Creek Wetlands to the south and east, and Comet Avenue to the west.

Borrow Site Five (Borrow 5) totals approximately 21.28 acres and is located at latitude 33.949712 and longitude -117.613437 in the City of Chino, San Bernardino County, California [Exhibit 1] within Section 33, Township 2 South, and Range 7 West, of the U.S. Geological Survey (USGS) 7.5” quadrangle map Corona North (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 5 is bordered by undeveloped land to the north and south, Hellman Avenue to the east, and Chino-Corona Road to the west.

The Project also may be conditioned with a request for the Project applicant to use good faith efforts to acquire right-of-way for a proposed realignment of Mountain Avenue from the southwest Project boundary to El Prado Road. The Project will not be conditioned to construct such realigned road. The approximate location for this proposed road improvement is latitude 33.954357 and longitude -117.667229.

D. Owner/Applicant:

John Burroughs
Commerce Construction Company, L.P.
13191 Crossroads Parkway North
Sixth Floor
City of Industry, California 91746
Phone: (562) 948-4380
Email: jburroughs@commercelp.com

E. Principal Investigator:

Glenn Lukos Associates, Inc.
29 Orchard
Lake Forest, California 92630
Phone: (949) 340-3851
Report Preparer: Martin Rasnick

F. Report Summary:

A biological study was performed for the proposed Majestic Chino Heritage Project (Project). Discretionary actions requested for the Project include a General Plan Amendment (PL18-0090), a Change of Zone (PL18-0091), a Vesting Tentative Parcel Map (PL18-0119), two (2) Site Approvals (PL18-0118) and (PL18-0120), and a Special Conditional Use Permit (PL19-0011).

The Project would involve the construction and operation of two warehouse buildings consisting of 1,168,710 square feet (sf) and 914,040 sf, respectively, on an approximately 96.91-acre property located at the southeast corner of the intersection of Mountain Avenue and Bickmore Avenue in the City of Chino, San Bernardino County, California. Other physical improvements on the Project site would include, but would not be limited to, automobile and truck parking areas, vehicle drive aisles, landscaping, a water quality/detention basin, public street and utility infrastructure, exterior lighting, and signage.

A majority of the Project site's ground surface elevation is below 566 feet above mean sea level (amsl); the portions of the site located at and below 566 feet amsl are located within the inundation area for the Prado Dam.

In order to develop the Project as proposed, the ground surface elevations of the proposed building footprints would need to be raised above the inundation line for the Prado Dam while simultaneously lowering the elevations of other sites within the Inundation Area in order to maintain the Inundation Area's capacity to hold water that may back up behind the Dam during rare, extreme storm events. Accordingly, the Project entails the potential movement of earth materials from five (5) off-site "excess fill dirt sites" (known as Borrow Sites 1-5 in this report) within the Inundation Area to the Project site in order to raise the proposed building footprints above the inundation line and create additional flood water holding capacity at the excess fill dirt sites.

The Project also entails the construction of an off-site, underground storm drain line that would connect proposed on-site stormwater drainage facilities (along the southern boundary of the Project site) to the Cypress Channel, which is located approximately 600 feet east of the Project site. This improvement is documented as the Off Site Storm Drain Improvement Area Adjacent to the Project Site in this report. A new outlet would be constructed within the Cypress Channel to receive stormwater runoff discharged via the new storm drain line.

The Project is also may be conditioned with a request for the Project applicant to use good faith efforts to acquire right-of-way for a proposed realignment of Mountain Avenue from the southwest Project boundary to El Prado Road. The Project will not be conditioned to construct such realigned road. The specific alignment for this road realignment has not been finalized but the area proposed for this disturbance is an existing golf course, and the area in question does not support sensitive biological resources, nor does it support drainage features that could be regulated by the resource agencies under Section 401 or 404 of the Clean Water Act, Section 13260 of the State Water Code, or Section 1602 of the State Fish and Game Code.

This document provides the results of a field study performed to evaluate the potential occurrence of biological resources and the requirements triggered by environmental laws and regulations. A habitat assessment was performed for the Study Area which determined the presence of potential habitat for the burrowing owl (*Athene cunicularia*), the tri-colored blackbird (*Agelaius tricolor*), and the least Bell's vireo (*Vireo bellii pusillus*). The Study Area contains two drainage features, including the Cypress Channel, a concrete flood control channel, along the eastern boundary of the Project site, and Drainage 1, an intermittent soft-bottom streambed passing through Borrow Site 1, as well as one roadside drainage ditch, which is parallel to Johnson Avenue and Pine Avenue within Borrow Site 2. Although artificially created, this ditch is subject to jurisdiction by both the Santa Ana Regional Water Quality Control Board (Regional Board) and the California Department of Fish and Wildlife (CDFW), no part of which is wetland or supports riparian habitat.

The Cypress Channel and Drainage 1 would be subject to U.S. Army Corps of Engineers (Corps) jurisdiction under Section 404 of the Clean Water Act (CWA), Regional Board jurisdiction under Section 401 of the CWA, and CDFW jurisdiction under Section 1602 of the state Fish and Game Code, and regulatory permits and agreements from these agencies would be needed, should impact to these resources occur.

G. Individuals Conducting Fieldwork:

David Smith, Trina Ming, Zack West, Jeff Ahrens, Stephanie Cashin, Amy Walters, Martin Rasnick, and Lesley Lokovic Gamber

TABLE OF CONTENTS

Page #

TABLES

EXHIBITS

APPENDICES

1.0 INTRODUCTION

1.1 Background and Scope of Work

This document provides the results of a biological study for the approximately 96.91-acre Majestic Chino Heritage Project (the Project) located in the City of Chino, San Bernardino County, California, an off site storm drain improvement area/drainage study area adjacent to the Project site, and its five potential borrow sites, totaling an additional 203.63 acres, all also located in the City of Chino, San Bernardino County, California. Combined, this report covers and analyzes approximately 300.54 acres of land, hereafter considered as the "Study Area," plus the potential acquisition of right of way for a proposed realignment of Mountain Avenue from the southwestern Project boundary to El Prado Road. This report identifies and evaluates impacts to biological resources associated with the proposed Project and related areas including its five potential borrow sites in the context of the California Environmental Quality Act (CEQA), and State and Federal regulations such as the Endangered Species Act (ESA), Clean Water Act (CWA), Porter-Cologne Water Quality Control Act (CWC), and the California Fish and Game Code.

The scope of this report includes a discussion of existing conditions for the approximate 300.54-acre Study Area, and the potential acquisition of right of way for the realignment of Mountain Avenue from the southwestern Project boundary to El Prado Road, all methods employed regarding the biological study, the documentation of botanical and wildlife resources identified (including special-status species), and an analysis of impacts to biological resources. Methods of the study include a review of relevant literature, field surveys, and a Geographical Information System (GIS)-based analysis of vegetation communities. As appropriate, this report is consistent with accepted scientific and technical standards and survey guideline requirements issued by the U.S. Fish and Wildlife Service (USFWS), the CDFW, the California Native Plant Society (CNPS), and other applicable agencies/organizations.

The field study focused on a number of primary objectives that would comply with CEQA requirements, including (1) general reconnaissance survey and vegetation mapping; (2) general biological study; (3) habitat assessments for special-status plant species; and (4) habitat assessments for special-status wildlife species. Observations of all plant and wildlife species were recorded during the general biological survey and are included as Appendix A: Floral Compendium and Appendix B: Faunal Compendium.

1.2 Project Location

The Project site totals approximately 96.91 acres and is located at latitude 33.957541 and longitude -117.662515 in the City of Chino, San Bernardino County, California [Exhibit 1] within an unsectioned area and Section 31, Township 2 South, and Range 7 West, and Section 36, Township 2 South, and Range 8 West of the U.S. Geological Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. The Project site is bordered by Bickmore Avenue to the north, the El Prado Golf Course to the south, Cypress Channel to the east, and Mountain Avenue to the west.

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1.3 Project Description

Discretionary actions requested for the Project include a General Plan Amendment (PL18-0090), a Change of Zone (PL18-0091), a Vesting Tentative Parcel Map (PL18-0119), two (2) Site Approvals (PL18-0118) and (PL18-0120), and a Special Conditional Use Permit (PL19-0011).

The Project would involve the construction and operation of two warehouse buildings consisting of 1,168,710 square feet (sf) and 914,040 sf, respectively, on an approximately 96.91-acre property located at the southeast corner of the intersection of Mountain Avenue and Bickmore Avenue in the City of Chino, San Bernardino County, California. Other physical improvements on the Project site would include, but would not be limited to, automobile and truck parking areas, vehicle drive aisles, landscaping, a water quality/detention basin, public street and utility infrastructure, exterior lighting, and signage.

A majority of the Project site's ground surface elevation is below 566 feet above mean sea level (amsl); the portions of the site located at and below 566 feet amsl are located within the inundation area for the Prado Dam.

In order to develop the Project as proposed, the ground surface elevations of the proposed building footprints would need to be raised above the inundation line for the Prado Dam while simultaneously lowering the elevations of other sites within the Inundation Area in order to maintain the Inundation Area's capacity to hold water that may back up behind the Dam during rare, extreme storm events. Accordingly, the Project entails the potential movement of earth materials from five (5) off-site "excess fill dirt sites" (known as Borrow Sites 1-5 in this report) within the Inundation Area to the Project site in order to raise the proposed building footprints above the inundation line and create additional flood water holding capacity at the excess fill dirt sites.

The Project further entails the construction of an off-site, underground storm drain line that would connect proposed on-site stormwater drainage facilities (located along the southern boundary of the Project site) to the Cypress Channel, which is located approximately 600 feet east of the Project site. A new outlet would be constructed within the Cypress Channel to receive stormwater runoff discharged via the new storm drain line.

The Project also may be conditioned with a request for the Project applicant to use good faith efforts to acquire right-of-way for a proposed realignment of Mountain Avenue from the southwest Project boundary to El Prado Road. The Project will not be conditioned to construct such realigned road. The specific alignment for this road improvement and realignment has not been finalized but the area proposed for this disturbance is west of Mountain Avenue in an existing golf course, and the area in question does not support sensitive biological resources, nor does it support drainage features that could be regulated by the resource agencies under Section

401 or 404 of the Clean Water Act, Section 13260 of the State Water Code, or Section 1602 of the State Fish and Game Code.

2.0 METHODOLOGY

In order to adequately identify biological resources in accordance with the requirements of CEQA, Glenn Lukos Associates (GLA) assembled biological data consisting of three main components:

- Performance of a jurisdictional waters and wetlands delineation;
- Performance of vegetation mapping; and
- Performance of habitat assessments to evaluate the presence/absence of special-status species in accordance with the requirements of CEQA.

The focus of the biological study was determined through initial site reconnaissance, a review of the CNDDB [CDFW 2019], CNPS 8th edition online inventory (CNPS 2019), Natural Resource Conservation Service (NRCS) soil data, other pertinent literature, and knowledge of the region. Site-specific general surveys within the Project site were conducted on foot in the proposed development areas for each target plant or animal species identified below.

Vegetation was mapped directly onto a 200-scale (1"=200') aerial photograph. All flora and fauna identified on site during vegetation mapping was included in a floral and faunal compendia prepared for the Project (Appendix A and B, respectively). The site has been historically maintained for agricultural purposes and has been subject to past disking. Due to highly disturbed site conditions there are no natural vegetation alliances or associations fitting or approaching criteria for membership rules in A Manual of California Vegetation, Second Edition or MCVII (Baldwin et al. 2012), which is the California expression of the National Vegetation Classification. Vegetation present is relatively sparse overall and reflects ornamental plantings (e.g. nonnative trees) or spontaneous, herb-dominated species strongly adapted to anthropogenic disturbance. Vegetation present was mapped directly onto a 200-scale (1"=200') aerial photograph.

2.1 Summary of Surveys

GLA conducted biological studies in order to identify and analyze actual or potential impacts to biological resources associated with development of the Study Area. Observations of all plant and wildlife species were recorded during field efforts [Appendix A: Floral Compendium and Appendix B: Faunal Compendium]. The studies conducted include the following:

- Performance of vegetation mapping;
- Performance of site-specific habitat assessments to evaluate the potential presence/absence of special-status species (or potentially suitable habitat) to the satisfaction of CEQA and federal and state regulations;
- Performance of focused burrowing owl surveys;
- Performance of focused surveys for the least Bell's vireo;

- Performance of focused surveys for sensitive plant species; and
- Performance of a jurisdictional waters and wetlands delineation;

Table 2-1 provides a summary list of survey dates, survey types and personnel.

Table 2-1. Summary of Biological Surveys for the Study Area.

Survey Type	2019 Survey Dates	Biologists
Habitat Assessment	3/12/19, 3/13/19, and 4/16/19	ZW, SC, JA, DS
Focused Burrowing Owl Surveys	2/26/19, 2/28/19, 4/16/19, 4/23/19, 5/21/19, 5/22/19, 7/02/19, and 7/03/19.	ZW, JA, SC, DS, TM, AN, JS
Focused Least Bell's Vireo Surveys	4/11/19, 4/25/19, 5/08/19, 5/20/19, 5/31/19, 6/11/19, 6/27/19, and 7/08/19.	JA, DS
Focused Sensitive Plant Surveys	4/16/19 and 5/10/19	ZW, TM, JA, DS
Jurisdictional Delineation	3/2019, 4/2019, and 5/2019	MR, LLG, AW

DS = David Smith, TM = Trina Ming, MR = Martin Rasnick, LLG = Lesley Lokovic Gamber, ZW = Zack West, SC = Stephanie Cashin, JA = Jeff Ahrens, AW = Amy Walters, AN = April Nakagawa, JS = Jillian Stephens

Individual plants and wildlife species are evaluated in this report based on their "special-status." For the purpose of this report, plants were considered "special-status" based on one or more of the following criteria:

- Listing through the Federal and/or State Endangered Species Act (ESA);
- Occurrence in the CNPS Rare Plant Inventory (Rank 1A/1B, 2A/2B, 3, or 4); and/or
- Occurrence in the CNDDB inventory.

Wildlife species were considered "special-status" based on one or more of the following criteria:

- Listing through the Federal and/or State ESA; and
- Designation by the State as a Species of Special Concern (SSC) or California Fully Protected (CFP) species.

Vegetation communities and habitats were considered "special-status" based on one or more of the following criteria:

- Global (G) and/or State (S) ranking of category 3 or less based on CDFW (see Section 3.2.2 below for further explanation); and
- Riparian habitat.

2.2 Botanical Resources

A site-specific survey program was designed to accurately document the botanical resources within the Study Area, and consisted of five components: (1) a literature search; (2) preparation of a list of target special-status plant species and sensitive vegetation communities that could occur within the Study Area; (3) a field reconnaissance survey; (4) vegetation mapping; and (5) habitat assessments for special-status plants.

2.2.1 Literature Search

Prior to conducting fieldwork, pertinent literature on the flora of the region was examined. A thorough archival review was conducted using available literature and other historical records. These resources included the following:

- California Native Plant Society, Rare Plant Program. 2019. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39) for the USGS 7.5' quadrangles: Black Star Canyon, Corona North, Corona South, Guasti, Ontario, Orange, Prado Dam, San Dimas, and Yorba Linda (CNPS 2019); and

- CNDDB for the USGS 7.5' quadrangles: Black Star Canyon, Corona North, Corona South, Guasti, Ontario, Orange, Prado Dam, San Dimas, and Yorba Linda (CNDDB 2019).

2.2.2 Vegetation Mapping

Vegetation communities within the Project site were mapped according to Holland (1986) when possible. The Project site does not meet the parameters of any natural vegetation classification system. These vegetation communities were named based on the dominant plant species present. Plant communities were mapped in the field directly onto a 200-scale (1"=200') aerial photograph. Vegetation maps are included as Exhibit 4,Sheets 1 through 6 . Representative site photographs are included as Exhibit 13.

2.2.3 Special-Status Plant Species and Habitats Evaluated for the Study Area

A literature search was conducted to obtain a list of special status plants with the potential to occur within the Study Area. The CNDDB was initially consulted to determine well-known occurrences of plants and habitats of special concern in the region. Other sources used to develop a list of target species for the survey program included the CNPS online inventory (2019).

Based on this information, vegetation profiles and a list of target sensitive plant species and habitats that could occur within the Study Area were developed and incorporated into a mapping and survey program to achieve the following goals: (1) characterize the vegetation associations and land use; (2) prepare a detailed floristic compendium; (3) identify the potential for any special status plants that may occur within the Study Area; and (4) prepare a map showing the distribution of any sensitive botanical resources associated with the Study Area, if applicable.

2.2.4 Botanical Surveys

GLA biologists Stephanie Cashin, Zack West, Jeff Ahrens, and David Smith visited the Study Area on March 12, April 16, and May 10, 2019 to conduct habitat assessments for special-status species, including plants. Surveys were conducted in accordance with accepted botanical survey guidelines (CDFG 2009, CNPS 2001, USFWS 2000). An aerial photograph, a soil map, and/or a topographic map were used to determine the community types and other physical features that may support sensitive and uncommon taxa or communities within the Study Area. The habitat assessment was conducted by following meandering transects within the Study Area. All plant species encountered during the field surveys were identified and recorded following the above-referenced guidelines adopted by CNPS (2010) and CDFW by Nelson (1984). A complete list of the plant species observed is provided in Appendix A. Scientific nomenclature and common names used in this report follow Baldwin et al (2012), and Munz (1974).

2.3 Wildlife Resources

Wildlife species were evaluated and detected during the field visit by sight, call, tracks, and scat. Site reconnaissance was conducted in such a manner as to allow inspection of the entire Study Area by direct observation, including the use of binoculars. Observations of physical evidence and direct sightings of wildlife were recorded in field notes during the visit. A complete list of wildlife species observed within the Study Area is provided in Appendix B. Scientific nomenclature and common names for vertebrate species referred to in this report follow the Complete List of Amphibian, Reptile, Bird, and Mammal Species in California (CDFW 2016), Standard Common and Scientific Names for North American Amphibians, Turtles, Reptiles, and Crocodilians 6th Edition, Collins and Taggert (2009) for amphibians and reptiles, and the American Ornithologists' Union Checklist 7th Edition (2009) for birds. The methodology (including any applicable survey protocols) utilized to conduct general surveys, habitat assessments, and/or focused surveys for special-status animals are included below.

2.3.1 General Surveys

Birds

During the general biological and reconnaissance survey within the Study Area, birds were detected incidentally by direct observation and/or by vocalizations, with identifications recorded in field notes.

Mammals

During general biological and reconnaissance survey within the Study Area, mammals were identified and detected incidentally by direct observations and/or by the presence of diagnostic sign (i.e., tracks, burrows, scat, etc.).

Reptiles and Amphibians

During general biological and reconnaissance surveys within the Study Area, reptiles and amphibians were identified incidentally during surveys. Habitats were examined for diagnostic reptile sign, which include shed skins, scat, tracks, snake prints, and lizard tail drag marks. All reptiles and amphibian species observed, as well as diagnostic sign, were recorded in field notes.

2.3.2 Special-Status Animal Species Reviewed

A literature search was conducted in order to obtain a list of special-status wildlife species with the potential to occur within the Study Area. Species were evaluated based on two factors: 1) species identified by the CNDDB as occurring (either currently or historically) on or in the vicinity of the Study Area, and 2) any other special-status animals that are known to occur within the vicinity of the Study Area, or for which potentially suitable habitat occurs on the Study Area.

2.3.3 Habitat Assessment for Special Status Animal Species

GLA biologists Stephanie Cashin, Zack West, Jeff Ahrens, and David Smith visited the Study Area on March 12, March 13, and April 16, 2019 to conduct a habitat assessment for special-status wildlife species. An aerial photograph, soil map and/or topographic map were used to determine the community types and other physical features that may support special-status and uncommon taxa within the Study Area.

Burrowing Owl

GLA biologists Jeff Ahrens, Stephanie Cashin, David Smith, Trina Ming, Jillian Stephens, April Nakagawa, and Zack West conducted focused surveys for the burrowing owl (*Athene cunicularia*) for all suitable habitat areas within the Project Study Area. Surveys were conducted in accordance with survey guidelines described in the 2012 CDFG Staff Report on Burrowing Owl Mitigation. The guidelines stipulate that four focused survey visits should be conducted between February 15 and July 15, with the first visit occurring between February 15 and April 15. The remaining three visits should be conducted three weeks apart from each other, with at least one visit occurring between June 15 and July 15. Focused surveys for the burrowing owl were conducted for the Project site and the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site on February 26, 2019, April 23, 2019, May 22, 2019, and July 2, 2019. Focused surveys were conducted for Borrow Sites 1 and 2 on February 26, 2019,April 16, 2019, May 21, 2019, and July 2, 2019. Focused surveys were conducted for Borrow Site 3 on February 28, 2019, April 16, 2019, May 22, 2019, and July 3, 2019. Focused surveys were conducted for Borrow Sites 4 and 5 on February 27, 2019, April 16, 2019, May 22, 2019, and July 3, 2019. As recommended by the survey guidelines, the survey visits were conducted between morning civil twilight and 10:00 AM, and between two hours before sunset and evening civil twilight. Weather conditions during the surveys were conducive to a high level of bird activity.

Surveys were conducted by walking meandering transects throughout areas of suitable habitat. Exhibit 7 – Burrowing Owl Survey Map identifies the burrowing owl survey areas within the Project study area. Transects were spaced between 7 m and 20 m apart, adjusting for vegetation height and density, in order to provide adequate visual coverage of the survey areas. At the start of each transect, and at least every 100 m along transects, the survey area was scanned for burrowing owls using binoculars. All suitable burrows were inspected for diagnostic owl sign (e.g., pellets, prey remains, whitewash, feathers, bones, and/or decoration) in order to identify potentially occupied burrows. Exhibit 7 – Burrowing Owl Survey Map provides locations of suitable burrows mapped during the transect surveys. Table 2-2 summarizes the burrowing owl survey visits. The results of the burrowing owl surveys are documented in Section 4.0 of this report.

Table 2-2. Summary of Burrowing Owl Surveys

Survey Date	Survey Location/ Survey Number	Biologist	Start/End Time	Start/End Temperature (Fahrenheit)	Wind Speed (mph)	Cloud Cover
2/26/19	Project Site/Off Site Storm Drain Improvement Area Adjacent to the Project Site Survey 1	JA/SC	06:00-10:00	42-55	1-2	Mostly clear
2/26/19	Borrow Site 1 and 2 Survey 1	JA/SC/ZW	06:30-09:45	47-61	1-2	Clear/ Partly Cloudy
2/27/19	Borrow Site 4 and 5/ Survey 1	JA	05:55-09:30	45-54	1-3	Partly Cloudy/ Overcast
2/28/19	Borrow Site 3 Survey 1	DS	06:30-09:00	54-55	0	Overcast
4/16/19	Borrow Site 1 and 2/ Survey 2	JA/SC/ZW	06:30-09:45	47-61	1-2	Clear/ Partly Cloudy
4/16/19	Borrow Site 3 Survey 2	JA	05:50-10:00	54-59	2-4	Overcast
4/16/19	Borrow Site 4 and 5/ Survey 2	ZW	07:05-09:50	56-59	0-2	Overcast
4/23/19	Project Site/ Off Site Storm Drain Improvement	JA	16:00-19:30	78-68	1-5	Mostly Clear

Survey Date	Survey Location/ Survey Number	Biologist	Start/End Time	Start/End Temperature (Fahrenheit)	Wind Speed (mph)	Cloud Cover
	Area Adjacent to the Project Site Survey 2					
5/21/19	Borrow Site 1 and 2/ Survey 3	SC/TM	05:30-07:30	53-54	0-1	Overcast/Cloudy
5/22/19	Borrow Site 3, 4, and 5/ Survey 3	JS/AN	05:45-08:15	49-56	0-2	Partially Cloudy
5/22/19	Project Site/ Off Site Storm Drain Improvement Area Adjacent to the Project Site Survey 3	DS	05:30-08:00	52-56	0-1	Partially Cloudy
7/02/19	Project Site/ Off Site Storm Drain Improvement Area Adjacent to the Project Site Survey 4	DS	06:00-09:00	63-66	0-1	Clear
7/02/19	Borrow Site 1 and 2/ Survey 4	AN/JS	06:00-08:15	63-64	0-1	Mostly Clear
7/03/19	Borrow Sites 3, 4, and 5/ Survey 4	TM/JS	05:45-08:00	59-64	0-2	Partially Clear

JA = Jeff Ahrens   ZW = Zack West SC = Stephanie Cashin DS = David Smith JS = Jillian Stephens AN = April Nakagawa TM = Trina Ming

Least Bell's Vireo

GLA biologists Jeff Ahrens and David Smith conducted focused surveys for the least Bell's vireo (*Vireo bellii pusillus*) for all suitable habitat areas within the Study Area. Surveys were conducted in accordance with the 2001 USFWS survey guidelines, which stipulate that eight surveys should be conducted between April 10 and July 31, with a minimum of ten days separating each survey visit.

Focused surveys for the least Bell's vireo were conducted on April 11, April 25, May 8, May 20, May 31, June 11, June 27, and July 8, 2019 per the protocol.   Pursuant to the survey guidelines, the surveys have been conducted between sunrise and 11:00 a.m. Weather conditions during the surveys were conducive to a high level of bird activity. Table 2-3 summarizes the vireo survey visits. The results of the vireo surveys are documented in Section 4.0 of this report.

Table 2-3. Summary of Least Bell's Vireo Surveys

Survey Date	Biologist	Start/End Time	Start/End Temperature (°F)	Start/End Wind Speed (mph)	Cloud Cover
4/11/19	JA	6:00/8:00 a.m.	46/56	1-3/1-3	Clear
4/25/19	JA	6:00/8:00 a.m.	52/60	1-3/1-3	Clear
5/08/19	JA	6:00/8:00 a.m.	54/60	1-3/1-3	Clear
5/20/19	DS	6:00/9:00 a.m.	68/70	0-2/0-1	Partly Cloudy
5/31/19	DS	6:30/9:30 a.m.	75/77	0-1/0-1	Clear
6/11/19	DS	5:30/8:30 a.m.	63/89	0-1/0-1	Clear
6/27/19	DS	7:00/9:05 a.m.	65/68	0-1/0-1	Partially Cloudy
7/08/19	DS	7:00/9:55 a.m.	65/76	0-1/0-1	Clear

JA=Jeff Ahrens DS = David Smith

Tri-Colored Blackbird

GLA biologist Zack West conducted surveys for the tri-colored blackbird (*Agelaius tricolor*) for all suitable habitat areas within the Study Area as part of GLA's general biological surveys conducted on March 12 and 13, 2019. The surveys have been conducted between sunrise and 11:00 a.m. Weather conditions during the surveys were conducive to a high level of bird activity. The results of the blackbird surveys are documented in Section 4.0 of this report.

2.4 Jurisdictional Delineation

In March, April, and May 2019, regulatory specialists Martin Rasnick, Amy Walters, and Lesley Lokovic Gamber performed a jurisdictional delineation. Prior to beginning the field delineation, a color aerial photograph, a topographic base map of the property, and the USGS topographic map for the site were examined to determine the locations of potential areas of Corps/Regional Board/CDFW jurisdiction. Suspected jurisdictional areas were field checked for the presence of definable channels and/or wetland vegetation, soils and hydrology. Suspected wetland habitats on the site were evaluated using the methodology set forth in the U.S. Army Corps of Engineers 1987 Wetland Delineation Manual[1] (Wetland Manual) and the 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Supplement (Arid West Supplement)[2]. While in the field the limits of Corps/Regional Board/CDFW jurisdiction were recorded onto a color aerial photograph using visible landmarks and/or sub-meter accuracy global positioning system devices.

3.0 REGULATORY SETTING

The Study Area is subject to state and federal regulations associated with a number of regulatory programs. These programs often overlap and were developed to protect natural resources, including: state- and federally listed plants and animals; aquatic resources including rivers and creeks, ephemeral streambeds, wetlands, and areas of riparian habitat; other special-status species which are not listed as threatened or endangered by the state or federal governments; and other special-status vegetation communities.

3.1 State and/or Federally Listed Plants or Animals

3.1.1 State of California Endangered Species Act

California's Endangered Species Act (CESA) defines an endangered species as "a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease." The State defines a threatened species as "a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an Endangered species in the foreseeable future in the absence of the special protection and management efforts required by this chapter. Any animal determined by the commission as rare on or before January 1, 1985 is a threatened species." Candidate species are defined as "a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that the commission has formally noticed as being under review by the department for addition to either the list of endangered species or the list of threatened species, or a species for which the commission has published a notice of proposed regulation to add the species to either list." Candidate species may be afforded temporary protection as though they were already listed as threatened or endangered at the discretion of the Fish and Game Commission. Unlike the Federal Endangered Species Act (FESA), CESA does not list invertebrate species.

Article 3, Sections 2080 through 2085, of the CESA addresses the taking of threatened, endangered, or candidate species by stating "No person shall import into this state, export out of this state, or take, possess, purchase, or sell within this state, any species, or any part or product

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[1] Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1, U.S. Army Engineer Waterways Experimental Station, Vicksburg, Mississippi.

[2] U.S. Army Corps of Engineers. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

thereof, that the commission determines to be an endangered species or a threatened species, or attempt any of those acts, except as otherwise provided." Under the CESA, "take" is defined as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Exceptions authorized by the state to allow "take" require permits or memoranda of understanding and can be authorized for endangered species, threatened species, or candidate species for scientific, educational, or management purposes and for take incidental to otherwise lawful activities. Sections 1901 and 1913 of the California Fish and Game Code provide that notification is required prior to disturbance.

3.1.2 Federal Endangered Species Act

The FESA of 1973 defines an endangered species as "any species that is in danger of extinction throughout all or a significant portion of its range." A threatened species is defined as "any species that is likely to become an Endangered species within the foreseeable future throughout all or a significant portion of its range." Under provisions of Section 9(a)(1)(B) of the FESA it is unlawful to "take" any listed species. "Take" is defined in Section 3(18) of FESA: "...harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Further, the USFWS, through regulation, has interpreted the terms "harm" and "harass" to include certain types of habitat modification that result in injury to, or death of species as forms of "take." These interpretations, however, are generally considered and applied on a case-by-case basis and often vary from species to species. In a case where a property owner seeks permission from a Federal agency for an action that could affect a federally listed plant and animal species, the property owner and agency are required to consult with USFWS. Section 9(a)(2)(b) of the FESA addresses the protections afforded to listed plants.

3.1.3 State and Federal Take Authorizations for Listed Species

Federal or state authorizations of impacts to or incidental take of a listed species by a private individual or other private entity would be granted in one of the following ways:

- Section 7 of the FESA stipulates that any federal action that may affect a species listed as threatened or endangered requires a formal consultation with USFWS to ensure that the action is not likely to jeopardize the continued existence of the listed species or result in destruction or adverse modification of designated critical habitat. 16 U.S.C. 1536(a)(2).

- In 1982, the FESA was amended to give private landowners the ability to develop Habitat Conservation Plans (HCP) pursuant to Section 10(a) of the FESA. Upon development of an HCP, the USFWS can issue incidental take permits for listed species where the HCP specifies at minimum, the following: (1) the level of impact that will result from the taking, (2) steps that will minimize and mitigate the impacts, (3) funding necessary to implement the plan, (4) alternative actions to the taking considered by the applicant and the reasons why such alternatives were not chosen, and (5) such other measures that the Secretary of the Interior may require as being necessary or appropriate for the plan.

- Sections 2090-2097 of the CESA require that the state lead agency consult with CDFW on projects with potential impacts on state-listed species. These provisions also require

CDFW to coordinate consultations with USFWS for actions involving federally listed as well as state-listed species. In certain circumstances, Section 2080.1 of the California Fish and Game Code allows CDFW to adopt the federal incidental take statement or the 10(a) permit as its own based on its findings that the federal permit adequately protects the species under state law.

3.2 California Environmental Quality Act

3.2.1 CEQA Guidelines Section 15380

CEQA requires evaluation of a project's impacts on biological resources and provides guidelines and thresholds for use by lead agencies for evaluating the significance of proposed impacts. Sections 5.1.1 and 5.2.2 below set forth these thresholds and guidelines. Furthermore, pursuant to the CEQA Guidelines Section 15380, CEQA provides protection for non-listed species that could potentially meet the criteria for state listing. For plants, CDFW recognizes that plants on Lists 1A, 1B, or 2 of the CNPS *Inventory of Rare and Endangered Plants in California* may meet the criteria for listing and should be considered under CEQA. CDFW also recommends protection of plants, which are regionally important, such as locally rare species, disjunct populations of more common plants, or plants on the CNPS Lists 3 or 4.

3.2.2 Special-Status Plants, Wildlife and Vegetation Communities Evaluated Under CEQA

Federally Designated Special-Status Species

Within recent years, the USFWS instituted changes in the listing status of candidate species. Former C1 (candidate) species are now referred to simply as candidate species and represent the only candidates for listing. Former C2 species (for which the USFWS had insufficient evidence to warrant listing) and C3 species (either extinct, no longer a valid taxon or more abundant than was formerly believed) are no longer considered as candidate species. Therefore, these species are no longer maintained in list form by the USFWS, nor are they formally protected. This term is employed in this document, but carries no official protections. All references to federally protected species in this report (whether listed, proposed for listing, or candidate) include the most current published status or candidate category to which each species has been assigned by USFWS.

For this report the following acronyms are used for federal special-status species:

- FE Federally listed as Endangered
- FT Federally listed as Threatened
- FPE Federally proposed for listing as Endangered
- FPT Federally proposed for listing as Threatened

State-Designated Special-Status Species

Some mammals and birds are protected by the state as Fully Protected (SFP) Mammals or Fully Protected Birds, as described in the California Fish and Game Code, Sections 4700 and 3511, respectively. California SSC are designated as vulnerable to extinction due to declining population levels, limited ranges, and/or continuing threats. This list is primarily a working document for the CDFW's CNDDB project. Informally listed taxa are not protected, but warrant consideration in the preparation of biotic assessments. For some species, the CNDDB is only concerned with specific portions of the life history, such as roosts, rookeries, or nest sites.

For this report the following acronyms are used for State special-status species:

- SE State-listed as Endangered
- ST State-listed as Threatened
- SFP State Fully Protected
- SSC State Species of Special Concern

California Native Plant Society

The CNPS is a private plant conservation organization dedicated to the monitoring and protection of sensitive species in California. The CNPS's Eighth Edition of the *California Native Plant Society's Inventory of Rare and Endangered Plants of California* separates plants of interest into five ranks. CNPS has compiled an inventory comprised of the information focusing on geographic distribution and qualitative characterization of Rare, Threatened, or Endangered vascular plant species of California. The list serves as the candidate list for listing as threatened and endangered by CDFW. CNPS has developed five categories of rarity that are summarized in Table 3-1.

Table 3-1. CNPS Ranks 1, 2, 3, & 4, and Threat Code Extensions

CNPS Rank	Comments
Rank 1A – Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere	Thought to be extinct in California based on a lack of observation or detection for many years.
Rank 1B – Plants Rare, Threatened, or Endangered in California and Elsewhere	Species, which are generally rare throughout their range that are also judged to be vulnerable to other threats such as declining habitat.
Rank 2A – Plants presumed Extirpated in California, But Common Elsewhere	Species that are presumed extinct in California but more common outside of California
Rank 2B – Plants Rare, Threatened or Endangered in California, But More Common Elsewhere	Species that are rare in California but more common outside of California
Rank 3 – Plants About Which More Information Is Needed (A Review List)	Species that are thought to be rare or in decline but CNPS lacks the information needed to assign to the appropriate list. In most instances, the extent of surveys for these species is not sufficient to allow CNPS to accurately assess whether these species should be assigned to a

CNPS Rank	Comments
	specific rank. In addition, many of the Rank 3 species have associated taxonomic problems such that the validity of their current taxonomy is unclear.
Rank 4 – Plants of Limited Distribution (A Watch List)	Species that are currently thought to be limited in distribution or range whose vulnerability or susceptibility to threat is currently low. In some cases, as noted above for Rank 3 species, CNPS lacks survey data to accurately determine status in California. Many species have been placed on Rank 4 in previous editions of the "Inventory" and have been removed as survey data has indicated that the species are more common than previously thought. CNPS recommends that species currently included on this list should be monitored to ensure that future substantial declines are minimized.
Extension	**Comments**
.1 – Seriously endangered in California	Species with over 80% of occurrences threatened and/or have a high degree and immediacy of threat.
.2 – Fairly endangered in California	Species with 20-80% of occurrences threatened.
.3 – Not very endangered in California	Species with <20% of occurrences threatened or with no current threats known.

3.3 Jurisdictional Waters

3.3.1 Army Corps of Engineers

Pursuant to Section 404 of the Clean Water Act (CWA), the Corps regulates the discharge of dredged and/or fill material into waters of the United States. The term "waters of the United States" is defined in Corps regulations at 33 CFR Part 328.3(a)[3] as:

(1) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters, including interstate wetlands;

(3) The territorial seas;

(4) All impoundments of waters otherwise identified as waters of the United States under this section;

(5) All tributaries, as defined in paragraph (c)(3) of this section, of waters identified in paragraphs (a)(1) through (3) of this section;

(6) All waters adjacent to a water identified in paragraphs (a)(1) through (5) of this section, including wetlands, ponds, lakes, oxbows, impoundments, and similar waters;

(7) All waters in paragraphs (a)(7)(i) through (v) of this section where they are determined, on a case-specific basis, to have a significant nexus to a water identified in paragraphs (a)(1) through (3) of this section. The waters identified in each of paragraphs (a)(7)(i) through (v) of this section are similarly situated and shall be combined, for purposes of a significant nexus analysis, in the watershed that drains to the nearest water identified in paragraphs (a)(1) through (3) of this section. Waters identified in this

[3] As revised by the Corps and EPA, "Clean Water Rule: Definition of 'Waters of the United States"; Final Rule," 80 Federal Register 124 (29 June, 2015), pp. 37054-37127.

paragraph shall not be combined with waters identified in paragraph (a)(6) of this section when performing a significant nexus analysis. If waters identified in this paragraph are also an adjacent water under paragraph (a)(6), they are an adjacent water and no case-specific significant nexus analysis is required.

(i) Prairie potholes. Prairie potholes are a complex of glacially formed wetlands, usually occurring in depressions that lack permanent natural outlets, located in the upper Midwest.

(ii) Carolina bays and Delmarva bays. Carolina bays and Delmarva bays are ponded, depressional wetlands that occur along the Atlantic coastal plain.

(iii) Pocosins. Pocosins are evergreen shrub and tree dominated wetlands found predominantly along the Central Atlantic coastal plain.

(iv) Western vernal pools. Western vernal pools are seasonal wetlands located in parts of California and associated with topographic depression, soils with poor drainage, mild, wet winters and hot, dry summers.

(v) Texas coastal prairie wetlands. Texas coastal prairie wetlands are freshwater wetlands that occur as a mosaic of depressions, ridges, intermound flats, and mima mound wetlands located along the Texas Gulf Coast.

(8) All waters located within the 100- year floodplain of a water identified in paragraphs (a)(1) through (3) of this section and all waters located within 4,000 feet of the high tide line or ordinary high water mark of a water identified in paragraphs (a)(1) through (5) of this section where they are determined on a case-specific basis to have a significant nexus to a water identified in paragraphs (a)(1) through (3) of this section. For waters determined to have a significant nexus, the entire water is a water of the United States if a portion is located within the 100-year floodplain of a water identified in paragraphs (a)(1) through (3) of this section or within 4,000 feet of the high tide line or ordinary high water mark. Waters identified in this paragraph shall not be combined with waters identified in paragraph (a)(6) of this section when performing a significant nexus analysis. If waters identified in this paragraph are also an adjacent water under paragraph (a)(6), they are an adjacent water and no case-specific significant nexus analysis is required.

In the absence of wetlands, the limits of Corps jurisdiction in non-tidal waters, such as intermittent streams, extend to the OHWM which is defined at 33 CFR 328.3(e) as:

> *...that line on the shore established by the fluctuation of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.*

The term “wetlands” (a subset of “waters of the United States”) is defined at 33 CFR 328.3(b) as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support...a prevalence of vegetation typically adapted for life in saturated soil conditions." In 1987 the Corps published a manual to guide its field personnel in determining jurisdictional wetland boundaries. The methodology set forth in the 1987 Wetland Delineation Manual and the Arid West Supplement generally require that, in order to be considered a wetland, the vegetation, soils, and hydrology of an area exhibit at least minimal hydric characteristics. While the manual and Supplement provide great detail in methodology and allow for varying special conditions, a wetland should normally meet each of the following three criteria:

- more than 50 percent of the dominant plant species at the site must be typical of wetlands (i.e., rated as facultative or wetter in the National List of Plant Species that Occur in Wetlands[4]);
- soils must exhibit physical and/or chemical characteristics indicative of permanent or periodic saturation (e.g., a gleyed color, or mottles with a matrix of low chroma indicating a relatively consistent fluctuation between aerobic and anaerobic conditions); and
- Whereas the 1987 Manual requires that hydrologic characteristics indicate that the ground is saturated to within 12 inches of the surface for at least five percent of the growing season during a normal rainfall year, the Arid West Supplement does not include a quantitative criteria with the exception for areas with “problematic hydrophytic vegetation”, which require a minimum of 14 days of ponding to be considered a wetland.

The following are not ‘‘waters of the United States’’ even where they otherwise meet the terms of paragraphs (a)(4) through (8) of the section above as defined in Corps regulations at 33 CFR Part 328.3(b):

(1) Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the Clean Water Act.

(2) Prior converted cropland. Notwithstanding the determination of an area’s status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA.

(3) The following ditches:

(i) Ditches with ephemeral flow that are not a relocated tributary or excavated in a tributary.

(ii) Ditches with intermittent flow that are not a relocated tributary, excavated in a tributary, or drain wetlands.

(iii) Ditches that do not flow, either directly or through another water, into a water identified in paragraphs (a)(1) through (3) of this section.

(4) The following features:

[4] Lichvar, R. W. 2013. *The National Wetland Plant List:* 2013 wetland ratings. Phytoneuron 2013-49: 1-241.

(i) Artificially irrigated areas that would revert to dry land should application of water to that area cease;
(ii) Artificial, constructed lakes and ponds created in dry land such as farm and stock watering ponds, irrigation ponds, settling basins, fields flooded for rice growing, log cleaning ponds, or cooling ponds;
(iii) Artificial reflecting pools or swimming pools created in dry land;
(iv) Small ornamental waters created in dry land;
(v) Water-filled depressions created in dry land incidental to mining or construction activity, including pits excavated for obtaining fill, sand, or gravel that fill with water;
(vi) Erosional features, including gullies, rills, and other ephemeral features that do not meet the definition of tributary, non-wetland swales, and lawfully constructed grassed waterways; and
(vii) Puddles.

(5) Groundwater, including groundwater drained through subsurface drainage systems.

(6) Stormwater control features constructed to convey, treat, or store stormwater that are created in dry land.

(7) Wastewater recycling structures constructed in dry land; detention and retention basins built for wastewater recycling; groundwater recharge basins; percolation ponds built for wastewater recycling; and water distributary structures built for wastewater recycling.

3.3.2 Regional Water Quality Control Board

Section 401 of the CWA requires any applicant for a Section 404 permit to obtain certification from the State that the discharge (and the operation of the facility being constructed) will comply with the applicable effluent limitation and water quality standards. In California this 401 certification is obtained from the Regional Water Quality Control Board. The Corps, by law, cannot issue a Section 404 permit until a 401 certification is issued or waived.

Subsequent to the SWANCC decision, the Chief Counsel for the State Water Resources Control Board issued a memorandum that addressed the effects of the SWANCC decision on the Section 401 Water Quality Certification Program.[5] The memorandum stating that for waters that are no longer considered subject to federal jurisdiction pursuant to Section 404 of the Clean Water Act, but which remain "waters of the state", the State will continue to regulate discharges under the Porter-Cologne Act. In such cases the applicant must apply for and obtain a Waste Discharge Requirement from the Regional Board.

[5] Wilson, Craig M. January 25, 2001. Memorandum addressed to State Board Members and Regional Board Executive Officers.

3.3.3 California Department of Fish and Wildlife

Pursuant to Division 2, Chapter 6, Sections 1600-1617 of the California Fish and Game Code, the CDFCDFW regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake, which supports fish or wildlife.

CDFW defines a "stream" (including creeks and rivers) as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation." CDFW's definition of "lake" includes "natural lakes or man-made reservoirs."

CDFW jurisdiction within altered or artificial waterways is based upon the value of those waterways to fish and wildlife. CDFW Legal Advisor has prepared the following opinion[6]:

- Natural waterways that have been subsequently modified and which have the potential to contain fish, aquatic insects and riparian vegetation will be treated like natural waterways...

- Artificial waterways that have acquired the physical attributes of natural stream courses and which have been viewed by the community as natural stream courses, should be treated by [CDFW] as natural waterways...
- Artificial waterways without the attributes of natural waterways should generally not be subject to Fish and Game Code provisions...

Thus, CDFW jurisdictional limits closely mirror those of the Corps. Exceptions are CDFW's addition of artificial stock ponds and irrigation ditches constructed on uplands, and the addition of riparian habitat supported by a river, stream, or lake regardless of the riparian area's federal wetland status.

3.4 City of Chino, The Preserve Specific Plan Resource Management Plan

Borrow Sites 1-5 are located within the boundary of the City of Chino's "The Preserve Specific Plan" (EDAW AECOM 2011[amended]) and The Preserve, Chino Sphere of Influence – Subarea 2, Environmental Impact Report (EIR) (Michael Brandman Associates, 2003a), but the Project site and the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area are not. A Resources Management Plan (RMP) (Michael Brandman Associates, 2003b) was adopted and provides the roadmap for successfully implementing the vision and requirements of the Specific Plan and the EIR. Therefore, this report provides analysis and mitigation consistent with the RMP for resources located within the RMP boundary; specifically, burrowing owl.

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[6] California Department of Fish and Game. Environmental Services Division (ESD). 1994. *A Field Guide to Lake and Streambed Alteration Agreements, Sections 1600-1607, California Fish and Game Code*.

4.0 RESULTS

This section provides the results of general biological surveys, vegetation mapping, habitat assessments for special-status plants and animals, and a jurisdictional delineation for Waters of the United States (including wetlands) subject to the jurisdiction of the Corps and Regional Board, and streams (including riparian vegetation) and lakes subject to the jurisdiction of CDFW.

4.1 Existing Conditions

Historically, the Project site and borrow sites have been used for livestock farming and dairy operation with remnants of building foundations within portion of each property in the Study Area. Each site has been heavily disturbed as part of ongoing agriculture and ranching for several decades. The Project also may be conditioned with a request for the Project applicant to use good faith efforts to acquire right-of-way for a proposed realignment of Mountain Avenue from the southwest Project boundary to El Prado Road. The Project will not be conditioned to construct such realigned road. The specific alignment for this road improvement and realignment has not been finalized but the area proposed for this disturbance is west of Mountain Avenue in an existing golf course, and the area in question does not support sensitive biological resources, nor does it support drainage features that could be regulated by the resource agencies under Section 4001 or 404 of the Clean Water Act, Section 13260 of the State Water Code, or Section 1602 of the State Fish and Game Code. A description of each property is listed below.

<u>Project Site</u>

The Project site totals approximately 96.91 acres and is located at latitude 33.957541 and longitude -117.662515 in the City of Chino, San Bernardino County, California [Exhibit 1] within an unsectioned area and Section 31, Township 2 South, and Range 7 West, and Section 36, Township 2 South, and Range 8 West of the U.S. Geological Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. The Project site is bordered by Bickmore Avenue to the north, the El Prado Golf Course to the south, Cypress Channel to the east, and Mountain Avenue to the west. The Project site abuts an off site concrete flood control channel along a portion of its eastern boundary, which enters the site at the northeast and flows in a north to south direction for 2,527 feet before leaving the Study Area. The soils mapped on the Project site are Chino Silt Loam, Chualar Clay Loam, 0 to 2 Percent Slopes, and Chualar Clay Loam, 2 to 9 Percent Slopes [Exhibit 6, Sheet 2].

<u>Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to Project Site</u>

The Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project site totals approximately 2.98 acres and is located at latitude 33.954018 and longitude -117.659439 in the City of Chino, San Bernardino County, California [Exhibit 1] within an unsectioned area of Township 2 South and Range 7 West of the U.S. Geological Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. This area is bordered by the Project site to the north, the El Prado Golf Course to the south and west, and Cypress Channel to the east.

The Project site abuts an off site concrete flood control channel along a portion of its eastern boundary, which enters the site at the northeast and flows in a north to south direction for 2,527 feet before leaving the Study Area. The soils mapped on this site are Grangeville Fine Sandy Loam, Chualar Clay Loam, 0 to 2 Percent Slopes, Chualar Clay Loam, 2 to 9 Percent Slopes, and Chualar Clay Loam, 9 to 15 Percent Slopes [Exhibit 6, Sheet 2].

Borrow Site 1

Borrow 1 totals approximately 43.67 acres and is located at latitude 33.952213 and longitude -117.648256 in the City of Chino, San Bernardino County, California [Exhibit 1] within an unsectioned area of Township 2 South and Range 7 West, of the U.S. Geological Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 1 is bordered by Pine Avenue to the north, the Prado Regional Park to the south, Johnson Avenue to the east, and Euclid Avenue to the west.

Borrow 1 contains a drainage course supporting wetland and riparian habitat, which flows in a north to south direction for 1,645 feet before leaving the Study Area. The soils mapped in Borrow 1 are Chino Silt Loam, Chualar Clay Loam, 2 to 9 Percent Slopes, Chualar Clay Loam, 9 to 15 Percent Slopes, and Grangeville Fine Sandy Loam [Exhibit 6, Sheet 3].

Borrow Site 2

Borrow 2 totals approximately 38.51 acres and is located at latitude 33.952641 and longitude -117.644448 in the City of Chino, San Bernardino County, California [Exhibit 1] within an unsectioned area of Township 2 South and Range 7 West, of the U.S. Geological Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 2 is bordered by Pine Avenue to the north, the Prado Regional Park and the Prado Equestrian Center to the south, the California Institute for Women to the east, and Johnson Avenue to the west.

Borrow 2 does not contain a drainage course; only a roadside ditch and former waste treatment facilities are present. The soil mapped in Borrow 2 is Chino Silt Loam [Exhibit 6, Sheet 3].

Borrow Site 3

Borrow Site Three (Borrow 3) totals approximately 84.25 acres and is located at latitude 33.941462 and longitude -117.635815 in the City of Chino, San Bernardino County, California [Exhibit 1] within Section 5, Township 3 South, and Range 7 West, of the U.S. Geological Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 3 is bordered by the California Institute for Women to the north, the Prado Basin to the south and west, and Cucamonga Avenue to the east.

Borrow 3 contains no drainages; only former waste treatment facilities are present. The soils mapped in Borrow 3 are Chualar Clay Loam, 0 to 2 Percent Slopes and Chualar Clay Loam, 2 to 9 Percent Slopes [Exhibit 6, Sheet 4].

Borrow Site 4

Borrow 4 totals approximately 12.94 acres and is located at latitude 33.945011 and longitude -117.622304 in the City of Chino, San Bernardino County, California [Exhibit 1] within Section 4, Township 3 South, and Range 7 West of the U.S. Geological Survey (USGS) 7.5" quadrangle map Corona North (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 4 is bordered by Chino-Corona Road to the north, the Mill Creek Wetlands to the south and east, and Comet Avenue to the west.

Borrow 4 does not contain a drainage course. The soils mapped in Borrow 4 are Chualar Clay Loam, 0 to 2 Percent Slopes, Chualar Clay Loam, 2 to 9 Percent Slopes, and Chualar Clay Loam, 9 to 15 Percent Slopes [Exhibit 6, Sheet 5].

Borrow Site 5

Borrow 5 totals approximately 21.28 acres and is located at latitude 33.949712 and longitude -117.613437 in the City of Chino, San Bernardino County, California [Exhibit 1] within Section 33, Township 2 South, and Range 7 West, of the U.S. Geological Survey (USGS) 7.5" quadrangle map Corona North (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 5 is bordered by undeveloped land to the north and south, Hellman Avenue to the east, and Chino-Corona Road to the west.

Borrow 5 does not contain a drainage course; only former waste treatment facilities are present. The soils mapped in Borrow 5 are Chino Silt Loam, Chualar Clay Loam, 2 to 9 Percent Slopes, and Grangeville Fine Sandy Loam [Exhibit 6, Sheet 6].

Mountain Avenue Improvement/Realignment

The Project also may be conditioned with a request for the Project applicant to use good faith efforts to acquire right-of-way for a proposed realignment of Mountain Avenue from the southwest Project boundary to El Prado Road. The Project will not be conditioned to construct such realigned road. The approximate location for this proposed road improvement is latitude 33.954357 and longitude -117.667229 .

4.2 Vegetation

Project Site

During vegetation mapping of the Project site, one vegetation type was identified. Table 4-1 provides a summary of vegetation/land uses and the corresponding acreage. Detailed descriptions of each vegetation type follow the table. A Vegetation Map is attached as Exhibit 4, Sheet 2. Photographs depicting the various vegetation types are attached as Exhibit 13.

Table 4-1. Summary of Vegetation/Land Use Types for the Project Site

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	96.91
TOTAL	**96.91**

Ruderal/Disturbed

Approximately 96.91 acres of the Project site consist of ruderal/disturbed habitat. Vegetation within the Project site consists of Aleppo pine (*Pinus halepensis*), ash (*Fraxinus* sp), Bermuda grass (*Cynodon dactylon*), black willow (*Salix gooddingii*), blue elderberry (*Sambucus nigra* ssp. *caerulea*), chaparral yucca (*Hesperoyucca whipplei*), cheeseweed mallow (*Malva parviflora*), clover (*Trifolium* sp), common dandelion (*Taraxacum officinale*), common fiddleneck (*Amsinckia intermedia*), common Mediterranean grass (*Schismus barbatus*), common sunflower (*Helianthus annuus*), curly dock (*Rumex crispus*), desert brittlebush (*Encelia farinosa*), dwarf nettle (*Urtica urens*), field bindweed (*Convolvulus arvensis*), foxtail barley (*Hordeum murinum*), golden crownbeard (*Verbesina enceliodes*), lamb's quarters (*Chenopodium album*), London rocket (*Sisymbrium irio*), Mexican fan palm (*Washingtonia robusta*), milk thistle (*Silybum marianum*), millet (*Eleusine* sp.), mission cactus (*Opuntia ficus-indica*), Peruvian pepper tree (*Schinus molle*), prostrate knotweed (*Polygonum aviculare*), red brome (*Bromus madritensis*), red stemmed filaree (*Erodium cicutarium*), Russian thistle (*Salsola tragus*), salt cedar (*Tamarix ramosissima*), silver puffs (*Uropappus lindleyi*), southern cattail (*Typha domingensis*), spiny sowthistle (*Sonchus asper*), summer mustard (*Hirschfeldia incana*), tree tobacco (*Nicotiana glauca*), western ragweed (*Ambrosia psilostachya*), and white horehound (*Marrubium vulgare*).

<u>Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site</u>

During vegetation mapping of the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site, two vegetation types were identified. Table 4-2 provides a summary of vegetation/land uses and the corresponding acreage. Detailed descriptions of each vegetation type follow the table. A Vegetation Map is attached as Exhibit 4, Sheet 2. Photographs depicting the various vegetation types are attached as Exhibit 13.

Table 4-2. Summary of Vegetation/Land Use Types for Off Site Storm Drain Improvement Area/Streambed Study Area Adjacent to the Project Site

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ornamental	0.66
Developed	2.32
TOTAL	**2.98**

Ornamental

Approximately 0.66 acre of the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area adjacent to the Project site consists of ornamental habitat. Vegetation within the area appears to be maintained and ornamentally planted species dominated by coyote brush (Baccharis pilularis), with a few planted ornamental pines (*Pinus* sp.) and oak (*Quercus* sp.). Other species identified include salt cedar (*Tamarix ramosissima),* milk thistle (*Silybum marianum*), morning glory (*Ipomoea* sp.), and black nightshade (*Solanum americanum*).

Developed

Approximately 2.32 acres are considered developed, which are associated with the Cypress Channel located easterly of the Project site. No vegetation is present as the area in question consists of a concrete-sided, concrete-bottomed flood control channel.[7]

Borrow Site 1

During vegetation mapping of the Borrow Site 1, three vegetation types were identified. Table 4-3 provides a summary of vegetation/land uses and the corresponding acreage. Detailed descriptions of each vegetation type follow the table. A Vegetation Map is attached as Exhibit 4, Sheet 3. Photographs depicting the various vegetation types are attached as Exhibit 13.

Table 4-3. Summary of Vegetation/Land Use Types for Borrow Site 1

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	39.05
Freshwater Marsh/Disturbed Freshwater Marsh	4.46
Southern Willow Scrub	0.16
TOTAL	**43.67**

Ruderal/Disturbed

Approximately 39.05 acres of land consists of ruderal/disturbed habitat within Borrow Site 1. Vegetation consists of jimson weed (*Datura wrightii*), mulefat (*Baccharis salicifolia*), common sunflower (*Helianthus annuus*), Canada horseweed (*Erigeron canadensis*), nightshade (*Solanum* sp.), Russian thistle (*Salsola tragus*), nettle leaf goosefoot (*Chenopodium murale*), tumbleweed (*Amaranthus albus*), cheeseweed mallow (*Malva parviflora*), prickly lettuce (*Lactuca serriola*), milk thistle (*Silybum marianum*), London rocket (*Sisymbrium irio*), Bermuda grass (*Cynodon dactylon*), red stemmed filaree (*Erodium cicutarium*), prostrate knotweed (*Polygonum aviculare*), tree of heaven (*Ailanthus altissima*), Mexican fan palm (*Washingtonia robusta*), common Mediterranean grass (*Schismus barbatus*), goldentop grass (*Lamarckia aurea*), annual stinging nettle (*Urtica urens*), tree tobacco (*Nicotiana glauca*), mission cactus (*Opuntia ficus-*

[7] Please note that the Cypress Channel, an off site concreate flood control channel, was studied and analyzed as part of the Project; however, only 0.01 acre and 21 linear feet of channel will be affected by the Project. The remainder of the Cypress Channel is not a part of the Project.

indica), creeping bentgrass (*Agrostic gigantea*) agave (*Agave attenuata*), and perennial pepperweed (*Lepidium latifolium*).

Freshwater Marsh/Disturbed Freshwater Marsh

Approximately 4.46 acres of land consist of freshwater marsh and disturbed freshwater marsh habitat within Borrow Site 1. Vegetation consists of southern cattail (*Typha domingensis*), yerba mansa (*Anemopsis californica*), Canada horseweed (*Erigeron canadensis*), Mexican sprangletop grass (*Leptochloa fusca* ssp. *uninervia*), common sunflower (*Helianthus annuus*), salt marsh sand spurry (*Spergularia marina*), common knotweed (*Persicaria lapathifolia*), nettle leaf goosefoot (*Chenopodium murale*), flax-leaved horseweed (*Erigeron bonariensis*), summer mustard (*Hirschfeldia incana*), wild radish (*Raphanus sativus*), cheeseweed mallow (*Malva parviflora*), rabbitsfoot grass (*Polypogon monspeliensis*) spiny sowthistle (*Sonchus asper*), sweet clover (*Melilotus sp.*), London rocket (*Sisymbrium irio*), Bermuda grass (*Cynodon dactylon*), tree tobacco (*Nicotiana glauca*), Mexican fan palm (*Washingtonia robusta*), golden crownbeard (*Verbesina encelioides*), and perennial pepperweed (*Lepidium latifolium*).

Southern Willow Scrub

Approximately 0.16 acre of land consists of southern willow scrub habitat within Borrow Site 1. Vegetation consists of black willow (*Salix gooddingii*) and salt cedar (*Tamarix ramosissima*).

<u>Borrow Site 2</u>

During vegetation mapping of the Borrow Site 2, one vegetation type was identified. Table 4-4 provides a summary of vegetation/land uses and the corresponding acreage. Detailed descriptions of each vegetation type follow the table. A Vegetation Map is attached as Exhibit 4, Sheet 3. Photographs depicting the various vegetation types are attached as Exhibit 13.

Table 4-4. Summary of Vegetation/Land Use Types for Borrow Site 2

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	38.51
TOTAL	**38.51**

Ruderal/Disturbed

All 38.51 acres of Borrow Site 2 consist of ruderal/disturbed habitat. Vegetation within Borrow Site 2 consists of Chinese parsley (*Heliotropium curassavicum*), telegraph weed (*Heterotheca grandiflora*), Russian thistle (*Salsola tragus*), spiny sowthistle (*Sonchus asper*), nettle leaf goosefoot (*Chenopodium murale*), cheeseweed mallow (*Malva parviflora*), italian rye grass (*Festuca perennis*), poison hemlock (*Conium maculatum*), prickly lettuce (*Lactuca serriola*), London rocket (*Sisymbrium irio*), flax-leaved horseweed (*Erigeron bonariensis*), Bermuda grass (*Cynodon dactylon*), bull thistle (*Cirsium vulgare*), bristly ox-tongue (*Helminthotheca echioides*), prostrate knotweed (*Polygonum aviculare*), shamel ash (*Fraxinus* uhdei), field bindweed (*Convolvulus arvensis*), curly dock (*Rumex crispus*), sweet clover (*Melilotus sp.*), and Asian ponyfoot (*Dichondra micrantha*).

<u>Borrow Site 3</u>

During vegetation mapping of the Borrow Site 3, one vegetation type was identified. Table 4-5 provides a summary of vegetation/land uses and the corresponding acreage. Detailed descriptions of each vegetation type follow the table. A Vegetation Map is attached as Exhibit 4, Sheet 4. Photographs depicting the various vegetation types are attached as Exhibit 13.

Table 4-5. Summary of Vegetation/Land Use Types for Borrow Site 3

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	84.25
TOTAL	**84.25**

Ruderal/Disturbed

All 84.25 acres of Borrow Site 3 consist of ruderal/disturbed habitat. Vegetation within Borrow Site 3 consists of Mexican fireweed (*Bassia scoparia*), five-hook bassia (*Bassia hyssopifolia*), prickly lettuce (*Lactuca serriola*), Russian thistle (*Salsola tragus*), soft chess (*Bromus tectorum*), wild oat (*Avena fatua*), goldentop grass (*Lamarkia aurea*), sunflower (*Heliantus annuus*), cheeseweed mallow (*Malva parviflora*), coyote brush (*Baccharis pilularis*), London rocket (*Sisymbrium irio*), Italian thistle (*Carduus* sp.), Bermuda grass (*Cynodon dactylon*), tumbleweed (*Amaranthus albus*), prickly sow-thistle (*Sonchus asper*), rabbitsfoot grass (*Polypogon monspeliensis*), common knotgrass (*Polygonum aviculare*), Australian saltbush (*Atriplex semibaccata*), big saltbush (*Atriplex lentiformis*), purple needlegrass (*Stipa pulchra*), salt heliotrope (*Heliotropium curassavicum*), Italian rye grass (*Festuca perennis*), wall barley (*Hordeum marinum*), pigweed (*Chenopodium album*), London rocket (*Sysimbrium irio*), Mediterranean grass (Schismus barbatus), perennial pepperweed (*Lepidium latifolium*), milk thistle (*Silybum marianum*), golden crownbeard (*Verbesina encelioides*), and California brittlebrush (*Encilia californica*).

<u>Borrow Site 4</u>

During vegetation mapping of Borrow Site 4, one vegetation type was identified. Table 4-6 provides a summary of vegetation/land uses and the corresponding acreage. Detailed descriptions of each vegetation type follow the table. A Vegetation Map is attached as Exhibit 4, Sheet 5. Photographs depicting the various vegetation types are attached as Exhibit 13.

Table 4-6. Summary of Vegetation/Land Use Types for Borrow Site 4

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	12.94
TOTAL	**12.94**

Ruderal/Disturbed

All 12.94 acres of Borrow Site 4 consist of ruderal/disturbed habitat. Vegetation within Borrow Site 4 consists of coyote brush (*Baccharis pilularis*), coast goldenbush (*Isocoma menziesii*), common sunflower (*Helianthus annuus*), toyon (*Heteromeles arbutifolia*), lemonadeberry (*Rhus integrifolia*), creeping wild rye (*Elymus triticoides*), laurel sumac (*Malosma laurina*), deergrass (*Muhlenbergia rigens*), California sagebrush (*Artemisia californica*), Spanish lotus (*Acmispon americanus*), brittlebush (*Encelia farinosa*), mulefat (*Baccharis salicifolia*), saltgrass (*Distichlis spicata*), cheeseweed mallow (*Malva parviflora*), curly dock (*Rumex crispus*), Russian thistle (*Salsola tragus*), nettle leaf goosefoot (*Chenopodium murale*), London rocket (*Sisymbrium irio*), flax-leaved horseweed (*Erigeron bonariensis*), tumbleweed (*Amaranthus albus*), common red sage (*Kochia scoparia*), annual stinging nettle (*Urtica urens*), prickly lettuce (*Lactuca serriola*), Peruvian pepper tree (*Schinus molle*), Mexican fan palm (*Washingtonia robusta*), and Bermuda grass (*Cynodon dactylon*).

<u>Borrow Site 5</u>

During vegetation mapping of the Borrow Site 5, one vegetation type was identified. Table 4-7 provides a summary of vegetation/land uses and the corresponding acreage. Detailed descriptions of each vegetation type follow the table. A Vegetation Map is attached as Exhibit 4, Sheet 6. Photographs depicting the various vegetation types are attached as Exhibit 13.

Table 4-7. Summary of Vegetation/Land Use Types for Borrow Site 5

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	21.28
TOTAL	**21.28**

Ruderal/Disturbed

All 21.28 acres of Borrow Site 5 consist of ruderal/disturbed habitat. Vegetation within Borrow Site 5 consists of common sunflower (*Helianthus annuus*), Russian thistle (*Salsola tragus*), common red sage (*Kochia scoparia*), spiny sowthistle (*Sonchus asper*), nettle leaf goosefoot (*Chenopodium murale*), cheeseweed mallow (*Malva parviflora*), foxtail barley (*Hordeum murinum*), prickly lettuce (*Lactuca serriola*), London rocket (*Sisymbrium irio*), milk thistle (*Silybum marianum*), flax-leaved horseweed (*Erigeron bonariensis*), Bermuda grass (*Cynodon dactylon*), and annual stinging nettle (*Urtica urens*).

Mountain Avenue Improvement/Realignment

The Project also may be conditioned with a request for the Project applicant to use good faith efforts to acquire right-of-way for a proposed realignment of Mountain Avenue from the southwest Project boundary to El Prado Road. The Project will not be conditioned to construct such realigned road. The specific alignment for this road improvement and realignment has not been finalized but the area proposed for this disturbance is west of Mountain Avenue in an existing golf course, and the area in question does not support sensitive biological resources, nor does it support drainage features that could be regulated by the resource agencies under Section 4001 or 404 of the Clean Water Act, Section 13260 of the State Water Code, or Section 1602 of the State Fish and Game Code.

4.3 Wildlife

On March 12, March 13, and April 16,2019, biologist Zack West conducted a habitat assessment of the Study Area, during which all detected wildlife was recorded. No special status species were detected, though portions of the Study Area do constitute potential habitat for the burrowing owl (*Athene cunicularia*), tri-colored blackbird (*Agelaius tricolor*), and the least Bell's vireo (*Vireo bellii pusillus*).

Species detected within the Project site and the Off Site Storm Drain Improvement Area/ Adjacent to the Project Site included:[8]

- Invertebrates: painted lady (*Vanessa cardui*);

- Birds: American coot (*Fulica americana*), American crow (*Corvus brachyrhynchos*), American pipit (*Anthus rubescens*), Anna's hummingbird (*Calypte anna*), black phoebe (*Sayornis nigricans*), blue-gray gnatcatcher (*Polioptila caerulea*), Brewer's blackbird (*Euphagus cyanocephalus*), Canada goose (*Branta canadensis*), Cassin's kingbird (*Tyrannus vociferans*), common raven (*Corvus corax*), common yellowthroat (*Geothlypis trichas*), Eurasian-collared dove (*Streptopelia decaocto*), European starling (*Sturnus vulgaris*), great-tailed grackle (*Quiscalus mexicanus*), house finch (*Haemorhous mexicanus*), killdeer (*Charadrius vociferous*), lesser goldfinch (*Spinus psaltria*), mallard (*Anas platyrhynchos*), northern harrier (*Circus hudsonius*), red-tailed hawk (*Buteo jamaicensis*), ring-billed gull (*Larus delawarensis*), Say's phoebe (*Sayornis saya*), song sparrow (*Melospiza melodia*), tree swallow (*Tachycineta bicolor*), turkey vulture (*Cathartes aura*), willet (*Tringa semipalmata*), yellow-rumped warbler (*Setophaga coronata*);

- Reptiles and Amphibians: western fence lizard (*Sceloporus occidentalis*), western toad (*Anaxyrus boreas*); and

[8] Please note that the Cypress Channel, an off site concreate flood control channel, was studied and analyzed as part of the Project; however, only 0.01 acre and 21 linear feet of channel will be affected by the Project. The remainder of the Cypress Channel is not a part of the Project.

- Mammals: California ground squirrel (*Otospermophilus beecheyi*), coyote (*Canis latrans*).

Species detected in Borrow Sites 1 and 2 included:

- Invertebrates: Painted lady (*Vanessa cardui*);

- Birds: American crow (*Corvus brachyrhynchos*), American pipit (*Anthus rubescens*), black phoebe (*Sayornis nigricans*), Brewer's blackbird (*Euphagus cyanocephalus*), Canada goose (*Branta canadensis*), common raven (*Corvus corax*), common yellowthroat (*Geothlypis trichas*), Cooper's hawk (*Accipiter cooperi*), double-crested cormorant (*Phalacrocorax auratus*), Eurasian-collared dove (*Streptopelia decaocto*), European starling (*Sturnus vulgaris*), great egret (*Ardea alba*), great-tailed grackle (*Quiscalus mexicanus*), greater yellowlegs (*Tringa melanoleuca*), horned lark (*Eremophila alpestris*), house finch (*Haemorhous mexicanus*), house sparrow (*Passer domesticus*), killdeer (*Charadrius vociferous*), mallard (*Anas platyrhynchos*), northern flicker (*Colaptes auratus*), northern mockingbird (*Mimus polyglottos*), red-tailed hawk (*Buteo jamaicensis*), red-winged blackbird (*Agelaius phoeniceus*), rock pigeon (*Columba livia),* rufous hummingbird (*Selasphorus rufus*), savannah sparrow (*Passerculus sandwichensis*), Say's phoebe (*Sayornis saya*), song sparrow (*Melospiza melodia*), white-crowned sparrow (*Zonotrichia leucophrys*), white-faced ibis (*Plegadis chihi*), yellow-rumped warbler (*Setophaga coronata*); and

- Mammals: Botta's pocket gopher (*Thomomys bottae*), California ground squirrel (*Otospermophilus beecheyi*), common raccoon (*Procyon lotor*).

Species detected in Borrow Site 3 included:

- Birds: American crow (*Corvus brachyrhynchos*), cinnamon teal (*Spatula cyanoptera*), European starling (*Sturnus vulgaris*), greater yellowlegs (*Tringa melanoleuca*), house wren (*Troglodytes aedon*), killdeer (*Charadrius vociferous*), lark sparrow (*Chondestes grammacus*), lesser scaup (*Aythya affinis*), northern flicker (*Colaptes auratus*), northern shoveler (*Spatula clypeata*), red-winged blackbird (*Agelaius phoeniceus*), song sparrow (*Melospiza melodia*), tree swallow (*Tachycineta bicolor*), turkey vulture (*Cathartes aura*), western meadowlark (*Sturnella neglecta*), western sandpiper (*Calidris mauri*), willet (*Tringa semipalmata*).

Species detected in Borrow Sites 4 and 5 included:

- Invertebrates: painted lady (*Vanessa cardui*);

- Birds: American kestrel (*Falco sparverius*), barn swallow (*Hirundo rustica*), black phoebe (*Sayornis nigricans*), Brewer's blackbird (*Euphagus cyanocephalus*), brown-headed cowbird (*Molothrus ater*), California gull (*Larus californicus*), California thrasher (*Toxostoma redivivum*), California towhee (*Melozone crissalis*), Canada goose (*Branta canadensis*), common raven (*Corvus corax*), common yellowthroat (*Geothlypis trichas*), Cooper's hawk (*Accipiter cooperi*), Eurasian-collared dove (*Streptopelia decaocto*), European starling (*Sturnus vulgaris*), great-tailed grackle (*Quiscalus mexicanus*), house finch (*Haemorhous mexicanus*), killdeer (*Charadrius vociferous*), northern mockingbird (*Mimus polyglottos*), northern rough-winged swallow (*Stelgidopteryx serripennis*), red-tailed hawk (*Buteo jamaicensis*), red-winged blackbird (*Agelaius phoeniceus*), savannah sparrow (*Passerculus sandwichensis*), song sparrow (*Melospiza melodia*), tricolored blackbird (*Agelaius tricolor*), western kingbird (*Tyrannus verticalis*), yellow-headed blackbird (*Xanthocephalus xanthocephalus*);

- Reptiles and Amphibians: western fence lizard (*Sceloporus occidentalis*); and

- Mammals: Botta's pocket gopher (*Thomomys bottae*), California ground squirrel (*Otospermophilus beecheyi*), desert cottontail (*Sylvilagus audubonii*).

4.4 Special-Status Vegetation Communities (Habitats)

The CNDDB identifies the following 11 special-status vegetation communities for the Black Star Canyon, Corona North, Corona South, Guasti, Ontario, Orange, Prado Dam, San Dimas, and Yorba Linda quadrangle maps: Southern California Arroyo Chub/Santa Ana Sucker Stream, Riversidian Alluvial Fan Sage Scrub, Southern Riparian Forest, Southern Coast Live Oak Riparian Forest, Southern Cottonwood Willow Riparian Forest, Southern Sycamore Alder Riparian Woodland, Southern Riparian Scrub, Southern Willow Scrub, California Walnut Woodland, Walnut Forest, and Southern Interior Cypress Forest.

The Study Area contains two special-status vegetation types, southern willow scrub and freshwater marsh/disturbed freshwater marsh habitat. A total of 0.16 acre of southern willow scrub habitat is present and a total of 4.46 acres of freshwater marsh/disturbed freshwater marsh habitat is present.

4.5 Special-Status Plants

No special-status plants were detected within the Study Area. Species within Table 4-8 provide a list of special-status plants evaluated for the Study Area through a general biological survey and habitat assessment. Species were evaluated based on the following factors: 1) species identified by the CNDDB and CNPS as occurring (either currently or historically) on or in the vicinity of the Study Area, and 2) any other special-status plants that are known to occur within the vicinity of the Study Area, or for which potentially suitable habitat occurs within the Study Area.

Table 4-8. Special-Status Plants Evaluated for the Study Area

Status

Federal
FE – Federally Endangered
FT – Federally Threatened
FC – Federal Candidate

State
SE – State Endangered
ST – State Threatened

CNPS
Rank 1A – Plants presumed extirpated in California and either rare or extinct elsewhere.
Rank 1B – Plants rare, threatened, or endangered in California and elsewhere.
Rank 2A – Plants presumed extirpated in California, but common elsewhere.
Rank 2B – Plants rare, threatened, or endangered in California, but more common elsewhere.
Rank 3 – Plants about which more information is needed (a review list).
Rank 4 – Plants of limited distribution (a watch list).

CNPS Threat Code extension
.1 – Seriously endangered in California (over 80% occurrences threatened)
.2 – Fairly endangered in California (20-80% occurrences threatened)
.3 – Not very endangered in California (<20% of occurrences threatened or no current threats known)

Occurrence

- Does not occur – The site does not contain habitat for the species and/or the site does not occur within the geographic range of the species.
- Absent – The site contains suitable habitat for the species, but the species has been confirmed absent through focused surveys.
- Not expected to occur – The species is not expected to occur onsite due to low habitat quality, however absence cannot be ruled out.
- Potential to occur – The species has a potential to occur onsite based on suitable habitat, however its presence/absence could not be confirmed.
- Present – The species was detected onsite incidentally or through focused surveys.

Species Name	Status	Habitat Requirements	Occurrence
Allen's pentachaeta *Pentachaeta aurea* ssp. *allenii*	Federal: None State: None CNPS: Rank 1B.1	Openings in coastal sage scrub, and valley and foothill grasslands.	Does not occur.
Brand's star phacelia *Phacelia stellaris*	Federal: None State: None CNPS: Rank 1B.1	Coastal dunes and coastal sage scrub.	Does not occur
Braunton's milk-vetch *Astragalus brauntonii*	Federal: FE State: None CNPS: Rank 1B.1	Closed-cone coniferous forest, chaparral, coastal sage scrub, valley and foothill grassland. Usually carbonate soils. Recent burn or disturbed areas.	Does not occur.
California beardtongue *Penstemon californicus*	Federal: None State: None CNPS: Rank 1B.2	Sandy soils in chaparral, lower montane coniferous forest, and pinyon and juniper woodland.	Does not occur
California saw-grass *Cladium californicum*	Federal: None State: None CNPS: Rank 2B.2	Meadows and seeps, and alkaline or freshwater marshes and swamps.	Does not occur.

Species Name	Status	Habitat Requirements	Occurrence
Chaparral nolina *cismontana*	Federal: None State: None CNPS: Rank 1B.2	Chaparral, coastal sage scrub. Occurring on sandstone or gabbro substrates.	Does not occur
Chaparral ragwort *Senecio aphanactis*	Federal: None State: None CNPS: Rank 2B.2	Chaparral, cismontane woodland, coastal scrub. Sometimes associated with alkaline soils.	Does not occur
Chaparral sand-verbena *Abronia villosa* var. *aurita*	Federal: None State: None CNPS: Rank 1B.1	Sandy soils in chaparral, coastal sage scrub.	Does not occur
Coulter's saltbush *Atriplex coulteri*	Federal: None State: None CNPS: Rank 1B.2	Coastal bluff scrub, coastal dunes, coastal sage scrub, valley and foothill grassland. Occurring on alkaline or clay soils.	Does not occur
Gambel's water cress *Nasturtium gambelii*	Federal: FE State: ST CNPS: Rank 1B.1	Marshes and swamps (freshwater or brackish).	Absent
Heart-leaved pitcher sage *Lepechinia cardiophylla*	Federal: None State: None CNPS: Rank 1B.2	Closed-cone coniferous forest, chaparral, and cismontane woodland.	Does not occur
Intermediate mariposa-lily *Calochortus weedii* var. *intermedius*	Federal: None State: None CNPS: Rank 1B.2	Rocky soils in chaparral, coastal sage scrub, valley and foothill grassland.	Does not occur
Intermediate monardella *Monardella hypoleuca ssp.intermedia*	Federal: None State: None CNPS: Rank 1B.3	Usually in the understory of chaparral, cismontane woodland, and lower montane coniferous forest (sometimes)	Does not occur
Jokerst's monardella *Monardella australis* ssp. *jokerstii*	Federal: None State: None CNPS: Rank 1B.1	Steep scree or talus slopes between breccia, secondary alluvial benches along drainages and washes. Chaparral, lower montane coniferous forest.	Does not occur
Long-spined spineflower *Chorizanthe polygonoides* var. *longispina*	Federal: None State: None CNPS: Rank 1B.2	Clay soils in chaparral, coastal sage scrub, meadows and seeps, and valley and foothill grasslands	Does not occur
Lucky morning-glory *Calystegia felix*	Federal: None State: None CNPS: Rank 3.1	Historically associated with wetland and marshy places, but possibly in drier situations as well. Possibly silty loam and alkaline soils. Meadows and seeps (sometimes alkaline), riparian scrub (alluvial).	Absent
Malibu baccharis *Baccharis malibuensis*	Federal: None State: None CNPS: Rank 1B.1	Chaparral, cismontane woodland, coastal sage scrub.	Does not occur
Many-stemmed dudleya *Dudleya multicaulis*	Federal: None State: None CNPS: Rank 1B.2	Chaparral, coastal sage scrub, valley and foothill grassland. Often occurring in clay soils.	Does not occur.

Species Name	Status	Habitat Requirements	Occurrence
Mesa horkelia *Horkelia cuneata* var. *puberula*	Federal: None State: None CNPS: Rank 1B.1	Sandy or gravelly soils in chaparral (maritime), cismontane woodland, and coastal scrub.	Does not occur
Parry's spineflower *Chorizanthe parryi* var. *parryi*	Federal: None State: None CNPS: Rank 1B.1	Sandy or rocky soils in open habitats of chaparral and coastal sage scrub.	Does not occur
Prostrate vernal pool navarretia *Navarretia prostrata*	Federal: None State: None CNPS: Rank 1B.1	Coastal sage scrub, valley and foothill grassland (alkaline), vernal pools. Occurring in mesic soils.	Does not occur
Rigid fringepod *Thysanocarpus rigidus*	Federal: None State: None CNPS: Rank 1B.2	Dry rocky slopes in pinyon and juniper woodland.	Does not occur
Salt Spring checkerbloom *Sidalcea neomexicana*	Federal: None State: None CNPS: Rank 2B.2	Mesic, alkaline soils in chaparral, coastal sage scrub, lower montane coniferous forest, Mojavean desert scrub, and playas.	Does not occur
San Bernardino aster *Symphyotrichum defoliatum*	Federal: None State: None CNPS: Rank 1B.2	Cismontane woodland, coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, valley and foothill grassland (vernally mesic).	Does not occur
San Fernando Valley spineflower *Chorizanthe parryi* var. *fernandina*	Federal: FPT State: SE CNPS: Rank 1B.1	Coastal sage scrub, occurring on sandy soils.	Does not occur
Santa Ana River woolly star *Eriastrum densifolium* ssp. *sanctorum*	Federal: FE State: SE CNPS: Rank 1B.1	Alluvial fan sage scrub, chaparral. Occurring on sandy or rocky soils.	Does not occur
Santiago Peak phacelia *Phacelia keckii*	Federal: None State: None CNPS: Rank 1B.3	Closed-cone coniferous forest, chaparral	Does not occur
Slender-horned spineflower *Dodecahema leptoceras*	Federal: FE State: SE CNPS: Rank 1B.1	Sandy soils in alluvial scrub, chaparral, cismontane woodland.	Does not occur
Smooth tarplant *Centromadia pungens* ssp. *laevis*	Federal: None State: None CNPS: Rank 1B.1	Alkaline soils in chenopod scrub, meadows and seeps, playas, riparian woodland, valley and foothill grasslands, disturbed habitats.	Absent
Southern tarplant *Centromadia parryi* ssp. *australis*	Federal: None State: None CNPS: Rank 1B.1	Disturbed habitats, margins of marshes and swamps, vernally mesic valley and foothill grassland, vernal pools.	Absent
Tecate cypress *Hesperocyparis forbesii*	Federal: None State: None CNPS: Rank 1B.1	Closed-cone coniferous forest, chaparral.	Does not occur

Species Name	Status	Habitat Requirements	Occurrence
White rabbit-tobacco *Pseudognaphalium leucocephalum*	Federal: None State: None CNPS: Rank 2B.2	Sandy or gravelly soils in chaparral, cismontane woodland, coastal scrub, and riparian woodland.	Does not occur

4.5.1 Special-Status Plants Detected within the Study Area

No special-status plants were detected within the Study Area and none are expected. The Study Area has been either a working farm or dairy operation for several decades and although there are lands that are dominated by non-native grasses and forbes, there is no potential for the lands to function as a natural vegetation community that would support special-status plants.

4.6 Special-Status Animals

Table 4-9 provides a list of special-status animals evaluated for the Study Area through general biological surveys, habitat assessments, and focused surveys. Species were evaluated based on the following factors, including: 1) species identified by the CNDDB as occurring (either currently or historically) on or in the vicinity of the Study Area, and 2) any other special-status animals that are known to occur within the vicinity of the Study Area, for which potentially suitable habitat occurs on the site.

Table 4-9. Special Status Animals Evaluated for the Study Area

Status

Federal	**State**
FE – Federally Endangered	SE – State Endangered
FT – Federally Threatened	ST – State Threatened
FPT – Federally Proposed Threatened	SC– State Candidate
BGEPA– Bald and Golden Eagle Protection Act	CFP – California Fully-Protected Species
SSC – Species of Special Concern	

Western Bat Working Group (WBWG)
H – High Priority
LM – Low-Medium Priority
M – Medium Priority
MH – Medium-High Priority

Occurrence

- Absent – The species is absent from the site, either because the site lacks suitable habitat for the species, the site is located outside of the known range of the species, or focused surveys has confirmed the absence of the species.
- Not expected to occur – The species is not expected to occur onsite due to low habitat quality, however absence cannot be ruled out.
- Potential to occur – The species has a potential to occur onsite based on suitable habitat, however its presence/absence could not be confirmed.
- Present – The species was detected onsite incidentally or through focused surveys.

Species Name	Status	Habitat Requirements	Occurrence
Invertebrates			
Delhi-sands flower-loving fly *Raphiomidas terminatus abdominalis*	Federal: FE State: None	Fine, sandy soils, often associated with wholly or partially consolidated dunes referred to as the “Delhi” series. Vegetation consists of a sparse cover, including California buckwheat, California croton, deerweed, and evening primrose.	Does not occur
San Diego fairy shrimp *Branchinecta sandiegonensis*	Federal: FE State: None	Seasonal vernal pools	Does not occur
Vernal pool fairy shrimp *Branchinecta lynchi*	Federal: FT State: None	Seasonal vernal pools	Does not occur
Fish			
Arroyo chub *Gila orcutti*	Federal: None State: SSC	Slow-moving or backwater sections of warm to cool streams with substrates of sand or mud.	Does not occur
Santa Ana sucker *Catostomus santaanae*	Federal: FT State: None	Small, shallow streams, less than 7 meters in width, with currents ranging from swift in the canyons to sluggish in the bottom lands. Preferred substrates are generally coarse and consist of gravel, rubble, and boulders with growths of filamentous algae, but occasionally they are found on sand/mud substrates.	Does not occur
Amphibians			
Arroyo toad *Anaxyrus californicus*	Federal: FE State: SSC	Breed, forage, and/or aestivate in aquatic habitats, riparian, coastal sage scrub, oak, and chaparral habitats. Breeding pools must be open and shallow with minimal current, and with a sand or pea gravel substrate overlain with sand or flocculent silt. Adjacent banks with sandy or gravely terraces and very little herbaceous cover for adult and	Does not occur

Species Name	Status	Habitat Requirements	Occurrence
		juvenile foraging areas, within a moderate riparian canopy of cottonwood, willow, or oak.	
Coast Range newt *Taricha torosa*	Federal: None State: SSC	Found in wet forests, oak forests, chaparral, and rolling grasslands. In southern California, drier chaparral, oak woodland, and grasslands are used.	Does not occur
Northern leopard frog *Lithobates pipiens*	Federal: None State: SSC	Inhabits grassland, wet meadows, potholes, forests, woodland, brushlands, springs, canals, bogs, marshes, reservoirs. Generally prefers permanent water with abundant aquatic vegetation.	Does not occur
Western spadefoot *Spea hammondii*	Federal: None State: SSC	Seasonal pools in coastal sage scrub, chaparral, and grassland habitats.	Does not occur.
Reptiles			
California glossy snake *Arizona elegans occidentalis*	Federal: None State: SSC	Inhabits arid scrub, rocky washes, grasslands, chaparral.	Does not occur
Coastal whiptail *Aspidoscelis tigris stejnegeri (multiscutatus)*	Federal: None State: SSC	Open, often rocky areas with little vegetation, or sunny microhabitats within shrub or grassland associations.	Does not occur
Coast horned lizard *Phrynosoma blainvillii*	Federal: None State: SSC	Occurs in a variety of vegetation types including coastal sage scrub, chaparral, annual grassland, oak woodland, and riparian woodlands.	Does not occur
Coast patch-nosed snake *Salvadora hexalepis virgultea*	Federal: None State: SSC	Occurs in coastal chaparral, desert scrub, washes, sandy flats, and rocky areas.	Does not occur
Red-diamond rattlesnake *Crotalus ruber*	Federal: None State: SSC	Habitats with heavy brush and rock outcrops, including coastal sage scrub and chaparral.	Does not occur
San Diego banded gecko *Coleonyx variegatus abbotti*	Federal: None State: SSC	Primarily a desert species, but also occurs in cismontane chaparral, desert scrub, and open sand dunes.	Does not occur
Southern California legless lizard *Anniella stebbinsi*	Federal: None State: SSC	Broadleaved upland forest, chaparral, coastal dunes, coastal scrub; found in a	Does not occur

Species Name	Status	Habitat Requirements	Occurrence
		broader range of habitats that any of the other species in the genus. Often locally abundant, specimens are found in coastal sand dunes and a variety of interior habitats, including sandy washes and alluvial fans	
Two-striped garter snake *Thamnophis hammondii*	Federal: None State: SSC	Aquatic snake typically associated with wetland habitats such as streams, creeks, and pools.	Not expected to occur
Western pond turtle *Emys marmorata*	Federal: None State: SSC	Slow-moving permanent or intermittent streams, small ponds and lakes, reservoirs, abandoned gravel pits, permanent and ephemeral shallow wetlands, stock ponds, and treatment lagoons. Abundant basking sites and cover necessary, including logs, rocks, submerged vegetation, and undercut banks.	Does not occur
Birds			
American peregrine falcon (nesting) *Falco peregrinus anatum*	Federal: Delisted State: Delisted, FP	Breeding habitat consists of high cliffs, tall buildings, and bridges along the coast and inland. Foraging habitat primarily includes open areas near wetlands, marshes, and adjacent urban landscapes.	Foraging only
Bald eagle (nesting & wintering) *Haliaeetus leucocephalus*	Federal: Delisted State: SE, FP	Primarily in or near seacoasts, rivers, swamps, and large lakes. Perching sites consist of large trees or snags with heavy limbs or broken tops.	Foraging only
Burrowing owl (burrow sites & some wintering sites) *Athene cunicularia*	Federal: None State: SSC	Shortgrass prairies, grasslands, lowland scrub, agricultural lands (particularly rangelands), coastal dunes, desert floors, and some artificial, open areas as a year-long resident. Occupies abandoned ground squirrel burrows as well as artificial structures such as culverts and underpasses.	Present within project site. Moderate potential to occur within the Off Site Storm Drain Improvement Area Adjacent to the Project Site and Borrow Sites 1-5.

Species Name	Status	Habitat Requirements	Occurrence
California black rail *Laterallus jamaicensis coturniculus*	Federal: None State: ST, FP	Nests in high portions of salt marshes, shallow freshwater marshes, wet meadows, and flooded grassy vegetation.	Does not occur
Coastal cactus wren (San Diego & Orange County only) *Campylorhynchus brunneicapillus sandiegensis*	Federal: None State: SSC	Occurs almost exclusively in cactus (cholla and prickly pear) dominated coastal sage scrub.	Does not occur
Coastal California gnatcatcher *Polioptila californica californica*	Federal: FT State: SSC	Low elevation coastal sage scrub and coastal bluff scrub.	Does not occur
Golden eagle (nesting & wintering) *Aquila chrysaetos*	Federal: None State: FP	In southern California, occupies grasslands, brushlands, deserts, oak savannas, open coniferous forests, and montane valleys. Nests on rock outcrops and ledges.	Foraging only
Grasshopper sparrow (nesting) *Ammodramus savannarum*	Federal: None State: SSC	Open grassland and prairies with patches of bare ground.	Does not occur
Least Bell's vireo (nesting) *Vireo bellii pusillus*	Federal: FE State: SE	Dense riparian habitats with a stratified canopy, including southern willow scrub, mule fat scrub, and riparian forest.	Present within Borrow Site 1 and adjacent to Borrow Sites 2 and 5. No suitable habitat in Borrow Sites 3 or 4. Very low potential to occur in Project site and the Off Site Storm Drain Improvement Area Adjacent to the Project Site.
Long-eared owl (nesting) *Asio otus*	Federal: None State: SSC	Riparian habitats are required by the long-eared owl, but it also uses live-oak thickets and other dense stands of trees.	Does not occur
Southwestern willow flycatcher (nesting) *Empidonax traillii extimus*	Federal: FE State: SE	Riparian woodlands along streams and rivers with mature dense thickets of trees and shrubs.	Does not occur
Swainson's hawk (nesting) *Buteo swainsoni*	Federal: None State: ST	Summer in wide open spaces of the American West. Nest in grasslands, but can use sage flats and agricultural lands. Nests are placed in lone trees.	Foraging only
Tricolored blackbird (nesting colony) *Agelaius tricolor*	Federal: None State: SE	Breeding colonies require nearby water, a suitable nesting substrate, and	Present in foraging role within and adjacent Borrow Site 4. No

Species Name	Status	Habitat Requirements	Occurrence
		open-range foraging habitat of natural grassland, woodland, or agricultural cropland.	suitable foraging or breeding habitat present within Project site, the Off Site Storm Drain Improvement Area Adjacent to the Project Site, or Borrow Sites 1, 2, 3, and 5.
Western yellow-billed cuckoo (nesting) *Coccyzus americanus occidentalis*	Federal: FT State: SE	Dense, wide riparian woodlands with well-developed understories.	Does not occur
White-tailed kite (nesting) *Elanus leucurus*	Federal: None State: FP	Low elevation open grasslands, savannah-like habitats, agricultural areas, wetlands, and oak woodlands. Dense canopies used for nesting and cover.	Foraging only.
Yellow rail *Coturnicops noveboracensis*	Federal: None State: SSC	Shallow marshes, and wet meadows; in winter, drier freshwater and brackish marshes, as well as dense, deep grass, and rice fields.	Does not occur
Yellow warbler (nesting) *Setophaga petechia*	Federal: None State: SSC	Breed in lowland and foothill riparian woodlands dominated by cottonwoods, alders, or willows and other small trees and shrubs typical of low, open-canopy riparian woodland. During migration, forages in woodland, forest, and shrub habitats.	Moderate potential to occur in Borrow Site 1. No suitable habitat is present in Project site, the Off Site Storm Drain Improvement Area Adjacent to the Project Site, or Borrow Sites 2, 3, 4, or 5.
Yellow-breasted chat (nesting) *Icteria virens*	Federal: None State: SSC	Dense, relatively wide riparian woodlands and thickets of willows, vine tangles, and dense brush with well-developed understories.	Moderate potential to occur in Borrow Site 1. No suitable habitat present in Project site, the Off Site Storm Drain Improvement Area Adjacent to the Project Site, or Borrow Sites 2, 3, 4, or 5.
Mammals			
American badger *Taxidea taxus*	Federal: None State: SSC	Most abundant in drier open stages of most scrub, forest, and herbaceous habitats, with friable soils.	Absent
Big free-tailed bat *Nyctinomops macrotis*	Federal: None State: SSC WBWG: MH	Roost mainly in crevices and rocks in cliff situations; also utilize buildings, caves, and tree cavities.	Foraging only

Species Name	Status	Habitat Requirements	Occurrence
Los Angeles pocket mouse *Perognathus longimembris brevinasus*	Federal: None State: SSC	Fine, sandy soils in coastal sage scrub and grasslands.	Does not occur
Mexican long-tongued bat *Choeronycteris mexicana*	Federal: None State: SSC WBWG: H	Variety of habitats ranging from desert, montane, riparian, to pinyon-juniper habitats. Found roosting in desert canyons, deep caves, mines, or rock crevices. Can use abandoned buildings.	Does not occur
Northwestern San Diego pocket mouse *Chaetodipus fallax fallax*	Federal: None State: SSC	Coastal sage scrub, sage scrub/grassland ecotones, and chaparral.	Does not occur
Pallid bat *Antrozous pallidus*	Federal: None State: SSC WBWG: H	Deserts, grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting.	Roosting: Low potential to occur within project site, the Off Site Storm Drain Improvement Area Adjacent to the Project Site and Borrow Site 5. No suitable habitat for roosting in Borrow Sites 1, 2, 3, or 4.
Pocketed free-tailed bat *Nyctinomops femorosaccus*	Federal: None State: SSC WBWG: M	Rocky areas with high cliffs in pine-juniper woodlands, desert scrub, palm oasis, desert wash, and desert riparian.	Does not occur
San Bernardino kangaroo rat *Dipodomys merriami parvus*	Federal: FE State: SSC	Typically found in Riversidean alluvial fan sage scrub and sandy loam soils, alluvial fans and floodplains, and along washes with nearby sage scrub.	Does not occur
San Diego desert woodrat *Neotoma lepida intermedia*	Federal: None State: SSC	Occurs in a variety of shrub and desert habitats, primarily associated with rock outcrops, boulders, cacti, or areas of dense undergrowth.	Absent
Stephens' kangaroo rat *Dipodomys stephensi*	Federal: FE State: ST	Open grasslands or sparse shrublands with less than 50% vegetation cover during the summer.	Does not occur
Western mastiff bat *Eumops perotis californicus*	Federal: None State: SSC WBWG: H	Occurs in many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands, and chaparral. Roosts in crevices in cliff faces, high	Roosting: Low potential to occur within Project site, the Off Site Storm Drain Improvement Area Adjacent to the Project Site and Borrow Site 5. No suitable habitat for

Species Name	Status	Habitat Requirements	Occurrence
		buildings, trees, and tunnels.	roosting in Borrow Sites 1, 2, 3, or 4.
Western yellow bat *Lasiurus xanthinus*	Federal: None State: SSC WBWG: H	Found in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats. Roosts in trees, particularly palms. Forages over water and among trees.	Roosting: Low potential to occur within Project site, the Off Site Storm Drain Improvement Area Adjacent to the Project Site and Borrow Site 5. No suitable habitat for roosting in Borrow Sites 1, 2, 3, or 4.
Yuma myotis *Myotis yumanensis*	Federal: None State: None WBWG: LM	Optimal habitats are open forests and woodlands with sources of water over which to feed. Distribution is closely tied to bodies of water. Maternity colonies in caves, mines, buildings or crevices.	Foraging only.

4.6.1 Special-Status Wildlife Species Observed within the Study Area

Three special-status wildlife species were detected within the Study Area. These species are the least Bell's vireo, burrowing owl, and tri-colored blackbird.

Burrowing Owl (*Athene cunicularia*)

Focused surveys for the burrowing owl were conducted for the Project site and the Off Site Storm Drain Improvement Area Adjacent to the Project Site on February 26, 2019, April 23, 2019, May 22, 2019, and July 2, 2019. Focused surveys were conducted for Borrow Sites 1 and 2 on February 26, 2019, April 16, 2019, May 21, 2019, and July 2, 2019. Focused surveys were conducted for Borrow Site 3 on February 28, 2019, April 16, 2019, May 22, 2019, and July 3, 2019. Focused surveys were conducted for Borrow Sites 4 and 5 on February 27, 2019, April 16, 2019, May 22, 2019, and July 3, 2019. No burrowing owls were detected within Borrow Sites 1 through 5, or the Off Site Storm Drain Improvement Area Adjacent to the Project Site. Two burrowing owls were detected within the Project Study Area within a remnant dairy portion of the Project Site (Exhibit 7 – Burrowing Owl Survey Area Map). These owls are assumed to be a breeding pair based upon their presence during the breeding season. These owls occur within the portion of the Project Study Area located outside of the RMP. There is potential for burrowing owls to occur within an approximate 300.54-acre portion of the Study Area. .

Least Bell's Vireo (*Vireo bellii pusillus*)

Focused surveys for the least Bell's vireo were conducted on April 11, April 25, May 8, May 20, May 31, June 11, June 27, and July 8, 2019 per the protocol. The Least Bell's vireo has been detected within Borrow Site 1, and off site within the vicinity of Borrow Sites 2 and 5 but has not been detected within the remainder of the Study Area (Project site, Off Site Storm Drain

Improvement Area Adjacent to the Project Site, and Borrow Sites 3 and 4) as these other borrow sites do not support suitable habitat for this species. It is assumed that the vireo may be nesting within approximately 0.16 acre of riparian habitat and foraging within 4.46 acres of Borrow Site 1 (black willow thickets, tamarisk thickets, cattail marshes) in the Study Area. It is not expected that the vireo will be temporarily or permanently affected in Borrow Sites 2 or 5 as no foraging habitat for this species is present within either Borrow Site 2 or 5. No suitable habitat for this species is present within Borrow Sites 3 or 4. The Project Site and the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site have very low potential to support vireo due to the lack of suitable habitat present within the Project site or the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site, and superior habitat present within off site areas nearby the Project site, such as the Prado Basin.

Yellow Warbler (*Setophaga petechia*)

Focused surveys for the least Bell's vireo were conducted between mid-April and July 2019. The habitat requirements for the least Bell's vireo generally overlap with the habitat requirements for the yellow warbler. Suitable habitat for the yellow warbler is present within Borrow Site 1, and off site within the vicinity of Borrow Sites 2 and 5. The yellow warbler was not detected within Borrow Site 1, 2, or 5. The yellow warbler was also not detected within the remainder of the Study Area (Project site, the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site, or Borrow Sites 3 and 4) as these areas do not support suitable habitat for this species. It is not expected that the yellow warbler will be temporarily or permanently affected in Borrow Sites 2 or 5 as they were not detected. No suitable nesting habitat for this species is present within Borrow Sites 3 or 4. The Project site and the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site have very low potential to support the warbler due to the lack of suitable nesting habitat present within either site, and superior nesting habitat present within off site areas nearby the Project site. In addition, compensatory mitigation proposed for the least Bell's vireo would also compensate for potential yellow warbler nesting habitat loss.

Yellow-Breasted Chat (*Icteria virens*)

Focused surveys for the least Bell's vireo were conducted between mid-April and July 2019. The habitat requirements for the least Bell's vireo generally overlap with the habitat requirements for the yellow-breasted chat. Suitable habitat for the yellow-breasted chat is present within Borrow Site 1, and off site within the vicinity of Borrow Sites 2 and 5. The yellow-breasted chat was not detected within Borrow Site 1, 2, or 5. The yellow-breasted chat was also not detected within the remainder of the Study Area (Project site, the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site, or Borrow Sites 3 and 4) as these areas do not support suitable habitat for this species. It is not expected that the yellow warbler will be temporarily or permanently affected in Borrow Sites 2 or 5 as they were not detected. No suitable nesting habitat for this species is present within Borrow Sites 3 or 4. The Project site and the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site have very low potential to support the yellow-breasted chat due to the lack of suitable nesting habitat present within either site, and superior nesting habitat present within off site areas nearby the Project site. In addition, compensatory mitigation proposed for the least Bell's vireo would also compensate for potential yellow-breasted chat nesting habitat loss.

Tri-Colored Blackbird (*Agelaius tricolor*)

The tricolored blackbird is listed as a Threatened species by the state. The tri-colored blackbird was observed foraging within and adjacent to Borrow Site 4 near a known population of blackbirds associated with the Mill Creek Wetlands. GLA biologists did not detect the tri-colored blackbird within the Project site, the Off Site Storm Drain Improvement Area Adjacent to the Project Site, or Borrow Sites 1, 2, 3, or 5.

4.6.2 Special-Status Wildlife Species Not Observed but with a Potential to Occur within the Study Area

There is moderate potential for the state Fully Protected white-tailed kite (*Elanus leucurus*) to nest within large ornamental trees and forage within the Project site but not within Borrow Sites 1-5.

The state listed as Endangered bald eagle (*Haliaeetus leucocephalus*) has the potential to forage within the Project Study Area; however, this species is not expected to nest within the Project Study Area, as it is located approximately one-half to one mile from the nearest large body of open water.

The state listed as Threatened Swainson's hawk (*Buteo swainsoni*) has the potential to forage within the Project Study Area; however, the Project Study Area is located outside of the nesting range for this species.

The state Fully Protected golden eagle (*Aquila chrysaetos*) has the potential to forage within the Project Study Area; however, the Project Study Area does not contain the high cliffs and rocky escarpments used for nesting by this species.

The state Fully Protected American peregrine falcon (*Falco peregrinus anatum*) has the potential to forage within the Project Study Area; however, the Project study area does not contain the high cliffs, tall buildings, and bridges used for nesting by this species.

Five special-status bats have potential to forage within the Project study area: big free-tailed bat (*Nyctinomops macrotis*), pallid bat (*Antrozous pallidus*), western mastiff bat (*Eumops perotis californicus*), western yellow bat (*Lasiurus xanthinus*), and Yuma myotis (*Myotis yumanensis*).

None of these species are state or federally listed but four of the five are state Species of Special Concern. Of these, the western yellow bat has the potential to roost within ornamental trees within the site and the two sycamore trees within Borrow Site 5. No suitable habitat is present within the remainder of the Study Area.

4.6.3 Critical Habitat

The Project site, as well as Borrow Sites 2 and 4, is not located within USFWS-designated critical habitat areas, but the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site, Borrow Sites 1, 3, and 5 are within mapped designated Critical Habitat for the least Bell's vireo, a state and federal endangered songbird. Exhibit 9, Sheet 1 through 6 depict Critical Habitat within the Study Area.

4.7 Raptor Use

The Study Area has the potential to support raptor foraging habitat for several species and nesting habitat for burrowing owl. The four most regionally abundant raptor species, red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), Great Horned Owl (*Bubo virginianus*) and Barn Owl (*Tyto alba*), may forage on the site throughout the year. As indicated above in Section 4.6.2, the burrowing owl is present within the Project site and has the potential to be present in Borrow Sites 1-5, but surveys for the burrowing owl documented its absence is Borrow Sites 1-5.

There are approximately 300.54 acres of raptor foraging habitat within the Study Area.

4.8 Nesting Birds

The Study Area contains trees, shrubs, and ground cover that provide suitable habitat for nesting migratory birds. Impacts to nesting birds are prohibited under the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code.[9]

4.9 Wildlife Linkages/ Corridors and Nursery Sites

Habitat linkages are areas which provide a communication between two or more other habitat areas which are often larger or superior in quality to the linkage. Such linkage sites can be quite small or constricted, but may can be vital to the long-term health of connected habitats. Linkage values are often addressed in terms of "gene flow" between populations, with movement taking potentially many generations.

Corridors are similar to linkages but provide specific opportunities for individual animals to disperse or migrate between areas, generally extensive but otherwise partially or wholly separated regions. Adequate cover and tolerably low levels of disturbance are common requirements for corridors. Habitat in corridors may be quite different than that in the connected areas, but if used by the wildlife species of interest, the corridor will still function as desired.

The Study Area does not support any habitat linkage or wildlife corridor.

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[9] The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 C.F.R. Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 C.F.R.21). In addition, sections 3505, 3503.5, and 3800 of the California Department of Fish and Game Code prohibit the take, possession, or destruction of birds, their nests or eggs.

Wildlife nurseries are sites where wildlife concentrate for hatching and/or raising young, such as rookeries, spawning areas, and bat colonies. Nurseries can be important to both special-status species as well as commonly occurring species.

The Study Area does not support a wildlife nursery.

4.10 Jurisdictional Delineation

The Study Area contains one concrete flood control channel (Cypress Channel) adjacent to the Project site, one drainage, Drainage 1, within Borrow Site 1, and one artificially created roadside ditch, Ditch 1, within Borrow Site 2 [Exhibit 5A – Corps/Regional Board Jurisdictional Delineation Map and Exhibit 5B – CDFW Jurisdictional Delineation Map].

The Cypress Channel is a concrete-lined, concrete-bottomed flood control channel abutting a portion of the eastern boundary of the Project site. It enters the Study Area near the northeast corner of the site beneath Bickmore Avenue and flows for 2,527 linear feet before leaving the Study Area and entering the Prado Basin. Approximately 1.45 acres of Corps and Regional Board jurisdiction, and 2.32 acres of CDFW jurisdiction, are present within the Cypress Channel.[10]

Drainage 1 is an intermittent channel located in the central portion of Borrow 1. Drainage 1 enters Borrow 1 beneath Pine Avenue to the north and flows in a north to south direction for 1,645 feet before leaving Borrow Site 1 and entering the Prado Basin. Approximately 4.59 acres of Corps and Regional Board jurisdiction, and 4.81 acres of CDFW jurisdiction, are present within Drainage 1.

Ditch 1 is an artificially created roadside ditch located parallel to Johnson Avenue within Borrow Site 2. Ditch 1 enters the Study Area beneath Pine Avenue to the north and flows in a north to south direction for 2,366 feet before leaving Borrow Site 2 and entering the Prado Basin. Approximately 0.27 acre of Regional Board and CDFW jurisdiction is present within Ditch 1. There is no Corps jurisdiction within Ditch 1 as it would not be regulated under 33 CFR Section 328.3(b)(3)(i) of the Clean Water Rule.

Based on the current site plan, the Study Area will result in permanent impact to 0.07 acre of Corps jurisdictional waters, of which 0.06 acre consist of jurisdictional wetlands. A total of 190 feet of streambed will be disturbed.

Impacts to Corps jurisdictional waters are limited to Drainage 1 within Borrow Site 1 (0.06 acre and 169 linear feet of streambed) and the Cypress Channel within the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site (0.01 acre and 21 linear feet of streambed). Impacts to Corps/Regional Board jurisdiction are depicted on Exhibit 10A.

[10] Please note that the Cypress Channel, an off site concreate flood control channel, was studied and analyzed as part of the Project; however, only 0.01 acre and 21 linear feet of channel will be affected by the Project. The remainder of the Cypress Channel is not a part of the Project, nor will it be affected by the Project.

Based on the current site plan, the Study Area will result in permanent impact to 0.07 acre of Regional Board jurisdictional waters, of which 0.06 acre consist of jurisdictional wetlands. A total of 190 feet of streambed will be disturbed.

Impacts to Regional Board jurisdictional waters are limited to Drainage 1 within Borrow Site 1 (0.06 acre and 169 linear feet of streambed) and the Cypress Channel within the Off Site Storm Drain Improvement Area Adjacent to the Project Site site (0.01 acre and 21 feet of streambed). Impacts to Corps/Regional Board jurisdiction are depicted on Exhibit 10A.

Based on the current site plan, the Study Area will result in permanent impact to 0.07 acre of CDFW jurisdiction, of which 0.06 acre consists of riparian habitat and 0.01 acre consists of non-riparian streambed. A total of 190 feet of streambed will be disturbed.

Impacts to CDFW jurisdiction are limited to Drainage 1 within Borrow Site 1 (0.06 acre and 169 linear feet of streambed) and the Cypress Channel within the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site (0.01 acre and 21 linear feet of streambed). Impacts to CDFW jurisdiction are depicted on Exhibit 10B.

The Study Area jurisdictional delineation report is attached as Appendix C and a copy of the delineation impact memorandum is attached as Appendix D.

5.0 IMPACT ANALYSIS

The following discussion examines the potential impacts to plant and wildlife resources that would occur as a result of the proposed project. Impacts (or effects) can occur in two forms, direct and indirect. Direct impacts are considered to be those that involve the loss, modification or disturbance of plant communities, which in turn, directly affect the flora and fauna of those habitats. Direct impacts also include the destruction of individual plants or animals, which may also directly affect regional population numbers of a species or result in the physical isolation of populations thereby reducing genetic diversity and population stability.

Indirect impacts pertain to those impacts that result in a change to the physical environment, but which is not immediately related to a project. Indirect (or secondary) impacts are those that are reasonably foreseeable and caused by a project, but occur at a different time or place. Indirect impacts can occur at the urban/wildland interface of projects, to biological resources located downstream from projects, and other off site areas where the effects of the project may be experienced by plants and wildlife. Examples of indirect impacts include the effects of increases in ambient levels of noise or light; predation by domestic pets; competition with exotic plants and animals; introduction of toxics, including pesticides; and other human disturbances such as hiking, off-road vehicle use, unauthorized dumping, etc. Indirect impacts are often attributed to the subsequent day-to-day activities associated with project build-out, such as increased noise, the use of artificial light sources, and invasive ornamental plantings that may encroach into native areas. Indirect effects may be both short-term and long-term in their duration. These impacts are commonly referred to as "edge effects" and may result in a slow replacement of native plants by non-native invasives, as well as changes in the behavioral patterns of wildlife and reduced wildlife diversity and abundance in habitats adjacent to project sites.

Cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. A cumulative impact can occur from multiple individual effects from the same project, or from several projects. The cumulative impact from several projects is the change in the environment resulting from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

5.1 California Environmental Quality Act (CEQA)

5.1.1 Thresholds of Significance

Environmental impacts to biological resources are assessed using impact significance threshold criteria, which reflect the policy statement contained in CEQA, Section 21001(c) of the California Public Resources Code. Accordingly, the State Legislature has established it to be the policy of the State of California:

> *"Prevent the elimination of fish or wildlife species due to man's activities, ensure that fish and wildlife populations do not drop below self-perpetuating levels, and preserve for future generations representations of all plant and animal communities..."*

Determining whether a project may have a significant effect, or impact, plays a critical role in the CEQA process. According to CEQA, Section 15064.7 (Thresholds of Significance), each public agency is encouraged to develop and adopt (by ordinance, resolution, rule, or regulation) thresholds of significance that the agency uses in the determination of the significance of environmental effects. A threshold of significance is an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant. In the development of thresholds of significance for impacts to biological resources CEQA provides guidance primarily in Section 15065, Mandatory Findings of Significance, and the CEQA Guidelines, Appendix G, Environmental Checklist Form. Section 15065(a) states that a project may have a significant effect where:

> *"The project has the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or wildlife community, reduce the number or restrict the range of an endangered, rare, or threatened species, ..."*

Therefore, for the purpose of this analysis, impacts to biological resources are considered potentially significant (before considering offsetting mitigation measures) if one or more of the following criteria discussed below would result from implementation of the proposed project.

5.1.2 Criteria for Determining Significance Pursuant to CEQA

Appendix G of the 2019 State CEQA guidelines indicate that a project may be deemed to have a significant effect on the environment if the project is likely to:

> *a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.*
>
> *b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.*
>
> *c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.*
>
> *d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.*
>
> *e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.*
>
> *f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.*

5.2 Impacts to Native Vegetation

Tables 5-1 through 5-7 provide a summary of vegetation community impacts. There are two native vegetation communities present within the Study Area, Freshwater Marsh/Disturbed Freshwater Marsh and Southern Willow Scrub habitat. The Project proposed for the Study Area will result in permanent impacts of up to 0.06 acre of disturbance to Disturbed Freshwater Marsh habitat within Borrow Site 1. No other impact to native habitat communities will occur in the Project Site, the Off Site Storm Drain Improvement Area Adjacent to the Project Site or Borrow Sites 2 through 5. No impact to Southern Willow Scrub habitat is proposed.

The removal of up to 0.06 acre of Disturbed Freshwater Marsh habitat within Borrow Site 1 would be considered significant pursuant to CEQA; however, with the incorporation of compensatory mitigation for this habitat impact at a minimum 1:1 mitigation-to-impact ratio, the impact would be reduced to a less than significant level.

The proposed Project Study Area will permanently impact up to 210.06 acres of non-native vegetation/ornamental vegetation in the form of ruderal/disturbed habitat and ornamental habitat, and 0.01 acre of developed area for a total permanent impact of up to 210.07 acres of disturbed lands. As discussed in Section 4.2, the ruderal/disturbed habitat is not a natural vegetation community but rather are lands dominated by several non-native grass and forb species. The Study Area has been in agriculture and ranching (dairy) for decades.

Once borrow activities have been completed within Borrow Sites 1 through 5, the Project will apply a native hydroseed mix to each borrow site to avoid infestation or the spread of invasive species.

The removal of up to 209.75 acres of ruderal/disturbed lands, up to 0.31 acre of ornamental vegetation, and 0.01 acre of developed area would not be a significant impact under CEQA. These lands are not expected to support quality habitat for plants and animals due to the decades of disking and pasture use by dairy cattle.

Vegetation impact maps are attached as Exhibit 11, Sheet 1 through 6.

Table 5-1. Summary of Vegetation/Land Use Impacts, Project Site

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	96.91
TOTAL	**96.91**

Table 5-2. Summary of Vegetation/Land Use Impacts, Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ornamental	0.31
Developed	0.01
TOTAL	**0.32**

Table 5-3. Summary of Vegetation/Land Use Impacts, Borrow Site 1

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	28.53
Freshwater Marsh/Disturbed Freshwater Marsh	0.06
TOTAL	**28.59**

Table 5-4. Summary of Vegetation/Land Use Impacts, Borrow Site 2

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	20.79
TOTAL	**20.79**

Table 5-5. Summary of Vegetation/Land Use Impacts, Borrow Site 3

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	32.00
TOTAL	**32.00**

Table 5-6. Summary of Vegetation/Land Use Impacts, Borrow Site 4

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	12.94
TOTAL	**12.94**

Table 5-7. Summary of Vegetation/Land Use Impacts, Borrow Site 5

VEGETATION TYPE/ LAND USE TYPE	ACREAGE
Ruderal/Disturbed	18.58
TOTAL	**18.58**

5.3 Impacts to Special-Status Plants

The proposed Project in the Study Area will not impact special-status plants as there is no potential for any to occur.

5.4 Impacts to Special-Status Animals

The proposed Project in the Study Area has the potential to impact burrowing owl, least Bell's vireo, tri-colored blackbird, as well as raptors such as the white-tailed kite, bald eagle, golden eagle, peregrine falcon, and Swainson's hawk, if any of these species is present during construction. The Project may also potentially affect the big free-tailed bat, pallid bat, western mastiff bat, western yellow bat, and Yuma myotis.

Focused surveys for the burrowing owl were conducted for the Project site and the Off Site Storm Drain Improvement Area Adjacent to the Project Site on February 26, 2019, April 23, 2019, May 22, 2019, and July 2, 2019. Focused surveys were conducted for Borrow Sites 1 and 2 on February 26, 2019, April 16, 2019, May 21, 2019, and July 2, 2019. Focused surveys were conducted for Borrow Site 3 on February 28, 2019, April 16, 2019, May 22, 2019, and July 3, 2019. Focused surveys were conducted for Borrow Sites 4 and 5 on February 27, 2019, April 16, 2019, May 22, 2019, and July 3, 2019. As discussed in Section 4.6.1, there are burrows on the Project Site that are potentially suitable for burrowing owl and a pair of burrowing owls have been observed within the Project Site. There were also potentially suitable burrows for the burrowing owl on Borrow Sites 1 through 5, but no owls were detected within Borrow Sites 1 through 5. No suitable burrows were observed within the Off Site Storm Drain Improvement Area Adjacent to the Project Site. The potential presence of burrowing owls within the Project site is a potentially significant impact under CEQA. Refer to Section 6 to address this potential impact.

Focused surveys for the least Bell's vireo were conducted on April 11, April 25, May 8, May 20, May 31, June 11, June 27, and July 8, 2019 per the protocol. A total of 0.38 acre of lands designated as critical habitat for the vireo are being impacted; however, 0.15 acre of these lands within the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project site have been disturbed and are dominated by ornamental vegetation consisting of planted coyote brush, with a few planted ornamental pines and oaks. This ornamental habitat area does not contain the primary constituent elements or physical/biological attributes [riparian woodland habitat that generally contains both canopy and shrub layers] which could be utilized by the vireo for foraging or nesting.

As a result, impact to this area would be considered less than significant pursuant to CEQA and would not be subject to compensatory mitigation. A total of 0.23 acre of permanent impact to areas supporting primary constituent elements for least Bell's vireo critical habitat will occur. A total of 0.23 acre of this critical habitat is within Borrow Site 1. No critical habitat impacts will occur to Borrow Sites 2, 3, 4, or 5. Borrow Sites 2 and 4 are not within critical habitat, nor is the Project Site. Impacts to least Bell's vireo will require a minimum 1:1 mitigation-to-impact ratio for habitat to reduce impacts to a less than significant level. Compensatory mitigation is expected to occur at a local mitigation bank or in-lieu fee program within the Santa Ana River (or adjacent) watershed. Refer to Section 6 to address this resource.

Focused surveys for the least Bell's vireo were conducted between mid-April and July 2019. The habitat requirements for the least Bell's vireo generally overlap with the habitat requirements for the yellow warbler. Suitable habitat for the yellow warbler is present within Borrow Site 1, and off site within the vicinity of Borrow Sites 2 and 5. The yellow warbler was not detected within Borrow Site 1, 2, or 5. The yellow warbler was also not detected within the remainder of the Study Area (Project site, the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site, or Borrow Sites 3 and 4) as these areas do not support suitable habitat for this species. It is not expected that the yellow warbler will be temporarily or permanently affected in Borrow Sites 2 or 5 as they were not detected. No suitable nesting habitat for this species is present within Borrow Sites 3 or 4. The Project site and the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site have very low potential to support the warbler due to the lack of suitable nesting habitat present within either site, and superior nesting habitat present within off site areas nearby the Project site, such as the Prado Basin. In addition, compensatory mitigation proposed for the least Bell's vireo (see Section 6.5) would also compensate for potential yellow warbler nesting habitat loss.

Focused surveys for the least Bell's vireo were conducted between mid-April and July 2019. The habitat requirements for the least Bell's vireo generally overlap with the habitat requirements for the yellow-breasted chat. Suitable habitat for the yellow-breasted chat is present within Borrow Site 1, and off site within the vicinity of Borrow Sites 2 and 5. The yellow-breasted chat was not detected within Borrow Site 1, 2, or 5. The yellow-breasted chat was also not detected within the remainder of the Study Area (Project site, the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site, or Borrow Sites 3 and 4) as these areas do not support suitable habitat for this species. It is not expected that the yellow warbler will be temporarily or permanently affected in Borrow Sites 2 or 5 as they were not detected. No suitable nesting habitat for this species is present within Borrow Sites 3 or 4. The Project site and the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site have very low potential to support the yellow-breasted chat due to the lack of suitable nesting habitat present within either site, and superior nesting habitat present within off site areas nearby the Project site, such as the Prado Basin. In addition, compensatory mitigation proposed for the least Bell's vireo (see Section 6.5) would also compensate for potential yellow-breasted chat nesting habitat loss.

Surveys for the tri-colored blackbird were conducted in March 2019. A total of 12.94 acres of foraging habitat for the blackbird are being impacted, all of which are in Borrow Site 4. The Project site, the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site, and Borrow Sites 1, 2, 3, and 5 do not support suitable foraging or nesting habitat for the blackbird. The blackbirds located on site were foraging only and not nesting; therefore, the potential to incidentally take this species very low given the more suitable nesting habitat within the Mill Creek Wetlands adjacent to the site. The applicant will conduct borrow activities within Borrow Site 4 outside of the nesting season for the blackbird (March 15th to September 15th) to the greatest extent feasible. If this is not possible, sound walls will be erected to ensure that the blackbird is not affected by borrow activities.

The Study Area impact boundary provides 210.13 acres of potential foraging habitat for white-tailed kite, bald eagle, golden eagle, peregrine falcon, and Swainson's hawk. The lands are not good quality given the amount of disturbance over the years and this species remains common in the region. The removal of up to 210.13 acres of potential foraging habitat for these species would be less than significant under CEQA, especially given the higher quality habitat surrounding the Study Area in Prado Basin, Prado Regional Park, Chino Hills State Park, and the Santa Ana Mountains.

The Study Area impact boundary provides 210.13 acres of potential foraging habitat for the big free-tailed bat (*Nyctinomops macrotis*), pallid bat (*Antrozous pallidus*), western mastiff bat (*Eumops perotis californicus*), western yellow bat (*Lasiurus xanthinus*), and Yuma myotis (*Myotis yumanensis*).

However, based on the level of ongoing human disturbance within the Project study area, and the regional availability of foraging habitat in the vicinity of the Project site, such as the Prado Basin, Chino Hills State Park, and the Santa Ana Mountains, the loss of up to 212.01 acres of low-quality potential bat foraging habitat is not judged to be significant under CEQA.

5.5 Impacts to Critical Habitat

The proposed Project in the Study Area will result in permanent impact to 0.23 acre of areas supporting primary constituent elements for least Bell's vireo. The Project will also result in permanent impact to 0.15 acre of lands within the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project site which do not contain the primary constituent elements or physical/biological attributes [riparian woodland habitat that generally contains both canopy and shrub layers] which could be utilized by the vireo for foraging or nesting. A total of 0.23 acre of this critical habitat is within Borrow Site 1. No critical habitat impacts will occur to Borrow Sites 2, 3, 4, or 5. Borrow Sites 2 and 4 are not within critical habitat, nor is the Project Site. Critical Habitat impact maps are attached as Exhibit 12, Sheet 1 through 6.

Impacts to least Bell's vireo will require a minimum 1:1 mitigation-to-impact ratio for habitat containing primary constituent elements to reduce impacts to a less than significant level. Compensatory mitigation is expected to occur at a local mitigation bank or in-lieu fee program within the Santa Ana River (or adjacent) watershed. Refer to Section 6 to address this resource.

5.6 Raptor Use

The proposed Project would remove up to 210.13 acres of potential foraging habitat (disturbed non-native grassland, non-native ruderal) for species common to the region. This would consist of the loss of up to 96.91 acres of raptor foraging habitat within the Project site, up to 0.32 acre of raptor foraging habitat within the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site, up to 28.53 acres of raptor foraging habitat in Borrow Site 1, up to 20.79 of raptor foraging habitat in Borrow Site 2, up to 32.00 acres of raptor foraging habitat in Borrow Site 3, up to 12.94 acres of raptor foraging habitat in Borrow Site 4, and up to 18.58 acres of raptor foraging habitat in Borrow Site 5.

However, based on the level of ongoing human disturbance within the Project Study Area, and due to the regional availability of foraging habitat in the vicinity of the Project site, such as the Prado Basin, Prado Regional Park, Chino Hills State Park, and the Santa Ana Mountains, the loss of 210.13 acres of low-quality potential raptor foraging habitat is not judged to be significant under CEQA

5.7 Impacts to Nesting Birds

The Project in the Study Area has the potential to impact active bird nests if vegetation is removed during the nesting season (February 1 to August 31). Impacts to nesting native birds are prohibited by the MBTA and California Fish and Game Code. A Project-specific mitigation measure is identified in Section 6.2 of this report to avoid impacts to native nesting birds.

Although impacts to native birds are prohibited by MBTA and similar provisions of California Fish and Game Code, impacts to native birds by the proposed Project would not be a significant impact under CEQA. The native birds with potential to nest on the Project site would be those that are extremely common to the region and highly adapted to human landscapes (Anna's Hummingbird, House Finch). The number of individuals potentially affected by the Project would not significantly affect regional, let alone local, populations of such species. Thus, the impacts to nesting birds is not judged to be significant under CEQA.

5.8 Wildlife Migration/Nurseries

The proposed Project in the Study Area would not interfere or impact the movement of native resident or migratory fish or wildlife species or established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites. The Study Area lacks migratory wildlife corridors and wildlife nursery sites, although they are nearby. The impacts on the movement of native resident or migratory wildlife species, or native resident or wildlife corridors or nursery sites is not judged to be significant under CEQA.

5.9 Impacts to Jurisdictional Waters

Based on the current site plan, impacts within the Study Area will result in permanent impact to 0.07 acre of Corps jurisdictional waters, of which 0.06 acre consist of jurisdictional wetlands. A total of 190 feet of streambed will be disturbed.

Impacts to Corps jurisdictional waters are limited to Drainage 1 within Borrow Site 1 (0.06 acre and 169 linear feet of streambed) and the Cypress Channel within the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project site (0.01 acre and 21 linear feet of streambed). Impacts to Corps/Regional Board jurisdiction are depicted on Exhibit 10A.

Based on the current site plan, impacts within the Study Area will result in permanent impact to 0.07 acre of Regional Board jurisdictional waters, of which 0.06 acre consist of jurisdictional wetlands. A total of 190 feet of streambed will be disturbed.

Impacts to Regional Board jurisdictional waters are limited to Drainage 1 within Borrow Site 1 (0.06 acre and 169 linear feet of streambed) and the Cypress Channel within the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project site (0.01 acre and 21 feet of streambed). Impacts to Corps/Regional Board jurisdiction are depicted on Exhibit 10A.

Based on the current site plan, impacts within the Study Area will result in permanent impact to 0.07 acre of CDFW jurisdiction, of which 0.06 acre consists of riparian habitat and 0.01 acre consist of non-riparian streambed. A total of 190 feet of streambed will be disturbed.

Impacts to CDFW jurisdiction are limited to Drainage 1 within Borrow Site 1 (0.06 acre and 169 linear feet of streambed) and the Cypress Channel within the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project site (0.01 acre and 21 linear feet of streambed). Impacts to CDFW jurisdiction are depicted on Exhibit 10B.

Impacts to Corps, CDFW, and Regional Board jurisdiction will require a minimum 1:1 mitigation-to-impact ratio to reduce impacts to a less than significant level. Compensatory mitigation is expected to occur at a local mitigation bank or in-lieu fee program within the Santa Ana River (or adjacent) watershed. Refer to Section 6 to address this resource.

5.10 Indirect Impacts to Biological Resources

In the context of biological resources, indirect effects are those effects associated with developing areas adjacent to native open space. Potential indirect effects associated with development include water quality impacts associated with drainage into adjacent open space/downstream aquatic resources; dust effects; lighting effects; noise effects; invasive plant species from landscaping; and effects from human entry into adjacent open space, such as recreational activities (including hiking), pets, dumping, etc. Temporary, indirect effects may also occur as a result of construction-related activities.

There would be potential for these indirect effects to occur temporarily during construction and also in the long-term by the proposed development. These potential indirect effects can degrade the existing functions and values of creek and habitat areas and include introduction of non-native invasive plants that outcompete native riparian plant species and thus cause reduced value to native plants and wildlife; a temporary reduction of insect production (which may reduce available food sources for bats), and increased mortality to native wildlife from dogs and cats. These impacts can occur to non-special status as well as special-status species (e.g. western Mastiff bat, nesting hawks).

There would be potential for indirect effects to occur temporarily during construction and also in the long-term by the proposed development. These potential indirect effects can degrade the existing functions and values of creek and habitat areas and include increased depredation of wildlife from noise and lighting, and dissuaded use of creeks or natural areas by wildlife from noise and lighting.

However, based on the level of ongoing human disturbance within the Project Study Area, and the regional availability of habitat and foraging resources available to these species in the vicinity of the Project site, such as the Prado Regional Park, Prado Basin, Chino Hills State Park, and the Santa Ana Mountains, these temporary impacts described above are not judged to be significant under CEQA.

Noise

The Project Noise Study notes that the Equivalent Continuous [Average] Sound Level (Leq) during construction activity ranges from 28.9 to 67.5 dBA L_{eq} at noise-sensitive receiver locations. It also ranges from 34.2 to 83.2 dBA L_{eq} in open space receiver locations.

The threshold for special-status wildlife species (i.e., least Bell's vireo and tricolored blackbird) is 65 dBA Leq, which would be exceeded during construction soil import/export operations at Borrow Sites 1, 3, and 4. This noise impact to special-status species is potentially significant under CEQA prior to mitigation; however, a Project specific measure is included in Section 6.7 to reduce this impact to a level of less than significant.

Construction noise levels are below the 65 dBA Leq level at the Project Site, the Off Site Storm Drain Improvement Area Adjacent to the Project Site, and Borrow Sites 2 and 5; therefore, the noise levels at these locations are considered less than significant under CEQA.

Operational noise levels are all below the 65 dBA Leq level for areas that may support sensitive wildlife within the Study Area; therefore, these noise levels are considered less than significant under CEQA.

Lighting

Activities may include working at night within portions of the Project Site, the Off Site Storm Drain Improvement Area Adjacent to the Project Site or Borrow Sites 1 through 5. Night working activities would include erecting and installing lighting, and the use of heavy equipment. The same noise measures noted above would be followed as project design features at night to minimize the potential effect of lighting on sensitive wildlife species. Night lighting would be shielded and directed away from known sensitive habitat areas within the Study Area. Night work and lighting would also be limited around areas supporting, or with the potential to support, sensitive wildlife species.

Based on the presence of the least Bell's vireo in Borrow Site 1 and its presence within the vicinity of Borrow Sites 2 and 5, and the presence of the tri-colored blackbird (in a foraging role) in Borrow Site 4, night lighting would be shielded and directed away from foraging or nesting habitat areas for these species, and would not affect sensitive wildlife species more than 500 feet from known vireo territories in Borrow Site 1 and in the vicinity of Borrow Sites 2 and 5, and known nesting locations of the tri-colored blackbird in Borrow Site 4. With the mitigation measures noted above, lighting effects on the Study Area within Borrow Sites 1, 2, 4, and 5 would be reduced to a less than significant level.

Night work and lighting would not be considered significant under CEQA at the Project Site, the Off Site Storm Drain Improvement Area Adjacent to the Project Site or Borrow Site 3 with the incorporation of the Project design features noted above (shielded and directional lighting).

Streambed Habitat

Although the portion of the streambeds and natural habitat areas adjacent to the Study Area already demonstrate many of these indirect impacts caused from past development, the proposed project would increase the severity of such impacts. The potential indirect impacts that the project in the Study Area could cause to the Disturbed Freshwater Marsh; and the existing wildlife, would be a potentially significant impact under CEQA. .

Bats

As it relates to bats, based on the level of ongoing human disturbance within the Project Study Area, and the regional availability of foraging habitat in the vicinity of the Project site, such as the Prado Basin, Prado Regional Park, Chino Hills State Park, and the Santa Ana Mountains, the potential indirect effect to bat foraging habitat is not judged to be significant under CEQA

Sensitive Bird Species

Potential indirect impacts to yellow warbler, yellow breasted chat, least Bell's vireo, and tri-colored blackbird would be adverse but not significant. These species have remained common to many riparian habitats and only a small number of individuals would be expected to be potentially affected by the proposed project (two to three pairs or less). The yellow warbler and yellow-breasted chat were not detected during surveys conducted for the least Bell's vireo, which is found in habitat areas overlapping those of the warbler and chat. Additionally, with the regional availability of foraging and nesting habitat in the vicinity of the Project Study Area, such as the Prado Basin, Prado Regional Park, Chino Hills State Park, and the Santa Ana Mountains, the potential indirect effect to these species would not be judged to be significant under CEQA.

The biological resources within the Study Area are degraded and heavily dominated by nonnative species, as are the biological resources adjacent to the site. The potential for the Study Area to indirectly impact biological resources to a significant degree is less than reasonable. The Study Area lacks significant natural lands, other than the 4.46-acre Freshwater Marsh/Disturbed Freshwater Marsh and 0.16-acre Southern Willow Scrub habitats within Borrow Site 1, and portions of the Study Area are adjacent to active agriculture and ranching (dairy). Potential indirect impacts would be mitigated to less than significant levels with potential mitigation documented in Section 6 below.

5.11 Cumulative Impacts to Biological Resources

Cumulative impacts are defined as the direct and indirect effects of a proposed project which, when considered alone, would not be deemed a substantial impact, but when considered in addition to the impacts of related projects in the area, would be considered potentially significant. "Related projects" refers to past, present, and reasonably foreseeable probable future projects, which would have similar impacts to the proposed project.

There is potential for burrowing owl, least Bell's vireo, and tri-colored blackbird to be present. As such, the Project in the Study Area could make a cumulatively considerable contribution to regional impacts to these species (if present). Refer to Section 6 to address this potential impact and its reduction to a less than significant level.

For other biological resources potentially present and impacted by the Project Study Area (such as such as the yellow bat), the degree of contribution to the regional decline of these resources is judged to not be considerable at the project and regional levels.

However, based on the level of ongoing human disturbance within the Project Study Area, and the regional availability of foraging habitat in the vicinity of the Study Area, such as the Prado Regional Park, Prado Basin, Chino Hills State Park, and the Santa Ana Mountains, the loss of 210.13 acres of low-quality potential raptor and/or bat foraging habitat is not judged to be significant under CEQA

6.0 MITIGATION/AVOIDANCE MEASURES

The following discussion provides project-specific mitigation/avoidance measures for actual or potential impacts to special-status resources.

6.1 Burrowing Owl

A qualified biologist will conduct a pre-construction presence/absence survey for burrowing owls within 14 days prior to site disturbance.

If the species is absent, no additional mitigation will be required. If burrowing owl(s) is(are) detected within the Study Area's disturbance footprint in the City of Chino RMP boundary, the owl(s) are required to be handled as indicated by the RMP:

The RMP addresses mitigation requirements for impacts to burrowing owls. The RMP states that the 1995 CDFG Staff Report on Burrowing Owl Mitigation (as supplemented by the RMP) shall be followed when burrowing owls are detected on properties. If avoidance of occupied habitat is infeasible, provisions shall be made to passively relocate owls from sites in accordance with the current 2012 CDFG Staff Report (supersedes 1995 CDFG Staff Report).

According to the Preserve EIR and RMP, Burrowing Owls to be relocated from properties within the City's Subarea 2 are intended to be accommodated within a "300-acre conservation area" and/or additional Candidate Relocation Areas as described on Page 4-16 and 4-21 of the RMP. One such contingency conservation area is identified in the RMP as "Drainage Area B".

Drainage Area B consists of a series of Natural Treatment System (NTS) facilities that were constructed south of Kimball Avenue and west of Mill Creek Road. When the NTS facilities were constructed, approximately 50 artificial owl burrows were installed within the basins to accommodate relocated owls and additional owls dispersing to the site. This location was given top priority as an owl relocation site by the RMP due to its proximity to areas that have been and will be converted to urban development. If Burrowing Owls are present at the Project site at time of site disturbance, the Burrowing Owls would be more likely to initially relocate to the immediately surrounding properties, including additional locations within the Chino Airport. However, the NTS basins represent the nearest conservation area providing regional mitigation for the loss of burrowing owl habitat.

Consistent with the RMP, the following measures shall apply to the portion of the Project site within the RMP boundary regarding burrowing owl mitigation:

- Prior to disturbance of the occupied burrows, suitable and unoccupied replacement burrows shall be provided at a ratio of 2:1 within the City of Chino designated relocation area (e.g. the NTS basins). A qualified biologist through coordination with the City shall confirm that the artificial burrows are currently unoccupied and suitable for use by owls.

- Until suitable replacement burrows have been provided/confirmed within the designated relocation area (e.g. the NTS basins), no disturbance shall occur within 50 meters (approximately 160 feet) of occupied burrows during the nonbreeding season (September 1 through January 31) or within 75 meters (approximately 250 feet) during the breeding season (February 1 through August 31).

- Occupied burrows should not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist approved by CDFW verifies through non-invasive methods that either: 1) the birds have not begun egg-laying and incubation; or 2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

- If Burrowing Owls are present at the time that the occupied burrows are to be disturbed, then the owls shall be excluded from the site following the 2012 CDFG Staff Report and Table 4-6 of the RMP.

- Pursuant to mitigation measure B-3(8) of The Preserve EIR, and as noted on Page 4-39 of the RMP, the Project applicant shall pay the required mitigation fee prior to initiation of ground disturbing activities. One priority for funding supported by the mitigation fees is the establishment and long-term management of burrowing owl habitat within the Drainage Area B conservation area.

If burrowing owl(s) is(are) detected within the Study Area's proposed disturbance footprint outside of the RMP boundary:

- Prior to disturbance of the occupied burrows, suitable and unoccupied replacement burrows shall be provided at a ratio of 2:1 within designated off-site conserved lands to be identified through coordination with the City in which the burrowing owl(s) is(are) detected (City of Chino). A qualified biologist shall confirm that the artificial burrows are currently unoccupied and suitable for use by owls.

- Until suitable replacement burrows have been provided/confirmed within the off-site conserved lands to be identified through coordination with the City of Chino, no disturbance shall occur within 50 meters (approximately 160 feet) of occupied burrows during the nonbreeding season (September 1 through January 31) or within 75 meters (approximately 250 feet) during the breeding season (February 1 through August 31).

- Occupied burrows should not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist approved by CDFW verifies through non-invasive methods that either: 1) the birds have not begun egg-laying and incubation; or 2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

- If burrowing owls are present at the time that the occupied burrows are to be disturbed, then the owls shall be excluded from the site following the 2012 CDFG Staff Report.

With the implementation of these mitigation measures, impacts to burrowing owls will be reduced to below a level of significance.

6.2 Nesting Birds

Vegetation clearing should be conducted outside of the nesting season (February 1 through August 31). If avoidance of the nesting season is not feasible, then a qualified biologist shall conduct a nesting bird survey within three days prior any disturbance of the site, including disking, demolition activities, and grading. If active nests are identified, the biologist shall establish suitable buffers around the nests, and the buffer areas shall be avoided until the nests are no longer occupied and the juvenile birds can survive independently from the nests.

6.3 Jurisdictional Waters

Impacts to Corps, Regional Board, and CDFW jurisdiction will be mitigated at a minimum 1:1 ratio through off site mitigation, targeting in-lieu fee mitigation with a local Resource Conservation District (RCD), or other approved mitigation bank within the Santa Ana River watershed and/or an adjacent watershed. The Project applicant will obtain the necessary permits from the Corps, CDFW, and/or Regional Board prior to any impacts within jurisdictional areas. With mitigation, impacts to state waters will be less than significant.

6.4 Least Bell's Vireo Critical Habitat

Impacts to up to 0.23 acre of designated critical habitat for the least Bell's vireo will be mitigated at a minimum 1:1 ratio through off site mitigation, targeting in-lieu fee mitigation with a local Resource Conservation District (RCD), or other approved mitigation bank within the Santa Ana River watershed and/or an adjacent watershed. The Project applicant will obtain this compensatory mitigation prior to any impacts to critical habitat areas. With mitigation, impacts to critical habitat will be less than significant.

6.5 Least Bell's Vireo

Impacts to up to 0.23 acre of potential habitat for the least Bell's vireo is identical to the impact for least Bell's vireo critical habitat, which will be mitigated at a minimum 1:1 ratio through off site mitigation, targeting in-lieu fee mitigation with a local Resource Conservation District (RCD), or other approved mitigation bank within the Santa Ana River watershed and/or an adjacent watershed. The Project applicant will obtain this compensatory mitigation prior to any impacts to critical habitat areas. With mitigation, impacts to critical habitat and the least Bell's vireo will be less than significant. Please note that the compensatory mitigation described in Section 6.5 is the same as described in Section 6.4. It is not additive.

Impacts to up to 0.23 acre of vireo habitat will be limited to Borrow Site 1. Borrow activities will occur outside of the nesting season for the vireo (February 1st to August 31st) to the greatest extent feasible. If this is not possible, the Project applicant will erect sound wall(s), hay bales, or other measures outside of the nesting season [for use during the nesting season] to ensure that the vireo is not affected by borrow activities conducted during the nesting season.

The Project will also result in permanent impact to 0.15 acre of lands within the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project site which do not contain the primary constituent elements or physical/biological attributes [riparian woodland habitat that generally contains both canopy and shrub layers] which could be utilized by the vireo for foraging or nesting. Compensatory mitigation is not required for this impact as the disturbance to critical habitat lacking primary constituent elements and containing ornamental habitat areas would be considered less than significant.

6.6 Tri-Colored Blackbird

Impacts to up to 12.94 acres of tri-colored blackbird foraging habitat will be limited to Borrow Site 4. Borrow activities will occur outside of the nesting season for the blackbird (February 1st to August 31st) to the greatest extent feasible. If this is not possible, the project will erect sound wall(s), hay bales, or other measures outside of the nesting season to ensure that the blackbird is not affected by borrow activities conducted during the nesting season.

6.7 Noise (Construction)

Soil import and/or export work should be conducted outside of the breeding season (March 15 to September 15 is recognized as the breeding season) at Borrow Sites 1, 3, and 4 to reduce potential indirect noise effects on special-status wildlife. If this is not feasible, then sound walls, hay bales, or other measures designed to reduce effects from Project noise levels on special-status wildlife species would be installed/erected prior to the commencement of ground-disturbing activities and sound monitoring would occur as needed, within 500 feet of known least Bell's vireo territories and tricolored blackbird nesting colonies to ensure that noise levels at these locations are below the 65 dBA Leq level and would not affect special-status wildlife species.

6.8 Lighting

Based on the presence of the least Bell's vireo in Borrow Site 1 and its presence within the vicinity of Borrow Sites 2 and 5, and the presence of the tri-colored blackbird (in a foraging role) in Borrow Site 4, night lighting would be shielded and directed away from foraging or nesting habitat areas, and would be placed in a manner that would not cause a significant effect on sensitive wildlife species at least 500 feet from known vireo territories in Borrow Site 1 and in the vicinity of Borrow Sites 2 and 5, and known nesting locations of the tri-colored blackbird in Borrow Site 4.

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8.0 CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

Signed:____________________________________ Date: ___09/25/19__

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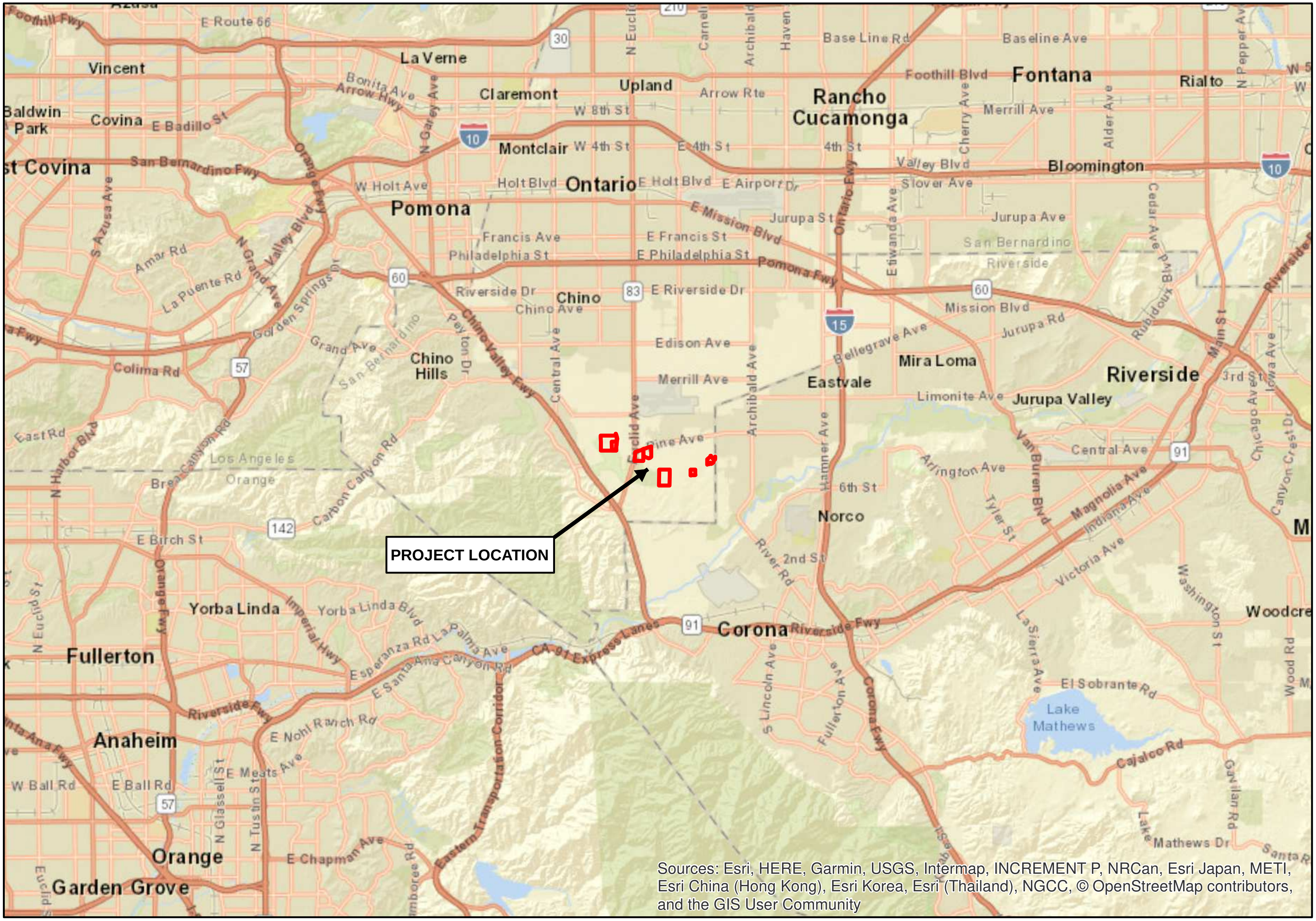


Source: ESRI World Street Map

N

0 2 4 8 Miles

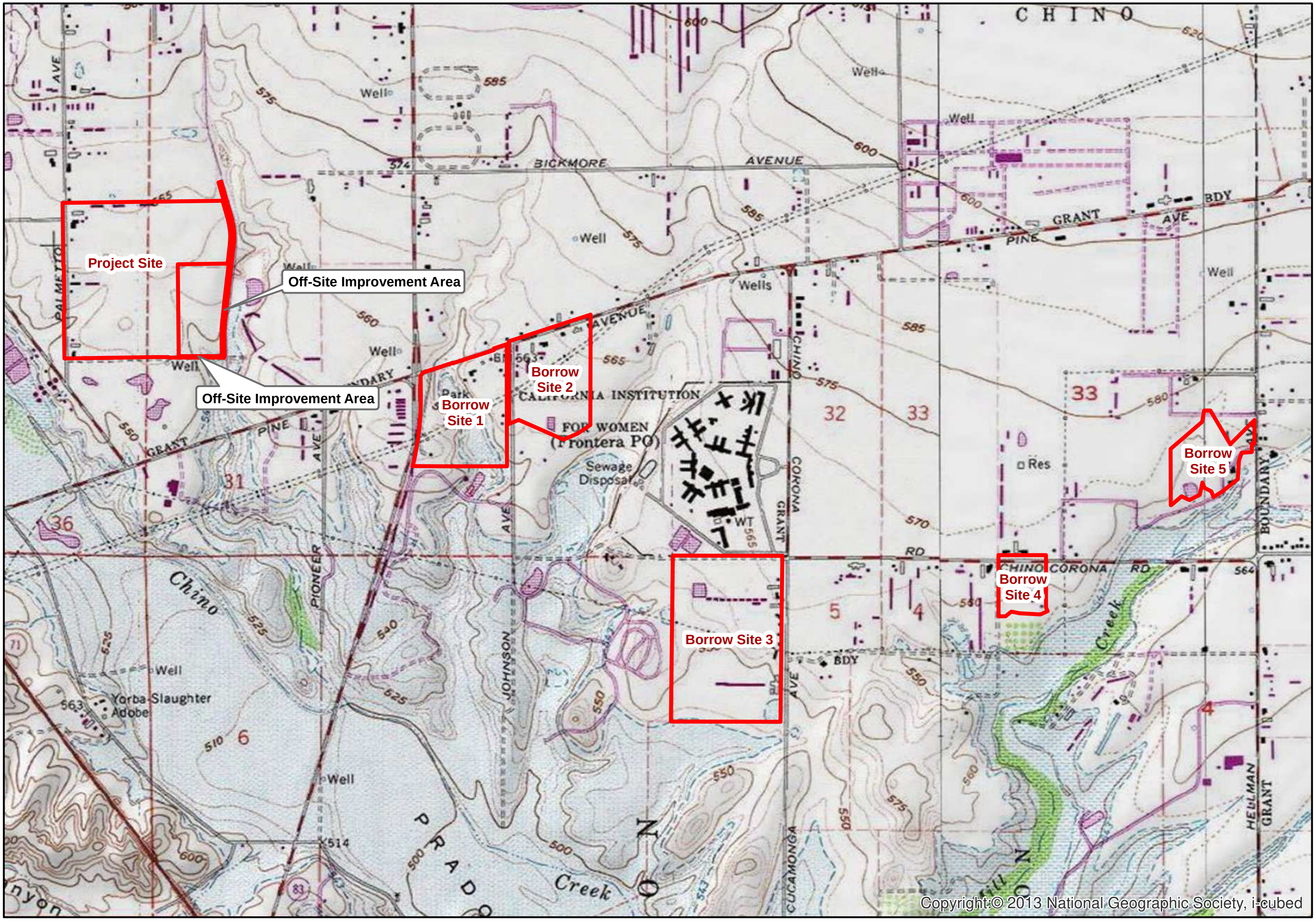
MAJESTIC CHINO HERITAGE PROJECT

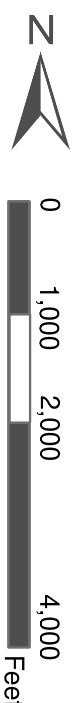
Regional Map

GLENN LUKOS ASSOCIATES

Exhibit 1

Adapted from USGS Corona North & Prado Dam, CA quadrangle



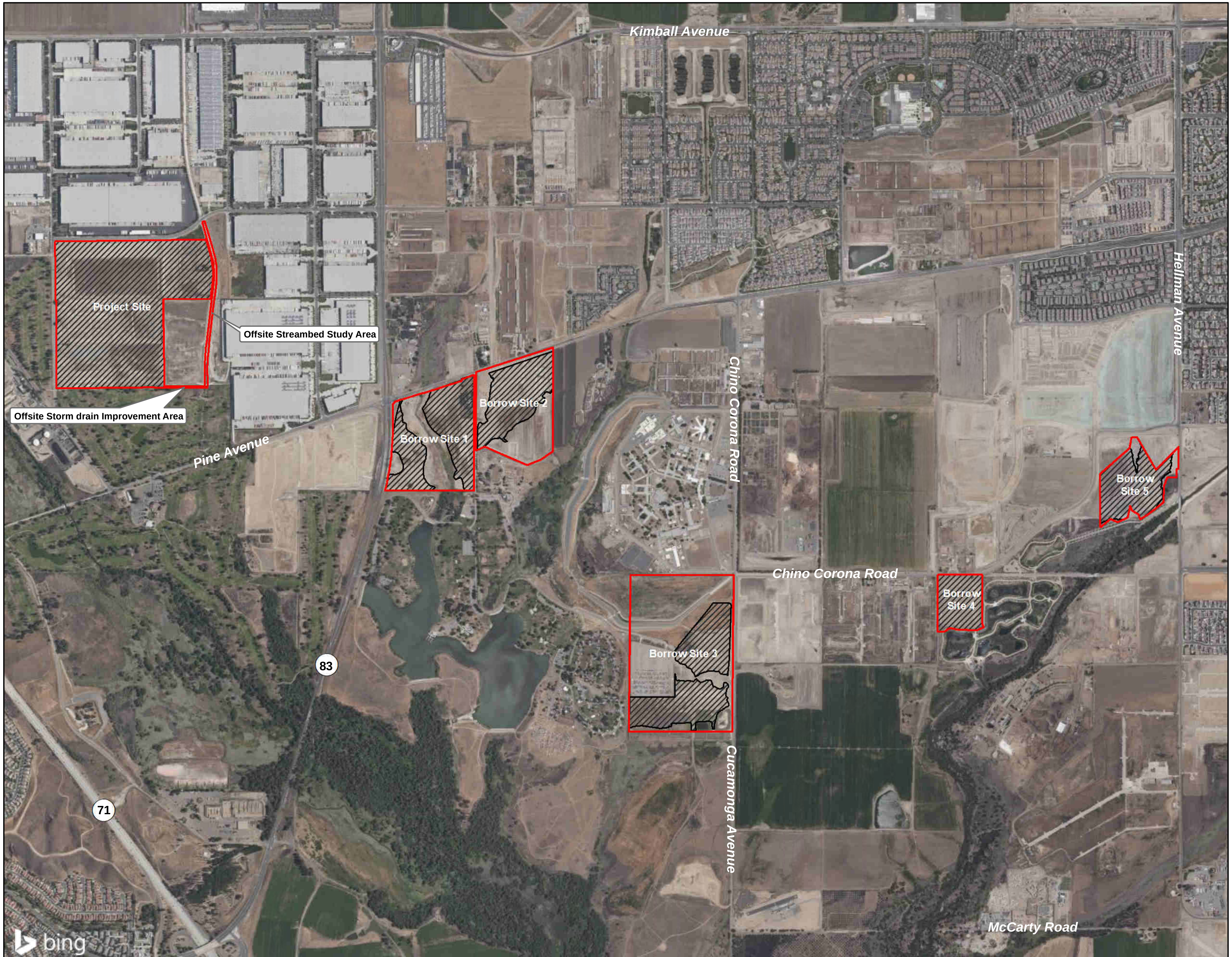


MAJESTIC CHINO HERITAGE PROJECT

Vicinity Map

GLENN LUKOS ASSOCIATES

Exhibit 2



Study Area Boundary

Limits of Grading

N

0 725 1,450 2,900
Feet

1 inch = 1,450 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

MAJESTIC CHINO HERITAGE PROJECT

Grading Plan - Key Map

GLENN LUKOS ASSOCIATES

Exhibit 3 - Sheet 1

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Study Area Boundary

Limits of Grading

N

0 137.5 275 550

Feet

1 inch = 275 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

MAJESTIC CHINO HERITAGE PROJECT

Grading Plan, Project Site and Off Site Storm Drain Improvement Area/
Off Site Streambed Study Area Adjacent to the Project Site

GLENN LUKOS ASSOCIATES

Exhibit 3 - Sheet 2

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Study Area Boundary

Limits of Grading

N

0 125 250 500

Feet

1 inch = 250 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

MAJESTIC CHINO HERITAGE PROJECT

Grading Plan - Borrow Sites 1 & 2

GLENN LUKOS ASSOCIATES

Exhibit 3 - Sheet 3

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\ImpactsGIS\1090-2_ImpactsBorrowSite1-2.mxd

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

MAJESTIC CHINO HERITAGE PROJECT

Grading Plan - Borrow Site 3

GLENN LUKOS ASSOCIATES

Exhibit 3 - Sheet 4

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\ImpactsGIS\1090-2_ImpactsBorrowSite3.mxd

Study Area Boundary

Limits of Grading

N

0 50 100 200

Feet

1 inch = 100 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

MAJESTIC CHINO HERITAGE PROJECT

Grading Plan - Borrow Site 4

GLENN LUKOS ASSOCIATES

Exhibit 3 - Sheet 5

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\ImpactsGIS\1090-2_ImpactsBorrowSite4.mxd

Study Area Boundary

Limits of Grading

N

0 75 150 300

Feet

1 inch = 150 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

MAJESTIC CHINO HERITAGE PROJECT

Grading Plan - Borrow Site 5

GLENN LUKOS ASSOCIATES

Exhibit 3 - Sheet 6

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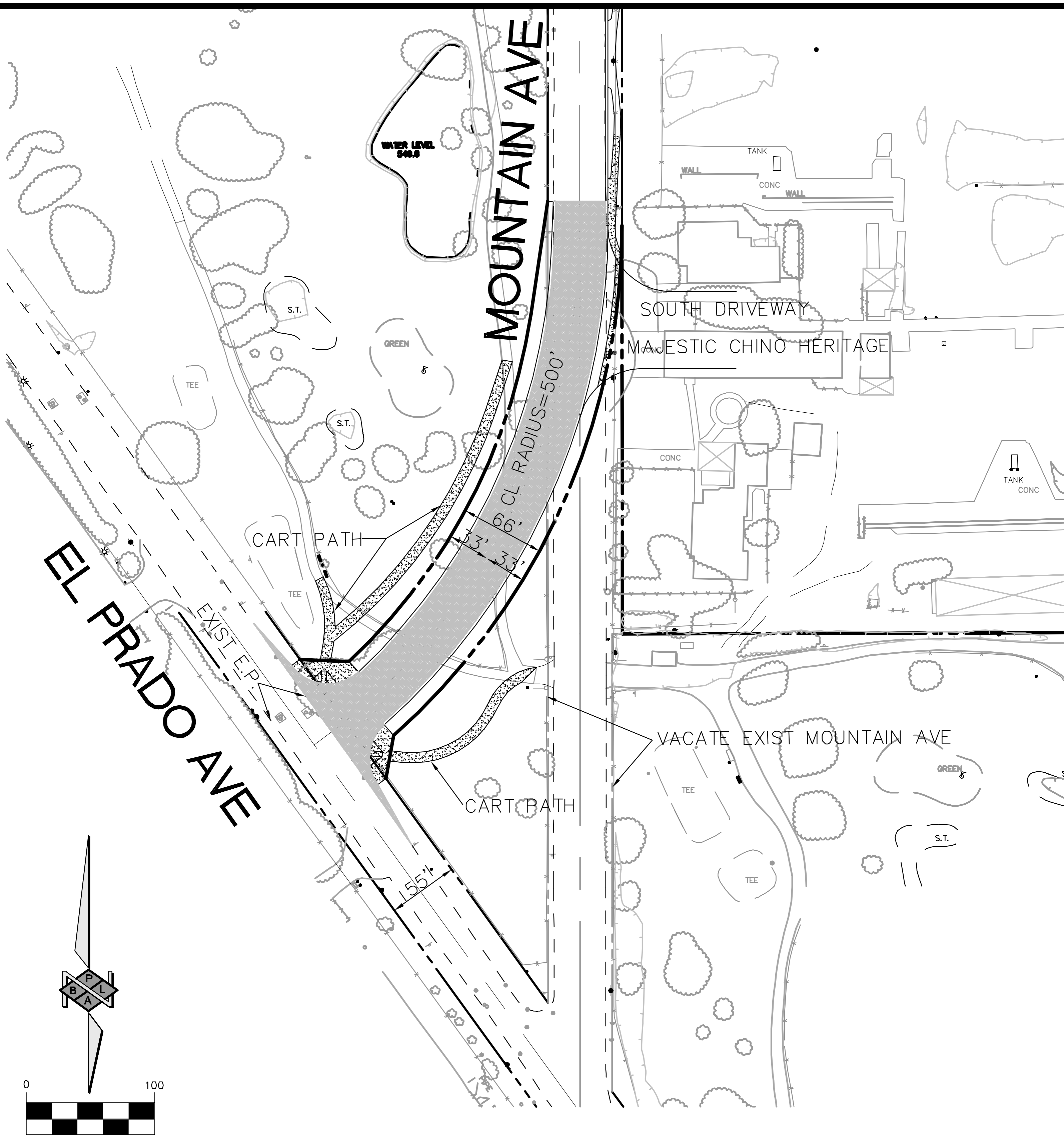
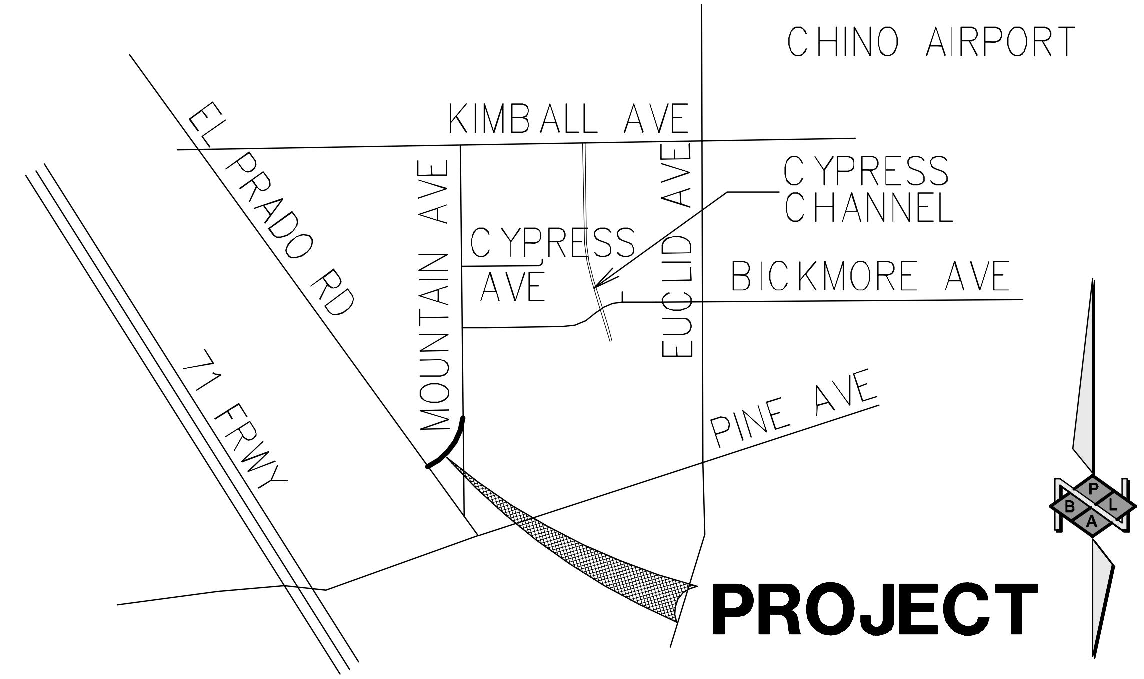
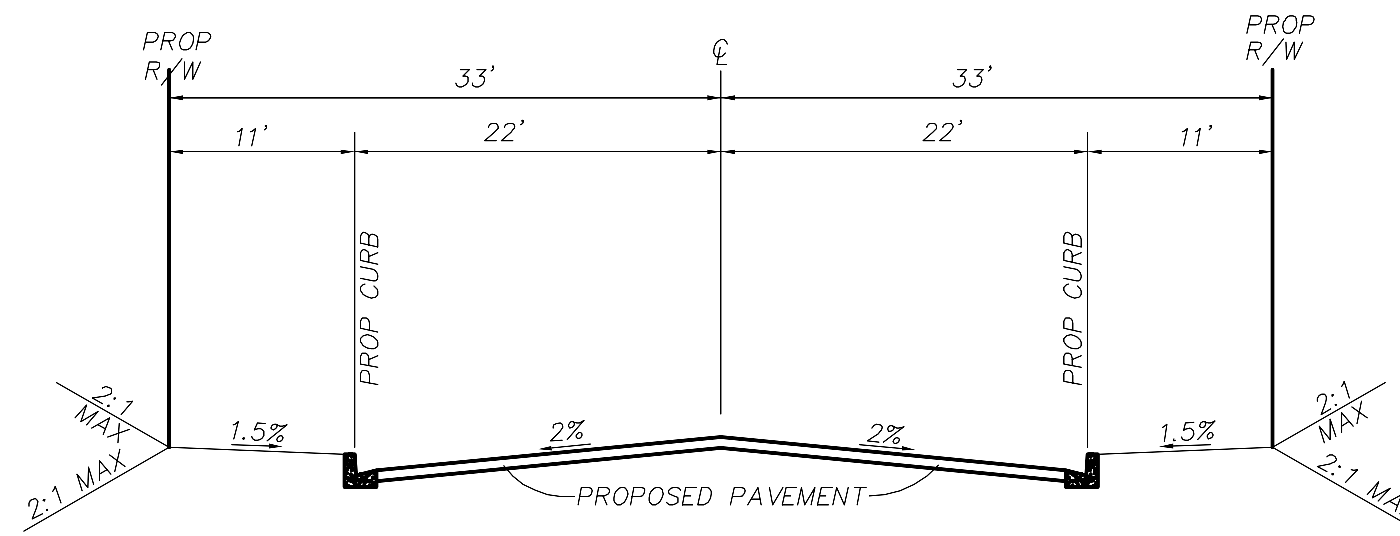




VICINITY MAP

NOT TO SCALE



TYPICAL SECTION - MOUNTAIN AVE

LOOKING NORTH N.T.S.

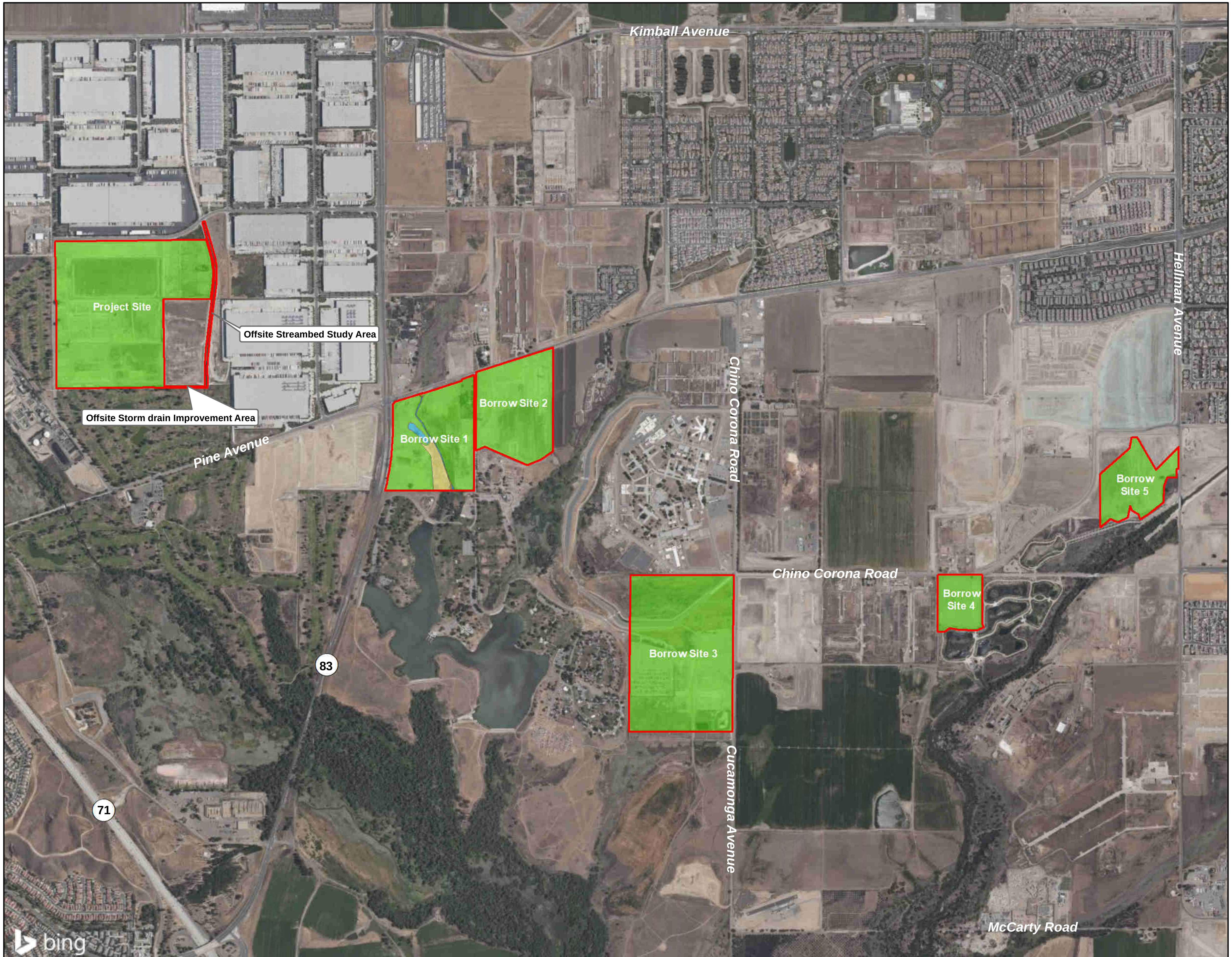
Mar 07 2019

PBLA ENGINEERING, INC.
Planning • Engineering • Surveying
1481 FORD ST, STE 202
REDLANDS, CALIF. 92373
(888) 714-9642 • (714)389-9191 FAX

COMMERCE CONSTRUCTION CO., L.P.
13191 Crossroads Parkway North
Sixth Floor
City of Industry, California 91746-3497
Telephone: (562) 699-0453
License No. 723302

MOUNTAIN AVENUE RE-ALIGNMENT STUDY

CHINO, CA



Study Area Boundary
Freshwater Marsh
Disturbed Freshwater Marsh
Ruderal / Disturbed
Southern Willow Scrub
Ornamental
Developed

N

0 725 1,450 2,900
Feet

1 inch = 1,450 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

MAJESTIC CHINO HERITAGE PROJECT

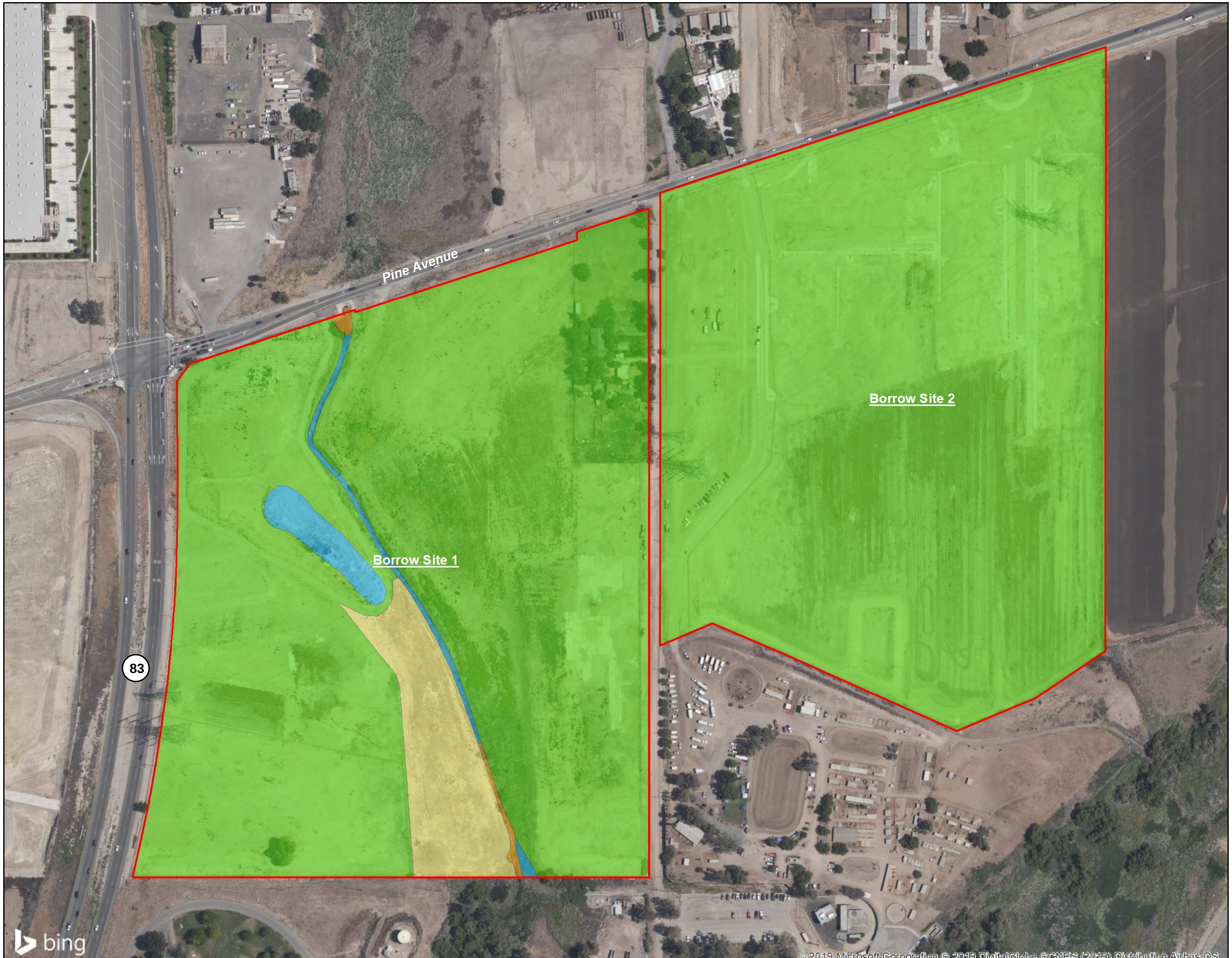
Vegetation - Key Map

GLENN LUKOS ASSOCIATES

Exhibit 4 - Sheet 1

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\VegetationGIS\1090-2_Vegetation_KeyMap.mxd

Bickmore Avenue
Mountain Avenue
Project Site
Offsite Streambed Study Area
Offsite Streambed Study Area
Offsite Storm drain Improvement Area
bing
© 2019 Microsoft Corporation © 2019 DigitalGlobe ©CNES (2019) Distribution Airbus DS
Study Area Boundary
Ruderal / Disturbed
Ornamental
Developed
N
0 137.5 275 550
Feet
1 inch = 275 feet
Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019
MAJESTIC CHINO HERITAGE PROJECT
Vegetation Map, Project Site and Off Site Storm Drain Improvement Area/ Off Site Streambed Study Area Adjacent to the Project Site
GLENN LUKOS ASSOCIATES
Exhibit 4 - Sheet 2
X:\0363-THE REST\1090-02CHNO\1090-02_GIS\VegetationGIS\1090-2_Vegetation_ProjectSite.mxd



Study Area Boundary
Freshwater Marsh
Disturbed Freshwater Marsh
Ruderal / Disturbed
Southern Willow Scrub

N

0 125 250 500
Feet

1 inch = 250 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

MAJESTIC CHINO HERITAGE PROJECT

Vegetation Map - Borrow Sites 1 & 2

GLENN LUKOS ASSOCIATES

Exhibit 4 - Sheet 3

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\VegetationGIS\1090-2_Vegetation_BorrowSite1-2.mxd

Study Area Boundary

Ruderal / Disturbed

N

0 125 250 500

Feet

1 inch = 250 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

MAJESTIC CHINO HERITAGE PROJECT

Vegetation Map - Borrow Site 3

GLENN LUKOS ASSOCIATES

Exhibit 4 - Sheet 4

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\VegetationGIS\1090-2_Vegetation_BorrowSite3.mxd

Study Area Boundary

Ruderal / Disturbed

N

0 50 100 200

Feet

1 inch = 100 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

MAJESTIC CHINO HERITAGE PROJECT

Vegetation Map - Borrow Site 4

GLENN LUKOS ASSOCIATES

Exhibit 4 - Sheet 5

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\VegetationGIS\1090-2_Vegetation_BorrowSite4.mxd

Study Area Boundary
Ruderal / Disturbed

N

0 75 150 300
Feet

1 inch = 150 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

MAJESTIC CHINO HERITAGE PROJECT

Vegetation Map - Borrow Site 5

GLENN LUKOS ASSOCIATES

Exhibit 4 - Sheet 6

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\VegetationGIS\1090-2_Vegetation_BorrowSite5.mxd

Study Area Boundary
Corps/RWQCB Non-Wetland Waters
25 Width in Feet

N

0 137.5 275 550
Feet

1 inch = 275 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

MAJESTIC CHINO HERITAGE PROJECT

Corps/Regional Board Jurisdictional Delineation Map

GLENN LUKOS ASSOCIATES

Exhibit 5A - Sheet 1

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\DelineationGIS\1090-2_Corps_ProjectSite.mxd

Study Area Boundary
RWQCB Non-Wetland Waters Jurisdiction Only
Corps/RWQCB Wetland Waters
5 Width in Feet

W indicates Borrow Site 1 Wetland in Channel

N

0 125 250 500
Feet

1 inch = 250 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

MAJESTIC CHINO HERITAGE PROJECT

Corps/RWQCB Jurisdictional Delineation Map - Borrow Sites 1 & 2

GLENN LUKOS ASSOCIATES

Exhibit 5A - Sheet 2

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\DelineationGIS\1090-2_Corps_BorrowSite1-2.mxd

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

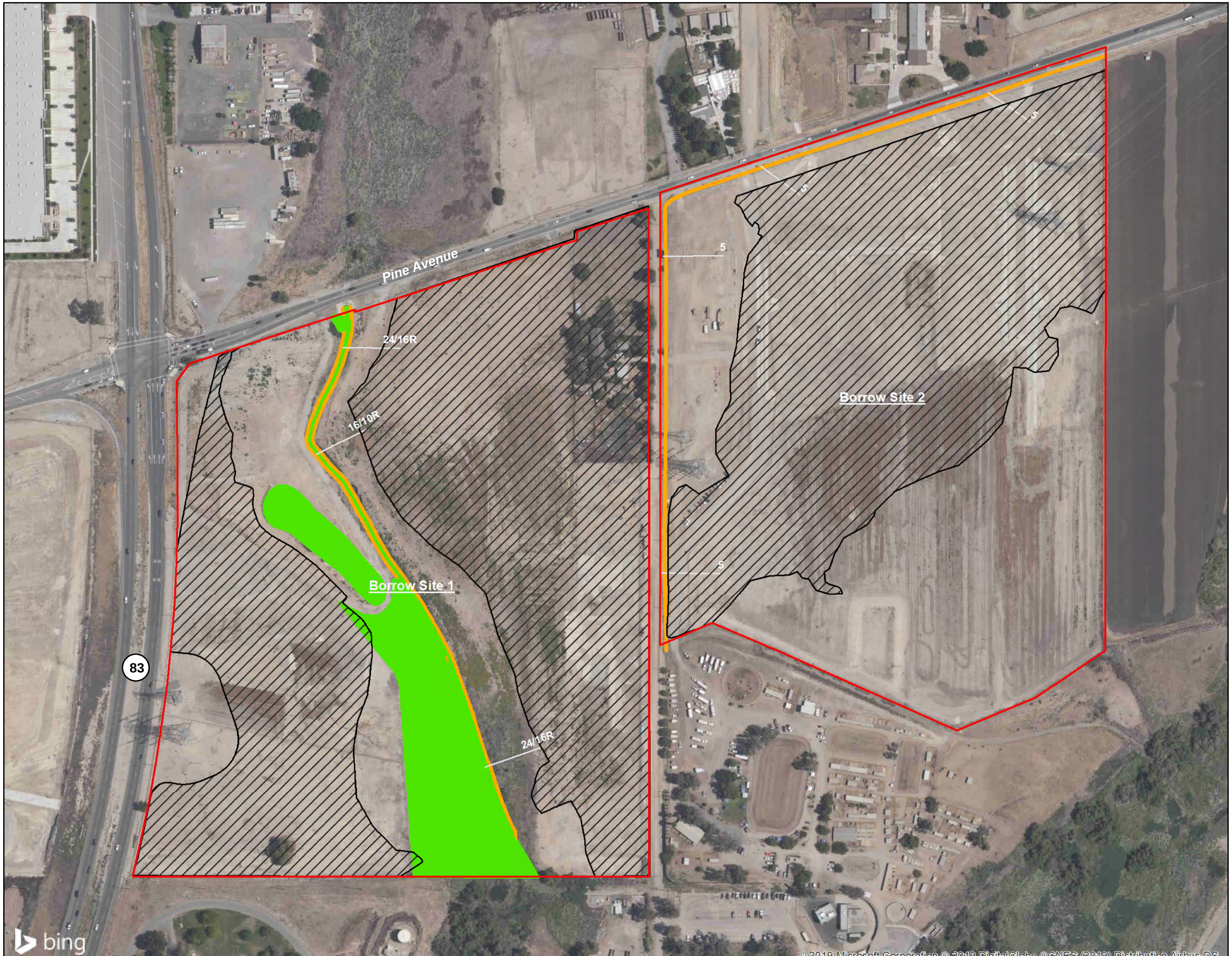
MAJESTIC CHINO HERITAGE PROJECT

CDFW Jurisdictional Delineation Map

GLENN LUKOS ASSOCIATES

Exhibit 5B - Sheet 1

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\DelineationGIS\1090-2_CDFW_ProjectSite.mxd



Study Area Boundary
Limits of Grading
CDFW Non-Riparian Streambed
CDFW Riparian
5 Width in Feet
R indicates Borrow Site 1 Riparian in Channel

N

0 125 250 500
Feet

1 inch = 250 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

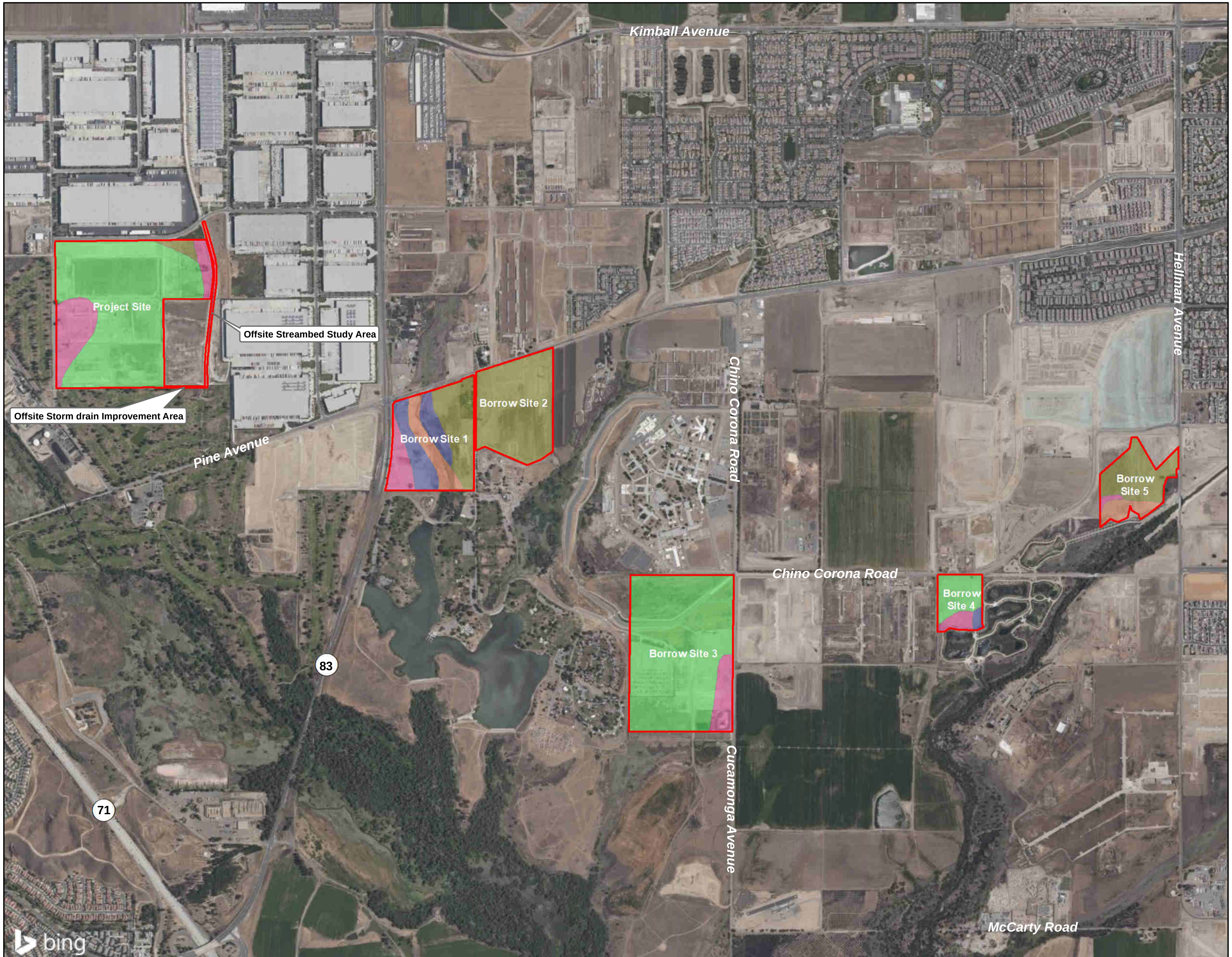
MAJESTIC CHINO HERITAGE PROJECT

CDFW Jurisdictional Delineation/
Impact Map - Borrow Sites 1 & 2

GLENN LUKOS ASSOCIATES

Exhibit 10B - Sheet 2

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\ImpactsGIS\1090-2_CDFW_Impacts_BorrowSite1-2.mxd



Study Area Boundary
Cb - CHINO SILT LOAM
CkA - CHUALAR CLAY LOAM, 0 TO 2 PERCENT SLOPES
CkC - CHUALAR CLAY LOAM, 2 TO 9 PERCENT SLOPES
CkD - CHUALAR CLAY LOAM, 9 TO 15 PERCENT SLOPES
Gr - GRANGEVILLE FINE SANDY LOAM
Hr - HILMAR LOAMY FINE SAND

N

0 725 1,450 2,900
Feet

1 inch = 1,450 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

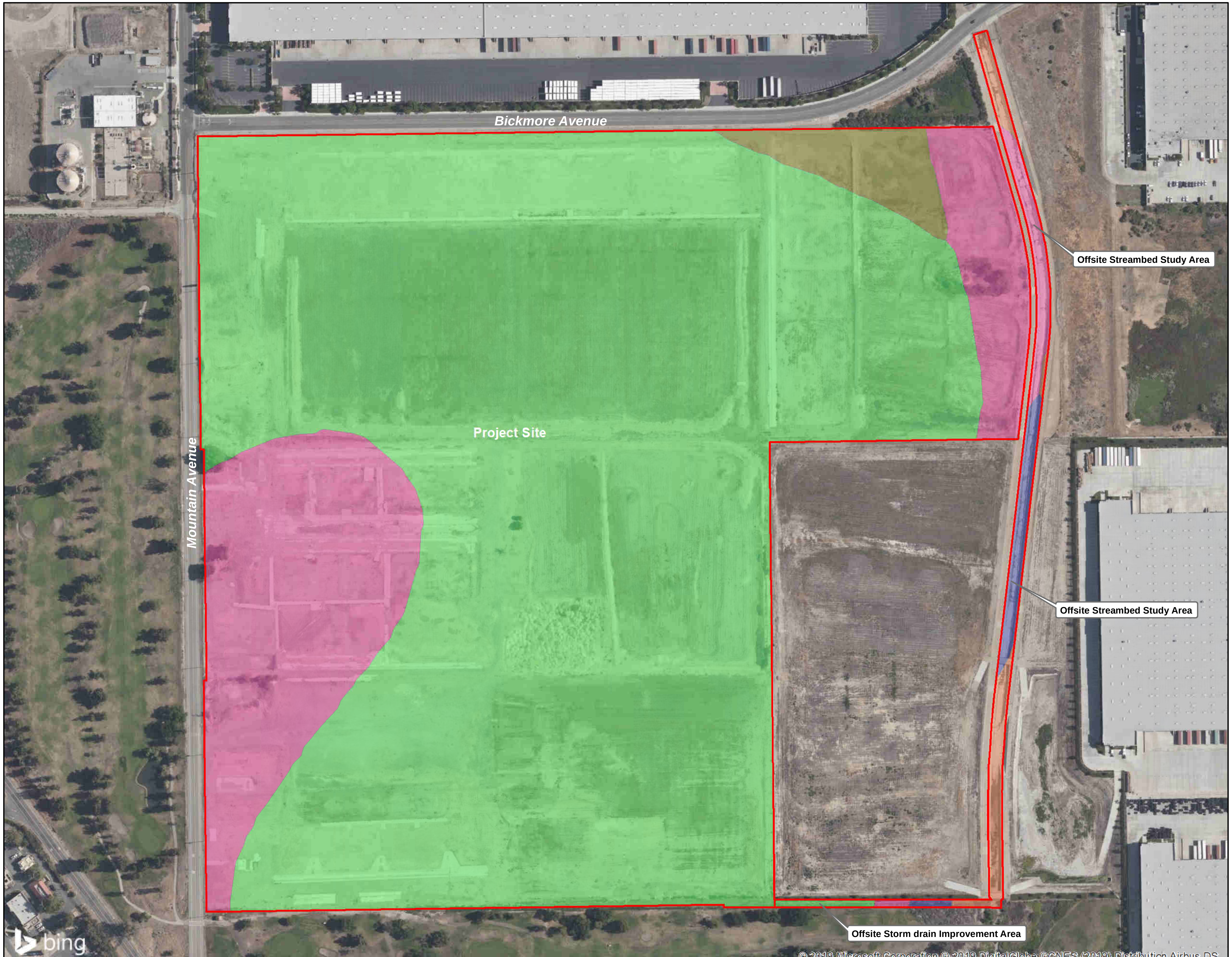
MAJESTIC CHINO HERITAGE PROJECT

Soils - Key Map

GLENN LUKOS ASSOCIATES

Exhibit 6 - Sheet 1

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\SoilsGIS\1090-2_Soils_KeyMap.mxd



- Study Area Boundary
- Cb - CHINO SILT LOAM
- CkA - CHUALAR CLAY LOAM, 0 TO 2 PERCENT SLOPES
- CkC - CHUALAR CLAY LOAM, 2 TO 9 PERCENT SLOPES
- CkD - CHUALAR CLAY LOAM, 9 TO 15 PERCENT SLOPES
- Gr - GRANGEVILLE FINE SANDY LOAM

N

0 137.5 275 550
Feet

1 inch = 275 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

MAJESTIC CHINO HERITAGE PROJECT

Soils Map, Project Site and Off Site Storm Drain Improvement Area/
Off Site Streambed Study Area Adjacent to the Project Site

GLENN LUKOS ASSOCIATES

Exhibit 6 - Sheet 2

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\SoilsGIS\1090-2_Soils_ProjectSite.mxd

Study Area Boundary
Cb - CHINO SILT LOAM
CkC - CHUALAR CLAY LOAM, 2 TO 9 PERCENT SLOPES
CkD - CHUALAR CLAY LOAM, 9 TO 15 PERCENT SLOPES
Gr - GRANGEVILLE FINE SANDY LOAM

N

0 125 250 500
Feet

1 inch = 250 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

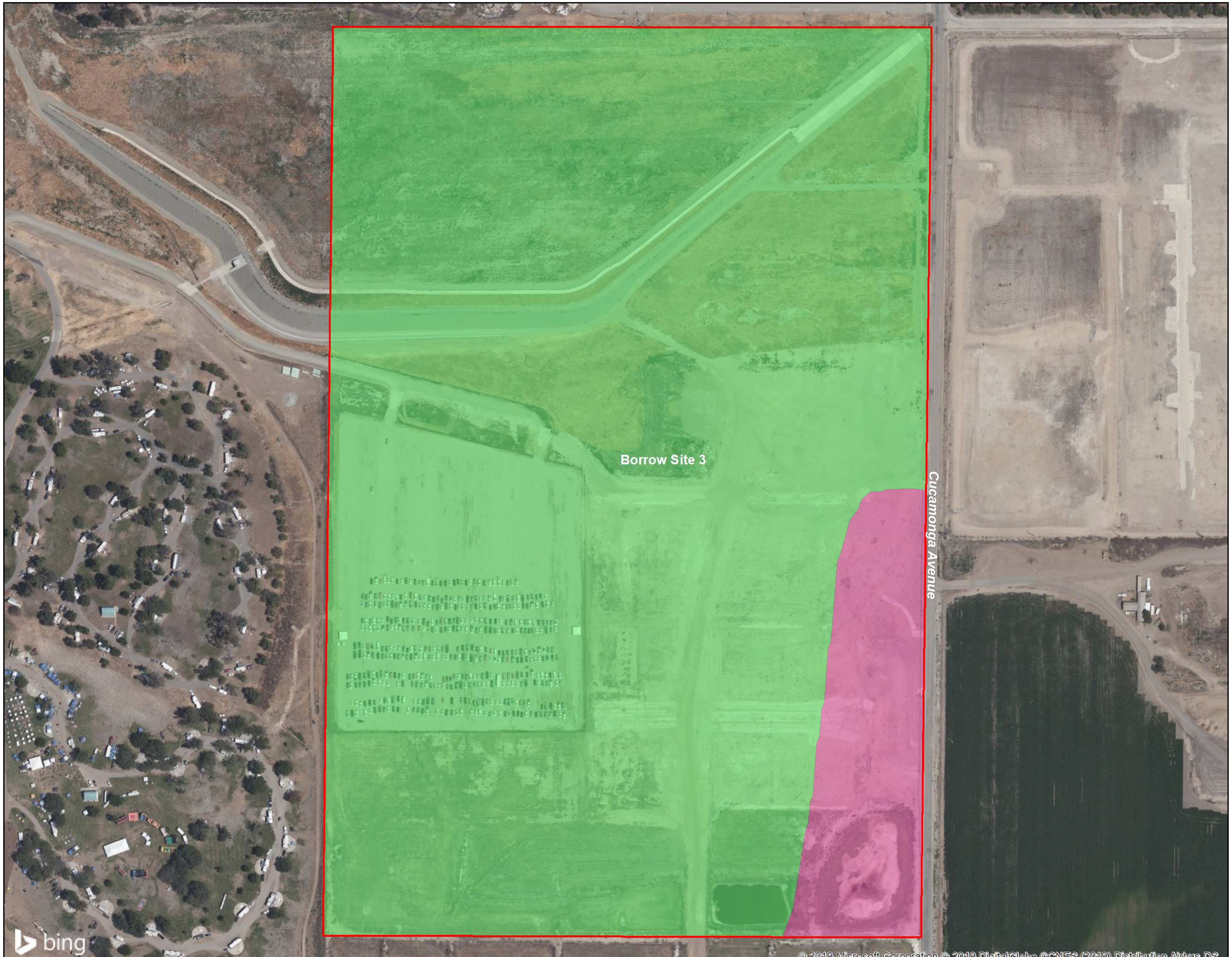
MAJESTIC CHINO HERITAGE PROJECT

Soils Map - Borrow Sites 1 & 2

GLENN LUKOS ASSOCIATES

Exhibit 6 - Sheet 3

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\SoilsGIS\1090-2_Soils_BorrowSite1-2.mxd



Study Area Boundary

CkA - CHUALAR CLAY LOAM, 0 TO 2 PERCENT SLOPES

CkC - CHUALAR CLAY LOAM, 2 TO 9 PERCENT SLOPES

N

0 125 250 500

Feet

1 inch = 250 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

MAJESTIC CHINO HERITAGE PROJECT

Soils Map - Borrow Site 3

GLENN LUKOS ASSOCIATES

Exhibit 6 - Sheet 4

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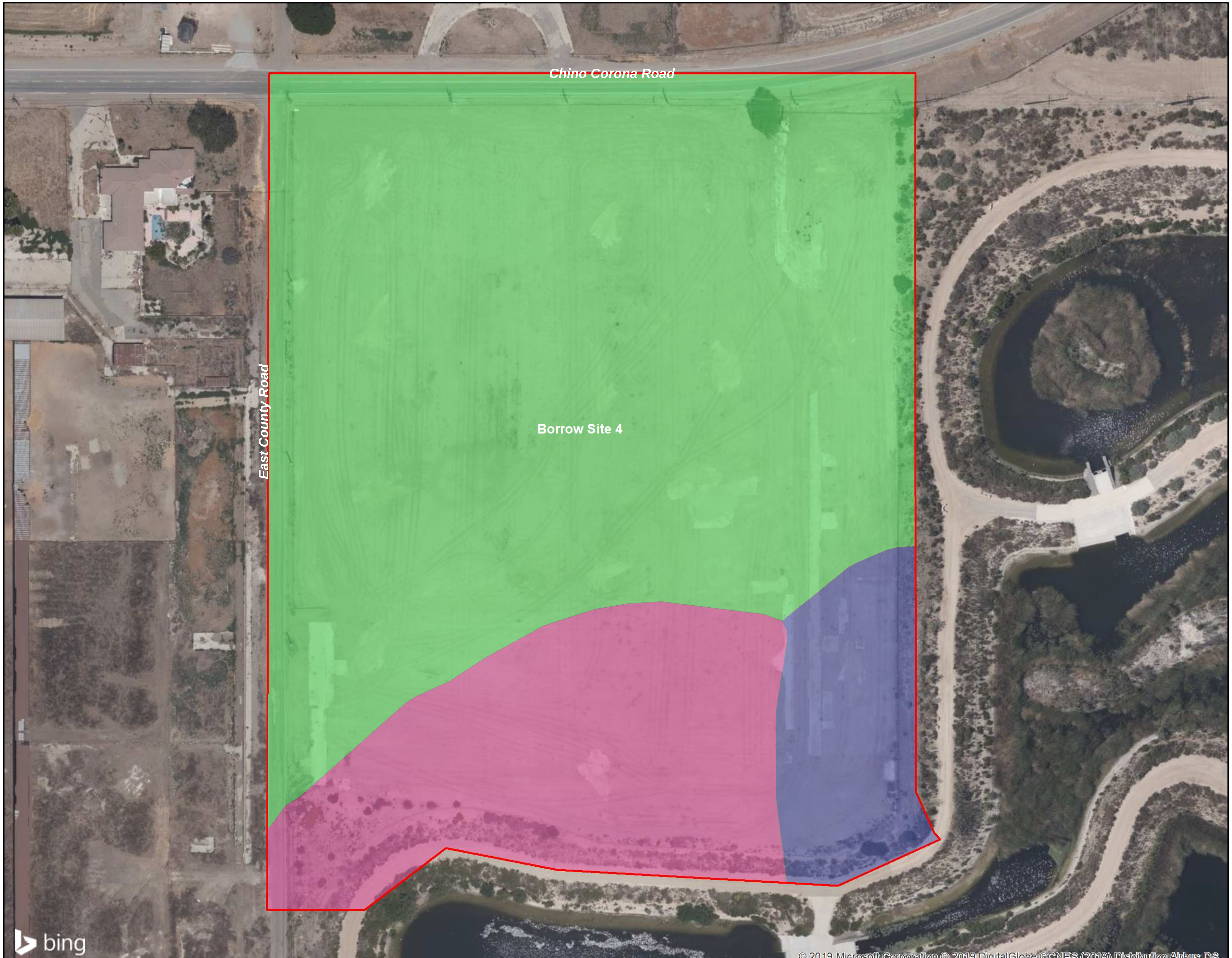

Study Area Boundary

CkA - CHUALAR CLAY LOAM, 0 TO 2 PERCENT SLOPES

CkC - CHUALAR CLAY LOAM, 2 TO 9 PERCENT SLOPES

CkD - CHUALAR CLAY LOAM, 9 TO 15 PERCENT SLOPES

N

0 50 100 200

Feet

1 inch = 100 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

MAJESTIC CHINO HERITAGE PROJECT

Soils Map - Borrow Site 4

GLENN LUKOS ASSOCIATES

Exhibit 6 - Sheet 5

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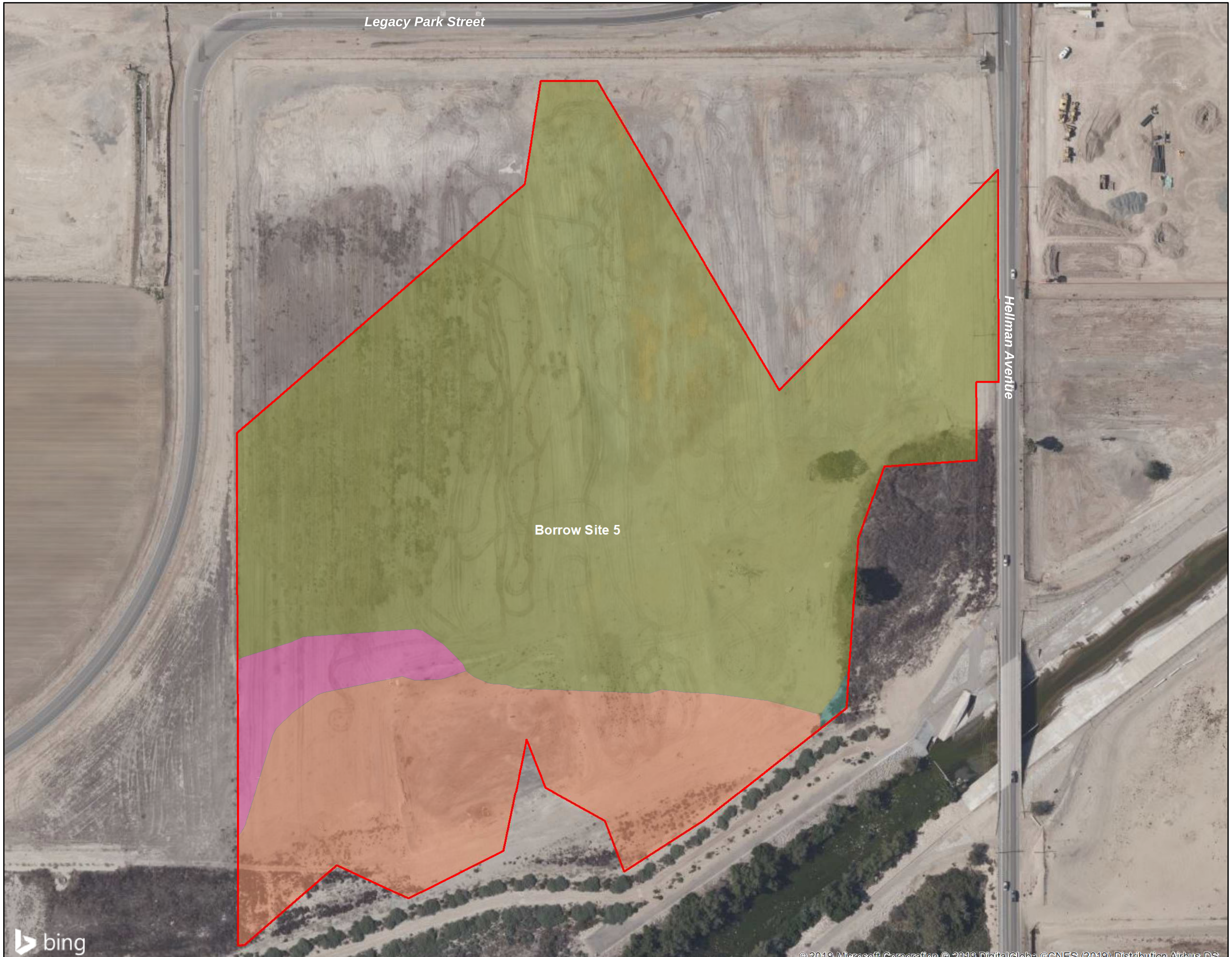


Study Area Boundary

Cb - CHINO SILT LOAM

CkC - CHUALAR CLAY LOAM, 2 TO 9 PERCENT SLOPES

Gr - GRANGEVILLE FINE SANDY LOAM

Hr - HILMAR LOAMY FINE SAND

N

0 75 150 300

Feet

1 inch = 150 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

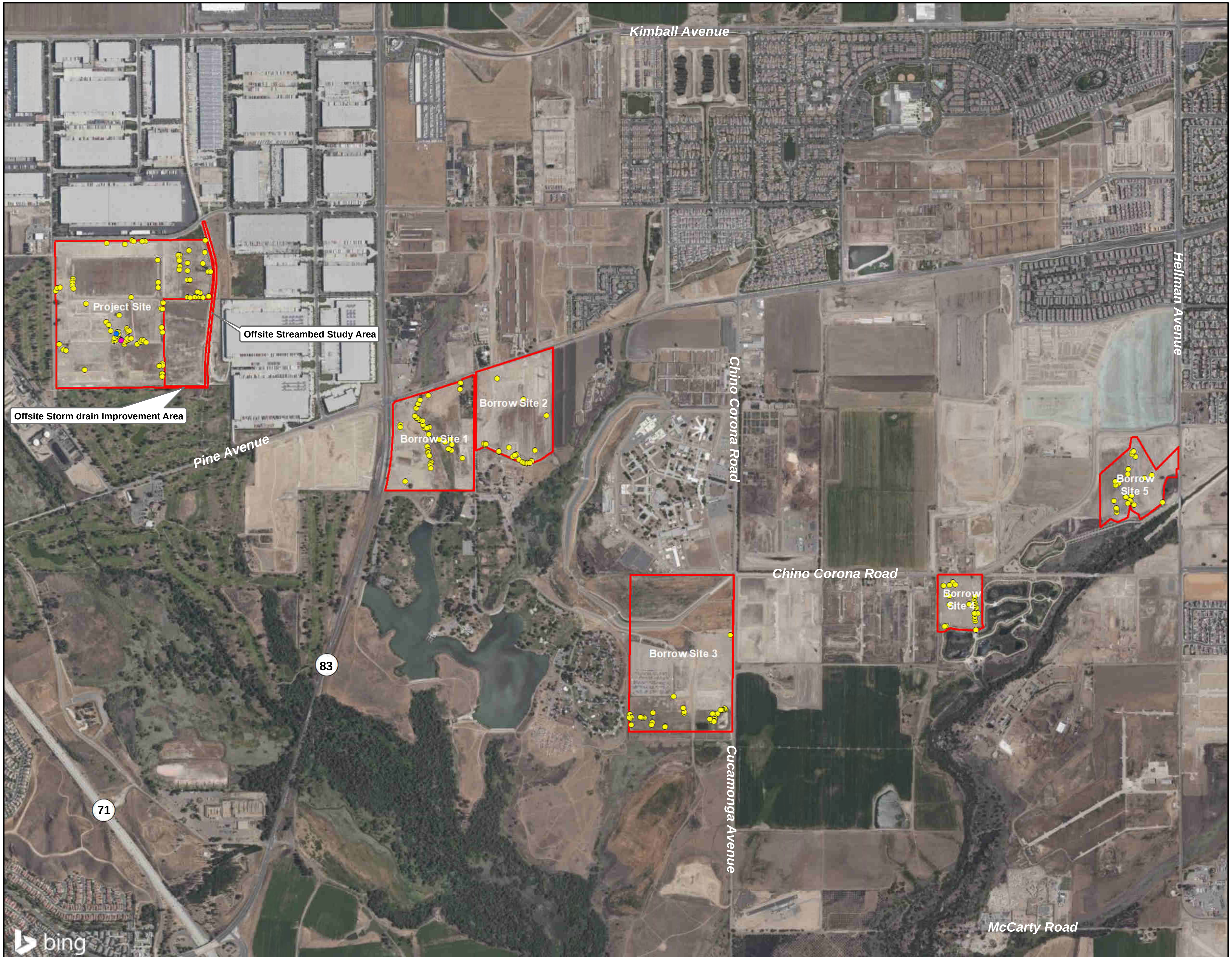
MAJESTIC CHINO HERITAGE PROJECT

Soils Map - Borrow Site 5

GLENN LUKOS ASSOCIATES

Exhibit 6 - Sheet 6

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\SoilsGIS\1090-2_Soils_BorrowSite5.mxd



Study Area Boundary
Burrowing Owl
Burrow With Owl Sign
Burrows

N

0 725 1,450 2,900
Feet

1 inch = 1,450 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

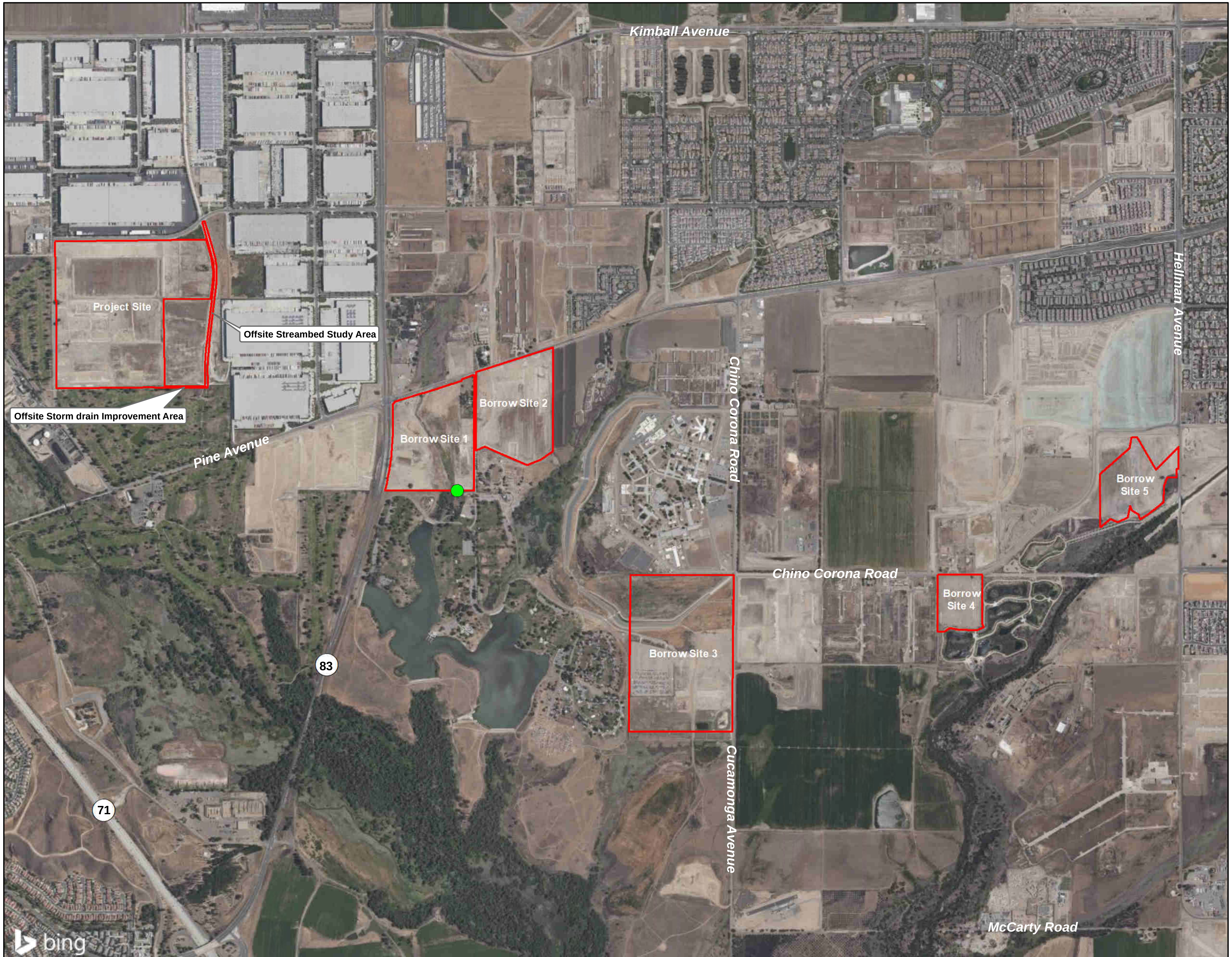
MAJESTIC CHINO HERITAGE PROJECT

Burrowing Owl Survey Map

GLENN LUKOS ASSOCIATES

Exhibit 7

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\BirdsGIS\1090-2_BUOW Survey.mxd



Study Area Boundary

Least Bell's Vireo

N

0 725 1,450 2,900

Feet

1 inch = 1,450 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

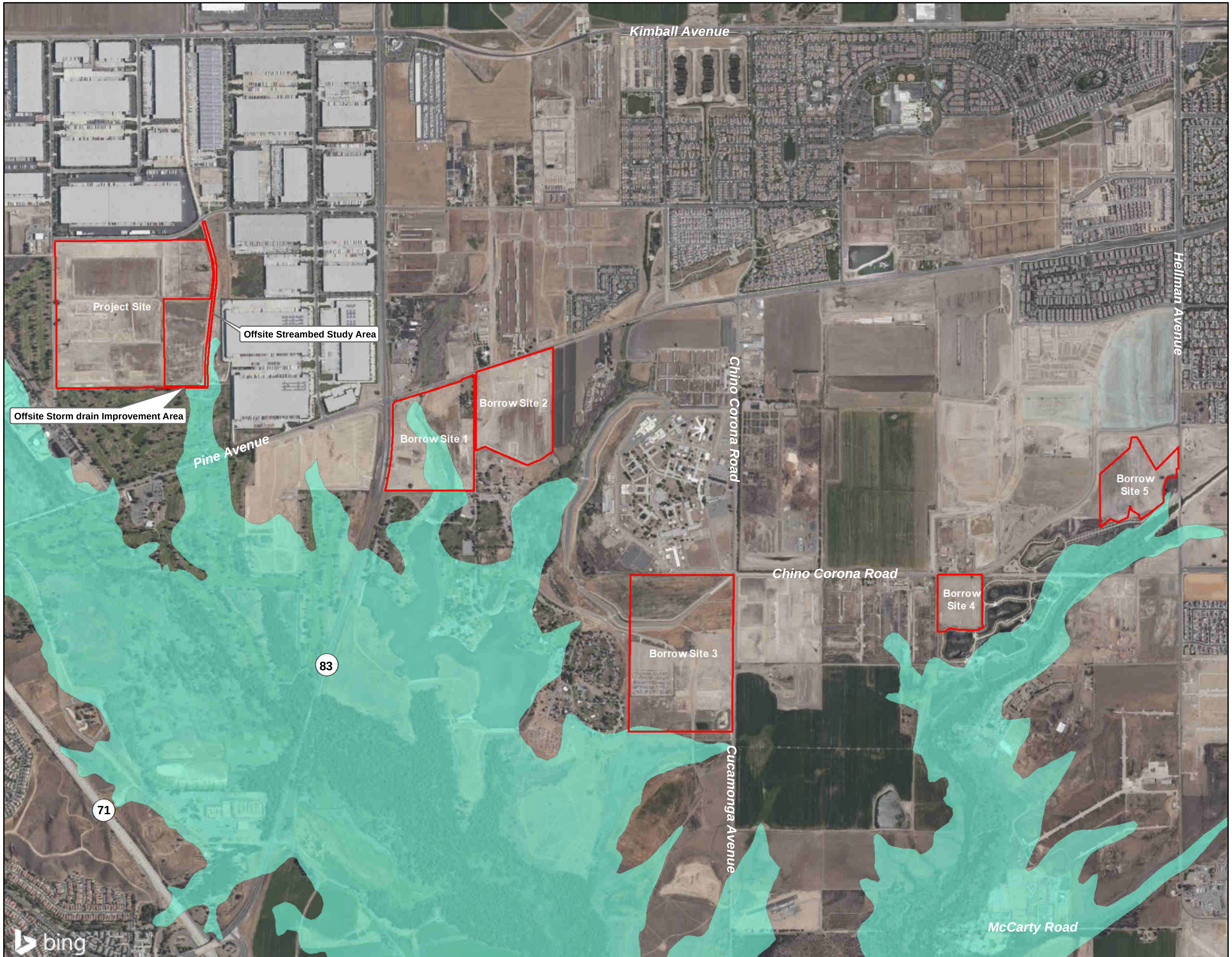
MAJESTIC CHINO HERITAGE PROJECT

Least Bell's Vireo Survey Map

GLENN LUKOS ASSOCIATES

Exhibit 8

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\BirdsGIS\1090-2_LBV Survey.mxd



Study Area Boundary

Least Bell's Vireo Critical Habitat

N

0 725 1,450 2,900

Feet

1 inch = 1,450 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

MAJESTIC CHINO HERITAGE PROJECT

Least Bell's Vireo Critical Habitat Map - Key Map

GLENN LUKOS ASSOCIATES

Exhibit 9 - Sheet 1

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\BirdsGIS\1090-2_LBV_CH_KeyMap.mxd

Study Area Boundary

Least Bell's Vireo Critical Habitat

N

0 137.5 275 550

Feet

1 inch = 275 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

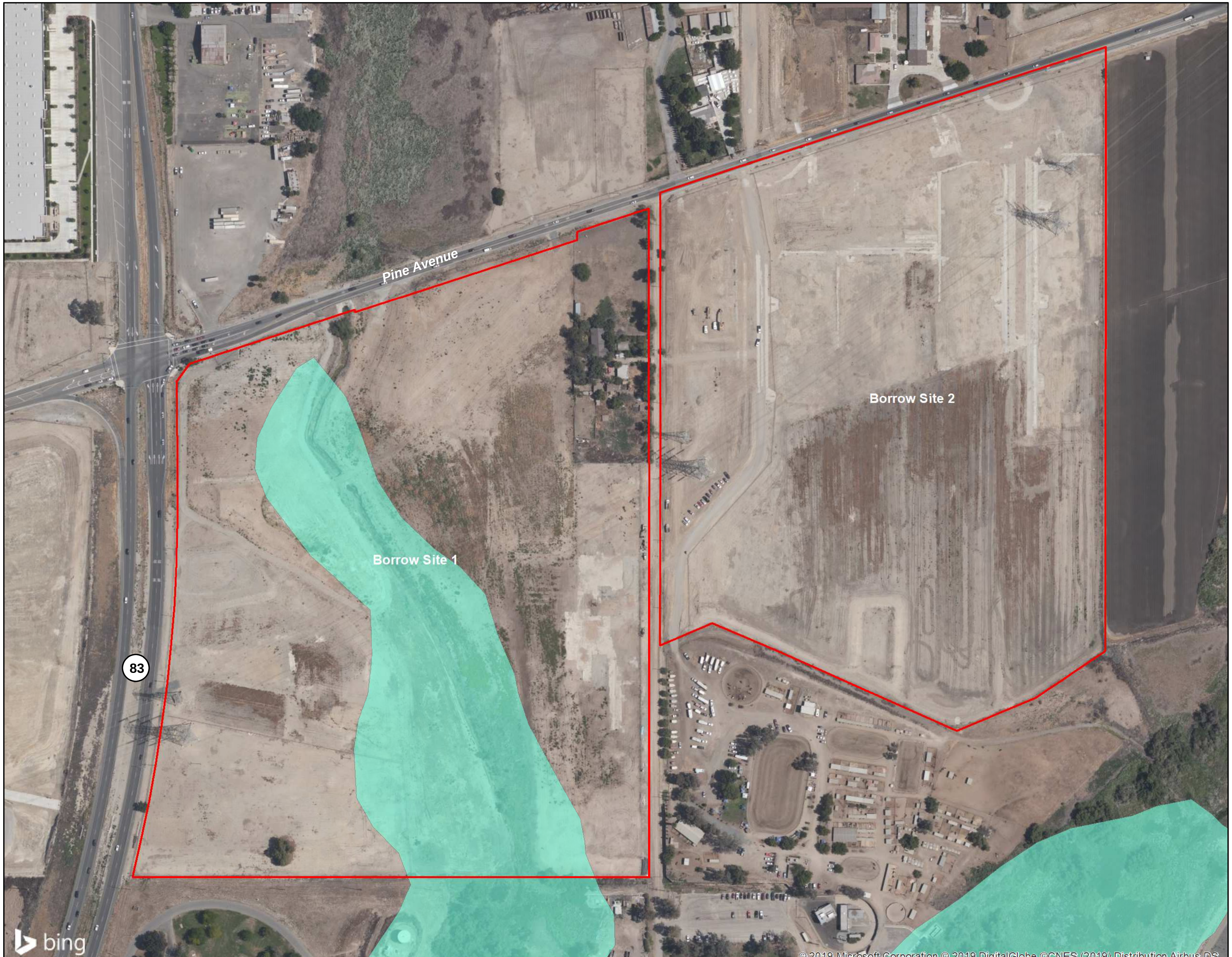
MAJESTIC CHINO HERITAGE PROJECT

Least Bell's Vireo Critical Habitat Map, Project Site and Off Site Storm Drain Improvement Area/ Off Site Streambed Study Area

GLENN LUKOS ASSOCIATES

Exhibit 9 - Sheet 2

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\BirdsGIS\1090-2_LBV_CH_ProjectSite.mxd



Study Area Boundary
Least Bell's Vireo Critical Habitat

N

0 125 250 500
Feet

1 inch = 250 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

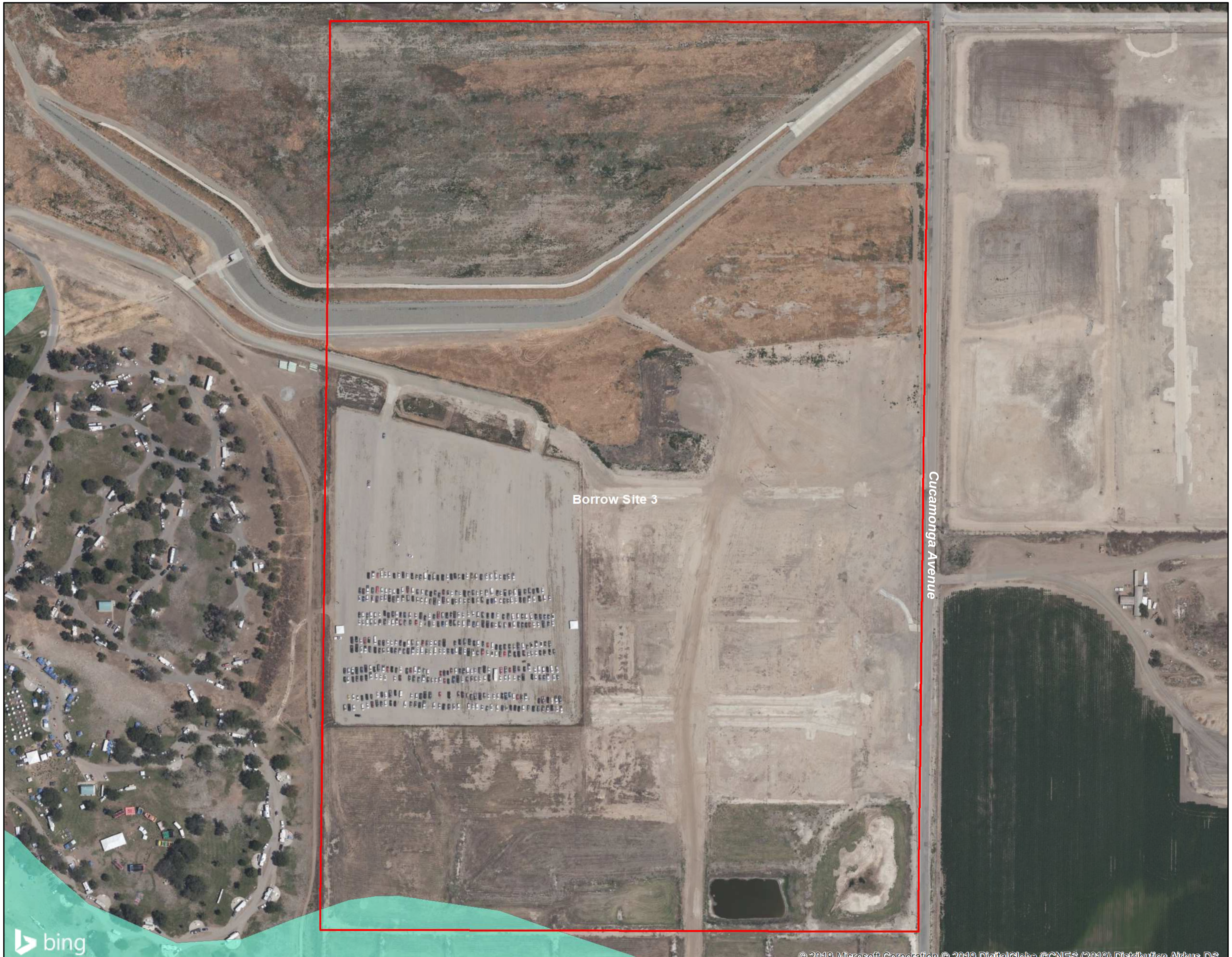
MAJESTIC CHINO HERITAGE PROJECT

Least Bell's Vireo Critical Habitat Map - Borrow Sites 1 & 2

GLENN LUKOS ASSOCIATES

Exhibit 9 - Sheet 3

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\BirdsGIS\1090-2_LBV_CH_BorrowSite1-2.mxd



Study Area Boundary

Least Bell's Vireo Critical Habitat

N

0 125 250 500

Feet

1 inch = 250 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

MAJESTIC CHINO HERITAGE PROJECT

Least Bell's Vireo Critical Habitat Map - Borrow Site 3

GLENN LUKOS ASSOCIATES

Exhibit 9 - Sheet 4

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\BirdsGIS\1090-2_LBV_CH_BorrowSite3.mxd

Study Area Boundary
Least Bell's Vireo Critical Habitat

N

0 50 100 200
Feet

1 inch = 100 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

MAJESTIC CHINO HERITAGE PROJECT

Least Bell's Vireo Critical Habitat Map - Borrow Site 4

GLENN LUKOS ASSOCIATES

Exhibit 9 - Sheet 5

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\BirdsGIS\1090-2_LBV_CH_BorrowSite4.mxd

Study Area Boundary

Least Bell's Vireo Critical Habitat

N

0 75 150 300

Feet

1 inch = 150 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

MAJESTIC CHINO HERITAGE PROJECT

Least Bell's Vireo Critical Habitat Map - Borrow Site 5

GLENN LUKOS ASSOCIATES

Exhibit 9 - Sheet 6

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\BirdsGIS\1090-2_LBV_CH_BorrowSite5.mxd

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

MAJESTIC CHINO HERITAGE PROJECT

Corps/Regional Board Jurisdictional Delineation Impact Map

GLENN LUKOS ASSOCIATES

Exhibit 10A - Sheet 1

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\ImpactsGIS\1090-2_Corps_ImpactsProjectSite.mxd

Study Area Boundary
Limits of Grading
RWQCB Non-Wetland Waters Jurisdiction Only
Corps/RWQCB Wetland Waters
5 Width in Feet

W indicates Borrow Site 1 Wetland in Channel

N

0 125 250 500
Feet

1 inch = 250 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

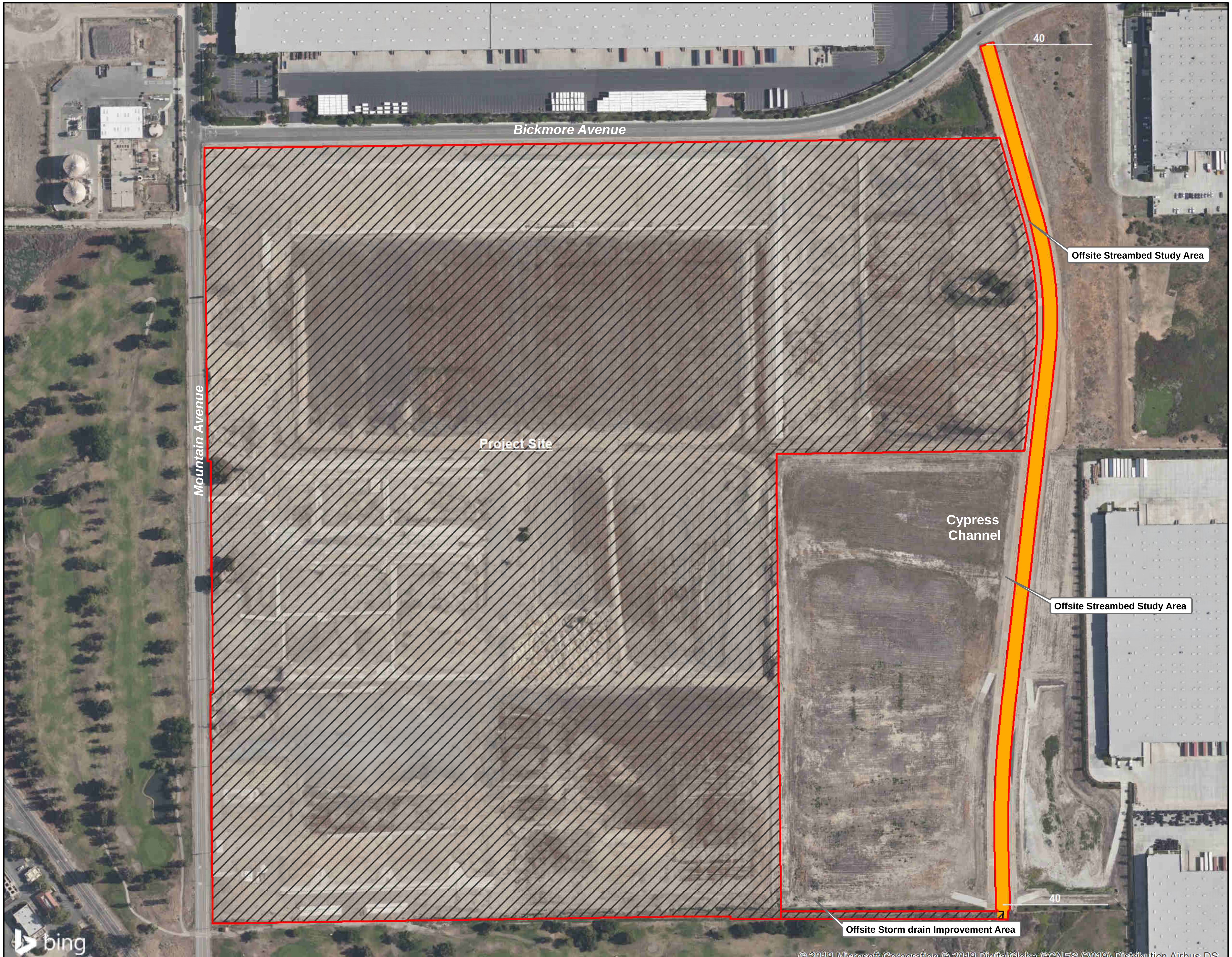
MAJESTIC CHINO HERITAGE PROJECT

Corps/RWQCB Jurisdictional Delineation/
Impact Map - Borrow Sites 1 & 2

GLENN LUKOS ASSOCIATES

Exhibit 10A - Sheet 2

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\ImpactsGIS\1090-2_Corps_Impacts_BorrowSite1-2.mxd



Study Area Boundary
Limits of Grading
CDFW Non-Riparian Streambed
40 Width in Feet

N

0 137.5 275 550
Feet

1 inch = 275 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

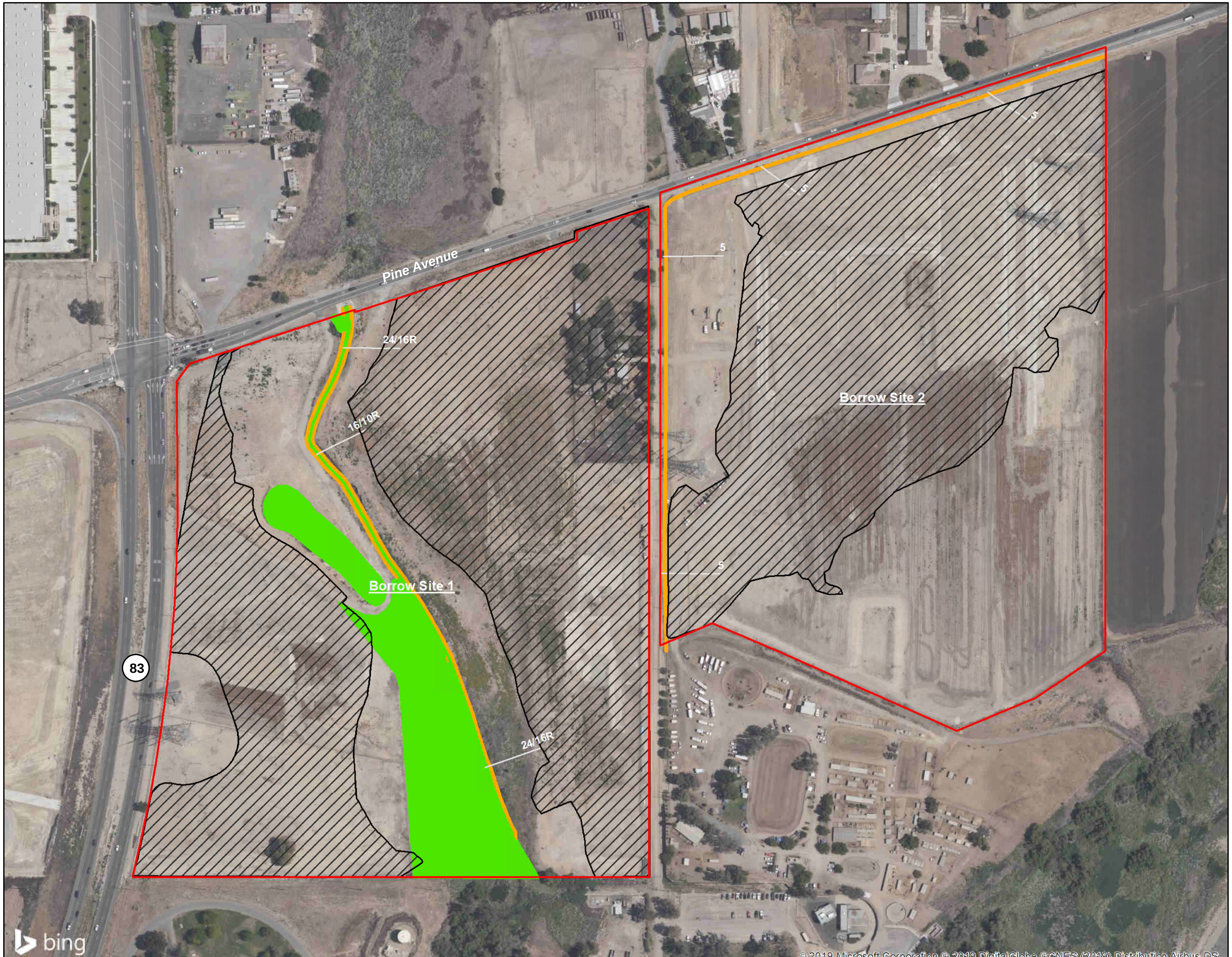
MAJESTIC CHINO HERITAGE PROJECT

CDFW Jurisdictional Delineation Impact Map

GLENN LUKOS ASSOCIATES

Exhibit 10B - Sheet 1

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\ImpactsGIS\1090-2_CDFW_Impacts_ProjectSite.mxd



Study Area Boundary
Limits of Grading
CDFW Non-Riparian Streambed
CDFW Riparian
Width in Feet
R indicates Borrow Site 1 Riparian in Channel

N

0 125 250 500
Feet

1 inch = 250 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

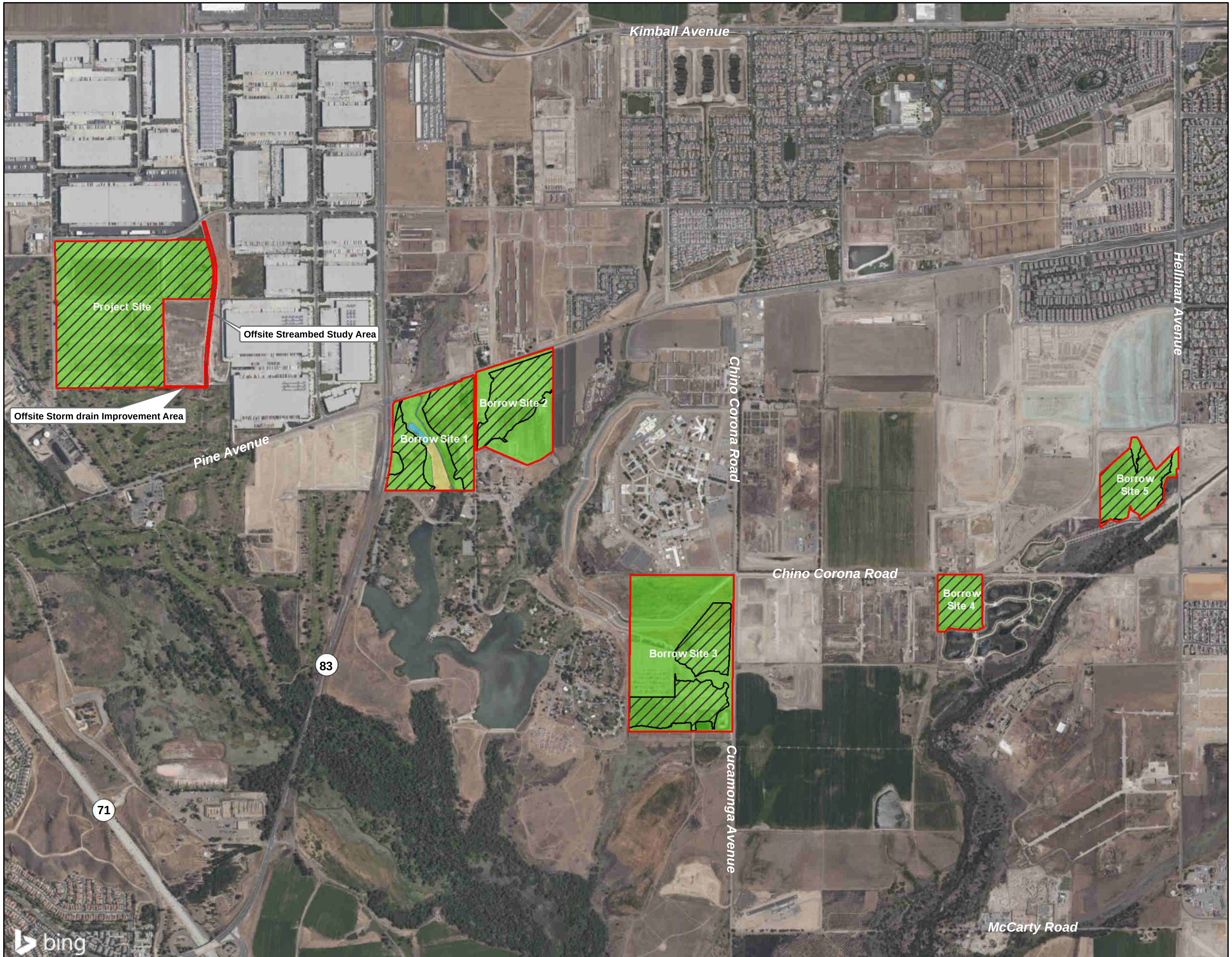
MAJESTIC CHINO HERITAGE PROJECT

CDFW Jurisdictional Delineation/ Impact Map - Borrow Sites 1 & 2

GLENN LUKOS ASSOCIATES

Exhibit 10B - Sheet 2

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\ImpactsGIS\1090-2_CDFW_Impacts_BorrowSite1-2.mxd



Study Area Boundary
Limits of Grading
Freshwater Marsh
Disturbed Freshwater Marsh
Ruderal / Disturbed
Southern Willow Scrub
Ornamental
Developed

N

0 725 1,450 2,900
Feet

1 inch = 1,450 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

MAJESTIC CHINO HERITAGE PROJECT

Vegetation Impact Map - Key Map

GLENN LUKOS ASSOCIATES

Exhibit 11 - Sheet 1

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\ImpactsGIS\1090-2_Vegetation_ImpactsKeyMap.mxd

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

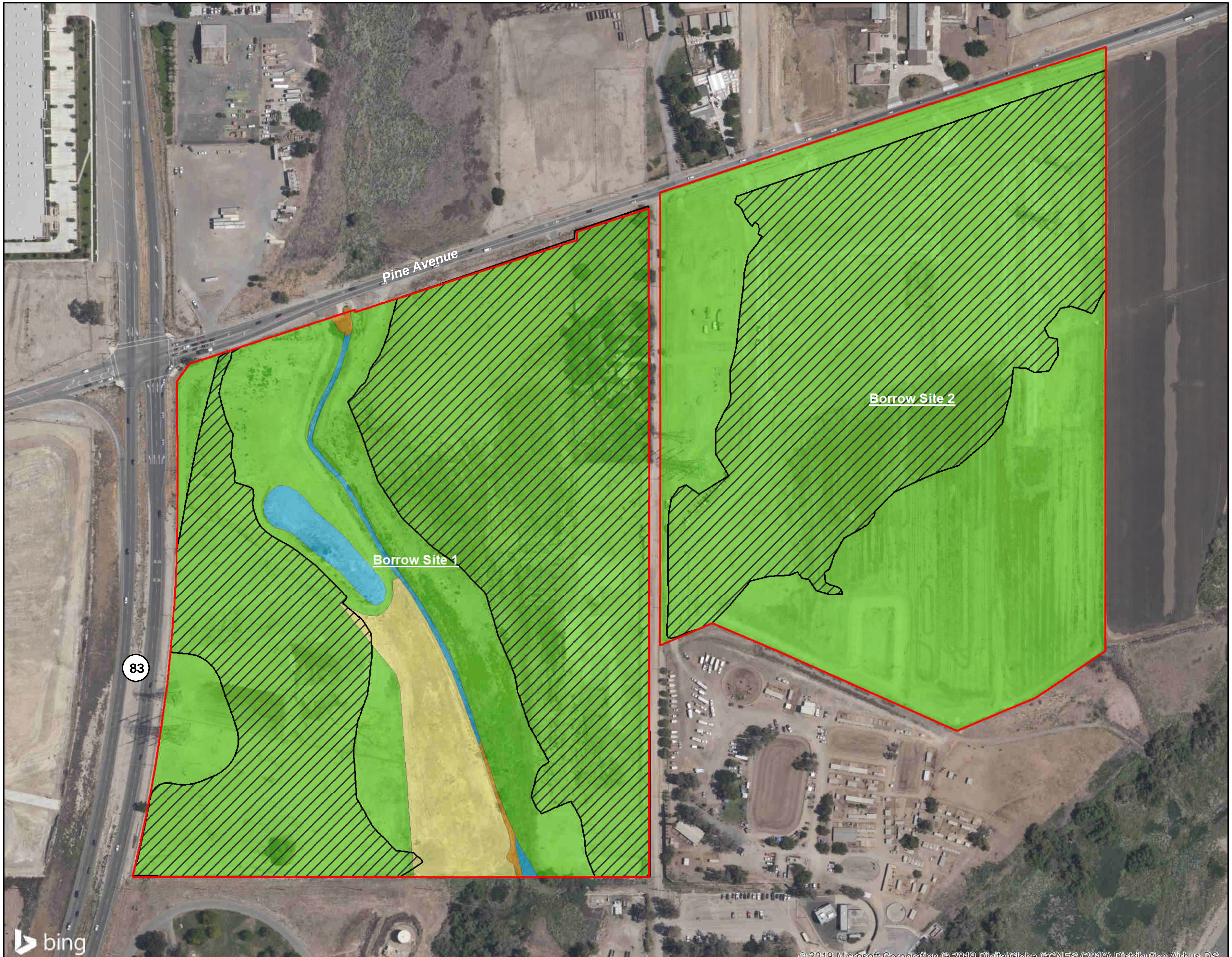
MAJESTIC CHINO HERITAGE PROJECT

Vegetation Impact Map, Project Site and Off Site Storm Drain Improvement Area/ Off Site Streambed Study Area Adjacent to the Project Site

GLENN LUKOS ASSOCIATES

Exhibit 11 - Sheet 2

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\ImpactsGIS\1090-2_Vegetation_ImpactsProjectSite.mxd



Study Area Boundary
Limits of Grading
Freshwater Marsh
Disturbed Freshwater Marsh
Ruderal / Disturbed
Southern Willow Scrub

N

0 125 250 500
Feet

1 inch = 250 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

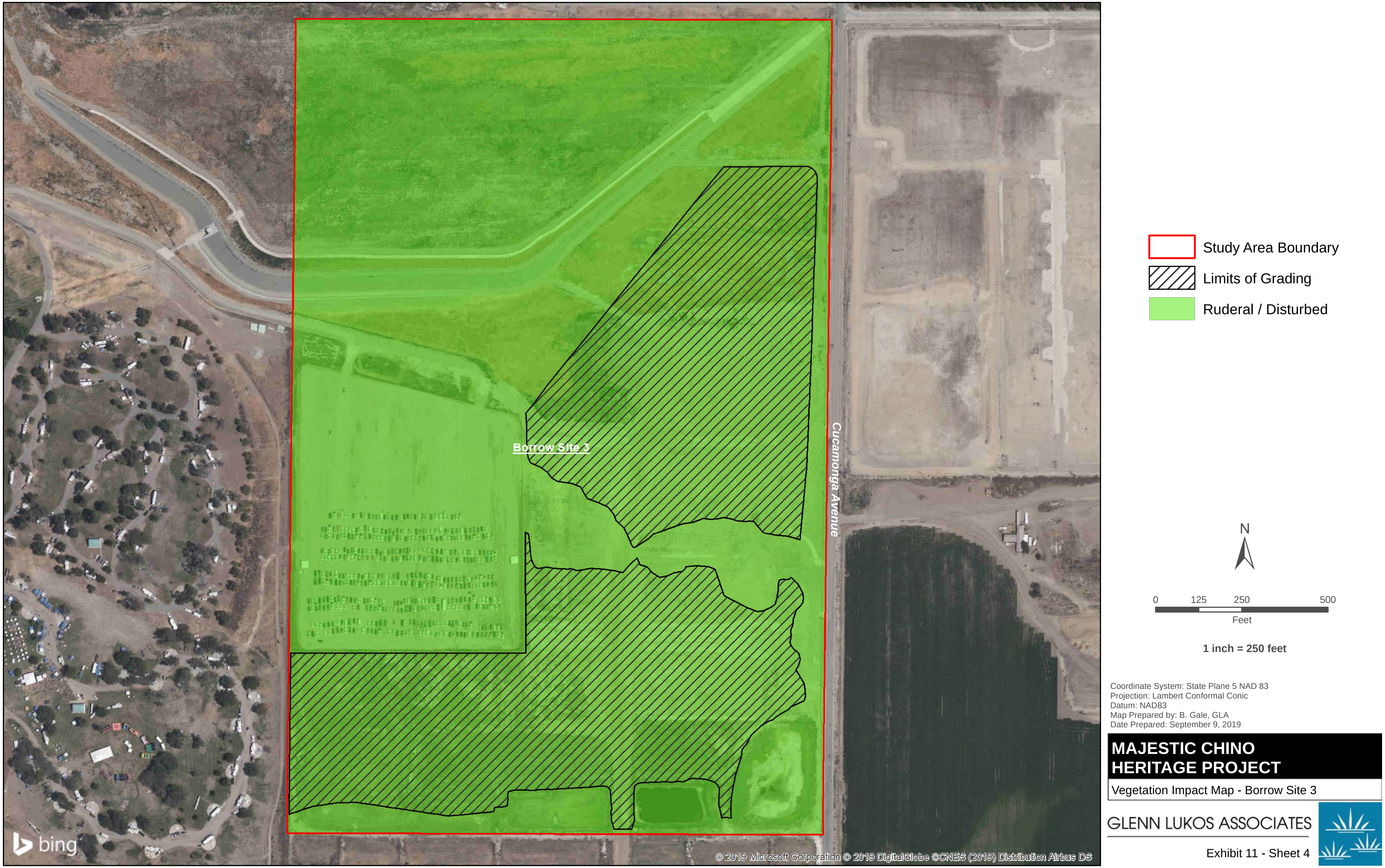
MAJESTIC CHINO HERITAGE PROJECT

Vegetation Impact Map - Borrow Sites 1 & 2

GLENN LUKOS ASSOCIATES

Exhibit 11 - Sheet 3

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\ImpactsGIS\1090-2_Vegetation_ImpactsBorrowSite1-2.mxd



Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

MAJESTIC CHINO HERITAGE PROJECT

Vegetation Impact Map - Borrow Site 3

GLENN LUKOS ASSOCIATES

Exhibit 11 - Sheet 4

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\ImpactsGIS\1090-2_Vegetation_ImpactsBorrowSite3.mxd

Study Area Boundary
Limits of Grading
Ruderal / Disturbed

N

0 50 100 200
Feet

1 inch = 100 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

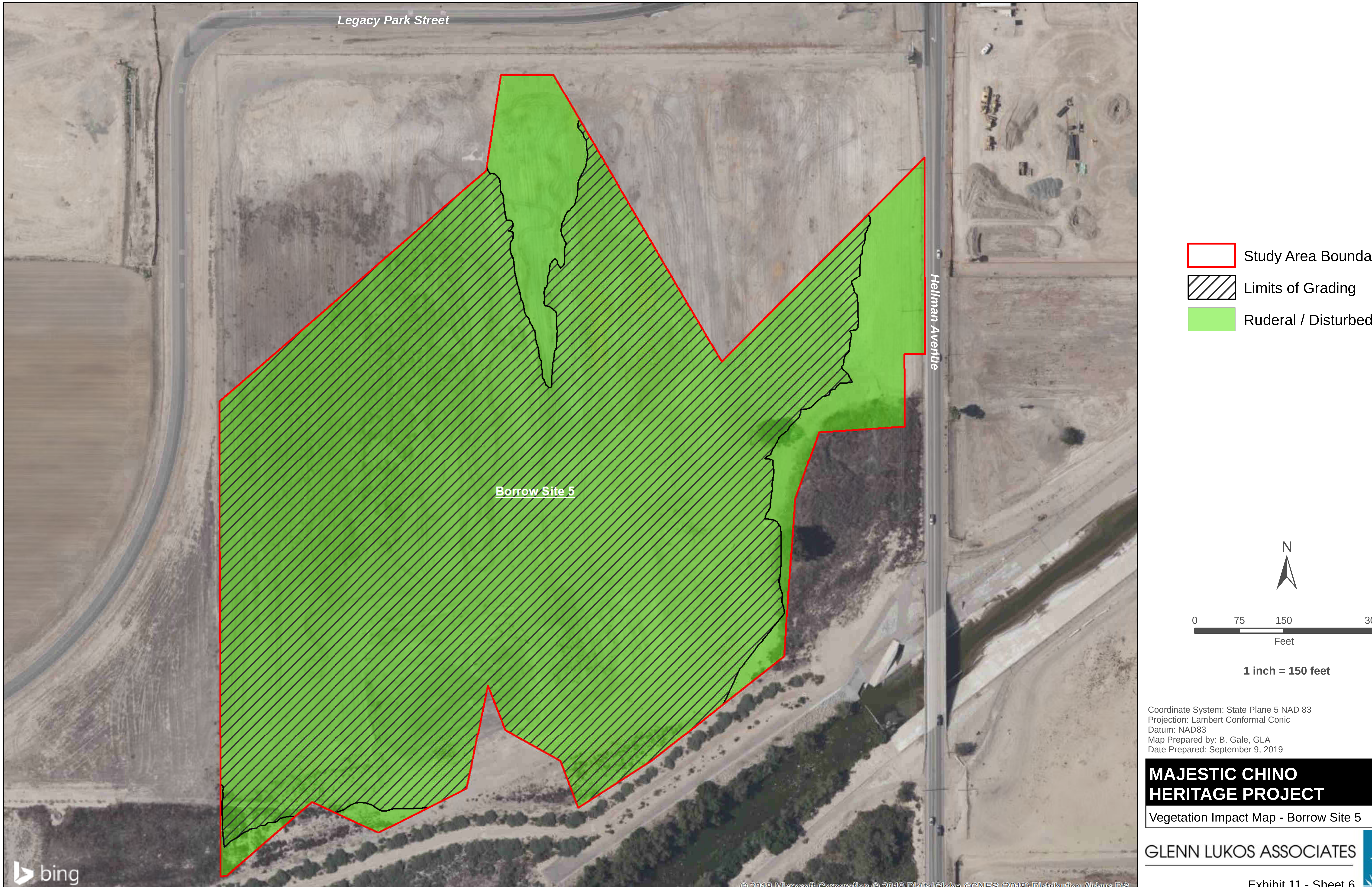
MAJESTIC CHINO HERITAGE PROJECT

Vegetation Impact Map - Borrow Site 4

GLENN LUKOS ASSOCIATES

Exhibit 11 - Sheet 5

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\ImpactsGIS\1090-2_Vegetation_ImpactsBorrowSite4.mxd



Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

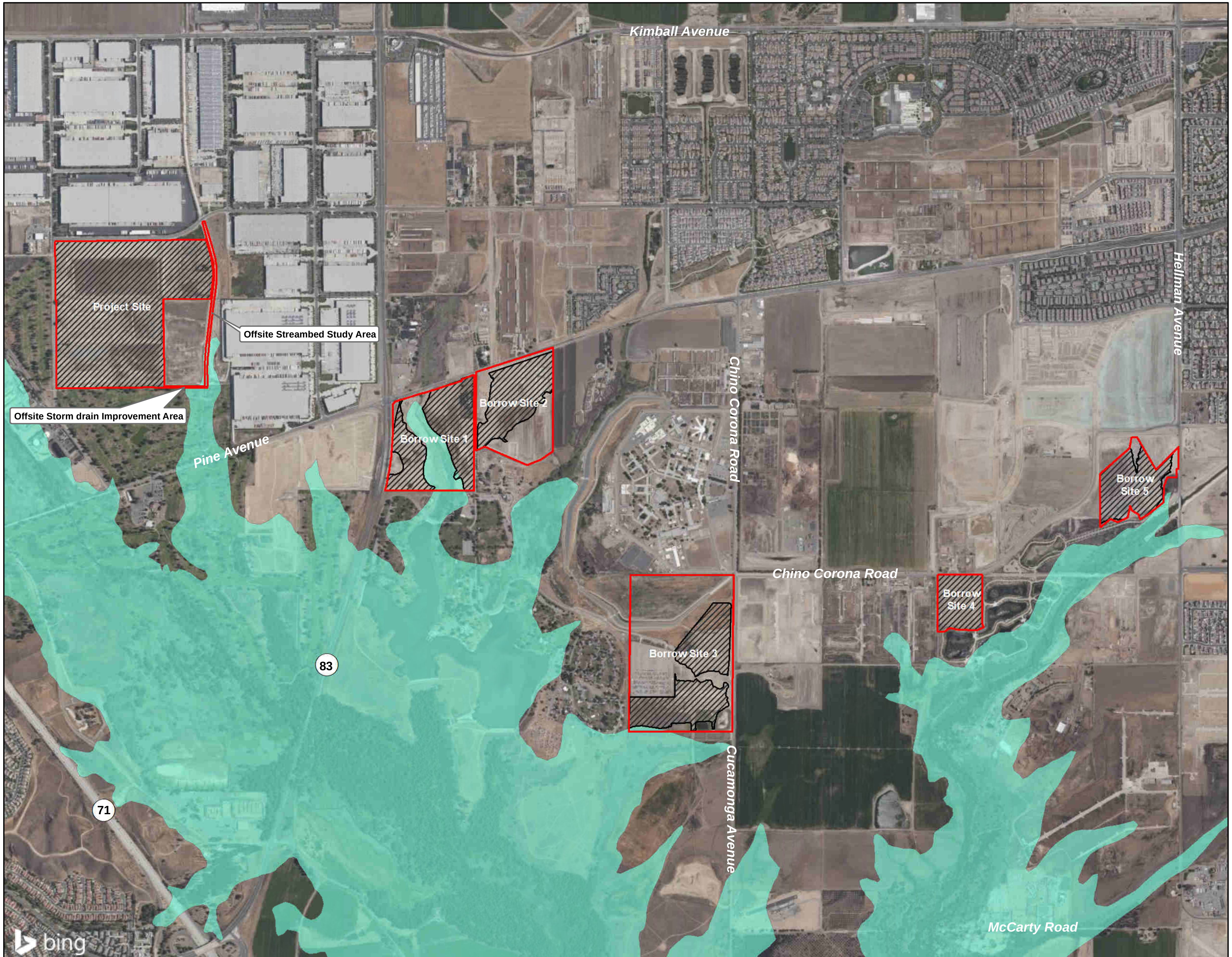
MAJESTIC CHINO HERITAGE PROJECT

Vegetation Impact Map - Borrow Site 5

GLENN LUKOS ASSOCIATES

Exhibit 11 - Sheet 6

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\ImpactsGIS\1090-2_Vegetation_ImpactsBorrowSite5.mxd



Study Area Boundary

Limits of Grading

Least Bell's Vireo Critical Habitat

N

0 725 1,450 2,900

Feet

1 inch = 1,450 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

MAJESTIC CHINO HERITAGE PROJECT

Least Bell's Vireo Critical Habitat Impact Map - Key Map

GLENN LUKOS ASSOCIATES

Exhibit 12 - Sheet 1

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\ImpactsGIS\1090-2_Impacts_LBV_CH_KeyMap.mxd

Study Area Boundary
Limits of Grading
Least Bell's Vireo Critical Habitat

N

0 137.5 275 550
Feet

1 inch = 275 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

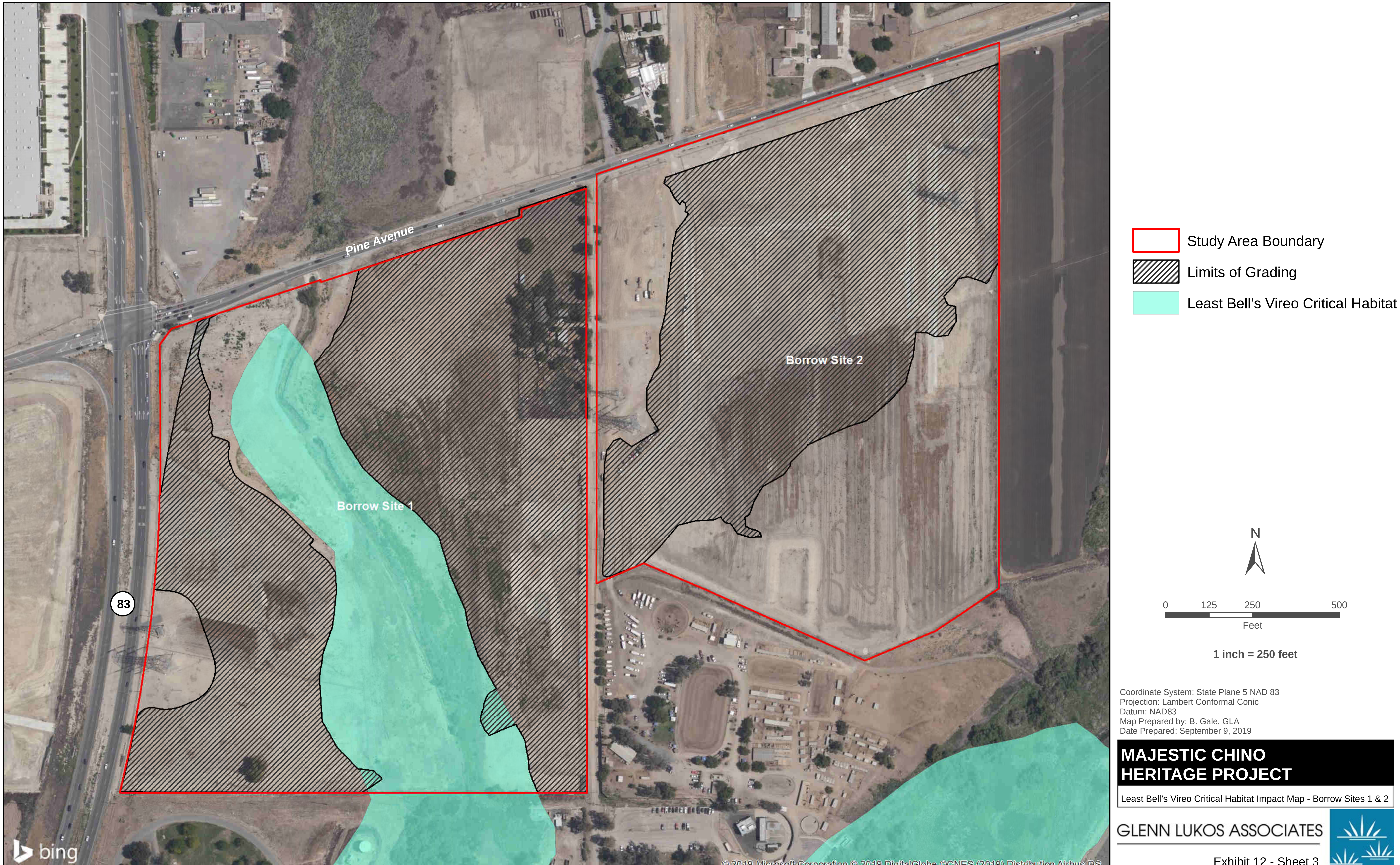
MAJESTIC CHINO HERITAGE PROJECT

Least Bell's Vireo Critical Habitat Impact Map, Project Site and Off Site Storm Drain Improvement Area/ Off Site Streambed Study Area Adjacent to the Project Site

GLENN LUKOS ASSOCIATES

Exhibit 12 - Sheet 2

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\ImpactsGIS\1090-2_Impacts_LBV_CH_ProjectSite.mxd



Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

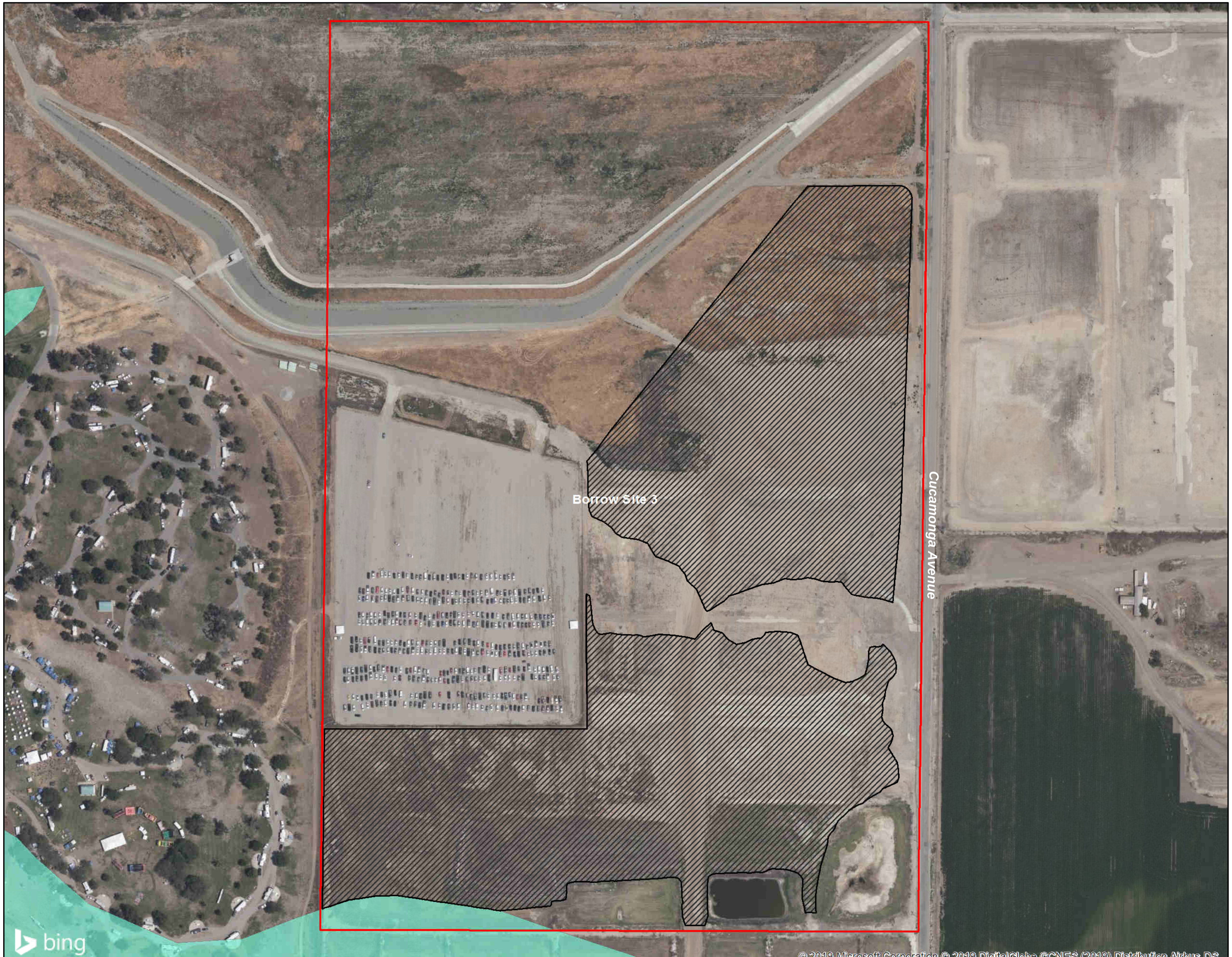
MAJESTIC CHINO HERITAGE PROJECT

Least Bell's Vireo Critical Habitat Impact Map - Borrow Sites 1 & 2

GLENN LUKOS ASSOCIATES

Exhibit 12 - Sheet 3

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\ImpactsGIS\1090-2_Impacts_LBV_CH_BorrowSite1-2.mxd



Study Area Boundary

Limits of Grading

Least Bell's Vireo Critical Habitat

N

0 125 250 500

Feet

1 inch = 250 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

MAJESTIC CHINO HERITAGE PROJECT

Least Bell's Vireo Critical Habitat Impact Map - Borrow Site 3

GLENN LUKOS ASSOCIATES

Exhibit 12 - Sheet 4

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\ImpactsGIS\1090-2_Impacts_LBV_CH_BorrowSite3.mxd

Study Area Boundary
Limits of Grading
Least Bell's Vireo Critical Habitat

N

0 50 100 200
Feet

1 inch = 100 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

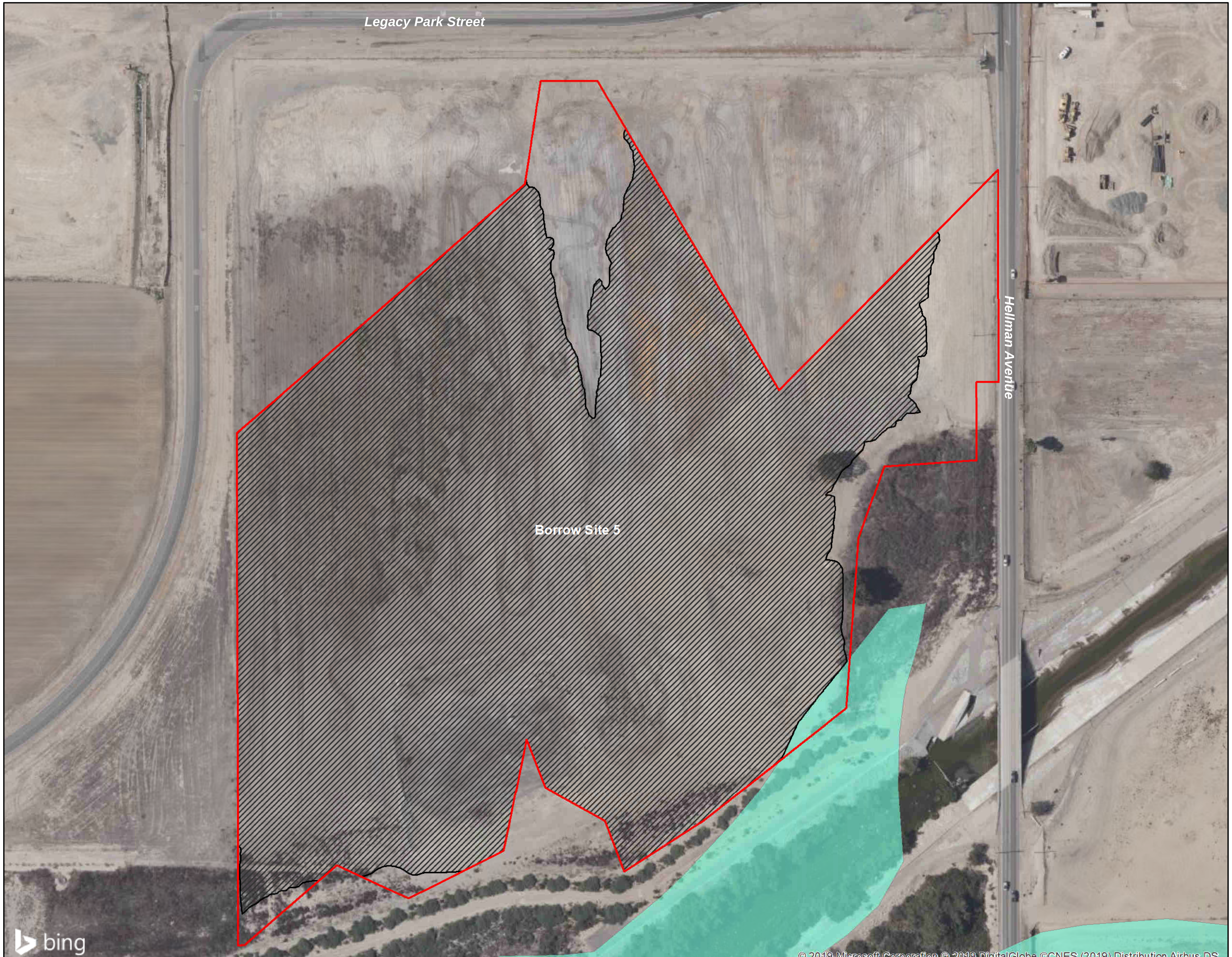
MAJESTIC CHINO HERITAGE PROJECT

Least Bell's Vireo Critical Habitat Impact Map - Borrow Site 4

GLENN LUKOS ASSOCIATES

Exhibit 12 - Sheet 5

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\ImpactsGIS\1090-2_Impacts_LBV_CH_BorrowSite4.mxd



Study Area Boundary

Limits of Grading

Least Bell's Vireo Critical Habitat

N

0 75 150 300

Feet

1 inch = 150 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

MAJESTIC CHINO HERITAGE PROJECT

Least Bell's Vireo Critical Habitat Impact Map - Borrow Site 5

GLENN LUKOS ASSOCIATES

Exhibit 12 - Sheet 6

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\ImpactsGIS\1090-2_Impacts_LBV_CH_BorrowSite5.mxd

Photograph 1: Photograph depicting Project Site. Note the disturbed condition of the site.

Photograph 2: Photograph depicting Project Site. Note the disturbed condition of the site.

Photograph 3: Photograph depicting typical waste treatment pond within Project Site.

Photograph 4: Photograph depicting Project Site. Note the disturbed condition of the site.

GLENN LUKOS ASSOCIATES

Exhibit 13

MAJESTIC CHINO HERITAGE PROJECT

Site Photographs – Project Site

Photograph 5: Photograph depicting Project Site. Note the disturbed condition of the site.

Photograph 6: Photograph depicting Project Site. Note the disturbed condition of the site.

Photograph 7: Photograph depicting Project Site. Note the presence of a typical waste treatment pond on site.

Photograph 8: Photograph depicting Project Site. Note the disturbed condition of the site.

GLENN LUKOS ASSOCIATES

Exhibit 13

MAJESTIC CHINO HERITAGE PROJECT

Site Photographs – Borrow Site 3

Photograph 9: Photograph depicting Project Site. Note the disturbed condition of the site.

Photograph 10: Photograph depicting Project Site. Note the disturbed condition of the site.

Photograph 11: Photograph depicting Project Site. Note the disturbed condition of the site.

Photograph 12: Photograph depicting Project Site. Note the disturbed condition of the site.

GLENN LUKOS ASSOCIATES

Exhibit 13

MAJESTIC CHINO HERITAGE PROJECT

Site Photographs – Borrow Site 4

Photograph 13: Photograph depicting Project Site. Note the disturbed condition of the site.

Photograph 14: Photograph depicting Project Site. Note the disturbed condition of the site.

Photograph 15: Photograph depicting Project Site. Note the disturbed condition of the site.

Photograph 16: Photograph depicting Project Site. Note the disturbed condition of the site.

GLENN LUKOS ASSOCIATES

Exhibit 13

MAJESTIC CHINO HERITAGE PROJECT

Site Photographs – Borrow Site 5

Photograph 17: Photograph depicting Drainage 1 and freshwater marsh habitat on site.

Photograph 18: Photograph depicting freshwater marsh/seep area within Borrow Site 1 westerly of Drainage 1.

Photograph 19: Photograph depicting Drainage 1 and freshwater marsh habitat on site.

Photograph 20: Photograph depicting disturbed freshwater marsh area on site.

GLENN LUKOS ASSOCIATES

Exhibit 13

MAJESTIC CHINO HERITAGE PROJECT

Site Photographs – Borrow Site 1

Photograph 21: Photograph depicting Cypress Channel. Note the concrete sides and bottom.

Photograph 22: Photograph depicting Cypress Channel. Note the concrete sides and bottom.

GLENN LUKOS ASSOCIATES

Exhibit 13

MAJESTIC CHINO HERITAGE PROJECT

Site Photographs – Cypress Channel

APPENDIX A: FLORAL COMPENDIUM

The floral compendium lists all species identified during floristic level plant surveys conducted for the Study Area. Taxonomy typically follows Jepson Flora Project (2013)[1]. An asterisk (*) denotes a non-native species.

