



Job Cost _____ Library

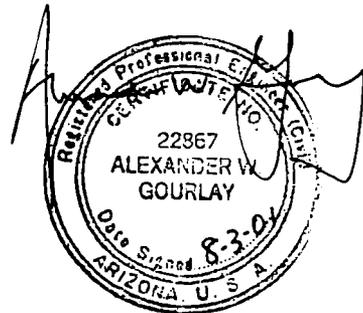
File # _____

**DESIGN REPORT
VOLUME II
INTERIM DAM SAFETY
IMPROVEMENTS
WHITE TANKS FRS #3 (07.28)**

Prepared for:
**FLOOD CONTROL DISTRICT OF
MARICOPA COUNTY**

Prepared by
URS/Dames & Moore

**D&M Job No. 15448-007-058
August 3, 2001**



August 3, 2001

Mr. Tom Renckly, P.E.
Project Manager
Maricopa County Flood Control District
2801 West Durango
Phoenix, AZ 85009

Re: White Tanks FRS #3 Dam (07.28)
Interim Dam Safety Improvements
Design Report
and Design Drawings
D&M Job No. 15448-007-058

Mr. Renckly:

This letter transmits our submittal of the updated design report and drawings for the Interim Dam Safety Project. This submittal follows our 100 percent level final report, submitted on February 7, 2001. As you requested, we are also sending one copy of these documents to ADWR and NRCS. This submittal updates the February 7, 2001 100 percent final submittal, incorporating comments that we received from the following:

- Verbal comments from the District
- ADWR letter dated March 1, 2001
- ADWR letter dated March 15, 2001
- ADWR verbal comments made on March 27 meeting
- ADWR letter of Approval of Application for Alteration (Conditions 4 & 5) dated June 21, 2001

Responses to the ADWR comment letters are provided in Appendix A of this report, and identify the sections where the comments are addressed.

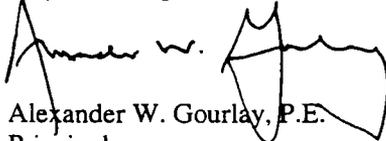
If you have any questions, please call me at (602) 861-7425.

Sincerely,

URS DAMES & MOORE



Todd E. Ringsmuth, P.E.
Project Manager

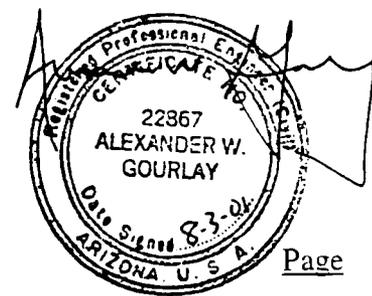


Alexander W. Gourlay, P.E.
Principal

cc: Mike Greenslade – ADWR (1 copy)
Noller Herbert – NRCS (1 copy)

URS Corporation
7720 North 16th Street, Suite 100
Phoenix, AZ 85020
Tel: 602.371.1100
Fax: 602.371.1615

TABLE OF CONTENTS (VOLUME I)



		<u>Page</u>
1.0	INTRODUCTION.....	1-1
1.1	OBJECTIVES	1-1
2.0	PROJECT OVERVIEW	2-1
2.1	DAM HISTORY	2-1
2.1.1	Initial Design and Construction.....	2-1
2.1.2	Past Observed Problems.....	2-1
3.0	EXISTING FILTER INVESTIGATION	3-1
3.1	FIELD INVESTIGATION.....	3-1
3.1.1	Borings	3-1
3.1.2	Test Pit	3-1
3.2	LABORATORY TESTING	3-2
3.3	CONCLUSIONS.....	3-2
3.3.1	Field Observations.....	3-2
3.3.2	Design Information	3-2
3.3.3	Material Suitability.....	3-3
4.0	CRACK INVESTIGATION	4-1
4.1	FIELD INVESTIGATION.....	4-1
4.2	LAB TESTING	4-1
4.3	RESULTS.....	4-1
5.0	DESIGN	5-1
5.1	DIAPHRAGM FILTERS AND OUTLET PIPE EXTENSIONS.....	5-1
5.1.1	Diaphragm Filter	5-1
5.1.2	Outlet Pipe Extension.....	5-2
5.2	TRASH RACKS	5-3
5.3	RIPRAP AT THE RIGHT DAM ABUTMENT	5-4
5.4	EMERGENCY SPILLWAY MODIFICATIONS	5-4
5.5	HYDRAULICS	5-5
5.6	DAM BREAK ANALYSIS	5-5
5.7	INTERIM OPERATIONAL PLAN.....	5-5
5.8	WATERS OF THE U.S.	5-6
6.0	CONSTRUCTION SUPPORT DOCUMENTATION	6-1
6.1	DESIGN DRAWINGS.....	6-1
6.2	SPECIAL PROVISIONS	6-1



6.3	CONSTRUCTION QUALITY ASSURANCE PLAN.....	6-1
7.0	REFERENCES.....	7-1

LIST OF FIGURES (VOLUME I)

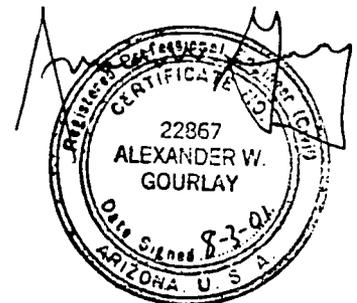
- 1 Site Plan Showing Boring and Test Pit Locations
- 2 Plan and Section Showing Crack and Filter Investigation at Station 59+00
- 3 Comparison of Existing Materials and Construction Specifications

LIST OF DRAWINGS (VOLUME I)

- | | | |
|----|----------|--|
| G1 | 1 of 18 | Cover Sheet and Vicinity Map |
| G2 | 2 of 18 | Drawing Index, Legend and General Notes |
| G3 | 3 of 18 | Site Map |
| Q1 | 4 of 18 | Quantity Summary |
| C1 | 5 of 18 | Plan and Alignment of Emergency Spillway Modifications and Armor |
| C2 | 6 of 18 | North Outlet Plan - Buttress |
| C3 | 7 of 18 | Central Outlet Plan - Buttress |
| C4 | 8 of 18 | South Outlet Plan – Buttress |
| C5 | 9 of 18 | North Outlet Plan – Filter |
| C6 | 10 of 18 | Central Outlet Plan – Filter |
| C7 | 11 of 18 | South Outlet Plan - Filter |
| D1 | 12 of 18 | Emergency Spillway Sections |
| D2 | 13 of 18 | North Outlet Section and Elevation |
| D3 | 14 of 18 | Central Outlet Section and Elevation |
| D4 | 15 of 18 | South Outlet Section and Elevation |
| D5 | 16 of 18 | Outlet Pipes and Trash Rack Section and Details |
| D6 | 17 of 18 | Outlet Pipes Section and Details |
| D7 | 18 of 18 | Outlet Riprap End Sections |

LIST OF APPENDICES (VOLUME II)

- A. ADWR and NRCS Review Comments
- B. Outlet Inspection
- C. Boring Logs and Laboratory Tests
- D. Filter and Crack Investigation
- E. Calculation Packages
- F. December 1999 Survey (submitted under separate cover)
- G. Special Provisions
- H. Supplementary General Conditions
- I. Construction Quality Assurance Plan



1.0 INTRODUCTION

This report was prepared to document the background and design basis for Interim Dam Safety Improvements to the White Tanks Flood Retarding Structure (FRS) #3 (Permit #07.28), owned and maintained by the Flood Control District of Maricopa County (the District). The purpose and scope for this engineering work are described in contract FCD 98-11, Change Order No. 5. Interim measures are required for renovation of the dam for safety purposes. The required measures dictated in the Arizona Department of Water Resource (ADWR) memorandum dated July 1999 and letter dated August 9, 1999 are as follows:

- Provide minimum 4 feet freeboard
- Outlets require trash racks
- Outlets require diaphragm filters
- Develop operational plan
- Ensure dam's safety against erosion in cracks
- Verify adequate filter protection between Station 57+00 and Station 59+00

This report is a final design submittal prepared for review by the District, ADWR, and the Natural Resources Conservation Service (NRCS). This report incorporates the comments made on the 90 percent submittal. ADWR and NRCS comments on the previous submittals (10, 30, and 60, 90, and 95 percent level design) and responses to the comments are presented in Appendix A.

1.1 OBJECTIVES

The design objectives of the interim dam safety improvements are to increase the confidence of ADWR and the District in the integrity of the embankment and viable operation of outlet works during an impoundment event, and to implement several freeboard and erosion-related improvements in the vicinity of the emergency spillway.

A series of dam safety inspections and engineering studies (Dames & Moore, 1999) have characterized the elements of the dam that require renovation or modification. Previously identified features requiring modification consist of trash racks on outlet works, diaphragm filters around outlet pipes and associated extension of outlet pipes, riprap armor at the right dam abutment, and emergency spillway modifications.



Design drawings, special provisions and supplementary general conditions for construction, and the construction quality assurance (CQA) plan are assembled as separate documents. An operations plan will be submitted separately by the District.



2.0 PROJECT OVERVIEW

2.1 DAM HISTORY

2.1.1 Initial Design and Construction

White Tanks FRS #3 was built as a flood control structure in 1954. It was initially a homogenous earth dam constructed by the NRCS (then the Soil Conservation Service, SCS). In later renovations filter/drainage works were added, as described Section 2.1.2.1.

The dam is currently owned and operated by the District. The embankment is approximately 7,700 feet long and was constructed using material borrowed from the reservoir of the dam. The embankment is approximately 30 feet high. The crest width varies between 10 and 11 feet. The upstream and downstream faces are sloped at 2.5:1 (horizontal to vertical) and 2:1, respectively. Three gated corrugated metal pipes (CMPs) through the embankment serve as the principal outlets from the reservoir. Two of the outlets are 48 inches in diameter and one outlet is 24 inches in diameter. The northernmost outlet is connected to the Beardsley Canal via a shotcrete-lined channel, while the other two outlets discharge into desert washes. The emergency spillway for the facility is cut into natural ground at the right abutment of the dam. The spillway crest elevation is approximately 1,210 feet. The reservoir has never held more than approximately 300 acre-feet of water.

2.1.2 Past Observed Problems

2.1.2.1 Cracks

Transverse and, to a lesser extent, longitudinal cracks have been observed through the embankment. In 1982, the NRCS implemented a remedial action program to address the issue of transverse cracking. A section of the embankment between Station 56+10 and Station 59+90 was breached and re-constructed. A central chimney drain also was installed along the entire length of the embankment. Finger drains, which daylight at the downstream toe, were provided at the location of the selected transverse cracks to convey water intercepted by the chimney drain. The cracks selected were those on the downstream face of the trench that extended below the trench excavation limit as well as those cracks wider than 3/8 inch.

Dames & Moore conducted inspections of the dam in October 1998 and November 1999. During the November 1999 inspection, transverse and longitudinal cracks were observed at Station 59+00. Dames & Moore performed a field investigation on March 31, 2000 to explore the cracks



and identify their extent, laterally and vertically. The results of this crack investigation are presented in Section 4.0.

2.1.2.2 *Subsidence*

Since its construction in 1954, the crest of the dam has settled approximately 3.6 feet at the northern end of the alignment. This settlement is a result of regional land subsidence associated with groundwater withdrawal in the area. The amount of settlement appears to decrease steadily along the alignment until virtually no settlement is observed at the southern end of the embankment.

2.1.2.3 *Potential Voids Around Outlet Pipes*

The outlet pipes were visually inspected and videotaped by Speedie and Associates (Speedie) in October 1999. The inspection revealed that the pipes are in relatively good condition in that they did not identify areas of significant corrosion and/or deformation. However, the sound generated when the pipe was tapped lightly with a hammer suggested that the soils around the haunches of the pipe may have been inadequately compacted during construction and that voids may be present around the outlet pipes. The Speedie report is included in Appendix B and a copy of the video tape resulting from the inspection is available upon request.



3.0 EXISTING FILTER INVESTIGATION STATION 57+00 TO 59+00

3.1 FIELD INVESTIGATION

The District and ADWR agreed that additional efforts should be made to verify the presence of a seepage control filter between Station 57+00 and Station 59+00. Finger drains at the toe are not visible through this portion of the dam, and construction records are inconclusive. Therefore, Dames and Moore conducted a field investigation to confirm the presence and makeup of the existing filter.

3.1.1 Borings

Three exploratory borings were drilled on the crest of the dam on November 1, 1999. ATL, Inc. completed the work under the supervision of a Dames & Moore field engineer using a CME 75 with a 3 ¾-inch hollow stem auger. The borings were located at Stations 57+30, 58+00, and 59+00 (see Figure 1) and were drilled to depths of 30 feet. Boring logs are presented in Appendix C.

3.1.2 Test Pit

A test pit was excavated using a backhoe on the crest of the dam on March 31, 2000 to provide additional insight regarding the construction of the existing filter at this location. The test pit was located at approximately Station 58+90 (see Figure 2). The approximate dimensions of this pit were 6 feet wide, 8 feet long, and 5.5 feet deep.

Originally the test pit was backfilled with sand up to approximately 2 feet from the surface. The top 2 feet of the test pit was backfilled with excavation spoils. However, given the coarse nature of the materials encountered in the test pit, the sand was considered too fine to be a good backfill material. Therefore, test pit was re-excavated to its original dimensions. A geotextile was placed across the bottom of the excavation. The test pit was backfilled with MAG Aggregate Base Course Floor Fill. This new backfill material matches the specifications for the existing filter. The new backfill material was placed in thin (approximately 8- inch thick) lifts and compacted with vibratory plate equipment. Again the top 1.5 to 2 feet were backfilled with excavation spoils.



3.2 LABORATORY TESTING

Mechanical sieve tests were performed on selected samples to obtain grain-size distributions. Four samples from the test pit and four samples from the borings were tested. The grain-size distributions are presented in Appendix C.

3.3 CONCLUSIONS

3.3.1 Field Observations

Excavation of the test pit revealed a sandy gravel filter, or transition zone, of 3 feet width on the upstream side of the centerline. Adjacent to the filter/transition zone material there is a zone of coarse washed gravel/cobbles, 2 feet wide. This material appeared to serve the function of a drain. It is comprised of rounded particles, with about a 4-inch maximum particle size. The three borings also encountered this material. Embankment soil lies directly against the gravel drain on its downstream side (illustrated on Figure 2). Samples were taken of the embankment fill downstream, the gravel drain, the sandy gravel transition zone, and the embankment fill upstream of the filter/drain.

3.3.2 Design Information

The as-built information identified during the field investigation was compared to the available reconstruction design and as-built documents. The reconstruction design report presented in Appendix D (ADWR, 1981) and drawings (dated April 1981) indicate that the dam was to be breached from Station 56+10 to 59+90. The bottom of the excavation was to extend from Station 57+00 to Station 59+00. As the dam was rebuilt, a chimney drain and outlet was to be constructed. The material to be used in the chimney drain, referred to as drain fill, was MAG Aggregate Base Course Type A. The chimney drain was to be three feet wide. The drain outlet was to be constructed of a coarse aggregate (ASTM C33 Coarse Aggregate Size 2), two feet square, surrounded by one foot of the drain fill. The drain outlet was to extend six feet past the downstream toe to the dam.

A second design-phase drawing provided by NRCS from its records indicates that the chimney drain design was changed prior to construction. This drawing (also dated April 1981) required two feet of drain fill on the upstream side of the centerline and two feet of coarse aggregate on the downstream side. This same drawing was also found in the bid documents for the repair dated August 7, 1981. As-built drawings dated August 9, 1982 and supplied by ADWR indicate the chimney drain was constructed according to this design. The results of the test pit excavation



are consistent with the NRCS-supplied drawing (not “as-builts”) and the as-builts supplied by ADWR.

3.3.3 Material Suitability

The reconstruction design report states that both the drain fill and coarse aggregate were checked for piping and permeability requirements. However, the report does not specifically state that the two materials meet the requirements. The report does state the two materials are in accordance with sited Reference Nos. 1 and 3. This could not be verified as copies of these references are not available.

The design report acknowledges both of the materials do not meet the requirements of Reference #4. More specifically the drain fill does not meet the D_{15} and D_{85} size requirements and the coarse aggregate does not meet the D_{85} size requirement. The filter compatibility calculations performed by Dames & Moore are also based on D_{15} and D_{85} sizes. Our calculations also show that the materials do not meet these requirements.

The design report states that Reference #1 was given precedence and the materials were considered acceptable. However a contract modification, presented in Appendix D, altered the drain fill gradation because suppliers could not meet the previously specified gradation. This contract modification does not mention if the new gradation was checked against any references. A handwritten note on the second page simply states that, “The filter is compatible with the embankment”. The notes goes on to say the gradation should not be a problem based on the size of the design crack and the requirement of an auxiliary drain wherever a crack is found which exceeds the design crack. In a letter dated November 25, 1981, ADWR approved the drain fill gradation modification.

The gradation of the filter/transition zone sample obtained during our field investigation was within the limits set by the contract modification, as shown on Figure 3. The gradation of the drain sample is slightly outside the limits of the coarse aggregate, as shown on Figure 3.

A material matching calculation was performed between the dam and the filter/transition zone. This calculation shows that the material specified in the contract modification is too coarse to match with the dam material. A material matching calculation was also performed between the filter/transition zone and the drain. This calculation shows that the drain sample is slightly too coarse to match with the filter material. These calculations are presented in Appendix D.



4.0 CRACK INVESTIGATION

4.1 FIELD INVESTIGATION

Dames & Moore conducted inspections of the dam in October 1998 and November 1999. During the November 1999 inspection, transverse and longitudinal cracks were observed at Station 59+00. Dames & Moore performed a field investigation on March 31, 2000 to determine the lateral and vertical extent of the cracks. A test pit was excavated on the upstream side of the dam at Station 59+00. Dames & Moore engineers directed the fieldwork. Figure 2 illustrates the location and approximate dimensions of the test pit.

4.2 LAB TESTING

A mechanical sieve test was performed on the sample taken from the test pit. The grain-size distribution obtained from this test is presented in Appendix C. The gradation is very similar to other gradations of embankment material.

4.3 RESULTS

Excavation began adjacent to the longitudinal crack toward the right end (west end) of the portion of the crack visible at the surface. Beyond the surficial depth of 1.5 to 2 feet, the crack could not be detected. Excavation continued towards the left (east) in an attempt to follow the crack. Excavation reached a depth of 6 feet and a length of 8 to 10 feet with no visible evidence of cracks. The upper 2 feet of the embankment fill has a dry, fissured structure that likely results from dessication. Beneath this surficial fissured zone, soil in the sidewalls of the trench appeared dry, hard and solid, and without evidence of cracks. No filter material was encountered in this test pit.



5.0 DESIGN

5.1 DIAPHRAGM FILTERS AND OUTLET PIPE EXTENSIONS

White Tanks FRS #3 originally was designed as a homogeneous embankment. Consequently, seepage control filters were not included around outlet pipes that pass through the dam. Current practice in dam engineering is to include diaphragm filters around outlet pipes to prevent internal erosion of soil (piping) in a seepage path along the outlet pipe. Previous investigations (Speedie & Associates, 1999) have identified potential voids around the outlet pipes within the embankment, which increases the need for the diaphragm filter to prevent such erosion.

The diaphragm filter material is designed to retain the soil within the embankment while passing seepage. Design criteria require the filter to have an opening size specifically to retain soil particles. At the same time, the opening size must be sufficient to provide a high coefficient of permeability, with little resistance to seepage. NRCS has established filter criteria that will be the basis of design. Their criteria also include dimensions of the filter zone. The filter must reach above and below the conduit a sufficient distance to intercept seepage paths. Similarly, lateral dimensions of the filter are required to intercept likely seepage paths.

5.1.1 Diaphragm Filter

A conventional graded sand diaphragm filter will be installed around each of the three outlets at the existing toe of the dam. Cross-sections of the filters on each of the three outlets are shown on Drawings D2, D3 and D4. The filter has been designed according to NRCS guidelines presented in Technical Release No. 60 210-VI (TR-60) (NRCS, 1985) and Amendment 1 (NRCS, 1990) to TR-60. According to TR-60, minimum diaphragm filter thickness is 3 feet. The filter will extend 3 times the diameter of the pipe on each side as well as above the pipe. The filter will extend one and a half times the diameter below the pipe. The filter will be composed of ASTM C33 fine aggregate, placed at a minimum of 3 inches thickness with a plus 6 inch construction tolerance, and to dimensions that meet or exceed the minimum required. The calculation supporting this design is presented in Appendix E, Diaphragm Filter Gradation.

A soil buttress has been designed to provide cover for the diaphragm filter. The thickness of the soil buttress fill was calculated according to the methods in TR-60. To be conservative 6 inches were added to all calculated minimum thickness of soil buttress fill, then the thickness was rounded up to the nearest 0.5-foot. The calculation to determine the minimum amount of soil needed to cover the filter and develop the soil buttress is presented in Appendix E, Thickness of Soil Buttress Fill. The soil buttress will be constructed using borrow from the emergency



spillway modifications. The gradation of the borrow material from the spillway will be maintained within a specification range to provide a consistent soil buttress fill that has been assumed for filter matching calculations. Although results of limited laboratory data indicate the borrow material will generally meet the specification, the contractor is required to stockpile and screen and/or blend the material to meet the required gradation in accordance with Special Provisions Subsection 210.1. Therefore, the soil buttress fill will need to be prequalified following the CQA testing plan prior to placement by the contractor.

The District has indicated they will perform any revegetation (assumed to be minor hydroseeding) disturbed as a result of construction of the soil buttress and outlet extension work, if found to be necessary .

The diaphragm filter will extend into the dam foundation. Therefore, calculations to check the match between the filter material and the foundation were performed and are presented in Appendix E. These calculations show a two-way match between the foundation and the filter.

A drain has been designed to provide a drainage outlet for the diaphragm filter. The drain gradation was designed to match with the diaphragm filter, the soil buttress and the foundation. The calculations performed to design the drain gradation are presented in Appendix E. The drain will extend along the outlet pipe from the diaphragm filter to the toe of the soil buttress. Drain pipes were added to the drain in order to meet the design criteria presented in Gradation Design of Sand and Gravel Filters (NRCS, 1994). A geotextile sock will be installed around the drain pipes. Geotextile will also be installed surrounding the drain sand to meet filter match criteria between the soil buttress material and the drain sand. Riprap will be installed at the toe of the soil buttress to protect the drain and soil buttress from erosion. Calculation packages for sizing of the drain pipes and filter match for the geotextile are provided in Appedix E.

There is an existing subsidence survey monument approximately 10 feet south of the soil buttress toe at the North outlet. The special provisions provide for the protection of this monument.

