

# PUBLIC NOTICE

## APPLICATION FOR PERMIT

**Public Notice/Application No. SPL-2010-00573-WHM**

**Comment Period: December 14, 2010 – January 13, 2011**

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### **Applicant**

Kent Pace, General Manager  
Magma Flood Control District (MFCDD)  
3850 E. Baseline Road, Suite #114  
Mesa, Arizona 85206  
(480) 424-3438

### **Agent**

Theresa Price, Environmental Planner  
AMEC Earth & Environmental, Inc.  
1405 W. Auto Drive  
Tempe, Arizona 85284  
(480) 940-2320

### **Location**

The project site is located approximately six miles north of the Town of Florence in Pinal County, Arizona. The project area is west of State Route 79 (SR 79), and north of Arizona Farms Road (Figure 1). The Magma Flood Retarding Structure (FRS) is a 5.3-mile-long structure that lies within the following sections of the Gila and Salt River Baseline and Meridian: Township 3 South, Range 9 East, Sections 9, 16, 21, 22, 26, 27, 34, 35, and 36; and Township 4 South, Range 9 East, Sections 2 and 3 (Figure 2).

### **Activity**

The Magma Flood Control District proposes to rehabilitate the existing Magma FRS to provide continued flood protection and to reduce the risk of loss of life due to catastrophic failure of the FRS and flooding.

Approximately 3.41 acres of the ephemeral washes within the project site would be impacted from the rehabilitation efforts (2.4 acres of permanent impacts and 1.01 acres of temporary impacts) (Figures 3, 4a-4c). For more information, see page 3 of this notice and attached figures.

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Interested parties are hereby notified that an application has been received for a Department of the Army permit for the activity described herein and shown on the attached drawing(s). Interested parties are invited to provide their views on the proposed work, which will become a part of the record and will be considered in the decision. This permit application will be issued or denied under Section 404 of the Clean Water Act (33 U.S.C. 1344). Comments can be e-mailed to [William.H.Miller@usace.army.mil](mailto:William.H.Miller@usace.army.mil) or mailed to:

U.S. Army Corps of Engineers  
ATTENTION: Regulatory Branch (SPL-2010-00573-WHM)  
3636 North Central Avenue, Suite 900  
Phoenix, AZ 85012

## **Evaluation Factors**

The decision to issue a permit will be based on an evaluation of the probable impact, including cumulative impacts of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit, which may be reasonably expected to accrue from the proposal, must be balanced against its reasonably foreseeable detriments. All factors that may be relevant to the proposal will be considered, including the cumulative effects thereof. Factors that will be considered include conservation, economics, aesthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food production and, in general, the needs and welfare of the people. In addition, the evaluation of the activity will include application of the Environmental Protection Agency (EPA) Guidelines (40 CFR 230) as required by Section 404 (b)(1) of the Clean Water Act.

The Corps of Engineers (Corps) is soliciting comments from the public; Federal, state, and local agencies and officials; Indian tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition, or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or and Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

## **Preliminary Review of Selected Factors**

**EIS Determination** – A preliminary determination has been made that an EIS is not required for the proposed work.

**Water Quality** – The Applicant is required to obtain water quality certification, under Section 401 of the Clean Water Act, from the U.S. Environmental Protection Agency. Section 401 of the Clean Water Act requires that any applicant for an individual Section 404 permit provide proof of water quality certification to the Corps of Engineers.

**Cultural Resources** – Cultural resources sites are not known to occur within the project site based on previous cultural resources surveying. However, six previously recorded cultural resource sites were identified as occurring within one mile of the project site. Only one of these previously recorded sites is located adjacent to the proposed project site and is identified as the Magma Arizona Railroad which has been determined eligible for listing on the National Register of Historic Places (NRHP) under Criterion A for its association with events that have made a significant contribution to the broad patterns of American history. Section 106 consultation with the State Historic Preservation Office has been conducted and concurrence for a No Adverse Effect determination was received on April 7, 2010. Construction and work activities conducted on the project site will stop if any artifacts or human remains are discovered during proposed construction activities and the proper authorities will be notified immediately.

**Endangered Species** – Preliminary determinations indicate that the proposed activity would not affect federally-listed endangered or threatened species, or their critical habitat. Therefore, formal consultation under Section 7 of the Endangered Species Act is not anticipated.

**Public Hearing** – Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this application. Requests for public hearing shall state with particularity the reasons for holding a public hearing.

## **Proposed Activity for Which a Permit is Required**

Basic Project Purpose – The basic project purpose comprises the fundamental, essential, or irreducible purpose of the proposed project, and is used by the Corps to determine whether the applicant’s project is water dependent. The basic project purpose for the proposed project is flood protection and therefore, is water dependent.

Overall Project Purpose – The overall project purpose serves as the basis for the Corps’ 404(b)(1) alternative analysis and is determined by further defining the basic project purpose in a manner that more specifically describes the applicant’s goals for the project, and which allows a reasonable range of alternatives to be analyzed. The overall project purpose for the proposed project is to rehabilitate the Magma FRS to provide continued flood protection and to reduce the risk of loss of life due to catastrophic failure of the FRS and flooding. Action is needed to address public health and safety issues surrounding a flood control structure that does not meet existing safety and performance standards for a high-hazard structure. Rehabilitation of the FRS would provide compliance with State and Federal dam safety standards and extend the design life an additional 100 years.

### Proposed Project Description –

The proposed project addresses the identified safety deficiencies and current criteria associated with the Magma FRS and would implement improvements to meet current NRCS and State of Arizona dam safety standards. The proposed project would extend the planned life of the FRS for the next 100 years and provide a 100-year level of flood protection.

The scope of work occurring within waters of the US would include:

- The crest of the FRS would be raised to elevation 1632.5 starting at FRS Station 20+75 and continuing through FRS Station 307+50 (Figure 4a-4b).
- The existing northern training dike located at approximate FRS Station 307+50 would be removed and reconstructed at approximately FRS Station 313+02. The northern training dike will be constructed to elevation 1632.5 and would include an upstream drainage swale running parallel to the new embankment (Figure 4a).
- An approximate 550 foot extension of the existing FRS would be constructed to elevation 1632.5 starting from FS Station 307+50 and intersect the reconstructed northern training dike at FRS Station 313+02 (Figure 4a).
- The existing 2,400 foot long southern training dike located along the eastern edge of the auxiliary spillway would be removed and reconstructed to elevation 1632.5. The reconstructed dike would also be extended approximately 550 feet (Figure 4b).
- A crack control system consisting of a granular central filter with downstream geotextile would be installed between FRS Stations 29+75 to 49+80, 107+20 to 313+02, and within the reconstructed northern and southern training dikes (see design plans).
- Riprap would be placed along the currently unprotected auxiliary spillway as erosion control (Figure 4c).
- The existing principal spillway pipe would be extended downstream approximately 50 feet. This extension would be coupled with the removal and reconstruction of the outlet impact basin (see design plans).
- The existing trash rack would be modified with additional 3-inch diameter tubular steel to reduce size of the openings within the cage (see design plans).
- The existing outlet channel would be improved by widening a portion of the channel, removing an existing drop structure within the channel, and installing small grouted riprap inlet structures along the east edge of the channel (Figure 4c).
- Nine 100 foot wide temporary access roads would be constructed across the low-flow channel along the upstream side of the FRS (Figure 4a-4b).

### Magma FRS Structure

Approximately 0.21 acres of delineated waters of the US would be impacted by the proposed improvements to the Magma FRS (0.05 acres direct impacts; 0.16 acres temporary impacts). To accommodate the crest raise of the structure, the northern limits of the FRS would be extended north approximately 550 feet to intersect with the relocated north training dike at the north end of the FRS at FRS Station 313+012 (Figure 4a). The extension of the FRS would cut off the natural flow path of an ephemeral wash within the project site. The northern training dike would be relocated and constructed from FRS Station 313+02 to reroute incoming drainage flows from this ephemeral wash to connect to the primary low-flow channel on the upstream side (east side) of the Magma FRS. Additionally, the existing FRS embankment has documented transverse cracks that could provide a conduit for seepage erosion leading to a breach during impoundment events. Therefore, a central filter with downstream geotextile would be installed between FRS Stations 29+75 to 49+80, 107+20 to 313+02, and within the reconstructed northern and southern training dikes.

### Upper Magma Channel Spillway

Approximately 2.19 acres of delineated waters of the US would be impacted by the proposed improvements within the Upper Magma Channel spillway. The Upper Magma Channel forms the principal spillway outlet from the Magma FRS and carries drainage flows that continue southwest to the Gila River (Figure 4c). The existing Upper Magma Channel is too narrow to convey all flows from the FRS 100-year storm design, including the added surface flows from the adjacent property upstream of the channel. Therefore, the channel would be improved by widening portions of the channel and constructing inlet structures along the east edge of the channel to collect surface flows. The downstream end of the principal spillway outlet would be extended beyond the downstream embankment raise and a new impact basin would be constructed. The existing trash rack structure would be modified to reduce the size of material that would be allowed to enter the principal spillway conduit. Additionally, the increase in the flow rate and the velocity in the channel would require the removal of the existing drop structure at Station 50+25 and the placement of riprap to provide protection against erosion. Erosion protection would consist of rip rap ranging from 6-inch to 18-inch thickness of rock with a D75 ranging from 4 inches to 12 inches in diameter to provide erosion protection for the auxiliary spillway. (D75 indicates that 75 percent of the total mass of the riprap used must consist of rocks that are smaller than the specified diameter; the remainder of the riprap [25 percent of the total mass] would consist of rocks that are larger than the specified diameter.)

### Temporary Access Roads

Approximately 1.01 acres of delineated waters of the US would be temporarily impacted for the creation of nine temporary access road crossings, each approximately 100 feet wide. The temporary road crossings would be created using fill from upland areas of the site. Where temporary road crossings are proposed in areas with a physically well-defined drainage bed and bank, culverts would be placed along the bed of the drainage prior to placement of fill material, maintaining connectivity between upstream and downstream portions of the drainage (Figure 4a-4c). In areas where waters of the US have been delineated but lack a well-defined bed and bank, temporary road crossings would consist of at-grade or dip crossings of the drainage area; no fill is anticipated. Vegetation would be cleared from the temporary road crossings as well.