EUDICOTS

Adoxaceae – Moschatel Family

Sambucus nigra ssp. *caerulea*, Blue Elderberry

Agavaceae – Agave Family

* *Agave americana*, American Century Plant
* *Agave attenuata*, Agave
Hesperoyucca whipplei, Chaparral Yucca

Amarnthaceae – Amaranth Family

* *Amaranthus albus*, Tumbleweed

Anacardiaceae – Sumac Family

Malosma laurina, Laurel Sumac
Rhus integrifolia, Lemonade Berry
* *Schinus molle,* Peruvian Pepper Tree

Apiaceae – Umbellifer Family

* *Conium maculatum*, Poison Hemlock

Apocynaceae – Dogbane Family

* *Nerium oleander*, Oleander

Asteraceae – Sunflower Family

Ambrosia psilostachya, Western Ragweed
Artemisia californica, California Sagebrush
Baccharis pilularis, Coyote Brush
Baccharis salicifolia, Mulefat
* *Cirsium vulgare*, Bull Thistle
Encelia farinosa, Desert Brittlebush
* *Erigeron bonariensis*, Flax-leaved Horseweed
Erigeron canadensis, Canada Horseweed
Helianthus annuus, Common Sunflower
* *Helminthotheca echioides*, Bristly Ox-Tongue

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[1] Jepson Flora Project (B. D. Baldwin, D. J. Keil, S. Markos, B. D. Mishler, R. Patterson, T. J. Rosatti, and D. H. Wilken, eds.) [JFP]. 2013. *Jepson Flora Project*. Accessed through 31 Oct 2014. Facets of this extensive online resource include the Jepson eFlora, available at http://ucjeps.berkeley.edu//IJM.html and Jepson Online Interchange (JOI), available at http://ucjeps.berkeley.edu/interchange.html. The latter enables searches of the Index to California Plant Names (ICPN) for nomenclature, status, and relationships, often with links to helpful details and discussion. All information incorporated here was accessed after, or confirmed accurate through, inclusion of the "Errata and Small Changes" at http://ucjeps.berkeley.edu/JM12_errata.html (dated 01 Jul 2013) and "Supplement 1 to" TJM2 at http://ucjeps.berkeley.edu/IJM_suppl_summary.html, (dated Jul 2013).

Heterotheca grandiflora, Telegraph Weed
Isocoma mensiesii, Coast Goldenbush
* *Lactuca serriola*, Prickly Lettuce
* *Sonchus asper*, Spiny Sowthistle
* *Silybum marianum*, Milk Thistle
* *Taraxacum officinale*, Common Dandelion
Uropappus lindleyi, Silver Puffs
* *Verbesina enceliodes*, Golden Crownbeard

Arecaceae – Palm Tree Family
* *Washingtonia robusta*, Mexican Fan Palm

Boraginaceae – Forget-Me-Not Family
Amsinckia intermedia, Common Fiddleneck
Heliotropium curassavicum, Chinese Parsley

Brassicaceae – Mustard Family
* *Hirschfeldia incana*, Summer Mustard
* *Lepidium latifolium*, Perennial Pepperweed
* *Raphanus sativus*, Wild Radish
* *Sisymbrium irio*, London Rocket

Cactaceae – Cactus Family
* *Opuntia ficus-indica*, Mission Cactus

Caryophyllaceae – Pink Family
Spergularia marina, Salt Marsh Sand Spurry

Chenopodiaceae – Goosefoot Family
Atriplex sp., Saltbush
* *Chenopodium album*, Lamb's Quarters
* *Chenopodium murale*, Nettle-leaf Goosefoot
* *Kochia scoparia*, Common Red Sage
* *Salsola tragus*, Russian Thistle

Convolvulaceae – Morning-Glory Family
* *Convolvulus arvensis,* Field Bindweed
* *Dichondra micrantha*, Asian Ponyfoot

Fabaceae – Pea Family
Acmison americanus, Spanish Lotus
* *Melilotus* sp. Sweet Clover

Geraniaceae – Geranium Family
* *Erodium cicutarium*, Red stemmed Filaree

Lamiaceae – Mint Family
* *Marrubium vulgare*, White Horehound

Malvaceae – Mallow Family
* *Malva parviflora*, Cheeseweed Mallow

Oleaceae – Olive Family
Fraxinus uhdei., Shamel Ash

Pinaceae – Pine Family
* *Pinus halepensis*, Aleppo Pine

Polygonaceae – Knotweed Family
Eriogonum fasciculatum, California Buckwheat
* *Polygonum aviculare*, Prostrate Knotweed
* *Rumex crispus*, Curly Dock

Rosaceae – Rose Family
Heteromeles arbutifolia, Toyon

Salicaeae – Willow Family
Salix gooddingii, Goodding's Black Willow

Saururaceae – Lizard's-Tail Family
Anemopsis californica, Yerba Mansa

Simaroubaceae – Quassia Family
* *Ailanthus altissima*, Tree of Heaven

Solanaeceae – Nightshade Family
Datura wrightii, Jimsonweed
* *Nicotiana glauca*, Tree Tobacco
Solanum sp., Nightshade

Tamaricaceae – Tamarisk Family
* *Tamarix ramosissima*, Salt Cedar

Urticaceae – Nettle Family
* *Urtica urens*, Annual Stinging Nettle

MONOCOTS

Poaceae – Grass Family
* *Agrostis gigantea*, Creeping Bentgrass
* *Bromus madritensis*, Red Brome

*	*Cynodon dactylon*, Bermuda Grass
	Distichlis spicata, Saltgrass
*	*Eleusine* sp., Millet
	Elymus triticoides, Creeping Wild Rye
*	*Festuca perennis*, Italian Rye Grass
*	*Hordeum murinum*, Foxtail Barley
*	*Lamarckia aurea,* Goldentop Grass
	Leptochloa fusca ssp. *uninervia*, Mexican Sprangletop
	Muhlenbergia rigens, Deergrass
*	*Polypogon monspeliensis*, Rabbitsfoot Grass
*	*Schismus barbatus*, Common Mediterranean Grass
	Typha domingensis, Southern Cattail

APPENDIX B: FAUNAL COMPENDIUM

The faunal compendium lists species that were either observed within or adjacent to the Project site. Taxonomy and common names are taken from Pelham (2008)[2] for butterflies, AOU (1998 et seq.)[3] for birds, Crother (2012)[4] for amphibian, turtle, and reptile taxonomy, and Wilson and Reeder (2005)[5] for mammals.

INVERTEBRATES

Nymphalidae - Brush-Footed Butterflies
Vanessa cardui, Painted Lady

REPTILES AND AMPHIBIANS

Bufonidae – True Toad Family
Anaxyrus boreas, Western Toad

Phrynosomatidae - Phrynosomatid Lizards
Sceloporus occidentalis, Western Fence Lizard

BIRDS

Accipitridae – Diurnal Raptor Family
Accipiter cooperi, Cooper's Hawk
Buteo jamaicensis, Red-tailed Hawk
Circus hudsonius, Northern Harrier

Aegithalidae – Bushtit Family
Psaltriparus minimus, Bushtit

Alaudidae – Lark Family
Eremophila alpestris, Horned Lark

Anatidae – Duck, Geese, and Swan Family
Anas platyrhynchos, Mallard
Aythya affinis, Lesser Scaup
Branta canadensis, Canada Goose
Spatula clypeata, Northern Shoveler

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[2] Jonathan Pelham. 2008. Catalogue of the Butterflies of the United States and Canada. Journal of Research on the Lepidoptera 40: xiv + 658 pp.
[3] American Ornithologists' Union 1998. The A.O.U. Checklist of North American Birds, seventh edition. American Ornithologists' Union, Washington D.C.; and 2000, 2002, 2003, and 2004 supplements.
[4] Crother, B. I., ed. 2012. *Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico, with Comments Regarding Confidence in Our Understanding, 7th Edition*. SSAR Herpetological Circular 39:1-92. Shoreview, MN: Society for the Study of Amphibians and Reptiles, Committee On Standard English And Scientific Names.
[5] Wilson, D. E., and D. M. Reeder, eds. 2005. *Mammal Species of the World: A Taxonomic and Geographic Reference, 3rd Edition*. Baltimore, MD: Johns Hopkins University Press. Available online at http://www.bucknell.edu/msw3/browse.asp. No separate corrigenda or updates since initial publication.

Spatula cyanoptera, Cinnamon Teal

Ardeidae – Heron Family
Ardea alba, Great Egret

Cathartidae – New World Vulture Family
Cathartes aura, Turkey Vulture

Charadriidae – Plover Family
Charadrius vociferous, Killdeer

Columbidae – Pigeon and Dove Family
* *Columba livia*, Rock Pigeon
* *Streptopelia decaocto*, Eurasian-collared Dove
Zenaida macroura, Mourning Dove

Corvidae – Jay and Crow Family
Corvus brachyrhynchos, American Crow
Corvus corax, Common Raven

Falconidae – Falcons and Caracaras
towee, American Kestrel

Fringillidae – Finch Family
Haemorhous mexicanus, House Finch
Spinus psaltria, Lesser Goldfinch

Hirundinidae – Swallow Family
Hirundo rustica, Barn Swallow
Stelgidopteryx serripennis, Northern Rough-winged Swallow
Tachycineta bicolor, Tree Swallow

Icteridae – Icterid Family
Agelaius phoeniceus, Red-winged Blackbird
Agelaius tricolor, Tricolored Blackbird
Euphagus cyanocephalus, Brewer's Blackbird
* *Molothrus ater*, Brown-headed Cowbird
Quiscalus mexicanus, Great-tailed Grackle
Sturnella neglecta, Western Meadowlark
Xanthocephalus xanthocephalus, Yellow-headed Blackbird

Laniidae – Shrike Family
Lanius ludovicianus, Loggerhead Shrike

Laridae – Gull and Tern Family
Larus californicus, California Gull

Larus delawarensis, Ring-billed Gull

Mimidae – Thrasher Family
Mimus polyglottos, Northern Mockingbird
Toxostoma redivivum, California Thrasher

Motacillidae – Wagtail and Pipit Family
Anthus rubescens, American Pipit

Parulidae – Wood-Warbler Family
Geothlypis trichas, Common Yellowthroat
Setophaga coronata, Yellow-rumped Warbler

Passerellidae – New World Sparrow Family
Chondestes grammacus, Lark Sparrow
Melospiza melodia, Song Sparrow
Melozone crissalis, California Towhee
Passerculus sandwichensis Savannah Sparrow
Zonotrichia leucophrys, White-crowned Sparrow

Passeridae – Old World Sparrow Family
* *Passer domesticus*, House Sparrow

Phalacrocoracidae – Cormorant Family
Phalacrocorax auratus, Double-crested Cormorant

Picidae – Woodpecker Family
Colaptes auratus, Northern Flicker

Polioptilidae – Gnatcatcher Family
Polioptila caerulea, Blue-gray Gnatcatcher

Rallidae – Rail Family
Fulica americana, American Coot

Recurvirostridae – Stilts and Avocets
Himantopus mexicanus, Black-necked Stilt

Scolopacidae – Sandpiper Family
Calidris mauri, Western Sandpiper
Calidris minutilla, Least Sandpiper
Gallinago delicata, Wilson’s Snipe
Tringa flavipes, Lesser Yellowlegs
Tringa melanoleuca, Greater Yellowlegs
Tringa semipalmata, Willet

Strigidae – True Owl Family
Athene cunicilaria, Burrowing Owl

Sturnidae – Starling Family
* *Sturnus vulgaris*, European Starling

Threskiornithidae – Ibis and Spoonbill Family
Plegadis chihi, White-faced Ibis

Trochilidae – Hummingbird Family
Calypte anna, Anna's Hummingbird
Selasphorus rufus, Rufous Hummingbird

Troglodytidae – Wren Family
Troglodytes aedon, House Wren

Tyrannidae – Tyrant Flycatcher Family
Sayornis nigricans, Black Phoebe
Sayornis saya, Say's Phoebe
Tyrannus verticalis, Western Kingbird
Tyrannus vociferans, Cassin's Kingbird

MAMMALS

Canidae – Canid Family
Canis latrans, Coyote

Geomyidae – Pocket Gopher Family
Thomomys bottae, Botta's Pocket Gopher

Leporidae – Hare and Rabbit Family
Sylvilagus audubonii, Desert Cottontail

Procyonidae – Raccoon and Allies Family
Procyon lotor, Common Raccoon

Sciuridae – Squirrel Family
Otospermophilus beecheyi, California Ground Squirrel

September 25, 2019

John Burroughs
Commerce Construction Company, L.P.
13191 Crossroads Parkway North
Sixth Floor
City of Industry, California 91746

SUBJECT: Jurisdictional Delineation of the Majestic Chino Heritage Project and Five Borrow Sites, a Total of Approximately 300.54-Acres of Property Located in the City of Chino, San Bernardino County, California.

Dear Mr. Burroughs:

This letter report summarizes our preliminary findings of U.S. Army Corps of Engineers (Corps), Santa Ana Regional Water Quality Control Board (Regional Board), and California Department of Fish and Wildlife (CDFW) jurisdiction for the above-referenced property.[1]

Project Location

The Majestic Chino Heritage Development Project (Project) totals approximately 96.91 acres and is located at latitude 33.957541 and longitude -117.662515 in the City of Chino, San Bernardino County, California [Exhibit 1] within an unsectioned area and Section 31, Township 2 South, and Range 7 West, and Section 36, Township 2 South, and Range 8 West of the U.S. Geological Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. The Project site is bordered by Bickmore Avenue to the north, the El Prado Golf Course to the south, Cypress Channel to the east, and Mountain Avenue to the west.

[1] This report presents our best effort at estimating the subject jurisdictional boundaries using the most up-to-date regulations and written policy and guidance from the regulatory agencies. Only the regulatory agencies can make a final determination of jurisdictional boundaries. If a final jurisdictional determination is required, GLA can assist in getting written confirmation of jurisdictional boundaries from the agencies.

The Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site totals approximately 2.98 acres and is located at latitude 33.954018 and longitude 659439 in the City of Chino, San Bernardino County, California [Exhibit 1] within an unsectioned area of Township 2 South and Range 7 West of the U.S. Geological Survey (USGS) 7.5” quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. This area is bordered by the Project to the north, the El Prado Golf Course to the south and west, and the Cypress Channel to the east.

Borrow Site One (Borrow 1) totals approximately 43.67 acres and is located at latitude 33.952213 and longitude -117.648256 in the City of Chino, San Bernardino County, California [Exhibit 1] within an unsectioned area of Township 2 South and Range 7 West, of the U.S. Geological Survey (USGS) 7.5” quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 1 is bordered by Pine Avenue to the north, the Prado Regional Park to the south, Johnson Avenue to the east, and Euclid Avenue to the west.

Borrow Site Two (Borrow 2) totals approximately 38.51 acres and is located at latitude 33.952641 and longitude -117.644448 in the City of Chino, San Bernardino County, California [Exhibit 1] within an unsectioned area of Township 2 South and Range 7 West, of the U.S. Geological Survey (USGS) 7.5” quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 2 is bordered by Pine Avenue to the north, the Prado Regional Park and the Prado Equestrian Center to the south, the California Institute for Women to the east, and Johnson Avenue to the west.

Borrow Site Three (Borrow 3) totals approximately 84.25 acres and is located at latitude 33.941462 and longitude -117.635815 in the City of Chino, San Bernardino County, California [Exhibit 1] within Section 5, Township 3 South, and Range 7 West, of the U.S. Geological Survey (USGS) 7.5” quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 3 is bordered by the California Institute for Women to the north, the Prado Basin to the south and west, and Cucamonga Avenue to the east.

Borrow Site Four (Borrow 4) totals approximately 12.94 acres and is located at latitude 33.945011 and longitude -117.622304 in the City of Chino, San Bernardino County, California [Exhibit 1] within Section 4, Township 3 South, and Range 7 West of the U.S. Geological Survey (USGS) 7.5” quadrangle map Corona North (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 4 is bordered by Chino-Corona Road to the north, the Mill Creek Wetlands to the south and east, and Comet Avenue to the west.

Borrow Site Five (Borrow 5) totals approximately 21.28 acres and is located at latitude 33.949712 and longitude -117.613437 in the City of Chino, San Bernardino County, California [Exhibit 1] within Section 33, Township 2 South, and Range 7 West, of the U.S. Geological Survey (USGS) 7.5” quadrangle map Corona North (dated 1967 and photorevised in 1981)

[Exhibit 2 – Vicinity Map]. Borrow 5 is bordered by undeveloped land to the north and south, Hellman Avenue to the east, and Chino-Corona Road to the west.

The Project also may be conditioned with a request for the Project applicant to use good faith efforts to acquire right-of-way for a proposed realignment of Mountain Avenue from the southwest Project boundary to El Prado Road. The Project will not be conditioned to construct such realigned road. The approximate location for this proposed road improvement is latitude 33.954357 and longitude -117.667229.

Jurisdictional Delineation

In March, April, and May 2019, regulatory specialists of Glenn Lukos Associates, Inc. (GLA) examined the Project site and borrow areas to determine the limits of (1) Corps jurisdiction pursuant to Section 404 of the Clean Water Act (CWA), (2) Regional Board jurisdiction pursuant to Section 401 of the CWA and Section 13260 of the California Water Code (CWC) [the Porter-Cologne Water Quality Act (Porter-Cologne)], and (3) CDFW jurisdiction pursuant to Division 2, Chapter 6, Sections 1600-1617 of the California Fish and Game Code.

Enclosed are aerial maps [Exhibit 3] that depict the Project Site, the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site, and the Borrow Areas and exhibits that depict the areas of potential Corps/Regional Board (Exhibit 4A) and CDFW jurisdiction (Exhibits 4B). Photographs to document the topography, vegetative communities, and general widths of each of the waters are provided as Exhibit 5 and maps depicting the soils are included as Exhibit 6, Sheets 1 through 6.

Corps jurisdiction associated with the Study Area is 6.04 acres, of which 4.59 acres consists of jurisdictional wetlands. A total of 4,172 linear feet of streambed is present.

Regional Board jurisdiction associated with the Study Area is 6.31 acres, of which 4.59 acres consists of jurisdictional wetlands. A total of 6,538 linear feet of streambed is present.

CDFW jurisdiction associated with the Study Area totals 7.40 acres, of which 4.62 acres consists of riparian habitat and 2.78 acres consist of non-riparian streambed. A total of 6,538 linear feet of streambed is present.

Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site

Corps and Regional Board jurisdiction associated with the Off Site Storm Drain Improvement Area Adjacent to the Project Site totals 1.45 acres, none of which consists of jurisdictional wetlands. A total of 2,527 linear feet of streambed is present associated with the Cypress Channel, a concrete-sided and concrete-bottomed drainage.

CDFW jurisdiction within the Off Site Storm Drain Improvement Area Adjacent to the Project Site totals 2.32 acres, all of which consists of non-riparian streambed within the Cypress Channel, a concrete-sided and concrete-bottomed drainage. A total of 2,527 linear feet of streambed is present.

Borrow Site 1

Corps and Regional Board jurisdiction associated with Borrow 1 totals 4.59 acres, all of which consists of jurisdictional wetlands. A total of 1,645 linear feet of streambed is present associated with Drainage 1.

CDFW jurisdiction within Borrow 1 totals 4.81 acres, of which 4.62 acres consists of riparian habitat and 0.19 acre consists of non-riparian streambed. A total of 1,645 linear feet of streambed is present associated with Drainage 1.

Borrow Site 2

There is no Corps jurisdiction associated with Borrow 2 as the only drainage feature present is a roadside ditch which would not be regulated by the Corps under the Clean Water Rule (CWR) at 33 CFR 328.3(b)(3)(i).

Regional Board jurisdiction associated with Borrow 2 totals 0.27 acre, none of which consists of jurisdictional wetlands. A total of 2,366 linear feet of streambed is present associated with Ditch 1, which is a roadside ditch located along the western boundary of Borrow Site 2 and adjacent to Johnson Avenue.

CDFW jurisdiction within Borrow 2 totals 0.27 acre, all of which consists of non-riparian streambed associated with Ditch 1. A total of 2,366 linear feet of streambed is present associated with Drainage 1.

Borrow Site 3

There is no Corps, CDFW, or Regional Board jurisdiction associated with Borrow 3.

Borrow Site 4

There is no Corps, CDFW, or Regional Board jurisdiction associated with Borrow 4.

Borrow Site 5

There is no Corps, CDFW, or Regional Board jurisdiction associated with Borrow 5.

I. METHODOLOGY

Prior to beginning the field delineation, a color aerial photograph, a topographic base map of the property, and the previously cited USGS topographic map were examined to determine the locations of potential areas of Corps/Regional Board/CDFW jurisdiction. Suspected jurisdictional areas were field checked for the presence of definable channels and/or wetland vegetation, soils and hydrology. Suspected wetland habitats on the site were evaluated using the methodology set forth in the U.S. Army Corps of Engineers 1987 Wetland Delineation Manual[2] (Wetland Manual) and the 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Supplement (Arid West Supplement)[3]. While in the field the limits of Corps/Regional Board/CDFW jurisdiction were recorded onto a color aerial photograph using visible landmarks and/or sub-meter accuracy global positioning system devices.

The Soil Conservation Service (SCS)[4] has mapped the following soil type as occurring in the general vicinity of the project site and borrow areas:

Project Site

Chino Silt Loam (Cb)

The Chino series consists of somewhat poorly drained, nearly level soils. These soils formed on flood plains and in basins in moderately fine textured alluvium. Slopes are zero to two percent and elevations range from 700 to 750 feet. Vegetation consists of annual grasses and forbs.

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[2] Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1, U.S. Army Engineer Waterways Experimental Station, Vicksburg, Mississippi.

[3] U.S. Army Corps of Engineers. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

[4] SCS is now known as the National Resource Conservation Service or NRCS.

In a typical surface layer, soils are gray silt loam about 16 inches thick. The underlying material is gray light silty clay loam and silty clay loam that extends to a depth of 60 inches or more. Chino soils are moderately alkaline and strongly calcareous throughout.

These soils are used for irrigated alfalfa, grains, corn silage, and pasture plants. Small areas are used for homesites and related uses.

Chualar clay loam, 0 to 2 Percent Slopes (CkA), Chualar clay loam, 2 to 9 Percent Slopes (CkC)

The Chualar series consists of well-drained soils. These soils are formed on alluvial fans and terraces in mixed, moderately fine textured alluvium. The vegetation commonly associated with Chualar soils includes annual grasses and forbs. Chualar soils are used for irrigated small grains, pasture plants, alfalfa, and silage. Some areas are used for dry farmed small grains and pasture plants.

Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site

Chualar clay loam, 0 to 2 Percent Slopes (CkA), Chualar clay loam, 2 to 9 Percent Slopes (CkC), and Chualar clay loam, 9 to 15 Percent Slopes (CkD

The Chualar series consists of well-drained soils. These soils are formed on alluvial fans and terraces in mixed, moderately fine textured alluvium. The vegetation commonly associated with Chualar soils includes annual grasses and forbs. Chualar soils are used for irrigated small grains, pasture plants, alfalfa, and silage. Some areas are used for dry farmed small grains and pasture plants.

Grangeville fine sandy loam (Gr)

The Grangeville series consists of somewhat poorly drained soils. These soils are formed on slopes of alluvial fans in moderately coarse textured granitic alluvium. The vegetation commonly associated with Grangeville soils includes annual grasses and forbs and scattered cottonwood trees. Grangeville soils are used for irrigated alfalfa, small grain and pasture plants.

Borrow Site 1

Chino Silt Loam (Cb)

The Chino series consists of somewhat poorly drained, nearly level soils. These soils formed on flood plains and in basins in moderately fine textured alluvium. Slopes are zero to two percent and elevations range from 700 to 750 feet. Vegetation consists of annual grasses and forbs.

In a typical surface layer, soils are gray silt loam about 16 inches thick. The underlying material is gray light silty clay loam and silty clay loam that extends to a depth of 60 inches or more. Chino soils are moderately alkaline and strongly calcareous throughout.

These soils are used for irrigated alfalfa, grains, corn silage, and pasture plants. Small areas are used for homesites and related uses.

Chualar clay loam, 2 to 9 Percent Slopes (CkC) and Chualar clay loam, 9 to 15 Percent Slopes (CkD)

The Chualar series consists of well-drained soils. These soils are formed on alluvial fans and terraces in mixed, moderately fine textured alluvium. The vegetation commonly associated with Chualar soils includes annual grasses and forbs. Chualar soils are used for irrigated small grains, pasture plants, alfalfa, and silage. Some areas are used for dry farmed small grains and pasture plants.

Grangeville fine sandy loam (Gr)

The Grangeville series consists of somewhat poorly drained soils. These soils are formed on slopes of alluvial fans in moderately coarse textured granitic alluvium. The vegetation commonly associated with Grangeville soils includes annual grasses and forbs and scattered cottonwood trees. Grangeville soils are used for irrigated alfalfa, small grain and pasture plants.

Borrow Site 2

Chino Silt Loam (Cb)

The Chino series consists of somewhat poorly drained, nearly level soils. These soils formed on flood plains and in basins in moderately fine textured alluvium. Slopes are zero to two percent and elevations range from 700 to 750 feet. Vegetation consists of annual grasses and forbs.

In a typical surface layer, soils are gray silt loam about 16 inches thick. The underlying material is gray light silty clay loam and silty clay loam that extends to a depth of 60 inches or more. Chino soils are moderately alkaline and strongly calcareous throughout.

These soils are used for irrigated alfalfa, grains, corn silage, and pasture plants. Small areas are used for homesites and related uses.

Borrow Site 3

Chualar clay loam, 0 to 2 Percent Slopes (CkA) and Chualar clay loam, 2 to 9 Percent Slopes (CkC)

The Chualar series consists of well-drained soils. These soils are formed on alluvial fans and terraces in mixed, moderately fine textured alluvium. The vegetation commonly associated with Chualar soils includes annual grasses and forbs. Chualar soils are used for irrigated small grains, pasture plants, alfalfa, and silage. Some areas are used for dry farmed small grains and pasture plants.

Borrow Site 4

Chualar clay loam, 0 to 2 Percent Slopes (CkA); Chualar clay loam, 2 to 9 Percent Slopes (CkC); and Chualar clay loam, 9 to 15 Percent Slopes (CkD)

The Chualar series consists of well-drained soils. These soils are formed on alluvial fans and terraces in mixed, moderately fine textured alluvium. The vegetation commonly associated with Chualar soils includes annual grasses and forbs. Chualar soils are used for irrigated small grains, pasture plants, alfalfa, and silage. Some areas are used for dry farmed small grains and pasture plants.

Borrow Site 5

Chino Silt Loam (Cb)

The Chino series consists of somewhat poorly drained, nearly level soils. These soils formed on flood plains and in basins in moderately fine textured alluvium. Slopes are zero to two percent and elevations range from 700 to 750 feet. Vegetation consists of annual grasses and forbs.

In a typical surface layer, soils are gray silt loam about 16 inches thick. The underlying material is gray light silty clay loam and silty clay loam that extends to a depth of 60 inches or more. Chino soils are moderately alkaline and strongly calcareous throughout.

These soils are used for irrigated alfalfa, grains, corn silage, and pasture plants. Small areas are used for homesites and related uses.

Chualar clay loam, 2 to 9 Percent Slopes (CkC)

The Chualar series consists of well-drained soils. These soils are formed on alluvial fans and terraces in mixed, moderately fine textured alluvium. The vegetation commonly associated with Chualar soils includes annual grasses and forbs. Chualar soils are used for irrigated small grains, pasture plants, alfalfa, and silage. Some areas are used for dry farmed small grains and pasture plants.

Grangeville fine sandy loam (Gr)

The Grangeville series consists of somewhat poorly drained soils. These soils are formed on slopes of alluvial fans in moderately coarse textured granitic alluvium. Slopes are typically zero to two percent. The vegetation commonly associated with Grangeville soils includes annual grasses and forbs and scattered cottonwood trees. Grangeville soils are used for irrigated alfalfa, small grain and pasture plants.

Hilmar Loamy Fine Sand (Hr)

The Hilmar series consists of somewhat poorly drained, nearly level soils on alluvial valley floors and fans. These soils formed on wind-laid, coarse-textured material underlain by medium-textured granitic alluvium. The vegetation commonly associated with this soil unit includes annual grasses and forbs. Hilmar soils are used for irrigated crops such as grapes, alfalfa, pasture plants, and small grains.

These soil units are not identified as hydric in the SCS's publication, Hydric Soils of the United States.[5] None of these soils are identified as hydric for the local Hydric Soils List of Southwestern San Bernardino County, however, inclusions of the Chino, Chualar, and Grangeville soil may be considered hydric for soils in the Aquic suborder, Aquic subgroups, Albolls suborder, Salorthids great group, Pell great groups of vertisols, Pachic subgroups, or Cumulic subgroups, which have a frequently occurring water table at less than 1.5 feet from the surface for a significant period (usually more than two weeks) during the growing season if permeability is less than 6.0 inches an hour in all layers within 20 inches and/or soils that are

[5] United States Department of Agriculture, Soil Conservation Service. 1991. Hydric Soils of the United States, 3rd Edition, Miscellaneous Publication Number 1491. (In cooperation with the National Technical Committee for Hydric Soils.)

frequently ponded for a long duration during the growing season. It would also be considered hydric under FSA items 1, 4, and/or 5 due to saturation, seasonally flooded or ponded areas, and/or areas farmed under natural conditions without removing woody vegetation or other manipulation.

It is important to note that under the Arid West Region Supplement, the presence of mapped hydric soils is no longer dispositive for the presence of hydric soils. Rather, the presence of hydric soils must now be confirmed in the field.

II. JURISDICTION

A. Army Corps of Engineers

Pursuant to Section 404 of the CWA, the Corps regulates the discharge of dredged and/or fill material into waters of the United States. The term "waters of the United States" is defined in Corps regulations at 33 CFR Part 328.3(a)[6] as:

(1) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
(2) All interstate waters, including interstate wetlands;
(3) The territorial seas;
(4) All impoundments of waters otherwise identified as waters of the United States under this section;
(5) All tributaries, as defined in paragraph (c)(3) of this section, of waters identified in paragraphs (a)(1) through (3) of this section;
(6) All waters adjacent to a water identified in paragraphs (a)(1) through (5) of this section, including wetlands, ponds, lakes, oxbows, impoundments, and similar waters;
(7) All waters in paragraphs (a)(7)(i) through (v) of this section where they are determined, on a case-specific basis, to have a significant nexus to a water identified in paragraphs (a)(1) through (3) of this section. The waters identified in each of paragraphs (a)(7)(i) through (v) of this section are similarly situated and shall be combined, for purposes of a significant nexus analysis, in the watershed that drains to the nearest water identified in paragraphs (a)(1) through (3) of this section. Waters identified in this paragraph shall not be combined with waters identified in paragraph

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[6] As revised by the Corps and EPA, "Clean Water Rule: Definition of 'Waters of the United States"; Final Rule," 80 Federal Register 124 (29 June, 2015), pp. 37054-37127, redacted October 9, 2015, enjoined and ordered by the U.S. District on August 16, 2018.

(a)(6) of this section when performing a significant nexus analysis. If waters identified in this paragraph are also an adjacent water under paragraph (a)(6), they are an adjacent water and no case-specific significant nexus analysis is required.

- *(i) Prairie potholes. Prairie potholes are a complex of glacially formed wetlands, usually occurring in depressions that lack permanent natural outlets, located in the upper Midwest.*
- *(ii) Carolina bays and Delmarva bays. Carolina bays and Delmarva bays are ponded, depressional wetlands that occur along the Atlantic coastal plain.*
- *(iii) Pocosins. Pocosins are evergreen shrub and tree dominated wetlands found predominantly along the Central Atlantic coastal plain.*
- *(iv) Western vernal pools. Western vernal pools are seasonal wetlands located in parts of California and associated with topographic depression, soils with poor drainage, mild, wet winters and hot, dry summers.*
- *(v) Texas coastal prairie wetlands. Texas coastal prairie wetlands are freshwater wetlands that occur as a mosaic of depressions, ridges, intermound flats, and mima mound wetlands located along the Texas Gulf Coast.*

(8) All waters located within the 100- year floodplain of a water identified in paragraphs (a)(1) through (3) of this section and all waters located within 4,000 feet of the high tide line or ordinary high water mark of a water identified in paragraphs (a)(1) through (5) of this section where they are determined on a case-specific basis to have a significant nexus to a water identified in paragraphs (a)(1) through (3) of this section. For waters determined to have a significant nexus, the entire water is a water of the United States if a portion is located within the 100-year floodplain of a water identified in paragraphs (a)(1) through (3) of this section or within 4,000 feet of the high tide line or ordinary high water mark. Waters identified in this paragraph shall not be combined with waters identified in paragraph (a)(6) of this section when performing a significant nexus analysis. If waters identified in this paragraph are also an adjacent water under paragraph (a)(6), they are an adjacent water and no case-specific significant nexus analysis is required.

In the absence of wetlands, the limits of Corps jurisdiction in non-tidal waters, such as intermittent streams, extend to the ordinary high-water mark (OHWM) which is defined at 33 CFR 328.3(e) as:

> *...that line on the shore established by the fluctuation of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.*

The term “wetlands” (a subset of “waters of the United States”) is defined at 33 CFR 328.3(b) as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support...a prevalence of vegetation typically adapted for life in saturated soil conditions." In 1987 the Corps published a manual to guide its field personnel in determining jurisdictional wetland boundaries. The methodology set forth in the 1987 Wetland Delineation Manual and the Arid West Supplement generally require that, in order to be considered a wetland, the vegetation, soils, and hydrology of an area exhibit at least minimal hydric characteristics. While the manual and Supplement provide great detail in methodology and allow for varying special conditions, a wetland should normally meet each of the following three criteria:

- more than 50 percent of the dominant plant species at the site must be typical of wetlands (i.e., rated as facultative or wetter in the National List of Plant Species that Occur in Wetlands[7]);
- soils must exhibit physical and/or chemical characteristics indicative of permanent or periodic saturation (e.g., a gleyed color, or mottles with a matrix of low chroma indicating a relatively consistent fluctuation between aerobic and anaerobic conditions); and
- Whereas the 1987 Manual requires that hydrologic characteristics indicate that the ground is saturated to within 12 inches of the surface for at least five percent of the growing season during a normal rainfall year, the Arid West Supplement does not include a quantitative criteria with the exception for areas with “problematic hydrophytic vegetation”, which require a minimum of 14 days of ponding to be considered a wetland.

B. <u>Regional Water Quality Control Board</u>

Section 401 of the CWA requires any applicant for a Section 404 permit to obtain certification from the State that the discharge (and the operation of the facility being constructed) will comply with the applicable effluent limitation and water quality standards. In California, this 401 certification is obtained from the Regional Board. The Corps, by law, cannot issue a Section 404 permit until a 401 certification is issued or waived.

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[7] Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. *The National Wetland Plant List*: 2016 wetland ratings. Phytoneuron 2016-30: 1-17. Published 28 April 2016. ISSN 2153 733X.

Subsequent to the SWANCC decision, the Chief Counsel for the State Water Resources Control Board issued a memorandum that addressed the effects of the SWANCC decision on the Section 401 Water Quality Certification Program.[8] The memorandum states:

> *California's right and duty to evaluate certification requests under section 401 is pendant to (or dependent upon) a valid application for a section 404 permit from the Corps, or another application for a federal license or permit. Thus, if the Corps determines that the water body in question is not subject to regulation under the COE's 404 program, for instance, no application for 401 certification will be required…*
>
> *The SWANCC decision does not affect the Porter Cologne authorities to regulate discharges to isolated, non-navigable waters of the states….*
>
> *Water Code section 13260 requires "any person discharging waste, or proposing to discharge waste, within any region that could affect the waters of the state to file a report of discharge (an application for waste discharge requirements)." (Water Code § 13260(a)(1) (emphasis added).) The term "waters of the state" is defined as "any surface water or groundwater, including saline waters, within the boundaries of the state." (Water Code § 13050(e).) The U.S. Supreme Court's ruling in SWANCC has no bearing on the Porter-Cologne definition. While all waters of the United States that are within the borders of California are also waters of the state, the converse is not true—waters of the United States is a subset of waters of the state. Thus, since Porter-Cologne was enacted California always had and retains authority to regulate discharges of waste into any waters of the state, regardless of whether the COE has concurrent jurisdiction under section 404. The fact that often Regional Boards opted to regulate discharges to, e.g., vernal pools, through the 401 program in lieu of or in addition to issuing waste discharge requirements (or waivers thereof) does not preclude the regions from issuing WDRs (or waivers of WDRs) in the absence of a request for 401 certification….*

In this memorandum, the SWRCB's Chief Counsel has made the clear assumption that fill material to be discharged into isolated waters of the United States is to be considered equivalent to "waste" and therefore subject to the authority of the Porter Cologne Water Quality Act.[9]

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[8] Wilson, Craig M. January 25, 2001. Memorandum addressed to State Board Members and Regional Board Executive Officers.

[9] On June 17, 2016, the SWRCB issued a draft "Procedures for Discharges of Dredged or Fill Materials to Waters of the State" which provides definitions for wetlands, procedures for jurisdictional delineations, and procedures for obtaining permits for impacts to waters of the State.

C. <u>California Department of Fish and Wildlife</u>

Pursuant to Division 2, Chapter 6, Sections 1600-1617 of the California Fish and Game Code, the CDFW regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake, which supports fish or wildlife.

CDFW defines a stream (including creeks and rivers) as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation." CDFW's definition of "lake" includes "natural lakes or man-made reservoirs." CDFW also defines a stream as “a body of water that flows, or has flowed, over a given course during the historic hydrologic regime, and where the width of its course can reasonably be identified by physical or biological indicators.”

It is important to note that the Fish and Game Code defines fish and wildlife to include: all wild animals, birds, plants, fish, amphibians, invertebrates, reptiles, and related ecological communities including the habitat upon which they depend for continued viability (FGC Division 5, Chapter 1, section 45 and Division 2, Chapter 1 section 711.2(a) respectively). Furthermore, Division 2, Chapter 5, Article 6, Section 1600 et seq. of the California Fish and Game Code does not limit jurisdiction to areas defined by specific flow events, seasonal changes in water flow, or presence/absence of vegetation types or communities.

III. RESULTS

A. <u>Corps Jurisdiction</u>

Corps jurisdiction associated with the Study Area totals 6.04 acres, of which 4.59 acres consists of jurisdictional wetlands. A total of 4,172 linear feet of streambed is present.

Corps jurisdiction within the Study Area is limited to the Cypress Channel, a concrete-sided and concrete-bottomed flood control channel located just east of the easterly boundary of the Project Site, and Drainage 1, an unnamed tributary located within Borrow Site 1 near the intersection of Pine Avenue and Euclid Avenue.

There are no Corps jurisdictional waters located within Borrow Sites 2, 3, 4, or 5. Exhibit 4A depicts the limits of Corps jurisdiction within the Project Site and Borrow Areas.

Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site

The Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site totals approximately 2.98 acres and is located at latitude 33.954018 and longitude 659439 in the City of Chino, San Bernardino County, California [Exhibit 1] within an unsectioned area of Township 2 South and Range 7 West of the U.S. Geological Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. This area is bordered by the Project to the north, the El Prado Golf Course to the south and west, and the Cypress Channel to the east.

Corps jurisdiction associated with the Cypress Channel totals 1.45 acres, none of which consist of jurisdictional wetlands. A total of 2,527 linear feet of Corps streambed is present. The Cypress Channel is an ephemeral, concrete-sided and concrete-bottomed flood control channel located just east of the easterly boundary of the Project Site. The Cypress Channel enters the Study Area at Bickmore Avenue located northeast of the Project Site and flows in a north to south direction for 2,527 linear feet before leaving the Study Area and continuing to flow southerly into the Prado Basin.

Under 33 CFR Section 328.3(b)(1), the CWR of 2015 does not consider waste treatment ponds as Waters of the United States. 33 CFR Section 328.3(b) states as follows:

The following are not waters of the United States even where they otherwise meet the terms of paragraphs (a)(4) through (8) of this section.

(1) *Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the Clean Water Act.*
(2) *Prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA.*

(3) *The following ditches:*

> ***(i)*** *Ditches with ephemeral flow that are not a relocated tributary or excavated in a tributary.*
> ***(ii)*** *Ditches with intermittent flow that are not a relocated tributary, excavated in a tributary, or drain wetlands.*
> ***(iii)*** *Ditches that do not flow, either directly or through another water, into a water identified in paragraphs (a)(1) through (3) of this section.*

(4) *The following features:*

> ***(i)*** *Artificially irrigated areas that would revert to dry land should application of water to that area cease;*
> ***(ii)*** *Artificial, constructed lakes and ponds created in dry land such as farm and stock watering ponds, irrigation ponds, settling basins, fields flooded for rice growing, log cleaning ponds, or cooling ponds;*
> ***(iii)*** *Artificial reflecting pools or swimming pools created in dry land;*
> ***(iv)*** *Small ornamental waters created in dry land;*
> ***(v)*** *Water-filled depressions created in dry land incidental to mining or construction activity, including pits excavated for obtaining fill, sand, or gravel that fill with water;*
> ***(vi)*** *Erosional features, including gullies, rills, and other ephemeral features that do not meet the definition of tributary, non-wetland swales, and lawfully constructed grassed waterways; and*
> ***(vii)*** *Puddles.*

(5) *Groundwater, including groundwater drained through subsurface drainage systems.*

(6) *Stormwater control features constructed to convey, treat, or store stormwater that are created in dry land.*

(7) *Wastewater recycling structures constructed in dry land; detention and retention basins built for wastewater recycling; groundwater recharge basins; percolation ponds built for wastewater recycling; and water distributary structures built for wastewater recycling.*

The OHWM within the Cypress Channel ranges from approximately 20-25 feet wide. No vegetation is present within the Cypress Channel as this feature is a concrete-sided and concrete-bottomed flood control channel.

Vegetation within the Project Site consists of Aleppo pine (*Pinus halepensis*), ash (*Fraxinus* sp), Bermuda grass (*Cynodon dactylon*), black willow (*Salix gooddingii*), blue elderberry (*Sambucus nigra* ssp. *caerulea*), chaparral yucca (*Hesperoyucca whipplei*), cheeseweed mallow (*Malva parviflora*), clover (*Trifolium* sp), common dandelion (*Taraxacum officinale*), common fiddleneck (*Amsinckia intermedia*), common Mediterranean grass (*Schismus barbatus*), common sunflower (*Helianthus annuus*), curly dock (*Rumex crispus*), desert brittlebush (*Encelia farinosa*), dwarf nettle (*Urtica urens*), field bindweed (*Convolvulus arvensis*), foxtail barley (*Hordeum murinum*), golden crownbeard (*Verbesina enceliodes*), lamb's quarters (*Chenopodium album*), London rocket (*Sisymbrium irio*), Mexican fan palm (*Washingtonia robusta*), milk thistle (*Silybum marianum*), millet (*Eleusine* sp.), mission cactus (*Opuntia ficus-indica*), Peruvian pepper tree (*Schinus molle*), prostrate knotweed (*Polygonum aviculare*), red brome (*Bromus madritensis*), red stemmed filaree (*Erodium cicutarium*), Russian thistle (*Salsola tragus*), salt cedar (*Tamarix ramosissima*), silver puffs (*Uropappus lindleyi*), southern cattail (*Typha domingensis*), spiny sowthistle (*Sonchus asper*), summer mustard (*Hirschfeldia incana*), tree tobacco (*Nicotiana glauca*), western ragweed (*Ambrosia psilostachya*), and white horehound (*Marrubium vulgare*).

The riparian trees/shrubs identified in this report include salt cedar (*Tamarix ramosissima*), mulefat (*Baccharis salicifolia*), and black willow (*Salix gooddingii*), which are all located within the non-jurisdictional waste treatment ponds constructed within the Project Site.

Exhibit 4A depicts the limits of Corps jurisdiction within the Cypress Channel.

<u>Borrow Site 1</u>

Borrow Site One (Borrow 1) totals approximately 43.67 acres and is located at latitude 33.952213 and longitude -117.648256 in the City of Chino, San Bernardino County, California [Exhibit 1] within an unsectioned area of Township 2 South and Range 7 West, of the U.S. Geological Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 1 is bordered by Pine Avenue to the north, the Prado Regional Park to the south, Johnson Avenue to the east, and Euclid Avenue to the west.

Borrow 1 previously supported a combination of a dairy operation, which was recently abandoned, and a residence.

Corps jurisdiction associated with Borrow 1 is limited to Drainage 1, an unnamed intermittent tributary located near the intersection of Pine Avenue and Euclid Avenue. Corps jurisdiction associated with Drainage 1 totals 4.59 acres, all of which consist of jurisdictional wetlands. A total of 1,645 linear feet of Corps streambed is present.

Drainage 1 enters Borrow 1 from a culvert and pipe beneath Pine Avenue near its intersection with Euclid Avenue. The drainage flows in a north to south direction for 1,645 linear feet before leaving Borrow 1 and entering the Prado Basin. Ultimately, flows from Drainage 1enter the lakes located at the El Prado Golf Course before flowing into Prado Basin.

Drainage 1 is contained in a channel with a defined bed and bank, which appears to be relatively uniform in width. The OHWM within Drainage 1 ranges from 10 to 16 feet in width and is all wetland.

Vegetation within Drainage 1 consists of black willow (*Salix gooddingii*), blue elderberry (*Sambucus nigra* ssp. *caerulea*), cheeseweed mallow (*Malva parviflora*), common Mediterranean grass (*Schismus barbatus*), common sunflower (*Helianthus annuus*), curly dock (*Rumex crispus*), salt cedar (*Tamarix ramosissima*), southern cattail (*Typha domingensis*), wild radish (*Raphanus raphanistrum*), prostrate knotweed (*Polygonum aviculare*), duckweed (*Lemna sp*.), and Yerba mansa (*Anemopsis californica*).

Drainage 1 was considered a wetland based on its existing condition of flowing water (hydrology), the presence of dominant hydrophytic vegetation, and hydric soils.
There is also an adjacent wetland next to Drainage 1. This adjacent wetland has been significantly disturbed by past clearing and maintenance operations. Currently, the area is dominated by Bermuda grass; however, it also supports southern cattail (*Typha domingensis*), salt grass (*Distichlis spicata*), salt marsh sand spurry (*Spergularia marina*), pepperweed (*Lepidium latifolium*), and stinging nettle (*Urtica dioica*). Data Point 2 documents the vegetation within the data point area as well as the presence of wetland hydrology and hydric soils. This adjacent wetland also supports surface water, contains soil cracks, ponding, and discoloration of the soil surface typical of an anaerobic and wetland condition.
Due to the amount of disturbance (vegetation maintenance) in this adjacent wetland area, it is considered a problematic situation under the Corps' Arid West Supplement and would meet the criteria for a jurisdictional wetland due to the presence of hydric soils and wetland hydrology, absent the presence of hydrophytic vegetation[10].

Borrow Site 2

Borrow Site Two (Borrow 2) totals approximately 38.51 acres and is located at latitude 33.952641 and longitude -117.644448 in the City of Chino, San Bernardino County, California [Exhibit 1] within an unsectioned area of Township 2 South and Range 7 West, of the U.S. Geological Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 2 is bordered by Pine Avenue to the north, the Prado Regional Park and the Prado Equestrian Center to the south, the California Institute for Women to the east, and Johnson Avenue to the west.

There is no Corps jurisdiction associated with Borrow 2. Borrow 2 previously supported a dairy operation which was recently abandoned, and approximately three waste treatment ponds remaining from that dairy operation.

Vegetation within Borrow Site 2 consists of Chinese parsley (*Heliotropium curassavicum*), telegraph weed (*Heterotheca grandiflora*), Russian thistle (*Salsola tragus*), spiny sow thistle (*Sonchus asper*), nettle leaf goosefoot (*Chenopodium murale*), cheese weed mallow (*Malva parviflora*), Italian rye grass (*Festuca perennis*), poison hemlock (*Conium maculatum*), prickly lettuce (*Lactuca serriola*), London rocket (*Sisymbrium irio*), flax-leaved horseweed (*Erigeron bonariensis*), Bermuda grass (*Cynodon dactylon*), bull thistle (*Cirsium vulgare*), bristly ox-tongue (*Helminthotheca echioides*), prostrate knotweed (*Polygonum aviculare*), shamel ash

[10] U.S. Army Corps of Engineers. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

(*Fraxinus* uhdei), field bindweed (*Convolvulus arvensis*), curly dock (*Rumex crispus*), sweet clover (*Melilotus sp.*), and Asian ponyfoot (*Dichondra micrantha*).

Under 33 CFR Section 328.3(b)(1), the CWR does not consider waste treatment ponds as Waters of the United States. 33 CFR Section 328.3(b) states as follows:

The following are not waters of the United States even where they otherwise meet the terms of paragraphs (a)(4) through (8) of this section.
(1) *Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the Clean Water Act.*

(2) *Prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA.*

(3) *The following ditches:*

> ***(i)*** *Ditches with ephemeral flow that are not a relocated tributary or excavated in a tributary.*
> ***(ii)*** *Ditches with intermittent flow that are not a relocated tributary, excavated in a tributary, or drain wetlands.*
> ***(iii)*** *Ditches that do not flow, either directly or through another water, into a water identified in paragraphs (a)(1) through (3) of this section.*

(4) *The following features:*

> ***(i)*** *Artificially irrigated areas that would revert to dry land should application of water to that area cease;*
> ***(ii)*** *Artificial, constructed lakes and ponds created in dry land such as farm and stock watering ponds, irrigation ponds, settling basins, fields flooded for rice growing, log cleaning ponds, or cooling ponds;*
> ***(iii)*** *Artificial reflecting pools or swimming pools created in dry land;*
> ***(iv)*** *Small ornamental waters created in dry land;*
> ***(v)*** *Water-filled depressions created in dry land incidental to mining or construction activity, including pits excavated for obtaining fill, sand, or gravel that fill with water;*
> ***(vi)*** *Erosional features, including gullies, rills, and other ephemeral features that do not meet the definition of tributary, non-wetland swales, and lawfully constructed grassed waterways; and*
> ***(vii)*** *Puddles.*

(5) *Groundwater, including groundwater drained through subsurface drainage systems.*

(6) *Stormwater control features constructed to convey, treat, or store stormwater that are created in dry land.*

(7) *Wastewater recycling structures constructed in dry land; detention and retention basins built for wastewater recycling; groundwater recharge basins; percolation ponds built for wastewater recycling; and water distributary structures built for wastewater recycling.*

Borrow 2 also contains an ephemeral roadside ditch constructed in the uplands. Under the CWR, at 33 CFR 328.3(b)(3)(i), roadside ditches with ephemeral flow that are not a relocated tributary or excavated in a tributary would be considered non-jurisdictional.

Section 33 CFR 328.3(b) states as follows:

The following are not waters of the United States even where they otherwise meet the terms of paragraphs (a)(4) through (8) of this section.

(1) *Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the Clean Water Act.*

(2) *Prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA.*

(3) *The following ditches:*

> ***(i)*** *Ditches with ephemeral flow that are not a relocated <u>tributary</u> or excavated in a <u>tributary</u>.*
> ***(ii)*** *Ditches with intermittent flow that are not a relocated <u>tributary</u>, excavated in a <u>tributary</u>, or drain <u>wetlands</u>.*
> ***(iii)*** *Ditches that do not flow, either directly or through another water, into a water identified in paragraphs (a)(1) through (3) of this section….*

As noted above, this ditch would be considered non-jurisdictional under the CWR or the CWA.

<u>Borrow Site 3</u>

Borrow Site Three (Borrow 3) totals approximately 84.25 acres and is located at latitude 33.941462 and longitude -117.635815 in the City of Chino, San Bernardino County, California [Exhibit 1] within Section 5, Township 3 South, and Range 7 West, of the U.S. Geological

Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 3 is bordered by the California Institute for Women to the north, the Prado Basin to the south and west, and Cucamonga Avenue to the east.

There is no Corps jurisdiction associated with Borrow 3. Borrow 3 previously supported a dairy operation which was recently abandoned, and several waste treatment ponds remaining from that dairy operation.

Vegetation within Borrow 3 includes Mexican fireweed (*Bassia scoparia*), five-hook bassia (*Bassia hyssopifolia*), prickly lettuce (*Lactuca serriola*), Russian thistle (*Salsola tragus*), soft chess (*Bromus tectorum*), wild oat (*Avena fatua*), goldentop grass (*Lamarkia aurea*), sunflower (*Heliantus annuus*), cheeseweed mallow (*Malva parviflora*), coyote brush (*Baccharis pilularis*), London rocket (*Sisymbrium irio*), Italian thistle (*Carduus* sp.), Bermuda grass (*Cynodon dactylon*), tumbleweed (*Amaranthus albus*), prickly sow-thistle (*Sonchus asper*), rabbitfoot grass (*Polypogon monspeliensis*), common knotgrass (*Polygonum aviculare*), Australian saltbush (*Atriplex semibaccata*), big saltbush (*Atriplex lentiformis*), purple needlegrass (*Stipa pulchra*), salt heliotrope (*Heliotropium curassavicum*), Italian rye grass (*Festuca perennis*), wall barley (*Hordeum marinum*), pigweed (*Chenopodium album*), London rocket (*Sysimbrium irio*), Mediterranean grass (Schismus barbatus), perennial pepperweed (*Lepidium latifolium*), milk thistle (*Silybum marianum*), golden crownbeard (*Verbesina encelioides*), and California brittlebrush (*Encilia californica*).

Under 33 CFR Section 328.3(b)(1), the CWR does not consider waste treatment ponds as Waters of the United States. 33 CFR Section 328.3(b) states as follows:

The following are not waters of the United States even where they otherwise meet the terms of paragraphs (a)(4) through (8) of this section.
(1) *Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the Clean Water Act.*

(2) *Prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA.*

(3) *The following ditches:*

> ***(i)*** *Ditches with ephemeral flow that are not a relocated <u>tributary</u> or excavated in a <u>tributary</u>.*
> ***(ii)*** *Ditches with intermittent flow that are not a relocated <u>tributary</u>, excavated in a <u>tributary</u>, or drain <u>wetlands</u>.*

(iii) *Ditches that do not flow, either directly or through another water, into a water identified in paragraphs (a)(1) through (3) of this section.*

(4) *The following features:*
(i) *Artificially irrigated areas that would revert to dry land should application of water to that area cease;*
(ii) *Artificial, constructed lakes and ponds created in dry land such as farm and stock watering ponds, irrigation ponds, settling basins, fields flooded for rice growing, log cleaning ponds, or cooling ponds;*
(iii) *Artificial reflecting pools or swimming pools created in dry land;*
(iv) *Small ornamental waters created in dry land;*
(v) *Water-filled depressions created in dry land incidental to mining or construction activity, including pits excavated for obtaining fill, sand, or gravel that fill with water;*
(vi) *Erosional features, including gullies, rills, and other ephemeral features that do not meet the definition of tributary, non-wetland swales, and lawfully constructed grassed waterways; and*
(vii) *Puddles.*

(5) *Groundwater, including groundwater drained through subsurface drainage systems.*

(6) *Stormwater control features constructed to convey, treat, or store stormwater that are created in dry land.*

(7) *Wastewater recycling structures constructed in dry land; detention and retention basins built for wastewater recycling; groundwater recharge basins; percolation ponds built for wastewater recycling; and water distributary structures built for wastewater recycling.*

Borrow Site 4

Borrow Site Four (Borrow 4) totals approximately 12.94 acres and is located at latitude 33.945011 and longitude -117.622304 in the City of Chino, San Bernardino County, California [Exhibit 1] within Section 4, Township 3 South, and Range 7 West of the U.S. Geological Survey (USGS) 7.5" quadrangle map Corona North (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 4 is bordered by Chino-Corona Road to the north, the Mill Creek Wetlands to the south and east, and Comet Avenue to the west.

There is no Corps jurisdiction associated with Borrow 4. Borrow 4 previously supported a dairy operation which was recently abandoned, but no jurisdictional waters were present on site. Borrow 4 is located adjacent to the Mill Creek Wetlands but as noted, does not support Corps jurisdictional waters.

Vegetation within Borrow Site 4 consists of coyote brush (*Baccharis pilularis*), coast goldenbush (*Isocoma menziesii*), common sunflower (*Helianthus annuus*), toyon (*Heteromeles arbutifolia*), lemonadeberry (*Rhus integrifolia*), creeping wild rye (*Elymus triticoides*), laurel sumac (*Malosma laurina*), deergrass (*Muhlenbergia rigens*), California sagebrush (*Artemisia californica*), Spanish lotus (*Acmispon americanus*), brittlebush (*Encelia farinosa*), mulefat (*Baccharis salicifolia*), saltgrass (*Distichlis spicata*), cheeseweed mallow (*Malva parviflora*), curly dock (*Rumex crispus*), Russian thistle (*Salsola tragus*), nettle leaf goosefoot (*Chenopodium murale*), London rocket (*Sisymbrium irio*), flax-leaved horseweed (*Erigeron bonariensis*), tumbleweed (*Amaranthus albus*), common red sage (*Kochia scoparia*), annual stinging nettle (*Urtica urens*), prickly lettuce (*Lactuca serriola*), Peruvian pepper tree (*Schinus molle*), Mexican fan palm (*Washingtonia robusta*), and Bermuda grass (*Cynodon dactylon*).

<u>Borrow Site 5</u>

Borrow Site Five (Borrow 5) totals approximately 21.28 acres and is located at latitude 33.949712 and longitude -117.613437 in the City of Chino, San Bernardino County, California [Exhibit 1] within Section 33, Township 2 South, and Range 7 West, of the U.S. Geological Survey (USGS) 7.5" quadrangle map Corona North (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 5 is bordered by undeveloped land to the north and south, Hellman Avenue to the east, and Chino-Corona Road to the west.

There is no Corps jurisdiction associated with Borrow 5.

Vegetation within Borrow Site 5 consists of common sunflower (*Helianthus annuus*), Russian thistle (*Salsola tragus*), common red sage (*Kochia scoparia*), spiny sow thistle (*Sonchus asper*), nettle leaf goosefoot (*Chenopodium murale*), cheeseweed mallow (*Malva parviflora*), foxtail barley (*Hordeum murinum*), prickly lettuce (*Lactuca serriola*), London rocket (*Sisymbrium irio*), milk thistle (*Silybum marianum*), flax-leaved horseweed (*Erigeron bonariensis*), Bermuda grass (*Cynodon dactylon*), and annual stinging nettle (*Urtica urens*). There is also one California sycamore (*Platanus racemosa*).

Borrow 5 previously supported a dairy operation which was recently abandoned, and approximately two to three waste treatment ponds remaining from that dairy operation. Under 33 CFR Section 328.3(b)(1), the CWR does not consider waste treatment ponds as Waters of the United States. 33 CFR Section 328.3(b) states as follows:

The following are not waters of the United States even where they otherwise meet the terms of paragraphs (a)(4) through (8) of this section.

***(1)** Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the Clean Water Act.*

***(2)** Prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA.*
***(3)** The following ditches:*

> ***(i)** Ditches with ephemeral flow that are not a relocated tributary or excavated in a tributary.*
> ***(ii)** Ditches with intermittent flow that are not a relocated tributary, excavated in a tributary, or drain wetlands.*
> ***(iii)** Ditches that do not flow, either directly or through another water, into a water identified in paragraphs (a)(1) through (3) of this section.*

***(4)** The following features:*
> ***(i)** Artificially irrigated areas that would revert to dry land should application of water to that area cease;*
> ***(ii)** Artificial, constructed lakes and ponds created in dry land such as farm and stock watering ponds, irrigation ponds, settling basins, fields flooded for rice growing, log cleaning ponds, or cooling ponds;*
> ***(iii)** Artificial reflecting pools or swimming pools created in dry land;*
> ***(iv)** Small ornamental waters created in dry land;*
> ***(v)** Water-filled depressions created in dry land incidental to mining or construction activity, including pits excavated for obtaining fill, sand, or gravel that fill with water;*
> ***(vi)** Erosional features, including gullies, rills, and other ephemeral features that do not meet the definition of tributary, non-wetland swales, and lawfully constructed grassed waterways; and*
> ***(vii)** Puddles.*

***(5)** Groundwater, including groundwater drained through subsurface drainage systems.*

***(6)** Stormwater control features constructed to convey, treat, or store stormwater that are created in dry land.*

***(7)** Wastewater recycling structures constructed in dry land; detention and retention basins built for wastewater recycling; groundwater recharge basins; percolation ponds built for wastewater recycling; and water distributary structures built for wastewater recycling.*

B. Regional Board Jurisdiction

Regional Board jurisdiction associated with the Study Area totals 6.31 acres, of which 4.59 acres consists of jurisdictional wetlands. A total of 6,538 linear feet of streambed is present. Regional Board jurisdiction within the Study Area is limited to the Cypress Channel, a concrete-sided and concrete-bottomed flood control channel located just east of the easterly boundary of the Project Site, Drainage 1, an unnamed tributary located within Borrow 1 near the intersection of Pine Avenue and Euclid Avenue, and Ditch 1, a roadside ditch constructed in the uplands adjacent to Johnson Avenue in Borrow 2.

There are no Regional Board jurisdictional waters located within Borrow Sites 3, 4, or 5. Exhibit 4A depicts the limits of Regional Board jurisdiction within the Project Site and Borrow Areas.

Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site

The Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site totals approximately 2.98 acres and is located at latitude 33.954018 and longitude 659439 in the City of Chino, San Bernardino County, California [Exhibit 1] within an unsectioned area of Township 2 South and Range 7 West of the U.S. Geological Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. This area is bordered by the Project to the north, the El Prado Golf Course to the south and west, and the Cypress Channel to the east.

Regional Board jurisdiction associated with the Cypress Channel totals 1.45 acres, none of which consist of jurisdictional wetlands. A total of 2,527 linear feet of streambed is present. The Cypress Channel is a concrete-sided and concrete-bottomed flood control channel located just east of the easterly boundary of the Project Site. The Cypress Channel enters the Study Area at Bickmore Avenue located northeast of the Project Site and flows in a north to south direction for 2,527 linear feet before leaving the Study Area and continuing to flow southerly into the Prado Basin.

The OHWM within the Cypress Channel ranges from approximately 20-25 feet wide. No vegetation is present within the Cypress Channel as this feature is a concrete-sided and concrete-bottomed flood control channel.

Vegetation within the Project Site consists of Aleppo pine (*Pinus halepensis*), ash (*Fraxinus* sp), Bermuda grass (*Cynodon dactylon*), black willow (*Salix gooddingii*), blue elderberry (*Sambucus nigra* ssp. *caerulea*), chaparral yucca (*Hesperoyucca whipplei*), cheeseweed mallow (*Malva parviflora*), clover (*Trifolium* sp), common dandelion (*Taraxacum officinale*), common fiddleneck (*Amsinckia intermedia*), common Mediterranean grass (*Schismus barbatus*), common sunflower (*Helianthus annuus*), curly dock (*Rumex crispus*), desert brittlebush (*Encelia farinosa*), dwarf nettle (*Urtica urens*), field bindweed (*Convolvulus arvensis*), foxtail barley (*Hordeum murinum*), golden crownbeard (*Verbesina enceliodes*), lamb's quarters (*Chenopodium album*), London rocket (*Sisymbrium irio*), Mexican fan palm (*Washingtonia robusta*), milk thistle (*Silybum marianum*), millet (*Eleusine* sp.), mission cactus (*Opuntia ficus-indica*), Peruvian pepper tree (*Schinus molle*), prostrate knotweed (*Polygonum aviculare*), red brome (*Bromus madritensis*), red stemmed filaree (*Erodium cicutarium*), Russian thistle (*Salsola tragus*), salt cedar (*Tamarix ramosissima*), silver puffs (*Uropappus lindleyi*), southern cattail (*Typha domingensis*), spiny sowthistle (*Sonchus asper*), summer mustard (*Hirschfeldia incana*), tree tobacco (*Nicotiana glauca*), western ragweed (*Ambrosia psilostachya*), and white horehound (*Marrubium vulgare*).

The riparian trees identified in this report include salt cedar (*Tamarix ramosissima*), mulefat (*Baccharis salicifolia*), and black willow (*Salix gooddingii*), which are all located within the non-jurisdictional waste treatment ponds constructed within the Project Site.

The Project Site previously supported a dairy operation which was recently abandoned, and several waste treatment ponds remaining from that dairy operation. None of these features would be subject to Regional Board jurisdiction as they do not support beneficial uses that would be regulated under the Regional Board's Basin Plan.

Exhibit 3 depicts the limits of Regional Board jurisdiction within the Cypress Channel.

<u>Borrow Site 1</u>

Borrow Site One (Borrow 1) totals approximately 43.67 acres and is located at latitude 33.952213 and longitude -117.648256 in the City of Chino, San Bernardino County, California [Exhibit 1] within an unsectioned area of Township 2 South and Range 7 West, of the U.S. Geological Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 1 is bordered by Pine Avenue to the north, the Prado Regional Park to the south, Johnson Avenue to the east, and Euclid Avenue to the west.

Borrow 1 previously supported a combination of a dairy operation, which was recently abandoned, and a residence.

Regional Board jurisdiction associated with Borrow 1 is limited to Drainage 1, an unnamed tributary located near the intersection of Pine Avenue and Euclid Avenue. Regional Board jurisdiction associated with Drainage 1 totals 4.59 acres, all of which consist of jurisdictional wetlands. A total of 1,645 linear feet of Regional Board streambed is present.

Drainage 1 enters Borrow 1 from a culvert and pipe beneath Pine Avenue near its intersection with Euclid Avenue. The drainage flows in a north to south direction for 1,645 linear feet before leaving Borrow 1 and entering the Prado Basin. Ultimately, flows from Drainage 1enter the lakes located at the El Prado Golf Course before flowing into Prado Basin.

Drainage 1 is contained in a channel with a defined bed and bank, which appears to be relatively uniform in width. The OHWM within Drainage 1 ranges from 10 to 16 feet in width and is all wetland.

Vegetation within Drainage 1 consists of black willow (*Salix gooddingii*), blue elderberry (*Sambucus nigra* ssp. *caerulea*), cheeseweed mallow (*Malva parviflora*), common Mediterranean grass (*Schismus barbatus*), common sunflower (*Helianthus annuus*), curly dock (*Rumex crispus*), salt cedar (*Tamarix ramosissima*), southern cattail (*Typha domingensis*), wild radish (*Raphanus raphanistrum*), prostrate knotweed (*Polygonum aviculare*), duckweed (*Lemna sp*.), and Yerba mansa (*Anemopsis californica*).

Drainage 1 was considered a wetland based on its existing condition of flowing water (hydrology), the presence of dominant hydrophytic vegetation, and hydric soils.
There is also an adjacent wetland next to Drainage 1. This adjacent wetland has been significantly disturbed by past clearing and maintenance operations. Currently, the area is dominated by Bermuda grass; however, it also supports southern cattail (*Typha domingensis*), salt grass (*Distichlis spicata*), salt marsh sand spurry (*Spergularia marina*), pepperweed (*Lepidium latifolium*), and stinging nettle (*Urtica dioica*). Data Point 2 documents the vegetation within the data point area as well as the presence of wetland hydrology and hydric soils. This adjacent wetland also supports surface water, contains soil cracks, ponding, and discoloration of the soil surface typical of an anaerobic and wetland condition.

Due to the amount of disturbance (vegetation maintenance) in this adjacent wetland area, it is considered a problematic situation under the Corps' Arid West Supplement and would meet the criteria for a jurisdictional wetland due to the presence of hydric soils and wetland hydrology, absent the presence of hydrophytic vegetation[11]. As such, this feature would be considered as Corps jurisdictional waters. Since the Drainage 1 adjacent wetland would be considered as Corps jurisdictional waters, it would also be considered as Regional Board jurisdiction.

[11] U.S. Army Corps of Engineers. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

Borrow Site 2

Borrow Site Two (Borrow 2) totals approximately 38.51 acres and is located at latitude 33.952641 and longitude -117.644448 in the City of Chino, San Bernardino County, California [Exhibit 1] within an unsectioned area of Township 2 South and Range 7 West, of the U.S. Geological Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 2 is bordered by Pine Avenue to the north, the Prado Regional Park and the Prado Equestrian Center to the south, the California Institute for Women to the east, and Johnson Avenue to the west.

Regional Board jurisdiction within Borrow 2 is limited to a roadside ditch along the western and northern edge of the borrow area. Regional Board jurisdiction associated with Ditch 1 totals 0.27 acre, none of which consist of jurisdictional wetlands. A total of 2,366 linear feet of streambed is present. Ditch 1 is a soft-bottomed ditch located parallel to Johnson Avenue along the western edge of the borrow area. Ditch 1 enters the Study Area at :Pine Avenue located and flows in a north to south or east to west direction for 2,366 linear feet before leaving the Study Area and continuing to flow southerly into the Prado Basin.

The OHWM within Ditch 1 is about five feet wide.

Vegetation within Borrow Site 2 consists of Chinese parsley (*Heliotropium curassavicum*), telegraph weed (*Heterotheca grandiflora*), Russian thistle (*Salsola tragus*), spiny sow thistle (*Sonchus asper*), nettle leaf goosefoot (*Chenopodium murale*), cheeseweed mallow (*Malva parviflora*), Italian rye grass (*Festuca perennis*), poison hemlock (*Conium maculatum*), prickly lettuce (*Lactuca serriola*), London rocket (*Sisymbrium irio*), flax-leaved horseweed (*Erigeron bonariensis*), Bermuda grass (*Cynodon dactylon*), bull thistle (*Cirsium vulgare*), bristly ox-tongue (*Helminthotheca echioides*), prostrate knotweed (*Polygonum aviculare*), shamel ash (*Fraxinus* uhdei), field bindweed (*Convolvulus arvensis*), curly dock (*Rumex crispus*), sweet clover (*Melilotus sp.*), and Asian ponyfoot (*Dichondra micrantha*).

Borrow 2 previously supported a dairy operation which was recently abandoned, and approximately three waste treatment ponds remaining from that dairy operation. None of these features would be subject to Regional Board jurisdiction as they do not support beneficial uses that would be regulated under the Regional Board's Basin Plan.

Borrow Site 3

Borrow Site Three (Borrow 3) totals approximately 84.25 acres and is located at latitude 33.941462 and longitude -117.635815 in the City of Chino, San Bernardino County, California [Exhibit 1] within Section 5, Township 3 South, and Range 7 West, of the U.S. Geological

Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 3 is bordered by the California Institute for Women to the north, the Prado Basin to the south and west, and Cucamonga Avenue to the east.

There is no Regional Board jurisdiction associated with Borrow 3.

Vegetation within Borrow 3 includes Mexican fireweed (*Bassia scoparia*), five-hook bassia (*Bassia hyssopifolia*), prickly lettuce (*Lactuca serriola*), Russian thistle (*Salsola tragus*), soft chess (*Bromus tectorum*), wild oat (*Avena fatua*), goldentop grass (*Lamarkia aurea*), sunflower (*Heliantus annuus*), cheeseweed mallow (*Malva parviflora*), coyote brush (*Baccharis pilularis*), London rocket (*Sisymbrium irio*), Italian thistle (*Carduus* sp.), Bermuda grass (*Cynodon dactylon*), tumbleweed (*Amaranthus albus*), prickly sow-thistle (*Sonchus asper*), rabbitfoot grass (*Polypogon monspeliensis*), common knotgrass (*Polygonum aviculare*), Australian saltbush (*Atriplex semibaccata*), big saltbush (*Atriplex lentiformis*), purple needlegrass (*Stipa pulchra*), salt heliotrope (*Heliotropium curassavicum*), Italian rye grass (*Festuca perennis*), wall barley (*Hordeum marinum*), pigweed (*Chenopodium album*), London rocket (Sysimbrium irio), Mediterranean grass (Schismus barbatus), perennial pepperweed (*Lepidium latifolium*), milk thistle (*Silybum marianum*), golden crownbeard (*Verbesina encelioides*), and California brittlebrush (*Encilia californica*).

Borrow 3 previously supported a dairy operation which was recently abandoned, and several waste treatment ponds remaining from that dairy operation. None of these features would be subject to Regional Board jurisdiction as they do not support beneficial uses that would be regulated under the Regional Board's Basin Plan.

Borrow Site 4

Borrow Site Four (Borrow 4) totals approximately 12.94 acres and is located at latitude 33.945011 and longitude -117.622304 in the City of Chino, San Bernardino County, California [Exhibit 1] within Section 4, Township 3 South, and Range 7 West of the U.S. Geological Survey (USGS) 7.5" quadrangle map Corona North (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 4 is bordered by Chino-Corona Road to the north, the Mill Creek Wetlands to the south and east, and Comet Avenue to the west.

There is no Regional Board jurisdiction associated with Borrow 4.

Vegetation within Borrow Site 4 consists of coyote brush (*Baccharis pilularis*), coast goldenbush (*Isocoma menziesii*), common sunflower (*Helianthus annuus*), toyon (*Heteromeles arbutifolia*), lemonadeberry (*Rhus integrifolia*), creeping wild rye (*Elymus triticoides*), laurel sumac (*Malosma laurina*), deergrass (*Muhlenbergia rigens*), California sagebrush (*Artemisia* *californica*), Spanish lotus (*Acmispon americanus*), brittlebush (*Encelia farinosa*), mulefat (*Baccharis salicifolia*), saltgrass (*Distichlis spicata*), cheeseweed mallow (*Malva parviflora*), curly dock (*Rumex crispus*), Russian thistle (*Salsola tragus*), nettle leaf goosefoot (*Chenopodium murale*), London rocket (*Sisymbrium irio*), flax-leaved horseweed (*Erigeron bonariensis*), tumbleweed (*Amaranthus albus*), common red sage (*Kochia scoparia*), annual stinging nettle (*Urtica urens*), prickly lettuce (*Lactuca serriola*), Peruvian pepper tree (*Schinus molle*), Mexican fan palm (*Washingtonia robusta*), and Bermuda grass (*Cynodon dactylon*).

Borrow 4 previously supported a dairy operation which was recently abandoned, but no jurisdictional waters were present on site. Borrow 4 is located adjacent to the Mill Creek Wetlands but as noted, does not support Regional Board jurisdictional waters.

<u>Borrow Site 5</u>

Borrow Site Five (Borrow 5) totals approximately 21.28 acres and is located at latitude 33.949712 and longitude -117.613437 in the City of Chino, San Bernardino County, California [Exhibit 1] within Section 33, Township 2 South, and Range 7 West, of the U.S. Geological Survey (USGS) 7.5" quadrangle map Corona North (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 5 is bordered by undeveloped land to the north and south, Hellman Avenue to the east, and Chino-Corona Road to the west.

There is no Regional Board jurisdiction associated with Borrow 5.

Vegetation within Borrow Site 5 consists of common sunflower (*Helianthus annuus*), Russian thistle (*Salsola tragus*), common red sage (*Kochia scoparia*), spiny sow thistle (*Sonchus asper*), nettle leaf goosefoot (*Chenopodium murale*), cheeseweed mallow (*Malva parviflora*), foxtail barley (*Hordeum murinum*), prickly lettuce (*Lactuca serriola*), London rocket (*Sisymbrium irio*), milk thistle (*Silybum marianum*), flax-leaved horseweed (*Erigeron bonariensis*), Bermuda grass (*Cynodon dactylon*), and annual stinging nettle (*Urtica urens*). There is also one California sycamore (*Platanus racemosa*).

Borrow 5 previously supported a dairy operation which was recently abandoned, and approximately two to three waste treatment ponds remaining from that dairy operation. None of these features would be subject to Regional Board jurisdiction as they do not support beneficial uses that would be regulated under the Regional Board's Basin Plan.

C. CDFW Jurisdiction

CDFW jurisdiction associated with the Study Area totals 7.40 acres, of which 4.62 acres consist of riparian habitat and 2.78 acres consist of non-riparian streambed. A total of 6,538 linear feet of streambed is present.

CDFW jurisdiction within the Study Area is limited to the Cypress Channel, a concrete-sided and concrete-bottomed flood control channel located just east of the easterly boundary of the Project Site, Drainage 1, an unnamed tributary located within Borrow 1 near the intersection of Pine Avenue and Euclid Avenue, and Ditch 1, a roadside ditch constructed in the uplands adjacent to Johnson Avenue in Borrow Site 2.

There is no CDFW jurisdiction located within Borrow Sites 3, 4, or 5. Exhibit 4B depicts the limits of CDFW jurisdiction within the Project Site and Borrow Areas.

<u>Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site</u>

The Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site totals approximately 2.98 acres and is located at latitude 33.954018 and longitude 659439 in the City of Chino, San Bernardino County, California [Exhibit 1] within an unsectioned area of Township 2 South and Range 7 West of the U.S. Geological Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. This area is bordered by the Project to the north, the El Prado Golf Course to the south and west, and the Cypress Channel to the east.

CDFW jurisdiction associated with the Cypress Channel totals 2.32 acres, all of which consist of non-riparian, concrete streambed. A total of 2,527 linear feet of streambed is present. The Cypress Channel is a concrete-sided and concrete-bottomed flood control channel located just east of the easterly boundary of the Project Site. The Cypress Channel enters the Study Area at Bickmore Avenue located northeast of the Project Site and flows in a north to south direction for 2,527 linear feet before leaving the Study Area and continuing to flow southerly into the Prado Basin.

The high-water mark (HWM) within the Cypress Channel ranges from approximately 40-45 feet wide. No vegetation is present within the Cypress Channel as this feature is a concrete-sided and concrete-bottomed flood control channel.

Vegetation within the Project Site consists of Aleppo pine (*Pinus halepensis*), ash (*Fraxinus* sp), Bermuda grass (*Cynodon dactylon*), black willow (*Salix gooddingii*), blue elderberry (*Sambucus nigra* ssp. *caerulea*), chaparral yucca (*Hesperoyucca whipplei*), cheeseweed mallow (*Malva *parviflora*), clover (*Trifolium* sp), common dandelion (*Taraxacum officinale*), common fiddleneck (*Amsinckia intermedia*), common Mediterranean grass (*Schismus barbatus*), common sunflower (*Helianthus annuus*), curly dock (*Rumex crispus*), desert brittlebush (*Encelia farinosa*), dwarf nettle (*Urtica urens*), field bindweed (*Convolvulus arvensis*), foxtail barley (*Hordeum murinum*), golden crownbeard (*Verbesina enceliodes*), lamb's quarters (*Chenopodium album*), London rocket (*Sisymbrium irio*), Mexican fan palm (*Washingtonia robusta*), milk thistle (*Silybum marianum*), millet (*Eleusine* sp.), mission cactus (*Opuntia ficus-indica*), Peruvian pepper tree (*Schinus molle*), prostrate knotweed (*Polygonum aviculare*), red brome (*Bromus madritensis*), red stemmed filaree (*Erodium cicutarium*), Russian thistle (*Salsola tragus*), salt cedar (*Tamarix ramosissima*), silver puffs (*Uropappus lindleyi*), southern cattail (*Typha domingensis*), spiny sowthistle (*Sonchus asper*), summer mustard (*Hirschfeldia incana*), tree tobacco (*Nicotiana glauca*), western ragweed (*Ambrosia psilostachya*), and white horehound (*Marrubium vulgare*).

The riparian trees identified in this report include salt cedar (*Tamarix ramosissima*), mulefat (*Baccharis salicifolia*), and black willow (*Salix gooddingii*), which are all located within the non-jurisdictional waste treatment ponds constructed within the Project Site.

The Project Site previously supported a dairy operation which was recently abandoned, and several waste treatment ponds remaining from that dairy operation. None of these features would be subject to CDFW jurisdiction as they are not rivers, streams, or lakes and their disturbance will not occur in the bed, bank, or channel of a river, stream, or lake, nor will they affect riparian habitat protected by Section 1602 of the State of California Fish and Game Code. Additionally, the repair activities would not result in 1) the substantial diversion, obstruction, or alteration of the natural flow or bed, channel, or bank of a river, stream, or lake, 2) the use of material from a streambed, or 3) a substantial adverse effect upon existing fish or wildlife resources.

Exhibit 4B depicts the limits of CDFW jurisdiction within the Cypress Channel.

<u>Borrow Site 1</u>

Borrow Site One (Borrow 1) totals approximately 43.67 acres and is located at latitude 33.952213 and longitude -117.648256 in the City of Chino, San Bernardino County, California [Exhibit 1] within an unsectioned area of Township 2 South and Range 7 West, of the U.S. Geological Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 1 is bordered by Pine Avenue to the north, the Prado Regional Park to the south, Johnson Avenue to the east, and Euclid Avenue to the west.

Borrow 1 previously supported a combination of a dairy operation, which was recently abandoned, and a residence.

CDFW jurisdiction associated with Borrow 1 is limited to Drainage 1 located near the intersection of Pine Avenue and Euclid Avenue. CDFW jurisdiction associated with Drainage 1 totals 4.81 acres, of which 4.62 acres consist of riparian habitat and 0.19 acre consists of non-riparian streambed. A total of 1,645 linear feet of CDFW streambed is present.

Drainage 1 enters Borrow 1 from a culvert and pipe beneath Pine Avenue near its intersection with Euclid Avenue. The drainage flows in a north to south direction for 1,645 linear feet before leaving Borrow 1 and entering the Prado Basin. Ultimately, flows from Drainage 1enter the lakes located at the El Prado Golf Course before flowing into Prado Basin.
Drainage 1 is contained in a channel with a defined bed and bank, which appears to be relatively uniform in width. The HWM within Drainage 1 ranges from 16 to 24 feet in width.
Vegetation within Drainage 1 consists of black willow (*Salix gooddingii*), blue elderberry (*Sambucus nigra* ssp. *caerulea*), cheeseweed mallow (*Malva parviflora*), common Mediterranean grass (*Schismus barbatus*), common sunflower (*Helianthus annuus*), curly dock (*Rumex crispus*), salt cedar (*Tamarix ramosissima*), southern cattail (*Typha domingensis*), wild radish (*Raphanus raphanistrum*), prostrate knotweed (*Polygonum aviculare*), duckweed (*Lemna sp*.), and Yerba mansa (*Anemopsis californica*).

Drainage 1 was considered a wetland/riparian habitat area based on its existing condition of flowing water (hydrology), the presence of dominant hydrophytic vegetation, and hydric soils.

There is also an adjacent wetland/riparian area next to Drainage 1. This adjacent wetland/riparian area has been significantly disturbed by past clearing and maintenance operations. Currently, the area is dominated by Bermuda grass; however, it also supports southern cattail (*Typha domingensis*), salt grass (*Distichlis spicata*), salt marsh sand spurry (*Spergularia marina*), pepperweed (*Lepidium latifolium*), and stinging nettle (*Urtica dioica*). This adjacent wetland/riparian area also supports surface water, contains soil cracks, ponding, and discoloration of the soil surface typical of an anaerobic and wetland condition.

Based on the presence of riparian habitat upstream and downstream of this maintained, disturbed area, it is assumed that riparian habitat would re-establish if maintenance would cease. As such, this feature would be considered as CDFW jurisdiction.

Borrow Site 2

Borrow Site Two (Borrow 2) totals approximately 38.51 acres and is located at latitude 33.952641 and longitude -117.644448 in the City of Chino, San Bernardino County, California

[Exhibit 1] within an unsectioned area of Township 2 South and Range 7 West, of the U.S. Geological Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 2 is bordered by Pine Avenue to the north, the Prado Regional Park and the Prado Equestrian Center to the south, the California Institute for Women to the east, and Johnson Avenue to the west.

Vegetation within Borrow Site 2 consists of Chinese parsley (*Heliotropium curassavicum*), telegraph weed (*Heterotheca grandiflora*), Russian thistle (*Salsola tragus*), spiny sow thistle (*Sonchus asper*), nettle leaf goosefoot (*Chenopodium murale*), cheeseweed mallow (*Malva parviflora*), Italian rye grass (*Festuca perennis*), poison hemlock (*Conium maculatum*), prickly lettuce (*Lactuca serriola*), London rocket (*Sisymbrium irio*), flax-leaved horseweed (*Erigeron bonariensis*), Bermuda grass (*Cynodon dactylon*), bull thistle (*Cirsium vulgare*), bristly ox-tongue (*Helminthotheca echioides*), prostrate knotweed (*Polygonum aviculare*), shamel ash (*Fraxinus* uhdei), field bindweed (*Convolvulus arvensis*), curly dock (*Rumex crispus*), sweet clover (*Melilotus sp.*), and Asian ponyfoot (*Dichondra micrantha*).

CDFW jurisdiction within Borrow 2 is limited to a roadside ditch along the western edge of the borrow area. CDFW jurisdiction associated with Ditch 1 totals 0.27 acre, all of which consists of non-riparian roadside ditch. A total of 2,366 linear feet of streambed is present. Ditch 1 is a soft-bottomed ditch located parallel to Johnson Avenue and/or Pine Avenue along the western and northern edge of the borrow area. Ditch 1 enters the Study Area at :Pine Avenue and flows in a north to south or east to west direction for 2,366 linear feet before leaving the Study Area and continuing to flow southerly into the Prado Basin.

The HWM within Ditch 1 is about five feet wide.
Vegetation within Ditch 1 consists of Russian thistle (*Salsola tragus*), wild oat (*Avena fatua*), brome grasses (*Bromus sp*.), barnyard grass (*Echinochloa crus-galli*), and bull thistle (*Cirsium vulgare*).

Borrow 2 previously supported a dairy operation which was recently abandoned, and approximately three waste treatment ponds remaining from that dairy operation. These features would be subject to CDFW jurisdiction as they are not rivers, streams, or lakes and their disturbance will not occur in the bed, bank, or channel of a river, stream, or lake, nor will they affect riparian habitat protected by Section 1602 of the State of California Fish and Game Code. Additionally, the repair activities would not result in 1) the substantial diversion, obstruction, or alteration of the natural flow or bed, channel, or bank of a river, stream, or lake, 2) the use of material from a streambed, or 3) a substantial adverse effect upon existing fish or wildlife resources.

Borrow Site 3

Borrow Site Three (Borrow 3) totals approximately 84.25 acres and is located at latitude 33.941462 and longitude -117.635815 in the City of Chino, San Bernardino County, California [Exhibit 1] within Section 5, Township 3 South, and Range 7 West, of the U.S. Geological Survey (USGS) 7.5" quadrangle map Prado Dam (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 3 is bordered by the California Institute for Women to the north, the Prado Basin to the south and west, and Cucamonga Avenue to the east.

There is no CDFW jurisdiction associated with Borrow 3.

Vegetation within Borrow 3 includes Mexican fireweed (*Bassia scoparia*), five-hook bassia (*Bassia hyssopifolia*), prickly lettuce (*Lactuca serriola*), Russian thistle (*Salsola tragus*), soft chess (*Bromus tectorum*), wild oat (*Avena fatua*), goldentop grass (*Lamarkia aurea*), sunflower (*Heliantus annuus*), cheeseweed mallow (*Malva parviflora*), coyote brush (*Baccharis pilularis*), London rocket (*Sisymbrium irio*), Italian thistle (*Carduus* sp.), Bermuda grass (*Cynodon dactylon*), tumbleweed (*Amaranthus albus*), prickly sow-thistle (*Sonchus asper*), rabbitfoot grass (*Polypogon monspeliensis*), common knotgrass (*Polygonum aviculare*), Australian saltbush (*Atriplex semibaccata*), big saltbush (*Atriplex lentiformis*), purple needlegrass (*Stipa pulchra*), salt heliotrope (*Heliotropium curassavicum*), Italian rye grass (*Festuca perennis*), wall barley (*Hordeum marinum*), pigweed (*Chenopodium album*), London rocket (Sysimbrium irio), Mediterranean grass (Schismus barbatus), perennial pepperweed (*Lepidium latifolium*), milk thistle (*Silybum marianum*), golden crownbeard (*Verbesina encelioides*), and California brittlebrush (*Encilia californica*).

Borrow 3 previously supported a dairy operation which was recently abandoned, and several waste treatment ponds remaining from that dairy operation. None of these features would be subject to CDFW jurisdiction as they are not rivers, streams, or lakes and their disturbance will not occur in the bed, bank, or channel of a river, stream, or lake, nor will they affect riparian habitat protected by Section 1602 of the State of California Fish and Game Code. Additionally, the repair activities would not result in 1) the substantial diversion, obstruction, or alteration of the natural flow or bed, channel, or bank of a river, stream, or lake, 2) the use of material from a streambed, or 3) a substantial adverse effect upon existing fish or wildlife resources.

Borrow Site 4

Borrow Site Four (Borrow 4) totals approximately 12.94 acres and is located at latitude 33.945011 and longitude -117.622304 in the City of Chino, San Bernardino County, California [Exhibit 1] within Section 4, Township 3 South, and Range 7 West of the U.S. Geological Survey (USGS) 7.5" quadrangle map Corona North (dated 1967 and photorevised in 1981)

[Exhibit 2 – Vicinity Map]. Borrow 4 is bordered by Chino-Corona Road to the north, the Mill Creek Wetlands to the south and east, and Comet Avenue to the west.

There is no CDFW jurisdiction associated with Borrow 4.

Vegetation within Borrow Site 4 consists of coyote brush (*Baccharis pilularis*), coast goldenbush (*Isocoma menziesii*), common sunflower (*Helianthus annuus*), toyon (*Heteromeles arbutifolia*), lemonadeberry (*Rhus integrifolia*), creeping wild rye (*Elymus triticoides*), laurel sumac (*Malosma laurina*), deergrass (*Muhlenbergia rigens*), California sagebrush (*Artemisia californica*), Spanish lotus (*Acmispon americanus*), brittlebush (*Encelia farinosa*), mulefat (*Baccharis salicifolia*), saltgrass (*Distichlis spicata*), cheeseweed mallow (*Malva parviflora*), curly dock (*Rumex crispus*), Russian thistle (*Salsola tragus*), nettle leaf goosefoot (*Chenopodium murale*), London rocket (*Sisymbrium irio*), flax-leaved horseweed (*Erigeron bonariensis*), tumbleweed (*Amaranthus albus*), common red sage (*Kochia scoparia*), annual stinging nettle (*Urtica urens*), prickly lettuce (*Lactuca serriola*), Peruvian pepper tree (*Schinus molle*), Mexican fan palm (*Washingtonia robusta*), and Bermuda grass (*Cynodon dactylon*).

Borrow 4 previously supported a dairy operation which was recently abandoned, but no jurisdictional waters were present on site. Borrow 4 is located adjacent to the Mill Creek Wetlands but as noted, does not support Regional Board jurisdictional waters.

<u>Borrow Site 5</u>

Borrow Site Five (Borrow 5) totals approximately 21.28 acres and is located at latitude 33.949712 and longitude -117.613437 in the City of Chino, San Bernardino County, California [Exhibit 1] within Section 33, Township 2 South, and Range 7 West, of the U.S. Geological Survey (USGS) 7.5" quadrangle map Corona North (dated 1967 and photorevised in 1981) [Exhibit 2 – Vicinity Map]. Borrow 5 is bordered by undeveloped land to the north and south, Hellman Avenue to the east, and Chino-Corona Road to the west.

There is no CDFW jurisdiction associated with Borrow 5.

Vegetation within Borrow Site 5 consists of common sunflower (*Helianthus annuus*), Russian thistle (*Salsola tragus*), common red sage (*Kochia scoparia*), spiny sow thistle (*Sonchus asper*), nettle leaf goosefoot (*Chenopodium murale*), cheeseweed mallow (*Malva parviflora*), foxtail barley (*Hordeum murinum*), prickly lettuce (*Lactuca serriola*), London rocket (*Sisymbrium irio*), milk thistle (*Silybum marianum*), flax-leaved horseweed (*Erigeron bonariensis*), Bermuda grass (*Cynodon dactylon*), and annual stinging nettle (*Urtica urens*).

Borrow 5 previously supported a dairy operation which was recently abandoned, and approximately two to three waste treatment ponds remaining from that dairy operation. None of these features would be subject to CDFW jurisdiction as they are not rivers, streams, or lakes and their disturbance will not occur in the bed, bank, or channel of a river, stream, or lake, nor will they affect riparian habitat protected by Section 1602 of the State of California Fish and Game Code. Additionally, the repair activities would not result in 1) the substantial diversion, obstruction, or alteration of the natural flow or bed, channel, or bank of a river, stream, or lake, 2) the use of material from a streambed, or 3) a substantial adverse effect upon existing fish or wildlife resources.

IV. DISCUSSION

A. Impact Analysis

An analysis of impacts will be performed, based upon this delineation and the current Project design (or design alternative) upon the client's request. This analysis will be provided as a separate memorandum and accompanying map.

If you have any questions about this letter report, please contact me at (949) 340-3851 at the office or (714) 323-6221 on my cellular telephone.

Sincerely,

GLENN LUKOS ASSOCIATES, INC.

Martin A. Rasnick
Principal/Senior Regulatory Specialist

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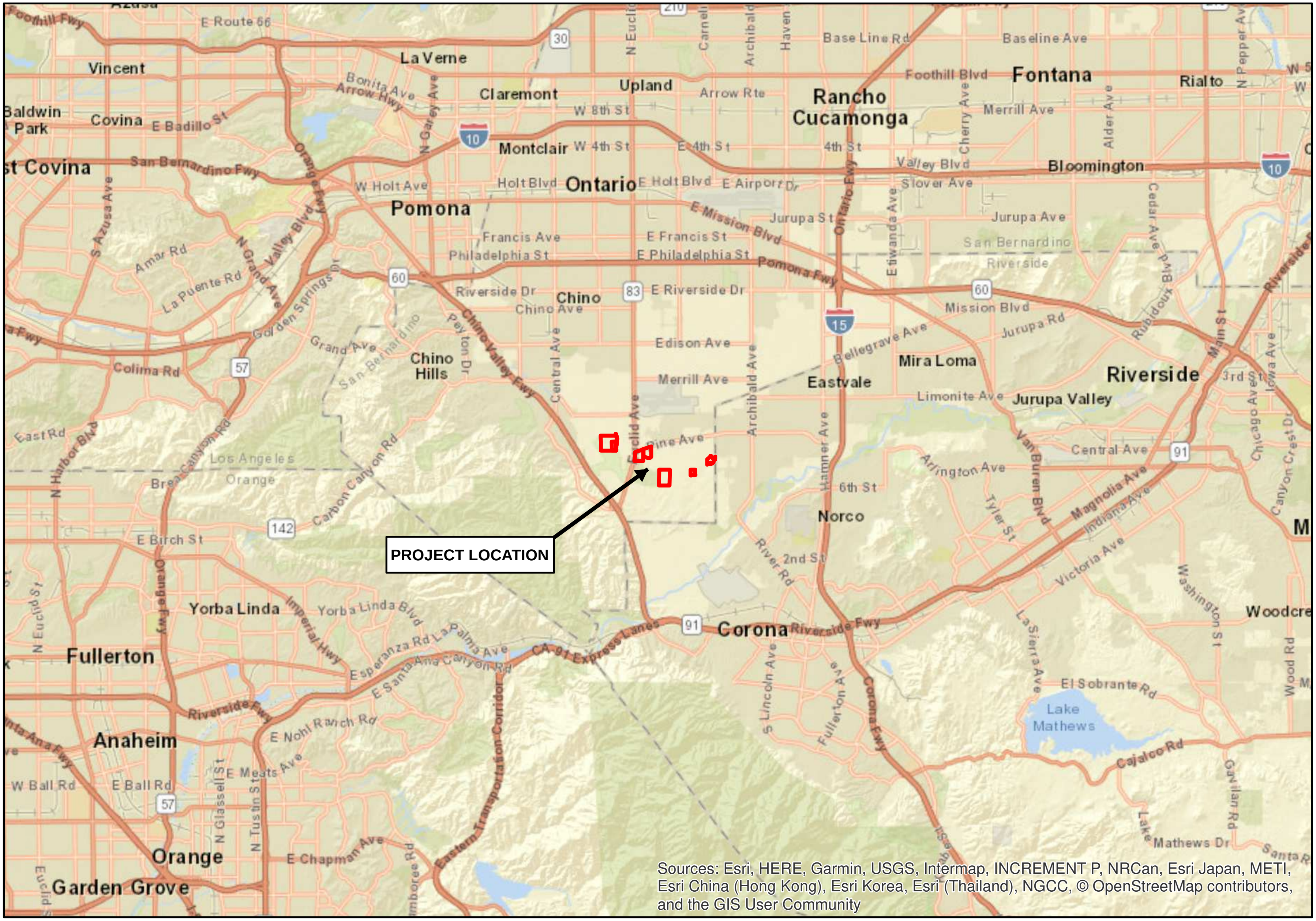
Source: ESRI World Street Map



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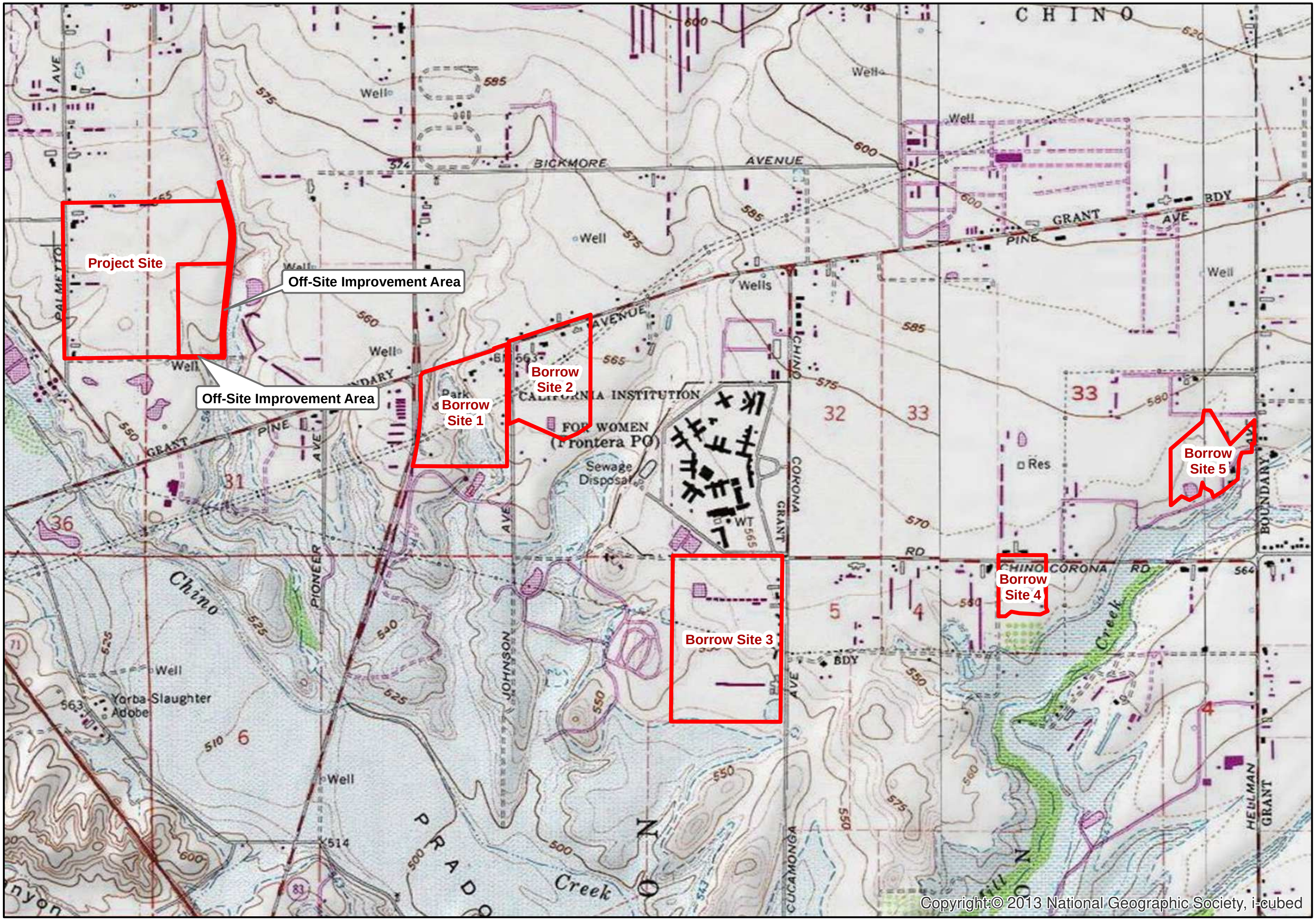
Miles

MAJESTIC CHINO HERITAGE PROJECT

Regional Map

GLENN LUKOS ASSOCIATES

Exhibit 1



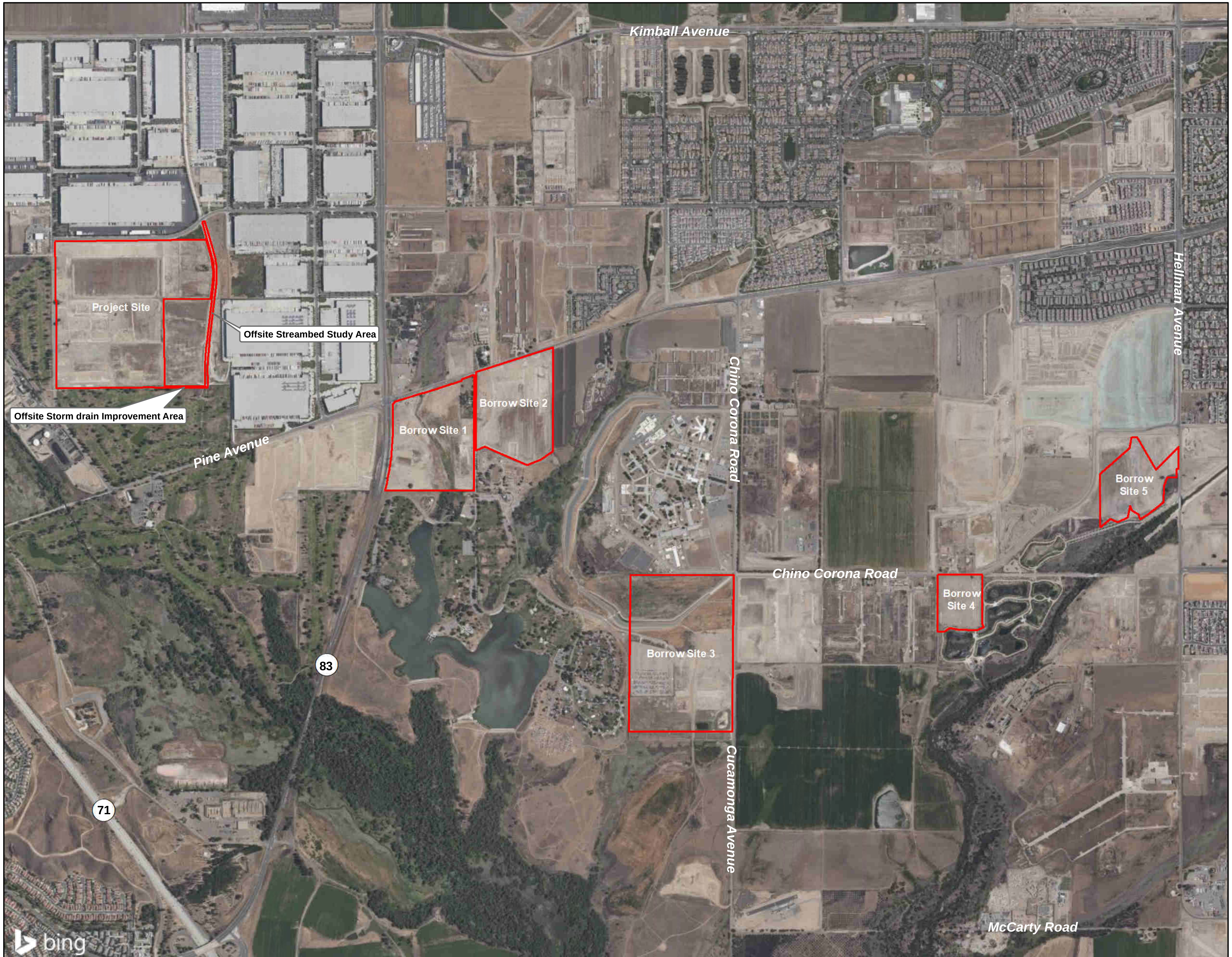
Adapted from USGS Corona North & Prado Dam, CA quadrangle

MAJESTIC CHINO HERITAGE PROJECT

Vicinity Map

GLENN LUKOS ASSOCIATES

Exhibit 2



Study Area Boundary

N

0 725 1,450 2,900
Feet

1 inch = 1,450 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: September 9, 2019

MAJESTIC CHINO HERITAGE PROJECT

Aerial Map

GLENN LUKOS ASSOCIATES

Exhibit 3

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\1090-2_Aerial.mxd

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

MAJESTIC CHINO HERITAGE PROJECT

Corps/Regional Board Jurisdictional Delineation Map

GLENN LUKOS ASSOCIATES

Exhibit 4A - Sheet 1

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\DelineationGIS\1090-2_Corps_ProjectSite.mxd

Study Area Boundary
RWQCB Non-Wetland Waters Jurisdiction Only
Corps/RWQCB Wetland Waters
5 Width in Feet
W indicates Borrow Site 1 Wetland in Channel

N

0 125 250 500
Feet

1 inch = 250 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

MAJESTIC CHINO HERITAGE PROJECT

Corps/RWQCB Jurisdictional Delineation Map - Borrow Sites 1 & 2

GLENN LUKOS ASSOCIATES

Exhibit 4A - Sheet 2

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\DelineationGIS\1090-2_Corps_BorrowSite1-2.mxd

Study Area Boundary

CDFW Non-Riparian Streambed

40 Width in Feet

N

0 137.5 275 550

Feet

1 inch = 275 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

MAJESTIC CHINO HERITAGE PROJECT

CDFW Jurisdictional Delineation Map

GLENN LUKOS ASSOCIATES

Exhibit 4B - Sheet 1

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\DelineationGIS\1090-2_CDFW_ProjectSite.mxd

Study Area Boundary

CDFW Non-Riparian Streambed

CDFW Riparian

5 Width in Feet

R indicates Borrow Site 1 Riparian in Channel

N

0 125 250 500

Feet

1 inch = 250 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

MAJESTIC CHINO HERITAGE PROJECT

CDFW Jurisdictional Delineation Map - Borrow Sites 1 & 2

GLENN LUKOS ASSOCIATES

Exhibit 4B - Sheet 2

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\DelineationGIS\1090-2_CDFW_BorrowSite1-2.mxd

Photograph 1: Photograph depicting Drainage 1 and freshwater marsh habitat on site.

Photograph 2: Photograph depicting freshwater marsh/seep area within Borrow Site 1 westerly of Drainage 1.

Photograph 3: Photograph depicting Drainage 1 and freshwater marsh habitat on site.

Photograph 4: Photograph depicting disturbed freshwater marsh area on site.

GLENN LUKOS ASSOCIATES

Exhibit 5

MAJESTIC CHINO HERITAGE PROJECT

Site Photographs – Borrow Site 1

Photograph 5: Photograph depicting Cypress Channel. Note the concrete sides and bottom.

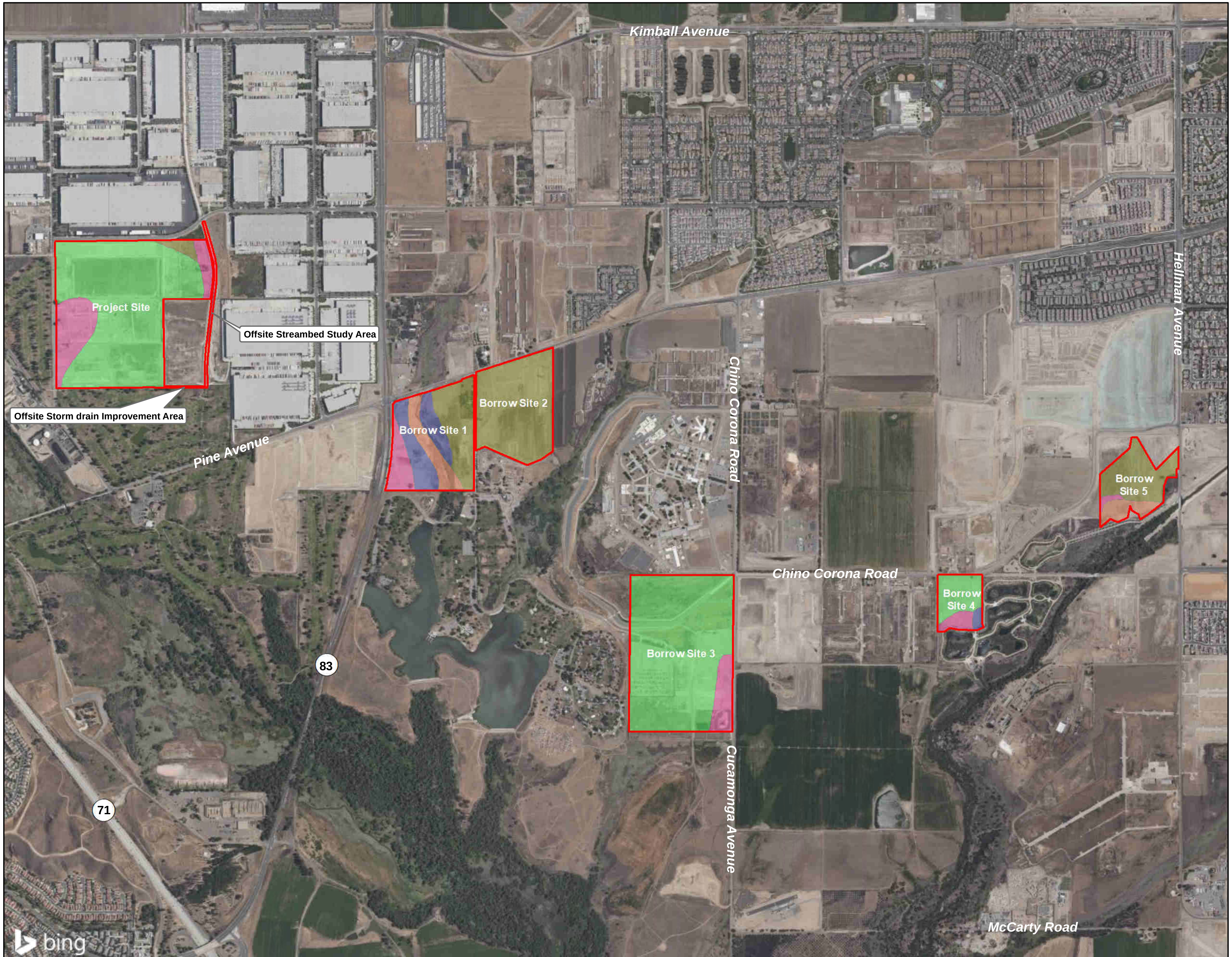
Photograph 6: Photograph depicting Cypress Channel. Note the concrete sides and bottom.

GLENN LUKOS ASSOCIATES

Exhibit 5

MAJESTIC CHINO HERITAGE PROJECT

Site Photographs – Cypress Channel



Study Area Boundary
Cb - CHINO SILT LOAM
CkA - CHUALAR CLAY LOAM, 0 TO 2 PERCENT SLOPES
CkC - CHUALAR CLAY LOAM, 2 TO 9 PERCENT SLOPES
CkD - CHUALAR CLAY LOAM, 9 TO 15 PERCENT SLOPES
Gr - GRANGEVILLE FINE SANDY LOAM
Hr - HILMAR LOAMY FINE SAND

N

0 725 1,450 2,900
Feet

1 inch = 1,450 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

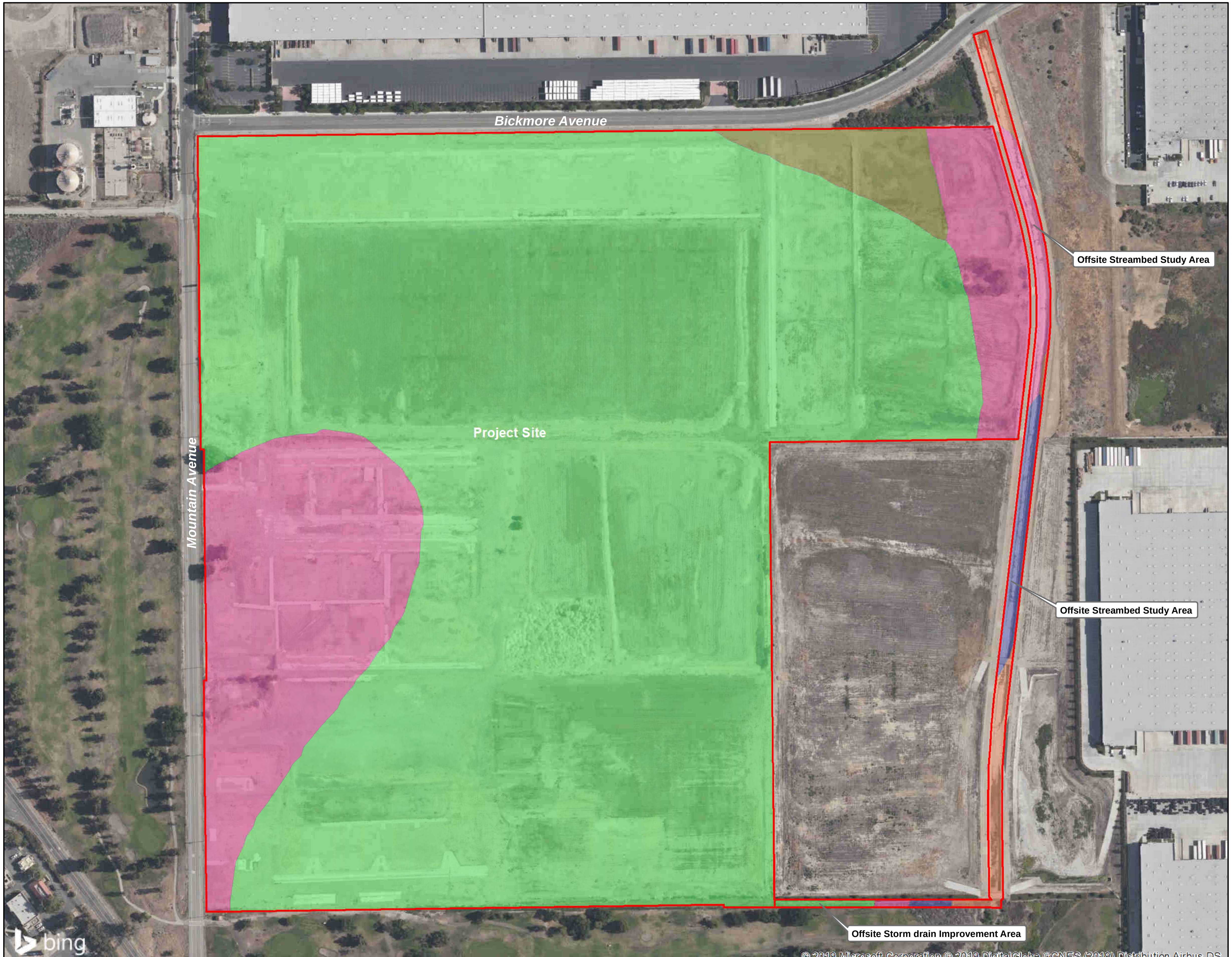
MAJESTIC CHINO HERITAGE PROJECT

Soils - Key Map

GLENN LUKOS ASSOCIATES

Exhibit 6 - Sheet 1

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\SoilsGIS\1090-2_Soils_KeyMap.mxd



Study Area Boundary
Cb - CHINO SILT LOAM
CkA - CHUALAR CLAY LOAM, 0 TO 2 PERCENT SLOPES
CkC - CHUALAR CLAY LOAM, 2 TO 9 PERCENT SLOPES
CkD - CHUALAR CLAY LOAM, 9 TO 15 PERCENT SLOPES
Gr - GRANGEVILLE FINE SANDY LOAM

N

0 137.5 275 550
Feet

1 inch = 275 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

MAJESTIC CHINO HERITAGE PROJECT

Soils Map, Project Site and Off Site Storm Drain Improvement Area/
Off Site Streambed Study Area Adjacent to the Project Site

GLENN LUKOS ASSOCIATES

Exhibit 6 - Sheet 2

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\SoilsGIS\1090-2_Soils_ProjectSite.mxd

Study Area Boundary

Cb - CHINO SILT LOAM

CkC - CHUALAR CLAY LOAM, 2 TO 9 PERCENT SLOPES

CkD - CHUALAR CLAY LOAM, 9 TO 15 PERCENT SLOPES

Gr - GRANGEVILLE FINE SANDY LOAM

N

0 125 250 500

Feet

1 inch = 250 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

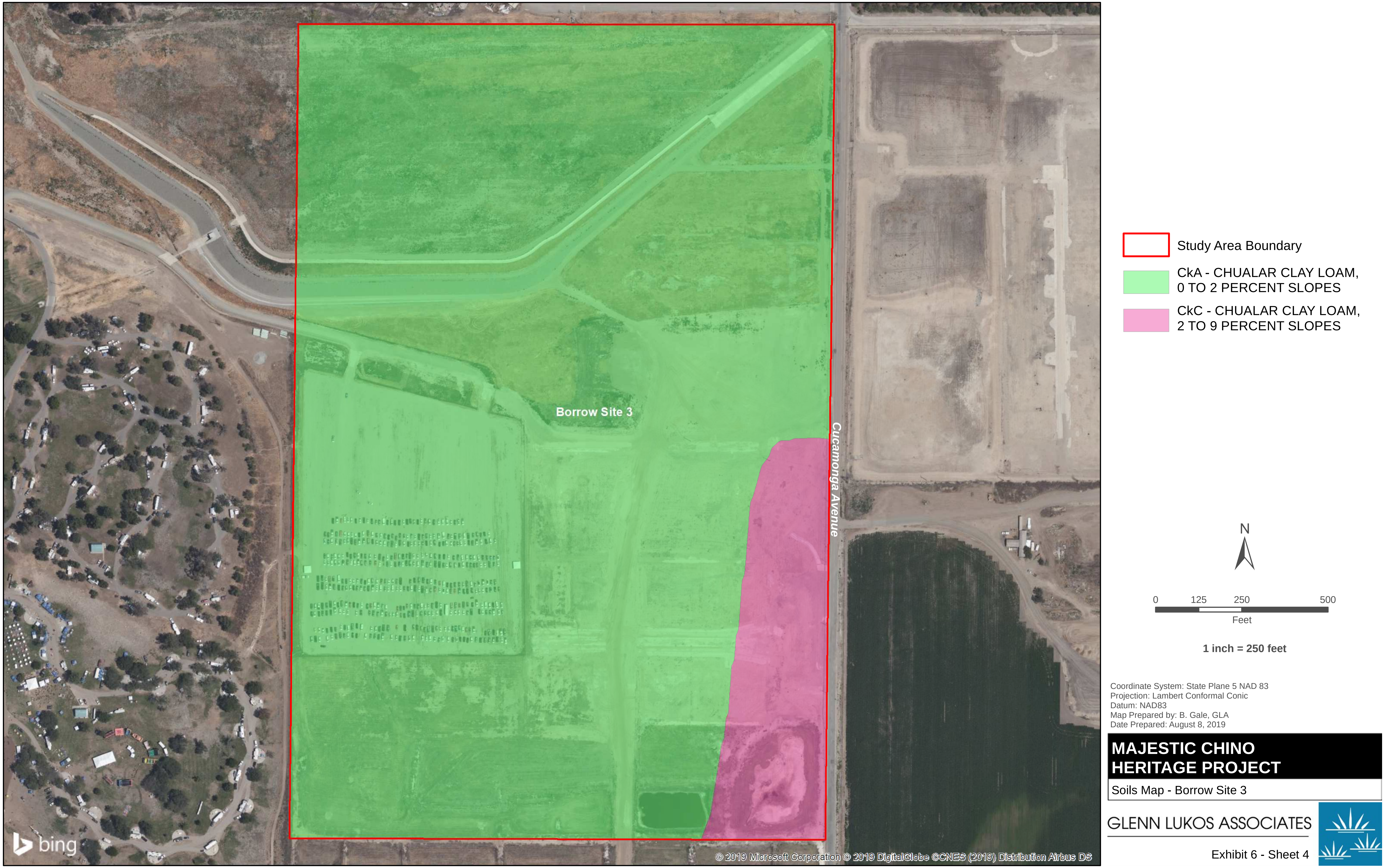
MAJESTIC CHINO HERITAGE PROJECT

Soils Map - Borrow Sites 1 & 2

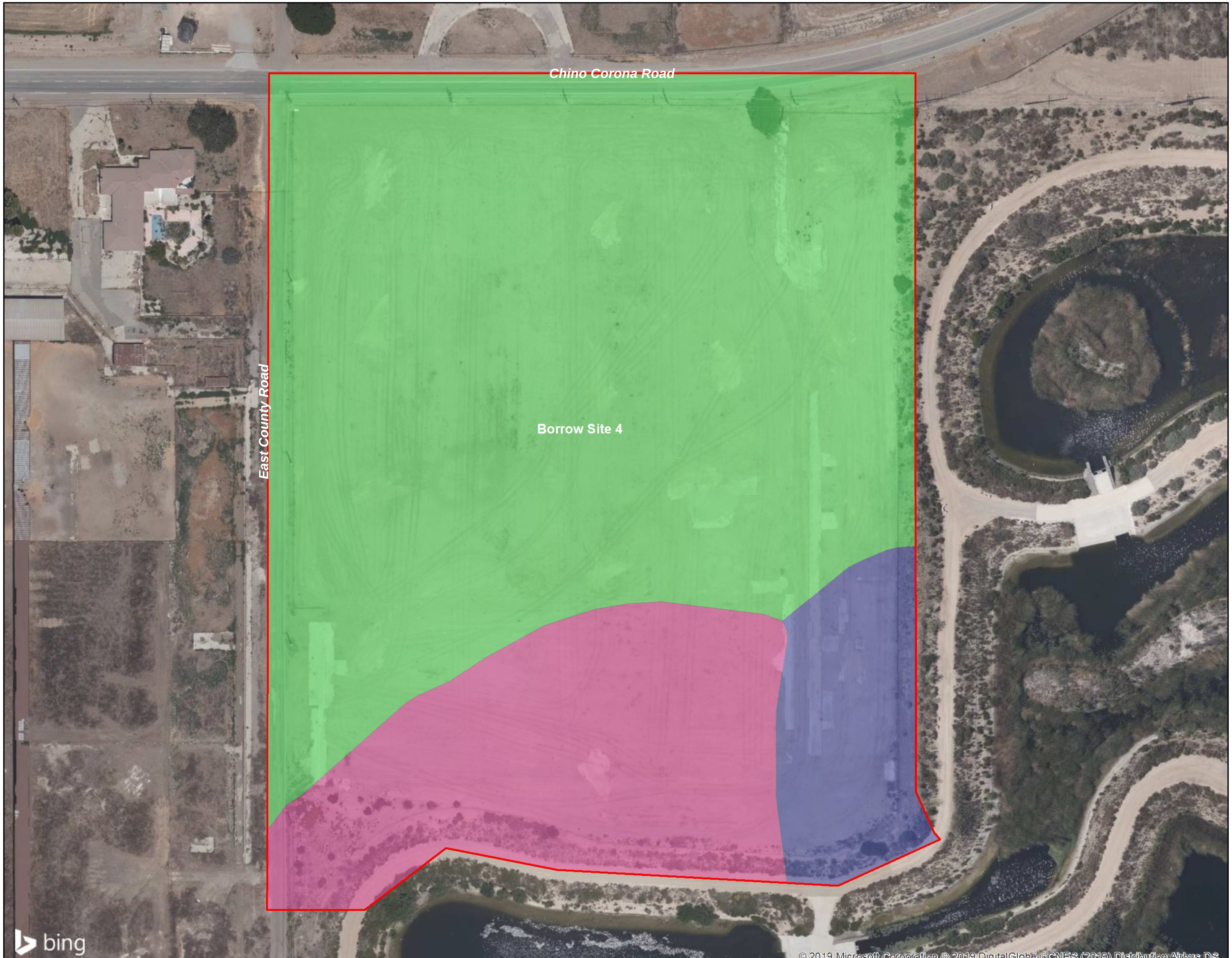
GLENN LUKOS ASSOCIATES

Exhibit 6 - Sheet 3

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\SoilsGIS\1090-2_Soils_BorrowSite1-2.mxd



Borrow Site 3
Cucamonga Avenue
bing
© 2019 Microsoft Corporation © 2019 DigitalGlobe ©CNES (2019) Distribution Airbus DS
Study Area Boundary
CkA - CHUALAR CLAY LOAM, 0 TO 2 PERCENT SLOPES
CkC - CHUALAR CLAY LOAM, 2 TO 9 PERCENT SLOPES
N
0 125 250 500
Feet
1 inch = 250 feet
Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019
MAJESTIC CHINO HERITAGE PROJECT
Soils Map - Borrow Site 3
GLENN LUKOS ASSOCIATES
Exhibit 6 - Sheet 4
X:\0363-THE REST\1090-02CHNO\1090-02_GIS\SoilsGIS\1090-2_Soils_BorrowSite3.mxd



Study Area Boundary

CkA - CHUALAR CLAY LOAM, 0 TO 2 PERCENT SLOPES

CkC - CHUALAR CLAY LOAM, 2 TO 9 PERCENT SLOPES

CkD - CHUALAR CLAY LOAM, 9 TO 15 PERCENT SLOPES

N

0 50 100 200

Feet

1 inch = 100 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

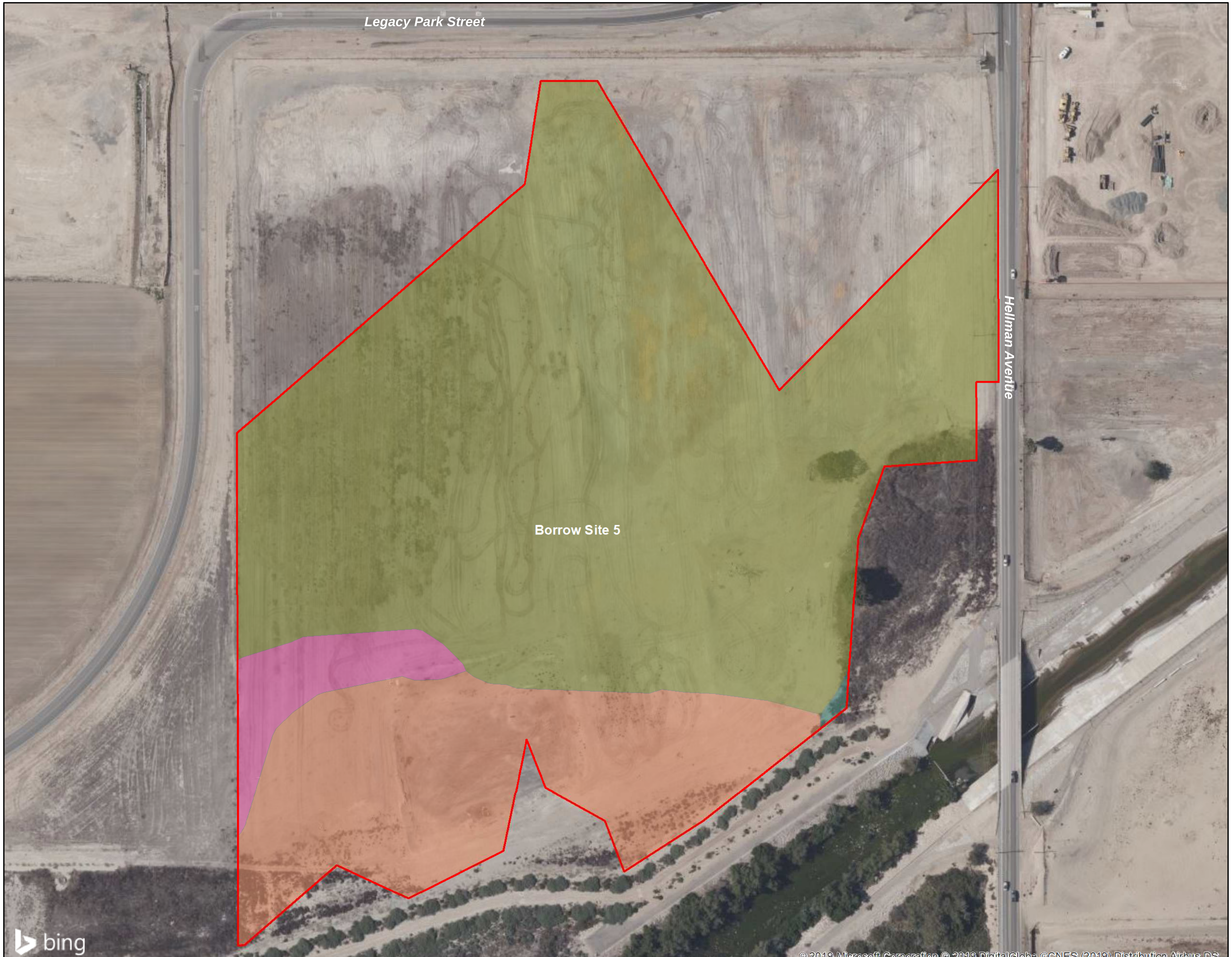
MAJESTIC CHINO HERITAGE PROJECT

Soils Map - Borrow Site 4

GLENN LUKOS ASSOCIATES

Exhibit 6 - Sheet 5

X:\0363-THE REST\1090-02CHNO\1090-02_GIS\SoilsGIS\1090-2_Soils_BorrowSite4.mxd



Study Area Boundary
Cb - CHINO SILT LOAM
CkC - CHUALAR CLAY LOAM, 2 TO 9 PERCENT SLOPES
Gr - GRANGEVILLE FINE SANDY LOAM
Hr - HILMAR LOAMY FINE SAND

N

0 75 150 300
Feet

1 inch = 150 feet

Coordinate System: State Plane 5 NAD 83
Projection: Lambert Conformal Conic
Datum: NAD83
Map Prepared by: B. Gale, GLA
Date Prepared: August 8, 2019

MAJESTIC CHINO HERITAGE PROJECT

Soils Map - Borrow Site 5

GLENN LUKOS ASSOCIATES

Exhibit 6 - Sheet 6

X:\0363-THE REST\1090-02CHINO\1090-02_GIS\SoilsGIS\1090-2_Soils_BorrowSite5.mxd

MEMORANDUM

GLENN LUKOS ASSOCIATES

Regulatory Services

PROJECT NUMBER: 1090-0002chno

TO: John Burroughs
Commerce Construction Company, L.P.
13191 Crossroads Parkway North
Sixth Floor
City of Industry, California 91746

FROM: Martin Rasnick

DATE: September 25, 2019

SUBJECT: Jurisdictional Delineation Impact Assessment for the Majestic Chino Heritage Project and Five Borrow Sites, a Total of Approximately 300.54-Acres of Property Located in the City of Chino, San Bernardino County, California.

Mr. Burroughs

This memorandum summarizes our preliminary findings and an impact analysis of U.S. Army Corps of Engineers (Corps), California Department of Fish and Wildlife (CDFW), and Santa Ana Regional Water Quality Control Board (Regional Board) jurisdiction for the Majestic Chino Heritage Project and its five borrow sites located in the City of Chino, San Bernardino County, California: An impact analysis was conducted for the Project Study Area based upon files received from the Project engineer. Impacts to each regulatory jurisdiction are described below.

1. Impacts to Potential Corps/Regional Board Jurisdiction

Corps Jurisdiction

Corps jurisdiction associated with the Study Area is 6.04 acres, of which 4.59 acres consists of jurisdictional wetlands. A total of 4,172 linear feet of streambed is present.

Corps jurisdiction within the Study Area is limited to the Cypress Channel, a concrete-sided and concrete-bottomed flood control channel located just east of the easterly boundary of the Project Site, and Drainage 1, an unnamed tributary located within Borrow Site 1 near the intersection of Pine Avenue and Euclid Avenue.

Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site

Corps jurisdiction associated with the Cypress Channel totals 1.45 acres, none of which consist of jurisdictional wetlands. A total of 2,527 linear feet of Corps streambed is present. The Cypress Channel is an ephemeral, concrete-sided and concrete-bottomed flood control channel located just east of the easterly boundary of the Project Site. The Cypress Channel enters the Study Area at Bickmore Avenue located northeast of the Project Site and flows in a north to south direction for 2,527 linear feet before leaving the Study Area and continuing to flow southerly into the Prado Basin.

Borrow Site 1

Corps jurisdiction associated with Borrow 1 is limited to Drainage 1, an unnamed intermittent tributary located near the intersection of Pine Avenue and Euclid Avenue. Corps jurisdiction associated with Drainage 1 totals 4.59 acres, all of which consist of jurisdictional wetlands. A total of 1,645 linear feet of Corps streambed is present.

Drainage 1 enters Borrow 1 from a culvert and pipe beneath Pine Avenue near its intersection with Euclid Avenue. The drainage flows in a north to south direction for 1,645 linear feet before leaving Borrow 1 and entering the Prado Basin. Ultimately, flows from Drainage 1enter the lakes located at the El Prado Golf Course before flowing into Prado Basin.

There are no Corps jurisdictional waters located within Borrow Sites 2, 3, 4, or 5.

Impacts to Corps Jurisdiction

Based on the current site plan, impacts within the Study Area will result in permanent impact to 0.07 acre of Corps jurisdictional waters, of which 0.06 acre consist of jurisdictional wetlands. A total of 190 feet of streambed will be disturbed.

Impacts to Corps jurisdictional waters are limited to Drainage 1 within Borrow Site 1 (0.06 acre and 169 linear feet of streambed) and the Cypress Channel within the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project site (0.01 acre and 21 linear feet of streambed).

Regional Board Jurisdiction

Regional Board jurisdiction associated with the Study Area totals 6.31 acres, of which 4.59 acres consists of jurisdictional wetlands. A total of 6,538 linear feet of streambed is present.

Regional Board jurisdiction within the Study Area is limited to the Cypress Channel, a concrete-sided and concrete-bottomed flood control channel located just east of the easterly boundary of the Project Site, Drainage 1, an unnamed tributary located within Borrow 1 near the intersection of Pine Avenue and Euclid Avenue, and Ditch 1, a roadside ditch constructed in the uplands adjacent to Johnson Avenue in Borrow 2.

There are no Regional Board jurisdictional waters located within Borrow Sites 3, 4, or 5.

Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site

Regional Board jurisdiction associated with the Cypress Channel totals 1.45 acres, none of which consist of jurisdictional wetlands. A total of 2,527 linear feet of streambed is present. The Cypress Channel is an ephemeral, concrete-sided and concrete-bottomed flood control channel located just east of the easterly boundary of the Project Site. The Cypress Channel enters the Study Area at Bickmore Avenue located northeast of the Project Site and flows in a north to south direction for 2,527 linear feet before leaving the Study Area and continuing to flow southerly into the Prado Basin.

Borrow Site 1

Regional Board jurisdiction associated with Borrow 1 is limited to Drainage 1, an unnamed intermittent tributary located near the intersection of Pine Avenue and Euclid Avenue. Regional Board jurisdiction associated with Drainage 1 totals 4.59 acres, all of which consist of jurisdictional wetlands. A total of 1,645 linear feet of streambed is present.

Drainage 1 enters Borrow 1 from a culvert and pipe beneath Pine Avenue near its intersection with Euclid Avenue. The drainage flows in a north to south direction for 1,645 linear feet before leaving Borrow 1 and entering the Prado Basin. Ultimately, flows from Drainage 1enter the lakes located at the El Prado Golf Course before flowing into Prado Basin.

Borrow Site 2

Regional Board jurisdiction within Borrow 2 is limited to a roadside ditch along the western and northern edge of the borrow area. Regional Board jurisdiction associated with Ditch 1 totals 0.27 acre, none of which consist of jurisdictional wetlands. A total of 2,366 linear feet of streambed is present. Ditch 1 is a soft-bottomed ditch located parallel to Johnson Avenue along the western edge of the borrow area. Ditch 1 enters the Study Area at :Pine Avenue located and flows in a north to south or east to west direction for 2,366 linear feet before leaving the Study Area and continuing to flow southerly into the Prado Basin.

Impacts to Regional Board Jurisdiction

Based on the current site plan, impacts within the Study Area will result in permanent impact to 0.07 acre of Regional Board jurisdictional waters, of which 0.06 acre consist of jurisdictional wetlands. A total of 190 feet of streambed will be disturbed.

Impacts to Regional Board jurisdictional waters are limited to Drainage 1 within Borrow Site 1 (0.06 acre and 169 linear feet of streambed) and the Cypress Channel within the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project site (0.01 acre and 21 feet of streambed).

2. Impacts to Potential CDFW Jurisdiction

CDFW Jurisdiction

CDFW jurisdiction associated with the Study Area totals 7.40 acres, of which 4.62 acres consist of riparian habitat and 2.78 acres consist of non-riparian streambed. A total of 6,538 linear feet of streambed is present.

CDFW jurisdiction within the Study Area is limited to the Cypress Channel, a concrete-sided and concrete-bottomed flood control channel located just east of the easterly boundary of the Project Site, Drainage 1, an unnamed tributary located within Borrow 1 near the intersection of Pine Avenue and Euclid Avenue, and Ditch 1, a roadside ditch constructed in the uplands adjacent to Johnson Avenue in Borrow Site 2.

Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project Site

CDFW jurisdiction associated with the Cypress Channel totals 2.32 acres, all of which consist of non-riparian, concrete streambed. A total of 2,527 linear feet of streambed is present. The Cypress Channel is a concrete-sided and concrete-bottomed flood control channel located just east of the easterly boundary of the Project Site. The Cypress Channel enters the Study Area at Bickmore Avenue located northeast of the Project Site and flows in a north to south direction for 2,527 linear feet before leaving the Study Area and continuing to flow southerly into the Prado Basin.

Borrow Site 1

CDFW jurisdiction associated with Borrow 1 is limited to Drainage 1 located near the intersection of Pine Avenue and Euclid Avenue. CDFW jurisdiction associated with Drainage 1 totals 4.81 acres, of which 4.62 acres consist of riparian habitat and 0.19 acre consists of non-riparian streambed. A total of 1,645 linear feet of CDFW streambed is present.

Drainage 1 enters Borrow 1 from a culvert and pipe beneath Pine Avenue near its intersection with Euclid Avenue. The drainage flows in a north to south direction for 1,645 linear feet before leaving Borrow 1 and entering the Prado Basin. Ultimately, flows from Drainage 1enter the lakes located at the El Prado Golf Course before flowing into Prado Basin.

Borrow Site 2

CDFW jurisdiction within Borrow 2 is limited to a roadside ditch along the western edge of the borrow area. CDFW jurisdiction associated with Ditch 1 totals 0.27 acre, all of which consists of non-riparian roadside ditch. A total of 2,366 linear feet of streambed is present. Ditch 1 is a soft-bottomed ditch located parallel to Johnson Avenue and/or Pine Avenue along the western and northern edge of the borrow area. Ditch 1 enters the Study Area at :Pine Avenue and flows in a north to south or east to west direction for 2,366 linear feet before leaving the Study Area and continuing to flow southerly into the Prado Basin.

Impacts to CDFW Jurisdiction

Based on the current site plan, impacts within the Study Area will result in permanent impact to 0.07 acre of CDFW jurisdiction, of which 0.06 acre consists of riparian habitat and 0.01 acre consist of non-riparian streambed. A total of 190 feet of streambed will be disturbed.

Impacts to CDFW jurisdiction are limited to Drainage 1 within Borrow Site 1 (0.06 acre and 169 linear feet of streambed) and the Cypress Channel within the Off Site Storm Drain Improvement Area/Off Site Streambed Study Area Adjacent to the Project site (0.01 acre and 21 linear feet of streambed).

If you have any questions regarding this memorandum, please call me at (949) 340-3851 at the office or (714) 323-6221 on my cellular telephone. Thanks again.

p: 1090-2c.impactassessment.doc

cc: Tracy Zinn
David Ornelas
Ruth Villalobos

Appendix B

Air Quality and Greenhouse Gas Analysis

July 15, 2019

Ms. Ruth Villalobos
Ruth Villalobos & Associated, Inc.
3602 Inland Empire Boulevard, Suite C310
Ontario, CA 91764

SUBJECT: MAJESTIC CHINO HERITAGE AIR QUALITY AND GREENHOUSE GAS ANALYSIS FOR NEPA

Dear Ms. Ruth Villalobos:

This Analysis for NEPA has been prepared for the Majestic Chino Heritage Project, which is located on the southeast corner of Mountain Avenue and Bickmore Avenue in the City of Chino.

AIR QUALITY

AFFECTED ENVIRONMENT

National Ambient Air Quality Standards

The Clean Air Act identified and established the National Ambient Air Quality Standards (NAAQS) for a number of criteria pollutants in order to protect the public health and welfare. The criteria pollutants include ozone (O3), carbon monoxide (CO), suspended particulate matter (PM), sulfur dioxide (SO2), nitrogen dioxide (NO2), and lead (Pb). PM emissions are regulated in two size classes: Particulates up to 10 microns in diameter (PM10) and particulates up to 2.5 microns in diameter (PM2.5).

A region is given the status of “attainment” or “unclassified” if the NAAQS have not been exceeded. A status of "nonattainment" for particular criteria pollutants is assigned if the NAAQS have been exceeded. Once designated as nonattainment, attainment status may be achieved after three years of data showing non-exceedance of the standard. When an area is reclassified from nonattainment to attainment, it is designated as a “maintenance area,” indicating the requirement to establish and enforce a plan to maintain attainment of the standard.

General Conformity Rule

Section 176(c) of the federal Clean Air Act states that a federal agency cannot issue a permit for, or support an activity within, a nonattainment or maintenance area unless the agency determines it will conform to the most recent U.S. Environmental Protection Agency-approved State Implementation Plan. Thus, a federal action must not:

- Cause or contribute to any new violation of a NAAQS.
- Increase the frequency or severity of any existing violation.

- Delay the timely attainment of any standard, interim emission reduction, or other milestone.

A conformity determination is required for each criteria pollutant or precursor where the total of direct and indirect emissions of the criteria pollutant or precursor in a nonattainment or maintenance area caused by the federal action would equal or exceed the General Conformity applicability rates specified in 40 C.F.R. section 93.153. Operation and maintenance emissions are considered exempt under 40 C.F.R. 93.153, therefore they are not included in the total direct and indirect effects of the federal action.

The project site is in the South Coast Air Basin (SCAB). The SCAB is composed of Orange County and the urban, non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. The climate of the SCAB is determined primarily by terrain and geography. Local climactic conditions are characterized by warm summers, mild winters, infrequent rainfall, moderate daytime on-shore breezes, and moderate humidity. The SCAB's normally mild climate is occasionally interrupted by periods of hot weather, winter storms, and hot easterly Santa Ana winds.

Table 1 summarizes the federal attainment status of the San Bernardino County portion of the SCAB.

TABLE 1: FEDERAL ATTAINMENT STATUS FOR CRITERIA POLLUTANTS

Pollutant	Attainment Status	General Conformity Applicability Rates (tons/year)
Ozone	Nonattainment, Extreme	10
CO	Attainment/Maintenance	100
NO2	Attainment/Maintenance	100
SO2	Attainment	100
PM10	Attainment/Maintenance	100
PM2.5	Nonattainment	100
Pb	Attainment/Maintenance	25

The SCAB is currently in extreme nonattainment for ozone (precursors: VOC or NOx); nonattainment for PM2.5; attainment/maintenance for PM10; attainment/maintenance for NO2; attainment/maintenance for CO; and attainment/maintenance for lead (with the exception of the LA County portion of the basin which is in nonattainment). Based on the present attainment designation for the SCAB, a federal action would conform to the SIP if annual emissions are below 100 tons of CO, PM2.5, PM10, NO2, or Pb, 10 tons of VOC, or 25 tons of lead.

Greenhouse Gases

Gases that trap heat in the atmosphere are often called greenhouse gases (GHG). GHGs are emitted by natural processes and human activities. Examples of GHGs that are produced both by natural processes and industry include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Currently, there are no Federal standards for GHG emissions, and no Federal regulations have been set at this time.

Emission Estimates Methodology

Emissions were estimated using the California Emissions Estimator Model™ (CalEEMod™) v2016.3.2 emission modeling software.

Estimates of lead emissions were not calculated. Lead emissions from mobile sources in California have significantly decreased due to the near elimination of lead in fuels. Thus, CalEEMod, the SCAQMD-approved emission modeling software, does not provide estimated emissions for lead.

Ozone (O_3) formation is driven by two major classes of directly emitted precursors: nitrogen oxides (NOx) and volatile organic compounds (VOC). The relation between O_3, NOx and VOC is driven by complex nonlinear photochemistry. Due to the variability in rates of O_3 formation, CalEEMod does not provide estimates for the compound. Instead, the emission estimates for VOCs is used as a surrogate for reporting O_3 emissions per the General Conformity Applicability Rates. Since the consumption of VOC in O_3 formation reaction is variable, actual O_3 levels are lower than those reported.

ENVIRONMENTAL CONSEQUENCES

No Action Alternative. Under the No Action Alternative, the project site would remain in pre-project conditions. No construction would occur, and impacts related to air quality and objectionable odors would not occur.

Preferred Alternative/Proposed Action

General Conformity. As part of the environmental review of the federal action, a general conformity evaluation has been completed pursuant to 40 C.F.R. 93.153. The general conformity regulations apply because the project is situated in San Bernardino County within the SCAB, and the County is designated as a nonattainment area for ozone, and PM2.5, as well as a attainment/maintenance area for PM10, NO_2, CO and Pb.

Table 2 summarizes the annual construction air quality emissions and associated General Conformity Applicability Rates.

Table 3 summarizes the annual operational air quality emissions and associated General Conformity Applicability Rates.

TABLE 2: COMPARISON OF ESTIMATED ANNUAL CONSTRUCTION EMISSIONS TO GENERAL CONFORMITY APPLICABILITY RATES

Pollutant	General Conformity Applicability Rates (tons/year)	Estimated Construction Emissions (tons/year)	
		2021	2022
Ozone (VOC)	10	0.36	6.33
CO	100	5.86	12.60
NO2	100	11.46	10.46
SO2	100	0.02	0.05
PM10	100	1.30	3.26
PM2.5	100	0.23	1.00
Pb	25	0	0

TABLE 3: COMPARISON OF ESTIMATED ANNUAL OPERATIONAL EMISSIONS TO GENERAL CONFORMITY APPLICABILITY RATES

Pollutant	General Conformity Applicability Rates (tons/year)	Estimated Operational Emissions (tons/year)
Ozone (VOC)	10	9.31
CO	100	24.48
NO2	100	31.74
SO2	100	0.17
PM10	100	9.25
PM2.5	100	2.64
Pb	25	0

For all pollutants, the emissions associated with construction of the federal action would be less than the applicability rates. Therefore, a general conformity determination is not required. Little to no quantifiable and foreseeable lead emissions would be generated by the construction or operations of the proposed project. The proposed project would have no significant impacts on air quality.

GHG Emissions. Per discussion of GHG above, the estimated GHG emissions are included for the purpose of disclosure under NEPA. **Table 4** summarizes the annual greenhouse gas emissions.

TABLE 4: COMPARISON OF ESTIMATED ANNUAL GREENHOUSE GAS EMISSIONS (METRIC TONS/YEAR)

Pollutant	Estimated Construction Emissions (MT/year)		Estimated Operational Emissions (MT/year)
	2021	2022	
GHGs (CO2e)	2,048.99	4,404.23	20,285.56

Objectionable Odors*.* Although offensive odors rarely cause physical harm, they can be unpleasant and lead to considerable distress among the public. According to CARB's *Air Quality and Land Use Handbook*, land uses associated with odor complaints typically include sewage treatment plants, landfills, recycling facilities, and manufacturing facilities (CARB, 2005). Short-term objectionable odors during construction of the proposed action would be associated with the use of diesel-powered construction equipment and on-road vehicles. During construction activities, odors would mostly occur on-site, would be short-term and transient. Any odors during routine maintenance during project operation would also be minor and transient. Therefore, construction and operation of the proposed action would not create objectionable odors that would affect a substantial number of people. There would be no significant impacts to air quality due to objectionable odors.

If you have any questions, please contact me directly at (949) 336-5987.

Respectfully submitted,
URBAN CROSSROADS, INC.

Haseeb Qureshi
Associate Principal

URBAN CROSSROADS
260 E. Baker St. | Suite 200 | Costa Mesa, CA 92626 | (949) 660-1994
urbanxroads.com

March 2, 2020

Ms. Ruth Villalobos
Ruth Villalobos & Associates, Inc.
3602 Inland Empire Boulevard, Suite C310
Ontario, CA 91764

SUBJECT: MAJESTIC CHINO HERITAGE AIR QUALITY CUMULATIVE ANALYSIS FOR NEPA

Dear Ms. Ruth Villalobos:

This Cumulative Analysis for NEPA has been prepared for the Majestic Chino Heritage Project, which is located on the southeast corner of Mountain Avenue and Bickmore Avenue in the City of Chino.

CUMULATIVE AIR QUALITY EMISSIONS

In addition to the construction and operational emissions associated with the proposed Majestic Chino Heritage Project, the nearby Alcoa Dike Project construction activities may occur concurrently. Operational activities associated with the Alcoa Dike Project would be negligible as identified in the Environmental Assessment prepared for the Alcoa Dike Project. As such, the potential cumulative impacts from the Majestic Chino Heritage and Alcoa Dike Projects are considered.

Table 1 summarizes the cumulative annual construction air quality emissions and associated General Conformity Applicability Rates.

Table 2 summarizes the cumulative annual operational air quality emissions and associated General Conformity Applicability Rates.

As shown, the cumulative air quality emissions do not exceed any of the applicable general conformity rates and therefore a less than significant impact would occur.

- .

TABLE 1: CUMULATIVE ANNUAL CONSTRUCTION EMISSIONS COMPARISON TO GENERAL CONFORMITY APPLICABILITY RATES

Pollutant	General Conformity Applicability Rates (tons/year)	Estimated Construction Emissions (tons/year)		
		Majestic Chino Heritage	Alcoa Dike	Total Cumulative
O_3 (VOC)	10	6.33	0.57	6.90
CO	100	12.60	3.84	16.44
NO_2	100	11.46	5.79	17.25
SO_2	100	0.05	0.007	0.06
PM_{10}	100	3.26	1.10	4.36
$PM_{2.5}$	100	1.00	0.67	1.67
Pb	25	0	0	0

TABLE 2: CUMULATIVE ANNUAL OPERATIONAL EMISSIONS COMPARISON TO GENERAL CONFORMITY APPLICABILITY RATES

Pollutant	General Conformity Applicability Rates (tons/year)	Estimated Operational Emissions (tons/year) Majestic Chino Heritage	Estimated Operational Emissions (tons/year) Alcoa Dike	Total Cumulative
O_3 (VOC)	10	9.31	Negligible	9.31
CO	100	24.48	Negligible	24.48
NO_2	100	31.74	Negligible	31.74
SO_2	100	0.17	Negligible	0.17
PM_{10}	100	9.25	Negligible	9.25
$PM_{2.5}$	100	2.64	Negligible	2.64
Pb	25	0	Negligible	0

If you have any questions, please contact me directly at (949) 336-5987.

Respectfully submitted,
URBAN CROSSROADS, INC.

Haseeb Qureshi
Associate Principal

Appendix C

Noise Impact Analysis

Majestic Chino Heritage

NOISE IMPACT ANALYSIS

CITY OF CHINO

PREPARED BY:

Bill Lawson, PE, INCE
blawson@urbanxroads.com
(949) 336-5979

Alex Wolfe, INCE
awolfe@urbanxroads.com
(949) 336-5977

AUGUST 12, 2019

TABLE OF CONTENTS

APPENDICES

LIST OF EXHIBITS

LIST OF TABLES

LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
ANSI	American National Standards Institute
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
L_{max}	Maximum level measured over the time interval
L_{min}	Minimum level measured over the time interval
mph	Miles per hour
PPV	Peak Particle Velocity
Project	Majestic Chino Heritage
REMEL	Reference Energy Mean Emission Level
RMS	Root-mean-square
VdB	Vibration Decibels

EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the noise exposure and the necessary noise mitigation measures for the proposed Majestic Chino Heritage development ("Project"). The Project site is located on the southeast corner of Mountain Avenue and Bickmore Avenue in the City of Chino. The total development is proposed to consist of up to 2,082,750 square feet of industrial uses. As a part of Project construction, five nearby soil borrow sites (or "Excess Fill Dirt Sites") have been identified to provide the soil export to be used as the import required for the Project site, and as such, construction activity associated with these sites has included in this analysis.

This study has been prepared consistent with applicable City of Chino noise standards, and significance criteria based on guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1) In addition, since nearby sensitive receiver locations are located in the adjacent City of Chino Hills and City of Eastvale, applicable noise level standards of each jurisdiction are used in this analysis to evaluate potential impacts. Further, additional receiver locations are identified at open space locations in the Project study area for information purposes only; the Project's Biology report will analyze the significance of any potential noise impacts to sensitive wildlife species.

OFF-SITE PROJECT TRAFFIC NOISE ANALYSIS

Traffic generated by the operation of the proposed Project will influence the traffic noise levels in surrounding off-site areas. To quantify the traffic noise increases on the surrounding off-site areas, the changes in traffic noise levels on 34 roadway segments surrounding the Project site were calculated based on the change in the average daily traffic (ADT) volumes. The traffic noise levels provided in this analysis are based on the traffic forecasts found in *Majestic Chino Heritage Traffic Impact Analysis*. (2) To assess the off-site noise level impacts associated with the proposed Project, noise contour boundaries were developed for Existing, Opening Year 2022, and Horizon Year 2040 traffic conditions. The analysis shows that the unmitigated Project-related traffic noise level increases under all traffic scenarios will be *less than significant*.

SOIL IMPORT/EXPORT HAUL TRUCK OFF-SITE TRAFFIC NOISE ANALYSIS

Traffic generated by the soil import/export truck haul activity associated with construction of the proposed Project will influence the traffic noise levels in surrounding off-site areas under Existing conditions. To quantify the traffic noise increases on the surrounding off-site areas during Project construction, the changes in traffic noise levels on eight roadway segments surrounding the Project site were calculated based on the change in the average daily traffic (ADT) volumes. The traffic noise levels provided in this analysis are based on the traffic forecasts found in *Majestic Chino Heritage Traffic Impact Analysis*. (2) To assess the off-site noise level impacts associated with the soil import/export haul truck trips, noise contour boundaries were developed for Existing traffic conditions.

The analysis shows that the unmitigated Project-related traffic noise level increases will be *potentially significant* at existing and future noise-sensitive land uses, if built and occupied at the time of soil import/export haul truck activity to and from the Excess Fill Dirt Sites, adjacent to the following roadway segments, as shown on Exhibits ES-A and ES-B, if haul truck activity occurs within the proposed daytime (7:00 a.m. – 3:00 p.m.) or off-peak (6:00 p.m. – 2:00 a.m.) hour conditions:

DAYTIME HAUL TRUCK OFF-SITE TRAFFIC NOISE IMPACTS

- Pine Av. west of W. Preserve Loop (Excess Fill Dirt Site #5);
- Chino Corona Rd. south of Pine Av. (Excess Fill Dirt Sites #3 & #4);
- Chino Corona Rd. east of Cucamonga Av. (Excess Fill Dirt Site #4);
- Hellman Av. south of Pine Av. (Excess Fill Dirt Site #5).

OFF-PEAK HAUL TRUCK OFF-SITE TRAFFIC NOISE IMPACTS

- Pine Av. east of Euclid Av. (Excess Fill Dirt Sites #2 to #5);
- Pine Av. west of Chino Corona Rd. (Excess Fill Dirt Sites #2 to #5);
- Pine Av. west of W. Preserve Loop (Excess Fill Dirt Site #5);
- Pine Av. west of E. Preserve Loop (Excess Fill Dirt Site #5);
- Pine Av. west of Hellman Av. (Excess Fill Dirt Site #5);
- Chino Corona Rd. south of Pine Av. (Excess Fill Dirt Sites #3 & #4);
- Chino Corona Rd. east of Cucamonga Av. (Excess Fill Dirt Site #4);
- Hellman Av. south of Pine Av. (Excess Fill Dirt Site #5).

PROJECT OPERATIONAL NOISE ANALYSIS

Using reference noise levels to represent the expected noise sources from the Majestic Chino Heritage site, this analysis estimates the Project-related stationary-source noise levels at nearby sensitive receiver locations. The normal activities associated with the proposed Majestic Chino Heritage are anticipated to include roof-top air conditioning units, idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, and parking lot vehicle movements. For this analysis, the closest noise-sensitive receiver locations to the Project site are located greater than 2,000 feet west of the Project site in the City of Chino Hills. An additional noise-sensitive receiver location is identified east of the Project site, at over 4,000 feet from the Project site, in the City of Chino. The operational noise analysis shows that the Project-related stationary-source noise levels at the nearby sensitive receiver locations will not exceed the City of Chino and City of Chino Hills exterior noise level standards. Therefore, the operational noise level impacts associated with the proposed Project activities, such as the roof-top air conditioning units, idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, and parking lot vehicle movements, are considered *less than significant*.

PROJECT OPERATIONAL VIBRATION ANALYSIS

The operation of the Project site will include heavy trucks moving on site to and from the loading dock areas. Truck vibration levels are dependent on vehicle characteristics, load, speed, and pavement conditions. Typical vibration levels for the Majestic Chino Heritage heavy truck activity at normal traffic speeds will approach 0.004 in/sec peak-particle-velocity (PPV) and 0.003 in/sec root-mean-square (RMS) velocity at 25 feet based on the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Assessment.* (3) Trucks transiting on site will be travelling at very low speeds so it is expected that delivery truck vibration impacts at nearby homes will not exceed the City of Chino 0.05 in/sec RMS vibration level standard, the City of Chino Hills 0.2 in/sec PPV standard, and the City of Eastvale 0.0787 in/sec PPV, and therefore, will be *less than significant*.

PROJECT SITE CONSTRUCTION NOISE ANALYSIS

Construction-related noise impacts are expected to create temporary and intermittent high-level noise conditions at receivers surrounding the Project site. Using sample reference noise levels to represent the planned construction activities of the Majestic Chino Heritage site, this analysis estimates the Project-related construction noise levels at nearby sensitive receiver locations. The analysis shows that the Project-related short-term construction noise levels, including those generated by both daytime and nighttime concrete pouring activity, are expected to approach 38.0 dBA L_{eq} and will not exceed the 65 dBA L_{eq} City of Chino construction noise level threshold at the nearby sensitive receiver locations. Therefore, based on the results of this analysis, all nearby sensitive receiver locations will experience *less than significant* impacts due to Project site construction noise levels.

SOIL IMPORT/EXPORT CONSTRUCTION NOISE ANALYSIS

Using sample reference noise levels to represent the planned construction activities at the Excess Fill Dirt Sites, this analysis estimates the construction noise levels at nearby sensitive receiver locations to each site. The short-term construction noise levels are expected to range from 30.0 to 67.5 dBA L_{eq} and will exceed the 65 dBA L_{eq} City of Chino construction noise level threshold at one of the sensitive receiver locations, R10, near Excess Fill Dirt Site #4. Therefore, based on the results of this analysis, if sensitive receiver location R10 represents built and occupied residential use it will experience *potentially significant* impacts due to construction noise levels generated by activities at Excess Fill Dirt Site #4. As such, a construction noise mitigation plan shall be required, as outlined below, if Excess Fill Dirt Site #4 is used for soil import/export activities, and if R10 represents built and occupied residential use at the time of the soil import/export activities.

All other receiver locations will experience *less than significant* noise impacts due to construction activities at the Excess Fill Dirt Sites.

SOIL IMPORT/EXPORT CONSTRUCTION NOISE MITIGATION MEASURES

A construction noise mitigation plan shall be prepared outlining the noise reduction measures to be implemented during construction activities at Excess Fill Dirt Site #4 if used for soil import/export, and if R10 represents built and occupied residential use at the time of the soil import/export activities. The construction noise mitigation plan shall indicate the mitigation measure(s) to be implemented to reduce construction noise levels at adjacent sensitive residential receiver locations to satisfy the City of Chino 65 dBA L_{eq} construction noise level limit. The following noise reduction measures represent individual examples of mitigation measures which, if implemented, would be capable of reducing construction noise levels at R10. A minimum of one of the following, or equivalent, measures shall be required to be implemented as a part of the construction noise mitigation plan:

- Install minimum 8-foot high temporary construction noise barriers at the construction activity boundaries adjacent to sensitive receiver R10, as shown on Exhibit ES-C, if R10 represents built and occupied noise-sensitive residential uses at the time of construction. The noise control barriers must have a solid face from top to bottom and must block the line-of-sight to the noise source. The noise control barriers must meet the minimum height and be constructed as follows:
    - The temporary noise barriers shall provide a minimum transmission loss of 20 dBA (Federal Highway Administration, Noise Barrier Design Handbook). The noise barrier shall be constructed using an acoustical blanket (e.g. vinyl acoustic curtains or quilted blankets) attached to the construction site perimeter fence or equivalent temporary fence posts;
    - The noise barrier must be maintained, and any damage promptly repaired. Gaps, holes, or weaknesses in the barrier or openings between the barrier and the ground shall be promptly repaired;
    - The noise control barrier and associated elements shall be completely removed, and the site appropriately restored upon the conclusion of the construction activity; or
- Install sound dampening mats or blankets to the engine compartments of heavy mobile equipment (e.g., dozers, graders, scrapers) capable of a minimum 5 dBA noise reduction (FHWA, Construction Noise Special Report). (4) The dampening materials must be capable of the minimum 5 dBA noise reduction and can be made of commercially-available sound dampening materials, including but not limited to polyurethane foam and vinyl sheeting (University of Massachusetts Lowell The Use of Noise Dampening Mats to Reduce Heavy-Equipment Noise). (5)
    - The sound dampening mats or blankets must be installed prior to the use of heavy mobile construction equipment within the Project site;
    - The sound dampening mats or blankets must remain installed for the duration of the use of the equipment during Project construction; or
- Prohibit the use of large construction equipment (greater than 80,000 pounds) within 170 feet of sensitive receiver R10, if R10 represents built and occupied noise-sensitive residential uses at the time of construction. Instead, small rubber-tired or alternative equipment shall be used within this buffer area during construction to reduce noise impacts.

PROJECT & SOIL IMPORT/EXPORT CONSTRUCTION VIBRATION ANALYSIS

The construction vibration analysis is based on the shortest distance to either Project site construction or Excess Fill Dirt Site soil import/export activities. Based on the analysis, construction vibration velocity levels are expected to approach 0.012 in/sec PPV, and 0.009 in/sec RMS. Based on the results of the analysis, the Project construction vibration levels will remain below the City of Chino 0.05 in/sec RMS vibration level standard, the City of Chino Hills 0.2 in/sec PPV standard, and the City of Eastvale 0.0787 in/sec PPV standard at the nearby sensitive receiver locations.

Further, the Project-related construction vibration levels do not represent levels capable of causing building damage to nearby residential homes. The FTA identifies construction vibration levels capable of building damage ranging from 0.12 to 0.5 in/sec PPV. (3) The peak Project-construction vibration levels approaching 0.012 in/sec PPV will remain below the FTA vibration levels for building damage at the residential homes near the Project site. Moreover, the impacts at the site of the closest sensitive receivers are unlikely to be sustained during the entire construction period, but will occur rather only during the times that heavy construction equipment is operating adjacent to the Project site perimeter.

SUMMARY OF CEQA SIGNIFICANCE FINDINGS

The results of this Majestic Chino Heritage Noise Impact Analysis are summarized below based on the significance criteria in Section 4 of this report consistent with Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1). Table ES-1 shows the findings of significance for each potential noise and vibration impact under CEQA.

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Off-Site Traffic Noise Levels (Long-Term Operation)	7	*Less Than Significant*	-
Off-Site Traffic Noise Levels (Short-Term Dirt Haul Trips)		*Potentially Significant*	*Significant*
Operational Noise Levels (Stationary Source)	9	*Less Than Significant*	-
Operational Vibration Levels		*Less Than Significant*	-
Project Construction Noise Levels (Stationary Source)	10	*Less Than Significant*	-
Soil Export Construction Noise Levels (Stationary-Source)		*Potentially Significant*	*Less Than Significant*
Construction Vibration Levels (Project & Soil Export)		*Less Than Significant*	-

EXHIBIT ES-A: DAYTIME EXCESS FILL DIRT SITE OFF-SITE TRAFFIC NOISE IMPACTS

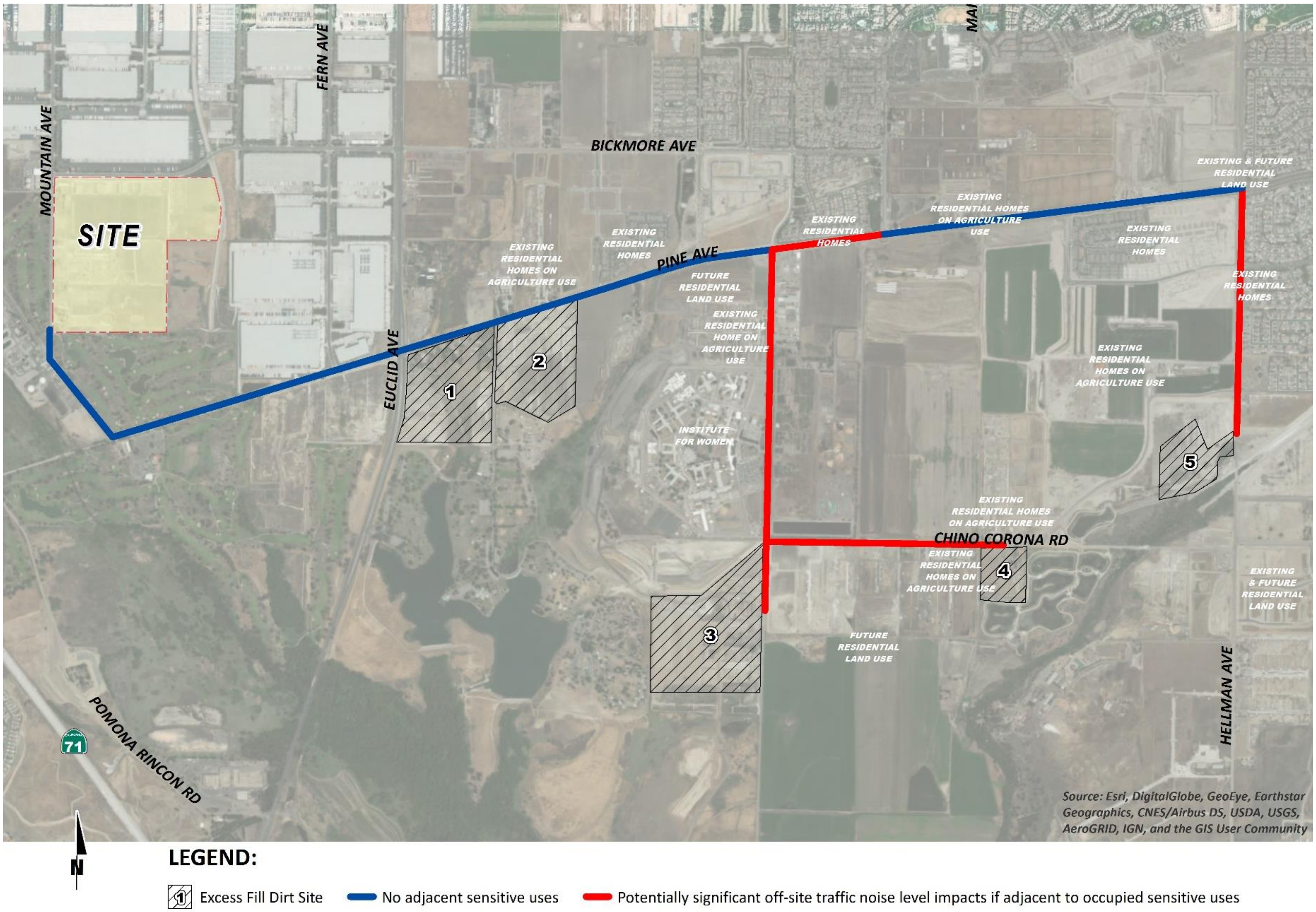


EXHIBIT ES-B: OFF-PEAK EXCESS FILL DIRT SITE OFF-SITE TRAFFIC NOISE IMPACTS

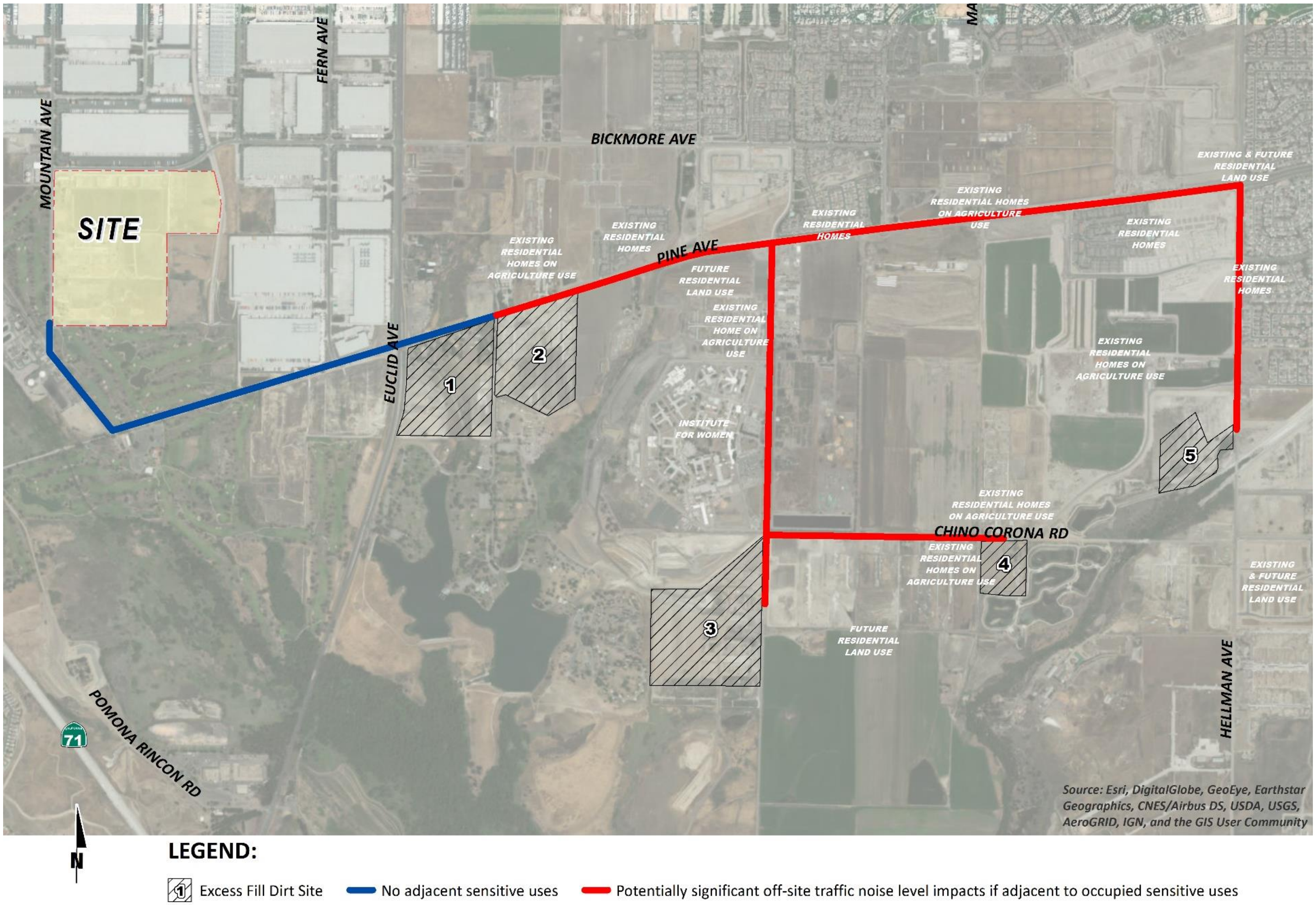


EXHIBIT ES-C: TEMPORARY CONSTRUCTION NOISE BARRIER LOCATIONS

LEGEND:

1 Excess Fill Dirt Site | Construction Activity | 8-foot high temporary noise barriers required to reduce construction noise levels at occupied sensitive receiver locations

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1 INTRODUCTION

This noise analysis has been completed to determine the noise impacts associated with the development of the proposed Majestic Chino Heritage ("Project"). This noise study briefly describes the proposed Project, provides information regarding noise fundamentals, describes the local regulatory setting, provides the study methods and procedures for transportation noise analysis, and evaluates the future exterior noise environment. In addition, this study includes an analysis of the potential Project-related long-term operational noise and short-term construction noise and vibration impacts.

1.1 SITE LOCATION

The Project site is located on the southeast corner of Mountain Avenue and Bickmore Avenue in the City of Chino, as shown on Exhibit 1-A. The closest noise-sensitive receiver locations to the Project site are located greater than 2,000 feet west of the Project site in the City of Chino Hills. Additional noise-sensitive receiver locations are identified east of the Project site, at over 4,000 feet from the Project site, in the City of Chino and City of Eastvale.

1.2 PROJECT DESCRIPTION

Exhibit 1-B shows the preliminary Project site plan. As indicated on Exhibit 1-B, the total development is proposed to consist of up to 2,082,750 square feet of industrial uses. Consistent with the *Traffic Impact Analysis*, the following land uses are assumed in this report:

- Building 1: 1,168,710 square feet of High-Cube Fulfillment Center Warehouse use
- Building 2: 814,040 square feet of High-Cube Without Cold Storage use
- Remainder of Building 2: 100,000 square feet of High-Cube with Cold Storage use

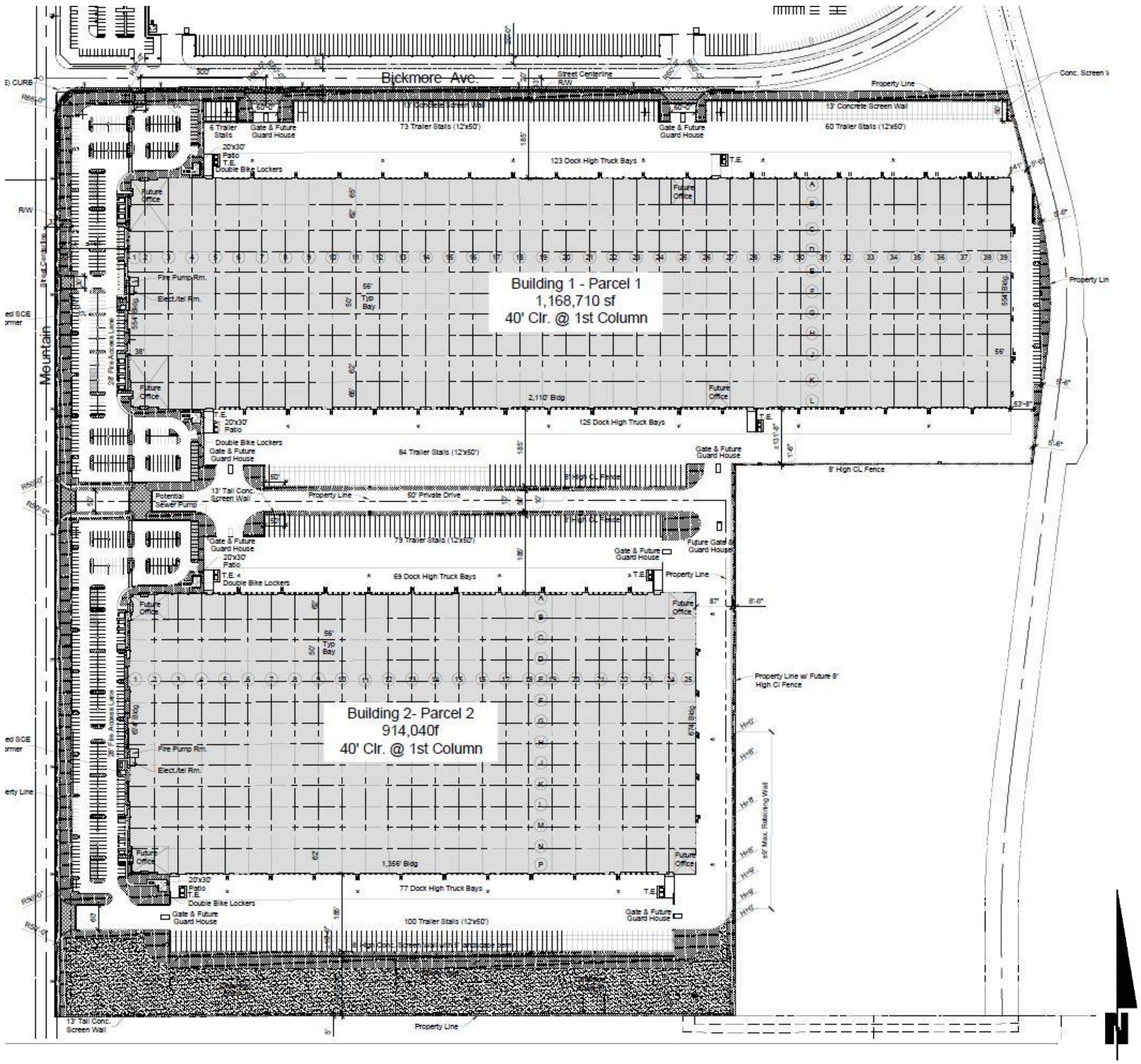
Total of 2,082,750 square feet

At the time this noise analysis was prepared, the future tenants of the proposed Project were unknown. The on-site Project-related noise sources are expected to include: roof-top air conditioning units, idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, and parking lot vehicle movements. This noise analysis is intended to describe noise level impacts associated with the expected typical, 24-hour seven days per week operational activities at the Project site.

Per the *Majestic Chino Heritage Traffic Impact Analysis* prepared by Urban Crossroads, Inc. the Project is expected to generate a net total of approximately 4,440 trip-ends per day (actual vehicles) and includes 824 truck trip-ends per day from the proposed buildings within the Project site. (6) This noise study relies on the actual Project trips (as opposed to the passenger car equivalents) to accurately account for the effect of individual truck trips on the study area roadway network.

EXHIBIT 1-A: LOCATION MAP

EXHIBIT 1-B: SITE PLAN



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2 FUNDAMENTALS

Noise has been simply defined as "unwanted sound." Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Noise is measured on a logarithmic scale of sound pressure level known as a decibel (dB). A-weighted decibels (dBA) approximate the subjective response of the human ear to broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear. Exhibit 2-A presents a summary of the typical noise levels and their subjective loudness and effects that are described in more detail below.

EXHIBIT 2-A: TYPICAL NOISE LEVELS

COMMON OUTDOOR ACTIVITIES	COMMON INDOOR ACTIVITIES	A - WEIGHTED SOUND LEVEL dBA	SUBJECTIVE LOUDNESS	EFFECTS OF NOISE
THRESHOLD OF PAIN		140	INTOLERABLE OR DEAFENING	HEARING LOSS
NEAR JET ENGINE		130		
		120		
JET FLY-OVER AT 300m (1000 ft)	ROCK BAND	110		
LOUD AUTO HORN		100	VERY NOISY	
GAS LAWN MOWER AT 1m (3 ft)		90		
DIESEL TRUCK AT 15m (50 ft), at 80 km/hr (50 mph)	FOOD BLENDER AT 1m (3 ft)	80		SPEECH INTERFERENCE
NOISY URBAN AREA, DAYTIME	VACUUM CLEANER AT 3m (10 ft)	70	LOUD	
HEAVY TRAFFIC AT 90m (300 ft)	NORMAL SPEECH AT 1m (3 ft)	60		
QUIET URBAN DAYTIME	LARGE BUSINESS OFFICE	50	MODERATE	
QUIET URBAN NIGHTTIME	THEATER, LARGE CONFERENCE ROOM (BACKGROUND)	40		SLEEP DISTURBANCE
QUIET SUBURBAN NIGHTTIME	LIBRARY	30	FAINT	NO EFFECT
QUIET RURAL NIGHTTIME	BEDROOM AT NIGHT, CONCERT HALL (BACKGROUND)	20		
	BROADCAST/RECORDING STUDIO	10	VERY FAINT	
LOWEST THRESHOLD OF HUMAN HEARING	LOWEST THRESHOLD OF HUMAN HEARING	0		

Source: Environmental Protection Agency Office of Noise Abatement and Control, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (EPA/ONAC 550/9-74-004) March 1974.

2.1 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. (7) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA at approximately 100 feet, which can cause serious discomfort. (8) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 NOISE DESCRIPTORS

Environmental noise descriptors are generally based on averages, rather than instantaneous, noise levels. The most commonly used figure is the equivalent level (L_{eq}). Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period and is commonly used to describe the "average" noise levels within the environment.

To describe the time-varying character of environmental noise, the statistical or percentile noise descriptors L_{50}, L_{25}, L_8 and L_2, are commonly used. The percentile noise descriptors are the noise levels equaled or exceeded during 50 percent, 25 percent, 8 percent and 2 percent of a stated time. Sound levels associated with the L_2 and L_8 typically describe transient or short-term events, while levels associated with the L_{50} describe the steady state (or median) noise conditions. The City of Chino relies on the percentile noise levels to describe the stationary source noise level limits. While the L_{50} describes the noise levels occurring 50 percent of the time, the L_{eq} accounts for the total energy (average) observed for the entire hour.

Peak hour or average noise levels, while useful, do not completely describe a given noise environment. Noise levels lower than peak hour may be disturbing if they occur during times when quiet is most desirable, namely evening and nighttime (sleeping) hours. To account for this, the Community Noise Equivalent Level (CNEL), representing a composite 24-hour noise level is utilized. The CNEL is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time of day corrections require the addition of 5 decibels to dBA L_{eq} sound levels in the evening from 7:00 p.m. to 10:00 p.m., and the addition of 10 decibels to dBA L_{eq} sound levels at night between 10:00 p.m. and 7:00 a.m. These additions are made to account for the noise sensitive time periods during the evening and night hours when sound appears louder. CNEL does not represent the actual sound level heard at any time, but rather represents the total sound exposure. The City of Chino relies on the 24-hour CNEL level to assess land use compatibility with transportation related noise sources.

2.3 SOUND PROPAGATION

When sound propagates over a distance, it changes in level and frequency content. The way noise reduces with distance depends on the following factors.

2.3.1 GEOMETRIC SPREADING

Sound from a localized source (i.e., a stationary point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source. (7)

2.3.2 GROUND ABSORPTION

The propagation path of noise from a highway to a receptor is usually very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 ft. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receptor, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receptor such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance from a line source. (9)

2.3.3 ATMOSPHERIC EFFECTS

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects. (7)

2.3.4 SHIELDING

A large object or barrier in the path between a noise source and a receptor can substantially attenuate noise levels at the receptor. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Shielding by trees and other such vegetation typically only has an "out of sight, out of mind" effect. That is, the perception of noise impact tends to decrease when vegetation blocks the line-of-sight to nearby resident. However, for vegetation to provide a substantial, or even noticeable, noise reduction, the vegetation area must be at least 15 feet in height, 100 feet wide and dense enough to completely obstruct the line-of sight between the source and the receiver. This size of vegetation may provide up to 5 dBA of noise reduction. The FHWA does not consider the planting of vegetation to be a noise abatement measure. (9)

2.4 NOISE CONTROL

Noise control is the process of obtaining an acceptable noise environment for an observation point or receptor by controlling the noise source, transmission path, receptor, or all three. This concept is known as the source-path-receptor concept. In general, noise control measures can be applied to these three elements.

2.5 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receptor. Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source. (9)

2.6 LAND USE COMPATIBILITY WITH NOISE

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development, so too can the mismanagement of noise impacts impair the economic health and growth potential of a community by reducing the area's desirability as a place to live, shop and work. For this reason, land use compatibility with the noise environment is an important consideration in the planning and design process. The FHWA encourages State and Local government to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway, or that the developments are planned, designed, and constructed in such a way that noise impacts are minimized. (10)

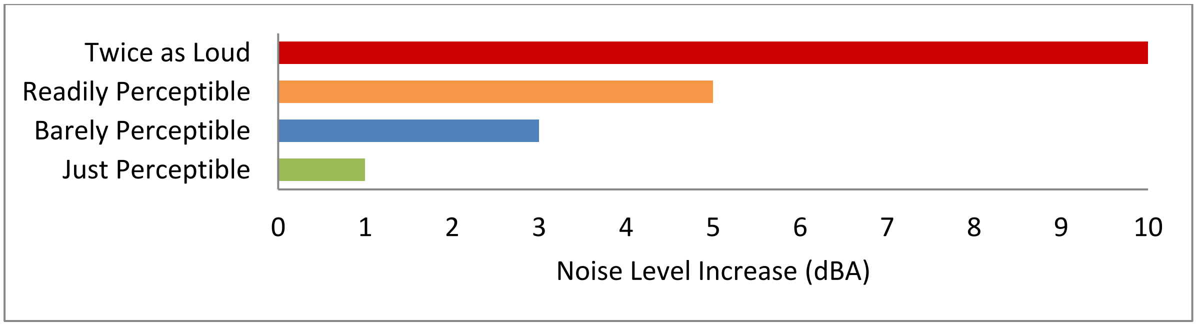
2.7 COMMUNITY RESPONSE TO NOISE

Community responses to noise may range from registering a complaint by telephone or letter, to initiating court action, depending upon everyone's susceptibility to noise and personal attitudes about noise. Several factors are related to the level of community annoyance including:

- Fear associated with noise producing activities;
- Socio-economic status and educational level;
- Perception that those affected are being unfairly treated;
- Attitudes regarding the usefulness of the noise-producing activity;
- Belief that the noise source can be controlled.

Approximately ten percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints will occur. Another twenty-five percent of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (11) Surveys have shown that about ten percent of the people exposed to traffic noise of 60 dBA will report being highly annoyed with the noise, and each increase of one dBA is associated with approximately two percent more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain. (11) Despite this variability in behavior on an individual level, the population can be expected to exhibit the following responses to changes in noise levels as shown on Exhibit 2-B. An increase or decrease of 1 dBA cannot be perceived except in carefully controlled laboratory experiments, a change of 3 dBA are considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (9)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



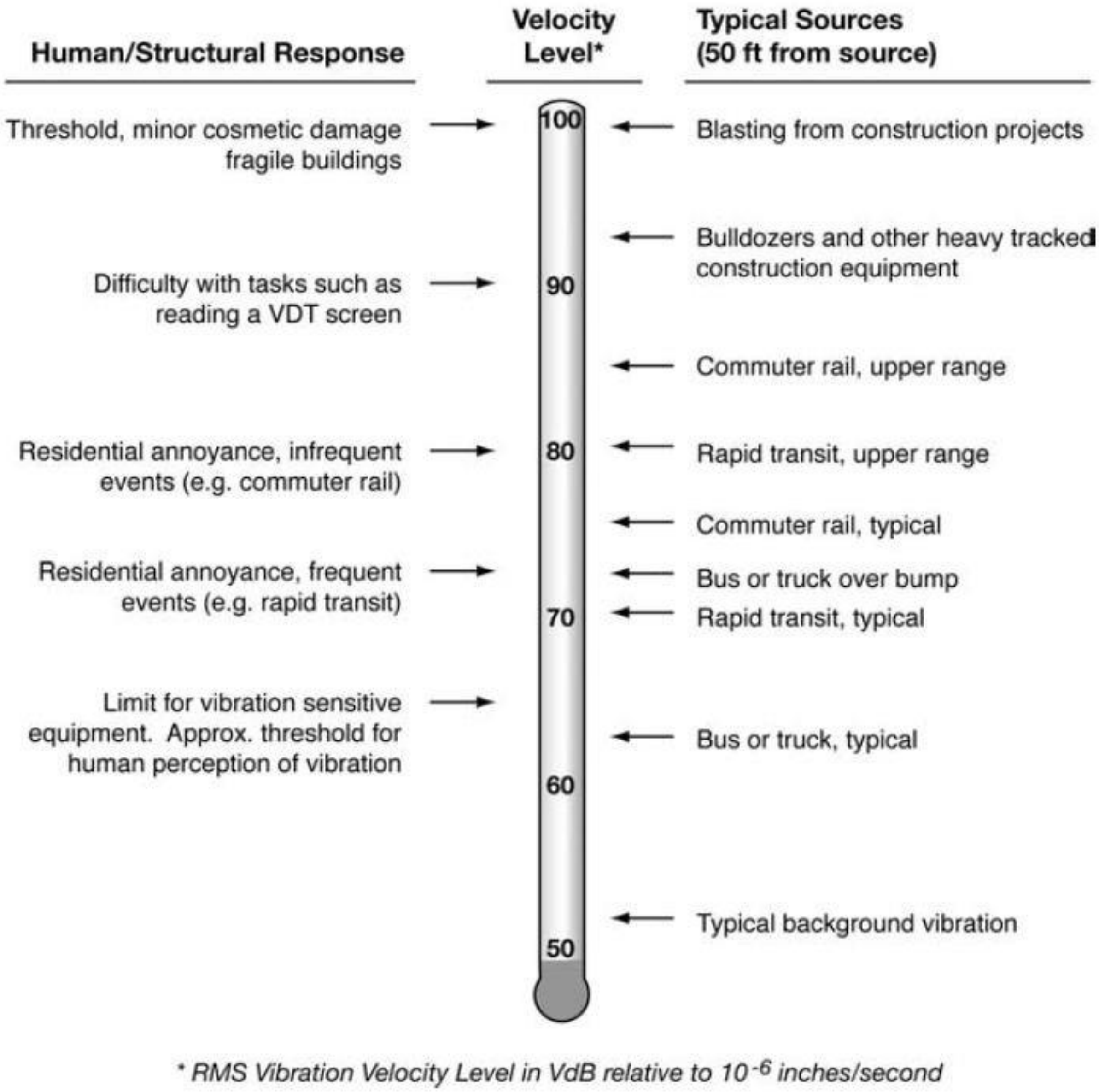
2.8 VIBRATION

Per the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Assessment*, vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions. As is the case with airborne sound, ground-borne vibrations may be described by amplitude and frequency.

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings but is not always suitable for evaluating human response (annoyance) because it takes some time for the human body to respond to vibration signals. Instead, the human body responds to average vibration amplitude often described as the root mean square (RMS). The RMS amplitude is defined as the average of the squared amplitude of the signal and is most frequently used to describe the effect of vibration on the human body. Decibel notation (VdB) is commonly used to measure RMS. Decibel notation (VdB) serves to reduce the range of numbers used to describe human response to vibration. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receivers for vibration include structures (especially older masonry structures), people (especially residents, the elderly, and sick), and vibration-sensitive equipment.

The background vibration-velocity level in residential areas is generally 50 VdB. Ground-borne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground-borne vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Exhibit 2-C illustrates common vibration sources and the human and structural response to ground-borne vibration.

EXHIBIT 2-C: TYPICAL LEVELS OF GROUND-BORNE VIBRATION



Source: Federal Transit Administration (FTA) Transit Noise Impact and Vibration Assessment.

3 REGULATORY SETTING

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise. In most areas, automobile and truck traffic is the major source of environmental noise. Traffic activity generally produces an average sound level that remains constant with time. Air and rail traffic, and commercial and industrial activities are also major sources of noise in some areas. Federal, state, and local agencies regulate different aspects of environmental noise. Federal and state agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while regulation of stationary sources is left to local agencies.

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared per guidelines adopted by the Governor's Office of Planning and Research. (12) The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*. In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts.

3.2 STATE OF CALIFORNIA BUILDING CODE

The State of California's noise insulation standards are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 2, and the California Building Code. These noise standards are applied to new construction in California for the purpose of controlling interior noise levels resulting from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, or hospitals, are developed near major transportation noise sources, and where such noise sources create an exterior noise level of 60 dBA CNEL or higher. Acoustical studies that accompany building plans for noise-sensitive land uses must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new residential buildings, schools, and hospitals, the acceptable interior noise limit for new construction is 45 dBA CNEL.

3.3 CITY OF CHINO GENERAL PLAN NOISE ELEMENT

The City of Chino has adopted a Noise Element of the General Plan (13) to minimize problems from intrusive sound and to ensure that development does not expose people to unacceptable noise levels. The Noise Element specifies the maximum exterior and interior noise levels for new developments impacted by transportation noise sources such as arterial roads, freeways, airports, and railroads. In addition, the Noise Element identifies noise polices designed to protect, create, and maintain an environment free from noise that may jeopardize the health or welfare of sensitive receivers, or degrade quality of life. To protect Chino residents from unacceptable noise levels, the Noise Element contains the following three objectives:

N-1.1. Ensure appropriate exterior and interior noise levels for existing and new land uses;
N-1.2 Reduce noise impacts from transportation;
N-1.3 Control sources of construction noise.

The noise policies specified in the City of Chino Noise Element provide the guidelines necessary to satisfy these objectives. To ensure the appropriate exterior and interior noise levels for existing and new land uses (N-1.1), Table N-3 of the City of Chino General Plan Noise Element, identifies a maximum allowable exterior noise level of 65 dBA CNEL and an interior noise level limit of 45 dBA CNEL for new residential developments impacted by transportation noise sources such as arterial roads, freeways, airports, railroads, and warehousing uses.

The City of Chino General Plan Noise Element does not identify criteria to assess the impacts associated with exterior off-site transportation-related noise impacts at non-noise-sensitive uses, such as industrial, and therefore, the Office of Planning and Research (OPR) land use/noise compatibility criteria, found in Figure 2 of the *General Plan Guidelines, Appendix C: Noise Element Guidelines* criteria can be used to assess potential impacts at adjacent land uses. The *normally acceptable* exterior noise level for non-noise-sensitive land use, such as industrial use, is 70 dBA CNEL. Noise levels greater than 70 dBA CNEL are considered *conditionally acceptable* per the *Land Use Compatibility Criteria*. (14)

ADJACENT JURISDICTIONS

The City of Chino residential exterior noise level standard for transportation noise sources of 65 dBA CNEL is generally consistent with the adjacent jurisdictional guidelines of the City of Chino Hills, City of Ontario, and City of Eastvale, as indicated in Table 7-1 of the City of Chino Hills General Plan, The Ontario Plan Safety Section on Noise Hazards (Table LU-7), and Table N-3 of the City of Eastvale General Plan Noise Element, respectively. As such, this noise study relies on the 65 dBA CNEL City of Chino residential exterior noise level standard for transportation noise sources when evaluating Project-related off-site traffic noise level increases at noise-sensitive land uses. (15) (16) (17) In addition, the guidelines of the City of Chino Hills, City of Ontario, and City of Eastvale, as indicated in their respective General Plans, also generally identify 70 dBA CNEL as *normally acceptable* for non-noise-sensitive uses, such as industrial.

3.4 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as the Majestic Chino Heritage, operational noise that may include roof-top air conditioning units, idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, and parking lot vehicle movements are typically evaluated against standards established under a City's Municipal Code. Since nearby sensitive receiver locations are located in the adjacent City of Chino Hills, applicable noise level standards of each jurisdiction are used in this analysis to evaluate potential impacts.

3.4.1 City of Chino Municipal Code

The City of Chino Noise Ordinance included in the Municipal Code (Chapter 9.40) establishes the maximum permissible noise level that may intrude into a neighbor's property. The Noise Ordinance (Section 9.40.040) establishes the exterior noise level criteria for residential properties affected by stationary noise sources. While the Municipal Code identifies noise zones for commercial (Zone II), manufacturing and industrial properties (Zone III), it only establishes exterior noise standards for residential property (Section 9.40.030). For residential properties (Noise Zone 1), the exterior noise level shall not exceed 55 dBA during daytime hours (7:00 a.m. to 10:00 p.m.) and shall not exceed 50 dBA during the nighttime hours (10:00 p.m. to 7:00 a.m.) for more than 30 minutes in any hour. (18) These standards shall apply for a cumulative period of 30 minutes in any hour, as well as the standard plus 5 dBA cannot be exceeded for a cumulative period of more than 15 minutes in any hour, or the standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour, or the standard plus 15 dBA for a cumulative period of more than 1 minute in any hour, or the standard plus 20 dBA for any period of time. The City of Chino Municipal Code operational noise level standards are shown on Table 3-1 and included in Appendix 3.1.

3.4.2 City of Chino Hills Municipal Code

The City of Chino Hills Municipal Code, Chapter 16 *Performance Standards*, Section 16.48.020(B) *Noise Standards*, identifies the City's standards as the *"Zone C" noise standard for that receiving land use specified in Table N-1 of the General Plan Noise Element.* (19) Consistent with Table 7-1 of the General Plan Noise Element, single-family residential land use shall not exceed a transportation-related exterior noise level of 65 dBA CNEL or an interior noise level of 45 dBA CNEL.

To assess the stationary noise sources associated with the Project, Development Code, Section 16.48.020(B)(2), identifies percentile noise level standards by land use category. The percentile noise levels represent the noise level standard (as show on Table 7-1 of the General Plan Noise Element) for that receiving land use for a cumulative period of more than 30 minutes (L_{50}) in any hour. For a cumulative period of more than fifteen minutes (L_{25}) in any hour, the standard plus 5 dBA may not be exceeded. For a cumulative period of more than five minutes (L_8) in any hour, the standard plus 10 dBA may not be exceeded. For any one minute period (L_2) in any hour, the standard plus 15 dBA may not be exceeded, and the noise standard plus 20 dBA (L_{max}) may not be exceeded for any period of time. (19) Table 3-1 shows the Chino Hills exterior noise level limits for residential uses.

TABLE 3-1: OPERATIONAL NOISE STANDARDS

City	Land Use	Time Period	Exterior Noise Level Standards (dBA)[1]				
			L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
Chino[2]	Residential	Daytime	55	60	65	70	75
		Nighttime	50	55	60	65	70
Chino Hills[3]		Any Time	65	70	75	80	85

[1] The percent noise level is the level exceeded "n" percent of the time during the measurement period. L_{50} is the noise level exceeded 50% of the time.
[2] Source: Section 9.40.040 of the City of Chino Municipal Code (Appendix 3.1).
[3] Source: Section 16.48.020 of the City of Chino Hills Development Code and Table 7-1 of the City of Chino Hills Noise Element.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

3.5 CONSTRUCTION NOISE STANDARDS

The City of Chino has set restrictions to control noise impacts associated with construction activities throughout the City. Section 9.40.060(D) of the City's Noise Ordinance indicates that noise sources associated with construction, repair, remodeling, or grading of any real property, are exempt from the provisions of the noise ordinance, provided the construction activities take place between the hours of 7:00 a.m. and 8:00 p.m. Monday through Saturday, with no construction allowed on Sundays and Federal holidays (Section 15.44.030), and provided the noise levels exceeding 65 dBA when measured on residential property do not endanger the public health, welfare and safety. (20) The City can authorize construction activities to occur outside of the hours specified above.

Although construction noise may not pose an immediate a health risk or damage human hearing, it has the potential to adversely affect people's quality of life. Noise annoys, awakens, angers, and frustrates noise-sensitive individuals. It disrupts communication and affects performance capabilities. Noise is one of the biological stressors associated with everyday life. Thus, the numerous effects of noise combine to detract from the quality of people's lives and the environment. (21) In addition, acceptance of temporary construction noise varies with the individual. For this reason, and to present a conservative evaluation of construction noise effects in this report, the numerical noise standard of 65 dBA (with higher noise level allowances for short bursts of louder noise) established in the City of Chino Municipal Code, Section 9.40.060(D) *Special Provisions*, is used in this analysis to determine the significance of construction noise on noise-sensitive receivers.

The reference construction noise limit of 65 dBA L_{eq} provides an acceptable numerical threshold for determining the relative significance of Project construction noise levels at nearby residential receivers. Note that pursuant to the City of Chino Municipal Code, Section 9.40.060(D), the noise limit of 65 dBA is the noise standard for a cumulative period of more than thirty minutes in any hour (L_{50}). In addition, the Municipal Code allows for short bursts or periods of increased construction-related noise as follows:

- 70 dBA for a cumulative period of no more than fifteen minutes in any hour (L_{25});

- 75 dBA for a cumulative period of no more than five minutes in any hour (L_8);
- 80 dBA for a cumulative period of more than one minute in any hour (L_2);
- Noise levels greater than 85 dBA experienced at a sensitive receiver for any period (L_{max}).

For the purposes of this analysis, the 65 dBA L_{eq} threshold is used to represent a single numerical average threshold to assess the potential construction noise level impacts at nearby sensitive receivers. While the L_{50} describes the median noise levels occurring 50 percent of the time, the L_{eq} accounts for the total energy (average) observed for the entire hour during construction activities. In addition, the City of Chino Hills and Eastvale do not identify specific construction noise level thresholds, and as such, this analysis relies on the conservative City of Chino 65 dBA L_{eq} threshold.

Mobile construction equipment will operate throughout the Project site and will not remain stationary, and therefore, the stationary-source noise level limits of Section 9.40.040 of the City of Chino Municipal Code are not applied to Project construction noise levels. Moreover, since the City of Chino specifically identifies a 65 dBA exterior noise level limit for construction noise, the previously identified Municipal Code stationary-source noise level limits described in Section 3.4 for operational noise are not used in the evaluation of potential construction noise impacts.

3.6 VIBRATION STANDARDS

To analyze vibration impacts originating from the operation and construction of the Majestic Chino Heritage, vibration-generating activities are typically evaluated against standards established under a City's Municipal Code. The City of Chino and Chino Hills Municipal Code and the City of Eastvale General Plan vibration level standards are used in this analysis to assess potential impacts at nearby sensitive receiver locations within each jurisdiction, respectively.

The Project construction vibration levels are evaluated in this report base on the City of Chino 0.05 in/sec RMS vibration level standard, the City of Chino Hills 0.2 in/sec PPV standard, and the City of Eastvale 0.0787 in/sec PPV standard. (18) (19) (16)

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4 SIGNIFICANCE CRITERIA

The following significance criteria are based on currently adopted guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1) For the purposes of this report, impacts would be potentially significant if the Project results in or causes:

A. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

B. Generation of excessive ground-borne vibration or ground-borne noise levels?

C. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

While the City of Chino General Plan Guidelines provide direction on noise compatibility and establish noise standards by land use type that are sufficient to assess the significance of noise impacts, they do not define the levels at which increases are considered substantial for use under Guideline A. CEQA Appendix G Guideline C applies to nearby public and private airports, if any, and the Project's land use compatibility.

4.1 CEQA GUIDELINES NOT FURTHER ANALYZED

Based on future Year 2030 conditions provided in the *Chino Airport Master Plan* and the *Airport Comprehensive Land Use Plan*, the Project site is located outside of the 55 to 60 dBA CNEL noise level contour boundary. (22) As such, exterior noise levels due to aircraft overflight activities would not exceed the exterior noise level standards of the City of Chino General Plan Noise Element, and Project interior noise levels would be reduced with standard building construction. Therefore, no impact related to the exposure of people residing or working in the Project area to excessive airport related noise levels is anticipated, and no further analysis is required under Guideline C.

4.2 SIGNIFICANCE CRITERIA SUMMARY

Noise impacts shall be considered significant if any of the following occur as a direct result of the proposed development. The significance criteria is shown on Table 4-1.

OFF-SITE TRAFFIC NOISE

- When off-site traffic noise levels, without or with the Project, at existing and future noise-sensitive land uses (e.g. residential, schools, churches, etc.) exceed the 65 dBA CNEL standard for noise-sensitive uses identified in Table N-3 of the City of Chino General Plan Noise Element, and the Project creates a community noise level increase of greater than 1.5 dBA CNEL (FICON). (23)

- When off-site traffic noise levels, without or with the Project, at existing and future non-noise-sensitive land uses (e.g. industrial, etc.) exceed the OPR General Plan Guidelines, Appendix C: Noise Element Guidelines, *normally acceptable* 70 dBA CNEL noise level criteria and the Project creates a community noise level increase of greater than 1.5 dBA CNEL (FICON). (23)

OPERATIONAL NOISE

- If Project-related operational (stationary-source) noise levels exceed the exterior noise level standards for sensitive residential land uses in the City of Chino or City of Chino Hills, as previously shown on Table 3-1.

OPERATIONAL VIBRATION

- If long-term Project-generated operational-source vibration levels could exceed:
  - the vibration standard of 0.05 inch/sec RMS at noise-sensitive receiver locations in the City of Chino;
  - the vibration standard of 0.2 inch/sec PPV at noise-sensitive receiver locations in the City of Chino Hills;
  - the vibration standard of 0.0787 inch/sec PPV at noise-sensitive receiver locations in the City of Eastvale.

CONSTRUCTION NOISE

- If Project-related construction activities create noise levels during the approved hours at sensitive residential receiver locations which exceed the construction noise level limit of 65 dBA L_{eq} (City of Chino Municipal Code, Section 9.40.060(D)).

CONSTRUCTION VIBRATION

- If short-term Project-generated construction-source vibration levels could exceed:
  - the vibration standard of 0.05 inch/sec RMS at noise-sensitive receiver locations in the City of Chino;
  - the vibration standard of 0.2 inch/sec PPV at noise-sensitive receiver locations in the City of Chino Hills;
  - the vibration standard of 0.0787 inch/sec PPV at noise-sensitive receiver locations in the City of Eastvale.

TABLE 4-1: SIGNIFICANCE CRITERIA SUMMARY

Analysis	City	Receiving Land Use	Condition(s)	Significance Criteria	
				Daytime	Nighttime
Off-Site Traffic Noise	All	Noise-Sensitive[1]	If off-site traffic noise is > 65 dBA CNEL	≥ 1.5 dBA CNEL Project increase	
		Non-Noise-Sensitive[2]	If off-site traffic noise is > 70 dBA CNEL	≥ 1.5 dBA CNEL Project increase	
Operational[3]	Multiple	Noise-Sensitive	Exterior Noise Level Limits	See Table 3-1	
Construction[4,5]	All	Residential	Noise Level Threshold[4]	65 dBA L_{eq}	
	Chino	Sensitive	Vibration Level Threshold	0.05 in/sec RMS	
	Chino Hills		Vibration Level Threshold	0.2 in/sec PPV	
	Eastvale		Vibration Level Threshold	0.0787 in/sec PPV	

[1] Based on City of Chino General Plan criteria and FICON guidance (1992).
[2] Based on the land use compatibility criteria found in the Office of Planning and Research General Plan Guidelines, Figure 2, and the General Plans of the City of Chino, Chino Hills, and Eastvale, and FICON guidance (1992).
[3] Municipal Code exterior noise level limits.
[4] Based on the conservative construction noise level threshold for residential uses identified in the City of Chino Municipal Code, Section 9.40.060(D).
[5] Vibration thresholds based on the Municipal Codes of the City of Chino and Chino Hills and Eastvale General Plan.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.; "RMS" = root-mean-square; "PPV" = peak-particle-velocity

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5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 11 24-hour noise level measurements were taken at sensitive receiver locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Tuesday, April 2nd, 2019. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (24)

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent any part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (7) Further, FTA guidance states, t*hat it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community*. (3)

Based on recommendations of Caltrans and the FTA, it is not necessary to collect measurements at each individual building or residence, because each receiver measurement represents a group of buildings that share acoustical equivalence. In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent a location of noise sensitive areas and are used to estimate the future noise level impacts. Collecting reference ambient noise level measurements at the nearby sensitive receiver locations allows for a comparison of the before and after Project noise levels and is necessary to assess potential noise impacts due to the Project's contribution to the ambient noise levels.

5.3 NOISE MEASUREMENT RESULTS

The noise measurements presented below focus on the average or equivalent sound levels (L_{eq}). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. Table 5-1 identifies the hourly daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) noise levels at each noise level measurement location. Additional median noise levels (L_{50}) are provided on Table 5-1 consistent with applicable Municipal Code exterior noise level standards. Appendix 5.2 provides a summary of the existing ambient noise levels described below:

- Location L1 represents the noise levels near a Big League Dreams and Fairfield Ranch Park, west of the Project site. The noise level measurements collected show an overall 24-hour exterior noise level of 57.8 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 53.9 dBA L_{eq} with an average nighttime noise level of 50.3 dBA L_{eq}.
- Location L2 represents the noise levels on Mountain Avenue, north of El Prado Road south of the Project site boundary. The noise level measurements collected show an overall 24-hour exterior noise level of 62.1 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 59.0 dBA L_{eq} with an average nighttime noise level of 54.4 dBA L_{eq}.
- Location L3 represents the noise levels on Pine Avenue, near Lizze Custom Processing, southeast of the Project site. The 24-hour CNEL indicates that the overall exterior noise level is 67.9 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 62.6 dBA L_{eq} with an average nighttime noise level of 61.0 dBA L_{eq}.
- Location L4 represents the noise levels on Johnson Avenue, near Prado Park Equestrian Center, southeast of the Project site. The noise level measurements collected show an overall 24-hour exterior noise level of 58.3 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 53.9 dBA L_{eq} with an average nighttime noise level of 50.9 dBA L_{eq}.
- Location L5 represents the noise levels on Meadowhouse Avenue, near Meadow Square Apartment Homes, east of the Project site. The noise level measurements collected show an overall 24-hour exterior noise level of 65.5 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 60.5 dBA L_{eq} with an average nighttime noise level of 58.3 dBA L_{eq}.
- Location L6 represents the noise levels in Prado Regional Park near campground areas. The noise level measurements collected show an overall 24-hour exterior noise level of 56.3 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 53.8 dBA L_{eq} with an average nighttime noise level of 48.3 dBA L_{eq}.
- Location L7 represents the noise levels on Cucamonga Road, near Vermontes Mulch, southeast of the Project site. The noise level measurements collected show an overall 24-hour exterior noise level of 58.1 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 57.0 dBA L_{eq} with an average nighttime noise level of 48.9 dBA L_{eq}.
- Location L8 represents the noise levels on Chino Corona Road, near County Road, adjacent to existing rural residential homes. The noise level measurements collected show an overall 24-hour exterior noise level of 66.1 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 62.7 dBA L_{eq} with an average nighttime noise level of 58.7 dBA L_{eq}.

- Location L9 represents the noise levels on Hereford Road, near residential construction and a vacant area, east of the Project site. The 24-hour CNEL indicates that the overall exterior noise level is 61.8 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 60.2 dBA L_{eq} with an average nighttime noise level of 53.3 dBA L_{eq}.
- Location L10 represents the noise levels at Walters Street and Hellman Avenue, adjacent to existing residential homes. The noise level measurements collected show an overall 24-hour exterior noise level of 79.7 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 75.4 dBA L_{eq} with an average nighttime noise level of 72.6 dBA L_{eq}.
- Location L11 represents the noise levels on Chandler Street, near a vacant area and existing residential neighborhood. The noise level measurements collected show an overall 24-hour exterior noise level of 65.4 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 61.9 dBA L_{eq} with an average nighttime noise level of 57.7 dBA L_{eq}.

Table 5-1 provides the (energy average) noise levels used to describe the daytime and nighttime ambient conditions. These daytime and nighttime energy average noise levels represent the average of all hourly noise levels observed during these time periods expressed as a single number. Appendix 5.2 provides summary worksheets of the noise levels for each hour as well as the minimum, maximum, L_1, L_2, L_5, L_8, L_{25}, L_{50}, L_{90}, L_{95}, and L_{99} percentile noise levels observed during the daytime and nighttime periods.

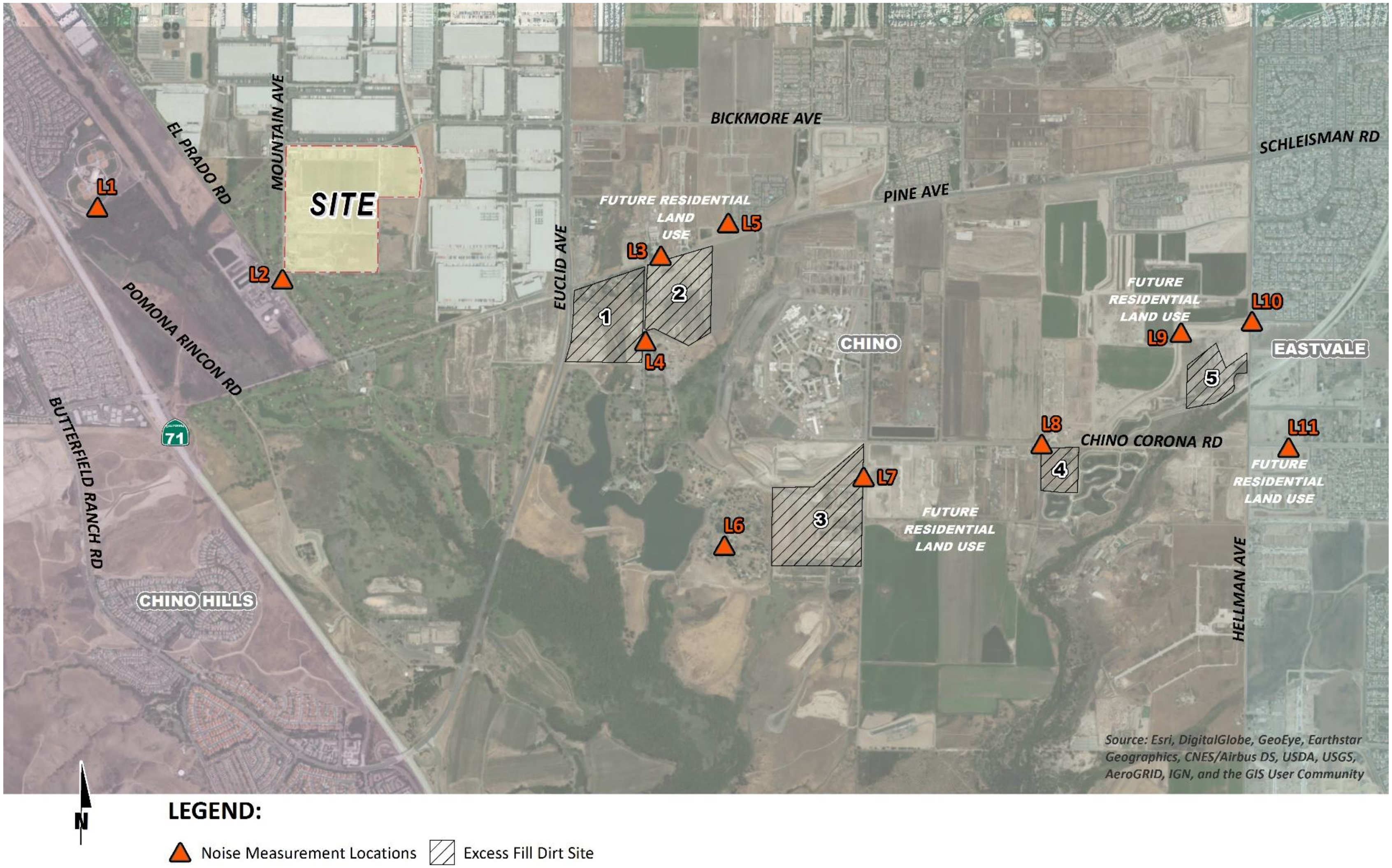
The background ambient noise levels in the Project study area are dominated by the transportation-related noise associated with the arterial roadway network and background Chino Airport aircraft flyover events. The 24-hour existing noise level measurements shown on Table 5-1 present the existing ambient noise conditions.

TABLE 5-1: 24-HOUR AMBIENT NOISE LEVEL MEASUREMENTS

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]		Average Median Noise Level (dBA L_{50})[2]		CNEL
		Daytime	Nighttime	Daytime	Nighttime	
L1	Located near a Big League Dreams and Fairfield Ranch Park, west of the Project site.	53.9	50.3	51.7	48.8	57.8
L2	Located on Mountain Avenue, north of El Prado Road south of the Project site boundary.	59.0	54.4	52.9	47.9	62.1
L3	Located on Pine Avenue, near Lizze Custom Processing, southeast of the Project site.	62.6	61.0	58.5	53.2	67.9
L4	Located on Johnson Avenue, near Prado Park Equestrian Center, southeast of the Project site.	53.9	50.9	49.2	47.1	58.3
L5	Located on Meadowhouse Avenue, near Meadow Square Apartment Homes, east of the Project site.	60.5	58.3	56.6	51.9	65.5
L6	Located in Prado Regional Park near campground areas.	53.8	48.3	48.1	45.9	56.3
L7	Located on Cucamonga Road, near Vermontes Mulch, southeast of the Project site.	57.0	48.9	49.1	43.7	58.1
L8	Located on Chino Corona Road, near County Road, adjacent to existing rural residential homes.	62.7	58.7	47.7	43.7	66.1
L9	Located on Hereford Road, near residential construction and a vacant area, east of the Project site.	60.2	53.3	51.5	45.1	61.8
L10	Located at Walters Street and Hellman Avenue, adjacent to existing residential homes.	75.4	72.6	68.9	53.4	79.7
L11	Located on Chandler Street, near a vacant area and existing residential neighborhood.	61.9	57.7	51.1	45.8	65.4

[1] See Exhibit 5-A for the noise level measurement locations.
[2] Energy (logarithmic) average hourly levels. The long-term 24-hour measurement worksheets are included in Appendix 5.2.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS



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6 METHODS AND PROCEDURES

The following section outlines the methods and procedures used to model and analyze the future traffic noise environment.

6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The estimated roadway noise impacts from vehicular traffic were calculated using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (25) The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). In California the national REMELs are substituted with the California Vehicle Noise (Calveno) Emission Levels. (26) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period. Research by Caltrans has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model used in this analysis. (27)

6.2 OFF-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

Table 6-1 presents the roadway parameters used to assess the Project's off-site transportation noise impacts. Table 6-1 identifies the 37 study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the City of Chino General Plan Circulation Element, and the posted vehicle speeds.

6.2.1 PROJECT OPERATIONAL TRAFFIC

The Existing, Opening Year 2022, and Horizon Year 2040 average daily traffic volumes used for this study are presented on Table 6-2 and are provided by *Majestic Chino Heritage Traffic Impact Analysis*. (2) To quantify the off-site noise levels, the Project related truck trips were added to the heavy truck category in the FHWA noise prediction model. The addition of the Project related truck trips increases the percentage of heavy trucks in the vehicle mix. This approach recognizes that the FHWA noise prediction model is significantly influenced by the number of heavy trucks in the vehicle mix.

Table 6-4 provides the time of day (daytime, evening, and nighttime) vehicle splits. The daily Project truck trip-ends were assigned to the individual off-site study area roadway segments based on the Project truck trip distribution percentages documented in the *Traffic Impact Analysis*. Using the Project truck trips in combination with the Project trip distribution, Urban Crossroads, Inc. calculated the number of additional Project truck trips and vehicle mix percentages for each of the study area roadway segments. Table 6-5 shows the traffic flow by vehicle type (vehicle mix) used for all without Project traffic scenarios, and Tables 6-6 to 6-8 show the vehicle mixes used for the with Project traffic scenarios.

6.2.2 SOIL IMPORT/EXPORT HAUL TRUCK TRAFFIC

The Existing and Existing with Project (haul truck trips) average daily traffic volumes used for the soil import/export off-site traffic noise analysis are presented on Table 6-3 and are based on the daytime and off-peak hour time periods, described in Section 7.5, and trips identified in the *Majestic Chino Heritage Traffic Impact Analysis*. (2)

TABLE 6-1: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Adjacent Planned (Existing if Different) Land Use[1]	Distance from Centerline to Nearest Adjacent Land Use (Feet)[2]	Vehicle Speed (mph)[3]
1	Central Av.	n/o El Prado Rd.	Industrial/Urban Reserve	60'	45
2	Central Av.	s/o El Prado Rd.	Industrial	60'	45
3	El Prado Rd.	n/o Kimball Av.	Industrial/Urban Reserve	44'	45
4	Euclid Av.	n/o Walnut Av.	Commercial	84'	55
5	Euclid Av.	n/o Riverside Dr.	Residential/Commercial	84'	55
6	Euclid Av.	n/o Chino Av.	Residential/Commercial	84'	55
7	Euclid Av.	n/o Schaefer Av.	Residential/Commercial	84'	55
8	Euclid Av.	n/o Edison Av.	Residential/Commercial	84'	55
9	Euclid Av.	n/o Eucalyptus Av.	Residential/Commercial	84'	55
10	Euclid Av.	n/o Merrill Av.	Residential/Agricultural	84'	55
11	Euclid Av.	s/o Merrill Av.	Open Space/Airport Related	84'	55
12	Euclid Av.	n/o Kimball Av.	Industrial/Airport Related	84'	55
13	Euclid Av.	n/o Bickmore Av.	Industrial/Commercial	84'	55
14	Archibald Av.	n/o Limonite Av.	Commercial/Residential	84'	55
15	Archibald Av.	s/o Limonite Av.	Commercial/Residential	76'	45
16	Archibald Av.	s/o Schleisman Rd.	Commercial/ Residential	76'	45
17	Kimball Av.	w/o Mountain Av.	Urban Reserve/Industrial	44'	50
18	Kimball Av.	w/o Euclid Av.	Industrial/Airport Related	44'	50
19	Kimball Av.	e/o Euclid Av.	Industrial/Airport Related	49'	50
20	Kimball Av.	w/o Rincon Meadows Av.	Airport Related/Residential	49'	50
21	Kimball Av.	e/o Rincon Meadows Av.	Airport Related/Residential	49'	50
22	Kimball Av.	e/o Mill Creek Av.	Airport Related/Residential	49'	50
23	Kimball Av.	e/o Main St.	Airport Related/Residential	49'	50
24	Kimball Av.	e/o Flight Av.	Industrial/Residential	49'	50
25	Limonite Av.	w/o Archibald Av.	Industrial	76'	50
26	Limonite Av.	e/o Archibald Av.	Commercial/Residential	76'	50
27	Pine Av.	w/o El Prado Rd.	Open Space (Golf Course)	60'	45
28	Pine Av.	w/o Euclid Av.	Industrial/Open Space	60'	45
29	Pine Av.	e/o Euclid Av.	Comm./Recreation (Residential)	60'	45
30	Pine Av.	w/o Chino Corona Rd.	Commercial/Residential	60'	45
31	Pine Av.	w/o W. Preserve Loop	Residential	60'	45
32	Pine Av.	w/o E. Preserve Loop	Residential	60'	45
33	Pine Av.	w/o Hellman Av.	Residential	60'	45
34	Schleisman Rd.	w/o Archibald Av.	Commercial/Residential	76'	45
35[4]	Chino Corona Rd.	s/o Pine Av.	Commercial/Residential	30'	45
36[4]	Chino Corona Rd.	e/o Cucamonga Av.	Residential/Agricultural	30'	40
37[4]	Hellman Av.	s/o Pine Av.	Residential	49'	45

[1] Sources: Land Use Maps of the City of Chino, Chino Hills, Ontario, and Eastvale, and aerial imagery.
[2] Distance to adjacent land use is based upon the right-of-way distances for each roadway classification provided in the General Plan Circulation Element.
[3] Sources: Majestic Chino Heritage Traffic Impact Analysis, prepared by Urban Crossroads, Inc.
[4] Segments 35 to 37 are only analyzed under Existing and Existing with Project conditions to determine potential off-site traffic noise impacts during dirt haul truck trips associated with Project construction.

TABLE 6-2: OPERATIONAL AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic Volumes[1]					
			Existing 2019		Opening Year 2022		Horizon Year 2040	
			Without Project	With Project	Without Project	With Project	Without Project	With Project
1	Central Av.	n/o El Prado Rd.	29,420	29,772	31,600	31,954	33,180	33,535
2	Central Av.	s/o El Prado Rd.	34,911	35,873	37,909	38,873	39,805	40,021
3	El Prado Rd.	n/o Kimball Av.	24,718	26,099	27,269	28,653	28,632	29,164
4	Euclid Av.	n/o Walnut Av.	30,254	30,863	34,918	35,531	52,793	53,422
5	Euclid Av.	n/o Riverside Dr.	25,283	25,924	29,681	30,326	45,572	46,231
6	Euclid Av.	n/o Chino Av.	25,245	25,994	29,908	30,662	49,051	49,822
7	Euclid Av.	n/o Schaefer Av.	27,794	28,582	32,723	33,515	49,457	50,264
8	Euclid Av.	n/o Edison Av.	29,878	30,668	35,053	35,847	52,051	52,860
9	Euclid Av.	n/o Eucalyptus Av.	27,743	28,639	32,935	33,836	47,542	48,456
10	Euclid Av.	n/o Merrill Av.	31,921	32,894	36,593	37,570	47,149	48,135
11	Euclid Av.	s/o Merrill Av.	30,618	31,662	34,987	36,035	49,987	51,048
12	Euclid Av.	n/o Kimball Av.	30,229	31,272	34,574	35,621	49,377	50,437
13	Euclid Av.	n/o Bickmore Av.	18,579	19,643	22,353	23,421	36,945	38,833
14	Archibald Av.	n/o Limonite Av.	25,446	25,613	29,340	29,511	46,489	46,675
15	Archibald Av.	s/o Limonite Av.	24,166	24,896	27,324	28,057	36,298	36,347
16	Archibald Av.	s/o Schleisman Rd.	21,994	22,146	24,024	24,178	27,702	27,859
17	Kimball Av.	w/o Mountain Av.	19,433	20,629	21,661	22,859	22,744	23,271
18	Kimball Av.	w/o Euclid Av.	22,184	22,245	24,434	24,497	29,863	29,889
19	Kimball Av.	e/o Euclid Av.	17,975	18,063	20,429	20,520	24,348	25,135
20	Kimball Av.	w/o Rincon Meadows Av.	19,031	19,120	21,291	21,382	22,356	23,141
21	Kimball Av.	e/o Rincon Meadows Av.	18,215	18,304	20,432	20,523	21,454	22,238
22	Kimball Av.	e/o Mill Creek Av.	16,458	16,545	18,591	18,680	19,521	20,303
23	Kimball Av.	e/o Main St.	15,466	15,552	17,491	17,579	18,365	19,110
24	Kimball Av.	e/o Flight Av.	13,131	13,143	14,790	14,803	15,529	16,235
25	Limonite Av.	w/o Archibald Av.	n/a	n/a	n/a	n/a	27,217	27,934
26	Limonite Av.	e/o Archibald Av.	18,317	18,897	22,105	22,688	43,320	43,906
27	Pine Av.	w/o El Prado Rd.	25	25	27	27	27,780	29,483
28	Pine Av.	w/o Euclid Av.	7,306	7,979	7,772	8,446	25,288	25,605
29	Pine Av.	e/o Euclid Av.	25,747	26,758	28,876	29,889	37,279	37,606
30	Pine Av.	w/o Chino Corona Rd.	29,771	30,785	32,911	33,928	36,277	36,604
31	Pine Av.	w/o W. Preserve Loop	16,445	17,411	18,578	19,546	19,507	19,782
32	Pine Av.	w/o E. Preserve Loop	26,664	27,639	30,018	30,996	31,519	31,805
33	Pine Av.	w/o Hellman Av.	26,513	27,488	29,448	30,426	30,920	31,206
34	Schleisman Rd.	w/o Archibald Av.	28,660	29,565	31,944	32,852	38,337	38,557

[1] Source: Majestic Chino Heritage Traffic Impact Analysis, Urban Crossroads, Inc.
"n/a" = Roadway segment does not represent a paved and/or fully constructed roadway under the given scenario.

TABLE 6-3: SOIL IMPORT/EXPORT AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic Volumes[1]		
			Existing 2019		
			Without Project	With Daytime Hauling	With Off-Peak Hauling
29	Pine Av.	e/o Euclid Av.	25,747	26,935	26,935
30	Pine Av.	w/o Chino Corona Rd.	29,771	30,959	30,959
31	Pine Av.	w/o W. Preserve Loop	16,445	17,495	17,495
32	Pine Av.	w/o E. Preserve Loop	26,664	27,714	27,714
33	Pine Av.	w/o Hellman Av.	26,513	27,563	27,563
35	Chino Corona Rd.	s/o Pine Av.	3,068	4,256	4,256
36	Chino Corona Rd.	e/o Cucamonga Av.	3,068	4,256	4,256
37	Hellman Av.	s/o Pine Av.	13,118	14,168	14,168

[1] Source: Majestic Chino Heritage Traffic Impact Analysis, Urban Crossroads, Inc.
"n/a" = Roadway segment does not represent a paved and/or fully constructed roadway under the given scenario.

TABLE 6-4: TIME OF DAY VEHICLE SPLITS

Vehicle Type	Time of Day Splits			Total of Time of Day Splits
	Daytime	Evening	Nighttime	
Autos	66.20%	13.50%	20.30%	100.00%
Medium Trucks	77.10%	5.30%	17.60%	100.00%
Heavy Trucks	86.30%	1.50%	12.20%	100.00%

Based on an existing vehicle count taken at Pine Avenue and Chino Corona Road (Majestic Chino Heritage Traffic Impact Analysis, Urban Crossroads, Inc.). Vehicle mix percentage values rounded to the nearest one-hundredth.
"Daytime" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

TABLE 6-5: WITHOUT PROJECT CONDITIONS VEHICLE MIX

Classification	Total % Traffic Flow			Total
	Autos	Medium Trucks	Heavy Trucks	
All Segments	93.40%	4.70%	1.90%	100.00%

Based on an existing vehicle count taken at Pine Avenue and Chino Corona Road (Majestic Chino Heritage Traffic Impact Analysis, Urban Crossroads, Inc.). Vehicle mix percentage values rounded to the nearest one-hundredth.
"Daytime" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

TABLE 6-6: EXISTING WITH PROJECT CONDITIONS VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Central Av.	n/o El Prado Rd.	93.47%	4.65%	1.88%	100.00%
2	Central Av.	s/o El Prado Rd.	92.99%	4.82%	2.19%	100.00%
3	El Prado Rd.	n/o Kimball Av.	93.11%	4.72%	2.17%	100.00%
4	Euclid Av.	n/o Walnut Av.	92.46%	5.06%	2.48%	100.00%
5	Euclid Av.	n/o Riverside Dr.	92.29%	5.12%	2.59%	100.00%
6	Euclid Av.	n/o Chino Av.	92.32%	5.10%	2.58%	100.00%
7	Euclid Av.	n/o Schaefer Av.	92.42%	5.06%	2.52%	100.00%
8	Euclid Av.	n/o Edison Av.	92.49%	5.03%	2.48%	100.00%
9	Euclid Av.	n/o Eucalyptus Av.	92.45%	5.04%	2.51%	100.00%
10	Euclid Av.	n/o Merrill Av.	92.59%	4.98%	2.43%	100.00%
11	Euclid Av.	s/o Merrill Av.	92.57%	4.99%	2.44%	100.00%
12	Euclid Av.	n/o Kimball Av.	92.56%	4.99%	2.45%	100.00%
13	Euclid Av.	n/o Bickmore Av.	92.28%	5.07%	2.65%	100.00%
14	Archibald Av.	n/o Limonite Av.	93.44%	4.67%	1.89%	100.00%
15	Archibald Av.	s/o Limonite Av.	93.36%	4.66%	1.98%	100.00%
16	Archibald Av.	s/o Schleisman Rd.	93.33%	4.72%	1.95%	100.00%
17	Kimball Av.	w/o Mountain Av.	92.98%	4.77%	2.26%	100.00%
18	Kimball Av.	w/o Euclid Av.	93.23%	4.77%	2.00%	100.00%
19	Kimball Av.	e/o Euclid Av.	93.43%	4.68%	1.89%	100.00%
20	Kimball Av.	w/o Rincon Meadows Av.	93.42%	4.68%	1.89%	100.00%
21	Kimball Av.	e/o Rincon Meadows Av.	93.43%	4.68%	1.89%	100.00%
22	Kimball Av.	e/o Mill Creek Av.	93.43%	4.68%	1.89%	100.00%
23	Kimball Av.	e/o Main St.	93.43%	4.68%	1.89%	100.00%
24	Kimball Av.	e/o Flight Av.	93.40%	4.70%	1.90%	100.00%
25	Limonite Av.	w/o Archibald Av.	93.40%	4.70%	1.90%	100.00%
26	Limonite Av.	e/o Archibald Av.	93.29%	4.69%	2.02%	100.00%
27	Pine Av.	w/o El Prado Rd.	93.40%	4.70%	1.90%	100.00%
28	Pine Av.	w/o Euclid Av.	92.40%	4.96%	2.64%	100.00%
29	Pine Av.	e/o Euclid Av.	93.33%	4.66%	2.01%	100.00%
30	Pine Av.	w/o Chino Corona Rd.	93.34%	4.66%	2.00%	100.00%
31	Pine Av.	w/o W. Preserve Loop	93.28%	4.64%	2.07%	100.00%
32	Pine Av.	w/o E. Preserve Loop	93.33%	4.66%	2.01%	100.00%
33	Pine Av.	w/o Hellman Av.	93.33%	4.66%	2.01%	100.00%
34	Schleisman Rd.	w/o Archibald Av.	93.32%	4.68%	2.01%	100.00%

[1] Source: Majestic Chino Heritage Traffic Impact Analysis, Urban Crossroads, Inc.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-7: OPENING YEAR WITH PROJECT CONDITIONS VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Central Av.	n/o El Prado Rd.	93.47%	4.65%	1.88%	100.00%
2	Central Av.	s/o El Prado Rd.	93.03%	4.81%	2.16%	100.00%
3	El Prado Rd.	n/o Kimball Av.	93.14%	4.72%	2.15%	100.00%
4	Euclid Av.	n/o Walnut Av.	92.58%	5.01%	2.41%	100.00%
5	Euclid Av.	n/o Riverside Dr.	92.45%	5.06%	2.49%	100.00%
6	Euclid Av.	n/o Chino Av.	92.48%	5.04%	2.48%	100.00%
7	Euclid Av.	n/o Schaefer Av.	92.57%	5.01%	2.43%	100.00%
8	Euclid Av.	n/o Edison Av.	92.62%	4.99%	2.39%	100.00%
9	Euclid Av.	n/o Eucalyptus Av.	92.60%	4.99%	2.42%	100.00%
10	Euclid Av.	n/o Merrill Av.	92.69%	4.95%	2.36%	100.00%
11	Euclid Av.	s/o Merrill Av.	92.67%	4.95%	2.38%	100.00%
12	Euclid Av.	n/o Kimball Av.	92.66%	4.95%	2.38%	100.00%
13	Euclid Av.	n/o Bickmore Av.	92.46%	5.01%	2.53%	100.00%
14	Archibald Av.	n/o Limonite Av.	93.43%	4.68%	1.89%	100.00%
15	Archibald Av.	s/o Limonite Av.	93.36%	4.67%	1.97%	100.00%
16	Archibald Av.	s/o Schleisman Rd.	93.34%	4.72%	1.95%	100.00%
17	Kimball Av.	w/o Mountain Av.	93.02%	4.76%	2.22%	100.00%
18	Kimball Av.	w/o Euclid Av.	93.24%	4.76%	1.99%	100.00%
19	Kimball Av.	e/o Euclid Av.	93.42%	4.68%	1.89%	100.00%
20	Kimball Av.	w/o Rincon Meadows Av.	93.42%	4.68%	1.89%	100.00%
21	Kimball Av.	e/o Rincon Meadows Av.	93.42%	4.68%	1.89%	100.00%
22	Kimball Av.	e/o Mill Creek Av.	93.43%	4.68%	1.89%	100.00%
23	Kimball Av.	e/o Main St.	93.43%	4.68%	1.89%	100.00%
24	Kimball Av.	e/o Flight Av.	93.40%	4.70%	1.90%	100.00%
25	Limonite Av.	w/o Archibald Av.	93.40%	4.70%	1.90%	100.00%
26	Limonite Av.	e/o Archibald Av.	93.31%	4.69%	2.00%	100.00%
27	Pine Av.	w/o El Prado Rd.	93.40%	4.70%	1.90%	100.00%
28	Pine Av.	w/o Euclid Av.	92.45%	4.95%	2.60%	100.00%
29	Pine Av.	e/o Euclid Av.	93.34%	4.66%	2.00%	100.00%
30	Pine Av.	w/o Chino Corona Rd.	93.35%	4.67%	1.99%	100.00%
31	Pine Av.	w/o W. Preserve Loop	93.30%	4.65%	2.05%	100.00%
32	Pine Av.	w/o E. Preserve Loop	93.33%	4.67%	2.00%	100.00%
33	Pine Av.	w/o Hellman Av.	93.33%	4.67%	2.00%	100.00%
34	Schleisman Rd.	w/o Archibald Av.	93.32%	4.68%	2.00%	100.00%

[1] Source: Majestic Chino Heritage Traffic Impact Analysis, Urban Crossroads, Inc.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-8: HORIZON YEAR WITH PROJECT CONDITIONS VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Central Av.	n/o El Prado Rd.	93.46%	4.65%	1.88%	100.00%
2	Central Av.	s/o El Prado Rd.	93.43%	4.68%	1.89%	100.00%
3	El Prado Rd.	n/o Kimball Av.	93.51%	4.62%	1.87%	100.00%
4	Euclid Av.	n/o Walnut Av.	92.86%	4.91%	2.24%	100.00%
5	Euclid Av.	n/o Riverside Dr.	92.78%	4.94%	2.29%	100.00%
6	Euclid Av.	n/o Chino Av.	92.84%	4.91%	2.26%	100.00%
7	Euclid Av.	n/o Schaefer Av.	92.85%	4.90%	2.25%	100.00%
8	Euclid Av.	n/o Edison Av.	92.87%	4.89%	2.23%	100.00%
9	Euclid Av.	n/o Eucalyptus Av.	92.84%	4.90%	2.26%	100.00%
10	Euclid Av.	n/o Merrill Av.	92.85%	4.89%	2.26%	100.00%
11	Euclid Av.	s/o Merrill Av.	92.89%	4.88%	2.24%	100.00%
12	Euclid Av.	n/o Kimball Av.	92.88%	4.88%	2.24%	100.00%
13	Euclid Av.	n/o Bickmore Av.	92.76%	4.88%	2.36%	100.00%
14	Archibald Av.	n/o Limonite Av.	93.42%	4.69%	1.89%	100.00%
15	Archibald Av.	s/o Limonite Av.	93.36%	4.72%	1.93%	100.00%
16	Archibald Av.	s/o Schleisman Rd.	93.35%	4.71%	1.94%	100.00%
17	Kimball Av.	w/o Mountain Av.	93.54%	4.60%	1.86%	100.00%
18	Kimball Av.	w/o Euclid Av.	93.40%	4.70%	1.90%	100.00%
19	Kimball Av.	e/o Euclid Av.	93.44%	4.62%	1.94%	100.00%
20	Kimball Av.	w/o Rincon Meadows Av.	93.44%	4.62%	1.94%	100.00%
21	Kimball Av.	e/o Rincon Meadows Av.	93.44%	4.61%	1.94%	100.00%
22	Kimball Av.	e/o Mill Creek Av.	93.45%	4.61%	1.95%	100.00%
23	Kimball Av.	e/o Main St.	93.44%	4.61%	1.95%	100.00%
24	Kimball Av.	e/o Flight Av.	93.43%	4.60%	1.97%	100.00%
25	Limonite Av.	w/o Archibald Av.	93.42%	4.64%	1.94%	100.00%
26	Limonite Av.	e/o Archibald Av.	93.39%	4.68%	1.93%	100.00%
27	Pine Av.	w/o El Prado Rd.	92.38%	5.02%	2.60%	100.00%
28	Pine Av.	w/o Euclid Av.	93.32%	4.71%	1.97%	100.00%
29	Pine Av.	e/o Euclid Av.	93.34%	4.71%	1.95%	100.00%
30	Pine Av.	w/o Chino Corona Rd.	93.34%	4.71%	1.95%	100.00%
31	Pine Av.	w/o W. Preserve Loop	93.28%	4.72%	2.00%	100.00%
32	Pine Av.	w/o E. Preserve Loop	93.32%	4.72%	1.96%	100.00%
33	Pine Av.	w/o Hellman Av.	93.32%	4.72%	1.96%	100.00%
34	Schleisman Rd.	w/o Archibald Av.	93.33%	4.72%	1.95%	100.00%

[1] Source: Majestic Chino Heritage Traffic Impact Analysis, Urban Crossroads, Inc.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

6.3 VIBRATION ASSESSMENT

This analysis focuses on the potential ground-borne vibration associated with vehicular traffic and construction activities. Ground-borne vibration levels from automobile traffic are generally overshadowed by vibration generated by heavy trucks that roll over the same uneven roadway surfaces. However, due to the rapid drop-off rate of ground-borne vibration and the short duration of the associated events, vehicular traffic-induced ground-borne vibration is rarely perceptible beyond the roadway right-of-way, and rarely results in vibration levels that cause damage to buildings in the vicinity.

However, while vehicular traffic is rarely perceptible, construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized on Table 6-9. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the human response (annoyance) using the following vibration assessment methods defined by the FTA. To describe the human response (annoyance) associated with vibration impacts the FTA provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

TABLE 6-9: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment	PPV (in/sec) at 25 feet
Small bulldozer	0.003
Jackhammer	0.035
Loaded Trucks	0.076
Large bulldozer	0.089

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, September 2018.

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7 OFF-SITE TRAFFIC NOISE IMPACTS

To assess the off-site transportation CNEL noise level impacts associated with development of the proposed Project, noise contours were developed based on *Majestic Chino Heritage Traffic Impact Analysis*. (2) Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway. Noise contours were developed for the following traffic scenarios:

PROJECT OPERATIONAL TRAFFIC

- Existing Conditions Without Project: This scenario refers to the existing present-day noise conditions without the proposed Project.
  - Existing With Project: This scenario refers to the existing present-day noise conditions with the proposed Project.
- Opening Year 2022 Without the Project: This scenario refers to Opening Year noise conditions without the proposed Project.
  - Opening Year 2022 With Project: This scenario includes all cumulative projects identified in the *Traffic Impact Analysis*.
- Horizon Year 2040 Without Project: This scenario refers to the background noise conditions at Horizon Year 2040 without the proposed Project.
  - Horizon Year 2040 With Project: This scenario corresponds to Horizon Year 2040 conditions, and includes all cumulative projects identified in the *Traffic Impact Analysis*.

SOIL IMPORT/EXPORT HAUL TRUCK CONSTRUCTION TRAFFIC

- Existing Conditions Without Project: This scenario refers to the existing present-day noise conditions without the proposed Project.
  - Existing With Project: This scenario refers to the existing present-day noise conditions with the proposed soil import/export truck haul trips to the Excess Fill Dirt Sites.

7.1 PROJECT OPERATIONAL TRAFFIC NOISE CONTOURS

Noise contours were used to assess the Project's incremental traffic-related noise impacts at land uses adjacent to roadways conveying Project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 dBA noise levels. The noise contours do not consider the effect of any existing noise barriers or topography that may attenuate ambient noise levels. In addition, because the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the Project study area. Tables 7-1 and 7-6 present a summary of the exterior traffic noise levels, without barrier attenuation, for the study area roadway segments analyzed from the without Project to the with Project conditions for Existing, Opening Year 2022, and Horizon Year 2040 conditions. Appendix 7.1 includes a summary of the traffic noise level contours for each of the traffic scenarios.

TABLE 7-1: EXISTING WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Central Av.	n/o El Prado Rd.	Industrial/Urban Reserve	74.5	119	257	553
2	Central Av.	s/o El Prado Rd.	Industrial	75.3	136	293	632
3	El Prado Rd.	n/o Kimball Av.	Industrial/Urban Reserve	74.7	90	194	417
4	Euclid Av.	n/o Walnut Av.	Commercial	78.8	322	695	1497
5	Euclid Av.	n/o Riverside Dr.	Residential/Commercial	78.0	286	616	1328
6	Euclid Av.	n/o Chino Av.	Residential/Commercial	78.0	286	616	1327
7	Euclid Av.	n/o Schaefer Av.	Residential/Commercial	78.4	305	657	1414
8	Euclid Av.	n/o Edison Av.	Residential/Commercial	78.7	320	689	1484
9	Euclid Av.	n/o Eucalyptus Av.	Residential/Commercial	78.4	304	656	1413
10	Euclid Av.	n/o Merrill Av.	Residential/Agricultural	79.0	334	720	1551
11	Euclid Av.	s/o Merrill Av.	Open Space/Airport Related	78.8	325	700	1509
12	Euclid Av.	n/o Kimball Av.	Industrial/Airport Related	78.8	322	694	1496
13	Euclid Av.	n/o Bickmore Av.	Industrial/Commercial	76.6	233	502	1081
14	Archibald Av.	n/o Limonite Av.	Commercial/Residential	78.0	287	619	1334
15	Archibald Av.	s/o Limonite Av.	Commercial/Residential	71.4	94	204	438
16	Archibald Av.	s/o Schleisman Rd.	Commercial/ Residential	71.0	89	191	412
17	Kimball Av.	w/o Mountain Av.	Urban Reserve/Industrial	74.7	90	195	420
18	Kimball Av.	w/o Euclid Av.	Industrial/Airport Related	75.3	99	213	459
19	Kimball Av.	e/o Euclid Av.	Industrial/Airport Related	74.1	92	198	426
20	Kimball Av.	w/o Rincon Meadows Av.	Airport Related/Residential	74.3	95	205	443
21	Kimball Av.	e/o Rincon Meadows Av.	Airport Related/Residential	74.1	93	200	430
22	Kimball Av.	e/o Mill Creek Av.	Airport Related/Residential	73.7	87	187	402
23	Kimball Av.	e/o Main St.	Airport Related/Residential	73.4	83	179	386
24	Kimball Av.	e/o Flight Av.	Industrial/Residential	72.7	74	160	346
25	Limonite Av.	w/o Archibald Av.	Industrial	n/a	n/a	n/a	n/a
26	Limonite Av.	e/o Archibald Av.	Commercial/Residential	71.3	93	200	431
27	Pine Av.	w/o El Prado Rd.	Open Space (Golf Course)	43.8	RW	RW	RW
28	Pine Av.	w/o Euclid Av.	Industrial/Open Space	68.4	RW	101	219
29	Pine Av.	e/o Euclid Av.	Comm./Recreation (Residential)	73.9	109	235	506
30	Pine Av.	w/o Chino Corona Rd.	Commercial/Residential	74.5	120	259	558
31	Pine Av.	w/o W. Preserve Loop	Residential	71.9	81	174	376
32	Pine Av.	w/o E. Preserve Loop	Residential	74.0	112	241	518
33	Pine Av.	w/o Hellman Av.	Residential	74.0	111	240	516
34	Schleisman Rd.	w/o Archibald Av.	Commercial/Residential	72.2	106	228	491

[1] Sources: Land Use Maps of the City of Chino, Chino Hills, Ontario, and Eastvale, and aerial imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road; "n/a" = Roadway segment does not represent a paved and/or fully constructed roadway under the given scenario.

TABLE 7-2: EXISTING WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Central Av.	n/o El Prado Rd.	Industrial/Urban Reserve	74.5	120	258	556
2	Central Av.	s/o El Prado Rd.	Industrial	75.6	142	307	661
3	El Prado Rd.	n/o Kimball Av.	Industrial/Urban Reserve	75.0	95	206	443
4	Euclid Av.	n/o Walnut Av.	Commercial	79.2	344	741	1596
5	Euclid Av.	n/o Riverside Dr.	Residential/Commercial	78.5	309	665	1434
6	Euclid Av.	n/o Chino Av.	Residential/Commercial	78.5	309	666	1434
7	Euclid Av.	n/o Schaefer Av.	Residential/Commercial	78.9	327	705	1520
8	Euclid Av.	n/o Edison Av.	Residential/Commercial	79.1	342	737	1587
9	Euclid Av.	n/o Eucalyptus Av.	Residential/Commercial	78.9	327	705	1520
10	Euclid Av.	n/o Merrill Av.	Residential/Agricultural	79.4	357	768	1655
11	Euclid Av.	s/o Merrill Av.	Open Space/Airport Related	79.3	348	750	1615
12	Euclid Av.	n/o Kimball Av.	Industrial/Airport Related	79.2	345	744	1603
13	Euclid Av.	n/o Bickmore Av.	Industrial/Commercial	77.3	257	554	1194
14	Archibald Av.	n/o Limonite Av.	Commercial/Residential	78.0	288	620	1336
15	Archibald Av.	s/o Limonite Av.	Commercial/Residential	71.6	97	209	449
16	Archibald Av.	s/o Schleisman Rd.	Commercial/ Residential	71.1	90	193	416
17	Kimball Av.	w/o Mountain Av.	Urban Reserve/Industrial	75.1	97	209	450
18	Kimball Av.	w/o Euclid Av.	Industrial/Airport Related	75.3	100	215	464
19	Kimball Av.	e/o Euclid Av.	Industrial/Airport Related	74.1	92	198	427
20	Kimball Av.	w/o Rincon Meadows Av.	Airport Related/Residential	74.3	96	206	443
21	Kimball Av.	e/o Rincon Meadows Av.	Airport Related/Residential	74.2	93	200	431
22	Kimball Av.	e/o Mill Creek Av.	Airport Related/Residential	73.7	87	187	402
23	Kimball Av.	e/o Main St.	Airport Related/Residential	73.4	83	179	386
24	Kimball Av.	e/o Flight Av.	Industrial/Residential	72.7	74	160	346
25	Limonite Av.	w/o Archibald Av.	Industrial	n/a	n/a	n/a	n/a
26	Limonite Av.	e/o Archibald Av.	Commercial/Residential	71.5	95	206	443
27	Pine Av.	w/o El Prado Rd.	Open Space (Golf Course)	43.8	RW	RW	RW
28	Pine Av.	w/o Euclid Av.	Industrial/Open Space	69.3	RW	115	248
29	Pine Av.	e/o Euclid Av.	Comm./Recreation (Residential)	74.1	113	243	523
30	Pine Av.	w/o Chino Corona Rd.	Commercial/Residential	74.7	124	266	574
31	Pine Av.	w/o W. Preserve Loop	Residential	72.3	85	183	395
32	Pine Av.	w/o E. Preserve Loop	Residential	74.3	115	248	535
33	Pine Av.	w/o Hellman Av.	Residential	74.2	115	247	533
34	Schleisman Rd.	w/o Archibald Av.	Commercial/Residential	72.3	109	235	505

[1] Sources: Land Use Maps of the City of Chino, Chino Hills, Ontario, and Eastvale, and aerial imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road; "n/a" = Roadway segment does not represent a paved and/or fully constructed roadway under the given scenario.

TABLE 7-3: OPENING YEAR WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Central Av.	n/o El Prado Rd.	Industrial/Urban Reserve	74.8	125	269	580
2	Central Av.	s/o El Prado Rd.	Industrial	75.7	144	310	667
3	El Prado Rd.	n/o Kimball Av.	Industrial/Urban Reserve	75.1	96	207	446
4	Euclid Av.	n/o Walnut Av.	Commercial	79.4	355	764	1647
5	Euclid Av.	n/o Riverside Dr.	Residential/Commercial	78.7	318	686	1478
6	Euclid Av.	n/o Chino Av.	Residential/Commercial	78.7	320	689	1485
7	Euclid Av.	n/o Schaefer Av.	Residential/Commercial	79.1	340	732	1577
8	Euclid Av.	n/o Edison Av.	Residential/Commercial	79.4	356	766	1651
9	Euclid Av.	n/o Eucalyptus Av.	Residential/Commercial	79.1	341	735	1584
10	Euclid Av.	n/o Merrill Av.	Residential/Agricultural	79.6	366	789	1699
11	Euclid Av.	s/o Merrill Av.	Open Space/Airport Related	79.4	355	765	1649
12	Euclid Av.	n/o Kimball Av.	Industrial/Airport Related	79.3	352	759	1636
13	Euclid Av.	n/o Bickmore Av.	Industrial/Commercial	77.4	264	568	1223
14	Archibald Av.	n/o Limonite Av.	Commercial/Residential	78.6	316	681	1466
15	Archibald Av.	s/o Limonite Av.	Commercial/Residential	72.0	103	221	476
16	Archibald Av.	s/o Schleisman Rd.	Commercial/ Residential	71.4	94	203	437
17	Kimball Av.	w/o Mountain Av.	Urban Reserve/Industrial	75.2	97	210	451
18	Kimball Av.	w/o Euclid Av.	Industrial/Airport Related	75.7	105	227	489
19	Kimball Av.	e/o Euclid Av.	Industrial/Airport Related	74.6	100	215	464
20	Kimball Av.	w/o Rincon Meadows Av.	Airport Related/Residential	74.8	103	221	477
21	Kimball Av.	e/o Rincon Meadows Av.	Airport Related/Residential	74.6	100	215	464
22	Kimball Av.	e/o Mill Creek Av.	Airport Related/Residential	74.2	94	202	436
23	Kimball Av.	e/o Main St.	Airport Related/Residential	74.0	90	194	419
24	Kimball Av.	e/o Flight Av.	Industrial/Residential	73.2	81	174	374
25	Limonite Av.	w/o Archibald Av.	Industrial	28.7	RW	RW	RW
26	Limonite Av.	e/o Archibald Av.	Commercial/Residential	72.1	105	227	488
27	Pine Av.	w/o El Prado Rd.	Open Space (Golf Course)	44.1	RW	RW	RW
28	Pine Av.	w/o Euclid Av.	Industrial/Open Space	68.7	RW	106	228
29	Pine Av.	e/o Euclid Av.	Comm./Recreation (Residential)	74.4	118	254	547
30	Pine Av.	w/o Chino Corona Rd.	Commercial/Residential	75.0	128	277	596
31	Pine Av.	w/o W. Preserve Loop	Residential	72.5	88	189	407
32	Pine Av.	w/o E. Preserve Loop	Residential	74.6	121	260	561
33	Pine Av.	w/o Hellman Av.	Residential	74.5	119	257	554
34	Schleisman Rd.	w/o Archibald Av.	Commercial/Residential	72.6	114	245	528

[1] Sources: Land Use Maps of the City of Chino, Chino Hills, Ontario, and Eastvale, and aerial imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road; "n/a" = Roadway segment does not represent a paved and/or fully constructed roadway under the given scenario.

TABLE 7-4: OPENING YEAR WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Central Av.	n/o El Prado Rd.	Industrial/Urban Reserve	74.8	125	270	582
2	Central Av.	s/o El Prado Rd.	Industrial	76.0	150	323	696
3	El Prado Rd.	n/o Kimball Av.	Industrial/Urban Reserve	75.4	101	218	470
4	Euclid Av.	n/o Walnut Av.	Commercial	79.7	375	808	1742
5	Euclid Av.	n/o Riverside Dr.	Residential/Commercial	79.1	340	733	1578
6	Euclid Av.	n/o Chino Av.	Residential/Commercial	79.1	342	737	1587
7	Euclid Av.	n/o Schaefer Av.	Residential/Commercial	79.5	361	778	1677
8	Euclid Av.	n/o Edison Av.	Residential/Commercial	79.8	377	812	1749
9	Euclid Av.	n/o Eucalyptus Av.	Residential/Commercial	79.5	363	782	1685
10	Euclid Av.	n/o Merrill Av.	Residential/Agricultural	80.0	387	835	1799
11	Euclid Av.	s/o Merrill Av.	Open Space/Airport Related	79.8	377	813	1751
12	Euclid Av.	n/o Kimball Av.	Industrial/Airport Related	79.7	375	807	1738
13	Euclid Av.	n/o Bickmore Av.	Industrial/Commercial	78.0	286	617	1329
14	Archibald Av.	n/o Limonite Av.	Commercial/Residential	78.6	317	682	1469
15	Archibald Av.	s/o Limonite Av.	Commercial/Residential	72.1	105	226	486
16	Archibald Av.	s/o Schleisman Rd.	Commercial/ Residential	71.4	95	204	440
17	Kimball Av.	w/o Mountain Av.	Urban Reserve/Industrial	75.6	103	223	480
18	Kimball Av.	w/o Euclid Av.	Industrial/Airport Related	75.8	107	229	494
19	Kimball Av.	e/o Euclid Av.	Industrial/Airport Related	74.7	100	216	465
20	Kimball Av.	w/o Rincon Meadows Av.	Airport Related/Residential	74.8	103	222	478
21	Kimball Av.	e/o Rincon Meadows Av.	Airport Related/Residential	74.7	100	216	465
22	Kimball Av.	e/o Mill Creek Av.	Airport Related/Residential	74.2	94	203	436
23	Kimball Av.	e/o Main St.	Airport Related/Residential	74.0	90	195	419
24	Kimball Av.	e/o Flight Av.	Industrial/Residential	73.2	81	174	374
25	Limonite Av.	w/o Archibald Av.	Industrial	28.7	RW	RW	RW
26	Limonite Av.	e/o Archibald Av.	Commercial/Residential	72.3	108	232	500
27	Pine Av.	w/o El Prado Rd.	Open Space (Golf Course)	44.1	RW	RW	RW
28	Pine Av.	w/o Euclid Av.	Industrial/Open Space	69.5	RW	119	257
29	Pine Av.	e/o Euclid Av.	Comm./Recreation (Residential)	74.6	121	261	563
30	Pine Av.	w/o Chino Corona Rd.	Commercial/Residential	75.1	132	284	612
31	Pine Av.	w/o W. Preserve Loop	Residential	72.8	92	198	426
32	Pine Av.	w/o E. Preserve Loop	Residential	74.7	124	268	577
33	Pine Av.	w/o Hellman Av.	Residential	74.7	123	264	570
34	Schleisman Rd.	w/o Archibald Av.	Commercial/Residential	72.8	117	251	542

[1] Sources: Land Use Maps of the City of Chino, Chino Hills, Ontario, and Eastvale, and aerial imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road; "n/a" = Roadway segment does not represent a paved and/or fully constructed roadway under the given scenario.

TABLE 7-5: HORIZON YEAR WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Central Av.	n/o El Prado Rd.	Industrial/Urban Reserve	75.0	129	278	600
2	Central Av.	s/o El Prado Rd.	Industrial	75.9	149	320	689
3	El Prado Rd.	n/o Kimball Av.	Industrial/Urban Reserve	75.3	99	214	460
4	Euclid Av.	n/o Walnut Av.	Commercial	81.2	467	1007	2169
5	Euclid Av.	n/o Riverside Dr.	Residential/Commercial	80.5	424	913	1967
6	Euclid Av.	n/o Chino Av.	Residential/Commercial	80.9	445	959	2066
7	Euclid Av.	n/o Schaefer Av.	Residential/Commercial	80.9	447	964	2077
8	Euclid Av.	n/o Edison Av.	Residential/Commercial	81.1	463	998	2149
9	Euclid Av.	n/o Eucalyptus Av.	Residential/Commercial	80.7	436	939	2023
10	Euclid Av.	n/o Merrill Av.	Residential/Agricultural	80.7	433	934	2012
11	Euclid Av.	s/o Merrill Av.	Open Space/Airport Related	80.9	451	971	2092
12	Euclid Av.	n/o Kimball Av.	Industrial/Airport Related	80.9	447	963	2075
13	Euclid Av.	n/o Bickmore Av.	Industrial/Commercial	79.6	368	794	1710
14	Archibald Av.	n/o Limonite Av.	Commercial/Residential	80.6	429	925	1993
15	Archibald Av.	s/o Limonite Av.	Commercial/Residential	73.2	124	267	575
16	Archibald Av.	s/o Schleisman Rd.	Commercial/ Residential	72.0	103	223	480
17	Kimball Av.	w/o Mountain Av.	Urban Reserve/Industrial	75.4	100	216	466
18	Kimball Av.	w/o Euclid Av.	Industrial/Airport Related	76.6	120	260	559
19	Kimball Av.	e/o Euclid Av.	Industrial/Airport Related	75.4	112	242	522
20	Kimball Av.	w/o Rincon Meadows Av.	Airport Related/Residential	75.0	106	229	493
21	Kimball Av.	e/o Rincon Meadows Av.	Airport Related/Residential	74.9	103	223	480
22	Kimball Av.	e/o Mill Creek Av.	Airport Related/Residential	74.4	97	209	450
23	Kimball Av.	e/o Main St.	Airport Related/Residential	74.2	93	201	432
24	Kimball Av.	e/o Flight Av.	Industrial/Residential	73.5	83	179	387
25	Limonite Av.	w/o Archibald Av.	Industrial	73.0	121	260	561
26	Limonite Av.	e/o Archibald Av.	Commercial/Residential	75.0	165	355	764
27	Pine Av.	w/o El Prado Rd.	Open Space (Golf Course)	74.2	115	247	533
28	Pine Av.	w/o Euclid Av.	Industrial/Open Space	73.8	108	232	500
29	Pine Av.	e/o Euclid Av.	Comm./Recreation (Residential)	75.5	140	301	648
30	Pine Av.	w/o Chino Corona Rd.	Commercial/Residential	75.4	137	295	636
31	Pine Av.	w/o W. Preserve Loop	Residential	72.7	91	195	421
32	Pine Av.	w/o E. Preserve Loop	Residential	74.8	125	269	579
33	Pine Av.	w/o Hellman Av.	Residential	74.7	123	266	572
34	Schleisman Rd.	w/o Archibald Av.	Commercial/Residential	73.4	128	277	596

[1] Sources: Land Use Maps of the City of Chino, Chino Hills, Ontario, and Eastvale, and aerial imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-6: HORIZON YEAR WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Central Av.	n/o El Prado Rd.	Industrial/Urban Reserve	75.0	130	279	602
2	Central Av.	s/o El Prado Rd.	Industrial	75.9	149	320	690
3	El Prado Rd.	n/o Kimball Av.	Industrial/Urban Reserve	75.3	100	215	463
4	Euclid Av.	n/o Walnut Av.	Commercial	81.4	485	1045	2252
5	Euclid Av.	n/o Riverside Dr.	Residential/Commercial	80.8	443	954	2054
6	Euclid Av.	n/o Chino Av.	Residential/Commercial	81.1	464	999	2153
7	Euclid Av.	n/o Schaefer Av.	Residential/Commercial	81.2	466	1005	2164
8	Euclid Av.	n/o Edison Av.	Residential/Commercial	81.4	482	1037	2235
9	Euclid Av.	n/o Eucalyptus Av.	Residential/Commercial	81.0	455	981	2113
10	Euclid Av.	n/o Merrill Av.	Residential/Agricultural	81.0	453	976	2104
11	Euclid Av.	s/o Merrill Av.	Open Space/Airport Related	81.2	470	1013	2183
12	Euclid Av.	n/o Kimball Av.	Industrial/Airport Related	81.2	467	1005	2166
13	Euclid Av.	n/o Bickmore Av.	Industrial/Commercial	80.1	395	852	1835
14	Archibald Av.	n/o Limonite Av.	Commercial/Residential	80.6	430	926	1995
15	Archibald Av.	s/o Limonite Av.	Commercial/Residential	73.2	124	268	577
16	Archibald Av.	s/o Schleisman Rd.	Commercial/ Residential	72.1	104	225	484
17	Kimball Av.	w/o Mountain Av.	Urban Reserve/Industrial	75.4	101	218	470
18	Kimball Av.	w/o Euclid Av.	Industrial/Airport Related	76.6	120	260	559
19	Kimball Av.	e/o Euclid Av.	Industrial/Airport Related	75.5	115	247	533
20	Kimball Av.	w/o Rincon Meadows Av.	Airport Related/Residential	75.2	109	234	504
21	Kimball Av.	e/o Rincon Meadows Av.	Airport Related/Residential	75.0	106	228	491
22	Kimball Av.	e/o Mill Creek Av.	Airport Related/Residential	74.6	100	215	462
23	Kimball Av.	e/o Main St.	Airport Related/Residential	74.4	96	206	444
24	Kimball Av.	e/o Flight Av.	Industrial/Residential	73.7	86	185	399
25	Limonite Av.	w/o Archibald Av.	Industrial	73.1	123	265	571
26	Limonite Av.	e/o Archibald Av.	Commercial/Residential	75.1	166	358	772
27	Pine Av.	w/o El Prado Rd.	Open Space (Golf Course)	74.9	128	275	593
28	Pine Av.	w/o Euclid Av.	Industrial/Open Space	73.9	109	236	508
29	Pine Av.	e/o Euclid Av.	Comm./Recreation (Residential)	75.6	141	304	654
30	Pine Av.	w/o Chino Corona Rd.	Commercial/Residential	75.4	138	298	643
31	Pine Av.	w/o W. Preserve Loop	Residential	72.8	92	199	428
32	Pine Av.	w/o E. Preserve Loop	Residential	74.8	126	272	586
33	Pine Av.	w/o Hellman Av.	Residential	74.8	125	269	579
34	Schleisman Rd.	w/o Archibald Av.	Commercial/Residential	73.5	130	279	602

[1] Sources: Land Use Maps of the City of Chino, Chino Hills, Ontario, and Eastvale, and aerial imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

7.2 EXISTING CONDITION PROJECT OPERATIONAL TRAFFIC NOISE LEVEL CONTRIBUTIONS

An analysis of existing traffic noise levels plus traffic noise generated by the proposed Project has been included in this report for informational purposes. However, the analysis of existing traffic noise levels plus traffic noise generated by the proposed Project scenario will not actually occur since the Project would not be fully constructed and operational until Year 2022 cumulative conditions. Moreover, a focused analysis of the construction-related soil import/export truck haul trips is provided n Section 7.5.

Table 7-1 presents the Existing without Project conditions CNEL noise levels. The without Project exterior noise levels are expected to range from 43.8 to 79.0 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing with Project conditions will range from 43.8 to 79.4 dBA CNEL. As shown on Table 7-7 the Project will generate a noise level increase of up to 0.8 dBA CNEL on the study area roadway segments.

7.3 OPENING YEAR 2022 PROJECT OPERATIONAL TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-3 presents the Opening Year without Project conditions CNEL noise levels which are expected to range from 44.1 to 79.6 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography.

Table 7-4 shows the Opening Year with Project conditions will range from 44.1 to 80.0 dBA CNEL. As shown on Table 7-8 the Project will generate a noise level increase of up to 0.8 dBA CNEL on the study area roadway segments. Based on the significance criteria in Section 4, the Project-related noise level increases are considered *less than significant* under Opening Year with Project conditions at the land uses adjacent to roadways conveying Project traffic.

7.4 HORIZON YEAR 2040 PROJECT OPERATIONAL TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-5 presents the Horizon Year 2040 without Project conditions CNEL noise levels are expected to range from 72.0 to 81.2 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography.

Table 7-6 shows the Horizon Year 2040 with Project conditions will range from 72.1 to 81.4 dBA CNEL. As shown on Table 7-9 the Project will generate a noise level increase of up to 0.7 dBA CNEL on the study area roadway segments. Based on the significance criteria in Section 4, the Project-related noise level increases are considered *less than significant* under Horizon Year 2040 with Project conditions at the land uses adjacent to roadways conveying Project traffic.

TABLE 7-7: EXISTING OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Adjacent Land Use (dBA)[2]			Noise-Sensitive Land Use?	Threshold Exceeded?[2]
				No Project	With Project	Project Addition		
1	Central Av.	n/o El Prado Rd.	Industrial/Urban Reserve	74.5	74.5	0.0	No	No
2	Central Av.	s/o El Prado Rd.	Industrial	75.3	75.6	0.3	No	No
3	El Prado Rd.	n/o Kimball Av.	Industrial/Urban Reserve	74.7	75.0	0.4	No	No
4	Euclid Av.	n/o Walnut Av.	Commercial	78.8	79.2	0.4	No	No
5	Euclid Av.	n/o Riverside Dr.	Residential/Commercial	78.0	78.5	0.5	Yes	No
6	Euclid Av.	n/o Chino Av.	Residential/Commercial	78.0	78.5	0.5	Yes	No
7	Euclid Av.	n/o Schaefer Av.	Residential/Commercial	78.4	78.9	0.5	Yes	No
8	Euclid Av.	n/o Edison Av.	Residential/Commercial	78.7	79.1	0.4	Yes	No
9	Euclid Av.	n/o Eucalyptus Av.	Residential/Commercial	78.4	78.9	0.5	Yes	No
10	Euclid Av.	n/o Merrill Av.	Residential/Agricultural	79.0	79.4	0.4	Yes	No
11	Euclid Av.	s/o Merrill Av.	Open Space/Airport Related	78.8	79.3	0.4	No	No
12	Euclid Av.	n/o Kimball Av.	Industrial/Airport Related	78.8	79.2	0.4	No	No
13	Euclid Av.	n/o Bickmore Av.	Industrial/Commercial	76.6	77.3	0.6	No	No
14	Archibald Av.	n/o Limonite Av.	Commercial/Residential	78.0	78.0	0.0	Yes	No
15	Archibald Av.	s/o Limonite Av.	Commercial/Residential	71.4	71.6	0.2	Yes	No
16	Archibald Av.	s/o Schleisman Rd.	Commercial/ Residential	71.0	71.1	0.1	Yes	No
17	Kimball Av.	w/o Mountain Av.	Urban Reserve/Industrial	74.7	75.1	0.4	No	No
18	Kimball Av.	w/o Euclid Av.	Industrial/Airport Related	75.3	75.3	0.1	No	No
19	Kimball Av.	e/o Euclid Av.	Industrial/Airport Related	74.1	74.1	0.0	No	No
20	Kimball Av.	w/o Rincon Meadows Av.	Airport Related/Residential	74.3	74.3	0.0	Yes	No
21	Kimball Av.	e/o Rincon Meadows Av.	Airport Related/Residential	74.1	74.2	0.0	Yes	No
22	Kimball Av.	e/o Mill Creek Av.	Airport Related/Residential	73.7	73.7	0.0	Yes	No
23	Kimball Av.	e/o Main St.	Airport Related/Residential	73.4	73.4	0.0	Yes	No
24	Kimball Av.	e/o Flight Av.	Industrial/Residential	72.7	72.7	0.0	Yes	No
25	Limonite Av.	w/o Archibald Av.	Industrial	n/a	n/a	n/a	No	n/a
26	Limonite Av.	e/o Archibald Av.	Commercial/Residential	71.3	71.5	0.2	Yes	No
27	Pine Av.	w/o El Prado Rd.	Open Space (Golf Course)	43.8	43.8	0.0	No	No

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Adjacent Land Use (dBA)[2]			Noise-Sensitive Land Use?	Threshold Exceeded?[2]
				No Project	With Project	Project Addition		
28	Pine Av.	w/o Euclid Av.	Industrial/Open Space	68.4	69.3	0.8	No	No
29	Pine Av.	e/o Euclid Av.	Comm./Recreation (Residential)	73.9	74.1	0.2	Yes	No
30	Pine Av.	w/o Chino Corona Rd.	Commercial/Residential	74.5	74.7	0.2	Yes	No
31	Pine Av.	w/o W. Preserve Loop	Residential	71.9	72.3	0.3	Yes	No
32	Pine Av.	w/o E. Preserve Loop	Residential	74.0	74.3	0.2	Yes	No
33	Pine Av.	w/o Hellman Av.	Residential	74.0	74.2	0.2	Yes	No
34	Schleisman Rd.	w/o Archibald Av.	Commercial/Residential	72.2	72.3	0.2	Yes	No

[1] Sources: Land Use Maps of the City of Chino, Chino Hills, Ontario, and Eastvale, and aerial imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use. Values rounded to the nearest one-tenth.
"n/a" = Roadway segment does not represent a paved and/or fully constructed roadway under the given scenario.

TABLE 7-8: OPENING YEAR OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	CNEL at Adjacent Land Use (dBA)[1]			Noise-Sensitive Land Use?	Threshold Exceeded?[2]
			No Project	With Project	Project Addition		
1	Central Av.	n/o El Prado Rd.	74.8	74.8	0.0	No	No
2	Central Av.	s/o El Prado Rd.	75.7	76.0	0.3	No	No
3	El Prado Rd.	n/o Kimball Av.	75.1	75.4	0.4	No	No
4	Euclid Av.	n/o Walnut Av.	79.4	79.7	0.4	No	No
5	Euclid Av.	n/o Riverside Dr.	78.7	79.1	0.4	Yes	No
6	Euclid Av.	n/o Chino Av.	78.7	79.1	0.4	Yes	No
7	Euclid Av.	n/o Schaefer Av.	79.1	79.5	0.4	Yes	No
8	Euclid Av.	n/o Edison Av.	79.4	79.8	0.4	Yes	No
9	Euclid Av.	n/o Eucalyptus Av.	79.1	79.5	0.4	Yes	No
10	Euclid Av.	n/o Merrill Av.	79.6	80.0	0.4	Yes	No
11	Euclid Av.	s/o Merrill Av.	79.4	79.8	0.4	No	No
12	Euclid Av.	n/o Kimball Av.	79.3	79.7	0.4	No	No
13	Euclid Av.	n/o Bickmore Av.	77.4	78.0	0.5	No	No
14	Archibald Av.	n/o Limonite Av.	78.6	78.6	0.0	Yes	No
15	Archibald Av.	s/o Limonite Av.	72.0	72.1	0.1	Yes	No
16	Archibald Av.	s/o Schleisman Rd.	71.4	71.4	0.1	Yes	No
17	Kimball Av.	w/o Mountain Av.	75.2	75.6	0.4	No	No
18	Kimball Av.	w/o Euclid Av.	75.7	75.8	0.1	No	No
19	Kimball Av.	e/o Euclid Av.	74.6	74.7	0.0	No	No
20	Kimball Av.	w/o Rincon Meadows Av.	74.8	74.8	0.0	Yes	No
21	Kimball Av.	e/o Rincon Meadows Av.	74.6	74.7	0.0	Yes	No
22	Kimball Av.	e/o Mill Creek Av.	74.2	74.2	0.0	Yes	No
23	Kimball Av.	e/o Main St.	74.0	74.0	0.0	Yes	No
24	Kimball Av.	e/o Flight Av.	73.2	73.2	0.0	Yes	No
25	Limonite Av.	w/o Archibald Av.	n/a	n/a	n/a	No	n/a
26	Limonite Av.	e/o Archibald Av.	72.1	72.3	0.2	Yes	No
27	Pine Av.	w/o El Prado Rd.	44.1	44.1	0.0	No	No
28	Pine Av.	w/o Euclid Av.	68.7	69.5	0.8	No	No
29	Pine Av.	e/o Euclid Av.	74.4	74.6	0.2	Yes	No
30	Pine Av.	w/o Chino Corona Rd.	75.0	75.1	0.2	Yes	No
31	Pine Av.	w/o W. Preserve Loop	72.5	72.8	0.3	Yes	No
32	Pine Av.	w/o E. Preserve Loop	74.6	74.7	0.2	Yes	No
33	Pine Av.	w/o Hellman Av.	74.5	74.7	0.2	Yes	No
34	Schleisman Rd.	w/o Archibald Av.	72.6	72.8	0.2	Yes	No

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use. Values rounded to the nearest one-tenth.
[2] Significance Criteria (Section 4).
"n/a" = Roadway segment does not represent a paved and/or fully constructed roadway under the given scenario.