5.1.2 Outlet Pipe Extension

In order to install the diaphragm filter, the existing CMP must be extended beyond the toe of the new soil buttress. The extension will consist of galvanized, polymer-coated CMP to extend the outlet pipe. The Central outlet pipe is designated by the District as the primary outlet structure for operation in flood conditions, with the North and South Outlets serving as secondary. During design, erosion of the Soil Buttress toe was identified as a concern during outlet discharge. The selected approach to mitigate the concern was to extend the pipe 20 feet from the toe to provide measurable distance from the discharge point and the buttress toe. Only the Central outlet was



extended an additional 20 feet because of its designation as the primary outlet structure. The extension will be partially encased in concrete to the springline. The potential negative aspects associated with the use of CMP are poor compaction around the pipe, or deformation of the pipe allowing erosion or piping of embankment fill. The concrete encasement to the springline will provide protection against these mechanisms. The flow capacity versus elevation rating curve for the outlet pipes is provided on Drawing G3.

The existing headwall will be demolished and the cut slope resulting from the demolition will be the upstream face of the new filter. One foot of the existing CMP will be cut off and a conventional universal band connection will join the existing CMP to the extension (see Drawing D5 for detail). The U.S. Army Corps of Engineers pipe connection detail was evaluated and decided against because of the need to join the existing annular CMP to the new helical CMP. To insure an adequate watertight seal, the band connection will be fully encased in concrete. The diaphragm filter will completely surround the concrete encasement.

The rust-proofing coating in the existing CMP contains 10 percent chrysotile asbestos according to the laboratory results provided to Dames & Moore by the District. Since the existing CMP will be cut to join the new segments pipe, precautionary measures need to be taken to reduce fiber release of the identified asbestos. In its current state, the coating is not considered to be friable. Friable asbestos is considered hazardous and is defined as materials which can be crushed, pulverized or reduced to powder by hand pressure when dry. Non-friable asbestos, however, can be rendered friable by such actions as sanding, sawing, drilling, or breaking into pieces, as will likely be the case with the pipe coating. Therefore, health and safety procedures in general accordance with industry practice for asbestos abatement have been incorporated into the design and special provisions and supplementary general conditions.

5.2 TRASH RACKS

Trash racks are required to prevent the outlet pipes from clogging with debris during flood events. The central outlet pipe trash rack was designed according to *Design of Small Dams* (Bureau of Reclamation, 1987) and NRCS Technical Release 60, 210-VI, Amendment 1, dated October 1985. From these two documents it was determined that the maximum bar spacing be six (6) inches on center in each direction, and the maximum flow velocity through the net area of the trash rack would not exceed 2.5 feet per second (ft/sec). The trash racks were designed to cover the inlet end of each outlet pipe allowing for operation of the slide gate within the trash rack. The District also requested a trash rack design that would allow cleaning using a Backhoe, Trackhoe, or Gradeall type piece of equipment operated from the dam crest. Therefore the top of the trash racks have 4-inch wide flat steel bars affixed on edge in order for the equipment's



bucket teeth to easily remove debris accumulation. Accordingly, the overall dimensions of the trash rack for the central outlet pipe will be 9 feet long, 6 feet wide, and 2 feet high. The trash rack will be constructed with a combination of ½-inch diameter round steel bars and 4-inch wide, ½-inch thick flat steel bars. The supporting calculation is presented in Appendix E, Central Outlet Trash Rack Sizing. The northern outlet trash rack is identical to the above mentioned central outlet trash rack. The southern trash rack is identical with respect to design components but has smaller overall dimensions. The dimensions for the southern trash rack will be 6 feet long, 4.5 feet wide, and 2 feet high. The trash rack design is illustrated on Drawing D5.

5.3 RIPRAP AT THE RIGHT DAM ABUTMENT

Armor protection of the right dam abutment, within the emergency spillway, and along a portion of the downstream toe of the dam, is needed in order to prevent erosion of the earthen embankment during flood events when the emergency spillway is passing flow.

Riprap sizing was conducted using Riprap Design System computer software, Version 2.0, developed by West Consultants, Inc. A flow rate of 525 cubic feet per second (cfs) was used in the design as this is the maximum expected flow over the spillway as specified in “Maximum Water Surface Elevation for Inflow Design Flood (IDF) at White Tank Flood Retarding Structure No. 3 under Current Conditions” (District, 1998). The riprap will have a D_{50} of 6 inches with a minimum stone size of 2 inches and a maximum stone size of 12 inches. The details of this calculation are presented in Appendix E, Riprap Sizing.

The riprap will extend approximately 155 feet along the downstream toe of the dam, around the right abutment and approximately 50 feet along the upstream toe, as shown on Drawing C1. The depth of the water through the spillway was used to estimate riprap height and location. The riprap will extend 2.5 feet vertically from the toe of the dam as illustrated on Drawing D1.

5.4 EMERGENCY SPILLWAY MODIFICATIONS

Review of the embankment elevations and reservoir routing have shown that the total freeboard and residual freeboard during the passage of the inflow design flood (half-PMF) do not meet current ADWR freeboard requirements (ADWR 1991). Routing of the half-PMF under current conditions resulted in a maximum water surface elevation of 1210.34 feet (District 1998). The lowest elevation along the embankment crest is 1211.39 feet, as identified from the December 1999 survey. The spillway crest elevation is 1210 feet. Therefore, the total freeboard is 1.39 feet and the estimated freeboard during passage of the half-PMF is 1.05 feet.



The proposed form and extent of modifications to the structure have been derived through meetings and correspondence between the District and ADWR. The modification identified to meet the freeboard requirement consist of installing a “notch” in the existing emergency spillway to provide a total freeboard of 4 feet.

The “notch” will consist of a channel with a minimum 75-foot bottom width constructed with 5:1 (H:V) side slopes and a bed slope of 0.5 percent. The bottom width of 75 feet will significantly reduce the drawdown time for the surcharge pool and will provide sufficient borrow material to construct the soil buttress. The channel inlet invert elevation was calculated using the 4-feet required by ADWR and incorporates 10 years of potential future subsidence at the north end of the embankment. Based on survey data collected in 1990 and 1997 at the subsidence marker located at the north end of the embankment, the estimated annual subsidence rate is 0.0266 feet or 0.266 feet for a 10-year period. Details of the subsidence estimate are provided in Appendix E, Spillway Notch Elevation.

With the current lowest elevation along the embankment crest at 1211.39 feet, a potential lowering due to subsidence of 0.266 feet, and the required 4 feet of total freeboard, the “notch” elevation must be no higher than 1207.12 feet. The design presented on Drawing C1 sets the channel inlet invert elevation at 1207.0 feet.

5.5 HYDRAULICS

Rating curves for the outlet pipes have been developed and are shown on Drawing G3. The development of the rating curves is shown in the calculation titled Development of Rating Curves shown in Appendix E. The emergency spillway rating curve is provided on Drawing C1.

5.6 DAM BREAK ANALYSIS

Since the spillway modifications are minor, these modifications should have no effect on previous dam break analyses. Therefore, previous dam break analyses (AGK Engineers, 1991) are sufficient.

5.7 INTERIM OPERATIONAL PLAN

The District is developing an interim operational plan and will submit it to ADWR as a separate document. This document will address how the District will operate the outlet pipe slide gates during periods when water may be present behind the dam.

The Interim Operational Plan addresses the operation of the outlet pipes for normal operation and emergency actions. The plan includes evaluation of pipe flows, normal and emergency outlet



operations, details of the hydrology used for development of the inflow design flood, and routing of the half-PMF through the reservoir and emergency spillway with the Interim Dam Safety Improvements in place. This information will be submitted to ADWR by the District in a separate document.

5.8 WATERS OF THE U.S.

The renovations described in Section 5.0 impact the waters of the U.S and the District has obtained a 404 permit (Permit No. 984-0495-LSF) for the work. The boundaries of the waters of the U.S. are marked on all plan drawings. The total permanently impacted area will be approximately 1,198 square feet. The total volume of fill to be placed in this area is approximately 14,700 cubic feet. The total temporarily impacted area will be approximately 3,280 square feet. All construction access to and from the site will be along existing maintenance roads. The contractor is held responsible for meeting the requirements of the 404 permit, including limiting construction access and work zones as specified in the Supplementary General Conditions Subsection 107.7.2. The District will reseed disturbed project areas in accordance with the 404 permit requirements..



6.0 CONSTRUCTION SUPPORT DOCUMENTATION

6.1 DESIGN DRAWINGS

Design drawings reflect completion of engineering and design for each of the elements described above. This final design submittal consists of eighteen drawings containing all major components of the project. Details or technical notes may have been added.

6.2 SPECIAL PROVISIONS

The Special Provisions presented in Appendix G will provide technical instructions and specification guidance for the contractor performing the installation of the Interim Dam Safety project components. The Special Provisions prepared for this project have been generally developed based upon Uniform Standard Specifications and Details for Public Works Construction sponsored by MAG, but substantially revised to become a stand-alone document. This specification format has been used at the request of the District. These Special Provisions have been tailored to be project-specific and are augmented by language obtained from Dames & Moore's historical project database of technical specifications.

The Supplementary General Conditions presented in Appendix H have also been modified using a template supplied by the District. The Supplementary General Conditions are greatly stand-alone in project specifics and content, however its general intent is to supplement the General Conditions of the MAG standard that may be referenced occasionally.

The District will develop the "upfront" documents describing the specific Bidding and Contract Requirements for this project, separately from the Special Provisions and Supplementary General Conditions.

6.3 CONSTRUCTION QUALITY ASSURANCE PLAN

The Construction Quality Assurance (CQA) Plan will provide guidance for the District or its designated CQA Consultant conducting inspection, construction oversight, and construction materials testing for the installation of the Interim Dam Safety components. The CQA Plan, a stand-alone document, is presented in Appendix I. The plan is written as a separate guide for the oversight on behalf of the District. The plan can be used by a third-party CQA Consultant engaged in oversight or by the District directly. The plan summarizes the project components, project and CQA team, responsibilities, lists of observations and testing requirements, documentation requirements and forms, and a table showing suggested materials testing methods and frequencies.



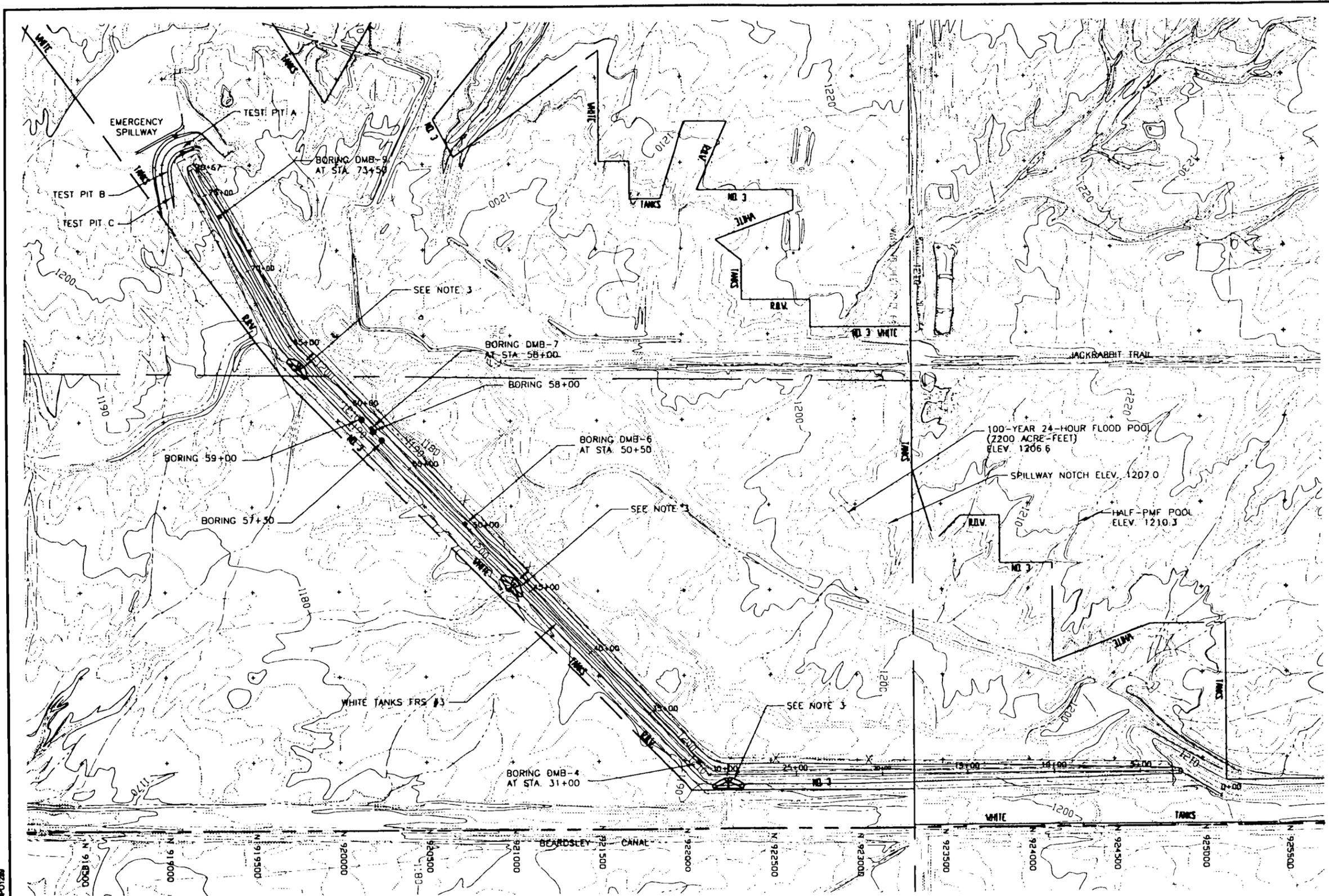
7.0 REFERENCES

- ADWR 1981. Arizona Department of Water Resources, Safety of Dams Section, White Tanks FRS #3 Repair Design Report prepared for ADWR, May 1981.
- ADWR 1991. Arizona Department of Water Resources, Safety of Dams Section, *Instructions for Filing an Application*, May 1991.
- Bureau of Reclamation 1987. Bureau of Reclamation, *Design of Small Dams*, 1987.
- District 1998. Flood Control District of Maricopa County, Maximum Water Surface Elevation for Inflow Design Flood (IDF) at White Tank Flood Retarding Structure No. 3 under Current Conditions, September 1998.
- NRCS 1991. Natural Resource Conservation Service, Technical Release No. 60 210-VI with Amendment 1, January 1991.
- NRCS 1994. Natural Resource Conservation Service, Gradation Design of Sand & Gravel Filters, October 1994.

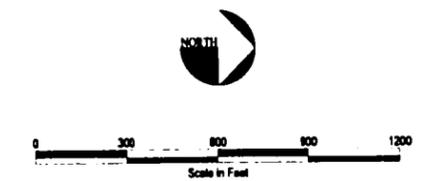


FIGURES





- NOTES:**
1. Borings 57+30, 58+00, and 59+00 are part of the filter investigation.
 2. Samples from borings DMB-4, DMB-6, DMB-7 and DMB-9 were used in calculating the diaphragm filter gradation.
 3. Proposed Interim Dam Safety (IDS) modifications.



SOURCE:
 BASE MAP OF WHITE TANKS/AGUA FRIA A.D.M.S. TOPOGRAPHIC
 MAPS, FLOWN 12/22/89 BY COOPER AERIAL OF PHOENIX, INC.
 FOR THE WLB GROUP INC., AREA DRAINAGE MASTER STUDY.

 Flood Control District
 of Maricopa County

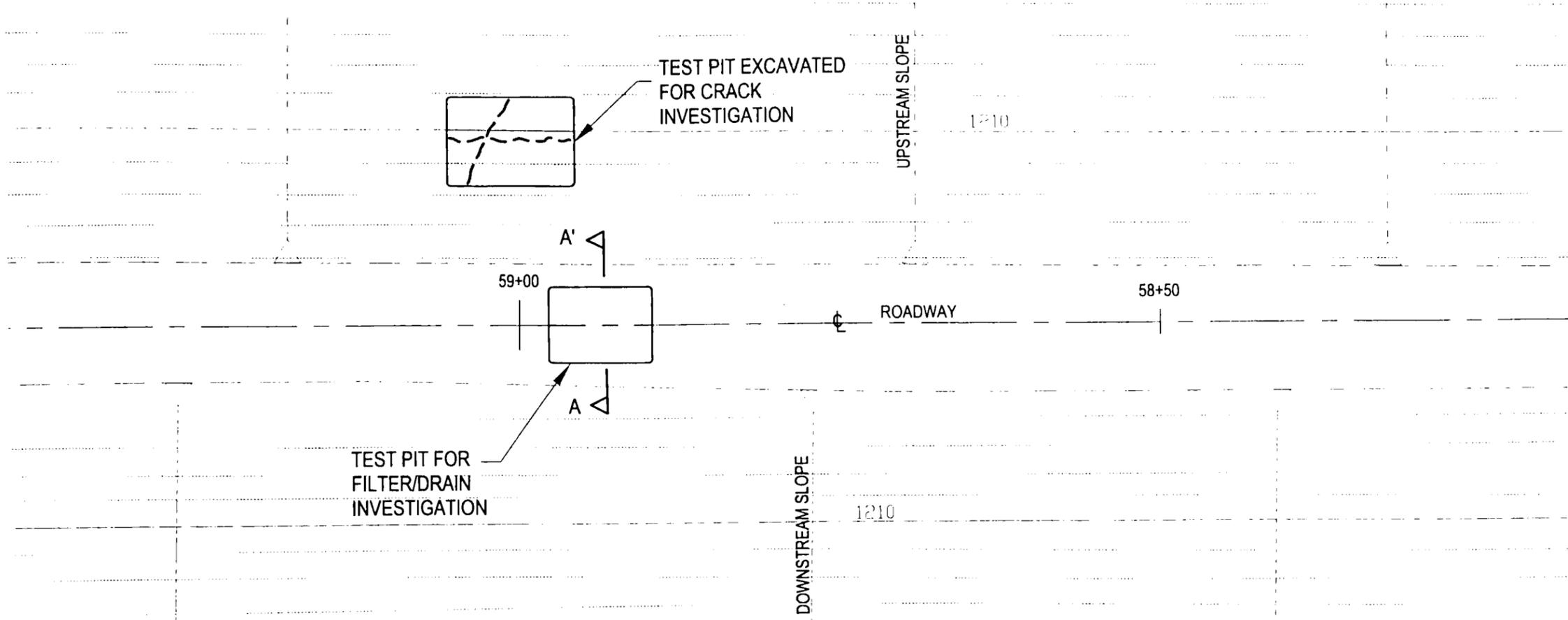
 **DAMES & MOORE**
 A DAMES & MOORE GROUP COMPANY

A14018.DWG 8-26-00 XREF:TOP01288

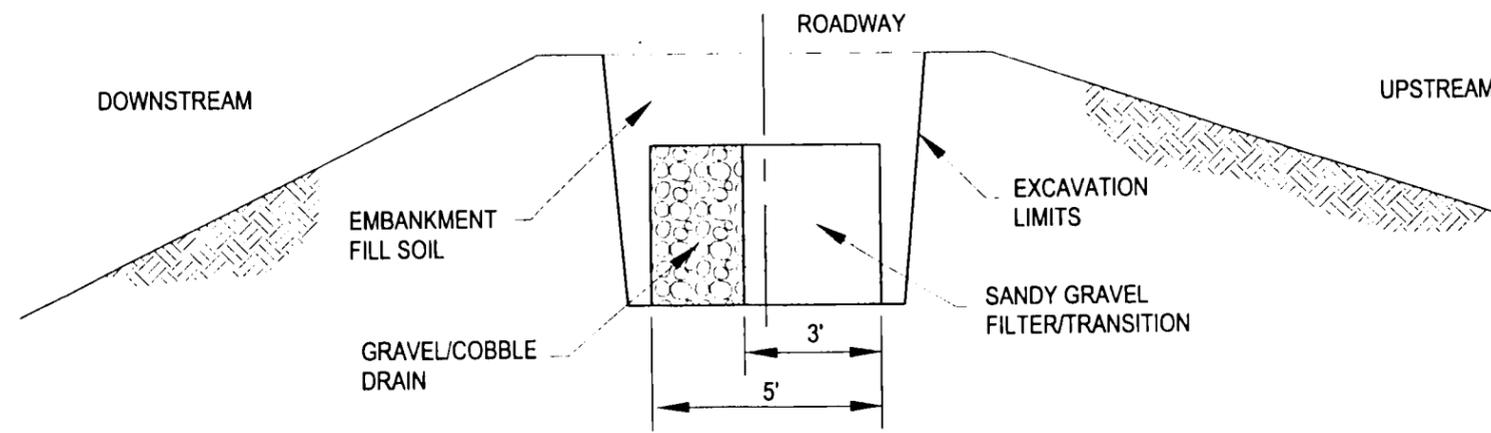
Location of Borings and Testpits
 Figure 1

Legend:

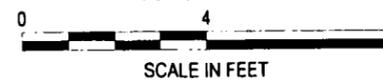
-  5-foot Contour
-  1-foot Contour
-  Edge of Crest Roadway
-  Visible Cracks
-  Test Pit Limits



PLAN



SECTION



WHITE
TANKS
F R S # 3

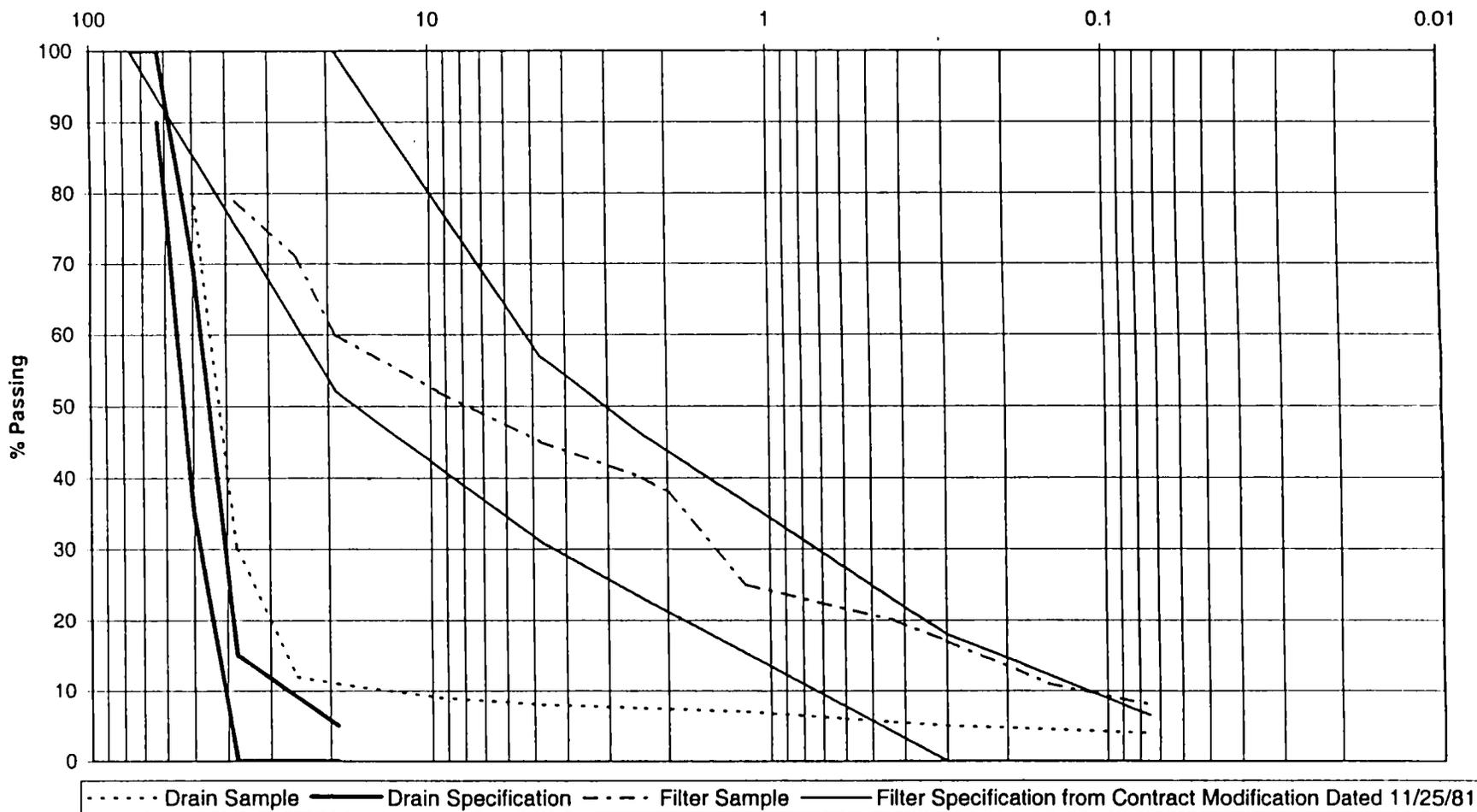
A13910.DWG 5-17-00 XREF: 15448007XREFS90317b.dwg



DAMES & MOORE
A DAMES & MOORE GROUP COMPANY

Figure 3
White Tanks FRS #3
15448-007-058
Existing Filter Investigation

Comparison of Existing Materials and Specifications
Grain Size (mm)



Note: Drain and Filter samples were obtained during the Crack and Filter Investigation in March 2000 and were tested by ATL, Inc.