### **Additional Project Information**

The Magma FRS is a homogeneous embankment dam constructed across several unnamed washes that originate in the Tortilla Mountains, all tributaries to the Gila River. The 5.3-mile-long embankment of the Magma FRS was constructed in 1964 by the Soil Conservation Service (SCS), now the NRCS, to provide a 100-year level of flood protection to downstream agricultural lands and utilities under authority of the Watershed Protection and Flood Prevention Act (Public Law 566), as amended. The Magma FRS is classified by ADWR and NRCS as a high-hazard structure that does not meet current safety and performance standards. The FRS has a safety deficiency (embankment cracking) and does not meet current criteria associated with the capacity, integrity, and stability of the auxiliary spillway. Rapid

development has occurred in the downstream benefited area of the Magma FRS and additional development is planned. There is a flooding risk to downstream structures and inhabitants if no action is taken to rehabilitation the FRS. Population growth and development within the watershed has increased the need to develop a plan to correct the safety deficiencies, meet current dam safety criteria and to reduce the risks associated with the Magma FRS.

The vegetation community of the project vicinity is characterized as Lower Colorado River Valley subdivision of the Sonoran desert scrub biotic community. Vegetation cover is sparse in the undeveloped upland regions of the project site with a relatively dense vegetation cover along the east side of the FRS around the low-flow channel and connecting drainages. This relatively dense vegetation consists primarily of mesquite (*Prosopis* sp.) shrubs and trees. The project area collects drainage flows from ephemeral washes and does not contain any wetland areas.

Approximately 245 acres, or 25 percent, of the project study area is previously-disturbed. There are approximately 91.37 acres of ephemeral washes within the project site identified as jurisdictional Waters of the US under Section 404 of the Clean Water Act (Figure 3); of which a majority of the jurisdictional washes were located within previously-disturbed areas along the existing FRS. The identified waters of the US within this project site consist of unnamed ephemeral washes with flows connecting to the Gila River by the Upper Magma Channel; the Gila River is a tributary to the Colorado River. Upon completion of the project, temporary fill materials (including culverts) used for the temporary access road crossings would be removed from waters of the US. Fill from upland areas would be removed by excavating the fill material using backhoe machinery. Following completion of construction activities, all temporary road crossing would be re-seeded using a locally appropriate native seed mix. The proposed project would result in a permanent loss of 2.4 acres of Waters of the US. The applicant proposes to contribute to in-lieu fee mitigation fund at the ratio of 1:1 (provided:impacted).

**Proposed Special Conditions**

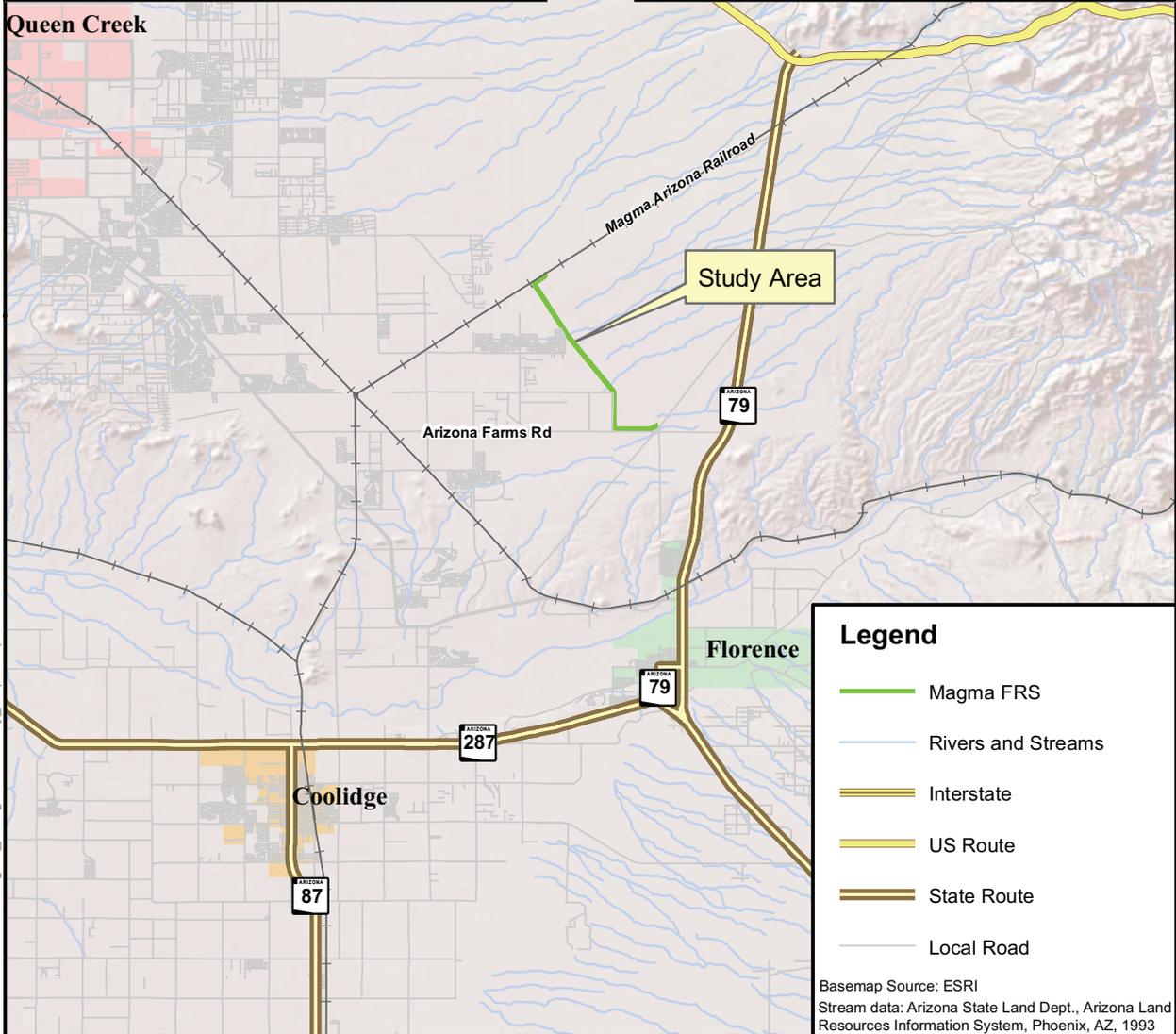
None at this time.

For additional information, please contact William Miller at (602) 640-5385 ext. 221. This public notice is issued by the Chief, Regulatory Division.

MILLER  
CESPL-RG-A

MCGUIRE  
CESPL-RG-A

## FIGURES



Map Document: (X:\Projects\1720104006\MXD\Magma\_IP\Figure 1 Vicinity\_Map.mxd) 6/29/2010 -- 8:43:19 AM



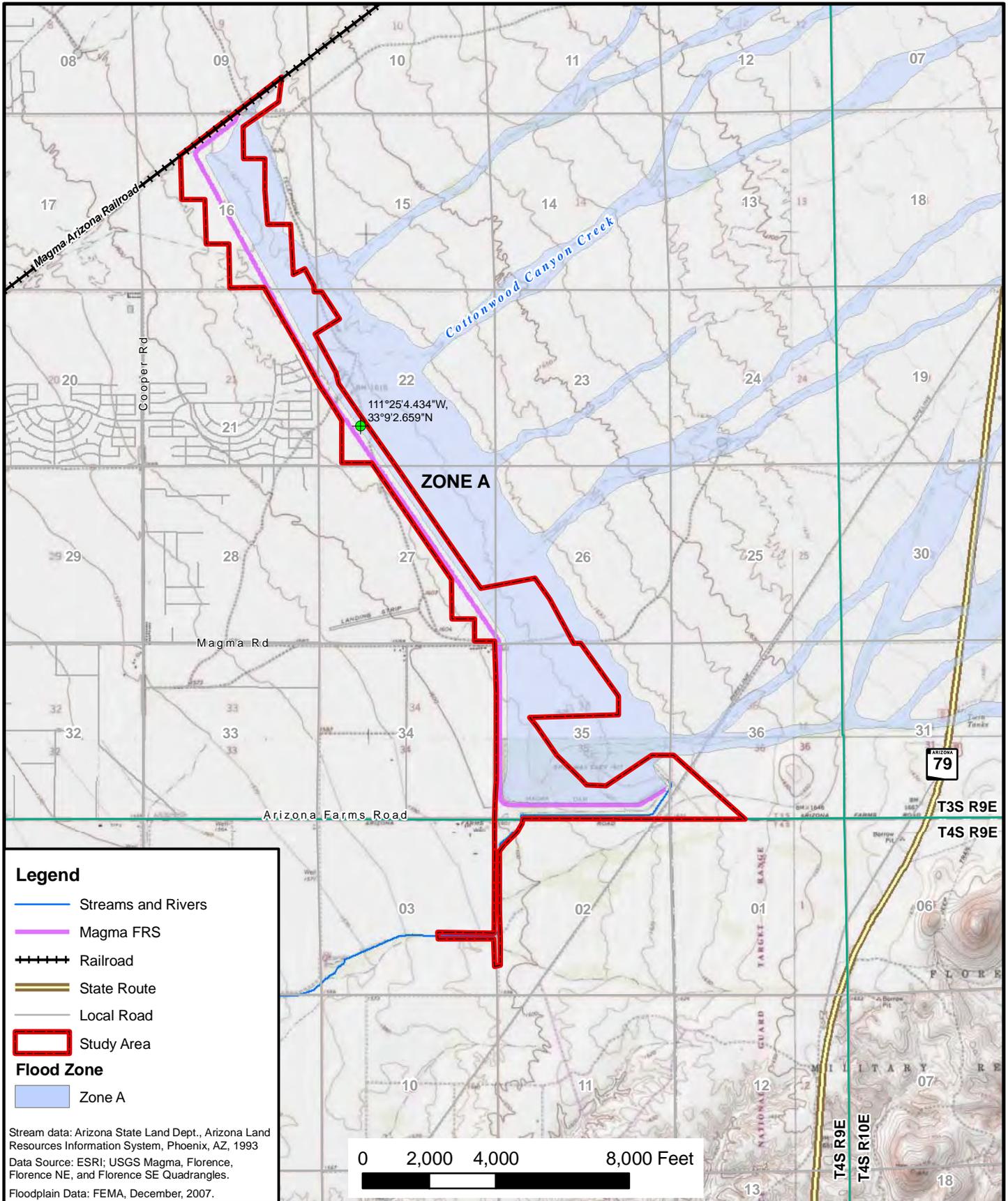
**Public Notice**  
**Magma Flood Retarding Structure**  
**Pinal County, Arizona**

