



**US Army Corps
of Engineers** ®
Los Angeles District



**SAN GABRIEL RIVER/
COYOTE CREEK 2 LEVEE SYSTEM
LOS ANGELES COUNTY, CALIFORNIA
NLD SYSTEM ID # 3805010031**

**PERIODIC INSPECTION REPORT NO. 2
GENERALIZED EXECUTIVE SUMMARY**

**FINAL SYSTEM RATING: MINIMALLY ACCEPTABLE
FINAL RATING DATE: SEPTEMBER 19, 2017**

PERIODIC INSPECTION REPORT PREPARED BY TETRA TECH FOR THE
U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT

SUBMITTED: JULY 2017
INSPECTED: NOVEMBER 14-18 AND 23, 2016

EXECUTIVE SUMMARY

This Executive Summary provides an introduction to the Periodic Inspection, an overview of the San Gabriel River/Coyote Creek 2 (SGR/CC2) Levee System, a summary of the major findings of the Periodic Inspection of the SGR/CC2 Levee System, and the overall rating for the SGR/CC2 Levee System.

1.1 Scope and Purpose of Periodic Inspections

The purpose of the SGR/CC2 Levee System Periodic Inspection is to identify deficiencies that pose hazards to human life or property. The inspection is intended to identify the issues in order to facilitate future studies and associated repairs as appropriate.

This assessment of the general condition of the SGR/CC2 Levee System is based on available data and visual inspections. Detailed investigation and analysis involving hydrologic design, topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of this levee system inspection.

1.2 System Summary

This report is for the Periodic Inspection Number 2 (PI No. 2) of the SGR/CC2 Levee System. The PI No. 1 of the SGR/CC2 Levee System was conducted by URS Group, Inc. (URS) on behalf of the U.S. Army Corps of Engineers, South Pacific Division, Los Angeles District (USACE SPL) in 2010. The results of the PI No. 1 are documented in the report titled *San Gabriel River/Coyote Creek 2 Levee System Periodic Inspection Report No. 1 Volume 1- Text and Appendices F through J (PI Report No. 1 [USACE SPL 2012])*.

The SGR/CC2 Levee System (Figure 1) is part of the Los Angeles County Drainage Area (LACDA) and is composed of two levee segments:

- San Gabriel River SGR/CC2 Levee Segment
- Coyote Creek SGR/CC2 Levee Segment

The SGR/CC2 Levee System (Figure 1) has two different upstream limits since there are two segments within the system (San Gabriel River SGR/CC2 Levee Segment and Coyote Creek SGR/CC2 Levee Segment). The downstream limit is at the confluence of the San Gabriel River and Coyote Creek in the city of Long Beach. The total distance of the SGR/CC2 Levee System is approximately 123,120 feet (23.32 miles). There are different types of infrastructure that lie within the leveed area, which include: residential, commercial, industrial, educational, transportation, and civic improvements. This area is located to the east of the San Gabriel River SGR/CC2 Levee Segment and west of the Coyote Creek SGR/CC2 Levee Segment. This area is bordered on the east by Interstate 605 from Whittier Narrows Dam to the Artesia Freeway, and is bordered on the north by the Artesia Freeway from Interstate 605 to Bloomfield Avenue, where it then extends north of the Artesia Freeway to the upstream limit of the Coyote Creek SGR/CC2 Levee Segment.

The San Gabriel River SGR/CC2 Levee Segment is located on the left/east bank of the San Gabriel River and extends from the San Gabriel River Parkway Bridge (San Gabriel River [SGR] Station 1077+33), to the confluence with Coyote Creek (SGR Station 230+15). The San Gabriel River SGR/CC2 Levee Segment is 84,718 feet (16.05 miles) in length. It is located in the cities of Pico Rivera, Santa Fe Springs, Downey, Norwalk, Cerritos, Bellflower, Lakewood, Los Alamitos, Long Beach, and in unincorporated areas of Los Angeles County. The upstream limit is near San Gabriel

River Parkway in the city of Pico Rivera and the downstream limit is at the confluence of San Gabriel River and Coyote Creek near Willow Street in the city of Long Beach.