DRAWINGS



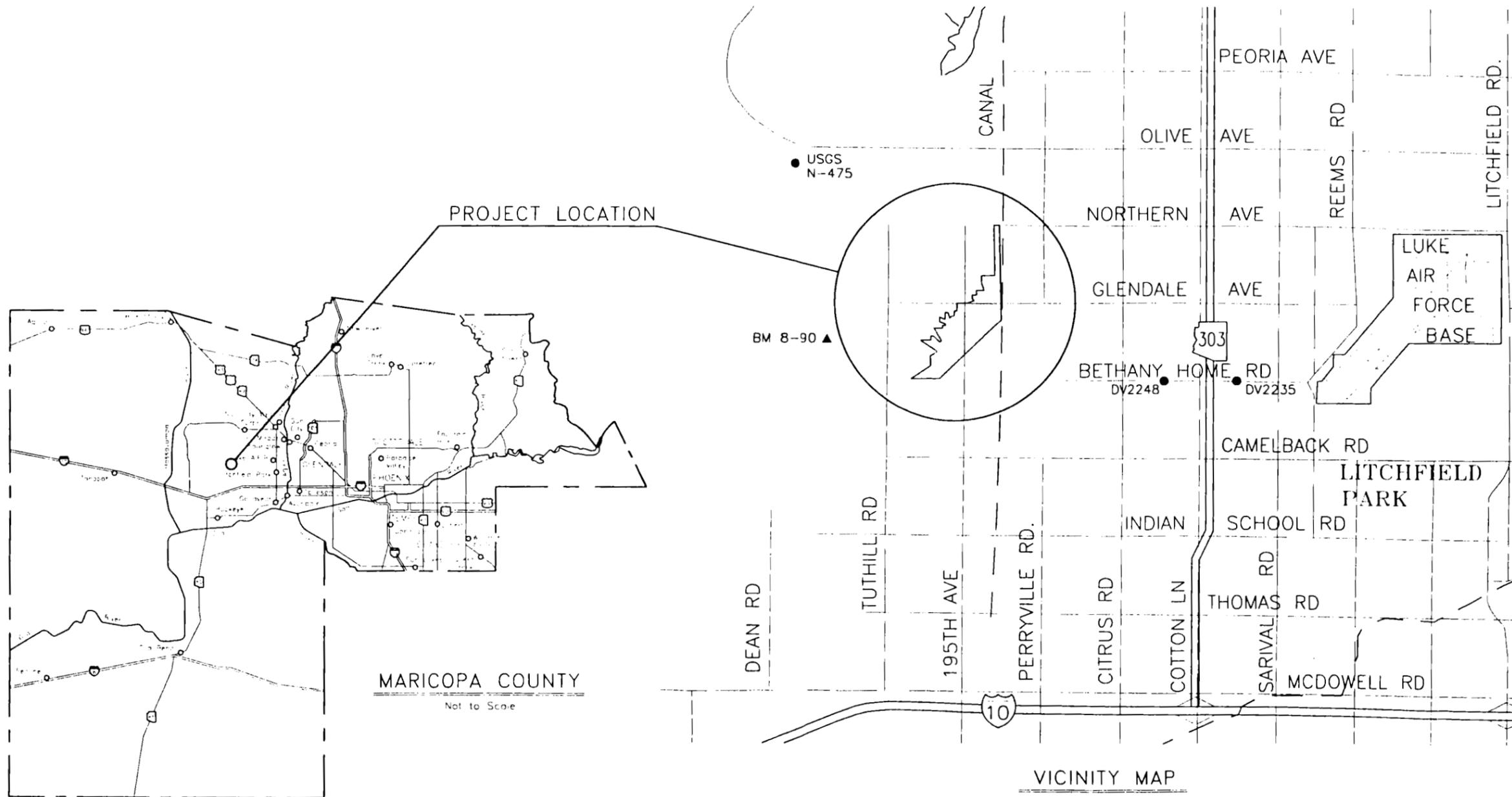
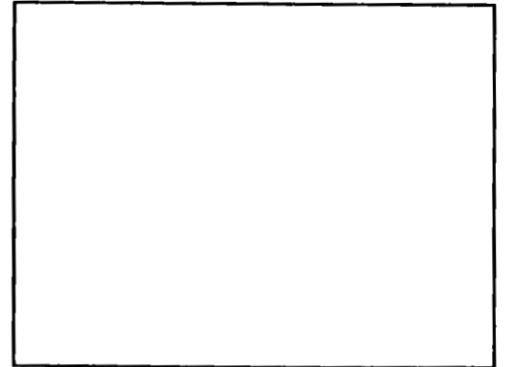


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PLANS FOR THE WHITE TANKS FRS#3
INTERIM DAM SAFETY IMPROVEMENTS
PCN. 4700430
FCD CONTRACT NO. FCD2000C028



ADWR APPROVAL



MARICOPA COUNTY
Not to Scale

VICINITY MAP
Not to Scale

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ISSUED FOR PUBLIC BIDDING BY:

CHIEF ENGINEER AND
GENERAL MANAGER

BOARD OF DIRECTORS OF
THE FLOOD CONTROL DISTRICT

JAN BREWER - CHAIRMAN

- | | |
|------------|------------------|
| DISTRICT 1 | FULTON BROCK |
| DISTRICT 2 | DON STAPLEY |
| DISTRICT 3 | ANDY KUNASEK |
| DISTRICT 4 | JAN BREWER |
| DISTRICT 5 | MARY ROSE WILCOX |

LEGEND

- USGS PIN
- ▲ BENCHMARK
- EXISTING SURVEY MONUMENT (BRASS CAP FLUSH)
- EXISTING SURVEY MONUMENT (BRASS CAP IN HAND HOLE)
- EXISTING DITCH
- IRR --- EXISTING IRRIGATION LINE (NOTE AS TO - PRIVATE, SALT RIVER OR R.I.D.)
- □ --- EXISTING IRRIGATION STRUCTURE
- EXISTING IRRIGATION STANDPIPE
- 12"W --- EXISTING WATER LINE / SIZE
- EXISTING FIRE HYDRANT
- 12'00 --- EXISTING CONTOUR 5' INTERVAL
- EXISTING CONTOUR 1' INTERVAL
- FCDMC PROPERTY LINE
- APPROXIMATE PROJECT BOUNDARY
- EXISTING DIRT ROAD
- * --- EXISTING BARBED WIRE FENCE
- GATE WITH POST
- WATERS OF U.S.

STRUCTURAL NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO PROJECT SPECIAL PROVISIONS AND SUPPLEMENTARY GENERAL CONDITIONS.
2. REINFORCING STEEL SHALL CONFORM TO ASTM SPECIFICATION A615, GRADE 60.
3. STRESSES - FS = 60,000 PSI - GRADE 60 REINFORCING STEEL.
4. ALL REINFORCING STEEL PLACEMENT DIMENSIONS SHALL BE TO CENTER OF BARS UNLESS OTHERWISE NOTED.
5. ALL REINFORCING STEEL SHALL HAVE 2" CLEAR COVER UNLESS OTHERWISE NOTED.
6. ALL WELDING SHALL CONFORM TO THE REQUIREMENTS OF THE AMERICAN WELDING SOCIETY, STRUCTURAL WELDING CODE, REVISED 1996.
7. DIMENSIONS SHALL NOT BE SCALED FROM DRAWINGS.
8. CHAMFER ALL EXPOSED CONCRETE CORNERS 3/4" UNLESS OTHERWISE NOTED.
9. CONCRETE COMPRESSIVE STRENGTH SHALL BE 3,000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE.

GENERAL NOTES

1. ALL CONSTRUCTION TO BE PERFORMED ACCORDING TO THESE PROJECT DRAWINGS, SPECIAL PROVISIONS, AND SUPPLEMENTARY GENERAL CONDITIONS.
2. FACILITIES WHICH ARE NOT SPECIFICALLY LOCATED WITH ACTUAL HORIZONTAL AND VERTICAL CONTROLS ARE APPROXIMATE AND TO THE BEST AVAILABLE INFORMATION.
3. EXISTING UTILITIES AND OTHER FACILITIES HAVE BEEN PLACED ON THE PLANS FROM FIELD SURVEYS, EXISTING MAPS AND OTHER CURRENT PLANS WITHIN THE AREA OF THIS PROJECT. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION AND/OR ELEVATION OF EXISTING UTILITIES WHICH PERTAIN TO AND AFFECT THE CONSTRUCTION OF THIS PROJECT.
4. TWO (2) WORKING DAYS PRIOR TO EXCAVATING, THE CONTRACTOR SHALL CALL FOR BLUE STAKE UTILITY LOCATING SERVICE AT THE BLUE STAKE CENTER (PHONE: 602-263-1100).
5. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS PRIOR TO CONSTRUCTION.
6. THE FLOOD CONTROL DISTRICT IS NOT RESPONSIBLE FOR LIABILITY ACCRUED DUE TO DELAYS AND/OR DAMAGE TO UTILITIES IN CONJUNCTION WITH THIS CONSTRUCTION.
7. ANY WORK PERFORMED WITHOUT THE APPROVAL OF THE FLOOD CONTROL DISTRICT AND/OR THE ENGINEER AND ALL WORK AND MATERIALS NOT IN CONFORMANCE WITH THE SPECIFICATIONS IS SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTRACTOR'S EXPENSE.
8. THE ENGINEER WILL DETERMINE THE NUMBER AND LOCATION OF THE REQUIRED CONFORMANCE COMPACTION TESTS FOR STRUCTURE BACKFILL IN GENERAL ACCORDANCE WITH THE APPROVED COA PLAN.
9. TRAFFIC CONTROL SHALL BE MAINTAINED IN ACCORDANCE WITH M.A.G. SPECIFICATION 40.1, PART VI OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (1988 EDITION) INCLUDING REVISION 3 DATED SEPTEMBER 3, 1993).
10. PRIOR TO FINAL APPROVAL AND ACCEPTANCE OF THE WORK, THE CONTRACTOR WILL BE REQUIRED TO CLEAN ADJACENT (OFF-PROJECT) ROADWAYS USED DURING THE COURSE OF CONSTRUCTION.

UTILITY NOTIFICATION

PHONE NO.	COMPANY	CONTACT
(602) 250-1000	ARIZONA PUBLIC SERVICE COMPANY (APS)	MS. ISABEL CABRERA
(909) 898-4776	AT&T FIBER OPTIC TELEPHONE	MR. FRANCO JAUREGUI
(602) 659-7214	COX COMMUNICATIONS (CABLE TV)	MR. CARL MCKAY
(602) 438-4224	EL PASO NATURAL GAS (EPNG)	MR. BILL WARD
(623) 975-1125	MARICOPA WATER DISTRICT (CANAL)	MR. GLENN VORTHERMS
(602) 236-4609	SALT RIVER PROJECT IRRIGATION (SRP)	MR. GERRY BASTIAN
(602) 236-8643	SALT RIVER PROJECT POWER DISTRIBUTION (SRPPD)	MR. GREG WILSON
(602) 236-8603	SALT RIVER PROJECT POWER TRANSMISSION (SRPPT)	MR. DAN HAWKINS
(602) 484-5302	SOUTHWEST GAS (SWG)	MR. GENE FLOREZ
(602) 630-0496	U.S. WEST COMMUNICATIONS (USW)	MR. JOHN AKER

NOTE: OTHER UTILITIES MAY BE PRESENT.

ABBREVIATIONS

ABBR	DESCRIPTION
CSTR	CONSTRUCTION
DESC	DESCRIPTION
EQ	EQUAL
OHE	OVERHEAD ELECTRIC
P/L	PROPERTY LINE
C/L	CENTERLINE
PRV	PRIVATE
ROW	RIGHT-OF-WAY
TCE	TEMPORARY CONSTRUCTION EASEMENT
O.C.	ON CENTER
E.W.	EACH WAY
N	NORTHING
E	EASTING
EL	ELEVATION
BM	BENCHMARK
CP	CONTROL POINT
CLR	CLEARANCE
TYP	TYPICAL
NTS	NOT TO SCALE

INDEX OF SHEETS

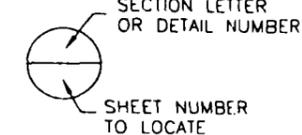
DRAWING NO.	TITLE	SHEET NO.
G1	COVER SHEET AND VICINITY MAP	1
G2	DRAWING INDEX, LEGEND AND GENERAL NOTES	2
G3	SITE MAP	3
O1	QUANTITY SUMMARY	4
C1	PLAN AND ALIGNMENT OF EMERGENCY SPILLWAY MODIFICATIONS AND ARMOR	5
C2	NORTH OUTLET PLAN - BUTTRESS	6
C3	CENTRAL OUTLET PLAN - BUTTRESS	7
C4	SOUTH OUTLET PLAN - BUTTRESS	8
C5	NORTH OUTLET PLAN - FILTER	9
C6	CENTRAL OUTLET PLAN - FILTER	10
C7	SOUTH OUTLET PLAN - FILTER	11
D1	EMERGENCY SPILLWAY SECTIONS	12
D2	NORTH OUTLET SECTION AND ELEVATIONS	13
D3	CENTRAL OUTLET SECTION AND ELEVATIONS	14
D4	SOUTH OUTLET SECTION AND ELEVATIONS	15
D5	TRASH RACK SECTION AND DETAILS	16
D6	OUTLET PIPES SECTIONS AND DETAILS	17
D7	OUTLET RIPRAP END SECTIONS	18

PROJECT BENCHMARKS AND CONTROL POINTS

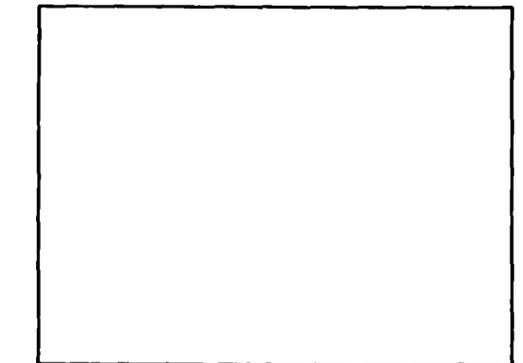
NAME	NORTHING	EASTING	ELEVATION	GENERAL DESCRIPTION	STATUS
DV2235	918038.84	546702.59	NOT VERIFIED	DISK IN CONCRETE	EXISTING
DV2248	918094.59	541630.47	NOT VERIFIED	DISK IN CONCRETE	EXISTING
SCS BM 8-90	*921112.4	*522153.7	1284.36	DISK IN ROCK	EXISTING
USGS N-475	*928029.7	*518015.5	1474.15	BRASS CAP IN CONCRETE	EXISTING
* *				PROJECT BENCH MARK	
CP#1	922254.41	531191.71	1207.5	NORTH OUTLET CONTROL POINT FOR FILTER	DESIGNED
CP#2	922254.35	531167.16	1186.9 (INVERT)	NORTH OUTLET CONTROL POINT FOR PIPE	DESIGNED
CP#3	922371.4	531142.7	1190.5	REBAR IN CONCRETE AT NORTH OUTLET	DESIGNED
CP#4	921030.79	529942.07	1207.00	CENTRAL OUTLET CONTROL POINT FOR FILTER	DESIGNED
CP#5	920960.67	520009.51	1185.9 (INVERT)	CENTRAL OUTLET CONTROL POINT FOR PIPE	DESIGNED
CP#6	921012.0	530047.3	1189.9	REBAR IN CONCRETE AT CENTRAL OUTLET	DESIGNED
CP#7	919792.26	528664.47	1205.0	SOUTH OUTLET CONTROL POINT FOR FILTER	DESIGNED
CP#8	919750.36	528704.97	1189.3 (INVERT)	SOUTH OUTLET CONTROL POINT FOR PIPE	DESIGNED
CP#9	919691.9	528611.6	1191.5	REBAR IN CONCRETE AT SOUTH OUTLET	DESIGNED
CP#10	919184.75	527353.81	1204.0	REBAR IN CONCRETE AT SPILLWAY	DESIGNED

COORDINATE INFORMATION WAS OBTAINED FROM THE MAP OF WHITE TANKS/AGUA FRIA A.D.M.S. TOPOGRAPHIC MAPS, FLOWN 12/22/89 BY COOPER AERIAL OF PHOENIX, INC. FOR THE WLB GROUP INC., AREA DRAINAGE MASTER STUDY. BASIS OF BEARING: COVERED FROM NAD 27 TO ARIZONA ZONE 12 CENTRAL NAD 83

- * COORDINATES ARE APPROXIMATE. THESE POINTS ARE FOR VERTICAL CONTROL ONLY.
- * * PROJECT BENCH MARK TO BE PROVIDED BY FCDMC.



ADWR APPROVAL



NO.	REVISION	BY	DATE
2	100% FINAL, PER ADWR COMMENTS	TER	04/01
1	100% FINAL, ISSUED FOR ADWR PERMIT	TER	01/01
D	100% SUBMITTAL, REVIEW FOR ADWR PERMIT	TER	10/00
E	95% SUBMITTAL	TER	07/00
D	90% SUBMITTAL	TER	05/00
C	60% SUBMITTAL	TER	02/00
B	30% SUBMITTAL	TER	01/00
A	10% SUBMITTAL	TER	11/99

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

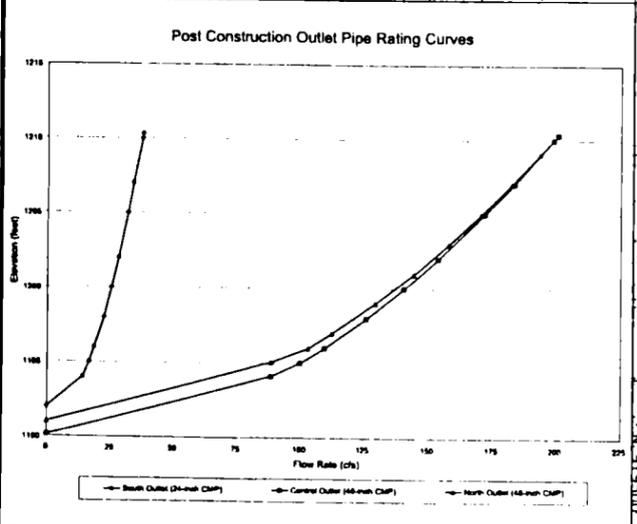
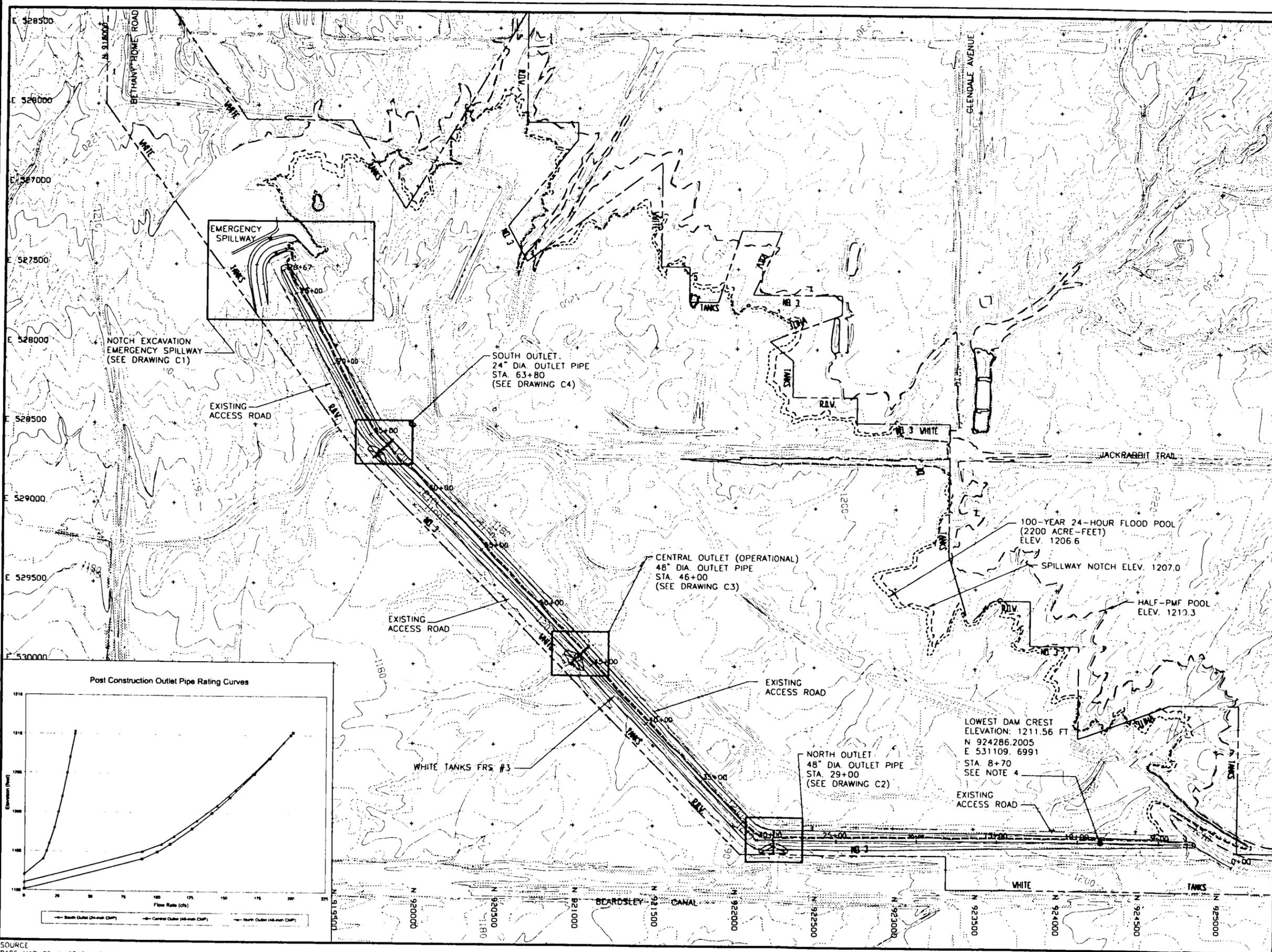
WHITE TANKS FRS#3 INTERIM DAM SAFETY