TABLE 7-9: HORIZON YEAR 2040 OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	CNEL at Adjacent Land Use (dBA)[1]			Noise-Sensitive Land Use?	Threshold Exceeded?[2]
			No Project	With Project	Project Addition		
1	Central Av.	n/o El Prado Rd.	75.0	75.0	0.0	No	No
2	Central Av.	s/o El Prado Rd.	75.9	75.9	0.0	No	No
3	El Prado Rd.	n/o Kimball Av.	75.3	75.3	0.0	No	No
4	Euclid Av.	n/o Walnut Av.	81.2	81.4	0.2	No	No
5	Euclid Av.	n/o Riverside Dr.	80.5	80.8	0.3	Yes	No
6	Euclid Av.	n/o Chino Av.	80.9	81.1	0.3	Yes	No
7	Euclid Av.	n/o Schaefer Av.	80.9	81.2	0.3	Yes	No
8	Euclid Av.	n/o Edison Av.	81.1	81.4	0.3	Yes	No
9	Euclid Av.	n/o Eucalyptus Av.	80.7	81.0	0.3	Yes	No
10	Euclid Av.	n/o Merrill Av.	80.7	81.0	0.3	Yes	No
11	Euclid Av.	s/o Merrill Av.	80.9	81.2	0.3	No	No
12	Euclid Av.	n/o Kimball Av.	80.9	81.2	0.3	No	No
13	Euclid Av.	n/o Bickmore Av.	79.6	80.1	0.5	No	No
14	Archibald Av.	n/o Limonite Av.	80.6	80.6	0.0	Yes	No
15	Archibald Av.	s/o Limonite Av.	73.2	73.2	0.0	Yes	No
16	Archibald Av.	s/o Schleisman Rd.	72.0	72.1	0.0	Yes	No
17	Kimball Av.	w/o Mountain Av.	75.4	75.4	0.1	No	No
18	Kimball Av.	w/o Euclid Av.	76.6	76.6	0.0	No	No
19	Kimball Av.	e/o Euclid Av.	75.4	75.5	0.1	No	No
20	Kimball Av.	w/o Rincon Meadows Av.	75.0	75.2	0.1	Yes	No
21	Kimball Av.	e/o Rincon Meadows Av.	74.9	75.0	0.2	Yes	No
22	Kimball Av.	e/o Mill Creek Av.	74.4	74.6	0.2	Yes	No
23	Kimball Av.	e/o Main St.	74.2	74.4	0.2	Yes	No
24	Kimball Av.	e/o Flight Av.	73.5	73.7	0.2	Yes	No
25	Limonite Av.	w/o Archibald Av.	73.0	73.1	0.1	No	No
26	Limonite Av.	e/o Archibald Av.	75.0	75.1	0.1	Yes	No
27	Pine Av.	w/o El Prado Rd.	74.2	74.9	0.7	No	No
28	Pine Av.	w/o Euclid Av.	73.8	73.9	0.1	No	No
29	Pine Av.	e/o Euclid Av.	75.5	75.6	0.1	Yes	No
30	Pine Av.	w/o Chino Corona Rd.	75.4	75.4	0.1	Yes	No
31	Pine Av.	w/o W. Preserve Loop	72.7	72.8	0.1	Yes	No
32	Pine Av.	w/o E. Preserve Loop	74.8	74.8	0.1	Yes	No
33	Pine Av.	w/o Hellman Av.	74.7	74.8	0.1	Yes	No
34	Schleisman Rd.	w/o Archibald Av.	73.4	73.5	0.1	Yes	No

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use. Values rounded to the nearest one-tenth.
[2] Significance Criteria (Section 4).

7.5 SOIL IMPORT/EXPORT HAUL TRUCK CONSTRUCTION TRAFFIC

The 96.9-acre Project site is located at the southeast corner of Mountain Avenue and Bickmore Avenue in the City of Chino and is generally below the 566 elevation. In order for the Project to be feasible, it requires that dirt be imported to raise the proposed building elevations so that they are 567-feet above mean sea level. To accomplish this, five nearby borrow sites (or "Excess Fill Dirt Sites") have been identified that can provide export to be used as import for the Project. The order in which soil will be imported from the Excess Fill Dirt Sites is as follows (see Exhibits 7-B and 7-C):

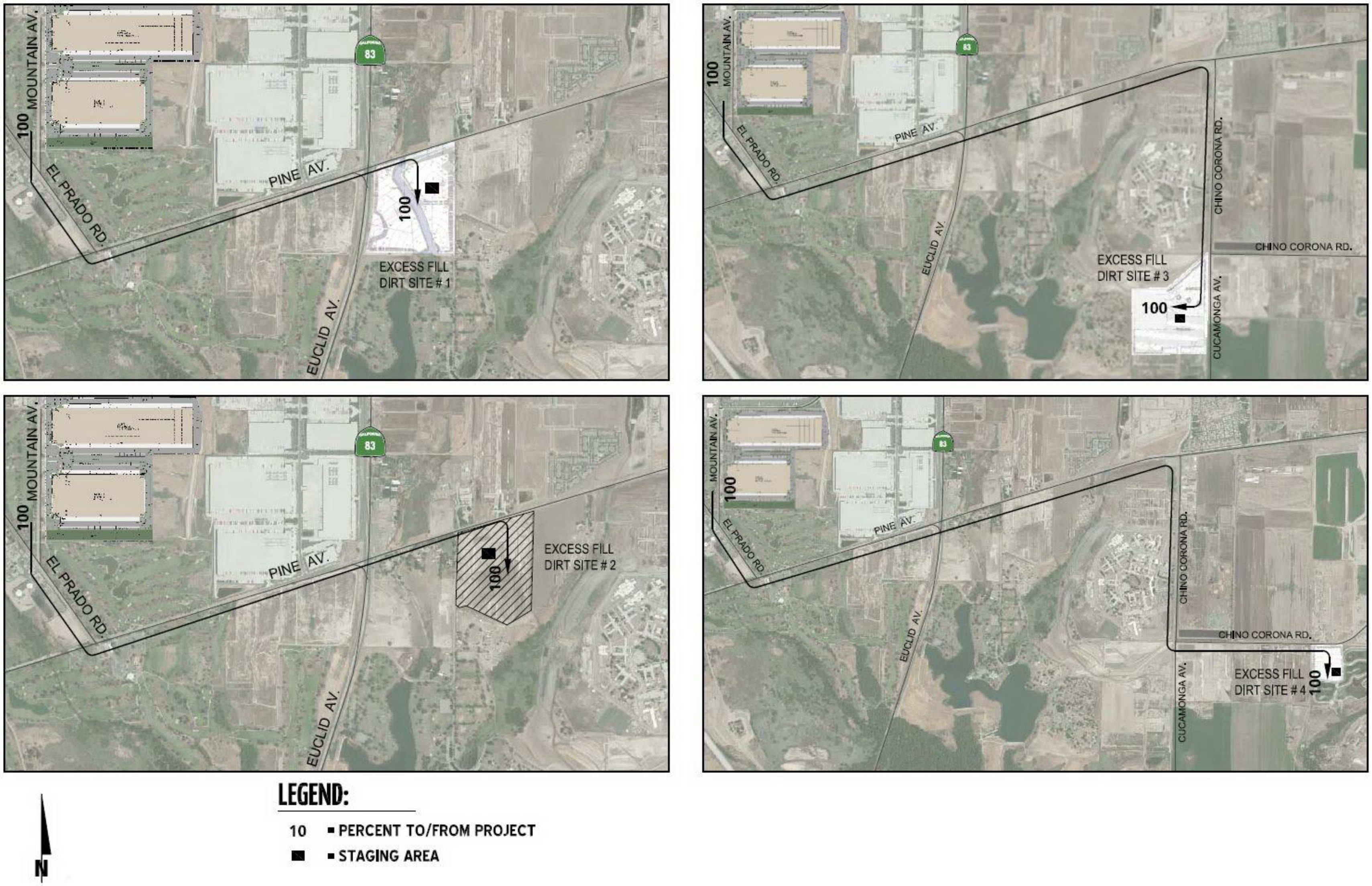
- Excess Fill Dirt Site #1
- Excess Fill Dirt Site #3
- Excess Fill Dirt Site #4
- Excess Fill Dirt Site #5
- Excess Fill Dirt Site #2

It is our understanding that import activities from the Excess Fill Dirt Sites will not overlap with another (i.e., hauling activity at one site is independent from other sites). Soil import/export activity could occur during typical construction daytime (7:00 a.m. – 3:00 p.m.) or off-peak/nighttime (6:00 p.m. – 2:00 a.m.) hours. Notwithstanding, the off-road construction equipment is not anticipated to operate for more than eight hours per day. Exhibit 7-A shows the hauling hours in comparison to the time of day used in calculating the 24-hour CNEL for off-site traffic noise analysis. Exhibits 7-B and 7-C show the truck distribution used in the *Traffic Impact Analysis* and the associated Excess Fill Dirt Sites.

EXHIBIT 7-A: HAUL TRUCK HOURS

<table>
<tr><th>Hour</th><th>CNEL Timeframe</th><th>Hauling Activity</th></tr>
<tr><td>0</td><td rowspan="7">Nighttime</td><td rowspan="3">Hauling (Off-Peak)</td></tr>
<tr><td>1</td></tr>
<tr><td>2</td></tr>
<tr><td>3</td><td rowspan="4">No Hauling Activity</td></tr>
<tr><td>4</td></tr>
<tr><td>5</td></tr>
<tr><td>6</td></tr>
<tr><td>7</td><td rowspan="12">Daytime</td><td rowspan="9">Hauling (Daytime)</td></tr>
<tr><td>8</td></tr>
<tr><td>9</td></tr>
<tr><td>10</td></tr>
<tr><td>11</td></tr>
<tr><td>12</td></tr>
<tr><td>13</td></tr>
<tr><td>14</td></tr>
<tr><td>15</td></tr>
<tr><td>16</td><td rowspan="2">No Hauling Activity</td></tr>
<tr><td>17</td></tr>
<tr><td>18</td><td>Hauling (Off-Peak)</td></tr>
<tr><td>19</td><td rowspan="3">Evening</td><td rowspan="3">Hauling (Off-Peak)</td></tr>
<tr><td>20</td></tr>
<tr><td>21</td></tr>
<tr><td>22</td><td rowspan="3">Nighttime</td><td rowspan="3">Hauling (Off-Peak)</td></tr>
<tr><td>23</td></tr>
<tr><td>24</td></tr>
</table>

EXHIBIT 7-B: EXCESS FILL DIRT SITE LOCATION MAP (1 OF 2)



URBAN CROSSROADS

EXHIBIT 7-C: EXCESS FILL DIRT SITE LOCATION MAP (2 OF 2)

LEGEND:

10 = PERCENT TO/FROM PROJECT

■ = STAGING AREA

N

7.5.1 DAYTIME HAUL TRUCK OFF-SITE TRAFFIC NOISE IMPACTS

The following analysis presents the potential off-site traffic noise impacts if all truck haul trips occur within the daytime hours of 7:00 a.m. to 7:00 p.m. for analysis purposes using the CNEL metric. Actual daytime soil import/export haul truck activities are anticipated to occur between the hours of 7:00 a.m. and 3:00 p.m. Table 7-10 presents the Existing without Project conditions CNEL noise levels which are expected to range from 66.4 to 74.5 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-11 shows the Existing with daytime-only soil import/export truck haul trip conditions will range from 72.1 to 75.5 dBA CNEL.

As shown on Table 7-12 the Project will generate a noise level increase ranging from 1.0 to 5.7 dBA CNEL on the study area roadway segments if activity occurs during the daytime hours. Based on the significance criteria in Section 4, the Project soil import/export truck trip-related noise level increases are considered *potentially significant* impacts under Existing conditions at the land uses adjacent to roadways conveying Project traffic.

The analysis shows that the unmitigated Project-related traffic noise level increases will be *potentially significant* at existing and future noise-sensitive land uses, if built and occupied at the time of soil import/export haul truck activity adjacent to the following roadway segments, as shown on Exhibit 7-D:

- Pine Av. west of W. Preserve Loop (Excess Fill Dirt Site #5);
- Chino Corona Rd. south of Pine Av. (Excess Fill Dirt Sites #3 & #4);
- Chino Corona Rd. east of Cucamonga Av. (Excess Fill Dirt Site #4);
- Hellman Av. south of Pine Av. (Excess Fill Dirt Site #5).

TABLE 7-10: EXISTING WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
29	Pine Av.	e/o Euclid Av.	Comm./Recreation (Residential)	73.9	109	235	506
30	Pine Av.	w/o Chino Corona Rd.	Commercial/Residential	74.5	120	259	558
31	Pine Av.	w/o W. Preserve Loop	Residential	71.9	81	174	376
32	Pine Av.	w/o E. Preserve Loop	Residential	74.0	112	241	518
33	Pine Av.	w/o Hellman Av.	Residential	74.0	111	240	516
35	Chino Corona Rd.	s/o Pine Av.	Commercial/Residential	67.6	RW	45	96
36	Chino Corona Rd.	e/o Cucamonga Av.	Residential/Agricultural	66.4	RW	37	80
37	Hellman Av.	s/o Pine Av.	Residential	71.6	63	136	292

[1] Sources: Land Use Maps of the City of Chino, Chino Hills, Ontario, and Eastvale, and aerial imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-11: EXISTING WITH DAYTIME IMPORT/EXPORT HAUL TRUCK TRIP NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
29	Pine Av.	e/o Euclid Av.	Comm./Recreation (Residential)	75.0	129	279	600
30	Pine Av.	w/o Chino Corona Rd.	Commercial/Residential	75.5	140	301	648
31	Pine Av.	w/o W. Preserve Loop	Residential	73.4	101	218	470
32	Pine Av.	w/o E. Preserve Loop	Residential	75.0	129	279	601
33	Pine Av.	w/o Hellman Av.	Residential	75.0	129	278	599
35	Chino Corona Rd.	s/o Pine Av.	Commercial/Residential	73.0	47	102	220
36	Chino Corona Rd.	e/o Cucamonga Av.	Residential/Agricultural	72.1	41	89	192
37	Hellman Av.	s/o Pine Av.	Residential	73.4	83	178	384

[1] Sources: Land Use Maps of the City of Chino, Chino Hills, Ontario, and Eastvale, and aerial imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-12: DAYTIME IMPORT/EXPORT OFF-SITE TRUCK TRIP-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	CNEL at Adjacent Land Use (dBA)[1]			Noise-Sensitive Land Use?	Threshold Exceeded?[2]
			No Project	With Project	Project Addition		
29	Pine Av.	e/o Euclid Av.	73.9	75.0	1.1	Yes	No
30	Pine Av.	w/o Chino Corona Rd.	74.5	75.5	1.0	Yes	No
31	Pine Av.	w/o W. Preserve Loop	71.9	73.4	1.5	Yes	Yes
32	Pine Av.	w/o E. Preserve Loop	74.0	75.0	1.0	Yes	No
33	Pine Av.	w/o Hellman Av.	74.0	75.0	1.0	Yes	No
35	Chino Corona Rd.	s/o Pine Av.	67.6	73.0	5.4	Yes	Yes
36	Chino Corona Rd.	e/o Cucamonga Av.	66.4	72.1	5.7	Yes	Yes
37	Hellman Av.	s/o Pine Av.	71.6	73.4	1.8	Yes	Yes

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use. Values rounded to the nearest one-tenth.
[2] Significance Criteria (Section 4).

7.5.2 OFF-PEAK HAUL TRUCK OFF-SITE TRAFFIC NOISE IMPACTS

The following analysis presents the potential off-site traffic noise impacts if all truck haul trips occur within the daytime hours of 7:00 a.m. to 7:00 p.m., evening hours of 7:00 p.m. to 10:00 p.m., and nighttime hours of 10:00 p.m. to 7:00 a.m. for analysis purposes using the CNEL metric. Actual off-peak soil import/export haul truck activities are anticipated to occur between the hours of 6:00 p.m. – 2:00 a.m. Table 7-10 previously provided the Existing without Project conditions CNEL noise levels which are expected to range from 66.4 to 74.5 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-13 shows the Existing with off-peak soil import/export truck haul trip conditions will range from 77.8 to 80.2 dBA CNEL.

As shown on Table 7-14 the Project will generate a noise level increase ranging from 4.4 to 13.0 dBA CNEL on the study area roadway segments if activity occurs during the off-peak hours. Based on the significance criteria in Section 4, the Project soil import/export truck trip-related noise level increases are considered *potentially significant* impacts under Existing conditions at the land uses adjacent to roadways conveying Project traffic.

The analysis shows that the unmitigated Project-related traffic noise level increases will be *potentially significant* at existing and future noise-sensitive land uses, if built and occupied at the time of soil import/export haul truck activity adjacent to the following roadway segments, as shown on Exhibit 7-E:

- Pine Av. east of Euclid Av. (Excess Fill Dirt Sites #2 to #5);
- Pine Av. west of Chino Corona Rd. (Excess Fill Dirt Sites #2 to #5);
- Pine Av. west of W. Preserve Loop (Excess Fill Dirt Site #5);
- Pine Av. west of E. Preserve Loop (Excess Fill Dirt Site #5);
- Pine Av. west of Hellman Av. (Excess Fill Dirt Site #5);
- Chino Corona Rd. south of Pine Av. (Excess Fill Dirt Sites #3 & #4);
- Chino Corona Rd. east of Cucamonga Av. (Excess Fill Dirt Site #4);
- Hellman Av. south of Pine Av. (Excess Fill Dirt Site #5).

TABLE 7-13: EXISTING WITH OFF-PEAK IMPORT/EXPORT HAUL TRUCK TRIP NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
29	Pine Av.	e/o Euclid Av.	Comm./Recreation (Residential)	78.7	229	494	1064
30	Pine Av.	w/o Chino Corona Rd.	Commercial/Residential	79.0	237	511	1100
31	Pine Av.	w/o W. Preserve Loop	Residential	77.8	198	427	920
32	Pine Av.	w/o E. Preserve Loop	Residential	78.4	219	472	1017
33	Pine Av.	w/o Hellman Av.	Residential	78.4	219	471	1015
35	Chino Corona Rd.	s/o Pine Av.	Commercial/Residential	80.2	144	310	668
36	Chino Corona Rd.	e/o Cucamonga Av.	Residential/Agricultural	79.4	128	275	593
37	Hellman Av.	s/o Pine Av.	Residential	78.2	173	373	804

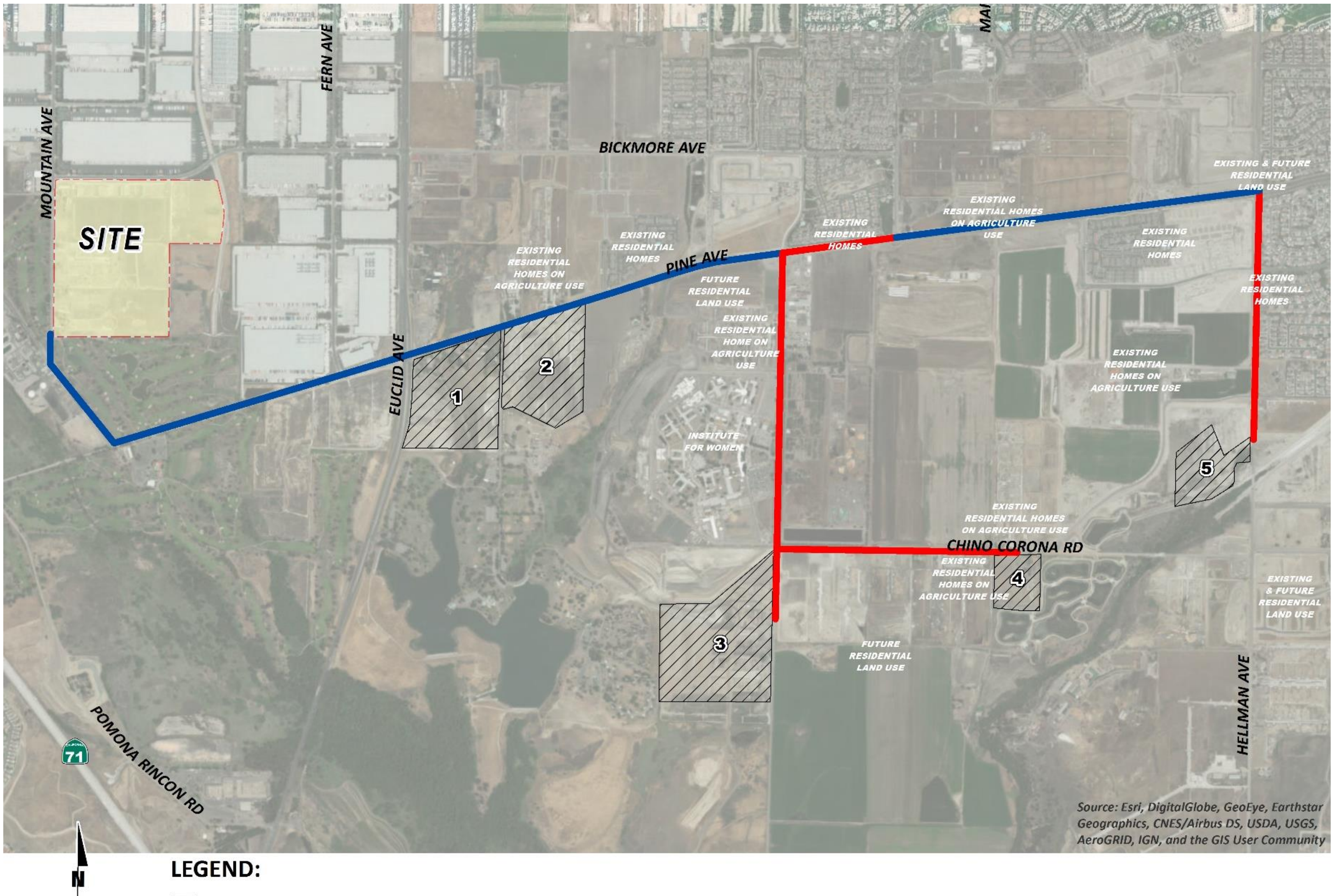
[1] Sources: Land Use Maps of the City of Chino, Chino Hills, Ontario, and Eastvale, and aerial imagery.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-14: OFF-PEAK IMPORT/EXPORT OFF-SITE TRUCK TRIP-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	CNEL at Adjacent Land Use (dBA)[1]			Noise-Sensitive Land Use?	Threshold Exceeded?[2]
			No Project	With Project	Project Addition		
29	Pine Av.	e/o Euclid Av.	73.9	78.7	4.8	Yes	Yes
30	Pine Av.	w/o Chino Corona Rd.	74.5	79.0	4.5	Yes	Yes
31	Pine Av.	w/o W. Preserve Loop	71.9	77.8	5.9	Yes	Yes
32	Pine Av.	w/o E. Preserve Loop	74.0	78.4	4.4	Yes	Yes
33	Pine Av.	w/o Hellman Av.	74.0	78.4	4.4	Yes	Yes
35	Chino Corona Rd.	s/o Pine Av.	67.6	80.2	12.6	Yes	Yes
36	Chino Corona Rd.	e/o Cucamonga Av.	66.4	79.4	13.0	Yes	Yes
37	Hellman Av.	s/o Pine Av.	71.6	78.2	6.6	Yes	Yes

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use. Values rounded to the nearest one-tenth.
[2] Significance Criteria (Section 4).

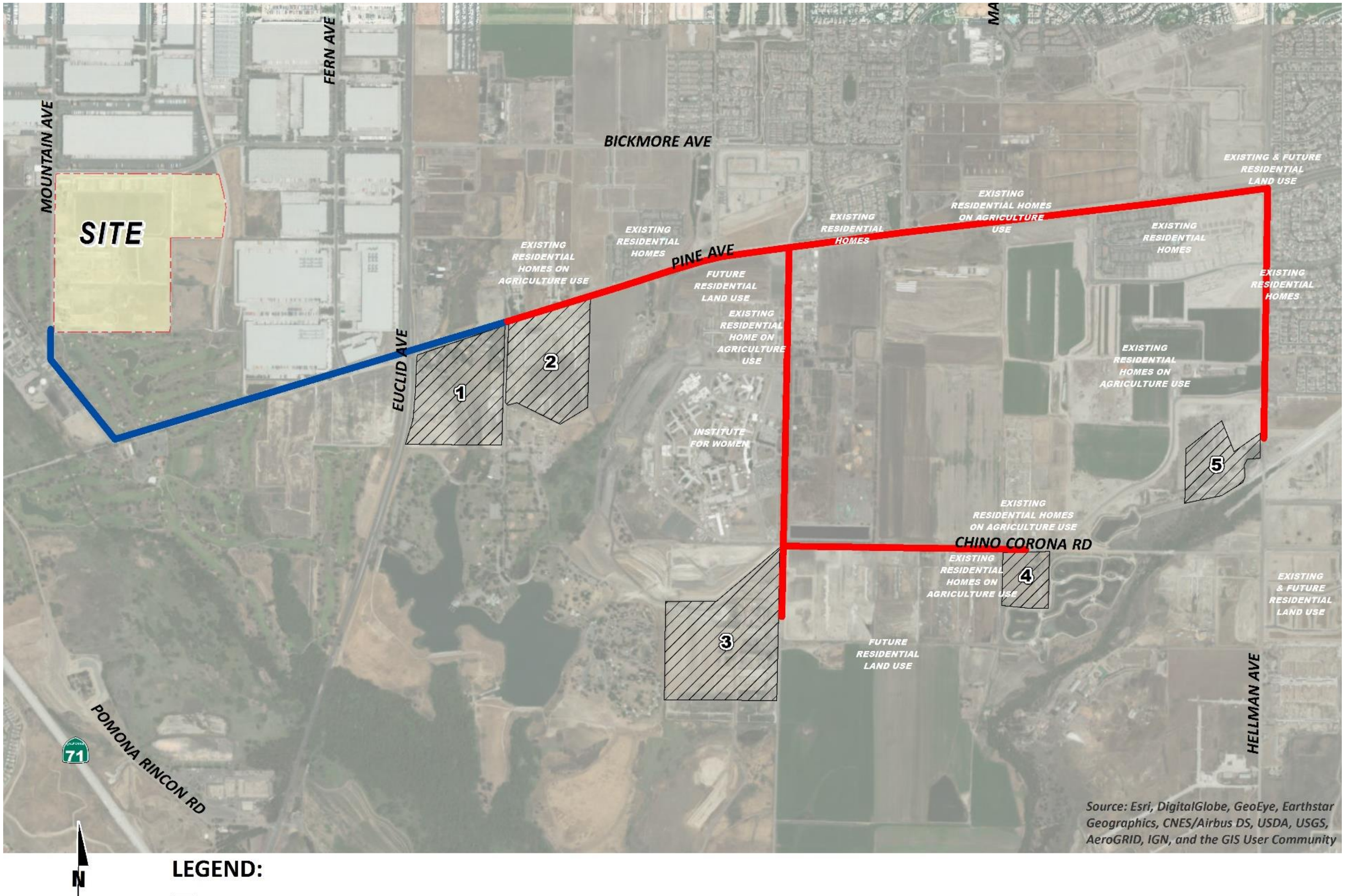
EXHIBIT 7-D: DAYTIME EXCESS FILL DIRT SITE OFF-SITE TRAFFIC NOISE IMPACTS



LEGEND:

Excess Fill Dirt Site — No adjacent sensitive uses — Potentially significant off-site traffic noise level impacts if adjacent to occupied sensitive uses

EXHIBIT 7-E: OFF-PEAK EXCESS FILL DIRT SITE OFF-SITE TRAFFIC NOISE IMPACTS



LEGEND:

1 Excess Fill Dirt Site — No adjacent sensitive uses — Potentially significant off-site traffic noise level impacts if adjacent to occupied sensitive uses

8 RECEIVER LOCATIONS

To assess the potential for long-term operational and short-term construction noise impacts, the following receiver locations as shown on Exhibit 8-A were identified as representative locations for focused analysis. Additional, off-site open space receiver locations are identified to quantify Project operational and construction-related noise levels for information purposes only. The Project's Biology report will analyze the significance of any potential noise impacts to sensitive wildlife species.

Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include: schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. Moderately noise-sensitive land uses typically include: multi-family dwellings, hotels, motels, dormitories, out-patient clinics, cemeteries, golf courses, country clubs, athletic/tennis clubs, and equestrian clubs. Land uses that are considered relatively insensitive to noise include business, commercial, and professional developments. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, natural open space, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

Sensitive receivers near the Project site are described below. Other sensitive land uses in the Project study area that are located at greater distances than those identified in this noise study will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures.

R1: Located approximately 3,594 feet west of the Project site, R1 represents existing residential homes east of State Route 71 in the City of Chino Hills. A 24-hour noise level measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents existing park use west of the Project site at approximately 2,938 feet, east of State Route 71 in the City of Chino Hills. A 24-hour noise level measurement was taken near this location, L1, to describe the existing ambient noise environment.

R3: Located approximately 4,240 feet east of the Project site, and 147 feet north of Excess Fill Dirt Site #2, R3 represents an existing residential home on agricultural land use on the north side of Pine Avenue in the City of Chino. A 24-hour noise level measurement was taken near this location, L3, to describe the existing ambient noise environment.

R4: Location R4 represents the existing equestrian center located roughly 135 feet south of Excess Fill Dirt Site #2, south of Pine Avenue. A 24-hour noise level measurement was taken near this location, L4, to describe the existing ambient noise environment.

R5: Located approximately 331 feet southeast of Excess Fill Dirt Site #1, R5 represents existing Prado Regional Park uses. A 24-hour noise level measurement was taken near this location, L4, to describe the existing ambient noise environment.

R6: Located approximately 487 feet north of Excess Fill Dirt Site #2, R6 represents existing residential homes north of Pine Avenue. A 24-hour noise level measurement was taken near this location, L5, to describe the existing ambient noise environment.

R7: Location R7 represents the existing women's correctional facility located roughly 653 feet north of Excess Fill Dirt Site #3, west of Chino Corona Road. A 24-hour noise level measurement was taken near this location, L7, to describe the existing ambient noise environment.

R8: Located approximately 75 feet west of Excess Fill Dirt Site #3, R8 represents existing Prado Regional Park uses. A 24-hour noise level measurement was taken near this location, L6, to describe the existing ambient noise environment.

R9: Located approximately 88 feet east of Excess Fill Dirt Site #3, R9 represents future, planned residential use east of Chino Corona Road. A 24-hour noise level measurement was taken near this location, L7, to describe the existing ambient noise environment.

R10: Location R10 represents an existing residential home on agricultural use and future residential development west of Excess Fill Dirt Site #4 at roughly 102 feet, south of Chino Corona Road. A 24-hour noise level measurement was taken near this location, L8, to describe the existing ambient noise environment.

R11: Located approximately 151 feet north of Excess Fill Dirt Site #4, R11 represents an existing residential home on agricultural use. A 24-hour noise level measurement was taken near this location, L8, to describe the existing ambient noise environment.

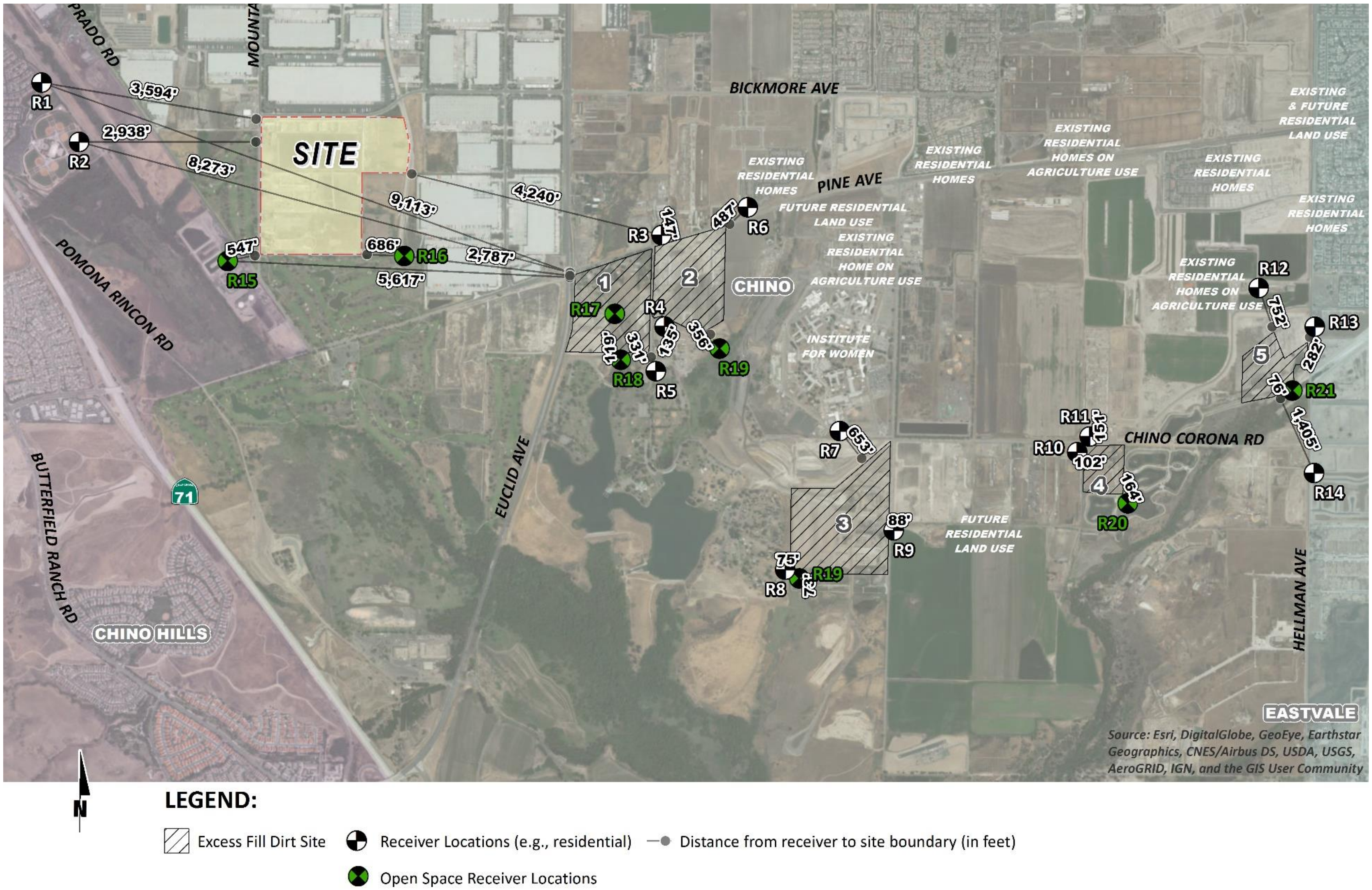
R12: Located approximately 752 feet north of Excess Fill Dirt Site #5, R12 represents existing residential homes west of Hellman Avenue. A 24-hour noise level measurement was taken near this location, L9, to describe the existing ambient noise environment.

R13: Location R13 represents the existing residential homes located roughly 282 feet east of Excess Fill Dirt Site #5, south of Pine Avenue in the City of Eastvale. A 24-hour noise level measurement was taken near this location, L10, to describe the existing ambient noise environment.

R14: Located approximately 1,405 feet southeast of Excess Fill Dirt Site #5, R14 represents existing and future residential uses east of Hellman Avenue in the City of Eastvale. A 24-hour noise level measurement was taken near this location, L11, to describe the existing ambient noise environment.

R15 – R22: Receiver locations R15 to R22 represent open space receiver locations that are identified for informational purposes only. The Project's Biology report will analyze the significance of any potential noise impacts to sensitive wildlife species.

EXHIBIT 8-A: RECEIVER LOCATIONS



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9 OPERATIONAL IMPACTS

This section analyzes the potential operational noise impacts due to the Project's stationary noise sources on the off-site sensitive receiver locations identified in Section 8. Exhibit 9-A identifies the receiver locations and noise source locations used to assess the Project-related operational noise levels.

9.1 REFERENCE NOISE LEVELS

To estimate the Project operational noise impacts, reference noise level measurements were collected from similar types of activities to represent the noise levels expected with the development of the proposed Project. This section provides a detailed description of the reference noise level measurements shown on Table 10-1 used to estimate the Project operational noise impacts. It is important to note that the following projected noise levels assume the worst-case noise environment with the roof-top air conditioning units, idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, and parking lot vehicle movements all operating continuously. These noise level impacts will likely vary throughout the day.

9.1.1 ROOF-TOP AIR CONDITIONING UNITS

To assess the impacts created by the roof-top air conditioning units at the Project buildings, reference noise levels measurements were taken over a four-day total duration at the Santee Walmart on July 27th, 2015. Located at 170 Town Center Parkway in the City of Santee, the noise level measurements describe a mechanical roof-top air conditioning unit on the roof of an existing Walmart store, in addition to background noise levels from additional roof-top units. The reference noise level represents a Lennox SCA120 series 10-ton model packaged air conditioning unit. Using the uniform reference distance of 50 feet, the noise level is 54.4 dBA L_{50}. The operating conditions of the reference noise level measurement reflect peak summer cooling requirements with measured temperatures approaching 96 degrees Fahrenheit (°F) with average daytime temperatures of 82°F. The roof-top air condition units were observed to operate the most during the daytime hours for a total of 39 minutes per hour. The noise attenuation provided by a parapet wall is not reflected in this reference noise level measurement.

9.1.2 TRUCK IDLING, DELIVERIES, BACKUP ALARMS, AND LOADING/UNLOADING

Short-term reference noise level measurements were collected on Wednesday, January 7th, 2015, by Urban Crossroads, Inc. at the Motivational Fulfillment & Logistics Services distribution facility located at 6810 Bickmore Avenue in the City of Chino. The noise level measurements represent the typical weekday dry goods logistics warehouse operation in a single building, of roughly 285,000 square feet, with a loading dock area on the western side of the building façade. Up to ten trucks were observed in the loading dock area including a combination of track trailer semi-trucks, two-axle delivery trucks, and background forklift operations.

The unloading/docking activity noise level measurement was taken over a fifteen-minute period and represents multiple noise sources taken from the center of loading dock activities generating a reference noise level of 59.8 dBA L_{50} at a uniform reference distance of 50 feet. At this measurement location, the noise sources associated with employees unloading a docked truck container included the squeaking of the truck's shocks when weight was removed from the truck, employees playing music over a radio, as well as a forklift horn and backup alarm. In addition, during the noise level measurement a truck entered the loading dock area and proceeded to reverse and dock in a nearby loading bay, adding truck engine and air brakes noise.

9.1.3 PARKING LOT VEHICLE MOVEMENTS (AUTOS)

To determine the noise levels associated with parking lot vehicle movements, Urban Crossroads collected reference noise level measurements over a 24-hour period on May 17th, 2017 at the parking lot for the Panasonic Avionics Corporation in the City of Lake Forest. The peak hour of activity measured over the 24-hour noise level measurement period occurred between 12:00 p.m. to 1:00 p.m., or the typical lunch hour for employees working in the area. The measured reference noise level at 50 feet from parking lot vehicle movements was measured at 38.5 dBA L_{50}. The parking lot noise levels are mainly due to cars pulling in and out of spaces during peak lunch hour activity and employees talking. Noise associated with parking lot vehicle movements is expected to operate for the entire hour (60 minutes).

TABLE 9-1: REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source	Duration (hh:mm:ss)	Distance From Source (Feet)	Noise Source Height (Feet)	Hourly Activity (Minutes)[4]	Noise Level (dBA L_{50})	
					@ Ref. Distance	@ 50 Feet
Roof-Top Air Conditioning Units[1]	01:00:00	5'	5'	39	74.4	54.4
Truck Unloading/Docking Activity[2]	00:15:00	30'	8'	60	64.2	59.8
Parking Lot Vehicle Movements[3]	01:00:00	10'	5'	60	49.0	35.0

[1] As measured by Urban Crossroads, Inc. on 7/27/2015 at the Santee Walmart located at 170 Town Center Parkway.
[2] Reference noise level measurements were collected on 1/7/2015 from the existing operations of the Motivational Fulfillment & Logistics Services distribution facility located at 6810 Bickmore Avenue in the City of Chino.
[3] As measured by Urban Crossroads, Inc. on 5/17/2017 at the Panasonic Avionics Corporation parking lot in the City of Lake Forest.
[4] Duration (minutes within the hour) of noise activity during peak hourly conditions.

EXHIBIT 9-A: OPERATIONAL NOISE SOURCE AND RECEIVER LOCATIONS

9.2 OPERATIONAL NOISE LEVELS

Based upon the reference noise levels, it is possible to estimate the Project operational stationary-source noise levels at each of the sensitive receiver locations. The operational noise level calculations shown on Table 9-2 account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. Hard site conditions are used in the operational noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source. The basic noise attenuation equation shown below is used to calculate the distance attenuation based on a reference noise level (SPL_1):

$$SPL_2 = SPL_1 - 20\log(D_2/D_1)$$

Where SPL_2 is the resulting noise level after attenuation, SPL_1 is the source noise level, D_2 is the distance to the reference sound pressure level (SPL_1), and D_1 is the distance to the receiver location.

Table 9-2 indicates that the noise levels associated with the roof-top air conditioning units, idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, and parking lot vehicle movements are expected to range from 20.5 to 24.1 dBA L_{50} at the noise-sensitive off-site receiver locations. Open space receiver locations are shown to experience Project operational noise levels ranging from 35.5 to 35.6 dBA L_{50}. Receiver locations R15 to R22 represent open space receiver locations that are identified for informational purposes only. The Project’s Biology report will analyze the significance of any potential noise impacts to sensitive wildlife species. In addition, only open space receiver locations R15 and R16 are analyzed in this section since receiver locations R17 to R22 are located further from the on-site Project operational activities, and as such, would experience operational noise levels less than those identified at R15 and R16. The operational noise level calculation worksheets are included in Appendix 9.1.

TABLE 9-2: UNMITIGATED PROJECT OPERATIONAL NOISE LEVELS

Receiver Location[1]	Noise Source[2]	Project Operational Noise Levels (dBA)[3]				
		L_{50} (30 mins)	L_{25} (15 mins)	L_{8} (5 mins)	L_{2} (1 min)	L_{max} (<1 min)
R1	Roof-Top Air Conditioning Units	14.9	16.6	17.9	18.2	18.7
	Truck Unloading/Docking Activity	21.7	24.7	29.3	33.1	37.5
	Parking Lot Vehicle Movements	0.0	0.0	3.7	9.7	20.6
	Combined Noise Level:	**22.5**	**25.3**	**29.6**	**33.3**	**37.6**
R2	Roof-Top Air Conditioning Units	16.6	18.3	19.6	19.9	20.4
	Truck Unloading/Docking Activity	23.2	26.2	30.8	34.6	39.0
	Parking Lot Vehicle Movements	0.0	0.5	5.5	11.5	22.4
	Combined Noise Level:	**24.1**	**26.9**	**31.1**	**34.8**	**39.2**
R3	Roof-Top Air Conditioning Units	12.6	14.3	15.6	15.9	16.4
	Truck Unloading/Docking Activity	19.7	22.7	27.3	31.1	35.5
	Parking Lot Vehicle Movements	0.0	0.0	0.0	5.0	15.9
	Combined Noise Level:	**20.5**	**23.3**	**27.6**	**31.2**	**35.6**
R15	Roof-Top Air Conditioning Units	27.8	29.5	30.8	31.1	31.6
	Truck Unloading/Docking Activity	34.8	37.8	42.4	46.2	50.6
	Parking Lot Vehicle Movements	11.9	12.9	17.9	23.9	34.8
	Combined Noise Level:	**35.6**	**38.4**	**42.7**	**46.4**	**50.8**
R16	Roof-Top Air Conditioning Units	27.7	29.4	30.7	31.0	31.5
	Truck Unloading/Docking Activity	34.7	37.7	42.3	46.1	50.5
	Parking Lot Vehicle Movements	2.1	3.1	8.1	14.1	25.0
	Combined Noise Level:	**35.5**	**38.3**	**42.6**	**46.2**	**50.6**

[1] See Exhibit 9-A for the receiver and noise source locations.
[2] Reference noise sources as shown on Table 9-1.
[3] Operational noise level calculations are provided in Appendix 9.1.
Note: Receiver locations R4 to R14 are not included in this analysis since they are located further from the on-site Project operational activities, and as such, would experience operational noise levels less than those identified at R3.

9.3 UNMITIGATED OPERATIONAL NOISE LEVEL COMPLIANCE

To demonstrate compliance with local noise regulations, the Project-only operational noise levels are evaluated against exterior noise level threshold based on the City of Chino and City of Chino Hills exterior noise level standards. Table 9-3 shows the operational noise levels associated with Majestic Chino Heritage Project will not exceed the City of Chino and City of Chino Hills Municipal Code daytime and nighttime exterior noise level standards at nearby receiver locations in each jurisdiction, respectively.

TABLE 9-3: UNMITIGATED OPERATIONAL NOISE LEVEL COMPLIANCE

Receiver Location[1]	City	Land Use	Noise Level at Receiver Locations (dBA)[2]					Threshold Exceeded?[3]
			L_{50} (30 mins)	L_{25} (15 mins)	L_{8} (5 mins)	L_{2} (1 min)	L_{max} (<1 min)	
Daytime	**Chino**	**Residential Standards**	**55**	**60**	**65**	**70**	**75**	**-**
Nighttime			**50**	**55**	**60**	**65**	**70**	**-**
Any Time	**Chino Hills**		**65**	**70**	**75**	**80**	**85**	**-**
R1	Chino Hills	Residential	22.5	25.3	29.6	33.3	37.6	No
R2	Chino Hills	Park	24.1	26.9	31.1	34.8	39.2	No
R3	Chino	Residential	20.5	23.3	27.6	31.2	35.6	No
R15	Open Space Receiver[4]		35.6	38.4	42.7	46.4	50.8	-
R16	Open Space Receiver[4]		35.5	38.3	42.6	46.2	50.6	-

[1] See Exhibit 9-A for the receiver and noise source locations.
[2] Estimated unmitigated Project operational noise levels as shown on Table 9-2.
[3] Do the estimated Project operational noise levels meet the operational noise level standards (Table 3-1)?
[4] Open space receiver locations are identified for informational purposes only. The Project's Biology report will analyze the significance of any potential noise impacts to sensitive wildlife species. Receiver locations R17 to R22 are located further from the on-site Project operational activities, and as such, would experience operational noise levels less than those identified at R15 and R16 for open space receiver locations.

10 CONSTRUCTION IMPACTS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 10-A shows the construction activity boundaries at the Project site, and Exhibit 10-B shows the Excess Dirt Fill Sites in relation to the nearby sensitive receiver locations.

10.1 CONSTRUCTION NOISE LEVELS

Noise generated by the Project construction equipment will include a combination of trucks, power tools, concrete mixers, and portable generators that when combined can reach high levels. The number and mix of construction equipment is expected to occur in the following stages:

- Soil Import/Export Process
- Grading
- Building Construction
- Paving
- Architectural Coating

This construction noise analysis was prepared using reference noise level measurements taken by Urban Crossroads, Inc. to describe the typical construction activity noise levels for each stage of Project construction. The construction reference noise level measurements represent a list of typical construction activity noise levels. Noise levels generated by heavy construction equipment can range from approximately 68 dBA to in excess of 80 dBA when measured at 50 feet. Hard site conditions are used in the construction noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source (i.e. construction equipment). For example, a noise level of 80 dBA measured at 50 feet from the noise source to the receiver would be reduced to 74 dBA at 100 feet from the source to the receiver and would be further reduced to 68 dBA at 200 feet from the source to the receiver. The construction stages used in this analysis are consistent with the data used to support the construction emissions in the *Majestic Chino Heritage Air Quality Impact Analysis* prepared by Urban Crossroads, Inc. (28)

10.2 CONSTRUCTION REFERENCE NOISE LEVELS

To describe the Project construction noise levels, measurements were collected for similar activities at several construction sites. Table 10-1 provides a summary of the construction reference noise level measurements. Since the reference noise levels were collected at varying distances, all construction noise level measurements presented on Table 10-1 have been adjusted to describe a common reference distance of 50 feet.

TABLE 10-1: CONSTRUCTION REFERENCE NOISE LEVELS

ID	Noise Source	Duration (h:mm:ss)	Reference Distance From Source (Feet)	Reference Noise Levels @ Reference Distance (dBA L_{eq})	Reference Noise Levels @ 50 Feet (dBA L_{eq})[6]
1	Truck Pass-Bys & Dozer Activity[1]	0:01:15	30'	63.6	59.2
2	Dozer Activity[1]	0:01:00	30'	68.6	64.2
3	Construction Vehicle Maintenance Activities[2]	0:01:00	30'	71.9	67.5
4	Foundation Trenching[2]	0:01:01	30'	72.6	68.2
5	Rough Grading Activities[2]	0:05:00	30'	77.9	73.5
6	Framing[3]	0:02:00	30'	66.7	62.3
7	Scraper, Water Truck, & Dozer Activity[4]	0:30:00	30'	79.7	75.3
8	Concrete Mixer Truck Movements[5]	0:01:00	50'	71.2	71.2
9	Concrete Paver Activities[5]	0:01:00	30'	70.0	65.6
10	Concrete Mixer Pour & Paving Activities[5]	0:01:00	30'	70.3	65.9
11	Concrete Mixer Backup Alarms & Air Brakes[5]	0:00:20	50'	71.6	71.6
12	Concrete Mixer Pour Activities[5]	1:00:00	50'	67.7	67.7

[1] As measured by Urban Crossroads, Inc. on 10/14/15 at a business park construction site located at the northwest corner of Barranca Parkway and Alton Parkway in the City of Irvine.
[2] As measured by Urban Crossroads, Inc. on 10/20/15 at a construction site located in Rancho Mission Viejo.
[3] As measured by Urban Crossroads, Inc. on 10/20/15 at a residential construction site located in Rancho Mission Viejo.
[4] As measured by Urban Crossroads, Inc. on 10/30/15 during grading operations at an industrial construction site in the City of Ontario.
[5] Reference noise level measurements were collected from a nighttime concrete pour at an industrial construction site, located at 27334 San Bernardino Avenue in the City of Redlands, between 1:00 a.m. to 2:00 a.m. on 7/1/15.
[6] Reference noise levels are calculated at 50 feet using a drop off rate of 6 dBA per doubling of distance (point source).

EXHIBIT 10-A: PROJECT SITE CONSTRUCTION ACTIVITY AND RECEIVER LOCATIONS

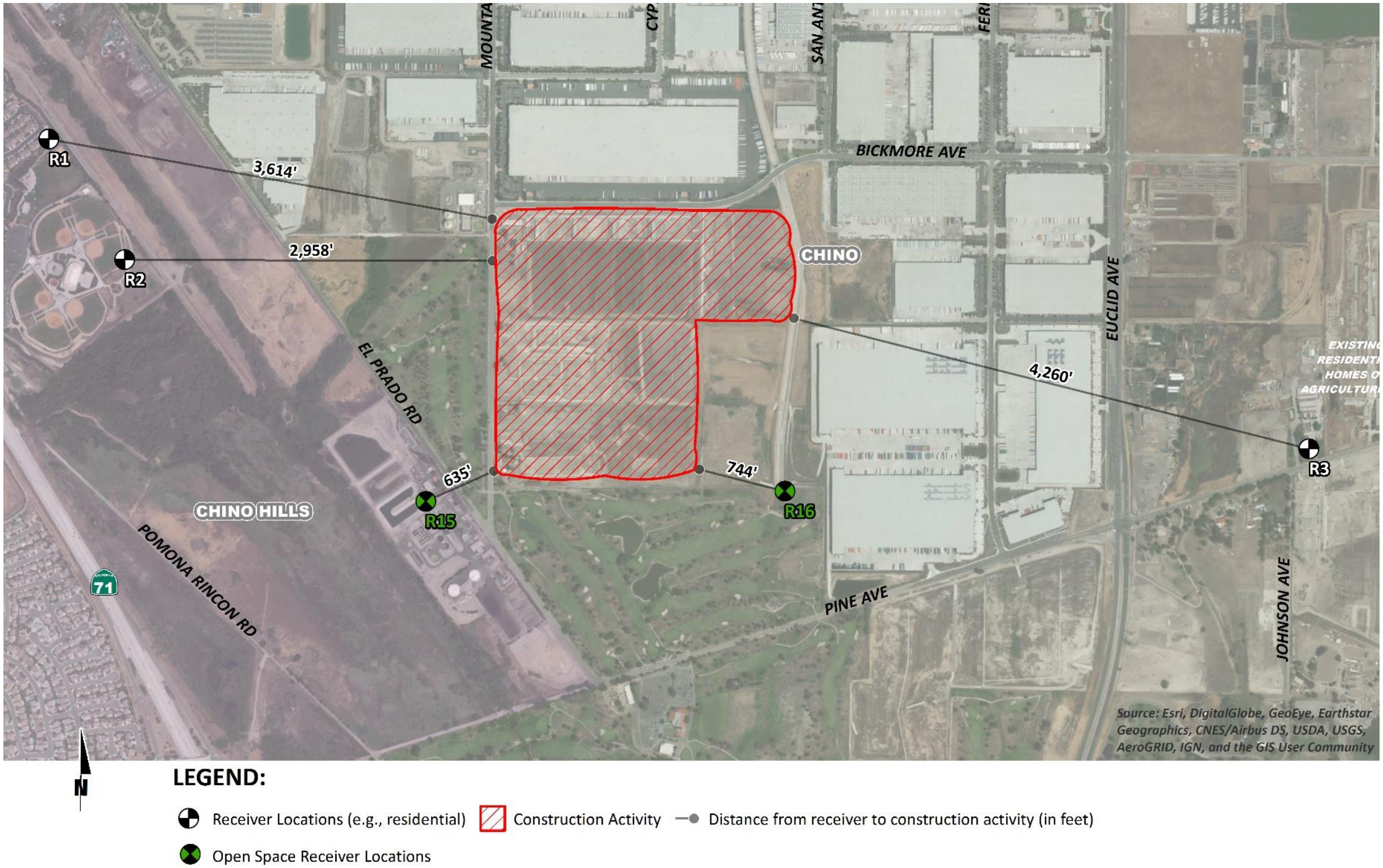
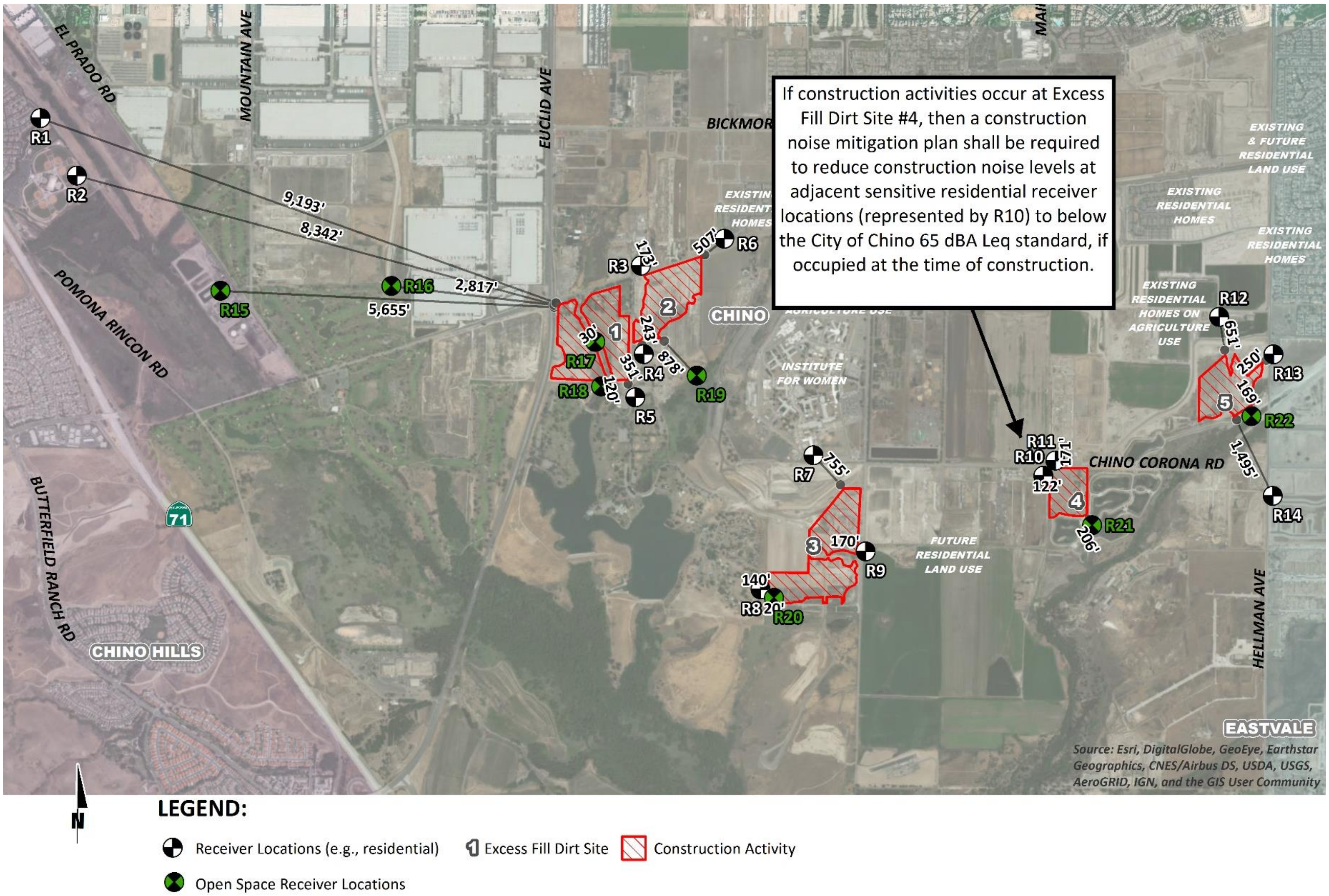


EXHIBIT 10-B: EXCESS DIRT FILL SITE CONSTRUCTION ACTIVITY AND RECEIVER LOCATIONS



10.3 CONSTRUCTION NOISE ANALYSIS

Tables 10-2 to 10-6 show the Project construction stages and the reference construction noise levels used for each stage. Table 10-7 provides a summary of the noise levels from each stage of construction at each of the sensitive receiver locations. Based on the reference construction noise levels, the Project-related construction noise levels when the highest reference noise level is operating at the edge of primary construction activity nearest each sensitive receiver location will range from 28.9 to 67.5 dBA L_{eq} at the noise-sensitive receiver locations, as shown on Table 10-7. Open space receiver locations, which are identified for information purposes only, are shown to experience construction noise levels ranging from 34.2 to 83.2 dBA L_{eq}. The Project's Biology report will analyze the significance of any potential noise impacts to sensitive wildlife species.

TABLE 10-2: SOIL IMPORT/EXPORT ACTIVITY NOISE LEVELS (DAYTIME & NIGHTTIME)

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Rough Grading Activities	73.5
Scraper, Water Truck, & Dozer Activity	75.3
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	75.3

Receiver Location	Distance to Closest Fill Site Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	9,193'	-45.3	0.0	30.0
R2	8,342'	-44.4	0.0	30.8
R3	173'	-10.8	0.0	64.5
R4	243'	-13.7	0.0	61.5
R5	351'	-16.9	0.0	58.3
R6	507'	-20.1	0.0	55.1
R7	755'	-23.6	0.0	51.7
R8	140'	-8.9	0.0	66.3
R9	170'	-10.6	0.0	64.6
R10	122'	-7.7	0.0	67.5
R11	171'	-10.7	0.0	64.6
R12	651'	-22.3	0.0	53.0
R13	250'	-14.0	0.0	61.3
R14	1,495'	-29.5	0.0	45.7
R15	5,655'	-41.1	0.0	34.2
R16	2,817'	-35.0	0.0	40.2
R17	30'	4.4	0.0	79.7
R18	120'	-7.6	0.0	67.7
R19	878'	-24.9	0.0	50.4
R20	20'	8.0	0.0	83.2
R21	206'	-12.3	0.0	63.0
R22	169'	-10.6	0.0	64.7

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area, if any.

TABLE 10-3: GRADING ACTIVITY NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Rough Grading Activities	73.5
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	73.5

Receiver Location	Distance to Project Site Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	3,614'	-37.2	0.0	36.3
R2	2,958'	-35.4	0.0	38.0
R3	4,260'	-38.6	0.0	34.9
R15	635'	-22.1	0.0	51.4
R16	744'	-23.5	0.0	50.0

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area, if any.

TABLE 10-4: BUILDING CONSTRUCTION ACTIVITY NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Construction Vehicle Maintenance Activities	67.5
Foundation Trenching	68.2
Framing	62.3
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	68.2

Receiver Location	Distance to Project Site Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	3,614'	-37.2	0.0	31.0
R2	2,958'	-35.4	0.0	32.7
R3	4,260'	-38.6	0.0	29.6
R15	635'	-22.1	0.0	46.1
R16	744'	-23.5	0.0	44.7

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area, if any.

TABLE 10-5: PAVING ACTIVITY NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Concrete Mixer Truck Movements	71.2
Concrete Paver Activities	65.6
Concrete Mixer Pour & Paving Activities	65.9
Concrete Mixer Backup Alarms & Air Brakes	71.6
Concrete Mixer Pour Activities	67.7
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	71.6

Receiver Location	Distance to Project Site Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	3,614'	-37.2	0.0	34.4
R2	2,958'	-35.4	0.0	36.2
R3	4,260'	-38.6	0.0	33.0
R15	635'	-22.1	0.0	49.5
R16	744'	-23.5	0.0	48.1

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area, if any.

TABLE 10-6: ARCHITECTURAL COATING ACTIVITY NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Construction Vehicle Maintenance Activities	67.5
Framing	62.3
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	67.5

Receiver Location	Distance to Project Site Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	3,614'	-37.2	0.0	30.3
R2	2,958'	-35.4	0.0	32.0
R3	4,260'	-38.6	0.0	28.9
R15	635'	-22.1	0.0	45.4
R16	744'	-23.5	0.0	44.0

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation from existing barriers in the Project study area, if any.

TABLE 10-7: UNMITIGATED CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location[1]	Construction Noise Levels by Stage (dBA L_{eq})					
	Soil Import/Export Process	Grading	Building Construction	Paving	Architectural Coating	Highest Construction Noise Level[2]
R1	30.0	36.3	31.0	34.4	30.3	36.3
R2	30.8	38.0	32.7	36.2	32.0	38.0
R3	64.5	34.9	29.6	33.0	28.9	64.5
R4	61.5	-[3]	-[3]	-[3]	-[3]	61.5
R5	58.3	-[3]	-[3]	-[3]	-[3]	58.3
R6	55.1	-[3]	-[3]	-[3]	-[3]	55.1
R7	51.7	-[3]	-[3]	-[3]	-[3]	51.7
R8	66.3	-[3]	-[3]	-[3]	-[3]	66.3
R9	64.6	-[3]	-[3]	-[3]	-[3]	64.6
R10	67.5	-[3]	-[3]	-[3]	-[3]	67.5
R11	64.6	-[3]	-[3]	-[3]	-[3]	64.6
R12	53.0	-[3]	-[3]	-[3]	-[3]	53.0
R13	61.3	-[3]	-[3]	-[3]	-[3]	61.3
R14	45.7	-[3]	-[3]	-[3]	-[3]	45.7
R15	34.2	51.4	46.1	49.5	45.4	51.4
R16	40.2	50.0	44.7	48.1	44.0	50.0
R17	79.7	-[4]	-[4]	-[4]	-[4]	79.7
R18	67.7	-[4]	-[4]	-[4]	-[4]	67.7
R19	50.4	-[4]	-[4]	-[4]	-[4]	50.4
R20	83.2	-[4]	-[4]	-[4]	-[4]	83.2
R21	63.0	-[4]	-[4]	-[4]	-[4]	63.0
R22	64.7	-[4]	-[4]	-[4]	-[4]	64.7

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Estimated construction noise levels based on the highest reference construction activity for each stage.
[3] Receiver locations R4 to R14 are located further from the on-site Project construction activities (non-soil import activities), and as such, would experience construction noise levels less than those identified at R3.
[4] Open space receiver locations are identified for informational purposes only. The Project's Biology report will analyze the significance of any potential noise impacts to sensitive wildlife species. Receiver locations R17 to R22 are located further from the on-site Project construction activities (non-soil import activities), and as such, would experience construction noise levels less than those identified at R15 and R16 for open space receiver locations.

10.4 CONSTRUCTION NOISE THRESHOLDS OF SIGNIFICANCE

To evaluate whether the Project will generate potentially significant short-term noise levels at off-site noise-sensitive receiver locations the City of Chino noise level threshold of 65 dBA L_{eq} is used.

10.4.1 PROJECT SITE CONSTRUCTION NOISE ANALYSIS

The Project-related short-term construction noise levels are expected to range approach 38.0 dBA L_{eq} and will not exceed the 65 dBA L_{eq} City of Chino construction noise level threshold at the nearby sensitive receiver locations. Therefore, based on the results of this analysis, all nearby sensitive receiver locations (R1 to R3) will experience *less than significant* impacts due to Project site construction noise levels, as shown on Table 10-8.

10.4.2 PROJECT NIGHTTIME CONCRETE POUR ACTIVITY ANALYSIS

It is our understanding that nighttime concrete pouring activities may occur as a part of Project construction activities. The paving stage construction noise levels, previously presented on Table 10-5, are based on nighttime concrete pouring activity reference noise level measurements, which are shown to result in Project construction noise levels ranging from 33.0 to 36.2 dBA L_{eq} at the nearby sensitive receiver locations. Therefore, nighttime concrete pouring activity would result in Project construction noise levels that will not exceed the City of Chino 65 dBA L_{eq} exterior noise level standard at nearby sensitive receiver locations.

10.4.3 SOIL IMPORT/EXPORT CONSTRUCTION NOISE ANALYSIS

The short-term construction noise levels associated with soil import/export activity, which could occur during daytime or nighttime hours, are expected to range from 30.0 to 67.5 dBA L_{eq} and will potentially exceed the 65 dBA L_{eq} City of Chino construction noise level threshold at one of the sensitive receiver locations, R10, near Excess Fill Dirt Site #4. Therefore, based on the results of this analysis, sensitive receiver location R10, if R10 represent built and occupied residential use, will experience *potentially significant* impacts due to construction noise levels generated by activities at Excess Fill Dirt Site #4. As such, a construction noise mitigation plan shall be required, as outlined in the Executive Summary, if Excess Fill Dirt Site #4 is used for soil import/export activities, and if R10 represents built and occupied residential use at the time of the soil import/export activities. All other receiver locations will experience *less than significant* noise impacts due to construction activities at the Excess Fill Dirt Sites.

10.4.4 CONSTRUCTION NOISE LEVELS AT OPEN SPACE RECEIVER LOCATIONS

As previously stated, open space receiver locations R15 to R22 are identified for information purposes only. The Project's Biology report will analyze the significance of any potential noise impacts to sensitive wildlife species.

On-site Project construction noise levels are anticipated to range from 44.0 to 51.4 dBA L_{eq} at open space receiver locations R15 to R16, which represent the closest open space receiver locations to the Project site. R17 to R22, located at greater distances, would experience lower on-site Project construction noise levels. Similarly, on-site Project nighttime concrete pour noise levels would range from 48.1 to 49.5 dBA L_{eq} at receiver locations R15 to R16.

The short-term construction noise levels associated with soil import/export activity, which could occur during daytime or nighttime hours, are expected to range from 34.2 to 83.2 dBA L_{eq} at the off-site open space receiver locations.

TABLE 10-8: CONSTRUCTION EQUIPMENT NOISE LEVEL COMPLIANCE (DBA L_{EQ})

Receiver Location[1]	Land Use	Highest Unmitigated Construction Noise Levels (dBA L_{eq})[2]	Construction Activity	Threshold (dBA L_{eq})[3]	Threshold Exceeded?[4]
R1	Residential	36.3	Project Grading	65	No
R2	Park	38.0	Project Grading	n/a	No
R3	Residential	64.5	Dirt Import/Export	65	No
R4	Equestrian Center	61.5	Dirt Import/Export	n/a	No
R5	Park	58.3	Dirt Import/Export	n/a	No
R6	Residential	55.1	Dirt Import/Export	65	No
R7	Institutional	51.7	Dirt Import/Export	n/a	No
R8	Park	66.3	Dirt Import/Export	n/a	No
R9	Residential (Future)	64.6	Dirt Import/Export	65	No
R10	Residential	67.5	Dirt Import/Export	65	**Yes**
R11	Residential	64.6	Dirt Import/Export	65	No
R12	Residential	53.0	Dirt Import/Export	65	No
R13	Residential	61.3	Dirt Import/Export	65	No
R14	Residential	45.7	Dirt Import/Export	65	No
R15	Open Space Receiver[5]	51.4	Dirt Import/Export	-	-
R16	Open Space Receiver[5]	50.0	Dirt Import/Export	-	-
R17	Open Space Receiver[5]	79.7	Dirt Import/Export	-	-
R18	Open Space Receiver[5]	67.7	Dirt Import/Export	-	-
R19	Open Space Receiver[5]	50.4	Dirt Import/Export	-	-
R20	Open Space Receiver[5]	83.2	Dirt Import/Export	-	-
R21	Open Space Receiver[5]	63.0	Dirt Import/Export	-	-
R22	Open Space Receiver[5]	64.7	Dirt Import/Export	-	-

[1] Noise receiver locations are shown on Exhibits 10-A and 10-B
[2] Estimated highest construction noise levels, as shown on Table 10-7.
[3] Construction noise standard as shown on Table 4-2.
[4] Do the estimated Project construction noise levels satisfy the construction noise level threshold?
[5] Open space receiver locations are identified for informational purposes only. The Project's Biology report will analyze the significance of any potential noise impacts to sensitive wildlife species.
"n/a" = No construction noise level threshold is identified for the given use; however, construction noise levels are presented for informational purposes.

10.5 CONSTRUCTION VIBRATION IMPACTS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. The proposed Project's construction activities most likely to cause vibration impacts are:

- Heavy Construction Equipment: Although all heavy mobile construction equipment has the potential of causing at least some perceptible vibration while operating close to buildings, the vibration is usually short-term and is not of sufficient magnitude to cause building damage.
- Trucks: Trucks hauling building materials to construction sites can be sources of vibration intrusion if the haul routes pass through residential neighborhoods on streets with bumps or potholes. Repairing the bumps and potholes generally eliminates the problem.

Ground-borne vibration levels resulting from construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration (FTA). Construction activities that would have the potential to generate low levels of ground-borne vibration within the Project site include mobile equipment activities and pile driving, among others. Using the vibration source level of construction equipment provided on Table 6-9 and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts.

The construction vibration analysis is based on the shortest distance to either Project site construction or Excess Fill Dirt Site soil import/export activities. Based on the analysis, construction vibration velocity levels are expected to approach 0.012 in/sec PPV, and 0.009 in/sec RMS, as shown on Table 10-9. Based on the results of the analysis, the Project construction vibration levels will remain below the City of Chino 0.05 in/sec RMS vibration level standard, the City of Chino Hills 0.2 in/sec PPV standard, and the City of Eastvale 0.0787 in/sec PPV standard at the nearby sensitive receiver locations.

Further, the Project-related construction vibration levels do not represent levels capable of causing building damage to nearby residential homes. The FTA identifies construction vibration levels capable of building damage ranging from 0.12 to 0.5 in/sec PPV. (3) The peak Project-construction vibration levels approaching 0.012 in/sec PPV will remain below the FTA vibration levels for building damage at the residential homes near the Project site. Moreover, the impacts at the site of the closest sensitive receivers are unlikely to be sustained during the entire construction period, but will occur rather only during the times that heavy construction equipment is operating adjacent to the Project site perimeter.

TABLE 10-9: UNMITIGATED CONSTRUCTION EQUIPMENT VIBRATION LEVELS

Receiver Location[1]	City	Shortest Distance to Const. Activity (Feet)	Receiver PPV Levels (in/sec)[2]					RMS Velocity Levels (in/sec)[3]	Threshold (in/sec)		Threshold Exceeded?[4]
			Small Bulldozer	Jack-hammer	Loaded Trucks	Large Bulldozer	Peak Vibration		PPV	RMS	
R1	Chino Hills	3,614'	0.0000	0.0000	0.0000	0.0001	0.0001	-	0.20	-	No
R2	Chino Hills	2,958'	0.0000	0.0000	0.0001	0.0001	0.0001	-	0.20	-	No
R3	Chino	167'	0.0002	0.0020	0.0044	0.0052	0.0052	0.004	-	0.05	No
R4	Chino	155'	0.0002	0.0023	0.0049	0.0058	0.0058	0.004	-	0.05	No
R5	Chino	351'	0.0001	0.0007	0.0014	0.0017	0.0017	0.001	-	0.05	No
R6	Chino	507'	0.0000	0.0004	0.0008	0.0010	0.0010	0.001	-	0.05	No
R7	Chino	673'	0.0000	0.0003	0.0005	0.0006	0.0006	0.000	-	0.05	No
R8	Chino	95'	0.0004	0.0047	0.0103	0.0120	0.0120	0.009	-	0.05	No
R9	Chino	108'	0.0003	0.0039	0.0085	0.0099	0.0099	0.007	-	0.05	No
R10	Chino	122'	0.0003	0.0032	0.0070	0.0083	0.0083	0.006	-	0.05	No
R11	Chino	171'	0.0002	0.0020	0.0042	0.0050	0.0050	0.004	-	0.05	No
R12	Chino	772'	0.0000	0.0002	0.0004	0.0005	0.0005	0.000	-	0.05	No
R11	Eastvale	282'	0.0001	0.0009	0.0020	0.0023	0.0023	-	0.0787	-	No
R12	Eastvale	1,425'	0.0000	0.0001	0.0002	0.0002	0.0002	-	0.0787	-	No

[1] Receiver locations are shown on Exhibit 10-A.
[2] Based on the Vibration Source Levels of Construction Equipment included on Table 6-9.
[3] Vibration levels in PPV are converted to RMS velocity using a 0.71 conversion factor identified in the Caltrans Transportation and Construction Vibration Guidance Manual, September 2013.
[4] Does the vibration exceed the maximum acceptable vibration threshold?

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11 REFERENCES

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21. **Environmental Protection Agency Office of Noise Abatement and Control.** *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* March, 1974. EPA/ONAC 550/9/74-004.
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24. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*

25. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.

26. **California Department of Transportation Environmental Program, Office of Environmental Engineering.** *Use of California Vehicle Noise Reference Energy Mean Emission Levels (Calveno REMELs) in FHWA Highway Traffic Noise Prediction.* September 1995. TAN 95-03.

27. **California Department of Transportation.** *Traffic Noise Attenuation as a Function of Ground and Vegetation Final Report.* June 1995. FHWA/CA/TL-95/23.

28. **Urban Crossroads, Inc.** *Majestic Chino Heritage Air Quality Impact Analysis.* May 2019.

12 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Majestic Chino Heritage Project. The information contained in this noise study report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5979.

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Master of Science in Civil and Environmental Engineering
California Polytechnic State University, San Luis Obispo • December, 1993

Bachelor of Science in City and Regional Planning
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PROFESSIONAL REGISTRATIONS

PE – Registered Professional Traffic Engineer – TR 2537 • January, 2009
AICP – American Institute of Certified Planners – 013011 • June, 1997–January 1, 2012
PTP – Professional Transportation Planner • May, 2007 – May, 2013
INCE – Institute of Noise Control Engineering • March, 2004

PROFESSIONAL AFFILIATIONS

ASA – Acoustical Society of America
ITE – Institute of Transportation Engineers

PROFESSIONAL CERTIFICATIONS

Certified Acoustical Consultant – County of Orange • February, 2011
FHWA-NHI-142051 Highway Traffic Noise Certificate of Training • February, 2013

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APPENDIX 3.1:

CITY OF CHINO MUNICIPAL CODE

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Chapter 9.40 - NOISE*

Sections:

9.40.010 - Definitions.

The following words, phrases and terms as used in this chapter shall have the meanings as indicated here:

"Agricultural property" means a parcel of real property which is undeveloped for any use other than agricultural purposes.

"Ambient noise level" means the all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding the alleged offensive noise, at the location and approximate time at which a comparison with the alleged offensive noise is to be made.

"A-weighted sound level" means the total sound level meter with a reference pressure of twenty micro-pascals using the A-weighted network (scale) at slow response. The unit of measurement shall be defined as dBA.

"Commercial property" means a parcel of real property which is developed and used as either in or part or in whole for commercial purposes.

"Cumulative period" means an additive period of time composed of individual time segments which may be continuous or interrupted.

"Decibel (dB)" means a unit which denotes the ratio between two quantities which are proportional to power: the number of decibels corresponding to the ratio of two amounts of power is ten times the logarithm to the base ten of this ratio.

"Director of community development" means the director of community development of the city of Chino or his/her duly authorized deputy.

"Dwelling unit" means a single unit providing complete independent living facilities for one or more persons including permanent provisions for living, sleeping, eating, cooking and sanitation.

"Emergency machinery, vehicle, work or alarm" means any machinery, vehicle, work or alarm used, employed, performed or operated in an effort to protect, provide or restore safety conditions in the community or for the citizenry, or work by private or public utilities when restoring utility service.

"Fixed noise source" means a stationary device which creates sounds while fixed or motionless including but not limited to residential, agricultural, industrial and commercial machinery and equipment, pumps, fans, compressors, air conditioners and refrigeration equipment.

"Grading" means any excavating of filling of earth material or any combination thereof conducted at a site to prepare said site for construction or other improvements thereon.

"Hertz (Hz)" means the unit which describes the frequency of a function periodic in time which is the reciprocal of the period.

"Health care institution" means any hospital, convalescent home or other similar facility excluding residential.

"Impulsive noise" means a noise of short duration usually less than one second and of high intensity, with an abrupt onset and rapid decay.

"Industrial property" means a parcel of real property which is developed and used either in part or in whole for manufacturing purposes.

"Intruding noise level" means the total sound level, in decibels, created, caused, maintained or originating from an alleged offensive source at a specified location while the alleged offensive source is in operation.

"Licensed" means the issuance of a formal license or permit by the appropriate jurisdictional authority, or where no permits or licenses are issued, the sanctioning of the activity by the jurisdiction as noted in public record.

"Major roadway" means any street, avenue, boulevard or highway used for motor vehicle traffic which is owned or controlled by a public government entity.

"Mobile noise source" means any noise source other than a fixed noise source.

"Person" means a person, firm, association, co-partnership, joint venture, corporation or any entity, public or private in nature.

"Residential property" means a parcel of real property which is developed and used either in part or in whole for residential purposes, other than transient uses such as hotels and motels, and residential care facilities.

"Simple tone noise" means a noise characterized by a predominant frequency or frequencies so that other frequencies cannot be readily distinguished. If measured, simple tone noise shall exist if the one-third octave band sound pressure levels in the band with the tone exceeds the arithmetic average of the sound pressure levels of the two continuous one-third octave bands as follows: 5 dB for frequencies of 500 Hertz (Hz) and above or; by 15 dB for frequencies less than equal to 125 Hz.

"Sound level meter" means an instrument meeting American National Standard Institute's Standard S1.4-1971 or most recent revision thereof for Type 2 sound level meters or an instrument and the associated recording and analyzing equipment which will provide equivalent data.

"Sound pressure level" of a sound, in decibels, means twenty times the logarithm to the base 10 of the ratio of the pressure of the sound to a reference pressure shall be explicitly stated.

"Vibration" means any movement of the earth, ground or other similar surface created by a temporal and spacial oscillation device or equipment located upon, affixed in conjunction with that surface.

(Ord. 95-10 § 1 (part), 1995.)

9.40.020 - Decibel measurement criteria.

Any decibel measurement made pursuant to the provisions of this chapter shall be based on a reference sound pressure of twenty micro-pascals as measured with a sound level meter using the A-weighted network (scale) at slow response.

(Ord. 95-10 § 1 (part), 1995.)

9.40.030 - Designated noise zones.

The properties hereinafter described are assigned to the following noise zones:

Noise Zone I: All single-, double- and multiple-family residential properties.

Noise Zone II: All commercial properties.

Noise Zone III: All manufacturing or industrial properties.

(Ord. 95-10 § 1 (part), 1995.)

9.40.040 - Exterior noise standards.

The following noise standards, unless otherwise specifically indicated, shall apply to all residential property with a designated noise zone:

These criteria are given in terms of allowable noise levels for a given period of time at the residential property boundary. Higher noise levels are permitted during the day (seven a.m. to ten p.m.) than the night (ten p.m. to seven a.m.). The table below shows the acceptable levels at residential land uses during the daytime and nighttime.

City of Chino Exterior Noise Ordinance

Criteria for Residential Properties (Zone 1)

Maximum Time of Exposure	Noise		
Metric	Noise Level Not to Exceed		
		7 am—10 pm	10 pm—7 am
30 min/hr	L50	55 dBA	50 dBA
15 min/hr	L25	60 dBA	55 dBA
5 min/hr	L8.3	65 dBA	60 dBA
1 min/hr	L1.7	70 dBA	65 dBA
Any period of time	Lmax	75 dBA	70 dBA

Each of the noise limits specified here shall be reduced by five dBA for impulse or simple tone noises, or for noises consisting of speech or music; provided, however, that if the ambient noise level exceeds the resulting standard, the ambient shall be the standard.

It is unlawful for any person at any location within the incorporated area of the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level when measured on any other property, to exceed:

A. The noise standard for a cumulative period of more than thirty minutes in any hour; or
B. The noise standard plus five dBA for a cumulative period of more than fifteen minutes in any hour; or
C. The noise standard plus ten dBA for a cumulative period of more than five minutes in any hour; or
D. The noise standard plus fifteen dBA for a cumulative period of more than one minute in any hour; or
E. The noise standard plus twenty dBA for any period of time.

In the event the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

If the measurement location is on boundary between two different noise zones, the lower noise level standard applicable to the noise zone shall apply.

If the intruding noise source is continuous and cannot be reasonably discontinued or stopped for a time period whereby the ambient noise level can be determined, the measured noise level obtained while the source is in operation shall be compared directly to the allowable noise level standards as specified respective to the measurement location's designated land use and for the time of the day the noise level is measured.

A. The reasonableness of temporarily discontinuing the noise generation by an intruding noise source shall be determined by the director or his/her duly authorized deputy for the purpose of establishing the existing ambient noise level at the measurement location.

(Ord. 95-10 § 1 (part), 1995.)

9.40.050 - Interior noise standards.

The following noise standard, unless otherwise specifically indicated, shall apply to all residential property within all noise zones:

Each of the noise limits specified above shall be reduced by five dBA for impulse or simple tone noises or for noises consisting of speech or music provided, however, if the ambient noise level exceeds the resulting standard, the ambient shall be the standard.

It is unlawful for any person at any location within the incorporated area of the city to create any noise or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such a person which causes the noise level when measured within any other residential dwelling unit in any noise zone to exceed:

A. The noise standard for cumulative period of more than five minutes in any hour; or
B. The noise standard plus 5 dBA for a cumulative period of more than one minute in any hour; or
C. The noise standard plus ten dBA for any period of time.

In the event the ambient noise level exceeds any of the first two noise limit categories above, the noise standard applicable to said category shall be increased to reflect the maximum ambient noise level.

If the measurement location is on a boundary between two different noise zones, the lower noise level standard applicable to the noise zone shall apply.

If the intruding noise source is continuous and cannot reasonably be discontinued or stopped for a time period whereby the ambient noise level can be determined; the same procedures specified in Section 9.40.040(E), shall be deemed proper to enforce the provisions of this section.

(Ord. 95-10 § 1 (part), 1995.)

9.40.060 - Special provisions.

The following activities shall be exempted from the provisions of this chapter:

A. Activities conducted on public parks, public playgrounds and public or private school grounds including school athletic and school entertainment events that are conducted under the sanction of the school or which a license or permit has been duly issued pursuant to any provision of the city code;
B. Occasional outdoor gatherings, public dances, show, sporting and entertainment events, provided said events are conducted pursuant to a permit or license issued by the appropriate jurisdiction relative to the staging of

said events. Such permits and licenses may restrict noise;

C. Any mechanical device, apparatus or equipment used, related to or connected with emergency machinery, vehicle, work or warning alarm or bell, provided the sounding of any bell or alarm on any building or motor vehicle shall terminate its operation within thirty minutes in any hour of its being activated;

D. Noise sources associated with or vibration created by construction, repair, remodeling or grading of any real property or during authorized seismic surveys, provided said activities do not take place outside the hours for construction as defined in Section 15.44.030 of this code, and provided the noise standard of sixty-five dBA plus the limits specified in Section 9.40.040(B) as measured on residential property and any vibration created does not endanger the public health, welfare and safety;

E. All mechanical devices, apparatus or equipment associated with agriculture operations provided:

1. Operations do not take place between eight p.m. and seven a.m. on weekdays, including Saturday, or at any time Sunday or a Federal holiday, or
2. Such operations and equipment are utilized for the protection of salvage of agricultural crops during periods of potential or actual frost damage or other adverse weather conditions, or
3. Such operations and equipment are associated with agricultural pest control through pesticide application, provided the application is made in accordance with permits issued by or regulations enforced by the California Department of Agriculture,
4. Noise sources associated with the maintenance of real property, provided said activities take place between the hours of seven a.m. to eight p.m. on any day except Sunday, or between the hours of nine a.m. and eight p.m. on Sunday,
5. Any activity to the extent regulation thereof has been preempted by state or federal law.

NOTE: Preemption may include motor vehicle, aircraft in flight, and railroad noise regulations.

(Ord. 2004-23 § 59, 2004; Ord. 95-10 § 1 (part), 1995.)

9.40.070 - Schools, churches, libraries, health care institutions—Special provisions.

It shall be deemed unlawful for any person to create any noise which causes the noise level at any school, hospital or similar health care institution, church or library while the same is in use, to exceed the noise standards specified in Section 9.40.040 prescribed for the assigned noise zone level, unreasonably interferes with the use of such institutions, or which unreasonably disturbs or annoys patients in a hospital, convalescent home or other similar health care institutions, provided conspicuous signs are displayed in three separate locations within one-tenth-mile of the institution or facility indicating a quiet zone.

(Ord. 95-10 § 1 (part), 1995.)

9.40.080 - Air conditioning and refrigeration—Special provisions.

Until January 1, 1996, the noise standards enumerated in Section 9.40.040 and 9.40.050 shall be increased five dBA where the alleged intruding noise source is an air conditioning or refrigeration system or associated equipment which was installed prior to the effective date of the ordinance codified in this chapter.

(Ord. 95-10 § 1 (part), 1995.)

9.40.090 - Noise sources generated on publicly owned property.

Notwithstanding any other provision of this code and in addition thereto, it is unlawful for any person to permit or cause any noise, sound, music or program to be emitted from any radio, tape player, tape recorder, record player, television outdoors, or any other mode on or in any publicly owned property, park or place when such noise, sound, music or program is audible to a person of normal hearing sensitivity one hundred feet from said radio, tape player, tape recorder, record player or television.

A. As used herein, "a person of normal hearing sensitivity" means a person who has a hearing threshold level of between zero decibels and twenty-five decibels HL averaged over the frequencies 500, 1,000 and 2,000 Hertz.
B. Notwithstanding any other provision of this code, any person violating this section shall be guilty of an infraction and upon conviction thereof, is punishable by a fine not exceeding fifty dollars, for a first violation; a fine not exceeding one hundred dollars for a second violation of this section within one year; a fine not exceeding two hundred fifty dollars for each additional violation of this section within one year. A person who violates the provisions of this section shall be deemed to be guilty of a separate offense for each day, or portion thereof, during which the violation continues or is repeated.
C. Notwithstanding any other provision of this code, no citation or notice to appear shall be issued or criminal complaint shall be filed for a violation of this section unless the offending party is first given a verbal or written notification of violation by any peace officer, public officer, park ranger or other person charged with enforcing this section and the offending party given an opportunity to correct said violation.
D. This section shall not apply to broadcasting from any aircraft, vehicle or stationary sound amplifying equipment or to the use of radios, tape players, tape recorders, record players or televisions in the course of an assembly or festival for which a license has been issued or a parade for which a permit has been issued pursuant to or any other activity, assembly or function for which a permit or license has been duly issued pursuant to any provision of the city code.

(Ord. 95-10 § 1 (part), 1995.)

9.40.100 - Noise level measurement.

The location selected for measuring exterior noise levels shall be made within the affected residential unit. The measurements shall be made at a point at least four feet from the wall, ceiling or floor nearest the noise source with windows in an open position depending on the normal seasonal ventilation requirements.

(Ord. 95-10 § 1 (part), 1995.)

9.40.110 - Vibration.

Notwithstanding other sections of this chapter, it is unlawful for any person to create, maintain or cause any ground vibration which is perceptible without instruments at any point on any affected property adjoining the property on which the vibration source is located. For the purpose of this chapter, the perception threshold shall be presumed to be more than 0.05 inches per second RMS vertical velocity.

(Ord. 95-10 § 1 (part), 1995.)

9.40.120 - Proposed developments.

Each department whose duty it is to review and approve new projects or changes to existing projects that result or may result in the creation of noise shall consult with the director prior to any such approval. If at any time the director of community development has reason to believe that a standard, regulation, action, proposed standard, regulation or action of any department respecting noise does not conform to the provisions as specified in this chapter, the director may request such department to consult with them on the advisability of revising such standard or regulation to obtain uniformity.

(Ord. 95-10 § 1 (part), 1995.)

9.40.130 - Variance procedure.

The variance procedure process shall remain as specified in the city's zoning code (Title 20).

(Ord. 95-10 § 1 (part), 1995.)

9.40.140 - Planning commission.

The planning commission shall evaluate all applications for variance from the requirements of this chapter and may grant said variances with respect to time for compliance, subject to such terms, conditions and requirements as it may deem reasonable to achieve maximum compliance with the provisions of this chapter. Said terms, conditions and requirements may include, but shall not be limited to, limitation on noise levels and operating hours. Each such variance shall set forth in detail the approved method of achieving maximum compliance and a time schedule for its accomplishment. In its determinations, the commission shall consider the following:

A. The magnitude of nuisance caused by the offensive noise;
B. The uses of property within the area of impingement by the noise;
C. The time factors related to study, design, financing and construction of remedial work;
D. The economic factors related to age and useful life of the equipment;
E. The general public interest, welfare and safety.

Any variance granted by the commission shall be by resolution and shall be transmitted to the director of community development for enforcement. Any violation of the terms of said variance shall be unlawful.

The planning commission may require additional acoustical studies based on the individual circumstances of each case. Such studies must be performed by a person qualified in acoustical engineering with the state of California.

Meetings of the planning commission shall be held at the call of the secretary and at such times and locations as the commission shall determine. All such meetings shall be open to the public.

(Ord. 95-10 § 1 (part), 1995.)

9.40.150 - Appeals.

The appeal procedure process shall remain as specified in the city's zoning code (Title 20).

(Ord. 95-10 § 1 (part), 1995.)

9.40.160 - Prima facie violation.

Any noise exceeding the noise level standard as specified in Section 9.40.040 and 9.40.050 or vibration exceeding the standard as specified in Section 9.40.110 of this chapter, shall be deemed to be prima facie evidence of a violation of the provisions of this chapter.

(Ord. 95-10 § 1 (part), 1995.)

9.40.170 - Violations/misdemeanors.

Any persons violating any of the provisions of this chapter shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined in an amount not to exceed an amount as specified by city council resolution, or be imprisoned in the Jail for a period not to exceed six months or by both such fine and imprisonment. Each day such violation is committed or permitted to continue shall constitute a separate offense and shall be punishable as such.

(Ord. 95-10 § 1 (part), 1995.)

9.40.180 - Violations/additional remedies— Injunctions.

As an additional remedy, the operation or maintenance of any device, instrument, vehicle or machinery in violation of any provisions of this chapter which operation or maintenance causes or creates sound levels or vibration exceeding the allowable standards as specified in this chapter shall be deemed and is hereby declared to be a public nuisance and may be subject to abatement summarily by a restraining order or injunction issued by a court of competent jurisdiction.

Any violation of this chapter is declared to be a public nuisance and may be abated in accordance with law. The expense of this chapter is declared to be public nuisance and may be by resolution of the city council declared to be a lien against the property on which such nuisance is maintained, and such lien shall be made a personal obligation of the property owner.

(Ord. 95-10 § 1 (part), 1995.)

9.40.190 - Manner of enforcement.

The director is directed to enforce the provisions of this chapter and is authorized and may cite at his/her discretion, any person without a warrant who has reasonable cause to believe that such person has committed a misdemeanor in his/her presence.

No person shall interfere with, oppose or resist any authorized person charged with the enforcement of this chapter while such person is engaged in the performance of his/her duty.

Violations of this chapter shall be prosecuted in the same manner as other misdemeanor violations pursuant to Chapter 1.12; provided, however, that in the event of an initial violation of the provisions of this chapter, a written notice shall be given the alleged violator which specifies the time by which the condition shall be corrected or an application for variance shall be received by the event the cause of the violation has been removed, the condition abated or fully corrected within the time period specified in the written notice.

In the event the alleged violated cannot be located in order to serve the notice of intention to prosecute, the notice as required herein shall be deemed to be given upon mailing such notice to registered or certified mail to the alleged violator at his last known address or at the place where the violation occurred in which event the specified time period for abating the violation or applying for a variance shall commence at the date of the day following the mailing of such notice. Subsequent violations of the same offense shall result in the immediate filing of a misdemeanor complaint.

(Ord. 95-10 § 1 (part), 1995.)

9.40.200 - Delay in implementation—Fixed noise sources.

None of the provisions of this chapter shall apply to a fixed sound source during the period commencing the effective date of this chapter and terminating one-hundred eighty days thereafter.

(Ord. 95-10 § 1 (part), 1995.)

APPENDIX 5.1:

STUDY AREA PHOTOS

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L1 East
33, 57' 24.830000", 117, 40' 39.870000"

L1 North
33, 57' 24.780000", 117, 40' 39.790000"

L1 South
33, 57' 24.830000", 117, 40' 39.870000"

L1 West
33, 57' 24.820000", 117, 40' 39.840000"

L2 East
33, 57' 12.770000", 117, 40' 1.120000"

L2 North
33, 57' 12.860000", 117, 40' 1.140000"

JN:10351 Study Area Photos

L2 South
33, 57' 12.770000", 117, 40' 1.090000"

L2 West
33, 57' 12.760000", 117, 40' 1.120000"

L3 East
33, 57' 17.730000", 117, 38' 42.430000"

L3 North
33, 57' 17.690000", 117, 38' 42.430000"

L3 South
33, 57' 17.700000", 117, 38' 42.430000"

L3 West
33, 57' 17.690000", 117, 38' 42.430000"

JN:10351 Study Area Photos

L4 East
33, 57' 2.870000", 117, 38' 45.450000"

L4 North
33, 57' 2.850000", 117, 38' 45.450000"

L4 South
33, 57' 2.850000", 117, 38' 45.420000"

L4 West
33, 57' 2.850000", 117, 38' 45.450000"

L5 East
33, 57' 23.610000", 117, 38' 28.530000"

L5 North
33, 57' 23.620000", 117, 38' 28.530000"

L5 South
33, 57' 23.550000", 117, 38' 28.530000"

L5 West
33, 57' 23.610000", 117, 38' 28.580000"

L6 East
33, 56' 27.620000", 117, 38' 28.420000"

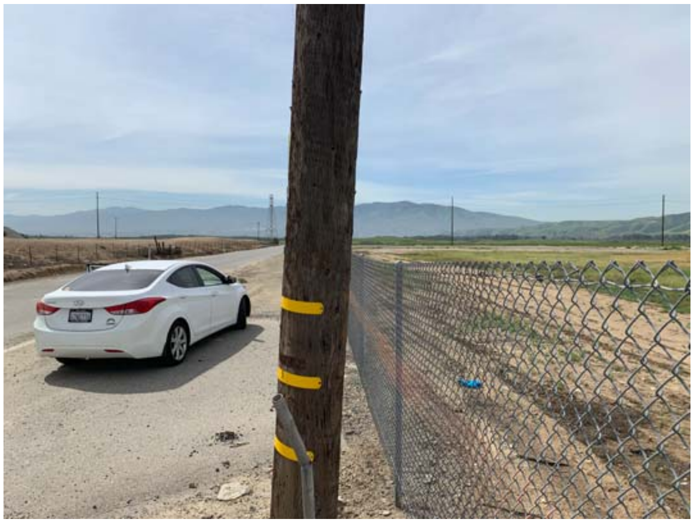
L6 North
33, 56' 27.650000", 117, 38' 28.420000"

L6 South
33, 56' 27.660000", 117, 38' 28.420000"

L6 West
33, 56' 27.650000", 117, 38' 28.420000"

L7 East
33, 56' 39.770000", 117, 37' 59.610000"

L7 North
33, 56' 39.770000", 117, 37' 59.640000"



L7 South
33, 56' 39.790000", 117, 37' 59.610000"

L7 West
33, 56' 39.830000", 117, 37' 59.610000"

L8 East
33, 56' 45.970000", 117, 37' 22.610000"

L8 North
33, 56' 45.950000", 117, 37' 22.640000"

JN:10351 Study Area Photos


L8 South
33, 56' 45.950000", 117, 37' 22.610000"


L8 West
33, 56' 45.940000", 117, 37' 22.670000"


L9 East
33, 57' 5.590000", 117, 36' 53.990000"


L9 North
33, 57' 5.660000", 117, 36' 53.960000"


L9 South
33, 57' 5.630000", 117, 36' 53.990000"


L9 West
33, 57' 5.630000", 117, 36' 53.960000"

JN:10351 Study Area Photos

L10 East
33, 57' 7.690000", 117, 36' 39.220000"

L10 North
33, 57' 7.710000", 117, 36' 39.220000"

L10 South
33, 57' 7.730000", 117, 36' 39.190000"

L10 West
33, 57' 7.710000", 117, 36' 39.220000"

L11 East
33, 56' 45.940000", 117, 36' 31.250000"

L11 North
33, 56' 45.940000", 117, 36' 31.280000"

L11 South
33, 56' 45.910000", 117, 36' 31.280000"

L11 West
33, 56' 45.910000", 117, 36' 31.250000"

APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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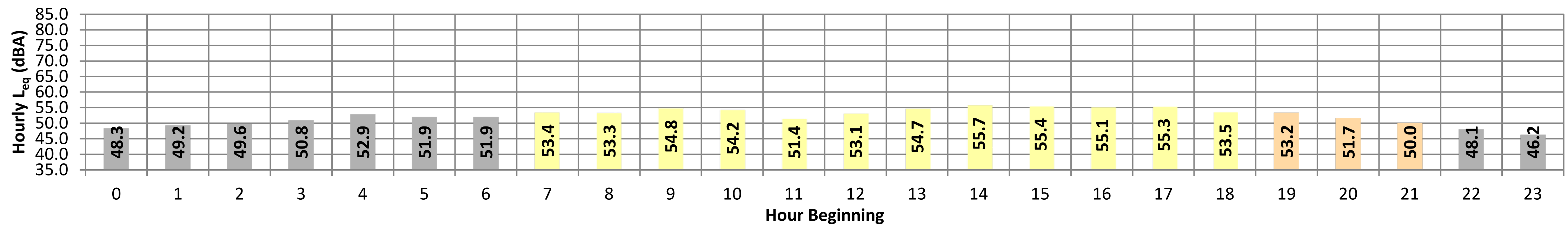
24-Hour Noise Level Measurement Summary

Date: Tuesday, April 02, 2019
Project: MCH
Location: L1 - Located near a Big League Dreams and Fairfield Ranch Park, west of the Project site.
Meter: Piccolo I
JN: 10351
Analyst: R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	48.3	63.6	42.5	53.0	52.0	51.0	50.0	48.0	47.0	45.0	44.0	43.0	48.3	10.0	58.3
	1	49.2	61.1	43.1	55.0	54.0	52.0	51.0	49.0	48.0	46.0	45.0	44.0	49.2	10.0	59.2
	2	49.6	59.6	42.5	55.0	54.0	52.0	52.0	50.0	48.0	46.0	45.0	44.0	49.6	10.0	59.6
	3	50.8	60.0	43.1	56.0	55.0	54.0	53.0	51.0	50.0	47.0	45.0	44.0	50.8	10.0	60.8
	4	52.9	65.9	47.5	58.0	57.0	55.0	54.0	53.0	52.0	50.0	49.0	48.0	52.9	10.0	62.9
	5	51.9	63.9	45.2	57.0	56.0	55.0	54.0	52.0	51.0	48.0	47.0	46.0	51.9	10.0	61.9
	6	51.9	61.2	47.9	56.0	55.0	54.0	53.0	52.0	51.0	49.0	49.0	48.0	51.9	10.0	61.9
Day	7	53.4	74.2	45.9	60.0	57.0	55.0	54.0	52.0	51.0	48.0	47.0	46.0	53.4	0.0	53.4
	8	53.3	65.8	44.0	62.0	61.0	60.0	58.0	51.0	48.0	46.0	46.0	45.0	53.3	0.0	53.3
	9	54.8	71.4	46.0	63.0	61.0	59.0	58.0	55.0	52.0	48.0	47.0	46.0	54.8	0.0	54.8
	10	54.2	70.6	44.8	65.0	63.0	58.0	56.0	52.0	50.0	47.0	47.0	46.0	54.2	0.0	54.2
	11	51.4	64.8	45.0	60.0	58.0	54.0	53.0	51.0	50.0	47.0	47.0	46.0	51.4	0.0	51.4
	12	53.1	64.1	46.8	58.0	57.0	55.0	55.0	53.0	52.0	50.0	49.0	48.0	53.1	0.0	53.1
	13	54.7	65.7	49.8	61.0	59.0	57.0	56.0	55.0	53.0	52.0	51.0	50.0	54.7	0.0	54.7
	14	55.7	76.1	49.2	62.0	59.0	57.0	57.0	55.0	54.0	52.0	52.0	51.0	55.7	0.0	55.7
	15	55.4	67.4	50.8	61.0	60.0	58.0	57.0	55.0	54.0	53.0	52.0	51.0	55.4	0.0	55.4
	16	55.1	68.7	50.5	62.0	60.0	57.0	56.0	55.0	54.0	52.0	52.0	51.0	55.1	0.0	55.1
	17	55.3	67.4	49.5	62.0	60.0	57.0	57.0	55.0	54.0	52.0	51.0	50.0	55.3	0.0	55.3
	18	53.5	65.5	47.9	59.0	58.0	56.0	55.0	53.0	52.0	50.0	50.0	49.0	53.5	0.0	53.5
Evening	19	53.2	63.3	48.5	58.0	57.0	55.0	55.0	53.0	52.0	50.0	50.0	49.0	53.2	5.0	58.2
	20	51.7	70.9	46.4	57.0	56.0	54.0	53.0	52.0	51.0	48.0	48.0	47.0	51.7	5.0	56.7
	21	50.0	60.7	44.3	54.0	53.0	52.0	52.0	50.0	49.0	47.0	46.0	45.0	50.0	5.0	55.0
Night	22	48.1	60.3	43.3	53.0	51.0	50.0	50.0	48.0	47.0	45.0	44.0	44.0	48.1	10.0	58.1
	23	46.2	58.6	41.3	50.0	49.0	48.0	48.0	46.0	45.0	43.0	43.0	42.0	46.2	10.0	56.2

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	51.4	64.1	44.0	58.0	57.0	54.0	53.0	51.0	48.0	46.0	46.0	45.0
	Max	55.7	76.1	50.8	65.0	63.0	60.0	58.0	55.0	54.0	53.0	52.0	51.0
Energy Average		54.3	Average:		61.3	59.4	56.9	56.0	53.5	52.0	49.8	49.3	48.3
Evening	Min	50.0	60.7	44.3	54.0	53.0	52.0	52.0	50.0	49.0	47.0	46.0	45.0
	Max	53.2	70.9	48.5	58.0	57.0	55.0	55.0	53.0	52.0	50.0	50.0	49.0
Energy Average		51.8	Average:		56.3	55.3	53.7	53.3	51.7	50.7	48.3	48.0	47.0
Night	Min	46.2	58.6	41.3	50.0	49.0	48.0	48.0	46.0	45.0	43.0	43.0	42.0
	Max	52.9	65.9	47.9	58.0	57.0	55.0	54.0	53.0	52.0	50.0	49.0	48.0
Energy Average		50.3	Average:		54.8	53.7	52.3	51.7	49.9	48.8	46.6	45.7	44.8

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
52.9	53.9	50.3

24-Hour CNEL (dBA)

57.8

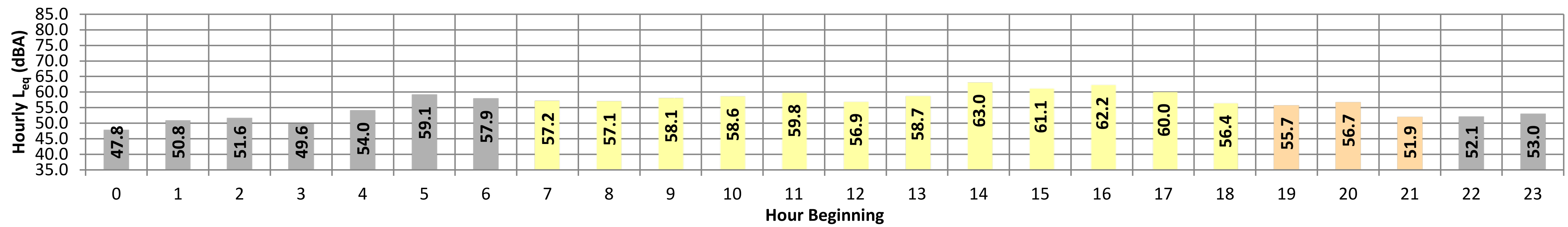
U:\UcJobs_10100-10500_10300\10351\Fieldwork\10351_L1_Summary

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Date: Tuesday, April 02, 2019
Project: MCH
Location: L2 - Located on Mountain Avenue, north of El Prado Road south of the Project site boundary.
Meter: Piccolo I
JN: 10351
Analyst: R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	47.8	70.2	39.0	56.0	54.0	51.0	49.0	46.0	44.0	42.0	41.0	40.0	47.8	10.0	57.8
	1	50.8	74.7	40.7	57.0	53.0	51.0	50.0	48.0	46.0	43.0	43.0	42.0	50.8	10.0	60.8
	2	51.6	79.0	42.0	59.0	56.0	51.0	50.0	48.0	46.0	44.0	44.0	43.0	51.6	10.0	61.6
	3	49.6	69.2	40.8	57.0	55.0	53.0	52.0	49.0	47.0	44.0	44.0	42.0	49.6	10.0	59.6
	4	54.0	78.0	45.9	62.0	59.0	57.0	56.0	52.0	50.0	47.0	47.0	46.0	54.0	10.0	64.0
	5	59.1	81.5	46.8	70.0	66.0	60.0	59.0	55.0	52.0	49.0	49.0	48.0	59.1	10.0	69.1
	6	57.9	78.7	47.7	69.0	65.0	61.0	59.0	56.0	53.0	49.0	49.0	48.0	57.9	10.0	67.9
Day	7	57.2	78.7	43.3	67.0	65.0	61.0	59.0	55.0	52.0	48.0	46.0	45.0	57.2	0.0	57.2
	8	57.1	80.6	42.0	69.0	65.0	59.0	57.0	53.0	49.0	44.0	44.0	43.0	57.1	0.0	57.1
	9	58.1	81.4	42.8	70.0	67.0	61.0	58.0	52.0	49.0	45.0	44.0	43.0	58.1	0.0	58.1
	10	58.6	81.0	43.6	71.0	66.0	63.0	60.0	54.0	51.0	47.0	46.0	45.0	58.6	0.0	58.6
	11	59.8	83.2	43.7	72.0	68.0	62.0	59.0	53.0	50.0	47.0	46.0	45.0	59.8	0.0	59.8
	12	56.9	77.6	46.1	66.0	64.0	61.0	60.0	56.0	53.0	49.0	48.0	47.0	56.9	0.0	56.9
	13	58.7	78.7	49.5	67.0	66.0	63.0	62.0	58.0	55.0	52.0	51.0	50.0	58.7	0.0	58.7
	14	63.0	86.9	50.6	71.0	69.0	67.0	65.0	61.0	58.0	54.0	54.0	52.0	63.0	0.0	63.0
	15	61.1	81.5	50.1	70.0	68.0	65.0	64.0	60.0	57.0	53.0	52.0	51.0	61.1	0.0	61.1
	16	62.2	84.2	50.7	71.0	69.0	66.0	64.0	60.0	58.0	54.0	53.0	52.0	62.2	0.0	62.2
	17	60.0	79.5	48.5	68.0	66.0	64.0	63.0	60.0	57.0	53.0	52.0	51.0	60.0	0.0	60.0
	18	56.4	77.2	48.0	64.0	61.0	58.0	57.0	55.0	53.0	50.0	49.0	48.0	56.4	0.0	56.4
Evening	19	55.7	77.3	48.2	62.0	60.0	58.0	57.0	54.0	52.0	50.0	50.0	49.0	55.7	5.0	60.7
	20	56.7	77.9	44.7	70.0	63.0	57.0	56.0	52.0	50.0	47.0	47.0	46.0	56.7	5.0	61.7
	21	51.9	69.5	44.9	62.0	57.0	55.0	54.0	50.0	49.0	47.0	47.0	46.0	51.9	5.0	56.9
Night	22	52.1	77.3	44.3	59.0	55.0	53.0	52.0	49.0	48.0	46.0	45.0	45.0	52.1	10.0	62.1
	23	53.0	81.4	39.0	56.0	54.0	52.0	50.0	46.0	45.0	42.0	42.0	40.0	53.0	10.0	63.0

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	56.4	77.2	42.0	64.0	61.0	58.0	57.0	52.0	49.0	44.0	44.0	43.0
	Max	63.0	86.9	50.7	72.0	69.0	67.0	65.0	61.0	58.0	54.0	54.0	52.0
Energy Average		59.6	Average:		68.8	66.2	62.5	60.7	56.4	53.5	49.7	48.8	47.7
Evening	Min	51.9	69.5	44.7	62.0	57.0	55.0	54.0	50.0	49.0	47.0	47.0	46.0
	Max	56.7	77.9	48.2	70.0	63.0	58.0	57.0	54.0	52.0	50.0	50.0	49.0
Energy Average		55.2	Average:		64.7	60.0	56.7	55.7	52.0	50.3	48.0	48.0	47.0
Night	Min	47.8	69.2	39.0	56.0	53.0	51.0	49.0	46.0	44.0	42.0	41.0	40.0
	Max	59.1	81.5	47.7	70.0	66.0	61.0	59.0	56.0	53.0	49.0	49.0	48.0
Energy Average		54.4	Average:		60.6	57.4	54.3	53.0	49.9	47.9	45.1	44.9	43.8

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
57.8	59.0	54.4

24-Hour CNEL (dBA)

62.1

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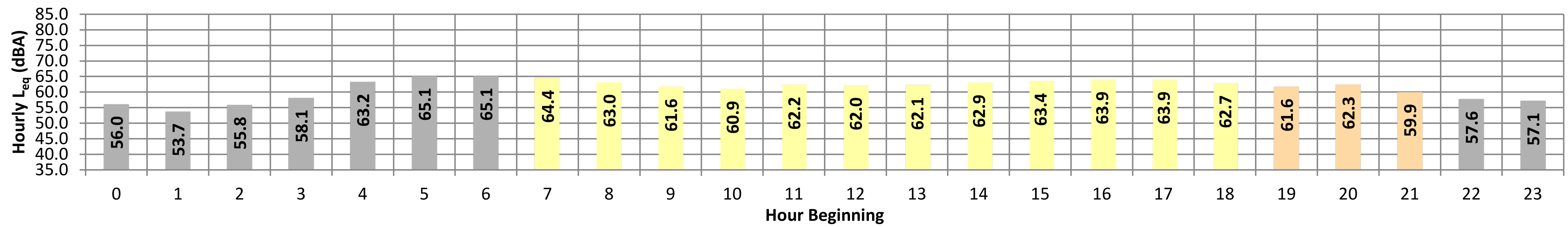
URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Date: Tuesday, April 02, 2019 *Location:* L3 - Located on Pine Avenue, near Lizze Custom Processing, southeast of the Project site. *Meter:* Piccolo I *JN:* 10351
Project: MCH *Analyst:* R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	56.0	78.5	42.5	67.0	64.0	60.0	59.0	53.0	47.0	45.0	44.0	43.0	56.0	10.0	66.0
	1	53.7	76.3	43.2	63.0	60.0	58.0	57.0	51.0	48.0	46.0	45.0	44.0	53.7	10.0	63.7
	2	55.8	79.2	44.4	66.0	63.0	60.0	59.0	52.0	48.0	46.0	46.0	45.0	55.8	10.0	65.8
	3	58.1	75.9	42.5	69.0	66.0	64.0	62.0	57.0	50.0	45.0	44.0	43.0	58.1	10.0	68.1
	4	63.2	81.7	46.2	73.0	71.0	68.0	66.0	63.0	60.0	50.0	48.0	47.0	63.2	10.0	73.2
	5	65.1	91.1	46.7	73.0	71.0	68.0	67.0	63.0	61.0	56.0	53.0	49.0	65.1	10.0	75.1
	6	65.1	84.2	51.1	74.0	72.0	70.0	68.0	64.0	62.0	58.0	56.0	53.0	65.1	10.0	75.1
Day	7	64.4	86.4	46.5	73.0	72.0	69.0	67.0	63.0	61.0	56.0	55.0	51.0	64.4	0.0	64.4
	8	63.0	85.8	43.1	72.0	71.0	68.0	66.0	61.0	58.0	51.0	49.0	45.0	63.0	0.0	63.0
	9	61.6	81.1	42.0	71.0	69.0	67.0	65.0	60.0	57.0	49.0	47.0	44.0	61.6	0.0	61.6
	10	60.9	80.1	42.5	70.0	69.0	66.0	65.0	60.0	57.0	50.0	47.0	45.0	60.9	0.0	60.9
	11	62.2	80.0	41.8	72.0	71.0	68.0	66.0	61.0	57.0	49.0	48.0	45.0	62.2	0.0	62.2
	12	62.0	82.9	47.6	71.0	69.0	66.0	65.0	61.0	57.0	51.0	50.0	48.0	62.0	0.0	62.0
	13	62.1	78.8	47.1	72.0	70.0	67.0	66.0	61.0	58.0	52.0	50.0	48.0	62.1	0.0	62.1
	14	62.9	79.1	47.9	72.0	70.0	68.0	66.0	62.0	59.0	54.0	53.0	49.0	62.9	0.0	62.9
	15	63.4	80.7	52.6	71.0	70.0	67.0	66.0	63.0	61.0	58.0	57.0	54.0	63.4	0.0	63.4
	16	63.9	92.1	51.2	71.0	69.0	66.0	65.0	62.0	59.0	55.0	54.0	53.0	63.9	0.0	63.9
	17	63.9	83.9	49.3	74.0	70.0	67.0	66.0	62.0	60.0	55.0	54.0	52.0	63.9	0.0	63.9
	18	62.7	81.2	48.0	73.0	70.0	67.0	65.0	62.0	59.0	55.0	53.0	51.0	62.7	0.0	62.7
Evening	19	61.6	80.8	46.6	70.0	68.0	65.0	64.0	61.0	59.0	54.0	51.0	48.0	61.6	5.0	66.6
	20	62.3	82.9	44.5	72.0	70.0	66.0	64.0	61.0	58.0	51.0	49.0	46.0	62.3	5.0	67.3
	21	59.9	79.0	44.3	70.0	67.0	64.0	62.0	59.0	57.0	48.0	47.0	45.0	59.9	5.0	64.9
Night	22	57.6	73.1	43.2	68.0	66.0	62.0	61.0	57.0	53.0	45.0	44.0	43.0	57.6	10.0	67.6
	23	57.1	78.0	41.5	68.0	65.0	61.0	60.0	56.0	50.0	44.0	44.0	43.0	57.1	10.0	67.1

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	60.9	78.8	41.8	70.0	69.0	66.0	65.0	60.0	57.0	49.0	47.0	44.0
	Max	64.4	92.1	52.6	74.0	72.0	69.0	67.0	63.0	61.0	58.0	57.0	54.0
Energy Average		62.9	Average:		71.8	70.0	67.2	65.7	61.5	58.6	52.9	51.4	48.8
Evening	Min	59.9	79.0	44.3	70.0	67.0	64.0	62.0	59.0	57.0	48.0	47.0	45.0
	Max	62.3	82.9	46.6	72.0	70.0	66.0	64.0	61.0	59.0	54.0	51.0	48.0
Energy Average		61.4	Average:		70.7	68.3	65.0	63.3	60.3	58.0	51.0	49.0	46.3
Night	Min	53.7	73.1	41.5	63.0	60.0	58.0	57.0	51.0	47.0	44.0	44.0	43.0
	Max	65.1	91.1	51.1	74.0	72.0	70.0	68.0	64.0	62.0	58.0	56.0	53.0
Energy Average		61.0	Average:		69.0	66.4	63.4	62.1	57.3	53.2	48.3	47.1	45.6

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
62.1	62.6	61.0

24-Hour CNEL (dBA)

67.9

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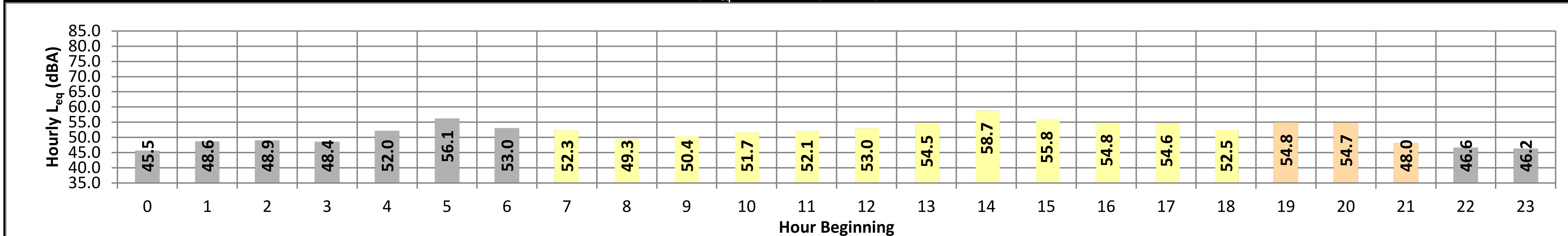
URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Date: Tuesday, April 02, 2019
Project: MCH
Location: L4 - Located on Johnson Avenue, near Prado Park Equestrian Center, southeast of the Project site.
Meter: Piccolo I
JN: 10351
Analyst: R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	45.5	57.9	41.0	51.0	50.0	48.0	47.0	46.0	44.0	42.0	42.0	41.0	45.5	10.0	55.5
	1	48.6	65.6	42.9	53.0	52.0	51.0	50.0	49.0	48.0	45.0	44.0	44.0	48.6	10.0	58.6
	2	48.9	61.6	44.2	55.0	53.0	51.0	50.0	49.0	48.0	46.0	45.0	45.0	48.9	10.0	58.9
	3	48.4	60.1	41.4	55.0	53.0	51.0	51.0	49.0	47.0	44.0	43.0	42.0	48.4	10.0	58.4
	4	52.0	79.5	44.1	54.0	52.0	50.0	50.0	48.0	47.0	45.0	45.0	44.0	52.0	10.0	62.0
	5	56.1	85.6	43.6	59.0	58.0	55.0	53.0	51.0	49.0	46.0	46.0	45.0	56.1	10.0	66.1
	6	53.0	67.4	47.7	61.0	60.0	56.0	55.0	52.0	51.0	49.0	49.0	48.0	53.0	10.0	63.0
Day	7	52.3	69.7	44.2	61.0	59.0	56.0	54.0	51.0	50.0	48.0	47.0	45.0	52.3	0.0	52.3
	8	49.3	67.0	41.7	60.0	56.0	52.0	51.0	48.0	45.0	43.0	43.0	42.0	49.3	0.0	49.3
	9	50.4	68.0	41.5	62.0	59.0	55.0	52.0	48.0	46.0	43.0	42.0	42.0	50.4	0.0	50.4
	10	51.7	74.7	41.3	61.0	59.0	55.0	54.0	50.0	47.0	44.0	43.0	42.0	51.7	0.0	51.7
	11	52.1	71.4	40.6	64.0	60.0	56.0	54.0	49.0	47.0	44.0	43.0	42.0	52.1	0.0	52.1
	12	53.0	71.3	43.0	62.0	58.0	56.0	55.0	52.0	50.0	46.0	45.0	44.0	53.0	0.0	53.0
	13	54.5	73.1	44.9	62.0	60.0	58.0	57.0	54.0	51.0	48.0	47.0	46.0	54.5	0.0	54.5
	14	58.7	86.5	46.7	67.0	62.0	58.0	56.0	54.0	52.0	49.0	49.0	48.0	58.7	0.0	58.7
	15	55.8	71.8	48.0	63.0	61.0	59.0	58.0	56.0	53.0	50.0	50.0	49.0	55.8	0.0	55.8
	16	54.8	75.2	45.2	62.0	60.0	58.0	57.0	54.0	52.0	49.0	48.0	47.0	54.8	0.0	54.8
	17	54.6	70.9	46.9	64.0	62.0	58.0	57.0	53.0	51.0	49.0	48.0	48.0	54.6	0.0	54.6
	18	52.5	71.9	45.8	63.0	59.0	55.0	54.0	51.0	49.0	47.0	47.0	46.0	52.5	0.0	52.5
Evening	19	54.8	84.0	45.5	58.0	57.0	54.0	53.0	51.0	49.0	48.0	47.0	46.0	54.8	5.0	59.8
	20	54.7	78.6	44.8	62.0	61.0	57.0	54.0	50.0	49.0	47.0	46.0	45.0	54.7	5.0	59.7
	21	48.0	58.4	44.0	54.0	53.0	51.0	50.0	48.0	47.0	45.0	45.0	44.0	48.0	5.0	53.0
Night	22	46.6	60.0	42.3	51.0	50.0	49.0	48.0	47.0	45.0	44.0	43.0	43.0	46.6	10.0	56.6
	23	46.2	59.2	41.4	52.0	50.0	49.0	48.0	46.0	45.0	43.0	43.0	42.0	46.2	10.0	56.2

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	49.3	67.0	40.6	60.0	56.0	52.0	51.0	48.0	45.0	43.0	42.0	42.0
	Max	58.7	86.5	48.0	67.0	62.0	59.0	58.0	56.0	53.0	50.0	50.0	49.0
Energy Average		54.0	Average:		62.6	59.6	56.3	54.9	51.7	49.4	46.7	46.0	45.1
Evening	Min	48.0	58.4	44.0	54.0	53.0	51.0	50.0	48.0	47.0	45.0	45.0	44.0
	Max	54.8	84.0	45.5	62.0	61.0	57.0	54.0	51.0	49.0	48.0	47.0	46.0
Energy Average		53.4	Average:		58.0	57.0	54.0	52.3	49.7	48.3	46.7	46.0	45.0
Night	Min	45.5	57.9	41.0	51.0	50.0	48.0	47.0	46.0	44.0	42.0	42.0	41.0
	Max	56.1	85.6	47.7	61.0	60.0	56.0	55.0	52.0	51.0	49.0	49.0	48.0
Energy Average		50.9	Average:		54.6	53.1	51.1	50.2	48.6	47.1	44.9	44.4	43.8

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
53.0	53.9	50.9

24-Hour CNEL (dBA)

58.3

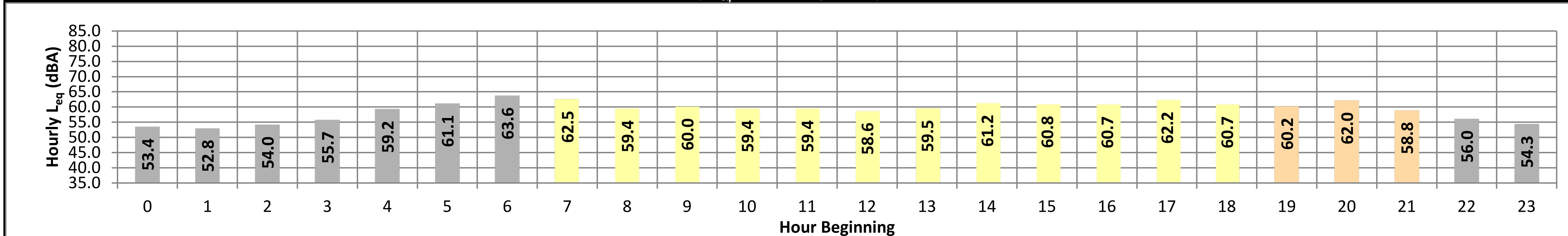
U:\UcJobs_10100-10500_10300\10351\Fieldwork\10351_L4_Summary

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Date: Tuesday, April 02, 2019
Project: MCH
Location: L5 - Located on Meadowhouse Avenue, near Meadow Square Apartment Homes, east of the Project site.
Meter: Piccolo I
JN: 10351
Analyst: R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	53.4	70.4	42.9	62.0	61.0	59.0	57.0	52.0	49.0	45.0	44.0	43.0	53.4	10.0	63.4
	1	52.8	70.3	44.5	62.0	60.0	58.0	56.0	51.0	49.0	47.0	46.0	45.0	52.8	10.0	62.8
	2	54.0	74.0	45.5	65.0	61.0	58.0	56.0	52.0	49.0	47.0	47.0	46.0	54.0	10.0	64.0
	3	55.7	75.6	43.5	67.0	64.0	60.0	58.0	54.0	50.0	46.0	45.0	44.0	55.7	10.0	65.7
	4	59.2	74.6	45.9	69.0	68.0	65.0	62.0	58.0	55.0	51.0	50.0	49.0	59.2	10.0	69.2
	5	61.1	84.4	46.3	71.0	69.0	65.0	63.0	59.0	56.0	53.0	51.0	48.0	61.1	10.0	71.1
	6	63.6	81.1	51.4	73.0	71.0	69.0	68.0	62.0	59.0	55.0	54.0	52.0	63.6	10.0	73.6
Day	7	62.5	78.6	48.3	72.0	71.0	68.0	66.0	61.0	58.0	53.0	52.0	50.0	62.5	0.0	62.5
	8	59.4	77.5	42.6	69.0	67.0	65.0	64.0	58.0	55.0	49.0	48.0	45.0	59.4	0.0	59.4
	9	60.0	80.0	44.3	70.0	68.0	65.0	64.0	58.0	55.0	50.0	48.0	46.0	60.0	0.0	60.0
	10	59.4	76.1	44.4	69.0	67.0	65.0	63.0	59.0	55.0	50.0	49.0	46.0	59.4	0.0	59.4
	11	59.4	76.1	44.1	69.0	67.0	65.0	63.0	59.0	55.0	49.0	48.0	46.0	59.4	0.0	59.4
	12	58.6	72.0	45.9	68.0	66.0	63.0	62.0	58.0	55.0	51.0	50.0	47.0	58.6	0.0	58.6
	13	59.5	76.2	48.7	67.0	66.0	64.0	63.0	59.0	57.0	52.0	51.0	50.0	59.5	0.0	59.5
	14	61.2	79.0	49.0	70.0	68.0	65.0	64.0	60.0	58.0	54.0	53.0	51.0	61.2	0.0	61.2
	15	60.8	76.4	49.1	69.0	67.0	65.0	64.0	60.0	58.0	55.0	54.0	53.0	60.8	0.0	60.8
	16	60.7	79.4	49.4	69.0	67.0	65.0	63.0	60.0	58.0	55.0	54.0	52.0	60.7	0.0	60.7
	17	62.2	80.5	50.2	71.0	70.0	67.0	65.0	61.0	59.0	55.0	54.0	52.0	62.2	0.0	62.2
	18	60.7	78.0	47.6	70.0	68.0	66.0	64.0	59.0	57.0	53.0	52.0	49.0	60.7	0.0	60.7
Evening	19	60.2	74.3	48.3	69.0	67.0	65.0	63.0	59.0	57.0	53.0	52.0	50.0	60.2	5.0	65.2
	20	62.0	78.7	46.2	74.0	71.0	66.0	64.0	59.0	57.0	51.0	50.0	47.0	62.0	5.0	67.0
	21	58.8	74.8	45.5	69.0	67.0	64.0	62.0	58.0	55.0	49.0	48.0	46.0	58.8	5.0	63.8
Night	22	56.0	76.9	44.6	66.0	63.0	60.0	59.0	56.0	52.0	46.0	46.0	45.0	56.0	10.0	66.0
	23	54.3	74.6	42.7	65.0	63.0	59.0	57.0	53.0	48.0	44.0	44.0	43.0	54.3	10.0	64.3

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	58.6	72.0	42.6	67.0	66.0	63.0	62.0	58.0	55.0	49.0	48.0	45.0
	Max	62.5	80.5	50.2	72.0	71.0	68.0	66.0	61.0	59.0	55.0	54.0	53.0
Energy Average		60.5	Average:		69.4	67.7	65.3	63.8	59.3	56.7	52.2	51.1	48.9
Evening	Min	58.8	74.3	45.5	69.0	67.0	64.0	62.0	58.0	55.0	49.0	48.0	46.0
	Max	62.0	78.7	48.3	74.0	71.0	66.0	64.0	59.0	57.0	53.0	52.0	50.0
Energy Average		60.5	Average:		70.7	68.3	65.0	63.0	58.7	56.3	51.0	50.0	47.7
Night	Min	52.8	70.3	42.7	62.0	60.0	58.0	56.0	51.0	48.0	44.0	44.0	43.0
	Max	63.6	84.4	51.4	73.0	71.0	69.0	68.0	62.0	59.0	55.0	54.0	52.0
Energy Average		58.3	Average:		66.7	64.4	61.4	59.6	55.2	51.9	48.2	47.4	46.1

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
59.8	60.5	58.3

24-Hour CNEL (dBA)
65.5

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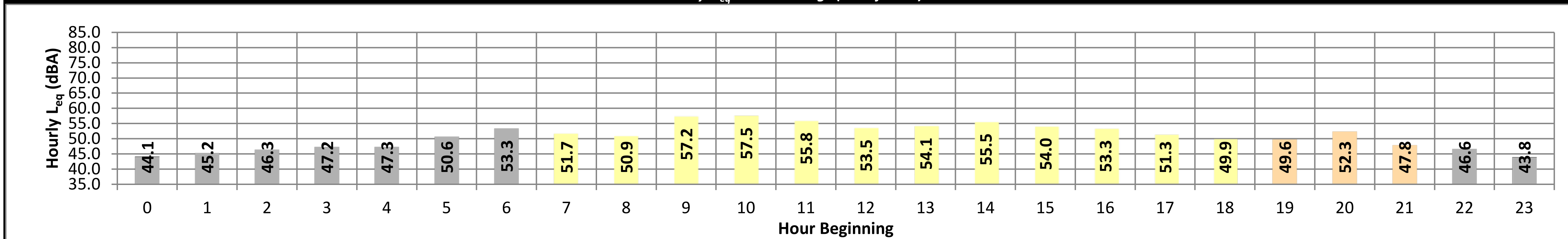
URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Date: Tuesday, April 02, 2019 | Location: L6 - Located in Prado Regional Park near campground areas. | Meter: Piccolo I | JN: 10351

Project: MCH | Analyst: R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	44.1	54.4	39.7	49.0	48.0	47.0	46.0	44.0	43.0	41.0	41.0	41.0	44.1	10.0	54.1
	1	45.2	55.6	41.1	51.0	49.0	48.0	47.0	45.0	44.0	42.0	42.0	41.0	45.2	10.0	55.2
	2	46.3	57.2	41.8	51.0	50.0	49.0	48.0	46.0	45.0	43.0	42.0	42.0	46.3	10.0	56.3
	3	47.2	56.6	41.2	52.0	51.0	50.0	49.0	48.0	46.0	43.0	42.0	42.0	47.2	10.0	57.2
	4	47.3	57.2	44.1	53.0	51.0	49.0	49.0	47.0	46.0	45.0	45.0	44.0	47.3	10.0	57.3
	5	50.6	67.1	45.4	56.0	54.0	53.0	52.0	51.0	50.0	46.0	46.0	46.0	50.6	10.0	60.6
	6	53.3	71.1	45.9	62.0	60.0	58.0	55.0	52.0	51.0	48.0	47.0	46.0	53.3	10.0	63.3
Day	7	51.7	73.9	39.4	63.0	57.0	51.0	50.0	47.0	44.0	40.0	39.0	39.0	51.7	0.0	51.7
	8	50.9	74.5	40.0	63.0	61.0	55.0	51.0	45.0	42.0	41.0	41.0	41.0	50.9	0.0	50.9
	9	57.2	81.9	44.1	67.0	62.0	58.0	57.0	52.0	49.0	46.0	45.0	45.0	57.2	0.0	57.2
	10	57.5	79.8	42.4	69.0	66.0	59.0	56.0	51.0	48.0	45.0	44.0	43.0	57.5	0.0	57.5
	11	55.8	81.3	41.8	66.0	63.0	58.0	56.0	51.0	48.0	44.0	44.0	43.0	55.8	0.0	55.8
	12	53.5	73.9	45.1	62.0	60.0	57.0	56.0	52.0	50.0	47.0	47.0	46.0	53.5	0.0	53.5
	13	54.1	69.3	45.8	61.0	60.0	58.0	57.0	54.0	52.0	48.0	47.0	47.0	54.1	0.0	54.1
	14	55.5	77.3	46.0	66.0	60.0	57.0	56.0	52.0	50.0	48.0	47.0	46.0	55.5	0.0	55.5
	15	54.0	68.7	46.0	63.0	61.0	59.0	57.0	53.0	51.0	48.0	48.0	47.0	54.0	0.0	54.0
	16	53.3	72.5	46.7	63.0	60.0	57.0	55.0	52.0	50.0	48.0	47.0	47.0	53.3	0.0	53.3
	17	51.3	68.5	45.2	61.0	59.0	55.0	53.0	50.0	48.0	46.0	46.0	46.0	51.3	0.0	51.3
	18	49.9	70.1	45.3	59.0	56.0	52.0	51.0	48.0	47.0	46.0	46.0	45.0	49.9	0.0	49.9
Evening	19	49.6	67.4	44.9	57.0	55.0	52.0	51.0	48.0	47.0	46.0	46.0	45.0	49.6	5.0	54.6
	20	52.3	73.3	43.1	63.0	60.0	55.0	52.0	49.0	48.0	46.0	45.0	44.0	52.3	5.0	57.3
	21	47.8	65.0	43.3	53.0	51.0	50.0	49.0	47.0	47.0	45.0	45.0	45.0	47.8	5.0	52.8
Night	22	46.6	59.0	42.4	51.0	50.0	49.0	48.0	47.0	45.0	44.0	43.0	43.0	46.6	10.0	56.6
	23	43.8	50.5	39.4	47.0	46.0	46.0	45.0	44.0	43.0	41.0	41.0	39.0	43.8	10.0	53.8

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	49.9	68.5	39.4	59.0	56.0	51.0	50.0	45.0	42.0	40.0	39.0	39.0
	Max	57.5	81.9	46.7	69.0	66.0	59.0	57.0	54.0	52.0	48.0	48.0	47.0
Energy Average		54.4	Average:		63.6	60.4	56.3	54.6	50.6	48.3	45.6	45.1	44.6
Evening	Min	47.8	65.0	43.1	53.0	51.0	50.0	49.0	47.0	47.0	45.0	45.0	44.0
	Max	52.3	73.3	44.9	63.0	60.0	55.0	52.0	49.0	48.0	46.0	46.0	45.0
Energy Average		50.3	Average:		57.7	55.3	52.3	50.7	48.0	47.3	45.7	45.3	44.7
Night	Min	43.8	50.5	39.4	47.0	46.0	46.0	45.0	44.0	43.0	41.0	41.0	39.0
	Max	53.3	71.1	45.9	62.0	60.0	58.0	55.0	52.0	51.0	48.0	47.0	46.0
Energy Average		48.3	Average:		52.4	51.0	49.9	48.8	47.1	45.9	43.7	43.2	42.7

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
52.4	53.8	48.3

24-Hour CNEL (dBA)

56.3

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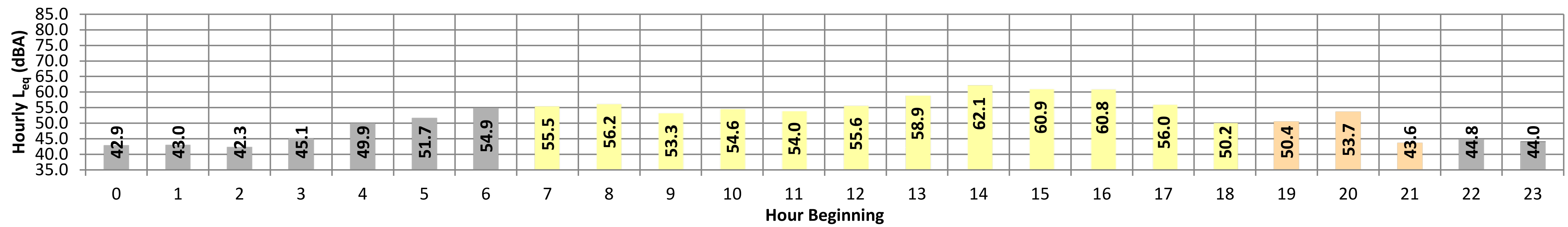
URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Date: Tuesday, April 02, 2019
Project: MCH
Location: L7 - Located on Cucamonga Road, near Vermontes Mulch, southeast of the Project site.
Meter: Piccolo I
JN: 10351
Analyst: R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	42.9	54.2	39.0	49.0	48.0	46.0	45.0	43.0	41.0	39.0	39.0	39.0	42.9	10.0	52.9
	1	43.0	56.5	40.2	49.0	47.0	45.0	44.0	43.0	42.0	40.0	40.0	40.0	43.0	10.0	53.0
	2	42.3	53.9	39.1	48.0	47.0	44.0	43.0	42.0	42.0	40.0	40.0	39.0	42.3	10.0	52.3
	3	45.1	58.8	39.1	53.0	52.0	49.0	48.0	45.0	42.0	40.0	39.0	39.0	45.1	10.0	55.1
	4	49.9	74.9	43.0	59.0	55.0	51.0	49.0	46.0	45.0	44.0	43.0	43.0	49.9	10.0	59.9
	5	51.7	75.6	43.0	58.0	54.0	51.0	50.0	48.0	47.0	45.0	44.0	44.0	51.7	10.0	61.7
	6	54.9	81.0	43.1	64.0	59.0	55.0	54.0	50.0	48.0	45.0	44.0	44.0	54.9	10.0	64.9
Day	7	55.5	79.0	45.4	66.0	60.0	57.0	56.0	53.0	49.0	46.0	46.0	45.0	55.5	0.0	55.5
	8	56.2	83.5	39.1	66.0	63.0	54.0	52.0	47.0	45.0	41.0	40.0	39.0	56.2	0.0	56.2
	9	53.3	77.7	39.0	65.0	61.0	56.0	53.0	47.0	44.0	41.0	40.0	39.0	53.3	0.0	53.3
	10	54.6	77.6	39.1	66.0	61.0	56.0	55.0	50.0	46.0	42.0	41.0	40.0	54.6	0.0	54.6
	11	54.0	76.2	39.1	67.0	63.0	56.0	54.0	49.0	45.0	41.0	40.0	39.0	54.0	0.0	54.0
	12	55.6	74.1	40.8	66.0	63.0	61.0	60.0	54.0	49.0	43.0	42.0	41.0	55.6	0.0	55.6
	13	58.9	72.7	43.1	69.0	67.0	65.0	63.0	58.0	53.0	47.0	45.0	43.0	58.9	0.0	58.9
	14	62.1	79.2	42.6	71.0	69.0	67.0	66.0	62.0	58.0	50.0	48.0	45.0	62.1	0.0	62.1
	15	60.9	75.5	43.8	70.0	68.0	66.0	65.0	61.0	57.0	50.0	48.0	46.0	60.9	0.0	60.9
	16	60.8	75.8	42.7	70.0	68.0	66.0	65.0	61.0	57.0	49.0	47.0	44.0	60.8	0.0	60.8
	17	56.0	71.1	42.6	65.0	63.0	61.0	60.0	56.0	52.0	45.0	44.0	43.0	56.0	0.0	56.0
	18	50.2	69.7	42.0	60.0	57.0	54.0	53.0	48.0	46.0	43.0	43.0	43.0	50.2	0.0	50.2
Evening	19	50.4	72.1	42.1	60.0	58.0	55.0	53.0	49.0	46.0	44.0	43.0	43.0	50.4	5.0	55.4
	20	53.7	78.2	41.7	62.0	60.0	56.0	53.0	48.0	46.0	43.0	42.0	42.0	53.7	5.0	58.7
	21	43.6	51.2	41.3	47.0	46.0	45.0	44.0	43.0	43.0	42.0	42.0	42.0	43.6	5.0	48.6
Night	22	44.8	63.9	40.8	51.0	50.0	47.0	46.0	44.0	43.0	42.0	42.0	41.0	44.8	10.0	54.8
	23	44.0	60.7	39.1	49.0	48.0	47.0	46.0	44.0	43.0	40.0	40.0	39.0	44.0	10.0	54.0

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	50.2	69.7	39.0	60.0	57.0	54.0	52.0	47.0	44.0	41.0	40.0	39.0
	Max	62.1	83.5	45.4	71.0	69.0	67.0	66.0	62.0	58.0	50.0	48.0	46.0
Energy Average		57.8	Average:		66.8	63.6	59.9	58.5	53.8	50.1	44.8	43.7	42.3
Evening	Min	43.6	51.2	41.3	47.0	46.0	45.0	44.0	43.0	43.0	42.0	42.0	42.0
	Max	53.7	78.2	42.1	62.0	60.0	56.0	53.0	49.0	46.0	44.0	43.0	43.0
Energy Average		50.9	Average:		56.3	54.7	52.0	50.0	46.7	45.0	43.0	42.3	42.3
Night	Min	42.3	53.9	39.0	48.0	47.0	44.0	43.0	42.0	41.0	39.0	39.0	39.0
	Max	54.9	81.0	43.1	64.0	59.0	55.0	54.0	50.0	48.0	45.0	44.0	44.0
Energy Average		48.9	Average:		53.3	51.1	48.3	47.2	45.0	43.7	41.7	41.2	40.9

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
55.4	57.0	48.9

24-Hour CNEL (dBA)
58.1

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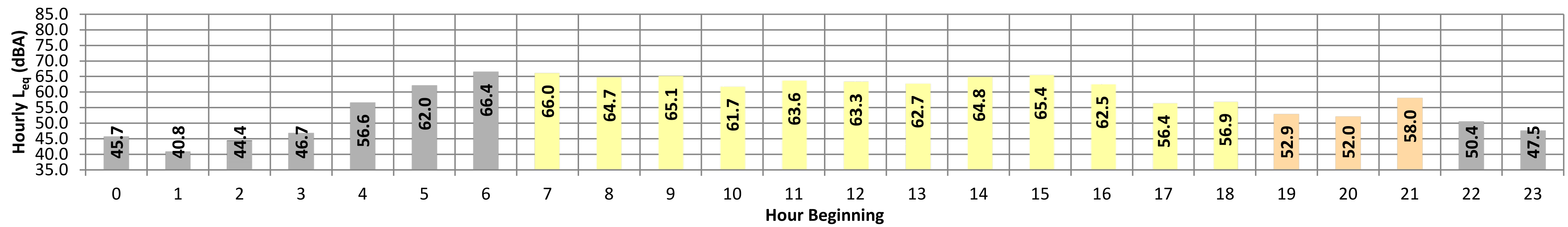
URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Date: Tuesday, April 02, 2019
Project: MCH
Location: L8 - Located on Chino Corona Road, near County Road, adjacent to existing rural residential homes.
Meter: Piccolo I
JN: 10351
Analyst: R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	45.7	68.7	39.3	54.0	52.0	49.0	48.0	45.0	42.0	40.0	39.0	39.0	45.7	10.0	55.7
	1	40.8	55.6	36.4	49.0	48.0	44.0	42.0	40.0	39.0	36.0	36.0	36.0	40.8	10.0	50.8
	2	44.4	73.5	36.4	51.0	49.0	44.0	42.0	41.0	39.0	39.0	39.0	36.0	44.4	10.0	54.4
	3	46.7	71.5	39.2	55.0	54.0	50.0	48.0	44.0	42.0	39.0	39.0	39.0	46.7	10.0	56.7
	4	56.6	84.7	41.1	63.0	58.0	52.0	48.0	44.0	43.0	42.0	42.0	41.0	56.6	10.0	66.6
	5	62.0	83.7	43.7	75.0	73.0	69.0	64.0	52.0	48.0	45.0	45.0	44.0	62.0	10.0	72.0
	6	66.4	86.0	45.6	77.0	75.0	73.0	71.0	63.0	57.0	50.0	49.0	47.0	66.4	10.0	76.4
Day	7	66.0	89.9	47.0	77.0	75.0	72.0	70.0	59.0	53.0	49.0	48.0	48.0	66.0	0.0	66.0
	8	64.7	93.5	40.7	75.0	71.0	64.0	59.0	51.0	49.0	45.0	43.0	41.0	64.7	0.0	64.7
	9	65.1	90.3	41.1	78.0	73.0	66.0	61.0	51.0	48.0	44.0	43.0	42.0	65.1	0.0	65.1
	10	61.7	85.3	41.1	76.0	71.0	63.0	59.0	52.0	48.0	45.0	44.0	42.0	61.7	0.0	61.7
	11	63.6	87.1	36.4	76.0	73.0	66.0	61.0	51.0	47.0	42.0	40.0	39.0	63.6	0.0	63.6
	12	63.3	89.4	38.8	76.0	73.0	67.0	62.0	52.0	48.0	42.0	41.0	39.0	63.3	0.0	63.3
	13	62.7	84.5	45.2	75.0	73.0	68.0	64.0	55.0	52.0	48.0	47.0	46.0	62.7	0.0	62.7
	14	64.8	91.2	44.8	77.0	73.0	69.0	65.0	54.0	51.0	48.0	47.0	46.0	64.8	0.0	64.8
	15	65.4	89.0	43.6	77.0	74.0	71.0	69.0	57.0	51.0	46.0	45.0	44.0	65.4	0.0	65.4
	16	62.5	87.2	42.7	74.0	72.0	67.0	62.0	52.0	49.0	45.0	44.0	43.0	62.5	0.0	62.5
	17	56.4	80.1	41.0	70.0	67.0	59.0	55.0	48.0	46.0	43.0	43.0	41.0	56.4	0.0	56.4
	18	56.9	81.4	40.9	70.0	68.0	59.0	55.0	47.0	44.0	42.0	42.0	41.0	56.9	0.0	56.9
Evening	19	52.9	80.6	41.4	64.0	58.0	54.0	52.0	46.0	44.0	42.0	42.0	42.0	52.9	5.0	57.9
	20	52.0	76.1	40.7	63.0	60.0	55.0	53.0	46.0	43.0	41.0	41.0	41.0	52.0	5.0	57.0
	21	58.0	77.9	39.3	72.0	70.0	62.0	56.0	45.0	43.0	41.0	41.0	39.0	58.0	5.0	63.0
Night	22	50.4	79.1	39.2	60.0	54.0	50.0	47.0	42.0	41.0	39.0	39.0	39.0	50.4	10.0	60.4
	23	47.5	74.2	39.3	54.0	50.0	48.0	48.0	43.0	42.0	41.0	40.0	39.0	47.5	10.0	57.5

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	56.4	80.1	36.4	70.0	67.0	59.0	55.0	47.0	44.0	42.0	40.0	39.0
	Max	66.0	93.5	47.0	78.0	75.0	72.0	70.0	59.0	53.0	49.0	48.0	48.0
Energy Average		63.5	Average:		75.1	71.9	65.9	61.8	52.4	48.8	44.9	43.9	42.7
Evening	Min	52.0	76.1	39.3	63.0	58.0	54.0	52.0	45.0	43.0	41.0	41.0	39.0
	Max	58.0	80.6	41.4	72.0	70.0	62.0	56.0	46.0	44.0	42.0	42.0	42.0
Energy Average		55.2	Average:		66.3	62.7	57.0	53.7	45.7	43.3	41.3	41.3	40.7
Night	Min	40.8	55.6	36.4	49.0	48.0	44.0	42.0	40.0	39.0	36.0	36.0	36.0
	Max	66.4	86.0	45.6	77.0	75.0	73.0	71.0	63.0	57.0	50.0	49.0	47.0
Energy Average		58.7	Average:		59.8	57.0	53.2	50.9	46.0	43.7	41.2	40.9	40.0

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
61.6	62.7	58.7

24-Hour CNEL (dBA)

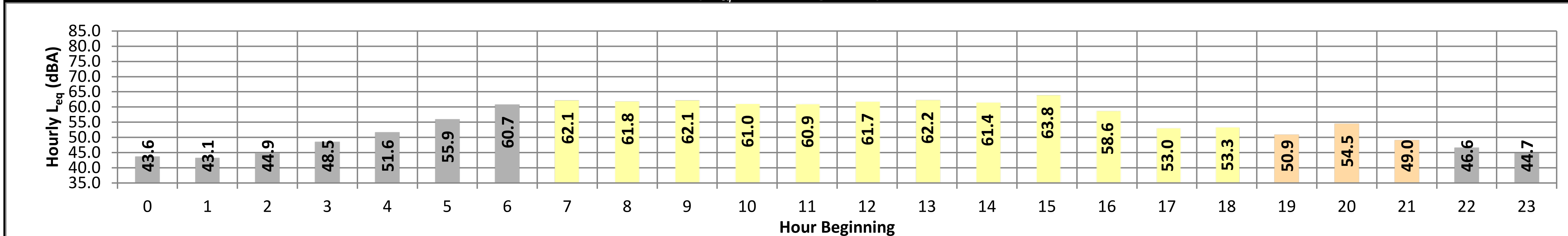
66.1

24-Hour Noise Level Measurement Summary

Date: Tuesday, April 02, 2019 *Location:* L9 - Located on Hereford Road, near residential construction and a vacant area, east of the Project site. *Meter:* Piccolo I *JN:* 10351

Project: MCH *Analyst:* R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	43.6	54.0	36.9	50.0	50.0	48.0	47.0	44.0	42.0	39.0	39.0	39.0	43.6	10.0	53.6
	1	43.1	58.1	36.2	54.0	51.0	47.0	45.0	41.0	39.0	39.0	39.0	36.0	43.1	10.0	53.1
	2	44.9	63.0	36.2	56.0	54.0	49.0	45.0	42.0	40.0	39.0	38.0	36.0	44.9	10.0	54.9
	3	48.5	63.4	40.3	60.0	58.0	53.0	51.0	46.0	44.0	42.0	41.0	41.0	48.5	10.0	58.5
	4	51.6	70.4	42.2	61.0	59.0	55.0	53.0	50.0	48.0	45.0	44.0	43.0	51.6	10.0	61.6
	5	55.9	71.8	45.4	64.0	63.0	61.0	59.0	55.0	53.0	49.0	48.0	47.0	55.9	10.0	65.9
	6	60.7	78.1	47.2	69.0	67.0	65.0	64.0	61.0	58.0	52.0	51.0	49.0	60.7	10.0	70.7
Day	7	62.1	84.8	46.9	71.0	70.0	67.0	66.0	61.0	57.0	51.0	49.0	48.0	62.1	0.0	62.1
	8	61.8	82.0	46.6	72.0	70.0	67.0	65.0	60.0	57.0	50.0	49.0	47.0	61.8	0.0	61.8
	9	62.1	81.4	45.4	72.0	70.0	68.0	66.0	60.0	56.0	50.0	48.0	47.0	62.1	0.0	62.1
	10	61.0	81.5	43.0	73.0	70.0	67.0	65.0	57.0	51.0	46.0	45.0	44.0	61.0	0.0	61.0
	11	60.9	80.8	39.3	73.0	70.0	66.0	65.0	58.0	51.0	43.0	42.0	41.0	60.9	0.0	60.9
	12	61.7	79.6	41.8	73.0	71.0	68.0	66.0	58.0	53.0	46.0	45.0	43.0	61.7	0.0	61.7
	13	62.2	78.6	45.1	73.0	71.0	68.0	66.0	61.0	56.0	50.0	49.0	47.0	62.2	0.0	62.2
	14	61.4	79.7	45.1	73.0	70.0	67.0	65.0	59.0	55.0	50.0	48.0	47.0	61.4	0.0	61.4
	15	63.8	89.6	43.2	75.0	71.0	67.0	64.0	59.0	55.0	48.0	47.0	45.0	63.8	0.0	63.8
	16	58.6	84.7	42.7	69.0	66.0	62.0	61.0	56.0	52.0	46.0	45.0	43.0	58.6	0.0	58.6
	17	53.0	68.6	42.0	62.0	61.0	58.0	57.0	52.0	49.0	45.0	44.0	43.0	53.0	0.0	53.0
	18	53.3	71.8	42.1	65.0	62.0	58.0	56.0	50.0	47.0	44.0	43.0	42.0	53.3	0.0	53.3
Evening	19	50.9	72.0	41.6	60.0	59.0	56.0	54.0	49.0	45.0	43.0	42.0	42.0	50.9	5.0	55.9
	20	54.5	77.2	40.9	67.0	65.0	60.0	57.0	47.0	44.0	42.0	42.0	41.0	54.5	5.0	59.5
	21	49.0	64.7	39.2	60.0	59.0	55.0	52.0	46.0	44.0	42.0	41.0	40.0	49.0	5.0	54.0
Night	22	46.6	65.9	39.1	57.0	56.0	53.0	50.0	43.0	41.0	39.0	39.0	39.0	46.6	10.0	56.6
	23	44.7	64.0	39.1	55.0	53.0	47.0	46.0	42.0	41.0	39.0	39.0	39.0	44.7	10.0	54.7

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	53.0	68.6	39.3	62.0	61.0	58.0	56.0	50.0	47.0	43.0	42.0	41.0
	Max	63.8	89.6	46.9	75.0	71.0	68.0	66.0	61.0	57.0	51.0	49.0	48.0
Energy Average		61.1	Average:		70.9	68.5	65.3	63.5	57.6	53.3	47.4	46.2	44.8
Evening	Min	49.0	64.7	39.2	60.0	59.0	55.0	52.0	46.0	44.0	42.0	41.0	40.0
	Max	54.5	77.2	41.6	67.0	65.0	60.0	57.0	49.0	45.0	43.0	42.0	42.0
Energy Average		52.1	Average:		62.3	61.0	57.0	54.3	47.3	44.3	42.3	41.7	41.0
Night	Min	43.1	54.0	36.2	50.0	50.0	47.0	45.0	41.0	39.0	39.0	38.0	36.0
	Max	60.7	78.1	47.2	69.0	67.0	65.0	64.0	61.0	58.0	52.0	51.0	49.0
Energy Average		53.3	Average:		58.4	56.8	53.1	51.1	47.1	45.1	42.6	42.0	41.0

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
58.7	60.2	53.3

24-Hour CNEL (dBA)
61.8

URBAN CROSSROADS

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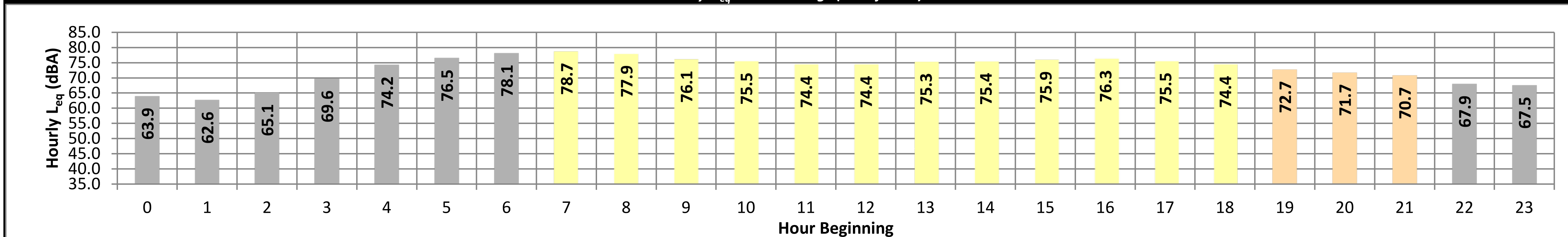
24-Hour Noise Level Measurement Summary

Date: Tuesday, April 02, 2019 *Location:* L10 - Located near the intersection of Walters Street and Hellman Avenue, adjacent to existing single-family residential homes, east of the Project site. *Meter:* Piccolo I *JN:* 10351

Project: MCH *Analyst:* R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	63.9	86.0	38.7	78.0	75.0	69.0	63.0	49.0	44.0	40.0	39.0	38.0	63.9	10.0	73.9
	1	62.6	86.8	38.7	77.0	73.0	63.0	57.0	46.0	42.0	39.0	38.0	38.0	62.6	10.0	72.6
	2	65.1	90.1	38.7	79.0	74.0	64.0	57.0	47.0	43.0	39.0	38.0	38.0	65.1	10.0	75.1
	3	69.6	90.5	41.1	83.0	81.0	77.0	72.0	57.0	49.0	44.0	43.0	41.0	69.6	10.0	79.6
	4	74.2	90.0	43.4	85.0	83.0	81.0	80.0	72.0	59.0	47.0	46.0	44.0	74.2	10.0	84.2
	5	76.5	91.0	49.2	84.0	83.0	82.0	81.0	78.0	71.0	57.0	54.0	51.0	76.5	10.0	86.5
	6	78.1	91.3	53.3	85.0	84.0	82.0	82.0	79.0	76.0	67.0	63.0	57.0	78.1	10.0	88.1
Day	7	78.7	93.1	51.9	85.0	84.0	83.0	82.0	80.0	77.0	67.0	63.0	57.0	78.7	0.0	78.7
	8	77.9	97.3	47.5	86.0	84.0	83.0	82.0	79.0	74.0	60.0	56.0	51.0	77.9	0.0	77.9
	9	76.1	92.1	47.6	85.0	84.0	82.0	80.0	76.0	70.0	58.0	54.0	50.0	76.1	0.0	76.1
	10	75.5	92.0	46.1	86.0	84.0	81.0	80.0	74.0	68.0	54.0	52.0	48.0	75.5	0.0	75.5
	11	74.4	92.2	47.1	84.0	82.0	80.0	79.0	74.0	68.0	55.0	53.0	50.0	74.4	0.0	74.4
	12	74.4	91.7	47.8	84.0	83.0	80.0	79.0	74.0	68.0	55.0	53.0	50.0	74.4	0.0	74.4
	13	75.3	94.8	50.4	85.0	83.0	81.0	79.0	75.0	69.0	57.0	55.0	52.0	75.3	0.0	75.3
	14	75.4	90.8	50.2	85.0	83.0	81.0	79.0	75.0	71.0	58.0	55.0	52.0	75.4	0.0	75.4
	15	75.9	93.5	49.0	85.0	83.0	81.0	80.0	76.0	72.0	60.0	57.0	52.0	75.9	0.0	75.9
	16	76.3	94.8	48.7	84.0	83.0	81.0	80.0	77.0	73.0	58.0	55.0	51.0	76.3	0.0	76.3
	17	75.5	90.7	48.6	84.0	83.0	81.0	80.0	76.0	72.0	56.0	53.0	50.0	75.5	0.0	75.5
	18	74.4	88.1	46.0	83.0	82.0	80.0	79.0	75.0	69.0	54.0	51.0	48.0	74.4	0.0	74.4
Evening	19	72.7	94.6	44.0	82.0	81.0	79.0	77.0	73.0	63.0	48.0	47.0	45.0	72.7	5.0	77.7
	20	71.7	91.8	42.7	82.0	80.0	78.0	76.0	71.0	61.0	47.0	45.0	44.0	71.7	5.0	76.7
	21	70.7	88.3	41.6	81.0	80.0	78.0	76.0	68.0	58.0	46.0	44.0	42.0	70.7	5.0	75.7
Night	22	67.9	85.9	38.8	79.0	78.0	75.0	73.0	61.0	50.0	42.0	41.0	40.0	67.9	10.0	77.9
	23	67.5	89.1	40.0	80.0	78.0	75.0	72.0	57.0	47.0	42.0	41.0	40.0	67.5	10.0	77.5

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	74.4	88.1	46.0	83.0	82.0	80.0	79.0	74.0	68.0	54.0	51.0	48.0
	Max	78.7	97.3	51.9	86.0	84.0	83.0	82.0	80.0	77.0	67.0	63.0	57.0
Energy Average		76.0	Average:		84.7	83.2	81.2	79.9	75.9	70.9	57.7	54.8	50.9
Evening	Min	70.7	88.3	41.6	81.0	80.0	78.0	76.0	68.0	58.0	46.0	44.0	42.0
	Max	72.7	94.6	44.0	82.0	81.0	79.0	77.0	73.0	63.0	48.0	47.0	45.0
Energy Average		71.8	Average:		81.7	80.3	78.3	76.3	70.7	60.7	47.0	45.3	43.7
Night	Min	62.6	85.9	38.7	77.0	73.0	63.0	57.0	46.0	42.0	39.0	38.0	38.0
	Max	78.1	91.3	53.3	85.0	84.0	82.0	82.0	79.0	76.0	67.0	63.0	57.0
Energy Average		72.6	Average:		81.1	78.8	74.2	70.8	60.7	53.4	46.3	44.8	43.0

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
74.6	75.4	72.6

24-Hour CNEL (dBA)
79.7

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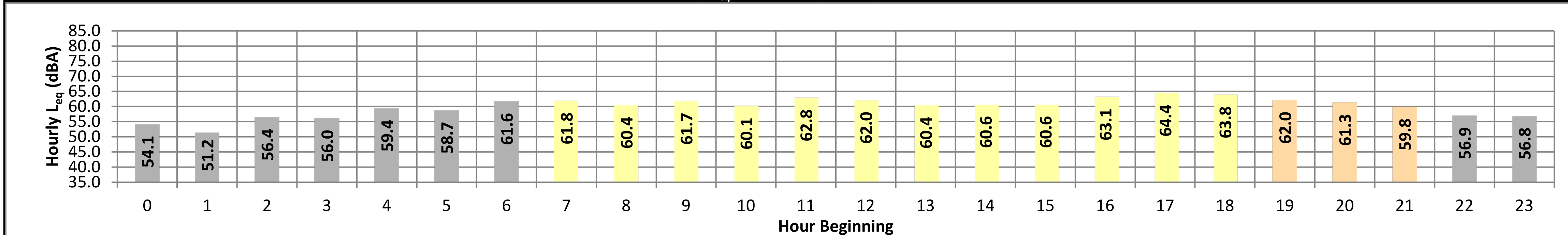
URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Date: Tuesday, April 02, 2019 *Location:* L11 - Located on Chandler Street, near a vacant area and existing residential neighborhood. *Meter:* Piccolo I *JN:* 10351
Project: MCH *Analyst:* R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	54.1	79.5	38.8	68.0	63.0	55.0	51.0	46.0	42.0	38.0	38.0	38.0	54.1	10.0	64.1
	1	51.2	75.7	35.9	64.0	58.0	52.0	49.0	41.0	39.0	38.0	38.0	38.0	51.2	10.0	61.2
	2	56.4	84.1	38.8	66.0	61.0	55.0	53.0	43.0	40.0	38.0	38.0	38.0	56.4	10.0	66.4
	3	56.0	85.0	38.9	66.0	63.0	60.0	57.0	49.0	45.0	40.0	40.0	39.0	56.0	10.0	66.0
	4	59.4	83.8	40.6	70.0	66.0	62.0	61.0	55.0	49.0	44.0	43.0	41.0	59.4	10.0	69.4
	5	58.7	83.4	44.3	69.0	65.0	62.0	61.0	57.0	52.0	48.0	47.0	45.0	58.7	10.0	68.7
	6	61.6	82.5	47.0	73.0	70.0	66.0	63.0	59.0	56.0	51.0	50.0	48.0	61.6	10.0	71.6
Day	7	61.8	83.9	46.5	73.0	71.0	68.0	64.0	58.0	55.0	50.0	49.0	47.0	61.8	0.0	61.8
	8	60.4	82.5	41.5	71.0	70.0	67.0	63.0	56.0	52.0	46.0	44.0	43.0	60.4	0.0	60.4
	9	61.7	85.0	41.7	73.0	71.0	67.0	64.0	57.0	52.0	46.0	45.0	43.0	61.7	0.0	61.7
	10	60.1	85.1	41.6	71.0	69.0	65.0	62.0	54.0	50.0	45.0	44.0	42.0	60.1	0.0	60.1
	11	62.8	91.1	39.8	72.0	70.0	66.0	64.0	55.0	49.0	43.0	42.0	40.0	62.8	0.0	62.8
	12	62.0	89.3	40.6	73.0	70.0	66.0	64.0	55.0	50.0	44.0	42.0	41.0	62.0	0.0	62.0
	13	60.4	81.0	44.0	72.0	70.0	67.0	64.0	56.0	51.0	47.0	46.0	45.0	60.4	0.0	60.4
	14	60.6	81.3	42.7	71.0	70.0	67.0	66.0	57.0	52.0	48.0	47.0	45.0	60.6	0.0	60.6
	15	60.6	75.6	43.8	71.0	70.0	68.0	66.0	58.0	52.0	48.0	47.0	45.0	60.6	0.0	60.6
	16	63.1	83.4	44.0	73.0	72.0	69.0	68.0	60.0	54.0	48.0	46.0	45.0	63.1	0.0	63.1
	17	64.4	92.2	43.7	74.0	72.0	69.0	68.0	61.0	53.0	47.0	46.0	44.0	64.4	0.0	64.4
	18	63.8	89.4	42.8	73.0	72.0	69.0	68.0	60.0	52.0	45.0	44.0	43.0	63.8	0.0	63.8
Evening	19	62.0	83.6	41.6	72.0	70.0	68.0	67.0	57.0	50.0	44.0	43.0	42.0	62.0	5.0	67.0
	20	61.3	82.7	40.6	72.0	70.0	68.0	66.0	56.0	49.0	43.0	42.0	41.0	61.3	5.0	66.3
	21	59.8	81.6	38.9	71.0	70.0	67.0	64.0	52.0	46.0	42.0	41.0	39.0	59.8	5.0	64.8
Night	22	56.9	75.5	38.8	70.0	68.0	63.0	60.0	51.0	46.0	40.0	39.0	38.0	56.9	10.0	66.9
	23	56.8	79.6	38.8	70.0	68.0	61.0	57.0	47.0	43.0	39.0	38.0	38.0	56.8	10.0	66.8

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	60.1	75.6	39.8	71.0	69.0	65.0	62.0	54.0	49.0	43.0	42.0	40.0
	Max	64.4	92.2	46.5	74.0	72.0	69.0	68.0	61.0	55.0	50.0	49.0	47.0
Energy Average		62.0	Average:		72.3	70.6	67.3	65.1	57.3	51.8	46.4	45.2	43.6
Evening	Min	59.8	81.6	38.9	71.0	70.0	67.0	64.0	52.0	46.0	42.0	41.0	39.0
	Max	62.0	83.6	41.6	72.0	70.0	68.0	67.0	57.0	50.0	44.0	43.0	42.0
Energy Average		61.1	Average:		71.7	70.0	67.7	65.7	55.0	48.3	43.0	42.0	40.7
Night	Min	51.2	75.5	35.9	64.0	58.0	52.0	49.0	41.0	39.0	38.0	38.0	38.0
	Max	61.6	85.0	47.0	73.0	70.0	66.0	63.0	59.0	56.0	51.0	50.0	48.0
Energy Average		57.7	Average:		68.4	64.7	59.6	56.9	49.8	45.8	41.8	41.2	40.3

L_{eq} (dBA)		
24-Hour	Daytime	Nighttime
60.7	61.9	57.7

24-Hour CNEL (dBA)
65.4

URBAN CROSSROADS

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APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE LEVEL CONTOURS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project — *Project Name:* MCH
Road Name: Central Av. — *Job Number:* 10351
Road Segment: n/o El Prado Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 29,420 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 2,942 vehicles
Vehicle Speed: 45 mph
Near/Far Lane Distance: 76 feet

Site Data

Barrier Height: **0.0 feet**
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 60.0 feet
Centerline Dist. to Observer: 60.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 — *Grade Adjustment:* 0.0

Lane Equivalent Distance (in feet)

Autos: 46.701
Medium Trucks: 46.511
Heavy Trucks: 46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.55	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-10.43	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.36	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.2	67.6	66.7	63.7	70.9	71.3
Medium Trucks:	68.2	66.3	60.7	61.1	68.5	68.7
Heavy Trucks:	69.1	67.6	56.0	60.4	68.5	68.5
Vehicle Noise:	74.0	72.0	67.9	66.7	74.2	74.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	114	246	531	1,144
CNEL:	119	257	553	1,192

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project — *Project Name:* MCH
Road Name: Central Av. — *Job Number:* 10351
Road Segment: s/o El Prado Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 34,911 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 3,491 vehicles
Vehicle Speed: 45 mph
Near/Far Lane Distance: 78 feet

Site Data

Barrier Height: **0.0 feet**
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 60.0 feet
Centerline Dist. to Observer: 60.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 — *Grade Adjustment:* 0.0

Lane Equivalent Distance (in feet)

Autos: 45.869
Medium Trucks: 45.676
Heavy Trucks: 45.695

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.30	0.46	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-9.69	0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-13.62	0.48	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.0	68.4	67.5	64.5	71.7	72.2
Medium Trucks:	69.0	67.1	61.5	62.0	69.4	69.6
Heavy Trucks:	69.9	68.5	56.9	61.2	69.3	69.4
Vehicle Noise:	74.8	72.8	68.8	67.6	75.1	75.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	131	281	606	1,306
CNEL:	136	293	632	1,361

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project — *Project Name:* MCH
Road Name: El Prado Rd. — *Job Number:* 10351
Road Segment: n/o Kimball Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 24,718 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 2,472 vehicles
Vehicle Speed: 45 mph
Near/Far Lane Distance: 36 feet

Site Data

Barrier Height: **0.0 feet**
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 44.0 feet
Centerline Dist. to Observer: 44.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 — *Grade Adjustment:* 0.0

Lane Equivalent Distance (in feet)

Autos: 40.460
Medium Trucks: 40.241
Heavy Trucks: 40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	1.80	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	79.45	-11.19	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-15.12	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.3	67.8	66.9	63.9	71.0	71.5
Medium Trucks:	68.4	66.4	60.8	61.3	68.7	68.9
Heavy Trucks:	69.2	67.8	56.2	60.6	68.7	68.7
Vehicle Noise:	74.2	72.2	68.1	66.9	74.4	74.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	86	186	401	863
CNEL:	90	194	417	899

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project — *Project Name:* MCH
Road Name: Euclid Av. — *Job Number:* 10351
Road Segment: n/o Walnut Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 30,254 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 3,025 vehicles
Vehicle Speed: 55 mph
Near/Far Lane Distance: 154 feet

Site Data

Barrier Height: **0.0 feet**
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 84.0 feet
Centerline Dist. to Observer: 84.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 — *Grade Adjustment:* 0.0

Lane Equivalent Distance (in feet)

Autos: 33.941
Medium Trucks: 33.679
Heavy Trucks: 33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	1.80	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-11.18	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-15.11	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.8	72.2	71.3	68.3	75.5	75.9
Medium Trucks:	72.5	70.6	65.0	65.4	72.8	73.0
Heavy Trucks:	72.5	71.1	59.5	63.9	72.0	72.0
Vehicle Noise:	78.2	76.1	72.5	71.0	78.5	78.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	309	665	1,433	3,087
CNEL:	322	695	1,497	3,225

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Euclid Av.
Road Segment: n/o Riverside Dr.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,283 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,528 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	1.02	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-11.96	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-15.89	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.0	71.4	70.6	67.6	74.7	75.2
Medium Trucks:	71.7	69.8	64.2	64.6	72.0	72.2
Heavy Trucks:	71.8	70.3	58.8	63.1	71.2	71.3
Vehicle Noise:	77.4	75.4	71.7	70.3	77.7	78.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	274	590	1,271	2,739
CNEL:	286	616	1,328	2,861

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Euclid Av.
Road Segment: n/o Chino Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,245 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,525 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	1.02	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-11.97	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-15.90	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.0	71.4	70.5	67.6	74.7	75.2
Medium Trucks:	71.7	69.8	64.2	64.6	72.0	72.2
Heavy Trucks:	71.8	70.3	58.8	63.1	71.2	71.2
Vehicle Noise:	77.4	75.3	71.7	70.3	77.7	78.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	274	589	1,270	2,736
CNEL:	286	616	1,327	2,858

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Euclid Av.
Road Segment: n/o Schaefer Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,794 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,779 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	1.43	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-11.55	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-15.48	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.4	71.9	71.0	68.0	75.1	75.6
Medium Trucks:	72.1	70.2	64.6	65.0	72.4	72.6
Heavy Trucks:	72.2	70.7	59.2	63.5	71.6	71.7
Vehicle Noise:	77.8	75.8	72.1	70.7	78.1	78.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	292	629	1,354	2,917
CNEL:	305	657	1,414	3,047

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Euclid Av.
Road Segment: n/o Edison Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,878 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,988 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	1.75	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-11.23	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-15.17	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.7	72.2	71.3	68.3	75.5	75.9
Medium Trucks:	72.4	70.5	64.9	65.4	72.8	72.9
Heavy Trucks:	72.5	71.1	59.5	63.8	71.9	72.0
Vehicle Noise:	78.1	76.1	72.4	71.0	78.4	78.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	306	660	1,421	3,061
CNEL:	320	689	1,484	3,198

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Euclid Av.
Road Segment: n/o Eucalyptus Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,743 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,774 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	1.43	2.42	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	82.40	-11.56	2.47	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-15.49	2.47	-1.20	*-5.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	74.4	71.9	71.0	68.0	75.1	75.6
Medium Trucks:	72.1	70.2	64.6	65.0	72.4	72.6
Heavy Trucks:	72.2	70.7	59.2	63.5	71.6	71.7
Vehicle Noise:	77.8	75.8	72.1	70.7	78.1	78.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	291	628	1,352	2,914
CNEL:	304	656	1,413	3,044

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Euclid Av.
Road Segment: n/o Merrill Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	31,921 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,192 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	2.04	2.42	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	82.40	-10.95	2.47	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-14.88	2.47	-1.20	*-5.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	75.0	72.5	71.6	68.6	75.7	76.2
Medium Trucks:	72.7	70.8	65.2	65.6	73.0	73.2
Heavy Trucks:	72.8	71.3	59.8	64.1	72.2	72.3
Vehicle Noise:	78.4	76.4	72.7	71.3	78.7	79.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	320	689	1,485	3,199
CNEL:	334	720	1,551	3,342

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Euclid Av.
Road Segment: s/o Merrill Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,618 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,062 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	1.85	2.42	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	82.40	-11.13	2.47	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-15.06	2.47	-1.20	*-5.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	74.9	72.3	71.4	68.4	75.6	76.0
Medium Trucks:	72.5	70.6	65.0	65.5	72.9	73.1
Heavy Trucks:	72.6	71.2	59.6	63.9	72.0	72.1
Vehicle Noise:	78.2	76.2	72.5	71.1	78.5	78.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	311	670	1,444	3,112
CNEL:	325	700	1,509	3,250

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Euclid Av.
Road Segment: n/o Kimball Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,229 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,023 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	1.80	2.42	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	82.40	-11.18	2.47	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-15.12	2.47	-1.20	*-5.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	74.8	72.2	71.3	68.3	75.5	75.9
Medium Trucks:	72.5	70.6	65.0	65.4	72.8	73.0
Heavy Trucks:	72.5	71.1	59.5	63.9	72.0	72.0
Vehicle Noise:	78.2	76.1	72.5	71.0	78.5	78.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	309	665	1,432	3,085
CNEL:	322	694	1,496	3,223

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Euclid Av.
Road Segment: n/o Bickmore Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,579 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,858 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	-0.32	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-13.30	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-17.23	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	72.7	70.1	69.2	66.2	73.4	73.8
Medium Trucks:	70.4	68.4	62.8	63.3	70.7	70.9
Heavy Trucks:	70.4	69.0	57.4	61.8	69.8	69.9
Vehicle Noise:	76.1	74.0	70.3	68.9	76.4	76.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	223	480	1,035	2,230
CNEL:	233	502	1,081	2,330

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Archibald Av.
Road Segment: n/o Limonite Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,446 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,545 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	1.05	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-11.93	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-15.87	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	74.1	71.5	70.6	67.6	74.8	75.2
Medium Trucks:	71.7	69.8	64.2	64.7	72.1	72.3
Heavy Trucks:	71.8	70.4	58.8	63.1	71.2	71.3
Vehicle Noise:	77.4	75.4	71.7	70.3	77.7	78.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	275	593	1,277	2,751
CNEL:	287	619	1,334	2,873

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Archibald Av.
Road Segment: s/o Limonite Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,166 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,417 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	1.70	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	79.45	-11.28	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-15.22	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.1	64.5	63.6	60.6	67.8	68.2
Medium Trucks:	65.1	63.2	57.6	58.0	65.4	65.6
Heavy Trucks:	66.0	64.6	53.0	57.3	65.4	65.5
Vehicle Noise:	70.9	68.9	64.9	63.7	71.1	71.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	91	195	421	906
CNEL:	94	204	438	945

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Archibald Av.
Road Segment: s/o Schleisman Rd.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,994 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,199 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	1.29	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	79.45	-11.69	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-15.63	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.7	64.1	63.2	60.2	67.4	67.8
Medium Trucks:	64.7	62.8	57.2	57.6	65.0	65.2
Heavy Trucks:	65.6	64.2	52.6	56.9	65.0	65.1
Vehicle Noise:	70.5	68.5	64.5	63.3	70.7	71.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	85	183	395	851
CNEL:	89	191	412	887

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Kimball Av.
Road Segment: w/o Mountain Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,433 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,943 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.29	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	81.00	-12.69	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-16.62	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.6	68.0	67.1	64.1	71.3	71.7
Medium Trucks:	68.4	66.5	60.9	61.3	68.7	68.9
Heavy Trucks:	68.9	67.4	55.9	60.2	68.3	68.3
Vehicle Noise:	74.2	72.1	68.3	67.0	74.4	74.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	87	187	402	867
CNEL:	90	195	420	905

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Kimball Av.
Road Segment: w/o Euclid Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,184 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,218 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.87	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	81.00	-12.11	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-16.05	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.1	68.6	67.7	64.7	71.9	72.3
Medium Trucks:	69.0	67.1	61.5	61.9	69.3	69.5
Heavy Trucks:	69.4	68.0	56.4	60.8	68.9	68.9
Vehicle Noise:	74.7	72.7	68.9	67.5	75.0	75.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	95	204	440	947
CNEL:	99	213	459	988

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Kimball Av.
Road Segment: e/o Euclid Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,975 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,798 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-0.04	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-13.03	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-16.96	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.0	67.4	66.5	63.5	70.7	71.1
Medium Trucks:	67.8	65.9	60.3	60.7	68.1	68.3
Heavy Trucks:	68.3	66.8	55.2	59.6	67.7	67.7
Vehicle Noise:	73.6	71.5	67.7	66.4	73.8	74.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	88	190	408	880
CNEL:	92	198	426	918

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Kimball Av.
Road Segment: w/o Rincon Meadows Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,031 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,903 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.20	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-12.78	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-16.71	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.2	67.6	66.7	63.8	70.9	71.4
Medium Trucks:	68.1	66.1	60.5	61.0	68.4	68.6
Heavy Trucks:	68.5	67.1	55.5	59.8	67.9	68.0
Vehicle Noise:	73.8	71.8	67.9	66.6	74.1	74.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	91	197	424	914
CNEL:	95	205	443	954

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Kimball Av.
Road Segment: e/o Rincon Meadows Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,215 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,822 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	0.01	1.01	-1.20	*-4.64*	0.000	0.000
Medium Trucks:	81.00	-12.97	1.04	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-16.90	1.04	-1.20	*-5.44*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.0	67.5	66.6	63.6	70.7	71.2
Medium Trucks:	67.9	65.9	60.3	60.8	68.2	68.4
Heavy Trucks:	68.3	66.9	55.3	59.6	67.7	67.8
Vehicle Noise:	73.6	71.6	67.7	66.4	73.9	74.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	89	191	412	888
CNEL:	93	200	430	926

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Kimball Av.
Road Segment: e/o Mill Creek Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,458 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,646 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-0.43	1.01	-1.20	*-4.64*	0.000	0.000
Medium Trucks:	81.00	-13.41	1.04	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-17.34	1.04	-1.20	*-5.44*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.6	67.0	66.1	63.1	70.3	70.7
Medium Trucks:	67.4	65.5	59.9	60.3	67.8	67.9
Heavy Trucks:	67.9	66.4	54.9	59.2	67.3	67.4
Vehicle Noise:	73.2	71.1	67.3	66.0	73.4	73.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	83	179	385	830
CNEL:	87	187	402	866

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Kimball Av.
Road Segment: e/o Main St.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,466 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,547 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-0.70	1.01	-1.20	*-4.64*	0.000	0.000
Medium Trucks:	81.00	-13.68	1.04	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-17.61	1.04	-1.20	*-5.44*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.3	66.7	65.8	62.8	70.0	70.5
Medium Trucks:	67.2	65.2	59.6	60.1	67.5	67.7
Heavy Trucks:	67.6	66.2	54.6	58.9	67.0	67.1
Vehicle Noise:	72.9	70.9	67.0	65.7	73.2	73.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	80	171	369	796
CNEL:	83	179	386	831

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Kimball Av.
Road Segment: e/o Flight Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,131 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,313 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-1.41	1.01	-1.20	*-4.64*	0.000	0.000
Medium Trucks:	81.00	-14.39	1.04	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-18.32	1.04	-1.20	*-5.44*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.6	66.0	65.1	62.1	69.3	69.7
Medium Trucks:	66.5	64.5	58.9	59.4	66.8	67.0
Heavy Trucks:	66.9	65.5	53.9	58.2	66.3	66.4
Vehicle Noise:	72.2	70.2	66.3	65.0	72.5	72.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	71	154	331	714
CNEL:	74	160	346	745

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project — *Project Name:* MCH
Road Name: Limonite Av. — *Job Number:* 10351
Road Segment: w/o Archibald Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	0 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-42.59	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	81.00	-55.57	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-59.51	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	24.6	22.0	21.1	18.1	25.3	25.7
Medium Trucks:	22.4	20.5	14.9	15.3	22.7	22.9
Heavy Trucks:	22.8	21.4	9.8	14.1	22.2	22.3
Vehicle Noise:	28.1	26.1	22.3	20.9	28.4	28.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	0	0	1	1
CNEL:	0	0	1	1

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project — *Project Name:* MCH
Road Name: Limonite Av. — *Job Number:* 10351
Road Segment: e/o Archibald Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,317 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,832 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.04	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	81.00	-12.95	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-16.88	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.2	64.6	63.7	60.7	67.9	68.3
Medium Trucks:	65.0	63.1	57.5	57.9	65.3	65.5
Heavy Trucks:	65.5	64.0	52.4	56.8	64.9	64.9
Vehicle Noise:	70.8	68.7	64.9	63.6	71.0	71.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	89	192	413	889
CNEL:	93	200	431	928

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project — *Project Name:* MCH
Road Name: Pine Av. — *Job Number:* 10351
Road Segment: w/o El Prado Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-28.15	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-41.14	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-45.07	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	39.4	36.9	36.0	33.0	40.2	40.6
Medium Trucks:	37.5	35.6	30.0	30.4	37.8	38.0
Heavy Trucks:	38.3	36.9	25.3	29.7	37.8	37.8
Vehicle Noise:	43.3	41.3	37.2	36.0	43.5	43.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	1	2	5	10
CNEL:	1	2	5	11

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project — *Project Name:* MCH
Road Name: Pine Av. — *Job Number:* 10351
Road Segment: w/o Euclid Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	7,306 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	731 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-3.50	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-16.48	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-20.41	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.1	61.5	60.6	57.6	64.8	65.2
Medium Trucks:	62.1	60.2	54.6	55.1	62.5	62.6
Heavy Trucks:	63.0	61.6	50.0	54.3	62.4	62.5
Vehicle Noise:	67.9	65.9	61.9	60.7	68.2	68.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	45	97	210	452
CNEL:	47	101	219	471

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Pine Av.
Road Segment: e/o Euclid Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,747 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,575 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	1.97	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-11.01	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.94	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.6	67.0	66.1	63.1	70.3	70.7
Medium Trucks:	67.6	65.7	60.1	60.5	67.9	68.1
Heavy Trucks:	68.5	67.0	55.5	59.8	67.9	68.0
Vehicle Noise:	73.4	71.4	67.4	66.2	73.6	73.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	105	226	486	1,047
CNEL:	109	235	506	1,091

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Pine Av.
Road Segment: w/o Chino Corona Rd.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,771 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,977 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.60	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-10.38	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.31	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.2	67.6	66.7	63.7	70.9	71.3
Medium Trucks:	68.2	66.3	60.7	61.2	68.6	68.7
Heavy Trucks:	69.1	67.7	56.1	60.4	68.5	68.6
Vehicle Noise:	74.0	72.0	68.0	66.8	74.3	74.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	115	248	535	1,153
CNEL:	120	259	558	1,202

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Pine Av.
Road Segment: w/o W. Preserve Loop

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,445 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,645 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	0.03	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-12.96	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-16.89	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.6	65.1	64.2	61.2	68.3	68.8
Medium Trucks:	65.7	63.7	58.1	58.6	66.0	66.2
Heavy Trucks:	66.5	65.1	53.5	57.8	65.9	66.0
Vehicle Noise:	71.5	69.4	65.4	64.2	71.7	71.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	78	167	360	776
CNEL:	81	174	376	809

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Pine Av.
Road Segment: w/o E. Preserve Loop

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,664 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,666 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.13	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-10.86	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.79	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.7	67.2	66.3	63.3	70.4	70.9
Medium Trucks:	67.8	65.8	60.2	60.7	68.1	68.3
Heavy Trucks:	68.6	67.2	55.6	59.9	68.0	68.1
Vehicle Noise:	73.6	71.5	67.5	66.3	73.8	74.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	107	231	497	1,071
CNEL:	112	241	518	1,117

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Pine Av.
Road Segment: w/o Hellman Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,513 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,651 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.10	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-10.88	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.82	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.7	67.1	66.2	63.2	70.4	70.8
Medium Trucks:	67.7	65.8	60.2	60.6	68.1	68.2
Heavy Trucks:	68.6	67.2	55.6	59.9	68.0	68.1
Vehicle Noise:	73.5	71.5	67.5	66.3	73.8	74.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	107	230	495	1,067
CNEL:	111	240	516	1,112

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Schleisman Rd.
Road Segment: w/o Archibald Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,660 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,866 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.44	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	79.45	-10.54	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.48	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.8	65.3	64.4	61.4	68.6	69.0
Medium Trucks:	65.9	63.9	58.3	58.8	66.2	66.4
Heavy Trucks:	66.7	65.3	53.7	58.1	66.1	66.2
Vehicle Noise:	71.7	69.7	65.6	64.4	71.9	72.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	102	219	471	1,016
CNEL:	106	228	491	1,058

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Central Av.
Road Segment: n/o El Prado Rd.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,772 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,977 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.48%
Medium Trucks:	77.1%	5.3%	17.6%	4.64%
Heavy Trucks:	86.3%	1.5%	12.2%	1.88%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.61	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-10.43	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.36	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.2	67.6	66.7	63.7	70.9	71.3
Medium Trucks:	68.2	66.3	60.7	61.1	68.5	68.7
Heavy Trucks:	69.1	67.6	56.0	60.4	68.5	68.5
Vehicle Noise:	74.0	72.0	68.0	66.8	74.2	74.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	115	247	533	1,148
CNEL:	120	258	556	1,197

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Central Av.
Road Segment: s/o El Prado Rd.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	35,873 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,587 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.00%
Medium Trucks:	77.1%	5.3%	17.6%	4.81%
Heavy Trucks:	86.3%	1.5%	12.2%	2.18%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.40	0.46	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-9.47	0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-12.90	0.48	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.1	68.5	67.6	64.6	71.8	72.2
Medium Trucks:	69.3	67.3	61.7	62.2	69.6	69.8
Heavy Trucks:	70.6	69.2	57.6	62.0	70.1	70.1
Vehicle Noise:	75.2	73.2	69.0	67.9	75.4	75.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	137	295	635	1,368
CNEL:	142	307	661	1,424

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project — *Project Name:* MCH
Road Name: El Prado Rd. — *Job Number:* 10351
Road Segment: n/o Kimball Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,099 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,610 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.12%
Medium Trucks:	77.1%	5.3%	17.6%	4.71%
Heavy Trucks:	86.3%	1.5%	12.2%	2.17%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.02	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	79.45	-10.94	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-14.31	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.6	68.0	67.1	64.1	71.3	71.7
Medium Trucks:	68.6	66.7	61.1	61.5	68.9	69.1
Heavy Trucks:	70.0	68.6	57.0	61.4	69.5	69.5
Vehicle Noise:	74.6	72.6	68.4	67.3	74.8	75.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	92	197	425	916
CNEL:	95	206	443	954

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project — *Project Name:* MCH
Road Name: Euclid Av. — *Job Number:* 10351
Road Segment: n/o Walnut Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,863 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,086 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	92.47%
Medium Trucks:	77.1%	5.3%	17.6%	5.05%
Heavy Trucks:	86.3%	1.5%	12.2%	2.48%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	1.85	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-10.78	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-13.87	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.8	72.3	71.4	68.4	75.6	76.0
Medium Trucks:	72.9	71.0	65.4	65.8	73.2	73.4
Heavy Trucks:	73.8	72.4	60.8	65.1	73.2	73.3
Vehicle Noise:	78.7	76.7	72.6	71.4	78.9	79.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	330	711	1,531	3,299
CNEL:	344	741	1,596	3,438

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project — *Project Name:* MCH
Road Name: Euclid Av. — *Job Number:* 10351
Road Segment: n/o Riverside Dr.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,924 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,592 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	92.30%
Medium Trucks:	77.1%	5.3%	17.6%	5.11%
Heavy Trucks:	86.3%	1.5%	12.2%	2.59%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	1.08	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-11.49	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-14.44	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.1	71.5	70.6	67.6	74.8	75.2
Medium Trucks:	72.2	70.3	64.7	65.1	72.5	72.7
Heavy Trucks:	73.2	71.8	60.2	64.5	72.6	72.7
Vehicle Noise:	78.0	76.0	71.9	70.7	78.2	78.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	296	639	1,376	2,965
CNEL:	309	665	1,434	3,088

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project — *Project Name:* MCH
Road Name: Euclid Av. — *Job Number:* 10351
Road Segment: n/o Chino Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,994 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,599 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	92.33%
Medium Trucks:	77.1%	5.3%	17.6%	5.09%
Heavy Trucks:	86.3%	1.5%	12.2%	2.58%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	1.09	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-11.49	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-14.44	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.1	71.5	70.6	67.6	74.8	75.2
Medium Trucks:	72.2	70.3	64.7	65.1	72.5	72.7
Heavy Trucks:	73.2	71.8	60.2	64.5	72.6	72.7
Vehicle Noise:	78.0	76.0	71.9	70.7	78.2	78.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	297	639	1,377	2,966
CNEL:	309	666	1,434	3,090

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project | *Project Name:* MCH
Road Name: Euclid Av. | *Job Number:* 10351
Road Segment: n/o Schaefer Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,582 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,858 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.44%
Medium Trucks:	77.1%	5.3%	17.6%	5.05%
Heavy Trucks:	86.3%	1.5%	12.2%	2.52%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	1.51	2.42	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	82.40	-11.12	2.47	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-14.14	2.47	-1.20	*-5.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	74.5	71.9	71.0	68.0	75.2	75.6
Medium Trucks:	72.6	70.6	65.0	65.5	72.9	73.1
Heavy Trucks:	73.5	72.1	60.5	64.8	72.9	73.0
Vehicle Noise:	78.4	76.4	72.3	71.1	78.6	78.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	314	677	1,458	3,142
CNEL:	327	705	1,520	3,274

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project | *Project Name:* MCH
Road Name: Euclid Av. | *Job Number:* 10351
Road Segment: n/o Edison Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,668 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,067 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.50%
Medium Trucks:	77.1%	5.3%	17.6%	5.02%
Heavy Trucks:	86.3%	1.5%	12.2%	2.47%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	1.82	2.42	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	82.40	-10.83	2.47	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-13.91	2.47	-1.20	*-5.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	74.8	72.2	71.3	68.3	75.5	76.0
Medium Trucks:	72.8	70.9	65.3	65.8	73.2	73.4
Heavy Trucks:	73.8	72.3	60.7	65.1	73.2	73.2
Vehicle Noise:	78.7	76.6	72.6	71.4	78.9	79.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	328	707	1,523	3,281
CNEL:	342	737	1,587	3,419

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project | *Project Name:* MCH
Road Name: Euclid Av. | *Job Number:* 10351
Road Segment: n/o Eucalyptus Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,639 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,864 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.46%
Medium Trucks:	77.1%	5.3%	17.6%	5.03%
Heavy Trucks:	86.3%	1.5%	12.2%	2.51%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	1.52	2.42	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	82.40	-11.12	2.47	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-14.15	2.47	-1.20	*-5.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	74.5	71.9	71.0	68.0	75.2	75.7
Medium Trucks:	72.6	70.6	65.0	65.5	72.9	73.1
Heavy Trucks:	73.5	72.1	60.5	64.8	72.9	73.0
Vehicle Noise:	78.4	76.4	72.3	71.1	78.6	78.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	314	677	1,459	3,143
CNEL:	327	705	1,520	3,275

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project | *Project Name:* MCH
Road Name: Euclid Av. | *Job Number:* 10351
Road Segment: n/o Merrill Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	32,894 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,289 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.60%
Medium Trucks:	77.1%	5.3%	17.6%	4.98%
Heavy Trucks:	86.3%	1.5%	12.2%	2.42%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	2.13	2.42	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	82.40	-10.57	2.47	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-13.69	2.47	-1.20	*-5.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	75.1	72.5	71.7	68.7	75.8	76.3
Medium Trucks:	73.1	71.2	65.6	66.0	73.4	73.6
Heavy Trucks:	74.0	72.5	61.0	65.3	73.4	73.5
Vehicle Noise:	78.9	76.9	72.9	71.7	79.1	79.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	342	737	1,588	3,421
CNEL:	357	768	1,655	3,566

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Euclid Av.
Road Segment: s/o Merrill Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	31,662 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,166 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.58%
Medium Trucks:	77.1%	5.3%	17.6%	4.98%
Heavy Trucks:	86.3%	1.5%	12.2%	2.44%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	1.96	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-10.73	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-13.83	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	75.0	72.4	71.5	68.5	75.7	76.1
Medium Trucks:	72.9	71.0	65.4	65.9	73.3	73.5
Heavy Trucks:	73.8	72.4	60.8	65.2	73.2	73.3
Vehicle Noise:	78.8	76.8	72.7	71.5	79.0	79.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	334	719	1,550	3,339
CNEL:	348	750	1,615	3,480

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Euclid Av.
Road Segment: n/o Kimball Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	31,272 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,127 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.57%
Medium Trucks:	77.1%	5.3%	17.6%	4.98%
Heavy Trucks:	86.3%	1.5%	12.2%	2.45%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	1.91	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-10.79	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-13.87	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	74.9	72.3	71.4	68.4	75.6	76.0
Medium Trucks:	72.9	71.0	65.4	65.8	73.2	73.4
Heavy Trucks:	73.8	72.4	60.8	65.1	73.2	73.3
Vehicle Noise:	78.7	76.7	72.7	71.5	78.9	79.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	331	714	1,538	3,313
CNEL:	345	744	1,603	3,453

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Euclid Av.
Road Segment: n/o Bickmore Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,643 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,964 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.30%
Medium Trucks:	77.1%	5.3%	17.6%	5.06%
Heavy Trucks:	86.3%	1.5%	12.2%	2.65%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	-0.12	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-12.74	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-15.55	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	72.9	70.3	69.4	66.4	73.6	74.0
Medium Trucks:	70.9	69.0	63.4	63.9	71.3	71.4
Heavy Trucks:	72.1	70.7	59.1	63.4	71.5	71.6
Vehicle Noise:	76.8	74.8	70.7	69.5	77.0	77.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	247	532	1,146	2,470
CNEL:	257	554	1,194	2,572

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Archibald Av.
Road Segment: n/o Limonite Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,613 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,561 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.45%
Medium Trucks:	77.1%	5.3%	17.6%	4.66%
Heavy Trucks:	86.3%	1.5%	12.2%	1.89%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	1.08	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-11.94	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-15.87	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	74.1	71.5	70.6	67.6	74.8	75.2
Medium Trucks:	71.7	69.8	64.2	64.7	72.1	72.3
Heavy Trucks:	71.8	70.4	58.8	63.1	71.2	71.3
Vehicle Noise:	77.5	75.4	71.7	70.3	77.7	78.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	276	594	1,279	2,756
CNEL:	288	620	1,336	2,879

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Archibald Av.
Road Segment: s/o Limonite Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,896 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,490 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.37%
Medium Trucks:	77.1%	5.3%	17.6%	4.65%
Heavy Trucks:	86.3%	1.5%	12.2%	1.98%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	1.83	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	79.45	-11.20	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.92	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.2	64.7	63.8	60.8	67.9	68.4
Medium Trucks:	65.2	63.3	57.7	58.1	65.5	65.7
Heavy Trucks:	66.3	64.9	53.3	57.6	65.7	65.8
Vehicle Noise:	71.1	69.1	65.0	63.8	71.3	71.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	93	200	431	929
CNEL:	97	209	449	968

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Archibald Av.
Road Segment: s/o Schleisman Rd.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,146 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,215 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.34%
Medium Trucks:	77.1%	5.3%	17.6%	4.71%
Heavy Trucks:	86.3%	1.5%	12.2%	1.95%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	1.32	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	79.45	-11.66	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-15.48	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.7	64.1	63.3	60.3	67.4	67.9
Medium Trucks:	64.8	62.8	57.2	57.7	65.1	65.3
Heavy Trucks:	65.7	64.3	52.7	57.0	65.1	65.2
Vehicle Noise:	70.6	68.6	64.5	63.3	70.8	71.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	86	185	399	859
CNEL:	90	193	416	895

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Kimball Av.
Road Segment: w/o Mountain Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,629 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,063 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.99%
Medium Trucks:	77.1%	5.3%	17.6%	4.76%
Heavy Trucks:	86.3%	1.5%	12.2%	2.26%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	0.53	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	81.00	-12.38	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-15.62	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.8	68.2	67.3	64.3	71.5	71.9
Medium Trucks:	68.7	66.8	61.2	61.7	69.1	69.2
Heavy Trucks:	69.9	68.4	56.9	61.2	69.3	69.4
Vehicle Noise:	74.7	72.7	68.6	67.4	74.9	75.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	93	200	432	930
CNEL:	97	209	450	969

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Kimball Av.
Road Segment: w/o Euclid Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,245 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,224 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.24%
Medium Trucks:	77.1%	5.3%	17.6%	4.76%
Heavy Trucks:	86.3%	1.5%	12.2%	2.00%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	0.87	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	81.00	-12.05	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-15.81	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.2	68.6	67.7	64.7	71.9	72.3
Medium Trucks:	69.1	67.1	61.5	62.0	69.4	69.6
Heavy Trucks:	69.7	68.2	56.7	61.0	69.1	69.2
Vehicle Noise:	74.8	72.8	68.9	67.6	75.1	75.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	96	207	445	959
CNEL:	100	215	464	1,000

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Kimball Av.
Road Segment: e/o Euclid Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,063 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,806 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.44%
Medium Trucks:	77.1%	5.3%	17.6%	4.67%
Heavy Trucks:	86.3%	1.5%	12.2%	1.89%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-0.02	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-13.03	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-16.96	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.0	67.4	66.5	63.5	70.7	71.1
Medium Trucks:	67.8	65.9	60.3	60.7	68.1	68.3
Heavy Trucks:	68.3	66.8	55.2	59.6	67.7	67.7
Vehicle Noise:	73.6	71.5	67.7	66.4	73.8	74.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	88	190	409	881
CNEL:	92	198	427	920

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Kimball Av.
Road Segment: w/o Rincon Meadows Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,120 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,912 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.44%
Medium Trucks:	77.1%	5.3%	17.6%	4.67%
Heavy Trucks:	86.3%	1.5%	12.2%	1.89%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	0.22	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-12.78	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-16.71	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.2	67.7	66.8	63.8	70.9	71.4
Medium Trucks:	68.1	66.1	60.5	61.0	68.4	68.6
Heavy Trucks:	68.5	67.1	55.5	59.8	67.9	68.0
Vehicle Noise:	73.8	71.8	67.9	66.6	74.1	74.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	92	197	425	915
CNEL:	96	206	443	955

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Kimball Av.
Road Segment: e/o Rincon Meadows Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,304 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,830 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.44%
Medium Trucks:	77.1%	5.3%	17.6%	4.67%
Heavy Trucks:	86.3%	1.5%	12.2%	1.89%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	0.04	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-12.97	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-16.90	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.1	67.5	66.6	63.6	70.8	71.2
Medium Trucks:	67.9	65.9	60.3	60.8	68.2	68.4
Heavy Trucks:	68.3	66.9	55.3	59.6	67.7	67.8
Vehicle Noise:	73.6	71.6	67.8	66.4	73.9	74.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	89	192	413	889
CNEL:	93	200	431	928

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Kimball Av.
Road Segment: e/o Mill Creek Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,545 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,654 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.44%
Medium Trucks:	77.1%	5.3%	17.6%	4.67%
Heavy Trucks:	86.3%	1.5%	12.2%	1.89%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-0.40	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-13.41	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-17.34	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.6	67.0	66.1	63.1	70.3	70.7
Medium Trucks:	67.4	65.5	59.9	60.3	67.8	67.9
Heavy Trucks:	67.9	66.4	54.9	59.2	67.3	67.4
Vehicle Noise:	73.2	71.1	67.3	66.0	73.4	73.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	83	179	386	831
CNEL:	87	187	402	867

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project — *Project Name:* MCH
Road Name: Kimball Av. — *Job Number:* 10351
Road Segment: e/o Main St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,552 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,555 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.44%
Medium Trucks:	77.1%	5.3%	17.6%	4.67%
Heavy Trucks:	86.3%	1.5%	12.2%	1.89%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-0.67	1.01	-1.20	*-4.64*	0.000	0.000
Medium Trucks:	81.00	-13.68	1.04	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-17.61	1.04	-1.20	*-5.44*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.3	66.8	65.9	62.9	70.1	70.5
Medium Trucks:	67.2	65.2	59.6	60.1	67.5	67.7
Heavy Trucks:	67.6	66.2	54.6	58.9	67.0	67.1
Vehicle Noise:	72.9	70.9	67.1	65.7	73.2	73.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	80	172	370	797
CNEL:	83	179	386	832

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project — *Project Name:* MCH
Road Name: Kimball Av. — *Job Number:* 10351
Road Segment: e/o Flight Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,143 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,314 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.41%
Medium Trucks:	77.1%	5.3%	17.6%	4.69%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-1.40	1.01	-1.20	*-4.64*	0.000	0.000
Medium Trucks:	81.00	-14.40	1.04	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-18.32	1.04	-1.20	*-5.44*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.6	66.0	65.1	62.1	69.3	69.7
Medium Trucks:	66.4	64.5	58.9	59.4	66.8	67.0
Heavy Trucks:	66.9	65.5	53.9	58.2	66.3	66.4
Vehicle Noise:	72.2	70.2	66.3	65.0	72.5	72.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	71	154	331	714
CNEL:	74	160	346	745

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project — *Project Name:* MCH
Road Name: Limonite Av. — *Job Number:* 10351
Road Segment: w/o Archibald Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	0 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.41%
Medium Trucks:	77.1%	5.3%	17.6%	4.69%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-42.59	-1.85	-1.20	*-4.73*	0.000	0.000
Medium Trucks:	81.00	-55.58	-1.84	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-59.51	-1.84	-1.20	*-5.25*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	24.6	22.0	21.1	18.1	25.3	25.7
Medium Trucks:	22.4	20.5	14.9	15.3	22.7	22.9
Heavy Trucks:	22.8	21.4	9.8	14.1	22.2	22.3
Vehicle Noise:	28.1	26.1	22.3	20.9	28.4	28.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	0	0	1	1
CNEL:	0	0	1	1

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project — *Project Name:* MCH
Road Name: Limonite Av. — *Job Number:* 10351
Road Segment: e/o Archibald Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,897 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,890 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.31%
Medium Trucks:	77.1%	5.3%	17.6%	4.68%
Heavy Trucks:	86.3%	1.5%	12.2%	2.02%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	0.17	-1.85	-1.20	*-4.73*	0.000	0.000
Medium Trucks:	81.00	-12.83	-1.84	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-16.49	-1.84	-1.20	*-5.25*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.3	64.7	63.8	60.8	68.0	68.5
Medium Trucks:	65.1	63.2	57.6	58.0	65.5	65.6
Heavy Trucks:	65.9	64.4	52.8	57.2	65.3	65.3
Vehicle Noise:	71.0	68.9	65.0	63.8	71.2	71.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	92	197	425	915
CNEL:	95	206	443	955

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project — *Project Name:* MCH
Road Name: Pine Av. — *Job Number:* 10351
Road Segment: w/o El Prado Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.41%
Medium Trucks:	77.1%	5.3%	17.6%	4.69%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-28.15	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-41.14	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-45.07	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	39.5	36.9	36.0	33.0	40.2	40.6
Medium Trucks:	37.5	35.6	30.0	30.4	37.8	38.0
Heavy Trucks:	38.3	36.9	25.3	29.7	37.8	37.8
Vehicle Noise:	43.3	41.3	37.2	36.0	43.5	43.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	1	2	5	10
CNEL:	1	2	5	11

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project — *Project Name:* MCH
Road Name: Pine Av. — *Job Number:* 10351
Road Segment: w/o Euclid Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	7,979 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	798 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	92.41%
Medium Trucks:	77.1%	5.3%	17.6%	4.95%
Heavy Trucks:	86.3%	1.5%	12.2%	2.64%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-3.16	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-15.87	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-18.60	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.4	61.9	61.0	58.0	65.1	65.6
Medium Trucks:	62.7	60.8	55.2	55.7	63.1	63.3
Heavy Trucks:	64.8	63.4	51.8	56.1	64.2	64.3
Vehicle Noise:	68.9	66.9	62.4	61.5	69.0	69.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	51	111	239	515
CNEL:	54	115	248	535

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project — *Project Name:* MCH
Road Name: Pine Av. — *Job Number:* 10351
Road Segment: e/o Euclid Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,758 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,676 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.34%
Medium Trucks:	77.1%	5.3%	17.6%	4.65%
Heavy Trucks:	86.3%	1.5%	12.2%	2.01%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.14	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-10.89	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.54	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.7	67.2	66.3	63.3	70.4	70.9
Medium Trucks:	67.7	65.8	60.2	60.6	68.1	68.2
Heavy Trucks:	68.9	67.4	55.9	60.2	68.3	68.4
Vehicle Noise:	73.6	71.6	67.5	66.4	73.8	74.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	108	233	502	1,082
CNEL:	113	243	523	1,127

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project — *Project Name:* MCH
Road Name: Pine Av. — *Job Number:* 10351
Road Segment: w/o Chino Corona Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,785 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,079 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.35%
Medium Trucks:	77.1%	5.3%	17.6%	4.65%
Heavy Trucks:	86.3%	1.5%	12.2%	1.99%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.75	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-10.28	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-13.96	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.3	67.8	66.9	63.9	71.1	71.5
Medium Trucks:	68.3	66.4	60.8	61.3	68.7	68.9
Heavy Trucks:	69.5	68.0	56.4	60.8	68.9	68.9
Vehicle Noise:	74.2	72.2	68.1	67.0	74.4	74.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	119	256	551	1,187
CNEL:	124	266	574	1,237

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Pine Av.
Road Segment: w/o W. Preserve Loop
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,411 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,741 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	0.0 feet
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.29%
Medium Trucks:	77.1%	5.3%	17.6%	4.64%
Heavy Trucks:	86.3%	1.5%	12.2%	2.07%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	0.27	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-12.77	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-16.27	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.9	65.3	64.4	61.4	68.6	69.0
Medium Trucks:	65.8	63.9	58.3	58.8	66.2	66.4
Heavy Trucks:	67.1	65.7	54.1	58.5	66.6	66.6
Vehicle Noise:	71.8	69.8	65.7	64.5	72.0	72.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	82	176	379	817
CNEL:	85	183	395	851

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Pine Av.
Road Segment: w/o E. Preserve Loop
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,639 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,764 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	0.0 feet
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.34%
Medium Trucks:	77.1%	5.3%	17.6%	4.66%
Heavy Trucks:	86.3%	1.5%	12.2%	2.01%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.28	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-10.74	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.40	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.9	67.3	66.4	63.4	70.6	71.0
Medium Trucks:	67.9	66.0	60.4	60.8	68.2	68.4
Heavy Trucks:	69.0	67.6	56.0	60.3	68.4	68.5
Vehicle Noise:	73.8	71.8	67.7	66.5	74.0	74.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	111	238	513	1,106
CNEL:	115	248	535	1,152

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Pine Av.
Road Segment: w/o Hellman Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,488 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,749 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	0.0 feet
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.34%
Medium Trucks:	77.1%	5.3%	17.6%	4.66%
Heavy Trucks:	86.3%	1.5%	12.2%	2.01%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.25	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-10.77	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.42	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.9	67.3	66.4	63.4	70.6	71.0
Medium Trucks:	67.9	65.9	60.3	60.8	68.2	68.4
Heavy Trucks:	69.0	67.6	56.0	60.3	68.4	68.5
Vehicle Noise:	73.7	71.8	67.7	66.5	74.0	74.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	110	237	512	1,102
CNEL:	115	247	533	1,148

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Schleisman Rd.
Road Segment: w/o Archibald Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,565 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,956 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	0.0 feet
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.33%
Medium Trucks:	77.1%	5.3%	17.6%	4.67%
Heavy Trucks:	86.3%	1.5%	12.2%	2.00%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.57	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	79.45	-10.44	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.11	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.0	65.4	64.5	61.5	68.7	69.1
Medium Trucks:	66.0	64.0	58.4	58.9	66.3	66.5
Heavy Trucks:	67.1	65.7	54.1	58.4	66.5	66.6
Vehicle Noise:	71.9	69.9	65.8	64.6	72.1	72.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	105	225	485	1,045
CNEL:	109	235	505	1,089

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project *Project Name:* MCH
Road Name: Central Av. *Job Number:* 10351
Road Segment: n/o El Prado Rd.

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	31,600 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	3,160 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph		
Near/Far Lane Distance:	76 feet		

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.86	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-10.12	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.05	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.5	67.9	67.0	64.0	71.2	71.6
Medium Trucks:	68.5	66.6	61.0	61.4	68.8	69.0
Heavy Trucks:	69.4	67.9	56.4	60.7	68.8	68.8
Vehicle Noise:	74.3	72.3	68.3	67.0	74.5	74.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	120	259	557	1,200
CNEL:	125	269	580	1,251

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project *Project Name:* MCH
Road Name: Central Av. *Job Number:* 10351
Road Segment: s/o El Prado Rd.

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	37,909 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	3,791 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph		
Near/Far Lane Distance:	78 feet		

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.65	0.46	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-9.33	0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-13.26	0.48	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.4	68.8	67.9	64.9	72.1	72.5
Medium Trucks:	69.4	67.5	61.9	62.3	69.7	69.9
Heavy Trucks:	70.3	68.8	57.3	61.6	69.7	69.8
Vehicle Noise:	75.2	73.2	69.2	68.0	75.4	75.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	138	297	640	1,379
CNEL:	144	310	667	1,438

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project *Project Name:* MCH
Road Name: El Prado Rd. *Job Number:* 10351
Road Segment: n/o Kimball Av.

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	27,269 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	2,727 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph		
Near/Far Lane Distance:	36 feet		

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.22	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	79.45	-10.76	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-14.69	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.8	68.2	67.3	64.3	71.5	71.9
Medium Trucks:	68.8	66.9	61.3	61.7	69.1	69.3
Heavy Trucks:	69.7	68.2	56.7	61.0	69.1	69.1
Vehicle Noise:	74.6	72.6	68.6	67.3	74.8	75.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	92	198	428	921
CNEL:	96	207	446	960

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project *Project Name:* MCH
Road Name: Euclid Av. *Job Number:* 10351
Road Segment: n/o Walnut Av.

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	34,918 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	3,492 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	55 mph		
Near/Far Lane Distance:	154 feet		

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	2.42	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-10.56	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-14.49	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.4	72.8	72.0	69.0	76.1	76.6
Medium Trucks:	73.1	71.2	65.6	66.0	73.4	73.6
Heavy Trucks:	73.2	71.7	60.2	64.5	72.6	72.7
Vehicle Noise:	78.8	76.8	73.1	71.7	79.1	79.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	340	732	1,577	3,397
CNEL:	355	764	1,647	3,548

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project *Project Name:* MCH
Road Name: Euclid Av. *Job Number:* 10351
Road Segment: n/o Riverside Dr.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,681 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,968 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	1.72	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-11.26	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-15.20	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.7	72.1	71.3	68.3	75.4	75.9
Medium Trucks:	72.4	70.5	64.9	65.3	72.7	72.9
Heavy Trucks:	72.5	71.0	59.5	63.8	71.9	71.9
Vehicle Noise:	78.1	76.0	72.4	71.0	78.4	78.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	305	657	1,415	3,048
CNEL:	318	686	1,478	3,184

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project *Project Name:* MCH
Road Name: Euclid Av. *Job Number:* 10351
Road Segment: n/o Chino Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,908 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,991 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	1.75	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-11.23	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-15.16	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.8	72.2	71.3	68.3	75.5	75.9
Medium Trucks:	72.4	70.5	64.9	65.4	72.8	73.0
Heavy Trucks:	72.5	71.1	59.5	63.8	71.9	72.0
Vehicle Noise:	78.1	76.1	72.4	71.0	78.4	78.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	306	660	1,422	3,063
CNEL:	320	689	1,485	3,200

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project *Project Name:* MCH
Road Name: Euclid Av. *Job Number:* 10351
Road Segment: n/o Schaefer Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	32,723 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,272 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	2.14	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-10.84	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-14.77	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.1	72.6	71.7	68.7	75.9	76.3
Medium Trucks:	72.8	70.9	65.3	65.7	73.2	73.3
Heavy Trucks:	72.9	71.5	59.9	64.2	72.3	72.4
Vehicle Noise:	78.5	76.5	72.8	71.4	78.8	79.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	325	701	1,510	3,253
CNEL:	340	732	1,577	3,398

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project *Project Name:* MCH
Road Name: Euclid Av. *Job Number:* 10351
Road Segment: n/o Edison Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	35,053 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,505 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	2.44	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-10.54	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-14.47	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.4	72.9	72.0	69.0	76.2	76.6
Medium Trucks:	73.1	71.2	65.6	66.0	73.5	73.6
Heavy Trucks:	73.2	71.8	60.2	64.5	72.6	72.7
Vehicle Noise:	78.8	76.8	73.1	71.7	79.1	79.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	341	734	1,581	3,405
CNEL:	356	766	1,651	3,557

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project
Road Name: Euclid Av.
Road Segment: n/o Eucalyptus Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	32,935 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,294 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	2.17	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-10.81	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-14.74	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.2	72.6	71.7	68.7	75.9	76.3
Medium Trucks:	72.9	70.9	65.3	65.8	73.2	73.4
Heavy Trucks:	72.9	71.5	59.9	64.2	72.3	72.4
Vehicle Noise:	78.6	76.5	72.8	71.4	78.8	79.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	327	704	1,516	3,267
CNEL:	341	735	1,584	3,412

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project
Road Name: Euclid Av.
Road Segment: n/o Merrill Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	36,593 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,659 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	2.63	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-10.35	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-14.29	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.6	73.1	72.2	69.2	76.3	76.8
Medium Trucks:	73.3	71.4	65.8	66.2	73.6	73.8
Heavy Trucks:	73.4	71.9	60.4	64.7	72.8	72.9
Vehicle Noise:	79.0	77.0	73.3	71.9	79.3	79.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	350	755	1,627	3,504
CNEL:	366	789	1,699	3,661

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project
Road Name: Euclid Av.
Road Segment: s/o Merrill Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	34,987 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,499 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	2.43	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-10.55	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-14.48	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.4	72.9	72.0	69.0	76.1	76.6
Medium Trucks:	73.1	71.2	65.6	66.0	73.4	73.6
Heavy Trucks:	73.2	71.7	60.2	64.5	72.6	72.7
Vehicle Noise:	78.8	76.8	73.1	71.7	79.1	79.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	340	733	1,579	3,401
CNEL:	355	765	1,649	3,553

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project
Road Name: Euclid Av.
Road Segment: n/o Kimball Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	34,574 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,457 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	2.38	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-10.60	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-14.53	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.4	72.8	71.9	68.9	76.1	76.5
Medium Trucks:	73.1	71.1	65.5	66.0	73.4	73.6
Heavy Trucks:	73.1	71.7	60.1	64.4	72.5	72.6
Vehicle Noise:	78.8	76.7	73.0	71.6	79.1	79.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	337	727	1,566	3,374
CNEL:	352	759	1,636	3,525

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project
Road Name: Euclid Av.
Road Segment: n/o Bickmore Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,353 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,235 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	0.49	2.42	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	82.40	-12.49	2.47	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-16.43	2.47	-1.20	*-5.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.5	70.9	70.0	67.0	74.2	74.6
Medium Trucks:	71.2	69.3	63.7	64.1	71.5	71.7
Heavy Trucks:	71.2	69.8	58.2	62.6	70.7	70.7
Vehicle Noise:	76.9	74.8	71.1	69.7	77.2	77.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	252	544	1,171	2,523
CNEL:	264	568	1,223	2,635

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project
Road Name: Archibald Av.
Road Segment: n/o Limonite Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,340 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,934 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	1.67	2.42	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	82.40	-11.31	2.47	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-15.25	2.47	-1.20	*-5.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.7	72.1	71.2	68.2	75.4	75.8
Medium Trucks:	72.4	70.4	64.8	65.3	72.7	72.9
Heavy Trucks:	72.4	71.0	59.4	63.7	71.8	71.9
Vehicle Noise:	78.1	76.0	72.3	70.9	78.3	78.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	302	652	1,404	3,024
CNEL:	316	681	1,466	3,159

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project
Road Name: Archibald Av.
Road Segment: s/o Limonite Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,324 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,732 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.23	-1.85	-1.20	*-4.73*	0.000	0.000
Medium Trucks:	79.45	-10.75	-1.84	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-14.68	-1.84	-1.20	*-5.25*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.6	65.1	64.2	61.2	68.4	68.8
Medium Trucks:	65.7	63.7	58.1	58.6	66.0	66.2
Heavy Trucks:	66.5	65.1	53.5	57.8	65.9	66.0
Vehicle Noise:	71.5	69.4	65.4	64.2	71.7	72.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	98	212	457	984
CNEL:	103	221	476	1,025

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project
Road Name: Archibald Av.
Road Segment: s/o Schleisman Rd.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,024 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,402 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	1.67	-1.85	-1.20	*-4.73*	0.000	0.000
Medium Trucks:	79.45	-11.31	-1.84	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-15.24	-1.84	-1.20	*-5.25*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.1	64.5	63.6	60.6	67.8	68.2
Medium Trucks:	65.1	63.2	57.6	58.0	65.4	65.6
Heavy Trucks:	66.0	64.5	53.0	57.3	65.4	65.4
Vehicle Noise:	70.9	68.9	64.9	63.7	71.1	71.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	90	195	419	903
CNEL:	94	203	437	941

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project *Project Name:* MCH
Road Name: Kimball Av. *Job Number:* 10351
Road Segment: w/o Mountain Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,661 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,166 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	0.77	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	81.00	-12.22	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-16.15	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.0	68.5	67.6	64.6	71.8	72.2
Medium Trucks:	68.9	67.0	61.4	61.8	69.2	69.4
Heavy Trucks:	69.3	67.9	56.3	60.7	68.8	68.8
Vehicle Noise:	74.6	72.6	68.8	67.4	74.9	75.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	93	201	433	932
CNEL:	97	210	451	973

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project *Project Name:* MCH
Road Name: Kimball Av. *Job Number:* 10351
Road Segment: w/o Euclid Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,434 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,443 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	1.29	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	81.00	-11.69	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-15.63	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.6	69.0	68.1	65.1	72.3	72.7
Medium Trucks:	69.4	67.5	61.9	62.3	69.7	69.9
Heavy Trucks:	69.9	68.4	56.8	61.2	69.3	69.3
Vehicle Noise:	75.2	73.1	69.3	68.0	75.4	75.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	101	218	469	1,010
CNEL:	105	227	489	1,054

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project *Project Name:* MCH
Road Name: Kimball Av. *Job Number:* 10351
Road Segment: e/o Euclid Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,429 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,043 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	0.51	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-12.47	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-16.41	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.5	67.9	67.1	64.1	71.2	71.7
Medium Trucks:	68.4	66.4	60.8	61.3	68.7	68.9
Heavy Trucks:	68.8	67.4	55.8	60.1	68.2	68.3
Vehicle Noise:	74.1	72.1	68.2	66.9	74.4	74.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	96	206	445	958
CNEL:	100	215	464	1,000

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project *Project Name:* MCH
Road Name: Kimball Av. *Job Number:* 10351
Road Segment: w/o Rincon Meadows Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,291 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,129 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	0.69	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-12.29	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-16.23	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.7	68.1	67.2	64.2	71.4	71.8
Medium Trucks:	68.6	66.6	61.0	61.5	68.9	69.1
Heavy Trucks:	69.0	67.6	56.0	60.3	68.4	68.5
Vehicle Noise:	74.3	72.3	68.4	67.1	74.5	74.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	99	212	457	985
CNEL:	103	221	477	1,028

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project — *Project Name:* MCH
Road Name: Kimball Av. — *Job Number:* 10351
Road Segment: e/o Rincon Meadows Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,432 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,043 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	0.51	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-12.47	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-16.40	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.5	67.9	67.1	64.1	71.2	71.7
Medium Trucks:	68.4	66.4	60.8	61.3	68.7	68.9
Heavy Trucks:	68.8	67.4	55.8	60.1	68.2	68.3
Vehicle Noise:	74.1	72.1	68.2	66.9	74.4	74.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	96	206	445	958
CNEL:	100	215	464	1,000

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project — *Project Name:* MCH
Road Name: Kimball Av. — *Job Number:* 10351
Road Segment: e/o Mill Creek Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,591 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,859 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	0.10	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-12.88	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-16.81	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.1	67.5	66.6	63.6	70.8	71.3
Medium Trucks:	68.0	66.0	60.4	60.9	68.3	68.5
Heavy Trucks:	68.4	67.0	55.4	59.7	67.8	67.9
Vehicle Noise:	73.7	71.7	67.8	66.5	74.0	74.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	90	194	418	900
CNEL:	94	202	436	939

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project — *Project Name:* MCH
Road Name: Kimball Av. — *Job Number:* 10351
Road Segment: e/o Main St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,491 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,749 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-0.16	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-13.15	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-17.08	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.9	67.3	66.4	63.4	70.6	71.0
Medium Trucks:	67.7	65.8	60.2	60.6	68.0	68.2
Heavy Trucks:	68.1	66.7	55.1	59.5	67.6	67.6
Vehicle Noise:	73.4	71.4	67.6	66.2	73.7	74.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	86	186	401	864
CNEL:	90	194	419	902

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project — *Project Name:* MCH
Road Name: Kimball Av. — *Job Number:* 10351
Road Segment: e/o Flight Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,790 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,479 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-0.89	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-13.87	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-17.81	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.1	66.5	65.7	62.7	69.8	70.3
Medium Trucks:	67.0	65.0	59.4	59.9	67.3	67.5
Heavy Trucks:	67.4	66.0	54.4	58.7	66.8	66.9
Vehicle Noise:	72.7	70.7	66.8	65.5	73.0	73.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	77	166	359	773
CNEL:	81	174	374	806

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project — *Project Name:* MCH
Road Name: Limonite Av. — *Job Number:* 10351
Road Segment: w/o Archibald Av.

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	1 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	0 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	50 mph		
Near/Far Lane Distance:	78 feet		

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 — Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos: 65.422
Medium Trucks: 65.286
Heavy Trucks: 65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-42.59	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	81.00	-55.57	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-59.51	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	24.6	22.0	21.1	18.1	25.3	25.7
Medium Trucks:	22.4	20.5	14.9	15.3	22.7	22.9
Heavy Trucks:	22.8	21.4	9.8	14.1	22.2	22.3
Vehicle Noise:	28.1	26.1	22.3	20.9	28.4	28.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	0	0	1	1
CNEL:	0	0	1	1

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project — *Project Name:* MCH
Road Name: Limonite Av. — *Job Number:* 10351
Road Segment: e/o Archibald Av.

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	22,105 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	2,211 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	50 mph		
Near/Far Lane Distance:	78 feet		

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 — Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos: 65.422
Medium Trucks: 65.286
Heavy Trucks: 65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.85	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	81.00	-12.13	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-16.06	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.0	65.4	64.5	61.5	68.7	69.1
Medium Trucks:	65.8	63.9	58.3	58.7	66.1	66.3
Heavy Trucks:	66.3	64.8	53.3	57.6	65.7	65.8
Vehicle Noise:	71.6	69.5	65.7	64.4	71.8	72.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	101	217	468	1,008
CNEL:	105	227	488	1,051

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project — *Project Name:* MCH
Road Name: Pine Av. — *Job Number:* 10351
Road Segment: w/o El Prado Rd.

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	27 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	3 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph		
Near/Far Lane Distance:	76 feet		

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 — Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos: 46.701
Medium Trucks: 46.511
Heavy Trucks: 46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-27.82	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-40.80	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-44.74	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	39.8	37.2	36.3	33.3	40.5	40.9
Medium Trucks:	37.8	35.9	30.3	30.7	38.1	38.3
Heavy Trucks:	38.7	37.2	25.7	30.0	38.1	38.2
Vehicle Noise:	43.6	41.6	37.6	36.4	43.8	44.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	1	2	5	11
CNEL:	1	2	5	11

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project — *Project Name:* MCH
Road Name: Pine Av. — *Job Number:* 10351
Road Segment: w/o Euclid Av.

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	7,772 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	777 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph		
Near/Far Lane Distance:	76 feet		

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 — Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos: 46.701
Medium Trucks: 46.511
Heavy Trucks: 46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-3.23	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-16.21	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-20.14	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.4	61.8	60.9	57.9	65.1	65.5
Medium Trucks:	62.4	60.5	54.9	55.3	62.7	62.9
Heavy Trucks:	63.3	61.8	50.3	54.6	62.7	62.8
Vehicle Noise:	68.2	66.2	62.2	61.0	68.4	68.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	47	101	219	471
CNEL:	49	106	228	491

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project | *Project Name:* MCH
Road Name: Pine Av. | *Job Number:* 10351
Road Segment: e/o Euclid Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,876 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,888 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.47	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-10.51	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.44	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.1	67.5	66.6	63.6	70.8	71.2
Medium Trucks:	68.1	66.2	60.6	61.0	68.4	68.6
Heavy Trucks:	69.0	67.5	56.0	60.3	68.4	68.5
Vehicle Noise:	73.9	71.9	67.9	66.7	74.1	74.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	113	243	524	1,130
CNEL:	118	254	547	1,178

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project | *Project Name:* MCH
Road Name: Pine Av. | *Job Number:* 10351
Road Segment: w/o Chino Corona Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	32,911 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,291 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	3.04	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-9.94	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-13.88	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.6	68.1	67.2	64.2	71.4	71.8
Medium Trucks:	68.7	66.7	61.1	61.6	69.0	69.2
Heavy Trucks:	69.5	68.1	56.5	60.9	69.0	69.0
Vehicle Noise:	74.5	72.5	68.4	67.2	74.7	75.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	123	266	572	1,233
CNEL:	128	277	596	1,285

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project | *Project Name:* MCH
Road Name: Pine Av. | *Job Number:* 10351
Road Segment: w/o W. Preserve Loop

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,578 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,858 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	0.56	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-12.43	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-16.36	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.2	65.6	64.7	61.7	68.9	69.3
Medium Trucks:	66.2	64.3	58.7	59.1	66.5	66.7
Heavy Trucks:	67.1	65.6	54.0	58.4	66.5	66.5
Vehicle Noise:	72.0	70.0	65.9	64.7	72.2	72.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	84	181	391	842
CNEL:	88	189	407	878

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project | *Project Name:* MCH
Road Name: Pine Av. | *Job Number:* 10351
Road Segment: w/o E. Preserve Loop

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,018 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,002 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.64	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-10.34	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.28	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.2	67.7	66.8	63.8	71.0	71.4
Medium Trucks:	68.3	66.3	60.7	61.2	68.6	68.8
Heavy Trucks:	69.1	67.7	56.1	60.5	68.6	68.6
Vehicle Noise:	74.1	72.1	68.0	66.8	74.3	74.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	116	250	538	1,160
CNEL:	121	260	561	1,208

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project
Road Name: Pine Av.
Road Segment: w/o Hellman Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,448 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,945 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.56	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-10.43	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-14.36	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.2	67.6	66.7	63.7	70.9	71.3
Medium Trucks:	68.2	66.3	60.7	61.1	68.5	68.7
Heavy Trucks:	69.1	67.6	56.0	60.4	68.5	68.5
Vehicle Noise:	74.0	72.0	67.9	66.7	74.2	74.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	114	247	531	1,145
CNEL:	119	257	554	1,193

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY Without Project
Road Name: Schleisman Rd.
Road Segment: w/o Archibald Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	31,944 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,194 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.91	-1.85	-1.20	*-4.73*	0.000	0.000
Medium Trucks:	79.45	-10.07	-1.84	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-14.01	-1.84	-1.20	*-5.25*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.3	65.7	64.8	61.8	69.0	69.5
Medium Trucks:	66.3	64.4	58.8	59.2	66.7	66.8
Heavy Trucks:	67.2	65.8	54.2	58.5	66.6	66.7
Vehicle Noise:	72.1	70.1	66.1	64.9	72.4	72.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	109	235	507	1,092
CNEL:	114	245	528	1,138

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project
Road Name: Central Av.
Road Segment: n/o El Prado Rd.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	31,954 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,195 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.48%
Medium Trucks:	77.1%	5.3%	17.6%	4.64%
Heavy Trucks:	86.3%	1.5%	12.2%	1.88%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.91	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-10.12	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-14.05	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.5	67.9	67.0	64.0	71.2	71.7
Medium Trucks:	68.5	66.6	61.0	61.4	68.8	69.0
Heavy Trucks:	69.4	67.9	56.4	60.7	68.8	68.8
Vehicle Noise:	74.3	72.3	68.3	67.1	74.5	74.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	120	259	559	1,204
CNEL:	125	270	582	1,255

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project
Road Name: Central Av.
Road Segment: s/o El Prado Rd.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	38,873 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,887 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.04%
Medium Trucks:	77.1%	5.3%	17.6%	4.80%
Heavy Trucks:	86.3%	1.5%	12.2%	2.16%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	3.75	0.46	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-9.13	0.49	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-12.59	0.48	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.5	68.9	68.0	65.0	72.2	72.6
Medium Trucks:	69.6	67.7	62.1	62.5	69.9	70.1
Heavy Trucks:	70.9	69.5	57.9	62.3	70.4	70.4
Vehicle Noise:	75.5	73.5	69.3	68.2	75.7	76.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	144	310	669	1,440
CNEL:	150	323	696	1,499

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project | *Project Name:* MCH
Road Name: El Prado Rd. | *Job Number:* 10351
Road Segment: n/o Kimball Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,653 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,865 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.15%
Medium Trucks:	77.1%	5.3%	17.6%	4.71%
Heavy Trucks:	86.3%	1.5%	12.2%	2.14%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.43	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	79.45	-10.54	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-13.96	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.0	68.4	67.5	64.5	71.7	72.1
Medium Trucks:	69.0	67.1	61.5	61.9	69.3	69.5
Heavy Trucks:	70.4	69.0	57.4	61.7	69.8	69.9
Vehicle Noise:	75.0	73.0	68.8	67.7	75.2	75.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	97	210	452	973
CNEL:	101	218	470	1,013

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project | *Project Name:* MCH
Road Name: Euclid Av. | *Job Number:* 10351
Road Segment: n/o Walnut Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	35,531 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,553 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.59%
Medium Trucks:	77.1%	5.3%	17.6%	5.00%
Heavy Trucks:	86.3%	1.5%	12.2%	2.40%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	2.46	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-10.21	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-13.39	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	75.5	72.9	72.0	69.0	76.2	76.6
Medium Trucks:	73.5	71.5	65.9	66.4	73.8	74.0
Heavy Trucks:	74.3	72.8	61.3	65.6	73.7	73.8
Vehicle Noise:	79.2	77.2	73.2	72.0	79.5	79.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	360	775	1,671	3,600
CNEL:	375	808	1,742	3,752

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project | *Project Name:* MCH
Road Name: Euclid Av. | *Job Number:* 10351
Road Segment: n/o Riverside Dr.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,326 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,033 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.46%
Medium Trucks:	77.1%	5.3%	17.6%	5.05%
Heavy Trucks:	86.3%	1.5%	12.2%	2.49%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	1.77	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-10.86	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-13.93	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	74.8	72.2	71.3	68.3	75.5	75.9
Medium Trucks:	72.8	70.9	65.3	65.7	73.1	73.3
Heavy Trucks:	73.7	72.3	60.7	65.1	73.1	73.2
Vehicle Noise:	78.6	76.6	72.6	71.4	78.8	79.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	326	703	1,514	3,263
CNEL:	340	733	1,578	3,400

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project | *Project Name:* MCH
Road Name: Euclid Av. | *Job Number:* 10351
Road Segment: n/o Chino Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,662 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,066 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.49%
Medium Trucks:	77.1%	5.3%	17.6%	5.03%
Heavy Trucks:	86.3%	1.5%	12.2%	2.48%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	1.82	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-10.83	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-13.91	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	74.8	72.2	71.3	68.3	75.5	76.0
Medium Trucks:	72.8	70.9	65.3	65.8	73.2	73.4
Heavy Trucks:	73.8	72.3	60.7	65.1	73.2	73.2
Vehicle Noise:	78.7	76.6	72.6	71.4	78.9	79.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	328	707	1,523	3,282
CNEL:	342	737	1,587	3,420

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project — *Project Name:* MCH
Road Name: Euclid Av. — *Job Number:* 10351
Road Segment: n/o Schaefer Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	33,515 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,352 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.58%
Medium Trucks:	77.1%	5.3%	17.6%	5.00%
Heavy Trucks:	86.3%	1.5%	12.2%	2.42%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	2.21	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-10.47	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-13.61	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	75.2	72.6	71.7	68.7	75.9	76.3
Medium Trucks:	73.2	71.3	65.7	66.1	73.5	73.7
Heavy Trucks:	74.1	72.6	61.0	65.4	73.5	73.5
Vehicle Noise:	79.0	77.0	73.0	71.8	79.2	79.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	347	747	1,609	3,466
CNEL:	361	778	1,677	3,613

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project — *Project Name:* MCH
Road Name: Euclid Av. — *Job Number:* 10351
Road Segment: n/o Edison Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	35,847 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,585 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.63%
Medium Trucks:	77.1%	5.3%	17.6%	4.98%
Heavy Trucks:	86.3%	1.5%	12.2%	2.39%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	2.50	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-10.20	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-13.38	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	75.5	72.9	72.0	69.0	76.2	76.6
Medium Trucks:	73.5	71.6	66.0	66.4	73.8	74.0
Heavy Trucks:	74.3	72.9	61.3	65.6	73.7	73.8
Vehicle Noise:	79.3	77.3	73.3	72.0	79.5	79.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	361	779	1,678	3,614
CNEL:	377	812	1,749	3,768

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project — *Project Name:* MCH
Road Name: Euclid Av. — *Job Number:* 10351
Road Segment: n/o Eucalyptus Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	33,836 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,384 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.61%
Medium Trucks:	77.1%	5.3%	17.6%	4.98%
Heavy Trucks:	86.3%	1.5%	12.2%	2.41%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	2.25	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-10.44	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-13.59	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	75.3	72.7	71.8	68.8	76.0	76.4
Medium Trucks:	73.2	71.3	65.7	66.1	73.6	73.7
Heavy Trucks:	74.1	72.6	61.1	65.4	73.5	73.6
Vehicle Noise:	79.0	77.0	73.0	71.8	79.3	79.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	348	751	1,617	3,484
CNEL:	363	782	1,685	3,631

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project — *Project Name:* MCH
Road Name: Euclid Av. — *Job Number:* 10351
Road Segment: n/o Merrill Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,570 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,757 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.70%
Medium Trucks:	77.1%	5.3%	17.6%	4.94%
Heavy Trucks:	86.3%	1.5%	12.2%	2.36%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	2.71	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-10.02	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-13.23	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	75.7	73.1	72.2	69.2	76.4	76.8
Medium Trucks:	73.7	71.7	66.1	66.6	74.0	74.2
Heavy Trucks:	74.4	73.0	61.4	65.8	73.8	73.9
Vehicle Noise:	79.5	77.4	73.5	72.2	79.7	80.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	372	801	1,725	3,716
CNEL:	387	835	1,799	3,875

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project
Road Name: Euclid Av.
Road Segment: s/o Merrill Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 36,035 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 3,603 vehicles
Vehicle Speed: 55 mph
Near/Far Lane Distance: 154 feet

Site Data

Barrier Height: 0.0 feet
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 84.0 feet
Centerline Dist. to Observer: 84.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	92.68%
Medium Trucks:	77.1%	5.3%	17.6%	4.94%
Heavy Trucks:	86.3%	1.5%	12.2%	2.37%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos: 33.941
Medium Trucks: 33.679
Heavy Trucks: 33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	2.53	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-10.20	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-13.39	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.5	72.9	72.1	69.1	76.2	76.7
Medium Trucks:	73.5	71.5	65.9	66.4	73.8	74.0
Heavy Trucks:	74.3	72.8	61.3	65.6	73.7	73.8
Vehicle Noise:	79.3	77.3	73.3	72.0	79.5	79.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	362	780	1,680	3,619
CNEL:	377	813	1,751	3,773

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project
Road Name: Euclid Av.
Road Segment: n/o Kimball Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 35,621 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 3,562 vehicles
Vehicle Speed: 55 mph
Near/Far Lane Distance: 154 feet

Site Data

Barrier Height: 0.0 feet
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 84.0 feet
Centerline Dist. to Observer: 84.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	92.68%
Medium Trucks:	77.1%	5.3%	17.6%	4.94%
Heavy Trucks:	86.3%	1.5%	12.2%	2.38%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos: 33.941
Medium Trucks: 33.679
Heavy Trucks: 33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	2.48	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-10.25	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-13.43	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.5	72.9	72.0	69.0	76.2	76.6
Medium Trucks:	73.4	71.5	65.9	66.3	73.7	73.9
Heavy Trucks:	74.2	72.8	61.2	65.6	73.7	73.7
Vehicle Noise:	79.2	77.2	73.2	72.0	79.5	79.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	359	774	1,668	3,593
CNEL:	375	807	1,738	3,745

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project
Road Name: Euclid Av.
Road Segment: n/o Bickmore Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 23,421 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 2,342 vehicles
Vehicle Speed: 55 mph
Near/Far Lane Distance: 154 feet

Site Data

Barrier Height: 0.0 feet
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 84.0 feet
Centerline Dist. to Observer: 84.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	92.48%
Medium Trucks:	77.1%	5.3%	17.6%	5.00%
Heavy Trucks:	86.3%	1.5%	12.2%	2.53%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos: 33.941
Medium Trucks: 33.679
Heavy Trucks: 33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	0.65	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-12.03	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-14.99	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.6	71.1	70.2	67.2	74.4	74.8
Medium Trucks:	71.6	69.7	64.1	64.6	72.0	72.2
Heavy Trucks:	72.7	71.2	59.7	64.0	72.1	72.2
Vehicle Noise:	77.5	75.5	71.4	70.2	77.7	78.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	275	592	1,276	2,749
CNEL:	286	617	1,329	2,864

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project
Road Name: Archibald Av.
Road Segment: n/o Limonite Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 29,511 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 2,951 vehicles
Vehicle Speed: 55 mph
Near/Far Lane Distance: 154 feet

Site Data

Barrier Height: 0.0 feet
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 84.0 feet
Centerline Dist. to Observer: 84.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.44%
Medium Trucks:	77.1%	5.3%	17.6%	4.67%
Heavy Trucks:	86.3%	1.5%	12.2%	1.89%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos: 33.941
Medium Trucks: 33.679
Heavy Trucks: 33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	1.70	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-11.32	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-15.25	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.7	72.1	71.2	68.2	75.4	75.8
Medium Trucks:	72.4	70.4	64.8	65.3	72.7	72.9
Heavy Trucks:	72.4	71.0	59.4	63.7	71.8	71.9
Vehicle Noise:	78.1	76.0	72.3	70.9	78.4	78.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	303	653	1,406	3,030
CNEL:	317	682	1,469	3,165

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project
Road Name: Archibald Av.
Road Segment: s/o Limonite Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 28,057 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 2,806 vehicles
Vehicle Speed: 45 mph
Near/Far Lane Distance: 78 feet

Site Data

Barrier Height: 0.0 feet
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 76.0 feet
Centerline Dist. to Observer: 76.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.37%
Medium Trucks:	77.1%	5.3%	17.6%	4.66%
Heavy Trucks:	86.3%	1.5%	12.2%	1.97%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos: 65.422
Medium Trucks: 65.286
Heavy Trucks: 65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.35	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	79.45	-10.68	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.42	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.8	65.2	64.3	61.3	68.5	68.9
Medium Trucks:	65.7	63.8	58.2	58.7	66.1	66.2
Heavy Trucks:	66.8	65.4	53.8	58.1	66.2	66.3
Vehicle Noise:	71.6	69.6	65.5	64.4	71.8	72.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	101	217	467	1,006
CNEL:	105	226	486	1,048

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project
Road Name: Archibald Av.
Road Segment: s/o Schleisman Rd.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 24,178 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 2,418 vehicles
Vehicle Speed: 45 mph
Near/Far Lane Distance: 78 feet

Site Data

Barrier Height: 0.0 feet
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 76.0 feet
Centerline Dist. to Observer: 76.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.35%
Medium Trucks:	77.1%	5.3%	17.6%	4.71%
Heavy Trucks:	86.3%	1.5%	12.2%	1.95%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos: 65.422
Medium Trucks: 65.286
Heavy Trucks: 65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	1.70	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	79.45	-11.28	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-15.11	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.1	64.5	63.6	60.6	67.8	68.2
Medium Trucks:	65.1	63.2	57.6	58.0	65.5	65.6
Heavy Trucks:	66.1	64.7	53.1	57.4	65.5	65.6
Vehicle Noise:	71.0	69.0	64.9	63.7	71.2	71.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	91	196	423	911
CNEL:	95	204	440	949

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project
Road Name: Kimball Av.
Road Segment: w/o Mountain Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 22,859 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 2,286 vehicles
Vehicle Speed: 50 mph
Near/Far Lane Distance: 36 feet

Site Data

Barrier Height: 0.0 feet
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 44.0 feet
Centerline Dist. to Observer: 44.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.03%
Medium Trucks:	77.1%	5.3%	17.6%	4.75%
Heavy Trucks:	86.3%	1.5%	12.2%	2.22%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos: 40.460
Medium Trucks: 40.241
Heavy Trucks: 40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.98	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	81.00	-11.94	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-15.24	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.3	68.7	67.8	64.8	72.0	72.4
Medium Trucks:	69.2	67.3	61.7	62.1	69.5	69.7
Heavy Trucks:	70.2	68.8	57.2	61.6	69.7	69.7
Vehicle Noise:	75.1	73.1	69.0	67.8	75.3	75.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	99	214	461	993
CNEL:	103	223	480	1,035

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project
Road Name: Kimball Av.
Road Segment: w/o Euclid Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 24,497 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 2,450 vehicles
Vehicle Speed: 50 mph
Near/Far Lane Distance: 36 feet

Site Data

Barrier Height: 0.0 feet
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 44.0 feet
Centerline Dist. to Observer: 44.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.25%
Medium Trucks:	77.1%	5.3%	17.6%	4.75%
Heavy Trucks:	86.3%	1.5%	12.2%	1.99%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos: 40.460
Medium Trucks: 40.241
Heavy Trucks: 40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.29	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	81.00	-11.63	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-15.41	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.6	69.0	68.1	65.1	72.3	72.7
Medium Trucks:	69.5	67.6	62.0	62.4	69.8	70.0
Heavy Trucks:	70.1	68.6	57.1	61.4	69.5	69.6
Vehicle Noise:	75.2	73.2	69.3	68.0	75.5	75.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	102	220	474	1,021
CNEL:	107	229	494	1,065

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY With Project	*Project Name:*	MCH
Road Name:	Kimball Av.	*Job Number:*	10351
Road Segment:	e/o Euclid Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,520 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,052 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.43%
Medium Trucks:	77.1%	5.3%	17.6%	4.67%
Heavy Trucks:	86.3%	1.5%	12.2%	1.89%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	0.53	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-12.48	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-16.41	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.5	68.0	67.1	64.1	71.3	71.7
Medium Trucks:	68.4	66.4	60.8	61.3	68.7	68.9
Heavy Trucks:	68.8	67.4	55.8	60.1	68.2	68.3
Vehicle Noise:	74.1	72.1	68.3	66.9	74.4	74.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	96	207	445	959
CNEL:	100	216	465	1,001

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY With Project	*Project Name:*	MCH
Road Name:	Kimball Av.	*Job Number:*	10351
Road Segment:	w/o Rincon Meadows Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,382 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,138 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.43%
Medium Trucks:	77.1%	5.3%	17.6%	4.68%
Heavy Trucks:	86.3%	1.5%	12.2%	1.89%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	0.71	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-12.30	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-16.23	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.7	68.1	67.3	64.3	71.4	71.9
Medium Trucks:	68.5	66.6	61.0	61.5	68.9	69.1
Heavy Trucks:	69.0	67.6	56.0	60.3	68.4	68.5
Vehicle Noise:	74.3	72.3	68.4	67.1	74.6	74.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	99	212	458	986
CNEL:	103	222	478	1,029

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY With Project	*Project Name:*	MCH
Road Name:	Kimball Av.	*Job Number:*	10351
Road Segment:	e/o Rincon Meadows Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,523 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,052 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.43%
Medium Trucks:	77.1%	5.3%	17.6%	4.67%
Heavy Trucks:	86.3%	1.5%	12.2%	1.89%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	0.53	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-12.48	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-16.40	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.5	68.0	67.1	64.1	71.3	71.7
Medium Trucks:	68.4	66.4	60.8	61.3	68.7	68.9
Heavy Trucks:	68.8	67.4	55.8	60.1	68.2	68.3
Vehicle Noise:	74.1	72.1	68.3	66.9	74.4	74.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	96	207	445	960
CNEL:	100	216	465	1,001

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	OY With Project	*Project Name:*	MCH
Road Name:	Kimball Av.	*Job Number:*	10351
Road Segment:	e/o Mill Creek Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,680 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,868 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.44%
Medium Trucks:	77.1%	5.3%	17.6%	4.67%
Heavy Trucks:	86.3%	1.5%	12.2%	1.89%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	0.12	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-12.89	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-16.81	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.1	67.6	66.7	63.7	70.8	71.3
Medium Trucks:	68.0	66.0	60.4	60.9	68.3	68.5
Heavy Trucks:	68.4	67.0	55.4	59.7	67.8	67.9
Vehicle Noise:	73.7	71.7	67.8	66.5	74.0	74.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	90	194	418	901
CNEL:	94	203	436	940

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project — *Project Name:* MCH
Road Name: Kimball Av. — *Job Number:* 10351
Road Segment: e/o Main St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,579 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,758 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.44%
Medium Trucks:	77.1%	5.3%	17.6%	4.67%
Heavy Trucks:	86.3%	1.5%	12.2%	1.89%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-0.14	1.01	-1.20	*-4.64*	0.000	0.000
Medium Trucks:	81.00	-13.15	1.04	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-17.08	1.04	-1.20	*-5.44*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.9	67.3	66.4	63.4	70.6	71.0
Medium Trucks:	67.7	65.8	60.2	60.6	68.0	68.2
Heavy Trucks:	68.1	66.7	55.1	59.5	67.6	67.6
Vehicle Noise:	73.4	71.4	67.6	66.3	73.7	74.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	87	186	402	865
CNEL:	90	195	419	903

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project — *Project Name:* MCH
Road Name: Kimball Av. — *Job Number:* 10351
Road Segment: e/o Flight Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,803 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,480 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.41%
Medium Trucks:	77.1%	5.3%	17.6%	4.69%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-0.89	1.01	-1.20	*-4.64*	0.000	0.000
Medium Trucks:	81.00	-13.88	1.04	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-17.81	1.04	-1.20	*-5.44*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.1	66.5	65.7	62.7	69.8	70.3
Medium Trucks:	67.0	65.0	59.4	59.9	67.3	67.5
Heavy Trucks:	67.4	66.0	54.4	58.7	66.8	66.9
Vehicle Noise:	72.7	70.7	66.8	65.5	73.0	73.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	77	166	359	773
CNEL:	81	174	374	806

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project — *Project Name:* MCH
Road Name: Limonite Av. — *Job Number:* 10351
Road Segment: w/o Archibald Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	1 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	0 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.41%
Medium Trucks:	77.1%	5.3%	17.6%	4.69%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-42.59	-1.85	-1.20	*-4.73*	0.000	0.000
Medium Trucks:	81.00	-55.58	-1.84	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-59.51	-1.84	-1.20	*-5.25*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	24.6	22.0	21.1	18.1	25.3	25.7
Medium Trucks:	22.4	20.5	14.9	15.3	22.7	22.9
Heavy Trucks:	22.8	21.4	9.8	14.1	22.2	22.3
Vehicle Noise:	28.1	26.1	22.3	20.9	28.4	28.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	0	0	1	1
CNEL:	0	0	1	1

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project — *Project Name:* MCH
Road Name: Limonite Av. — *Job Number:* 10351
Road Segment: e/o Archibald Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,688 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,269 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.32%
Medium Trucks:	77.1%	5.3%	17.6%	4.68%
Heavy Trucks:	86.3%	1.5%	12.2%	2.00%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	0.96	-1.85	-1.20	*-4.73*	0.000	0.000
Medium Trucks:	81.00	-12.03	-1.84	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-15.73	-1.84	-1.20	*-5.25*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.1	65.5	64.6	61.6	68.8	69.2
Medium Trucks:	65.9	64.0	58.4	58.8	66.2	66.4
Heavy Trucks:	66.6	65.2	53.6	57.9	66.0	66.1
Vehicle Noise:	71.7	69.7	65.8	64.5	72.0	72.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	103	222	479	1,032
CNEL:	108	232	500	1,077

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project
Road Name: Pine Av.
Road Segment: w/o El Prado Rd.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.41%
Medium Trucks:	77.1%	5.3%	17.6%	4.69%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-27.82	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-40.81	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-44.74	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	39.8	37.2	36.3	33.3	40.5	40.9
Medium Trucks:	37.8	35.9	30.3	30.7	38.1	38.3
Heavy Trucks:	38.7	37.2	25.7	30.0	38.1	38.2
Vehicle Noise:	43.6	41.6	37.6	36.4	43.8	44.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	1	2	5	11
CNEL:	1	2	5	11

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project
Road Name: Pine Av.
Road Segment: w/o Euclid Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,446 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	845 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	92.46%
Medium Trucks:	77.1%	5.3%	17.6%	4.94%
Heavy Trucks:	86.3%	1.5%	12.2%	2.60%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.91	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-15.64	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-18.42	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	64.7	62.1	61.2	58.2	65.4	65.8
Medium Trucks:	63.0	61.1	55.5	55.9	63.3	63.5
Heavy Trucks:	65.0	63.6	52.0	56.3	64.4	64.5
Vehicle Noise:	69.1	67.1	62.6	61.7	69.2	69.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	53	115	247	533
CNEL:	55	119	257	554

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project
Road Name: Pine Av.
Road Segment: e/o Euclid Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,889 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,989 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.35%
Medium Trucks:	77.1%	5.3%	17.6%	4.65%
Heavy Trucks:	86.3%	1.5%	12.2%	2.00%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.62	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-10.40	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.08	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.2	67.6	66.7	63.7	70.9	71.4
Medium Trucks:	68.2	66.3	60.7	61.1	68.5	68.7
Heavy Trucks:	69.3	67.9	56.3	60.7	68.8	68.8
Vehicle Noise:	74.1	72.1	68.0	66.8	74.3	74.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	116	251	540	1,164
CNEL:	121	261	563	1,213

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project
Road Name: Pine Av.
Road Segment: w/o Chino Corona Rd.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	33,928 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,393 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.36%
Medium Trucks:	77.1%	5.3%	17.6%	4.66%
Heavy Trucks:	86.3%	1.5%	12.2%	1.98%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.17	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-9.85	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-13.56	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.8	68.2	67.3	64.3	71.5	71.9
Medium Trucks:	68.8	66.8	61.2	61.7	69.1	69.3
Heavy Trucks:	69.9	68.4	56.9	61.2	69.3	69.3
Vehicle Noise:	74.6	72.6	68.6	67.4	74.9	75.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	127	273	587	1,266
CNEL:	132	284	612	1,319

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project | *Project Name:* MCH
Road Name: Pine Av. | *Job Number:* 10351
Road Segment: w/o W. Preserve Loop

SITE SPECIFIC INPUT DATA	
Highway Data	
Average Daily Traffic (Adt):	19,546 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,955 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet
Site Data	
Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS				
Site Conditions (Hard = 10, Soft = 15)				
Autos:	15			
Medium Trucks (2 Axles):	15			
Heavy Trucks (3+ Axles):	15			
Vehicle Mix				
VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.31%
Medium Trucks:	77.1%	5.3%	17.6%	4.64%
Heavy Trucks:	86.3%	1.5%	12.2%	2.05%
Noise Source Elevations (in feet)				
Autos:	0.000			
Medium Trucks:	2.297			
Heavy Trucks:	8.004	Grade Adjustment: 0.0		
Lane Equivalent Distance (in feet)				
Autos:	46.701			
Medium Trucks:	46.511			
Heavy Trucks:	46.530			

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	0.77	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-12.26	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-15.81	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.4	65.8	64.9	61.9	69.1	69.5
Medium Trucks:	66.4	64.4	58.8	59.3	66.7	66.9
Heavy Trucks:	67.6	66.2	54.6	58.9	67.0	67.1
Vehicle Noise:	72.3	70.3	66.2	65.0	72.5	72.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	88	190	409	881
CNEL:	92	198	426	918

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project | *Project Name:* MCH
Road Name: Pine Av. | *Job Number:* 10351
Road Segment: w/o E. Preserve Loop

SITE SPECIFIC INPUT DATA	
Highway Data	
Average Daily Traffic (Adt):	30,996 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,100 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet
Site Data	
Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS				
Site Conditions (Hard = 10, Soft = 15)				
Autos:	15			
Medium Trucks (2 Axles):	15			
Heavy Trucks (3+ Axles):	15			
Vehicle Mix				
VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.35%
Medium Trucks:	77.1%	5.3%	17.6%	4.66%
Heavy Trucks:	86.3%	1.5%	12.2%	1.99%
Noise Source Elevations (in feet)				
Autos:	0.000			
Medium Trucks:	2.297			
Heavy Trucks:	8.004	Grade Adjustment: 0.0		
Lane Equivalent Distance (in feet)				
Autos:	46.701			
Medium Trucks:	46.511			
Heavy Trucks:	46.530			

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.78	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-10.24	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-13.93	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.4	67.8	66.9	63.9	71.1	71.5
Medium Trucks:	68.4	66.5	60.9	61.3	68.7	68.9
Heavy Trucks:	69.5	68.1	56.5	60.8	68.9	69.0
Vehicle Noise:	74.3	72.3	68.2	67.0	74.5	74.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	119	257	554	1,193
CNEL:	124	268	577	1,243

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project | *Project Name:* MCH
Road Name: Pine Av. | *Job Number:* 10351
Road Segment: w/o Hellman Av.

SITE SPECIFIC INPUT DATA	
Highway Data	
Average Daily Traffic (Adt):	30,426 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,043 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet
Site Data	
Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS				
Site Conditions (Hard = 10, Soft = 15)				
Autos:	15			
Medium Trucks (2 Axles):	15			
Heavy Trucks (3+ Axles):	15			
Vehicle Mix				
VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.34%
Medium Trucks:	77.1%	5.3%	17.6%	4.66%
Heavy Trucks:	86.3%	1.5%	12.2%	2.00%
Noise Source Elevations (in feet)				
Autos:	0.000			
Medium Trucks:	2.297			
Heavy Trucks:	8.004	Grade Adjustment: 0.0		
Lane Equivalent Distance (in feet)				
Autos:	46.701			
Medium Trucks:	46.511			
Heavy Trucks:	46.530			

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.70	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-10.32	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.00	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.3	67.7	66.8	63.8	71.0	71.4
Medium Trucks:	68.3	66.4	60.8	61.2	68.6	68.8
Heavy Trucks:	69.4	68.0	56.4	60.7	68.8	68.9
Vehicle Noise:	74.2	72.2	68.1	66.9	74.4	74.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	118	254	547	1,178
CNEL:	123	264	570	1,228

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY With Project | *Project Name:* MCH
Road Name: Schleisman Rd. | *Job Number:* 10351
Road Segment: w/o Archibald Av.