The Coyote Creek SGR/CC2 Levee Segment runs along the right/west bank of the North Fork Coyote Creek (North Fork [NF]) from a few hundred feet south of Interstate 5 (approximately NF Station 64+50) to the confluence with Coyote Creek (NF Station 1+42), and along the right/west bank of Coyote Creek from the confluence with North Fork (CC Station 372+67) to the confluence with the San Gabriel River (CC Station 51+73). The Coyote Creek SGR/CC2 Levee Segment is 38,402 feet (7.27 miles) in length. It is located in the cities of Cerritos, La Palma, Lakewood, Hawaiian Gardens, Cypress, Los Alamitos, Long Beach, and in unincorporated areas of Los Angeles County and Orange County. The upstream limit is near Interstate 5 in the city of Cerritos and the downstream limit is at the confluence of San Gabriel River and Coyote Creek near Willow Street in the city of Long Beach.

The SGR/CC2 Levee System consists of an earthen levee embankment and a trapezoidal channel with either riprap, reinforced-concrete, grouted stone, or shotcrete on the riverward slope and no revetment on the landward slope. Other features along the SGR/CC2 Levee System include 170 culverts/discharge pipes, seven drop structures, three pump stations, 49 bridge crossings, 36 access ramps, and numerous utility crossings.

The SGR/CC2 Levee System was authorized under the general comprehensive plan for flood control and other purposes in the basins of the Los Angeles, San Gabriel Rivers, and Ballona Creek, as set forth in House Document 838, 76th Congress, third session. The comprehensive plan was approved August 18, 1941 by Act of Congress, Public Law 228, 77th Congress, first session.

The USACE SPL and the Los Angeles County Flood Control District (LACFCD) entered into a Project Cooperation Agreement on August 7, 1995, as required by Public Law 99-622. The LACFCD is responsible for operating and maintaining all the non-federal features of the LACDA. The Los Angeles County Department of Public Works (LACDPW) has assumed the functions of the LACFCD and entirely operates and maintains the SGR/CC2 Levee System.

1.3 Summary of Major Deficiencies Found

The PI No. 2 of the SGR/CC2 Levee System was conducted on November 14 through 18 and 23, 2016 and the LACDPW staff were present. During the inspection of the levee system, deficiencies were noted for which remedial actions are required. The following major deficiencies of the project features were noted during the PI No. 2:

- San Gabriel River SGR/CC2 Levee Segment:
 - Levee Embankment:
 - Non-Compliant Vegetation Growth: Significant vegetation growth including trees with trunks larger than 2 inches in diameter and shrubs were present within the vegetation-free zone. The vegetation-free zone extends 15 feet outward from both the landward and riverward toes of the levee.
 - Encroachments: There were multiple encroachments that inhibited the ability to inspect the levee prism and/or negatively impact the integrity of the levee.
 - Erosion/Bank Caving: There was erosion along the face of the landward slope measuring 6 inches deep and 8 feet wide, extending from the middle to the toe of the landward slope.