Vicinity Map



FIGURE  
1

Map Document: (X:\Projects\1720104006\MXD\Magma\_topo\_8x11.mxd) 5/11/2010 -- 1:42:50 PM



JOB NO.: 1720104006  
 DATE: 05/11/2010  
 SCALE: 1" = 4000'

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**Pinal County, Arizona**

USGS Topographic & FEMA Floodplain Map

FIGURE  
**2**





Map Document: (X:\Projects\1720104006\MXD\Magma\_IP\Site\_Map.mxd) 7/13/2010 -- 2:00:01 PM

**Legend**

- +++++ Railroad
- Magma FRS
- Waters of the US
- Township-range

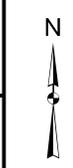
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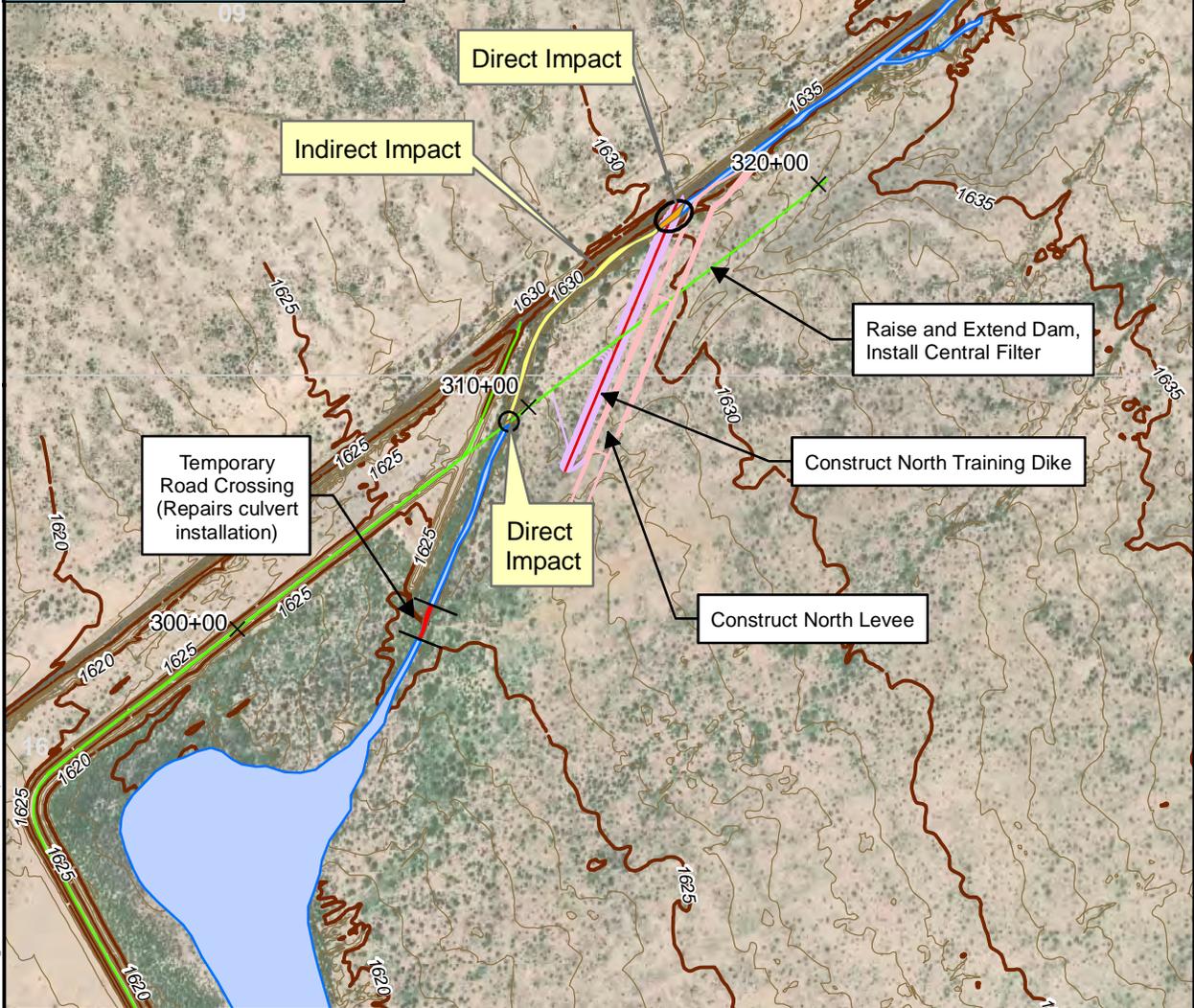
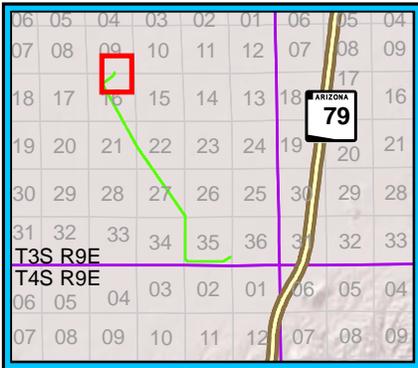


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**Pinal County, Arizona**

Waters Map

Figure  
**3**





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**Legend**

- |                                    |                             |
|------------------------------------|-----------------------------|
| <b>Impacts to Waters of the US</b> | — Proposed North Levee      |
| Direct Impact                      | — North Training Dike       |
| Indirect Impact                    | — Dike Centerline           |
| Temporary Impact                   | <b>Elevation Contours</b>   |
| No Impact                          | — Index Contour (5')        |
| Magma FRS                          | — Intermediate Contour (1') |



**Public Notice  
 Magma Flood Retarding Structure  
 Pinal County, Arizona**

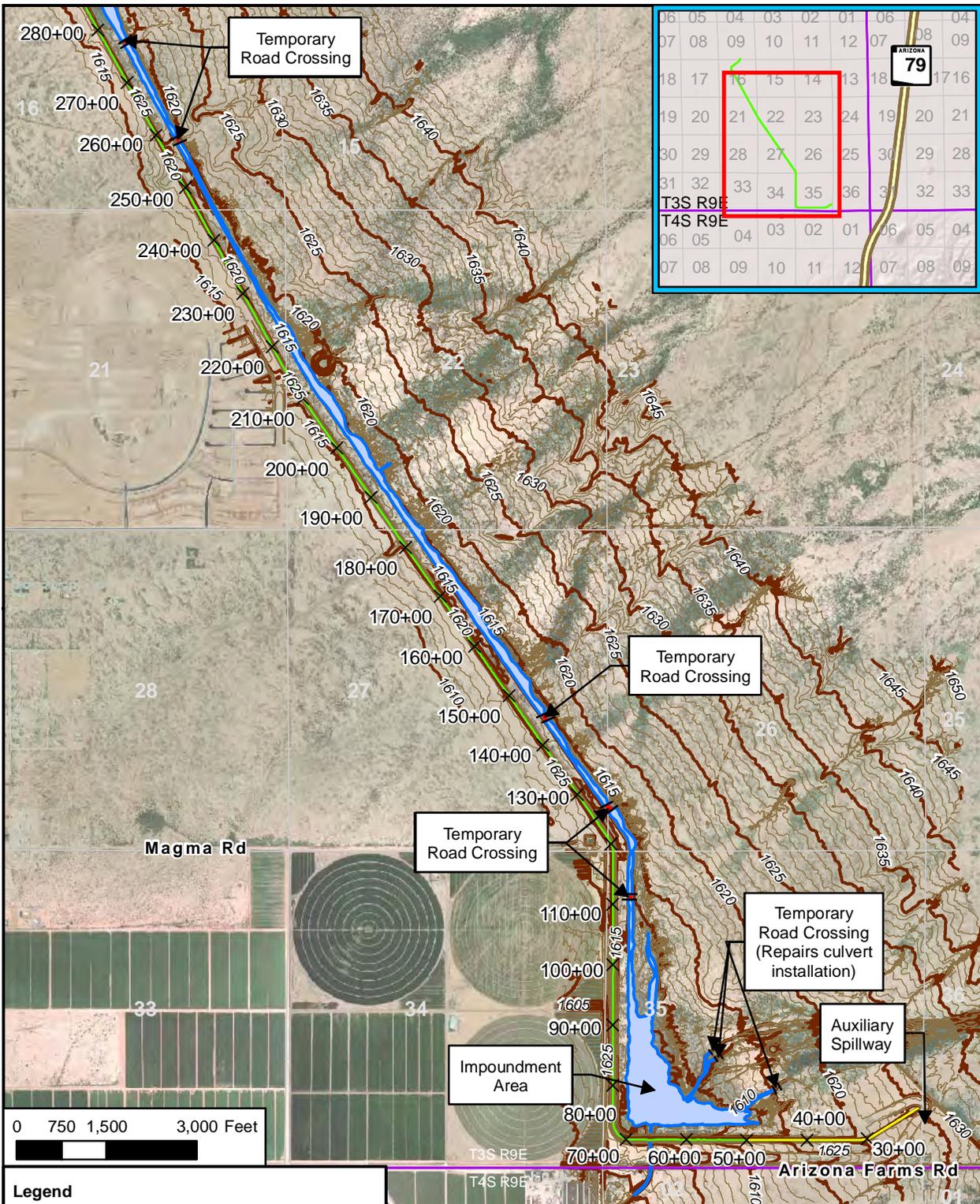
Impacts to Waters of the US

Figure  
**4a**



Aerial Imagery: Air Photo USA, April, 2007  
 NOTE: This area is located within T3S R9E

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**Legend**

	Temporary Impact		Magma FRS
	No Impact		Elevation Contours
	Township-range		Index Contour (5')
			Intermediate Contour (1')

