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Part III
Attachment III-C
Appendix III-C.1

FACILITY SURFACE WATER DRAINAGE REPORT NARRATIVE

Pescadito Environmental Resource Center
MSW No. 2374
Webb County, Texas

PESCADITO
ENVIRONMENTAL RESOURCE CENTER

Initial Submittal March 2015
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Revised September 2015
Revised November 2015

11-6-2015

STATE OF TEXAS
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This document is released for the purpose of permitting only under the authority of Michael W. Oden, P.E. #67165. It is not to be used for bidding or construction. Texas Registered Engineering Firm F-5650.

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Attachments

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1.0 INTRODUCTION

This Facility Surface Water Drainage Report (FSWDR) for the Pescadito Environmental Resource Center (PERC) has been designed to collect, route, and detain stormwater runoff from the facility in an environmentally sound manner. The Plan for the landfill contains design features that follow best management practices that meet or exceed the regulations applicable to stormwater management outlined in Title 30 of the Texas Administrative Code (30 TAC), Section 330, Municipal Solid Waste. Specifically, Sections 330.63(c), 330.303, 330.305, and 330.307 are addressed.

Specific regulations of note include:

- ❑ Section 330.63(c) – Facility Surface Water Drainage Report
  - *"The owner or operator of a municipal solid waste (MSW) facility shall include a statement that the facility design complies with the requirements of 330.303 of this title (relating to Surface Water Drainage for Municipal Solid Waste Facilities). Additionally, applications for landfill and compost units shall include a surface water drainage report to satisfy the requirements of Subchapter G of this chapter (relating to Surface Water Drainage)."*
- ❑ Section 330.303 – Surface Water Drainage for Municipal Solid Waste Facilities
  - *"(a) A facility must be constructed, maintained, and operated to manage run-on and runoff during the peak discharge of a 25-year rainfall event*
  - *(b) Surface water drainage in and around a facility shall be controlled to minimize surface water running onto, into, and off the treatment area"*
- ❑ Section 330.305 – Additional Surface Water Drainage Requirements for Landfills
  - *"(a) Existing or permitted drainage patterns must not be adversely altered.*
  - *(b) The owner or operator shall design, construct, and maintain a run-on control system capable of preventing flow onto the active portion of the landfill during the peak discharge from at least a 25-year rainfall event.*
  - *(c) The owner or operator shall design, construct, and maintain a runoff management system from the active portion of the landfill to collect and control at least the water volume resulting from a 24-hour, 25-year storm.*

- *(d) The landfill design must provide effective erosional stability to top dome surfaces and external embankment side slopes during all phases of landfill operation, closure, and post-closure care.*
- *(e) Dikes, embankments, drainage structures, or diversion channels must be sized and graded to handle the design runoff and be graded to minimize the potential for erosion."*

❑ Section 330.307 – Flood Protection

- *"(a) The facility shall be protected from flooding by suitable levees constructed to provide protection from a 100-year frequency flood.*
- *(b) Flood protection levees must be designed and constructed to prevent the washout of solid waste from the facility."*

Stormwater modeling has been completed with the software program HydroCAD. HydroCAD is a computer aided design program used to model hydrology and hydraulics of stormwater using either TR-20 or TR-55 procedures developed by the Soil Conservation Service (now the Natural Resource Conservation Service). HydroCAD was selected for the modeling software due to the large number of stormwater control devices that will be utilized at the PERC. Unlike models such as HEC-HMS, HydroCAD can link multiple models together to allow the user to model a large number of nodes. Model linking has been utilized in this analysis.

2.0 DRAINAGE REVISIONS PRIOR TO LANDFILL FACILITY DEVELOPMENT

The goal in developing a surface water drainage plan is to show that the development of a facility will not adversely alter, to any significant degree, the natural drainage patterns of the watershed that will be affected by the proposed development. This goal is typically achieved by comparing pre-development conditions to post-development conditions for both peak discharge rates (flows) and discharge volumes for various storm events. In the case of the PERC, several drainage modifications were designed in 2011 in order to remove the 100-year floodplain where landfilling was anticipated to occur. Stormwater analyses were developed that considered detailed grading plans for areas outside of the landfill facility boundary and split the landfill facility between two areas. These modifications have added an Intermediate Conditions step that must be used to compare pre-development and post-development conditions.

The 2011 drainage modifications were developed for the purpose of securing a Conditional Letter of Map Revision (CLOMR) from the Federal Emergency Management Agency (FEMA) which would approve modifying the location of the 100-year floodplain based on the proposed CLOMR modifications. A CLOMR Application was developed that included stormwater analyses that considered the detailed grading plans for areas outside of the landfill facility and general assumptions of discharge rates and locations for the facility which was not yet designed.

In addition, the CLOMR Application established the requirement of the landowner or operator to establish an inspection and maintenance program that will ensure that the proposed drainage modifications achieve and maintain their intended function for the life of the landfill facility The drainage modifications will be maintained for as long as waste remains in the landfill units (Appendix E of Attachment III-C.1-A).

The impact of these developments and the anticipated design on natural drainage patterns were thoroughly evaluated by FEMA and approved on November 21, 2014.

The following text briefly describes the pre-development and intermediate development (post-CLOMR) conditions that are expanded upon within the CLOMR Application in Attachment A of this Appendix (III-C.1-A).

2.1 Pre-Development Conditions

The proposed facility will be located on a 953 acre tract of land owned by Rancho Viejo Waste Management, LLC (RVWM). The facility is located approximately 20 miles east of Laredo in Webb County, Texas. The site is located entirely within the 12,194 acre Yugo Ranch that is owned by Rancho Viejo Cattle Company, Ltd., the same owner as the PERC, and has been used for cattle ranching and oil and gas production for many years.

The facility site slopes from north to south at approximate grades of 0.5 to 1 percent. Surficial soils generally have very low permeability, and the site is uniformly covered with native vegetation consisting of brush, forbs and grass. Stormwater runoff historically has not eroded bed-and-bank features into the shallow swales that covey drainage from the site. In recent times, several impoundments have been created on site by shallow excavation and embankment construction across the swales to create livestock watering tanks. Historically, patterns of storm water runoff have thus been significantly altered by the capture of rainfall by these tanks.

Drawing 1 of Appendix III-C.2 shows the regional pre-development topography of all areas that were reviewed as part of the CLOMR. The "drainage areas" (also referred to as "subcatchment areas") that were used for pre-development conditions modeling within the CLOMR are also shown on Drawing 1. Drawing 2 shows the pre-development topography of the facility and immediately surrounding area at a smaller scale to provide greater clarity.

2.2 Intermediate Conditions (Post-CLOMR Modifications)

Hydrologic modifications will be completed in accordance with CLOMR modifications prior to development of the facility. These intermediate conditions will remove the floodplain from the majority of the PERC without increasing peak flood discharges to downstream receiving areas. The CLOMR modifications include the removal of numerous impoundments located within the project area, ranging in size from very small to large (Burrito Tank). Three new detention basins outside the perimeter of the facility will be constructed in order to prevent run-on to the facility. Two of these detention basins are to be located to the north of the site and have been designed to completely capture the 100-year flood flows from Drainage Areas 6 and 7. The two basins are referred to as the Northwest and Northeast Detention Basins in the hydrologic model for the CLOMR. See Figure 7 and Table 12 in the CLOMR application (Attachment A of this Appendix (III-C.1-A)). The two basins and drainage areas can be seen on Drawing III-C.2-3.

A larger detention basin located west of the property will also intercept flows from the western drainage area and from other areas to the north that currently flow through the project site. The basin is designed for temporary detention and attenuation of flows from the revised drainage basin. A new channel capable of handling the basin outflows and redirecting them around the project site will link this basin to a series of existing surface water features south of the project site. These modifications are fully described within the CLOMR Application, which has been reviewed and approved by FEMA.

Drawing 3 of Appendix III-C.2 shows the regional intermediate topography described within the CLOMR. The "drainage areas" (also referred to as "subcatchment areas") that were used for intermediate conditions modeling within the CLOMR are also shown on Drawing 3. Drawing 4 shows the intermediate topography of the facility and immediately surrounding area at a smaller scale to provide greater clarity. It is noted that the text and Figures 4-6 of the CLOMR Application provide additional information regarding these modifications, as provided in Attachment A of this Appendix (III-C.1-A).

As can be seen on Drawings 3 and 4 in III-C.2, the intermediate (post-CLOMR) conditions discharge from two points within the area that the landfill is intended to be constructed. In fact, a drainage divide runs approximately through the middle of the landfill. This drainage divide separates Drainage Areas DA2 and DA3. It is noted in the text of the CLOMR that this drainage divide was placed in this location based on the assumption that stormwater would be evenly divided after landfill development.

2.3 Key Conclusion of CLOMR

A key conclusion of the CLOMR, which includes an assumed discharge rate from the landfill property, is included on page 10 of the report:

> *"Comparing the two peak discharges from the site, the proposed peak flow rate of 14,096 cfs is lower than the existing peak flow of 14,568 cfs. This shows that the proposed West Detention Basin attenuates peak flows sufficiently to prevent increases in flooding downstream of the site. Examining the existing amount of runoff of 6,732.5 acre-feet and the proposed 6,751.2 acre-feet, the two values differ by less than 0.3%. This shows that the models generate roughly the same amount of runoff, confirming that the two models reflect the same characteristics despite heavy modifications to drainage basin delineation and recalculation of curve numbers."*

2.4 Incorporation of CLOMR Assumptions into Proposed Design

Based on the general post-development CLOMR stormwater analysis that has been reviewed and approved by FEMA, CB&I has intentionally designed the landfill to be consistent with the CLOMR's assumptions regarding the landfill's discharge rates, drainage areas, and discharge locations. It is the opinion of CB&I that this approach validates the findings of the CLOMR and confirms that the proposed landfill design will not adversely alter to any significant degree the natural drainage patterns of the watershed.

Additional information regarding the CLOMR is provided within this document. The entire CLOMR application is provided as Attachment A to this Appendix (III-C.1-A), as it is a key component in the stormwater analysis.

3.0 OBJECTIVES OF MODELING

Based on the above discussion, this Facility Surface Water Drainage Report approaches stormwater modeling with the following objectives:

1. Demonstrate that the HydroCAD software produces similar discharge rates and volumes as the HEC-HMS models presented in the CLOMR. This step is completed to ensure an "apples-to-apples" comparison between software models.
2. Develop a detailed stormwater model that reflects the post-development design of the landfill. Model every stormwater management component to ensure that they are adequately sized and can convey stormwater at rates that will not cause erosion (e.g. less than five feet per second) for the 100-year, 24-hour storm. The 100-year storm is selected based on the need to demonstrate that the CLOMR is maintained. It is noted that the CLOMR modeled 100-year storms to accurately delineate the 100-year floodplain. It is also noted that Texas regulations require sizing the facility stormwater management components for the smaller 25-year 24-hour storm.
3. Update the intermediate conditions model (which was based on general landfill hydrology assumptions) with the detailed landfill design described in Objective 2. This model is a hybrid:
    a. Areas inside of the landfill's stormwater management footprint will use the detailed stormwater modeling based on CB&I's design.
    b. Areas outside of the landfill's stormwater management footprint that will be modified from the existing conditions that are modeled as described within the CLOMR.
    c. The purpose of this hybrid model is to verify that the results are substantially similar to the intermediate conditions described in the CLOMR for the 100-year storm to ensure that the CLOMR conclusions are maintained.
4. Run the pre-development HydroCAD model and the post-development HydroCAD model described in Goal #3 for the 25-year 24-hour storm to determine the discharge rates. Demonstrate that the post-development design maintains similar discharge rates and volumes to pre-development conditions, indicating that the landfill development will not produce adverse effects to area stormwater management.

By developing a detailed stormwater model for the proposed facility, CB&I is able to demonstrate that all stormwater features used to convey stormwater within the facility are adequately sized. Additionally, by demonstrating that discharge rates and Drainage Area locations for the facility are consistent with those developed within the CLOMR, the results of the CLOMR and its approach can be maintained.

4.0 OBJECTIVE 1

Demonstrate that the HydroCAD software produces similar discharge rates and volumes as the HEC-HMS models presented in the CLOMR.

Due to the fact that the existing and intermediate development conditions described in the CLOMR were modeled in HEC-HMS, CB&I re-created the HEC-HMS models using HydroCAD to ensure that the two software models produce similar discharge rate and volume determinations for the various stormwater control elements. All input areas and curve numbers identified for the drainage areas were input into HydroCAD exactly as they were input into the HEC-HMS models. It is noted that the drainage areas were converted from square miles (HEC-HMS input) to acres (HydroCAD input). The same elevation-area and elevation-discharge values were also used for the detention basins.

Due to the fact that HEC-HMS determines runoff based on lag time and HydroCAD determines runoff based on time of concentration, the lag times identified in the CLOMR were adjusted to represent time of concentration to be input into HydroCAD. Lag time can be converted to time of concentration using multiple approximations, but is typically found to be between 60 and 70% of time of concentration. The models were found to offer calculated discharge volumes and rates within one percent when using the following conversion:

$$\text{Time of Concentration} = (\text{Lag Time} / 66.6\%) \text{ or } (\text{Lag Time} \times 1.5)$$

The overall discharge from the facility (HEC-HMS model vs HydroCAD model; node Junction-1) are compared in Tables 1 and 2 below. As is evident, the models provide very similar results. The overall difference between the discharge rates of the existing models is less than 0.2% and 0.1% for the existing and proposed conditions, respectively. The overall difference between the discharge volumes of the existing models is 0.04% and 0.0% for the existing and proposed conditions, respectively.

The modeling results clearly demonstrate that HydroCAD software produces similar discharge rates and volumes as the HEC-HMS models presented in the CLOMR, satisfying Objective 1. Therefore, the intermediate conditions model that has been recreated in HydroCAD can be updated with the detailed landfill design for the purpose of comparison to existing conditions and for validation of the CLOMR results.

Table 1 Peak Discharge Rate – 100-Year, 24-Hour Model Comparison			
Model Run	**HEC-HMS – CLOMR (cfs)**	**HydroCAD – Recreated (cfs)**	**Percent Difference**
Pre-development Conditions			
DA1	7860.9	7890.0	0.37%
DA2	1676.8	1687.6	0.64%
DA3	3823.2	3835.91	0.33%
DA4	3824.2	3819.7	-0.12%
Junction-2	6905.7	6926.7	0.30%
Burrito Tank	7714.2	7720.42	0.08%
Reach 1	3272.6	3272.8	0.01%
Junction-1 (Downstream Discharge Point)	14567.6	14540.47	-0.19%
Intermediate Conditions			
DA1	6852.4	6885.92	0.49%
DA2	2082.6	2084.3	0.08%
DA3	4690.7	4709.99	0.41%
DA4	3824.2	3819.9	-0.11%
DA5	468.5	471.92	0.73%
DA6	378.5	380.18	0.44%
DA7	1015.7	1024.75	0.89%
West Detention Basin	5980.8	5960.38	-0.34%
NW Detention Basin	0	0	0.00%
NE Detention Basin	0	0	0.00%
Reach 1	5980.8	5960.38	-0.34%
Junction-1 (Downstream Discharge Point)	14096.1	14083.77	-0.09%

Table 2 Peak Discharge Volume – 25-Year, 24-Hour Model Comparison			
Model Run	**HEC-HMS – CLOMR (cfs)**	**HydroCAD – Recreated (cfs)**	**Percent Difference**
Pre-development Conditions			
DA1	3272.6	3272.9	0.01%
DA2	364.6	363.7	-0.25%
DA3	1263.3	1262.4	-0.07%
DA4	1832	1830.9	-0.06%
Junction-2	3095.3	3093.3	-0.06%
Burrito Tank	3272.6	3272.9	0.01%
Reach 1	3272.6	3272.9	0.01%
Junction-1 (Downstream Discharge Point)	6732.5	6729.8	-0.04%
Intermediate Conditions			
DA1	2520.7	2522.4	0.07%
DA2	557.5	557	-0.09%
DA3	1547.6	1547.6	0.00%
DA4	1832	1830.9	-0.06%
DA5	78.6	78.8	0.25%
DA6	51.8	51.7	-0.19%
DA7	163	162.9	-0.06%
West Detention Basin	2599.3	2601.2	0.07%
Reach 1	2599.3	2601.2	0.07%
NW Detention Basin	0	0	0.00%
NE Detention Basin	0	0	0.00%
Junction-1 (Downstream Discharge Point)	6536.4	6536.6	0.00%

Note: 25 year storm event results were not provided in the CLOMR text. HEC-HMS results shown in Table 2 were obtained from the digital HEC-HMS model files provided with the CLOMR submission.

5.0 OBJECTIVE 2

Develop a detailed stormwater model that reflects the post-development design of the landfill. Model every stormwater management component to ensure that they are adequately sized and can convey stormwater at rates that will not cause erosion (e.g. less than five feet per second) for storm events equal to or less than the 100-year storms.

5.1 Model Analysis Setup

To ensure that the proposed stormwater management features are adequately sized for actual stormwater needs, all elements were computer modeled with numerous conservative assumptions. The computer model HydroCAD was used to develop discharge rates and volumes for various storm events for each stormwater feature described in this Plan. Runoff was evaluated for the 24-hour duration for the 100-year and 25-year storm frequencies. The analyses meet or exceed state and federal requirements for landfills.

The stormwater modeling methodology used the following analysis methods:

Runoff Calculation Method:	SCS TR-20
Reach Routing Method:	Storage Indication Method (also known as Modified-Puls)
Pond Routing Method:	Storage Indication Method (also known as Modified-Puls)
Storm Distribution:	SCS Type III 24-hour storm
Unit Hydrograph:	SCS

5.2 Rainfall

The precipitation for the 100-year storm was obtained from Technical Paper No. 40, "Rainfall Frequency Atlas of the United States" (TP-40). A summary of all rainfall depths associated with the 25-year and 100-year modeled storms is provided in Appendix III-C.3-1. The Soil Conservation Service Storm Type III rainfall distribution was used to develop the peak rainfall for the 100-year and 25-year frequency rainfall events.

The CLOMR was developed using a correction factor of 97% of the rainfall depicted in TP-40, based on Figure 15 – Area-Depth Curves, included in TP-40, which provide correction factors for rainfall over a given drainage area and storm duration. Based on a 22.9 square mile drainage area for the area evaluated, the correction factor is 97%.

For purposes of comparing the CLOMR's existing conditions to intermediate conditions during the 100-year 24-hour storm, the correction factor is used to remain consistent with the CLOMR design approach. However, the model was run without the correction factor for the 25-year, 24-hour storm, which leads to slightly higher rainfall totals, to ensure that all stormwater management features are appropriately sized with respect to 30 TAC Section 330.301 through 307 requirements.

5.3 Model Inputs

Detailed model inputs of all key stormwater management features are provided in the calculations and summaries provided in Appendix III-C.3 and are briefly discussed in the following text sections. Detailed information provided in Appendix III-C.3 includes:

1. Rainfall Totals and Distributions
2. Stormwater Management Feature Delineation
3. Runoff Curve Number Determination
4. Subcatchment Lag Time
5. Subcatchment Area Discharge Rates
6. Terrace Bench Sizing
7. Downchute Sizing
8. Perimeter Channel Sizing
9. Culvert Sizing
10. South Detention Basin Sizing and Discharge Rates

Modeling diagrams and output files are provided in Appendix III-C.4. Output files for pre-development (pre-CLOMR), intermediate (post-CLOMR), and post-development conditions are provided.

It is noted that the landfill catchment boundaries generally have two configuration types, as shown on Drawing 6 of Appendix III-C.2 and described in Appendix III-C.3-2 (Stormwater Management Features Delineation). Representative catchment areas are Landfill Catchment A (representative of Catchments C, E, G, I, K, M, and O) and Landfill Catchment B (representative of Catchments D, F, H, J, L, N, and P). Therefore, model output summary files are only provided for these representative catchments. However, all model output data is available upon request from TCEQ. Output files for all perimeter ditches, culverts, and the South Detention Basin are included in Appendix III-C.4.

5.4 Post-Development Hydrologic Overview

As previously mentioned, the intermediate conditions described within the CLOMR include all modifications that will take place prior to the development of the facility. However, intermediate conditions (post-CLOMR) modeling (identified as Proposed Conditions within the CLOMR) included assumed discharge rates, drainage areas, and discharge locations from the proposed landfill facility. For this reason, CB&I has intentionally developed the detailed landfill design to be consistent with the CLOMR assumptions. Additionally, all stormwater management features have been designed to ensure that the stormwater management system complies with all applicable regulations in 30 TAC, Section 330, Subchapter G. An overview of the post-development conditions is provided as Drawing 5 in Appendix III-C.2.

The proposed design has two waste units, both which have 4H:1V sideslopes and six percent plateau slopes. The northern landfill unit has a peak elevation of approximately 855 ft MSL, while the southern landfill unit has a peak elevation of approximately 840 ft MSL. The landfill units both drain to a common perimeter ditch drainage network that drains into the South Detention Basin, where stormwater ultimately discharges from the facility, as described in the following text.

5.4.1 Terrace benches

Vegetated terrace benches will be used to intercept stormwater sheet flow, collect runoff, and control erosion along the sideslopes of the landfill final cover. Terrace benches are located approximately every 200 horizontal feet. The terrace benches will be constructed in the locations shown on Drawing 6 in Appendix III-C.2.

The terrace benches will have check dams approximately every 250 to 450 feet to slow water and allow for a controlled release rate. Check dams will be installed at the downslope side of each subcatchment area, as detailed on Drawing 7. Check dams will be constructed of soil and will have 7 inch (South Unit) or 14 inch (North Unit) diameter in-line drainage pipes at the base to allow stormwater to pass in a controlled manner. The terrace benches are modeled as catch basins due to the fact that the check dams temporarily hold stormwater to allow its discharge into the next terrace berm/check dam segment in a controlled manner. However, due to the presence of in-line drainage pipes through the check dams, stormwater will only be temporarily held and will not pond on the landfill final cover. Erosion will not occur due to the fact that check dam construction will limit flow length and velocity of the stormwater on the face of the final landform and convey it to downchutes lined with rip-rap or other erosion control material (ECM). The terrace benches have been designed to function without overtopping during the modeled 100-year 24-hour and 25-year 24-hour storms, which exceeds the requirements specified in 30 TAC 330.303.

5.4.2 Downchutes

Downchutes (also known as downslope ditches) will be constructed to convey the stormwater collected by the terrace benches down the slope of the landfill and into the perimeter ditches. The downchutes will be lined with riprap or other erosion control material (ECM) to minimize scour and prevent erosion. The downchutes are designed to adequately handle runoff flow rates from the peak 100-year storm without overtopping, exceeding the requirements of 30 TAC 330.305. The planned locations of the downchutes are shown on Drawing 6 of Attachment III-C.2. Details of the downchutes are provided on Drawing 7. The design parameters for the downchutes and calculations demonstrating that the downchutes will provide adequate stormwater control and are sufficiently sized are presented in Attachment III-C.3-7.

5.4.5 South Detention Basin

The South Detention Basin will be installed along the southern border of the facility to temporarily detain all stormwater that falls on the landfill, perimeter roads, and ancillary facilities. The detention basin receives stormwater through the perimeter ditches. The size of the South Detention Basin has been designed based on a fully developed landfill footprint and will be constructed prior to the time that waste in the first cell developed is placed above existing ground. The basin has been designed with excess capacity to safely detain and release the 100-year, 24-hour and 25-year, 24-hour storm events while maintaining one foot of freeboard above the maximum water level, in accordance with best management practices.

The location of the South Detention Basin is shown in Drawings 5, 6, 11 and 12 of Appendix III-C.2. Profiles and details of the basin are provided on Drawings 11 and 12. See Attachment 10 to Appendix III-C.3 (III-C.3-10) for the detention basin sizing. See Attachment 3.D in Appendix III-C.4 (III-C.4-3.D) for the HydroCAD® Output files for the detention basin capacity calculations. Page 82 in Section I contains information for the 100-year storm and page 82 in Section II for the 25-year storm. Drawings 6, 11 and 12 in Appendix III-C.2 show the location of the basin.

5.4.6 South Detention Basin Discharge

The South Detention Basin will have two discharge points, located approximately at the southwest and southeast corners of the basin. Each discharge point will contain multiple culvert outlets that will facilitate the controlled release of stormwater. Stormwater will discharge through the culverts to the outside of the basin. Riprap or other erosion control material will be placed at the discharge locations to minimize the potential for erosion and scour. Refer to Drawing 12 of Appendix III-C.2 for details of the proposed outlet structure design.

Discharge from the detention basin will be sent to both the east and the west into Drainage Areas DA-3 and DA-2, respectively. Percentage of the discharge volume from the detention basin to DA-2 and DA-3 has been split to provide discharge rates and volumes consistent with the CLOMR (intermediate conditions). Additional stormwater conveyance features may be installed to direct water directly into the San Juanito Creek tributary system. Please note that the outlet structure design may be changed provided that the revised design provides adequate reinforcement and protection of the outfall and equivalent release rates to the modeled design. Any changes desired will be submitted as a permit modification and approval obtained prior to implementation.

The outlet structures are designed so that the total release rates from the post-development conditions of the modeled storm events are similar to the corresponding discharge rates for the intermediate conditions, as demonstrated and described in the subsequent modeling text.

5.4.7 Run-On Protection

Run-on from off-site areas will be prevented from flowing onto the active portion of the landfill by virtue of the fact that outer alignment of the perimeter road, which will surround both waste units, has been designed to be at least one foot higher than the surrounding existing topography. This creates an island affect where surficial water will flow around the landfill facility. Additionally, the waste boundary is located one-foot in elevation higher than the crest of the perimeter channels, which are designed to convey the 100-year storm. Thus, the top of slope for the waste boundary is located at least two feet in elevation higher than the surrounding topography in all areas of the landfill.

5.4.8 Flood Protection

No portion of the landfill footprint, proposed landfill development, ancillary facilities, or associated appurtenances are located within the revised 100-year floodplain, as shown on Drawing 5 and 6 of Appendix III-C.2. Consistent with 30 TAC Section 330.63(c)(2), 330.307, 330.547(a) and (b), neither waste disposal unit or any operations area will be located within the 100-year floodplain. The facility development will not restrict the flow of the 100-year flood, will not reduce the temporary water storage capacity of the floodplain, and will not result in the washout of solid waste.

5.4.9 Contaminated Water Management

Contaminated water is defined in TAC Section 330.3(36) as leachate, gas condensate, or water that has come into contact with waste. Stormwater will be managed carefully in all areas of the landfill to limit the quantity that may come in contact with waste. Two-foot tall earthen berms will be used to separate rainfall that has not become contaminated from exposed waste and contain stormwater that has come into contact with waste from leaving the active area (See Detail 2 on drawing III-D.3-8. An intact layer of soil, or other approved cover will be placed over the waste to prevent rainfall from contacting the waste. Ditches, swales, culverts, and other structures as appropriate will be constructed to prevent stormwater run-on onto the active fill areas. The handling, storage, treatment, and disposal of contaminated surface or groundwater will be managed according to TAC Section 330.207. See Appendix III-D.6 for a detailed leachate and contaminated water plan.

5.5 Key Modeling Results for Landfill Stormwater Management Components

As previously mentioned, detailed descriptions of all elements and model inputs are thoroughly described in the calculations provided in Appendix III-C.3. All stormwater controls were found to be appropriately sized to convey the 100-year and 25-year, 24-hour storm events (surpassing local, state, and federal requirements). Key findings include the following:

1. All terrace benches are appropriately sized to pass the peak discharge of the 100-year, 24-hour storm event without overtopping. Additionally, they are not anticipated to experience erosion or scour due to the check dams.
2. Downchutes can safely convey the 100-year, 24-hour storm. Downchutes will be armoured with riprap or other equivalent erosion control material.
3. All stormwater ditches are appropriately sized to convey the 100-year, 24-hour storm event without overtopping under design conditions. All stormwater ditches will be vegetated, lined with SmartDitch™, riprap, or lined with other erosion control material to minimize the potential for erosion or scour. Areas where peak velocities within the stormwater ditch is over 5-ft/sec for the 25-year, 24-hour storm will be lined with Turf Reinforced Mats (TRM).
4. All culverts are appropriately sized to convey stormwater within the perimeter ditches for the 100-year, 24-hour storm event. The culverts will not back up or lead to overtopping conditions within the stormwater ditches.
5. The detention basin is sufficiently sized to detain the 100-year, 24-hour storm event. Sufficient sediment storage is provided below the normal water level without impeding basin performance.

Based on the results summarized above and described in detail within the calculations, all stormwater management features for the post-development design of the landfill have been modeled and have been shown to be adequately sized to manage the 100-year and 25-year storm events, satisfying 30 TAC 330.305. Furthermore, areas of the perimeter ditch exhibiting peak storwmater velocities greater than five ft/sec will be lined with TRM. Downchutes will be reinforced with rip-rap or an alternative erosion control material. Therefore, Objective 2 has been satisfied.

6.0 OBJECTIVE 3

Update the Intermediate Conditions (post-CLOMR) Model to include detailed landfill design. Verify that the updated results are substantially similar to the intermediate conditions described in the CLOMR for the 100-year storm to ensure that the CLOMR conclusions are maintained.

In order to ensure that the determinations made in the CLOMR were maintained, the proposed stormwater model including the detailed stormwater management system was compared to the proposed stormwater model from the CLOMR for the 100-year, 24-hour event.

This model is a hybrid:

A. Areas inside of the landfill's stormwater management footprint will use the detailed stormwater modeling based on CB&I's design.
B. Areas outside of the landfill's stormwater management footprint that will be modified from existing conditions are modeled as described within the CLOMR.

Because some of the drainage areas in the CLOMR proposed model were modified by the detailed proposed model, the two models were compared at the "Junction 1-Downstream Discharge Point" for the 100-year, 24-hour storm event to demonstrate that the design of the stormwater management system does not significantly or negatively impact the downstream discharge values determined in the CLOMR. The Junction 1-Downstream Discharge Point is shown on Drawings 1 and 3 of Appendix III-C.2. The stormwater model output files are provided in Appendix III-C.4. Table 5 below summarizes the comparison of the two models.

Table 5
100-Year, 24-Hour Storm Event Model Comparison

Model Run	**Intermediate (post-CLOMR)**	**Post Development**	**Percent Difference**
Peak Discharge Rate (cfs)			
Junction-1 (Downstream Discharge Point)	14,083.77	14,070.88	-0.1%
Peak Discharge Volume (af)			
Junction-1 (Downstream Discharge Point)	6,536.62	6,734.90	3.0%

Based on the fact that both models produce peak discharge rates and volumes within 5 percent, Objective 3 is satisfied. This demonstrates that the CLOMR results are valid when incorporating the detailed landfill design.

7.0 OBJECTIVE 4

Run the pre-development HydroCAD model and the post-development HydroCAD model described in Objective #3 for the 100-year storm to determine the discharge rates associated with the 100-year storms. Demonstrate that post-development design maintains similar discharge rates and volumes to pre-development conditions, indicating that the landfill development will not produce adverse effects to area stormwater management.

In order to demonstrate compliance with 30 TAC, Section 330, Subchapter G, the proposed stormwater model including the detailed stormwater management system was compared to the existing conditions stormwater model. The two models were compared at the "Junction 1-Downstream Discharge Point" to demonstrate that the design of the stormwater management system does not significantly or negatively impact the existing downstream discharge values. Table 6 below summarizes the comparison of the two models.

Table 6
100-Year, 24-Hour Storm Event Model Comparison

Model Run	Pre-Development (pre-CLOMR)	Post-Development	Percent Difference
Peak Discharge Rate			
Junction-1 (Downstream Discharge Point)	14,540.47	14,070.88	-3.3%
Peak Discharge Volume			
Junction-1 (Downstream Discharge Point)	6,729.82	6,734.90	0.1%

Based on the fact that the post-development conditions will discharge water downstream at flow rates and volumes that are within 5 percent of existing conditions demonstrates that the proposed landfill will not adversely affect drainage conditions. Therefore, Objective 4 is achieved.

Attachment III-C

Appendix III-C.1

FACILITY SURFACE WATER DRAINAGE REPORT

III-C.1-A. APPROVED CONDITIONAL LETTER OF MAP REVISION APPLICATION (ATTACHMENT A TO APPENDIX III-C.1)

Technically Complete, March 11, 2016

Federal Emergency Management Agency

Washington, D.C. 20472

November 21, 2014

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 14-06-1606R

The Honorable Danny Valdez
Webb County Judge
1000 Houston Street, 3rd Floor
Laredo, TX 78040

Community Name: Webb County, TX
Community No.: 481059

Dear Judge Valdez:

We are providing our comments with the enclosed Conditional Letter of Map Revision (CLOMR) on a proposed project within your community that, if constructed as proposed, could revise the effective Flood Insurance Study report and Flood Insurance Rate Map for your community.

If you have any questions regarding the floodplain management regulations for your community, the National Flood Insurance Program (NFIP) in general, or technical questions regarding this CLOMR, please contact the Director, Mitigation Division of the Federal Emergency Management Agency (FEMA) Regional Office in Denton, Texas, at (940) 898-5127, or the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our Web site at http://www.fema.gov/business/nfip.

Sincerely,

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

List of Enclosures:
Conditional Letter of Map Revision Comment Document

cc: Ms. Rhonda Tiffin
Director of Planning Department
Webb County

Mr. Michael W. Oden, P.E.
Senior Project Manager
CB&I Environmental and Infrastructure, Inc.

Mr. Carlos Y. Benavides, III
Rancho Viejo Waste Management, LLC

Ms. Cristy B. Alexander
Rancho Viejo Cattle Company Ltd.

Technically Complete, March 11, 2016

Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION
COMMENT DOCUMENT

COMMUNITY INFORMATION		PROPOSED PROJECT DESCRIPTION	BASIS OF CONDITIONAL REQUEST
COMMUNITY	**Unincorporated areas of Webb County Texas**	BRIDGE CHANNELIZATION CHANNEL RELOCATION DETENTION BASIN FILL	HYDRAULIC ANALYSIS HYDROLOGIC ANALYSIS UPDATED TOPOGRAPHIC DATA
	COMMUNITY NO.: 481059		
IDENTIFIER	Pescadito Environmental Resource Center	**APPROXIMATE LATITUDE AND LONGITUDE:** 27.555, -99.165 **SOURCE:** Precision Mapping Streets **DATUM:** NAD 83	

AFFECTED MAP PANELS	
TYPE: FIRM* NO.: 48479C1275C DATE: April 2, 2008	* FIRM - Flood Insurance Rate Map

FLOODING SOURCES AND REACH DESCRIPTION See Page 2 for Additional Flooding Sources

East Channel – from the confluence with West Channel to approximately 8,730 feet upstream of the confluence with West Channel

PROPOSED PROJECT DESCRIPTION

Flooding Source	Proposed Project	Location of Proposed Project
East Channel	Fill Placement	from approximately 3,200 feet upstream of the confluence with West Channel to approximately 8,730 feet upstream of the confluence with West Channel

SUMMARY OF IMPACTS TO FLOOD HAZARD DATA

Flooding Source	Effective Flooding	Proposed Flooding	Increases	Decreases
East Channel	Zone A	Zone AE	Yes	Yes
	No BFEs*	BFEs	Yes	None

* BFEs - Base (1-percent-annual-chance) Flood Elevations

COMMENT

This document provides the Federal Emergency Management Agency's (FEMA's) comment regarding a request for a CLOMR for the project described above. This document is not a final determination; it only provides our comment on the proposed project in relation to the flood hazard information shown on the effective National Flood Insurance Program (NFIP) map. We reviewed the submitted data and the data used to prepare the effective flood hazard information for your community and determined that the proposed project meets the minimum floodplain management criteria of the NFIP. Your community is responsible for approving all floodplain development and for ensuring that all permits required by Federal or State/Commonwealth law have been received. State/Commonwealth, county, and community officials, based on their knowledge of local conditions and in the interest of safety, may set higher standards for construction in the Special Flood Hazard Area (SFHA), the area subject to inundation by the base flood. If the State/Commonwealth, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on the FEMA Web site at http://www.fema.gov/business/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

ADDITIONAL FLOODING SOURCES AFFECTED BY THIS CONDITIONAL REQUEST

FLOODING SOURCES AND REACH DESCRIPTION **See Page 3 for Additional Flooding Sources**

West Channel – from approximately 270 feet downstream of Ranch Road 7150 to approximately 8,920 feet upstream of the Ranch Road 7150

PROPOSED PROJECT DESCRIPTION

Flooding Source	Proposed Project	Location of Proposed Project
West Channel	Fill Placement	from approximately 3,050 feet upstream of the Ranch Road 7150 to approximately 7,300 feet upstream of the Ranch Road 7150
	New West Detention Basin	at approximately 7,300 feet upstream of the Ranch Road 7150
	Channel Relocation	from approximately 3,730 feet upstream of Ranch Road 7150 to approximately 7,300 feet upstream of the Ranch Road 7150
	New Bridge	at approximately 6,710 feet upstream of the Ranch Road 7150

SUMMARY OF IMPACTS TO FLOOD HAZARD DATA

Flooding Source	Effective Flooding	Proposed Flooding	Increases	Decreases
West Channel	Zone A	Zone AE	Yes	Yes
	No BFEs*	BFEs	Yes	None

* BFEs - Base (1-percent-annual-chance) Flood Elevations

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on the FEMA Web site at http://www.fema.gov/business/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

ADDITIONAL FLOODING SOURCES AFFECTED BY THIS CONDITIONAL REQUEST

FLOODING SOURCES AND REACH DESCRIPTION

Northwest Channel – from the confluence with West Channel to approximately 6,860 feet upstream of the confluence with West Channel

Northeast Detention Basin – Entire shoreline within the Unincorporated Areas of Webb County

Northwest Detention Basin – Entire shoreline within the Unincorporated Areas of Webb County

PROPOSED PROJECT DESCRIPTION

Flooding Source	Proposed Project	Location of Proposed Project
Northwest Channel	Channelization	from approximately 3,790 feet upstream of the confluence with West Channel to approximately 6,860 feet upstream of the confluence with West Channel
Northeast Detention Basin	New Detention Basin	Entire shoreline within the Unincorporated Areas of Webb County
Northwest Detention Basin	New Detention Basin	Entire shoreline within the Unincorporated Areas of Webb County

SUMMARY OF IMPACTS TO FLOOD HAZARD DATA

Flooding Source	Effective Flooding	Proposed Flooding	Increases	Decreases
Northwest Channel	Zone A	Zone AE	Yes	None
	Zone X (unshaded)	Zone AE	Yes	None
	No BFEs*	BFEs	Yes	None
Northeast Detention Basin	Zone X (unshaded)	Zone AE	Yes	None
	No BFEs	BFEs	Yes	None
Northwest Detention Basin	Zone X (unshaded)	Zone AE	Yes	None
	No BFEs	BFEs	Yes	None

* BFEs - Base (1-percent-annual-chance) Flood Elevations

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on the FEMA Web site at http://www.fema.gov/business/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Technically Complete, March 11, 2016

Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

To determine the changes in flood hazards that will be caused by the proposed project, we compared the hydraulic modeling reflecting the proposed project (referred to as the proposed conditions model) to the hydraulic modeling reflecting the existing conditions.

The table below shows the changes in the base flood water-surface elevations (WSELs).

Base Flood WSEL Comparison Table

Flooding Source: East Channel		Base Flood WSEL Change (feet)	Location of maximum change
Proposed vs. Existing	Maximum increase	0.2	At approximately 4,360 feet upstream of the confluence with West channel
	Maximum decrease	0.2	At approximately 6,040 feet upstream of the confluence with West channel
Flooding Source: West Channel		Base Flood WSEL Change (feet)	Location of maximum change
Proposed vs. Existing	Maximum increase	2.7	At approximately 7,190 feet upstream of the Ranch Road 7150
	Maximum decrease	1.4	At approximately 3,050 feet upstream of the Ranch Road 7150
Flooding Source: Northwest Channel		Base Flood WSEL Change (feet)	Location of maximum change
Proposed vs. Existing	Maximum increase	None	
	Maximum decrease	None	
Flooding Source: Northeast Detention Basin		Base Flood WSEL Change (feet)	Location of maximum change
Proposed vs. Existing	Maximum increase	None	
	Maximum decrease	None	
Flooding Source: Northwest Detention Basin		Base Flood WSEL Change (feet)	Location of maximum change
Proposed vs. Existing	Maximum increase	None	
	Maximum decrease	None	

NFIP regulations Subparagraph 60.3(b)(7) requires communities to ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management ordinances; therefore, responsibility for maintenance of the altered or relocated watercourse, including any related appurtenances such as bridges, culverts, and other drainage structures, rests with your community. We may request that your community submit a description and schedule of maintenance activities necessary to ensure this requirement.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on the FEMA Web site at http://www.fema.gov/business/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

DATA REQUIRED FOR FOLLOW-UP LOMR

Upon completion of the project, your community must submit the data listed below and request that we make a final determination on revising the effective FIRM and FIS report. If the project is built as proposed and the data below are received, a revision to the FIRM and FIS report would be warranted.