- Depressions/Rutting: There were depressions on the landward slope measuring up to 2 feet deep. There were depressions and rutting on the crown measuring 6 inches deep. In addition, large voids/depressions on the crown in the asphalt concrete and levee embankment were observed at several locations measuring up to 4 feet deep.
- Animal Control: There were numerous animal burrows at one location. Although the dimensions of the burrows were not observed to be severe, the number of burrows present within this reach appeared to possibly impact the stability of the levee.
- Riprap Revetments and Bank Protection: There was significant riprap displacement at two locations. In one location, the displaced riprap had exposed the underlying embankment materials. In another location, the displaced riprap had exposed the foundation of the railroad bridge abutment.
- Revetments other than Riprap: There was significant undermining of the grouted stone at the toe of the riverward slope that measured approximately 18 inches deep at one location. Underlying rock was not detected along some portions of the damaged area.
- Floodwalls:
 - Monolith Joints: There was missing joint material in the floodwall at one location under Spring Street Bridge measuring approximately 1.125 inches wide and 3.25 inches tall. This missing material prevented the structure from being water-tight.
- Interior Drainage Systems:
 - Vegetation and Obstructions: The outlets or inlets of ten of the side-drainage structures were obstructed more than 10 percent by vegetation, sediment, and/or debris. Sediment and/or debris on the concrete apron prevented the flap gate from functioning as intended in some locations.
 - Encroachments: The abandonment of two 30-inch-diameter reinforced-concrete pipe (RCP) side-drainage structures was not permitted by the USACE SPL.
 - Fencing and Gates: The damaged chain-link fence on the landward slope above the inlet of the four 54-inch-diameter side-drainage structure presents a human injury hazard concern.
 - Culverts/Discharge Pipes: Video inspection records for the culverts/discharge pipes have not been provided.
 - Flap Gates: There was one location where a flap gate was not present on a 36-inch-diameter pipe and it is not known whether a flap gate is required since the side-drainage structure is not shown on the as-built drawings and no permit information is available.
 - Trash Racks: There was a broken hinge on one trash rack at the outlet of a 36-inch-diameter corrugated metal pipe (CMP) side-drainage structure.
- Flood Damage Reduction Channels:
 - Tilting, Sliding, or Settlement of Concrete Structures: There was a vertical offset measuring 5 inches high between the invert slab and the vertical wall associated with Drop Structure Number (No.) 5. It appeared the invert slab has settled. In addition, there was tilting of the railroad abutment retaining wall along the downstream side of the Southern Pacific Railroad (SPRR) bridge crossing that resulted in a separation measuring up to 3 inches wide at the top of the retaining wall.

- Coyote Creek SGR/CC2 Levee Segment:
 - Levee Embankment:
 - Non-Compliant Vegetation Growth: Significant vegetation growth including trees with trunks larger than 2 inches in diameter and shrubs were present within the vegetation-free zone. The vegetation-free zone extends 15 feet outward from both the landward and riverward toes of the levee.
 - Encroachments: There were multiple encroachments that negatively impact the integrity of the levee, which include an area of unpermitted excavation and unpermitted retaining walls made of timber, concrete blocks, concrete masonry units, or concrete rubble blocks.
 - Depressions/Rutting: There were depressions/rutting on the landward slope measuring up to 12 inches deep. There were depressions on the crown measuring 14 inches deep.
 - Animal Control: There were animal burrows located on the crown measured up to 3 feet deep and up to 6 inches in diameter.
 - Underseepage Relief Wells/Toe Drainage Systems: Intermittent subdrains along the toe of the riverward slope were obstructed by sediment. Per the USACE Operations and Maintenance (O&M) Manual (USACE SPL 1999), a test program is required every three years for the subdrain system; however, no maintenance records have been provided.
 - Interior Drainage Systems:
 - Vegetation and Obstructions: The outlets or inlets of five of the side-drainage structures were obstructed more than 10 percent by vegetation, sediment, and/or debris.
 - Encroachments: There were pipes that were shown on the as-built drawings, but were not found during the inspection. These pipes were likely removed during the construction of the bike path under-crossings. In addition, one pipe had been abandoned, but no permit is available indicating that the abandonment of the pipe was approved.
 - Tilting, Sliding, or Settlement of Concrete and Sheet Pile Structures: There were vertical offsets that measured up to 4.5 inches at the interface of the side-drainage structure headwall/wingwall and the adjacent concrete slope lining.
 - Culverts/Discharge Pipes: Video inspection records for the culverts/discharge pipes have not been provided.
 - Flap Gates: The flap gate at the outlet of the 12-foot by 5-foot reinforced-concrete box (RCB) side-drainage structure could not be exercised or inspected because of the homeless encampment inside the culvert. In addition, there were two locations where flap gates were not present on pipes that were greater than (or equal to) 36 inches in diameter and it was not known whether flap gates were required since the side-drainage structures are not shown on the as-built drawings and no permit information is available.
 - Pump Stations:
 - Pump Station Operating, Maintenance, Training, and Inspection Records: At one pump station, the operating, inspection, and training records were not available.

