GWESCH

White Tanks FRS No. 3 Outfall Channel
30% Design Report
FCD 2007C016 Assignment 4

VOLUME I – DESIGN REPORT AND 30% PLANS

June 30, 2009

EXPIRES 3/31/2012

Prepared for:
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009
(602) 506-1501

Hoskin • Ryan Consultants, Inc.
creative engineering solutions

201 West Indian School Road • Phoenix, AZ 85013 • (602) 252-8384

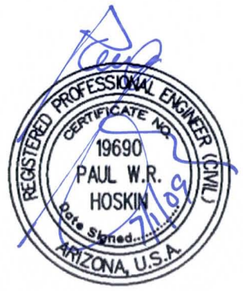
A470.640

TABLE OF CONTENTS

EXPIRES 3/31/2012

TABLE OF CONTENTS (Continued)

APPENDICES (Located in Volume II)



EXPIRES 3/31/2012

EXECUTIVE SUMMARY

Project Description

Hoskin•Ryan Consultants, Inc. (HRC), has been contracted by the Flood Control District of Maricopa County (FCDMC) to prepare a Preliminary Design Report, Design Report (30%), and Design Plans (30%) for the White Tanks Flood Retarding Structure #3 (FRS#3) Outfall Channel project (Figures 1 and 2). The FCDMC is in the process of performing a rehabilitation to FRS#3, including a new principal outlet which discharges adjacent to the Beardsley Canal. The FCDMC's desire is to provide a channel along the Jackrabbit Trail corridor, which will convey the principal outlet flows to White Tanks Flood Retarding Structure #4 (FRS#4). A new channel will ultimately provide an outfall from FRS#4 all the way to the Gila River.

The Jackrabbit Channel consists of a series of lined and unlined channels and ditches of various dimensions and capacities which extend from FRS#4, north to Missouri Avenue (Figure 3). North of Missouri Avenue to the FRS#3, natural drainage patterns remain with flow crossing the Jackrabbit Trail alignment from west to east.

The primary objective of the FRS#3 Outfall Channel is to provide a channel to convey the principal outlet flow from the FRS#3 to FRS#4. While the 100-year discharge for the principal outlet is rated at 195 cfs, the maximum outlet potential for these pipes, under head from the Probable Maximum Flood (PMF), is much greater. The FCDMC has requested that the outlet channel be sized for a minimum discharge of 560 cfs.

A secondary objective to be accomplished is to ensure that the capacities of the existing downstream facilities, including the culverts and channel at I-10 and at Pasqualetti Ranch, are not exceeded. Also, it is desirable to improve downstream flooding conditions, to remove structures from the floodplain, and to minimize the acquisition of private land.

The 30% Design Report and Plans document the proposed channel design. This report provides a synopsis of the alternatives selection process and provides details of the Final Design, which has been prepared to a 30% level of completion. The 100% Design Phase will use the 30% plans as a basis, and will provide greater detail including new topographic mapping, specific right-of-way requirements, survey control data, and specific utility line relocation requirements.

Preliminary Alternatives

The evaluation of six Preliminary Design Alternatives, which included three full conveyance and three detention basin alternatives, is documented in the *Preliminary Design Report,* dated April 10, 2009 (Ref. 32) (Appendix H). Table 1 summarizes the cost estimates for the six alternatives.

Table 1: Preliminary Alternatives Cost Estimate Summary

Item	Preliminary Alternative					
	1	2	3	4	5	6
Total Construction, Landscape, and Contingencies	$21.2m	$22.1m	$17.5m	$26.9m	$21.9m	$22.1m
Total Right-of-Way Acquisition	$10.7m	$3.4m	$4.7m	$9.5m	$9.5m	$3.4m
Total Alternative Cost	$31.9m	$25.5m	$22.2m	$36.4m	$31.4m	$25.5m

A review of the cost estimates indicated that there is a significant cost difference between the alternatives with and without detention storage, due to the additional right-of-way required for a detention basin. A comparison of the six Preliminary Alternatives showed that there is no significant hydrologic advantage to the inclusion of a detention basin in the design. This is attributed to the small contributing drainage area and the large volume of flow associated with the principal outlet discharge. After review and discussions with the FCDMC, Alternative 3, which is a full conveyance alternative, was selected.

Proposed Design

The Jackrabbit Channel will extend from the FRS#4, north along Jackrabbit Road to the principal outlet of FRS#3, near the Beardsley Canal, north of Bethany Home Road (Figure 1). The downstream end of the channel will connect to an existing concrete-lined channel approximately 1,300 feet north of McDowell Road. At the upstream end, at the principal outlet of FRS#3, are two controlled release pipes of 48-inch in diameter each.

The channel will be earth-lined for its entire length, except at the point of connection to the existing concrete downstream channel (see Section 9 for 30% Design Plans). To limit the channel velocities, a maximum bed slope of 0.0010 ft/ft will be used for all channel cross-sections. Grade control structures, constructed from sloped concrete, will each be 2.5 feet in height and will allow the channel slope to be reduced.

The landscape concept will be to meander the channel alignment as much as possible and provide a multi-use trail connection between FRS#4 and FRS#3. Landscape vegetation, trees and shrubs, along with a rock mulch, will help to provide erosion control. Where large flows reach the west side of the channel, side inlet spillways will be constructed to help prevent erosion and headcutting. The FCDMC has a *Policy for the Aesthetic Treatment of Landscaping of Flood Control Projects* (Ref.27) which provides a policy for Landscape and Non-Landscape Aesthetic Treatments funding. In keeping with this policy, concrete structures, including headwalls and grade control structures will have treatments to improve their appearance and allow them to blend to the native setting.

The project has been divided into nine (9) different reaches, each of which has its own channel cross-section and right-of-way requirements, as described in Section 5. Separate cost estimates have been prepared for each Reach, as described in Section 6. Table 2 provides a summary of the right-of-way acquisition and construction costs by reach.

Table 2: Proposed Design Cost Estimate Summary

Item Description	Reach									Lump Sum Items	Total
	1	2	3	4	5	6	7	8	9		
Total Construction, Landscape, and Contingencies Cost	$0.3m	$2.5m	$1.2m	$0.5m	$1.4m	$2.4m	$1.2m	$2.4m	$4.2m	$4.3m	$20.4m
Total Required Right-of-Way Acquisition	$0m	$0m	$0m	$0m	$2.6m	$1.5m	$0m	$2.0m	$0m	n/a	$6.1m
Total Project Cost	**$0.3m**	**$2.5m**	**$1.2m**	**$0.5m**	**$4.0m**	**$3.9m**	**$1.2m**	**$4.4m**	**$4.2m**	**$4.3m**	**$26.5m**

Conclusions

This 30% Design Report accompanies the 30% Design Plans submitted as a part of FCD Contract 2007C016 Assignment 4. A Preliminary Design Report (Ref. 32) precedes this submittal and provides documentation for the decisions leading to the selection of the channel alignment.

The Final Design Plans will be prepared using new and more detailed topographic mapping. In order to accurately define the final channel alignment and right-of-way boundaries, a detailed survey of the section corners and monuments will be necessary. Utility conflicts and relocations will be further defined as the Final Design Plans are prepared. Cost estimates provided herein can be expected to change as plan details become further refined.

When construction is completed, this project will allow FRS#3 to drain to FRS#4. It will also help to reduce or eliminate floodplains which are currently located along Jackrabbit Trail and the Beardsley Canal.

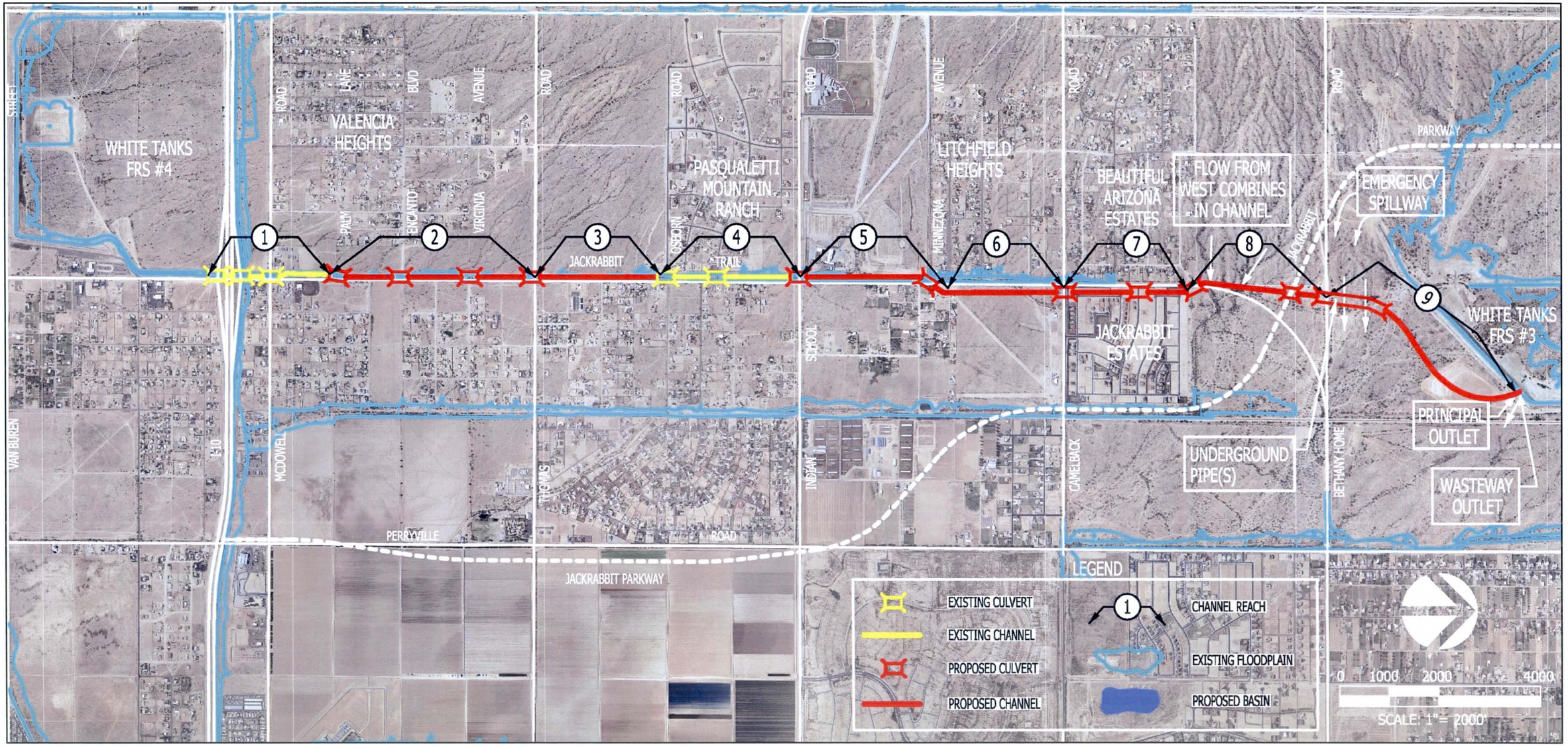


FIGURE 1 – PROPOSED DESIGN SCHEMATIC

1 INTRODUCTION

Hoskin•Ryan Consultants, Inc. (HRC), has been contracted by the Flood Control District of Maricopa County (FCDMC) to prepare a Preliminary Design Report, Design Report (30%) and Design Plans (30%) for the White Tanks Flood Retarding Structure #3 (FRS#3) Outfall Channel project (Figures 1 and 2). The results of the Preliminary Design are documented in another report dated April 10, 2009 (Ref. 32).

The existing Jackrabbit Channel is a concrete-lined trapezoidal channel extending from the White Tanks Flood Retarding Structure #4 (FRS#4) on the south side of Interstate 10, north along the west side of Jackrabbit Trail, to approximately 1300 feet north of McDowell Road. From the north end of the existing improved channel to the Missouri Avenue alignment, the Jackrabbit Channel consists of a series of unlined channels and ditches of various dimensions and capacities (Figure 3). North of Missouri Avenue to the FRS#3, natural drainage patterns remain with flow crossing the Jackrabbit Trail alignment from west to east.

An existing 100-year floodplain has been delineated along the west side of Jackrabbit Trail all the way north to approximately Colter Road. Several residential lots lie within this currently delineated floodplain. In addition, there is an existing 100-year floodplain along the Beardsley Canal between I-10 and Bethany Home Road which may be impacted by the future construction of this project. Hydrology for this area is addressed in the *Loop 303/White Tanks Area Drainage Master Study Area Hydrologic Analysis* (Ref. 30), as revised by this study.

1.1 Stakeholders

Interested stakeholders include the FCDMC, Arizona Department of Transportation (ADOT), Maricopa County Department of Transportation (MCDOT), Town of Buckeye, and Maricopa County Municipal Water Conservation District (MCMWCD). Existing and on-going developments include Jackrabbit Estates, Beautiful Arizona Estates, Pasqualetti Ranch, and Litchfield Heights, and private development interests such as DMB White Tanks (Verrado, north of Indian School Road) and Klondike Land Portfolio (north of Missouri Avenue).

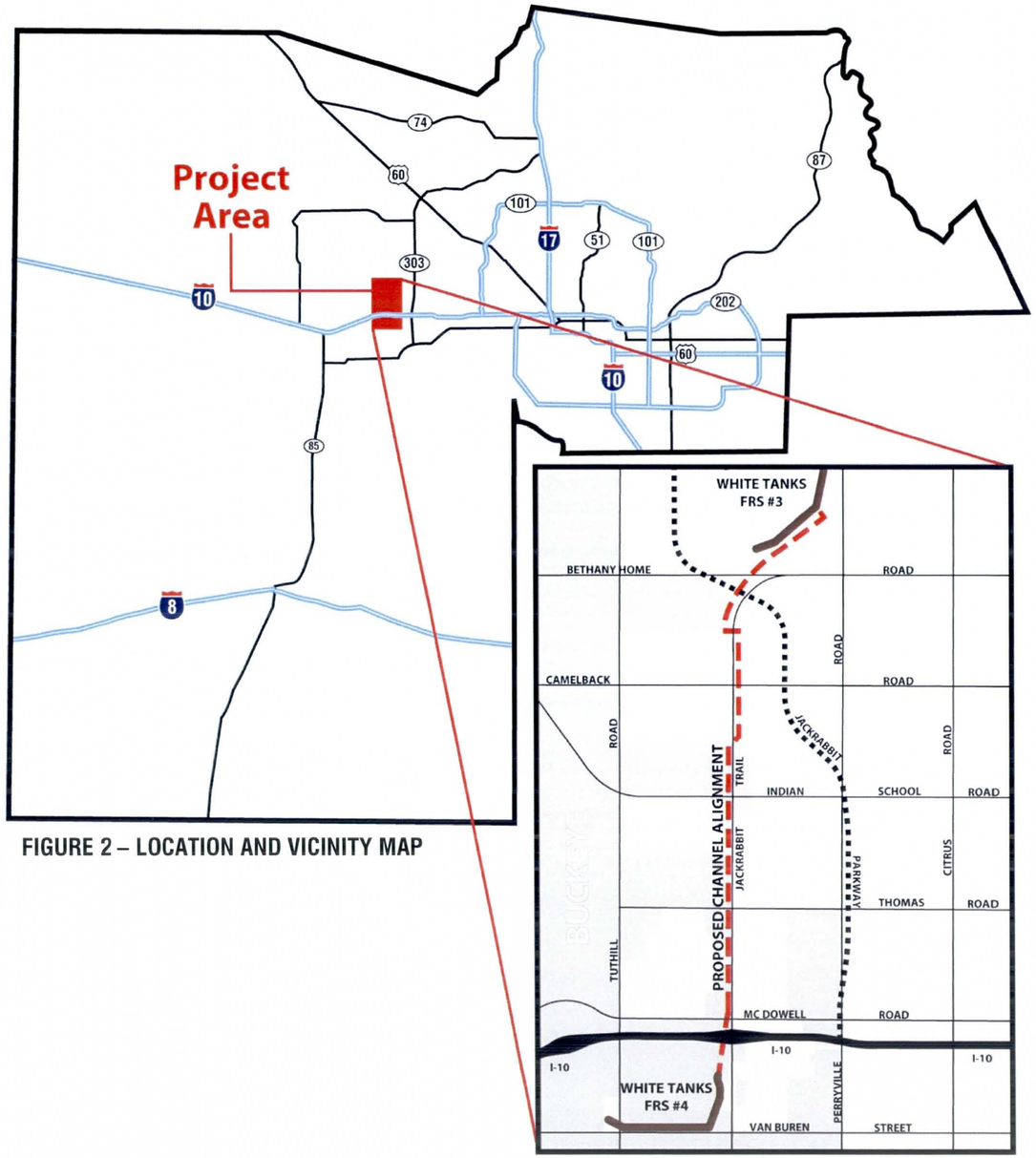


FIGURE 2 – LOCATION AND VICINITY MAP

1.2 Purpose

The FCDMC is in the process of performing a rehabilitation to FRS#3, including a new principal outlet that discharges adjacent to the Beardsley Canal. The FCDMC's desire is to provide a channel along the Jackrabbit Trail corridor, which will convey the principal outlet flows to FRS#4. A new channel will ultimately provide an outfall from FRS#4 to the Gila River.

The 30% Design Report and Plans document the proposed channel design. This report provides a synopsis of the selection process and provides details of the Final Design, which has been prepared to a 30% level of completion. The Final Design will use the 30% plans as a basis for design, and will provide greater detail including new detailed topographic mapping, specific right-of-way requirements, survey control data, and specific utility line relocation requirements. The evaluation of six different design alternatives, which included three full conveyance and three detention basin alternatives, is documented in the *Preliminary Design Report,* dated April 10, 2009 (Ref. 32).

The maximum discharge from the principal outlet, for the Probable Maximum Flood (PMF) was provided by the FCDMC as 560 cfs. Since the existing channel along Jackrabbit Trail intercepts runoff, which approaches it from the west, a secondary goal is to intercept and convey the 100-year flow. The channel will provide 100-year flood protection to adjacent existing and future properties.

1.3 Authority for Study

The Flood Control District of Maricopa County's contract number is FCD 2007C016, Assignment Number 4. The official Notice to Proceed date is January 26, 2009. The FCDMC Project Manager is Gary Wesch, P.E..

1.4 Location of Study

The main area of interest lies along Jackrabbit Trail between FRS#3 and FRS#4, from approximately Roosevelt Street to Glendale Avenue, and includes the jurisdictions of the Town of Buckeye and unincorporated Maricopa County. The immediate watershed area contributing to the channel extends west to Tuthill Road, and north to FRS#3. Additionally, the watershed area includes all areas that drain into the FRS#3 from the White Tanks Mountains, east to the Perryville Road alignment and north to McMicken Dam, near the Cactus Road alignment.

1.5 Public Involvement

Public involvement for the White Tanks FRS No. 3 Outfall Channel Project was integrated with the public involvement for the White Tanks FRS#4 Rehabilitation Project. Public meetings were held April 26, 2006, June 26, 2007, and June 3, 2008. The mailers for the meetings are included in Appendix B. In addition, an informational only presentation was made to the Town of Buckeye City Council on April 7, 2009.

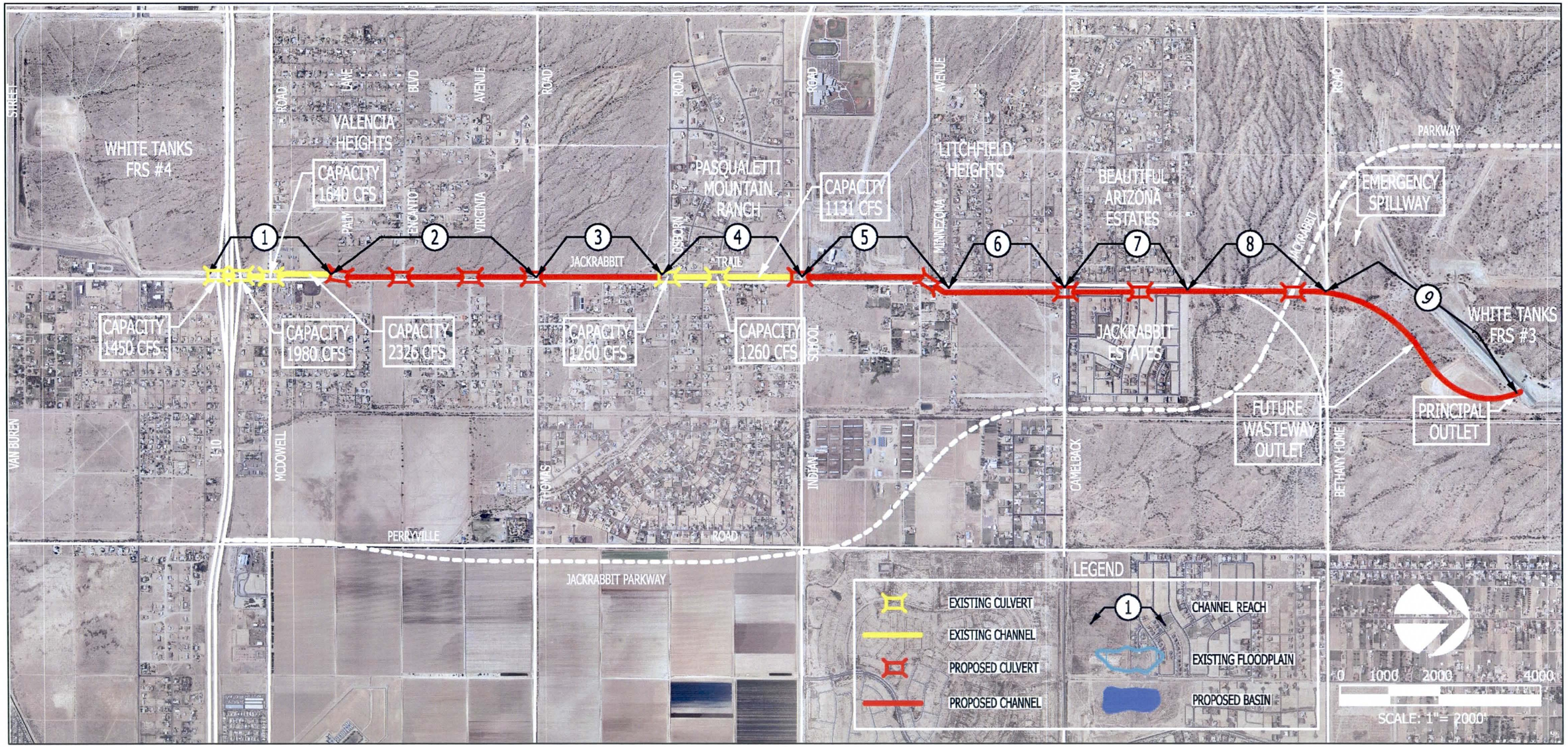


FIGURE 3 – EXISTING CHANNEL AND CULVERT CAPACITY MAP

2 DESIGN CONSIDERATIONS

Details of the Data Collection process are included in the *Preliminary Design Report* (Ref. 32) which includes details regarding agencies contacted for data collection, descriptions of the materials collected, site visit photographs, and descriptions of the previous studies referenced. The following are design studies and projects within the area which influence the final design configuration and alignment of the channel.

2.1 Final Design Concept Report, Jackrabbit Trail – Yuma Road to Thomas Road

MCDOT conducted a Design Concept Report (DCR) to move forward with recommendations provided in the *Jackrabbit Trail Design Concept Report* prepared in 2004 (Ref.1). A traffic analysis performed for the DCR recommended a four-lane roadway section. The cross-section proposed consists of 73 feet of pavement with two 12-foot travel lanes in each direction, 5.5 feet for bike lanes, and an 18-foot two-way left turn lane within a 130-foot wide right-of-way. The report proposes the use of a raised median in the future; however, those improvements would not be included immediately. The report also provides recommendations for the improvement of the ADOT interchange with I-10, including options for the replacement of the existing culverts and concrete channel (Appendix C).

2.2 Jackrabbit Trail Access Control and Corridor Improvement Study

The Jackrabbit Trail Corridor is identified as a Primary Roadway by MCDOT as documented in the Transportation System Plan (TSP), updated February 2007. The Maricopa Association of Governments (MAG) also designated Jackrabbit Trail as an Urban Road of Regional Significance (RRS) from MC 85 to Olive Avenue. Jackrabbit Trail is a significant transportation corridor because it is the westernmost north-south section line east of the White Tanks Mountains. It is also one of the few north-south arterial streets in the area to have a full interchange with I-10.

In order to evaluate potential alignments for this important north-south street, MCDOT commissioned the *Jackrabbit Trail Access Control and Corridor Improvement Study*, dated October 2008 (Refs. 9 and 10). The preferred alignment connects to I-10 at the Perryville Road interchange. From there, it continues north to Indian School Road and then curves westward to meet the Beardsley Canal. It then continues north adjacent to the Beardsley Canal until it passes Jackrabbit Estates (Missouri alignment) and then it continues in a northwesterly direction toward 199th Avenue. This alignment allows the Parkway to pass south of the emergency spillway of FRS#3. After passing FRS#3 on the west, it continues north along the 191st Avenue alignment. The study proposes that a future Bethany Home Road would connect this east-west street to the north-south extension of Jackrabbit Trail.

2.3 White Tanks FRS#3 Emergency Spillway Improvements

Improvements to the emergency spillway are planned as part of the *White Tanks FRS No. 3 Remediation Project, Phase 2* (Refs. 47, 48) (Appendix D). The improvements include re-grading of the emergency spillway channel, and berms along both sides of the downstream channel to direct the flow. Additional improvements shown on the plans include a sedimentation basin and landscape berms immediately downstream of the dam, west of the principal outlet.

2.4 Park and Ride Facility

The Town of Buckeye has plans to build a new park and ride facility to be located on a 5-acre parcel of land located north of Palm Lane, on the west side of Jackrabbit Trail. The plan is for this facility to accommodate approximately 700 vehicles. A shared driveway along Palm Lane will provide access with approximately 60 feet of new right-of-way. A new concrete box culvert, and concrete channel transition on the south side of the culvert, will be required. Since this project will probably move forward with construction prior to the improvements to Jackrabbit channel, the culverts and channel will be designed to the ultimate design condition. A temporary transition structure may also be necessary at the upstream end of the culverts.

2.5 Sewer Improvement Project

The Jackrabbit Trails Sewer Improvement project (Ref. 55) consists of the extension of a new 12- to 15-inch sewer line from a connection north of Roosevelt Street, to a point approximately 1,300 feet north of Indian School Road. Plans signed and dated November 2008 were the latest version available at the time of this study. It is anticipated that the sewer design will be updated to include lateral extensions to the west at major streets. The top of pipe varies from 10 to 20 feet below existing pavement grades on Jackrabbit Trail.

2.6 Verrado Master Drainage Plan

The master planned community of Verrado will ultimately encompass up to 8,800 acres of land located on the eastern base of the White Tanks Mountains. The Master Drainage Plan documents the site's hydrologic conditions (Ref. 53). In general, the property is bounded on the west by the summit of the White Tanks Mountains, on the east by Tuthill Road, on the north by Glendale Avenue, and on the south by I-10. The main portion of Verrado (west of Tuthill Road) is outside of the watershed boundary and study limits of this project, as Tuthill Road is a physical boundary to runoff from the west.

A half section of Verrado, referred to as Phase 3 East, located north of Indian School Road, south of Campbell Avenue, west of Jackrabbit Trail, and east of Tuthill Road, does lie within the watershed boundary. Currently, there is a school constructed at the southwest corner of this site and a temporary fire station on the southeast corner, next to Jackrabbit Trail. Excluding the school site, this property encompasses approximately 250 acres of land. The Town of Buckeye has already approved a Preliminary Plat for a planned residential subdivision (Appendix F). The Preliminary Plat shows dedication of road right-of-way of 70 feet adjacent to Jackrabbit Trail, plus a drainage easement of approximately 32 feet in width. At the time of platting, the design engineer anticipated that the Jackrabbit Channel would be maintained in its current condition with (3) 10' x 6' concrete box culverts at the crossing of Indian School Road.

2.7 Zanjero Trails

Zanjero Trails (Refs. 3 and 4) is a master development project planned by the Maricopa County Municipal Water Conservation District. The entire project will be located along the east side of McMicken Dam and the Beardsley Canal, between Sun Valley Parkway/Bell Road, and Camelback Road (Appendix E). Parcel 34 of Zanjero Trails is a planned residential subdivision east of Jackrabbit Trail, north of the existing Jackrabbit Estates residential subdivision. The proposed White Tanks FRS#3 Outlet Channel alignment crosses Jackrabbit Trail at the southwest corner of Parcel 34, through a proposed landscape tract.

2.8 White Tanks FRS No. 3 Remediation Project – Phase 1

The former Soil Conservation Service (SCS) (now Natural Resources Conservation Service (NRCS)) completed construction of the FRS#3 in 1954. Prior to its remediation, the dam consisted of a homogeneous earth-fill embankment of approximately 30 feet in height, with three gated corrugated metal pipe outlets that served as the principal outlet. An emergency spillway at the west end of the dam consists of an unlined earth cut spillway. In the 1980s, the core of the dam was improved with the introduction of a granular filter.

Recent concerns about subsidence and fissures in the area prompted an investigation that has resulted in construction of a new principal outlet, located at the east end of the dam (Refs. 46 and 47). The principal outlet consists of two 48" diameter pipes with control gates and a riser stack. The outlet includes a baffled headwall structure. Also planned is the re-grading of the emergency spillway to better contain flows and train them toward the east. The principal outlet and the emergency spillway are sized to handle the Probable Maximum Flood (PMF).

2.9 Existing Utilities

Agencies and utilities contacted during the data collection process included those listed in Table 3 below, and the FCDMC, Town of Buckeye, and Arizona Bluestake.

Table 3: Utilities Contact Summary

Company	Contact	Phone Number
Arizona Public Service	John Rael	(602) 371-6945
Arizona American Water	Christina Hassell	(623) 780-3790
Arizona Water Company	Joe Whelen	(602) 240-6860
Cox Communications	Ron Pint	(623) 328-3529
El Paso Gas	Dennis Segars	(602) 438-4228
Flood Control District of Maricopa County	Gary Maiers	(602) 506-0563
Maricopa County Municipal Water Conservation District	Veronica Valenzuela	(602) 546-8266
Qwest Communications	Matthew Phillips	(602) 630-1393
Southwest Gas	Valerie Gallardo-Weller	(602) 484-5342
Salt River Project	Website Query by Section	n/a

The 30% design plans, show existing utilities based on as-built information and observations during field survey and design team field visits. The noted existing utilities on the 30% design plans are not all-encompassing, and should be checked during the Final Design phase. Potential utility conflicts are noted on the 30% design plans, and are summarized in Appendix R in Volume II.

2.10 White Tanks FRS No. 3 Outfall Channel Project – Landscape & Aesthetics

EDAW, Inc. as a part of the White Tanks FRS No. 3 Outfall Channel Project – Preliminary Report, dated December 2008 (Ref. 28), completed a Scenic Resources Assessment (SRA) and Recreation and Multi-Use Assessment (RRA).

The SRA identified the surrounding natural and local community characteristics by analyzing the visual impact of the proposed flood control structures. The purpose of the analysis was to complement the existing landscape settings and to address the erosion potential of the channel. It was determined that the channel should be compatible with Class 3 (non-structural to semi-soft structural). Therefore, to be compatible with Class 3, the channel should appear as a natural feature as much as possible. Changes in bank slope and surface landscape treatments should help to soften the otherwise geometric nature of the channel.

A connection to the Maricopa County Regional Trail will provide Recreation and Multi-use opportunities. The Final Design will include a regional trail/multi-use trail in conjunction with the Operations and Maintenance Road. This trail will eventually provide connections to other trails including one south of FRS#4, which will ultimately connect to the Gila River.

The landscape theme for this project is a combination of Enhanced Desert and Desert Oasis theme. This theme is context sensitive with suburban, urban, and industrial cultural settings with a Sonoran landscape character type. This theme allows for native trees with non-native shade trees within the interior of a park type basin. The plant palette includes native vegetation such as Mesquites, Ironwoods, Palo Verdes, Bursage, Brittlebush, Creosote, Baccharis and Saltbush. Non-native trees include Evergreen Elm, Ash, Eucalyptus, and bushes are Leucophyllums, Tecoma, Dalea and Lantana.

2.11 Topographic Mapping and Survey

The FCDMC provided the topographic mapping for the 30% Design Plans. This mapping was provided from three different mapping sources as follows:

- 1-foot contour interval mapping produced for White Tanks FRS#3 Remediation
- 1-foot contour interval mapping produced for White Tanks FRS#4
- 2-foot contour interval mapping produced for Loop 303/White Tanks ADMPU Area Hydrologic Analysis

The horizontal datum used for the survey is North American Datum 1983, and the vertical datum used for the survey is North American Vertical Datum 1988. In addition, HRC conducted field survey to determine the elevations and sizes of existing culvert structures, locate utility boxes and overhead power lines, and confirm monument locations and elevations. This survey information is documented in a separate *Survey Report* (Ref. 31).

2.12 Geotechnical

A geotechnical investigation conducted by AMEC during the FRS#3 Remediation Project (Ref. 45) indicates there is subsidence and fissure zones in the area of the dam. The resulting fissure risk zone map is included in Appendix S of Volume II.

The channel in Reach 9, running parallel to the FRS#3 dam, crosses through two zones which may indicate future settlement or fissure development, defined as:

*Zone 1 – **Region where alluvial basin characteristics**, the distribution of probable soil discontinuities and past subsidence behavior indicates the presence of conditions favorable for future earth fissure development.*

*Zone 2 – **Region within Zone 1 where** the existence of deflation features in the Holocene alluvium, steeper interferometric gradients, an increased density of oriented photolineaments, and/or a significant break in the dam crest settlement profile may indicate a higher probability of earth fissure development.*

Approximately 3,000 linear feet of the 30% Design crosses through Zones 1 and 2. In this location, the channel will be vulnerable to subsidence and fissuring, and therefore it will be necessary to either place additional fill material or provide hardening measures, such as concrete lining on the downstream face of the channel. For the purpose of this 30% Design Report, a hardened structure allowance has been added to the 30% Design cost estimate to reflect an approximate additional cost required to address the fissure risk.

3 HYDROLOGY

3.1 HEC-1 Methodology

HEC-1 models were prepared for the future conditions with project-in-place as well as the future conditions without project-in-place. Both models were created based upon recently updated models in the *Loop303/White Tanks ADMPU Area Hydrologic Analysis* (Ref. 30), prepared by HDR. The ADMPU HEC-1 models include changes to NOAA 14 rainfall depth, and updates to sub-basin land use and retention due to planned development. Modifications to the ADMPU models by HRC include updates to land use types, retention volumes, and NOAA 14 precipitation values.

3.1.1 NOAA 14 Rainfall

As shown on the watershed map (Figure 4), the drainage area includes two distinct terrains: the mountainous terrain contributing runoff to FRS#3, and the relatively flat range terrain contributing to the Jackrabbit Channel. The mountainous area receives a higher precipitation depth than the Jackrabbit Corridor area. Since JD records were used in the ADMPU HEC-1 models to account for area-depth reduction, an individual precipitation depth for each sub-basin (PB record) could not be used.

To reflect the precipitation difference between the mountain terrain and range terrain precipitation values, the watershed was divided into two major basins. The FRS#3 major basin covers the watershed area upstream of White Tanks FRS#3. The Jackrabbit Corridor major basin covers the watershed area downstream of FRS#3. Separate HEC-1 models were created for each major basin. HEC-DSS was employed for data transfer between the two models.

The NOAA 14 precipitation depths were obtained using DDMSW (Ref. 33). The 100-year 24-hour NOAA 14 rainfall depths for the FRS#3 major basin vary from 4.80 inches to 3.65 inches. An area-weighted average depth of 4.016 inches was applied to the model for this area. Within the Jackrabbit Corridor major basin, the variation in NOAA 14 rainfall depth is less than 0.10 inch. A 100-year, 24-hour area-weighted average depth of 3.661 inches was applied to the Jackrabbit Corridor model.

3.1.2 Land Use and Retention

Changes were made to sub-basin land use and retention are summarized in Table 4. As shown in the HEC-1 schematic maps (Figures 10A-B and 11A-B, in Appendices L and M), the models include Sub-Basins W21A, W28A, and W33 through W38. The retention volume for Verrado (W34 and W35) was obtained from the Verrado Master Drainage Plan (Ref. 53). The retention volumes for the remaining sub-basins represent 80 per cent of the required site retention volume for the 100-year 2-hour precipitation of 2.3 inches (NOAA14).

Table 4: HEC-1 Sub-Basin Land Use and Retention

Sub-Basin	Communities	Land Use	Retention (AF)	Note
W21A	FCD Owned	Vacant	0	Keep undeveloped for future condition.
W28A	Beautiful Arizona Estates, Maracay Development	Large and Medium Lot Residence	30.0	Maracay future development will provide retention.
W33	Beautiful Arizona Estates, Litchfield Heights	Large Lot Residential	0	Neither community provides retention.
W34 and W35	Verrado	School and Residential	23.0	
W36	Pasqualetti Mountain Ranch, Arroyo Seco	Large Lot Residential	12.7	Pasqualetti does not provide retention. Arroyo Seco will provide retention for future development
W37A	Arroyo Seco, Valencia Heights	Large Lot Residential	16.1	Valencia Heights does not provide retention. Arroyo Seco will provide retention for future development.
W37B	Arroyo Seco, Valencia Heights	Large Lot Residential	3.0	Valencia Heights does not provide retention. Arroyo Seco will provide retention for future development
W38		Regional Commercial	10.4	Future development will provide retention.

The retention volume provided for the Verrado school grounds provides sufficient storage for the 100-year, 24-hour runoff for its contributing area. Therefore, the tributary area was adjusted by

approximately 0.184 square miles. In the future, when development occurs, the remaining portion of the Verrado development runoff will be collected and detained by a separate basin to be located at the northeast corner of Jackrabbit Trail and Indian School Road. The volume in this basin is 23.0 acre-feet, which was included in the HEC-1 models.

3.1.3 White Tanks FRS#3 Storage Routing

The storage volume, capacities of the principal and emergency spillways, capacity of the gated outlet, and infiltration rates at different elevations were obtained from the *White Tanks FRS No.3 Remediation Project - Phase I, Design Report Volume 2* (Ref. 46). For the PMF event, the maximum stage is 1216 ft (NAVD88). At this stage, the total discharge from the principal spillway and gated outlet is 560 cfs. The minimum design capacity for the channel is therefore 560 cfs.

The stage-storage-discharge curve for the "future condition," which was defined as the condition with the principal spillway open and the gated outlet closed, was used for FRS#3 storage routing. The discharge in the stage-storage-discharge curve accounts for not only the outflow from the principal outlet but also the natural infiltration within the reservoir. A diversion was added following the storage routing, to separate the natural infiltration from the outflow. The outflow from FRS#3 was stored in a HEC-DSS file for retrieval by the Jackrabbit corridor major basin HEC-1 model.

3.1.4 Rainfall Loss, Unit Hydrograph, and Routing

The Green-Ampt method was used for rainfall loss calculations, and the Valley S-Graph for the creation of unit hydrographs. Normal depth routing was used to route flows through the proposed channel. Variables for Green-Ampt losses, unit hydrographs, channel and reservoir routing were based on those presented in the *Loop303/White Tanks ADMPU Area Hydrologic Analysis* (Ref. 30) and *Verrado Planning Unit Drainage Plan for Portions of Planning Units II & IV and Update to Master Drainage Plan* (Ref. 53). The unit hydrographs for Sub-Basins W37A and W37B were obtained using MCUHP2 and Valley S-Graph.

3.2 Pre-Project Conditions HEC-1

The following changes were made to the ADMPU HEC-1 model to create the Pre-Projects Conditions model, which reflects the future conditions without the project in place. The new model Pre-Project Conditions model serves as the baseline for comparison with the Proposed Conditions HEC-1 model. The filename for this model is "Future_MB02.dat". The HEC-1 schematic (Figures 10A,B) and output for the Pre-Project Conditions model are included in Appendix L.

- Major Basin MB02 was divided into two models, one for the areas upstream of White Tanks FRS#3 ("upstream model"), and one for the downstream areas ("downstream model"). In the upstream model, a 100-year 24-hour precipitation of 4.016 inches was applied. A 100-year 24-hour precipitation of 3.661 inches was used in the downstream model.
- The stage-storage-discharge curve from the White Tanks FRS#3 rehabilitation design (Ref. 46) was used in the upstream HEC-1 model to obtain the outflow hydrograph from FRS#3. The outflow hydrograph was stored in a HEC-DSS file for retrieval by the downstream HEC-1 model.
- Sub-Basin W21A, adjacent to FRS#3, is to remain undeveloped in the future conditions. Green-Ampt parameters and the unit hydrograph from the ADMPU existing conditions model with CIP (Exist_CIP_MB02.dat) were used for this basin.
- The retention volume modeled for Sub-Basins W28A, W36, W37A, W37B and W38 represents 80% of the required site retention volume for the 100-year 2-hour precipitation of 2.3 inches (NOAA14). No retention was provided for Sub-Basins W21A and W33.

- Green-Ampt parameters, unit hydrographs, and storage routing for Sub-Basins W34 and W35 were adopted from the *Verrado Planning Unit Drainage Plan for Portions of Planning Units II & IV and Update to Master Drainage Plan* (Ref. 53) by Wood/Patel. It was confirmed that the Green-Ampt parameters and hydraulic conductivity (XKSAT) in the Wood/Patel report are appropriate.
- Sub-Basin W37 was divided into Sub-Basins W37A and W37B. As indicated by the topography, Sub-Basin W37A contributes runoff directly to the proposed channel, while runoff from Sub-Basin W37B concentrates along McDowell Road. In previous studies conducted by WLB (Ref. 49) and URS (Ref. 42), the majority of the flow from Sub-Basin W37B was routed south through culverts under I-10 to the White Tanks FRS#4 reservoir. To be consistent with the current ADMPU (Ref. 30), which routes the flow from Sub-Basin W37 to the intersection of McDowell Road and Jackrabbit Trail, it was assumed that the runoff from Sub-Basin W37B was conveyed along McDowell Road east to Jackrabbit Trail.

3.3 Proposed Conditions HEC-1

The following change was made to the Pre-Project Conditions HEC-1 model to create the Proposed Conditions model. This model reflects future conditions with the proposed Jackrabbit Trail Channel in place. The filename for this model is "Future_CIP_MB02.dat". The HEC-1 schematic (Figures 11A,B) and the output for the Proposed Conditions model are included in Appendix M. Peak discharges are summarized in Table 5 in Section 3.4.

- The channel routings were updated to reflect the proposed channel layout and geometry. The routing steps (NSTPS) were estimated based on a non-erosive design velocity of 3 feet per second.

In previous studies conducted by WLB (Ref. 48) and URS (Ref. 41), the 100-year peak flow concentrating at Tuthill Road and I-10 is greater than the capacity of (4) 10' X 8' box culverts at the intersection. The excess flow diverted east along the north side of I-10, with portions of the flow crossing to the south under I-10 via (1) 12' X 12' CBC, (2) 42" CMPs, and (17) 36" CMPs.

The amount of flow conveyance along the north side of I-10 and the capacity of the culverts under I-10 are currently under study as part of the ADMPU. However, results were not available prior to the completion of this report. It is assumed that flow from west of Tuthill Road will not reach Jackrabbit Trail, and that any diversion of flow along I-10 will not impact Jackrabbit Trail north of McDowell Road. Upon resolution of this issue in the ADMPU, the HEC-1 models should be updated as necessary.

3.4 Design Discharge

Design discharges used in the channel sizing are rounded values based on the Proposed Conditions HEC-1 peak flows. Table 5 summarizes the design discharges and corresponding HEC-1 peak flows by reach. The FRS#3 principal spillway and gated outlet base flow of 560 cfs was used when the HEC-1 flow rate was less than 560 cfs.

The existing channel and culverts along the west side of Jackrabbit Trail within Reach 6 (Litchfield Heights) have enough capacity to convey the 100-year peak flow from Sub-Basin W33 downstream to Reach 5. Therefore, the proposed channel design east of Jackrabbit Trail would not have to include this flow in Reach 6. To be conservative, Reach 6 was designed using a larger flowrate than Reach 7, in the event that the existing Litchfield Heights culverts are clogged, and flow overtops Jackrabbit Trail and enters the proposed channel east of Jackrabbit Trail.

Table 5: Design Discharge Summary

Channel Reach	HEC-1 Discharge		Design Discharge
	Concentration Point	Flow Rate (cfs)	Flow Rate (cfs)
Reach 1	CPW38	1549	1549
Reach 2	CPW37A	648	700
Reach 3	CPW36	670	700
Reach 4	CPW35	701	700
Reach 5	CPW33	795	800
Reach 6	CPW33	795	800
Reach 7	CPW28A	664	700
Reach 8	CPW28A	664	700
Reach 9	CPW21A	218	560*

** Given by FCDMC. Approximate peak flow from FRS#3 principal spillway and gated outlet during 6-hr local PMP storm events.*

3.5 Local Drainage Area Runoff

The Rational Method was used to quantify existing flow rates in natural washes that will be intercepted by the proposed channel. Computations were based upon the NOAA 14 precipitation values. The "Open Space" land use type was selected for all vacant lands except those within the future Verrado development.

In all cases but two, the contributing drainage areas are less than 160 acres. DDMSW (Ref. 33) was employed for the Rational Method calculations. The local drainage sub-basins are shown in Figures 5A-B, and the DDMSW output is included in Appendix K.

Side inlet spillways were sized based upon the geometric properties of each wash with reference made to the flowrates as computed above.

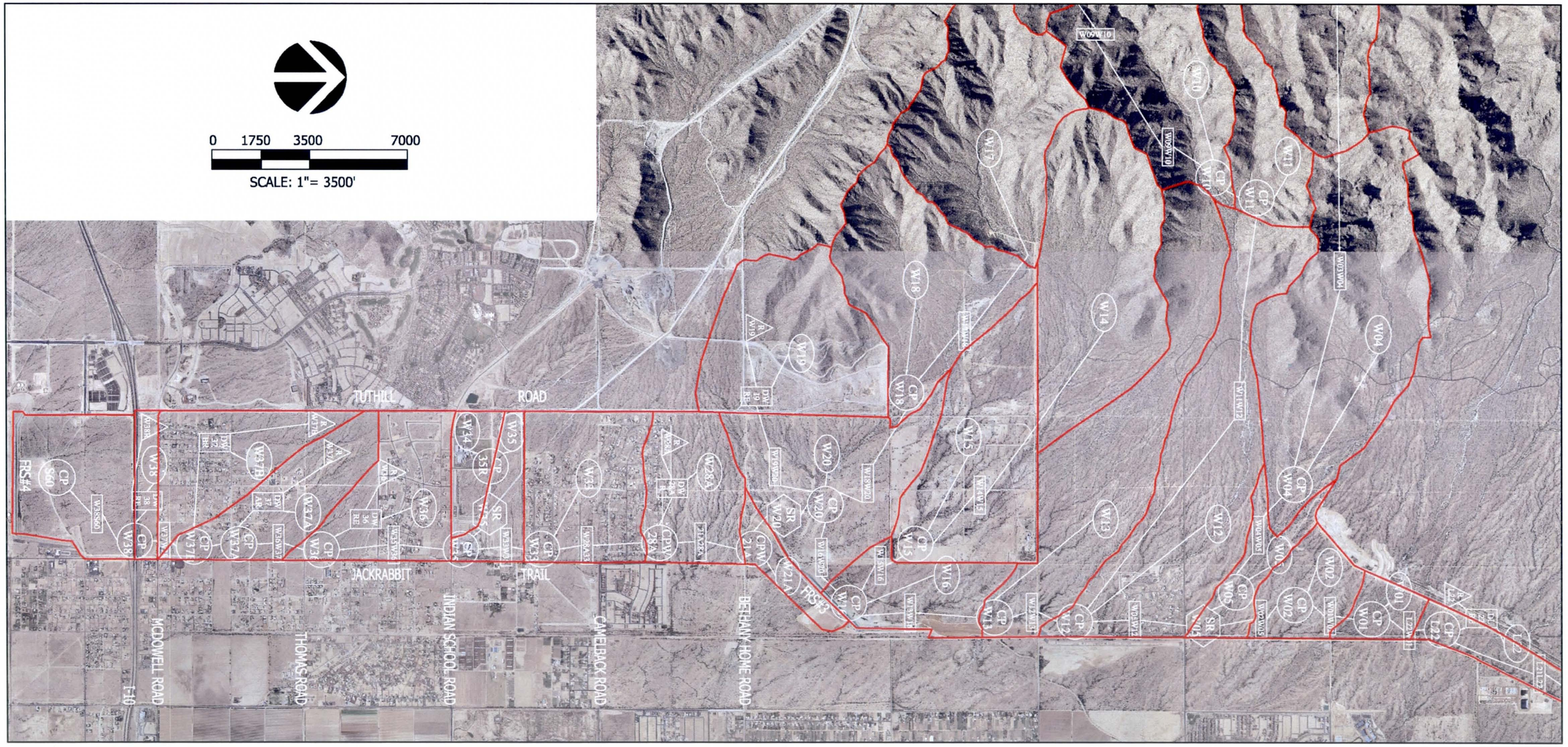


FIGURE 4 – WATERSHED MAP

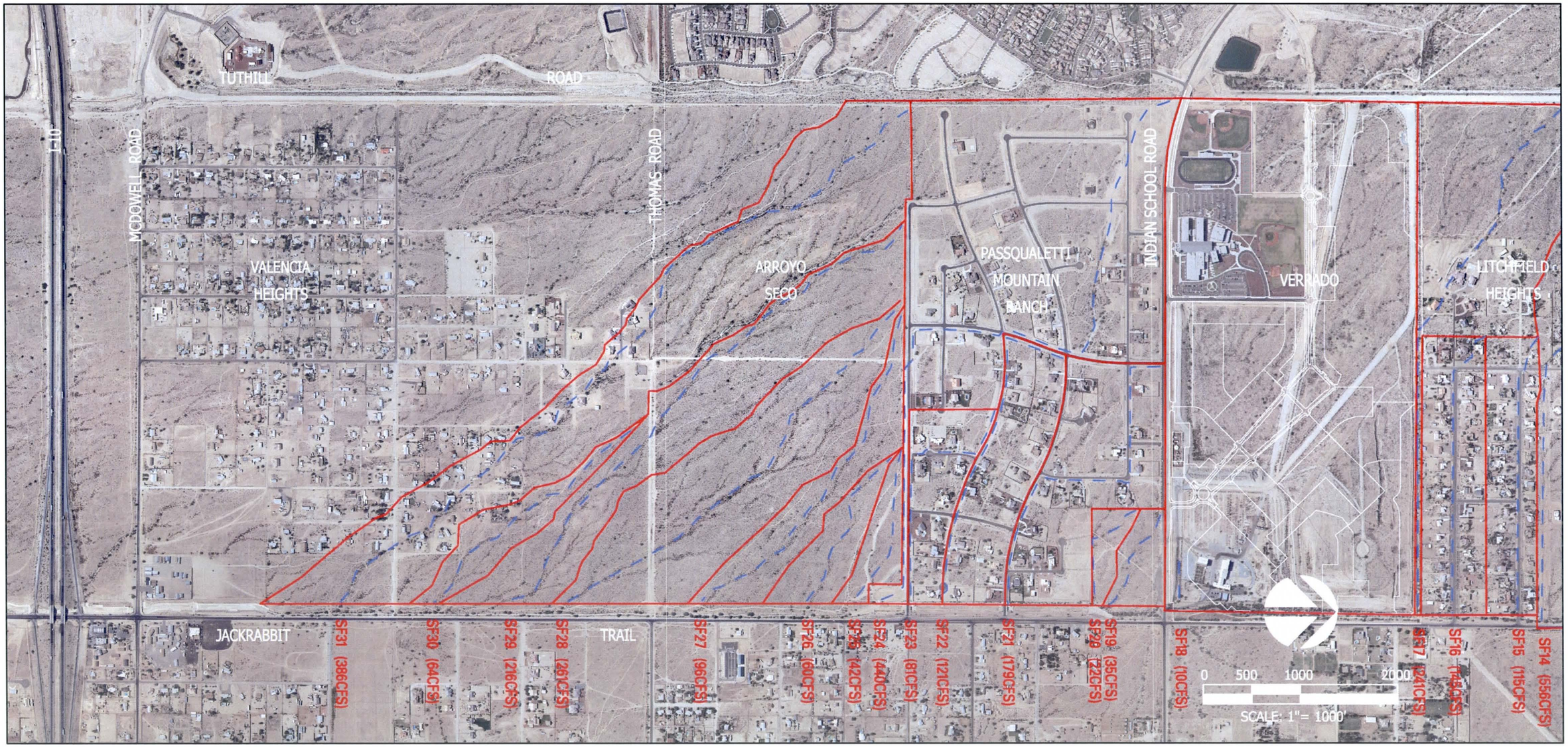


FIGURE 5A – LOCAL DRAINAGE MAP, 1 OF 2

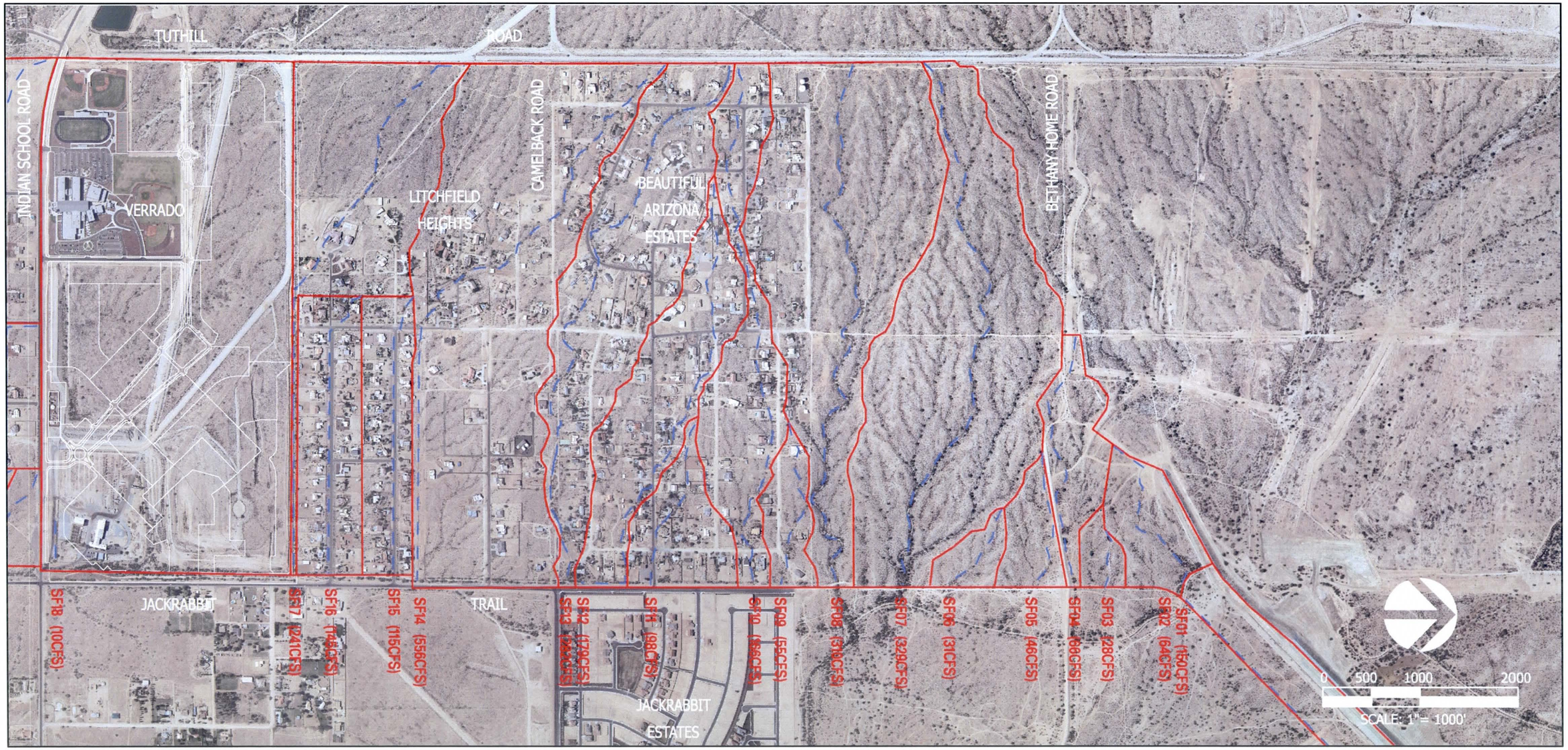


FIGURE 5B – LOCAL DRAINAGE MAP, 2 OF 2

4 HYDRAULICS

4.1 Design Assumptions

The soils data provided by the FCDMC indicates that a sandy loam covers the project site along Jackrabbit Trail. In accordance with the FCDMC Hydraulics Manual (Ref. 16), a maximum design velocity of 3 feet per second was selected for the unlined portions of the channel.

Channel depths were initially estimated using normal depth calculations, calculated using FlowMaster software (Ref. 29), plus freeboard. During the 100-year storm event, the flow depth will be generally more than 3 feet, and the channel will become a high danger zone per the FCDMC *Drainage Policies and Standards Manual* (Ref. 18). Public access will be restricted with the installation of fencing along the top of channel bank.

Due to grade limitations within Reach 9, the channel will be created by two berms that run parallel to the FRS#3 dam. The north bank will not require any freeboard, and fill will be placed as graded landscape mounds. The south bank will be designed per FEMA's levee requirements, therefore a minimum of 3 feet of freeboard will be provided for the 100-year event.

4.2 Drop Structures

The natural slope along Jackrabbit Trail exceeds the non-erosive velocity of 3 feet per second and, therefore, a bed slope of 0.0010 ft/ft was selected. Drop structures of 2.5 feet in height will be used for grade control. To mitigate the erosion caused by the acceleration at the upstream end of the structures, the crests of the drop structures will be raised one foot above the main channel flowline. A 4-foot wide notch in the crest will be provided to pass the smaller storm event flows, and will be drowned out during the larger flow events. Drop structure details are included in the 30% Design Plans, located in Section 9.

A HEC-RAS model was created to check the performance of the drop structure design. The model represents a typical channel cross-section, with a 30-foot bottom width and a design discharge of 700 cfs. Interpolated cross-sections were added and mixed flow regime was selected, in order to determine the location of the hydraulic jump within the downstream portion of the drop structure. The HEC-RAS output table and profile are provided in Appendix N.

The HEC-RAS results indicate that the hydraulic jump occurs at the downstream transition section (RS 552.5) at a supercritical Froude number of 2.2. According to Figure 6.5 in the *Hydraulic Design of Energy Dissipators for Culverts and Channels* (Ref. 11), the length of jump is about 25 feet for a rectangular channel. Riprap will be provided for a distance of 30 feet downstream of the drop structures in order to protect the channel against erosion caused by turbulence. At the upstream transition section (RS 578), the flow velocity will be controlled under 4.0 feet per second.

4.3 Junction Structure Near Minnezona Avenue

At the northeast corner of Verrado, at Minnezona Avenue and Jackrabbit Trail, two existing earthen channels merge into the proposed channel. Flowline elevation differences between the existing channels and the proposed channel are 6.5 feet and 9.5 feet. A special junction structure was designed to combine the channels and dissipate the energy. A detail of the junction structure is included in the 30% Design Plans, located in Section 9.

The junction structure is composed of two baffled chutes. The design of these two baffled chutes was done in accordance with the *Hydraulic Design of Energy Dissipators for Culverts and Channels* (Ref. 11) and FCDMC Hydraulics Manual (Ref. 16). The design calculations are provided in Appendix P. The design discharge of 799 cfs for Baffled Chute 1 is from the Proposed Conditions HEC-1 output (Sub-Basin W33, Appendix M). The design discharge of 241 cfs from the side inflow is from the Rational Method Calculations (SF17, Appendix K).