SITE SPECIFIC INPUT DATA	
Highway Data	
Average Daily Traffic (Adt):	32,852 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,285 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet
Site Data	
Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS				
Site Conditions (Hard = 10, Soft = 15)				
Autos:	15			
Medium Trucks (2 Axles):	15			
Heavy Trucks (3+ Axles):	15			
Vehicle Mix				
VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.33%
Medium Trucks:	77.1%	5.3%	17.6%	4.67%
Heavy Trucks:	86.3%	1.5%	12.2%	1.99%
Noise Source Elevations (in feet)				
Autos:	0.000			
Medium Trucks:	2.297			
Heavy Trucks:	8.004	Grade Adjustment: 0.0		
Lane Equivalent Distance (in feet)				
Autos:	65.422			
Medium Trucks:	65.286			
Heavy Trucks:	65.299			

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.03	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	79.45	-9.98	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-13.68	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.4	65.9	65.0	62.0	69.1	69.6
Medium Trucks:	66.4	64.5	58.9	59.3	66.8	66.9
Heavy Trucks:	67.5	66.1	54.5	58.9	67.0	67.0
Vehicle Noise:	72.3	70.3	66.2	65.1	72.5	72.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	112	241	520	1,120
CNEL:	117	251	542	1,167

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: Central Av.
Road Segment: n/o El Prado Rd.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 33,180 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 3,318 vehicles
Vehicle Speed: 45 mph
Near/Far Lane Distance: 76 feet

Site Data

Barrier Height: 0.0 feet
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 60.0 feet
Centerline Dist. to Observer: 60.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos: 46.701
Medium Trucks: 46.511
Heavy Trucks: 46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.07	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-9.91	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-13.84	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.7	68.1	67.2	64.2	71.4	71.8
Medium Trucks:	68.7	66.8	61.2	61.6	69.0	69.2
Heavy Trucks:	69.6	68.1	56.6	60.9	69.0	69.1
Vehicle Noise:	74.5	72.5	68.5	67.3	74.7	75.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	124	267	575	1,240
CNEL:	129	278	600	1,292

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: Central Av.
Road Segment: s/o El Prado Rd.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 39,805 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 3,981 vehicles
Vehicle Speed: 45 mph
Near/Far Lane Distance: 78 feet

Site Data

Barrier Height: 0.0 feet
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 60.0 feet
Centerline Dist. to Observer: 60.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos: 45.869
Medium Trucks: 45.676
Heavy Trucks: 45.695

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.87	0.46	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-9.12	0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-13.05	0.48	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.6	69.0	68.1	65.1	72.3	72.7
Medium Trucks:	69.6	67.7	62.1	62.5	69.9	70.1
Heavy Trucks:	70.5	69.1	57.5	61.8	69.9	70.0
Vehicle Noise:	75.4	73.4	69.4	68.2	75.6	75.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	143	307	661	1,425
CNEL:	149	320	689	1,485

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: El Prado Rd.
Road Segment: n/o Kimball Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 28,632 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 2,863 vehicles
Vehicle Speed: 45 mph
Near/Far Lane Distance: 36 feet

Site Data

Barrier Height: 0.0 feet
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 44.0 feet
Centerline Dist. to Observer: 44.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos: 40.460
Medium Trucks: 40.241
Heavy Trucks: 40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.43	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	79.45	-10.55	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-14.48	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.0	68.4	67.5	64.5	71.7	72.1
Medium Trucks:	69.0	67.1	61.5	61.9	69.3	69.5
Heavy Trucks:	69.9	68.4	56.9	61.2	69.3	69.4
Vehicle Noise:	74.8	72.8	68.8	67.6	75.0	75.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	95	205	442	952
CNEL:	99	214	460	992

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: Euclid Av.
Road Segment: n/o Walnut Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 52,793 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 5,279 vehicles
Vehicle Speed: 55 mph
Near/Far Lane Distance: 154 feet

Site Data

Barrier Height: 0.0 feet
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 84.0 feet
Centerline Dist. to Observer: 84.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos: 33.941
Medium Trucks: 33.679
Heavy Trucks: 33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	4.22	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-8.76	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-12.70	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	77.2	74.6	73.8	70.8	77.9	78.4
Medium Trucks:	74.9	73.0	67.4	67.8	75.2	75.4
Heavy Trucks:	75.0	73.5	62.0	66.3	74.4	74.4
Vehicle Noise:	80.6	78.5	74.9	73.5	80.9	81.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	447	964	2,077	4,474
CNEL:	467	1,007	2,169	4,674

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project *Project Name:* MCH
Road Name: Euclid Av. *Job Number:* 10351
Road Segment: n/o Riverside Dr.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	45,572 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,557 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	3.58	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-9.40	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-13.33	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	76.6	74.0	73.1	70.1	77.3	77.7
Medium Trucks:	74.3	72.3	66.7	67.2	74.6	74.8
Heavy Trucks:	74.3	72.9	61.3	65.6	73.7	73.8
Vehicle Noise:	80.0	77.9	74.2	72.8	80.3	80.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	406	874	1,883	4,056
CNEL:	424	913	1,967	4,237

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project *Project Name:* MCH
Road Name: Euclid Av. *Job Number:* 10351
Road Segment: n/o Chino Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	49,051 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,905 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	3.90	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-9.08	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-13.01	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	76.9	74.3	73.4	70.4	77.6	78.0
Medium Trucks:	74.6	72.7	67.1	67.5	74.9	75.1
Heavy Trucks:	74.6	73.2	61.6	66.0	74.1	74.1
Vehicle Noise:	80.3	78.2	74.6	73.1	80.6	80.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	426	918	1,977	4,260
CNEL:	445	959	2,066	4,450

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project *Project Name:* MCH
Road Name: Euclid Av. *Job Number:* 10351
Road Segment: n/o Schaefer Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	49,457 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,946 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	3.94	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-9.05	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-12.98	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	76.9	74.4	73.5	70.5	77.7	78.1
Medium Trucks:	74.6	72.7	67.1	67.5	74.9	75.1
Heavy Trucks:	74.7	73.3	61.7	66.0	74.1	74.2
Vehicle Noise:	80.3	78.3	74.6	73.2	80.6	80.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	428	923	1,988	4,284
CNEL:	447	964	2,077	4,475

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project *Project Name:* MCH
Road Name: Euclid Av. *Job Number:* 10351
Road Segment: n/o Edison Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	52,051 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,205 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	4.16	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-8.82	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-12.76	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	77.2	74.6	73.7	70.7	77.9	78.3
Medium Trucks:	74.9	72.9	67.3	67.8	75.2	75.4
Heavy Trucks:	74.9	73.5	61.9	66.2	74.3	74.4
Vehicle Noise:	80.5	78.5	74.8	73.4	80.8	81.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	443	955	2,057	4,432
CNEL:	463	998	2,149	4,630

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: Euclid Av.
Road Segment: n/o Eucalyptus Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	47,542 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,754 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	3.77	2.42	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	82.40	-9.22	2.47	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-13.15	2.47	-1.20	*-5.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	76.8	74.2	73.3	70.3	77.5	77.9
Medium Trucks:	74.5	72.5	66.9	67.4	74.8	75.0
Heavy Trucks:	74.5	73.1	61.5	65.8	73.9	74.0
Vehicle Noise:	80.2	78.1	74.4	73.0	80.4	80.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	417	899	1,937	4,172
CNEL:	436	939	2,023	4,359

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: Euclid Av.
Road Segment: n/o Merrill Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	47,149 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,715 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	3.73	2.42	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	82.40	-9.25	2.47	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-13.19	2.47	-1.20	*-5.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	76.7	74.2	73.3	70.3	77.4	77.9
Medium Trucks:	74.4	72.5	66.9	67.3	74.7	74.9
Heavy Trucks:	74.5	73.0	61.5	65.8	73.9	74.0
Vehicle Noise:	80.1	78.1	74.4	73.0	80.4	80.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	415	894	1,926	4,149
CNEL:	433	934	2,012	4,335

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: Euclid Av.
Road Segment: s/o Merrill Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	49,987 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,999 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	3.98	2.42	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	82.40	-9.00	2.47	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-12.93	2.47	-1.20	*-5.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	77.0	74.4	73.5	70.5	77.7	78.1
Medium Trucks:	74.7	72.7	67.1	67.6	75.0	75.2
Heavy Trucks:	74.7	73.3	61.7	66.1	74.1	74.2
Vehicle Noise:	80.4	78.3	74.6	73.2	80.7	80.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	431	929	2,003	4,314
CNEL:	451	971	2,092	4,507

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: Euclid Av.
Road Segment: n/o Kimball Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	49,377 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,938 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	3.93	2.42	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	82.40	-9.05	2.47	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-12.99	2.47	-1.20	*-5.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	76.9	74.4	73.5	70.5	77.6	78.1
Medium Trucks:	74.6	72.7	67.1	67.5	74.9	75.1
Heavy Trucks:	74.7	73.2	61.7	66.0	74.1	74.2
Vehicle Noise:	80.3	78.3	74.6	73.2	80.6	80.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	428	922	1,986	4,279
CNEL:	447	963	2,075	4,470

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project — *Project Name:* MCH
Road Name: Euclid Av. — *Job Number:* 10351
Road Segment: n/o Bickmore Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	36,945 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,695 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	2.67	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-10.31	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-14.25	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.7	73.1	72.2	69.2	76.4	76.8
Medium Trucks:	73.4	71.4	65.8	66.3	73.7	73.9
Heavy Trucks:	73.4	72.0	60.4	64.7	72.8	72.9
Vehicle Noise:	79.1	77.0	73.3	71.9	79.3	79.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	353	760	1,637	3,527
CNEL:	368	794	1,710	3,684

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project — *Project Name:* MCH
Road Name: Archibald Av. — *Job Number:* 10351
Road Segment: n/o Limonite Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	46,489 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,649 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	3.67	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-9.31	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-13.25	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	76.7	74.1	73.2	70.2	77.4	77.8
Medium Trucks:	74.4	72.4	66.8	67.3	74.7	74.9
Heavy Trucks:	74.4	73.0	61.4	65.7	73.8	73.9
Vehicle Noise:	80.1	78.0	74.3	72.9	80.3	80.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	411	886	1,908	4,111
CNEL:	429	925	1,993	4,294

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project — *Project Name:* MCH
Road Name: Archibald Av. — *Job Number:* 10351
Road Segment: s/o Limonite Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	36,298 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,630 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.46	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	79.45	-9.52	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-13.45	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.9	66.3	65.4	62.4	69.6	70.0
Medium Trucks:	66.9	65.0	59.4	59.8	67.2	67.4
Heavy Trucks:	67.8	66.3	54.7	59.1	67.2	67.2
Vehicle Noise:	72.7	70.7	66.7	65.4	72.9	73.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	119	256	552	1,189
CNEL:	124	267	575	1,239

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project — *Project Name:* MCH
Road Name: Archibald Av. — *Job Number:* 10351
Road Segment: s/o Schleisman Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,702 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,770 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.29	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	79.45	-10.69	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.62	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.7	65.1	64.2	61.2	68.4	68.8
Medium Trucks:	65.7	63.8	58.2	58.6	66.0	66.2
Heavy Trucks:	66.6	65.2	53.6	57.9	66.0	66.1
Vehicle Noise:	71.5	69.5	65.5	64.3	71.7	72.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	99	214	461	993
CNEL:	103	223	480	1,035

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project — *Project Name:* MCH
Road Name: Kimball Av. — *Job Number:* 10351
Road Segment: w/o Mountain Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,744 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,274 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.98	1.28	-1.20	*-4.61*	0.000	0.000
Medium Trucks:	81.00	-12.01	1.31	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-15.94	1.31	-1.20	*-5.50*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.3	68.7	67.8	64.8	72.0	72.4
Medium Trucks:	69.1	67.2	61.6	62.0	69.4	69.6
Heavy Trucks:	69.5	68.1	56.5	60.9	69.0	69.0
Vehicle Noise:	74.8	72.8	69.0	67.7	75.1	75.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	96	207	447	963
CNEL:	100	216	466	1,005

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project — *Project Name:* MCH
Road Name: Kimball Av. — *Job Number:* 10351
Road Segment: w/o Euclid Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,863 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,986 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.16	1.28	-1.20	*-4.61*	0.000	0.000
Medium Trucks:	81.00	-10.82	1.31	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-14.76	1.31	-1.20	*-5.50*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.4	69.9	69.0	66.0	73.2	73.6
Medium Trucks:	70.3	68.4	62.8	63.2	70.6	70.8
Heavy Trucks:	70.7	69.3	57.7	62.1	70.1	70.2
Vehicle Noise:	76.0	74.0	70.2	68.8	76.3	76.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	115	249	536	1,155
CNEL:	120	260	559	1,205

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project — *Project Name:* MCH
Road Name: Kimball Av. — *Job Number:* 10351
Road Segment: e/o Euclid Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,348 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,435 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.27	1.01	-1.20	*-4.64*	0.000	0.000
Medium Trucks:	81.00	-11.71	1.04	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-15.64	1.04	-1.20	*-5.44*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.3	68.7	67.8	64.8	72.0	72.4
Medium Trucks:	69.1	67.2	61.6	62.0	69.5	69.6
Heavy Trucks:	69.6	68.1	56.6	60.9	69.0	69.1
Vehicle Noise:	74.9	72.8	69.0	67.7	75.1	75.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	108	232	500	1,077
CNEL:	112	242	522	1,124

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project — *Project Name:* MCH
Road Name: Kimball Av. — *Job Number:* 10351
Road Segment: w/o Rincon Meadows Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,356 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,236 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.90	1.01	-1.20	*-4.64*	0.000	0.000
Medium Trucks:	81.00	-12.08	1.04	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	85.38	-16.01	1.04	-1.20	*-5.44*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.9	68.3	67.4	64.4	71.6	72.1
Medium Trucks:	68.8	66.8	61.2	61.7	69.1	69.3
Heavy Trucks:	69.2	67.8	56.2	60.5	68.6	68.7
Vehicle Noise:	74.5	72.5	68.6	67.3	74.8	75.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	102	219	472	1,018
CNEL:	106	229	493	1,062

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: Kimball Av.
Road Segment: e/o Rincon Meadows Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	21,454 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,145 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	0.72	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-12.26	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-16.19	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.7	68.2	67.3	64.3	71.5	71.9
Medium Trucks:	68.6	66.7	61.1	61.5	68.9	69.1
Heavy Trucks:	69.0	67.6	56.0	60.3	68.4	68.5
Vehicle Noise:	74.3	72.3	68.5	67.1	74.6	74.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	99	213	460	990
CNEL:	103	223	480	1,033

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: Kimball Av.
Road Segment: e/o Mill Creek Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,521 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,952 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	0.31	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-12.67	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-16.60	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.3	67.8	66.9	63.9	71.0	71.5
Medium Trucks:	68.2	66.2	60.6	61.1	68.5	68.7
Heavy Trucks:	68.6	67.2	55.6	59.9	68.0	68.1
Vehicle Noise:	73.9	71.9	68.0	66.7	74.2	74.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	93	200	432	930
CNEL:	97	209	450	970

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: Kimball Av.
Road Segment: e/o Main St.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,365 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,837 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	0.05	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-12.93	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-16.87	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.1	67.5	66.6	63.6	70.8	71.2
Medium Trucks:	67.9	66.0	60.4	60.8	68.2	68.4
Heavy Trucks:	68.4	66.9	55.3	59.7	67.8	67.8
Vehicle Noise:	73.6	71.6	67.8	66.5	73.9	74.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	89	192	414	893
CNEL:	93	201	432	931

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: Kimball Av.
Road Segment: e/o Flight Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,529 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,553 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	-0.68	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-13.66	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-17.60	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.3	66.8	65.9	62.9	70.0	70.5
Medium Trucks:	67.2	65.3	59.7	60.1	67.5	67.7
Heavy Trucks:	67.6	66.2	54.6	58.9	67.0	67.1
Vehicle Noise:	72.9	70.9	67.1	65.7	73.2	73.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	80	172	370	798
CNEL:	83	179	387	833

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: Limonite Av.
Road Segment: w/o Archibald Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA	
Highway Data	
Average Daily Traffic (Adt):	27,217 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,722 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	78 feet
Site Data	
Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)	
Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)		
Autos:	0.000	
Medium Trucks:	2.297	
Heavy Trucks:	8.004	*Grade Adjustment:* 0.0

Lane Equivalent Distance (in feet)	
Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.76	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	81.00	-11.23	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-15.16	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.9	66.3	65.4	62.4	69.6	70.0
Medium Trucks:	66.7	64.8	59.2	59.6	67.1	67.2
Heavy Trucks:	67.2	65.7	54.2	58.5	66.6	66.7
Vehicle Noise:	72.5	70.4	66.6	65.3	72.7	73.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	116	249	537	1,158
CNEL:	121	260	561	1,208

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: Limonite Av.
Road Segment: e/o Archibald Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA	
Highway Data	
Average Daily Traffic (Adt):	43,320 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,332 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	78 feet
Site Data	
Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)	
Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)		
Autos:	0.000	
Medium Trucks:	2.297	
Heavy Trucks:	8.004	*Grade Adjustment:* 0.0

Lane Equivalent Distance (in feet)	
Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	3.78	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	81.00	-9.21	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-13.14	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.9	68.3	67.5	64.5	71.6	72.1
Medium Trucks:	68.8	66.8	61.2	61.7	69.1	69.3
Heavy Trucks:	69.2	67.8	56.2	60.5	68.6	68.7
Vehicle Noise:	74.5	72.5	68.6	67.3	74.8	75.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	158	340	732	1,578
CNEL:	165	355	764	1,647

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: Pine Av.
Road Segment: w/o El Prado Rd.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA	
Highway Data	
Average Daily Traffic (Adt):	27,780 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,778 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet
Site Data	
Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)	
Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)		
Autos:	0.000	
Medium Trucks:	2.297	
Heavy Trucks:	8.004	*Grade Adjustment:* 0.0

Lane Equivalent Distance (in feet)	
Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.30	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-10.68	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.61	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.9	67.3	66.4	63.4	70.6	71.0
Medium Trucks:	67.9	66.0	60.4	60.9	68.3	68.4
Heavy Trucks:	68.8	67.4	55.8	60.1	68.2	68.3
Vehicle Noise:	73.7	71.7	67.7	66.5	74.0	74.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	110	237	511	1,101
CNEL:	115	247	533	1,148

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: Pine Av.
Road Segment: w/o Euclid Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA	
Highway Data	
Average Daily Traffic (Adt):	25,288 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,529 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet
Site Data	
Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)	
Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)		
Autos:	0.000	
Medium Trucks:	2.297	
Heavy Trucks:	8.004	*Grade Adjustment:* 0.0

Lane Equivalent Distance (in feet)	
Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	1.90	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-11.09	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-15.02	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.5	66.9	66.0	63.0	70.2	70.6
Medium Trucks:	67.5	65.6	60.0	60.4	67.8	68.0
Heavy Trucks:	68.4	67.0	55.4	59.7	67.8	67.9
Vehicle Noise:	73.3	71.3	67.3	66.1	73.5	73.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	103	223	480	1,034
CNEL:	108	232	500	1,078

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: Pine Av.
Road Segment: e/o Euclid Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 37,279 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 3,728 vehicles
Vehicle Speed: 45 mph
Near/Far Lane Distance: 76 feet

Site Data

Barrier Height: 0.0 feet
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 60.0 feet
Centerline Dist. to Observer: 60.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004
Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos: 46.701
Medium Trucks: 46.511
Heavy Trucks: 46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.58	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-9.40	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-13.34	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.2	68.6	67.7	64.7	71.9	72.3
Medium Trucks:	69.2	67.3	61.7	62.1	69.5	69.7
Heavy Trucks:	70.1	68.7	57.1	61.4	69.5	69.6
Vehicle Noise:	75.0	73.0	69.0	67.8	75.2	75.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	134	289	622	1,340
CNEL:	140	301	648	1,396

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: Pine Av.
Road Segment: w/o Chino Corona Rd.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 36,277 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 3,628 vehicles
Vehicle Speed: 45 mph
Near/Far Lane Distance: 76 feet

Site Data

Barrier Height: 0.0 feet
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 60.0 feet
Centerline Dist. to Observer: 60.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004
Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos: 46.701
Medium Trucks: 46.511
Heavy Trucks: 46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.46	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-9.52	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-13.45	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.1	68.5	67.6	64.6	71.8	72.2
Medium Trucks:	69.1	67.2	61.6	62.0	69.4	69.6
Heavy Trucks:	70.0	68.5	57.0	61.3	69.4	69.4
Vehicle Noise:	74.9	72.9	68.9	67.6	75.1	75.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	132	283	611	1,316
CNEL:	137	295	636	1,371

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: Pine Av.
Road Segment: w/o W. Preserve Loop

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 19,507 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 1,951 vehicles
Vehicle Speed: 45 mph
Near/Far Lane Distance: 76 feet

Site Data

Barrier Height: 0.0 feet
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 60.0 feet
Centerline Dist. to Observer: 60.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004
Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos: 46.701
Medium Trucks: 46.511
Heavy Trucks: 46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	0.77	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-12.21	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-16.15	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.4	65.8	64.9	61.9	69.1	69.5
Medium Trucks:	66.4	64.5	58.9	59.3	66.7	66.9
Heavy Trucks:	67.3	65.8	54.3	58.6	66.7	66.8
Vehicle Noise:	72.2	70.2	66.2	65.0	72.4	72.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	87	187	404	870
CNEL:	91	195	421	907

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: Pine Av.
Road Segment: w/o E. Preserve Loop

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 31,519 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 3,152 vehicles
Vehicle Speed: 45 mph
Near/Far Lane Distance: 76 feet

Site Data

Barrier Height: 0.0 feet
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 60.0 feet
Centerline Dist. to Observer: 60.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004
Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos: 46.701
Medium Trucks: 46.511
Heavy Trucks: 46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.85	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-10.13	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.06	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.5	67.9	67.0	64.0	71.2	71.6
Medium Trucks:	68.5	66.6	61.0	61.4	68.8	69.0
Heavy Trucks:	69.4	67.9	56.3	60.7	68.8	68.8
Vehicle Noise:	74.3	72.3	68.2	67.0	74.5	74.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	120	258	556	1,198
CNEL:	125	269	579	1,248

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: Pine Av.
Road Segment: w/o Hellman Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,920 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,092 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.77	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-10.21	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-14.15	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.4	67.8	66.9	63.9	71.1	71.5
Medium Trucks:	68.4	66.5	60.9	61.3	68.7	68.9
Heavy Trucks:	69.3	67.8	56.3	60.6	68.7	68.8
Vehicle Noise:	74.2	72.2	68.2	67.0	74.4	74.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	118	255	549	1,183
CNEL:	123	266	572	1,233

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY Without Project
Road Name: Schleisman Rd.
Road Segment: w/o Archibald Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	38,337 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,834 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.3%	13.5%	20.3%	93.40%
Medium Trucks:	77.0%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	3.70	-1.85	-1.20	*-4.73*	0.000	0.000
Medium Trucks:	79.45	-9.28	-1.84	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-13.21	-1.84	-1.20	*-5.25*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.1	66.5	65.6	62.6	69.8	70.2
Medium Trucks:	67.1	65.2	59.6	60.0	67.4	67.6
Heavy Trucks:	68.0	66.6	55.0	59.3	67.4	67.5
Vehicle Noise:	72.9	70.9	66.9	65.7	73.2	73.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	123	266	572	1,233
CNEL:	128	277	596	1,285

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project
Road Name: Central Av.
Road Segment: n/o El Prado Rd.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	33,535 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,354 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.47%
Medium Trucks:	77.1%	5.3%	17.6%	4.65%
Heavy Trucks:	86.3%	1.5%	12.2%	1.88%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	3.12	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-9.91	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-13.84	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.7	68.1	67.3	64.3	71.4	71.9
Medium Trucks:	68.7	66.8	61.2	61.6	69.0	69.2
Heavy Trucks:	69.6	68.1	56.6	60.9	69.0	69.1
Vehicle Noise:	74.5	72.5	68.5	67.3	74.7	75.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	124	268	577	1,244
CNEL:	130	279	602	1,296

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project
Road Name: Central Av.
Road Segment: s/o El Prado Rd.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	40,021 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,002 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.44%
Medium Trucks:	77.1%	5.3%	17.6%	4.67%
Heavy Trucks:	86.3%	1.5%	12.2%	1.89%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	45.869
Medium Trucks:	45.676
Heavy Trucks:	45.695

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	3.89	0.46	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-9.12	0.49	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-13.05	0.48	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.6	69.0	68.1	65.1	72.3	72.7
Medium Trucks:	69.6	67.7	62.1	62.5	69.9	70.1
Heavy Trucks:	70.5	69.1	57.5	61.8	69.9	70.0
Vehicle Noise:	75.4	73.4	69.4	68.2	75.6	75.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	143	307	662	1,427
CNEL:	149	320	690	1,487

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project — *Project Name:* MCH
Road Name: El Prado Rd. — *Job Number:* 10351
Road Segment: n/o Kimball Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,164 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,916 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.53%
Medium Trucks:	77.1%	5.3%	17.6%	4.61%
Heavy Trucks:	86.3%	1.5%	12.2%	1.87%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.52	1.28	-1.20	*-4.61*	0.000	0.000
Medium Trucks:	79.45	-10.55	1.31	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-14.48	1.31	-1.20	*-5.50*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.1	68.5	67.6	64.6	71.8	72.2
Medium Trucks:	69.0	67.1	61.5	61.9	69.3	69.5
Heavy Trucks:	69.9	68.4	56.9	61.2	69.3	69.4
Vehicle Noise:	74.8	72.8	68.8	67.6	75.1	75.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	96	206	444	957
CNEL:	100	215	463	998

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project — *Project Name:* MCH
Road Name: Euclid Av. — *Job Number:* 10351
Road Segment: n/o Walnut Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	53,422 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,342 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.87%
Medium Trucks:	77.1%	5.3%	17.6%	4.90%
Heavy Trucks:	86.3%	1.5%	12.2%	2.24%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	4.25	2.42	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	82.40	-8.53	2.47	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-11.94	2.47	-1.20	*-5.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	77.2	74.7	73.8	70.8	78.0	78.4
Medium Trucks:	75.1	73.2	67.6	68.1	75.5	75.7
Heavy Trucks:	75.7	74.3	62.7	67.0	75.1	75.2
Vehicle Noise:	80.9	78.9	75.0	73.7	81.2	81.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	465	1,002	2,159	4,652
CNEL:	485	1,045	2,252	4,852

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project — *Project Name:* MCH
Road Name: Euclid Av. — *Job Number:* 10351
Road Segment: n/o Riverside Dr.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	46,231 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,623 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.79%
Medium Trucks:	77.1%	5.3%	17.6%	4.93%
Heavy Trucks:	86.3%	1.5%	12.2%	2.29%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	3.62	2.42	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	82.40	-9.13	2.47	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-12.47	2.47	-1.20	*-5.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	76.6	74.0	73.1	70.1	77.3	77.8
Medium Trucks:	74.5	72.6	67.0	67.5	74.9	75.1
Heavy Trucks:	75.2	73.8	62.2	66.5	74.6	74.7
Vehicle Noise:	80.3	78.3	74.4	73.1	80.6	80.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	424	914	1,970	4,244
CNEL:	443	954	2,054	4,426

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project — *Project Name:* MCH
Road Name: Euclid Av. — *Job Number:* 10351
Road Segment: n/o Chino Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	49,822 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,982 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.85%
Medium Trucks:	77.1%	5.3%	17.6%	4.90%
Heavy Trucks:	86.3%	1.5%	12.2%	2.25%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	3.94	2.42	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	82.40	-8.83	2.47	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-12.21	2.47	-1.20	*-5.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	76.9	74.4	73.5	70.5	77.7	78.1
Medium Trucks:	74.8	72.9	67.3	67.8	75.2	75.4
Heavy Trucks:	75.5	74.0	62.4	66.8	74.9	74.9
Vehicle Noise:	80.6	78.6	74.7	73.4	80.9	81.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	445	958	2,064	4,447
CNEL:	464	999	2,153	4,638

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project — *Project Name:* MCH
Road Name: Euclid Av. — *Job Number:* 10351
Road Segment: n/o Schaefer Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	50,264 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,026 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.86%
Medium Trucks:	77.1%	5.3%	17.6%	4.89%
Heavy Trucks:	86.3%	1.5%	12.2%	2.25%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	3.98	2.42	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	82.40	-8.80	2.47	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-12.18	2.47	-1.20	*-5.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	77.0	74.4	73.5	70.5	77.7	78.1
Medium Trucks:	74.9	73.0	67.4	67.8	75.2	75.4
Heavy Trucks:	75.5	74.1	62.5	66.8	74.9	75.0
Vehicle Noise:	80.6	78.6	74.7	73.4	80.9	81.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	447	963	2,075	4,471
CNEL:	466	1,005	2,164	4,663

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project — *Project Name:* MCH
Road Name: Euclid Av. — *Job Number:* 10351
Road Segment: n/o Edison Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	52,860 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,286 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.88%
Medium Trucks:	77.1%	5.3%	17.6%	4.88%
Heavy Trucks:	86.3%	1.5%	12.2%	2.23%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	4.20	2.42	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	82.40	-8.59	2.47	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-11.99	2.47	-1.20	*-5.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	77.2	74.6	73.7	70.7	77.9	78.3
Medium Trucks:	75.1	73.2	67.6	68.0	75.4	75.6
Heavy Trucks:	75.7	74.2	62.7	67.0	75.1	75.2
Vehicle Noise:	80.9	78.8	74.9	73.6	81.1	81.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	462	995	2,143	4,616
CNEL:	482	1,037	2,235	4,815

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project — *Project Name:* MCH
Road Name: Euclid Av. — *Job Number:* 10351
Road Segment: n/o Eucalyptus Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	48,456 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,846 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.85%
Medium Trucks:	77.1%	5.3%	17.6%	4.89%
Heavy Trucks:	86.3%	1.5%	12.2%	2.26%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	3.82	2.42	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	82.40	-8.96	2.47	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-12.32	2.47	-1.20	*-5.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	76.8	74.2	73.4	70.4	77.5	78.0
Medium Trucks:	74.7	72.8	67.2	67.6	75.0	75.2
Heavy Trucks:	75.3	73.9	62.3	66.7	74.8	74.8
Vehicle Noise:	80.5	78.5	74.6	73.3	80.7	81.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	437	940	2,026	4,365
CNEL:	455	981	2,113	4,553

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project — *Project Name:* MCH
Road Name: Euclid Av. — *Job Number:* 10351
Road Segment: n/o Merrill Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	48,135 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,814 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.86%
Medium Trucks:	77.1%	5.3%	17.6%	4.89%
Heavy Trucks:	86.3%	1.5%	12.2%	2.26%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	3.79	2.42	-1.20	*-4.75*	0.000	0.000
Medium Trucks:	82.40	-9.00	2.47	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-12.35	2.47	-1.20	*-5.21*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	76.8	74.2	73.3	70.3	77.5	77.9
Medium Trucks:	74.7	72.8	67.2	67.6	75.0	75.2
Heavy Trucks:	75.3	73.9	62.3	66.6	74.7	74.8
Vehicle Noise:	80.5	78.4	74.5	73.2	80.7	81.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	434	936	2,017	4,345
CNEL:	453	976	2,104	4,532

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project
Road Name: Euclid Av.
Road Segment: s/o Merrill Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	51,048 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,105 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	0.0 feet
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	92.90%
Medium Trucks:	77.1%	5.3%	17.6%	4.87%
Heavy Trucks:	86.3%	1.5%	12.2%	2.23%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	4.05	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-8.76	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-12.14	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	77.1	74.5	73.6	70.6	77.8	78.2
Medium Trucks:	74.9	73.0	67.4	67.8	75.2	75.4
Heavy Trucks:	75.5	74.1	62.5	66.8	74.9	75.0
Vehicle Noise:	80.7	78.7	74.8	73.5	80.9	81.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	451	971	2,093	4,508
CNEL:	470	1,013	2,183	4,703

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project
Road Name: Euclid Av.
Road Segment: n/o Kimball Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	50,437 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,044 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	0.0 feet
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	92.89%
Medium Trucks:	77.1%	5.3%	17.6%	4.87%
Heavy Trucks:	86.3%	1.5%	12.2%	2.24%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	4.00	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-8.81	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-12.18	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	77.0	74.4	73.5	70.5	77.7	78.1
Medium Trucks:	74.9	72.9	67.3	67.8	75.2	75.4
Heavy Trucks:	75.5	74.0	62.5	66.8	74.9	75.0
Vehicle Noise:	80.6	78.6	74.7	73.4	80.9	81.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	447	964	2,077	4,474
CNEL:	467	1,005	2,166	4,667

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project
Road Name: Euclid Av.
Road Segment: n/o Bickmore Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	38,833 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,883 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	0.0 feet
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	92.77%
Medium Trucks:	77.1%	5.3%	17.6%	4.87%
Heavy Trucks:	86.3%	1.5%	12.2%	2.36%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	2.86	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-9.94	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-13.09	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.9	73.3	72.4	69.4	76.6	77.0
Medium Trucks:	73.7	71.8	66.2	66.6	74.1	74.2
Heavy Trucks:	74.6	73.1	61.6	65.9	74.0	74.1
Vehicle Noise:	79.6	77.6	73.6	72.4	79.8	80.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	379	817	1,760	3,791
CNEL:	395	852	1,835	3,953

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project
Road Name: Archibald Av.
Road Segment: n/o Limonite Av.
Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	46,675 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,668 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	154 feet

Site Data

Barrier Height:	0.0 feet
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	84.0 feet
Centerline Dist. to Observer:	84.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.43%
Medium Trucks:	77.1%	5.3%	17.6%	4.68%
Heavy Trucks:	86.3%	1.5%	12.2%	1.89%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	33.941
Medium Trucks:	33.679
Heavy Trucks:	33.705

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	3.69	2.42	-1.20	-4.75	0.000	0.000
Medium Trucks:	82.40	-9.32	2.47	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-13.25	2.47	-1.20	-5.21	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	76.7	74.1	73.2	70.2	77.4	77.8
Medium Trucks:	74.4	72.4	66.8	67.3	74.7	74.9
Heavy Trucks:	74.4	73.0	61.4	65.7	73.8	73.9
Vehicle Noise:	80.1	78.0	74.3	72.9	80.4	80.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	412	887	1,910	4,115
CNEL:	430	926	1,995	4,299

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project — *Project Name:* MCH
Road Name: Archibald Av. — *Job Number:* 10351
Road Segment: s/o Limonite Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 36,347 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 3,635 vehicles
Vehicle Speed: 45 mph
Near/Far Lane Distance: 78 feet

Site Data

Barrier Height: 0.0 feet
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 76.0 feet
Centerline Dist. to Observer: 76.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.37%
Medium Trucks:	77.1%	5.3%	17.6%	4.71%
Heavy Trucks:	86.3%	1.5%	12.2%	1.92%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 — *Grade Adjustment:* 0.0

Lane Equivalent Distance (in feet)

Autos: 65.422
Medium Trucks: 65.286
Heavy Trucks: 65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.47	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	79.45	-9.50	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-13.39	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.9	66.3	65.4	62.4	69.6	70.0
Medium Trucks:	66.9	65.0	59.4	59.8	67.2	67.4
Heavy Trucks:	67.8	66.4	54.8	59.1	67.2	67.3
Vehicle Noise:	72.7	70.7	66.7	65.5	72.9	73.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	119	257	554	1,193
CNEL:	124	268	577	1,243

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project — *Project Name:* MCH
Road Name: Archibald Av. — *Job Number:* 10351
Road Segment: s/o Schleisman Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 27,859 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 2,786 vehicles
Vehicle Speed: 45 mph
Near/Far Lane Distance: 78 feet

Site Data

Barrier Height: 0.0 feet
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 76.0 feet
Centerline Dist. to Observer: 76.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.36%
Medium Trucks:	77.1%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.94%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 — *Grade Adjustment:* 0.0

Lane Equivalent Distance (in feet)

Autos: 65.422
Medium Trucks: 65.286
Heavy Trucks: 65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.31	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	79.45	-10.66	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-14.51	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.7	65.1	64.2	61.2	68.4	68.9
Medium Trucks:	65.7	63.8	58.2	58.7	66.1	66.3
Heavy Trucks:	66.7	65.3	53.7	58.0	66.1	66.2
Vehicle Noise:	71.6	69.6	65.5	64.3	71.8	72.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	100	215	464	1,000
CNEL:	104	225	484	1,042

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project — *Project Name:* MCH
Road Name: Kimball Av. — *Job Number:* 10351
Road Segment: w/o Mountain Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 23,271 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 2,327 vehicles
Vehicle Speed: 50 mph
Near/Far Lane Distance: 36 feet

Site Data

Barrier Height: 0.0 feet
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 44.0 feet
Centerline Dist. to Observer: 44.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.55%
Medium Trucks:	77.1%	5.3%	17.6%	4.59%
Heavy Trucks:	86.3%	1.5%	12.2%	1.86%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 — *Grade Adjustment:* 0.0

Lane Equivalent Distance (in feet)

Autos: 40.460
Medium Trucks: 40.241
Heavy Trucks: 40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.08	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	81.00	-12.01	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-15.94	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.4	68.8	67.9	64.9	72.1	72.5
Medium Trucks:	69.1	67.2	61.6	62.0	69.4	69.6
Heavy Trucks:	69.5	68.1	56.5	60.9	69.0	69.0
Vehicle Noise:	74.9	72.8	69.1	67.7	75.2	75.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	97	209	450	970
CNEL:	101	218	470	1,013

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project — *Project Name:* MCH
Road Name: Kimball Av. — *Job Number:* 10351
Road Segment: w/o Euclid Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 29,889 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 2,989 vehicles
Vehicle Speed: 50 mph
Near/Far Lane Distance: 36 feet

Site Data

Barrier Height: 0.0 feet
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 44.0 feet
Centerline Dist. to Observer: 44.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.41%
Medium Trucks:	77.1%	5.3%	17.6%	4.69%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.004 — *Grade Adjustment:* 0.0

Lane Equivalent Distance (in feet)

Autos: 40.460
Medium Trucks: 40.241
Heavy Trucks: 40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.16	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	81.00	-10.83	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-14.76	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.4	69.9	69.0	66.0	73.2	73.6
Medium Trucks:	70.3	68.4	62.8	63.2	70.6	70.8
Heavy Trucks:	70.7	69.3	57.7	62.1	70.1	70.2
Vehicle Noise:	76.0	74.0	70.2	68.8	76.3	76.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	115	249	536	1,155
CNEL:	120	260	559	1,205

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project
Road Name: Kimball Av.
Road Segment: e/o Euclid Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,135 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,513 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	0.0 feet
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.45%
Medium Trucks:	77.1%	5.3%	17.6%	4.62%
Heavy Trucks:	86.3%	1.5%	12.2%	1.94%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.41	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-11.65	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-15.42	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.4	68.8	68.0	65.0	72.1	72.6
Medium Trucks:	69.2	67.3	61.7	62.1	69.5	69.7
Heavy Trucks:	69.8	68.4	56.8	61.1	69.2	69.3
Vehicle Noise:	75.0	73.0	69.1	67.8	75.3	75.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	110	237	511	1,100
CNEL:	115	247	533	1,148

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project
Road Name: Kimball Av.
Road Segment: w/o Rincon Meadows Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,141 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,314 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	0.0 feet
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.45%
Medium Trucks:	77.1%	5.3%	17.6%	4.61%
Heavy Trucks:	86.3%	1.5%	12.2%	1.94%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.05	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-12.01	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-15.77	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.1	68.5	67.6	64.6	71.8	72.2
Medium Trucks:	68.8	66.9	61.3	61.7	69.2	69.3
Heavy Trucks:	69.4	68.0	56.4	60.8	68.9	68.9
Vehicle Noise:	74.7	72.6	68.8	67.5	74.9	75.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	104	224	483	1,041
CNEL:	109	234	504	1,086

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project
Road Name: Kimball Av.
Road Segment: e/o Rincon Meadows Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,238 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,224 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	0.0 feet
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.45%
Medium Trucks:	77.1%	5.3%	17.6%	4.61%
Heavy Trucks:	86.3%	1.5%	12.2%	1.94%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.88	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-12.19	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-15.94	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.9	68.3	67.4	64.4	71.6	72.0
Medium Trucks:	68.7	66.7	61.1	61.6	69.0	69.2
Heavy Trucks:	69.3	67.8	56.3	60.6	68.7	68.8
Vehicle Noise:	74.5	72.5	68.6	67.3	74.7	75.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	101	218	471	1,014
CNEL:	106	228	491	1,058

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project
Road Name: Kimball Av.
Road Segment: e/o Mill Creek Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,303 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,030 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	0.0 feet
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.46%
Medium Trucks:	77.1%	5.3%	17.6%	4.60%
Heavy Trucks:	86.3%	1.5%	12.2%	1.95%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.49	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-12.59	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-16.33	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.5	67.9	67.0	64.0	71.2	71.6
Medium Trucks:	68.3	66.3	60.7	61.2	68.6	68.8
Heavy Trucks:	68.9	67.5	55.9	60.2	68.3	68.4
Vehicle Noise:	74.1	72.1	68.2	66.9	74.3	74.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	95	206	443	954
CNEL:	100	215	462	996

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project
Road Name: Kimball Av.
Road Segment: e/o Main St.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,110 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,911 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.45%
Medium Trucks:	77.1%	5.3%	17.6%	4.60%
Heavy Trucks:	86.3%	1.5%	12.2%	1.95%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	0.22	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-12.85	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-16.58	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.2	67.7	66.8	63.8	70.9	71.4
Medium Trucks:	68.0	66.1	60.5	60.9	68.3	68.5
Heavy Trucks:	68.6	67.2	55.6	60.0	68.1	68.1
Vehicle Noise:	73.8	71.8	67.9	66.6	74.1	74.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	92	198	426	917
CNEL:	96	206	444	957

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project
Road Name: Kimball Av.
Road Segment: e/o Flight Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,235 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,624 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.44%
Medium Trucks:	77.1%	5.3%	17.6%	4.60%
Heavy Trucks:	86.3%	1.5%	12.2%	1.97%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	-0.49	1.01	-1.20	-4.64	0.000	0.000
Medium Trucks:	81.00	-13.57	1.04	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-17.26	1.04	-1.20	-5.44	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.5	66.9	66.1	63.1	70.2	70.7
Medium Trucks:	67.3	65.4	59.8	60.2	67.6	67.8
Heavy Trucks:	68.0	66.5	55.0	59.3	67.4	67.4
Vehicle Noise:	73.1	71.1	67.2	65.9	73.4	73.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	82	177	382	823
CNEL:	86	185	399	859

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project
Road Name: Limonite Av.
Road Segment: w/o Archibald Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,934 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,793 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.43%
Medium Trucks:	77.1%	5.3%	17.6%	4.64%
Heavy Trucks:	86.3%	1.5%	12.2%	1.94%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.87	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	81.00	-11.17	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-14.96	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.0	66.4	65.5	62.5	69.7	70.2
Medium Trucks:	66.8	64.9	59.3	59.7	67.1	67.3
Heavy Trucks:	67.4	65.9	54.4	58.7	66.8	66.9
Vehicle Noise:	72.6	70.6	66.7	65.4	72.9	73.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	118	254	547	1,179
CNEL:	123	265	571	1,230

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project
Road Name: Limonite Av.
Road Segment: e/o Archibald Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	43,906 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,391 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	93.40%
Medium Trucks:	77.1%	5.3%	17.6%	4.67%
Heavy Trucks:	86.3%	1.5%	12.2%	1.93%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	3.83	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	81.00	-9.18	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-13.02	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.0	68.4	67.5	64.5	71.7	72.1
Medium Trucks:	68.8	66.9	61.3	61.7	69.1	69.3
Heavy Trucks:	69.3	67.9	56.3	60.6	68.7	68.8
Vehicle Noise:	74.6	72.5	68.7	67.4	74.8	75.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	159	343	740	1,594
CNEL:	166	358	772	1,663

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project
Road Name: Pine Av.
Road Segment: w/o El Prado Rd.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,483 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,948 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	92.39%
Medium Trucks:	77.1%	5.3%	17.6%	5.01%
Heavy Trucks:	86.3%	1.5%	12.2%	2.60%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.51	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-10.14	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-12.99	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.1	67.5	66.6	63.6	70.8	71.3
Medium Trucks:	68.5	66.6	60.9	61.4	68.8	69.0
Heavy Trucks:	70.4	69.0	57.4	61.7	69.8	69.9
Vehicle Noise:	74.5	72.6	68.1	67.1	74.7	74.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	123	265	570	1,229
CNEL:	128	275	593	1,277

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project
Road Name: Pine Av.
Road Segment: w/o Euclid Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,605 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,560 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.33%
Medium Trucks:	77.1%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.97%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	1.95	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-11.03	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-14.81	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.5	67.0	66.1	63.1	70.3	70.7
Medium Trucks:	67.6	65.7	60.1	60.5	67.9	68.1
Heavy Trucks:	68.6	67.2	55.6	59.9	68.0	68.1
Vehicle Noise:	73.4	71.4	67.3	66.2	73.6	73.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	105	226	487	1,049
CNEL:	109	236	508	1,093

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project
Road Name: Pine Av.
Road Segment: e/o Euclid Av.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,606 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,761 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.35%
Medium Trucks:	77.1%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.95%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	3.62	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-9.36	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-13.19	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.2	68.6	67.7	64.7	71.9	72.4
Medium Trucks:	69.3	67.3	61.7	62.2	69.6	69.8
Heavy Trucks:	70.2	68.8	57.2	61.5	69.6	69.7
Vehicle Noise:	75.1	73.1	69.0	67.8	75.3	75.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	135	292	628	1,353
CNEL:	141	304	654	1,410

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project
Road Name: Pine Av.
Road Segment: w/o Chino Corona Rd.

Project Name: MCH
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	36,604 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,660 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.35%
Medium Trucks:	77.1%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.95%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	3.50	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-9.48	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-13.31	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	71.1	68.5	67.6	64.6	71.8	72.2
Medium Trucks:	69.1	67.2	61.6	62.1	69.5	69.6
Heavy Trucks:	70.1	68.7	57.1	61.4	69.5	69.6
Vehicle Noise:	75.0	73.0	68.9	67.7	75.2	75.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	133	286	617	1,329
CNEL:	138	298	643	1,385

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project | *Project Name:* MCH
Road Name: Pine Av. | *Job Number:* 10351
Road Segment: w/o W. Preserve Loop

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,782 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,978 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.29%
Medium Trucks:	77.1%	5.3%	17.6%	4.72%
Heavy Trucks:	86.3%	1.5%	12.2%	1.99%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	0.82	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-12.14	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-15.88	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.4	65.8	65.0	62.0	69.1	69.6
Medium Trucks:	66.5	64.6	59.0	59.4	66.8	67.0
Heavy Trucks:	67.5	66.1	54.5	58.9	67.0	67.0
Vehicle Noise:	72.3	70.3	66.2	65.1	72.5	72.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	89	191	411	886
CNEL:	92	199	428	923

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project | *Project Name:* MCH
Road Name: Pine Av. | *Job Number:* 10351
Road Segment: w/o E. Preserve Loop

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	31,805 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,181 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.34%
Medium Trucks:	77.1%	5.3%	17.6%	4.71%
Heavy Trucks:	86.3%	1.5%	12.2%	1.96%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.89	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-10.09	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-13.89	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.5	67.9	67.0	64.0	71.2	71.6
Medium Trucks:	68.5	66.6	61.0	61.4	68.9	69.0
Heavy Trucks:	69.5	68.1	56.5	60.8	68.9	69.0
Vehicle Noise:	74.4	72.4	68.3	67.1	74.6	74.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	121	261	562	1,212
CNEL:	126	272	586	1,262

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project | *Project Name:* MCH
Road Name: Pine Av. | *Job Number:* 10351
Road Segment: w/o Hellman Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	31,206 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,121 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.33%
Medium Trucks:	77.1%	5.3%	17.6%	4.71%
Heavy Trucks:	86.3%	1.5%	12.2%	1.96%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.81	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-10.17	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-13.97	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.4	67.8	66.9	63.9	71.1	71.5
Medium Trucks:	68.4	66.5	60.9	61.4	68.8	69.0
Heavy Trucks:	69.4	68.0	56.4	60.8	68.9	68.9
Vehicle Noise:	74.3	72.3	68.2	67.0	74.5	74.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	120	258	555	1,196
CNEL:	125	269	579	1,247

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY With Project | *Project Name:* MCH
Road Name: Schleisman Rd. | *Job Number:* 10351
Road Segment: w/o Archibald Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	38,557 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,856 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	78 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	76.0 feet
Centerline Dist. to Observer:	76.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.34%
Medium Trucks:	77.1%	5.3%	17.6%	4.71%
Heavy Trucks:	86.3%	1.5%	12.2%	1.95%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	65.422
Medium Trucks:	65.286
Heavy Trucks:	65.299

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	3.72	-1.85	-1.20	-4.73	0.000	0.000
Medium Trucks:	79.45	-9.24	-1.84	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-13.07	-1.84	-1.20	-5.25	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.1	66.5	65.7	62.7	69.8	70.3
Medium Trucks:	67.2	65.2	59.6	60.1	67.5	67.7
Heavy Trucks:	68.1	66.7	55.1	59.5	67.6	67.6
Vehicle Noise:	73.0	71.0	66.9	65.7	73.2	73.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	124	268	577	1,244
CNEL:	130	279	602	1,296

Thursday, May 02, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Pine Av.
Road Segment: e/o Euclid Av.

Project Name: MCH (Dirt Haul Truck Trip
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,747 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,575 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.40%
Medium Trucks:	77.1%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	1.97	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-11.01	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-14.94	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.6	67.0	66.1	63.1	70.3	70.7
Medium Trucks:	67.6	65.7	60.1	60.5	67.9	68.1
Heavy Trucks:	68.5	67.0	55.5	59.8	67.9	68.0
Vehicle Noise:	73.4	71.4	67.4	66.2	73.6	73.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	105	226	486	1,047
CNEL:	109	235	506	1,091

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL	
Scenario: Existing Without Project	*Project Name:* MCH (Dirt Haul Truck Trip
Road Name: Pine Av.	*Job Number:* 10351
Road Segment: w/o Chino Corona Rd.	

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,771 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,977 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.40%
Medium Trucks:	77.1%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.60	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-10.38	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-14.31	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.2	67.6	66.7	63.7	70.9	71.3
Medium Trucks:	68.2	66.3	60.7	61.2	68.6	68.7
Heavy Trucks:	69.1	67.7	56.1	60.4	68.5	68.6
Vehicle Noise:	74.0	72.0	68.0	66.8	74.3	74.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	115	248	535	1,153
CNEL:	120	259	558	1,202

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Pine Av.
Road Segment: w/o W. Preserve Loop

Project Name: MCH (Dirt Haul Truck Trip
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,445 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,645 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.40%
Medium Trucks:	77.1%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	0.03	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-12.96	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-16.89	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.6	65.0	64.2	61.2	68.3	68.8
Medium Trucks:	65.7	63.7	58.1	58.6	66.0	66.2
Heavy Trucks:	66.5	65.1	53.5	57.8	65.9	66.0
Vehicle Noise:	71.5	69.4	65.4	64.2	71.7	71.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	78	167	360	776
CNEL:	81	174	376	809

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Pine Av.
Road Segment: w/o E. Preserve Loop

Project Name: MCH (Dirt Haul Truck Trip
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,664 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,666 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.40%
Medium Trucks:	77.1%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.13	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-10.86	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-14.79	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.7	67.1	66.3	63.3	70.4	70.9
Medium Trucks:	67.8	65.8	60.2	60.7	68.1	68.3
Heavy Trucks:	68.6	67.2	55.6	59.9	68.0	68.1
Vehicle Noise:	73.6	71.5	67.5	66.3	73.8	74.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	107	231	497	1,071
CNEL:	112	241	518	1,117

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing Without Project	*Project Name:*	MCH (Dirt Haul Truck Trip
Road Name:	Pine Av.	*Job Number:*	10351
Road Segment:	w/o Hellman Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,513 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,651 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.40%
Medium Trucks:	77.1%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.10	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-10.88	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-14.82	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.7	67.1	66.2	63.2	70.4	70.8
Medium Trucks:	67.7	65.8	60.2	60.6	68.1	68.2
Heavy Trucks:	68.6	67.2	55.6	59.9	68.0	68.1
Vehicle Noise:	73.5	71.5	67.5	66.3	73.8	74.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	107	230	495	1,067
CNEL:	111	240	516	1,112

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Chino Corona Rd.
Road Segment: s/o Pine Av.

Project Name: MCH (Dirt Haul Truck Trip
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,068 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	307 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.40%
Medium Trucks:	77.1%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-7.27	3.26	-1.20	*-4.49*	0.000	0.000
Medium Trucks:	79.45	-20.25	3.33	-1.20	*-4.86*	0.000	0.000
Heavy Trucks:	84.25	-24.18	3.32	-1.20	*-5.77*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	63.3	60.7	59.8	56.8	64.0	64.4
Medium Trucks:	61.3	59.4	53.8	54.2	61.7	61.8
Heavy Trucks:	62.2	60.8	49.2	53.5	61.6	61.7
Vehicle Noise:	67.1	65.1	61.1	59.9	67.3	67.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	20	43	92	199
CNEL:	21	45	96	207

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing Without Project	*Project Name:*	MCH (Dirt Haul Truck Trip
Road Name:	Chino Corona Rd.	*Job Number:*	10351
Road Segment:	e/o Cucamonga Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,068 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	307 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.40%
Medium Trucks:	77.1%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-6.75	3.26	-1.20	*-4.49*	0.000	0.000
Medium Trucks:	77.72	-19.74	3.33	-1.20	*-4.86*	0.000	0.000
Heavy Trucks:	82.99	-23.67	3.32	-1.20	*-5.77*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	61.8	59.2	58.4	55.4	62.5	63.0
Medium Trucks:	60.1	58.2	52.6	53.0	60.4	60.6
Heavy Trucks:	61.4	60.0	48.4	52.8	60.9	60.9
Vehicle Noise:	66.0	64.0	59.7	58.7	66.1	66.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	17	36	77	166
CNEL:	17	37	80	173

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing Without Project	*Project Name:*	MCH (Dirt Haul Truck Trip
Road Name:	Hellman Av.	*Job Number:*	10351
Road Segment:	s/o Pine Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,118 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,312 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	93.40%
Medium Trucks:	77.1%	5.3%	17.6%	4.70%
Heavy Trucks:	86.3%	1.5%	12.2%	1.90%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-0.96	1.01	-1.20	*-4.64*	0.000	0.000
Medium Trucks:	79.45	-13.94	1.04	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-17.87	1.04	-1.20	*-5.44*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.3	64.7	63.8	60.8	68.0	68.5
Medium Trucks:	65.4	63.4	57.8	58.3	65.7	65.9
Heavy Trucks:	66.2	64.8	53.2	57.5	65.6	65.7
Vehicle Noise:	71.1	69.1	65.1	63.9	71.4	71.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	60	130	281	605
CNEL:	63	136	292	630

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Pine Av.
Road Segment: e/o Euclid Av.

Project Name: MCH (Dirt Haul Truck Trip
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,935 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,694 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	89.28%
Medium Trucks:	77.1%	5.3%	17.6%	4.49%
Heavy Trucks:	32.3%	21.7%	46.1%	6.23%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	1.97	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-11.01	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-9.59	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.6	67.0	66.1	63.1	70.3	70.7
Medium Trucks:	67.6	65.7	60.1	60.5	67.9	68.1
Heavy Trucks:	73.8	68.1	72.4	70.9	77.1	77.5
Vehicle Noise:	75.9	71.8	73.5	71.9	78.4	78.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	217	467	1,006	2,167
CNEL:	229	494	1,064	2,293

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing With Project	*Project Name:*	MCH (Dirt Haul Truck Trip
Road Name:	Pine Av.	*Job Number:*	10351
Road Segment:	w/o Chino Corona Rd.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,959 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,096 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	89.82%
Medium Trucks:	77.1%	5.3%	17.6%	4.52%
Heavy Trucks:	34.6%	20.8%	44.6%	5.66%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.60	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-10.38	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-9.40	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.2	67.6	66.7	63.7	70.9	71.3
Medium Trucks:	68.2	66.3	60.7	61.2	68.6	68.7
Heavy Trucks:	74.0	68.6	72.4	71.0	77.2	77.6
Vehicle Noise:	76.3	72.4	73.7	72.1	78.6	79.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	224	483	1,041	2,242
CNEL:	237	511	1,100	2,371

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Pine Av.
Road Segment: w/o W. Preserve Loop
Project Name: MCH (Dirt Haul Truck Trip
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,495 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,750 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	87.79%
Medium Trucks:	77.1%	5.3%	17.6%	4.42%
Heavy Trucks:	27.5%	23.5%	49.0%	7.79%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	0.03	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-12.96	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-10.49	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.6	65.0	64.2	61.2	68.3	68.8
Medium Trucks:	65.7	63.7	58.1	58.6	66.0	66.2
Heavy Trucks:	72.9	66.5	71.9	70.3	76.5	76.8
Vehicle Noise:	74.6	70.0	72.7	71.0	77.4	77.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	187	403	868	1,870
CNEL:	198	427	920	1,982

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing With Project	*Project Name:*	MCH (Dirt Haul Truck Trip
Road Name:	Pine Av.	*Job Number:*	10351
Road Segment:	w/o E. Preserve Loop		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,714 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,771 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	89.86%
Medium Trucks:	77.1%	5.3%	17.6%	4.52%
Heavy Trucks:	34.8%	20.7%	44.4%	5.62%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.13	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-10.86	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-9.92	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.7	67.1	66.3	63.3	70.4	70.9
Medium Trucks:	67.8	65.8	60.2	60.7	68.1	68.3
Heavy Trucks:	73.5	68.1	71.9	70.4	76.7	77.1
Vehicle Noise:	75.8	71.9	73.2	71.6	78.1	78.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	207	446	962	2,072
CNEL:	219	472	1,017	2,191

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Pine Av.
Road Segment: w/o Hellman Av.

Project Name: MCH (Dirt Haul Truck Trip
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,563 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,756 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	89.84%
Medium Trucks:	77.1%	5.3%	17.6%	4.52%
Heavy Trucks:	34.7%	20.8%	44.5%	5.64%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.10	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-10.88	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-9.92	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.7	67.1	66.2	63.2	70.4	70.8
Medium Trucks:	67.7	65.8	60.2	60.6	68.1	68.2
Heavy Trucks:	73.5	68.1	71.9	70.4	76.7	77.1
Vehicle Noise:	75.8	71.9	73.2	71.6	78.1	78.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	207	446	960	2,069
CNEL:	219	471	1,015	2,188

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Chino Corona Rd.
Road Segment: s/o Pine Av.

Project Name: MCH (Dirt Haul Truck Trip
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,256 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	426 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	67.33%
Medium Trucks:	77.1%	5.3%	17.6%	3.39%
Heavy Trucks:	13.6%	28.7%	57.8%	29.28%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-7.27	3.26	-1.20	*-4.49*	0.000	0.000
Medium Trucks:	79.45	-20.25	3.33	-1.20	*-4.86*	0.000	0.000
Heavy Trucks:	84.25	-10.88	3.32	-1.20	*-5.77*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.3	60.7	59.8	56.8	64.0	64.4
Medium Trucks:	61.3	59.4	53.8	54.2	61.7	61.8
Heavy Trucks:	75.5	66.0	75.3	73.6	79.6	80.0
Vehicle Noise:	75.9	67.8	75.4	73.7	79.8	80.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	135	291	627	1,350
CNEL:	144	310	668	1,438

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario:	Existing With Project	*Project Name:*	MCH (Dirt Haul Truck Trip
Road Name:	Chino Corona Rd.	*Job Number:*	10351
Road Segment:	e/o Cucamonga Av.		

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,256 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	426 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	67.33%
Medium Trucks:	77.1%	5.3%	17.6%	3.39%
Heavy Trucks:	13.6%	28.7%	57.8%	29.28%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	66.51	-6.75	3.26	-1.20	*-4.49*	0.000	0.000
Medium Trucks:	77.72	-19.74	3.33	-1.20	*-4.86*	0.000	0.000
Heavy Trucks:	82.99	-10.37	3.32	-1.20	*-5.77*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	61.8	59.2	58.4	55.4	62.5	63.0
Medium Trucks:	60.1	58.2	52.6	53.0	60.4	60.6
Heavy Trucks:	74.7	65.3	74.6	72.8	78.9	79.3
Vehicle Noise:	75.1	66.9	74.7	72.9	79.0	79.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	120	258	557	1,200
CNEL:	128	275	593	1,278

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Hellman Av.
Road Segment: s/o Pine Av.
Project Name: MCH (Dirt Haul Truck Trip
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,168 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,417 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	86.48%
Medium Trucks:	77.1%	5.3%	17.6%	4.35%
Heavy Trucks:	24.6%	24.5%	50.8%	9.17%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-0.96	1.01	-1.20	*-4.64*	0.000	0.000
Medium Trucks:	79.45	-13.94	1.04	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-10.70	1.04	-1.20	*-5.44*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.3	64.7	63.8	60.8	68.0	68.5
Medium Trucks:	65.4	63.4	57.8	58.3	65.7	65.9
Heavy Trucks:	73.4	66.5	72.5	70.9	77.1	77.4
Vehicle Noise:	74.9	69.9	73.2	71.5	77.8	78.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	163	352	757	1,632
CNEL:	173	373	804	1,731

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Pine Av.
Road Segment: e/o Euclid Av.

Project Name: MCH (Dirt Haul Truck Trip
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,935 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,694 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	89.28%
Medium Trucks:	77.1%	5.3%	17.6%	4.49%
Heavy Trucks:	96.0%	0.4%	3.6%	6.23%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	1.97	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-11.01	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-9.59	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.6	67.0	66.1	63.1	70.3	70.7
Medium Trucks:	67.6	65.7	60.1	60.5	67.9	68.1
Heavy Trucks:	73.8	72.9	55.5	59.8	71.2	71.3
Vehicle Noise:	75.9	74.5	67.4	66.2	74.8	75.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	125	270	581	1,253
CNEL:	129	279	600	1,293

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Pine Av.
Road Segment: w/o Chino Corona Rd.

Project Name: MCH (Dirt Haul Truck Trip
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,959 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,096 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	89.82%
Medium Trucks:	77.1%	5.3%	17.6%	4.52%
Heavy Trucks:	95.6%	0.5%	3.9%	5.66%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.60	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-10.38	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-9.40	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.2	67.6	66.7	63.7	70.9	71.3
Medium Trucks:	68.2	66.3	60.7	61.2	68.6	68.7
Heavy Trucks:	74.0	73.0	56.1	60.4	71.5	71.6
Vehicle Noise:	76.3	74.8	68.0	66.8	75.3	75.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	135	291	627	1,350
CNEL:	140	301	648	1,395

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Pine Av.
Road Segment: w/o W. Preserve Loop

Project Name: MCH (Dirt Haul Truck Trip
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,495 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,750 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	87.79%
Medium Trucks:	77.1%	5.3%	17.6%	4.42%
Heavy Trucks:	96.9%	0.3%	2.8%	7.79%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	0.03	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-12.96	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-10.49	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.6	65.0	64.2	61.2	68.3	68.8
Medium Trucks:	65.7	63.7	58.1	58.6	66.0	66.2
Heavy Trucks:	72.9	72.0	53.5	57.8	70.1	70.1
Vehicle Noise:	74.6	73.3	65.4	64.2	73.2	73.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	98	212	457	984
CNEL:	101	218	470	1,013

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Pine Av.
Road Segment: w/o E. Preserve Loop

Project Name: MCH (Dirt Haul Truck Trip
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,714 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,771 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	89.86%
Medium Trucks:	77.1%	5.3%	17.6%	4.52%
Heavy Trucks:	95.5%	0.5%	4.0%	5.62%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.13	0.34	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-10.86	0.37	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-9.92	0.37	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.7	67.1	66.3	63.3	70.4	70.9
Medium Trucks:	67.8	65.8	60.2	60.7	68.1	68.3
Heavy Trucks:	73.5	72.5	55.6	59.9	71.0	71.1
Vehicle Noise:	75.8	74.3	67.5	66.3	74.8	75.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	125	270	581	1,252
CNEL:	129	279	601	1,294

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Pine Av.
Road Segment: w/o Hellman Av.
Project Name: MCH (Dirt Haul Truck Trip
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,563 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,756 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	76 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	89.84%
Medium Trucks:	77.1%	5.3%	17.6%	4.52%
Heavy Trucks:	95.6%	0.5%	4.0%	5.64%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	46.701
Medium Trucks:	46.511
Heavy Trucks:	46.530

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.10	0.34	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	79.45	-10.88	0.37	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-9.92	0.37	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.7	67.1	66.2	63.2	70.4	70.8
Medium Trucks:	67.7	65.8	60.2	60.6	68.1	68.2
Heavy Trucks:	73.5	72.5	55.6	59.9	71.0	71.0
Vehicle Noise:	75.8	74.3	67.5	66.3	74.8	75.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	125	269	580	1,249
CNEL:	129	278	599	1,290

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Chino Corona Rd.
Road Segment: s/o Pine Av.

Project Name: MCH (Dirt Haul Truck Trip
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,256 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	426 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	67.33%
Medium Trucks:	77.1%	5.3%	17.6%	3.39%
Heavy Trucks:	99.4%	0.1%	0.6%	29.28%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-7.27	3.26	-1.20	*-4.49*	0.000	0.000
Medium Trucks:	79.45	-20.25	3.33	-1.20	*-4.86*	0.000	0.000
Heavy Trucks:	84.25	-10.88	3.32	-1.20	*-5.77*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	63.3	60.7	59.8	56.8	64.0	64.4
Medium Trucks:	61.3	59.4	53.8	54.2	61.7	61.8
Heavy Trucks:	75.5	74.7	49.2	53.5	71.9	71.9
Vehicle Noise:	75.9	75.0	61.1	59.9	72.9	73.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	47	101	217	468
CNEL:	47	102	220	473

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Chino Corona Rd.
Road Segment: e/o Cucamonga Av.

Project Name: MCH (Dirt Haul Truck Trip
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	4,256 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	426 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	12 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	30.0 feet
Centerline Dist. to Observer:	30.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	66.2%	13.5%	20.3%	67.33%
Medium Trucks:	77.1%	5.3%	17.6%	3.39%
Heavy Trucks:	99.4%	0.1%	0.6%	29.28%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	29.816
Medium Trucks:	29.518
Heavy Trucks:	29.547

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-6.75	3.26	-1.20	*-4.49*	0.000	0.000
Medium Trucks:	77.72	-19.74	3.33	-1.20	*-4.86*	0.000	0.000
Heavy Trucks:	82.99	-10.37	3.32	-1.20	*-5.77*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.8	59.2	58.4	55.4	62.5	63.0
Medium Trucks:	60.1	58.2	52.6	53.0	60.4	60.6
Heavy Trucks:	74.7	73.9	48.4	52.8	71.2	71.2
Vehicle Noise:	75.1	74.2	59.7	58.7	72.0	72.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	41	88	190	410
CNEL:	41	89	192	414

Monday, May 20, 2019

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Hellman Av.
Road Segment: s/o Pine Av.

Project Name: MCH (Dirt Haul Truck Trip
Job Number: 10351

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,168 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,417 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	51 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	49.0 feet
Centerline Dist. to Observer:	49.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	66.2%	13.5%	20.3%	86.48%
Medium Trucks:	77.1%	5.3%	17.6%	4.35%
Heavy Trucks:	97.4%	0.3%	2.3%	9.17%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.004

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	42.140
Medium Trucks:	41.929
Heavy Trucks:	41.950

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-0.96	1.01	-1.20	*-4.64*	0.000	0.000
Medium Trucks:	79.45	-13.94	1.04	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-10.70	1.04	-1.20	*-5.44*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.3	64.7	63.8	60.8	68.0	68.5
Medium Trucks:	65.4	63.4	57.8	58.3	65.7	65.9
Heavy Trucks:	73.4	72.5	53.2	57.5	70.4	70.4
Vehicle Noise:	74.9	73.6	65.1	63.9	73.2	73.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	81	173	374	805
CNEL:	83	178	384	827

Monday, May 20, 2019

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APPENDIX 9.1:

OPERATIONAL NOISE LEVEL CALCULATIONS

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STATIONARY SOURCE NOISE PREDICTION MODEL

6/17/2019

Observer Location: **R1**
Source: Air Conditioning Unit (Roof-Top)
Condition: Operational

Project Name: MCH
Job Number: 10351
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	3,808.0 feet
Noise Distance to Barrier:	3,808.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Elevation:	0.0 feet
Noise Source Elevation:	30.0 feet
Barrier Elevation:	0.0 feet
Barrier Height:	**0.0 feet**
Noise Source Height:	5.0 feet
Observer Height:	5.0 feet
Barrier Type (0-Wall, 1-Berm):	0
Drop Off Coefficient:	20.0

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	3,808.0	-57.6	-57.6	-57.6	-57.6	-57.6	-57.6
Shielding (Barrier Attenuation)	3,808.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-57.6	16.8	18.5	19.8	20.1	20.6
39 Minute Hourly Adjustment		**-59.5**	**14.9**	**16.6**	**17.9**	**18.2**	**18.7**

STATIONARY SOURCE NOISE PREDICTION MODEL

6/17/2019

Observer Location: **R1**
Source: Truck Unloading/Docking Activity
Condition: Operational

Project Name: MCH
Job Number: 10351
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	3,995.0 feet
Noise Distance to Barrier:	3,995.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Elevation:	0.0 feet
Noise Source Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Barrier Height:	**0.0 feet**
Noise Source Height:	8.0 feet
Observer Height:	5.0 feet
Barrier Type (0-Wall, 1-Berm):	0
Drop Off Coefficient:	20.0

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	0.0	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	3,995.0	-42.5	-42.5	-42.5	-42.5	-42.5	-42.5
Shielding (Barrier Attenuation)	3,995.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-42.5	21.7	24.7	29.3	33.1	37.5
60 Minute Hourly Adjustment		**-42.5**	**21.7**	**24.7**	**29.3**	**33.1**	**37.5**

STATIONARY SOURCE NOISE PREDICTION MODEL
6/17/2019

Observer Location: **R1** — *Project Name:* MCH
Source: Parking Lot Vehicle Movements — *Job Number:* 10351
Condition: Operational — *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	3,685.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	3,685.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	0.0	49.0	50.0	55.0	61.0	71.9
Distance Attenuation	3,685.0	-51.3	-51.3	-51.3	-51.3	-51.3	-51.3
Shielding (Barrier Attenuation)	3,685.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-51.3	-2.3	-1.3	3.7	9.7	20.6
60 Minute Hourly Adjustment		**-51.3**	**-2.3**	**-1.3**	**3.7**	**9.7**	**20.6**

STATIONARY SOURCE NOISE PREDICTION MODEL
6/17/2019

Observer Location: **R2** — *Project Name:* MCH
Source: Air Conditioning Unit (Roof-Top) — *Job Number:* 10351
Condition: Operational — *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	3,132.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	3,132.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	3,132.0	-55.9	-55.9	-55.9	-55.9	-55.9	-55.9
Shielding (Barrier Attenuation)	3,132.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-55.9	18.5	20.2	21.5	21.8	22.3
39 Minute Hourly Adjustment		**-57.8**	**16.6**	**18.3**	**19.6**	**19.9**	**20.4**

STATIONARY SOURCE NOISE PREDICTION MODEL	6/17/2019

Observer Location: **R2**
Source: Truck Unloading/Docking Activity
Condition: Operational

Project Name: MCH
Job Number: 10351
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	3,355.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	3,355.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	0.0	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	3,355.0	-41.0	-41.0	-41.0	-41.0	-41.0	-41.0
Shielding (Barrier Attenuation)	3,355.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-41.0	23.2	26.2	30.8	34.6	39.0
60 Minute Hourly Adjustment		**-41.0**	**23.2**	**26.2**	**30.8**	**34.6**	**39.0**

STATIONARY SOURCE NOISE PREDICTION MODEL	6/17/2019

Observer Location: **R2**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: MCH
Job Number: 10351
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,983.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,983.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	0.0	49.0	50.0	55.0	61.0	71.9
Distance Attenuation	2,983.0	-49.5	-49.5	-49.5	-49.5	-49.5	-49.5
Shielding (Barrier Attenuation)	2,983.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-49.5	-0.5	0.5	5.5	11.5	22.4
60 Minute Hourly Adjustment		**-49.5**	**-0.5**	**0.5**	**5.5**	**11.5**	**22.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

6/17/2019

***Observer Location:* R3**
Source: Air Conditioning Unit (Roof-Top)
Condition: Operational

Project Name: MCH
Job Number: 10351
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	4,943.0	feet
Noise Distance to Barrier:	4,943.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Elevation:	0.0	feet
Noise Source Elevation:	30.0	feet
Barrier Elevation:	0.0	feet
Barrier Height:	**0.0**	**feet**
Noise Source Height:	5.0	feet
Observer Height:	5.0	feet
Barrier Type (0-Wall, 1-Berm):	0	
Drop Off Coefficient:	20.0	

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	4,943.0	-59.9	-59.9	-59.9	-59.9	-59.9	-59.9
Shielding (Barrier Attenuation)	4,943.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-59.9	14.5	16.2	17.5	17.8	18.3
39 Minute Hourly Adjustment		**-61.8**	**12.6**	**14.3**	**15.6**	**15.9**	**16.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

6/17/2019

***Observer Location:* R3**
Source: Truck Unloading/Docking Activity
Condition: Operational

Project Name: MCH
Job Number: 10351
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	5,030.0	feet
Noise Distance to Barrier:	5,030.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Elevation:	0.0	feet
Noise Source Elevation:	0.0	feet
Barrier Elevation:	0.0	feet
Barrier Height:	**0.0**	**feet**
Noise Source Height:	8.0	feet
Observer Height:	5.0	feet
Barrier Type (0-Wall, 1-Berm):	0	
Drop Off Coefficient:	20.0	

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	0.0	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	5,030.0	-44.5	-44.5	-44.5	-44.5	-44.5	-44.5
Shielding (Barrier Attenuation)	5,030.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-44.5	19.7	22.7	27.3	31.1	35.5
60 Minute Hourly Adjustment		**-44.5**	**19.7**	**22.7**	**27.3**	**31.1**	**35.5**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/17/2019

Observer Location: **R3** *Project Name:* MCH
Source: Parking Lot Vehicle Movements *Job Number:* 10351
Condition: Operational *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer 6,330.0 feet
Noise Distance to Barrier: 6,330.0 feet
Barrier Distance to Observer: 0.0 feet

Observer Elevation: 0.0 feet
Noise Source Elevation: 0.0 feet
Barrier Elevation: 0.0 feet

Barrier Height: **0.0 feet**
Noise Source Height: 5.0 feet
Observer Height: 5.0 feet

Barrier Type (0-Wall, 1-Berm): 0
Drop Off Coefficient: 20.0

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	0.0	49.0	50.0	55.0	61.0	71.9
Distance Attenuation	6,330.0	-56.0	-56.0	-56.0	-56.0	-56.0	-56.0
Shielding (Barrier Attenuation)	6,330.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-56.0	-7.0	-6.0	-1.0	5.0	15.9
60 Minute Hourly Adjustment		**-56.0**	**-7.0**	**-6.0**	**-1.0**	**5.0**	**15.9**

STATIONARY SOURCE NOISE PREDICTION MODEL 6/17/2019

Observer Location: **R15** *Project Name:* MCH
Source: Air Conditioning Unit (Roof-Top) *Job Number:* 10351
Condition: Operational *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer 860.0 feet
Noise Distance to Barrier: 860.0 feet
Barrier Distance to Observer: 0.0 feet

Observer Elevation: 0.0 feet
Noise Source Elevation: 30.0 feet
Barrier Elevation: 0.0 feet

Barrier Height: **0.0 feet**
Noise Source Height: 5.0 feet
Observer Height: 5.0 feet

Barrier Type (0-Wall, 1-Berm): 0
Drop Off Coefficient: 20.0

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	860.0	-44.7	-44.7	-44.7	-44.7	-44.7	-44.7
Shielding (Barrier Attenuation)	860.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-44.7	29.7	31.4	32.7	33.0	33.5
39 Minute Hourly Adjustment		**-46.6**	**27.8**	**29.5**	**30.8**	**31.1**	**31.6**

STATIONARY SOURCE NOISE PREDICTION MODEL

6/17/2019

***Observer Location:* R15**
Source: Truck Unloading/Docking Activity
Condition: Operational

Project Name: MCH
Job Number: 10351
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	887.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	887.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	0.0	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	887.0	-29.4	-29.4	-29.4	-29.4	-29.4	-29.4
Shielding (Barrier Attenuation)	887.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-29.4	34.8	37.8	42.4	46.2	50.6
60 Minute Hourly Adjustment		**-29.4**	**34.8**	**37.8**	**42.4**	**46.2**	**50.6**

STATIONARY SOURCE NOISE PREDICTION MODEL

6/17/2019

***Observer Location:* R15**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: MCH
Job Number: 10351
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	715.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	715.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	0.0	49.0	50.0	55.0	61.0	71.9
Distance Attenuation	715.0	-37.1	-37.1	-37.1	-37.1	-37.1	-37.1
Shielding (Barrier Attenuation)	715.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-37.1	11.9	12.9	17.9	23.9	34.8
60 Minute Hourly Adjustment		**-37.1**	**11.9**	**12.9**	**17.9**	**23.9**	**34.8**

STATIONARY SOURCE NOISE PREDICTION MODEL

6/17/2019

Observer Location: **R16**
Source: Air Conditioning Unit (Roof-Top)
Condition: Operational

Project Name: MCH
Job Number: 10351
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	871.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	871.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	0.0	74.4	76.1	77.4	77.7	78.2
Distance Attenuation	871.0	-44.8	-44.8	-44.8	-44.8	-44.8	-44.8
Shielding (Barrier Attenuation)	871.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-44.8	29.6	31.3	32.6	32.9	33.4
39 Minute Hourly Adjustment		**-46.7**	**27.7**	**29.4**	**30.7**	**31.0**	**31.5**

STATIONARY SOURCE NOISE PREDICTION MODEL

6/17/2019

Observer Location: **R16**
Source: Truck Unloading/Docking Activity
Condition: Operational

Project Name: MCH
Job Number: 10351
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	896.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	896.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	0.0	64.2	67.2	71.8	75.6	80.0
Distance Attenuation	896.0	-29.5	-29.5	-29.5	-29.5	-29.5	-29.5
Shielding (Barrier Attenuation)	896.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-29.5	34.7	37.7	42.3	46.1	50.5
60 Minute Hourly Adjustment		**-29.5**	**34.7**	**37.7**	**42.3**	**46.1**	**50.5**

STATIONARY SOURCE NOISE PREDICTION MODEL	6/17/2019

Observer Location: **R16**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: MCH
Job Number: 10351
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,213.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,213.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	0.0	49.0	50.0	55.0	61.0	71.9
Distance Attenuation	2,213.0	-46.9	-46.9	-46.9	-46.9	-46.9	-46.9
Shielding (Barrier Attenuation)	2,213.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		-46.9	2.1	3.1	8.1	14.1	25.0
60 Minute Hourly Adjustment		**-46.9**	**2.1**	**3.1**	**8.1**	**14.1**	**25.0**

Appendix D

Cultural Resource Letters

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017-3489

August 10, 2020

Ms. Julianne Polanco
State Historic Preservation Officer
Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, California 95816-7100

Dear Ms. Polanco:

The U.S. Army Corps of Engineers (Corps), Los Angeles District is consulting with your office regarding a proposed industrial development located in the southern portion of the City of Chino in San Bernardino County, California. The proposed 97-acre industrial development would consist of two warehouse buildings and associated parking areas, drive aisles, outdoor employee break areas, stormwater drainage facilities, and ornamental landscaping. The proposed development is situated on lands owned by the Orange County Flood Control District which are located within the Prado Dam Inundation Area (PDIA). In order to develop the parcel as proposed, the ground surface elevations of the building footprints would need to be raised above the 566-foot flood elevation level of the PDIA. Fill material would be excavated from five proposed borrow locations within the PDIA and transported to the development site in order to raise the proposed building footprints above the inundation line and create additional flood water holding capacity at the excess fill dirt sites. Approximately 740,000 gross cubic yards of fill dirt would be brought to the Project development site from the proposed borrow sites.

Consent from the Corps is required to remove borrow fill from land within the PDIA. Additionally, the proposed Borrow Site located at the southeast corner of Chino Corona Road and East County Road (identified as proposed Borrow Site 4) would require a construction approval from the Corps in order to grade a small area of adjacent Corps land (APN 1057-212-09, -11) in order to maintain the current drainage pattern. The proposed Project would also require a storm drain easement from the Corps within the adjacent El Prado Golf Course (APN 1056-351-02, -01). The Corps is consulting with your office under Section 106 of the National Historic Preservation Act. This letter provides a brief description of the undertaking, documents the area of potential effect (APE), summarizes our efforts to identify historic properties, and requests your concurrence with our finding that there will be *no historic properties affected.*

The Corps has defined the APE as the entire 97-acre development site and the five borrow locations where fill would be removed. The total APE is approximately 265 acres. Majestic Reality Co. contracted with Brian F. Smith and Associates (BFSA) to complete a cultural resource assessment of the APE (Enclosure 1) in anticipation of the Corps Section 106 responsibilities. As part of their assessment, BFSA conducted a records search at the South Central Coastal Information Center (SCCIC) at California State University Fullerton (CSUF) and the Eastern Information Center (EIC) at the University of California Riverside (UCR). The records search included a review of all previously recorded cultural resources and previous cultural resources studies within a ½-mile radius of the Project area. An archaeological survey was conducted on March 14 and 15, 2019, which consisted of an intensive pedestrian survey that included parallel transects that covered the entirety of the Project development site and the five Borrow Sites.

As part of their historic property identification efforts, BFSA contacted the Native American Heritage Commission (NAHC) to request a review of the Sacred Lands File (SLF) to determine if any recorded Native American sacred sites or locations of religious or ceremonial importance are present within one mile of the APE. The NAHC responded to BFSA on October 28, 2018 indicating the record search returned negative results. The contacts list provided by the NAHC identified a total of 17 contacts with possible knowledge of cultural resources in the Project area. BFSA contacted the individuals/groups on the contacts list via postal and email communications on November 6, 2018 and a total of two responses had been received by the time the cultural resources reports were written in June 2019. The Morongo Band of Mission Indians indicate that they have no additional information to provide at this time. The Agua Caliente Band of Cahuilla Indians indicate that the APE is not located within their Traditional Use Area and therefore, defer to the other tribes in the area.

A total of thirteen cultural resource sites were identified within the APE during the survey and/or record search. Seven of these sites had previously been recorded, CA-SBR-2845, CA-SBR-5241, CA-SBR-12573H, CA-SBR-12613H, P-36-029722, CA-SBR-29791H, and P-36-029792. Of these seven previously-recorded sites, six had been either recommended as ineligible for the National Register of Historic Places (NRHP) or were determined to be not eligible for the California Register of Historic Places. As part of their assessment, BFSA reevaluated these sites and also recommended them as ineligible for the NRHP under all criteria. The final site, CA-SBR-12573H, is a historic ditch known to have been in existence in 1888. The records search indicates a 430-foot portion of the ditch should be located within the southeast corner of Borrow Site Five; however, BFSA did not identify the presence of any portion of the historic era ditch remaining within the APE. Historical aerial photographs indicate that portions of the ditch in the APE were likely destroyed prior to 1938.

Of the remaining six sites, five are foundation remnants of demolished buildings and structures, CA-SBR-33112H, CA-SBR-33113H, CA-SBR-33115H, CA-SBR-33116H, and CA-SBR-33117H. All five are associated with the region's dairy history. None of these sites retain enough integrity to be eligible under Criteria A-C. Further, since the burning of garbage was outlawed in 1939 and garbage collection was available in the early 1950s, it is unlikely that trash deposits associated with these foundations are present. The remaining site, P-36-033114, consists of a single-family residence built between 1948 and 1959 and a detached garage built between 1967 and 1980. There is also a modern shed and modern cabin built after 1980. The residence and garage lack essential integrity. Neither structure is representative of any specific architectural style or are associated with events or individuals. The Corps has determined that the site is not eligible for the NRHP under any criteria.

At this time the Corps is requesting your review and agreement with our determination that sites CA-SBR-2845, CA-SBR-5241, CA-SBR-12573H, CA-SBR-12613H, P-36-029722, CA-SBR-29791H, P-36 -029792, CA-SBR-33112H, CA-SBR-33113H, CA-SBR-33115H, CA-SBR-33116H, CA-SBR-33117H and P-36-033114 are not eligible for the National Register of Historic Places. The Fuqua Ditch CA-SBR-12573H is a long linear site and where it is still extant may be eligible; however it is no longer present within the APE. The Corps is requesting agreement with our finding that the undertaking would result in no historic properties affected. The Corps has compiled a table to aid in your review of the report (Enclosure 2). The Corps is concurrently notifying the Federally recognized and non-Federally recognized Tribes listed in Appendix D of Enclosure 1. We appreciate your consideration of our request. If you have specific questions or if we can provide any clarification about this request or any other concerns, please contact Ms. Danielle Storey, Archaeologist, at Danielle.L.Storey@usace.army.mil or at (213) 308-0437.

Sincerely,

Eduardo T. De Mesa
Chief, Planning Division

Enclosure(s)

State of California • Natural Resources Agency
Gavin Newsom, *Governor*

DEPARTMENT OF PARKS AND RECREATION
OFFICE OF HISTORIC PRESERVATION
Armando Quintero, *Director*

Julianne Polanco, State Historic Preservation Officer
1725 23rd Street, Suite 100, Sacramento, CA 95816-7100
Telephone: (916) 445-7000 FAX: (916) 445-7053
calshpo.ohp@parks.ca.gov www.ohp.parks.ca.gov

September 09, 2020 In reply refer to: COE_2020_0811_004

VIA ELECTRONIC MAIL

Eduardo T. DeMesa
Chief, Planning Division
U.S. Army Corps of Engineers, Los Angeles District
915 Wilshire Blvd., Suite 930
Los Angeles, CA 90017-3489

RE: Section 106 consultation for the Majestic Chino Heritage, San Bernardino County

Dear Eduardo DeMesa,

The U.S. Army Corps of Engineers (COE) is initiating consultation with the State Historic Preservation Officer (SHPO) to comply with Section 106 of the National Historic Preservation Act of 1966 (as amended) and its implementing regulation at 36 CFR Part 800. By letter received on August 11, 2020, the COE is seeking comments on their finding of effect for the above-referenced undertaking. The COE submitted the following document to support their finding of effect:

- *A Section 106 (NHPA) Historic Properties Study for the Majestic Chino Heritage Project; City of Chino, San Bernardino County, California* (Brian F. Smith and Associates, Inc. 2019, revised 2020)

The COE is issuing a permit supporting the construction of an industrial development east of the Chino Airport in the Prado Dam Inundation Area (PIDA) in the City of Chino, San Bernardino County. Project activities include the construction of two buildings for general industrial space and associated parking lots, storm water drainages and landscaping. As construction is proposed within the PIDA, the project requires soils to be built up to elevate the buildings out of the flood zone. Five borrow sites (Borrow Site 1-5) will be used for materials relocation to the proposed building footprint areas. The Area of Potential Effects (APE) is defined as 265 acres, encompassing the 97-acre construction site and the five borrow areas. Efforts to identify historic properties include a records search, pedestrian survey, and Native American outreach.

The COE's applicant requested a Sacred Lands File from the Native American Heritage Commission (NAHC) returning negative results. The COE contacted Native American entities listed by the NAHC as having cultural ties to the project area. The COE received response from the Gabrieleño Band of Mission Indians-Kizh Nation, expressing concern over excavation in the PDIA, the sensitivity of the area for inadvertently damaging previously unrecorded archaeological sites and requesting tribal monitors be present during excavation. Addressing these concerns, the COE is requiring archaeological and Native American monitoring as a permit condition.

Efforts to identify historic properties resulted in 13 possible historic properties in the APE. The COE has evaluated these properties and made determinations of eligibility for the National Register as listed in the table below with the associated SHPO concurrence.

Site #	Description	COE determination	SHPO concurrence
CA-SBR-33112H	Foundational remains of a dairy farm. First structures built between 1948 and 1959. Other structures were added and/or removed between 1959 and 2014. Only concrete pathways (milk parlor alleys) remain.	Not Eligible	Concur
CA-SBR-33113H	Foundational remains of a dairy farm – includes concrete driveway and concrete pathways. Site had once contained a Streamline Moderne-style milk parlor building and a Ranch-style residence but these have been destroyed.	Not Eligible	Concur
CA-SBR-5241	Reported location of a Lithic Scatter. Location was noted by (Langenwalter and Brock 1985) however they did not find evidence of the site. Site was not found during pedestrian survey.	Not Eligible/Not Extant	Not extant – will need to be evaluated if found during monitoring.
P-36-029722	Previously recorded Southern California Edison transmission line.	Not Eligible	Tower concurred not eligible. Transmission line adequately evaluated in Supernowicz 2013 DPR 523.
P-36-033114	Single-family residence built between 1948 and 1959 and a detached garage built between 1967 and 1980. There is	Not Eligible	Concur

Site #	Description	COE determination	SHPO concurrence
	also a modern shed and modern cabin (post 1980) at the site.		
CA-SBR-33115H	Foundation remnants of the J.H. Warner/D.B. Warner Ranch and Warner's Stock Removal Company slaughterhouse facility and associated structures. The first structures were built between 1938 and 1946. Other structures were added and/or removed to the site between 1948 and 1980 and the last remaining structures were demolished prior to 1994.	Not Eligible	Concur
CA-SBR-29791H	Previously recorded 1948 to 1959 farm or dairy farm foundation remains/concrete pads. No standing structures remain at the site.	Not Eligible	Concur
P-36-029792	Previously recorded segment of the Serrano-Mira Loma Transmission Line built circa 1966.	Not Eligible	Concur
CA-SBR-12613H	Previously recorded 1953 to 1954 Southern California Edison transmission alignment.	Not Eligible	Concur
CA-SBR-33116H	Case Van Der Eyk and Sons dairy farm driveway remnants. Original structures built between 1959 and 1966. Demolished between 2011 and 2013.	Not Eligible	Concur
CA-SBR-2845	Previously recorded prehistoric lithic scatter. Site was not found during pedestrian survey.	Not Eligible/Not Extant	Not found in APE- will need to be evaluated if found during monitoring.
CA-SBR-33117H	1930s orchard, outbuilding, and dairy feed alley (1967-1994) and a concrete driveway to a modern residence that has been destroyed (1973).	Not Eligible	Concur
CA-SBR-12573H	Previously recorded portion of the alignment of the 1888 Fuqua Ditch.	Not Extant in APE	Not extant in APE, no need to evaluate

The COE has concluded that issuing a permit would have no effect on historic properties and has requested my review and comment on their finding of effect for the proposed undertaking. After reviewing your letter and supporting documentation, **I do not object** to a finding of *no historic properties affected* for this undertaking pursuant to 36 CFR 800.4(d)(1).

Be advised that under certain circumstances, such as unanticipated discovery or a change in project description, the COE may have additional future responsibilities for this undertaking under 36 CFR Part 800. If you require further information, contact Elizabeth Hodges of my staff at (916) 445-7017 or Elizabeth.Hodges@parks.ca.gov.

Sincerely,

Julianne Polanco
State Historic Preservation Officer

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017-3489

August 10, 2020

Ms. Donna Yocum
Chairperson
San Fernando Band of Mission Indians
P.O. Box 221838
Newhall, California 91322

Dear Chairperson Yocum:

The U.S. Army Corps of Engineers (Corps), Los Angeles District is consulting with your office regarding a proposed industrial development located in the southern portion of the City of Chino in San Bernardino County, California. The proposed 97-acre industrial development would consist of two warehouse buildings and associated parking areas, drive aisles, outdoor employee break areas, stormwater drainage facilities, and ornamental landscaping. The proposed development is situated on lands owned by the Orange County Flood Control District which are located within the Prado Dam Inundation Area (PDIA). In order to develop the parcel as proposed, the ground surface elevations of the building footprints would need to be raised above the 566-foot flood elevation level of the PDIA. Fill material would be excavated from five proposed borrow locations within the PDIA and transported to the development site in order to raise the proposed building footprints above the inundation line and create additional flood water holding capacity at the excess fill dirt sites. Approximately 740,000 gross cubic yards of fill dirt would be brought to the Project development site from the proposed borrow sites.

Consent from the Corps is required to remove borrow fill from land within the PDIA. Additionally, the proposed Borrow Site located at the southeast corner of Chino Corona Road and East County Road (identified as proposed Borrow Site 4) would require a construction approval from the Corps in order to grade a small area of adjacent Corps land (APN 1057-212-09, -11) in order to maintain the current drainage pattern. The proposed Project would also require a storm drain easement from the Corps within the adjacent El Prado Golf Course (APN 1056-351-02, -01). The Corps has determined that the proposed federal action is an undertaking that has the potential to affect historic properties as part of our review under Section 106 of the National Historic Preservation Act (NHPA). This letter provides a brief project description, documents the area of potential effect (APE), summarizes our efforts to identify historic properties, and seeks your comments on our finding that the undertaking would result in *no historic properties affected*. The Corps welcomes you to share any issues or concerns you may have and seeks your assistance in identifying any properties which are of religious or cultural significance that may be affected by the project (see 36 C.F.R 800.4(a)(4)).

The Corps has defined the APE as the entire 97-acre development site and the five borrow locations where fill would be removed. The total APE is approximately 265 acres. Majestic Reality Co. contracted with Brian F. Smith and Associates (BFSA) to complete a cultural resource assessment of the APE (Enclosure 1) in anticipation of the Corps Section 106 responsibilities. As part of their assessment, BFSA conducted a records search at the South Central Coastal Information Center (SCCIC) at California State University Fullerton (CSUF) and the Eastern Information Center (EIC) at the University of California Riverside (UCR). The

records search included a review of all previously recorded cultural resources and previous cultural resources studies within a ½-mile radius of the Project area. An archaeological survey was conducted on March 14 and 15, 2019, which consisted of an intensive pedestrian survey that included parallel transects that covered the entirety of the Project development site and the five Borrow Sites.

As part of their historic property identification efforts, BFSA contacted the Native American Heritage Commission (NAHC) to request a review of the Sacred Lands File (SLF) to determine if any recorded Native American sacred sites or locations of religious or ceremonial importance are present within one mile of the APE. The NAHC responded to BFSA on October 28, 2018 indicating the record search returned negative results. The contacts list provided by the NAHC identified a total of 17 contacts with possible knowledge of cultural resources in the Project area. BFSA contacted the individuals/groups on the contacts list via postal and email communications on November 6, 2018 and a total of two responses had been received by the time the cultural resources reports were written in June 2019. The Morongo Band of Mission Indians indicate that they have no additional information to provide at this time. The Agua Caliente Band of Cahuilla Indians indicate that the APE is not located within their Traditional Use Area and therefore, defer to the other tribes in the area.

A total of thirteen cultural resource sites were identified within the APE during the survey and/or record search. Seven of these sites had previously been recorded, CA-SBR-2845, CA-SBR-5241, CA-SBR-12573H, CA-SBR-12613H, P-36-029722, CA-SBR-29791H, and P-36-029792. Of these seven previously-recorded sites, six had been either recommended as ineligible for the National Register of Historic Places (NRHP) or were determined to be not eligible for the California Register of Historic Places. As part of their assessment, BFSA reevaluated these sites and also recommended them as ineligible for the NRHP under all criteria. The final site, CA-SBR-12573H, is a historic ditch known to have been in existence in 1888. The records search indicates a 430-foot portion of the ditch should be located within the southeast corner of Borrow Site Five; however, BFSA did not identify the presence of any portion of the historic era ditch remaining within the APE. Historical aerial photographs indicate that portions of the ditch in the APE were likely destroyed prior to 1938.

Of the remaining six sites, five are foundation remnants of demolished buildings and structures, CA-SBR-33112H, CA-SBR-33113H, CA-SBR-33115H, CA-SBR-33116H, and CA-SBR-33117H. All five are associated with the region's dairy history. None of these sites retain enough integrity to be eligible under Criteria A-C. Further, since the burning of garbage was outlawed in 1939 and garbage collection was available in the early 1950s, it is unlikely that trash deposits associated with these foundations are present. The remaining site, P-36-033114, consists of a single-family residence built between 1948 and 1959 and a detached garage built between 1967 and 1980. There is also a modern shed and modern cabin built after 1980. The residence and garage lack essential integrity. Neither structure is representative of any specific architectural style or are associated with events or individuals. The Corps has determined that the site is not eligible for the NRHP under any criteria.

By this letter the Corps requests your comments on the appropriateness of the APE (pursuant to 36 C.F.R. 800.(a)(l)) and any concerns or comments that you may have on the undertaking or its potential effect on historic properties. The Corps is concurrently consulting with the State Historic Preservation Officer (SHPO) regarding our determination that sites CA-SBR-2845, CA-SBR-5241, CA-SBR-12573H, CA-SBR-12613H, P-36-029722, CA-SBR-

29791H, P-36 -029792, CA-SBR-33112H, CA-SBR-33113H, CA-SBR-33115H, CA-SBR-33116H, CA-SBR-33117H and P-36-033114 are not eligible for the National Register of Historic Places. The Fuqua Ditch, CA-SBR-12573H, is a long linear site and where it is still extant it may be eligible; however it is no longer present within the APE. The Corps is also requesting agreement from the SHPO with our finding that the undertaking would result in no historic properties affected. The Corps has compiled a table to aid in your review of the report (Enclosure 2). The Corps would appreciate any comments you may have on the appropriateness of our APE and/or any comment you have on the project at your earliest convenience or within 30 days. We appreciate your consideration of our request. If you have specific questions or if we can provide any clarification about this request or any other concerns, please contact Ms. Danielle Storey, Archaeologist, at Danielle.L.Storey@usace.army.mil or at (213) 308-0437.

Sincerely,

Eduardo T. De Mesa
Chief, Planning Division

Enclosure(s)

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017-3489

August 10, 2020

Mr. Andrew Salas
Chairperson
Gabrieleno Band of Mission Indians – Kizh Nation
P.O. Box 393
Covina, California 91723

Dear Chairperson Salas:

The U.S. Army Corps of Engineers (Corps), Los Angeles District is consulting with your office regarding a proposed industrial development located in the southern portion of the City of Chino in San Bernardino County, California. The proposed 97-acre industrial development would consist of two warehouse buildings and associated parking areas, drive aisles, outdoor employee break areas, stormwater drainage facilities, and ornamental landscaping. The proposed development is situated on lands owned by the Orange County Flood Control District which are located within the Prado Dam Inundation Area (PDIA). In order to develop the parcel as proposed, the ground surface elevations of the building footprints would need to be raised above the 566-foot flood elevation level of the PDIA. Fill material would be excavated from five proposed borrow locations within the PDIA and transported to the development site in order to raise the proposed building footprints above the inundation line and create additional flood water holding capacity at the excess fill dirt sites. Approximately 740,000 gross cubic yards of fill dirt would be brought to the Project development site from the proposed borrow sites.

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Sincerely,

Eduardo T. De Mesa
Chief, Planning Division

Enclosure(s)

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017-3489

August 10, 2020

Mr. Anthony Morales
Chairperson
Gabrieleno/Tongva San Gabriel Band of Mission Indians
P.O. Box 693
San Gabriel, California 91778

Dear Chairperson Morales:

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Consent from the Corps is required to remove borrow fill from land within the PDIA. Additionally, the proposed Borrow Site located at the southeast corner of Chino Corona Road and East County Road (identified as proposed Borrow Site 4) would require a construction approval from the Corps in order to grade a small area of adjacent Corps land (APN 1057-212-09, -11) in order to maintain the current drainage pattern. The proposed Project would also require a storm drain easement from the Corps within the adjacent El Prado Golf Course (APN 1056-351-02, -01). The Corps has determined that the proposed federal action is an undertaking that has the potential to affect historic properties as part of our review under Section 106 of the National Historic Preservation Act (NHPA). This letter provides a brief project description, documents the area of potential effect (APE), summarizes our efforts to identify historic properties, and seeks your comments on our finding that the undertaking would result in *no historic properties affected*. The Corps welcomes you to share any issues or concerns you may have and seeks your assistance in identifying any properties which are of religious or cultural significance that may be affected by the project (see 36 C.F.R 800.4(a)(4)).

The Corps has defined the APE as the entire 97-acre development site and the five borrow locations where fill would be removed. The total APE is approximately 265 acres. Majestic Reality Co. contracted with Brian F. Smith and Associates (BFSA) to complete a cultural resource assessment of the APE (Enclosure 1) in anticipation of the Corps Section 106 responsibilities. As part of their assessment, BFSA conducted a records search at the South Central Coastal Information Center (SCCIC) at California State University Fullerton (CSUF) and

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Eduardo T. De Mesa
Chief, Planning Division

Enclosure(s)

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017-3489

August 10, 2020

Sandonne Goad
Chairperson
Gabrielino /Tongva Nation
106 1/2 Judge John Aiso Street #231
Los Angeles, California 90012

Dear Chairperson Goad:

The U.S. Army Corps of Engineers (Corps), Los Angeles District is consulting with your office regarding a proposed industrial development located in the southern portion of the City of Chino in San Bernardino County, California. The proposed 97-acre industrial development would consist of two warehouse buildings and associated parking areas, drive aisles, outdoor employee break areas, stormwater drainage facilities, and ornamental landscaping. The proposed development is situated on lands owned by the Orange County Flood Control District which are located within the Prado Dam Inundation Area (PDIA). In order to develop the parcel as proposed, the ground surface elevations of the building footprints would need to be raised above the 566-foot flood elevation level of the PDIA. Fill material would be excavated from five proposed borrow locations within the PDIA and transported to the development site in order to raise the proposed building footprints above the inundation line and create additional flood water holding capacity at the excess fill dirt sites. Approximately 740,000 gross cubic yards of fill dirt would be brought to the Project development site from the proposed borrow sites.

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Chief, Planning Division

Enclosure(s)

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017-3489

August 10, 2020

Mr. Robert Dorame
Chairperson
Gabrielino Tongva Indians of California Tribal Council
P.O. Box 490
Bellflower, California 90707

Dear Chairperson Dorame:

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915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017-3489

August 10, 2020

Mr. Charles Alvarez
Chairperson
Gabrielino-Tongva Tribe
23454 Vanowen Street
West Hills, California 91307

Dear Chairperson Alvarez:

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Of the remaining six sites, five are foundation remnants of demolished buildings and structures, CA-SBR-33112H, CA-SBR-33113H, CA-SBR-33115H, CA-SBR-33116H, and CA-SBR-33117H. All five are associated with the region's dairy history. None of these sites retain enough integrity to be eligible under Criteria A-C. Further, since the burning of garbage was outlawed in 1939 and garbage collection was available in the early 1950s, it is unlikely that trash deposits associated with these foundations are present. The remaining site, P-36-033114, consists of a single-family residence built between 1948 and 1959 and a detached garage built between 1967 and 1980. There is also a modern shed and modern cabin built after 1980. The residence and garage lack essential integrity. Neither structure is representative of any specific architectural style or are associated with events or individuals. The Corps has determined that the site is not eligible for the NRHP under any criteria.

By this letter the Corps requests your comments on the appropriateness of the APE (pursuant to 36 C.F.R. 800.(a)(l)) and any concerns or comments that you may have on the undertaking or its potential effect on historic properties. The Corps is concurrently consulting with the State Historic Preservation Officer (SHPO) regarding our determination that sites CA-SBR-2845, CA-SBR-5241, CA-SBR-12573H, CA-SBR-12613H, P-36-029722, CA-SBR-

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Sincerely,

Eduardo T. De Mesa
Chief, Planning Division

Enclosure(s)

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CALIFORNIA 90017-3489

August 10, 2020

Mr. Matias Belardes
Chairperson
Juaneno Band of Mission Indians Acjachemen Nation -Belardes
32161 Avenida Los Amigos
San Juan Capisttrano, California 92675

Dear Chairperson Belardes:

The U.S. Army Corps of Engineers (Corps), Los Angeles District is consulting with your office regarding a proposed industrial development located in the southern portion of the City of Chino in San Bernardino County, California. The proposed 97-acre industrial development would consist of two warehouse buildings and associated parking areas, drive aisles, outdoor employee break areas, stormwater drainage facilities, and ornamental landscaping. The proposed development is situated on lands owned by the Orange County Flood Control District which are located within the Prado Dam Inundation Area (PDIA). In order to develop the parcel as proposed, the ground surface elevations of the building footprints would need to be raised above the 566-foot flood elevation level of the PDIA. Fill material would be excavated from five proposed borrow locations within the PDIA and transported to the development site in order to raise the proposed building footprints above the inundation line and create additional flood water holding capacity at the excess fill dirt sites. Approximately 740,000 gross cubic yards of fill dirt would be brought to the Project development site from the proposed borrow sites.

Consent from the Corps is required to remove borrow fill from land within the PDIA. Additionally, the proposed Borrow Site located at the southeast corner of Chino Corona Road and East County Road (identified as proposed Borrow Site 4) would require a construction approval from the Corps in order to grade a small area of adjacent Corps land (APN 1057-212-09, -11) in order to maintain the current drainage pattern. The proposed Project would also require a storm drain easement from the Corps within the adjacent El Prado Golf Course (APN 1056-351-02, -01). The Corps has determined that the proposed federal action is an undertaking that has the potential to affect historic properties as part of our review under Section 106 of the National Historic Preservation Act (NHPA). This letter provides a brief project description, documents the area of potential effect (APE), summarizes our efforts to identify historic properties, and seeks your comments on our finding that the undertaking would result in *no historic properties affected*. The Corps welcomes you to share any issues or concerns you may have and seeks your assistance in identifying any properties which are of religious or cultural significance that may be affected by the project (see 36 C.F.R 800.4(a)(4)).

The Corps has defined the APE as the entire 97-acre development site and the five borrow locations where fill would be removed. The total APE is approximately 265 acres. Majestic Reality Co. contracted with Brian F. Smith and Associates (BFSA) to complete a cultural resource assessment of the APE (Enclosure 1) in anticipation of the Corps Section 106 responsibilities. As part of their assessment, BFSA conducted a records search at the South Central Coastal Information Center (SCCIC) at California State University Fullerton (CSUF) and the Eastern Information Center (EIC) at the University of California Riverside (UCR). The

records search included a review of all previously recorded cultural resources and previous cultural resources studies within a ½-mile radius of the Project area. An archaeological survey was conducted on March 14 and 15, 2019, which consisted of an intensive pedestrian survey that included parallel transects that covered the entirety of the Project development site and the five Borrow Sites.

As part of their historic property identification efforts, BFSA contacted the Native American Heritage Commission (NAHC) to request a review of the Sacred Lands File (SLF) to determine if any recorded Native American sacred sites or locations of religious or ceremonial importance are present within one mile of the APE. The NAHC responded to BFSA on October 28, 2018 indicating the record search returned negative results. The contacts list provided by the NAHC identified a total of 17 contacts with possible knowledge of cultural resources in the Project area. BFSA contacted the individuals/groups on the contacts list via postal and email communications on November 6, 2018 and a total of two responses had been received by the time the cultural resources reports were written in June 2019. The Morongo Band of Mission Indians indicate that they have no additional information to provide at this time. The Agua Caliente Band of Cahuilla Indians indicate that the APE is not located within their Traditional Use Area and therefore, defer to the other tribes in the area.

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Sincerely,

Eduardo T. De Mesa
Chief, Planning Division

Enclosure(s)

Appendix E

Geotechnical Study

KOURY
ENGINEERING
& TESTING, INC.

GEOTECHNICAL & SEISMIC ENGINEERING, CONSTRUCTION INSPECTION & MATERIALS TESTING SERVICES

CONSTRUCTION LEVEL GEOTECHNICAL STUDY

MAJESTIC CHINO LOGISTIC CENTER
SOUTHEAST CORNER OF
BICKMORE AVENUE AND MOUNTAIN AVENUE
CITY OF CHINO, CALIFORNIA

PREPARED FOR:
COMMERCE CONSTRUCTION CO., L.P.
13191 CROSSROADS PARKWAY NORTH 6th FLOOR
CITY OF INDUSTRY, CA 91746

PREPARED BY:
KOURY ENGINEERING & TESTING, INC.
14280 EUCLID AVENUE
CHINO, CALIFORNIA 91710

PROJECT NO. 18-0817

OCTOBER 24, 2018, REVISED FEBRUARY 14, 2019

TABLE OF CONTENTS

October 24, 2018, Revised February 14, 2019
Project No.18-0817

Mr. John R. Burroughs, LEED AP, President
Commerce Construction Co., L.P.
13191 Crossroads Parkway North 6th Floor
City of Industry, CA 91746

SUBJECT: Construction Level Geotechnical Study
Majestic Chino Logistic Center
Southeast Corner of Bickmore Avenue and Mountain Avenue
City of Chino, CA

1. INTRODUCTION

This report presents the results of a Geotechnical Investigation performed by Koury Engineering & Testing, Inc. (Koury) for the construction of two large distribution center buildings and associated improvements known as Majestic Chino Logistic Center located at the southeast corner of Bickmore Avenue and Mountain Avenue in the City of Chino (see Figure A-1 in Appendix A). The geotechnical study was performed to evaluate the subsurface soil conditions at the site in order to provide geotechnical recommendations for design and construction of the proposed facilities. This report includes our findings and recommendations for the design and construction of the proposed buildings and associated improvements from a geotechnical standpoint.

The recommendations provided within this submittal are based on the results of our field exploration, laboratory testing and engineering analyses. Our services were performed in general accordance with our Proposal No. 18-0817, dated August 20, 2018.

Our professional services have been performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical consultants practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report. This report has been prepared exclusively for Commerce Construction Co., L.P. and their consultants for the subject project. The report has not been prepared for use by other parties and may not contain sufficient information for the purposes of other parties or other uses.

2. SITE CONDITIONS

The site is bounded by Bickmore Avenue on the north, Mountain Avenue on the west, a golf course on the south, and a vacant lot and a concrete drainage channel on the east. Access is presently via Mountain Avenue on the west side. The site consists roughly of two rectangular areas; the northern area is parallel to Bickmore Avenue and measures about 2,420 feet in the east-west direction and 870 feet in the northerly direction. The southern area measures about 1,660 feet in the east-west direction, 1,340 feet in the northerly direction, and abuts against Mountain Avenue on the west.

The site was previously used as dairy farm and cattle raising. The site is presently vacant, and the buildings and cattle shelters have been removed. However, many of the slabs on grade, foundations, and most likely some of the underground utilities are still in place. At the time of the field exploration in September 2018, most of the site exposed bare ground. There was a few trees and shrubs along Mountain Avenue and around the seasonal water ponds.

The northeast corner of the site contains several water detention basins that are 3 to 5 feet deep; most of these basins have concrete-lined spillways. Within the same area, there is a relatively deep pond (roughly 80 to 100 feet wide, 200 feet long and 12 to 20 feet deep) containing vegetation and trash; this pond retains water during several months of the year. Two relatively smaller ponds were observed adjacent to Mountain Avenue; these ponds also retain storm water for several months of the year until the water evaporates. These ponds are about 10 to 12 feet deep.

The site generally slopes gently from north to south with elevations ranging from about 565 to 553 feet. Along the east property line, within the southeast portion of the site, there is a slope descending about 10 to 13 feet to a flood basin area. This slope gradually decreases in height in the north direction until it reaches a height of about 5 feet about 150 feet south of the proposed Building 1. We understand that a retaining wall ranging in height from about 1 to 12 feet and a length slightly over 400 feet will be constructed in the southeast corner of the Building 1 area to allow grading for the parking and driveway.

In its present state, the site has been cleared of the past structures such as buildings, shelters, and above ground ancillary facilities. The dominant features of the site are the many berms/levees that were constructed across the site. Many of these berms appear to have been constructed by pushing onsite soils into piles; however, the upper portion of some of the berms include imported soils. Within the northeast corner of the site, some of the berms are fitted with concrete spillways. Most of the berms have heights in the range of 3 to 6 feet and consist of relatively loose undocumented fill.

Within the northeastern portion of the proposed Building 2, there is an area measuring about 200 by 200 feet that was used to place import material. Several truckloads of soils were brought in and dumped in place without spreading. The average thickness of dumped material is on the order of 2½ to 3 feet.

3. PROPOSED IMPROVEMENTS

Koury understands the proposed project include the construction of two one-story tilt-up concrete buildings with slab on grade and relevant parking lots and site work. The larger rectangular-shaped Building 1 located within the northern portion of the property will have a footprint of approximately 1,172,387 square feet. This northern building will be about 2,112 feet long and 555 feet wide. The smaller Building 2, to be located within the southern portion of the property, will have a footprint of about 910,087 square feet. This southern building will measure about 1,400 by 650 feet in plan.

In accordance with the conceptual grading plan, there will be two detention basins located immediately south of the smaller building with storage capacities of 14.1 acre-feet and 9.7 acre-feet, respectively. Other proposed improvements include storm and a sewer pump building, construction of parking lots, driveways, retaining walls and some off-site work such as widening Mountain Avenue along the project frontage and construction of curbs and gutters.

We understand that the building pad will be raised to elevation 567 feet, which is one foot above the flood elevation of 566 feet. Most of the Building 1 area will require fill in the range of 2 to 8 feet in thickness with an average of about 5 feet above existing grade at the boring and test pit locations except for the existing retention pond/basin areas where deeper fill will be required to reach design grade. The proposed fill thickness above the existing bottom of the main retention pond is anticipated to be on the order of 30 feet, not including the required overexcavation. This pond contains debris and vegetation, and stores water during several months of the year. The existing detention basin at the northeast corner of the proposed Building 1 is not part of this project. There will be relatively small permanent cuts in the range of 1 to 5 feet in localized areas north and south of Building 1.

Except for the proposed two basins and some localized areas along Mountain Avenue, the grades in the southern half of the site will be raised. The grades within the area of Building 2 will generally be raised by 10 to 12 feet above existing grades. There are two existing water ponds encroaching within the proposed Building 2 footprint along Mountain Avenue that will require about 22 feet or more of backfill above existing grade.

Architectural and structural design details for the buildings were not provided. For the purpose of this report we understand that the maximum column loads will be about 95 kips and wall load approximately 8 kips per lineal foot. We understand that bearing pressures of 2,500 psf for footing and 1,000 psf for slab on grade are typically used.

4. FIELD EXPLORATION

The field exploration programs, including the feasibility study, consisted of drilling 14 soil test borings in Building 1, 10 soil test borings in Building 2, two soil test borings in the Detention Basin A and one boring in the WQ Basin B. Truck-mounted hollow-stem auger drilling equipment was used to drill the test borings, which range in depth from about 16½ to 71½ feet. In addition, a rubber tire backhoe was used to excavate a total of 71 test pits ranging in depth from about 4½ to 16½ feet. The borings and test pits were excavated during the months of May 2017 and August and September of 2018.

The locations of the borings and test pits are shown on the Field Exploration Map, Figures A-2a and A-2b, Appendix A. Standard Penetration Test samples, California Ring samples and bulk samples were obtained from the borings for laboratory testing, and bulk samples were obtained from the test pits. The contractor used a 140-lbs automatic hammer to drive the samplers 18 inches into the soils.

5. LABORATORY TESTING

Laboratory tests, including moisture content, dry unit weight, #200 sieve wash, pocket penetrometer, expansion index, plasticity index, consolidation, direct shear and maximum density were performed to aid in the classification of the materials encountered and to evaluate their engineering properties. Sulfates, chlorides, resistivity, and PH tests (corrosivity tests) were also performed on selected samples. The results of pertinent laboratory tests are presented on the boring logs in Appendix B, and/or in Appendix C.

6. SOIL CONDITIONS

The subsurface soil profile consists generally of artificial fill underlain by alluvial deposits. For the most part, the existing fill is generally 1 to 3 feet thick except for the berms/levees that were constructed, which range in height predominantly between 3 and 7 feet. The fill derived from onsite soils consists predominantly of medium plastic clay (lean clay with sand and sandy lean clay). The fill derived from previously imported material include various mixtures of soils, including asphalt, silty sand, gravel, cobbles, boulders, clay, and shale.

A large portion of the site contains a layer of younger alluvium underneath the fill and above the older alluvium. This younger alluvium generally ranges in thickness from about 2 to 6 feet and consists predominantly of lean clay with sand with localized areas of fat clay. The older alluvium was encountered at depths predominantly between 3½ and 6 feet, and for the most part also consists of clay (both fat and lean clay). The fat clay generally has a higher moisture content and is more expansive than the lean clay, and is considered a less desirable material.

California drive samples were obtained from the borings and test pits. Nuclear gauge tests were also performed in selected test pits. The test data for the drive samples within the test pits and the nuclear gauge tests is summarized in Table C-1 presented in Appendix C. The dry unit weights of the California drive samples range from about 72 to 134 pcf with an average of about 105 pcf. The nuclear gauge tests results (on shallow soils in test pits up to 7 ½ feet) indicate dry unit weight ranging from 86 to 118 pcf with an average of about 103 pcf. The insitu moisture contents of the tested soils range from about 8 to 29½ percent with an average of about 18 percent. Depending upon the time of the year, the soil moisture content near the ground surface may vary. Table 1 presents the results of the moisture content tests within the upper 2½ and 8 feet and of the test pits and borings. This tables indicates that the moisture contents increase with depth and the moisture contents of the recent borings and test pits are lower than the previous borings, thus reflecting seasonal variation.

Table 1 – Moisture Content Test Results

Test Pit / Boring	Min Moisture (%)		Max Moisture (%)		Average Moisture (%)	
	2½ feet	8 feet	2½ feet	8 feet	2½ feet	8 feet
TP-1 to TP-21 (Old)	8.6	8.6	33.3	40.2	17.5	19.5
TP-22 to TP-72 (New)	4.2	4.2	37.1	39.4	15.1	18.4
B-1 to B-10 (Old)	8.1	8.1	21.9	29.8	15.9	17.9
B-11 to B-28 (New)	5.4	5.4	16.8	25.2	11.6	13.3

The degree of saturation was calculated based on the moisture content and the dry density of the tested samples. The results of our calculations show that for the samples at depths between about 2½ and 6 feet, the degree of saturation varies from about 40½ to 100 percent with an average of about 82 percent. Soils with insitu degree of saturation of 85 percent or higher normally require higher compaction efforts to obtain 90 percent relative compaction.

Maximum density tests were performed to evaluate the required dry back of the soils to satisfy the compaction requirements. The following Table 2 indicates the range of optimum moisture for the tests performed to date, which provide some indication of the possible dry back required to facilitate compaction.

Table 2 – Maximum Density Test Results

Test Pit Number/Depth	**TP-7**/7'	**TP-8**/12'	**TP-10/2'**	**TP-40/3'-3.8'**
Maximum Dry Density (pcf)	115.3	112.2	122.8	123.7
Optimum Moisture Content (%)	12.5	14.3	11.2	11.7

To aid in the soils classification and to correlate the soil plasticity with the soil expansion, four plasticity index tests (Atterberg Limits) were performed on samples from depths ranging between about 2 and 12 feet. As shown in Table 3, the liquid limits for the tested samples range between about 39 and 68 and the plasticity index between 20 and 46, which indicate material ranging from low to high plasticity.

Table 3 – Plasticity Test Results

Test Pit Number/Depth	**TP-5**/2’	**TP-7**/8’	**TP-8**/12’	**TP-10**/2’
Liquid Limit	39	51	68	39
Plastic Limit	19	21	22	17
Plasticity Index	20	30	46	22

Our #200 sieve wash tests indicated that the sand has fines contents in the range of 6 to 46 percent (average of about 27%) and the clay and silt have fines contents in the range of 50 to 99 percent with an average of about 73%. The dry unit weights range from about 72 to 134 pcf with an average of approximately 105 pcf. The consolidation tests indicated moderate consolidation with low potential for expansion and collapse upon addition of water under pressures of 3200 psf; however, some of the rebound curves indicate that the soils could expand significantly under low confining pressures. One direct shear test on a sample remolded to about 90 percent relative compaction indicated a peak friction angle of about 26 degrees and a peak cohesion of approximately 386 psf. The corresponding ultimate values are 28 degrees and 12 psf, respectively

The site soils are generally expansive (EI>20). Table 4 presents the data for 39 tests with depths ranging between 1 and 12 feet. These tests indicate expansion index ranging from 20 to 162 with an average of about 79. Within the upper 2½ feet, the range of expansion index is 20 to 102 with an average of about 68.

Table 4 – Expansion Index Test Results

Boring/Test Pit	Depth (ft)	Field Moisture (%)	Percentage of Fines	Expansion Index
TP-1	6	25.4	84	78
TP-3	5	16.0	76	62
TP-5	2	23.3	71	50
TP-7	7	27.8	81	59
TP-8	12	23.3	84	90
TP-14	1	35.2	77	89
TP-15	3	31.0	86	60
TP-17	2	33.3	92	96
TP-19	1	17.1	79	24
TP-22	3-3.8	17.4	83	126
TP-22	4-4.8	16-4-18.8	81-80	62
TP-23	1.5-2.2	17.6	60	97
TP-26	Surface	13.4	80	20
TP-26	4.2-4.9	39.4	66	74
TP-27	3.5-4.2	18.4-20.9	65-66	144
TP-28	3-3.8	20.4	71	81
TP-30	3-3.5	15.9	86	48
TP-31	3.8-4.3	16.1	63	86
TP-32	3.8-4.3	8.3	79	61
TP-33	2.5-3	17.9	59	63
TP-37	3-3.5	22.2	70	105
TP-40	3-3.8	10-7-11.5	79-77	162
TP-42	2.7-3.2	12.8	65	62
TP-44	3-3.5	15.1	73	57
TP-48	1.8-2.3	13.5	75	64
TP-50	2-2.5	16.4	73	71
TP-53	3-3.5	20.8	63	50
TP-55	2-4	15.3	80	111
TP-58	3-3.5	14.9	78	59
TP-59	3.5-4	--	--	88
TP-60	22.5’	22.3	89	102

Table 4 – Expansion Index Test Results (continued)

Boring/Test Pit	Depth (ft)	Field Moisture (%)	Percentage of Fines	Expansion Index
TP-65	6-6.5	24	82	99
TP-70	2.5-3.5	12	57	160
TP-71	2.5-3	14.2	59	45
B-11	0-4	15-6-16.8	64-69	52
B-13	0-4	10.2-11.7	72-66	47
B-23	2-4	16.3	76	107
B-24	2-4	15.8	77	96
B-25	2-4	14.5	84	78

There is a rough correlation between in situ natural moisture content at depth and expansion index. For the same amount of fines, site soils with higher moisture and higher plasticity index tend to have higher expansion index.

7. GROUNDWATER

According to Carson and Matti, 1985, the depth to regional groundwater should be about 35 to 45 feet below the existing ground surface. Groundwater was encountered in the borings at depths between about 24 and 44 feet below the existing ground surface with corresponding elevations between approximately 518 and 539 feet (NAVD88). Groundwater seepage was encountered in three test pits at about elevations between 539 and 541 feet. The groundwater encountered in the test pits and within Boring B-26 is believed to be perched water. The following table summarizes the groundwater depths and elevations encountered in the borings and test pits.

Table 5 - Summary of Groundwater Data

Boring/Test Pit	Ground Elevation (feet)	Groundwater Depth (feet)	Groundwater Elevation (feet)
B-1	557.5	32.5	525.0
B-2	554.3	31.0	523.3
B-7	562.0	28.0	534.0
B-8	556.5	33.0	523.5
TP-8	556.5	*15.5	*541.0
TP-15	552.4	*10.5	*542.4
B-16	560.7	41	518.7
B-24	563.0	27.5	535.5
B-26	563.0	**24	**539.0
TP-68	540.0	**2	**538.0

*Seepage **Perched water

Fluctuations of the groundwater level, localized zones of perched water, and elevated soil moisture contents should be anticipated during and following the rainy season.

8. SITE GEOLOGY

The site is located within the Upper Santa Ana River Valley, which consists of a series of coalescing alluvial fans formed by streams flowing out of the San Gabriel Mountains to the north. The valley lies within the Peninsular Ranges geomorphic province, which is characterized by alluviated basins, elevated erosion surfaces, and northwest-trending mountain ranges bounded by northwest trending faults. The site, which is located within the Chino Basin, is underlain by sediments deposited by the Santa Ana River and its tributaries such as the Chino Creek.

Morton and Miller (2006) show the site to be underlain by very old alluvial-fan deposits (See Figure A-3 in Appendix A). The sediments observed during drilling consisted predominantly of clay.

9. SEISMIC CONSIDERATIONS

9.1. General

The project site, like the rest of Southern California, is located within a seismically active region as a result of being located near the active margin between the North American and Pacific tectonic plates. The principal source of seismic activity is movement along the northwest-trending regional faults such as the San Andreas, San Jacinto, Newport-Inglewood and Whittier-Elsinore fault zones.

By definition of the California Geological Survey (CGS), an active fault is one which has had surface displacement within the Holocene Epoch (roughly the last 11,000 years). The CGS has defined a potentially active fault as any fault which has been active during the Quaternary Period (approximately the last 2,000,000 years). These definitions are used in delineating Earthquake Fault Zones as mandated by the Alquist-Priolo Geologic Hazard Zones Act of 1972 and as subsequently revised in 1997 as the Alquist-Priolo Earthquake Fault Zones. The intent of the act is to require fault investigations on sites located within Special Studies Zone to preclude new construction of certain inhabited structures across the trace of active faults.

The subject site is not located within an Alquist-Priolo Earthquake Fault Zone. Probably the most important fault to the site from a seismic shaking standpoint is the northwest trending Chino Fault, located approximately 1.4 miles southwest of the site. The Whittier Fault is located about 5¾ miles to the southwest. Based on the available maps, the "potentially active" Central Avenue Fault (presently not known to be active) passes through the southwest corner of Building 2. This fault is not known to have moved during the last 11, 000 years. Based on the information available at this time, it is our opinion that a Mw6.7 earthquake may occur on the Chino Fault and a Mw6.9 earthquake may occur on the nearest active segment of the Whittier Fault (see Figure A-4, Fault Map, for fault locations).

Large earthquakes could occur on other faults in the general area, but because of their greater distance and/or lower probability of occurrence, they are less important to the site from a seismic shaking standpoint. Due to the proximity of these faults, near field effects from strong ground motion associated with large earthquakes along these faults may occur at the site. These near field effects, including "fling" and directivity of strong ground motion, may result in significantly higher accelerations at the site, which is normally accounted for/mitigated by the structural design of the project.

9.2. Landsliding

The site is not located in a Landslide Hazard Zone on the State of California Seismic Hazard Zones Map. No evidence for landsliding was observed on or in the immediate vicinity of the site at the time of our field exploration. Based on topographic conditions, landsliding is not considered a potential hazard at the site.

9.3. Liquefaction and Seismic Settlement

Liquefaction may occur when saturated, loose to medium dense, cohesionless soils are densified by ground shaking or vibrations. The densification results in increased pore water pressures if the soils are not sufficiently permeable to dissipate these pressures during and immediately following an earthquake. When the pore water pressure is equal to or exceeds the overburden pressure, liquefaction of the affected soil layers occurs. For liquefaction to occur, three conditions are required:

- Ground shaking of sufficient magnitude and duration;
- Groundwater level at or above the level of the susceptible soils during the ground shaking; and
- Soils that are susceptible to liquefaction.

The Liquefaction Hazards zone on the State of California Seismic Hazards Zones Map indicates that the site is not located in a liquefaction susceptibility zone. However, for seismic settlement due to ground shaking should be considered. For seismic settlement analysis, we calculated an earthquake magnitude of Mw6.49 from a seismic-hazard deaggregation using the USGS Unified Hazard Tool. Our analysis also utilized a site acceleration of 0.71g (PGA_M) obtained from the USGS Design Maps Detailed Report. The SPT tests were performed with an automatic hammer and unlined SPT samplers.

Using the LiquifyPro software, we calculated maximum seismic settlements less than ½ inch for the alluvium to a depth of 50 feet (see result of calculations in Appendix C). Considering the recommendations in Section 7.66 of the SCEC Guidelines for Implementation of Special Publication 117 and our total seismic settlement calculations, it is our opinion that a relatively small differential settlement on the order of ¼ inch in 30 feet may be used for the design seismic event.

9.4. Tsunamis and Seiches

The site is located at an average elevation of approximately 560 feet and 28 miles away from the coastline. There is no mapped major reservoir in the immediate vicinity and upslope of the site. Therefore, tsunamis and seiches are not considered potential hazards.

10. FLOODING

Except for localized areas within the southwest portion of the site, the project area lies outside the 100-year flood zone as shown on the FEMA Flood Map # 06071C9335H, effective date 08/28/2008 (Figure A-5, Appendix A). The site is located at elevations between about 553 and 565 feet (NAVD88) and the existing Prado Dam spillway is reportedly near elevation 543 feet. However, it is understood that the spillway could be raised to elevation 566 feet, which would locate portions of the site, outside the building pads, within the 100-year flood zone.

11. COLLAPSIBLE SOILS

Soils prone to collapse are generally young and deposited by flash floods and wind. The onsite soil moisture contents are generally above optimum, which mitigate collapse potential. Our laboratory tests did not indicate significant collapse. Therefore, the potential for collapse is considered low. Overerexcavation and recompaction, and appropriate drainage are anticipated to mitigate the potential for hydrocollapse.

12. CONCLUSIONS AND RECOMMENDATIONS

12.1. General

In our opinion, the planned improvements are feasible from a geotechnical engineering point of view. The main concerns from a geotechnical standpoint are the presence of fill, soft alluvium near the ground surface, the presence of deep-water ponds encroaching within the building pads, the soil expansion potential, and the soil consolidation due to the proposed fill.

For the proposed buildings, we understand that bearing pressures of 2,000 to 2500 psf are typically used for footings and 1,000 psf for slab on grade. The proposed buildings may be supported on conventional continuous footings or isolated pad footings underlain by engineered fill.

The following sections contain preliminary geotechnical recommendations for the design and construction of the proposed improvements and include our recommendations and discussions about bearing capacity, settlement, flatwork, slabs-on-grade, temporary excavations, and utility trenches.

12.2. Site Grading and Clearing

The site should be cleared of all remaining foundations, concrete and wood debris. One area of the proposed Building 2 contains bark at the ground surface. We recommend that this bark material be raked, and the material taken offsite along with any other onsite vegetation such as trees, shrubs and stumps. There is also some asphalt and oversize cobbles and boulders that should be taken offsite.

All existing fill should be removed, including all the earth berms, and should be replaced as engineered fill. Depending upon the grading time of the year, excessively wet, soft or dry soils may be encountered within the upper 2 to 3 feet of the ground surface. Due to soil expansion potential, all soil with moisture content less than 2 percent above optimum within the building pad area and less than 1 percent above optimum outside the building pad should be overexcavated unless indicated otherwise by the Geotechnical Engineer at the time of construction. To remove the most compressible soils, we anticipate that most of the removal will be on the order of 2½ to 3½ feet deep outside building areas and 4 to 6 feet deep within building areas, extending below the existing undocumented fill bottom. Deeper removal will be required in areas of wet soils and former basins. A table of estimated removal depths at the test pit and boring locations is enclosed in Appendix C and preliminary Remedial Grading Maps (Figure A-2e and A-2f) are presented in Appendix A.

Some of the soils to be removed near the surface generally have a lower expansion potential than the deeper soils. Except for the obvious area of high expansive soils near the surface, we suggest separating the upper 2 to 2½ feet of soil and re-using these soils within the upper 2 feet of pavement subgrade or within the upper 6 to 7 feet of the building pad subgrade. Although less desirable, blending of soils with high expansion and low expansion potential may be acceptable if they are of similar composition (e.g. sandy lean clay with lean clay).

We anticipate the soils with an expansion index less than 80 ("moderate quality dirt") to perform satisfactorily below foundations provided the moisture content of the soils remain stable during the project life. It is therefore important to provide good drainage and to avoid constructing planters immediately adjacent to buildings and other foundations. Soils with greater expansion potential should be placed at least 4 feet below footings and at least 5 feet away from the buildings/structures and in areas such as parking lots, driveways, and planters at the discretion of the owner.

12.3 Grading of Existing Ponds

There are two ponds within the northeast portion of the site (see blue highlighting on Figures A-2a and A-2e). Immediately outside the southeast end of Building 1, there is a former detention basin with a length of approximately 380 feet and a width ranging between about 40 and 80 feet (see Cross Section B-B', Figure A-2d). There is also a water pond encroaching approximately 150 feet within the footprint of the proposed Building 1 (see Cross Section A-A', Figure A-2c, in Appendix A). This water pond is about 80 to 100 feet wide and 200 feet long. The water pond stands about 12 to 20 feet below the high adjacent grades and contains trash and vegetation along most of its perimeter. There is a relatively low area east of the pond.

At the west end of Building 2, there are two water ponds encroaching within the footprint of the building (see blue highlighting on Figure A-2b and A-2f). These ponds, which are located east of Mountain Avenue, retain storm water for several months of the year until the water evaporates. These two ponds are separated by a driveway running east-west. The northern pond measures about 45 by 190 feet in plan and has a depth of 10 to 12 feet and the southern pond is about 80 to 100 feet wide and approximately 190 feet in long and has a depth similar to the northern pond.

During the recent field exploration, the water had evaporated from all the ponds and test pits were excavated in the three ponds. Two test pits were previously excavated within the desilting basin southeast corner of Building 1. The estimated depth of removal presented in the table below are based on our evaluation of the test pit data. The actual depth of removal may vary depending upon the conditions observed at the time of grading.

Pond/Basin Location	Test Pit No.	Anticipated Removal *Depth (feet)
East of Building 1	TP-68	11+
Southeast Corner of Building 1	TP-14 and TP-15	15+
West end of Bldg 2, north pond	TP-67	4+
West end of Bldg 2, south pond	TP-66	4+

*Based on the lowest portion of the pond. Exact depth to be determined at time of construction

Groundwater should be anticipated during the removal operation within the two ponds adjacent to Building 1. During and/or shortly after the rainy seasons, groundwater may also be encountered in the other ponds. The total fill depths above the existing pond bottoms are anticipated to be approximately 26 feet for the pond encroaching on the east end of Building 1, about 10 feet for the desilting pond at the southeast corner of Building 1 and 21 feet for the two ponds encroaching on the west end of Building 2.

The bottom of these ponds is anticipated to be "pumping" under the weight of rubber tire equipment. Track mounted backhoes or excavators are recommended for the bottom excavation of these ponds. To stabilize the subgrade for compaction purpose, we recommend placement of 18 inches of ¾-inch crushed rock wrapped with filter fabric (placed above and below the rock). The intent of the crushed rock is not only to stabilize the bottom for compaction purpose but also to provide a drainage path to enhance consolidation of the soils.

Considering the removal depths, the thickness of fill for these ponds will be in the range of about 20 to 30 feet. In order to reduce differential settlement, we suggest overexcavating, backfilling, and raising the grades to quasi final grades within the existing pond areas during the first phase of grading (at the beginning of grading) to accommodate as much settlement as possible before completing the project grading. For the pond encroaching on the east end of Building 1, to accelerate consolidation settlement, we recommend surcharging the pond area with about 10 feet of soil stockpile. We recommend installing two settlement monuments and to monitor the rate of settlement to determine the most appropriate time to remove the stockpile since we cannot accurately predict the amount of time required for settlement (a rough estimate is 6 months for about one half the anticipated settlement since not all settlement needs to occur). Because consolidation settlement depends on subsurface drainage and time, the surcharge load would have to be doubled to reduce the estimated time to 4 months. The following table indicates roughly the anticipated surcharge depth versus time. The actual surcharge duration required should be based on settlement monitoring.

Surcharge Parameters

Estimated Duration (month)	6	5½	4	3½
Minimum Surcharge Depth (ft)	10	15	20	25

12.4 General Grading Requirements

1. All fill, unless otherwise specifically stated in the report, should be compacted to at least 90 percent of the maximum dry density as determined by ASTM D1557 Method of Soil Compaction for clay soils and 95 percent relative compaction for sand and other granular soils.
2. No fill should be placed until the area to receive the fill has been adequately prepared and approved by the Geotechnical Consultant or his representative.
3. Fill soils should be kept free of debris and organic material.
4. Rocks or hard fragments larger than 4 inches may not be placed in the fill without approval of the Geotechnical Consultant or his representative, and in a manner specified for each occurrence. There should not be any concentrations of particles sizes of 2 inches or greater; proper mixing should be performed. If encountered, oversize materials should be disposed outside the structural fill and flatwork areas at the locations designated by the Engineer.
5. The fill material should be placed in lifts which, when loose, should not exceed 8 inches per lift. Each lift should be spread evenly and should be thoroughly mixed during the spreading operation to obtain uniformity of material and moisture.
6. When the moisture content of the fill material is lower than the specified value or is too low to obtain adequate compaction, water should be added and thoroughly dispersed until the soil has a moisture within 2½ percent of optimum moisture content for sand material and 125 percent of optimum for clay soils placed 6 feet below finish subgrade and 130 percent of optimum for clay soil placed within 6 feet of finish subgrade unless indicated otherwise in this report and/or by the Geotechnical Engineer at the time of construction. The moisture content of finished clay subgrade should be maintained until the time of hardscaping by frequent watering or by covering the surface with visqueen, granular material or other methods as agreed upon by the owner representative. The moisture content should be checked for compliance prior to construction above the subgrade.
7. When the moisture content of the fill material is too high to obtain adequate compaction, the fill material should be aerated by blading or other satisfactory methods until the soil has a moisture content as specified herein.
8. Permanent fill and cut slopes should not be constructed at gradients steeper than 2:1(H: V).

Based on the few maximum density tests performed to date, the optimum moisture contents of the onsite clay soils appear to be predominantly in the range of 11 to 15 percent. It should be noted that some of the clay soils have a high degree of saturation and moisture contents about 5 to 12 percent above optimum and outside the compactable moisture range. The contractor will have to select appropriate excavation and compaction equipment to avoid disturbing the high moisture content subgrade soils and to be able to compact the fill to the project specifications above relatively soft subgrade. Any scarified clay soils must be compacted to at least 90 percent relative compaction as determined by ASTM D1557.

12.5 Fill Materials

12.5.1. Onsite Materials

The onsite shallow clay soils encountered in the borings and test pits are considered to have a low to very high expansion potential. In general, the soils with high expansion potential should not be re-used as backfill within the upper 6 feet of finished subgrade (at least 4 feet below footings and 4 feet below flatwork subgrade). The clay soils with low to moderate expansion potential are considered suitable for backfilling purpose at shallow depths provided they are free of deleterious and oversize materials and are properly processed and moisture conditioned. Import materials will also be needed for backfilling purpose.

Overexcavation and re-compaction will induce fill shrinkage. Many factors such as mixing, relative compaction of the fill, and topographic approximations will affect shrinkage. We cannot estimate the exact amount of shrinkage; however, in our opinion, the shrinkage may be on the order of 15 percent for existing soils excavated and recompacted to 90 percent relative compaction. This estimate does not include the material that will be required to fill in the excavations after the removal of any subsurface structures from the prior use of the site and removal of topsoil.

12.5.2. Import

Import materials should contain sufficient fines (binder material) to be relatively impermeable and result in a stable subgrade when compacted. Soils with high expansion potential expansion are not recommended for import. Where possible, the imported materials should have an expansion index (EI) less than about 80 and should be free of organic materials, debris, and cobbles larger than 4 inches. Selective grading is suggested to place the better import materials (lower expansion) within the upper portion of the fill below building areas (at least 4 feet below footings and at least 5 feet away from the buildings) and to place the less desirable import material (more clayey and higher expansion) below parking lots, driveways, and other areas as designated by the owner representative. The contractor should also consider that some of the better soils may be encountered at shallow depths in the borrow sites, which may affect the grading sequence. A bulk sample of potential import material, weighing at least 35 pounds, should be submitted to the Geotechnical Consultant at least 48 hours before fill operations. Other than aggregate base and bedding sand, all proposed import materials should be tested for corrosivity, should be environmentally cleared from contamination and should be approved by the Geotechnical Consultant prior to being imported onsite.

12.6 Temporary Excavations

Temporary excavations adjacent to un-surcharged areas are anticipated to be stable vertically to a depth up to 5 feet in fill and alluvium. For deeper excavations up to a depth of 8 feet, we recommend a gradient no steeper than ¾:1 (H:V) for unsurcharged excavations unless shoring is used.

The tops of slopes should be barricaded to prevent vehicles and storage loads within 6 feet of the tops of slopes or within ½ the slope height, whichever is greater. A greater setback may be necessary when considering heavy vehicles, such as concrete trucks and cranes; we should be advised of such heavy vehicle loadings so that specific setback requirements can be established. When excavating adjacent to existing footings or building supports, proper means should be employed to prevent any possible damage to the existing structure. Un-shored excavations should not extend below a 1¼:1 (H:V) plane extending downward from the lower edge of adjacent footings and should start at least 2 feet away from the footing edge. Where there is insufficient space to slope back an excavation, shoring may be required. All regulations of State and Federal OSHA should be followed.

Temporary excavations are assumed to be those that will remain un-shored for a period of time not exceeding one week. In dry weather, the excavation slopes should be kept moist, but not soaked. If excavations are made during the rainy season (normally from November through April), particular care should be taken to protect slopes against erosion. Mitigative measures, such as installation of berms, plastic sheeting, or other devices, may be warranted to prevent surface water from flowing over or ponding at the top of excavations.

12.7 Floor Slabs

12.7.1. General

We understand that 7-inch thick slabs with 4000 psi concrete will be used for the building floors. We also anticipate that 6 inches of crushed miscellaneous aggregate base will be placed below the building slabs.

The building code requires minimum slab reinforcement consisting of #3 bars at 18 inches on center both directions when a slab is supported on soils with an expansion index greater than 20. In addition, the soils should be moisture conditioned to at least 130 percent of optimum as indicated in the grading section of this report unless indicated otherwise by the Geotechnical Engineer at the time of construction. The subgrade moisture content should be re-tested and confirmed within 48 hours prior to placement of the aggregate base.

12.7.2 Moisture Sensitive Floor Covering

Water vapor transmitted through floor slabs is a common cause of floor covering problems. In areas where moisture-sensitive floor coverings (such as tile, hardwood floors, linoleum or carpeting) are planned, a vapor retarder should be installed below the concrete slab to reduce excess vapor transmission through the slab.

The function of the recommended impermeable membrane (vapor retarder) is to reduce the amount of soil moisture or water vapor that is transmitted through the floor slab. The membrane should be at least 15-mil thick Stego Wrap, Class A, and care should be taken to preserve the continuity and integrity of the membrane beneath the floor slab. The vapor retarder should conform to ASTM E1745.

Another factor affecting vapor transmission through floor slabs is the water to cement ratio in the concrete used for the floor slab. A high water to cement ratio increases the porosity of the concrete, thereby facilitating the transmission of water vapor through the slab. The project Structural Engineer should provide recommendations for design of building slabs in accordance with the latest version of the applicable codes. We recommend a concrete with a water cement ratio not exceeding 0.45. The placement of sand above the vapor retarder is the purview of the Structural Engineer.

12.8 Seismic Coefficients

Under the Earthquake Design Regulations of Chapter 16A, Section 1613A of the CBC 2016, and based on the mapped values, the coefficients and factors presented in Table 6 were calculated using the USGS web site (refer to Figure A-6 in Appendix A).

The site class is determined in accordance with ASCE 7 Chapter 20 using shear wave velocity, SPT blow count or undrained shear strength. For a site to be classified as Site Class D the weighted average SPT blow count should be between 15 and 50 and the average weighted undrained shear strength should be between 1,000 and 2,000 psf within the upper 100 feet of soil. The SPT blow count test results presented on the boring logs indicate that the requirements for Class D are met.

Table 6 – Seismic Coefficients and Factors

Site Class (CBC 2016 – 1613A.3.2)	D
Seismic Design Category based on Occupancy Category III (CBC 2016-1604A.5 &1613A.3.5)	D
Mapped Acceleration Parameter for Short Period (0.2 Second), S_S	2.001
Mapped Acceleration Parameter for 1.0 Second, S_1	0.732
Adjusted Maximum Spectral Response Parameter for Short Period (0.2 Second), S_{MS}	2.001
Adjusted Maximum Spectral Response Parameter for 1.0 Second Period, S_{M1}	1.099
Design Spectral Response Acceleration Parameter, S_{DS}	1.334
Design Spectral Response Acceleration Parameter, S_{D1}	0.732
Peak Ground Acceleration (PGA_M)	0.718

Project Site Coordinates: Longitude: W117.66298° Latitude: N33.957164° (WGS84)

12.9 Shallow Foundations

General: For the purpose of preparing this report, we assumed that the proposed building structure will impose maximum column load of about 95 kips and wall loads less than 8 kips per lineal foot. The recommendations for preparation of the subgrade underlying the footings are provided in the

"Earthwork" Section of this report. The Structural Engineer should design foundations in accordance with the requirements of the applicable building code.

Footings should have a minimum width of 2 feet for isolated footings and 18 inches for continuous footings. The bottom of building footings should be located at least 36 inches below the lowest adjacent finish grade, and reinforcement should consist of a minimum of two No.5 bars, top and bottom or equivalent as determined by the Structural Engineer.

The proposed building structures may be supported on isolated and/or strip footings designed using a net allowable bearing pressure of 2,250 pounds per square foot (psf) for footings supported on at least 3½ feet of engineered fill as indicated in the grading section of this report and embedded at least 3 feet below the lowest adjacent grade. A one-third increase in the bearing value may be used when considering wind or seismic loads. In the event of new footings located within one footing width of an existing footing, we recommend reducing the bearing pressure of the new footing by 30 percent.

Minor footings may be required for low height exterior landscape walls (4 feet or less in height), or other small ancillary structures. These footings should be supported on at least 2½ feet of new engineered fill and should be embedded at least 24 inches. A vertical bearing pressure of 2,000 psf may be used for these footings.

Lateral Resistance of Footings: Lateral load resistance may be derived from passive resistance along the vertical sides of the foundations, friction acting at the base of the foundations, or a combination of the two. A coefficient of friction of 0.30 may be used between the footings, floor slabs, and the supporting soils comprised of engineered fill. Where a vapor retarder is used below the slab, the friction coefficient should not exceed 0.12. The passive resistance of level properly compacted fill soils in direct contact with the footings may be assumed to be equal to the pressure developed by a fluid with a density of 200 pcf, to a maximum pressure of 2,000 psf. A one-third increase in the passive value may be used for wind or seismic loads. The frictional resistance and the passive resistance of the soils may be combined provided that the passive resistance is reduced by one third. We recommend that the first foot of soil cover be neglected in the passive resistance calculations if the ground surface is not protected from erosion or disturbance by a slab, pavement or in a similar manner.

Estimated Settlement of Footings: Based on the results of our analyses and provided that our recommendations in preceding sections of this report are followed, we estimate that once the settlement due to fill placement has occurred, the total static settlement of isolated and/or strip footings under sustained loads will be on the order of 1 inch for the anticipated maximum structural load. The maximum static differential settlement due to building loading, over a horizontal distance of 20 feet, is anticipated to be on the order of ½ inch for similarly loaded footings. The differential settlement during the design seismic event is anticipated to be on the order of ¼ inch between adjacent columns located 30 feet apart.

The settlement during fill placement is anticipated to be on the order of 1 to 2½ inches depending upon the fill thickness except for the areas of deep ponds where the settlement is anticipated to be on the order of 3 to 5 inches. Except for the pond areas, a large portion of the calculated settlement is anticipated to have occurred one month following grading.

12.10 Retaining Wall

We have assumed that retaining walls will have a maximum height of 12 feet as shown on the drawings along the eastern portion of Building 2. Design earth pressures for retaining walls depend primarily on the allowable wall movement, wall inclination, type of backfill materials, backfill slopes, surcharges, and drainage. The earth pressures provided assume that non-expansive soil backfill will be used and a drainage system will be installed behind the walls so that hydrostatic pressure will not develop. If a drainage system is not installed, the cantilever level-backfilled walls, under static conditions, should be designed to resist a hydrostatic pressure equal to that developed by a fluid with a density of 90 pcf for the full height of the wall.

Determination of whether the active or at-rest condition is appropriate for design will depend on the flexibility of the wall. Walls that are free to rotate at least 0.002 radians (deflection at the top of the wall of at least 0.002 x H, where H is the unbalanced wall height) may be designed for the active condition. Walls that are not capable of this movement should be assumed rigid and designed for the at-rest conditions. Assuming that the backfill behind the retaining walls will consist of import sand, the recommended static active and at-rest earth pressures are as follow.

Table 7 - Earth Pressures for Retaining Walls

Wall Movement	Backfill Condition	Equivalent Fluid Pressure
Free to Deflect	Level	45
Restrained	Level	65

The above lateral earth pressures do not include the effects of surcharge (e.g., traffic, footings, sloping ground) or compaction-induced wall pressures. Any surcharge (live, including traffic, dead load, or slope) located within a 1:1 plane drawn upward from the base of the excavation should be added to the lateral earth pressures. The lateral contribution of a uniform surcharge load located immediately behind walls may be calculated by multiplying the surcharge by 0.33 for cantilevered walls and 0.5 for restrained walls. For vehicular surcharge, adjacent to driveways or parking areas a uniform lateral pressure of 100 pounds per square foot, acting as a result of an assumed 300 pounds per square foot traffic surcharge should be used. The onsite clay soils should not be used as backfill for the walls unless the soil expansion is considered in the design due to an increase of lateral pressure.

Walls should be waterproofed using appropriate membranes, and properly drained or designed to resist hydrostatic pressures. The waterproofing membrane should be covered with a protection board or equivalent to prevent perforation during backfilling.

Except for the upper 1½ feet, the backfill immediately behind retaining walls (minimum horizontal distance of 12 inches measured perpendicular to the wall) should consist of free-draining ¾-inch crushed rock wrapped with filter fabric. The upper 1½ feet of cover backfill should consist of relatively impervious onsite material. A 4-inch diameter perforated PVC pipe, placed perforations down at the bottom of the crushed rock layer, leading to a suitable gravity outlet, should be installed at the base of the walls. Geocomposite panel drains may be used as an alternative to extending the crushed rock to within 1½ feet of the ground surface for the wall drain. With wall drain panels, the 4-inch diameter perforated pipe located at the heel of the wall/footing should be surrounded with one cubic foot of ¾-inch crushed rock wrapped with filter fabric; the pipe invert should be supported on about 1½ inches of crushed rock. All drainage should be directed to the street or to a storm drain in non-erosive devices.

In the event of a large earthquake, the lateral earth pressure on walls may be significant. When combining both static and seismic lateral earth pressures, a decreased factor of safety may be used in the design of retaining walls when checking for sliding and overturning stability. For cantilever walls, we have calculated the seismic increment of lateral pressure using the Mononobe-Okabe equation assuming the seismic coefficient to be 1/3 of the peak acceleration (PGA_M). We suggest using a dynamic earth pressure increment of 30 psf/ft for cantilever yielding walls with level backfill assuming the walls will not exceed 10 feet in height. The pressure should be taken as an inverted triangular distribution with the zero pressure point at the toe of the wall and 30 H (psf where H in feet) at the top of the wall, where H is the wall height in feet. The point of application of the dynamic thrust may be taken at 0.6H above the toe of the wall. The Structural Engineer should determine if a seismic increment of lateral earth pressure is applicable based on wall heights and allowable wall movements.

The proposed wall along the east property line is located above a 10 to 13-foot high slope. Due to the proximity of the slope and expansive soils, we recommend a footing embedment of at least 3 feet; the edge of the footing should be located at least 6 feet from the slope face. The passive pressure should be reduced to 120 pcf due to the slope proximity and the presence of expansive soils. The thickness of engineered fill below wall footings should be at least 3 feet. It appears that portions of the slopes were constructed without placing and compacting the fill in thin lifts and without appropriate compaction, and the soils were found to be loose/soft. Deep removal should be anticipated along large portions of the slopes. All undocumented fill should be removed in the vicinity of the retaining walls and slopes.

12.11 Utility Trench Backfill

Bedding material surrounding utility lines and extending to a point 12 inches above the lines should consist of non-expansive soil to support and/or to protect the lines. Where bedding is required, a minimum of 4-inch thick bedding material should be placed below the bottom of the utility lines, on a firm and unyielding subgrade. The bedding material should meet the specifications provided in the latest edition of the “Standard Specifications for Public Works Construction” (Greenbook).

Above the bedding, up to finished subgrade in areas other than landscape and up to one foot below flatworks and pavements, utility trenches should be backfilled with onsite materials or imported materials with a low expansion potential and mechanically compacted to at least 90% of the maximum dry density of the soils.

For utility trenches within the building areas, the backfill should be compacted to the minimum required relative compaction indicated under the "Grading" Section of this report. The backfill material should be observed, tested and approved by the Geotechnical Consultant.

When adjacent to any footings, utility trenches and pipes should be laid above an imaginary line measured at a gradient of 1½ (H:V) projected down from the bottom edges of any footings. Otherwise, the pipe should be designed to accept the lateral effect from the footing load, or the footing bottom should be deepened as needed to comply with this requirement. Backfill consisting of 2-sack sand cement slurry may also be used.

12.12 Drainage

Foundation, slab, flatwork, and pavement performance depends greatly on proper drainage within and along the boundary of the improvements. Perimeter grades surrounding any type of structures should be sloped in a manner allowing water to drain away from the structure and not pond next to the foundations. Per the 2016 CBC, landscape areas within 10 feet of structures should slope away at gradients of at least 5 percent. Paved areas within 10 feet of structures should slope away at gradients of at least 2 percent. Proper drainage is recommended for all surfaces to reduce the risk of soil movement due to soil expansion.

Common measures to mitigate expansion risk include removal of the more susceptible material and recompaction, preventing and repairing promptly utility line leaks, maintaining site drainage and drainage devices, and proper management of landscape watering to reduce the likelihood of water infiltrating deeper materials. To reduce the potential for overwatering, irrigation should be performed under the management of experienced landscape architects, and not under the control of a landscape contractor.

12.13 Percolation Testing

Three percolation tests were performed; one located near the west side of Detention Basin A, south of Building 2, and two percolation tests within the WQ Basin B. The drilling for the holes and percolation testing were performed on a sunny day. No significant rain had occurred for several weeks prior to percolation testing. The depths of the holes for the three percolation tests were 20, 15 and 22 feet.

Since the County of San Bernardino does not have specific infiltration test procedures for storm water disposal, Koury performed the tests in substantial conformance with the boring percolation test procedures of the County of Riverside as defined in County Document, Riverside County – Low Impact Development BMP Design Handbook, Rev. 9/2011. The test procedures consisted of drilling 8-inch diameter boreholes to the test depths and placing a 2-inch layer of filter gravel at the bottom of the holes. We also placed a 3½-inch diameter perforated pipe in the holes and backfilled the annulus with clean gravel to avoid caving in the test zone. The procedure involved pre-soaking the percolation zone prior to testing. Following presoaking, the infiltration testing began by filling the bottom of the holes with water and measuring the drop-in water level. For the percolation tests, the water column height in P-1, P-2 and P-3 was about 5, 2½ and 8½ feet, respectively. Based on the infiltration rate during the presoaking period, we selected measuring intervals of 10 and 30 minutes per the test method. The water level drop measurements were repeated several times until consistent results were noted.

The in-situ field percolation tests performed provide short-term percolation rates, which apply mainly to the initiation of the infiltration process due to the short time of the test (minutes to hours instead of days) and the amount of water used. Where appropriate, the short-term infiltration rates should be converted to long-term infiltration rates using reduction factors ranging from 3 to 12 depending upon the degree of infiltrate quality, maintenance access and frequency, site variability, subsurface stratigraphy variation, hydraulic gradient, volume of water to be disposed of and other factors. The small-scale percolation testing cannot model the complexity of the effect of interbedded layers of different soil composition and our test results should be considered index values of infiltration rate.

We have applied a correction factor of 4 and calculated long-term infiltration rates of the percolation tests. For percolation tests P-2 and P-3, the estimated percolation rates are negligible. For percolation test P-1, the long-term rate of infiltration is on the order of 0.3 in/hr or less. The calculations are presented in Appendix C. Based on the boring logs, the fines contents of the soils are high and a low infiltration rate should be expected. The boring logs presented in Appendix B indicate the fines contents of the soils for different depths.

Other Geotechnical Considerations

The areas of the percolation tests were found to be underlain by alluvium materials consisting predominantly of clay at shallow depth, which are relatively impervious and are not conducive to infiltration and other methods of storm water disposal should be considered (e.g. bioswale). Groundwater was encountered at relatively shallow depths in the proposed WQ Basin. Therefore, onsite infiltration is not considered practical.

12.14 Asphalt Concrete (AC) Pavement

The required pavement structural sections depend on the expected wheel loads, volume of traffic, and subgrade soils. The characteristics of subgrade soils are determined by R-value testing. Based on soil classification and laboratory testing results, an R-value of 5 was selected for pavement design. The R-value may be confirmed by additional testing once pavement subgrade level has been reached, if necessary, at the time of construction. The following pavement sections were calculated based on assumed traffic indices of 4, 5, 6 and 7. The project Civil Engineer should determine the traffic index to be used for different areas of the site.

Table 8 – Alternative Pavement Sections for Vehicular Traffic

Traffic Index	Asphalt Thickness (Inches)	Base Course (CAB) Thickness (Inches)
4	3.0	7.0
5	3.0	10.0
6	3.5	13.0
7	4.0	15.0

Base course material should consist of Crushed Aggregate Base (CAB) as defined by Section 200-2.2 of the Standard Specifications for Public Works Construction ("Greenbook"). Base course and asphalt concrete should be compacted to at least 95 percent of the maximum dry density of that material. Crushed Miscellaneous Base (CMB) may be used only if the supplier can demonstrate that the aggregate does not contain contaminated material and provide documentation to that effect.

The subgrade underlying the pavement areas should be prepared as discussed under the grading section of this report to remove all soft and dry soils present at subgrade level. Prior to fill placement, the exposed surface should be scarified to a minimum depth of 8 inches, moisture conditioned and compacted to at least 90% of the maximum dry density obtained per ASTM D1557. The subgrade should be in a "non-pumping" condition at the time of compaction. Prior to placement of the aggregate base, the moisture content of the upper foot of clay subgrade should be verified to be at least 125 percent of optimum moisture unless approved otherwise by the Geotechnical Engineer.

Any onsite surficial organic soils within landscaped/turf areas should not be used as subgrade materials. Where feasible, the overexcavation should be laterally extended a minimum of 2 feet beyond the perimeters and edges of parking areas, roadways and curbs. Any abandoned footing and/or underground concrete structure within the work limit should be removed entirely and the excavation should be backfilled to grade.

In order to increase pavement performance and extend the pavement life, concrete curbs and gutters could be deepened to extend below the base course material and be seated in the compacted subgrade. Priority should be given to areas where heavier traffic is anticipated and where irrigation may be greater. The intent of deepening the curbs and gutters is to form a "cut-off" wall to reduce the amount of water flow through the base course material from adjacent landscaped areas. Subgrade soils, which become soaked as a result of water flowing through base course material, can reduce the life of the pavement and cause heaving of the pavement. The curbs should be deepened to an elevation of at least 6 inches below the bottom level of the proposed base course section. Proper pavement surface drainage and maintenance is important since longer lasting pavements are associated with soils that do not become excessively moist or soils that have a low expansion potential below the aggregate base.

12.15 Portland Cement Concrete (PCC) Vehicular Pavement

The grading recommendations for vehicular PCC pavement are provided in Section 12.2 of this report. Base course material used in the pavement sections should consist of Crushed Aggregate

Base (CAB) as defined by Section 200-2.2 of the Standard Specifications for Public Works Construction (Greenbook 2018) or by Crushed Miscellaneous Base (CMB), as defined by Section 200-2.4 of the Greenbook. The aggregate base course should be compacted to at least 95% of the maximum dry density of that material. Better pavement performance is anticipated where the soils immediately below the aggregate base are prevented from gaining moisture.

The subgrade underlying the pavement areas should be prepared as discussed under the grading section of this report to remove all soft and dry soils present at subgrade level. Prior to placement of the aggregate base, the moisture content of the upper foot of clay subgrade should be verified to be at least 130 percent of optimum moisture unless approved otherwise by the Geotechnical Engineer. The subgrade should be in a "non-pumping" condition at the time of aggregate base placement.

The recommendations presented herein should be used for design and construction of the slabs and pertaining grading work underlying vehicular pavement areas. A minimum modulus of rupture of 550 psi for concrete has been assumed in designing of the PCC pavement sections; this corresponds to a concrete compressive strength of approximately 4,000 psi at 28 days. A qualified design professional should specify traffic index for different areas of the site.

Table 9 - PCC Pavement Sections

Traffic Index	Portland Cement Concrete Thickness (inches)	Base Course (CAB) Thickness (inches)
4	6.5	4.0
5	7.0	4.0
6	7.5	4.0
7	8.0	4.0

The following recommendations should also be incorporated into the design and construction of PCC pavement sections:

- The pavement sections should be reinforced at the discretion of the owner with No. 3 rebar spaced at 18 inches on centers each way to reduce the amount of shrinkage cracking.

- Joint spacing in feet should not exceed twice the slab thickness in inches, e.g., 10 feet for a 5-inch thick slab. Regardless of slab thickness, joint spacing should not exceed 10 feet due to the presence of expansive soil.
- Layout joints should form square panels. When this is not practical, rectangular panels can be used if the long dimension is no more than 1.5 times the short one.
- Control joints should have a depth of at least 1/4 the slab thickness, e.g., 1 inch for a 4-inch thick slab.
- Where the pavement does not abut against a curb or gutter, an 8-inch thickened edge should be constructed if landscaping is anticipated.
- Pavement section design assumes that proper maintenance such as sealing, and repair of localized distress will be performed on a periodic basis to prevent the subgrade soils to gain moisture.

Exterior concrete slabs for pedestrian traffic or landscape should be at least four inches thick. Weakened plane joints should be located at intervals of no more than about 6 feet unless slabs thicker than 4 inches are used. A thickened edge (10-inch deep) is recommended at the exterior edge of the flatwork adjacent to landscape subject to irrigation. The upper 18 inches of the clay subgrade should have a moisture content of at least 130 percent of optimum prior to placement of the granular soils. The concrete strength for pedestrian walkways should be at least 2,500 psi unless determined otherwise by the Structural Engineer.

13. SOIL EXPANSIVITY

The subsurface soils encountered in our borings and test pits consist mostly of lean to fat clay. These types of material generally have a moderate to very high susceptibility to expansion when facing seasonal cycles of saturation/desiccation. The expansion index test indicated a range between about 20 and 162 with an average of about 79, which is generally considered a moderate to high expansion potential. The plasticity index test also indicated a moderate expansion potential; however, the expansion potential should be expected to vary throughout the site. As such, the recommendations provided in this report regarding drainage system, moisture content during compaction, presoaking if needed, the use of sand/aggregate base blankets and other pertinent recommendations for site improvements should be incorporated into the design and construction.

14. SOIL CORROSIVITY

The corrosion potential of the onsite materials to steel and buried concrete was preliminarily evaluated. Laboratory testing was performed on selected soil samples to evaluate pH, minimum resistivity, chloride and soluble sulfate content. These tests are only an indicator of soil corrosivity for the samples tested. Other soils found on site may be more, less, or of a similar corrosive nature. Imported fill materials should be tested to confirm that their corrosion potential is not significantly more severe than those noted. The test results are presented in the following table.

Table 10 - Corrosion Test Results

Boring	Depth (ft)	Minimum Resistivity (ohm-cm)	pH	Soluble Sulfate Content (ppm)	Soluble Chloride Content (ppm)
B-6	0 – 2	288	8.2	819	910
TP-4	2.5 – 3	1,550	7.4	112	65
B-18	0 – 2	1,770	7.9	147	25
B-23	2 – 4	1,740	7.8	215	45
TP-27	3.5 – 4.2	1,310	8.5	226	145

Based on the minimum resistivity results, some of the near-surface site soils are severely corrosive towards buried ferrous metals. The concentrations of soluble sulfates indicate that the potential of sulfate attack on concrete in contact with the onsite soils is "negligible" based on ACI 318 Table 4.3.1. Cement Type II may be used in the concrete. Maximum water-cement ratios are not specified for the sulfate concentrations; however, the Structural Engineer should select a concrete with appropriate strength.

Further interpretation of the corrosivity test results, including the resistivity value, and providing corrosion design and construction recommendations are the purview of a corrosion specialists/consultants.

15. OBSERVATION AND TESTING

This report has been prepared assuming that Koury Engineering & Testing, Inc. will perform all geotechnical-related field observations and testing. If the recommendations presented in this report are utilized, and observation of the geotechnical work is performed by others, the party performing the observations must review this report and assume responsibility for the recommendations contained herein. That party would then assume the title of "Geotechnical Consultant of Record". A representative of the Geotechnical Consultant should be present to observe all grading operations as well as all footing excavations. The proposed import soils should be tested prior to transportation on site.

16. CLOSURE

The findings and recommendations presented in this report were based on the results of our field and laboratory investigations, combined with professional engineering experience and judgment. The report was prepared in accordance with generally accepted engineering principles and practice. We make no other warranty, either expressed or implied. Subsurface variations between borings and test pits should be anticipated. Koury should be notified if subsurface conditions are encountered, which differ from those described in this report since updated recommendations may be required. Samples obtained during this investigation will be retained in our laboratory for a period of 45 days from the date of this report and will be disposed after this period.

Should you have any questions concerning this submittal, or the recommendations contained herewith, please do not hesitate to call our office.

Respectfully submitted,

KOURY ENGINEERING & TESTING, INC.

Jacques B. Roy P.E. G.E.
Principal Geotechnical Engineer

Distribution: 1. Addressee (1 wet stamped copy + a pdf copy via e-mail)
2. File (B)

APPENDICES

Appendix A: Maps and Plans

Vicinity Map – Figure A-1
Field Exploration Points – Figures A-2a and A-2b
Cross Section A-A' – Figure A-2c
Preliminary Remedial Grading Maps – Figure A-2d and A-2e
Geology Map – Figure A-3
Fault Map – Figure A-4
Flood Map – Figure A-5
Response Spectrum – Figure A-6

Appendix B: Field Exploratory Boring and Test Pit Logs

Borings B-1 through B-28

Test Pits 1 through 72 (Test Pit 34 was omitted)

Appendix C: Laboratory Test Results and Calculations

REFERENCES

1. California Division of Mines and Geological Survey, 1998, Seismic Hazard Zone Report 045 for the Prado Dam 7.5 Minute Quadrangle, California.

2. California Division of Mines and Geological Survey, 2003, Earthquake Fault Zones, Prado Dam Quadrangle, May 1, 2003.

3. City of Chino General Plan, Safety Element, 2010, Final Report.

4. http://geotracker.waterboards.ca.gov

5. Standards Specifications for Public Works Construction, 2018, Public Works Standard, Inc.

6. US Army Corps of Engineers, Laboratory Soils Testing, Engineering Manual EM 1110-2-1906, dated 8/26/86.

7. US Army Corps of Engineers, Geotechnical Investigations, Engineering Manual EM 1110-1-1804, dated 1/01/2001.

8. US Army Corps of Engineers, Settlement Analysis, Engineering Manual EM 1110-1-1904, dated 9/30/1990.

9. US Army Corps of Engineers, Bearing Capacity of Soils, Engineering Manual EM 1110-1-1905, dated 10/30/1992.

10. US Army Corps of Engineers, Slope Stability, Engineering Manual EM 1110-2-1902, dated 10/31/2003.

11. US Army Corps of Engineers, Groundwater Hydrology, Engineering Manual EM 1110-2-1421, dated 02/28/1999.

12. United States Geological Survey, 2006, Geology Map of the San Bernardino & Santa Ana 30' X 60' Quadrangles, California, Version 1.0, compiled by Douglas M. Morton et al, 2006.

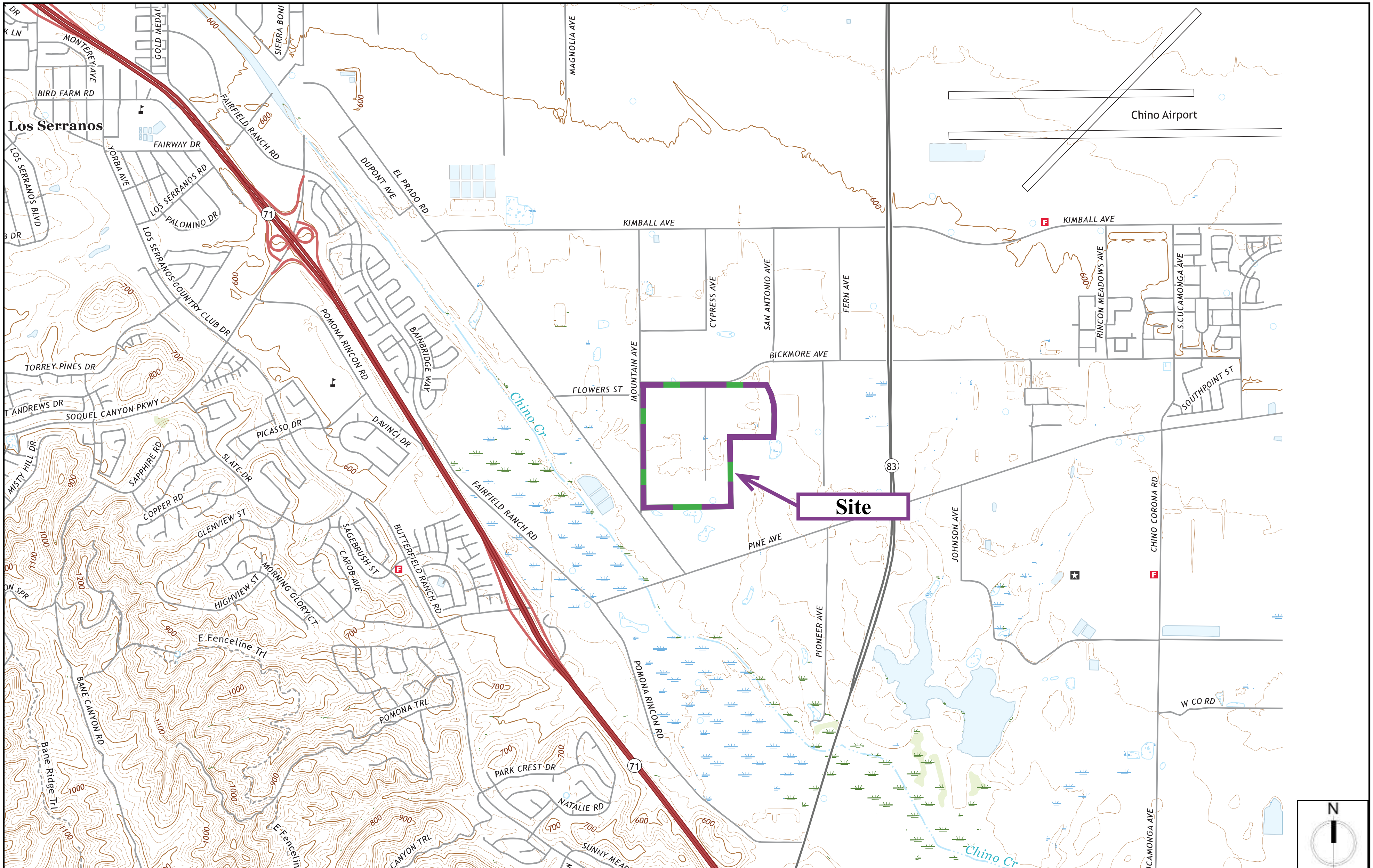
13. United States Geological Survey, 2015, Prado Dam Quadrangle, 7.5-Minute Series (Topographic) map Quadrangle, California.

14. USGS, U. S. Seismic Design Maps, Web Site http://earthquake.usgs.gov/designmaps/us/application.php.

15. USGS, Earthquake Hazards Program, Unified Hazard Tool, Web Site http://earthquake.usgs.gov/hazards/interactive/.

APPENDIX A

Maps and Drawings

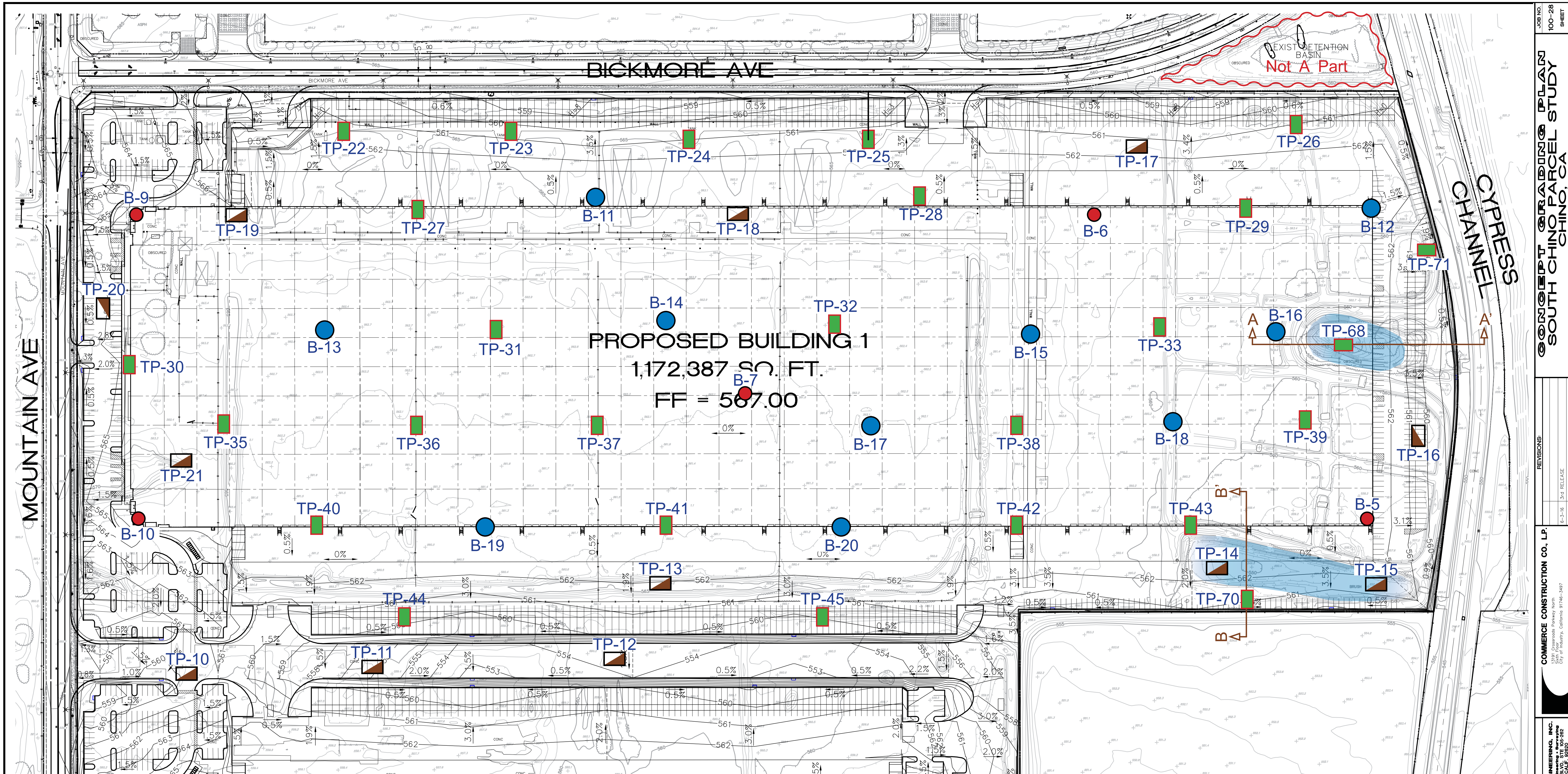


Reference: USGS Topographic Map, Prado Dam Quadrangle, California, 7.5 Minute Series 2018 - Contour Interval 20 feet, NAVD of 1988

0 1/2 1 Mile

KOURY ENGINEERING & TESTING, INC.

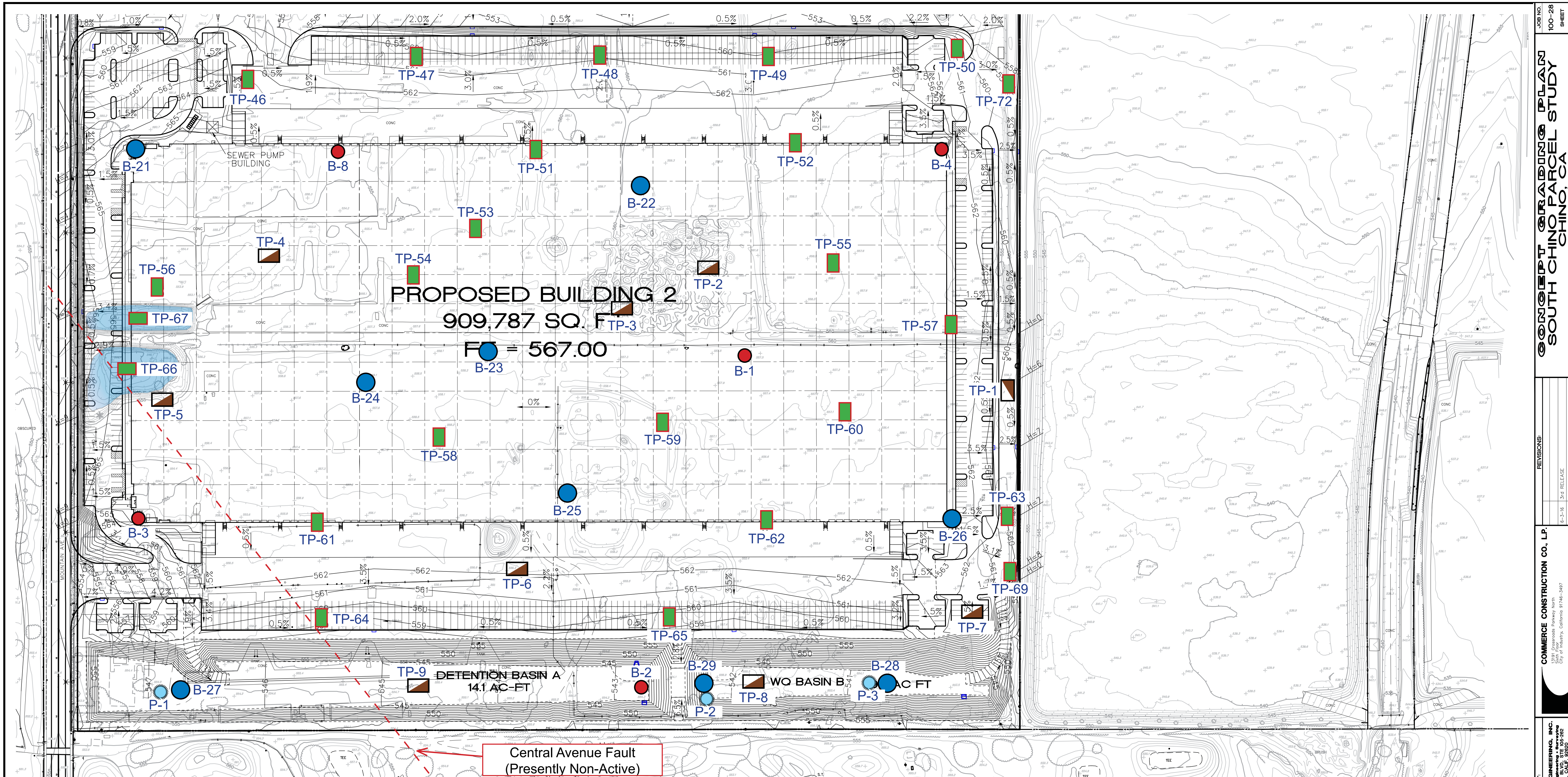
Project Name:	Project No.: 18-0817	Drawing Title:	Figure:
OC Prado Construction Level Study	Date: October 2018	Vicinity Map	A-1



Legend

TP-72, B-28	Approximate Location of Field Exploration Points For Construction Level Study
TP-21, B-10	Approximate Location of Field Exploration Points Performed For Feasibility Study on 5/17/17 & 5/22/17
	Existing Water Pond
B — B'	Geotechnical Cross Section

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado Construction Level Study	Project No.: 18-0817 Date: October 2018	Drawing Title: Field Exploration Points	Figure: A-2a



Legend

TP-72	B-28	Approximate Location of Field Exploration Points For Construction Level Study
TP-21	B-10	Approximate Location of Field Exploration Points Performed For Feasibility Study on 5/17/17 & 5/22/17

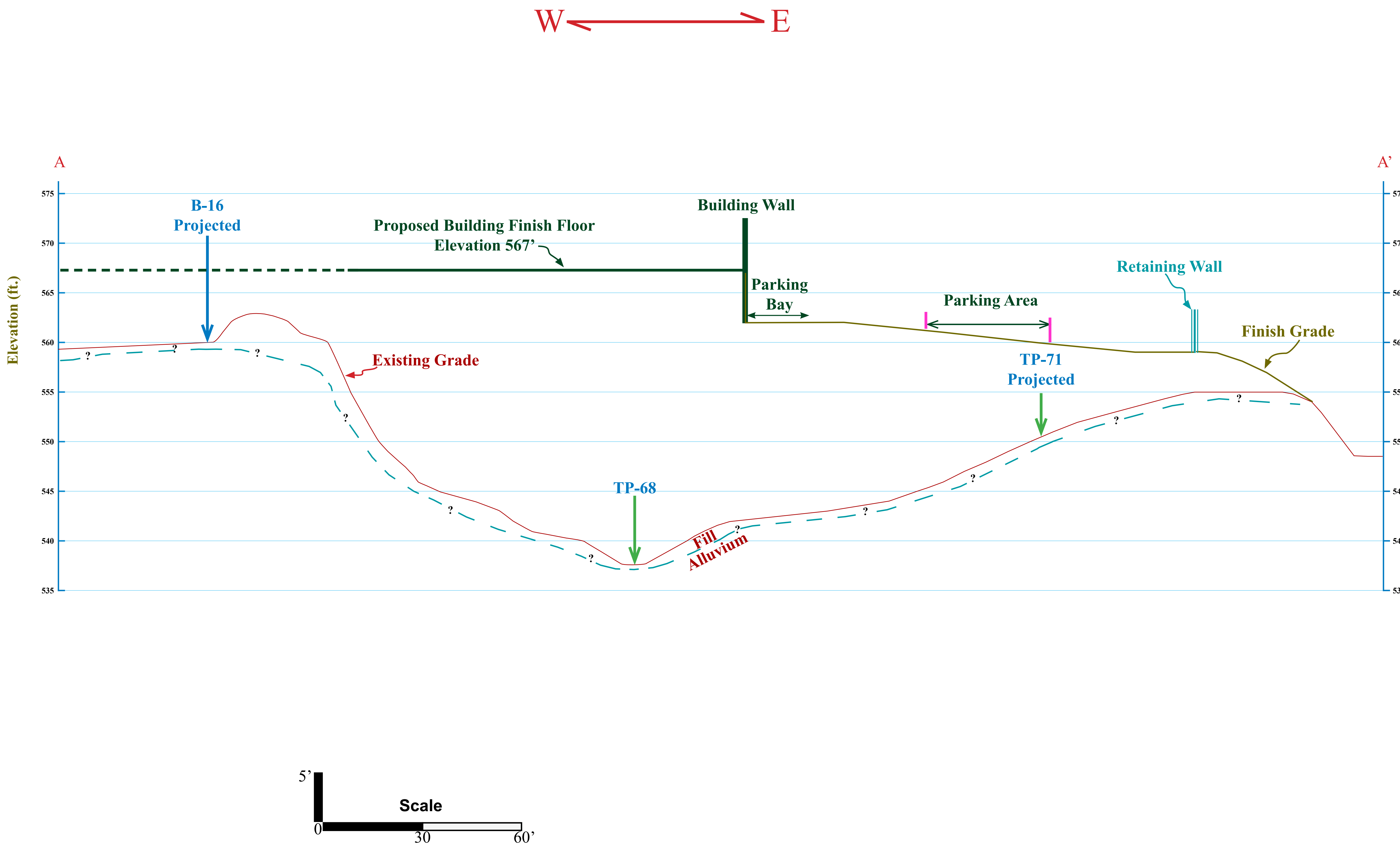
P-3 Approximate Location of Percolation Test

Existing Water Pond

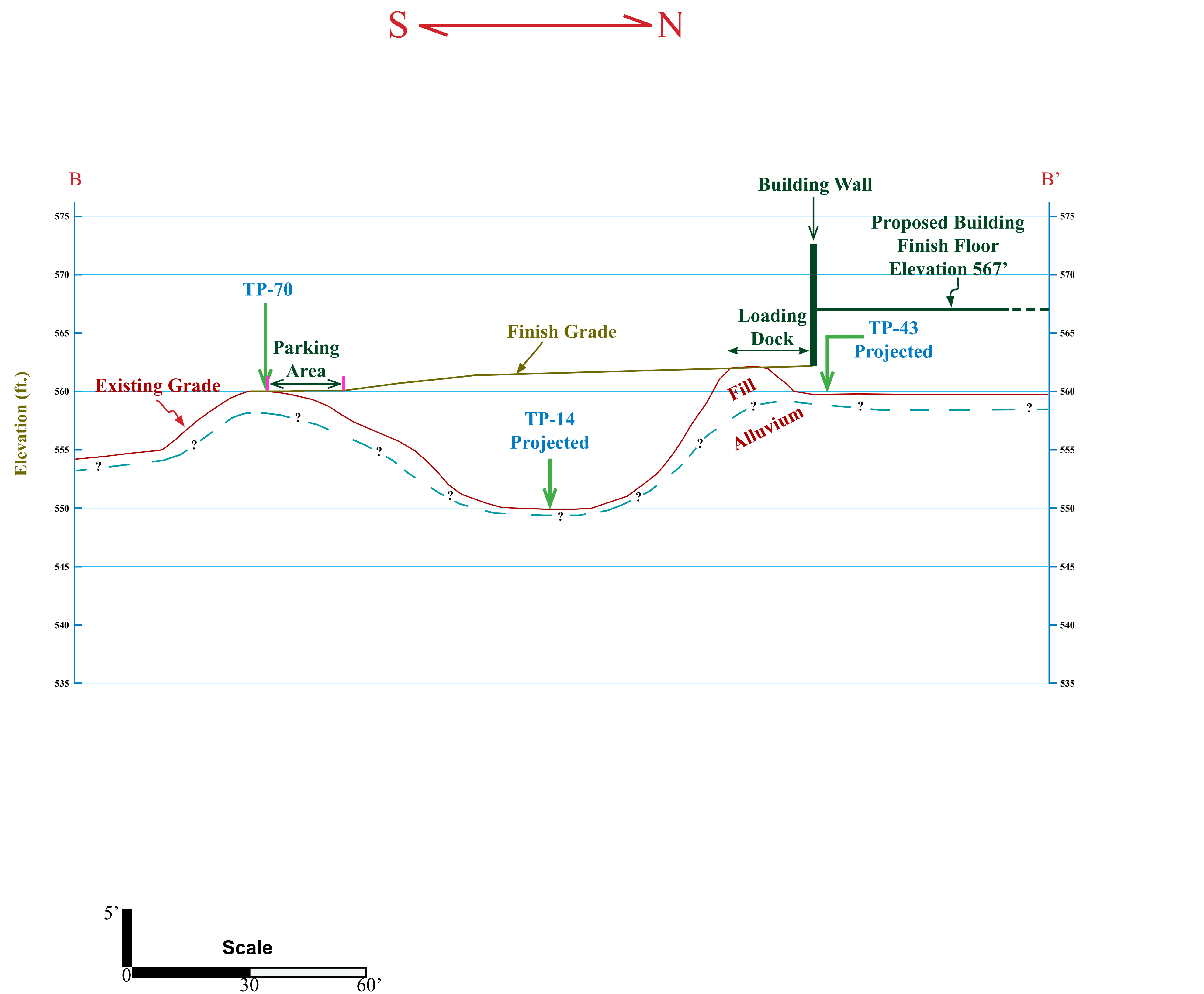
N

0 250 500'

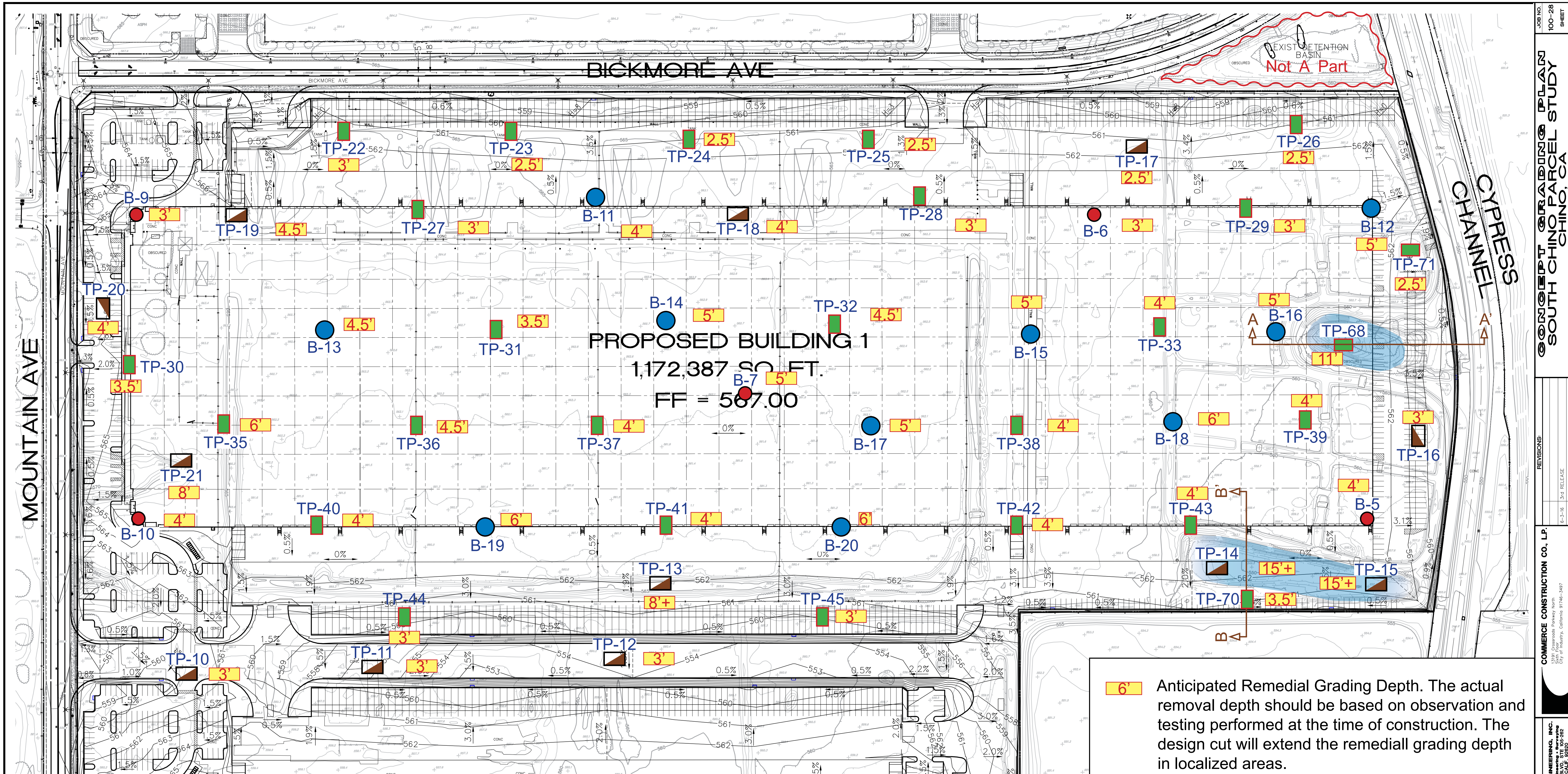
KOURY ENGINEERING & TESTING, INC.	**Project Name:** OC Prado Construction Level Study	**Project No.:** 18-0817 **Date:** October 2018	**Drawing Title:** Field Exploration Points	**Figure:** A-2b



KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado Construction Level Study	Project No.: 18-0817 Date: October 2018	Drawing Title: Geotechnical Cross Section A-A'	Figure: A-2c



KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado Construction Level Study	Project No.: 18-0817 Date: October 2018	Drawing Title: Geotechnical Cross Section B-B'	Figure: A-2d



Legend

TP-72 B-28 Approximate Location of Field Exploration Points For Construction Level Study

Existing Water Pond

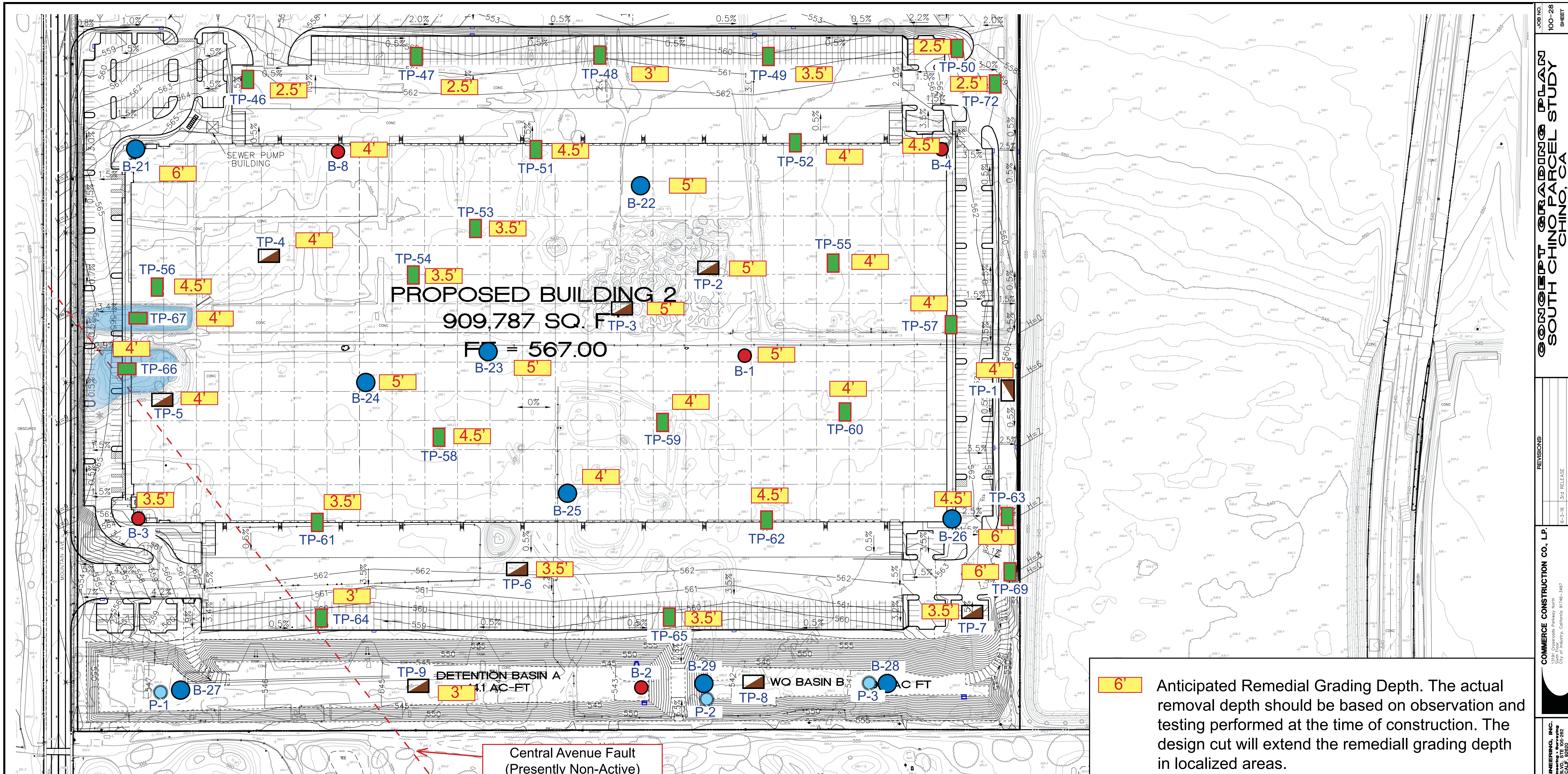
B B' Geotechnical Cross Section

TP-21 B-10 Approximate Location of Field Exploration Points Performed For Feasibility Study on 5/17/17 & 5/22/17

N

0 250 500'

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado Construction Level Study	Project No.: 18-0817 Date: October 2018	Drawing Title: Preliminary Remedial Grading Map	Figure: A-2e

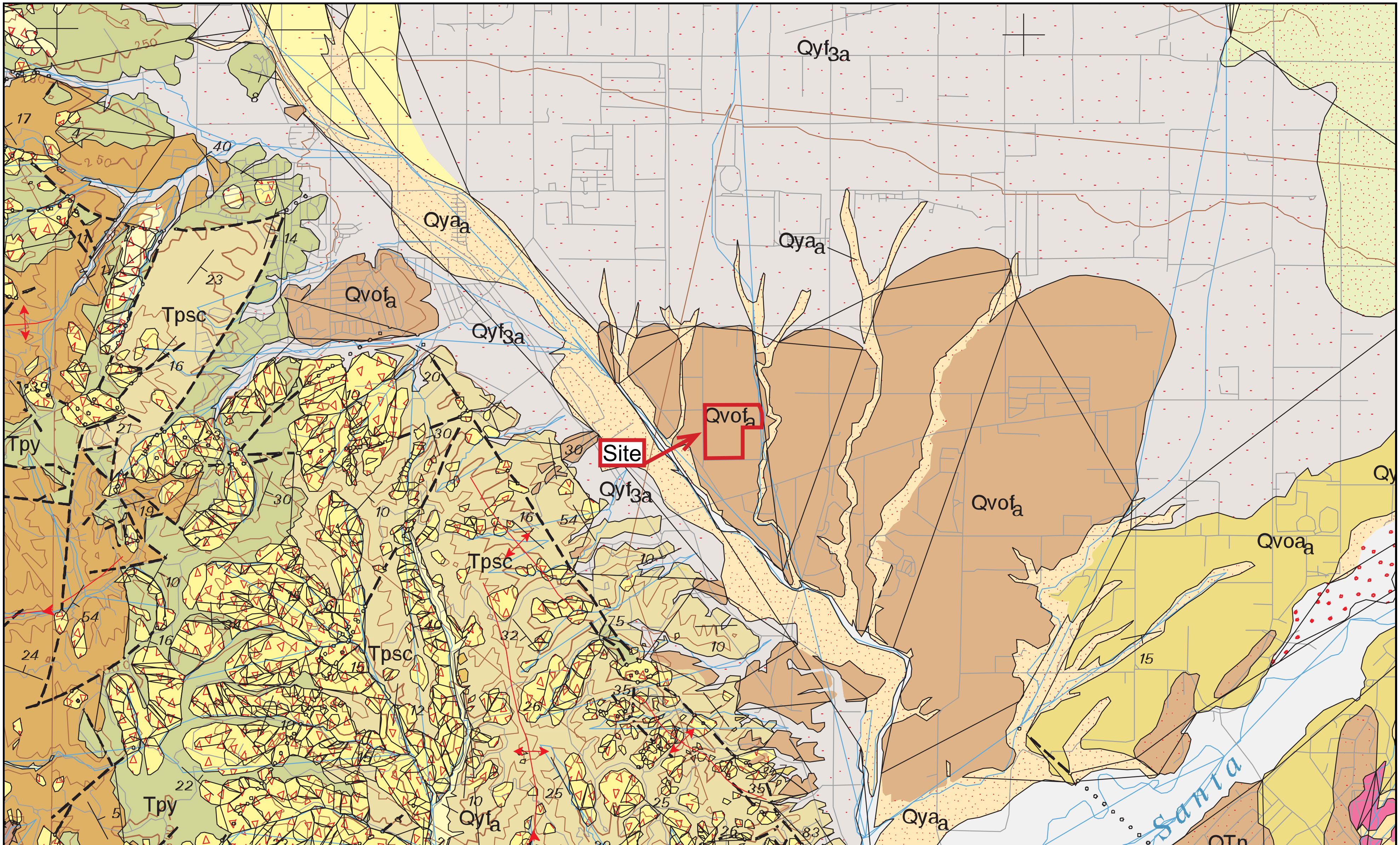


Legend

TP-72	B-28	Approximate Location of Field Exploration Points For Construction Level Study
TP-21	B-10	Approximate Location of Field Exploration Points Performed For Feasibility Study on 5/17/17 & 5/22/17
P-3		Approximate Location of Percolation Test
		Existing Water Pond

KOURY ENGINEERING & TESTING, INC.

Project Name: OC Prado Construction Level Study	**Project No.:** 18-0817 **Date:** October 2018	**Drawing Title:** Preliminary Remedial Grading Map	**Figure:** A-2f



LEGEND

Qya Young alluvial-valley deposits

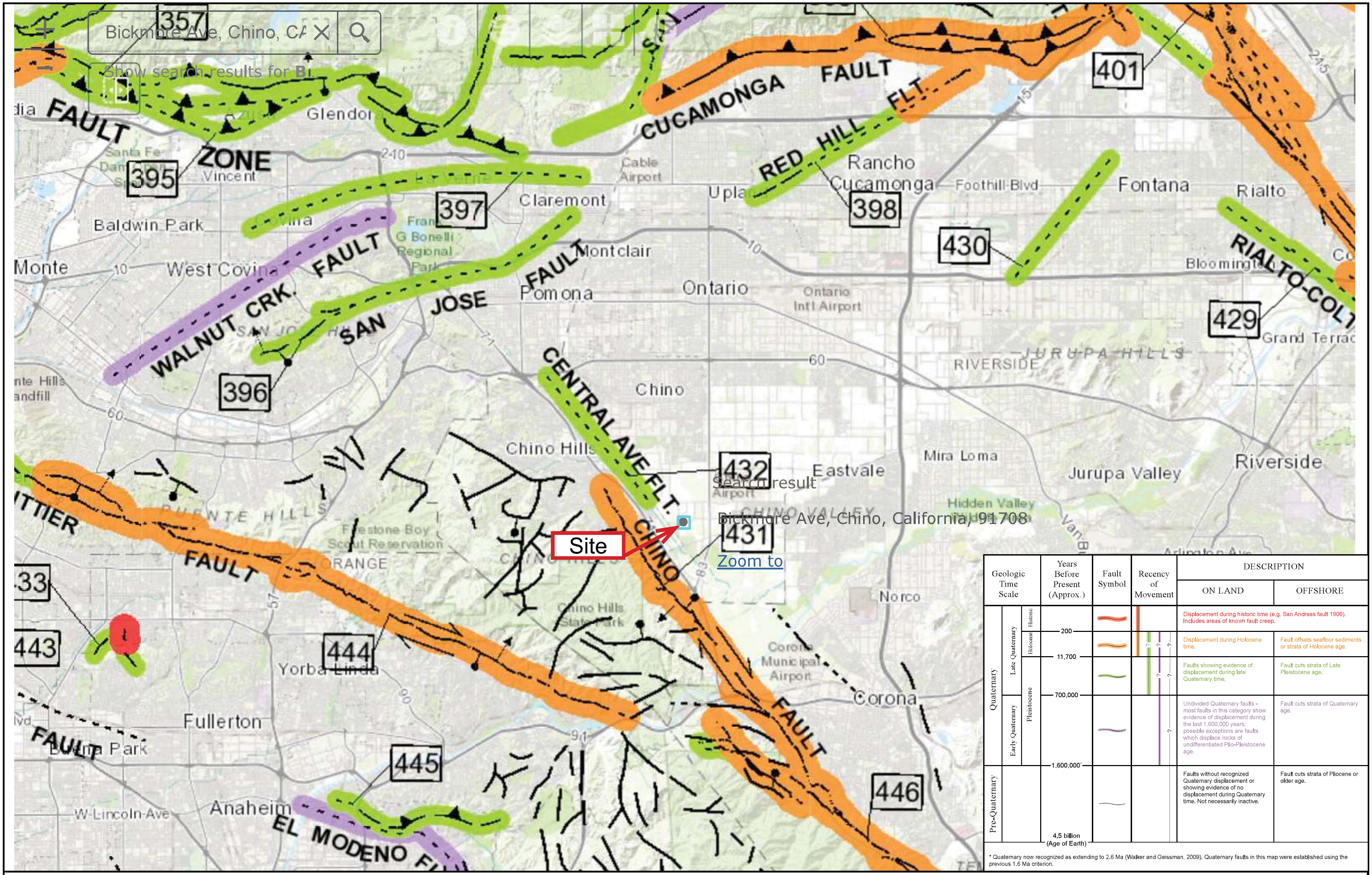
Qvof Very old alluvial-fan deposits

0 1 2 Mile

N

Reference: Geologic Map of the San Bernardino & Santa Ana 30´x60´ Quadrangle California-Version 1.0 Compiled by Douglas M. Morton and Fred K. Miller, 2006

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado Construction Level Study	Project No.: 18-0817 Date: October 2018	Drawing Title: Geology Map	Figure: A-3



Geologic Time Scale			Years Before Present (Approx.)	Fault Symbol	Recency of Movement	DESCRIPTION: ON LAND	DESCRIPTION: OFFSHORE
Quaternary	Late Quaternary	Historic	200			Displacement during historic time (e.g. San Andreas fault 1906). Includes areas of known fault creep.	
		Holocene	11,700		? ? ?	Displacement during Holocene time.	Fault offsets seafloor sediments or strata of Holocene age.
		Pleistocene	700,000		? ?	Faults showing evidence of displacement during late Quaternary time.	Fault cuts strata of Late Pleistocene age.
	Early Quaternary		1,600,000*		?	Undivided Quaternary faults - most faults in this category show evidence of displacement during the last 1,600,000 years; possible exceptions are faults which displace rocks of undifferentiated Plio-Pleistocene age.	Fault cuts strata of Quaternary age.
Pre-Quaternary			4.5 billion (Age of Earth)			Faults without recognized Quaternary displacement or showing evidence of no displacement during Quaternary time. Not necessarily inactive.	Fault cuts strata of Pliocene or older age.

* Quaternary now recognized as extending to 2.6 Ma (Walker and Geissman, 2009). Quaternary faults in this map were established using the previous 1.6 Ma criterion.

Reference: Fault Activity Map of California (2010) - California Geological Survey
Department of Conservation Web Site @ http://maps.conservation.ca.gov/cgs/fam/ - See Figure A-4a, for explanation

0 4 Mile

N

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado Construction Level Study	Project No.: 18-0817 Date: October 2018	Drawing Title: Fault Map	Figure: A-4

EXPLANATION

Fault traces on land are indicated by solid lines where well located, by dashed lines where approximately located or inferred, and by dotted lines where concealed by younger rocks or by lakes or bays. Fault traces are queried where continuation or existence is uncertain. Concealed faults in the Great Valley are based on maps of selected subsurface horizons, so locations shown are approximate and may indicate structural trend only. All offshore faults based on seismic reflection profile records are shown as solid lines where well defined, dashed where inferred, queried where uncertain.

FAULT CLASSIFICATION COLOR CODE (Indicating Recency of Movement)

Fault along which historic (last 200 years) displacement has occurred and is associated with one or more of the following:

(a) a recorded earthquake with surface rupture. (Also included are some well-defined surface breaks caused by ground shaking during earthquakes, e.g. extensive ground breakage, not on the White Wolf fault, caused by the Arvin-Tehachapi earthquake of 1952). The date of the associated earthquake is indicated. Where repeated surface ruptures on the same fault have occurred, only the date of the latest movement may be indicated, especially if earlier reports are not well documented as to location of ground breaks.
(b) fault creep slippage - slow ground displacement usually without accompanying earthquakes.
(c) displaced survey lines.

1906 ▶ ◀ 1906

1838 ▷ ◁ 1838

A triangle to the right or left of the date indicates termination point of observed surface displacement. Solid red triangle indicates known location of rupture termination point. Open black triangle indicates uncertain or estimated location of rupture termination point.

▶ 1951 ◀

Date bracketed by triangles indicates local fault break.

1992

No triangle by date indicates an intermediate point along fault break.

CREEP

Fault that exhibits fault creep slippage. Hachures indicate linear extent of fault creep. Annotation (creep with leader) indicates representative locations where fault creep has been observed and recorded.

1969

1968 ■ ■ 1968

Square on fault indicates where fault creep slippage has occured that has been triggered by an earthquake on some other fault. Date of causative earthquake indicated. Squares to right and left of date indicate termi- nal points between which triggered creep slippage has occurred (creep either continuous or intermittent between these end points).

Holocene fault displacement (during past 11,700 years) without historic record. Geomorphic evidence for Holocene faulting includes sag ponds, scarps showing little erosion, or the following features in Holocene age deposits: offset stream courses, linear scarps, shutter ridg- es, and triangular faceted spurs. Recency of faulting offshore is based on the interpreted age of the youngest strata displaced by faulting.

Late Quaternary fault displacement (during past 700,000 years). Geomorphic evidence similar to that described for Holocene faults ex- cept features are less distinct. Faulting may be younger, but lack of younger overlying deposits precludes more accurate age classification.

Quaternary fault (age undifferentiated). Most faults of this category show evidence of displacement some- time during the past 1.6 million years; possible exceptions are faults which displace rocks of undifferenti- ated Plio-Pleistocene age. Unnumbered Quaternary faults were based on Fault Map of California, 1975. See Bulletin 201, Appendix D for source data.

Pre-Quaternary fault (older that 1.6 million years) or fault without recognized Quaternary displacement. Some faults are shown in this category because the source of mapping used was of reconnaissnce nature, or was not done with the object of dating fault displacements.

ADDITIONAL FAULT SYMBOLS

Bar and ball on downthrown side (relative or apparent).

Arrows along fault indicate relative or apparent direction of lateral movement.

Arrow on fault indicates direction of dip.

Low angle fault (barbs on upper plate). Fault surface generally dips less than 45° but locally may have been subsequently steepened. On offshore faults, barbs simply indicate a reverse fault regardless of steepness of dip

OTHER SYMBOLS

491

Numbers refer to annotations listed in the appendices of the accompanying report. Annotations include fault name, age of fault displace- ment, and pertinent references including Earthquake Fault Zone maps where a fault has been zoned by the Alquist-Priolo Earthquake Fault Zoning Act. This Act requires the State Geolo- gist to delineate zones to encompass faults with Holocene displacement.

Structural discontinuity (offshore) separating differing Neogene structural domains. May indicate disconti- nuities between basement rocks.

Brawley Seismic Zone, a linear zone of seismicity locally up to 10 km wide associated with the releasing step between the Imperial and San Andreas faults

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado Construction Level Study	Project No.: 18-0817 Date: October 2018	Drawing Title: Fault Map Legend	Figure: A-4a

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/1/2018 at 6:40:48 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado Construction Level Study	Project No.: 18-0817 Date: October 2018	Drawing Title: Flood Map	Figure: A-5

USGS Design Maps Summary Report

User–Specified Input

Report Title OC Prado - Construction Level Study
Mon October 1, 2018 23:17:17 UTC

Building Code Reference Document ASCE 7-10 Standard
(which utilizes USGS hazard data available in 2008)

Site Coordinates 33.95716°N, 117.66298°W

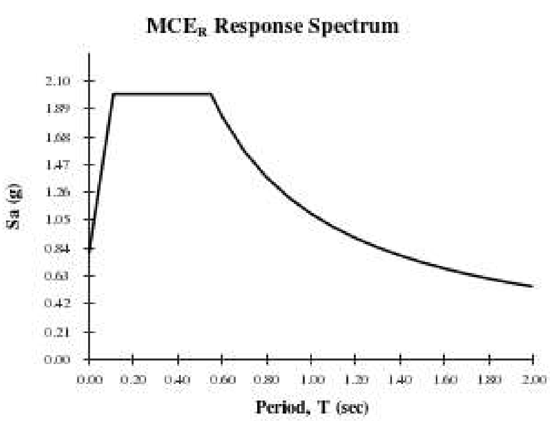
Site Soil Classification Site Class D – "Stiff Soil"

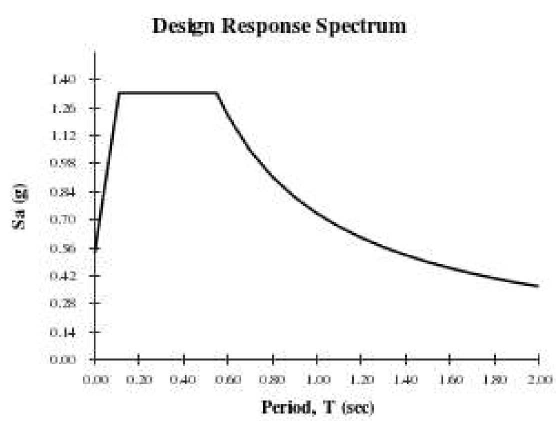
Risk Category I/II/III

USGS–Provided Output

S_S =	2.001 g	S_{MS} =	2.001 g	S_{DS} =	1.334 g
S_1 =	0.732 g	S_{M1} =	1.099 g	S_{D1} =	0.732 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado Construction Level Study	Project No.: 18-0817 Date: October 2018	Drawing Title: Response Spectrum	Figure: A-6

APPENDIX B

Field Exploratory Boring and Test Pit Logs

KEY TO LOGS

SOILS CLASSIFICATION					
MAJOR DIVISIONS			GRAPHIC LOG	USCS SYMBOL	TYPICAL NAMES
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS MORE THAN 50% OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS LESS THAN 5% FINES		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES MORE THAN 12% FINES		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS 50% OR MORE OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS LESS THAN 5% FINES		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES MORE THAN 12% FINES		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS 50% OR MORE OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 50			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT IS 50 OR MORE			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR GRAVELLY ELASTIC SILTS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT AND OTHER HIGHLY ORGANIC SOILS

GRAIN SIZES								
SILT AND CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		
	#200	#40	#10	#4	3/4"	3"	12"

SIEVE SIZES

KEY TO LOGS (continued)

SPT/CD BLOW COUNTS VS. CONSISTENCY/DENSITY					
FINE-GRAINED SOILS (SILTS, CLAYS, etc.)			GRANULAR SOILS (SANDS, GRAVELS, etc.)		
CONSISTENCY	*BLOWS/FOOT		RELATIVE DENSITY	*BLOWS/FOOT	
	SPT	CD		SPT	CD
SOFT	0-4	0-4	VERY LOOSE	0-4	0-8
FIRM	5-8	5-9	LOOSE	5-10	9-18
STIFF	9-15	10-18	MEDIUM DENSE	11-30	19-54
VERY STIFF	16-30	19-39	DENSE	31-50	55-90
HARD	over 30	over 39	VERY DENSE	over 50	over 90

* CONVERSION BETWEEN CALIFORNIA DRIVE SAMPLERS (CD) AND STANDARD PENETRATION TEST (SPT) BLOW COUNT HAS BEEN CALCULATED USING "FOUNDATION ENGINEERING HAND BOOK" BY H.Y. FANG. (**VALUES ARE FOR 140 Lbs HAMMER WEIGHT ONLY**)

DESCRIPTIVE ADJECTIVE VS. PERCENTAGE	
DESCRIPTIVE ADJECTIVE	PERCENTAGE REQUIREMENT
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
AND	35 - 50%

*THE FOLLOWING "DESCRIPTIVE TERMINOLOGY/ RANGES OF MOISTURE CONTENTS" HAVE BEEN USED FOR MOISTURE CLASSIFICATION IN THE LOGS.

APPROXIMATE MOISTURE CONTENT DEFINITION	
DEFINITION	DESCRIPTION
DRY	Dry to the touch; no observable moisture
SLIGHTLY MOIST	Some moisture but still a dry appearance
MOIST	Damp, but no visible water
VERY MOIST	Enough moisture to wet the hands
WET	Almost saturated; visible free water

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Boring No. : B-1
Sheet : 1 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/17/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
1	21.9			0	Bulk	CL	**Fill:** **Sandy Lean CLAY,** dry wood chips at the surface	#200 Wash Fines = 73%
2	15.2		3 7 11		SPT	CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of gravel, very stiff, moist, brown with white inclusions	#200 Wash Fines = 50% PP = 4 tsf
3	23.0	95	4 16 16	5	CD	CL		#200 Wash Fines = 66% PP = 4.5 tsf
4	17.8		3 6 10		SPT	CL	**Older ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, light olive brown	#200 Wash Fines = 51% PP = 4.0 tsf
5	25.7	104	2 7 18	10	CD	SM	**Silty SAND;** layers of sandy silt, medium dense, moist to very moist, yellowish brown and pale brown	#200 Wash Fines = 43%
6	25.7		3 5 8	15	SPT	CL/CH	**Lean to Fat CLAY;** stiff, moist, olive brown	#200 Wash Fines = 85% PP = 3.5 tsf
7	21.6	108	3 9 18	20	CD	CL	**Sandy Lean CLAY;** very stiff, moist, light olive brown	#200 Wash Fines = 69% PP = 3.5-4 tsf
8	19.4		6 10 17	25	SPT	CL		#200 Wash Fines = 70% PP = 3.5-4 tsf
9	34.7	92	6 15 20	30	CD	CH	**Fat CLAY;** very stiff, moist to very moist, pale brown with some yellowish brown	#200 Wash Fines = 87% PP=3.2-3.5 tsf
10	22.7		7 15 15	35	SPT	CL	**Sandy Lean CLAY;** very stiff, moist to very moist, light olive brown with some green	#200 Wash Fines = 61% PP = 3.5 tsf
				40				

Groundwater ▽ Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-1
Sheet : 2 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/17/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
11	20.1		15 33 50/6"	40	CD		CL	Layers of sandy silt	#200 Wash Fines = 50% PP = 4.5 tsf
12	28.8		7 21 33	45	SPT		CH	**Fat CLAY;** hard, moist to very moist, yellowish brown	#200 Wash Fines = 90% PP = 3.5 tsf
13	29.2	97	12 17 27	50	CD				#200 Wash Fines = 88% PP = 4-4.5 tsf
14	21.0	111	11 22 42	55	SPT		SM	**Silty SAND;** layers of sandy silt, very dense, moist, light olive brown	#200 Wash Fines = 44%
15	20.3		12 24 50/6"	60	CD		CL	**Sandy Lean CLAY**; very stiff, moist, yellowish brown	#200 Wash Fines = 54% PP = 4.5 tsf
							ML	**Sandy SILT;** layers of silty sand, hard, yellowish brown	
16	18.6	109	25 44 50/6"	65	SPT		SP-SM	**Poorly Graded SAND with SILT;** very dense, wet, light olive brown	#200 Wash Fines = 12%
17	18.8	109	13 26 28	70	CD				#200 Wash Fines = 6%
				75				End of Boring @ 71' 6" Groundwater encountered @ 32' 6"	
				80					

Groundwater   Bulk   CD   SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-2
Sheet : 1 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/17/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"
1	17.0		
2	16.5		5, 7, 9
3	21.8	107	2, 5, 6
4	23.7		3, 3, 4
5	36.4	87	3, 5, 12
6	20.7		2, 6, 18
7	22.8	109	8, 14, 14
8	24.4		8, 5, 6
9	16.3		10, 20, 36
10	32.7		8, 9, 15

Depth (ft): 0, 5, 10, 15, 20, 25, 30, 35, 40

Soil Type (USCS)	Description	Additional Tests
CL	**Fill:** **Sandy Lean CLAY;** trace of gravel, dark brown	#200 Wash Fines = 71%
CL	**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist to very moist, concretions, brown with some white	#200 Wash Fines = 85% PP = 4.5 tsf; #200 Wash Fines = 81% PP=2.5-2.7 tsf
CL	**Older ALLUVIUM:** **Sandy Lean CLAY;** firm, very moist, brown with some white	#200 Wash Fines = 64% PP = 2.5 tsf
CH	**Fat CLAY;** stiff, moist to very moist, light olive brown	#200 Wash Fines = 78% PP = 2.5-3 tsf
CL	**Sandy Lean CLAY;** stiff to very stiff, moist to very moist, olive brown with some yellowish brown	#200 Wash Fines = 50% PP = 2-2.7 tsf
CL	**Lean CLAY with SAND;** very stiff, very moist, olive gray with some yellowish brown	#200 Wash Fines = 78% PP = 3.5 tsf
CL	**Sandy Lean CLAY;** stiff, very moist, light olive brown	#200 Wash Fines = 73% PP = 2.5-3.5 tsf
SM	**Silty SAND;** layers of clayey sand, fine, dense, moist, yellowish brown	#200 Wash Fines = 35%
ML	**SILT;** layers of lean clay (2-3" thick), very stiff, moist, light olive brown	#200 Wash Fines = 88% PP = 1.5-2.5 tsf
CL		

Groundwater Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-2
Sheet : 2 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/17/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
11	21.2		5 9 17	40	CD		CL	**Sandy Lean CLAY;** very stiff, moist to very moist, caliche, light olive brown	#200 Wash Fines = 51% PP = 4.2 tsf
12	22.4		8 12 14	45	SPT				#200 Wash Fines = 63% PP = 2.7 tsf
								End of Boring @ 46' 6" Groundwater encountered @ 31'	

Depth scale: 40, 45, 50, 55, 60, 65, 70, 75, 80

Groundwater Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-3
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/17/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
1	17.6			0	Bulk	CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, stiff, moist, black	#200 Wash Fines = 73%
2	21.8		6 11 24		SPT	CL	**ALLUVIUM:** **Sandy Lean CLAY;** some concretions, very stiff, moist, light	#200 Wash Fines = 74%
3	26.2	102	7 15 23	5	CD	CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, stiff to very stiff, moist, light olive brown with white inclusions	#200 Wash Fines = 72% PP = 4.5 tsf
4	20.8		3 5 9		SPT	CL		#200 Wash Fines = 58% PP = 3-4 tsf
5	30.6	95	7 11 19	10	CD	CH	**Fat CLAY;** very stiff, moist, light olive brown	#200 Wash Fines = 85% PP = 4.5 tsf
6	15.9		3 7 7	15	SPT	CL/CH	**Lean to Fat CLAY;** some concretions, stiff, moist to very moist, pale yellow to light olive brown	#200 Wash Fines = 85% PP = 3 - 3.5 tsf
7	18.4	113	6 13 19	20	CD	CL	**Sandy Lean CLAY;** very stiff, moist, light olive brown	#200 Wash Fines = 50% PP = 4-4.5 tsf
							End of Boring @ 21' 6" No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-4
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/17/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
1	19.6			0	Bulk	CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, stiff, moist to very moist, very dark brown	#200 Wash Fines = 70%
2	21.5		4 4 4		SPT	CL	**ALLUVIUM:** **Sandy Lean CLAY;** concretions, stiff, moist, yellowish brown with some white specs	#200 Wash Fines = 63%
3	18.3	113	6 10 12	5	CD	SC	**Clayey SAND;** moist, mottled brown and yellowish brown	#200 Wash Fines = 38%
						SM	**Silty SAND;** fine, moist, yellowish brown	
4	30.9		2 4 7		SPT	CH	**OLDER ALLUVIUM:** **Fat CLAY with SAND;** some concretions and calcium carbonate, stiff, moist to very moist, light olive brown	#200 Wash Fines = 81% PP = 3.5 tsf
5	23.6	106	7 9 14	10	CD	CL/CH	**Sandy Lean to Fat CLAY;** very stiff, moist to very moist, green to grayish brown with white specs	#200 Wash Fines = 72% PP=3.5-4.5 tsf
6	27.3		3 4 7	15	SPT	CH	**Fat CLAY with SAND;** very stiff, moist, light olive brown	#200 Wash Fines = 84% PP = 3-4 tsf
7	16.2	122	3 14 25	20	CD	CL	**Sandy Lean CLAY;** very stiff, moist, yellowish brown	#200 Wash Fines = 64% PP = >4.5 tsf
							End of Boring @ 21' 6" No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-5
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/18/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	11.3			0	CL	**FILL:** **Sandy Lean CLAY;** moist, dark yellowish brown	#200 Wash Fines = 65%
2	11.5		9 7 9		CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of subrounded gravel, stiff to very stiff, moist, dark yellowish brown	#200 Wash Fines = 51% PP = 3.5 4.5 tsf
3	11.9	126	5 13 17	5	SC	**Clayey SAND;** trace of gravel, moist, yellowish brown	#200 Wash Fines = 39% PP = 4.5 tsf
4	33.0		7 13 18		CH	**OLDER ALLUVIUM**	#200 Wash Fines = 75% PP = 4.5 tsf
5	41.3	78	7 13 15	10	CH	**Fat CLAY with SAND;** trace of concretions, very stiff, moist to very moist, light olive brown	#200 Wash Fines = 85% PP = 4.5 tsf
6	34.4		3 3 5	15	CH	soft to firm, greenish gray	#200 Wash Fines = 76% PP = 0.75 tsf
7	28.1	102	5 8 11	20	CL/CH	**Lean to Fat CLAY;** very stiff, moist to very moist, light olive brown	#200 Wash Fines = 85% PP = 3.5 tsf
						End of Boring @ 21' 6" No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-6
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/18/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
1	8.1			0	Bulk	CL	**FILL: Sandy Lean CLAY;** very stiff, dry, light olive brown	#200 Wash Fines = 74%
						CL	**ALLUVIUM:**	
2	21.5	106	9 16 15		CD	CL	**OLDER ALLUVIUM:** **Lean CLAY with SAND;** few concretions, very stiff, moist, mottled white with dark yellowish brown	#200 Wash Fines = 77%
3	14.3		4 6 7	5	SPT	CL	**Sandy Lean CLAY:** trace of gravel, layers of silty sand, stiff to very stiff, yellowish brown with white specs	#200 Wash Fines = 52% PP = 4.5 tsf
4	40.7	80	6 9 12		CD	CH	**Fat CLAY;** very stiff, moist to very moist, olive brown	#200 Wash Fines = 88% PP=3.5-3.8 tsf
5	26.2	72	4 5 6	10	SPT	CH	abundant concretions, calcium carbonate, stiff	#200 Wash Fines = 72% PP = 1.5-2.5 tsf
6	25.0	101	4 8 9	15	CD	CH	stiff	#200 Wash Fines = 85% PP = 1.5-2 tsf
7	25.0		4 7 13	20	SPT	CL	**Lean CLAY with SAND;** stiff, moist to very moist, light olive brown	#200 Wash Fines = 70% PP = 2.5-3 tsf
							End of Boring @ 21' 6" No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-7
Sheet : 1 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/18/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Sample Location	Soil Type (USCS)	Description	Additional Tests
				Bulk	CL	**FILL:** **Sandy Lean CLAY;** few concretions, stiff, moist, dark yellowish brown with some white specs	
1	16.4	119	10 15 28	CD	CL	**ALLUVIUM:** **Lean CLAY with SAND;** few concretions, very stiff, moist, dark yellowish brown with some white inclusions	#200 Wash Fines = 78% PP = >4.5 tsf
2	19.8		3 5 7	SPT	CL	**OLDER ALLUVIUM:** **Lean CLAY with SAND;** few concretions, very stiff, moist to very moist, dark yellowish brown with some white specs	#200 Wash Fines = 76% PP=3.5-4.5 tsf
3	31.5	90	2 3 4	CD	CH	**Fat CLAY;** firm, very moist, pale yellow with some brown	#200 Wash Fines = 93% PP = 1.5-2.5 tsf
4	34.5		3 4 5	SPT	CH	calcium carbonate, stiff, pale brown	#200 Wash Fines = 88%
5	29.8	95	5 6 9	CD	CH	**Fat CLAY with SAND;** stiff, moist to very moist, light olive brown	#200 Wash Fines = 81%
6	22.7		5 7 11	SPT	CH		#200 Wash Fines = 82%
7	29.1	100	4 9 15	CD	CH	**Sandy Fat CLAY;** stiff, moist to very moist, mottled light olive brown and white	#200 Wash Fines = 63% PP = 2-2.5 tsf
8	24.0		22 12 15	SPT	CL	**Sandy Lean CLAY;** trace of gravel, stiff, moist to very moist, light olive brown	#200 Wash Fines = 65%
9	38.3	88	9 19 29	CD	CH	**Fat CLAY with SAND;** small pockets of organic, stiff to very stiff, moist to very moist, light olive brown	#200 Wash Fines = 83% PP = 2-2.7 tsf

Depth (ft): 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-7
Sheet : 2 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/18/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
10	23.5		7 16 27	40	SPT		ML	**Sandy SILT;** layers silty sand and lean clay with sand, stiff, moist, light olive brown	#200 Wash Fines = 69%
11	23.9	104	7 12 18	45	CD		CH	**Fat CLAY with SAND;** thin lenses of sandy silt, stiff, moist to very moist, light yellowish brown	#200 Wash Fines = 77% PP = 2.5-3.5 tsf
12	21.1		9 15 30	50	SPT		CL	**Sandy Lean Clay;** very stiff, moist, light olive brown with some rusty brown	#200 Wash Fines = 63%
				55				End of Boring @ 51' 6" Groundwater encountered @ 28' 0"	
				60					
				65					
				70					
				75					
				80					

Groundwater Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-8
Sheet : 1 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/22/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	18.9			0	CL	**FILL:** **Lean CLAY with SAND;** stiff, moist to very moist, very dark brown	#200 Wash Fines = 76%
2	18.4	111	7 8 12		CL	**ALLUVIUM:** **Lean CLAY with SAND;** moist, stiff, very dark brown	Fines = 75% PP =1.5-2 tsf
3	15.5		5 7 15	5	CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY**; concretions, calcium carbonate, very stiff to hard, moist, light olive brown	#200 Wash Fines = 70%
4	16.4	108	7 10 16		CL	**Lean CLAY with SAND;** stiff to very stiff, olive brown	Fines = 73% PP = 3-3.5 tsf
5	22.1		4 5 12	10	CH	**Sandy Fat CLAY;** very stiff, moist, pale yellow	#200 Wash Fines = 58%
					CL/CH	**Lean to Fat CLAY;** firm to stiff, moist to very moist, light olive brown with some white inclusions	
6	18.5	109	18 50/5"	15	CL/CH	**Lean to Fat CLAY with SAND;** few concretions, very stiff, moist, light olive brown with some white	#200 Wash Fines = 79% PP = 4.5 tsf
7	22.8		15 15 25	20	CL	**Sandy Lean CLAY with SAND;** few concretions, stiff to very stiff, moist to very moist, light olive brown with some white	#200 Wash Fines = 67%
8	33.9	93	9 16 41	25	CH	**Fat CLAY;** stiff to very stiff, moist to very moist, light olive brown	#200 Wash Fines = 88% PP = 2-2.5 tsf
9	21.4		36 29 20	30	CL/CH	**Lean to Fat CLAY;** concretions, white inclusion, stiff to very stiff, moist to very moist, light olive brown	#200 Wash Fines = 62%
10	22.6	111	18 45 50	35	SM	**Silty SAND;** fine, dense, moist, light olive brown	#200 Wash Fines = 21%
				40			

Groundwater ▽ Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-8
Sheet : 2 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/22/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
11	16.0		7 12 13	40	SPT		SM	**Silty SAND;** fine to coarse, medium dense, moist, light olive brown	#200 Wash Fines = 15%
12	20.5			45	SPT			trace of gravel	#200 Wash Fines = 18%
								End of Boring @ 46' 6" Groundwater encountered @ 33'	
				50					
				55					
				60					
				65					
				70					
				75					
				80					

Groundwater ▽ Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-9
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/22/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
				0		CL	**FILL: Sandy Lean CLAY;** stiff, moist, very dark brown	
1	19.8	104	9 18 28		CD		**ALLUVIUM:** **Lean CLAY with SAND;** very stiff, moist to very moist, few concretions, olive brown	#200 Wash Fines = 79% PP = 3.5 tsf
2	29.8		8 18 25	5	SPT	CH	**Fat CLAY;** very stiff, moist to very moist, pale yellow with light olive brown	#200 Wash Fines = 88%
3	33.6	88	7 9 17		CD	CH	**OLDER ALLUVIUM:** **Fat CLAY;** very stiff, moist to very moist, light olive brown	#200 Wash Fines = 85% PP = 3.0 tsf
4	32.9		7 17 22	10	SPT		**Sandy Fat CLAY;** thin layers of sandy lean clay, stiff, moist to very moist, light olive brown	#200 Wash Fines = 67% PP = 1.5 tsf
5	22.8		12 14 17	15	SPT		**Fat CLAY with SAND;** stiff, moist to very moist, light olive brown	#200 Wash Fines = 75% PP = 2.5 tsf
6	44.6	79	9 16 26	20	CD		**Fat CLAY;** very stiff, moist, light olive brown with white	#200 Wash Fines = 90% PP=3.5-4.5 tsf
							End of Boring @ 21' 6" No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-10
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/22/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
1	12.9			0	Bulk	CL	**FILL:** **Lean CLAY with SAND;** stiff, moist, dark brown	#200 Wash Fines = 75%
2	13.9	121	12 25 37		CD	CL	**Lean CLAY with SAND;** very stiff, moist, brown	#200 Wash Fines = 78% PP = 4.5 tsf
3	15.5		7 15 20	5	SPT	CL	**ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, dark yellowish brown	#200 Wash Fines = 67% PP = 2.5 tsf
4	23.3	102	10 15 19	10	CD	CL	**OLDER ALLUVIUM:** **Lean CLAY;** very stiff, moist, olive brown	#200 Wash Fines = 86% PP=3.2-4.2 tsf
						CL/CH	**Lean to Fat CLAY;** very stiff, moist, light olive brown with white specs	
5	37.5		15 25 25	15	SPT	CH	**Fat CLAY;** firm to stiff, moist to very moist, pale yellow	#200 Wash Fines = 90% PP = 1.5 tsf
6	23.6	106	9 19 22	20	CD	CL/CH	**Lean to Fat CLAY with SAND;** stiff to very stiff, moist to very moist, light olive brown with green	#200 Wash Fines = 81% PP = 2.5-3 tsf
				25			End of Boring @ 21' 6" No groundwater encountered	
				30				
				35				
				40				

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-11
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/05/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Soil Type (USCS)	Description	Additional Tests
1	15.6			CL	**Fill:** **Sandy Lean CLAY;** slightly moist, brown	#200 Wash Fines = 64% EI = 52
2	16.8	104	3 12 18	CL	**ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, very pale brown	#200 Wash Fines = 69% PP = 4.5 tsf
3	19.2		6 8 12	CL/CH	**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** concretions, stiff to very stiff, moist to very moist, olive brown to pale brown inclusions	#200 Wash Fines = 72% PP = 4.5 tsf
4	26.5	97	7 7 10	CH	**Fat CLAY;** stiff, moist to very moist, pale brown with red specks	#200 Wash Fines = 92% PP = 1.7 - 2.2 tsf
5	21.7		6 6 8	CH	concretions and soft zones	#200 Wash Fines = 97% PP = 2 - 4.5 tsf
6	27.5	124	1 5 10	CH	olive brown	#200 Wash Fines = 76% PP = 1 - 1.2 tsf consolodation
7	27.5		4 6 7	CH		#200 Wash Fines = 81% PP = 2.7 - 3.7 tsf

End of Boring @ 21' 6"
No groundwater encountered

Depth (ft): 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-12
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 08/29/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
1	7.4			0	Bulk	CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, firm, slightly moist to moist, brown to dark brown	#200 Wash Fines = 71%
2	11.5		6 12 13		SPT	CL	**ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, dark brown to yellowish brown	#200 Wash Fines = 67% PP = 4.5 tsf
3	11.6	118	8 25 38	5	CD	CL		#200 Wash Fines = 72% PP = 4.5 tsf
4	18.0		4 4 6		SPT	CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** trace of gravel, stiff, moist, yellowish brown	#200 Wash Fines = 57% PP = 3-3.5 tsf
5	38.0	84	6 9 9	10	CD	CL/CH	**Lean to Fat CLAY with SAND;** firm to stiff, moist to very moist, grayish brown to yellowish brown	#200 Wash Fines = 82% PP = 3.7 tsf
6	28.9		2 2 2	15	SPT	CL/CH		#200 Wash Fines = 82% PP = 2.7-3.5 tsf
7	21.8	100	10 7 8	20	CD	CL	**Sandy Lean CLAY;** stiff, moist, grayish brown with dark brown inclusions	#200 Wash Fines = 65% PP = 2.5-3.5 tsf
8	21.7		11 7 6	25	SPT	CL	6" layer of silty sand with trace of gravel	#200 Wash Fines = 51% PP = 2.5 tsf
9	23.8		5 9 13	30	SPT	CL	Very stiff	#200 Wash Fines = 65% PP = 3-3.5 tsf
				35			End of Boring @ 31' 6" No groundwater encountered	
				40				

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-13
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/05/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	10.2			0	Bulk		CL	**FILL:** **Sandy Lean CLAY;** concretions, stiff, moist, brown	#200 Wash Fines 72% EI = 47
2	11.7		8 9 15		Bulk		CL	**ALLUVIUM:** **Sandy Lean CLAY;** abundant concretions, very stiff, moist, brown with pale brown inclusioins	#200 Wash Fines = 66% PP = 4.5 tsf
3	17.2	107	12 33 50/4"	5	CD		CL	**OLDER ALLUVIUM:** **Sandy Lean Clay;** abundant concretions, hard, pale brown with very pale brown	#200 Wash Fines = 71% PP = 4.5 tsf
4	22.1		4 5 8		SPT		CL	olive brown	#200 Wash Fines = 63% PP = 4.5 tsf
5	13.0	116	5 12 16	10	CD		SC	**Clayey SAND**; fine medium dense, moist, olive brown	#200 Wash Fines = 33% Consolidation
6	31.1		3 5 6	15	SPT		CL/CH	**Lean to Fat CLAY;** stiff, moist to very moist, light yellowish brown	#200 Wash Fines = 90% PP = 1.5-2.5 tsf
7	23.1	107	4 7 16	20	CD		CL/CH		#200 Wash Fines = 70% PP = 2.5-3 tsf
				25 30 35 40				End of Boring @ 21' 6" No groundwater encountered	

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-14
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 08/30/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
1	7.3			0	Bulk	CL	**FILL:** **Sandy Lean CLAY;** slightly moist, powdery, dark brown	#200 Wash Fines = 72%
2	7.7	114	14 16 17		CD	CL	**ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, dark yellowish brown	#200 Wash Fines = 72% PP = 4.5 tsf
3	18.6		6 8 13	5	SPT	CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** very stiff, caliche stringers, moist, dark yellowish brown	#200 Wash Fines = 73% PP = 4.5 tsf
4	34.7	88	5 12 22		CD	CH	**Fat CLAY;** stiff to very stiff, moist to very moist, dark yellowish brown	#200 Wash Fines = 90% PP = 4.5 tsf
5	39.2		4 6 7	10	SPT	CH		#200 Wash Fines = 89% PP = 2.5-3.5 tsf
6	26.7	98	6 7 10	15	CD	CL/CH	**Lean to Fat CLAY with SAND;** stiff, moist, dark yellowish brown with rusty pockets	#200 Wash Fines = 79% PP = 2-2.5 tsf Consolidation
							End of Boring @ 16' 6" No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-15
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 08/29/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
1	11.8			0	Bulk	CL	**FILL:** **Sandy Lean CLAY;** fragments, debris, rock, some organics, concretions, firm to stiff, slightly moist, dark brown	#200 Wash Fines = 67%
2	13.5		3 4 5		SPT	CL		#200 Wash Fines = 72% PP = 4.5 tsf
						CL	**ALLUVIUM:** **Sandy Lean CLAY;** firm to stiff, moist, brown	
3	16.1	118	8 10 10	5	CD	CL/CH	**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** concretions,very stiff, moist, pale brown	#200 Wash Fines = 63% PP = 4.5 tsf Consolidation
4	29.7		3 4 7		SPT	CH	**Fat CLAY with SAND;** stiff, moist to very moist, light olive brown	#200 Wash Fines = 82% PP = 4.5 tsf
5	33.9	90	8 15 17	10	CD	CH	**Fat CLAY;** little gravel/concretions, very stiff, light olive brown	#200 Wash Fines = 92% PP = 4.5 tsf Gravel = 14%
6	31.7		3 3 4	15	SPT	CH	**Fat CLAY with SAND;** trace of concretions, stiff, moist to very moist, olive brown	#200 Wash Fines = 86% PP = 2-3 tsf Consolidation
7	29.1	96	4 7 10	20	CD	CH		#200 Wash Fines = 85% PP = 2.5-3 tsf
				25			End of boring @ 21' 6" No groundwater encountered	
				30				
				35				
				40				

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-16
Sheet : 1 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 08/29/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Soil Type (USCS)	Description	Additional Tests
1	7.2			CL	**FILL:** **Lean CLAY with SAND;** slightly moist, brown	#200 Wash Fines = 76%
2	14.8	121	10 8 8	CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of gravel, trace of concretions, stiff, moist, dark yellowish brown	#200 Wash Fines = 69% PP = 4.5 tsf
3	18.3		4 5 6	CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** stiff, moist, olive brown with pale brown	#200 Wash Fines = 64% PP = 4.5 tsf
4	37.7	97	4 6 11	CH	**Fat CLAY;** stiff, moist to very moist, olive with mottled dark brown	#200 Wash Fines = 88% PP = 4-4.5 tsf Consolidation
5	35.1		2 4 7	CH		#200 Wash Fines = 92% PP = 3.5-4.5 tsf
6	21.5	110	7 13 15	CL/CH	**Lean to Fat CLAY with SAND;** very stiff, moist, olive with mottled dark brown	#200 Wash Fines = 82% PP = 4.5 tsf Consolidation
7	26.1		4 5 8	CL/CH	**Lean to Fat CLAY;** stiff, moist, light olive brown	#200 Wash Fines = 86% PP= 3.5 -4 tsf
8	18.6	114	5 15 20	CL	**Sandy Lean CLAY;** trace of gravel, very stiff, moist, light olive brown with reddish brown	#200 Wash Fines = 63% PP = 4.5 tsf Consolidation
9	18.2		5 11 14	SC	**Clayey SAND;** layers of sandy clay, concretions, medium dense, moist, light olive brown	#200 Wash Fines = 46%
10	22.2	103	12 28 50	SC		#200 Wash Fines = 34%

Depth (ft): 0, 5, 10, 15, 20, 25, 30, 35, 40

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-16
Sheet : 2 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 08/29/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
11	16.0		7 26 40	40	SPT		SC	**Clayey Sand;** layers of sandy clay, concretions, medium dense, moist, light olive brown	#200 Wash Fines 40%
							SP-SM	**Poorly Graded SAND with SILT and GRAVEL;** fine to coarse, very moist, grayish brown	
12	10.0	134	7 18 50	45	CD				#200 Wash Fines = 9%
13	23.3		31 50/6"	50	SPT				#200 Wash Fines = 9%

End of Boring @ 51' 6"
Groundwater encountered @ 44'

Depth scale: 40, 45, 50, 55, 60, 65, 70, 75, 80

Groundwater ▽ Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-17
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 08/30/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
				0		CL	**FILL:** **Sandy Lean CLAY;** stiff, slightly moist, very dark brown	
1	11.6	116	11 15 16		CD	CL	**ALLUVIUM:** **Lean CLAY with SAND;** trace of gravel, very stiff, slightly moist to moist, olive brown with white inclustions	#200 Wash Fines = 81% PP = 4.5 tsf
2	13.3		5 6 7	5	SPT	CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, stiff, very pale brown with zones of olive brown	#200 Wash Fines = 66% PP = 4.5 tsf
3	24.0	103	6 12 17		CD	CL/CH	**Lean to Fat CLAY;** stiff to very stiff, moist to very moist, olive brown with white and reddish brown	#200 Wash Fines = 89% PP = 4.5 tsf
4	33.8		4 6 8	10	SPT	CL/CH		#200 Wash Fines = 90% PP = 4.2-4.5 tsf
5	35.9	86	11 14 16	15	CD	CL/CH		#200 Wash Fines = 91% PP = 4.5 tsf
							End of Boring @ 16' 6" No groundwater encountered	
				20				
				25				
				30				
				35				
				40				

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-18
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 08/30/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	7.3			0	CL	**FILL: Lean CLAY with SAND;** slightly moist, crumbly, brown	#200 Wash Fines = 80% Corrosivity
2	7.8	113	17 22 23		CL	**ALLUVIUM: Lean CLAY with SAND;** very stiff, slightly moist, dark yellowish brown	#200 Wash Fines = 80% PP = 4.5 tsf
3	14.0		5 5 7	5	CL	**OLDER ALLUVIUM: Sandy Lean CLAY;** concretions, stiff, moist, pale brown	#200 Wash Fines = 58%
4	4.3	111	11 24 14		SP-SM	**Poorly Graded SAND with SILT;** fine to coarse, medium dense, grayish brown with reddish brown	#200 Wash Fines = 11%
5	32.4		2 4 7	10	CH	**Fat CLAY;** stiff, moist to very moist, gray with reddish brown and white	#200 Wash Fines = 88% PP = 1.5-2.5 tsf
6	26.4	100	6 7 8	15	CL/CH	**Lean to Fat CLAY;** stiff, moist to very moist, olive brown	#200 Wash Fines = 83% PP = 2.3-2.6 tsf
7	20.1		4 8 12	20	CL	**Sandy Lean CLAY;** very stiff, moist to very moist, olive brown	#200 Wash Fines = 66% PP = 2.4 tsf
						End of Boring @ 21' 6" No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-19
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 08/30/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
1	5.4			0	Bulk	CL	**FILL:** **Sandy Lean CLAY;** stiff, moist, dark brown	#200 Wash Fines = 76%
2	10.5	112	5 6 9		CD	CL	**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, dark brown	#200 Wash Fines = 79% PP = 4.5 tsf
3	13.3		3 5 8	5	SPT	CL	**OLDER ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, dark yellowish brown with white inclusions	#200 Wash Fines = 70% PP = 4.5 tsf
4	29.8	93	7 13 17		CD	CH	**Fat CLAY;** stiff to very stiff, moist to very moist, pale brown	#200 Wash Fines = 96% PP = 4.0-4.2 tsf
5	33.3		5 7 8	10	SPT	CH		#200 Wash Fines = 90% PP = 4.5 tsf
6	22.1	109	6 12 12	15	CD	CL	**Lean CLAY with SAND;** stiff to very stiff, moist, light olive brown	#200 Wash Fines = 84% PP = 4.5 tsf
							End of Boring @ 16' 6" No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-20
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 08/30/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	9.4			0	Bulk		CL	**Fill:** **Lean CLAY with SAND;** crumbly, slightly moist, dark brown	#200 Wash Fines = 77%
2	9.4		9 10 11		SPT		CL	**ALLUVIUM:** **Lean CLAY with SAND;** very stiff, slightly moist, dark brown with white specks	Fines = 77%
3	11.6	119	20 28 33	5	CD		CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, very stiff to hard, moist, dark brown with white specks	#200 Wash Fines = 69% PP = 4.5 tsf
4	19.3		4 7 12	10	SPT		CL	**Lean CLAY with SAND;** trace of concretions, stiff, moist, brown with white specks	#200 Wash Fines = 84% PP = 4.5 tsf
5	28.9	94	9 11 13	15	CD		CL/CH	**Lean to Fat CLAY with SAND;** stiff to very stiff, moist to very moist, light olive brown	#200 Wash Fines = 84% PP = 2.5-2.7 tsf
6	26.9		5 6 8	20	SPT		CL/CH	concretions	#200 Wash Fines = 78% PP = 1-1.5 tsf
								End of Boring @ 21' 6" No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-21
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/04/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
				0		CL	**FILL:** **Lean CLAY with SAND;** trace of gravel, rootlets, crumbly, slightly moist, dark yellowish brown	
1	8.6		7 11 13		SPT			#200 Wash Fines = 75% PP = 4.5 tsf E.I.=
2	10.2	108	12 22 25	5	CD		**OLDER ALLUVIUM:** **Lean CLAY with SAND;** trace of gravel/concretions, very stiff, moist, dark yellowish brown with white specks	#200 Wash Fines = 81% PP = 4.5 tsf
3	18.1		11 12 13		SPT		**Sandy Lean CLAY;** trace of gravel/concretions, stiff to very stiff, moist, brown with white inclusions	#200 Wash Fines = 74% PP =4.5 tsf
4	15.4	114	13 33 47	10	CD			#200 Wash Fines = 61% PP = 4.5 tsf
5	24.6		12 18 33	15	CD	CL/CH	**Lean to Fat CLAY with SAND;** trace of concretions, very stiff to hard, moist, yellowish brown	#200 Wash Fines = 75% PP = 4.5 tsf
6	20.9		7 10 15	20	SPT	CL	**Sandy Lean CLAY;** trace of concretions, very stiff, moist, dark yellowish brown with white specks	#200 Wash Fines = 63% PP = 4-4.5 tsf
7	31.6	89	5 10 15	25	CD	CL/CH	**Sandy Lean to Fat CLAY;** very stiff, moist to very moist, brown with yellowish brown inclusions	#200 Wash Fines = 72% PP = 1.7-2.7 tsf
8	21.7		5 9 14	30	SPT			#200 Wash Fines = 73% PP = 4-4.5 tsf
				35			End of Boring @31.5' No groundwater encountered	
				40				

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-22
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/05/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Additional Tests
1	14.5			#200 Wash Fines = 78%
2	13.8	121	6 13 17	#200 Wash Fines =76% PP = 4.5 tsf
3	19.4		10 21 28	#200 Wash Fines = 73% PP = 4.5 tsf
4	20.5	105	9 10 12	#200 Wash Fines = 74% PP = 3.5-4 tsf
5	18.1		5 11 14	#200 Wash Fines = 50% PP = 4 - 4.5 tsf
6	34.7	88	6 12 18	#200 Wash Fines = 86% PP = 3-4.5 tsf
7	22.5		4 5 6	#200 Wash Fines = 83% PP = 3 tsf
8	22.2	105	4 5 12	#200 Wash Fines = 63% PP = 3-4 tsf

Depth (ft)	Soil Type (USCS)	Description
0	CL	**Fill:** **Lean Clay with SAND;** trace of concretions, stiff, moist, dark brown
	CL	**ALLUVIUM: Lean CLAY with SAND;** very stiff, moist, brown with white specks
	CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, very stiff to hard, pale brown with white
15	CL/CH	**Lean to Fat CLAY;** trace of concretions, very stiff, moist to very moist, light olive brown
20	CL	**Lean CLAY with SAND;** stiff, moist, very pale brown with white
25	CL	**Sandy Lean CLAY;** trace of gravel, stiff to very stiff, moist, light olive brown
		End of Boring @ 26' 6" No groundwater encountered

Depth scale (ft): 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-23
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/04/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	7.8			0	Bulk		CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, crumbly, slightly moist, dark yellowish brown	#200 Wash Fines = 50%
2	16.3		4 7 9		SPT		CL/CH	**ALLUVIUM:** **Lean to Fat CLAY with SAND;** trace of gravel, very stiff,moist, dark yellowish brown	#200 Wash Fines = 76% PP = 4.5 tsf EI = 107 Corrosivity
3	15.3	115	7 12 17	5	CD		CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY with SAND;** concretions, very stiff, moist, dark yellowish brown with white specks	#200 Wash Fines = 79% PP = 4.5 tsf
4	23.9		5 8 12		SPT		CL/CH	**Lean to Fat CLAY;** concretions, very stiff, moist, light olive brown	#200 Wash Fines = 89% PP = 4.5 tsf
5	21.8	107	6 18 21	10	CD		CL/CH	**Lean to Fat CLAY with SAND;** concretions, very stiff, moist, light olive brown	#200 Wash Fines = 79% PP = 4.0-4.5 tsf
6	35.8		2 3 6	15	SPT		CH	**Fat CLAY;** caliche stringers, concretions, firm to stiff, light olive brown	#200 Wash Fines = 93% PP = 3-3.5 tsf
				20, 25, 30, 35, 40				End of Boring @ 16' 6" No groundwater encountered	

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-24
Sheet : 1 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/04/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
1				0	Bulk	CL	**FILL:** **Sandy Lean CLAY;** trace of gravel and shale, crumbly slightly moist, dark yellowish brown	#200 Wash Fines = 50%
2	15.8	104	4 5 7		CD	CL	**Lean CLAY with SAND;** stiff, moist, dark brown	Fines = 77% PP = 3 - 4 tsf EI = 96
3	19.0		3 5 8	5	SPT	CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, stiff, moist, light olive brown	#200 Wash Fines = 55% PP = 3-3.7 tsf
4	37.5	89	6 12 17		CD	ML	**Silt with SAND;** concretions, very stiff, moist, light yellowish brown to olive brown	#200 Wash Fines = 79% PP = 4.5 tsf
5	33.3		3 4 9	10	SPT	CL/CH	**Lean to Fat CLAY;** trace of concretions, stiff, moist, olive brown	#200 Wash Fines = 83% PP = 4.5 tsf
6	21.9	108	6 13 19	15	CD	CL	**Sandy Lean CLAY;** concretions, very stiff, moist to very moist, olive brown with white inclusions	#200 Wash Fines = 66% PP= 3.5 - 4 tsf Consolidation
7	29.6		4 7 10	20	SPT	CL/CH	**Lean to Fat CLAY with SAND;** very stiff, moist, yellowish brown with olive inclusions	#200 Wash Fines = 87% PP= 2.5 - 3 tsf
8	20.1	108	7 14 18	25	CD	CL	**Sandy Lean CLAY;** trace of concretions, caliche stringers, very stiff, moist, yellowish brown	#200 Wash Fines = 62% PP = 4.5 tsf
9	29.2	101	12 30 40	30	CD	CL/CH	**Lean to Fat CLAY with SAND;** very stiff, moist, yellowish brown	#200 Wash Fines = 84% PP = 4 - 4.5 tsf Consolidation
10	31.2		7 13 16	35	SPT	ML	**Silt with SAND;** layers of silty sand, very stiff, moist to very moist, dark yellowish brown	#200 Wash Fines = 76% PP = 1.2-3.5 tsf
				40		CL/CH	**Lean to Fat CLAY;** very stiff, moist, yellowish brown with reddish brown	

Groundwater ▽ Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-24
Sheet : 2 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/04/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
11	38.9	89	4 12 21	40	CD		CL/CH	**Lean to Fat CLAY;** very stiff, moist, yellowish brown with reddish brown	#200 Wash Fines = 92% PP = 4.5 tsf
							SM	**Silty SAND;** layers of silt with sand, moist to very moist, yellowish brown	
12	14.0		23 28 28	45	SPT		SP/SM	**Poorly Graded SAND with SILT;** fine to coarse, dense to very dense, wet, reddish brown	#200 Wash Fines = 11%
								End of Boring @ 46' 6" Groundwater encountered @ 34' 6" Groundwater rose to 27' 6" at end of drilling	

Depth scale: 40, 45, 50, 55, 60, 65, 70, 75, 80

Groundwater Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-25
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/04/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
1	7.1			0	Bulk	CL	**FILL:** **Sandy Lean CLAY;** trace of gravel and shale, crumbly slightly moist, dark grayish brown	#200 Wash Fines = 60%
2	14.5	117	6 10 15		CD		**ALLUVIUM:** **Lean CLAY with SAND;** very stiff, moist, very dark brown	#200 Wash Fines = 84% PP = 4.5 tsf EI = 78
3	16.7		4 4 5	5	SPT		**OLDER ALLUVIUM:** **Lean CLAY with SAND;** carbonaceous stringers, trace of concretions stiff, moist to very moist, dark brown to very dark brown	#200 Wash Fines = 79% PP = 3 - 4.5 tsf
4	18.5	112	6 9 9		CD	CL/CH	**Sandy Lean CLAY to Fat CLAY;** layers and pockets of concretions, stiff, moist, olive brown	#200 Wash Fines = 51% PP = 3 tsf
5	25.2	84	4 5 9	10	SPT			#200 Wash Fines = 70% PP = 2.5-2.75
6	23.5		3 7 10	15	SPT	CL	**Lean CLAY with SAND;** trace of concretions, very stiff, moist to very moist, dark yellowish brown	#200 Wash Fines = 76% PP = 2.7-3.5 tsf
7	14.8	119	4 9 18	20	CD	SC	**Clayey SAND;** layers of sandy clay, medium dense, moist, yellowish brown	#200 Wash Fines = 36% PP = 4.5 tsf
8	20.6		6 9 15	25	SPT	CL	**Sandy Lean CLAY;** caliche stringers, very stiff, moist, dark yellowish brown	#200 Wash Fines = 71% PP = 4 - 4.5 tsf
9	18.4	114	11 22 30	30	CD		hard	#200 Wash Fines = 53% PP = 4.5 tsf
				35			End of Boring @ 31' 6" No groundwater encountered	
				40				

Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-26
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/05/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	12.5			0	Bulk		CL	**FILL:** **Lean CLAY with SAND;** trace of gravel, stiff, moist, dark brown	#200 Wash Fines = 79% PP = 3 tsf
2	13.4		5 8 10		SPT		CL	**ALLUVIUM:** **Lean CLAY with SAND;** very stiff, moist, dark brown	#200 Wash Fines = 80% PP = 4.5 tsf
3	18.0	112	9 13 20	5	CD		CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, very stiff, moist, dark yellowish brown	#200 Wash Fines = 67% PP = 4.5 tsf
4	24.5		3 4 5		SPT		CL/CH	**Lean to Fat CLAY with SAND;** trace of concretions, stiff, moist, light olive brown	#200 Wash Fines = 78% PP = 2.7-3.7 tsf
5	28.9	94	6 9 13	10	CD		CL/CH		#200 Wash Fines = 82% PP = 4 - 4.2 tsf
6	26.7		3 4 5	15	SPT		CL/CH		#200 Wash Fines = 60% PP = 2.5 - 4 tsf
7	28.1	94	5 7 9	20	CD		CH	**Fat CLAY with SAND;** concretions, stiff, moist to very moist, pale yellow	#200 Wash Fines = 82% PP = 2 - 3 tsf
8	23.3		5 6 11	25	SPT	Groundwater	CH	light olive brown with pale brown inclusions	#200 Wash Fines = 76% PP = 2 - 3.5 tsf
9	34.4	90	10 18 23	30	CD		CH	**Fat CLAY;** concretions, very stiff, moist to very moist, light olive brown with brown	#200 Wash Fines = 90% PP = 4 - 4.5 tsf
				35				End of Boring @ 31' 6" Perched groundwater encountered @ 24'	
				40					

Groundwater Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-27
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/06/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
				0		CL	**FILL: Sandy Lean CLAY;** trace of gravel, stiff, moist, dark brown	
1	15.1		2 4 5		Bulk		**ALLUVIUM: Lean CLAY with SAND;** trace of concretions, stiff, moist, dark brown	#200 Wash Fines = 82% PP = 3.5-4.5 tsf
2	17.7		8 8 9	5	Bulk		**OLDER ALLUVIUM:** **Sandy Lean CLAY;** abundant concretions, very stiff, moist, very pale brown to white	#200 Wash Fines = 64% PP = 4.5 tsf
3	17.5		7 9 10		Bulk			#200 Wash Fines = 59% PP = 4.5 tsf
4	16.0		6 9 13		Bulk			#200 Wash Fines = 61%
5	18.9		5 7 8	10	Bulk	ML	**Sandy Silt;** layers of silty sand, trace of concretions, stiff, moist, yellowish brown to olive brown	#200 Wash Fines = 60% PP = 2 - 2.5 tsf
6	29.7		3 5 11		Bulk			#200 Wash Fines = 89% PP = 2.5 - 3 tsf
7	20.8		7 12 13	15	Bulk			#200 Wash Fines = 71%
8	32.4		6 8 8		Bulk		Layers of sandy lean clay	#200 Wash Fines = 74% PP = 2-2.5 tsf
9	40.0		3 4 7		Bulk	CH	**Fat CLAY;** layers of silt, stiff, moist to very moist, light olive brown	#200 Wash Fines = 95% PP = 1.5-4 tsf
10	34.0		4 5 7	20	Bulk			#200 Wash Fines = 97%
11	35.4		2 4 4		Bulk	CL/CH	**Lean to Fat CLAY with SAND;** stiff, moist, olive brown	#200 Wash Fines = 75% PP = 2.5 tsf
12	25.4	100	5 7 10	25	CD		**Sandy Lean to Fat CLAY;** lenses of fine silty sand, firm to stiff, moist, dark grayish brown	#200 Wash Fines = 53% PP = 2.5 - 3 tsf
13	33.2		3 3 4		Bulk			#200 Wash Fines = 50%
14	22.2		7 9 12		Bulk	ML	**Sandy Silt;** layers of sandy lean clay, very stiff, moist, dark olive gray with layers of olive brown	#200 Wash Fines = 53%
15	16.3		5 15 26	30	Bulk	SM	**Silty SAND;** fine layers of sandy silt, dense, moist to very moist, dark yellowish brown	#200 Wash Fines = 32%
16	14.7	122	9 18 45		CD			#200 Wash Fines = 39%
17	21.3		9 11 18	35	Bulk	CL	**Sandy Lean CLAY;** layers of sandy silt and fine silty sand, very stiff, moist to very moist, dark yellowish brown	#200 Wash Fines = 50%
				40			End of Boring @ 35' 6" No groundwater encountered	

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-28
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/06/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	8.0			0	CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, crumbly, slightly moist, brown	#200 Wash Fines = 67%
2	24.0	106	6 10 12		CL	**ALLUVIUM: Sandy Lean CLAY;** concretions, stiff, moist, yellowish brown	Fines = 67% PP = 4.5 tsf
3	25.2		3 4 7	5	CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** abundant concretions, stiff, moist, yellowish brown	#200 Wash Fines = 65% PP = 4-4.5 tsf
4	26.4	104	9 13 18		CL	layer of fine silty sand	#200 Wash Fines = 58% PP = 4.5 tsf
5	32.9		6 7 8	10	CL/CH	**Lean to Fat CLAY with SAND;** layers of silt, concretions, stiff, moist to very moist, olive brown with yellowish brown	#200 Wash Fines = 74% PP = 1.5-3 tsf
6	25.7	101	8 9 10	15	CL/CH	**Sandy Lean to Fat CLAY;** abundant concretions, stiff to very stiff, moist to very moist, very pale brown to white	#200 Wash Fines = 50% PP = 1.5-1.8 tsf
7	23.3		5 7 7	20	CL/CH		#200 Wash Fines = 60% PP = 1.5 tsf
8	28.5		3 4 5		CH	**Fat CLAY;** abundant concretions, stiff, very moist, very pale brown	#200 Wash Fines = 87% PP = 1-2 tsf
9	26.2		5 7 8	25	CH	**Fat CLAY with SAND;** concretions, firm to stiff, very moist, very pale brown	#200 Wash Fines = 79% PP = 1-1.5 tsf
10	26.3		2 3 3		CH		#200 Wash Fines = 76% PP = 1.5 tsf
11	23.0		3 5 6	30	CH		#200 Wash Fines = 78% PP = 1-1.5 tsf
						End of Boring @ 31' 6" No groundwater encountered	
				35			
				40			

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Boring No. : TP-1
Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2
Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Lean CLAY with SAND;** stiff, moist, dark brown	
1	18.2				Bulk				#200 Wash Fines = 82%
								ALLUVIUM: **Lean CLAY with SAND;** stiff, moist, yellowish brown	
2	15.3				Bulk		CL	**OLDER ALLUVIUM:** **Lean CLAY with SAND;** very stiff, moist, dark yellowish brown	#200 Wash Fines = 77%
				5					
3	25.4				Bulk				#200 Wash Fines = 84% EI = 78
				10				End of Test Pit @ 9' 0" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-2

Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Ground Elevation:
Location : See Figure A-2
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	12.2			0	Bulk		SM	**FILL: Silty SAND;** fine, moist, pockets of sandy silt, and miscellaneous materials (asphalt, concrete, gravel, and boulders mixed in piles)	#200 Wash Fines = 31%
							SC	**Clayey SAND;** fine, loose, moist, dark brown	
2	17.8			5	Bulk		CL	**ALLUVIUM:** **Lean CLAY with SAND**; stiff, moist, dark brown	#200 Wash Fines = 82%
3	16.7				Bulk			**OLDER ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, yellowish brown	#200 Wash Fines = 80%
				10				End of Test Pit @ 7' 0" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-3
Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2
Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	11.6			0	Bulk		SM	**FILL (Import):** **Silty SAND;** fine, trace of gravel, loose, moist, strong brown	#200 Wash Fines = 42%
2	17.5				Bulk		CL	**Lean CLAY with SAND**	#200 Wash Fines = 82%
				5				**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, dark yellowish brown	
3	16.0				Bulk			**OLDER ALLUVIUM:** **Lean CLAY with SAND;** very stiff, moist, dark yellowish brown with some white, minor concretions	#200 Wash Fines = 76% EI = 62
				10				End of Boring 7' 0" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-4
Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Ground Elevation:
Location : See Figure A-2
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Soil Type (USCS)
1	14.1			CL
2	18.3			CL
3	14.8			CL
4	40.2			CL
5	21.0			CL

Description	Additional Tests
FILL: **Sandy Lean CLAY;** stiff, moist, brown	#200 Wash Fines = 68%
ALLUVIUM: **Sandy Lean CLAY;** stiff, moist to very moist, brown	#200 Wash Fines = 74% Corrosivity #200 Wash Fines = 57%
OLDER ALLUVIUM: **Lean CLAY with SAND;** firm, very moist, concretions, light olive brown to pale yellow with white	#200 Wash Fines = 83%
Sandy Lean CLAY; stiff, moist to very moist pale yellow with white	#200 Wash Fines = 53%

End of Test Pit @ 7' 6"
No groundwater encountered

Depth (ft): 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-5
Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Ground Elevation:
Location : See Figure A-2
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Lean CLAY with SAND;** soft, moist, brown	
1	27.8				Bulk			**ALLUVIUM:** **Lean CLAY with SAND;** soft, very moist, dark brown	Fines = 81% EI = 50 LL = 39 PL = 19
2	19.1			5	Bulk		CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** trace of gravel, stiff to very stiff, moist to very moist, concretions, dark yellowish brown	#200 Wash Fines= 68%
3	21.2				Bulk				#200 Wash Fines = 61%
								End of Test Pit @ 7' 6" No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-6
Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Ground Elevation:
Location : See Figure A-2
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	21.1			0	Bulk		CL	**FILL: Sandy Lean CLAY;** very moist, dark brown	#200 Wash Fines = 70%
								ALLUVIUM: **Sandy Lean CLAY;** stiff, moist to very moist, dark yellowish brown	
				5				**OLDER ALLUVIUM:** **Sandy Lean CLAY;** stiff, moist to very moist, concretions, olive brown with white	
2	21.5				Bulk				#200 Wash Fines = 64%
								End of Test Pit @ 7' 6" No groundwater encountered	

Depth scale (ft): 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-7
Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2
Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	18.7			0	CL	**Fill: Sandy Lean CLAY;** stiff, moist, dark yellowish brown	#200 Wash Fines = 68%
2	17.0				CL	**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, concretions, dark yellowish brown	#200 Wash Fines = 86%
3	18.7						Fines = 83%
4	19.8			5	CL	**OLDER ALLUVIUM:** **Lean CLAY with SAND;** stiff, to very stiff, moist to very moist, concretions, caliche, light olive brown with white	#200 Wash Fines = 80%
5	23.3					Max dry density; 115.3 pcf Optimum moisture 12.5%	LL = 51 PL = 21 EI = 59 #200 Wash Fines = 84%
						End of Test Pit @ 8' 6" No groundwater encountered	

Depth scale (ft): 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-8
Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2
Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			CL	**FILL**: **Lean CLAY with SAND;** stiff, moist, dark yellowish brown	
1	15.8				Bulk			**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist to very moist, concretions, brown	Fines = 80%
2	18.2				Bulk				#200 Wash Fines = 77%
3	25.2			5	Bulk		CH	**OLDER ALLUVIUM:** **Fat CLAY with SAND;** very stiff, very moist, abundant concretions, slightly porous, light yellowish brown	#200 Wash Fines = 66%
				10					
4	35.2				Bulk			stiff — Max dry density; 112.2 pcf, Optimum moisture 14.3%	#200 Wash Fines = 77%, LL = 68, PL = 22, EI = 90
5	39.6			15	Bulk				Fines = 80%
								End of Test Pit @ 16' Groundwater seepage encountered @ 15' 6"	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-9
Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2
Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Lean CLAY with SAND;** stiff, moist, dark yellowish brown	
1	15.6				Bulk			**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, dark brown	#200 Wash Fines = 86%
2	18.5			5	Bulk			**OLDER ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, calcium carbonate concretions, olive brown with white	#200 Wash Fines = 79%
3	19.0				Bulk		CL		#200 Wash Fines = 78%
				10				**Sandy Lean CLAY;** trace of gravel, stiff, moist to very moist, light olive brown	
4	19.3				Bulk				#200 Wash Fines = 59%
				15					
5	21.9				Bulk				#200 Wash Fines = 75%
								End of Boring 16' 6" No groundwater encountered	
				20					
				25					
				30					
				35					
				40					

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-10
Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2
Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	17.3			0	SC	**FILL:** **Clayey SAND;** fine, little gravel, dark yellowish brown	Fines = 33%
2	19.2				CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of gravel, stiff, moist, dark brown Maximum Dry Density :122.8 PCF @ 11.2% Moisture	#200 Wash Fines = 75% LL = 39 PL = 17
3	17.8				CL	**OLDER ALLUVIUM: Lean CLAY with SAND;** stiff, moist to very moist, concretions, dark brown	Fines = 80%
4	19.1				CL		#200 Wash Fines = 57%
5	17.5			5	CL	**Sandy Lean CLAY;** stiff, moist, concretions calcium carbonate, light olive brown with some white and yellowish brown	#200 Wash Fines = 64%
6	23.1				CH	**Fat CLAY;** stiff, moist to very moist, caliche and concretions, pale yellow with white	#200 Wash Fines = 85%
7	23.2			10	CL/CH	**Lean to Fat CLAY;** stiff, very moist, concretions, light olive brown	#200 Wash Fines = 61%

End of Test Pit @12' 0"
No groundwater encountered

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-11
Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Ground Elevation:
Location : See Figure A-2
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	8.6			0	Bulk			**FILL:** **Silty SAND with GRAVEL;** fine to coarse, loose, brown	#200 Wash Fines = 12% Gravel = 38%
					Bulk			**ALLUVIUM: Lean CLAY with SAND;** stiff, moist	
					Bulk		CL	**OLDER ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, black	
				5				**Lean CLAY with SAND;** stiff, moist, light brown	
				10				End of Test Pit @ 9' 6" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-12
Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2
Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL: Sandy Lean CLAY;** dark brown	
1	14.9				Bulk		CL	**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, dark brown	#200 Wash Fines = 78%
2	17.1			5	Bulk		CL/CH	**OLDER ALLUVIUM; Lean to Fat CLAY;** stiff to very stiff, moist to very moist, concretions, calcium carbonate, dark yellowish brown with some white	#200 Wash Fines = 52%
3	22.0				Bulk		CH	**Fat CLAY;** stiff, very moist, concretions, calcium carbonate, light yellowish brown with white	#200 Wash Fines= 86%
								End Test Pit @ 8' 0" No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Boring No. : TP-13
Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Ground Elevation:
Location : See Figure A-2
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	26.7			0			CL	**FILL:** **Lean CLAY with SAND;** stiff, very moist, shale fragments, yellowish brown	#200 Wash Fines = 59%
2	15.5			5				**Lean CLAY with SAND;** moist, dark brown (re-worked onsite alluvium)	#200 Wash Fines = 75%
				10				End of Test Pit @ 8' 0" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Boring No. : TP-14
Sheet : 1 **of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2
Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	33.3			0	Bulk		CH	**ALLUVIUM:** **Fat CLAY;** firm, very moist, slightly porous, greenish gray	#200 Wash Fines = 92% EI = 89
2	36.0			5	Bulk		CH	**OLDER ALLUVIUM:** **Fat CLAY;** soft, wet, concretions, light gray	#200 Wash Fines = 74%
	31.9			15	Bulk		CH	Stiff to very stiff, greenish gray	#200 Wash Fines = 83%
	20.9			15	Bulk		CL	**Lean CLAY;** stiff, very moist, greenish gray	Fines = 66%
								End of Test Pit 15' 6" No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-15
Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2
Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	18.2			0	Bulk		CL	**ALLUVIUM:** **Sandy Lean CLAY;** stiff to very stiff, moist to very moist, dark grayish brown	#200 Wash Fines = 61%
2	31.0				Bulk		CH	**OLDER ALLUVIUM:** **Fat CLAY;** stiff, moist to very moist, concretions, caliche, light olive brown with some white	#200 Wash Fines = 86% EI = 60
3	29.9			5	Bulk				#200 Wash Fines = 86%
4	27.0				Bulk		CL	**Sandy Lean CLAY;** lenses of silty sand, stiff, very moist, greenish gray with some white	#200 Wash Fines = 73%
5	44.0			15	Bulk		CH	**Fat CLAY;** very stiff, shale-lime, very moist, greenish gray	#200 Wash Fines = 99%
								End of Test Pit 15' 6" Groundwater seepage encountered @ 10' 6"	

Depth scale (ft): 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-16
Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2
Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	12.8			0	Bulk		CL	**FILL:** **Sandy Lean CLAY;** tsoft to stiff, moist, dark yellowish brown	#200 Wash Fines = 58%
								ALLUVIUM: **Sandy Lean CLAY;** firm, moist, dark yellowish brown	
2	15.0			5	Bulk			**OLDER ALLUVIUM:** **Sandy Lean CLAY;** stiff to very stiff, moist, dark yellowish brown	#200 Wash Fines = 55%
3	15.7				Bulk				#200 Wash Fines = 52%
								End of Test Pit @ 8' 6" No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-17
Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2
Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			CL	**FILL: Sandy Lean CLAY;** very stiff, moist, dark brown	
1	16.0				Bulk			**ALLUVIUM:** **Lean CLAY with SAND;** stiff to very stiff, moist, dark yellowish brown	#200 Wash Fines = 79%
2	23.3				Bulk		CH	**OLDER ALLUVIUM:** **Sandy Fat CLAY;** stiff to very stiff, moist to very moist, concretions, light olive brown	Fines = 71% EI = 96
3	37.6			5	Bulk			**Fat CLAY;** stiff to very stiff, moist, dark yellowish brown	#200 Wash Fines = 90%
								End of Test Pit @ 6' 0" No groundwater encountered	
				10					
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-18
Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2
Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL: Sandy Lean CLAY;** stiff, moist, concretions, olive brown	
1	17.8				Bulk				#200 Wash Fines = 59%
2	12.2				Bulk		CL	**ALLUVIUM:** **Sandy Lean CLAY;** very stiff, dark yellowish brown	#200 Wash Fines = 72%
3	13.0				Bulk			**OLDER ALLUVIUM: Sandy Lean CLAY;** very stiff, moist, concretions, yellowish brown	#200 Wash Fines = 65%
				5				End of Test Pit @ 4' 6" No groundwater encountered	
				10					
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-19
Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Ground Elevation:
Location : See Figure A-2
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	13.9			0	Bulk		CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, dark yellowish brown	#200 Wash Fines = 50% Gravel = 11%
2	17.1				Bulk			**ALLUVIUM:** **Lean CLAY with SAND;** trace of gravel, stiff, moist, dark brown	Fines = 79% EI = 24
3	23.1			5	Bulk			**OLDER ALLUVIUM:** **Lean CLAY with SAND;** stiff, very moist, yellowish brown	#200 Wash Fines = 80%
4	32.2				Bulk			**Fat CLAY;** trace of gravel, stiff, very moist, dark yellowish brown	#200 Wash Fines = 93%
5	31.6				Bulk				#200 Wash Fines = 94%
				10				End of Test Pit @ 9' 6" No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-20
Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2
Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	14.7			0	Bulk		CL	**FILL:** **Lean CLAY with SAND;** stiff, moist, brown	#200 Wash Fines = 78%
2	11.6				Bulk			**ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, dark yellowish brown	#200 Wash Fines = 74%
3	10.9			5	Bulk		SM	**OLDER ALLUVIUM:** **Silty SAND;** fine to medium, moist, yellowish brown	#200 Wash Fines = 28%
4	19.2			10	Bulk		CL	**Sandy Lean CLAY;** stiff, moist, light olive brown	#200 Wash Fines = 63%
								End of Test Pit @ 10' 6" No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-21
Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2
Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			SM	**FILL:** (Stockpile) **Silty SAND;** fine, slightly moist, yellowish brown	
1	17.3			5	Bulk		CL	**Sandy Lean CLAY;** trace of shale, stiff, moist to very moist, yellowish brown	#200 Wash Fines = 54%
2	18.9				Bulk			**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, dark brown	#200 Wash Fines = 76%
3	14.8			10	Bulk			**OLDER ALLUVIUM:** **Lean CLAY with SAND;** hard, moist, dark yellowish brown with some light brown	#200 Wash Fines = 76%
								End of Test Pit @ 10' 6" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 22
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-10-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	16.3			0–2	CL	**FILL:** **Lean CLAY with SAND;** stiff to very stiff, moist, very dark brown	#200 Wash Fines = 76% PP = 4.5 tsf
2	17.4			2–3.75	CL/CH	**ALLUVIUM:** **Lean to fat CLAY with SAND;** very stiff, moist, very dark brown	Fines = 83% PP = 4 tsf EI = 126
3	16.4	122		3.75–6.75	CL/CH	**OLDER ALLUVIUM:** **Lean to FAT CLAY with SAND;** concretions, moist to very moist, stiff, mottled brown and pale brown	Fines = 81% PP = 3-3.5 tsf
4	18.8						Fines = 80% PP = 3-3.5 tsf EI = 62
5	19.2						Fines = 80% PP = 2.5 tsf
6	30.6						Fines = 95% PP = 1-1.5 tsf
7	33.6			6.75–11.25	CH	**Fat CLAY;** trace of concretions, firm to stiff, moist to very moist, dark grayish brown with red specks	#200 Wash Fines = 91% PP = 1.5-3 tsf
8	41.4						Fines = 90% PP = 1 tsf
9	36.9						Fines = 87% PP = 1.2 tsf

End of test pit @ 10' 9"
No groundwater encountered

Nuclear gauge density test data at 5.5'
Dry density = 96 pcf   Moisture content = 19.1%

Bulk ☒   CD ■   SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 23
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-10-2018

Depth (ft)	Soil Type (USCS)	Description
0 – 1.5	CL	**FILL:** **Sandy Lean CLAY;** stiff, moist, very dark brown
1.5 – 3		**ALLUVIUM:** **Sandy Lean to Fat CLAY;** trace of gravel, trace of concretions, stiff to hard, moist to very moist, very dark brown to dark yellowish brown with pale brown inclusions
3 – 5.5		**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** abundant concretions, stiff to very stiff, moist, very pale brown with dark yellowish brown
5.5 – 10.75	CL/CH	**Lean to Fat CLAY with SAND;** trace of concretions, medium to high plastic, stiff to very stiff, dark yellowish brown to light olive brown with white

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Additional Tests
1	17.6			Fines = 60%, PP = 3.0 tsf, EI = 97
2	19.4			Fines = 52%, PP = 4.5 tsf, #200 Wash
3	16.1			Fines = 50%, PP = 3.5 tsf, EI = 107
4	18.2			Fines = 56%, PP = 2.0 tsf
5	22.0	103		Fines = 76%, PP = 4 - 4.5 tsf
6	25.9			Fines = 85%, PP= 3.5 tsf
7	29.2			Fines = 82%, PP = 2.0 tsf
8	37.7			Fines = 82%, PP = 2.0 tsf

End of test pit @ 10' 9"
No groundwater encountered

Nuclear gauge density test data at 5.5'
Dry density = 96 pcf   Moisture content =19.1%

Bulk ☒   CD ■   SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 24
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-11-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0–1.5			CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, abundant concretions, stiff, moist, dark brown	
1	14.2			2	Bulk		CL/CH	**ALLUVIUM:** **Sandy Lean to Fat CLAY;** abundant concretions, stiff, moist, dark brown	Fines = 58% PP = 2 tsf EI = 107
2	22.1			3	Bulk		CL/CH	**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** abundant concretions, stiff, moist to very moist, yellowish brown with pale brown	Fines = 50% PP = 2.5 tsf
3	19.5			4.5	Bulk				Fines = 56% PP = 2 tsf
4	21.1	107		5.5	CD				Fines = 71% PP = 2.7-4 tsf
5	21.0			6	Bulk				Fines = 71% PP = 3-4.5 tsf
6	24.9			6.5	Bulk			some olive brown	Fines = 71% PP = 2.5 tsf
7	35.3			8	Bulk		CL/CH	**Lean to Fat CLAY with SAND;** trace of concretions, medium to high plastic, stiff to very stiff, moist to very moist, olive brown to light olive brown with pale yellow	Fines = 84% PP = 2.5 tsf
8	31.0			9.5	Bulk				Fines = 81% PP = 1.5 tsf
9	26.8			11	Bulk				Fines = 79% PP = 3.75-4 tsf

End of test pit @ 11' 5"
No groundwater encountered

Nuclear gauge density test data at 5' 2"
Dry density = 99 pcf Moisture content = 22.3%

Bulk CD SPT

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 25
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-11-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
				0–1.5		CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, trace concretions, stiff, moist, dark yellowish brown with pale brown inclusions	
1	17.3			1.5–3	Bulk	CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of concretions, stiff, moist, dark yellowish brown with pale brown inclusions	#200 Wash Fines = 68% PP = 2 tsf
2	21.8	100		3–5	CD	CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** abundant concretions, medium plastic, stiff, moist, yellowish brown with pale brown	Fines = 58% PP = 3.7-4.5 tsf
3	17.3				Bulk			Fines = 50% PP = 3.5-4.5 tsf
4	19.0				Bulk			Fines = 58% PP = 2-3 tsf
5	24.5			5–7	Bulk	CL/CH	**Sandy Lean to Fat CLAY;** concretions, medium to high plastic, very stiff to hard, moist to very moist, yellowish brown to pale brown with olive brown	#200 Wash Fines = 74% PP = 1.5 tsf
6	31.2			7–9	Bulk	CL/CH	**Lean to Fat CLAY with SAND;** trace of concretions, medium to high plastic, stiff to very stiff, moist to very moist, olive brown to light olive brown with pale yellow	#200 Wash Fines = 82% PP= 3 tsf
7	44.4				Bulk			Fines = 92% PP = 1.5-1.7 tsf

End of test pit @ 9'
No groundwater encountered

Nuclear gauge density test data at 3'
Dry density = 97 pcf Moisture content = 24.0%

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado
Test Pit No. 26
Sheet : 1 **Of :** 1
Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Ground Elevation:
Location : See Figure A-2
Date Excavated : 09-11-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	USCS	Description	Additional Tests
1	13.4			0	CL	**FILL:** **Lean CLAY with SAND;** mostly crumbly, moist, dark reddish brown	Fines = 80% PP = 2.5 tsf EI = 20
2	14.2			2	CL		#200 Wash Fines = 81% PP = 2.5-4 tsf
3	14.2				CL	trace of concretions, stiff, moist, very dark brown	Fines = 82% PP = 4-4.5 tsf
4	14.8	116		3	CL	**OLDER ALLUVIUM:** **Lean CLAY with SAND;** stiff to very stiff, moist, dark yellowish brown	Fines = 79% PP = 4.5 tsf
5	15.7				CL	layer of fat clay	Fines = 79% PP = 4.5 tsf
6	39.4				CL	**Sandy Lean CLAY;** trace of concretions, stiff to very stiff, moist, very dark brown	Fines = 66% EI= 74
7	21.2				CL		Fines = 68% PP = 3-3.5 tsf
8	20.1				CL		#200 Wash Fines = 62% PP = 1.5-2 tsf
9	17.9				CL		Fines = 51% PP= 2.5-3.5 tsf
10	14.6			9	SC	**Clayey SAND;** layers of sandy clay, medium dense/stiff, moist, dark yellowish brown	Fines = 40% PP = 4.5
11	14.4			10	SC		Fines = 39% PP = 3.5-4.5

End of test pit @ 10'
No groundwater encountered

Nuclear gauge density test data at 3'
Dry density = 111 pcf   Moisture content = 13.3%

Nuclear gauge density test data at 4' 2"
Dry density = 97 pcf   Moisture content = 19.2%

Bulk   CD   SPT

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 27
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk -CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-10-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0–2	CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, trace concretions, stiff, moist, dark yellowish brown with pale brown inclusions	
1 2	37.1 15.9			2–4	CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of concretions, stiff, moist, dark yellowish brown with pale brown inclusions	Fines = 72% PP = 2.5-3.5 tsf Fines = 71% PP = 3.0 tsf
3 4 5	18.4 20.9 20.2	110		4–6.5	CL/CH	**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** abundant concretions, stiff, moist, yellowish brown with pale brown yellowish brown to pale brown with olive brown	Fines = 65% PP = 4.5 tsf Corrosivity Fines = 66% PP = 2.5 tsf EI = 144 Fines = 68% PP = 2.7 tsf
6 7	9.2 7.5			6.5–9	SM	**Silty SAND with GRAVEL;** fine to coarse, very moist brownish gray	Fines = 18% Gravel = 23% Fines = 12% Gravel = 29%
8	23.9			9–11	CL	**Sandy Lean CLAY;** firm to stiff, very moist, yellowish brown	Fines = 60 % PP = 1.5 tsf
				11		End of test pit @ 11' No groundwater encountered Nuclear gauge density test data at 3.5' Dry density = 100 pcf Moisture content = 16.2%	

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 28
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-11-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0–1.5	CL	**FILL:** **Sandy Lean CLAY;** crumbly, very stiff, slightly moist, dark yellowish brown	
1	16.5			1.5–3	CL	**ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, concretion, dark yellowish brown	Fines = 73% PP = 4.0 tsf
2 3	20.4 16.8			3–5	CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** abundant concretions, stiff, moist, yellowish brown with pale brown	Fines = 71% PP = 2-2.5 tsf EI = 81 Fines = 58% PP = 2-2.5 tsf
4 5	13.4 17.6	115		5–6.5	CL	**Sandy Lean CLAY;** concretions, very stiff to hard, moist to very moist, yellowish brown to pale brown with olive brown	PP = 4.5 tsf Fines = 50% Fines = 56% PP = 2.5-3.5 tsf
6 7 7	33.1 35.1 45.0			6.5–10.67	CH	**Fat CLAY;** trace of concretions, stiff to very stiff, moist to very moist, olive brown to light olive brown with pale yellow	Fines = 88% PP = 1.7 tsf Fines = 92% PP = 1.5-4 tsf #200 Wash Fines = 90% PP = 2.7-3.0 tsf

End of test pit @ 10' 8"
No groundwater encountered

Nuclear gauge density test data at 5'
Dry density = 109 pcf   Moisture content = 12.6%

Nuclear gauge density test data at 7' 2"
Dry density = 86 pcf   Moisture content = 31.3%

Legend: Bulk ☒   CD ■   SPT ☒

Test Pit Log

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 29
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-11-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0–2			CL	**FILL:** **Sandy Lean CLAY;** trace gravel, trace of concretions, stiff, moist, dark yellowish brown with pale brown inclusions	
1	12.5			2	Bulk		CL	**ALLUVIUM:** **Lean CLAY with SAND;** very stiff, moist to very moist, very dark brown	Fines = 81% PP = 3.5 tsf
2	15.9			3–4	Bulk		CL	**OLDER ALLUVIUM:** **Lean CLAY;** abundant concretions, medium plastic, stiff, moist, yellowish brown with pale brown	Fines = 76% PP = 2.7 tsf
3	20.4	98		4.5–5	CD		CL	**Sandy Lean CLAY;** trace of concretions, very stiff to hard, moist to very moist, yellowish brown to pale brown with olive brown	Fines = 58% PP = 4 -4.5 tsf
4	17.3			6.5	Bulk		CL		Fines = 53% PP = 2.7-4 tsf
5	12.3			8	Bulk		SM/SC	**Silty to Clayey SAND;** fine to medium, layers of sandy clay, trace of gravel, medium dense/stiff, moist, dark yellowish brown	Fines = 38%
6	14.6			8.5	Bulk		SM/SC		Fines = 34%
7	41.1			9.5–10	Bulk		CH	**Fat CLAY;** trace concretions, stiff, moist to very moist, olive brown	Fines = 88% PP = 2-3 tsf
8	43.2			11	Bulk		CH		Fines = 93% PP = 3.5-4.5 tsf

End of test pit @ 11' 3"
No groundwater encountered

Nuclear gauge density test data at 4.5'
Dry density = 98 pcf Moisture content = 19.6%

Nuclear gauge density test data at 7.5'
Dry density = 118 pcf Moisture content = 13.6%

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 30
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-10-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0–1.5	CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, stiff, slightly moist to moist, dark yellowish brown	
1 2 3	15.7 16.8 15.9			1.5–4	CL	**ALLUVIUM:** **Lean CLAY with SAND;** trace of concretions, stiff, moist, dark brown dark yellowish brown	Fines = 85% PP = 2.5 tsf #200 Wash Fines = 85% PP = 2-3 tsf Fines = 86% PP = 3.0 tsf EI = 48
4	18.3			4–5	CL	**OLDER ALLUVIUM: Lean CLAY with SAND;** concretions, stiff to very stiff, moist to very moist, dark brown with pale brown inclusions	Fines = 82% PP = 3.0 tsf
5 6 7	19.1 20.3 27.9	110		5–7	CL/CH	**Sandy Lean to Fat CLAY;** concretions, very stiff to hard, moist to very moist, yellowish brown to pale brown with olive brown	Fines = 69% PP = 4.5 tsf Fines = 73% PP = 3-4.5 tsf Fines = 64% PP= 2.0 tsf
8	35.7			7–9.5	CL/CH	**Lean to Fat CLAY with SAND;** concretions, firm to stiff, moist to very moist, dark yellowish brown with pale brown inclusions	#200 Wash Fines = 75% PP = 1.0 tsf
9	24.6			9.5–10.5	CL/CH	**Sandy Lean to Fat CLAY**; concretions, firm to stiff, moist to very moist, dark yellowish brown with pale brown inclusions	#200 Wash Fines = 50% PP = 1.7 tsf
10	14.0			10.5–11.75	SM	**Silty SAND;** fine to medium, moist, dark yellowish brown	#200 Wash Fines = 28 %
10	40.7			11.75–13.2	CH	**Fat CLAY;** firm to stiff, moist, dark yellowish brown with reddish brown inclusions	#200 Wash Fines = 85% PP = 1.7-2 tsf

End of test pit @ 13' 2"
No groundwater encountered

Nuclear gauge density test data at 5.0'
Dry density = 94 pcf   Moisture content = 26.1%

Bulk ☒   CD ■   SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 31
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-10-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Soil Type (USCS)	Additional Tests
1	8.5			2	Bulk	CL	#200 Wash Fines = 72% PP = 4.5 tsf
2	11.7			3	Bulk	CL	Fines = 74% PP = 4.5 tsf
3	16.1			4	Bulk	CL	Fines = 63% PP = 2-3 tsf
4	15.9	112		4.8	CD	CL	EI = 86 PP = 4.5 tsf
5	14.7			5	Bulk	CL	Fines = 60% PP = 3.5 tsf
6	18.7			6	Bulk	CL	#200 Wash Fines = 63% PP = 2-2.5 tsf
7	34.9			7.5	Bulk	CH	Fines = 91% PP = 3.5-4.5 tsf

Depth (ft)	Soil Type (USCS)	Description
0 - 1.5	CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, stiff, slightly moist, dark yellowish brown
1.5 - 4	CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of concretions, slightly moist, hard, dark yellowish brown,
4 - 7	CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, stiff to very stiff, moist, dark yellowish brown with pale brown and white inclusions
7 - 8	CH	**Fat CLAY;** trace of concretions, stiff to very stiff, moist to very moist, olive brown to light olive brown with pale yellow

End of test pit @ 8'
No groundwater encountered

Nuclear gauge density test data at 4.8'
Dry density = 102 pcf Moisture content = 16.2%

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado Construction Level S.I.