F.C.D. CONTRACT NO. FCD2000C028

	BY	DATE
DESIGNED	K. SOMERVILLE	01/01
DRAWN	M. HANCHETT	01/01
CHECKED	T. RINGSMUTH	01/01

DAMES & MOORE
A TANKS & WATER GROUP COMPANY

DRAWING NO.	DRAWING INDEX, LEGEND AND GENERAL NOTES	SHEET OF
G2		2 18



SOURCE
 BASE MAP OF WHITE TANKS/AGUA FRIA ADMS TOPOGRAPHIC
 MAPS, FLOWN 12/22/89 BY COOPER AERIAL OF PHOENIX, IN
 FOR THE WLB GROUP INC. AREA DRAINAGE MASTER STUDY
 BASIS OF BEARING COVERED FROM NAD 27 TO
 ARIZONA ZONE 12 CENTRAL NAD 83

ITEM NO.	ITEM DESCRIPTION	QUANTITY
105-1	PARTNERING (ALLOWANCE)	1 LS
107-1	CONSTRUCTION SWPPP	1 LS
107-2	PROJECT SIGN ALLOWANCE	1 LS
107-3	PUBLIC INFORMATION AND NOTIFICATION ALLOWANCE	1 LS
202-1	MOBILIZATION	1 LS
401-1	TRAFFIC CONTROL	1 LS
405-2	MONUMENTS	1 LS

- LEGEND:**
- 1200 — EXISTING CONTOUR 5' INTERVAL
 - — — — — EXISTING CONTOUR 1' INTERVAL
 - - - - - FCDMC PROPERTY LINE
 - EXISTING DIRT ROAD
 - - - - - EXISTING BARBED WIRE FENCE

- NOTES:**
- BENCHMARK LOCATIONS IDENTIFIED FOR THIS PROJECT ARE BEYOND THE LIMITS OF THIS DRAWING. SEE PROJECT BENCHMARK AND CONTROL POINT APPROXIMATE GEOGRAPHIC LOCATION SHOWN ON DRAWING G1 AND COORDINATE TABLE ON DRAWING G2.
 - CENTRAL OUTLET IS IDENTIFIED AS BEING THE PRIMARY OPERATIONAL STRUCTURE.
 - CONTRACTOR SHALL STAY ON EXISTING ROADS AND WORK WITHIN SPECIFIED ZONES ALLOWED FOR PROJECT.
 - LOWEST DAM CREST ELEVATION IDENTIFIED FROM A-TEAM SURVEY DATED 01/31/00.



ADWR APPROVAL

NO.	REVISION	BY	DATE
2	100% FINAL, PER ADWR COMMENTS	TER	04/01
1	100% FINAL, ISSUED FOR ADWR PERMIT	TER	01/01
0	100% SUBMITTAL, REVIEW FOR ADWR PERMIT	TER	10/00
E	95% SUBMITTAL	TER	07/00
D	90% SUBMITTAL	TER	05/00
C	60% SUBMITTAL	TER	02/00
B	30% SUBMITTAL	TER	01/00
A	10% SUBMITTAL	TER	11/99

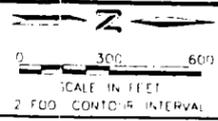
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS#3 INTERIM DAM SAFETY F.C.D. CONTRACT NO. FCD2000C028

	BY	DATE
DESIGNED	K. SOMERVILLE	01/01
DRAWN	K. PALMISANO	01/01
CHECKED	T. RINGSMUTH	01/01



DRAWING NO. G3	SITE MAP	SHEET OF 3 18
----------------	----------	---------------



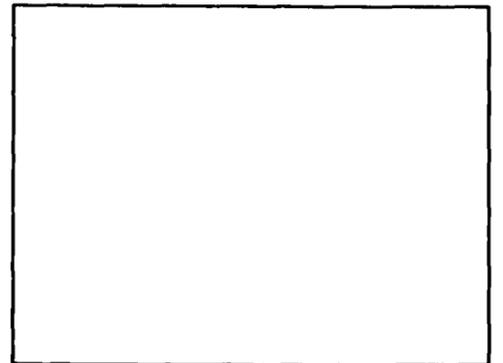
QUANTITY SUMMARY

ITEM NO.	ITEM DESCRIPTION	UNIT	SHEET NUMBERS															TOTAL QUANTITY	
			3	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
105-1	PARTNERING (ALLOWANCE)	L.S.	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
107-1	CONSTRUCTION SWPPP	L.S.	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
107-2	PROJECT SIGN ALLOWANCE	L.S.	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
107-3	PUBLIC INFORMATION AND NOTIFICATION ALLOWANCE	L.S.	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
201-1	CLEARING/GRUBBING	S.Y.		6060	845	990	620	0	0	0	0	0	0	0	0	0	0	0	8515
202-1	MOBILIZATION	L.S.	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
206-1	FOUNDATION PREPARATION	S.Y.	0	0	475	475	475	0	0	0	0	0	0	0	0	0	0	0	1425
206-2	EXCAVATION OF DAM FACE AND TOE	C.Y.	0	0	200	140	60	0	0	0	0	0	0	0	0	0	0	0	400
	BORROW EXCAVATION																		INCIDENTAL
211-1	FILTER SAND	C.Y.	0	0	0	0	0	134	134	62	0	0	0	0	0	0	0	0	330
211-2	SOIL BUTTRESS FILL CONSTRUCTION	C.Y.	0	0	1800	1900	1360	0	0	0	0	0	0	0	0	0	0	0	5060
211-3	DRAIN SAND	C.Y.	0	0	0	0	0	50	50	15	0	0	0	0	0	0	0	0	115
215-1	NOTCH EXCAVATION	C.Y.	0	5000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5000
220-1	RIPRAP	C.Y.	0	330	0	5	3	3	0	0	0	0	0	0	0	0	0	0	341
220-2	1-INCH AGGREGATE	C.Y.	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0	0	30
	WATERING																		INCIDENTAL
230-1	GEOTEXTILE	S.F.	0	0	0	0	0	3000	3100	1584	7650	0	0	0	0	0	0	0	15334
350-1	DEMOLITION OF EXISTING CONCRETE HEADWALL & REMOVAL OF PIPE & SHOTCRETE	EACH	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	3
350-2	REMOVE AND REPLACE PERIMETER FENCING	EACH	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	3
401-1	TRAFFIC CONTROL	L.S.	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
405-1	MONUMENTS	L.S.	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
505-1	CONCRETE STRUCTURES	C.Y.	0	0	0	0	0	27	27	17	0	0	0	0	0	0	0	0	71
515-1	TRASH RACK (48-INCH DIAMETER OUTLET)	EACH	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
515-2	TRASH RACK (48-INCH DIAMETER OUTLET)	EACH	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
515-3	TRASH RACK (24-INCH DIAMETER OUTLET)	EACH	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
525-1	PNEUMATICALLY PLACED MORTAR (SHOTCRETE)	S.F.	0	0	810	0	0	0	0	0	0	0	0	0	0	0	0	0	810
530-1	PAINTING TRASH RACK (NORTH OUTLET)	EACH	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
530-2	PAINTING TRASH RACK (CENTRAL OUTLET)	EACH	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
530-3	PAINTING TRASH RACK (SOUTH OUTLET)	EACH	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
605-1	8-INCH HDPE CORRUGATED PERFORATED DRAIN PIPE	L.F.	0	0	0	0	0	60	60	0	0	0	0	0	0	0	0	0	120
605-2	4-INCH HDPE CORRUGATED PERFORATED DRAIN PIPE	L.F.	0	0	0	0	0	0	0	52	0	0	0	0	0	0	0	0	52
621-1	CORRUGATED METAL PIPE (48-INCH NORTH OUTLET)	L.F.	0	0	0	0	0	37	0	0	0	0	0	0	0	0	0	0	37
621-2	CORRUGATED METAL PIPE (48-INCH CENTRAL OUTLET)	L.F.	0	0	0	0	0	0	57	0	0	0	0	0	0	0	0	0	57
621-3	CORRUGATED METAL PIPE (24-INCH SOUTH OUTLET)	L.F.	0	0	0	0	0	0	0	37	0	0	0	0	0	0	0	0	37

NOTE: SPECIAL PROVISION SECTION NUMBERS 210, 225, 701, 725, 726, 727, 738, 760, 790, ARE INCIDENTAL TO THE PROJECT AND ARE NOT CONSIDERED BID ITEMS.



ADWR APPROVAL



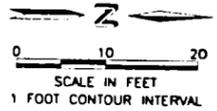
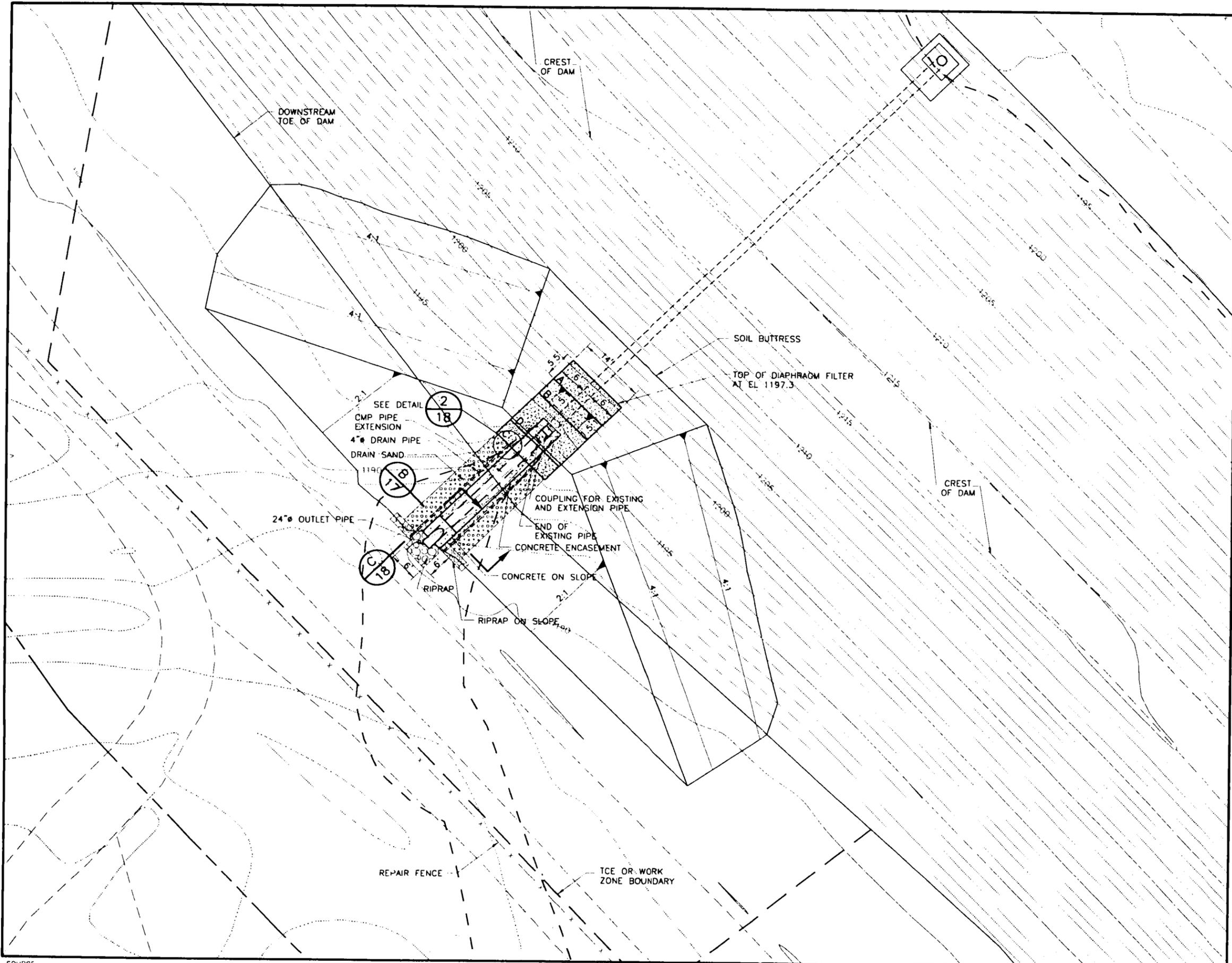
2	100% FINAL PER ADWR COMMENTS	TER	04/01
1	100% FINAL ISSUED FOR ADWR PERMIT	TER	01/01
0	100% SUBMITTAL REVIEW FOR ADWR PERMIT	TER	10/00
E	NEW SHEET 85% SUBMITTAL	TER	07/00
NO.	REVISION	BY	DATE

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS#3
INTERIM DAM SAFETY
F.C.D. CONTRACT NO. FCD2000C028

	BY	DATE
DESIGNED	K. SOMERVILLE	01/01
DRAWN	K. PALMISANO	01/01
CHECKED	T. RINGSMUTH	01/01





SOUTH OUTLET PLAN - FILTER

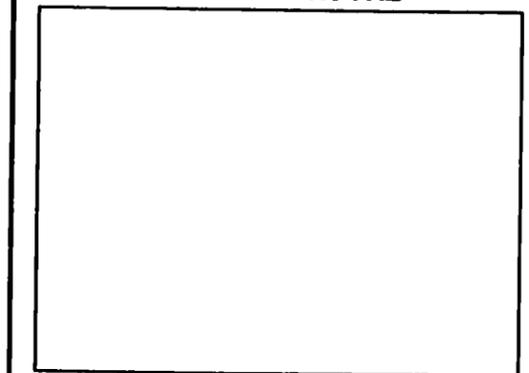
ITEM NO.	ITEM DESCRIPTION	QUANTITY
211-1	FILTER SAND	62 CY
211-3	DRAIN SAND	15 CY
621-3	CORRUGATED METAL PIPE (24-INCH DIA. SOUTH OUTLET)	37 L.F.
505-1	CONCRETE STRUCTURE	17 CY
230-1	GEOTEXTILE	1584 SF
605-2	4-INCH HDPE CORRUGATED PERFORATED DRAIN PIPE	52 L.F.

- LEGEND:
- 1200 --- EXISTING CONTOUR 5' INTERVAL
 - EXISTING CONTOUR 1' INTERVAL
 - FCDMC PROPERTY LINE
 - EXISTING DIRT ROAD
 - x x x EXISTING BARBED WIRE FENCE
 - WATERS OF U.S.

NOTE:
 1. LIMITS OF CONSTRUCTION 30 FT OUTSIDE WORK ZONE ON OUTLET SOIL BUTTRESS.



ADWR APPROVAL



NO.	REVISION	BY	DATE
2	100% FINAL, PER ADWR COMMENTS	TER	04/01
1	100% FINAL, ISSUED FOR ADWR PERMIT	TER	01/01
D	100% SUBMITTAL, REVIEW FOR ADWR PERMIT	TER	10/00
E	95% SUBMITTAL	TER	07/00
D	NEW SHEET 90% SUBMITTAL	TER	05/00

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS#3 INTERIM DAM SAFETY F.C.D. CONTRACT NO. FCD2000C028

	BY	DATE
DESIGNED	K. SOMERVILLE	01/01
DRAWN	K. PALMISANO	01/01
CHECKED	T. RINGSMUTH	01/01

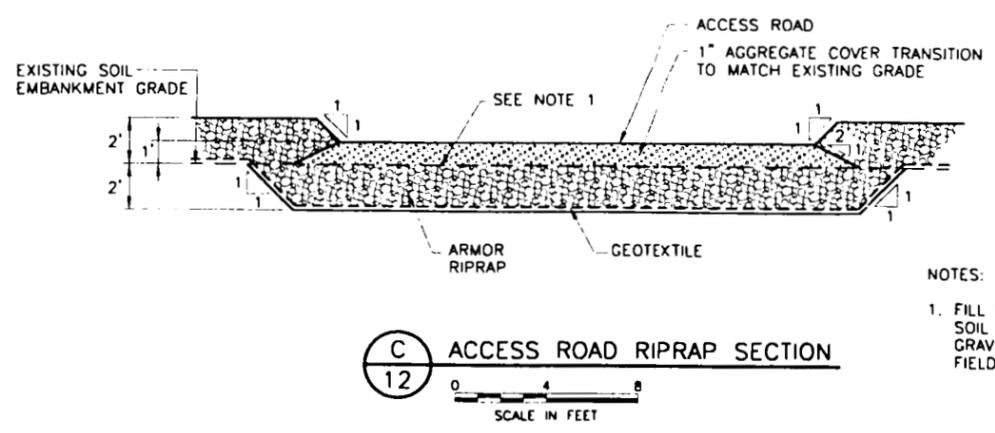
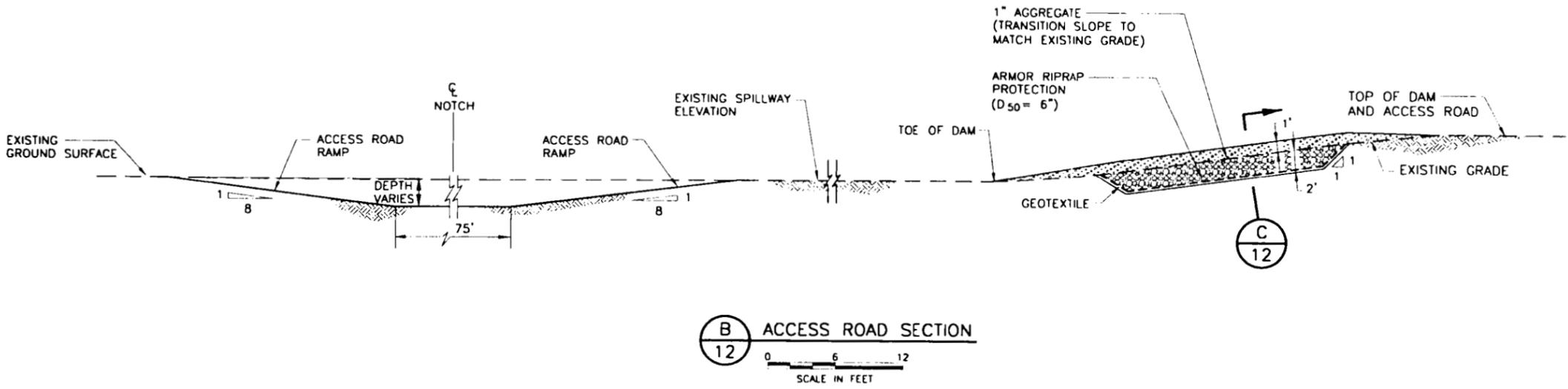
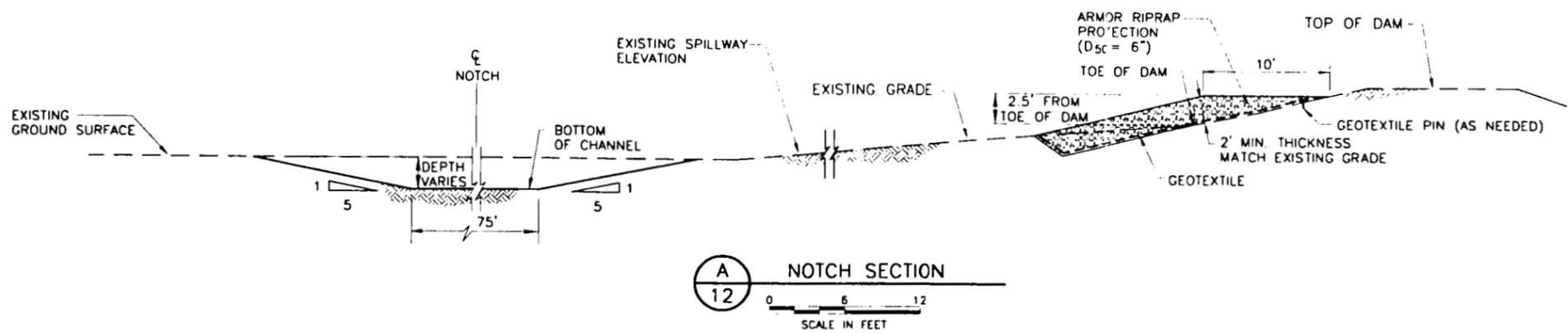


DRAWING NO. C7	SOUTH OUTLET PLAN - FILTER	SHEET OF 11 18
----------------	----------------------------	----------------

205/12/1
 REV-2/10
 JWG
 REF 9/8

SOURCE
 BASE MAP OF WHITE TANKS, AGUA FRIA A.D.M.S. TOPOGRAPHIC MAPS, PROVIDED BY FCDMC 12/98
 BASIS OF BEARING, ARIZONA ZONE 12, CENTRAL NAD 83

ITEM NO.	ITEM DESCRIPTION	QUANTITY
220-2	1-INCH AGGREGATE	30 CY
230-1	GEOTEXTILE	7650 SF

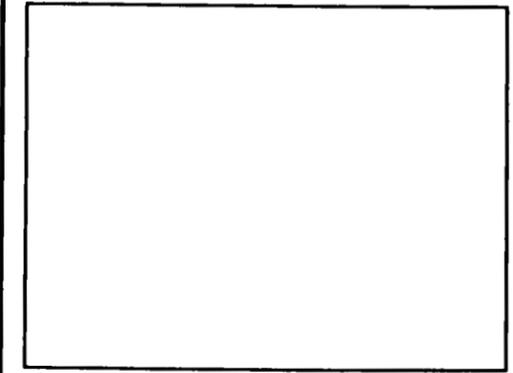


NOTE: ACCESS ROAD REALIGNMENT PER DIRECTION OF ENGINEER.