A minimum of four (4) rows of baffle are proposed to dissipate energy. In accordance with the design reference manual (Ref. 11), the baffled chute design will produce velocities at the bottom of the chute equal to no more than one-third of the critical velocity. In this case, the velocities at the bottom of the chutes are less than 3.2

feet per second. Riprap will be provided at the upstream and downstream ends of the baffled chutes to prevent potential erosion caused by acceleration and confluence turbulence.

4.4 Proposed Conditions HEC-RAS

A HEC-RAS model was created to analyze the performance of the proposed channel. Cross-sections were set at locations where changes occur in discharge, slope, or channel geometry, with maximum cross-section spacing of less than 400 feet. River Stations in the HEC-RAS model match the design plan stationing, therefore, the 30% Design Plans should be referenced for exact cross-section locations (See Section 9).

Manning's 'n' roughness coefficients selected for the model include 0.015 for concrete channel, 0.035 for earthen channel with landscape, 0.035 for riprap, 0.022 for drop structures with rough surface treatment, and 0.013 for concrete box culverts.

The Manning's roughness coefficients for concrete box culverts at RS19288.5 and RS24006.1 were adjusted to 0.014 to account for the head loss caused by culvert bends. Calculations for the bend loss and Manning's 'n' adjustment are provided in Appendix P. Bend loss coefficients were selected from Table 6 in the *Hydraulic Design of Highway Culverts* (Ref. 12). Internal bridge cross-sections were used to model drop inlets at box culverts.

The culverts at RS19288.5, RS21278, RS24006.1, and RS27826 have entrances skewed at less than 45 degrees. As indicated by the *Hydraulic Design of Highway Culverts* (Ref. 12), skewed inlets less than 45 degrees have minor impact on the culvert hydraulic performance. Therefore, head loss due to skewed inlets was not considered in the HEC-RAS model.

Due to grade limitations, no drop inlets are provided at box culverts RS22722.7, RS24006.1, and RS27826. To reduce entrance losses at these culverts, the top edges of the culverts will be rounded to a radius of 6-inches. An entrance loss coefficient of 0.2 was applied to these culverts in the HEC-RAS model. For all other culverts, the standard square-edge entrance applies and an entrance loss coefficient of 0.5 was selected.

The downstream boundary condition at the FRS#4 reservoir was set at the 100-year, 6-hour water surface elevation per the future conditions HEC-1 model prepared by Wood/Patel for the FRS#4 rehabilitation (Ref. 54). The water surface elevation used in that model is 1052.1 (NAVD88).

The HEC-RAS output, table, and cross-sections are provided in Appendix N. The proposed water surface elevations are summarized in Table 6. As shown in the HEC-RAS output, the velocities are generally controlled under 3.5 feet per second, except at locations around drop structures and culvert drop inlets, where concrete and riprap are specified for erosion protection. Freeboard for Reaches 1 through 6 meets the FCDMC requirements (Ref. 16). A minimum of 1-foot freeboard will be provided for Reaches 7 and 8. No freeboard will be provided for the north bank of Reach 9, and a minimum of 3-foot freeboard will be provided for the south bank of Reach 9, for the 100-year flood event. A 1-foot freeboard will be provided at the wasteway structure.

Table 6: Proposed Water Surface Elevations

HEC-RAS River Station	Design Flowrate (cfs)	Water Surface Elevation (NAVD88)
31100	560	1192.55
30200	560	1191.42
29000	560	1190.68
27860	560	1190.22
27826	Culvert	
26450	700	1187.37
25300	700	1186.09
24100	700	1185.31
24006.1	Culvert	
23620	700	1184.31
22750	700	1183.61
22703.8	Culvert	
22600	700	1182.79
21269	700	1180.82
21260	Culvert	
21142	800	1177.79
20491.5	800	1176.01
20475	800	1174.40
19826.3	800	1172.92
19809.8	800	1172.02
19297.6	800	1171.42
19288.5	Culvert	
18425	800	1164.38
17670	800	1162.53
17653.5	800	1161.07
16600	800	1159.80
15885.4	800	1157.45
15876.4	Culvert	
15778.5	700	1155.34
15570	700	1154.39
15553.5	700	1152.57
15300	700	1151.65
15283.5	700	1150.03
14300	700	1148.33
14260	700	1147.14
14235	700	1145.11
14227	Culvert	
14150	700	1144.61
13275	700	1141.76
13250	700	1139.96
13238	Culvert	
13150	700	1139.71
12460	700	1137.95
12443.5	700	1136.24
11960	700	1134.99
11943.5	700	1133.04
11600	700	1132.04
11583.5	700	1130.37

Table 6: Proposed Water Surface Elevations (Continued)

HEC-RAS River Station	Design Flowrate (cfs)	Water Surface Elevation (NAVD88)
11110	700	1129.07
11093.5	700	1127.35
10850	700	1126.39
10630	700	1123.91
10603.7	700	1122.92
10594.7	Culvert	
10510	700	1121.38
10100	700	1119.96
10083.5	700	1118.14
9690	700	1117.02
9673.5	700	1115.14
9284.1	700	1113.43
9275.1	Culvert	
9200	700	1112.20
9050	700	1111.19
9033.5	700	1109.27
8830	700	1108.46
8400	700	1105.5
8383.5	700	1103.79
8150	700	1102.84
8133.5	700	1100.48
7970.2	700	1099.35
7961.2	Culvert	
7885	700	1098.18
7650	700	1097.04
7633.5	700	1095.16
7370	700	1094.24
7353.5	700	1092.6
6950	700	1091.35
6933.5	700	1089.33
6659.2	700	1087.87
6651.2	Culvert	
6570	700	1085.40
5921	700	1082.55
5905	700	1079.4
5400	1328	1077.86
5342.1	Culvert	
5200	1328	1076.4
4730	1549	1073.51
4729.5	Culvert	
4650	1549	1071.1
4271	Culvert	
4185.5	1549	1067.59
2906.9	1549	1057.67
2890	1549	1053.69
1567.4	1549	1051.99
1556.5	1549	1052.07
1000	1549	1052.1

5 PROPOSED DESIGN

The Jackrabbit Channel will extend from the FRS#4, north along Jackrabbit Road to the principal outlet of FRS#3. The downstream end of the channel will connect to an existing concrete lined channel approximately 1,300 feet north of McDowell Road. This channel originates at FRS#4 on the south side of I-10, and transitions through the I-10 on- and off-ramps through concrete box culverts. At the upstream end, at the principal outlet of FRS#3, are two controlled-release pipes of 48 inches in diameter each.

The channel will be earth-lined for its entire length, except at the point of connection to the existing concrete channel described above. Grade control structures, constructed from sloped concrete, will each be 2.5 feet in height and will allow the channel slope to be reduced to 0.0010 ft/ft. The landscape concept will be to meander the channel alignment as much as possible and provide a multi-use trail connection between White Tanks FRS#4 and White Tanks FRS#3.

The project has been divided into nine (9) Reaches, each of which has its own channel cross-section and right-of-way requirements. Each of the Reaches is described below. Separate cost estimates have also been prepared for each Reach. By segregating the project in this manner, it is possible to break it into design and construction phases, if desired.

5.1 Channel

The dominance of sandy loam along the proposed channel alignment poses a constraint on the maximum design velocity for the channel. Per the *Drainage Design Manual for Maricopa County – Hydraulics* (Ref. 16), the maximum velocity for an earth channel of sandy loam without vegetation is 2.5 feet per second. However, the landscape plan for the proposed channel indicates vegetation such as trees and shrubs will be used to help resist erosion. Therefore, a maximum velocity of 3 feet per second will be used for the 100-year event for this project. To meet this requirement, a maximum bed slope of 0.0010 ft/ft will be used for all channel cross-sections. Additional riprap protection will be used at grade control structures, where velocities exceed 3 feet per second.

Initially, normal depth flow calculations were performed for each of the nine channel reaches. As the design progressed, a hydraulic analysis was performed using HEC-RAS for the entire length of the project, as described in detail in Section 4.4. In addition, a detailed HEC-RAS model was prepared for a typical grade control structure.

5.2 Grade Control Structures

The grade control structures that will be used on this project consist of a sloped concrete transition, with a grade change of 2.5 feet. The grade control structure has a maximum slope of 20 per cent, which will allow maintenance vehicles to drive between channel segments. A low–flow notch will be used within each grade control structure to allow smaller flows to be maintained on one side or the other of the channel and still allow maintenance vehicular travel. After some preliminary design analysis of the channel hydraulics, it was determined that a lower channel velocity could be achieved upstream of the grade control structures with a 1-foot adverse grade built into each structure. This adverse grade accommodates the low–flow notch and will eventually allow for some siltation on the grade control structure's upstream face. As a result, the channel velocity will be reduced to below 4 feet per second at the interface between the concrete and the riprap.

A riprap transition will be constructed at the downstream side of the grade control structures. This riprap will help to slow the velocity of flow as it leaves the concrete chute and will help to force a hydraulic jump. A large diameter rock (D50 = 15-inch) is proposed for the riprap. On top of this, a 6-inch layer of large diameter gravel will facilitate the travel of maintenance vehicles. It should be anticipated that siltation will occur over time, allowing the riprap to take on a more natural appearance. Low flows will be accommodated on alternating sides of the grade control structures so that a natural meander occurs within the main channel.

5.3 Side Inlet Drainage

Drainage approaches Reaches 1-6 and Reach 8 from the west. Since the channel will be unlined, side drainage has the potential to cause erosion and head cutting which could extend beyond FCDMC right-of-way. For the larger drainage flows, concrete inlet structures and spillways are proposed. These spillways will be shaped to match to the natural wash cross-section as it enters FCDMC right-of-way, and will match the incoming wash grades. Wherever possible, these spillway structures will coincide with the grade control structure locations so that the use of concrete and riprap will be minimized.

For drainage flows less than 10 cfs, side inlet spillways are not proposed. In these cases, a top-of-slope drainage collection ditch will be placed within the 20-foot landscape setback area. If these flows are significant in size or erosion potential, a riprap collection channel will be directed to the concrete spillways.

5.4 Culverts

Box culverts will be used where the channel alignment crosses roads. Generally, for flows less than 600 cfs, (2) 8' X 6' box culverts will be used, whereas for flows between 600 cfs and 800 cfs, (3) 8' X 6' box culverts will used (Appendix J). A 2.5-foot drop structure will generally apply at each box culvert inlet. This will help improve the hydraulic head for each structure and will reduce the grade control structures required within the channel sections.

The 30% Design Plans and cost estimates are based upon the assumed ultimate right-of-way for side streets which cross the channel alignment. In order to allow for future Public Utility Easements (PUE), the culvert lengths are based upon the ultimate right-of-way width plus 10 feet. FCDMC policy does not allow for the funding of the ultimate culvert length, therefore, a design modification is included with the 30% Design Plans for an interim condition. Since each culvert includes a 2.0- or 2.5-foot drop structure, it is desirable to construct the ultimate inlet condition. A modified culvert inlet and drop structure detail is provided with the 30% Design Plans.

5.5 Aesthetic Treatments

The FCDMC has a *Policy for the Aesthetic Treatment of Landscaping of Flood Control Projects* (Ref. 27) which provides an allowance for Landscape and Non-Landscape Aesthetic Treatments. In keeping with this policy, concrete structures, including headwalls and grade control structures will have treatments to improve their appearance and allow them to blend to the native setting. Headwall structures can be provided with integral colors and textures. The grade control structures shown on the 30% Design Plans show an additional structural thickness to allow for a freeform look and/or form liner. Natural boulders will be integrated into the concrete bed and Sideslopes.

The channel top and bottom of slope will meander and warp to create a more natural character and to match the surrounding landforms. The sideslopes of the channel will meander from 4:1 to 8:1 wherever possible. A low flow channel will be allowed to form naturally within the bottom of the channel, and will be controlled by the location of a notch within the grade control structures.

5.6 Operations and Maintenance Road

Where right-of-way is not too constrained, the Operations and Maintenance (O&M) road will meander to align with the sideslope contours and will be placed at the top of channel slope on both sides of the channel. This situation arises in Reaches 5, 6 and 8. Access will also be provided to the bottom of the channel with an access ramp graded with a maximum 10 per cent longitudinal slope. A gravel mulch will be used for the O&M road and shall match the existing surroundings. A stabilizer will be used to reduce dust and erosion.

Public access to the channel will be restricted with a 4-strand wire fence, and at access ramp locations, a gate will be provided. Where the channel and O&M road cross side streets, bollards will be used to allow pedestrian and bike traffic, and to restrict vehicular traffic. These bollards will be locked and removable to allow FCDMC vehicular access.

5.7 Landscape Character

A landscape concept has been prepared for the project and is included in Appendix G. The landscape theme for this project is a combination of Enhanced Desert and Desert Oasis (Ref. 28). This theme is context sensitive with suburban, urban and industrial cultural settings with a Sonoran landscape character type. The plant palette includes native vegetation such as Mesquites, Ironwoods, Palo Verdes, Bursage, Brittlebush, Creosote, Baccharis and Saltbush.

The plant materials will match to the existing species in the area and will respond to the context of the dam. Indigenous vegetation will be salvaged and re-used and, where possible, existing Saguaros, Ironwoods and other xeroriparian vegetation will be maintained in place. Detailed topographic mapping and a landscape inventory will help in this regard for the Final Design.

Shrubs and ground cover will be re-established through hydroseeding. Gravel mulch will be applied to all sloped areas to help prevent local rill erosion. Rocks and boulders will be placed in an irregular pattern along the sideslopes of the channel.

5.8 Sewer and Water Line Extensions

The Town of Buckeye is currently in the Final Design phase for a new 12-inch to 15-inch sewer line along Jackrabbit Trail. This line will extend from approximately Roosevelt Street, to approximately 1,300 feet north of Indian School Road. Although not yet designed, this sewer line may extend further to provide for future connections north of Camelback Road. Also, to provide for future flexibility, sewer lateral extensions will be provided under the cross street culverts.

Similarly, sleeves will be provided under all new culverts to provide flexibility for new waterline extensions. The locations and grades of both sewer and waterlines shown on the 30% Design Plans are approximate and will need to be confirmed during the Final Design stage.

5.9 Right-of-way Requirements

The existing right-of-way along the Jackrabbit Trail corridor varies from parcel to parcel. The current and proposed right-of-way limits are illustrated on Figures 7A, 7B, 7C and 7D. Jackrabbit Trail has not yet been widened to its ultimate cross-section, and the full right-of-way has not yet been acquired by either MCDOT or the Town of Buckeye. A future right-of-way width of 65 feet for half-street, and 130 feet for full-street is anticipated. The FCDMC owns right-of-way for Reaches 1, 2, 3, 4, 7 and 9. For Reaches 2, 3, 4 and 7, the available right-of-way is narrower than would be desirable to meet landscape, maintenance and preferred channel widths, however, the FCDMC does not desire to pursue acquisition for these reaches. In addition, the available right-of-way will be narrowed in the future as widening occurs on Jackrabbit Trail.

Full right-of-way acquisition will be necessary for Reaches 5, 6 and 8. For these reaches a full right-of-way of 214 feet in width is proposed. This width will accommodate an O&M road plus at least 20 feet of landscape buffer on each side of the channel.

5.10 Description by Reach

Reach 1

Reach 1 extends from the FRS#4 inlet channel, upstream to a point approximately 1,300 feet north of McDowell Road. The current channel is concrete-lined and trapezoidal in shape. This reach consists of an existing concrete channel located within FCDMC or ADOT right-of-way. Future widening of the Jackrabbit Trail/I-10 interchange may result in replacement of portions of the channel with an underground conduit. The hydraulic analysis indicates that (5) 10'X4' box culverts of 400 feet in length would convey the 100-year peak flow of 1,415 cfs, which is currently in the concrete-lined channel south of McDowell Road. That, however, is not a part of this project.

Removal and replacement of approximately 258 feet of the existing channel, south of Palm Lane, will be necessary in order to lower the channel and culvert grades at Palm Lane. The replacement channel will

Reach 1 - Existing concrete-lined Jackrabbit Channel west of Jackrabbit Trail. View north from I-10 westbound on-ramp.

commence at an existing channel access ramp. The Town of Buckeye has plans to build a Park and Ride Facility on the northwest corner of Jackrabbit Trail and Palm Lane (see Reach 2). It is desirable to place this culvert as close to the west right-of-way line as possible, therefore, the concrete channel will go through a westward alignment shift.

Reach 2

Reach 2 extends from the south side of Palm Lane, north to the south side of Thomas Road, along the west side of Jackrabbit Trail. The channel will be unlined with grade control structures, and a design slope of 0.0010 ft/ft. The FCDMC owns a 138 feet wide strip of right-of-way through this reach; however, future dedication of a full 65 feet of half-street right-of-way to MCDOT will reduce this to 129 feet. Construction of the O&M road will be limited to the east side of the channel.

Reach 2 - Existing channel with 14-foot bottom width north of Lewis Avenue, view north.

The Town of Buckeye Park and Ride, which will be located on the northwest corner of Palm Lane and Jackrabbit Trail, will precede the construction of this project. Therefore, the Town of Buckeye, through an Intergovernmental Agreement (IGA) with the FCDMC, will implement construction of the box culvert crossing at Palm Lane. Culvert structures will also be built at the future alignments of Encanto Boulevard and Virginia Avenue.

Reach 3

Reach 3 extends from the south end of the Thomas Road culvert crossing, north to the south end of the Pasqualetti Mountain Ranch subdivision. The existing 129 foot-wide right-of-way in this area will not be widened. An existing grouted riprap channel transition at the south end of Pasqualetti Mountain Ranch will be removed to make way for the new earth-lined channel.

Reach 3 - Overhead electric lines crossing the existing channel along Jackrabbit Trail at Flower Street. View southeast.

Reach 4

This reach runs through the Pasqualetti Mountain Ranch and extends north to the south side of Indian School Road. The channel has been built except for approximately 700 feet at the north end. There are existing concrete box culverts with drop structures at Osborn Road and Clarendon Avenue. The right-of-way in this area is limited by the existing subdivision, and the preferred channel cross-section cannot be achieved. Existing channel or structures will not be replaced, however, enhanced landscape will be provided. The existing road right-of-way is 65 feet, therefore no additional acquisition is necessary.

Reach 4 - Existing channel along Jackrabbit Trail south of Osborn Road, view north. 42-foot bottom width.

Reach 5

Reach 5 extends from Indian School Road to south of Minnezona Avenue, through the Verrado Phase 3 property. Full right-of-way acquisition of 214 feet plus half-street of 65 feet is proposed. At the north end of this

Reach 5 - Existing Jackrabbit Trail channel on the left, and a second parallel channel on the right, on the Verrado propety. View south.

reach (Sells Road), the main channel will transition to concrete box culverts under Jackrabbit Trail. In addition to the main channel flow, there are two more localized drainage flows which confluence just north of Sells Drive.

A berm and channel collect drainage from the north and west and direct it eastward toward Jackrabbit Trail. In addition, a local collection channel along the west side of Jackrabbit Trail intercepts runoff generated within the Litchfield Heights subdivision and conveys it south. This local channel extends from Sells Road to approximately 300 feet north of Meadowbrook Avenue. The two tributary drainage flows meet above the proposed channel invert, therefore two baffled chute drop structures are proposed in the area of what will be a three-way confluence.

Reach 6

Reach 6 extends from north of Sells Drive to the south side of Camelback Road. From Reach 5, the channel goes underground through (2) 8' x 6' concrete box culverts of 825 feet in length. These culverts will cross Jackrabbit Trail and take the channel to the east side of the road. Missionary Wings is the owner of this property that is an abandoned airstrip. Right-of-way acquisition will include 214 feet for drainage and an additional 10 feet for future road widening.

Reach 6 - Missionary Wings property at the southeast corner of Camelback Road and Jackrabbit Trail. View east.

On the west side of Jackrabbit Trail, within the Litchfield Heights subdivision, the existing drainage channel and culvert crossings at Minnezona Avenue and Meadowbrook Avenue will remain. Some channel re-grading will be necessary to transition from the existing channel to the baffled drop structure.

Prior to deciding on the use of a long culvert across Jackrabbit Trail, three options (6A, 6B and 6C) were evaluated. The results of this evaluation and cost comparison are included in Appendix J. The other two options considered would have required the acquisition of two or four individual homes located within the Litchfield Heights subdivision.

Reach 7

Reach 7 will consist of an unlined channel through the Jackrabbit Estates subdivision. The FCDMC acquired multiple platted lots within the subdivision from the developer, Shea Homes. The pads for lots were graded, perimeter landscaping installed, perimeter theme wall and rear and sideyard retaining walls built. In addition, water and sewer service taps and electric lines have also been installed. New culverts will be required under Colter Street. Drainage that crosses Jackrabbit Trail or enters from scuppers off the street will be accommodated with concrete spillways. The design slope of 0.0010 ft/ft will be accomplished without grade control structures. A single grade control structure will be built at the Camelback Road culvert crossing.

Reach 7 - Existing wall and drainage channel along the west and south sides of Jackrabbit Estates. View north.

The available right-of-way in this reach is limited due to width and depth. The O&M road will exit onto the subdivision street of 194th Drive in order to improve the channel side slopes and width. Retaining walls will be constructed in the narrowest right-of-way locations. The subdivision developer, Shea Homes, has been contacted for review and approval of the design concept.

Reach 8

Reach 8 extends from the north side of Jackrabbit Estates (Missouri Avenue) to Bethany Home Road. The channel will cross Jackrabbit Trail to the west side through (3) 8' x 6' box culverts. A diagonal portion of right-of-way will cross through property currently owned by the MCMWCD. This right-of-way acquisition was designed to integrate with preliminary site plans for this site, which show a planned residential subdivision called Zanjero Trails (Appendix E).

Reach 8 - Continuous raised dirt road along the Bethany Home Road alignment. View west.

On the west side of Jackrabbit Trail, the channel is unlined with a slope of 0.0010 ft/ft. Grade control structures are not necessary in this reach. The right-of-way requirement consists of 214 feet for drainage and 10 feet for future road widening. Jackrabbit Trail does not exist in this location, however it may be desirable to establish an approximate centerline grade during the Final Design. Additional fill material should be located within the existing road right-of-way to eliminate future disturbance to the channel and to ensure that a berm situation does not exist.

The future Jackrabbit Parkway will cross the Jackrabbit Chanel south of Bethany Home Road. Culverts will be required in the future, however, the exact road alignment is unknown and these structures will not be funded by the FCDMC.

Reach 9

Reach 9 extends from Bethany Home Road, northeast and parallel to the FRS#3 dam toe of slope, to the principal outlet, which is located just east of the Beardsley Canal. The property is owned by the FCDMC, therefore no additional right-of-way acquisition is necessary.

Starting just south of Bethany Home Road, the channel will go underground within (2) 10' x 6' culverts of 1,320 feet in length. These culverts will be constructed so that the emergency spillway flows can cross the channel alignment without the potential for embankment failure. Design plans for the re-grading of the emergency spillway are shown on the 30% Design Plans.

From the culverts, the channel continues north and east with an average slope of 0.0010 ft/ft without the need for grade control structures. The topography in these areas necessitates that the south embankment of this channel will be built as a levee. Subsidence and fissure problems occur in this area and, therefore, the embankment may require special geotechnical treatments that may include a concrete lining. The 30% Design Plans do not show this.

Reach 9 - Existing FRS#3 principal outlet structure, view northwest.

On the north side, the top of channel will be set at the design water surface elevation. The area between the toe of slope of the dam and the channel top of slope will be graded to drain toward the channel. Mounding within this area will help to mitigate the dam embankment face and will allow for the disposal of excess excavated fill material.

As it approaches the principal outlet, the channel will curve northward. A gated outlet structure will regulate the flow within the channel and, if closed, will divert flow over a concrete lined spillway into the Beardsley Wash. The purpose of this "wasteway" is to allow overflow diversion to its historic path if the FRS#4 is unable to accept the excess water. This event is only likely to occur prior to the construction of the FRS#4 Outlet channel. Eventually, the White Tanks FRS#4 Outlet channel will discharge to the Gila River.

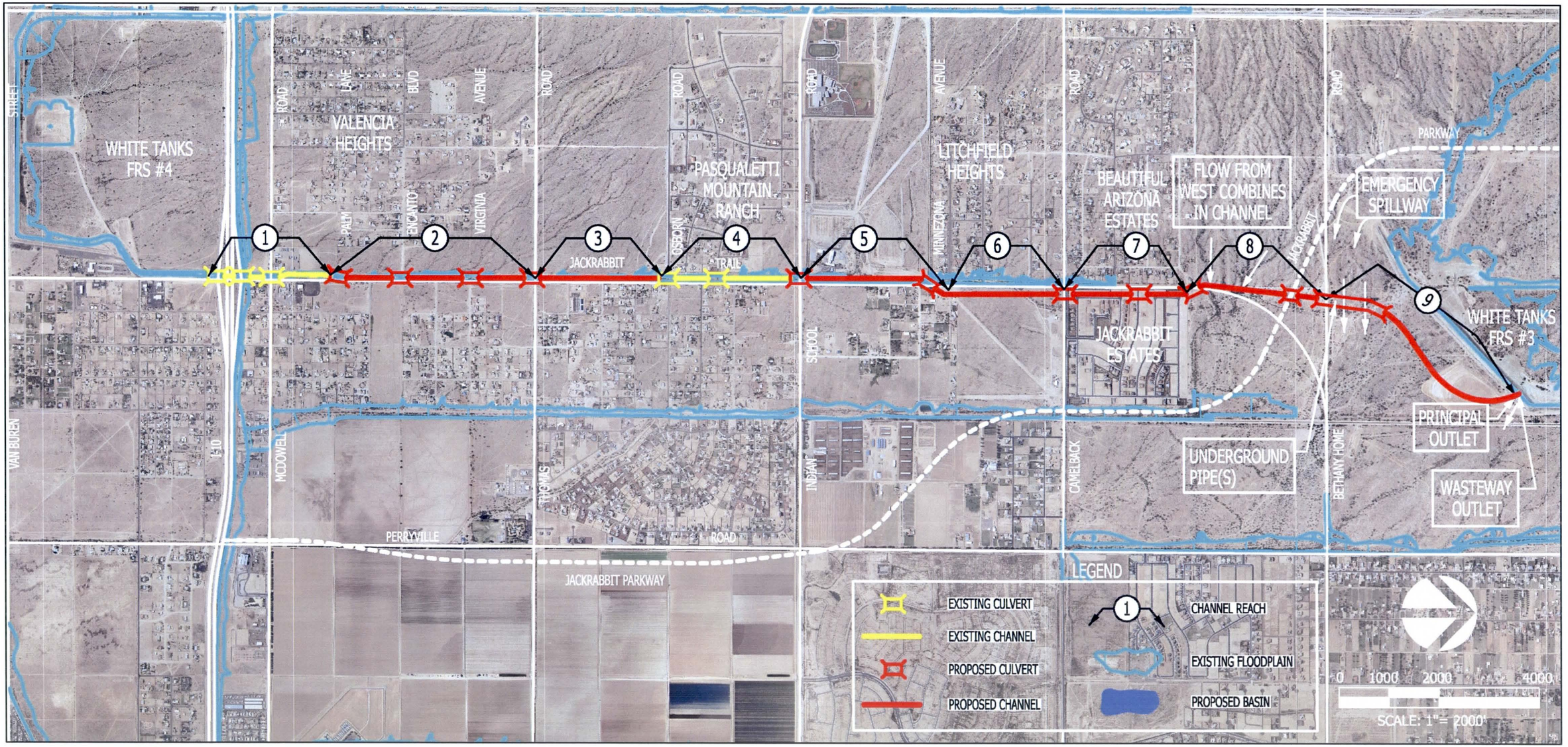


FIGURE 6 – PROPOSED DESIGN SCHEMATIC

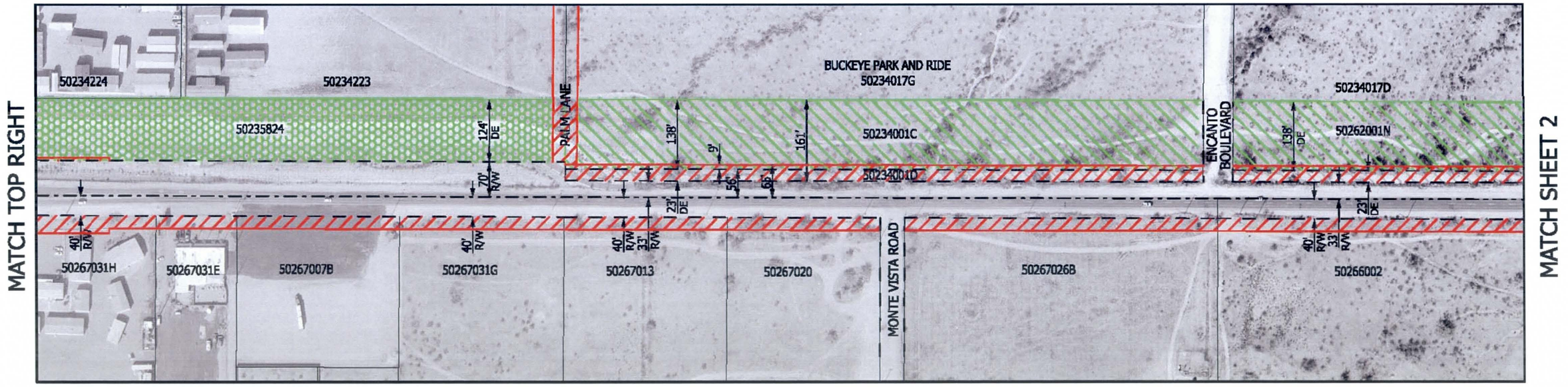


FIGURE 7A – EXISTING AND PROPOSED RIGHT-OF-WAY, 1 OF 4

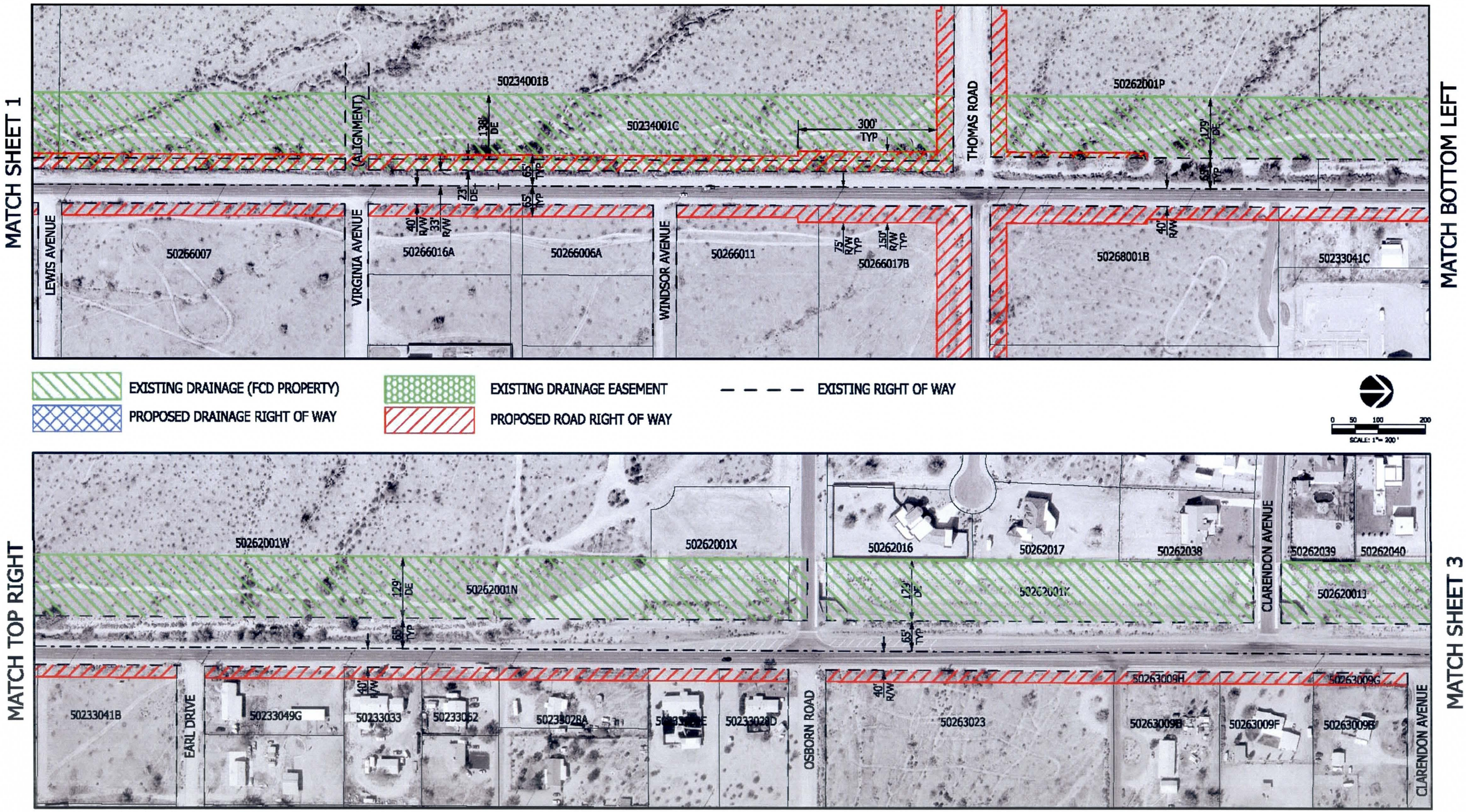


FIGURE 7B – EXISTING AND PROPOSED RIGHT-OF-WAY, 2 OF 4

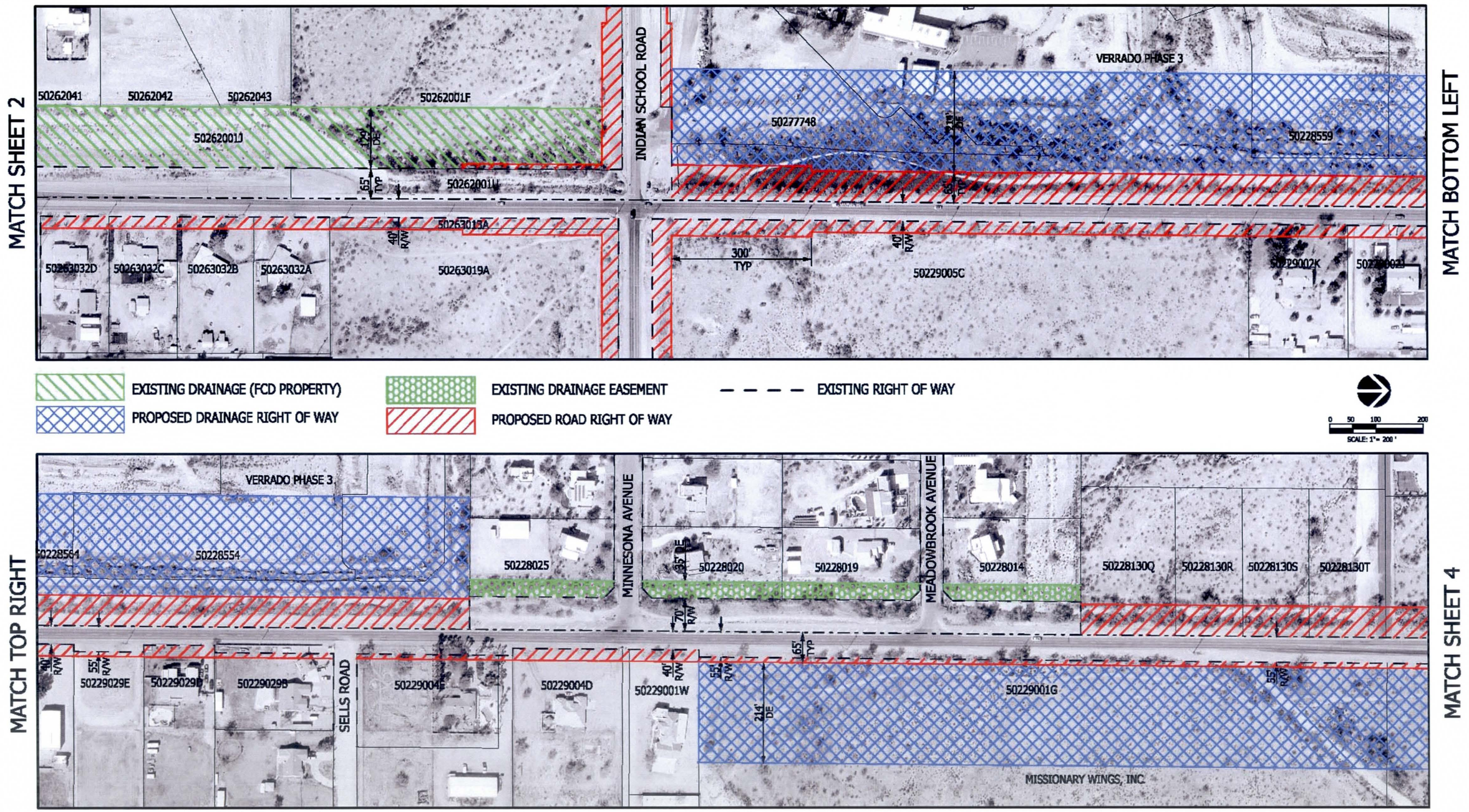


FIGURE 7C – EXISTING AND PROPOSED RIGHT-OF-WAY, 3 OF 4

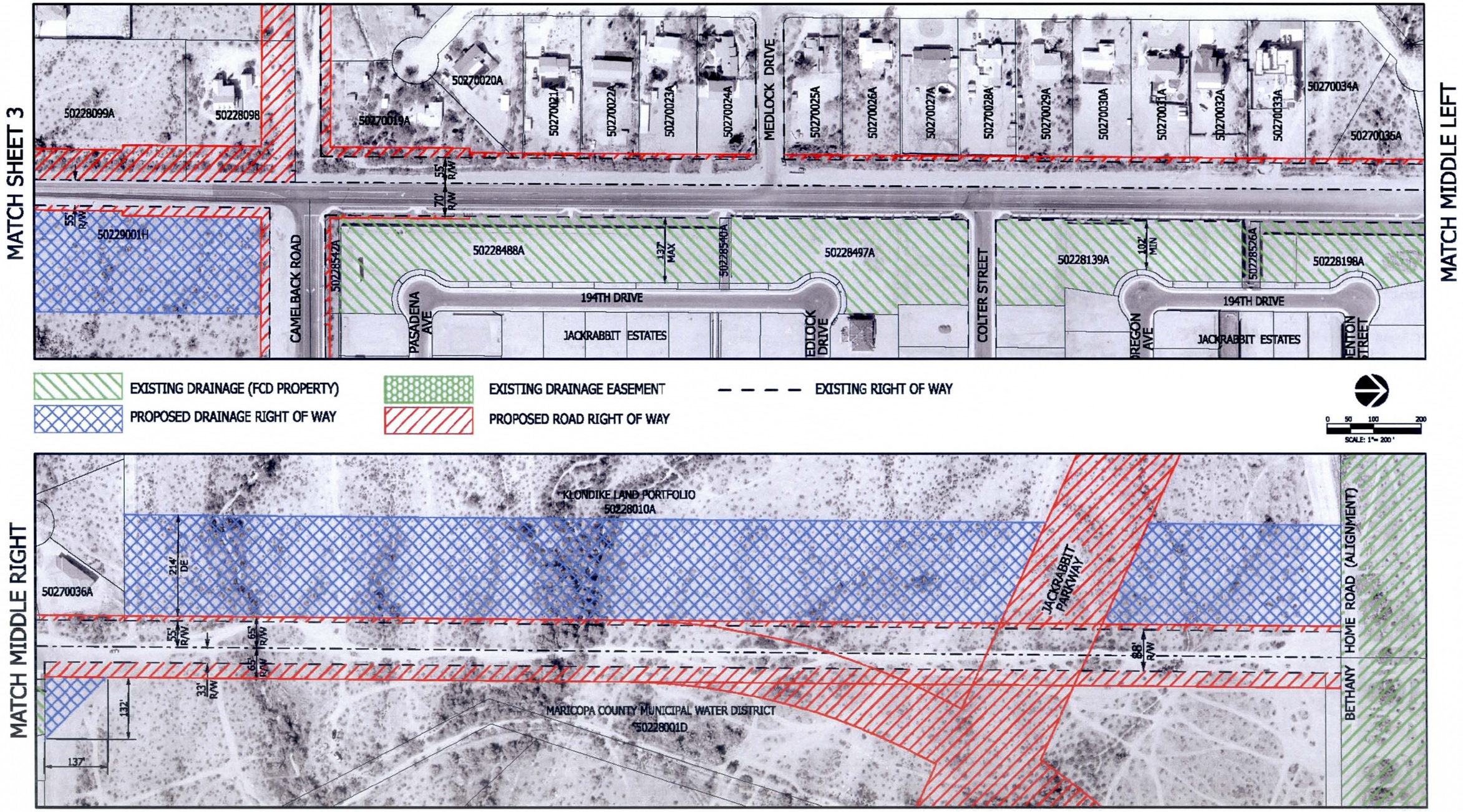


FIGURE 7D – EXISTING AND PROPOSED RIGHT-OF-WAY, 4 OF 4

6 COST ESTIMATE AND EVALUATION

6.1 Cost Estimate

Cost estimates and quantity summaries were prepared for the project by reach and by design plan sheet. The final cost estimate is located in Appendix Q in Volume II, and is summarized in Table 7. Quantity takeoffs by sheet are shown on the 30% Design Plans, located in Section 10. Items in the cost estimate are numbered according to the MAG Standard Specifications (Ref. 34) to provide consistency with FCDMC bid examples.

The cost estimate includes the cost for the total length of all culverts at road crossings, based on the anticipated road right-of-way width, plus 10 feet on each side of the right-of-way. Unit prices for the major construction components of the project are shown on the cost estimates, and were derived from a comparison of three similar design and construction projects as follows:

- Reems Road Channel and Basin Project (FCD 2005C018)
- 10th Street Storm Drain, Alice Avenue to ACDC (FCD 2006C009)
- Bullard Wash Channel Improvements (FCD 2004C006)

The cost for Relocation and/or Removal of Existing Utilities was applied as a flat rate of 5 per cent of the construction items cost. A contingency for Unknown Items was applied as a flat rate of 5 per cent of the construction items cost.

In accordance with the FCDMC *Policy for the Aesthetic Treatment and Landscaping of Flood Control Projects* (Ref. 27) criteria, costs for Landscaping as Aesthetic Treatment and Non-Landscaping Aesthetic Treatment were applied separately. The cost for Landscaping as Aesthetic Treatment was estimated at $20,000 per acre, applied over the right-of-way area less the maintenance road and channel bottom. The cost for Non-Landscaping Aesthetic Treatment was applied as a flat rate of 4 per cent of the total construction cost.

In addition, a contingency for Engineering and Landscape Design was applied as a flat rate of 10 per cent of the total construction and landscape cost, and a contingency for Construction Administration was applied as flat rate of 6 per cent of the total construction and landscape cost.

6.2 Right-of-Way

Right-of-way acquisition is a major cost item to the project. The right-of-way acquisition amounts and costs are included on the cost estimates in Appendix Q in Volume II, and are summarized in Table 7. The FCDMC has acquired right-of-way and/or drainage easements for major portions of the project length, however, there are some vital segments which are missing. Also, there are portions of Jackrabbit Trail for which the full MCDOT or Town of Buckeye road right-of-way has not yet been acquired. It is important to acquire sufficient right-of-way for the ultimate channel location. A full 130 feet right-of-way was assumed to be required for Jackrabbit Trail, centered with 65 feet on either side of the section line. The cost of road right-of-way has not been included in right-of-way cost estimates, however, the acquisition strips have been identified as shown on Figures 7A-D, in Section 5.

The cost of right-of-way varies according to whether the property is raw undeveloped land, has final recorded plats, or is developed and requires relocation of residents. Unit prices for land acquisition are identified on the cost estimate, in Appendix Q of Volume II, and were provided by the FCDMC.

6.3 Evaluation

The preliminary cost estimate provided in the *Preliminary Design Report* (Ref. 32), dated April 10, 2009, was updated and is included in Appendix H of Volume II. The preliminary cost estimate provided estimates for six different alternatives. Preliminary Alternative 3 was chosen as the basis for the 30% Design Plans, and therefore serves as a comparison to the 30% design cost estimate. Per the preliminary cost estimate, the total cost for Alternative 3 was $22.2 million. The 30% design cost estimate total is $26.5 million.

Table 7: Proposed Design Cost Estimate

Item Description	Reach									Lump Sum Items	Total
	1	2	3	4	5	6	7	8	9		
General Conditions										$220,885	$220,885
Earthwork	$21,762	$813,738	$429,998	$150,525	$596,766	$426,044	$360,338	$680,485	$801,502	$626,094	$4,907,252
Streets & Related Work	$38,996	$49,265	$63,788	$63,992	$77,756	$42,977	$85,014	$37,495	$30,432	$50,000	$539,716
Right-of-Way and Traffic Control	$2,605	$35,750	$20,700	$15,820	$23,970	$17,440	$22,300	$23,570	$18,355	$100,000	$280,510
Structures	$191,784	$858,265	$310,756	$106,230	$184,538	$1,167,497	$316,393	$900,308	$2,219,311	$2,231,383	$8,486,465
Sub-Total Construction Items	$255,148	$1,757,019	$825,242	$336,568	$883,030	$1,653,958	$784,045	$1,641,857	$3,069,600	$3,228,361	$14,434,827
Relocation and/or Removal of Existing Utilities (5% of Construction Items Cost)	$12,757	$87,851	$41,262	$16,828	$44,152	$82,698	$39,202	$82,093	$153,480	$161,418	$721,741
Engineering Contingencies for Unknown Items (10% of Construction Items Cost)	$12,757	$87,851	$41,262	$16,828	$44,152	$82,698	$39,202	$82,093	$153,480	$161,418	$721,741
Total Construction Cost	$280,663	$1,932,721	$907,766	$370,225	$971,333	$1,819,353	$862,450	$1,806,043	$3,376,560	$3,551,197	$15,878,310
Landscaping as Aesthetic Treatment	$6,175	$160,292	$87,381	$30,207	$174,060	$155,829	$113,690	$183,934	$129,275	$0	$1,040,842
Non-Landscaping Aesthetic Treatment (4% of Construction Cost)	$11,227	$77,309	$36,311	$14,809	$38,853	$72,774	$34,498	$72,242	$135,062	$142,048	$635,132
Total Construction and Landscape Cost	$298,064	$2,170,322	$1,031,457	$415,240	$1,184,246	$2,047,957	$1,010,637	$2,062,218	$3,640,897	$3,693,245	$17,554,284
Engineering and Landscape Design (10% of Construction and Landscape Cost)	$29,806	$217,032	$103,146	$41,524	$118,425	$204,796	$101,064	$206,222	$364,090	$369,324	$1,755,428
Administration Contingencies (6% of Construction and Landscape Cost)	$17,884	$130,219	$61,887	$24,914	$71,055	$122,877	$60,638	$123,733	$218,454	$221,595	$1,053,257
Total Construction, Landscape, and Contingencies Cost	**$345,755**	**$2,517,573**	**$1,196,490**	**$481,679**	**$1,373,725**	**$2,375,630**	**$1,172,339**	**$2,392,173**	**$4,223,440**	**$4,284,164**	**$20,362,969**
Right-of-Way Acquisition, Undeveloped Property	$0	$0	$0	$0	$0	10.1 Ac $1,537,440	$0	13.1 Ac $1,999,107	$0	n/a	$3,536,547
Right-of-Way Acquisition, Platted Property	$0	$0	$0	$0	12.5 Ac $2,565,195	$0	$0	$0	$0	n/a	$2,565,195
Total Required Right-of-Way Acquisition	**$0**	**$0**	**$0**	**$0**	**$2,565,195**	**$1,537,440**	**$0**	**$1,999,107**	**$0**	**n/a**	**$6,101,742**
Total Project Cost	**$345,755**	**$2,517,573**	**$1,196,490**	**$481,679**	**$3,938,921**	**$3,913,070**	**$1,172,339**	**$4,391,280**	**$4,223,440**	**$4,284,164**	**$26,464,711**

7 CONCLUSIONS

This 30% Design Report accompanies the 30% Design Plans submitted as a part of FCD Contract 2007C016 Assignment 4. A Preliminary Design Report precedes this submittal and provides documentation for the decisions leading to the selection of the channel alignment. The following should be considered in the Final Design stage of the project.

7.1 Detailed Surveys

The 30% Design Plans are intended to be used for the development of Final Design Plans and detailed right-of-way acquisition plans. Prior to the development of either, it will be necessary to complete a detailed survey of the existing right-of-way control and property ownerships. New topographic mapping will be developed using the same horizontal and vertical datum used for the 30% Design Plans. Detailed field surveys will be necessary to accurately determine the size and locations of existing structures and utilities.

7.2 Reach 9

A geotechnical investigation of the dam indicates that there are indicators of potential subsidence and fissuring in the area (Ref. 45). After completion of a project-specific investigation, it may be concluded that the earthen levees could be vulnerable. If this is the case, it may be may necessary to either place additional fill material or provide a concrete lining to the face of the channel.

Additionally, the 30% Design presents a channel in Reach 9 which is created by two berms which run parallel to the dam. This design will require approval by the Arizona Department of Water Resources (ADWR) and the Natural Resources Conservation Service (NRCS) to meet dam safety standards, as well as meet the United States Army Corps of Engineers (USACE) and FEMA criteria for levee design. Alternative design options for consideration in the Final Design phase may include widening of the berms or placement of fill or landscape mounding downstream of the channel to remove the classification as a dam or levee.

7.3 Utility Notifications

It is recommended that the 30% Design Plans are submitted immediately to all noted utility companies and service providers in the area. Where utilities are potentially in conflict with the proposed channel and structures, field locations and depths should be confirmed with potholes. Plans should be coordinated with the Town of Buckeye for future water and sewer line extensions.

7.4 Park and Ride

The Town of Buckeye is currently in the process of preparing final design plans for a new Park and Ride facility to be located on the west side of the channel with access at Palm Lane. Due to differing construction schedules, it is anticipated that the new box culvert structure at Palm Lane will be constructed in conjunction with the Park and Ride. Therefore, design details for the Palm Lane culvert, and downstream concrete channel, should be finalized soon and an IGA drafted.

7.5 Floodplain Update

When construction is completed for the White Tanks FRS#3 Outfall Channel, existing 100-year floodplains will be affected. Along Jackrabbit Trail, floodplain areas formerly outside of the new channel limits will be contained within the channel. In addition, it is anticipated that the floodplain areas along the Beardsley Canal will be reduced due to changes in the hydrology. A Conditional Letter of Map Revision (CLOMR) can be prepared for the Beardsley Wash as soon as the hydrology is updated for the areas upstream and new topographic mapping is available. The Jackrabbit Wash floodplain mapping can be prepared as soon as the new topographic mapping is available and the design grades have been finalized.

7.6 Coordination with Emergency Spillway Plans

The District currently has 100% design plans for the construction of improvements to the FRS#3 emergency spillway. The FRS#3 Outfall Channel design includes a concrete box culvert to convey flows under

the emergency spillway. The design of the box culvert will need to be integrated with the spillway training dike design, which includes rock riprap protection to a depth of 10 feet along both dikes. The cost estimate prepared as part of the Final Design phase should include the cost of breaching both dikes, including slope protection and the cost of reconstruction. Construction of the culvert may be phased to occur in conjunction with the spillway improvements.

It is likely that changes to the emergency spillway plans due to box culvert construction would also require approval by both ADWR and NRCS. Additionally, the erosion model developed by the District as part of the emergency spillway design may need to be revised due to the inclusion of the box culverts across the spillway.

Landscape plans prepared as part of the 100% Design for the emergency spillway show large landscape berms which are in direct conflict with the Outfall Channel alignment presented herein. Coordination will be required during the Final Design phase to determine if the landscaping in this area should be revised on the emergency spillway plans, or tied to the Final Design plans for the Outlet Channel itself.

7.7 Wasteway Design

A wasteway structure will be included in Reach 9 to allow flows to be diverted toward the Beardsley Canal in the event that the FRS#3 Outfall Channel is not complete, or if FRS#4 cannot accept additional flows. The location and design of the wasteway structure should be revisited in the Final Design phase. Discussion with the District has indicated a desire to move the wasteway further to the west, to align with an existing wash which flows to an overchute of the Beardsley Canal near the Bethany Home Road alignment. Improvements to the wash and overchute may be required if they lack sufficient capacity to convey flow without breaching the Beardsley Canal.

8 REFERENCES

1. AMEC Infrastructure, Inc., *Jackrabbit Trail (195th Avenue) Design Concept Report, Yuma Road to Thomas Road*, prepared for Maricopa County Department of Transportation, Engineering Division, MCDOT Work Order No. 69039, January 2004.
2. Arizona Water Company, *Water Distribution Quarter Section Maps*, October 19, 1981.
3. CMX, *Zanjero Trails Parcel 34 Conceptual Site Plan*, Draft, March 30, 2009.
4. CMX, *Zanjero Trails RUPD/CUPD-PAD Zone Change Request, Proposed Zoning Map,* April 2006.
5. Coe and Van Loo, *Verrado Agua Fria Irrigation Pump Station No. 1*, September 19, 2004, As-Built July 8, 2005.
6. Coe and Van Loo, *Verrado Indian School Road Well*, March 7, 2003, As-Built January 9, 2004.
7. Coe and Van Loo, *Zone 3S Booster Pump Station, Agua Fria Plant Booster Station No. 9,* April 5, 2003, As-Built January 9, 2004.
8. Dodson & Associates, Inc., *HydroCalc*, Version 1.2a for Windows, 1996.
9. DMJM Harris / AECOM, *Jackrabbit Trail Access Control and Corridor Improvement Study, Interstate-10 to Bell Road, Volume I Final Report*, October 2008.
10. DMJM Harris / AECOM, *Jackrabbit Trail Access Control and Corridor Improvement Study, Interstate-10 to Bell Road, Volume II Appendices*, October 2008.
11. Federal Highway Administration, *Hydraulic Design of Energy Dissipators for Culverts and Channels,* July, 2006.
12. Federal Highway Administration, *Hydraulic Design of Highway Culverts*, May, 2005.
13. Flood Control District of Maricopa County, *Aesthetic and Multiple-Use Design Guidelines for Flood Control Structures*, January 5, 2005.
14. Flood Control District of Maricopa County, *Computer Aided Drafting & Design Data Delivery Specifications*, Rev. 1.0, January 2000.
15. Flood Control District of Maricopa County, *Consultant Guidelines, Incorporated by Reference for Consultant Services Contracts*, Third Edition, Revision 1, December 1, 2003.
16. Flood Control District of Maricopa County, *Drainage Design Manual for Maricopa County, Arizona, Hydraulics*, Draft September 2003.
17. Flood Control District of Maricopa County, *Drainage Design Manual for Maricopa County, Arizona, Hydrology*, Draft November 2003.
18. Flood Control District of Maricopa County, *Drainage Policies and Standards for Maricopa County, Arizona*, January 11, 2007.
19. Flood Control District of Maricopa County, *Flood Protection Methods*, November 6, 2006.
20. Flood Control District of Maricopa County, *Flood Protection Structures Types Handbook*, April 1, 2008.
21. Flood Control District of Maricopa County, *FY 08/09 0.8-ft Orthophotography Tiles for the White Tanks FRS No. 3 Outfall Channel Project Area in Tif Format*, February 11, 2009, Date of Photography October-December 2008.
22. Flood Control District of Maricopa County, *FY 08/09 1-ft Orthophotography Tiles for the White Tanks FRS No. 3 Outfall Channel Project Area in Tif Format*, March 5, 2009, Date of Photography October-December 2008.
23. Flood Control District of Maricopa County, *GIS Data for the White Tanks FRS No. 3 Outfall Channel Project Area in Various Formats*, Project 2007-C016 Assignment #4, February 12, 2009.
24. Flood Control District of Maricopa County, *Landscape Aesthetics and Multi-Use Consultant Handbook*, April 2003.
25. Flood Control District of Maricopa County, *Landscape Design Themes Handbook*, July 27, 2007.
26. Flood Control District of Maricopa County, *Mission, Vision, Goals, and Objectives for Planning Studies*, February 12, 2007.
27. Flood Control District of Maricopa County, *Policy for the Aesthetic Treatment and Landscaping of Flood Control Projects*, December 16, 1992.
28. Gannett Fleming, *White Tanks FRS No. 3 Outfall Channel Project, Preliminary Design Report*, December 2008.
29. Haestad Methods, Inc., *FlowMaster*, Version 5.17, 1995.
30. HDR, *Loop 303/White Tanks ADMPU Area Hydrologic Analysis*, March 2009.
31. Hoskin-Ryan Consultants, Inc., *On-Call Contract FCD 2007C016, Work Assignment No. 4, White Tanks FRS No. 3 Outfall Channel, Survey Report*, March 19, 2009.
32. Hoskin-Ryan Consultants, Inc., *White Tanks FRS No. 3 Outfall Channel Preliminary Design Report*, April 10, 2009.
33. KVL Consultants, Inc., for Flood Control District of Maricopa County, *Drainage Design Management System for Windows*, Version 3.5.4, April 1, 2008.
34. Maricopa Association of Governments, *Uniform Standard Specifications for Public Works Construction,* 2009.
35. Morrison Maierle, Inc., *Off-Site Water Plans for Jackrabbit Estates*, March 29, 2005, As-Built October 11, 2007.
36. Phillips, Jeff V., and Saeid Tadayon, United States Geological Survey, in association with Flood Control District of Maricopa County, ***Selection of Manning's Roughness Coefficient for Natural and Constructed Vegetated and Non-Vegetated Channels, and Vegetation Maintenance Plan Guidelines for Vegetated Channels in Central Arizona***, Scientific Investigations Report 2006-5108, 2007.
37. Thomsen, B.W. and Hjalmarson, H.W., with U. S. Geological Survey, Water Resources Division, for Flood Control District of Maricopa County, ***Estimated Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona***, April 1991.
38. Town of Buckeye, *Transportation Design Manual, DM202*, May 2007.

39. United Engineering Group, *Water Plans for Jackrabbit Estates*, April 12, 2005, As-Built September 7, 2006.

40. United States Army Corps of Engineers, *Hydrologic Engineering Center, HEC-1 Flood Hydrograph Package*, Version 4.1, June 1998.

41. United States Army Corps of Engineers, *Hydrologic Engineering Center, HEC-RAS River Analysis System*, Version 4.0.0, March 2008.

42. URS, *Loop 303 Corridor/White Tanks Area Drainage Master Plan Update, Volume IV: Level III Area Drainage Master Plan Update Report, Final*, FCD Contract 99-40, February 2005.

43. URS, *Loop 303 Corridor/White Tanks Area Drainage Master Plan Update, Volume V: Existing Condition Hydrology Technical Data Notebook*, August 2004.

44. URS, *Loop 303 Corridor/White Tanks Area Drainage Master Plan Update, Volume V: Future Condition Hydrology Technical Data Notebook*, January 2005.

45. URS, *Design Report, White Tanks FRS No. 3 Remediation Project – Phase 1, Volume 1*, March 23, 2005.

46. URS, *Design Report, White Tanks FRS No. 3 Remediation Project – Phase 1, Volume 2*, March 23, 2005.

47. URS, *White Tanks FRS No. 3 Remediation Project – Phase 1: Embankment Fill Plan and Outlet Works Channel Plan and Profile, PCN 470.04.30, FCD Contract No. 2004C017*, March 2005.

48. URS, *White Tanks FRS No. 3 Remediation Project – Phase 2: Emergency Spillway Channel Plan and General Site Plan, PCN 470.04.30, FCD Contract No. 2008C031*, March 3, 2009.

49. WLB Group, *White Tanks/Agua Fria Area Drainage Master Study*, 1994.

50. Wood, Patel and Associates, Inc., *Indian School Road Utilities, Verrado*, February 17, 2003, As-Built February 9, 2004.