- Pump Station Operations and Maintenance Equipment Manuals: At one pump station, the operations and maintenance manuals were not available.
- Sumps/Wet Well: At one pump station, the sumps could not be inspected because the access manhole could not be removed at the time of the inspection. No procedures to clean the sump were in place and there appeared to be a large deposit observed beyond the bar screen on the sump.
- Megger Testing on Pump Motors and Critical Power Cables: At two pump stations, no megger testing had been performed to date.
- Intake and Discharge Pipelines: At one pump station, the sump discharge pipes lines could not be accessed for inspection because they were located within a confined space. There was visible deterioration on the discharge headers and pipelines were tape-wrapped in several places due to reported minor leaks.
- Flood Damage Reduction Channels:
 - Encroachments: There was a 36-inch-diameter RCP side-drainage structure that was shown on the as-built drawings, but was not found in the field. This pipe was likely removed when the bike path undercrossing was constructed and drainage was likely altered.
 - Tilting, Sliding, or Settlement of Concrete Structures: There were cases of observed settlement of the reinforced-concrete lining along the riverward slope measuring up to 3 inches deep, 19 feet wide, and 30 feet long. In addition, there were vertical offsets measuring up to 3.5 inches high along the riverward slope. These offsets were observed along the reinforced-concrete slope lining panels and where the top of the riverward slope and the crown meet.
 - Foundation of Concrete Structures: There were depressions in the asphalt concrete pavement at the top of the riverward slope measuring up to 15 inches deep, 8 inches wide, and 18 inches long. These depressions exposed the underside of the reinforced-concrete slope lining at the top of the riverward slope.
 - Slab/Monolith Joints: There were voids in the joints that measured up to 2 inches wide and 6 feet deep. These voids were observed between the levee crown and a side-drainage structure outlet at one location and between the crown and the retaining wall on the landward edge of the access ramp at another location.
 - Revetments other than Riprap: There were cracks and depressions along the asphalt concrete pavement on the riverward edge of the levee crown measuring up to 3 feet deep and 12 inches in diameter.

1.4 Overall Rating

The Levee Safety Officer Out-Brief Meeting was held on February 23, 2017. An engineering determination has concluded that the observed deficiencies would not prevent the system from performing as intended during the next significant runoff event. Therefore, the Levee Safety Officer (LSO), Los Angeles District, has determined the overall rating of the SGR/CC2 Levee System to be “Minimally Acceptable.”

A “Minimally Acceptable” system rating is defined as, “One or more items are rated Minimally Acceptable or one or more items are rated Unacceptable and an engineering determination concludes that the Unacceptable items would not

prevent the segment/system from performing as intended during the next significant runoff event.”

The Local Sponsor will be notified of the overall rating of the levee system by letter with instructions to correct the Minimally Acceptable rated items within two years so that they do not deteriorate further and become Unacceptable.

1.5 Overall System Rating Comparison

The Overall System Rating for this levee system associated with the PI No. 1 was “Unacceptable.” The Overall System Rating for this levee system associated with the PI No. 2 was “Minimally Acceptable.” The “Unacceptable” rating associated with the PI No. 1 was driven by the following:

- Erosion was repaired in some locations subsequent to PI No. 1, but was still present, had re-occurred, or had newly developed in some locations during PI No. 2. However, it was not considered to be critically Unacceptable during PI No. 2. Additionally, some repairs to the erosion were made subsequent to PI No. 2.
- Riprap displacement continues to be an issue. Some repairs occurred following PI No. 1 though some issues are still seen in the same locations. The extent of missing and displaced riprap was not considered to be critically Unacceptable in the PI No. 2.
- Flap gates were missing from unpermitted, large diameter side-drainage pipes during PI No. 1. The LACDPW provided documentation for some of the “missing” flap gates along the San Gabriel River SGR/CC2 Levee Segment to conclude that no flap gates were required during PI No. 2. However, there are still multiple locations where it is not known whether a flap gate is required on certain pipes observed during PI No. 2.
- Vegetation and obstructions within the interior drainage systems was still present during PI No. 2, but is not considered to be critically Unacceptable.