- NOTES:
1. FILL VOIDS OF RIPRAP WITH SOIL PRIOR TO PLACEMENT OF GRAVEL, TO SATISFACTION OF FIELD ENGINEER.



ADWR APPROVAL



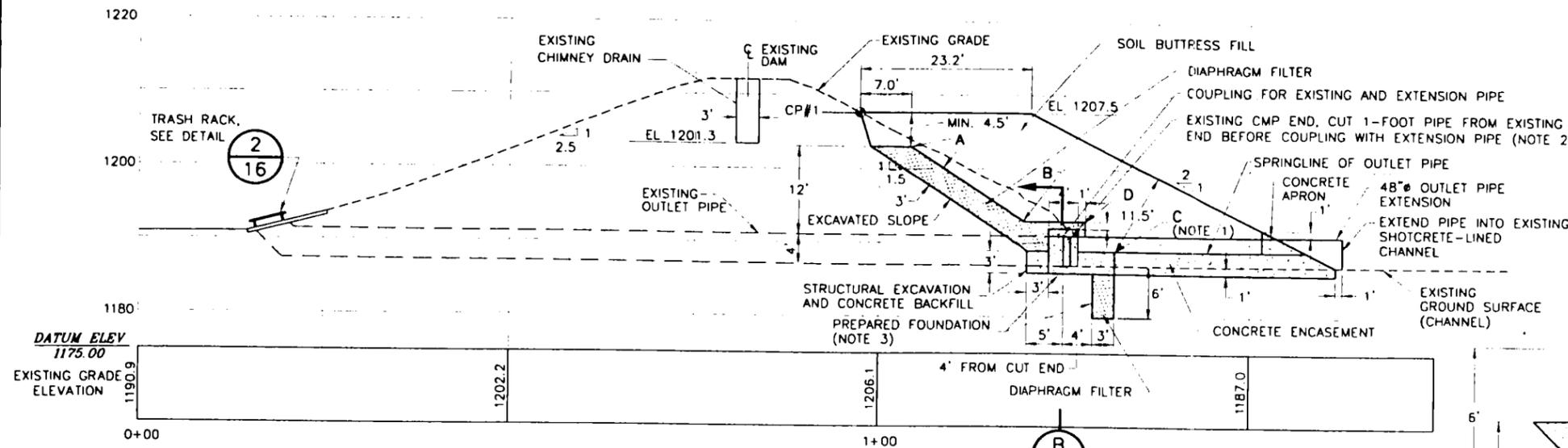
NO.	REVISION	BY	DATE
2	100% FINAL, PER ADWR COMMENTS	TER	04-01
1	100% FINAL, ISSUED FOR ADWR PERMIT	TER	01/01
D	100% SUBMITTAL, REVIEW FOR ADWR PERMIT	TER	10/00
E	95% SUBMITTAL	TER	07/00
D	90% SUBMITTAL	TER	05/00
C	NEW SHEET 60% SUBMITTAL	TER	02/00

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

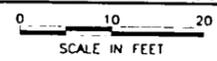
WHITE TANKS FRS#3 INTERIM DAM SAFETY F.C.D. CONTRACT NO. FCD2000C028

	BY	DATE
DESIGNED	K. SOMERVILLE	01/01
DRAWN	K. PALMSANO	01/01
CHECKED	T. RINGSMUTH	01/01

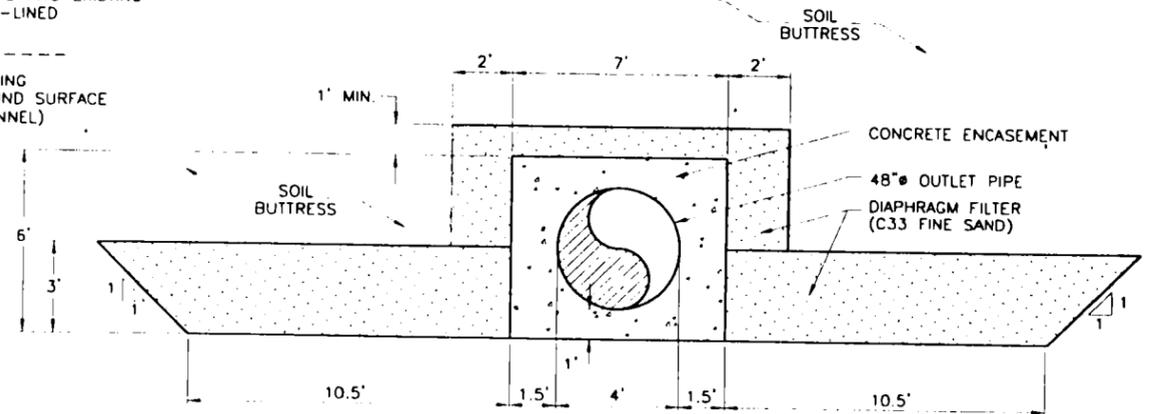




A NORTH OUTLET SECTION
13



- NOTE 1: FILTER EXTENDS TO POINT C, AROUND CONCRETE.
- NOTE 2: SPECIAL PRECAUTIONS MUST BE TAKEN WHEN CUTTING EXISTING CMP DUE TO PRESENCE OF ASBESTOS CONTAINING MATERIAL.
- NOTE 3: THE FOUNDATION MATERIAL REQUIRES SAMPLING AND LABORATORY ANALYSIS PRIOR TO PREP WORK OR FILL PLACEMENT.
- NOTE 4: CONTRACTOR SHALL MINIMIZE EXCAVATION TO EXPOSE EXISTING CMP AND BACKFILL TO SPRINGLINE WITH CAST-IN-PLACE CONCRETE AGAINST EXCAVATED SOIL FACE (NO FORMS ON SIDE OF INTERNAL DAM).



B SECTION
13



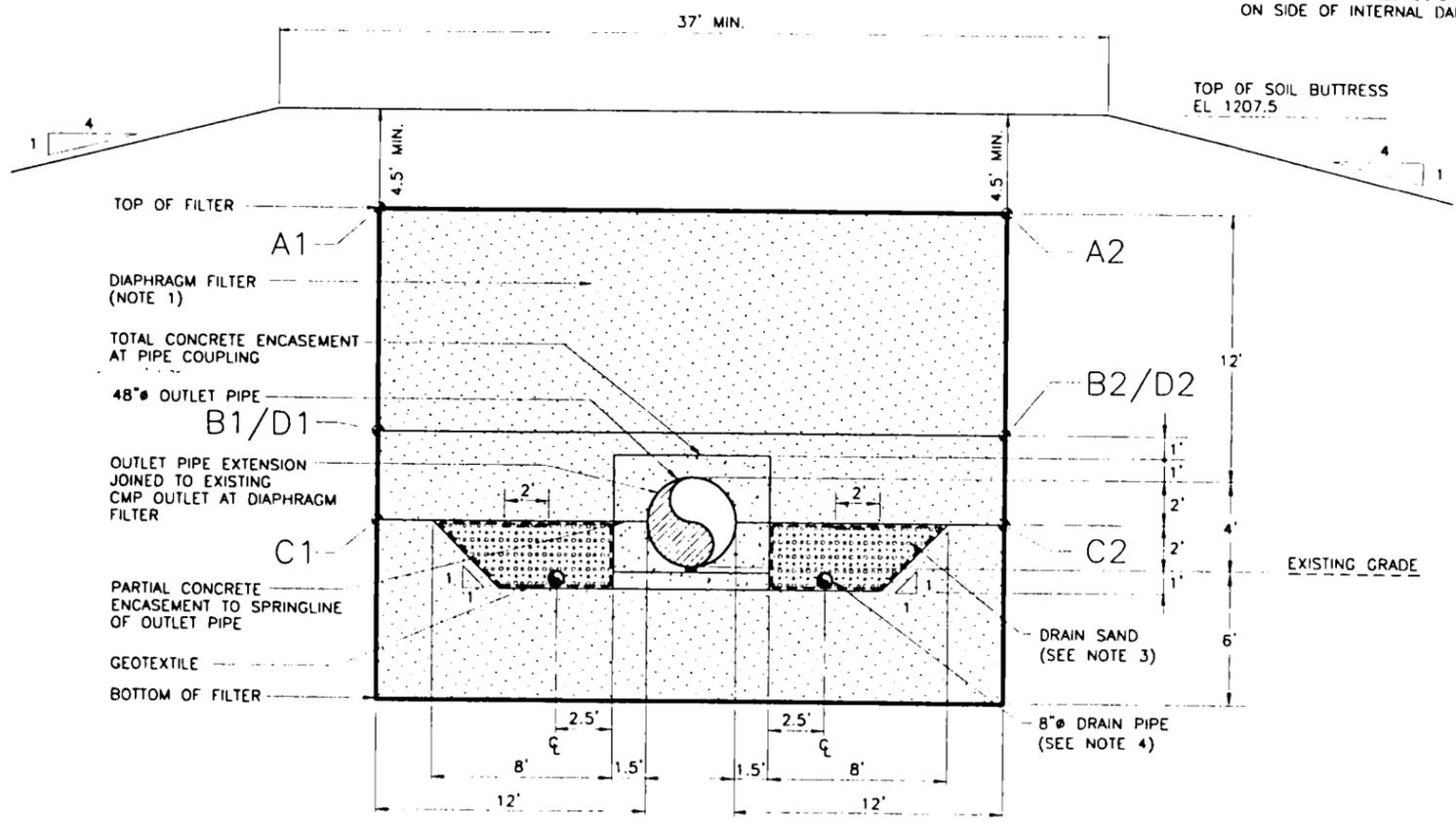
- NOTE 1: WASHED SAND CONFORMING TO ASTM C33 FINE AGGREGATE GRADATION (AS SPECIFIED).
- NOTE 2: SEE DRAWING NO. D6 SHEET 17 OF 17 FOR TIEDOWN SECTION AND DRAWING NO. D7 SHEET 18 OF 18 RIPRAP END SECTION DETAILS.
- NOTE 3: SEE SPECIFICATIONS FOR DRAIN SAND GRADATION, CONFORMING TO ASTM C-33 SIZE NO.9.
- NOTE 4: DRAIN PIPE SHALL BE INSTALLED WITH MANUFACTURED GEOTEXTILE SOCK.



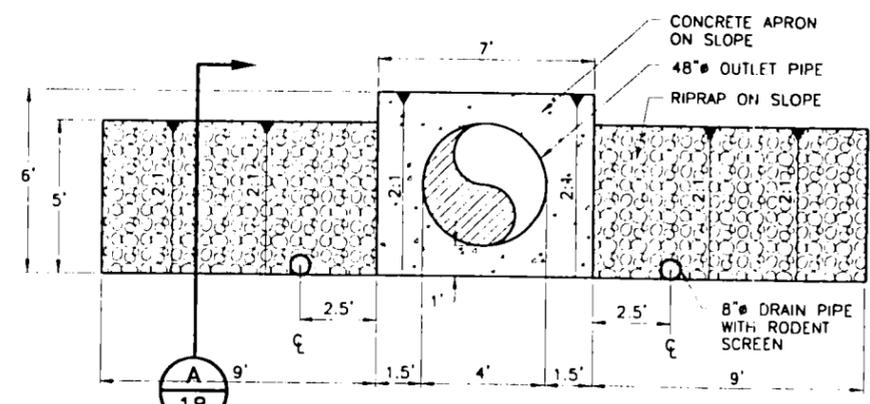
ADWR APPROVAL

KEY CONTROL POINTS OF DIAPHRAGM FILTER AT NORTH OUTLET

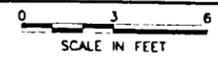
CP		CP		ELEVATION		
A1	N	922240.35	A2	N	922268.33	1203.00
	E	531108.69		E	531108.69	
B1	N	922240.40	B2	N	922268.34	1193.00
	E	531122.36		E	531122.36	
C1	N	922240.35	C2	N	922268.33	1189.00
	E	531136.36		E	531136.36	
D1	N	922240.35	D2	N	922268.33	1193.00
	E	531132.36		E	531132.36	



DIAPHRAGM FILTER ELEVATION AT NORTH OUTLET



RIPRAP AT NORTH OUTLET ELEVATION



NO.	REVISION	BY	DATE
2	100% FINAL, PER ADWR COMMENTS	TER	04/01
1	100% FINAL, ISSUED FOR ADWR PERMIT	TER	01/01
0	100% SUBMITTAL, REVIEW FOR ADWR PERMIT	TER	10/00
E	95% SUBMITTAL	TER	07/00
D	90% SUBMITTAL	TER	05/00
C	60% SUBMITTAL	TER	02/00
B	30% SUBMITTAL	TER	01/00
A	10% SUBMITTAL	TER	11/99

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

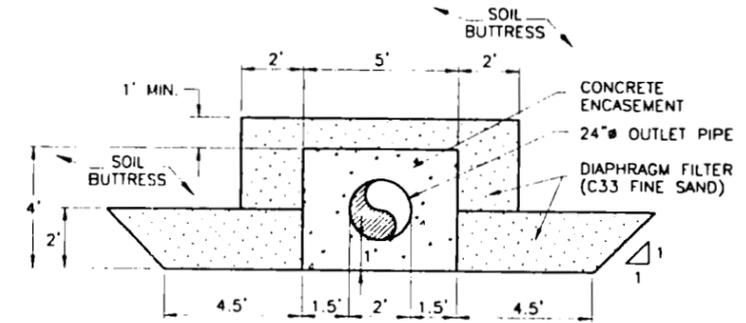
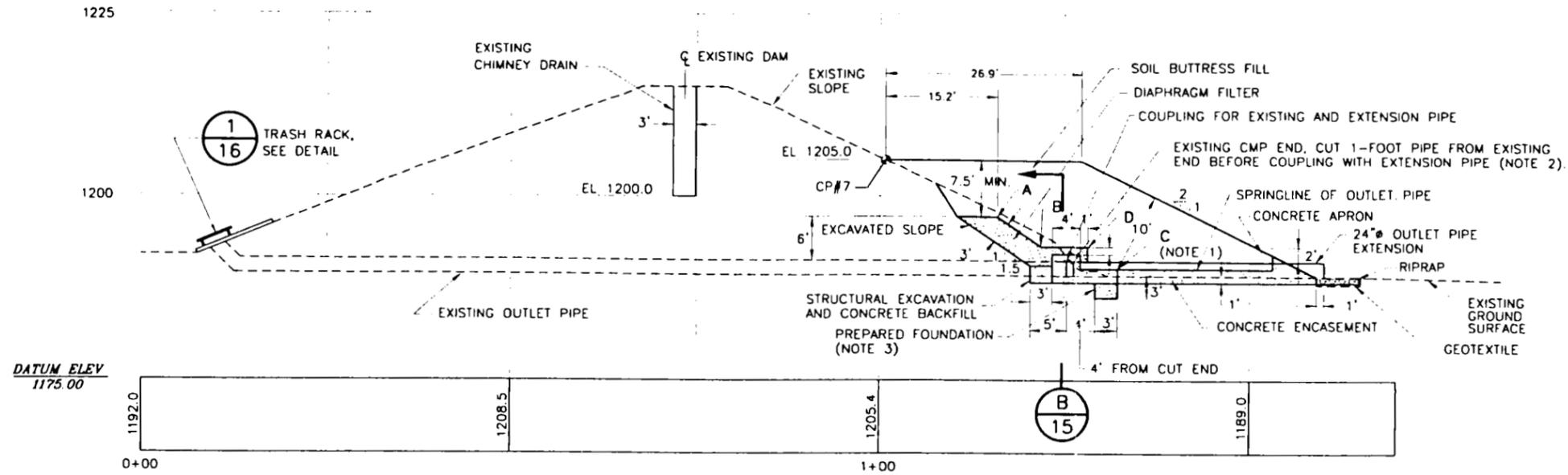
WHITE TANKS FR#3 INTERIM DAM SAFETY
F.C.D. CONTRACT NO. FCD2000C028

	BY	DATE
DESIGNED	K. SOMERVILLE	01/01
DRAWN	K. PALMISANO	01/01
CHECKED	T. RINGSMUTH	01/01

DAMES & MOORE
A DAVIS & BRANTER COMPANY

DRAWING NO. D2 NORTH OUTLET SECTION AND ELEVATIONS SHEET OF 13 18

122100851.14448.00/REV-27A.130232.DWG 4-13-01



A SOUTH OUTLET SECTION
 SCALE IN FEET

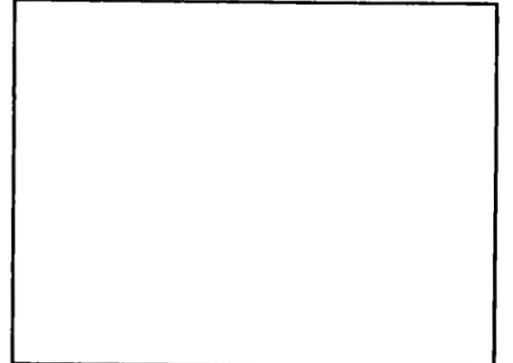
B SECTION
 SCALE IN FEET

- NOTE 1: FILTER EXTENDS TO POINT C, AROUND CONCRETE.
- NOTE 2: SPECIAL PRECAUTIONS MUST BE TAKEN WHEN CUTTING EXISTING CMP DUE TO PRESENCE OF ASBESTOS CONTAINING MATERIAL.
- NOTE 3: THE FOUNDATION MATERIAL REQUIRES SAMPLING AND LABORATORY ANALYSIS PRIOR TO PREP WORK OR FILL PLACEMENT.
- NOTE 4: CONTRACTOR SHALL MINIMIZE EXCAVATION TO EXPOSE EXISTING CMP AND BACKFILL TO SPRINGLINE WITH CAST-IN-PLACE CONCRETE AGAINST EXCAVATED SOIL FACE (NO FORMS ON SIDE OF INTERNAL DAM).

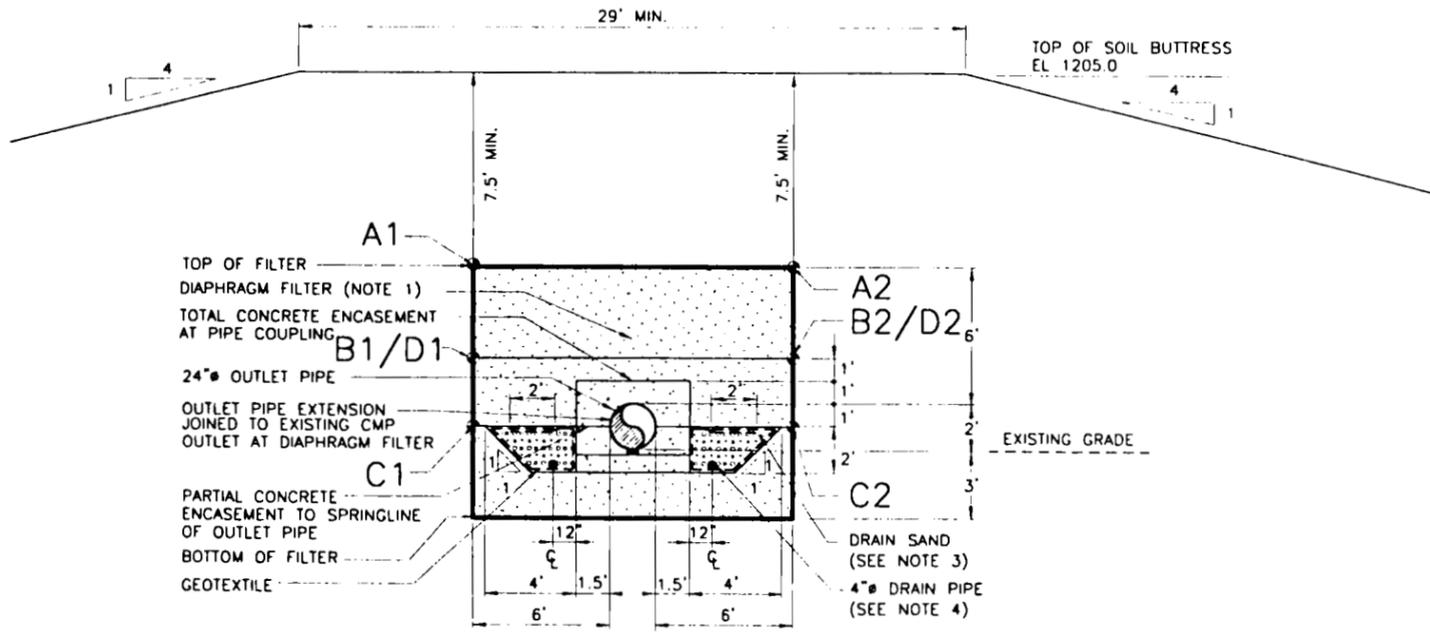
- NOTE 1: WASHED SAND CONFORMING TO ASTM C33 FINE AGGREGATE GRADATION (AS SPECIFIED).
- NOTE 2: SEE DRAWING NO. D6 SHEET 17 OF 17 FOR TIEDOWN SECTION AND DRAWING NO. D7 SHEET 18 OF 18 RIPRAP END SECTION DETAILS.
- NOTE 3: SEE SPECIFICATIONS FOR DRAIN SAND GRADATION, CONFORMING TO ASTM C-33 SIZE NO.9.
- NOTE 4: DRAIN PIPE SHALL BE INSTALLED WITH MANUFACTURED GEOTEXTILE SOCK.