51. Wood, Patel and Associates, Inc., *Nonpotable Waterline Plan, Sells Road to Indian School Road*, November 1, 2004, As-Built March 11, 2005.

52. Wood, Patel and Associates, Inc., *Offsite Water Transmission Main, Verrado*, April 17, 2003, As-Built October 22, 2003.

53. Wood, Patel and Associates, Inc., *Verrado Planning Unit Drainage Plan for Portions of Planning Units II and IV (Phase 3 South and Phase 3 East), and Update to Master Drainage Plan*, August 22, 2006.

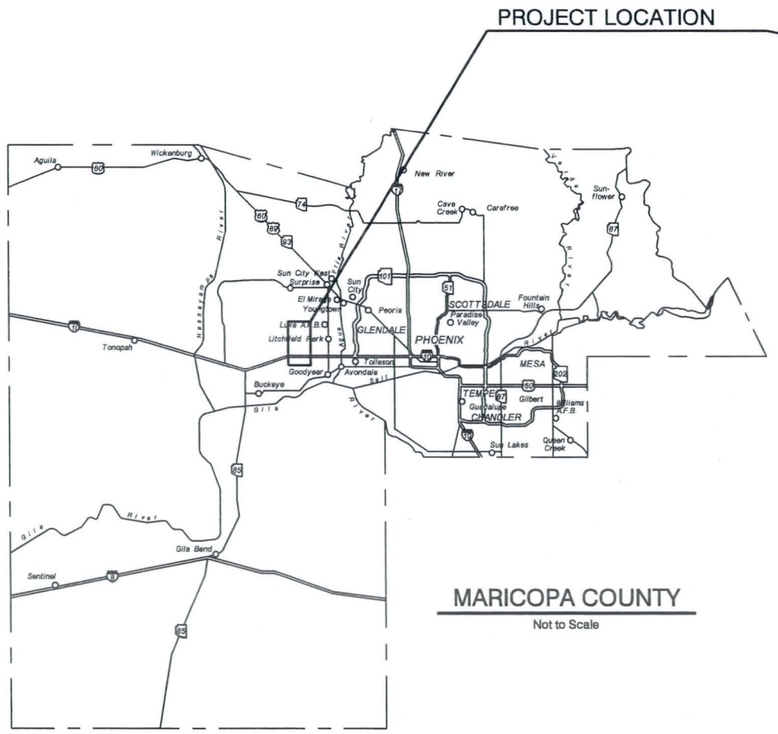
54. Wood, Patel and Associates, Inc., *White Tanks FRS No. 4 Rehabilitation Project*, December 2008.

55. RBF Consultants, *Sewer Plans for Jackrabbit Trail*, November 3, 2008.

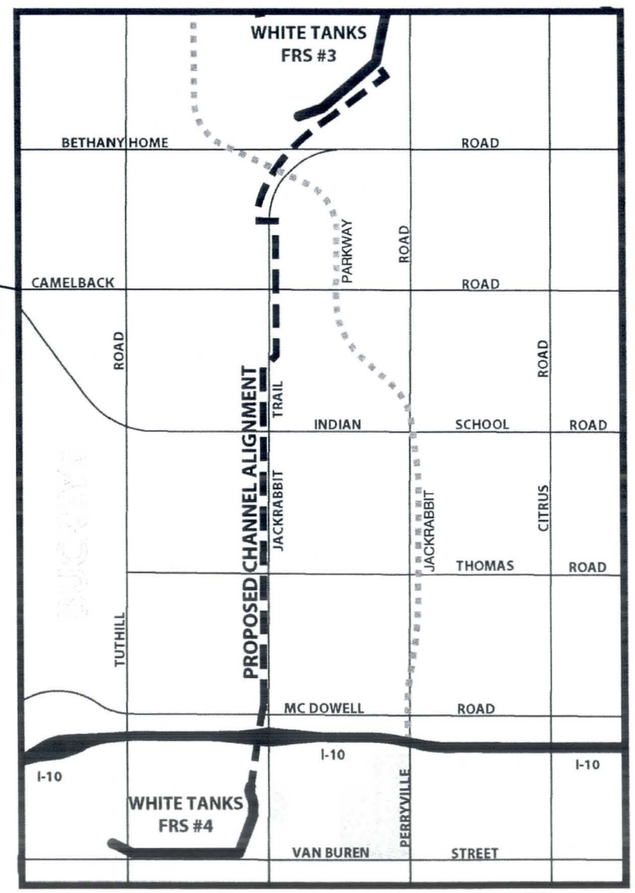
9 30% DESIGN PLANS

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

30% PLANS FOR THE CONSTRUCTION OF
WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
PCN 470.04.32
FCD CONTRACT NO. 2007-C016 (4)



MARICOPA COUNTY
Not to Scale



VICINITY MAP
Not to Scale

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ISSUE RECOMMENDED BY:

PROJECT MANAGER DATE

ISSUED FOR PUBLIC BIDDING BY:

CHIEF ENGINEER & GENERAL MANAGER DATE

BOARD OF DIRECTORS OF
THE FLOOD CONTROL DISTRICT

DON STAPLEY - CHAIRMAN

DISTRICT 1	FULTON BROCK
DISTRICT 2	DON STAPLEY
DISTRICT 3	ANDY KUNASEK
DISTRICT 4	MAX WILSON
DISTRICT 5	MARY ROSE WILCOX

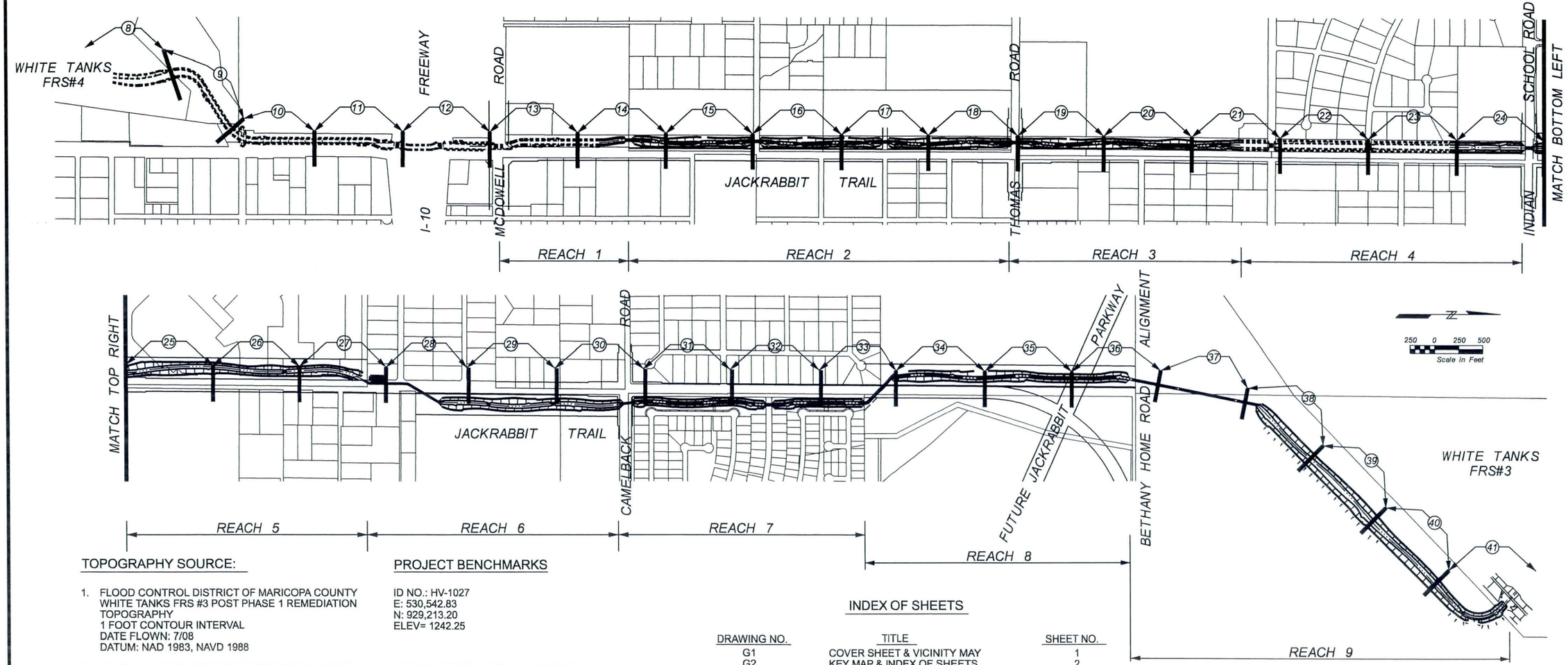
REGISTERED PROFESSIONAL ENGINEER (RPE)
CERTIFICATE NO.
19690
PAUL W.R.
HOSKIN
ARIZONA, U.S.A.

EXPIRES 3/31/12

PRELIMINARY
NOT FOR
CONSTRUCTION

SUBMITTAL 7/1/2009

30% SUBMITTAL



TOPOGRAPHY SOURCE:

1. FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
   WHITE TANKS FRS #3 POST PHASE 1 REMEDIATION TOPOGRAPHY
   1 FOOT CONTOUR INTERVAL
   DATE FLOWN: 7/08
   DATUM: NAD 1983, NAVD 1988
2. FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
   L303/WHITE TANKS ADMPU AREA HYDROLOGIC ANALYSIS JACKRABBIT TRAIL SPECIFIC
   2 FOOT CONTOUR INTERVAL
   DATE FLOWN: 3/08
   DATUM: NAD 1983, NAVD 1988
3. FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
   WHITE TANKS FRS #4 TOPOGRAPHY
   1 FOOT CONTOUR INTERVAL
   DATE FLOWN: 3/08
   DATUM: NAD 1983, NAVD 1988

ABBREVIATIONS

CSTR	CONSTRUCTION
DESC	DESCRIPTION
EQ	EQUAL
FOC	FIBRE OPTIC CABLE
OP	OVERHEAD ELECTRIC
PG	PAGE
P/L	PROPERTY LINE
P	PLATE CENTERLINE
PRV	PRIVATE
SPG	SPACING
UGT	UNDERGROUND TELE CABLE
TW	TOP OF WALL
TN	TOP OF NUT
D.E.	DRAINAGE EASEMENT
FC	FACE OF CURB
WS	WATER SURFACE
R/W	RIGHT OF WAY
L.S.	LANDSCAPE SETBACK

PROJECT BENCHMARKS

ID NO.: HV-1027
E: 530,542.83
N: 929,213.20
ELEV= 1242.25

SET 1/2" REBAR WITH 2" ALUMINUM CAP FLUSH WITH GROUND
ID NO.: 141 PANEL POINT NO. 7
E: 528,858.456
N: 914,783.345
ELEV= 1191.835
DATUM: NAD 1983, NAVD 1988

USE OF PLANS

THESE PLANS ARE PROVIDED AS AN AID IN THE PLANNING AND FINAL DESIGN OF THE WHITE TANKS FRS# 3 OUTLET CHANNEL. THESE PLANS ARE NOT FOR CONSTRUCTION. SHEETS 8-13 ARE PROVIDED FOR REFERENCE ONLY. THREREFORE, NO CONSTRUCTION WILL OCCUR IN THE PREVIOUSLY MENTIONED SHEETS.

SUPPLEMENTAL SURVEY

1. HOSKIN RYAN CONSULTANTS
   SURVEY REPORT DATED: 3/19/2009

INDEX OF SHEETS

SECTION LETTER OR DETAIL NUMBER

SHEET NUMBER TO LOCATE

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

KEY MAP AND INDEX OF SHEETS

DRAWING NO. G2 | SHEET 2 OF 55

REGISTERED PROFESSIONAL ENGINEER
19690
PAUL W.R. HOSKIN
ARIZONA U.S.A.
EXPIRES 3/31/12

PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES
1-800-STAKE-IT
Blue Stake Center 1-602-263-1100

G:\projects\07107-027 on-cell flood control district\04 - white tanks 3 channel\S-CHANNEL02.dgn
7/1/2009

SUBMITTAL 7/1/2009

30% SUBMITTAL

MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION (MCDOT) GENERAL NOTES

1. ALL WORK SHALL CONFORM TO THE MOST CURRENT UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION PUBLISHED BY THE MARICOPA ASSOCIATION OF GOVERNMENTS (MAG), TOGETHER WITH THE MCDOT SUPPLEMENT TO THE MAG STANDARD SPECIFICATIONS AND THE PROJECT SPECIAL PROVISIONS. ALL WORK MUST ALSO COMPLY WITH RESOLUTION 2001-01 – MARICOPA COUNTY RESOLUTION FOR PERMITS TO WORK IN DEDICATED RIGHT-OF-WAY AND RESOLUTION 2001-02 MARICOPA COUNTY RESOLUTION FOR STREET IMPROVEMENTS, INSTALLATION OF UTILITIES AND TRAFFIC CONTROL. ANY EXCEPTIONS MUST RECEIVE EXPLICIT APPROVAL FROM MCDOT AND SHALL BE IDENTIFIED ON THE PLANS AS HAVING EXPLICIT APPROVAL FROM MCDOT.
2. THE ENGINEERING DESIGNS ON THESE PLANS ARE ONLY APPROVED BY MCDOT IN CONCEPT AND NOT IN DETAIL. CONSTRUCTION QUANTITIES ON THESE PLANS ARE NOT VERIFIED BY MCDOT. APPROVAL OF THESE PLANS ARE FOR PERMIT PURPOSES ONLY AND SHALL NOT PREVENT MCDOT FROM REQUIRING CORRECTION OF ERRORS IN THE PLANS WHERE SUCH ERRORS ARE SUBSEQUENTLY FOUND TO BE IN VIOLATION OF ANY LAW, ORDINANCE, HEALTH, SAFETY, MCDOT ROADWAY DESIGN MANUAL, OR OTHER DESIGN ISSUES.
3. AN APPROVED SET OF PLANS SHALL BE ON THE SITE DURING CONSTRUCTION AND AVAILABLE TO MCDOT AND OTHER INSPECTORS.
4. ALL BOX CULVERTS CONSTRUCTED IN THE PUBLIC RIGHT-OF-WAY SHALL COMPLY WITH ARIZONA DEPARTMENT OF TRANSPORTATION (ADOT) LATEST DESIGN SPECIFICATIONS AND STANDARDS. MINIMUM CLEAR HEIGHT OF BOX CULVERT SHALL BE 4 FEET.
5. CONTRACTOR TO OBTAIN NECESSARY MCDOT PERMITS PRIOR TO CONSTRUCTION WITHIN COUNTY RIGHT-OF-WAY, AND ALL NECESSARY PERMITS FROM LOCAL GOVERNMENTS FOR WORK WITHIN THEIR JURISDICTION.
6. CONTRACTOR SHALL NOTIFY THE MCDOT INSPECTION DEPT. AT LEAST 24 HOURS IN ADVANCE OF ANY CONSTRUCTION AT (602) 506-8606.
7. CONTRACTOR PERFORMING CONSTRUCTION OR EXCAVATING OPERATIONS IS RESPONSIBLE FOR LOCATING AND RELOCATING ALL UTILITIES IN CONFLICT OR WITHIN THE CLEAR ZONE, AT NO EXPENSE TO MARICOPA COUNTY. THE CONTRACTOR SHALL CONTACT "BLUE STAKE" AT (602) 263-1100 PRIOR TO BEGINNING CONSTRUCTION.
8. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY REQUIRED PERMITS FOR EARTH MOVING FROM MARICOPA COUNTY AIR QUALITY DEPARTMENT'S DUST COMPLIANCE DIVISION (602) 506-6010 PRIOR TO CONDUCTING EXCAVATION OPERATIONS. A COPY OF THE PERMIT AND DUST CONTROL PLAN SHALL BE SUBMITTED TO THE COUNTY ENGINEER PRIOR TO COMMENCEMENT OF ANY EARTHMOVING ACTIVITIES.
9. PRIOR TO CONDUCTING EXCAVATION OPERATIONS, THE CONTRACTOR SHALL OBTAIN FROM THE ARIZONA STATE HISTORICAL PRESERVATION OFFICER (602) 542-4009, RECOMMENDATIONS REGARDING THE NEED FOR CULTURAL RESOURCES (ARCHAEOLOGICAL) CLEARANCE. ALL DISCOVERIES OF HUMAN REMAINS, CULTURAL ARTIFACTS, OR PALEONTOLOGICAL REMAINS SHALL BE REPORTED TO THE ARIZONA STATE MUSEUM AND MCDOT. UPON DISCOVERY, CONTRACTOR SHALL CEASE OPERATIONS IN THE VICINITY OF THE FIND AND PROTECT THE DISCOVERY AREA FROM FURTHER DISTURBANCE UNTIL THE FIND CAN BE PROFESSIONALLY INVESTIGATED BY THE ARIZONA STATE MUSEUM AND MCDOT.
10. EXCEPT UNDER EMERGENCY CONDITIONS, ROADS SHALL NOT BE CLOSED FOR CONSTRUCTION ACTIVITY UNLESS PRIOR APPROVAL IS OBTAINED FROM THE MCDOT TRANSPORTATION DIRECTOR OR HIS REPRESENTATIVE.
11. PRIOR TO MOVING OR DESTROYING PROTECTED NATIVE PLANT SPECIES, THE CONTRACTOR SHALL FILE A FORMAL NOTICE OF INTENT WITH THE ARIZONA DEPARTMENT OF AGRICULTURE NATIVE PLANTS (602) 542-6408.
12. PRIOR TO INSTALLATION OF CURB, GUTTER, SIDEWALK, BASE COURSE AND WEARING SURFACE, SUBMIT SOIL TEST(S) OF SUB-GRADE AND REVISED PAVEMENT DESIGN/CALCULATIONS TO MCDOT FOR REVIEW AND APPROVAL. IF SUB-GRADE STABILIZATION IS REQUIRED, THE AREA STABILIZED SHALL BE FROM BACK OF SIDEWALK TO BACK OF SIDEWALK AND MATCH THE STABILIZATION DEPTH OF THE PAVEMENT STRUCTURE.
13. ASPHALT MIX DESIGN SHALL BE SUBMITTED TO MCDOT A MINIMUM OF 48 HOURS PRIOR TO PLACING ANY ASPHALT COURSES. (TRENCH WORK EXCLUDED.) ALL PAVED TURNOUTS SHALL HAVE THE SAME ASPHALT AND BASE REQUIREMENTS AS THE ADJACENT ROADWAY UNLESS NOTED OTHERWISE.
14. ALL COMPACTION AND BACKFILL WITHIN COUNTY RIGHT-OF-WAY SHALL CONFORM TO THE MCDOT SUPPLEMENT TO MAG SPECIFICATIONS. BACKFILL UNDER EXISTING PAVEMENT, CURB AND GUTTER OR WITHIN TWO FEET (2') OR LESS FROM THE EDGE OF PAVEMENT SHALL CONSIST OF ONE-HALF (1/2) SACK CLSM.
15. ALL STRUCTURES, SUCH AS MANHOLES, VALVE BOX & COVERS, AND MONITORING WELLS MUST BE MARKED WITH AT LEAST TWO REFLECTIVE YELLOW FLEX POSTS WHEN STRUCTURES ARE LOCATED OUTSIDE THE TRAVELED WAY AND WITHIN THE RIGHT-OF-WAY. (APPLIES ONLY WHEN THERE IS NO CURB.)
16. ANY SAW CUT ALONG EXISTING ROADWAY EDGE WHICH REMOVES THE EDGE OF THE ROADWAY SHALL BE A MINIMUM OF 1' FROM THE EDGE OF THE EXISTING ROADWAY. THE CUT DISTANCE MAY BE GREATER, BASED ON PAVEMENT CONDITIONS OR ROADWAY ELEVATIONS BUT SHALL NOT BE LOCATED WITHIN A LANE WHEEL PATH, AND IF NEEDED SHALL BE IN HALF LANE INCREMENTS.
17. ALL EXISTING PAVEMENT MARKING, TRAFFIC SIGNS AND SIGNAL EQUIPMENT THAT NEEDS TO BE REMOVED, REPLACED, RELOCATED OR REPAIRED BECAUSE OF CONTRACTOR'S WORK WILL BE DONE BY THE CONTRACTOR AT HIS EXPENSE. ALL SALVAGED SIGNS SHALL BE DELIVERED TO THE TRAFFIC OPS BUILDING AT 2909 W. DURANGO ST. ARRANGEMENTS CAN BE MADE FOR DELIVERY BY CALLING (602) 506-8662. ALL NEW STREET NAME SIGNS SHALL BE PROVIDED AND INSTALLED BY PERMITTEE AT NO EXPENSE TO MARICOPA COUNTY.
18. PAVEMENT MARKING, SIGNING AND SIGNAL WORK WILL BE INSPECTED AND SHALL MEET COUNTY STANDARDS BEFORE RELEASE OF BOND.
19. THE CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS WITHIN THE RIGHT-OF-WAY TO A CONDITION EQUAL TO OR BETTER THAN EXISTING IMPROVEMENTS PER MAG 107.9. DISPOSAL OF ALL WASTE MATERIAL WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.

GENERAL NOTES

1. ALL CONSTRUCTION TO BE PERFORMED ACCORDING TO APPLICABLE MAG STANDARD DETAILS AND MAG SPECIFICATIONS, DATED 1998 AND THROUGH 2009 AND THE TOWN OF BUCKEYE.
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 WILL 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 STAKES AT THE BLUE STAKE CENTER CENTER (PHONE: 1800-STAKEIT)
5. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS PRIOR TO CONSTRUCTION
6. THE FLOOD CONTROL DISTRICT OR TOWN OF BUCKEYE 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 COMPACTION TESTS FOR STRUCTURAL BACKFILL
9. TRAFFIC CONTROL SHALL BE MAINTAINED IN ACCORDANCE WITH MAG SPECIFICATION 401, PART VI OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (1988 EDITION) INCLUDING REVISION 3 DATED SEPTEMBER 3, 1993)
10. CONTRACTOR SHALL REPLACE PAVEMENT TO THE EXISTING GRADES SHOWN ON THE PLANS
11. EXACT POINT OF MATCHING TERMINATION AND OVERLAY WILL BE DETERMINED IN THE FIELD BY THE ENGINEER
12. NO JOB WILL BE CONSIDERED COMPLETED UNTIL CURBS, PAVEMENT AND SIDEWALKS HAVE BEEN SWEPT CLEAN OF ALL DIRT AND DEBRIS
13. 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
14. CATCH BASIN CONNECTOR PIPES SHALL BE LAID ON A STRAIGHT ALIGNMENT AND SLOPE UNLESS OTHERWISE SPECIFIED. IF BREAKS IN ALIGNMENT AND SLOPE ARE NECESSARY TO MEET FIELD CONDITIONS. THE MAXIMUM DEFLECTION SHALL BE 22.5 DEGREES. CONTRACTOR SHALL PROVIDE A PIPE COLLAR PER MAG DETAIL 505 AT EACH DEFLECTION.
15. CONNECTOR PIPES SHALL CONNECT TO CATCH BASINS WALLS AT AN ANGLE NOT TO EXCEED 22.5 DEGREES FROM PERPENDICULAR

STRUCTURAL NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO MAG STANDARD DETAILS, SPECIFICATIONS, DATED 1998, INCLUDING ALL REVISIONS THRU 2009
2. DESIGN IS IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, DIVISION 1 17TH EDITION, 2002.
3. REINFORCING STEEL SHALL CONFORM TO ASTM SPECIFICATION A615 GRADE 60.
4. STRESSES - fs = 24,000 PSI - GRADE 60 REINFORCING STEEL.
5. ALL REINFORCING STEEL PLACEMENT DIMENSIONS SHALL BE TO THE CENTER OF BARS UNLESS OTHERWISE NOTED.
6. ALL REINFORCING STEEL SHALL HAVE 2" CLEAR COVER UNLESS OTHERWISE NOTED
7. STRUCTURAL STEEL SHALL CONFORM TO ASTM SPECIFICATION A36.
8. ALL WELDING SHALL CONFORM TO THE REQUIREMENTS OF THE AMERICAN WELDING SOCIETY, STRUCTURAL WELDING CODE, REVISION 1996
9. DIMENSIONS SHALL NOT BE SCALED FROM DRAWING
10. CHAMFER ALL EXPOSED CORNERS 3/4" UNLESS OTHERWISE NOTED
11. CONCRETE COMPRESSIVE STRENGTH SHALL BE 3,000 PSI PER MAG, UNLESS OTHERWISE NOTED
12. FOR ALL ADOT BOX CULVERTS, INCREASE TOP SLAB THICKNESS BY 1/2". INCREASE CLEAR COVER FOR BOTTOM BAR OF TOP SLAB TO 1-1/2".

UTILITY NOTIFICATION

COMPANY	CONTACT	PHONE NO.
ARIZONA PUBLIC SERVICE (APS)	JOHN RAEL	(602) 371-6945
ARIZONA AMERICAN WATER	CHRISTINA HASSELL	(623) 780-3790
ARIZONA WATER COMPANY	JOE WHELEN	(602) 240-6860
COX COMMUNICATIONS	RON PINT	(623) 328-3529
EL PASO GAS	DENNIS SEGARS	(602) 438-4228
FLOOD CONTROL DISCTRICT OF MARICOPA COUNTY	GARY MAIERS	(602) 506-0563
MARICOPA COUNTY MUNICIPAL WATER CONSERVATION DISTRICT	VERONICA VALENZUELA	(602) 546-8266
QWEST COMMUNICATIONS	MATTHEW PHILLIPS	(602) 630-1393
SOUTHWEST GAS	VALERIE GALLARDO-WELLER	(602) 484-5342
SALT RIVER PROJECT	WEBSITE QUERY BY SECTION	N/A

PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT (Arizona Blue Stake Center 1-800-782-5348)

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

REGISTERED PROFESSIONAL ENGINEER 19690 PAUL W.R. HOSKIN ARIZONA, U.S.A.
EXPIRES 3/31/12

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

GENERAL NOTES

DRAWING NO. G3 | SHEET 3 OF 55

SUBMITTAL 7/1/2009 30% SUBMITTAL

g:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S- CHANNEL03.dgn
7/1/2009

LEGEND SHEET

SYMBOLS

- Brass Cap In Hand Hole
- Benchmark
- Brass Cap
- Bush
- Cactus
- Catch Basin
- Chiseled Square
- Miscellaneous Control Point
- Check Shot
- Electric Manhole
- Electric Meter
- Elevation Reference Mark
- Fire Hydrant
- GDAC
- Gas Meter
- Gas Valve
- Iron Pipe
- Irrigation Manhole
- Light Pole
- Palm Tree
- Power Pole
- Rebar
- Rebar With Cap
- Section Corner
- Storm Drain Manhole
- Proposed Slope Indicator
- Existing Slope Indicator
- Sanitary Sewer Manhole
- Telephone Manhole
- Telephone Pole
- Tree
- Transmission Tower
- Well
- Water Manhole
- Water Meter
- Water Valve

SYMBOLS

- Flow Direction
- Proposed Concrete Sidewalk or O&M Road
- Concrete
- Rip-Rap

LINESTYLES

- Centerline
- Cut Line
- Fiber Optic Line
- Fill Line
- Forest/Indian Reservation Line
- High Pressure Gas Line
- Irrigation Line
- Proposed Chain Link Fence Line
- Proposed Fence Line
- Proposed Gas Line, size
- Proposed Overhead Power Line
- Proposed Overhead Telephone Line
- Proposed Retaining Wall
- Proposed ROW
- Proposed Sanitary Sewer Line, size
- Proposed Underground Power Line
- Proposed Underground Telephone Line
- Proposed Underground Cable Television Line
- Proposed Water Line, size
- Proposed Wood Fence Line
- Proposed Storm Drain (width varies 72" pipe shown)
- Section Line
- Temporary Construction Easement
- Proposed easement
- Tree Line
- Wash Flow Line
- Existing Water Surface Elevation (Profile Views Only)
- Proposed Water Surface Elevation (Profile Views Only)
- Existing Block Wall
- Existing Chain Link Fence Line
- Existing Fence Line
- Existing Gas Line And Size
- Existing Left Guardrail
- Existing Right Guardrail
- Existing Irrigation Line
- Existing Overhead Electric Line
- Existing Overhead Telephone Line

LINESTYLES

- Existing Retaining Wall
- Existing Edge Of Paved Road
- Existing ROW
- Existing Sanitary Sewer Line, size
- Existing Storm Drain Pipe And Size
- Existing Underground Power Line
- Existing Underground Telephone Line
- Existing Underground Cable Television Line
- Existing Water Line And Size
- Existing Wood Fence Line
- Existing Contour (1118)
- Existing easement
- Future ROW Acquisition by MCDOT

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

LEGEND

DRAWING NO. G4 | SHEET 4 OF 55

REGISTERED PROFESSIONAL ENGINEER — CERTIFICATE NO. 19690 — PAUL W.R. HOSKIN — ARIZONA, U.S.A.

EXPIRES 3/31/12

PRELIMINARY
NOT FOR CONSTRUCTION

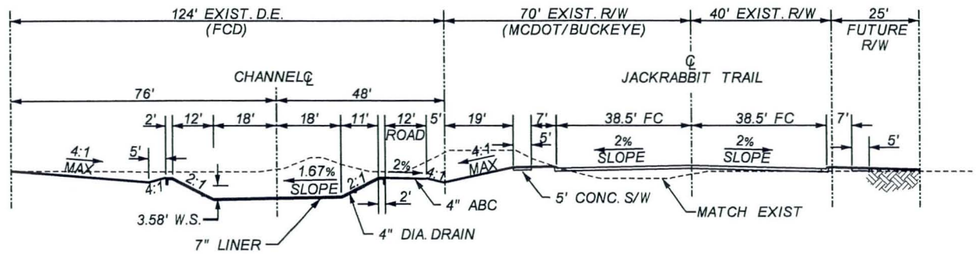
TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES
1-800-STAKE-IT
Blue Stake Center 1-602-263-1100

SUBMITTAL 7/1/2009

30% SUBMITTAL

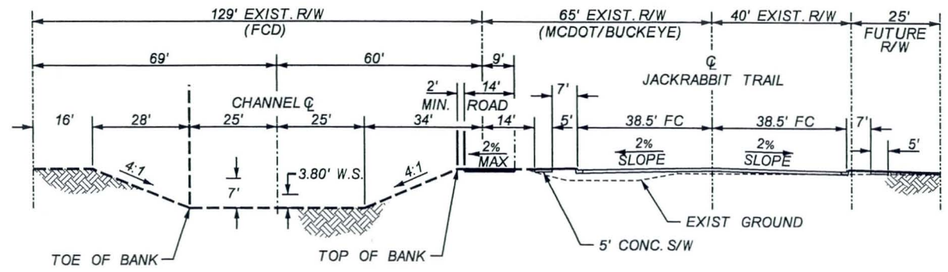
g:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL04.dgn
7/1/2009

NOTE: CROSS SECTIONS FOR JACKRABBIT TRAIL AND R/W ARE BASED UPON THE CLASSIFICATION "URBAN/MINOR/PRINCIPAL ARTERIAL"



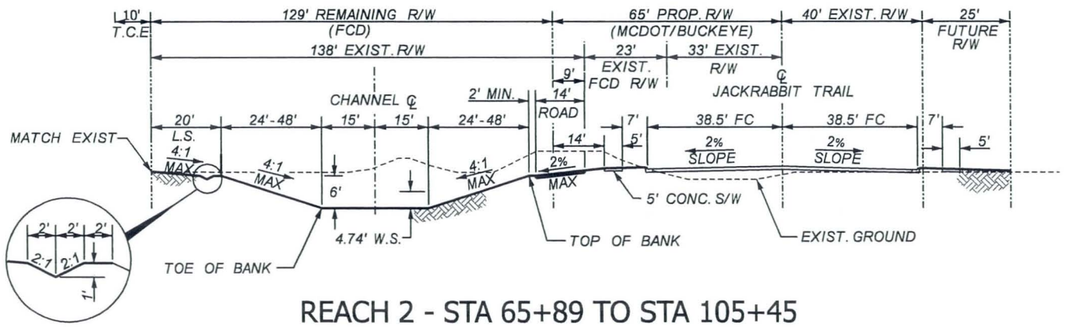
REACH 1 - STA 53+00 TO STA 65+89
(MCDOWELL ROAD TO PALM LANE)

N.T.S.



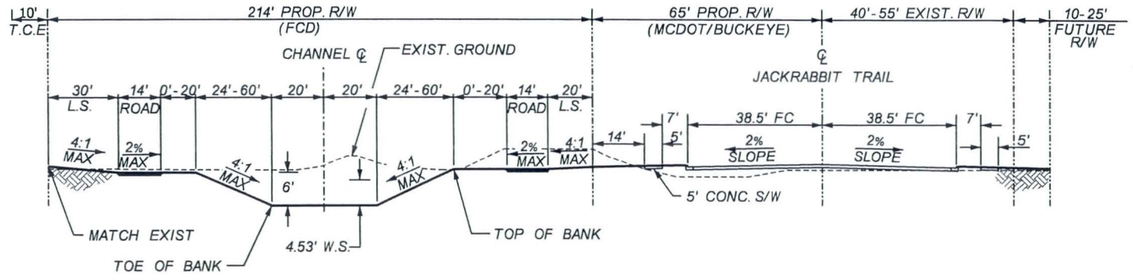
REACH 4 - STA 128+89 TO 158+18
(NEAR OSBORN ROAD TO INDIAN SCHOOL ROAD)

N.T.S.



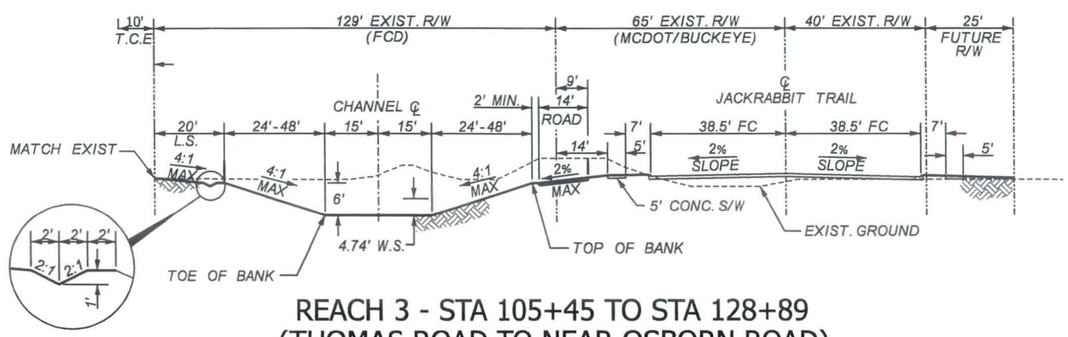
REACH 2 - STA 65+89 TO STA 105+45
(PALM LANE TO THOMAS ROAD)

N.T.S.



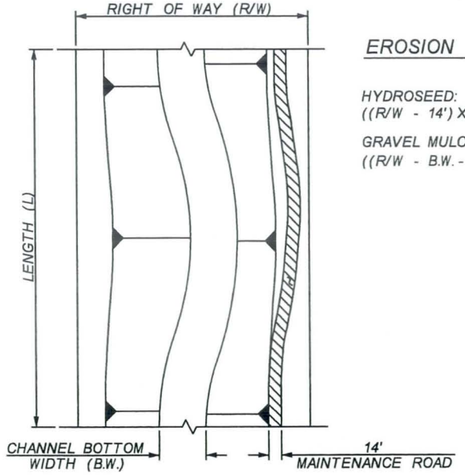
REACH 5 - STA 158+18 TO STA 184+63
(INDIAN SCHOOL ROAD TO NEAR MINNEZONA AVENUE)

N.T.S.



REACH 3 - STA 105+45 TO STA 128+89
(THOMAS ROAD TO NEAR OSBORN ROAD)

N.T.S.



EROSION CONTROL QUANTITIES:

HYDROSEED:
((R/W - 14') X L) / 43,560, ACRES

GRAVEL MULCH:
((R/W - B.W. - 14') X L) / 9, SQUARE YARDS

PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES
1-800-STAKE-IT
Blue Stake Center 1-602-263-1096

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 19690 PAUL W.R. HOSKIN ARIZONA, U.S.A.
EXPIRES 3/31/12

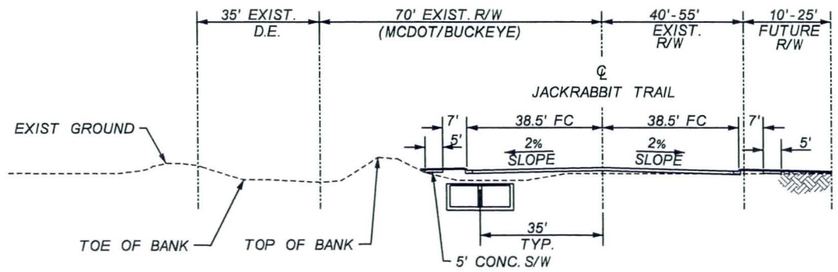
TYPICAL SECTIONS SHEET

DRAWING NO. G5 | SHEET 5 OF 55

SUBMITTAL 7/1/2009 | 30% SUBMITTAL

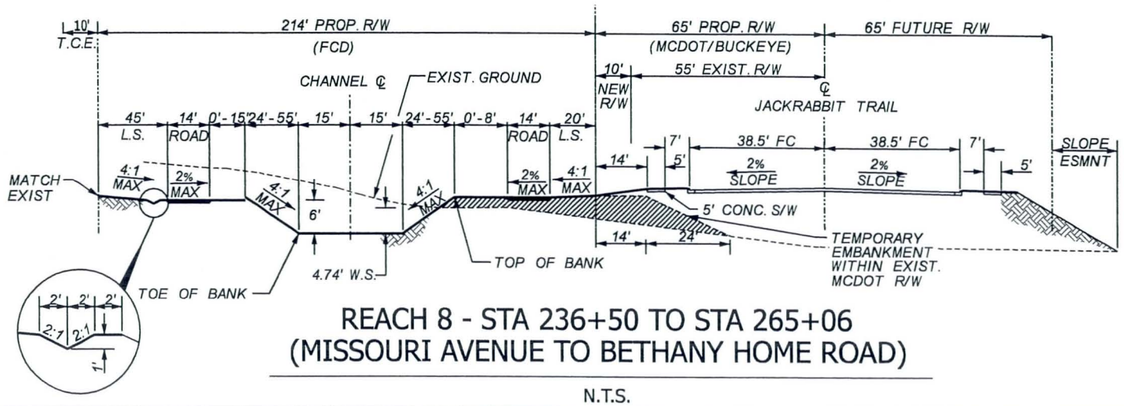
S:\projects\07107-027 on-call flood control district\104 - white tanks 3 channel\S-CHANNEL05.dgn
7/1/2009

NOTE: CROSS SECTIONS FOR JACKRABBIT TRAIL AND R/W ARE BASED UPON THE CLASSIFICATION "URBAN/MINOR/PRINCIPAL ARTERIAL"



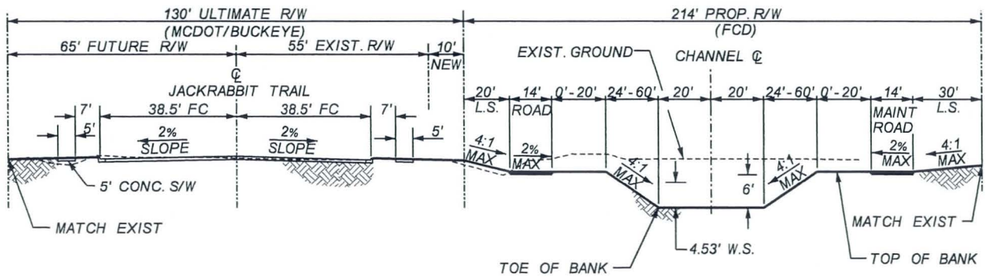
REACH 6-1 - STA 184+63 TO STA 192+88
(NORTH OF SELLS ROAD TO NORTH OF MINNEZONA AVENUE)

N.T.S.



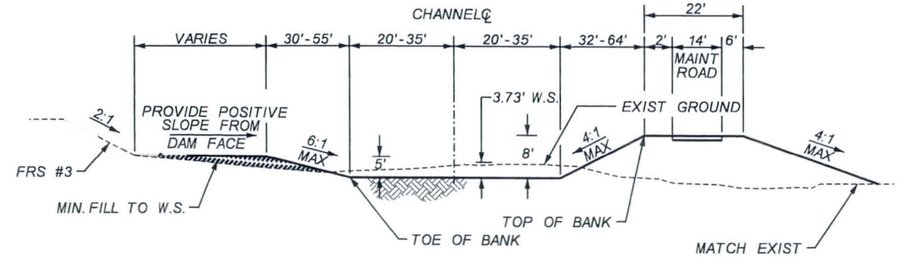
REACH 8 - STA 236+50 TO STA 265+06
(MISSOURI AVENUE TO BETHANY HOME ROAD)

N.T.S.



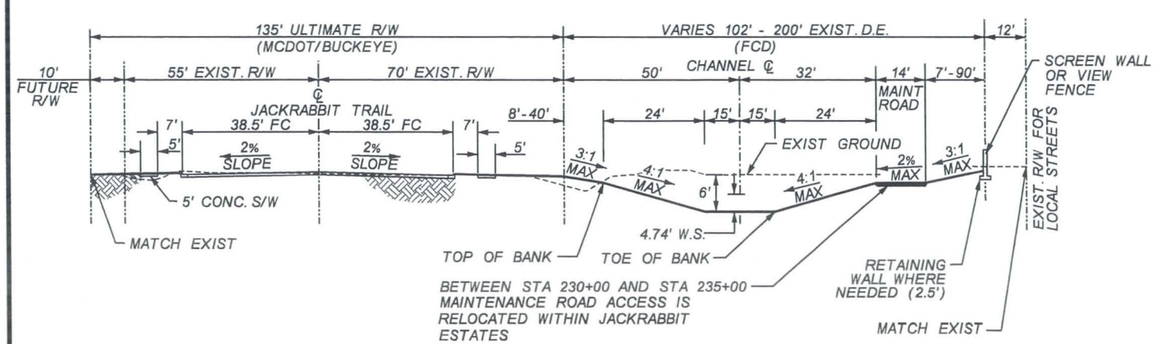
REACH 6-2 - STA 192+88 TO STA 211+76
(NORTH OF MINNEZONA AVENUE TO CAMELBACK ROAD)

N.T.S.



REACH 9 - STA 265+06 TO STA 313+00
(BETHANY HOME ROAD TO WTFRS#3)

N.T.S.



REACH 7 - STA 211+76 TO STA 236+50
(CAMELBACK ROAD TO MISSOURI AVENUE)

N.T.S.

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER — CERTIFICATE NO. 19590 — PAUL W.R. HOSKIN — ARIZONA, U.S.A.
EXPIRES 3/31/12

TYPICAL SECTIONS SHEET

DRAWING NO. G6 | SHEET 6 OF 55

PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT (Blue Stake Center 1-602-263-1100)

SUBMITTAL 7/1/2009 — 30% SUBMITTAL

g:\proj\ects\107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL06.dgn
7/1/2009

QUANTITY SUMMARY

ITEM NO.	ITEM DESCRIPTION	UNIT	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	TOTAL QUANTITY
	GENERAL CONDITIONS																														
105-1	PARTNERING ALLOWANCE	LS																													1
107-1	AZDPES/SWPPP PERMITS	LS																													1
107-2	PUBLIC INFORMATION & NOTIFICATION ALLOWANCE	LS																													1
107-3	PROJECT SIGNS ALLOWANCE	EA																													1
107-4	WATER MANAGEMENT	LS																													1
107-5	VANDALISM ALLOWANCE	LS																													1
	EARTHWORK																														
201-1	CLEARING AND GRUBBING	LS																													1
202-1	MOBILIZATION	LS																													1
211-1	FILL CONSTRUCTION (DITCHES, FARM ROAD AND OVERBANK)	CY	1,904	3,636	4,468	5,471	3,824	5,003	4,769	3,495	0	73	4,902	8,072	2,503	836	1,346	506	41	26	86	29	566	24	15	0	14,710	22,092	7,821	13,016	109,234
211-2	FINAL AESTHETIC GRADING	LS																													1
215-1	CHANNEL EXCAVATION	CY	10,090	16,648	12,819	13,078	15,844	14,472	16,008	4,971	0	259	13,405	28,445	25,626	28,896	8,329	19,317	22,449	21,875	26,148	16,299	28,371	32,035	29,217	6,130	3,471	2,485	42,836	11,066	470,589
220-1	PLAIN RIPRAP (D_{50} =2")	CY	10	47	41	46	26	30	20	10	0	0	42	0	16	0	0	20	0	0	0	0	151	0	0	0	0	0	0	0	459
220-2	PLAIN RIPRAP (D_{50} =12")	CY	100	187	260	223	190	127	0	0	0	0	100	0	0	240	29	0	84	0	100	100	1,217	0	61	0	20	0	0	0	3,038
220-3	PLAIN RIPRAP (D_{50} =15")	CY	247	628	600	819	325	544	494	247	0	0	522	0	281	0	0	562	0	0	0	0	748	0	0	0	0	0	0	0	6,017
230-1	GRAVEL MULCH	SY	5,150	9,400	8,669	8,878	8,188	8,028	8,500	4,618	0	699	8,389	14,600	14,600	11,745	9,499	15,600	13,661	10,600	10,011	8,044	15,600	15,600	12,588	0	6,418	7,600	7,600	7,600	251,884
230-2	HYDROSEEDING	AC	1.31	2.56	2.36	2.42	2.23	2.24	2.38	1.29	0.00	0.20	2.31	3.84	3.84	3.16	2.34	3.84	3.40	2.81	2.65	2.08	3.84	3.84	3.02	0.00	2.37	2.81	2.81	2.81	69
																0															
	STREETS & RELATED WORK															0															
310-1	ABC MAINTENANCE ROAD & RAMP (4-INCH)	SY	1,150	1,493	1,493	1,587	1,493	1,493	1,493	957	1,369	1,363	1,983	3,004	2,845	2,665	1,784	2,929	2,585	1,400	1,164	915	2,909	2,909	2,251	0	1,524	1,524	1,400	1,400	49,082
336-1	TEMPORARY PAVEMENT REPLACEMENT (2" A.C.)	SY	0	0	0	0	0	0	0	0	0	0	356	640	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	996
336-2	PERMANENT PAVEMENT REPLACEMENT (3" A.C.)	SY	0	0	0	0	0	0	0	0	0	0	86	0	0	0	274	0	140	0	182	0	0	0	0	0	0	0	0	0	682
340-1	CONCRETE VERTICAL CURB & GUTTER, MAG STD DET 220, TYPE 'A'	LF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	0	0	0	0	0	0	0	0	0	0	0	36
340-2	CONCRETE ROLL CURB & GUTTER, MAG STD DET 220, TYPE 'C'	LF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	0	0	0	0	0	0	0	0	0	80
340-3	CONCRETE SIDEWALK, MAG STD DET 230	SF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	300	0	608	96	0	0	0	0	0	0	0	0	1,004
340-4	CONCRETE DRIVEWAY ENTRANCE, MAG STD DET 250-1	SF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	144	0	0	0	0	0	0	0	0	0	0	0	144
340-5	CONCRETE DRIVEWAY ENTRANCE, MAG STD DET 250-2	SF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	432	144	0	0	0	0	0	0	0	0	576
350-1	REMOVE EXISTING WIRE FENCE	LF	447	0	0	0	0	0	0	326	873	868	6	1,070	67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	175	3,832
350-2	REMOVE PAVEMENT	SY	0	0	0	0	0	0	0	0	0	0	481	1,258	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,739
350-3	BURIED TRASH REMOVAL ALLOWANCE	LS																													1
350-4	REMOVE CONCRETE CURB & GUTTER	LF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0	152	24	0	0	0	0	0	0	0	0	236
350-5	REMOVE GROUTED RIPRAP	SY	0	0	0	0	0	0	0	2,388	117	438	1,654	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4,597
350-6	REMOVE EXISTING BLOCK WALL, RETAINIGN WALL	LF	0	0	0	0	0	0	0	0	0	0	170	176	0	0	0	0	291	1,114	1,125	1,181	0	0	0	0	0	0	0	0	4,057
350-7	REMOVE EXISTING CONCRETE LINED CHANNEL	SY	2,920	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,920
350-8	REMOVE EXISTING CONCRETE SIDEWALK	SY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	0	68	11	0	0	0	0	0	0	0	0	112
	RIGHT-OF-WAY AND TRAFFIC CONTROL																														
401-1	MISCELLANEOUS TRAFFIC CONTROL	LS																													1
412-1	4 STRAND SMOOTH WIRE FENCE	LF	1,175	1,700	1,640	1,600	1,556	1,664	1,783	998	811	839	1,291	1,786	1,786	1,140	550	1,800	1,338	1,800	1,614	886	1,800	1,800	1,074	0	746	900	900	925	35,902
421-1	INSTALL GATE	EA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
	STRUCTURES																														
505-1	CONCRETE CHANNEL LINING (7" THICK)	SF	17,476	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17,476
505-2	CONCRETE BOX CULVERT TYPE A (2 BARREL 8' x 6'), ADOT B-02.20	LF	0	0	0	0	0	0	0	0	0	0	0	0	0	238	588	0	85	0	0	0	0	0	0	0	0	0	0	0	911
505-3	CONCRETE BOX CULVERT TYPE B (3 BARREL 8' x 6'), ADOT B-02.30	LF	62	0	50	50	50	0	0	0	0	0	58	0	0	0	0	0	0	0	58	393	0	0	0	0	0	0	0	0	721
505-4	CONCRETE BOX CULVERT TYPE E (2 BARREL 10' x 6'), ADOT B-02.20	LF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	295	900	125	0	0	0	1,320
505-5	CONCRETE BOX CULVERT INLET HEADWALL, ADOT B-04.30	EA	1	0	1	1	0	1	0	0	0	0	1	0	0	0	1	0	1	0	1	1	0	0	0	0	1	0	0	0	10
505-6	CONCRETE BOX CULVERT OUTLET HEADWALL, ADOT B-04.30	EA	1	1	0	1	1	0	0	0	0	0	1	0	0	1	0	0	1	0	1	1	0	0	1	0	0	0	0	0	10
505-7	CONCRETE GRADE CONTROL STRUCTURE, (30'-10' BOTTOM WIDTH TRANSITION) TYPE 1	CY	69	135	135	201	69	135	138	69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	951
505-8	CONCRETE GRADE CONTROL STRUCTURE, (40'-20' BOTTOM WIDTH TRANSITION) TYPE 2	CY	0	0	0	0	0	0	0	0	0	0	0	0	84	0	0	168	0	0	0	0	0	0	0	0	0	0	0	0	252
505-9	CONCRETE GRADE CONTROL STRUCTURE, (50'-30' BOTTOM WIDTH TRANSITION) TYPE 3	CY	0	0	0	0	0	0	0	0	0	0	154	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	154
505-10	CONCRETE TEST PANELS - 10' x 10' x 6"	EA																													3
505-11	CONCRETE SIDE FLOW SPILLWAY, (10' BOTTOM WIDTH) TYPE1	CY	0	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35
505-12	CONCRETE SIDE FLOW SPILLWAY, (20' BOTTOM WIDTH) TYPE2	CY	0	0	0	40	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80
505-13	CONCRETE SIDE FLOW SPILLWAY, (30' BOTTOM WIDTH) TYPE3	CY	0	0	65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65
505-14	CONCRETE SIDE FLOW SPILLWAY, (40' BOTTOM WIDTH) TYPE4	CY	0	63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63
505-15	CONCRETE SIDE FLOW SPILLWAY, (50' BOTTOM WIDTH) TYPE5	CY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	140	0	0	0	0	0	0	0	140
505-16	CONCRETE SIDE FLOW SPILLWAY, (80' BOTTOM WIDTH) TYPE6	CY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	251	0	0	0	0	0	0	0	251
505-17	CONCRETE DROP INLET STRUCTURE, (3-8'X6' BOX CULVERT) TYPE 1	CY	16	0	16	16	0	16	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80
505-18	CONCRETE DROP INLET STRUCTURE, (2-8'X6' BOX CULVERT) TYPE 2	CY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	14	0	0	0	0	0	0	0	0	0	0	0	28
505-19	WASTEWAY STRUCTURE	CY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	202	202
505-20	FLOW JUNCTION STRUCTURE	CY	0	0	0	0	0	0	0	0	0	0	0	0	0	137	0	0	0	0	0	0	0	0	0	0	0	0	0	0	137
505-21	SLIDE GATE STRUCTURE	EA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
505-22	GROUTED RIPRAP DOWNDRAIN	EA	1	2	1	2	1	3	4	2	1	0	0	0	0	0	0	0	0	3	0	3	1	1	2	0	0	0	0	0	27
505-23	ALLOWANCE FOR HARDENED STRUCTURE WITHIN FISSURE ZONE	LS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
510-1	RETAINING WALL, 2' TO 3'	LF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	130	170	100	0	0	0	0	0	0	0	0	400
515-1	BOLLARDS, MAG STD DET 140, TYPE 2 REMOVABLE	EA	6	3	3	6	3	3	0	6	3	3	12	0	0	3	6	0	9	0	12	12	0	0	6	0	0	0	0	0	96
520-1	STEEL SAFETY RAIL, MAG STD DET 145, TYPE 1	LF	173	101	105	200	101	101	0	0	0	0	247	0	0	380	122	0	230	0	200	209	0	0	111	0	118	0	0	0	2,398

NO.	REVISION	BY	DATE
3			
2			
1			

PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT (Blue Stake Center 1-602-263-1100)

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

REGISTERED PROFESSIONAL ENGINEER — CERTIFICATE NO. 19690 — PAUL W.R. HOSKIN — ARIZONA, U.S.A. — EXPIRES 3/31/12

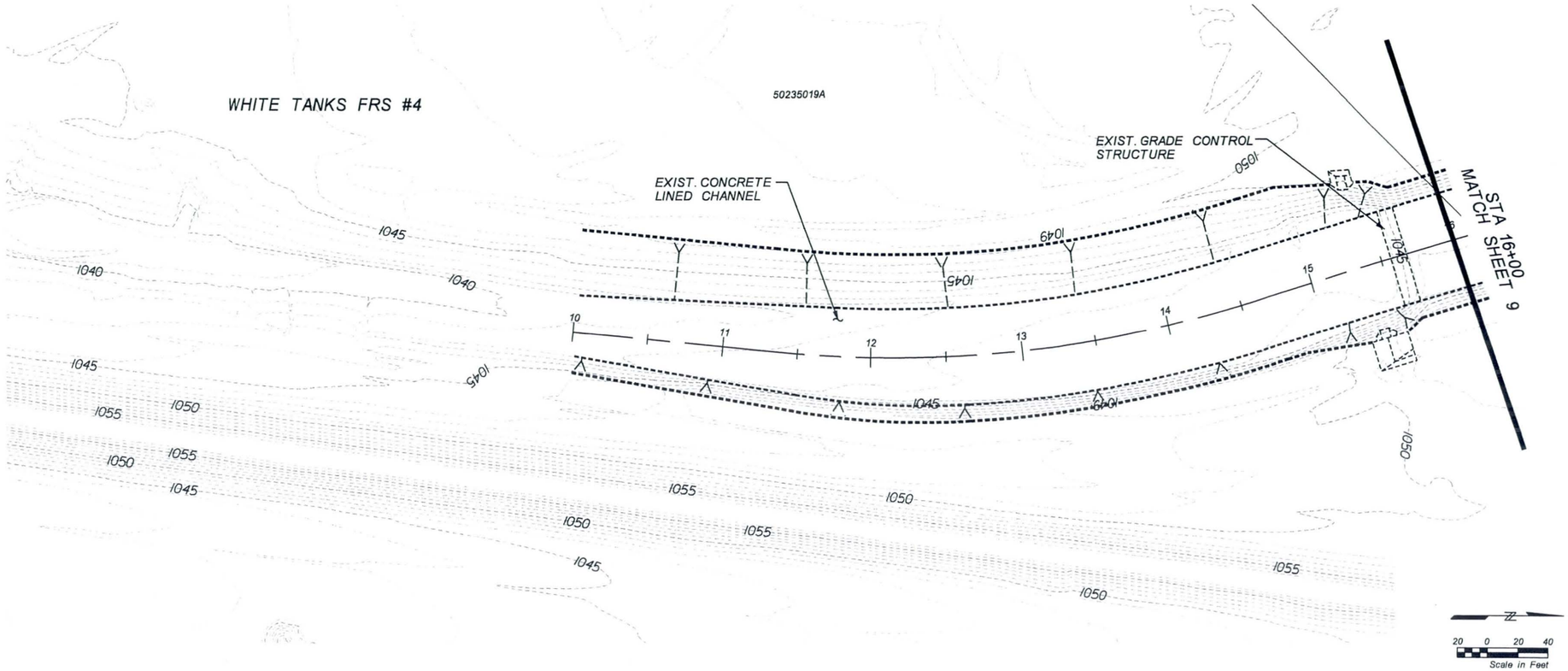
	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

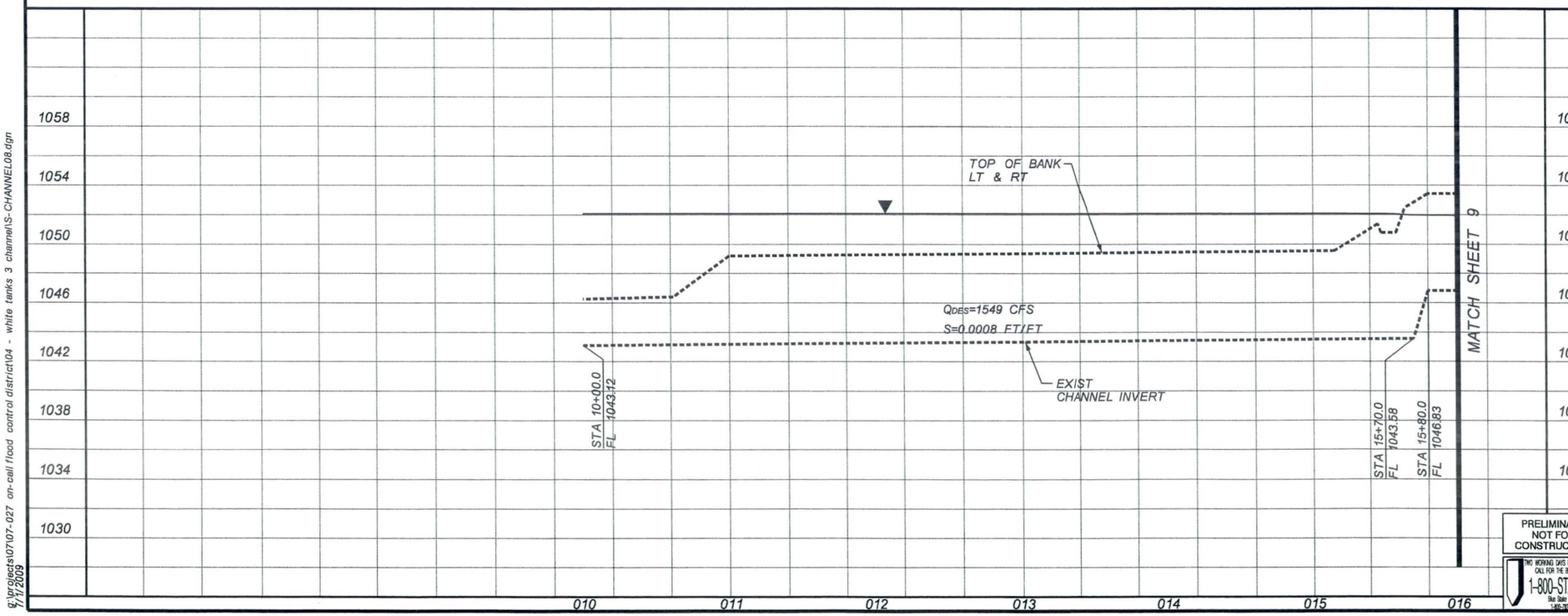
QUANTITY SUMMARY SHEET

DRAWING NO. QS1 | SHEET 7 OF 55

SUBMITTAL 6/8/2009

30% SUBMITTAL





REMOVE

CONSTRUCT

EROSION CONTROL

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 19690 PAUL W.R. HOSKIN ARIZONA, U.S.A.
EXPIRES 3/31/12

PLAN AND PROFILE SHEET

DRAWING NO. C1 | SHEET 8 OF 55

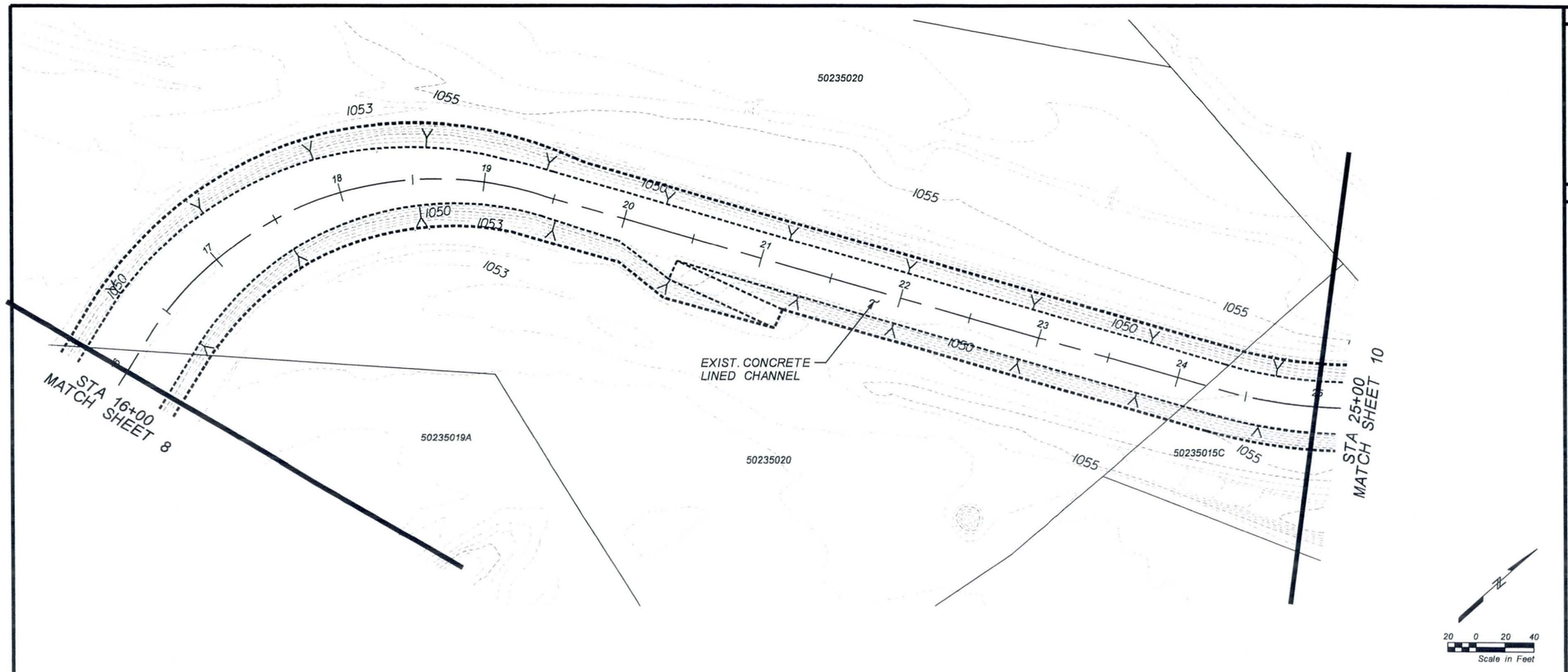
PRELIMINARY NOT FOR CONSTRUCTION

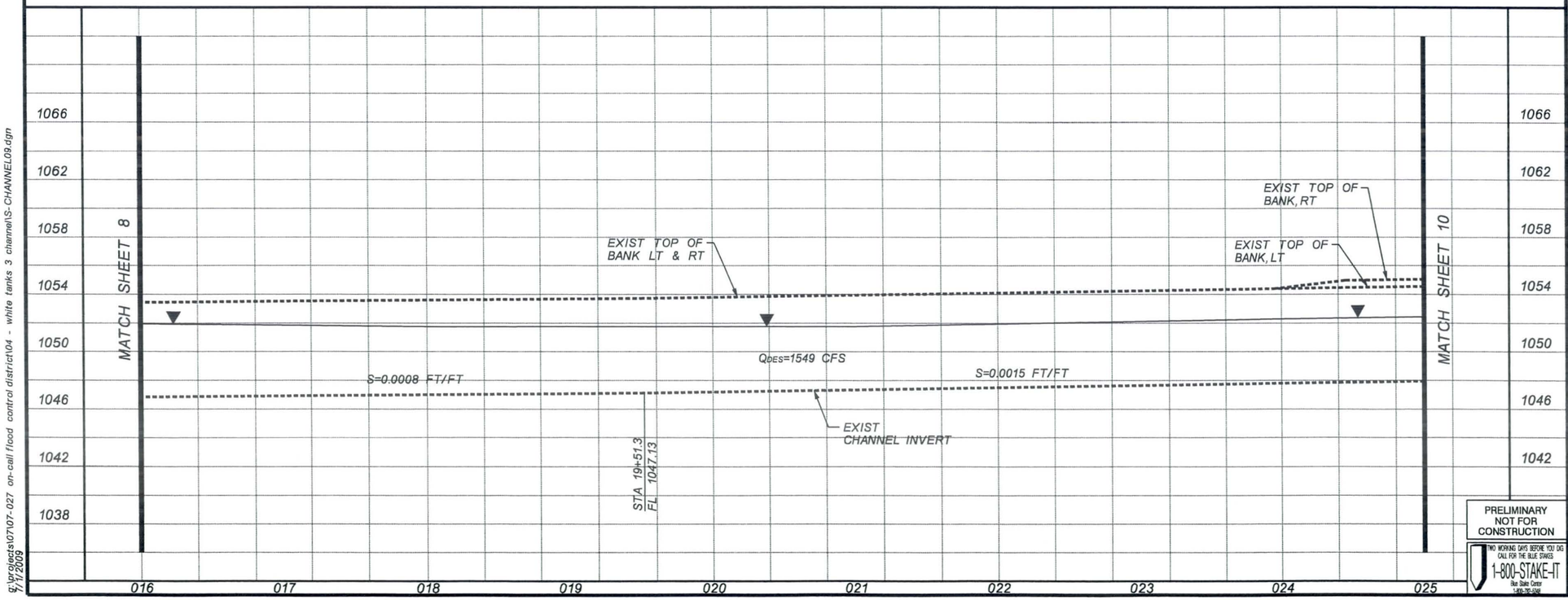
TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES
1-800-STAKE-IT
Blue Stake Center 1-602-263-1100

g:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL08.dgn
7/1/2009

SUBMITTAL 7/1/2009

30% SUBMITTAL





PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT (Blue Stake Center 1-602-263-1100)

REMOVE

CONSTRUCT

EROSION CONTROL

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 19690 PAUL W.R. HOSKIN State of ARIZONA U.S.A.