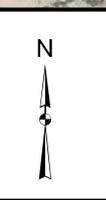
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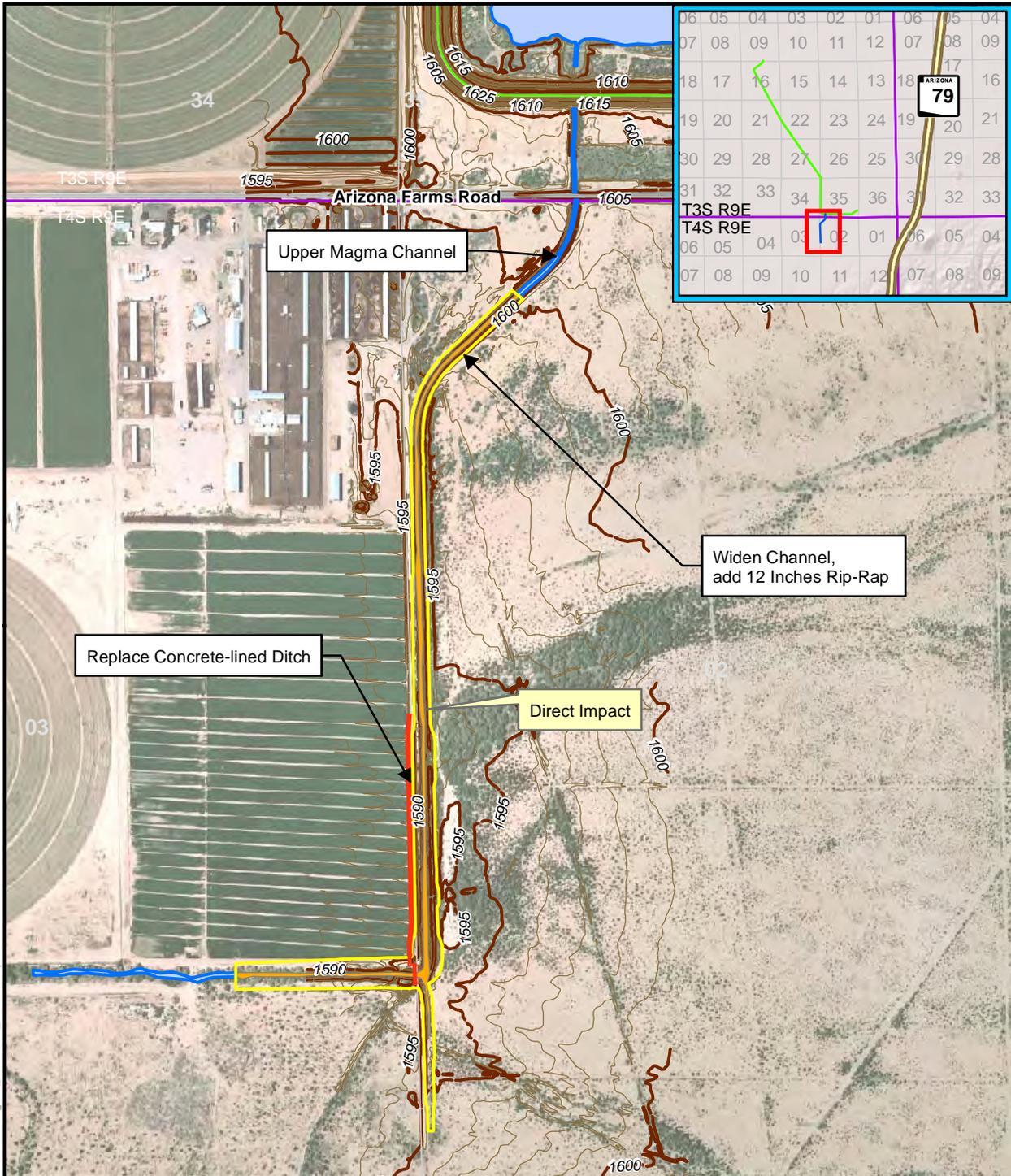
**Public Notice**  
**Magma Flood Retarding Structure**  
**Pinal County, Arizona**

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Impacts to Waters of the US

Figure  
**4b**





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**Legend**

- |  |  |
|--|--|
|  Direct Impact          |  Magma FRS                        |
|  No Impact              |  Replacement Concrete-lined Ditch |
|  Proposed Channel Width | <b>Elevation Contours</b>  |
|  Township-range         |  Index Contour (5')               |
|  |  Intermediate Contour (1')        |

Aerial Imagery: Air Photo USA, April, 2007

0 350 700 1,400 Feet

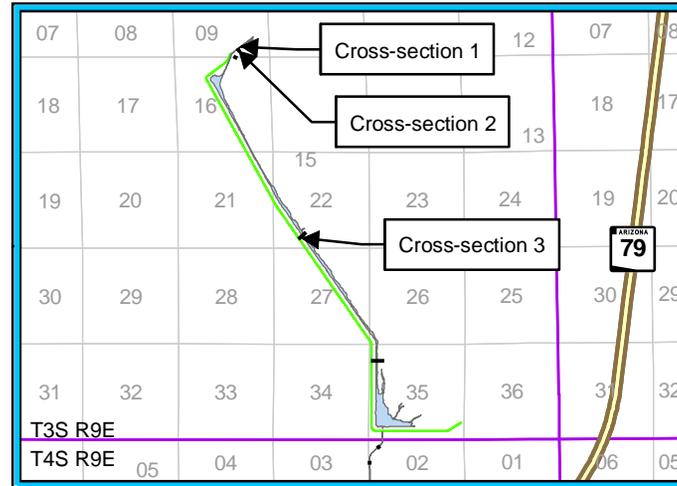
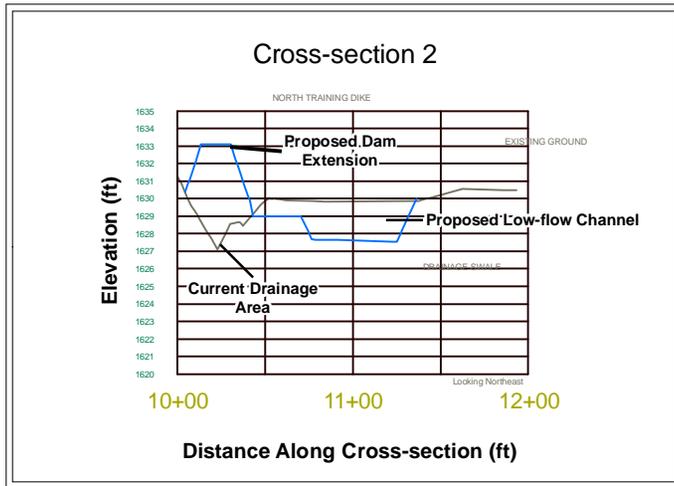
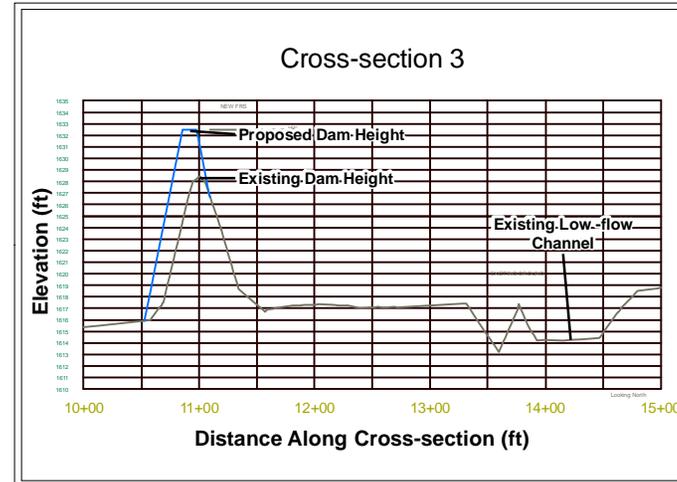
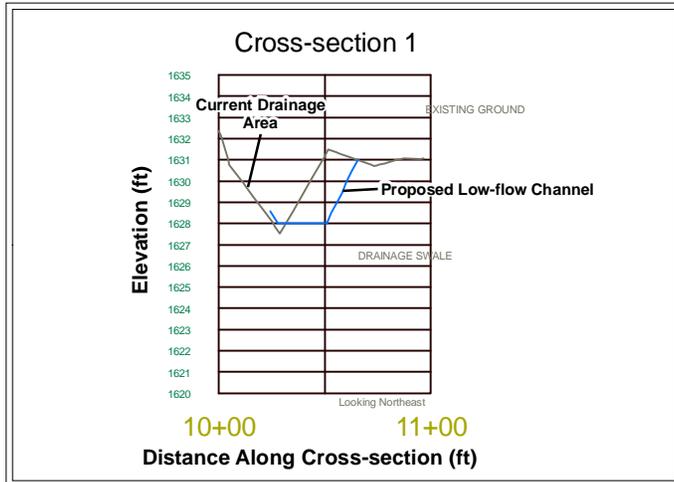


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**Magma Flood Retarding Structure**  
**Pinal County, Arizona**