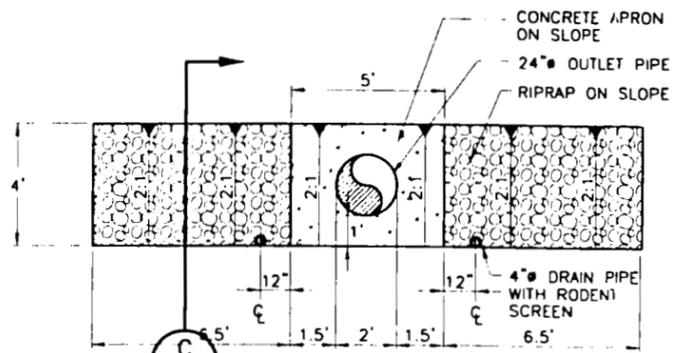
ADWR APPROVAL



KEY CONTROL POINTS OF DIAPHRAGM FILTER AT SOUTH OUTLET					
CP		CP		ELEVATION	
A1	N	919776.31	A2	N	919786.38
	E	528670.16		E	528679.90
B1	N	919773.20	B2	N	919783.31
	E	528673.17		E	528682.87
C1	N	919764.57	C2	N	919774.68
	E	528681.52		E	528691.20
D1	N	919767.44	D2	N	919777.56
	E	528678.73		E	528688.43



DIAPHRAGM FILTER ELEVATION AT SOUTH OUTLET
 SCALE IN FEET



RIPRAP AT SOUTH OUTLET ELEVATION
 SCALE IN FEET

NO.	REVISION	BY	DATE
2	100% FINAL, PER ADWR COMMENTS	TER	04/01
1	100% FINAL, ISSUED FOR ADWR PERMIT	TER	01/01
D	100% SUBMITTAL, REVIEW FOR ADWR PERMIT	TER	10/00
E	95% SUBMITTAL	TER	07/00
D	90% SUBMITTAL	TER	05/00
C	NEW SHEET 60% SUBMITTAL	TER	02/00

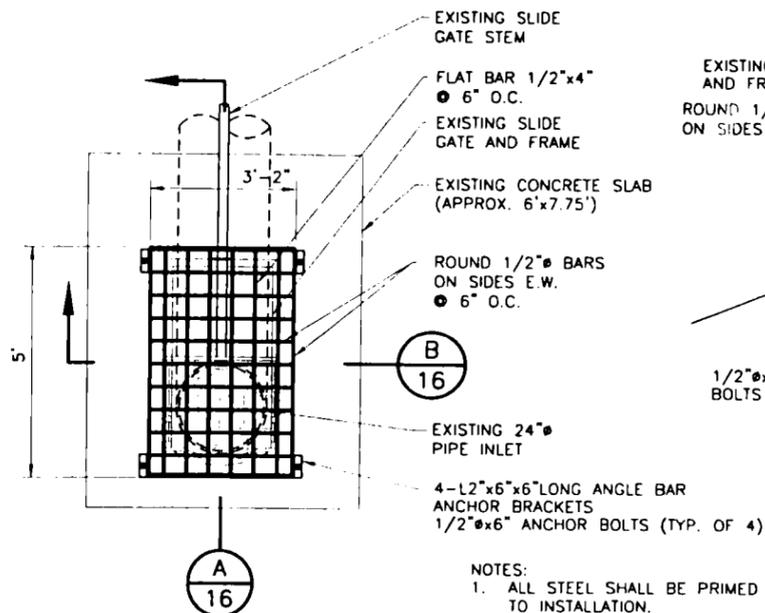
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
 ENGINEERING DIVISION

WHITE TANKS FR#3
 INTERIM DAM SAFETY
 F.C.D. CONTRACT NO. FCD2000C028

	BY	DATE
DESIGNED	K. SOMERVILLE	01/01
DRAWN	K. PALMISANO	01/01
CHECKED	T. RINGSMUTH	01/01

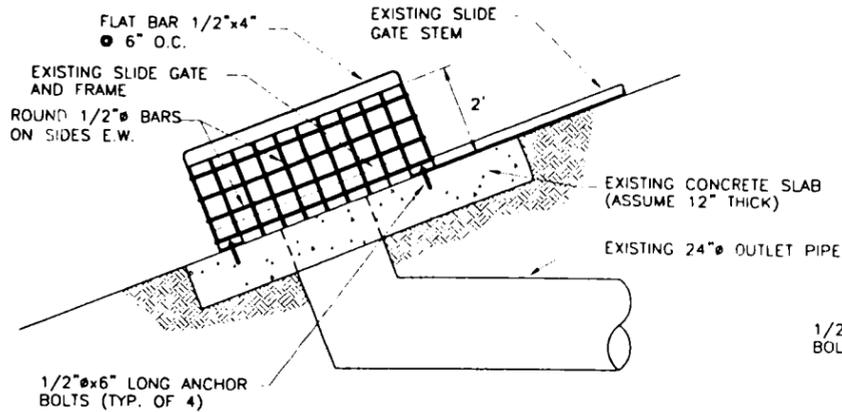
DAMES & MOORE
 ENGINEERS & ARCHITECTS

DRAWING NO. D4	SOUTH OUTLET SECTION AND ELEVATIONS	SHEET OF 15 18
----------------	-------------------------------------	----------------

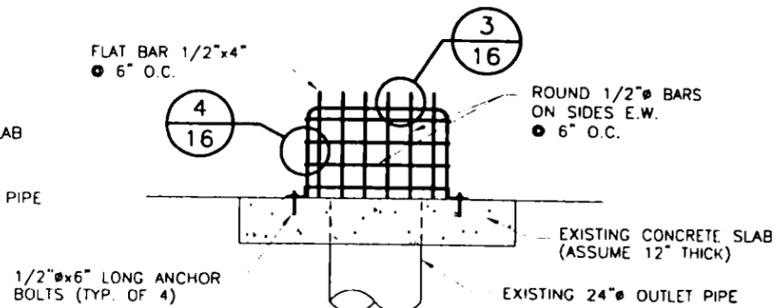


1 SOUTH TRASH RACK PLAN
16
0 2 4
SCALE IN FEET

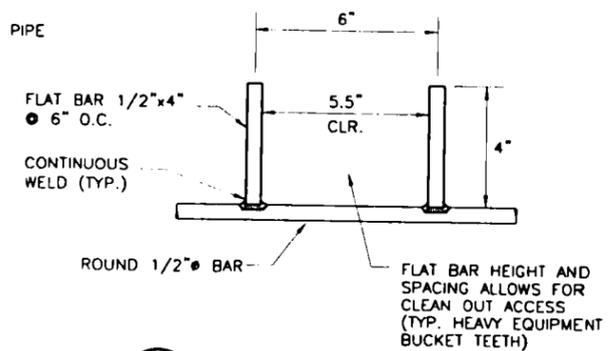
- NOTES:
1. ALL STEEL SHALL BE PRIMED PRIOR TO INSTALLATION.
 2. SHOP PRIME AND PAINT TRASHRACK AND FINAL TOUCH UP PAINT IN FIELD.
 3. DRILL AND EPOXY ANCHOR BOLTS PER SPECIFICATIONS.



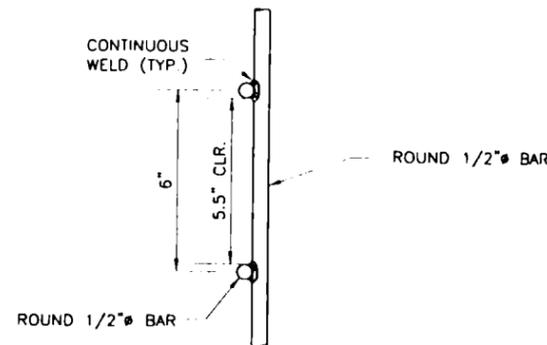
A SOUTH TRASH RACK SECTION
16
0 2 4
SCALE IN FEET



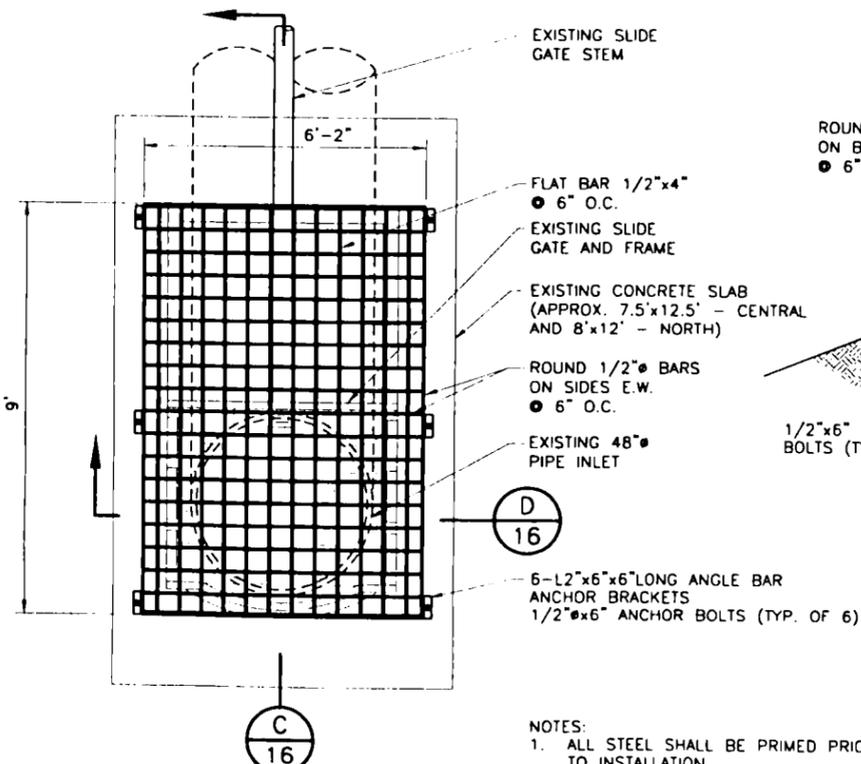
B SOUTH TRASH RACK SECTION
16
0 2 4
SCALE IN FEET



3 TOP OF TRASH RACK DETAIL
16
NTS

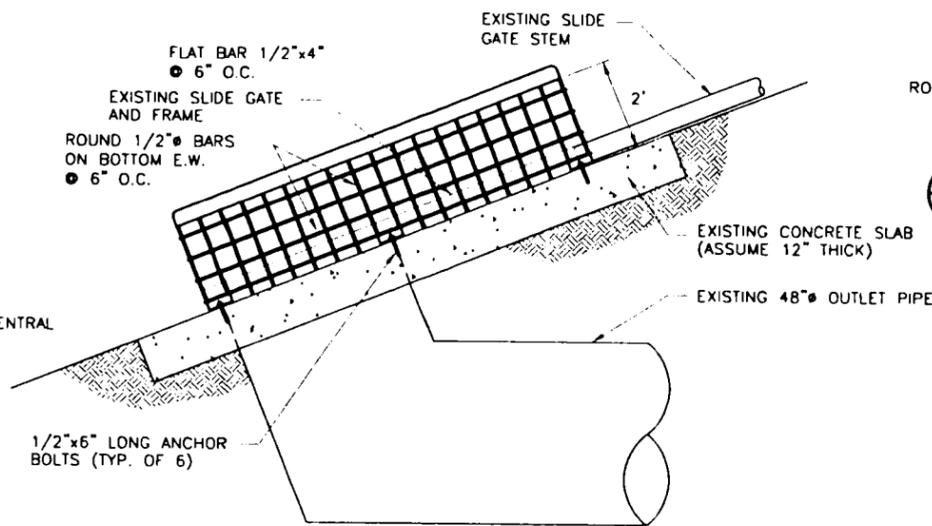


4 SIDE OF TRASH RACK DETAIL
16
NTS

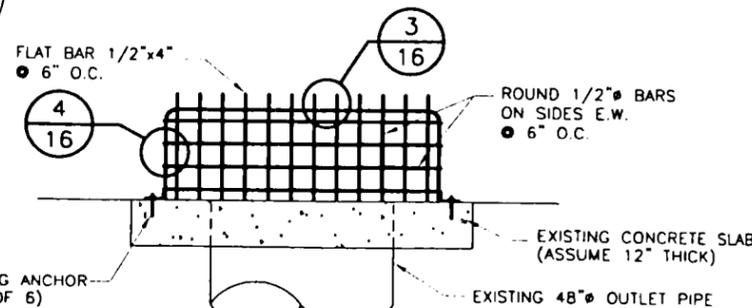


2 NORTH AND CENTRAL TRASH RACK PLAN
16
0 2 4
SCALE IN FEET

- NOTES:
1. ALL STEEL SHALL BE PRIMED PRIOR TO INSTALLATION.
 2. SHOP PRIME AND PAINT TRASHRACK AND FINAL TOUCH UP PAINT IN FIELD.
 3. CENTRAL OUTLET IS IDENTIFIED AS BEING THE PRIMARY OPERATIONAL STRUCTURE.
 4. DRILL AND EPOXY ANCHOR BOLTS PER SPECIFICATIONS.



C NORTH AND CENTRAL TRASH RACK SECTION
16
0 2 4
SCALE IN FEET



D NORTH AND CENTRAL TRASH RACK SECTION
16
0 2 4
SCALE IN FEET



ADWR APPROVAL

NO.	REVISION	BY	DATE
2	100% FINAL, PER ADWR COMMENTS	TER	04/01
1	100% FINAL, ISSUED FOR ADWR PERMIT	TER	01/01
D	100% SUBMITTAL, REVIEW FOR ADWR PERMIT	TER	10/00
E	95% SUBMITTAL	TER	07/00
D	90% SUBMITTAL	TER	05/00
C	60% SUBMITTAL	TER	02/00
B	30% SUBMITTAL	TER	01/00
A	10% SUBMITTAL	TER	11/99

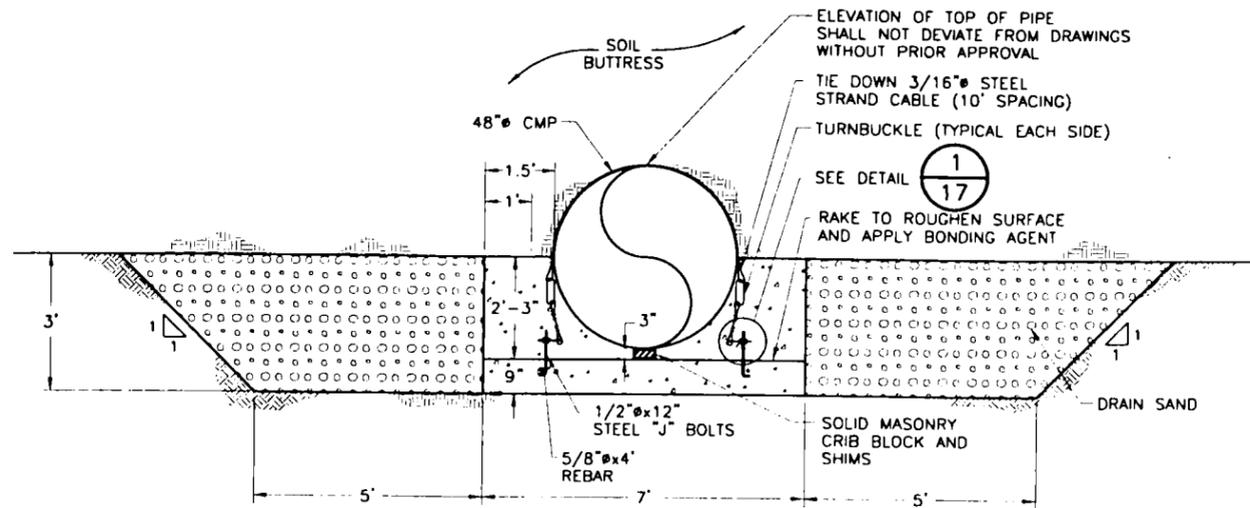
FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS#3
INTERIM DAM SAFETY
F.C.D. CONTRACT NO. FCD2000C028

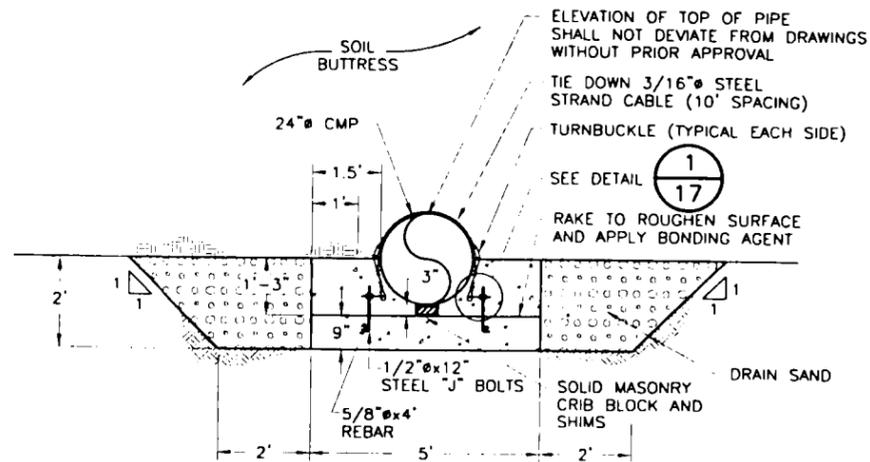
	BY	DATE
DESIGNED	K. SOMERVILLE	01/01
DRAWN	K. PALMISANO	01/01
CHECKED	T. RINGSMUTH	01/01