Test Pit No. 32
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-07-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0–2			CL	**FILL:** **Sandy Lean CLAY;** hard, slightly moist, grayish brown	
1	4.2			2	Bulk			**ALLUVIUM:** **Lean CLAY with SAND;** hard, slightly moist, rootlets, dark yellowish brown	Fines = 77% PP = 4.5 tsf
2	8.3			3	Bulk				#200 Wash Fines = 79% PP = 4.5 tsf EI = 61
3	19.8			5	Bulk		CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY;** abundant concretions, very stiff, moist to very moist, yellowish brown with pale brown inclusions	Fines = 68% PP = 3-3.5 tsf
4	21.2			6	Bulk				Fines = 65% PP = 4-4.5 tsf
								End of test pit @ 6' 3" No groundwater encountered	

Bulk CD SPT

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 33
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-07-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
				0–1		CL	**FILL:** **Sandy Lean CLAY;** crumbly, stiff, slightly moist to moist, brown	
1	15.4			2	Bulk	CL	**ALLUVIUM:** **Lean CLAY with SAND;** very stiff, moist, brown	#200 Wash Fines = 75% PP = 4.5 tsf
2	17.9			3	Bulk	CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** abundant concretions, very stiff, moist, pale brown with white specks	Fines = 59% PP = 4.5 tsf EI =63
3	12.7			5	Bulk	CL		#200 Wash Fines = 54% PP = 4.5 tsf
4	15.7	110		5.5	CD	CL	layer of silty sand	Fines = 50%
5	8.1			7	Bulk	SM	**Silty SAND;** fine to coarse, trace of gravel, moist, olive brown	#200 Wash Fines = 19%
6	29.3			9	Bulk	CH	**Fat CLAY;** moist to very moist, stiff, pale brown with white specks	#200 Wash Fines = 96% PP = 3-3.5 tsf
				9			End of test pit @ 9' No groundwater encountered	

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 35
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-10-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT
1	12.9		
2	13.7		
3	16.5		
4	16.6		
5	18.1		
6	15.6	116	
7	20.9		

Soil Type (USCS)	Description	Additional Tests
CL	**FILL:** **Lean CLAY with SAND;** stiff to very stiff, moist dark brown pale brown inclusions, several concretions	
CL	**ALLUVIUM:** **Sandy Lean CLAY;** hard, slightly moist, rootlets dark yellowish brown	Fines = 72% PP = 4.5 tsf Fines = 65% PP = 3-4 tsf Fines = 79% PP = 4.5 tsf
CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, stiff to very stiff, moist, yellowish brown to dark yellowish brown and brown inclusions pale brown and white inclusions	Fines = 69% PP = 4.5 tsf Fines = 58% PP = 2.0 tsf Fines = 52% PP = 4.5 tsf Fines = 56% PP = 4.5 tsf
CL/CH	**Lean to Fat CLAY with SAND**; abundant concretions, stiff to very stiff, moist to very moist, very pale brown	Fines = 78% PP = 2-4.5 tsf

End of test pit @ 8' 3"
No groundwater encountered

Nuclear gauge density test data at 6.5'
Dry density = 101 pcf   Moisture content = 20.9%

Bulk ☒   CD ■   SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 36
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-10-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0–2	CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, slightly moist to moist, very dark brown	
1	8.1			2	CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of gravel, slightly moist to moist, very dark brown	Fines = 73% PP = 4.5 tsf
2	10.6			3.5			Fines = 72% PP = 4.5 tsf
3	10.2			4.3			Fines = 74% PP = 4.5 tsf
4	10.8	118		4.8	CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY with SAND;** slightly moist to moist, stiff to very stiff, mottled dark brown and white, concretions	Fines = 75% PP = 4.5 tsf
5	27.2			6.5			Fines = 83% PP= 4.5 tsf
6	32.8			7.5			Fines =82 % PP = 4.5 tsf

End of test pit @ 8'
No groundwater encountered

Nuclear gauge density test data at 4.5'
Dry density = 108 pcf Moisture content = 11.8%

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 37
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-13-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	7.7			0–1.5	CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, crumbly, slightly moist, brown	#200 Wash Fines = 68% PP = 4.5 tsf
2	12.9			1.5–2.5	CL	**ALLUVIUM:** **Lean CLAY with SAND;** trace of gravel, very stiff, moist, dark yellowish brown	#200 Wash Fines = 74% PP = 4.5 tsf
3	22.2			2.5–3.5	CL/CH	**Lean to Fat CLAY with SAND;** trace of gravel, very stiff, moist, dark yellowish brown	Fines = 70% PP = 2.5-3.5 tsf EI = 105
4	17.5	101		3.5–5.5	CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY with SAND;** concretions, stiff to very stiff, slightly moist to moist, mottled dark brown and white	#200 Wash Fines = 72% PP = 4.5 tsf
5	28.1			5.5–7	CL/CH	**Lean to Fat CLAY;** stiff, moist to very moist, dark olive brown to dark yellowish brown	#200 Wash Fines = 91% PP= 2-4 tsf

End of test pit @ 7'
No groundwater encountered

Nuclear gauge density test data at 2'
Dry density = 111 pcf Moisture content = 16.2%

Nuclear gauge density test data at 4'
Dry density = 100 pcf Moisture content = 21.0%

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado Construction Level S.I.

Test Pit No. 38
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-07-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0–1.5			CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, stiff, dry to slightly moist, dark brown	
1	12.2			1.5–3.5	Bulk		CL	**OLD ALLUVIUM:** **Lean CLAY with SAND;** trace of gravel, stiff to very stiff, moist, very dark brown	Fines = 75% PP = 4 tsf
2	16.1			3.5–6	Bulk		CL/CH	**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** abundant concretions, trace of gravel, very stiff, moist, brown with pale brown inclusions	Fines = 51% PP = 4.5 tsf
3	16.7				Bulk			slightly darker, olive brown	Fines = 50% PP = 2-3.5 tsf
				6				End of test pit @ 6' No groundwater encountered	

Bulk CD SPT

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado Construction Level S.I.

Test Pit No. 39
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-07-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0–1				**FILL:** **Sandy Lean CLAY;** trace of gravel, crumbly, dry to slightly moist, brown	
1	9.3			2	Bulk		CL	**ALLUVIUM:** **Sandy Lean CLAY;** stiff, moist, dark yellowish brown with dark brown	#200 Wash Fines = 73% PP = 4.5 tsf
2	13.8			3	Bulk				Fines = 72% PP = 4 tsf
3	17.1	116		4	CD				Fines = 60% PP = 4.5 tsf Consolidation
4	13.5			6	Bulk				Fines = 57% PP = 4.5 tsf
				6				End of test pit @ 6' No groundwater encountered	

Bulk CD SPT

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 40
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-10-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0–1	CL	**FILL:** **Lean CLAY with SAND;** crumbly**,** slightly moist, brown	
1	10.3			1–2	CL	**ALLUVIUM:** **Lean CLAY with SAND;** trace of rootlets, slightly moist to moist, very stiff to hard, dark brown to very dark brown	Fines = 77% PP = 4.5 tsf
2	10.8			2–4	CL/CH	**Lean to Fat CLAY with SAND**; trace of rootlets, slightly moist to moist, very stiff to hard, dark brown to very dark brown. Maximum density, Direct shear	Fines 78% PP = 4.5 tsf
3	10.7	117					Fines 79% PP = 4.5 tsf
4	11.5						Fines = 77% PP = 4.5 tsf EI = 162
5	14.9			4–7	CL/CH	**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** trace of concretions, very stiff to hard, moist, dark yellowish brown with white and pale brown inclusions	Fines = 72% PP = 4.5 tsf
6	17.1	96					Fines = 74% PP = 4.5 tsf
7	17.7						Fines = 62% PP = 4.5 tsf
8	24.8						Fines = 73% PP = 3-4.5 tsf
9	30.7			7–8' 8"	CL/CH	**Lean to Fat CLAY with SAND;** concretions, very moist, stiff, dark yellowish brown	Fines = 77% PP = 2.7-3.5 tsf

End of test pit @ 8' 8"
No groundwater encountered

Nuclear gauge density test data at 3'
Dry density = 106 pcf Moisture content = 13.7%

Nuclear gauge density test data at 4' 8"
Dry density = 99 pcf Moisture content = 16.2%

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 41
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-13-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	10.0			0–1.5	Bulk		CL	**FILL:** **Lean CLAY with SAND;** trace of gravel and rootlets, crumbly, dry to slightly moist, brown	#200 Wash Fines = 80% PP = 4.5 tsf
2	12.8			1.5–4	Bulk		CL	**ALLUVIUM:** **Lean CLAY with SAND;** trace of gravel and concretions, crumbly, slightly moist, dark yellowish brown with white inclusions	#200 Wash Fines = 80% PP = 4.5 tsf
3	14.1			4–4.75	Bulk		CL	**OLDER ALLUVIUM: Sandy Lean CLAY;** abundant concretions, crumbly, mottled brown and pale brown	Fines = 65% PP = 4.5 tsf
4	17.7			4.75–6.5	Bulk		CL/CH	**Lean to Fat CLAY with SAND;** abundant concretions, very stiff, moist, dark yellowish brown, pale brown with white inclusions	#200 Wash Fines = 79% PP = 4-4.5 tsf
5	27.8				Bulk		CL/CH		Fines = 82% PP = 2-4.5 tsf

End of test pit @ 6' 6"
No groundwater encountered

Nuclear gauge density test data at 3'
Dry density = 109pcf Moisture content = 14.7%

Nuclear gauge density test data at 5'
Dry density = 93 pcf Moisture content = 21.2%

Depth scale (ft): 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Legend: Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 42
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Ground Elevation:
Location : See Figure A-2
Date Excavated : 09-07-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0–1.8	CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, crumbly, dry to slightly moist, yellowish brown	
1	9.5			2	CL	**ALLUVIUM:** **Sandy Lean Clay;** rootlets, trace of concretions and gravel, very stiff, slightly moist to moist, dark yellowish brown	#200 Wash Fines = 72% PP = 4.5 tsf
2	12.8			3	CL		Fines = 65% PP = 4.5 tsf EI = 62
3	18.6			5	CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** abundant concretions, crumbly, stiff to very stiff, moist, pale brown to brown	#200 Wash Fines = 57% PP = 2.75-4 tsf
4	6.3			7–8	SM	**Silty SAND;** fine to medium, moist, clay inclusions, dark yellowish brown	#200 Wash Fines = 10%
						End of test pit @ 8' 2" No groundwater encountered	

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 43
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Ground Elevation:
Location : See Figure A-2
Date Excavated : 09-07-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0–1			CL	**FILL:** **Sandy Lean CLAY;** crumbly, slightly moist, brown	
1	20.4			3	Bulk		CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of concretions**,** stiff, moist, dark yellowish brown	Fines = 67% PP = 2.5-3.5 tsf
2	17.2			4	Bulk		CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** trace of gravel and concretions, stiff, moist, pale brown to yellowish brown	Fines = 51% PP = 2.5-3.5 tsf
3	16.9			6	Bulk		CL		Fines = 50% PP = 2.5 tsf
4	29.3			7	Bulk		CH	**Fat CLAY with SAND;** concretions, moist to very moist, olive brown	Fines = 80% PP = 4.5 tsf
				7.5				End of test pit @ 7' 6" No groundwater encountered	

Depth scale (ft): 0 1 2 3 4 5 6 7 8 9 10 11 12

Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 44
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-13-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	10.8			0–1	Bulk			**FILL:** **Sandy Lean CLAY;** trace of concretions**,** crumbly, stiff, slightly moist, very dark brown	Fines = 74% PP = 3.5 tsf
2	15.8			2	Bulk			**ALLUVIUM:** **Lean CLAY with SAND:** trace of concretions, very stiff, moist, very dark brown with white inclusions	Fines = 75% PP = 3-3.7 tsf
3	15.1			3	Bulk		CL	**Sandy Lean CLAY;** concretions, very stiff, moist, dark yellowish brown with white inclusions	Fines = 73% PP = 3.3-4.5 tsf EI = 57
4	16.6			4	Bulk			**OLDER ALLUVIUM:** **Sandy Lean CLAY**; abundant concretions, very stiff, moist, dark yellowish brown with white inclusions	Fines = 70% PP = 2.5-3.5 tsf
5	15.0			5	Bulk				Fines = 51% PP = 4.5 tsf
6	16.4			6	Bulk			mostly light yellowish brown and pale brown	Fines = 52% PP = 4.5 tsf

End of test pit @ 6' 6"
No groundwater encountered

Nuclear gauge density test data at 2'
Dry density = 106 pcf Moisture content = 17.7%

Nuclear gauge density test data at 4'
Dry density = 101 pcf Moisture content = 20.0%

Legend: Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 45
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	11.0			0–1	Bulk		CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, crumbly, very stiff, slightly moist to moist, gray and dark brown	Fines = 74% PP = 4.5 tsf
2	14.7				Bulk		CL	**ALLUVIUM:** **Lean CLAY with SAND;** trace of concretions, very stiff, moist, dark brown to dark reddish brown	Fines = 76% PP = 3.5-4.5 tsf
3	15.1				Bulk				Fines = 75% PP = 4.5 tsf
4	18.5			3	Bulk			**Sandy Lean CLAY;** trace of concretions, stiff, moist, dark brown to dark reddish brown	Fines = 72% PP = 2.5-3.5 tsf
5	22.1			4	Bulk		CL/CH	**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** trace of gravel and concretions, stiff to very stiff, moist to very moist, dark yellowish brown with pale brown inclusions	Fines = 66% PP = 2.5-3 tsf
6	22.4			5	Bulk				Fines = 74% PP= 2.5-4.5 tsf
7	26.8			8	Bulk			**Lean to Fat CLAY;** trace of concretions, stiff, moist to very moist, light olive brown	Fines =78% PP = 2-2.5 tsf

End of test pit @ 8'
No groundwater encountered

Nuclear gauge density test data at 18"
Dry density = 117 pcf Moisture content = 14.2%

Nuclear gauge density test data at 4'
Dry density =102 pcf Moisture content = 19.9%

Legend: Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 46
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-06-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0–1.5			CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, crumbly, slightly moist to moist, brown	
1	13.2			1.5–3	Bulk		CL	**ALLUVIUM:** **Lean CLAY with SAND;** concretions, stiff to very stiff, moist, stiff, dark brown	Fines = 81% PP = 4.5 tsf
2	18.9			3	Bulk		CL/CH	**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** abundant concretions, stiff to very stiff, moist, yellowish brown with pale brown	Fines = 68% PP = 4.5 tsf
3	22.3			5.5	Bulk		CL/CH	olive brown and white inclusions	Fines = 71% PP = 3.2-3.7 tsf
4	18.4			6	Bulk		CL/CH	mostly pale brown to very pale brown	Fines = 66% PP = 4.5 tsf
5	15.1			7.5	Bulk		CL/CH		Fines = 50% PP = 4.5 tsf
				8				End of test pit @ 8' No groundwater encountered	

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 47
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-06-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0–1.5	CL	**FILL:** **Sandy Lean CLAY**; trace of organics, crumbly, slightly moist to moist, brown	
1	31.4			2	CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of organics, stiff to very stiff, moist, very dark brown	Fines = 68% PP = 2-3 tsf
2	18.7			3	CL	**Lean CLAY with SAND;** very stiff, moist, dark yellowish brown	Fines = 76% PP = 4 tsf
3	17.1			3.5	CL		Fines = 79% PP = 2.5 tsf
4	14.6			5.5	CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, stiff, moist, yellowish brown with pale brown	Fines = 73% PP = 3.7-4 tsf
5	14.2			7	CL		Fines = 50% PP = 2.0 tsf
6	22.1			8	CL/CH	**Lean to Fat CLAY with SAND;** concretions, very stiff, moist to very moist, very pale brown	Fines = 82% PP = 3.5-4 tsf

End of test pit @ 8' 6"
No groundwater encountered

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 48
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-06-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0–1.5				**FILL:** **Sandy Lean CLAY;** trace of gravel, crumbly, very stiff, slightly moist to moist, very dark brown	
1	13.5			2	Bulk		CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of gravel and concretions, very stiff, moist, dark yellowish brown	#200 Wash Fines = 75% PP = 4.5 tsf EI = 64
2	16.3			3	Bulk				Fines = 73% PP = 2.5-4.5 tsf
3	14.3			4	Bulk		CL/CH	**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** concretions, stiff, moist, pale brown to very pale brown	Fines = 59% PP = 3 tsf
4	23.3			6	Bulk				#200 Wash Fines = 74% PP = 3.5 - 4 tsf

End of test pit @ 6' 6"
No groundwater encountered

Depth scale: 0 1 2 3 4 5 6 7 8 9 10 11 12

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 49
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-10-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0–1.3			CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, rootlets, crumbly, slightly moist, dark brown	
1	13.9			1.8	Bulk		CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of concretions, trace of gravel, rootlets, stiff to very stiff, moist, dark brown	#200 Wash Fines = 74% PP = 3-4.5 tsf
2	13.8			3.3	Bulk		CL		Fines = 71% PP = 4.5 tsf
3	19.2			4.8	Bulk		CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY;** abundant concretions, stiff, moist, yellowish brown to pale brown	#200 Wash Fines = 58% PP= 2.5-3.5 tsf
4	17.3			5.8	Bulk		CL/CH		Fines = 54% PP = 2-2.5 tsf
5	23.9			7.8	Bulk		CL/CH	**Lean to Fat CLAY;** abundant concretions, stiff to very stiff, moist to very moist, pale brown to very pale brown	#200 Wash Fines = 79% PP = 3.5-4.5 tsf
				8				End of test pit @ 8' No groundwater encountered	

Bulk CD SPT

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 50
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	11.2			0–1	Bulk		CL	**FILL:** **Lean CLAY with SAND;** very stiff, slightly moist, dark yellowish brown	Fines = 76% PP = 4.5 tsf
2	11.9			1–2	Bulk		CL	**ALLUVIUM:** **Sandy Lean CLAY;** very stiff, slightly moist to moist, very dark brown	Fines = 71% PP = 4.5 tsf
3	16.4			2–3	Bulk		CL		Fines = 73% PP = 3.0 tsf EI = 71
4	16.7			3–4	Bulk		CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, dark yellowish brown, medium plasticity	#200 Wash Fines = 57% PP = 2.2 tsf
5	19.4			4–5	Bulk		CL		Fines = 56% PP = 2.5-3.5 tsf
6	22.4			5–5.5	Bulk		CL/CH	**Sandy Lean to Fat CLAY;** concretions, stiff, moist to very moist, dark yellowish brown with pale brown and white	#200 Wash Fines = 69% PP = 3-3.7 tsf

End of test pit @ 5' 6"
No groundwater encountered

Nuclear gauge density test data at 2'
Dry density = 102 pcf   Moisture content = 20.3%

Nuclear gauge density test data at 3'
Dry density = 105 pcf   Moisture content = 18.7%

Legend: Bulk ☒   CD ■   SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 51
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
				0–1		CL	**FILL:** **Sandy Lean CLAY;** crumbly, moist, brown	
1	17.8			1–1.5	Bulk	CL	**ALLUVIUM:** **Lean CLAY with SAND;** abundant concretions, stiff to very stiff, moist, very dark brown	Fines = 63% PP = 3-3.7 tsf
2	19.0			2–2.5	Bulk	CL		Fines = 57% PP = 2-3.5 tsf
3	19.7			3–3.5	Bulk	CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, dark yellowish brown	Fines = 59% PP = 3.5 tsf
4	23.4			4–4.5	Bulk	CL/CH	**Lean to Fat CLAY with SAND;** concretions, stiff to very stiff, moist to very moist, very pale brown	Fines = 80% PP = 2-3 tsf
5	16.7	105		5–5.5	CD	CL/CH		Fines = 77% PP = 4.5 tsf
5	21.6			6–6.5	Bulk	CL/CH		Fines = 81% PP = 2-2.7 tsf
6	23.4			7–7.5	Bulk	CL/CH		Fines = 80% PP = 2.5-4 tsf
7	19.0			8–8.5	Bulk	CL/CH		Fines = 77% PP = 1.5-2 tsf
				8.5			End of test pit @ 8' 6" No groundwater encountered	

Depth scale (ft): 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Legend: Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 52
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	9.3			0–1.5	Bulk		CL	**FILL:** **Lean CLAY with SAND;** rootlets, hard, slightly moist, very dark brown	#200 Wash Fines = 83% PP = 4.5 tsf
2	10.6			1.5–3	Bulk		CL	**ALLUVIUM:** **Lean CLAY with SAND;** rootlets carbonate, slightly moist, hard, dark brown with white specks	#200 Wash Fines = 82%
3	15.3			3–6.5	Bulk		CL	**OLDER ALLUVIUM:** **Lean CLAY with SAND;** small trace of concretions, very stiff to hard, moist, dark brown, pale brown	Fines = 81% PP = 4.5 tsf
4	13.8	99			CD		CL		Fines = 82% PP = 4.5 tsf
5	16.0				Bulk		CL		Fines = 76%
6	16.6			6.5–7.5	Bulk		CL	**Sandy Lean CLAY;** trace of gravel, concretions, carbonate, very stiff to hard, moist to very moist, brown to pale brown	Fines = 60% PP = 3-4.5 tsf
7	6.5			7.5–9	Bulk		SM	**SAND with SILT and GRAVEL;** fine to coarse, sub rounded gravel, moist, brown	Fines = 11% Gravel = 28%

End of test pit @ 9'
No groundwater encountered

Nuclear gauge density test data at 2.5"
Dry density = 103 pcf   Moisture content =13.1%

Nuclear gauge density test data at 6'
Dry density = 101 pcf   Moisture content = 22.4%

Bulk ☒   CD ■   SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 53
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0	CL	**FILL: Sandy Lean CLAY;** crumbly, slightly moist, yellowish brown	
1	17.4			1	CL	**ALLUVIUM:** **Sandy Lean CLAY;** concretions, stiff, moist, dark yellowish brown with pale brown inclusions	Fines = 65% PP = 3.5-4.5 tsf
2	16.5			2	CL		Fines = 57% PP= 4.0 tsf
3	20.8			3	CL/CH	**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** abundant concretions, very stiff, moist, pale brown	Fines = 63% PP = 4.0 tsf EI = 50
4	19.7			4	CL/CH		Fines = 63% PP = 4.0 tsf
5	22.7			5	CL/CH		Fines = 61% PP = 2.5-3.5 tsf
6	22.3			6	CL/CH		Fines = 70% PP = 4.0 tsf

End of test pit @ 6' 6"
No groundwater encountered

Nuclear gauge density test data at 2'
Dry density = 111 pcf Moisture content = 17.0%

Nuclear gauge density test data at 4'
Dry density = 99 pcf Moisture content = 19.7%

Bulk CD SPT

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 54
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
				0–1		CL	**FILL:** **Lean CLAY with SAND;** stiff, slightly moist to moist, dark yellowish brown	
1	17.1	107		1–3.25	CD	CL	**ALLUVIUM:** **Lean CLAY with SAND;** very stiff, moist, dark yellowish brown	#200 Wash Fines = 88% PP = 4.5 tsf
2	22.4				Bulk			#200 Wash Fines = 81% PP = 2.5-3.5 tsf
3	24.7			3.25–5.5	Bulk	CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY with SAND;** abundant concretions, stiff, moist, dark yellowish brown with pale brown inclusions	Fines = 76% PP = 4.5 tsf
4	25.6				Bulk			Fines = 84% PP= 2.5-3 tsf
5	26.2			5.5–7.5	Bulk		**Sandy Lean to Fat CLAY;** concretions, stiff to very stiff, moist to very moist, light olive brown with pale brown inclusions	#200 Wash Fines = 68% PP = 2.7-4 tsf
6	26.5				Bulk			Fines = 72% PP = 2-3 tsf

End of test pit @ 7' 6"
No groundwater encountered

Nuclear gauge density test data at 18"
Dry density = 110 pcf Moisture content = 16.5%

Nuclear gauge density test data at 4'
Dry density = 96 pcf Moisture content = 26.3%

▽ (groundwater)	Bulk ⊠	CD ■	SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 55
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0–1			CL	**FILL:** **Sandy Lean CLAY;** crumbly, slightly moist, dark brown	
1	13.7			1–1.5	Bulk		CL/CH	**ALLUVIUM:** **Lean to Fat CLAY with SAND;** trace of gravel, stiff to very stiff, moist, very dark brown	Fines = 79% PP = 2.5-4 tsf
2	15.3			2–2.5	Bulk		CL/CH		Fines = 80% PP = 3.2-3.7 tsf EI = 111
3	15.3			3–3.5	Bulk		CL/CH		Fines = 80% PP = 3-3.5 tsf
4	16.5			4–4.5	Bulk		CL/CH		Fines = 78% PP = 3-3.5 tsf
5	22.7			5–5.5	Bulk		CL/CH	**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** concretions, stiff to very stiff, moist to very moist, yellowish brown with pale brown inclusions	Fines = 73% PP = 3-3.5 tsf

End of test pit @ 5' 6"
No groundwater encountered

Nuclear gauge density test data at 2'
Dry density = 105 pcf Moisture content = 11.0%

Nuclear gauge density test data at 5'
Dry density = 100 pcf Moisture content = 26.5%

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 56
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Ground Elevation:
Location : See Figure A-2
Date Excavated : 09-06-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0–1	CL	**FILL:** **Sandy Lean CLAY;** crumbly, stiff, slightly moist, dark brown	
1	13.2			1–5	CL	**ALLUVIUM:** **Lean CLAY with SAND;** stiff to very stiff, moist, dark brown	Fines = 75% PP = 3.5-4.5 tsf
2	15.9						#200 Wash Fines = 85% PP = 2.5-4.5 tsf
3	19.7			5–9	CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY;** concretions, very stiff, moist, dark yellowish brown with pale brown	Fines = 90% PP = 2.5-3 tsf
4	27.1						Fines = 90% PP = 3.0 tsf
5	22.4						Fines = 87% PP = 3.2-3.5 tsf
6	23.5						Fines = 85% PP = 2.5-3 tsf
				9		End of test pit @ 9' No groundwater encountered	

Bulk CD SPT

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 57
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0–1			CL	**FILL:** **Lean CLAY with SAND;** crumbly, slightly moist to moist, dark brown	
1	15.7			2	Bulk		CL	**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, very dark brown	Fines = 86% PP = 3.5 tsf
2	17.7			2	Bulk				Fines = 85% PP = 2.7-4.5 tsf
3	23.1			3	Bulk		CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY with SAND;** concretions, stiff to very stiff, moist, dark yellowish brown with pale brown inclusions	Fines = 85% PP = 2-3.5 tsf
4	23.4			4	Bulk				Fines = 81% PP = 3-3.5 tsf

End of test pit @ 4' 6"
No groundwater encountered

Nuclear gauge density test data at 2'
Dry density = 106 pcf Moisture content = 19.4%

Nuclear gauge density test data at 4'
Dry density = 86 pcf Moisture content = 29.6%

Bulk CD SPT

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 58
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-06-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0–1	CL	**FILL:** **Sandy Lean CLAY;** trace of travel, slightly moist to moist, stiff, brown	
1	20.2			1–5	CL	**ALLUVIUM:** **Lean CLAY with SAND;** trace of gravel, moist, stiff, dark brown	#200 Wash Fines = 67% PP = 3.5-4 tsf
2	14.9						Fines = 78% PP = 3.5-4.5 tsf EI = 59
3	21.3			5–8	CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY;** concretions, stiff to very stiff, moist, dark yellowish brown with pale brown	Fines = 84% PP = 3.5 tsf
4	21.2						Fines = 89% PP = 2.5-3.5 tsf
5	23.2						Fines = 90% PP = 2.5-4 tsf
6	23.4			8–9.5	CL/CH	**Lean to Fat CLAY with SAND;** stiff, moist, dark yellowish brown with dark brown inclusions	#200 Wash Fines = 77% PP = 4.5 tsf
				9.5		End of test pit @ 9' 6" No groundwater encountered	

Bulk CD SPT

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 59
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Ground Elevation:
Location : See Figure A-2
Date Excavated : 09-06-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Lean CLAY with SAND;** trace of wood, stiff, moist, dark brown	
1	16.4			1	Bulk		CL	**ALLUVIUM:** **Lean CLAY;** stiff, moist, very dark brown	Fines = 87% PP = 2.5 tsf
2				4	Bulk				EI = 88
3	23.7			6	Bulk		CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY;** concretions, stiff, moist to very moist, dark yellowish brown with pale brown	Fines = 85% PP = 2.5-3 tsf
4	26.5			7	Bulk				Fines 87% PP = 2.5-3 tsf
								End of test pit @ 7' No groundwater encountered	

Depth scale: 0 1 2 3 4 5 6 7 8 9 10 11 12

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 60
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-06-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0–1	CL	**FILL:** **Lean CLAY with SAND,** stiff, moist, dark brown	
1	15.9			1–3.5	CL/CH	**ALLUVIUM:** **Lean to Fat CLAY;** very stiff, moist very dark brown	Fines = 86% PP = 4.0 tsf
2	22.3						Fines 89% PP = 1.5-4 tsf EI = 102
3	23.4			3.5–6	CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY with SAND;** concretions stiff, moist, dark yellowish brown with pale brown	Fines = 83% PP = 1.7-2.5 tsf
4	25.8						#200 Wash Fines = 78% PP = 2.5-3 tsf
5	31.0			6–8.25	CH	**Fat CLAY with SAND;** stiff, moist to very moist, dark yellowish brown with pale brown	#200 Wash Fines = 81% PP = 2-2.5 tsf
						End of test pit @ 8' 3" No groundwater encountered	

Bulk CD SPT

Test Pit Log

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 61
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-06-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0–1	CL	**FILL:** **Sandy Lean CLAY;** crumbly, slightly moist to moist, dark yellowish brown	
1	15			1–3.5	CL	**ALLUVIUM:** **Lean CLAY with SAND;** concretions, stiff, moist, dark yellowish brown	#200 Wash Fines = 79% PP = 4.0 tsf
2	16.4						Fines = 74% PP = 2.5-4 tsf
3	14.8			3.5–6.3	CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** abundant concretions, stiff, moist, yellowish brown and pale brown	Fines = 50% PP = 2.0 tsf
4	13.7						Fines = 50% PP = 2.5-3.5 tsf
5	21.6			6.3–9	CL/CH	**Sandy Lean to Fat CLAY;** abundant concretions, stiff to very stiff, moist, olive brown	Fines = 56% PP = 3.0 tsf
				9		End of test pit @ 9' No groundwater encountered	

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 62
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-06-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0–1			CL	**FILL:** **Lean CLAY with SAND;** stiff, moist, dark brown	
1	18.5			1	Bulk		CL	**ALLUVIUM:** **Lean CLAY with SAND;** very stiff, moist, dark brown	#200 Wash Fines = 82% PP = 2.2-3 tsf
2	15.1			3	Bulk		CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, dark brown	Fines = 72% PP = 3-3.2 tsf
3	25.9			5	Bulk		CL/CH	**Lean to Fat CLAY with SAND;** trace of concretions, stiff, moist, dark yellowish brown	#200 Wash Fines = 86% PP = 3-3.5 tsf
4	27.6			7	Bulk		CL/CH		Fines = 85%
5	30.3			8	Bulk		CL/CH		Fines = 94% PP = 3.0 tsf
6	20.2			10	Bulk		CL	**Sandy Lean CLAY;** stiff, moist, light olive brown to brown	#200 Wash Fines = 64% PP = 3.0 tsf

End of test pit @ 10' 4"
No groundwater encountered

Bulk CD SPT

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 63
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0–1			CL	**FILL:** **Lean CLAY with SAND;** crumbly, slightly moist to to moist, dark brown	
1	14.0			1–5.5	Bulk (1–3)		CL	**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, very dark brown	#200 Wash Fines = 86% PP = 3.5 tsf
2	20.5			5.5–6.5	Bulk (6–6.5)		CL/CH	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, very stiff, moist, dark yellowish brown with pale brown	#200 Wash Fines = 69% PP = 3.5 tsf

End of test pit @ 6' 6"
No groundwater encountered

Nuclear gauge density test data at 2.5"
Dry density = 98 pcf   Moisture content = 15.7%

Nuclear gauge density test data at 6'
Dry density = 89 pcf   Moisture content = 23.3%

Bulk CD SPT

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 64
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0–1				**FILL:** **Sandy Lean CLAY;** crumbly, slightly moist to moist, brown	
1	15.9			1–2	Bulk			**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, dark brown	Fines = 75% PP = 2.5-2.7 tsf
2	21.5			2–3	Bulk				Fines = 80% PP = 3.7-4.5
3	20.1			3–4	Bulk		CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, very stiff, moist, dark yellowish brown	Fines = 67% PP = 3-4.5 tsf
4	16.6			4–5	Bulk				Fines = 71% PP = 4.5 tsf
5	15.5			5–6	Bulk				Fines = 57% PP= 4.5 tsf
6	14.4			6–7	Bulk				Fines 50% PP = 4.5 tsf
7	18.0			7–7.5	Bulk			abundant concretions	Fines = 50% PP = 4.5 tsf

End of test pit @ 7' 6"
No groundwater encountered

Nuclear gauge density test data at 2'
Dry density = 99 pcf   Moisture content = 21.3%

Bulk ☒   CD ■   SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 65
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0–1.5	CL	**FILL:** **Lean CLAY with SAND;** crumbly, dry to slightly moist, dark brown	
1	7.7			1.5–3	CL	**ALLUVIUM:** **Lean CLAY with SAND;** trace of organics, stiff to very stiff, slightly moist to moist, very dark brown	Fines = 86% PP = 4.5 tsf
2	8.4						Fines 84% PP = 4.5 tsf
3	9.3	113		3–5	CL	**Sandy Lean CLAY;** concretions, caliche stringers, very stiff, slightly moist, mottled dark yellowish brown with white inclusions	Fines = 71% PP = 4.5 tsf
4	21.6			5–6	CL/CH	**Lean to Fat CLAY with SAND;** trace concretions, very stiff, moist, dark yellowish brown and pale brown	Fines = 80% PP = 4-4.5 tsf
5	17.4	114					
6	24.0			6–7	CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY with SAND;** trace of concretions, very stiff, moist, dark yellowish brown	Fines = 82% PP = 2.7-3 tsf EI = 99
7	20.9			7–8.5	CL	**Sandy Lean CLAY;** trace of concretions, very stiff, moist, dark yellowish brown with pale brown and white inclusions	Fines = 72% PP = 4-4.5 tsf
8	19.7						Fines = 63% PP = 4-4.5 tsf

End of test pit @ 8' 6"
No groundwater encountered

Nuclear gauge density test data at 18"
Dry density = 109 pcf   Moisture content = 7.9%

Bulk ☒   CD ■   SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 66
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Ground Elevation:
Location : See Figure A-2
Date Excavated : 09-07-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0–1			CL	**FILL:** **Sandy Lean CLAY;** slightly moist to moist, dark olive gray	
1	20.9			1–2.5	Bulk		CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of concretions, stiff to very stiff, moist to very mois,t olive brown	Fines = 74% PP = 3-3.5 tsf
2	15.9			2.5–4.5	Bulk		CL	**OLDER ALLUVIUM:** **Lean CLAY with SAND;** trace of concretions, very stiff, moist, olive brown with pale brown	Fines = 79% PP = 4.5 tsf
3	18.2			4.5–5.8	Bulk		CL	**Sandy Lean CLAY;** stiff to very stiff, moist, dark yellowish brown	Fines = 60% PP = 4-4.5 tsf
4	18.1			5.8–7.5	Bulk		SC	**Clayey SAND;** fine, layers of sandy lean clay, moist to very moist, yellowish brown with gray inclusions	Fines = 40%
5	18.6				Bulk				Fines = 44%
				7.5				End of test pit @ 7' 6" No groundwater encountered	

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 67
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-07-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
				0–1		CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, soft, slightly moist, grayish brown (pond surface sediments)	
1	27.0			~2	Bulk	CL/CH	**ALLUVIUM:** **Sandy Lean to Fat CLAY;** trace of organics, stiff to very stiff, moist, very dark brown	Fines = 74% PP = 3.5-4 tsf
2	17.0			~3.5	Bulk	CL/CH	**OLDER ALLUVIUM;** **Sandy Lean to Fat CLAY;** trace concretions, stiff to very stiff, moist to very moist, medium to high plasticity, dark olive gray	Fines 70% PP = 3-4 tsf
3	19.9	115		~5.5	CD			Fines = 66% PP = 3.2-3.7 tsf Consolidation
4	22.0			~7	Bulk			Fines = 69% PP = 3-4 tsf
5	24.3			~8.5	Bulk			Fines = 70%

End of test pit @ 8' 6"
No groundwater encountered

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 68
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Ground Elevation:
Location : See Figure A-2
Date Excavated : 09-07-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0	CL/CH	Pond surface containing trash One foot of sediment, very soft, bluish gray	
1	31.9			1–2	CL/CH	**Lean to Fat CLAY;** firm, moist ot very moist, dark olive brown to dark gray	Fines = 91% PP = 1-1.5 tsf
1	29.3			3	CL/CH	**ALLUVIUM:** **Lean to Fat CLAY with SAND;** soft, very moist to wet, olive gray with rusty strike	Fines = 77% PP = .5-.75 tsf
2	22.4			4	CL/CH	**Sandy Lean to Fat Clay;** stiff to very stiff, moist to very moist, olive gray with rusty strike and white specks	Fines = 70% PP = 2-4 tsf
3	31.8			5	CL/CH	**Lean to Fat CLAY;** stiff to very stiff, moist to very moist, olive gray	Fines = 90% PP = 1.5-2 tsf
4	33.4	93		6	CL/CH	**Lean to Fat CLAY with SAND;** firm to stiff, moist to very moist, grayish brown to brownish gray	Fines = 80% PP = 1.2-1.7 tsf
5	36.5	88		7–8	CL/CH		Fines = 71% PP = 1.0-1.5 tsf Consolidation
4	37.8			9–10	CL/CH	**Lean to Fat CLAY;** stiff, moist to very moist, olive gray	Fines = 97% PP = 2.5-4.5 tsf
5	30.5			11–14	ML	**Silt;** trace of sand, stiff, moist, dark olive gray cementation at 13.5 feet	Fines = 92% PP = 2.5-4 tsf
6	28.2			14	SM	**Silty SAND;** fine to medium, wet, dark olive gray	Fines = 13%

End of test pit @ 14' 6"
Water seeping in sand lenses at 3', groundwater at 13'
Hole filled with water to 2' of ground surface after one day

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 69
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0–1.3	CL	**FILL:** **Lean CLAY with SAND;** trace concretions, very stiff, slightly moist to moist, dark brown	
1	13.4			1.3–5.6	CL	**ALLUVIUM:** **Lean CLAY with SAND;** trace concretions, very stiff, moist, very dark brown	Fines = 86% PP = 4-4.5 tsf
2	15.7						Fines 84% PP = 3-3.5 tsf
3	16.0						Fines = 78% PP = 2.5 tsf
4	21.7			5.6–7.1	CL/CH	**OLDER ALLUVIUM:** **Sandy Lean to Fat Clay;** concretions, stiff, moist, dark yellowish brown with pale brown inclusions	Fines = 64% PP = 1.5-3 tsf
5	31.1			7.1–9	CL/CH	**Lean to Fat Clay;** concretions, stiff, moist to very moist, dark yellowish brown with pale brown inclusions	Fines = 85% PP = 2.0 tsf
6	39.6			9–10	CH	**Fat Clay;** concretions, stiff, moist to very moist, dark yellowish brown with pale brown inclusions	Fines = 98% PP = 4.5 tsf

End of test pit @ 10'
No groundwater encountered

Nuclear gauge density test data at 4'
Dry density = 91 pcf   Moisture content = 18.4%

Bulk ☒   CD ■   SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 70
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-11-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0–1	CL	**FILL:** **Sandy Lean CLAY;** crumbly, stiff, slightly moist to moist, brown	
1	14.9			1–2	CL	**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, dark yellowish brown	Fines = 76% PP = 2-2.5 tsf
2 3	15.0 18.1	108		2–3.25	CL/CH	**Sandy Lean to Fat CLAY;** concretions, slightly moist, dark yellowish brown with pale brown	Fines = 73% PP = 3.7-4 tsf Fines = 74% PP = 2.5-3.5 tsf EI = 160
3 4 5	12.0 15.3 14.9			3.25–5.75	CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, dark yellowish brown	Fines = 57% Fines = 52% PP = 4.0 tsf Fines = 50% PP = 3.5 tsf

End of test pit @ 4' 6"
No groundwater encountered

Nuclear gauge density test data at 2'
Dry density = 106 pcf Moisture content = 14.7%

Nuclear gauge density test data at 5'
Dry density = 105 pcf Moisture content = 14.1%

Bulk CD SPT

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 71
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-11-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0–1				**FILL:** **Sandy Lean CLAY;** crumbly, slightly moist to moist, brown	
1	10.7			2	Bulk		CL	**ALLUVIUM:** **Sandy Lean CLAY**; concretions, very stiff, moist, dark brown	Fines = 64% PP = 4.5 tsf
2	14.2			3	Bulk				Fines = 59% PP = 3-3.5 tsf EI = 45
3	14.5	119		4	CD			dark yellowish brown	Fines = 54% PP = 3.5-4.5 tsf

End of test pit @ 4' 2"
No groundwater encountered

Nuclear gauge density test data at 3.5'
Dry density = 116 pcf   Moisture content = 13.1%

Legend: Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 72
Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2
Ground Elevation:
Date Excavated : 09-11-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0–1	CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, crumbly, soft, slightly moist to moist, dark brown	
1	15.4			1–2	CL	**ALLUVIUM:** **Lean CLAY with SAND;** trace of concretions, very stiff, moist, very dark brown	Fines = 78% PP = 2.5-3.5 tsf
2	16.1			2–3	CL	**Sandy Lean CLAY;** trace of concretions, very stiff, moist, dark brown	Fines = 73% PP = 2.2-2.7 tsf
3	20.0			3–4	CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY with SAND;** concretions, stiff to very stiff, moist to very moist, dark yellowish brown with pale brown	Fines = 79% PP = 2.5-3 tsf
4	19.1	103		4–6.25	CL/CH	**Sandy Lean to Fat CLAY;** concretions, stiff to very stiff, moist to very moist, yellowish brown	Fines = 54% PP = 3.5-4 tsf
5	18.1						Fines = 50% PP = 2-2.5 tsf

End of test pit @ 6' 3"
No groundwater encountered

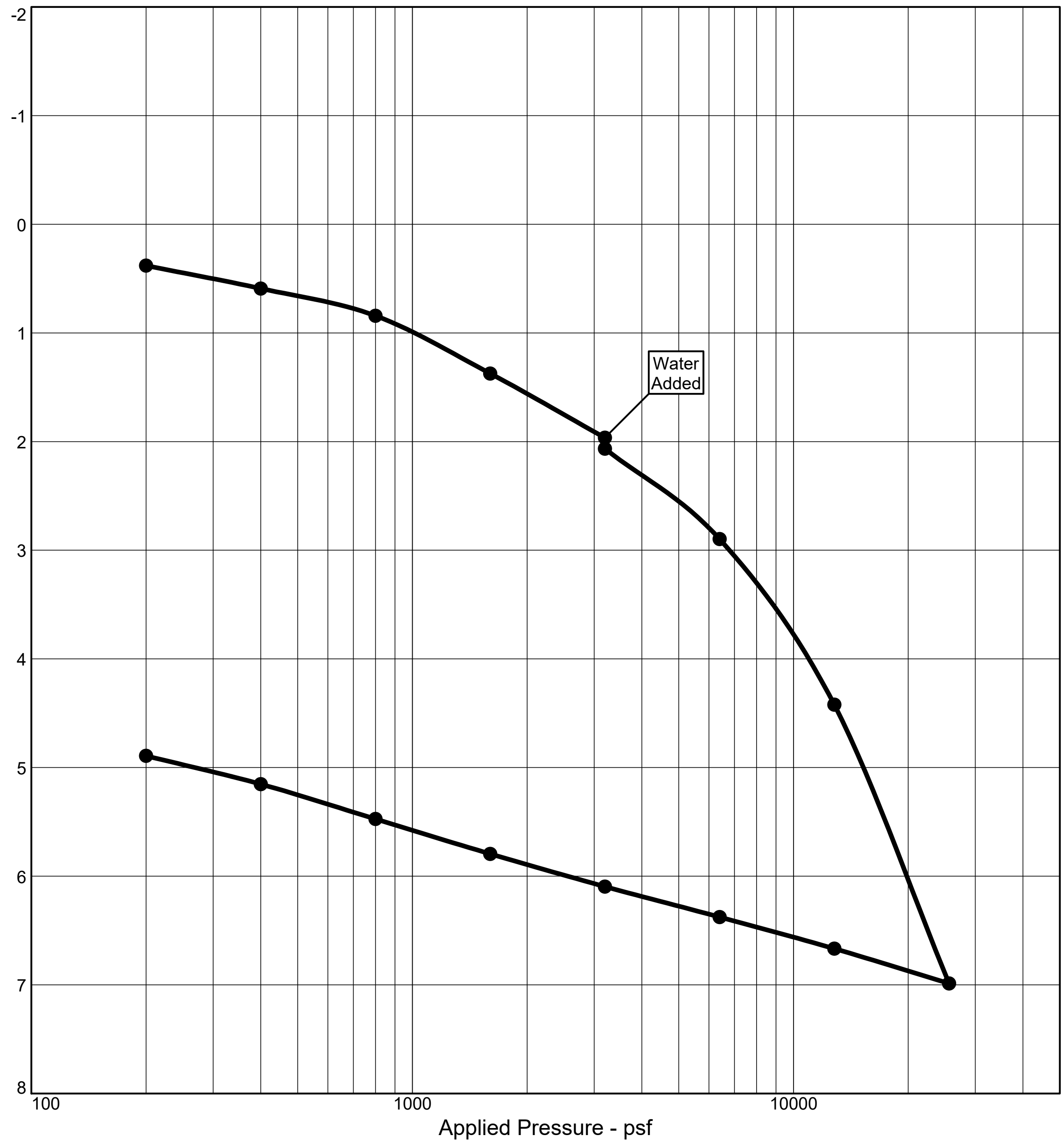
Nuclear gauge density test data at 3'
Dry density = 105 pcf Moisture content = 19.1%

Bulk ☒ CD ■ SPT ☒

APPENDIX C

Laboratory Test Results & Calculations

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Clpse. %	e_o
Sat.	Moist.											
85.0 %	17.6 %	108.1			2.7		10206	0.14	0.02		0.1	0.560

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Light Olive Gray Sandy Clay	Observed as: CL	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: B13 @ 11' **Sample Number:** 2018-249

Koury Engineering & Testing, Inc.

Chino, CA

Remarks:

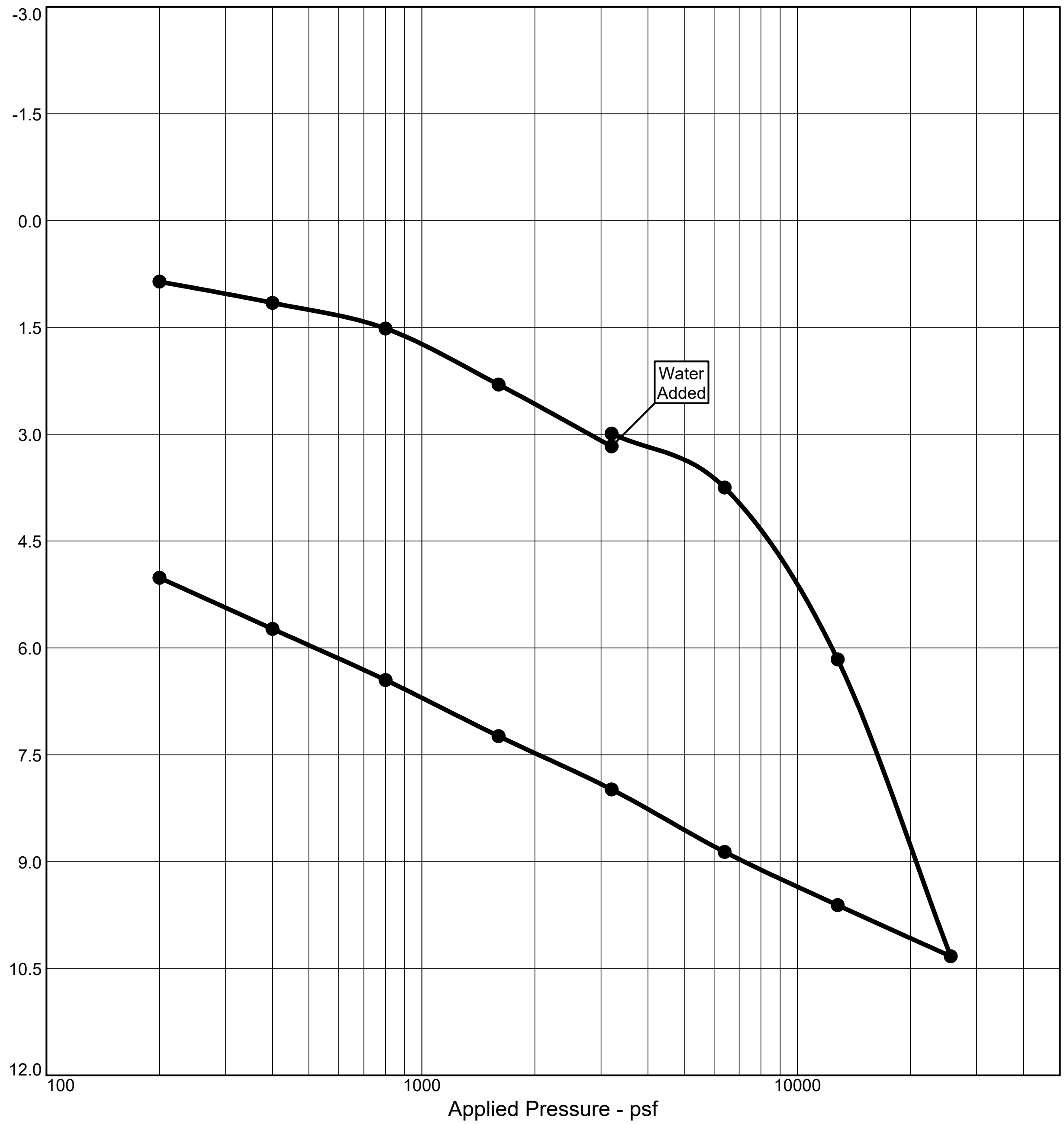
Lab #5345.

Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: Mathew F. Perry **Checked By:**

CONSOLIDATION TEST REPORT



These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Natural Saturation	Natural Moisture	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_r	Initial Void Ratio
95.6 %	28.1 %	93.9			2.7		9395	0.25	0.05	0.795

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Olive Clay	Observed as: CL	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: B14 @ 15' **Sample Number:** 2018-249

Koury Engineering & Testing, Inc.

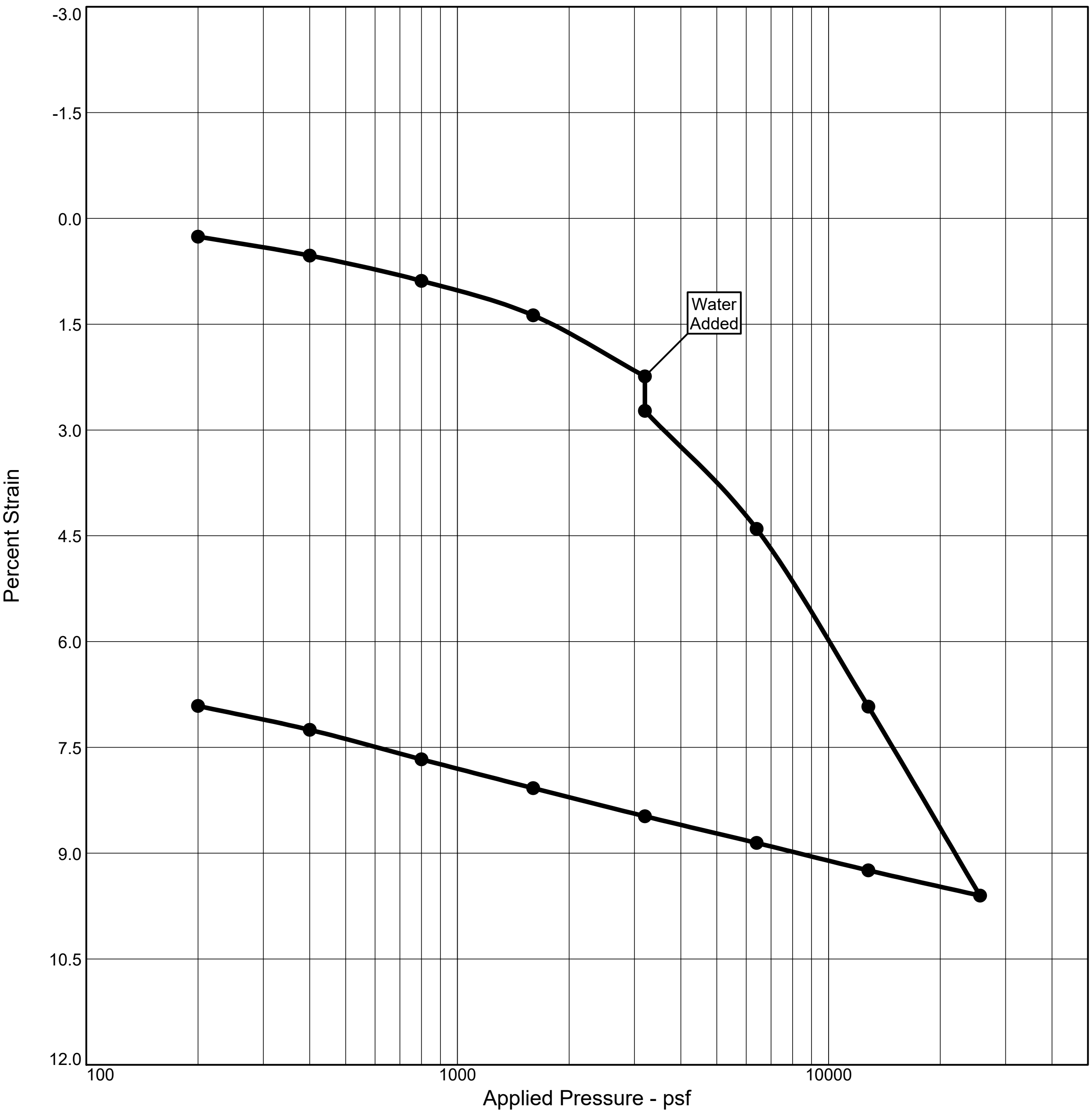
Chino, CA

Remarks:
Lab #5349.

Figure

Tested By: Mathew F. Perry **Checked By:**

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Clpse. %	e_o
Sat.	Moist.											
79.0 %	17.9 %	104.5			2.7		6908	0.15	0.02		0.5	0.613

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Light Yellowish Brown to Light Olive Brown Silt/Sand Mixture	Observed as: ML/SM	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: B15 @ 5' **Sample Number:** 2018-249

Remarks:
Lab #5318.

Koury Engineering & Testing, Inc.

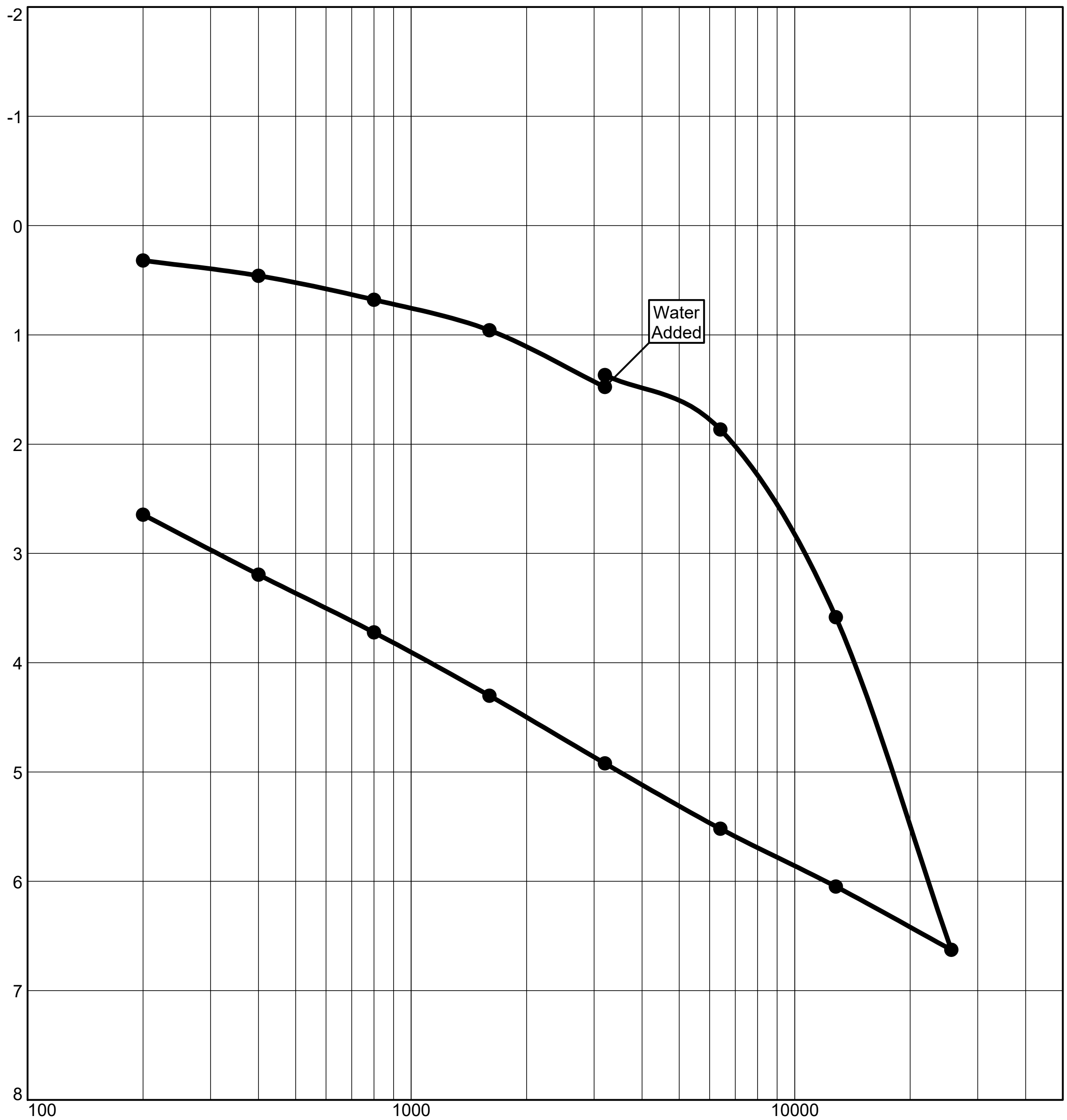
Chino, CA

Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: Mathew F. Perry **Checked By:**

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Swell %	e_o
Sat.	Moist.											
98.2 %	37.0 %	83.5			2.7		9483	0.21	0.04	725	0.1	1.018

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Grayish Brown to Dark Grayish Brown Sandy Clay	Observed as: CL	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: B16 @ 8' **Sample Number:** 2018-249

Koury Engineering & Testing, Inc.

Chino, CA

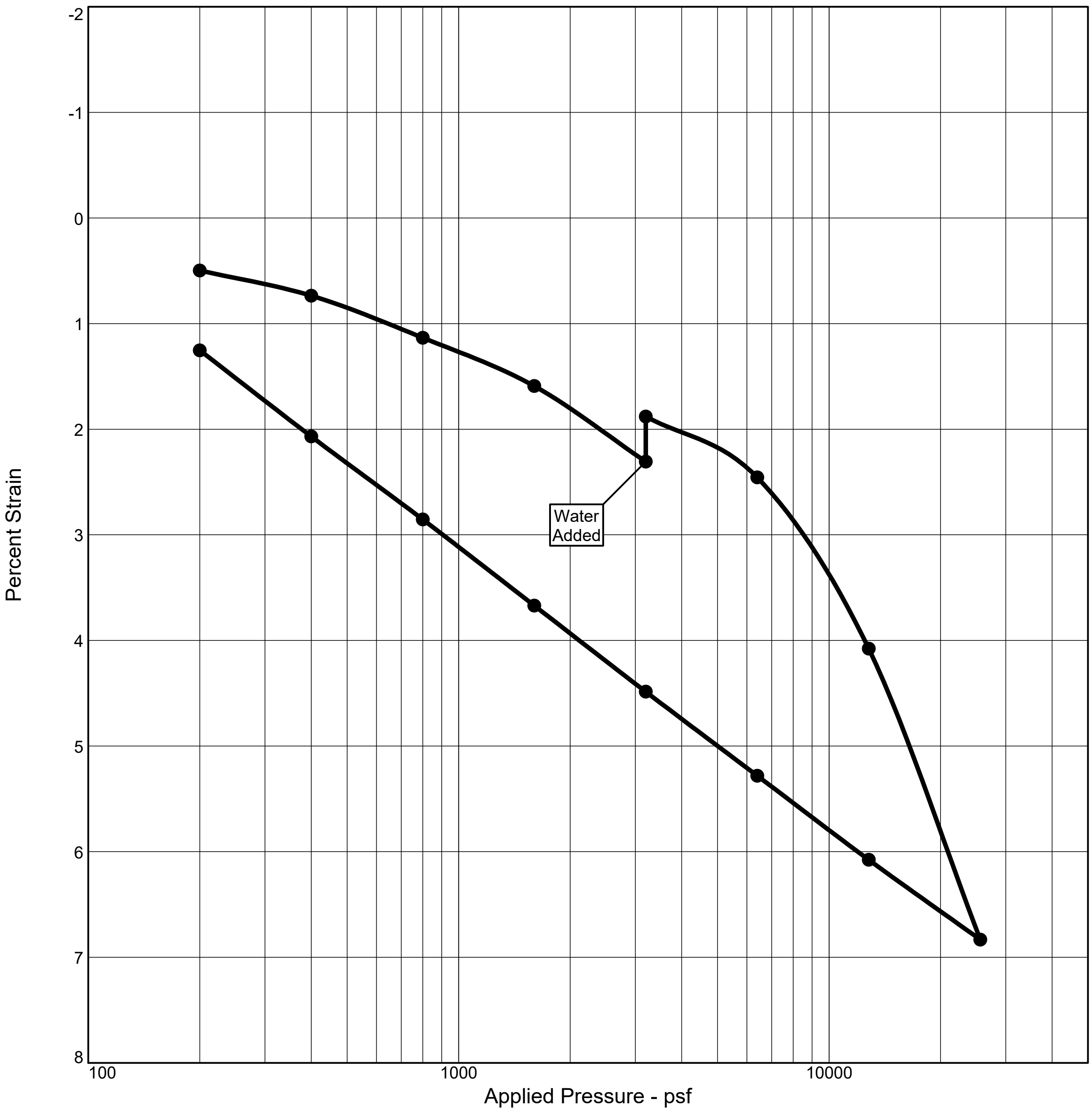
Remarks:
Lab #5318.

Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: Mathew F. Perry **Checked By:**

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Swell %	e_o
96.7 %	21.8 %	104.9			2.7		9373	0.15	0.04	2538	0.4	0.607

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Light Olive Brown to Grayish Brown Sandy Clay	Observed as: CL	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: B16 @ 15' **Sample Number:** 2018-249

Remarks:
Lab #5315.

Koury Engineering & Testing, Inc.

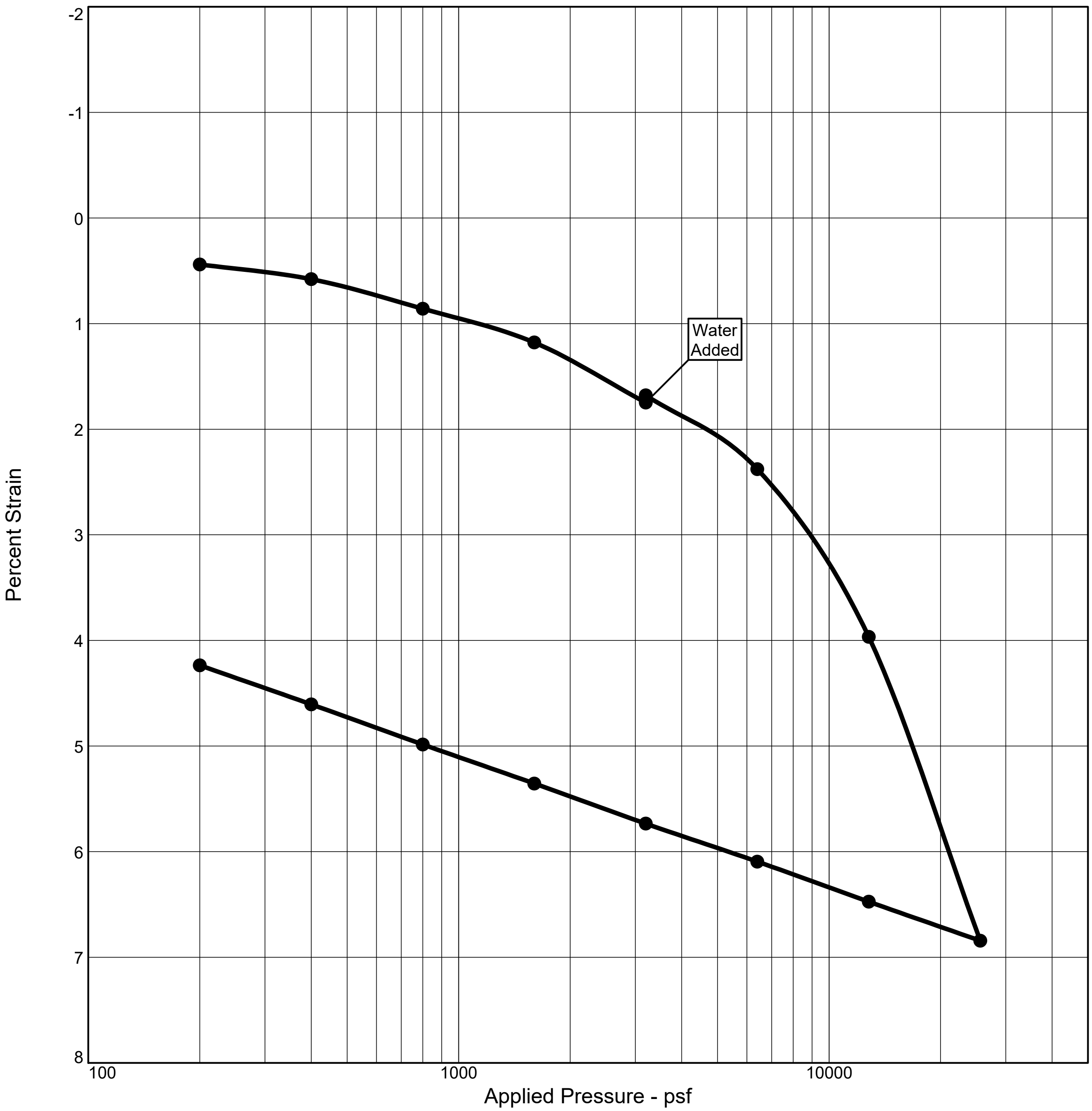
Chino, CA

Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: Mathew F. Perry **Checked By:** ____________

CONSOLIDATION TEST REPORT



These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Swell %	e_o
Sat.	Moist.											
89.8 %	19.4 %	106.5			2.7		9951	0.15	0.02	245	0.1	0.583

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Light Olive Brown Sandy Clay	Observed as: CL	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: B16 @ 25' **Sample Number:** 2018-249

Remarks:
Lab #5308.

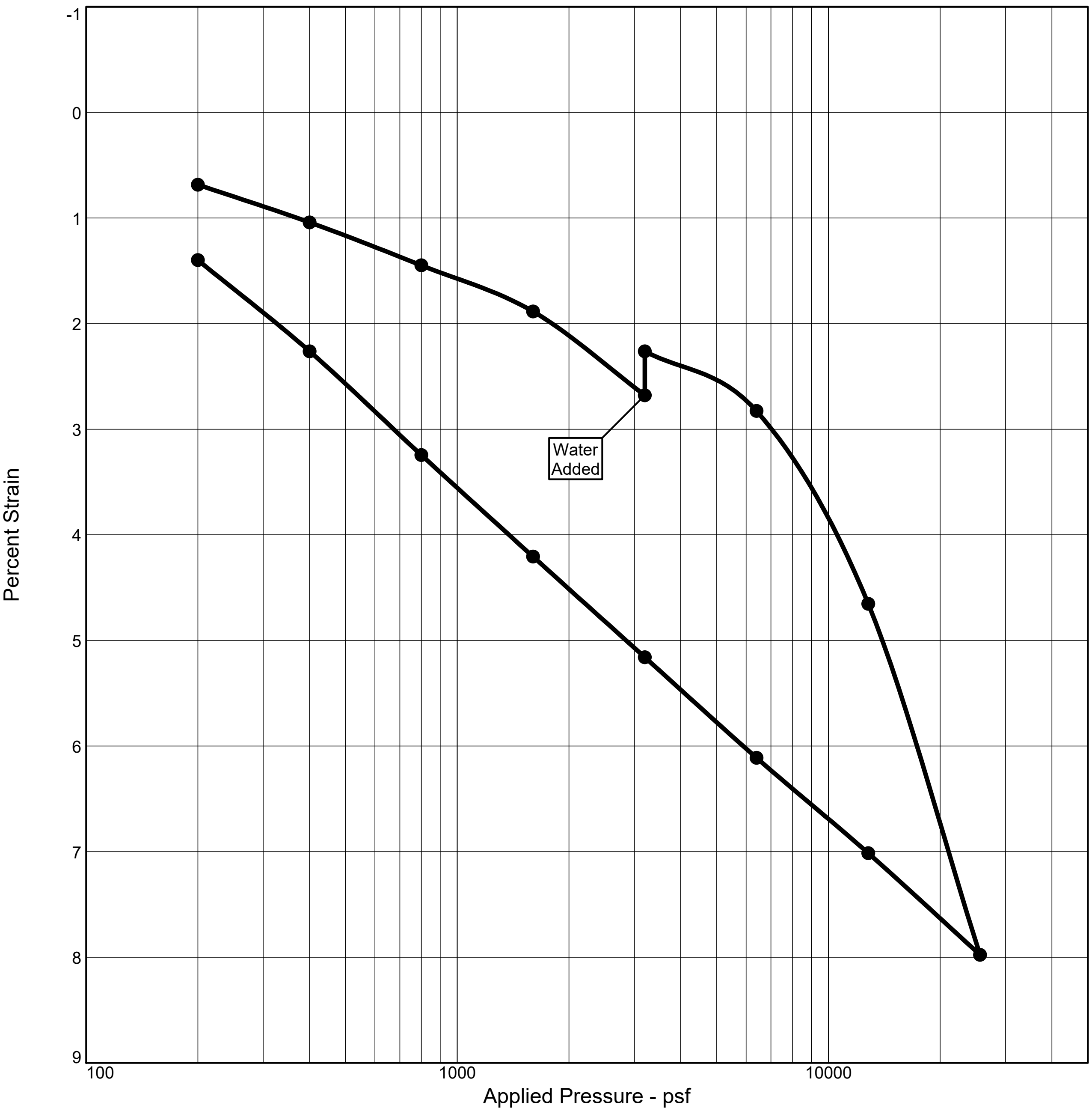
Koury Engineering & Testing, Inc.

Chino, CA

Figure

Tested By: Mathew F. Perry **Checked By:** ____________________

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
97.4 %	23.1 %	102.7			2.7		9616	0.18	0.05	0.641

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Olive Brown Silty Clay	Observed as: CL	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: B24 @ 16' **Sample Number:** 2018-249

Koury Engineering & Testing, Inc.

Chino, CA

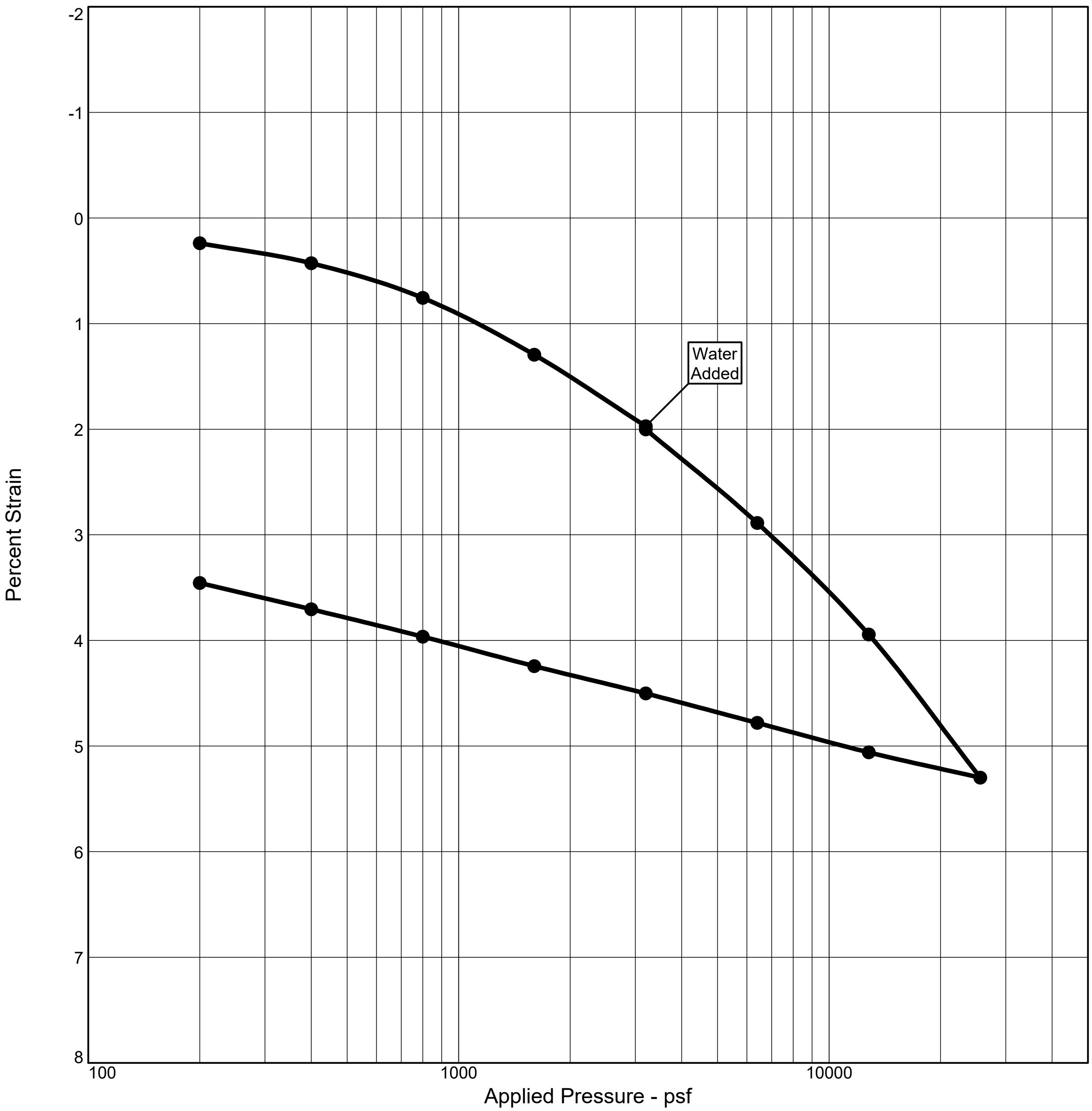
Remarks:
Lab #5372.

Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: Mathew F. Perry **Checked By:** ____________________

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Clpse. %	e_o
82.3 %	19.6 %	102.6			2.7		13086	0.07	0.01		0.0	0.643

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Yellowish Brown Silty Sand	Observed as: SM	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: B24 @ 30' **Sample Number:** 2018-249

Remarks:
Lab #5349.

Koury Engineering & Testing, Inc.

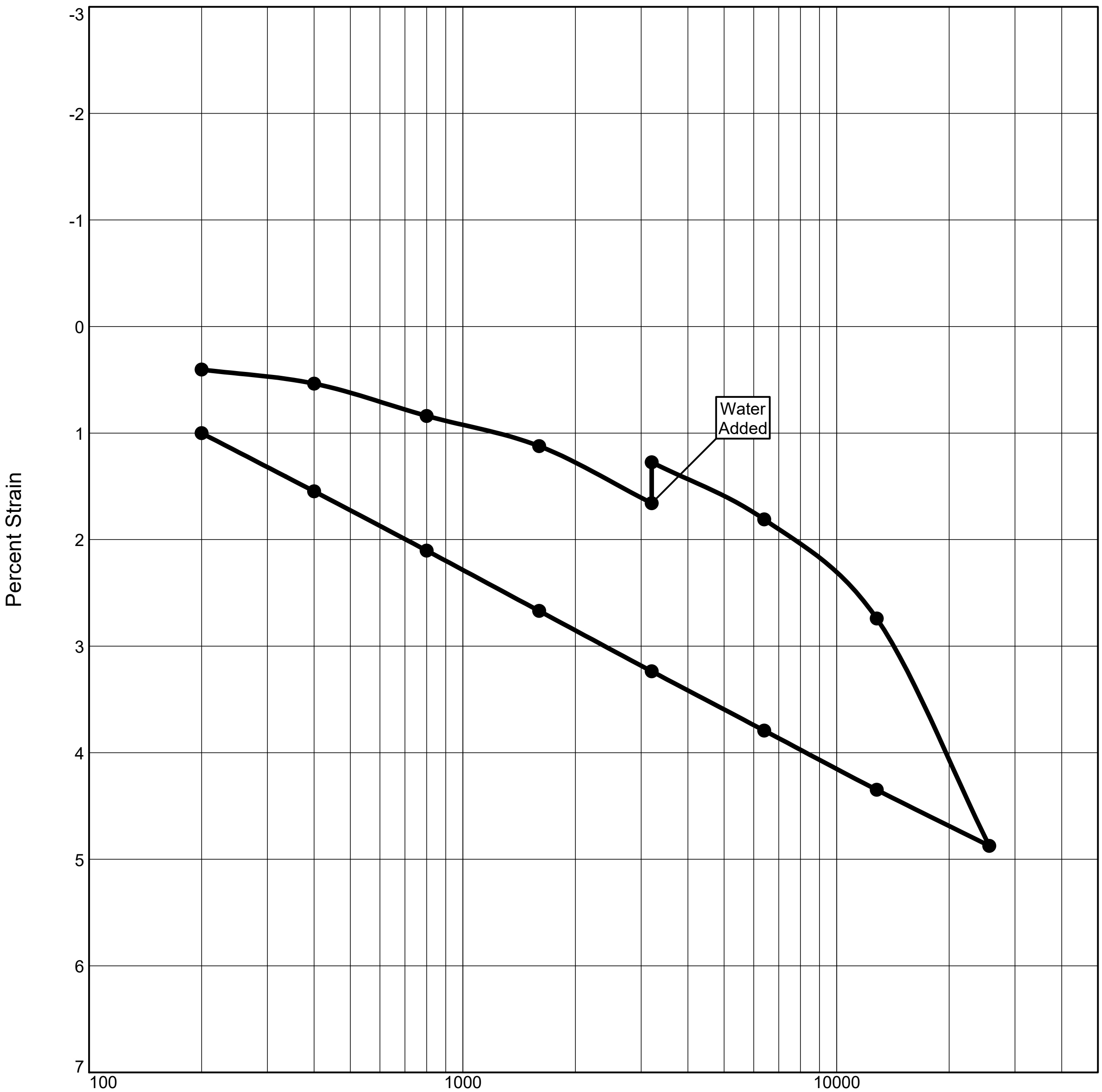
Chino, CA

Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: Mathew F. Perry **Checked By:**

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Swell %	e_o
Sat.	Moist.											
98.3 %	18.2 %	112.5			2.7		11881	0.11	0.03	2247	0.4	0.499

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Dark Yellowish Brown Sandy Clay	Observed as: CL	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: TP39 @ 4' - 4.5' **Sample Number:** 2018-249

Koury Engineering & Testing, Inc.

Chino, CA

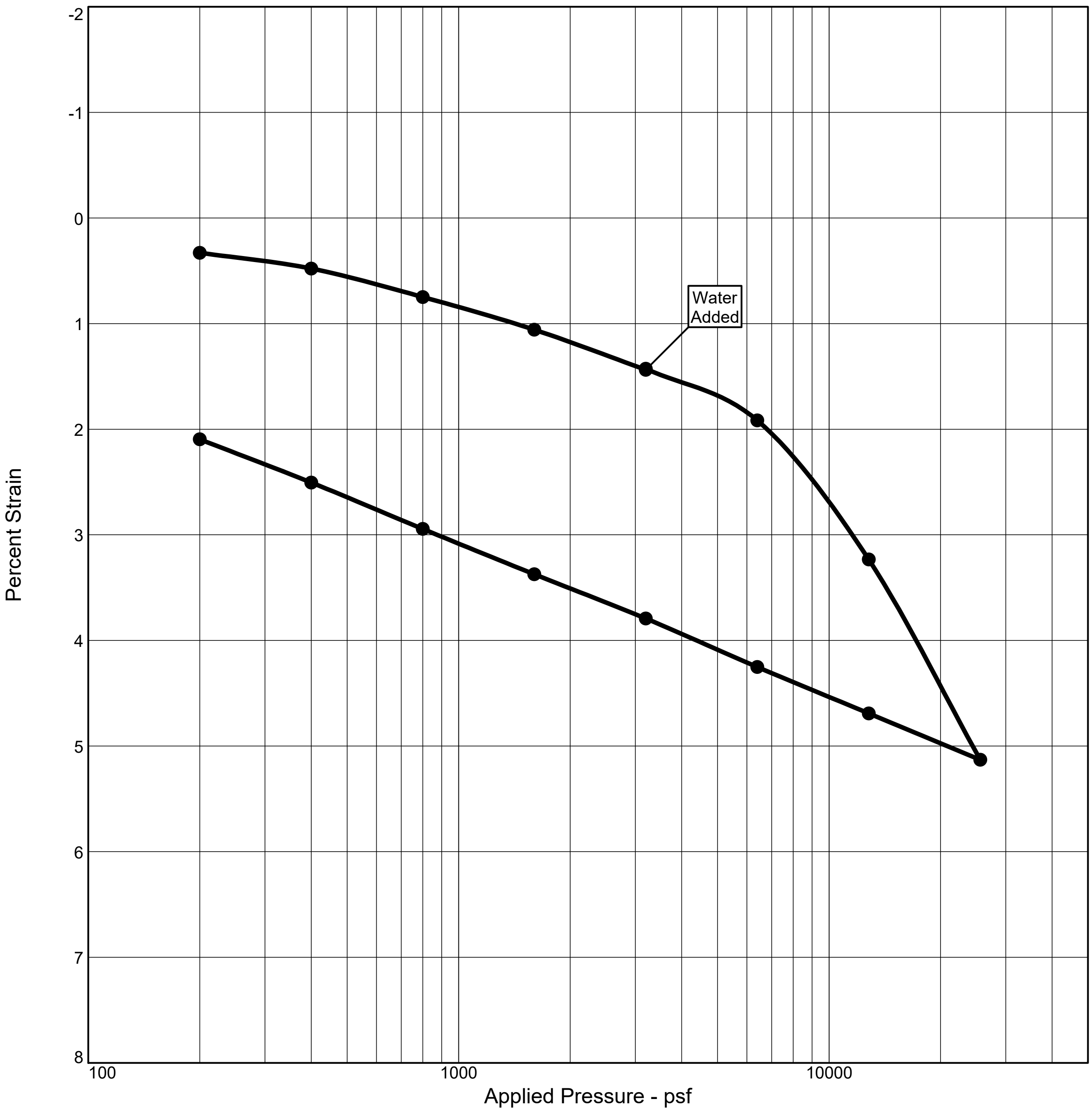
Remarks:
Lab #5308.

Figure

Tested By: Mathew F. Perry **Checked By:**

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Swell %	e_o
Sat.	Moist.											
96.9 %	18.3 %	111.7			2.7		8421	0.10	0.02	46	0.0	0.509

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Dark Greenish Gray Sandy Clay	Observed as: CL	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: TP67 @ 5' **Sample Number:** 2018-249

Remarks:
Lab #5315.

Koury Engineering & Testing, Inc.

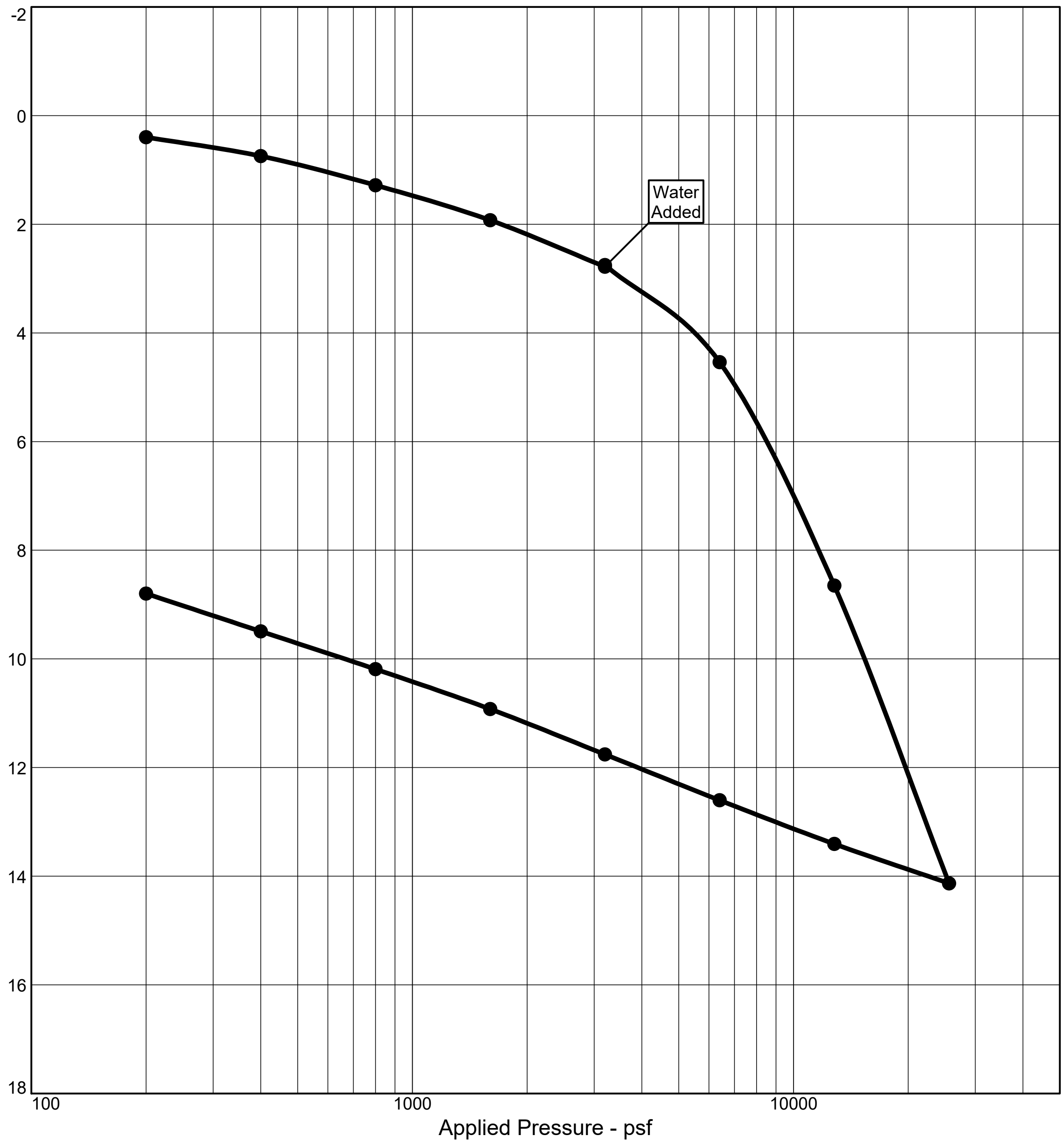
Chino, CA

Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: Mathew F. Perry **Checked By:**

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Swell %	e_o
Sat.	Moist.											
99.0 %	32.9 %	88.9			2.7		8065	0.35	0.05	38	0.0	0.896

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Light Olive Gray Sandy Clay	Observed as: CL	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: TP68 @ 6' - 6.5' **Sample Number:** 2018-249

Koury Engineering & Testing, Inc.

Chino, CA

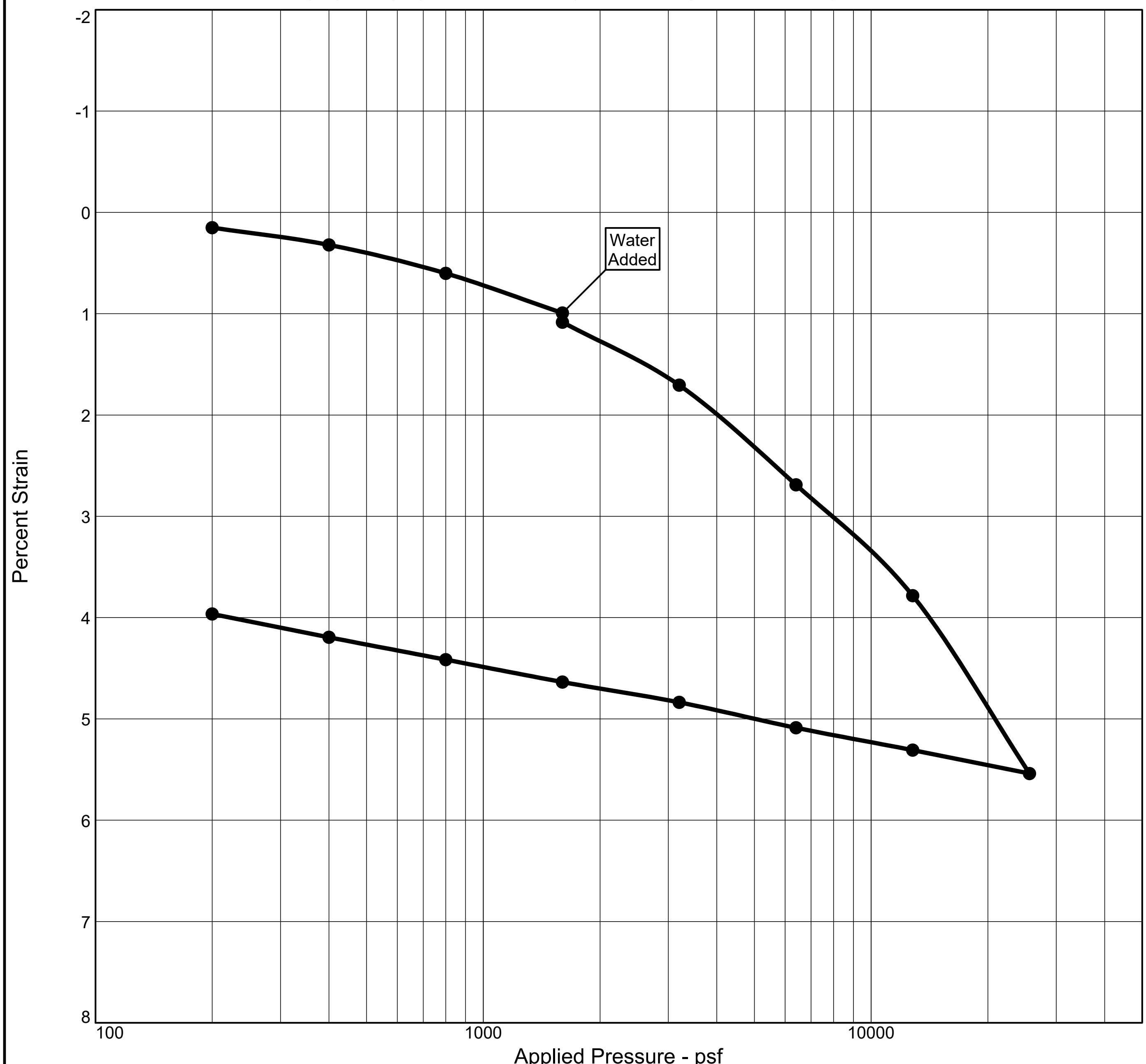
Remarks:
Lab #5318.

Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: Mathew F. Perry **Checked By:**

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Clpse. %	e_o
Sat.	Moist.											
86.0 %	18.1 %	107.5			2.7		3409	0.05	0.01		0.1	0.569

MATERIAL DESCRIPTION	USCS	AASHTO
Dark Yellowish Brown Silty Sand	SM	

Project No. 16-0899 **Client:**

Project: OC Prado

Location: B1 @ 11' **Sample Number:** 4458 Series

Koury Engineering & Testing, Inc.

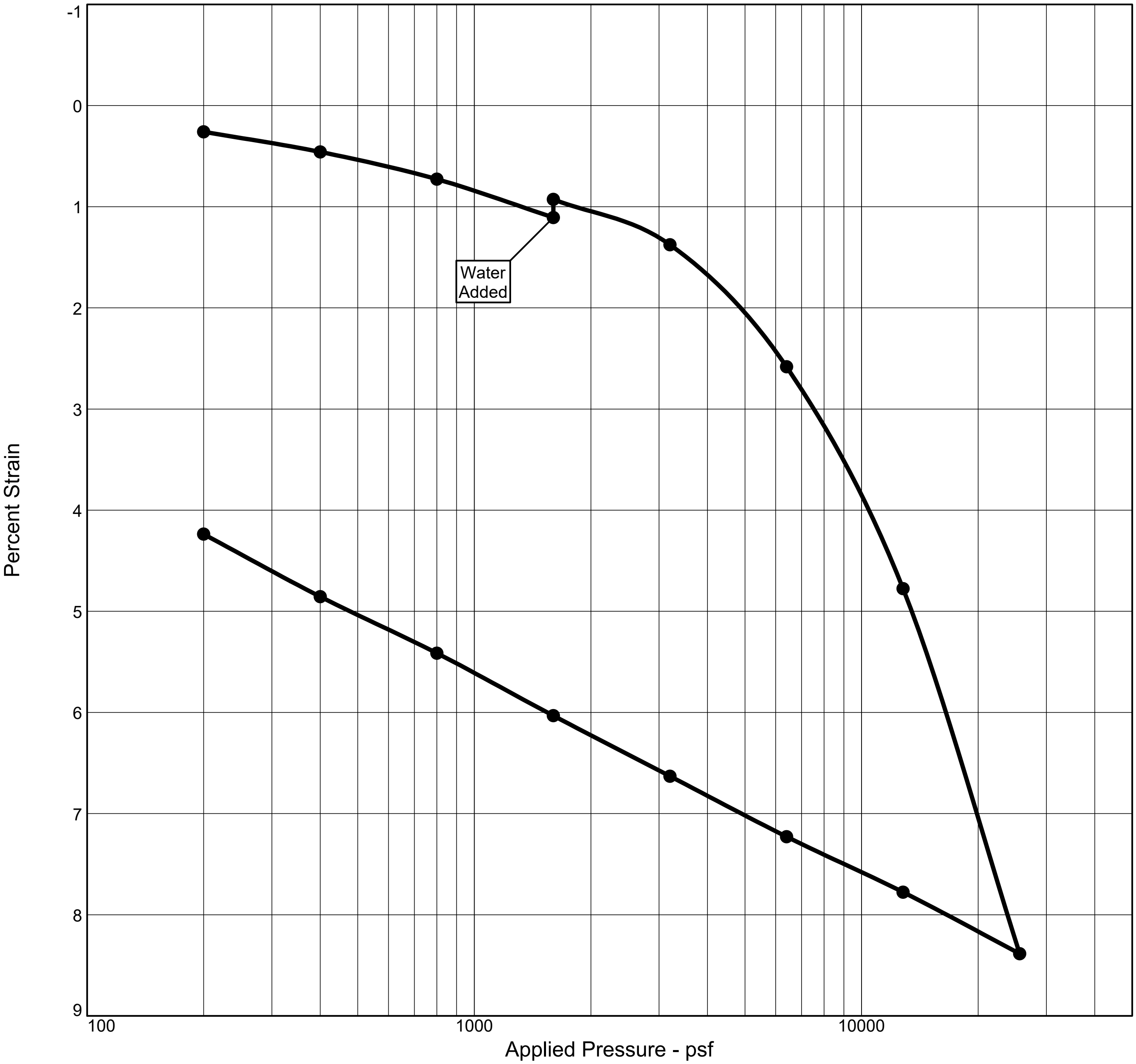
Chino, CA

Remarks:
Lab #4458 Series.

Figure

Tested By: Mathew F. Perry **Checked By:** ____________

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Swell %	e_o
Sat.	Moist.											
96.0 %	22.8 %	102.7			2.7		7535	0.20	0.03	674	0.2	0.641

MATERIAL DESCRIPTION	USCS	AASHTO
Olive Brown Clay	CL	

Project No. 16-0899 **Client:**

Project: OC Prado

Location: B1 @ 21' **Sample Number:** 4458 Series

Koury Engineering & Testing, Inc.

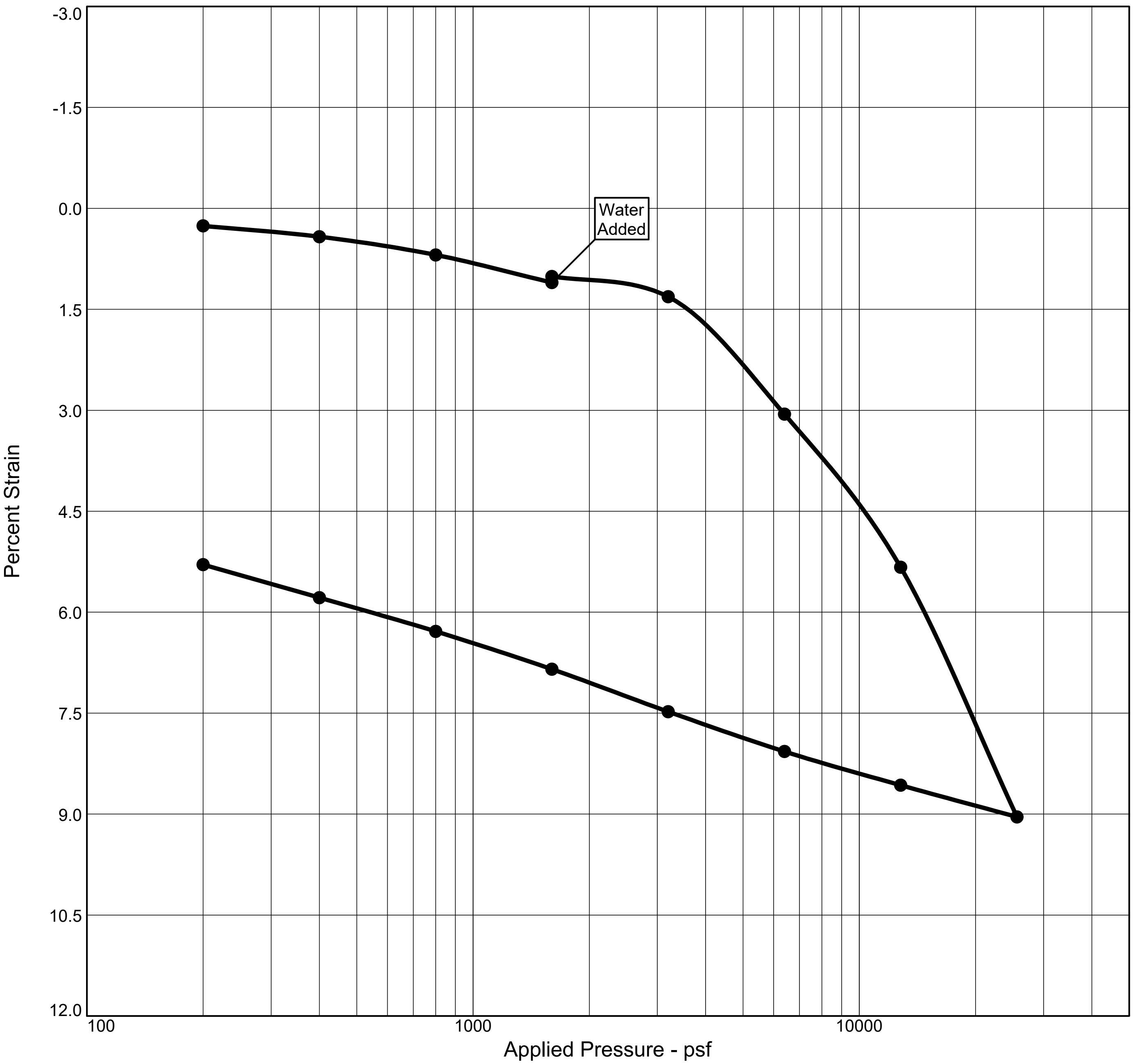
Chino, CA

Remarks:
Lab #4458 Series.

Figure

Tested By: Mathew F. Perry **Checked By:**

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Swell %	e_o
99.5 %	33.7 %	88.0			2.7		3550	0.13	0.03	794	0.1	0.914

MATERIAL DESCRIPTION	USCS	AASHTO
Dark Yellowish Brown Clay	CL	

Project No. 16-0899 **Client:**

Project: OC Prado

Location: B1 @ 31' **Sample Number:** 4458 Series

Remarks:
Lab #4458 Series.

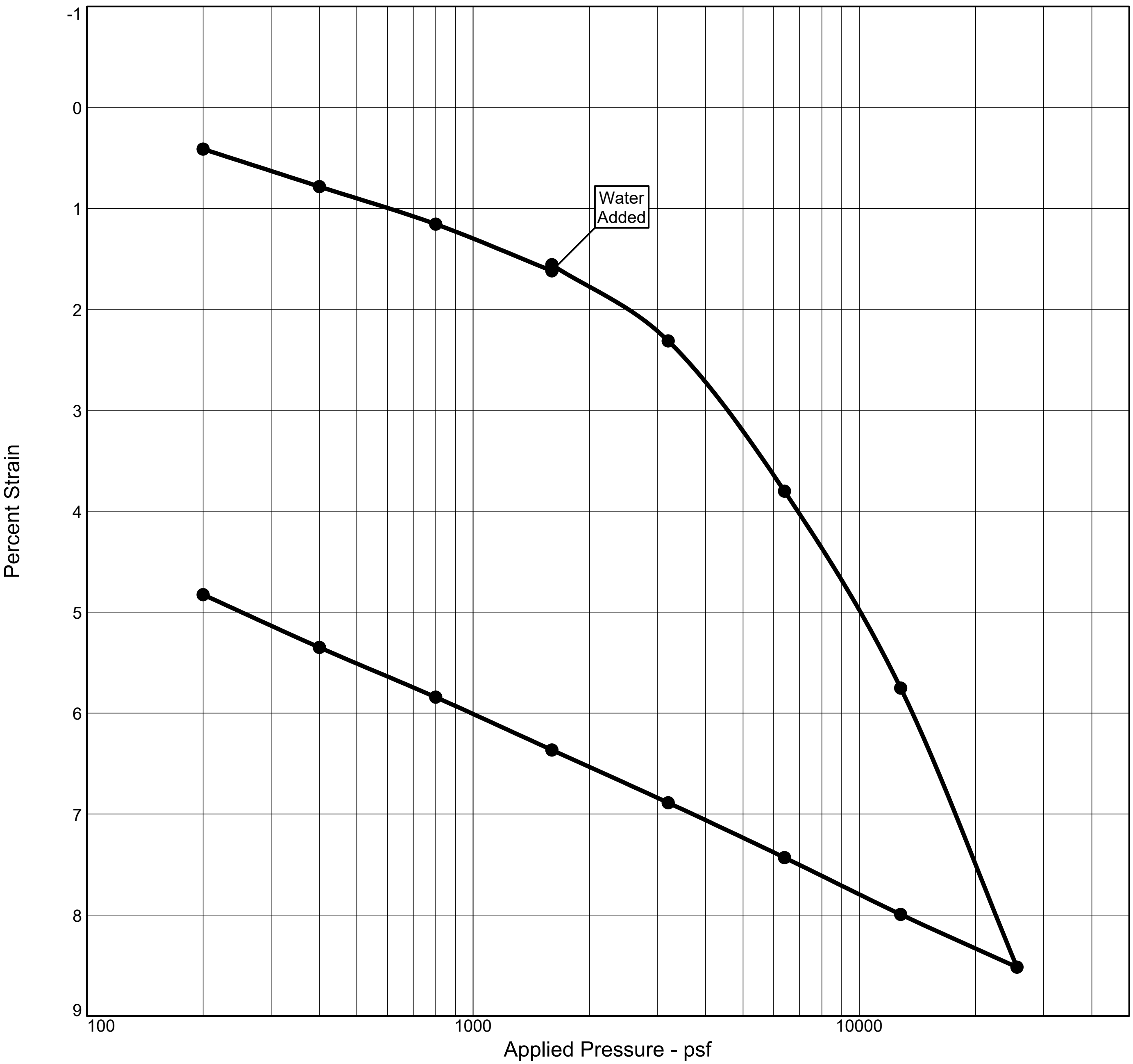
Koury Engineering & Testing, Inc.

Chino, CA

Figure

Tested By: Mathew F. Perry **Checked By:** ____________

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Swell %	e_o
Sat.	Moist.											
76.7 %	22.7 %	93.6			2.7		3655	0.10	0.03	95	0.1	0.800

MATERIAL DESCRIPTION	USCS	AASHTO
Light Olive Brown Silty Clay with Gravel		

Project No. 16-0899 **Client:**

Project: OC Prado

Location: B1 @ 6' **Sample Number:** 4458 Series

Koury Engineering & Testing, Inc.

Chino, CA

Remarks:
Lab #4458 Series.

Figure

Tested By: Mathew F. Perry **Checked By:**

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	B13 @ 0' - 4'		TP59 @ 3.5' - 4'		B11 @ 0' - 4'		TP32 @ 3.8' - 4.3'	
USCS Symbol	CL		CL		CL		CL	
Normal Load (psf)	144		144		144		144	
SAMPLE CONDITION	Initial	Final	Initial	Final	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	739.170		717.130		750.900		739.930	
Wt. of ring (gr)	367.46		364.15		366.62		367.49	
Wt. Specimen (gr)	371.710		352.980		384.280		372.440	
Specimen diameter (in)	4.010		4.010		4.010		4.010	
Specimen radius (cm)	5.09		5.09		5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479		81.479		81.479	
Init. Spec. height (in)	1.0025	N/A	0.9995	N/A	1.0005	N/A	1.0025	N/A
Height change (final)(in)	N/A	0.0467	N/A	0.0875	N/A	0.0516	N/A	0.0610
Adjusted Spec.height(in)	1.00	0.9558	1.00	0.9120	1.00	0.9489	1.00	0.9415
" " (cm)	2.546	2.428	2.539	2.316	2.541	2.410	2.546	2.391
Specimen Volume (cm^3)	207.475		206.854		207.061		207.475	
Moist Density (pcf)	111.85		106.53		115.86		112.07	
MOISTURE CONTENT								
Wt. moist soil+tare(gr)	124.55	124.55	126.16	126.16	388.88	388.88	342.36	342.36
Wt. dry soil+tare(gr)	113.05	113.05	111.08	111.08	370.92	370.92	330.03	330.03
Wt. of tare(gr)	19.64	19.64	17.33	17.33	225.18	225.18	236.00	236.00
Wt. dry soil (gr)	93.41	93.41	93.75	93.75	145.74	145.74	94.03	94.03
Wt. of water (gr)	11.50	11.50	15.08	15.08	17.96	17.96	12.33	12.33
M/C (%)	12.31	12.31	16.09	16.09	12.32	12.32	13.11	13.11
DRY DENSITY (pcf)	99.6		91.8		103.2		99.1	
% Saturation* (48%-52%)	48.0		51.9		52.5		50.5	
*Assumes Gs =	2.7		2.7		2.7		2.7	
EXPANSION INDEX =	47		88		52		61	
Potential Expansion (per ASTM 4829-08)	Low		Medium		Medium		Medium	

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado - Construction Level	Project No.: 18-0817	Run by: MFP	Lab:
		Date: 9/12/18	QA:	5283

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP71 @ 2.5' - 3'		TP33 @ 2.5' - 3'	
USCS Symbol	CL		CL	
Normal Load (psf)	144		144	
SAMPLE CONDITION	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	751.350		730.990	
Wt. of ring (gr)	366.60		367.49	
Wt. Specimen (gr)	384.750		363.500	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479	
Init. Spec. height (in)	1.0005	N/A	1.0025	N/A
Height change (final)(in)	N/A	0.0450	N/A	0.0628
Adjusted Spec.height(in)	1.00	0.9555	1.00	0.9397
" " (cm)	2.541	2.427	2.546	2.387
Specimen Volume (cm^3)	207.061		207.475	
Moist Density (pcf)	116.00		109.38	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	146.14	146.14	133.08	133.08
Wt. dry soil+tare(gr)	131.70	131.70	117.55	117.55
Wt. of tare(gr)	0.00	0.00	0.00	0.00
Wt. dry soil (gr)	131.70	131.70	117.55	117.55
Wt. of water (gr)	14.44	14.44	15.53	15.53
M/C (%)	10.96	10.96	13.21	13.21
DRY DENSITY (pcf)	104.5		96.6	
% Saturation* (48%-52%)	48.3		47.9	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	45		63	
Potential Expansion (per ASTM 4829-08)	Low		Medium	

KOURY ENGINEERING & TESTING, INC.

Project Name: OC Prado - Construction Level	Project No.: 18-0817	Run by: SA	Lab:
	Date: 9/17/18	QA:	5294

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP27 @ 3.5' - 4.2'	
USCS Symbol	CH	
Normal Load (psf)	144	
SAMPLE CONDITION	**Initial**	**Final**
Wt Specimen & Ring (gr)	731.670	
Wt. of ring (gr)	364.15	
Wt. Specimen (gr)	367.520	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	0.9995	N/A
Height change (final)(in)	N/A	0.1435
Adjusted Spec.height(in)	1.00	0.8560
" " (cm)	2.539	2.174
Specimen Volume (cm^3)	206.854	
Moist Density (pcf)	110.92	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	149.13	149.19
Wt. dry soil+tare(gr)	132.49	132.49
Wt. of tare(gr)	0.00	0.00
Wt. dry soil (gr)	132.49	132.49
Wt. of water (gr)	16.64	16.70
M/C (%)	12.56	12.60
DRY DENSITY (pcf)	98.5	
% Saturation* (48%-52%)	47.7	

*Assumes Gs = 2.7

EXPANSION INDEX = 144

Potential Expansion *(per ASTM 4829-08)* Very High

KOURY ENGINEERING & TESTING, INC.	**Project Name:** OC Prado	**Project No.: 18-0817** **Date: 9/18/18**	**Run by: SA** **QA:**	**Lab:** **5300**

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP26 @ 4.2' - 4.9'		TP30 @ 3' - 3.5'		TP22 @ 4' - 4.8'	
USCS Symbol	CL		CL		CL	
Normal Load (psf)	144		144		144	
SAMPLE CONDITION	**Initial**	**Final**	**Initial**	**Final**	**Initial**	**Final**
Wt Specimen & Ring (gr)	715.780		752.220		737.200	
Wt. of ring (gr)	366.60		367.44		364.14	
Wt. Specimen (gr)	349.180		384.780		373.060	
Specimen diameter (in)	4.010		4.010		4.010	
Specimen radius (cm)	5.09		5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479		81.479	
Init. Spec. height (in)	1.0005	N/A	1.0025	N/A	0.9995	N/A
Height change (final)(in)	N/A	0.0744	N/A	0.0483	N/A	0.0620
Adjusted Spec.height(in)	1.00	0.9261	1.00	0.9542	1.00	0.9375
" " (cm)	2.541	2.352	2.546	2.424	2.539	2.381
Specimen Volume (cm^3)	207.061		207.475		206.854	
Moist Density (pcf)	105.28		115.78		112.59	
MOISTURE CONTENT						
Wt. moist soil+tare(gr)	136.32	136.32	126.77	126.77	135.36	135.36
Wt. dry soil+tare(gr)	117.67	117.67	112.79	112.79	119.12	119.12
Wt. of tare(gr)	0.00	0.00	0.00	0.00	0.00	0.00
Wt. dry soil (gr)	117.67	117.67	112.79	112.79	119.12	119.12
Wt. of water (gr)	18.65	18.65	13.98	13.98	16.24	16.24
M/C (%)	15.85	15.85	12.39	12.39	13.63	13.63
DRY DENSITY (pcf)	90.9		103.0		99.1	
% Saturation* (48%-52%)	50.1		52.6		52.5	
*Assumes Gs =	2.7		2.7		2.7	
EXPANSION INDEX =	74		48		62	
Potential Expansion *(per ASTM 4829-08)*	Medium		Low		Medium	

KOURY ENGINEERING & TESTING, INC.

Project Name: OC Prado - Construction Level	**Project No.: 18-0817**	**Run by: SA**	**Lab:**
	Date: 9/19/18	**QA:**	**5304**

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP40 @ 3' - 3.8"		TP22 @ 3' - 3.8'	
USCS Symbol	CH		CH	
Normal Load (psf)	144		144	
SAMPLE CONDITION	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	756.190		731.400	
Wt. of ring (gr)	366.59		364.11	
Wt. Specimen (gr)	389.600		367.290	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479	
Init. Spec. height (in)	1.0005	N/A	0.9995	N/A
Height change (final)(in)	N/A	0.1624	N/A	0.1263
Adjusted Spec.height(in)	1.0005	0.8381	0.9995	0.8732
" " (cm)	2.541	2.129	2.539	2.218
Specimen Volume (cm^3)	207.061		206.854	
Moist Density (pcf)	117.47		110.85	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	133.29	133.29	121.12	121.12
Wt. dry soil+tare(gr)	119.39	119.39	107.54	107.54
Wt. of tare(gr)	0.00	0.00	0.00	0.00
Wt. dry soil (gr)	119.39	119.39	107.54	107.54
Wt. of water (gr)	13.90	13.90	13.58	13.58
M/C (%)	11.64	11.64	12.63	12.63
DRY DENSITY (pcf)	105.2		98.4	
% Saturation* (48%-52%)	52.2		47.8	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	162		126	
Potential Expansion *(per ASTM 4829-08)*	Very High		High	

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado - Construction Level	Project No.: 18-0817	Run by: SA	Lab:
		Date: 9/21/18	QA:	5312

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP70 @ 2.5' - 3.5'	
USCS Symbol	CL	
Normal Load (psf)	144	
SAMPLE CONDITION	Initial	Final
Wt Specimen & Ring (gr)	741.660	
Wt. of ring (gr)	367.45	
Wt. Specimen (gr)	374.210	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	1.0025	N/A
Height change (final)(in)	N/A	0.1599
Adjusted Spec.height(in)	1.00	0.8426
" " (cm)	2.546	2.140
Specimen Volume (cm^3)	207.475	
Moist Density (pcf)	112.60	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	120.26	120.26
Wt. dry soil+tare(gr)	107.55	107.55
Wt. of tare(gr)	0.00	0.00
Wt. dry soil (gr)	107.55	107.55
Wt. of water (gr)	12.71	12.71
M/C (%)	11.82	11.82
DRY DENSITY (pcf)	100.7	
% Saturation* (48%-52%)	47.3	

*Assumes Gs = 2.7

EXPANSION INDEX = 160

Potential Expansion *(per ASTM 4829-08)* Very High

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado - Construction Level	Project No.: 18-0817 Date: 9/22/18	Run by: SA QA:	Lab: 5316

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	B25 @ 2' - 4'		TP26 @ Surface	
USCS Symbol	CL		CL / SC	
Normal Load (psf)	144		144	
SAMPLE CONDITION	**Initial**	**Final**	**Initial**	**Final**
Wt Specimen & Ring (gr)	735.110		686.320	
Wt. of ring (gr)	364.12		367.45	
Wt. Specimen (gr)	370.990		318.870	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm²)	81.479		81.479	
Init. Spec. height (in)	0.9995	N/A	1.0025	N/A
Height change (final)(in)	N/A	0.0783	N/A	0.0200
Adjusted Spec.height(in)	1.00	0.9212	1.00	0.9825
" " (cm)	2.539	2.340	2.546	2.496
Specimen Volume (cm³)	206.854		207.475	
Moist Density (pcf)	111.97		95.95	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	109.32	109.32	110.27	110.27
Wt. dry soil+tare(gr)	98.35	98.35	89.96	89.96
Wt. of tare(gr)	19.67	19.67	0.00	0.00
Wt. dry soil (gr)	78.68	78.68	89.96	89.96
Wt. of water (gr)	10.97	10.97	20.31	20.31
M/C (%)	13.94	13.94	22.58	22.58
DRY DENSITY (pcf)	98.3		78.3	
% Saturation* (48%-52%)	52.6		52.9	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	78		20	
Potential Expansion *(per ASTM 4829-08)*	Medium		Very Low	

KOURY ENGINEERING & TESTING, INC.

Project Name: OC Prado Construction Level	**Project No.: 18-0817**	**Run by: SA**	**Lab:**
	Date: 9/26/18	**QA:**	**5322**

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP55 @ 2' - 4'	
USCS Symbol	CH	
Normal Load (psf)	144	
SAMPLE CONDITION	Initial	Final
Wt Specimen & Ring (gr)	744.870	
Wt. of ring (gr)	366.59	
Wt. Specimen (gr)	378.280	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	1.0005	N/A
Height change (final)(in)	N/A	0.1114
Adjusted Spec.height(in)	1.00	0.8891
" " (cm)	2.541	2.258
Specimen Volume (cm^3)	207.061	
Moist Density (pcf)	114.05	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	117.15	117.15
Wt. dry soil+tare(gr)	105.12	105.12
Wt. of tare(gr)	0.00	0.00
Wt. dry soil (gr)	105.12	105.12
Wt. of water (gr)	12.03	12.03
M/C (%)	11.44	11.44
DRY DENSITY (pcf)	102.3	
% Saturation* (48%-52%)	47.8	

*Assumes Gs = 2.7

EXPANSION INDEX = 111

Potential Expansion *(per ASTM 4829-08)* High

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado - Construction Level	Project No.: 18-0817 Date: 9/27/18	Run by: SA QA:	Lab: 5325

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP23 @ 1.5' - 2.2'			TP28 @ 3' - 3.8'	
USCS Symbol	CL / CH			CL	
Normal Load (psf)	144			144	
SAMPLE CONDITION	**Initial**	**Final**		**Initial**	**Final**
Wt Specimen & Ring (gr)	726.770			756.580	
Wt. of ring (gr)	367.47			364.13	
Wt. Specimen (gr)	359.300			392.450	
Specimen diameter (in)	4.010			4.010	
Specimen radius (cm)	5.09			5.09	
Area of Specimen (cm^2)	81.479			81.479	
Init. Spec. height (in)	1.0025	N/A		0.9995	N/A
Height change (final)(in)	N/A	0.0968		N/A	0.0805
Adjusted Spec.height(in)	1.0025	0.9057		1.00	0.9190
" " (cm)	2.546	2.300		2.539	2.334
Specimen Volume (cm^3)	207.475			206.854	
Moist Density (pcf)	108.11			118.44	
MOISTURE CONTENT					
Wt. moist soil+tare(gr)	101.09	101.90		110.56	110.56
Wt. dry soil+tare(gr)	89.21	89.21		97.98	97.98
Wt. of tare(gr)	0.00	0.00		0.00	0.00
Wt. dry soil (gr)	89.21	89.21		97.98	97.98
Wt. of water (gr)	11.88	12.69		12.58	12.58
M/C (%)	13.32	14.22		12.84	12.84
DRY DENSITY (pcf)	95.4			105.0	
% Saturation* (48%-52%)	46.9			57.2	
*Assumes Gs =	2.7			2.7	
EXPANSION INDEX =	97			81	
Potential Expansion *(per ASTM 4829-08)*	High			Medium	

KOURY ENGINEERING & TESTING, INC.	**Project Name:** OC Prado - Construction Level	**Project No.: 18-0817**	**Run by: SA**	**Lab:**
		Date: 9/28/18	**QA:**	5328

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	B24 @ 2' - 4'	
USCS Symbol	CH	
Normal Load (psf)	144	
SAMPLE CONDITION	Initial	Final
Wt Specimen & Ring (gr)	760.600	
Wt. of ring (gr)	366.62	
Wt. Specimen (gr)	393.980	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	1.0020	N/A
Height change (final)(in)	N/A	0.0965
Adjusted Spec.height(in)	1.00	0.9055
" " (cm)	2.545	2.300
Specimen Volume (cm^3)	207.371	
Moist Density (pcf)	118.61	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	11.38	11.38
Wt. dry soil+tare(gr)	10.22	10.22
Wt. of tare(gr)	0.00	0.00
Wt. dry soil (gr)	10.22	10.22
Wt. of water (gr)	1.16	1.16
M/C (%)	11.35	11.35
DRY DENSITY (pcf)	106.5	
% Saturation* (48%-52%)	52.6	

*Assumes Gs = 2.7

EXPANSION INDEX = 96

Potential Expansion (per ASTM 4829-08) High

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado - Construction Level	Project No.: 18-0817 Date: 10/3/18	Run by: CG QA:	Lab: 5331 Retest

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP31 @ 3.8' - 4.2'	
USCS Symbol	CL / CH	
Normal Load (psf)	144	
SAMPLE CONDITION	Initial	Final
Wt Specimen & Ring (gr)	750.670	
Wt. of ring (gr)	367.47	
Wt. Specimen (gr)	383.200	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	1.0025	N/A
Height change (final)(in)	N/A	0.0866
Adjusted Spec.height(in)	1.00	0.9159
" " (cm)	2.546	2.326
Specimen Volume (cm^3)	207.475	
Moist Density (pcf)	115.31	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	103.19	103.19
Wt. dry soil+tare(gr)	92.26	92.26
Wt. of tare(gr)	0.00	0.00
Wt. dry soil (gr)	92.26	92.26
Wt. of water (gr)	10.93	10.93
M/C (%)	11.85	11.85
DRY DENSITY (pcf)	103.1	
% Saturation* (48%-52%)	50.4	

*Assumes Gs = 2.7

EXPANSION INDEX = 86

Potential Expansion *(per ASTM 4829-08)* Medium

KOURY ENGINEERING & TESTING, INC.	**Project Name:** OC Prado - Construction Level	**Project No.: 18-0817**	**Run by: CG**	**Lab:**
		Date: 10/3/18	**QA:**	5337

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP42 @ 2.7' - 3.2'		TP 37 @ 3' - 3.5'	
USCS Symbol	CL		CH	
Normal Load (psf)	144		144	
SAMPLE CONDITION	**Initial**	**Final**	**Initial**	**Final**
Wt Specimen & Ring (gr)	754.350		716.200	
Wt. of ring (gr)	364.16		367.44	
Wt. Specimen (gr)	390.190		348.760	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479	
Init. Spec. height (in)	0.9990	N/A	1.0025	N/A
Height change (final)(in)	N/A	0.0619	N/A	0.1049
Adjusted Spec.height(in)	1.00	0.9371	1.00	0.8976
" " (cm)	2.537	2.380	2.546	2.280
Specimen Volume (cm^3)	206.750		207.475	
Moist Density (pcf)	117.82		104.94	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	100.65	100.65	102.16	102.16
Wt. dry soil+tare(gr)	91.33	91.33	88.75	88.75
Wt. of tare(gr)	0.00	0.00	0.00	0.00
Wt. dry soil (gr)	91.33	91.33	88.75	88.75
Wt. of water (gr)	9.32	9.32	13.41	13.41
M/C (%)	10.20	10.20	15.11	15.11
DRY DENSITY (pcf)	106.9		91.2	
% Saturation* (48%-52%)	47.8		48.1	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	62		105	
Potential Expansion *(per ASTM 4829-08)*	Medium		High	

KOURY ENGINEERING & TESTING, INC.	**Project Name:** OC Prado - Construction Level	**Project No.: 18-0817** **Date: 10/4/18**	**Run by: CG** **QA:**	**Lab:** **5338**

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP 44 @ 3' - 3.5'		TP 48 @ 1.8' - 2.3'	
USCS Symbol	CL		CL	
Normal Load (psf)	144		144	
SAMPLE CONDITION	**Initial**	**Final**	**Initial**	**Final**
Wt Specimen & Ring (gr)	750.950		750.020	
Wt. of ring (gr)	366.63		364.11	
Wt. Specimen (gr)	384.320		385.910	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479	
Init. Spec. height (in)	1.0020	N/A	0.9990	N/A
Height change (final)(in)	N/A	0.0570	N/A	0.0636
Adjusted Spec.height(in)	1.00	0.9450	1.00	0.9354
" " (cm)	2.545	2.400	2.537	2.376
Specimen Volume (cm^3)	207.371		206.750	
Moist Density (pcf)	115.70		116.53	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	101.23	101.23	101.31	101.31
Wt. dry soil+tare(gr)	90.69	90.69	90.67	90.67
Wt. of tare(gr)	0.00	0.00	0.00	0.00
Wt. dry soil (gr)	90.69	90.69	90.67	90.67
Wt. of water (gr)	10.54	10.54	10.64	10.64
M/C (%)	11.62	11.62	11.73	11.73
DRY DENSITY (pcf)	103.7		104.3	
% Saturation* (48%-52%)	50.1		51.4	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	57		64	
Potential Expansion *(per ASTM 4829-08)*	Medium		Medium	

KOURY ENGINEERING & TESTING, INC.

Project Name: OC Prado - Construction Level	**Project No.: 18-0817**	**Run by: CG**	**Lab:**
	Date: 10/5/18	**QA:**	**5341**

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP 53 @ 3' - 3.5'		TP 50 @ 2' - 2.5'	
USCS Symbol	CL		CL	
Normal Load (psf)	144		144	
SAMPLE CONDITION	**Initial**	**Final**	**Initial**	**Final**
Wt Specimen & Ring (gr)	702.460		744.770	
Wt. of ring (gr)	367.41		366.58	
Wt. Specimen (gr)	335.050		378.190	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479	
Init. Spec. height (in)	1.0025	N/A	1.0020	N/A
Height change (final)(in)	N/A	0.0506	N/A	0.0710
Adjusted Spec.height(in)	1.00	0.9519	1.00	0.9310
" " (cm)	2.546	2.418	2.545	2.365
Specimen Volume (cm^3)	207.475		207.371	
Moist Density (pcf)	100.82		113.86	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	102.01	102.01	102.71	102.71
Wt. dry soil+tare(gr)	86.55	86.55	91.41	91.41
Wt. of tare(gr)	0.00	0.00	0.00	0.00
Wt. dry soil (gr)	86.55	86.55	91.41	91.41
Wt. of water (gr)	15.46	15.46	11.30	11.30
M/C (%)	17.86	17.86	12.36	12.36
DRY DENSITY (pcf)	85.5		101.3	
% Saturation* (48%-52%)	49.7		50.3	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	50		71	
Potential Expansion *(per ASTM 4829-08)*	Medium		Medium	

KOURY ENGINEERING & TESTING, INC.

Project Name: OC Prado - Construction Level	**Project No.: 18-0817**	**Run by: SA**	**Lab:**
	Date: 10/10/18	**QA:**	**5346**

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP 60 @ 2' - 2.5'		TP 58 @ 3' - 3.5'	
USCS Symbol	CH		CL	
Normal Load (psf)	144		144	
SAMPLE CONDITION	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	707.870		748.270	
Wt. of ring (gr)	366.59		364.11	
Wt. Specimen (gr)	341.280		384.160	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479	
Init. Spec. height (in)	1.0020	N/A	0.9990	N/A
Height change (final)(in)	N/A	0.1021	N/A	0.0594
Adjusted Spec.height(in)	1.00	0.8999	1.00	0.9396
" " (cm)	2.545	2.286	2.537	2.387
Specimen Volume (cm^3)	207.371		206.750	
Moist Density (pcf)	102.74		116.00	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	101.15	101.15	104.12	104.12
Wt. dry soil+tare(gr)	86.71	86.71	92.64	92.64
Wt. of tare(gr)	0.00	0.00	0.00	0.00
Wt. dry soil (gr)	86.71	86.71	92.64	92.64
Wt. of water (gr)	14.44	14.44	11.48	11.48
M/C (%)	16.65	16.65	12.39	12.39
DRY DENSITY (pcf)	88.1		103.2	
% Saturation* (48%-52%)	49.2		52.8	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	102		59	
Potential Expansion *(per ASTM 4829-08)*	High		Medium	

KOURY ENGINEERING & TESTING, INC.

Project Name: OC Prado - Construction Level	Project No.: 18-0817	Run by: CG	Lab:
	Date: 10/11/18	QA:	5347

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP 65 @ 6' - 6.5'	
USCS Symbol	CL / CH	
Normal Load (psf)	144	
SAMPLE CONDITION	**Initial**	**Final**
Wt Specimen & Ring (gr)	718.690	
Wt. of ring (gr)	367.42	
Wt. Specimen (gr)	351.270	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	1.0010	N/A
Height change (final)(in)	N/A	0.0994
Adjusted Spec.height(in)	1.00	0.9016
" " (cm)	2.543	2.290
Specimen Volume (cm^3)	207.164	
Moist Density (pcf)	105.86	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	102.13	102.13
Wt. dry soil+tare(gr)	87.81	87.81
Wt. of tare(gr)	0.00	0.00
Wt. dry soil (gr)	87.81	87.81
Wt. of water (gr)	14.32	14.32
M/C (%)	16.31	16.31
DRY DENSITY (pcf)	91.0	
% Saturation* (48%-52%)	51.7	

*Assumes Gs =	2.7
EXPANSION INDEX =	99
Potential Expansion *(per ASTM 4829-08)*	High

KOURY ENGINEERING & TESTING, INC.	**Project Name:** OC Prado - Construction Level	**Project No.: 18-0817**	**Run by: CG**
		Date: 9/1/18	**QA:**
			Lab: 5351

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP-1 @ 6' - 7'		TP-3 @ 5' - 6'		TP-17 @ 2' - 3.5'	
USCS Symbol	CL/CH		CL/CH		CL/CH	
Normal Load (psf)	144		144		144	
SAMPLE CONDITION	**Initial**	**Final**	**Initial**	**Final**	**Initial**	**Final**
Wt Specimen & Ring (gr)	697.240		749.180		724.600	
Wt. of ring (gr)	364.23		367.53		366.70	
Wt. Specimen (gr)	333.010		381.650		357.900	
Specimen diameter (in)	4.010		4.010		4.010	
Specimen radius (cm)	5.09		5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479		81.479	
Init. Spec. height (in)	0.9980	N/A	1.0035	N/A	0.9965	N/A
Height change (final)(in)	N/A	0.0775	N/A	0.0619	N/A	0.0961
Adjusted Spec.height(in)	1.00	0.9205	1.00	0.9416	1.00	0.9004
" " (cm)	2.535	2.338	2.549	2.392	2.531	2.287
Specimen Volume (cm^3)	206.543		207.682		206.233	
Moist Density (pcf)	100.66		114.73		108.34	
MOISTURE CONTENT						
Wt. moist soil+tare(gr)	288.16	288.16	286.85	286.85	205.10	205.10
Wt. dry soil+tare(gr)	243.53	243.53	254.11	254.11	179.40	179.40
Wt. of tare(gr)	0.00	0.00	0.00	0.00	0.00	0.00
Wt. dry soil (gr)	243.53	243.53	254.11	254.11	179.40	179.40
Wt. of water (gr)	44.63	44.63	32.74	32.74	25.70	25.70
M/C (%)	18.33	18.33	12.88	12.88	14.33	14.33
DRY DENSITY (pcf)	85.1		101.6		94.8	
% Saturation* (48%-52%)	50.4		52.8		49.7	
*Assumes Gs =	2.7		2.7		2.7	
EXPANSION INDEX =	78		62		96	
Potential Expansion *(per ASTM 4829-08)*	Medium		Medium		High	

KOURY ENGINEERING & TESTING, INC.	**Project Name:** **OC Prado**	**Project No.: 16-0899** **Date: 7/14/17**	**Run by: SN/MFP** **QA:**	**Lab:** **4458 Series**

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP-5 @ 1.5' - 2'		TP-7 @ 7' - 8'	
USCS Symbol	CL		CH	
Normal Load (psf)	144		144	
SAMPLE CONDITION	**Initial**	**Final**	**Initial**	**Final**
Wt Specimen & Ring (gr)	734.400		735.970	
Wt. of ring (gr)	364.22		366.68	
Wt. Specimen (gr)	370.180		369.290	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479	
Init. Spec. height (in)	0.9960	N/A	0.9995	N/A
Height change (final)(in)	N/A	0.0502	N/A	0.0591
Adjusted Spec.height(in)	1.00	0.9458	1.00	0.9404
" " (cm)	2.530	2.402	2.539	2.389
Specimen Volume (cm^3)	206.129		206.854	
Moist Density (pcf)	112.12		111.45	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	286.42	286.42	426.87	426.87
Wt. dry soil+tare(gr)	267.49	267.49	401.97	401.97
Wt. of tare(gr)	114.53	114.53	226.08	226.08
Wt. dry soil (gr)	152.96	152.96	175.89	175.89
Wt. of water (gr)	18.93	18.93	24.90	24.90
M/C (%)	12.38	12.38	14.16	14.16
DRY DENSITY (pcf)	99.8		97.6	
% Saturation* (48%-52%)	48.5		52.6	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	50		59	
Potential Expansion *(per ASTM 4829-08)*	Medium		Medium	

KOURY ENGINEERING & TESTING, INC.	**Project Name:** OC Prado	**Project No.: 16-0899** **Date: 6/7/17**	**Run by: MFP** **QA:**	**Lab:** **4458 Series**

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP-8 @ 12' - 13'	
USCS Symbol	CH	
Normal Load (psf)	144	
SAMPLE CONDITION	Initial	Final
Wt Specimen & Ring (gr)	725.110	
Wt. of ring (gr)	367.54	
Wt. Specimen (gr)	357.570	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	1.0010	N/A
Height change (final)(in)	N/A	0.0901
Adjusted Spec.height(in)	1.00	0.9109
" " (cm)	2.543	2.314
Specimen Volume (cm^3)	207.164	
Moist Density (pcf)	107.76	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	329.02	329.02
Wt. dry soil+tare(gr)	315.31	315.31
Wt. of tare(gr)	226.12	226.12
Wt. dry soil (gr)	89.19	89.19
Wt. of water (gr)	13.71	13.71
M/C (%)	15.37	15.37
DRY DENSITY (pcf)	93.4	
% Saturation* (48%-52%)	51.6	

*Assumes Gs = 2.7

EXPANSION INDEX = 90

Potential Expansion *(per ASTM 4829-08)* High

KOURY ENGINEERING & TESTING, INC.	**Project Name:** **OC Prado**	**Project No.: 16-0899** **Date: 6/1/17**	**Run by: MFP** **QA:**	**Lab:** **4458 Series**

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP-15 @ 3' - 4'		TP-14 @ .5' - 1.5'	
USCS Symbol	CL/CH		CL/CH	
Normal Load (psf)	144		144	
SAMPLE CONDITION	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	711.000		719.000	
Wt. of ring (gr)	367.00		364.00	
Wt. Specimen (gr)	344.000		355.000	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479	
Init. Spec. height (in)	1.0010	N/A	0.9990	N/A
Height change (final)(in)	N/A	0.0460	N/A	0.0787
Adjusted Spec.height(in)	1.00	0.9550	1.00	0.9203
" " (cm)	2.543	2.426	2.537	2.338
Specimen Volume (cm^3)	207.164		206.750	
Moist Density (pcf)	103.67		107.20	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	202.00	202.00	200.00	200.00
Wt. dry soil+tare(gr)	159.00	159.00	166.00	166.00
Wt. of tare(gr)	0.00	0.00	0.00	0.00
Wt. dry soil (gr)	159.00	159.00	166.00	166.00
Wt. of water (gr)	43.00	43.00	34.00	34.00
M/C (%)	27.04	27.04	20.48	20.48
DRY DENSITY (pcf)	81.6		89.0	
% Saturation* (48%-52%)	68.5		61.8	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	60		89	
Potential Expansion *(per ASTM 4829-08)*	Medium		Medium	

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado	Project No.: 16-0899	Run by: MFP	Lab:
		Date: 7/17/17	QA:	4458 Series

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP-19 @ 1' - 2'	
USCS Symbol	SC	
Normal Load (psf)	144	
SAMPLE CONDITION	Initial	Final
Wt Specimen & Ring (gr)	765.800	
Wt. of ring (gr)	364.24	
Wt. Specimen (gr)	401.560	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	1.0020	N/A
Height change (final)(in)	N/A	0.0245
Adjusted Spec.height(in)	1.00	0.9775
" " (cm)	2.545	2.483
Specimen Volume (cm^3)	207.371	
Moist Density (pcf)	120.89	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	422.90	422.90
Wt. dry soil+tare(gr)	406.29	406.29
Wt. of tare(gr)	229.33	229.33
Wt. dry soil (gr)	176.96	176.96
Wt. of water (gr)	16.61	16.61
M/C (%)	9.39	9.39
DRY DENSITY (pcf)	110.5	
% Saturation* (48%-52%)	48.3	

*Assumes Gs =	2.7
EXPANSION INDEX =	24
Potential Expansion *(per ASTM 4829-08)*	Low

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado	Project No.: 16-0889 Date: 6/14/17	Run by: MFP QA:	Lab: 4458 Series

Maximum Density & Optimum Moisture

Curve No.: 5326

Project No.: 18-0817 **Date:** 9/27/18

Project: OC Prado - Construction Level

Client:

Location: TP40 @ 3' - 3.8'

Sample Number: 2018-249

Remarks: Less than 5% Material retained on the #4 Sieve.

MATERIAL DESCRIPTION

Description: Observed as: Dark Yellowish Brown Clay

Classifications - **USCS:** Observed as: CH **AASHTO:**

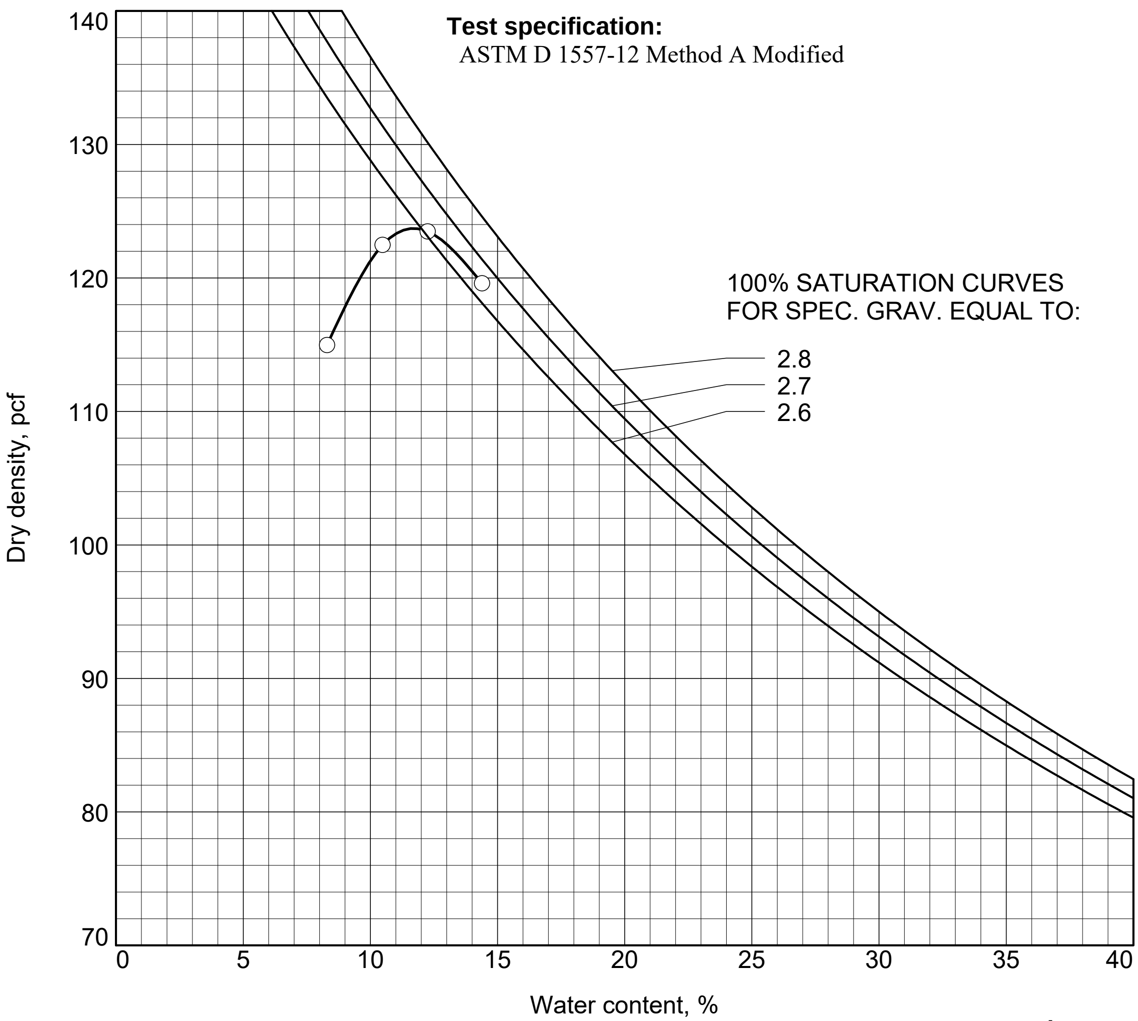
Nat. Moist. = **Sp.G. =**

Liquid Limit = **Plasticity Index =**

% < No.200 =

TEST RESULTS
Maximum dry density = 123.7 pcf
Optimum moisture = 11.7 %

Test specification:
ASTM D 1557-12 Method A Modified



These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Figure

Koury Engineering & Testing, Inc.

Tested By: Carlos Garcia **Checked By:**

MAXIMUM DENSITY TEST REPORT

Curve No.: 4458 Series

Project No.: 16-0899 **Date:** 06/01/17

Project: OC Prado

Client:

Location: TP-10 @ 1.5'-2.5'

Depth: 1.5'to 2.5'

Remarks: Less Than 5% Material Retained on the #4 Sieve

MATERIAL DESCRIPTION

Description: Observed as: Dark Brown Sandy Lean Clay

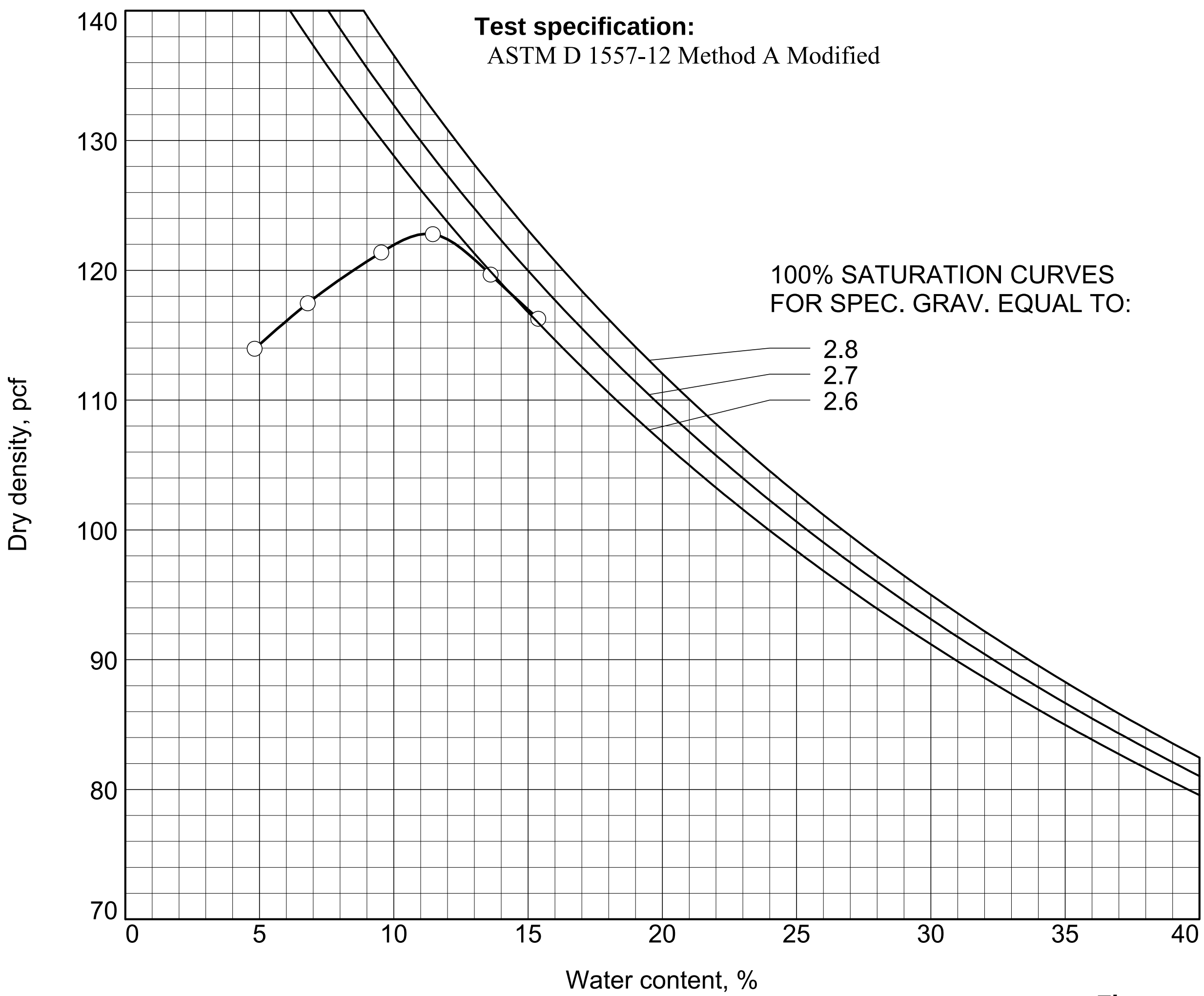
Classifications - **USCS:** CL **AASHTO:**

Nat. Moist. = 17.2 % **Sp.G. =**

Liquid Limit = **Plasticity Index =**

% < No.200 = 73.8 %

TEST RESULTS
Maximum dry density = 122.8 pcf
Optimum moisture = 11.2 %



Figure

Koury Engineering & Testing, Inc.

Tested By: ABB **Checked By:**

MAXIMUM DENSITY TEST REPORT

Curve No.: 4458 Series

Project No.: 16-0899 **Date:** 6/7/17

Project: OC Prado

Client:

Location: TP-7 @ 7' to 8'

Sample Number: 4458 Series

Remarks: Less than 5% Material retained on the #4 Sieve. (1.9% retained)

MATERIAL DESCRIPTION

Description:

Classifications - **USCS:** **AASHTO:**

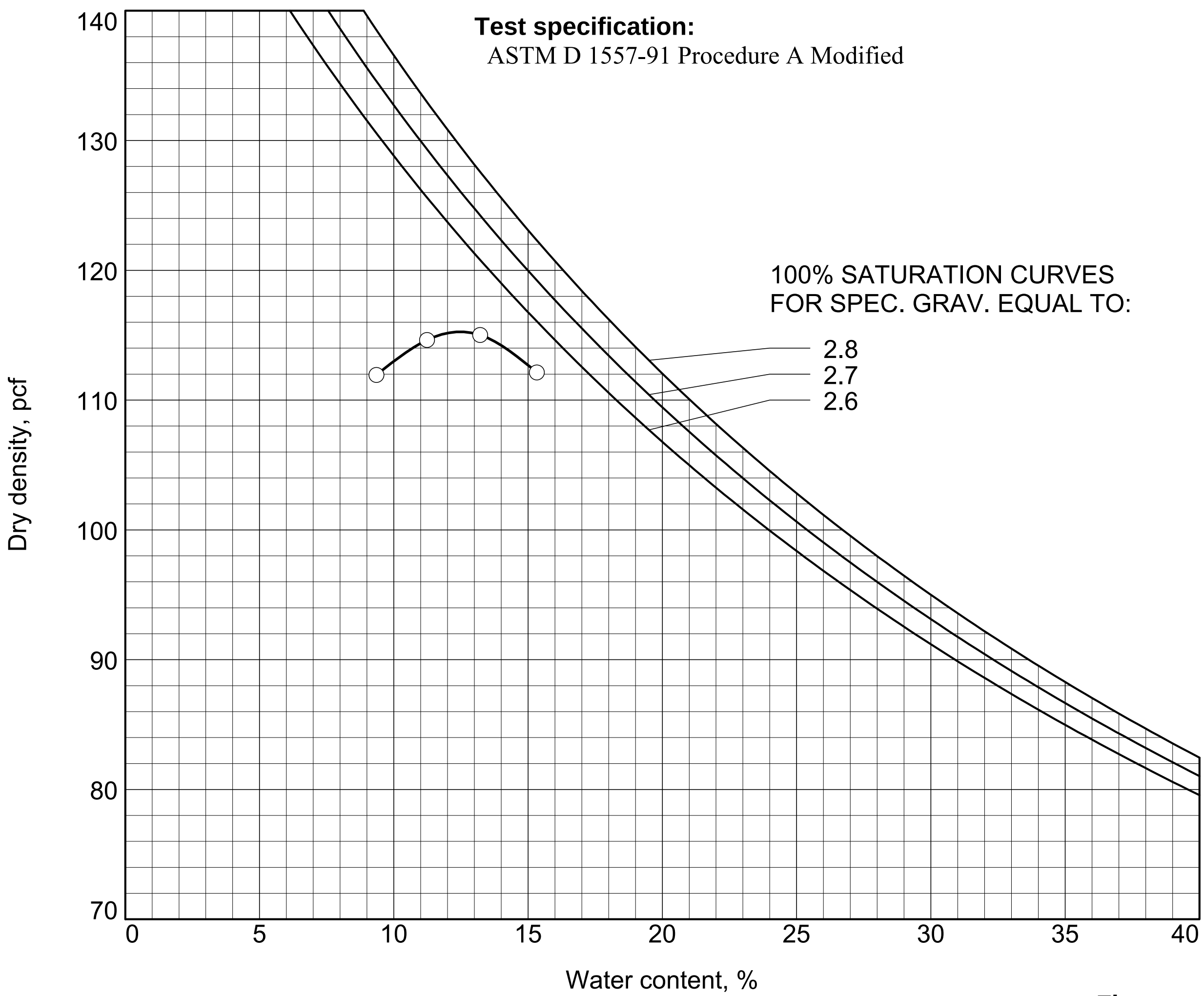
Nat. Moist. = **Sp.G. =**

Liquid Limit = **Plasticity Index =**

% < No.200 =

TEST RESULTS
Maximum dry density = 115.3 pcf
Optimum moisture = 12.5 %

Test specification:
ASTM D 1557-91 Procedure A Modified



Figure

Koury Engineering & Testing, Inc.

Tested By: ABB **Checked By:**

MAXIMUM DENSITY TEST REPORT

Curve No.: 4458 Series

Project No.: 16-0899 **Date:** 06/01/17

Project: OC Prado

Client:

Location: TP-8 @ 12' - 13'

Sample Number: 4458 Series **Depth:** 12' to 13'

Remarks: Less Than 5% Material Retained on the #4 Sieve.

MATERIAL DESCRIPTION

Description: Observed as: Olive Brown Fat Clay with Sand

Classifications - **USCS:** CH **AASHTO:**

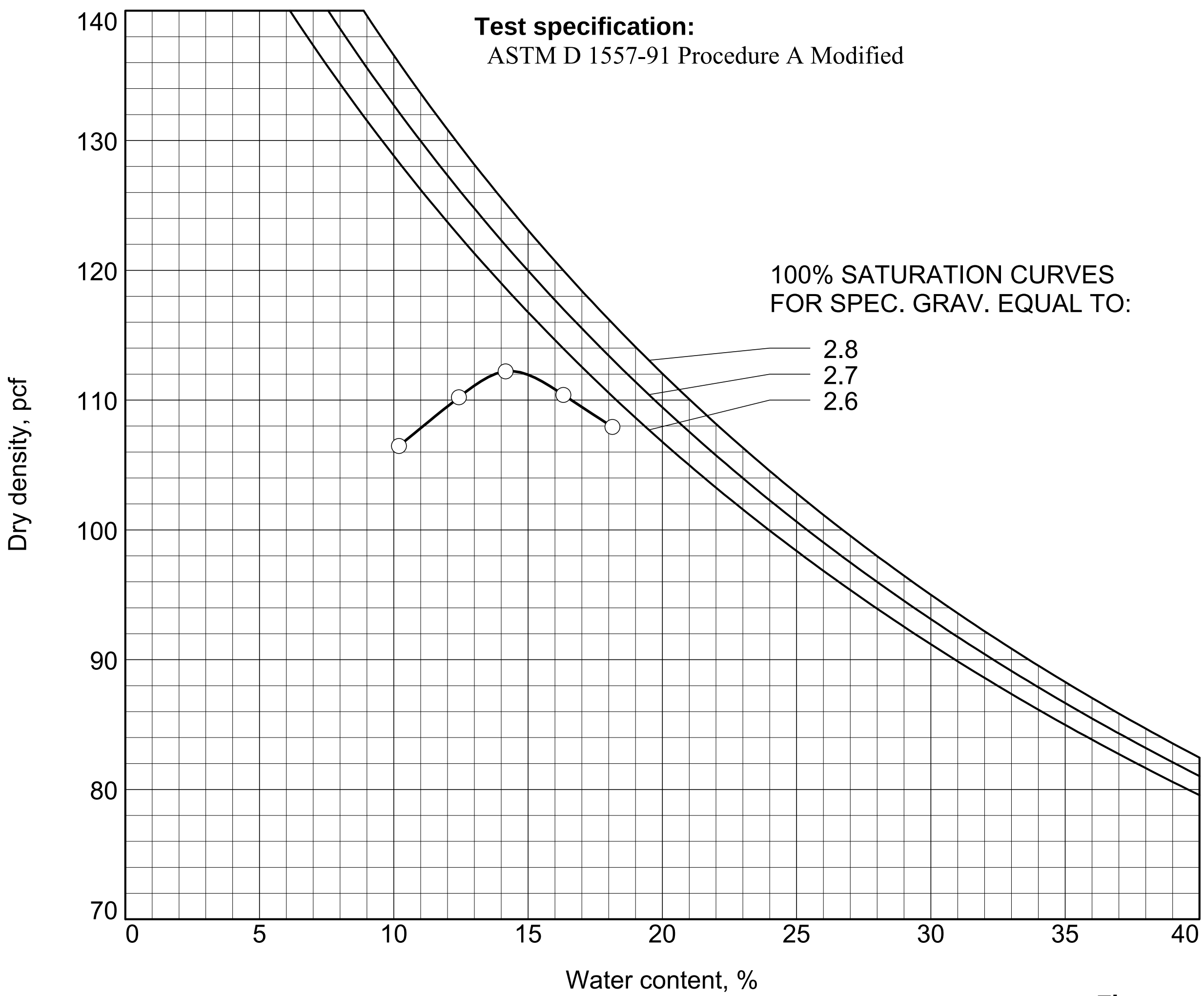
Nat. Moist. = 35.2 % **Sp.G. =**

Liquid Limit = 68 **Plasticity Index =** 46

% < No.200 =

TEST RESULTS
Maximum dry density = 112.2 pcf
Optimum moisture = 14.3 %

Test specification:
ASTM D 1557-91 Procedure A Modified



Figure

Koury Engineering & Testing, Inc.

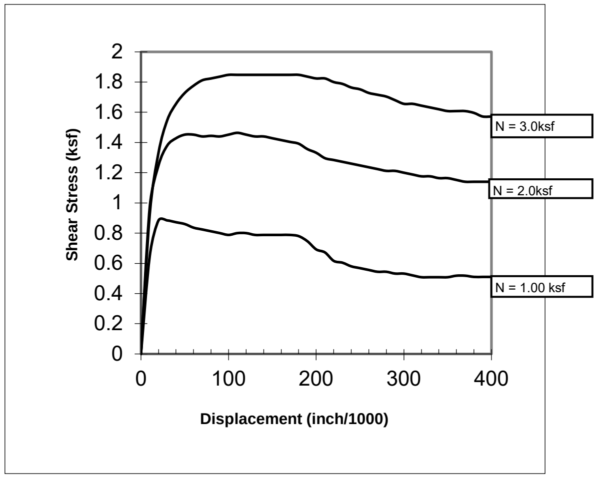
Tested By: ABB **Checked By:**

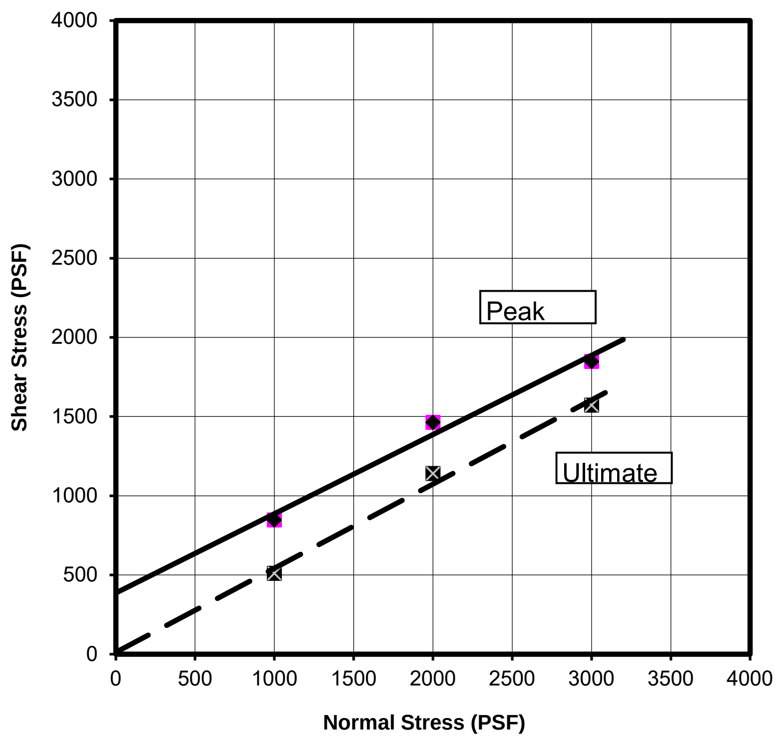
Direct Shear Test Report

Sample Identification	Sample Description	Sample Test State
TP40 @ 3' - 3.8'	Dark Yellowish Brown Clay	Saturated-Consolidated

Peak:	**Phi (Degrees)**	**26.6**	(Avg.Dry Dens. = 111.4 pcf) (Avg.Moist. = 15.4 %)
	Cohesion (PSF)	**386.7**	
Ultimate:	**Phi (Degrees)**	**28.0**	
	Cohesion (PSF)	**12.0**	

Relatively Undisturbed
Remolded





KOURY ENGINEERING & TESTING, INC.	**Project Name:** **OC Prado - Construction Level**	**Project No.: 18-0817** **Date: 10/8/18**	**Lab #** **2018-249**

Percolation Testing (Falling Head)-Porchet

Job Name: OC Prado

Job No.: 18-0817

Test Location: South of Building 2, west end of proposed detention Basin A

Water Table Depth (ft): ______ **Relatively Impervious Layer Depth (ft):** ______

Test Date: 9/7/2018

Test No.: P-1-Falling Head

Depth of Boring (d_b): 240 in

Diameter of Boring (D): 8 in

Test Performer: AB

Trial No.	Start Time (hr:min)	Stop Time (hr:min)	Time Interval (hr:min)	Initial Water Depth (in)	Final Water Depth (in)	Water Level Change (in)	Water Level Change >6"
1	8:15	8:40	0:25	14	14 11/16	8 4/16	Yes
2	8:45	9:10	0:25	16	16 8/16	6 6/16	Yes

If both yes, run test for an additional hour, reading at 10 minute interval

If no, run test for an additional 6 hours, reading at 30 minute interval

Trial No.	Time of Testing			Water Level Measurement		Water Level Calculations				Percolation & Infiltration Rate Calculations		
	Initial Time	Final Time	Time Interval	Initial Depth to Water	Final Depth to Water	Initial Height of Water Column	Final Height of Water Column	Drop in Height	Average Height of Water Column	Measured Percolation	Reduction Factor	Calculated Infiltration Rate =
	T_1	T_2	$\Delta T = T_2 - T_1$	d_1	d_2	$d_{H1} = d_b - d_1$	$d_{H2} = d_b - d_2$	$\Delta d_H = d_{H1} - d_{H2}$	$d_{avg} = (d_{H1}+d_{H2})/2$	$K_i = \Delta d_H / \Delta T$		(60ΔdHD/2)/(ΔT(D/2+2davg)
	(hr:min)	(hr:min)	(hr:min)	(in)	(in)	(in)	(in)	(in)	(in)	(in/hr)		(in/hr)
1	0:00	0:10	0:10	189 5/8	196 3/8	50 3/8	43 5/8	6 6/8	47	40.32	24.5	1.64
2	0:00	0:10	0:10	183 3/8	191 1/8	56 5/8	48 7/8	7 6/8	52 6/8	46.80	27.4	1.71
3	0:00	0:10	0:10	191 1/8	197 3/8	48 7/8	42 5/8	6 2/8	45 6/8	37.44	23.9	1.57
4	0:00	0:10	0:10	190 4/8	196 2/8	49 4/8	43 6/8	5 5/8	46 5/8	33.84	24.3	1.39
5	0:00	0:10	0:10	184 6/8	191	55 2/8	49	6 2/8	52 1/8	37.20	27.1	1.38
6	0:00	0:10	0:10	185 6/8	192 4/8	54 2/8	47 4/8	6 5/8	50 7/8	40.08	26.5	1.52
7	0:00	0:10	0:10	193 5/8	198 5/8	46 3/8	41 3/8	4 7/8	43 7/8	29.52	22.9	1.29
8	0:00	0:10	0:10	189 5/8	194 5/8	50 3/8	45 3/8	5	47 7/8	30.24	24.9	1.21
9												
10												
11												
12												

Note:

1. Infiltration Rate, It = (60ΔdHD/2)/(ΔT(D/2+2davg)
2. Long Term Infiltration Rate = Short Term Infiltration Rate / Correction Factor for Test Limitations

Correction Factor Range Normally used to account for Long Term Moderate Siltation, Test Scale Limitations and Other Factors = 3 to 12

Reference: Riverside County - Low Impact Development BMP Design Handbook Appendix A, dated 9/2011

Lowest Infiltration Rate = 1.21 in/hr

Adjusted Infiltration Rate = 0.30 in/hr

Percolation Testing (Falling Head)-Porchet

KOURY ENGINEERING & TESTING, INC.

Job Name: OC Prado

Job No.: 18-0817

Test No.: P-2-Falling Head

Test Location: South of Building 2, west end of proposed WQ Basin B

Depth of Boring (d_b): 180 in

Water Table Depth (ft): ______ **Relatively Impervious Layer Depth (ft):** ______

Diameter of Boring (D): 8 in

Test Date: 9/7/2018

Test Performer: GG, AB

Trial No.	Start Time (hr:min)	Stop Time (hr:min)	Time Interval (hr:min)	Initial Water Depth (ft)	Final Water Depth (ft)	Water Level Change (in)	Water Level Change >6"
1	10:15	10:40	0:25	11 13/16	11 14/16	1 3/16	NO
2	10:40	11:05	0:25	11 14/16	11 14/16	0	NO

If both yes, run test for an additional hour, reading at 10 minute interval

If no, run test for an additional 6 hours, reading at 30 minute interval

Trial No.	Time of Testing			Water Level Measurement		Water Level Calculations				Percolation & Infiltration Rate Calculations		
	Initial Time T_1 (hr:min)	Final Time T_2 (hr:min)	Time Interval $\Delta T = T_2 - T_1$ (hr:min)	Initial Depth to Water d_1 (in)	Final Depth to Water d_2 (in)	Initial Height of Water Column $d_{H1} = d_b - d_1$ (in)	Final Height of Water Column $d_{H2} = d_b - d_2$ (in)	Drop in Height $\Delta d_H = d_{H1} - d_{H2}$ (in)	Average Height of Water Column $d_{avg} = (d_{H1}+d_{H2})/2$ (in)	Measured Percolation $K_i = \Delta d_H / \Delta T$ (in/hr)	Reduction Factor	Calculated Infiltration Rate = (60ΔdHD/2)/(ΔT(D/2+2davg) (in/hr)
1	0:00	0:30	0:30	142 6/8	144	37 2/8	36	1 2/8	36 5/8	2.40	19.3	0.124
2	0:00	0:30	0:30	144	144 1/8	36	35 7/8	1/8	36	0.24	19.0	0.013
3	0:00	0:30	0:30	144	144 1/8	36	35 7/8	1/8	36	0.24	19.0	0.013
4	0:00	0:30	0:30	144	144 1/8	36	35 7/8	1/8	36	0.24	19.0	0.013
5	0:00	0:30	0:30	144	144 1/8	36	35 7/8	1/8	36	0.24	19.0	0.013
6	0:00	0:30	0:30	159	159 1/8	21	20 7/8	1/8	21	0.24	11.5	0.021
7	0:00	0:30	0:30	159	159 1/8	21	20 7/8	1/8	21	0.24	11.5	0.021
8	0:00	0:30	0:30	159	159 1/8	21	20 7/8	1/8	21	0.24	11.5	0.021
9												
10												
11												
12												

Note:

1. Infiltration Rate, It = (60ΔdHD/2)/(ΔT(D/2+2davg))
2. Long Term Infiltration Rate = Short Term Infiltration Rate / Correction Factor for Test Limitations

   Correction Factor Range Normally used to account for Long Term Moderate Siltation, Test Scale Limitations and Other Factors = 3 to 12

   Reference: Riverside County - Low Impact Development BMP Design Handbook Appendix A, dated 9/2011

Lowest Infiltration Rate = 0.013 **in/hr**

Adjusted Infiltration Rate = 0.003 **in/hr**

Percolation Testing (Falling Head)-Porchet

Job Name: OC Prado

Job No.: 18-0817

Test Location: South of Building 2, east end of proposed WQ Basin B

Water Table Depth (ft): ______ **Relatively Impervious Layer Depth (ft):** ______

Test Date: 9/7/2018

Test No.: P-3-Falling Head

Depth of Boring (d_b): 264 in

Diameter of Boring (D): 8 in

Test Performer: AB

Trial No.	Start Time (hr:min)	Stop Time (hr:min)	Time Interval (hr:min)	Initial Water Depth (in)	Final Water Depth (in)	Water Level Change (in)	Water Level Change >6"
							< 6"
							< 6"

If both yes, run test for an additional hour, reading at 10 minute interval

If no, run test for an additional 6 hours, reading at 30 minute interval

Trial No.	Time of Testing			Water Level Measurement		Water Level Calculations				Percolation & Infiltration Rate Calculations		
	Initial Time	Final Time	Time Interval	Initial Depth to Water	Final Depth to Water	Initial Height of Water Column	Final Height of Water Column	Drop in Height	Average Height of Water Column	Measured Percolation	Reduction Factor	Calculated Infiltration Rate =
	T_1	T_2	$\Delta T = T_2 - T_1$	d_1	d_2	$d_{H1} = d_b - d_1$	$d_{H2} = d_b - d_2$	$\Delta d_H = d_{H1} - d_{H2}$	$d_{avg} = (d_{H1}+d_{H2})/2$	$K_i = \Delta d_H / \Delta T$		(60ΔdHD/2)/ (ΔT(D/2+2davg)
	(hr:min)	(hr:min)	(hr:min)	(in)	(in)	(in)	(in)	(in)	(in)	(in/hr)		(in/hr)
1	0:00	0:30	0:30	158 3/8	158 4/8	105 5/8	105 4/8	1/8	105 4/8	0.24	53.8	0.004
2	0:00	0:30	0:30	158 3/8	158 4/8	105 5/8	105 4/8	1/8	105 4/8	0.24	53.8	0.004
3	0:00	0:30	0:30	158 3/8	158 4/8	105 5/8	105 4/8	1/8	105 4/8	0.24	53.8	0.004
4	0:00	0:30	0:30	158 3/8	158 4/8	105 5/8	105 4/8	1/8	105 5/8	0.25	53.8	0.005
5												
6												
7												
8												
9												
10												
11												
12												

Note:

1. Infiltration Rate, It = (60ΔdHD/2)/(ΔT(D/2+2davg)
2. Long Term Infiltration Rate = Short Term Infiltration Rate / Correction Factor for Test Limitations

Correction Factor Range Normally used to account for Long Term Moderate Siltation, Test Scale Limitations and Other Factors = 3 to 12

Reference: Riverside County - Low Impact Development BMP Design Handbook Appendix A, dated 9/2011

Lowest Infiltration Rate = 0.004 **in/hr**

Adjusted Infiltration Rate = 0.001 **in/hr**

Table C-1 -Test Pit Samples - Unit Weight Summary

Test Pit No.	Sample Type	Depth (feet)	Soil Type	Deposit	Dry Unit Weight (pcf)	Moisture Content (pcf)
22	CD	4	CL/CH	Older Alluvium	122	16.4
22	NG	5.5	CL/CH	Older Alluvium	96	19.1
23	CD	5.5	CL/CH	Older Alluvium	103	22.0
23	NG	5.5	CL/CH	Older Alluvium	96	19.1
24	CD	5.25	CL/CH	Older Alluvium	107	21.1
24	NG	5.25	CL/CH	Older Alluvium	99	22.3
25	CD	3	CL/CH	Older Alluvium	100	21.8
25	NG	3	CL/CH	Older Alluvium	97	24.0
26	CD	3	CL	Older Alluvium	116	14.8
26	NG	3	CL	Older Alluvium	111	13.3
26	NG	4.25	CL	Older Alluvium	97	19.2
27	CD	3.5	CL	Alluvium	110	18.4
27	NG	3.5	CL	Alluvium	100	16.2
28	CD	5	CL	Older Alluvium	115	13.4
28	NG	5	CL	Older Alluvium	109	12.6
28	NG	7.25	CH	Older Alluvium	86	31.3
29	CD	4.5	CL	Older Alluvium	98	20.4
29	NG	4.5	CL	Older Alluvium	98	19.6
29	NG	7.5	CL	Older Alluvium	118	13.6
30	CD	5	CL/CH	Older Alluvium	110	19.1
30	NG	5	CL/CH	Older Alluvium	94	26.1
31	CD	4.5	CL	Older Alluvium	112	15.9
31	NG	4.8’	CL	Older Alluvium	102	16.2
33	CD	5.25	CL	Older Alluvium	110	15.7
35	CD	6.5	CL	Older Alluvium	116	15.6
35	NG	6.5	CL	Older Alluvium	101	20.9
36	CD	4.5	CL/CH	Older Alluvium	118	10.8
36	NG	4.5	CL/CH	Older Alluvium	108	11.8
37	NG	2	CL	Alluvium	111	16.2
37	CD	4	CL	Older Alluvium	101	17.5
37	NG	4	CL	Older Alluvium	100	21.0
39	CD	4	CL	Alluvium	116	17.1
40	CD	3	CL	Alluvium	117	10.7
40	NG	3	CL	Alluvium	106	13.7
40	CD	4.8	CL	Older Alluvium	96	17.1
40	NG	4.8	CL	Older Alluvium	99	16.2

Table C-1 -Test Pit Samples - Unit Weight Summary (continued)

Test Pit No.	Sample Type	Depth (feet)	Soil Type	Deposit	Dry Unit Weight (pcf)	Moisture Content (pcf)
41	NG	3	CL	Alluvium	109	14.7
41	NG	5	CL/CH	Older Alluvium	93	21.2
44	NG	2	CL	Alluvium	106	17.7
44	NG	4	CL	Older Alluvium	101	20.0
45	NG	1.5	CL	Alluvium	117	14.2
45	NG	4	CL/CH	Older Alluvium	102	19.9
50	NG	2	CL	Alluvium	102	20.3
50	NG	3	CL	Older Alluvium	105	18.7
51	CD	5	CL/CH	Older Alluvium	105	16.7
52	NG	2.5	CL	Alluvium	103	13.1
52	CD	4	CL	Older Alluvium	99	13.8
52	NG	6	CL	Older Alluvium	101	22.4
53	NG	2	CL	Alluvium	111	17.0
53	NG	4	CL/CH	Older Alluvium	99	19.7
54	CD	1.5	CL	Alluvium	107	17.1
54	NG	1.5	CL	Alluvium	110	16.5
54	NG	4	CL/CH	Older Alluvium	96	26.3
55	NG	2	CL	Alluvium	105	11.0
55	NG	5	CL/CH	Older Alluvium	100	26.5
57	NG	2	CL	Alluvium	106	19.4
57	NG	4	CL/CH	Older Alluvium	86	29.6
63	NG	2.5	CL	Alluvium	98	15.7
63	NG	6’	CL	Older Alluvium	90	23.3
64	NG	2	CL	Alluvium	99	21.3
65	NG	1.5	CL	Alluvium	109	7.9
65	CD	3	CL	Alluvium	113	9.3
65	CD	5.25	CL/CH	Alluvium	114	17.4
67	CD	5	CL/CH	Older Alluvium	115	19.9
68	CD	6	CL/CH	Alluvium	93	33.4
69	NG	4	CL/CH	Alluvium	91	18.4
70	CD	2	CL	Alluvium	108	15.0
70	NG	2	CL	Alluvium	106	14.7
70	NG	5	CL	Older Alluvium	105	14.1
71	NG	3.5	CL	Alluvium	117	13.1
71	CD	3.5	CL	Alluvium	119	14.5
72	NG	3	CL	Older Alluvium	105	19.1
72	CD	4	CL	Older Alluvium	103	19.1

Table C-2 – Estimated Removal Depths

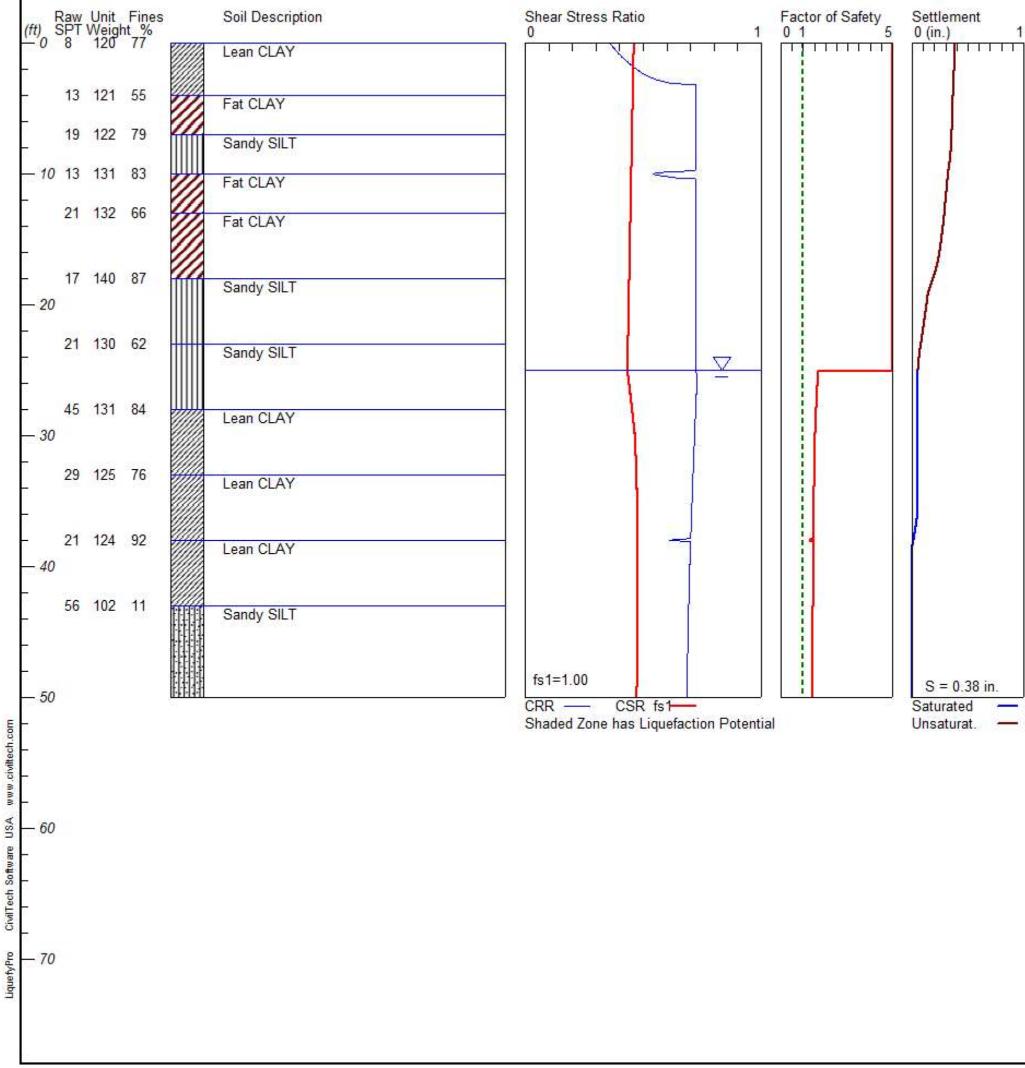
Boring/ Test Pit	*Remedial Depth (ft)	Location	Boring/ Test Pit	*Remedial Depth (ft)	Location
B-1	5	Building 2	TP-23	2.5	Driveway
B-2	5 & N/A	Detention Basin	TP-24	2.5	Driveway
B-3	3.5	Building 2	TP-25	2.5	Driveway
B-4	4.5	Building 2	TP-26	2.5	Driveway
B-5	4	Building 1	TP-27	3	Building 1
B-6	3	Building 1	TP-28	3	Building 1
B-7	5	Building 1	TP-29	3	Building 1
B-8	4	Building 2	TP-30	3.5	Building 1
B-9	3	Building 1	TP-31	3.5	Building 1
B-10	4	Building 1	TP-32	4.5	Building 1
B-11	4	Building 1	TP-33	4	Building 1
B-12	5	Building 1	TP-35	6	Building 1
B-13	4.5	Building 1	TP-36	4.5	Building 1
B-14	5	Building 1	TP-37	4	Building 1
B-15	5	Building 1	TP-38	4	Building 1
B-16	5	Building 1	TP-39	4	Building 1
B-17	5	Building 1	TP-40	4	Building 1
B-18	6	Building 1	TP-41	4	Building 1
B-19	6	Building 1	TP-42	4	Building 1
B-20	6	Building 1	TP-43	4	Building 1
B-21	6	Building 2	TP-44	3	Parking
B-22	5	Building 2	TP-45	3	Parking
B-23	5	Building 2	TP-46	2.5	Driveway
B-24	5	Building 2	TP-47	2.5	Parking
B-25	4	Building 2	TP-48	3	Parking
B-26	4.5	Building 2	TP-49	3.5	Parking
B-27	4 & N/A	Detention Basin	TP-50	2.5	Driveway
B-28	3 & N/A	WQ Basin	TP-51	4.5	Building 2
TP-1	4	Driveway	TP-52	4	Building 2
TP-2	5	Building 2	TP-53	3.5	Building 2
TP-3	5	Building 2	TP-54	3.5	Building 2
TP-4	4	Building 2	TP-55	4	Building 2
TP-5	4	Building 2	TP-56	4.5	Building 2
TP-6	3.5	Driveway	TP-57	4	Building 2
TP-7	3.5	Parking	TP-58	4.5	Building 2
TP-8	2.5 & N/A	WQ Basin	TP-59	4	Building 2
TP-9	3 & N/A	Detention Basin	TP-60	4	Building 2
TP-10	3	Driveway	TP-61	3.5	Building 2
TP-11	3	Driveway	TP-62	4.5	Building 2
TP-12	3	Driveway	TP-63	6	Driveway
TP-13	8+	Driveway	TP-64	3	Parking
TP-14	15+	Driveway	TP-65	3.5	Parking
TP-15	15+	Driveway	TP-66	4	Building 2
TP-16	3	Driveway	TP-67	4	Building 2
TP-17	2.5	Driveway	TP-68	11	Building 1
TP-18	4	Building 1	TP-69	6	Driveway
TP-19	4.5	Building 1	TP-70	3.5	Parking
TP-20	4	Driveway	TP-71	2.5	Parking
TP-21	8	Building 1	TP-72	2.5	Driveway
TP-22	3	Driveway	*Remedial Grading Removal Depth		

LIQUEFACTION ANALYSIS

OC Prado Construction Level

Hole No.=B-24 Water Depth=25 ft Surface Elev.=520

Magnitude= 6.49
Acceleration= 0.71g



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GEOTECHNICAL & SEISMIC ENGINEERING,
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MATERIALS TESTING SERVICES

BORROW SITE GEOTECHNICAL STUDY, PHASE I

OC PRADO - BORROW SITE
SOUTHEAST CORNER OF PINE AVENUE AND EUCLID AVENUE
CHINO, CALIFORNIA

PREPARED FOR:
COMMERCE CONSTRUCTION CO., L.P.
13191 CROSSROADS PARKWAY NORTH 6th FLOOR
CITY OF INDUSTRY, CALIFORNIA

PREPARED BY:
KOURY ENGINEERING & TESTING, INC.
14280 EUCLID AVENUE
CHINO, CALIFORNIA 91710

PROJECT NO. 16-0447
APRIL 24, 2017

TABLE OF CONTENTS

April 24, 2017
Project No.16-0447

Mr. John R. Burroughs, LEED AP, President
Commerce Construction Co., L.P.
13191 Crossroads Parkway North 6th Floor
City of Industry, CA 91746

SUBJECT: Borrow Site Geotechnical Study, Phase I
Southeast Corner of Pine Avenue and Euclid Avenue
City of Chino, CA 91708

1. INTRODUCTION

This report presents the results of a preliminary Geotechnical Study performed by Koury Engineering & Testing, Inc., (Koury) for the proposed Borrow Site located at the southeast corner of Pine Avenue and Euclid Avenue in the City of Chino, California. The purpose of our study was to evaluate the surface and subsurface soil conditions for the proposed grading of the borrow site and to determine the suitability of the soils to be used as fill for a project located on the southeast corner of Bickmore Avenue and Mountain Avenue, in the City of Chino.

The recommendations provided within this submittal are based on the results of our field exploration, laboratory testing and engineering analyses. Our services were performed in general accordance with our Proposal No. 16-0447E dated February 13, 2017.

Our professional services have been performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical consultants practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report. This report has been prepared exclusively for Commerce Construction Co., L.P. and their consultants for the subject project. The report has not been prepared for use by other parties and may not contain sufficient information for the purposes of other parties or other uses.

2. SITE CONDITIONS

The subject borrow site is bounded by Pine Avenue on the north, Johnson Avenue on the east, Euclid Avenue on the west and Prado Regional Park on the south. The borrow site consists of three small parcels with sizes ranging from 150 to 1000 square feet, and six large parcels with sizes in the range of about 136,000 to 731,800 square feet. The legal standard use code description for these parcels are identified as being; industrial, agricultural, rural, residential, and waste land/marshes parcels.

The existing property is about 1230 to 1390 feet wide in the east-west direction and 1300 to 1690 feet long in the north-south direction. The main topographic feature of the site is a creek/drainage channel that flows southerly and divides the property in two parts. The jurisdictional boundary of the creek ranges in width from about 30 to 60 feet. A 25-foot buffer zone has been established on both sides of the jurisdictional boundary and all proposed grading will remain outside of that buffer zone.

The property contains several easements. There is a 10-foot wide and about 600-foot long SCE easement near the southwest end of the site. There is a 195-foot wide overhead power lines easement crossing the site obliquely in the northeast direction along with two towers adjacent to Euclid Avenue. In the northwest corner of the site, there is a 20-foot wide and about 530-foot-long easement connecting Pine Avenue and Euclid Avenue.

The topographic conditions are centered along the creek. On the west side of the creek, the ground surface generally slopes moderately toward the creek except for the area immediately adjacent to the creek that is relatively level and subject to flooding. There is also relatively level ground immediately adjacent to Euclid Avenue. The ground elevations hover around 560 feet along Euclid Avenue and range between about 530 and 540 feet (NAVD88) along the west side of the creek. On the east side of the creek, the highest area is located in the northeast corner portion of the site where there is relatively flat ground with elevations between about 559 and 560 feet. The ground surface generally slopes between elevations 560 and 550 feet, toward the south, along Johnson Avenue. Within the southern one-half of the site, west of Johnson Avenue, there is a relatively level area with elevations ranging from about 547 to 557 over a width of 280 to 330 feet. On the west side of this area, the ground surface slopes toward the creek. Within the northern portion of the site and east of the creek, the ground surface generally slopes west toward the creek within a distance of about 250 feet from the creek. The grades along the creek generally ranges from 530 to 540 feet.

The other features of the site include the above ground structures, which encompass the caretaker residence located within the northwest corner of the site. There is still a small area located in the vicinity of the caretaker residence being used for farming purpose. West and south of the small active farming area, there are vacant buildings. West of the creek and south of Pine Avenue, there is an abandoned former electric station and other buildings. Along Johnson Avenue, there are several slabs at grade that appear to be the remains of former buildings. Several corral fences are still remaining in place.

There is some evidence that prior grading has occurred at the site. There are four small retaining walls located in the northwest corner of the site along with a remaining driveway ramp. There is an access trail that begins along Pine Avenue, passes parallel to Euclid Avenue and loop down along the west side of the creek. A small retaining wall and a slope was built to support a portion of that loop road. On the east side of the creek, the main past grading appears to be near the south end of the site where up to about 15 feet of fill may have been placed to raise the grades in the vicinity of the creek. Some grading also appears to have been performed to bury the foundation of some buildings that have been removed.

Most of the vegetation, which consists of medium size trees, is located in the northern portion of the site along Pine Avenue and Johnston Avenue. There are concentrations of large shrubs along the east side of the creek within the southern portion of the site. At the time of our field exploration, there was heavy ground cover below and north of the SCE electrical overhead easement on the slope east of the creek.

3. PROPOSED BORROW SITE GRADING

As presently planned, we understand that approximately 694,038 cubic yards of soils will be excavated from the site, and out of this quantity about 24,023 cubic yards will be placed in low areas on the west side of the creek jurisdictional boundary buffer zone and 670,915 cubic yards will be exported off site. The Conceptual Grading Plan dated November 22, 2016, indicates that no grading will occur within 20 feet of the property lines on the south, east and west sides, and within 20 feet of the future right-of-way along Pine Avenue. Also, no grading will take place within the immediate vicinity of the two electric towers located along Euclid Avenue and within the Creek Jurisdictional Boundary and its buffer zone that extends 25 feet on both sides of the Jurisdictional Boundary.

Starting from the 20 feet setback from the property lines, the site will be graded at 4:1 (H:V) descending slopes toward the center of the property until the base level of the site is reached. The base level of the site will have a one percent gradient sloping toward the creek traversing the property. For the most part, the proposed cut slope adjacent to Johnson Avenue will have a height in the range of 15 to 21 feet. The slope along Pine Avenue, between Johnson Avenue and the creek will also be a 4:1 (H:V) cut with a height ranging between 3 and 18 feet. Along the buffer zone on the east side of the creek, there will be small 2 to 6-foot high slopes descending toward the graded area except for the southwest corner area where the slope may reach a height of up to about 15 feet in a localized area. Except within the vicinity of the buffer zone, the proposed borrow site cuts between the buffer zone and Johnson Avenue range predominantly between 5 and 20 feet. There is no proposed fill on the east side of the buffer zone. The base grade elevations on the east side of the creek will range between about 531 and 543 feet.

For the most part, the proposed 4:1 (H:V) cut slopes at the south end of the site and adjacent to Euclid Avenue will have a height in the range of 15 to 23 feet. The slope along Pine Avenue, between Euclid Avenue and the creek, will also be at an inclination of 4:1 (H:V), with partial cut and fill segments with a height ranging between about 3 and 15 feet. Along the buffer zone on the west side of the creek, there will be small slopes of about 1 to 4 feet in height descending toward the buffer zone. Except within the vicinity of the buffer zone and Pine Avenue, the proposed cuts between the buffer zone and Euclid Avenue are predominantly between 4 and 23 feet in height. There is a strip along the entire west side of the buffer zone that will be in fill with anticipated thickness in the range of 1 to 6 feet. The proposed width of the fill area is estimated to range predominantly between 100 and 150 feet. The finish base elevations on the west side of the creek will range between about 531 and 544 feet.

4. FIELD EXPLORATION

The field exploration program consisted of drilling twelve soil test borings on March 10 and 17, 2017, and excavating eighteen test pits on March 17, 2017. The borings were drilled to depths ranging between about 16 and 36½ feet and the test pits were excavated to depths between about 6 and 16 feet. The locations of the borings and the test pits are shown on the Boring Location Map, Figures A-2a and 2b, Appendix A. Standard penetration test samples, California ring samples and bulk samples were obtained from the borings for laboratory testing. The test pits were visually logged and bulk samples were obtained from representative strata. The depths, blow counts, and description of the samples are shown on the attached boring logs presented in Appendix B of this report. The contractor used a 140-lbs automatic hammer to drive the samplers 18 inches into the soils.

5. LABORATORY TESTING

Laboratory tests, including moisture content, #200 sieve wash, gradation, dry unit weight, maximum density and optimum moisture content, expansion index, plasticity index (Atterberg Limits) and pocket penetrometer were performed to aid in the classification of the materials encountered and to evaluate their engineering properties. Sulfates, chlorides, resistivity, and PH tests (corrosivity tests) were also performed on selected samples. The results of the laboratory tests are presented on the boring logs in Appendix B, and/or in Appendix C.

6. SOILS CONDITIONS

The subsurface soil profile consists of fill underlain by alluvial deposits. We encountered fill depths up to 15 feet during our field exploration.

The subsurface soils encountered in our borings and test pits consist predominantly of various mixtures of clay, which includes lean clay and fat clay with variable sand contents. Other soils encountered included sandy silt, elastic silt, poorly graded sand with silt, clayey sand and silty sand.

The clay soils were found to be generally very moist. With few exception, the laboratory testing indicated moisture contents of the clay and silt soils to be generally in the range of 11 and 30 percent with an average of about 24 percent. The moisture content of the sand generally range between about 7 and 19 percent with an average of about 13½ percent.

Our #200 sieve wash tests indicated that the sand generally has about 17 to 49 percent fines contents with an average of about 32 percent. The fines contents of the silt and clay vary between about 50 and 96 percent with an average of about 72 percent. The dry unit weights of sand generally vary between 106 and 115 with an average of about 111 pcf and the dry unit weights of silt and clay vary between 84 and 116 with an average of about 101 pcf. The pocket penetrometer test result shows the unconfined compression strength of the fine soils to be between 0.5 and 4.5 tsf. with an average of about 2.5 tsf. The maximum density test results of representative silt and clay samples are presented in the following table.

Table 1 – Maximum Density Test Results

Test Pit	TP-4	TP-5	TP-11	TP-17
Maximum Dry Density (pcf)	120.5	104.5	119.1	118.1
Optimum Moisture Content (%)	12.4	17.3	13.1	13.0

The plasticity index test results on one sample of Boring B-2 indicated a fat clay type of soil with Liquid Limit, Plastic Limit and Plasticity Index equal to 61, 22 and 39, respectively. The gradation test results indicate that the sand size is generally fine to medium.

The soil conditions described in this report are based on the soils observed in the test borings drilled for this investigation and the laboratory test results. Variations in the soil conditions as well as detailed descriptions are indicated on the logs attached in Appendix B. Variations between and beyond the borings and test pits should be anticipated.

7. SITE GEOLOGY

The site is located within the Upper Santa Ana River Valley, which consists of a series of coalescing alluvial fans formed by streams flowing out of the San Gabriel Mountains to the north. The valley lies within the Peninsular Ranges geomorphic province, which is characterized by alluviated basins, elevated erosion surfaces, and northwest-trending mountain ranges bounded by northwest trending faults. The site, which is located within the Chino Basin, is underlain by sediments deposited by the Santa Ana River and its tributaries such as the Chino Creek.

Morton and Miller (2006) show the site to be underlain by two sedimentary units; namely young alluvial-valley deposits within the channel and very old alluvial-fan deposits outside the channel (See Figure A-4 in Appendix A). The sediments observed during drilling consisted predominantly of clay and silt.

8. GROUNDWATER

The creek bottom is near elevation 538 feet at the north end of the site and near elevation 528 feet (NAVD) at the south end. Based on extrapolation of groundwater monitoring north and west of the site, the groundwater level should be at approximately elevation 540 feet at the north end of the site and 530 feet at the south end. The groundwater elevations encountered in our borings/test pits near the creek correspond roughly to the elevations anticipated from extrapolation of the previous groundwater monitoring data. Further away from the creek such as along Johnson Avenue and 1/3 of the way between Euclid Avenue and the creek, the water level may be on the order of 5 feet higher than adjacent to the creek. Perched water was encountered in Borings B-9 and B-11 (these borings were drilled following prolonged rains).

We also noted that the creek overflows its west bank during prolonged heavy rainstorms. During some of our site visits immediately following heavy rains, we encountered standing water at the ground surface on the west side of the creek, where it is proposed to raise the grades.

The groundwater elevations encountered in the borings are plotted on Figures A-3a and A-3b presented in Appendix A. The groundwater depths and elevations encountered during the field exploration are summarized in the following Table 2. The groundwater elevations encountered in the exploration points range between about 528 and 542 feet.

Table 2 - Summary of Groundwater Data

Boring/Test Pit	Ground Elevation (feet)	Groundwater Depth (feet)	Groundwater Elevation (feet)
B-1	548.7	20.0	528.7
B-2	550.4	20.0	530.4
B-3	556.1	16.0	540.1
B-4	557.9	16.0	541.9
B-5	560.2	23.0	537.2
B-6	559.2	20.0	539.2
B-7	559.3	20.0	539.3
B-8	564.2	30.0	534.2
B-9	556.2	14.0	542.2
B-10	556.8	15.0	541.8
B-11	559.2	25.0	534.2
B-12	545.8	≃16.0	≃ 529.7
TP-13	539.4	6.0	533.4
TP-14	551.5	15.3	536.2
TP-15	549.0	14.5	534.5
TP-16	546.5	10.5	536.0
TP-17	547.0	11.5	535.5

9. SOIL EXPANSIVITY

Except for some of the fills in the southeast portion of the site, the subsurface soils encountered in the borings/test pits consist mostly of clay. This type of material generally has a high susceptibility to expansion when facing seasonal cycles of saturation/desiccation. Except for one test, the expansion index test indicated value of 80, 91 and 95. The majority of the clay soils appears to have an expansion potential near the high range.

10. SOIL CORROSIVITY

The corrosion potential of the onsite materials to steel and buried concrete was preliminarily evaluated. Laboratory testing was performed on selected soil samples to evaluate pH, minimum resistivity, chloride and soluble sulfate content. The test results are presented in the following table.

Table 3 - Corrosion Test Results

Test Pit	Depth (ft)	Minimum Resistivity (ohm-cm)	pH	Soluble Sulfate Content (ppm)	Soluble Chloride Content (ppm)
TP-4	6.5-7.0	427	9.4	1380	55
TP-5	3.5	2040	8.3	48	30
TP-11	12-12.5	222	8.9	725	1550
TP-17	8.5-9.5	1300	8.0	271	145

These tests are only an indicator of soil corrosivity for the samples tested. Other soils found on site may be more, less, or of a similar corrosive nature. Based on the minimum resistivity results from the soils tested, the near-surface site soils are considered to be corrosive to severely corrosive towards buried ferrous metals.

The concentrations of soluble sulfates indicate that the potential of sulfate attack on concrete in contact with the onsite soils is moderate based on ACI 318 Table 4.3.1. Cement Type II/V may be used in the concrete based on these test results; however, the water-cement ratio should not exceed 0.5 and the concrete strength should be at least 4,000 psi for these sulfate concentrations. Because of the high soluble chloride content and the severe corrosivity to metals, concrete with a water-cement ratio of 0.45 and a minimum strength of 4,500 psi is more appropriated for the soil tested. Further interpretation of the corrosivity test results, including the resistivity value, and providing corrosion design and construction recommendations are the purview of corrosion specialists/consultants. We recommend that additional corrosivity tests be performed following soil placement at the building site.

11. CONCLUSIONS AND RECOMMENDATIONS

11.1. General

In our opinion, the planned borrow site grading is feasible with minor modifications provided the geotechnical recommendations presented in this report are followed.

The main concerns from a geotechnical standpoint are the proposed depths of excavation that may reach groundwater in localized areas, the presence of clay with a high expansion potential, the large quantity of very moist soils that cannot be compacted without dry back, and the presence of undocumented fill containing construction debris and oversize particles. The following sections contain geotechnical conclusions and recommendations for the borrow site grading, and discussions about the suitability of the borrow site soils to be used as engineered fill to balance the grade for the site development at the southeast corner of Bickmore Avenue and Mountain Avenue, in the City of Chino.

11.2. Design and Grading of the Borrow Site

On the east side of the creek buffer zone, the proposed grades are generally lower than along the buffer zone boundary. We recommend to raise the proposed design grades by at least 4 feet to maintain positive drainage toward the creek buffer zone for most of its length. This raise in grade should allow to maintain the finish grade surface above the localized zones of relatively high water levels encountered during the borrow site exploration.

On the west side of the buffer zone, in the vicinity of the SCE overhead electrical line easement and east of the electrical towers, perched water was encountered. We suggest to raise the design grades by about 6 feet in the area of Boring B-10 and 4 feet in the area of Boring B-9. This perched water is attributed to heavy rainfall and should drain itself over time.

The borrow site slopes are generally less than 22 feet in height and will be cut or filled at 4:1 (H:V) inclination. Based on our observation of some of the steeper existing slopes onsite and the types of soils, we expect the proposed slopes to perform as intended both from a gross stability standpoint and a surficial stability standpoint.

Most of the borrow site grading will consist of cuts except for a strip along the west side of the buffer zone that extends to the setback line along Pine Avenue where the existing grades will be raised by 1 to 6 feet, including some slope construction along Pine Avenue. We recommend that all organic materials and other debris be removed from the areas to be filled. Following the removal of unsuitable materials, these areas should be scarified, moisture conditioned and recompacted to at least 85 percent relative compaction except for the slope area and access roads which should be compacted to at least 90 percent relative compaction. The fill outside the slopes and access roads should be placed in 8 inch lifts, moisture conditioned and compacted to at least 85 percent relative compaction. For slope areas, a keyway (1 by 2 by 10'wide) should be excavated prior to filling. The slope fill should be placed in 8 inch lifts, moisture conditioned, and compacted to at least 90 percent relative compaction. Benching into the existing native material should be performed as the fill progress.

11.3. General Grading Requirements

Prior to grading, we recommend that the site be cleared of remaining structures, foundations, abandoned utilities and pavements. We recommend that all organic topsoil be stockpiled for placement at subgrade level once the site has been excavated to design grade.

1. All fills, unless otherwise specifically stated in the report, should be compacted to at least 90 percent of the maximum dry density as determined by ASTM D 1557 Method of Soil Compaction.

2. No fill should be placed until the area to receive the fill has been adequately prepared and approved by the Geotechnical Consultant or his representative.

3. Fill soils should be kept free of debris and organic material.

4. Rocks or hard fragments larger than 6 inches may not be placed in the fill without approval of the Geotechnical Consultant or his representative, and in a manner specified for each occurrence. All rock fragments in the 2 to 3-inch range should be dispersed and mixed within the sand matrix to avoid rock concentrations. Oversize materials should be disposed outside the structural fill and flatwork areas.

5. The fill material should be placed in lifts which, when loose, should not exceed 8 inches per lift. Each lift should be spread evenly and should be thoroughly mixed during the spreading to obtain uniformity of material and moisture.

6. When the moisture content of the fill material is too low to obtain adequate compaction or lower than the minimum recommended, water should be added and thoroughly dispersed until the soil has a moisture within 2½ percent of optimum moisture content for granular

soils and at least 125 percent of optimum or 3 percent above optimum, whichever is greater, for clay except as indicated otherwise by the Geotechnical Engineer at the time of construction.

7. When the moisture content of the fill material is too high to obtain adequate compaction, the fill material should be aerated by blading or other satisfactory methods until the soil has a moisture content as specified herein.

It should be noted that some of the onsite soils have high moisture contents and these soils are subject to “pumping” (deflection). Remixing and drying back these soils will be required to achieve compaction. When weather and/or time does not allow drying back the excavation bottoms, “bridging” of bottom excavations for exterior flatwork may be performed by overexcavating some of the moist/wet soils and backfilling with ¾-inch crushed rock wrapped with geosynthetics. The contractor should select appropriate excavation and compaction equipment to avoid disturbing the subgrade and to be able to compact the fill to the project specifications above a relatively soft subgrade. Track-mounted excavators, track backhoes, and appropriate towed non-vibratory sheepsfoot combined with very thin backfill lifts should be used as necessary to reduce subgrade disturbance.

11.4. Fill Materials for Borrow Site

The onsite soils can be used for backfill within the borrow site following removals of all oversize particles, organic and other deleterious material and proper processing.

11.5. Excavations at the Borrow site

The shallow undisturbed site soils are expected to be temporarily stable when excavated vertically to a depth of 5 feet. For excavations between 5 and 8 feet, a gradient of ¾:1 (H:V) may be used. The top of slopes should be barricaded to prevent vehicles and storage loads within 5 feet of the tops of the slopes. A greater setback may be necessary when considering heavy vehicles, such as concrete trucks and cranes; we should be advised of such heavy vehicle loadings so that specific setback requirements can be established. When excavating adjacent to existing footings or building supports, proper means should be employed to prevent any possible damage to the existing structures. Un-shored excavations should not extend below a 1¼:1 (H:V) plane extending downward from the lower edge of adjacent footings and should start at least two feet away from the footing. Where there is insufficient space to slope back an excavation, shoring may be required. All regulations of State and Federal OSHA should be followed. Some sloughing and caving of excavations may occur.

Temporary excavations are assumed to be those that will remain un-shored for a period of time not exceeding one week. In dry weather, the excavation slopes should be kept moist, but not soaked. If excavations are made during the rainy season (normally from November through April), particular care should be taken to protect slopes against erosion. Mitigative measures, such as installation of berms, plastic sheeting, or other devices, may be warranted to prevent surface water from flowing over or ponding at the top of excavations.

12. SUITABILITY OF SOILS FOR EXPORT

The majority of the borrow site soils are fine, very moist, and have medium to high plasticity, which make them difficult to excavate, to process, to place and to compact. They will require significantly more effort and more time as compared to importing granular material to achieve an acceptable engineered fill.

Barring the workability constraints, the onsite soils can generally be used for export to the proposed development on Bickmore Avenue in Chino with some special consideration. The primary consideration from a geotechnical standpoint is the presence of clay soils with moderate to high expansion potential. We recommend that the clay soils with expansion index of 80 or greater be placed at least 2 feet below the finished pavement subgrade and at least four feet below the building foundations. The clay soils will have to be placed at moisture contents of at least 130 percent of optimum or 3 percent above optimum, whichever is greater.

The second consideration is the high moisture content of most of the clay soils. Based on the maximum density tests performed for this study, the optimum moisture contents on the clay range from about 12 to 17 percent with an average near 14 percent. On the other hand, the average moisture content of the clay tested from our field exploration indicated an average of about 24 percent with a range generally of up to the lows 30’s. The moisture contents get higher within about 6 to 7 feet of the groundwater level. Based on this limited data, the moisture contents of the clay soils are generally 10 to 15 percent above optimum. Therefore, dry back of the soils will be required to achieve the specified relative compaction. We recommend that most of the dry back be performed in the borrow site by opening large areas and disking and turning over the material several times. Depending upon the weather condition, the efficiency of the processing and the soil conditions, this drying back may take a few days or more for each lift. We recommend that the moisture content of the soils be monitored in the borrow site prior to exporting.

The third consideration is the presence of construction debris. The fill that was placed onsite appears to come from construction/demolition sites and contains some oversize material, concrete, rebars, wood etc. Personnel and equipment should be assigned to remove the deleterious material from these soils prior to export. All topsoil, organic material, manure from the corral areas, and other non-suitable material for structural fill should be stockpiled onsite and placed back at finish surface following grading completion.

A fourth consideration is to perform selective grading within the borrow site and to use another borrow site to complement the soils needed. The upper 10 feet of soil appears to have generally lower moisture contents than the deeper soils and may be more suitable than the deeper soils. Some areas of the borrow site may be more suitable than other areas, i.e. lower plastic soils. We recommend that additional test pits be excavated to further characterize the soils if selective grading is contemplated.

13. OBSERVATION AND TESTING

This report has been prepared assuming that Koury Engineering & Testing, Inc. will perform all geotechnical-related field observations and testing. If the recommendations presented in this report are utilized, and observation of the geotechnical work is performed by others, the party performing the observations must review this report and assume responsibility for the recommendations contained herein. That party would then assume the title of "Geotechnical Consultant of Record". A representative of the Geotechnical Consultant should be present to observe all grading operations as well as all footing excavations. A report presenting the results of these observations and related testing should be issued upon completion of these operations.

14. CLOSURE

The findings and recommendations presented in this report were based on the results of our field and laboratory investigations, combined with professional engineering experience and judgment.

The report was prepared in accordance with generally accepted engineering principles and practice. We make no other warranty, either expressed or implied. Subsurface variations between and beyond the borings/test pits should be anticipated. Koury should be notified if subsurface conditions are encountered, which differ from those described in this report. Samples obtained during this investigation will be retained in our laboratory for a period of 45 days from the date of this report and will be disposed after this period.

Should you have any questions concerning this submittal, or the recommendations contained herewith, please do not hesitate to call our office.

Respectfully submitted,

KOURY ENGINEERING & TESTING, INC.

Jacques Roy

Jacques B. Roy P.E. G.E.
Principal Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
JACQUES B. ROY
NO. 2077
Ex. Date 9/30/17
Geotechnical
STATE OF CALIFORNIA

Distribution: 1. Addressee (2 wet stamped copy + a pdf copy via e-mail)
2. File (B)

APPENDICES

Appendix A: Maps and Plans

Vicinity Map – Figure A-1
Field Exploration Map – Figures A-2a and A-2b
Water Elevation Map – Figure A-3a and A-3b
Geology Map – Figure A-4

Appendix B: Field Exploratory Boring Logs

Appendix C: Laboratory Test Results

REFERENCES

1. California Division of Mines and Geological, 1998, Seismic Hazard Zone Report 045 for the Prado Dam 7.5 Minute Quadrangle, California.

2. California Division of Mines and Geological Survey, 2003, Earthquake Fault Zones, Prado Dam Quadrangle, May 1, 2003.

3. City of Chino General Plan, Safety Element, 2010, Final Report.

4. http://geotracker.waterboards.ca.gov.

5. US Army Corps of Engineers, Geotechnical Investigations, Engineering Manual EM 1110-1-1804, dated 8/26/86.

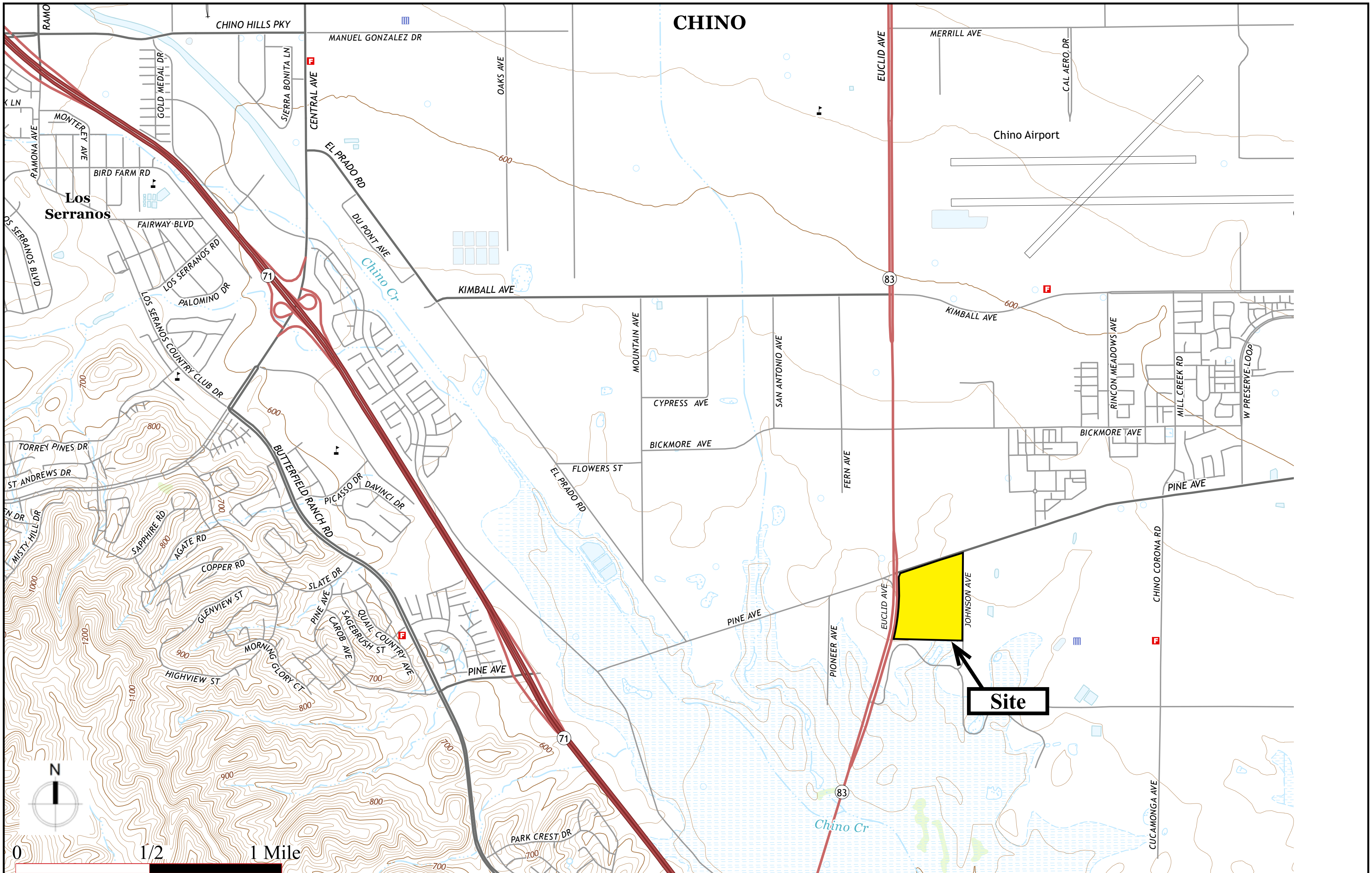
6. US Army Corps of Engineers, Laboratory Soils Testing, Engineering Manual EM 1110-2-1906, dated 8/26/86.

7. United States Geological Survey, 2006, Geology Map of the San Bernardino & Santa Ana 30’ X 60’ Quadrangles, California, Version 1.0, compiled by Douglas M. Morton et al, 2006.

8. United States Geological Survey, 2015, Prado Dam Quadrangle, 7.5-Minute Series (Topographic) Map Quadrangle, California.

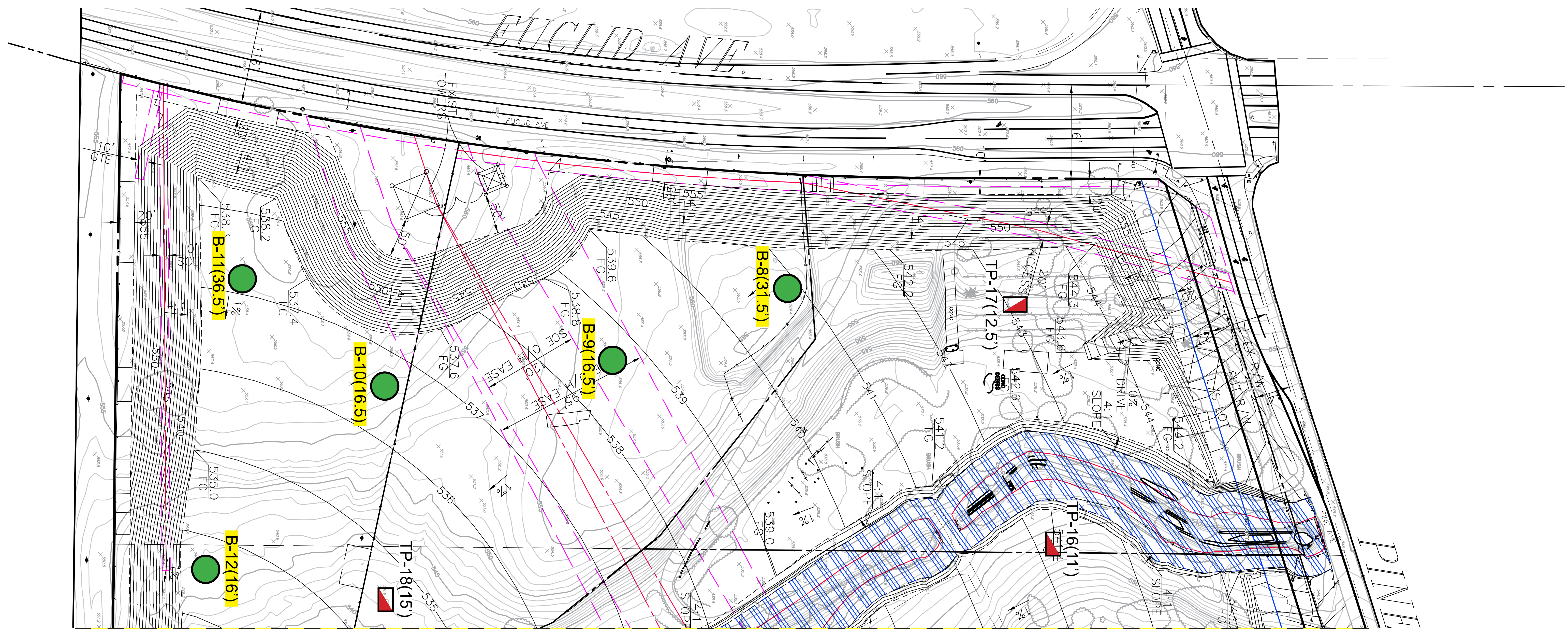
APPENDIX A

Maps and Plans



Reference: USGS Topographic Map, Prado Dam Quadrangle, California, 7.5 Minute Series 2015 - Contour Interval 20 feet, NAVD of 1988

KOURY ENGINEERING & TESTING, INC.	Project Name:	Project No.: 16-0447	Drawing Title:	Figure:
	Borrow Site	Date: April 2017	Vicinity Map	A-1



MATCHLINE - SEE FIGURE A-1

Legend

TP-18 (15') Test Pit Location, Number & Depth in feet

B-12 (12') Boring Location, Number & Depth in feet

0 120 240'

PREPARED BY:
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License No. 723302

REVISIONS:

11-22-16	3rd RELEASE
10-25-16	2nd RELEASE
10-18-16	1st RELEASE

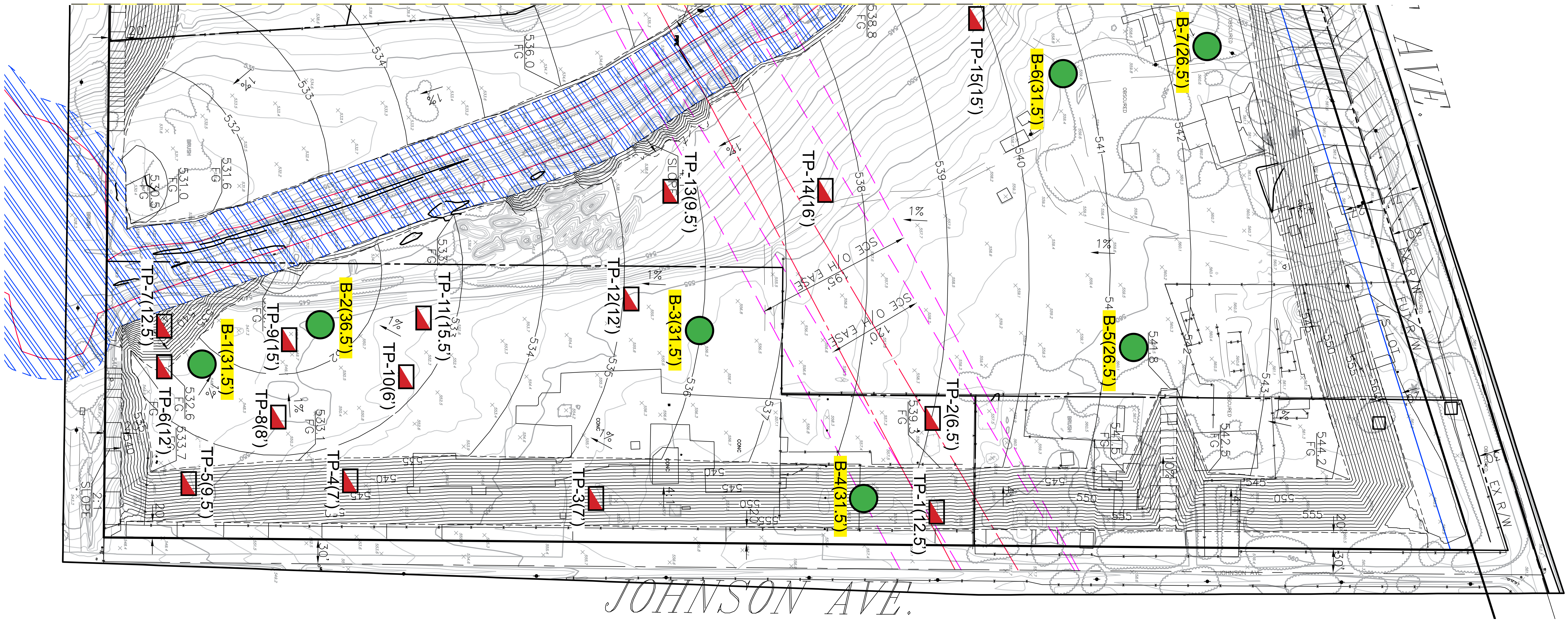
CONCEPT GRADING PLAN
SOUTH CHINO PARCEL STUDY
CHINO, CA
BORROW SITE GRADING

JOB NO. 100-28
SHEET 1 of 1

KOURY ENGINEERING & TESTING, INC.

Project Name:	Project No.: 16-0447	Drawing Title:	Figure:
Borrow Site	Date: April 2017	Field Exploration Map	A-2a

MATCHLINE - SEE FIGURE A-2



Legend

TP-18 (15') Test Pit Location, Number & Depth in feet

B-12 (12') Boring Location, Number & Depth in feet

0 120 240'

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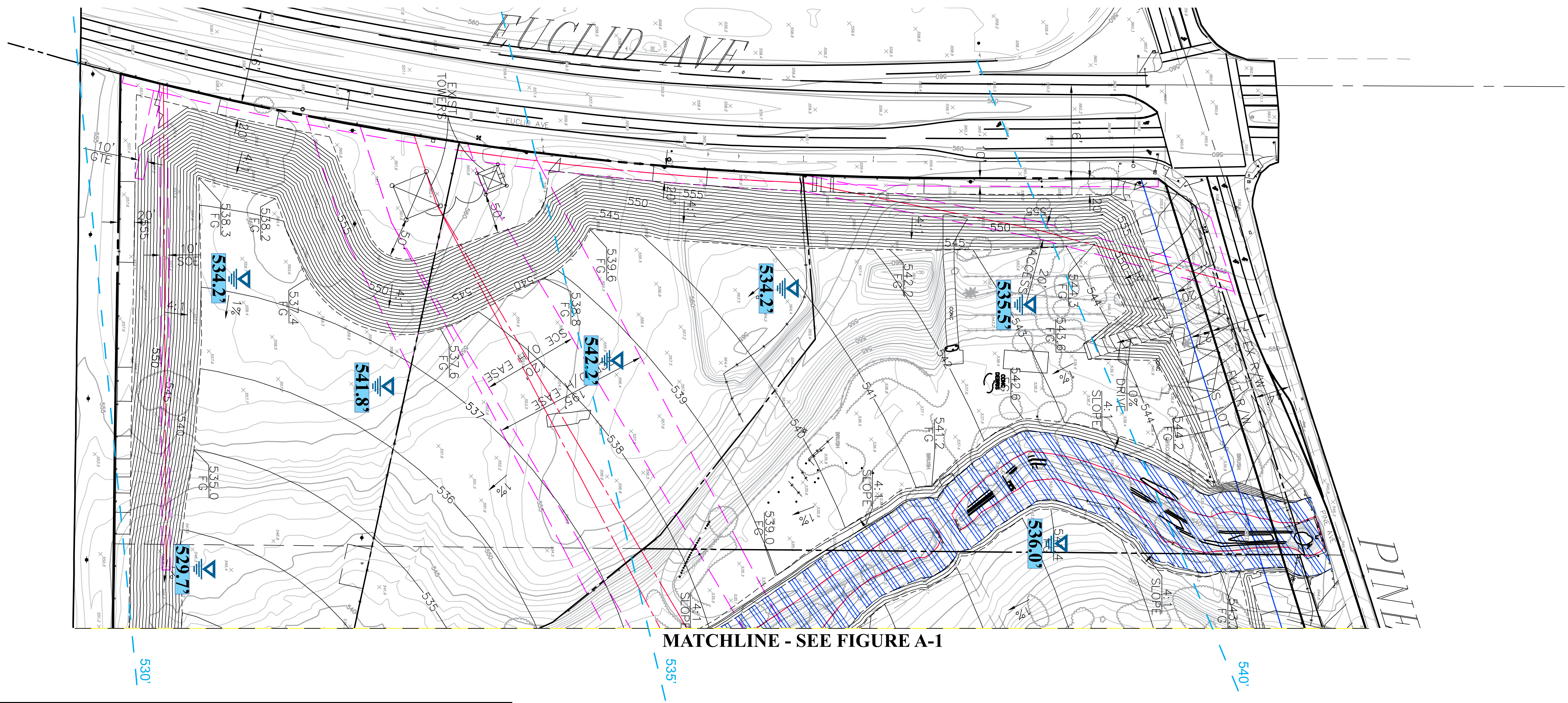
CONCEPT GRADING PLAN
SOUTH CHINO PARCEL STUDY
CHINO, CA
BORROW SITE GRADING

JOB NO. 100-28
SHEET 1 of 1

KOURY ENGINEERING & TESTING, INC.

Project Name: Borrow Site	**Project No.:** 16-0447	**Drawing Title:** Field Exploration Map	**Figure:** A-2b
	Date: April 2017		



MATCHLINE - SEE FIGURE A-1

Legend

529.7' Ground Water Elevation (ft.) Measured During Field Exploration

540' Approximate Groundwater Contour Elevation Based on Information Provided by Others

0 120 240'

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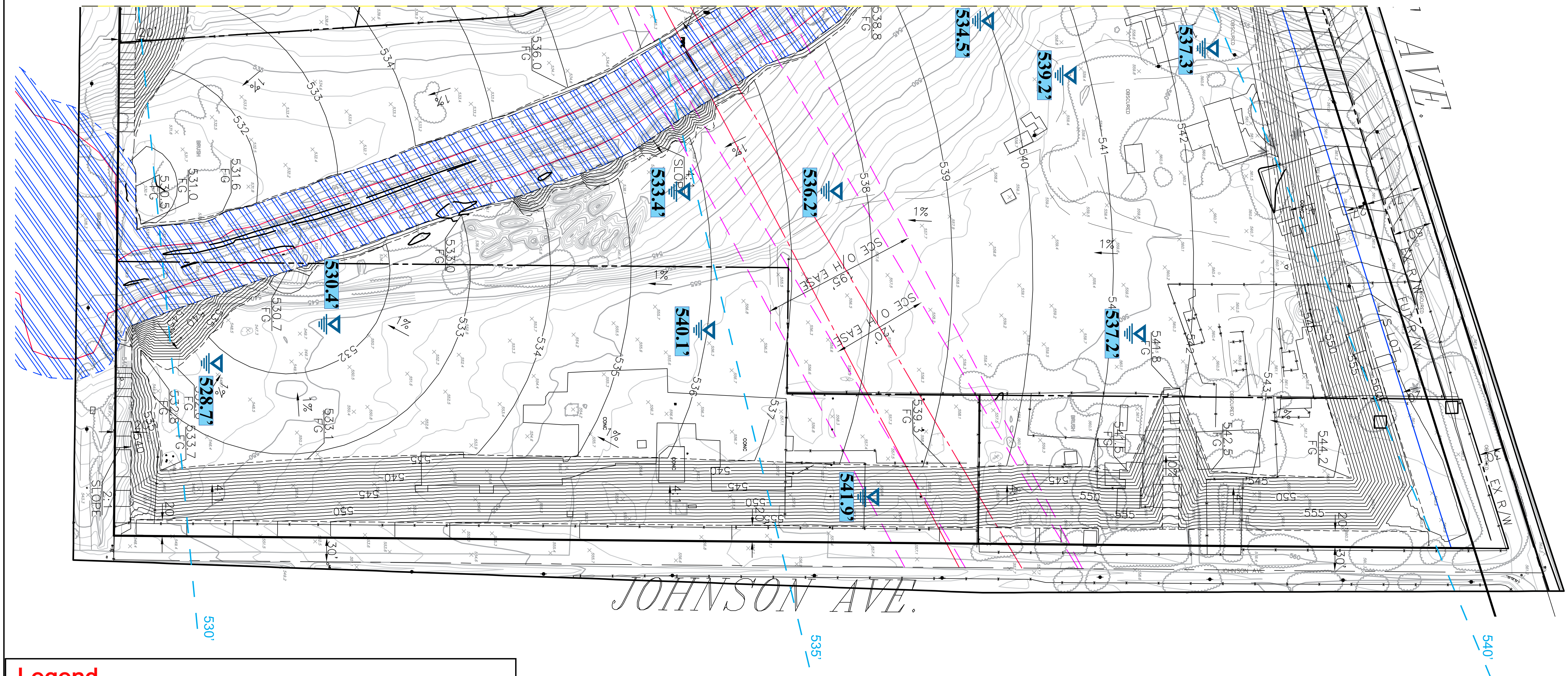
CONCEPT GRADING PLAN
SOUTH CHINO PARCEL STUDY
CHINO, CA
BORROW SITE GRADING

JOB NO. 100-28
SHEET 1 of 1

KOURY ENGINEERING & TESTING, INC.

Project Name: Borrow Site	Project No.: 16-0447 Date: April 2017	Drawing Title: Water Elevation Map	Figure: A-3a

MATCHLINE - SEE FIGURE A-2



Legend

529.7' Ground Water Elevation (ft.) Measured During Field Exploration

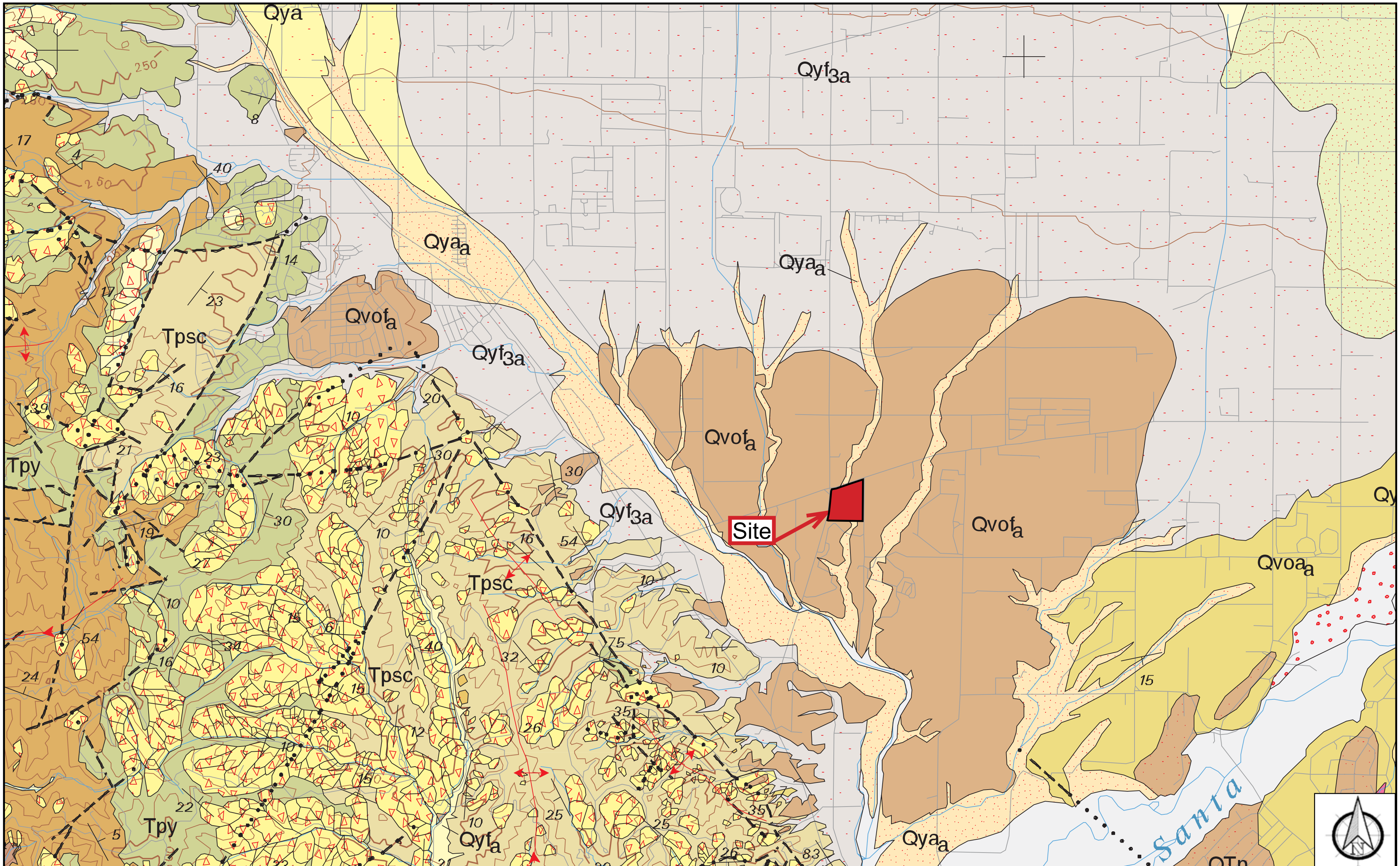
540' Approximate Groundwater Contour Elevation Based on Information Provided by Others

0 120 240'

PREPARED BY:		REVISIONS:		
PBLA ENGINEERING, INC. Planning • Engineering • Surveying 4790 IRVINE BLVD., STE 105-262 IRVINE, CALIF. 92620 (888) 714-9642 • (714)389-9191 FAX	COMMERCE CONSTRUCTION CO., L.P. 13191 Crossroads Parkway North Sixth Floor City of Industry, California 91746-3497 Telephone: (562) 699-0453 License No. 723302	11-22-16 3rd RELEASE 10-25-16 2nd RELEASE 10-18-16 1st RELEASE	CONCEPT GRADING PLAN SOUTH CHINO PARCEL STUDY CHINO, CA BORROW SITE GRADING	JOB NO. 100-28 SHEET 1 of 1

KOURY ENGINEERING & TESTING, INC.

Project Name:	Project No.: 16-0447	Drawing Title:	Figure:
Borrow Site	Date: April 2017	Water Elevation Map	A-3b



LEGEND

Qya	Young alluvial-valley deposits
Qvof	Very old alluvial-fan deposits

Reference: Geologic Map of the San Bernardino & Santa Ana 30´x60´ Quadrangle California-Version 1.0 Compiled by Douglas M. Morton and Fred K. Miller, 2006

KOURY ENGINEERING & TESTING, INC.	Project Name: Borrow Site	Project No.: 16-0447 Date: April 2017	Drawing Title: Geology Map	Figure: A-4

APPENDIX B

Field Exploratory Boring Logs

KEY TO LOGS

SOILS CLASSIFICATION					
MAJOR DIVISIONS			GRAPHIC LOG	USCS SYMBOL	TYPICAL NAMES
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS MORE THAN 50% OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS LESS THAN 5% FINES		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES MORE THAN 12% FINES		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS 50% OR MORE OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS LESS THAN 5% FINES		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES MORE THAN 12% FINES		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS 50% OR MORE OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 50			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT IS 50 OR MORE			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR GRAVELLY ELASTIC SILTS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT AND OTHER HIGHLY ORGANIC SOILS

GRAIN SIZES							
SILT AND CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		
	#200	#40	#10	#4	3/4"	3"	12"
SIEVE SIZES							

KEY TO LOGS (continued)

SPT/CD BLOW COUNTS VS. CONSISTENCY/DENSITY					
FINE-GRAINED SOILS (SILTS, CLAYS, etc.)			GRANULAR SOILS (SANDS, GRAVELS, etc.)		
CONSISTENCY	*BLOWS/FOOT		RELATIVE DENSITY	*BLOWS/FOOT	
	SPT	CD		SPT	CD
SOFT	0-4	0-4	VERY LOOSE	0-4	0-8
FIRM	5-8	5-9	LOOSE	5-10	9-18
STIFF	9-15	10-18	MEDIUM DENSE	11-30	19-54
VERY STIFF	16-30	19-39	DENSE	31-50	55-90
HARD	over 30	over 39	VERY DENSE	over 50	over 90

* CONVERSION BETWEEN CALIFORNIA DRIVE SAMPLERS (CD) AND STANDARD PENETRATION TEST (SPT) BLOW COUNT HAS BEEN CALCULATED USING "FOUNDATION ENGINEERING HAND BOOK" BY H.Y. FANG. (**VALUES ARE FOR 140 Lbs HAMMER WEIGHT ONLY**)

DESCRIPTIVE ADJECTIVE VS. PERCENTAGE	
DESCRIPTIVE ADJECTIVE	PERCENTAGE REQUIREMENT
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
AND	35 - 50%

*THE FOLLOWING "DESCRIPTIVE TERMINOLOGY/ RANGES OF MOISTURE CONTENTS" HAVE BEEN USED FOR MOISTURE CLASSIFICATION IN THE LOGS.

APPROXIMATE MOISTURE CONTENT DEFINITION	
DEFINITION	DESCRIPTION
DRY	Dry to the touch; no observable moisture
SLIGHTLY MOIST	Some moisture but still a dry appearance
MOIST	Damp, but no visible water
VERY MOIST	Enough moisture to wet the hands
WET	Almost saturated; visible free water

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. :16-0447
Project Name : Borrow Site

Boring No. : B-1
Sheet : 1 **Of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Discovery
Date Drilled : 03/10/17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0	CL	**FILL:**	
1	19.2		2 3 5		CL	**Sandy Lean CLAY;** trace of gravel, firm, very moist, upper portion dark brown and lower portion yellowish brown	#200 Wash Fines = 67% PP = 2.0 tsf
2	18.4		3 3 5	5	CL	wood and asphalt, organic smell, dark brown	#200 Wash Fines = 56% PP=3-4.5 tsf
3			8 3 6		CL		
4	24.6		3 3 3	10	CL	wood debris, firm, dark brown	#200 Wash Fines = 52%
					CL/CH	**ALLUVIUM:**	
5	27.6	95	2 4 6	15	CL/CH	**Lean to Fat CLAY with SAND;** slightly organic smell, stiff, very moist, very dark brown	#200 Wash Fines = 78% PP=1.5-2 tsf
6	21.3	106	3 6 8	20	CL/CH	wood specks, dark gray	#200 Wash Fines = 76% PP=2.2-2.7 tsf
7	22.7		1 3 8	25	CL/CH	wood specks, dark yellowish brown with dark gray zones	#200 Wash Fines = 77% PP=0.5-2 tsf
8	26.7	108	3 6 8	30	CL/CH		#200 Wash Fines = 75% PP=0.5-2.2 tsf
						End of boring @ 31' 6" Groundwater encountered @ 20'	
				35			
				40			

Groundwater Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0447
Project Name : Borrow Site

Boring No. : B-2
Sheet : 1 **Of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Cascade
Date Drilled : 3-17-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Soil Type (USCS)	Description	Additional Tests
				CL	**FILL:**	
1	19.8			CL	**Sandy Lean CLAY:** trace of gravel, moist to very moist, stiff, brown with yellowish brown	#200 Wash Fines = 67%
2	17.6			CL		#200 Wash Fines = 63% PP = 3 tsf
3	18.7	102	3 4 6	CL	trace of organic, stiff, very moist, brown and dark brown	#200 Wash Fines = 67% PP = 4 tsf
4	27.6		0 0 1	CL/CH	**Lean to Fat CLAY with SAND;** very soft, very moist, dark brown	#200 Wash Fines = 77%
5	25.2	87	42 22 10	CL/CH	very stiff, very moist, dark brown, layer of gravel	#200 Wash Fines = 78% PP = 0.7 tsf
				CH	**ALLUVIUM:**	
6	29.9		2 4 5	CH	**Fat CLAY;** firm to stiff, caliche and concretions, very moist, dark yellowish brown	#200 Wash Fines = 85% Atterberg LL = 61 PL = 22
7	28.6	99	4 6 10	CH	**Sandy Fat CLAY;** caliche, layer of silty sand, 50% clay and 50% sand, stiff, very moist, light yellowish brown	#200 Wash Fines = 67% PP=1.5-2 tsf
8	28.4		5 7 8	CH	**Fat CLAY with SAND;** layers of silty sand and sandy silt, stiff, very moist, olive yellow	#200 Wash Fines = 81%
9	19.3	115	14 28 22	SM	**Silty SAND;** fine, medium dense, moist to very moist, mottled grayish brown and yellowish brown	Gradation Fines = 15%
10	29.0		8 11 12	CL	**Sandy Lean CLAY;** layers of silty sand and poorly graded sand, medium dense sand and soft clay, wet, pale yellow	#200 Wash Fines = 51%
					End of boring @ 36' 6" Groundwater encountered @ 20'	

Depth (ft): 0, 5, 10, 15, 20, 25, 30, 35, 40

Groundwater   Bulk   CD   SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. :16-0447
Project Name : Borrow Site

Boring No. : B-3
Sheet : 1 **Of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Discovery
Date Drilled : 3-10-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	16.3			0			CL	**FILL:** **Sandy Lean CLAY;** layers of silty sand,trace of gravel, stiff, moist to very moist, dark yellowish brown	#200 Wash Fines = 69% PP = 1.7 tsf
2			7 8 2				CL	**Sandy Lean CLAY with GRAVEL;** trace of glass and concrete, moist, dark brown with gray	
3	23.6		1 1 2	5			CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of rounded gravel, soft, very moist, yellowish brown and very dark brown	#200 Wash Fines = 71% PP=1-1.7 tsf
4	18.3		2 3 5					abundant concretions, firm to stiff, very moist	#200 Wash Fines = 65% PP=2-2.5 tsf
5	28.2		2 2 3	10			ML	**Sandy SILT;** layer of lean clay, firm to stiff, very moist, olive	#200 Wash Fines = 63% PP=3.2-4.2 tsf
6	28.5		3 5 6	15			CH	**Sandy Fat CLAY;** layers of sandy silt and fine silty sand, concretions, stiff, very moist, olive and olive brown	#200 Wash Fines = 70% PP=2-3.5 tsf
7	34.3	89	2 2 3	20			CH	**Fat CLAY;** firm, very moist, mottled white with yellowish brown	#200 Wash Fines = 87% PP=0.5-1.5 tsf
8	29.1	97	5 9 14	25			CL/CH	**Sandy Lean to Fat CLAY;** very stiff, very moist, pale yellow	#200 Wash Fines = 72% PP=2.5-3.5 tsf
9	20.2	112	8 14 22	30				light yellowish brown	#200 Wash Fines = 71% PP = 4.5 tsf
				35				End of boring @ 31' 6" Groundwater encountered @ 16'	
				40					

Groundwater Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0447
Project Name : Borrow Site

Boring No. : B-4
Sheet : 1 **Of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Cascade
Date Drilled : 3-17-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
				0			**FILL:**	
1	17.9				Bulk	CL	**Lean CLAY with SAND;** stiff, moist to very moist, dark brown	#200 Wash Fines = 80% PP=1.7-2.7 tsf
2	21.9	107	8 14 11	5	CD	CL	**ALLUVIUM:** **Sandy Lean CLAY;** caliche and concretions, firm to stiff, very moist, dark yellowish brown	#200 Wash Fines = 74 % PP=1.2-1.5 tsf
3	21.0				Bulk			#200 Wash Fines = 70 % PP=1.5-2.5 tsf
4	11.3			10	Bulk			
5	19.4	116	12 28 19	15	CD	ML	**Sandy SILT;** very stiff, very moist, light olive brown	#200 Wash Fines = 57% PP = 4.5 tsf
6	44.5		3 4 5	20	SPT	CH	**Fat CLAY with SAND;** stiff, very moist, mottled yellowish brown with abundant white stringers (caliche)	#200 Wash Fines = 83% PP = 1.2-1.5 tsf
7	23.9		5 8 9	25	SPT	CH	**Sandy Fat CLAY;** very stiff, very moist, yellowish brown	#200 Wash Fines = 58% PP = 2.5-3 tsf
5	24.1	106	6 14 26	30	CD	CH	**Fat CLAY with SAND;** very stiff, very moist, light brown mottled yellowish brown	#200 Wash Fines = 76% PP=4-4.5 tsf
							End of boring @ 31' 6" Groundwater encountered @ 16'	
				35				
				40				

Legend: ▽ (groundwater) Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0447
Project Name : Borrow Site

Boring No. : B-5
Sheet : 1 **Of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Discovery
Date Drilled : 3-10-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0		**FILL:** **Sandy Lean Clay;** soft, moist, dark yellowish brown	
1	19.2		1 1 1		CL	**ALLUVIUM:** **Sandy Lean CLAY;** concretions and caliche, very soft, moist to very moist, dark yellowish brown	#200 Wash Fines = 70% PP = 1.6 tsf
2	19.3		1/10"	5	CL	**ALLUVIUM:** **Lean CLAY;** concretions and caliche, very soft, moist to very moist, dark yellowish brown	#200 Wash Fines = 87% PP=2-3.5 tsf
3	17.0		8 4 7		CL	**ALLUVIUM:** **Sandy Lean CLAY;** caliche stringers and concretions, stiff, moist to very moist, olive brown with white	#200 Wash Fines = 60% PP = 4.5 tsf
4	19.3		4 7 10	10		very stiff	#200 Wash Fines = 62% PP = 4.5 tsf
5	18.8	112	4 9 15	15	ML	**Sandy SILT;** very stiff, moist, olive brown with white specs	#200 Wash Fines = 50% PP=2.7-3.5 tsf
6	26.8	94	8 15 15	20	CH	**Fat CLAY with SAND;** very stiff, very moist, dark yellowish brown	#200 Wash Fines = 77% PP = 4.5 tsf
7	27.7	112	3 3 4	25	CH	**Sandy Fat CLAY;** caliche stringers and concretions, firm, very moist, dark yellowish brown w/ white, some brown	#200 Wash Fines = 60% PP=1-1.5 tsf
						End of boring @ 26' 6" Groundwater encountered at 23'	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0447
Project Name : Borrow Site

Boring No. : B-6
Sheet : 1 **Of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Discovery
Date Drilled : 3-10-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			CL	**FILL:** **Lean CLAY with SAND;** trace of organic, moist, brown	
1	18.3		2 3 3				CL	**ALLUVIUM:** **Lean CLAY with SAND;** trace of organics, concretions, firm, moist to very moist, olive brown with white specs	#200 Wash Fines = 79% PP=1.5-2.5 tsf
2	18.9		3 8 14	5			CL	**Sandy Lean CLAY;** abundant caliche and concretions, very stiff, very moist, light olive brown with white	#200 Wash Fines = 69% PP = 4.5 tsf
3	21.5		2 4 6					stiff, pale yellow mottled with olive brown	#200 Wash Fines = 62% PP=2.7-3 tsf
4	28.0		3 5 8	10			CH	**Fat CLAY with SAND;** layers of sandy silt, stiff, very moist, light olive brown	#200 Wash Fines = 84% PP=4-4.5 tsf
5	26.0		3 5 7	15				trace of gravel, caliche stringers	#200 Wash Fines = 77% PP = 4.5 tsf
6	36.9	84	5 8 14	20			CH	**Sandy FAT CLAY;** caliche, very stiff, very moist, light olive brown	#200 Wash Fines = 70% PP = 4.5 tsf
7	25.5	104	6 11 14	25					#200 Wash Fines = 60% PP=1.5-2 tsf
8	23.7	107		30					#200 Wash Fines = 74% PP=4-4.5 tsf
								End of boring @ 31' 6" Groundwater encountered @ 20'	
				35					
				40					

Groundwater Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0447
Project Name : Borrow Site

Boring No. : B-7
Sheet : 1 **Of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Discovery
Date Drilled : 3-10-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	8.6			0	SM	**FILL:** **Silty SAND;** fine to medium, trace of gravel, moist, dark yellowish brown	Gradation Fines = 32%
2	18.8		3 4 7		CL	**Lean CLAY with SAND;** concretions, stiff, very moist, dark yellowish brown	#200 Wash Fines = 81% PP = 4.5 tsf
3	15.3		7 14 12	5	CL	**ALLUVIUM:** **Sandy Lean CLAY;** concretions, very stiff, moist, pale yellow with white	#200 Wash Fines = 50% PP = 4.5 tsf
4	16.8		6 8 8			Caliche, olive brown with white inclusions	#200 Wash Fines = 58% PP = 4.5 tsf
5	18.9		3 5 10	10		abundant concretions and caliche, very moist	#200 Wash Fines = 68% PP=3-4.5 tsf
6	32.2		1 3 4	15	CH	**Sandy Fat CLAY;** layer of sandy silt, firm to stiff, very moist, yellowish brown	#200 Wash Fines = 58% PP=1.5-2 tsf
7	29.3	94	9 10 15	20		abundant concretions and caliche, very stiff, very moist, white with olive brown inclusions	#200 Wash Fines = 50% PP = 4.5 tsf
8	36.3	90	5 7 8	25	CH	**Fat CLAY with SAND;** concretions and caliche, firm to stiff, very moist, yellowish brown	#200 Wash Fines = 76% PP=1.5-4 tsf
				30		End of boring @ 26' 6" Groundwater encountered @ 20'	
				35			
				40			

Groundwater Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. :16-0447
Project Name : Borrow Site

Boring No. : B-8
Sheet : 1 **Of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Discovery
Date Drilled : 3-10-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
				0		CL	**FILL:** **Lean CLAY with SAND;** trace of gravel and asphalt, firm, moist, dark brown	
1	17.4		2 2 3		SPT			#200 Wash Fines = 80%
2	17.3		1 2 4	5	SPT	CL	**Sandy Lean CLAY;** layers of fine silty sand, firm, moist, dark brown with yellowish brown silty sand	#200 Wash Fines = 58% PP = 4.5 tsf
3	13.4		4 7 7		SPT	CL	**ALLUVIUM:** **Lean CLAY;** stiff, moist, dark yellowish brown	#200 Wash Fines = 85% PP = 4.5 tsf
4	21.5	99	6 12 14	10	CD	CL	**Lean CLAY with SAND;** pinhole porosity, very stiff, veri moist, dark yellowish brown (top) and light bluish brown (bottom)	#200 Wash Fines = 80% PP = 4.5 tsf
5	17.9	114	7 17 25	15	CD	CL	**Sandy Lean CLAY;** caliche stringers and concretions, hard, moist, light yellowish brown with white inclusions	#200 Wash Fines = 67% PP = 4.5 tsf
6	35.1	87	5 7 12	20	CD	CH	**Fat CLAY with SAND**; very stiff, very moist, thin silty sand layers, light yellowish brown with white inclusions	#200 Wash Fines = 80% PP=2-2.7 tsf
7	22.0	107	6 12 12	25	CD		olive brown with white inclusions	#200 Wash Fines = 81% PP = 4.5 tsf
8	38.0	95	9 15 21	30	CD	CH	**Fat CLAY**; very stiff, moist to very moist, dark brown	#200 Wash Fines = 93% PP = 4.5 tsf
				35			End of boring @ 31' 6" Groundwater encountered @ 30'	
				40				

Groundwater ▽ Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0447
Project Name : Borrow Site

Boring No. : B-9
Sheet : 1 **Of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Discovery
Date Drilled : 3-10-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
1	17.8			0	Bulk	CL	**FILL:** **Lean CLAY with SAND;** trace of gravel, soft, moist, dark yellowish brown	#200 Wash Fines = 75%
2	20.9		1 1 2		SPT	CL	**ALLUVIUM:** **Lean CLAY;** soft, moist, dark yellow and brown with white concretions	#200 Wash Fines = 85% PP=1.5-2.2 tsf
3	16.0		7 35 50/1"	5	SPT	CL	**Sandy Lean CLAY;** abundant concretions, hard, moist, white and very pale brown	#200 Wash Fines = 50%
4	23.6		4 3 2		SPT		firm, very moist	#200 Wash Fines = 57% PP=3-4.5 tsf
5	22.3	109	3 9 9	10	CD	CL	**Lean CLAY;** caliche stringers, stiff, very moist, light olive brown	#200 Wash Fines = 85% PP=1.5-2.2 tsf
6	17.6	107	3 10 11	15	CD	CL	**Sandy Lean CLAY;** layer of fine clayey sand, very stiff, moist, light olive brown	#200 Wash Fines = 50% PP=2-2.5 tsf
							End of boring @ 16' 6" Groundwater encountered @ 14'	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0447
Project Name : Borrow Site

Boring No. : B-10
Sheet : 1 **Of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Date Drilled : Discovery
Date Drilled : 3-10-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	45.2		2 2 4	0	Bulk		CL	**FILL:** **Sandy Lean CLAY;** pockets of grayish brown clay, organic material, topsoil, lome material, firm, wet, very dark brown	#200 Wash Fines = 50%
2	18.4		2 3 5	5	Bulk		CL	**ALLUVIUM:** **Lean CLAY;** rootlet inclusions, firm, moist to very moist, dark brown	#200 Wash Fines = 87% PP=2-3.5 tsf
3	18.2		2 4 6		Bulk		CL	**Lean CLAY with SAND;** caliche, stiff, moist to very moist, dark yellowish brown	#200 Wash Fines = 76% PP=4.2-4.5 tsf
4	19.8		2 4 6	10	Bulk	Groundwater			#200 Wash Fines = 81% PP=2.5-3.7 tsf
5	17.4	112	1 10 20	15	CD	Groundwater	SP-SM	**Poorly Graded SAND with SILT;** lumps of clay and trace of gravel, very stiff, wet, light olive brown	Gradation Fines = 11%
				20				End of boring @ 16' 6" Groundwater encountered @ 15' then it raised up to 10'	
				25					
				30					
				35					
				40					

Groundwater Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0447
Project Name : Borrow Site

Boring No. : B-11
Sheet : 1 **Of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Cascade
Date Drilled : 3-17-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	15.2			0	CL	**FILL:** **Lean CLAY with SAND;** abundant concretions, very stiff to hard, moist, dark brown	#200 Wash Fines = 75 %
2	19.7	99	6 17 22	5	CL	**ALLUVIUM:** **Sandy Lean CLAY;** abundant concretions**,** very stiff, very moist, very dark brown	#200 Wash Fines = 65% PP = >4.5 tsf
3	22.3					very moist, light yellowish brown with dark brown	
4	23.4			10	CL	**Lean CLAY;** stiff, very moist, dark brown	#200 Wash Fines = 85%
5	27.8	103	8 18 32	15	CH	**Fat CLAY;** layers of sandy silt, hard, moist, mottled olive brown and yellowish brown	#200 Wash Fines = 92% PP = 4.5 tsf
3	29.3		8 10 15	20	MH	**Elastic SILT with SAND;** layers of clay and silty sand, moist, very stiff, mottled gray and yellowish brown	#200 Wash Fines = 85% PP = 2 - 2.5 tsf
4	32.1		5 10 13	25			#200 Wash Fines = 81%
5	26.2	104	3 14 29	30	MH	**Sandy Elastic SILT;** layer of fine silty sand, moist, very stiff, mottled bluish gray and yellowish brown	#200 Wash Fines = 72% PP=3.5-4.5 tsf
6	26.2		12 19 25	35	CL	**Sandy Lean CLAY**; hard, moist, dark bluish gray	#200 Wash Fines = 72%
				40		End of boring @ 36' 6" Groundwater encountered @ 25'	

Groundwater ▽ Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. :16-0447

Project Name : Borrow Site

Boring No. : B-12

Sheet : 1 **Of :** 1

Drilling Method : Hollow Stem 6" Auger

Sampling Method : Bulk, CD

Hammer Weight : 140 lbs **Drop Height :** 30"

Location : See Figure A-2

Ground Elevation:

Drilling Co. : Cascade

Date Drilled : 3-17-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	14.1			0	Bulk		CL	**FILL:** **Sandy Lean CLAY with GRAVEL;** trace of wood and asphalt, dark brown	#200 wash Fines + 57%
2	28.1	89	2 4 6	5	CD		CH	**ALLUVIUM:** **Fat CLAY;** stiff, very moist,	#200 Wash Fines = 96% PP = 1.5 tsf
3	24.8				Bulk				
				10			SP-SM	**SAND with SILT and GRAVEL;** fine to coarse, cobbles	
4	22.3			15	Bulk		CL	**Sandy Lean CLAY with GRAVEL;** 75% of the sample has large gravel to 3", stiff, very moist, yellowish brown	#200 Wash Fines = 67%
				20				End of boring @ 16', Auger refusal on cobbles Near groundwater	
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0447
Project Name : Borrow Site

Test Pit No. : 1
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 3-17-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			CL	**FILL:** **Sandy Lean CLAY**	
1	19.0				Bulk		CL	**ALLUVIUM:** **Lean CLAY;** stiff, moist to very moist, dark olive brown	#200 Wash Fines = 85%
				5					
2	23.0				Bulk		CL	**Sandy Lean CLAY;** stiff, very moist, mottled brown and gray	Fines = 68% PP=2-2.5 tsf
3	20.2				Bulk			greenish gray with brown inclusions	Fines = 60% PP=1.5-2.5 tsf
4	20.4			10	Bulk				Fines = 51% PP=1.5-2.5 tsf
5	21.4				Bulk				Fines = 57% PP=1-1.5 tsf
								End of test pit @ 12' 6" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. :16-0447
Project Name : Borrow Site

Test Pit No. : 2
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 3-17-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			CL	**Fill: Sandy Lean CLAY**; stiff, very moist, yellowish brown	
1	30.4				Bulk		CH	**ALLUVIUM:** **Fat CLAY;** abundant calcium carbonate, stiff, very moist, mottled yellowish brown and white	#200 Wash Fines = 87% PP=1.5-2.5 tsf
2	21.1			5	Bulk		CL	**Sandy Lean CLAY;** abundant caliche, abundant calcium carbonate, stiff to very stiff, very moist, mottled green with white	#200 Wash Fines = 67% PP=1.5-4.0 tsf
								End of test pit @ 6' 6" No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. :16-0447
Project Name : Borrow Site

Test Pit No. : 3
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 3-17-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** Coarse sand at surface	
								Silty SAND; fine to coarse, slightly moist, olive	
							SM		
1	7.5				☒				Gradation Fines = 17%
				5					
2	6.8				☒				#200 Wash Fines = 16%
								End of test pit @ 7' No groundwater encountered Hole caving	
				10					
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0447
Project Name : Borrow Site

Test Pit No. : 4
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Drop Height :
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 3-17-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			CL	**FILL:** **Sandy Lean CLAY**	
1	19.7				Bulk		CL	**ALLUVIUM:** **Sandy Lean CLAY;** stiff, very moist, dark brown	Fines = 68% PP = 2 tsf
2	20.8				Bulk			greenish gray with brown inclusions	Fines = 68% PP = 2 tsf Corrosivity EI = 94
				5				at 6.5' max density = 120.5	
3	24.3				Bulk			caliche — optimum 12.4 %	Fines = 60% PP=1-1.75 tsf
								End of test pit @ 7' No groundwater encountered	
				10					
				15					
				20					
				25					
				30					
				35					
				40					

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. :16-0447
Project Name : Borrow Site

Test Pit No. : 5
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 3-17-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	25.8			0	Bulk		CL	**FILL:** **Lean CLAY;** stiff, very moist, black at 3.5' max density = 104.5 optimum 17.3%	Fines = 85% PP = 1.5 tsf Corrosivity EI = 35
2	50.2				Bulk		CL	**Lean CLAY with SAND;** stiff, wet, dark yellow brown, some organic, manure smell	Fines = 84% PP = 1.5 tsf
3	24.2			5	Bulk		CH	**ALLUVIUM:** **Fat CLAY;** stiff, very moist, gray	#200 Wash Fines = 88% PP = 2.5 tsf
4	26.0			10	Bulk			caliche, greenish gray with white and dark bands	#200 Wash Fines = 87% PP=1.75-2.5 tsf
				15, 20, 25, 30, 35, 40				End of test pit @ 9' 6" No groundwater encountered	

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0447
Project Name : Borrow Site

Test Pit No. : 6
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Ground Elevation:
Hammer Weight : **Drop Height :**
Drilling Co. : Gilstrap
Location : See Figure A-2
Date Drilled : 3-17-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			SC	**FILL: Clayey SAND;** fine to coarse, asphalt and concrete slab 8" thick by 2x3 ft, wood and concrete debris, mixture of silty sand and sandy clay	
1	17.7			5	Bulk		CL	**Sandy Lean CLAY;** firm, very moist, dark yellowish brown	#200 Wash Fines = 73% PP=1.5-2 tsf
2	16.8			10	Bulk		SC	**Clayey SAND; minor** wood and concrete, trace to little gravel, very moist, olive brown	#200 Wash Fines = 36%
				15, 20, 25, 30, 35, 40				End of test pit @ 12' No groundwater encountered	

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. :16-0447
Project Name : Borrow Site

Test Pit No. : 7
Sheet : 1 **Of :** 1

Drilling Method : Backhoe, John Deere 310SL
Sampling Method : Bulk
Ground Elevation:
Hammer Weight :
Drop Height :
Drilling Co. : Gilstrap
Location : See Figure A-2
Date Drilled :

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** Construction debris	
1	14.2						SC	**Clayey SAND;** trace of gravel, debris, moist to very moist, dark yellowish brown	#200 Wash Fines = 43%
2	27.0			5			CL	**Sandy Lean CLAY;** trace of gravel and concrete, cobbles and boulder sized material, stiff, moist, dark brown	#200 Wash Fines = 73% PP=1-1.5 tsf
3	13.6			10			SC	**Clayey SAND;** trace of wood and concrete, moist, dark yellowish brown	#200 Wash Fines = 49%
4	15.0						CL	**Sandy Lean CLAY;** coarse, little gravel, moist, brown	#200 Wash Fines = 55%
				15				End of test pit @ 12' 6" No groundwater encountered About 30% of the material is oversize	
				20					
				25					
				30					
				35					
				40					

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. :16-0447
Project Name : Borrow Site

Test Pit No. : 8
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Drop Height :
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 3-17-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	24.8			0–5			CL/CH	**FILL:** **Sandy Lean to Fat CLAY;** concrete debris to 3 feet size, rebars (about 15% not usable), old foundation burried at a depth of 5' to 6', firm to stiff, very moist, dark brownish yellow	#200 Wash Fines = 61%
2	23.9			5–8			CH	**ALLUVIUM:** **Fat CLAY with SAND;** firm to stiff, very moist, greenish gray with dark brown inclusions	Fines = 78% PP=0.8-1.2 tsf
3	28.3								Fines = 67% PP=0.75-1.5 tsf
								End of test pit @ 8' No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0447
Project Name : Borrow Site

Test Pit No. : 9
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled :

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	16.6			0	SC	**FILL: Clayey SAND;** trace of gravel, layers of silty sand, stiff, moist, yellowish brown	Fines = 46% PP=2.5-3 tsf
2	21.0				CL	**Sandy Lean CLAY;** stiff, very moist, olive brown (35% of material not usable)	Fines = 73% PP=1.5-3 tsf
3	21.6					trace of wood, some debris, firm, very moist, black	Fines = 50%
4	12.9			5	SM	**Silty SAND;** fine, trace of wood, dry to very moist, dark gray	#200 Wash Fines = 36%
				10	CL/CH	**Lean to Fat CLAY with SAND;** stiff to very stiff, very moist, black	
5	27.7						#200 Wash Fines = 83% PP=1.5-2.5 tsf
6	24.4					dark brown with gray	Fines = 78% PP=1.5-2 tsf
				15		End of test pit @ 15' No groundwater encountered	
				20			
				25			
				30			
				35			
				40			

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. :16-0447
Project Name : Borrow Site

Test Pit No. : 10
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 3-17-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	23.8			0	Bulk		CL	**FILL:** **Sandy Lean CLAY;** concretions, firm, very moist, dark yellowish with white	#200 Wash Fines = 71% PP=1-1.25 tsf
2	23.0			5	Bulk		CL	**Sandy Lean CLAY;** firm, very moist, dark brown	#200 Wash Fines = 72% PP=1.2-1.5 tsf
								End of test pit @ 6' No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0447
Project Name : Borrow Site

Test Pit No. : 11
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 3-17-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			SC	**FILL:** **Clayey SAND;** trace to little gravel, some cobble, asphalt, and boulders, very moist, dark yellowish brown	
1	15.5				Bulk				#200 Wash Fines = 47%
				5			CL	**Sandy Lean CLAY;** trace of wood, firm, wet, dark brown to black	
2	43.7				Bulk				#200 Wash Fines = 72% PP=0.7-1 tsf
				10			CL	**ALLUVIUM:** **Lean CLAY with SAND;** stiff, very moist, black	
3	18.2				Bulk				EI = 80 Fines = 82% PP=1.5-2.5 tsf
4	22.5				Bulk			very dark grayish brown at 12.5' max density = 119.1 pcf optimum 13.1%	Fines = 77% PP = 1.5 tsf
5	20.5			15	Bulk			dark gray	Fines = 77% PP=1.5-2.5 tsf
								End of test pit @ 15' 6" No groundwater encountered	
				20					
				25					
				30					
				35					
				40					

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0447
Project Name : Borrow Site

Test Pit No. : 12
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 3-17-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	25.0			0–4.5	Bulk		CL/CH	**FILL:** **Lean to Fat CLAY with SAND;** firm to stiff, very moist, very dark brown	#200 Wash Fines = 78%
2	25.9			4.5–9	Bulk		CL/CH	**Sandy Lean to Fat CLAY;** soft, very moist, mottled brown with white	#200 Wash Fines = 74% PP=0.5-1tsf
3	23.3			9–12	Bulk		CL/CH	**Lean to Fat CLAY with SAND;** very stiff, very moist, very dark brown	#200 Wash Fines = 84%
								End of test pit @ 12' No groundwater encountered	

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0447
Project Name : Borrow Site

Test Pit No. : 13
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Drop Height :
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 3-17-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	32.0			0			CL	**ALLUVIUM:** **Lean CLAY with SAND;** firm to stiff, very moist, dark brown	#200 Wash Fines = 81% PP = 2.5 tsf
2	24.4			5			CL	**Sandy Lean CLAY;** soft to firm, very moist, dark greenish gray	#200 Wash Fines = 73% PP=0.7-1.5 tsf
3	20.9							very stiff, dark yellowish brown	#200 Wash Fines = 71% PP=0.7-1.5 tsf
				10				End of test pit @ 9' 6" Groundwater encountered at 6'	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0447
Project Name : Borrow Site
Test Pit No. : 14
Sheet : 1 **Of :** 1
Drilling Method : Backhoe
Sampling Method : Bulk
Ground Elevation:
Hammer Weight :
Drop Height :
Drilling Co. : Gilstrap
Location : See Figure A-2
Date Drilled : 3-17-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			CL	**FILL:** **Sandy Lean CLAY;** moist, grayish brown	
							CL	**ALLUVIUM:**	
1	18.4			5	Bulk			**Sandy Lean CLAY;** stiff, very moist, grayish brown	#200 Wash Fines = 71% PP=2-2.5 tsf
2	19.8			10	SPT				#200 Wash Fines = 62% PP = 2 tsf
3	18.3			15	SPT		ML	**Sandy SILT;** fine, very moist, grayish brown	Fines = 50%
4	25.0				Bulk			wet	Fines = 70%
								End of test pit @ 16' Groundwater encountered @ 15' 3"	
				20					
				25					
				30					
				35					
				40					

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0447
Project Name : Borrow Site

Test Pit No. : 15
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 3-17-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			CL	**FILL:** **Sandy Lean CLAY**	
1	24.7				Bulk		CL	**ALLUVIUM:** **Sandy Lean CLAY;** very moist, very dark brown	#200 Wash Fines = 69%
2	24.1			5	Bulk		CL	**Lean CLAY with SAND;** very stiff, very moist, very dark brown	#200 Wash Fines = 77% PP = 4 tsf
3	18.2			10	Bulk		ML	**Sandy SILT;** very stiff, moist to very moist, yellowish red	#200 Wash Fines = 62% PP = 4.5 tsf
4	23.3			15	Bulk	Groundwater	CL	**Sandy Lean CLAY;** soft, very moist to wet, yellowish brown	#200 Wash Fines = 73%
								End of test pit @ 15' Groundwater encountered @ 14' 6"	
				20					
				25					
				30					
				35					
				40					

Groundwater Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. :16-0447
Project Name : Borrow Site

Test Pit No. : 16
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 3-17-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Lean CLAY with SAND;** moist, dark brown	
1 2	23.6 19.5			5	Bulk Bulk		CL	**ALLUVIUM:** **Lean Clay with SAND;** stiff to very stiff, very moist, strong brown	Fines = 83% PP=3.5-4.5 tsf Fines = 76%
3	20.9				Bulk		ML	**Sandy SILT;** layer of sandy clay, stiff, very moist, grayish brown	#200 Wash Fines = 66% PP=2.5-3 tsf
4	20.9			10	Bulk	Groundwater	CL	**Sandy Lean CLAY;** layer of sandy silt, firm to stiff, very moist, dark yellowish brown	#200 Wash Fines = 66% PP=1-1.5 tsf
				15 20 25 30 35 40				End of test pit @ 11' Groundwater encountered @ 10' 6"	

Groundwater Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0447
Project Name : Borrow Site

Test Pit No. : 17
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 3-17-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0	CL	**FILL: Lean CLAY with SAND;** stiff, very moist, very dark brown	
1	17.6						#200 Wash Fines = 78%
2	20.3				CL	**Sandy Lean CLAY;** concretions, very stiff, very moist, brownish yelow	#200 Wash Fines = 63% PP=2-4.5 tsf
				5			
					CH	**Sandy Fat CLAY;** stiff to very stif, very moist, yellowish brown	
3	24.3					at 8.5' max density = 118.1 optimum 13.0%	EI = 91 Fines = 71% PP=1.5-3 tsf
				10			
4	48.0					soft, wet, yellowish brown	#200 Wash Fines = 86%
						End of test pit @ 12' 6" Groundwater encountered @ 11' 6"	
				15			
				20			
				25			
				30			
				35			
				40			

Groundwater Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0447
Project Name : Borrow Site

Test Pit No. : 18
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 3-17-17

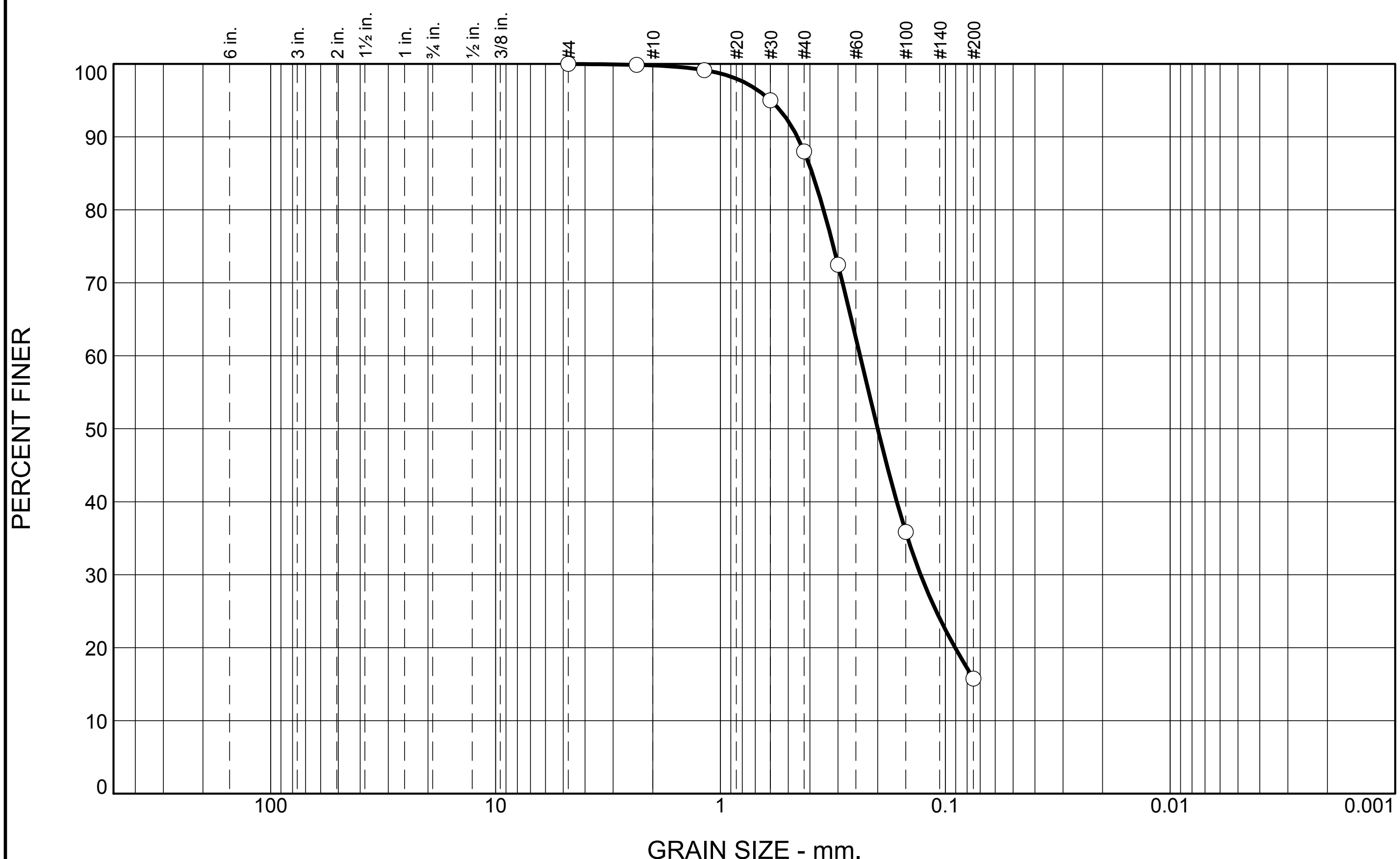
Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	20.8			0	Bulk		CL	**ALLUVIUM:** **Sandy Lean CLAY;** very moist, dark brown	#200 Wash Fines = 67%
2	23.2			5	Bulk		CL	**Lean CLAY;** soft, very moist, brown	#200 Wash Fines = 88% PP = 0.75 tsf
3	29.0			10	Bulk		CH	**Fat CLAY;** stiff to very stiff, very moist, yellowish brown	#200 Wash Fines = 85% PP=1.5-1.75 tsf
4	35.8			15	Bulk			very moist, grayish brown	#200 Wash Fines = 93% PP=1.75-2 tsf
				20, 25, 30, 35, 40				End of test pit @ 15' No groundwater encountered	

Bulk CD SPT

APPENDIX C

Laboratory Test Results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	11.8	72.3	15.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	99.9		
#16	99.2		
#30	95.0		
#40	88.0		
#50	72.5		
#100	35.9		
#200	15.7		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.4547 D_{85}= 0.3908 D_{60}= 0.2394
D_{50}= 0.2000 D_{30}= 0.1288 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Lab #4385 Series.

Location: B2 @ 30'
Sample Number: 4385 Series

Date: 4/10/17

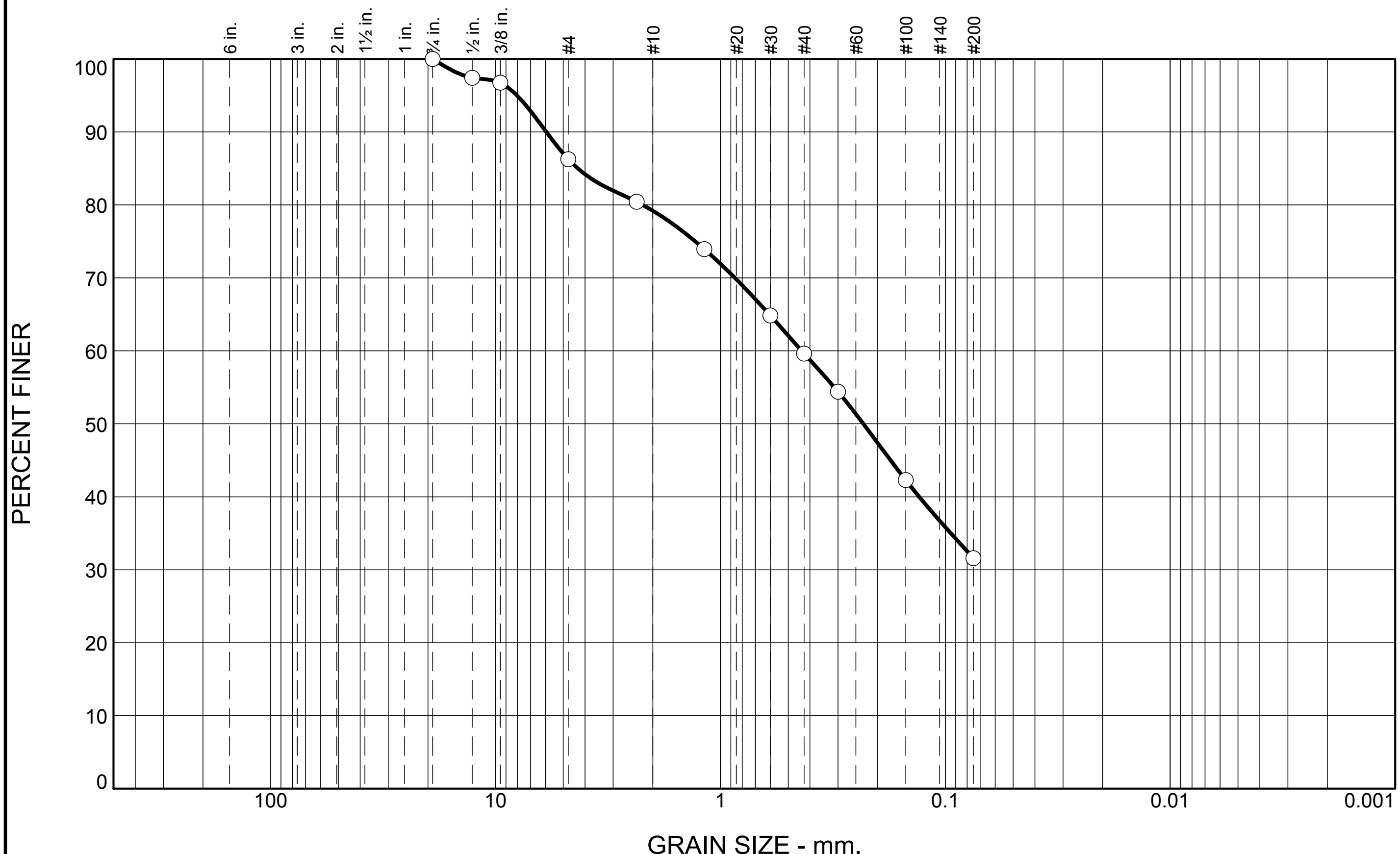
Koury Engineering & Testing, Inc.