Impacts to Waters of the US

Figure  
**4c**





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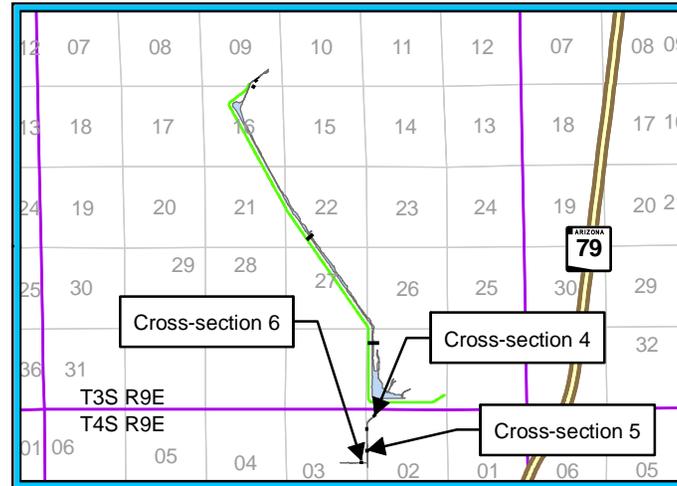
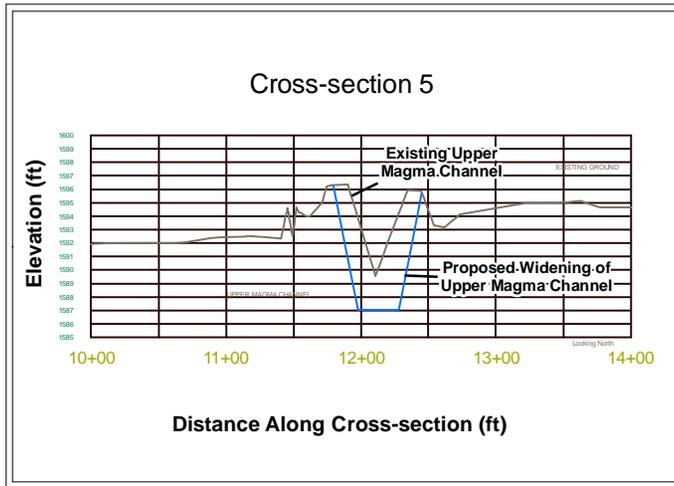
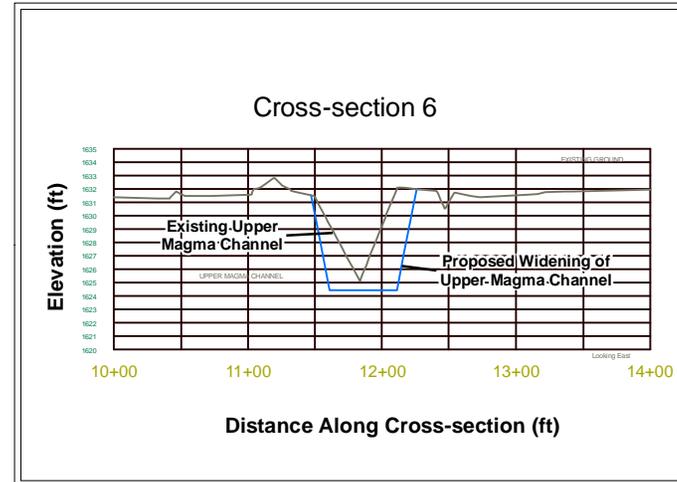
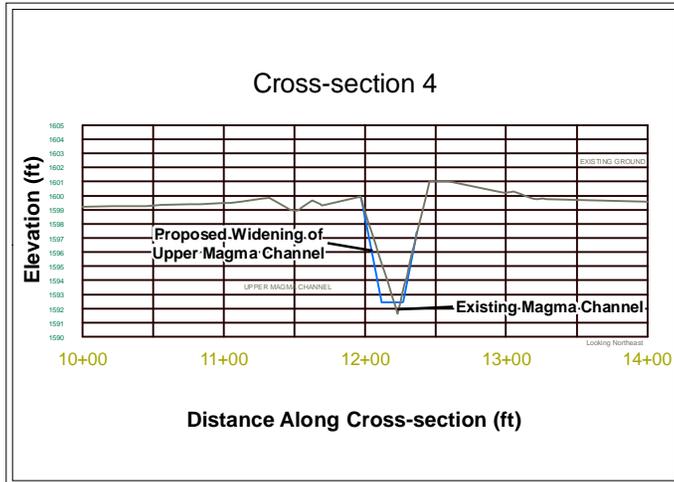
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 DATE: 7/12/2010

Public Notice  
 Magma Flood Retarding Structure  
 Pinal County, Arizona

Cross Section Map

FIGURE  
 5a





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**Public Notice**  
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**Pinal County, Arizona**

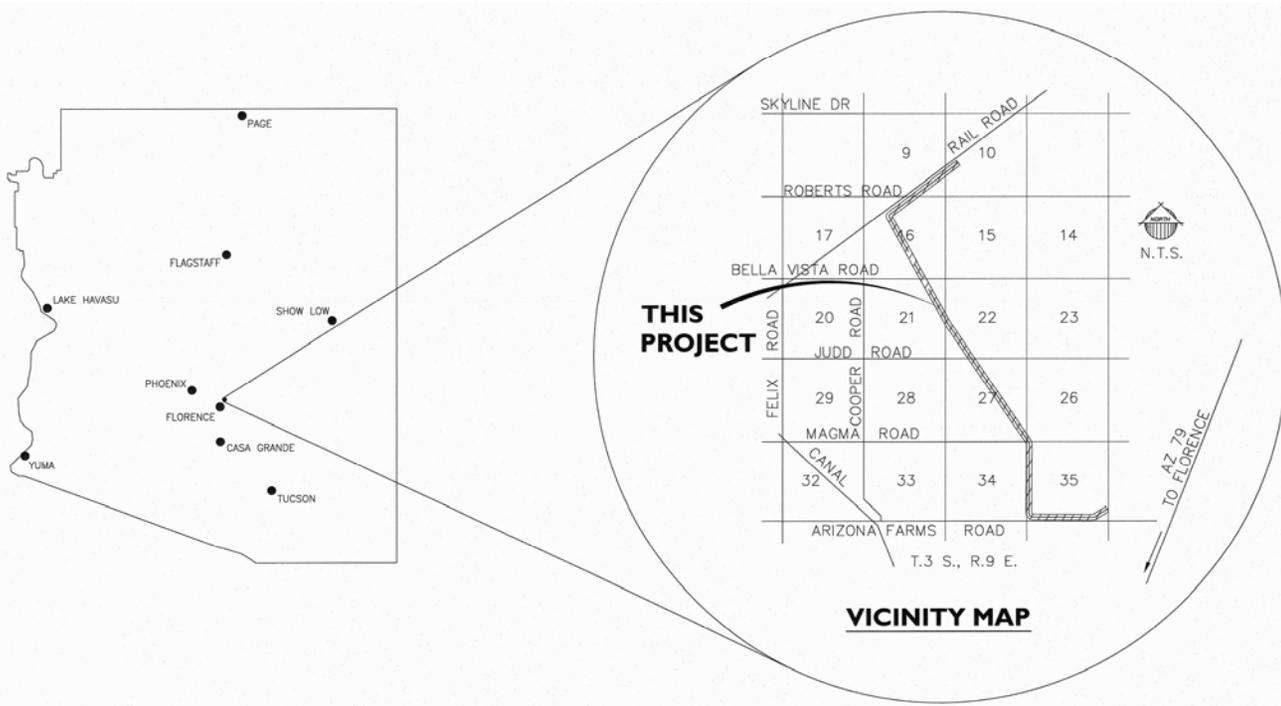
Cross Section Map

FIGURE  
**5b**



# MAGMA FLOOD CONTROL DISTRICT

## MAGMA FLOOD RETARDING STRUCTURE REHABILITATION PROJECT PINAL COUNTY, ARIZONA



### SHEET INDEX

#### SHEET NUMBER AND DESCRIPTION

1. TITLE SHEET, VICINITY MAP, LOCATION MAP AND SHEET INDEX
2. SITE MAP
3. TYPICAL CROSS-SECTION FRS EMBANKMENT WITHOUT EXISTING CENTRAL FILTER
4. TYPICAL CROSS-SECTION FRS EMBANKMENT WITH EXISTING CENTRAL FILTER
5. NEW CONSTRUCTION TYPICAL CROSS-SECTIONS
6. UPPER MAGMA CHANNEL MODIFICATION
7. AUXILIARY SPILLWAY-PLAN VIEW AND TYPICAL CROSS-SECTION
8. PRINCIPAL SPILLWAY EXTENSION
9. PRINCIPAL SPILLWAY INLET STRUCTURE DETAIL
10. PRINCIPAL SPILLWAY OUTLET STRUCTURE DETAIL



Appendix D

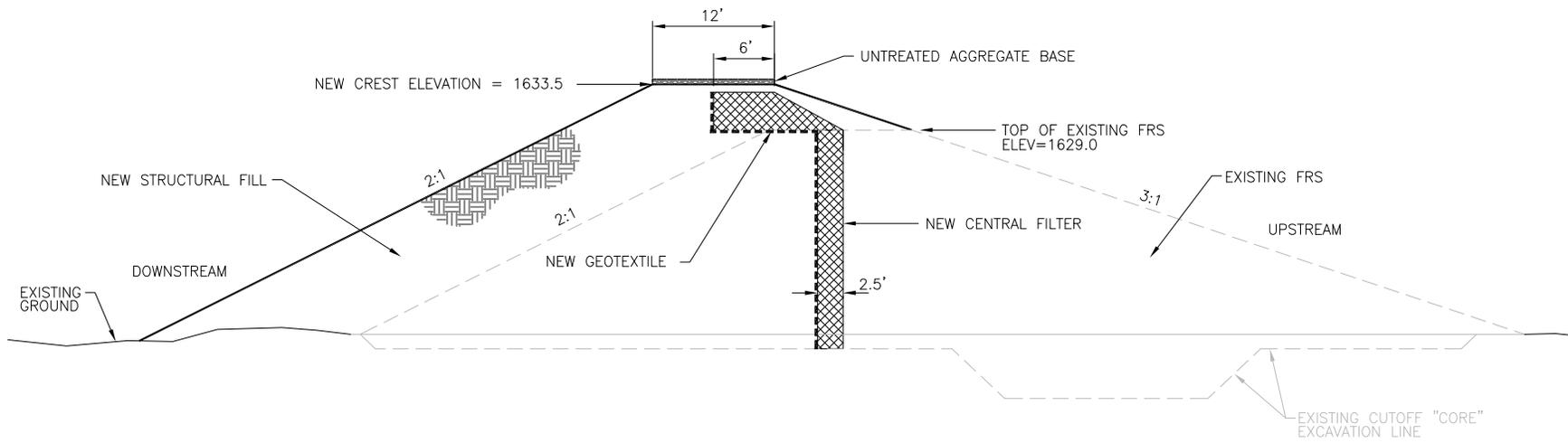
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Designed	GWH
Drawn	DNF
Checked	
Approved	



TITLE SHEET, VICINITY MAP, LOCATION MAP & SHEET INDEX  
 MAGMA FLOOD RETARDING STRUCTURE REHABILITATION PROJECT  
**PRELIMINARY NOT FOR CONSTRUCTION**  
 ARIZONA  
 PINAL COUNTY



File Name	
Drawing No.	
Sheet	1 of 10



FRS EMBANKMENT WITHOUT EXISTING CENTRAL FILTER  
 TYPICAL CROSS-SECTION STA. 20+26 TO 49+80 AND 107+20 TO 307+50

NTS



United States Department of Agriculture  
 Natural Resources Conservation Service