• Detailed application and certification forms must be used for requesting final revisions to the maps. Therefore, when the map revision request for the area covered by this letter is submitted, Form 1, entitled "Overview and Concurrence Form," must be included. A copy of this form may be accessed at http://www.fema.gov/plan/prevent/fhm/dl_mt-2.shtm.

• The detailed application and certification forms listed below may be required if as-built conditions differ from the proposed plans. If required, please submit new forms, which may be accessed at http://www.fema.gov/plan/prevent/fhm/dl_mt-2.shtm, or annotated copies of the previously submitted forms showing the revised information.

Form 2, entitled "Riverine Hydrology and Hydraulics Form." Hydraulic analyses for as-built conditions of the base flood must be submitted with Form 2.

Form 3, entitled "Riverine Structures Form."

• A certified topographic work map showing the revised and effective base floodplain boundaries. Please ensure that the revised information ties-in with the current effective information at the downstream and upstream ends of the revised reach.

• An annotated copy of the FIRM, at the scale of the effective FIRM, that shows the revised base floodplain boundary delineation shown on the submitted work map and how it tie-into the base floodplain boundary delineation shown on the current effective FIRM at the downstream and upstream ends of the revised reach.

• As-built plans, certified by a registered Professional Engineer, of all proposed project elements.

• Documentation of the individual legal notices sent to property owners who will be affected by any widening or shifting of the base floodplain and/or any BFE establishment along East Channel, West Channel, Northwest Channel, Northeast Detention Basin and Northwest Detention Basin.

• Documentation of the evaluation of conservation measures performed onsite in the Endangered Species Act biological assessment report and put forth in the USFWS letter.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on the FEMA Web site at http://www.fema.gov/business/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION
COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

DATA REQUIRED FOR FOLLOW-UP LOMR (continued)

• An officially adopted maintenance and operation plan for the West Detention Basin (part of West Channel), Northeast Detention Basin and Northwest Detention Basin . This plan, which may be in the form of a written statement from the community Chief Executive Officer, an ordinance, or other legislation, must describe the nature of the maintenance activities, the frequency with which they will be performed, and the title of the local community official who will be responsible for ensuring that the maintenance activities are accomplished.

• FEMA's fee schedule for reviewing and processing requests for conditional and final modifications to published flood information and maps may be accessed at http://www.fema.gov/plan/prevent/fhm/frm_fees.shtm. The fee at the time of the map revision submittal must be received before we can begin processing the request. Payment of this fee can be made through a check or money order, made payable in U.S. funds to the National Flood Insurance Program, or by credit card (Visa or MasterCard only). Please either forward the payment, along with the revision application, to the following address:

LOMC Clearinghouse
Attention: LOMR Manager
847 South Pickett Street
Alexandria, Virginia 22304-4605

or submit the LOMR using the Online LOMC portal at: https://hazards.fema.gov/femaportal/onlinelomc/signin

After receiving appropriate documentation to show that the project has been completed, FEMA will initiate a revision to the FIRM and FIS report. Because the flood hazard information (i.e., base flood elevations, base flood depths, SFHAs, zone designations, and/or regulatory floodways) will change as a result of the project, a 90-day appeal period will be initiated for the revision, during which community officials and interested persons may appeal the revised flood hazard information based on scientific or technical data.

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on the FEMA Web site at http://www.fema.gov/business/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

COMMUNITY REMINDERS

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Mr. Frank Pagano
Director, Mitigation Division
Federal Emergency Management Agency, Region VI
Federal Regional Center, Room 206
800 North Loop 288
Denton, TX 76209
(940) 898-5127

This comment is based on the flood data presently available. If you have any questions about this document, please contact the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional information about the NFIP is available on the FEMA Web site at http://www.fema.gov/business/nfip.

Luis Rodriguez, P.E., Chief
Engineering Management Branch
Federal Insurance and Mitigation Administration

12005 Ford Road, Suite 600
Dallas, TX 75234
972-773-8400
Fax: 972-773-8401

Technically Complete, March 11, 2016

CB&I Environmental and Infrastructure, Inc.

LOMC Clearinghouse
847 South Pickett Street
Alexandria, VA 22304-4605
Attn: LOMC Manager

February 13, 2014

Re: Conditional Letter of Map Revision
Pescadito Environmental Resource Center
Rancho Viejo Waste Management, LLC
Webb County, Texas
Communities: Webb County
Community No.: 481059

Dear LOMC Manager,

CB&I Environmental and Infrastructure, Inc. (CB&I), formerly known as Shaw Environmental, Inc., is submitting the attached application for a Conditional Letter of Map Revision (CLOMR) for the relocation of existing impoundments and improvements to two unnamed tributaries to San Juanito Creek in Webb County, Texas.

The application was prepared by TRC Solutions, Inc.; however, CB&I is now managing the project and has been working to obtain compliance documentation with the Endangered Species Act. This has been recently completed and documentation is included in Appendix I of the attached application. Appendix J includes a compact disc containing electronic files of the modeling efforts supporting the application.

A check in the amount of $6,050 has been submitted along with the Payment Information Form to the address indicated on the Form. A copy is attached to this letter for your information.

We believe the application is complete for issuance of the CLOMR; however, if you have any questions or require additional information, please do not hesitate to contact me at the address or phone number listed above.

Sincerely,

CB&I Environmental and Infrastructure, Inc.
Texas Registered Engineering Firm F-5650 (Shaw Environmental, Inc.)

Michael W. Oden

Michael W. Oden, P.E.
Project Manager
Texas Solid Waste Program

Attachments

CC with attachments:
Mr. Carlos Y. Benavides, III
Mr. Bill Thompson

CC without attachments:
Mr. Richard Frithiof, P.E. – TRC Solutions, Inc.

12005 Ford Road, Suite 600
Dallas, TX 75234
972-773-8400
Fax: 972-773-8401

CB&I Environmental and Infrastructure, Inc.

FEMA
Fee Charge System Administrator
7390 Coca Cola Drive; Suite 204
Hanover, MD 21076

February 13, 2014

Re: Conditional Letter of Map Revision
Pescadito Environmental Resource Center
Rancho Viejo Waste Management, LLC
Webb County, Texas
Communities: Webb County
Community No.: 481059

Dear Fee Charge System Administrator,

CB&I Environmental and Infrastructure, Inc. (CB&I), formerly known as Shaw Environmental, Inc., is submitting the attached check (#7597 from Rancho Viejo Cattle Company, Ltd.) in the amount of $6,050.00. The check is for payment of fees related to an application for a Conditional Letter of Map Revision (CLOMR) for the relocation of existing impoundments and improvements to two unnamed tributaries to San Juanito Creek in Webb County, Texas. The improvements are related to the potential development of the Pescadito Environmental Resource Center by Ranch Viejo Waste Management, LLC.

Also included is a Payment Information Form (FEMA Form 81-107) as required. The actual application is being sent to the LOMC Clearinghouse in Alexandria, Virginia. Should you have any questions or require additional information, please do not hesitate to contact me at the address or phone number listed above.

Sincerely,

CB&I Environmental and Infrastructure, Inc.
Texas Registered Engineering Firm F-5650 (Shaw Environmental, Inc.)

Michael W. Oden, P.E.
Project Manager
Texas Solid Waste Program

Attachments

CC:
Mr. Carlos Y. Benavides, III
Mr. Bill Thompson

Technically Complete, March 11, 2016

FEDERAL EMERGENCY MANAGEMENT AGENCY
PAYMENT INFORMATION FORM

Community Name: Webb County

Project Identifier: Conditional Letter of Map Revision Request - Pescadito Environmental Resource Center

THIS FORM MUST BE MAILED, ALONG WITH THE APPROPRIATE FEE, TO THE ADDRESS BELOW OR FAXED TO THE FAX NUMBER BELOW.

Type of Request:

☐ MT-1 application
☑ MT-2 application

FEMA
Fee Charge System Administrator
7390 Coca Cola Drive
Suite 204
Hanover, MD 21076

☐ EDR application

FEMA Project Library
847 South Pickett St.
Alexandria, VA 22304
FAX (703) 212-4090

Request No.: ________ (if known)

Amount: $6,050

☐ INITIAL FEE* ☐ FINAL FEE ☐ FEE BALANCE** ☐ MASTER CARD ☐ VISA ☑ CHECK ☐ MONEY ORDER

*Note: Check only for EDR and/or Alluvial Fan requests (as appropriate).

**Note: Check only if submitting a corrected fee for an ongoing request.

COMPLETE THIS SECTION ONLY IF PAYING BY CREDIT CARD

CARD NUMBER

1 2 3 4 — 5 6 7 8 — 9 10 11 12 — 13 14 15 16

EXP. DATE

Month — Year

Date ________

Signature ________

NAME *(AS IT APPEARS ON CARD)*: ________
(please print or type)

ADDRESS: ________
(for your credit card receipt-please print or type) ________

DAYTIME PHONE: ________

Technically Complete, March 11, 2016

IBC BANK®

IBC Voice - (956) 723-2929

Laredo, TX

7597

RANCHO VIEJO CATTLE CO., LTD. 10-93
1116 CALLE DEL NORTE
LAREDO, TX 78041

88-252/1149 2

DATE 01-12-14

PAY TO THE ORDER OF National Flood Insurance Program $ 6,050.00

Six Thousand Fifty Dollars 00/100 DOLLARS

Security Features Included. Details on Back.

THIS CHECK IS DELIVERED FOR PAYMENT ON THE ACCOUNTS LISTED

L Cristina B Alexander MP

Cecily Bro[illegible]

⑈007597⑈ ⑆114902528⑆070876400 1⑈

Technically Complete, March 11, 2016

Conditional Letter of Map Revision Request
Pescadito Environmental Resource Center

Prepared for:

Rancho Viejo Waste Management, LLC
1116 Calle del Norte
Laredo, TX 78041

Prepared by:

TRC

Richard K. Frithiof, P.E., C.F.M.
TRC Solutions, Inc.
TBPE Firm Registration F-3775
505 E. Huntland Drive, Suite 250
Austin, Texas 78752
512-343-1070

STATE OF TEXAS
RICHARD K. FRITHIOF
55186
REGISTERED PROFESSIONAL ENGINEER

11/1/2011

Contents

Appendices

Conditional Letter of Map Revision Request for Pescadito Environmental Resource Center
Rancho Viejo Waste Management, LLC
Webb County, Texas

Introduction

Rancho Viejo Waste Management, LLC is proposing to construct the Pescadito Environmental Resource Center, a municipal landfill in Webb County, Texas. The design requirements for landfills dictate that a landfill cannot be located within the 100-year floodplain. Approximately 60% of the proposed landfill location is currently located within a Zone A mapped area. The existing stream channels and surface impoundments within the proposed landfill boundaries must be relocated in order to remove the 100-year floodplain from the area.

Rancho Viejo Waste Management, LLC has authorized TRC to complete this Conditional Letter of Revision (CLOMR) Request for two unnamed tributaries of San Juanito Creek to reflect proposed changes to local hydrology and hydraulics due to the relocation of existing stream channels and surface impoundments in the area. Specifically, numerous impoundments located within the project area, ranging in size from very small to large (Burrito Tank), will be removed. Three new detention basins outside the perimeter of the proposed landfill will be created. Two of these detention basins will be located to the north of the site and will be designed to completely capture the 100-year flood inflows. A larger detention basin located west of the property will intercept flows from the western drainage basin and from other areas to the north that currently flow through the project site. The basin is designed for temporary detention and attenuation of flows from the revised drainage basin. A new channel capable of handling the basin outflows and redirecting them around the project site was designed to link this basin to a series of existing surface water features south of the project site. These actions will effectively remove the project site from the floodplain associated with the existing stream system while providing adequate protection to assure peak flood discharges are not increased downstream.

FEMA MT-2 Forms associated with this project are included as Appendix A. The computer models and shapefiles used in the creation of this CLOMR are included on a CD in Appendix J.

Figure 1 in Appendix B is provided to establish the naming convention for streams studied in this CLOMR Request. This study covers approximately 7,500 feet of San Juanito Creek Tributary and approximately 7,250 feet of Tributary 1 of San Juanito Creek Tributary that are both currently Zone A, or unstudied, streams. This report will describe the overall characteristics of the modifications to the existing stream channel and surface impoundments. It will also include supporting technical documentation for a CLOMR submittal. Acting on behalf of Rancho Viejo Waste Management, LLC, the contact for the study is as follows:

Richard K Frithiof, P.E., CFM
TRC Environmental Corp.
505 East Huntland Drive, Suite 250
Austin, Texas 78752
Office: (512) 343-1070; Fax: (512) 343-1083

Hydrologic Analysis

The U.S. Army Corps of Engineers (USACE) program HEC-HMS 3.5 was utilized to perform hydrologic calculations for this CLOMR. The sections below describe the methods used to determine model inputs. 2-foot contour data from a LIDAR study of the area were available for the study area surrounding the proposed landfill. This data was supplemented by USGS 10-foot contour data in the remainder of the study area.

Pre-Project Hydrology

The project area was divided into four sub-basins determined by the hydrologic features of the watershed. The sub-basins were designated as Drainage Area 1 (DA1), DA2, DA3 and DA4. Existing conditions subbasin locations can be found in Appendix B as Figure 2. The total drainage area for the studied basin is approximately 22.9 square miles. Table 1 below provides the area for each sub-basin.

Table 1: Existing Conditions Subbasin Areas

Drainage Basin	Area (sq. mi)
DA1	10.86
DA2	1.21
DA3	4.61
DA4	6.22

Hydrologic Soil Groups, Land Use and NRCS Runoff Curve Number

A review of the United States Department of Agriculture - Natural Resources Conservation Service (USDA-NRCS) Soil Survey indicates that the soils within the Project survey area include clays, sandy clay loam, and sandy loam and lie on slopes that range from 0 to 3 percent. These deep soils are well- to moderately well-drained with moderate or very slow permeability. Descriptions the soils, as provided by the USDA–NRCS, are provided below.

Aguilares sandy clay loam, 0-3 percent slopes (AgB): The Aguilares sandy clay loam series consists of deep, well drained, moderately permeable, calcareous and moderately alkaline soils on uplands. This Aguilares soil map unit is found on broad, convex plains. The parent material consists of calcareous loamy residuum weathered from sandstone predominantly from the Jackson Formation. Most areas of these soils are mainly used for rangeland and habitat for wildlife. Slopes range from 0 to 3 percent. Hydrologic soil group B.

Brundage fine sandy loam, occasionally flooded (Bd): The Brundage fine sandy clay loam series consists of deep, moderately well drained, very slowly permeable, saline soils in upland valleys. This Brundage soil map unit is found on valleys along small drainageways and on smooth plains parallel to drainageways. The parent material consists of saline, loamy alluvium. Most areas of these soils are mainly used for rangeland and habitat for wildlife. Slopes range from 0 to 1 percent. Hydrologic soil group D.

Catarina Clay, 0 to 2 percent slopes (CaB): The Catarina Clay series consists of deep, moderately well drained, very slowly permeable, saline soils on upland plains and valleys. This

Catarina soil map unit is found on broad and narrow valleys along drainageways and on smooth plains. The parent material consists of calcareous, saline, clayey alluvium. Most areas of these soils are mainly used for rangeland and habitat for wildlife. Slopes range from 0 to 2 percent. Hydrologic soil group D.

Catarina Clay, occasionally flooded (CfA): The Catarina Clay series consists of deep, moderately well drained, very slowly permeable, saline soils on upland plains and valleys. This Catarina soil map unit is found on narrow valleys along drainageways. The parent material consists of calcareous, saline, clayey alluvium. Most areas of these soils are mainly used for rangeland and habitat for wildlife. Slopes range from 0 to 1 percent. Hydrologic soil group D.

Montell clay, 0 to 2 percent, saline (MnB): The Montell clay series consists of deep, moderately well drained, very slowly permeable, saline, clayey soil on upland plains and valleys. This Montell soil map unit is found on broad and narrow valleys along drainageways and on smooth plains. The parent material consists of clayey valley side alluvium. Most areas of these soils are mainly used for rangeland and habitat for wildlife. Slope ranges from 0 to 2 percent. Hydrologic soil group D.

Moglia clay, 1 to 5 percent slopes (MgC): The Moglia clay series consists of very deep, well drained, moderately slowly permeable soils that formed in calcareous, saline, loamy residuum weathered from mudstone. This Moglia soil map unit is found on interfluves on coastal plains. The parent material consists of calcareous, saline, loamy residuum weathered from shale. This soil is used primarily for livestock grazing and wildlife habitat. Slope ranges from 1 to 5 percent. Hydrologic soil group C.

The study area is undeveloped. The land use for the previous conditions within the basin was predominantly rangeland for cattle grazing. Oil and gas wells dot the landscape, but were not found to contribute significantly to runoff characteristics.

NRCS Technical Release 55 (TR-55) was consulted for curve numbers for the site. Table 2-2d in TR-55 contains runoff curve numbers for arid and semiarid rangelands. Based on the natural cover for the area, values were taken for the cover type "Desert shrub – major plants include saltbrush, greasewood, creosotebrush, blackbruch, bursage, palo verde, mesquite, and cactus." Table 2 shows the runoff curve number values for this cover type.

Table 2: Runoff Curve Numbers for Desert Shrub Cover

Hydrologic Condition	A	B	C	D
Poor	63	77	85	88
Fair	55	72	81	86
Good	49	68	79	84
Water	100			

Table 3 below provides the percentage of hydrologic soil groups within each drainage area.

Table 3: Existing Conditions Hydrologic Soil Group Percentages

Drainage Area	A	B	C	D	Water
DA1	0.0%	10.7%	14.1%	73.5%	1.7%
DA2	0.0%	0.0%	43.8%	55.8%	0.4%
DA3	0.0%	41.7%	0.0%	58.3%	0.0%
DA4	0.0%	17.6%	7.9%	74.2%	0.3%

Table 4 summarizes the calculated runoff curve numbers for the four drainage areas within the study area. This table provides the runoff curve numbers for normal moisture conditions which is referred to as antecedent moisture condition II (AMC-II). Fair hydrologic conditions were assumed for the area since grazing in the area has lessened the quality of ground level vegetation.

Table 4: Existing Conditions Runoff Curve Numbers

Drainage Area	Curve Number
DA1	84
DA2	84
DA3	80
DA4	83

Recent scientific investigation has been conducted to determine the affect of climatological conditions on the actual experienced runoff from watersheds in Texas. The NRCS investigated the use of overly conservative curve numbers in 1983 when Hailey and McGill investigated and recommended adjusting curve numbers for small drainage areas in Texas[1]. More recent research has been conducted by the Center for Multidisciplinary Research in Transportation under the direction of the Texas Department of Transportation (TxDOT). The research has culminated in Report No. 0-2104-2, "Climatic Adjustments of Natural Resources Conservation Service (NRCS) Runoff Curve Numbers: Final Report", 2003[2]. The report concludes that based upon the review of measured rainfall-runoff data from about 100 watersheds and approximately 1600 events, an adjustment of the AMC-II CN is required to avoid inflating the runoff volume associated with a particular design rainfall depth at a particular recurrence interval. Differences between the predicted CN and the observed CN were computed and used as the basis for a simple adjustment procedure. Basically, the adjustment amounts to a subtractive amount between 0 and 20 points. The predicted CN using standard NRCS methods is greater than the actual or observed CN for many parts of Texas. In the Webb County area the study indicates that the AMC-II CN may be adjusted downwards by as much as 20 points. TRC used a climatic adjustment of 15 points for the un-adjusted curve numbers shown in Table 4 to gain a more conservative estimate of runoff amounts for the area.

The adjusted curve numbers are shown in Table 5 below for all basins in the existing conditions model.

Table 5: Adjusted Existing Conditions Runoff Curve Numbers

Drainage Area	Curve Number
DA1	69
DA2	69
DA3	65
DA4	68

Time of Concentration and NRCS Lag Time

Time of concentration (T_C) values for all subbasins were calculated by TRC using the NRCS "Urban Hydrology for Small Watersheds" TR-55. Parameters for each subbasin were measured using the ArcMap computer program.

It is generally accepted that the NRCS Lag Time (t_P) can be estimated as 0.6 times the T_C for a given subbasin. Research conducted for the Center for Multidisciplinary Research in Transportation under the direction of TxDOT has shown that while this is a reasonable estimate for many watersheds, there may be a more accurate way to calculate t_P. Report No. 0-4696-2, "Time-Parameter Estimation for Applicable Texas Watersheds", 2005[3] demonstrates that 0.4 times T_C yields more accurate estimates of t_P for developed watersheds and 0.7 times T_C fits undeveloped watersheds more closely. Since the area is undeveloped, t_P values for this study were calculated using a multiplier of 0.7. Table 6 below summarizes the T_C and t_P values for all sub-basins. Calculations are included in Appendix C.

Table 6: Existing Conditions Time of Concentration and Lag Time

Drainage Basin	Time of Concentration, T_C (hours)	NRCS Lag Time, t_P (hours)
DA1	3.26	2.28
DA2	1.28	0.89
DA3	2.34	1.64
DA4	3.95	2.77

Precipitation and Rainfall Distribution

The precipitation for the 100-year storm investigated was obtained from Technical Paper No. 40, "Rainfall Frequency Atlas of the United States" (TP-40). A rainfall amount of 9.8 inches was obtained from the 100-Year 24-Hour Rainfall map within TP-40. Figure 15 – Area-Depth Curves, included in TP-40, depicts correction factors for rainfall over a given drainage area and storm duration. Based on a 22.9 square mile drainage area, the correction factor is 97% of the rainfall depicted in TP-40. With this correction, a rainfall amount of 9.5 inches was calculated for the study area.

The Soil Conservation Service Storm Type III rainfall distribution was used to develop the peak rainfall for the 100-year frequency rainfall event.

Existing Pond Model Inputs

Numerous impoundments (ponds or stock tanks) are located within the drainage area. While the vast majority of the impoundments are small in capacity, Burrito Tank is a relatively large pond and may have some attenuating effect on flows from DA1. Burrito Tank appears to be very old and currently has a very poorly defined spillway and berm. At the time the LIDAR data was gathered there was water within the pond, preventing any analysis of normal water capacity. The pond was assumed full and at an elevation of 538 ft (the spillway elevation) at the time of the design storm. Surface areas and discharges were estimated for the surcharge storage of Burrito Tank using the 2-foot contour data. Table 7 shows the elevation-area-discharge relationship entered into the HEC-HMS model to simulate the effects of Burrito Tank. The remainder of the tanks were not considered in the model due to their small size and lack of surcharge storage capacity.

Table 7: Burrito Tank Model Inputs

Elevation (ft)	Area (ac)	Discharge (cfs)
535	17.46	0
536	22.43	0
538	39.21	0
540	68.11	1167
542	124.32	7118
544	222.92	30969

Routing Methods

Simple lag routing was used to rout flows along streams. It was determined that there would not be significant attenuation in the reaches within the study area. Lag times were estimated using a channel velocity of 5 feet per second and the length of the reaches in question.

Pre-Project Hydrologic Results

Hydrologic calculations and the HEC-HMS model inputs used for the existing conditions can be found in Appendix C. The peak flows from the pre-project hydrology are shown in Table 8 below:

Table 8: Existing Conditions Hydrology Results

Hydrologic Element	Peak Discharge (cfs)
DA1	7860.9
Burrito Tank	7714.2
Reach-1	7714.2
DA4	3824.2
DA3	3823.2
Junction-2	6905.7
DA2	1676.8
Junction-1 (Outlet)	14567.6

Proposed Modifications to Watershed

The main goal of the proposed modifications is to reroute all runoff from west of the proposed landfill to the south and around the site. In order to better understand the current site layout, a topographic map reflecting the existing conditions of the area surrounding the proposed landfill is included in Appendix B as Figure 3. A map depicting the general changes described below is included in Appendix B as Figure 4.

In order to remove the project site from the floodplain, a large detention structure, referred to as the West Detention Basin, will be constructed. The structure will capture flows from multiple streams originating from the west and north of the project site. The outlet of this structure, located at the southwest end of the dam, will discharge flow into a newly excavated channel which runs south and west of the project boundary. The new system will effectively route the runoff around the project site. Preliminary grading for the proposed West Detention Basin and excavated channel are included in Appendix B as Figure 5. Typical channel cross sections and the profile for the West Detention Basin berm can be found in Appendix D.

A small drainage basin to the northwest must be diverted into the West Detention Basin in order to prevent it from draining onto the proposed landfill. To do this, the terrain will be re-graded in order to capture the runoff and divert it through a proposed excavated channel into the West Detention Basin. Preliminary grading for the northwest diversion channel is included in Appendix B as Figure 6. Typical channel cross sections and designs can be found in Appendix D.

The drainage area to the north of the proposed landfill must also be controlled. Two remaining small drainage basins to the north will be captured by two impoundments designed to fully capture the 100-year flows within each drainage area. These impoundments are referred to the Northwest and Northeast Detention Basins in the hydrologic model. The two impoundments will incorporate small low-flow outlets designed to release water at a very low rate.

An Operation and Maintenance Plan for the three proposed impoundments is included as Appendix E.

Finally, a perimeter drainage system will circle the proposed landfill, routing runoff to the perimeter of the facility. This will effectively create a watershed boundary down the center of the proposed landfill.

A 26-foot wide access bridge crossing the discharge channel will be installed approximately 525 feet downstream of the proposed West Detention Basin. While final plans and specifications for this bridge have not been completed, the bridge will be designed using TxDOT standard specifications and details located in Appendix F. Preliminary designs include a slab-span bridge with fourteen 25-foot spans. Piers are assumed to be 2 feet in width and the slabs are assumed to be 16 inches thick. The bridge itself is designed to pass the 25-year storm without overtopping, as required by the Texas Commission on Environmental Quality for access to landfill facilities.

Post-Project Hydrology

Due to the extensive modifications to the area surrounding the proposed landfill and the removal of existing water features within the facility boundary, major revisions to the existing hydrologic model were necessary. The hydrologic subbasins were redrawn to conform to the proposed modifications and all necessary parameters were recalculated as shown in the following sections.

The resulting proposed model contains seven drainage areas. Drainage areas 1-4 remain in the same general location, but with modified boundaries. DA5 encompasses the area to the northwest of the site that is being diverted into the new West Detention Basin. DA6 and DA7 are the remaining two small watersheds to the north captured by the Northwest and Northeast Detention Basins, respectively. Proposed conditions subbasin locations can be found in Appendix B as Figure 7. Table 9 summarizes the drainage areas for the proposed conditions model.

Table 9: Proposed Conditions Subbasin Areas

Drainage Basin	Area (sq. mi)
DA1	8.18
DA2	1.85
DA3	5.51
DA4	6.22
DA5	0.31
DA6	0.21
DA7	0.61

Hydrologic Soil Groups, Land Use and NRCS Runoff Curve Number

While the soils in the area will remain unchanged, the new drainage basins associated with the proposed conditions dictate the need for recalculated runoff curve numbers. Hydrologic soil groups, calculated runoff curve numbers and adjusted runoff curve numbers for the proposed conditions model are shown in Table 10.

Table 10: Proposed Conditions Curve Number Calculations

Drainage Area	A	B	C	D	Water	Curve Number	Adjusted CN
DA1	0.0%	4.8%	18.7%	75.3%	1.2%	85	70
DA2	0.0%	3.5%	28.8%	67.7%	0.0%	84	69
DA3	0.0%	36.0%	0.0%	64.0%	0.0%	81	66
DA4	0.0%	17.6%	7.9%	74.2%	0.3%	83	68
DA5	0.0%	64.6%	0.0%	35.4%	0.0%	77	62
DA6	0.0%	72.3%	0.0%	27.6%	0.0%	76	61
DA7	0.0%	47.3%	0.0%	52.7%	0.0%	79	64

Time of Concentration and NRCS Lag Time

Likewise, updated values for T_C and t_P were calculated to reflect the proposed conditions. The calculated values are summarized in Table 10. Calculations are included in Appendix G.

Table 10: Proposed Conditions Time of Concentration and Lag Time

Drainage Basin	Time of Concentration, T_C (hours)	NRCS Lag Time, t_P (hours)
DA1	2.74	1.92
DA2	1.74	1.22
DA3	2.34	1.64
DA4	3.95	2.77
DA5	0.82	0.58
DA6	0.56	0.39
DA7	0.76	0.53

Precipitation and Rainfall Distribution

The precipitation model was unchanged between existing and proposed conditions.

Proposed Detention Basin Model Inputs

Three detention basins are proposed around the perimeter of the landfill. The two northernmost detention basins will be sized to fully capture the 100-year storm, removing the need to account for the runoff generated in those subbasins. The West Detention Basin must be hydrologically modeled in order to determine the attenuation effects as water is diverted and detained by the structure. The West Detention Basin is designed with a spillway elevation of 542 feet. This was assumed to be the starting condition for the detention basin. Table 11 shows the elevation-area-discharge curve used to model the West Detention Basin.

Table 11: West Detention Basin Model Inputs

Elevation (ft)	Area (ac)	Discharge (cfs)
542	14.4	0
544	37.0	1273
546	94.2	3600
548	124.8	6614

Routing Methods

The routing method was unchanged between existing and proposed conditions.

Post-Project Hydrologic Results

Hydrologic calculations and the HEC-HMS model inputs used for the proposed conditions can be found in Appendix G. According to the model, the West Detention Basin performs as designed. Peak flow rates are sufficiently attenuated to lessen the impacts of the modifications to the watershed. The peak water surface elevation for the detention basin was calculated as 547.6 ft, leaving 0.4 feet of freeboard. With such flat site topography, this is a relatively large amount of storage. The peak flows from the post-project hydrology are shown in Table 12 below:

Table 12: Proposed Conditions Hydrology Results

Hydrologic Element	Peak Discharge (cfs)
DA1	6852.4
DA5	468.5
West Detention Basin	5980.8
Reach-1	5980.8
DA2	2082.6
DA3	4690.7
DA4	3824.2
Junction-2	7707.0
Junction-1 (Outlet)	14096.1
DA7	1015.7
NE Detention Basin	0
DA6	378.5
NW Detention Basin	0

Conclusions

Comparing the two peak discharges from the site, the proposed peak flow rate of 14,096 cfs is lower than the existing peak flow rate of 14,568 cfs. This shows that the proposed West Detention Basin attenuates peak flows sufficiently to prevent increases in flooding downstream of the site. Examining the existing amount of runoff of 6,732.5 acre-feet and the proposed amount of 6751.2 acre-feet, the two values differ by less than 0.3%. This shows that the models generate roughly the same amount of runoff, confirming the two models reflect the same characteristics despite heavy modifications to drainage basin delineation and recalculation of curve numbers.

Hydraulic Analysis

The USACE program HEC-RAS 4.1.0 was used in order to hydraulically model the streams in the vicinity of the proposed landfill. 2-foot contours from LIDAR data for the site were used in order to delineate cross sections for the model. USGS 10-foot contour data, with limited 5-foot contours, were used to supplement the LIDAR data. Contour data was modified to reflect the proposed modifications to the watershed.

The hydraulic model consists of three reaches: West, Lower West and East. West and Lower West consist of approximately 7,500 feet of the proposed San Juanito Creek Tributary channel from the proposed West Detention Basin to a point approximately 350 feet downstream of the existing water features to the south of the site. The water features to the south of the proposed landfill fall within Lower West and are modeled as permanent ineffective flow areas. East consists of approximately 7,250 feet of Tributary 1 of San Juanito Creek Tributary that follows the eastern boundary of the landfill, measured from the confluence with San Juanito Creek Tributary. The perimeter drainage system will divert more runoff to this stream, creating the need to model the stream with the increased discharge. The water features to the south of the proposed landfill fall within this reach and are modeled as permanent ineffective flow areas.

The downstream boundary condition for Lower West and the upstream boundary condition for East were assumed to be normal depth, based on the channel slope for each point. Since the upstream cross section of the West reach is located within the West Detention Basin, the upstream boundary condition for West was assumed to be a known water surface elevation of 547.6 feet, the maximum water surface elevation of the West Detention Basin.

The proposed bridge crossing the West Detention Basin discharge channel (West reach) was included in the HEC-RAS model for the site. The bridge is a 26-foot wide slab-span design with fourteen 25-foot spans supported by 2-foot wide columns. The slabs are 16 inches thick. The bridge model also includes proposed 2.5-foot high guard rails.

Flow rates in the hydraulic model were selected based on peak flow rates for the corresponding feature within the hydrologic model.

Sediment transport was not considered for any structures associated with this CLOMR. The velocities associated with the 100-year event and slopes within the watershed are sufficiently low that sediment transport is not a major concern for this site.

Table 13 includes results from the HEC-RAS model used for the proposed conditions. The HEC-RAS cross sections are included as Appendix H.

Table 13: Proposed Conditions HEC-RAS Results

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	WS Elev (ft)	Crit WS (ft)	EG Elev (ft)	EG Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
West	7535	100yr	5980	542	547.35	542.52	547.35	0.000005	0.32	20254.1	4773.93	0.03
West	7485	Inl Struct (West Detention Basin Dam)										
West	7435	100yr	5980	542	545.83		546.26	0.002247	5.41	1257.99	528.68	0.51
West	7135	100yr	5980	541	545.34		545.68	0.001522	4.81	1384.62	484.17	0.43
West	7020	100yr	5980	540.67	545.18	543.35	545.52	0.00132	4.79	1450.57	490.00	0.41
West	6973	Bridge (Landfill Access Road)										
West	6900	100yr	5980	540.33	544.12		544.62	0.00251	5.77	1117.92	399.56	0.54
West	6785	100yr	5980	540	543.82		544.31	0.002894	5.79	1129.20	391.05	0.57
West	6435	100yr	5980	539	542.87		543.36	0.002546	5.89	1233.95	509.03	0.55
West	6085	100yr	5980	538	541.92		542.42	0.002858	5.81	1158.87	491.71	0.57
West	5735	100yr	5980	537	540.92		541.42	0.002857	5.81	1158.90	491.71	0.57
West	5385	100yr	5980	536	539.92		540.41	0.002863	5.81	1158.00	491.53	0.57
West	5035	100yr	5980	535	538.71		539.29	0.003618	6.26	1072.07	506.58	0.63
West	4685	100yr	5980	534	537.39		537.95	0.004089	6.11	1094.02	576.03	0.66
West	4335	100yr	5980	533	536.72		536.96	0.001781	4.09	1724.71	891.93	0.44
West	3985	100yr	5980	532	536.10		536.36	0.00168	4.62	1894.15	1101.88	0.44
West	3710	100yr	5980	531	535.21		535.73	0.005462	8.76	1501.14	997.75	0.80
West	3220	100yr	5980	529.3	534.36		534.48	0.002136	6.42	2593.24	1481.85	0.52
West	2700	100yr	5980	528	534.16	531.02	534.18	0.000171	1.77	6673.36	2544.43	0.15
Lower West	700	100yr	14095	528	532.95		533.08	0.001217	2.91	4965.1	2063.74	0.31
Lower West	0	100yr	14095	526	531.64	530.12	531.97	0.002003	5.57	4065.76	1783.13	0.44
East	7266	100yr	4690	540.2	544.65		544.96	0.002718	5.15	1352.86	798.75	0.48
East	6131	100yr	4690	537.3	542.45		542.54	0.002008	5.38	2121.63	1215.29	0.43
East	5753	100yr	4690	536.8	541.81		541.93	0.002492	5.65	1941.12	1271.91	0.47
East	5451	100yr	4690	536.3	541.05		541.12	0.001761	4.37	2346.74	1423.31	0.39
East	4936	100yr	4690	534.8	540.08		540.20	0.002288	5.47	1871.08	1056.86	0.45
East	4579	100yr	4690	533.4	539.44		539.54	0.002032	6.02	1968.19	996.80	0.44
East	3826	100yr	4690	532	538.30		538.51	0.002703	6.66	1726.12	1026.49	0.51
East	3212	100yr	4690	531	537.23		537.35	0.002044	6.06	1941.68	1067.99	0.45
East	2902	100yr	4690	530.5	536.92		537.01	0.001467	5.10	2321.41	1265.30	0.38
East	2357	100yr	7705	528.7	535.94		536.11	0.001333	5.05	3347.06	1666.77	0.37
East	1700	100yr	7705	528	535.45		535.56	0.000713	3.57	4311.86	2232.33	0.27

Floodplain Mapping

The floodplain was manually mapped within the ArcMap computer program using the HEC-RAS model output. The floodplain associated with the West Detention Basin was mapped at the detention basin's maximum water surface elevation of 547.6 feet. The mapped areas were tied into the existing Zone A areas adjacent to the study area. A topographic map with cross section locations and overlaid flood boundaries is included as Figure 8 in Appendix B. An annotated FIRM depicting the new floodplain boundaries overlaid on the existing map is included as Figure 9 in Appendix B.

Endangered Species Act Compliance

Documentation of Endangered Species Act compliance has been provided in Appendix I.

References

1. Hailey, James L. and McGill, H.N., 1983. “Runoff curve number based on soil-cover complex and climatic factors,” *Proceedings 1983 Summer Meeting ASAE*, Montana State University, Bozeman, MT, June 26-29, 1983, Paper Number 83-2057.

2. Thompson, D. B., Harle, H.K., Keister H., McLendon, D., Sandrana, S.K., 2003. *Climatic Adjustments of Natural Resources Conservation Service (NRCS) Runoff Curve Numbers: Final Report*. Texas Department of Transportation Research Study Number 0-2104-2, Civil Engineering Department, Texas Tech University, Lubbock, Texas.

3. Roussel, M.C., Thompson, D.B., Fang, X., Cleveland, T.G.,Garcia, C.A.,2005. *Time-Parameter Estimation for Applicable Texas Watersheds*. Texas Department of Transportation Research Study Number 0-4696-2, Department of Civil Engineering, Lamar University, Beaumont, Texas.

Appendix A

FEMA MT-2 Forms

Technically Complete, March 11, 2016

DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

OVERVIEW & CONCURRENCE FORM

O.M.B. NO. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a (NFIP) Flood Insurance Rate Maps (FIRM).

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a: (check one)

☒ CLOMR: A letter from DHS-FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).

☐ LOMR: A letter from DHS-FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway, or flood elevations. (See 44 CFR Ch. 1, Parts 60, 65 & 72).

B. OVERVIEW

1. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301 480287	City of Katy Harris County	TX TX	48473C 48201C	0005D 0220G	02/08/83 09/28/90
481059	Webb County	TX	48479C	1275C	04/02/08

2. a Flooding Source: Unnamed Tributaries of San Juanito Creek

b. Types of Flooding: ☒ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH) ☐ Alluvial fan ☐ Lakes ☐ Other (Attach Description)

3. Project Name/Identifier: Pescadito Environmental Resource Center

4. FEMA Zone designations affected: A (Choices A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X)

5. Basis for Request and Type of Revision: Proposed modifications to basin

a. The basis for this revision request is (check all that apply)

☒ Physical Change ☐ Improved Methodology/Data ☐ Regulatory Floodway Revision ☐ Base Map Changes
☐ Coastal Analysis ☒ Hydraulic Analysis ☒ Hydrologic Analysis ☐ Corrections
☒ Weir-Dam Changes ☐ Levee Certification ☐ Alluvial Fan Analysis ☐ Natural Changes
☒ New Topographic Data ☐ Other (attach Description)

Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

b. The area of revision encompasses the following structures (check all that apply)

Structures: ☒ Channelization ☐ Levee/Floodwall ☒ Bridge/Culvert
☒ Dam ☒ Fill ☐ Other (Attach Description)

6. ☒ Documentation of ESA compliance is submitted (required to initiate CLOMR review). Please refer to the instructions for more information

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☒ Yes, Fee Amount: $6,050
☐ No, Attach Explanation

Please see the DHS-FEMA website at http://fema.gov/plan/prevent/fhm/frm_fees.shtm for Fee Amounts and Exemptions.

D. SIGNATURE

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States code, Section 1001.

Name Carlos Y. Benavides, III	Company Rancho Viejo Waste Management, LLC	
Mailing Address 1116 Calle del Norte Laredo, TX 78041	Daytime Telephone No. (956) 523-1400	FAX No. (956) 523-1401
	EMAIL ADDRESS ccitollroad@aim.com	
Signature of Requester (Required)		Date 11/14/2011

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirement for when fill is placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. For conditional LOMR request, the applicant has documented Endangered Species Act (ESA) compliance to DHS/FEMA prior to DHS/FEMA's review of the Conditional LOMR application. For LOMR request, I acknowledge that compliance with sections 9 and 10 of the ESA has been achieved independently of DHS/FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44 CFR 65.2(c), and that we have available upon request by DHS/FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title Rhonda Tiffin, Director of Planning	Community Name Webb County	
Mailing Address 1110 Washington St., Suite 302 Laredo, TX 78040	Daytime Telephone No. (956) 523-4100	FAX No. (956) 523-5008
	EMAIL ADDRESS rhonda@webbcountytx.gov	
Community Official's signature (required)		Date 11/14/2011

Technically Complete, March 11, 2016

CERTIFICATION BY REGISTRATION PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.2(b) and as described in the MT-2 Forms instruction. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name	License No.	Expiration Date
Richard K. Frithiof, P.E., C.F.M.	55186	12/31/2011
Company Name: TRC Environmental Corp.	Telephone No.: (512) 684-3346	Fax No.: (512) 343-1083
Signature: Rich K. Frithiof	E-mail Address: rfrithiof@trcsolutions.com	Date: 11/1/2011

Ensure the forms that are appropriate to your revision request are included in your submittal.