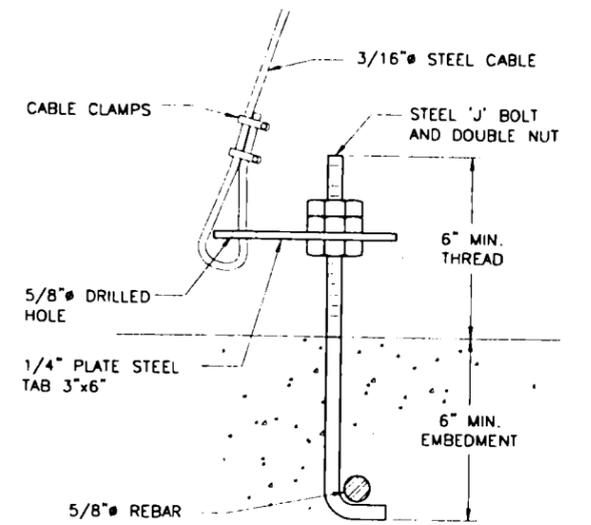
DRAWING NO. D5 TRASH RACK PLANS, SECTIONS AND DETAILS SHEET OF 16 18



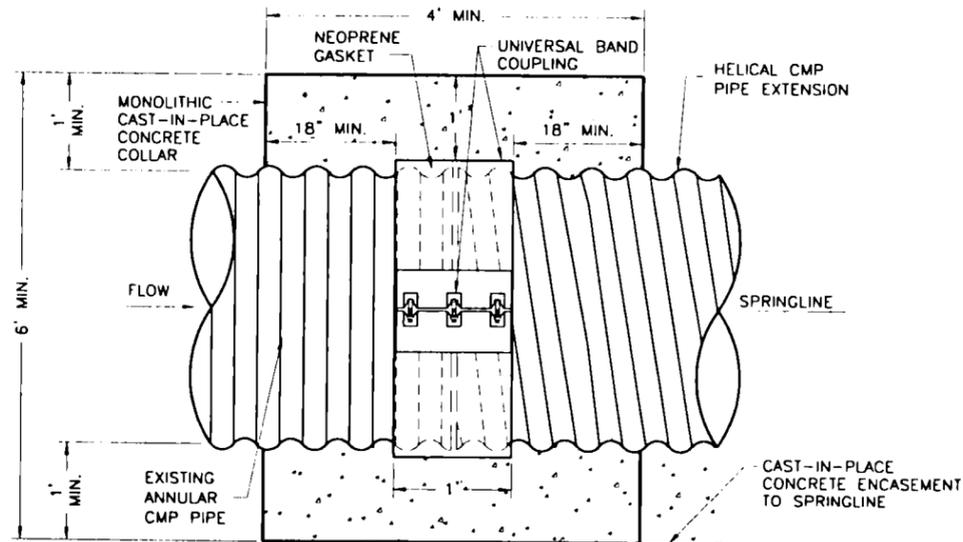
A 48" PIPE TIEDOWN SECTION
17
SCALE IN FEET



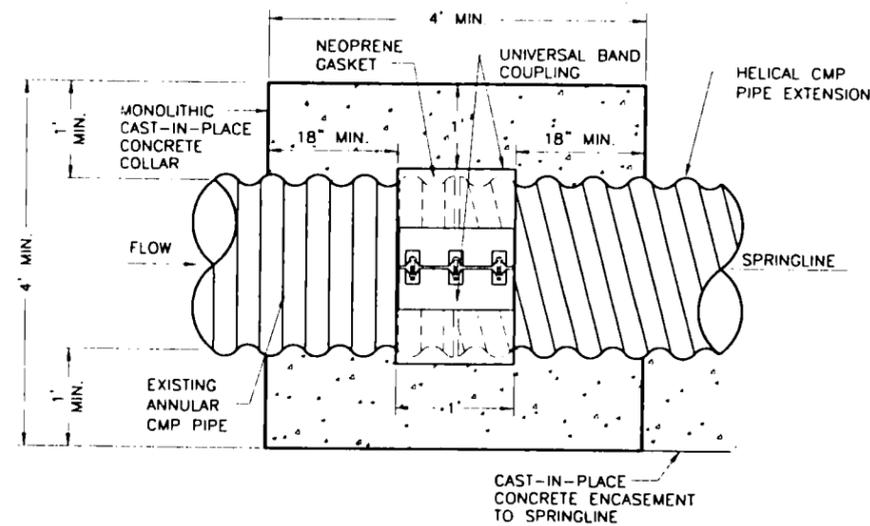
B 24" PIPE TIEDOWN SECTION
17
SCALE IN FEET



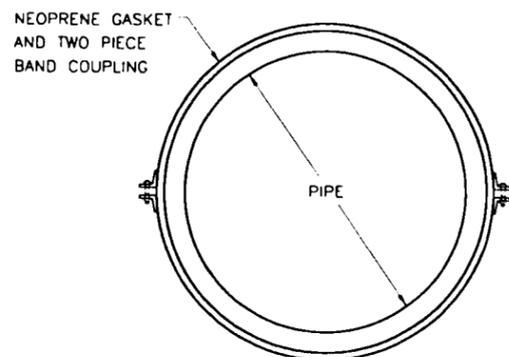
1 TIEDOWN DETAIL
17 NTS



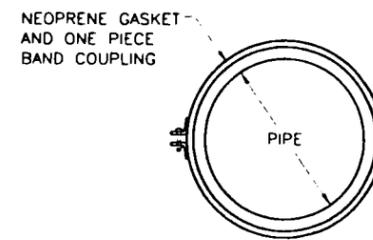
2 48" OUTLET PIPE COUPLING DETAIL
17 NTS



4 24" OUTLET PIPE COUPLING DETAIL
17 NTS



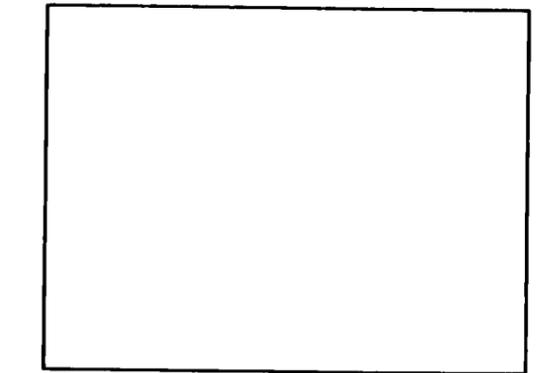
3 TWO PIECE BAND (48" PIPE) DETAIL
17 NTS



5 ONE PIECE BAND (24" PIPE) DETAIL
17 NTS



ADWR APPROVAL



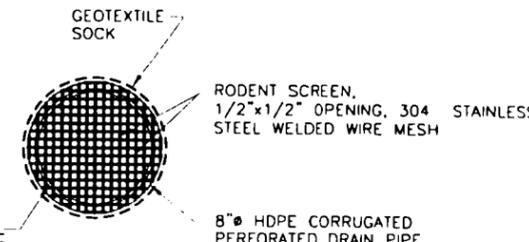
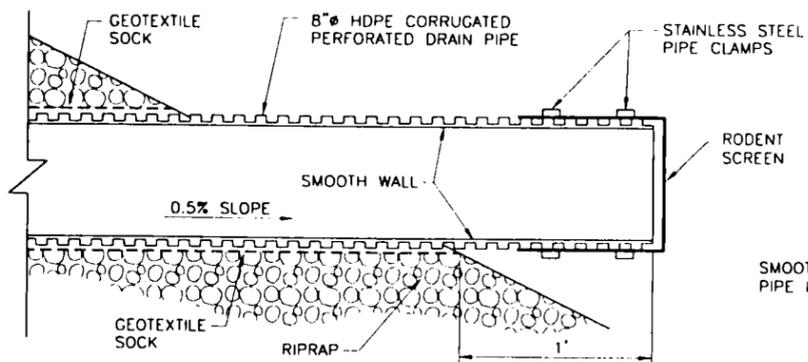
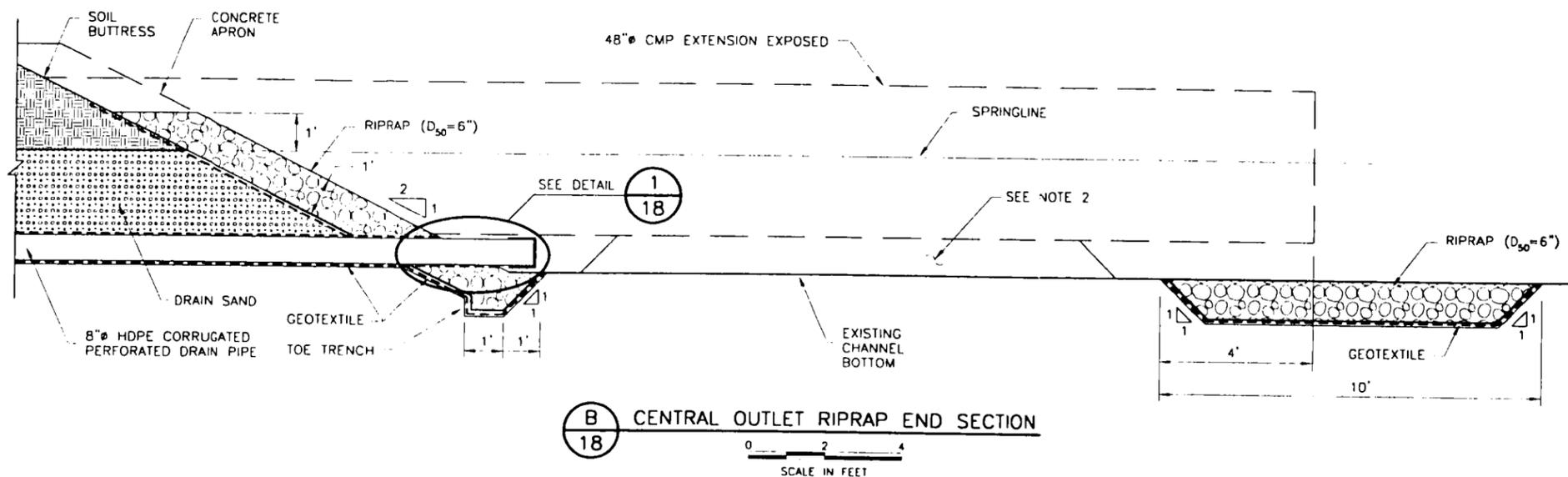
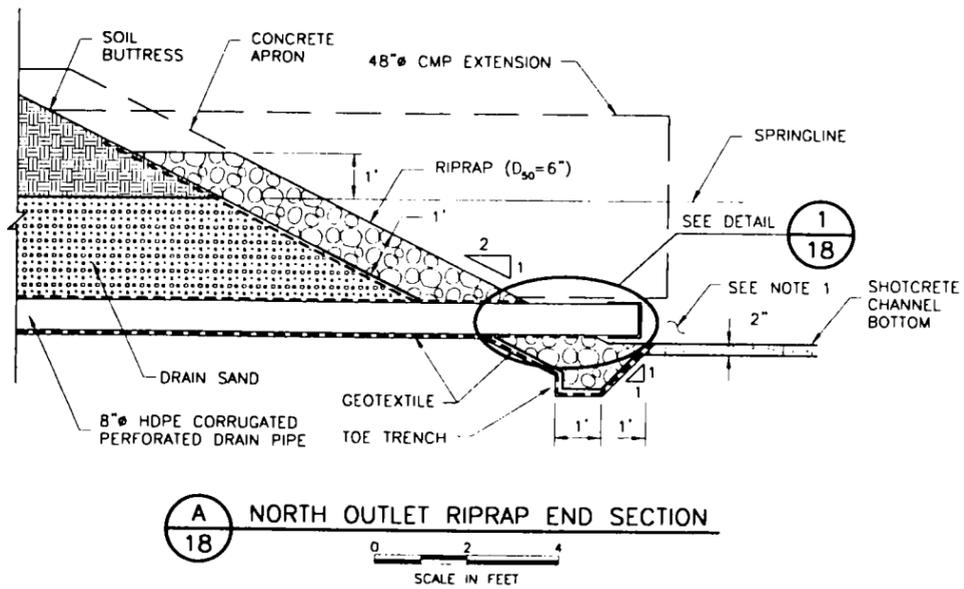
NO.	REVISION	BY	DATE
2	100% FINAL, PER ADWR COMMENTS	TER	04/01
1	100% FINAL, ISSUED FOR ADWR PERMIT	TER	01/01
0	100% SUBMITTAL, REVIEW FOR ADWR PERMIT	TER	10/00
E	95% SUBMITTAL	TER	07/00
D	90% SUBMITTAL	TER	05/00
C	60% SUBMITTAL	TER	02/00
B	30% SUBMITTAL	TER	01/00
A	10% SUBMITTAL	TER	11/99

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS#3 INTERIM DAM SAFETY F.C.D. CONTRACT NO. FCD2000C028

	BY	DATE
DESIGNED	K. SOMERVILLE	01/01
DRAWN	K. PALMISANO	01/01
CHECKED	T. RINGSMUTH	01/01



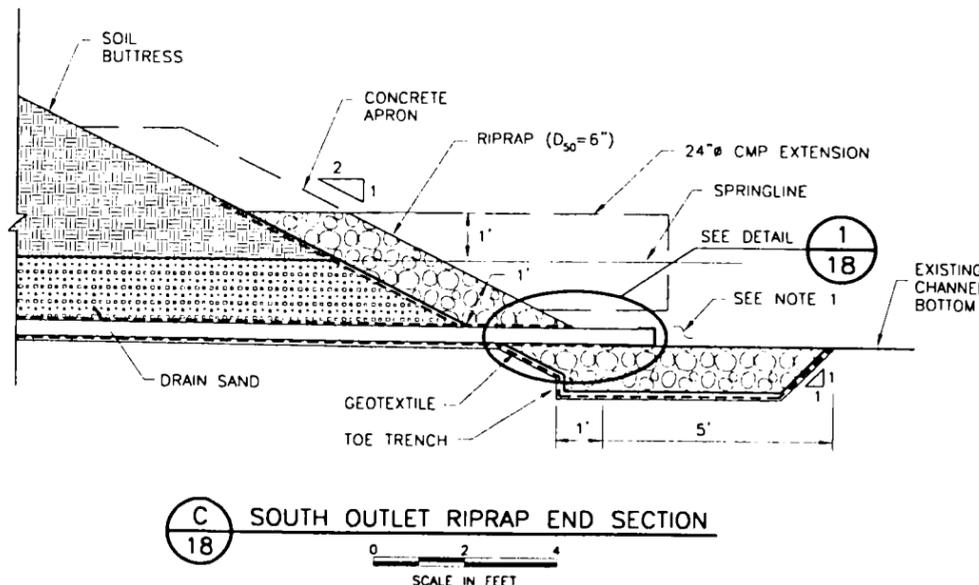
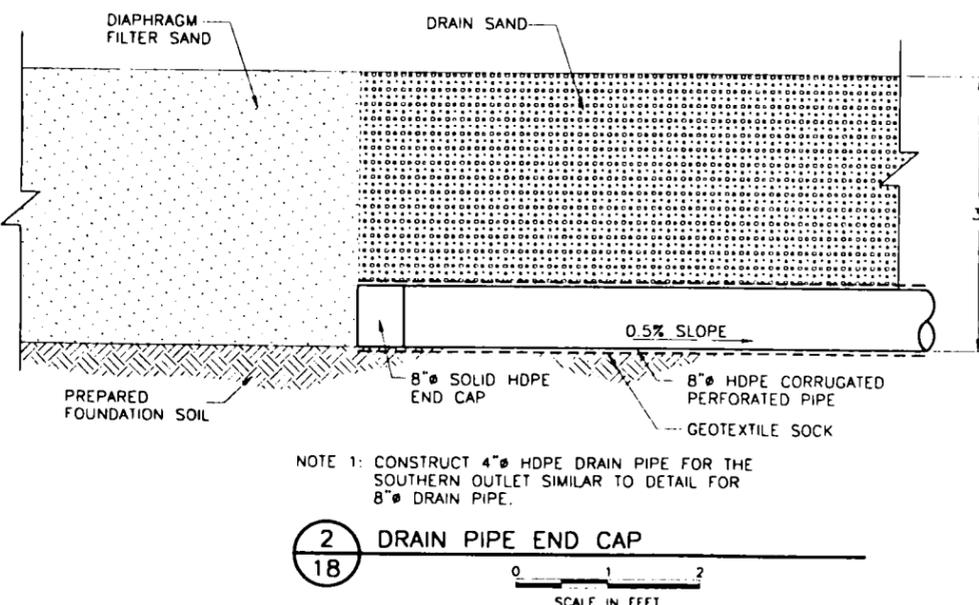
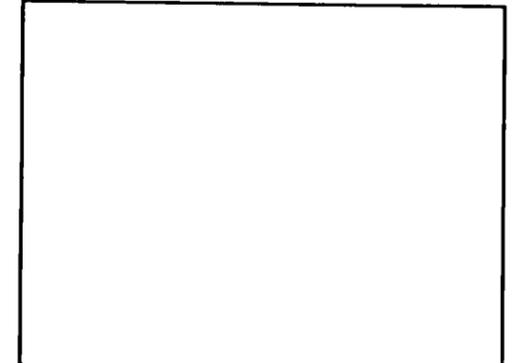


NOTE 1: DIFFERENCES IN ELEVATION BETWEEN INVERT OF PIPE AND EXISTING CHANNEL BOTTOM AND THE PIPE SLOPE IS NOMINAL. THESE ARE TO BE FIELD VERIFIED AND APPROVED BY THE ENGINEER.

NOTE 2: THE EXTENSION OF THE PIPE 21 FEET BEYOND THE SOIL BUTTRESS TOE WILL REQUIRE CONTINUOUS GROUND SUPPORT. THE CONTRACTOR SHALL PROVIDE CUT AND FILL ALONG THE CHANNEL BOTTOM TO SUPPORT THE PIPE. THE DIFFERENCE BETWEEN THE INVERT OF THE PIPE AND EXISTING CHANNEL BOTTOM IS NOMINAL. ALL STRUCTURAL FILL SHALL BE PLACED AND COMPACTED.



ADWR APPROVAL



NOTE 1: CONSTRUCT 4" HDPE DRAIN PIPE FOR THE SOUTHERN OUTLET SIMILAR TO DETAIL FOR 8" DRAIN PIPE.

NOTE 1: CONSTRUCT 4" HDPE DRAIN PIPE FOR THE SOUTHERN OUTLET SIMILAR TO DETAIL FOR 8" DRAIN PIPE.

NO.	REVISION	BY	DATE
2	100% FINAL, PER ADWR COMMENTS	TER	04/01
1	100% FINAL, ISSUED FOR ADWR PERMIT	TER	01/01
0	100% SUBMITTAL, REVIEW FOR ADWR PERMIT	TER	10/00
E	95% SUBMITTAL	TER	07/00
D	90% SUBMITTAL	TER	05/00
C	60% SUBMITTAL	TER	02/00
B	30% SUBMITTAL	TER	01/00
A	10% SUBMITTAL	TER	11/99

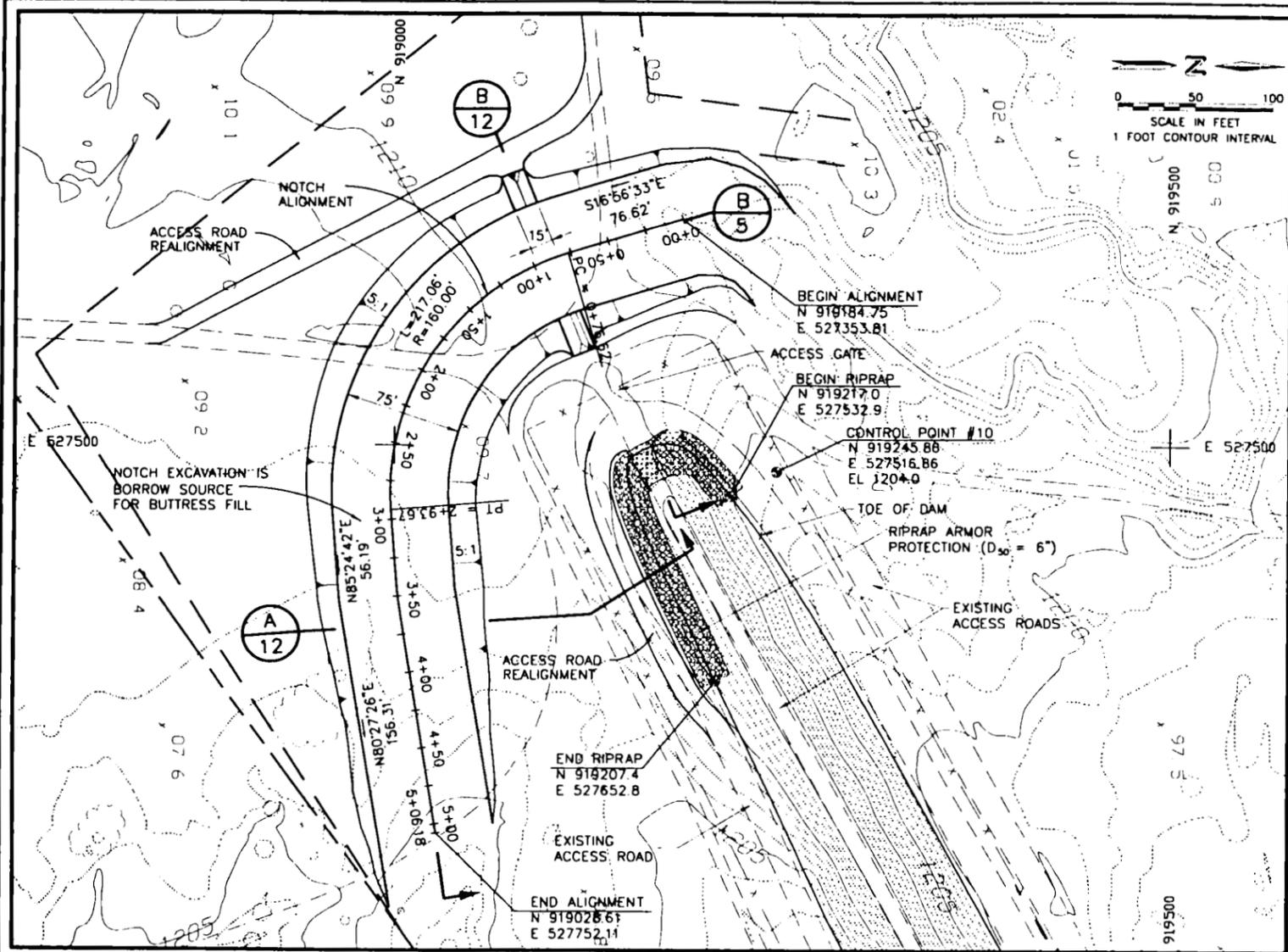
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION
 WHITE TANKS FR#13 INTERIM DAM SAFETY
 F.C.D. CONTRACT NO. FCD2000C028

	BY	DATE
DESIGNED	K. SOMERVILLE	01/01
DRAWN	K. PALMISANO	01/01
CHECKED	T. RINGSMUTH	01/01



DRAWING NO	OUTLET RIPRAP END SECTIONS	SHEET OF
D7		18 18

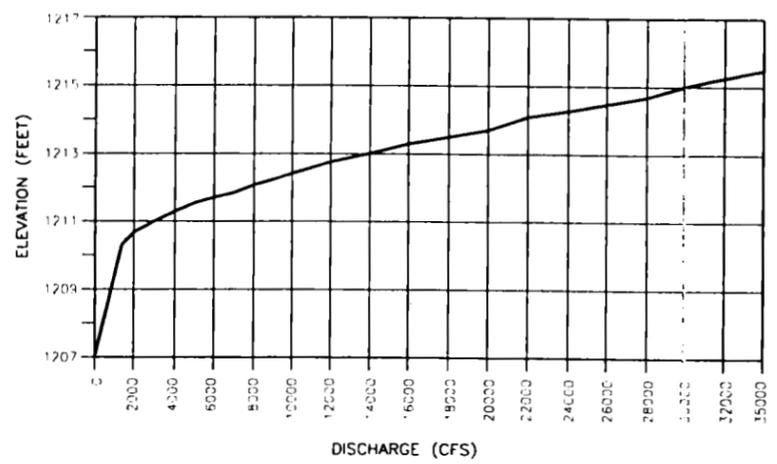
1:22Z JOB# 15448 (003) REV. 2/11/11 11:48:07 DWG 4-18-01



SOURCE: BASE MAP OF WHITE TANKS/AGUA FRIA A.D.M.S. TOPOGRAPHIC MAPS, PROVIDED BY FCDMC 12/98. BASIS OF BEARING: ARIZONA ZONE 12 CENTRAL NAD 83.

NOTE: ROAD REALIGNMENT PER ENGINEER.

A SPILLWAY PLAN
5

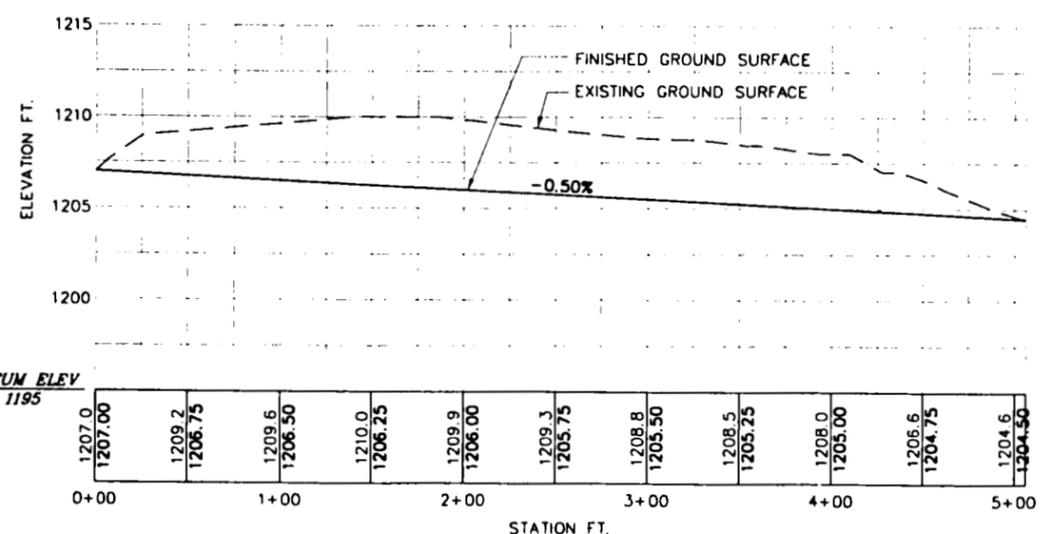
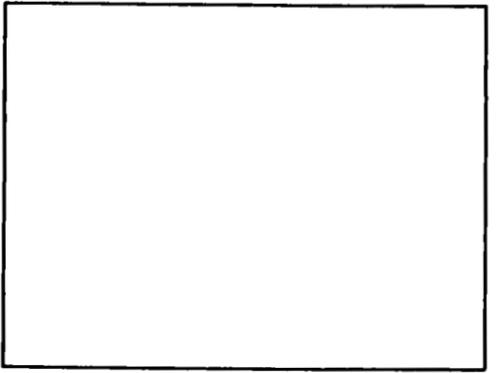


ITEM NO.	ITEM DESCRIPTION	QUANTITY
201-1	CLEARING/GRUBBING	6060 SY
215-1	NOTCH EXCAVATION	5000 CY
220-1	RIPRAP	330 CY

LEGEND:
 - - - - - EXISTING CONTOUR 5' INTERVAL
 EXISTING CONTOUR 1' INTERVAL
 - - - - - FCDMC PROPERTY LINE
 - - - - - EXISTING DIRT ROAD
 - x - - - EXISTING BARRIED WIRE FENCE
 - - - - - WORK ZONE BOUNDARY