Appendix D

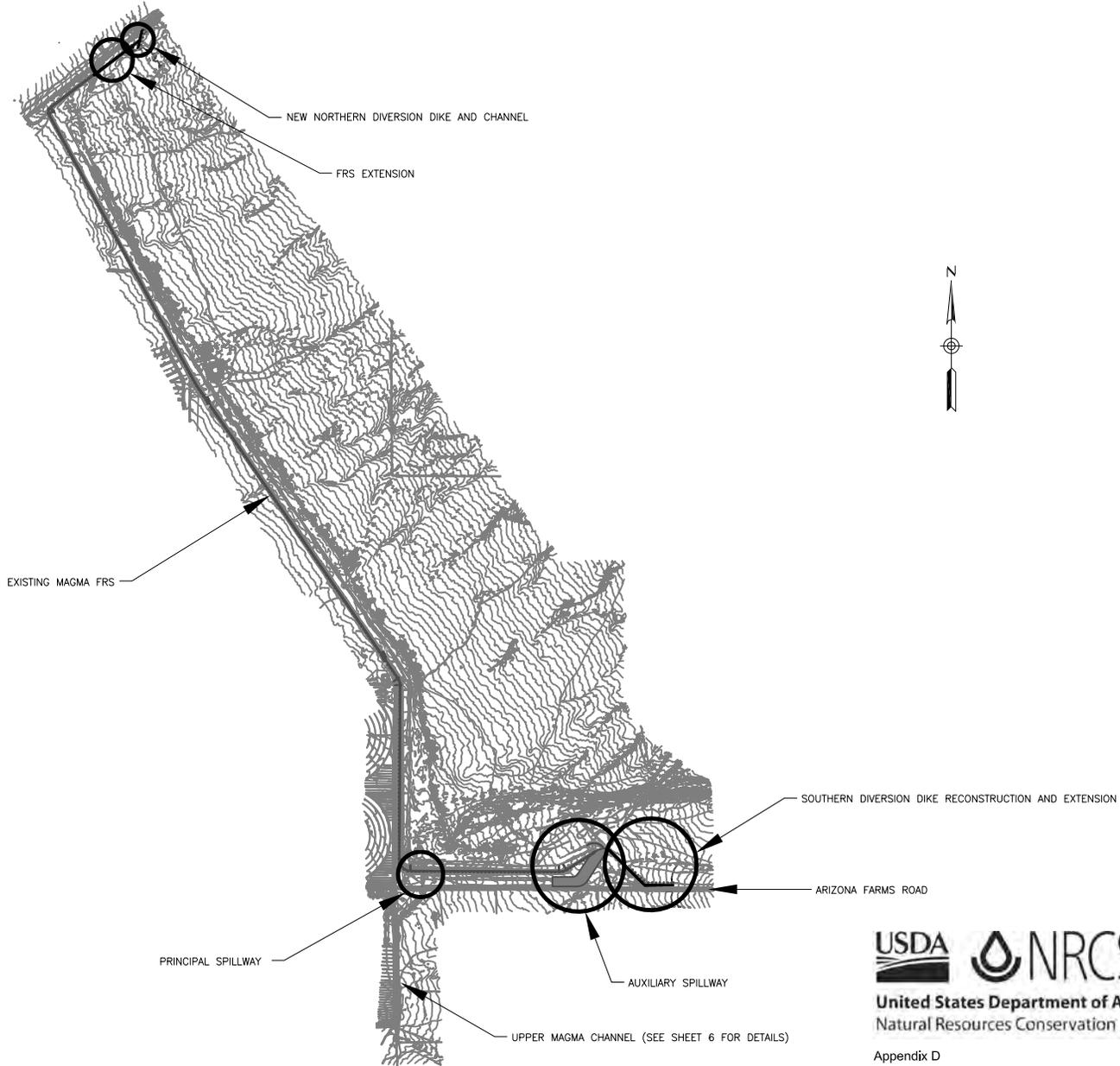
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Approved	



TYPICAL CROSS-SECTION  
 FRS EMBANKMENT WITHOUT EXISTING CENTRAL FILTER  
 MAGMA FLOOD RETARDING STRUCTURE  
 REHABILITATION PROJECT  
 PRELIMINARY NOT FOR CONSTRUCTION  
 PINAL COUNTY ARIZONA



File Name
Drawing No.
Sheet 3 of 10



Appendix D

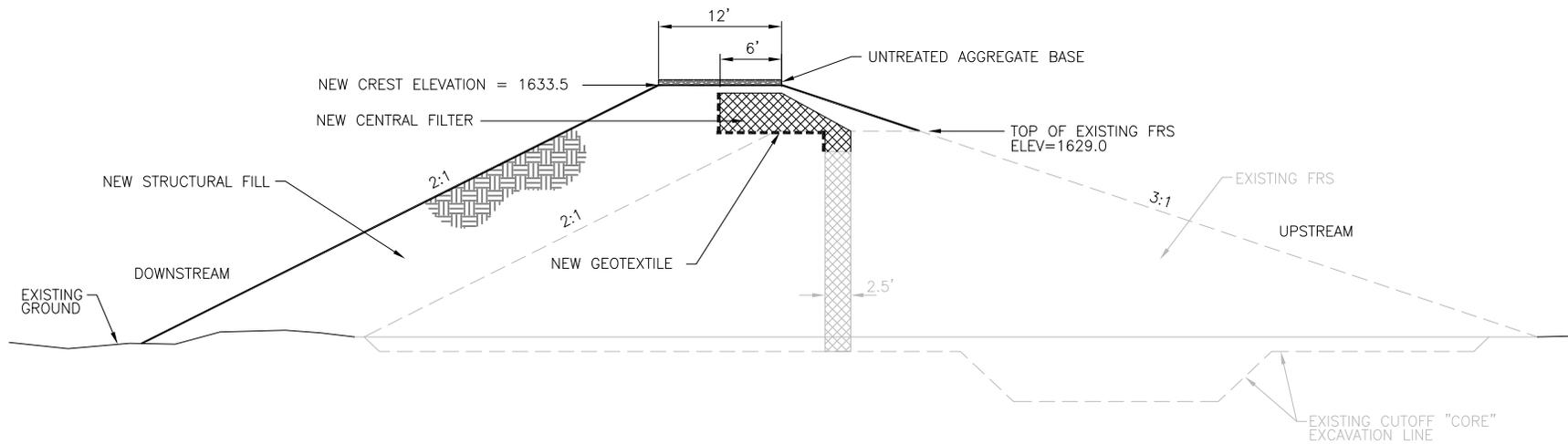
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Checked	DNF		01/2010
Approved			



ARIZONA  
 PINAL COUNTY  
**SITE MAP**  
 MAGMA FLOOD RETARDING STRUCTURE  
 REHABILITATION PROJECT  
*PRELIMINARY NOT FOR CONSTRUCTION*



File Name	
Drawing No.	
Sheet	2 of 10



FRS EMBANKMENT WITH EXISTING CENTRAL FILTER  
TYPICAL CROSS-SECTION STA. 49+80 TO 107+20

NTS



Appendix D

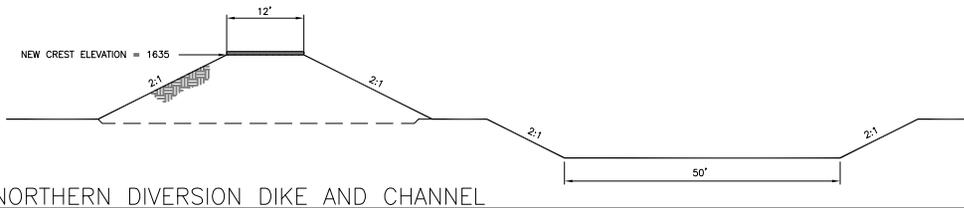
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Checked	DNF
Approved	



ARIZONA  
TYPICAL CROSS-SECTION  
FRS EMBANKMENT WITH EXISTING CENTRAL FILTER  
MAGNA FLOOD RETARDING STRUCTURE  
REHABILITATION PROJECT  
PRELIMINARY NOT FOR CONSTRUCTION  
PINAL COUNTY