Form name and (Number)	Required if.....
☒ Riverine Hydrology & Hydraulics Form (Form 2)	New or revised discharges or water-surface elevations
☒ Riverine Structures Form (Form 3)	Channel is modified, addition/revision of bridge/culverts, addition/revision of levee/floodwall, addition/revision of dam
☐ Coastal Analysis Form (Form 4)	New or revised coastal elevations
☐ Coastal Structures Form (Form 5)	Addition/revision of coastal structure
☐ Alluvial Fan Flooding Form (Form 6)	Flood control measures on alluvial fans

Seal (optional)

Technically Complete, March 11, 2016

DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
OVERVIEW & CONCURRENCE FORM

O.M.B. NO. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a (NFIP) Flood Insurance Rate Maps (FIRM).

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a: (check one)

☒ CLOMR: A letter from DHS-FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).

☐ LOMR: A letter from DHS-FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway, or flood elevations. (See 44 CFR Ch. 1, Parts 60, 65 & 72).

B. OVERVIEW

1. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301 480287	City of Katy Harris County	TX TX	48473C 48201C	0005D 0220G	02/08/83 09/28/90
481059	Webb County	TX	48479C	1275C	04/02/08

2. a Flooding Source: Unnamed Tributaries of San Juanito Creek

b. Types of Flooding: ☒ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH) ☐ Alluvial fan ☐ Lakes ☐ Other (Attach Description)

3. Project Name/Identifier: Pescadito Environmental Resource Center

4. FEMA Zone designations affected: A (Choices A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X)

5. Basis for Request and Type of Revision: Proposed modifications to basin

a. The basis for this revision request is (check all that apply)

- [x] Physical Change
- [ ] Improved Methodology/Data
- [ ] Regulatory Floodway Revision
- [ ] Base Map Changes
- [ ] Coastal Analysis
- [x] Hydraulic Analysis
- [x] Hydrologic Analysis
- [ ] Corrections
- [x] Weir-Dam Changes
- [ ] Levee Certification
- [ ] Alluvial Fan Analysis
- [ ] Natural Changes
- [x] New Topographic Data
- [ ] Other (attach Description)

Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

b. The area of revision encompasses the following structures (check all that apply)

Structures:
- [x] Channelization
- [ ] Levee/Floodwall
- [x] Bridge/Culvert
- [x] Dam
- [x] Fill
- [ ] Other (Attach Description)

6. [x] Documentation of ESA compliance is submitted (required to initiate CLOMR review). Please refer to the instructions for more information

C. REVIEW FEE

Has the review fee for the appropriate request category been included?

- [x] Yes, Fee Amount: $6,050
- [ ] No, Attach Explanation

Please see the DHS-FEMA website at http://fema.gov/plan/prevent/fhm/frm_fees.shtm for Fee Amounts and Exemptions.

D. SIGNATURE

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States code, Section 1001.

Name Cristy B. Alexander	Company Rancho Viejo Cattle Co, Ltd.	
Mailing Address 1116 Calle del Norte Laredo, TX 78041	Daytime Telephone No. (956) 523-1400	FAX No. (956) 523-1401
	EMAIL ADDRESS ccitollroad@aim.com	
Signature of Requester (Required) Cristy B. Alexander		Date 11/14/2011

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirement for when fill is placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. For conditional LOMR request, the applicant has documented Endangered Species Act (ESA) compliance to DHS/FEMA prior to DHS/FEMA's review of the Conditional LOMR application. For LOMR request, I acknowledge that compliance with sections 9 and 10 of the ESA has been achieved independently of DHS/FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44 CFR 65.2(c), and that we have available upon request by DHS/FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title Rhonda Tiffin, Director of Planning	Community Name Webb County	
Mailing Address 1110 Washington St., Suite 302 Laredo, TX 78040	Daytime Telephone No. (956) 523-4100	FAX No. (956) 523-5008
	EMAIL ADDRESS rhonda@webbcountytx.gov	
Community Official's signature (required)		Date 11/14/2011

Technically Complete, March 11, 2016

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.2(b) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: Michael W. Oden, P.E.	License No.: 67165	Expiration Date: 12/31/2014
Company Name: Shaw Environmental, Inc. (CB&I company	Telephone No.: 972-773-8381	Fax No.: 972-773-8401
Signature: Michael W. Oden	Date: 6/26/14	E-Mail Address: michael.oden@cbi.com

Ensure the forms that are appropriate to your revision request are included in your submittal.

Form Name and (Number)	Required if ...
☒ Riverine Hydrology and Hydraulics Form (Form 2)	New or revised discharges or water-surface elevations
☒ Riverine Structures Form (Form 3)	Channel is modified, addition/revision of bridge/culverts, addition/revision of levee/floodwall, addition/revision of dam
☐ Coastal Analysis Form (Form 4)	New or revised coastal elevations
☐ Coastal Structures Form (Form 5)	Addition/revision of coastal structure
☐ Alluvial Fan Flooding Form (Form 6)	Flood control measures on alluvial fans

6-26-14

STATE OF TEXAS
MICHAEL W. ODEN
67165
REGISTERED
PROFESSIONAL ENGINEER

Michael W. Oden

TBPE F5650

Technically Complete March 11, 2016

O.M.B. NO. 1660-0016
Expires February 28, 2014

RIVERINE HYDROLOGY & HYDRAULICS FORM

PAPERWORK BURDEN DISCLOSURE NOTICE

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: Tributary 1 of San Juanito Creek Tributary (HEC-RAS reach: East)

Note: Fill out one form for each flooding source studied.

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section B) ☒ No existing analysis ☐ Improved data

☐ Alternative methodology ☒ Proposed Conditions (CLOMR) ☒ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	Effective FIS (cfs)	Revised (cfs)
Upstrm Confluence w/ Trib 1	5.51	NA	4,690
Dwnstrm Confluence w/ Trib 1	11.72	NA	7,705

3. Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/runoff Model Specify Model HEC-HMS

☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters), and documentation to support the new analysis.

4. Review/Approval of Analysis.

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Is the hydrology for the revised flooding source(s) affected by sediment transport? ☐ Yes ☒ No

If Yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

Technically Complete, March 11, 2016

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	1,700 ft US of Confl. w/West	East, 1700	NA	NA - Zone A Only
Upstream Limit	7,300 ft US of Confl. w/West	East, 7266	NA	NA - Zone A Only

* Proposed/Revised elevations must tie-into the Effective elevations within 0.5 foot at the downstream and upstream limits of revision.

2. Hydraulic Method/Model Used HEC-RAS

3. Pre-Submittal Review of Hydraulic Models

DHS/FEMA has developed two review programs, CHECK-2 and CHECK-RAS to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS.

4. Models Submitted

	Natural Run File Name	Natural Run Plan Name	Floodway Run File Name	Floodway Run Plan Name	Datum
Duplicate Effective Model*	NA	NA	NA	NA	NA
Corrective Effective Model*	NA	NA	NA	NA	NA
Existing or Pre-Project Conditions Model	NA	NA	NA	NA	NA
Revised or Post-Project Conditions Model	RanchoViejo.prj	Rancho Viejo	NA	NA	NAVD88
Other - (attach description)	NA	NA	NA	NA	NA

* For details, refer to the corresponding section of the instructions.

☒ Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

A certified topographic map must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1% - and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g. dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

☒ Digital Mapping (GIS/CADD) Data Submitted

Topographic Information 2-foot contour data from LIDAR

Source Dallas Aerial Surveys, Inc. Date 2/15/2011

Accuracy 90% of all elevations within half contour interval (1 foot), remaining 10% within one contour interval (2 feet)

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM**, at the same scale as the original, annotated to show the boundaries of the revised 1%-and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%-and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area on revision.

☒ Annotated FIRM and/or FBFM (Required)

D. COMMON REGULATORY REQUIREMENTS*

1. For LOMR/CLOMR Requests, do Base Flood Elevations (BFEs) Increase? ☐ Yes ☒ No

   a. For CLOMR requests, if either of the following is true, please submit **evidence of compliance with Section 65.12 of the NFIP regulations:**

   - The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot compared to pre-project conditions.
   - The proposed project encroaches upon a SFHA with or without BFEs established and would result in increases above 1.00 foot compared to pre-prject conditions.

   b. Does this LOMR cause increase in the BFE and/or SFHA compared with the effective BFEs and/or SFHA? ☐ Yes ☐ No

   If Yes, **please attach proof of property owner notification and acceptance (if available).** Elements of and examples of property owner notifications can be found in the MT-2 Form Instructions.

2. Does the request involve the placement or proposed placement of fill? ☒ Yes ☐ No

   If Yes, the community must be able to certify that the area to be removed from the special hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(A)(3),65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☐ No

   If Yes, attach evidence of regulatory floodway revison notification. As per paragraph 65.7(b)(1) of the NFIP regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being established. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 instructions.)

4. For CLOMR requests, please submit documentation to FEMA and the community to show that you have complied with Sections 9 and 10 of the Endangered Species Act (ESA).

For actions authorized, funded, or being carried out by Federal or State agencies, please submit documentation from the agency showing its compliance with Section 7(a)(2) of the ESA. Please see MT-2-Instructions for more detail.

* Not inclusive of all applicable regulatory requirements. For details, see 44 CFR parts 60 and 65.

DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B. NO. 1660-0016
Expires February 28, 2014

Flooding Source: San Juanito Creek Tributary (HEC-RAS reach: West/Lower West)

Note: Fill out one form for each flooding source studied.

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section B) ☒ No existing analysis ☐ Improved data

☐ Alternative methodology ☒ Proposed Conditions (CLOMR) ☒ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	Effective FIS (cfs)	Revised (cfs)
Upstrm Confluence w/ Trib 1	8.49	NA	5,980
Dwnstrm Confluence w/ Trib 1	22.89	NA	14,095

3. Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/runoff Model Specify Model HEC-HMS

☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters), and documentation to support the new analysis.

4. Review/Approval of Analysis.

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Is the hydrology for the revised flooding source(s) affected by sediment transport? ☐ Yes ☒ No

If Yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

Technically Complete, March 11, 2016

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	350ft DS of south ponds	Lower West, 0	NA	NA - Zone A Only
Upstream Limit	West Detention Basin	West, 7585	NA	NA - Zone A Only

* Proposed/Revised elevations must tie-into the Effective elevations within 0.5 foot at the downstream and upstream limits of revision.

2. Hydraulic Method/Model Used HEC-RAS

3. Pre-Submittal Review of Hydraulic Models

DHS/FEMA has developed two review programs, CHECK-2 and CHECK-RAS to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS.

4. Models Submitted

	Natural Run File Name	Natural Run Plan Name	Floodway Run File Name	Floodway Run Plan Name	Datum
Duplicate Effective Model*	NA	NA	NA	NA	NA
Corrective Effective Model*	NA	NA	NA	NA	NA
Existing or Pre-Project Conditions Model	NA	NA	NA	NA	NA
Revised or Post-Project Conditions Model	RanchoViejo.prj	Rancho Viejo	NA	NA	NAVD88
Other - (attach description)	NA	NA	NA	NA	NA

* For details, refer to the corresponding section of the instructions.

☒ Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

A certified topographic map must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1% - and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g. dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

☒ Digital Mapping (GIS/CADD) Data Submitted

Topographic Information 2-foot contour data from LIDAR

Source Dallas Aerial Surveys, Inc. Date 2/15/2011

Accuracy 90% of all elevations within half contour interval (1 foot), remaining 10% within one contour interval (2 feet)

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM**, at the same scale as the original, annotated to show the boundaries of the revised 1%-and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%-and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area on revision.

☒ Annotated FIRM and/or FBFM (Required)

D. COMMON REGULATORY REQUIREMENTS*

1. For LOMR/CLOMR Requests, do Base Flood Elevations (BFEs) Increase? ☐ Yes ☒ No

   a. For CLOMR requests, if either of the following is true, please submit **evidence of compliance with Section 65.12 of the NFIP regulations:**

   - The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot compared to pre-project conditions.
   - The proposed project encroaches upon a SFHA with or without BFEs established and would result in increases above 1.00 foot compared to pre-prject conditions.

   b. Does this LOMR cause increase in the BFE and/or SFHA compared with the effective BFEs and/or SFHA? ☐ Yes ☐ No

   If Yes, **please attach proof of property owner notification and acceptance (if available).** Elements of and examples of property owner notifications can be found in the MT-2 Form Instructions.

2. Does the request involve the placement or proposed placement of fill? ☒ Yes ☐ No

   If Yes, the community must be able to certify that the area to be removed from the special hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(A)(3),65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☐ No

   If Yes, attach evidence of regulatory floodway revison notification. As per paragraph 65.7(b)(1) of the NFIP regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being established. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 instructions.)

4. For CLOMR requests, please submit documentation to FEMA and the community to show that you have complied with Sections 9 and 10 of the Endangered Species Act (ESA).

For actions authorized, funded, or being carried out by Federal or State agencies, please submit documentation from the agency showing its compliance with Section 7(a)(2) of the ESA. Please see MT-2-Instructions for more detail.

* Not inclusive of all applicable regulatory requirements. For details, see 44 CFR parts 60 and 65.

Technically Complete, March 11, 2016

DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

O.M.B. NO. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

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PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

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DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: San Juanito Creek Tributary

Note: Fill out one form for each flooding source studied.

A. GENERAL

Complete the appropriate section(s) for each Structure listed below:

Channelization..............complete Section B
Bridge/Culvert...............complete Section C
Dam..............................complete Section D
Levee/Floodwall............complete Section E
Sediment Transport........complete Section F (if required)

Description of Modeled Structure

1. Name of Structure: West Detention Basin

Type (check one): ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☒ Dam

Location of Structure: Western edge of proposed landfill

Downstream Limit/Cross Section: West, 7485

Upstream Limit/Cross Section: West, 7485

2. Name of Structure: West Detention Basin Discharge Channel

Type (check one): ☒ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure: Immediately downstream of West Detention Basin

Downstream Limit/Cross Section: West, 3985

Upstream Limit/Cross Section: West, 7485

3. Name of Structure: Landfill Access Road

Type (check one): ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure: 525 feet downstream of West Detention Basin, crossing channel

Downstream Limit/Cross Section: West, 4240

Upstream Limit/Cross Section: West, 4280

NOTE: FOR MORE STRUCTURES, ATTACH ADDITIONAL PAGES AS NEEDED.

B. CHANNELIZATION

Flooding Source: San Juanito Creek Tributary

Name of Structure: West Detention Basin Discharge Channel

1. Hydraulic Considerations

The channel was designed to carry ______ (cfs) and/or the 100 -year flood.

The design elevation in the channel is based on (check one):

☒ Subcritical flow ☐ Critical flow ☐ Super critical flow ☐ Energy grade line

If there is the potential for a hydraulic jump at the following locations, check all that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.

☐ Inlet to channel ☐ Outlet of channel ☐ At Drop Structures ☐ At Transitions

☐ Other locations (specify): ______

2. Channel Design Plans

Attach the plans of the channelization certified by a registered professional engineer, as described in the instructions.

3. Accessory Structures

The Channelization includes (check one):

☐ Levees [Attach Section (E Levee/Floodwall)] ☐ Drop structures ☒ Super elevated sections

☒ Transitions in cross sectional geometry ☐ Debris basin/design basin [Attach Section D (Dam/Basin)] ☐ Energy dissipater

☐ Weir ☐ Other (describe): ______

4. Sediment Transport Considerations

Are the hydraulics of the channel affected by sediment transport? ☐ Yes ☒ No

If Yes, then fill out Section F (Sediment Transport). If No, then attach your explanation for why sediment transport was not considered.

C. BRIDGE/CULVERT

Flooding Source: San Juanito Creek Tributary

Name of Structure: Landfill Access Road

1. This revision reflects (check one):

☒ Bridge/culvert not modeled in the FIS

☐ Modified bridge/culvert previously modeled in the FIS

☐ New analysis of bridge/culvert previously modeled in the FIS

2. Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8): HEC-RAS
If different hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structures. Attach justification.

3. Attach plans of the structures certified by a registered professional engineer. The plan detail and information should include the following (check the information that has been provided):

☒ Dimensions (height, width, span, radius, length)
☐ Shape (culverts only)
☒ Material
☐ Beveling or Rounding
☐ Wing Wall Angle
☐ Skew Angle

☐ Distance Between Cross Sections
☐ Erosion Protection
☒ Low Chord Elevations - Upstream and Downstream
☒ Top of Road Elevations - Upstream and Downstream
☒ Structure Invert Elevations - Upstream and Downstream
☒ Stream Invert Elevation - Upstream and Downstream
☐ Cross-Section Locations

4. Sediment Transport Considerations

Are the hydraulics of the structure affected by sediment transport? ☐ Yes ☒ No

If Yes, then fill out Section F (Sediment Transport) of Form 3. If no, then attach an explanation.

Technically Complete, March 11, 2016

D. DAM/BASIN

Flooding Source: San Juanito Creek Tributary

Name of Structure: West Detention Basin

1. This request is for (check one): ☐ Existing dam/basin ☒ New dam ☐ Modification of existing dam/basin
2. The dam/basin was designed by (check one): ☐ Federal agency ☐ State agency ☒ Private organization ☐ Local government agency

   Name of the agency or organization: TRC Environmental Corp.
3. The dam was permitted as (check one): ☐ Federal Dam ☐ State Dam ***Exempt per regulatory standards**

   Provide the permit or identification number (ID) for the dam and the appropriate permitting agency or organization

   Permit or ID number ______ Permit Agency or Organization: ______

   ☐ Local Government Dam ☒ Private Dam

Provide related drawings, specifications and supporting design information.

4. Does the project involve revised hydrology? ☒ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2)

Was the dam/basin designed using critical duration storm? (Must account for the maximum volume of runoff)

☒ Yes, provide supporting documents with your completed Form 2.

☐ No, provide written explanation and justification for not using the critical duration storm.

5. Does the submittal include debris/sediment yield analysis? ☐ Yes ☒ No

   If Yes, then fill out Section F (Sediment Transport). If No, then attach your explanation for why debris/sediment analysis was not considered?
6. Does the Base Flood Elevation behind the dam/basin or downstream of the dam/basin change? ☒ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

	Stillwater Elevation Behind the Dam/Basin	
FEQUENCY (% annual chance)	FIS	REVISED
10-year (10%)	NA	NA
50-year (2%)	NA	NA
100-year (1%)	NA	547.6 ft
500-year (0.2%)	NA	NA
Normal Pool Elevation	NA	542.0 ft (Empty)

7. Please attach a copy of the formal Operation and Maintenance Plan.

E. LEVEE/FLOODWALL

1. System Elements
   a. This Levee/Floodwall analysis is based on (check one): ☐ upgrading of an existing levee/ floodwall system ☐ a newly constructed levee/ floodwall system ☐ reanalysis of an existing levee/ floodwall system

   b. Levee elements and locations are (check one):

   ☐ earthen embankment, dike, berm, etc. Station ______ to ______

   ☐ structural floodwall Station ______ to ______

   ☐ other (describe): ______ Station ______ to ______

   c. Structural Type (check one): ☐ monolithic cast-in place reinforced concrete ☐ reinforced concrete masonry block ☐ sheet piling

   ☐ other (describe): ______

   d. Has the levee/floodwall system been certified by a Federal agency to provide protection from the base flood? ☐ Yes ☐ No

   If Yes, by which agency? ______

   e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

   1. Plan of the levee embankment and floodwall structures — Sheet Numbers ______
   2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. — Sheet Numbers ______
   3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. — Sheet Numbers ______

DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY
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Flooding Source: Tributary 2 of San Juanito Creek Tributary

Note: Fill out one form for each flooding source studied.

A. GENERAL

Complete the appropriate section(s) for each Structure listed below:

Channelization..............complete Section B
Bridge/Culvert...............complete Section C
Dam..............................complete Section D
Levee/Floodwall............complete Section E
Sediment Transport........complete Section F (if required)

Description of Modeled Structure

1. Name of Structure: Northwest Diversion Channel

Type (check one): ☒ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure: Northwest of proposed landfill, north of West Detention Basin

Downstream Limit/Cross Section: NA

Upstream Limit/Cross Section: NA

2. Name of Structure: ______

Type (check one): ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure: ______

Downstream Limit/Cross Section: ______

Upstream Limit/Cross Section: ______

3. Name of Structure: ______

Type (check one): ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure: ______

Downstream Limit/Cross Section: ______

Upstream Limit/Cross Section: ______

NOTE: FOR MORE STRUCTURES, ATTACH ADDITIONAL PAGES AS NEEDED.

B. CHANNELIZATION

Flooding Source: Tributary 2 of San Juanito Creek Tributary

Name of Structure: Northwest Diversion Channel

1. Hydraulic Considerations

The channel was designed to carry ________ (cfs) and/or the 100 -year flood.

The design elevation in the channel is based on (check one):

☒ Subcritical flow ☐ Critical flow ☐ Super critical flow ☐ Energy grade line

If there is the potential for a hydraulic jump at the following locations, check all that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.

☐ Inlet to channel ☐ Outlet of channel ☐ At Drop Structures ☐ At Transitions

☐ Other locations (specify): ________________

2. Channel Design Plans

Attach the plans of the channelization certified by a registered professional engineer, as described in the instructions.

3. Accessory Structures

The Channelization includes (check one):

☐ Levees [Attach Section (E Levee/Floodwall)] ☐ Drop structures ☒ Super elevated sections

☐ Transitions in cross sectional geometry ☐ Debris basin/design basin [Attach Section D (Dam/Basin)] ☐ Energy dissipater

☐ Weir ☐ Other (describe): ________________

4. Sediment Transport Considerations

Are the hydraulics of the channel affected by sediment transport? ☐ Yes ☒ No

If Yes, then fill out Section F (Sediment Transport). If No, then attach your explanation for why sediment transport was not considered.

C. BRIDGE/CULVERT

Flooding Source: ________________

Name of Structure: ________________

1. This revision reflects (check one):

☐ Bridge/culvert not modeled in the FIS

☐ Modified bridge/culvert previously modeled in the FIS

☐ New analysis of bridge/culvert previously modeled in the FIS

2. Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8): ________________
If different hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structures. Attach justification.

3. Attach plans of the structures certified by a registered professional engineer. The plan detail and information should include the following (check the information that has been provided):

☐ Dimensions (height, width, span, radius, length)
☐ Shape (culverts only)
☐ Material
☐ Beveling or Rounding
☐ Wing Wall Angle
☐ Skew Angle
☐ Distance Between Cross Sections
☐ Erosion Protection
☐ Low Chord Elevations - Upstream and Downstream
☐ Top of Road Elevations - Upstream and Downstream
☐ Structure Invert Elevations - Upstream and Downstream
☐ Stream Invert Elevation - Upstream and Downstream
☐ Cross-Section Locations

4. Sediment Transport Considerations

Are the hydraulics of the structure affected by sediment transport? ☐ Yes ☐ No

If Yes, then fill out Section F (Sediment Transport) of Form 3. If no, then attach an explanation.

Technically Complete, March 11, 2016

DEPARTMENT OF HOMELAND SECURITY
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Flooding Source: Drainage Area 6 (Unnamed Tributary of San Juanito Creek Tributary)

Note: Fill out one form for each flooding source studied.

A. GENERAL

Complete the appropriate section(s) for each Structure listed below:

Channelization..............complete Section B
Bridge/Culvert...............complete Section C
Dam..............................complete Section D
Levee/Floodwall............complete Section E
Sediment Transport........complete Section F (if required)

Description of Modeled Structure

1. Name of Structure: Northwest Detention Basin

Type (check one): ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☒ Dam

Location of Structure: North of proposed landfill

Downstream Limit/Cross Section: NA

Upstream Limit/Cross Section: NA

2. Name of Structure:

Type (check one): ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure:

Downstream Limit/Cross Section:

Upstream Limit/Cross Section:

3. Name of Structure:

Type (check one): ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure:

Downstream Limit/Cross Section:

Upstream Limit/Cross Section:

NOTE: FOR MORE STRUCTURES, ATTACH ADDITIONAL PAGES AS NEEDED.

D. DAM/BASIN

Flooding Source: Drainage Area 6 (Unnamed Tributary of San Juanito Creek Tributary)

Name of Structure: Northwest Detention Basin

1. This request is for (check one): ☐ Existing dam/basin ☒ New dam ☐ Modification of existing dam/basin
2. The dam/basin was designed by (check one): ☐ Federal agency ☐ State agency ☐ Private organization ☐ Local government agency

   Name of the agency or organization: TRC Environmental Corp.
3. The dam was permitted as (check one): ☐ Federal Dam ☐ State Dam * **Exempt per regulatory standards**

   Provide the permit or identification number (ID) for the dam and the appropriate permitting agency or organization

   Permit or ID number ____________ Permit Agency or Organization: ____________

   ☐ Local Government Dam ☒ Private Dam

Provide related drawings, specifications and supporting design information.

4. Does the project involve revised hydrology? ☒ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2)

Was the dam/basin designed using critical duration storm? (Must account for the maximum volume of runoff)

☒ Yes, provide supporting documents with your completed Form 2.

☐ No, provide written explanation and justification for not using the critical duration storm.

5. Does the submittal include debris/sediment yield analysis? ☐ Yes ☒ No

   If Yes, then fill out Section F (Sediment Transport). If No, then attach your explanation for why debris/sediment analysis was not considered?
6. Does the Base Flood Elevation behind the dam/basin or downstream of the dam/basin change? ☒ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

FEQUENCY (% annual chance)	Stillwater Elevation Behind the Dam/Basin FIS	REVISED
10-year (10%)	NA	NA
50-year (2%)	NA	NA
100-year (1%)	NA	567.4 ft
500-year (0.2%)	NA	NA
Normal Pool Elevation	NA	562.0 ft (Empty)

7. Please attach a copy of the formal Operation and Maintenance Plan.

E. LEVEE/FLOODWALL

1. System Elements

   a. This Levee/Floodwall analysis is based on (check one): ☐ upgrading of an existing levee/ floodwall system ☐ a newly constructed levee/ floodwall system ☐ reanalysis of an existing levee/ floodwall system

   b. Levee elements and locations are (check one):

   ☐ earthen embankment, dike, berm, etc. Station ____ to ____

   ☐ structural floodwall Station ____ to ____

   ☐ other (describe): ____________ Station ____ to ____

   c. Structural Type (check one): ☐ monolithic cast-in place reinforced concrete ☐ reinforced concrete masonry block ☐ sheet piling

   ☐ other (describe): ____________

   d. Has the levee/floodwall system been certified by a Federal agency to provide protection from the base flood? ☐ Yes ☐ No

   If Yes, by which agency? ____________

   e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

   1. Plan of the levee embankment and floodwall structures — Sheet Numbers ____
   2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. — Sheet Numbers ____
   3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. — Sheet Numbers ____

Technically Complete, March 11, 2016

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Flooding Source: Drainage Area 7 (Unnamed Tributary of San Juanito Creek Tributary)

Note: Fill out one form for each flooding source studied.

A. GENERAL

Complete the appropriate section(s) for each Structure listed below:
- Channelization..............complete Section B
- Bridge/Culvert...............complete Section C
- Dam..............................complete Section D
- Levee/Floodwall............complete Section E
- Sediment Transport........complete Section F (if required)

Description of Modeled Structure

1. Name of Structure: Northeast Detention Basin

   Type (check one): ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☒ Dam

   Location of Structure: Northeast of proposed landfill

   Downstream Limit/Cross Section: NA

   Upstream Limit/Cross Section: NA

2. Name of Structure:

   Type (check one): ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure:

   Downstream Limit/Cross Section:

   Upstream Limit/Cross Section:

3. Name of Structure:

   Type (check one): ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure:

   Downstream Limit/Cross Section:

   Upstream Limit/Cross Section:

NOTE: FOR MORE STRUCTURES, ATTACH ADDITIONAL PAGES AS NEEDED.

D. DAM/BASIN

Flooding Source: Drainage Area 7 (Unnamed Tributary of San Juanito Creek Tributary)

Name of Structure: Northeast Detention Basin

1. This request is for (check one): ☐ Existing dam/basin ☒ New dam ☐ Modification of existing dam/basin
2. The dam/basin was designed by (check one): ☐ Federal agency ☐ State agency ☐ Private organization ☐ Local government agency

   Name of the agency or organization: TRC Environmental Corp.
3. The dam was permitted as (check one): ☐ Federal Dam ☐ State Dam * Exempt per regulatory standards

   Provide the permit or identification number (ID) for the dam and the appropriate permitting agency or organization

   Permit or ID number ________ Permit Agency or Organization: ________

   ☐ Local Government Dam ☒ Private Dam

Provide related drawings, specifications and supporting design information.

4. Does the project involve revised hydrology? ☒ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2)

Was the dam/basin designed using critical duration storm? (Must account for the maximum volume of runoff)

☒ Yes, provide supporting documents with your completed Form 2.

☐ No, provide written explanation and justification for not using the critical duration storm.

5. Does the submittal include debris/sediment yield analysis? ☐ Yes ☒ No

   If Yes, then fill out Section F (Sediment Transport). If No, then attach your explanation for why debris/sediment analysis was not considered?
6. Does the Base Flood Elevation behind the dam/basin or downstream of the dam/basin change? ☒ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

	Stillwater Elevation Behind the Dam/Basin	
FEQUENCY (% annual chance)	FIS	REVISED
10-year (10%)	NA	NA
50-year (2%)	NA	NA
100-year (1%)	NA	561.8 ft
500-year (0.2%)	NA	NA
Normal Pool Elevation	NA	556.0 ft (Empty)

7. Please attach a copy of the formal Operation and Maintenance Plan.

E. LEVEE/FLOODWALL

1. System Elements

   a. This Levee/Floodwall analysis is based on (check one): ☐ upgrading of an existing levee/ floodwall system ☐ a newly constructed levee/ floodwall system ☐ reanalysis of an existing levee/ floodwall system

   b. Levee elements and locations are (check one):

   ☐ earthen embankment, dike, berm, etc. Station ____ to ____

   ☐ structural floodwall Station ____ to ____

   ☐ other (describe): ________ Station ____ to ____

   c. Structural Type (check one): ☐ monolithic cast-in place reinforced concrete ☐ reinforced concrete masonry block ☐ sheet piling

   ☐ other (describe): ________

   d. Has the levee/floodwall system been certified by a Federal agency to provide protection from the base flood? ☐ Yes ☐ No

   If Yes, by which agency? ________

   e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

   1. Plan of the levee embankment and floodwall structures Sheet Numbers ____
   2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers ____
   3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers ____

Appendix B

Figures

Technically Complete, March 11, 2016

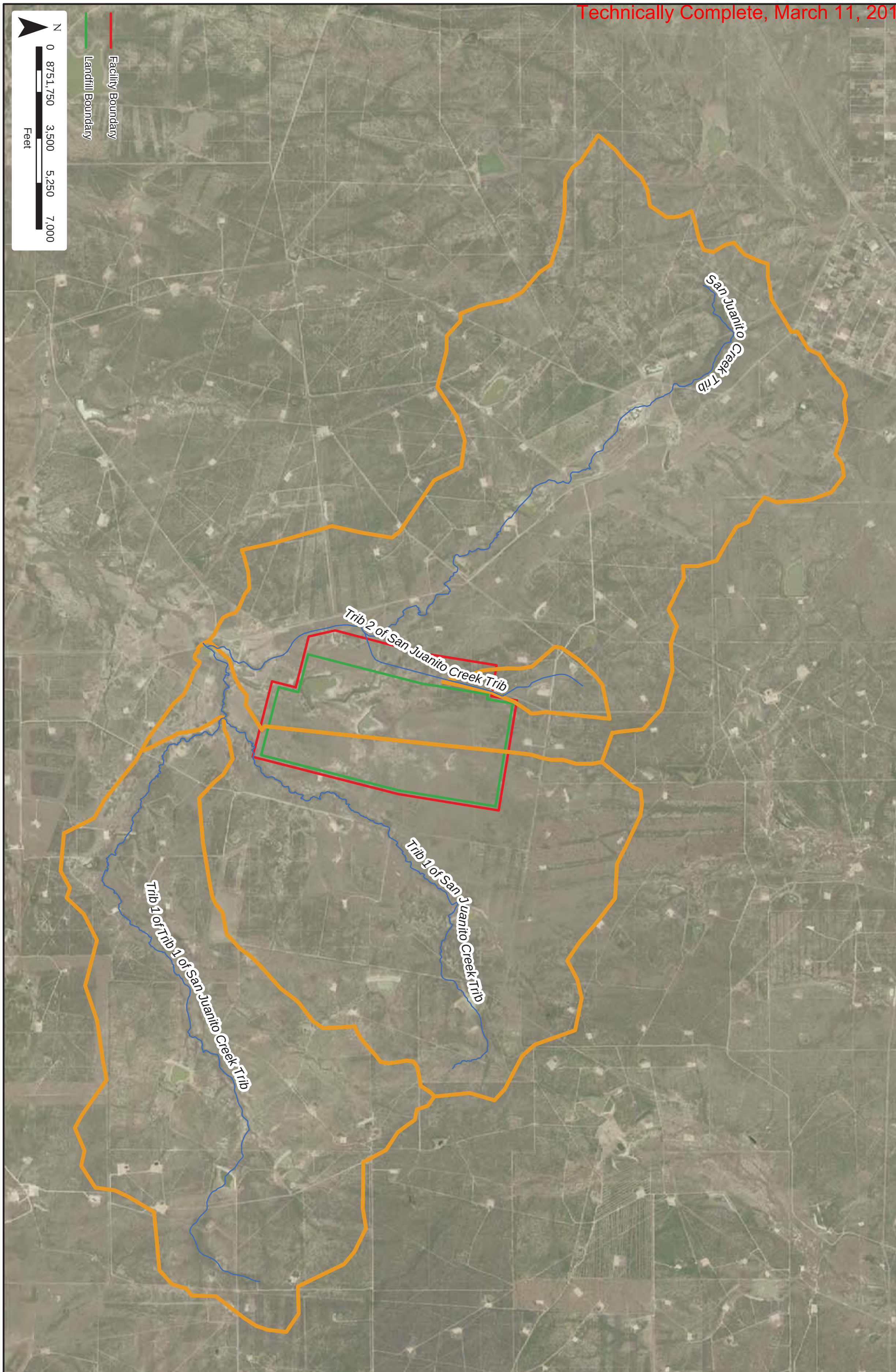

Figure 1: Stream Naming Convention

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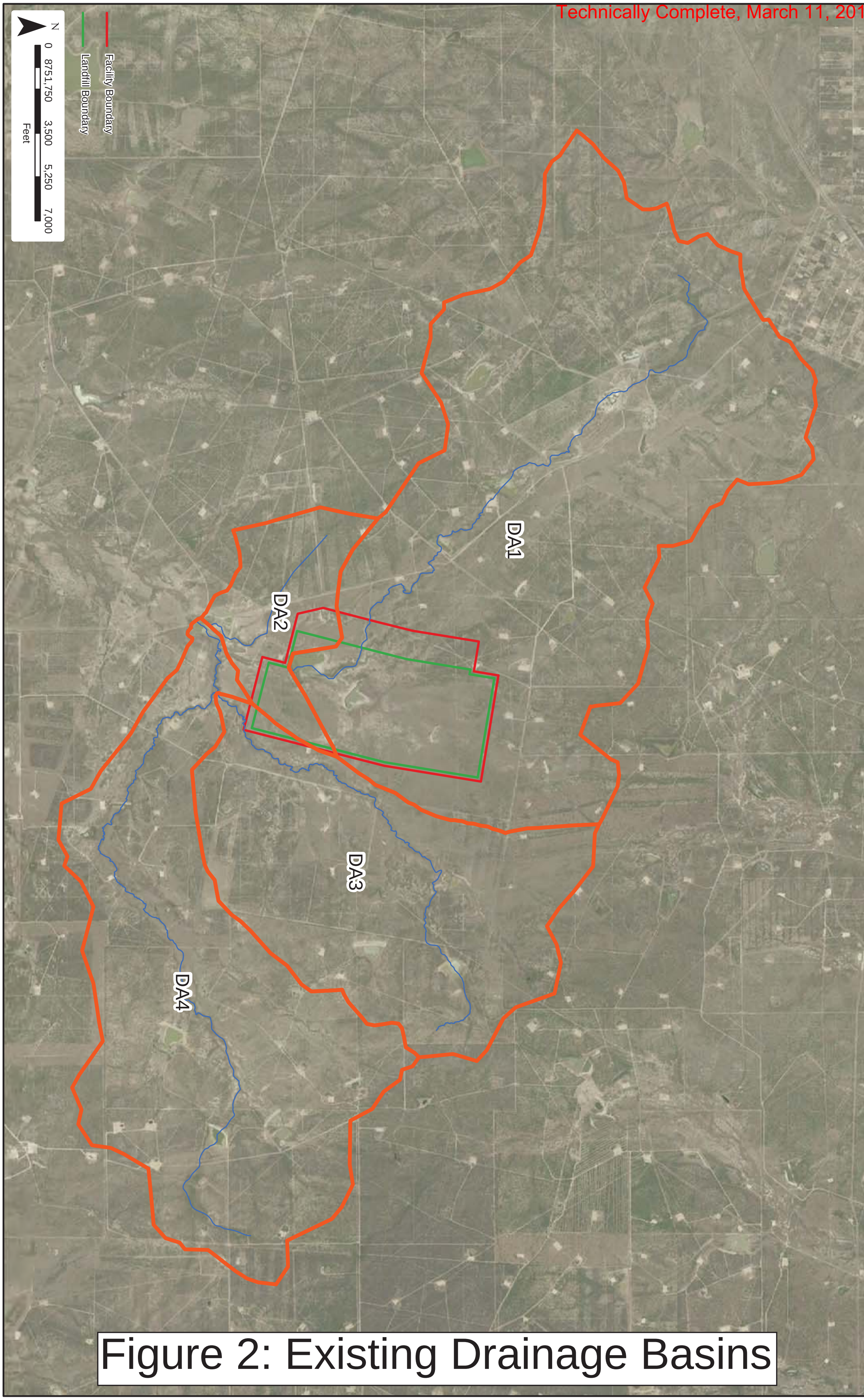