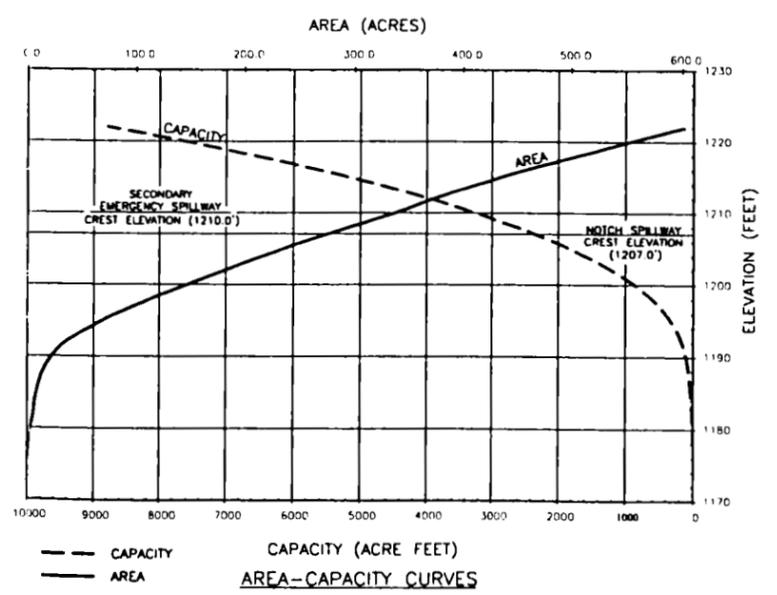
ADWR APPROVAL



LEGEND:
 1209.2 EXISTING GROUND SURFACE ELEVATION
 1206.75 FINISHED GROUND SURFACE ELEVATION

B NOTCH PROFILE
5

HORIZONTAL SCALE: 0 50 100 SCALE IN FEET
 VERTICAL SCALE: 0 5 10 SCALE IN FEET



NO.	REVISION	BY	DATE
2	100% FINAL, PER ADWR COMMENTS	TER	04/01
1	100% FINAL, ISSUED FOR ADWR PERMIT	TER	01/01
0	100% SUBMITTAL, REVIEW FOR ADWR PERMIT	TER	10/00
E	95% SUBMITTAL	TER	07/00
D	90% SUBMITTAL	TER	05/00
C	60% SUBMITTAL	TER	02/00
B	30% SUBMITTAL	TER	01/00
A	10% SUBMITTAL	TER	11/99

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS#3
INTERIM DAM SAFETY
F.C.D. CONTRACT NO. FCD2000C028

	BY	DATE
DESIGNED	K. SOMERVILLE	01/01
DRAWN	K. PALMISANO	01/01
CHECKED	T. RINGSMUTH	01/01



DRAWING NO.	PLAN AND ALIGNMENT OF EMERGENCY SPILLWAY MODIFICATIONS AND ARMOR	SHEET OF
C1		5 18



0 10 20
SCALE IN FEET
1 FOOT CONTOUR INTERVAL

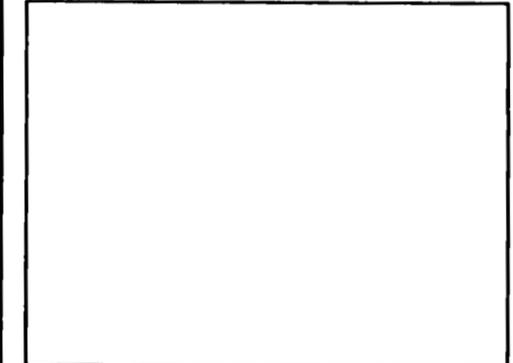
CENTRAL OUTLET PLAN

ITEM NO.	ITEM DESCRIPTION	QUANTITY
201-1	CLEARING/GRUBBING	990 SY
206-2	EXCAVATION AT DAM FACE AND TOE	140 CY
515-2	TRASH RACK (48-INCH DIA. OUTLET)	1 EA
211-2	SOIL BUTTRESS FILL CONSTRUCTION	1900 CY
220-1	RIPRAP	5 CY
206-1	FOUNDATION PREPARATION	475 SY
350-1	DEMOLITION OF EXISTING CONCRETE HEADWALL & REMOVAL OF PIPE & SHOTCRETE	1 EA
350-2	REMOVE AND REPLACE PERIMETER FENCING	1 EA
530-2	PAINTING TRASH RACK (CENTRAL OUTLET)	1 EA

- LEGEND:
- 1200 --- EXISTING CONTOUR 5' INTERVAL
 - 1195 --- EXISTING CONTOUR 1' INTERVAL
 - FCDMC PROPERTY LINE
 - - - - - EXISTING DIRT ROAD
 - x - x - EXISTING BARBED WIRE FENCE
 - - - - - WATERS OF U.S.
 - - - - - WORK ZONE BOUNDARY
- NOTES:
- LIMITS OF CONSTRUCTION 30 FT OUTSIDE WORK ZONE ON OUTLET SOIL BUTTRESS.
 - CENTRAL OUTLET IS IDENTIFIED AS BEING THE PRIMARY OPERATIONAL STRUCTURE.



ADWR APPROVAL



NO.	REVISION	BY	DATE
2	100% FINAL, PER ADWR COMMENTS		04/01
1	100% FINAL, ISSUED FOR ADWR PERMIT		01/01
0	100% SUBMITTAL, REVIEW FOR ADWR PERMIT		10/00
E	95% SUBMITTAL		07/00
D	90% SUBMITTAL		05/00
C	80% SUBMITTAL		02/00
B	30% SUBMITTAL		01/00
A	10% SUBMITTAL		11/99

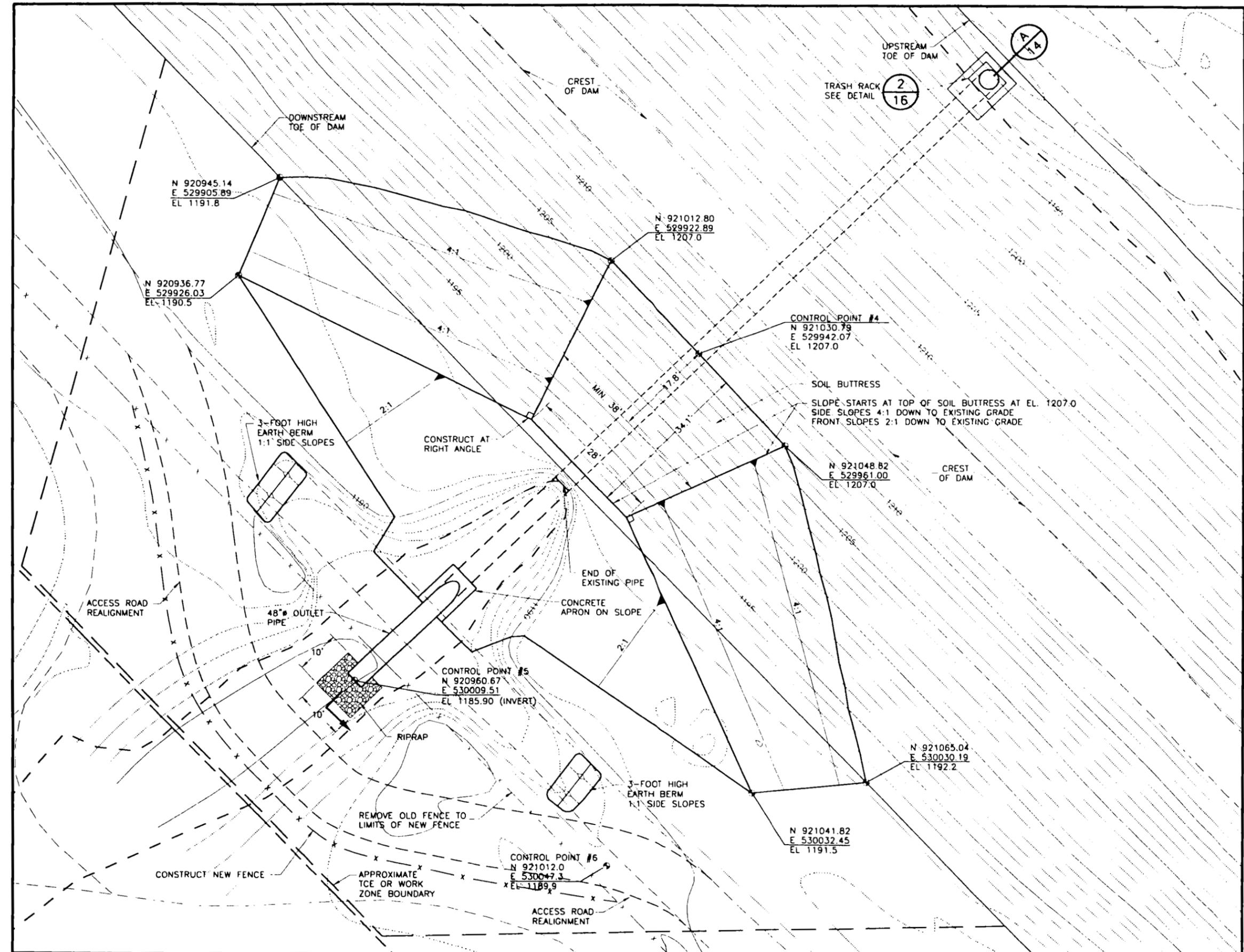
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS#3
INTERIM DAM SAFETY
F.C.D. CONTRACT NO. FCD2000C02B

	BY	DATE
DESIGNED	K. SOMERVILLE	01/01
DRAWN	K. PALMISANO	01/01
CHECKED	T. RINGSMITH	01/01

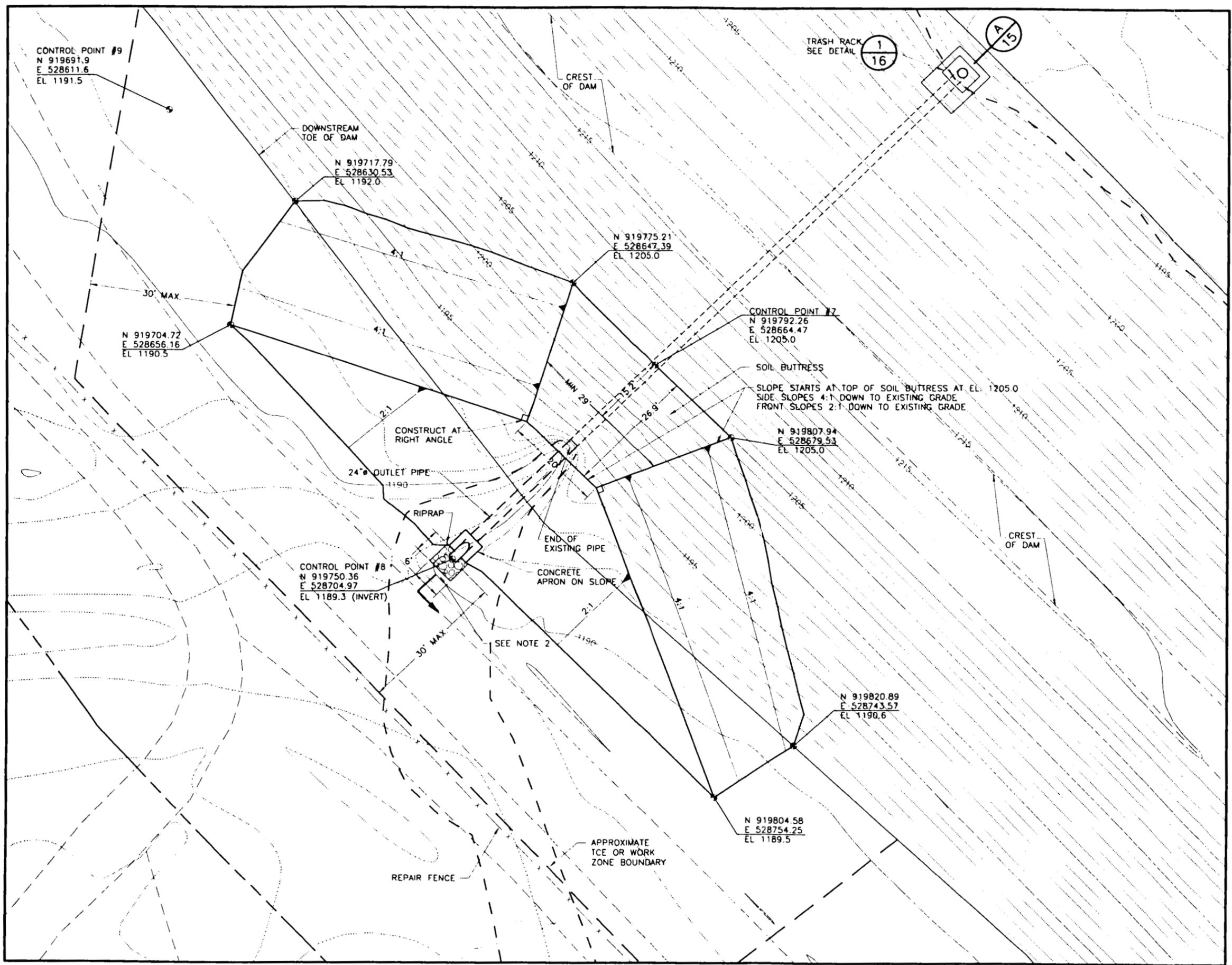


DRAWING NO. C3 CENTRAL OUTLET PLAN-BUTTRESS SHEET OF 7 18



SOURCE:
 BASE MAP OF WHITE TANKS/AGUA FRIA A.D.M.S. TOPOGRAPHIC
 MAPS, PROVIDED BY FCDMC 12/96
 BASIS OF BEARING ARIZONA ZONE 12 CENTRAL NAD 83

\Z2\JOBS\15448\007\REV-2\A\368742.DWG 4-14-01 4:07 PM REF: 9813176



0 10 20
SCALE IN FEET
1 FOOT CONTOUR INTERVAL
SOUTH OUTLET PLAN

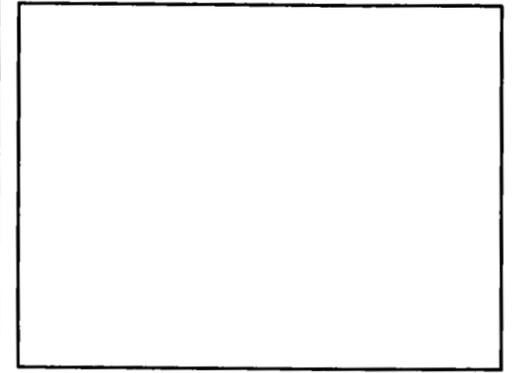
ITEM NO.	ITEM DESCRIPTION	QUANTITY
201-1	CLEARING/GRUBBING	620 SY
206-2	EXCAVATION AT DAM FACE AND TOE	60 CY
515-3	TRASH RACK (24-INCH DIA. OUTLET)	1 EA
211-2	SOIL BUTTRESS FILL CONSTRUCTION	1360 CY
220-1	RIPRAP	3 CY
206-1	FOUNDATION PREPARATION	475 SY
350-1	DEMOLITION OF EXISTING CONCRETE HEADWALL & REMOVAL OF PIPE & SHOTCRETE	1 EA
350-2	PERIMETER FENCING REMOVE AND REPLACE	1 EA
530-3	PAINTING TRASH RACK (SOUTH OUTLET)	1 EA

LEGEND:
 - - - - - EXISTING CONTOUR 5' INTERVAL
 EXISTING CONTOUR 1' INTERVAL
 - - - - - FCDMC PROPERTY LINE
 - - - - - EXISTING DIRT ROAD
 x x x x x EXISTING BARBED WIRE FENCE
 - - - - - WATERS OF U.S.
 - - - - - WORK ZONE BOUNDARY

NOTE:
 1. LIMITS OF CONSTRUCTION 30 FT OUTSIDE WORK ZONE ON OUTLET SOIL BUTTRESS.
 2. MINOR EXCAVATION NEEDED TO DAYLIGHT.



ADWR APPROVAL



NO.	REVISION	BY	DATE
2	100% FINAL, PER ADWR COMMENTS	TER	04/01
1	100% FINAL, ISSUED FOR ADWR PERMIT	TER	01/01
0	100% SUBMITTAL, REVIEW FOR ADWR PERMIT	TER	10/00
E	95% SUBMITTAL	TER	07/00
D	90% SUBMITTAL	TER	05/00
C	80% SUBMITTAL	TER	02/00
B	30% SUBMITTAL	TER	01/00
A	10% SUBMITTAL	TER	11/99

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

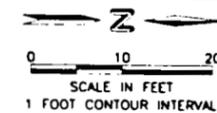
WHITE TANKS FRS#3 INTERIM DAM SAFETY F.C.D. CONTRACT NO. FCD2000C028

	BY	DATE
DESIGNED	K. SOMERVILLE	01/01
DRAWN	K. PALMISANO	01/01
CHECKED	T. RINGSMUTH	01/01



DRAWING NO.	SHEET OF
C4	8 18

SOURCE: BASE MAP OF WHITE TANKS/AGUA FRIA A.D.M.S. TOPOGRAPHIC MAPS, PROVIDED BY FCDMC 12/98. BASIS OF BEARING: ARIZONA ZONE 12 CENTRAL NAD 83.



CENTRAL OUTLET PLAN - FILTER

ITEM NO.	ITEM DESCRIPTION	QUANTITY
211-1	FILTER SAND	134 CY
211-3	DRAIN SAND	50 CY
621-2	CORRUGATED METAL PIPE (48-INCH DIA. CENTRAL OUTLET)	57 L.F.
505-1	CONCRETE STRUCTURE	27 CY
230-1	GEOTEXTILE	3100 SF
605-1	8-INCH HDPE CORRUGATED PERFORATED DRAIN PIPE	60 L.F.

LEGEND:

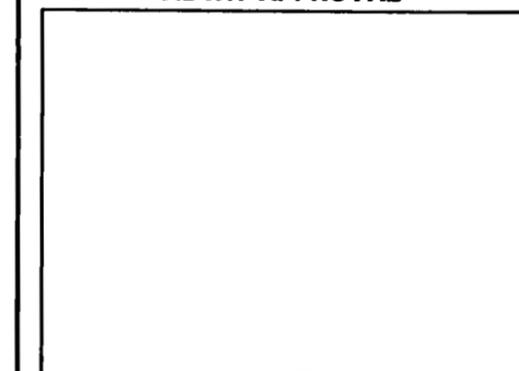
- 5' INTERVAL --- EXISTING CONTOUR 5' INTERVAL
- 1' INTERVAL --- EXISTING CONTOUR 1' INTERVAL
- FCDMC PROPERTY LINE
- EXISTING DIRT ROAD
- x x x x EXISTING BARBED WIRE FENCE
- WATERS OF U.S.

NOTE:

1. LIMITS OF CONSTRUCTION 30 FT OUTSIDE WORK ZONE ON OUTLET SOIL BUTTRESS.



ADWR APPROVAL

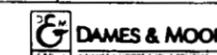


2	100% FINAL, PER ADWR COMMENTS	TER	04/01
1	100% FINAL, ISSUED FOR ADWR PERMIT	TER	01/01
D	100% SUBMITTAL, REVIEW FOR ADWR PERMIT	TER	10/00
E	90% SUBMITTAL	TER	07/00
D	NEW SHEET 90% SUBMITTAL	TER	05/00
NO.	REVISION	BY	DATE

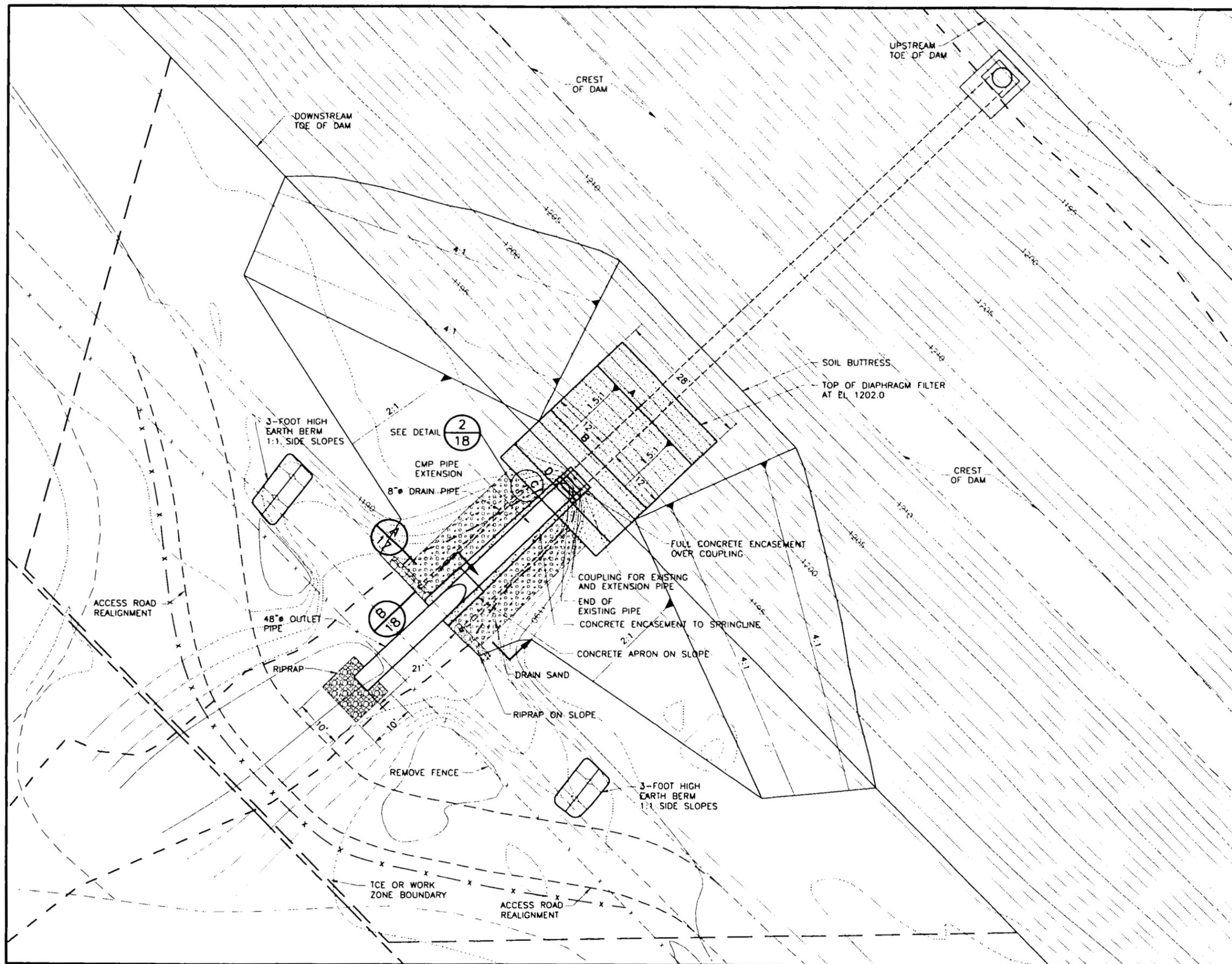
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS#3 INTERIM DAM SAFETY F.C.D. CONTRACT NO. FCD2000C028

	BY	DATE
DESIGNED	K. SOMERVILLE	01/01
DRAWN	K. PALMISANO	01/01
CHECKED	T. RINGSMUTH	01/01



DRAWING NO.	C6	CENTRAL OUTLET PLAN - FILTER	SHEET OF	10 18
-------------	----	------------------------------	----------	-------



SOURCE
 BASE MAP OF WHITE TANKS/AQUA FRIA A.D.M.S. TOPOGRAPHIC
 MAPS PROVIDED BY FCDMC 12/96
 BASIS OF BEARING ARIZONA ZONE 12 CENTRAL NAD 83

1327 J0851 13448 001 REV-1 11/14/02 R1 DMC 4-14-01 REF: 9803178 WATER