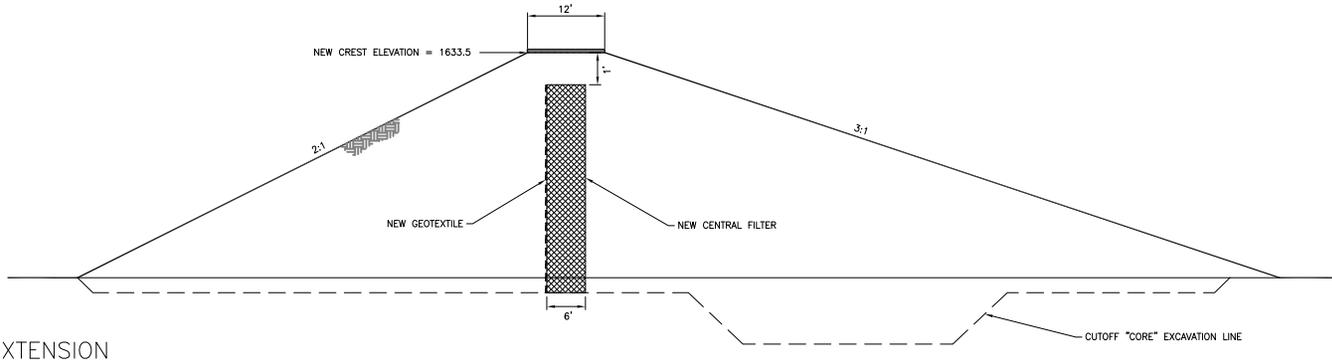


File Name	
Drawing No.	
Sheet	4 of 10



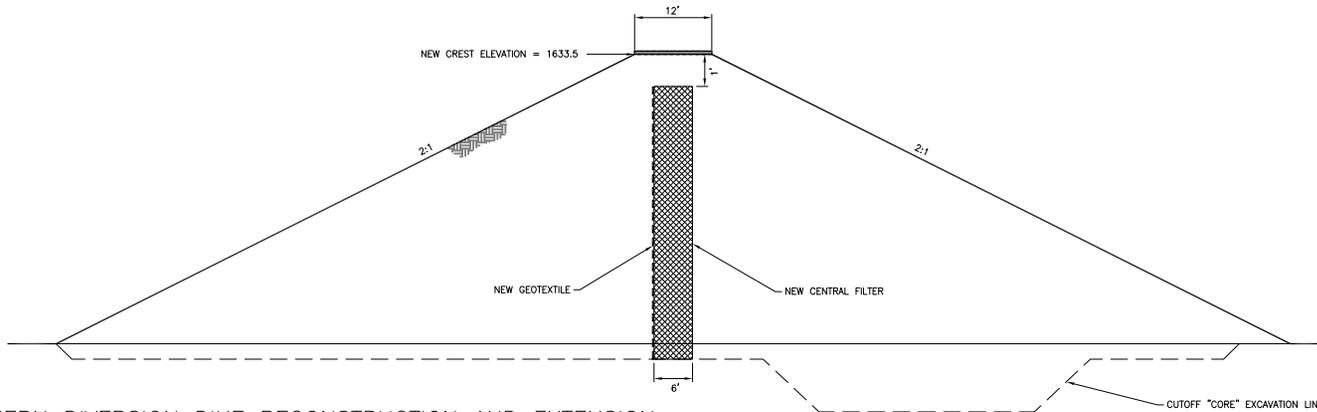
NEW NORTHERN DIVERSION DIKE AND CHANNEL

NTS



FRS EXTENSION

NTS



SOUTHERN DIVERSION DIKE RECONSTRUCTION AND EXTENSION

NTS



Appendix D

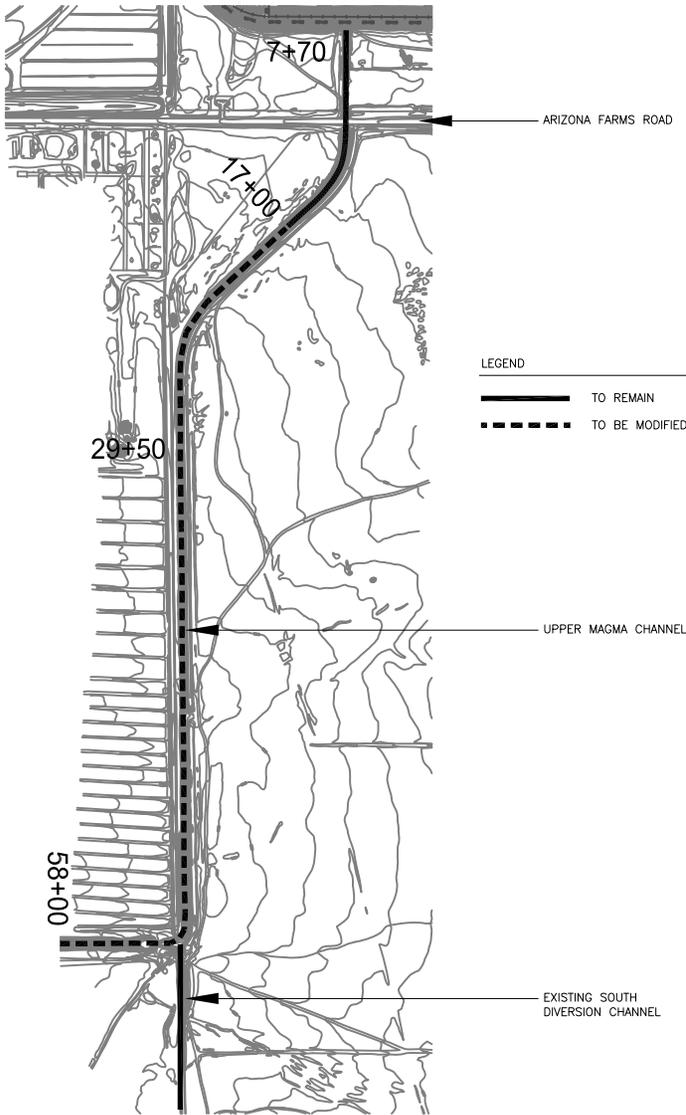
Date	03/2010
Designed	SVH
Drawn	GWH
Checked	DNF
Approved	



NEW CONSTRUCTION TYPICAL CROSS-SECTIONS  
 MAGMA FLOOD RETARDING STRUCTURE  
 REHABILITATION PROJECT  
 ARIZONA  
 PRELIMINARY NOT FOR CONSTRUCTION  
 PINAL COUNTY

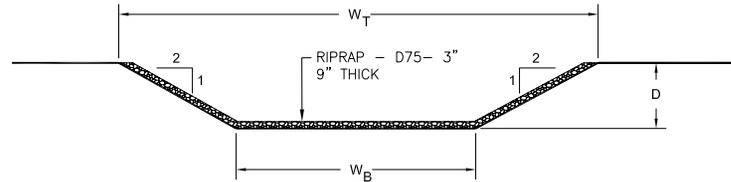


File Name	
Drawing No.	
Sheet	5 of 10



PLAN VIEW

NTS



STATION	D	W <sub>T</sub>	W <sub>B</sub>
7+70	5	30	14
11+20	5	30	14
12+20	8	32	12
17+00	7	35	15
29+50	4.5	35	15
35+00	5	50	30
42+00	6	75	55
49+50	7	108	88
58+00	5	90	70

UPPER MAGMA CHANNEL

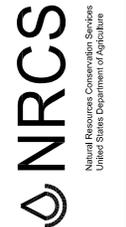


Appendix D

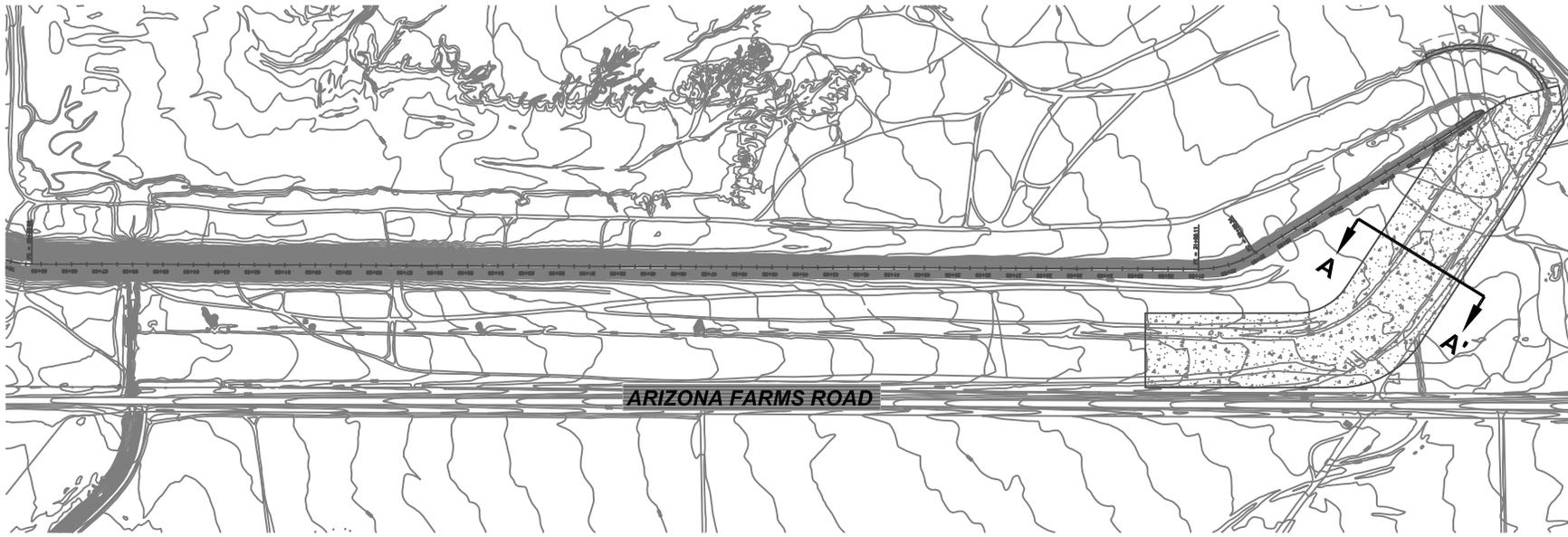
Date	03/2010
Designed	SVH
Drawn	GMH
Checked	DNF
Approved	



UPPER MAGMA CHANNEL MODIFICATION  
MAGMA FLOOD RETARDING STRUCTURE  
REHABILITATION PROJECT  
**PRELIMINARY NOT FOR CONSTRUCTION**  
PINAL COUNTY ARIZONA

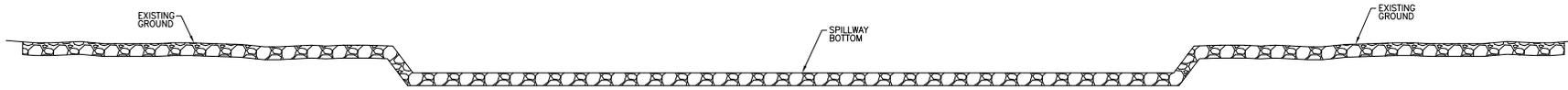


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PLAN VIEW

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TYPICAL CROSS-SECTION (A-A') AUXILIARY SPILLWAY RIPRAP

NTS



Appendix D

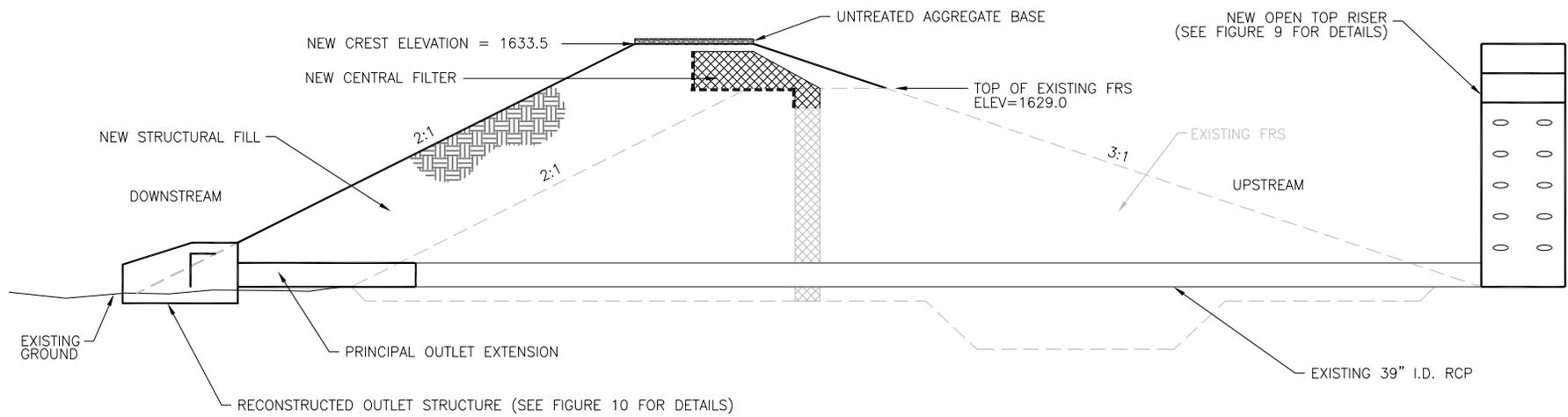
Date	01/20/10
Designed	
Drawn	GWH
Checked	DNF
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**ameco**  
 Earth & Environmental, Inc.  
 1405 West Auto Drive  
 Tempe, Arizona 85284