Chino, CA

Client:
Project: Borrow Site
Project No: 16-0447 **Figure**

Tested By: J.Roy/MF Perry **Checked By:** ____________

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	13.7	7.1	19.6	28.0	31.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	97.4		
3/8	96.8		
#4	86.3		
#8	80.4		
#16	74.0		
#30	64.8		
#40	59.6		
#50	54.4		
#100	42.3		
#200	31.6		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 5.9412 D_{85}= 4.3097 D_{60}= 0.4357
D_{50}= 0.2316 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Lab #4385 Series.

Location: B7 @ 0' - 2'
Sample Number: 4385 Series

Date: 4/10/17

Koury Engineering & Testing, Inc.

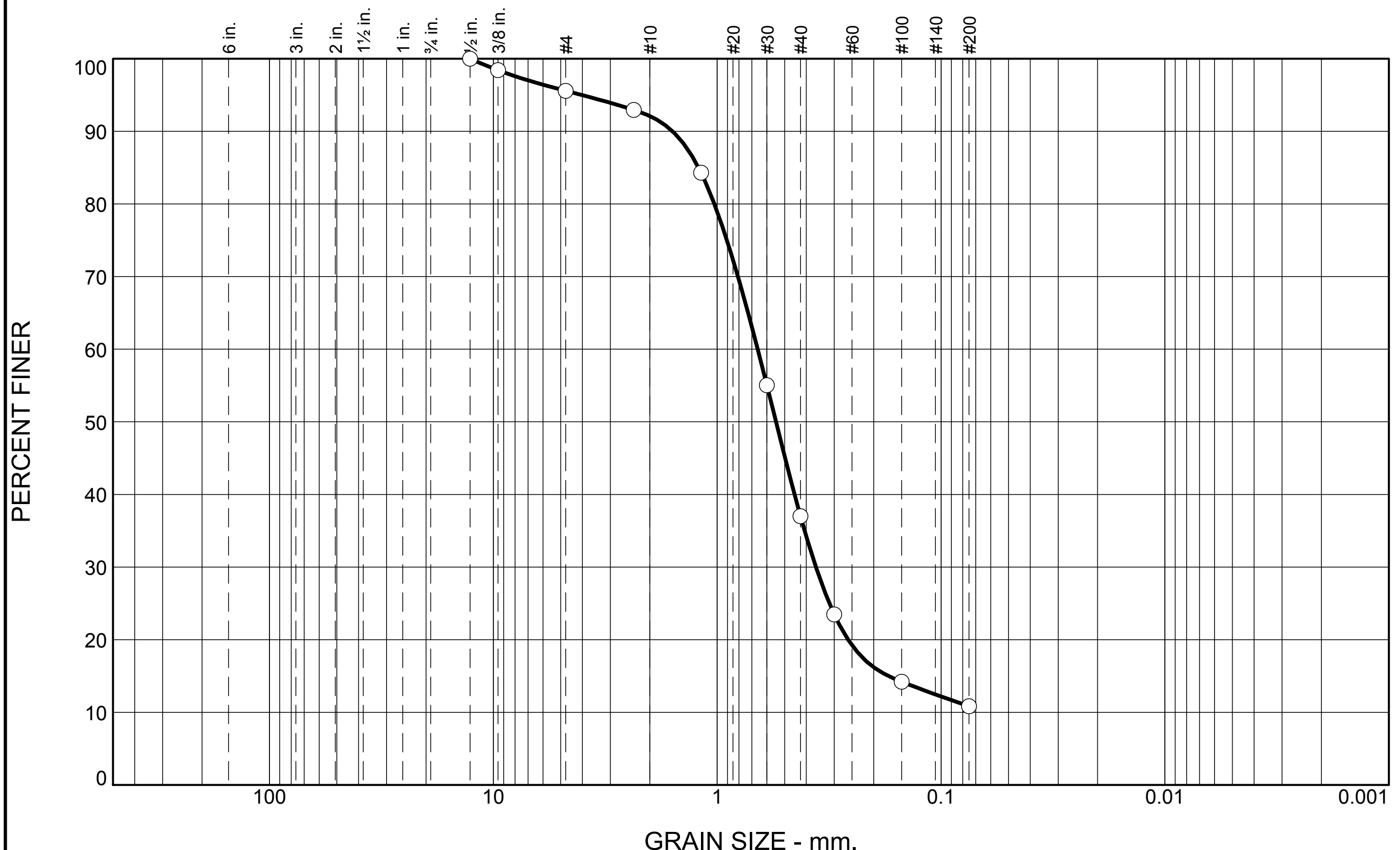
Chino, CA

Client:
Project: Borrow Site

Project No: 16-0447 **Figure**

Tested By: J.Roy/MF Perry **Checked By:** ____________

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.4	3.5	55.1	26.2	10.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2	100.0		
3/8	98.4		
#4	95.6		
#8	92.9		
#16	84.3		
#30	55.0		
#40	37.0		
#50	23.5		
#100	14.2		
#200	10.8		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.5810 D_{85}= 1.2108 D_{60}= 0.6593
D_{50}= 0.5463 D_{30}= 0.3625 D_{15}= 0.1720
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Lab #4385 Series.

Location: B10 @ 15'
Sample Number: 4385 Series **Date:** 4/10/17

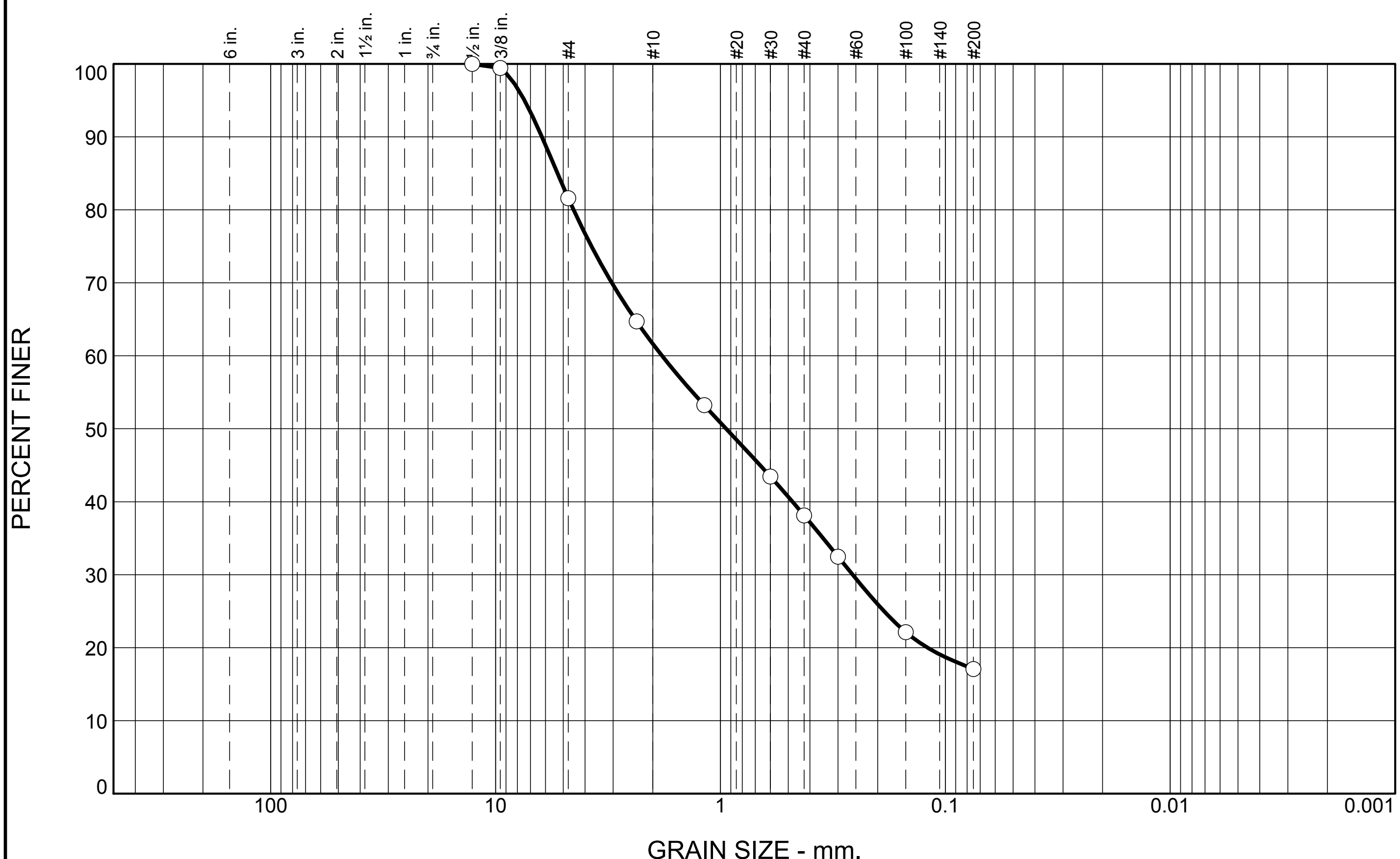
Koury Engineering & Testing, Inc.

Chino, CA

Client:
Project: Borrow Site
Project No: 16-0447 **Figure**

Tested By: J.Roy/MF Perry **Checked By:** ____________

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	18.4	19.9	23.6	21.0	17.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2	100.0		
3/8	99.5		
#4	81.6		
#8	64.7		
#16	53.2		
#30	43.5		
#40	38.1		
#50	32.5		
#100	22.1		
#200	17.1		

* (no specification provided)

Material Description

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 6.2186 D_{85}= 5.3000 D_{60}= 1.8185
D_{50}= 0.9436 D_{30}= 0.2583 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Lab #4385 Series.

Location: TP3 @ 3.5' - 4'
Sample Number: 4385 Series

Date: 4/10/17

Koury Engineering & Testing, Inc.

Chino, CA

Client:
Project: Borrow Site

Project No: 16-0447 **Figure**

Tested By: J.Roy/MF Perry **Checked By:** ____________

COMPACTION TEST REPORT

Curve No.: 4385 Series

Project No.: 16-0447 **Date:** 3/24/17

Project: Borrow Site

Client:

Location: TP-4 @ 6.5' -7'

Sample Number: 4385 Series

Remarks: Less than 5% Material retained on the #4 Sieve.

MATERIAL DESCRIPTION

Description: Light Yellowish Brown to Light Olive Brown Silty Clay

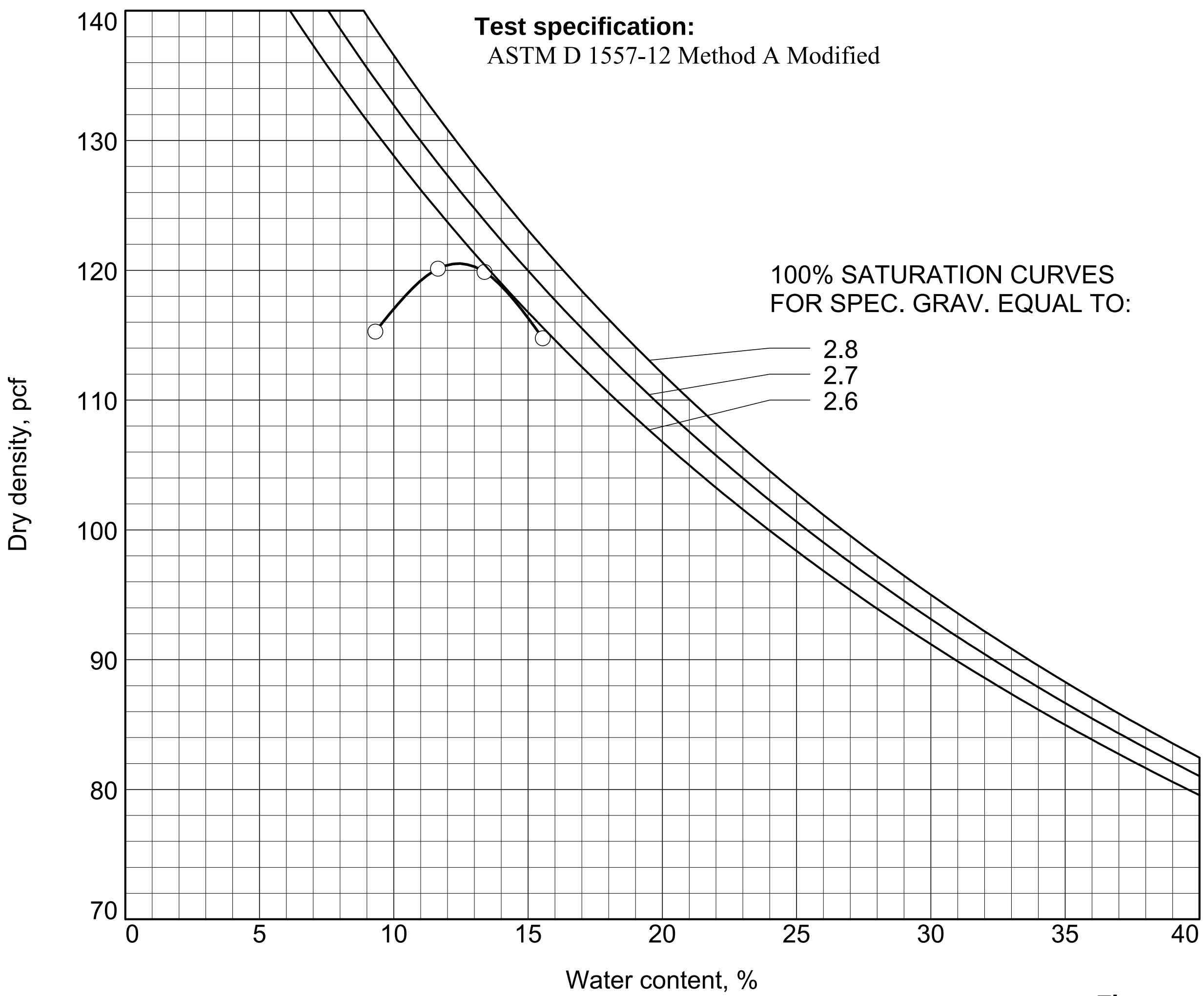
Classifications - **USCS:** CL **AASHTO:**

Nat. Moist. = **Sp.G. =**

Liquid Limit = **Plasticity Index =**

% < No.200 =

TEST RESULTS
Maximum dry density = 120.5 pcf
Optimum moisture = 12.4 %



Figure

Koury Engineering & Testing, Inc.

Tested By: Mathew F. Perry **Checked By:**

COMPACTION TEST REPORT

Curve No.: 4385 Series

Project No.: 16-0447 **Date:** 3/24/17

Project: Borrow Site

Client:

Location: TP-5 @ 3.5'

Sample Number: 4385 Series

Remarks: Less than 5% Material retained on the #4 Sieve.

MATERIAL DESCRIPTION

Description: Dark Brown to Dark Yellowish Brown Silt

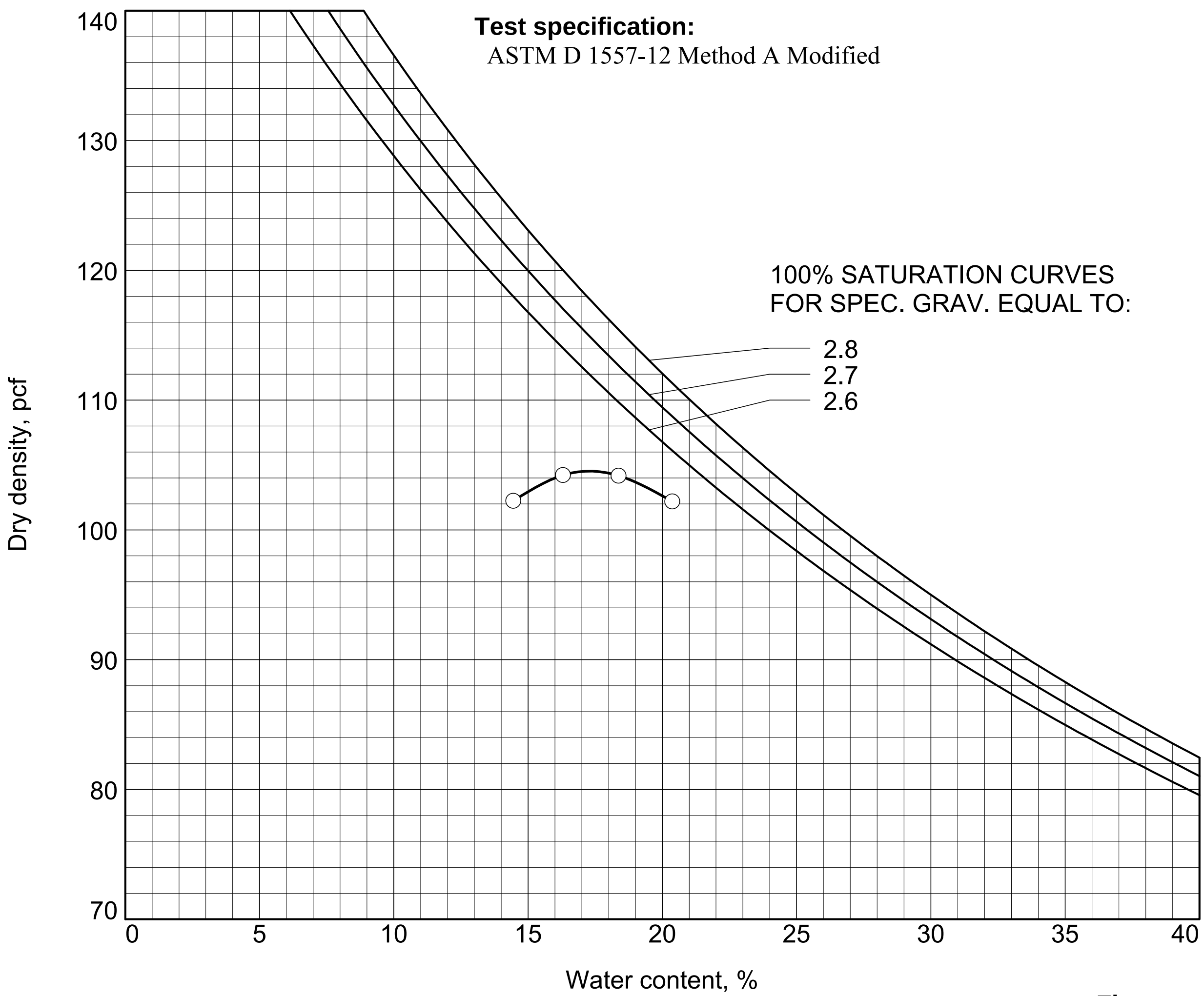
Classifications - **USCS:** ML **AASHTO:**

Nat. Moist. = **Sp.G. =**

Liquid Limit = **Plasticity Index =**

% < No.200 =

TEST RESULTS
Maximum dry density = 104.5 pcf
Optimum moisture = 17.3 %



Figure

Koury Engineering & Testing, Inc.

Tested By: Mathew F. Perry **Checked By:**

COMPACTION TEST REPORT

Curve No.: 4385 Series

Project No.: 16-0447 **Date:** 3/24/17

Project: Borrow Site

Client:

Location: TP-11 @ 12' - 12.5'

Sample Number: 4385 Series

Remarks: Less than 5% Material retained on the #4 Sieve.

MATERIAL DESCRIPTION

Description: Very Dark Greyish Brown Silty Clay

Classifications - **USCS:** CL **AASHTO:**

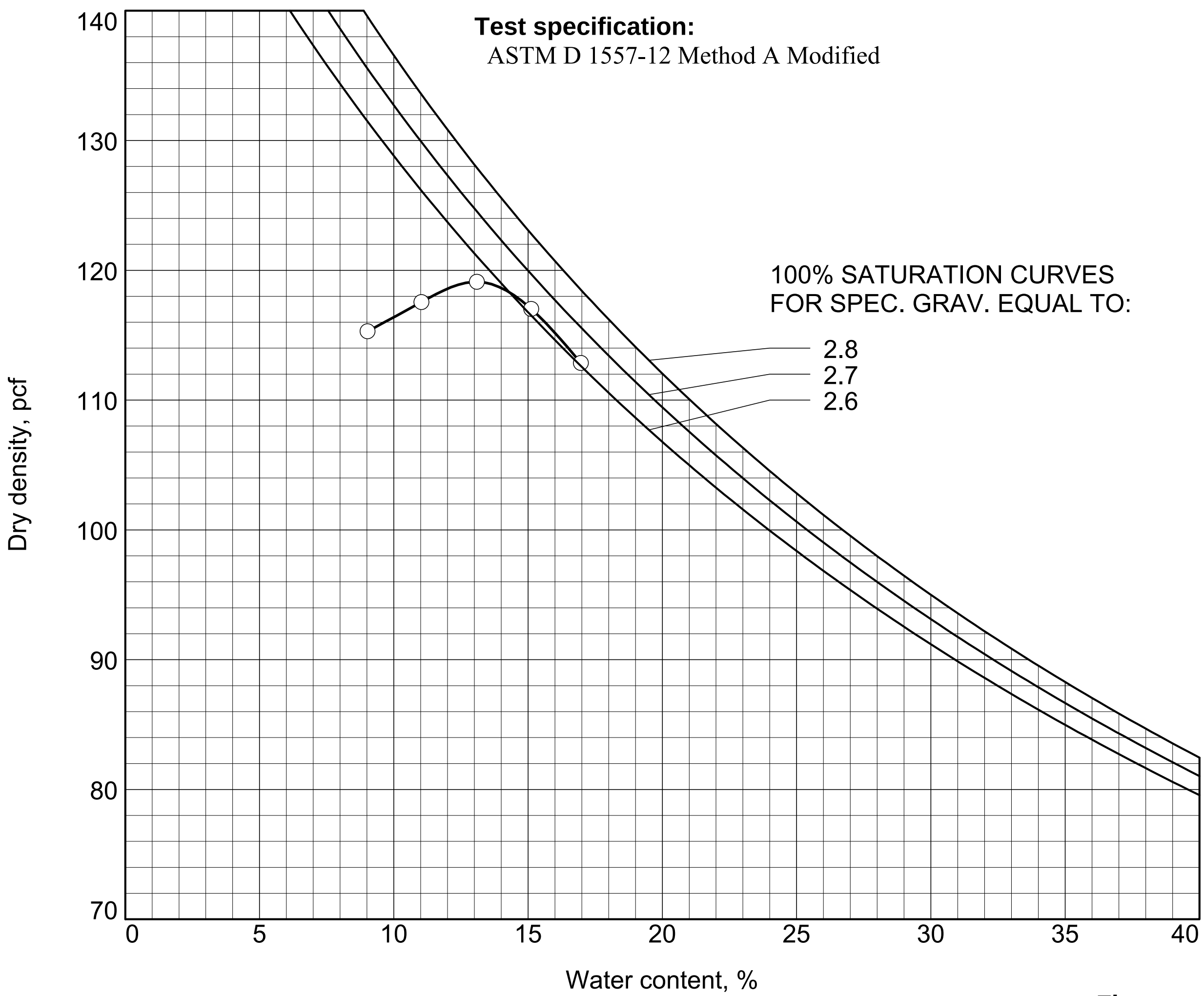
Nat. Moist. = **Sp.G. =**

Liquid Limit = **Plasticity Index =**

% < No.200 =

TEST RESULTS
Maximum dry density = 119.1 pcf
Optimum moisture = 13.1 %

Test specification:
ASTM D 1557-12 Method A Modified



Figure

Koury Engineering & Testing, Inc.

Tested By: Mathew F. Perry **Checked By:**

COMPACTION TEST REPORT

Curve No.: 4385 Series

Project No.: 16-0447 **Date:** 3/24/17

Project: Borrow Site

Client:

Location: TP-17 @ 8.5' - 9.5'

Sample Number: 4385 Series

Remarks: Less than 5% Material retained on the #4 Sieve.

MATERIAL DESCRIPTION

Description: Olive Brown to Light Olive Brown Clay

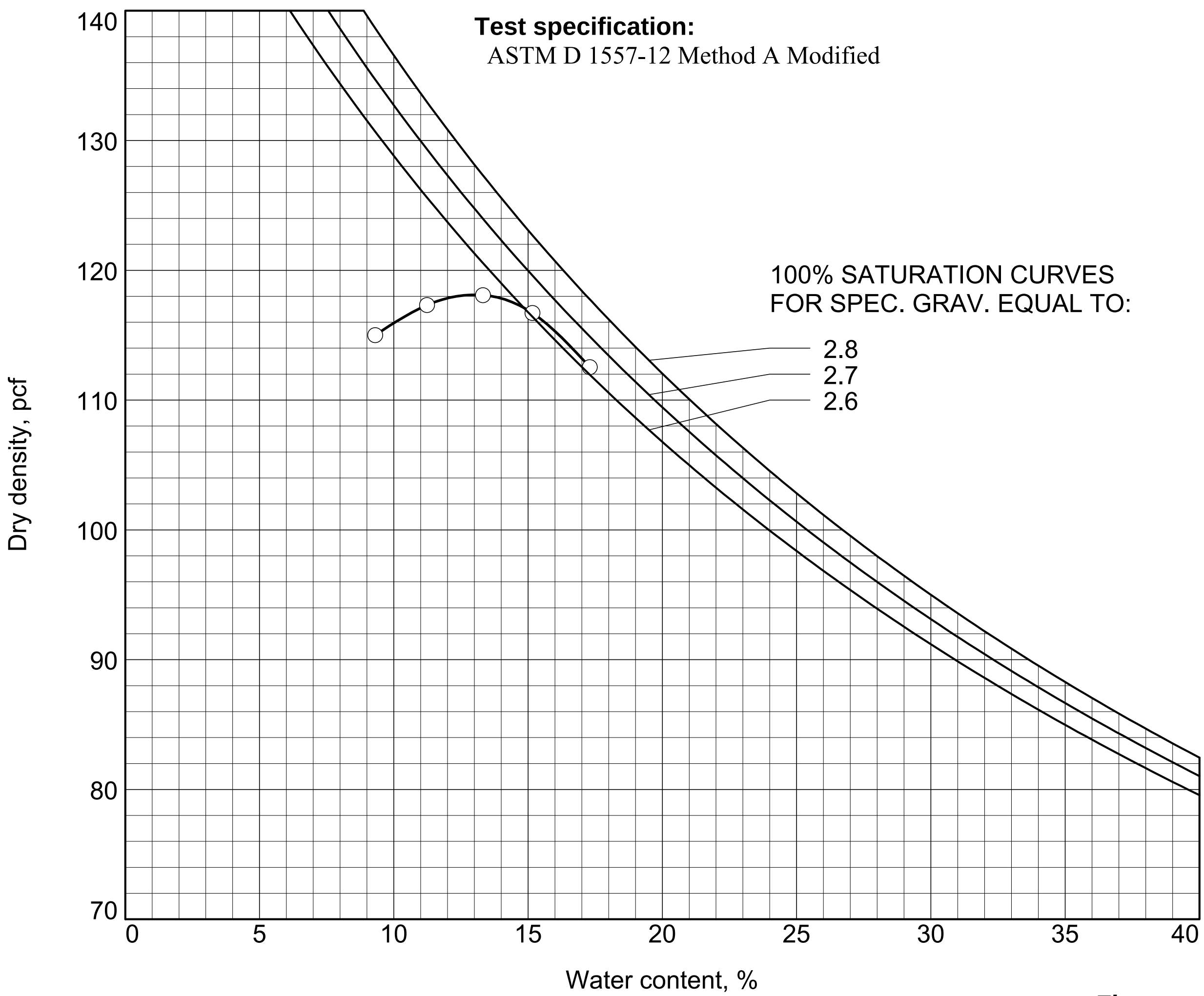
Classifications - **USCS:** CL/CH **AASHTO:**

Nat. Moist. = **Sp.G. =**

Liquid Limit = **Plasticity Index =**

% < No.200 =

TEST RESULTS
Maximum dry density = 118.1 pcf
Optimum moisture = 13.0 %



Figure

Koury Engineering & Testing, Inc.

Tested By: Mathew F. Perry **Checked By:** ____________

We are a key member of the construction team while safeguarding the public. We improve operational logistics and provide superior quality control through the continuing development of our engineering staff and technical expertise, utilization of classroom training and field supervisors, thus defining the industry standard.

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KOURY ENGINEERING & TESTING, INC.

GEOTECHNICAL & SEISMIC ENGINEERING, CONSTRUCTION INSPECTION & MATERIALS TESTING SERVICES

June 26, 2017
Project No. 17-0320

Mr. John R. Burroughs, LEED AP, President
Commerce Construction Co., L.P.
13191 Crossroads Parkway North 6th Floor
City of Industry, CA 91746

Subject: Feasibility Study, Proposed East Borrow Site
Southeast Corner of Pine Avenue & Johnson Avenue
City of Chino, CA

Dear Mr. Burroughs:

Presented herein are our preliminary findings and conclusions regarding the suitability of the soils to be used as engineered fill to balance the grade for the OC Prado site construction located on the southeast corner of Bickmore Avenue and Mountain Avenue, in the City of Chino.

The East Borrow Site consists of two vacant parcels with a total area of about 37 acres. The site is bounded by Pine Avenue to the north, Johnson Avenue to the west, OC Parks on the south and agricultural land on the east. A Site Vicinity Map with approximate ground contour elevations is presented in Appendix A as Figure A-1. Metal fences surround the site except for the east side where wooden fences separate the site from Johnson Avenue. The site is owned by the County of Orange Flood Control District.

Field Exploration and Laboratory Testing for Feasibility Study

The field exploration program for the feasibility study consisted of drilling four soil test borings and excavating nine test pits. Truck-mounted hollow-stem auger drilling equipment was used to drill the test borings to depths of about 31½ feet. In addition, a rubber tire mounted backhoe was used to excavate 9 test pits ranging in depths from about 11½ to 13½ feet. The locations of the borings and test pits are shown on the Field Exploration Map, Figure A-2, presented in Appendix A. Standard penetration test samples, California ring samples and bulk samples were obtained from the borings for laboratory testing, and bulk samples were obtained from the test pits. The contractor used a 140-lbs automatic hammer to drive the samplers 18 inches into the soils.

Laboratory tests, including moisture content, dry unit weight, #200 sieve wash, gradation, pocket penetrometer, expansion index, and plasticity index were performed to aid in the classification of the materials encountered and to evaluate their engineering properties. Sulfates, chlorides, resistivity, and PH tests (corrosivity tests) were also performed on selected samples. The results of pertinent laboratory tests are presented on the boring logs in Appendix B, and/or in Appendix C.

Site Geology

The site is located within the Upper Santa Ana River Valley, which consists of a series of coalescing alluvial fans formed by streams flowing out of the San Gabriel Mountains to the north. The valley lies within the Peninsular Ranges geomorphic province, which is characterized by alluviated basins, elevated erosion surfaces, and northwest-trending mountain ranges bounded by northwest trending faults. The site, which is located within the Chino Basin, is underlain by sediments deposited by the Santa Ana River and its tributaries such as the Chino Creek.

Morton and Miller (2006) show the site to be underlain by very old alluvial-fan deposits (See Figure A-3 in Appendix A). The sediments observed during drilling consisted predominantly of clay.

Surface Site Conditions

The site in its present state has been cleared of the past structures such as buildings, animal shelters, and other above ground ancillary facilities; however, it appears that several foundations and slab on grade are still in place. The dominant features of the site are few berms, a water pond that was constructed near the south end of the site, and power line towers. Many of the berms appear to have been constructed by pushing onsite soils into piles. Most of the berms have heights in the range of 3 to 5 feet and consist of relatively loose undocumented fill.

Near the southern end of the site, there is a detention basin approximately 100 feet long, 30 feet wide and 5 feet deep. High voltage overhead power lines, which are supported by steel towers, cross the site from east to west.

Soil Conditions

The subsurface soil profile consists generally of artificial fill underlain by alluvial deposits. For the most part, the fill is generally 1 to 3 feet thick except for the berms/levees that were constructed, which range in height predominantly between 3 and 5 feet. The fill derived from onsite soils consists predominantly of medium plastic clay (lean clay with sand and sandy lean clay).

The soils at shallow depth (upper 15 feet) consist predominantly of medium plastic clay with sand and interbeds of sandy lean clay and fat clay. No significant quantity of sand was encountered. The moisture contents are highly variable, ranging from about 11 to 34 percent with an average of about 18½ percent within the upper 15 feet. However, based on Table 1 presented below, many of the moisture contents are in the range of about 6 to 8 percent above optimum for the soils sampled within the upper 15 feet below existing grade.

Table 1 – Maximum Density Test Results

Test Pit Number	**TP-2**	**TP-5**
Maximum Dry Density (pcf)	103.0	114.0
Optimum Moisture Content (%)	21.2	15.3

To aid in the soils classification and to correlate the soil plasticity with the soils expansion, five plasticity index tests (Atterberg Limits) were performed on samples from depths ranging between about 2 and 21 feet. As shown in Table 2, the liquid limits for the tested samples range between about 35 and 81 and the plasticity index between 16 and 55, which indicate material ranging from low to high plasticity.

Table 2 – Plasticity Test Results

Test Pit/Boring No./Depth	**B-2**/21’	**B-4**/2’	**TP-2**/9’	**TP-3**/11’	**TP-5**/10’
Liquid Limit	62	35	81	39	35
Plastic Limit	31	17	26	21	19
Plasticity Index	31	18	55	18	16

The soil plasticity, thus the expansion potential, appears to generally increase with depth along with the moisture content. The site soils are generally expansive (EI>20). Table 3 presents the data for eight tests with depths ranging between 1 and 10 feet. These tests indicate expansion index up to 92 with an average of about 60.

Table 3 – Expansion Index Test Results

Test Pit/Boring No./Depth	**B-4**/2’	**TP-1**/5’	**TP-2**/9’	**TP-3**/1’	**TP-3**/5’	**TP-3**/10’	**TP-5**/6’	**TP-5**/10’
Expansion Index (EI)	38	57	92	27	62	85	58	40
Field Moisture (%)	16.4	21.4	33.8	18.3	24.2	20.9	25.4	25.5
Percentage of fines (%)	80	74	90	83	77	69	81	78

There is a rough correlation between in situ natural moisture content at depth and expansion index. For the same amounts of fines, site soils with higher moisture and higher plasticity index tend to have higher expansion index.

The corrosivity tests performed indicated that the site soils are generally corrosive to metal. However, the tests performed did not indicate high corrosivity to concrete. The corrosivity test results are summarized in the following Table 4.

Table 4 - Corrosion Test Results

Boring	Depth (ft)	Minimum Resistivity (ohm-cm)	pH	Soluble Sulfate Content (ppm)	Soluble Chloride Content (ppm)
TP-1	2 – 3	5,130	8.0	21	20
TP-5	8 – 8.5	1,690	7.8	135	50

Groundwater

Groundwater seepage was encountered in all the borings. Groundwater was encountered at a depth of about 27 feet in Borings B-1 and B-2 at the north end of the site. Groundwater was encountered at a depth of about 24½ feet near the center of the site and at a depth of about 21½ feet near the southwest end of the site in Boring B-4. The attached Field Exploration Map, Figure A-2, shows the locations of the borings and the corresponding groundwater depths.

Conclusions and Recommendations

Based on the data collected from the field to date, it appears feasible to import material from the East Borrow site to use at the OC Prado site. The shallow soils in the borrow site have some similarity with the shallow soils at the OC Prado site. It appears that with a combination of selective grading (and/or blending), the upper 15 to 17 feet of soils from the borrow site could be imported and used below the proposed building foundations at OC Prado. There are layers of high expansive soils within the upper 15 to 17 feet of subgrade; however, with proper mining and/or mixing, the resulting soil mixtures are anticipated to have expansion index less than 80. Drying back will be required; however, with proper mixing equipment, the moisture conditions should be manageable.

The soils below depths of 15 to 17 feet may be used below the proposed parking lot (preferably below a depth of 2 feet below finished subgrade) and at depths exceeding 4 feet below the building foundations; however, because of their relatively high moisture content and their expansion potential, they will be more difficult to process and to compact, and are less desirable from an engineering performance standpoint.

While the soil expansion index generally increases with depth, it is not uniform across the site and for all the layers. There are lenses and layers of more expansive soils sandwiched between lower expansive soil strata. The Field Exploration Map shows the boring and test pit locations and the zones within each exploration point where soils with expansion index of 80 or greater are deemed present. For quantity estimate purpose, we anticipate that the one to three-foot thick zones that have higher expansive soils will be mixed with the less expansive soils.

We recommend that additional borings and test pits be excavated to further determine the variation of moisture contents and soil expansivity with depth. Because the soil moisture contents increase near the water table, we suggest to limit the borrow site excavation depth to about 5 feet above the water table.

LIMITATIONS

Our work was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of Koury's profession practicing in the same locality, under similar conditions and at the date the services are provided.

CLOSURE

The findings and recommendations presented in this report were based on the results of our field and laboratory investigations, combined with professional engineering experience and judgment. The report was prepared in accordance with generally accepted engineering principles and practice. We make no other warranty, either expressed or implied. Subsurface variations between and beyond the borings/test pits should be anticipated. Koury should be notified if subsurface conditions are encountered, which differ from those described in this report. Samples obtained during this investigation will be retained in our laboratory for a period of 45 days from the date of this report and will be disposed after this period.

Should you have any questions concerning this submittal, or the recommendations contained herewith, please do not hesitate to call our office.

Respectfully submitted,

KOURY ENGINEERING & TESTING, INC.

Jacques Roy

REGISTERED PROFESSIONAL ENGINEER
JACQUES B. ROY
NO. 2077
Ex. Date 9/30/19
Geotechnical
STATE OF CALIFORNIA

Jacques B. Roy, P.E., G.E.
Principal Engineer

Distribution: 1. Addressee (2 wet stamped copies + a pdf copy via e-mail)
2.File (B)

REFERENCES

1. California Division of Mines and Geological Survey, 1998, Seismic Hazard Zone Report 045 for the Prado Dam 7.5 Minute Quadrangle, California.

2. California Division of Mines and Geological Survey, 2003, Earthquake Fault Zones, Prado Dam Quadrangle, May 1, 2003.

3. City of Chino General Plan, Safety Element, 2010, Final Report.

4. US Army Corps of Engineers, Geotechnical Investigations, Engineering Manual EM 1110-1-1804, dated 8/26/86.

5. US Army Corps of Engineers, Laboratory Soils Testing, Engineering Manual EM 1110-2-1906, dated 8/26/86.

APPENDICES

Appendix A: Maps and Plans

Vicinity Map – Figure A-1
Boring Location Map – Figure A-2
Geology Map – Figure A-3

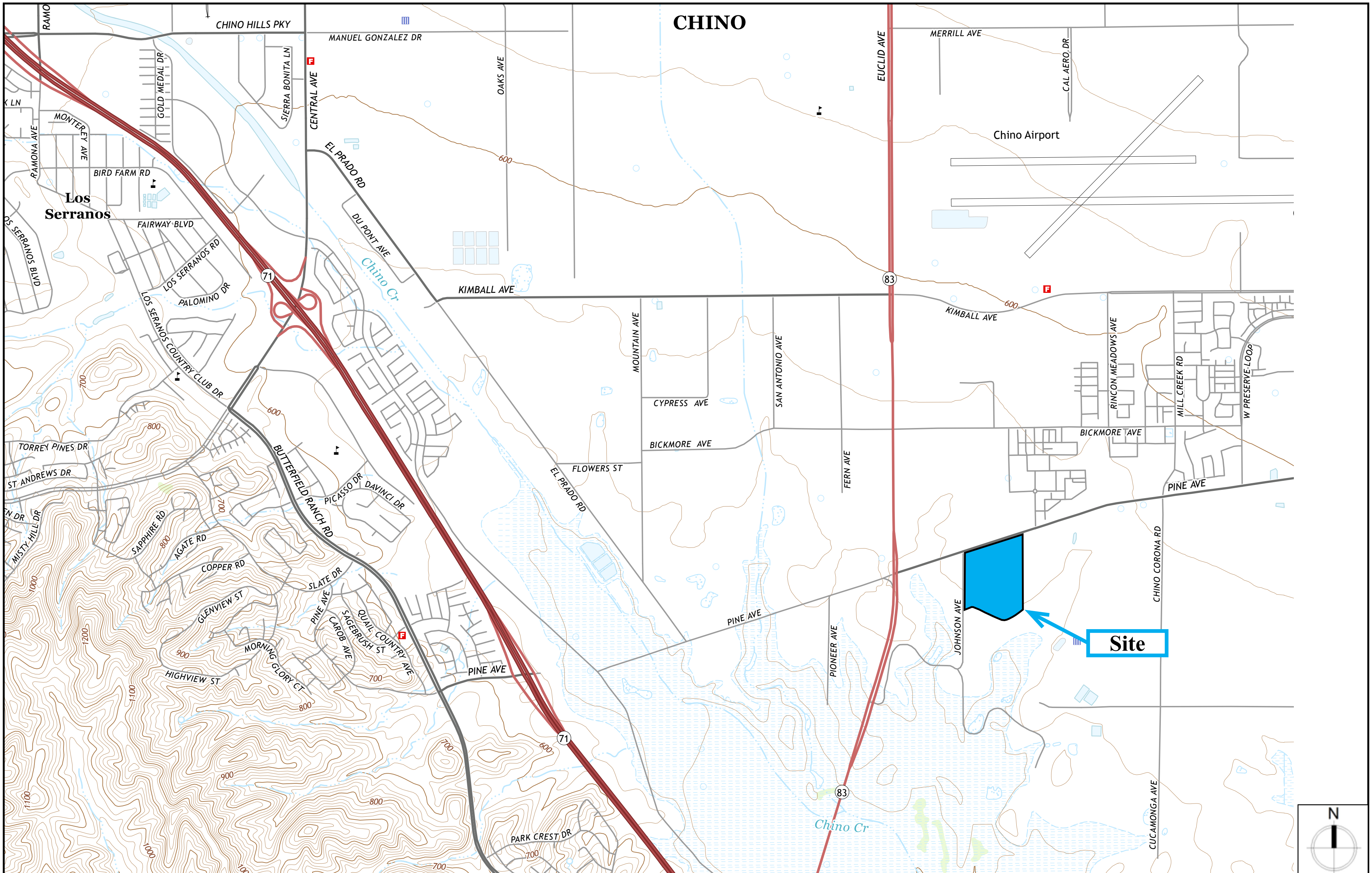
Appendix B: Field Exploratory Boring Logs and Test Pits

Borings B-1 through B-4 and Test Pits 1 through 9

Appendix C: Laboratory Test Results

APPENDIX A

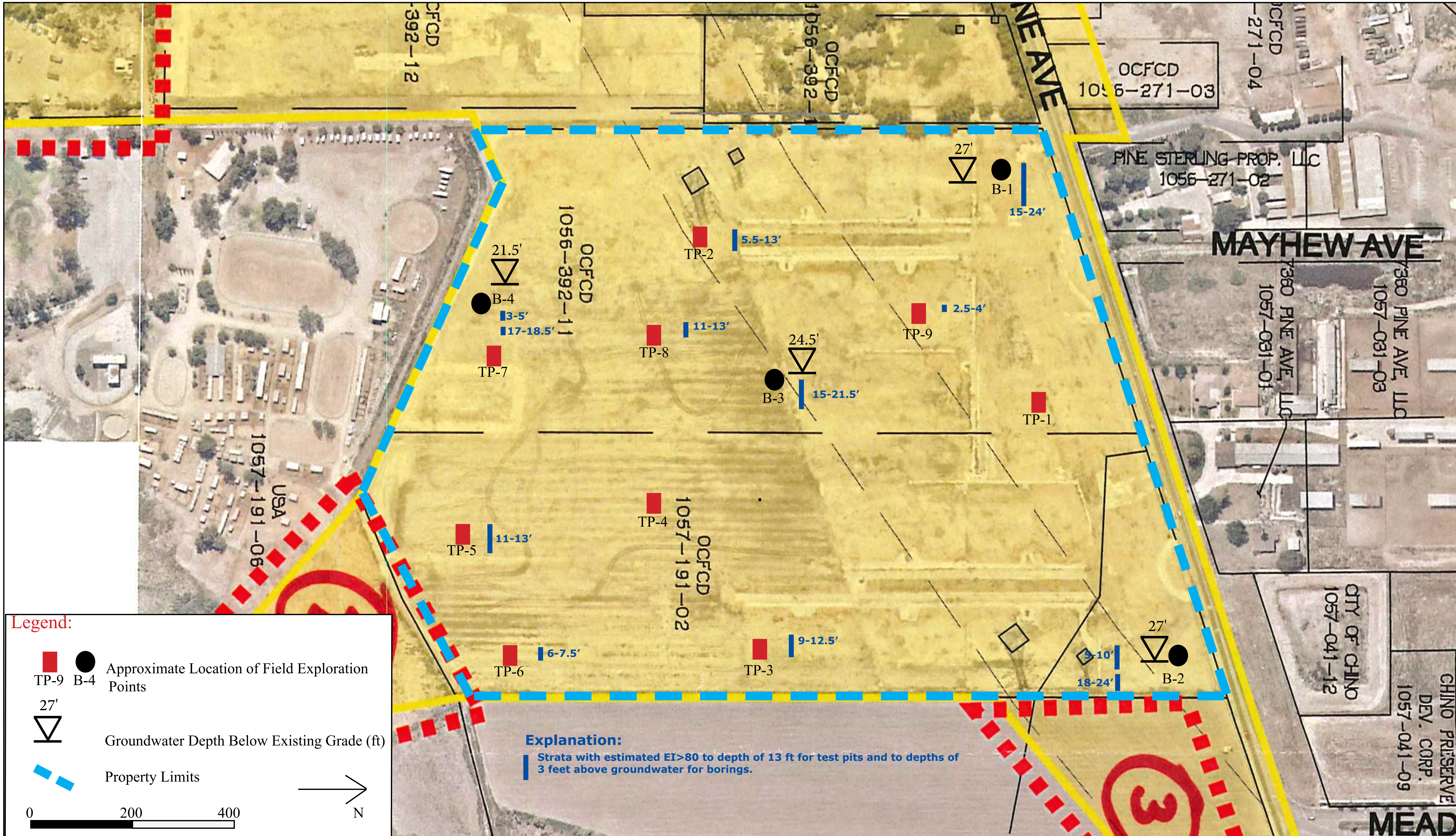
Maps and Plans



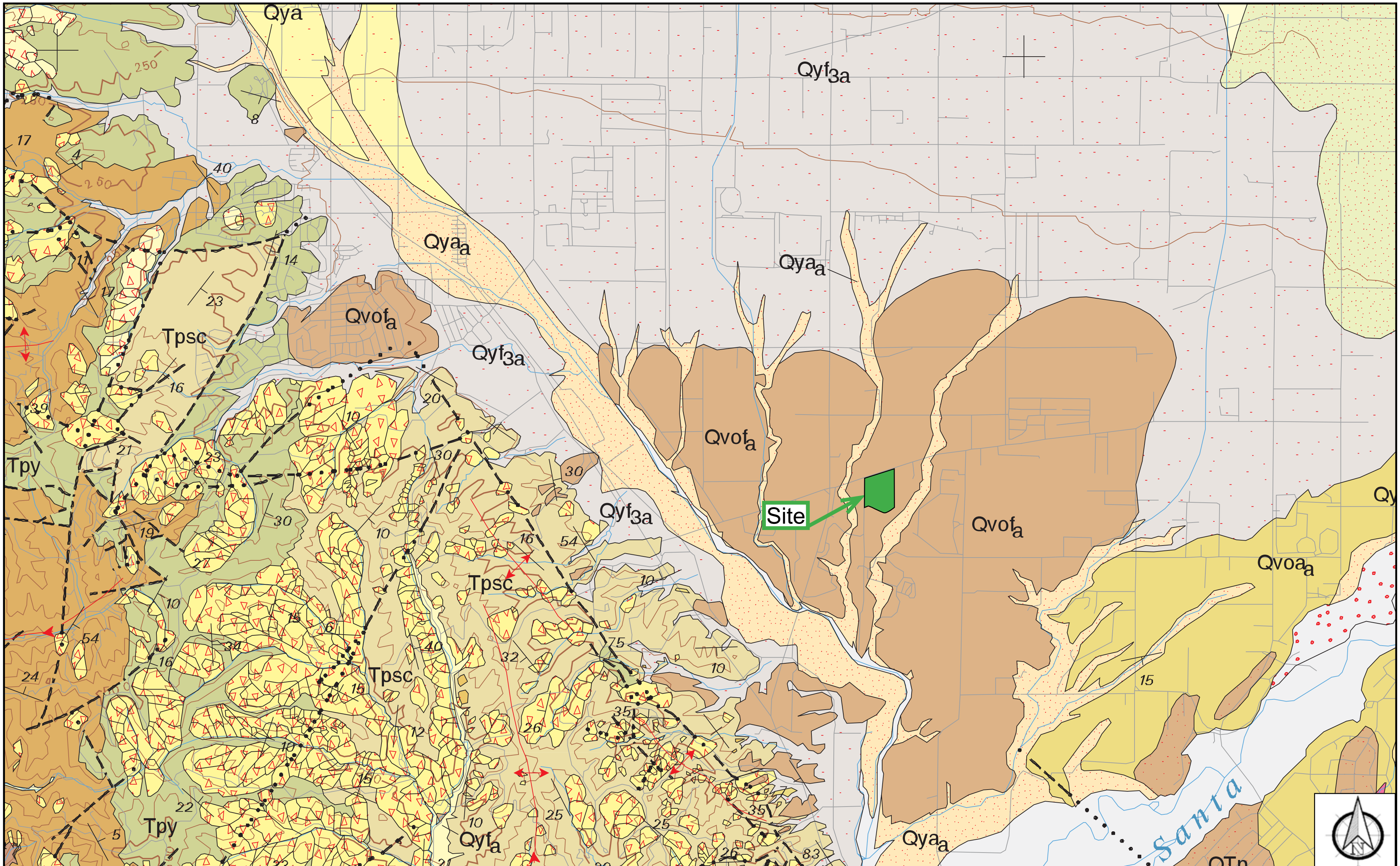
Reference: USGS Topographic Map, Prado Dam Quadrangle, California, 7.5 Minute Series 2015 - Contour Interval 20 feet, NAVD of 1988

0 1/2 1 Mile

KOURY ENGINEERING & TESTING, INC.	Project Name: East Borrow Site Phase II	Project No.: 17-0320 Date: July 2017	Drawing Title: Vicinity Map	Figure: A-1



KOURY ENGINEERING & TESTING, INC.	Project Name: East Borrow Site Phase II	Project No.: 17-0320 Date: July 2017	Drawing Title: Field Exploration Map	Figure: A-2



LEGEND

Qya	Young alluvial-valley deposits
Qvof	Very old alluvial-fan deposits

Reference: Geologic Map of the San Bernardino & Santa Ana 30´x60´ Quadrangle California-Version 1.0 Compiled by Douglas M. Morton and Fred K. Miller, 2006

KOURY ENGINEERING & TESTING, INC.	Project Name: East Borrow Site Phase II	Project No.: 17-0320 Date: July 2017	Drawing Title: Geology Map	Figure: A-3

APPENDIX B

Field Exploratory Boring Logs and Test Pits

KEY TO LOGS

SOILS CLASSIFICATION

MAJOR DIVISIONS			GRAPHIC LOG	USCS SYMBOL	TYPICAL NAMES
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS MORE THAN 50% OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS LESS THAN 5% FINES		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES MORE THAN 12% FINES		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS 50% OR MORE OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS LESS THAN 5% FINES		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES MORE THAN 12% FINES		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS 50% OR MORE OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 50			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT IS 50 OR MORE			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR GRAVELLY ELASTIC SILTS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT AND OTHER HIGHLY ORGANIC SOILS

GRAIN SIZES

SILT AND CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		
	#200	#40	#10	#4	3/4"	3"	12"

SIEVE SIZES

KEY TO LOGS (continued)

SPT/CD BLOW COUNTS VS. CONSISTENCY/DENSITY					
FINE-GRAINED SOILS (SILTS, CLAYS, etc.)			GRANULAR SOILS (SANDS, GRAVELS, etc.)		
CONSISTENCY	*BLOWS/FOOT		RELATIVE DENSITY	*BLOWS/FOOT	
	SPT	CD		SPT	CD
SOFT	0-4	0-4	VERY LOOSE	0-4	0-8
FIRM	5-8	5-9	LOOSE	5-10	9-18
STIFF	9-15	10-18	MEDIUM DENSE	11-30	19-54
VERY STIFF	16-30	19-39	DENSE	31-50	55-90
HARD	over 30	over 39	VERY DENSE	over 50	over 90

* CONVERSION BETWEEN CALIFORNIA DRIVE SAMPLERS (CD) AND STANDARD PENETRATION TEST (SPT) BLOW COUNT HAS BEEN CALCULATED USING "FOUNDATION ENGINEERING HAND BOOK" BY H.Y. FANG. (**VALUES ARE FOR 140 Lbs HAMMER WEIGHT ONLY**)

DESCRIPTIVE ADJECTIVE VS. PERCENTAGE	
DESCRIPTIVE ADJECTIVE	PERCENTAGE REQUIREMENT
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
AND	35 - 50%

*THE FOLLOWING "DESCRIPTIVE TERMINOLOGY/ RANGES OF MOISTURE CONTENTS" HAVE BEEN USED FOR MOISTURE CLASSIFICATION IN THE LOGS.

APPROXIMATE MOISTURE CONTENT DEFINITION	
DEFINITION	DESCRIPTION
DRY	Dry to the touch; no observable moisture
SLIGHTLY MOIST	Some moisture but still a dry appearance
MOIST	Damp, but no visible water
VERY MOIST	Enough moisture to wet the hands
WET	Almost saturated; visible free water

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 17-0320
Project Name : East Borrow Site

Boring No. : B-1
Sheet : 1 **Of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/30/17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	13.9			0	CL	**FILL:** **Lean CLAY with SAND;** moist, concretions, dark yellowish brown	#200 Wash Fines = 80%
2	14.4		7 9 11		CL	**ALLUVIUM:** **Lean CLAY with SAND;** very stiff, moist, concretions, yellowish brown with some white	#200 Wash Fines = 79% PP = 4.5 tsf
3	14.6	104	6 9 10	5	CL	**Sandy Lean CLAY;** very stiff, moist, abundant caliche, and concretions, pale yellow with white	#200 Wash Fines = 61% PP = > 4.5 tsf
4	16.1		4 5 6				#200 Wash Fines = 61% PP = 4.5 tsf
5	15.6	115	5 9 14	10			#200 Wash Fines = 57% PP = 4.5 tsf
6	27.6			15	CH	**Fat CLAY with SAND;** firm to stiff, thin layers of sandy silt, moist, light olive brown with some grayish brown	#200 Wash Fines = 82% PP = 1 tsf
7	23.7	102	10 14 18	20	ML	**Sandy SILT;** very stiff, moist, light olive brown with grayish brown, micaceous	#200 Wash Fines = 69%
8	31.2		6 6 8	25	CL/CH	**Lean to Fat CLAY;** stiff moist, yellowish brown	#200 Wash Fines = 88% PP=1.5-2.5 tsf
9	31.3	92	7 10 14	30			#200 Wash Fines = 86% PP=2.5-3.0 tsf
				35		End of boring @ 31' 6" Groundwater encountered @ 27'	
				40			

Groundwater Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. 17-0320
Project Name : East Borrow Site

Boring No. : B-2
Sheet : 1 **Of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Geoboden Inc.
Date Drilled : 5-30-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Sample Location	Soil Type (USCS)	Description	Additional Tests
1	11.1			Bulk	CL	**FILL:** **Lean CLAY with SAND;** stiff, moist, concretions, brown with yellowish brown	#200 Wash Fines = 78%
2	16.8	93	9 6 4	CD	CL	**ALLUVIUM:** **Sandy Lean CLAY**; stiff, moist, concretions, yellowish brown with white	#200 Wash Fines = 62% PP=3.5-4.5 tsf
3	22.9	93	1 1 1	SPT	CL		#200 Wash Fines = 82% PP = 2-2.5 tsf
4	25.0	116	8 14 18	CD	CL/CH	**Lean to Fat CLAY with SAND;** very stiff, moist, concretions, dark yellowish brown with some white	#200 Wash Fines = 85% PP = 4.5 tsf
5	15.5		5 6 11	SPT	CL/CH		#200 Wash Fines = 81% PP = 4.5 tsf
6	19.3	112	7 11 12	CD	CL	**Sandy Lean CLAY;** very stiff, moist to very moist, light olive brown/greenish	#200 Wash Fines = 55% PP = 4.5 tsf
7	41.4		3 4 4	SPT	CH	**Fat CLAY with SAND;** firm, some concretions, thin layers of sandy lean clay, light olive brown	#200 Wash Fines = 83% PP = 1.5 tsf LL = 62 PL = 31
8	29.2	100	5 5 7	CD	CH	stiff, moist to very moist, concretions, light olive brown	#200 Wash Fines = 92% PP = 3-4 tsf
9	31.5			SPT	CH		#200 Wash Fines = 76%

End of boring @ 31' 6"
Groundwater encountered @ 27'

Depth (ft): 0, 5, 10, 15, 20, 25, 30, 35, 40

Groundwater ▽ Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. 17-0320
Project Name : East Borrow Site

Boring No. : B-3
Sheet : 1 **Of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden Inc.
Date Drilled : 5-30-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Soil Type (USCS)	Description	Additional Tests
1	12.7			0	Bulk	CL	**FILL:** **Lean CLAY with SAND;** trace of gravel, stiff, moist, dark yellowish brown	#200 Wash Fines = 83%
2	19.9		6 8 10		SPT	CL	**ALLUVIUM:** **Lean CLAY with SAND;** very stiff, moist, olive brown with layers of pale yellow to white	#200 Wash Fines = 77% PP = 4.5 tsf
3	21.0	107	7 7 13	5	CD	CL	**Sandy Lean CLAY;** very stiff, moist to very moist, concretions, olive brown	#200 Wash Fines = 71% PP = 1-1.7 tsf
4	16.5		4 7 11		SPT	CL		#200 Wash Fines = 58% PP = 4.5 tsf
5	16.0	118	9 14 21	10	CD	CL		#200 Wash Fines = 61% PP = 3.5 tsf
6	30.5		4 6 7	15	SPT	CH	**Fat CLAY;** stiff, moist, to very moist, concretions, light olive brown	#200 Wash Fines = 85% PP = 2.0 tsf
7	29.4	100	6 9 11	20	CD	CH	**Fat CLAY with SAND;** layers of sandy silt, very stiff, moist to very moist, concretions, light olive brown	#200 Wash Fines = 75% PP = 4.5 tsf
8	25.0		5 6 10	25	SPT	CL/CH	**Sandy Lean to Fat CLAY with SAND;** very stiff, moist to very moist, brown	#200 Wash Fines = 80% PP=2-4.5 tsf
9	19.8	111	6 12 19	30	CD	CL	**Lean CLAY with SAND;** very stiff, moist, concretions olive yellow	#200 Wash Fines = 75% PP = 4.0 tsf
				35			End of boring @ 31' 6" Groundwater encountered @ 24' 6"	
				40				

Groundwater ▽ Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 17-0320
Project Name : East Borrow Site

Boring No. : B-4
Sheet : 1 **Of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden
Date Drilled : 5-30-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	16.4			0	CL	**FILL:** **Lean CLAY with SAND;** stiff, moist to very moist, dark brown	#200 Wash Fines = 80% EI = 38 LL = 35 PL = 17
2	22.8	104	4 7 9		CL/CH	**ALLUVIUM:** **Lean to Fat CLAY with SAND;** stiff, very moist, concretions, very pale brown with olive brown	#200 Wash Fines = 75% PP = 4.5 tsf
3	19.4		4 5 7	5	CL	**Sandy Lean CLAY;** stiff, moist, yellowish brown and grayish brown with some white	#200 Wash Fines = 63% PP = 4.5 tsf
4	12.3	121	5 12 19			light olive brown	#200 Wash Fines = 58% PP = 4.5 tsf
5	18.4		5 5 10	10			#200 Wash Fines = 52% PP = 4.5 tsf
6	13.8	118	5 22 40	15	SM	**Silty SAND;** fine, moist, yellowish brown	#200 Wash Fines = 13%
7	35.1	116	3 4 5	20	CH	**Fat CLAY with SAND;** lenses of sandy silt, stiff, very moist, concretions, light olive brown	#200 Wash Fines = 81% PP=1.5-1.75tsf
8	17.1	116	16 11 15	25	CH	**Sandy Lean CLAY;** very stiff, moist, light olive brown	#200 Wash Fines = 50% PP = 4.5 tsf
9			3 6 30	30	SP-SM	**Poorly Graded SAND with SILT;** fine to medium, wet, grayish brown	#200 Wash Fines = 6%
				35		End of boring @ 31' 6" Groundwater encountered @ 21' 6"	
				40			

Groundwater ▽ Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 17-0320
Project Name : East Borrow Site

Test Pit No. : 1
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 5-30-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				Few inches of gravel at surface Sandy Lean Clay @ 8"	
							CL	**ALLUVIUM @ 1.2'**	
1	13.7				Bulk		CL	**Sandy Lean CLAY;** moist, yellowish brown	#200 Wash Fines = 72% Corrosivity
2	21.4			5	Bulk		CL/CH	**Sandy Lean to Fat CLAY;** moist, stiff, abundant, concretions, yellowish brown with white	Fines = 74% EI = 57
3	15.7				Bulk		CL	**Sandy Lean CLAY;** moist, stiff, caliche, yellowish brown	#200 Wash Fines = 69%
4	14.0			10	Bulk		CL	Some white, few concretions	#200 Wash Fines = 60%
5	17.0				Bulk		CL	More white, abundant concretions	#200 Wash Fines = 57%
								End of test pit @ 11' 6" No groundwater encountered	

Depth (ft) scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 17-0320
Project Name : East Borrow Site

Test Pit No. : 2
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 5-30-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**Fill:** high organic content	
1	21.5				Bulk		CL	**ALLUVIUM:** **Lean CLAY with SAND;** moist to very moist, dark yellowish brown	#200 Wash Fines = 83%
2	15.4			5	Bulk				#200 Wash Fines = 82%
3	21.4				Bulk		CH	**Fat CLAY with SAND;** very moist, stiff to very stiff, trace of gravel, abundant concretions, dark yellowish brown	#200 Wash Fines = 83%
4	33.8			10	Bulk		CH	**Fat CLAY**; moist, stiff, concretions, greenish olive Max density = 103.0 pcf Optimum moisture = 21.2%	Fines = 90% EI = 92 LL = 81 PL = 26
5	30.6				Bulk			Concretions, caliche	#200 Wash Fines = 88%
				15				End of test pit @ 12' 6" No groundwater encountered	
				20					
				25					
				30					
				35					
				40					

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. :17-0320
Project Name : East Borrow Site

Test Pit No. : 3
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 5-30-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**Fill: Lean Clay with Sand**	
1	16.3				Bulk		CL	**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, dark, yellowish brown	#200 Wash Fines = 83% EI = 27
2	24.2			5	Bulk		CL/CH	**Lean to Fat CLAY with SAND;** stiff, moist to very moist, small concretions, yellowish brown	#200 Wash Fines = 77% EI=62
3	17.4				Bulk		CL	**Sandy Lean CLAY;** stiff, moist, trace concretions and caliche, dark yellowish brown	#200 Wash Fines = 61%
4	20.9			10	Bulk		CL/CH	**Sandy Lean to Fat CLAY;** stiff to very stiff, very moist, yellowish brown	Fines = 69% EI = 85 LL = 39 PL = 21
5	19.5				Bulk		CL	**Sandy Lean CLAY;** very stiff, moist, caliche, concretions, yellowish brown with rusty brown	#200 Wash Fines = 63%
				15				End of test pit @ 12' 6" No groundwater encountered	
				20					
				25					
				30					
				35					
				40					

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. :17-0320
Project Name : East Borrow Site

Test Pit No. : 4
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 5-30-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**Fill: Lean CLAY with SAND;** dark brown (topsoil)	
1	17.7				Bulk		CL	**ALLUVIUM:** **Lean CLAY with SAND;** trace of gravel, stiff, moist, concretions, dark yellowish brown	#200 Wash Fines = 85%
2	19.6				Bulk				#200 Wash Fines = 84%
3	21.1			5	Bulk		CL/CH	**Lean to Fat CLAY with SAND;** stiff, moist to very moist, caliche, calcium carbonate, some concretions, light olive brown with some green	#200 Wash Fines = 76%
				10					
				15				End of test pit @ 13' 6" No groundwater encountered	
				20					
				25					
				30					
				35					
				40					

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. :17-0320
Project Name : East Borrow Site

Test Pit No. : 5
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 5-30-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**Fill: Lean CLAY with SAND;** dark brown (topsoil)	
1	16.7				Bulk			**Lean CLAY with SAND;** moist to very moist, dark yellowish brown LL = 30 PL = 16	Fines = 86% LL = 30 PL = 16
2	16.9				Bulk			**ALLUVIUM:** **Lean CLAY with SAND;** very stiff, moist, few concretions, dark yellowish brown	#200 Wash Fines = 80%
				5					
3	25.4				Bulk		CL	**Lean CLAY with SAND;** stiff, moist to very moist, few concretions, caliche, dark yellowish brown	#200 Wash Fines = 81% EI = 58
4	21.0				Bulk			**Sandy Lean CLAY;** stiff, moist to very moist, concretions, light olive brown with white	#200 Wash Fines = 66%
5	25.5			10	Bulk			**Lean CLAY with SAND;** stiff, moist, concretions, very pale brown with white Maximum Dry Density 114.0 Optimum moisture 15.3%	#200 Wash Fines = 78% EI = 40 LL = 35 PL = 19
6	25.7				Bulk			few concretions, light olive brown with white	Fines = 78%
								End of test pit @ 13' 6" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 17-0320
Project Name : East Borrow Site

Test Pit No. : 6
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 5-30-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**Fill**	
1	16.2				Bulk		CL/CH	**Lean to Fat Clay with SAND;** stiff, moist, few concretions, very dark brown to dark yellowish brown with white	#200 Wash Fines = 83%
2	19.8				Bulk				#200 Wash Fines = 83%
3	20.2			5	Bulk			**Sandy Lean to Fat CLAY;** stiff, moist to very moist, abundant concretions, light olive brown with pale yellow	#200 Wash Fines = 66%
4					Bulk			**Lean to Fat CLAY with SAND;** stiff, moist to very moist, few concretions, caliche, light olive brown with green	#200 Wash Fines = 82%
5	19.5			10	Bulk		CL	**Sandy Lean CLAY;** stiff, moist, caliche, few concretions, light olive brown	#200 Wash Fines = 74%
6	16.7				Bulk				#200 Wash Fines = 70%
				15				End of test pit @ 12' No groundwater encountered	
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 17-0320
Project Name : East Borrow Site

Test Pit No. : 7
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 5-30-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			CL	**Fill: Lean CLAY with SAND;** black	
1 2	16.4 15.1				Bulk Bulk		CL	**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, numerous concretions, dark yellowish brown to dark brown	Fines = 82% Fines = 78%
3	20.1				Bulk				#200 Wash Fines = 83%
				5					
4	19.2				Bulk		CL	**Sandy Lean CLAY;** stiff, moist, concretions, caliche, light olive brown with green	#200 Wash Fines = 62%
5	17.8				SPT				#200 Wash Fines = 61%
				10					
6	17.6				SPT				#200 Wash Fines = 53 %
								End of test pit @ 13' No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 17-0320
Project Name : East Borrow Site

Test Pit No. : 8
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Drop Height :
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 5-30-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			CL	**Fill: Lean CLAY with SAND;** brown	
1	16.1				Bulk		CL	**Lean CLAY with SAND;** stiff, moist, few concretions, dark brown to dark yellowish brown	#200 Wash Fines = 86%
2	16.0				Bulk				#200 Wash Fines = 76%
3	15.9				SPT			**Sandy Lean CLAY;** stiff, moist, abundant concretions, light yellowish brown with white	#200 Wash Fines = 54%
				5					
4	16.6			10	Bulk			light olive brown with green	#200 Wash Fines = 62%
5	20.3				SPT			caliche, calcium carbonate, with rusty brown specs	#200 Wash Fines = 64%
								End of test pit @ 13' No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 17-0320
Project Name : East Borrow Site

Test Pit No. : 9
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Drop Height :
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 5-30-17

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0	CL	**Fill: Lean CLAY with SAND;** brown	
1	13.0				CL	**ALLUVIUM:** **Lean Clay with SAND;** very stiff, moist, abundant concretions, dark yellowish brown	#200 Wash Fines = 80%
2	20.0					crumbly, desiccated, abundant caliche, light yellowish brown with white	#200 Wash Fines = 75%
3	18.8			5		**Sandy Lean CLAY;** stiff to very stiff, moist, some large concretions, very pale brown with white	#200 Wash Fines = 72%
4	17.4				ML	**Sandy SILT;** firm to stiff, moist, few concretions, large chunk of caliche, light olive brown with green	#200 Wash Fines = 70%
				10			
5	14.2						#200 Wash Fines = 44%
6	19.8				CL	**Sandy Lean CLAY;** firm to stiff, moist, few concretions light olive brown with green	#200 Wash Fines = 50%
						End of test pit @ 13' 6" No groundwater encountered	
				15			
				20			
				25			
				30			
				35			
				40			

Bulk ☒ CD ■ SPT ☒

APPENDIX C

Laboratory Test Results

MAXIMUM DENSITY TEST REPORT

Curve No.: 4467 Series

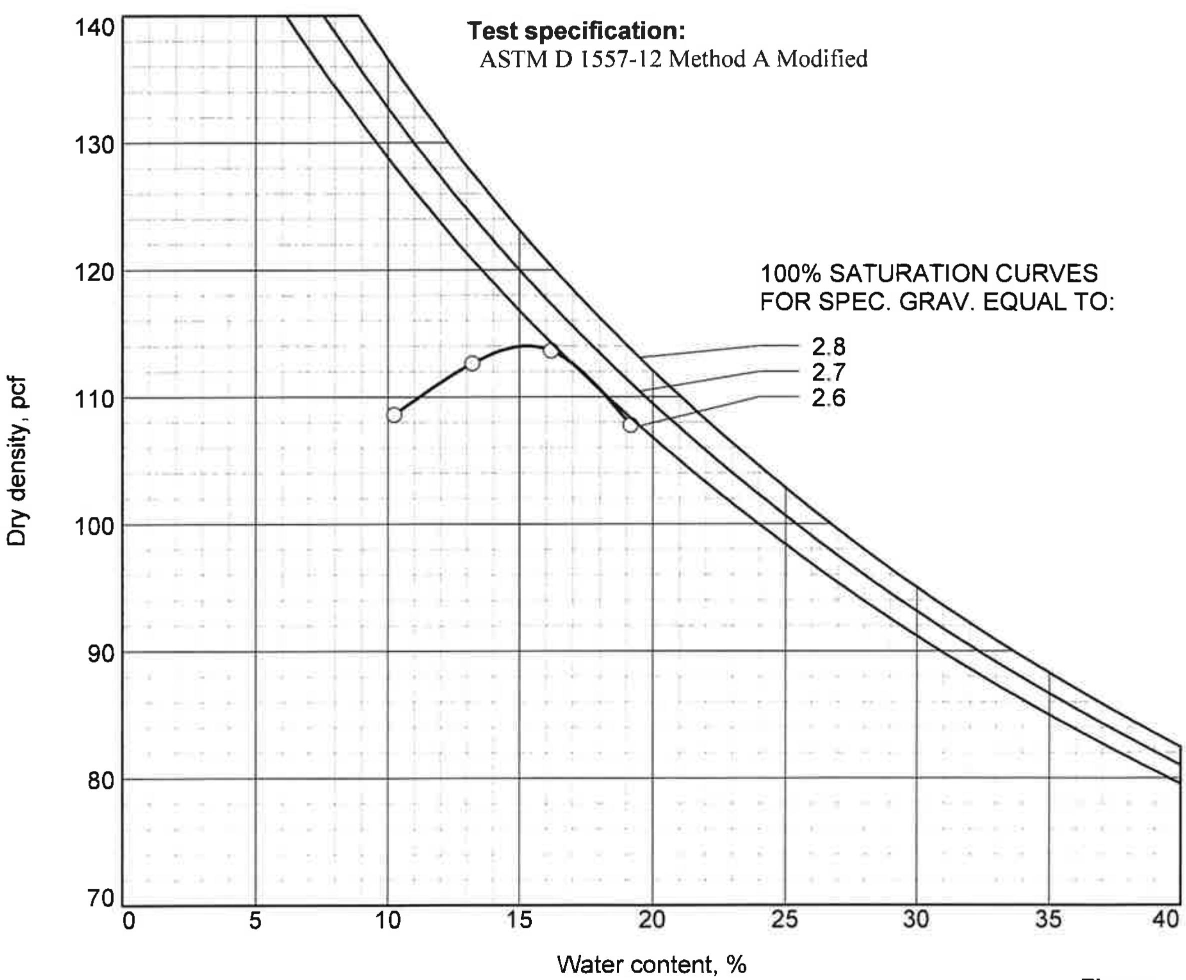
Project No.: 17-0320 **Date:** 6/27/17
Project: East Borrow Site
Client:
Location: TP-5 @ 9.5' - 10.5'
Sample Number: 4467 Series
Remarks: Less than 5% Material retained on the #4 Sieve.

MATERIAL DESCRIPTION

Description: Light Grey to Very Pale Brown Silty Clay

Classifications - **USCS:** CL **AASHTO:**
Nat. Moist. = **Sp.G. =**
Liquid Limit = 35 **Plasticity Index =** 16
% < No.200 =

TEST RESULTS
Maximum dry density = 114.0 pcf
Optimum moisture = 15.3 %



Figure

Koury Engineering & Testing, Inc.

Tested By: BT **Checked By:**

MAXIMUM DENSITY TEST REPORT

Curve No.: 4467 Series

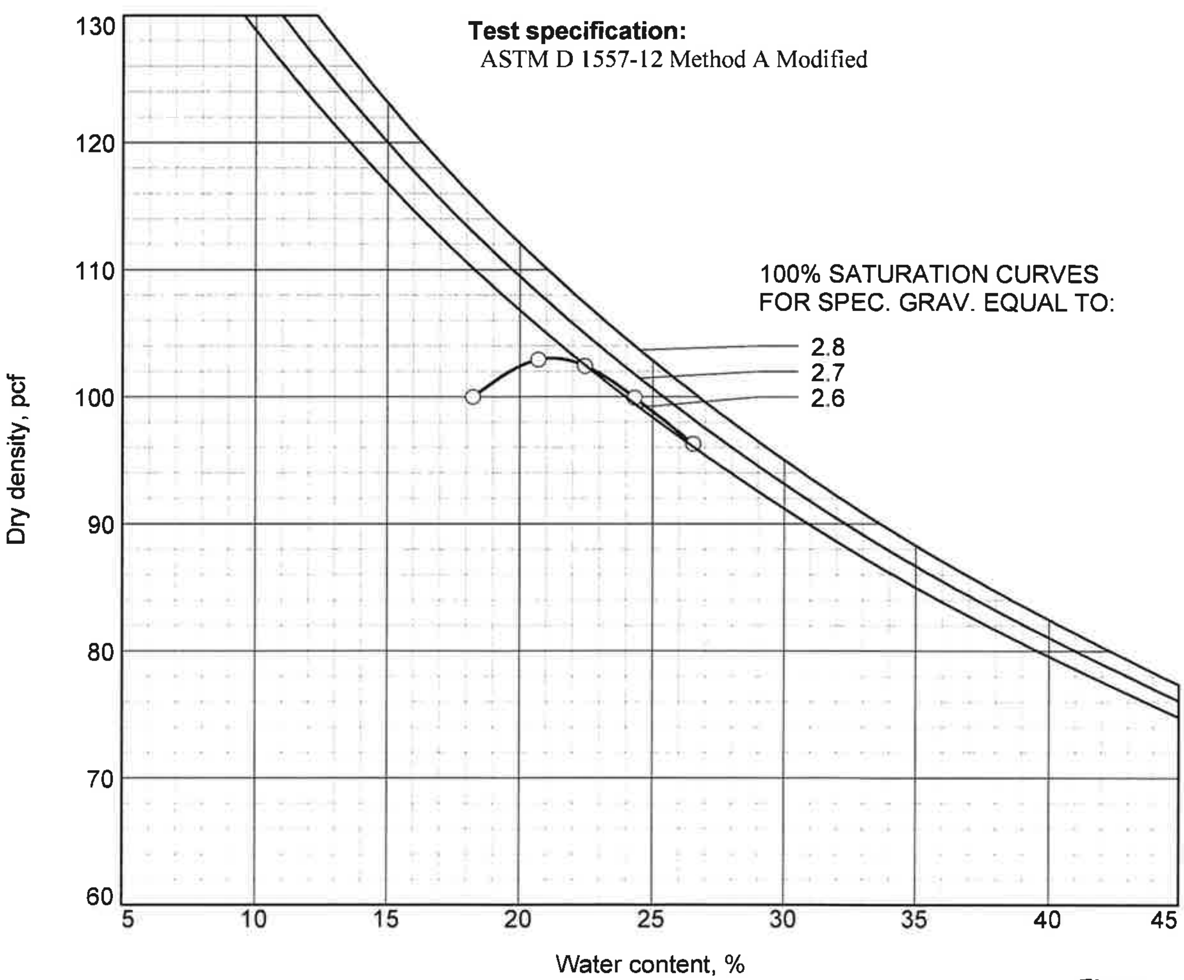
Project No.: 17-0320 **Date:** 06/14/17
Project: East Borrow Site
Client:
Location: Tp2 @ 8.5' - 9.5'
Depth: 8.5' - 9.5'
Remarks: Less Than 5% Material Retained on the #4 Sieve.

MATERIAL DESCRIPTION

Description: Olive Grey to Olive Brown Clay

Classifications - **USCS:** **AASHTO:**
Nat. Moist. = **Sp.G. =**
Liquid Limit = **Plasticity Index =**
% < No.200 =

TEST RESULTS
Maximum dry density = 103.0 pcf
Optimum moisture = 21.2 %



Figure

Koury Engineering & Testing, Inc.

Tested By: ABB/BT **Checked By:**

We are a key member of the construction team while safeguarding the public. We improve operational logistics and provide superior quality control through the continuing development of our engineering staff and technical expertise, utilization of classroom training and field supervisors, thus defining the industry standard.

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KOURY
ENGINEERING
& TESTING, INC.

GEOTECHNICAL & SEISMIC ENGINEERING,
CONSTRUCTION INSPECTION &
MATERIALS TESTING SERVICES

May 10, 2018, Revised July 22, 2018
Project No. 17-1024

Mr. John R. Burroughs, LEED AP, President
Commerce Construction Co., L.P.
13191 Crossroads Parkway North 6th Floor
City of Industry, CA 91746

Subject: Limited Borrow Site Study
Borrow Site No. 3 (Export Fill Dirt Site No. 3)
Cucamonga Avenue and West County Road
City of Chino, CA

Dear Mr. Burroughs:

Presented herein are our preliminary findings and conclusions regarding the suitability of the soils within Borrow Site 3 to be used as engineered fill to balance the grades for the OC Prado site construction located on the southeast corner of Bickmore Avenue and Mountain Avenue, in the City of Chino.

In accordance with the revised Conceptual Grading Plan, the irregular hexagonal-shaped borrow site covers an area of about 44± acres. The site is bounded by the California Institution for Women to the north, Prado Reservoir Park to the west, vacant land to the south and Cucamonga Avenue to the east. On the east side, the site borders Cucamonga Avenue over a distance of about 2230 feet, extending approximately 910 feet south of the intersection with West County Road. The width of the site is about 850 feet in its middle and 1510 feet in its southern portion that extends about 490 feet in the southerly direction.

A Vicinity Map with approximate ground contour elevations is presented in Appendix A as Figure A-1. The site is located entirely on the west side of Cucamonga Avenue, and the nearest street intersection is Cucamonga Avenue with West County Road.

Field Exploration and Laboratory Testing

The field exploration program for Borrow Site 3 was performed in two phases. The first phase of the field exploration was performed within the northern portion of the site and consisted of four test pits, TP-3 through TP-6, excavated on February 23, 2018. The second phase consisted of excavating thirteen test pits; TP-7 though TP-18 plus TP-15A on April 17, 2018. A rubber tire mounted backhoe was used to excavate the test pits ranging in depths from about 14 to 17 feet for the first phase and from 6 to 9 feet for the second phase. Test Pit 1 and 2 were excavated using a hand auger on April 24, 2018 due to the recent re-seeding and on-going irrigation. The locations of the test pits are shown on the Field Exploration Map, Figure A-2, presented in Appendix A. Bulk samples were obtained from the test pits and hand augering for laboratory testing.

Laboratory tests, including moisture content, #200 sieve wash, expansion index, maximum density, pocket penetrometer and plasticity index were performed to aid in the classification of the materials encountered and to evaluate their engineering properties. The results of pertinent laboratory tests are presented on the test pit logs in Appendix B, and/or in Appendix C.

Site Geology

The site is located within the Upper Santa Ana River Valley, which consists of a series of coalescing alluvial fans formed by streams flowing out of the San Gabriel Mountains to the north. The valley lies within the Peninsular Ranges geomorphic province, which is characterized by alluviated basins, elevated erosion surfaces, and northwest-trending mountain ranges bounded by northwest trending faults. The site, which is located within the Chino Basin, is underlain by sediments deposited by the Santa Ana River and its tributaries such as the Chino Creek.

Morton and Miller (2006) show the site to be underlain by very old alluvial-fan deposits (See Figure A-3 in Appendix A). The sediments observed during the subsurface investigation consisted predominantly of clay at shallow depths.

Surface Site Conditions

The site has at least three entrances from Cucamonga Avenue to the east; one of these entrances is near the intersection of West County Road with Cucamonga Avenue. No buildings were present onsite at the time of our field exploration; however, there are power lines supported on pile foundations crossing the site about 100 feet north of West County Road. There are also remnants of concrete slabs on grade, which were observed in various locations. Portions of the site appear to have abandoned underground utilities. Other portions of the site support irrigation lines that are being used to water the recent seeding and other grass areas. More than one-half of the site was devoid of vegetation at the time of our field exploration and the remainder of the site contained mostly sparse to dense grass vegetation.

The southern portion of the site contains several water storage ponds that range in depth mostly from about 3 to 7 feet. At the time of our site exploration in April 2018, only the ponds located east of Test Pit 17 and northwest of Test Pit 18 contained water (approximately 1 to 3 feet). The ponds appear to have been created by excavating and mounding the native soils around the excavations. There was localized grass areas and low shrubs near the ponds at the time of our second phase of the field exploration.

The northern portion of the site slopes gently to the southwest while the southern portion generally slopes gently to the south. The existing elevations range between about 545 feet at the south end to 566 feet at the northeast corner of the site (NAVD88).

Soil Conditions

The subsurface soil profile consists generally of artificial fill underlain by alluvial deposits. The fill depth is variable, ranging from less than one foot to about 6 feet at the test pit locations. For the most part, the fill materials are derived from onsite shallow soils and consist generally of lean clay with sand, sandy lean clay, and thin layers of clayey sand and silty sand at or near the surface with localized areas of fat clay. Organic material, including manure, was encountered in Test Pit 15A, which was excavated through a pond berm near the southwest corner of the site.

The alluvium soils consist predominantly of stiff to very stiff, medium to high plastic sandy clay, lean clay with sand, fat clay and sandy silt. Some clayey sand and silty sand layers were encountered below a depth of about 12 feet in some of the deeper test pits.

The soils were generally dry near the surface at the time of the Phase 2 field exploration. Except for organic material, for the soils below a depth of about 1 to 2 feet, the moisture contents of the clay soils are highly variable, ranging from about 9 to 41½ percent with an average on the order of 23 percent. At the time of our field exploration, the silty sand and clayey sand moisture contents ranged from about 3 to 23½ percent with an average of about 12½ percent. Based on the maximum density test performed and prior experience with similar soils, many of the clay sample moisture contents are about 8 to 12 percent above optimum for the soils sampled within the upper 8 feet of the ground surface (see Table 1 and Appendix C for maximum density test results).

The fines contents of the clay soils range from about 50 to 93 percent with an average of about 69 percent while the fine contents of the sands range from about 14 to 44 percent with an average of about 26½ percent. The average relatively low fines contents of the clay soils are attributed to the presence of concretions (hard matter formed by precipitation of mineral cement between particles) observed in many of the clay samples. The pocket penetrometer tests indicate unconfined compression strength on the order of 1 to 4.5 tsf with an average of about 2.8 tsf.

To aid in the soil classification and to correlate the soil plasticity with the soil expansion, one plasticity index test (Atterberg Limits) was performed on a sample of Test Pit 6 at a depth of 8 to 9 feet. As shown in Table 1, the Liquid limit, Plastic Limit and Plasticity Index for the tested sample are 75, 18 and 57 respectively, which indicate a high plasticity soil at that depth for this test pit.

Table 1 – Maximum Density and Plasticity Index

Test Pit Number	**TP-6 @ 8 to 9 feet**
Maximum Dry Density (pcf)	111.1
Optimum Moisture Content (%)	16.2
Liquid Limit	75
Plastic Limit	18
Plasticity Index	57

The site soil expansion potential ranges from low to very high. Table 2 presents the data for 26 expansion index tests at depths ranging from 1 to 11 feet. These tests indicate expansion index variations from 32 to 208 with an average of about 94. For the 13 tests on samples at depths between 1 and 4½ feet, the expansion index ranges from about 32 to 100 with an average of approximately 65.

Table 2 – Expansion Index Test Results

Test Pit No.	Depth (feet)	Expansion Index	Field Moisture (%)	Fines Percent
*TP-1	2 - 3	64	17.7	76
*TP-1	5 - 6	175	22.4	50
*TP-2	3 - 4	100	21.8	71
*TP-3	1.5 - 2.5	53	17.9	66
*TP-3	4 - 4.5	99	23.7	63
*TP-3	10 - 11	96	25.5	51
*TP-4	3 - 3.5	80	33.8	54
*TP-4	4 - 4.5	56	29.1	60
*TP-5	6 - 7	176	28.4	74
*TP-5	8 - 10	190	31.3	50
*TP-6	1 - 2	32	17.9	56
*TP-6	7 - 8	172	30.6	73
*TP-6	8 - 9	208	30.4	57
TP-7	4 - 4.5	92	18.3	79
TP-7	5.7 - 6.5	101	22.8	68
TP-8	6 - 6.5	60	15.7	83
TP-9	4 - 4.5	62	18.4	65
TP-10	6 - 7	37	25.8	93
TP-11	3.7 - 4.2	32	22.0	50
TP-11	5.5 - 6	50	16.1	50
TP-13	4.75 - 5	100	18.7	53
TP-14	6.7 - 7	40	18.0	82
TP-15	4.2 - 4.7	79	25.0	82
TP-15	5.5 - 6	195	36.2	84
TP-17	4 - 4.5	40	23.4	79
TP-18	4.5 - 5	55	22.8	90

*Northern portion of proposed borrow site

We noted that the light-colored clay samples containing concretions tend to have higher expansion index. The expansion potential can change rapidly with depth as shown by two tests on TP-15 for depths of about 4½ and 5½ feet, where the expansion indices are 79 and 195, respectively.

There is a rough correlation between in situ natural moisture content and expansion index. For the same amounts of fines, site clay below the depth of seasonal moisture variation, soils with higher moisture and higher plasticity index tend to have higher expansion potential.

Corrosivity

The corrosivity tests performed indicates that the site soils are generally severely corrosive to metal. However, the tests performed did not indicate high corrosivity to concrete. The corrosivity test results are summarized in the following Table 3.

Table 3 - Corrosion Test Results

Boring	Depth (ft)	Minimum Resistivity (ohm-cm)	pH	Soluble Sulfate Content (ppm)	Soluble Chloride Content (ppm)
TP-5	5 – 6	566	7.7	235	490

Groundwater

Groundwater seepage was encountered in Test Pit 18 which was excavated within the slope of a pond containing water. The wet soil level in the test pit was at about the pond water level. Groundwater seepage was encountered at a depth of about 13½ feet in Test Pit 3. No seepage was encountered in the other test pits excavated to a maximum depth of 17 feet. Borings should be drilled if the groundwater level needs to be determined.

Conclusions and Recommendations

Based on the data collected from the field to date, it appears feasible to import material from Borrow Site 3 to use at the OC Prado site. However, it appears that on average only the upper 4 to 4½ feet of soils (once well blended and once clearing, grubbing and stripping of the topsoil is complete) could be suitable for foundation. It should be noted that for the southernmost portion of the site, the construction of the ponds has resulted in some of the expansive clay soils to be mixed with the less expansive soils and with some organics. Therefore, some material at shallow depth in the southernmost portion of the site may not be suitable for export to be used as engineered fill. Therefore, observation and testing during export of the material to the OC Prado site is advisable. All organic material, construction debris, and other unsuitable materials should be removed prior to export to the OC Prado site.

During the second phase of field exploration, we noted that the upper one to two feet of soils had low moisture contents due to drying weather conditions. Dry clay soils are undesirable from a geotechnical performance standpoint and require time to absorb moisture. Therefore, the surface conditions should be checked prior to export, and where the moisture contents are not above optimum, we recommend that the soils be pre-moisture conditioned in the borrow site prior to export. For the areas under active irrigation, the irrigation system should be stopped at least 3 to 4 weeks prior to soil export.

We anticipate that an excavation plan will be prepared by the project civil engineer. Appropriate setback should be set from existing foundations, slopes and property lines.

LIMITATIONS

Our work was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of Koury's profession practicing in the same locality, under similar conditions and at the date the services are provided.

CLOSURE

The findings and recommendations presented in this report were based on the results of our field and laboratory investigations, combined with professional engineering experience and judgment. The report was prepared in accordance with generally accepted engineering principles and practice. We make no other warranty, either expressed or implied. Subsurface variations between and beyond the test pits should be anticipated. Koury should be notified if subsurface conditions are encountered, which differ from those described in this report. Samples obtained during this investigation will be retained in our laboratory for a period of 45 days from the date of this report and will be disposed after this period.

Should you have any questions concerning this submittal, or the recommendations contained herewith, please do not hesitate to call our office.

Respectfully submitted,

KOURY ENGINEERING & TESTING, INC

Jacques Roy

Jacques B. Roy, PE, GE
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
JACQUES B. ROY
NO. 2077
Ex. Date 9/30/19
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Mehrab Jesmani, PhD, P.E.
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Distribution: 1. Addressee (pdf copy via e-mail)
2.File (B)

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2. California Division of Mines and Geological Survey, 2003, Earthquake Fault Zones, Prado Dam Quadrangle, May 1, 2003.

3. City of Chino General Plan, Safety Element, 2010, Final Report.

4. US Army Corps of Engineers, Soil Investigations, Engineering Manual EM 1110-1-1804, dated 8/26/86.

5. US Army Corps of Engineers, Laboratory Soils Testing, Engineering Manual EM 1110-2-1906, dated 8/26/86.

APPENDICES

Appendix A: Maps and Plans

Vicinity Map – Figure A-1
Field Exploration Map – Figure A-2
Geology Map – Figure A-3

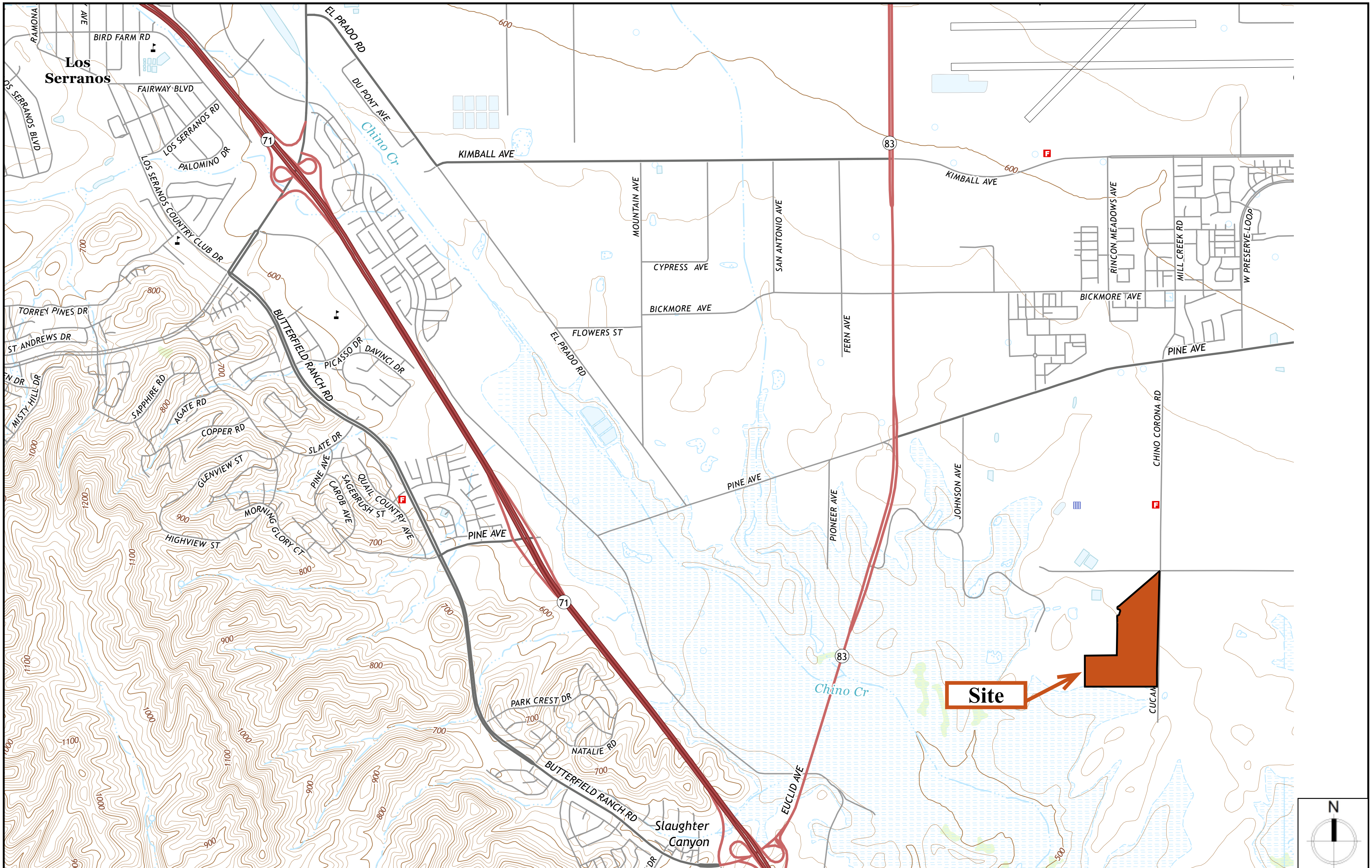
Appendix B: Field Exploratory Test Pits

Test Pits 1 through 18

Appendix C: Laboratory Test Results

APPENDIX A

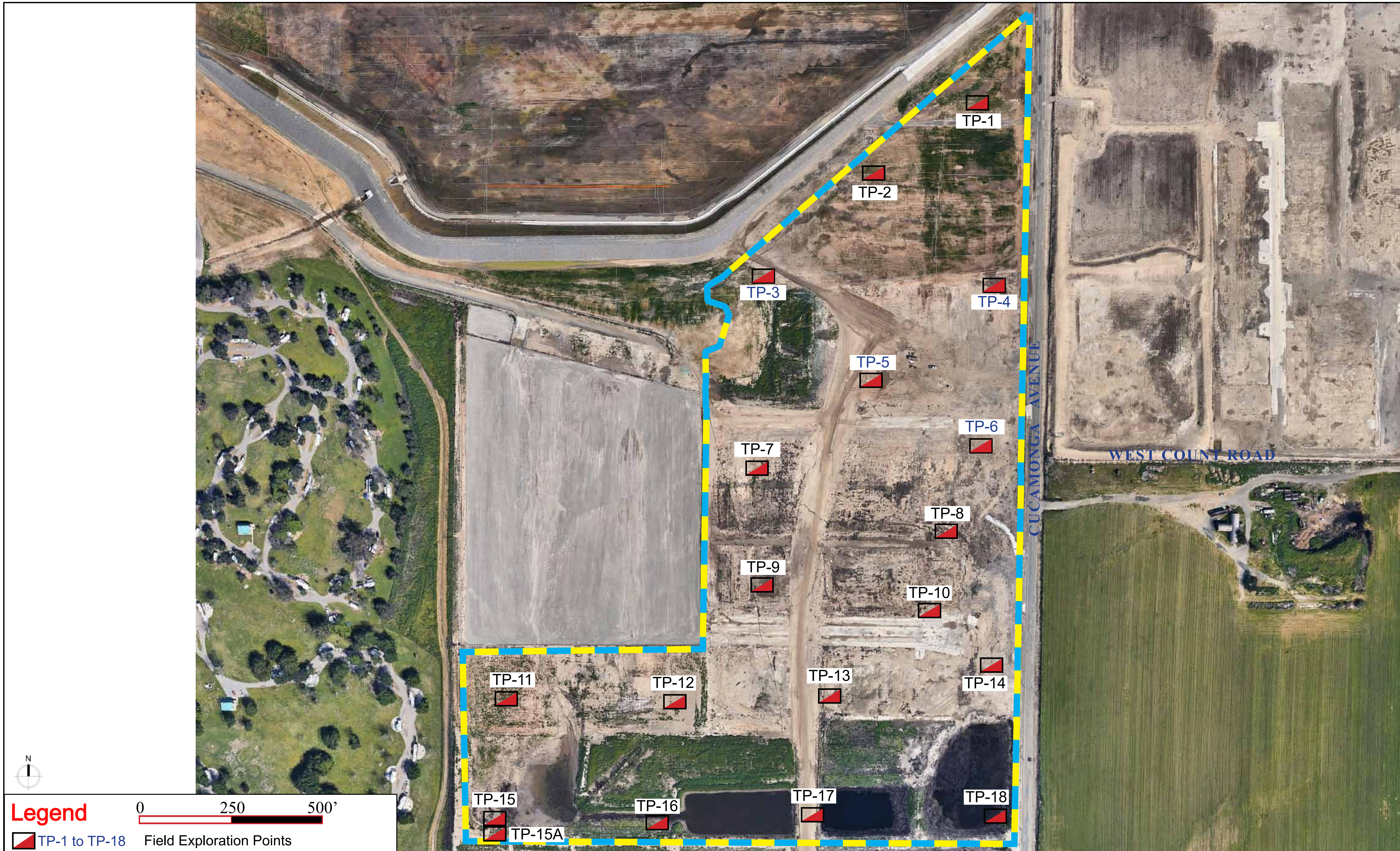
Maps and Plans



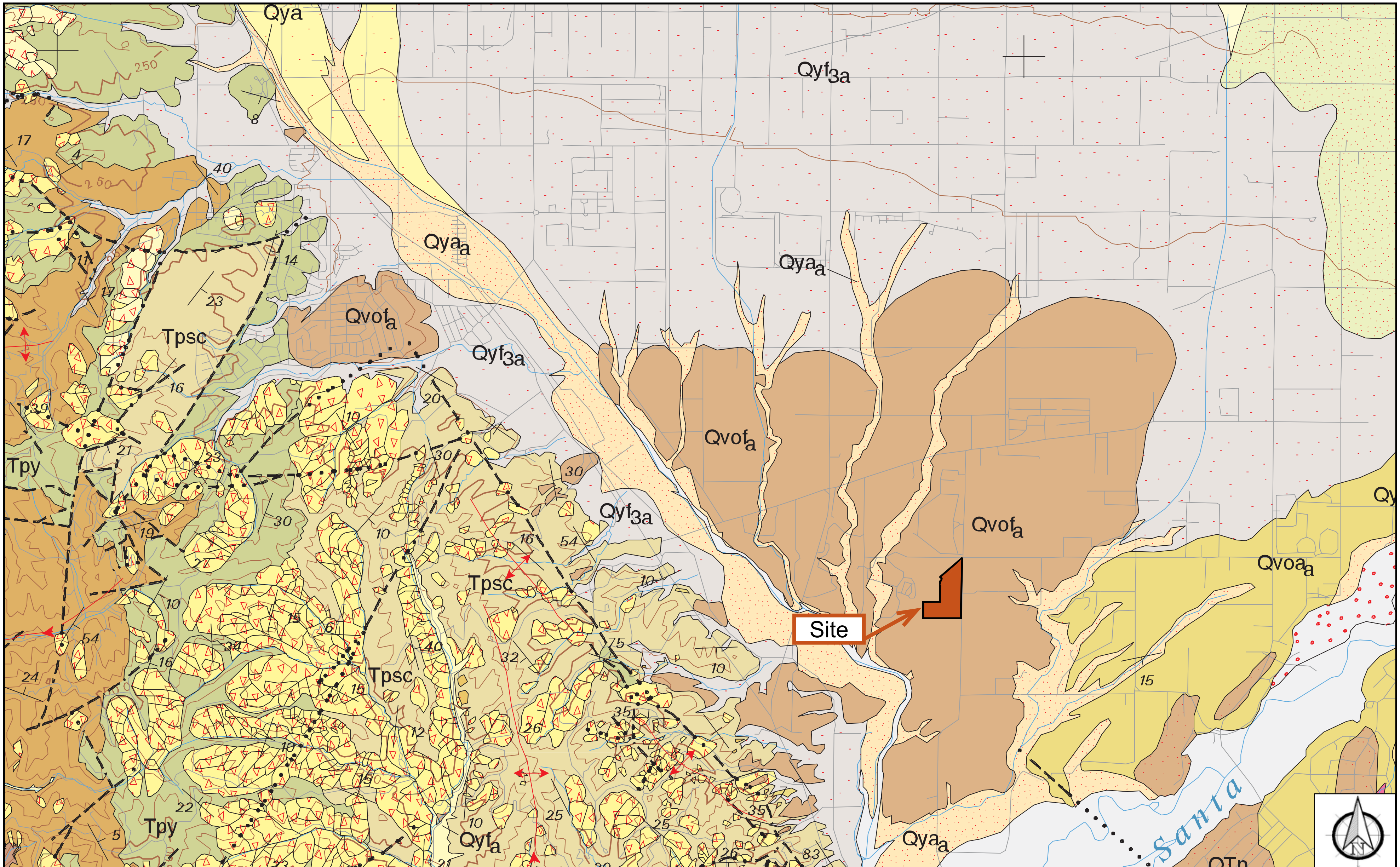
Reference: USGS Topographic Map, Prado Dam Quadrangle, California, 7.5 Minute Series 2015 - Contour Interval 20 feet, NAVD of 1988

0 1/2 1 Mile

KOURY ENGINEERING & TESTING, INC.	Project Name: **Alternative Borrow Site # 2 South of California Institution for Women**	Project No.: **17-1024** Date: **June 2018**	Drawing Title: **Vicinity Map**	Figure: **A-1**



KOURY ENGINEERING & TESTING, INC.	Project Name: Alternative Borrow Site # 3	Project No.: 17-1024 Date: June 2018	Drawing Title: Field Exploration Points	Figure: A-2



LEGEND

Qvof — Very old alluvial-fan deposits

0 1 2 Mile

Reference: Geologic Map of the San Bernardino & Santa Ana 30´x60´ Quadrangle California-Version 1.0 Compiled by Douglas M. Morton and Fred K. Miller, 2006

KOURY ENGINEERING & TESTING, INC.	Project Name: Alternative Borrow Site # 2 South of California Institution for Women	Project No.: 17-1024 Date: June 2018	Drawing Title: Geology Map	Figure: A-3

APPENDIX B

Field Exploratory Test Pits

KEY TO LOGS

SOILS CLASSIFICATION					
MAJOR DIVISIONS			GRAPHIC LOG	USCS SYMBOL	TYPICAL NAMES
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS MORE THAN 50% OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS LESS THAN 5% FINES		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES MORE THAN 12% FINES		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS 50% OR MORE OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS LESS THAN 5% FINES		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES MORE THAN 12% FINES		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS 50% OR MORE OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 50			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT IS 50 OR MORE			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR GRAVELLY ELASTIC SILTS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT AND OTHER HIGHLY ORGANIC SOILS

GRAIN SIZES							
SILT AND CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		
	#200	#40	#10	#4	3/4"	3"	12"

SIEVE SIZES

KEY TO LOGS (continued)

SPT/CD BLOW COUNTS VS. CONSISTENCY/DENSITY					
FINE-GRAINED SOILS (SILTS, CLAYS, etc.)			GRANULAR SOILS (SANDS, GRAVELS, etc.)		
CONSISTENCY	*BLOWS/FOOT		RELATIVE DENSITY	*BLOWS/FOOT	
	SPT	CD		SPT	CD
SOFT	0-4	0-4	VERY LOOSE	0-4	0-8
FIRM	5-8	5-9	LOOSE	5-10	9-18
STIFF	9-15	10-18	MEDIUM DENSE	11-30	19-54
VERY STIFF	16-30	19-39	DENSE	31-50	55-90
HARD	over 30	over 39	VERY DENSE	over 50	over 90

* CONVERSION BETWEEN CALIFORNIA DRIVE SAMPLERS (CD) AND STANDARD PENETRATION TEST (SPT) BLOW COUNT HAS BEEN CALCULATED USING "FOUNDATION ENGINEERING HAND BOOK" BY H.Y. FANG. (**VALUES ARE FOR 140 Lbs HAMMER WEIGHT ONLY**)

DESCRIPTIVE ADJECTIVE VS. PERCENTAGE	
DESCRIPTIVE ADJECTIVE	PERCENTAGE REQUIREMENT
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
AND	35 - 50%

*THE FOLLOWING "DESCRIPTIVE TERMINOLOGY/ RANGES OF MOISTURE CONTENTS" HAVE BEEN USED FOR MOISTURE CLASSIFICATION IN THE LOGS.

APPROXIMATE MOISTURE CONTENT DEFINITION	
DEFINITION	DESCRIPTION
DRY	Dry to the touch; no observable moisture
SLIGHTLY MOIST	Some moisture but still a dry appearance
MOIST	Damp, but no visible water
VERY MOIST	Enough moisture to wet the hands
WET	Almost saturated; visible free water

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 17-1024
Project Name : Borrow Site 3

Test Pit No. : 1
Sheet : 1 **Of :** 1

Drilling Method : Hand Auger
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Koury
Date Drilled : 4-24-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	18.7			0	Bulk		CL	**FILL: Lean CLAY with SAND;** trace of gravel, very stiff, moist, dark brown	Fines = 79%
2	17.6				Bulk				Fines = 75% PP = 2.5-3 tsf
3	17.7				Bulk		CL/CH	**ALLUVIUM:** **Lean to Fat CLAY with SAND;** trace of gravel, very stiff, moist, brown with light brown inclusions	Fines = 76% PP = 3.5 tsf EI = 64
4	19.5				Bulk				Fines = 82%
5	22.4			5	Bulk		CH	**Sandy Fat CLAY;** trace of gravel, concretions, stiff to very stiff, moist, light brown to pale brown	Fines = 82% PP = 2.5 tsf
6	22.4				Bulk				Fines = 50% EI = 175
7	21.0				Bulk				Fines = 53%
8	26.2				Bulk				Fines = 51%
				10				End of test pit @ 8' No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 17-1024
Project Name : Borrow Site 3

Test Pit No. : 2
Sheet : 1 **Of :** 1

Drilling Method : Hand Auger
Sampling Method : Bulk
Hammer Weight :
Drop Height :
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Koury
Date Drilled : 4-24-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	8.2			0	SC	**FILL: Clayey SAND**; fine-coarse, trace gravel, moist, dk brown	Fines = 27%
2	17.2				CL	**ALLUVIUM: Lean CLAY with SAND**; very stiff, concretions	Fines = 76% PP = 3.0 tsf
3	20.5				CL/CH	**Lean to Fat CLAY;** very stiff, concretions, moist, light brown	Fines = 84% PP = 3.5 tsf
4	21.8				CH	**Sandy Fat CLAY;** stiff to very stiff, concretions, moist, light yellowish brown EI = 100	Fines = 71% PP = 3.0 tsf Fines = 51%
5	22.3			5			
6	27.5					**Fat CLAY with SAND**; concretions, stiff, moist, light yellowish brown to pale brown	Fines = 76%
7	24.5						Fines = 88%
8	25.8						Fines = 88%

End of test pit @ 8'
No groundwater encountered

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 17-1024
Project Name : Borrow Site 3

Test Pit No. : 3
Sheet : 1 **of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Drop Height :
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 2-23-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0					
1	14.4						CL	**FILL: Sandy Lean CLAY**; very stiff, brown	Fines = 65% PP = >4.5 tsf
2	17.9							**ALLUVIUM:** **Sandy Lean CLAY**; hard, slightly moist, brown to dark brown and light grayish brown	#200 Wash Fines = 66% EI = 53
3	23.7						CL/CH	**Sandy Lean to Fat CLAY;** very stiff, moist, pale brown	Fines = 63% EI = 99
				5					
4	21.9							Light olive brown with white specks	Fines = 53% PP = 4-4.5 tsf
5	25.6								Fines = 69% PP = 2.5-2.8 tsf
				10					
6	25.5							Very moist	#200 Wash Fines = 51% PP = 2.5 tsf EI = 96
								Thin layers of sitly sand	
7	31.6								#200 Wash Fines = 51%
8	41.4								Fines = 52%
				15				End of test pit @ 14' Groundwater sepage observed @ 13' 6"	
				20					
				25					
				30					
				35					
				40					

Bulk CD SPT

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 17-1024
Project Name : Borrow Site 3

Test Pit No. : 4
Sheet : 1 **of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Drop Height :
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 2-23-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0		**FILL:**	
1	16.2					**Sandy Lean CLAY;** stiff, moist to very moist, dark brown	#200 Wash Fines = 62%
2	33.8				CL/CH	**ALLUVIUM:** **Sandy LEAN to Fat CLAY;** concretions, firm, moist to very moist, dark yellowish brown	Fines = 54% EI = 80
3	29.1			5		Abundant concretions	#200 Wash Fines = 60% EI = 56
4	18.7						#200 Wash Fines = 50%
5	15.6				SC	**Clayey SAND;** trace of gravel, moist, dark yelllowish brown	Fines = 30%
6	26.4			10	CL	**Sandy Lean CLAY;** stiff, moist, yellowish brown	Fines = 51%
7	23.6				SC	**Clayey SAND;** fine, moist, yellowish brown	#200 Wash Fines = 28%
8	22.7			15	CL	**Sandy Lean CLAY;** layers of clayey sand, stiff, moist, yellowish brown	#200 Wash Fines = 51%
9	23.1				SM	**Silty SAND;** fine to medium, very moist, light olive brown	#200 Wash Fines = 17%
				20		End of test pit @ 17' No groundwater encountered	
				25			
				30			
				35			
				40			

Bulk CD SPT

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 17-1024
Project Name : Borrow Site 3

Test Pit No. : 5
Sheet : 1 **of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 2-23-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0	CL	**FILL:**	
1	13.2					**Sandy Lean CLAY;** stiff to very stiff, slightly moist, yellowish brown	#200 Wash Fines = 73% PP = 4.5 tsf
2	25.6			5	CL/CH	**Lean to Fat CLAY;** very stiff, moist, concretions, olive brown	Fines = 77% PP=3.5-4.5 tsf
3	28.4				CH	**ALLUVIUM:**	#200 Wash Fines = 74% EI = 176
4	31.3					**Sandy Fat CLAY**; very moist, light olive brown	#200 Wash Fines = 50% EI = 190
5	5.4				SC	**Clayey SAND;** fine to medium, trace of gravel, moist to very moist, yellowish brown	Fines = 23%
6	14.7						Fines = 19%
7	16.3						Fines = 27%
8	16.6			15		Coarser, more gravel	Fines = 14%
						End of test pit @ 17' No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk CD SPT

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 17-1024
Project Name : Borrow Site 3

Test Pit No. : 6
Sheet : 1 **of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 2-23-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL: Sandy Lean Clay;** stiff, brown	
1	17.9						CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of gravel, stiff, brown with light brown inclusions	#200 Wash Fines = 56% EI = 32
2	18.0			5			CL/CH	**Lean to Fat CLAY with SAND;** trace of gravel, concretions, stiff, moist, pale brown	#200 Wash Fines = 77%
3	30.6						CH	**Sandy Fat CLAY;** stiff, very moist, light olive brown	Fines = 73% PP = 1.5 tsf EI = 172
4	30.4			10					Fines = 57% PP = 1.5 tsf EI = 208
5	12.4						SC	**Clayey SAND;** fine to medium, pockets of silty sand, trace of gravel, concretions, moist olive yellow	#200 Wash Fines = 25%
6	15.2						SM	**Silty SAND;** fine, trace of gravel, moist, mottled yellowish brown and gray	#200 Wash Fines = 19%
7	18.8			15					#200 Wash Fines = 14%
								End of test pit @ 16' 6" No groundwater encountered	
				20					
				25					
				30					
				35					
				40					

Bulk CD SPT

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 17-1024
Project Name : Borrow Site 3

Test Pit No. : 7
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Bastedo Backhoe
Date Drilled : 4-17-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	8.4			0	Bulk		SC	**FILL: Clayey SAND;** moist, brown	Fines = 26%
2	23.5				Bulk		CL	**ALLUVIUM:** **Lean CLAY with SAND;** moist to very moist, stiff to very stiff, brown to dark brown	Fines = 79%
3	18.3				Bulk				EI = 92 Fines = 79%
				5			CH	**Sandy Fat CLAY;** moist, stiff, abundant concretions, yellowish brown	EI = 101
4	22.8				Bulk				Fines = 68%
5	24.1				Bulk				Fines = 51%
6	22.2				Bulk				Fines = 67%
				10				End of test pit @ 8' 6" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk CD SPT

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 17-1024
Project Name : Borrow Site 3

Test Pit No. : 8
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Drop Height :
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Bastedo Backhoe
Date Drilled : 4-17-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	15.8			0		**FILL: Sandy Lean CLAY;** stiff, moist, trace of gravel, dark brown	#200 Wash Fines = 65%
2	17.9				CL	**ALLUVIUM:** **Lean CLAY with SAND;** firm to stiff, moist to very moist, dark brown and black	#200 Wash Fines = 81%
3	18.3						PP = 1.0 tsf Fines = 79%
4	25.5			5			PP = 1.5 tsf Fines = 83%
5	21.8						PP = 1.0 tsf Fines = 83%
6	15.7						EI = 60 Fines = 62%
7	28.6						PP = 1.75 tsf Fines = 62%
						End of test pit @ 8' 6" No groundwater encountered	

Depth scale (ft): 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 17-1024
Project Name : Borrow Site 3

Test Pit No. : 9
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Drop Height :
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Bastedo Backhoe
Date Drilled : 4-17-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	4.8			0	Bulk		SM	**FILL:** **Silty SAND;** fine to coarse, trace of gravel, moist, dark yellowish brown	Fines = 20%
2	5.4				Bulk				Fines = 19%
3	17.5				Bulk		CL	**ALLUVIUM: Lean CLAY with SAND;** stiff to very stiff, moist, very dark brown	Fines = 77%
4	18.4				Bulk		CL/CH	**Sandy Lean to Fat CLAY;** stiff, moist to very moist, minor concretions, dark grayish brown	Fines = 65% EI = 62
5	21.8			5	Bulk		CH	**Sandy Fat CLAY;** stiff to very stiff, moist, concretions, pale brown with reddish gray and white	Fines = 50% PP = 4.5 tsf
6	34.7				Bulk				Fines = 70%
7	31.3				Bulk				#200 Wash Fines = 50%
				10				End of test pit @ 9' No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 17-1024
Project Name : Borrow Site 3

Test Pit No. : 10
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Drop Height :
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Bastedo Backhoe
Date Drilled : 4-17-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	8.0			0	Bulk		SC	**FILL: Clayey SAND;** hard, lumps of sandy clay, trace of gravel, slightly moist, brown	#200 Wash Fines = 30%
2	16.1				Bulk		CL	**ALLUVIUM:** **Sandy Lean CLAY;** stiff, moist, trace of gravel and wood, very dark brown	Fines = 69% PP = 2.5 tsf
3	16.8				Bulk				Fines = 72% PP = 3.5 tsf
4	27.6			5	Bulk			**Lean CLAY;** trace of concretions, stiff, moist, dark gray and dark browninsh gray	Fines = 93%
5	25.8				Bulk				Fines = 93% EI = 37 PP = 1.5 tsf
7	22.6				Bulk			stiff to very stiff, gray with white specs	Fines = 90% PP = 2.5-3 tsf
								End of test pit @ 8' No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 17-1024
Project Name : Borrow Site 3

Test Pit No. : 11
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Bastedo Backhoe
Date Drilled : 4-17-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	5.6			0	CL/CH	**FILL: Sandy Lean to Fat CLAY;** hard, trace of gravel, dry, yellowish brown	#200 Wash Fines = 66% PP = 2.5 tsf
2	8.3				SC	**ALLUVIUM: Clayey SAND;** organics, wood inclusions, very light, dry, gray	#200 Wash Fines = 27%
3	22.0				CL	**Sandy Lean CLAY;** concretions, moist to very moist, mottled brown, yellowish brown	Fines = 50% EI = 32
4	23.0			5			Fines = 68%
5	21.0				CH	**Sandy Fat CLAY;** concretions, stiff, moist, light brown to brown	Fines = 52%
6	16.1						PP = 4.5 tsf Fines = 50% EI = 50
7	22.5						Fines = 66%
8	13.9				SC	**Clayey SAND;** concretions, moist, yellow	Fines = 38%
						End of test pit @ 8' 6" No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 17-1024
Project Name : Borrow Site 3

Test Pit No. : 12
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Drop Height :
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Bastedo Backhoe
Date Drilled : 4-17-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	7.0			0	Bulk		SC	**FILL:** **Clayey SAND;** trace of gravel, dry, brown	#200 Wash Fines = 34%
2 3	14.9 10.9				Bulk Bulk		CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of gravel, stiff to very stiff, moist to slightly moist, mottled brown, yellowish brown to dark brown	Fines = 74% Fines = 61% PP = 4.5 tsf
				5			CH	**Sandy Fat CLAY**; stiff to very stiff, moist, yellowish brown with some brown	
				10				End of test pit @ 8' 0" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 17-1024
Project Name : Borrow Site 3

Test Pit No. : 13
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Drop Height :
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Bastedo Backhoe
Date Drilled : 4-17-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"
1	14.7		
2	24.6		
3	20.5		
4	17.8		
5	18.7		
6	28.7		
7	30.8		

Depth (ft)	Soil Type (USCS)	Description	Additional Tests
0	SC	**FILL: Clayey SAND;** moist, dark yellowish brown	#200 Wash Fines = 39%
	CL	**ALLUVIUM:** **Sandy Lean CLAY;** minor concretions, stiff, moist, brown to black	Fines = 68% #200 Wash Fines = 71% PP = 3.2 tsf Fines = 86% PP = 2.5 tsf
5	CH	**Sandy Fat CLAY**; stiff, concretions, moist, white specs, yellowish brown and grayish brown pale brown	Fines = 53% PP = 1.5 tsf EI = 100 Fines = 74% PP = 2-2.5 tsf Fines = 71%

End of test pit @ 8' 0"
No groundwater encountered

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 17-1024
Project Name : Borrow Site 3
Test Pit No. : 14
Sheet : 1 **Of :** 1
Drilling Method : Backhoe
Sampling Method : Bulk
Ground Elevation:
Hammer Weight :
Drop Height :
Drilling Co. : Bastedo Backhoe
Location : See Figure A-2
Date Drilled : 4-17-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	3.0			0	Bulk		SC	**FILL:** **Clayey SAND;** trace of gravel, dry, yellowish brown	#200 Wash Fines = 26%
							CL	**ALLUVIUM:**	
2	29.6				Bulk			**Sandy Lean CLAY;** stiff, moist to very moist, brown to black	Fines = 86% PP = 1.5 tsf
3	29.0				Bulk				Fines = 84%
				5					
4	18.0				Bulk			become brownish gray	PP = 2.5 tsf Fines = 82% EI = 40
5	20.8				Bulk				PP = 2.5 tsf Fines = 81%
								End of test pit @ 8' 0" No groundwater encountered	
				10					
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 17-1024
Project Name : Borrow Site 3

Test Pit No. : 15
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Bastedo Backhoe
Date Drilled : 4-17-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0		**ALLUVIUM:**	
1	9.3				CL	**Lean CLAY with SAND;** very stiff, slightly moist, mottled yellowish brown	#200 Wash Fines = 83%
2	13.6				CL	**Sandy Lean CLAY;** very stiff, slightly moist, grayish brown with white	Fines = 73%
3	25.0			5	CL	**Lean CLAY with SAND;** stiff to very stiff, moist, minor concretions, light yellowish brown	#200 Wash Fines = 82% EI = 79
4	36.2				CH	**Fat CLAY with SAND;** stiff to very stiff, moist to very moist, yellowish brown	Fines = 84% EI = 195
5	17.8				SC	**Clayey SAND;** fine, very moist, gray	Fines = 36%
				10		End of test pit @ 8' 5" No groundwater encountered	
				15			
				20			
				25			
				30			
				35			
				40			

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 17-1024
Project Name : Borrow Site 3

Test Pit No. : 15A
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Bastedo Backhoe
Date Drilled : 4-17-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	12.9			0	Bulk		CL	Test pit excavated on top of pond berm **FILL: Sandy Lean CLAY;** stiff, moist, yellowish brown	#200 Wash Fines = 62%
2	44.0				Bulk		CL/OL	**Sandy Lean CLAY with Organic Material;** soft, moist, dark brown with reddish brown	Fines = 55%
3	36.6			5	SPT				#200 Wash Fines = 63% PP = 1.5 tsf
4	8.7				SPT		CL	**ALLUVIUM: Lean CLAY with SAND;** trace of gravel, stiff, moist, yellowish brown	#200 Wash Fines = 80%
								End of test pit @ 7' 6" No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 17-1024
Project Name : Borrow Site 3

Test Pit No. : 16
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Bastedo Backhoe
Date Drilled : 4-17-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	9.2			0	Bulk		CL	**ALLUVIUM: Lean CLAY with SAND;** hard, slightly moist, brown to dark brown	#200 Wash Fines = 79%
2	11.9				Bulk		CL	**Sandy Lean CLAY;** stiff, dry, mottled, brown with white	Fines = 66%
3	24.6				Bulk		CL		Fines = 65%
4	32.5			5	Bulk		CH	**Sandy Fat CLAY;** stiff, concretions, moist to very moist, light olive brown	Fines = 65%
5	25.0				SPT		CH		Fines = 68% PP = 2.5 tsf
								End of test pit @ 8' No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 17-1024
Project Name : Borrow Site 3

Test Pit No. : 17
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Bastedo Backhoe
Date Drilled : 4-17-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	4.1			0	Bulk		SC	**FILL: Clayey SAND;** trace of gravel, slightly moist, yellowish brown	#200 Wash Fines = 44%
2	19.1				Bulk		CL	**ALLUVIUM: Lean CLAY with SAND; stiff, moist, light brown**	Fines = 84% PP = 2.75 tsf
3	23.4			5	Bulk				#200 Wash Fines = 79% EI = 40
4	26.6				Bulk		CH	**Fat CLAY with SAND;** soft to stiff, concretions, pale brown	#200 Wash Fines = 76%
				10				End of test pit @ 8' No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 17-1024
Project Name : Borrow Site 3

Test Pit No. : 18
Sheet : 1 **Of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Drop Height :
Location : See Figure A-2
Ground Elevation:
Drilling Co. : Bastedo Backhoe
Date Drilled : 4-17-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1 2 3	28.0 26.2 18.0			0			CL	**FILL: Sandy Lean CLAY; stiff, moist, very dark brown**	Fines = 72% PP= 2.5-3.5 tsf Fines = 73% Fines = 60
4	21.7							**ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, dark gray	Fines = 64%
5	22.8			5				**Lean CLAY with SAND;** very stiff, moist, dark gray	Fines = 90% EI = 55
								End of test pit @ 6' Wet soils encountered at 6'	

Depth scale (ft): 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ⊠ CD ■ SPT ⊠

APPENDIX C

Laboratory Test Results

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP7 @ 4' - 4.5'		TP7 @ 5.75' - 6.5'		TP9 @ 4' - 4.5'	
USCS Symbol	CH / CL		CH / CL		CH / CL	
Normal Load (psf)	144		144		144	
SAMPLE CONDITION	**Initial**	**Final**	**Initial**	**Final**	**Initial**	**Final**
Wt Specimen & Ring (gr)	761.380		703.070		742.100	
Wt. of ring (gr)	367.47		364.16		366.64	
Wt. Specimen (gr)	393.910		338.910		375.460	
Specimen diameter (in)	4.010		4.010		4.010	
Specimen radius (cm)	5.09		5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479		81.479	
Init. Spec. height (in)	1.0020	N/A	0.9993	N/A	1.0020	N/A
Height change (final)(in)	N/A	0.0926	N/A	0.1006	N/A	0.0623
Adjusted Spec.height(in)	1.00	0.9094	1.00	0.8987	1.00	0.9397
" " (cm)	2.545	2.310	2.538	2.283	2.545	2.387
Specimen Volume (cm^3)	207.371		206.812		207.371	
Moist Density (pcf)	118.59		102.31		113.03	
MOISTURE CONTENT						
Wt. moist soil+tare(gr)	126.54	126.54	130.33	130.33	125.87	125.87
Wt. dry soil+tare(gr)	115.59	115.59	113.23	113.23	113.23	113.23
Wt. of tare(gr)	19.64	19.64	19.71	19.71	19.74	19.74
Wt. dry soil (gr)	95.95	95.95	93.52	93.52	93.49	93.49
Wt. of water (gr)	10.95	10.95	17.10	17.10	12.64	12.64
M/C (%)	11.41	11.41	18.28	18.28	13.52	13.52
DRY DENSITY (pcf)	106.4		86.5		99.6	
% Saturation* (48%-52%)	52.8		52.0		52.7	
*Assumes Gs =	2.7		2.7		2.7	
EXPANSION INDEX =	92		101		62	
Potential Expansion *(per ASTM 4829-08)*	High		High		Medium	

KOURY ENGINEERING & TESTING, INC.	**Project Name:** Borrow Site #2	**Project No.: 17-1021**	**Run by: MFP**	**Lab:** 18-0023 Series
		Date: 4/25/18	**QA:**	

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP8 @ 6' - 6.5'		TP10 @ 6' - 7'		TP14 @ 6.5' - 7'	
USCS Symbol	CL		CL		CL	
Normal Load (psf)	144		144		144	
SAMPLE CONDITION	**Initial**	**Final**	**Initial**	**Final**	**Initial**	**Final**
Wt Specimen & Ring (gr)	752.450		718.350		762.070	
Wt. of ring (gr)	367.45		364.18		366.65	
Wt. Specimen (gr)	385.000		354.170		395.420	
Specimen diameter (in)	4.010		4.010		4.010	
Specimen radius (cm)	5.09		5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479		81.479	
Init. Spec. height (in)	1.0020	N/A	0.9993	N/A	1.0020	N/A
Height change (final)(in)	N/A	0.0606	N/A	0.0369	N/A	0.0404
Adjusted Spec.height(in)	1.00	0.9414	1.00	0.9624	1.00	0.9616
" " (cm)	2.545	2.391	2.538	2.444	2.545	2.442
Specimen Volume (cm^3)	207.371		206.812		207.371	
Moist Density (pcf)	115.91		106.91		119.04	
MOISTURE CONTENT						
Wt. moist soil+tare(gr)	132.38	132.38	136.31	136.31	148.38	148.38
Wt. dry soil+tare(gr)	119.95	119.95	122.87	122.87	135.41	135.41
Wt. of tare(gr)	19.71	19.71	31.57	31.57	17.30	17.30
Wt. dry soil (gr)	100.24	100.24	91.30	91.30	118.11	118.11
Wt. of water (gr)	12.43	12.43	13.44	13.44	12.97	12.97
M/C (%)	12.40	12.40	14.72	14.72	10.98	10.98
DRY DENSITY (pcf)	103.1		93.2		107.3	
% Saturation* (48%-52%)	52.8		49.1		51.9	
*Assumes Gs =	2.7		2.7		2.7	
EXPANSION INDEX =	60		37		40	
Potential Expansion *(per ASTM 4829-08)*	Medium		Low		Low	

KOURY ENGINEERING & TESTING, INC.

Project Name: Borrow Site #2	**Project No.: 17-1021**	**Run by: MFP**	**Lab:** 18-0023 Series
	Date: 4/27/18	**QA:**	

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP11 @ 3.7' - 4.3'		TP11 @ 5.5' - 6.0'	
USCS Symbol	CL		CL / CH	
Normal Load (psf)	144		144	
SAMPLE CONDITION	**Initial**	**Final**	**Initial**	**Final**
Wt Specimen & Ring (gr)	716.340		743.890	
Wt. of ring (gr)	367.47		364.17	
Wt. Specimen (gr)	348.870		379.720	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479	
Init. Spec. height (in)	1.0020	N/A	0.9993	N/A
Height change (final)(in)	N/A	0.0321	N/A	0.0502
Adjusted Spec.height(in)	1.00	0.9699	1.00	0.9491
" " (cm)	2.545	2.464	2.538	2.411
Specimen Volume (cm^3)	207.371		206.812	
Moist Density (pcf)	105.03		114.63	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	142.42	142.42	133.92	133.92
Wt. dry soil+tare(gr)	125.20	125.20	120.63	120.63
Wt. of tare(gr)	19.62	19.62	17.33	17.33
Wt. dry soil (gr)	105.58	105.58	103.30	103.30
Wt. of water (gr)	17.22	17.22	13.29	13.29
M/C (%)	16.31	16.31	12.87	12.87
DRY DENSITY (pcf)	90.3		101.6	
% Saturation* (48%-52%)	50.8		52.7	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	32		50	
Potential Expansion *(per ASTM 4829-08)*	Low		Medium	

KOURY ENGINEERING & TESTING, INC.	**Project Name:** **Borrow Site #2**	**Project No.: 17-1021** **Date: 4/23/18**	**Run by: MFP** **QA:**	**Lab:** **18-0023 Series**

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP13 @ 4.75' - 5'	
USCS Symbol	CH / CL	
Normal Load (psf)	144	
SAMPLE CONDITION	Initial	Final
Wt Specimen & Ring (gr)	749.650	
Wt. of ring (gr)	366.71	
Wt. Specimen (gr)	382.940	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	1.0020	N/A
Height change (final)(in)	N/A	0.0998
Adjusted Spec.height(in)	1.00	0.9022
" " (cm)	2.545	2.292
Specimen Volume (cm^3)	207.371	
Moist Density (pcf)	115.29	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	171.93	171.93
Wt. dry soil+tare(gr)	154.80	154.80
Wt. of tare(gr)	19.71	19.71
Wt. dry soil (gr)	135.09	135.09
Wt. of water (gr)	17.13	17.13
M/C (%)	12.68	12.68
DRY DENSITY (pcf)	102.3	
% Saturation* (48%-52%)	52.9	

*Assumes Gs =	2.7
EXPANSION INDEX =	100
Potential Expansion *(per ASTM 4829-08)*	High

KOURY ENGINEERING & TESTING, INC.	**Project Name:** Borrow Site #2	**Project No.: 17-1024** **Date: 5/1/18**	**Run by: MFP** **QA:**	**Lab:** 18-0023 Series

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP-15 @ 4.2' - 4.7'	
USCS Symbol	CL	
Normal Load (psf)	144	
SAMPLE CONDITION	**Initial**	**Final**
Wt Specimen & Ring (gr)	679.610	
Wt. of ring (gr)	366.65	
Wt. Specimen (gr)	312.960	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	1.0015	N/A
Height change (final)(in)	N/A	0.0788
Adjusted Spec.height(in)	1.00	0.9227
" " (cm)	2.544	2.344
Specimen Volume (cm^3)	207.268	
Moist Density (pcf)	94.26	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	128.75	128.75
Wt. dry soil+tare(gr)	110.26	110.26
Wt. of tare(gr)	19.72	19.72
Wt. dry soil (gr)	90.54	90.54
Wt. of water (gr)	18.49	18.49
M/C (%)	20.42	20.42
DRY DENSITY (pcf)	78.3	
% Saturation* (48%-52%)	47.8	

*Assumes Gs = 2.7

EXPANSION INDEX = 79

Potential Expansion *(per ASTM 4829-08)* Medium

KOURY ENGINEERING & TESTING, INC.	**Project Name:** Borrow Site #2	**Project No.: 17-1024**	**Run by: MFP**	**Lab:** 18-0023 Series
		Date: 5/11/18	**QA:**	

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP15 @ 5.5' - 6'	
USCS Symbol	CH	
Normal Load (psf)	144	
SAMPLE CONDITION	Initial	Final
Wt Specimen & Ring (gr)	682.770	
Wt. of ring (gr)	364.17	
Wt. Specimen (gr)	318.600	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	0.9995	N/A
Height change (final)(in)	N/A	0.1946
Adjusted Spec.height(in)	1.00	0.8049
" " (cm)	2.539	2.044
Specimen Volume (cm^3)	206.854	
Moist Density (pcf)	96.16	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	136.78	136.78
Wt. dry soil+tare(gr)	117.52	117.52
Wt. of tare(gr)	31.57	31.57
Wt. dry soil (gr)	85.95	85.95
Wt. of water (gr)	19.26	19.26
M/C (%)	22.41	22.41
DRY DENSITY (pcf)	78.6	
% Saturation* (48%-52%)	52.8	

*Assumes Gs = 2.7

EXPANSION INDEX = 195

Potential Expansion *(per ASTM 4829-08)* Very High

KOURY ENGINEERING & TESTING, INC.	Project Name: Borrow Site #2	Project No.: 17-1024 Date: 5/1/18	Run by: MFP QA:	Lab: 18-0023 Series

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP17 @ 4' - 4.5'	
USCS Symbol	CL	
Normal Load (psf)	144	
SAMPLE CONDITION	**Initial**	**Final**
Wt Specimen & Ring (gr)	714.050	
Wt. of ring (gr)	366.68	
Wt. Specimen (gr)	347.370	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	1.0020	N/A
Height change (final)(in)	N/A	0.0399
Adjusted Spec.height(in)	1.00	0.9621
" " (cm)	2.545	2.444
Specimen Volume (cm^3)	207.371	
Moist Density (pcf)	104.58	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	155.07	155.07
Wt. dry soil+tare(gr)	135.10	135.10
Wt. of tare(gr)	19.73	19.73
Wt. dry soil (gr)	115.37	115.37
Wt. of water (gr)	19.97	19.97
M/C (%)	17.31	17.31
DRY DENSITY (pcf)	89.1	
% Saturation* (48%-52%)	52.5	

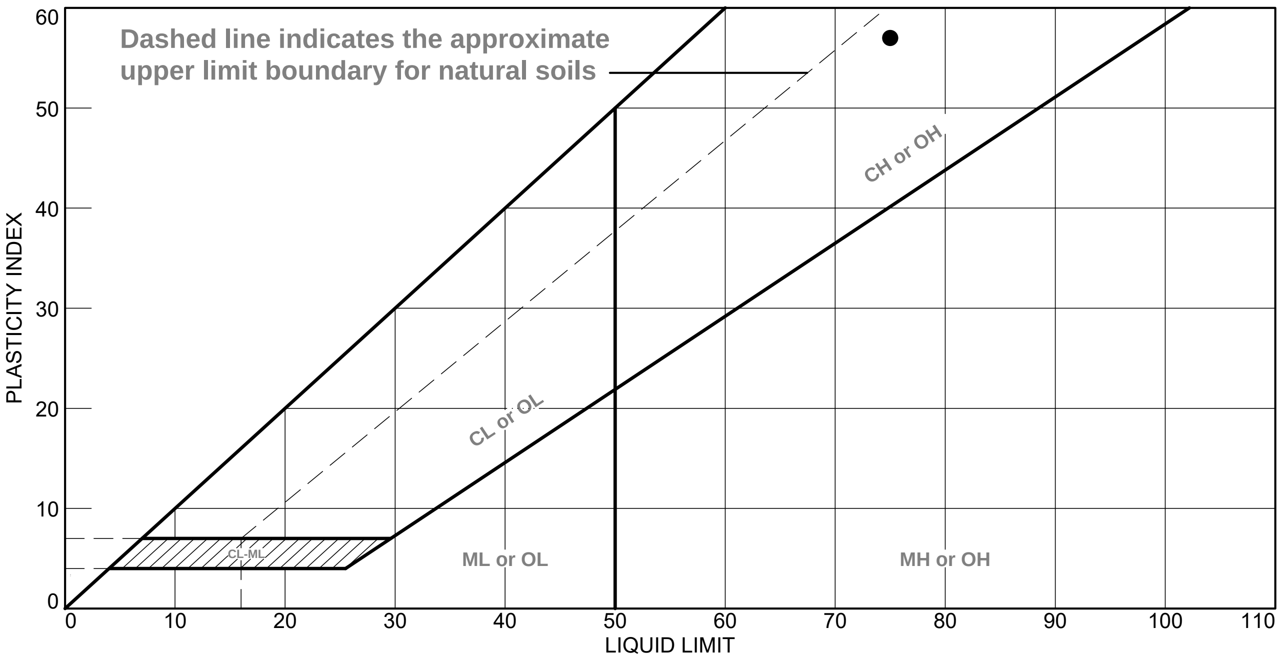
*Assumes Gs = 2.7

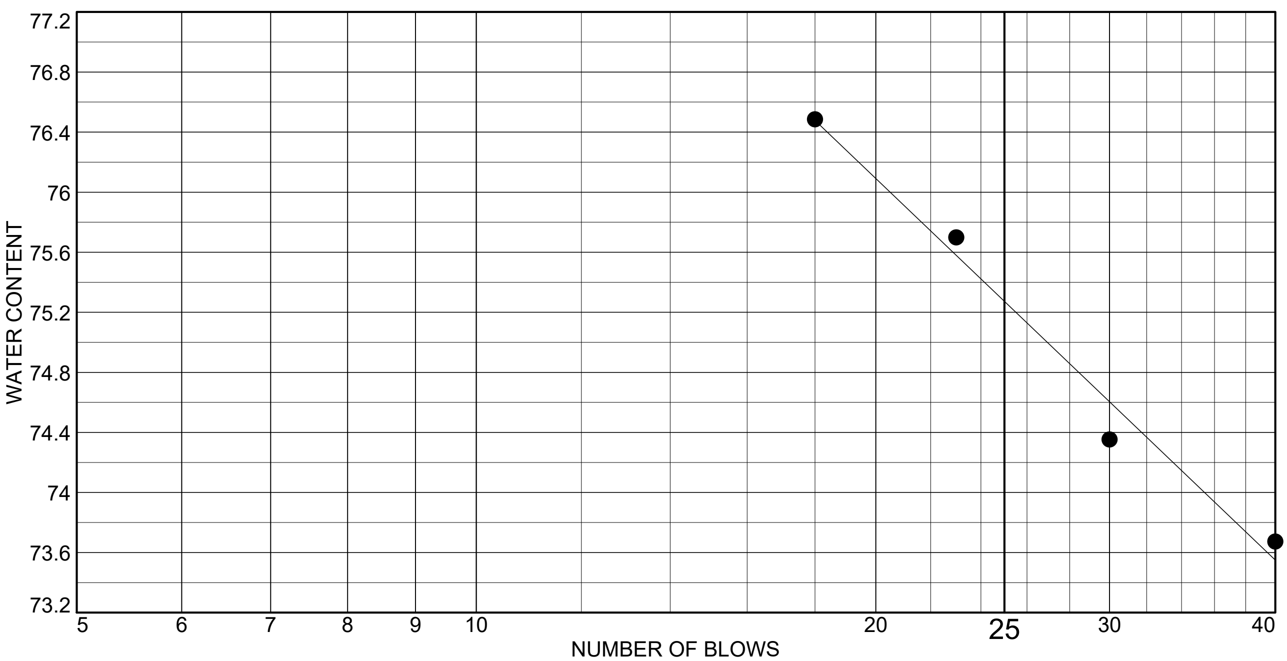
EXPANSION INDEX = 40

Potential Expansion *(per ASTM 4829-08)* Low

KOURY ENGINEERING & TESTING, INC.	**Project Name:** Borrow Site #2	**Project No.: 17-1021**	**Run by: MFP**	**Lab:** 18-0023 Series
		Date: 4/26/18	**QA:**	

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Light Pale Olive to Light Yellowish Brown Clay	75	18	57			CH

Project No. 17-1024 **Client:**

Project: Borrow Site #2

Location: TP-6 @ 8' - 9'
Sample Number: 4838 Series

Koury Engineering & Testing, Inc.

Chino, CA

Remarks:
● Lab #4838 Series.

Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: Suzy Amaya **Checked By:** ____________

MAXIMUM DENSITY TEST REPORT

Curve No.: 4838 Series

Project No.: 17-1024 **Date:** 3/10/18

Project: Borrow Site #2

Client:

Location: TP-6 @ 8' - 9'

Sample Number: 4838 Series

Remarks: Less than 5% Material retained on the #4 Sieve.

MATERIAL DESCRIPTION

Description: Light Pale Olive to Light Yellowish Brown Clay

Classifications - **USCS:** CH **AASHTO:**

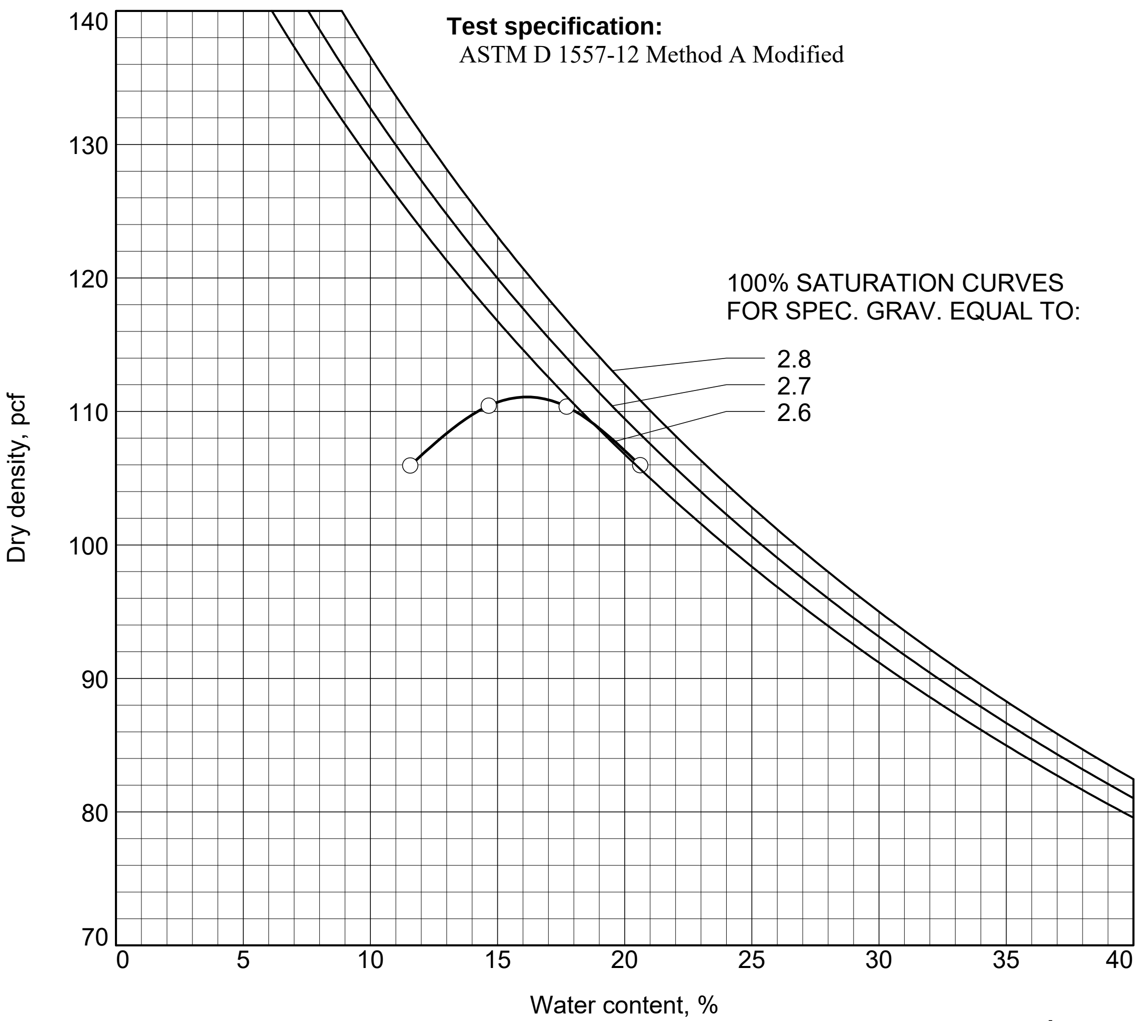
Nat. Moist. = **Sp.G. =**

Liquid Limit = **Plasticity Index =**

% < No.200 =

TEST RESULTS
Maximum dry density = 111.1 pcf
Optimum moisture = 16.2 %

Test specification:
ASTM D 1557-12 Method A Modified



These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Figure

Koury Engineering & Testing, Inc.

Tested By: Mathew F. Perry **Checked By:**

We are a key member of the construction team while safeguarding the public. We improve operational logistics and provide superior quality control through the continuing development of our engineering staff and technical expertise, utilization of classroom training and field supervisors, thus defining the industry standard.

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KOURY ENGINEERING & TESTING, INC.

GEOTECHNICAL & SEISMIC ENGINEERING,
CONSTRUCTION INSPECTION &
MATERIALS TESTING SERVICES

March 16, 2018
Project No. 18-0158

Mr. John R. Burroughs, LEED AP, President
Commerce Construction Co., L.P.
13191 Crossroads Parkway North 6th Floor
City of Industry, CA 91746

Subject: Limited Borrow Site Feasibility Study
Alternative Borrow Site 6
SEC of East County Road and Chino Corona Road
City of Chino, California

Dear Mr. Burroughs:

Presented herein are our preliminary findings and conclusions regarding the suitability of the Borrow Site 6 soils to be used as engineered fill to balance the grade for the OC Prado site construction located on the southeast corner of Bickmore Avenue and Mountain Avenue in the City of Chino.

Based on the conceptual grading plan, the proposed rectangular shaped Borrow Site 6 covers an area of about 485,000 square feet or roughly 11 acres. The site is bounded by Chino Corona Road to the north, East County Road to the west, one retention pond to the south and two other retention ponds to the east. A Site Vicinity Map with approximate ground contour elevations is presented in Appendix A as Figure A-1. The site is owned by the County of Orange Flood Control District.

Field Exploration and Laboratory Testing for Feasibility Study

The field exploration program for the feasibility study consisted of excavating twelve test pits. A rubber tire mounted backhoe was used to excavate the 12 test pits ranging in depths from about 15 to 17½ feet. The locations of the test pits are shown on the Field Exploration Map, Figure A-2, presented in Appendix A. Bulk samples were obtained from the test pits for laboratory testing.

Laboratory tests, including moisture content, #200 sieve wash, expansion index, maximum density, pocket penetrometer and plasticity index were performed to aid in the classification of the materials encountered and to evaluate their engineering properties. Sulfates, chlorides, resistivity, and PH tests (corrosivity tests) were also performed on selected samples. The results of pertinent laboratory tests are presented on the boring logs in Appendix B, and/or in Appendix C.

Site Geology

The site is located within the Upper Santa Ana River Valley, which consists of a series of coalescing alluvial fans formed by streams flowing out of the San Gabriel Mountains to the north. The valley lies within the Peninsular Ranges geomorphic province, which is characterized by alluviated basins, elevated erosion surfaces, and northwest-trending mountain ranges bounded by northwest trending faults. The site, which is located within the Chino Basin, is underlain by sediments deposited by the Santa Ana River and its tributaries such as the Chino Creek.

Morton and Miller (2006) show the site to be underlain by very old alluvial-fan deposits (See Figure A-3 in Appendix A). The sediments encountered during the subsurface investigation consisted predominantly of clay.

Surface Site Conditions

At the time of the subsurface investigation, the site was accessible through gated driveways along Chino Corona Road, East County Road, and along unfenced areas adjacent to East County Road. Except for localized areas where concrete was exposed, the ground surface exposed bare soils. There were some concrete slabs remaining at the southwest corner of the site and near the south eastern boundary along with an asphalt paved driveway in the northeastern portion of the site. The site has been cleared of trees, past structures such as buildings, animal shelters, and other above ground ancillary facilities; however, it appears that some foundations may remain below the ground surface.

The site generally slopes to the south between about elevations 563 and 555 feet except for the south end of the site that has a 10-foot high slope dipping toward the existing retention pond. The conceptual plan indicates a proposed 20-feet setback from Chino Corona Road and East County Road followed by slopes at an inclination of 4:1 (H:V). The proposed grades at the toe of the slope will range from about elevation 552 feet at the north end and 544 feet at the south end, which correspond to cuts of about 10 to 12 feet.

Soil Conditions

The subsurface soil profile consists generally of artificial fill underlain by alluvial deposits. For the most part, the fill is generally on the order of one foot thick except for the former area of buildings/structures and underground utilities where 6 feet of fill was encountered in Test Pit 12. The fill derived from onsite shallow soils consists predominantly of lean clay with sand and sandy lean clay.

The alluvium soils consist predominantly of stiff to very stiff medium plastic to high plastic sandy clay and clay with sand. Some discrete layers of silty sand, clayey sand, and poorly graded sand with silt were encountered in Test Pit 3 at depths of 9 to 10 feet, in Test Pit 6 at 15 to 16½ feet, in Test Pit 9 at 11½ to 13 and at 15 to 17½ feet, and in Test Pit 11 at 10½ to 16 feet.

The moisture contents of clay soils are highly variable, ranging from about 12 to 37 percent with an average of about 21 percent while the silty sand and clayey sand moisture contents range from about 9½ to 12½ percent with an average of about 11 percent. Based on two maximum density tests performed and prior experience with similar soils, many of the clay sample moisture contents are about 8 to 12 percent above optimum for the soils sampled at depths between 4 and 12 feet below the ground surface.

The fine contents range from about 50 to 87 percent with an average of about 64½ percent for clay and from about 15 to 32 percent with an average of about 23½ percent for silt and clayey sand. The average relatively low fine contents of the clay soils are attributed to the presence of concretions (hard matter formed by precipitation of mineral cement between particles), which was observed in many of the clay samples. The pocket penetrometer tests indicate unconfined compression strength on the order of 2 to 4.5 tsf with an average of about 3.8 tsf.

Table 1 – Maximum Density and Plasticity Index

Test Pit Number	TP-6 @ 10 to 11 feet	TP-11 @ 8 to 9 feet
Maximum Dry Density (pcf)	102.6	112.4
Optimum Moisture Content (%)	19.9	15.5
Liquid Limit	54	53
Plastic Limit	29	23
Plasticity Index	25	30

To aid in the soil classification and to correlate the soil plasticity with the soil expansion, two plasticity index tests (Atterberg Limits) were performed on samples of Test Pits 6 and 11 at depths of 8 to 11 feet. As shown in Table 1, the liquid limits exceed 50, which indicate high plasticity for the two samples tested.

The site soil expansion potential ranges from very low to very high. Table 2 presents the data for 15 tests sampled at depths ranging from 1 to 14 feet. These tests indicate expansion index variation from 20 to 180. Within the upper 4 feet, the test data obtained to date indicate expansion indices ranging between 20 and 45 and moisture contents between about 13 and 19 with an average of about 16½ percent. Except for Test Pit 2, at depths of 4 to 5 feet and Test Pit 5 at depths of 6-8 feet that contained abundant concretions, all the expansion index tests performed on samples at depth greater than 4 feet indicated expansion indices greater than 76. Excluding the upper 4 feet of soils and the samples with high concentrations of concretions, the average expansion index is about 132, which is very high.

The moisture contents of the clay below a depth of 4 feet range predominantly between 22 and 37 percent with an average of about 27 percent. On average, this moisture content is about 8 to 12 percent above optimum; however, some samples have moisture contents up to about 15 to 17 percent above optimum.

Table 2 – Expansion Index Test Results

Test Pit	TP-2	TP-3	TP-5	TP-5	TP-6	TP-6	TP-6	TP-6	TP-7	TP-8	TP-9	TP-11	TP-11	TP-11	TP-12
Depth (ft)	**4-5**	**2-3**	**1-2**	**6-8**	**1.5-2**	**5.5-6**	**10-11**	**13-14**	**1-2**	**4.5-5**	**10-11**	**1-2**	**5-6**	**8-9**	**8.5-9.5**
Expansion	57	28	31	49	38	107	108	151	20	76	158	45	132	180	148
Moisture	22.8	19.3	15.7	26.4	13.8	26.4	36.9	34.3	16.9	21.9	30.5	16.4	22.3	24.9	27.0
Fines	73	51	73	66	66	71	69	78	76	71	87	65	70	64	83

There is a rough correlation between in situ natural moisture content at depth and expansion index. For the same amounts of fines, site soils with higher moisture and higher plasticity index tend to have higher expansion index.

Groundwater

No groundwater was encountered in the excavated test pits

Corrosivity

The corrosivity tests performed indicates that the site soils are generally severely corrosive to metal. However, the tests performed did not indicate high corrosivity to concrete. The corrosivity test results are summarized in the following Table 3.

Table 3 - Corrosion Test Results

Boring	Depth (ft)	Minimum Resistivity (ohm-cm)	pH	Soluble Sulfate Content (ppm)	Soluble Chloride Content (ppm)
TP-11	5.0 - 6.0	446	7.5	203	425
TP-12	1.5-2.5	717	7.6	322	170

Conclusions and Recommendations

Based on the data collected from the field to date, it appears feasible to import some material from Borrow Site 6 to use at the OC Prado site. However, it appears that only the upper 4 feet of soils (once well blended) could be suitable for foundation support. Some silty sand and clayey sands were encountered in the southwest corner of the site (mostly in TP-6, TP-9, and TP-11) at depths of about 15 to 17 feet (end of test pits). However, based on the conceptual plan, the proposed basin depth is only 10 to 12 feet and the sands encountered are generally deeper than these depths.

The other soils tested between the depths of 4 feet and the proposed design bottom of the borrow site are generally undesirable from a geotechnical standpoint due to their high moisture content (average of about 27%), high plasticity and high to very high expansion potential (EI average of 132).

If this borrow site is further considered for import, we recommend that additional test pits be excavated to confirm the preliminary findings, especially within the zone selected for import.

CLOSURE

The findings and recommendations presented in this report were based on the results of our field and laboratory investigations, combined with professional engineering experience and judgment. The report was prepared in accordance with generally accepted engineering principles and practice. We make no other warranty, either expressed or implied. Subsurface variations between and beyond the test pits should be anticipated. Samples obtained during this investigation will be retained in our laboratory for a period of 45 days from the date of this report and will be disposed after this period.

Should you have any questions concerning this submittal, or the recommendations contained herewith, please do not hesitate to call our office.

Respectfully submitted,

KOURY ENGINEERING & TESTING, INC

REGISTERED PROFESSIONAL ENGINEER
JACQUES B. ROY
NO. 2077
Ex. Date 9/30/19
Geotechnical
STATE OF CALIFORNIA

Jacques Roy
Jacques B. Roy, PE, GE
Principal Engineer

Distribution: 1. Addressee (a pdf copy via e-mail)
2.File (B)

APPENDICES

Appendix A: Maps and Plans

Vicinity Map – Figure A-1
Field Exploration Map – Figure A-2
Geology Map – Figure A-3

Appendix B: Field Exploratory Test Pits

Test Pits 1 through 12

Appendix C: Laboratory Test Results

REFERENCES

1. California Division of Mines and Geological Survey, 1998, Seismic Hazard Zone Report 045 for the Prado Dam 7.5 Minute Quadrangle, California.

2. California Division of Mines and Geological Survey, 2003, Earthquake Fault Zones, Prado Dam Quadrangle, May 1, 2003.

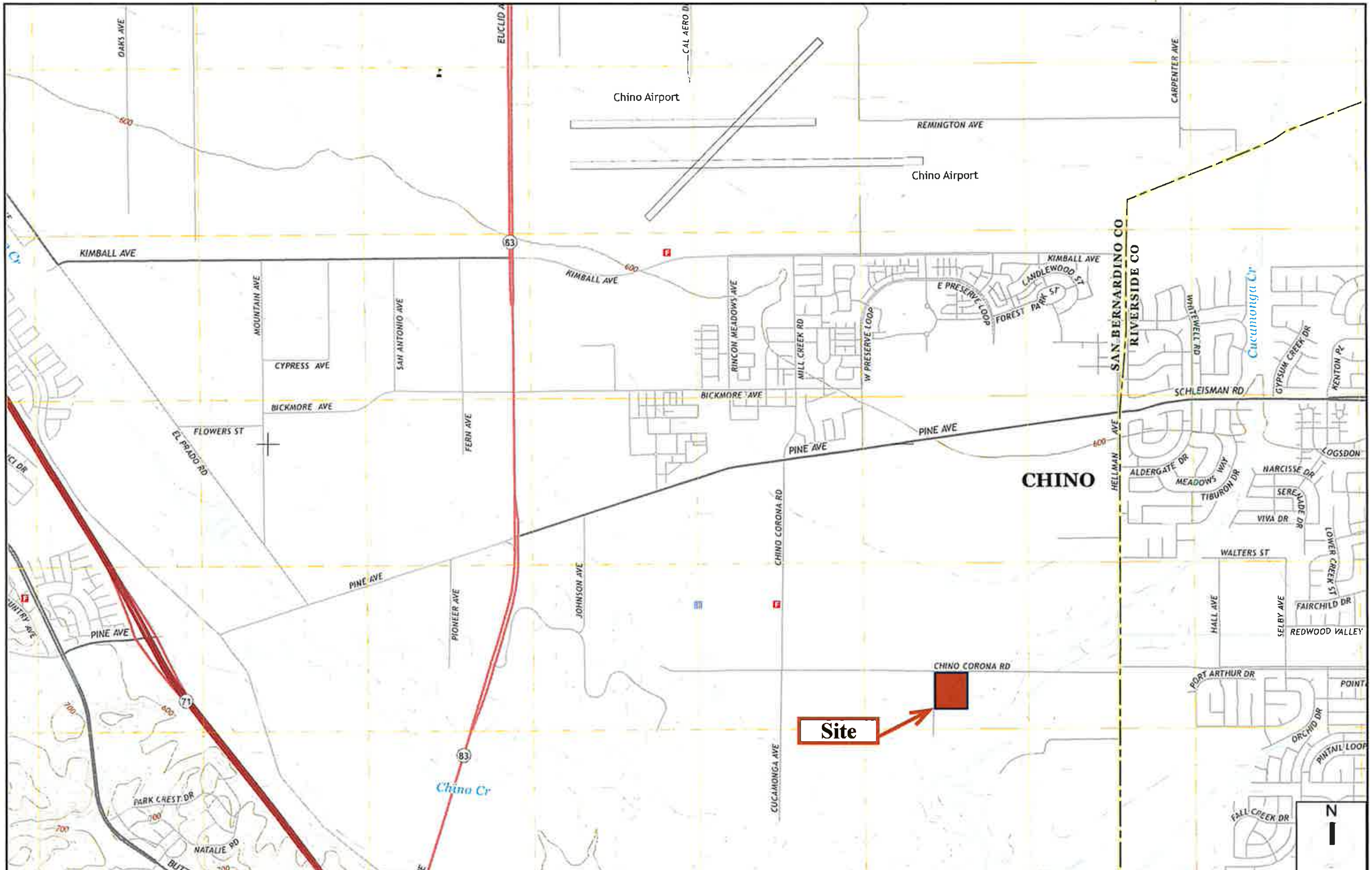
3. City of Chino General Plan, Safety Element, 2010, Final Report.

4. US Army Corps of Engineers, Geotechnical Investigations, Engineering Manual EM 1110-1-1804, dated 8/26/86.

5. US Army Corps of Engineers, Laboratory Soils Testing, Engineering Manual EM 1110-2-1906, dated 8/26/86.

APPENDIX A

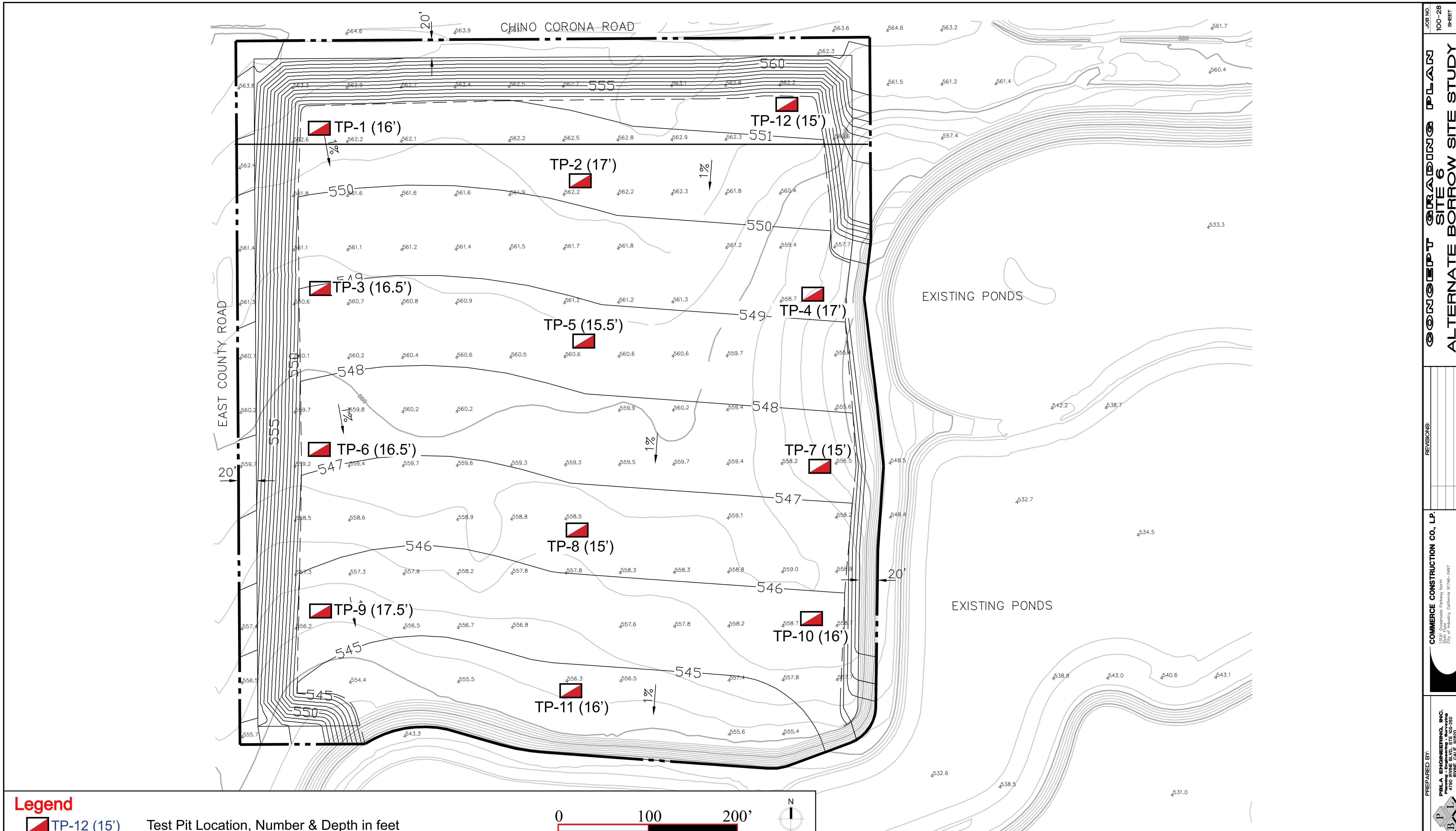
Maps and Plans



Reference: USGS Topographic Map, Prado Dam & Corona North Quadrangles, California, 7.5 Minute Series 2015 - Contour Interval 20 feet, NAVD of 1988

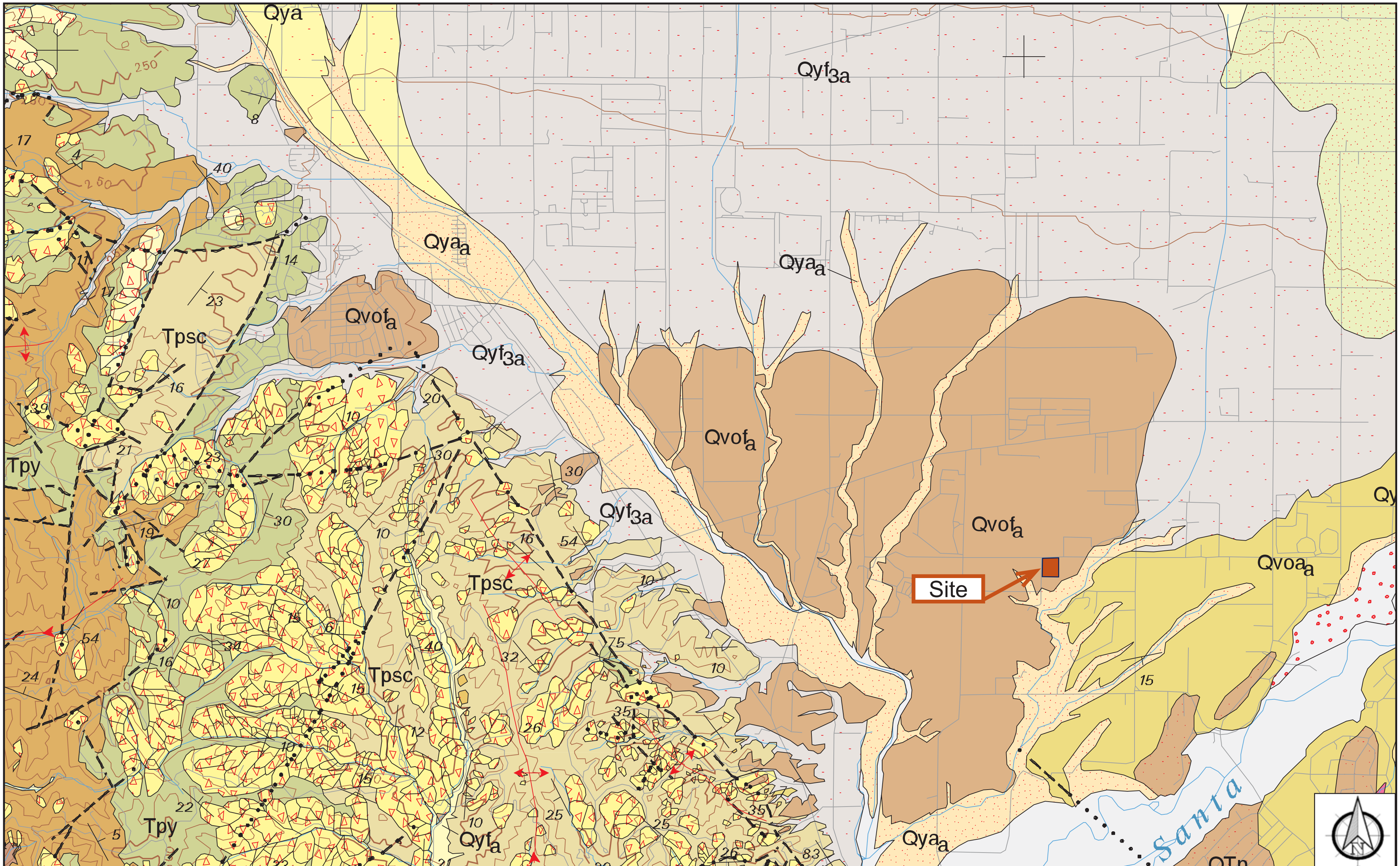
0 1/2 1 Mile

KOURY ENGINEERING & TESTING, INC.	Project Name: Alternative Borrow Site Chino Corona Road & East County Road	Project No.: 18-0158 Date: March 2018	Drawing Title: Vicinity Map	Figure: A-1



KOURY ENGINEERING & TESTING, INC.

Project Name:	Project No.: 18-0158	Drawing Title:	Figure:
Alternative Borrow Site Chino Corona Road & East County Road	Date: March 2018	Test Pit Exploration Map	A-2



LEGEND

Qvof	Very old alluvial-fan deposits
Qya	Young alluvial-valley deposits

Reference: Geologic Map of the San Bernardino & Santa Ana 30´x60´ Quadrangle California-Version 1.0 Compiled by Douglas M. Morton and Fred K. Miller, 2006

KOURY ENGINEERING & TESTING, INC.	Project Name: Alternative Borrow Site Chino Corona Road & East County Road	Project No.: 18-0158 Date: March 2018	Drawing Title: Geology Map	Figure: A-3

APPENDIX B

Field Exploratory Test Pits

KEY TO LOGS

SOILS CLASSIFICATION					
MAJOR DIVISIONS			GRAPHIC LOG	USCS SYMBOL	TYPICAL NAMES
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS MORE THAN 50% OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS LESS THAN 5% FINES		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES MORE THAN 12% FINES		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS 50% OR MORE OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS LESS THAN 5% FINES		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES MORE THAN 12% FINES		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS 50% OR MORE OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 50			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT IS 50 OR MORE			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR GRAVELLY ELASTIC SILTS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT AND OTHER HIGHLY ORGANIC SOILS

GRAIN SIZES							
SILT AND CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		
	#200	#40	#10	#4	3/4"	3"	12"

SIEVE SIZES

KEY TO LOGS (continued)

SPT/CD BLOW COUNTS VS. CONSISTENCY/DENSITY					
FINE-GRAINED SOILS (SILTS, CLAYS, etc.)			GRANULAR SOILS (SANDS, GRAVELS, etc.)		
CONSISTENCY	*BLOWS/FOOT		RELATIVE DENSITY	*BLOWS/FOOT	
	SPT	CD		SPT	CD
SOFT	0-4	0-4	VERY LOOSE	0-4	0-8
FIRM	5-8	5-9	LOOSE	5-10	9-18
STIFF	9-15	10-18	MEDIUM DENSE	11-30	19-54
VERY STIFF	16-30	19-39	DENSE	31-50	55-90
HARD	over 30	over 39	VERY DENSE	over 50	over 90

* CONVERSION BETWEEN CALIFORNIA DRIVE SAMPLERS (CD) AND STANDARD PENETRATION TEST (SPT) BLOW COUNT HAS BEEN CALCULATED USING "FOUNDATION ENGINEERING HAND BOOK" BY H.Y. FANG. (**VALUES ARE FOR 140 Lbs HAMMER WEIGHT ONLY**)

DESCRIPTIVE ADJECTIVE VS. PERCENTAGE	
DESCRIPTIVE ADJECTIVE	PERCENTAGE REQUIREMENT
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
AND	35 - 50%

*THE FOLLOWING "DESCRIPTIVE TERMINOLOGY/ RANGES OF MOISTURE CONTENTS" HAVE BEEN USED FOR MOISTURE CLASSIFICATION IN THE LOGS.

APPROXIMATE MOISTURE CONTENT DEFINITION	
DEFINITION	DESCRIPTION
DRY	Dry to the touch; no observable moisture
SLIGHTLY MOIST	Some moisture but still a dry appearance
MOIST	Damp, but no visible water
VERY MOIST	Enough moisture to wet the hands
WET	Almost saturated; visible free water

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0158
Project Name : Borrow Site 4

Test Pit No. : 1
Sheet : 1 of : 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight : **Drop Height :**
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Gilstrap
Date Drilled : 2-22-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**Fill: Lean CLAY with SAND;** moist, brown	
1	12.2				Bulk		CL	**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, brown	#200 Wash Fines = 82%
2	3.6			5	Bulk		CL/CH	**Sandy Lean to Fat CLAY;** stiff, some concretions, moist to very moist, light yellowish brown	#200 Wash Fines = 72%
3	17.1				Bulk			Aubundant concretions, very pale brown with white	#200 Wash Fines = 50%
4	17.4			10	Bulk				#200 Wash Fines = 50%
5	23.0				Bulk		CH	**Fat CLAY with SAND;** minor concretions, stiff, moist to very moist, brown with white	#200 Wash Fines = 80% PP = 3.0 tsf
6	16.1			15	Bulk		CL/CH	**Lean to Fat CLAY;** stiff, concretions, moist, light yellowish brown	Fines = 65% PP = 2.5-3 tsf
7	19.9				Bulk				Fines = 66%
				20				End of test pit @ 16' No groundwater encountered	
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0158 **Project Name :** Borrow Site 4

Test Pit No. : 2

Sheet : 1 **of :** 1

Drilling Method : Backhoe

Sampling Method : Bulk

Ground Elevation:

Hammer Weight : **Drop Height :**

Drilling Co. : Gilstrap

Location : See Figure A-2

Date Drilled : 2-22-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**Fill: Sandy Lean CLAY;** moist, brown	
							CL	**ALLUVIUM:** **Sandy Lean CLAY;** stiff**,** moist, brown	
1	22.8			5	Bulk			**Sandy Lean to Fat CLAY;** concretions, moist to very moist, very pale brown	#200 Wash Fines = 73% EI = 57
2	24.9				Bulk				#200 Wash Fines = 70%
				10			CL/CH		
3	18.7			15	Bulk			Yellowish brown	#200 Wash Fines = 61% PP = 2.0 tsf
4	17.5				Bulk				#200 Wash Fines = 59%
								End of test pit @ 17' No groundwater encountered	
				20					
				25					
				30					
				35					
				40					

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0158 **Project Name :** Borrow Site 4

Test Pit No. : 3

Sheet : 1 **of :** 1

Drilling Method : Backhoe

Sampling Method : Bulk

Hammer Weight : **Drop Height :**

Location : See Figure A-2

Ground Elevation:

Drilling Co. : Gilstrap

Date Drilled : 2-22-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**Fill: Sandy Lean CLAY;** moist, brown	
1	14.5				Bulk		CL	**ALLUVIUM:**	#200 Wash Fines = 55% EI = 28
2	19.3				Bulk			**Sandy Lean CLAY; trace of concretions, very** stiff, moist, pale brown	Fines = 51% PP = 4-4.5 tsf
				5			CL/CH	**Sandy Lean to Fat CLAY; very** stiff, abundant concretions, moist, very pale brown with white	
3	17.8				Bulk				#200 Wash Fines = 55% PP = 4.5 tsf
									#200 Wash Fines = 61%
4	10.2				Bulk		SC	**Clayey SAND;** trace to little gravel, moist, yellowish brown	Fines = 32%
5	16.2			10	Bulk		CL/CH	**Sandy Lean to Fat CLAY;** concretions, moist, dark yellowish brown	Fines = 51% PP = 3.5 tsf
6	32.7				Bulk				Fines = 50% PP = 2-4 tsf
7	34.1			15	Bulk		CH	**Sandy Fat CLAY;** stiff, very moist, yellowish brown with dark brown	#200 Wash Fines = 51% PP = 2.5 - 3 tsf
								End of test pit @ 16' 6" No groundwater encountered	
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0158 **Project Name :** Borrow Site 4

Test Pit No. : 4

Sheet : 1 **of :** 1

Drilling Method : Backhoe

Sampling Method : Bulk

Hammer Weight : **Drop Height :**

Location : See Figure A-2

Ground Elevation:

Drilling Co. : Gilstrap

Date Drilled : 2-22-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0		**Fill: Sandy Lean CLAY;** stiff brown.	
1	13.8				CL	**ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, brown	#200 Wash Fines = 61% PP= 4 - 4.5 tsf
2	19.5			5	CL/CH	**Sandy Lean to Fat CLAY;** abundant concretions, moist, very pale brown	#200 Wash Fines = 51%
3	19.4					abundant concretions	#200 Wash Fines = 55%
4	23.9			10		yellowish brown	#200 Wash Fines = 55%
5	17.6					brown and strong brown	#200 Wash Fines = 58% PP=3.5-4.5 tsf
6	22.4			15		**Lean to Fat CLAY with SAND;** stiff to very stiff, moist to very moist, olive	#200 Wash Fines = 76% PP= 3.5 tsf
				20		End of test pit @ 17' No groundwater encountered	
				25			
				30			
				35			
				40			

Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0158 **Project Name :** Borrow Site 4

Test Pit No. : 5

Sheet : 1 **of :** 1

Drilling Method : Backhoe

Sampling Method : Bulk

Hammer Weight : **Drop Height :**

Location : See Figure A-2

Ground Elevation:

Drilling Co. : Gilstrap

Date Drilled : 2-22-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0		**Fill: Sandy Lean CLAY;** stiff, moist	
1	15.7				CL	**ALLUVIUM:** **Sandy Lean CLAY;** concretions, very stiff, moist, brown	Fines = 73% EI = 31 PP= 3 - 4.5 tsf
2	26.4			5	CL/CH	**Sandy Lean to Fat CLAY;** stiff, abundant concretions, stiff to very stiff, moist to very moist, pale brown	#200 Wash Fines = 66% EI = 49 PP= 2.5- 3.5 tsf
3	30.9			10	CH	**Fat CLAY with SAND;** concretions, stiff, moist to very moist, dark yellowish brown.	#200 Wash Fines = 84%
4	27.6				CL/CH	**Sandy Lean to Fat CLAY;** stiff to very stiff, moist to very moist, brown	#200 Wash Fines = 51% PP= 3- 4.5 tsf
5	17.8			15		dark yellowish brown with white inclusions	#200 Wash Fines =66% PP= 4.5 tsf
						End of test pit @ 15' 6" No groundwater encountered	
				20			
				25			
				30			
				35			
				40			

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0158 **Project Name :** Borrow Site 4

Test Pit No. : 6

Sheet : 1 **of :** 1

Drilling Method : Backhoe

Sampling Method : Bulk

Hammer Weight :

Drop Height :

Location : See Figure A-2

Ground Elevation:

Drilling Co. : Gilstrap

Date Drilled : 2-22-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0		**Fill: Sandy Lean CLAY;** stiff, dark brown	
1	13.8				CL	**ALLUVIUM:** **Sandy Lean CLAY;** stiff, moist, dark brown	#200 Wash Fines = 65% EI = 38
2	17.7			5	CL/CH	**Sandy Lean to Fat CLAY;** stiff, concretions, moist, brownish yellow	#200 Wash Fines = 50%
3	26.4					light olive brown with white, moist to very moist	#200 Wash Fines = 71% EI= 107
4	20.8						#200 Wash Fines = 51%
5	25.3					brown, layers of dark yellowish brown silty sand	#200 Wash Fines = 54%
6	36.9			10	CH	**Sandy Fat CLAY;** very stiff, very moist, yellowish brown LL= 54 PL= 29 Max Density = 102.6 pcf Opt Moisture = 19.9%	#200 Wash Fines = 69% EI= 108 PP= 3.5 - 4.5 tsf
7	34.3					**Fat CLAY with SAND;** very stiff, moist to very moist, light yellowish brown	#200 Wash Fines = 78% EI= 151 PP= 4.5 tsf
8	10.5			15	SM	**Silty SAND;** fine to coarse, trace to little gravel, moist, light olive brown	#200 Wash Fines = 19%
9							
						End of test pit @ 16' 6" No groundwater encountered	
				20			
				25			
				30			
				35			
				40			

Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0158 **Project Name :** Borrow Site 4

Test Pit No. : 7

Sheet : 1 **of :** 1

Drilling Method : Backhoe

Sampling Method : Bulk

Ground Elevation:

Hammer Weight : **Drop Height :**

Drilling Co. : Gilstrap

Location : See Figure A-2

Date Drilled : 2-22-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**Fill: Sandy Lean CLAY;** stiff, dark brown.	
1	16.9						CL	**ALLUVIUM:** **Lean CLAY with SAND;** concretions, stiff, moist, brown	Fines = 76% EI= 20
2	19.2			5			CL/CH	**Sandy Lean to Fat CLAY;** abundant concretions, stiff, moist, pale brown with white	#200 Wash Fines = 50%
3				10				yellowish brown	PP= 3- 3.5 tsf
4	16.2						CL	Sandy Lean CLAY; stiff to very stiff, moist, strong brown with light yellowish brown and black	Fines = 60% PP= 3 - 3.5 tsf
5 6	17.2 20.2			15			CL/CH	**Sandy Lean to Fat CLAY;** very stiff to hard, moist, mottled brown to light olive brown	Fines = 63% PP= 4- 4.5 tsf Fines = 69%
				20 25 30 35 40				End of test pit @ 15' No groundwater encountered	

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0158 **Project Name :** Borrow Site 4

Test Pit No. : 8

Sheet : 1 **of :** 1

Drilling Method : Backhoe

Sampling Method : Bulk

Ground Elevation:

Hammer Weight :

Drop Height :

Drilling Co. : Gilstrap

Location : See Figure A-2

Date Drilled : 2-22-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**Fill: Lean CLAY with SAND;** stiff, brown	
1	16.4				Bulk		CL	**ALLUVIUM:** **Lean CLAY with SAND;** trace of gravel, very stiff, moist, brown	#200 Wash Fines = 82%
2	16.0			5	Bulk		CL/CH	**Sandy Lean to Fat CLAY;** concretions, moist, pale brown	#200 Wash Fines = 50% EI = 76
3	21.9				Bulk				Fines = 71%
				10				pale brown with white	
4	22.2				Bulk		CH	**Sandy Fat CLAY;** stiff, moist to very moist, light olive brown with white and brown	#200 Wash Fines = 55% PP = 2.5 tsf
5	17.7				Bulk		CL/CH	**Sandy Lean to Fat CLAY;** concretions, very stiff, moist, light yellowish brown with white concretions	Fines = 51% PP = 4.5 tsf
				15				End of test pit @ 15' No groundwater encountered	
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0158 **Project Name :** Borrow Site 4

Test Pit No. : 9

Sheet : 1 **of :** 1

Drilling Method : Backhoe

Sampling Method : Bulk

Hammer Weight :

Drop Height :

Location : See Figure A-2

Ground Elevation:

Drilling Co. : Gilstrap

Date Drilled : 2-22-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Soil Type (USCS)	Description	Additional Tests
				CL	**Fill: Sandy Lean CLAY;** stiff, brown	
1	14.2			CL	**ALLUVIUM:** **Lean CLAY with SAND;** concretions, stiff to very stiff, moist, brown	#200 Wash Fines = 76%
2	17.8			CH	**Fat CLAY with SAND;** concretions, very stiff, moist to very moist, very pale brown with yellowish brown and white	#200 Wash Fines = 75% PP = 4 tsf
3	31.4			CH		#200 Wash Fines = 79%
4	30.5			CH	**Fat CLAY;** very stiff, moist to very moist, light yellowish brown	#200 Wash Fines = 87% PP = 3.5-4 tsf EI = 158
5	9.5			SM	**Silty SAND;** fine to coarse,trace to little gravel, light yellowish brown	Fines = 15%
6	28.5			CH	**Fat CLAY with SAND;** thin layers of silty sand, stiff, moist to very moist, light yellowish brown	Fines = 67%
7	12.5			SM	**Silty SAND;** fine to coarse, trace of gravel, moist, light yellowish brown	Fines = 22%
8				SP-SM	**Poorly Graded SAND with SILT;** fine to coarse, concretions	
					End of test pit @ 17' 6" No groundwater encountered	

Depth (ft): 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0158 **Project Name :** Borrow Site 4

Test Pit No. : 10

Sheet : 1 **of :** 1

Drilling Method : Backhoe

Sampling Method : Bulk

Ground Elevation:

Hammer Weight : **Drop Height :**

Drilling Co. : Gilstrap

Location : See Figure A-2

Date Drilled : 2-22-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**Fill: Lean Clay with SAND**	
1	14.5				Bulk		CL	**ALLUVIUM:** **Lean Clay with SAND;** very stiff, moist, brown	#200 Wash Fines = 82% PP = 4-4.25 tsf
2	19.2			5	Bulk		CL/CH	**Sandy Lean to Fat CLAY;** concretions, very stiff, moist, light yellowish brown	#200 Wash Fines = 70%
3	20.7				Bulk			abundant concretions, very pale brown	#200 Wash Fines = 50% PP = 4.5 tsf
				10					
4	27.1				Bulk		CH	**Sandy Fat CLAY;** concretions, very stiff, light olive brown with white	#200 Wash Fines = 51% PP = 4.5 tsf
5	17.2			15	Bulk		CL/CH	**Sandy Lean to Fat CLAY;** very stiff to hard, moist, yellowish brown	#200 Wash Fines = 51% PP = 4.5 tsf
								End of test pit @ 16' No groundwater encountered	
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0158 **Project Name :** Borrow Site 4

Test Pit No. : 11

Sheet : 1 **of :** 1

Drilling Method : Backhoe

Sampling Method : Bulk

Ground Elevation:

Hammer Weight :

Drop Height :

Drilling Co. : Gilstrap

Location : See Figure A-2

Date Drilled : 2-22-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0		**Fill: Sandy Lean CLAY;** stiff, brown	
1	16.4				CL	**ALLUVIUM:** **Sandy Lean CLAY;** stiff, moist, brown	#200 Wash Fines = 65% EI = 45
2	22.3			5	CH	**Sandy Fat CLAY;** trace of concretions, moist to very moist, brown with white	#200 Wash Fines = 70% EI = 132 Corrosivity
3	24.9				CH	very stiff, light yellowish brown; Max Density 112.4 pcf Optimum 15.5%	#200 Wash Fines = 64% PP = 3.5-4.5 tsf EI = 180 LL=53 PL =23
4	11.9			10	SC	**Clayey SAND;** trace of gravel and cobbles, concretions, yellowish brown	#200 Wash Fines = 28%
5	12.1				SC	light olive yellow	#200 Wash Fines = 30%
6	10.8			15	SC	fine to medium, trace of gravel, light yellowish brown	Fines = 17%
				16		End of test pit @ 16' No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk CD SPT

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0158 **Project Name :** Borrow Site 4

Test Pit No. : 12

Sheet : 1 **of :** 1

Drilling Method : Backhoe

Sampling Method : Bulk

Ground Elevation:

Hammer Weight :

Drop Height :

Drilling Co. : Gilstrap

Location : See Figure A-2

Date Drilled : 2-22-18

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0		**Fill:**	
1	13.7				CL	**Lean CLAY with SAND;** stiff to very stiff, moist, brown	#200 Wash Fines = 80% PP = 3.5-4.5 tsf Corrosivity
				5			
2	18.8				CL/CH	**ALLUVIUM:** **Sandy Lean to Fat CLAY;** abundant concretions, moist, very pale brown	#200 Wash Fines = 64%
3	27.0				CH	**Fat CLAY with SAND;** stiff, moist to very moist, pale brown	#200 Wash Fines = 83% EI=148
				10			
4	30.3				CL/CH	**Sandy Lean to Fat CLAY;** stiff, moist to very moist, yellowish brown	Fines = 50% LL= 54 PL= 29
5	23.6						Fines = 68% PP = 4-4.5 tsf
6	22.7						#200 Wash Fines = 59%
7	14.7				CL	**Sandy Lean CLAY;** very stiff, moist, yellowish brown	Fines = 58%
				15		End of test pit @ 15' No groundwater encountered	
				20			
				25			
				30			
				35			
				40			

Bulk ☒ CD ■ SPT ☒

APPENDIX C

Laboratory Test Results

MAXIMUM DENSITY TEST REPORT

Curve No.: 4835 Series

Project No.: 18-0158 **Date:** 3/5/18

Project: Borrow Site #4

Client:

Location: TP-6 @ 10' - 11'

Sample Number: 4835 Series

Remarks: Less than 5% Material retained on the #4 Sieve.

MATERIAL DESCRIPTION

Description: Light Yellowish Brown to Pale Olive Silty Fat Clay

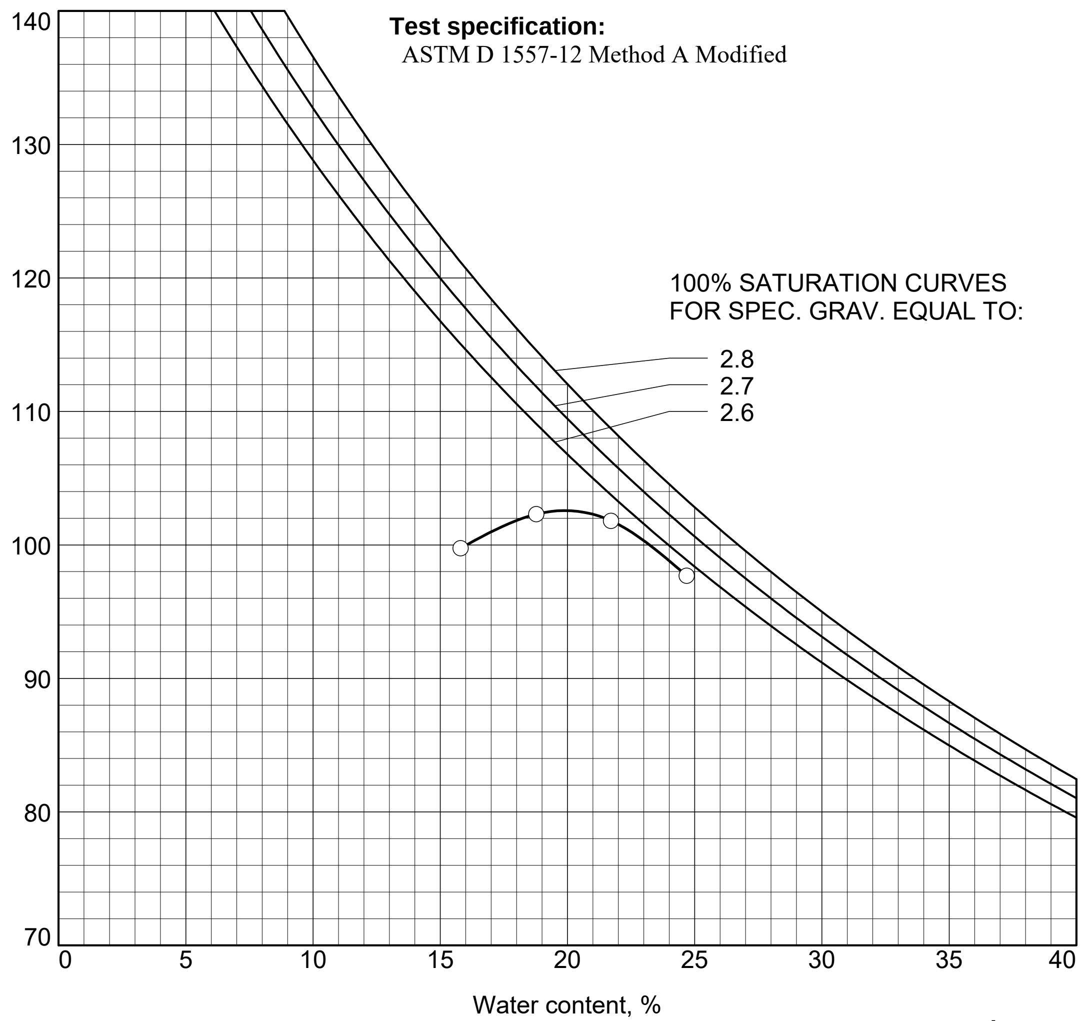
Classifications - **USCS:** CH **AASHTO:**

Nat. Moist. = **Sp.G. =**

Liquid Limit = 54 **Plasticity Index =** 25

% < No.200 =

TEST RESULTS
Maximum dry density = 102.6 pcf
Optimum moisture = 19.9 %



Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Koury Engineering & Testing, Inc.

Tested By: Mathew F. Perry **Checked By:**

MAXIMUM DENSITY TEST REPORT

Curve No.: 4835 Series

Project No.: 18-0158 **Date:** 3/1/18

Project: Borrow Site #4

Client:

Location: TP-11 @ 8' - 9'

Sample Number: 4835 Series

Remarks: Less than 5% Material retained on the #4 Sieve.

MATERIAL DESCRIPTION

Description: Light Yellowish Brown to Light Olive Brown Fat Clay with Sand

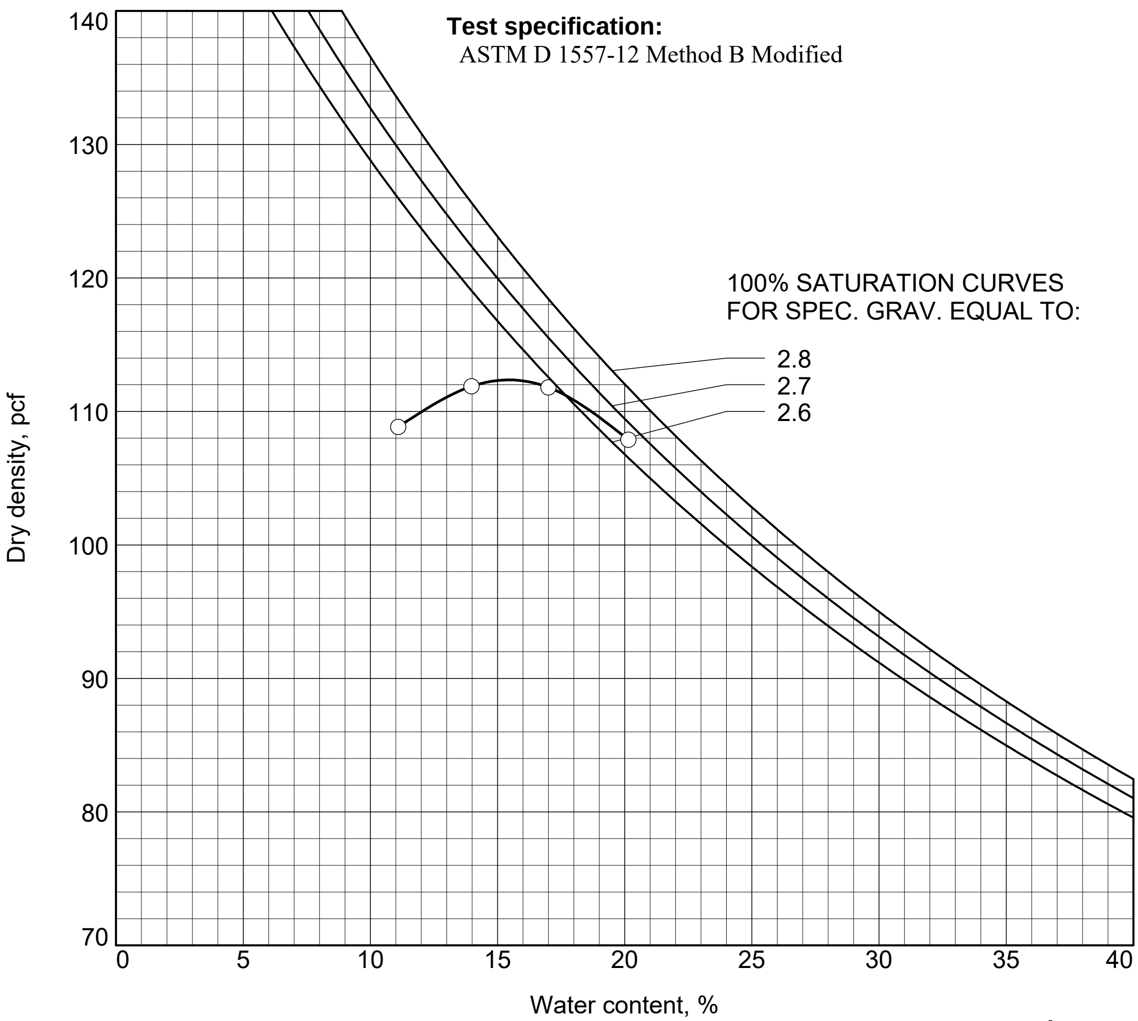
Classifications - **USCS:** CH **AASHTO:**

Nat. Moist. = **Sp.G. =**

Liquid Limit = 53 **Plasticity Index =** 30

% < No.200 =

TEST RESULTS
Maximum dry density = 112.4 pcf
Optimum moisture = 15.5 %



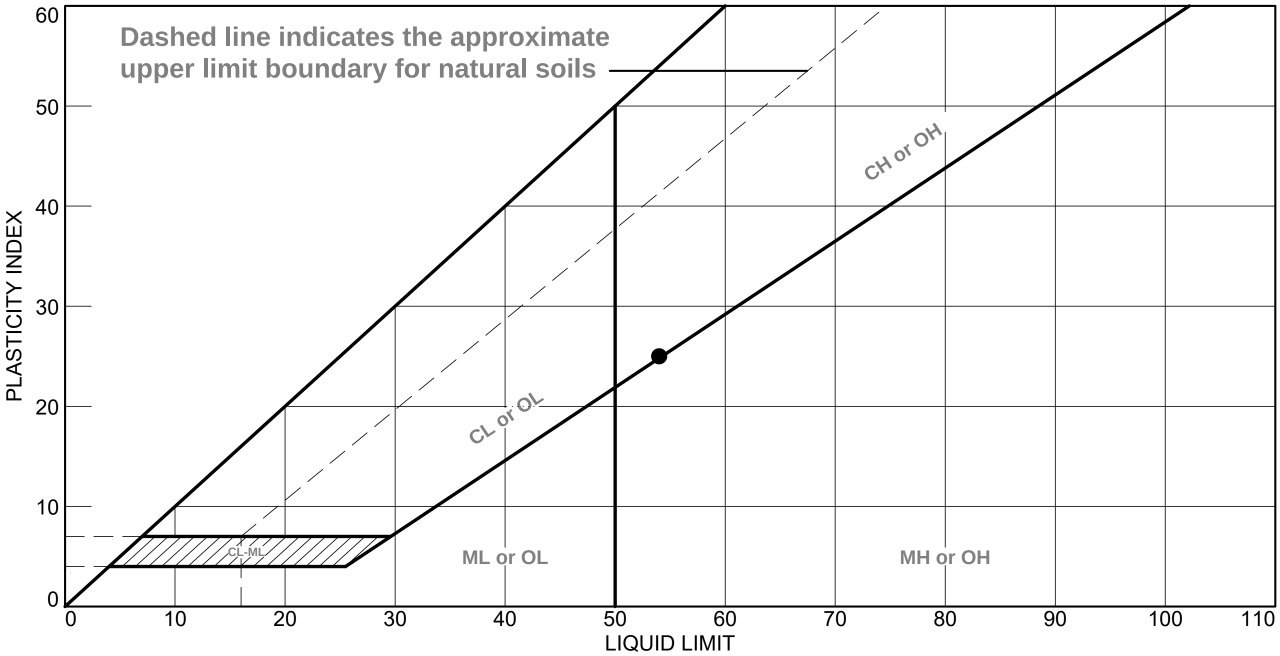
These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

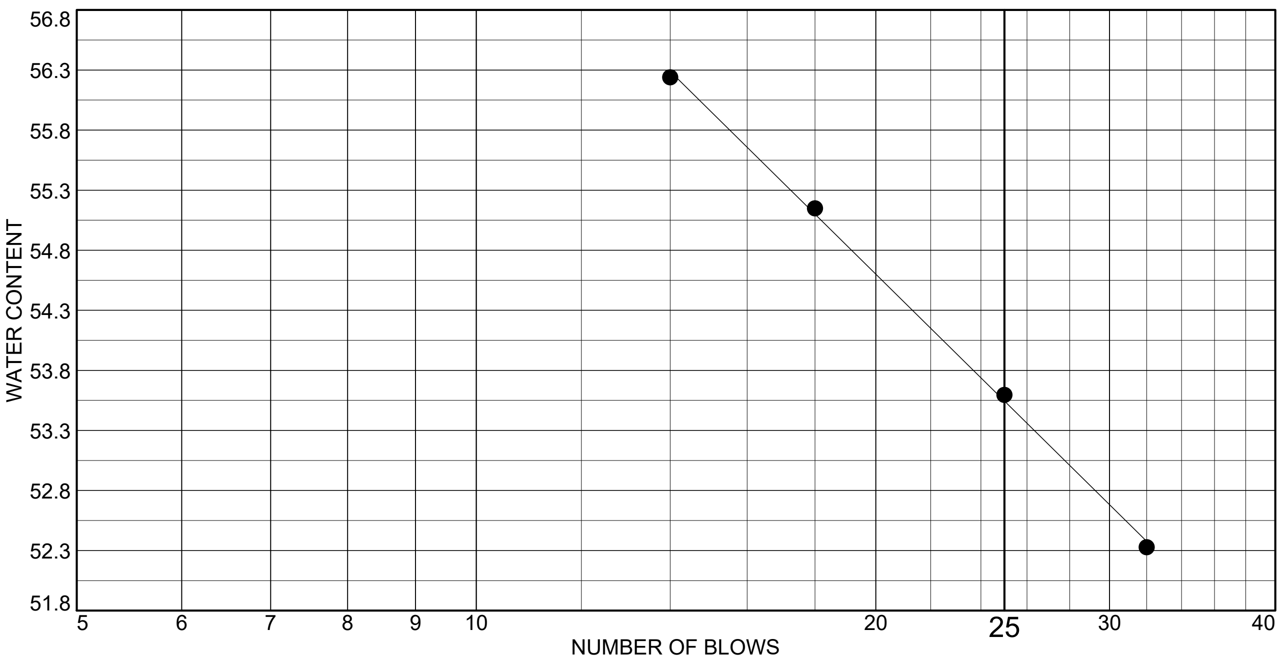
Figure

Koury Engineering & Testing, Inc.

Tested By: Mathew F. Perry **Checked By:**

LIQUID AND PLASTIC LIMITS TEST REPORT





These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Light Yellowish Brown to Pale Olive Silty Fat Clay	54	29	25			CH

Project No. 18-0158 **Client:**

Project: Borrow Site #4

Location: TP-6 @ 10' - 11'
Sample Number: 4835 Series

Remarks:
● Lab #4835 Series.

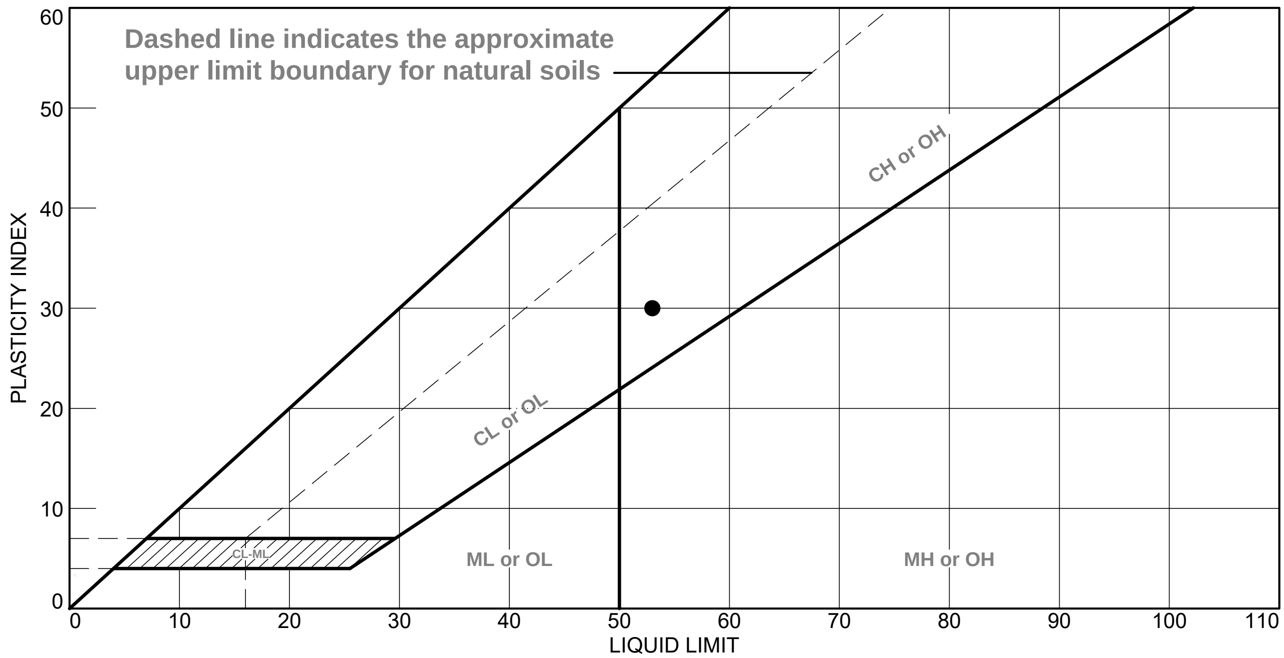
Koury Engineering & Testing, Inc.

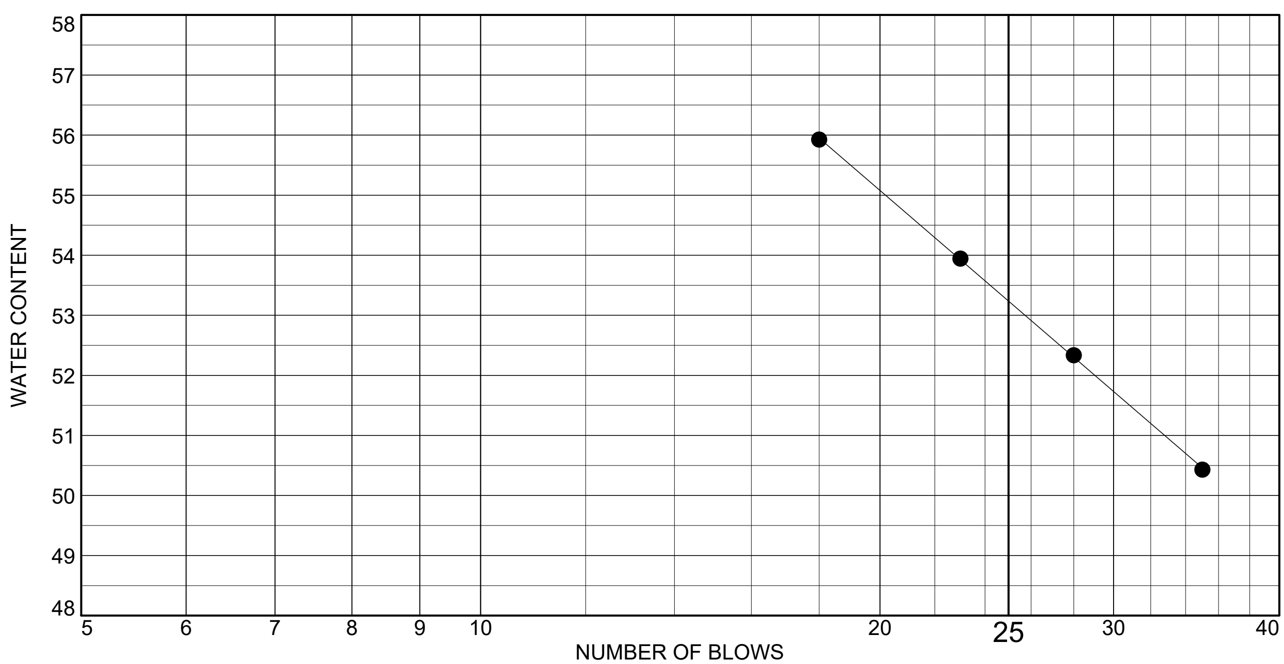
Chino, CA

Figure

Tested By: Mathew F. Perry **Checked By:** ____________

LIQUID AND PLASTIC LIMITS TEST REPORT





These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Light Yellowish Brown to Light Olive Brown Fat Clay with Sand	53	23	30			CH

Project No. 18-0158 **Client:**

Project: Borrow Site #4

Location: TP-11 @ 8' - 9'
Sample Number: 4835 Series

Koury Engineering & Testing, Inc.

Chino, CA

Remarks:
● Lab #4835 Series.

Figure

Tested By: Mathew F. Perry **Checked By:**

EXPANSION INDEX TEST RESULTS

ASTM D 4829

Client Name: Koury Geotechnical Services, Inc.
Project Name: Borrow Site 4
Project No.: 18-0158

AP Job No.: 18-0309
Date: 03/09/18

Boring No.	Sample No.	Depth (ft)	Soil Description	Molded Dry Density (pcf)	Molded Moisture Content (%)	Init. Degree Saturation (%)	Measured Expansion Index	Corrected Expansion Index
TP-2	-	4-5	Silty Clay	84.8	19.0	52.0	36	57
TP-5	-	6-8	Silty Clay	92.4	14.7	48.1	30	49
TP-6	-	5.5-6.5	Clay	94.8	13.6	47.4	110	107
TP-6	-	13-14	Clay	90.3	15.3	47.8	153	151
TP-9	-	10-11	Clay	96.7	13.8	50.3	158	158
TP-11	-	5-6	Clay	96.7	13.7	49.7	133	132

ASTM EXPANSION CLASSIFICATION

Expansion Index	Classification
0-20	V. Low
21-50	Low
51-90	Medium
91-130	High
>130	V. High

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP-3 @ 2' - 3'		TP-8 @ 4.5' - 5'	
USCS Symbol	CL		CL	
Normal Load (psf)	144		144	
SAMPLE CONDITION	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	715.950		726.030	
Wt. of ring (gr)	366.67		364.16	
Wt. Specimen (gr)	349.280		361.870	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479	
Init. Spec. height (in)	1.0020	N/A	1.0005	N/A
Height change (final)(in)	N/A	0.0279	N/A	0.0759
Adjusted Spec.height(in)	1.00	0.9741	1.00	0.9246
" " (cm)	2.545	2.474	2.541	2.348
Specimen Volume (cm^3)	207.371		207.061	
Moist Density (pcf)	105.15		109.11	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	131.71	131.71	126.26	126.26
Wt. dry soil+tare(gr)	116.99	116.99	113.10	113.10
Wt. of tare(gr)	17.32	17.32	19.59	19.59
Wt. dry soil (gr)	99.67	99.67	93.51	93.51
Wt. of water (gr)	14.72	14.72	13.16	13.16
M/C (%)	14.77	14.77	14.07	14.07
DRY DENSITY (pcf)	91.6		95.6	
% Saturation* (48%-52%)	47.5		49.8	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	28		76	
Potential Expansion *(per ASTM 4829-08)*	Low		Medium	

KOURY ENGINEERING & TESTING, INC.

	Project Name: Borrow Site #4	**Project No.: 18-0158**	**Run by: MFP**	**Lab:** 4835 Series
		Date: 3/15/18	**QA:**	

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP-5 @ 1' - 2'		TP-6 @ 1.5' - 2.5'		TP-7 @ 1' - 2'	
USCS Symbol	CL		CL		CL	
Normal Load (psf)	144		144		144	
SAMPLE CONDITION	Initial	Final	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	758.510		762.780		748.810	
Wt. of ring (gr)	367.50		364.17		366.67	
Wt. Specimen (gr)	391.010		398.610		382.140	
Specimen diameter (in)	4.010		4.010		4.010	
Specimen radius (cm)	5.09		5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479		81.479	
Init. Spec. height (in)	1.0020	N/A	1.0000	N/A	1.0015	N/A
Height change (final)(in)	N/A	0.0310	N/A	0.0376	N/A	0.0200
Adjusted Spec.height(in)	1.00	0.9710	1.00	0.9624	1.00	0.9815
" " (cm)	2.545	2.466	2.540	2.444	2.544	2.493
Specimen Volume (cm^3)	207.371		206.957		207.268	
Moist Density (pcf)	117.72		120.24		115.10	
MOISTURE CONTENT						
Wt. moist soil+tare(gr)	148.18	148.18	151.86	151.86	144.12	144.12
Wt. dry soil+tare(gr)	135.32	135.32	139.40	139.40	132.94	132.94
Wt. of tare(gr)	19.67	19.67	19.61	19.61	31.58	31.58
Wt. dry soil (gr)	115.65	115.65	119.79	119.79	101.36	101.36
Wt. of water (gr)	12.86	12.86	12.46	12.46	11.18	11.18
M/C (%)	11.12	11.12	10.40	10.40	11.03	11.03
DRY DENSITY (pcf)	105.9		108.9		103.7	
% Saturation* (48%-52%)	50.8		51.3		47.6	
*Assumes Gs =	2.7		2.7		2.7	
EXPANSION INDEX =	31		38		20	
Potential Expansion *(per ASTM 4829-08)*	Low		Low		Very Low	

KOURY ENGINEERING & TESTING, INC.	Project Name: Borrow Site #4	Project No.: 18-0158	Run by: MFP	Lab: 4835 Series
		Date: 3/14/18	QA:	

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP-11 @ 1' - 2'	
USCS Symbol	CL	
Normal Load (psf)	144	
SAMPLE CONDITION	**Initial**	**Final**
Wt Specimen & Ring (gr)	751.570	
Wt. of ring (gr)	366.66	
Wt. Specimen (gr)	384.910	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	1.0020	N/A
Height change (final)(in)	N/A	0.0446
Adjusted Spec.height(in)	1.00	0.9574
" " (cm)	2.545	2.432
Specimen Volume (cm^3)	207.371	
Moist Density (pcf)	115.88	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	159.09	159.09
Wt. dry soil+tare(gr)	145.93	145.93
Wt. of tare(gr)	31.57	31.57
Wt. dry soil (gr)	114.36	114.36
Wt. of water (gr)	13.16	13.16
M/C (%)	11.51	11.51
DRY DENSITY (pcf)	103.9	
% Saturation* (48%-52%)	50.0	

*Assumes Gs =	2.7
EXPANSION INDEX =	45
Potential Expansion *(per ASTM 4829-08)*	Low

KOURY ENGINEERING & TESTING, INC.	**Project Name:** Borrow Site #4	**Project No.: 18-0158**	**Run by: MFP**	**Lab:**
		Date: 3/16/18	**QA:**	**4835 Series**

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP-11 @ 8' - 9'		TP-6 @ 10' - 11'	
USCS Symbol	CH		CH	
Normal Load (psf)	144		144	
SAMPLE CONDITION	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	716.690		706.920	
Wt. of ring (gr)	366.67		367.49	
Wt. Specimen (gr)	350.020		339.430	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479	
Init. Spec. height (in)	1.0015	N/A	1.0010	N/A
Height change (final)(in)	N/A	0.1802	N/A	0.1080
Adjusted Spec.height(in)	1.00	0.8213	1.00	0.8930
" " (cm)	2.544	2.086	2.543	2.268
Specimen Volume (cm^3)	207.268		207.164	
Moist Density (pcf)	105.43		102.29	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	196.18	196.18	145.08	145.08
Wt. dry soil+tare(gr)	174.98	174.98	125.60	125.60
Wt. of tare(gr)	31.57	31.57	19.61	19.61
Wt. dry soil (gr)	143.41	143.41	105.99	105.99
Wt. of water (gr)	21.20	21.20	19.48	19.48
M/C (%)	14.78	14.78	18.38	18.38
DRY DENSITY (pcf)	91.8		86.4	
% Saturation* (48%-52%)	47.8		52.2	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	180		108	
Potential Expansion *(per ASTM 4829-08)*	Very High		High	

KOURY ENGINEERING & TESTING, INC.	Project Name: Borrow Site #4	Project No.: 18-0158 Date: 2/28/18	Run by: MFP QA:	Lab: 4835 Series

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP12 @ 8.5' - 9.5'	
USCS Symbol	CH	
Normal Load (psf)	144	
SAMPLE CONDITION	Initial	Final
Wt Specimen & Ring (gr)	684.810	
Wt. of ring (gr)	357.47	
Wt. Specimen (gr)	327.340	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	1.0010	N/A
Height change (final)(in)	N/A	0.1483
Adjusted Spec.height(in)	1.00	0.8527
" " (cm)	2.543	2.166
Specimen Volume (cm^3)	207.164	
Moist Density (pcf)	98.65	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	122.69	122.69
Wt. dry soil+tare(gr)	105.21	105.21
Wt. of tare(gr)	19.60	19.60
Wt. dry soil (gr)	85.61	85.61
Wt. of water (gr)	17.48	17.48
M/C (%)	20.42	20.42
DRY DENSITY (pcf)	81.9	
% Saturation* (48%-52%)	52.1	

*Assumes Gs = 2.7

EXPANSION INDEX = 148

Potential Expansion *(per ASTM 4829-08)* Very High

KOURY ENGINEERING & TESTING, INC.	**Project Name:** Borrow Site #4	**Project No.: 18-0158** **Date: 3/6/18**	**Run by: MFP** **QA:**	**Lab:** 4835 Series

We are a key member of the construction team while safeguarding the public. We improve operational logistics and provide superior quality control through the continuing development of our engineering staff and technical expertise, utilization of classroom training and field supervisors, thus defining the industry standard.

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ENGINEERING
& TESTING, INC.

GEOTECHNICAL & SEISMIC ENGINEERING, CONSTRUCTION INSPECTION & MATERIALS TESTING SERVICES

April 16, 2019
Project No. 17-1025

Mr. John R. Burroughs, LEED AP, President
Commerce Construction Co., L.P.
13191 Crossroads Parkway North 6th Floor
City of Industry, CA 91746

**Subject: Limited Borrow Site Feasibility Study
Alternative Borrow Site 5
Southwest Corner of Hereford Drive and Hellman Avenue
City of Chino, California**

Dear Mr. Burroughs:

Presented herein are our preliminary findings and conclusions regarding the suitability of the Borrow Site 5 soils to be used as engineered fill to balance the grade for the 95 Acres OC Prado site construction located on the southeast corner of Bickmore Avenue and Mountain Avenue in the City of Chino.

Based on the conceptual grading plan, the proposed irregular-shaped Borrow Site 5 covers an area of about 723,000 square feet or roughly 16.6 acres. The site is bounded by Hereford Drive to the north, Walters Street to the west, Cucamonga Creek to the south and Hellman Avenue to the east. A Site Vicinity Map with approximate ground contour elevations is presented in Appendix A as Figure A-1.

Field Exploration and Laboratory Testing for Feasibility Study

The field exploration program for the feasibility study consisted of excavating ten test pits on March 13, 2019. A rubber tire mounted backhoe was used to excavate the 10 test pits ranging in depths from about 11 to 17 feet below the existing ground surface. The locations of the test pits are shown on the Field Exploration Map, Figure A-2, presented in Appendix A. Bulk samples were obtained from the test pits for laboratory testing.

Laboratory tests, including moisture content, #200 sieve wash, expansion index, maximum density, pocket penetrometer, and corrosivity were performed to aid in the classification of the materials encountered and to evaluate their engineering properties. Sulfates, chlorides, resistivity, and PH tests (corrosivity tests) were also performed on selected samples. The results of pertinent laboratory tests are presented on the boring logs in Appendix B, and/or in Appendix C.

Site Geology

The site is located within the Upper Santa Ana River Valley, which consists of a series of coalescing alluvial fans formed by streams flowing out of the San Gabriel Mountains to the north. The valley lies within the Peninsular Ranges geomorphic province, which is characterized by alluviated basins, elevated erosion surfaces, and northwest-trending mountain ranges bounded by northwest trending faults. The site, which is located within the Chino Basin, is underlain by sediments deposited by the Santa Ana River and its tributaries such as the Chino Creek.

Morton and Miller (2006) show the site to be underlain by very old alluvial-fan deposits (See Figure A-3 in Appendix A). The sediments encountered during the subsurface investigation consisted predominantly of clay.

Surface Site Conditions

Access to the site is presently via Hellman Avenue at the northeast corner of the site. The site is roughly rectangular in area: extending about 1200 feet in the east-west direction and 1250 feet in the northerly direction.

The site was previously used as dairy farm and cattle raising. The site is presently vacant, and the previously existing buildings and cattle shelters have been removed. However, few of the slabs on grade, foundations, fence posts, and most likely some underground utilities are still in place. At the time of the field exploration in March 2019, most of the site exposed bare ground. There was a few trees and shrubs along Hellman Ave and around the seasonal water ponds.

The south side of the site contains a 4 to 6-foot-deep water detention basin; the basin has an entry ramp in the northeast corner. Little vegetation and trash were found within the basin.

The site generally slopes gently from north to south with elevations ranging for the most part from about 555 to 545 feet. Along the east property line, within the southeast portion of the site, there is a gentle slope descending about 8 to 11 feet to the Cucamonga Creek.

In its present state, the site has been cleared of all past structures such as buildings, shelters, and above ground ancillary facilities; however, it appears that several foundations, slabs on grade, and underground conduits are still in place. There are overhead powerlines present onsite, trending north-south, west of Hellman Ave and roughly 60 feet into the property. The dominant features of the site are the many small berms and unpaved roads that were constructed across the site. Many of the berms appear to have been constructed by pushing onsite soils into piles. Most of the berms have heights in the range of 1 to 2 feet and consist of relatively loose undocumented fill.

Within the site area, there are several small piles of construction debris roughly 10 feet in diameter consisting of crushed concrete, rebar and trash.

Soil Conditions

The subsurface soil profile consists generally of artificial fill underlain by alluvial deposits. For the most part, the fill is generally on the order of 1 to 3 feet in thickness. The deeper fills appear to be associated with previous improvements that were demolished. The fill derived from onsite shallow soils consists predominantly of lean clay with sand and sandy lean clay, and includes fat clay. clayey sand, silty sand, and construction debris.

The alluvium soils consist predominantly of stiff to very stiff medium plastic to high plastic sandy clay and clay with sand. Some discrete layers of silty sand and poorly graded sand with silt were encountered in Test Pit 1 from 14½ to 17 feet, Test Pit 3 from 12½ to 14½ feet, and Test Pit 8 from 14 to 16½ feet.

The moisture contents of clay soils are highly variable, ranging from about 16½ to 49½ percent with an average of about 28 percent while the sand material moisture contents range from about 10 to 37 percent with an average of about 19 percent. Based on two maximum density tests performed and prior experience with similar soils, many of the clay sample moisture contents are about 7 to 20 percent above optimum for the soils sampled at depths between 4 and 13 feet below the ground surface.

Table 1 – Maximum Density Test Results

Test Pit Number	TP8 @ 4-4.5	TP2 @ 1.5-2
Maximum Dry Density (pcf)	97.1	81.3
Optimum Moisture Content (%)	23.4	36.4

The fine contents range from about 50 to 98 percent with an average of about 77 percent for clay and from about 8 to 42 percent with an average of about 25½ percent for the sand. The average relatively low fine contents of the clay soils are attributed to the presence of concretions (hard matter formed by precipitation of mineral cement between particles), which was observed in many of the clay samples. The pocket penetrometer tests indicate unconfined compression strength on the order of 1 to 4.5 tsf with an average of about 2.6 tsf.

The site soil expansion potential ranges from very low to very high. Table 2 presents the data for 12 tests sampled at depths ranging from 1 to 5.5 feet. These tests indicate expansion index variation from 19 to 174. Within the upper 4 feet, the test data obtained to date indicate expansion indices ranging between 19 and 98 and moisture contents between about 12 and 47 percent with an average of about 30 percent. Except for Test Pit 2, at depths of 4 to 4½ feet and Test Pit 4 at depths of 5 to 5½ feet, all the expansion index tests performed on samples at depths greater than 3½ feet indicated expansion indices greater than 65. The sample collected at Test Pit 3 between the depths of 4.8 and 5.2 feet indicated a very high expansion potential.

The moisture contents of the clay below a depth of 4 feet range predominantly between 24 and 49 percent with an average of about 30 percent. On average, this moisture content is about 6 to 12½ percent above optimum.

Table 2 – Expansion Index Test Results

Test Pit	TP-1	TP-1	TP-2	TP-2	TP-3	TP-4	TP-5	TP-5	TP-7	TP-7	TP-8	TP-10
Depth (ft)	**0-1**	**3.7-4**	**1.5-2**	**4-4.5**	**4.8-5.2**	**5-5.5**	**1-1.5**	**2.5-3**	**1-1.5**	**3.5-4**	**4-4.5**	**4.5-5.5**
Expansion	43	98	52	38	174	34	39	39	19	60	80	66
Moisture	23.4	19.1	42.0	49.4	33.1	42.9	22.0	24.0	26.0	22.0	31.7	44.0
Fines	54	83	89	93	95	77	83	77	87	85	59	89

Groundwater

No groundwater was encountered in the excavated test pits.

Corrosivity

The corrosivity tests performed indicates that the site soils are generally severely corrosive to ferrous metal. In addition, test result from Test Pit 2 reveal that the soil has a moderate sulfate exposure or Class S1 exposure category in accordance with ACI 318-14, Table 19.3.1.1. The corrosivity test results are summarized in the following Table 3.

Table 3 - Corrosion Test Results

Boring	Depth (ft)	Minimum Resistivity (ohm-cm)	pH	Soluble Sulfate Content (ppm)	Soluble Chloride Content (ppm)
TP-2	1.5-2.0	304	8.2	1360	700
TP-6	1.5-2.0	491	8.3	654	270

The test results from Test Pit 2 reveal a moderate sulfate exposure, which if imported, will require concrete special design considerations in accordance with ACI 318, Table 19.3.2.1 if this soil is placed against concrete.

Conclusions and Recommendations

Based on the data collected from the field to date, it appears feasible to import some material from Borrow Site 5 to use at the OC Prado site. Soil with high expansion potential was encountered at all depths throughout the soil profile. However, with proper blending and processing, it appears that mainly the upper 4 feet of soils could be suitable for foundation support. The deeper soils generally have higher moisture contents, higher plasticity and are deemed to have higher expansion potential than the soil at 4 feet and shallower, and therefore are less desirable to be used as fill. If need be, after proper processing and dry back, these deeper materials could be used as general fill in parking lots and driveway areas at the OC Prado site.

CLOSURE

The findings and recommendations presented in this report were based on the results of our field and laboratory investigations, combined with professional engineering experience and judgment. The report was prepared in accordance with generally accepted engineering principles and practice. We make no other warranty, either expressed or implied. Subsurface variations between and beyond the test pits should be anticipated. Samples obtained during this investigation will be retained in our laboratory for a period of 45 days from the date of this report and will be disposed after this period.

Should you have any questions concerning this submittal, or the recommendations contained herewith, please do not hesitate to call our office.

Respectfully submitted,

KOURY ENGINEERING & TESTING, INC

Jacques B. Roy, PE, GE
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
JACQUES B. ROY
NO. 2077
Ex. Date 9/30/19
Geotechnical
STATE OF CALIFORNIA

Distribution: 1. Addressee (a pdf copy via e-mail)
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APPENDICES

Appendix A: Maps and Plans

Vicinity Map – Figure A-1
Field Exploration Map – Figure A-2
Geology Map – Figure A-3

Appendix B: Field Exploratory Test Pits

Test Pits 1 through 10

Appendix C: Laboratory Test Results

REFERENCES

1. California Division of Mines and Geological Survey, 1998, Seismic Hazard Zone Report 045 for the Prado Dam 7.5 Minute Quadrangle, California.

2. California Division of Mines and Geological Survey, 2003, Earthquake Fault Zones, Prado Dam Quadrangle, May 1, 2003.

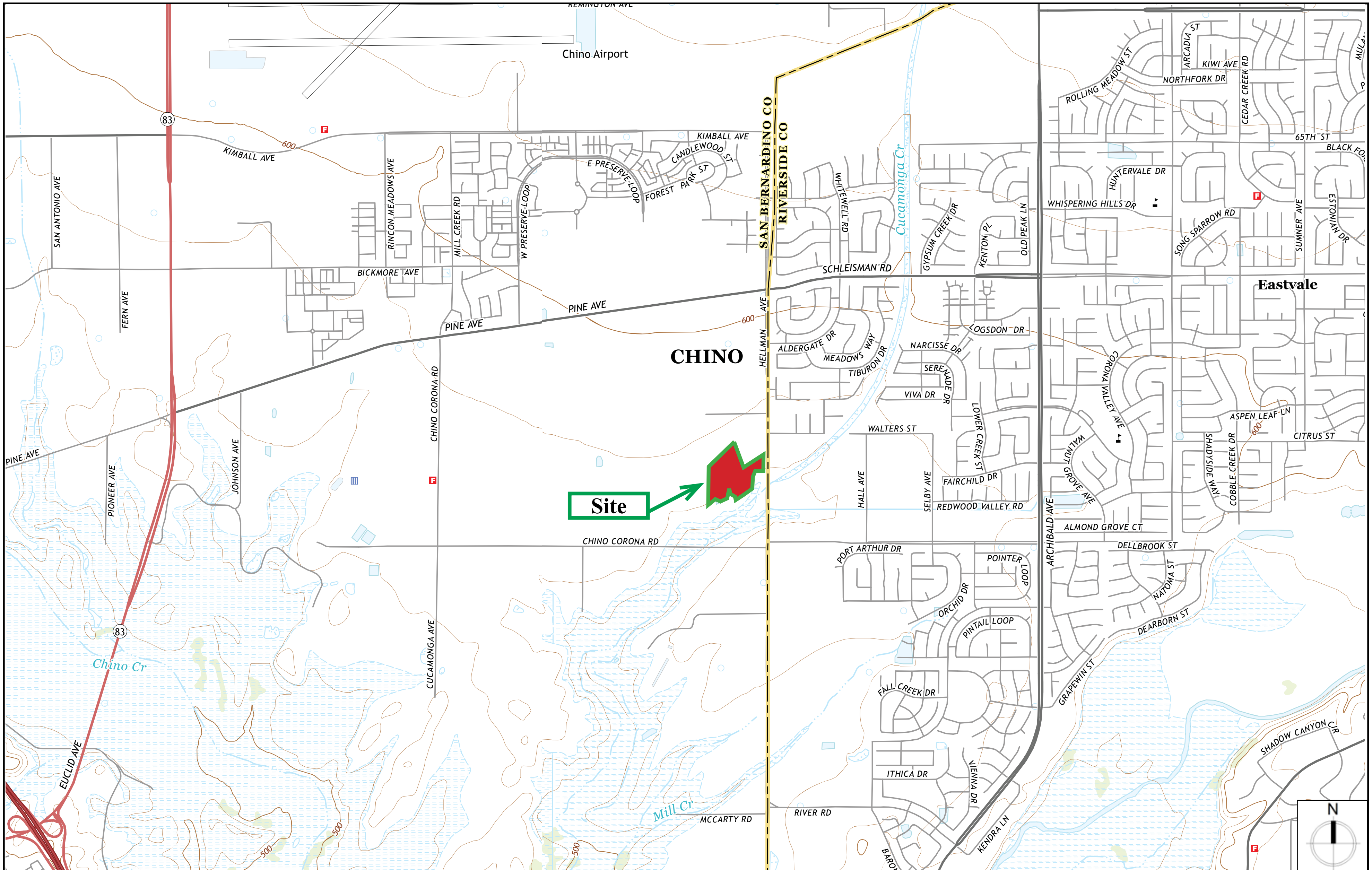
3. City of Chino General Plan, Safety Element, 2010, Final Report.

4. US Army Corps of Engineers, Geotechnical Investigations, Engineering Manual EM 1110-1-1804, dated 8/26/86.

5. US Army Corps of Engineers, Laboratory Soils Testing, Engineering Manual EM 1110-2-1906, dated 8/26/86.

APPENDIX A

Maps and Plans

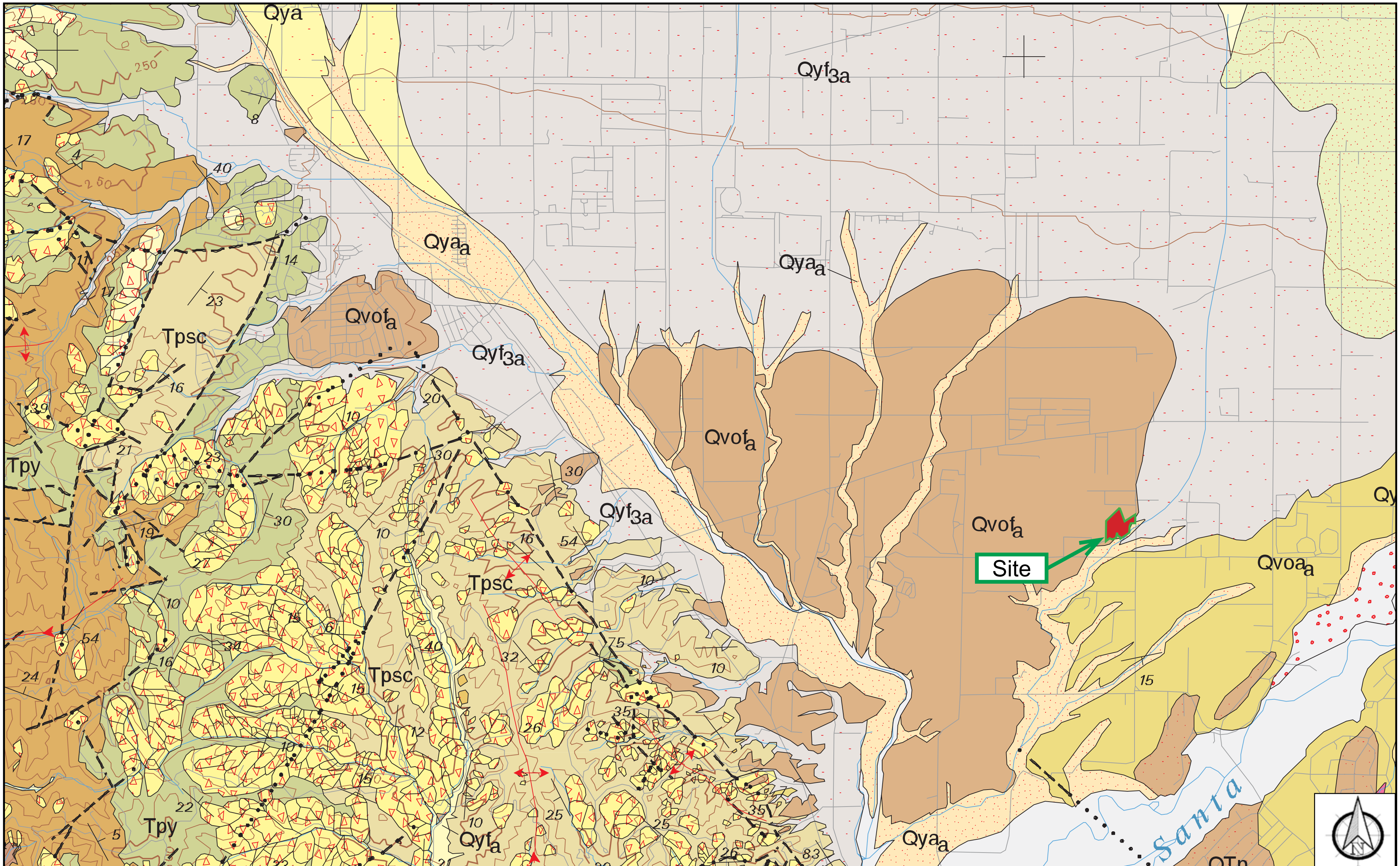


Reference: USGS Topographic Map, Prado Dam & Corona Quadrangles, California, 7.5 Minute Series 2015 - Contour Interval 20 feet, NAVD of 1988

0 1/2 1 Mile

KOURY ENGINEERING & TESTING, INC.	Project Name: Alternative Borrow Site # 5	Project No.: 17-1025 Date: April 2019	Drawing Title: Vicinity Map	Figure: A-1

KOURY ENGINEERING & TESTING, INC.	Project Name: Alternative Borrow Site # 5	Project No.: 17-1025 Date: April 2019	Drawing Title: Field Exploration Points	Figure: A-2



LEGEND

Qvof	Very old alluvial-fan deposits
Qya	Young axial channel deposits

0 1 2 Mile

Reference: Geologic Map of the San Bernardino & Santa Ana 30´x60´ Quadrangle California-Version 1.0 Compiled by Douglas M. Morton and Fred K. Miller, 2006

KOURY ENGINEERING & TESTING, INC.	Project Name: Alternative Borrow Site # 5	Project No.: 17-1025 Date: April 2019	Drawing Title: Geology Map	Figure: A-3

APPENDIX B

Field Exploratory Test Pits

KEY TO LOGS

SOILS CLASSIFICATION					
MAJOR DIVISIONS			GRAPHIC LOG	USCS SYMBOL	TYPICAL NAMES
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS MORE THAN 50% OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS LESS THAN 5% FINES		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES MORE THAN 12% FINES		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS 50% OR MORE OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS LESS THAN 5% FINES		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES MORE THAN 12% FINES		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS 50% OR MORE OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 50			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT IS 50 OR MORE			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR GRAVELLY ELASTIC SILTS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT AND OTHER HIGHLY ORGANIC SOILS

GRAIN SIZES							
SILT AND CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		
	#200	#40	#10	#4	3/4"	3"	12"
SIEVE SIZES							

KEY TO LOGS (continued)

SPT/CD BLOW COUNTS VS. CONSISTENCY/DENSITY					
FINE-GRAINED SOILS (SILTS, CLAYS, etc.)			GRANULAR SOILS (SANDS, GRAVELS, etc.)		
CONSISTENCY	*BLOWS/FOOT		RELATIVE DENSITY	*BLOWS/FOOT	
	SPT	CD		SPT	CD
SOFT	0-4	0-4	VERY LOOSE	0-4	0-8
FIRM	5-8	5-9	LOOSE	5-10	9-18
STIFF	9-15	10-18	MEDIUM DENSE	11-30	19-54
VERY STIFF	16-30	19-39	DENSE	31-50	55-90
HARD	over 30	over 39	VERY DENSE	over 50	over 90

* CONVERSION BETWEEN CALIFORNIA DRIVE SAMPLERS (CD) AND STANDARD PENETRATION TEST (SPT) BLOW COUNT HAS BEEN CALCULATED USING "FOUNDATION ENGINEERING HAND BOOK" BY H.Y. FANG. (**VALUES ARE FOR 140 Lbs HAMMER WEIGHT ONLY**)

DESCRIPTIVE ADJECTIVE VS. PERCENTAGE	
DESCRIPTIVE ADJECTIVE	PERCENTAGE REQUIREMENT
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
AND	35 - 50%

*THE FOLLOWING "DESCRIPTIVE TERMINOLOGY/ RANGES OF MOISTURE CONTENTS" HAVE BEEN USED FOR MOISTURE CLASSIFICATION IN THE LOGS.

APPROXIMATE MOISTURE CONTENT DEFINITION	
DEFINITION	DESCRIPTION
DRY	Dry to the touch; no observable moisture
SLIGHTLY MOIST	Some moisture but still a dry appearance
MOIST	Damp, but no visible water
VERY MOIST	Enough moisture to wet the hands
WET	Almost saturated; visible free water

Project No. : 17-1025
Project Name : Borrow Site 5

Boring No. : TP-1
Sheet : 1 of : 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Bill Bastedo
Date Drilled : 3/13/19

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	23.4			0	CL	**FILL:** **Sandy Lean CLAY;** pockets of clayey sand, stiff, moist, very dark brown	#200 Wash Fines = 54% EI = 43
2	19.3				CL	**ALLUVIUM:** **Lean CLAY with SAND;** stiff to very stiff, moist, dark yellowish brown	Fines = 81% PP = 2.5 tsf
3	19.1						Fines = 83% PP = 4.5 tsf EI = 98
4	23.0			5	CL/CH	**Lean to Fat CLAY with SAND;** stiff, moist, dark brown	Fines = 84% PP= 1.75-2.4 tsf
5	26.2				CL/CH	**Lean to Fat CLAY**; very stiff, moist to very moist, dark yellowish brown	#200 Wash Fines = 93% PP=2.5-3 tsf
6	26.8			10	CL/CH	**Lean to Fat CLAY with SAND**; stiff, moist to very moist, olive brown	#200 Wash Fines= 79% PP=2.0 tsf
7	40.0				CH	**Fat CLAY**; layers of silty sand, firm, moist to very moist, olive gray	#200 Wash Fines = 92%
8	11.3			15	SP-SM	**Poorly Graded SAND with SILT**; fine to coarse, pockets of gray clay, moist to very moist, dark yellowish brown	#200 Wash Fines = 12%
9	17.0						#200 Wash Fines = 8%

End of test pit @ 16' 9"
No groundwater encountered

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 17-1025
Project Name : Borrow Site 5

Boring No. : TP-2
Sheet : 1 of : 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Bill Bastedo
Date Drilled : 3/13/19

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	34.2			0	CL/CH	Cobbles at the surface and 8 inches of sand **FILL: Sandy Lean to Fat CLAY**; organic inclusions, stiff, moist, very dark brown	Fines = 64% PP = 3-4 tsf Corrosion EI = 52
2	42.0						Fines = 89% PP = 3.5 tsf
3	49.4			5	CH	**ALLUVIUM:** **Fat CLAY**; very stiff, moist, very dark gray	#200 Wash Fines = 93% PP = 4.5 tsf EI = 38
4	24.7			10	CL/CH	**Lean to Fat CLAY**; very stiff, moist, mottled gray with brown inclusions	Fines = 92% PP = 4.0 tsf
5	27.2					dark gray with rusty brown pockets	Fines = 83% PP = 2-2.5 tsf
				15		End of test pit @ 12' 6" No groundwater encountered	

Depth scale (ft): 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 17-1025
Project Name : Borrow Site 5

Boring No. : TP-3
Sheet : 1 of : 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Bill Bastedo
Date Drilled : 3/13/19

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0	CL	Gravel, cobbles, and construction debris **FILL: Lean CLAY with SAND**; some organic, stiff, moist, dark brown	#200 Wash Fines = 83% PP=2.5-2.75 tsf
1	32.7						
2	22.7				CL/CH	**ALLUVIUM: Lean to Fat CLAY with SAND**; trace concretions, stiff, moist, dark brown	#200 Wash Fines = 80% PP = 1.5 tsf
3	33.1			5	CH	**Fat CLAY**; firm to stiff, moist to very moist, mottled dark yellowish brown with dark brown	EI = 174 Fines = 95% PP = 1.0 tsf
4	28.1						#200 Wash Fines = 90% PP=1.5-1.75 tsf
5	25.0				CL	**Lean CLAY with SAND**; firm, moist, dark grayish brown (mostly silt)	Fines = 83% PP = 0.5 tsf
6	38.0			10	CH	**Fat CLAY**; stiff, moist to very moist, grayish brown	#200 Wash Fines = 98% PP = 1.75 tsf
7	10.3				SM	**Silty SAND;** fine to coarse, lumps of sandy clay, dark yellowish brown	#200 Wash Fines = 13%
8	33.6			15	ML	**SILT**; very stiff, trace of organic, moist to very moist, pockets of dark clay and oxidation	Fines = 89% PP = 2.5 tsf
						End of test pit @ 15' 5" No groundwater encountered	
				20			
				25			
				30			
				35			
				40			

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 17-1025
Project Name : Borrow Site 5

Boring No. : TP-4
Sheet : 1 of : 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Bill Bastedo
Date Drilled : 3/13/19

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	16.5			0	SC	Cobbles, boulders, and concrete at surface **FILL: Clayey SAND;** trace of concretions, trace of gravel, moist, very dark brown	#200 Wash Fines = 19%
2	45.7				CL/CH	**ALLUVIUM: Sandy Lean to Fat CLAY**; trace of organic, moist, stiff, very dark brown	#200 Wash Fines = 65% PP = 3-4 tsf
3	42.9			5			Fines = 77% PP = 2.5 tsf EI = 34
4	26.3				CL	**Lean CLAY with SAND;** firm, moist, dark grayish brown (mostly silt)	#200 Wash Fines = 84% PP = 2.5-3 tsf
5	24.0			10			#200 Wash Fines = 83% PP = 2.0 tsf
6	25.2				CL/CH	**Sandy Lean to Fat CLAY**; trace of organics, rootlets, moist, very dark greenish gray	#200 Wash Fines = 73% PP = 2-2.5 tsf
				15		End of test pit @ 13' 6" No groundwater encountered	
				20			
				25			
				30			
				35			
				40			

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 17-1025
Project Name : Borrow Site 5

Boring No. : TP-5
Sheet : 1 of : 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Bill Bastedo
Date Drilled : 3/13/19

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	46.8			0	Bulk		CL/CH	**Topsoil**; **Sandy Lean to Fat CLAY;** trace of organics, very dark brown	Fines = 50%
2	22.0				Bulk		CL	**FILL: Lean CLAY with SAND;** trace of concretions, very moist, very dark brown	EI = 39 Fines = 83% PP = 3-3.2 tsf
3	24.0				Bulk		CL/CH	**ALLUVIUM:** **Lean to Fat CLAY with SAND**; trace of concretions, stiff, moist to very moist, pale brown	EI = 39 Fines = 77% PP = 2-2.5 tsf
4	21.8			5	Bulk		CH	**Fat CLAY**; concretions, stiff, moist to very moist, pale brown	#200 Wash Fines = 87% PP = 1.5 tsf
5	30.0			10	Bulk		CL/CH	**Lean to Fat CLAY with SAND**; stiff, moist, dark yellowish brown	#200 Wash Fines = 76% PP = 1.5 tsf
6	16.6				Bulk		CL	**Sandy CLAY;** firm, moist, yellowish brown to very dark brown	Fines = 50%
				15				End of test pit @ 13' 5" No groundwater encountered	
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 17-1025
Project Name : Borrow Site 5

Boring No. : TP-6
Sheet : 1 of : 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Bill Bastedo
Date Drilled : 3/13/19

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			SM	Gravel, cobbles, concrete, wood, asphalt pieces at surface **FILL: Silty SAND;** trace of gravel and topsoil	
1	32.9				Bulk		CL/CH	**ALLUVIUM:** **Lean to Fat CLAY**; pockets of silty sand, stiff, moist, brown with pale brown	Corrosion Fines = 85% PP = 4.0 tsf
2	20.3			5	Bulk		CL	**Lean CLAY with SAND**; very stiff, moist, mottled brown	Fines = 75% PP = 3.5-4.5 tsf
3	21.0				Bulk				#200 Wash Fines = 77%
4	23.2				Bulk			**Sandy Lean CLAY;** very stiff, moist, olive brown	Fines = 62% PP=2.75-4.2 tsf
5	23.1			10	Bulk				Fines = 61% PP=2.5-2.75 tsf
								End of test pit @ 11' No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 17-1025
Project Name : Borrow Site 5

Boring No. : TP-7
Sheet : 1 of : 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Bill Bastedo
Date Drilled : 3/13/19

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	36.8			0	SC	Patchy grass over clayey sand topsoil, trace of organic	#200 Wash Fines = 42%
2	26.0				CL	**ALLUVIUM**: **Lean CLAY**; abundant concretions, very stiff, moist, brown	EI = 19 Fines = 87% PP = 4.5 tsf
3	22.0						Fines = 85% PP = 2.5-3 tsf
4	25.8			5			EI = 60 Fines = 88%
5	27.3				CL/CH	**Lean to Fat CLAY with SAND;** firm to stiff, moist to very moist, light olive brown	#200 Wash Fines = 77% PP = 1-1.25 tsf
6	19.7				CL	**Sandy Lean CLAY;** firm to stiff, moist, light olive brown	Fines = 54%
7	22.4						Fines = 60% PP = 2.5 tsf
				15		End of test pit @ 15' No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 17-1025
Project Name : Borrow Site 5

Boring No. : TP-8
Sheet : 1 of : 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Bill Bastedo
Date Drilled : 3/13/19

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1 2	12.6 44.1			0	SC	Retention basin slope **FILL: Clayey SAND;** layers of sandy clay, moist, trace of gravel, concretions and organic	#200 Wash Fines = 33% Fines = 74%
3 4 5	42.0 31.7 27.8			5	CL/CH	**ALLUVIUM:** **Lean to Fat CLAY with SAND**; trace of organic, stiff, moist, dark gray (max density 97.1 pcf @ 23.4% moisture)	Fines = 84% PP=3.75 tsf EI = 80 Fines = 59% PP = 3.5-4 tsf Fines = 83% PP = 2.5-3 tsf
6 7 8	26.3 23.1 28.5			10	CL	**Sandy Lean CLAY;** stiff, moist to very moist, concretions, olive brown with dark brown inclusions	PP = 1-1.5 tsf Fines = 68% #200 Wash Fines = 50% PP = 2.0 tsf Fines = 71.3% PP = 2-2.2 tsf
9 10	16.1 17.5			15	SM	**Silty SAND;** fine to medium, lumps of clay, moist to very moist, dark yellowish brown	Fines = 40% Fines = 22%
				20 25 30 35 40		End of test pit @ 16' 6" No groundwater encountered	

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 17-1025
Project Name : Borrow Site 5

Boring No. : TP-9
Sheet : 1 of : 1

Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Bill Bastedo
Date Drilled : 3/13/19

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
				0	CL	**FILL: Sandy Lean CLAY**	
1	31.6				CL	**ALLUVIUM: Lean CLAY with SAND;** stiff, moist, dark yellowish brown	Fines = 76% PP = 2.5 tsf
2 3	21.0 20.3				CL		Fines = 85% PP=2.75-3.5 tsf
				5	CL	**Sandy Lean CLAY;** concretions, stiff, moist to very moist, yellowish brown	Fines = 69%
4	18.5				CL	**Lean CLAY with SAND;** concretions, moist, olive brown with white	#200 Wash Fines = 82%
5	19.3			10	CL	**Sandy Lean CLAY;** caliche stringers, very stiff, moist, light olive brown with white specs	Fines = 74% PP = 3-4 tsf
6	17.9				CL		Fines = 60%
						End of test pit @ 11' 6" No groundwater encountered	

Depth scale: 0, 5, 10, 15, 20, 25, 30, 35, 40

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 17-1025
Project Name : Borrow Site 5
Drilling Method : Backhoe
Sampling Method : Bulk
Hammer Weight :
Location : See Figure A-2

Boring No. : TP-10
Sheet : 1 of : 1
Ground Elevation:
Drilling Co. : Bill Bastedo
Date Drilled : 3/13/19

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	36.0			0	Bulk		SC	**FILL: Clayey SAND;** topsoil, trace of organics, moist, dark brown	#200 Wash Fines = 41%
2	30.8				Bulk		CL/CH	**ALLUVIUM:** **Sandy Lean to Fat CLAY;** trace of organic, very moist, very dark grayish brown	#200 Wash Fines = 57%
3	44.0			5	Bulk		CH	**Fat CLAY**; stiff, moist to very moist, black	#200 Wash Fines = 89% PP = 4.0 tsf EI = 66
4	28.5				Bulk				Fines = 88% PP = 1-1.5 tsf
5	24.0			10	Bulk		CL	**Lean CLAY with SAND;** stiff, moist to very moist, dark grayish brown	Fines = 76% PP = 2.0 tsf
6	24.8				Bulk				PP=1.75-2.2 tsf
				15				End of test pit @ 13' No groundwater encountered	
				20					
				25					
				30					
				35					
				40					

Bulk CD SPT

APPENDIX C

Laboratory Test Results

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP 1 @ 0-1'		TP 1 @ 3.75-4'		TP 2 @ 1.5-2'		TP 5 @ 2.5-3'	
USCS Symbol								
Normal Load (psf)								
SAMPLE CONDITION	Initial	Final	Initial	Final	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	726.100		753.180		657.110		720.710	
Wt. of ring (gr)	364.10		367.40		366.64		367.31	
Wt. Specimen (gr)	362.000		385.780		290.470		353.400	
Specimen diameter (in)	4.010		4.010		4.010		4.010	
Specimen radius (cm)	5.09		5.09		5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479		81.479		81.479	
Init. Spec. height (in)	1.0005	N/A	1.0030	N/A	1.0030	N/A	1.0030	N/A
Height change (final)(in)	N/A	0.0427	N/A	0.0983	N/A	0.0520	N/A	0.0389
Adjusted Spec.height(in)	1.00	0.9578	1.00	0.9047	1.00	0.9510	1.00	0.9641
" " (cm)	2.541	2.433	2.548	2.298	2.548	2.416	2.548	2.449
Specimen Volume (cm^3)	207.061		207.578		207.578		207.578	
Moist Density (pcf)	109.15		116.02		87.36		106.29	
MOISTURE CONTENT								
Wt. moist soil+tare(gr)	445.45	445.45	482.74	482.74	276.47	276.47	442.91	442.91
Wt. dry soil+tare(gr)	402.84	402.84	441.09	441.09	239.60	239.60	397.43	397.43
Wt. of tare(gr)	83.45	83.45	96.96	96.96	96.96	96.96	90.02	90.02
Wt. dry soil (gr)	319.39	319.39	344.13	344.13	142.64	142.64	307.41	307.41
Wt. of water (gr)	42.61	42.61	41.65	41.65	36.87	36.87	45.48	45.48
M/C (%)	13.34	13.34	12.10	12.10	25.85	25.85	14.79	14.79
DRY DENSITY (pcf)	96.3		103.5		69.4		92.6	
% Saturation* (48%-52%)	48.0		52.0		48.9		48.7	
*Assumes Gs =	2.7		2.7		2.7		2.7	
EXPANSION INDEX =	43		98		52		39	
Potential Expansion *(per ASTM 4829-08)*	Low		High		Medium		Low	

KOURY ENGINEERING & TESTING, INC.	Project Name: Borrow Site 5	Project No.: 17-1025	Run by:	Lab:
		Date: 04-15-2019	QA:	

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP 2 @ 4-4.5'		TP 7 @ 3.5-4'		TP 8 @ 4-4.5'		TP 7 @ 1-1.5'	
USCS Symbol								
Normal Load (psf)								
SAMPLE CONDITION	Initial	Final	Initial	Final	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	649.030		744.340		705.390		700.250	
Wt. of ring (gr)	366.37		366.31		366.44		363.90	
Wt. Specimen (gr)	282.660		378.030		338.950		336.350	
Specimen diameter (in)	4.010		4.010		4.010		4.010	
Specimen radius (cm)	5.09		5.09		5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479		81.479		81.479	
Init. Spec. height (in)	0.9955	N/A	1.0000	N/A	1.0020	N/A	1.0020	N/A
Height change (final)(in)	N/A	0.0381	N/A	0.0598	N/A	0.0800	N/A	0.0189
Adjusted Spec.height(in)	1.00	0.9574	1.00	0.9402	1.00	0.9220	1.00	0.9831
" " (cm)	2.529	2.432	2.540	2.388	2.545	2.342	2.545	2.497
Specimen Volume (cm^3)	206.026		206.957		207.371		207.371	
Moist Density (pcf)	85.65		114.04		102.04		101.26	
MOISTURE CONTENT								
Wt. moist soil+tare(gr)	375.45	375.45	475.25	475.25	431.23	431.23	416.46	416.46
Wt. dry soil+tare(gr)	315.22	315.22	435.34	435.34	382.96	382.96	367.22	367.22
Wt. of tare(gr)	92.79	92.79	97.22	97.22	92.28	92.28	80.11	80.11
Wt. dry soil (gr)	222.43	222.43	338.12	338.12	290.68	290.68	287.11	287.11
Wt. of water (gr)	60.23	60.23	39.91	39.91	48.27	48.27	49.24	49.24
M/C (%)	27.08	27.08	11.80	11.80	16.61	16.61	17.15	17.15
DRY DENSITY (pcf)	67.4		102.0		87.5		86.4	
% Saturation* (48%-52%)	48.7		48.8		48.4		48.7	
*Assumes Gs =	2.7		2.7		2.7		2.7	
EXPANSION INDEX =	38		60		80		19	
Potential Expansion *(per ASTM 4829-08)*	Low		Medium		Medium		Very Low	

KOURY ENGINEERING & TESTING, INC.	Project Name: Borrow Site 5	Project No.: 17-1025 Date: 04-15-2019	Run by: QA:	Lab:

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP 10 @ 4.5-5.5'		TP 3 @ 4.8-5.2'		TP 4 @ 5-5.5'		TP 5 @ 1-1.5'	
USCS Symbol								
Normal Load (psf)								
SAMPLE CONDITION	Initial	Final	Initial	Final	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	688.900		714.510		665.470		744.140	
Wt. of ring (gr)	366.61		366.48		366.64		364.14	
Wt. Specimen (gr)	322.290		348.030		298.830		380.000	
Specimen diameter (in)	4.010		4.010		4.010		4.010	
Specimen radius (cm)	5.09		5.09		5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479		81.479		81.479	
Init. Spec. height (in)	1.0020	N/A	1.0000	N/A	1.0000	N/A	1.0030	N/A
Height change (final)(in)	N/A	0.0659	N/A	0.1744	N/A	0.0339	N/A	0.0396
Adjusted Spec.height(in)	1.00	0.9361	1.00	0.8256	1.00	0.9661	1.00	0.9634
" " (cm)	2.545	2.378	2.540	2.097	2.540	2.454	2.548	2.447
Specimen Volume (cm^3)	207.371		206.957		206.957		207.578	
Moist Density (pcf)	97.03		104.99		90.14		114.29	
MOISTURE CONTENT								
Wt. moist soil+tare(gr)	408.59	408.59	440.82	440.82	382.28	382.28	472.30	472.30
Wt. dry soil+tare(gr)	355.77	355.77	390.75	390.75	325.40	325.40	429.76	429.76
Wt. of tare(gr)	86.30	86.30	92.79	92.79	83.45	83.45	92.30	92.30
Wt. dry soil (gr)	269.47	269.47	297.96	297.96	241.95	241.95	337.46	337.46
Wt. of water (gr)	52.82	52.82	50.07	50.07	56.88	56.88	42.54	42.54
M/C (%)	19.60	19.60	16.80	16.80	23.51	23.51	12.61	12.61
DRY DENSITY (pcf)	81.1		89.9		73.0		101.5	
% Saturation* (48%-52%)	49.1		51.8		48.5		51.5	
*Assumes Gs =	2.7		2.7		2.7		2.7	
EXPANSION INDEX =	66		174		34		39	
Potential Expansion *(per ASTM 4829-08)*	Medium		Very High		Low		Low	

KOURY ENGINEERING & TESTING, INC.	Project Name: Borrow Site 5	Project No.: 17-1025 Date: 04-15-2019	Run by: QA:	Lab:

We are a key member of the construction team while safeguarding the public. We improve operational logistics and provide superior quality control through the continuing development of our engineering staff and technical expertise, utilization of classroom training and field supervisors, thus defining the industry standard.

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Appendix H

Traffic Impact Analysis

Majestic Chino Heritage

TRAFFIC IMPACT ANALYSIS

CITY OF CHINO

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TRAFFIC
STATE OF CALIFORNIA

AUGUST 13, 2019

10349-04 TIA Report

TABLE OF CONTENTS

APPENDICES

LIST OF EXHIBITS

LIST OF TABLES

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
CAMUTCD	California Manual on Uniform Traffic Control Devices
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CMP	Congestion Management Program
DIF	Development Impact Fee
E+P	Existing Plus Project
HCM	Highway Capacity Manual
HCS	Highway Capacity Software
ITE	Institute of Transportation Engineers
LOS	Level of Service
NCHRP	National Cooperative Highway Research Program
NP	No Project (or Without Project)
PCE	Passenger Car Equivalents
PeMS	Performance Measurement System
PHF	Peak Hour Factor
Project	Majestic Chino Heritage
RivTAM	Riverside Traffic Analysis Model
RTA	Riverside Transport Authority
RTP	Regional Transportation Plan
SBCTA	San Bernardino County Transportation Authority
SBTAM	San Bernardino Transportation Analysis Model
SCAG	Southern California Association of Governments
SCS	Sustainable Communities Strategy
sf	Square Feet
SHS	State Highway System
SR	State Route
TIA	Traffic Impact Analysis
v/c	Volume to Capacity Ratio
vphgpl	Vehicles Per Hour Green Per Lane
WP	With Project

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1 SUMMARY OF FINDINGS

This report presents the results of the traffic impact analysis (TIA) for the proposed Majestic Chino Heritage ("Project"), which is located on the southeast corner of Mountain Avenue and Bickmore Avenue in the City of Chino, as shown on Exhibit 1-1.

The purpose of this TIA is to evaluate the potential circulation system deficiencies that may result from the development of the proposed Project, and where necessary recommend improvements to achieve acceptable operations consistent with General Plan level of service goals and policies. This traffic study has been prepared in accordance with the San Bernardino County Congestion Management Program (CMP) Guidelines for CMP Traffic Impact Analysis Reports (Appendix B, 2016 Update), the California Department of Transportation (Caltrans) Guide for the Preparation of Traffic Impact Studies (December 2002), and consultation with City staff during the traffic study scoping process. (1) (2) The City approved Project Traffic Study Scoping agreement is provided in Appendix 1.1 of this TIA.

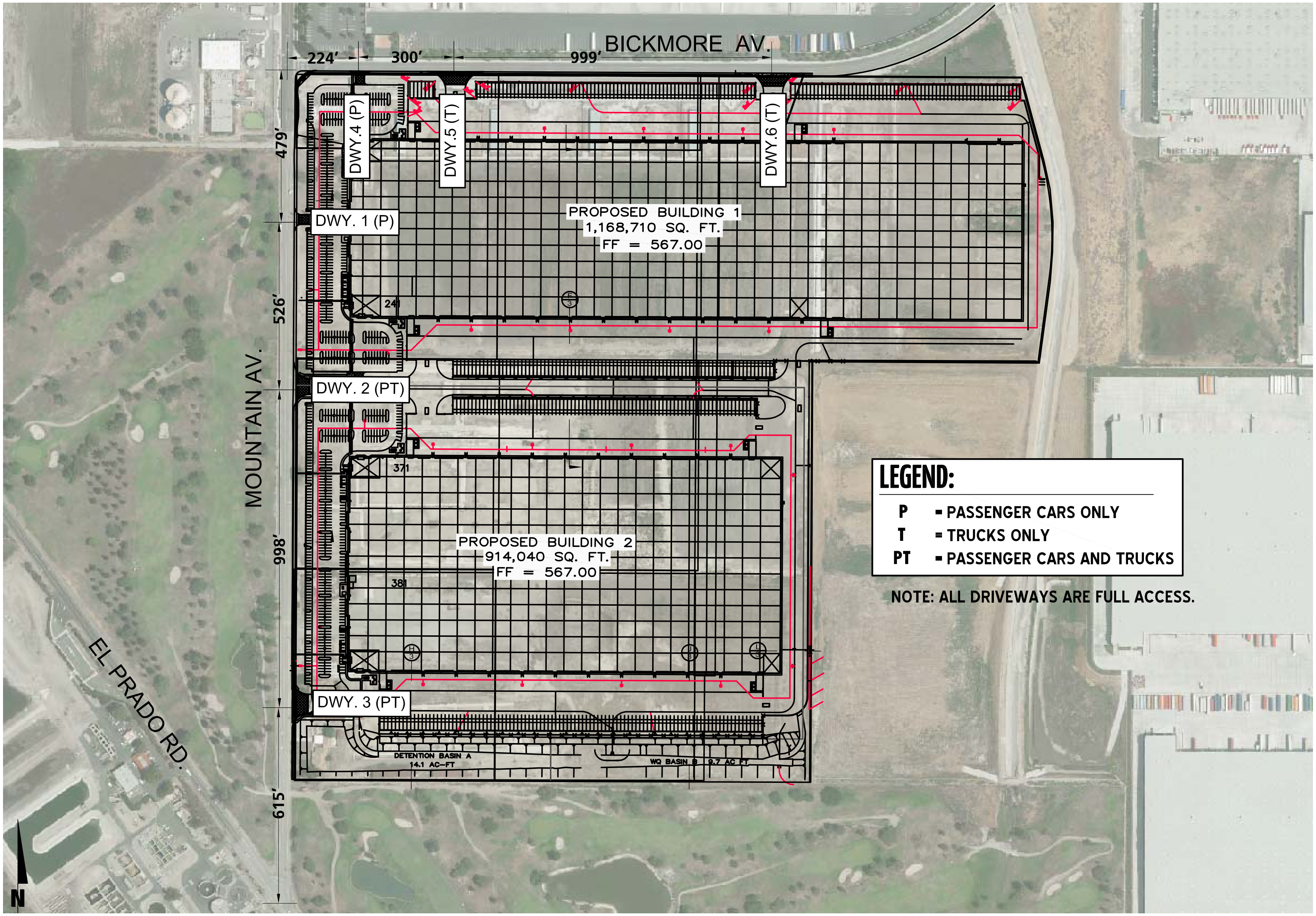
1.1 PROJECT OVERVIEW

Exhibit 1-1 illustrates the preliminary Project site plan. As indicated on Exhibit 1-1, the total development is proposed to consist of up to 2,082,750 square feet of industrial uses. For purposes of scoping the TIA, the following land uses are assumed:

- Building 1: 1,168,710 square feet of High-Cube Fulfillment Center Warehouse use
- Building 2: 814,040 square feet of High-Cube Fulfillment Center Warehouse use
- Remainder of Building 2: 100,000 square feet of High-Cube Warehouse with Cold Storage use
- **Total of 2,082,750 square feet**

The Project's anticipated Opening Year is 2022. Trips generated by the Project's proposed land uses have been estimated based on trip generation rates collected by the Institute of Transportation Engineers (ITE) Trip Generation Manual, (10th Edition, 2017) and the DRAFT Transportation Uniform Mitigation Fee (TUMF) High-Cube Warehouse Trip Generation Study (WSP, January 29, 2019). (3) (4) The Project is estimated to generate a net total of 4,440 trip-ends per day (actual vehicles) on a typical weekday with approximately 252 net AM peak hour trips and 338 net PM peak hour trips. The assumptions and methods used to estimate the Project's trip generation characteristics are discussed in greater detail in Section 4.1 *Project Trip Generation* of this report.

Exhibit 1-1: Preliminary Site Plan



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1.2 ANALYSIS SCENARIOS

For the purposes of this traffic study, potential traffic impacts have been assessed for each of the following conditions:

- Existing (2019)
- Existing plus Project (E+P)
  - E+P (Building 1)
  - E+P (Project Buildout)
- Opening Year Cumulative (2022) Without Project
- Opening Year Cumulative (2022) With Project
- Horizon Year (2040) Without Project
- Horizon Year (2040) With Project

1.2.1 EXISTING (2019) CONDITIONS

Information for Existing (2019) conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared.

1.2.2 EXISTING PLUS PROJECT CONDITIONS

The Existing plus Project (E+P) analysis determines significant traffic impacts that would occur on the existing roadway system with the addition of Project traffic. E+P traffic conditions have been evaluated for Building 1 only and Project Buildout (Building 1 & Building 2) in order to determine any potential off-site improvements that may be applicable to Building 1 only. Building 1 and Building 2 have been evaluated independently as the Project is contemplating constructing Building 1 first. However, constructing Building 2 prior to Building 1 would not result in any additional or different traffic deficiencies or improvement needs.

1.2.3 OPENING YEAR CUMULATIVE (2022) CONDITIONS

The Opening Year Cumulative conditions analysis determines the potential near-term cumulative circulation system deficiencies. To account for background traffic growth, traffic associated with other known cumulative development projects in conjunction with an ambient growth factor from Existing conditions of 2% per year (compounded annually) are included for Opening Year Cumulative (2022) traffic conditions. This comprehensive list was compiled from information provided by the City of Chino and other near-by agencies.

1.2.4 HORIZON YEAR (2040) CONDITIONS

Traffic projections for Horizon Year (2040) with Project conditions were derived from the San Bernardino Transportation Analysis Model (SBTAM) modified to represent buildout of the City of Chino. The Horizon Year (2040) conditions analysis will be utilized to determine if improvements funded through regional transportation mitigation fee programs, such as the City's Development Impact Fee (DIF) program, or other approved funding mechanisms can accommodate the long-range cumulative traffic at the target level of service (LOS) identified by the City of Chino (lead agency). It should be noted that the City of Chino has updated their DIF program to also include appropriate contributions towards regionally significant improvements that have been identified via the San Bernardino County CMP regional fee program study. If the planned and funded improvements can provide the target LOS, then the Project's payment into established fee programs will be considered as cumulative mitigation. Other improvements needed beyond the "funded" improvements (such as localized improvements to non-DIF facilities) are identified as such.

1.3 STUDY AREA

To ensure that this TIA satisfies the City of Chino's traffic study requirements, Urban Crossroads, Inc. prepared a project traffic study scoping package for review by City staff prior to the preparation of this report. The Agreement provides an outline of the Project study area, trip generation, trip distribution, and analysis methodology.

1.3.1 INTERSECTIONS

The following 43 study area intersections shown on Exhibit 1-2 and listed on Table 1-1 were selected for this TIA based on consultation with City of Chino staff.

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

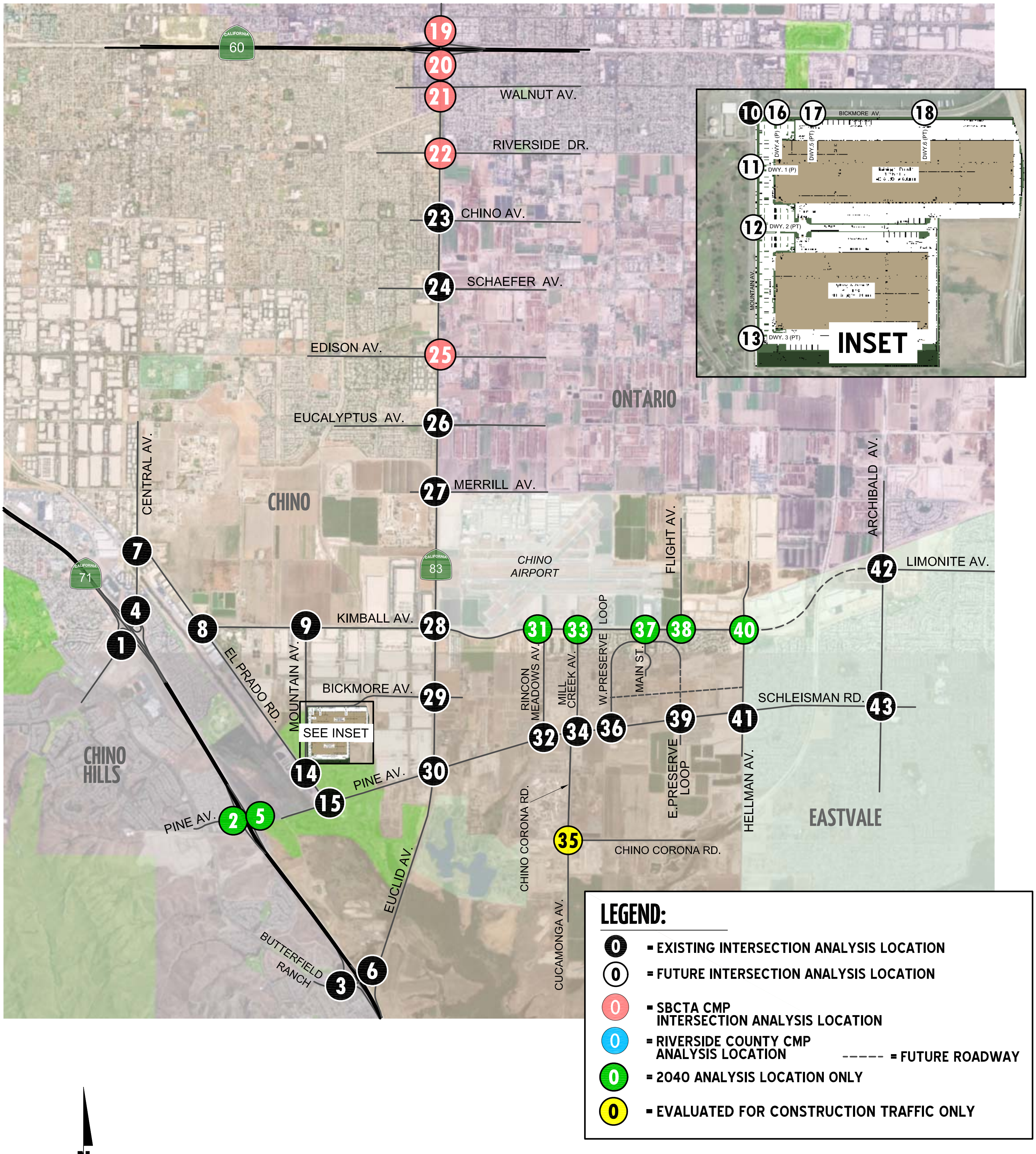
ID	Intersection Location	Jurisdiction	CMP?
1	SR-71 SB Ramps & Soquel Canyon Rd.	Chino Hills, Caltrans	No
2	SR-71 SB Ramps & Pine Av. – 2040 Analysis Location Only	Chino Hills, Caltrans	No
3	SR-71 SB Ramps & Butterfield Ranch Rd.	Chino Hills, Caltrans	No
4	SR-71 NB Ramps & Central Av.	Chino Hills, Caltrans	No
5	SR-71 NB Ramps & Pine Av. – 2040 Analysis Location Only	Chino Hills, Caltrans	No
6	SR-71 NB Ramps & Euclid Av. (SR-83)	Chino, Caltrans	No
7	Central Av. & El Prado Rd.	Chino	No
8	El Prado Rd. & Kimball Av.	Chino	No
9	Mountain Av. & Kimball Av.	Chino	No
10	Mountain Av. & Bickmore Av.	Chino	No
11	Mountain Av. & Driveway 1 – Future Intersection	Chino	No
12	Mountain Av. & Driveway 2 – Future Intersection	Chino	No
13	Mountain Av. & Driveway 3 – Future Intersection	Chino	No
14	El Prado Rd. & Mountain Av.	Chino	No
15	El Prado Rd. & Pine Av.	Chino	No
16	Driveway 4 & Bickmore Avenue – Future Intersection	Chino	No
17	Driveway 5 & Bickmore Avenue – Future Intersection	Chino	No
18	Driveway 6 & Bickmore Avenue – Future Intersection	Chino	No
19	Euclid Av. (SR-83) & SR-60 WB Ramps	Ontario, Caltrans	Yes
20	Euclid Av. (SR-83) & SR-60 EB Ramps	Ontario, Caltrans	Yes

ID	Intersection Location	Jurisdiction	CMP?
21	Euclid Av. (SR-83) & Walnut Av.	Ontario	Yes
22	Euclid Av. (SR-83) & Riverside Dr.	Caltrans, Chino, Ontario	Yes
23	Euclid Av. (SR-83) & Chino Av.	Caltrans, Chino, Ontario	No
24	Euclid Av. (SR-83) & Schaefer Av.	Caltrans, Chino, Ontario	No
25	Euclid Av. (SR-83) & Edison Av.	Caltrans, Chino, Ontario	Yes
26	Euclid Av. (SR-83) & Eucalyptus Av.	Caltrans, Chino, Ontario	No
27	Euclid Av. (SR-83) & Merrill Av.	Caltrans, Chino, Ontario	No
28	Euclid Av. (SR-83) & Kimball Av.	Caltrans, Chino	No
29	Euclid Av. (SR-83) & Bickmore Av.	Caltrans, Chino	No
30	Euclid Av. (SR-83) & Pine Av.	Caltrans, Chino	No
31	Rincon Meadows Av. & Kimball Av. – 2040 Analysis Location Only	Chino	No
32	Rincon Meadows Av. & Pine Av.	Chino	No
33	Mill Creek Av. & Kimball Av. – 2040 Analysis Location Only	Chino	No
34	Mill Creek Av./Chino-Corona Rd. & Pine Av.	Chino	No
35	Cucamonga Av. & Chino-Corona Rd. – Construction Only	Chino	No
36	W. Preserve Loop & Pine Av.	Chino	No
37	Main St. & Kimball Av. – 2040 Analysis Location Only	Chino	No
38	Flight Av. & Kimball Av. – 2040 Analysis Location Only	Chino	No
39	E. Preserve Loop & Pine Av.	Chino	No
40	Hellman Av. & Kimball Av. – 2040 Analysis Location Only	Chino, Eastvale	No
41	Hellman Av. & Pine Av./Schleisman Rd.	Chino, Eastvale	No
42	Archibald Av. & Limonite Av.	Eastvale	No
43	Archibald Av. & Schleisman Rd.	Eastvale	No

The "50 peak hour trip" criterion utilized by the City of Chino is consistent with the methodology employed by the County of San Bernardino, and generally represents a minimum number of trips at which a typical intersection would have the potential to be substantively impacted by a given development proposal. Although each intersection may have unique operating characteristics, this traffic engineering rule of thumb is a widely utilized tool for estimating a potential area of impact (i.e., study area). The "50 peak hour trip" criterion is also utilized by the County of Riverside, including the City of Eastvale. Other intersections within the adjacent cities were not selected for evaluation as the Project is anticipated to contribute less than 50 peak hour trips at these non-Chino intersections.