Figure 2: Existing Drainage Basins

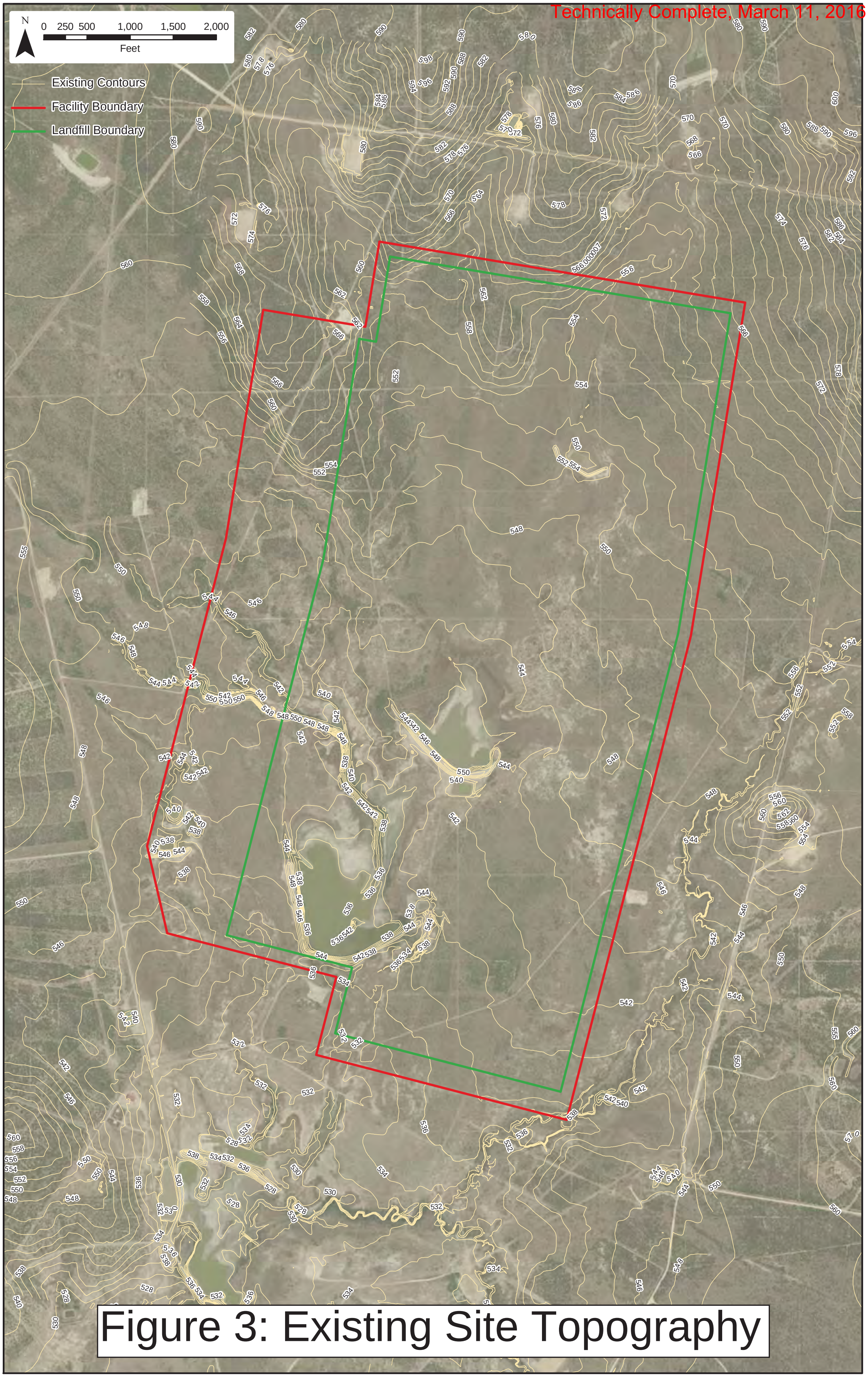

Figure 3: Existing Site Topography

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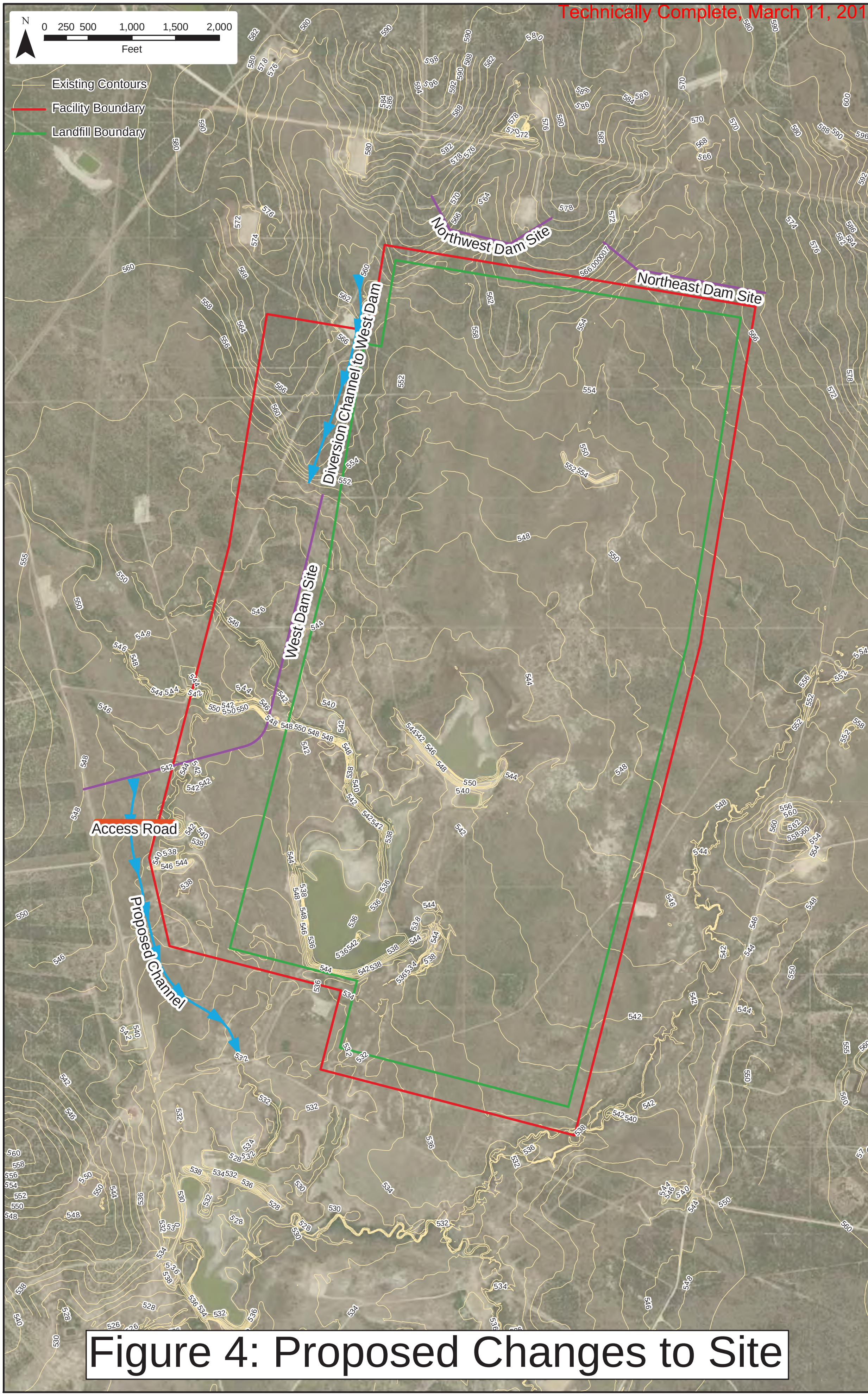


Figure 4: Proposed Changes to Site

Technically Complete, March 11, 2016

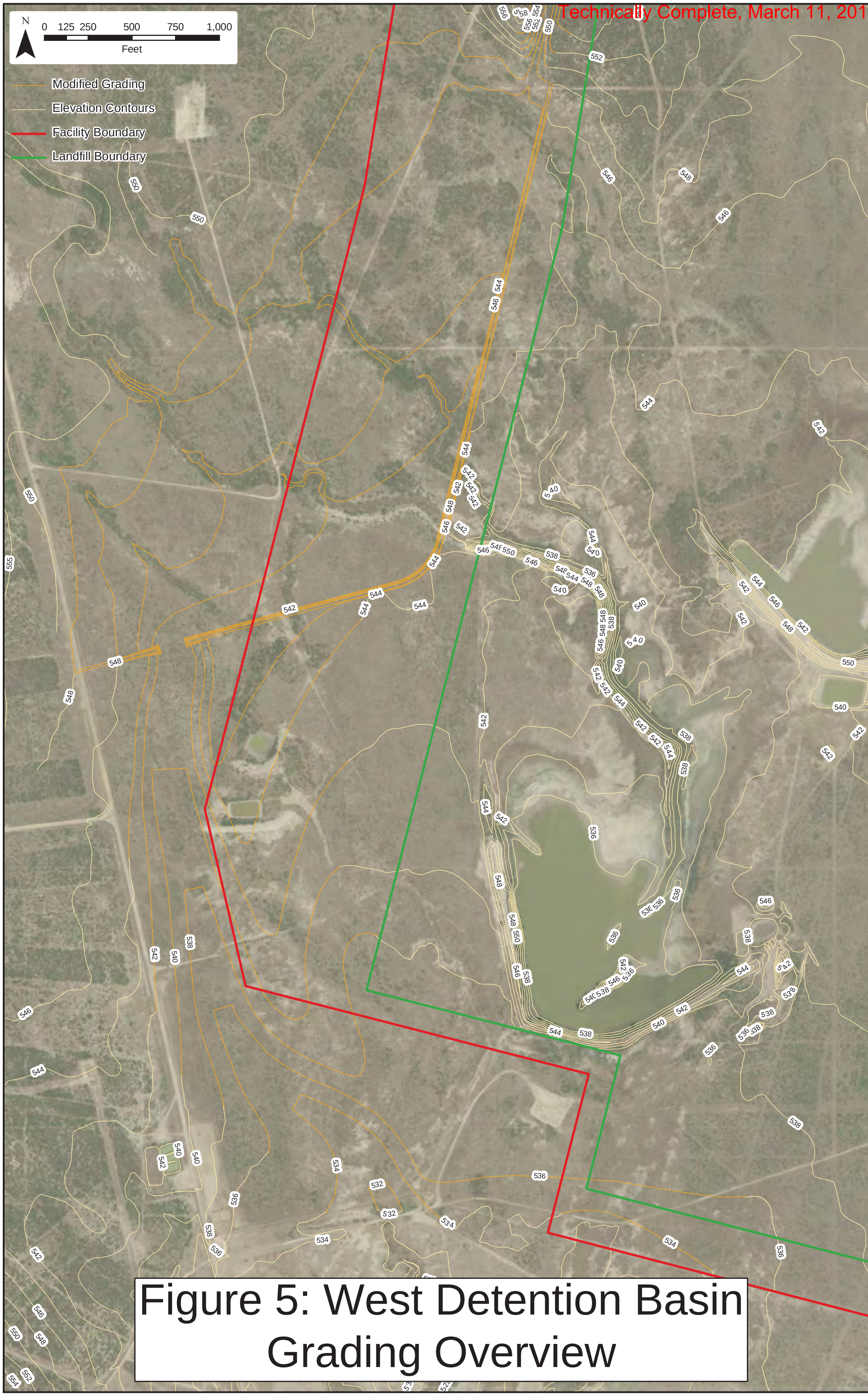


Figure 5: West Detention Basin Grading Overview

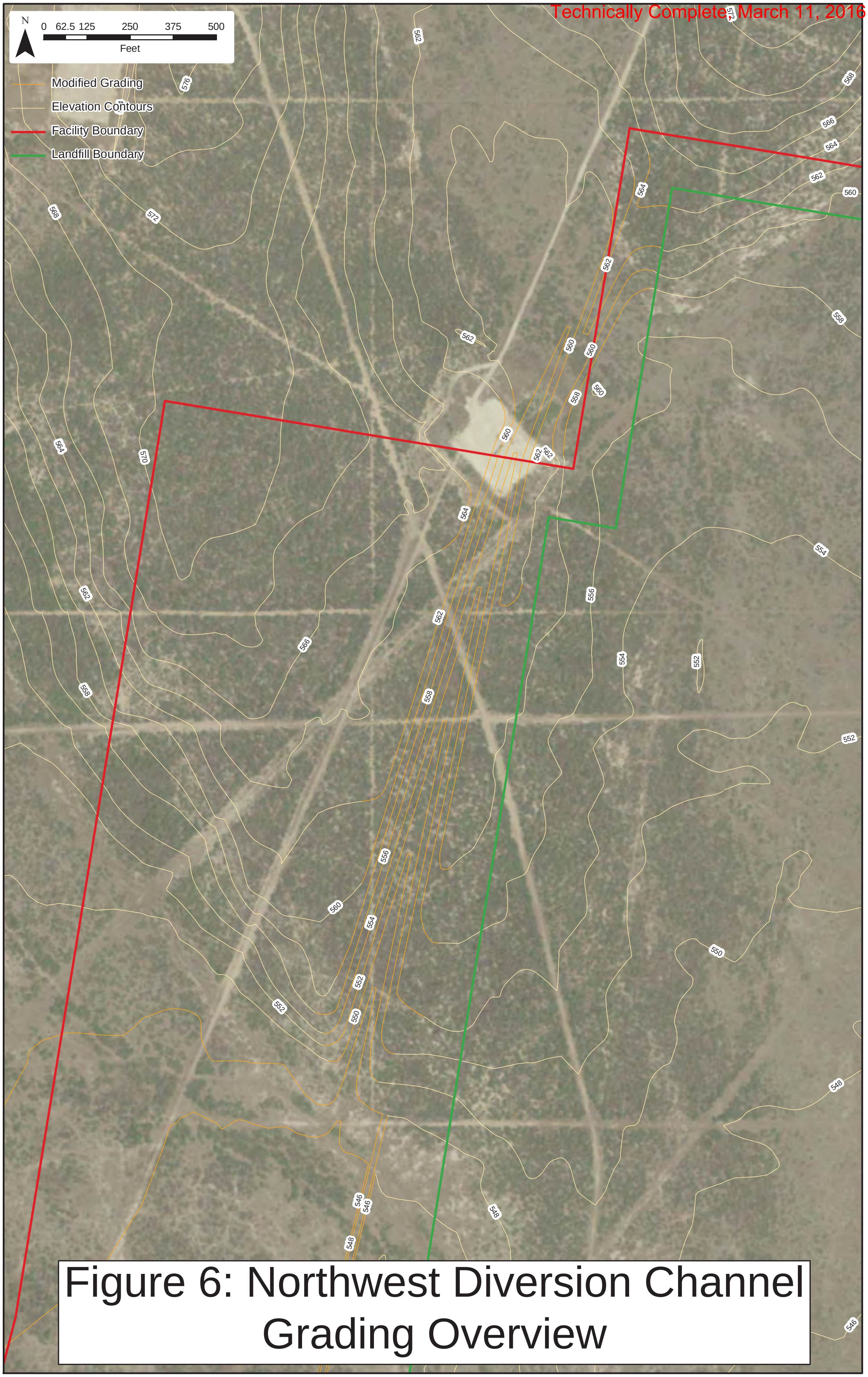


Figure 6: Northwest Diversion Channel Grading Overview

Technically Complete, March 11, 2016

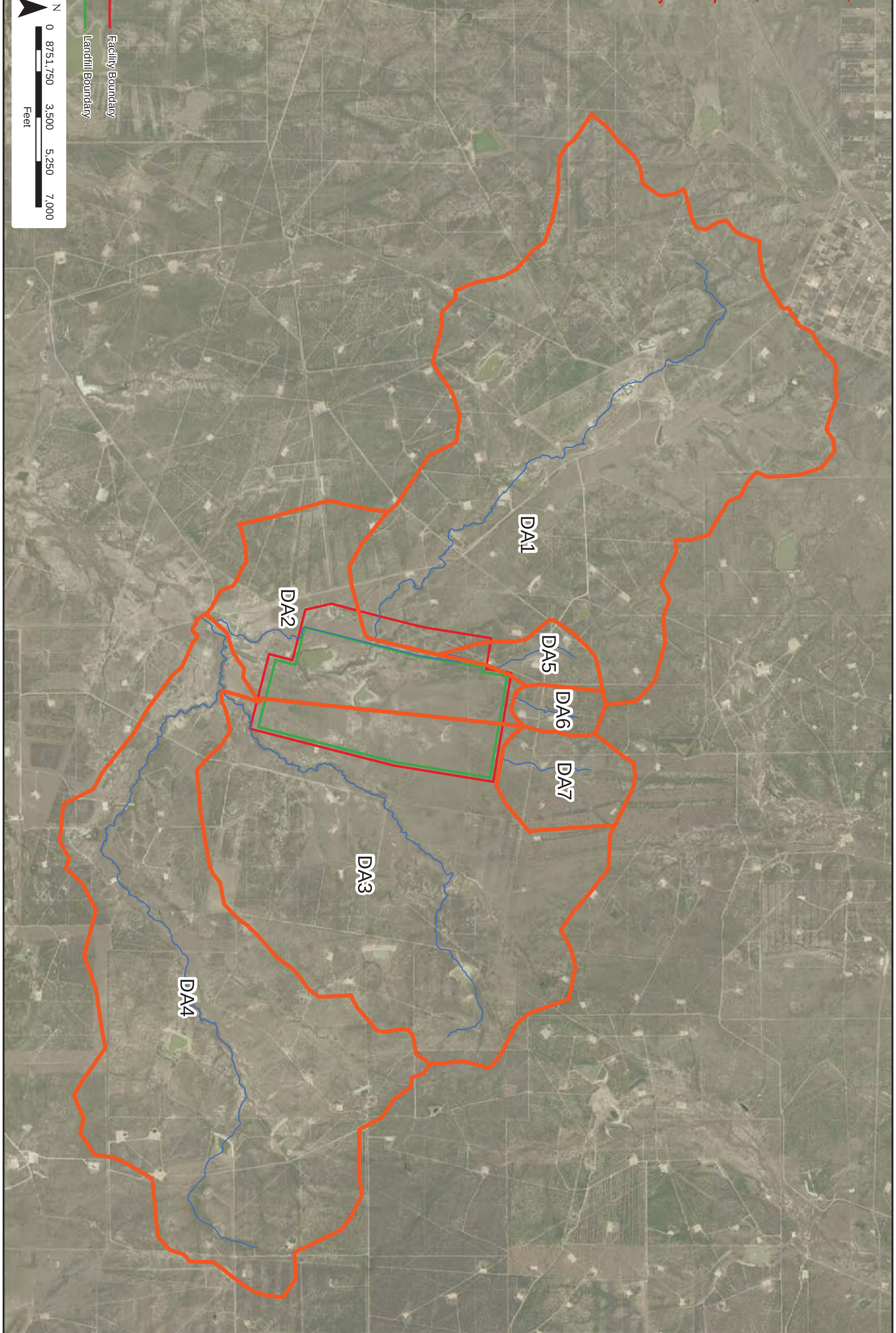
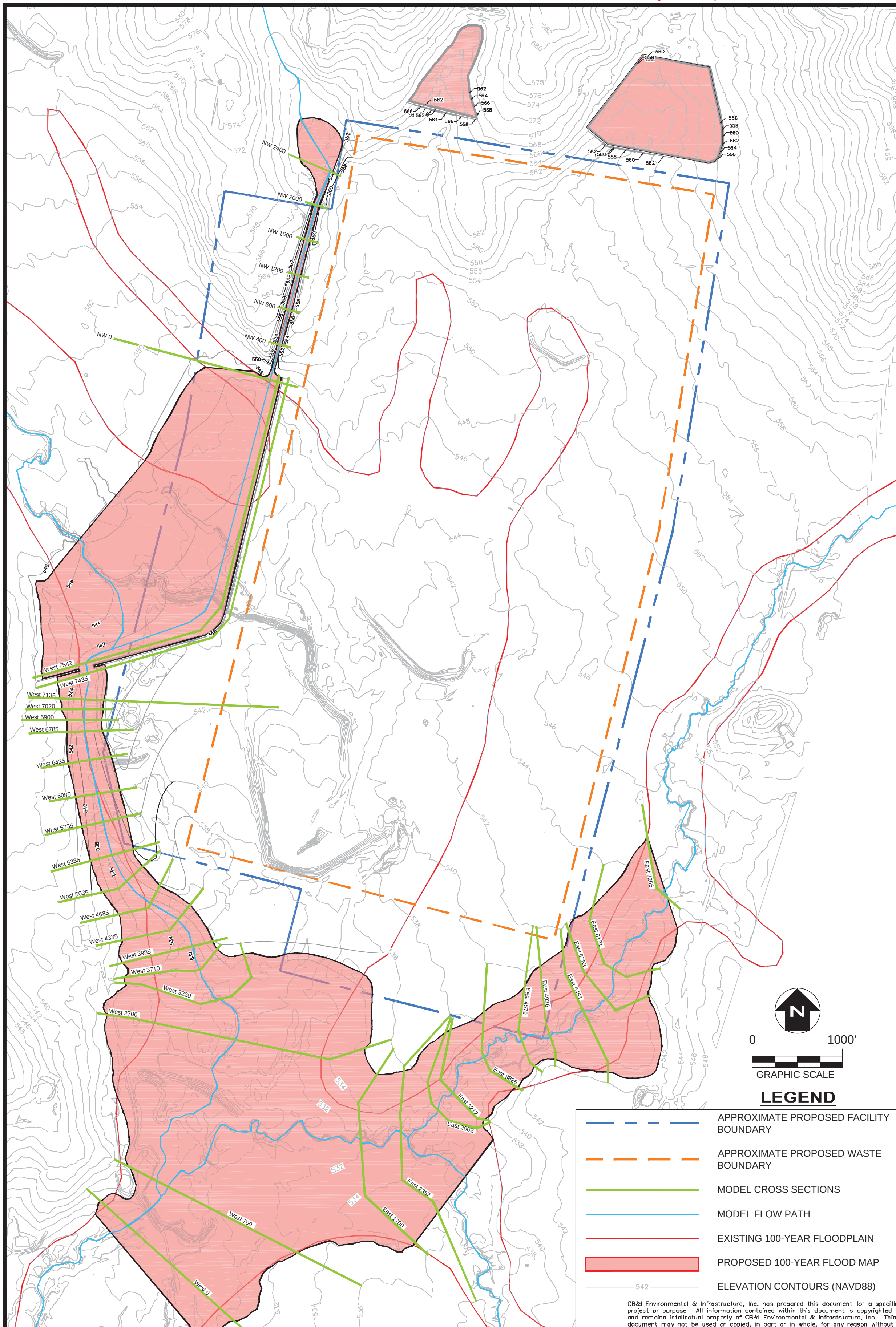


Figure 7: Proposed Drainage Basins

Technically Complete, March 11, 2016



CB&I

PESCADITO ENVIRONMENTAL RESOURCE CENTER
WEBB, COUNTY

FIGURE 8
TOPOGRAPHIC WORK MAP

DRAWN BY: ZPC	APPROVED BY: MO	PROJ. NO.: 148866	DATE: OCTOBER 2014

T:\AutoCAD\Projects\Pescadito Landfill\Stormwater\Proposed 100 Year Floodplain\Proposed 100 Year Floodplain_Rev4.dwg, 10/1/2014 5:43:17 PM

Technically Complete, March 11, 2016

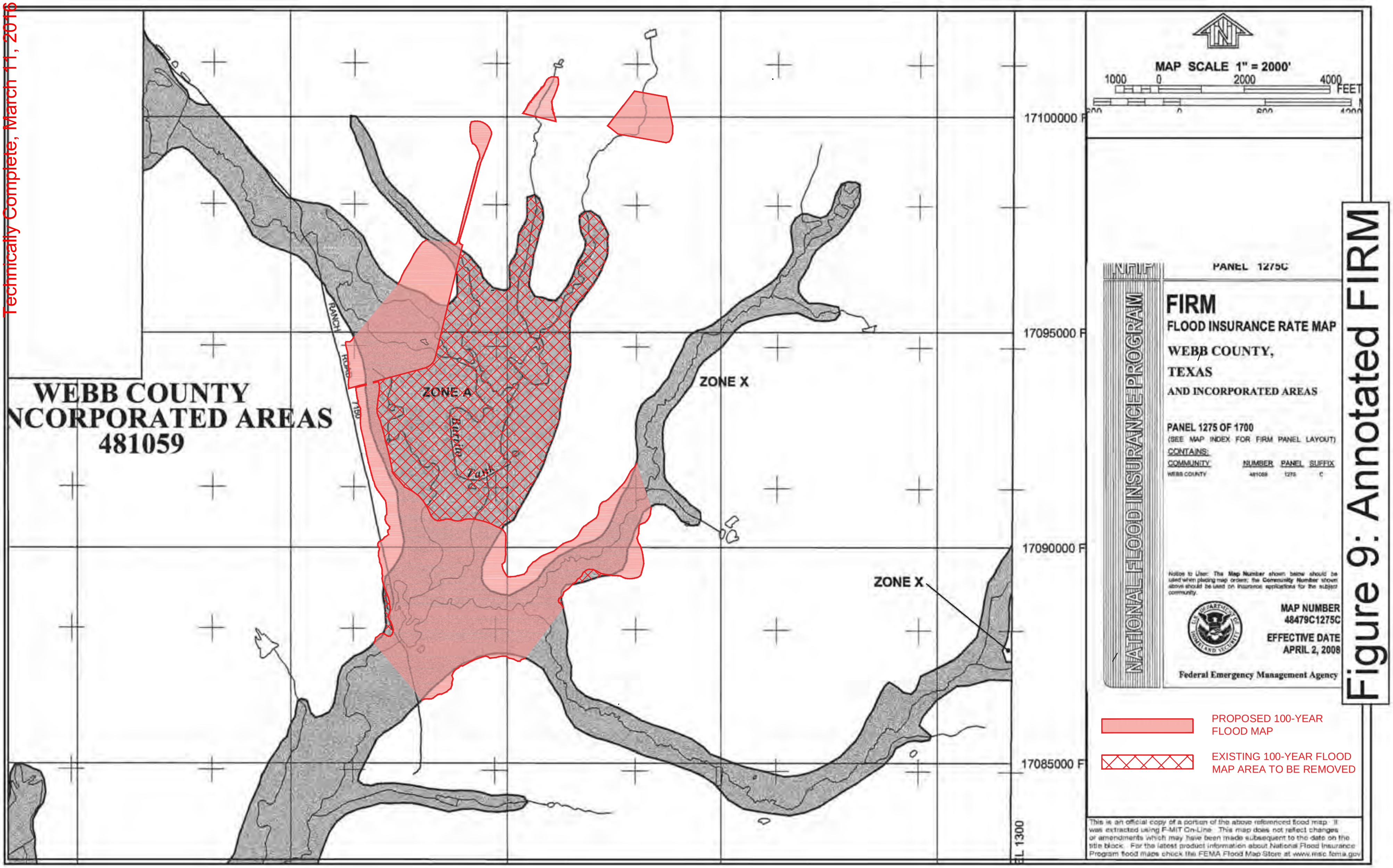
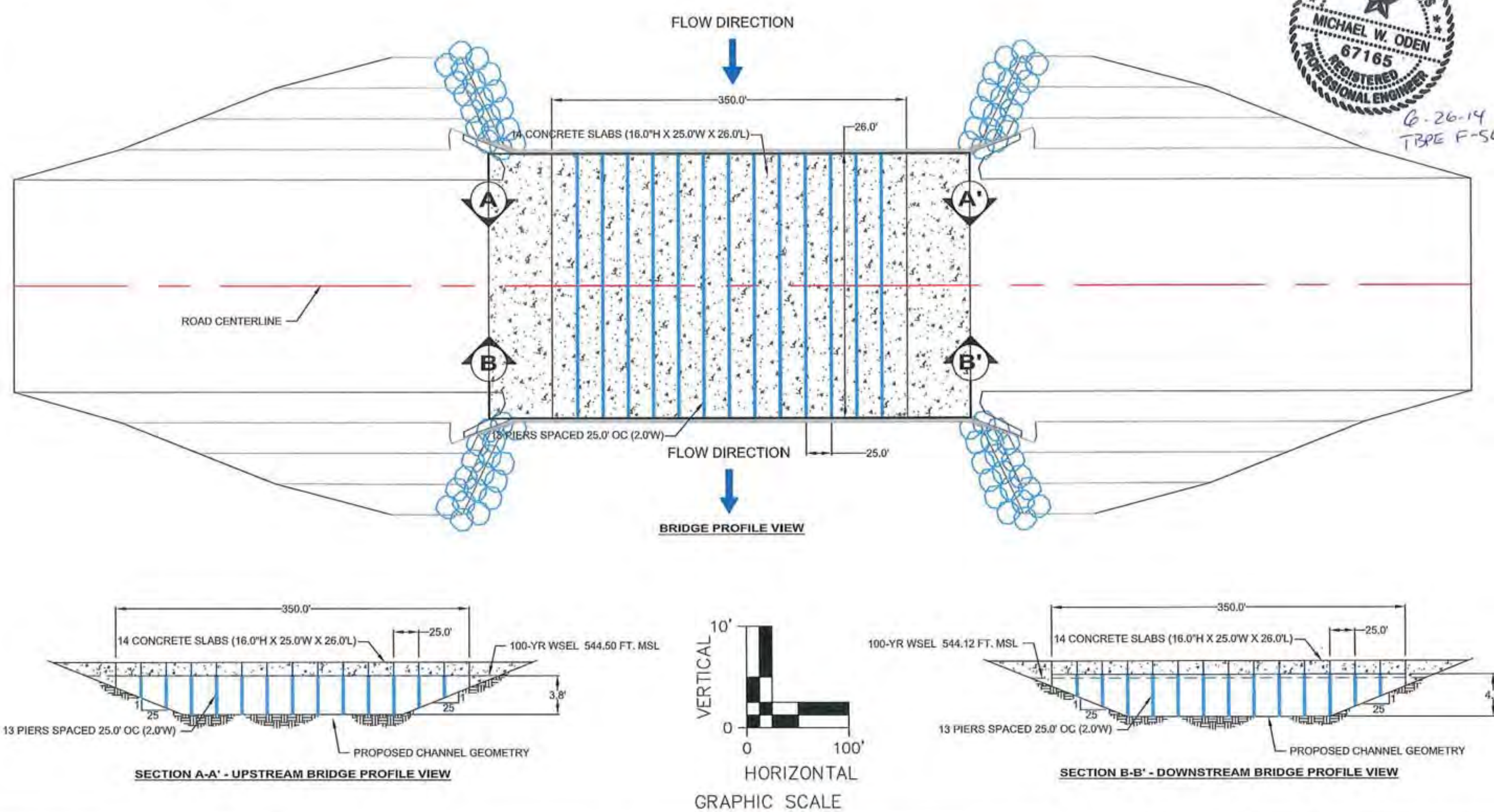


Figure 9: Annotated FIRM

Technically Complete, March 11, 2016

STATE OF TEXAS
MICHAEL W. ODEN
67165
REGISTERED
PROFESSIONAL ENGINEER

6-26-14
TBPE F-5650



REV. NO.	DATE	DESCRIPTION

CB&I

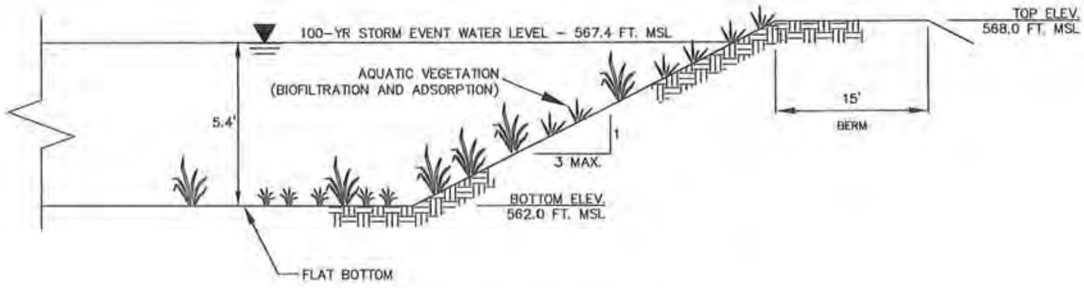
PESCADITO ENVIRONMENTAL RESOURCE CENTER
WEBB, COUNTY

FIGURE 10
PROPOSED BRIDGE PLAN AND PROFILE VIEW

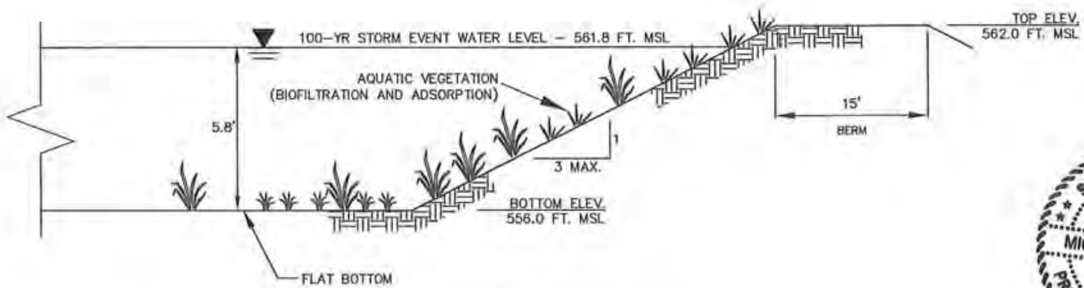
DRAWN BY:	ZPC	APPROVED BY:	MO	PROJ. NO.:	148866	DATE:	JUNE 2014

T:\AutoCAD\Projects\Pescadito Landfill\Stormwater\Road Alignment.dwg 6/23/2014 5:22:04 PM

Technically Complete, March 11, 2016



PARTIAL SECTION
NORTHWEST DETENTION BASIN
NOT TO SCALE



PARTIAL SECTION
NORTHEAST DETENTION BASIN
NOT TO SCALE

6-26-14
STATE OF TEXAS
MICHAEL W. ODEN
67165
REGISTERED
PROFESSIONAL ENGINEER
TBPE F-5650

REV. NO.	DATE	DESCRIPTION

CB&I

PESCADITO ENVIRONMENTAL RESOURCE CENTER
WEBB, COUNTY

FIGURE 11
NORTHWEST AND NORTHEAST DETENTION BASIN DETAIL

DRAWN BY:	ZPC	APPROVED BY:	MO	PROJ. NO.:	148866	DATE:	JUNE 2014

Appendix C

Existing Conditions Hydrologic Calculations and HEC-HMS Model Inputs

Existing Conditions Curve Number Calculations

Arid/Semiarid Rangelands -- Desert Shrub

	A	B	C	D
Poor	63	77	85	88
Fair	55	72	81	86
Good	49	68	79	84
Water	100			

Existing Conditions

Assuming Fair conditions

Drainage Area	A	B	C	D	Water	Curve Number	Adjusted CN
DA1	0.0%	10.7%	14.1%	73.5%	1.7%	84	69
DA2	0.0%	0.0%	43.8%	55.8%	0.4%	84	69
DA3	0.0%	41.7%	0.0%	58.3%	0.0%	80	65
DA4	0.0%	17.6%	7.9%	74.2%	0.3%	83	68

Time of Concentration Calculations Using TR-55
Existing Conditions

Sheet Flow
T = 0.007*(nL)^0.8 / (P2^0.5) * s^0.4

	DA1	DA2	DA3	DA4	
n =	0.07	0.07	0.07	0.07	*
L =	300	300	300	300	ft
P2 =	3.75	3.75	3.75	3.75	in***
s =	0.047619	0.01	0.02	0.016667	ft/ft
T =	0.14	0.26	0.20	0.21	hours
T =	8.4	15.6	11.8	12.7	minutes

Shallow Concentrated Flow
T = L / V

	DA1	DA2	DA3	DA4	
L =	1000	1500	1000	1400	ft
s =	0.026	0.006	0.025	0.018333	ft/ft
V =	2.60	1.30	2.60	2.10	ft/sec**
T =	384.62	1153.85	384.62	666.67	seconds
T =	6.4	19.2	6.4	11.1	minutes

Open Channel Flow
V = (1.49 * r^0.67 * s^0.5) / n

	DA1	DA2	DA3	DA4	
n =	0.035	0.035	0.035	0.035	*
L =	30070	7673	23409	35759	ft
s =	0.003193	0.00391	0.004229	0.003244	ft/ft
a =	16	16	16	16	ft^2
pw =	12.94	12.94	12.94	12.94	ft
r = a/pw	1.2	1.2	1.2	1.2	ft
V =	2.8	3.1	3.2	2.8	ft/sec
T = L / V	10846	2501	7336	12796	seconds
	180.8	41.7	122.3	213.3	minutes

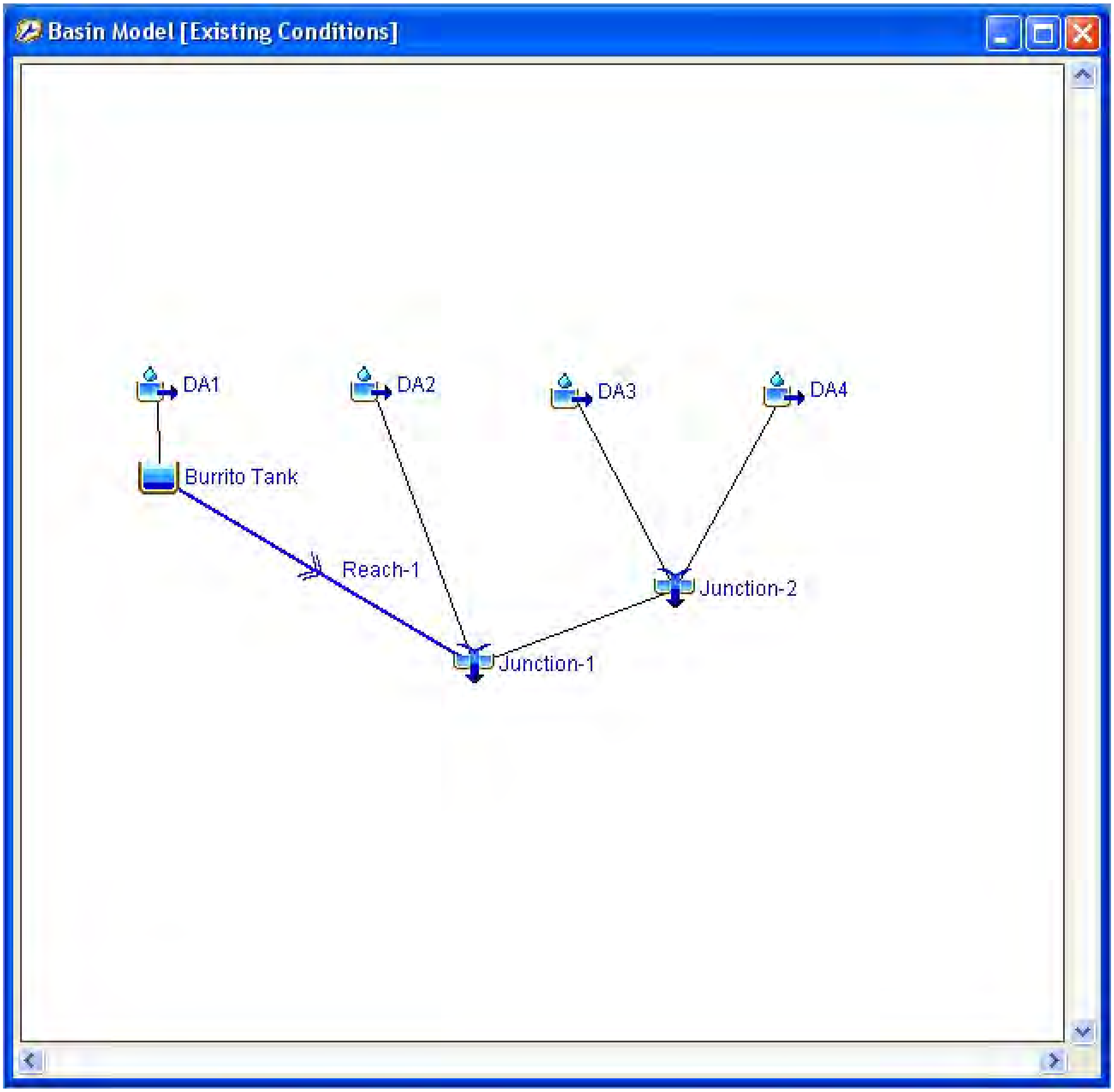
Totaled Times

	DA1	DA2	DA3	DA4	
Total Tc	**195.6**	**76.5**	**140.5**	**237.1**	**minutes**
Total Tc	**3.26**	**1.28**	**2.34**	**3.95**	**hours**
Tlag = 0.7*Tc	**136.89**	**53.58**	**98.37**	**165.98**	**minutes**
Tlag = 0.7*Tc	**2.28**	**0.89**	**1.64**	**2.77**	**hours**

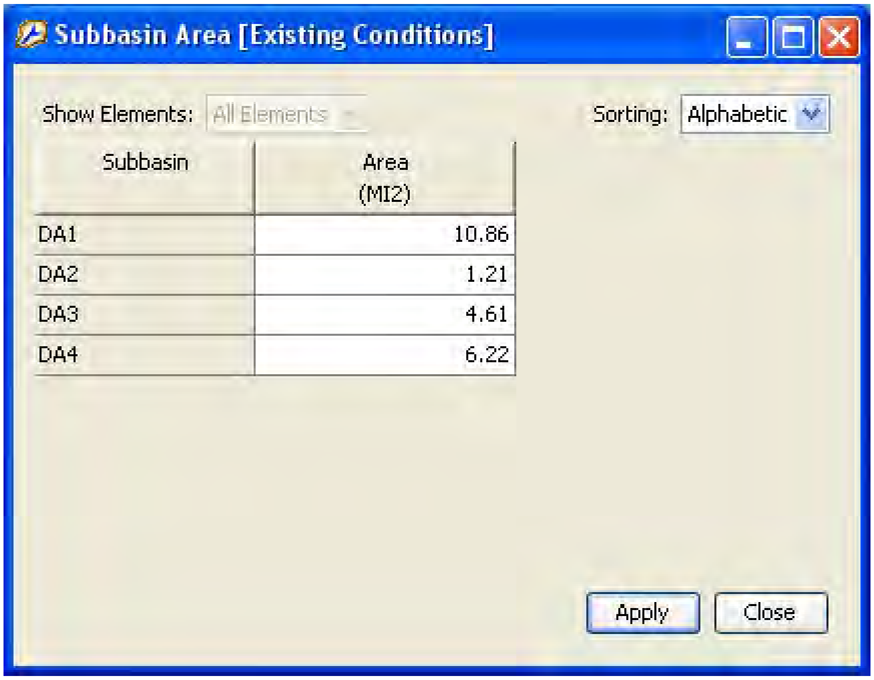
* from Chow's Open Hydraulics, Table 5-6, 1959
** from Figure 3-1 in TR-55 Report
*** from Appendix B in TR-55 Report