EXPIRES 3/31/12

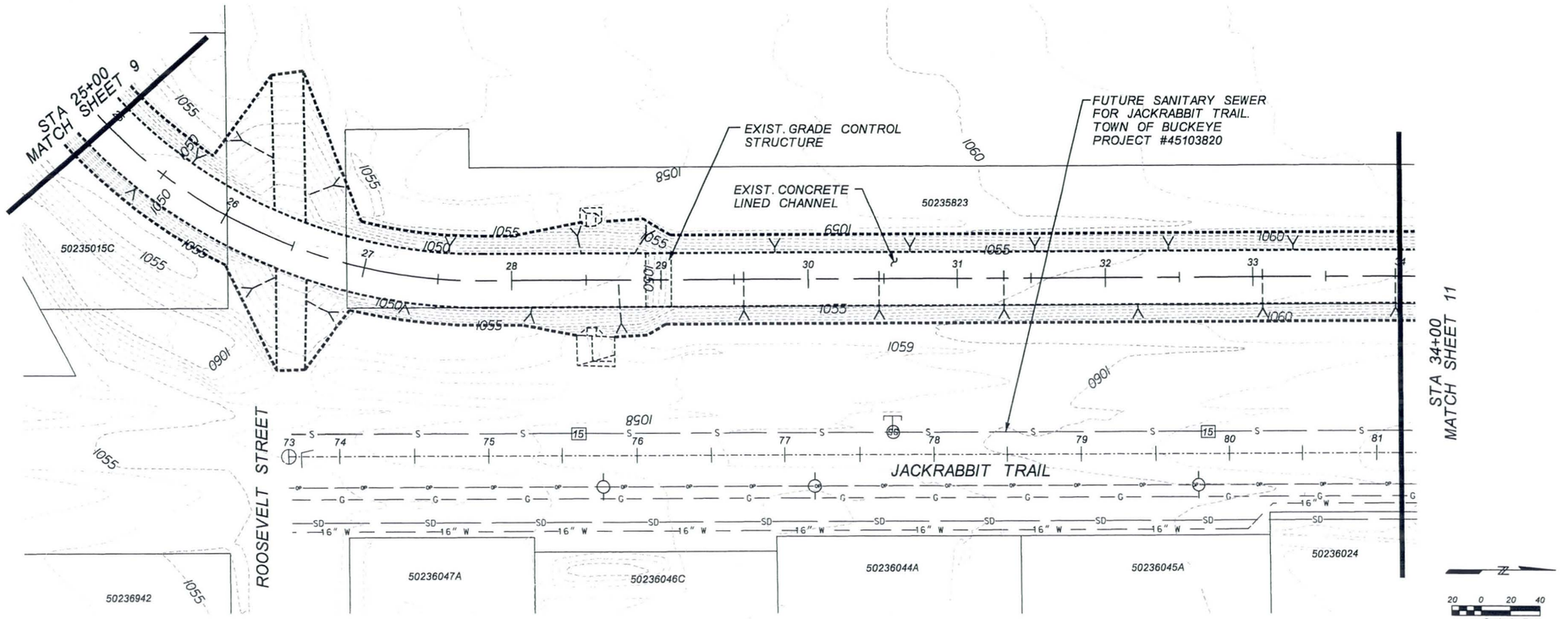
PLAN AND PROFILE SHEET

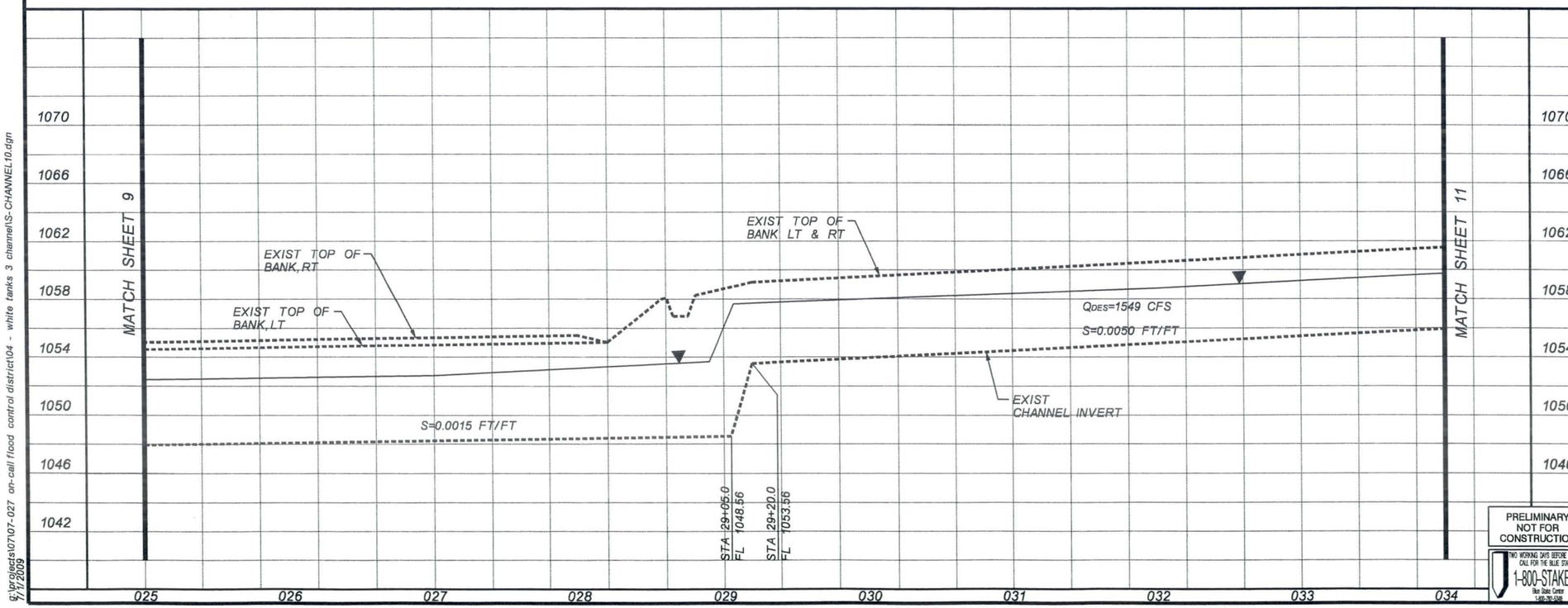
DRAWING NO. C2 | SHEET 9 OF 55

SUBMITTAL 7/1/2009

30% SUBMITTAL

g:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL09.dgn
7/1/2009





REMOVE

CONSTRUCT

EROSION CONTROL

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER CERTIFICATE NO. 19690 PAUL W.R. HOSKIN ARIZONA, U.S.A.
EXPIRES 3/31/12

PLAN AND PROFILE SHEET

DRAWING NO. C3 | SHEET 10 OF 55

PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT Blue Stake Center 1-602-263-1100

SUBMITTAL 7/1/2009

30% SUBMITTAL

g:\projects\07107-027 on-call flood control district\104 - white tanks 3 channel\S-CHANNEL10.dgn 7/1/2009

FUTURE SANITARY SEWER FOR JACKRABBIT TRAIL. TOWN OF BUCKEYE PROJECT #45103820

EXIST. CONCRETE LINED CHANNEL

EXIST. GRADE CONTROL STRUCTURE

EXIST. (5) 10'X4' CBC

I-10 FREEWAY OFF RAMP

STA 34+00 MATCH SHEET 10

STA 43+00 MATCH SHEET 12

JACKRABBIT TRAIL

50235823

50236024

50236025A

50236029B

1061 1064 1060 1057 1062 1063 1065 1070 1075

34 35 36 37 38 39 40 41 42 43

82 83 84 85 86 87 88 89 90

16" W SD G S

20 0 20 40
Scale in Feet

MATCH SHEET 10

MATCH SHEET 12

EXIST TOP OF BANK LT & RT

EXIST (5) 10'X4' CBC S=0.0047 FT/FT

Q_{DES}=1549 CFS

S=0.0015 FT/FT

S=0.0224 FT/FT

S=0.0050 FT/FT

EXIST CHANNEL INVERT

STA 37+20.0 FL 1057.54

STA 38+20.0 FL 1059.80

STA 41+83.0 FL 1060.35

STA 41+95.0 FL 1064.35

STA 42+10.0 FL 1064.42

STA 42+71.0 FL 1064.71

1078 1074 1070 1066 1062 1058 1054 1050

034 035 036 037 038 039 040 041 042 043

PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT Blue Stake Center 1-602-263-1100

REMOVE

CONSTRUCT

EROSION CONTROL

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

CERTIFIED PROFESSIONAL ENGINEER (PE) CERTIFICATE NO. 19690 PAUL W.R. HOSKIN ARIZONA, U.S.A.

EXPIRES 3/31/12

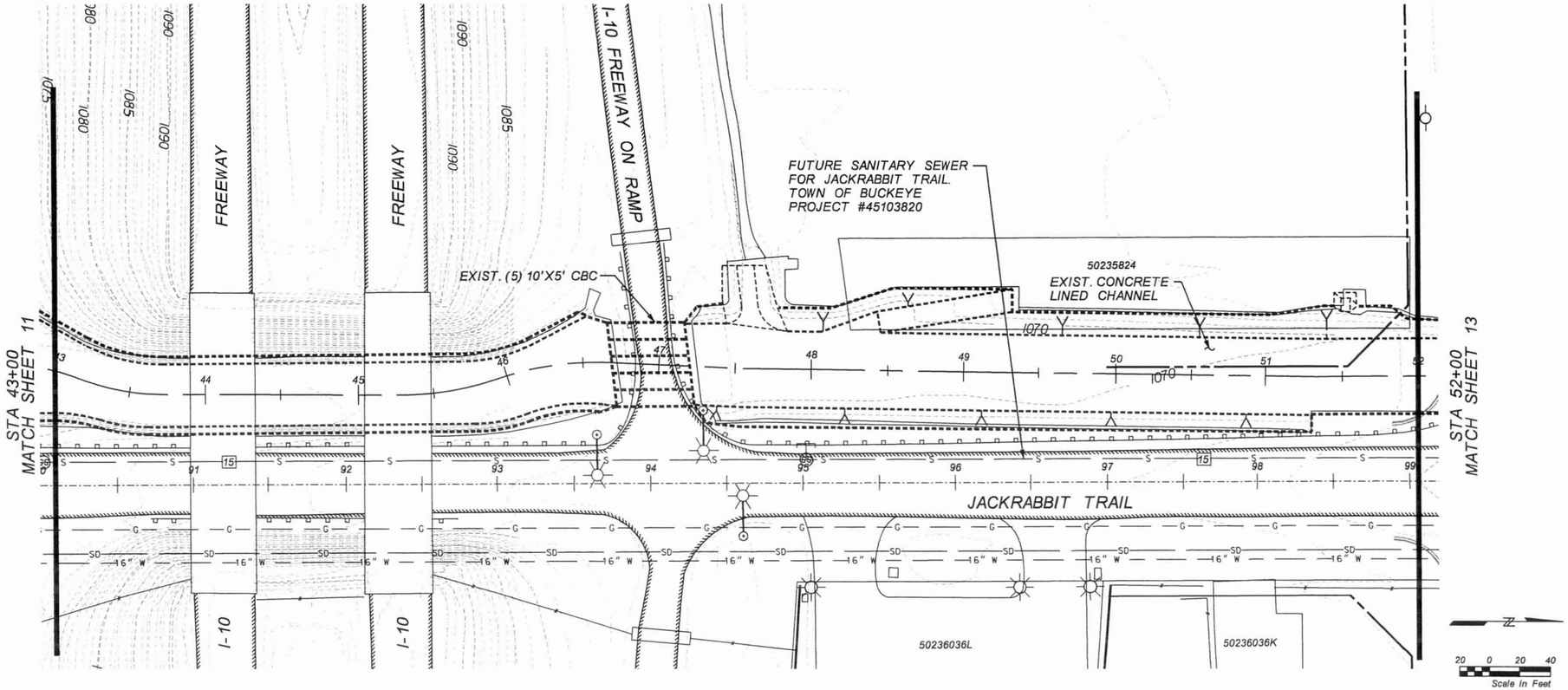
PLAN AND PROFILE SHEET

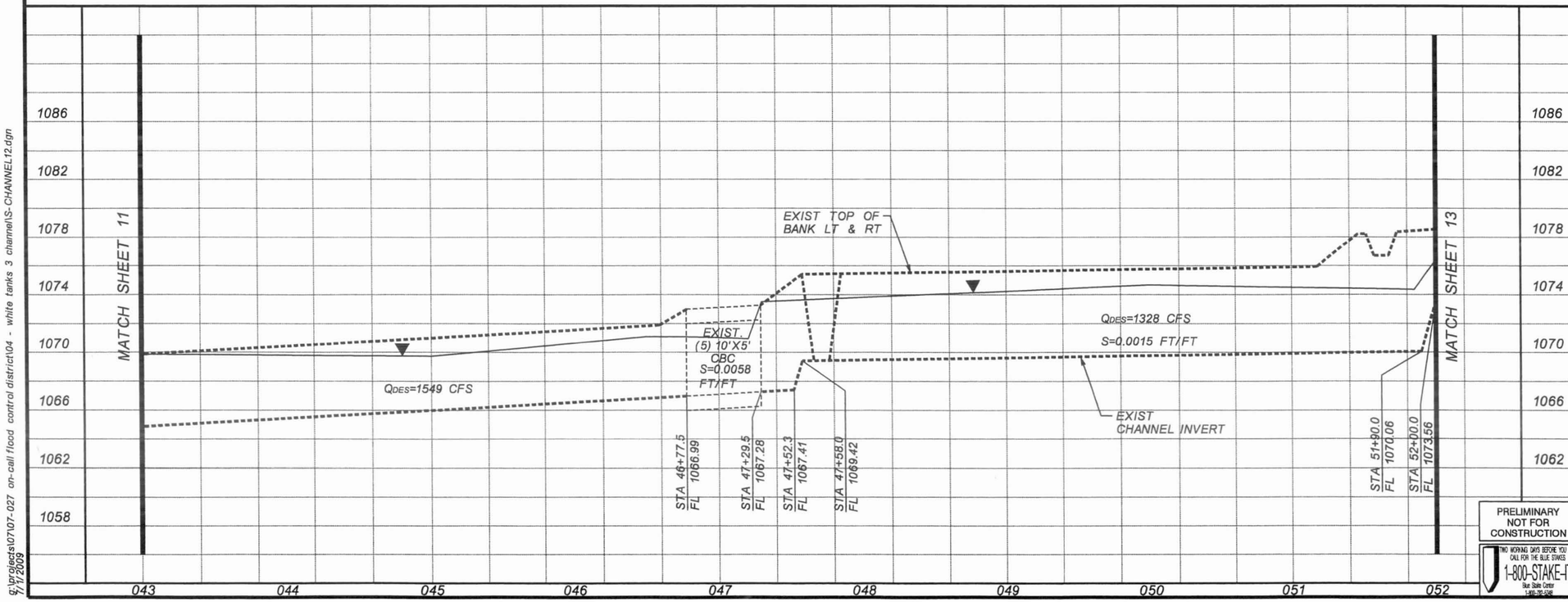
DRAWING NO. C4 | SHEET 11 OF 55

SUBMITTAL 7/1/2009

30% SUBMITTAL

S:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL11.dgn
7/1/2009





PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT Blue Stake Center 1-602-263-1464

REMOVE

CONSTRUCT

EROSION CONTROL

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER CERTIFICATE NO. 19690 PAUL W.R. HOSKIN ARIZONA U.S.A.

EXPIRES 3/31/12

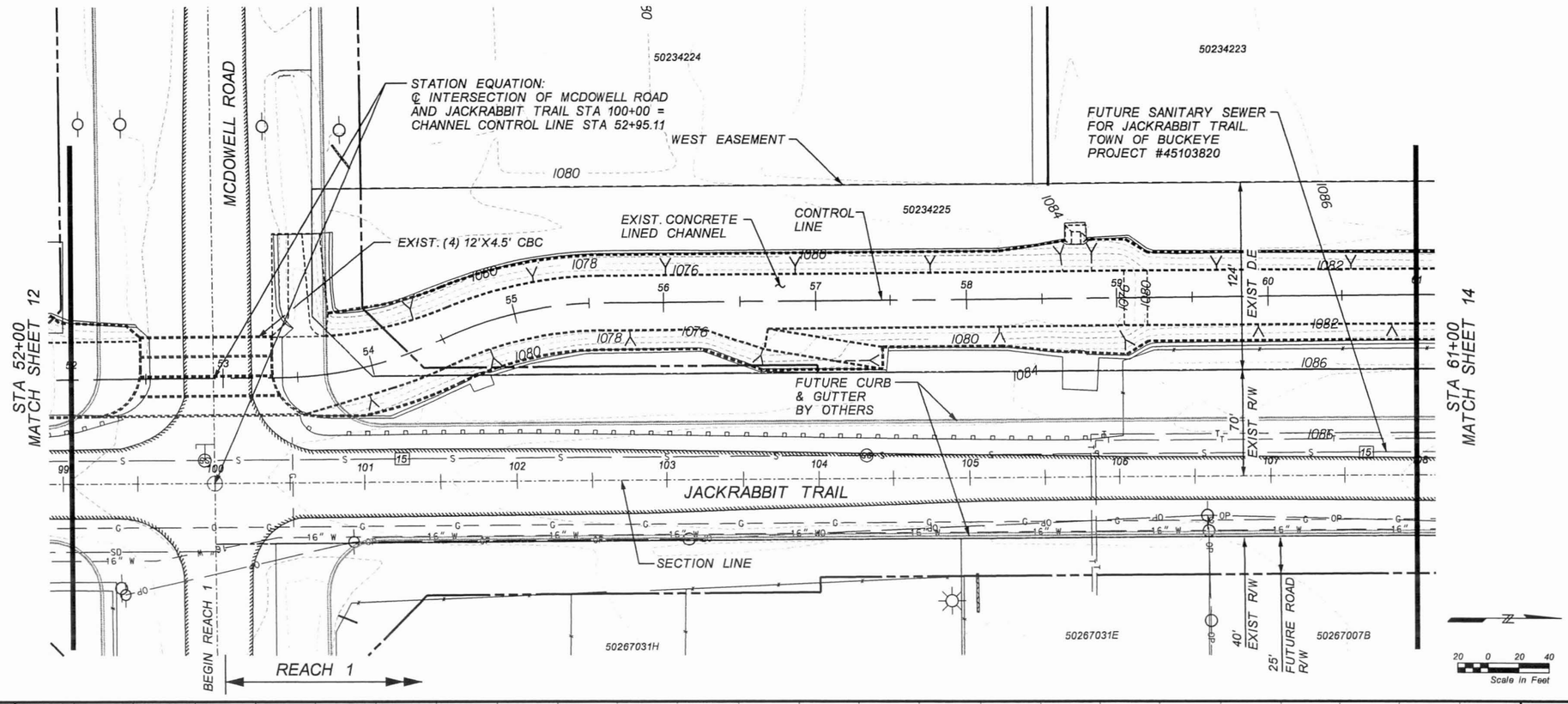
PLAN AND PROFILE SHEET

DRAWING NO. C5 | SHEET 12 OF 55

g:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL12.dgn 7/1/2009

SUBMITTAL 7/1/2009

30% SUBMITTAL



REMOVE

CONSTRUCT

EROSION CONTROL

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

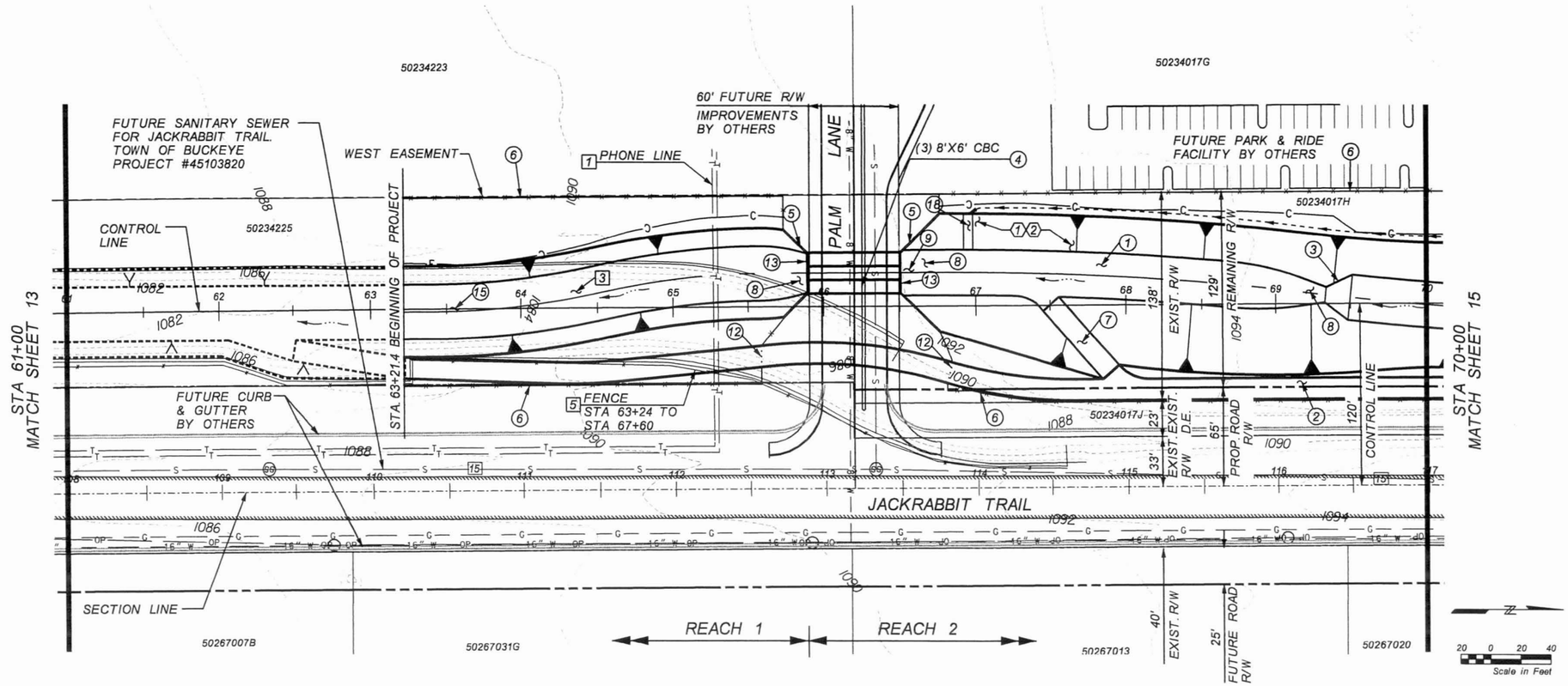
REGISTERED PROFESSIONAL ENGINEER 19690 PAUL W.R. HOSKIN ARIZONA, U.S.A.
EXPIRES 3/31/12

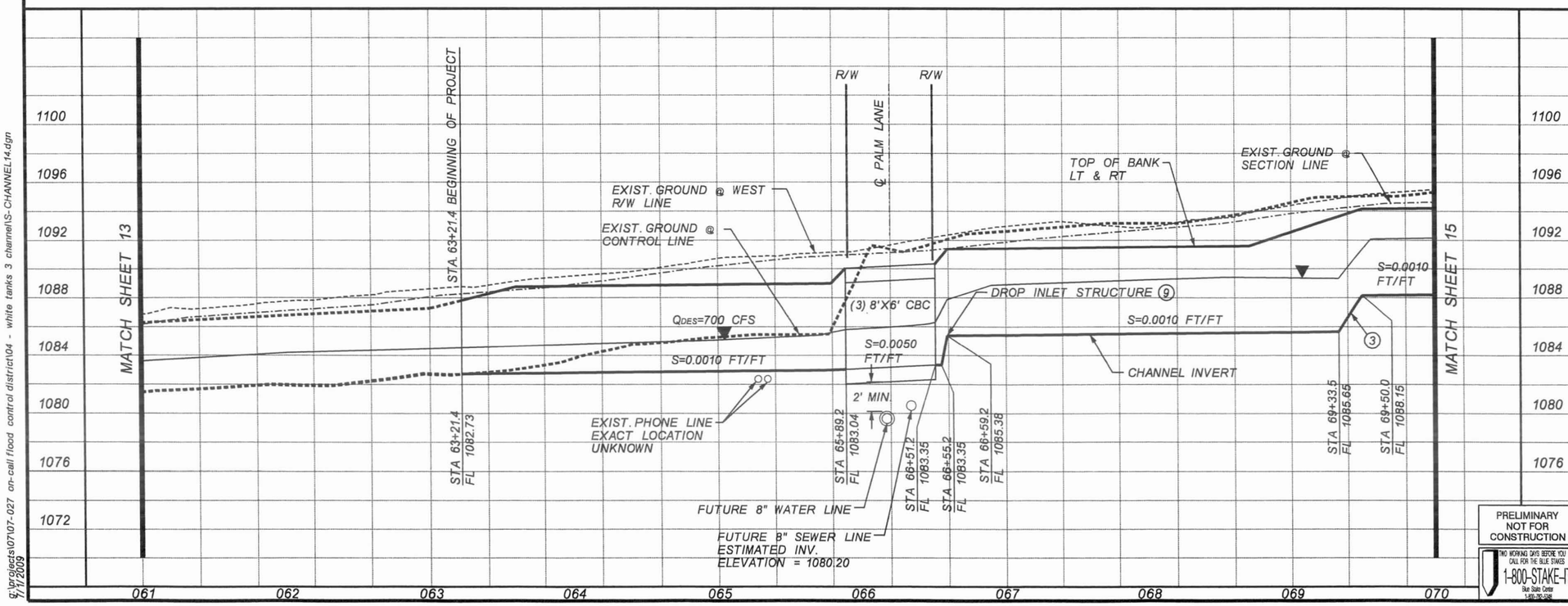
PLAN AND PROFILE SHEET

DRAWING NO. C6 | SHEET 13 OF 55

SUBMITTAL 7/1/2009 30% SUBMITTAL

g:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL13.dgn
7/1/2009





PRELIMINARY
NOT FOR
CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG
CALL FOR THE BLUE STAKES
1-800-STAKE-IT
Blue Stake Center
1-602-263-1100

g:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL14.dgn
7/1/2009

REMOVE

1	UTILITY LINE RELOCATION (TYPE PER SHEET)	1 EA
3	REMOVE CONCRETE LINED CHANNEL	2,920 SY
5	REMOVE EXIST. FENCE, BLOCK WALL AND/OR RETAINING WALL	447 LF

CONSTRUCT

1	CONSTRUCT EARTHEN CHANNEL, CUT	10,090 CY
	CONSTRUCT EARTHEN CHANNEL, FILL	1,904 CY
2	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	1,150 SY
3	CONSTRUCT CONCRETE GRADE CONTROL STRUCTURE, PER DET. A-DRAWING NO. D1	69 CY
4	CONSTRUCT CBC, PER ADOT STD. DET. B-02.20 & B-02.30 (SIZE PER SHEET AND DRAWING NO. D11)	62 LF
5	CONSTRUCT CONCRETE HEADWALL, PER ADOT STD. DET. B-04.20, B-04.30	2 EA
6	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H- DRAWING NO. D6	1,175 LF
7	CONSTRUCT MAINTENANCE RAMP, PER DET. J-DRAWING NO. D7	1 EA
8	INSTALL PLAIN RIP RAP	357 CY
9	CONSTRUCT DROP INLET STRUCTURE, PER DET. M-DRAWING NO. D8	16 CY
12	INSTALL BOLLARDS, PER MAG STD. DET. 140, TYPE 2	6 EA
13	INSTALL SAFETY RAIL , PER DET. G- DRAWING NO. D5	173 LF
15	CONSTRUCT CONCRETE CHANNEL LINING, PER DET. K- DRAWING NO. D7	17,476 SF
18	GROUTED RIP-RAP DOWNDRAIN	1 EA

EROSION CONTROL

1	PLACE GRAVEL MULCH	1.06 AC
2	HYDROSEED	1.31 AC

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

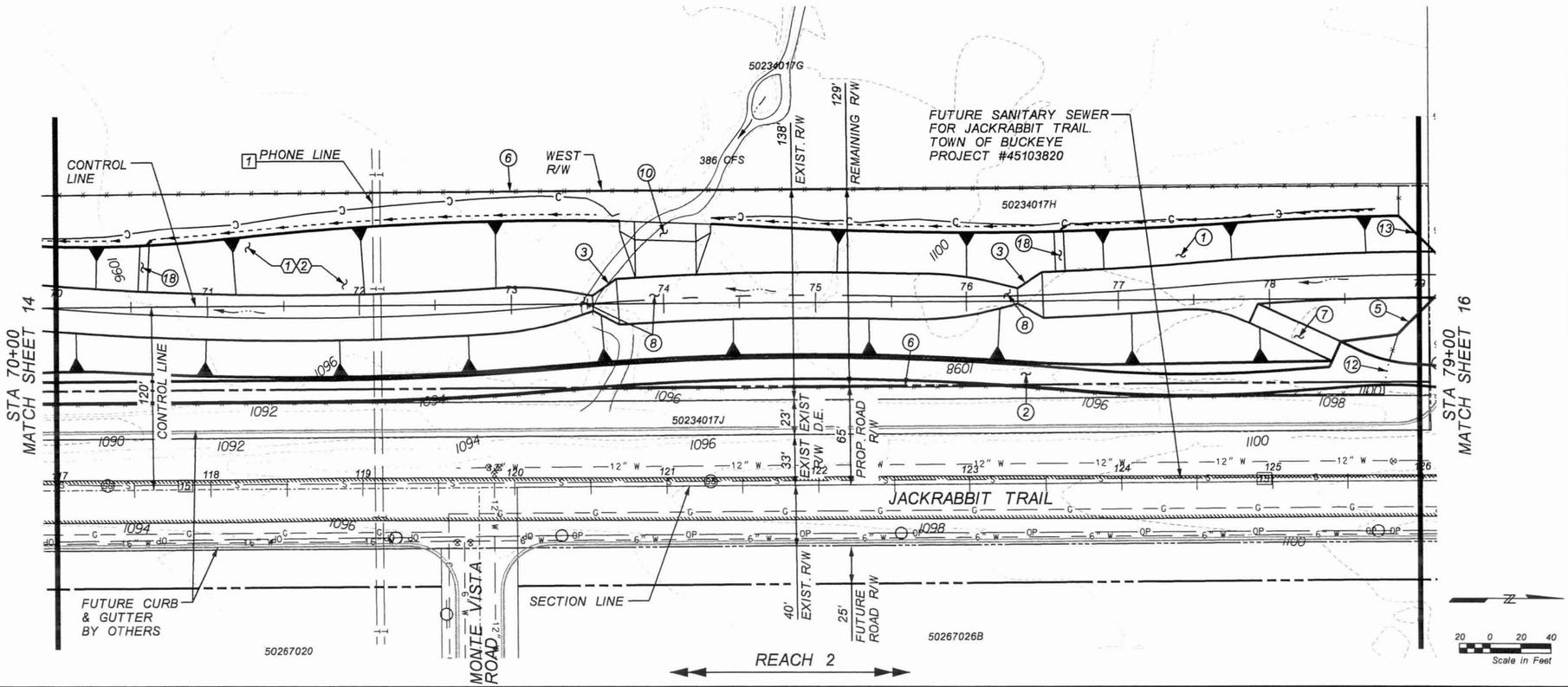
REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO.
19690
PAUL W.R.
HOSKIN
Date Signed
ARIZONA, U.S.A.
EXPIRES 3/31/12

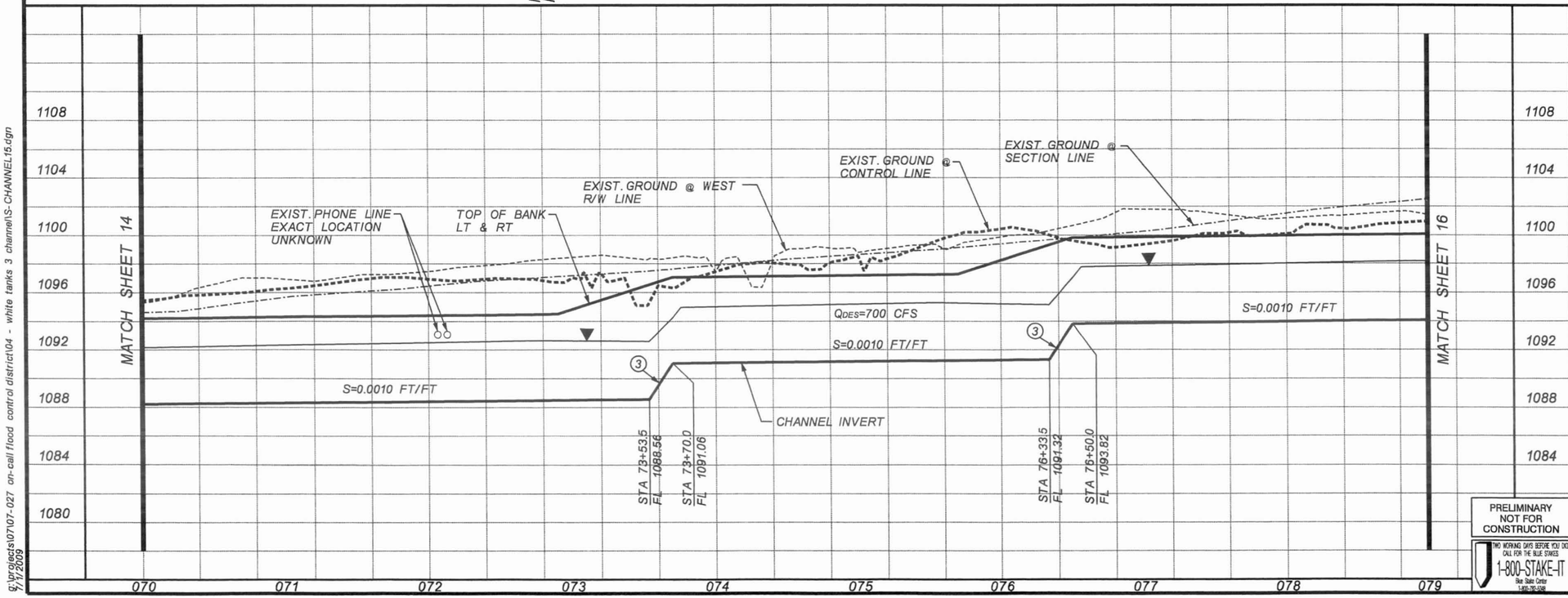
	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

PLAN AND PROFILE SHEET

DRAWING NO. C7 | SHEET 14 OF 55

SUBMITTAL 7/1/2009 30% SUBMITTAL





PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT (Arizona Blue Stake, Inc. 1-602-263-1100)

REMOVE

1	UTILITY LINE RELOCATION (TYPE PER SHEET)	1 EA

CONSTRUCT

1	CONSTRUCT EARTHEN CHANNEL, CUT CONSTRUCT EARTHEN CHANNEL, FILL	16,648 CY 3,636 CY
2	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	1,493 SY
3	CONSTRUCT CONCRETE GRADE CONTROL STRUCTURE, PER DET. A- DRAWING NO. D1	135 CY
5	CONSTRUCT CONCRETE HEADWALL, PER ADOT STD. DET. B-04.20, B-04.30	1 EA
6	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H- DRAWING NO. D6	1,700 LF
7	CONSTRUCT MAINTENANCE RAMP, PER DET. J- DRAWING NO. D7	1 EA
8	INSTALL PLAIN RIP RAP	862 CY
10	CONSTRUCT SIDE FLOW SPILLWAY, PER DET. B, C & D- DRAWINGS NO. D2 & D3	63 CY
12	INSTALL BOLLARDS, PER MAG STD. DET. 140, TYPE 2	3 EA
13	INSTALL SAFETY RAIL , PER DET. G- DRAWING NO. D5	101 LF
18	GROUTED RIP-RAP DOWNDRAIN	2 EA

EROSION CONTROL

1	PLACE GRAVEL MULCH	1.94 AC
2	HYDROSEED	2.56 AC

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

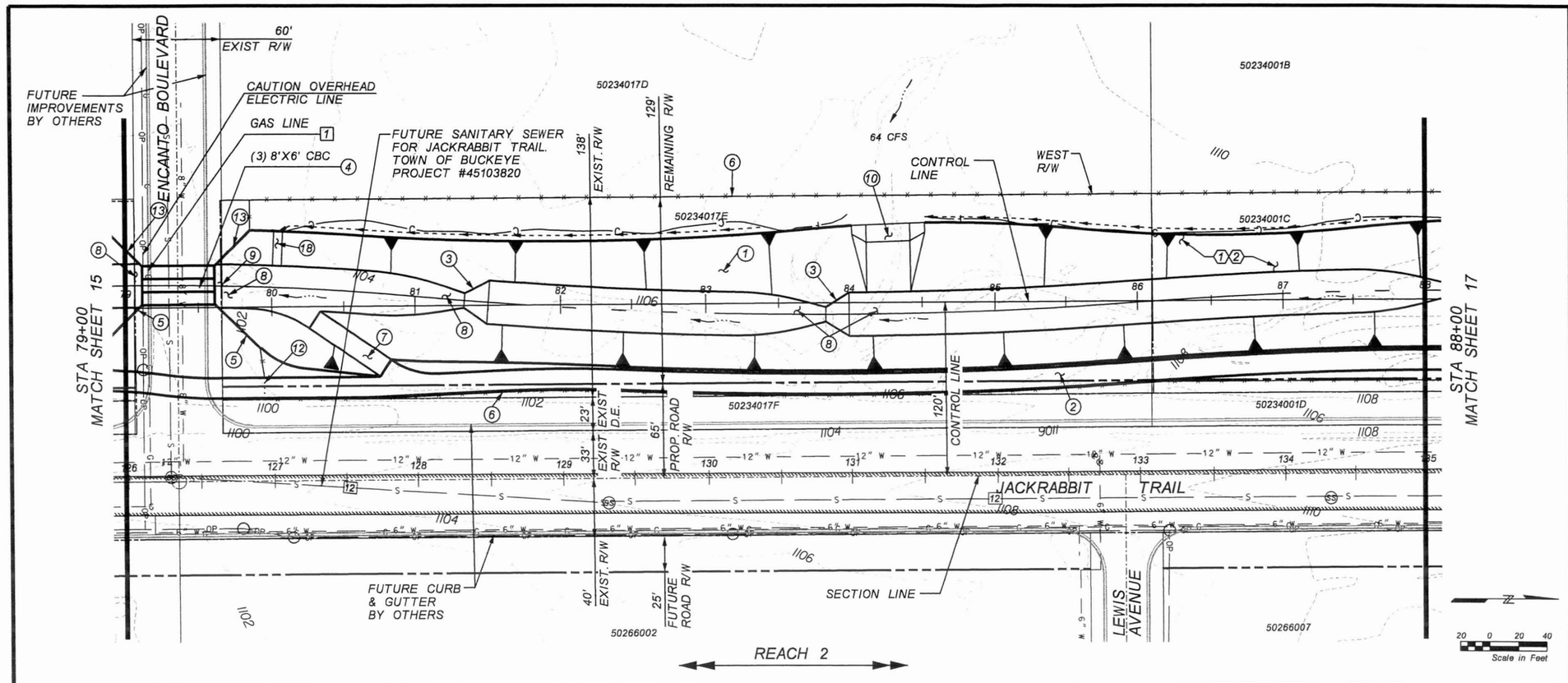
REGISTERED PROFESSIONAL ENGINEER — 19590 PAUL W.R. HOSKIN — ARIZONA, U.S.A. — EXPIRES 3/31/12

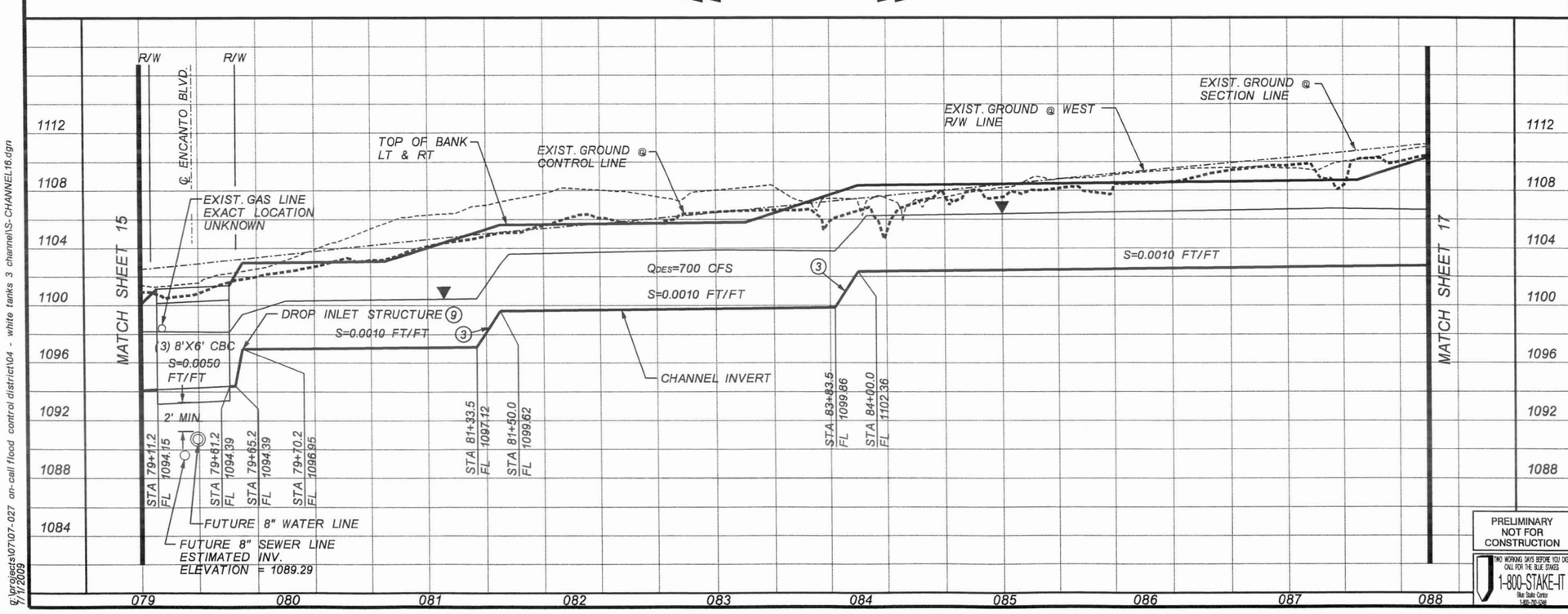
PLAN AND PROFILE SHEET

DRAWING NO. C8 | SHEET 15 OF 55

SUBMITTAL 7/1/2009 — 30% SUBMITTAL

g:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL15.dgn
7/1/2009





PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT (Blue Stake Center 1-602-263-1100)

G:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL16.dgn 7/1/2009

REMOVE

1	UTILITY LINE RELOCATION (TYPE PER SHEET)	1 EA

CONSTRUCT

(1)	CONSTRUCT EARTHEN CHANNEL, CUT CONSTRUCT EARTHEN CHANNEL, FILL	12,819 CY 4,468 CY
(2)	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	1,493 SY
(3)	CONSTRUCT CONCRETE GRADE CONTROL STRUCTURE, PER DET. A- DRAWING NO. D1	135 CY
(4)	CONSTRUCT CBC, PER ADOT STD. DET. B-02.20 & B-02.30 (SIZE PER SHEET AND DRAWING NO. D11)	50 LF
(5)	CONSTRUCT CONCRETE HEADWALL, PER ADOT STD. DET. B-04.20, B-04.30	1 EA
(6)	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H- DRAWING NO. D6	1,640 LF
(7)	CONSTRUCT MAINTENANCE RAMP, PER DET. J- DRAWING NO. D7	1 EA
(8)	INSTALL PLAIN RIP RAP	901 CY
(9)	CONSTRUCT DROP INLET STRUCTURE, PER DET. M- DRAWING NO. D8	16 CY
(10)	CONSTRUCT SIDE FLOW SPILLWAY, PER DET. B, C & D- DRAWINGS NO. D2 & D3	65 CY
(12)	INSTALL BOLLARDS, PER MAG STD. DET. 140, TYPE 2	3 EA
(13)	INSTALL SAFETY RAIL , PER DET. G- DRAWING NO. D5	105 LF
(18)	GROUTED RIP-RAP DOWNDRAIN	1 EA

EROSION CONTROL

(1)	PLACE GRAVEL MULCH	1.79 AC
(2)	HYDROSEED	2.36 AC

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

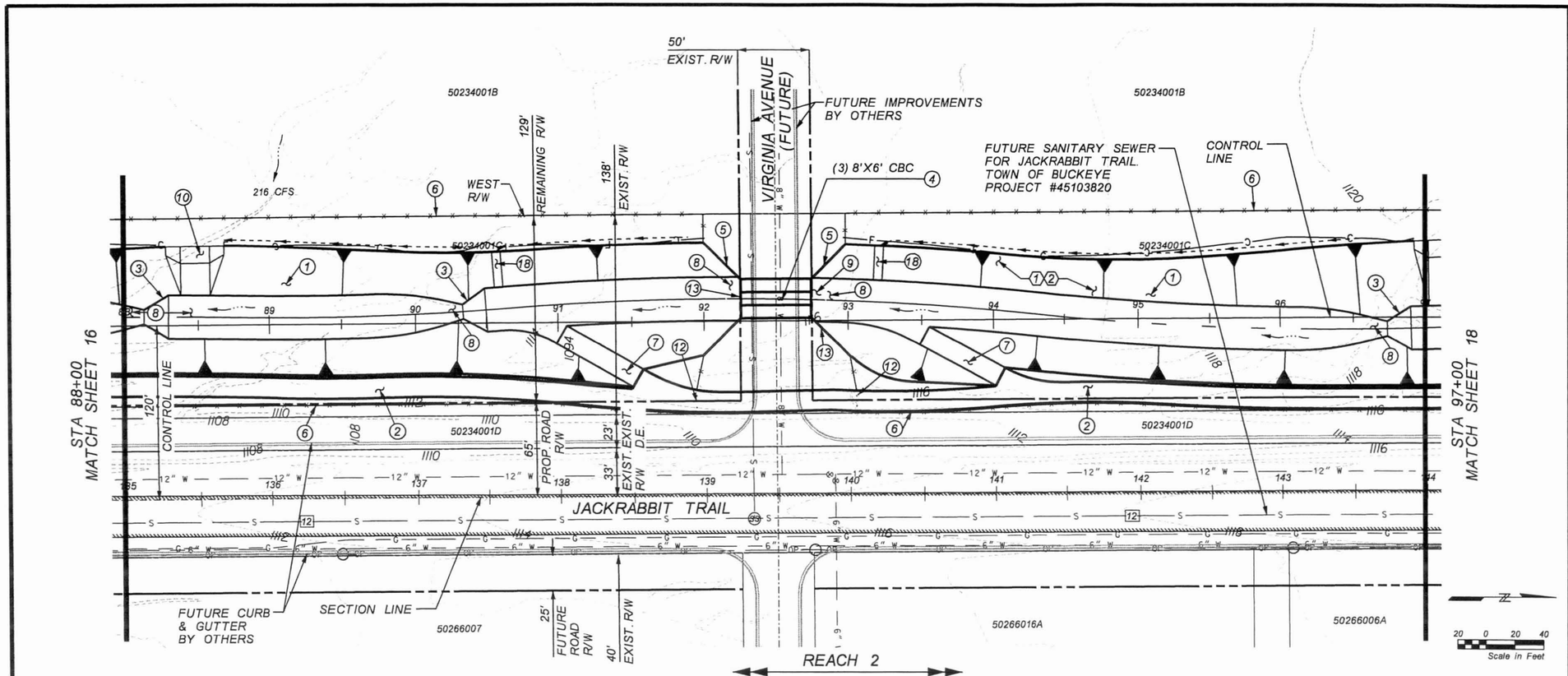
	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

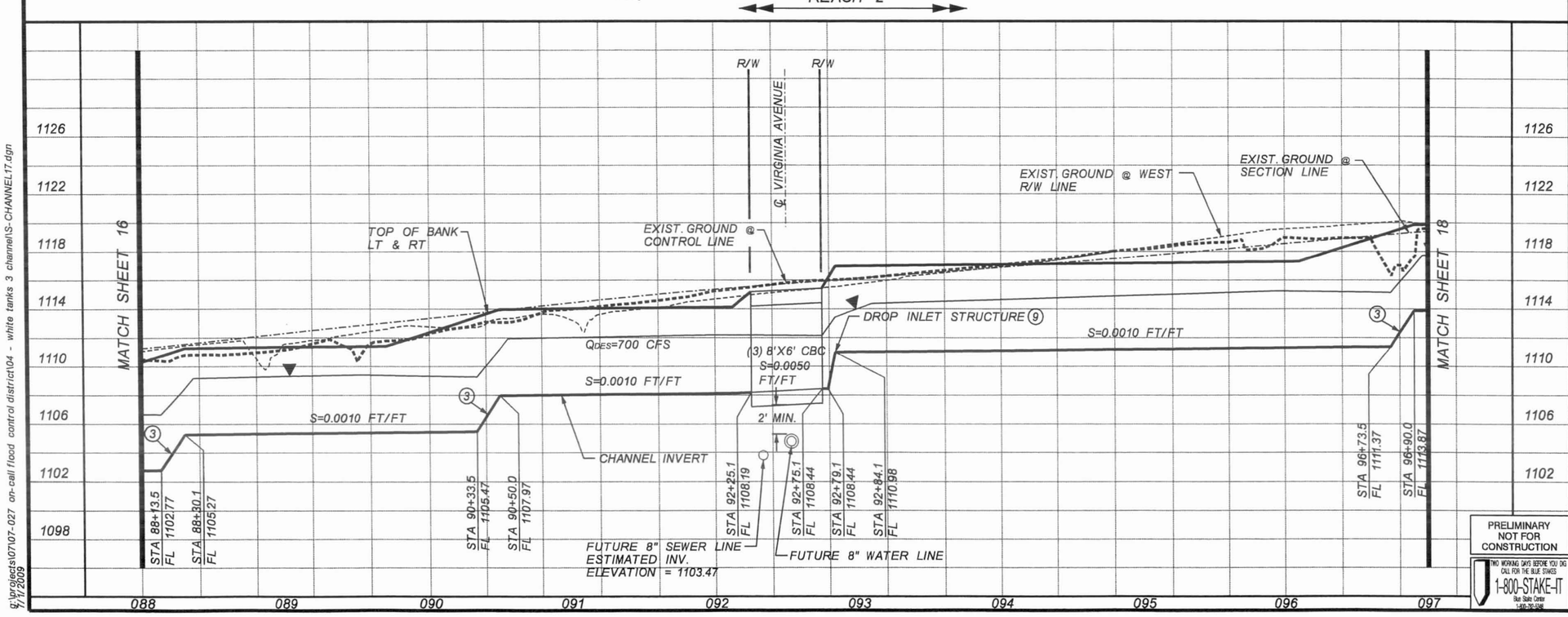
REGISTERED PROFESSIONAL ENGINEER 19690 PAUL W.R. HOSKIN ARIZONA, U.S.A.
EXPIRES 3/31/12

PLAN AND PROFILE SHEET

DRAWING NO. C9 | SHEET 16 OF 55

SUBMITTAL 7/1/2009 30% SUBMITTAL





PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT Blue Stake Center 1-602-263-1100

REMOVE

CONSTRUCT

(1)	CONSTRUCT EARTHEN CHANNEL, CUT CONSTRUCT EARTHEN CHANNEL, FILL	13,078 CY 5,471 CY
(2)	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	1,587 SY
(3)	CONSTRUCT CONCRETE GRADE CONTROL STRUCTURE, PER DET. A- DRAWING NO. D1	201 CY
(4)	CONSTRUCT CBC, PER ADOT STD. DET. B-02.20 & B-02.30 (SIZE PER SHEET AND DRAWING NO. D11)	50 LF
(5)	CONSTRUCT CONCRETE HEADWALL, PER ADOT STD. DET. B-04.20, B-04.30	2 EA
(6)	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H-DRAWING NO. D6	1,600 LF
(7)	CONSTRUCT MAINTENANCE RAMP, PER DET. J- DRAWING NO. D7	2 EA
(8)	INSTALL PLAIN RIP RAP	1,088 CY
(9)	CONSTRUCT DROP INLET STRUCTURE, PER DET. M- DRAWING NO. D8	16 CY
(10)	CONSTRUCT SIDE FLOW SPILLWAY, PER DET. B, C & D- DRAWINGS NO. D2 & D3	40 CY
(12)	INSTALL BOLLARDS, PER MAG STD. DET. 140, TYPE 2	6 EA
(13)	INSTALL SAFETY RAIL , PER DET. G- DRAWING NO. D5	200 LF
(18)	GROUTED RIP-RAP DOWNDRAIN	2 EA

EROSION CONTROL

(1)	PLACE GRAVEL MULCH	1.83 AC
(2)	HYDROSEED	2.42 AC

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER CERTIFICATE NO. 19690 PAUL W.R. HOSKIN ARIZONA, U.S.A.