The intent of a CMP is to more directly link land use, transportation, and air quality, thereby prompting reasonable growth management programs that will effectively utilize new transportation funds, alleviate traffic congestion and related impacts, and improve air quality. Counties within California have developed CMPs with varying methods and strategies to meet the intent of the CMP legislation. Study area intersections that are identified as CMP facilities in the County of San Bernardino per the San Bernardino County Transportation Authority (SBCTA) CMP are indicated in Table 1-1. (1)

EXHIBIT 1-2: LOCATION MAP



1.3.2 FREEWAY MAINLINE AND RAMP JUNCTION ANALYSIS

Study area freeway mainline analysis locations were selected based on Caltrans traffic study guidelines, which may require the analysis of State highway facilities. (2) Consistent with recent Caltrans guidance, and because impacts to freeway segments tend to dissipate with distance from the point of State Highway System (SHS) entry, quantitative study of freeway segments beyond those immediately adjacent to the point of entry typically is not required. As such, this study conservatively evaluates the following freeway segments adjacent to the point of entry to the SHS, even where the Project is anticipated to contribute less than 50 one-way peak hour trips (see Table 1-2 and Exhibit 1-3):

TABLE 1-2: FREEWAY FACILITY ANALYSIS LOCATIONS

ID	Freeway Mainline Segments
1	SR-71 Southbound, North of Central Av.
2	SR-71 Southbound, Central Av. Off-Ramp
3	SR-71 Southbound, Central Av. Loop On-Ramp
4	SR-71 Southbound, Central Av. On-Ramp
5	SR-71 Southbound, Central Av. to Pine Av.
6	SR-71 Southbound, Pine Av. Off-Ramp
7	SR-71 Southbound, Pine Av. On-Ramp
8	SR-71 Southbound, Pine Av. to Euclid Av. (SR-83)
9	SR-71 Southbound, Euclid Av. (SR-83) Off-Ramp
10	SR-71 Southbound, Euclid Av. (SR-83) Loop On-Ramp
11	SR-71 Southbound, Euclid Av. (SR-83) On-Ramp
12	SR-71 Southbound, South of Euclid Av. (SR-83)
13	SR-71 Northbound, North of Central Av.
14	SR-71 Northbound, Central Av. On-Ramp
15	SR-71 Northbound, Central Av. Loop On-Ramp
16	SR-71 Northbound, Central Av. Off-Ramp
17	SR-71 Northbound, Central Av. to Pine Av.
18	SR-71 Northbound, Pine Av. On-Ramp
19	SR-71 Northbound, Pine Av. Off-Ramp
20	SR-71 Northbound, Pine Av. to Euclid Av. (SR-83)
21	SR-71 Northbound, Euclid Av. (SR-83) On-Ramp
22	SR-71 Northbound, Euclid Av. (SR-83) Off-Ramp
23	SR-71 Northbound, South of Euclid Av. (SR-83)
24	SR-60 Westbound, West of Euclid Av. (SR-83)
25	SR-60 Westbound, Euclid Av. (SR-83) On-Ramp
26	SR-60 Westbound, Euclid Av. (SR-83) Off-Ramp
27	SR-60 Westbound, East of Euclid Av. (SR-83)
28	SR-60 Eastbound, West of Euclid Av. (SR-83)
29	SR-60 Eastbound, Euclid Av. (SR-83) Off-Ramp

ID	Freeway Mainline Segments
30	SR-60 Eastbound, Euclid Av. (SR-83) On-Ramp
31	SR-60 Eastbound, East of Euclid Av. (SR-83)

1.4 PROJECT IMPACTS

This section provides a summary of Project impacts. Section 2 *Methodologies* provides information on the methodologies used in the analysis and Section 6 *E+P Traffic Analysis*, Opening Year Cumulative (2022), Horizon Year (2040) traffic conditions includes the detailed analysis. A summary of LOS results for all analysis scenarios is presented on Exhibit 1-4.

E+P (Building 1) Conditions:

Based on a comparison of Existing to E+P traffic conditions, the addition of Building 1 traffic is anticipated to contribute to an existing deficiency and would worsen the LOS at the following intersections.

Central Avenue & El Prado Road (#7) – This intersection was found to operate at an unacceptable LOS (LOS E or worse) during the peak hours under Existing traffic conditions, and is anticipated to continue to operate at an unacceptable LOS during the one or more peak hours with the addition of Project (Building 1) traffic. As such, the impact is considered cumulatively significant.

El Prado Road & Kimball Avenue (#8) – This intersection was found to operate at an unacceptable LOS (LOS E or worse) during the peak hours under Existing traffic conditions, and is anticipated to continue to operate at an unacceptable LOS during the one or more peak hours with the addition of Project (Building 1) traffic. As such, the impact is considered cumulatively significant.

Euclid Avenue (SR-83) & Pine Avenue (#30) – This intersection was found to operate at an unacceptable LOS (LOS E or worse) during the peak hours under Existing traffic conditions, and is anticipated to continue to operate at an unacceptable LOS during the one or more peak hours with the addition of Project (Building 1) traffic. As such, the impact is considered cumulatively significant.

EXHIBIT 1-3: FREEWAY FACILITY LOCATION MAP

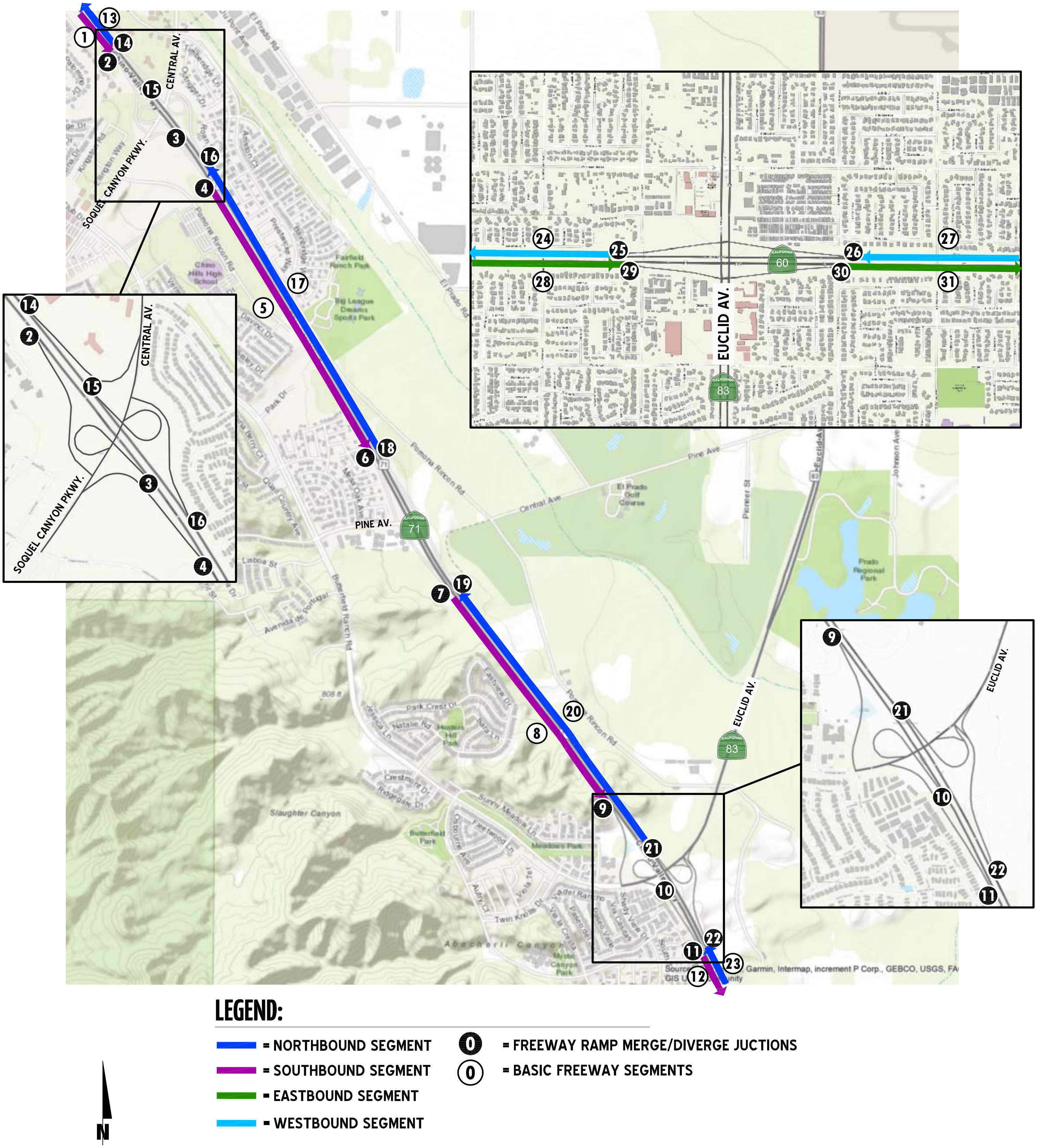


EXHIBIT 1-4 (1OF2): SUMMARY OF DEFICIENT INTERSECTIONS BY ANALYSIS SCENARIO

#	Intersection	Existing (2019)	E+P (Building 1)	E+P (Project Buildout)	Opening Year Cumulative (2022) Without Project	Opening Year Cumulative (2022) With Project	Horizon Year (2040) Without Project	Horizon Year (2040) With Project
1	SR-71 SB Ramps & Soquel Canyon Rd.	A-E	A-E	A-E	A-E	A-E	A-E	A-E
2	SR-71 SB Ramps & Pine Av.	A-E	NA	NA	NA	NA	F / A-E	F / E
3	SR-71 SB Ramps & Butterfield Ranch Rd.	A-E	A-E	A-E	A-E	A-E	E	E
4	SR-71 NB Ramps & Central Av.	A-E	A-E	A-E	A-E	A-E	A-E	A-E
5	SR-71 NB Ramps & Pine Av.	A-E	NA	NA	NA	NA	F	F
6	SR-71 NB Ramps & Euclid Av. (SR-83)	A-E	A-E	A-E	A-E	A-E	A-E	A-E
7	Central Av. & El Prado Rd.	A-E / E	A-E / E	A-E / E	A-E / F	A-E / F	A-E / E	A-E / E
8	El Prado Rd. & Kimball Av.	A-E / F	A-E / F	A-E / F	A-E / F	A-E / F	A-E / F	A-E / F
9	Mountain Av. & Kimball Av.	A-E	A-E	A-E	A-E	A-E	A-E	A-E
10	Mountain Av. & Bickmore Av.	A-E	A-E	A-E	A-E	A-E	A-E	A-E
11	Mountain Av. & Dwy. 1	NA	A-E	A-E	NA	A-E	NA	A-E
12	Mountain Av. & Dwy. 2	NA	A-E	A-E	NA	A-E	NA	A-E
13	Mountain Av. & Dwy. 3	NA	NA	A-E	NA	A-E	NA	A-E
14	El Prado Rd. & Mountian Av.	A-E	A-E	A-E	A-E	A-E	A-E	A-E / F
15	El Prado Rd. & Pine Av.	A-E	A-E	A-E	A-E	A-E	F	F
16	Dwy. 4 & Bickmore Av.	NA	A-E	A-E	NA	A-E	NA	A-E
17	Dwy. 5 & Bickmore Av.	NA	A-E	A-E	NA	A-E	NA	A-E
18	Dwy. 6 & Bickmore Av.	NA	A-E	A-E	NA	A-E	NA	A-E
19	Euclid Av. (SR-83) & SR-60 WB Ramps	A-E	A-E	A-E	A-E	A-E	E	E
20	Euclid Av. (SR-83) & SR-60 EB Ramps	A-E	A-E	A-E	A-E	A-E	F	F
21	Euclid Av. (SR-83) & Walnut Av.	A-E	A-E	A-E	A-E	A-E	A-E	A-E
22	Euclid Av. (SR-83) & Riverside Dr.	A-E / E	A-E / E	A-E / E	E / F	E / F	F	F

LEGEND:

- (left half) = AM PEAK HOUR
- (right half) = PM PEAK HOUR
- (green) = LOS A-E
- (yellow) = LOS E
- (red) = LOS F
- NA = NOT AN ANALYSIS LOCATION FOR THIS SCENARIO

EXHIBIT 1-4 (2OF2): SUMMARY OF DEFICIENT INTERSECTIONS BY ANALYSIS SCENARIO

#	Intersection	Existing (2019)	E+P (Building 1)	E+P (Project Buildout)	Opening Year Cumulative (2022) Without Project	Opening Year Cumulative (2022) With Project	Horizon Year (2040) Without Project	Horizon Year (2040) With Project
23	Euclid Av. (SR-83) & Chino Av.	Green/Green	Green/Green	Green/Green	Green/Green	Green/Green	Yellow/Red	Yellow/Red
24	Euclid Av. (SR-83) & Schaefer Av.	Green/Green	Green/Green	Green/Green	Green/Green	Green/Green	Red/Red	Red/Red
25	Euclid Av. (SR-83) & Edison Av.	Green/Green	Green/Green	Green/Green	Green/Yellow	Yellow/Yellow	Red/Red	Red/Red
26	Euclid Av. (SR-83) & Eucalyptus Av.	Green/Green	Green/Green	Green/Green	Green/Green	Green/Green	Yellow/Red	Yellow/Red
27	Euclid Av. (SR-83) & Merrill Av.	Green/Green	Green/Green	Green/Green	Green/Yellow	Green/Red	Red/Red	Red/Red
28	Euclid Av. (SR-83) & Kimball Av.	Green/Green	Green/Green	Green/Green	Green/Green	Green/Yellow	Red/Red	Red/Red
29	Euclid Av. (SR-83) & Bickmore Av.	Green/Green	Green/Green	Green/Green	Green/Green	Green/Green	Green/Green	Green/Green
30	Euclid Av. (SR-83) & Pine Av.	Green/Yellow	Green/Yellow	Green/Yellow	Green/Red	Green/Red	Red/Red	Red/Red
31	Rincon Meadows Av. & Kimball Av.	Green/Green	NA	NA	NA	NA	Green/Green	Green/Green
32	Rincon Meadows Av. & Pine Av.	NA	NA	NA	Green/Green	Green/Green	Yellow/Red	Yellow/Red
33	Mill Creek Av. & Kimball Av.	Green/Green	NA	NA	NA	NA	Green/Green	Green/Green
34	Mill Creek Av./Chino-Corona Rd. & Pine Av.	Green/Green	Green/Green	Green/Green	Green/Green	Green/Green	Red/Yellow	Red/Yellow
35	Cucamonga Av. & Chino-Corona Rd.	Green/Green	NA	NA	NA	NA	NA	NA
36	W. Preserve Loop & Pine Av.	Green/Green	Green/Green	Green/Green	Green/Green	Green/Green	Yellow/Green	Yellow/Green
37	Main St. & Kimball Av.	Green/Green	NA	NA	NA	NA	Green/Green	Green/Green
38	Flight Av. & Kimball Av.	Green/Green	NA	NA	NA	NA	Red/Red	Red/Red
39	E. Preserve Loop & Pine Av.	Green/Green	Green/Green	Green/Green	Green/Green	Green/Green	Red/Red	Red/Red
40	Hellman Av. & Kimball Av.	Red/Red	NA	NA	NA	NA	Green/Red	Green/Red
41	Hellman Av. & Pine Av./Schleisman Rd.	Green/Green	Green/Green	Green/Green	Green/Green	Green/Green	Green/Green	Green/Green
42	Archibald Av. & Limonite Av.	Green/Green	Green/Green	Green/Green	Yellow/Yellow	Yellow/Yellow	Red/Red	Red/Red
43	Archibald Av. & Schleisman Rd.	Red/Green	Red/Green	Red/Green	Red/Yellow	Red/Yellow	Red/Red	Red/Red

LEGEND:

- (left half) = AM PEAK HOUR
- (right half) = PM PEAK HOUR
- (green) = LOS A-E
- (yellow) = LOS E
- (red) = LOS F
- NA = NOT AN ANALYSIS LOCATION FOR THIS SCENARIO

E+P (Project Buildout) Conditions:

Based on a comparison of Existing to E+P traffic conditions, the addition of Project Buildout traffic is anticipated to contribute to an existing deficiency and would worsen the LOS at the following intersections.

Central Avenue & El Prado Road (#7) – This intersection was found to operate at an unacceptable LOS (LOS E or worse) during the peak hours under Existing traffic conditions, and is anticipated to continue to operate at an unacceptable LOS during the one or more peak hours with the addition of Project (Project Buildout) traffic. As such, the impact is considered cumulatively significant.

El Prado Road & Kimball Avenue (#8) – This intersection was found to operate at an unacceptable LOS (LOS E or worse) during the peak hours under Existing traffic conditions, and is anticipated to continue to operate at an unacceptable LOS during the one or more peak hours with the addition of Project (Project Buildout) traffic. As such, the impact is considered cumulatively significant.

Euclid Avenue (SR-83) & Riverside Drive (#22) – This intersection was found to operate at an unacceptable LOS (LOS E or worse) during the peak hours under Existing traffic conditions, and is anticipated to continue to operate at an unacceptable LOS during the one or more peak hours with the addition of Project (Project Buildout) traffic. As such, the impact is considered cumulatively significant.

Euclid Avenue (SR-83) & Pine Avenue (#30) – This intersection was found to operate at an unacceptable LOS (LOS E or worse) during the peak hours under Existing traffic conditions, and is anticipated to continue to operate at an unacceptable LOS during the one or more peak hours with the addition of Project (Project Buildout) traffic. As such, the impact is considered cumulatively significant.

Archibald Avenue & Schleisman Road (#43) – This intersection was found to operate at an unacceptable LOS (LOS E or worse) during the peak hours under Existing traffic conditions, and is anticipated to continue to operate at an unacceptable LOS during the one or more peak hours with the addition of Project (Project Buildout) traffic. As such, the impact is considered cumulatively significant.

Opening Year Cumulative (2022) Conditions:

The following study area intersections are anticipated to operate at a deficient LOS during one or both peak hours for Opening Year Cumulative (2022) Without Project traffic conditions. The Project is anticipated to contribute to these deficiencies by adding traffic (as measured by 50 or more peak hours trips) to already deficient intersections resulting in an increase to peak hour delays. Cumulative impacts are deficiencies that would not be directly caused by the Project. The Project would, however, contribute traffic to these deficient facilities along with other cumulative development projects, resulting in a cumulatively considerable impact.

- Central Avenue & El Prado Road (#7) – LOS F PM peak hour only
- El Prado Road & Kimball Avenue (#8) – LOS F PM peak hour only

- Euclid Avenue (SR-83) & Riverside Drive (#22) – LOS E AM peak hour; LOS F PM peak hour
- Euclid Avenue (SR-83) & Edison Avenue (#25) – LOS E PM peak hour only
- Euclid Avenue (SR-83) & Merrill Avenue (#27) – LOS E PM peak hour only
- Euclid Avenue (SR-83) & Pine Avenue (#30) – LOS F PM peak hour only
- Archibald Avenue & Limonite Avenue (#42) – LOS E AM and PM peak hour
- Archibald Avenue & Schleisman Road (#43) – LOS F AM peak hour; LOS E PM peak hour

The following study area intersection is anticipated to operate at a deficient LOS during one or both peak hours for Opening Year Cumulative (2022) With Project traffic conditions with the addition of Project traffic, in addition to the locations identified above for Opening Year Cumulative (2022) Without Project traffic conditions.

- Euclid Avenue (SR-83) & Kimball Avenue (#28) – LOS E PM peak hour only

Horizon Year (2040) Conditions:

The following study area intersections are anticipated to operate at a deficient LOS during one or both peak hours for Horizon Year (2040) Without Project traffic conditions. The Project is anticipated to contribute to these deficiencies by adding traffic (as measured by 50 or more peak hours trips) to already deficient intersections resulting in an incase to peak hour delays. Cumulative impacts are deficiencies that would not be directly caused by the Project. The Project would, however, contribute traffic to these deficient facilities along with other cumulative development projects, resulting in a cumulatively considerable impact.

- SR-71 Southbound Ramps & Pine Avenue (#2) – LOS F AM peak hour only
- SR-71 Northbound Ramps & Pine Avenue (#5) – LOS F AM and PM peak hours
- El Prado Road & Pine Avenue (#15) – LOS F AM and PM peak hours
- Euclid Avenue (SR-83) & SR-60 Eastbound Ramps (#20) – LOS F AM and PM peak hours
- Euclid Avenue (SR-83) & Riverside Drive (#22) – LOS F AM and PM peak hours
- Euclid Avenue (SR-83) & Chino Avenue (#23) – LOS E AM peak hour; LOS F PM peak hour
- Euclid Avenue (SR-83) & Schaefer Avenue (#24) – LOS F AM and PM peak hours
- Euclid Avenue (SR-83) & Edison Avenue (#25) – LOS F AM and PM peak ours
- Euclid Avenue (SR-83) & Eucalyptus Avenue (#26) – LOS E AM peak hour; LOS F PM peak hour
- Euclid Avenue (SR-83) & Merrill Avenue (#27) – LOS F AM and PM peak hours
- Euclid Avenue (SR-830 & Kimball Avenue (#28) – LOS F AM and PM peak hours
- Flight Avenue & Kimball Avenue (#38) – LOS F AM and PM peak hours
- Helman Avenue & Kimball Avenue (#40) – LOS F PM peak hour only
- Archibald Avenue & Limonite Avenue (#42) – LOS F AM and PM peak hours

The following study area intersection is anticipated to operate at a deficient LOS during one or both peak hours for Horizon Year (2040) With Project traffic conditions with the addition of Project traffic, in addition to the locations identified above for Horizon Year (2040) Without Project traffic conditions.

- El Prado Road & Mountain Avenue (#14) – LOS F PM peak hour only

1.5 RECOMMENDED IMPROVEMENTS TO ADDRESS CIRCULATION DEFICIENCIES

Table 1-3 lists the incremental improvements that are required for each analysis scenario from Existing to Horizon Year (2040) traffic conditions to alleviate circulation system deficiencies. The regional and local transportation impact fee programs have each been reviewed and compared to the recommended improvements for each impacted facility. Recommended improvements already identified and included in the City of Chino DIF are clearly denoted. If an impacted facility was found to require improvements to transportation facilities not identified in the fee program, the Project would be required to contribute to the associated intersection or roadway a fair-share percentage toward the costs of the recommended improvements. The fair-share calculations presented on Table 1-3 indicate that the Project contributes 0.5% to 9.6% of new vehicle trips to these intersections. The construction of facilities by the Project Applicant would be eligible for DIF credit and reimbursement (if the costs of construction exceed the Project's fair share contribution or amount of DIF payment), as identified on Table 1-3. These fees (both to the City of Chino, and as determined, to surrounding agencies as fair-share contributions) are collected as part of a funding mechanism aimed at ensuring that regional highways and arterial expansions keep pace with the projected vehicle trip increases.

The improvements listed on Table 1-3 comprise lane additions/modifications, installation of signals and signal modifications. As noted, the identified improvements are covered either by the City of Chino DIF Program or as a fair-share contribution, if not covered by a fee program. Depending on the width of the existing pavement and right-of-way, these improvements may involve only striping modifications, or they may involve construction of additional pavement width. Additional discussion of the relevant pre-existing transportation impact fee programs is provided below.

Table 1-3 also summarizes the applicable cost associated with each of the recommended improvements based on the preliminary construction cost estimates found in Appendix G of the San Bernardino County CMP in conjunction with a cost escalation factor of 1.484 to reflect current (2019) costs. A rough order of magnitude cost has been prepared to determine the appropriate contribution value based upon the Project's fair share of traffic as part of the project approval process. Based on the Project fair share percentages, the Project's fair share cost is estimated at $139,596. These estimates are a rough order of magnitude only as they are intended only for disclosure purposes and do not imply any legal responsibility or formula for contributions or mitigation.

Table 1-3

Summary of Improvements Recommended to Meet City of Chino or Surrounding Agency LOS Requirements

#	Intersection Location	Jurisdiction	Existing (2019)	E+P (Building 1)	E+P (Project Buildout)	2022 Without Project	2022 With Project	2040 Without/With Project	Improvements in City DIF?[1]	DIF Project #	Project Responsibility[7]	Total Cost[2,3,4]	Fair Share %[4]	Fair Share Cost[5]
2	SR-71 SB Ramps & Pine Av.	Chino Hills, Caltrans	None	None	None	None	None	Restripe the EB approach to provide one through lane and one shared through-right turn lane	No		Fair Share	$37,100	7.579%	$2,812
								Restripe the SB approach to provide one through lane and one shared through-right turn lane	No		Fair Share	$37,100		$2,812
											Total	**$74,200**		**$5,623**
5	SR-71 NB Ramps & Pine Av.	Chino Hills, Caltrans	None	None	None	None	None	Install a traffic signal	No		Fair Share	$250,000	6.784%	$16,960
								Restripe the NB approach to provide one left-through and one right turn lane	No		Fair Share	$37,100		$2,517
								2nd EB left turn lane	No		Fair Share	$74,200		$5,034
								2nd WB through lane	Yes	TR-035	Fees	$0		$0
											Total	**$361,300**		**$24,511**
7	Central Av. & El Prado Rd.	Chino	2nd SB left turn lane	Same	Same	Same	Same	Same	Yes	TR-31	Fees	$0	--	$0
											Total	**$0**		**$0**
8	El Prado Rd. & Kimball Av.	Chino, Chino Hills	Restripe the SB approach to provide dual left turns and one shared through-right turn lane	Same	Same	Same	Same	Same	No		Fair Share	$37,100	9.585%	$3,556
											Total	**$37,100**		**$3,556**
14	El Prado Rd. & Mountain Av.	Chino	None	None	None	None	None	Install a traffic signal	Yes	TR-023	Fees	$0	--	$0
											Total	**$0**		**$0**
15	El Prado Rd. & Pine Av.	Chino, Chino Hills	None	None	None	None	None	Install a traffic signal	Yes	TR-124	Fees	$0	--	$0
											Total	**$0**		**$0**
20	Euclid Av. (SR-83) & SR-60 EB Ramps	Ontario, Caltrans	None	None	None	None	None	Add EB right turn lane	Yes	TR-039	Fees	$0	--	$0
								Add 2nd SB left turn lane	Yes	TR-039	Fees	$0		$0
											Total	**$0**		**$0**
22	Euclid Av. (SR-83) & Riverside Dr.	Caltrans, Chino, Ontario	EB right turn lane	Not Applicable	Same	Same	Same	Same	No		Fair Share	$74,200	3.611%	$2,679
						3rd NB through lane	Same	Same	No		Fair Share	$267,120		$9,646
						3rd SB through lane	Same	Same	Yes	TR-125	Fees	$0		$0
								2nd NB left turn lane	No		Fair Share	$74,200		$2,679
								2nd SB left turn lane	No		Fair Share	$74,200		$2,679
								2nd EB through lane	Yes	TR-042	Fees	$0		$0
								EB right turn lane	Yes	TR-042	Fees	$0		$0
											Total	**$489,720**		**$17,684**
23	Euclid Av. (SR-83) & Chino Av.	Caltrans, Chino, Ontario	None	None	None	None	None	3rd NB through lane	No		Fair Share	$267,120	4.108%	$10,974
								3rd SB through lane	No		Fair Share	$267,120		$10,974
								WB left turn lane	No		Fair Share	$74,200		$3,048
											Total	**$608,440**		**$24,996**
24	Euclid Av. (SR-83) & Schaefer Av.	Caltrans, Chino, Ontario	None	None	None	None	None	2nd NB left turn lane	No		Fair Share	$74,200	3.054%	$2,266
								3rd NB through lane	No		Fair Share	$267,120		$8,157
								2nd SB left turn lane	No		Fair Share	$111,300		$3,399
								3rd SB through lane	No		Fair Share	$267,120		$8,157
								2nd EB left turn lane	No		Fair Share	$267,120		$8,157
											Total	**$986,860**		**$30,137**

Table 1-3

Page 2 of 3

Summary of Improvements Recommended to Meet City of Chino or Surrounding Agency LOS Requirements

#	Intersection Location	Jurisdiction	Existing (2019)	E+P (Building 1)	E+P (Project Buildout)	2022 Without Project	2022 With Project	2040 Without/With Project	Improvements in City DIF?[1]	DIF Project #	Project Responsibility[7]	Total Cost[2,3,4]	Fair Share %[4]	Fair Share Cost[5]
25	Euclid Av. (SR-83) & Edison Av.	Caltrans, Chino, Ontario	None	None	None	3rd NB through lane	Same	Same	Yes	TR-126	Fees	$0	2.329%	$0
						3rd SB through lane	Same	Same	Yes	TR-126	Fees	$0		$0
								2nd NB left turn lane	No		Fair Share	$74,200		$1,728
								2nd SB left turn lane	Yes	TR-126	Fees	$0		$0
								2nd EB left turn lane	Yes	TR-126	Fees	$0		$0
								2nd EB through lane	Yes	TR-126	Fees	$0		$0
								3rd EB through lane	Yes	TR-126	Fees	$0		$0
								2nd WB left turn lane	No		Fair Share	$74,200		$1,728
								2nd WB through lane	No		Fair Share	$267,120		$6,222
								WB right turn lane	No		Fair Share	$74,200		$1,728
								Modify the traffic signal to implement overlap phasing for the WB and SB right turn lanes	No		Fair Share	$111,300		$2,592
											Total	**$601,020**		**$13,999**
26	Euclid Av. (SR-83) & Eucalyptus Av.	Caltrans, Chino, Ontario	None	None	None	None	None	3rd NB through lane	Yes	TR-166	Fees	$0	3.865%	$0
								3rd SB through lane	Yes	TR-028	Fees	$0		$0
								2nd WB left turn lane	No		Fair Share	$74,200		$2,868
								WB right turn lane	No		Fair Share	$74,200		$2,868
											Total	**$148,400**		**$5,736**
27	Euclid Av. (SR-83) & Merrill Av.	Caltrans, Chino, Ontario	None	None	None	3rd NB through lane	Same	Same	Yes	TR-166	Fees	$0	4.561%	$0
						3rd SB through lane	Same	Same	Yes	TR-028	Fees	$0		$0
								EB left turn lane	No		Fair Share	$74,200		$3,384
								2 WB left turn lanes	Yes	TR-028	Fees	$0		$0
								WB right turn lane	Yes	TR-028	Fees	$0		$0
								Modify the traffic signal to implement overlap phasing for the NB and WB right turn lanes	No		Fair Share	$111,300		$5,076
											Total	**$185,500**		**$8,460**
28	Euclid Av. (SR-83) & Kimball Av.	Caltrans, Chino	None	None	None	None	3rd NB through lane	Same	Yes	TR-166	Fees	$0	--	$0
							3rd SB through lane	Same	Yes	TR-166	Fees	$0		$0
								2nd WB left turn lane	Yes	TR-166	Fees	$0		$0
											Total	**$0**		**$0**
30	Euclid Av. (SR-83) & Pine Av.	Caltrans, Chino	NB free right turn lane	Same	Same	Same	Same	Same	Yes	TR-166	Fees	$0	--	$0
						3rd NB through lane	Same	Same	Yes	TR-166	Fees	$0		$0
						3rd SB through lane	Same	Same	Yes	TR-130	Fees	$0		$0
											Total	**$0**		**$0**
38	Flight Av. & Kimball Av.	Chino	None	None	None	None	None	Install a traffic signal	Yes	TR-148	Fees	$0	5.771%	$0
								SB left turn lane	Yes	TR-107	Fees	$0		$0
								2nd WB through lane	Yes	TR-121	Fees	$0		$0
								WB right turn lane	No		Fair Share	$74,200		$4,282
											Total	**$74,200**		**$4,282**
40	Hellman Av. & Kimball Av.	Chino, Eastvale	Operation of the traffic signal[6]	2040 Analysis Location	2040 Analysis Location	2040 Analysis Location	2040 Analysis Location	Same	Yes	TR-131	Fees	$0	--	$0
			2nd NB left turn lane					Same	Yes	TR-131	Fees	$0		$0
								SB left turn lane	Yes	TR-131	Fees	$0		$0
								2nd EB through lane	Yes	TR-121	Fees	$0		$0
								2 WB left turn lanes	Yes	TR-131	Fees	$0		$0
								2 WB through lanes	Yes	TR-131	Fees	$0		$0
								WB right turn lane	Yes	TR-131	Fees	$0		$0
											Total	**$0**		**$0**

Summary of Improvements Recommended to Meet City of Chino or Surrounding Agency LOS Requirements

#	Intersection Location	Jurisdiction	Existing (2019)	E+P (Building 1)	E+P (Project Buildout)	2022 Without Project	2022 With Project	2040 Without/With Project	Improvements in City DIF?[1]	DIF Project #	Project Responsibility[7]	Total Cost[2,3,4]	Fair Share %[4]	Fair Share Cost[5]
42	Archibald Av. & Limonite Av.	Eastvale	None	None	None	2nd NB through lane	Same	Same	Yes	TR-304	Fees	$0	--	$0
								NB left turn lane	Yes	TR-304	Fees	$0		$0
								3rd NB through lane	Yes	TR-304	Fees	$0		$0
								2nd SB left turn lane	Yes	TR-304	Fees	$0		$0
								2nd SB through lane	Yes	TR-304	Fees	$0		$0
								3rd SB through lane	Yes	TR-304	Fees	$0		$0
								2nd EB left turn lane	Yes	TR-304	Fees	$0		$0
								2nd EB through lane	Yes	TR-304	Fees	$0		$0
								2nd WB left turn lane	Yes	TR-304	Fees	$0		$0
								2nd WB through lane	Yes	TR-304	Fees	$0		$0
											Total	**$0**		**$0**
43	Archibald Av. & Schleisman Rd.	Eastvale	Modify the traffic signal to extend the cycle length to 130 seconds	Not Applicable	Same	Same	Same	Same	No		Fair Share	$111,300	0.549%	$612
											Total	**$111,300**		**$612**
											Total Costs for Horizon Year (2040) Improvements	**$3,678,040**		**$139,596**
											Total Project Fair Share Contribution to the City of Chino (non-DIF/other)[8]		**$48,909**	
											Total Project Fair Share Contribution to the City of Ontario[9]		**$59,941**	
											Total Project Fair Share Contribution to the City of Chino Hills[10]		**$24,805**	
											Total Project Fair Share Contribution to the City of Eastvale[11]		**$612**	
											Total Project Fair Share Contribution to Caltrans[12]		**$5,329**	

1 Improvements included in City of Chino DIF program for local, regional and specific plan components (City of Chino Development Impact Fee Nexus and Calculation Report, December 28, 2017).

2 Costs have been estimated using the data provided in Appendix "G" of the CMP (2003 Update) for preliminary construction costs.

3 Appendix "G" costs escalated by a factor of 1.484 per City direction except Traffic Signals.

4 Program improvements constructed by project may be eligible for fee credit, at discretion of City. See Table 1-5 for Fair Share Calculations.

5 Rough order of magnitude cost estimate.

6 Traffic signal is currently flashing red. As such, an all-way stop controlled intersection was assumed for Existing traffic conditions only.

7 Identifies the Project's responsibility to construct an improvement or contribute fair share or fee payment towards the implementation of the improvement shown.

8 Total project fair share contribution consists of the improvements which are not already included in the City-wide DIF for those intersections wholly or partially within the City of Chino.

9 Total project fair share contribution consists of the improvements which are not already included in a fee program for those intersections wholly or partially within the City of Ontario.

10 Total project fair share contribution consists of the improvements which are not already included in a fee program for those intersections wholly or partially within the City of Chino Hills.

11 Total project fair share contribution consists of the improvements which are not already included in a fee program for those intersections wholly or partially within the City of Eastvale.

12 Total project fair share contribution consists of the improvements which are not already included in a fee program for those intersections wholly or partially within Caltrans' jurisdiction.

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1.6 MITIGATION MEASURES

The following mitigation measures are based on the improvements needed under Opening Year Cumulative (2022) and Horizon Year (2040) traffic conditions. The improvements needed to address Opening Year Cumulative deficiencies are typically a sub-set of those improvements recommended under Horizon Year (2040) traffic conditions.

Mitigation Measure 1.1 – Prior to the issuance of each building's certificate of occupancy, the Project Applicant shall participate in the City's city-wide DIF program by paying the requisite DIF fee on a per building basis for Building 1 and Building 2, DIF fees may be reduced or off-set based on the cost DIF eligible facilities constructed by the Project Applicant.

Mitigation Measure 2.1 – Prior to the issuance of each building's certificate of occupancy, the Project Applicant shall pay the Project's fair share amount of $27,445 for Building 1 and $21,464 for Building 2 (total of $48,909) for the improvements identified on Table 1-3 at intersections located within the City of Chino.

Mitigation Measure 3.1 – Table 1-3 of the TIA includes intersections that either share a mutual border with or are wholly located within the City of Ontario, City of Chino Hills and City of Eastvale, or are subject to the jurisdiction of Caltrans that have recommended improvements which are not covered by DIF. Because the City of Chino does not have plenary control over intersections that share a border with these other agencies, the City cannot guarantee that such improvements will be constructed. Thus, the following additional mitigation measure is required: The City of Chino shall participate in a multi-jurisdictional effort with the City of Ontario, City of Chino Hills, City of Eastvale, and Caltrans to develop a study to identify fair share contribution funding sources attributable to and paid from private and public development to supplement other regional and State funding sources necessary to implement the improvements identified on Table 1-3 of the TIA, that are located in these other jurisdictions. The study shall include fair-share contributions related to private and or public development based on nexus requirements contained in the Mitigation Fee Act (Govt. Code § 66000 et seq.) and 14 Cal. Code of Regs. § 15126.4(a)(4) and, to this end, the study shall recognize that impacts attributable to the City of Ontario, City of Chino Hills, City of Eastvale, and Caltrans facilities that are not attributable to development located within the City of Chino are not paying in excess of such developments' fair share obligations. The fee study shall also be compliant with Government Code § 66001(g) and any other applicable provisions of law. The study shall set forth a timeline and other agreed-upon relevant criteria for implementation of the recommendations contained within the study to the extent the other agencies agree to participate in the fee study program. Because the City of Chino and these other agencies are responsible to implement this mitigation measure, Developer shall have no compliance obligations with respect to this Mitigation Measure.

Mitigation Measure 3.2 – The Developer's fair-share amount for the intersections that either share a mutual border with or are wholly located within the City of Ontario, City of Chino Hills, and the City of City of Eastvale or are subject to the jurisdiction of Caltrans that have recommended improvements which are not covered by DIF are as follows:

- City of Ontario: $33,635 for Building 1 and $26,306 for Building 2 (total of $59,941)
- City of Chino Hills: $13,919 for Building 1 and $10,886 for Building 2 (total of $24,805)
- City of Eastvale: $344 for Building 1 and $268 for Building 2 (total of $612)
- Caltrans: $2,991 for Building 1 and $2,338 for Building 2 (total of $5,329)

Developer shall be required to pay the amount shown above to the City of Chino prior to the issuance of the Project's final certificate of occupancy. The City of Chino shall hold Developer's Fair Share contribution in trust and shall apply Developer's Fair Share Contribution to any fee program adopted or agreed upon by the City of Chino and other agencies as a result of implementation of Mitigation Measure 3.1. If, within five years of the date of collection of Developer's Fair Share Contribution, the City of Chino and other agencies do not comply with Mitigation Measure 3.1, then Developer's Fair Share Contribution shall be returned to the Developer.

Mitigation Measure 4.1 – The Project Applicant will be required to develop and implement a City-approved Construction Traffic Management Plan addressing potential construction-related traffic detours and disruptions. In general, the Construction Traffic Management Plan would ensure that to the extent practical, construction traffic would access the Project site during off-peak hours or limited access during the peak hours; and that construction traffic would be routed to avoid travel through, or proximate to, sensitive land uses.

Mitigation Measure 5.1 – The delivery and removal of heavy equipment is recommended to minimize the heavy truck activity during the morning and evening peak periods (6:00 AM to 9:00 AM and 3:00 PM to 6:00 PM) in order to have nominal impacts to traffic and circulation near the vicinity of the Project.

Mitigation Measure 6.1 – During the site grading, the Project shall limit soil import activity between the Project site and excess dirt fill sites during the hours of 6:00 AM – 9:00 AM (morning peak period) and 3:00 PM – 6:00 PM (evening peak period) to fewer than the equivalent of 50 passenger car equivalent (PCE) truck trips per hour. 50 PCE truck trips equates to approximately 16 total trucks (8 trucks in and 8 trucks out) during the peak periods specified above in order to limit the potential impacts of haul truck activity during these busy commute times:

50 PCE truck trips / 3.0 PCE factor = 16 total trucks during the peak hour

1.7 RECOMMENDED ON-SITE ROADWAY AND SITE ACCESS IMPROVEMENTS

This section summarizes Project site access and on-site circulation recommendations. The Project is proposed to have access on Mountain Avenue and Bickmore Avenue. All Project access points are assumed to allow full-access. Regional access to the Project site is provided via the SR-60 Freeway and the SR-71 Freeway. Roadway improvements necessary to provide site access and on-site circulation are assumed to be constructed in conjunction with site development and are described below. These improvements are required to be in place prior to occupancy.

1.7.1 RECOMMENDED SITE ADJACENT ROADWAY IMPROVEMENTS

The recommended site-adjacent roadway improvements for the Project are described below. These improvements need to be incorporated into the Project description prior to Project approval or imposed as conditions of approval as part of the Project approval. Construction of on-site and site adjacent improvements are recommended to occur in conjunction with adjacent Project development activity or as needed for Project access purposes. Ultimate improvements along Mountain Avenue and Bickmore Avenue and the intersection of Mountain Avenue at Bickmore Avenue are consistent with the City of Chino General Plan and are shown on Exhibit 1-5.

Mountain Avenue – Mountain Avenue is a north-south oriented roadway located along the Project's western boundary. Construct Mountain Avenue from Bickmore Avenue to the southern Project boundary at its ultimate half-section width as an urban industrial collector (66-foot ultimate right-of-way) in compliance with the circulation recommendations found in City of Chino General Plan.

Bickmore Avenue – Bickmore Avenue is an east-west oriented roadway located along the Project's northern boundary. Bickmore Avenue from Mountain Avenue to the eastern Project boundary is currently constructed to its ultimate full-section width as an urban industrial collector (66-foot ultimate right-of-way), consistent with the circulation recommendations found in the City of Chino General Plan. However, the Project should modify the curb and gutter and sidewalk improvements along the Project's frontage to accommodate the proposed Project driveways.

On-site traffic signing and striping should be implemented agreeable with the provisions of the California Manual on Uniform Traffic Control Devices (CA MUTCD) and in conjunction with detailed construction plans for the Project site.

Sight distance at each project access point should be reviewed with respect to standard Caltrans and City of Chino sight distance standards at the time of preparation of final grading, landscape and street improvement plans.

1.7.2 RECOMMENDED SITE ACCESS IMPROVEMENTS

Exhibit 1-5 also shows the site access improvements at each applicable Project driveway. Construction of on-site and site adjacent improvements shall occur in conjunction with adjacent Project development activity or as needed for Project access purposes. The two driveways serving trucks (Driveway 5 and Driveway 6) on Bickmore Avenue should be signed prohibiting trucks from turning left onto Bickmore Avenue.

A queuing analysis was conducted along the site adjacent roadways of Mountain Avenue and Bickmore Avenue for Horizon Year (2040) traffic conditions to determine the turn pocket lengths necessary to accommodate near term 95th percentile queues. The analysis was conducted for the weekday AM and weekday PM peak hours. The storage length recommendations for the turning movements at the Project were shown previously on Exhibit 1-5. The Horizon Year (2040) queuing results are provided in Appendix 1.2 of this report.

Wherever necessary, roadways adjacent to the Project, site access points and site-adjacent intersections will be constructed to be consistent with the identified roadway classifications and respective cross-sections in the City of Chino General Plan Circulation Element.

1.8 TRUCK ACCESS AND CIRCULATION

Due to the typical wide turning radius of large trucks, a truck turning template has been overlaid on the site plan at each applicable Project driveway and site adjacent intersection anticipated to be utilized by heavy trucks in order to determine appropriate curb radii and to verify that trucks will have sufficient space to execute turning maneuvers (see Exhibit 1-6). As shown, all driveways that would be utilized by heavy trucks are anticipated to accommodate the wide turning radius of the heavy trucks (WB-67).

At the request of City of Chino staff, Exhibit 1-6 identifies the interim and ultimate right-of-way needs at the intersection of El Prado Road and Mountain Avenue (see pages 3 and 4 of Exhibit 1-6). The Project Applicant will make a good-faith effort to obtain the necessary right-of-way shown on Exhibit 1-6 for the intersection of El Prado Road and Mountain Avenue. However, for purposes of this TIA, to provide a conservative analysis and full disclosure of impacts, acquisition of this right-of-way and improvement of this intersection is not assumed to be accomplished.

1.9 PEDESTRIAN AND BICYCLE ACCOMMODATIONS

The Project will construct its ultimate half-section of Mountain Avenue and Bickmore Avenue including curb and gutter and sidewalk improvements. Some of these sections will also include sidewalks. Consistent with the City's General Plan Circulation Element, Pine Avenue is proposed to have Class I off-street bike lanes in close proximity to the Project.

EXHIBIT 1-5 (1 OF 2): CONCEPT STRIPING PLAN

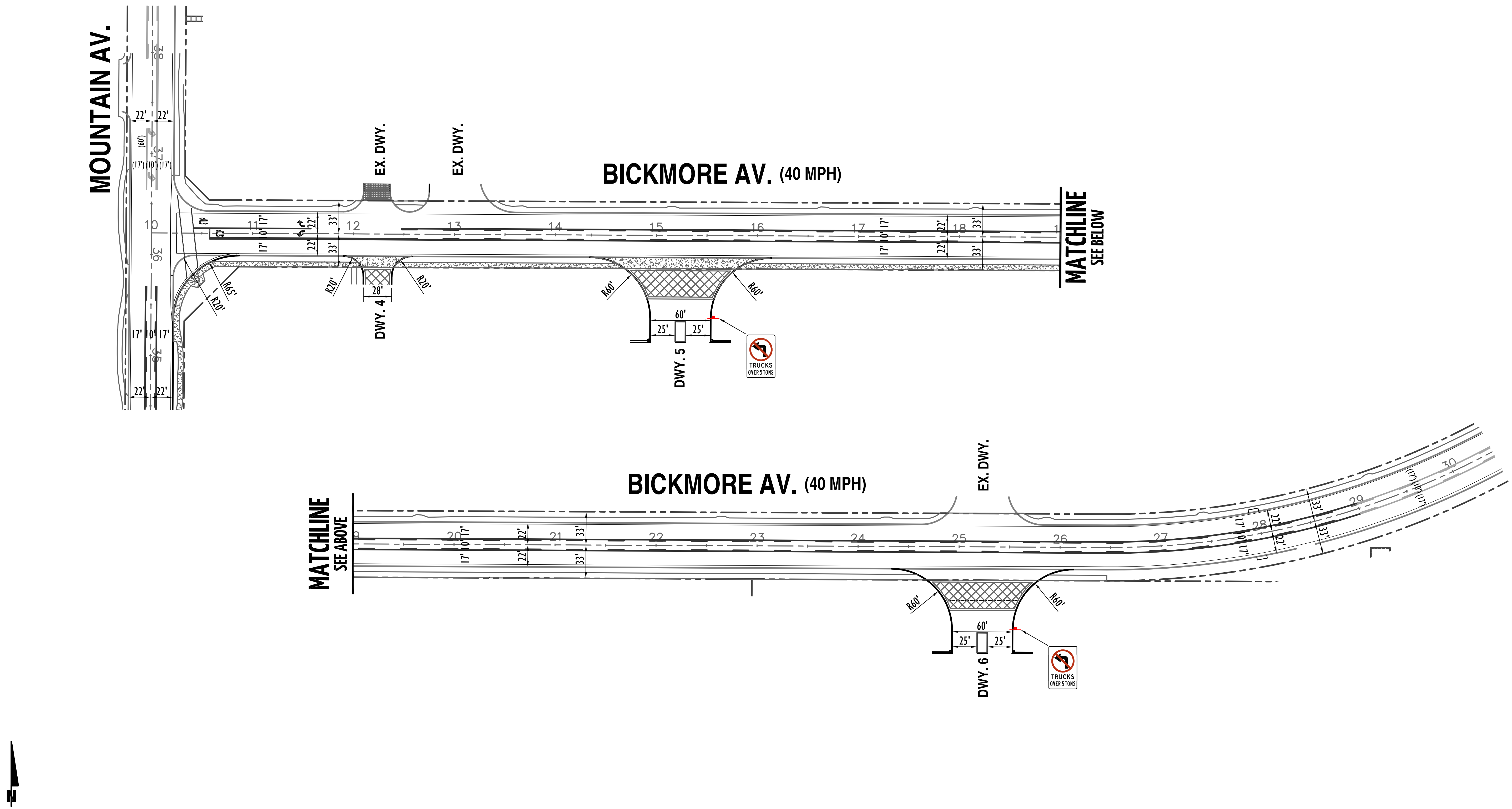

EXHIBIT 1-5 (2 OF 2): CONCEPT STRIPING PLAN

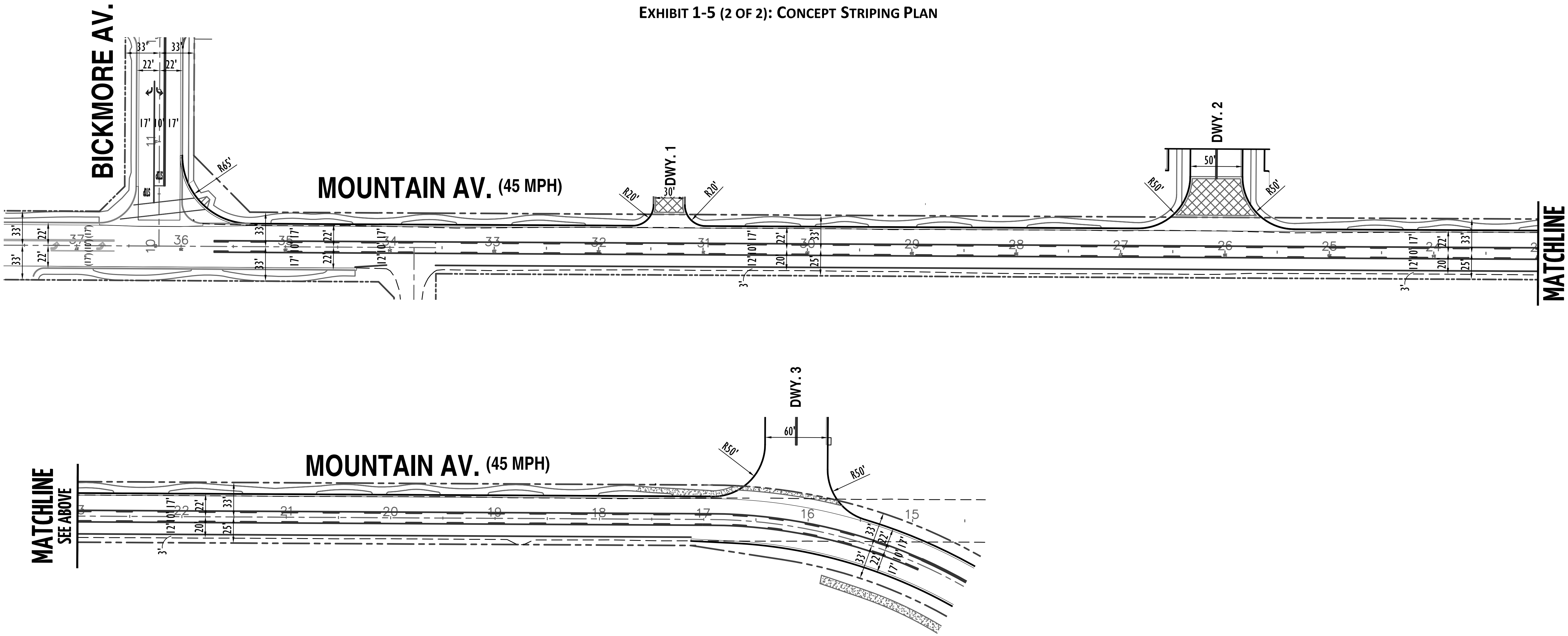

EXHIBIT 1-6 (1 OF 4): WB-67 TRUCK TURNING TEMPLATES

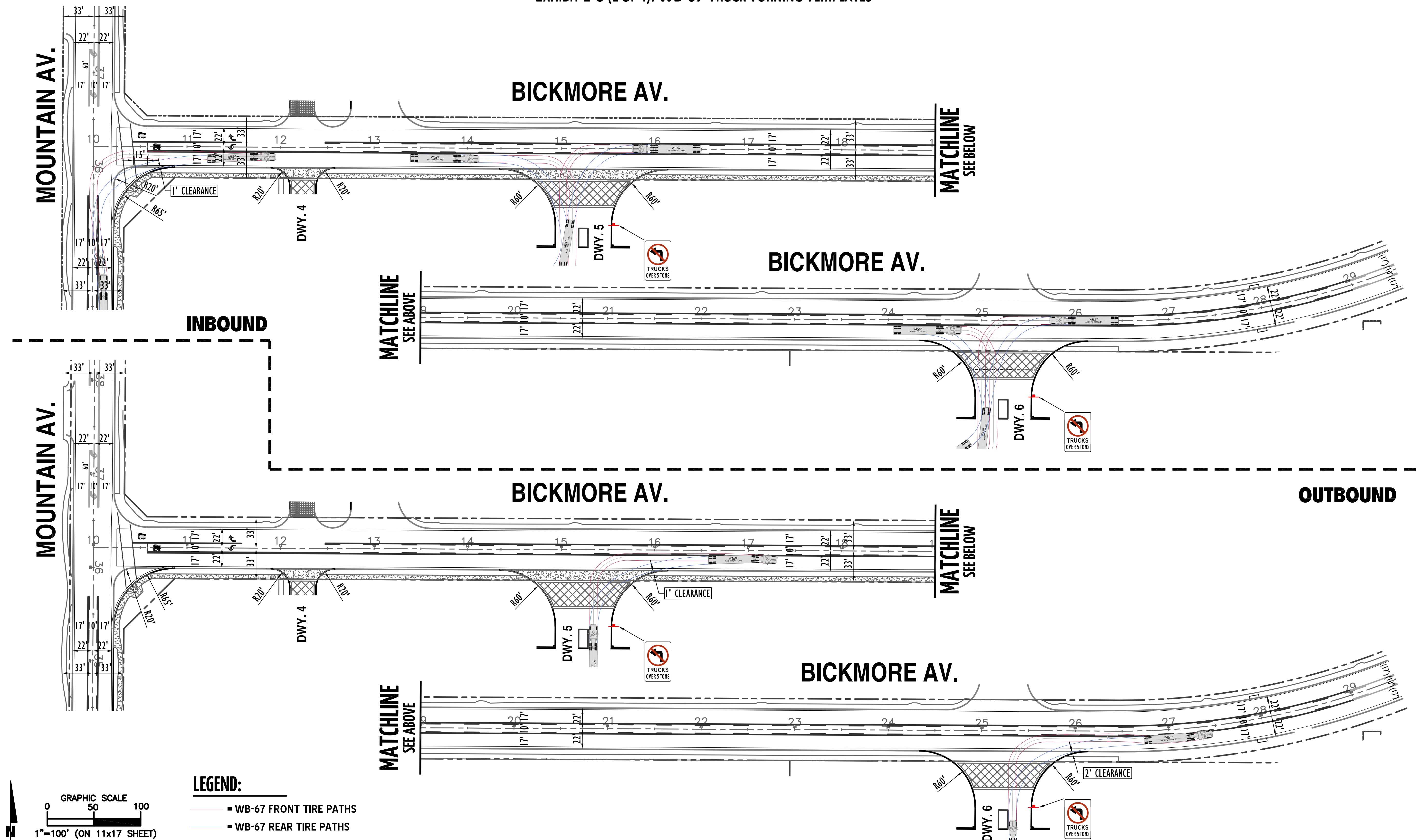

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EXHIBIT 1-6 (2 OF 4): WB-67 TRUCK TURNING TEMPLATES

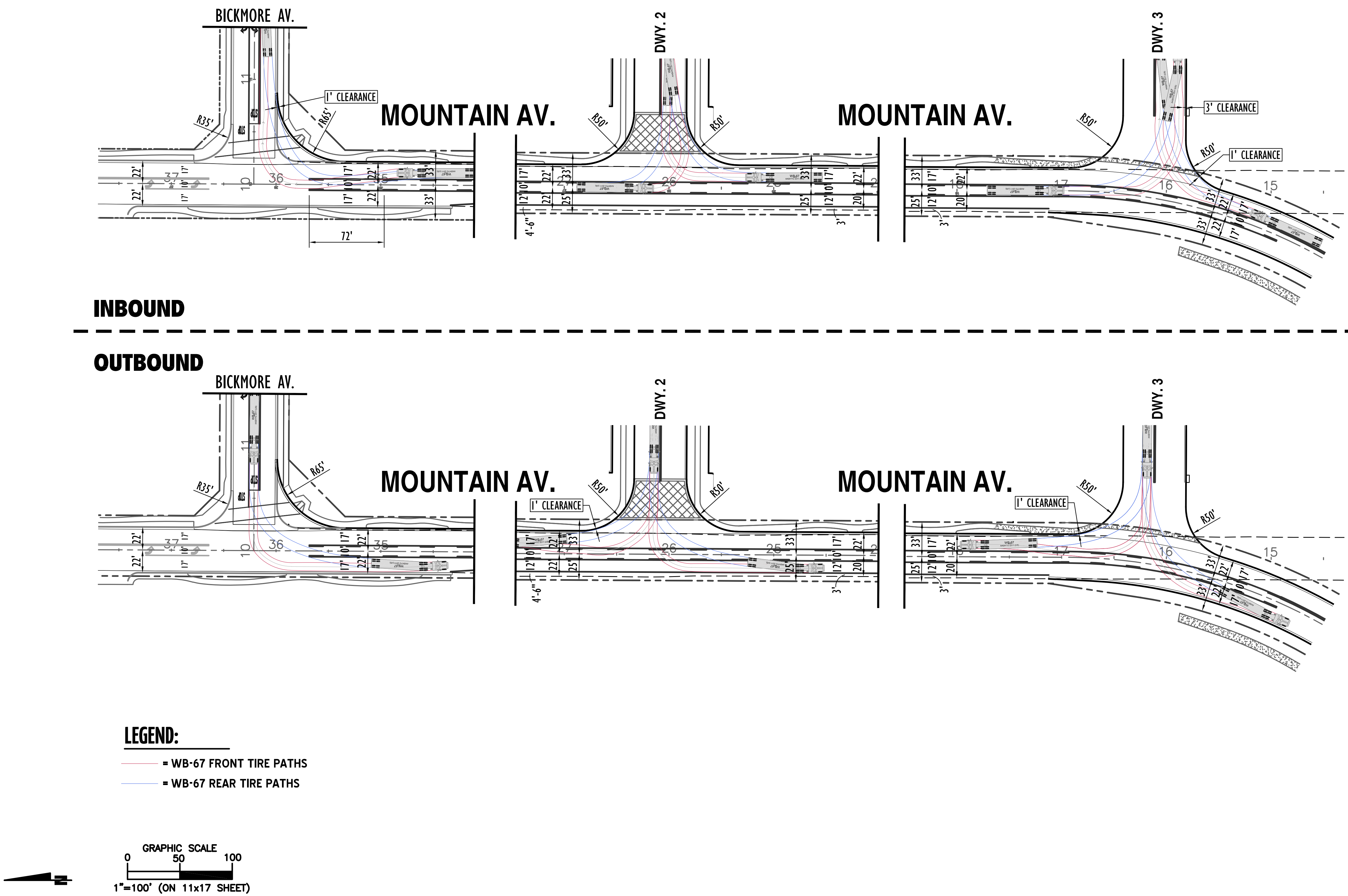
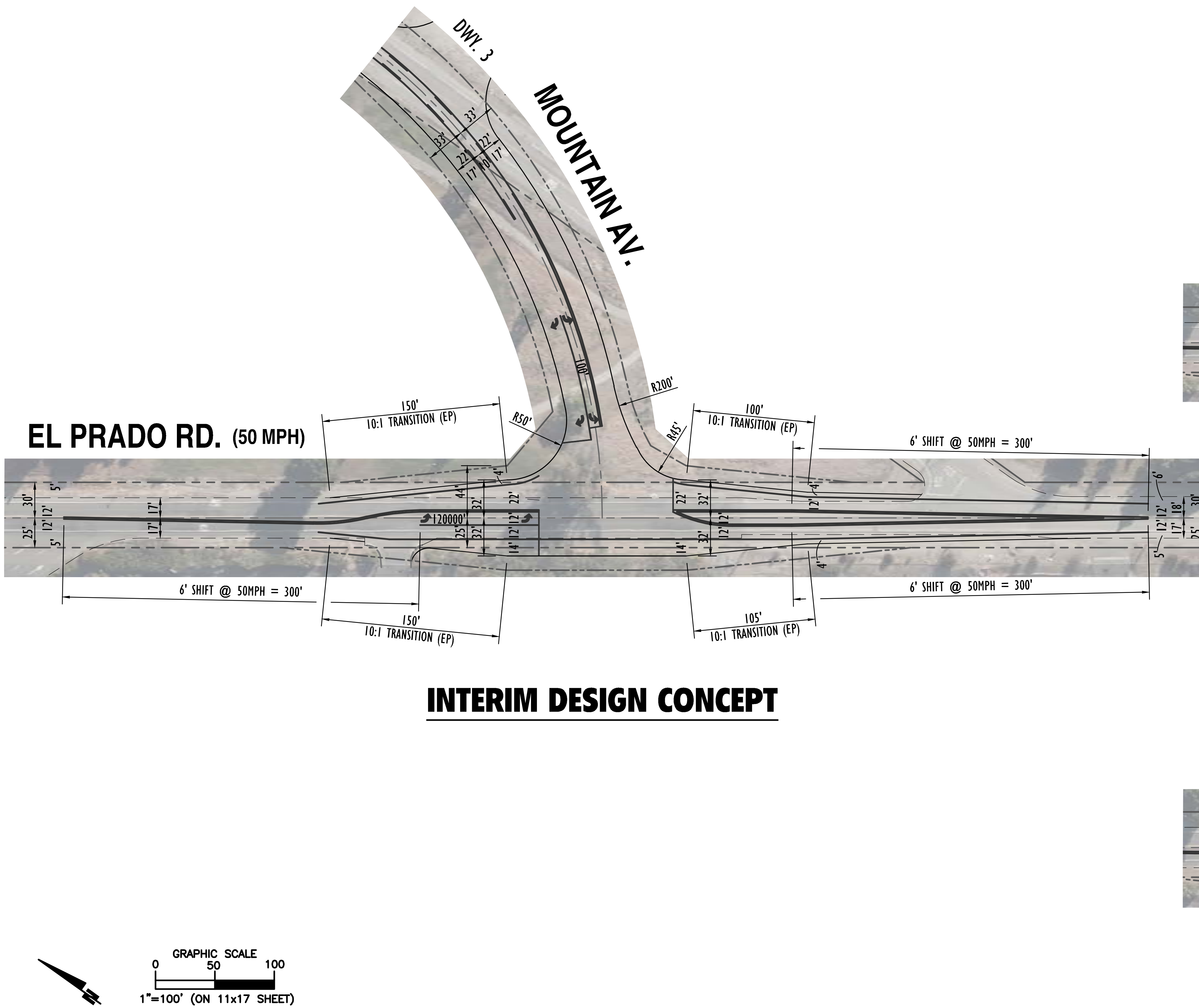
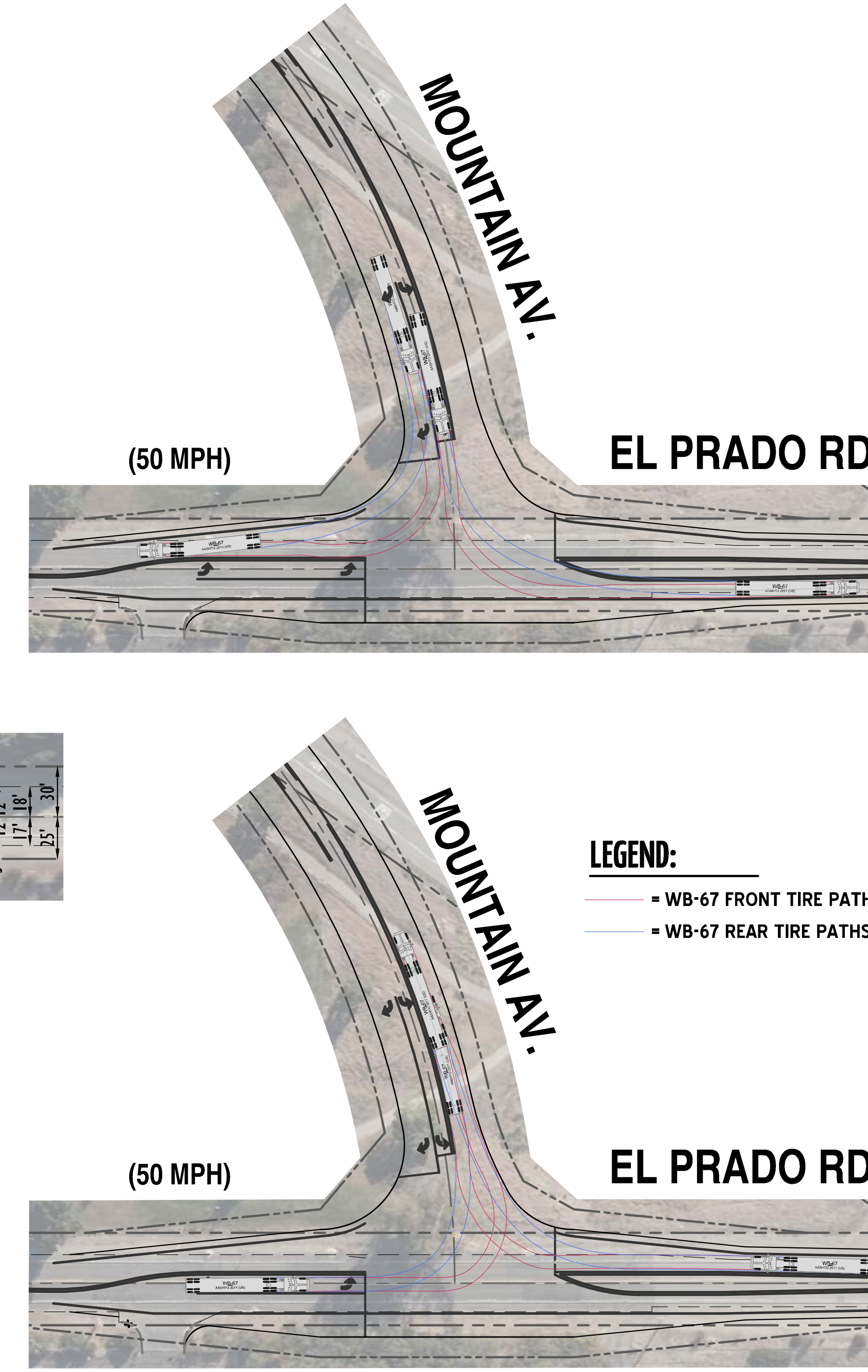


EXHIBIT 1-6 (3 OF 4): WB-67 TRUCK TURNING TEMPLATES
MOUNTAIN AVE. / EL PRADO RD. INTERIM CONFIGURATION

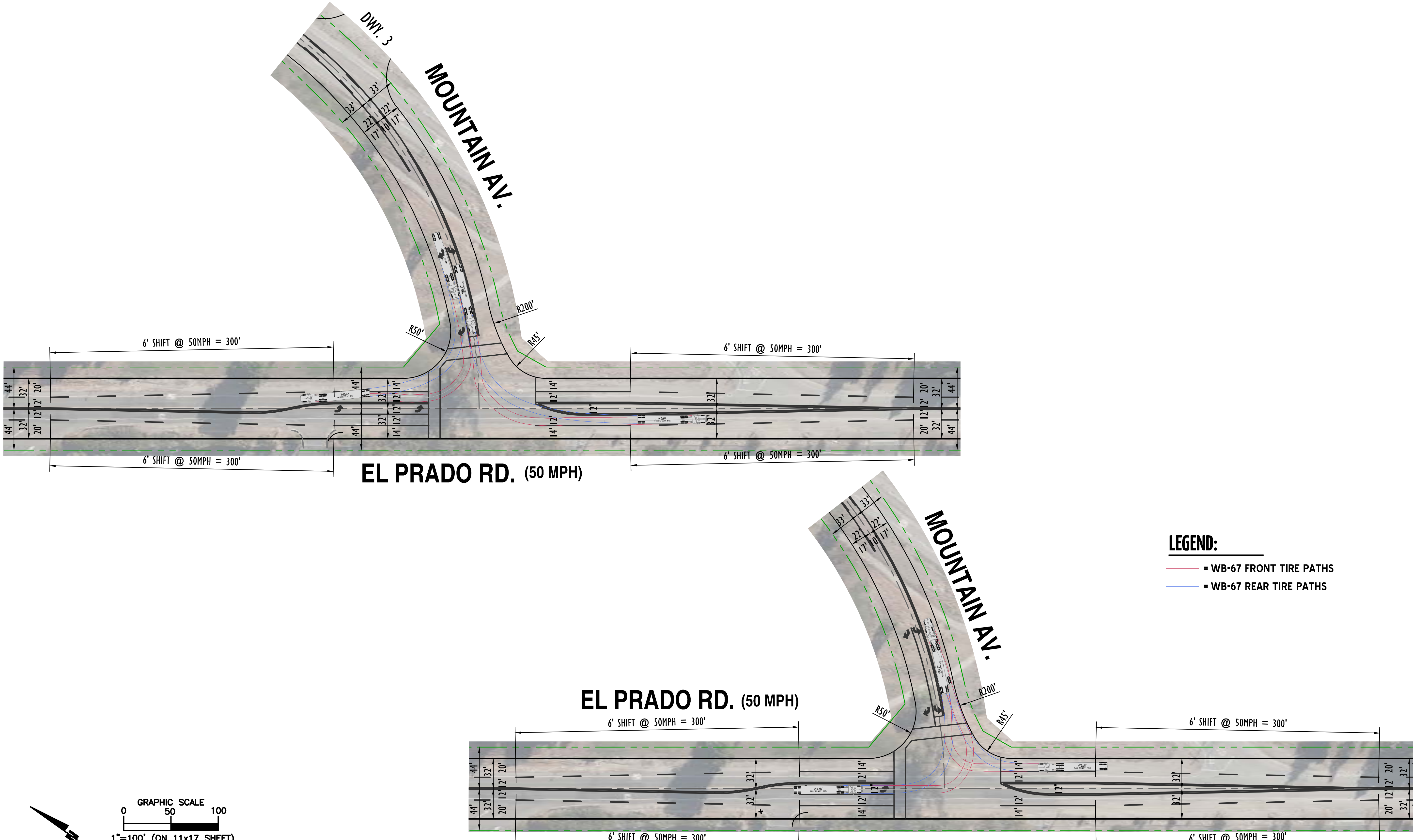


INTERIM DESIGN CONCEPT



TRUCK TURNS

EXHIBIT 1-6 (4 OF 4): WB-67 TRUCK TURNING TEMPLATES
MOUNTAIN AVE. / EL PRADO RD. ULTIMATE CONFIGURATION



2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are generally consistent with City of Chino traffic study guidelines.

2.1 LEVEL OF SERVICE

Traffic operations of roadway facilities are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on several factors such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The Highway Capacity Manual (HCM) (6th Edition) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (5) The HCM uses different procedures depending on the type of intersection control.

2.2.1 SIGNALIZED INTERSECTIONS

City of Chino, City of Ontario, City of Eastvale, City of Chino Hills

The City of Chino, City of Ontario, City of Eastvale, and City of Chino Hills require signalized intersection operations analysis based on the methodology described in the HCM. (5) Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is directly related to the average control delay per vehicle and is correlated to a LOS designation as described on Table 2-1.

TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Operations with very low delay occurring with favorable progression and/or short cycle length.	0 to 10.00	A	F
Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00	B	F

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.01 to 35.00	C	F
Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.01 to 55.00	D	F
Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.01 to 80.00	E	F
Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	80.01 and up	F	F

Source: HCM (6th Edition)

Consistent with Appendix B of the San Bernardino County CMP, the following saturation flow rates, in vehicles per hour green per lane (vphgpl), will be utilized in the traffic analysis for signalized intersections:

Existing and Opening Year Cumulative Traffic Conditions:

- Exclusive through: 1800 vphgpl
- Exclusive left: 1700 vphgpl
- Exclusive right: 1800 vphgpl
- Exclusive dual left: 1600 vphgpl
- Exclusive triple left: 1500 vphgpl

Horizon Year Traffic Conditions:

- Exclusive through: 1900 vphgpl
- Exclusive left: 1800 vphgpl
- Exclusive right: 1900 vphgpl
- Exclusive dual left: 1700 vphgpl
- Exclusive triple left: 1600 vphgpl

The traffic modeling and signal timing optimization software package Synchro (Version 10) has been utilized to analyze signalized intersections within the City of Chino, City of Ontario, City of Chino Hills, and City of Eastvale. Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

The peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15-minute volumes. Common practice for LOS analysis is to use a peak 15-minute rate of flow. However, flow rates are typically expressed in vehicles per hour. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g. PHF = [Hourly Volume] / [4 x Peak 15-minute Flow Rate]). The use of a 15-minute PHF produces a more detailed analysis as compared to analyzing vehicles per hour. Existing PHFs have been used for all analysis scenarios. Per the HCM, PHF values over 0.95 often are indicative of high traffic volumes with capacity constraints on peak hour flows while lower PHF values are indicative of greater variability of flow during the peak hour. (5)

California Department of Transportation (Caltrans)

Per the Caltrans Guide for the Preparation of Traffic Impact Studies, the traffic modeling and signal timing optimization software package Synchro (Version 10) has also been utilized to analyze signalized intersections under Caltrans' jurisdiction, which include interchange to arterial ramps (i.e. SR-60 Freeway ramps at Euclid Avenue (SR-83), SR-71 Freeway ramps at Central Avenue, SR-71 Freeway ramps at Pine Avenue, and SR-71 Freeway ramps at Euclid Avenue (SR-83)). (2) Signal timing for the freeway arterial-to-ramp intersections have been obtained from Caltrans District 8 and were utilized for the purposes of this analysis.

2.2.2 UNSIGNALIZED INTERSECTIONS

The City of Chino, City of Ontario, City of Eastvale, and City of Chino Hills require the operations of unsignalized intersections be evaluated using the methodology described in the HCM (6th Edition). (5) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2).

TABLE 2-2: UNSIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay Per Vehicle (Seconds)	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Little or no delays.	0 to 10.00	A	F
Short traffic delays.	10.01 to 15.00	B	F
Average traffic delays.	15.01 to 25.00	C	F
Long traffic delays.	25.01 to 35.00	D	F
Very long traffic delays.	35.01 to 50.00	E	F
Extreme traffic delays with intersection capacity exceeded.	> 50.00	F	F

Source: HCM (6th Edition)

At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. For all-way stop controlled intersections, LOS is computed for the intersection as a whole.

2.3 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term "signal warrants" refers to the list of established criteria used by Caltrans and other public agencies to quantitatively justify or ascertain the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TIA uses the signal warrant criteria presented in the latest edition of the Caltrans' California Manual on Uniform Traffic Control Devices (CA MUTCD), for all study area intersections. (6)

The signal warrant criteria for Existing study area intersections are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The CA MUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (6) Specifically, this TIA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing traffic conditions. Warrant 3 is appropriate to use for this TIA because it provides specialized warrant criteria for intersections with rural characteristics (e.g. located in communities with populations of less than 10,000 persons or with adjacent major streets operating above 40 miles per hour). For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection.

Future unsignalized intersections, that currently do not exist, have been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the Caltrans planning level ADT-based signal warrant analysis worksheets.

As shown on Table 2-3, traffic signal warrant analyses were performed for the following unsignalized study area intersections during the peak weekday conditions wherein the Project is anticipated to contribute the highest trips:

TABLE 2-3: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction
5	SR-71 NB Ramps & Pine Av. – 2040 Analysis Location Only	Chino Hills, Caltrans
10	Mountain Av. & Bickmore Av.	Chino
11	Mountain Av. & Driveway 1 – Future Intersection	Chino
12	Mountain Av. & Driveway 2 – Future Intersection	Chino
13	Mountain Av. & Driveway 3 – Future Intersection	Chino
14	El Prado Rd. & Mountain Av.	Chino
15	El Prado Rd. & Pine Av.	Chino
16	Driveway 4 & Bickmore Avenue – Future Intersection	Chino
17	Driveway 5 & Bickmore Avenue – Future Intersection	Chino
18	Driveway 6 & Bickmore Avenue – Future Intersection	Chino
32	Rincon Meadows Av. & Pine Av.	Chino
38	Flight Av. & Kimball Av. – 2040 Analysis Location Only	Chino

The Existing conditions traffic signal warrant analysis is presented in the subsequent section, Section 3 *Area Conditions* of this report. The traffic signal warrant analyses for future conditions are presented in Section 6 *E+P Traffic Analysis,* Section 7 *Opening Year Cumulative (2022) Traffic Analysis,* and Section 8 *Horizon Year (2040) Traffic Analysis* of this report.

It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

2.4 FREEWAY OFF-RAMP QUEUING ANALYSIS

The study area for this TIA includes the freeway-to-arterial interchanges of the SR-71 Freeway at Central Avenue, SR-71 Freeway at Pine Avenue, SR-71 Freeway at Euclid Avenue (SR-83) off-ramps, and SR-60 Freeway at Euclid Avenue (SR-83) off-ramps. Consistent with Caltrans requirements, the 95th percentile queuing of vehicles has been assessed at the off-ramps to determine potential queuing impacts at the freeway ramp intersections on Central Avenue, Pine Avenue, and Euclid Avenue (SR-83). Specifically, the queuing analysis is utilized to identify any potential queuing and "spill back" onto the SR-71 Freeway or SR-60 Freeway mainline from the off-ramps.

The traffic progression analysis tool and HCM intersection analysis program, Synchro, has been used to assess the potential impacts/needs of the intersections with traffic added from the proposed Project. Storage (turn-pocket) length recommendations at the ramps have been based upon the 95th percentile queue resulting from the Synchro progression analysis. There are two footnotes which appear on the Synchro outputs. One footnote indicates if the 95th percentile cycle exceeds capacity. Traffic is simulated for two complete cycles of the 95th percentile traffic in Synchro in order to account for the effects of spillover between cycles. In practice, the 95th percentile queue shown will rarely be exceeded and the queues shown with the footnote are acceptable for the design of storage bays. The other footnote indicates whether or not the volume for the 95th percentile queue is metered by an upstream signal. In many cases, the 95th percentile queue will not be experienced and may potentially be less than the 50th percentile queue due to upstream metering. If the upstream intersection is at or near capacity, the 50th percentile queue represents the maximum queue experienced.

A vehicle is considered queued whenever it is traveling at less than 10 feet/second. A vehicle will only become queued when it is either at the stop bar or behind another queued vehicle. Although only the 95th percentile queue has been reported in the tables, the 50th percentile queue can be found in the appendix alongside the 95th percentile queue for each ramp location. The 50th percentile maximum queue is the maximum back of queue on a typical cycle during the peak hour, while the 95th percentile queue is the maximum back of queue with 95th percentile traffic volumes during the peak hour. The queue length reported is for the lane with the highest queue in the lane group. The 50th percentile or average queue represents the typical queue length for peak hour traffic conditions, while the 95th percentile queue is derived from the average queue plus 1.65 standard deviations. The 95th percentile queue is not necessarily ever observed it is simply based on statistical calculations.

2.5 FREEWAY MAINLINE SEGMENT ANALYSIS METHODOLOGY

Consistent with recent Caltrans guidance and because impacts to freeway segments dissipate with distance from the point of SHS entry, quantitative study of freeway segments beyond those immediately adjacent to the point of entry is not required. The traffic study has conservatively evaluated the freeway segments along the SR-71 Freeway and SR-60 Freeway although the Project is anticipated to contribute less than 50 one-way peak hour trips (or 100 two-way peak hour trips), with the exception of the SR-71 Freeway Northbound, north of Central Avenue during the PM peak hour where the Project is anticipated to contribute 50 one-way peak hour trips.

The freeway system in the study area has been broken into segments defined by the freeway-to-arterial interchange locations. The freeway segments have been evaluated in this TIA based upon peak hour directional volumes. The freeway segment analysis is based on the methodology described in the HCM and performed using HCS7 (Highway Capacity Software, HCM 6th Edition). The performance measure preferred by Caltrans to calculate LOS is density. Density is expressed in terms of passenger cars per mile per lane. Table 2-4 illustrates the freeway segment LOS descriptions for each density range utilized for this analysis.

The number of lanes for existing baseline conditions has been obtained from field observations conducted by Urban Crossroads in March 2019. These existing freeway geometrics have been utilized for Existing, E+P, Opening Year Cumulative Without and With Project, and Horizon Year Without and With Project conditions.

The SR-71 Freeway and SR-60 Freeway mainline volume data were obtained from the Caltrans Performance Measurement System (PeMS) website for the segments of the SR-71 Freeway north of Central Avenue and SR-60 Freeway west of Euclid Avenue (SR-83). The data was obtained from January 2019. In an effort to conduct a conservative analysis, the maximum value observed within the three-day period was utilized for the weekday morning (AM) and weekday evening (PM) peak hours. In addition, truck traffic, represented as a percentage of total traffic, has been utilized for the purposes of this analysis in an effort to not overstate traffic volumes and peak hour deficiencies. As such, actual vehicles (as opposed to passenger-car-equivalent volumes) have been utilized for the purposes of the basic freeway segment analysis. (7)

TABLE 2-4: DESCRIPTION OF FREEWAY MAINLINE LOS

Level of Service	Description	Density Range (pc/mi/ln)[1]
A	Free-flow operations in which vehicles are relatively unimpeded in their ability to maneuver within the traffic stream. Effects of incidents are easily absorbed.	0.0 – 11.0
B	Relative free-flow operations in which vehicle maneuvers within the traffic stream are slightly restricted. Effects of minor incidents are easily absorbed.	11.1 – 18.0
C	Travel is still at relative free-flow speeds, but freedom to maneuver within the traffic stream is noticeably restricted. Minor incidents may be absorbed, but local deterioration in service will be substantial. Queues begin to form behind significant blockages.	18.1 – 26.0
D	Speeds begin to decline slightly and flows, and densities begin to increase more quickly. Freedom to maneuver is noticeably limited. Minor incidents can be expected to create queuing as the traffic stream has little space to absorb disruptions.	26.1 – 35.0
E	Operation at capacity. Vehicles are closely spaced with little room to maneuver. Any disruption in the traffic stream can establish a disruption wave that propagates throughout the upstream traffic flow. Any incident can be expected to produce a serious disruption in traffic flow and extensive queuing.	35.1 – 45.0
F	Breakdown in vehicle flow.	>45.0

[1] pc/mi/ln = passenger cars per mile per lane. Source: HCM (6th Edition)

2.6 FREEWAY MERGE/DIVERGE RAMP JUNCTION ANALYSIS

The freeway system in the study area has been broken into segments defined by freeway-to-arterial interchange locations resulting in two existing on and off ramp locations. Although the HCM indicates the influence area for a merge/diverge junction is 1,500 feet, the analysis presented in this traffic study has been performed at all ramp locations with respect to the nearest on or off ramp at each interchange in an effort to be consistent with Caltrans guidance/comments on other projects Urban Crossroads has worked on in the region.

The merge/diverge analysis is based on the HCM Ramps and Ramp Junctions analysis method and performed using HCS7 software. The measure of effectiveness (reported in passenger car/mile/lane) are calculated based on the existing number of travel lanes, number of lanes at the on and off ramps both at the analysis junction and at upstream and downstream locations (if applicable) and acceleration/deceleration lengths at each merge/diverge point. Table 2-5 presents the merge/diverge area level of service descriptions for each density range utilized for this analysis.

Similar to the basic freeway segment analysis, the SR-71 and SR-60 Freeway mainline volume data were obtained from the Caltrans PeMS website for the segments of the SR-71 Freeway north of Central Avenue and SR-60 Freeway west of Euclid Avenue (SR-83). The ramp data (per the count data presented in Appendix 3.1) were then utilized to flow conserve the mainline volumes to determine the remaining SR-71 and SR-60 Freeway mainline segment volumes. Flow conservation checks ensure that traffic flows from east to west and north to south (and vice versa) of the interchange area with no unexplained loss of vehicles. The data was obtained from January 2019. In an effort to conduct a conservative analysis, the maximum value observed within the three-day period was utilized for the weekday morning (AM) and weekday evening

(PM) peak hours. In addition, truck traffic, represented as a percentage of total traffic, has been utilized for the purposes of this analysis in an effort to not overstate traffic volumes and peak hour deficiencies. (7) As such, actual vehicles (as opposed to passenger-car-equivalent volumes) have been utilized for the purposes of the freeway ramp junction (merge/diverge) analysis.

TABLE 2-5: DESCRIPTION OF FREEWAY MERGE AND DIVERGE LOS

Level of Service	Density Range (pc/mi/ln)[1]
A	≤10.0
B	10.0 – 20.0
C	20.0 – 28.0
D	28.0 – 35.0
E	>35.0
F	Demand Exceeds Capacity

[1] pc/mi/ln = passenger cars per mile per lane. Source: HCM (6th Edition)

2.7 MINIMUM ACCEPTABLE LEVELS OF SERVICE (LOS) AND INTERSECTION DEFICIENCY CRITERIA

Minimum Acceptable LOS and associated definitions of intersection deficiencies has been obtained from each of the applicable surrounding jurisdictions.

2.7.1 CITY OF CHINO

According to the City of Chino, LOS D is the minimum acceptable condition that should be maintained during the peak commute hours, where feasible. Therefore, any intersection operating at LOS E or F is considered deficient. A higher LOS standard of LOS C has been applied to the Project driveways.

2.7.2 CITY OF ONTARIO

The City of Ontario utilizes a minimum acceptable LOS of LOS E, where feasible.

2.7.3 CITY OF EASTVALE

The City of Eastvale General Plan Policy C-10 sets a standard of LOS C with LOS D as acceptable in commercial and employment areas and at intersections of any combination of major highways, urban arterials, secondary highways, or freeway ramps. Based on this criterion, where feasible, LOS D is the minimum acceptable LOS at each of the study intersections within the City of Eastvale.

2.7.4 CITY OF CHINO HILLS

The Traffic Impact Study Guidelines for Development Projects in the City of Chino Hills (dated October 15, 2001) indicates LOS D shall be the minimum acceptable LOS to be used for all City of Chino Hills roadways and intersections. Therefore, any intersection operating at LOS E or LOS F will be considered deficient.

2.7.5 CMP

The CMP definition of deficiency is based on maintaining a level of service standard of LOS E or better, where feasible, except where an existing LOS F condition is identified in the CMP document. However, in an effort to overstate as opposed to understate potential impacts, LOS D has been utilized for the CMP intersections for the purposes of this analysis, unless the intersection is located in the City of Ontario (which uses LOS E).

2.7.6 CALTRANS

Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D on SHS facilities, however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. If an existing State highway facility is operating at less than this target LOS, the existing LOS should be maintained. In general, the region-wide goal for an acceptable LOS on all freeways and intersections is LOS D. Consistent with the City of Chino LOS threshold of LOS D and in excess of the City of Ontario stated LOS threshold of LOS E, LOS D will be used as the target LOS for freeway ramps, freeway segments, and freeway merge/diverge ramp junctions.

2.8 THRESHOLDS OF SIGNIFICANCE

This section outlines the methodology used in this analysis related to identifying circulation system deficiencies.

2.8.1 INTERSECTIONS

To determine whether the addition of project traffic (as defined through the comparison of Existing traffic conditions to E+P traffic conditions) at a study intersection would result in a project-specific traffic impact, the following will be utilized:

- When the pre-Project condition is at or better than LOS D (or LOS E for CMP intersections and intersections located in the City of Ontario) (i.e., acceptable LOS), and project-generated traffic, as measured by 50 or more peak hour trips, causes deterioration below LOS D/LOS E (i.e., unacceptable LOS), a deficiency is deemed to occur.

However, when the pre-Project condition is already below LOS D/LOS E (i.e., unacceptable LOS), the Project will be responsible for mitigating its impact to a level of service equal to or better than it was without the Project for intersections that receive 50 or more peak hour project-related trips. This is a standard protocol in many urban jurisdictions because to require a Project to mitigate to LOS D/LOS E or better would in effect force the Project to mitigate beyond its Project impacts, which is prohibited under California law. Thus, for intersections currently operating at unacceptable LOS during either the AM and/or PM peak hour under Existing traffic conditions, improvements have been identified to mitigate the impacts of the Project to an intersection LOS that is equal to or better than pre-Project conditions (see Table 2-6).

Cumulative traffic impacts are created as a result of a combination of the proposed Project together with other future developments contributing to the overall traffic impacts requiring additional improvements to maintain acceptable level of service operations with or without the

Project. A Project's contribution to a significant cumulative impact can be reduced to less than significant if the Project is required to implement or fund its fair share of improvements designed to alleviate its cumulatively considerable contribution to the impact. Cumulatively considerable is defined as the addition of 50 or more peak hour trips, and all facilities that would receive 50 or more peak hour trips from the Project are evaluated in this report.

In the event that an intersection is operating at or is forecast to operate at a deficient LOS, the CMP guidelines have defined a series of steps to be completed to determine the Project's contribution to the deficiency of intersections, which has been applied to both CMP and non-CMP study area intersections. The steps are as follows:

- Determine the mitigation measures necessary to achieve an acceptable service level,
- Calculate the Project's share in the future traffic volume projections for the peak hours,
- Estimate the cost to implement recommended mitigation measures, and
- Calculate the Project's fair-share contribution to mitigate the Project's traffic impacts

TABLE 2-6: THRESHOLD OF SIGNIFICANCE

Pre-Project Level of Service	Level of Service with 50 or more Project trips	Significant Impact?	Mitigation Required?
City of Chino, City of Eastvale, City of Chino Hills, City of Jurupa Valley, CMP			
A	A-D	No	No
B	B-D	No	No
C	C-D	No	No
D	D	No	No
A-D	E or F	Yes	Yes, bring LOS to D or better
E	E	Yes	Yes, bring LOS to D or better
E	F	Yes	Yes, bring LOS to D or better
F	F	Yes	Yes, bring LOS to D or better
City of Ontario, CMP (in Ontario)			
A	A-D	No	No
B	B-D	No	No
C	C-D	No	No
D	D-E	No	No
E	E	No	No
A-E	F	Yes	Yes, bring LOS to E or better
F	F	Yes	Yes, bring LOS to E or better

2.8.2 CALTRANS FACILITIES

To determine whether the addition of project traffic to the SHS freeway segments would result in a deficiency, the following will be utilized:

- The traffic study finds that the LOS of a segment will degrade from D or better to E or F.
- The traffic study finds that the project will exacerbate an already deficient condition by contributing 50 or more one-way peak hour trips. A segment that is operating at or near capacity is deemed to be deficient.

2.9 PROJECT FAIR SHARE CALCULATION METHODOLOGY

In cases where this TIA identifies that the Project would contribute additional traffic volumes to cumulative traffic deficiencies, Project fair share costs of improvements necessary to address deficiencies have been identified. The Project's fair share cost of improvements is determined based on the following equation, which is the ratio of Project traffic to new traffic, and new traffic is total future (Horizon Year) traffic less existing baseline traffic:

Project Fair Share % = Project (2040) AM/PM Traffic / (2040 With Project AM/PM Total Traffic – Existing AM/PM Traffic)

The project fair share percentage has been calculated for both the AM peak hour and PM peak hour and the highest of the two has been selected. The Project fair share contribution calculations are presented in Section 9 *Local and Regional Funding Mechanisms* of this TIA. The cost of implementing the improvements shown on Table 1-3 have been estimated based on the preliminary construction cost estimates found in Appendix G of the San Bernardino County CMP in conjunction with a total cost escalation factor of 1.484 to more closely approximate current (2019) costs. These cost estimates have been utilized in conjunction with the Project fair share percentages to determine the Project's fair share cost of the recommended cumulative improvements (see Table 9-2). These estimates are a rough order of magnitude only as they are intended only for discussion purposes and do not imply any legal responsibility or formula for contributions or mitigation.

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3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of Chino General Plan Circulation Network, and a review of existing peak hour intersection operations, freeway mainline operations, and traffic signal warrant analyses.

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the agreement with City of Chino staff (Appendix 1.1), the study area includes a total of 43 existing and future intersections as shown previously on Exhibit 1-2. Exhibit 3-1 illustrates the study area intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

3.2 CITY OF CHINO GENERAL PLAN CIRCULATION ELEMENT

As noted previously, the Project site is located within the City of Chino. The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on the City of Chino General Plan Circulation Element, are described subsequently. Exhibit 3-2 shows the City of Chino General Plan Circulation Element and Exhibit 3-3 illustrates the City of Chino General Plan roadway cross-sections. The two streets adjacent to the Project (Merrill Avenue and Flight Avenue) have been identified in **bold** text.

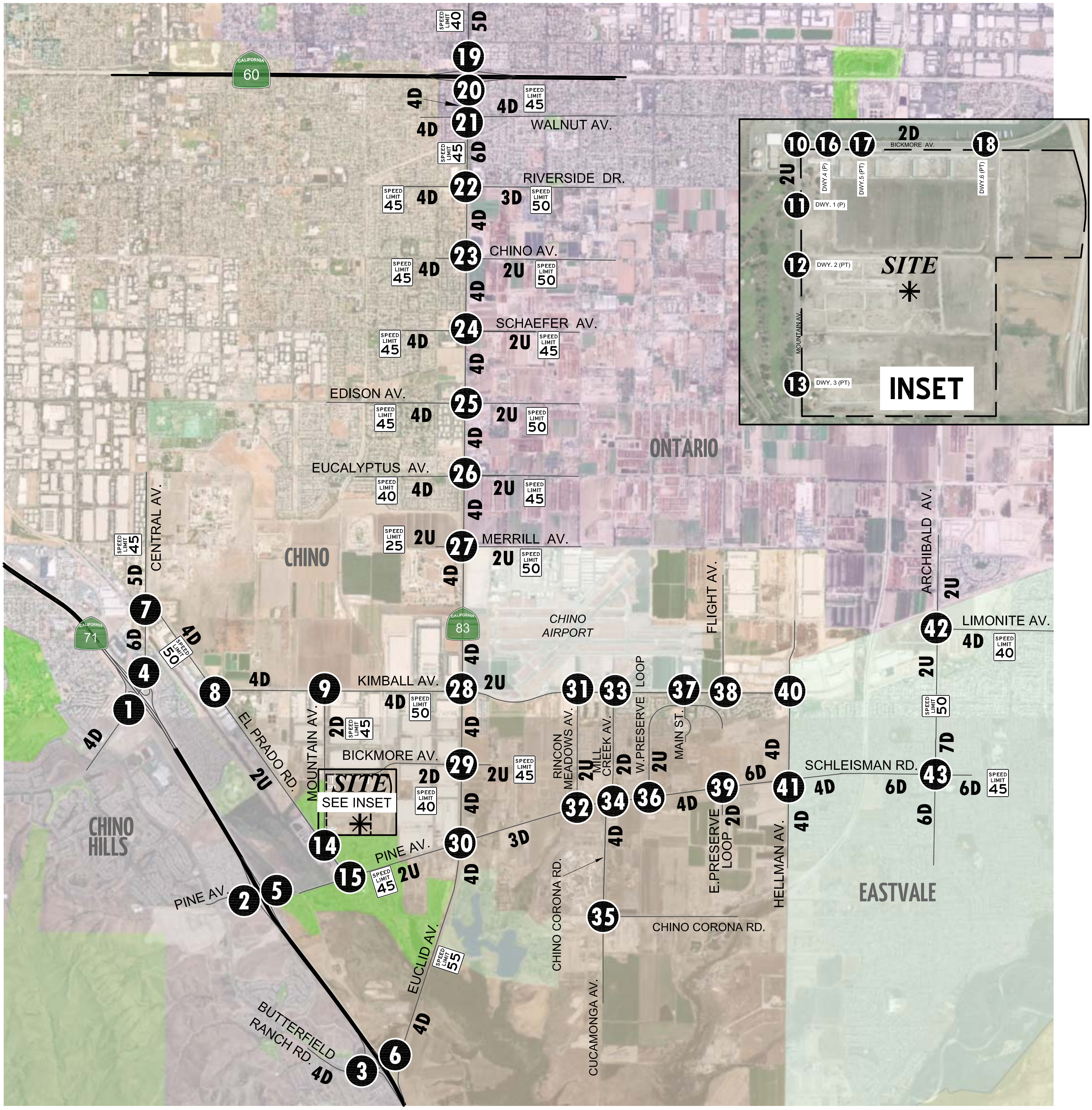
The study area roadway that is classified as an Expressway is identified as having a 142-foot right-of-way and 104-foot curb-to-curb measurement. Expressways include four lanes of travel in each direction and a 64-foot curbed and/or landscaped median. The following study area roadway within the City of Chino is classified as an Expressway:

- Euclid Avenue (SR-83) from SR-71 Freeway to Riverside Drive

The study area roadway that is classified as a Major Arterial is identified as having a 120-foot right-of-way and 100-foot curb-to-curb measurement. Major Arterials include three lanes of travel in each direction and a 14-foot curbed and/or landscaped median. The following study area roadway within the City of Chino is classified as a Major Arterial:

- Central Avenue from the City Limit to Phillips Boulevard
- Riverside Drive from Reservoir Street to Fern Avenue
- Edison Avenue from the City Limit to Euclid Avenue (SR-83)
- Pine Avenue from Euclid Avenue (SR-83) to Hellman Avenue

EXHIBIT 3-1 (1OF3): EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS



LEGEND:

- 4 = NUMBER OF LANES
- D = DIVIDED
- U = UNDIVIDED
- SPEED LIMIT 25 = SPEED LIMIT (MPH)

N

EXHIBIT 3-1 (2OF3): EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS

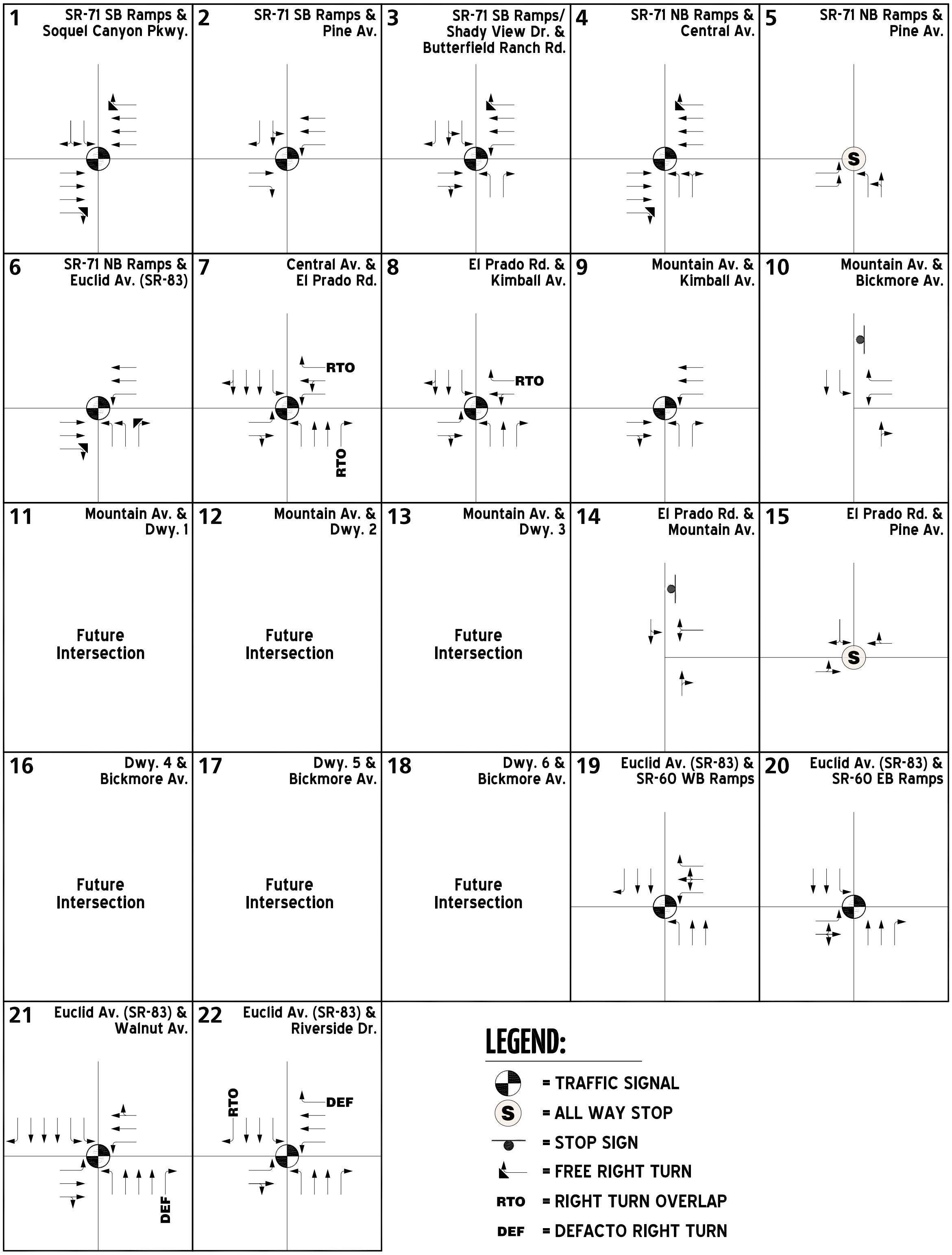


EXHIBIT 3-1 (3OF3): EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS

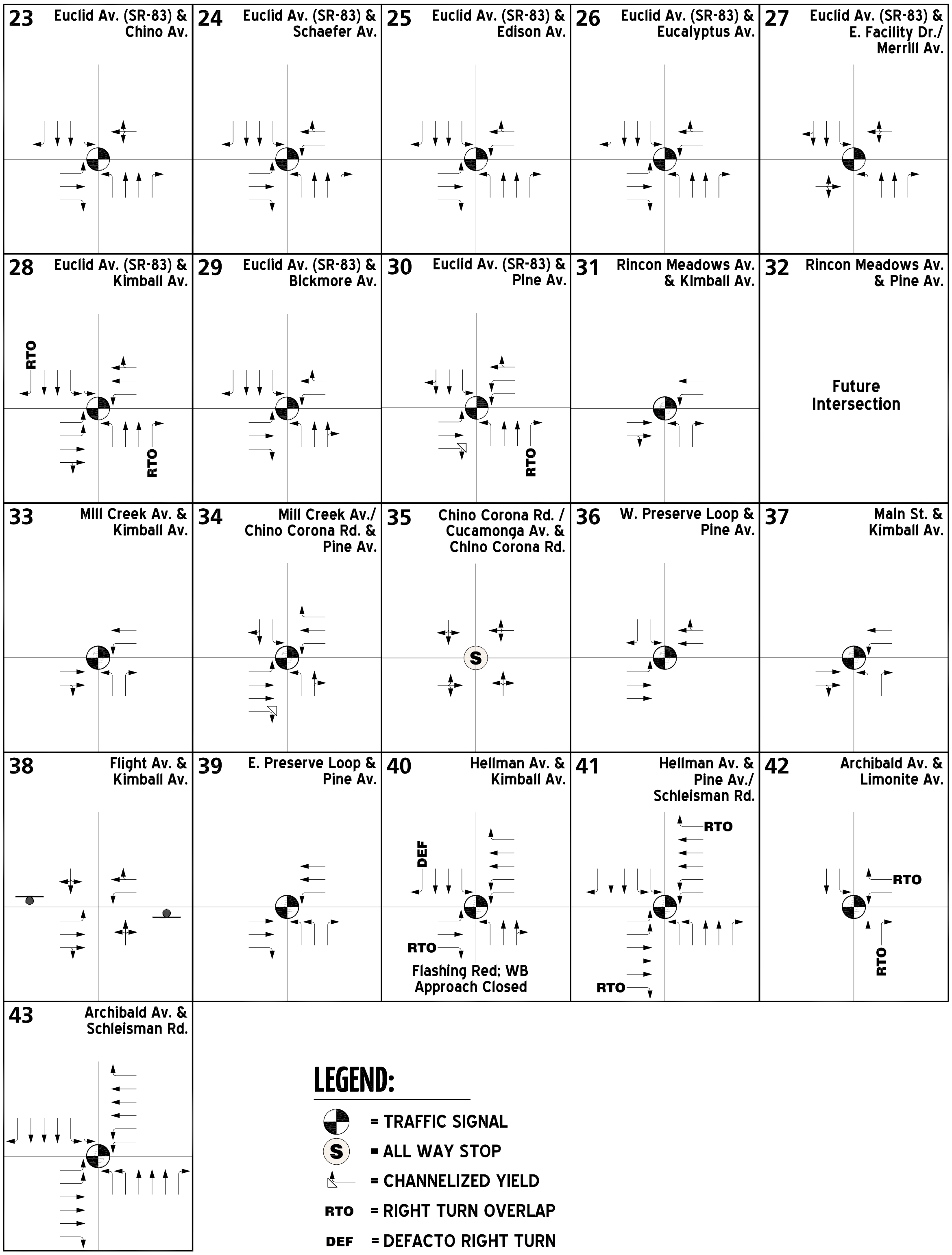


EXHIBIT 3-2: CITY OF CHINO GENERAL PLAN CIRCULATION ELEMENT

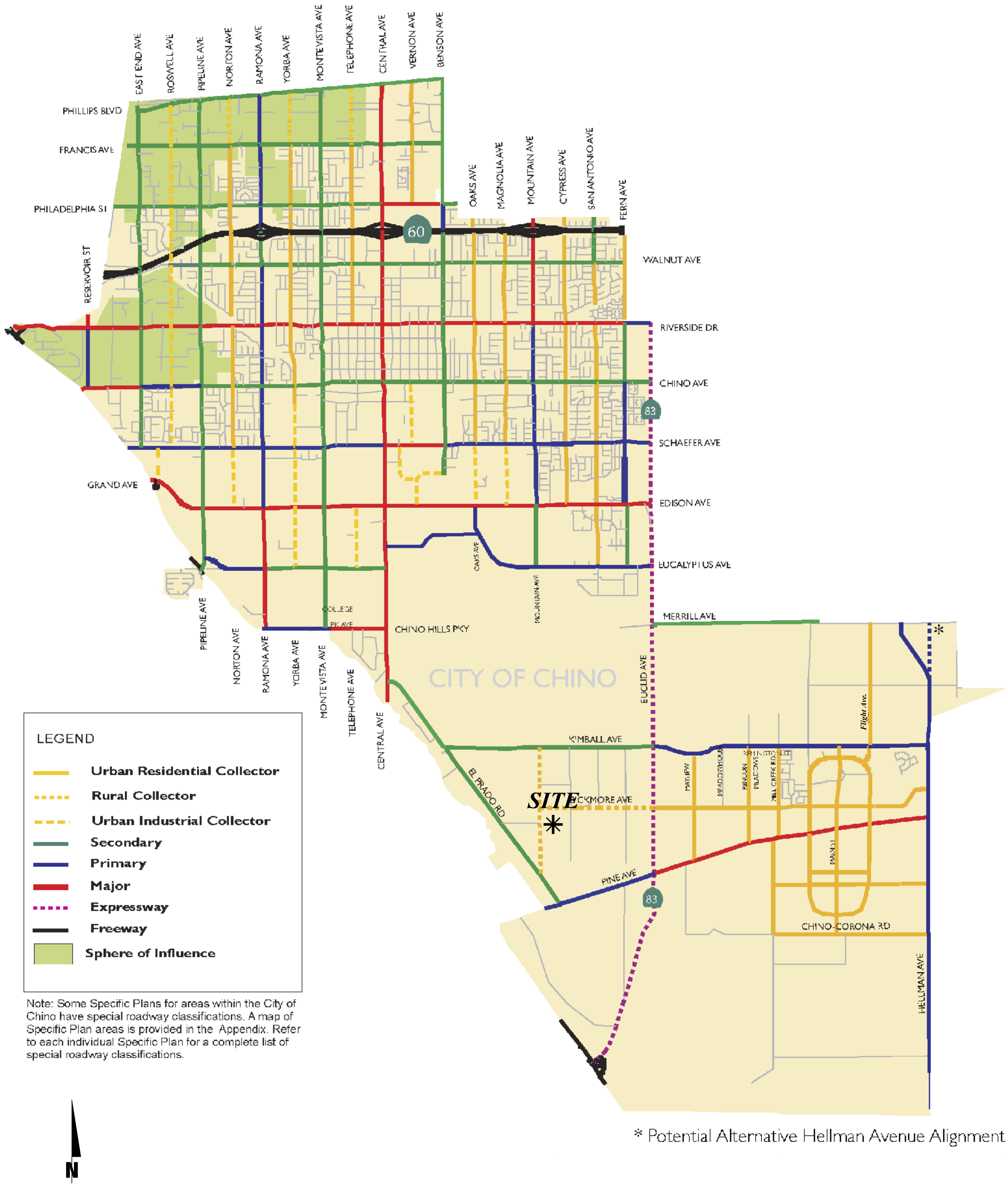
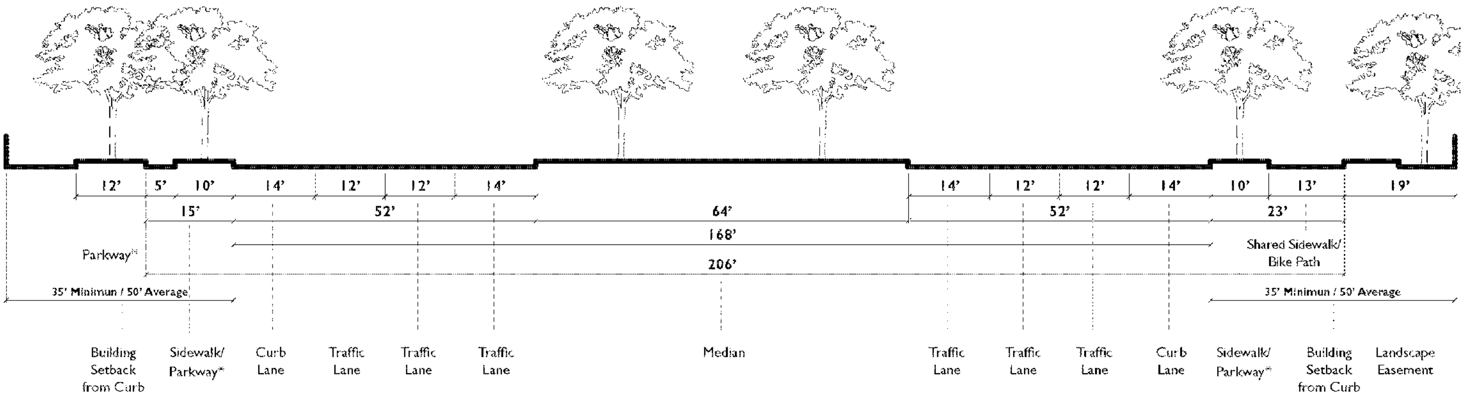
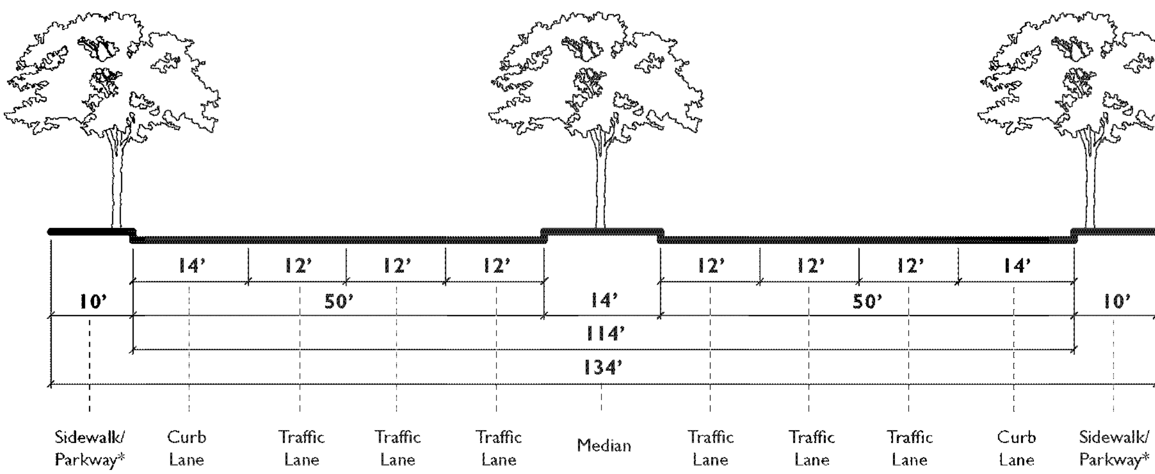


EXHIBIT 3-3 (1 of 2): CITY OF CHINO GENERAL PLAN ROADWAY CROSS-SECTIONS

Major Arterial (Expressway): Typical 8 Lane
Provides 8 traffic lanes and a wide median without parking



Major Arterial: Minimum 8 Lane
Provides 8 traffic lanes and 2 bicycle lanes separated by a median without parking



Major Arterial: Minimum 6 Lane
Provides 6 traffic lanes and 2 bicycle lanes separated by a median without parking

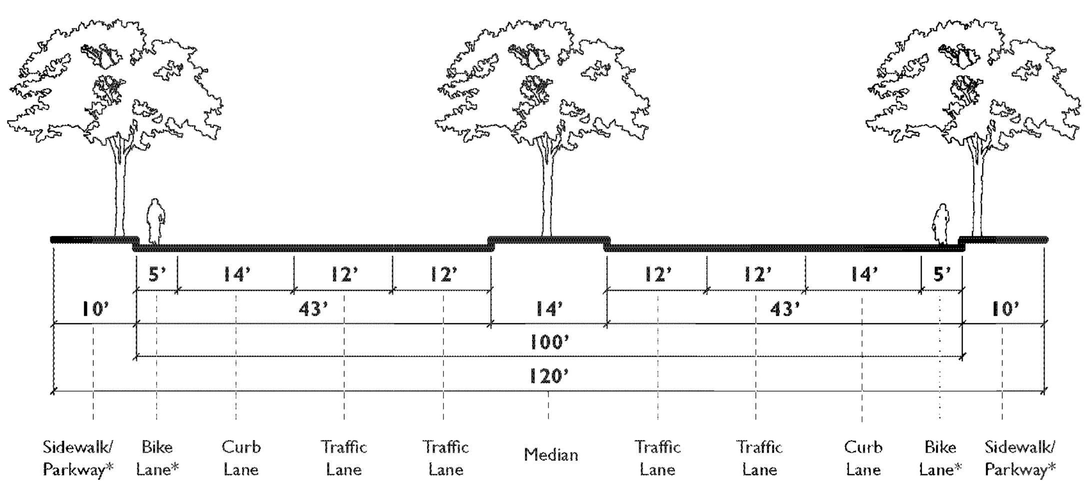
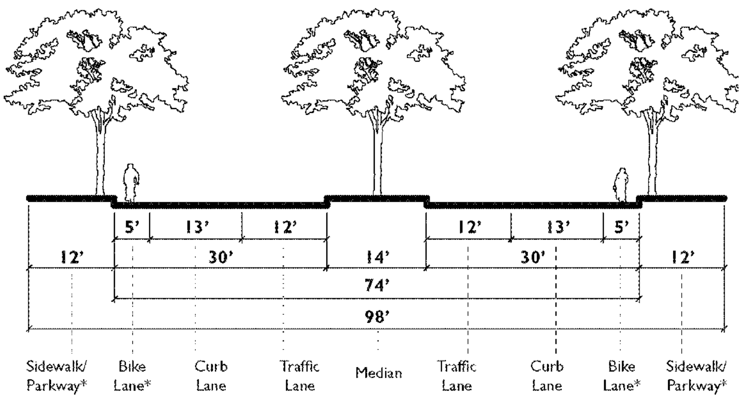
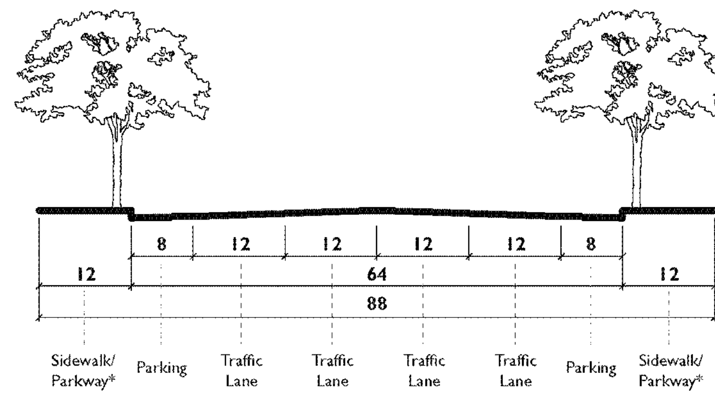


EXHIBIT 3-3 (2 of 2): CITY OF CHINO GENERAL PLAN ROADWAY CROSS-SECTIONS

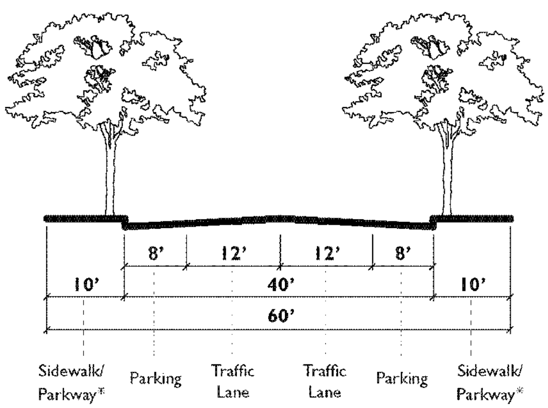
Primary Arterial: Typical 4 Lane
Provides 4 traffic lanes and 2 bicycle lanes separated by a median without parking



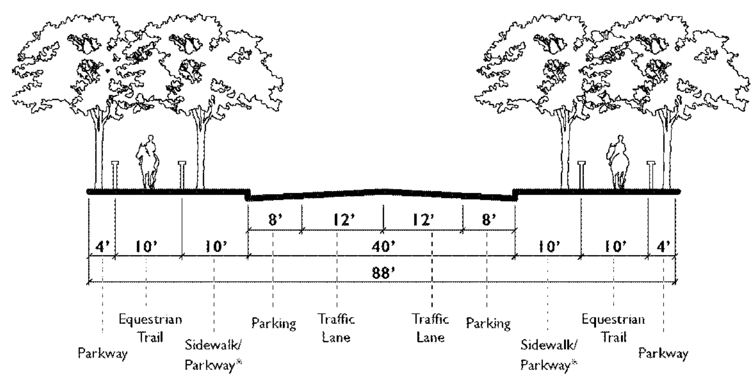
Secondary Arterial
Provides 4 traffic lanes with parking



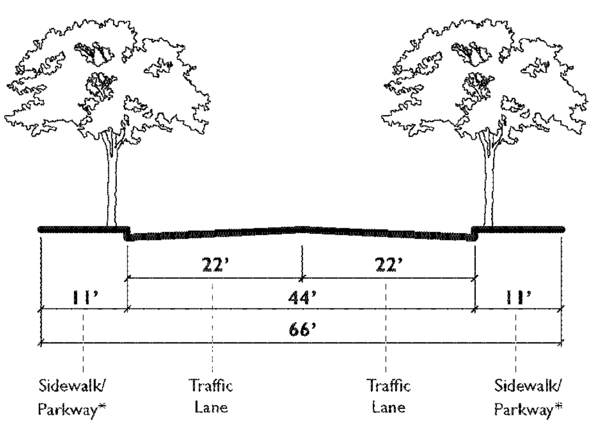
Urban Residential/Rural Collector
Provides 2 traffic lanes with parking and shared bicycle access



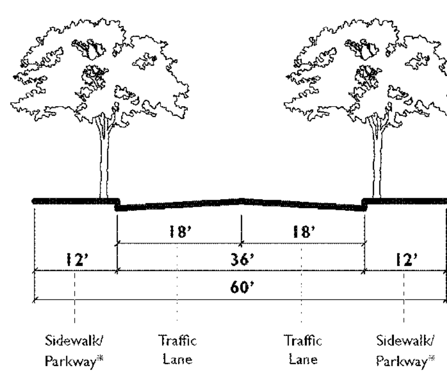
Urban Residential/Rural Collector with Equestrian Trails
Provides 2 traffic lanes and 2 equestrian trails with parking and shared bicycle access



Urban Industrial Collector
Provides 2 traffic lanes



Local Street
Provides 2 traffic lanes



10349 - cross-sections.dwg

The study area roadway that is classified as a Primary Arterial is identified as having a 98-foot right-of-way and 74-foot curb-to-curb measurement. Primary Arterials include two lanes of travel in each direction and a 14-foot curbed and/or landscaped median. The following study area roadways within the City of Chino are classified as a Primary Arterial:

- Riverside Drive from Fern Avenue to Euclid Avenue (SR-83)
- Schaefer Avenue from Benson Avenue to Euclid Avenue (SR-83)
- Eucalyptus Avenue from Central Avenue to Euclid Avenue (SR-83)
- Kimball Avenue from Euclid Avenue (SR-83) to Hellman Avenue
- Pine Avenue from the City Limit to Euclid Avenue (SR-83)
- Hellman Avenue south of Merrill Avenue

The study area roadway that is classified as a Secondary Arterial is identified as having an 88-foot right-of-way and 64-foot curb-to-curb measurement. Secondary Arterials include two lanes of travel in each direction and 8-feet of parking in both directions. The following study area roadways within the City of Chino are classified as a Secondary Arterial:

- El Prado Road from Central Avenue to Pine Avenue
- Chino Avenue from Pipeline Avenue to Euclid Avenue (SR-83)
- Merrill Avenue from Euclid Avenue (SR-83) to Flight Avenue
- Kimball Avenue from El Prado Road to Euclid Avenue (SR-83)

The study area roadway that is classified as an Urban Residential Collector, Rural Collector, or Urban Industrial Collector are identified as having a 60-66-foot right-of-way and 40-44-foot curb-to-curb measurement. Urban Residential Collector and Rural Collectors include one lane of travel in each direction and 8-feet of parking in both directions. Urban Industrial Collectors include a painted median that separates the two directions of travel. The following study area roadways within the City of Chino are classified as an Urban Residential Collector, Urban Industrial Collector, or Rural Collector:

- Mountain Avenue between Kimball Avenue to El Prado Road
- Bickmore Avenue from Mountain Avenue to Hellman Avenue
- Rincon Meadows Avenue from Kimball Avenue to Pine Avenue
- Mill Creek Road from Kimball Avenue to Pine Avenue
- West Preserve Loop
- Main Street from Kimball Avenue to Chino Corona Road
- East Preserve Loop
- Flight Avenue from Merrill Avenue to East Preserve Loop

3.3 City of Ontario, City of Eastvale, City of Chino Hills, and City of Jurupa Valley General Plan Circulation Element

Exhibits 3-4 and 3-5 show the City of Ontario General Plan Circulation Element and roadway cross-sections, respectively. Exhibits 3-6 and 3-7 show the City of Eastvale General Plan Circulation Element and roadway cross-sections, respectively. Exhibits 3-8 and 3-9 show the City of Chino Hills General Plan Circulation Element and roadway cross-sections, respectively. These classifications and cross-sections have been utilized for the purposes of determining the ultimate planned improvements along these study area roadways/intersections.

3.4 Truck Routes

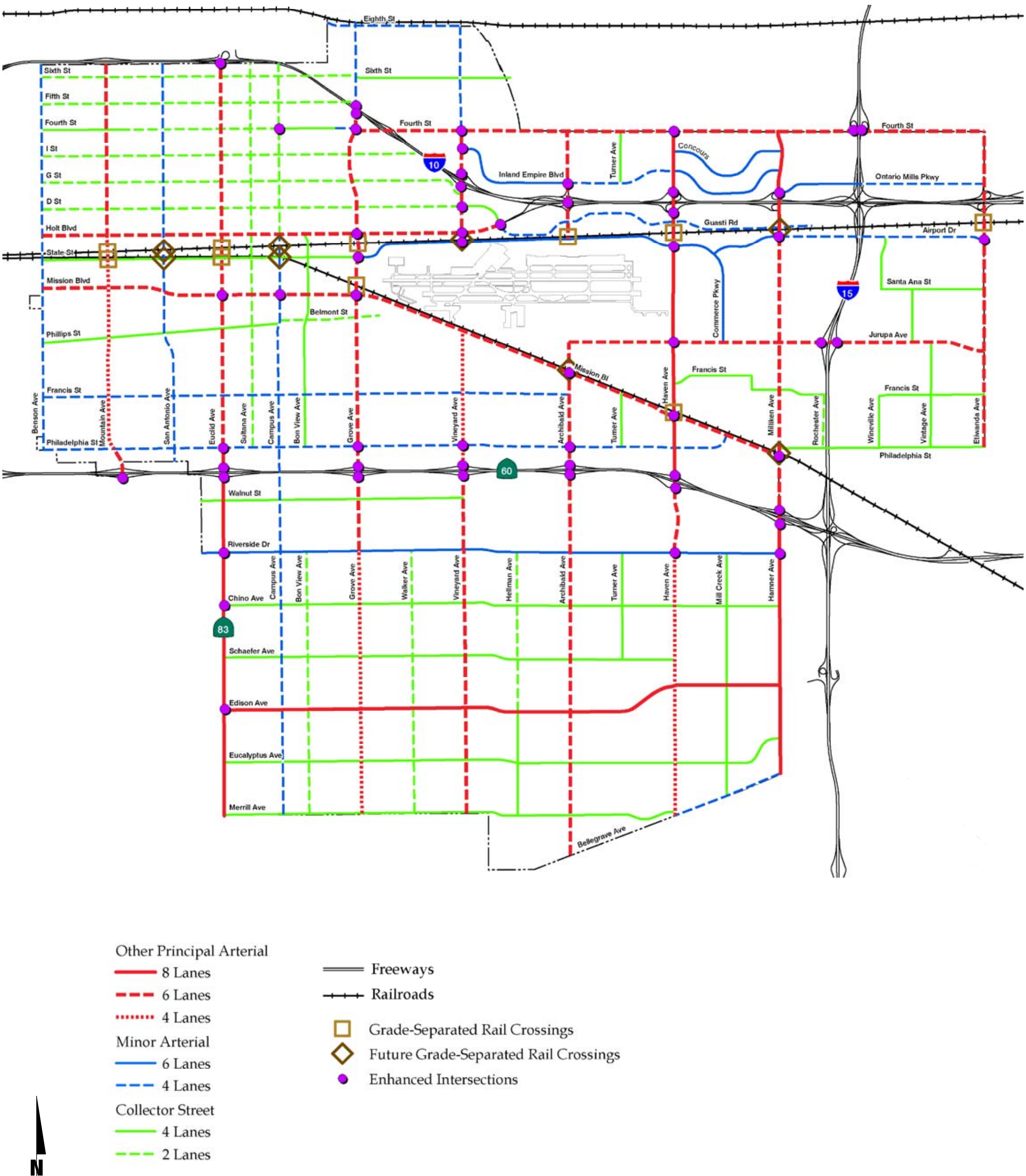
The City of Chino designated truck route map is shown on Exhibit 3-10. There are State truck routes and other truck routes throughout the City of Chino. El Prado Road, Mountain Avenue, Bickmore Avenue, Riverside Drive, Kimball Avenue, Flight Avenue, Merrill Avenue, Hellman Avenue, and Pine Avenue are the designated City of Chino truck routes within the study area while Euclid Avenue (SR-83) is designated as a State Truck Route. Other large truck routes in the study area include Central Avenue and Edison Avenue. The designated truck route map has been utilized to route truck traffic from both the proposed Project and future cumulative development projects throughout the study area. The City of Ontario designated truck route map is shown on Exhibit 3-11. Euclid Avenue (SR-83), Edison Avenue/Ontario Ranch Road, Merrill Avenue, and Archibald Avenue are designated as a Truck Route in the City of Ontario. The designated truck route map has been utilized to route truck traffic from both the proposed Project and future cumulative development projects throughout the study area.

3.5 Bicycle, Equestrian, & Pedestrian Facilities

Field observations conducted in March 2019 indicate nominal pedestrian and bicycle activity within the study area. Exhibit 3-12 illustrates the City of Chino future planned bicycle facilities, which proposes Class I bike lanes along Pine Avenue in the vicinity of the Project site. Euclid Avenue (SR-83) is planned to have Class II bike lanes in the vicinity of the Project site.

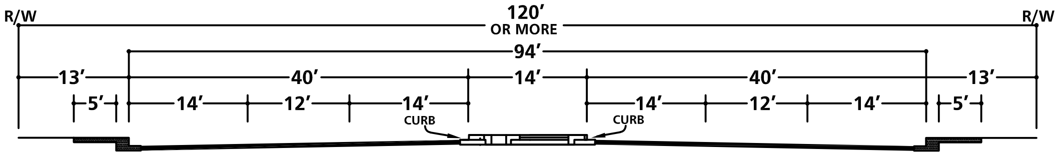
Exhibit 3-13 illustrates the City of Ontario General Plan trails and bikeway systems. Euclid Avenue (SR-83) is identified as a bicycle corridor. Exhibit 3-14 illustrates the City of Eastvale trails and bikeway systems. Existing pedestrian facilities within the study area are shown on Exhibit 3-15.

EXHIBIT 3-4: CITY OF ONTARIO GENERAL PLAN CIRCULATION ELEMENT

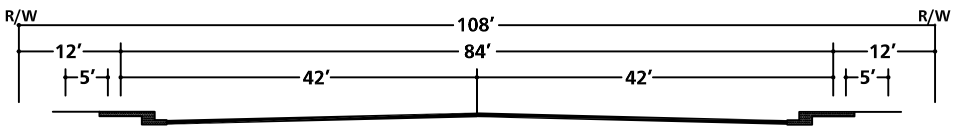


10349 - gpce-ontario.dwg

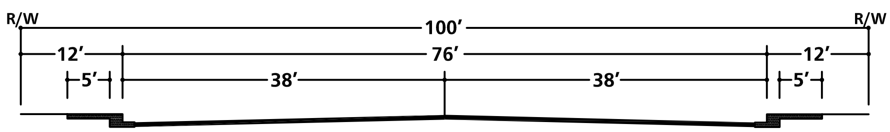
EXHIBIT 3-5: CITY OF ONTARIO GENERAL PLAN ROADWAY CROSS-SECTIONS



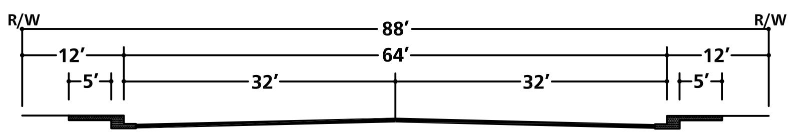
PRINCIPAL ARTERIAL



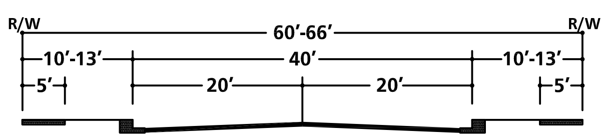
MINOR ARTERIAL



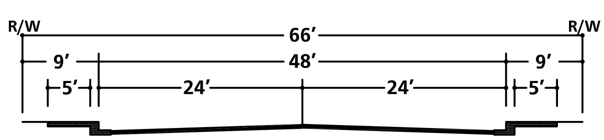
OTHER PRINCIPAL ARTERIAL



COLLECTOR STREET



LOCAL STREET

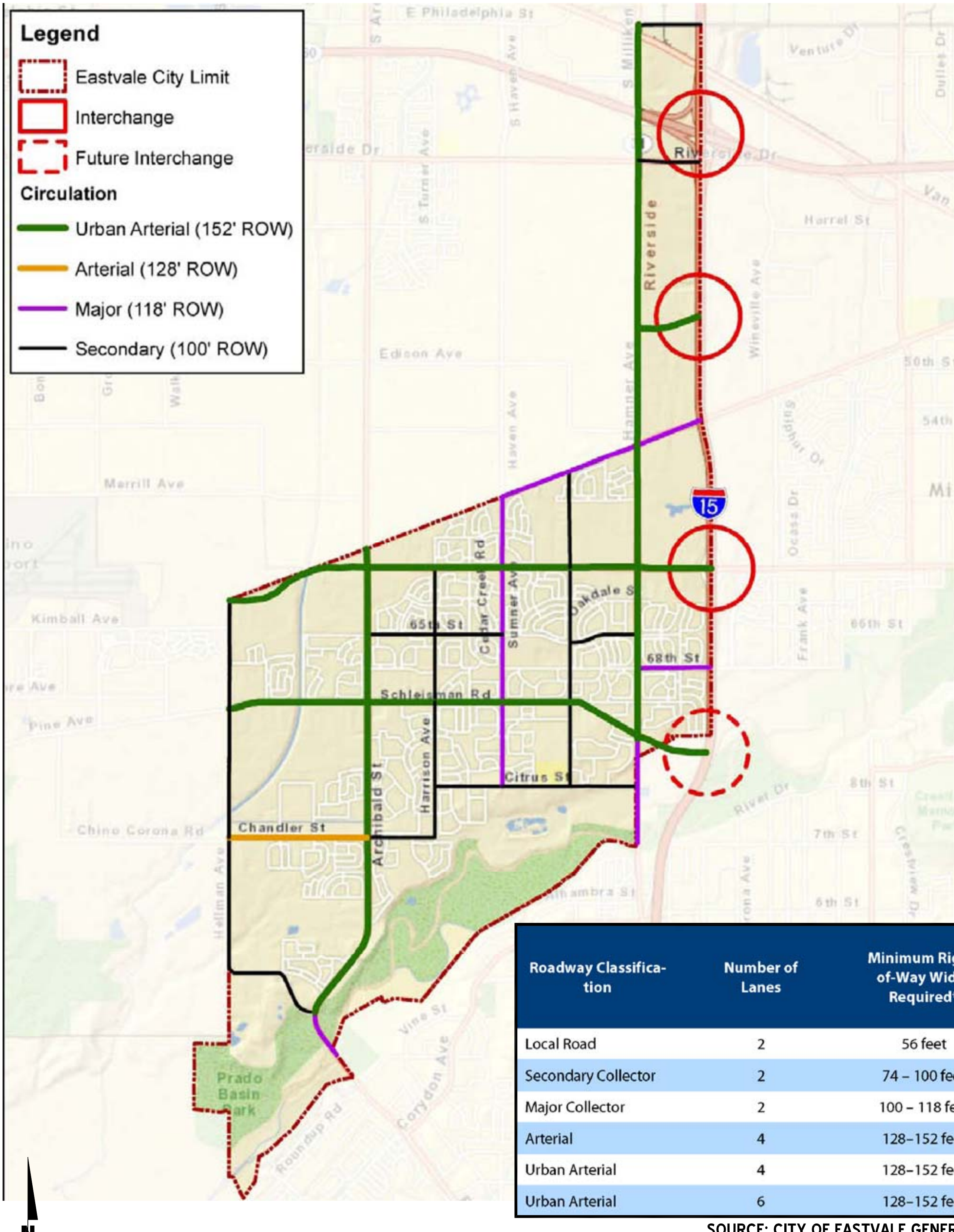


LOCAL INDUSTRIAL STREET

SOURCE: CITY OF ONTARIO

10349 - ontario_xsections.dwg

EXHIBIT 3-6: CITY OF EASTVALE GENERAL PLAN CIRCULATION ELEMENT

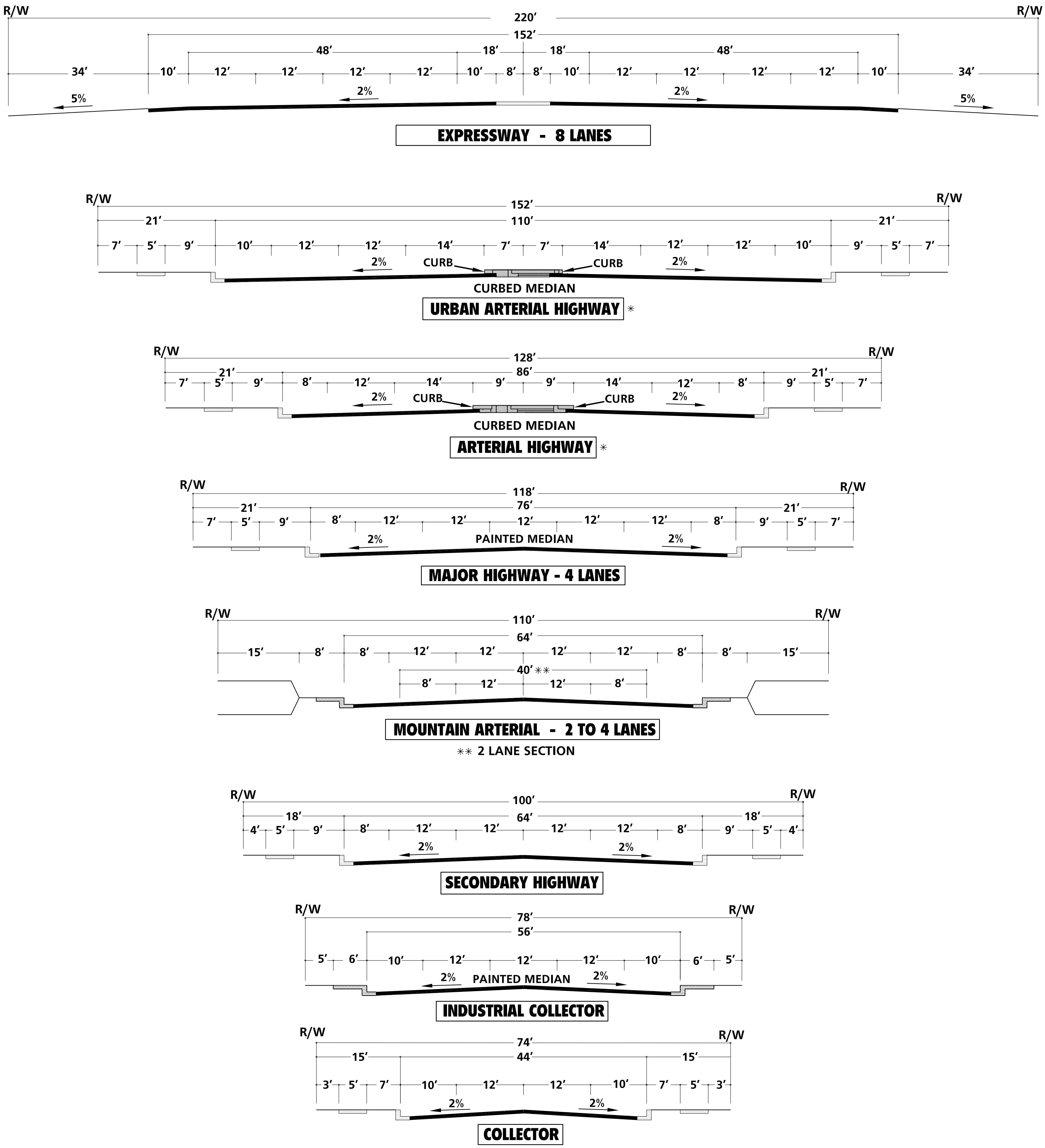


Roadway Classification	Number of Lanes	Minimum Right-of-Way Width Required*
Local Road	2	56 feet
Secondary Collector	2	74 – 100 feet
Major Collector	2	100 – 118 feet
Arterial	4	128–152 feet
Urban Arterial	4	128–152 feet
Urban Arterial	6	128–152 feet

SOURCE: CITY OF EASTVALE GENERAL PLAN
ADOPTED: JUNE 13, 2012

10349 - eastvale-gpce.dwg

EXHIBIT 3-7: CITY OF EASTVALE GENERAL PLAN ROADWAY CROSS-SECTIONS

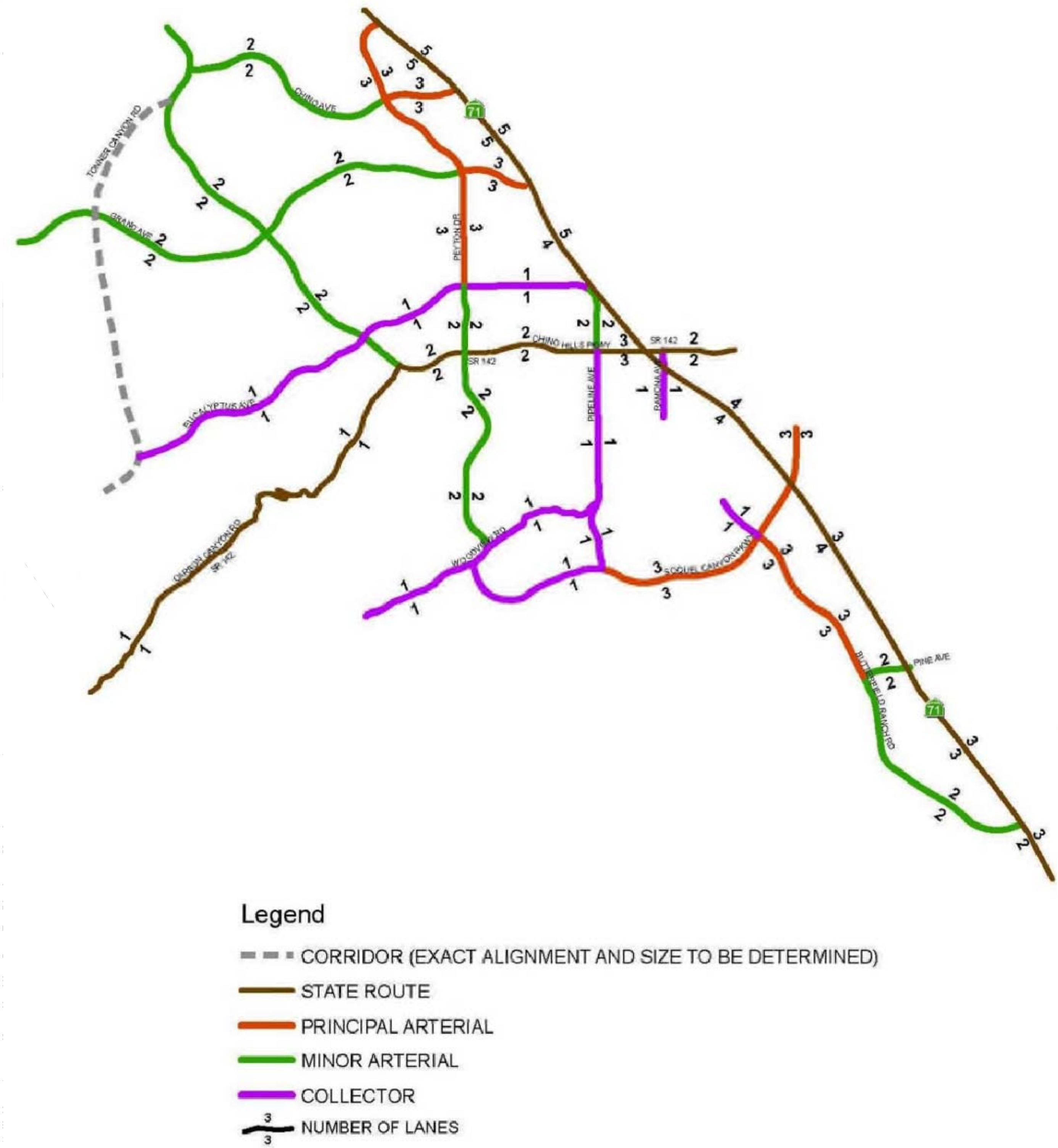


* IMPROVEMENTS MAY BE RECONFIGURED TO ACCOMMODATE EXCLUSIVE TRANSIT LANES OR ALTERNATIVE LANE ARRANGEMENTS ADDITIONAL RIGHT OF WAY MAY BE REQUIRED AT INTERSECTIONS TO ACCOMMODATE ULTIMATE IMPROVEMENTS FOR STATE HIGHWAYS SHALL CONFORM TO CALTRANS DESIGN STANDARDS.

NOT TO SCALE

10349 - gprcs.dwg

EXHIBIT 3-8: CITY OF CHINO HILLS GENERAL PLAN ROADWAY SEGMENTS



N

EXHIBIT 3-9: CITY OF CHINO HILLS GENERAL PLAN ROADWAY CROSS-SECTIONS

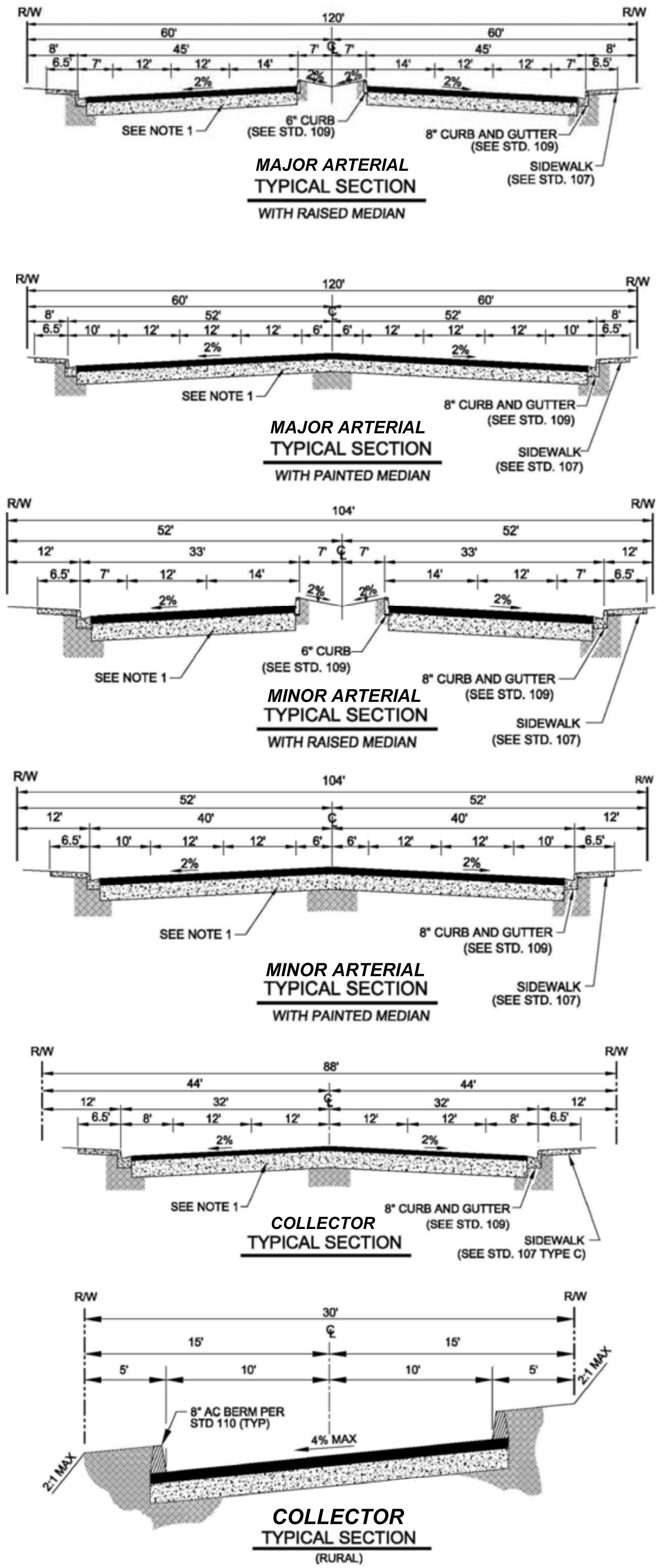
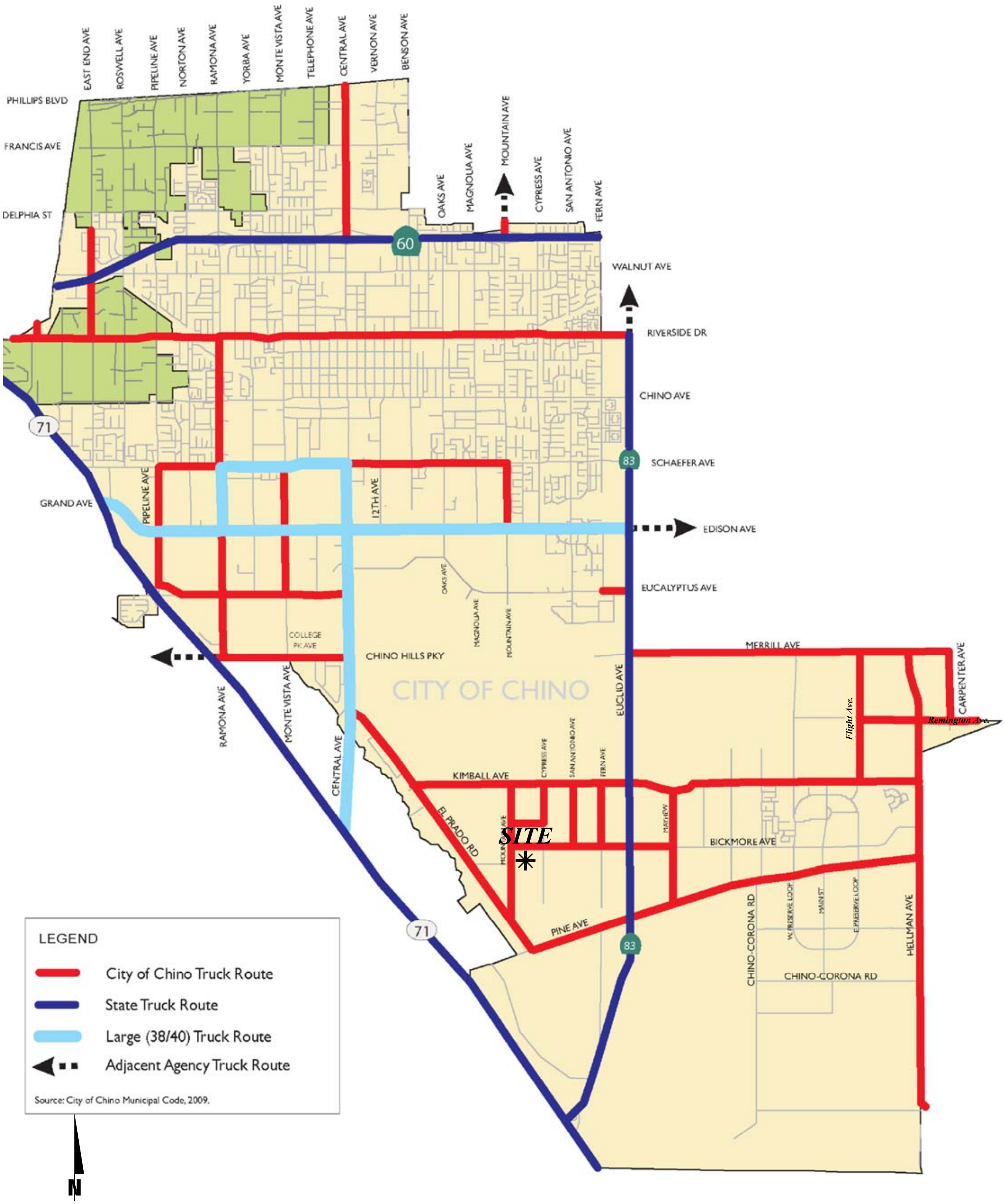


EXHIBIT 3-10: CITY OF CHINO TRUCK ROUTES



10349 - chino-trucks.dwg

EXHIBIT 3-11: CITY OF ONTARIO TRUCK ROUTES

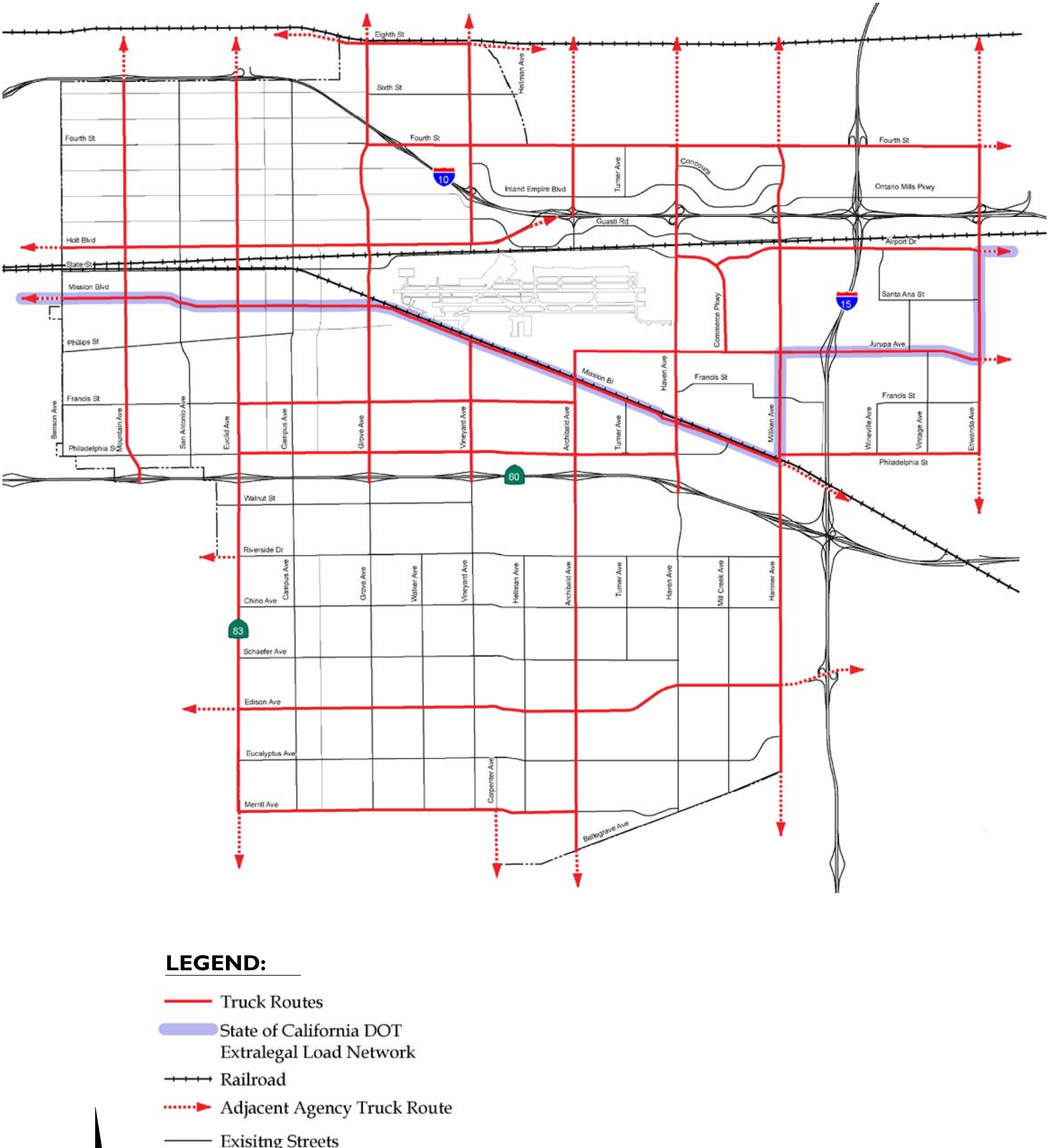


EXHIBIT 3-12: CITY OF CHINO FUTURE BICYCLE FACILITIES

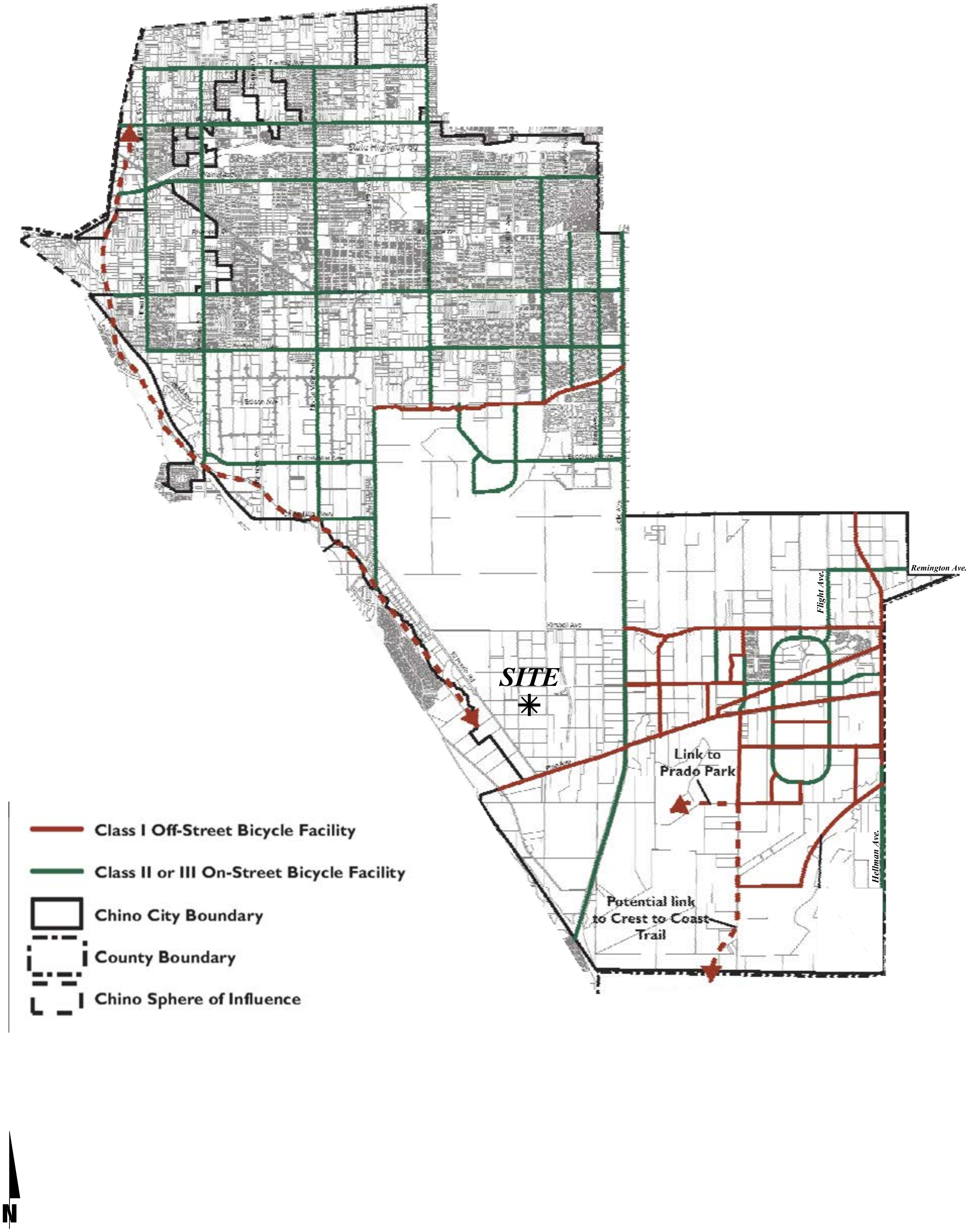


EXHIBIT 3-13: CITY OF ONTARIO GENERAL PLAN TRAILS AND BIKEWAY SYSTEMS

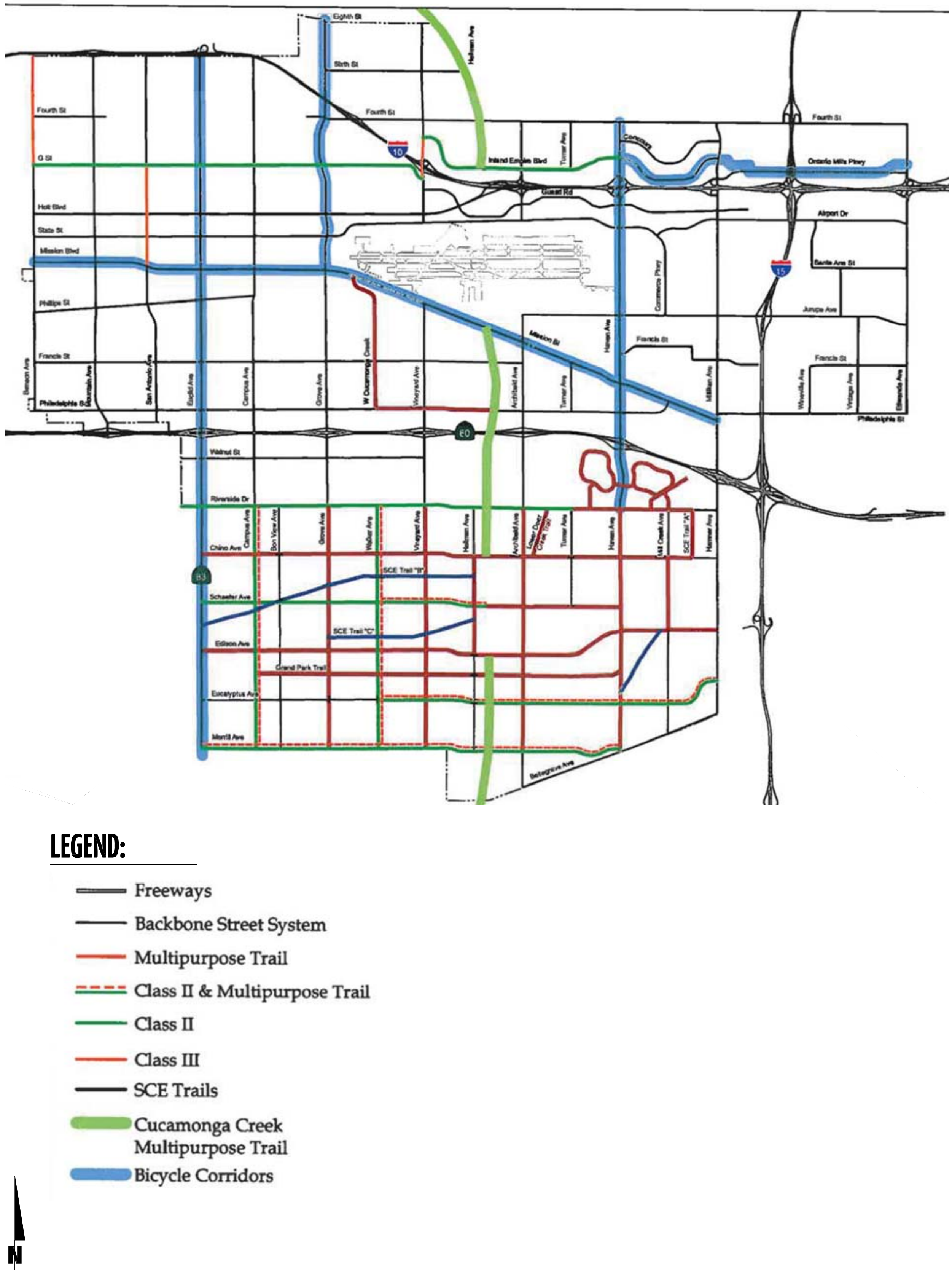


EXHIBIT 3-14: EASTVALE AREA TRAILS AND BIKEWAYS SYSTEM

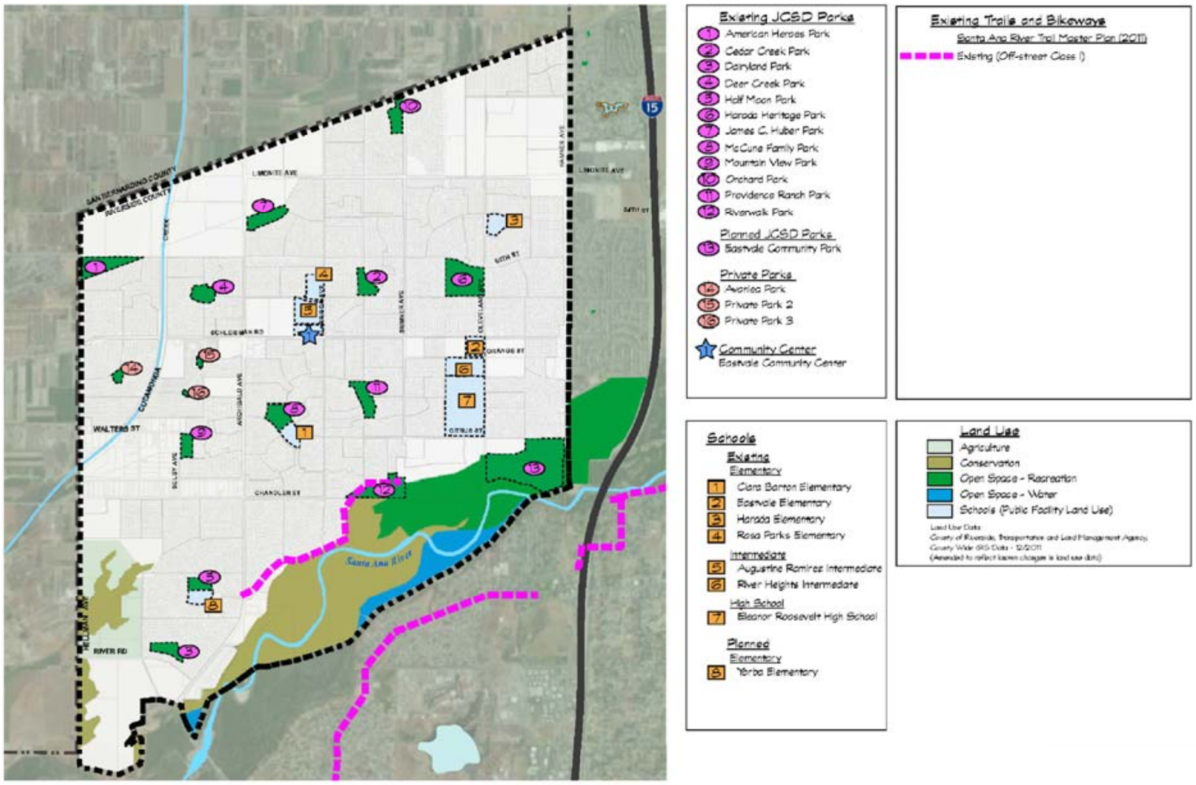


Exhibit 2.8-1 Existing Trails

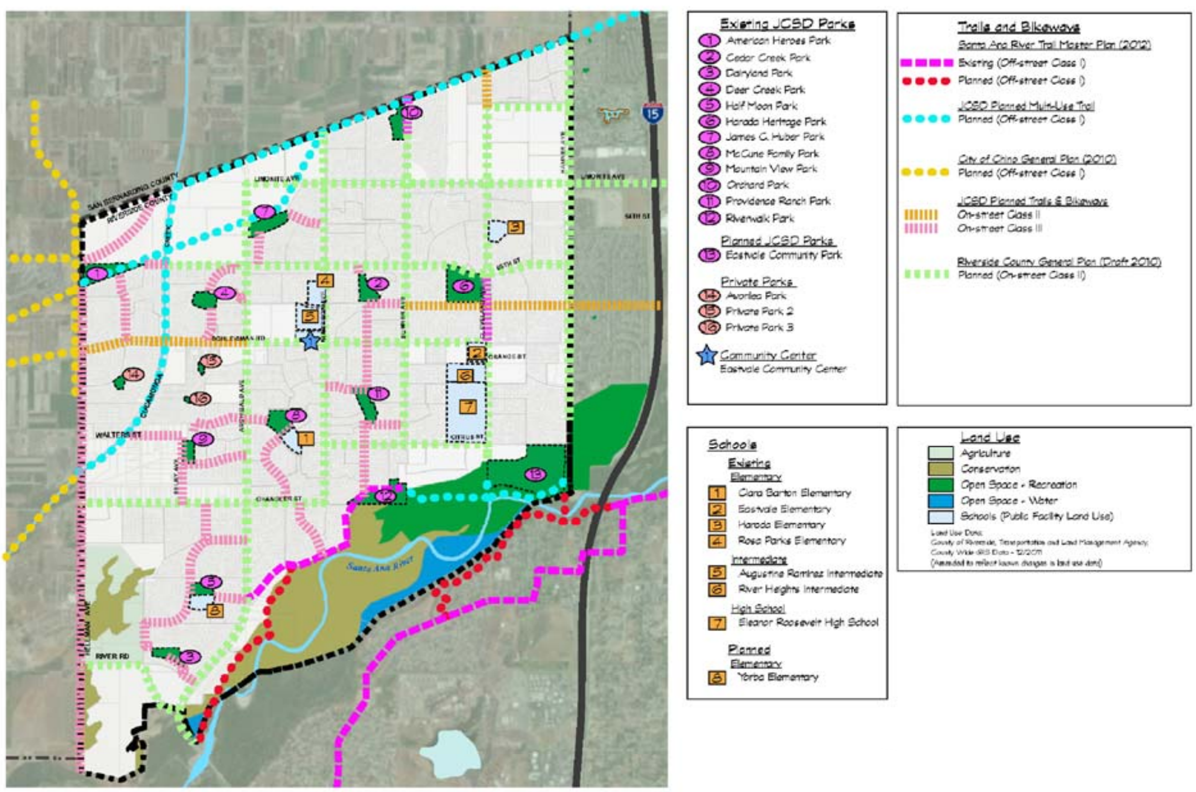
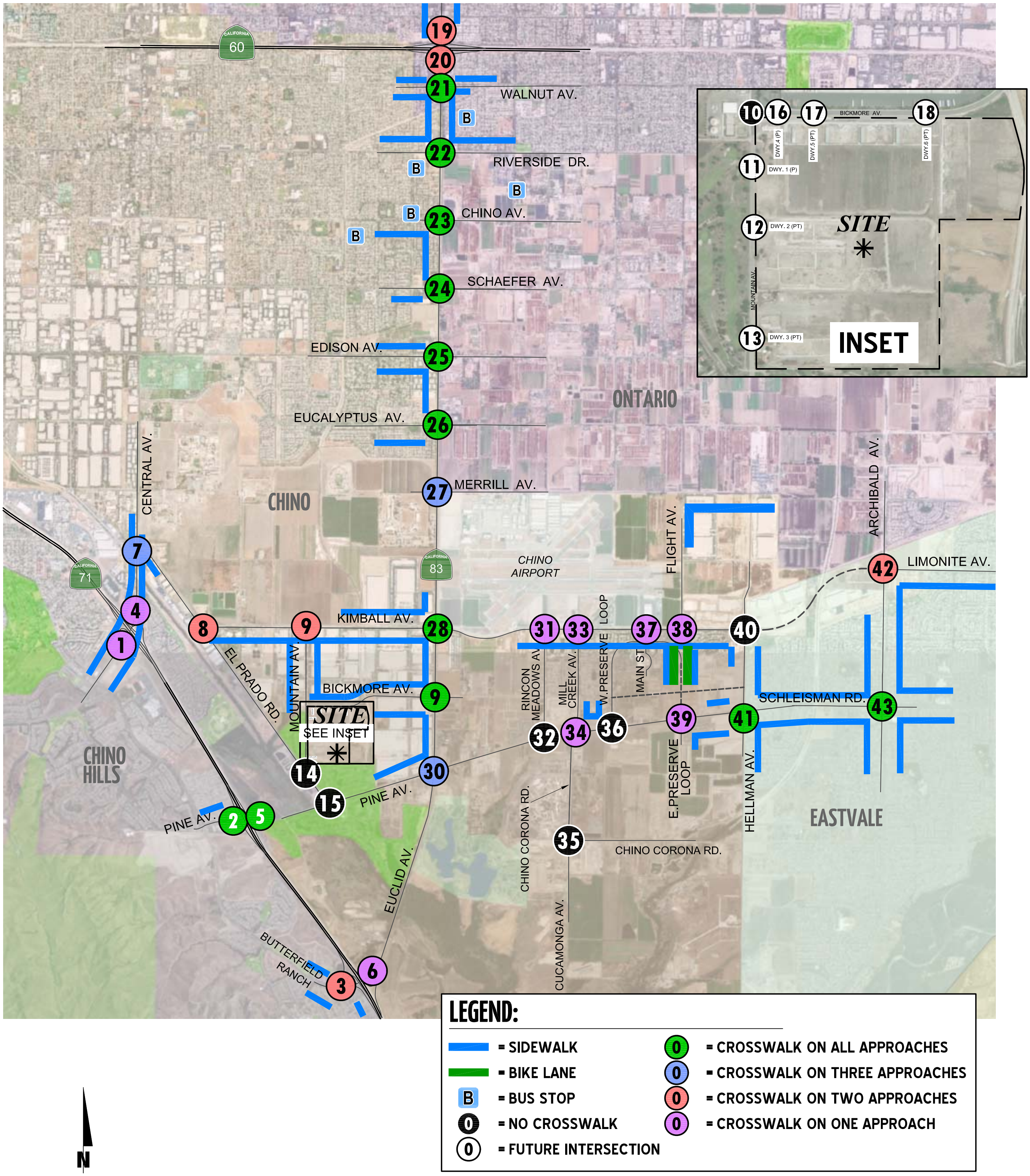


Exhibit 2.8-2 Planned Trails

N

EXHIBIT 3-15: EXISTING PEDESTRIAN FACILITIES



3.6 TRANSIT SERVICE

The study area within the City of Chino is currently served by Omnitrans, a public transit agency serving various jurisdictions within San Bernardino County. Based on a review of the existing transit routes within the vicinity of the proposed Project, there are no existing Omnitrans routes that operate near the vicinity of the site. The Riverside Transit Authority (RTA) serves the City of Eastvale. However, transit service is reviewed and updated by Omnitrans periodically to address ridership, budget and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate. As such, it is recommended that the applicant work in conjunction with Omnitrans and RTA to potentially provide bus service to the site. Existing transit routes in the vicinity of the study area are illustrated on Exhibit 3-16.

The Project Applicant shall encourage vanpool, shuttle service, and carpool to maintain the parking demand, reduce trips, and potentially provide incentives for employees by designating near and “shaded” preferential parking spaces for high occupancy vehicles.

3.7 EXISTING (2019) TRAFFIC COUNTS

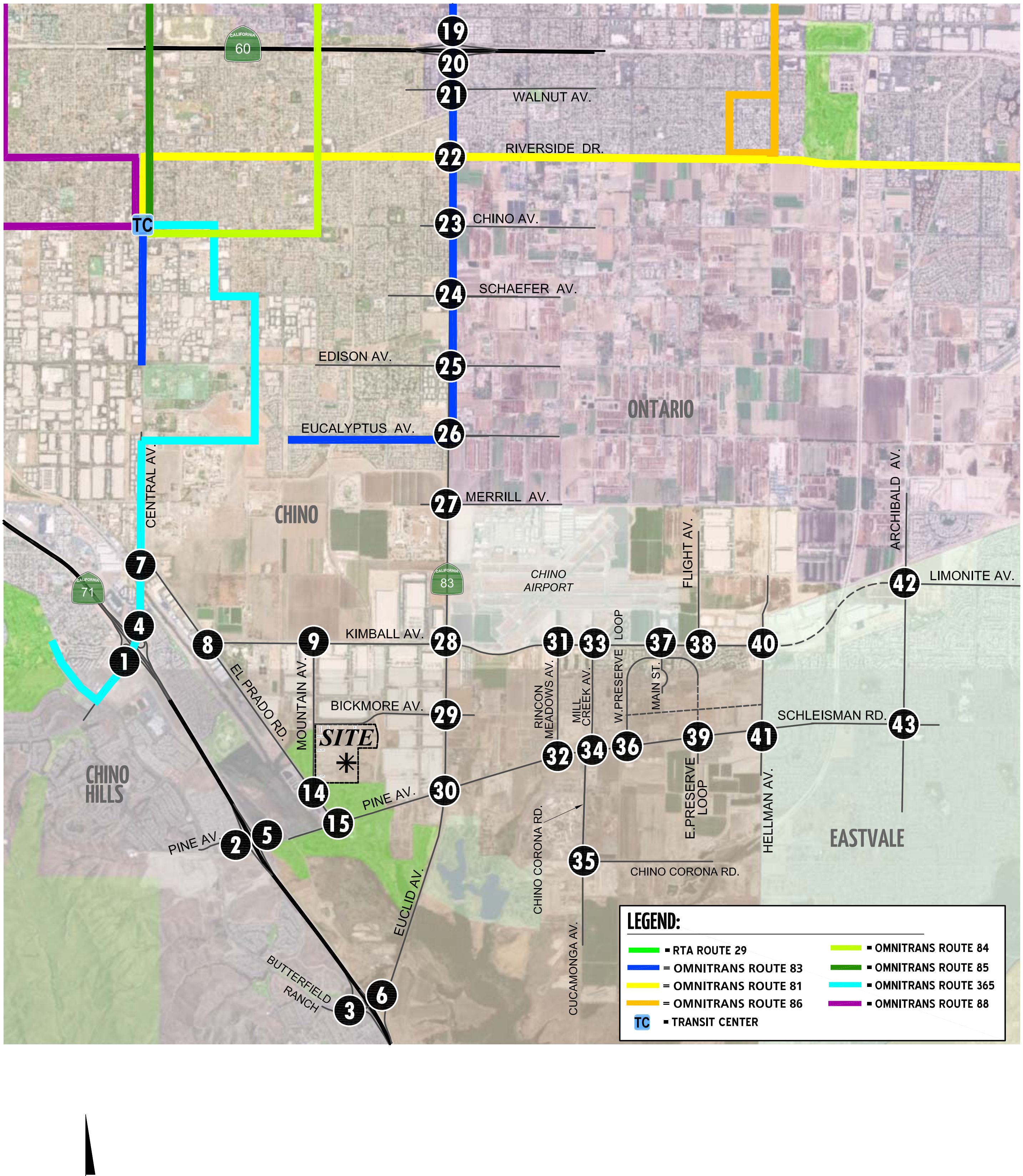
The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in January 2019. The following peak hours were selected for analysis:

- Weekday AM Peak Hour (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)

The weekday AM and weekday PM peak hour count data is representative of typical weekday peak hour traffic conditions in the study area. There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes and near-by schools were in session and operating on normal schedules. The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1.

The traffic counts collected in January 2019 include the following vehicle classifications: Passenger Cars, 2-Axle Trucks, 3-Axle Trucks, and 4 or More Axle Trucks. To represent the impact large trucks, buses and recreational vehicles have on traffic flow; all trucks were converted into PCE. By their size alone, these vehicles occupy the same space as two or more passenger cars. In addition, the time it takes for them to accelerate and slow-down is much longer than for passenger cars and varies depending on the type of vehicle and number of axles. For the purpose of this analysis, a PCE factor of 1.5 has been applied to 2-axle trucks, 2.0 for 3-axle trucks, and 3.0 for 4+-axle trucks to estimate each turning movement. These factors are consistent with the values recommended for use in the CMP.

EXHIBIT 3-16: EXISTING TRANSIT ROUTES



10349 - transit.dwg

Consistent with standard engineering practice, the traffic counts were collected on either a typical Tuesday, Wednesday, or Thursday on a non-holiday. Traffic counts were also conducted when local schools were in session and operating on normal bell schedules. The purpose of this TIA is to evaluate the peak hour operations for the typical weekday peak hour. Existing weekday ADT volumes are shown on Exhibit 3-17. Where actual 24-hour tube count data was not available, Existing ADT volumes were based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 12.55 = Leg Volume

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 7.97 percent. As such, the above equation utilizing a factor of 12.55 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 7.97 percent (i.e., 1/0.0797 = 12.55) and was assumed to sufficiently estimate average daily traffic (ADT) volumes for planning-level analyses. Existing weekday AM and weekday PM peak hour intersection volumes (in PCE) are shown on Exhibit 3-18.

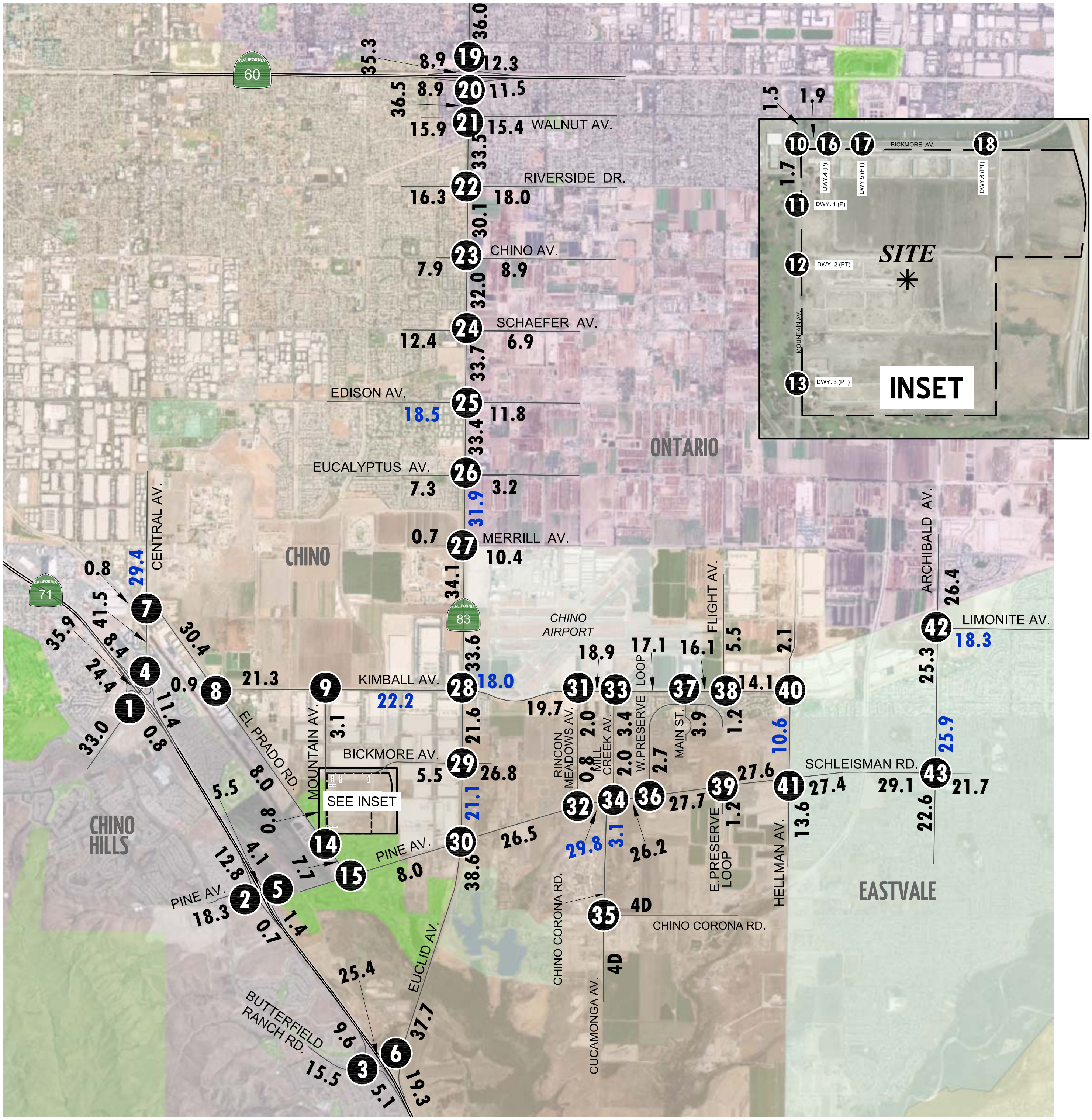
3.8 INTERSECTION OPERATIONS ANALYSIS

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection operations analysis results are summarized on Table 3-1, which indicates that all existing study area intersections are currently operating at an acceptable LOS during the peak hours with exception to the following:

- Central Avenue & El Prado Road (#7) – LOS E PM peak hour only
- El Prado Road & Kimball Avenue (#8) – LOS F PM peak hour only
- Euclid Avenue (SR-83) & Riverside Drive (#22) – LOS E PM peak hour only
- Euclid Avenue (SR-83) & Pine Avenue (#30) – LOS E PM peak hour only
- Hellman Avenue & Kimball Avenue (#40) – LOS F AM and PM peak hours
- Archibald Avenue & Schleisman Road (#43) – LOS F AM peak hour only

Consistent with Table 3-1, a summary of the peak hour intersection LOS for Existing conditions are shown on Exhibit 3-19. The intersection operations analysis worksheets are included in Appendix 3.2 of this TIA.

EXHIBIT 3-17: EXISTING (2019) AVERAGE DAILY TRAFFIC (ADT) (IN PCE)



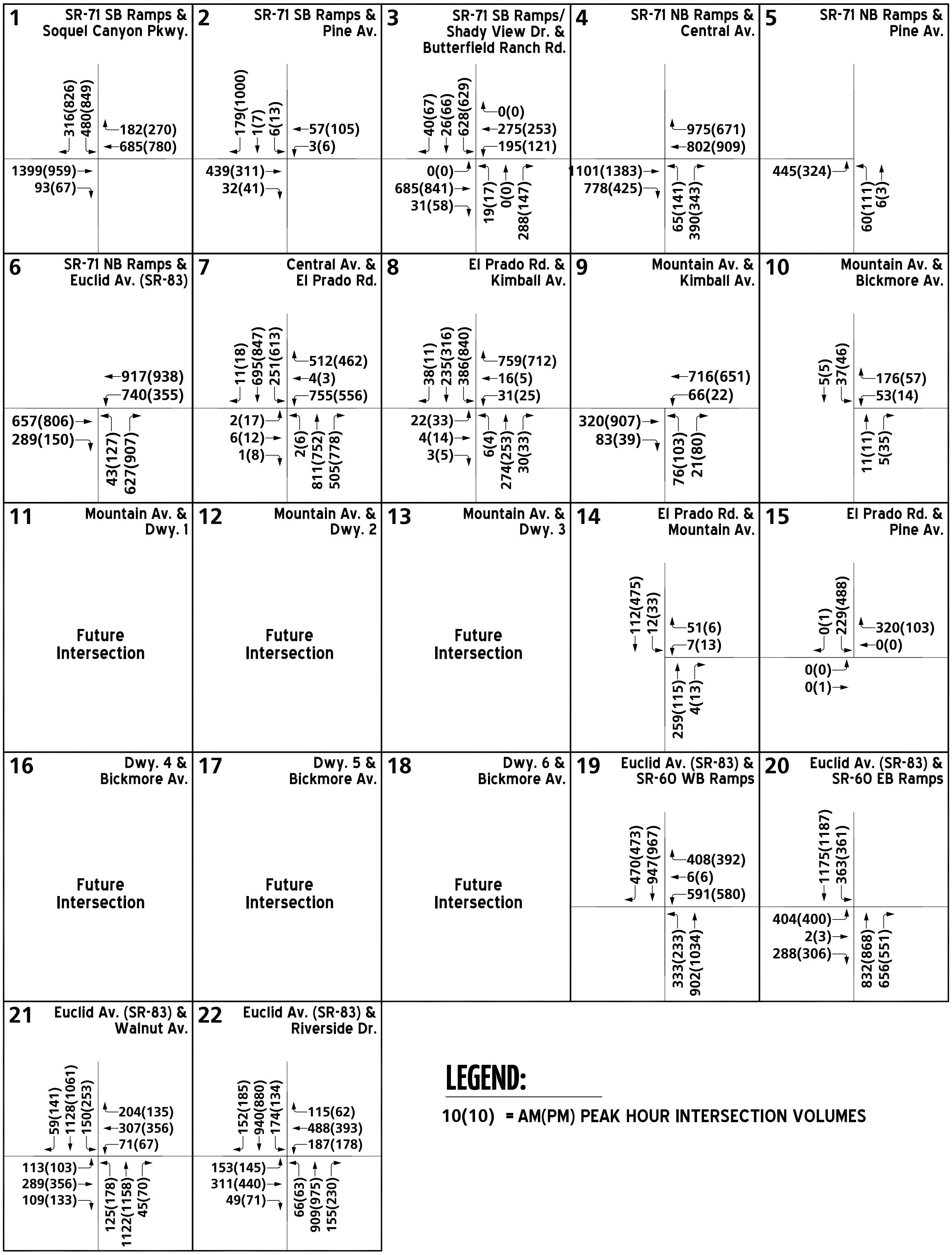
LEGEND:

10.0 = ACTUAL (COUNT-BASED) VEHICLES PER DAY (1000'S)

10.0 = ESTIMATED VEHICLES PER DAY (1000'S)

N

EXHIBIT 3-18 (1 OF 2): EXISTING (2019) TRAFFIC VOLUMES (IN PCE)



LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

EXHIBIT 3-18 (2OF2): EXISTING (2019) TRAFFIC VOLUMES (IN PCE)

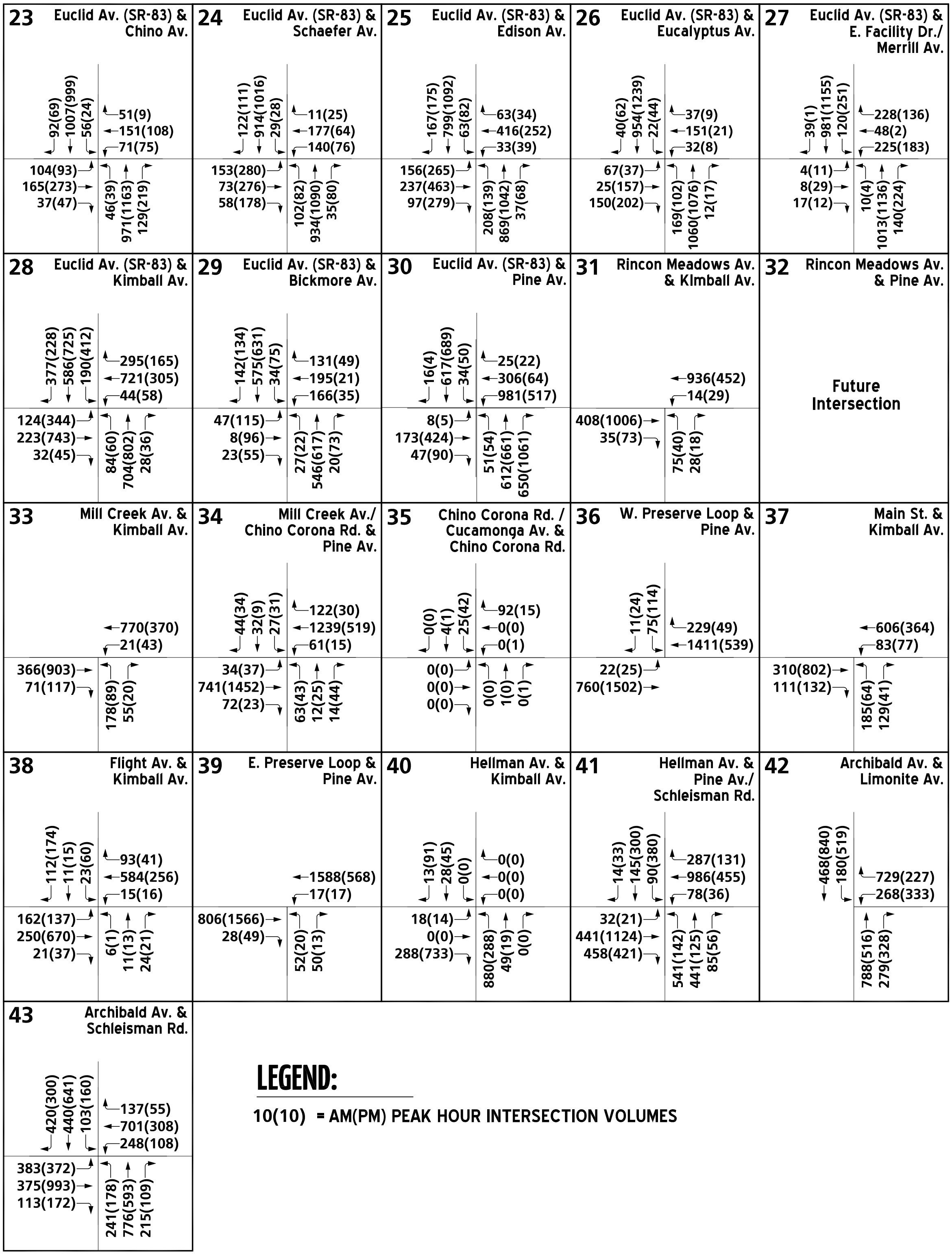
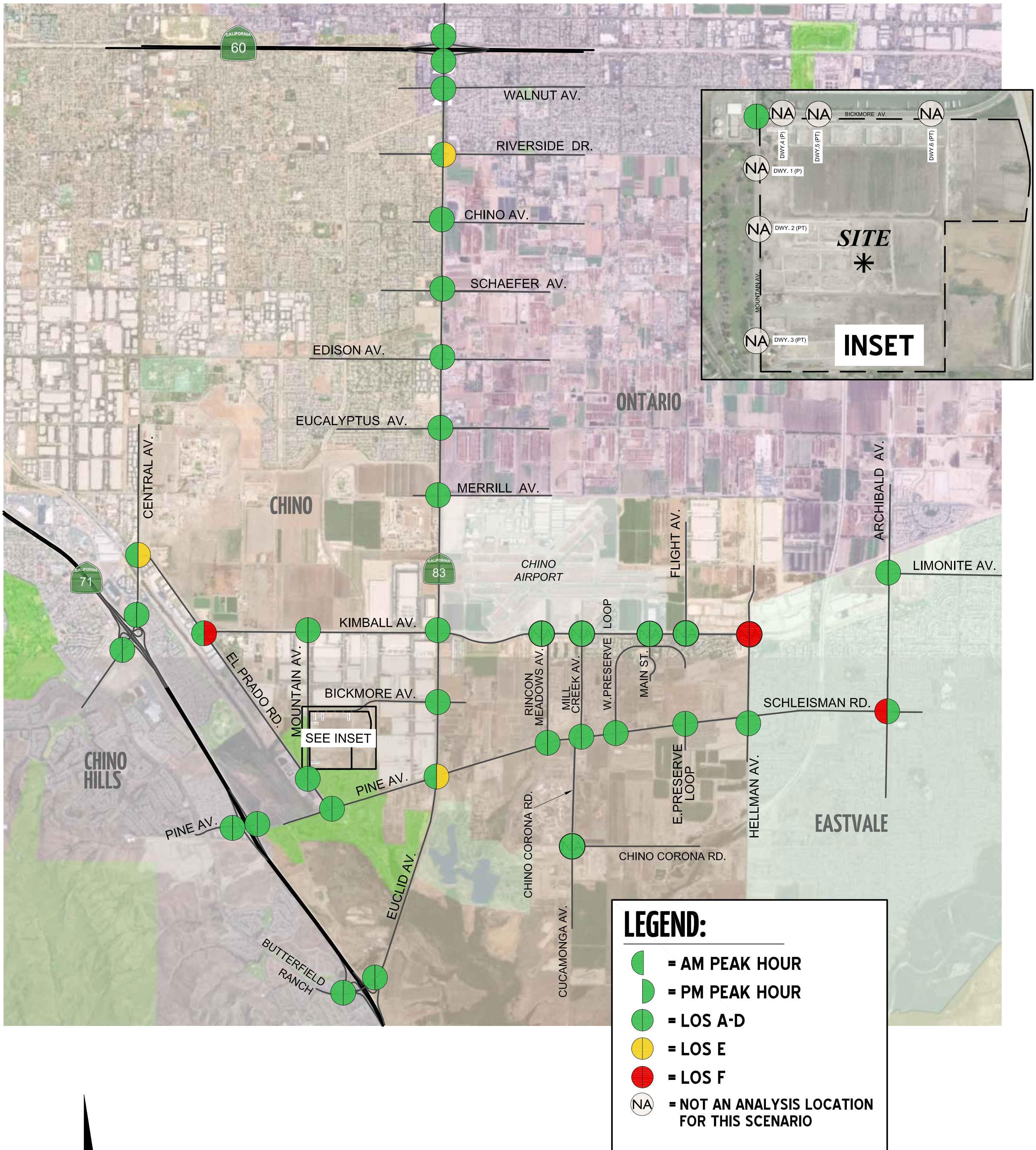


EXHIBIT 3-19: EXISTING (2019) SUMMARY OF LOS



URBAN CROSSROADS

Table 3-1

Page 1 of 2

Intersection Analysis for Existing (2019) Conditions

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service		Acceptable LOS[4]
			Northbound			Southbound			Eastbound			Westbound							
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM	
1	SR-71 SB Ramps & Soquel Canyon Rd.	TS	0	0	0	1	1	0	0	3	1>>	0	3	1>>	13.3	23.2	B	C	D
2	SR-71 SB Ramps & Pine Av.	TS	0	0	0	0	1	1	0	1	1	1	2	0	31.2	26.7	C	C	D
3	SR-71 SB Ramps & Butterfield Ranch Rd.	TS	1	0	1	1	1	1	0	2	0	1	2	1>>	40.0	39.6	D	D	D
4	SR-71 NB Ramps & Central Av.	TS	1	1	0	0	0	0	0	3	1>>	0	3	1>>	8.6	7.7	A	A	D
5	SR-71 NB Ramps & Pine Av.	AWS	1	1	0	0	0	0	2	0	0	0	0	0	9.3	8.9	A	A	D
6	SR-71 NB Ramps & Euclid Av. (SR-83)	TS	2	0	1>>	0	0	0	0	2	1>>	1	2	0	27.2	42.5	C	D	D
7	Central Av. & El Prado Rd.	TS	1	2	1>	1	3	0	1	1	0	1	1	1>	29.0	**61.2**	C	**E**	D
8	El Prado Rd. & Kimball Av.	TS	1	1	1	1	2	0	1	1	0	0	1	1>	28.1	**86.2**	C	**F**	D
9	Mountain Av. & Kimball Av.	TS	1	0	1	0	0	0	0	2	0	1	2	0	7.4	9.7	A	A	D
10	Mountain Av. & Bickmore Av.	CSS	0	1	0	1	1	0	0	0	0	1	0	1	9.8	9.6	A	A	D
11	Mountain Av. & Driveway 1		Future Intersection																D
12	Mountain Av. & Driveway 2		Future Intersection																D
13	Mountain Av. & Driveway 3		Future Intersection																D
14	El Prado Rd. & Mountain Av.	CSS	0	1	0	0	1	0	0	0	0	0	1	0	10.4	13.6	B	B	D
15	El Prado Rd. & Pine Av.	AWS	0	0	0	0	1	0	0	1	0	0	1	0	9.8	13.5	A	B	D
16	Driveway 4 & Bickmore Av.		Future Intersection																D
17	Driveway 5 & Bickmore Av.		Future Intersection																D
18	Driveway 6 & Bickmore Av.		Future Intersection																D
19	Euclid Av. (SR-83) & SR-60 WB Ramps	TS	1	2	0	0	2	1	0	0	0	1	1	1	22.3	18.6	C	B	D
20	Euclid Av. (SR-83) & SR-60 EB Ramps	TS	0	2	1	1	2	0	1	1	0	0	0	0	25.3	21.9	C	C	D
21	Euclid Av. (SR-83) & Walnut Av.	TS	1	3	d	2	3	1	1	2	0	1	2	0	30.1	32.5	C	C	E
22	Euclid Av. (SR-83) & Riverside Dr.	TS	1	2	1	1	2	1>	1	1	0	1	2	d	47.0	**55.5**	D	**E**	D
23	Euclid Av. (SR-83) & Chino Av.	TS	1	2	1	1	2	1	1	1	1	0	1	0	21.5	23.2	C	C	D
24	Euclid Av. (SR-83) & Schaefer Av.	TS	1	2	1	1	2	1	1	1	1	1	1	0	23.6	26.2	C	C	D
25	Euclid Av. (SR-83) & Edison Av.	TS	1	2	1	1	2	1	1	1	1	1	1	0	38.1	39.7	D	D	D
26	Euclid Av. (SR-83) & Eucalyptus Av.	TS	1	2	1	1	2	1	1	1	1	1	1	0	13.8	13.2	B	B	D
27	Euclid Av. (SR-83) & Merrill Av.	TS	1	2	1	1	2	0	0	1	0	0	1	0	26.4	29.9	C	C	D
28	Euclid Av. (SR-83) & Kimball Av.	TS	1	2	1>	2	2	1>	2	2	0	1	2	0	32.4	38.3	C	D	D
29	Euclid Av. (SR-83) & Bickmore Av.	TS	1	2	0	1	2	1	1	1	1	1	1	0	16.3	14.0	B	B	D
30	Euclid Av. (SR-83) & Pine Av.	TS	1	2	1>	1	2	0	1	1	1	2	1	0	31.9	**61.5**	C	**E**	D
31	Rincon Meadows Av. & Kimball Av.	TS	1	0	1	0	0	0	0	2	0	1	1	0	15.4	12.8	B	B	D
32	Rincon Meadows Av. & Pine Av.		Future Intersection																D
33	Mill Creek Av. & Kimball Av.	TS	1	0	1	0	0	0	0	2	0	1	1	0	14.5	12.9	B	B	D
34	Mill Creek Av./Chino-Corona Rd. & Pine Av.	TS	1	1	0	1	1	0	1	2	1	1	1	1	27.1	12.2	C	B	D
35	Cucamonga Av. & Chino Corona Rd.	AWS	0	1	0	0	1	0	0	1	0	0	1	0	7.0	7.3	A	A	D
36	W. Preserve Loop & Pine Av.	TS	0	0	0	1	0	1	1	2	0	0	2	0	9.4	8.0	A	A	D
37	Main St. & Kimball Av.	TS	1	0	1	0	0	0	0	2	0	1	1	0	13.4	12.5	B	B	D
38	Flight Av. & Kimball Av.	CSS	0	1	0	0	1	0	1	2	0	1	1	0	21.0	20.5	C	C	D
39	E. Preserve Loop & Pine Av.	TS	2	0	1	0	0	0	0	2	1	1	2	0	8.5	7.2	A	A	D
40	Hellman Av. & Kimball Av.	TS	1	2	0	0	2	d	1	0	1>	0	0	0	**>200.0**	**77.9**	**F**	**F**	D

Intersection Analysis for Existing (2019) Conditions

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service		Acceptable LOS[4]
			Northbound			Southbound			Eastbound			Westbound							
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM	
41	Hellman Av. & Pine Av./Schleisman Rd.	TS	2	2	1	2	2	1	2	3	1>	2	3	1>	37.7	38.6	D	D	D
42	Archibald Av. & Limonite Av.	TS	0	1	1>	1	1	0	0	0	0	1	0	1>	48.0	29.6	D	C	D
43	Archibald Av. & Schleisman Rd.	TS	2	3	1	2	3	1	2	3	1	2	3	1	**80.1**	46.5	**F**	D	D

* **BOLD** = Level of Service (LOS) does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

1 When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; >> = Free-Right Turn Lane; d = Defacto Right Turn Lane

2 Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

3 CSS = Cross-street Stop; AWS = All-Way Stop; TS = Traffic Signal

4 Minimum acceptable LOS for each applicable jurisdiction.

3.9 TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for Existing traffic conditions are based on existing peak hour intersection turning volumes. The following study area intersection currently warrants a traffic signal for Existing traffic conditions:

- El Prado Road & Mountain Avenue (#14)
- El Prado Road & Pine Avenue (#15)
- Flight Avenue & Kimball Avenue (#38)

However, all three intersections are currently operating at an acceptable LOS with current traffic controls and the installation of a traffic signal does not appear necessary with respect to peak hour operations. Existing conditions traffic signal warrant analysis worksheets are provided in Appendix 3.3.

3.10 OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the SR-71 Freeway at Central Avenue, Pine Avenue, and Euclid Avenue (SR-83) and the SR-60 Freeway and Euclid Avenue (SR-83) interchanges to assess vehicle queues for the off ramps that may potentially result in deficient peak hour operations at the ramp-to-arterial intersections and may potentially "spill back" onto the SR-71 and SR-60 Freeway mainlines. Queuing analysis findings are presented on Table 3-2. It is important to note that off-ramp lengths are consistent with the measured distance between the intersection and the freeway mainline. As shown on Table 3-2, there are no movements that are currently experiencing queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows. Worksheets for Existing traffic conditions off-ramp queuing analysis are provided in Appendix 3.4.

3.11 FREEWAY FACILITY ANALYSIS

Existing (2019) mainline directional volumes for the AM and PM peak hours are provided on Exhibit 3-20. As shown on Table 3-3, the SR-71 and SR-60 Freeway segments and merge/diverge ramp junctions analyzed for this study were found to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours for Existing (2019) traffic conditions, with exception of the following diverge ramp junction:

- SR-60 Freeway Westbound, Euclid Avenue (SR-83) Off-Ramp (#26) – LOS E AM and PM peak hours

Existing (2019) freeway facility analysis worksheets are provided in Appendix 3.5.

Table 3-2

Peak Hour Freeway Off-Ramp Queuing Summary Existing (2019) Conditions

Intersection	Movement	Available Stacking Distance (Feet)	95th Percentile Queue (Feet)		Acceptable? [1]	
			AM Peak Hour	PM Peak Hour	AM	PM
SR-71 SB Ramps & Central Avenue	SBL	1,530	245	516 [2]	Yes	Yes
	SBL/R	740	0	698 [2]	Yes	Yes
SR-71 SB Ramps & Pine Avenue	SBL/T	1,370	8	16	Yes	Yes
	SBR	725	29	456 [2]	Yes	Yes
SR-71 SB Ramps & Euclid Avenue (SR-83)	SBL	1,100	215	230	Yes	Yes
	SBL/T	1,560	215	232	Yes	Yes
	SBR	255	0	1	Yes	Yes
SR-71 NB Ramps & Central Avenue	NBL	1,485	34	75	Yes	Yes
	NBL/R	1,070	0	0	Yes	Yes
SR-71 NB Ramps & Pine Avenue	NBL	1,375	5	10	Yes	Yes
	NBL/T	815	5	10	Yes	Yes
SR-71 NB Ramps & Euclid Avenue (SR-83)	NBL	1,745	27	44	Yes	Yes
	NBR	420	203 [2]	732 [2]	Yes	Yes[3]
Euclid Av. (SR-83) & SR-60 WB Ramps	WBL	400	306	276	Yes	Yes
	WBL/T/R	1,430	316 [2]	284	Yes	Yes
	WBR	400	202	207	Yes	Yes
Euclid Av. (SR-83) & SR-60 EB Ramps	EBL	900	363 [2]	352 [2]	Yes	Yes
	EBT/R	1,270	260 [2]	288 [2]	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Although the 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the SR-71 Freeway mainline.

Table 3-3

Freeway Facility Analysis for Existing (2019) Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]
SR-71 Freeway	Southbound	North of Central Avenue	3	9.6	A	18.4	C
		Central Avenue Off-Ramp	3	16.4	B	28.0	C
		Central Avenue Loop On-Ramp	3	9.5	A	13.9	B
		Central Avenue On-Ramp	3	10.0	A	14.0	B
		Central Avenue to Pine Avenue	3	10.4	A	17.1	B
		Pine Avenue Off-Ramp	2	14.5	B	22.2	C
		Pine Avenue On-Ramp	2	12.5	B	12.3	B
		Pine Avenue to Euclid Avenue (SR-83)	2	9.2	A	9.0	A
		Euclid Avenue (SR-83) Off-Ramp	2	13.4	B	13.2	B
		Euclid Avenue (SR-83) Loop On-Ramp	2	9.7	A	10.4	B
		Euclid Avenue (SR-83) On-Ramp	2	15.8	B	16.5	B
		South of Euclid Avenue (SR-83)	2	15.0	B	16.3	B
	Northbound	North of Central Avenue	3	20.3	C	17.8	B
		Central Avenue On-Ramp	3	24.6	C	21.2	C
		Central Avenue Loop On-Ramp	3	18.7	B	16.5	B
		Central Avenue Off-Ramp	3	20.4	C	21.7	C
		Central Avenue to Pine Avenue	3	13.6	B	14.9	B
		Pine Avenue On-Ramp	2	15.8	B	18.5	C
		Pine Avenue Off-Ramp	2	22.7	C	26.4	C
		Pine Avenue to Euclid Avenue (SR-83)	2	17.2	B	20.4	C
		Euclid Avenue (SR-83) On-Ramp	2	18.6	B	22.2	C
		Euclid Avenue (SR-83) Off-Ramp	3	8.9	A	15.6	B
		South of Euclid Avenue (SR-83)	3	10.8	A	19.0	C
SR-60 Freeway	Westbound	West of Euclid Avenue (SR-83)	4	33.9	D	31.5	D
		Euclid Avenue (SR-83) On-Ramp	4	28.6	D	27.3	C
		Euclid Avenue (SR-83) Off-Ramp	4	**36.3**	**E**	**35.7**	**E**
		East of Euclid Avenue (SR-83)	4	34.6	D	33.3	D
	Eastbound	West of Euclid Avenue (SR-83)	4	31.2	D	25.7	C
		Euclid Avenue (SR-83) Off-Ramp	4	32.2	D	28.5	D
		Euclid Avenue (SR-83) On-Ramp	4	28.9	D	24.7	C
		East of Euclid Avenue (SR-83)	4	32.9	D	26.4	D

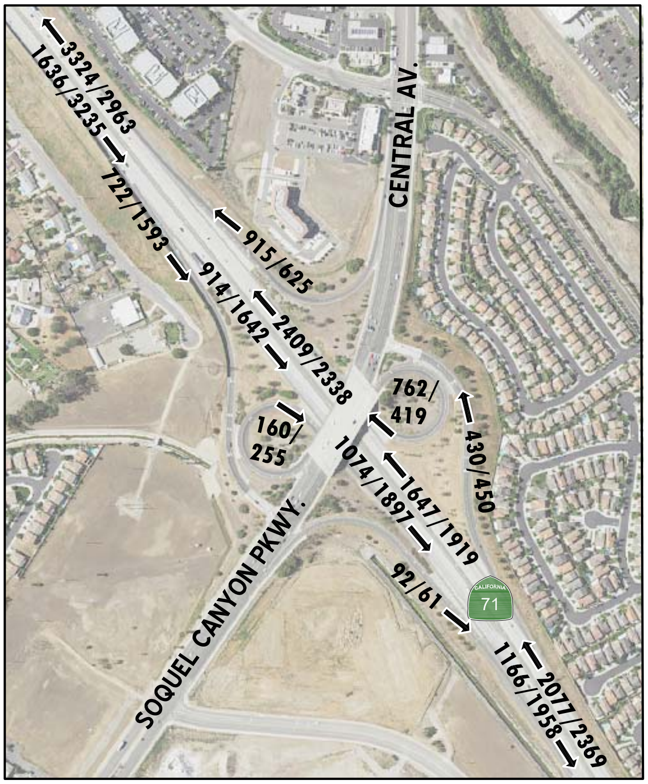
* **BOLD** = Unacceptable Level of Service

[1] Number of lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

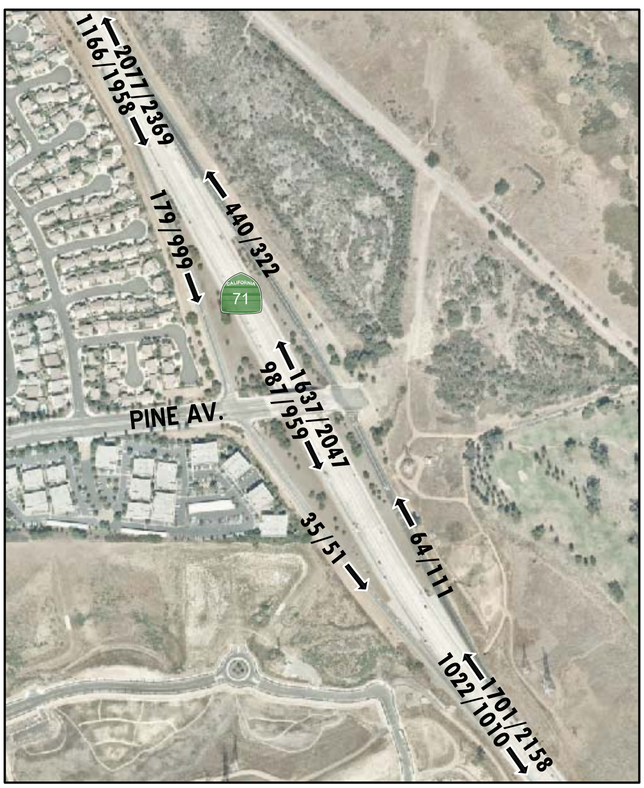
EXHIBIT 3-20: EXISTING (2019) FREEWAY MAINLINE VOLUMES



LEGEND:

100/200 = AM/PM PEAK HOUR VOLUMES

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)



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URBAN CROSSROADS

3.12 RECOMMENDED IMPROVEMENTS

Improvement strategies have been recommended at intersections and freeway segments that have been identified as impacted under Existing (2019) traffic conditions in an effort to achieve an acceptable LOS (i.e., LOS D or better).

3.12.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

Table 3-4 indicates the physical improvements needed to address LOS deficiencies at each of the study area intersections under Existing (2019) traffic conditions. The following improvements are recommended to improve the Existing (2019) deficiencies back to acceptable levels.

Central Avenue & El Prado Road (#7) – The following improvement is necessary to improve the existing deficiency to acceptable levels:

- Add a 2nd southbound left turn lane

El Prado Road & Kimball Avenue (#8) – The following improvement is necessary to improve the existing deficiency to acceptable levels:

- Restripe the southbound approach to accommodate two southbound left turn lanes and a shared through-right turn lane.

Euclid Avenue (SR-83) & Riverside Drive (#22) – The following improvement is necessary to improve the existing deficiency to acceptable levels:

- Add an eastbound right turn lane.

Euclid Avenue (SR-83) & Pine Avenue (#30) – The following improvement is necessary to improve the existing deficiency to acceptable levels:

- Add a northbound free right turn lane.

Hellman Avenue & Kimball Avenue (#40) – The following improvements are necessary to improve the existing deficiency to acceptable levels:

- Operation of the traffic signal.
- Add a 2nd northbound left turn lane.

Archibald Avenue & Schleisman Road (#43) – The following improvement is necessary to improve the existing deficiency to acceptable levels:

- Modify the traffic signal to extend the cycle length to 130 seconds.

3.12.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON OFF-RAMP QUEUES

As shown previously on Table 3-2, there are no peak hour queuing issues at the SR-71 Freeway at Central Avenue, Pine Avenue, or Euclid Avenue (SR-83) and SR-60 Freeway and Euclid Avenue (SR-83) interchanges. As such, no improvements have been recommended.

Table 3-4

Intersection Analysis for Existing (2019) Conditions With Improvements

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
7	Central Av. & El Prado Rd.																	
	-Without Improvements	TS	1	2	1>	1	3	0	1	1	0	1	1	1>	29.0	**61.2**	C	**E**
	-With Improvements	TS	1	2	1>	**2**	3	0	1	1	0	1	1	1>	27.8	31.5	C	C
8	El Prado Rd. & Kimball Av.																	
	-Without Improvements	TS	1	1	1	1	2	0	1	1	0	0	1	1>	28.1	**86.2**	C	**F**
	-With Improvements	TS	1	1	1	**2**	**1**	0	1	1	0	0	1	1>	24.4	25.7	C	C
22	Euclid Av. (SR-83) & Riverside Dr.																	
	-Without Improvements	TS	1	2	1	1	2	1>	1	1	0	1	2	d	47.0	**55.5**	D	**E**
	-With Improvements	TS	1	2	1	1	2	1>	1	1	**1**	1	2	d	45.3	49.8	D	D
30	Euclid Av. (SR-83) & Pine Av.																	
	-Without Improvements	TS	1	2	1>	1	2	0	1	1	1	2	1	0	31.9	**61.5**	C	**E**
	-With Improvements	TS	1	2	**1>>**	1	2	0	1	1	1	2	1	0	39.1	36.1	C	D
40	Hellman Av. & Kimball Av.																	
	-Without Improvements	TS[4]	1	2	0	0	2	d	1	0	1>	0	0	0	**>200.0**	**77.9**	**F**	**F**
	-With Improvements	**TS**	**2**	2	0	0	2	d	1	0	1>	0	0	0	53.3	39.7	D	D
43	Archibald Av. & Schleisman Rd.																	
	-Without Improvements	TS	2	3	1	2	3	1	2	3	1	2	3	1	**80.1**	46.5	**F**	D
	-With Improvements[5]	TS	2	3	1	2	3	1	2	3	1	2	3	1	32.8	29.6	C	C

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; d= Defacto Right Turn Lane; **1** = Improvement

[2] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] TS = Traffic Signal; **TS** = Improvement

[4] Traffic signal is currently flashing red. As such, an all-way stop controlled intersection was assumed for Existing traffic conditions only.

[5] Improvement consists of modifying the traffic signal to extend the cycle length to 130 seconds.

3.12.3 Recommended Improvements To Address Deficiencies On Freeway Facilities

At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development projects in the City of Chino (or other neighboring jurisdictions) on SHS roadway segments. As such, no improvements have been recommended to address the Existing (2019) deficiencies on the SHS, because there is no feasible mitigation available.

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4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project, as well as the Project's trip assignment onto the study area roadway network. The Project is proposed to consist of up to 2,082,750 square feet of industrial uses. For purposes of the TIA, the following land uses are assumed:

- Building 1: 1,168,710 square feet of High-Cube Fulfillment Center Warehouse use
- Building 2: 814,040 square feet of High-Cube Fulfillment Center Warehouse use
- Remainder of Building 2: 100,000 square feet of High-Cube Warehouse with Cold Storage use
- **Total of 2,082,750 square feet**

The Project's anticipated Opening Year is 2022. Although the Project is anticipated to be developed in a single phase, Building 1 has been evaluated separately for E+P traffic conditions for the purpose of identifying potential traffic impacts for Building 1 only.

4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic which is both attracted to and produced by a development. Determining traffic generation for a specific project is therefore based upon forecasting the amount of traffic that is expected to be both attracted to and produced by the specific land uses being proposed for a given development.

Trip generation rates for the Project are shown on Table 4-1 for both actual vehicles and PCE. The trip generation summary illustrating daily, and peak hour trip generation estimates for the proposed Project in actual vehicles and PCE are shown on Table 4-2. The trip generation rates used for this analysis are based upon information collected by the Institute of Transportation Engineers (ITE) as provided in their Trip Generation Manual (10th Edition, 2017) and the DRAFT TUMF High-Cube Warehouse Trip Generation Study (WSP, November 6, 2018).

Table 4-1

Project Trip Generation Rates

Land Use[1]	Units[2]	ITE LU Code	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Actual Vehicle Trip Generation Rates									
High-Cube Fulfillment Center Warehouse	TSF	--[3]	0.094	0.028	0.122	0.046	0.119	0.165	2.129
Passenger Cars (AM-84.3%; PM-87.2%; Daily-82.2%)			0.079	0.024	0.103	0.040	0.104	0.144	1.750
2-4 Axle Trucks (AM-6.3%; PM-6.4%; Daily-7.6%)			0.006	0.002	0.008	0.003	0.008	0.011	0.162
5+-Axle Trucks (AM-9.4%; PM-6.4%; Daily-10.2%)			0.008	0.003	0.011	0.003	0.007	0.010	0.217
High-Cube Cold Storage Warehouse (With Cold Storage)[4]	TSF	157	0.085	0.025	0.110	0.032	0.088	0.120	2.120
Passenger Cars (AM-69.2%; PM-78.3%; Daily-67.8%)			0.059	0.018	0.077	0.025	0.069	0.094	1.437
2-Axle Trucks (AM-10.7%; PM-7.5%; Daily-11.2%)			0.009	0.003	0.012	0.002	0.007	0.009	0.237
3-Axle Trucks (AM-3.4%; PM-2.4%; Daily-3.5%)			0.003	0.001	0.004	0.001	0.002	0.003	0.075
4-Axle+ Trucks (AM-16.7%; PM-11.8%; Daily-17.5%)			0.014	0.004	0.018	0.004	0.010	0.014	0.371
Passenger Car Equivalent (PCE) Trip Generation Rates[5]									
High-Cube Fulfillment Center Warehouse	TSF	--[3]	0.094	0.028	0.122	0.046	0.119	0.165	2.129
Passenger Cars (AM-84.3%; PM-87.2%; Daily-82.2%)			0.079	0.024	0.103	0.040	0.104	0.144	1.750
2-4 Axle Trucks (AM-6.3%; PM-6.4%; Daily-7.6%) (PCE = 2.0)			0.012	0.004	0.016	0.006	0.016	0.022	0.324
5+-Axle Trucks (AM-9.4%; PM-6.4%; Daily-10.2%) (PCE = 3.0)			0.025	0.008	0.033	0.008	0.022	0.030	0.651
High-Cube Cold Storage Warehouse (With Cold Storage)[4]	TSF	157	0.085	0.025	0.110	0.032	0.088	0.120	2.120
Passenger Cars (AM-69.2%; PM-78.3%; Daily-67.8%)			0.059	0.018	0.077	0.025	0.069	0.094	1.437
2-Axle Trucks (AM-10.7%; PM-7.5%; Daily-11.2%) (PCE = 1.5)			0.014	0.004	0.018	0.004	0.010	0.014	0.355
3-Axle Trucks (AM-3.4%; PM-2.4%; Daily-3.5%) (PCE = 2.0)			0.006	0.002	0.008	0.002	0.004	0.006	0.150
4-Axle+ Trucks (AM-16.7%; PM-11.8%; Daily-17.5%) (PCE = 3.0)			0.043	0.013	0.056	0.011	0.031	0.042	1.114

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Tenth Edition (2017).

[2] TSF = thousand square feet; VFP = Vehicle Fueling Position

[3] Trip Generation Source: High Cube Warehouse Trip Generation Study, WSP, January 29, 2019.
Inbound and outbound split source: High Cube Warehouse Vehicle Trip Generation Analysis, October 2016, ITE.

[4] Vehicle Mix Source: High Cube Warehouse Vehicle Trip Generation Analysis, October 2016, ITE.
Truck Mix: South Coast Air Quality Management District's (SCAQMD) recommended truck mix, by axle type for high-cube warehouse. PCE rates are per SBCTA.

Table 4-2

Project Trip Generation Summary

Land Use	Quantity	Units[1]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Project Trip Generation Summary (Actual Vehicles)									
High-Cube Fulfillment Center Warehouse (Building 1)	1,168.710	TSF							
Passenger Cars:			93	28	121	47	121	168	2,046
Truck Trips:									
2-4 axle:			7	2	9	4	9	13	190
5+-axle:			10	3	13	3	8	11	254
- Net Truck Trips			17	5	22	7	17	24	444
High-Cube Fulfillment Center Warehouse (Building 2)	814.040	TSF							
Passenger Cars:			65	19	84	33	84	117	1,426
Truck Trips:									
2-4 axle:			5	1	6	3	6	9	132
5+-axle:			7	2	9	2	6	8	178
- Net Truck Trips			12	3	15	5	12	17	310
High-Cube Warehouse (With Cold Storage) (Building 2)	100.000	TSF							
Passenger Cars:			6	2	8	3	7	10	144
Truck Trips:									
2-axle:			1	0	1	0	1	1	24
3-axle:			0	0	0	0	0	0	8
4+-axle:			1	0	1	0	1	1	38
- Net Truck Trips			2	0	2	0	2	2	70
Total Passenger Cars			164	49	213	83	212	295	3,616
Total Trucks			31	8	39	12	31	43	824
Truck %			19%	16%	18%	14%	15%	15%	23%
TOTAL NET TRIPS (Actual Vehicles) [2]			**195**	**57**	**252**	**95**	**243**	**338**	**4,440**
Project Trip Generation Summary (PCE)									
High-Cube Fulfillment Center Warehouse (Building 1)	1,168.710	TSF							
Passenger Cars:			93	28	121	47	121	168	2,046
Truck Trips:									
2-4 axle:			14	4	18	7	19	26	380
5+-axle:			30	9	39	10	25	35	762
- Net Truck Trips			44	13	57	17	44	61	1,142
High-Cube Fulfillment Center Warehouse (Building 2)	814.040	TSF							
Passenger Cars:			65	19	84	33	84	117	1,426
Truck Trips:									
2-4 axle:			10	3	13	5	13	18	264
5+-axle:			21	6	27	7	18	25	530
- Net Truck Trips			31	9	40	12	31	43	794
High-Cube Warehouse (With Cold Storage) (Building 2)	100.000	TSF							
Passenger Cars:			6	2	8	3	7	10	144
Truck Trips:									
2-axle:			1	0	1	0	1	1	36
3-axle:			1	0	1	0	0	0	16
4+-axle:			4	1	5	1	3	4	112
- Net Truck Trips			6	1	7	1	4	5	164
Total Passenger Cars (PCE)			164	49	213	83	212	295	3,616
Total Trucks (PCE)			81	23	104	30	79	109	2,100
TOTAL NET TRIPS (PCE) [2]			**245**	**72**	**317**	**113**	**291**	**404**	**5,716**

[1] TSF = thousand square feet

[2] TOTAL NET TRIPS = Passenger Cars + Net Truck Trips.

The following land uses, and vehicle mixes have been utilized:

- High-Cube Fulfillment Center Warehouse has been used to derive site specific trip generation estimates for up to 1,982,700 square feet of the proposed Project. The ITE Trip Generation Manual (2017) has trip generation rates for high-cube fulfillment center use (ITE land use code 155), however, these rates are unreliable because they are based on limited data (i.e., one to two surveyed sites) and the ITE Trip Generation Manual recommends the use of local data sources where available. As such, the trip-generation statistics published in the High-Cube Warehouse Trip Generation Study (WSP, November 6, 2018) which was commissioned by the Western Riverside Council of Governments (WRCOG) in support of the Transportation Uniform Mitigation Fee (TUMF) update, has been utilized for the high-cube fulfillment center use. (4) The WSP trip generation rates were published in November 2018 and are based on data collected at 11 local high-cube fulfillment center sites. However, the WSP study does not include a split for inbound and outbound vehicles, as such, the inbound and outbound splits per the ITE High-Cube Warehouse Vehicle Trip Generation Analysis (October 2016) have been utilized.
- ITE land use code 157 (High-Cube with Cold Storage Warehouse) has been used to derive site specific trip generation estimates for up to 100,000 square feet of the proposed Project. The truck percentage was obtained from the ITE's High Cube Warehouse Vehicle Trip Generation Analysis (October 2016). The vehicle mix varies by peak hour and overall daily: 69.2% passenger cars in the AM peak hour, 78.3% passenger cars in the PM peak hour, and 67.8% passenger cars weekday daily, with the remaining percentages associated with heavy trucks. Trip generation for heavy trucks was further broken down by truck type (or axle type). The total truck percentage is comprised of 3 different truck types: 2-axle, 3-axle, and 4+-axle trucks. For the purposes of this analysis, the percentage of trucks, by axle type, were obtained from the SCAQMD Warehouse Truck Trip Study Data Results and Usage (2014) recommended truck mix. The SCAQMD has recently performed surveys of existing facilities and compiled the data to provide interim guidance on the mix of heavy trucks for these types of high-cube warehousing/distribution facilities. Based on this interim guidance from the SCAQMD, the following truck fleet mix was utilized for the purposes of estimating the truck trip generation for the site (with cold storage): 34.7% of the total trucks as 2-axle trucks, 11.0% of the total trucks as 3-axle trucks, and 54.3% of the total trucks as 4+-axle trucks.

Trip generation for heavy trucks was further broken down by truck type (or axle type). The total truck percentage is comprised of 2 different truck types: 2-4 axle, and 5+-axle trucks. PCE factors were applied to the trip generation rates for heavy trucks (large 2-4 axles, 5+-axles). PCEs allow the typical "real-world" mix of vehicle types to be represented as a single, standardized unit, such as the passenger car, to be used for the purposes of capacity and level of service analyses. A PCE factor was applied to the trip generation for heavy trucks (large 2-axles, 3-axles, and 4+-axles). PCEs allow the typical "real-world" mix of vehicle types to be represented as a single, standardized unit, such as the passenger car, to be used for the purposes of capacity and level of service analyses. The PCE factors are consistent with the recommended PCE factors in Appendix B of the San Bernardino County CMP, 2016 Update. (1)

As shown on Table 4-2, the proposed Project is anticipated to generate a net total of 5,716 PCE trip-ends per day, 317 PCE AM peak hour trips and 404 PCE PM peak hour trips. In comparison, the proposed Project is anticipated to generate a net total of 4,440 actual vehicle trip-ends per day with 252 AM peak hour trips and 338 PM peak hour trips.

4.2 PROJECT TRIP DISTRIBUTION

The Project trip distribution and assignment process represents the directional orientation of traffic to and from the Project site. The trip distribution pattern of passenger cars is heavily influenced by the geographical location of the site, the location of surrounding uses, and the proximity to the regional freeway system. The trip distribution pattern for truck traffic is also influenced by the local truck routes approved by the City of Chino. Given these differences, separate trip distributions were generated for both passenger cars and truck trips, for each analysis scenario.

Both the near-term and Horizon Year trip distribution patterns are primarily based on the existing roadway system in relation to the Horizon Year trip distribution patterns. The Project trip distribution patterns are also affected by near-term development patterns in the vicinity of the Project site. It is our understanding that the Pine Avenue Extension west of El Prado Road is anticipated to occur after the Project's anticipated Opening Year. As such, the Pine Avenue Extension would only be assumed to be in place for Horizon Year traffic conditions. As funding has not yet been secured, other roadway network changes within the study area, such as the Limonite Avenue/Kimball Avenue extension between Hellman Avenue and Archibald Avenue, will be evaluated as part of Horizon Year traffic conditions only.

Exhibit 4-1 shows the near-term passenger car trip distribution patterns, which utilizes the existing roadway network. Similarly, Exhibit 4-2 shows the near-term truck trip distribution patterns. Both these distributions will be utilized for E+P (Building 1), E+P (Project Buildout), and Opening Year Cumulative (2022) traffic conditions. As shown on Exhibit 4-2, trucks are anticipated to utilize designated truck routes such as Euclid Avenue (SR-83), Mountain Avenue, Kimball Avenue, Bickmore Avenue, Pine Avenue, Central Avenue, Limonite Avenue, and Archibald Avenue to reach regional freeways such as the SR-71, SR-60, and I-15 Freeways.

Exhibit 4-3 shows the Horizon Year passenger car trip distribution patterns, which utilize future long-range connections such as the Pine Avenue extension between El Prado Road and the SR-71 Freeway and the extension of Kimball Avenue between Hellman Avenue and Limonite Avenue into the City of Eastvale. The passenger car trip distribution patterns are consistent with other proposed industrial/non-residential uses within the immediate area. Exhibit 4-4 shows the Horizon Year truck trip distribution patterns. The distributions shown on Exhibits 4-3 and 4-4 will be utilized for Horizon Year (2040) traffic conditions.

4.3 MODAL SPLIT

The potential for Project trips (non-truck) to be reduced by the use of public transit, walking or bicycling have not been included as part of the Project's estimated trip generation. Essentially, the Project's traffic projections are "conservative" in that these alternative travel modes would reduce the forecasted traffic volumes (non-truck trips only).

EXHIBIT 4-1: PROJECT (NEAR-TERM PASSENGER CAR) TRIP DISTRIBUTION

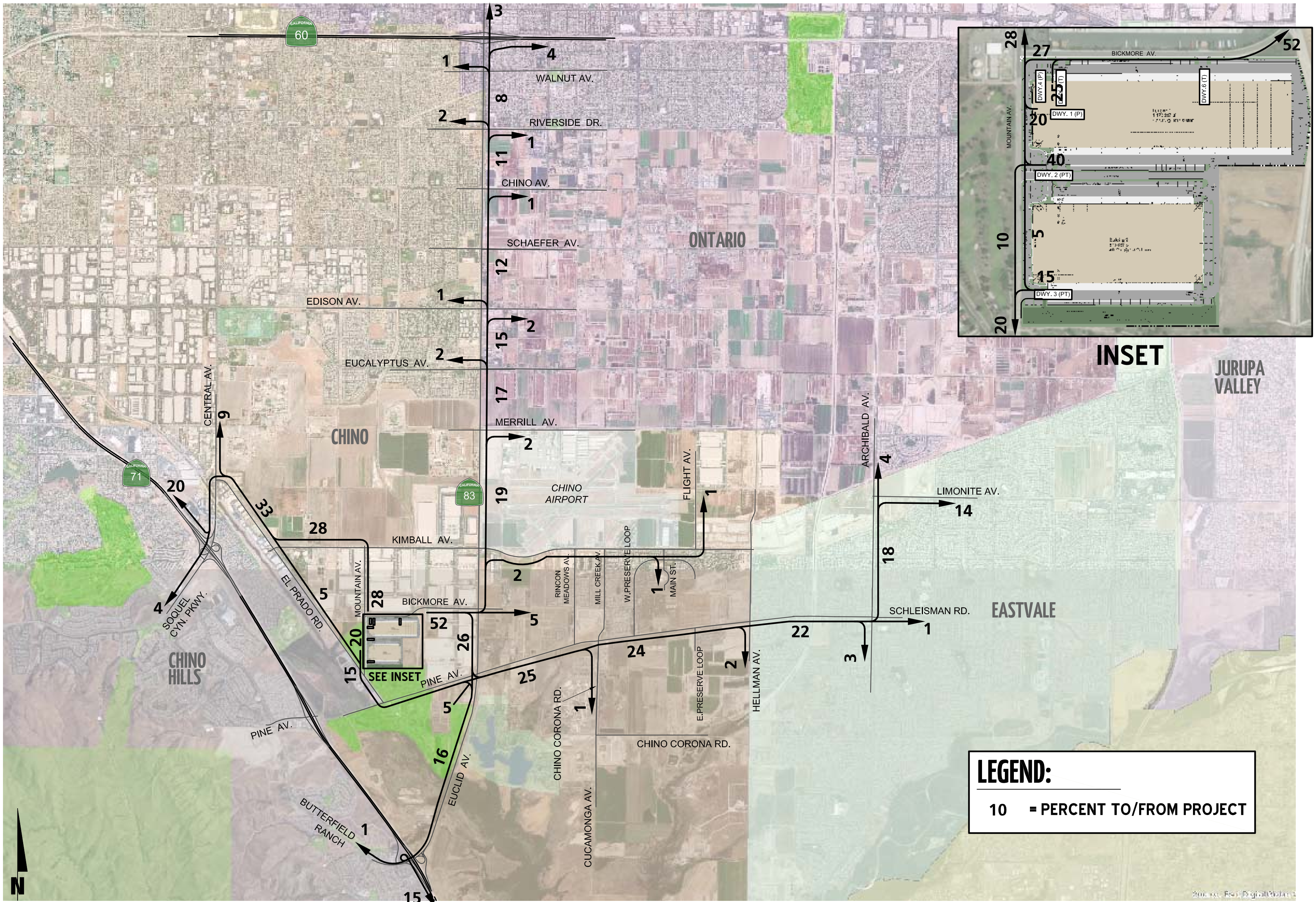


EXHIBIT 4-2: PROJECT (NEAR-TERM TRUCKS) TRIP DISTRIBUTION

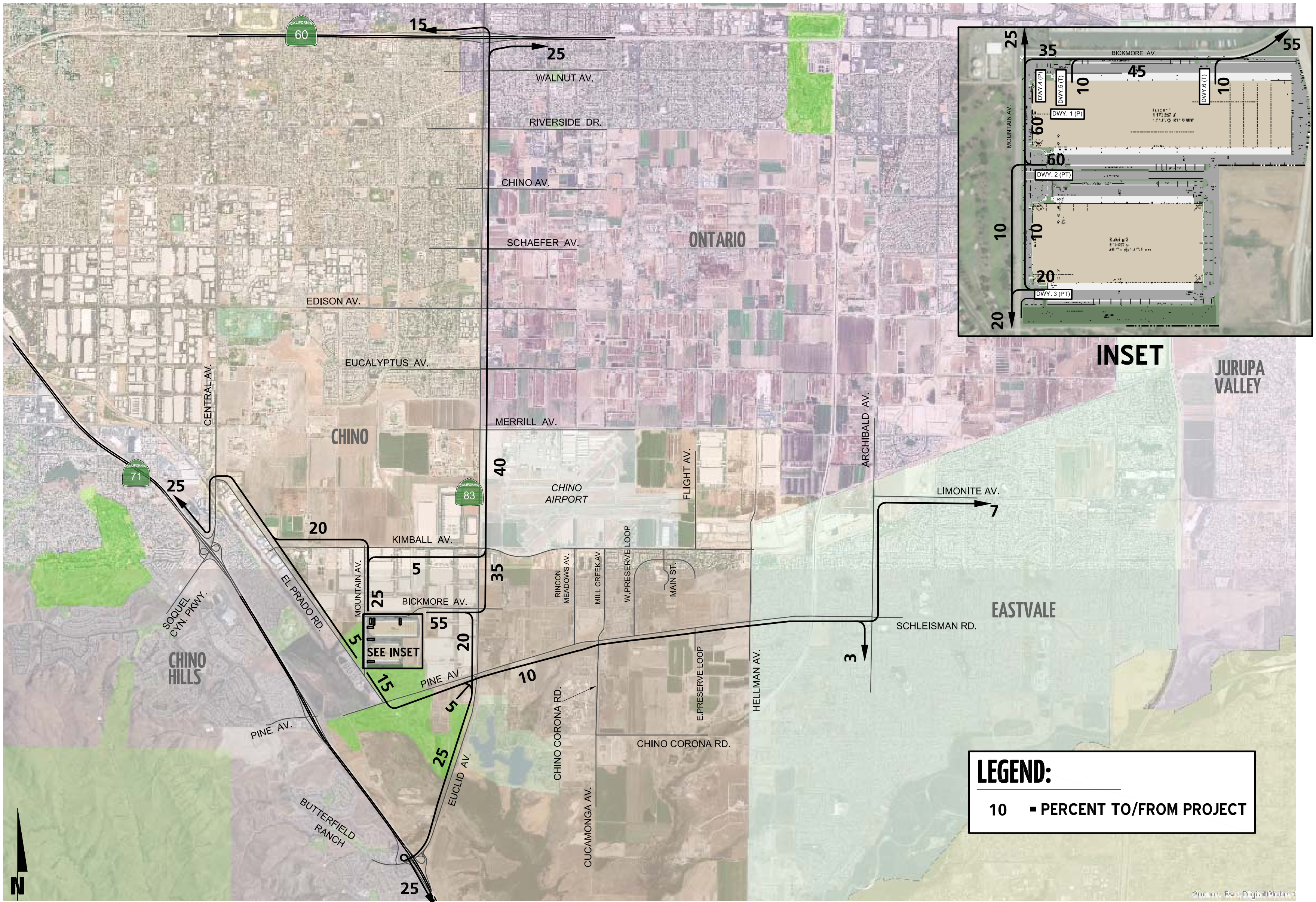


Exhibit 4-3: Project (Horizon Year Passenger Car) Trip Distribution

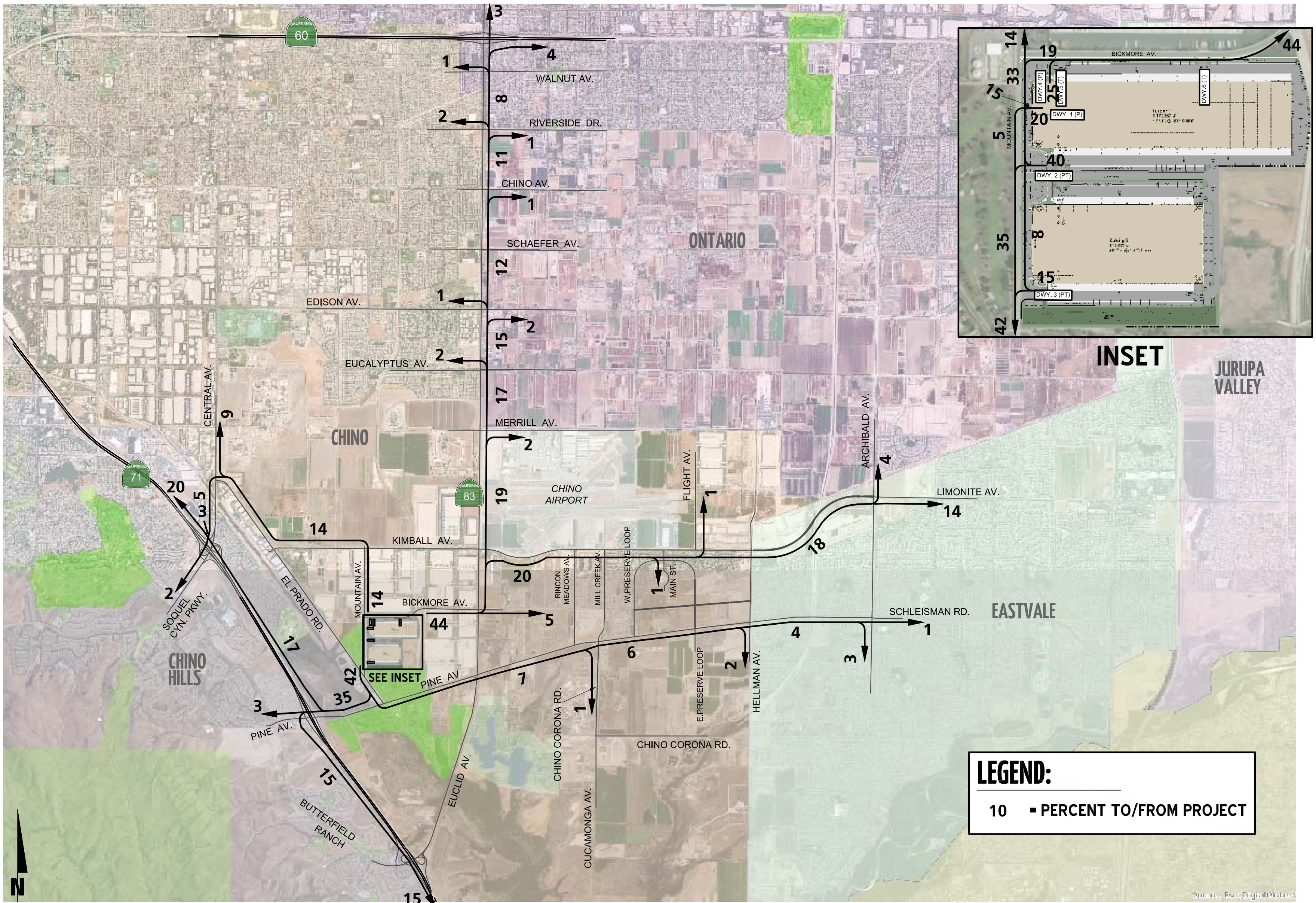
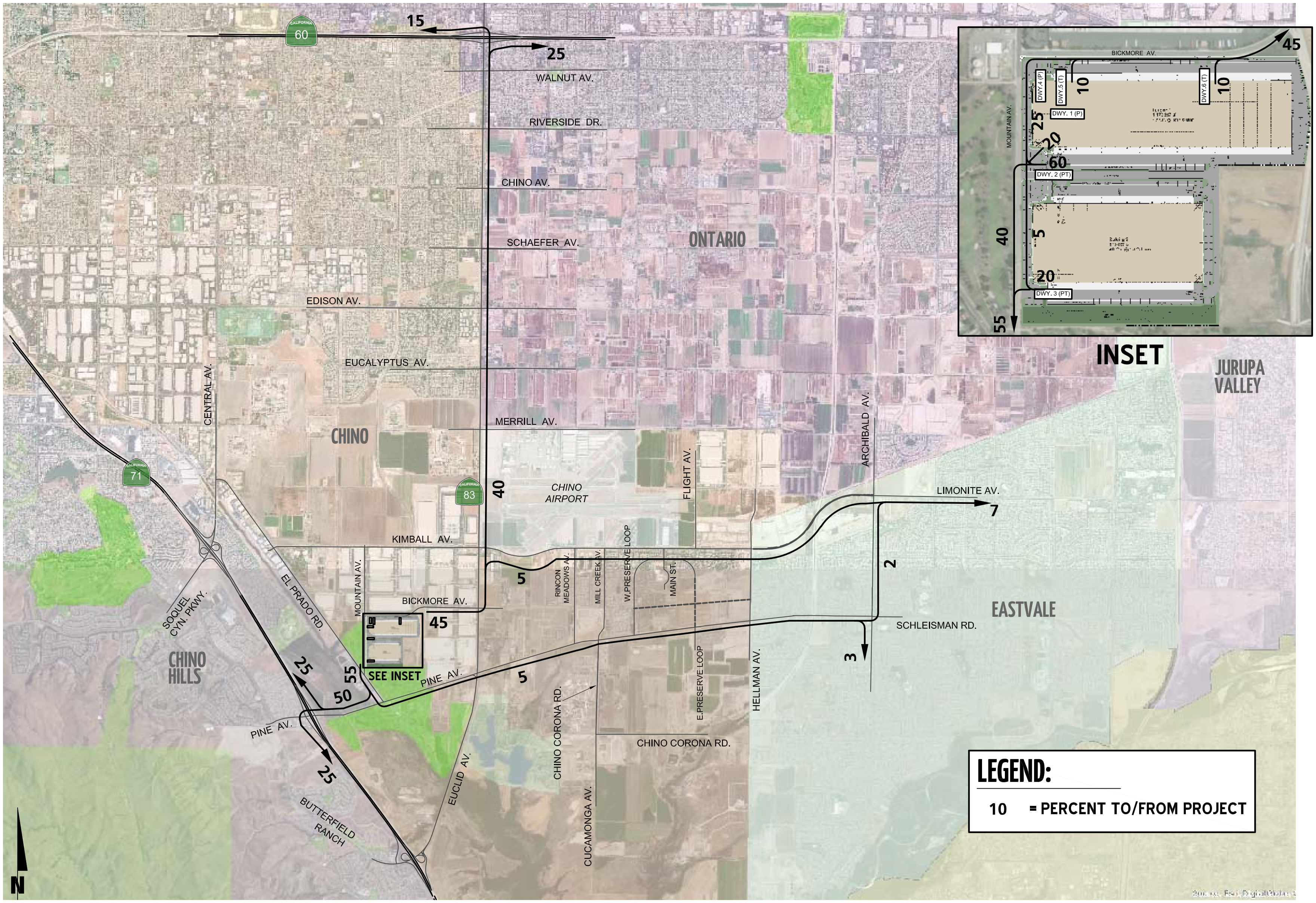


EXHIBIT 4-4: PROJECT (HORIZON YEAR TRUCKS) TRIP DISTRIBUTION



4.4 PROJECT TRIP ASSIGNMENT

The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, Project ADT and peak hour intersection turning movement volumes are shown on Exhibits 4-5 and 4-6 for E+P (Building 1), Exhibits 4-7 and 4-8 for E+P (Project Buildout) and Opening Year Cumulative (2022), and Exhibits 4-9 and 4-10 for Horizon Year (2040) traffic conditions.

4.5 BACKGROUND TRAFFIC

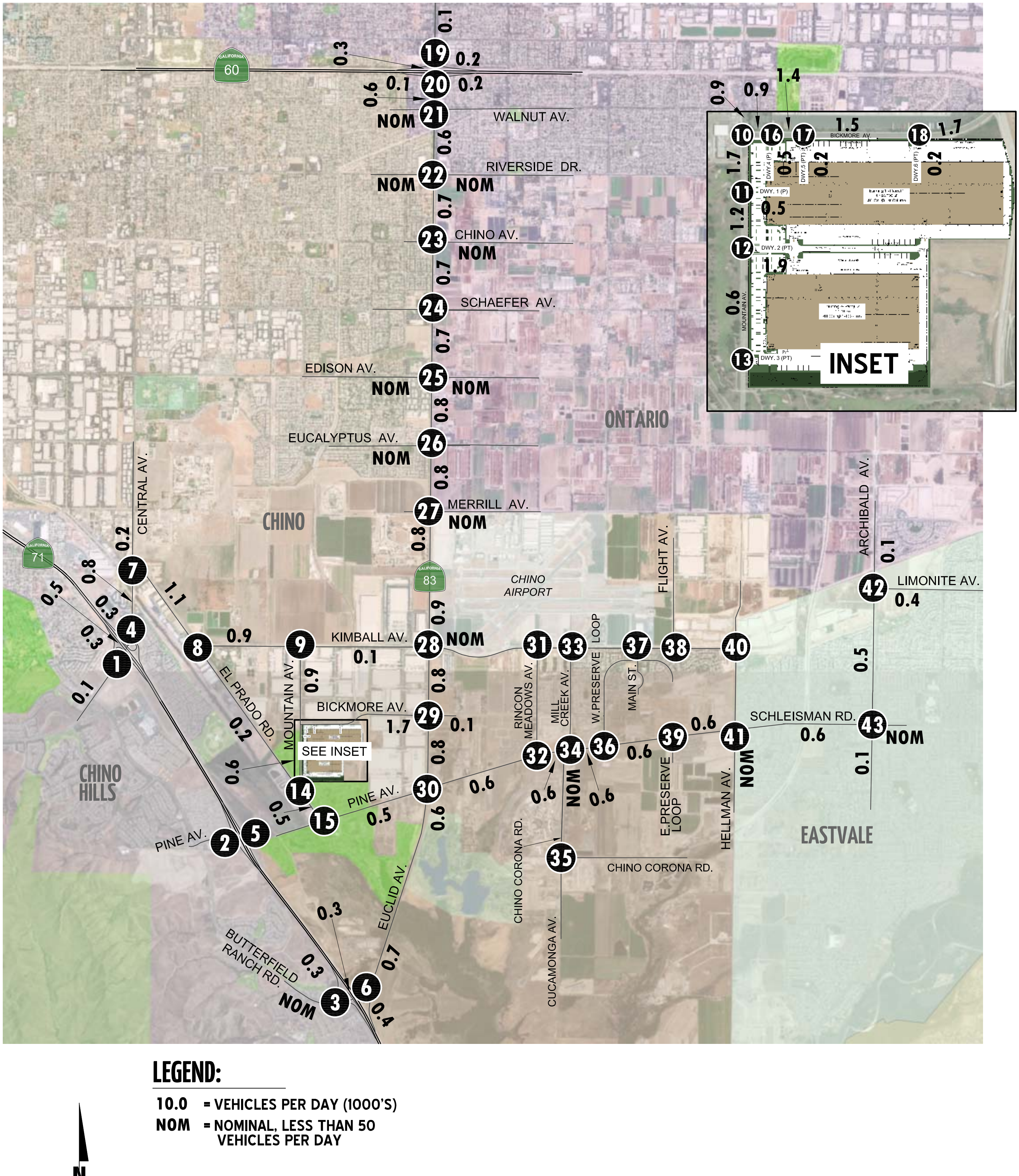
4.5.1 OPENING YEAR CUMULATIVE CONDITIONS

Future year traffic forecasts have been based upon background (ambient) growth at 2% per year for 2022 traffic conditions. The ambient growth factor is intended to approximate regional traffic growth. The total ambient growth is 6.12% for 2022 traffic conditions (compounded growth of 2 percent per year over 3 years or $1.02^{3\ \text{years}}$). This ambient growth rate is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development projects. Ambient growth has been added to daily and peak hour traffic volumes on surrounding roadways, in addition to traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies. Opening Year Cumulative (2022) traffic volumes are provided in Section 7 *Opening Year Cumulative (2022) Traffic Conditions* of this report. The traffic generated by the proposed Project was then manually added to the base volume to determine Opening Year Cumulative With Project forecasts.

4.5.2 HORIZON YEAR (2040) CONDITIONS

The adopted Southern California Association of Governments (SCAG) 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) (April 2016) growth forecasts for the City of Chino identifies projected growth in population of 79,400 in 2012 to 120,400 in 2040, or a 51.64% increase over the 28-year period. (8) The change in population equates to roughly a 1.50% growth rate, compounded annually. Similarly, growth over the same 28-year period in households is projected to increase by 61.90%, or a 1.74% annual growth rate. Finally, growth in employment over the same 28-year period is projected to increase by 18.78%, or a 0.62% annual growth rate.

EXHIBIT 4-5: PROJECT (BUILDING 1) ONLY AVERAGE DAILY TRAFFIC (ADT) (IN PCE)



10349 - adt.dwg

EXHIBIT 4-6 (1OF2): PROJECT (BUILDING 1) ONLY TRAFFIC VOLUMES (IN PCE)

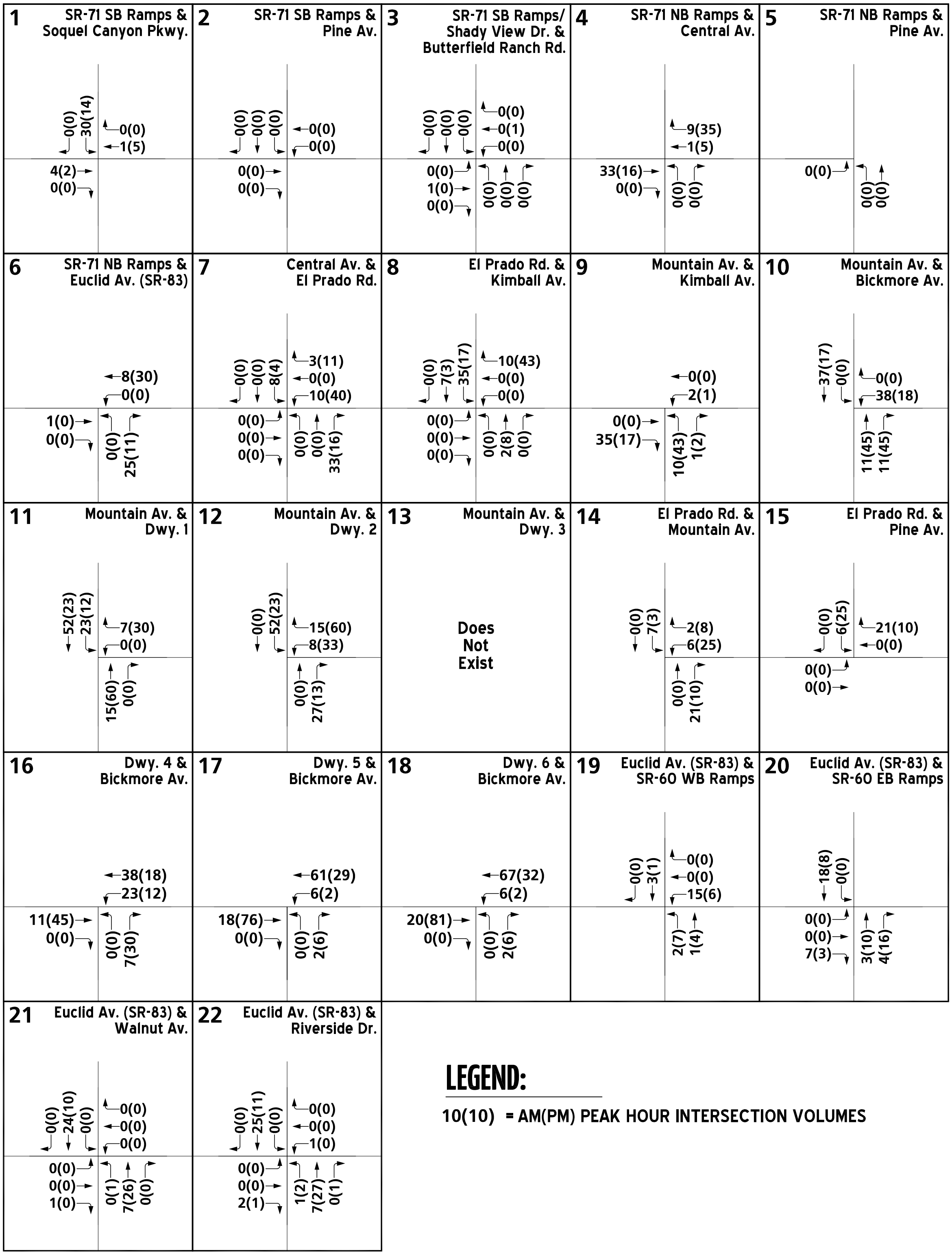


EXHIBIT 4-6 (2OF2): PROJECT (BUILDING 1) ONLY TRAFFIC VOLUMES (IN PCE)

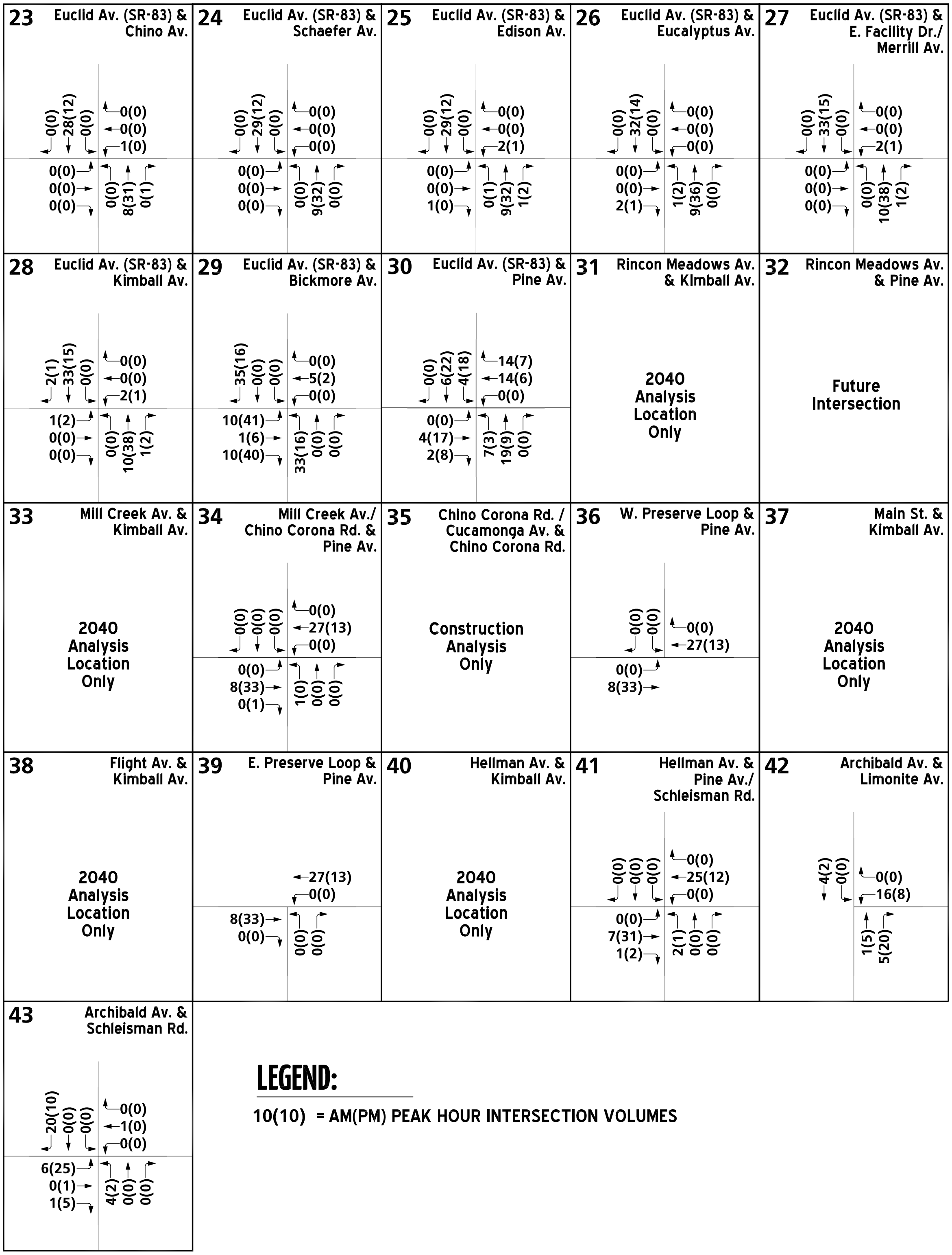
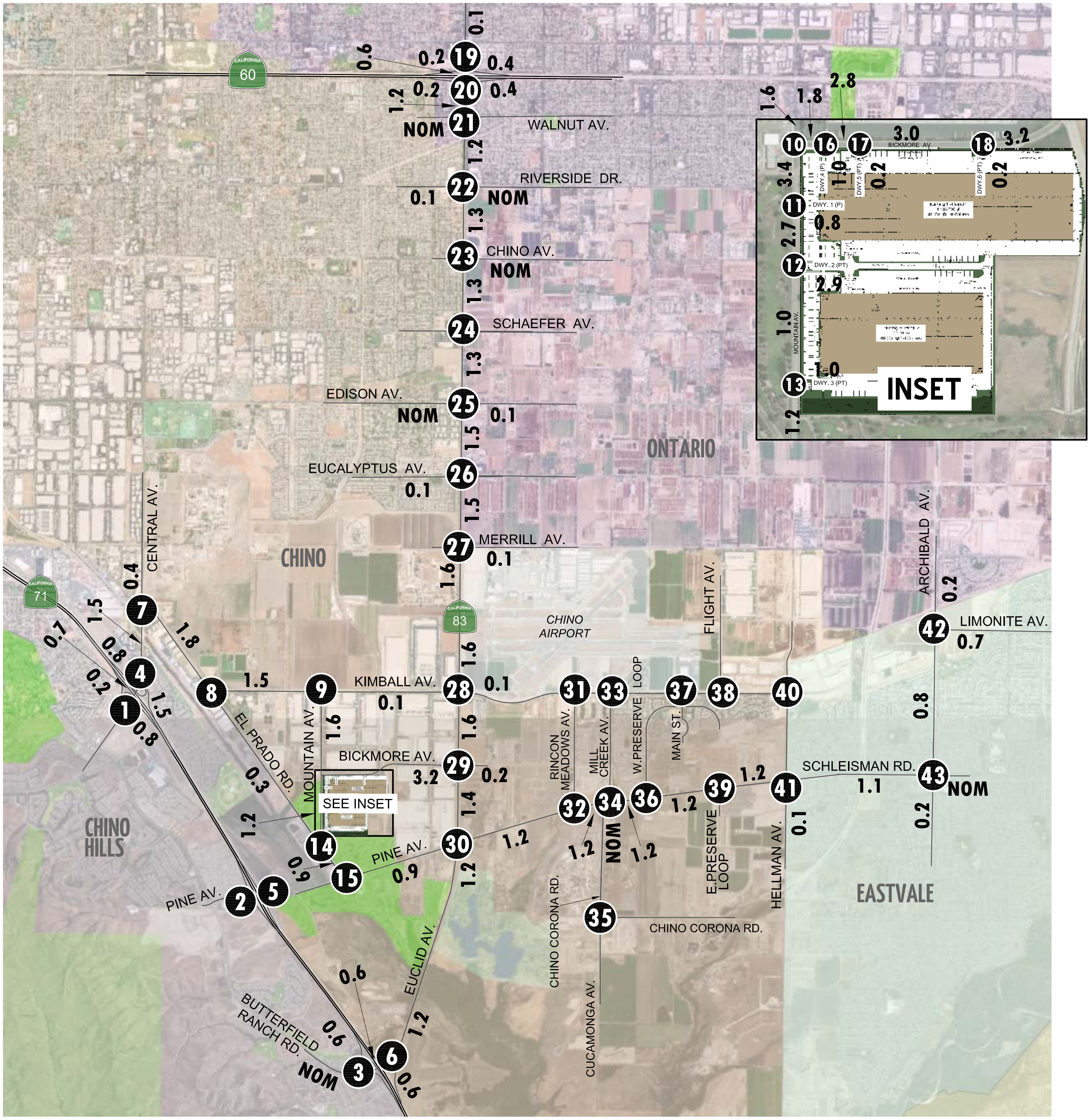


EXHIBIT 4-7: PROJECT (PROJECT BUILDOUT) ONLY AVERAGE DAILY TRAFFIC (ADT) (IN PCE)



LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

NOM = NOMINAL, LESS THAN 50 VEHICLES PER DAY

N

EXHIBIT 4-8 (1OF2): PROJECT (PROJECT BUILDOUT) ONLY TRAFFIC VOLUMES (IN PCE)

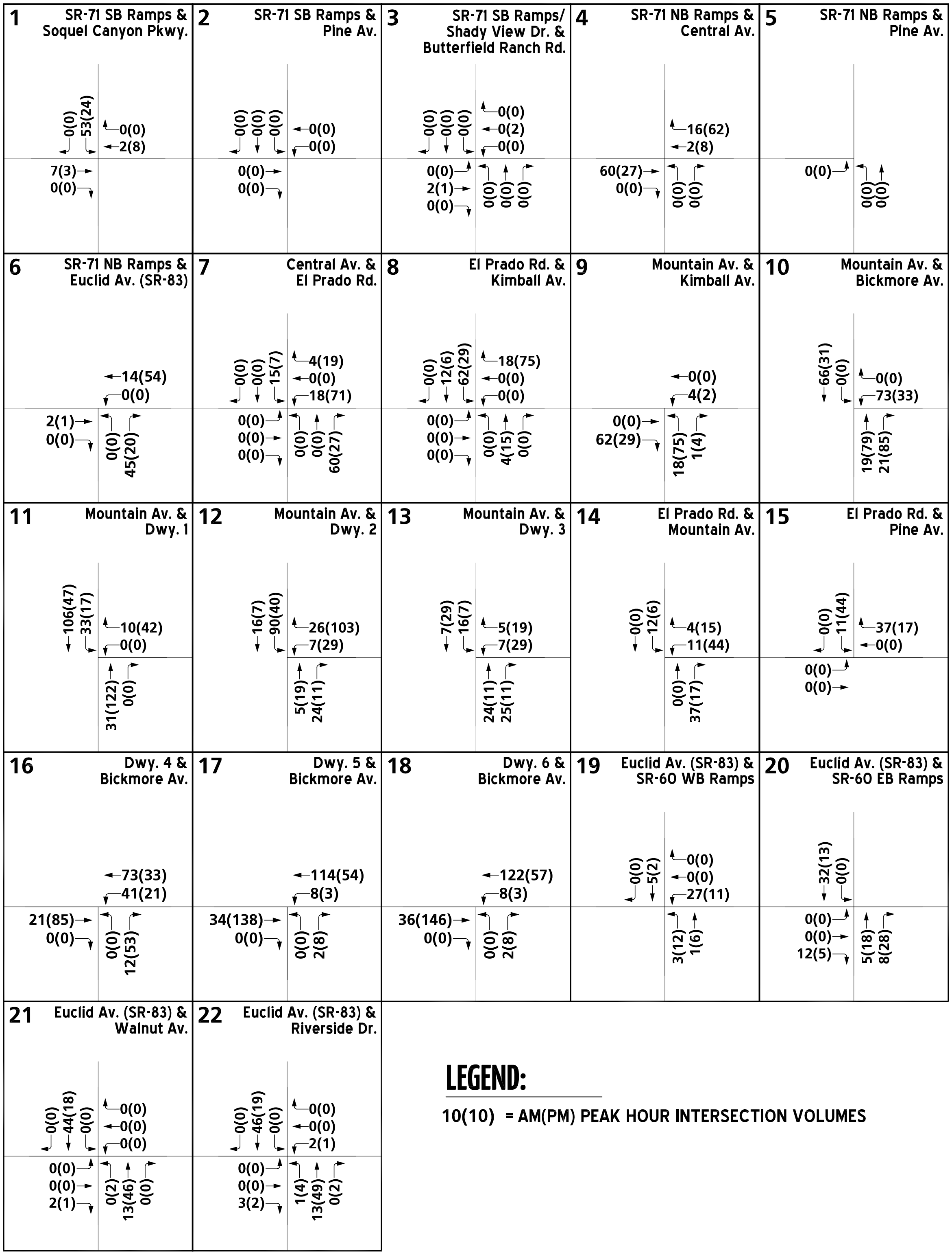


EXHIBIT 4-8 (2OF2): PROJECT (PROJECT BUILDOUT) ONLY TRAFFIC VOLUMES (IN PCE)

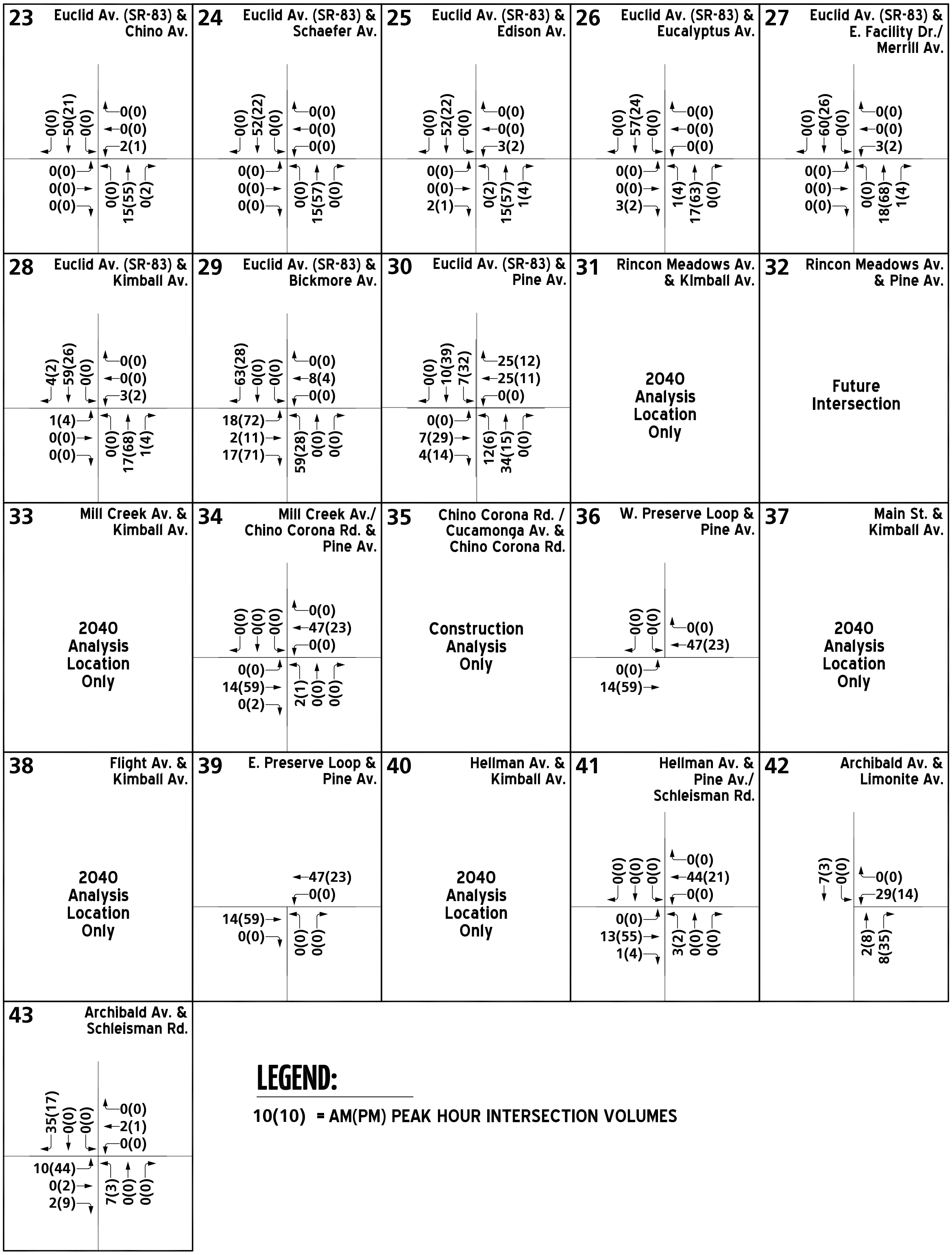
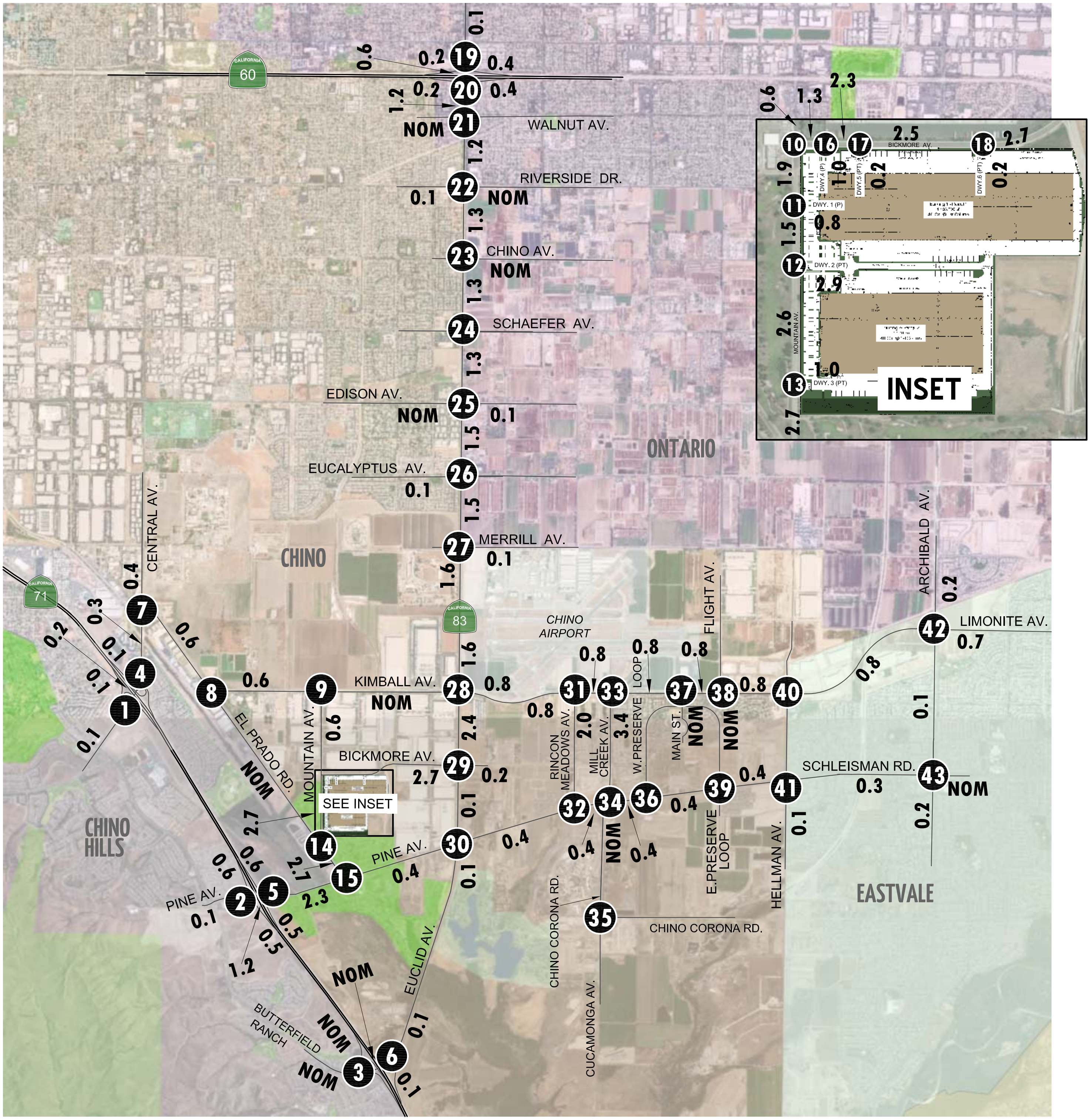


EXHIBIT 4-9: PROJECT ONLY (HORIZON YEAR) AVERAGE DAILY TRAFFIC (ADT) (IN PCE)



LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

NOM = NOMINAL, LESS THAN 50 VEHICLES PER DAY

N

EXHIBIT 4-10 (1OF2): PROJECT ONLY (HORIZON YEAR) TRAFFIC VOLUMES (IN PCE)

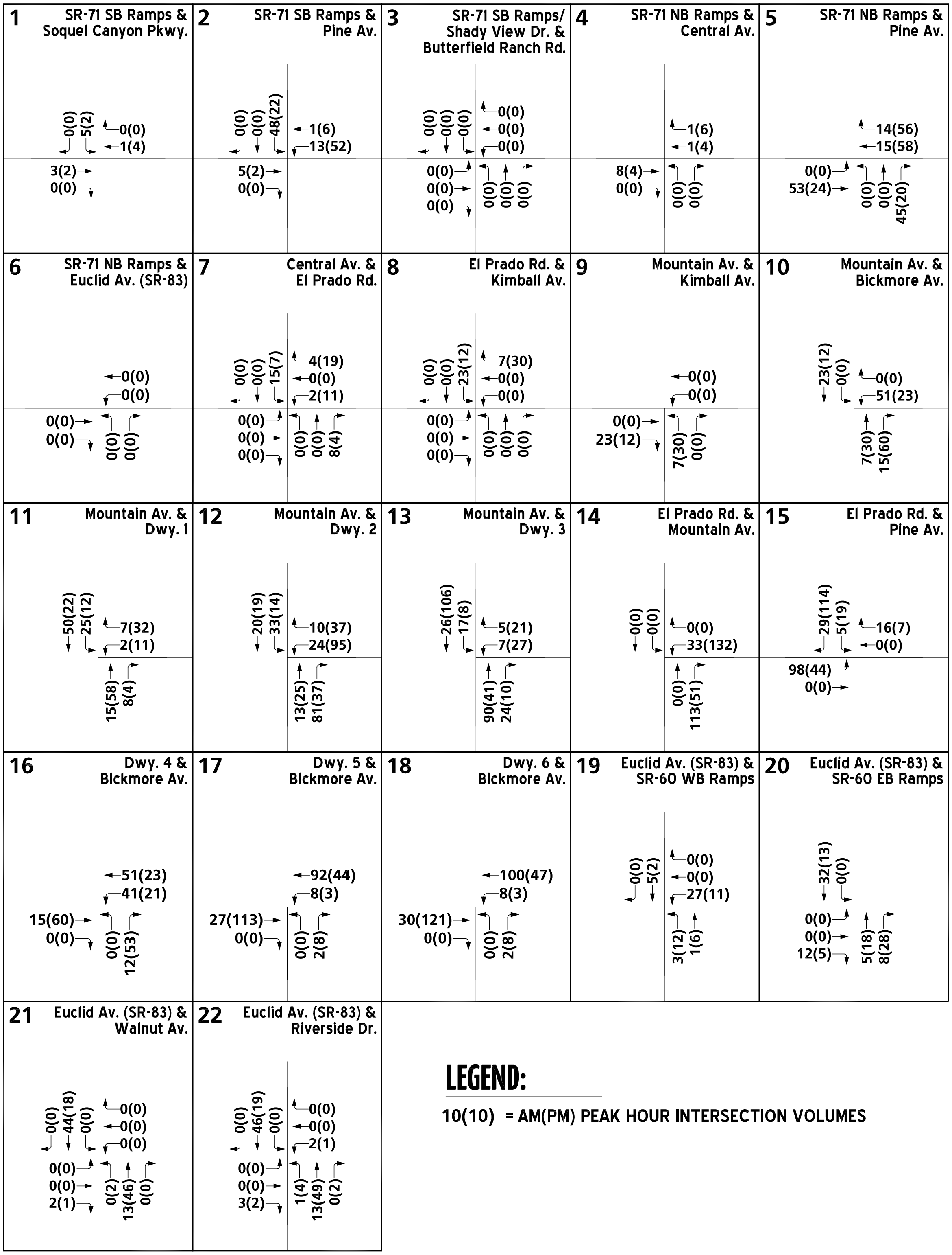
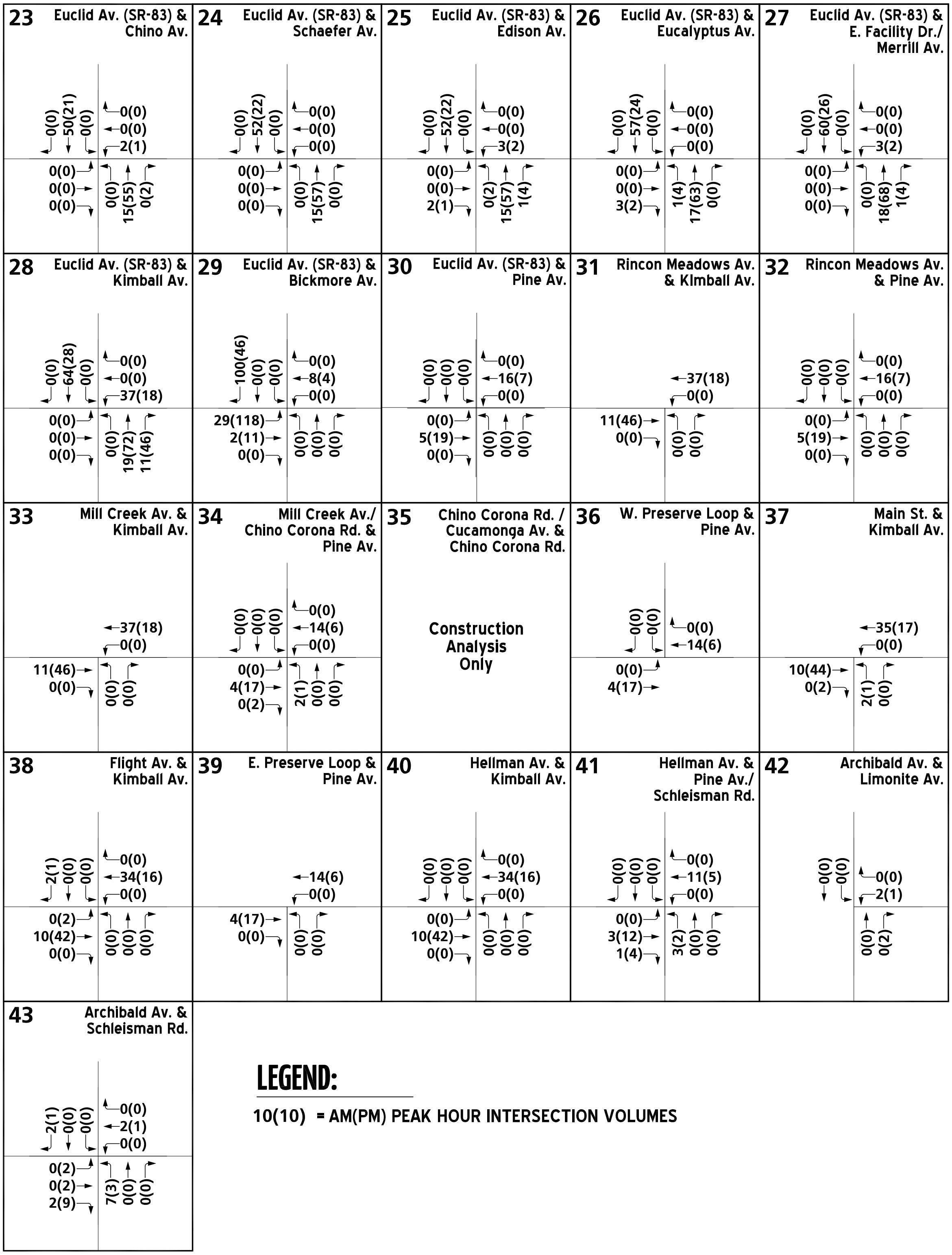


EXHIBIT 4-10 (2OF2): PROJECT ONLY (HORIZON YEAR) TRAFFIC VOLUMES (IN PCE)



Based on a comparison of Existing (2019) traffic volumes to the Horizon Year (2040) forecasts, the average growth rate is estimated at approximately 2.73%, compounded annually between Existing (2019) and 2040 traffic conditions. The annual growth rate at each individual intersection is not lower than 0.92% compounded annually to as high as 9.18% compounded annually over the same time period. Therefore, the annual growth rate utilized for the purposes of this analysis would appear to conservatively approximate the anticipated regional growth in traffic volumes in the City of Chino for Opening Year Cumulative and Horizon Year (2040) traffic conditions, especially when considered along with the addition of project-related traffic, which would tend to overstate as opposed to understate the potential impacts to traffic and circulation.