Existing HEC-HMS Model Inputs and Output

Drainage Basin Layout



Subbasin Areas



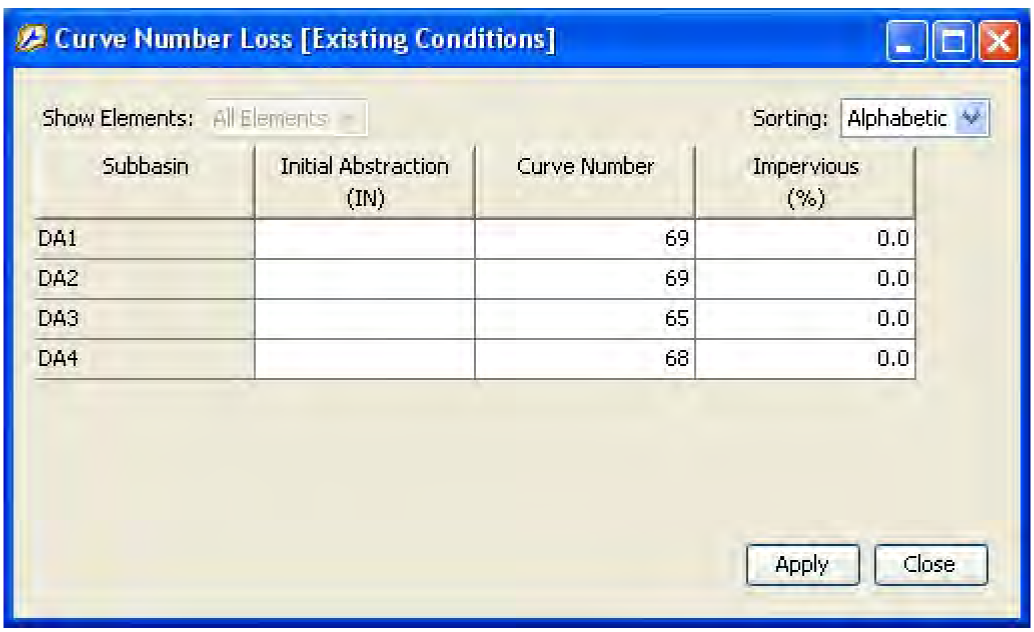
Subbasin Area [Existing Conditions]

Show Elements: All Elements   Sorting: Alphabetic

Subbasin	Area (MI2)
DA1	10.86
DA2	1.21
DA3	4.61
DA4	6.22

Apply   Close

SCS Curve Number Inputs



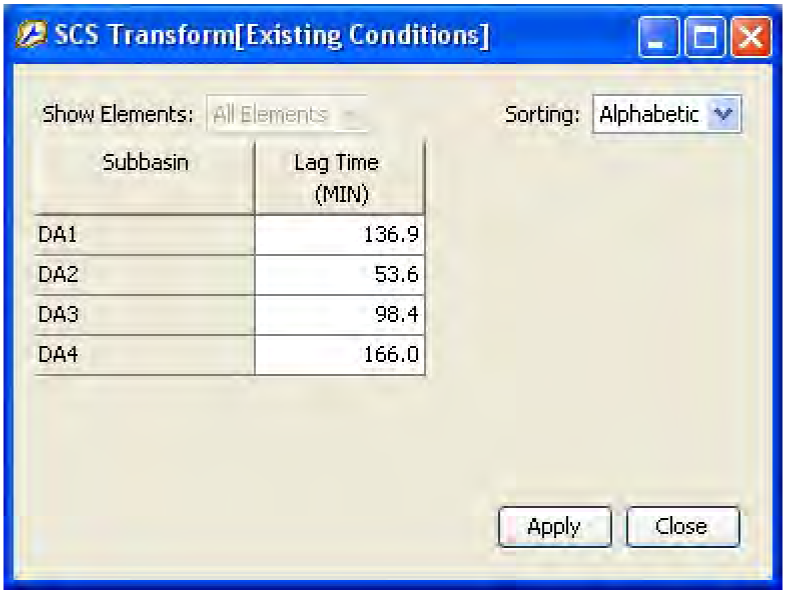
Curve Number Loss [Existing Conditions]

Show Elements: All Elements   Sorting: Alphabetic

Subbasin	Initial Abstraction (IN)	Curve Number	Impervious (%)
DA1		69	0.0
DA2		69	0.0
DA3		65	0.0
DA4		68	0.0

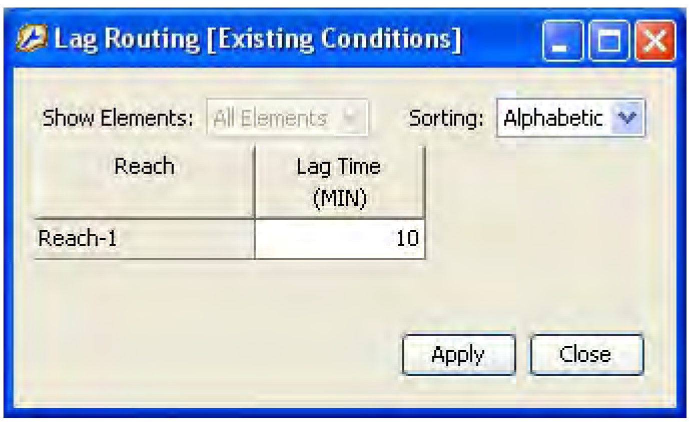
Apply   Close

SCS Unit Hydrograph Inputs



Subbasin	Lag Time (MIN)
DA1	136.9
DA2	53.6
DA3	98.4
DA4	166.0

Lag Routing Inputs



Reach	Lag Time (MIN)
Reach-1	10

Burrito Tank Inputs

Reservoir | Options

Basin Name: Existing Conditions
Element Name: Burrito Tank

Description:	Burrito Tank
Downstream:	Reach-1
Method:	Outflow Curve
Storage Method:	Elevation-Area-Discharge
*Elev-Area Function:	Burrito Tank Elev-Area
*Elev-Dis Function:	Burrito Tank Elev-Dis
Primary:	Elevation-Discharge
Initial Condition:	Elevation
*Initial Elevation (FT)	538

Paired Data | Table | Graph

Elevation (FT)	Area (AC)
535.0	17.46
536.0	22.43
538.0	39.21
540.0	68.11
542.0	124.32
544.0	222.92

Paired Data | Table | Graph

Elevation (FT)	Discharge (CFS)
535.0	0.0
536.0	0.0
538.0	0.0
540.0	1167.0
542.0	7118.0
544.0	30969.0

HEC-HMS Existing Conditions Model Output

Global Summary Results for Run "Existing 100yr"

Project: Laredo Landfill   Simulation Run: Existing 100yr

Start of Run: 01Jan2000, 12:00   Basin Model: Existing Conditions
End of Run: 03Jan2000, 12:00   Meteorologic Model: SCS Storm Type III 100yr 24h
Compute Time: 30Aug2011, 10:05:07   Control Specifications: Control 1

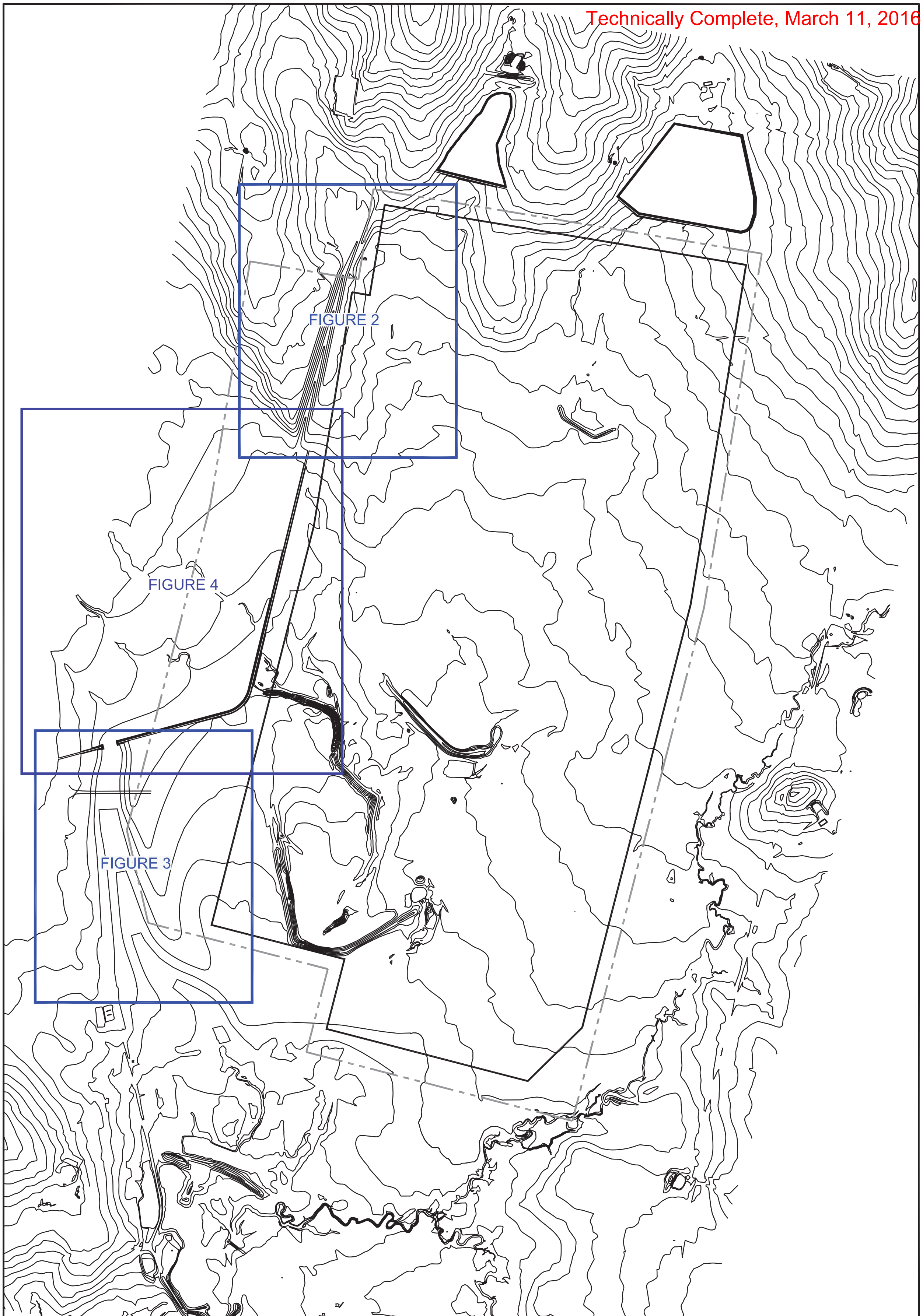
Show Elements: All Elements   Volume Units: IN AC-FT   Sorting: Hydrologic

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
DA1	10.86	7860.9	02Jan2000, 02:30	3272.6
Burrito Tank	10.86	7714.2	02Jan2000, 02:47	3272.6
Reach-1	10.86	7714.2	02Jan2000, 02:57	3272.6
DA4	6.22	3824.2	02Jan2000, 03:04	1832.0
DA3	4.61	3823.2	02Jan2000, 01:49	1263.3
Junction-2	10.83	6905.7	02Jan2000, 02:15	3095.3
DA2	1.21	1676.8	02Jan2000, 00:59	364.6
Junction-1	22.90	14567.6	02Jan2000, 02:46	6732.5

Appendix D

Typical Channel Cross Sections and West Detention Basin Profile

Technically Complete, March 11, 2016



LEGEND

FACILITY BOUNDARY LINE

APPPROXIMATE LANDFILL BOUNDARY

NOTES:

1. SOURCE: BOUNDARY AND IMPROVEMENT SURVEY, MEJIA ENGINEERING COMPANY (4/9/2010).
2. TRC ENVIRONMENTAL CORP. TBPE FIRM F-3775.

OVERVIEW MAP

PESCADITO ENVIRONMENTAL RESOURCE CENTER
MSW PERMIT NO. XXXX
WEBB COUNTY, TEXAS

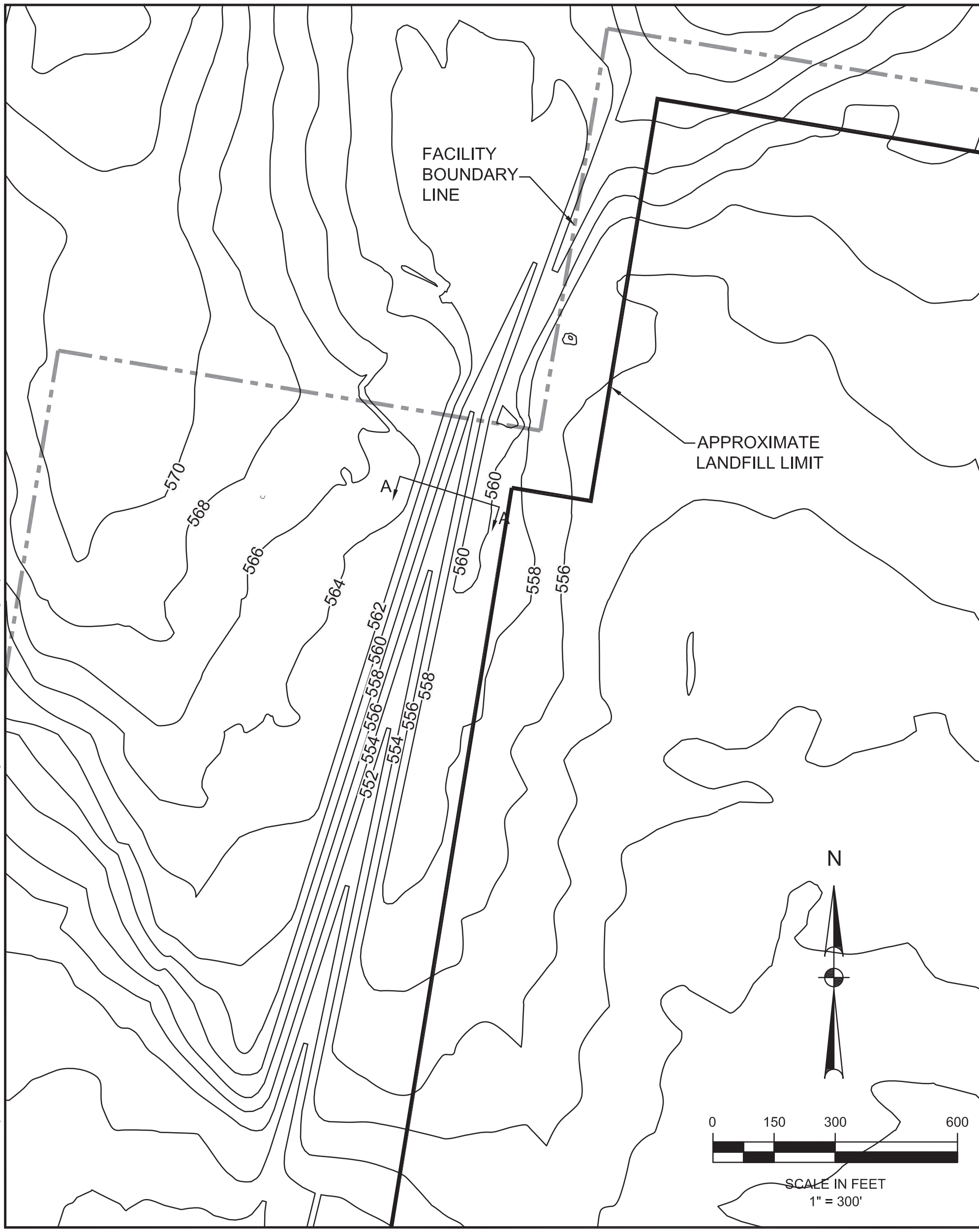
PROJECT NO.	182277	DWG FILE	182277-GRADING-1
DRAWN BY.	CL	DATE	08/31/11

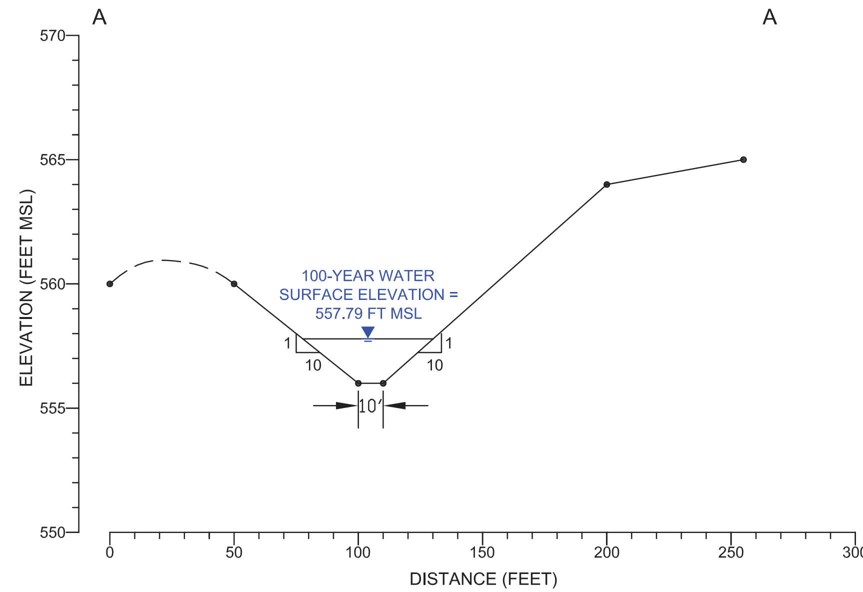
TRC
505 EAST HUNTLAND DRIVE
SUITE 250
AUSTIN, TEXAS 78752
(512) 329-6080

FIGURE 1

PART I

PAGE XX





NORTHWEST DIVERSION CHANNEL GRADING PLAN

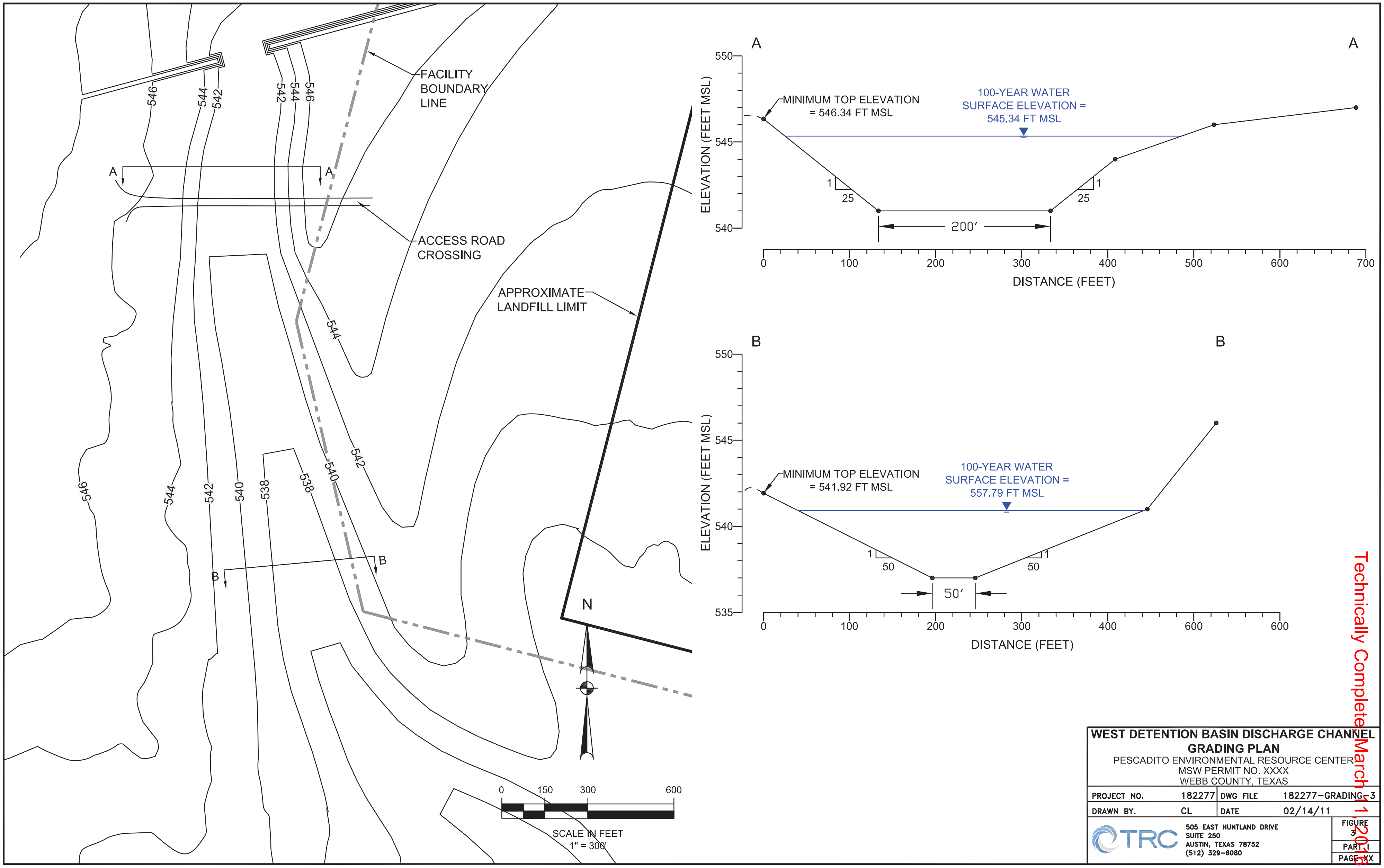
PESCADITO ENVIRONMENTAL RESOURCE CENTER
MSW PERMIT NO. XXXX
WEBB COUNTY, TEXAS

PROJECT NO.	182277	DWG FILE	182277-GRADING-2
DRAWN BY.	CL	DATE	08/30/11

TRC
505 EAST HUNTLAND DRIVE
SUITE 250
AUSTIN, TEXAS 78752
(512) 329-6080

FIGURE 2
PART I
PAGE XX

AUS S:\Rancho Viejo Cattle Co, Ltd\170401 Webb Co. Landfill Ph III\GIS\1100 Acre Figures\182277-GRADING-2.dwg Layout1 09/08/11



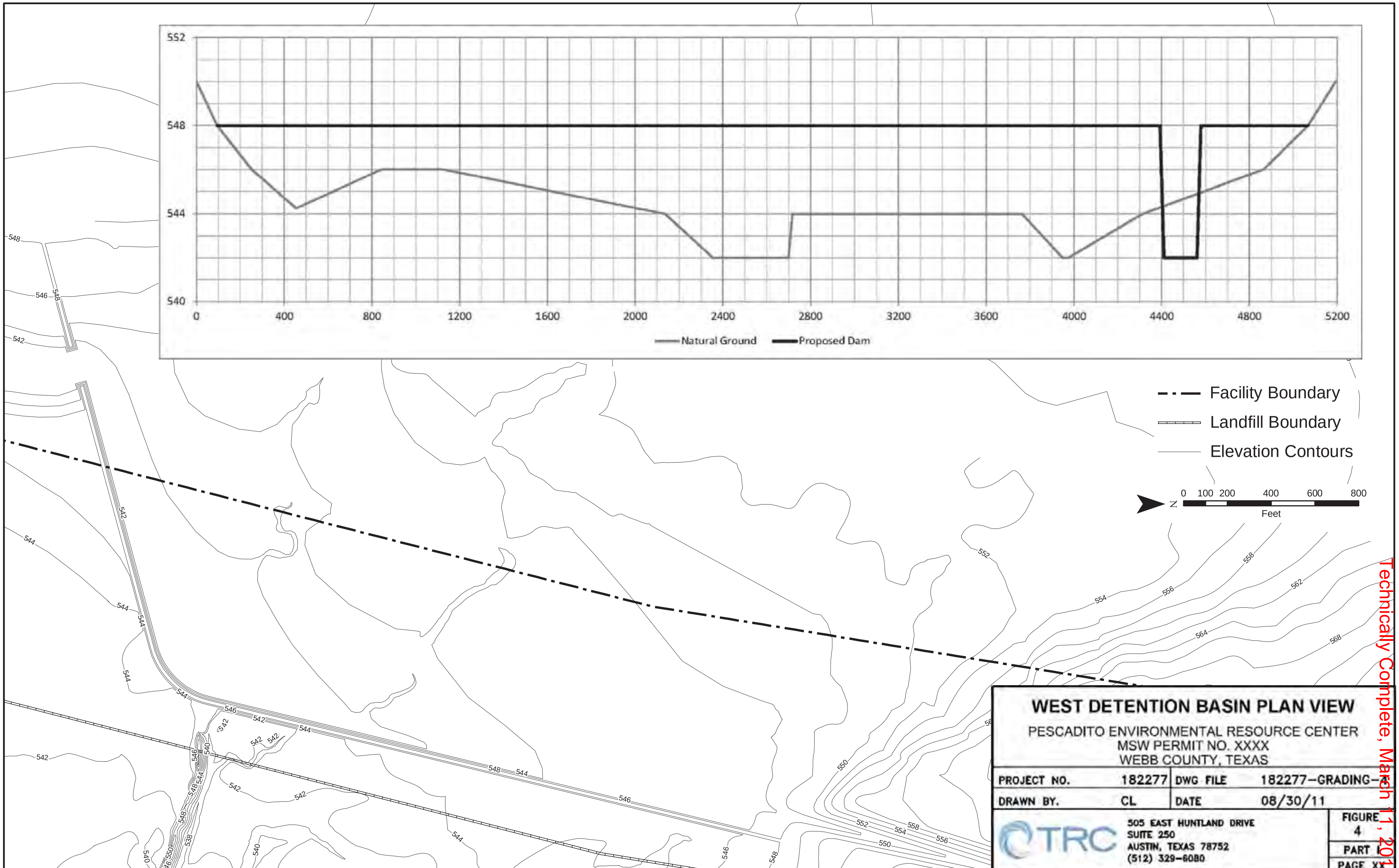
WEST DETENTION BASIN DISCHARGE CHANNEL GRADING PLAN
PESCADITO ENVIRONMENTAL RESOURCE CENTER
MSW PERMIT NO. XXXX
WEBB COUNTY, TEXAS

PROJECT NO.	182277	DWG FILE	182277-GRADING-3
DRAWN BY.	CL	DATE	02/14/11

TRC
505 EAST HUNTLAND DRIVE
SUITE 250
AUSTIN, TEXAS 78752
(512) 329-6080

FIGURE 3
PART I
PAGE XX

AUS S:\Rancho Viejo Cattle Co. Ltd\170401 Webb Co. Landfill Ph III\GIS\1100 Acre Figures\182277-GRADING-3.dwg Layout1 09/08/11



WEST DETENTION BASIN PLAN VIEW

PESCADITO ENVIRONMENTAL RESOURCE CENTER
MSW PERMIT NO. XXXX
WEBB COUNTY, TEXAS

PROJECT NO.	182277	DWG FILE	182277–GRADING–
DRAWN BY.	CL	DATE	08/30/11

TRC
505 EAST HUNTLAND DRIVE
SUITE 250
AUSTIN, TEXAS 78752
(512) 329–6080

FIGURE 4
PART I
PAGE XX

Appendix E

Operation and Maintenance Plan

OPERATION AND MAINTENANCE PLAN
PESCADITO ENVIRONMANTAL RESOURCE CENTER DETENTION PONDS

Operators:	Rancho Viejo Waste Management, LLC Rancho Viejo Cattle Co., Ltd.
Location:	20 miles East of Laredo, Texas
County:	Webb County
Prepared By:	TRC Solutions

Inspections and maintenance are required to achieve the intended function, benefits, and life of the detention ponds. The landowner/operator is responsible to establish and implement an inspection and maintenance program. Items to inspect and maintain during the design life of the detention ponds include, but are not limited to, the following:

1. Inspect ponds after significant storm events and at least bi-annually to identify repair and maintenance needs. The activities noted below should be performed after each significant engagement of the spillways.
2. Inspect the downstream toe of the embankment bi-annually. If there are wet areas or seeps at the downstream toe of the embankment during the temporary impoundment of flood waters, it could be a serious problem. Ask for assistance from an engineer to evaluate the seepage.
3. Inspect the spillway(s) of the ponds at least quarterly. Clear debris away from rock riprap, chutes and pipe inlets when found.
4. Repair erosion at outlet of principal spillway as needed. Replace or repair damaged turf reinforcement mat (TRM). Re-establish grass cover.
5. Fill rills and gullies that occur on the embankments and in the vegetated spillway. Reseed the filled areas.
6. Check frequently for burrowing animals. When found, remove the burrowing animals, replace embankment materials and reseed.
7. Maintain a vigorous sod on the embankments by regular mowing and fertilization. Remove excess growth.
8. Prevent trees and brush from growing on embankments, abutments, or in the spillway inlet or outlet areas. Control tree and bush growth by hand cutting, mowing, or chemicals. Avoid damaging grass with herbicide sprays.

Signatures:

Rancho Viejo Waste Management, LLC — 11/4/2011 Date

Rancho Viejo Cattle Co., Ltd. — 11/4/2011 Date

Appendix F

TxDOT Standard Drawings

TABLE OF CONTENTS

A list of bridge standards with revision dates or original drawing dates can be printed or downloaded from the Bridge Standards (English) web page on the TxDOT web site.

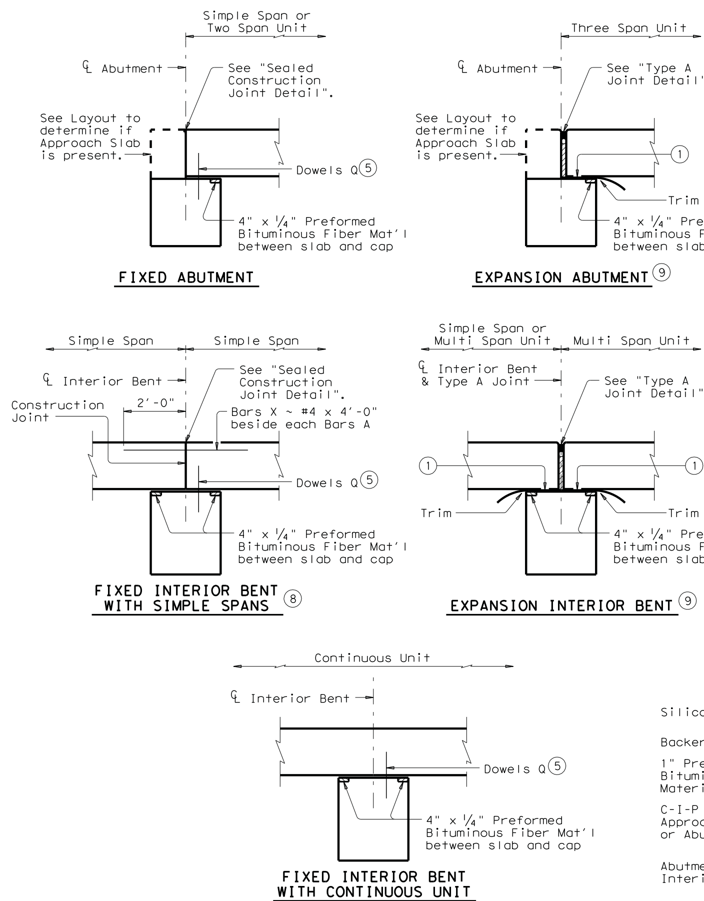
Issue date of standards - March 2009

Texas Department of Transportation
Bridge Division

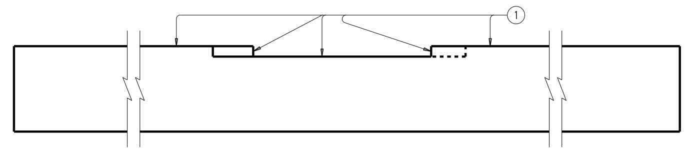
ENGLISH
C-I-P CONCRETE
SLAB SPAN STANDARDS

LEVELS DISPLAYED
ACC:
FILE: table07e.dgn

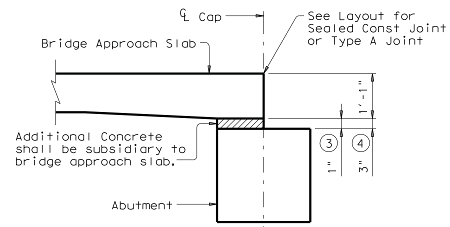
Technically Complete, March 11, 2016



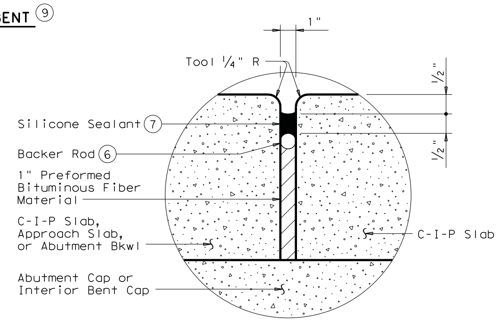
ELEVATION AT FIXED OR EXPANSION BENTS (10)



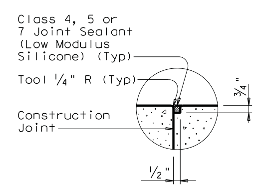
ELEVATION OF CAP



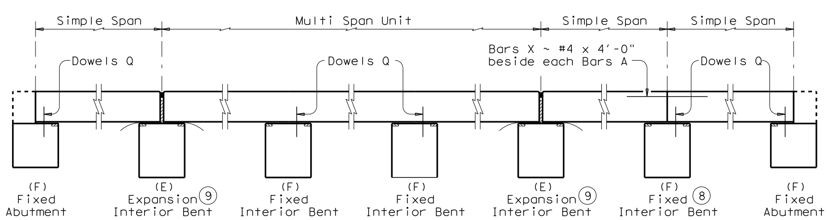
MODIFIED BRIDGE APPROACH SLAB (2)



TYPE A JOINT DETAIL (10)

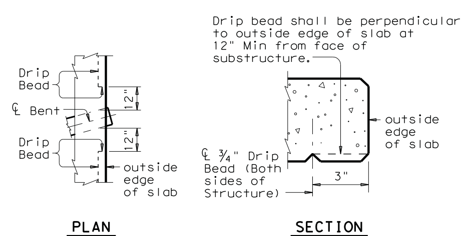


SEALED CONSTRUCTION JOINT DETAIL



EXAMPLE OF FIXED AND EXPANSION BENTS (10)

Showing C-I-P Slab Span with a 16" slab thickness.



DRIP BEAD DETAILS

ADJUSTMENT IN REINFORCING STEEL QUANTITIES

Rdwy Width	Fixed Condition (8)		Expansion Condition (9)	
	Add Bars X		Deduct Dowel Q	
	Add 2.67 lb/bar		Ded 2.25 lb/bar	
Ft	No.	Weight	No.	Weight
24	30	+80	5	-11
28	34	+91	5	-11
30	36	+96	5	-11
38	44	+118	5	-11
44	50	+134	5	-11

Note: The above quantities are for the Fixed or Expansion Condition over one Bent, and are for information only.

(1) Smooth trowel finish. Oil top of cap with 60 grade oil and apply heavy coat of powdered graphite. Press down one layer of 30# roofing felt.

(2) See Layout to determine if Approach Slab is present.

(3) Use with 14" slab thickness.

(4) Use with 16" slab thickness.

(5) See Abutment or Bent details for location of Dowels Q.

(6) Backer rod shall be 25% larger than joint opening and shall be compatible with the sealant; no reaction shall occur between the rod and the sealant.

(7) Sealant shall be Class 7 silicone sealant. Install when ambient temperature is between 55°F and 85°F and rising. Engineer to determine allowable hours for sealant application.

(8) Bars X required only when 2 Simple Spans are used together over a Fixed Interior Bent. The use of 3 consecutive Simple Spans are not recommended nor supported by this standard.

(9) Omit Dowels Q from Expansion Bents.

(10) Recommended location of Type A Joints are at the ends of 3 Span Units, ends of 2 Span Units supported by an interior bent, and no farther than 2 Simple Spans from an abutment.

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

Slab Construction Joints at bent locations shall be sealed with Class 4, 5 or 7 Joint Sealant (Low Modulus Silicone). See "Sealed Construction Joint Detail".

Expansion Joints shall be Type A Joints. See "Type A Joint Detail".

Sealed Construction Joint or Type A Joint shall be as shown on layout.

This standard does not support the use of Transition Bents.

HL93 LOADING

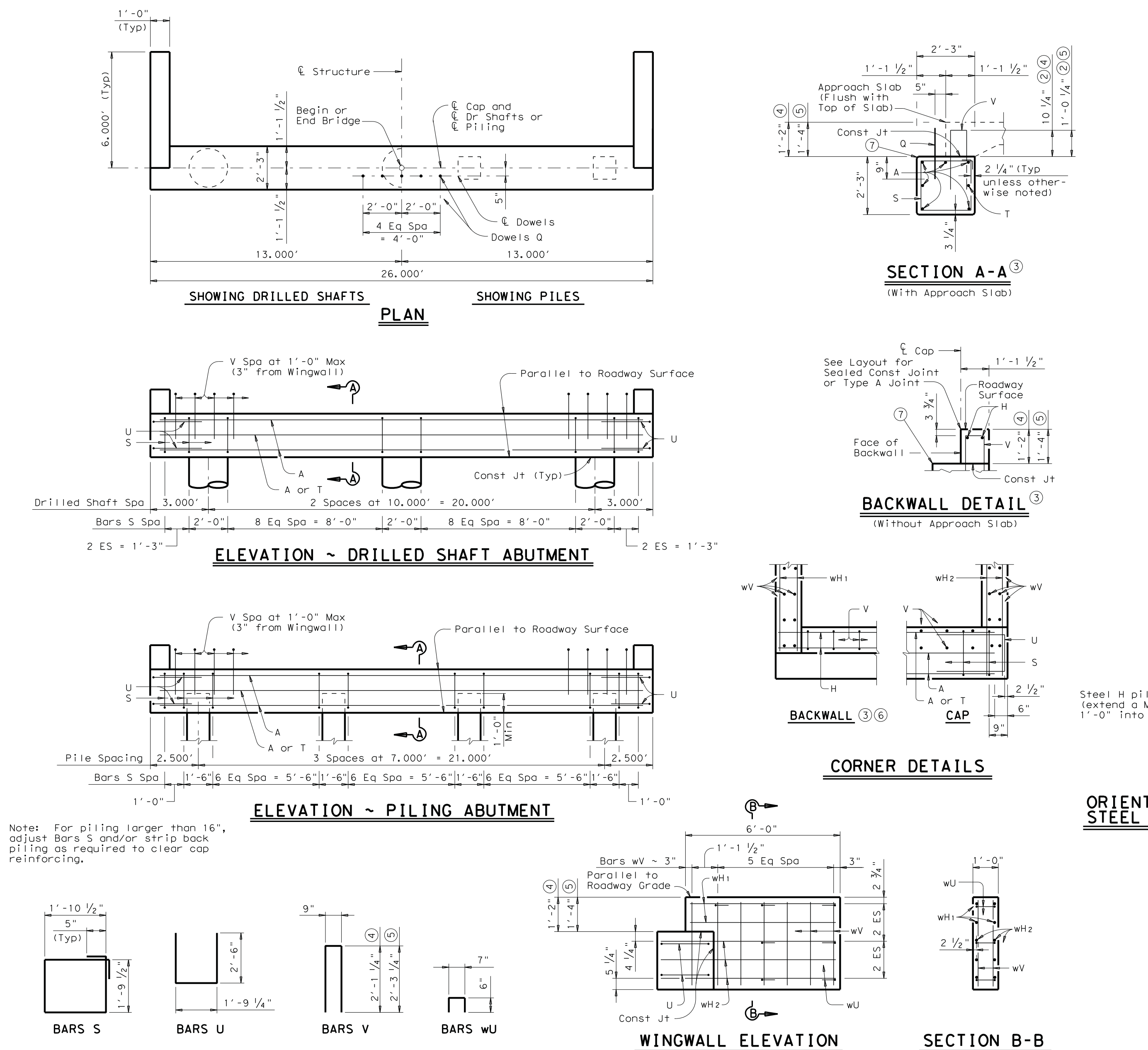
Texas Department of Transportation
Bridge Division

MISC DETAILS FOR C-I-P CONC SLAB SPANS

CS-MD

FILE: mcs01ste.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT March 2009	DISTRICT	FEDERAL AID PROJECT		SHEET
REVISIONS	COUNTY	CONTROL	SECT	JOB	HIGHWAY

PATH:
LEVELS DISPLAYED



14" SLAB ~ TABLE OF ESTIMATED QUANTITIES ①

DRILLED SHAFT ABUT

Bar	No.	Size	Length	Weight
A	6	#11	25' - 0"	797
Q	5	# 6	1' - 6"	11
S	24	# 4	8' - 2"	131
T	1	# 5	25' - 0"	26
U	4	# 6	6' - 9"	41
V	25	# 5	5' - 0"	130
wH1	8	# 6	5' - 8"	68
wH2	12	# 6	6' -10"	123
wU	14	# 4	1' - 7"	15
wV	28	# 5	3' - 1"	90
Reinforcing Steel			Lb	1,432
Class "C" Concrete			CY	6.2

PILING ABUTMENT

Bar	No.	Size	Length	Weight
A	6	#11	25' - 0"	797
Q	5	# 6	1' - 6"	11
S	25	# 4	8' - 2"	136
T	1	# 5	25' - 0"	26
U	4	# 6	6' - 9"	41
V	25	# 5	5' - 0"	130
wH1	8	# 6	5' - 8"	68
wH2	12	# 6	6' -10"	123
wU	14	# 4	1' - 7"	15
wV	28	# 5	3' - 1"	90
Reinforcing Steel			Lb	1,437
Class "C" Concrete			CY	6.2

16" SLAB ~ TABLE OF ESTIMATED QUANTITIES ①

DRILLED SHAFT ABUT

Bar	No.	Size	Length	Weight
A	6	#11	25' - 0"	797
Q	5	# 6	1' - 6"	11
S	24	# 4	8' - 2"	131
T	1	# 5	25' - 0"	26
U	4	# 6	6' - 9"	41
V	25	# 5	5' - 4"	139
wH1	8	# 6	5' - 8"	68
wH2	12	# 6	6' -10"	123
wU	14	# 4	1' - 7"	15
wV	28	# 5	3' - 3"	95
Reinforcing Steel			Lb	1,446
Class "C" Concrete			CY	6.3

PILING ABUTMENT

Bar	No.	Size	Length	Weight
A	6	#11	25' - 0"	797
Q	5	# 6	1' - 6"	11
S	25	# 4	8' - 2"	136
T	1	# 5	25' - 0"	26
U	4	# 6	6' - 9"	41
V	25	# 5	5' - 4"	139
wH1	8	# 6	5' - 8"	68
wH2	12	# 6	6' -10"	123
wU	14	# 4	1' - 7"	15
wV	28	# 5	3' - 3"	95
Reinforcing Steel			Lb	1,451
Class "C" Concrete			CY	6.3

① Quantities shown are for one Abutment only (with Approach Slab). With no Approach Slab, add 54 Lbs Reinforcing Steel for 2 ~ #5 Bars H (25'-8") and the following amounts of concrete:
14" slab thickness add 1.2 CY Class "C" Concrete.
16" slab thickness add 1.3 CY Class "C" Concrete.