EXPIRES 3/31/12

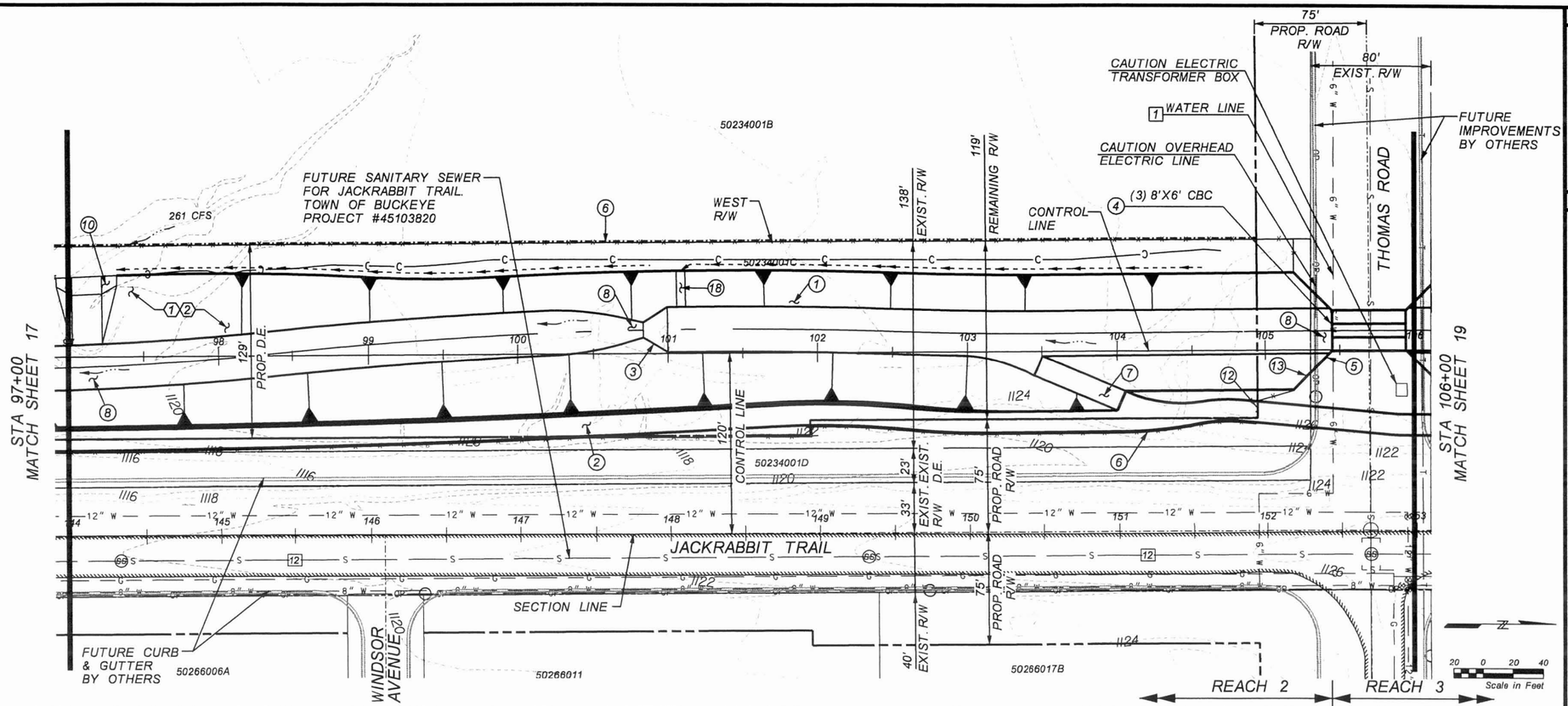
PLAN AND PROFILE SHEET

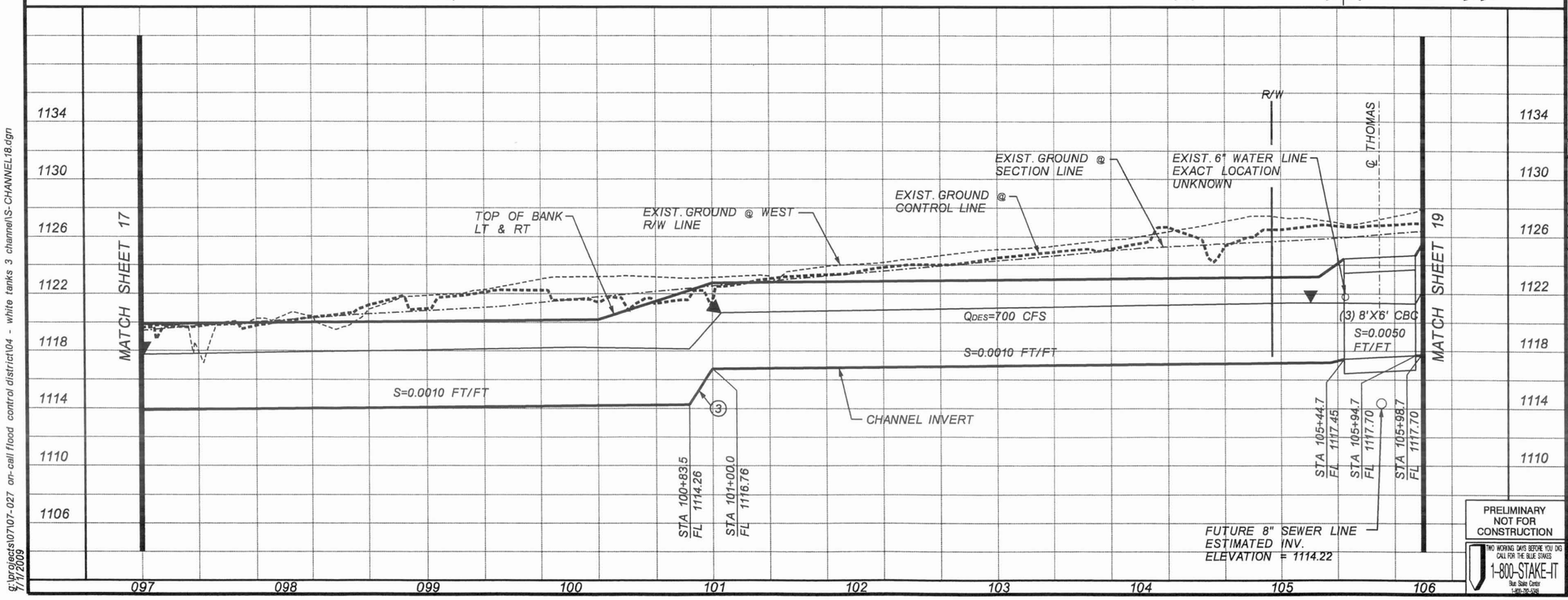
DRAWING NO. C10 | SHEET 17 OF 55

SUBMITTAL 7/1/2009

30% SUBMITTAL

g:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL17.dgn
7/1/2009





PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT Blue Stake Center 1-602-263-1100

REMOVE

1	UTILITY LINE RELOCATION (TYPE PER SHEET)	1 EA

CONSTRUCT

1	CONSTRUCT EARTHEN CHANNEL, CUT CONSTRUCT EARTHEN CHANNEL, FILL	15,844 CY 3,824 CY
2	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	1,493 SY
3	CONSTRUCT CONCRETE GRADE CONTROL STRUCTURE, PER DET. A- DRAWING NO. D1	69 CY
4	CONSTRUCT CBC, PER ADOT STD. DET. B-02.20 & B-02.30 (SIZE PER SHEET AND DRAWING NO. D11)	50 LF
5	CONSTRUCT CONCRETE HEADWALL, PER ADOT STD. DET. B-04.20, B-04.30	1 EA
6	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H- DRAWING NO. D6	1,556 LF
7	CONSTRUCT MAINTENANCE RAMP, PER DET. J- DRAWING NO. D7	1 EA
8	INSTALL PLAIN RIP RAP	541 CY
10	CONSTRUCT SIDE FLOW SPILLWAY, PER DET. B, C & D- DRAWINGS NO. D2 & D3	40 CY
12	INSTALL BOLLARDS, PER MAG STD. DET. 140, TYPE 2	3 EA
13	INSTALL SAFETY RAIL, PER DET. G- DRAWING NO. D5	101 LF
18	GROUTED RIP-RAP DOWNDRAIN	1 EA

EROSION CONTROL

1	PLACE GRAVEL MULCH	1.69 AC
2	HYDROSEED	2.23 AC

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

REGISTERED PROFESSIONAL ENGINEER — CERTIFICATE NO. 19690 — PAUL W.R. HOSKIN — ARIZONA U.S.A. — EXPIRES 3/31/12

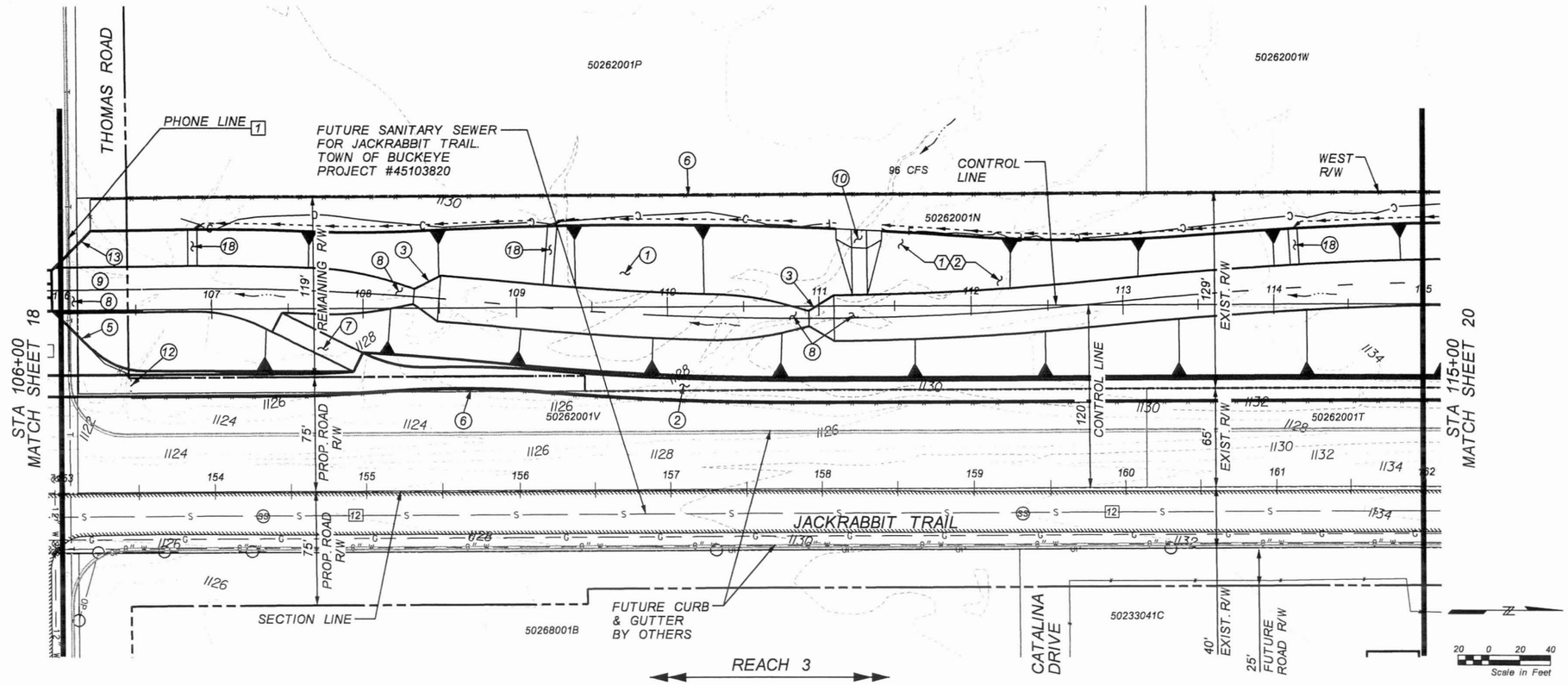
	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

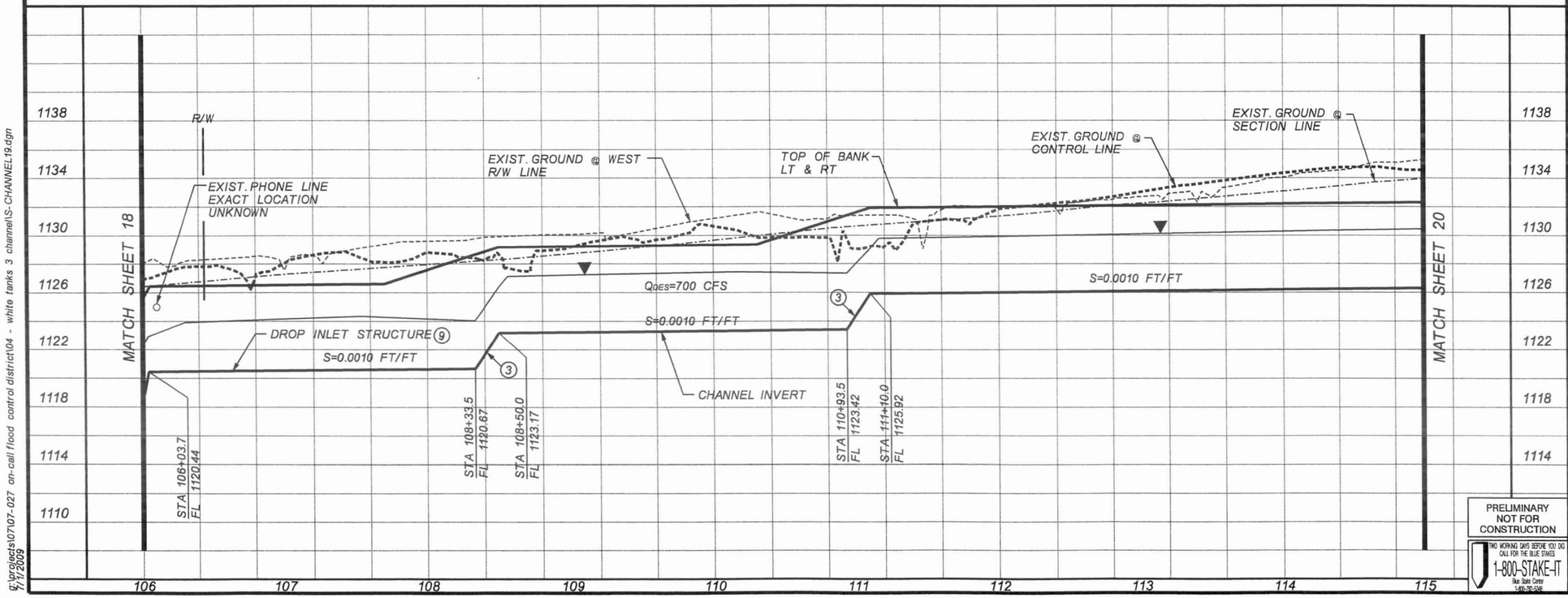
PLAN AND PROFILE SHEET

DRAWING NO. C11 | SHEET 18 OF 55

SUBMITTAL 7/1/2009 — 30% SUBMITTAL

g:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL18.dgn
7/1/2009





REMOVE

1	UTILITY LINE RELOCATION (TYPE PER SHEET)	1 EA

CONSTRUCT

1	CONSTRUCT EARTHEN CHANNEL, CUT CONSTRUCT EARTHEN CHANNEL, FILL	14,472 CY 5,003 CY
2	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	1,493 SY
3	CONSTRUCT CONCRETE GRADE CONTROL STRUCTURE, PER DET. A- DRAWING NO. D1	135 CY
5	CONSTRUCT CONCRETE HEADWALL, PER ADOT STD. DET. B-04.20, B-04.30	1 EA
6	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DRAWING DET. H- NO. D6	1,664 LF
7	CONSTRUCT MAINTENANCE RAMP, PER DRAWING DET. J- NO. D7	1 EA
8	INSTALL PLAIN RIP RAP	701 CY
9	CONSTRUCT DROP INLET STRUCTURE, PER DRAWING DET. M- NO. D8	16 CY
10	CONSTRUCT SIDE FLOW SPILLWAY, PER DRAWINGS DET. B, C & D- NO. D2 & D3	35 CY
12	INSTALL BOLLARDS, PER MAG STD. DET. 140, TYPE 2	3 EA
13	INSTALL SAFETY RAIL , PER DRAWING DET. G- NO. D5	101 LF
18	GROUTED RIP-RAP DOWNDRAIN	3 EA

EROSION CONTROL

1	PLACE GRAVEL MULCH	1.66 AC
2	HYDROSEED	2.24 AC

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER — CERTIFICATE NO. 19690 — PAUL W.R. HOSKIN — ARIZONA, U.S.A.
EXPIRES 3/31/12

PLAN AND PROFILE SHEET

DRAWING NO. C12 | SHEET 19 OF 55

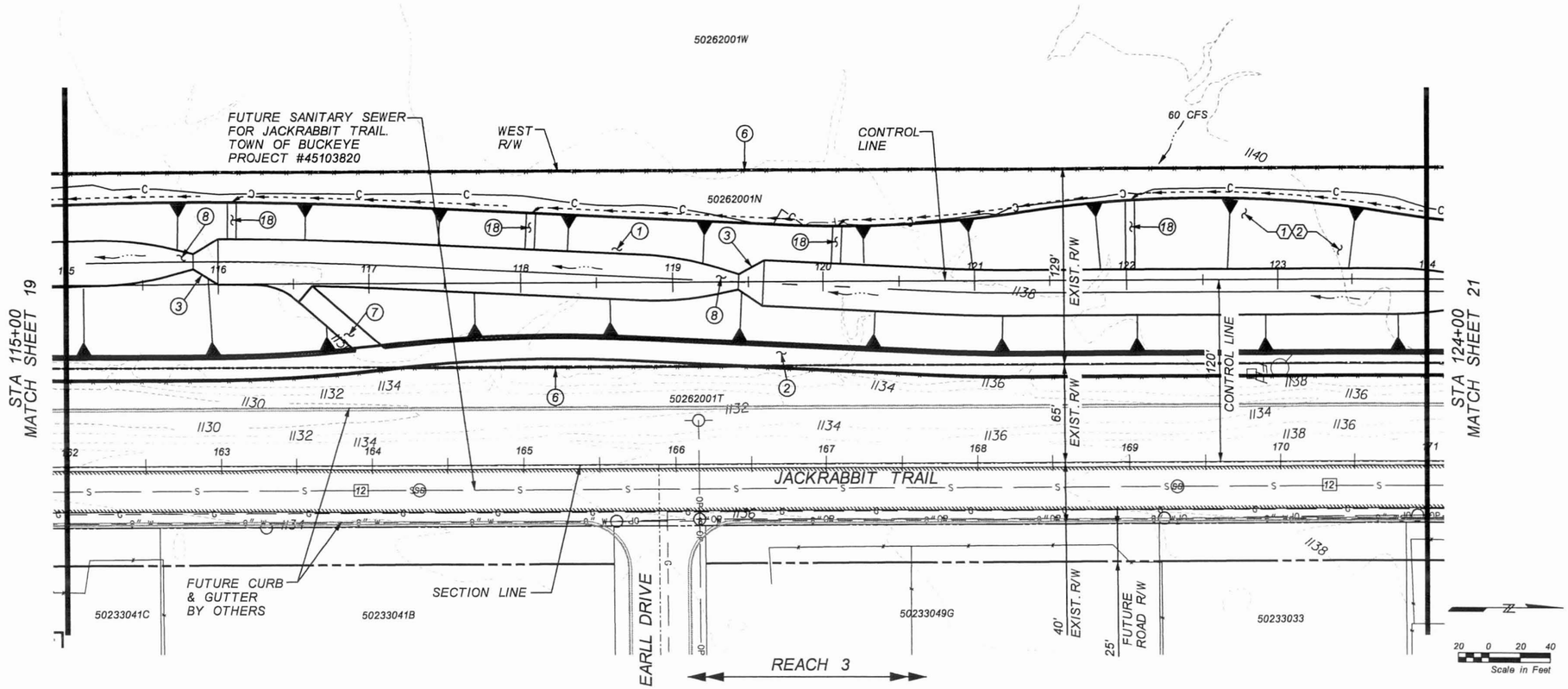
PRELIMINARY NOT FOR CONSTRUCTION

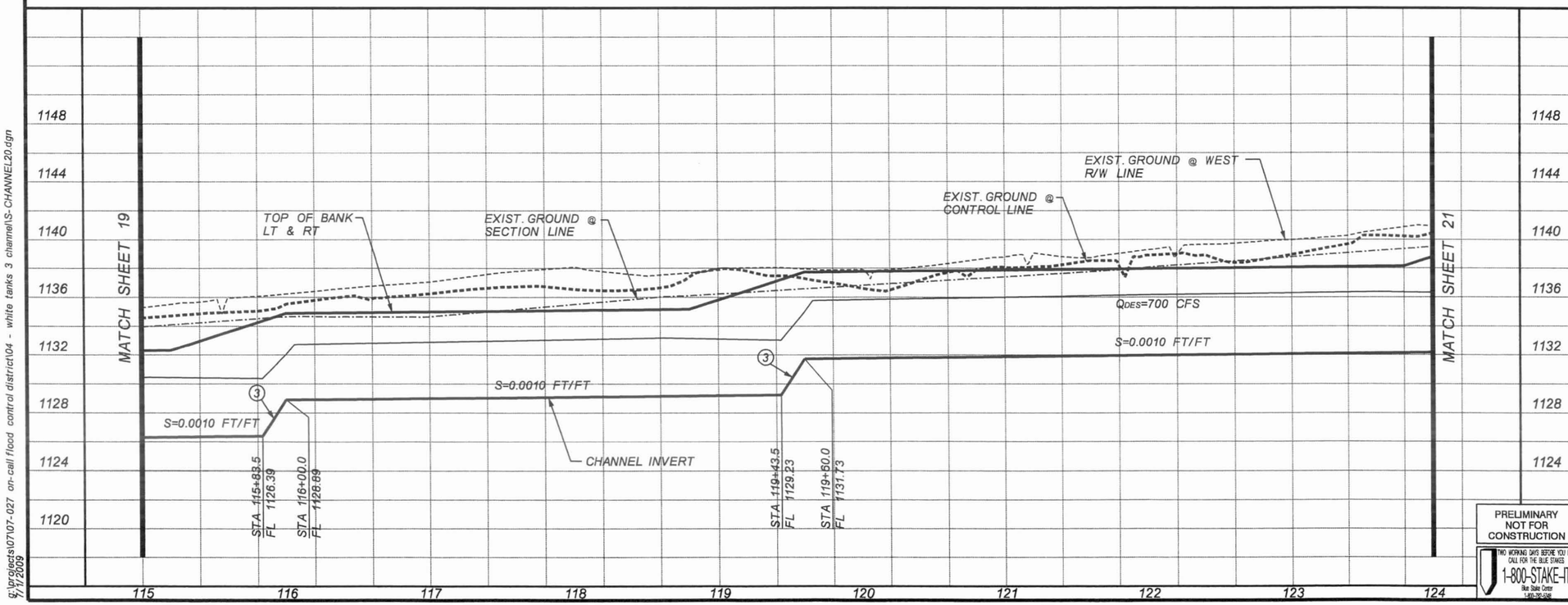
TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT (Blue Stake Center 1-602-263-1100)

SUBMITTAL 7/1/2009

30% SUBMITTAL

G:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL19.dgn 7/1/2009





PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT

REMOVE

CONSTRUCT

1	CONSTRUCT EARTHEN CHANNEL, CUT CONSTRUCT EARTHEN CHANNEL, FILL	16,008 CY 4,769 CY
2	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	1,493 SY
3	CONSTRUCT CONCRETE GRADE CONTROL STRUCTURE, PER DET. A-DRAWING NO. D1	138 CY
6	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H- DRAWING NO. D6	1,783 LF
7	CONSTRUCT MAINTENANCE RAMP, PER DET. J-DRAWING NO. D7	1 EA
8	INSTALL PLAIN RIP RAP	514 CY
18	GROUTED RIP-RAP DOWNDRAIN	4 EA

EROSION CONTROL

1	PLACE GRAVEL MULCH	1.76 AC
2	HYDROSEED	2.38 AC

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER — CERTIFICATE NO. 19690 — PAUL W.R. HOSKIN — ARIZONA, U.S.A. — EXPIRES 3/31/12

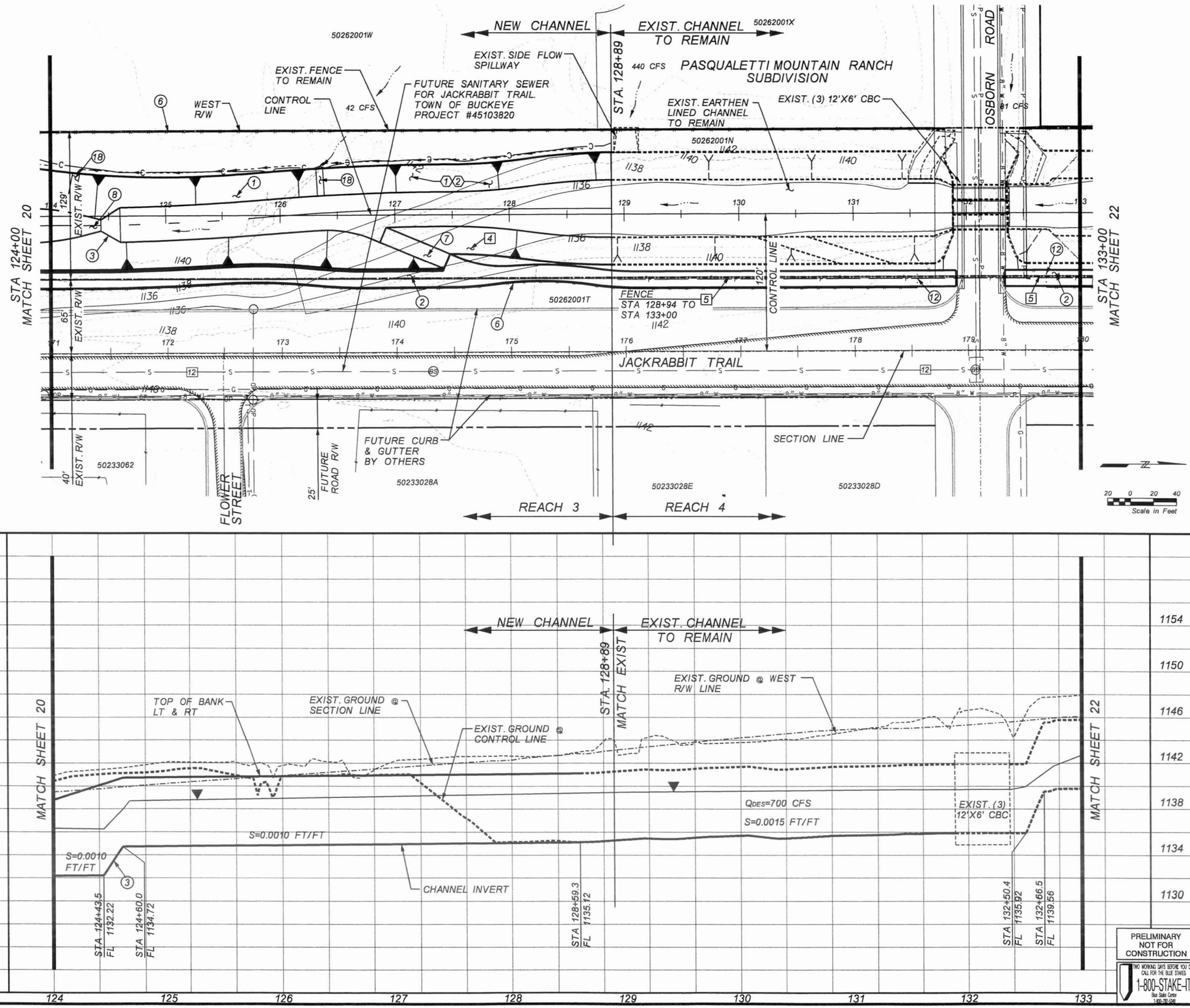
PLAN AND PROFILE SHEET

DRAWING NO. C13 | SHEET 20 OF 55

SUBMITTAL 7/1/2009

30% SUBMITTAL

g:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL20.dgn
7/1/2009



REMOVE		
4	REMOVE GROUTED RIPRAP	2,388 SY
5	REMOVE EXIST. FENCE, BLOCK WALL AND/OR RETAINING WALL	326 LF

CONSTRUCT		
1	CONSTRUCT EARTHEN CHANNEL, CUT	4,971 CY
	CONSTRUCT EARTHEN CHANNEL, FILL	3,495 CY
2	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	957 SY
3	CONSTRUCT CONCRETE GRADE CONTROL STRUCTURE, PER DET. A-DRAWING NO. D1	69 CY
6	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H-DRAWING NO. D6	998 LF
7	CONSTRUCT MAINTENANCE RAMP, PER DET. J- DRAWING NO. D7	1 EA
8	INSTALL PLAIN RIP RAP	257 CY
12	INSTALL BOLLARDS, PER MAG STD. DET. 140, TYPE 2	6 EA
18	GROUTED RIP-RAP DOWNDRAIN	2 EA

EROSION CONTROL		
1	PLACE GRAVEL MULCH	0.95 AC
2	HYDROSEED	1.29 AC

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER — CERTIFICATE NO. 19690 — PAUL W.R. HOSKIN — ARIZONA, U.S.A.
EXPIRES 3/31/12

PLAN AND PROFILE SHEET

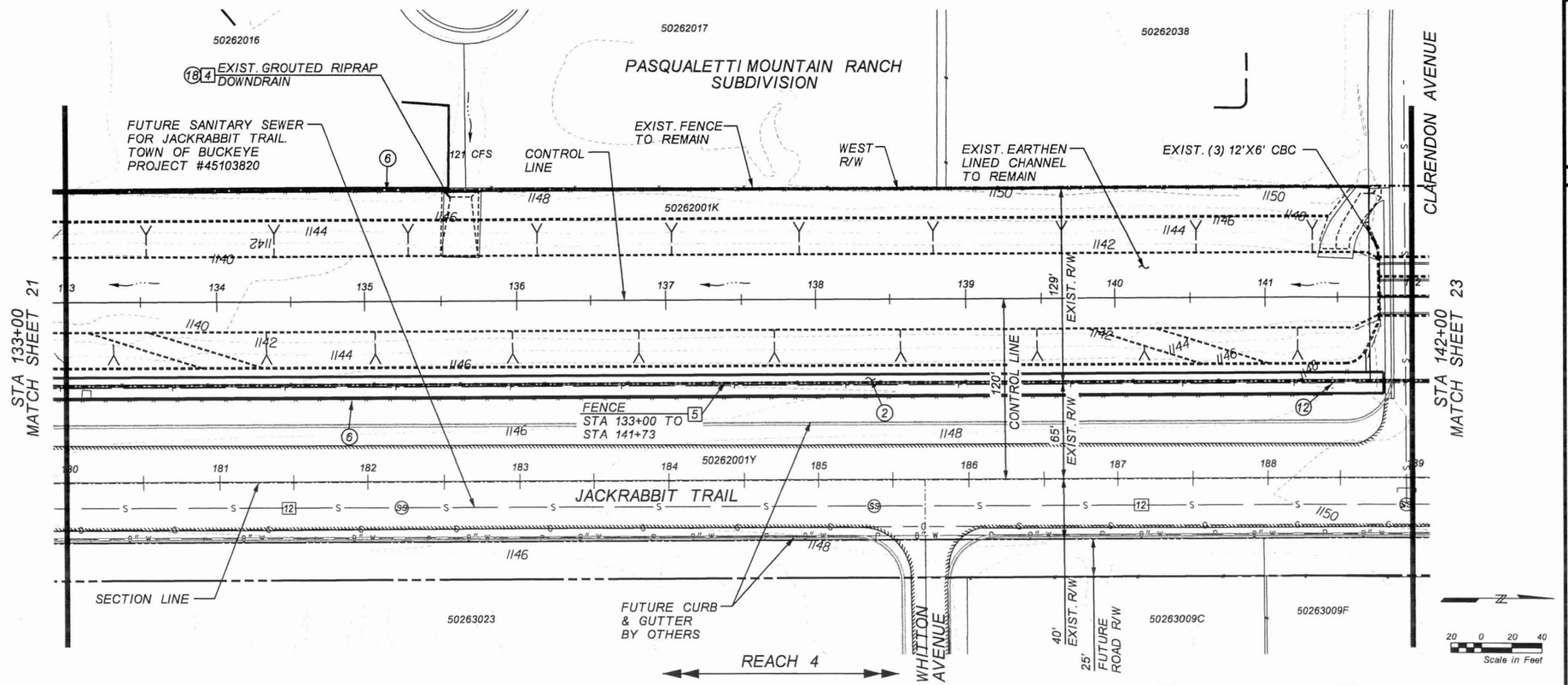
DRAWING NO. C14 | SHEET 21 OF 55

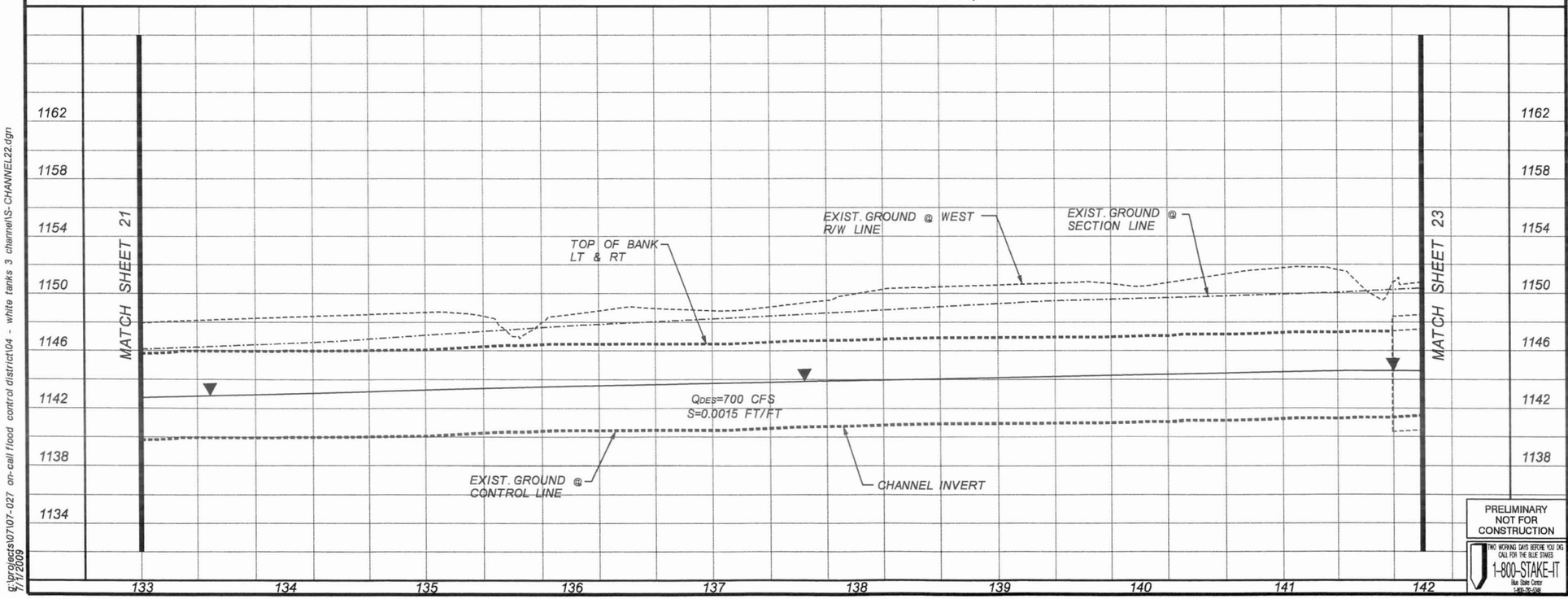
PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT Blue Stake Center 1-602-263-1100

SUBMITTAL 7/1/2009 30% SUBMITTAL

g:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL21.dgn
7/1/2009





REMOVE

4	REMOVE GROUTED RIPRAP	117 SY
5	REMOVE EXIST. FENCE, BLOCK WALL AND/OR RETAINING WALL	873 LF

CONSTRUCT

2	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	1,369 SY
6	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H- DRAWING NO. D6	811 LF
12	INSTALL BOLLARDS, PER MAG STD. DET. 140, TYPE 2	3 EA
18	GROUTED RIP-RAP DOWNDRAIN	1 EA

EROSION CONTROL

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER — CERTIFICATE NO. 19690 — PAUL W.R. HOSKIN — ARIZONA, U.S.A. — EXPIRES 3/31/12

PLAN AND PROFILE SHEET

DRAWING NO. C15 | SHEET 22 OF 55

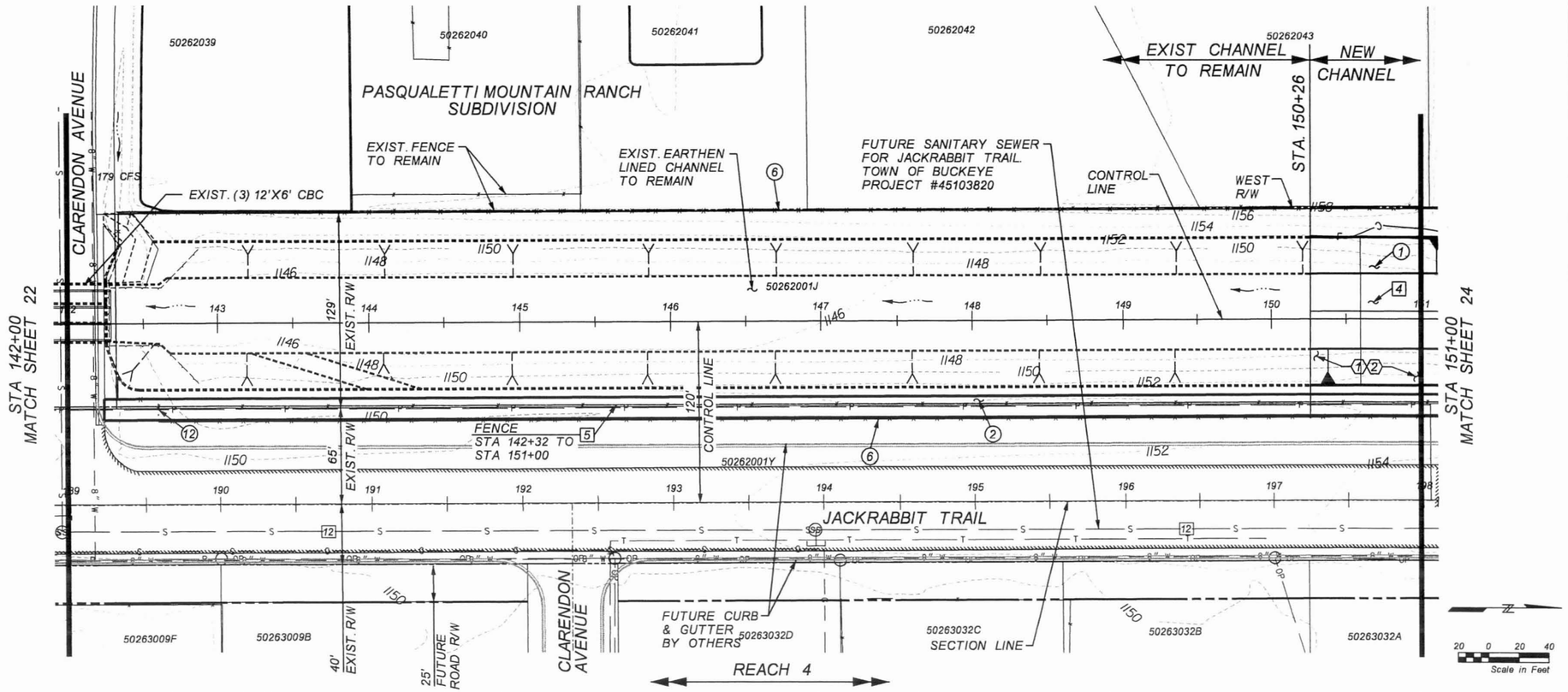
PRELIMINARY NOT FOR CONSTRUCTION

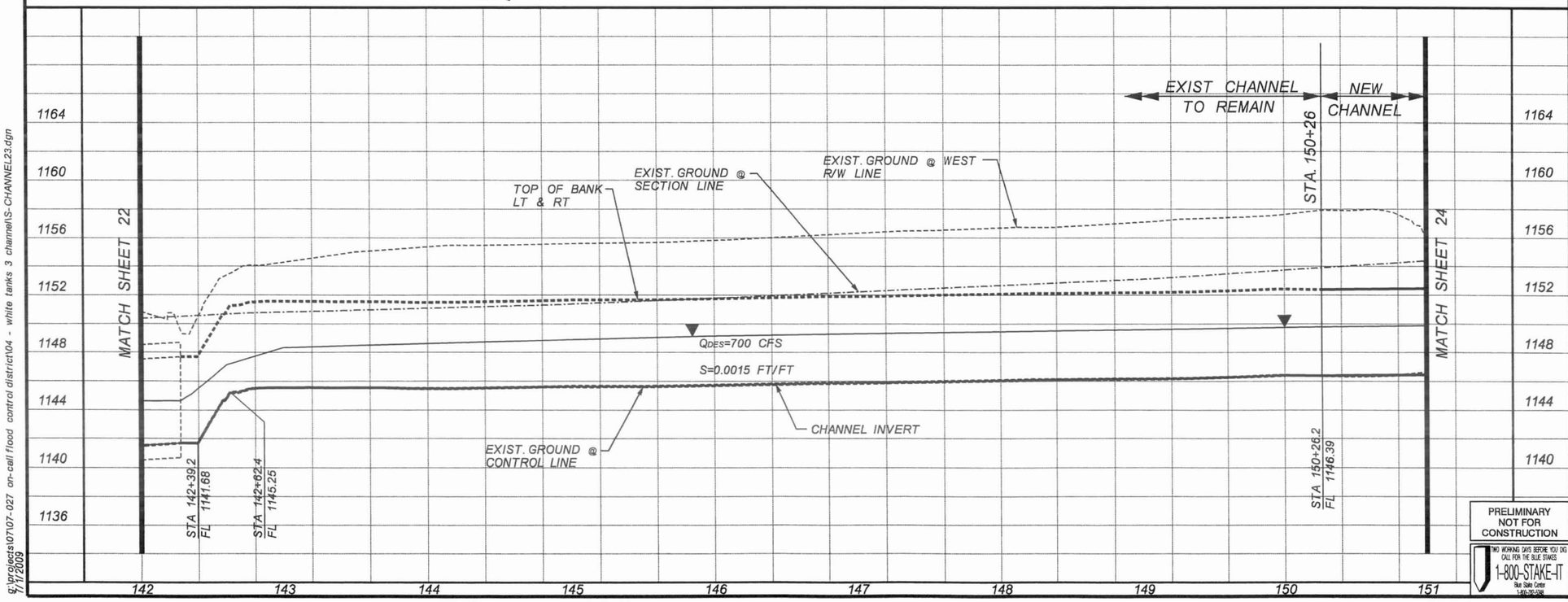
TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES
1-800-STAKE-IT
Blue Stake Center 1-602-263-1100

g:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL22.dgn
7/1/2009

SUBMITTAL 7/1/2009

30% SUBMITTAL





REMOVE

4	REMOVE GROUTED RIPRAP	438	SY
5	REMOVE EXIST. FENCE, BLOCK WALL AND/OR RETAINING WALL	868	LF

CONSTRUCT

1	CONSTRUCT EARTHEN CHANNEL, CUT	259	CY
	CONSTRUCT EARTHEN CHANNEL, FILL	73	CY
2	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	1,363	SY
6	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H- DRAWING NO. D6	839	LF
12	INSTALL BOLLARDS, PER MAG STD. DET. 140, TYPE 2	3	EA

EROSION CONTROL

1	PLACE GRAVEL MULCH	0.14	AC
2	HYDROSEED	0.20	AC

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 19690 PAUL W.R. HOSKIN ARIZONA, U.S.A.
EXPIRES 3/31/12

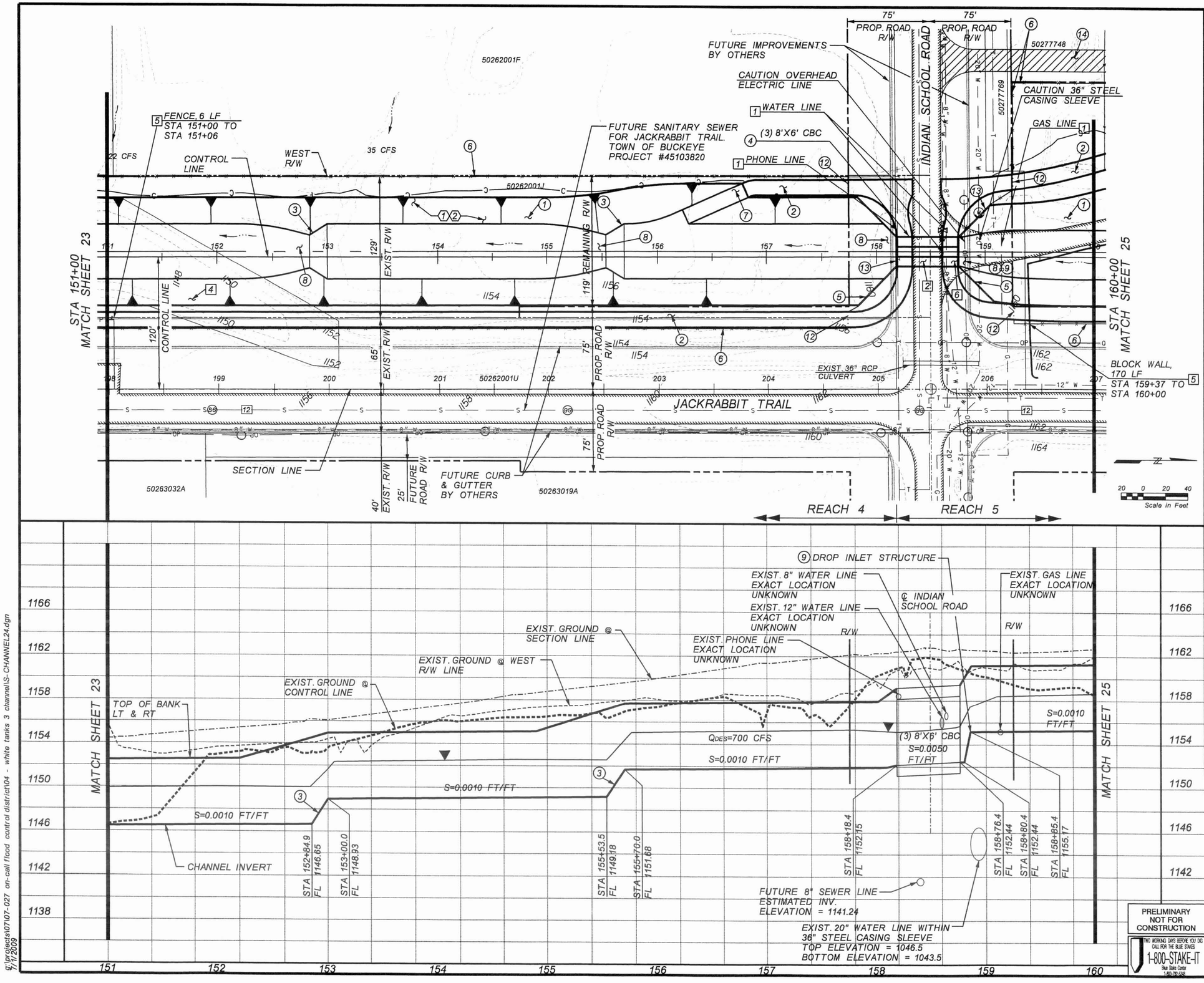
PLAN AND PROFILE SHEET

DRAWING NO. C16 | SHEET 23 OF 55

PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT Blue Stake Center 1-602-263-1100

g:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL23.dgn
7/1/2009



REMOVE

1	UTILITY LINE RELOCATION (TYPE PER SHEET)	4 EA
2	REMOVE AND REPLACE EXIST. ASPHALT PAVEMENT	86 SY
4	REMOVE GROUTED RIPRAP	1,654 SY
5	REMOVE EXIST. FENCE, BLOCK WALL AND/OR RETAINING WALL	176 LF
6	REMOVE EXIST. ACCESS ROAD	481 SY

CONSTRUCT

1	CONSTRUCT EARTHEN CHANNEL, CUT	13,406 CY
	CONSTRUCT EARTHEN CHANNEL, FILL	4,902 CY
2	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	1,983 SY
3	CONSTRUCT CONCRETE GRADE CONTROL STRUCTURE, PER DET. A-DRAWING NO. D1	154 CY
4	CONSTRUCT CBC, PER ADOT STD. DET. B-02.20 & B-02.30 (SIZE PER SHEET AND DRAWING NO. D11)	58 LF
5	CONSTRUCT CONCRETE HEADWALL, PER ADOT STD. DET. B-04.20, B-04.30	2 EA
6	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H- DRAWING NO. D6	1,291 LF
7	CONSTRUCT MAINTENANCE RAMP, PER DET. J- DRAWING NO. D7	1 EA
8	INSTALL PLAIN RIP RAP	664 CY
9	CONSTRUCT DROP INLET STRUCTURE, PER DET. M- DRAWING NO. D8	16 CY
12	INSTALL BOLLARDS, PER MAG STD. DET. 140, TYPE 2	12 EA
13	INSTALL SAFETY RAIL , PER DET. G-DRAWING NO. D5	247 LF
14	INSTALL TEMPORARY ACCESS ROAD 20' WIDE	356 SY

EROSION CONTROL

1	PLACE GRAVEL MULCH	1.73 AC
2	HYDROSEED	2.31 AC

NO.	REVISION	BY	DATE
3			
2			
1			

PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT Blue Stake Center 1-602-263-1100

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER — CERTIFICATE NO. 15690 PAUL W.R. HOSKIN — ARIZONA, U.S.A. — EXPIRES 3/31/12

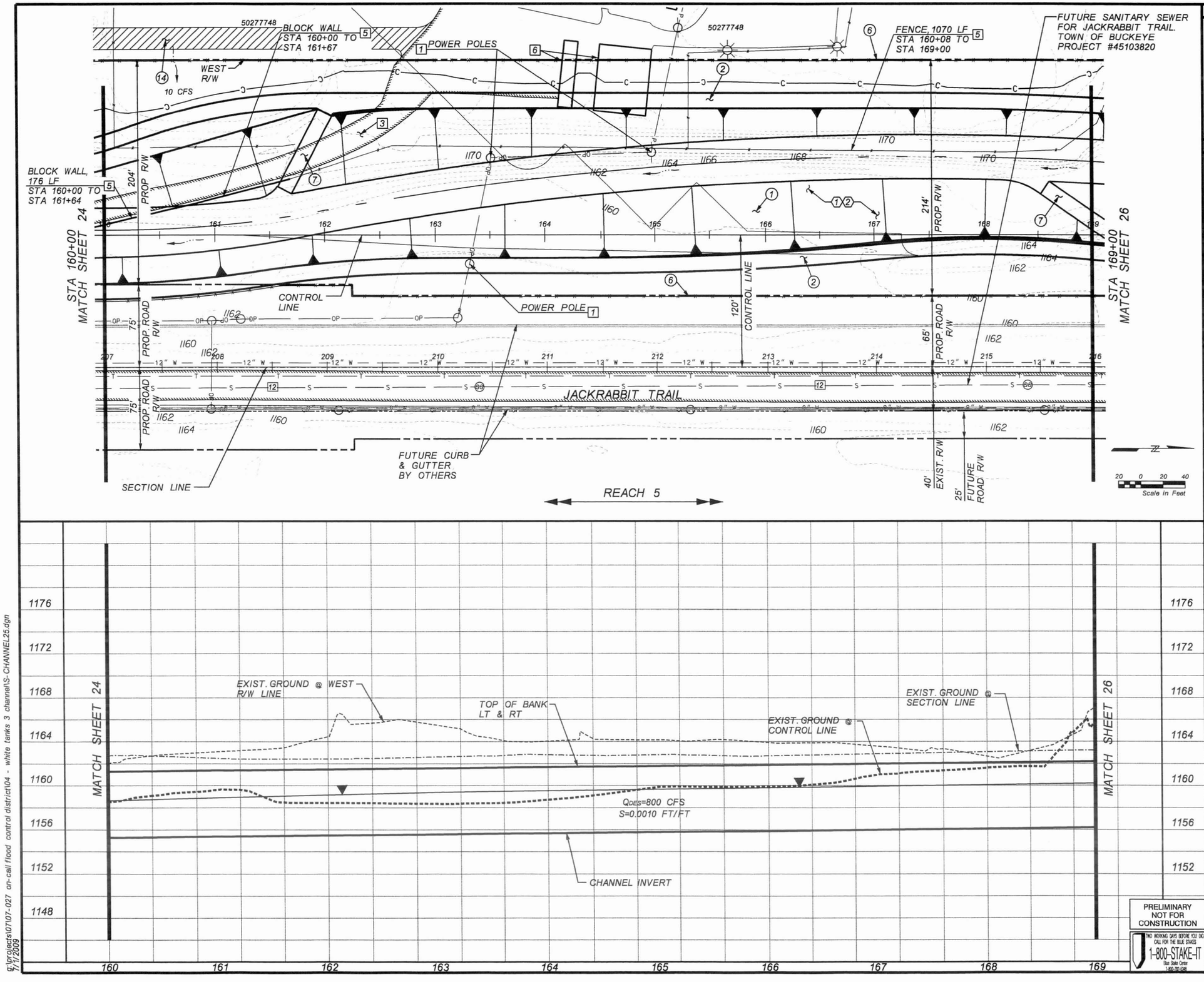
PLAN AND PROFILE SHEET

DRAWING NO. C17 | SHEET 24 OF 55

SUBMITTAL 7/1/2009

30% SUBMITTAL

G:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL24.dgn 7/1/2009



PRELIMINARY
NOT FOR
CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG
CALL FOR THE BLUE STAKES
1-800-STAKE-IT
Blue Stake Center
1-602-263-1096

g:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL25.dgn
7/1/2009

REMOVE

1	UTILITY LINE RELOCATION (TYPE PER SHEET)	3 EA
3	REMOVE EXIST. ACCESS ROAD	1,258 SY
5	REMOVE EXIST. FENCE, BLOCK WALL AND/OR RETAINING WALL	1,246 LF
6	REMOVE EXIST. BUILDINGS	2 EA

CONSTRUCT

1	CONSTRUCT EARTHEN CHANNEL, CUT	28,446 CY
	CONSTRUCT EARTHEN CHANNEL, FILL	8,072 CY
2	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	3,004 SY
6	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H- DRAWING NO. D6	1,786 LF
7	CONSTRUCT MAINTENANCE RAMP, PER DET. J- DRAWING NO. D7	1 EA
14	INSTALL TEMPORARY ACCESS ROAD 20' WIDE	640 SY

EROSION CONTROL

1	PLACE GRAVEL MULCH	3.02 AC
2	HYDROSEED	3.84 AC

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

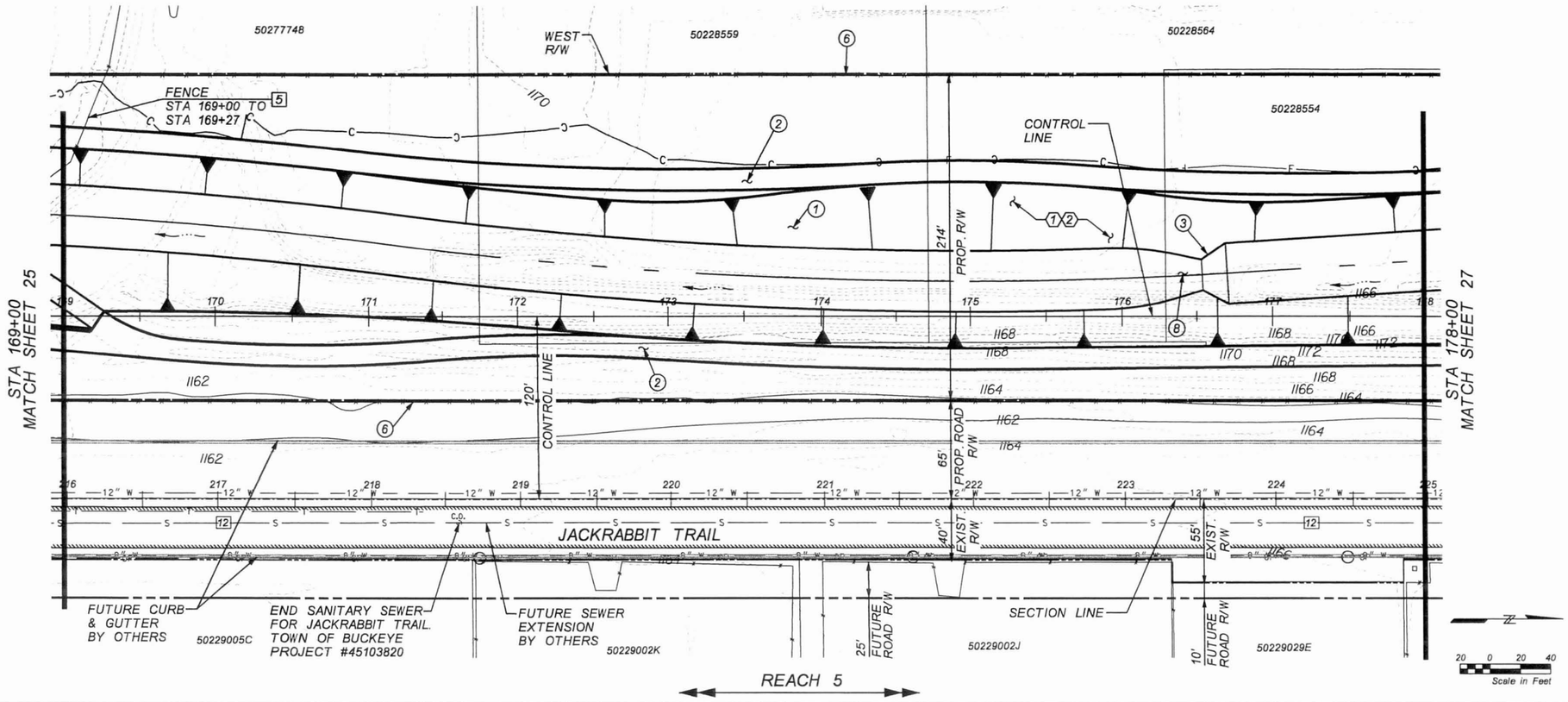
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO.
15690
PAUL W.R.
HOSKIN
ARIZONA, U.S.A.
EXPIRES 3/31/12

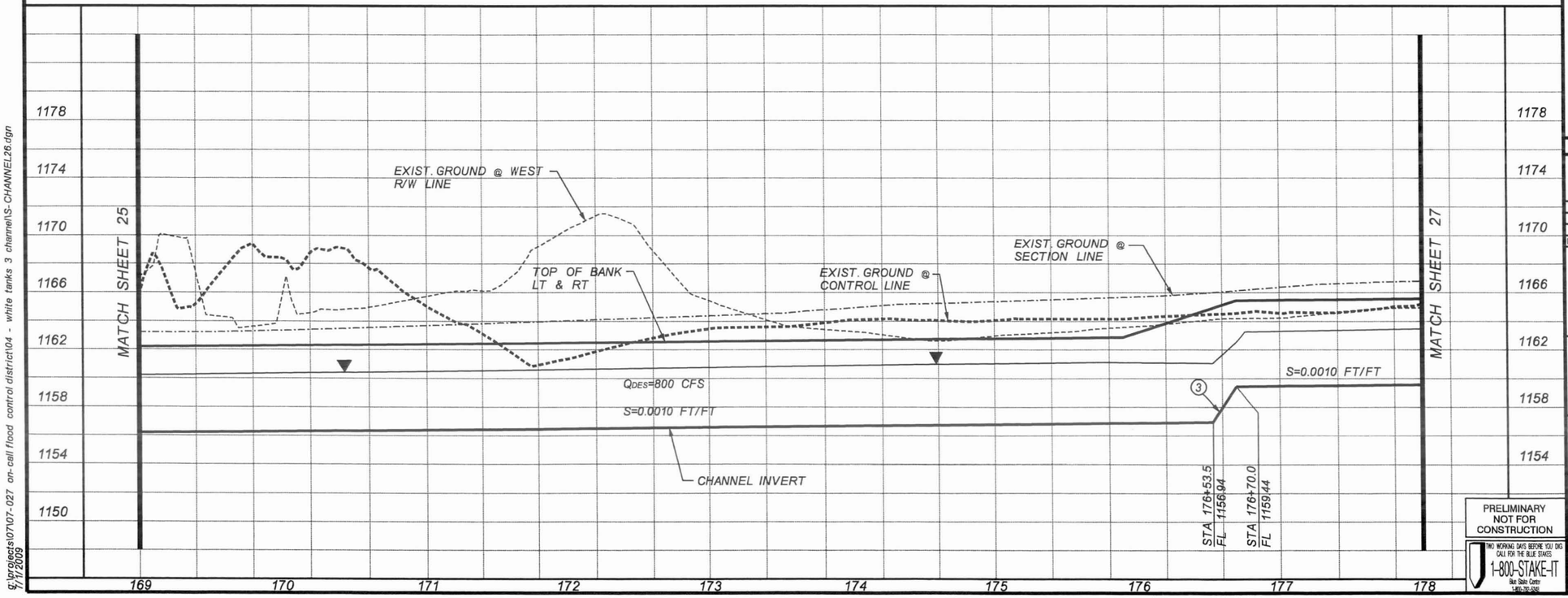
	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

PLAN AND PROFILE SHEET

DRAWING NO. C18 | SHEET 25 OF 55

SUBMITTAL 7/1/2009 30% SUBMITTAL





REMOVE

5	REMOVE EXIST. FENCE, BLOCK WALL AND/OR RETAINING WALL	67 LF

CONSTRUCT

1	CONSTRUCT EARTHEN CHANNEL, CUT	25,626 CY
	CONSTRUCT EARTHEN CHANNEL, FILL	2,503 CY
2	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	2,846 SY
3	CONSTRUCT CONCRETE GRADE CONTROL STRUCTURE, PER DET. A-DRAWING NO. D1	84 CY
6	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H-DRAWING NO. D6	1,786 LF
8	INSTALL PLAIN RIP RAP	297 CY

EROSION CONTROL

1	PLACE GRAVEL MULCH	3.02 AC
2	HYDROSEED	3.84 AC

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

PLAN AND PROFILE SHEET

REGISTERED PROFESSIONAL ENGINEER — CERTIFICATE NO. 19690 — PAUL W.R. HOSKIN — ARIZONA U.S.A.