4.6 CUMULATIVE DEVELOPMENT TRAFFIC

California Environmental Quality Act (CEQA) guidelines require that other reasonably foreseeable development projects which are either approved or being processed concurrently in the study area also be included as part of a cumulative analysis scenario. A cumulative project list was developed for the purposes of this analysis through consultation with planning and engineering staff from the City of Chino. The neighboring jurisdiction of Chino Hills has also been contacted to include key projects in their respective cities.

Exhibit 4-11 illustrates the cumulative development location map. A summary of cumulative development projects and their proposed land uses are shown on Table 4-3. If applicable, the traffic generated by individual cumulative projects was manually added to the Opening Year Cumulative forecasts to ensure that traffic generated by the listed cumulative development projects on Table 4-3 are reflected as part of the background traffic. Cumulative only ADT and peak hour intersection turning movement volumes are shown on Exhibits 4-12 and 4-13, respectively.

4.7 HORIZON YEAR (2040) VOLUME DEVELOPMENT

Traffic projections for Horizon Year (2040) without Project conditions were derived from the San Bernardino Transportation Analysis Model (SBTAM) using accepted procedures for model forecast refinement and smoothing for study area intersections located within the County of San Bernardino. The current version of the SBTAM (Version 2.20, March 2019) reflects the local input in the adopted 2016 SCAG RTP within the County of San Bernardino.

The traffic forecasts reflect the area-wide growth anticipated between Existing (2019) conditions and Horizon Year (2040) traffic conditions. In most instances the traffic model zone structure is not designed to provide accurate turning movements along arterial roadways unless refinement and reasonableness checking is performed. Therefore, the Horizon Year (2040) peak hour forecasts were refined using the model derived long range forecasts, base (validation) year model forecasts, along with existing peak hour traffic count data collected at each analysis location in January 2019. The SBTAM has a base (validation) year of 2012 and a horizon (future forecast) year of 2040. The difference in model volumes (2040-2012) defines the growth in traffic over the 28-year period. Similarly, the Riverside Transportation Analysis Model (RivTAM) has a base (validation) year of 2012 and a horizon (future forecast) year of 2040.

EXHIBIT 4-11: CUMULATIVE DEVELOPMENT LOCATION MAP

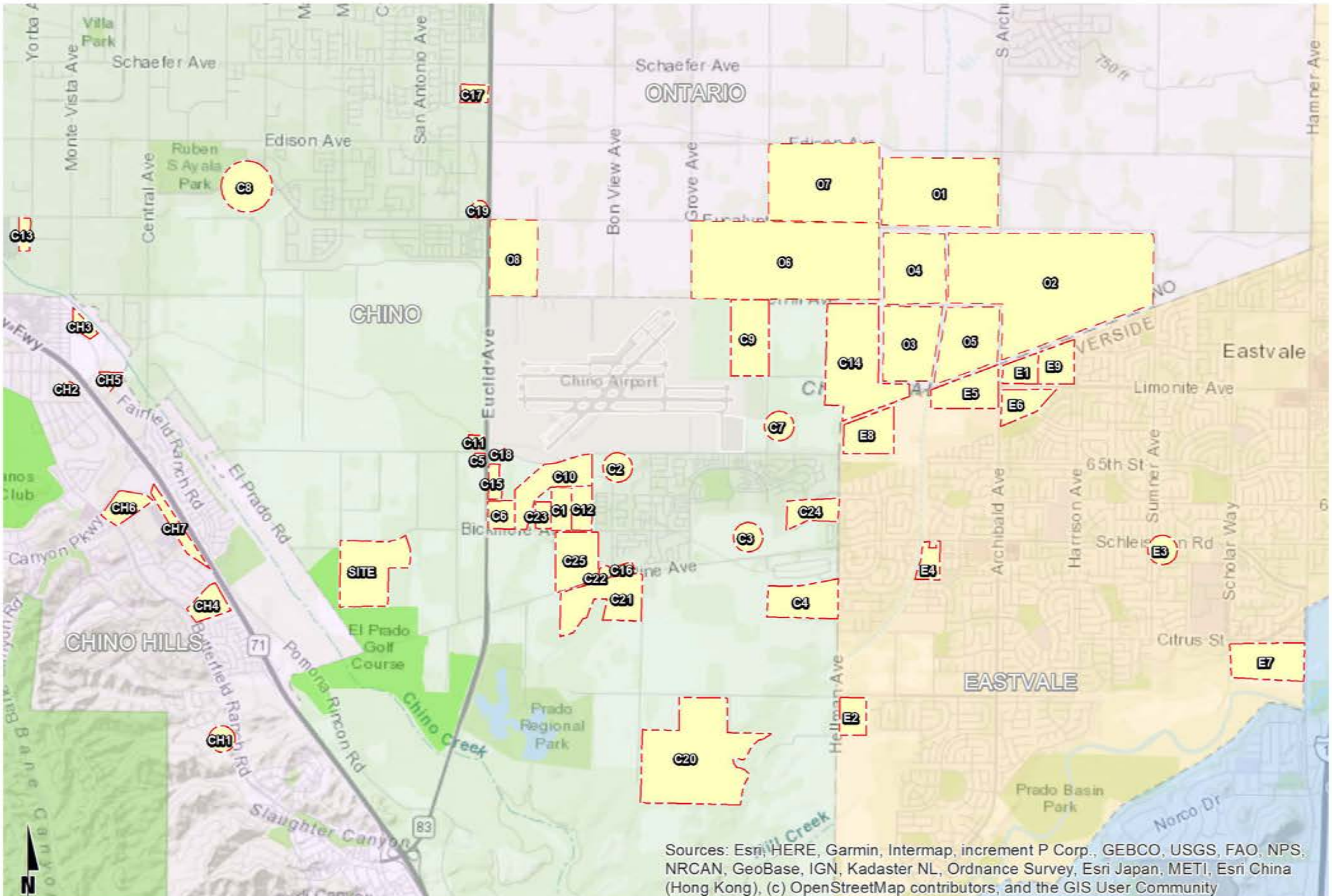
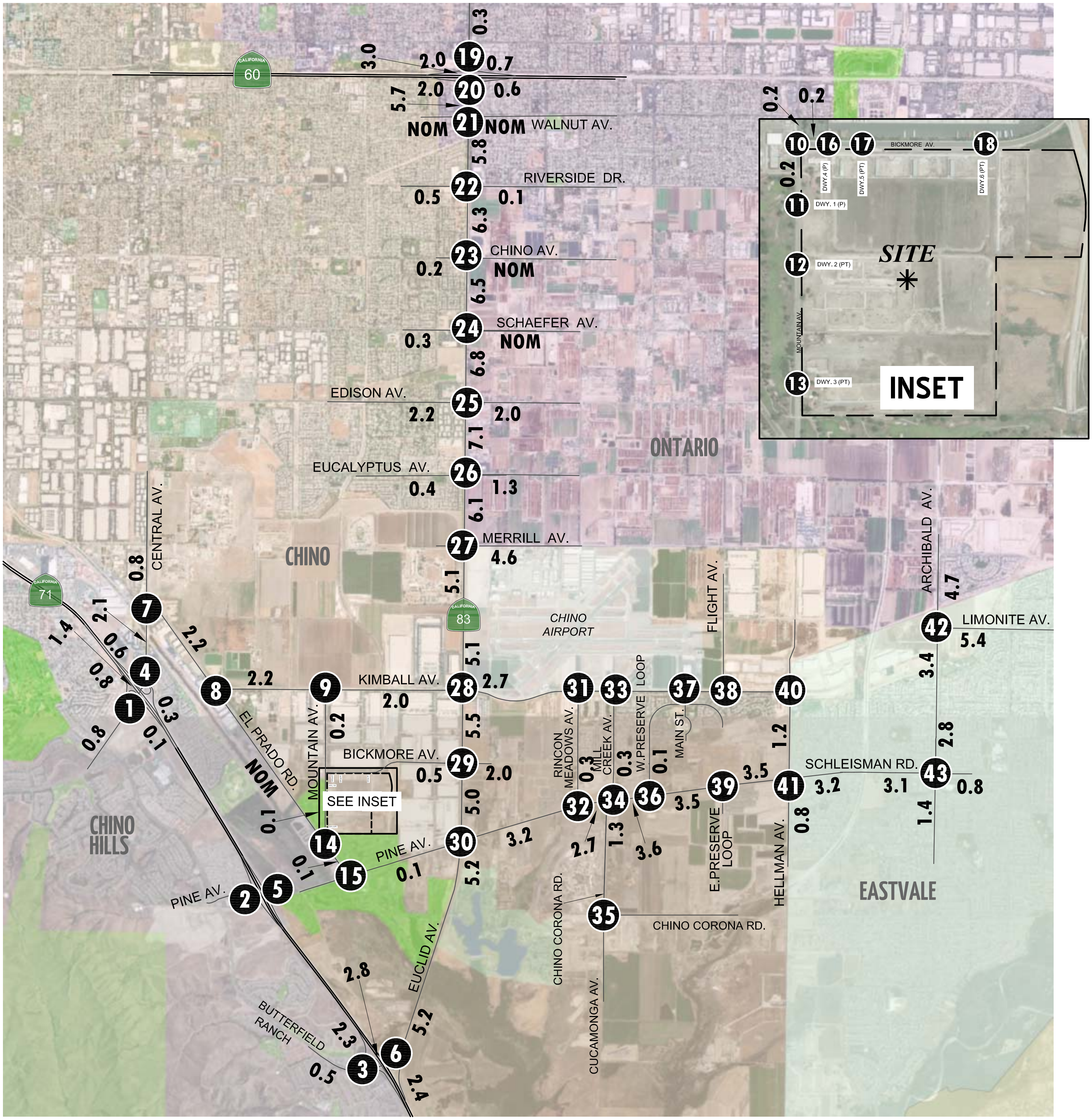


Exhibit 4-12: Cumulative Only Average Daily Traffic (ADT) (In PCE)



LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

NOM = NOMINAL, LESS THAN 50 VEHICLES PER DAY

EXHIBIT 4-13 (1OF2): CUMULATIVE ONLY TRAFFIC VOLUMES (IN PCE)

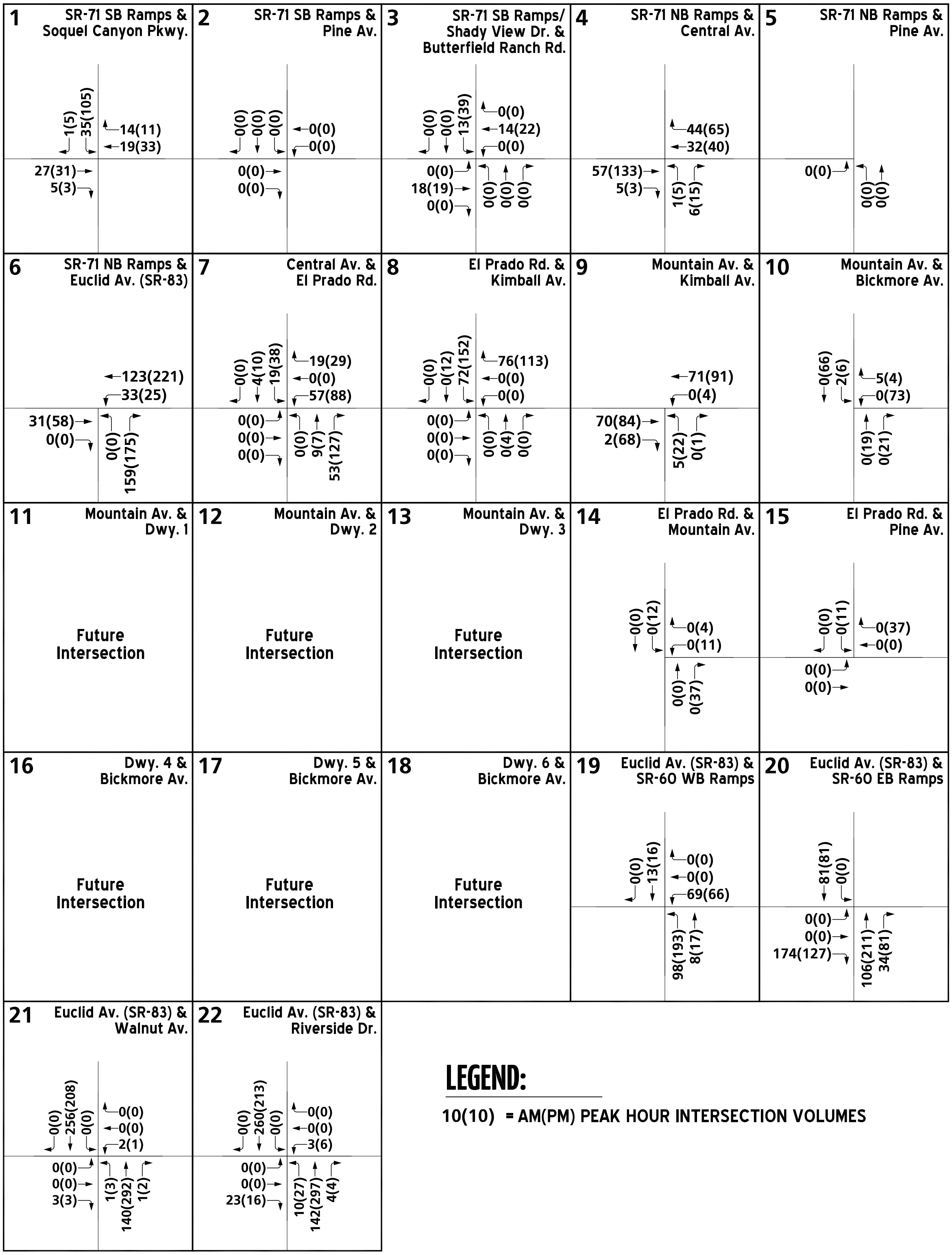
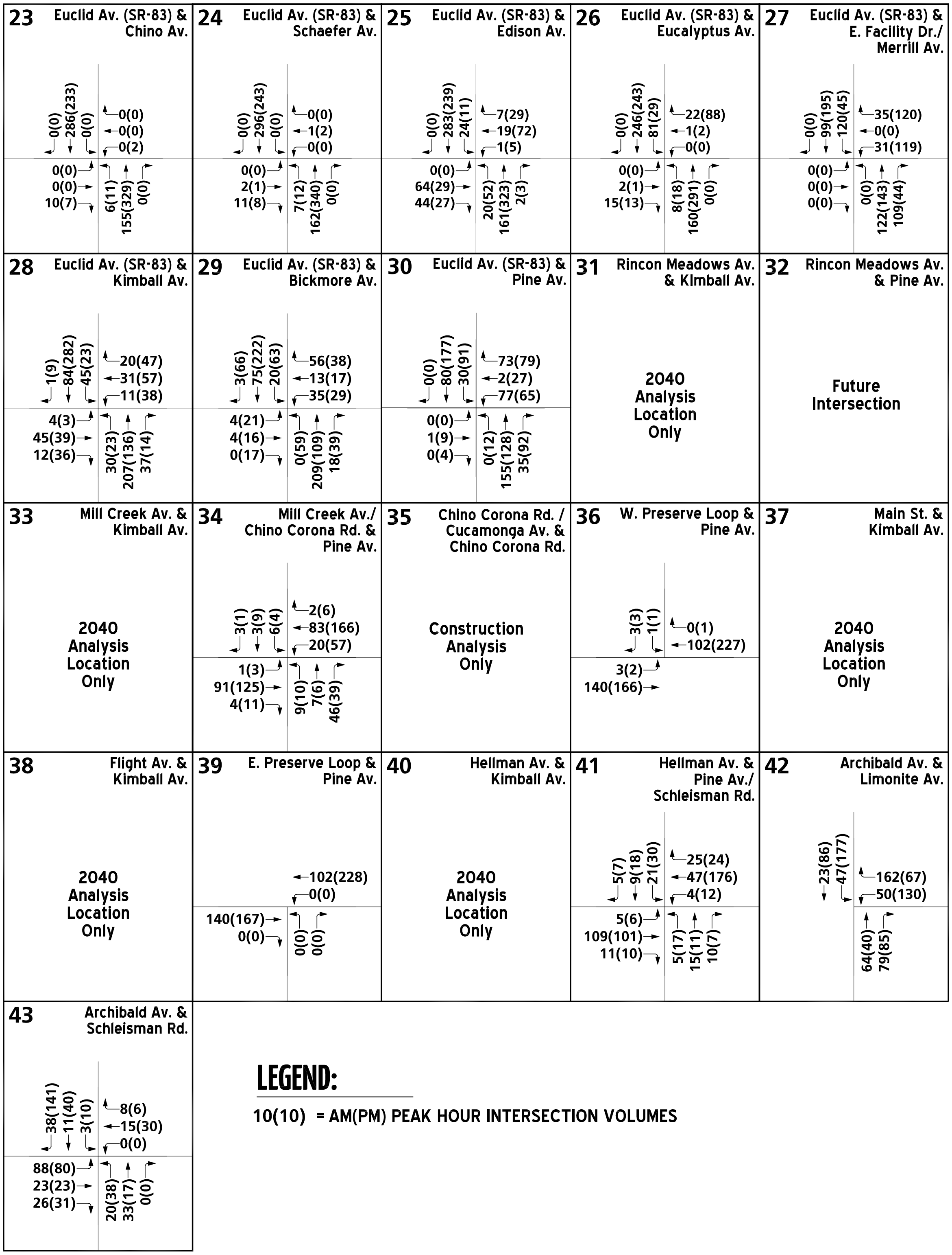


EXHIBIT 4-13 (2OF2): CUMULATIVE ONLY TRAFFIC VOLUMES (IN PCE)



Cumulative Development Land Use Summary

#	Project/Location	Land Use[1]	Quantity	Units[2]
		City of Chino		
C1	Bickmore Street Residential (TM 18858) (30% complete)	SFDR	185	DU
C2	TM17574 (80% complete)	Condo/Townhouse	108	DU
C3	Falloncrest at the Preserve	SFDR	210	DU
		Condo/Townhouse	786	DU
		Apartments	412	DU
		Shopping Center	77.597	TSF
		General Office	77.597	TSF
C4	Tract 19980 (Homecoming Phase 4)	Apartments	454	DU
	TTM No. 20166 & 20167	SFDR	148	DU
	Brio & TTM No. 21065 & 20168 (Orchards)	SFDR	239	DU
C5	Farmer Boys	Fast-food w/ Drive-Thru	3.218	TSF
		Shopping Center	2.300	TSF
C6	Euclid & Bickmore Warehouse	Warehousing	205.820	TSF
		General Light Industrial	51.030	TSF
		Business Park	110.620	TSF
C7	Kimball Business Park	Business Park	146.550	TSF
C8	Chaffey College Expansion	Junior/Community College	93.50	AC
	College Park Commercial	Shopping Center	7.50	AC
C9	Chino Parcel Delivery	Parcel Delivery Facility	765.274	TSF
C10	Altitude Business Centre	Warehousing	715.000	TSF
		Light Industrial	255.000	TSF
		Business Park	233.000	TSF
		Self-Storage	110.000	TSF
C11	Majestic Gateway	Specialty Retail	25.000	TSF
		Pharmacy/Drugstore with Drive-Thru	13.000	TSF
		Fast-Food with Drive-Thru	8.600	TSF
C12	Bouma Residential	SFDR	106	DU
		Condo/Townhouse	94	DU
C13	Fairfield Inn & Suites (PL 17-0060 & PL 17-0061)	Hotel	111	RM
C14	Watson Industrial Park (40% complete)	High-Cube Warehouse	3,889.900	TSF
C15	Chino Business Park	General Light Industrial	165.500	TSF
		Business Park	21.500	TSF
C16	Flores Site	Shopping Center	4.000	TSF
		Gas Station w/ convenience store	16	VFP
		Express Car Wash	5.000	TSF
C17	Brewart Residential (Stonebrook - TM 18923)	SFDR	127	DU
C18	Archibald's (PL 17-0037)	Fast-Food with Drive-Thru	3.147	TSF
C19	TM 18972 (80% complete)	SFDR	147	DU
C20	Rancho Miramonte	SFDR	691	DU
		Condo/Townhouse	132	DU
		Neighborhood Retail	21.780	TSF
		Church	400	SEAT

Cumulative Development Land Use Summary

#	Project/Location	Land Use[1]	Quantity	Units[2]
C21	Pines Community	SFDR	552	DU
		Public Park	3.0	AC
		Sports Park	41.8	AC
		Self-Storage & RV Storage	120.000	TSF
C22	Church	Church	47.979	TSF
		Daycare	190	STU
C23	Appesetche Residential	SFDR	60	DU
		Condo/Townhouse	160	DU
C24	Tract 19951, 19952, 19953, 19935 & 18479	SFDR	151	DU
		Condo/Townhouse	150	DU
C25	Ag. Buffer, Bungalow, Lic. Product, Liberty Deluxe, Lyon 2 & 3	SFDR	474	DU
City of Eastvale				
E1	The Merge	Warehousing	336.501	TSF
		Shopping Center	4.750	TSF
		Supermarket	30.000	TSF
		Gas Station w/ convenience store	16	VFP
		Pharmacy/Drugstore with Drive-Thru	14.600	TSF
		Fast-Food with Drive-Thru	6.000	TSF
		Automated Car Wash	4.000	TSF
		Fast-Food Without Drive-Thru	7.750	TSF
		Coffee/Donut Shop With Drive-Thru	2.500	TSF
E2	TR29997	SFDR	122	DU
E3	13-0632 - Sumner Residential (Stratham Homes)	SFDR	129	DU
E4	TR35751	Condo/Townhouse	243	DU
E5	PP23219 (PM35865) (50% complete)	General Light Industrial	738.430	TSF
E6	Eastvale Shopping Center	Free-Standing Discount Superstore	192.000	TSF
		Specialty Retail	9.200	TSF
		Fast-Food Without Drive-Thru	7.200	TSF
		Coffee/Donut Shop w/ Drive Thru	2.000	TSF
		Fast-Food with Drive-Thru	3.500	TSF
		Gas Station w/ convenience store and car wash	16	VFP
E7	Van Leeuwen	SFDR	224	DU
E8	SP00358 - The Ranch at Eastvale	Shopping Center	267.200	TSF
		General Light Industrial	801.500	TSF
		Business Park	1,121.100	TSF
E9	SC Limonite, LLC	SFDR	330	TSF
City of Ontario				
O1	Parkside	SFDR	437	DU
		Multi-Family Attached (Apartments)	1,510	DU
		Shopping Center	115.000	TSF
O2	Subarea 29 & Amendment (40% complete)	SFDR	2,149	DU
		Shopping Center	87.000	TSF
O3	Colony Commerce West	High-Cube Warehouse	2213.360	TSF
		Manufacturing	737.786	TSF
O4	West Ontario Commerce Center SP	High-Cube Warehouse	1976.535	TSF
		Manufacturing	658.845	TSF
		Business Park	548.856	TSF

Table 4-3

Cumulative Development Land Use Summary

#	Project/Location	Land Use[1]	Quantity	Units[2]
O5	Colony Commerce East	High-Cube Warehouse	998.680	TSF
		Manufacturing	233.129	TSF
		Warehousing	699.387	TSF
O6	Merrill Commerce Center	High-Cube Fulfillment Warehouse	7014.000	TSF
		Business Park	1441.000	TSF
O7	Parente Home Ranch SP	SFDR	270	DU
		Condo/Townhouse	1,872	DU
		General Office	462.281	TSF
		Shopping Center	194.278	TSF
O8	Ontario Ranch Commerce Center	High-Cube Cold Storage Warehouse	1159.200	TSF
		Warehousing	337.600	TSF
		Business Park	290.200	TSF
		City of Chino Hills		
CH1	Vila Borba Specific Plan (TR 16414)	SFDR	172	DU
CH2	Country Club Villas	Condo/Townhouse	46	DU
CH3	Crossings at Chino Hills	Apartments	346	DU
CH4	The Goddard School	Daycare	10.587	TSF
CH5	Indus Light Industrial	General Light Industrial	100.330	TSF
CH6	The Santa Barbara	Condo/Townhouse - Low Rise	138	DU
		Condo/Townhouse - Mid Rise	186	DU
		Shopping Center	15.700	TSF
CH7	Heritage Professional Center	Hospital	55.000	TSF
		Medical Office Building	86.952	TSF
		Hotel	120	RM
		Shopping Center	38.848	TSF
		Restaurant	7.200	TSF

[1] SFDR = Single Family Detached Residential

[2] TSF = Thousand Square Feet; DU = Dwelling Unit; VFP = Vehicle Fueling Position ; AC = Acres

[3] Source: Altfillisch Residential Project TIA Memorandum, LSA Associates, Inc., July 25, 2011.

The refined future peak hour approach and departure volumes obtained from the model output data are then entered into a spreadsheet program consistent with the National Cooperative Highway Research Program (NCHRP Report 255), along with initial estimates of turning movement proportions. A linear programming algorithm is used to calculate individual turning movements which match the known directional roadway segment forecast volumes computed in the previous step. This program computes a likely set of intersection turning movements from intersection approach counts and the initial turning proportions from each approach leg.

The SBTAM uses an AM peak period-to-peak hour factor of 0.35 and a PM peak period-to-peak hour factor of 0.27. These factors represent the relationship of the highest single AM peak hour to the modeled 3-hour AM peak period (an even distribution would result in a factor of 0.33) and the highest single PM peak hour to the modeled 4-hour PM peak period (an even distribution would result in a factor of 0.25). The model data from RivTAM represents peak hour data and therefore did not require adjustments.

Typically, the model growth is prorated and is subsequently added to the existing (base validation) traffic volumes to represent Horizon Year traffic conditions. In an effort to conduct a conservative analysis, reductions to traffic forecasts from either Existing or Opening Year Cumulative traffic conditions were not assumed as part of this analysis. As such, in conjunction with the addition of cumulative projects that are not consistent with the General Plan, additional growth has also been applied on a movement-by-movement basis, where applicable, to estimate reasonable Horizon Year (2040) forecasts. Horizon Year (2040) turning volumes were compared to Opening Year Cumulative (2022) volumes in order to ensure a minimum growth as a part of the refinement process. The minimum growth includes any additional growth between Opening Year Cumulative (2022) and Horizon Year (2040) traffic conditions that is not accounted for by the traffic generated by cumulative development projects and ambient growth rates assumed between Existing (2019) and Opening Year Cumulative (2022) conditions. Adjustments have not been made to study area intersections that may be affected by new future roadway connections (such as the extension of Pine Avenue or the extension of Kimball Avenue/Limonite Avenue), where travel patterns would likely get affected and forecasts may potentially decrease from the Opening Year Cumulative conditions. Future estimated peak hour traffic data was used for new intersections and intersections with an anticipated change in travel patterns to further refine the Horizon Year (2040) peak hour forecasts.

The future Horizon Year (2040) Without Project peak hour turning movements were then reviewed by Urban Crossroads, Inc. for reasonableness, and in some cases, were adjusted to achieve flow conservation, reasonable growth, and reasonable diversion between parallel routes. Flow conservation checks ensure that traffic flow between two closely spaced intersections, such as two adjacent driveway locations, is verified in order to make certain that vehicles leaving one intersection are entering the adjacent intersection and that there is no unexplained loss of vehicles. The result of this traffic forecasting procedure is a series of traffic volumes which are suitable for traffic operations analysis.

The SBTAM and RivTAM do not include a truck component or have data that is unusually low. As such, in an effort to conduct a conservative analysis, the presence of trucks has been accounted for based on the manual volume adjustments made to demonstrate growth above Opening Year Cumulative (2022) traffic forecasts, which are presented and evaluated in PCE (see Section 3.7 *Existing (2019) Traffic Counts* for discussion on PCE). As such, the Horizon Year (2040) forecasts are also assumed to be in PCE for the purposes of this analysis. Post-processing worksheets for Horizon Year (2040) without Project traffic conditions are provided in Appendix 4.1.

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5 CONSTRUCTION TRAFFIC

Traffic operations during the proposed construction phase of the Project may result localized short-term traffic impacts caused by vehicle trips associated with construction employees, import of soil, import of construction materials, etc.

5.1 EMPLOYEE TRIPS

Employee trips are estimated based on the number of employees anticipated to be on-site throughout the various stages of construction. Each employee is assumed to drive to and from the construction site each day. It has been assumed that employees will arrive up to 30 minutes prior to the workday and will leave up to 30 minutes after the workday ends. Initially, parking for employees and non-employee vehicles can be accommodated on-site near the construction staging area. Once the on-site roadway network is constructed, employee parking can be accommodated on-site.

It is anticipated that the majority of employees would arrive and depart from the site between 5:00 and 6:00 PM for nighttime hauling or between 6:00 and 7:00 AM for daytime hauling. Employee trips are based on the number of employees estimated to be on site during different points throughout the project. The potential impacts resulting from construction-related parking and employee trips are considered less than significant during the peak hours.

5.2 EXCESS FILL DIRT SITES

The 96.9-acre Project site is located at the southeast corner of Mountain Avenue and Bickmore Avenue in the City of Chino and is generally below the 566 Elevation. In order for the Project to be able to be constructed and occupied, it requires that dirt be imported to raise the proposed building Finish Floor elevations so that they are 567-feet above mean sea level. To accomplish this, five nearby borrow sites (or “Excess Fill Dirt Sites”) have been identified that can provide export to be used as import for the Project. The order in which soil will be imported from the Excess Fill Dirt Sites is as follows (see Exhibit 5-1):

- Excess Fill Dirt Site #1
- Excess Fill Dirt Site #3
- Excess Fill Dirt Site #4
- Excess Fill Dirt Site #5
- Excess Fill Dirt Site #2

It is our understanding, based on information from the Project Applicant, that import activities from the Excess Fill Dirt Sites will not overlap with another (i.e., hauling activity at one site is independent from other sites). Soil import activity could occur during typical construction daytime (7:00 AM – 3:00 PM) or off-peak/nighttime (6:00 PM – 2:00 AM) hours. Notwithstanding, the off-road construction equipment is not anticipated to operate for more than 8 hours per day.

EXHIBIT 5-1: EXCESS FILL DIRT SITE LOCATION MAP

10349 - borrow site.dwg

Construction of the Project will require the import of approximately 852,021 cubic yards of soil from nearby Excess Fill Dirt Sites. It is estimated that 522-600 haul truck loads will be required per day for the duration of soil import activities. Each truck will generate one inbound and one outbound trip, accounting for a total of two truck trips per load of material imported. Thus, a total of 1,044 to 1,200 haul trucks (two-way) per day will be generated, which translates to approximately 131-150 haul trips (two-way) per hour (see Table 5-1). In the event that soil import activity is to occur during peak periods, hauling activity should be limited to no more than 16 trucks trips per hour (8 trucks in and 8 trucks out) during the hours of 6:00 AM to 9:00 AM and 3:00 PM to 6:00 PM to ensure that haul activity would not significantly impact study area intersections along the haul route.

As shown on Table 5-1, the following cubic yards of soil will be imported to the site from each of the Excess Fill Dirt Sites:

- Excess Fill Dirt Site #1: 437,680 cubic yards of soil over 55 days
- Excess Fill Dirt Site #3: 161,228 cubic yards of soil over 22 days
- Excess Fill Dirt Site #4: 168,261 cubic yards of soil over 21 days
- Excess Fill Dirt Site #5: 42,558 cubic yards of soil over 6 days
- Excess Fill Dirt Site #2: 42,294 cubic yards of soil over 6 days

The soil import values shown above are the maximum that have been considered for the purposes of this TIA. Actual import of soil may be less than those shown above.

5.3 HEAVY EQUIPMENT

Heavy equipment to be utilized on-site during construction include, but is not limited to: flat beds, dozers, scrapers, graders, track hoes, dump trucks, forklifts, cranes, cement trucks, pavers, rollers, water trucks, rolling container trucks and bobcats. Heavy equipment will be delivered and removed from the site throughout the construction phase. As most heavy equipment is typically not an authorized vehicle to be driven on a public roadway, most of the equipment will be delivered and removed from the site via large flatbed trucks. It is anticipated that delivery of heavy equipment would not occur on a daily basis, but rather periodically throughout the construction phase based on need.

The delivery and removal of heavy equipment is recommended to occur outside of the morning and evening peak hours in order to have nominal impacts to traffic and circulation near the vicinity of the Project. In order to minimize the impact of construction truck traffic to the surrounding roadway network, it is recommended that trucks utilize the most direct route between the site and the SR-71 Freeway via Euclid Avenue (SR-83). With the application of these measures, it is anticipated that traffic impacts associated with the delivery and removal of heavy equipment are less than significant.

Table 5-1

Import Operation by Excess Fill Dirt Site

Site	Nighttime Hauling		Daytime Hauling		Excess Fill Dirt (CY of Import)	Trucks Per Day (one-way)[1]	Total Trucks per Hour[2]	Two-way Truck Trips per Hour[3]
	Hours	Duration	Hours[4]	Duration				
1	6:00 PM to 2:00 AM	55 Nights	7:00 AM to 3:00 PM	55 Days	437,680	589	74	147
3	6:00 PM to 2:00 AM	22 Nights	7:00 AM to 3:00 PM	22 Days	161,228	543	68	136
4	6:00 PM to 2:00 AM	21 Nights	7:00 AM to 3:00 PM	21 Days	168,261	594	74	148
5	6:00 PM to 2:00 AM	6 Nights	7:00 AM to 3:00 PM	6 Days	42,558	525	66	131
2	6:00 PM to 2:00 AM	6 Nights	7:00 AM to 3:00 PM	6 Days	42,294	522	65	131

[1] [Excess Fill Dirt / Duration] / 13.5 cubic yards per truck

[2] [Trucks Per Day / 8 hours]

[3] [Trucks Per Day / 8 hours] x 2 trips (one trip in and one trip out)

[4] In order to keep traffic impacts to less than significant during the AM peak hour, the Project shall limit trips to less than 50 two-way peak hour trips during the hours of 7:00 AM to 9:00 AM.

5.4 CONSTRUCTION MITIGATION MEASURES

Based on the haul routes between the Project site and each of the Excess Fill Dirt Sites (see Exhibit 5-2), if hauling activity is not limited during normal construction hours (outside of the morning and evening peak periods), the following intersections may potentially be impacted by haul trucks during the soil import phase:

- El Prado Road & Mountain Avenue (#14)
- El Prado Road & Pine Avenue (#15)
- Euclid Avenue (SR-83) & Pine Avenue (#30)
- Rincon Meadows Avenue & Pine Avenue (#32)
- Mill Creek Avenue/Chino Corona Road & Pine Avenue (#34)
- Cucamonga Avenue & Chino Corona Road (#35)
- W. Preserve Loop & Pine Avenue (#36)
- E. Preserve Loop & Pine Avenue (#39)
- Hellman Avenue & Pine Avenue (#41)

However, the following mitigation measures would ensure that traffic impacts at the aforementioned intersections would be less than significant for the morning and evening peak periods (6:00 AM – 9:00 AM and 3:00 PM – 6:00 PM) during hauling activity:

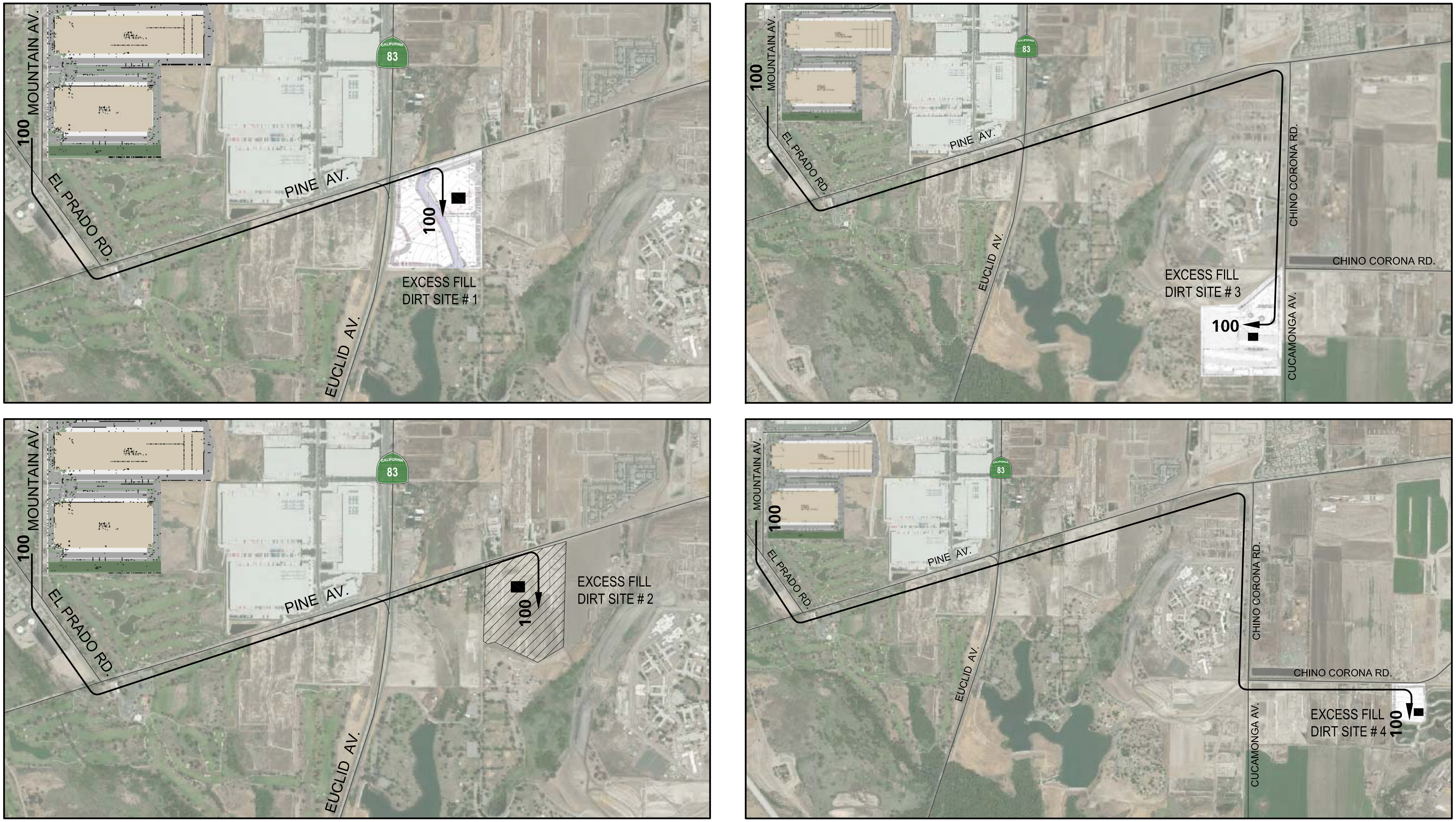
Mitigation Measure 4.1 – The Project Applicant will be required to develop and implement a City-approved Construction Traffic Management Plan addressing potential construction-related traffic detours and disruptions. In general, the Construction Traffic Management Plan would ensure that to the extent practical, construction traffic would access the Project site during off-peak hours or limited access during the peak hours; and that construction traffic would be routed to avoid travel through, or proximate to, sensitive land uses.

Mitigation Measure 5.1 – The delivery and removal of heavy equipment is recommended to minimize the heavy truck activity during the morning and evening peak periods (6:00 AM to 9:00 AM and 3:00 PM to 6:00 PM) in order to have nominal impacts to traffic and circulation near the vicinity of the Project.

Mitigation Measure 6.1 – During the site grading, the Project shall limit soil import activity between the Project site and excess dirt fill sites during the hours of 6:00 AM – 9:00 AM (morning peak period) and 3:00 PM – 6:00 PM (evening peak period) to fewer than the equivalent of 50 passenger car equivalent (PCE) truck trips per hour. 50 PCE truck trips equates to approximately 16 total trucks (8 trucks in and 8 trucks out) during the peak periods specified above in order to limit the potential impacts of haul truck activity during these busy commute times:

50 PCE truck trips / 3.0 PCE factor = 16 total trucks during the peak hour

Exhibit 5-2 (1of2): Haul Routes Between the Project and Excess Fill Dirt Sites



LEGEND:

10 = PERCENT TO/FROM PROJECT

■ = STAGING AREA

N

Exhibit 5-2 (2of2): Haul Routes Between the Project and Excess Fill Dirt Sites

LEGEND:

10 = PERCENT TO/FROM PROJECT
■ = STAGING AREA

N

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6 E+P TRAFFIC CONDITIONS

This section discusses the traffic forecasts for Existing plus Project (E+P) conditions and the resulting intersection operations, freeway mainline operations, and traffic signal warrant analyses.

6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for E+P conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for E+P conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).

6.2 E+P TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus Project traffic. Although the Project is anticipated to be developed in a single phase, Building 1 has been evaluated separately for E+P traffic conditions for the purpose of identifying potential traffic impacts for Building 1 only.

The ADT volumes which can be expected for E+P (Building 1) traffic conditions are shown on Exhibits 6-1. E+P (Building 1) weekday AM and PM peak hour intersection turning movement volumes are shown on Exhibits 6-2.

The ADT volumes which can be expected for E+P (Project Buildout) traffic conditions are shown on Exhibits 6-3. E+P (Project Buildout) weekday AM and PM peak hour intersection turning movement volumes are shown on Exhibits 6-4.

6.3 INTERSECTION OPERATIONS ANALYSIS

E+P (Building 1) peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TIA. The intersection analysis results are summarized on Table 6-1, which indicate that there are no additional study area intersections that are anticipated to operate at an unacceptable LOS, in addition to those identified for Existing traffic conditions. However, the Project (Building 1) is anticipated to contribute less than 50 peak hour trips to the following locations, resulting in a less than significant impact:

- Euclid Avenue (SR-83) & Riverside Drive (#22)
- Archibald Avenue & Schleisman Road (#43)

The intersection of Hellman Avenue and Kimball Avenue was not evaluated for E+P (Building 1) traffic conditions. Consistent with Table 6-1, a summary of the peak hour intersection LOS for E+P conditions is shown on Exhibit 6-5 for E+P (Building 1) traffic conditions. The intersection operations analysis worksheets for E+P (Building 1) traffic conditions are included in Appendix 6.1 of this TIA.

EXHIBIT 6-1: E+P (BUILDING 1) AVERAGE DAILY TRAFFIC (ADT) (IN PCE)

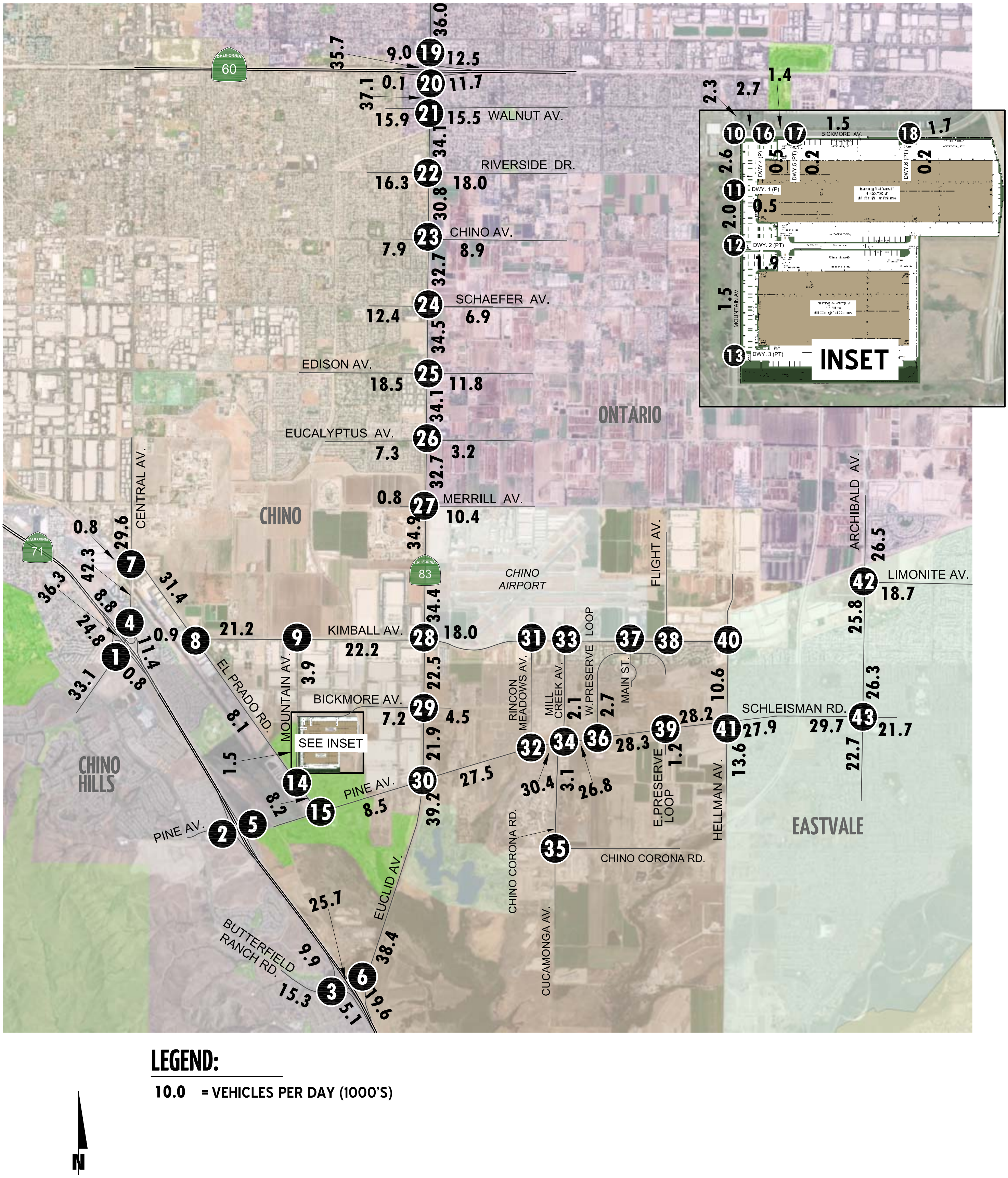


EXHIBIT 6-2 (1OF2): E+P (BUILDING 1) TRAFFIC VOLUMES (IN PCE)

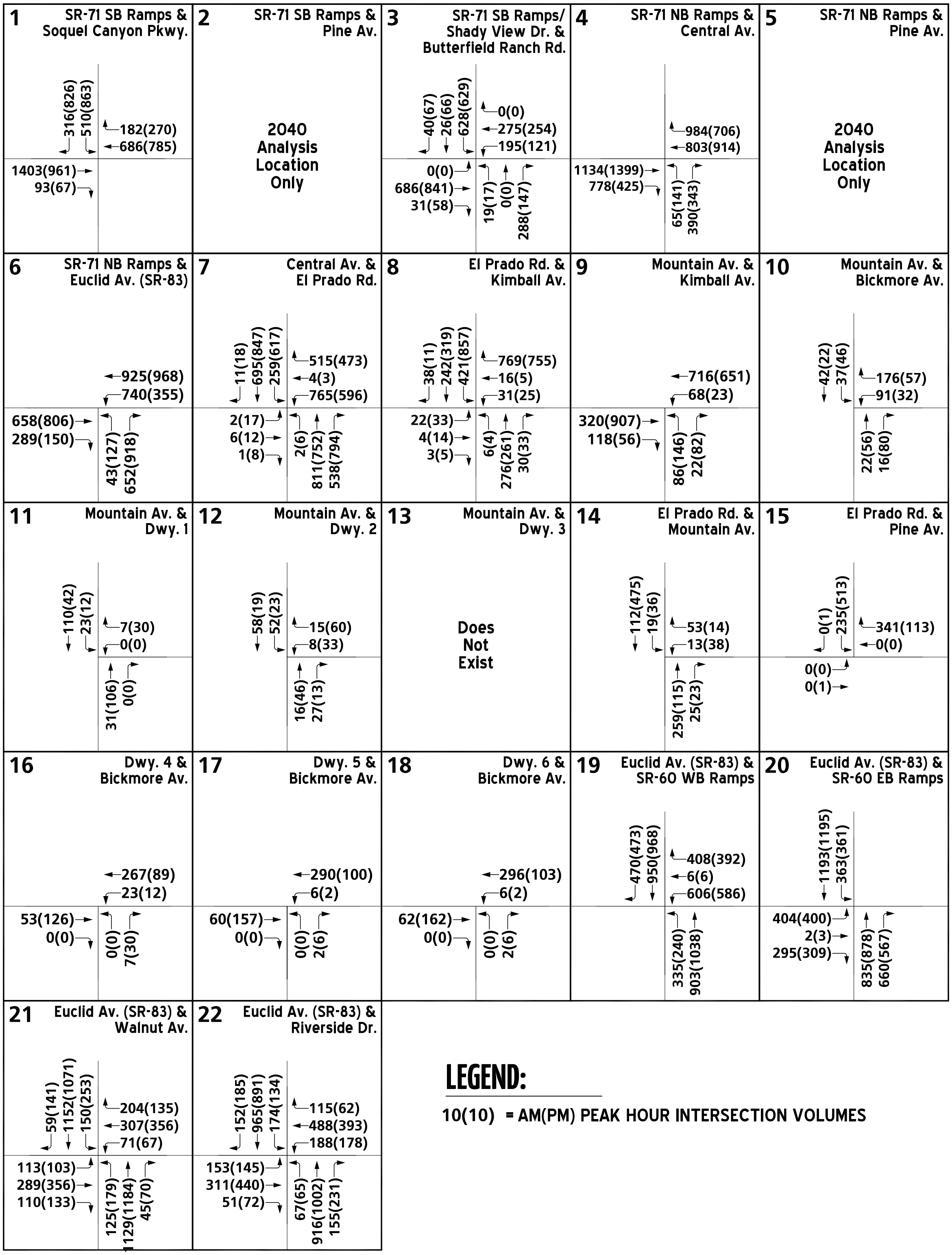
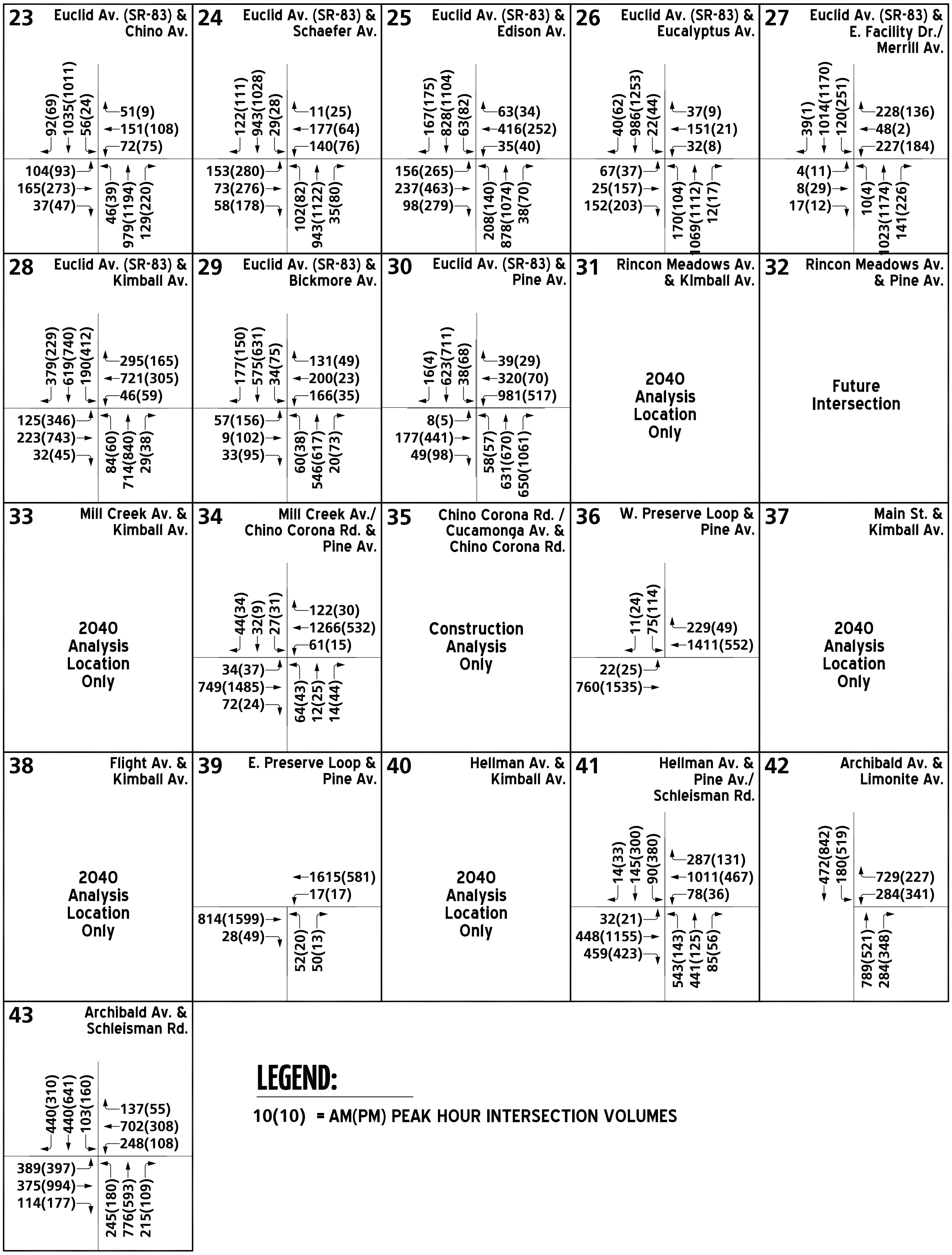


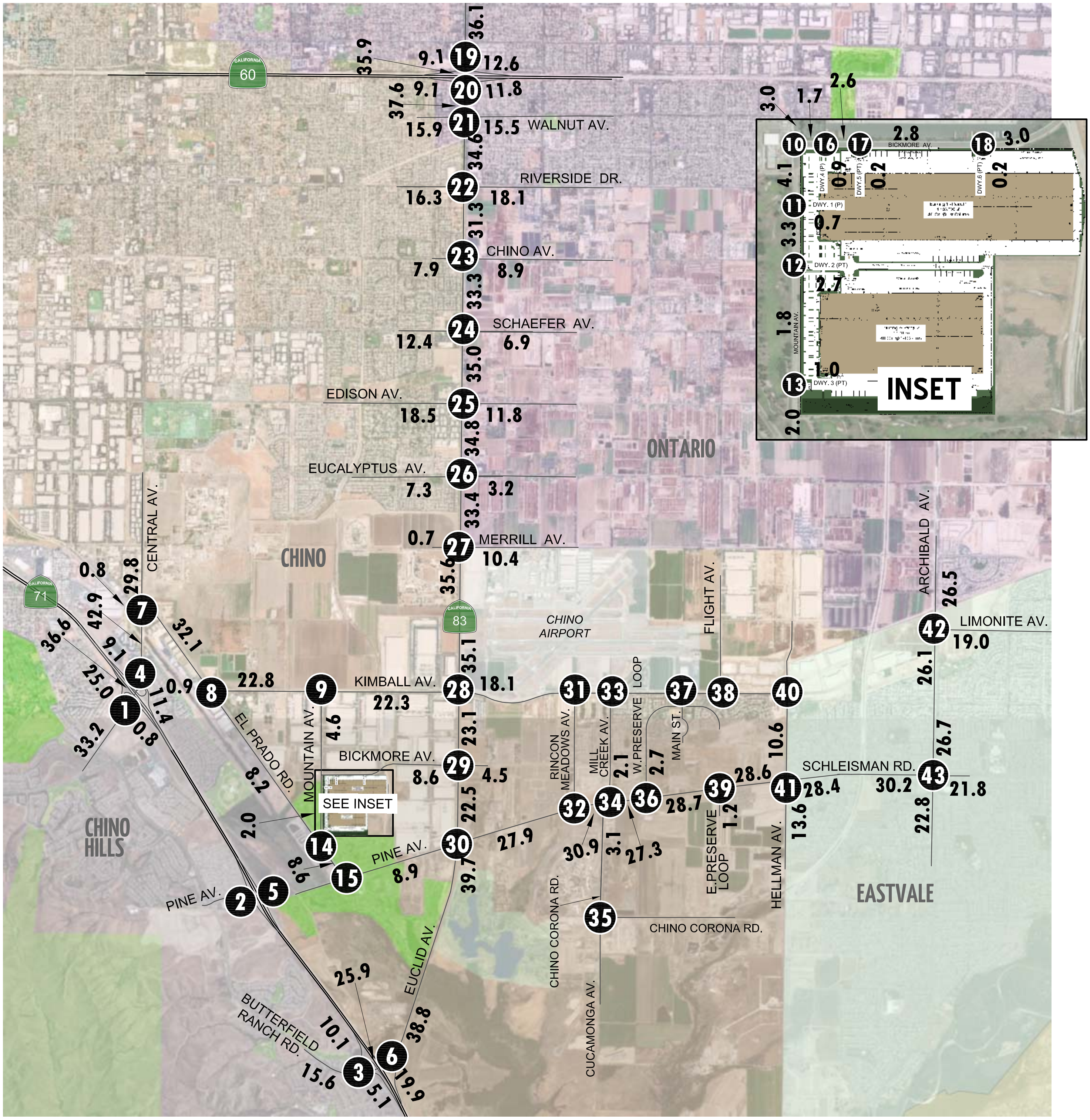
EXHIBIT 6-2 (2OF2): E+P (BUILDING 1) TRAFFIC VOLUMES (IN PCE)



LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES

EXHIBIT 6-3: E+P (PROJECT BUILDOUT) AVERAGE DAILY TRAFFIC (ADT) (IN PCE)



LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

N

EXHIBIT 6-4 (1OF2): E+P (PROJECT BUILDOUT) TRAFFIC VOLUMES (IN PCE)

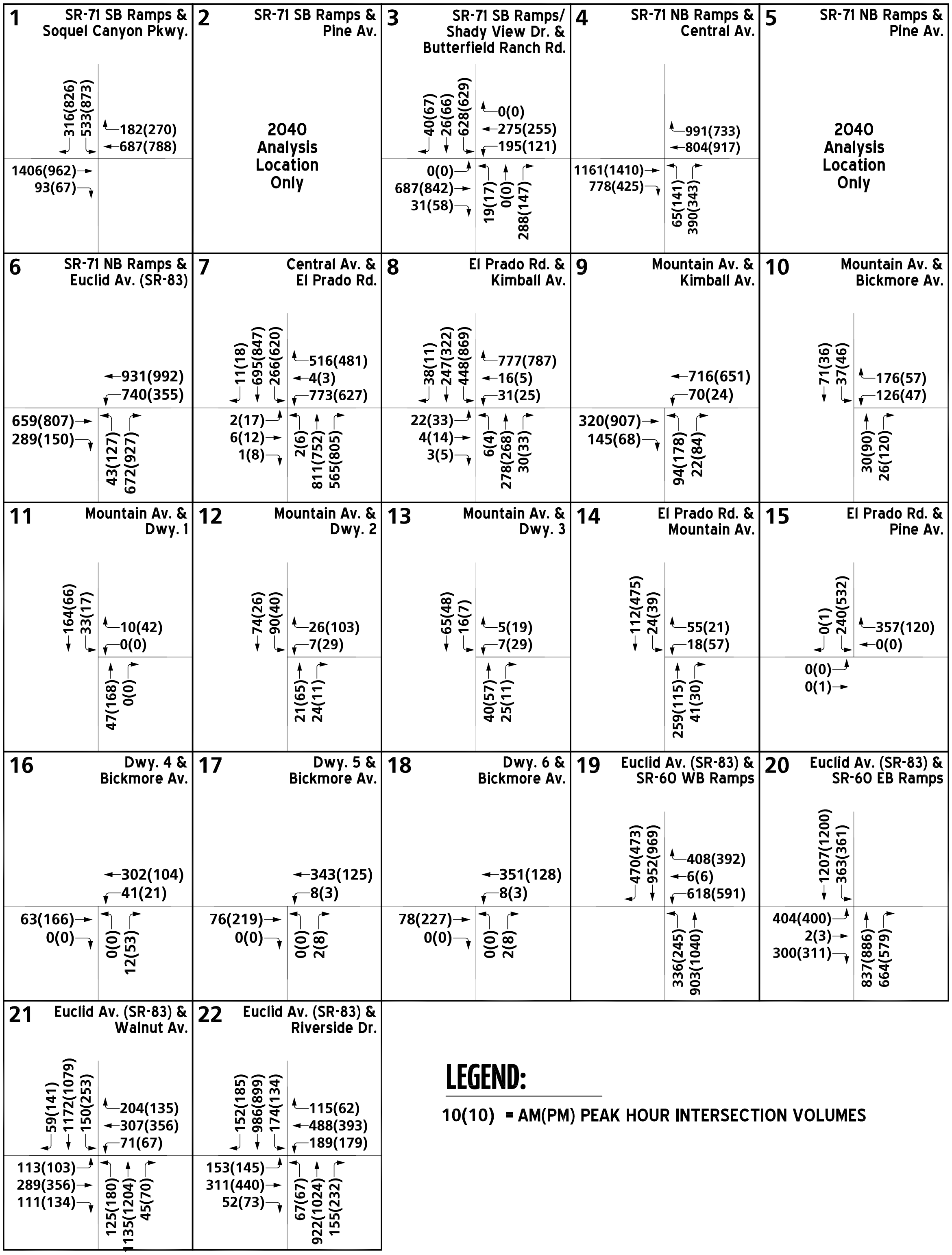


EXHIBIT 6-4 (2OF2): E+P (PROJECT BUILDOUT) TRAFFIC VOLUMES (IN PCE)

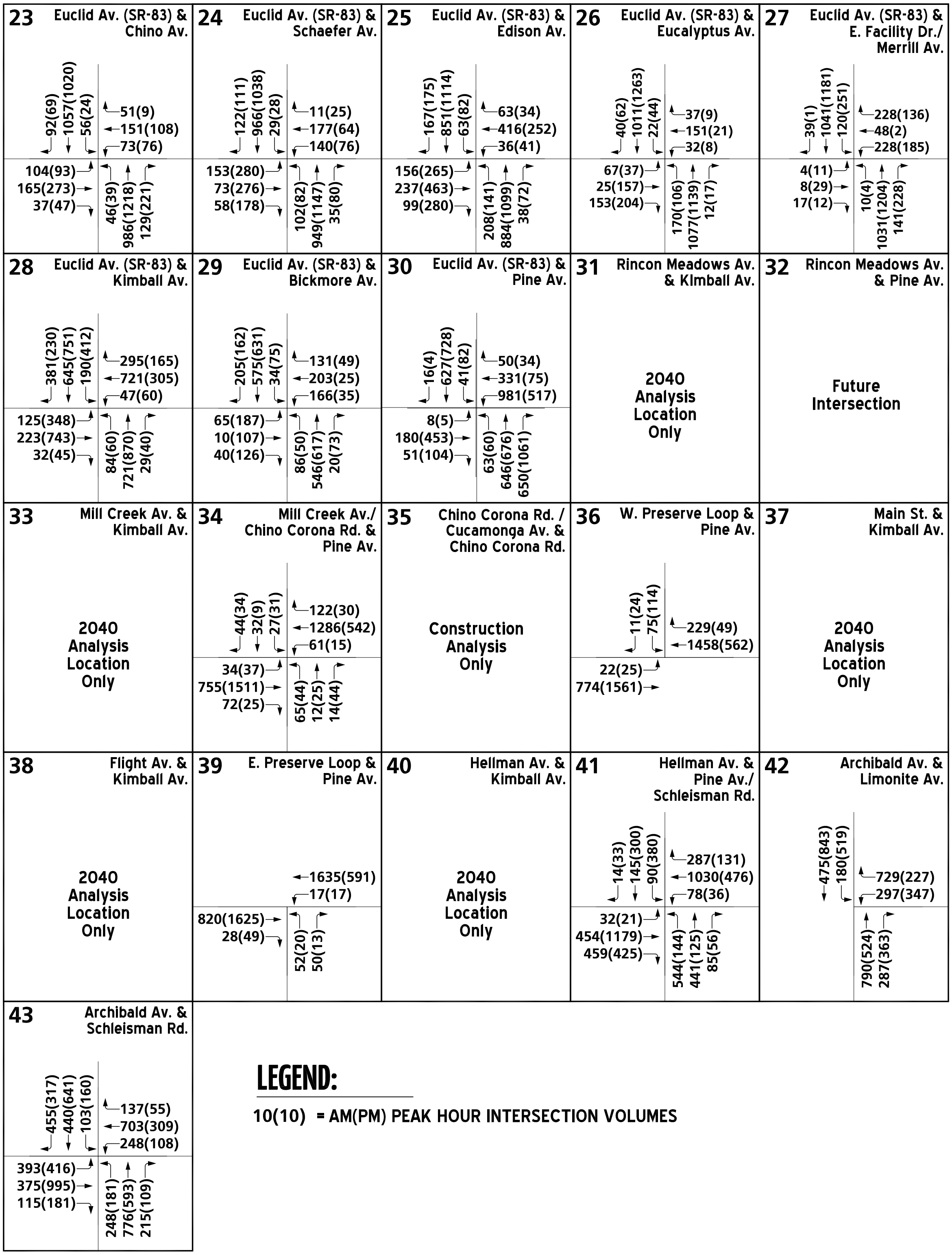
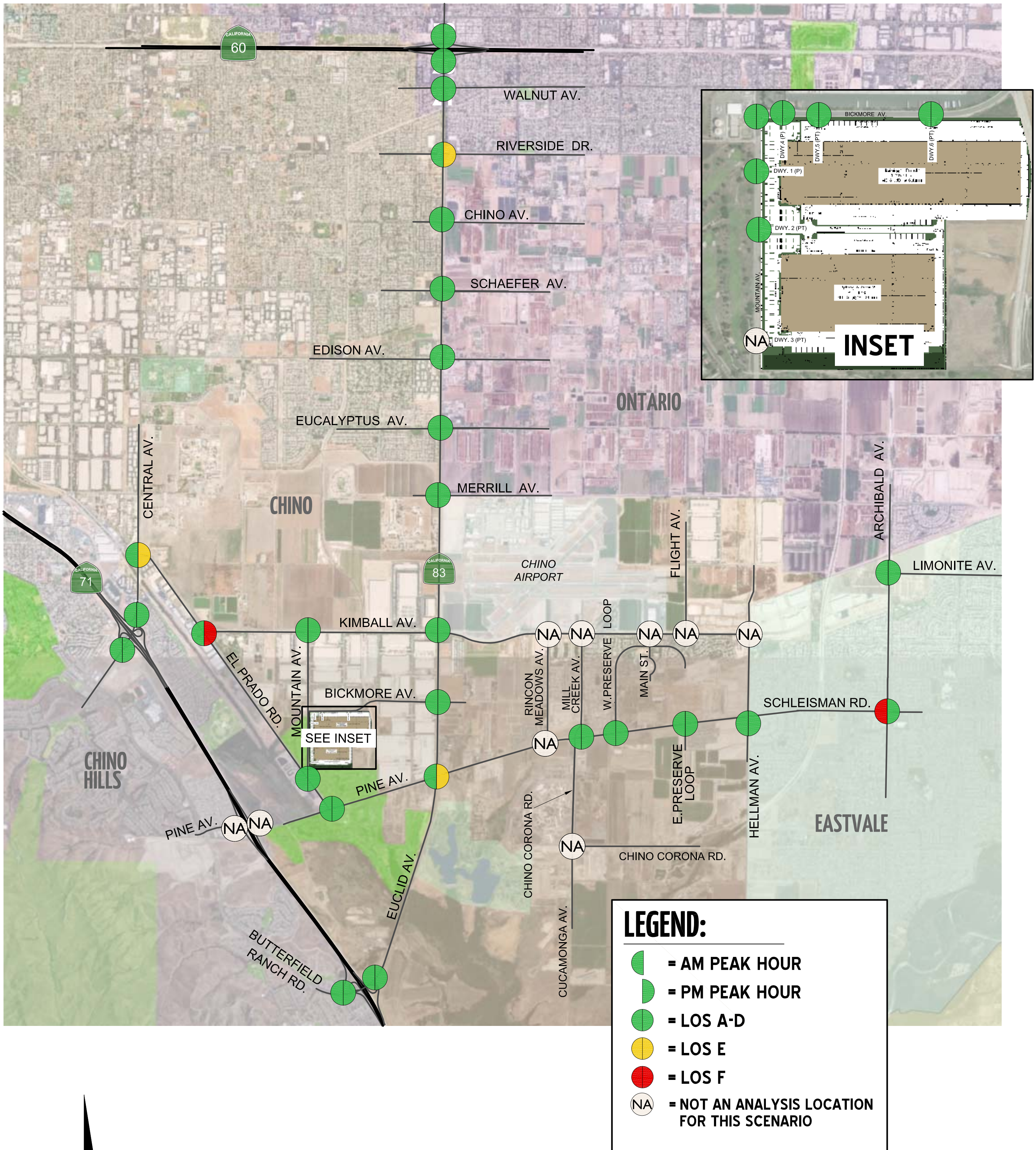


EXHIBIT 6-5: E+P (BUILDING 1) SUMMARY OF LOS



Intersection Analysis for E+P (Building 1) Conditions

#	Intersection	Traffic Control[2]	Existing (2019) Delay[1] (secs.) AM	Existing (2019) Delay[1] (secs.) PM	Existing (2019) Level of Service AM	Existing (2019) Level of Service PM	E+P - Building 1 Delay[1] (secs.) AM	E+P - Building 1 Delay[1] (secs.) PM	E+P - Building 1 Level of Service AM	E+P - Building 1 Level of Service PM	Acceptable LOS
1	SR-71 SB Ramps & Soquel Canyon Rd.	TS	13.3	23.2	B	C	13.9	23.7	B	C	D
2	SR-71 SB Ramps & Pine Av.	TS	31.2	26.7	C	C	2040 Analysis Location				D
3	SR-71 SB Ramps & Butterfield Ranch Rd.	TS	40.0	39.6	D	D	40.0	39.7	D	D	D
4	SR-71 NB Ramps & Central Av.	TS	8.6	7.7	A	A	8.6	7.7	A	A	D
5	SR-71 NB Ramps & Pine Av.	AWS	9.3	8.9	A	A	2040 Analysis Location				D
6	SR-71 NB Ramps & Euclid Av. (SR-83)	TS	27.2	42.5	C	D	29.8	42.5	C	D	D
7	Central Av. & El Prado Rd.	TS	29.0	**61.2**	C	**E**	29.8	**64.6**	C	**E**	D
8	El Prado Rd. & Kimball Av.	TS	28.1	**86.2**	C	**F**	30.3	**90.4**	C	**F**	D
9	Mountain Av. & Kimball Av.	TS	7.4	9.7	A	A	7.8	10.4	A	B	D
10	Mountain Av. & Bickmore Av.	CSS	9.8	9.6	A	A	10.4	10.2	B	B	D
11	Mountain Av. & Driveway 1	**CSS**	Future Intersection				8.5	9.0	A	A	D
12	Mountain Av. & Driveway 2	**CSS**	Future Intersection				9.0	9.3	A	A	D
13	Mountain Av. & Driveway 3	**CSS**	Future Intersection				Future Intersection				D
14	El Prado Rd. & Mountain Av.	CSS	10.4	13.6	B	B	10.7	15.0	B	C	D
15	El Prado Rd. & Pine Av.	AWS	9.8	13.5	A	B	10.1	14.6	B	B	D
16	Driveway 4 & Bickmore Av.	**CSS**	Future Intersection				8.6	9.1	A	A	D
17	Driveway 5 & Bickmore Av.	**CSS**	Future Intersection				8.6	9.1	A	A	D
18	Driveway 6 & Bickmore Av.	**CSS**	Future Intersection				8.6	9.2	A	A	D
19	Euclid Av. (SR-83) & SR-60 WB Ramps	TS	22.3	18.6	C	B	22.6	18.9	C	B	D
20	Euclid Av. (SR-83) & SR-60 EB Ramps	TS	25.3	21.9	C	C	25.5	22.0	C	C	D
21	Euclid Av. (SR-83) & Walnut Av.	TS	30.1	32.5	C	C	30.2	32.6	C	C	E
22	Euclid Av. (SR-83) & Riverside Dr.	TS	47.0	**55.5**	D	**E**	47.6	**57.5**	D	**E**	D
23	Euclid Av. (SR-83) & Chino Av.	TS	21.5	23.2	C	C	21.6	23.3	C	C	D
24	Euclid Av. (SR-83) & Schaefer Av.	TS	23.6	26.2	C	C	24.0	26.6	C	C	D
25	Euclid Av. (SR-83) & Edison Av.	TS	38.1	39.7	D	D	38.8	40.4	D	D	D
26	Euclid Av. (SR-83) & Eucalyptus Av.	TS	13.8	13.2	B	B	14.0	13.3	B	B	D
27	Euclid Av. (SR-83) & Merrill Av.	TS	26.4	29.9	C	C	27.0	31.5	C	C	D
28	Euclid Av. (SR-83) & Kimball Av.	TS	32.4	38.3	C	D	32.8	39.6	C	D	D
29	Euclid Av. (SR-83) & Bickmore Av.	TS	16.3	14.0	B	B	17.3	15.3	B	B	D
30	Euclid Av. (SR-83) & Pine Av.	TS	31.9	**61.5**	C	**E**	33.3	**67.5**	C	**E**	D
31	Rincon Meadows Av. & Kimball Av.	TS	15.4	12.8	B	B	2040 Analysis Location				D
32	Rincon Meadows Av. & Pine Av.		Future Intersection				Future Intersection				D
33	Mill Creek Av. & Kimball Av.	TS	14.5	12.9	B	B	2040 Analysis Location				D
34	Mill Creek Av./Chino-Corona Rd. & Pine Av.	TS	27.1	12.2	C	B	27.1	12.3	C	B	D
35	Cucamonga Av. & Chino Corona Rd.	AWS	7.0	7.3	A	A	Construction Location Only				D
36	W. Preserve Loop & Pine Av.	TS	9.4	8.0	A	A	9.4	8.0	A	A	D
37	Main St. & Kimball Av.	TS	13.4	12.5	B	B	2040 Analysis Location				D
38	Flight Av. & Kimball Av.	CSS	21.0	20.5	C	C	2040 Analysis Location				D
39	E. Preserve Loop & Pine Av.	TS	8.5	7.2	A	A	8.5	7.2	A	A	D
40	Hellman Av. & Kimball Av.	TS	**>200.0**	**77.9**	**F**	**F**	2040 Analysis Location				D

Table 6-1

Intersection Analysis for E+P (Building 1) Conditions

#	Intersection	Traffic Control[2]	Existing (2019) Delay[1] (secs.) AM	Existing (2019) Delay[1] (secs.) PM	Existing (2019) Level of Service AM	Existing (2019) Level of Service PM	E+P - Building 1 Delay[1] (secs.) AM	E+P - Building 1 Delay[1] (secs.) PM	E+P - Building 1 Level of Service AM	E+P - Building 1 Level of Service PM	Acceptable LOS
41	Hellman Av. & Pine Av./Schleisman Rd.	TS	37.7	38.6	D	D	37.7	39.0	D	D	D
42	Archibald Av. & Limonite Av.	TS	48.0	29.6	D	C	48.0	30.8	D	C	D
43	Archibald Av. & Schleisman Rd.	TS	**80.1**	46.5	**F**	D	**80.1**	50.9	**F**	D	D

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] CSS = Cross-street Stop; AWS = All-Way Stop; TS = Traffic Signal; **CSS** = Improvement

E+P (Project Buildout) peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TIA. The intersection analysis results are summarized on Table 6-2, which indicate that there are no additional study area intersections that are anticipated to operate at an unacceptable LOS, in addition to those identified for Existing traffic conditions.

The intersection of Hellman Avenue and Kimball Avenue was not evaluated for E+P (Project Buildout) traffic conditions. Consistent with Table 6-2, a summary of the peak hour intersection LOS for E+P conditions is shown on Exhibit 6-6 for E+P (Project Buildout) traffic conditions. The intersection operations analysis worksheets for E+P (Project Buildout) traffic conditions are included in Appendix 6.2 of this TIA.

6.4 TRAFFIC SIGNAL WARRANTS ANALYSIS

There are no study area intersections anticipated to meet either peak hour or planning level (ADT) volume-based traffic signal warrants for E+P (Building 1) and E+P (Project Buildout) traffic conditions, in addition to those previously warranted under Existing (2019) traffic conditions (see Appendix 6.3 and Appendix 6.4).

6.5 OFF-RAMP QUEUING ANALYSIS

Queuing analysis findings for E+P traffic conditions are presented on Table 6-3. As shown on Table 6-3, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows with addition of Project traffic (for both Building 1 and Project Buildout traffic conditions). Worksheets for E+P (Building 1) and E+P (Project Buildout) traffic conditions off-ramp queuing analysis are provided in Appendix 6.5 and Appendix 6.6, respectively.

6.6 FREEWAY FACILITY ANALYSIS

E+P (Building 1) mainline directional volumes for the AM and PM peak hours are provided on Exhibit 6-7. E+P (Project Buildout) mainline directional volumes for the AM and PM peak hours are provided on Exhibit 6-8. As shown on Table 6-4, no additional freeway segments or merge/diverge ramp junctions analyzed for this TIA were found to operate at an unacceptable LOS (i.e., LOS E or worse) during the peak hours for E+P traffic conditions, in addition to those previously identified under Existing (2019) traffic conditions. E+P (Building 1) and E+P (Project Buildout) freeway facility analysis worksheets are provided in Appendix 6.7 and Appendix 6.8, respectively.

Table 6-2
Page 1 of 2

Intersection Analysis for E+P (Project Buildout) Conditions

#	Intersection	Traffic Control[2]	Existing (2019) Delay[1] (secs.) AM	Existing (2019) Delay[1] (secs.) PM	Existing (2019) Level of Service AM	Existing (2019) Level of Service PM	E+P - Project Buildout Delay[1] (secs.) AM	E+P - Project Buildout Delay[1] (secs.) PM	E+P - Project Buildout Level of Service AM	E+P - Project Buildout Level of Service PM	Acceptable LOS
1	SR-71 SB Ramps & Soquel Canyon Rd.	TS	13.3	23.2	B	C	14.3	24.0	B	C	D
2	SR-71 SB Ramps & Pine Av.	TS	31.2	26.7	C	C	2040 Analysis Location				D
3	SR-71 SB Ramps & Butterfield Ranch Rd.	TS	40.0	39.6	D	D	40.0	39.8	D	D	D
4	SR-71 NB Ramps & Central Av.	TS	8.6	7.7	A	A	8.6	7.7	A	A	D
5	SR-71 NB Ramps & Pine Av.	AWS	9.3	8.9	A	A	2040 Analysis Location				D
6	SR-71 NB Ramps & Euclid Av. (SR-83)	TS	27.2	42.5	C	D	32.7	42.6	C	D	D
7	Central Av. & El Prado Rd.	TS	29.0	**61.2**	C	**E**	30.5	**67.2**	C	**E**	D
8	El Prado Rd. & Kimball Av.	TS	28.1	**86.2**	C	**F**	34.7	**93.2**	C	**F**	D
9	Mountain Av. & Kimball Av.	TS	7.4	9.7	A	A	8.1	10.8	A	B	D
10	Mountain Av. & Bickmore Av.	CSS	9.8	9.6	A	A	11.2	10.8	B	B	D
11	Mountain Av. & Driveway 1	**CSS**	Future Intersection				8.6	9.4	A	A	D
12	Mountain Av. & Driveway 2	**CSS**	Future Intersection				9.1	9.6	A	A	D
13	Mountain Av. & Driveway 3	**CSS**	Future Intersection				9.2	9.3	A	A	D
14	El Prado Rd. & Mountain Av.	CSS	10.4	13.6	B	B	11.0	16.2	B	C	D
15	El Prado Rd. & Pine Av.	AWS	9.8	13.5	A	B	10.3	16.0	B	C	D
16	Driveway 4 & Bickmore Av.	**CSS**	Future Intersection				8.6	9.4	A	A	D
17	Driveway 5 & Bickmore Av.	**CSS**	Future Intersection				8.7	9.5	A	A	D
18	Driveway 6 & Bickmore Av.	**CSS**	Future Intersection				8.7	9.6	A	A	D
19	Euclid Av. (SR-83) & SR-60 WB Ramps	TS	22.3	18.6	C	B	22.8	19.1	C	B	D
20	Euclid Av. (SR-83) & SR-60 EB Ramps	TS	25.3	21.9	C	C	25.6	22.1	C	C	D
21	Euclid Av. (SR-83) & Walnut Av.	TS	30.1	32.5	C	C	30.2	32.6	C	C	E
22	Euclid Av. (SR-83) & Riverside Dr.	TS	47.0	**55.5**	D	**E**	48.0	**59.4**	D	**E**	D
23	Euclid Av. (SR-83) & Chino Av.	TS	21.5	23.2	C	C	21.8	23.5	C	C	D
24	Euclid Av. (SR-83) & Schaefer Av.	TS	23.6	26.2	C	C	24.4	26.9	C	C	D
25	Euclid Av. (SR-83) & Edison Av.	TS	38.1	39.7	D	D	39.5	41.0	D	D	D
26	Euclid Av. (SR-83) & Eucalyptus Av.	TS	13.8	13.2	B	B	14.2	13.4	B	B	D
27	Euclid Av. (SR-83) & Merrill Av.	TS	26.4	29.9	C	C	27.3	33.0	C	C	D
28	Euclid Av. (SR-83) & Kimball Av.	TS	32.4	38.3	C	D	33.1	40.7	C	D	D
29	Euclid Av. (SR-83) & Bickmore Av.	TS	16.3	14.0	B	B	18.1	16.2	B	B	D
30	Euclid Av. (SR-83) & Pine Av.	TS	31.9	**61.5**	C	**E**	34.6	**71.3**	C	**E**	D
31	Rincon Meadows Av. & Kimball Av.	TS	15.4	12.8	B	B	2040 Analysis Location				D
32	Rincon Meadows Av. & Pine Av.		Future Intersection				Future Intersection				D
33	Mill Creek Av. & Kimball Av.	TS	14.5	12.9	B	B	2040 Analysis Location				D
34	Mill Creek Av./Chino-Corona Rd. & Pine Av.	TS	27.1	12.2	C	B	32.3	12.3	C	B	D
35	Cucamonga Av. & Chino Corona Rd.	AWS	7.0	7.3	A	A	Construction Location Only				D
36	W. Preserve Loop & Pine Av.	TS	9.4	8.0	A	A	9.6	8.0	A	A	D
37	Main St. & Kimball Av.	TS	13.4	12.5	B	B	2040 Analysis Location				D
38	Flight Av. & Kimball Av.	CSS	21.0	20.5	C	C	2040 Analysis Location				D
39	E. Preserve Loop & Pine Av.	TS	8.5	7.2	A	A	8.8	7.2	A	A	D
40	Hellman Av. & Kimball Av.	TS	**>200.0**	**77.9**	**F**	**F**	2040 Analysis Location				D

URBAN CROSSROADS

Table 6-2

Intersection Analysis for E+P (Project Buildout) Conditions

#	Intersection	Traffic Control[2]	Existing (2019) Delay[1] (secs.) AM	Existing (2019) Delay[1] (secs.) PM	Existing (2019) Level of Service AM	Existing (2019) Level of Service PM	E+P - Project Buildout Delay[1] (secs.) AM	E+P - Project Buildout Delay[1] (secs.) PM	E+P - Project Buildout Level of Service AM	E+P - Project Buildout Level of Service PM	Acceptable LOS
41	Hellman Av. & Pine Av./Schleisman Rd.	TS	37.7	38.6	D	D	38.3	39.4	D	D	D
42	Archibald Av. & Limonite Av.	TS	48.0	29.6	D	C	48.0	31.6	D	C	D
43	Archibald Av. & Schleisman Rd.	TS	**80.1**	46.5	**F**	D	**88.1**	55.0	**F**	D	D

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] CSS = Cross-street Stop; AWS = All-Way Stop; TS = Traffic Signal; **CSS** = Improvement

Table 6-3

Peak Hour Freeway Off-Ramp Queuing Summary for E+P Conditions

Intersection	Movement	Available Stacking Distance (Feet)	Existing (2019) 95th Percentile Queue (Feet)[3] AM Peak Hour	Existing (2019) 95th Percentile Queue (Feet)[3] PM Peak Hour	Existing (2019) Acceptable?[1] AM	Existing (2019) Acceptable?[1] PM	E+P - Building 1 95th Percentile Queue (Feet)[3] AM Peak Hour	E+P - Building 1 95th Percentile Queue (Feet)[3] PM Peak Hour	E+P - Building 1 Acceptable?[1] AM	E+P - Building 1 Acceptable?[1] PM	E+P - Project Buildout 95th Percentile Queue (Feet)[3] AM Peak Hour	E+P - Project Buildout 95th Percentile Queue (Feet)[3] PM Peak Hour	E+P - Project Buildout Acceptable?[1] AM	E+P - Project Buildout Acceptable?[1] PM
SR-71 SB Ramps & Central Avenue	SBL	1,530	245	516 [2]	Yes	Yes	257	528 [2]	Yes	Yes	265	538 [2]	Yes	Yes
	SBL/R	740	0	698 [2]	Yes	Yes	0	0	Yes	Yes	0	0	Yes	Yes
SR-71 SB Ramps & Pine Avenue	SBL/T	1,370	8	16	Yes	Yes	2040 Analysis Location				2040 Analysis Location			
	SBR	725	29	456 [2]	Yes	Yes								
SR-71 SB Ramps & Euclid Avenue (SR-83)	SBL	1,100	215	230	Yes	Yes	215	230	Yes	Yes	215	230	Yes	Yes
	SBL/T	1,560	215	232	Yes	Yes	215	232	Yes	Yes	215	232	Yes	Yes
	SBR	255	0	1	Yes	Yes	0	1	Yes	Yes	0	1	Yes	Yes
SR-71 NB Ramps & Central Avenue	NBL	1,485	34	75	Yes	Yes	34	75	Yes	Yes	34	75	Yes	Yes
	NBL/R	1,070	0	0	Yes	Yes	0	0	Yes	Yes	0	0	Yes	Yes
SR-71 NB Ramps & Pine Avenue	NBL	1,375	5	10	Yes	Yes	2040 Analysis Location				2040 Analysis Location			
	NBL/T	815	5	10	Yes	Yes								
SR-71 NB Ramps & Euclid Avenue (SR-83)	NBL	1,745	27	44	Yes	Yes	27	44	Yes	Yes	27	44	Yes	Yes
	NBR	420	203 [2]	732 [2]	Yes	Yes[3]	235 [2]	745 [2]	Yes	Yes[3]	259 [2]	757 [2]	Yes	Yes[3]
Euclid Av. (SR-83) & SR-60 WB Ramps	WBL	400	306	276	Yes	Yes	312 [2]	280	Yes	Yes	326 [2]	283	Yes	Yes
	WBL/T/R	1,430	316 [2]	284	Yes	Yes	342 [2]	281	Yes	Yes	346 [2]	284	Yes	Yes
	WBR	400	202	207	Yes	Yes	206	209	Yes	Yes	209	209	Yes	Yes
Euclid Av. (SR-83) & SR-60 EB Ramps	EBL	900	363 [2]	352 [2]	Yes	Yes	363 [2]	352 [2]	Yes	Yes	363 [2]	352 [2]	Yes	Yes
	EBT/R	1,270	260 [2]	288 [2]	Yes	Yes	289 [2]	294 [2]	Yes	Yes	300 [2]	298 [2]	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the SR-71 Freeway mainline.

Table 6-4

Freeway Facility Analysis for E+P Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	Existing (2019)				E+P - Building 1				E+P - Project Buildout			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]
SR-71 Freeway	Southbound	North of Central Avenue	3	9.6	A	18.4	C	9.7	A	18.5	C	9.8	A	18.6	C
		Central Avenue Off-Ramp	3	16.4	B	28.0	C	16.6	B	28.1	D	16.7	B	28.1	D
		Central Avenue Loop On-Ramp	3	9.5	A	13.9	B	9.5	A	13.9	B	9.5	A	13.9	B
		Central Avenue On-Ramp	3	10.0	A	14.0	B	10.0	A	14.0	B	10.0	A	14.0	B
		Central Avenue to Pine Avenue	3	10.4	A	17.1	B	10.4	A	17.1	B	10.4	A	17.1	B
		Pine Avenue Off-Ramp	2	14.5	B	22.2	C	14.5	B	22.2	C	14.5	B	22.2	C
		Pine Avenue On-Ramp	2	12.5	B	12.3	B	12.5	B	12.3	B	12.5	B	12.3	B
		Pine Avenue to Euclid Avenue (SR-83)	2	9.2	A	9.0	A	9.2	A	9.0	A	9.2	A	9.0	A
		Euclid Avenue (SR-83) Off-Ramp	2	13.4	B	13.2	B	13.4	B	13.2	B	13.4	B	13.2	B
		Euclid Avenue (SR-83) Loop On-Ramp	2	9.7	A	10.4	B	9.8	A	10.6	B	9.8	A	10.8	B
		Euclid Avenue (SR-83) On-Ramp	2	15.8	B	16.5	B	15.8	B	16.8	B	15.9	B	17.0	B
		South of Euclid Avenue (SR-83)	2	15.0	B	16.3	B	15.0	B	16.1	B	15.0	B	16.3	B
	Northbound	North of Central Avenue	3	20.3	C	17.8	B	20.4	C	17.9	B	20.4	C	18.1	C
		Central Avenue On-Ramp	3	24.6	C	21.2	C	24.6	C	21.4	C	24.7	C	21.6	C
		Central Avenue Loop On-Ramp	3	18.7	B	16.5	B	18.7	B	16.9	B	18.7	B	16.9	B
		Central Avenue Off-Ramp	3	20.4	C	21.7	C	20.4	C	21.7	C	20.4	C	21.7	C
		Central Avenue to Pine Avenue	3	13.6	B	14.9	B	13.6	B	14.9	B	13.6	B	14.9	B
		Pine Avenue On-Ramp	2	15.8	B	18.5	C	15.8	B	18.5	C	15.8	B	18.5	C
		Pine Avenue Off-Ramp	2	22.7	C	26.4	C	22.7	C	26.4	C	22.7	C	26.4	C
		Pine Avenue to Euclid Avenue (SR-83)	2	17.2	B	20.4	C	17.2	B	20.4	C	17.2	B	20.4	C
		Euclid Avenue (SR-83) On-Ramp	2	18.6	B	22.2	C	18.8	B	22.5	C	18.8	B	22.5	C
		Euclid Avenue (SR-83) Off-Ramp	3	8.9	A	15.6	B	9.1	A	15.7	B	9.2	A	15.7	B
		South of Euclid Avenue (SR-83)	3	10.8	A	19.0	C	11.0	A	19.0	C	11.1	B	19.1	C
SR-60 Freeway	Westbound	West of Euclid Avenue (SR-83)	4	33.9	D	31.5	D	34.0	D	31.5	D	343.0	D	32.2	D
		Euclid Avenue (SR-83) On-Ramp	4	28.6	D	27.3	C	33.4	D	32.0	C	33.4	D	32.3	C
		Euclid Avenue (SR-83) Off-Ramp	4	**36.3**	**E**	**35.7**	**E**	**36.4**	**E**	**35.7**	**E**	**36.5**	**E**	**35.7**	**E**
		East of Euclid Avenue (SR-83)	4	34.6	D	33.3	D	34.7	D	33.4	D	34.7	D	33.4	D
	Eastbound	West of Euclid Avenue (SR-83)	4	31.2	D	25.7	C	31.2	D	25.7	C	31.2	D	25.8	C
		Euclid Avenue (SR-83) Off-Ramp	4	32.2	D	28.5	D	32.2	D	28.6	D	32.3	D	28.7	D
		Euclid Avenue (SR-83) On-Ramp	4	28.9	D	24.7	C	33.1	D	24.8	C	33.1	D	27.6	C
		East of Euclid Avenue (SR-83)	4	32.9	D	26.4	D	32.9	D	26.5	D	33.0	D	26.5	D

* **BOLD** = Unacceptable Level of Service

[1] Number of lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

EXHIBIT 6-6: E+P (PROJECT BUILDOUT) SUMMARY OF LOS

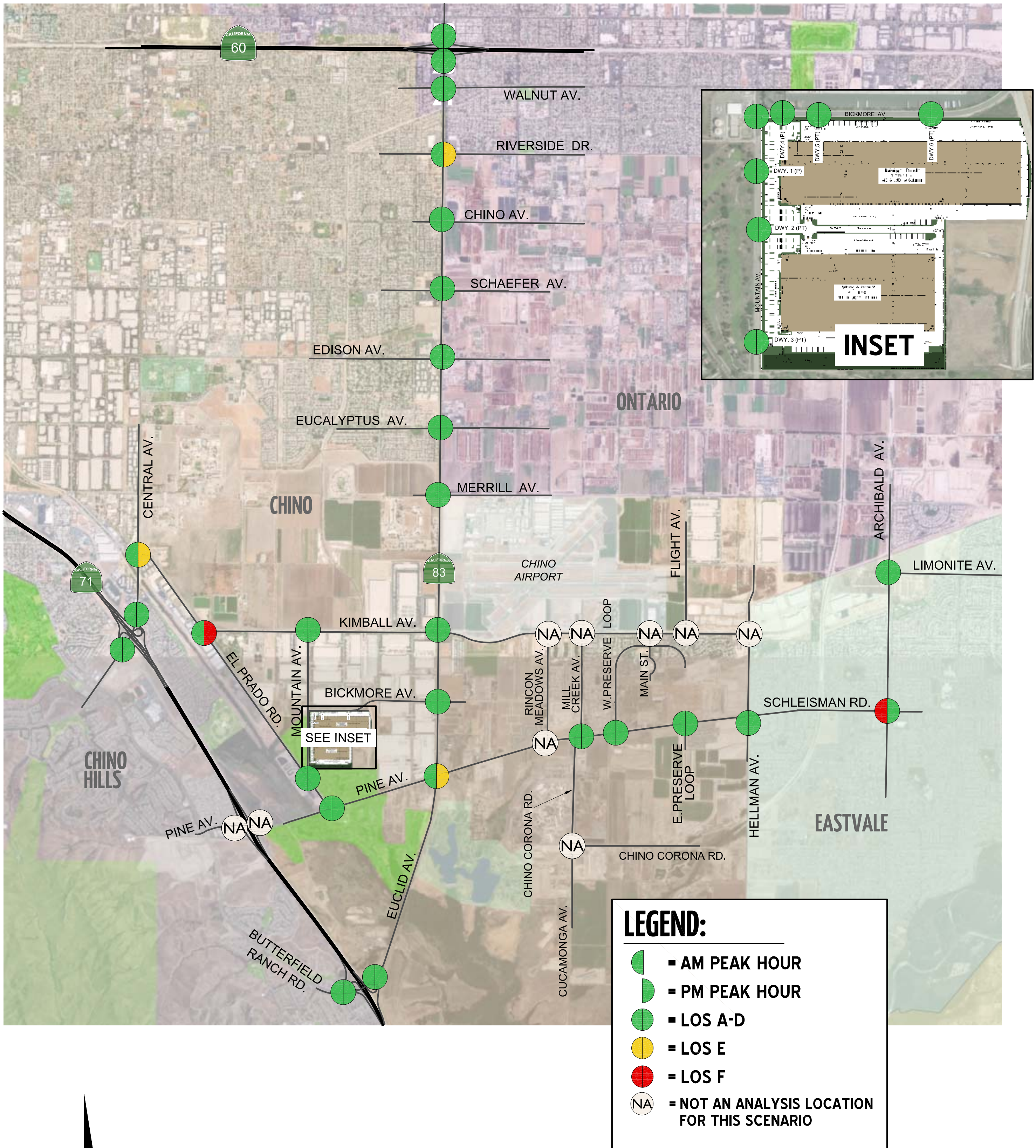
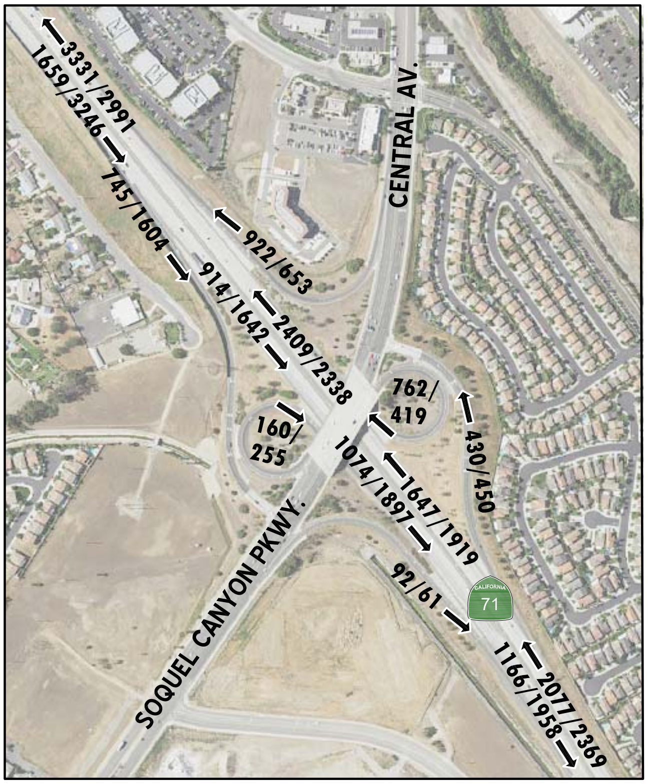


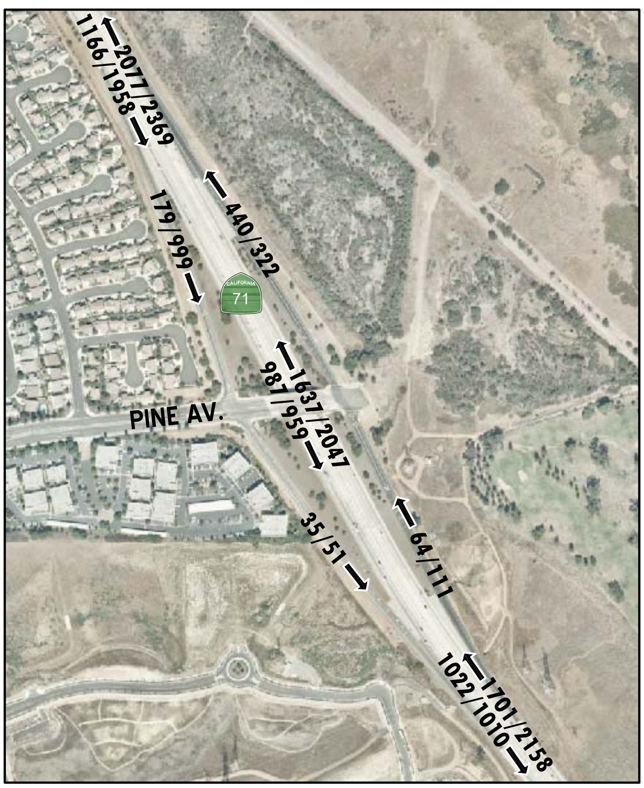
EXHIBIT 6-7: E+P (BUILDING 1) FREEWAY MAINLINE VOLUMES



LEGEND:

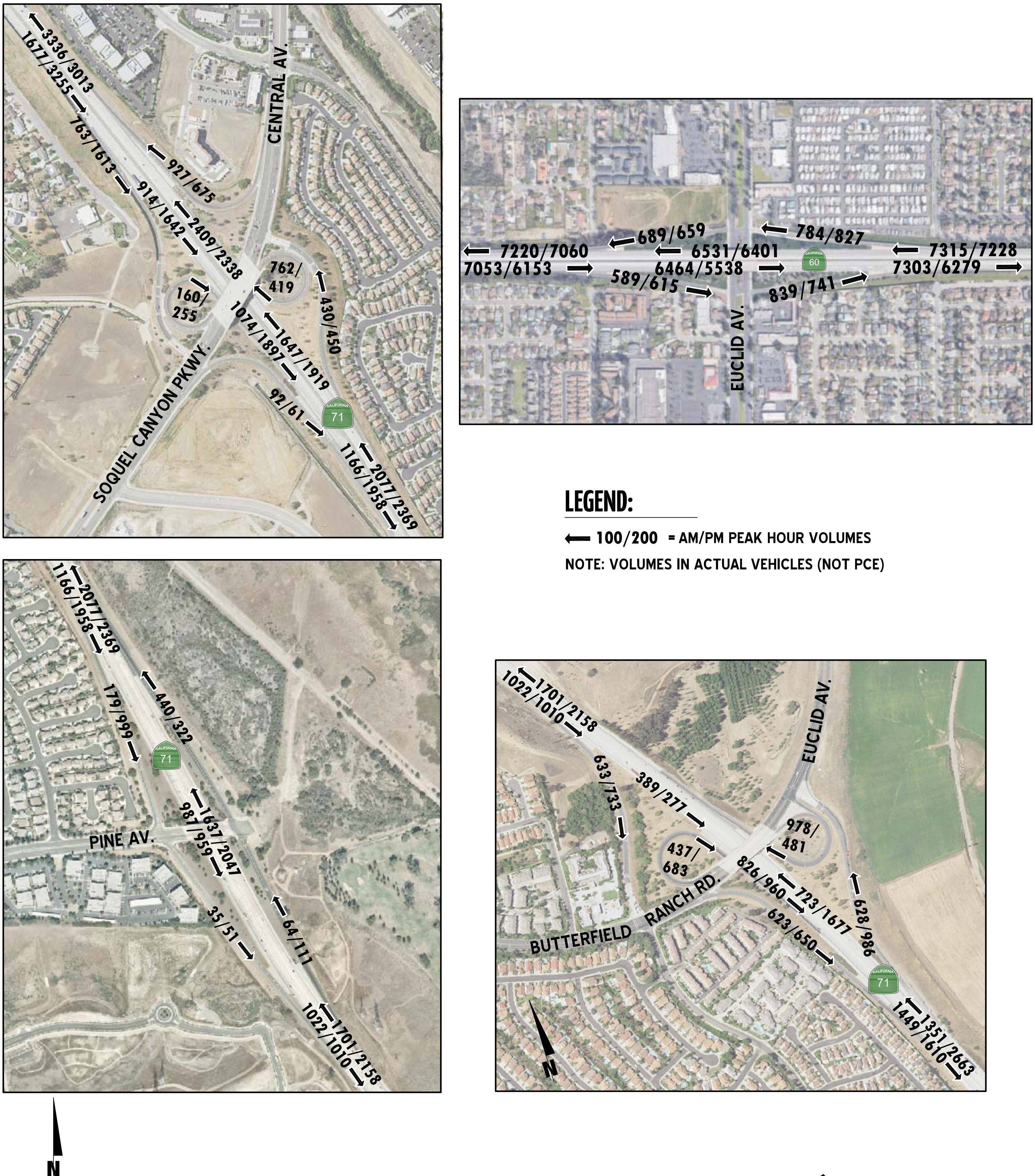
100/200 = AM/PM PEAK HOUR VOLUMES

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)



N

EXHIBIT 6-8: E+P (PROJECT BUILDOUT) FREEWAY MAINLINE VOLUMES



6.7 PROJECT IMPACTS AND RECOMMENDED IMPROVEMENTS

This section provides a summary of Project impacts and recommended improvements. Based on the City of Chino significance criteria discussed in Section 2.9 *Thresholds of Significance*, the following intersections were found to be impacted by Project. Improvements necessary to reduce project-related traffic impacts to less than significant are also discussed below.

6.7.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

The effectiveness of the proposed recommended mitigation measures is presented on Table 6-5 for E+P traffic conditions. The recommended mitigation measures necessary to reduce Project impacts to less than significant are discussed below. The intersection operations analysis worksheets for E+P (Building 1) and E+P (Project Buildout) traffic conditions, with improvements, are included in Appendix 6.9 and Appendix 6.10, respectively.

E+P (Building 1) Conditions:

Central Avenue & El Prado Road (#7) – This intersection was found to operate at an unacceptable LOS (LOS E or worse) during the peak hours under Existing traffic conditions, and is anticipated to continue to operate at an unacceptable LOS during the one or more peak hours with the addition of Project (Building 1) traffic. As such, the impact is considered cumulatively significant.

The following improvement is necessary to reduce the Project's proportionate increase in delay to pre-project levels or better, thus reducing the Project's cumulative impact to less than significant:

- Payment of the Project's DIF fees to be applied towards the addition of a 2nd southbound left turn lane to improve the existing deficiency.

El Prado Road & Kimball Avenue (#8) – This intersection was found to operate at an unacceptable LOS (LOS E or worse) during the peak hours under Existing traffic conditions, and is anticipated to continue to operate at an unacceptable LOS during the one or more peak hours with the addition of Project (Building 1) traffic. As such, the impact is considered cumulatively significant.

The following improvement is necessary to reduce the Project's proportionate increase in delay to pre-project levels or better, thus reducing the Project's cumulative impact to less than significant:

- Contribute fair share towards restriping the southbound approach to accommodate two left turn lanes and one shared through-right turn lane to improve the existing deficiency.

Intersection Analysis for E+P Conditions With Improvements

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
7	Central Av. & El Prado Rd.																	
	Existing:																	
	-Without Improvements	TS	1	2	1>	1	3	0	1	1	0	1	1	1>	29.0	**61.2**	C	**E**
	-With Improvements	TS	1	2	1>	**2**	3	0	1	1	0	1	1	1>	27.8	31.5	C	C
	E+P (Building 1):																	
	-Without Improvements	TS	1	2	1>	1	3	0	1	1	0	1	1	1>	29.8	**64.6**	C	**E**
	-With Improvements	TS	1	2	1>	**2**	3	0	1	1	0	1	1	1>	28.0	32.9	C	C
	E+P (Project Buildout):																	
	-Without Improvements	TS	1	2	1>	1	3	0	1	1	0	1	1	1>	30.5	**67.2**	C	**E**
	-With Improvements	TS	1	2	1>	**2**	3	0	1	1	0	1	1	1>	28.2	34.1	C	C
8	El Prado Rd. & Kimball Av.																	
	Existing:																	
	-Without Improvements	TS	1	1	1	1	2	0	1	1	0	0	1	1>	28.1	**86.2**	C	**F**
	-With Improvements	TS	1	1	1	**2**	**1**	0	1	1	0	0	1	1>	24.4	25.7	C	C
	E+P (Building 1):																	
	-Without Improvements	TS	1	1	1	1	2	0	1	1	0	0	1	1>	30.3	**90.4**	C	**F**
	-With Improvements	TS	1	1	1	**2**	**1**	0	1	1	0	0	1	1>	24.4	26.2	C	C
	E+P (Project Buildout):																	
	-Without Improvements	TS	1	1	1	1	2	0	1	1	0	0	1	1>	34.7	**93.2**	C	**F**
	-With Improvements	TS	1	1	1	**2**	**1**	0	1	1	0	0	1	1>	24.5	26.7	C	C
22	Euclid Av. (SR-83) & Riverside Dr.																	
	Existing:																	
	-Without Improvements	TS	1	2	1	1	2	1>	1	1	0	1	2	d	47.0	**55.5**	D	**E**
	-With Improvements	TS	1	2	1	1	2	1>	1	1	**1**	1	2	d	45.3	49.8	D	D
	E+P (Building 1):																	
	-Without Improvements	TS	1	2	1	1	2	1>	1	1	0	1	2	d	47.6	**57.5**	D	**E**
	-With Improvements		Not Applicable															
	E+P (Project Buildout):																	
	-Without Improvements	TS	1	2	1	1	2	1>	1	1	0	1	2	d	48.0	**59.4**	D	**E**
	-With Improvements	TS	1	2	1	1	2	1>	1	1	**1**	1	2	d	45.8	51.5	D	D
30	Euclid Av. (SR-83) & Pine Av.																	
	Existing:																	
	-Without Improvements	TS	1	2	1>	1	2	0	1	1	1	2	1	0	31.9	**61.5**	C	**E**
	-With Improvements	TS	1	2	**1>>**	1	2	0	1	1	1	2	1	0	39.1	36.1	C	D
	E+P (Building 1):																	
	-Without Improvements	TS	1	2	1>	1	2	0	1	1	1	2	1	0	33.3	**67.5**	C	**E**
	-With Improvements	TS	1	2	**1>>**	1	2	0	1	1	1	2	1	0	40.4	39.7	D	D
	E+P (Project Buildout):																	
	-Without Improvements	TS	1	2	1>	1	2	0	1	1	1	2	1	0	34.6	**71.3**	C	**E**
	-With Improvements	TS	1	2	**1>>**	1	2	0	1	1	1	2	1	0	41.8	42.9	D	D

Table 6-5

Intersection Analysis for E+P Conditions With Improvements

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1] Northbound L	T	R	Southbound L	T	R	Eastbound L	T	R	Westbound L	T	R	Delay[2] (secs.) AM	PM	Level of Service AM	PM
43	Archibald Av. & Schleisman Rd.																	
	Existing:																	
	-Without Improvements	TS	2	3	1	2	3	1	2	3	1	2	3	1	**80.1**	46.5	**F**	D
	-With Improvements[4]	TS	2	3	1	2	3	1	2	3	1	2	3	1	32.8	29.6	C	C
	E+P (Building 1):																	
	-Without Improvements	TS	2	3	1	2	3	1	2	3	1	2	3	1	**80.1**	50.9	**F**	D
	-With Improvements		Not Applicable															
	E+P (Project Buildout):																	
	-Without Improvements	TS	2	3	1	2	3	1	2	3	1	2	3	1	**88.1**	55.0	**F**	D
	-With Improvements[4]	TS	2	3	1	2	3	1	2	3	1	2	3	1	34.5	30.1	C	C

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; >> = Free Right Turn Lane; d= Defacto Right Turn Lane; **1** = Improvement

[2] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] TS = Traffic Signal

[4] Improvement consists of modifying the traffic signal to extend the cycle length to 130 seconds.

Euclid Avenue (SR-83) & Pine Avenue (#30) – This intersection was found to operate at an unacceptable LOS (LOS E or worse) during the peak hours under Existing traffic conditions, and is anticipated to continue to operate at an unacceptable LOS during the one or more peak hours with the addition of Project (Building 1) traffic. As such, the impact is considered cumulatively significant.

The following improvement is necessary to reduce the Project's proportionate increase in delay to pre-project levels or better, thus reducing the Project's cumulative impact to less than significant:

- Payment of Project's DIF fees to be applied towards the addition of a northbound free-right turn lane to improve the existing deficiency.

E+P (Project Buildout) Conditions:

Central Avenue & El Prado Road (#7) – This intersection was found to operate at an unacceptable LOS (LOS E or worse) during the peak hours under Existing traffic conditions, and is anticipated to continue to operate at an unacceptable LOS during the one or more peak hours with the addition of Project (Project Buildout) traffic. As such, the impact is considered cumulatively significant.

The following improvement is necessary to reduce the Project's proportionate increase in delay to pre-project levels or better, thus reducing the Project's cumulative impact to less than significant:

- Payment of the Project's DIF fees to be applied towards the addition of a 2nd southbound left turn lane to improve the existing deficiency.

El Prado Road & Kimball Avenue (#8) – This intersection was found to operate at an unacceptable LOS (LOS E or worse) during the peak hours under Existing traffic conditions, and is anticipated to continue to operate at an unacceptable LOS during the one or more peak hours with the addition of Project (Project Buildout) traffic. As such, the impact is considered cumulatively significant.

The following improvement is necessary to reduce the Project's proportionate increase in delay to pre-project levels or better, thus reducing the Project's cumulative impact to less than significant:

- Contribute fair share towards restriping the southbound approach to accommodate two left turn lanes and one shared through-right turn lane to improve the existing deficiency.

Euclid Avenue (SR-83) & Riverside Drive (#22) – This intersection was found to operate at an unacceptable LOS (LOS E or worse) during the peak hours under Existing traffic conditions, and is anticipated to continue to operate at an unacceptable LOS during the one or more peak hours with the addition of Project (Project Buildout) traffic. As such, the impact is considered cumulatively significant.

The following improvement is necessary to reduce the Project's proportionate increase in delay to pre-project levels or better, thus reducing the Project's cumulative impact to less than significant:

- Contribute fair share towards an eastbound right turn lane to improve the existing deficiency.

Euclid Avenue (SR-83) & Pine Avenue (#30) – This intersection was found to operate at an unacceptable LOS (LOS E or worse) during the peak hours under Existing traffic conditions, and is anticipated to continue to operate at an unacceptable LOS during the one or more peak hours with the addition of Project (Project Buildout) traffic. As such, the impact is considered cumulatively significant.

The following improvement is necessary to reduce the Project's proportionate increase in delay to pre-project levels or better, thus reducing the Project's cumulative impact to less than significant:

- Payment of Project's DIF fees to be applied towards the addition of a northbound free-right turn lane to improve the existing deficiency.

Archibald Avenue & Schleisman Road (#43) – This intersection was found to operate at an unacceptable LOS (LOS E or worse) during the peak hours under Existing traffic conditions, and is anticipated to continue to operate at an unacceptable LOS during the one or more peak hours with the addition of Project (Project Buildout) traffic. As such, the impact is considered cumulatively significant.

The following improvement is necessary to reduce the Project's proportionate increase in delay to pre-project levels or better, thus reducing the Project's cumulative impact to less than significant:

- Contribute fair share towards modifying the traffic signal to extend the cycle length to 130-seconds to improve the existing deficiency.

6.7.2 Recommended Improvements To Address Deficiencies On Off-Ramp Queues

As shown previously on Table 6-3, there are no peak hour queuing issues at the SR-71 Freeway at Euclid Avenue (SR-83) and Euclid Avenue (SR-83) at SR-60 Freeway interchanges. As such, no improvements have been recommended.

6.7.3 Recommended Improvements To Address Deficiencies On Freeway Facilities

At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development projects in the City of Chino (or other neighboring jurisdictions) on SHS roadway segments. As such, no improvements have been recommended to address the E+P deficiencies on the SHS, because there is no feasible mitigation available.

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7 OPENING YEAR CUMULATIVE (2022) TRAFFIC CONDITIONS

This section discusses the methods used to develop Opening Year Cumulative (2022) Without and With Project traffic forecasts, and the resulting intersection operations, freeway mainline operations, and traffic signal warrant analyses.

7.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Opening Year Cumulative (2022) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Opening Year Cumulative conditions only (e.g., intersection and roadway improvements along the Project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Opening Year Cumulative conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways such as the southern extension of Rincon Meadows Avenue on Pine Avenue).

7.2 OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus an ambient growth factor of 6.12% plus traffic from pending and approved but not yet constructed known development projects in the area. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Opening Year Cumulative (2022) Without Project traffic conditions are shown on Exhibits 7-1 and 7-2.

7.3 OPENING YEAR CUMULATIVE (2022) WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Opening Year Cumulative (2022) Without Project traffic in conjunction with the addition of Project traffic. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Opening Year Cumulative (2022) With Project traffic conditions are shown on Exhibits 7-3 and 7-4.

EXHIBIT 7-1: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT) (IN PCE)

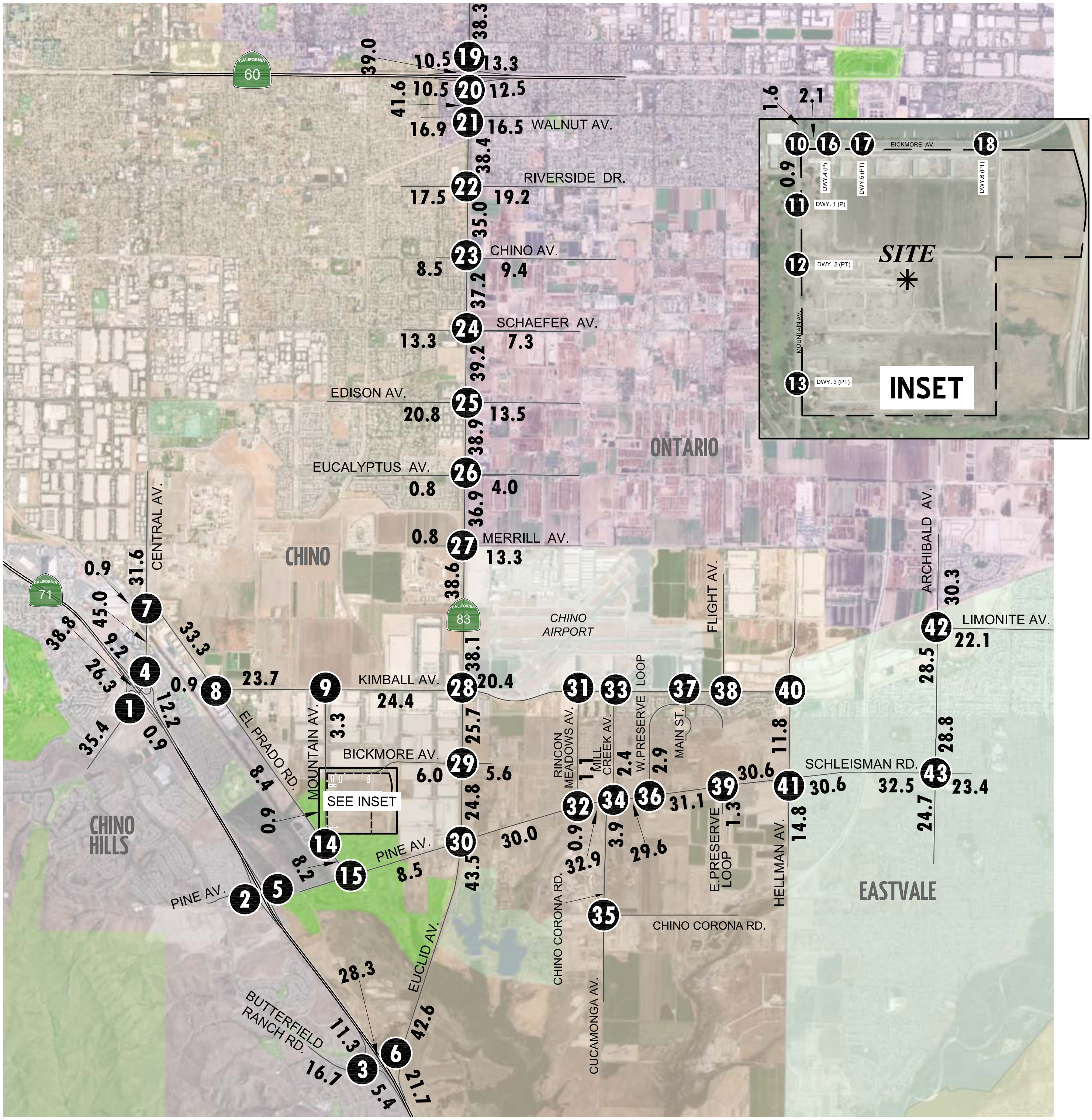


EXHIBIT 7-2 (1 OF 2): OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)

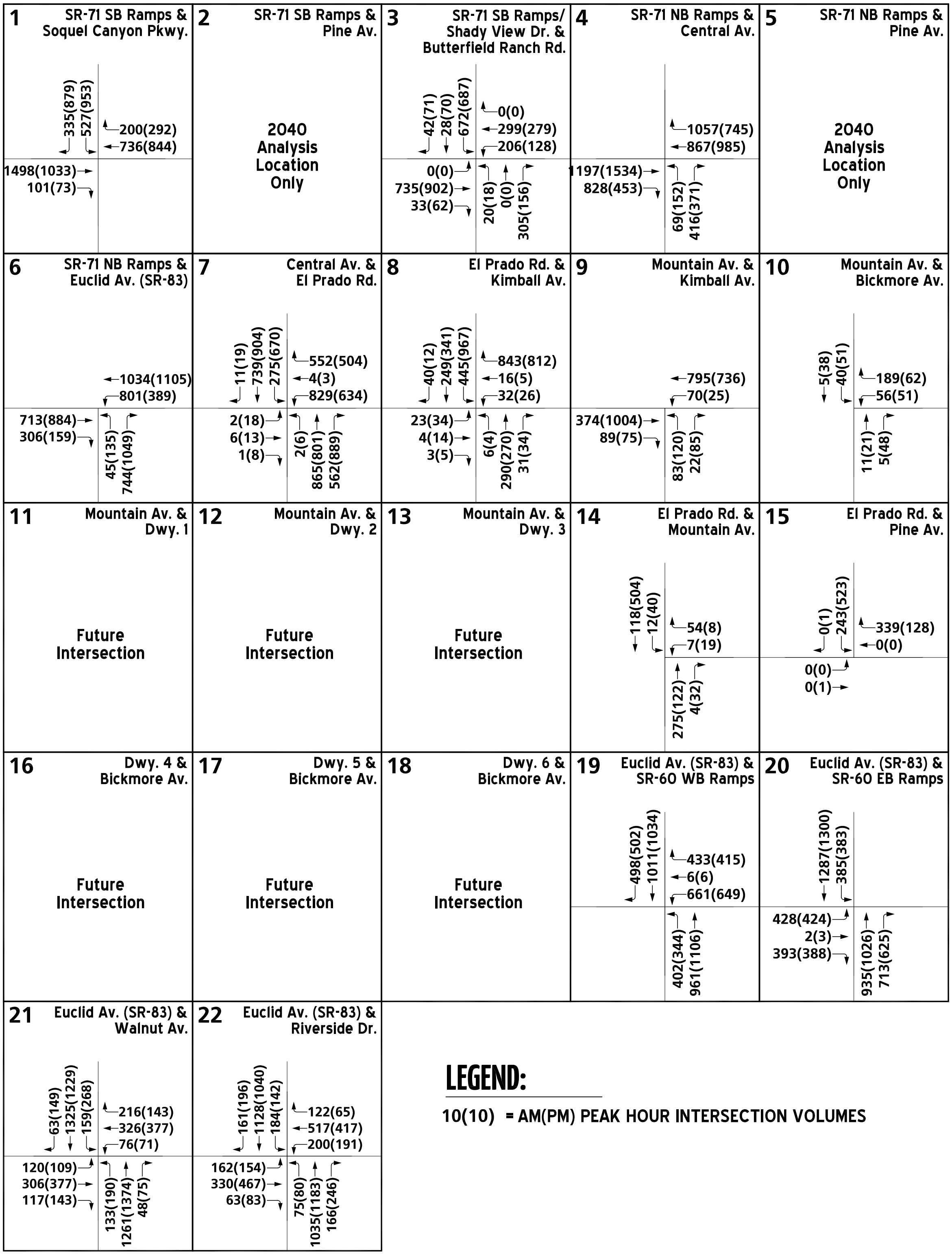


EXHIBIT 7-2 (2OF2): OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)

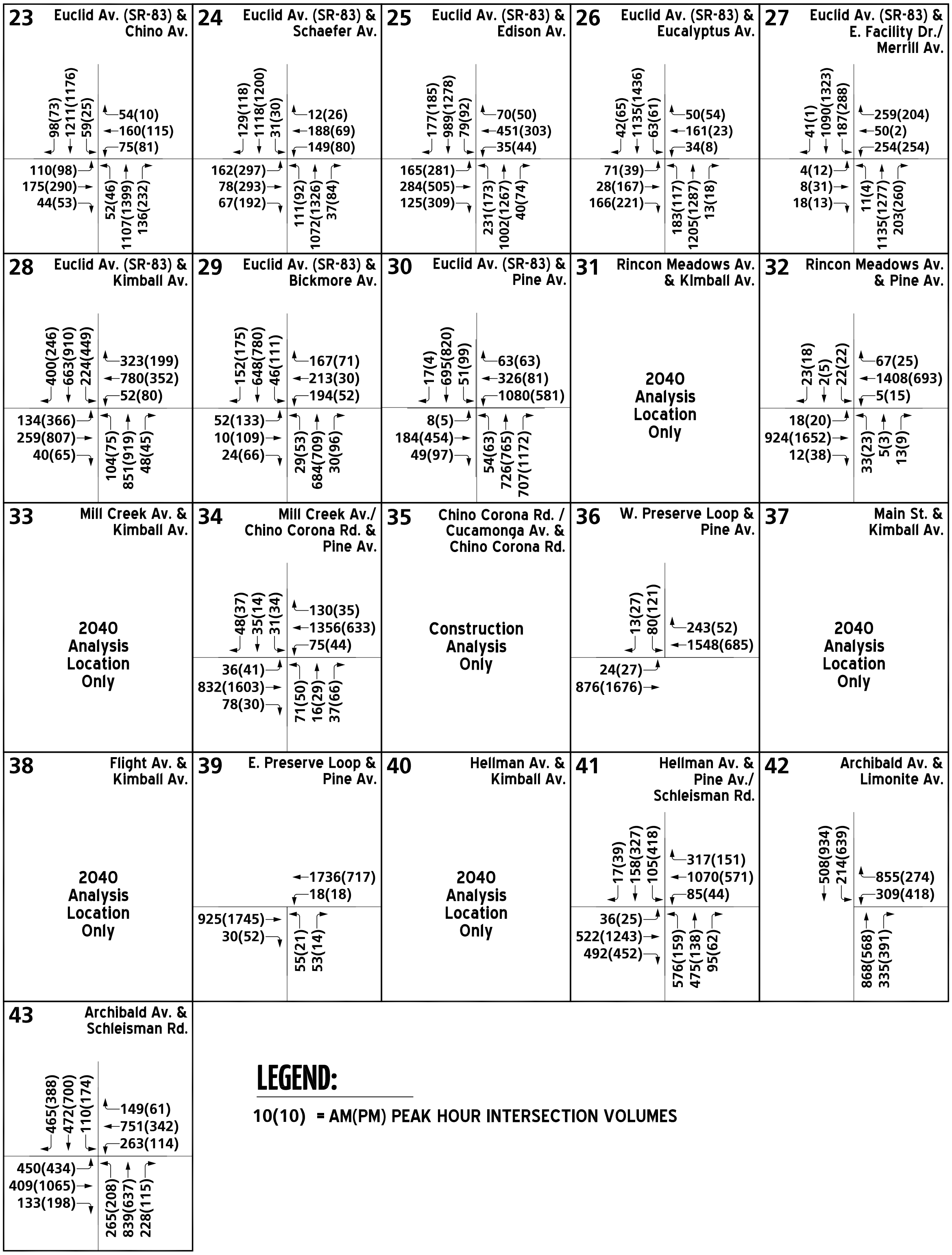
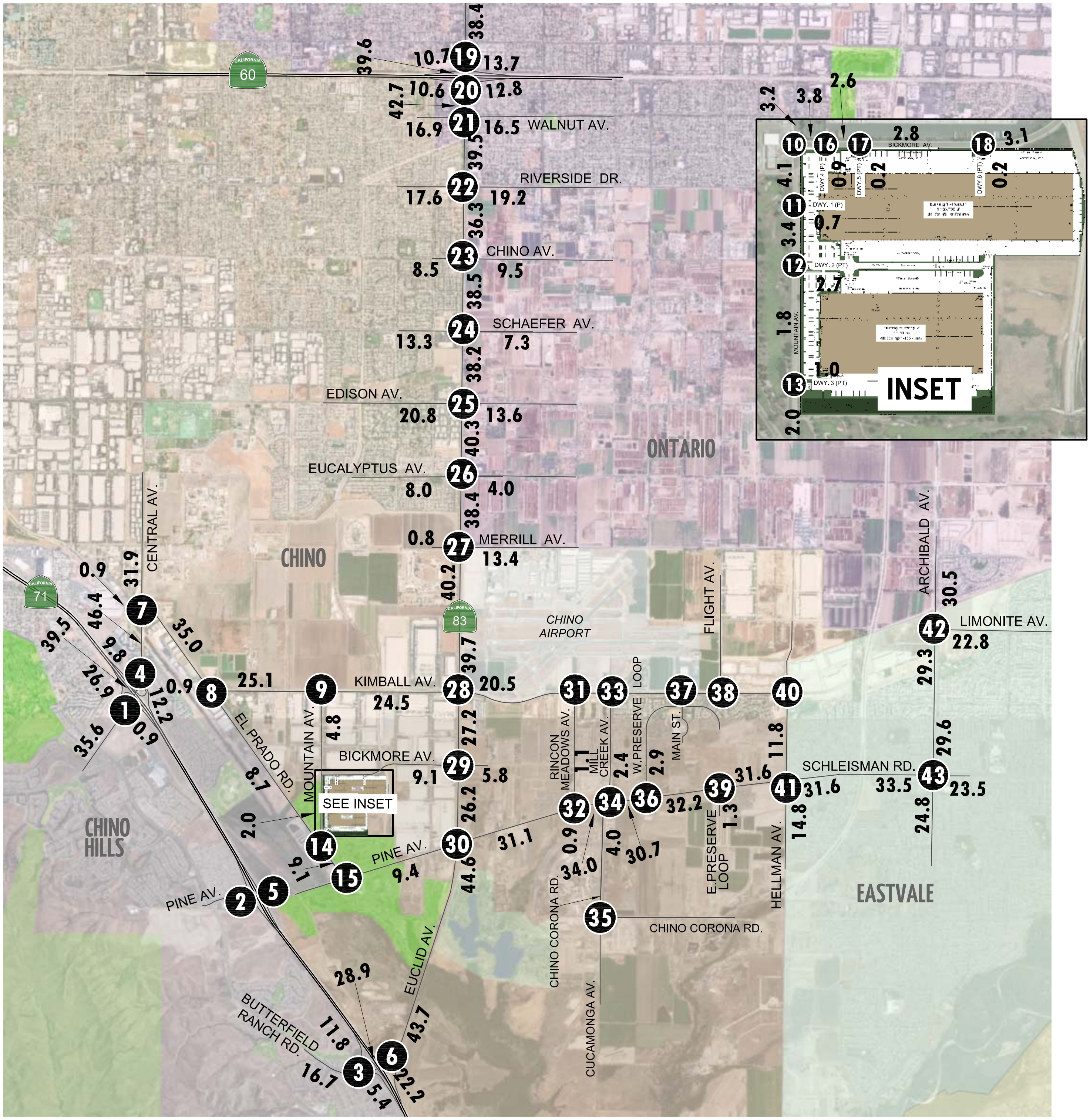


EXHIBIT 7-3: OPENING YEAR CUMULATIVE (2022) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT) (IN PCE)



LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

N

EXHIBIT 7-4 (1OF2): OPENING YEAR CUMULATIVE (2022) WITH PROJECT TRAFFIC VOLUMES (IN PCE)

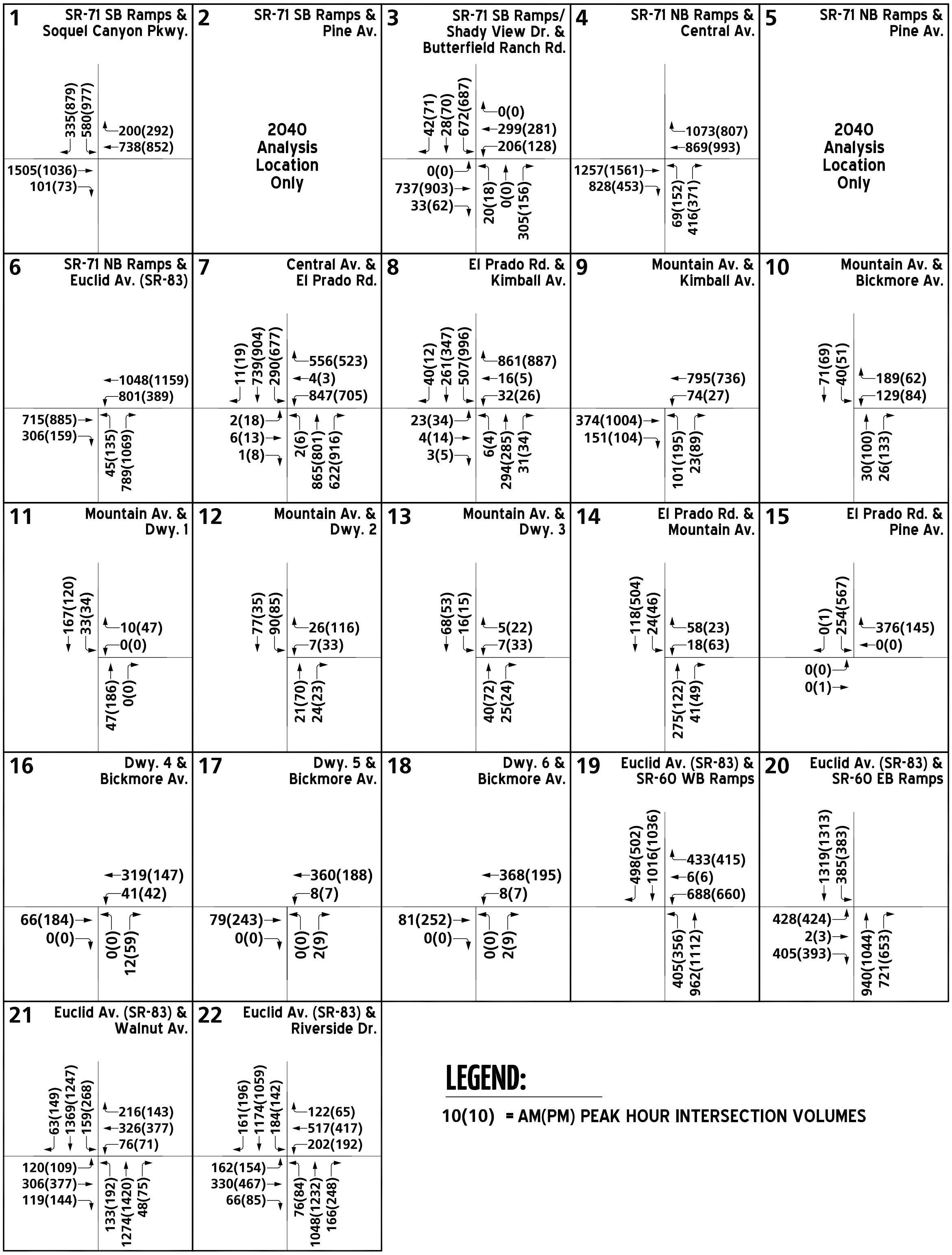
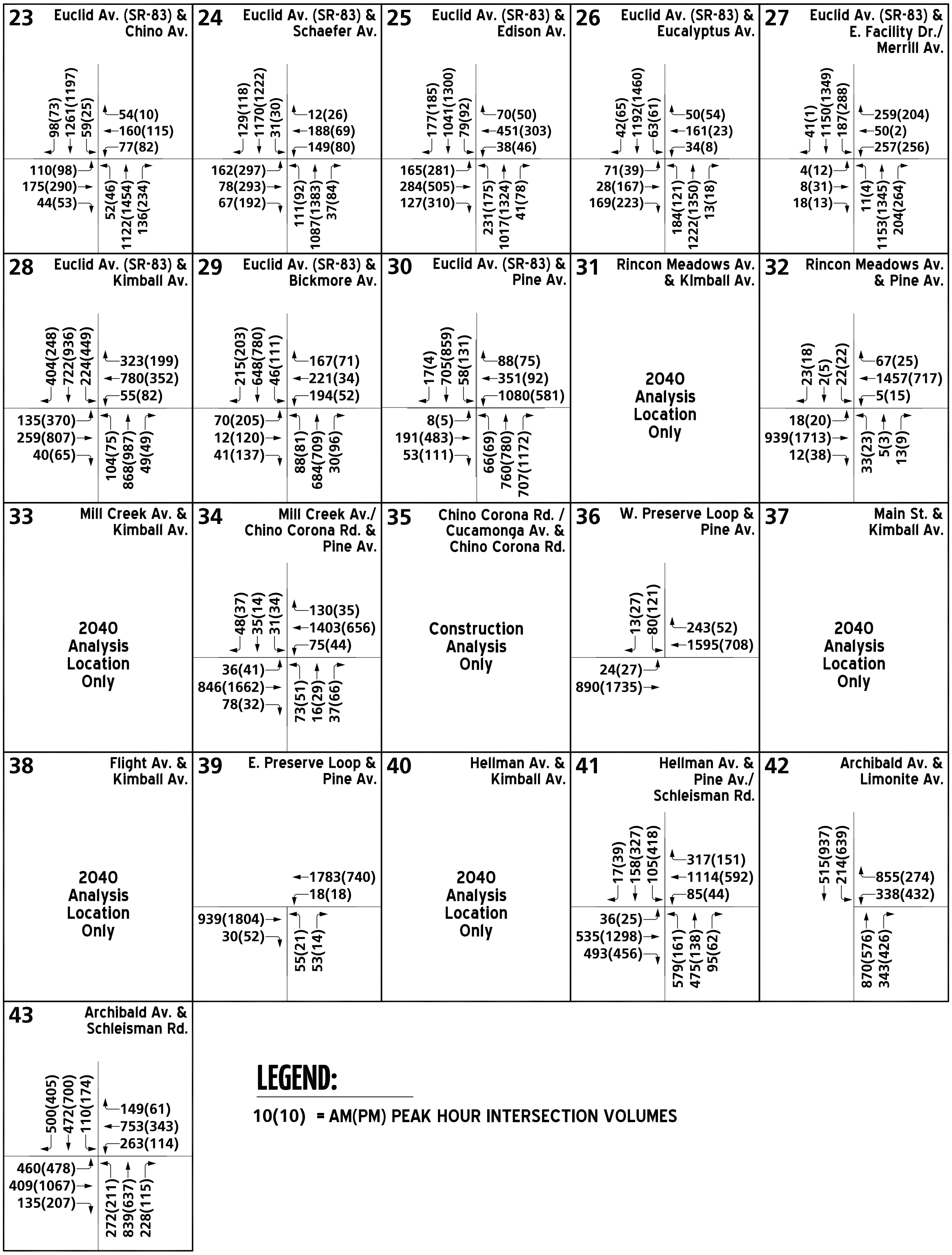


EXHIBIT 7-4 (2OF2): OPENING YEAR CUMULATIVE (2022) WITH PROJECT TRAFFIC VOLUMES (IN PCE)



7.4 INTERSECTION OPERATIONS ANALYSIS

7.4.1 OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT TRAFFIC CONDITIONS

LOS calculations were conducted for the study intersections to evaluate their operations under Opening Year Cumulative (2022) Without Project conditions with roadway and intersection geometrics consistent with Section 7.1 *Roadway Improvements*. As shown on Table 7-1, the following study area intersections are anticipated to operate at an unacceptable LOS under Opening Year (2022) Without Project traffic conditions:

- Central Avenue & El Prado Road (#7) – LOS F PM peak hour only
- El Prado Road & Kimball Avenue (#8) – LOS F PM peak hour only
- Euclid Avenue (SR-83) & Riverside Drive (#22) – LOS E AM peak hour; LOS F PM peak hour
- Euclid Avenue (SR-83) & Edison Avenue (#25) – LOS E PM peak hour only
- Euclid Avenue (SR-83) & Merrill Avenue (#27) – LOS E PM peak hour only
- Euclid Avenue (SR-83) & Pine Avenue (#30) – LOS F PM peak hour only
- Archibald Avenue & Limonite Avenue (#42) – LOS E AM and PM peak hour
- Archibald Avenue & Schleisman Road (#43) – LOS F AM peak hour; LOS E PM peak hour

A summary of the peak hour intersection LOS for Opening Year Cumulative (2022) Without Project conditions is shown on Exhibit 7-5. The intersection operations analysis worksheets for Opening Year Cumulative (2022) Without Project traffic conditions are included in Appendix 7.1 of this TIA.

7.4.2 OPENING YEAR CUMULATIVE (2022) WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 7-1 and illustrated on Exhibit 7-6, the following study area intersection is anticipated to operate at a deficient LOS during one or both peak hours for Opening Year Cumulative (2022) With Project traffic conditions with the addition of Project traffic, in addition to the locations identified above for Opening Year Cumulative (2022) Without Project traffic conditions:

- Euclid Avenue (SR-830 & Kimball Avenue (#28) – LOS E PM peak hour only

The intersection operations analysis worksheets for Opening Year Cumulative (2022) With Project traffic conditions are included in Appendix 7.2 of this TIA.

7.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

There are no study area intersections anticipated to meet either peak hour or planning level (ADT) volume-based traffic signal warrants for Opening Year Cumulative (2022) Without and With Project traffic conditions, in addition to those previously warranted under Existing (2019) traffic conditions (see Appendix 7.3 and Appendix 7.4).

Table 7-1

Intersection Analysis for Opening Year Cumulative (2022) Conditions

#	Intersection	Traffic Control[2]	2022 Without Project Delay[1] (secs.) AM	2022 Without Project Delay[1] (secs.) PM	2022 Without Project Level of Service AM	2022 Without Project Level of Service PM	2022 With Project Delay[1] (secs.) AM	2022 With Project Delay[1] (secs.) PM	2022 With Project Level of Service AM	2022 With Project Level of Service PM	Acceptable LOS
1	SR-71 SB Ramps & Soquel Canyon Rd.	TS	14.8	30.5	B	C	16.0	32.0	B	C	D
2	SR-71 SB Ramps & Pine Av.	TS	2040 Analysis Location				2040 Analysis Location				D
3	SR-71 SB Ramps & Butterfield Ranch Rd.	TS	43.6	46.7	D	D	43.6	46.7	D	D	D
4	SR-71 NB Ramps & Central Av.	TS	9.2	8.2	A	A	9.2	8.2	A	A	D
5	SR-71 NB Ramps & Pine Av.	AWS	2040 Analysis Location				2040 Analysis Location				D
6	SR-71 NB Ramps & Euclid Av. (SR-83)	TS	33.7	49.0	C	D	37.1	49.1	D	D	D
7	Central Av. & El Prado Rd.	TS	35.0	**81.1**	D	**F**	36.9	**87.7**	D	**F**	D
8	El Prado Rd. & Kimball Av.	TS	35.0	**124.9**	C	**F**	48.8	**132.4**	D	**F**	D
9	Mountain Av. & Kimball Av.	TS	7.7	11.0	A	B	8.3	12.2	A	B	D
10	Mountain Av. & Bickmore Av.	CSS	9.9	10.3	A	B	11.3	11.7	B	B	D
11	Mountain Av. & Driveway 1	**<u>CSS</u>**	Future Intersection				8.6	9.5	A	A	D
12	Mountain Av. & Driveway 2	**<u>CSS</u>**	Future Intersection				9.1	10.0	A	B	D
13	Mountain Av. & Driveway 3	**<u>CSS</u>**	Future Intersection				9.2	9.5	A	A	D
14	El Prado Rd. & Mountain Av.	CSS	10.5	14.9	B	B	11.2	18.1	B	C	D
15	El Prado Rd. & Pine Av.	AWS	10.2	15.7	B	C	10.7	18.4	B	C	D
16	Driveway 4 & Bickmore Av.	**<u>CSS</u>**	Future Intersection				8.7	9.6	A	A	D
17	Driveway 5 & Bickmore Av.	**<u>CSS</u>**	Future Intersection				8.7	9.7	A	A	D
18	Driveway 6 & Bickmore Av.	**<u>CSS</u>**	Future Intersection				8.7	9.7	A	A	D
19	Euclid Av. (SR-83) & SR-60 WB Ramps	TS	26.4	22.7	C	C	27.6	23.3	C	C	D
20	Euclid Av. (SR-83) & SR-60 EB Ramps	TS	35.3	25.2	D	C	36.4	25.6	D	C	D
21	Euclid Av. (SR-83) & Walnut Av.	TS	32.3	35.5	C	D	32.4	35.7	C	D	E
22	Euclid Av. (SR-83) & Riverside Dr.	TS	**59.0**	**83.7**	**E**	**F**	**61.2**	**91.8**	**E**	**F**	D
23	Euclid Av. (SR-83) & Chino Av.	TS	23.9	27.3	C	C	24.3	28.2	C	C	D
24	Euclid Av. (SR-83) & Schaefer Av.	TS	30.1	33.4	C	C	31.5	35.2	C	D	D
25	Euclid Av. (SR-83) & Edison Av.	TS	51.6	**60.6**	D	**E**	**56.3**	**64.8**	**E**	**E**	D
26	Euclid Av. (SR-83) & Eucalyptus Av.	TS	17.1	16.7	B	B	17.8	17.4	B	B	D
27	Euclid Av. (SR-83) & Merrill Av.	TS	45.5	**71.5**	D	**E**	47.6	**81.6**	D	**F**	D
28	Euclid Av. (SR-83) & Kimball Av.	TS	42.4	52.2	D	D	43.2	**57.1**	D	**E**	D
29	Euclid Av. (SR-83) & Bickmore Av.	TS	18.9	16.1	B	B	20.8	18.5	C	B	D
30	Euclid Av. (SR-83) & Pine Av.	TS	45.3	**101.0**	D	**F**	50.0	**114.4**	D	**F**	D
31	Rincon Meadows Av. & Kimball Av.	TS	2040 Analysis Location				2040 Analysis Location				D
32	Rincon Meadows Av. & Pine Av.	**<u>TS</u>**	10.7	11.3	B	B	11.0	11.9	B	B	D
33	Mill Creek Av. & Kimball Av.	TS	2040 Analysis Location				2040 Analysis Location				D
34	Mill Creek Av./Chino-Corona Rd. & Pine Av.	TS	42.1	15.9	D	B	49.6	16.2	D	B	D
35	Cucamonga Av. & Chino Corona Rd.	AWS	Construction Location Only				Construction Location Only				D
36	W. Preserve Loop & Pine Av.	TS	10.3	8.2	B	A	10.6	8.2	B	A	D
37	Main St. & Kimball Av.	TS	2040 Analysis Location				2040 Analysis Location				D
38	Flight Av. & Kimball Av.	CSS	2040 Analysis Location				2040 Analysis Location				D
39	E. Preserve Loop & Pine Av.	TS	8.5	7.3	A	A	8.6	7.4	A	A	D
40	Hellman Av. & Kimball Av.	TS	2040 Analysis Location				2040 Analysis Location				D

Table 7-1

Intersection Analysis for Opening Year Cumulative (2022) Conditions

#	Intersection	Traffic Control[2]	2022 Without Project Delay[1] (secs.) AM	2022 Without Project Delay[1] (secs.) PM	2022 Without Project Level of Service AM	2022 Without Project Level of Service PM	2022 With Project Delay[1] (secs.) AM	2022 With Project Delay[1] (secs.) PM	2022 With Project Level of Service AM	2022 With Project Level of Service PM	Acceptable LOS
41	Hellman Av. & Pine Av./Schleisman Rd.	TS	39.8	42.0	D	D	40.7	43.7	D	D	D
42	Archibald Av. & Limonite Av.	TS	**76.8**	**63.6**	**E**	**E**	**77.2**	**66.5**	**E**	**E**	D
43	Archibald Av. & Schleisman Rd.	TS	**106.7**	**66.0**	**F**	**E**	**116.0**	**77.8**	**F**	**E**	D

* **BOLD** = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

1 Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

2 CSS = Cross-street Stop; AWS = All-Way Stop; TS = Traffic Signal; **CSS** = Improvement

3 Intersection geometrics reflect the completion of Pine Avenue Stages 1-3.

EXHIBIT 7-5: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT SUMMARY OF LOS

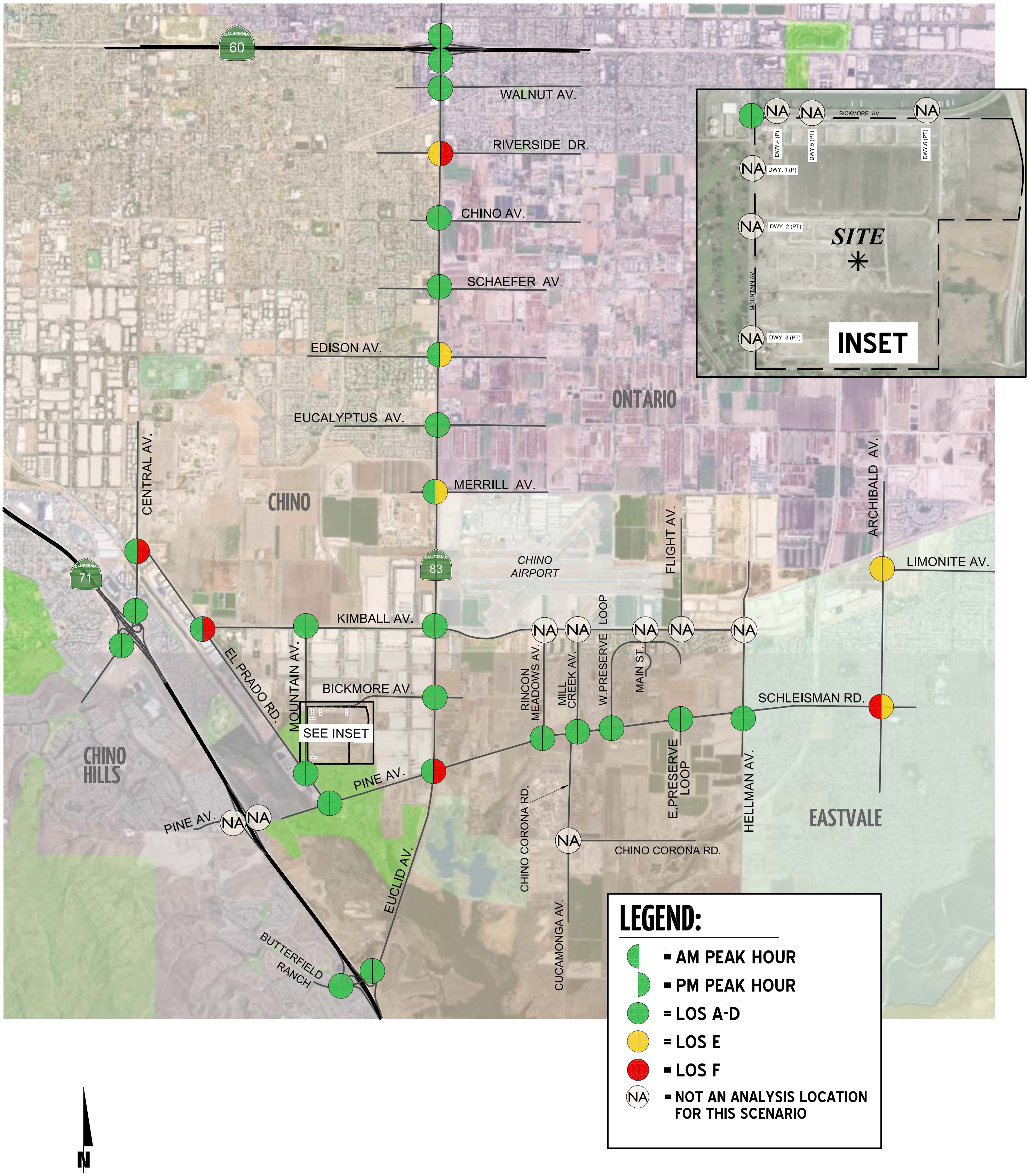
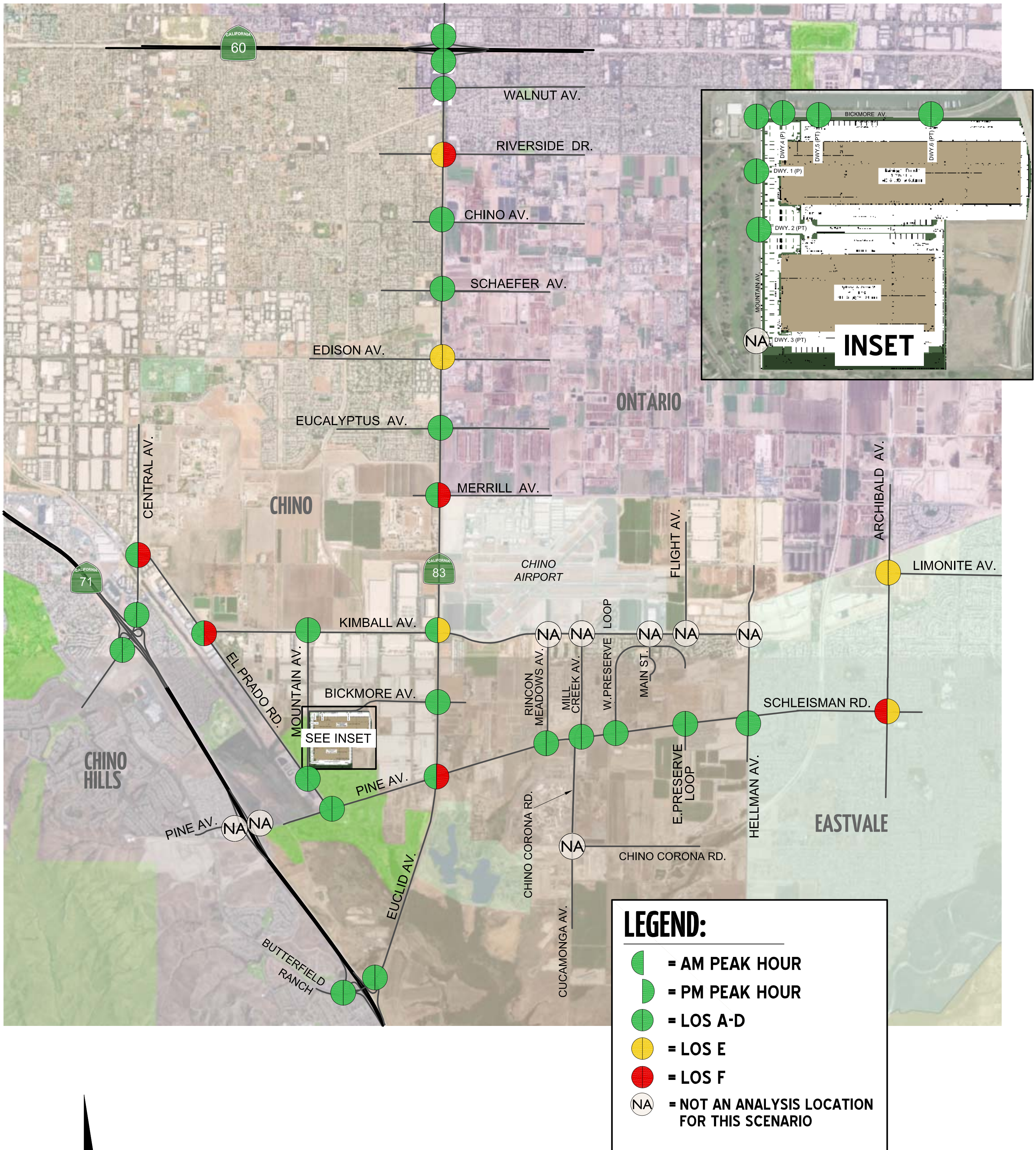


EXHIBIT 7-6: OPENING YEAR CUMULATIVE (2022) WITH PROJECT SUMMARY OF LOS



7.6 OFF-RAMP QUEUING ANALYSIS

Queuing analysis findings for Opening Year Cumulative (2022) Without and With Project traffic conditions are shown on Table 7-2. As shown on Table 7-2, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows with addition of Project traffic. Worksheets for Opening Year Cumulative (2022) Without and With Project traffic conditions off-ramp queuing analysis are provided in Appendices 7.5 and 7.6, respectively.

7.7 FREEWAY FACILITY ANALYSIS

Opening Year Cumulative (2022) Without and With Project mainline directional volumes for the AM and PM peak hours are provided on Exhibits 7-7 and 7-8, respectively. As shown on Table 7-3, the following freeway segments and merge/diverge ramp junctions are anticipated to operate at an unacceptable LOS (i.e., LOS E or worse) for Opening Year Cumulative (2022) Without Project:

- SR-60 Freeway Westbound, West of Euclid Avenue (SR-83) (#24) – LOS E AM and PM peak hours
- SR-60 Freeway Westbound, Euclid Avenue (SR-83) Off-Ramp (#26) – LOS E AM and PM peak hours
- SR-60 Freeway Westbound, East of Euclid Avenue (SR-83) (#27) – LOS E AM and PM peak hours
- SR-60 Freeway Eastbound, East of Euclid Avenue (SR-83) (#31) – LOS E AM peak hour only

With the addition of Project traffic, there are no additional freeway segments or merge/diverge ramp junctions anticipated to operate at an unacceptable LOS during the peak hours, in addition to those previously identified under Opening Year Cumulative (2022) Without Project traffic conditions.

Opening Year Cumulative (2022) Without and With Project basic freeway segment analysis worksheets are provided in Appendix 7.7 and 7.8, respectively.

Table 7-2

Peak Hour Freeway Off-Ramp Queuing Summary for Opening Year Cumulative (2022) Conditions

Intersection	Movement	Available Stacking Distance (Feet)	2022 Without Project				2022 With Project			
			95th Percentile Queue (Feet)[3]		Acceptable?[1]		95th Percentile Queue (Feet)[3]		Acceptable?[1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
SR-71 SB Ramps & Central Avenue	SBL	1,530	273	613 [2]	Yes	Yes	297 [2]	636 [2]	Yes	Yes
	SBL/R	740	0	0	Yes	Yes	0	0	Yes	Yes
SR-71 SB Ramps & Pine Avenue	SBL/T	1,370	2040 Analysis Location				2040 Analysis Location			
	SBR	725								
SR-71 SB Ramps & Euclid Avenue (SR-83)	SBL	1,100	233	256	Yes	Yes	233	256	Yes	Yes
	SBL/T	1,560	233	255	Yes	Yes	233	255	Yes	Yes
	SBR	255	0	3	Yes	Yes	0	3	Yes	Yes
SR-71 NB Ramps & Central Avenue	NBL	1,485	35	81	Yes	Yes	35	81	Yes	Yes
	NBL/R	1,070	0	0	Yes	Yes	0	0	Yes	Yes
SR-71 NB Ramps & Pine Avenue	NBL	1,375	2040 Analysis Location				2040 Analysis Location			
	NBL/T	815								
SR-71 NB Ramps & Euclid Avenue (SR-83)	NBL	1,745	28	49	Yes	Yes	28	49	Yes	Yes
	NBR	420	355 [2]	941 [2]	Yes	Yes[3]	412 [2]	967 [2]	Yes	Yes[3]
Euclid Av. (SR-83) & SR-60 WB Ramps	WBL	400	375 [2]	308	Yes	Yes	388 [2]	308	Yes	Yes
	WBL/T/R	1,430	384 [2]	315	Yes	Yes	401 [2]	328 [2]	Yes	Yes
	WBR	400	241	236	Yes	Yes	250	238	Yes	Yes
Euclid Av. (SR-83) & SR-60 EB Ramps	EBL	900	396 [2]	386 [2]	Yes	Yes	396 [2]	386 [2]	Yes	Yes
	EBT/R	1,270	457 [2]	433 [2]	Yes	Yes	477 [2]	442 [2]	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the SR-71 Freeway mainline.

Table 7-3

Freeway Facility Analysis for Opening Year Cumulative (2022) Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	2022 Without Project				2022 With Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]
SR-71 Freeway	Southbound	North of Central Avenue	3	9.9	A	19.4	C	10.2	A	19.5	C
		Central Avenue Off-Ramp	3	16.7	B	29.1	D	17.2	B	29.3	D
		Central Avenue Loop On-Ramp	3	9.9	A	14.6	B	9.9	A	14.6	B
		Central Avenue On-Ramp	3	10.4	B	14.6	B	10.4	B	14.6	B
		Central Avenue to Pine Avenue	3	11.1	B	18.2	C	11.1	B	18.2	C
		Pine Avenue Off-Ramp	2	15.3	B	23.4	C	15.3	B	23.4	C
		Pine Avenue On-Ramp	2	13.1	B	12.9	B	13.1	B	12.9	C
		Pine Avenue to Euclid Avenue (SR-83)	2	9.8	A	9.6	A	9.8	A	9.6	A
		Euclid Avenue (SR-83) Off-Ramp	2	14.2	B	13.9	B	14.2	B	13.9	B
		Euclid Avenue (SR-83) Loop On-Ramp	2	10.3	B	10.9	B	10.3	B	11.3	B
		Euclid Avenue (SR-83) On-Ramp	2	16.7	B	17.4	B	16.8	B	17.8	B
		South of Euclid Avenue (SR-83)	2	16.0	B	16.9	B	16.0	B	17.3	B
	Northbound	North of Central Avenue	3	21.6	C	18.6	C	8.0	A	18.9	C
		Central Avenue On-Ramp	3	25.8	C	21.9	C	10.3	B	22.3	C
		Central Avenue Loop On-Ramp	3	19.7	B	17.8	B	14.2	B	17.8	B
		Central Avenue Off-Ramp	3	21.3	C	22.9	C	13.1	B	22.9	C
		Central Avenue to Pine Avenue	3	14.5	B	15.9	B	9.5	A	15.9	B
		Pine Avenue On-Ramp	2	16.8	B	20.0	C	15.3	B	20.0	C
		Pine Avenue Off-Ramp	2	24.0	C	28.2	D	10.4	B	28.2	D
		Pine Avenue to Euclid Avenue (SR-83)	2	18.2	C	22.1	C	6.8	A	22.1	C
		Euclid Avenue (SR-83) On-Ramp	2	20.0	B	24.4	C	9.9	A	24.4	C
		Euclid Avenue (SR-83) Off-Ramp	3	9.5	A	16.8	B	17.2	B	16.9	B
		South of Euclid Avenue (SR-83)	3	11.6	B	20.4	C	10.2	A	20.5	C
SR-60 Freeway	Westbound	West of Euclid Avenue (SR-83)	4	**38.0**	**E**	**35.9**	**E**	**38.0**	**E**	**35.9**	**E**
		Euclid Avenue (SR-83) On-Ramp	4	36.3	D	35.0	D	36.3	D	35.1	D
		Euclid Avenue (SR-83) Off-Ramp	4	**38.6**	**E**	**38.0**	**E**	**38.8**	**E**	**38.1**	**E**
		East of Euclid Avenue (SR-83)	4	**38.6**	**E**	**37.2**	**E**	**38.7**	**E**	**37.2**	**E**
	Eastbound	West of Euclid Avenue (SR-83)	4	34.8	D	28.1	D	34.8	D	28.1	D
		Euclid Avenue (SR-83) Off-Ramp	4	34.9	D	30.8	D	34.9	D	30.8	D
		Euclid Avenue (SR-83) On-Ramp	4	35.8	D	29.7	C	35.9	D	29.8	D
		East of Euclid Avenue (SR-83)	4	**36.6**	**E**	28.8	D	**36.6**	**E**	28.9	D

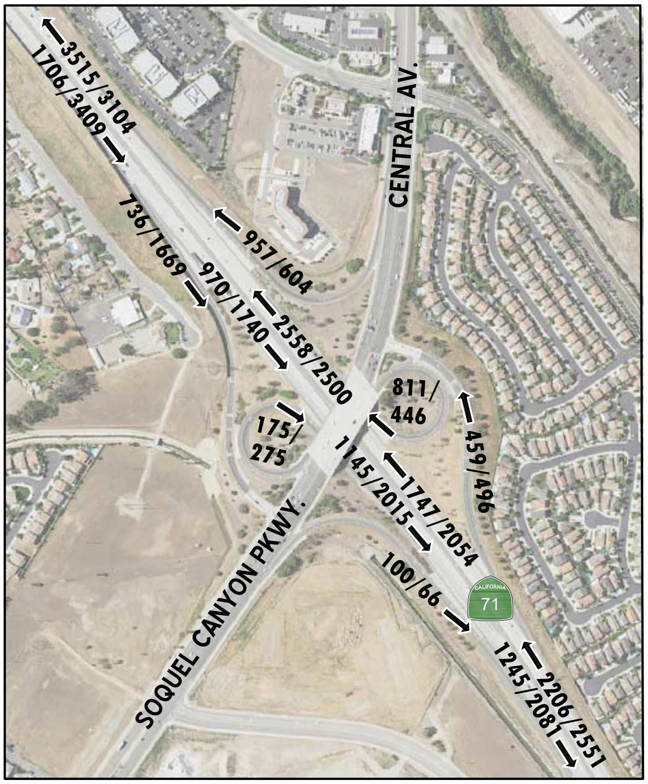
* **BOLD** = Unacceptable Level of Service

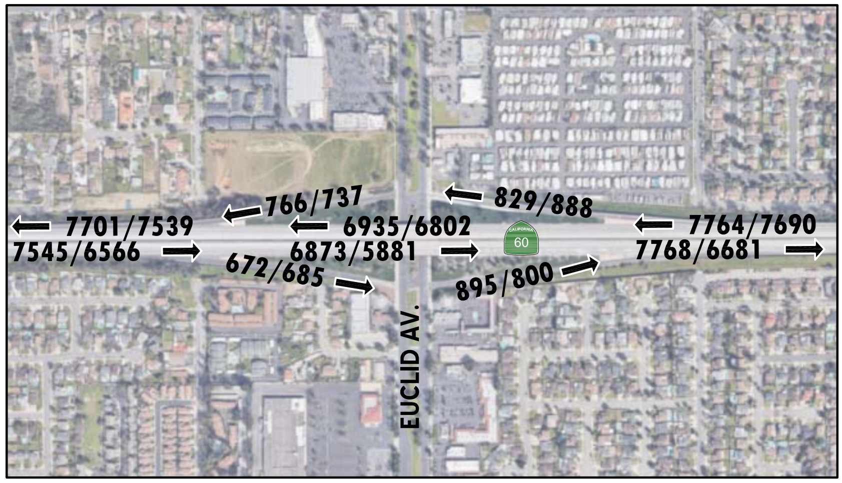
[1] Number of lanes are in the specified direction and is based on existing conditions

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

EXHIBIT 7-7: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT FREEWAY MAINLINE VOLUMES





LEGEND:

100/200 = AM/PM PEAK HOUR VOLUMES

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

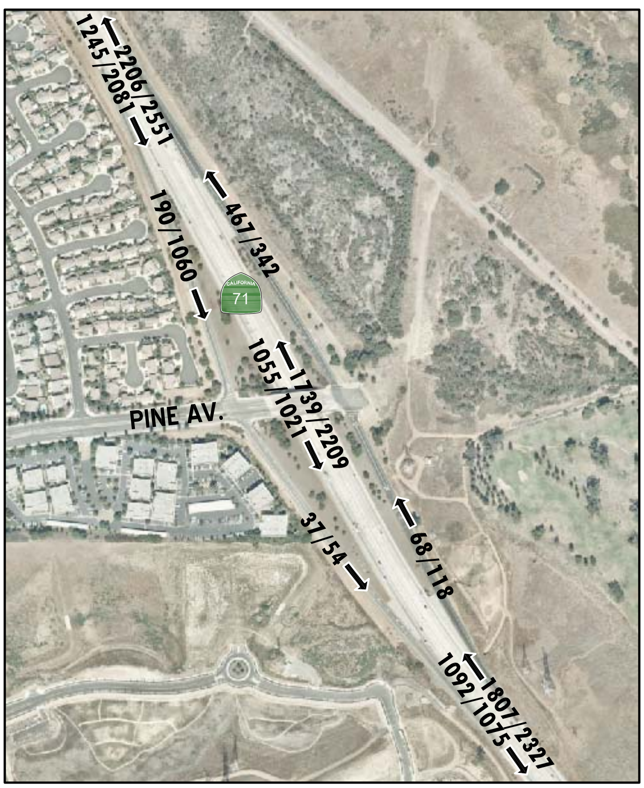


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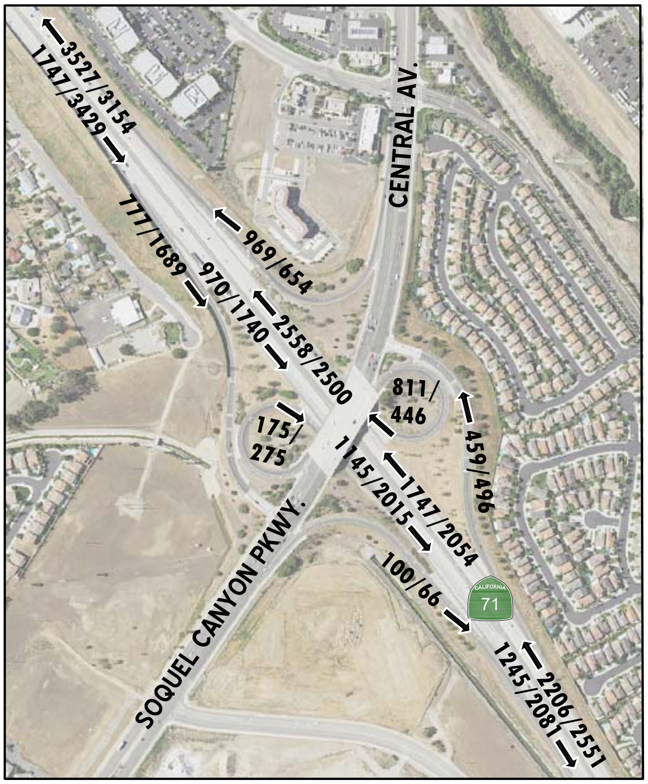
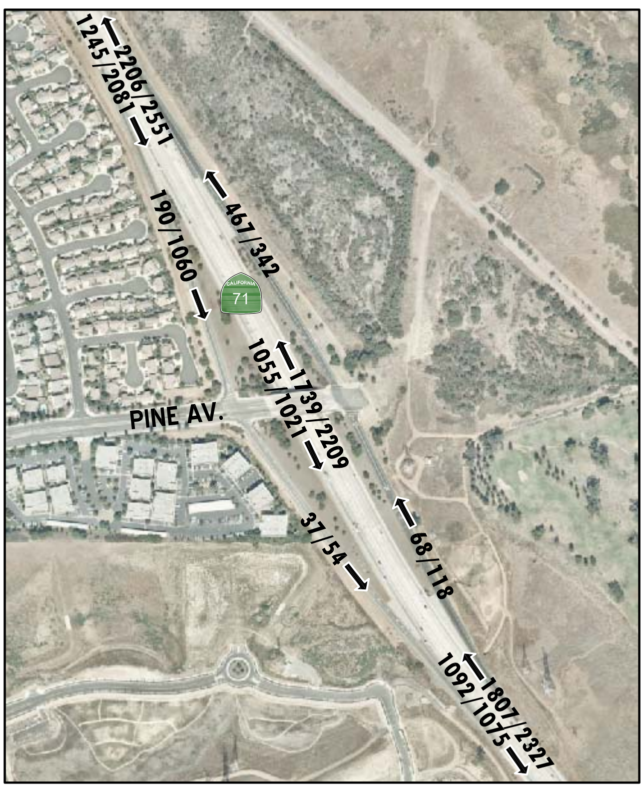
EXHIBIT 7-8: OPENING YEAR CUMULATIVE (2022) WITH PROJECT FREEWAY MAINLINE VOLUMES



LEGEND:

100/200 = AM/PM PEAK HOUR VOLUMES

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)



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7.8 RECOMMENDED IMPROVEMENTS

7.8.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

Improvement strategies have been recommended at intersections that have been identified as deficient in an effort to reduce each location's peak hour delay and improve the associated LOS grade to an acceptable LOS (LOS D or better). The effectiveness of the recommended improvement strategies discussed below to address Opening Year Cumulative (2022) traffic deficiencies is presented on Table 7-4. Worksheets for Opening Year Cumulative (2022) Without and With Project conditions, with improvements, HCM calculation worksheets are provided in Appendix 7.9 and Appendix 7.10.

7.8.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON OFF-RAMP QUEUES

As shown previously on Table 7-2, there are no peak hour queuing issues at the SR-71 Freeway at Euclid Avenue (SR-83) and Euclid Avenue (SR-83) at SR-60 Freeway interchanges for Opening Year Cumulative (2022) Without and With Project traffic conditions. As such, no improvements have been recommended.

7.8.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development projects in the City of Chino (or other neighboring jurisdictions) on SHS roadway segments. As such, no improvements have been recommended to address the Opening Year Cumulative (2022) Without and With Project deficiencies on the SHS, because there is no feasible mitigation available.

Intersection Analysis for Opening Year Cumulative (2022) Conditions With Improvements

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
7	Central Av. & El Prado Rd.																	
	2022 Without Project:																	
	-Without Improvements	TS	1	2	1>	1	3	0	1	1	0	1	1	1>	35.0	**81.1**	D	**F**
	-With Improvements	TS	1	2	1>	**2**	3	0	1	1	0	1	1	1>	30.1	37.5	C	D
	2022 With Project:																	
	-Without Improvements	TS	1	2	1>	1	3	0	1	1	0	1	1	1>	36.9	**87.7**	D	**F**
	-With Improvements	TS	1	2	1>	**2**	3	0	1	1	0	1	1	1>	30.6	40.9	C	D
8	El Prado Rd. & Kimball Av.																	
	2022 Without Project:																	
	-Without Improvements	TS	1	1	1	1	2	0	1	1	0	0	1	1>	35.0	**124.9**	C	**F**
	-With Improvements	TS	1	1	1	**2**	**1**	0	1	1	0	0	1	1>	25.4	27.9	C	C
	2022 With Project:																	
	-Without Improvements	TS	1	1	1	1	2	0	1	1	0	0	1	1>	48.8	**132.4**	D	**F**
	-With Improvements	TS	1	1	1	**2**	**1**	0	1	1	0	0	1	1>	25.6	29.4	C	C
22	Euclid Av. (SR-83) & Riverside Dr.																	
	2022 Without Project:																	
	-Without Improvements	TS	1	2	1	1	2	1>	1	1	0	1	2	d	**59.0**	**83.7**	**E**	**F**
	-With Improvements	TS	1	**3**	1	1	**3**	1>	1	1	**1**	1	2	d	39.9	47.8	D	D
	2022 With Project:																	
	-Without Improvements	TS	1	2	1	1	2	1>	1	1	0	1	2	d	**61.2**	**91.8**	**E**	**F**
	-With Improvements	TS	1	**3**	1	1	**3**	1>	1	1	**1**	1	2	d	40.2	48.7	D	D
25	Euclid Av. (SR-83) & Edison Av.																	
	2022 Without Project:																	
	-Without Improvements	TS	1	2	1	1	2	1	1	1	1	1	1	0	51.6	**60.6**	D	**E**
	-With Improvements	TS	1	**3**	1	1	**3**	1	1	1	1	1	1	0	38.5	41.3	D	D
	2022 With Project:																	
	-Without Improvements	TS	1	2	1	1	2	1	1	1	1	1	1	0	**56.3**	**64.8**	**E**	**E**
	-With Improvements	TS	1	**3**	1	1	**3**	1	1	1	1	1	1	0	39.3	42.1	D	D
27	Euclid Av. (SR-83) & Merrill Av.																	
	2022 Without Project:																	
	-Without Improvements	TS	1	2	1	1	2	0	0	1	0	0	1	0	45.5	**71.5**	D	**E**
	-With Improvements	TS	1	**3**	1	1	**3**	0	0	1	0	0	1	0	29.2	39.9	C	D
	2022 With Project:																	
	-Without Improvements	TS	1	2	1	1	2	0	0	1	0	0	1	0	47.6	**81.6**	D	**F**
	-With Improvements	TS	1	**3**	1	1	**3**	0	0	1	0	0	1	0	29.9	42.5	C	D
28	Euclid Av. (SR-83) & Kimball Av.																	
	2022 Without Project:																	
	-Without Improvements	TS	1	2	1>	2	2	1>	2	2	0	1	2	0	42.4	52.2	D	D
	-With Improvements		Not Applicable															
	2022 With Project:																	
	-Without Improvements	TS	1	2	1>	2	2	1>	2	2	0	1	2	0	43.2	**57.1**	D	**E**
	-With Improvements	TS	1	**3**	1>	2	**3**	1>	2	2	0	1	2	0	34.5	41.5	C	D

Table 7-4

Page 2 of 2

Intersection Analysis for Opening Year Cumulative (2022) Conditions With Improvements

			Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
		Traffic	Northbound			Southbound			Eastbound			Westbound						
#	**Intersection**	**Control[3]**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**AM**	**PM**	**AM**	**PM**
30	Euclid Av. (SR-83) & Pine Av.																	
	2022 Without Project:																	
	-Without Improvements	TS	1	2	1>	1	2	0	1	1	1	2	1	0	45.3	**101.0**	D	**F**
	-With Improvements	TS	1	**3**	**1>>**	1	**3**	0	1	1	1	2	1	0	35.8	39.3	D	D
	2022 With Project:																	
	-Without Improvements	TS	1	2	1>	1	2	0	1	1	1	2	1	0	50.0	**114.4**	D	**F**
	-With Improvements	TS	1	**3**	**1>>**	1	**3**	0	1	1	1	2	1	0	38.6	46.6	D	D
42	Archibald Av. & Limonite Av.																	
	2022 Without Project:																	
	-Without Improvements	TS	0	1	1>	1	1	0	0	0	0	1	0	1>	**76.8**	**63.6**	**E**	**E**
	-With Improvements	TS	0	**2**	1>	1	1	0	0	0	0	1	0	1>	31.7	37.4	C	D
	2022 With Project:																	
	-Without Improvements	TS	0	1	1>	1	1	0	0	0	0	1	0	1>	**77.2**	**66.5**	**E**	**E**
	-With Improvements	TS	0	**2**	1>	1	1	0	0	0	0	1	0	1>	32.1	41.4	C	D
43	Archibald Av. & Schleisman Rd.																	
	2022 Without Project:																	
	-Without Improvements	TS	2	3	1	2	3	1	2	3	1	2	3	1	**106.7**	**66.0**	**F**	**E**
	-With Improvements[4]	TS	2	3	1	2	3	1	2	3	1	2	3	1	38.3	33.9	D	C
	2022 With Project:																	
	-Without Improvements	TS	2	3	1	2	3	1	2	3	1	2	3	1	**116.0**	**77.8**	**F**	**E**
	-With Improvements[4]	TS	2	3	1	2	3	1	2	3	1	2	3	1	41.8	35.4	D	D

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; >> = Free Right Turn Lane; d= Defacto Right Turn Lane; **1** = Improvement

[2] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] TS = Traffic Signal

[4] Improvement consists of modifying the traffic signal to extend the cycle length to 130 seconds.

8 HORIZON YEAR (2040) TRAFFIC CONDITIONS

This section discusses the methods used to develop Horizon Year (2040) Without and With Project traffic forecasts, and the resulting intersection operations, freeway mainline operations, and traffic signal warrant analyses.

8.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Horizon Year (2040) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

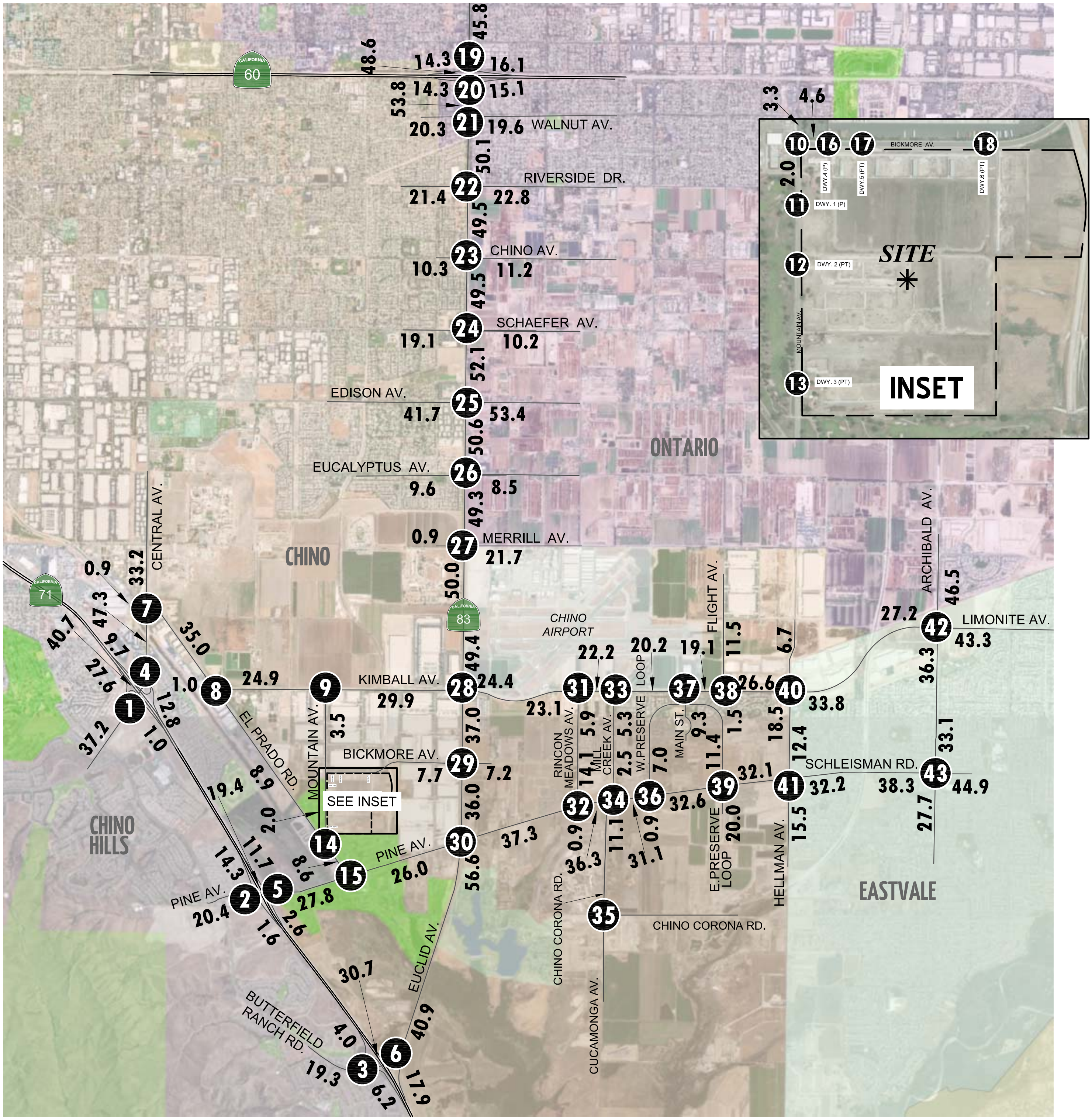
- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Horizon Year conditions only (e.g., intersection and roadway improvements along the Project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Horizon Year conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways such as the southern extension of Rincon Meadows Avenue on Pine Avenue).
- The Pine Avenue extension between El Prado Road and the SR-71 Freeway is assumed to be in place.
- Other parallel facilities, that although not evaluated for the purposes of this analysis, are anticipated to be in place for Horizon Year traffic conditions and would affect the travel patterns within the study area (e.g., The Preserve Specific Plan roadway network, extension of Kimball Avenue between Hellman Avenue and Archibald Avenue, etc.).

8.2 HORIZON YEAR (2040) TRAFFIC VOLUME FORECASTS

The Horizon Year (2040) Without Project analysis scenario includes the refined post-process volumes obtained from the SBTAM or RivTAM (see Section 4.7 *Horizon Year (2040) Volume Development* of this TIA for a detailed discussion on the post-processing methodology). The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Horizon Year (2040) Without Project traffic conditions are shown on Exhibits 8-1 and 8-2.

The Horizon Year (2040) With Project analysis scenario includes the refined post-process volumes obtained from the SBTAM or RivTAM, plus the traffic generated by the proposed Project (see Section 4.7 *Horizon Year (2040) Volume Development* of this TIA for a detailed discussion on the post-processing methodology). The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Horizon Year (2040) With Project traffic conditions are shown on Exhibits 8-3 and 8-4.

EXHIBIT 8-1: HORIZON YEAR (2040) WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT) (IN PCE)



LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

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EXHIBIT 8-2 (1OF2): HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)

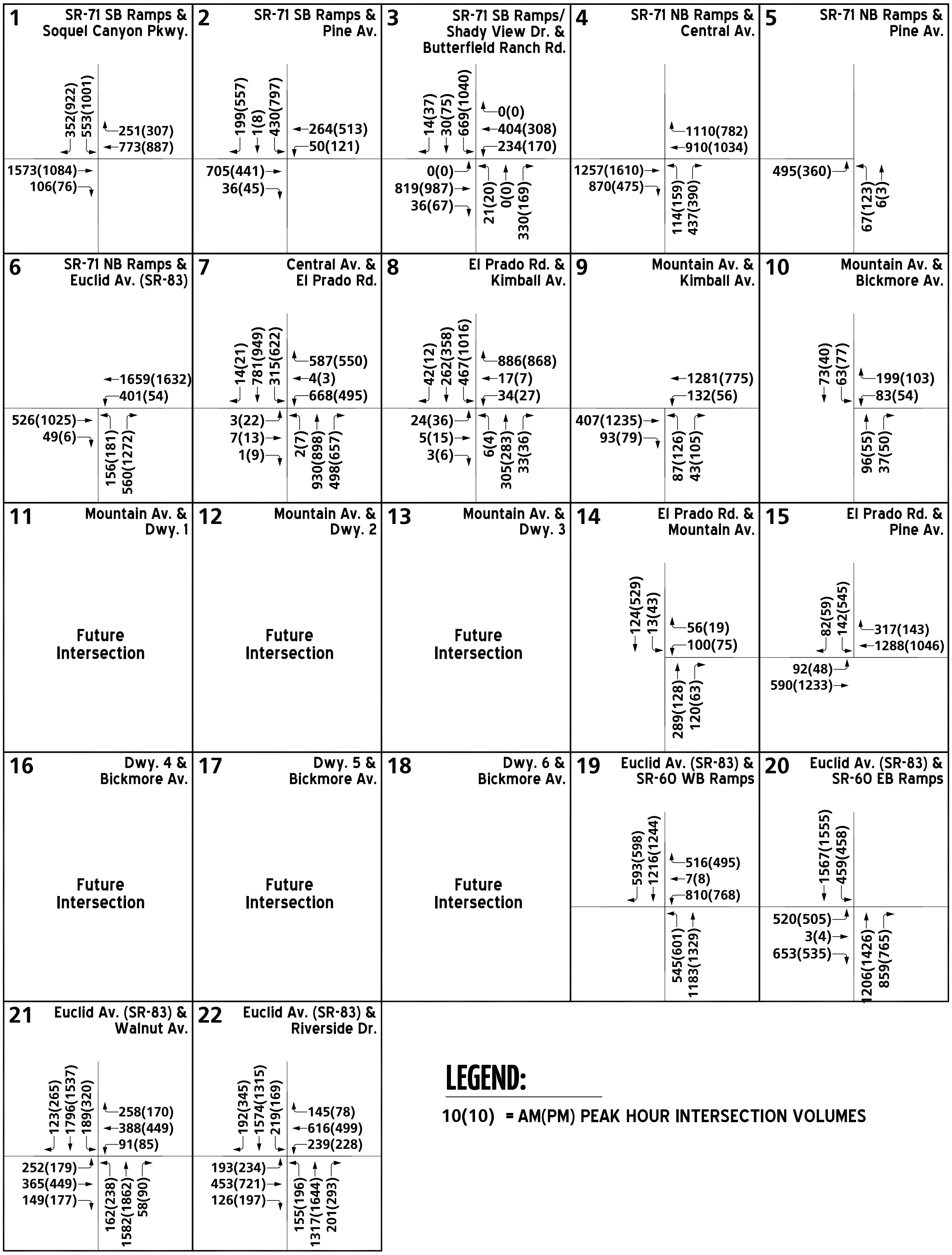


EXHIBIT 8-2 (2OF2): HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)

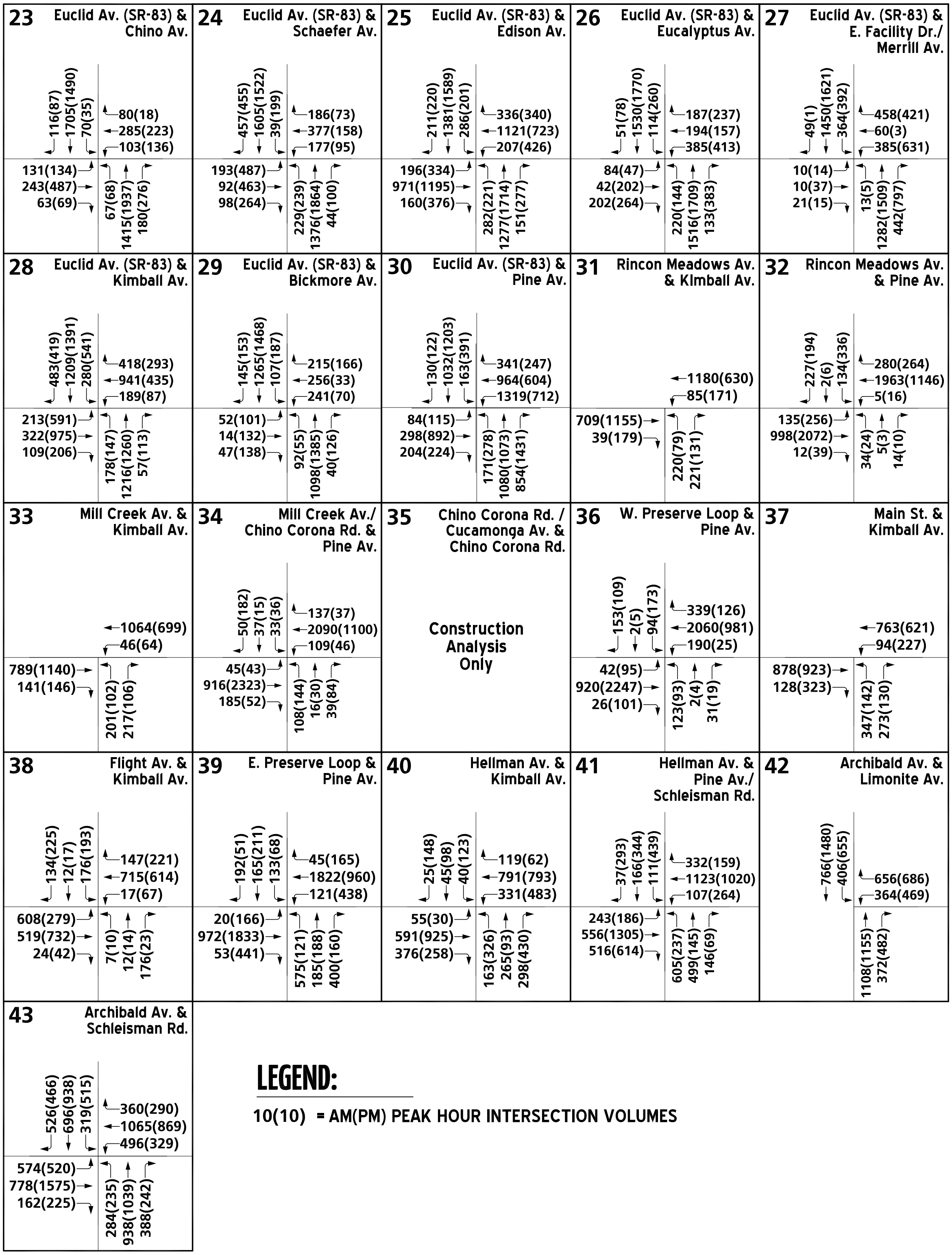
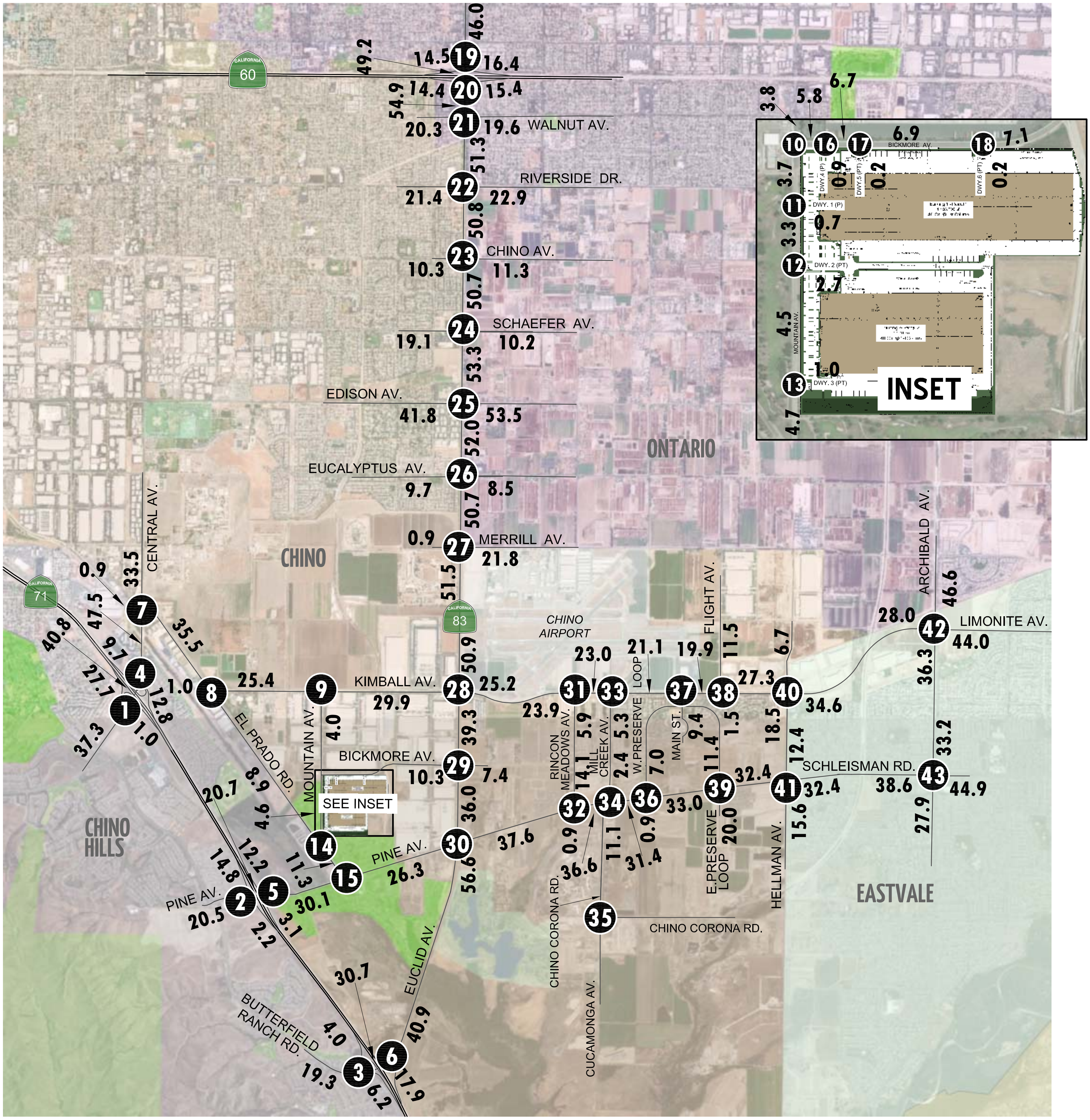


EXHIBIT 8-3: HORIZON YEAR (2040) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT) (IN PCE)



LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

N

EXHIBIT 8-4 (1OF2): HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUMES (IN PCE)

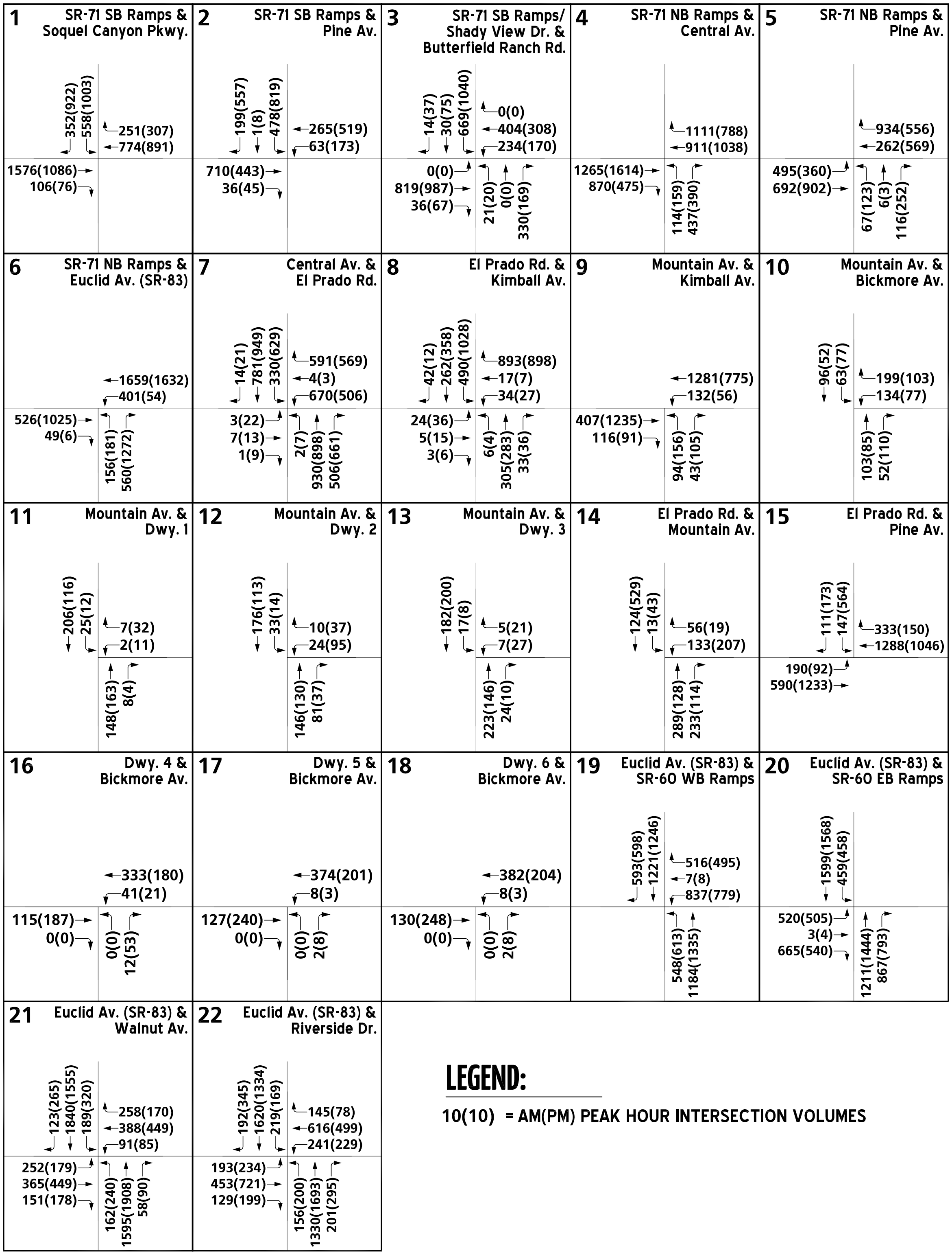
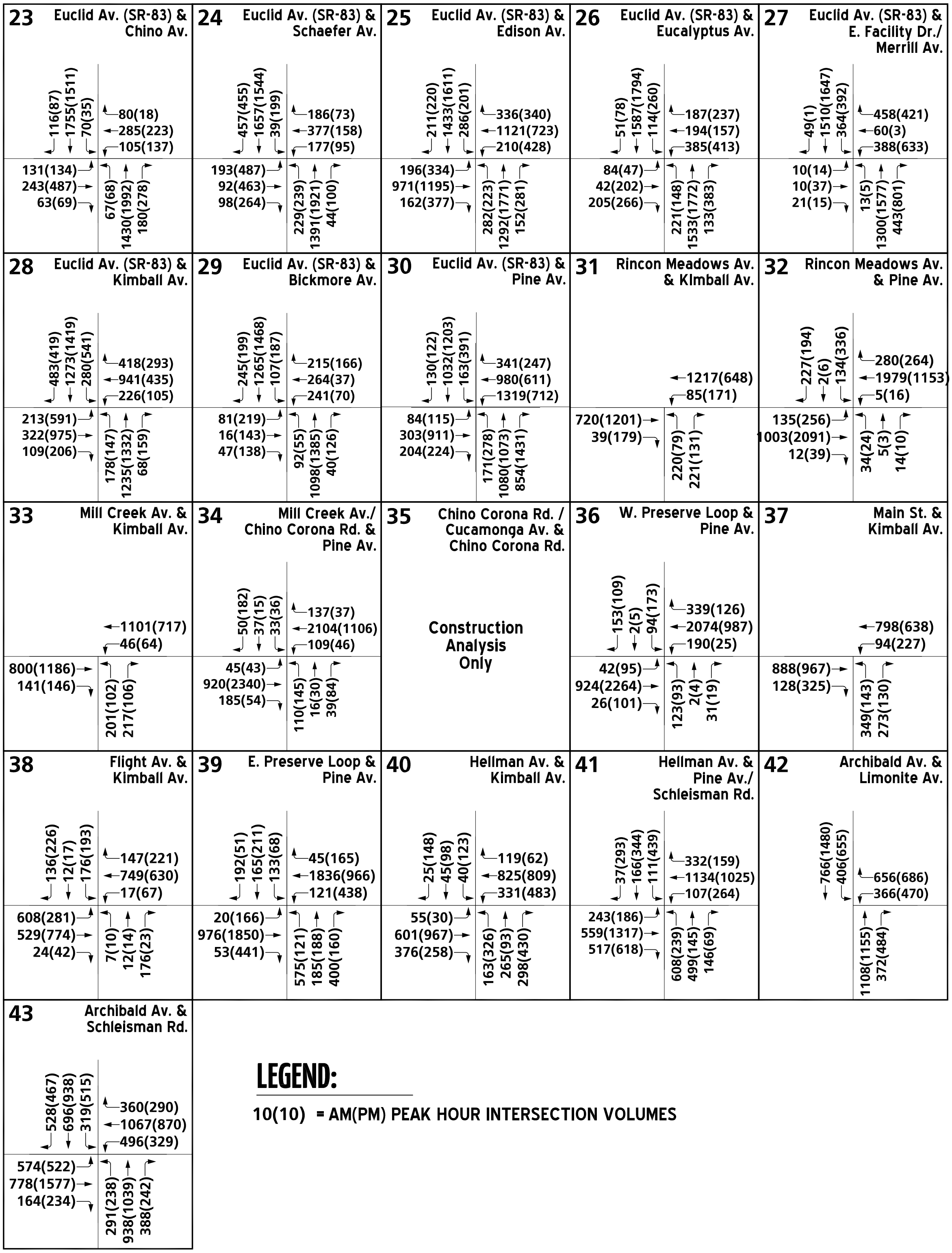


EXHIBIT 8-4 (2OF2): HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUMES (IN PCE)



8.3 INTERSECTION OPERATIONS ANALYSIS

8.3.1 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC CONDITIONS

LOS calculations were conducted for the study intersections to evaluate their operations under Horizon Year (2040) Without Project conditions with roadway and intersection geometrics consistent with Section 8.1 *Roadway Improvements*. As shown on Tables 8-1 and 8-2, the following study area intersections are anticipated to operate at an unacceptable LOS under Horizon Year (2040) Without Project traffic conditions:

- SR-71 Southbound Ramps & Pine Avenue (#2) – LOS F AM peak hour only
- SR-71 Northbound Ramps & Pine Avenue (#5) – LOS F AM and PM peak hours
- El Prado Road & Pine Avenue (#15) – LOS F AM and PM peak hours
- Euclid Avenue (SR-83) & SR-60 Eastbound Ramps (#20) – LOS F AM and PM peak hours
- Euclid Avenue (SR-83) & Riverside Drive (#22) – LOS F AM and PM peak hours
- Euclid Avenue (SR-83) & Chino Avenue (#23) – LOS E AM peak hour; LOS F PM peak hour
- Euclid Avenue (SR-83) & Schaefer Avenue (#24) – LOS F AM and PM peak hours
- Euclid Avenue (SR-83) & Edison Avenue (#25) – LOS F AM and PM peak ours
- Euclid Avenue (SR-83) & Eucalyptus Avenue (#26) – LOS E AM peak hour; LOS F PM peak hour
- Euclid Avenue (SR-83) & Merrill Avenue (#27) – LOS F AM and PM peak hours
- Euclid Avenue (SR-830 & Kimball Avenue (#28) – LOS F AM and PM peak hours
- Flight Avenue & Kimball Avenue (#38) – LOS F AM and PM peak hours
- Hellman Avenue & Kimball Avenue (#40) – LOS F PM peak hour only
- Archibald Avenue & Limonite Avenue (#42) – LOS F AM and PM peak hours

A summary of the peak hour intersection LOS for Horizon Year (2040) Without Project conditions is shown on Exhibit 8-5. The intersection operations analysis worksheets for Horizon Year (2040) Without Project traffic conditions are included in Appendices 8.1 of this TIA.

8.3.2 HORIZON YEAR (2040) WITH PROJECT TRAFFIC CONDITIONS

As shown on Tables 8-1 and illustrated on Exhibit 8-6, the following study area intersection is anticipated to operate at a deficient LOS during one or both peak hours for Horizon Year (2040) With Project traffic conditions with the addition of Project traffic, in addition to the locations identified above for Horizon Year (2040) Without Project traffic conditions:

- El Prado Road & Mountain Avenue (#14) – LOS F PM peak hour only

The intersection operations analysis worksheets for Horizon Year (2040) With Project traffic conditions are included in Appendix 8.2 of this TIA.

Table 8-1

Intersection Analysis for Horizon Year (2040) Conditions

#	Intersection	Traffic Control[2]	2040 Without Project Delay[1] (secs.) AM	2040 Without Project Delay[1] (secs.) PM	2040 Without Project Level of Service AM	2040 Without Project Level of Service PM	2040 With Project Delay[1] (secs.) AM	2040 With Project Delay[1] (secs.) PM	2040 With Project Level of Service AM	2040 With Project Level of Service PM	Acceptable LOS
1	SR-71 SB Ramps & Soquel Canyon Rd.	TS	16.0	36.7	B	D	16.1	36.8	B	D	D
2	SR-71 SB Ramps & Pine Av.	TS	**121.0**	40.1	**F**	D	**122.4**	**55.9**	**F**	**E**	D
3	SR-71 SB Ramps & Butterfield Ranch Rd.	TS	**58.3**	**65.9**	**E**	**E**	**58.3**	**65.9**	**E**	**E**	D
4	SR-71 NB Ramps & Central Av.	TS	10.0	8.7	B	A	10.0	8.7	B	A	D
5	SR-71 NB Ramps & Pine Av.	AWS	**>100.0**	**>100.0**	**F**	**F**	**>100.0**	**>100.0**	**F**	**F**	D
6	SR-71 NB Ramps & Euclid Av. (SR-83)	TS	20.1	13.9	C	B	20.1	13.9	C	B	D
7	Central Av. & El Prado Rd.	TS	30.3	**59.8**	C	**E**	31.8	**61.5**	C	**E**	D
8	El Prado Rd. & Kimball Av.	TS	34.6	**121.4**	C	**F**	38.6	**124.2**	D	**F**	D
9	Mountain Av. & Kimball Av.	TS	9.3	14.8	A	B	9.5	15.3	A	B	D
10	Mountain Av. & Bickmore Av.	CSS	11.7	11.1	B	B	13.0	11.9	B	B	D
11	Mountain Av. & Driveway 1	**CSS**	Future Intersection				9.7	9.7	A	A	D
12	Mountain Av. & Driveway 2	**CSS**	Future Intersection				10.9	10.9	B	B	D
13	Mountain Av. & Driveway 3	**CSS**	Future Intersection				10.2	10.2	B	B	D
14	El Prado Rd. & Mountain Av.	CSS	14.5	20.6	B	C	17.3	**64.7**	C	**F**	D
15	El Prado Rd. & Pine Av.	AWS	**>100.0**	**>100.0**	**F**	**F**	**>100.0**	**>100.0**	**F**	**F**	D
16	Driveway 4 & Bickmore Av.	**CSS**	Future Intersection				9.6	9.6	A	A	D
17	Driveway 5 & Bickmore Av.	**CSS**	Future Intersection				9.6	9.6	A	A	D
18	Driveway 6 & Bickmore Av.	**CSS**	Future Intersection				9.7	9.7	A	A	D
19	Euclid Av. (SR-83) & SR-60 WB Ramps	TS	**73.5**	**69.5**	**E**	**E**	**77.9**	**73.0**	**E**	**E**	D
20	Euclid Av. (SR-83) & SR-60 EB Ramps	TS	**100.8**	**81.7**	**F**	**F**	**103.8**	**87.1**	**F**	**F**	D
21	Euclid Av. (SR-83) & Walnut Av.	TS	55.3	59.0	E	E	58.2	62.9	E	E	E
22	Euclid Av. (SR-83) & Riverside Dr.	TS	**129.9**	**>200.0**	**F**	**F**	**136.2**	**>200.0**	**F**	**F**	D
23	Euclid Av. (SR-83) & Chino Av.	TS	**56.5**	**121.9**	**E**	**F**	**61.8**	**128.0**	**E**	**F**	D
24	Euclid Av. (SR-83) & Schaefer Av.	TS	**155.8**	**172.7**	**F**	**F**	**165.1**	**180.7**	**F**	**F**	D
25	Euclid Av. (SR-83) & Edison Av.	TS	**>200.0**	**>200.0**	**F**	**F**	**>200.0**	**>200.0**	**F**	**F**	D
26	Euclid Av. (SR-83) & Eucalyptus Av.	TS	**69.2**	**155.8**	**E**	**F**	**75.9**	**162.8**	**E**	**F**	D
27	Euclid Av. (SR-83) & Merrill Av.	TS	**117.6**	**>200.0**	**F**	**F**	**120.8**	**>200.0**	**F**	**F**	D
28	Euclid Av. (SR-83) & Kimball Av.	TS	**101.3**	**152.6**	**F**	**F**	**114.1**	**163.3**	**F**	**F**	D
29	Euclid Av. (SR-83) & Bickmore Av.	TS	49.4	40.5	D	D	52.4	49.5	D	D	D
30	Euclid Av. (SR-83) & Pine Av.	TS	**>200.0**	**>200.0**	**F**	**F**	**>200.0**	**>200.0**	**F**	**F**	D
31	Rincon Meadows Av. & Kimball Av.	TS	31.4	26.4	C	C	36.0	27.5	D	C	D
32	Rincon Meadows Av. & Pine Av.	**TS**	**57.7**	**107.7**	**E**	**F**	**59.6**	**109.8**	**E**	**F**	D
33	Mill Creek Av. & Kimball Av.	TS	26.2	15.3	C	B	30.3	16.0	C	B	D
34	Mill Creek Av./Chino-Corona Rd. & Pine Av.	TS	**175.6**	**62.4**	**F**	**E**	**178.8**	**64.2**	**F**	**E**	D
35	Cucamonga Av. & Chino Corona Rd.	AWS	Construction Location Only				Construction Location Only				D
36	W. Preserve Loop & Pine Av.	TS	**72.7**	36.0	**E**	D	**74.4**	36.9	**E**	D	D
37	Main St. & Kimball Av.	TS	24.6	25.0	C	C	25.5	26.1	C	C	D
38	Flight Av. & Kimball Av.	CSS	**>100.0**	**>100.0**	**F**	**F**	**>100.0**	**>100.0**	**F**	**F**	D
39	E. Preserve Loop & Pine Av.	TS	**160.3**	**>200.0**	**F**	**F**	**161.3**	**>200.0**	**F**	**F**	D
40	Hellman Av. & Kimball Av.	TS	32.9	**>200.0**	C	**F**	33.4	**>200.0**	C	**F**	D

Table 8-1

Page 2 of 2

Intersection Analysis for Horizon Year (2040) Conditions

#	Intersection	Traffic Control[2]	2040 Without Project Delay[1] (secs.) AM	PM	Level of Service AM	PM	2040 With Project Delay[1] (secs.) AM	PM	Level of Service AM	PM	Acceptable LOS
41	Hellman Av. & Pine Av./Schleisman Rd.	TS	41.6	46.7	D	D	41.8	47.0	D	D	D
42	Archibald Av. & Limonite Av.	TS	**>200.0**	**>200.0**	**F**	**F**	**>200.0**	**>200.0**	**F**	**F**	D
43	Archibald Av. & Schleisman Rd.	TS	**>200.0**	**152.3**	**F**	**F**	**>200.0**	**152.8**	**F**	**F**	D

* **BOLD** = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

1 Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

2 CSS = Cross-street Stop; AWS = All-Way Stop; TS = Traffic Signal; **CSS** = Improvement

3 Includes additional lanes consistent with the planned Pine Avenue extension.

4 Intersection geometrics reflect the completion of Pine Avenue Stages 1-3.

5 Assumes signalization of the intersection and the buildout of the east leg.

6 Assumes the buildout of the west leg.

7 Assumes new interchange improvements at I-15 Freeway and Limonite Avenue.

EXHIBIT 8-5: HORIZON YEAR (2040) WITHOUT PROJECT SUMMARY OF LOS

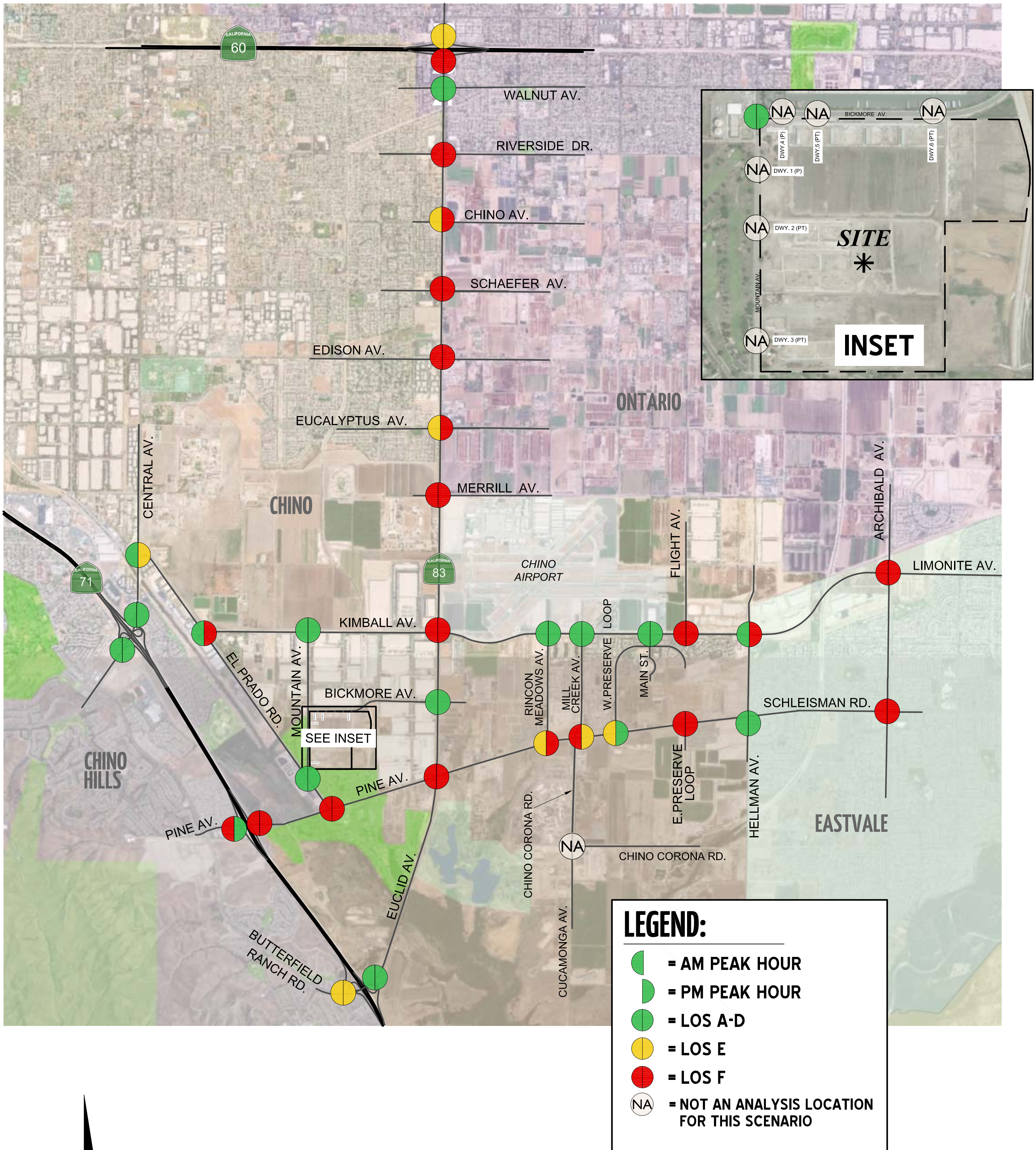
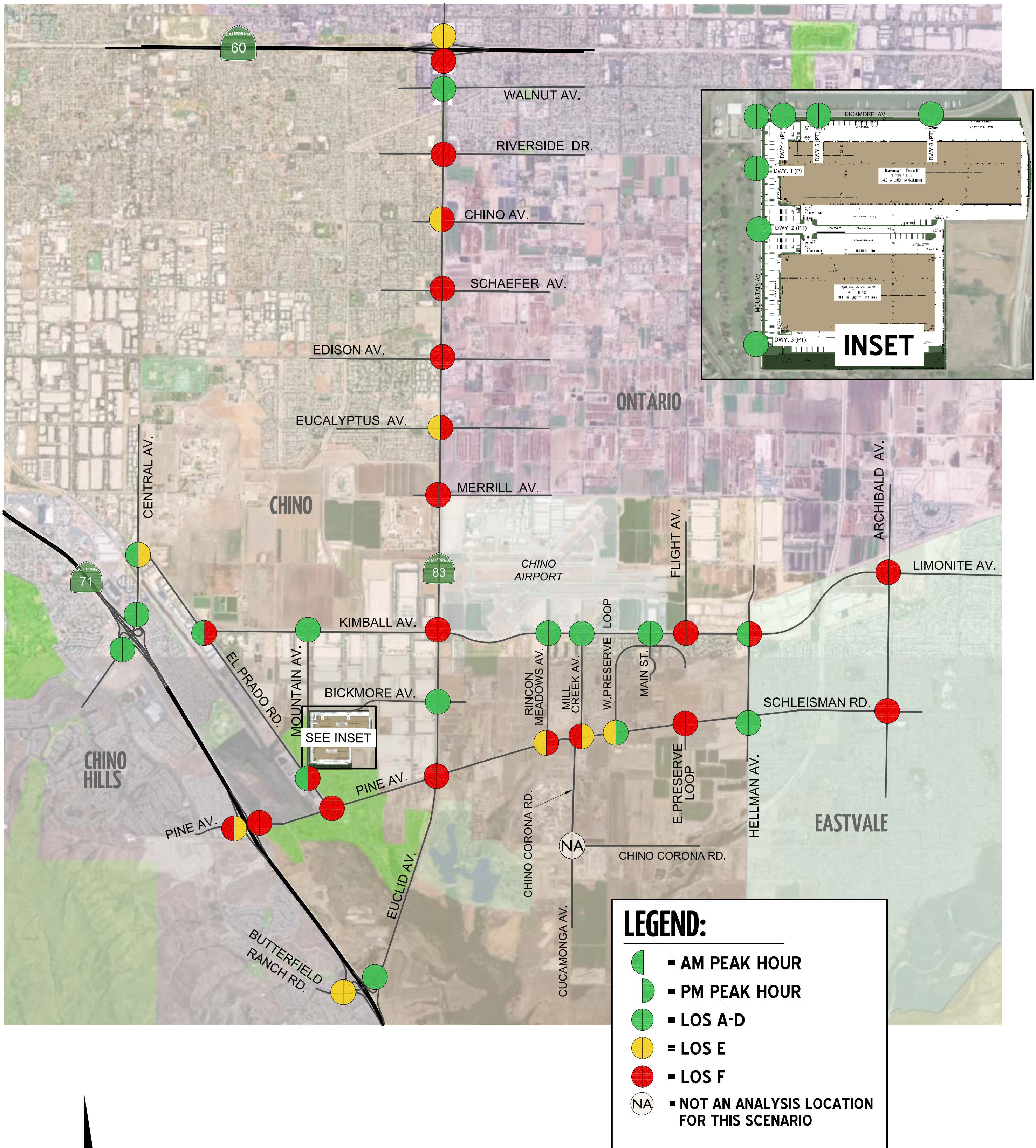


EXHIBIT 8-6: HORIZON YEAR (2040) WITH PROJECT SUMMARY OF LOS



8.4 TRAFFIC SIGNAL WARRANTS ANALYSIS

The following study area intersections are anticipated to meet either ADT or peak hour volume-based traffic signal warrants for Horizon Year (2040) Without Project traffic conditions in addition to those previously warranted under Existing traffic conditions:

- SR-71 Northbound Ramps & Pine Avenue (#5)
- Rincon Meadows Avenue & Pine Avenue (#32)

Worksheets for Horizon Year (2040) Without Project traffic conditions signal warrants are provided in Appendix 8.3.

There are no additional study area intersections anticipated to meet either ADT or peak hour volume-based traffic signal warrants for Horizon Year (2040) With Project traffic conditions, in addition to those warranted previously (see Appendix 8.4).

8.5 OFF-RAMP QUEUING ANALYSIS

Queuing analysis findings for Horizon Year (2040) traffic conditions are presented on Table 8-2. As shown on Table 8-2, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows for Horizon Year (2040) Without Project traffic conditions. Similarly, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows with addition of Project traffic. Worksheets for Horizon Year (2040) traffic conditions off-ramp queuing analysis are provided in Appendices 8.5 and 8.6.

8.6 FREEWAY FACILITY ANALYSIS

Horizon Year (2040) mainline directional volumes for the AM and PM peak hours are provided on Exhibits 8-7 and 8-8. As shown on Table 8-3, the following freeway segments and merge/diverge ramp junctions analyzed for this study are anticipated to operate at an unacceptable LOS (i.e., LOS E or worse) during the peak hours:

- SR-71 Freeway Southbound, South of Euclid Avenue (SR-83) (#12) – LOS E AM peak hour only
- SR-60 Freeway Westbound, West of Euclid Avenue (SR-83) (#24) – LOS E AM and PM peak hours
- SR-60 Freeway Westbound, Euclid Avenue (SR-83) Off-Ramp (#26) – LOS E AM peak hour; LOS F PM peak hour
- SR-60 Freeway Westbound, East of Euclid Avenue (SR-83) (#27) – LOS E AM peak hour; LOS F PM peak hour
- SR-60 Freeway Eastbound, West of Euclid Avenue (SR-83) (#28) – LOS F PM peak hour only
- SR-60 Freeway Eastbound, Euclid Avenue (SR-83) Off-Ramp (#29) – LOS E AM peak hour; LOS F PM peak hour
- SR-60 Freeway Eastbound, Euclid Avenue (SR-83) On-Ramp (#30) – LOS F PM peak hour only
- SR-60 Freeway Eastbound, East of Euclid Avenue (SR-83) (#31) – LOS F PM peak hour only

Table 8-2

Peak Hour Freeway Off-Ramp Queuing Summary for Horizon Year (2040) Conditions

Intersection	Movement	Available Stacking Distance (Feet)	2040 Without Project				2040 With Project			
			95th Percentile Queue (Feet)[3]		Acceptable? [1]		95th Percentile Queue (Feet)[3]		Horizon Year (2040)	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
SR-71 SB Ramps & Central Avenue	SBL	1,530	297 [2]	656 [2]	Yes	Yes	295 [2]	658 [2]	Yes	Yes
	SBL/R	740	0	0	Yes	Yes	0	0	Yes	Yes
SR-71 SB Ramps & Pine Avenue	SBL/T	1,370	236	599 [2]	Yes	Yes	272	622 [2]	Yes	Yes
	SBR	725	30	240	Yes	Yes	30	242	Yes	Yes
SR-71 SB Ramps & Euclid Avenue (SR-83)	SBL	1,100	232	470 [2]	Yes	Yes	232	470 [2]	Yes	Yes
	SBL/T	1,560	233	484 [2]	Yes	Yes	233	484 [2]	Yes	Yes
	SBR	255	0	0	Yes	Yes	0	0	Yes	Yes
SR-71 NB Ramps & Central Avenue	NBL	1,485	54	85	Yes	Yes	54	85	Yes	Yes
	NBL/R	1,070	0	0	Yes	Yes	0	0	Yes	Yes
SR-71 NB Ramps & Pine Avenue	NBL	1,375	15	35	Yes	Yes	15	35	Yes	Yes
	NBL/T	815	20	90	Yes	Yes	33	105	Yes	Yes
SR-71 NB Ramps & Euclid Avenue (SR-83)	NBL	1,745	70	63	Yes	Yes	70	63	Yes	Yes
	NBR	420	157 [2]	1,226 [2,3]	Yes	Yes	157 [2]	1,226 [2,3]	Yes	Yes
Euclid Av. (SR-83) & SR-60 WB Ramps	WBL	400	493 [2,3]	420 [2,3]	Yes	Yes	503 [2,3]	428 [2,3]	Yes	Yes
	WBL/T/R	1,430	510 [2]	447 [2]	Yes	Yes	537 [2]	447 [2]	Yes	Yes
	WBR	400	388 [2]	326 [2]	Yes	Yes	395 [2]	334 [2]	Yes	Yes
Euclid Av. (SR-83) & SR-60 EB Ramps	EBL	900	518 [2]	489 [2]	Yes	Yes	518 [2]	489 [2]	Yes	Yes
	EBT/R	1,270	883 [2]	687 [2]	Yes	Yes	903 [2]	695 [2]	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the SR-71 Freeway mainline.

Table 8-3

Freeway Facility Analysis for Horizon Year (2040) Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	2040 Without Project				2040 With Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]
SR-71 Freeway	Southbound	North of Central Avenue	3	12.2	B	19.1	C	12.6	B	19.3	C
		Central Avenue Off-Ramp	3	19.0	B	26.4	C	19.4	B	26.6	C
		Central Avenue Loop On-Ramp	3	8.6	A	14.1	B	8.9	A	14.2	B
		Central Avenue On-Ramp	3	15.5	B	21.4	C	15.8	B	21.5	C
		Central Avenue to Pine Avenue	3	17.9	B	28.5	D	18.2	C	28.8	D
		Pine Avenue Off-Ramp	2	23.1	C	45.0	D	23.4	C	45.0	D
		Pine Avenue On-Ramp	2	18.7	B	17.3	B	18.8	B	17.7	B
		Pine Avenue to Euclid Avenue (SR-83)	2	15.3	B	13.2	B	15.4	B	13.4	B
		Euclid Avenue (SR-83) Off-Ramp	2	20.4	C	18.9	B	20.5	C	19.4	B
		Euclid Avenue (SR-83) Loop On-Ramp	2	21.3	C	17.4	B	21.4	C	17.9	B
		Euclid Avenue (SR-83) On-Ramp	2	34.9	D	28.1	C	35.1	D	28.6	D
		South of Euclid Avenue (SR-83)	2	**35.5**	**E**	27.7	D	**35.6**	**E**	28.2	D
	Northbound	North of Central Avenue	3	17.6	B	18.1	C	17.6	B	18.4	C
		Central Avenue On-Ramp	3	20.5	C	21.6	C	20.6	C	21.9	C
		Central Avenue Loop On-Ramp	3	17.2	B	17.0	B	17.2	B	17.3	B
		Central Avenue Off-Ramp	3	23.2	C	24.8	C	23.3	C	25.0	C
		Central Avenue to Pine Avenue	3	16.3	B	17.1	B	16.3	B	17.4	B
		Pine Avenue On-Ramp	2	15.0	B	17.5	B	15.0	B	17.5	B
		Pine Avenue Off-Ramp	2	24.2	C	32.6	D	24.6	C	32.8	D
		Pine Avenue to Euclid Avenue (SR-83)	2	18.5	C	26.6	D	18.8	C	26.8	D
		Euclid Avenue (SR-83) On-Ramp	2	20.5	C	29.6	D	20.7	C	29.8	D
		Euclid Avenue (SR-83) Off-Ramp	3	13.1	B	24.7	C	13.3	B	24.8	C
		South of Euclid Avenue (SR-83)	3	15.9	B	28.9	D	16.1	B	29.0	D
SR-60 Freeway	Westbound	West of Euclid Avenue (SR-83)	4	**35.5**	**E**	**42.9**	**E**	**35.5**	**E**	**42.9**	**E**
		Euclid Avenue (SR-83) On-Ramp	4	35.4	D	40.8	D	35.4	D	40.8	D
		Euclid Avenue (SR-83) Off-Ramp	4	**41.3**	**E**	**43.4**	**F**	**41.5**	**E**	**43.4**	**F**
		East of Euclid Avenue (SR-83)	4	**38.1**	**E**	**45.0**	**F**	**38.2**	**E**	**45.0**	**F**
	Eastbound	West of Euclid Avenue (SR-83)	4	32.9	D	**45.0**	**F**	33.0	D	**45.0**	**F**
		Euclid Avenue (SR-83) Off-Ramp	4	**36.4**	**E**	**50.1**	**F**	**36.5**	**E**	**50.1**	**F**
		Euclid Avenue (SR-83) On-Ramp	4	34.9	D	**55.3**	**F**	35.0	D	**55.3**	**F**
		East of Euclid Avenue (SR-83)	4	34.7	D	**38.4**	**F**	34.8	D	**38.4**	**F**

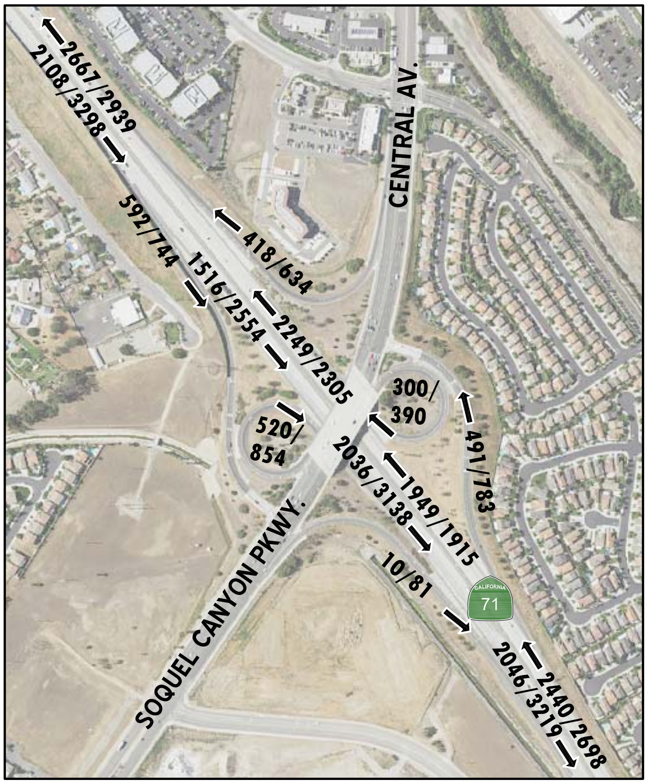
* **BOLD** = Unacceptable Level of Service

[1] Number of lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

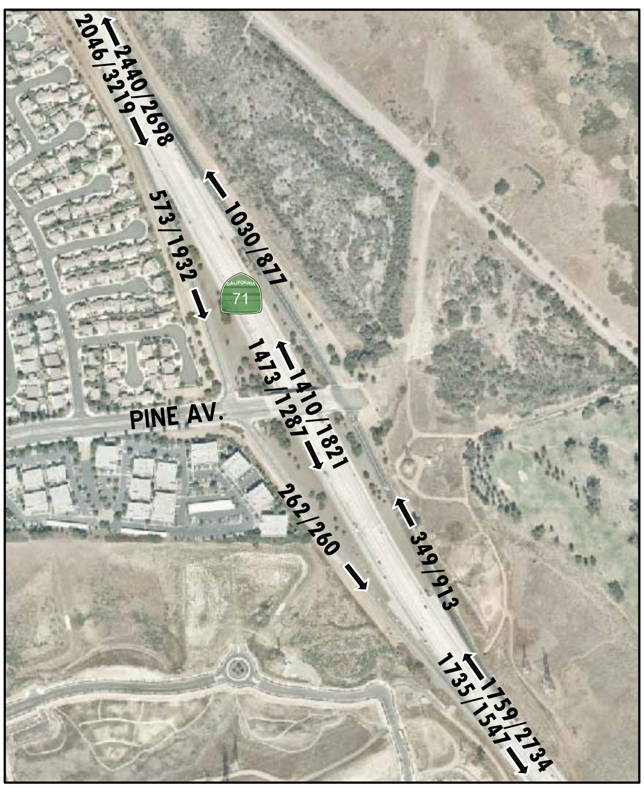
Exhibit 8-7: Horizon Year (2040) Without Project Freeway Mainline Volumes



LEGEND:

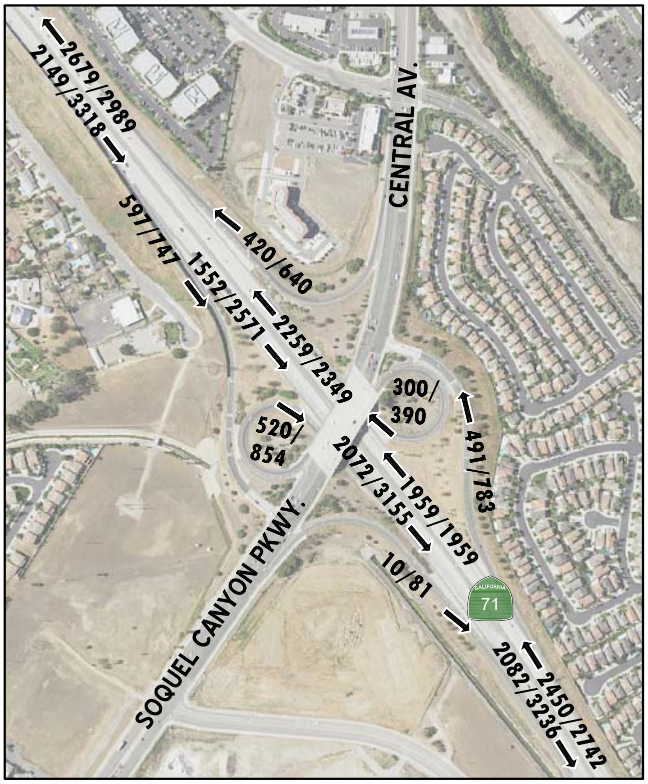
100/200 = AM/PM PEAK HOUR VOLUMES

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)



N

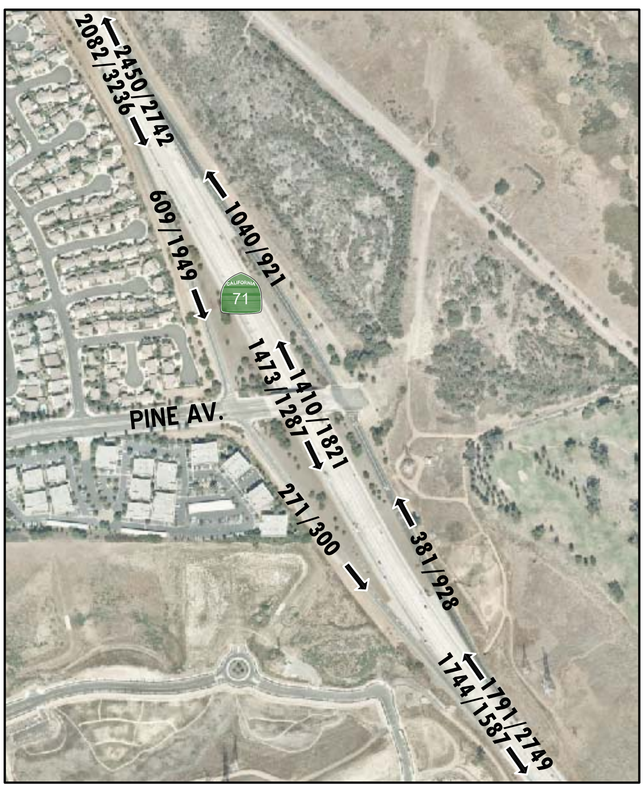
EXHIBIT 8-8: HORIZON YEAR (2040) WITH PROJECT FREEWAY MAINLINE VOLUMES



LEGEND:

100/200 = AM/PM PEAK HOUR VOLUMES

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)



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URBAN CROSSROADS

There are no additional freeway segments or merge/diverge ramp junctions that are anticipated to operate at an unacceptable LOS during the peak hours with the addition of Project traffic. Horizon Year (2040) basic freeway segment analysis worksheets are provided in Appendix 8.7 and 8.8, respectively.

8.7 HORIZON YEAR (2040) DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

8.7.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

Improvement strategies have been recommended at intersections that have been identified as deficient in an effort to reduce each location's peak hour delay and improve the associated LOS grade to an acceptable LOS (LOS D or better). The effectiveness of the recommended improvement strategies discussed below to address Horizon Year (2040) traffic deficiencies is presented on Table 8-4.

Although the following intersections are anticipated to operate at a deficient LOS for Horizon Year (2040) traffic conditions, the Project is anticipated to contribute less than 50 peak hour trips:

- SR-71 Southbound Ramps & Butterfield Ranch Road (#2)
- Central Avenue & El Prado Road (#7)
- El Prado Road & Kimball Avenue (#8)
- Euclid Avenue (SR-83) & SR-60 Westbound Ramps (#19)
- Euclid Avenue (SR-83) & Pine Avenue (#30)
- Rincon Meadows Avenue & Pine Avenue (#32)
- Mill Creek Avenue/Chino Corona Road & Pine Avenue (#34)
- W. Preserve Loop & Pine Avenue (#36)
- E. Preserve Loop & Pine Avenue (#39)
- Archibald Avenue & Schleisman Road (#43)

As such, the impact at these locations are less than significant and improvements have not been recommended at these locations.

The Project Applicant shall participate in the funding of off-site improvements, including traffic signals that are needed to serve cumulative traffic conditions through the payment of City of Chino DIF (if the improvements are included in the DIF program) or on a fair share basis (if the improvements are not included in the DIF program). These fees shall be collected by the City of Chino, with the proceeds solely used as part of a funding mechanism aimed at ensuring that regional highways and arterial expansions keep pace with the projected population increases. Each of the improvements discussed above have been identified as being included as part of City DIF fee program or fair share contribution in Section 9 *Local and Regional Funding Mechanisms* of this TIA.

Worksheets for Horizon Year (2040) Without and With Project conditions, with improvements, HCM calculation worksheets are provided in Appendix 8.9 and Appendix 8.10, respectively.

Table 8-4

Page 1 of 3

Intersection Analysis for Horizon Year (2040) Conditions With Improvements

			Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
		Traffic	Northbound			Southbound			Eastbound			Westbound						
#	Intersection	Control[3]	L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
2	SR-71 SB Ramps & Pine Av.																	
	2040 Without Project:																	
	-Without Improvements	TS	0	0	0	0	1	1	0	1	1	1	2	0	**121.0**	**40.1**	**F**	**D**
	-With Improvements	TS	0	0	0	1	1	0	0	2	0	1	2	0	22.2	27.1	C	C
	2040 With Project:																	
	-Without Improvements	TS	0	0	0	0	1	1	0	1	1	1	2	0	**122.4**	**55.9**	**F**	**E**
	-With Improvements	TS	0	0	0	1	1	0	0	2	0	1	2	0	23.1	29.7	C	C
5	SR-71 NB Ramps & Pine Av.																	
	2040 Without Project:																	
	-Without Improvements[4]	AWS	1	1	0	0	0	0	1	1	0	0	1	0	**>100.0**	**>100.0**	**F**	**F**
	-With Improvements[4]	TS	0	1	1	0	0	0	2	1	0	0	2	1	18.4	21.5	B	C
	2040 With Project:																	
	-Without Improvements[4]	AWS	1	1	0	0	0	0	1	1	0	0	1	0	**>100.0**	**>100.0**	**F**	**F**
	-With Improvements[4]	TS	0	1	1	0	0	0	2	1	0	0	2	1	24.2	22.6	C	C
14	El Prado Rd. & Mountain Av.																	
	2040 Without Project:																	
	-Without Improvements	CSS	0	1	0	0	1	0	0	0	0	0	1	0	14.5	20.6	B	C
	-With Improvements		Not Applicable															
	2040 With Project:																	
	-Without Improvements	CSS	0	1	0	0	1	0	0	0	0	0	1	0	17.3	**64.7**	C	**F**
	-With Improvements	TS	0	1	0	0	1	0	0	0	0	0	1	0	10.5	10.6	B	B
15	El Prado Rd. & Pine Av.																	
	2040 Without Project:																	
	-Without Improvements[4]	AWS	0	0	0	0	1	0	1	2	0	0	2	0	**>100.0**	**>100.0**	**F**	**F**
	-With Improvements[4]	TS	0	0	0	0	1	0	1	2	0	0	2	0	20.8	31.6	C	C
	2040 With Project:																	
	-Without Improvements[4]	AWS	0	0	0	0	1	0	1	2	0	0	2	0	**>100.0**	**>100.0**	**F**	**F**
	-With Improvements[4]	TS	0	0	0	0	1	0	1	2	0	0	2	0	37.7	54.3	D	D
20	Euclid Av. (SR-83) & SR-60 EB Ramps																	
	2040 Without Project:																	
	-Without Improvements	TS	0	2	1	1	2	0	1	1	0	0	0	0	**100.8**	**81.7**	**F**	**F**
	-With Improvements	TS	0	2	1	2	2	0	1	1	1	0	0	0	30.0	22.1	C	C
	2040 With Project:																	
	-Without Improvements	TS	0	2	1	1	2	0	1	1	0	0	0	0	**103.8**	**87.1**	**F**	**F**
	-With Improvements	TS	0	2	1	2	2	0	1	1	1	0	0	0	30.7	22.1	C	C
22	Euclid Av. (SR-83) & Riverside Dr.																	
	2040 Without Project:																	
	-Without Improvements	TS	1	2	1	1	2	1>	1	1	0	1	2	d	**129.9**	**>200.0**	**F**	**F**
	-With Improvements	TS	2	3	1	2	3	1>	1	2	1	1	2	d	37.0	45.8	D	D
	2040 With Project:																	
	-Without Improvements	TS	1	2	1	1	2	1>	1	1	0	1	2	d	**136.2**	**>200.0**	**F**	**F**
	-With Improvements	TS	2	3	1	2	3	1>	1	2	1	1	2	d	37.2	46.4	D	D

Table 8-4

Intersection Analysis for Horizon Year (2040) Conditions With Improvements

			Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
		Traffic	Northbound			Southbound			Eastbound			Westbound						
#	Intersection	Control[3]	L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
23	Euclid Av. (SR-83) & Chino Av.																	
	2040 Without Project:																	
	-Without Improvements	TS	1	2	1	1	2	1	1	1	1	0	1	0	**56.5**	**121.9**	**E**	**F**
	-With Improvements	TS	1	**3**	1	1	**3**	1	1	1	1	**1**	1	0	25.9	36.3	C	D
	2040 With Project:																	
	-Without Improvements	TS	1	2	1	1	2	1	1	1	1	0	1	0	**61.8**	**128.0**	**E**	**F**
	-With Improvements	TS	1	**3**	1	1	**3**	1	1	1	1	**1**	1	0	26.1	37.7	C	D
24	Euclid Av. (SR-83) & Schaefer Av.																	
	2040 Without Project:																	
	-Without Improvements	TS	1	2	1	1	2	1	1	1	1	1	1	0	**155.8**	**172.7**	**F**	**F**
	-With Improvements	TS	**2**	**3**	1	**2**	**3**	1	**2**	1	1	1	1	0	52.2	41.5	D	D
	2040 With Project:																	
	-Without Improvements	TS	1	2	1	1	2	1	1	1	1	1	1	0	**165.1**	**180.7**	**F**	**F**
	-With Improvements	TS	**2**	**3**	1	**2**	**3**	1	**2**	1	1	1	1	0	54.9	42.9	D	D
25	Euclid Av. (SR-83) & Edison Av.																	
	2040 Without Project:																	
	-Without Improvements	TS	1	2	1	1	2	1	1	1	1	1	1	0	**>200.0**	**>200.0**	**F**	**F**
	-With Improvements	TS	**2**	**3**	1	**2**	**3**	**1>**	**2**	**3**	1	**2**	**2**	**1>**	41.9	43.2	D	D
	2040 With Project:																	
	-Without Improvements	TS	1	2	1	1	2	1	1	1	1	1	1	0	**>200.0**	**>200.0**	**F**	**F**
	-With Improvements	TS	**2**	**3**	1	**2**	**3**	**1>**	**2**	**3**	1	**2**	**2**	**1>**	42.7	44.1	D	D
26	Euclid Av. (SR-83) & Eucalyptus Av.																	
	2040 Without Project:																	
	-Without Improvements	TS	1	2	1	1	2	1	1	1	1	1	1	0	**69.2**	**155.8**	**E**	**F**
	-With Improvements	TS	1	**3**	1	1	**3**	1	1	1	1	**2**	1	**1**	25.9	45.2	C	D
	2040 With Project:																	
	-Without Improvements	TS	1	2	1	1	2	1	1	1	1	1	1	0	**75.9**	**162.8**	**E**	**F**
	-With Improvements	TS	1	**3**	1	1	**3**	1	1	1	1	**2**	1	**1**	26.6	47.3	C	D
27	Euclid Av. (SR-83) & Merrill Av.																	
	2040 Without Project:																	
	-Without Improvements	TS	1	2	1	1	2	0	0	1	0	0	1	0	**117.6**	**>200.0**	**F**	**F**
	-With Improvements	TS	1	**3**	**1>**	1	**3**	0	**1**	1	0	**2**	1	**1>**	25.3	46.1	C	D
	2040 With Project:																	
	-Without Improvements	TS	1	2	1	1	2	0	0	1	0	0	1	0	**120.8**	**>200.0**	**F**	**F**
	-With Improvements	TS	1	**3**	**1>**	1	**3**	0	**1**	1	0	**2**	1	**1>**	25.5	50.4	C	D
28	Euclid Av. (SR-83) & Kimball Av.																	
	2040 Without Project:																	
	-Without Improvements	TS	1	2	1>	2	2	1>	2	2	0	1	2	0	**101.3**	**152.6**	**F**	**F**
	-With Improvements	TS	1	**3**	1>	2	**3**	1>	2	2	0	**2**	2	0	35.0	52.7	C	D
	2040 With Project:																	
	-Without Improvements	TS	1	2	1>	2	2	1>	2	2	0	1	2	0	**114.1**	**163.3**	**F**	**F**
	-With Improvements	TS	1	**3**	1>	2	**3**	1>	2	2	0	**2**	2	0	35.9	54.9	D	D

Table 8-4

Intersection Analysis for Horizon Year (2040) Conditions With Improvements

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
38	Flight Av. & Kimball Av.																	
	2040 Without Project:																	
	-Without Improvements	CSS	0	1	0	0	1	0	1	2	0	1	1	0	**>100.0**	**>100.0**	**F**	**F**
	-With Improvements	**TS**	0	1	0	**1**	1	0	1	2	0	1	**2**	**1**	43.2	19.2	D	B
	2040 With Project:																	
	-Without Improvements	CSS	0	1	0	0	1	0	1	2	0	1	1	0	**>100.0**	**>100.0**	**F**	**F**
	-With Improvements	**TS**	0	1	0	**1**	1	0	1	2	0	1	**2**	**1**	45.2	19.5	D	B
40	Hellman Av. & Kimball Av.																	
	2040 Without Project:																	
	-Without Improvements	TS	1	2	0	**1**	2	d	1	**1**	1>	**2**	**2**	**1**	32.9	**>200.0**	C	**F**
	-With Improvements	TS	**2**	2	0	**1**	2	d	1	**2**	1>	**2**	**2**	**1**	31.6	43.0	C	D
	2040 With Project:																	
	-Without Improvements	TS	1	2	0	**1**	2	d	1	**1**	1>	**2**	**2**	**1**	33.4	**>200.0**	C	**F**
	-With Improvements	TS	**2**	2	0	**1**	2	d	1	**2**	1>	**2**	**2**	**1**	31.9	44.3	C	D
42	Archibald Av. & Limonite Av.																	
	2040 Without Project:																	
	-Without Improvements	TS	**1**	1	1>	1	1	0	**1**	**1**	0	1	**1**	1>	**>200.0**	**>200.0**	**F**	**F**
	-With Improvements	TS	**1**	**3**	1>	**2**	**3**	0	**2**	**2**	0	**2**	**2**	1>	40.5	52.4	D	D
	2040 With Project:																	
	-Without Improvements	TS	**1**	1	1>	1	1	0	**1**	**1**	0	1	**1**	1>	**>200.0**	**>200.0**	**F**	**F**
	-With Improvements	TS	**1**	**3**	1>	**2**	**3**	0	**2**	**2**	0	**2**	**2**	1>	41.0	54.0	D	D

1 When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; >> = Free Right Turn Lane; d = Defacto Right Turn Lane; **1** = Improvement

2 Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

3 CSS = Cross-street Stop; AWS = All-Way Stop; TS = Traffic Signal; **TS** = Improvement

4 Includes additional lanes consistent with the planned Pine Avenue extension.

8.7.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON OFF-RAMP QUEUES

As shown previously on Table 8-2, there are no peak hour queuing issues at the SR-71 Freeway at Euclid Avenue (SR-83) and Euclid Avenue (SR-83) at SR-60 Freeway interchanges for Horizon Year (2040) Without and With Project traffic conditions. As such, no improvements have been recommended.

8.7.4 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development projects in the City of Chino (or other neighboring jurisdictions) on SHS roadway segments. As such, no improvements have been recommended to address the Horizon Year (2040) Without and With Project deficiencies on the SHS, because there is no feasible mitigation available.

9 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements within the City of Chino are funded through a combination of project mitigation, development impact fee programs or fair share contributions, such as the City of Chino Development Impact Fee (DIF) program. Identification and timing of needed improvements is generally determined through local jurisdictions based upon a variety of factors.

9.1 CITY OF CHINO DEVELOPMENT IMPACT FEE PROGRAM

The City of Chino has created its own local Development Impact Fee (DIF) program to impose and collect fees from new residential, commercial and industrial development for the purpose of funding roadways and intersections necessary to accommodate City growth as identified in the City's General Plan Circulation Element. The City's DIF includes regional improvements to comply with Measure "I". The fee schedule was recently adopted on July 16, 2019. The fee schedule and project transportation impacts fees are shown on Table 9-1. Under the City's DIF program, the City may grant to developers a credit against specific components of fees when those developers construct certain facilities and landscaped medians identified in the list of improvements funded by the DIF program.

TABLE 9-1: ESTIMATED FEE OBLIGATION

Fee Reference	Light Industrial ($ PER SQ. FT.)
Streets, Signals and Bridges (Schedule 5.2)	2.188/SF

* City-wide DIF rates adopted July 16, 2019.

Fee Calculation

Building	Category	Unit Cost	Units/Sq.Ft.	Local Circulation
Building 1	Industrial	$2.188	1,168,710	$2,557,137
Building 2	Industrial	$2.188	914,040	$1,999,920

Total Transportation Impact Fees	**$4,557,057**

The timing to use the DIF fees is established through periodic capital improvement programs which are overseen by the City's Public Works Department. Periodic traffic counts, review of traffic accidents, and a review of traffic trends throughout the City are also periodically performed by City staff and consultants. The City uses this data to determine the timing of implementing the improvements listed in its facilities list. The City also uses this data to ensure that the improvements listed on the facilities list are constructed before the LOS falls below the

LOS performance standards adopted by the City. In this way, the improvements are constructed before the LOS falls below the City's LOS performance thresholds.

The Project Applicant will be subject to the City's DIF fee program and will pay the requisite City DIF fees at the rates then in effect pursuant to the City's ordinance. The Project Applicant's payment of the requisite DIF at the rates then in effect, pursuant to the City DIF Program, would satisfy the Project's proportional mitigation requirements at potentially affected DIF-funded facilities.

9.2 MEASURE "I" FUNDS

In 2004, the voters of San Bernardino County approved the 30-year extension of Measure "I", a one-half of one percent sales tax on retail transactions, through the year 2040, for transportation projects including, but not limited to, infrastructure improvements, commuter rail, public transit, and other identified improvements. The Measure "I" extension requires that a regional traffic impact fee be created to ensure development is paying its fair share. A regional Nexus study was prepared by the San Bernardino County Transportation Authority (SBCTA) and concluded that each jurisdiction should include a regional fee component in their local programs in order to meet the Measure "I" requirement. The regional component assigns specific facilities and cost sharing formulas to each jurisdiction and was most recently updated in November 2011. Revenues collected through these programs are used in tandem with Measure "I" funds to deliver projects identified in the Nexus Study. While Measure "I" is a self-executing sales tax administered by SBCTA, it bears discussion here because the funds raised through Measure "I" have funded in the past and will continue to fund new transportation facilities in San Bernardino County.

9.3 FAIR SHARE CONTRIBUTION

Project mitigation may include a combination of fee payments to established programs, construction of specific improvements, payment of a fair share contribution toward future improvements or a combination of these approaches. Improvements constructed by development may be eligible for a fee credit or reimbursement through the program where appropriate (to be determined at the City's discretion).

When off-site improvements are identified with a minor share of responsibility assigned to proposed development, the approving jurisdiction may elect to collect a fair share contribution or require the development to construct improvements. Detailed fair share calculations, for each peak hour, has been provided on Table 9-2 for the applicable deficient study area intersections.

Table 9-2
Page 1 of 2

Project Fair Share Calculations for Intersections

#	Intersection		Existing	Project	2040 With Project Volume	Total New Traffic	Project % of New Traffic
2	SR-71 SB Ramps & Pine Av.						
		AM:	716	67	1,751	1,035	6.473%
		PM:	1,482	82	2,564	1,082	**7.579%**
5	SR-71 NB Ramps & Pine Av.						
		AM:	510	127	2,572	2,062	6.159%
		PM:	437	158	2,766	2,329	**6.784%**
8	El Prado Rd. & Kimball Av.						
		AM:	1,801	30	2,114	313	**9.585%**
		PM:	2,248	42	2,711	463	9.071%
22	Euclid Av. (SR-83) & Riverside Dr.						
		AM:	3,696	65	5,496	1,800	**3.611%**
		PM:	3,753	77	5,996	2,243	3.433%
23	Euclid Av. (SR-83) & Chino Av.						
		AM:	2,877	67	4,525	1,648	4.066%
		PM:	3,116	79	5,039	1,923	**4.108%**
24	Euclid Av. (SR-83) & Schaefer Av.						
		AM:	2,746	67	4,940	2,194	**3.054%**
		PM:	3,302	79	5,999	2,697	2.929%
25	Euclid Av. (SR-83) & Edison Av.						
		AM:	3,143	73	6,653	3,510	2.080%
		PM:	3,926	88	7,704	3,778	**2.329%**
26	Euclid Av. (SR-83) & Eucalyptus Av.						
		AM:	2,717	78	4,735	2,018	**3.865%**
		PM:	2,972	93	5,756	2,784	3.341%
27	Euclid Av. (SR-83) & Merrill Av.						
		AM:	2,828	82	4,626	1,798	**4.561%**
		PM:	3,143	100	5,546	2,403	4.161%
30	Euclid Av. (SR-83) & Pine Av.						
		AM:	3,519	21	6,661	3,142	0.668%
		PM:	3,639	26	7,318	3,679	**0.707%**
32	Rincon Meadows Av. & Pine Av.						
		AM:	2,231	21	3,830	1,599	**1.313%**
		PM:	2,140	26	4,392	2,252	1.155%
36	W. Preserve Loop & Pine Av.						
		AM:	2,506	18	4,000	1,494	1.205%
		PM:	2,252	23	4,001	1,749	**1.315%**
38	Flight Av. & Kimball Av.						
		AM:	1,310	46	2,594	1,284	3.583%
		PM:	1,440	61	2,497	1,057	**5.771%**
42	Archibald Av. & Limonite Av.						
		AM:	2,711	46	5,732	3,021	**1.523%**
		PM:	2,762	61	7,203	4,441	1.374%

Table 9-2

Project Fair Share Calculations for Intersections

#	Intersection	Existing	Project	2040 With Project Volume	Total New Traffic	Project % of New Traffic
43	Archibald Av. & Schleisman Rd.					
	AM:	4,151	13	6,600	2,449	0.531%
	PM:	3,985	18	7,261	3,276	**0.549%**

BOLD = Denotes highest fair share percentage.

[1] Fair share based on total traffic only.

10 REFERENCES

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3. **Institute of Transportation Engineers.** *Trip Generation.* 10th Edition. 2017.
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5. **Transportation Research Board.** *Highway Capacity Manual (HCM).* 6th. s.l. : National Academy of Sciences, 2016.
6. **Caltrans.** Manual on Uniform Traffic Control Devices (MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CAMUTCD).* 2014.
7. **California Department of Transportation.** *Freeway Performance Measurement (PeMS).* [Online] [Cited: February 12, 2019.] http://pems.dot.ca.gov/.
8. **Southern California Association of Governments.** *2016 Regional Transportation Plan/Sustainable Communities Strategy.* April 2016.

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Appendix I

EJScreen Report

EJSCREEN ACS Summary Report

Location: User-specified point center at 33.959597, -117.666742
Ring (buffer): 1-miles radius
Description:

Summary of ACS Estimates	2013 - 2017
Population	2,928
Population Density (per sq. mile)	1,126
Minority Population	2,314
% Minority	79%
Households	969
Housing Units	981
Housing Units Built Before 1950	0
Per Capita Income	34,146
Land Area (sq. miles) (Source: SF1)	2.60
% Land Area	100%
Water Area (sq. miles) (Source: SF1)	0.01
% Water Area	0%

	2013 - 2017 ACS Estimates	Percent	MOE (±)
Population by Race			
Total	2,928	100%	722
Population Reporting One Race	2,764	94%	1,725
White	928	32%	625
Black	357	12%	270
American Indian	15	0%	39
Asian	1,129	39%	373
Pacific Islander	0	0%	17
Some Other Race	335	11%	401
Population Reporting Two or More Races	163	6%	130
Total Hispanic Population	694	24%	465
Total Non-Hispanic Population	2,233		
White Alone	614	21%	448
Black Alone	357	12%	270
American Indian Alone	15	0%	39
Non-Hispanic Asian Alone	1,129	39%	373
Pacific Islander Alone	0	0%	17
Other Race Alone	0	0%	17
Two or More Races Alone	119	4%	110
Population by Sex			
Male	1,369	47%	388
Female	1,559	53%	442
Population by Age			
Age 0-4	202	7%	135
Age 0-17	807	28%	368
Age 18+	2,121	72%	553
Age 65+	143	5%	144

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2013 - 2017 .

EJSCREEN ACS Summary Report

Location: User-specified point center at 33.959597, -117.666742
Ring (buffer): 1-miles radius
Description:

	2013 - 2017 ACS Estimates	Percent	MOE (±)
Population 25+ by Educational Attainment			
Total	1,962	100%	507
Less than 9th Grade	13	1%	33
9th - 12th Grade, No Diploma	51	3%	61
High School Graduate	234	12%	207
Some College, No Degree	454	23%	206
Associate Degree	153	8%	117
Bachelor's Degree or more	1,210	62%	357
Population Age 5+ Years by Ability to Speak English			
Total	2,726	100%	710
Speak only English	1,527	56%	462
Non-English at Home[1+2+3+4]	1,198	44%	436
[1]Speak English "very well"	899	33%	401
[2]Speak English "well"	175	6%	121
[3]Speak English "not well"	83	3%	93
[4]Speak English "not at all"	41	1%	73
[3+4]Speak English "less than well"	124	5%	117
[2+3+4]Speak English "less than very well"	299	11%	167
Linguistically Isolated Households*			
Total	34	100%	49
Speak Spanish	0	0%	17
Speak Other Indo-European Languages	8	23%	23
Speak Asian-Pacific Island Languages	27	77%	40
Speak Other Languages	0	0%	17
Households by Household Income			
Household Income Base	969	100%	162
< $15,000	35	4%	68
$15,000 - $25,000	15	2%	53
$25,000 - $50,000	118	12%	111
$50,000 - $75,000	83	9%	81
$75,000 +	718	74%	386
Occupied Housing Units by Tenure			
Total	969	100%	162
Owner Occupied	771	80%	160
Renter Occupied	198	20%	154
Employed Population Age 16+ Years			
Total	2,199	100%	525
In Labor Force	1,569	71%	382
Civilian Unemployed in Labor Force	60	3%	91
Not In Labor Force	630	29%	302

Data Note: Datail may not sum to totals due to rounding. Hispanic population can be of anyrace.
N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS)
*Households in which no one 14 and over speaks English "very well" or speaks English only.

EJSCREEN ACS Summary Report

Location: User-specified point center at 33.959597, -117.666742
Ring (buffer): 1-miles radius
Description:

	2013 - 2017 **ACS Estimates**	**Percent**	**MOE (±)**
Population by Language Spoken at Home*			
Total (persons age 5 and above)	4,943	100%	574
English	2,915	59%	572
Spanish	751	15%	312
French	0	0%	30
French Creole	N/A	N/A	N/A
Italian	N/A	N/A	N/A
Portuguese	N/A	N/A	N/A
German	0	0%	17
Yiddish	N/A	N/A	N/A
Other West Germanic	N/A	N/A	N/A
Scandinavian	N/A	N/A	N/A
Greek	N/A	N/A	N/A
Russian	N/A	N/A	N/A
Polish	N/A	N/A	N/A
Serbo-Croatian	N/A	N/A	N/A
Other Slavic	N/A	N/A	N/A
Armenian	N/A	N/A	N/A
Persian	N/A	N/A	N/A
Gujarathi	N/A	N/A	N/A
Hindi	N/A	N/A	N/A
Urdu	N/A	N/A	N/A
Other Indic	N/A	N/A	N/A
Other Indo-European	31	1%	51
Chinese	413	8%	269
Japanese	N/A	N/A	N/A
Korean	78	2%	111
Mon-Khmer, Cambodian	N/A	N/A	N/A
Hmong	N/A	N/A	N/A
Thai	N/A	N/A	N/A
Laotian	N/A	N/A	N/A
Vietnamese	55	1%	93
Other Asian	119	2%	106
Tagalog	492	10%	291
Other Pacific Island	N/A	N/A	N/A
Navajo	N/A	N/A	N/A
Other Native American	N/A	N/A	N/A
Hungarian	N/A	N/A	N/A
Arabic	88	2%	173
Hebrew	N/A	N/A	N/A
African	N/A	N/A	N/A
Other and non-specified	0	0%	17
Total Non-English	2,028	41%	810

Data Note: Detail may not sum to totals due to rounding. Hispanic popultion can be of any race.
N/A meansnot available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2013 - 2017.
*Population by Language Spoken at Home is available at the census tract summary level and up.

Appendix J

Mailing List

Draft Majestic Chino Heritage dEA Mailing List

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Redlands, CA 92374

Organizations/Groups

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Santa Ana Watershed Association
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Riverside, CA 92517

Riverside-Corona Resource Conservation District
Attn: Kerwin Russell
4500 Glenwood Dr., Bldg. A
Riverside, CA 92501

Riverside Audubon Society
5370 Riverview Drive
Rubidoux, CA 92509

Audubon Society
San Bernardino Valley Chapter
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San Bernardino, CA 92423-0973

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Chair: Prado Basin Group Sierra Club San Gorgonio Chapter
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Jeff Morgan
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Ileene Anderson
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Private Entity

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Greg Rousseau, Project Engineer
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Other

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Jason Marseilles
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Libraries

Corona Public Library
Attn: Nora Jacob
650 South Main Street
Corona, CA 91720

Norco Public Library
3954 Old Hamner Avenue
Norco, CA 91760

Riverside Public Library
Attn: Government Documents
3581 Mission Inn Avenue
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Chino Branch Library
13180 Central Avenue
Chino, CA 91710

Native American Contacts

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