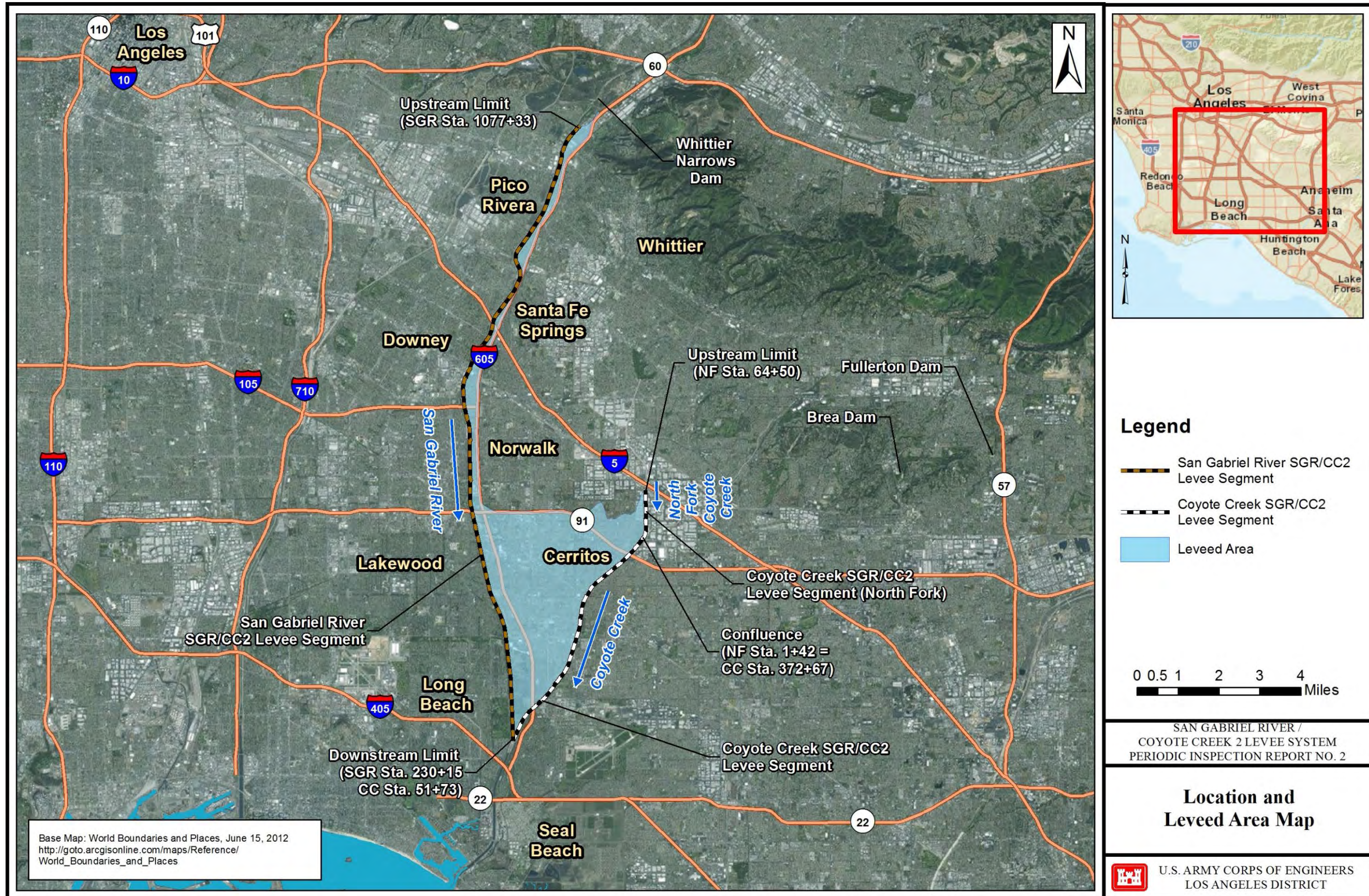


Figure 1