EXPIRES 3/31/12

DRAWING NO. C19 | SHEET 26 OF 55

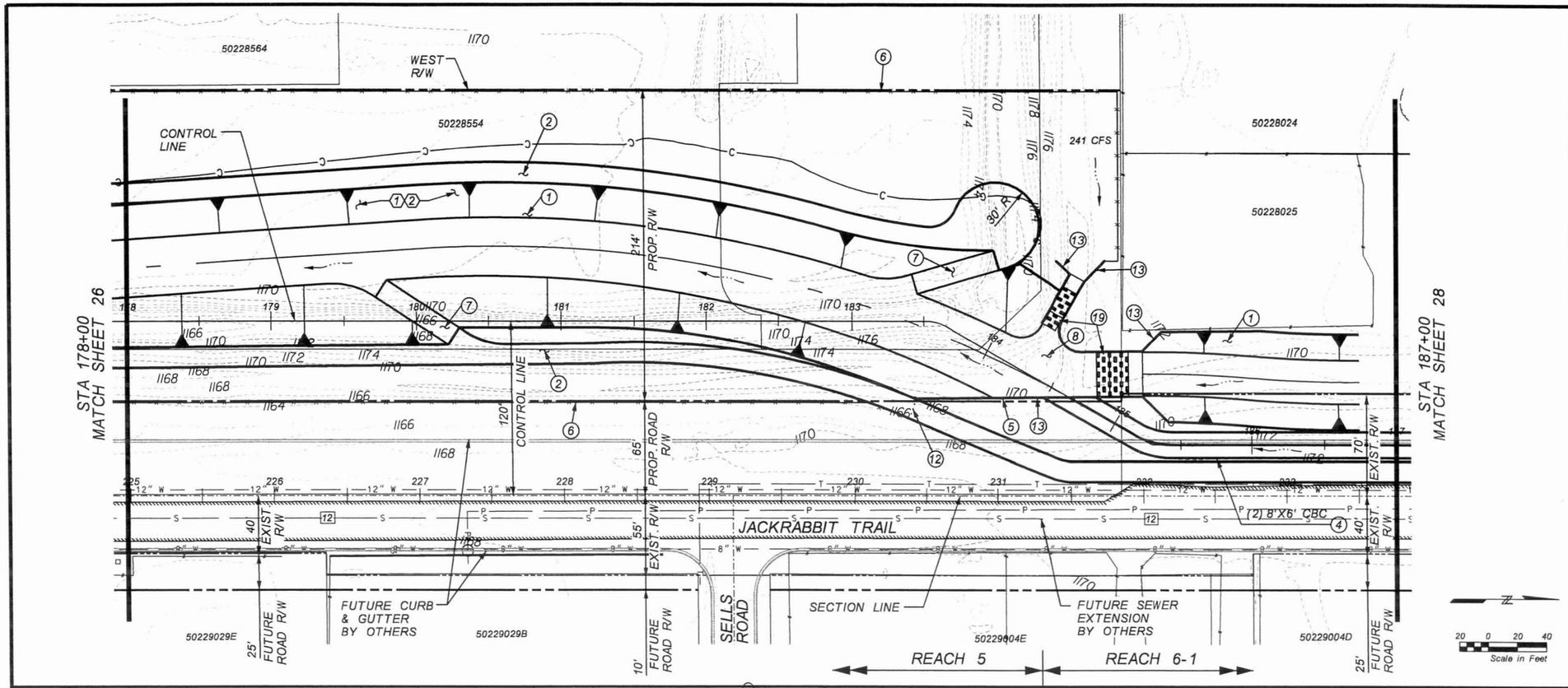
PRELIMINARY NOT FOR CONSTRUCTION

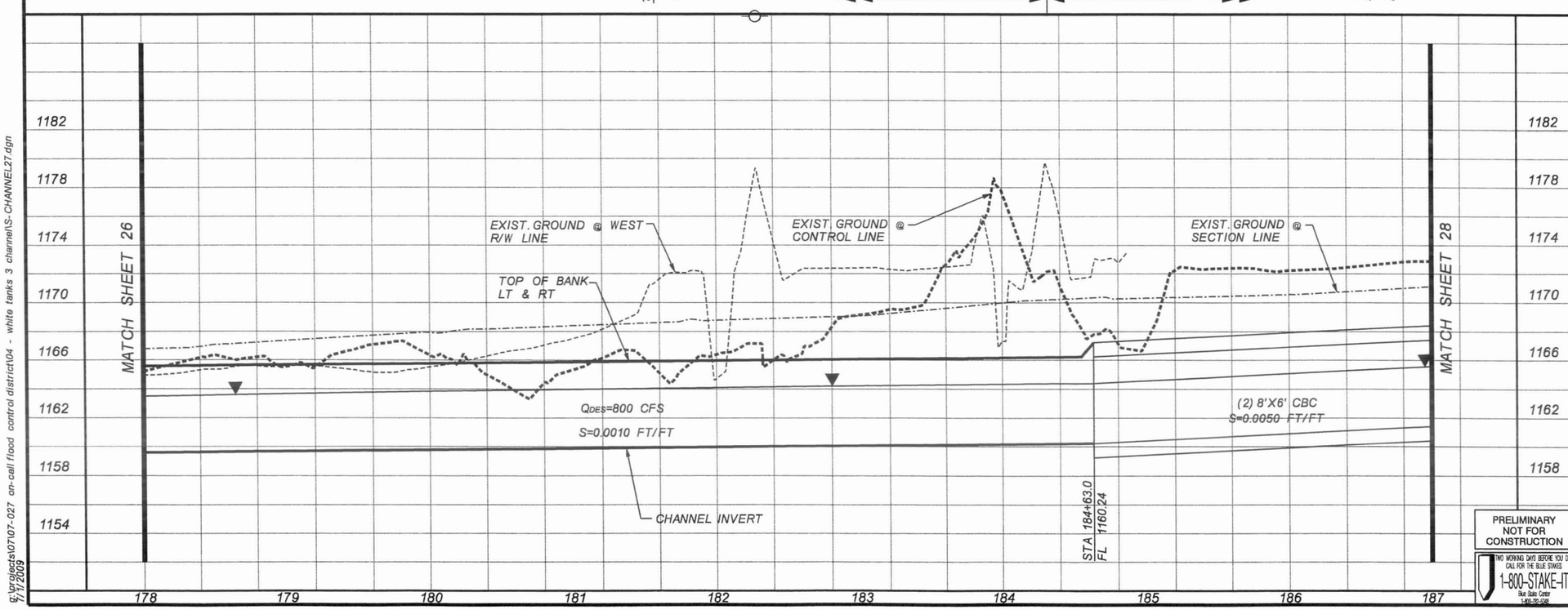
TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT (Not State Corp. 1-602-263-1100)

SUBMITTAL 7/1/2009

30% SUBMITTAL

g:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL26.dgn
7/1/2009





PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT (Blue Stake, Corp) 1-602-263-1100

g:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL27.dgn 7/1/2009

REMOVE

CONSTRUCT

(1)	CONSTRUCT EARTHEN CHANNEL, CUT CONSTRUCT EARTHEN CHANNEL, FILL	28,896 CY 836 CY
(2)	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	2,665 SY
(4)	CONSTRUCT CBC, PER ADOT STD. DET. B-02.20 & B-02.30 (SIZE PER SHEET AND DRAWING NO. D11)	238 LF
(5)	CONSTRUCT CONCRETE HEADWALL, PER ADOT STD. DET. B-04.20, B-04.30	1 EA
(6)	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H- DRAWING NO. D6	1,140 LF
(7)	CONSTRUCT MAINTENANCE RAMP, PER DET. J- DRAWING NO. D7	2 EA
(8)	INSTALL PLAIN RIP RAP	240 CY
(12)	INSTALL BOLLARDS, PER MAG STD. DET. 140, TYPE 2	3 EA
(13)	INSTALL SAFETY RAIL, PER DET. G- DRAWING NO. D5	380 LF
(19)	CONSTRUCT FLOW JUNCTION STRUCTURE, PER DET. N- DRAWING NO. D9,	137 CY

EROSION CONTROL

(1)	PLACE GRAVEL MULCH	2.43 AC
(2)	HYDROSEED	3.16 AC

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

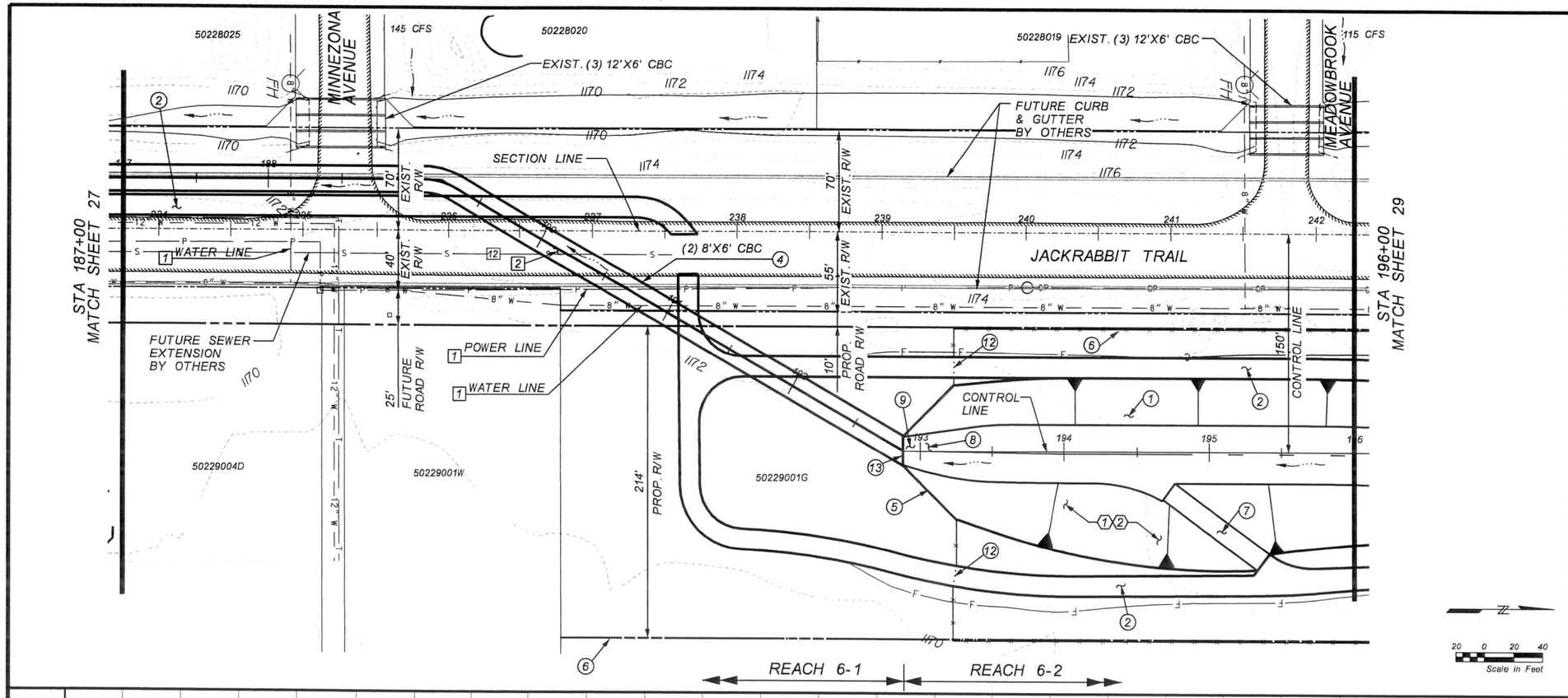
	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

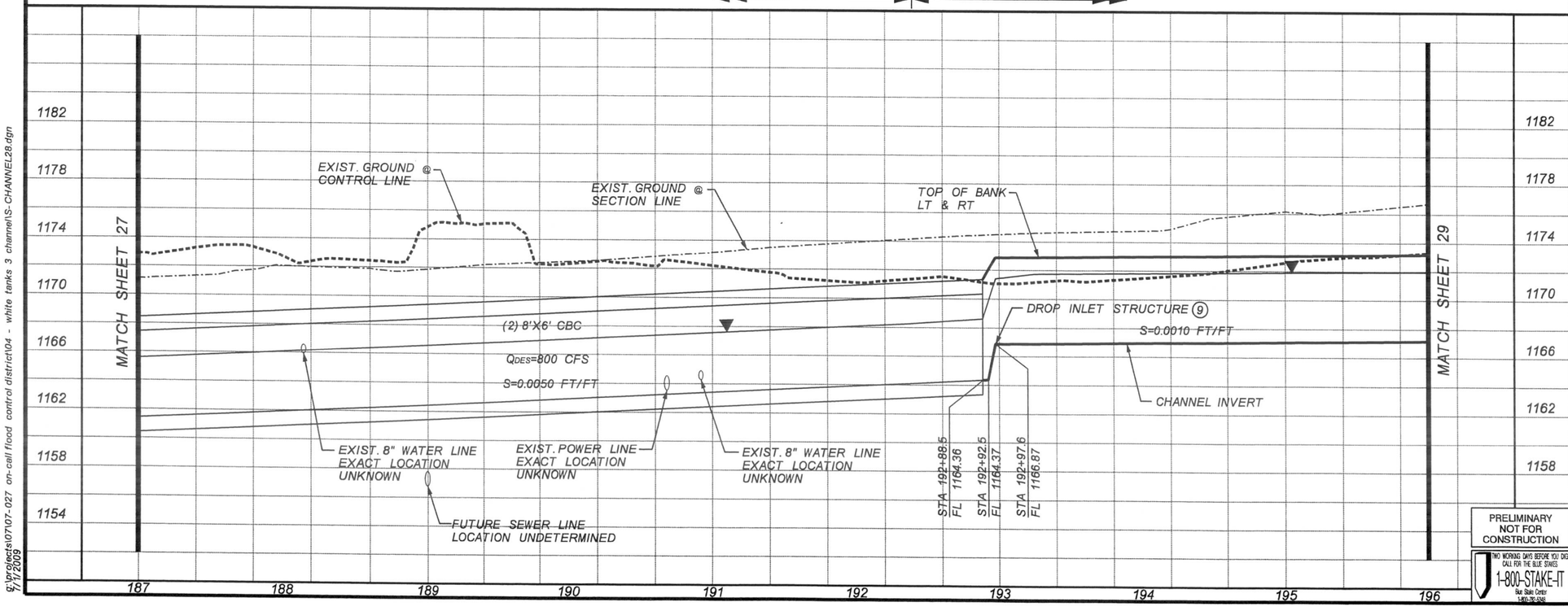
REGISTERED PROFESSIONAL ENGINEER — 19690 — PAUL W.R. HOSKIN — ARIZONA, U.S.A. — EXPIRES 3/31/12

PLAN AND PROFILE SHEET

DRAWING NO. C20 | SHEET 27 OF 55

SUBMITTAL 7/1/2009 30% SUBMITTAL





REMOVE

1	UTILITY LINE RELOCATION (TYPE PER SHEET)	3 EA
2	REMOVE AND REPLACE EXIST. ASPHALT PAVEMENT	274 SY

CONSTRUCT

1	CONSTRUCT EARTHEN CHANNEL, CUT CONSTRUCT EARTHEN CHANNEL, FILL	8,329 CY 1,346 CY
2	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	1,784 SY
4	CONSTRUCT CBC, PER ADOT STD. DET. B-02.20 & B-02.30 (SIZE PER SHEET AND DRAWING NO. D11)	588 LF
5	CONSTRUCT CONCRETE HEADWALL, PER ADOT STD. DET. B-04.20, B-04.30	1 EA
6	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H- DRAWING NO. D6	550 LF
7	CONSTRUCT MAINTENANCE RAMP, PER DET. J- DRAWING NO. D7	1 EA
8	INSTALL PLAIN RIP RAP	29 CY
9	CONSTRUCT DROP INLET STRUCTURE, PER DET. M- DRAWING NO. D8	14 CY
12	INSTALL BOLLARDS, PER MAG STD. DET. 140, TYPE 2	6 EA
13	INSTALL SAFETY RAIL, PER DET. G- DRAWING NO. D5	122 LF

EROSION CONTROL

1	PLACE GRAVEL MULCH	1.96 AC
2	HYDROSEED	2.34 AC

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER — 19690 PAUL W.R. HOSKIN — ARIZONA, U.S.A. — EXPIRES 3/31/12

PLAN AND PROFILE SHEET

DRAWING NO. C21 | SHEET 28 OF 55

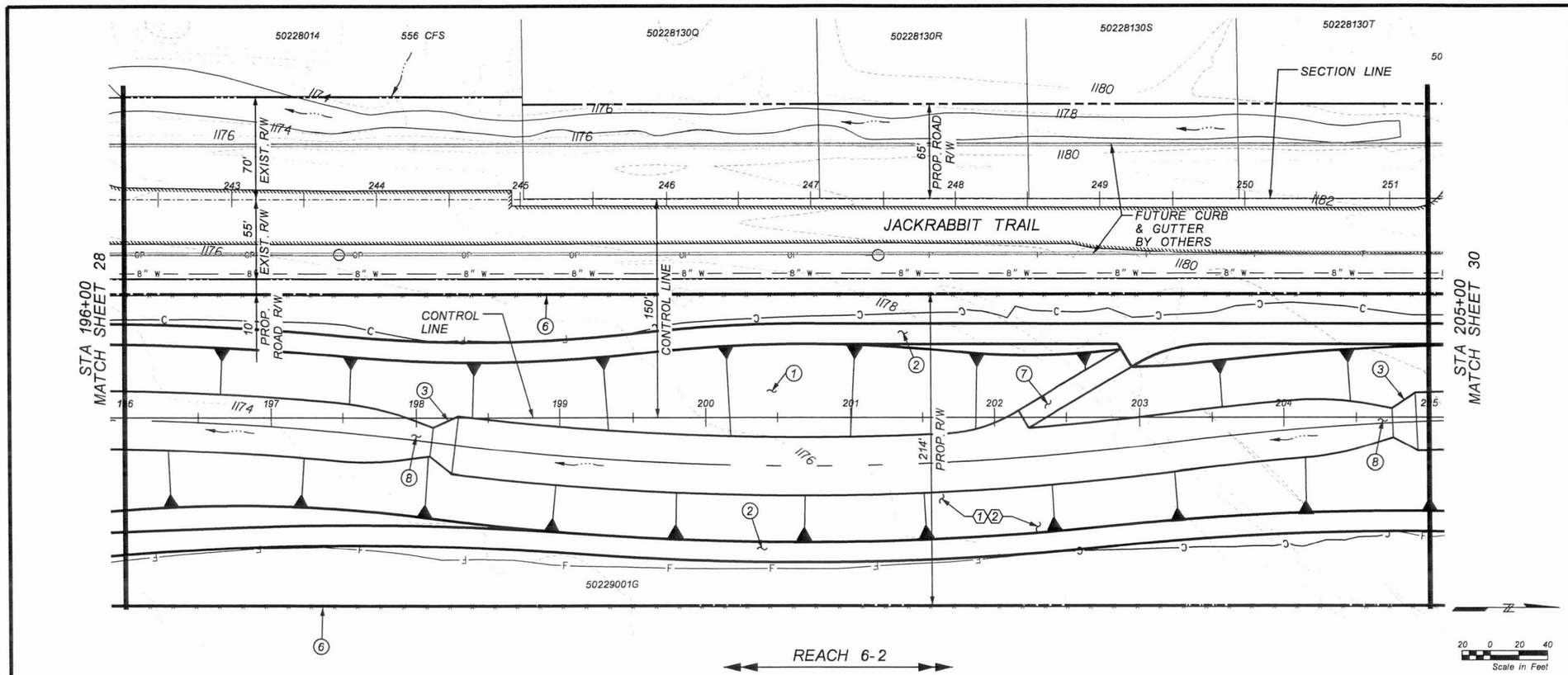
PRELIMINARY NOT FOR CONSTRUCTION

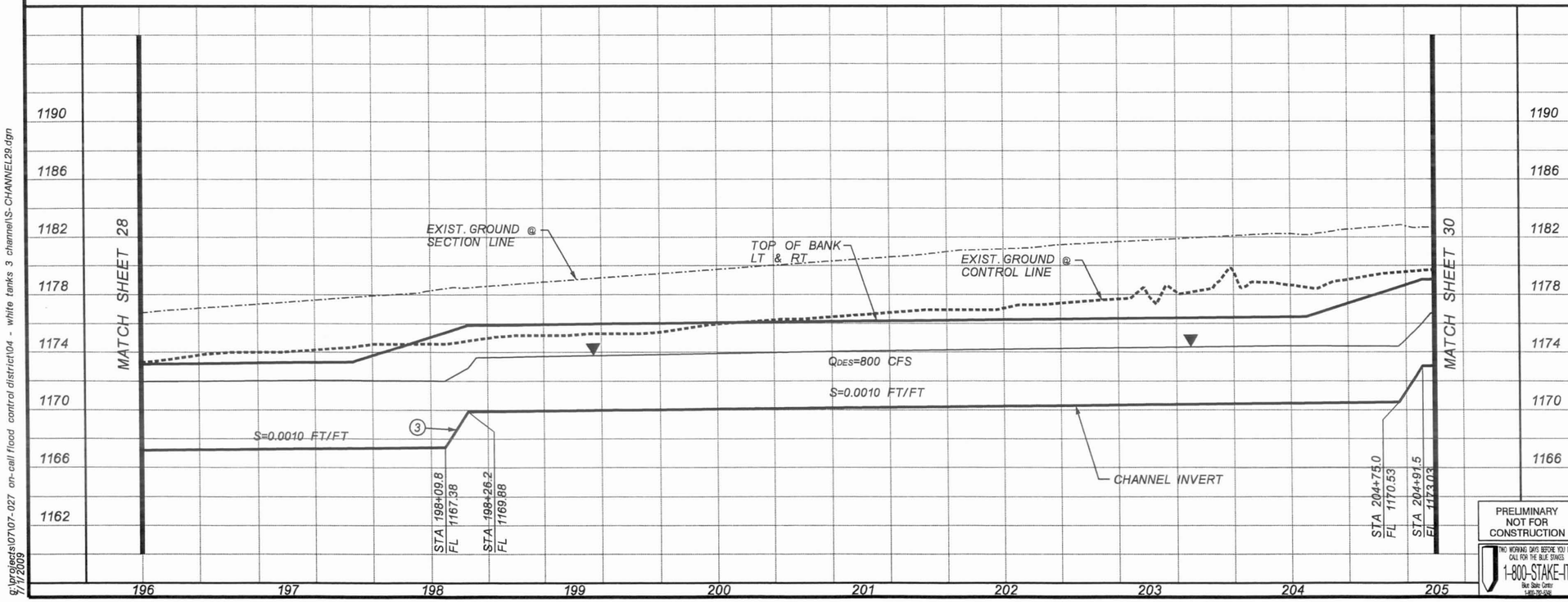
TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT (Arizona Blue Stake Center)

SUBMITTAL 7/1/2009

30% SUBMITTAL

g:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL28.dgn
7/1/2009





PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT (Ariz. Blue Stake Center 602-263-1100)

g:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL29.dgn
7/1/2009

REMOVE

CONSTRUCT

(1)	CONSTRUCT EARTHEN CHANNEL, CUT CONSTRUCT EARTHEN CHANNEL, FILL	19,317 CY 506 CY
(2)	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	2,929 SY
(3)	CONSTRUCT CONCRETE GRADE CONTROL STRUCTURE, PER DET. A-DRAWING NO. D1	168 CY
(6)	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H-DRAWING NO. D6	1,800 LF
(7)	CONSTRUCT MAINTENANCE RAMP, PER DET. J- DRAWING NO. D7	1 EA
(8)	INSTALL PLAIN RIP RAP	582 CY

EROSION CONTROL

(1)	PLACE GRAVEL MULCH	3.22 AC
(2)	HYDROSEED	3.84 AC

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

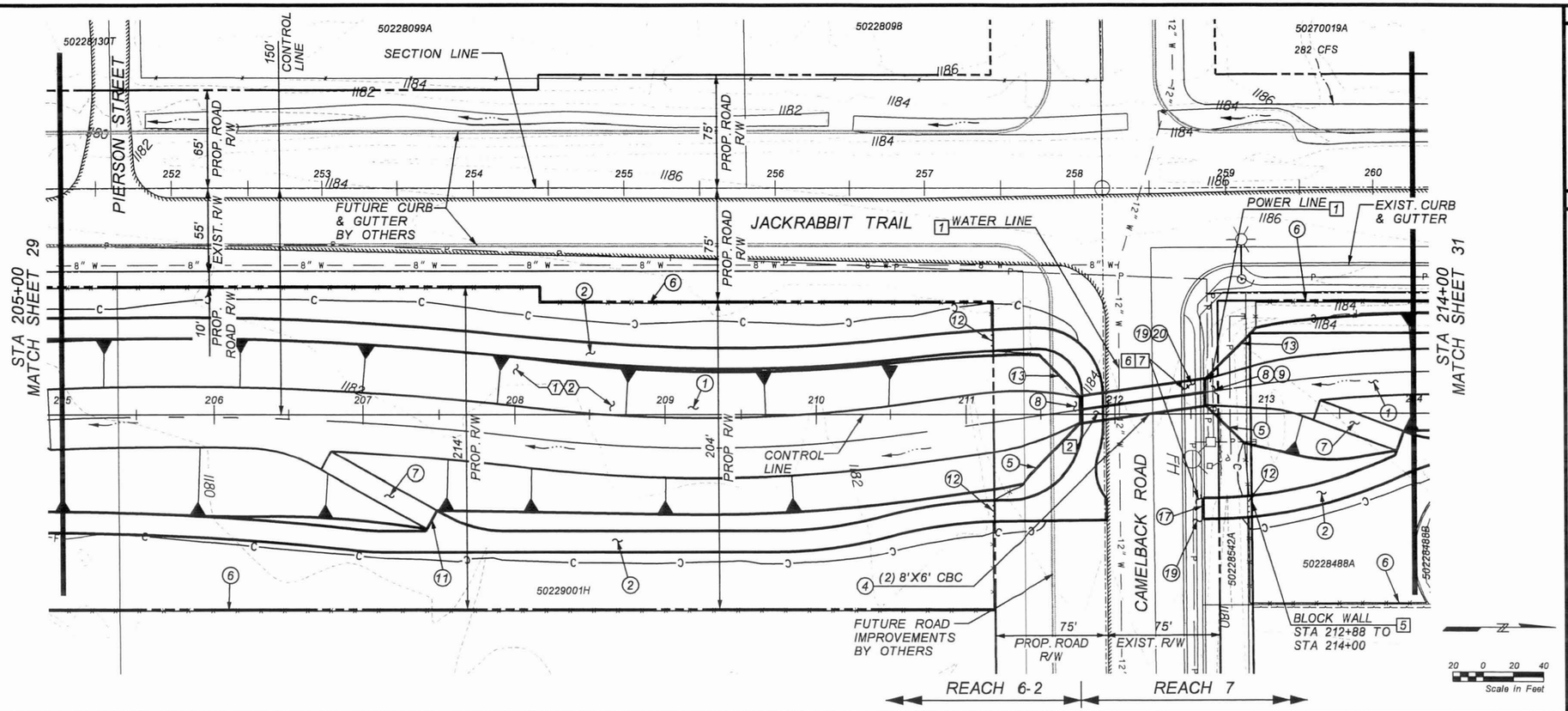
	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

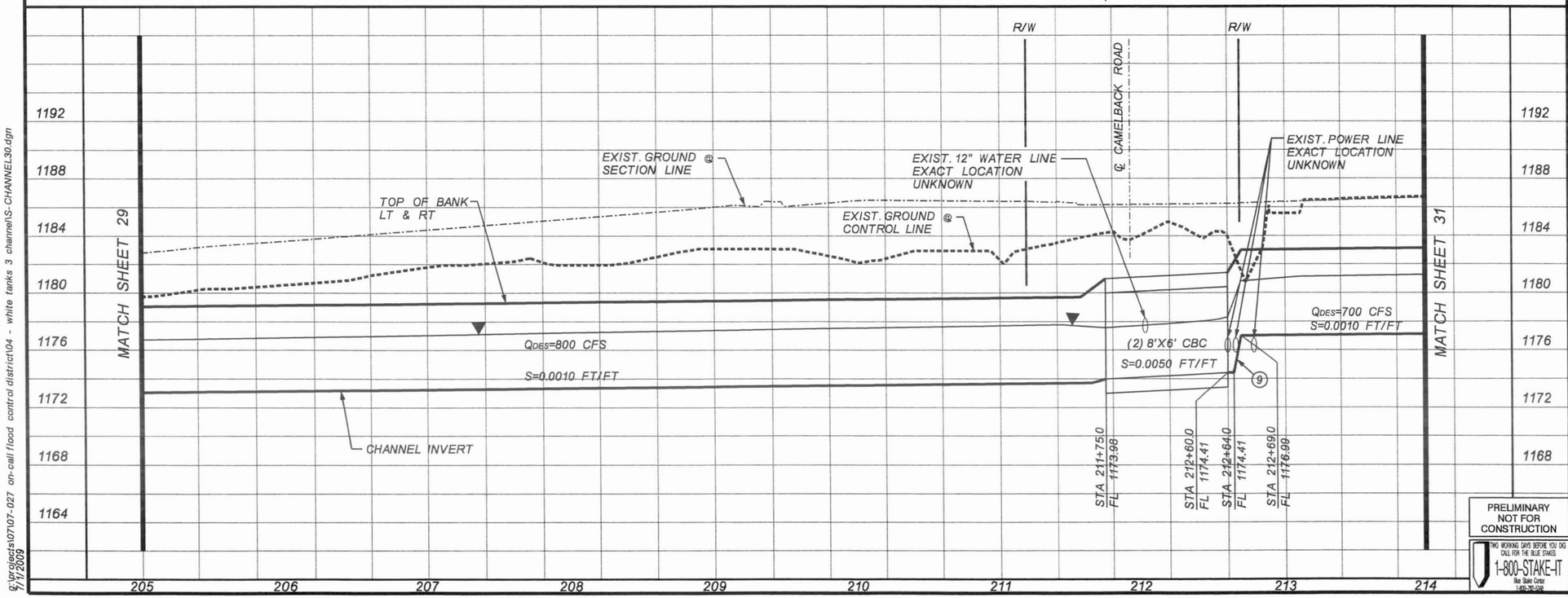
REGISTERED PROFESSIONAL ENGINEER CERTIFICATE NO. 19690 PAUL W.R. HOSKIN DATE SIGNED ARIZONA, U.S.A.
EXPIRES 3/31/12

PLAN AND PROFILE SHEET

DRAWING NO. C22 | SHEET 29 OF 55

SUBMITTAL 7/1/2009 30% SUBMITTAL





PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT Blue Stake Center 1-602-263-1100

REMOVE

1	UTILITY LINE RELOCATION (TYPE PER SHEET)	2 EA
2	REMOVE AND REPLACE EXIST. ASPHALT PAVEMENT	140 SY
5	REMOVE EXIST. FENCE, BLOCK WALL AND/OR RETAINING WALL	291 LF
6	REMOVE EXIST. CURB & GUTTER	60 LF
7	REMOVE CONCRETE SIDEWALK	33 SY

CONSTRUCT

1	CONSTRUCT EARTHEN CHANNEL, CUT CONSTRUCT EARTHEN CHANNEL, FILL	22,449 CY 41 CY
2	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	2,585 SY
4	CONSTRUCT CBC, PER ADOT STD. DET. B-02.20 & B-02.30 (SIZE PER SHEET AND DRAWING NO. D11)	85 LF
5	CONSTRUCT CONCRETE HEADWALL, PER ADOT STD. DET. B-04.20, B-04.30	2 EA
6	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H-DRAWING NO. D6	1,338 LF
7	CONSTRUCT MAINTENANCE RAMP, PER DET. J- DRAWING NO. D7	2 EA
8	INSTALL PLAIN RIP RAP	84 CY
9	CONSTRUCT DROP INLET STRUCTURE, PER DET. M- DRAWING NO. D8	14 CY
12	INSTALL BOLLARDS, PER MAG STD. DET. 140, TYPE 2	9 EA
13	INSTALL SAFETY RAIL , PER DET. G- DRAWING NO. D5	230 LF
17	INSTALL DRIVEWAY PER MAG STD. DET. 250-1	144 SF
19	CONSTRUCT CONCRETE SIDEWALK PER MAG STD. DET. 230	300 SF
20	CONSTRUCT CONCRETE CURB & GUTTER PER MAG STD. DET. 220, TYPE 'A'	36 LF

EROSION CONTROL

1	PLACE GRAVEL MULCH	2.82 AC
2	HYDROSEED	3.40 AC

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

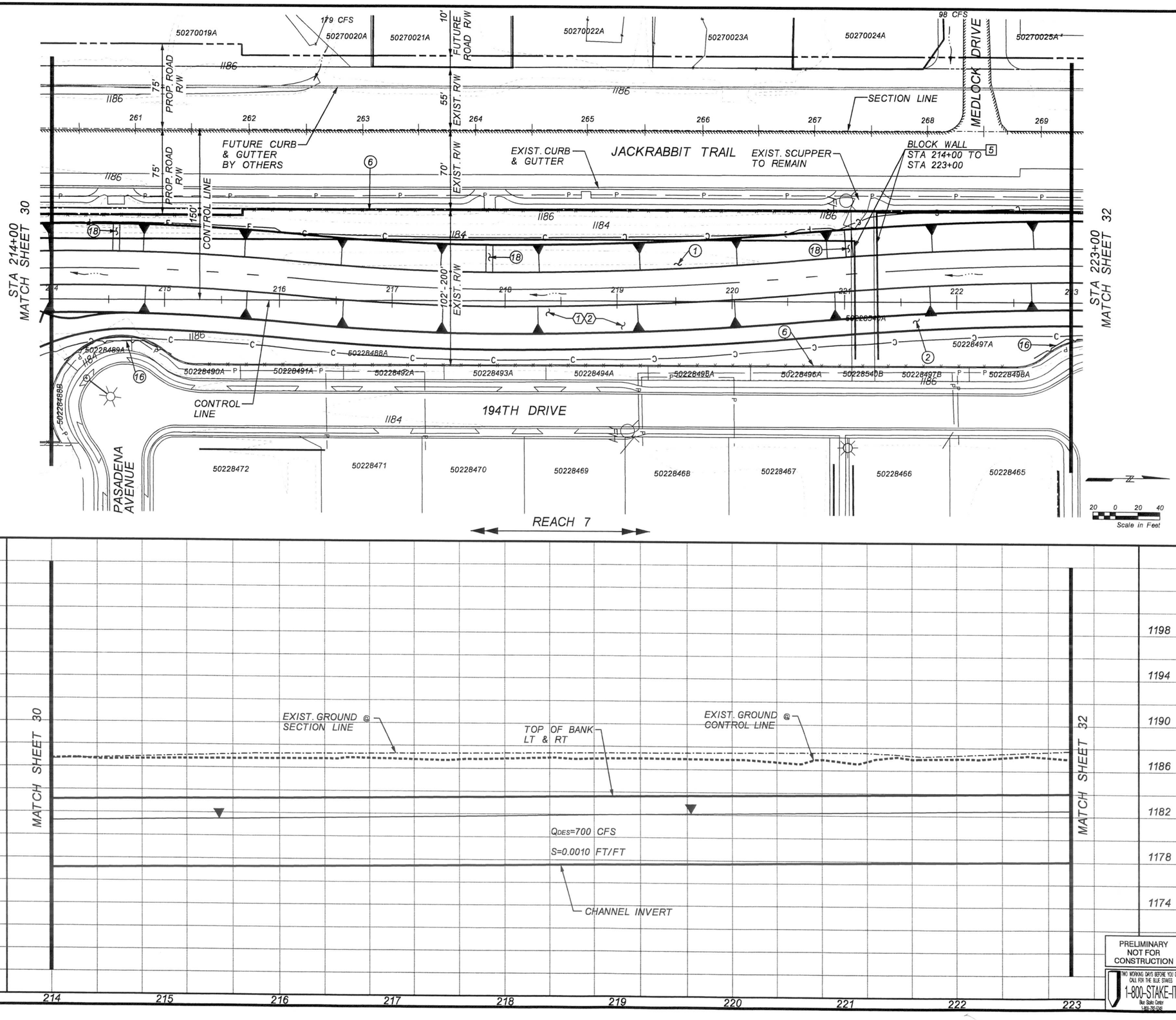
REGISTERED PROFESSIONAL ENGINEER — CERTIFICATE NO. 19690 — PAUL W.R. HOSKIN — ARIZONA U.S.A.
EXPIRES 3/31/12

PLAN AND PROFILE SHEET

DRAWING NO. C23 | SHEET 30 OF 55

SUBMITTAL 7/1/2009 30% SUBMITTAL

g:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL30.dgn
7/1/2009



NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER CERTIFICATE NO. 19690 PAUL W.R. HOSKIN ARIZONA U.S.A.
EXPIRES 3/31/12

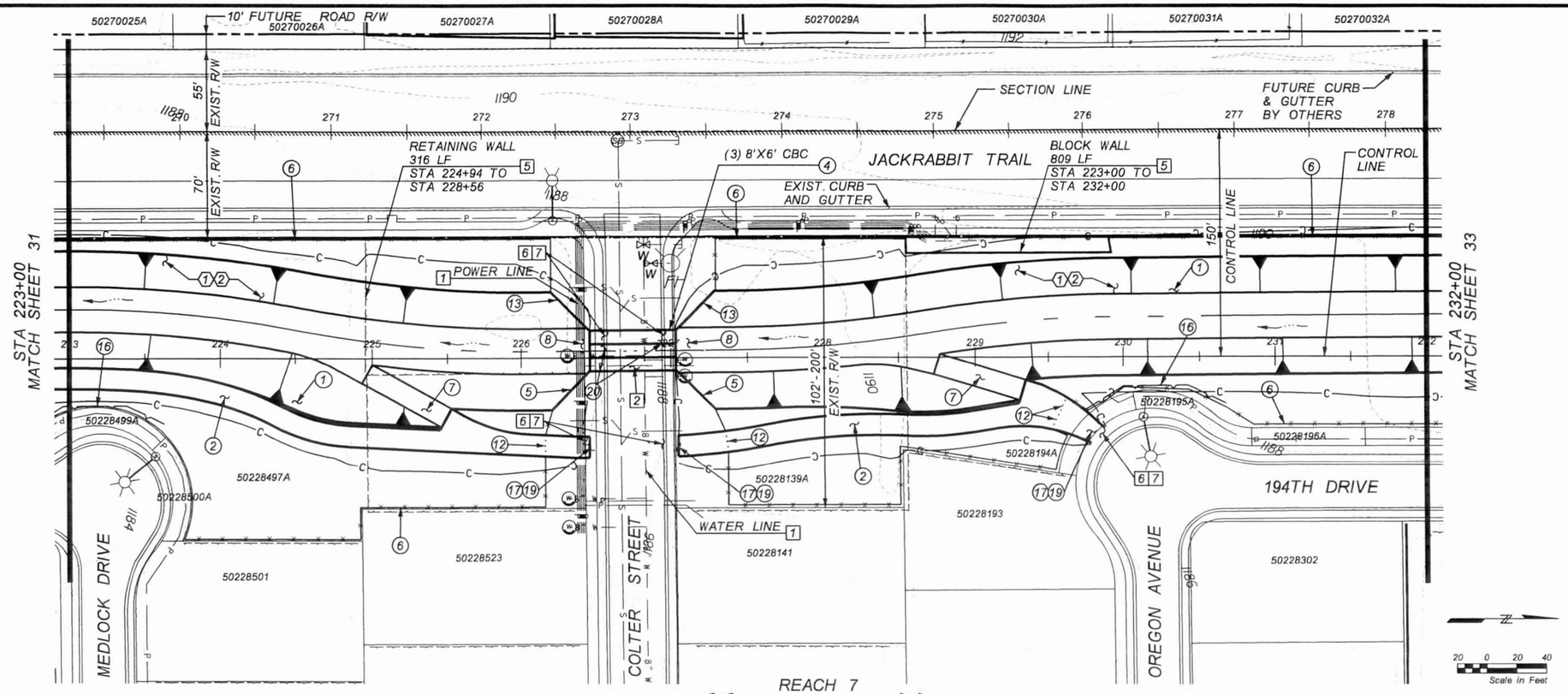
PLAN AND PROFILE SHEET

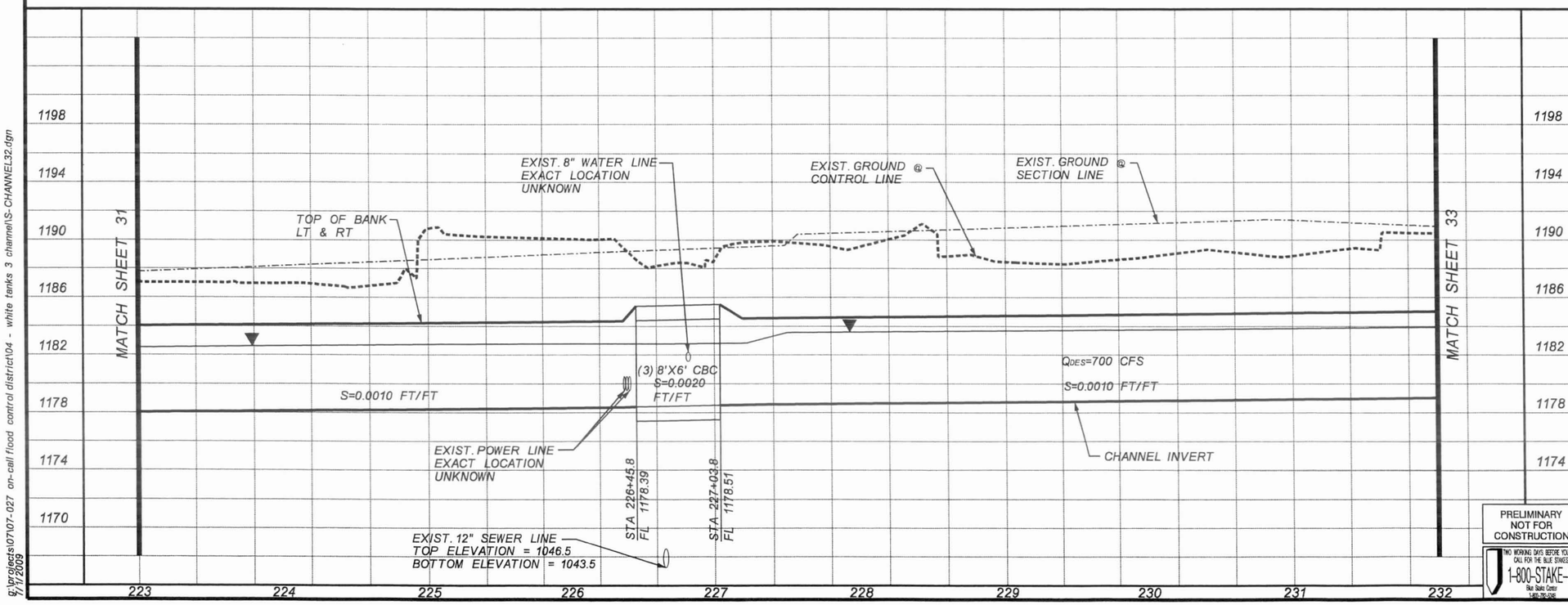
DRAWING NO. C24 | SHEET 31 OF 55

SUBMITTAL 7/1/2009

30% SUBMITTAL

G:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL31.dgn
7/1/2009





REMOVE		
1	UTILITY LINE RELOCATION (TYPE PER SHEET)	2 EA
2	REMOVE AND REPLACE EXIST. ASPHALT PAVEMENT	182 SY
5	REMOVE EXIST. FENCE, BLOCK WALL AND/OR RETAINING WALL	1,125 LF
6	REMOVE EXIST. CURB & GUTTER	152 LF
7	REMOVE CONCRETE SIDEWALK	68 SY

CONSTRUCT		
1	CONSTRUCT EARTHEN CHANNEL, CUT CONSTRUCT EARTHEN CHANNEL, FILL	26,148 CY 86 CY
2	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	1,164 SY
4	CONSTRUCT CBC, PER ADOT STD. DET. B-02.20 & B-02.30 (SIZE PER SHEET AND DRAWING NO. D11), AND CHAMFER EXPOSED CORNERS AT INLET PER ADOT STD. DET. B-01.10	58 LF
5	CONSTRUCT CONCRETE HEADWALL, PER ADOT STD. DET. B-04.20, B-04.30	2 EA
6	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H- DRAWING NO. D6	1,614 LF
7	CONSTRUCT MAINTENANCE RAMP, PER DET. J- DRAWING NO. D7	2 EA
8	INSTALL PLAIN RIP RAP	100 CY
12	INSTALL BOLLARDS, PER MAG STD. DET. 140, TYPE 2	12 EA
13	INSTALL SAFETY RAIL , PER DET. G- DRAWING NO. D5	200 LF
16	CONSTRUCT RETAINING WALL (2'-3')	170 LF
17	INSTALL DRIVEWAY PER MAG STD. DET. 250-2	432 SF
19	CONSTRUCT CONCRETE SIDEWALK PER MAG STD. DET. 230	608 SF
20	CONSTRUCT CONCRETE CURB & GUTTER PER MAG STD. DET. 220, TYPE 'C'	80 LF

EROSION CONTROL		
1	PLACE GRAVEL MULCH	2.07 AC
2	HYDROSEED	2.65 AC

NO.	REVISION	BY	DATE
3			
2			
1			

PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT (Net State Center 1-800-782-5348)

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

REGISTERED PROFESSIONAL ENGINEER — CERTIFICATE NO. 19690 — PAUL W.R. HOSKIN — ARIZONA, U.S.A. — EXPIRES 3/31/12

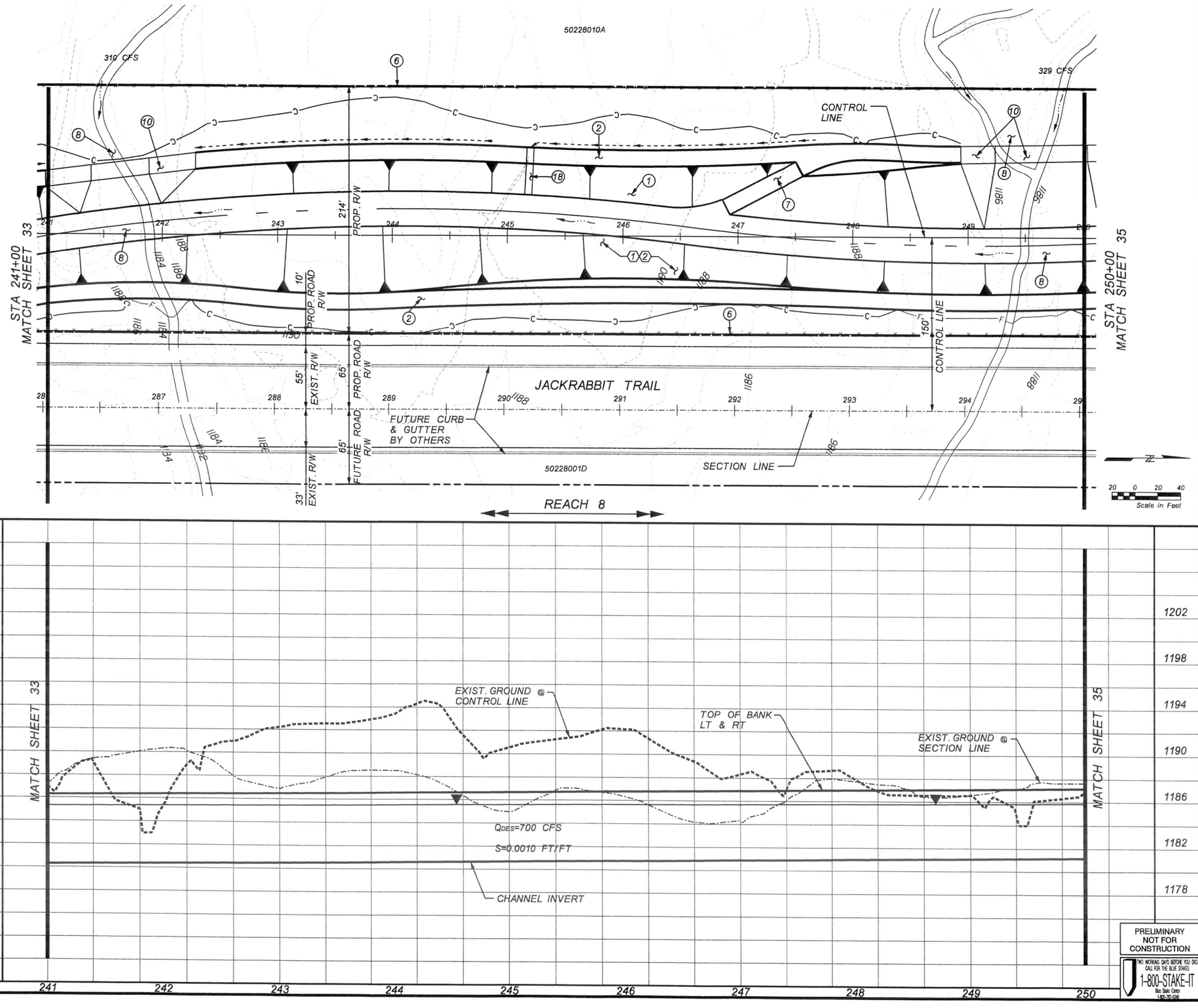
	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

PLAN AND PROFILE SHEET

DRAWING NO. C25 | SHEET 32 OF 55

SUBMITTAL 7/1/2009 — 30% SUBMITTAL

g:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL32.dgn
7/1/2009



REMOVE

CONSTRUCT

(1)	CONSTRUCT EARTHEN CHANNEL, CUT CONSTRUCT EARTHEN CHANNEL, FILL	28,371 CY 566 CY
(2)	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	2,909 SY
(6)	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H-DRAWING NO. D6	1,800 LF
(7)	CONSTRUCT MAINTENANCE RAMP, PER DET. J- DRAWING NO. D7	1 EA
(8)	INSTALL PLAIN RIP RAP	2,116 CY
(10)	CONSTRUCT SIDE FLOW SPILLWAY, PER DET. B, C & D- DRAWINGS NO. D2 & D3	391 CY
(18)	GROUTED RIP-RAP DOWNDRAIN	1 EA

EROSION CONTROL

(1)	PLACE GRAVEL MULCH	3.22 AC
(2)	HYDROSEED	3.84 AC

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER — CERTIFICATE NO. 19690 — PAUL W.R. HOSKIN — ARIZONA, U.S.A.
EXPIRES 3/31/12

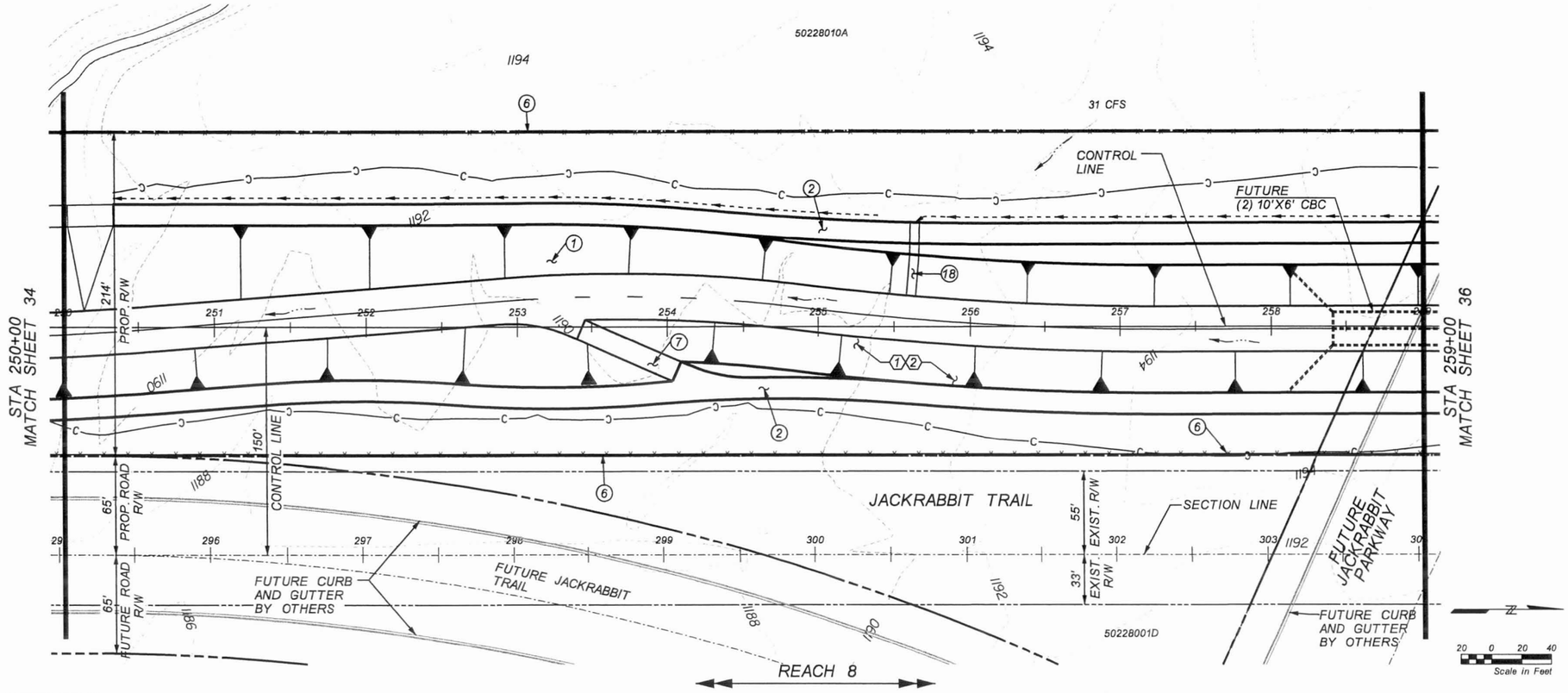
PLAN AND PROFILE SHEET

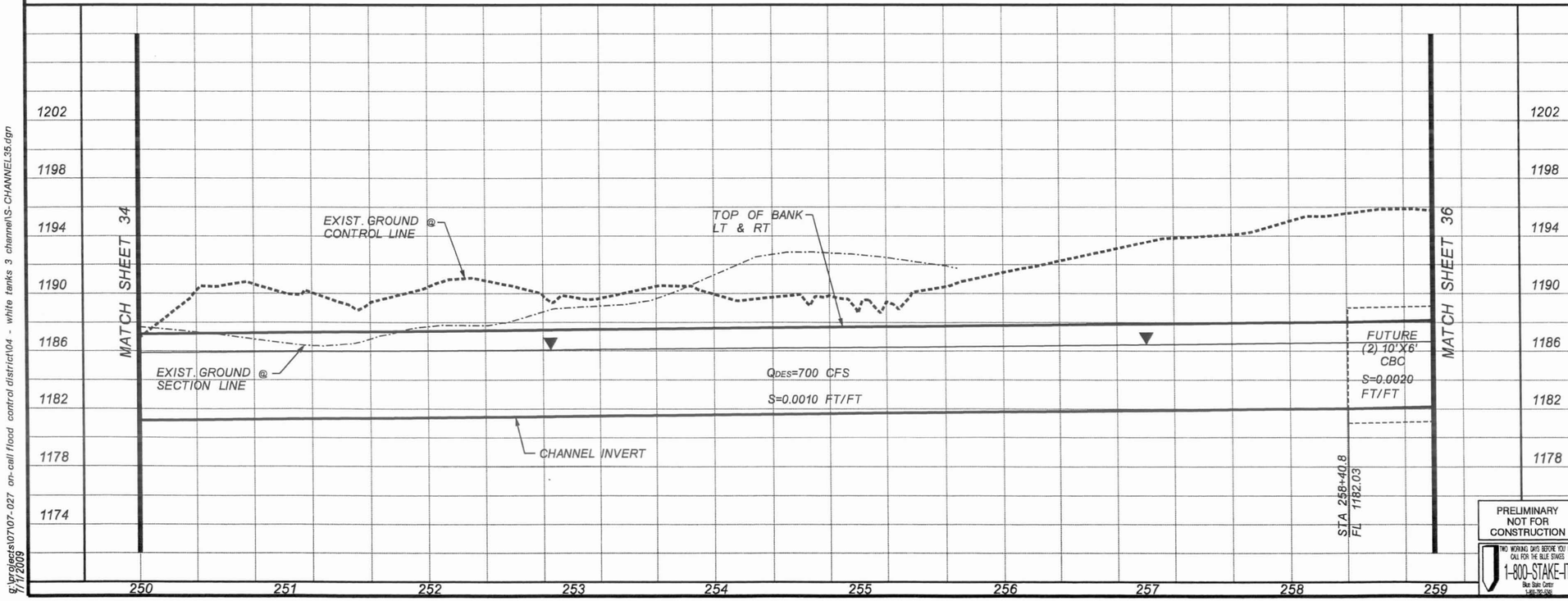
DRAWING NO. C27 | SHEET 34 OF 55

PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT (Box Butte Cnty 1-800-762-8348)

G:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL34.dgn
7/1/2009





g:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL35.dgn
7/1/2009

PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT Blue Stake Center 1-602-263-1100

REMOVE

CONSTRUCT

(1)	CONSTRUCT EARTHEN CHANNEL, CUT	32,035 CY
	CONSTRUCT EARTHEN CHANNEL, FILL	24 CY
(2)	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	2,909 SY
(6)	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H- DRAWING NO. D6	1,800 LF
(7)	CONSTRUCT MAINTENANCE RAMP, PER DET. J- DRAWING NO. D7	1 EA
(18)	GROUTED RIP-RAP DOWNDRAIN	1 EA

EROSION CONTROL

(1)	PLACE GRAVEL MULCH	3.22 AC
(2)	HYDROSEED	3.84 AC

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

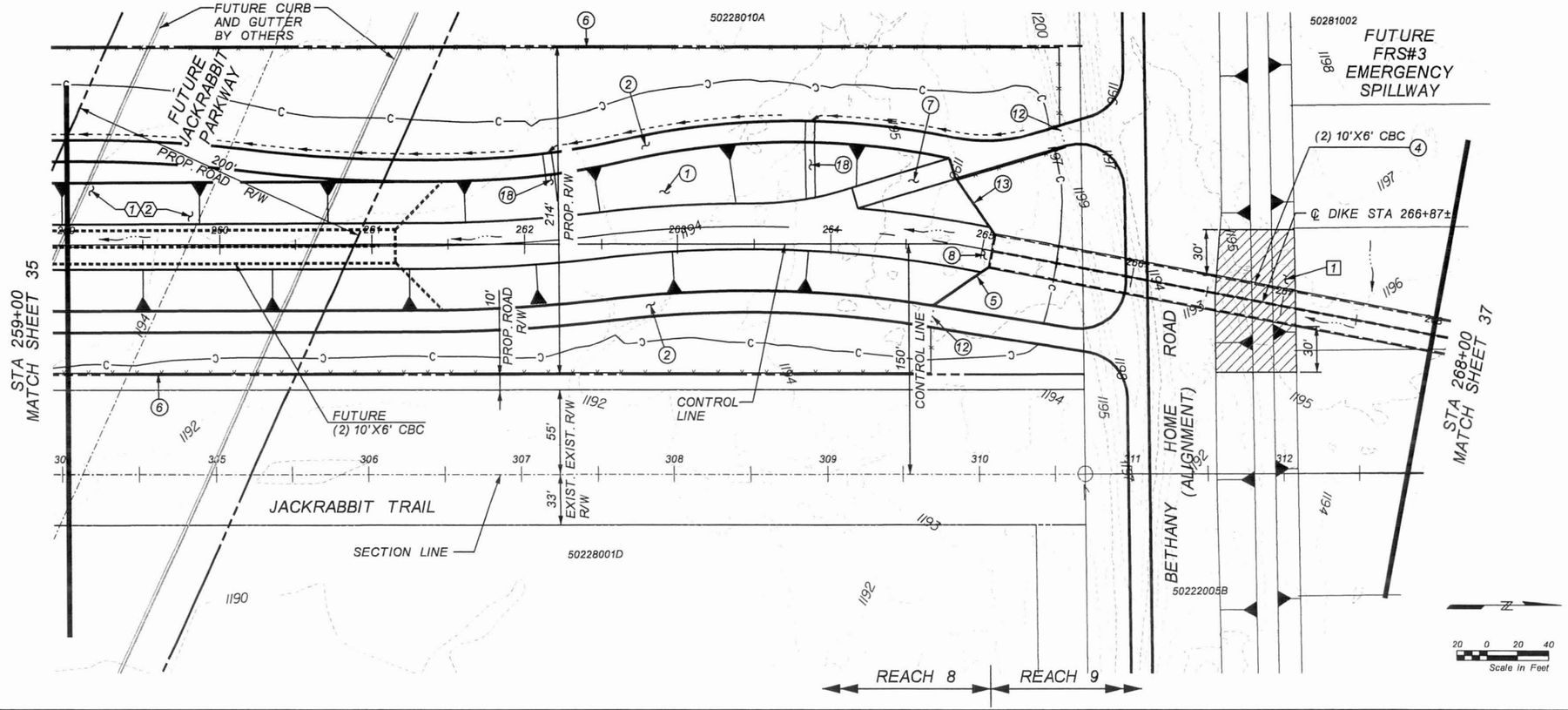
	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

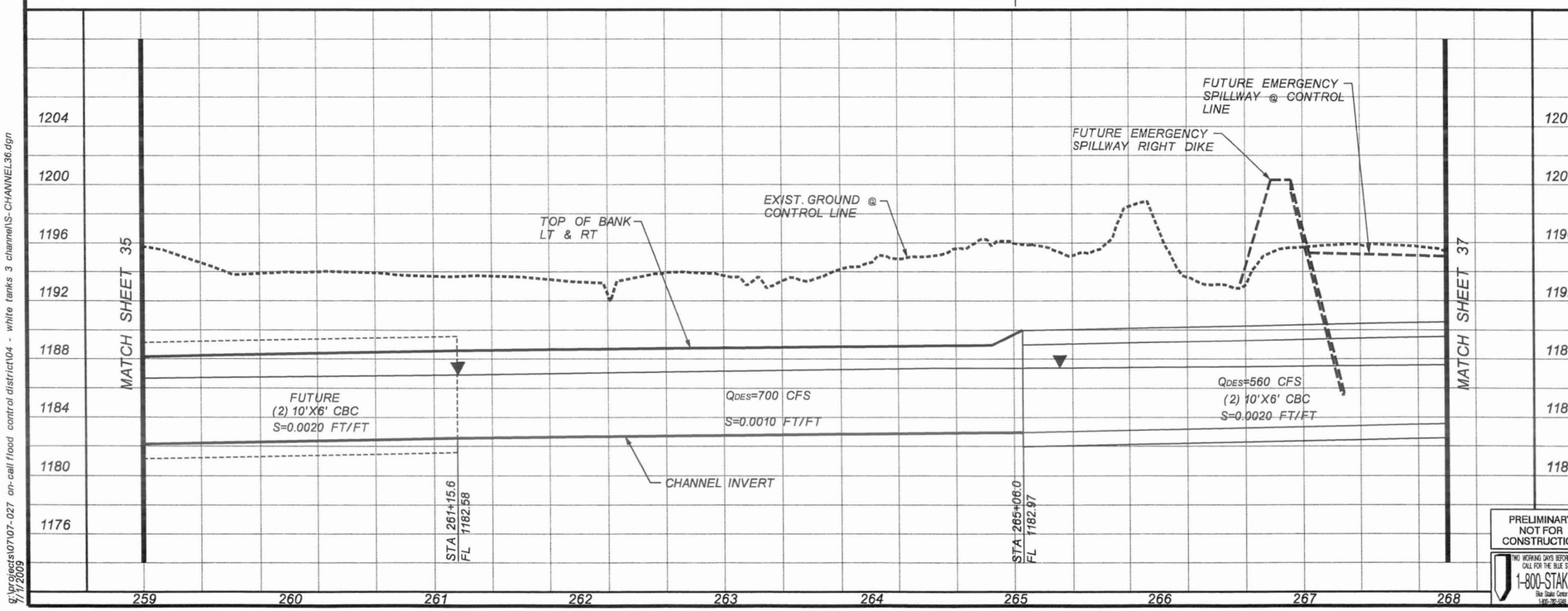
REGISTERED PROFESSIONAL ENGINEER (CIVIL) 19690 PAUL W.R. HOSKIN ARIZONA, U.S.A.
EXPIRES 3/31/12

PLAN AND PROFILE SHEET

DRAWING NO. C28 | SHEET 35 OF 55

SUBMITTAL 7/1/2009 30% SUBMITTAL





PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT Blue Stake Center 1-602-263-1100

REMOVE

8	REMOVE EXIST. RIP-RAP, SALVAGE AND REPLACE. RE-COMPACT EARTH EMBANKMENT WITH ADWR AND NRCS CRITERIA.	507 CY

CONSTRUCT

1	CONSTRUCT EARTHEN CHANNEL, CUT	29,217 CY
	CONSTRUCT EARTHEN CHANNEL, FILL	15 CY
2	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	2,251 SY
4	CONSTRUCT CBC, PER ADOT STD. DET. B-02.20 & B-02.30 (SIZE PER SHEET AND DRAWING NO. D11)	295 LF
5	CONSTRUCT CONCRETE HEADWALL, PER ADOT STD. DET. B-04.20, B-04.30	1 EA
6	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H-DRAWING NO. D6	1,074 LF
7	CONSTRUCT MAINTENANCE RAMP, PER DET. J- DRAWING NO. D7	1 EA
8	INSTALL PLAIN RIP RAP	61 CY
12	INSTALL BOLLARDS, PER MAG STD. DET. 140, TYPE 2	6 EA
13	INSTALL SAFETY RAIL , PER DET. G- DRAWING NO. D5	111 LF
18	GROUTED RIP-RAP DOWNDRAIN	2 EA

EROSION CONTROL

1	PLACE GRAVEL MULCH	2.60 AC
2	HYDROSEED	3.02 AC

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

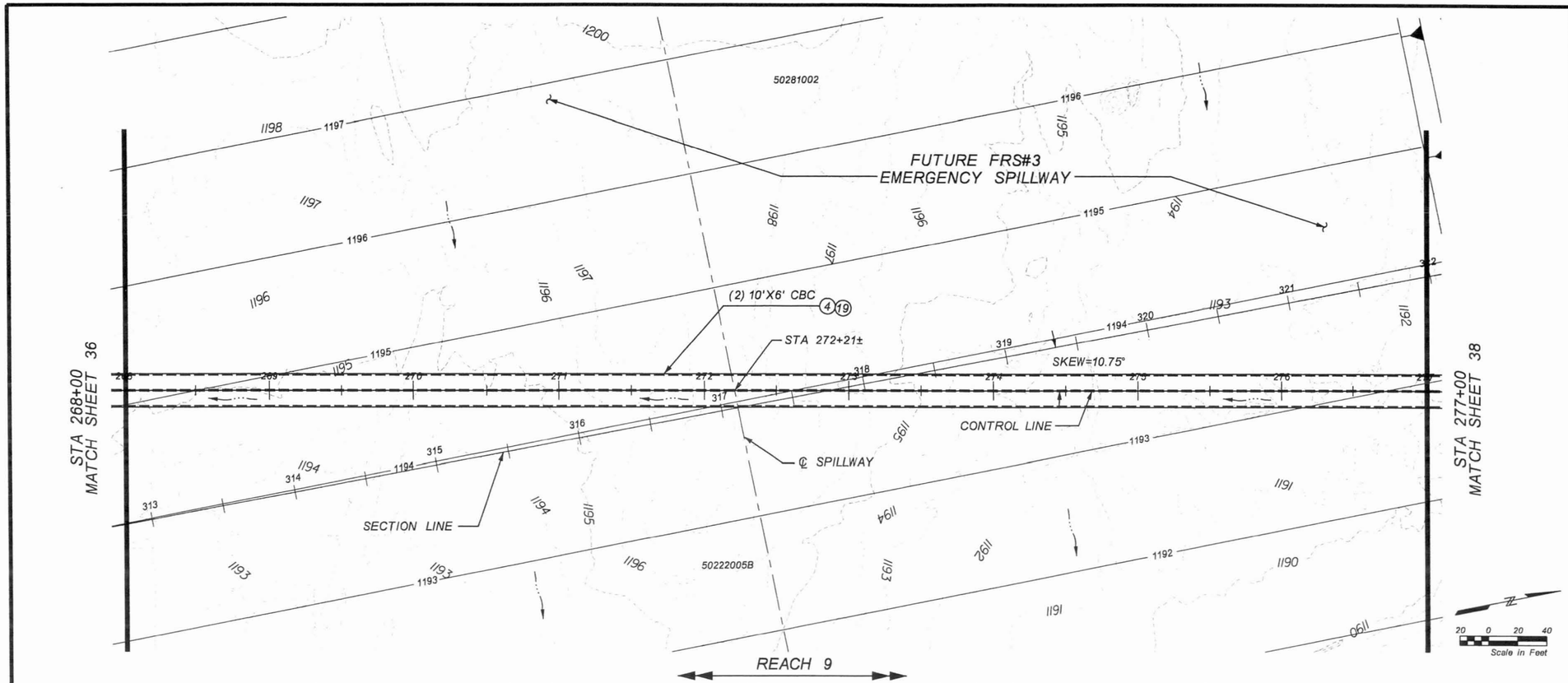
REGISTERED PROFESSIONAL ENGINEER CERTIFICATE NO. 19690 PAUL W.R. HOSKIN ARIZONA, U.S.A.

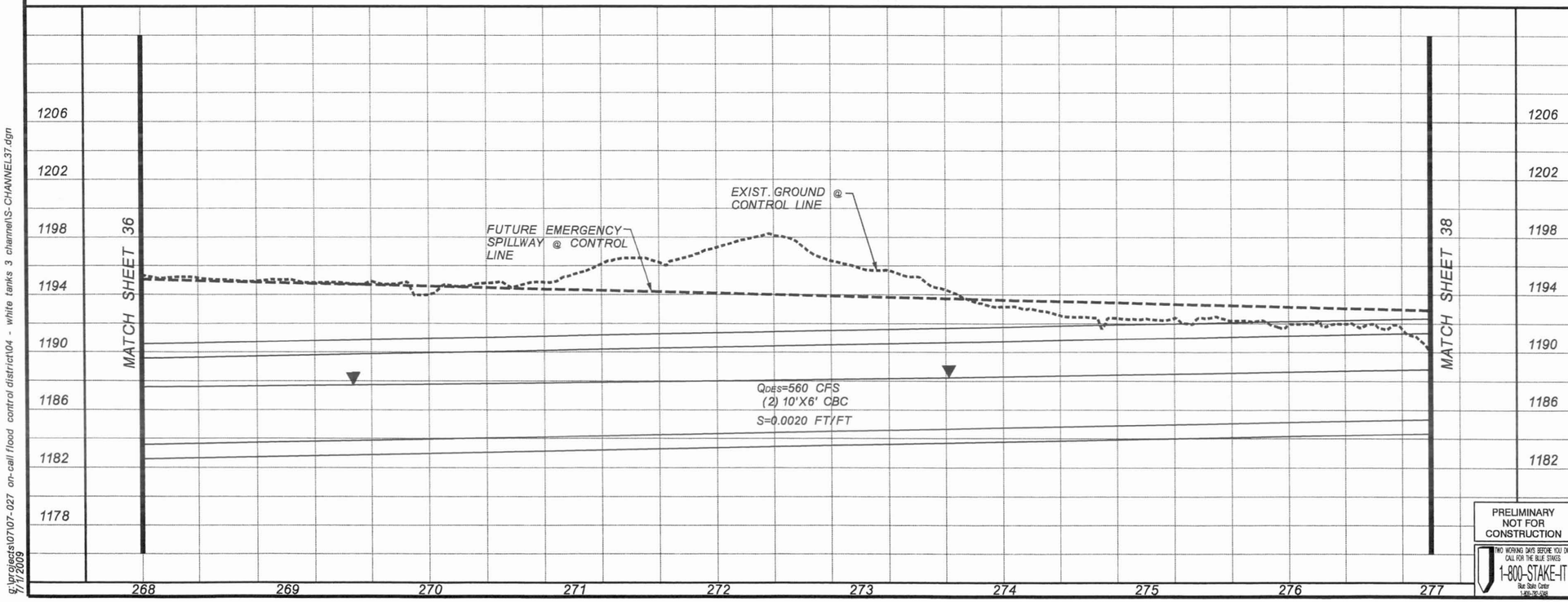
EXPIRES 3/31/12

PLAN AND PROFILE SHEET

DRAWING NO. C29 | SHEET 36 OF 55

g:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL36.dgn
7/1/2009





REMOVE

CONSTRUCT

4 CONSTRUCT CBC, PER ADOT STD. DET. B-02.20 & B-02.30 (SIZE PER SHEET AND DRAWING NO. D11) 900 LF

19 CULVERT, CUT 6,130 CY
CULVERT, FILL 0 CY

EROSION CONTROL

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER 19690 PAUL W.R. HOSKIN ARIZONA U.S.A.
EXPIRES 3/31/12

PLAN AND PROFILE SHEET

DRAWING NO. C30 | SHEET 37 OF 55

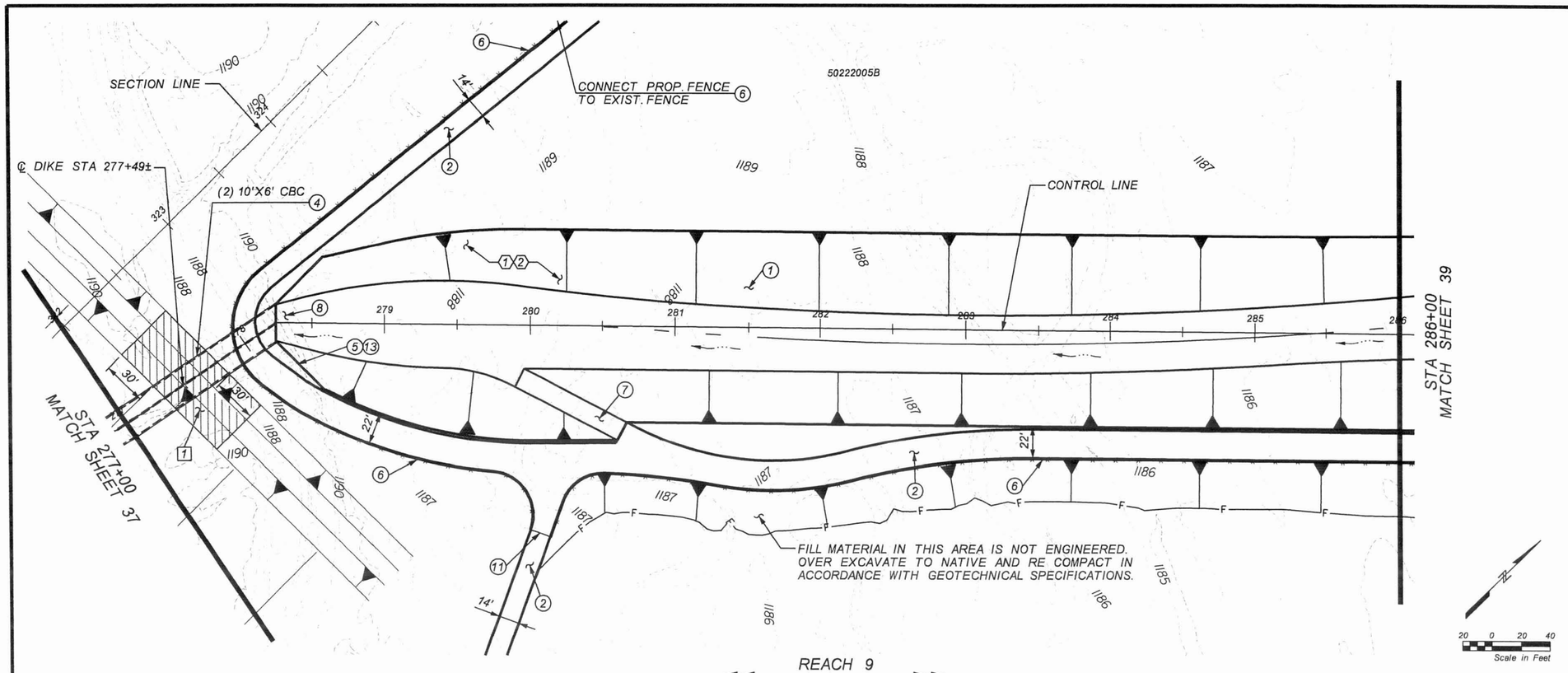
PRELIMINARY
NOT FOR
CONSTRUCTION

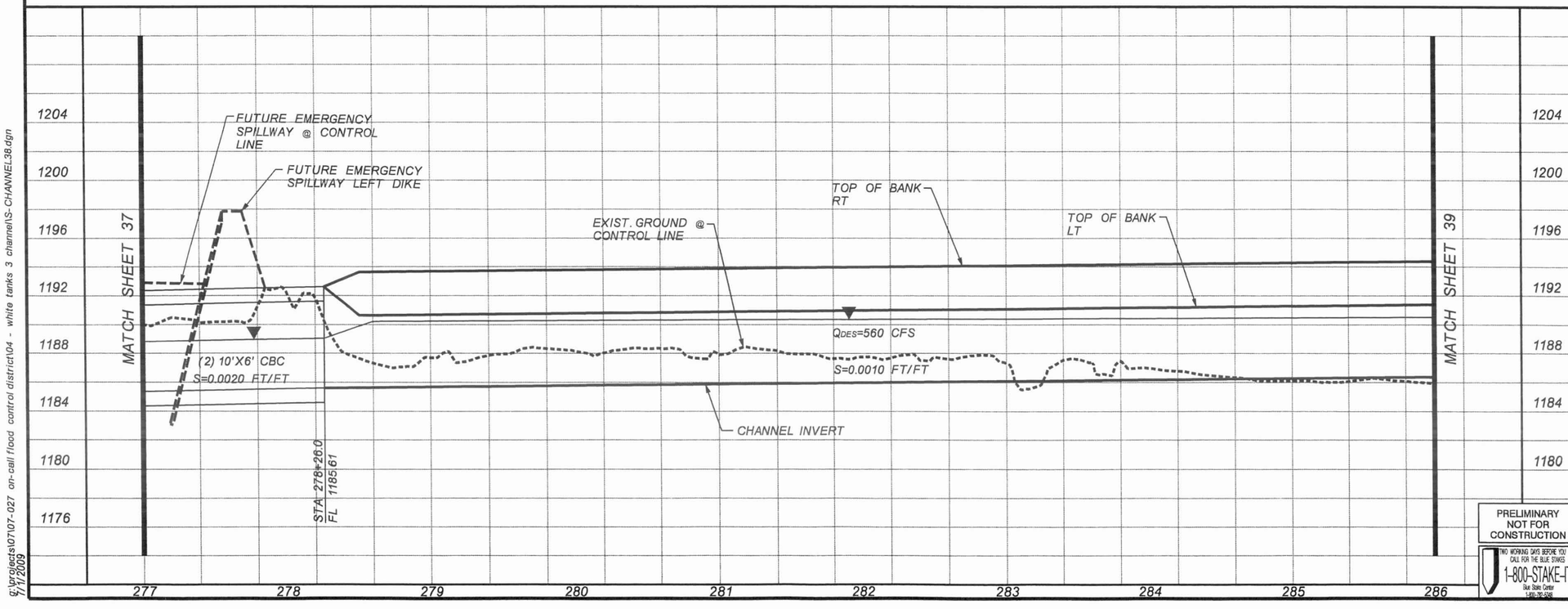
TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES
1-800-STAKE-IT
Blue Stake Center 1-800-782-5348

G:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL37.dgn
7/1/2009

SUBMITTAL 7/1/2009

30% SUBMITTAL





REMOVE

8	REMOVE EXIST. RIP-RAP, SALVAGE AND REPLACE. RE-COMPACT EARTH EMBANKMENT WITH ADWR AND NRCS CRITERIA.	507 CY

CONSTRUCT

1	CONSTRUCT EARTHEN CHANNEL, CUT CONSTRUCT EARTHEN CHANNEL, FILL	3,471 CY 14,710 CY
2	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	1,524 SY
4	CONSTRUCT CBC, PER ADOT STD. DET. B-02.20 & B-02.30 (SIZE PER SHEET AND DRAWING NO. D11), AND CHAMFER EXPOSED CORNERS AT INLET PER ADOT STD. DET. B-01.10	125 LF
5	CONSTRUCT CONCRETE HEADWALL, PER ADOT STD. DET. B-04.20, B-04.30	1 EA
6	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H-DRAWING NO. D6	746 LF
7	CONSTRUCT MAINTENANCE RAMP, PER DET. J- DRAWING NO. D7	1 EA
8	INSTALL PLAIN RIP RAP	20 CY
11	INSTALL GATE PER DRAWING DET. I-NO. D6	1 EA
13	INSTALL SAFETY RAIL , PER DET. G- DRAWING NO. D5	118 LF

EROSION CONTROL

1	PLACE GRAVEL MULCH	1.33 AC
2	HYDROSEED	2.37 AC

NO.	REVISION	BY	DATE
3			
2			
1			

PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT (Blue Stake Center 1-800-782-5348)

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 19690 PAUL W.R. HOSKIN STATE OF ARIZONA, U.S.A.
EXPIRES 3/31/12

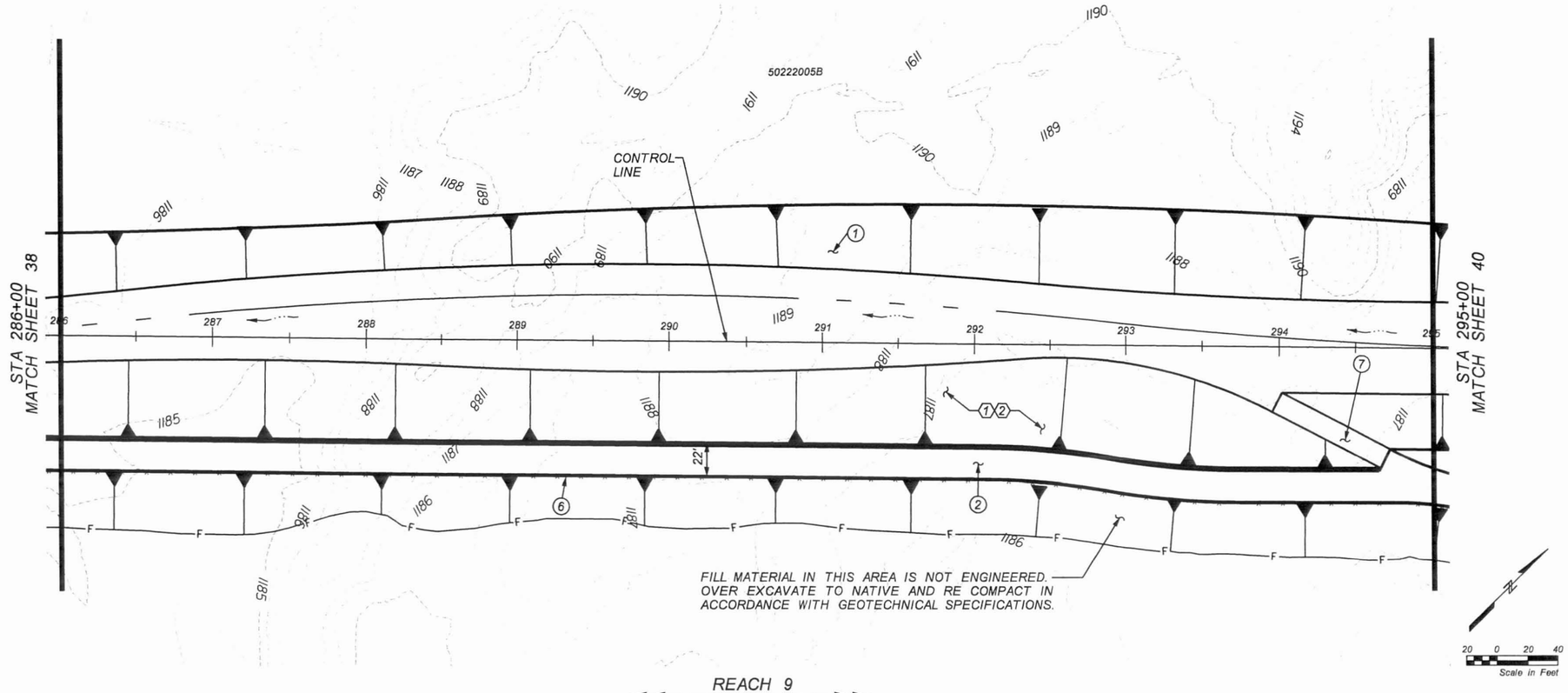
	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

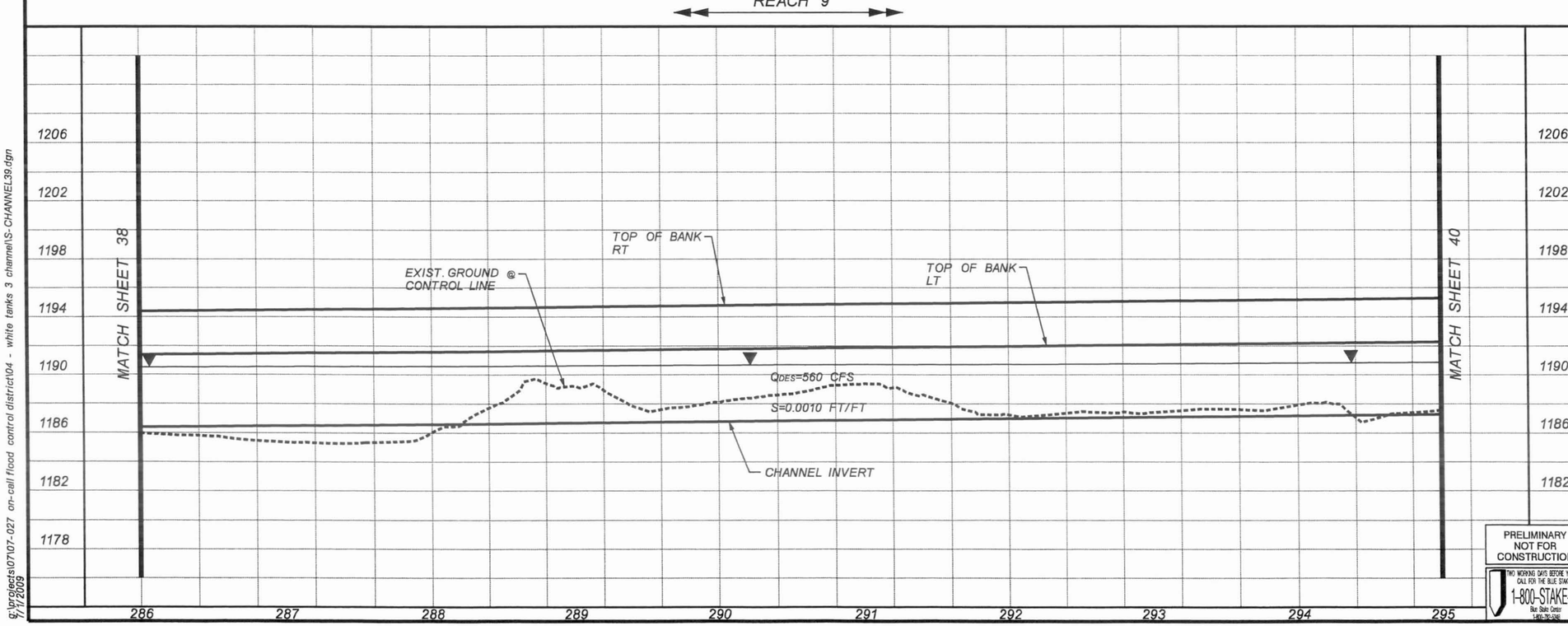
PLAN AND PROFILE SHEET

DRAWING NO. C31 | SHEET 38 OF 55

SUBMITTAL 7/1/2009 | 30% SUBMITTAL

g:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL38.dgn
7/1/2009





PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT (Not State Cntrs) 1-800-782-5348

g:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL39.dgn 7/1/2009

REMOVE

CONSTRUCT

(1)	CONSTRUCT EARTHEN CHANNEL, CUT CONSTRUCT EARTHEN CHANNEL, FILL	2,486 CY 22,092 CY
(2)	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	1,524 SY
(6)	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H-DRAWING NO. D6	900 LF
(7)	CONSTRUCT MAINTENANCE RAMP, PER DET. J- DRAWING NO. D7	1 EA

EROSION CONTROL

(1)	PLACE GRAVEL MULCH	1.57 AC
(2)	HYDROSEED	2.81 AC

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

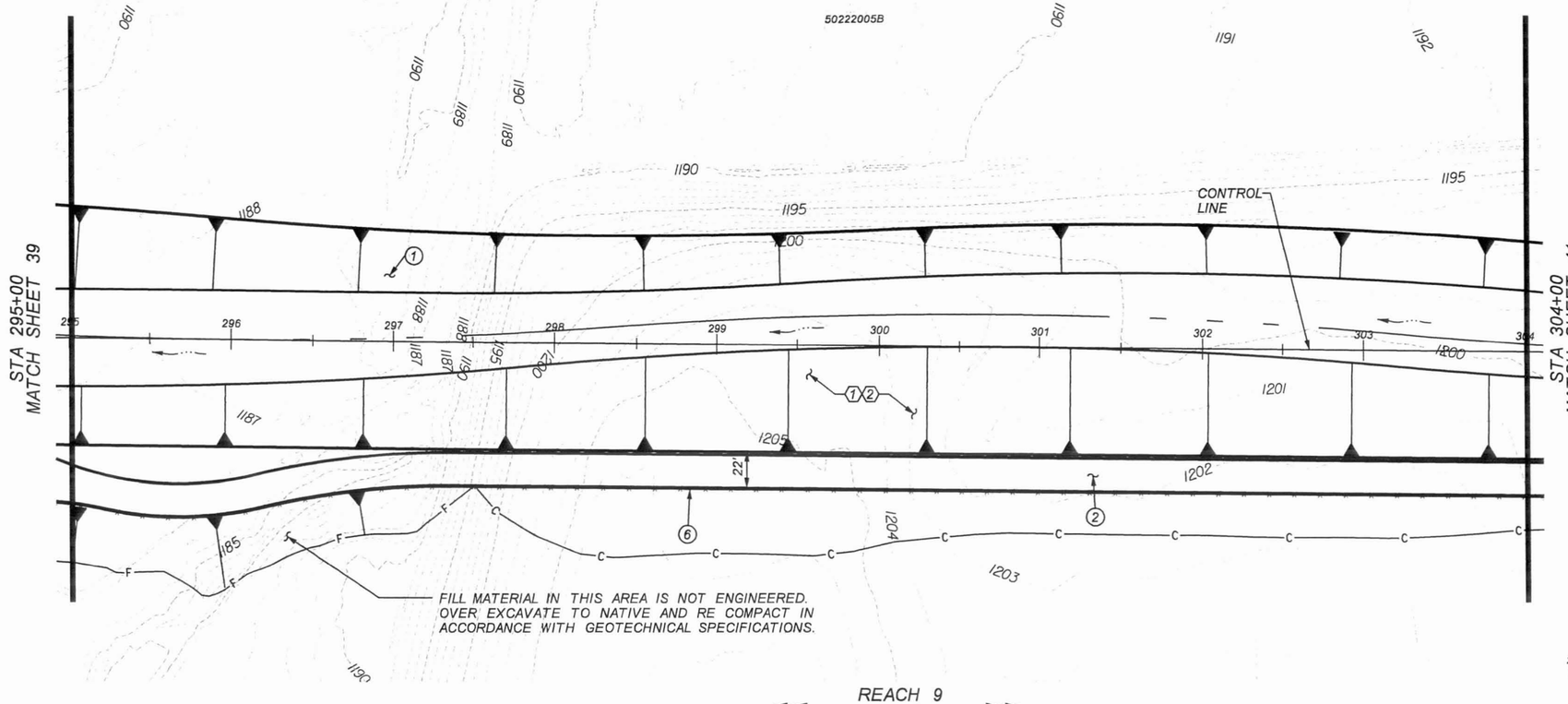
REGISTERED PROFESSIONAL ENGINEER 19690 PAUL W.R. HOSKIN ARIZONA, U.S.A.

EXPIRES 3/31/12

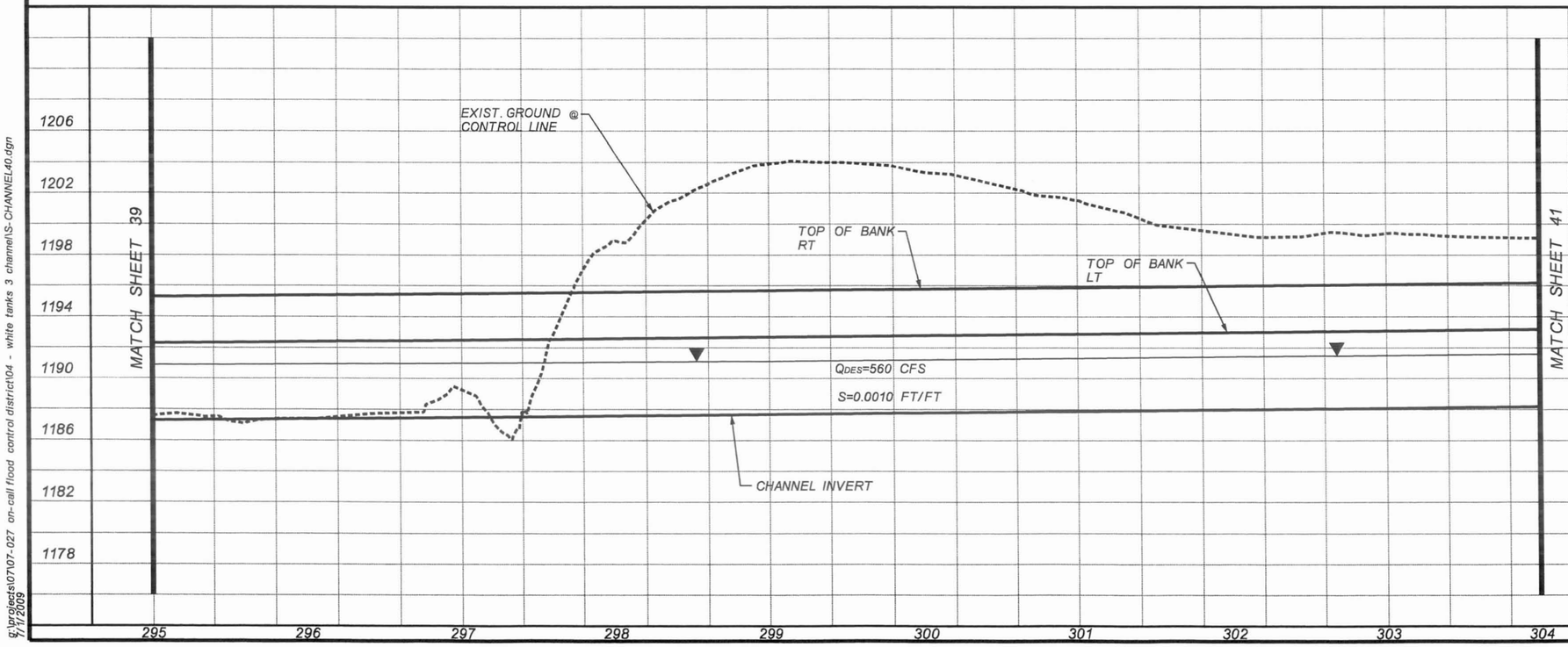
PLAN AND PROFILE SHEET

DRAWING NO. C32 | SHEET 39 OF 55

SUBMITTAL 7/1/2009 30% SUBMITTAL



REACH 9



REMOVE

CONSTRUCT

(1)	CONSTRUCT EARTHEN CHANNEL, CUT	42,836	CY
	CONSTRUCT EARTHEN CHANNEL, FILL	7,821	CY
(2)	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	1,400	SY
(6)	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H-DRAWING NO. D6	900	LF

EROSION CONTROL

(1)	PLACE GRAVEL MULCH	1.57 AC
(2)	HYDROSEED	2.81 AC

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

PLAN AND PROFILE SHEET

DRAWING NO. C33 | SHEET 40 OF 55

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 19690 PAUL W.R. HOSKIN ARIZONA, U.S.A.
EXPIRES 3/31/12

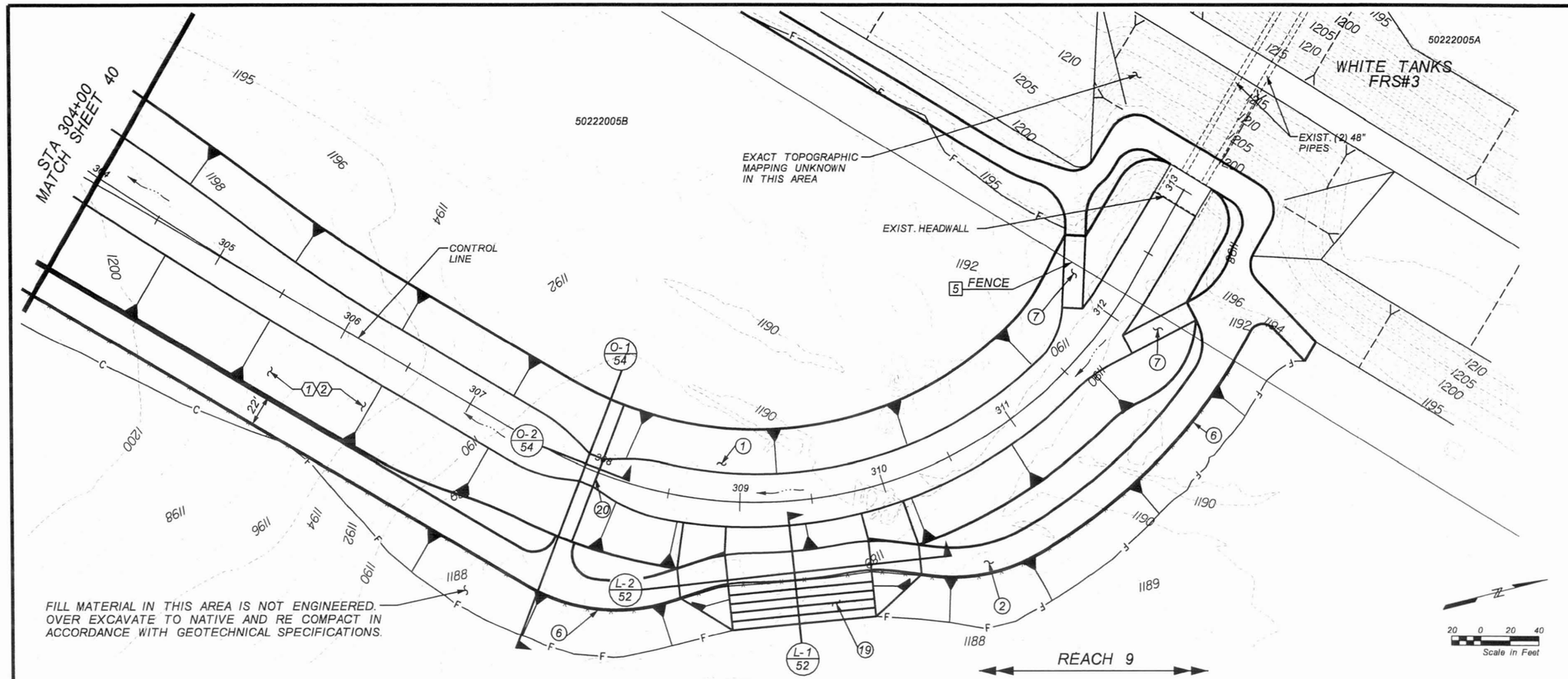
PRELIMINARY NOT FOR CONSTRUCTION

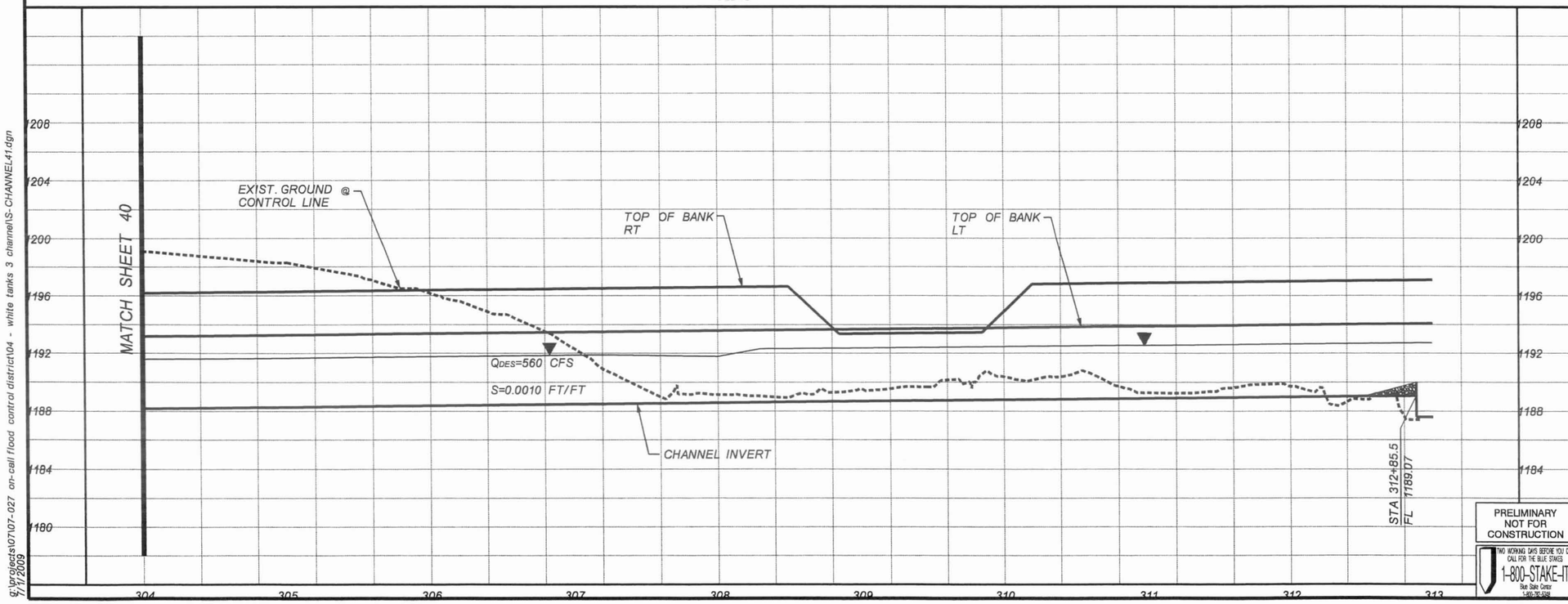
TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT (Arizona Blue Stake Center 1-602-263-1100)

g:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL40.dgn
7/1/2009

SUBMITTAL 7/1/2009

30% SUBMITTAL





g:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL41.dgn
7/1/2009

PRELIMINARY
NOT FOR
CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG
CALL FOR THE BLUE STAKES
1-800-STAKE-IT
(Ariz. Blue Stake Center)
1-800-782-5348

REMOVE

5	REMOVE EXIST. FENCE, BLOCK WALL AND/OR RETAINING WALL	175 LF

CONSTRUCT

1	CONSTRUCT EARTHEN CHANNEL, CUT	11,066 CY
	CONSTRUCT EARTHEN CHANNEL, FILL	13,016 CY
2	CONSTRUCT 4" ABC MAINTENANCE ROAD (14' WIDE)	1,400 SY
6	INSTALL 4-STRAND SMOOTH WIRE FENCE, PER DET. H- DRAWING NO. D6	925 LF
7	CONSTRUCT MAINTENANCE RAMP, PER DET. J- DRAWING NO. D7	2 EA
19	CONSTRUCT WASTEWAY, PER DET. L- DRAWING NO. D8	202 CY
20	CONSTRUCT SLIDE GATE, PER DET. O- DRAWING NO. D10	3 EA

EROSION CONTROL

1	PLACE GRAVEL MULCH	1.57 AC
2	HYDROSEED	2.81 AC

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

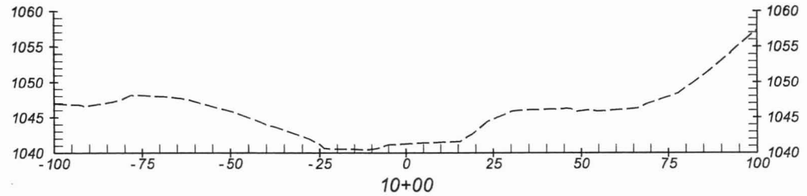
REGISTERED PROFESSIONAL ENGINEER
19690
PAUL W.R. HOSKIN
ARIZONA, U.S.A.
EXPIRES 3/31/12

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

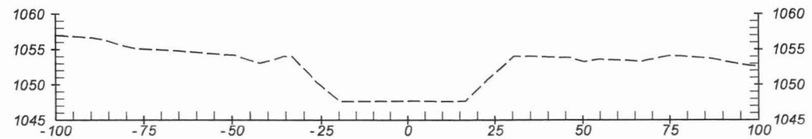
PLAN AND PROFILE SHEET

DRAWING NO. C34 | SHEET 41 OF 55

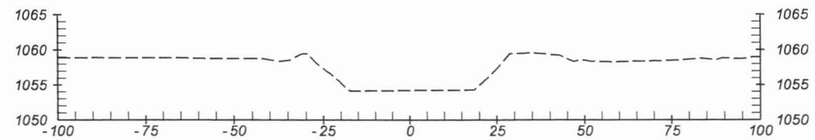
SUBMITTAL 7/1/2009 30% SUBMITTAL



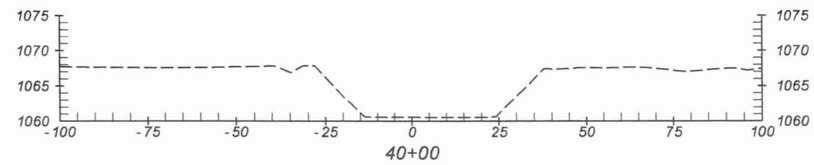
10+00



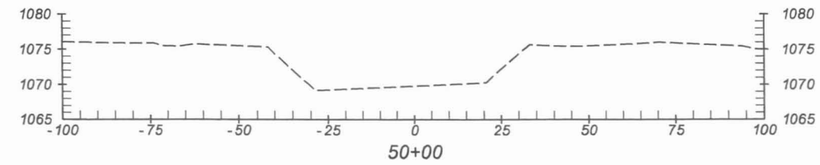
20+00



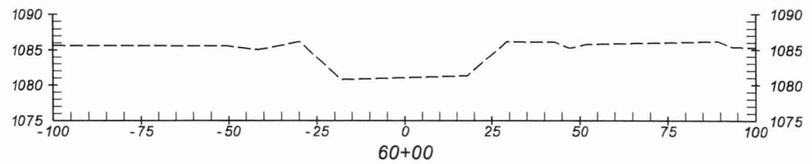
30+00



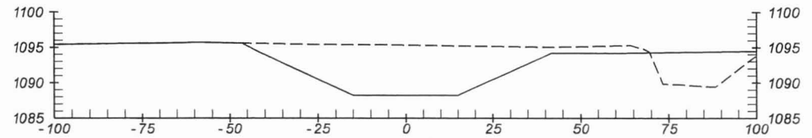
40+00



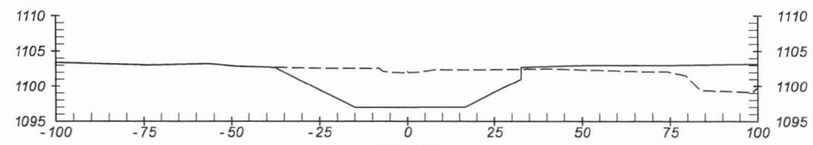
50+00



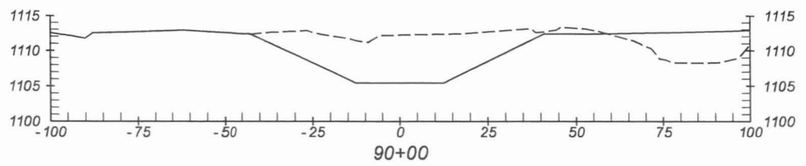
60+00



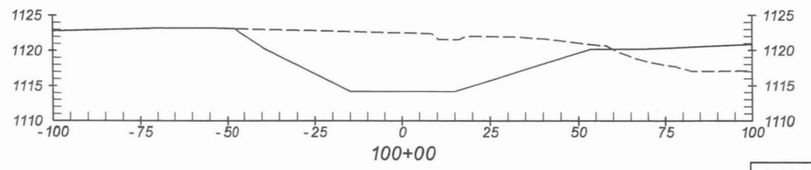
70+00



80+00



90+00



100+00

LEGEND

EXIST GROUND

PROPOSED CHANNEL

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

CROSS-SECTIONS
SHEET

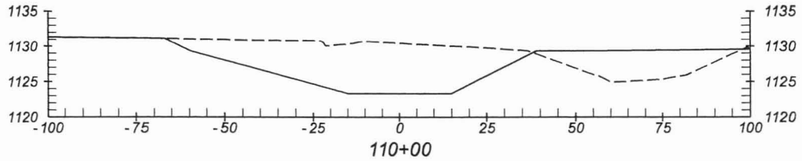
DRAWING NO. XS1 | SHEET 42 OF 55

REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO.
19690
PAUL W.R.
HOSKIN
ARIZONA, U.S.A.
EXPIRES 3/31/12

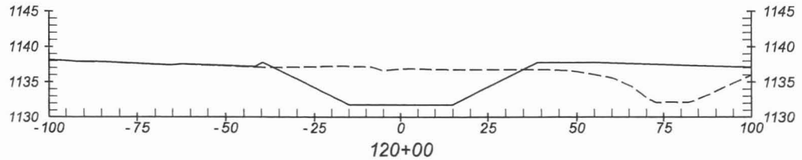
PRELIMINARY
NOT FOR
CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG
CALL FOR THE BLUE STAKES
1-800-STAKE-IT
Blue Stake Center
1-800-782-5348

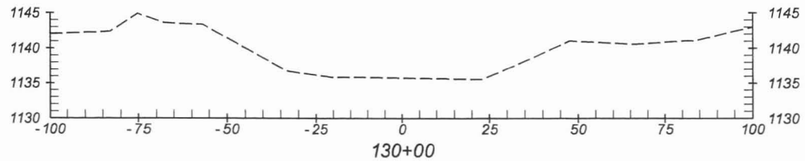
g:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL42.dgn
7/1/2009



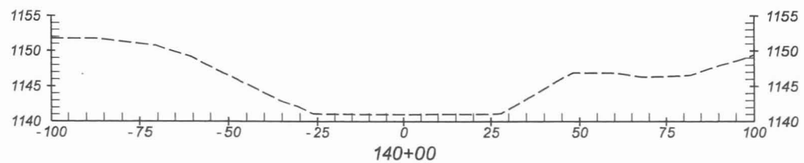
110+00



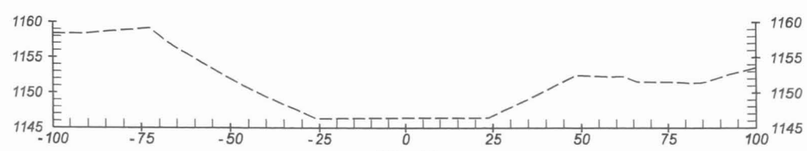
120+00



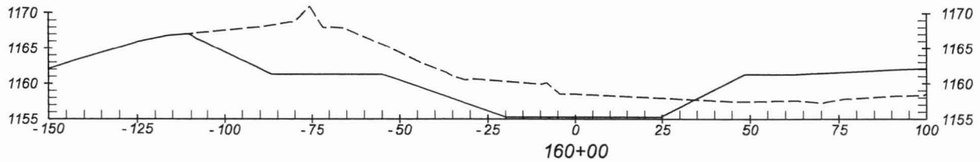
130+00



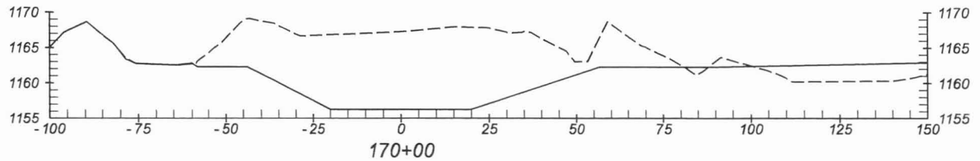
140+00



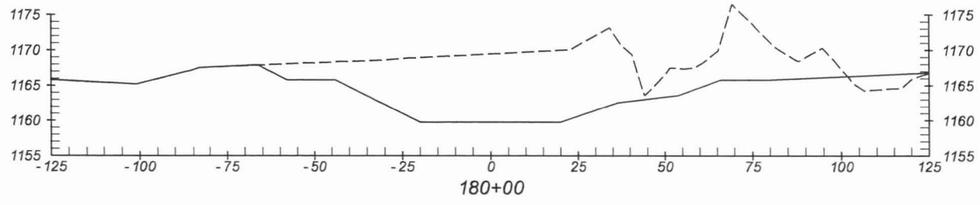
150+00



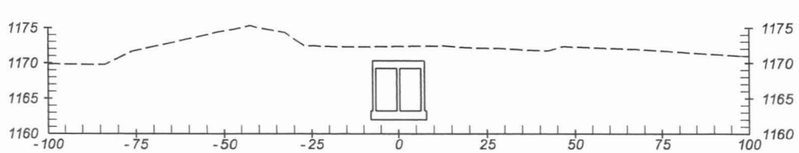
160+00



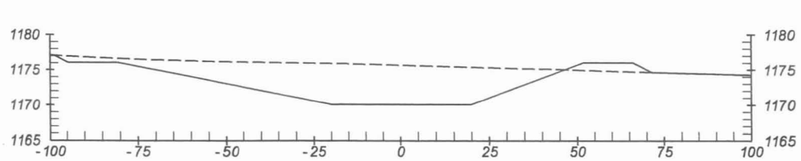
170+00



180+00



190+00



200+00

LEGEND

EXIST GROUND

PROPOSED CHANNEL

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

CROSS-SECTIONS
SHEET

REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO.
19690
PAUL W.R.
HOSKIN
ARIZONA, U.S.A.
EXPIRES 3/31/12

DRAWING NO. XS2 | SHEET 43 OF 55

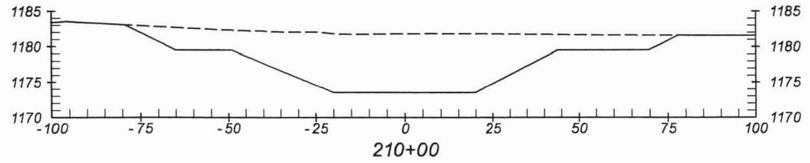
PRELIMINARY
NOT FOR
CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG
CALL FOR THE BLUE STAKE
1-800-STAKE-IT
Blue Stake Center
1-800-782-5348

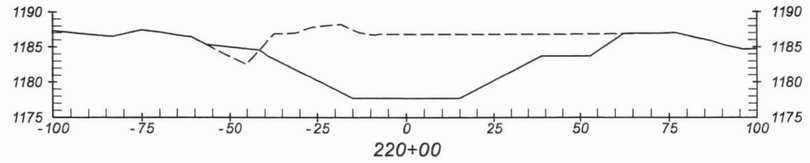
g:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL43.dgn
7/1/2009

SUBMITTAL 7/1/2009

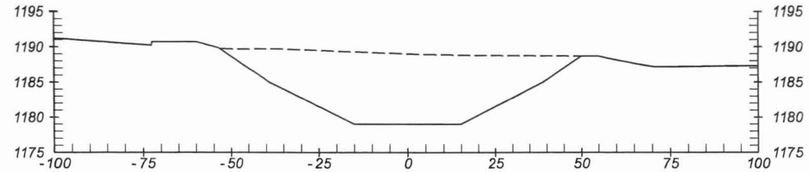
30% SUBMITTAL



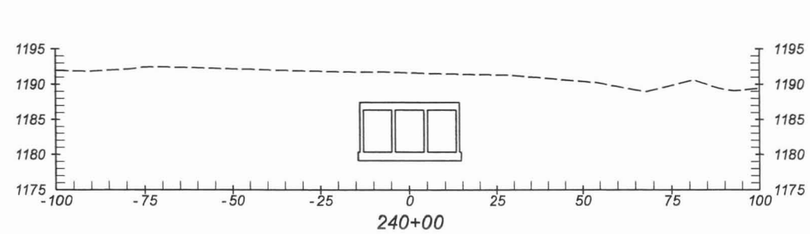
210+00



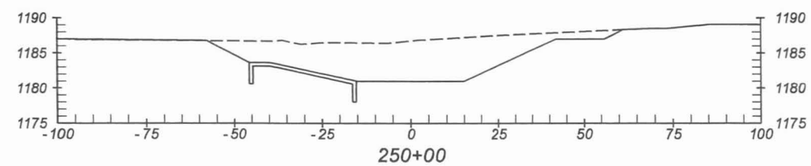
220+00



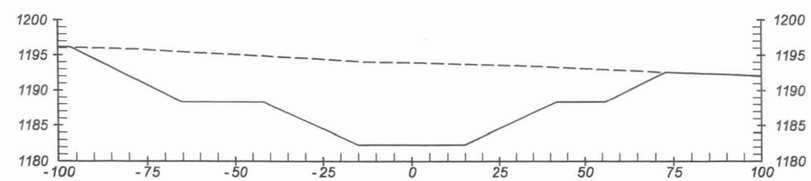
230+00



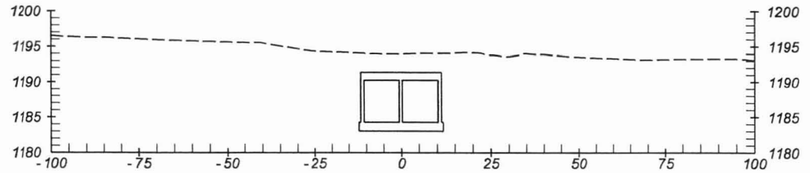
240+00



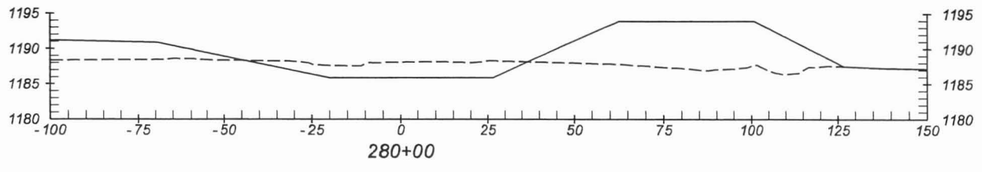
250+00



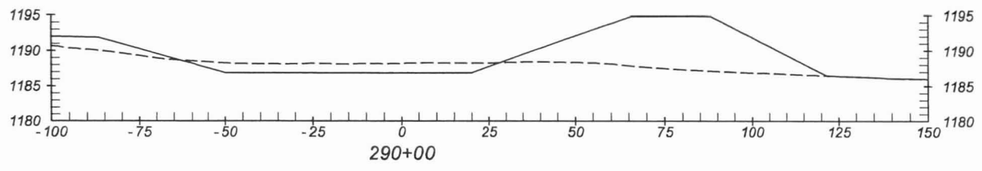
260+00



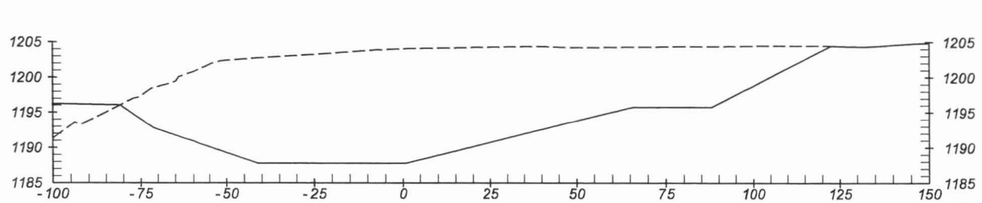
270+00



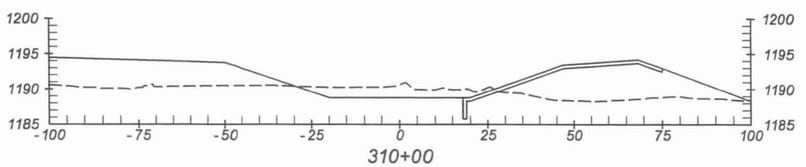
280+00



290+00



300+00



310+00

LEGEND

EXIST GROUND

PROPOSED CHANNEL

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

CROSS-SECTIONS SHEET

DRAWING NO. XS3 | SHEET 44 OF 55

REGISTERED PROFESSIONAL ENGINEER — 19690 — PAUL W.R. HOSKIN — ARIZONA, U.S.A.