ARIZONA  
 AUXILIARY SPILLWAY  
 PLAN VIEW AND TYPICAL CROSS-SECTION  
 MAGMA FLOOD RETARDING STRUCTURE  
 REHABILITATION PROJECT  
**PRELIMINARY NOT FOR CONSTRUCTION**  
 PINAL COUNTY

**NRCS**  
 Natural Resources Conservation Service  
 United States Department of Agriculture

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# PRINCIPAL SPILLWAY OUTLET EXTENSION

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Appendix D

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Drawn	GWH		
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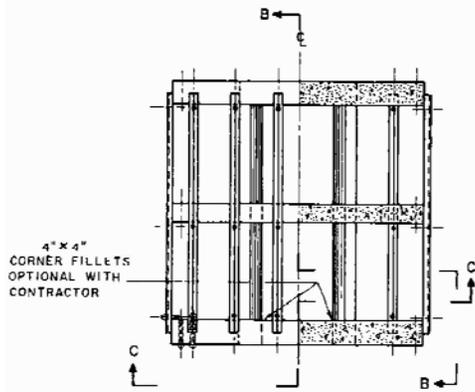
PRINCIPAL SPILLWAY EXTENSION  
 MAGMA FLOOD RETARDING STRUCTURE  
 REHABILITATION PROJECT

**PRELIMINARY NOT FOR CONSTRUCTION**

ARIZONA  
 PINAL COUNTY



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SECTION A-A  
FOOTING AND SPIGOT WALL FITTING NOT SHOWN

**SCOPE**

- The rectangular open top riser is a standard for one and two-stage risers.
- Height Ranges of Riser:  
 High stage,  $H_2 =$  up to 20 ft.  
 Low stage,  $H_1 =$  up to 30 ft.  
 Sum,  $H = H_2 + H_1 \leq 40$  ft.

**CRITERIA**

- Pipe Diameters and Associated Discharges:  

D	$Q_{max} = \frac{30}{4} \pi D^2$	Note:
24	94	Maximum allowable
30	148	nominal velocity in
36	212	pipe = 30 fps
42	288	
48	376	
- Trashracks:  
 Required net area for National Standard Detailed Drawings—to be computed from  $Q_{max}$  as listed in Criteria (1) and an allowable average velocity of 2.0 fps.  
 All bolts, nuts, pipe sleeves, and grating to be galvanized or otherwise protected by corrosion resistant coating except when made of aluminum.  
 Grating may be used in front of weir crest (but not for more than 9" above crest). If grating used, check required net area of trashrack, a revision of the anti-vortex wall dimensions may be necessary.
- Anti-vortex Walls:  
 Omit center anti-vortex wall when  $D < 36"$ . The bottom of the anti-vortex walls may be formed with a 45° slope when the riser is located in the reservoir.
- Flotation:  
 When riser is in reservoir—the ratio of the weight of riser to the weight of the volume of water displaced by the riser shall not be less than 1.5.  
 When riser is in embankment—add to the weight of the riser, the buoyant weight of the submerged fill over the footing projections.

**5. Dry Dams:**

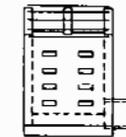
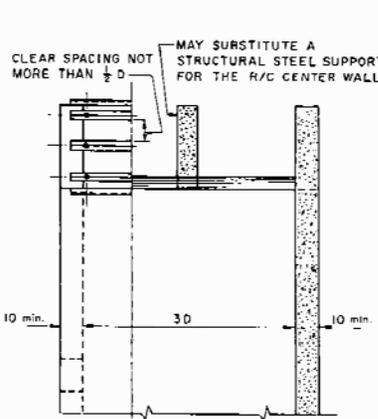
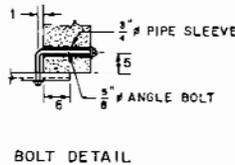
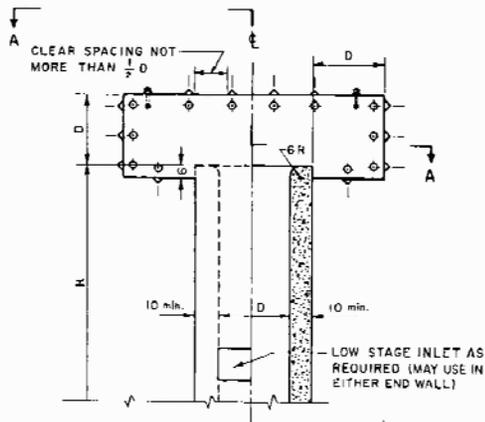
Where sediment is not a problem—set crest of single stage riser, or crest of low stage inlet of two-stage riser, at required elevation.  
 Where sediment is a problem—use a series of slotted openings up the longitudinal sides. Trashracks are not required for these openings.

**6. Materials:**

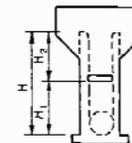
Concrete : Class B,  $f'_c = 4000$  psi,  $f'_c = 16000$  psi.  
 Reinforcing Steel: Intermediate grade.  
 Trashrack : Structural steel or structural aluminum.

**NOTES:**

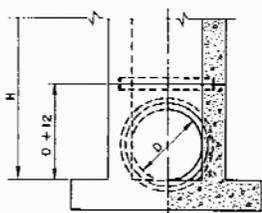
- Riser Analyses:  
 Standards to be developed for risers located in the embankment (at berm) and for risers located in the reservoir area.
- Round Bottom: May be obtained by use of a pipe cut longitudinally along a diameter, or may be formed by removable semi-circular forms acceptable to the engineer.
- Drainage of Pool:  
 Provision of means of draining pool to be handled as a modification of these standards by the Field.



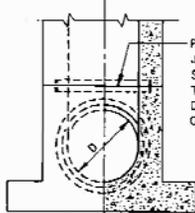
DRY-DAMS  
SEE CRITERIA (5)



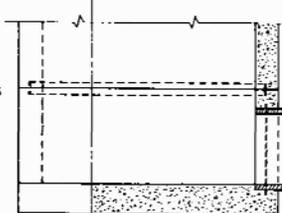
RISER IN RESERVOIR  
SEE CRITERIA (3)



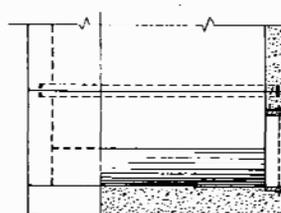
FLAT BOTTOM



ROUND BOTTOM



FLAT BOTTOM



ROUND BOTTOM



United States Department of Agriculture  
Natural Resources Conservation Service

NOTE: BASED ON UNITED STATES DEPARTMENT OF AGRICULTURE DESIGN NOTE NO. 18

Appendix D

Date	03/2010
Designed	SVH
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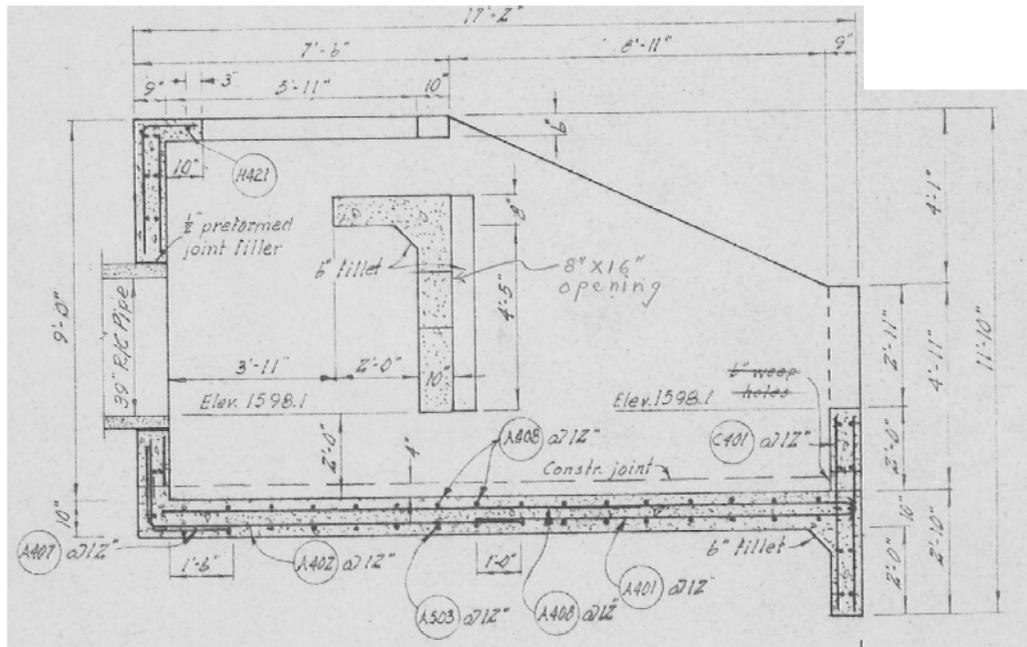
Earth & Environmental, Inc.  
1405 West Auto Drive  
Tempe, Arizona 85284

PROPOSED PRINCIPAL SPILLWAY INLET STRUCTURE  
MAGMA FLOOD RETARDING STRUCTURE  
REHABILITATION PROJECT  
PRELIMINARY NOT FOR CONSTRUCTION  
ARIZONA  
PINAL COUNTY



Natural Resources Conservation Service  
United States Department of Agriculture

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NOTE: PRINCIPAL SPILLWAY OUTLET STRUCTURE TO BE RECONSTRUCTED IN KIND

## PRINCIPAL SPILLWAY OUTLET STRUCTURE DETAIL

NTS



Appendix D

Date	03/20/10
Designed	SVH
Drawn	GWH
Checked	DNF
Approved	



PRINCIPAL SPILLWAY OUTLET STRUCTURE DETAIL  
MAGNIA FLOOD RETARDING STRUCTURE  
REHABILITATION PROJECT

PRELIMINARY NOT FOR CONSTRUCTION

ARIZONA

PINAL COUNTY



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