② Increase as required to maintain 3 3/4" from Finished Grade.

③ See Layout to determine if Approach Slab is present.

④ Use with 14" slab thickness.

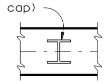
⑤ Use with 16" slab thickness.

⑥ Omit Bars H if Approach Slab is present.

⑦ See standard CS-MD for Preformed Bituminous Fiber Material.

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.
All cap and wall reinforcing shall be Grade 60.
Concrete strength f'c = 3,600 psi.
Designed for normal embankment header slope of 3:1.
See Layout for foundation type, size and length.
See standard FD for foundation details and notes.
See standard CS-MD for joint details and details not shown.
Calculated Foundation Loads: 35 Tons/Drilled Shaft
25 Tons/Pile.
These abutment details may be used with standards CS-25-24, CS-50-24, CS-75-24 and CS-80-24 only.



ORIENTATION OF STEEL H PILING

HL93 LOADING

Texas Department of Transportation
Bridge Division

ABUTMENTS FOR C-I-P CONC SLAB SPANS

24 FT ROADWAY

ACS-24

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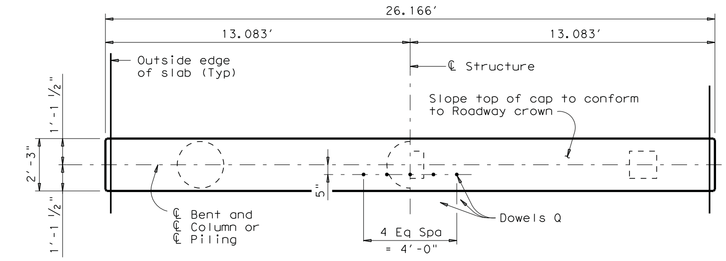

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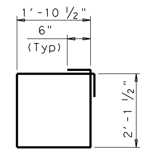
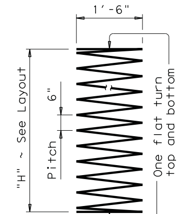
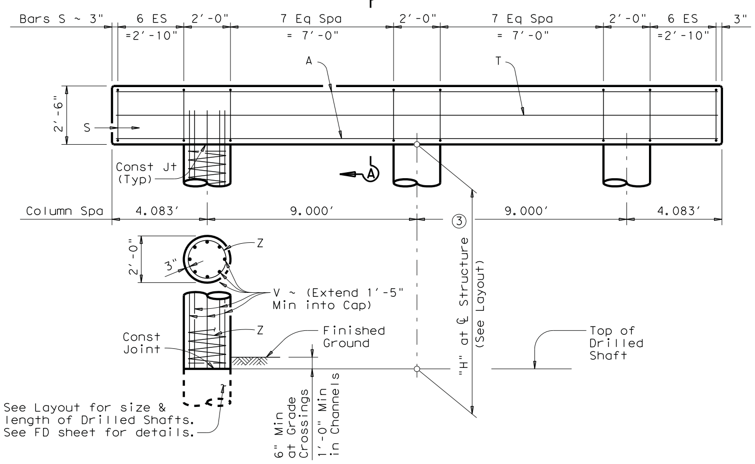


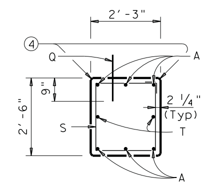
BARS S



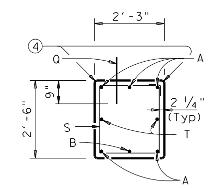
BARS Z



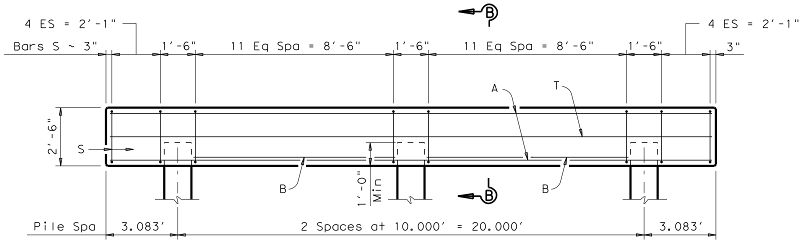
ELEVATION ~ 3 COLUMN BENT



SECTION A-A

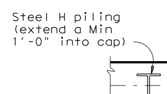


SECTION B-B



Note: For piling larger than 16", adjust Bars S as required to avoid piling.

ELEVATION ~ 3 PILE BENT ③



ORIENTATION OF STEEL H PILING

TABLE OF CONSTANT QUANTITIES

3 COLUMN BENT

Bar	No.	Size	Length	Weight
A	6	#11	25'-10"	824
Q	5	# 6	1'- 6"	11
S	30	# 5	9'- 0"	282
T	2	# 5	25'-10"	54
Reinforcing Steel			Lb	1,171
Class "C" Concrete			CY	5.5

TABLE OF ESTIMATED QUANTITIES

3 PILE BENT

Bar	No.	Size	Length	Weight
A	5	#11	25'-10"	686
B	2	#11	8'- 6"	90
Q	5	# 6	1'- 6"	11
S	34	# 5	9'- 0"	319
T	2	# 5	25'-10"	54
Reinforcing Steel			Lb	1,160
Class "C" Concrete			CY	5.5

TABLE OF VARIABLE QUANTITIES ~ 3 COLUMN BENT ①

"H" ③	Class "C" Conc (Cols)	Bars V 24 ~ #7		Bars Z 3 ~ #3 Spiral	
Ft	CY	Length	Weight	Length	Weight
24	8.4	25'-5"	1,247	237'	267

TOTAL EST QUANT ~ 3 COL BENT ②

Reinf Steel	Class "C" Conc
Lb	CY
2,685	13.9

① Adjust Bars V length by 1 Ft and Bars Z length by 9.4777 Ft for each linear foot of variation in "H" value.

② Adjust Reinforcing Steel Total by 60 Lbs and Class "C" Conc by 0.349 CY for each linear foot of variation in "H" value.

③ This standard may not be used for "H" heights or exposed pile heights exceeding the values shown in the tables. In areas of very soft soil or where scour is anticipated, allowable "H" heights or exposed pile heights shall be evaluated by the Engineer prior to the use of this standard.

④ See standard CS-MD for Preformed Bituminous Fiber Material.

TABLE OF MAXIMUM EXPOSED PILE HEIGHTS ③

Max Height	Pile Type	
	PS Concrete	Steel
16'-0"	16" Sq	HP14 X 73
20'-0"	18" Sq	HP14 X 117

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.
All cap reinforcing shall be Grade 60.
Concrete strength f'c = 3,600 psi.
Column and Drilled Shaft reinforcing may be Grade 40.
See Layout for foundation type, size and length.
See standard FD for foundation details and notes.
These bent details do not support the use of multi-pile footings as shown on the FD standard.
See standard CS-MD for details not shown.
For usual soil and construction conditions, slab formwork may be supported from the sides of bent caps if one of the following is satisfied:
1) For column bents, a maximum "H" height of 24'.
2) For pile bents, a maximum exposed pile height of 20'.
Calculated Foundation Loads: 69 Tons/Drilled Shaft
60 Tons/Pile
These bent details may be used with standards CS-25-24, CS-50-24, CS-75-24 and CS-80-24 only.

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Bridge Division

INTERIOR BENTS FOR C-I-P CONC SLAB SPANS

24 FT ROADWAY

BCS-24

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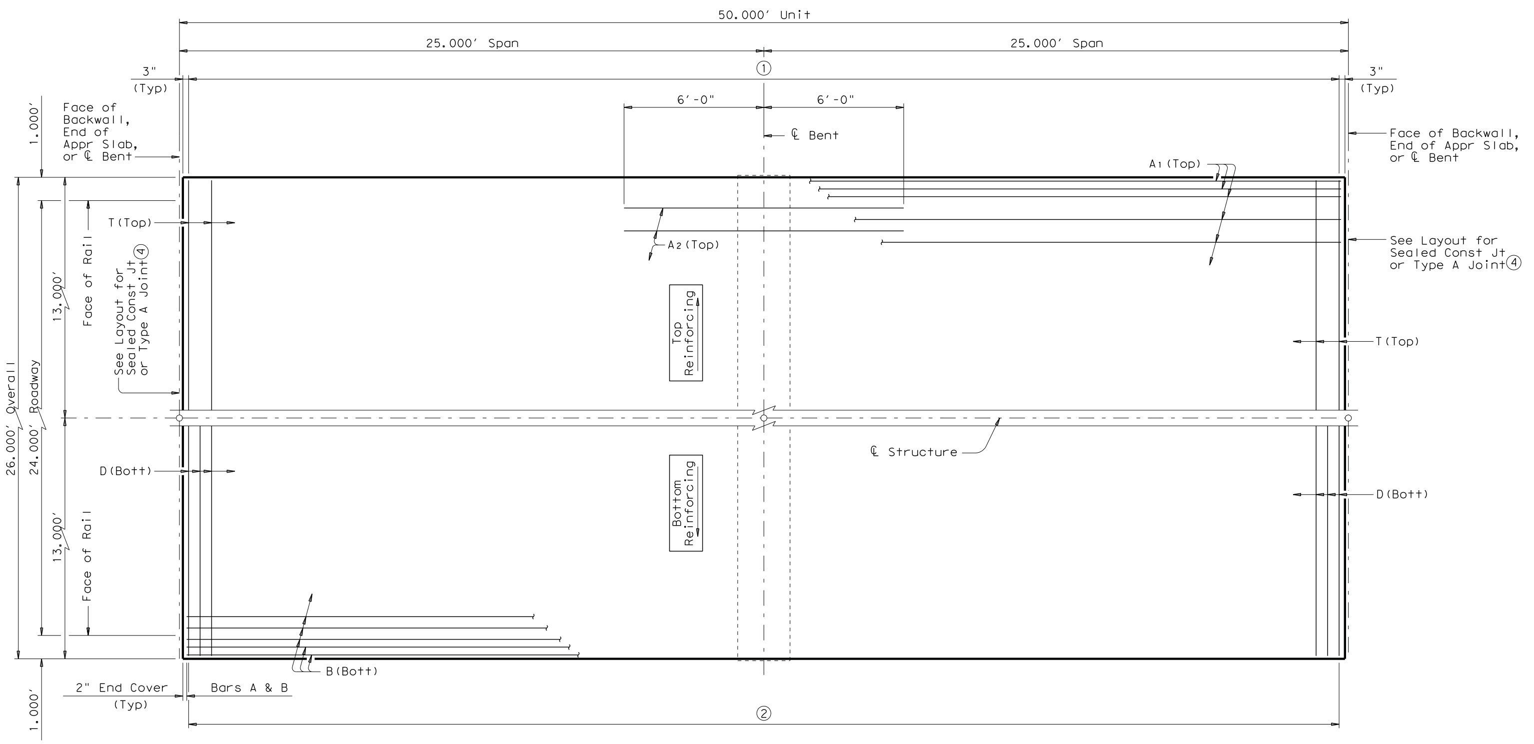
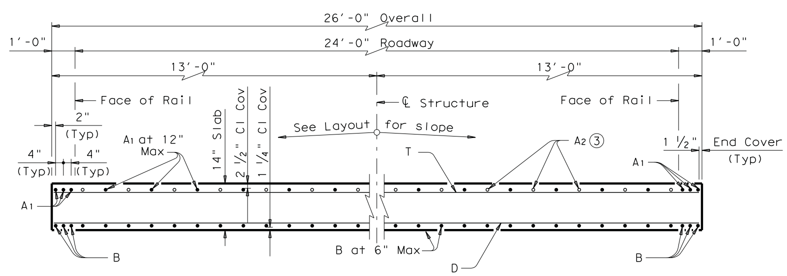


① Bars T (Top) at 12" Max Spacing
② Bars D (Bott) at 6" Max Spacing

PLAN



TYPICAL TRANSVERSE SECTION

③ Place Bars A2 between Bars A1 over Bent (See PLAN for Placement)

TABLE OF ESTIMATED QUANTITIES CS-50-24

Bar	No.	Size	Length	Weight
A1	30	# 8	49'- 8"	3,978
A2	25	# 8	12'- 0"	801
B	54	# 8	49'- 8"	7,161
D	100	# 4	25'- 9"	1,720
T	51	# 4	25'- 9"	877
Reinforcing Steel			Lb	14,537
Class "S" Concrete ⑤			CY	56.2

④ See standard CS-MD for Fixed or Expansion Joint Details.

⑤ Provide Class S(HPC) if shown elsewhere in the plans.

GENERAL NOTES:

Designed according to AASHTO LRFD Specifications.

See standard CS-MD for additional slab span details.

All reinforcing shall be Grade 60.

Bar laps not permitted for Bars A and B.

Concrete strength f'c = 4,000 psi.

This standard does not support the use of Transition Bents.

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50' C-I-P CONTINUOUS SLAB UNIT (25'-25') 24 FT ROADWAY

CS-50-24

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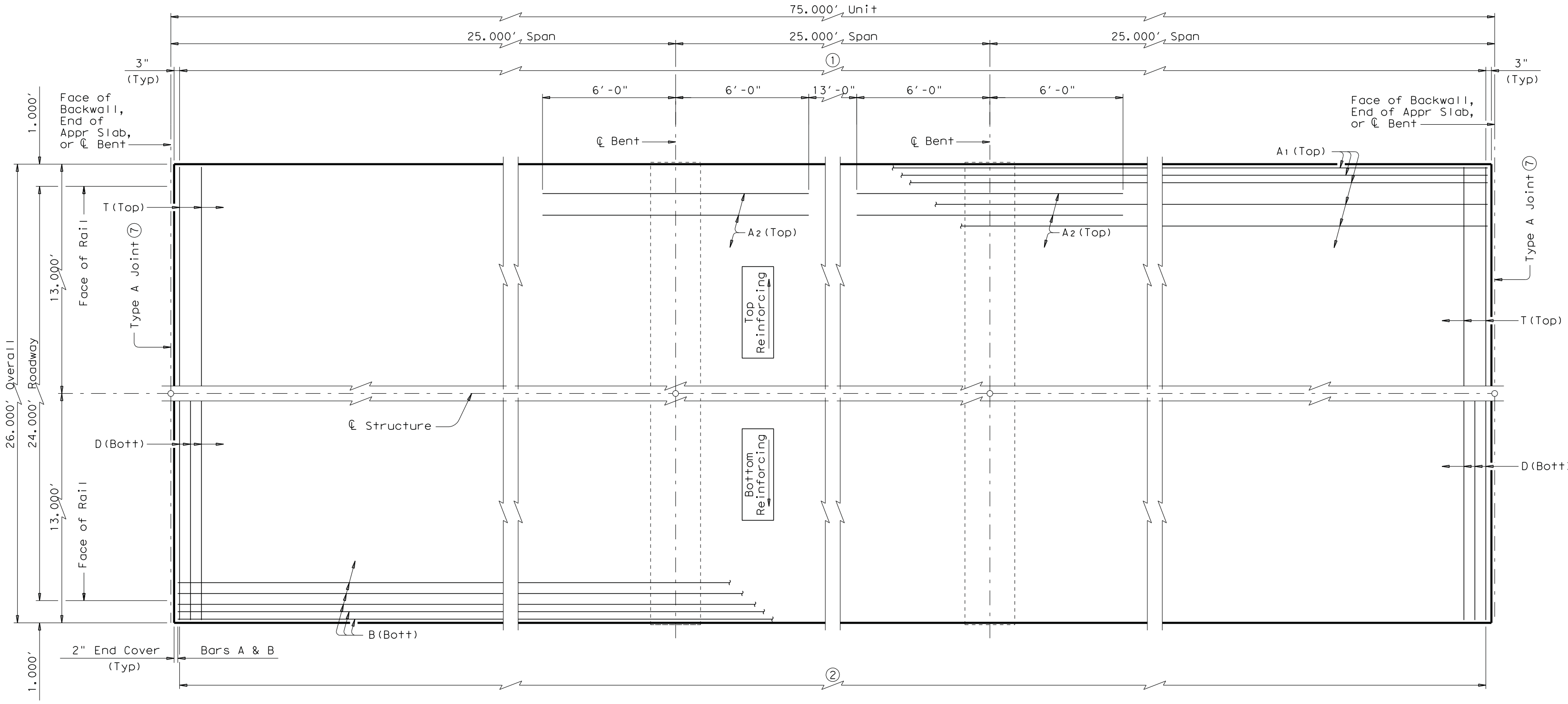
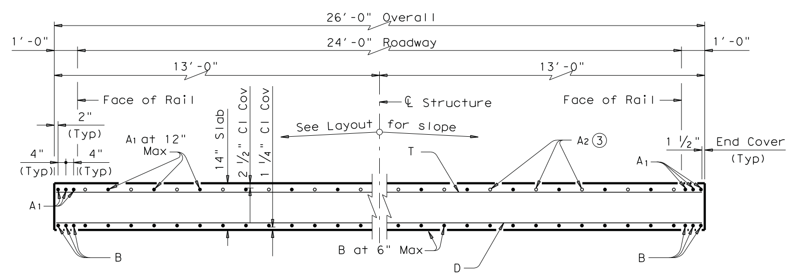


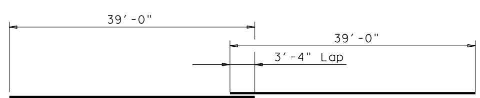
① Bars T (Top) at 12" Max Spacing
② Bars D (Bott) at 6" Max Spacing

PLAN

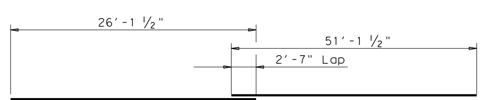


TYPICAL TRANSVERSE SECTION

③ Place Bars A2 between Bars A1 over Bent (See PLAN for Placement)



BARS A1



BARS B ④

④ Alternate Splices over Supports

TABLE OF ESTIMATED QUANTITIES CS-75-24

Bar	No.	Size	Length	Weight
A1 ⑤	30	# 8	78' - 0"	6,248
A2	50	# 8	12' - 0"	1,602
B ⑥	54	# 8	77' - 3"	11,138
D	150	# 4	25' - 9"	2,580
T	76	# 4	25' - 9"	1,307
Reinforcing Steel			Lb	22,875
Class "S" Concrete ⑧			CY	84.3

⑤ Length shown includes one 3'-4" lap splice.

⑥ Length shown includes one 2'-7" lap splice.

⑦ See standard CS-MD for Expansion Joint Details.

⑧ Provide Class S (HPC) if shown elsewhere in the plans.

GENERAL NOTES:
Designed according to AASHTO LRFD Specifications.
See standard CS-MD for additional slab span details.
All reinforcing shall be Grade 60.
Concrete strength f'c = 4,000 psi.
When epoxy coated reinforcing is used, the lap splice lengths shown shall be increased by a factor of 1.5.
This standard does not support the use of Transition Bents.

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Bridge Division

75' C-I-P CONTINUOUS SLAB UNIT (25'-25'-25') 24 FT ROADWAY

CS-75-24

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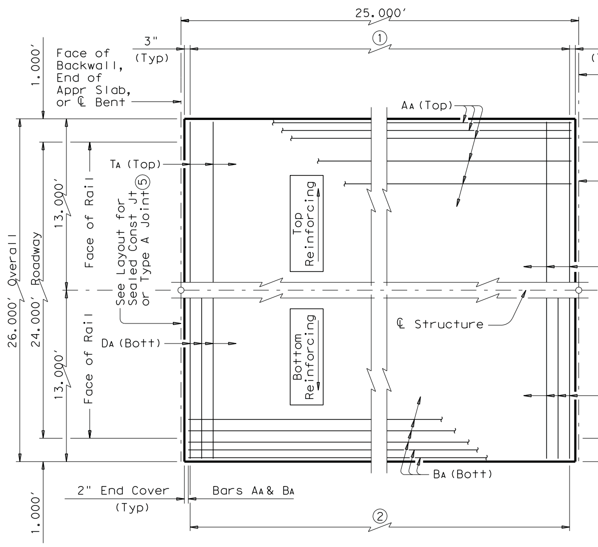
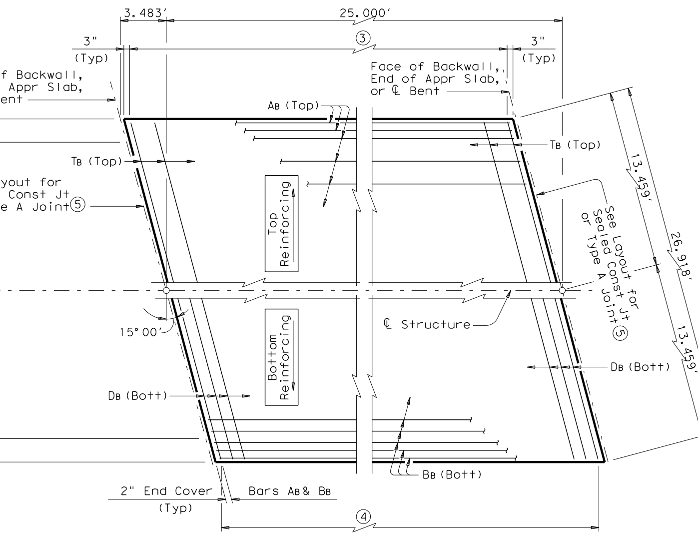


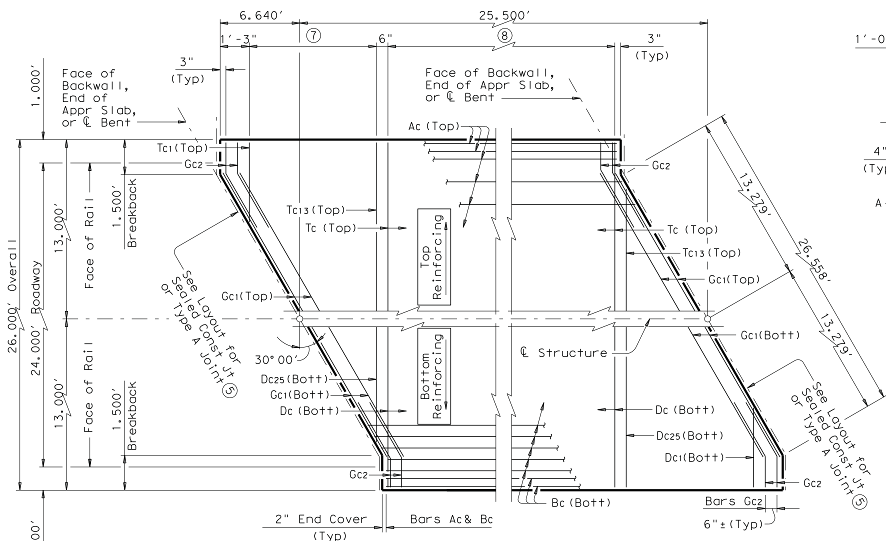
CS-25-24

① Bars TA (Top) at 12" Max Spacing
② Bars DA (Bott) at 6" Max Spacing



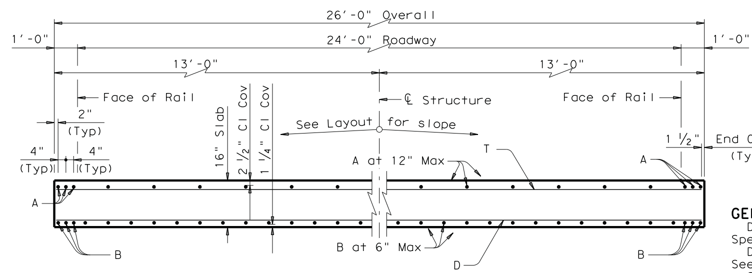
CS-25-24 (15°)

③ Bars TB (Top) at 12" Max Spacing
④ Bars DB (Bott) at 6" Max Spacing

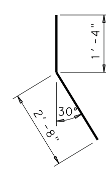


CS-25-24 (30°)

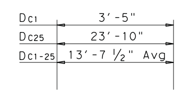
⑦ Bars TC 1-13 (Top) at 12" Max Spacing = 11'-9 1/2"
Bars DC 1-25 (Bott) at 6" Max Spacing = 11'-9 1/2"
⑧ Bars TC (Top) at 12" Max Spacing
Bars DC (Bott) at 6" Max Spacing



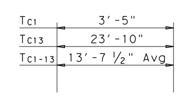
TYPICAL TRANSVERSE SECTION



BARS GC2



BARS DC



BARS TC

TABLE OF ESTIMATED QUANTITIES⑤ CS-25-24

Bar	No.	Size	Length	Weight
AA	30	# 4	24'- 8"	494
BA	54	# 8	24'- 8"	3,556
DA	50	# 4	25'- 9"	860
TA	26	# 4	25'- 9"	447
Reinforcing Steel			Lb	5,357
Class "S" Concrete⑥			CY	32.1

TABLE OF ESTIMATED QUANTITIES⑤ CS-25-24 (15°)

Bar	No.	Size	Length	Weight
AB	30	# 4	24'- 8"	494
BB	54	# 8	24'- 8"	3,556
DB	50	# 4	26'- 8"	891
TB	26	# 4	26'- 8"	463
Reinforcing Steel			Lb	5,404
Class "S" Concrete⑥			CY	32.2

TABLE OF ESTIMATED QUANTITIES⑤ CS-25-24 (30°)

Bar	No.	Size	Length	Weight
AC	30	# 4	25'- 2"	504
BC	54	# 9	25'- 2"	4,621
DC	25	# 4	25'- 9"	430
DC1-25	50	# 4	13'- 8"AV	456
GC1	8	# 5	26'- 7"	222
GC2	16	# 5	4'- 0"	67
TC	13	# 4	25'- 9"	224
TC1-13	26	# 4	13'- 8"AV	237
Reinforcing Steel			Lb	6,761
Class "S" Concrete⑥			CY	32.8

⑤ See standard CS-MD for Fixed or Expansion Joint Details.

⑥ Provide Class S(HPC) if shown elsewhere in the plans.

GENERAL NOTES:
Designed according to AASHTO LRFD Specifications.
Details shown are for right forward skew. See Layout for actual skew direction.
See standard CS-MD for additional slab span details and quantity adjustments.
All reinforcing shall be Grade 60.
Concrete strength f'c = 4,000 psi.
This standard does not support the use of Transition Bents.

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Texas Department of Transportation
Bridge Division

25' C-I-P CONCRETE SLAB SPANS

24 FT ROADWAY 0°-30° SKEW

CS-25-24

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Appendix G

Proposed Conditions Hydrologic Calculations and HEC-HMS Model Inputs

Proposed Conditions Curve Number Calculations

Arid/Semiarid Rangelands -- Desert Shrub

	A	B	C	D
Poor	63	77	85	88
Fair	55	72	81	86
Good	49	68	79	84
Water	100			

Proposed Conditions

Assuming Fair conditions

Drainage Area	A	B	C	D	Water	Curve Number	Adjusted CN
DA1	0.0%	4.8%	18.7%	75.3%	1.2%	85	70
DA2	0.0%	3.5%	28.8%	67.7%	0.0%	84	69
DA3	0.0%	36.0%	0.0%	64.0%	0.0%	81	66
DA4	0.0%	17.6%	7.9%	74.2%	0.3%	83	68
DA5	0.0%	64.6%	0.0%	35.4%	0.0%	77	62
DA6	0.0%	72.3%	0.0%	27.6%	0.0%	76	61
DA7	0.0%	47.3%	0.0%	52.7%	0.0%	79	64

Time of Concentration Calculations Using TR-55
Proposed Conditions

Sheet Flow
T = 0.007*(nL)^0.8 / (P2^0.5) * s^0.4

	DA1	DA2	DA3	DA4	DA5	DA6	DA7	
n =	0.07	0.07	0.07	0.07	0.07	0.07	0.07	*
L =	300	300	300	300	300	300	300	ft
P2 =	3.75	3.75	3.75	3.75	3.75	3.75	3.75	in***
s =	0.047619	0.02	0.02	0.016667	0.01	0.013333	0.013333	ft/ft
T =	0.14	0.20	0.20	0.21	0.26	0.23	0.23	hours
T =	8.4	11.8	11.8	12.7	15.6	13.9	13.9	minutes

Shallow Concentrated Flow
T = L / V

	DA1	DA2	DA3	DA4	DA5	DA6	DA7	
L =	1000	1400	1000	1400	1200	1000	1400	ft
s =	0.026	0.011429	0.025	0.018333	0.018333	0.013	0.02	ft/ft
V =	2.60	1.70	2.60	2.10	2.20	1.80	2.30	ft/sec**
T =	384.62	823.53	384.62	666.67	545.45	555.56	608.70	seconds
T =	6.4	13.7	6.4	11.1	9.1	9.3	10.1	minutes

Open Channel Flow
V = (1.49 * r^0.67 * s^0.5) / n

	DA1	DA2	DA3	DA4	DA5	DA6	DA7	
n =	0.035	0.035	0.035	0.035	0.035	0.035	0.035	*
L =	26167	11204	23409	35759	5523	2773	4119	ft
s =	0.003516	0.002321	0.004229	0.003244	0.005794	0.008656	0.004127	ft/ft
a =	16	16	16	16	8	8	8	ft^2
pw =	12.94	12.94	12.94	12.94	6.47	6.47	6.47	ft
r = a/pw	1.2	1.2	1.2	1.2	1.2	1.2	1.2	ft
V =	2.9	2.4	3.2	2.8	3.7	4.6	3.2	ft/sec
T = L / V	8994	4740	7336	12796	1479	607	1307	seconds
	149.9	79.0	122.3	213.3	24.6	10.1	21.8	minutes

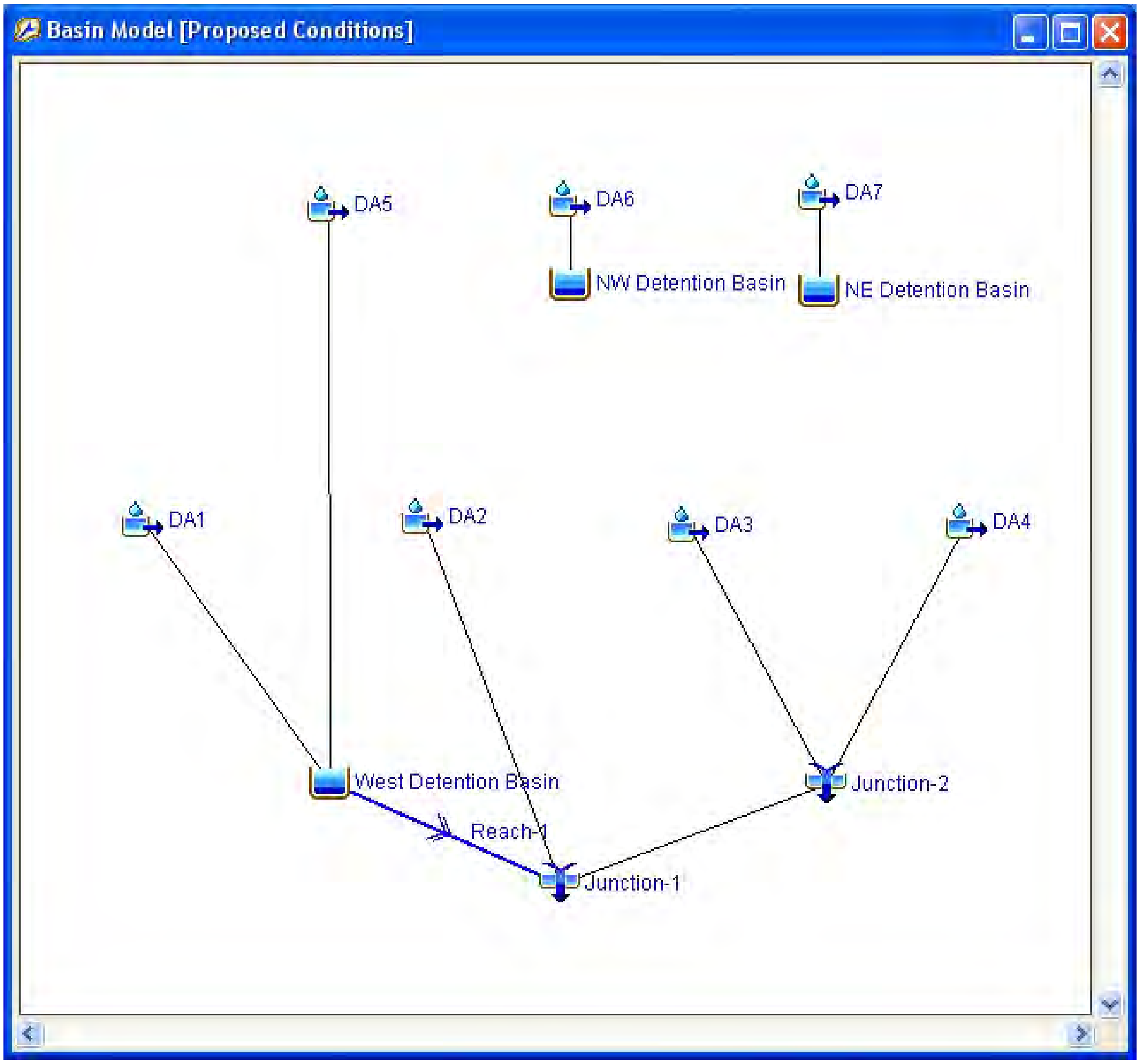
Totaled Times

	DA1	DA2	DA3	DA4	DA5	DA6	DA7	
Total Tc	**164.7**	**104.6**	**140.5**	**237.1**	**49.4**	**33.3**	**45.9**	**minutes**
Total Tc	**2.74**	**1.74**	**2.34**	**3.95**	**0.82**	**0.56**	**0.76**	**hours**
Tlag = 0.7*Tc	**115.28**	**73.20**	**98.37**	**165.98**	**34.56**	**23.32**	**32.10**	**minutes**
Tlag = 0.7*Tc	**1.92**	**1.22**	**1.64**	**2.77**	**0.58**	**0.39**	**0.53**	**hours**

* from Chow's Open Hydraulics, Table 5-6, 1959
** from Figure 3-1 in TR-55 Report
*** from Appendix B in TR-55 Report

Proposed HEC-HMS Model Inputs and Output

Drainage Basin Layout



Subbasin Areas

Subbasin Area [Proposed Conditions]

Show Elements: All Elements   Sorting: Alphabetic

Subbasin	Area (MI2)
DA1	8.18
DA2	1.85
DA3	5.51
DA4	6.22
DA5	0.31
DA6	0.21
DA7	0.61

Apply   Close

SCS Curve Number Inputs

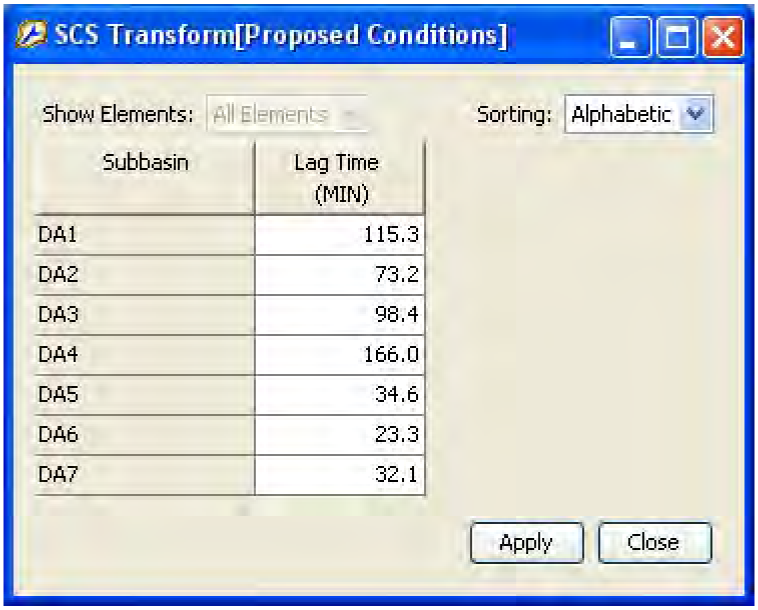
Curve Number Loss [Proposed Conditions]

Show Elements: All Elements   Sorting: Alphabetic

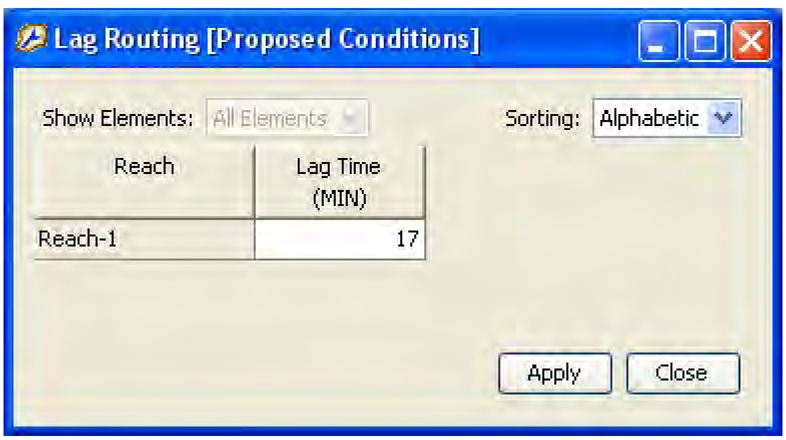
Subbasin	Initial Abstraction (IN)	Curve Number	Impervious (%)
DA1		70	0.0
DA2		69	0.0
DA3		66	0.0
DA4		68	0.0
DA5		62	0.0
DA6		61	0.0
DA7		64	0.0

Apply   Close

SCS Unit Hydrograph Inputs



Lag Routing Inputs



Technically Complete, March 11, 2016

West Detention Basin Inputs

Reservoir | Options

Basin Name: Proposed Conditions
Element Name: West Detention Basin

Description:	Proposed tank W of property
Downstream:	Reach-1
Method:	Outflow Curve
Storage Method:	Elevation-Area-Discharge
*Elev-Area Function:	West Detention Elev-Area
*Elev-Dis Function:	West Detention Elev-Dis
Primary:	Elevation-Area
Initial Condition:	Elevation
*Initial Elevation (FT)	542

Paired Data | Table | Graph

Elevation (FT)	Area (AC)
542.0	14.4
544.0	37.0
546.0	94.2
548.0	124.8

Paired Data | Table | Graph

Elevation (FT)	Discharge (CFS)
542.0	0.0
544.0	1273.0
546.0	3600.0
548.0	6614.0

Northwest Detention Basin Inputs

Reservoir | Options

Basin Name: Proposed Conditions
Element Name: NW Detention Basin

Description: Proposed tank NW of property
Downstream: --None--
Method: Outflow Curve
Storage Method: Elevation-Area-Discharge
*Elev-Area Function: NW Detention Elev-Area
*Elev-Dis Function: NW Detention Elev-Dis
Primary: Elevation-Area
Initial Condition: Elevation
*Initial Elevation (FT) 562