EXPIRES 3/31/12

PRELIMINARY NOT FOR CONSTRUCTION

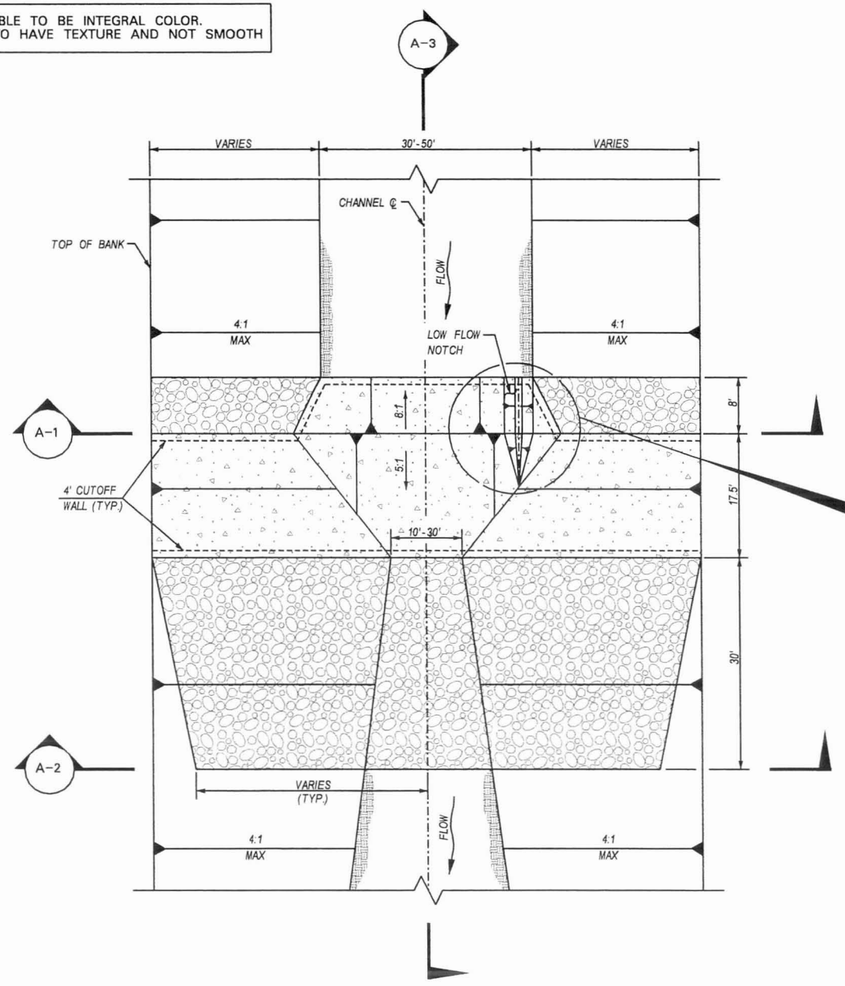
TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT (Arizona Blue Stake Center 1-800-782-5348)

SUBMITTAL 7/1/2009

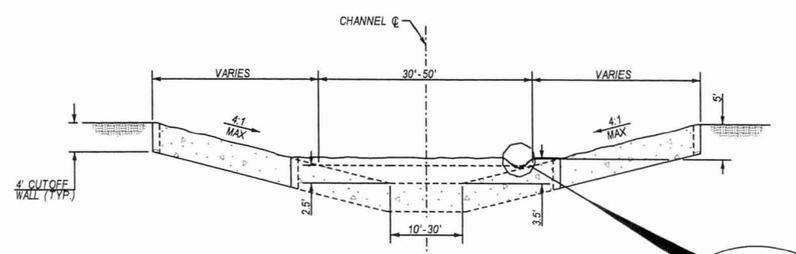
30% SUBMITTAL

G:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL44.dgn
7/1/2009

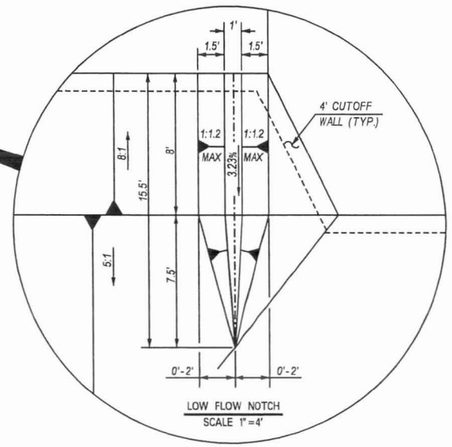
ALL CONCRETE VISIBLE TO BE INTEGRAL COLOR.
CONCRETE FINISH TO HAVE TEXTURE AND NOT SMOOTH



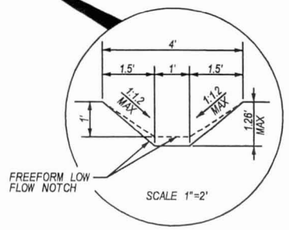
A GRADE CONTROL
SCALE 1"=10'



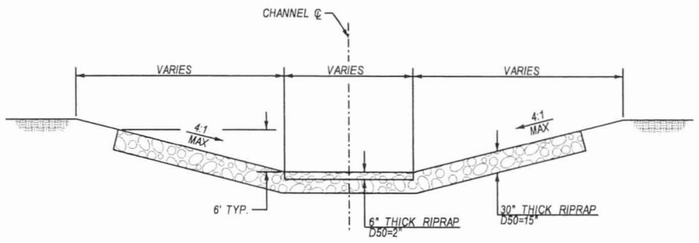
A-1 SECTION
SCALE 1"=10'



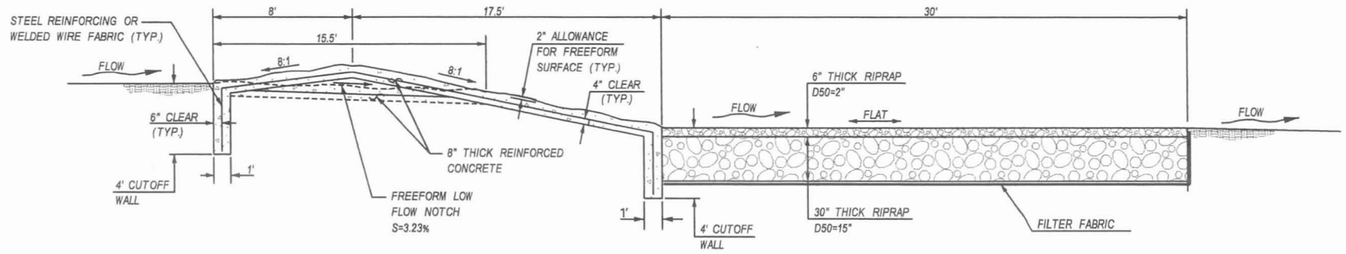
LOW FLOW NOTCH
SCALE 1"=4'



SCALE 1"=2'



A-2 SECTION
SCALE 1"=10'



A-3 SECTION
SCALE 1"=4'

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

CONCRETE GRADE CONTROL DETAIL SHEET

DRAWING NO. D1 | SHEET 45 OF 55

REGISTERED PROFESSIONAL ENGINEER 19690 PAUL W.R. HOSKIN ARIZONA, U.S.A.
EXPIRES 3/31/12

PRELIMINARY NOT FOR CONSTRUCTION

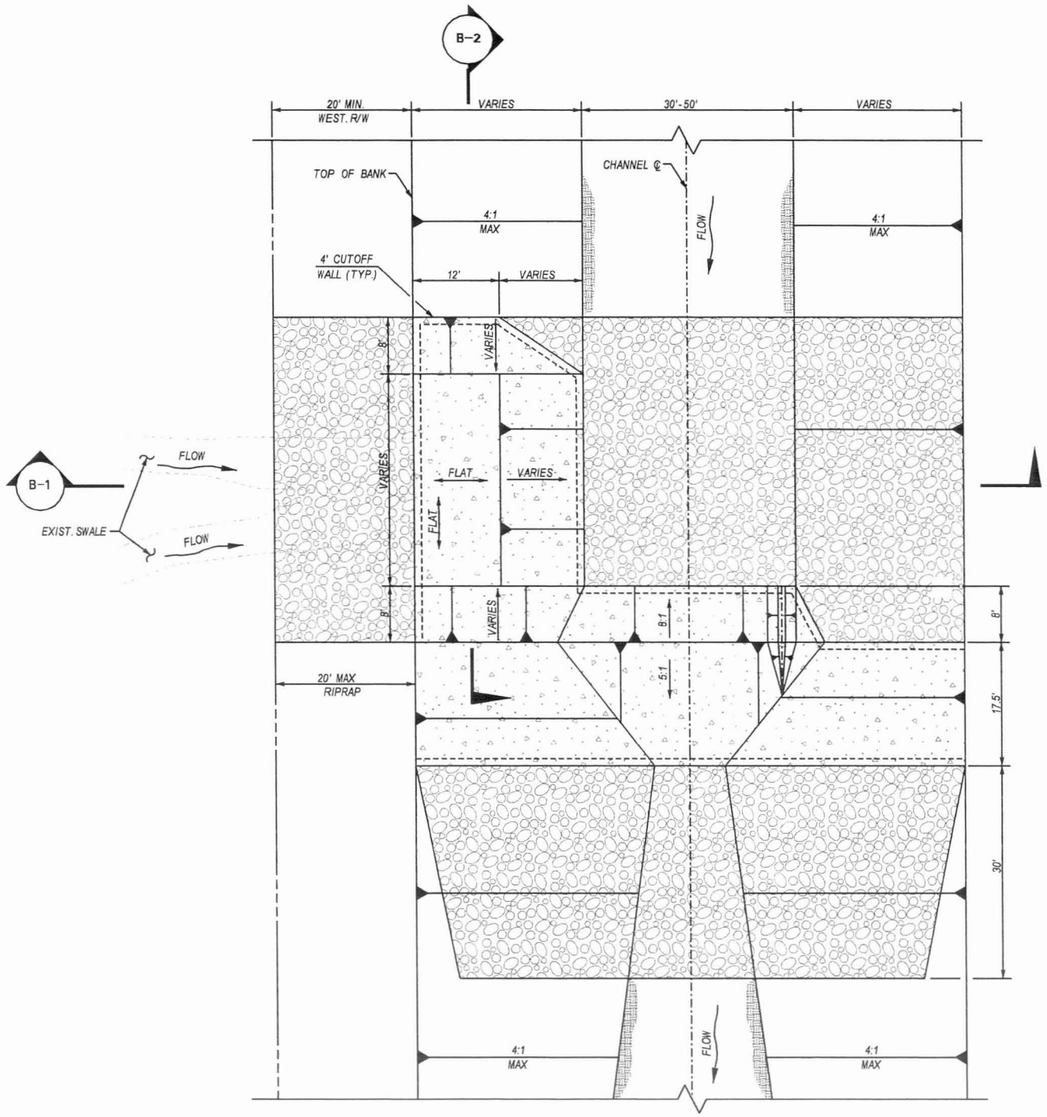
TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT (Blue Stake, Inc. 1-602-263-1100)

SUBMITTAL 7/1/2009

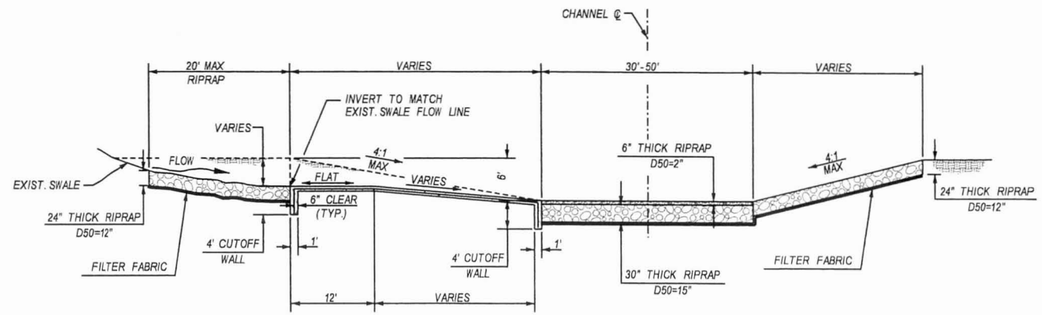
30% SUBMITTAL

g:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL45.dgn
7/1/2009

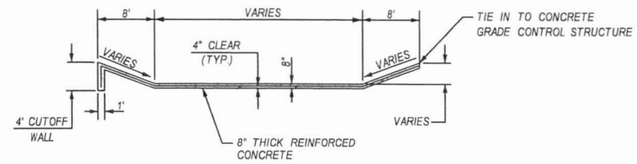
ALL CONCRETE VISIBLE TO BE INTEGRAL COLOR.
CONCRETE FINISH TO HAVE TEXTURE AND NOT SMOOTH



B — SIDE FLOW SPILLWAY ADJACENT TO A GRADE CONTROL STRUCTURE
SCALE 1"=10'



B-1 — SECTION
SCALE 1"=10'



B-2 — SECTION
SCALE 1"=10'

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

SIDE FLOW SPILLWAY DETAIL SHEET

DRAWING NO. D2 | SHEET 46 OF 55

REGISTERED PROFESSIONAL ENGINEER — CERTIFICATE NO. 19690 — PAUL W.R. HOSKIN — ARIZONA, U.S.A.
EXPIRES 3/31/12

PRELIMINARY NOT FOR CONSTRUCTION

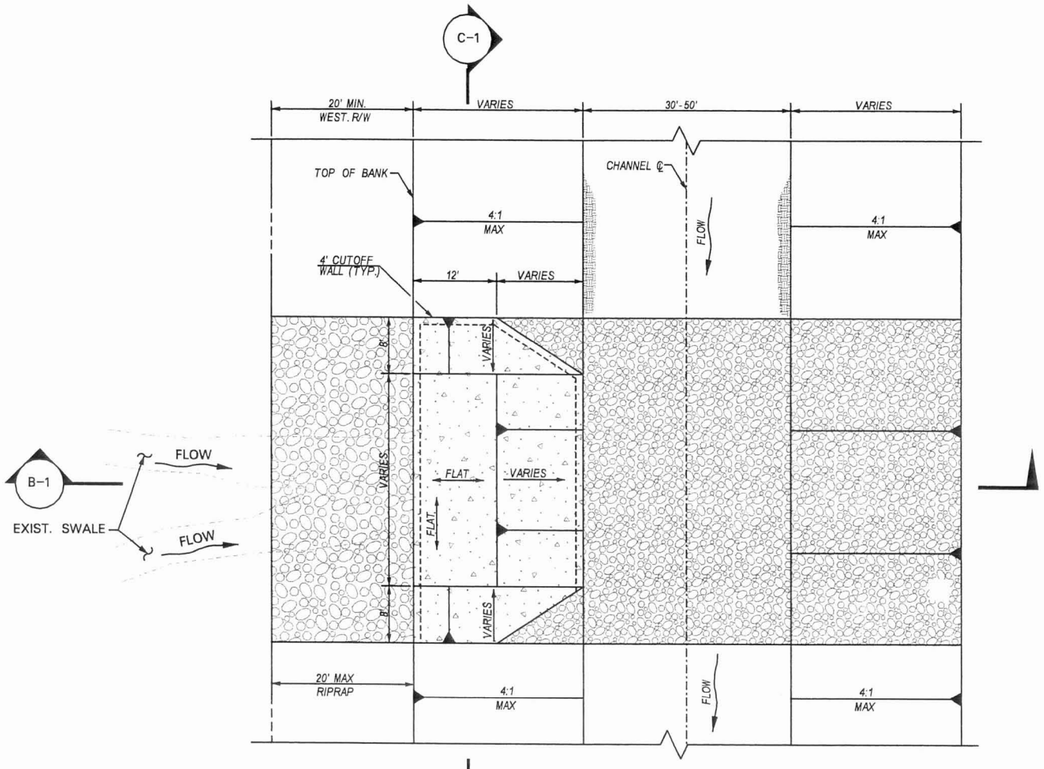
TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES
1-800-STAKE-IT
Blue Stake Center 1-800-782-5348

g:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL46.dgn
7/1/2009

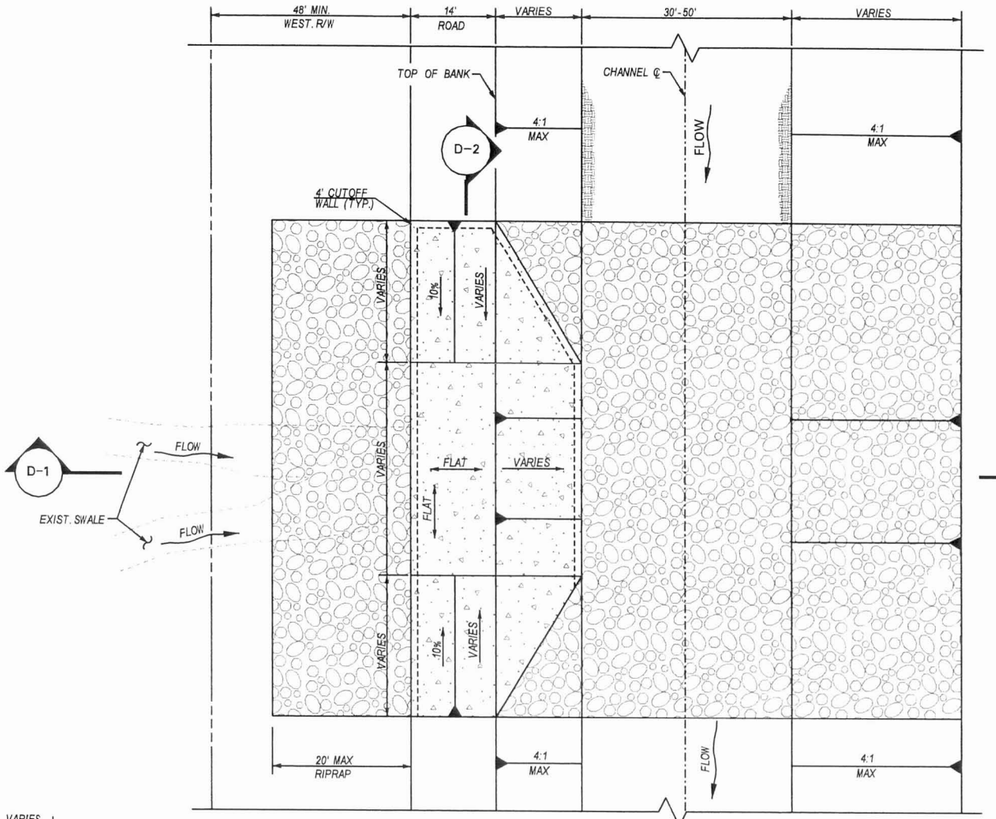
SUBMITTAL 7/1/2009

30% SUBMITTAL

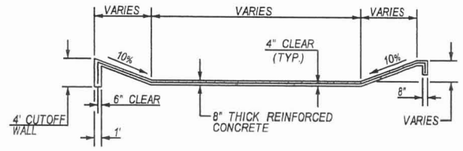
ALL CONCRETE VISIBLE TO BE INTEGRAL COLOR.
CONCRETE FINISH TO HAVE TEXTURE AND NOT SMOOTH



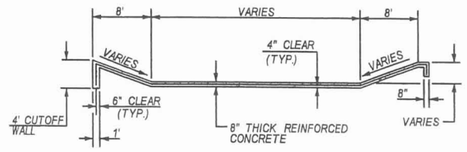
C SIDE FLOW SPILLWAY
SCALE 1"=10'



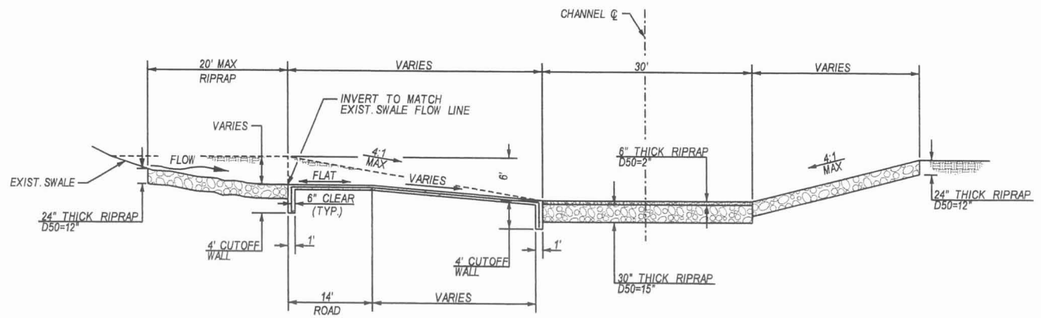
D SIDE FLOW SPILLWAY WITH MAINTENANCE ROAD
N.T.S.



D-2 SECTION
N.T.S.



C-1 SECTION
SCALE 1"=10'



D-1 SECTION
N.T.S.

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

SIDE FLOW SPILLWAY
DETAIL SHEET

DRAWING NO. D3 | SHEET 47 OF 55

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 19690 PAUL W.R. HOSKIN STATE OF ARIZONA, U.S.A.
EXPIRES 3/31/12

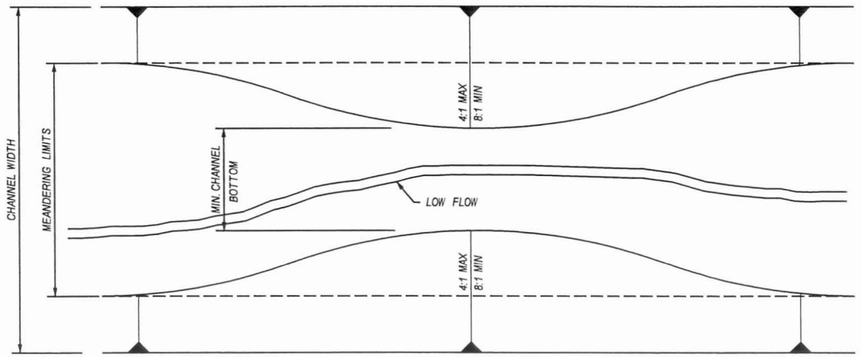
PRELIMINARY
NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT (Ariz. Blue Stake Center 1-800-782-5348)

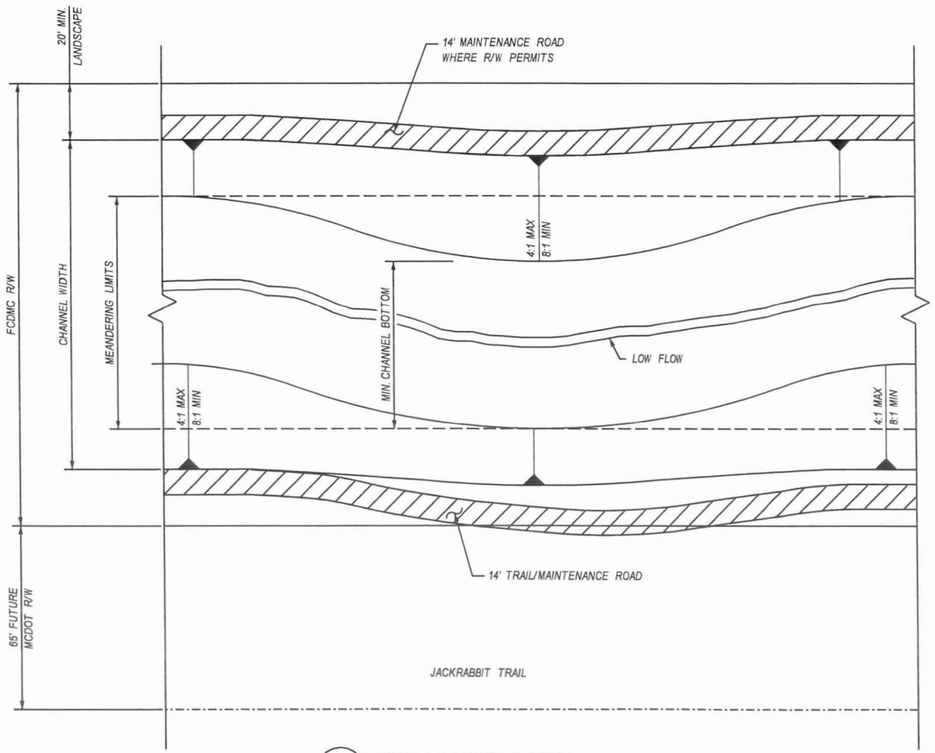
g:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S- CHANNEL47.dgn
7/1/2009

SUBMITTAL 7/1/2009

30% SUBMITTAL



E MEANDER OPTION 1 DETAIL
NTS



F MEANDER OPTION 2 DETAIL
NTS

g:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL48.dgn
7/1/2009

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 19690 PAUL W.R. HOSKIN STATE OF ARIZONA, U.S.A.
EXPIRES 3/31/12

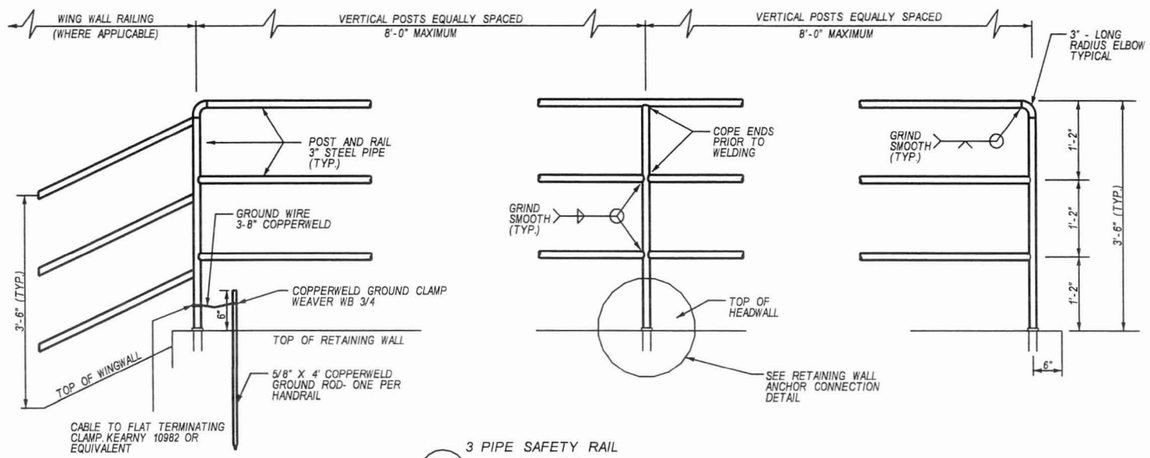
MEANDERING CHANNEL OPTIONS SHEET

DRAWING NO. D4 | SHEET 48 OF 55

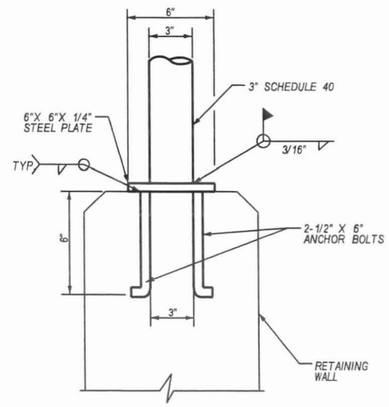
PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT (Ariz. Blue Stake, Center) 1-602-263-1100

SUBMITTAL 7/1/2009 30% SUBMITTAL



G-1 3 PIPE SAFETY RAIL ELEVATION
NTS



G-2 RETAINING WALL ANCHOR CONNECTION
NTS

CONSTRUCTION NOTES:

1. 3" ROUND TUBE STEEL (SCHEDULE 40) GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 WELD 3/8" THICK ALL AROUND. SHOP PRIME WITH RUST INHIBITING PRIMER (FIELD REPAIR PRIMER AS NEEDED).
2. PAINT HANDRAIL PER MAG SPECIFICATIONS SECTION 530. ALL EXPOSED CONCRETE SHALL BE PAINTED DUNN EDWARDS NEUTRAL VALLEY DE 6119 OR EQUAL.
3. VERTICAL POSTS TO BE EVENLY SPACED.

g:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL49.dgn
7/1/2009

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO.
19690
PAUL W.R.
HOSKIN
ARIZONA, U.S.A.
EXPIRES 3/31/12

SAFETY RAIL DETAIL SHEET

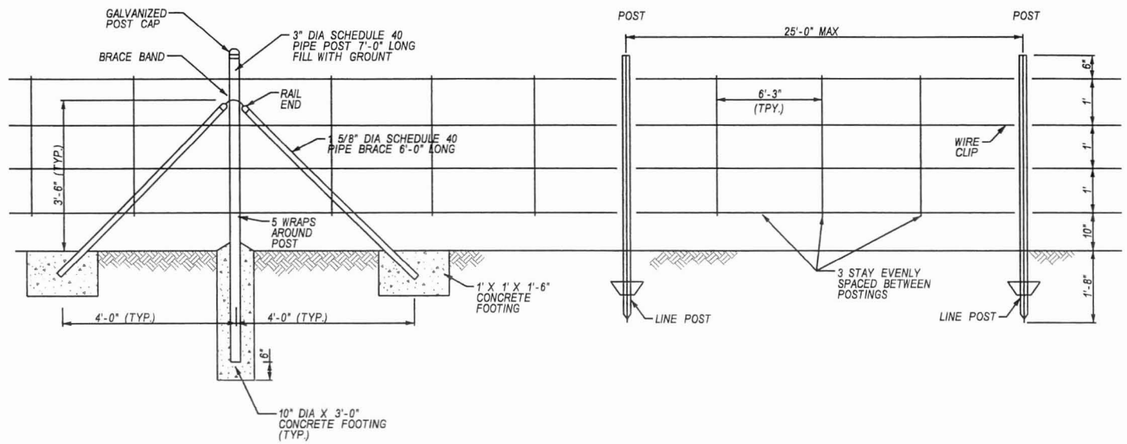
DRAWING NO. D5 | SHEET 49 OF 55

PRELIMINARY
NOT FOR
CONSTRUCTION

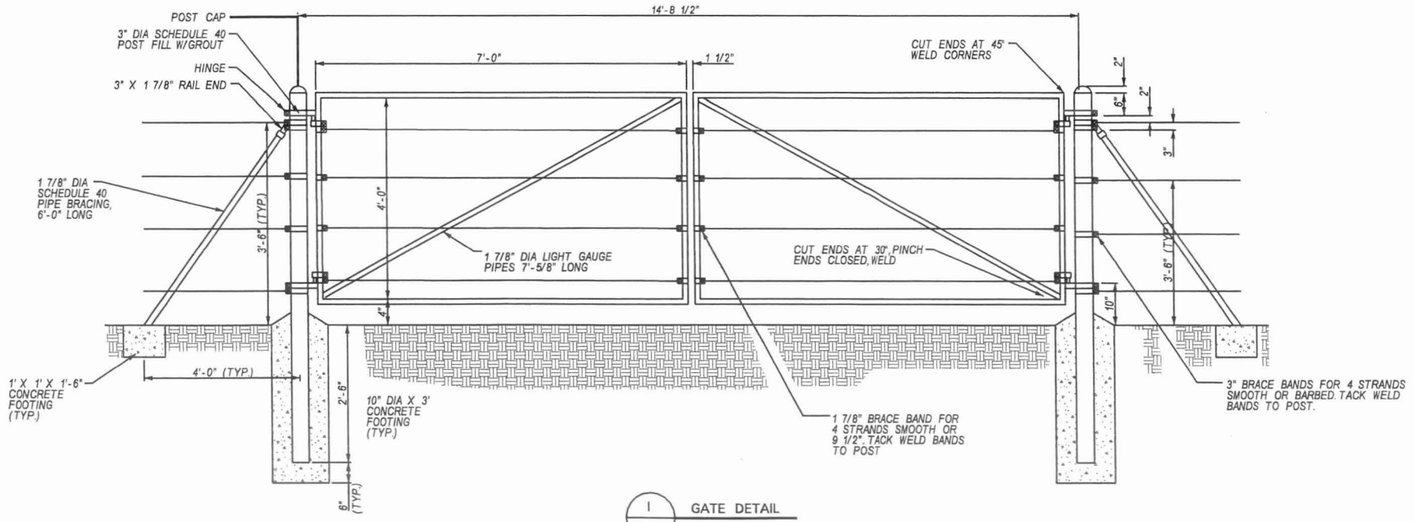
TWO WORKING DAYS BEFORE YOU DIG
CALL FOR THE BLUE STAKES
1-800-STAKE-IT
Blue Stake Center
1-602-263-1100

SUBMITTAL 7/1/2009

30% SUBMITTAL



H CORNER OR INTERMEDIATE POST ASSEMBLY
NTS



I GATE DETAIL
NTS

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 19590 PAUL W.R. HOSKIN Date Signed ARIZONA, U.S.A.
EXPIRES 3/31/12

FENCE AND GRATE DETAIL SHEET

DRAWING NO. D6 | SHEET 50 OF 55

PRELIMINARY NOT FOR CONSTRUCTION

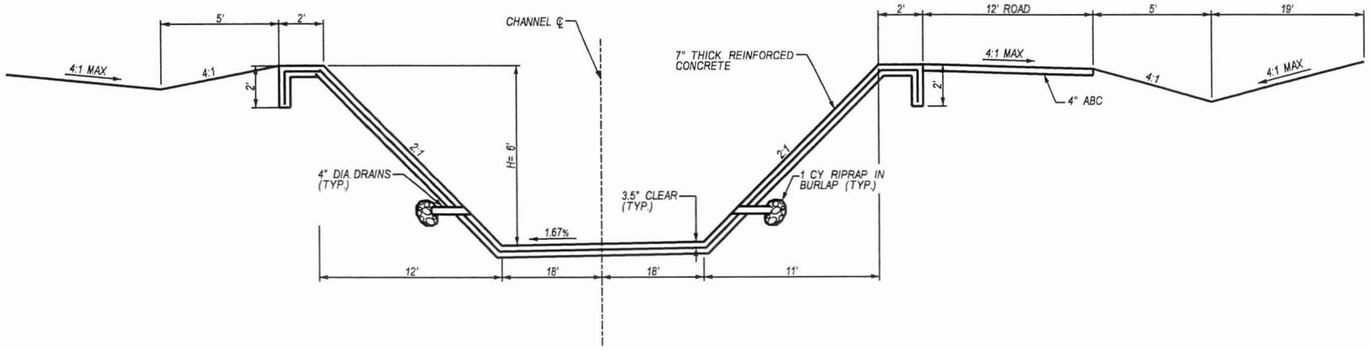
TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES. 1-800-STAKE-IT (Ariz. Blue Stake Center) 1-602-263-1100

SUBMITTAL 7/1/2009

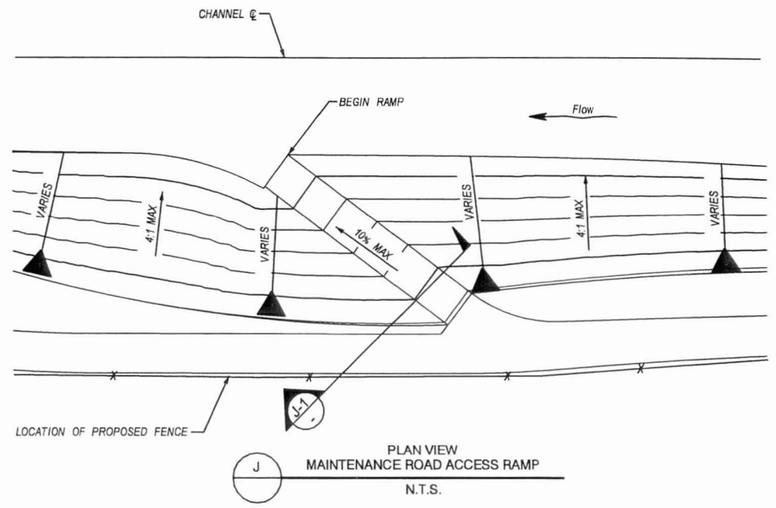
30% SUBMITTAL

g:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL50.dgn
7/1/2009

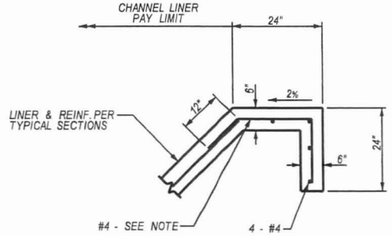
ALL CONCRETE VISIBLE TO BE INTEGRAL COLOR.
CONCRETE FINISH TO HAVE TEXTURE AND NOT SMOOTH



K CONCRETE LINED CHANNEL SECTION
N.T.S.

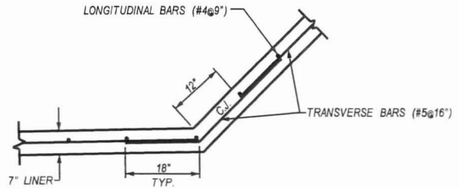


J PLAN VIEW
MAINTENANCE ROAD ACCESS RAMP
N.T.S.

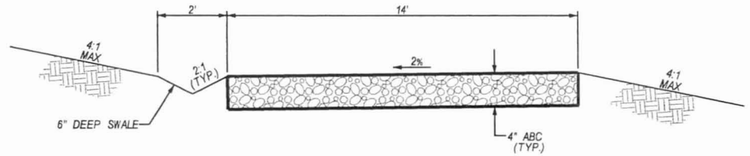


NOTE:
MATCH TRANSVERSE BAR SPACING OF BANK LINER

K-1 LONGITUDINAL CUTOFF WALL
N.T.S.



K-2 CHANNEL LINER REINFORCING
N.T.S.



J-1 SECTION
N.T.S.

NOTES:

1. CONCRETE CHANNEL LINING SHALL BE CONTINUOUSLY REINFORCED WITHOUT EXPANSION OR TOOLED JOINTS EXCEPT CONSTRUCTION JOINTS SHALL BE LOCATED AT THE END OF A DAY'S POUR OR WHEN CONCRETE PLACEMENT STOPS FOR MORE THAN 45 MINUTES AND BETWEEN LONGITUDINAL PAVING STRIPS.REINFORCING STEEL SHALL BE BE CONTINUOUS THROUGH LINING CONSTRUCTION JOINTS.
2. ALL REINFORCING STEEL SHALL BE GRADE 60.CONCRETE SHALL BE CLASS "A" CAST-IN-PLACE, f'c = 3,000 P.S.I.
3. CONCRETE SURFACE SHALL RECEIVE A TRANSVERSE LIGHT BROOM FINISH.

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 19690 PAUL W.R. HOSKIN STATE OF ARIZONA U.S.A.
EXPIRES 3/31/12

MAINTENANCE RAMP AND CONCRETE LINED CHANNEL DETAIL SHEET

DRAWING NO. D7 | SHEET 51 OF 55

PRELIMINARY
NOT FOR CONSTRUCTION

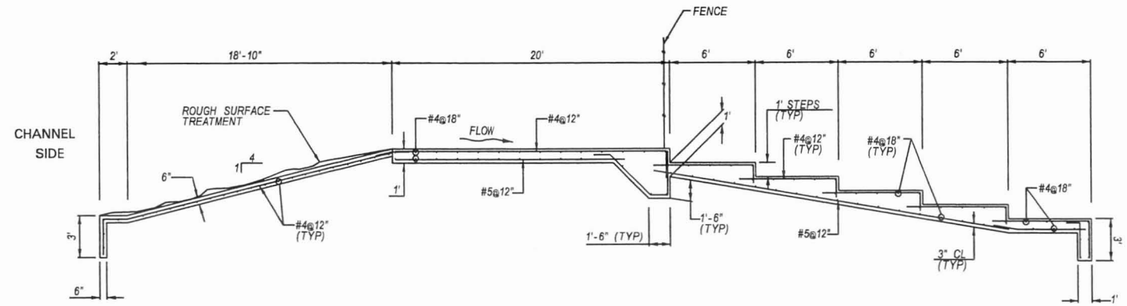
TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES.
1-800-STAKE-IT
Blue Stake Center 1-800-782-5348

SUBMITTAL 7/1/2009

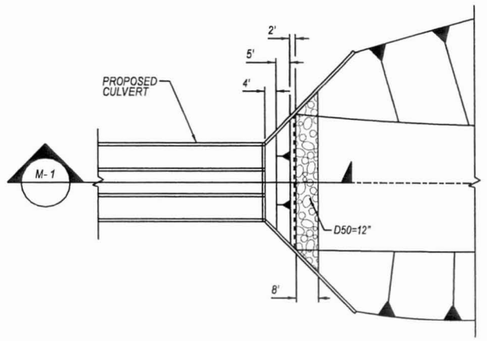
30% SUBMITTAL

g:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL51.dgn
7/1/2009

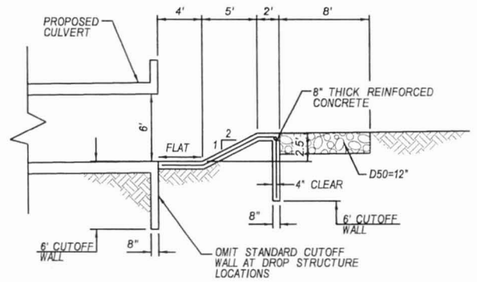
ALL CONCRETE VISIBLE TO BE INTEGRAL COLOR.
CONCRETE FINISH TO HAVE TEXTURE AND NOT SMOOTH



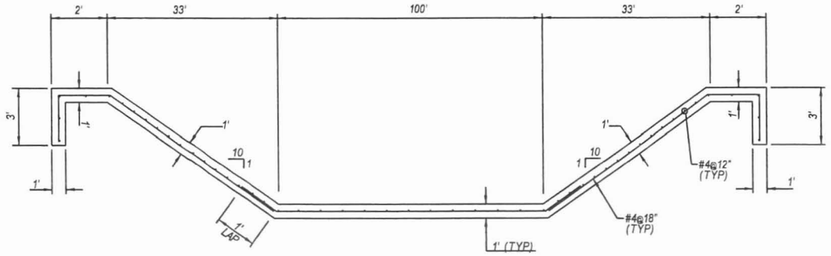
L-1 / 41 SECTION NTS



M DROP INLET STRUCTURE NTS



M-1 SECTION NTS



L-2 / 41 SECTION NTS

g:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL52.dgn
9/1/2009

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER CERTIFICATE NO. 19690 PAUL W.R. HOSKIN ARIZONA, U.S.A.
EXPIRES 3/31/12

WASTEWAY AND DROP INLET STRUCTURE DETAILS SHEET

DRAWING NO. D8 | SHEET 52 OF 55

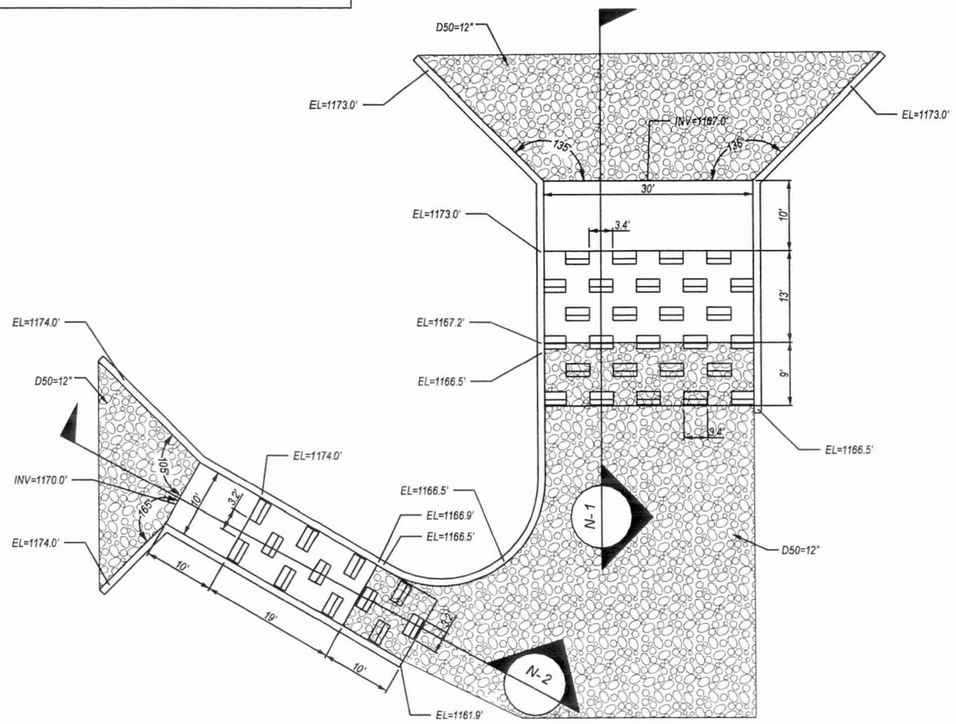
PRELIMINARY NOT FOR CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG CALL FOR THE BLUE STAKES 1-800-STAKE-IT Blue Stake Center 1-602-263-1100

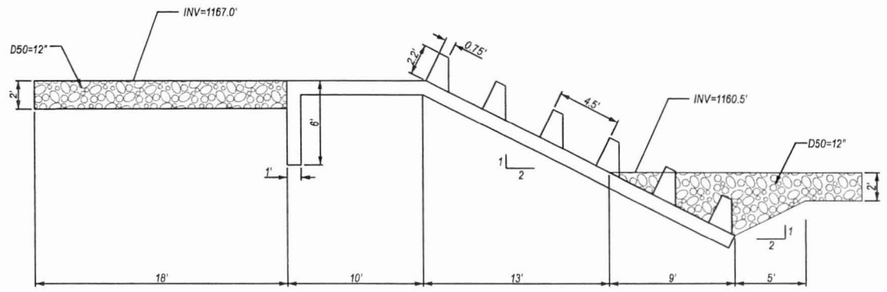
SUBMITTAL 7/1/2009

30% SUBMITTAL

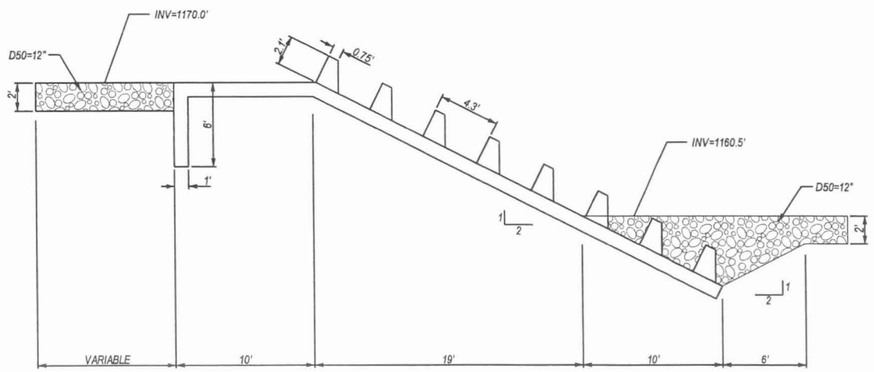
ALL CONCRETE VISIBLE TO BE INTEGRAL COLOR.
CONCRETE FINISH TO HAVE TEXTURE AND NOT SMOOTH



N FLOW JUNCTION STRUCTURE
NTS



N-1 SECTION
NTS



N-2 SECTION
NTS

G:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL53.dgn
7/1/2009

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

FLOW JUNCTION STRUCTURE
DETAIL SHEET

DRAWING NO. D9 | SHEET 53 OF 55

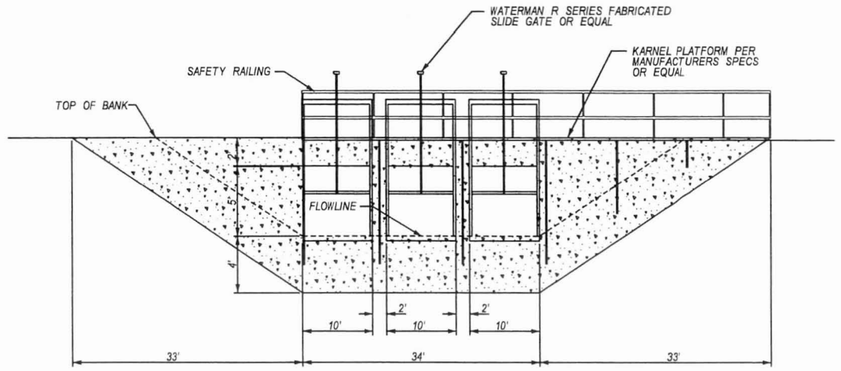
REGISTERED PROFESSIONAL ENGINEER (CIVIL)
CERTIFICATE NO.
19690
PAUL W.R. HOSKIN
ARIZONA, U.S.A.
EXPIRES 3/31/12

PRELIMINARY
NOT FOR
CONSTRUCTION

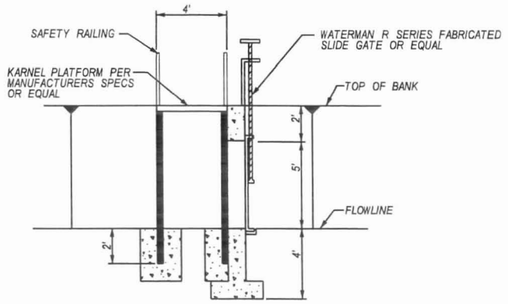
TWO WORKING DAYS BEFORE YOU DIG
CALL FOR THE BLUE STAKES
1-800-STAKE-IT
Blue Stake, Center
1-602-263-1100

SUBMITTAL 7/1/2009 30% SUBMITTAL

ALL CONCRETE VISIBLE TO BE INTEGRAL COLOR.
CONCRETE FINISH TO HAVE TEXTURE AND NOT SMOOTH



O-1 SECTION
NTS



O-2 SECTION
NTS

g:\projects\07\07-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL54.dgn
7/1/2009

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO. 19690
PAUL W.R. HOSKIN
ARIZONA, U.S.A.
EXPIRES 3/31/12

SLIDE GATE
DETAIL SHEET

DRAWING NO. D10 | SHEET 54 OF 55

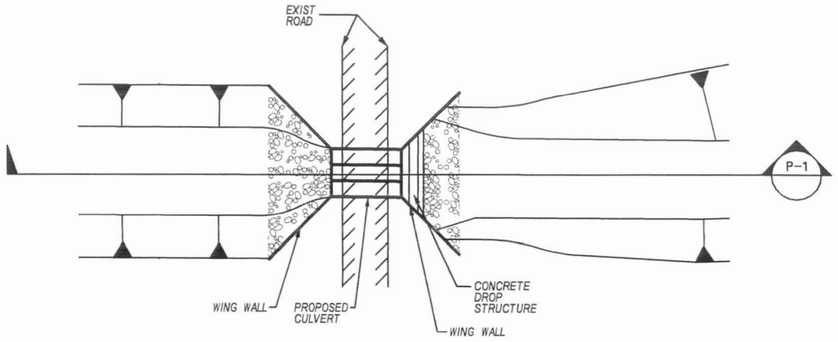
PRELIMINARY
NOT FOR
CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG
CALL FOR THE BLUE STAKES
1-800-STAKE-IT
Bar State Center
1-602-263-1100

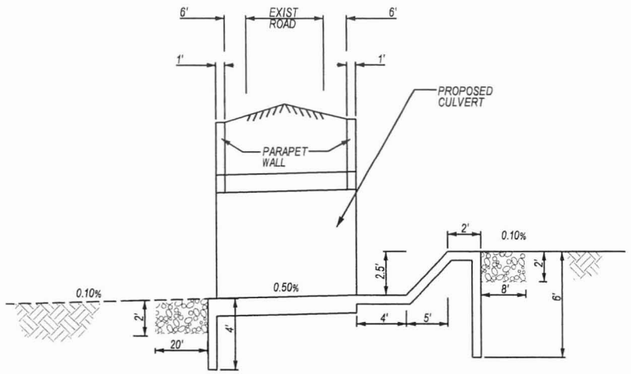
SUBMITTAL 7/1/2009

30% SUBMITTAL

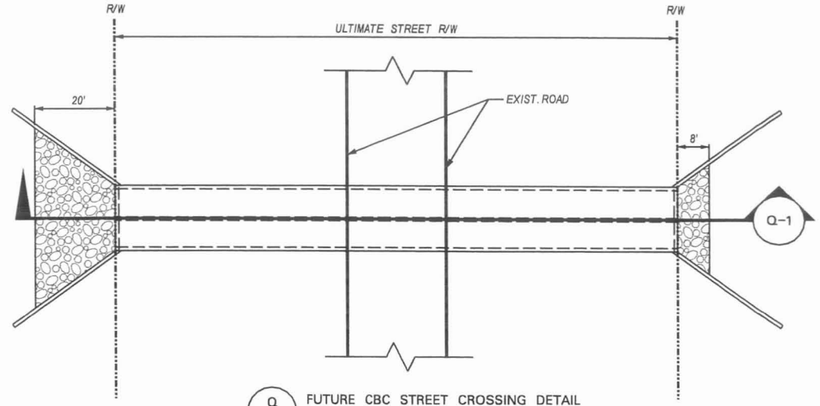
ALL CONCRETE VISIBLE TO BE INTEGRAL COLOR.
CONCRETE FINISH TO HAVE TEXTURE AND NOT SMOOTH



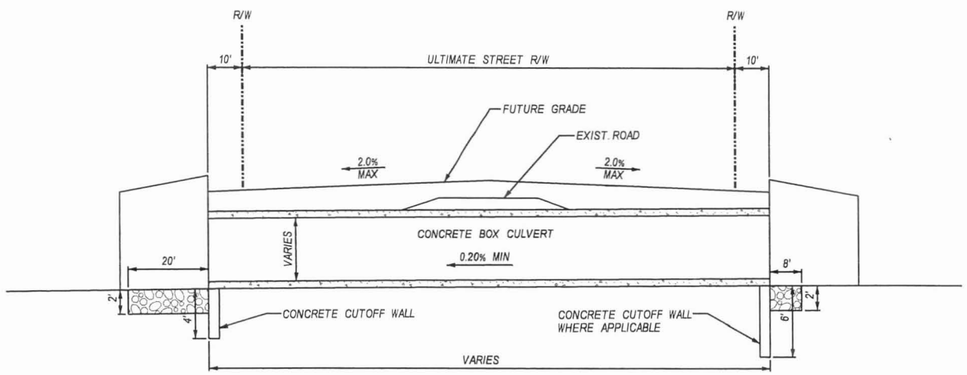
P PROPOSED CBC ROAD CROSSING
NTS



P-1 SECTION
NTS



Q FUTURE CBC STREET CROSSING DETAIL
NTS



Q-1 SECTION
NTS

NO.	REVISION	BY	DATE
3			
2			
1			

Hoskin • Ryan Consultants
creative engineering solutions
201 W. Indian School Road, Phoenix, Arizona 85013-3203
Office: (602) 252-8384 Fax: (602) 252-8385 www.hoskinryan.com

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS NO. 3 OUTFALL CHANNEL
FCD 2007C016
WORK ASSIGNMENT NO. 4

	BY	DATE
DESIGNED	PZ	05/09
DRAWN	NZ	05/09
CHECKED	PWRH, RR	05/09

CBC ROAD CROSSING
DETAIL SHEET

REGISTERED PROFESSIONAL ENGINEER
CERTIFICATE NO. 19690
PAUL W.R. HOSKIN
ARIZONA, U.S.A.
EXPIRES 3/31/12

DRAWING NO. D11 | SHEET 55 OF 55

PRELIMINARY
NOT FOR
CONSTRUCTION

TWO WORKING DAYS BEFORE YOU DIG
CALL FOR THE BLUE STAKES
1-800-STAKE-IT
Blue Stake Center
1-602-263-1100

SUBMITTAL 7/1/2009

30% SUBMITTAL

G:\projects\07107-027 on-call flood control district\04 - white tanks 3 channel\S-CHANNEL55.dgn
7/1/2009