Paired Data | Table | Graph

Elevation (FT)	Area (AC)
562.0	9.02
564.0	9.44
566.0	9.85
568.0	10.28

Paired Data | Table | Graph

Elevation (FT)	Discharge (CFS)
562.0	0.0
568.0	0.0

Northeast Detention Basin Inputs

Reservoir | Options

Basin Name: Proposed Conditions
Element Name: NE Detention Basin

Description:	Tank NE of property
Downstream:	--None--
Method:	Outflow Curve
Storage Method:	Elevation-Area-Discharge
*Elev-Area Function:	NE Detention Elev-Area
*Elev-Dis Function:	NE Detention Elev-Dis
Primary:	Elevation-Area
Initial Condition:	Elevation
*Initial Elevation (FT)	556

Paired Data | Table | Graph

Elevation (FT)	Area (AC)
556.0	26.99
558.0	27.58
560.0	28.18
562.0	28.77

Paired Data | Table | Graph

Elevation (FT)	Discharge (CFS)
556.0	0.0
562.0	0.0

HEC-HMS Proposed Conditions Model Output

Global Summary Results for Run "Proposed 100yr"

Project: Laredo Landfill   Simulation Run: Proposed 100yr

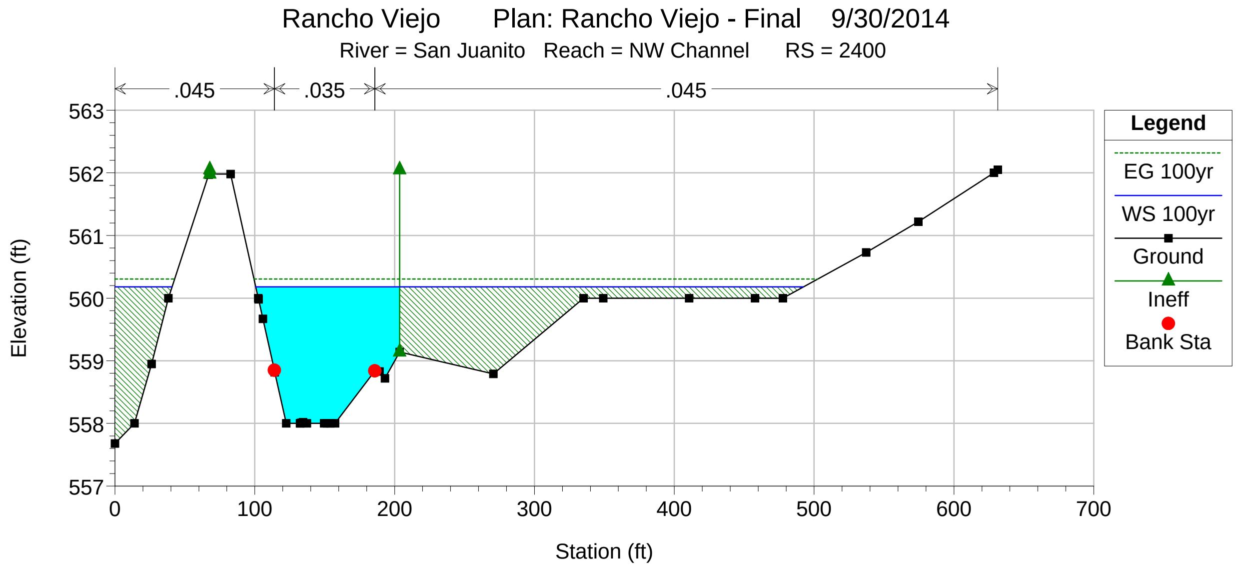
Start of Run: 01Jan2000, 12:00   Basin Model: Proposed Conditions
End of Run: 03Jan2000, 12:00   Meteorologic Model: SCS Storm Type III 100yr 24h
Compute Time: 30Aug2011, 10:05:36   Control Specifications: Control 1

Show Elements: All Elements   Volume Units: IN AC-FT   Sorting: Hydrologic

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
DA4	6.22	3824.2	02Jan2000, 03:04	1832.0
Junction-2	11.73	7707.0	02Jan2000, 02:12	3379.6
DA1	8.18	6852.4	02Jan2000, 02:06	2520.7
DA5	0.31	468.5	02Jan2000, 00:40	78.6
DA3	5.51	4690.7	02Jan2000, 01:48	1547.6
West Detention Basin	8.49	5980.8	02Jan2000, 02:49	2599.3
Reach-1	8.49	5980.8	02Jan2000, 03:06	2599.3
DA2	1.85	2082.6	02Jan2000, 01:20	557.5
Junction-1	22.07	14096.1	02Jan2000, 02:27	6536.4
DA7	0.61	1015.7	02Jan2000, 00:37	163.0
NE Detention Basin	0.61	0.0	01Jan2000, 12:00	0.0
DA6	0.21	378.5	02Jan2000, 00:27	51.8
NW Detention Basin	0.21	0.0	01Jan2000, 12:00	0.0

Appendix H

Proposed Conditions HEC-RAS Cross Sections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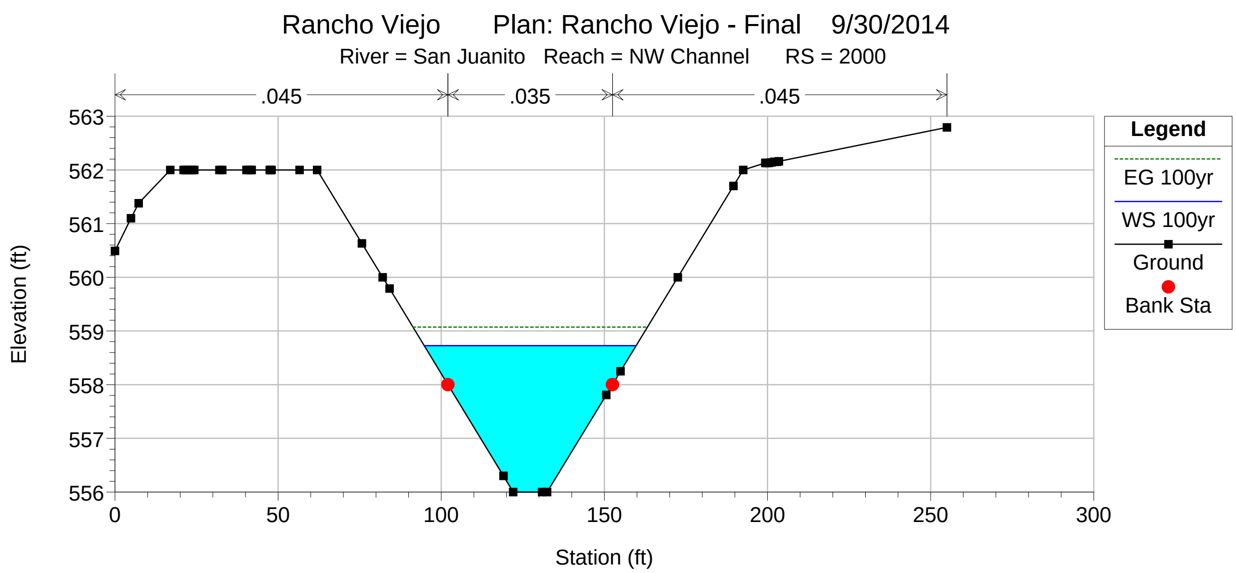
River = San Juanito Reach = NW Channel RS = 2400
.045
.035
.045
Elevation (ft)
Station (ft)
563
562
561
560
559
558
557
0
100
200
300
400
500
600
700
Legend
EG 100yr
WS 100yr
Ground
Ineff
Bank Sta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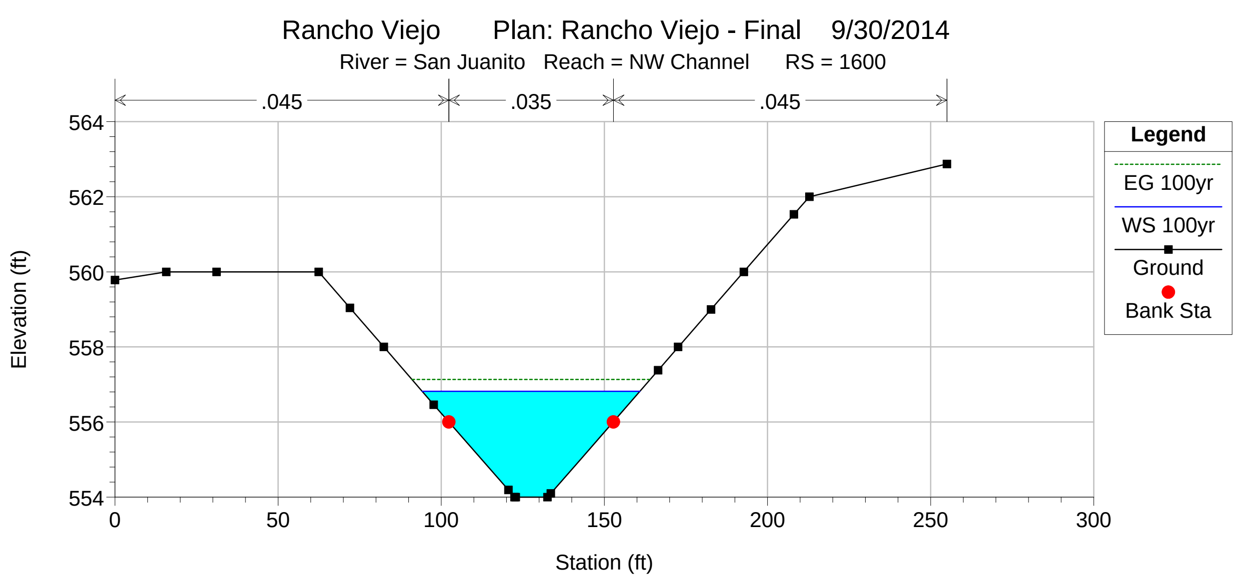
River = San Juanito Reach = NW Channel RS = 2000
.045
.035
.045
Elevation (ft)
Station (ft)
563
562
561
560
559
558
557
556
0
50
100
150
200
250
300
Legend
EG 100yr
WS 100yr
Ground
Bank Sta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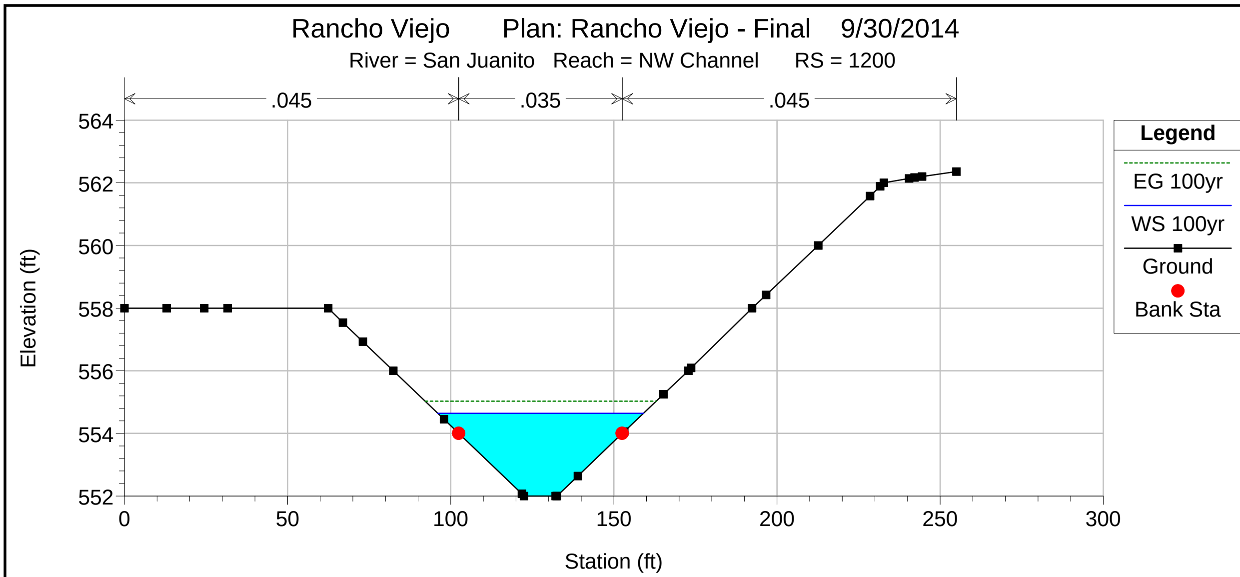
River = San Juanito Reach = NW Channel RS = 1600
.045
.035
.045
Elevation (ft)
Station (ft)
564
562
560
558
556
554
0
50
100
150
200
250
300
Legend
EG 100yr
WS 100yr
Ground
Bank Sta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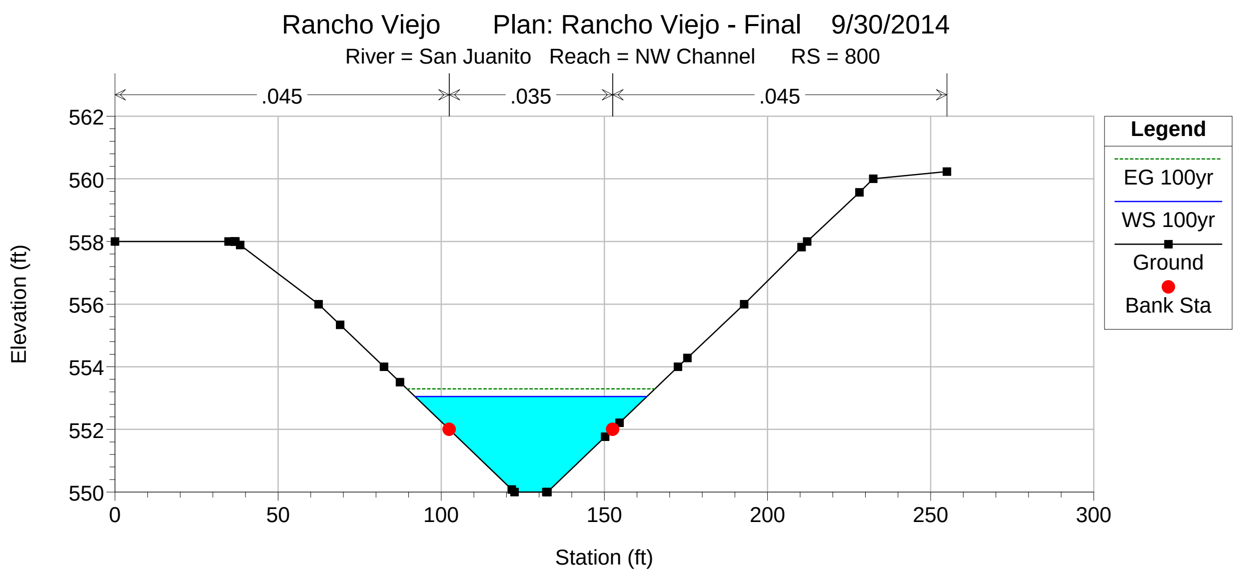
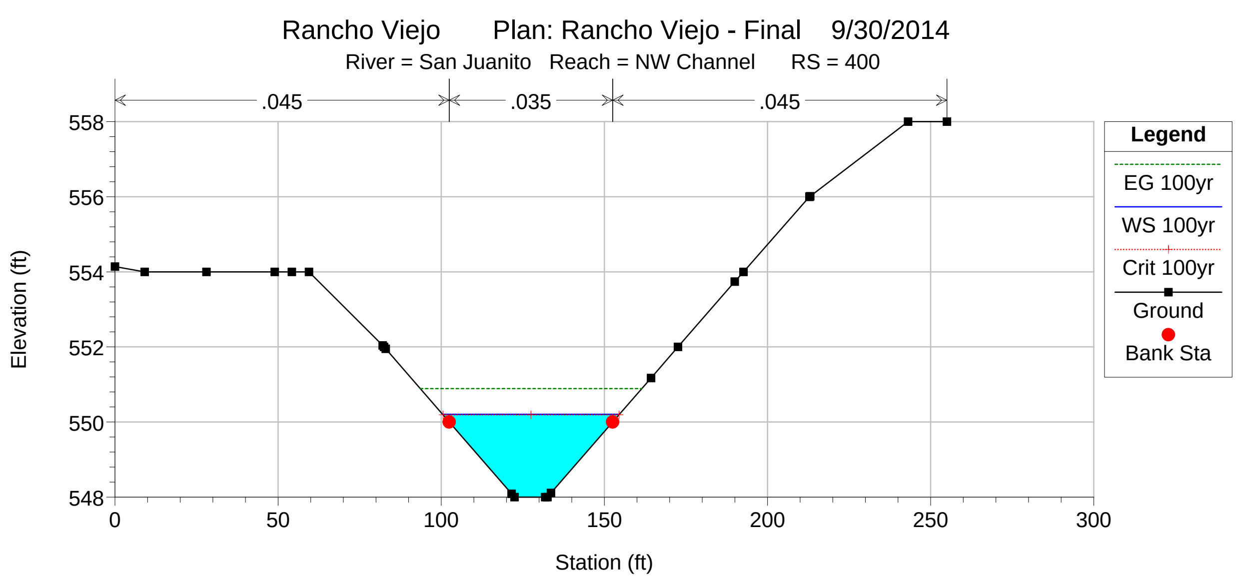
River = San Juanito Reach = NW Channel RS = 1200
.045
.035
.045
Elevation (ft)
564
562
560
558
556
554
552
0
50
100
150
200
250
300
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Bank Sta


Rancho Viejo Plan: Rancho Viejo - Final 9/30/2014
River = San Juanito Reach = NW Channel RS = 800
.045
.035
.045
Elevation (ft)
562
560
558
556
554
552
550
0
50
100
150
200
250
300
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Bank Sta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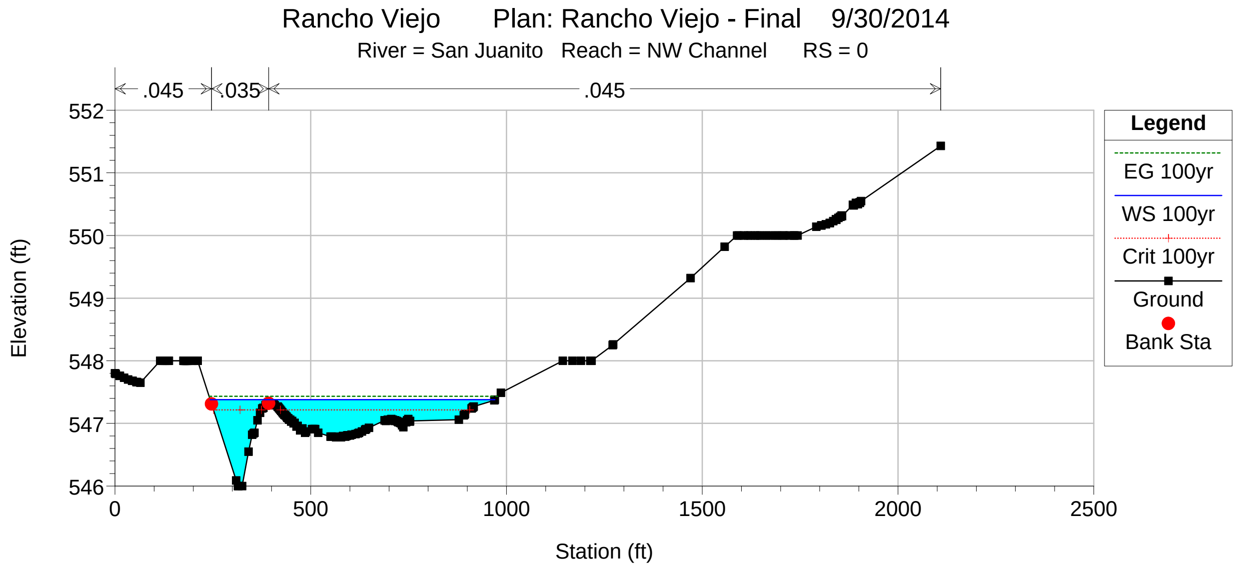
River = San Juanito Reach = NW Channel RS = 400
.045
.035
.045
Elevation (ft)
558
556
554
552
550
548
0
50
100
150
200
250
300
Station (ft)
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta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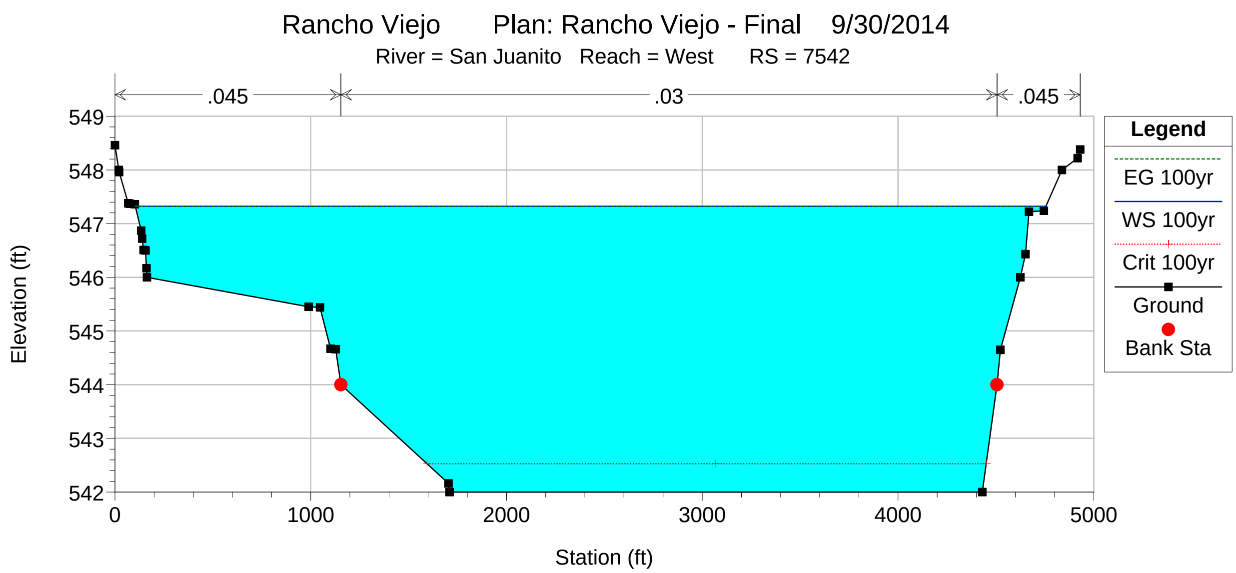
River = San Juanito Reach = NW Channel RS = 0
.045
.035
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta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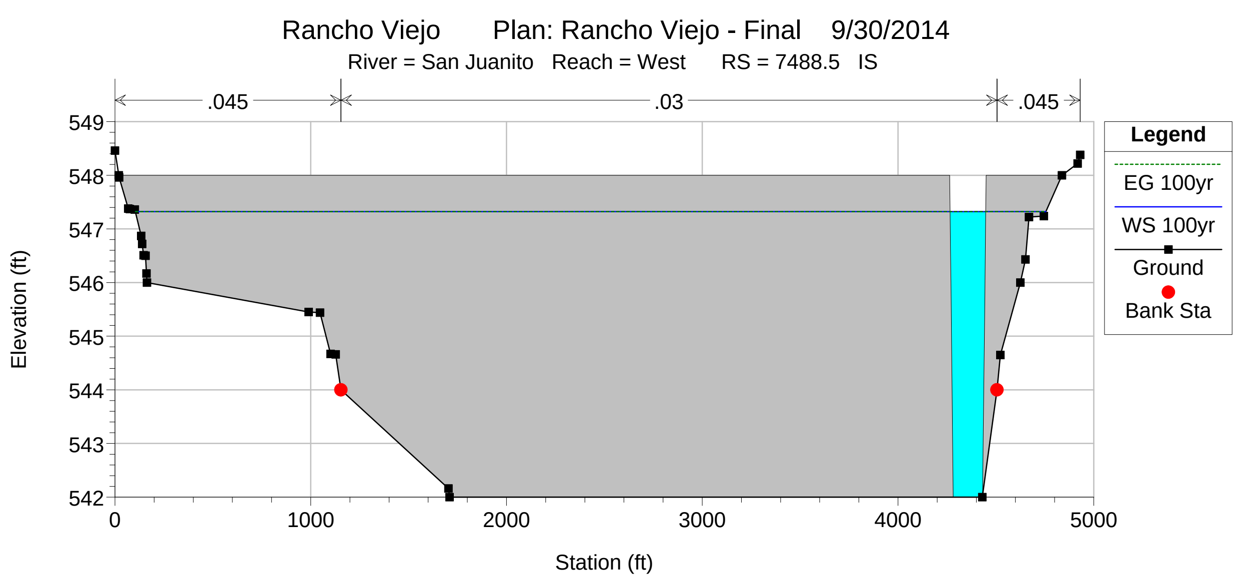
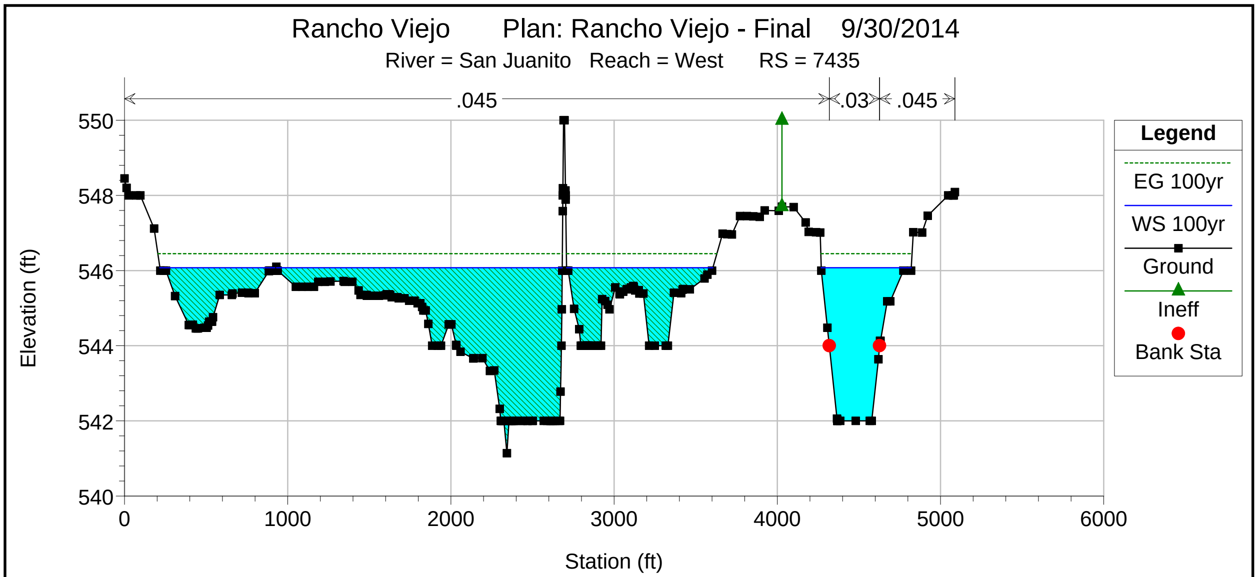
River = San Juanito Reach = West RS = 7542
.045
.03
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta


Rancho Viejo Plan: Rancho Viejo - Final 9/30/2014
River = San Juanito Reach = West RS = 7488.5 IS
.045
.03
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Bank Sta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River = San Juanito Reach = West RS = 7435
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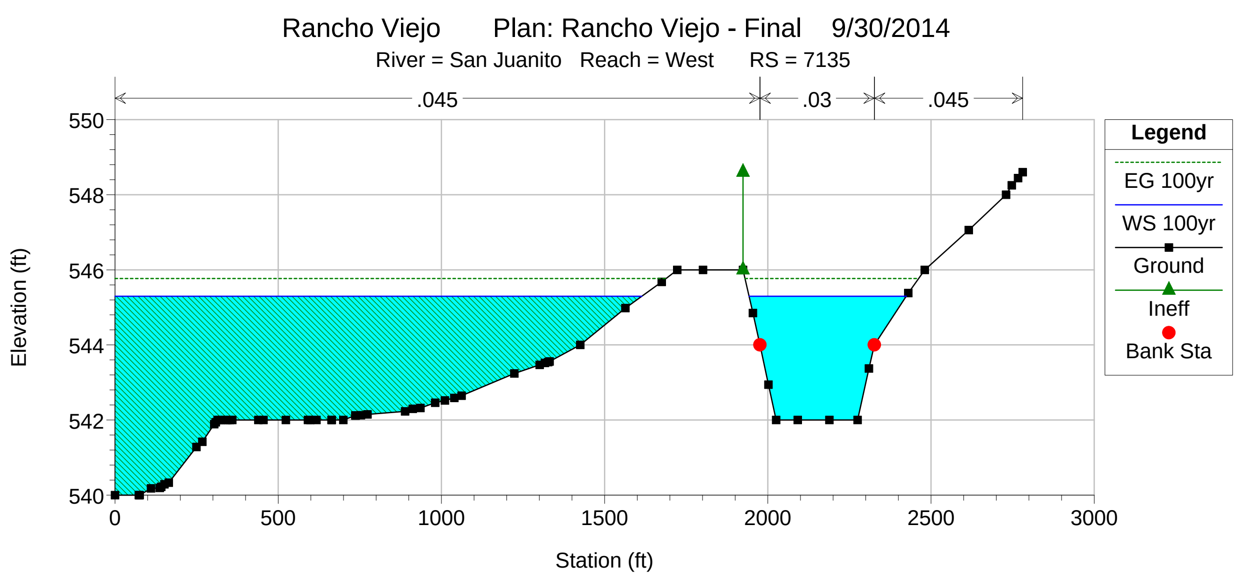
.03
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Ineff
Bank Sta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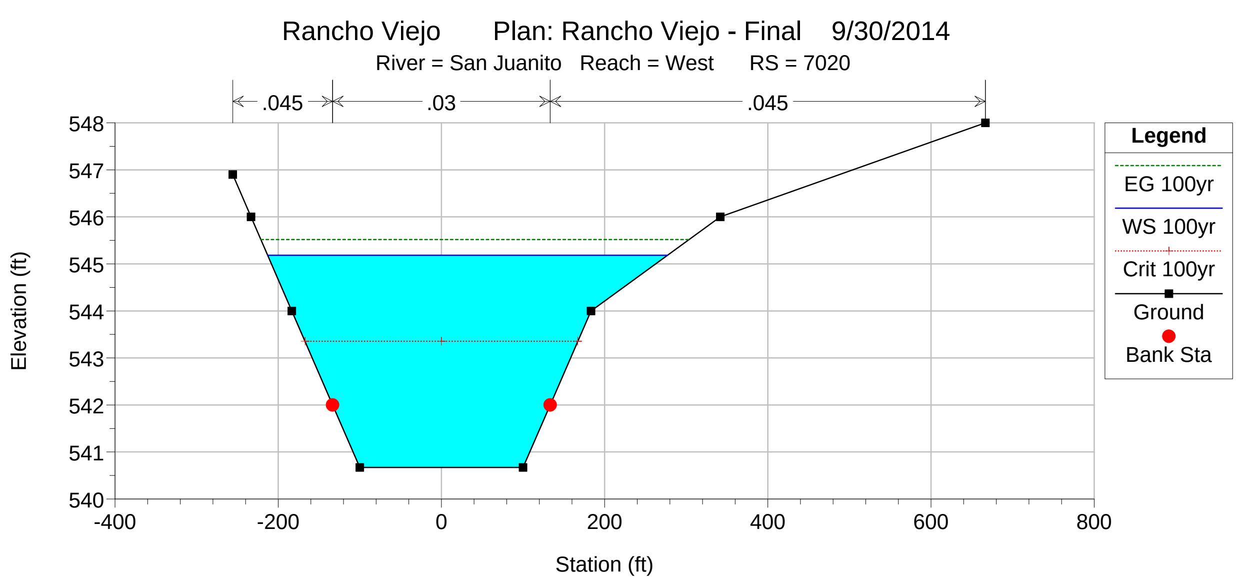
River = San Juanito Reach = West RS = 7135
.045
.03
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Ineff
Bank Sta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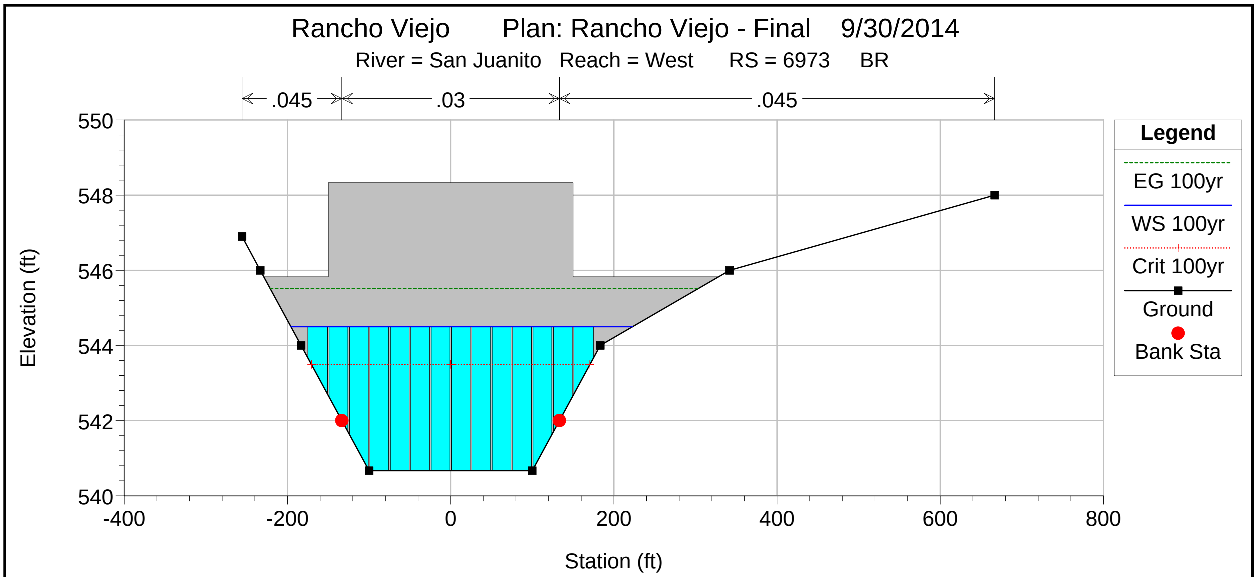
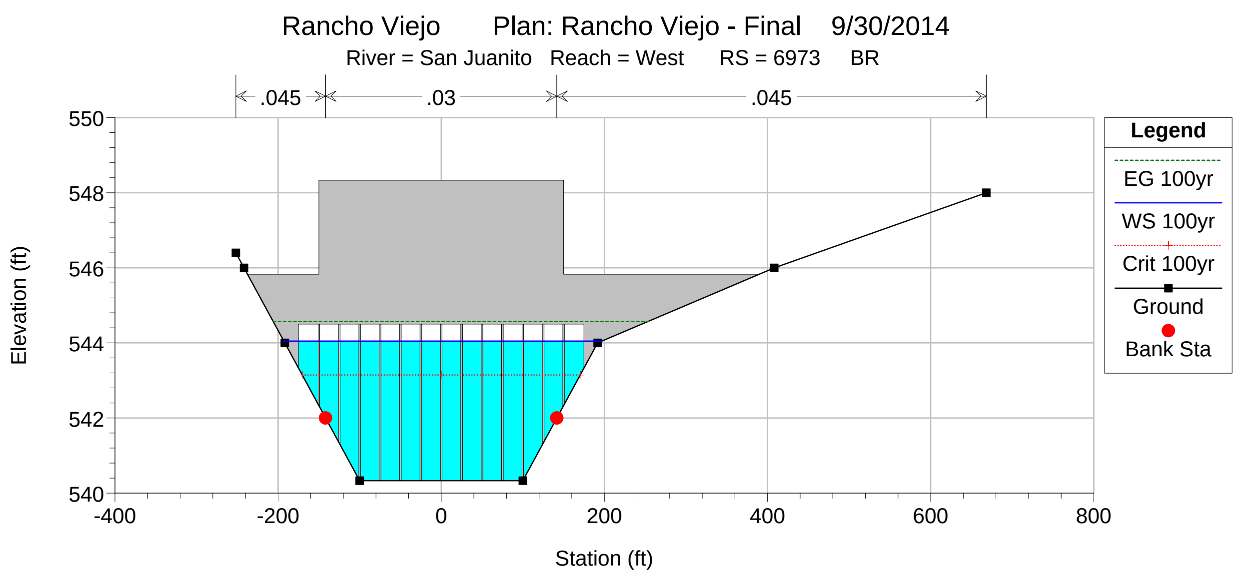
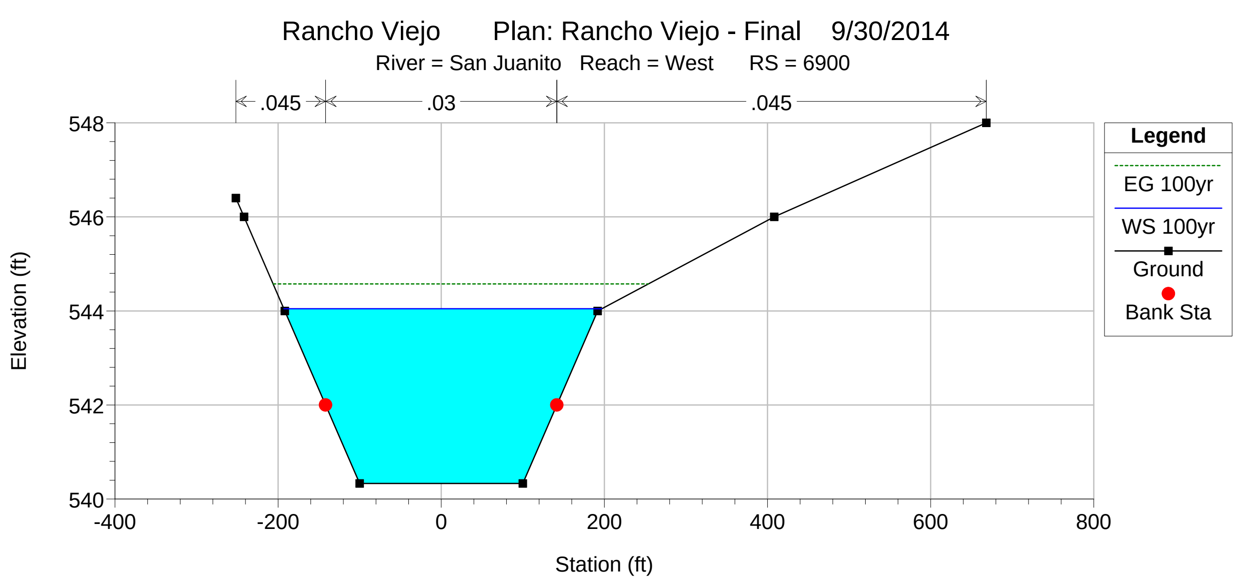
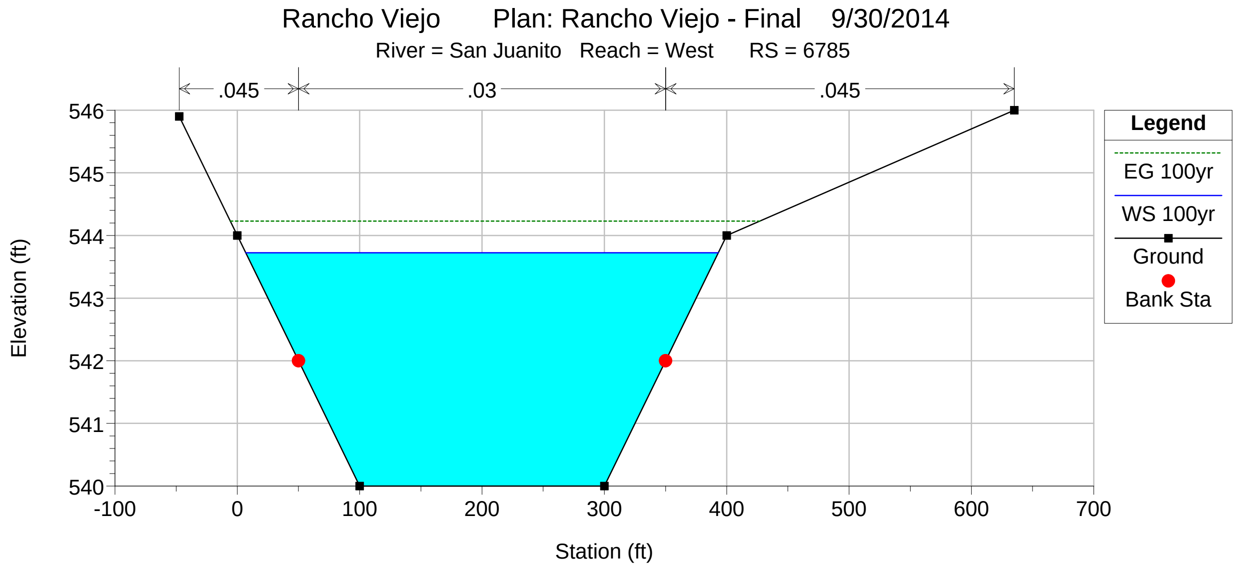
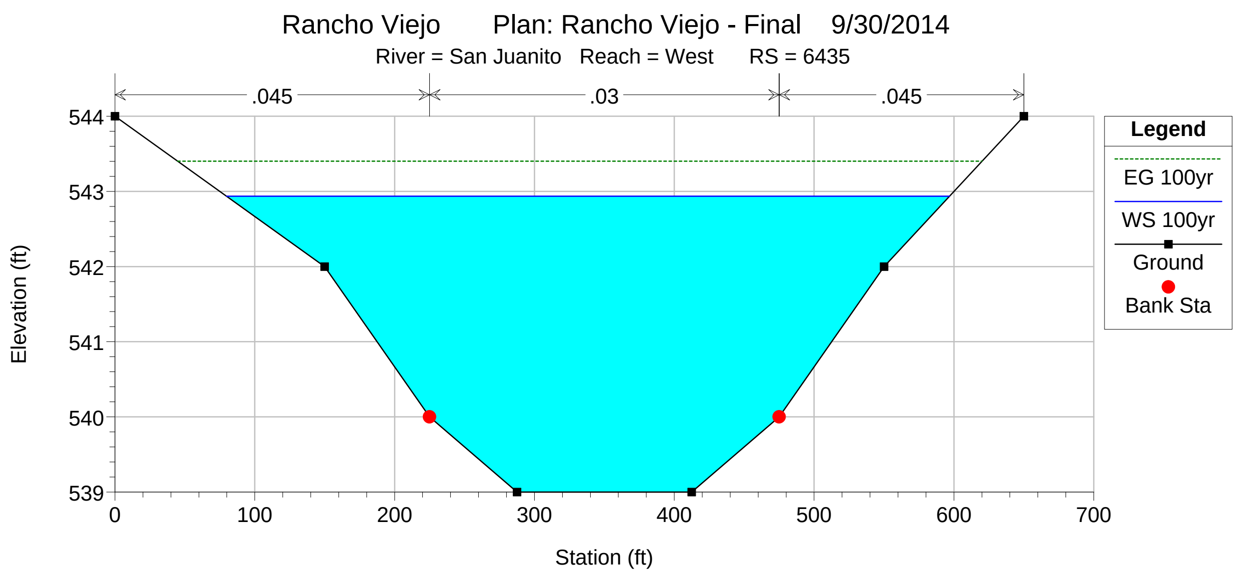
River = San Juanito Reach = West RS = 7020
.045
.03
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta


Rancho Viejo Plan: Rancho Viejo - Final 9/30/2014
River = San Juanito Reach = West RS = 6973 BR
.045
.03
.045
Elevation (ft)
550
548
546
544
542
540
-400
-200
0
200
400
600
800
Station (ft)
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta


Rancho Viejo Plan: Rancho Viejo - Final 9/30/2014
River = San Juanito Reach = West RS = 6973 BR
.045
.03
.045
Elevation (ft)
550
548
546
544
542
540
-400
-200
0
200
400
600
800
Station (ft)
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta


Rancho Viejo Plan: Rancho Viejo - Final 9/30/2014
River = San Juanito Reach = West RS = 6900
.045
.03
.045
Elevation (ft)
548
546
544
542
540
-400
-200
0
200
400
600
800
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Bank Sta


Rancho Viejo Plan: Rancho Viejo - Final 9/30/2014
River = San Juanito Reach = West RS = 6785
.045
.03
.045
Elevation (ft)
546
545
544
543
542
541
540
-100
0
100
200
300
400
500
600
700
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Bank Sta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River = San Juanito Reach = West RS = 6435
.045
.03
.045
Elevation (ft)
544
543
542
541
540
539
0
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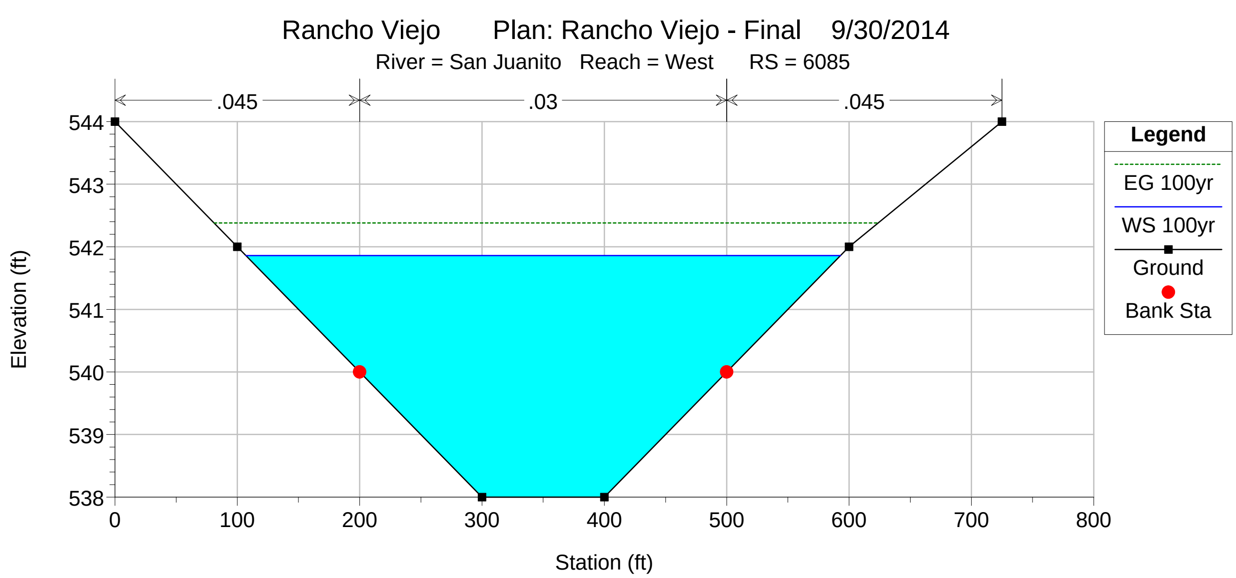
200
300
400
500
600
700
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Bank Sta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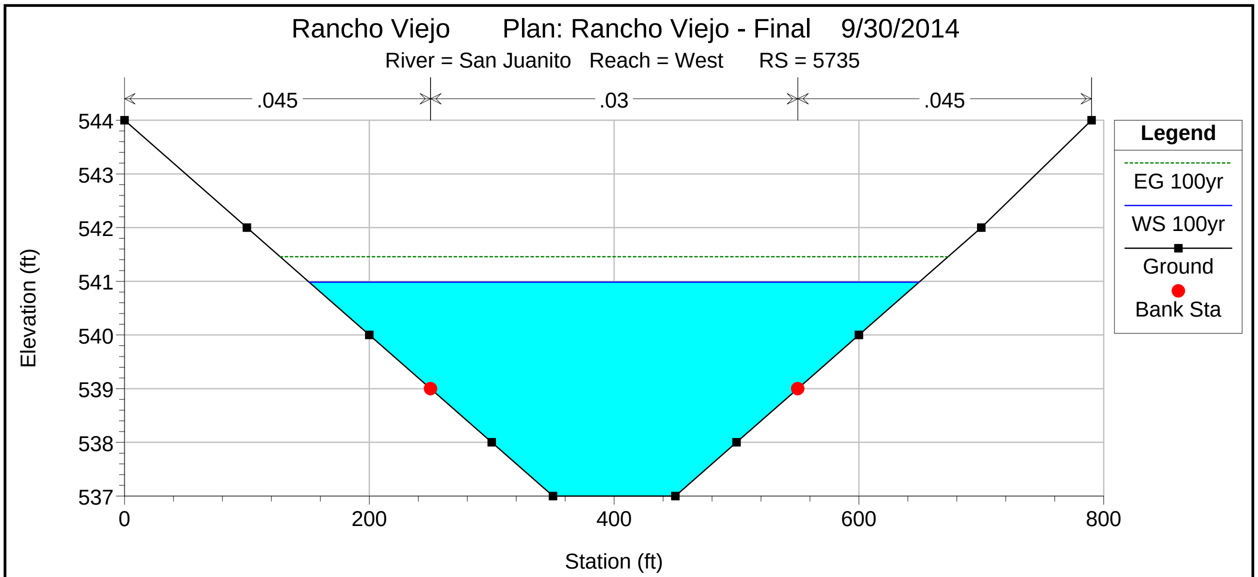
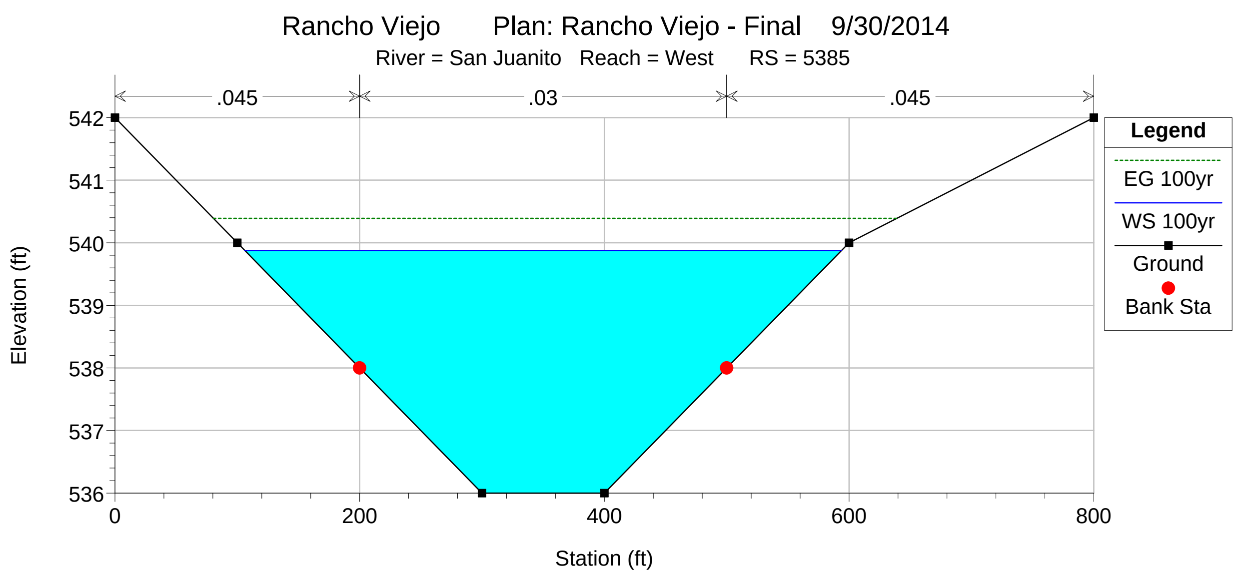
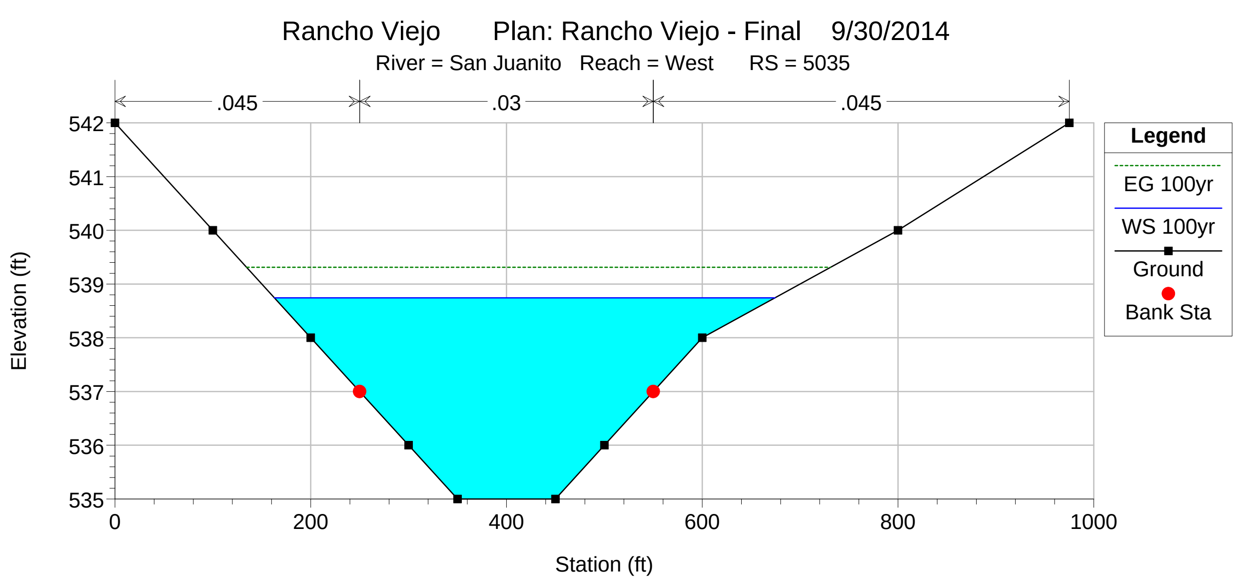
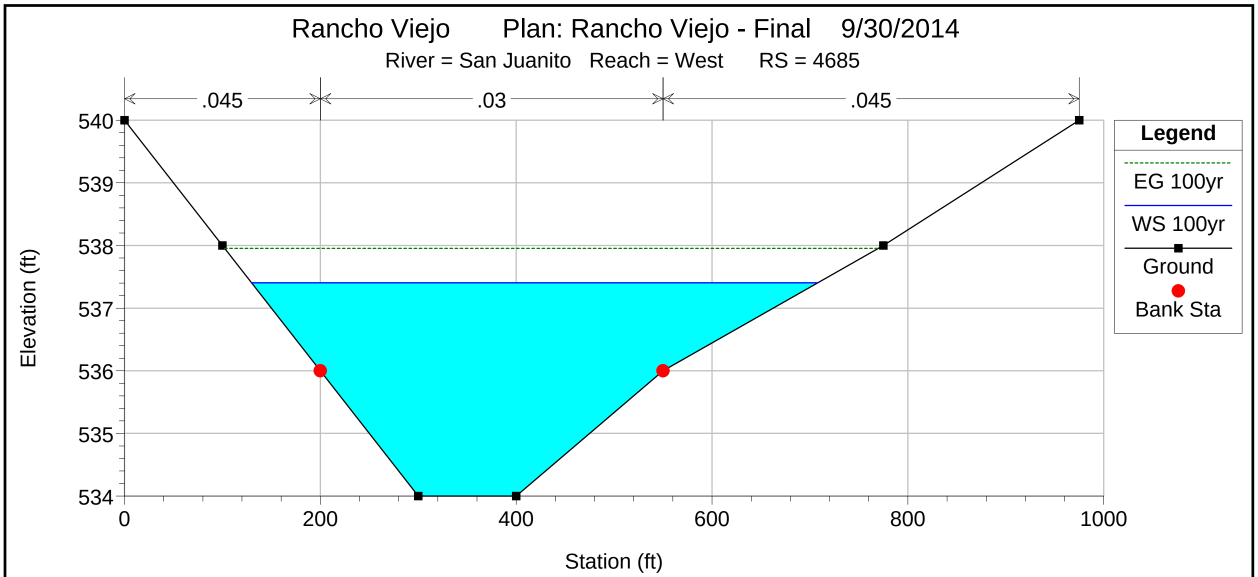
River = San Juanito Reach = West RS = 6085
.045
.03
.045
Elevation (ft)
544
543
542
541
540
539
538
0
100
200
300
400
500
600
700
800
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Bank Sta

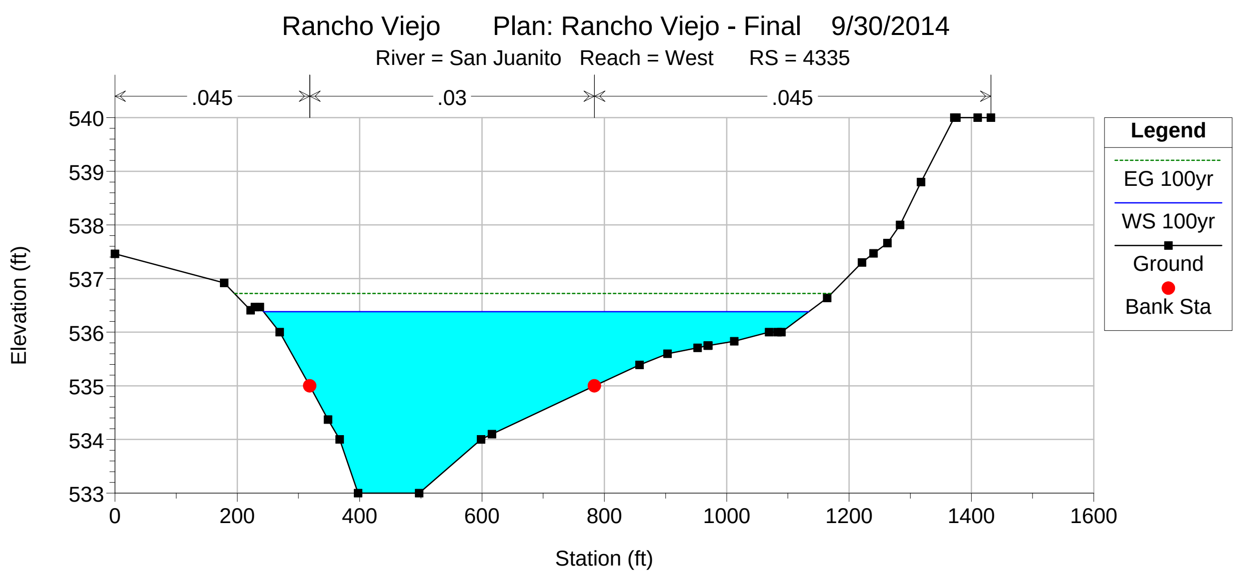
Technically Complete, March 11, 2016

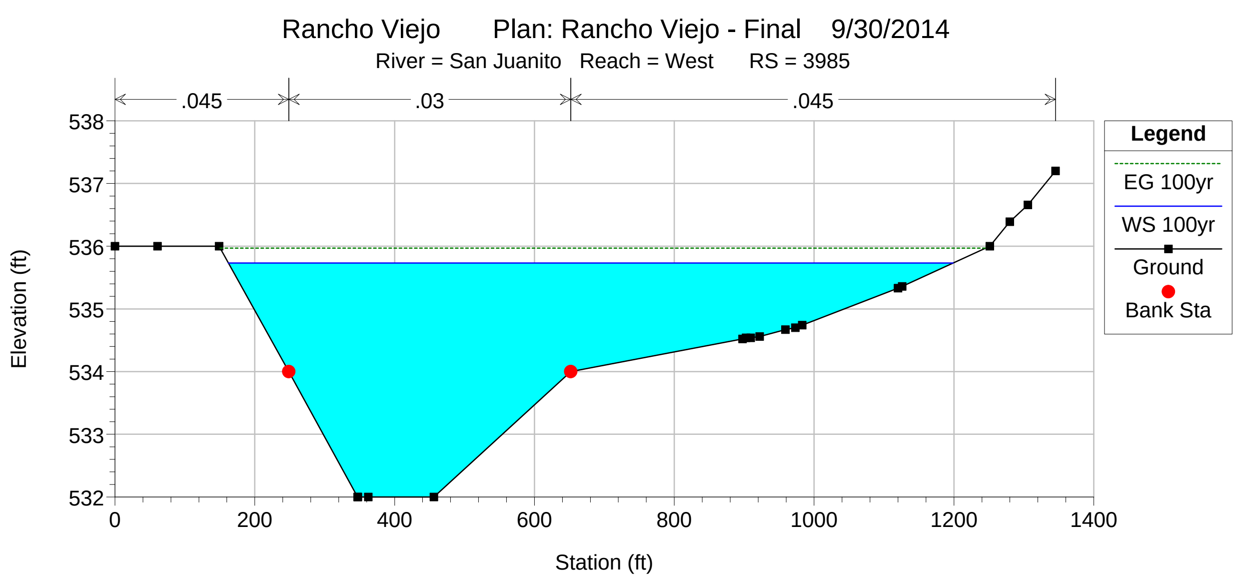


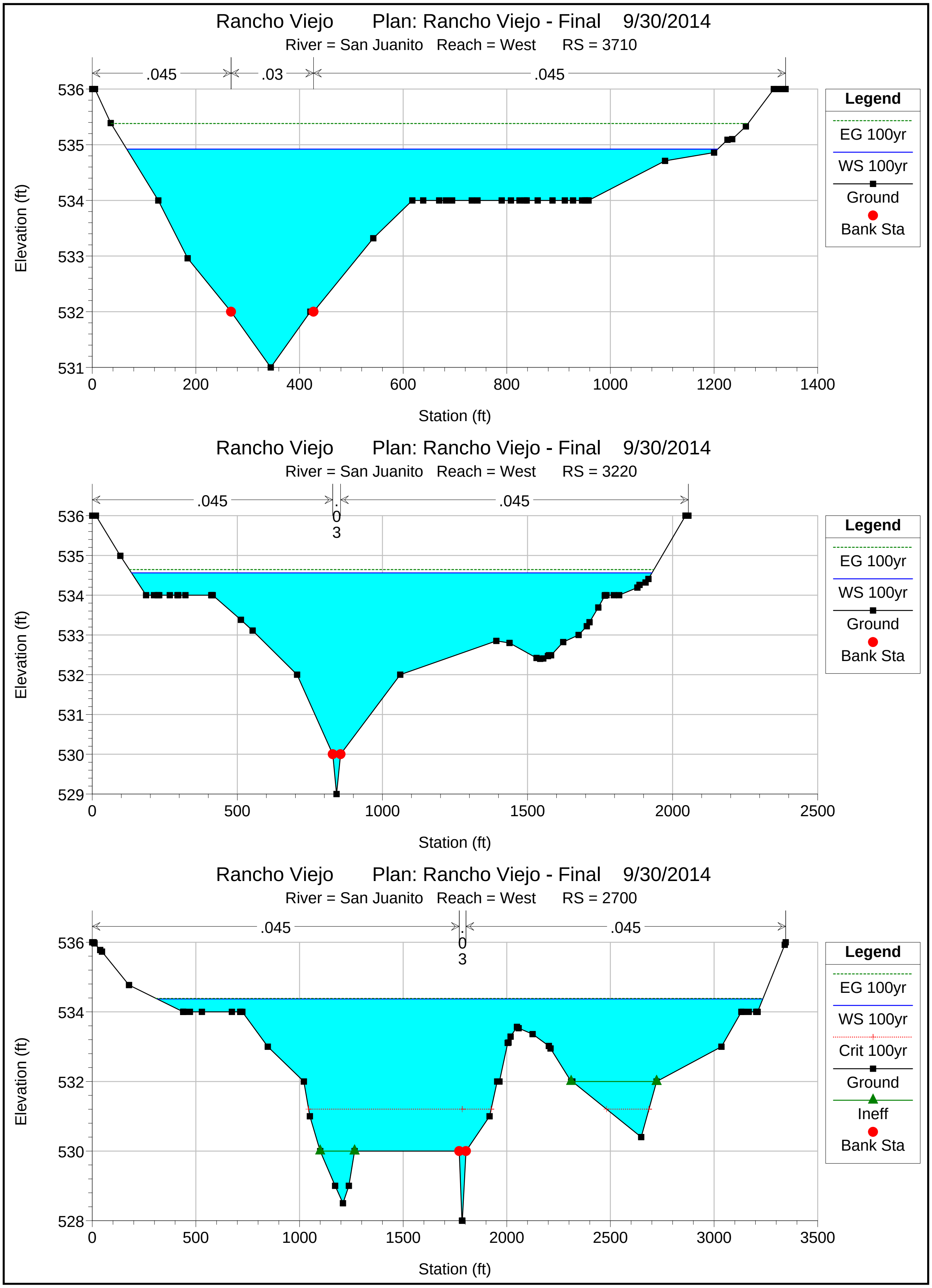





Rancho Viejo Plan: Rancho Viejo - Final 9/30/2014
River = San Juanito Reach = West RS = 4685
.045
.03
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Bank Sta


Rancho Viejo Plan: Rancho Viejo - Final 9/30/2014
River = San Juanito Reach = West RS = 4335
.045
.03
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Bank Sta


Rancho Viejo Plan: Rancho Viejo - Final 9/30/2014
River = San Juanito Reach = West RS = 3985
.045
.03
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Bank Sta


Rancho Viejo Plan: Rancho Viejo - Final 9/30/2014
River = San Juanito Reach = West RS = 3710
.045
.03
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Bank Sta
Rancho Viejo Plan: Rancho Viejo - Final 9/30/2014
River = San Juanito Reach = West RS = 3220
.045
.03
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Bank Sta
Rancho Viejo Plan: Rancho Viejo - Final 9/30/2014
River = San Juanito Reach = West RS = 2700
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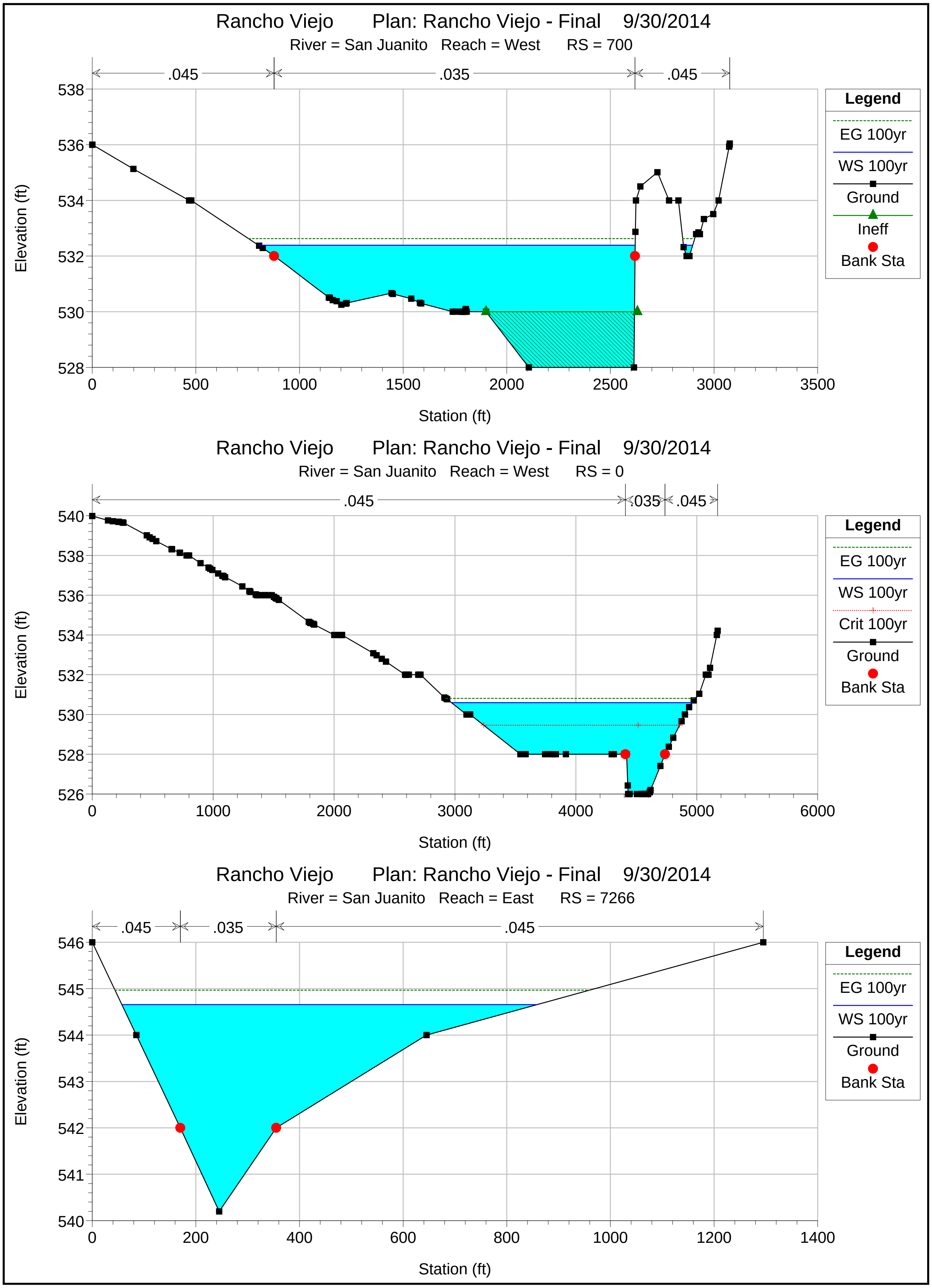
.03
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Ineff
Bank Sta


Rancho Viejo Plan: Rancho Viejo - Final 9/30/2014
River = San Juanito Reach = West RS = 700
.045
.035
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Ineff
Bank Sta
Rancho Viejo Plan: Rancho Viejo - Final 9/30/2014
River = San Juanito Reach = West RS = 0
.045
.035
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta
Rancho Viejo Plan: Rancho Viejo - Final 9/30/2014
River = San Juanito Reach = East RS = 7266
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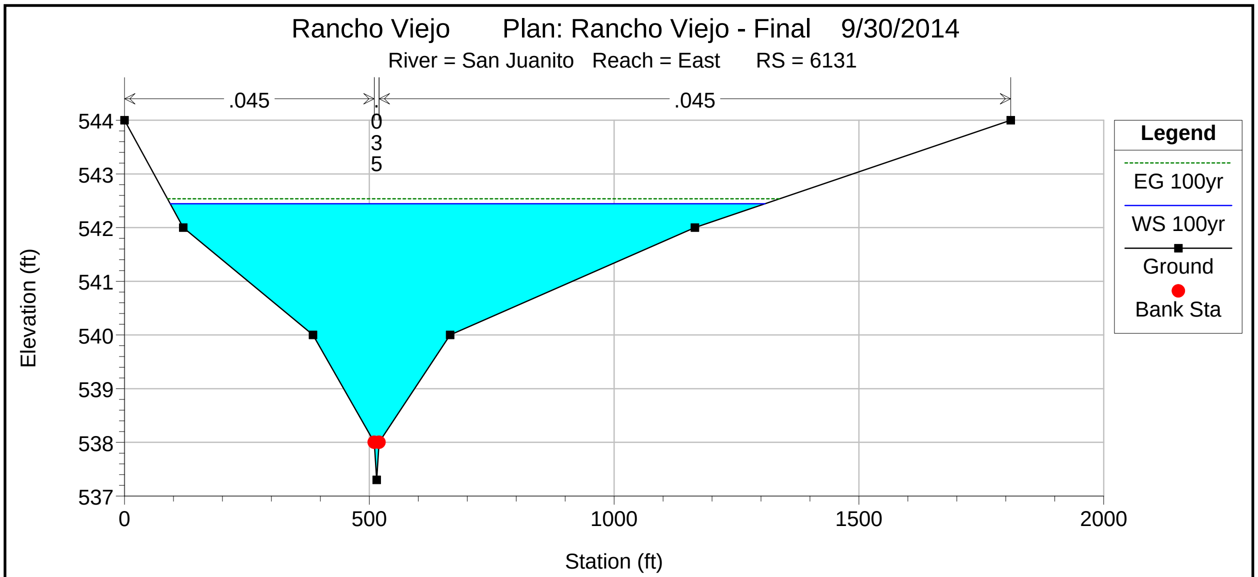
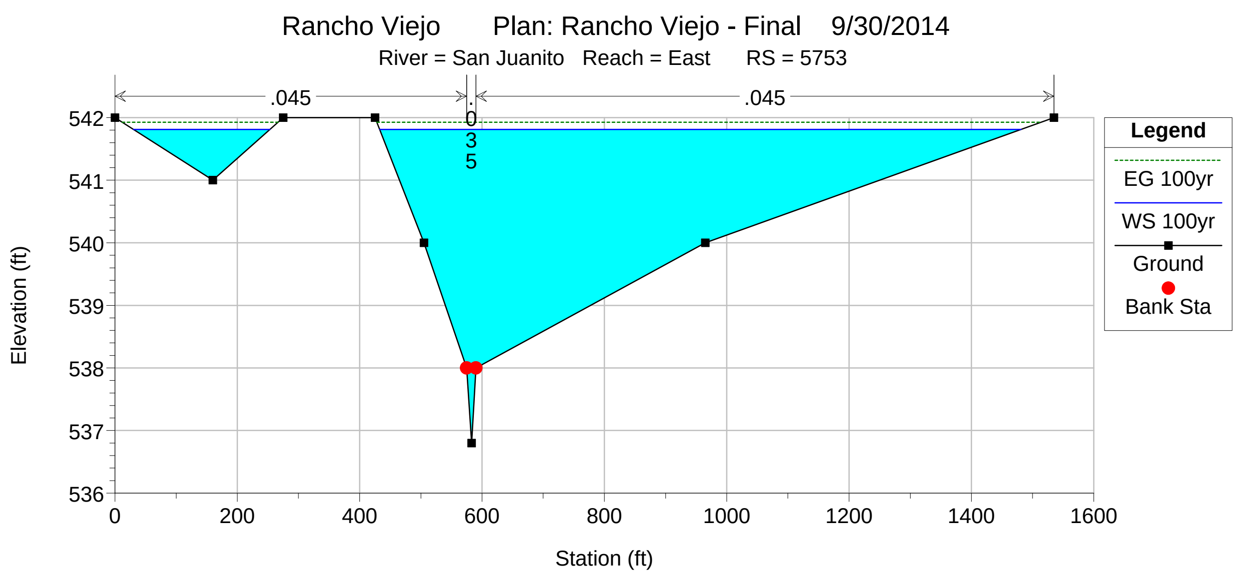
.035
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Bank Sta


Rancho Viejo Plan: Rancho Viejo - Final 9/30/2014
River = San Juanito Reach = East RS = 6131
.045
.035
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Bank Sta


Rancho Viejo Plan: Rancho Viejo - Final 9/30/2014
River = San Juanito Reach = East RS = 5753
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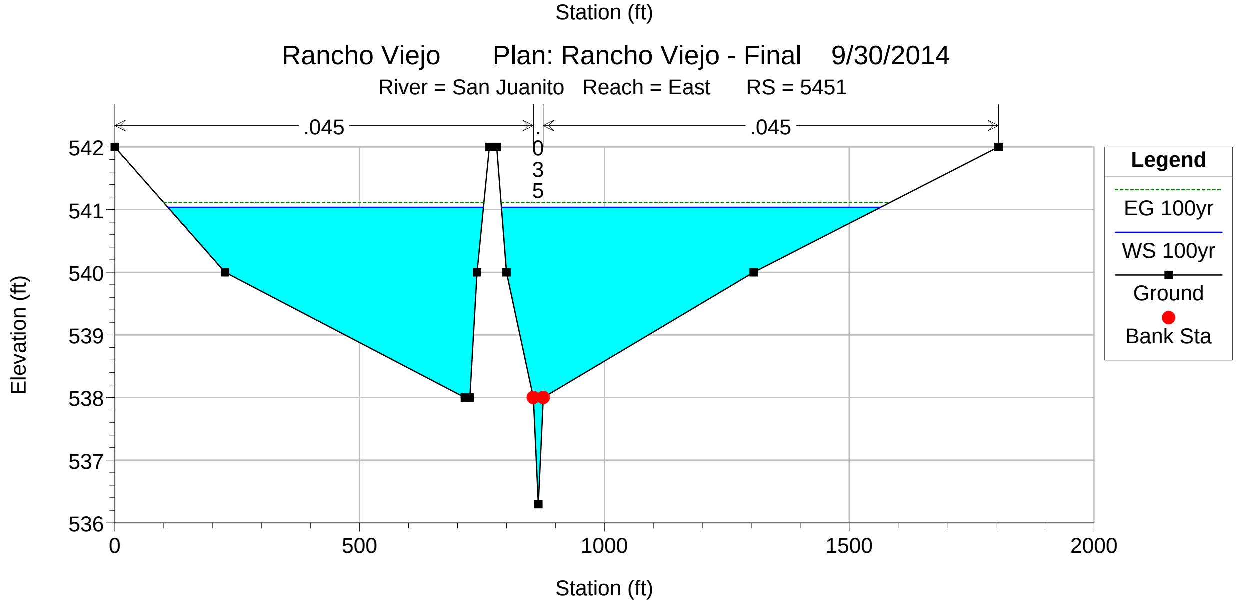
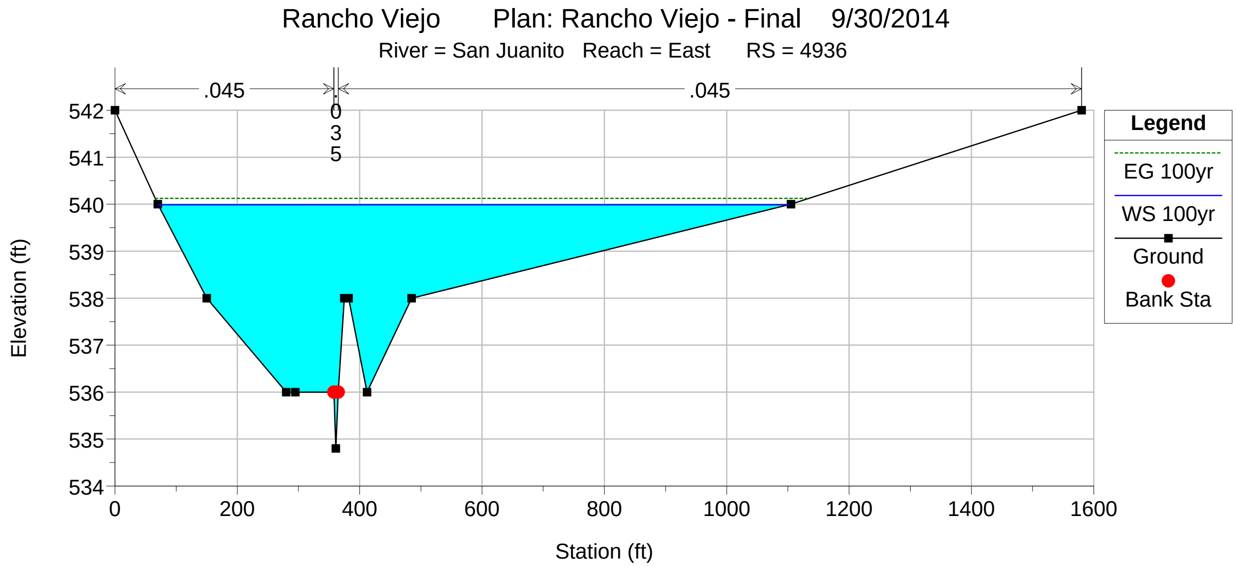
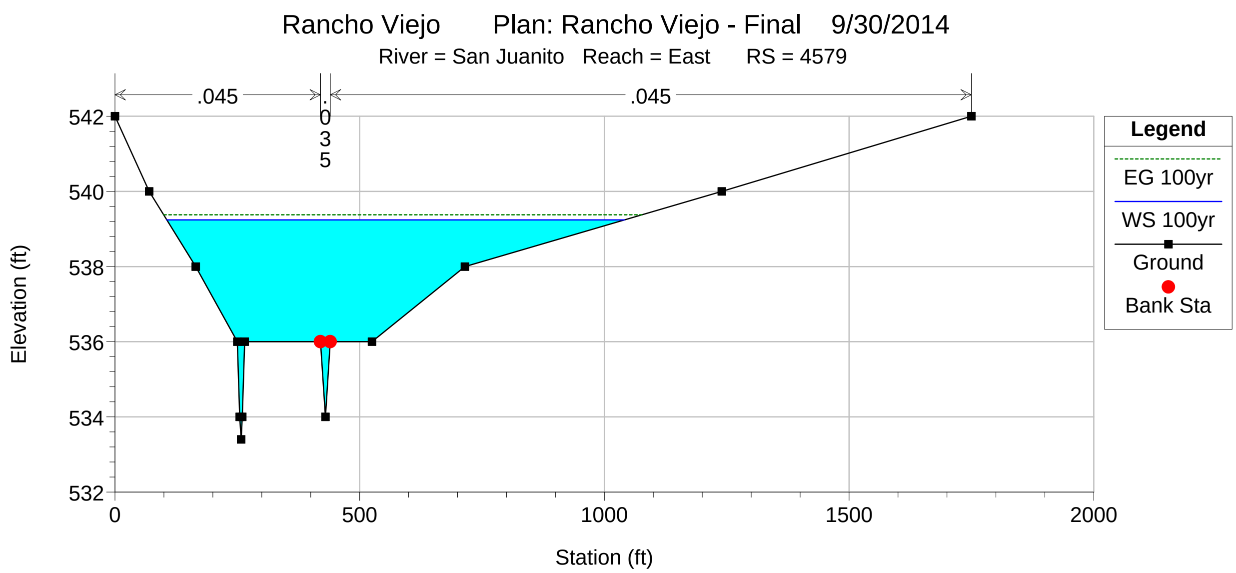
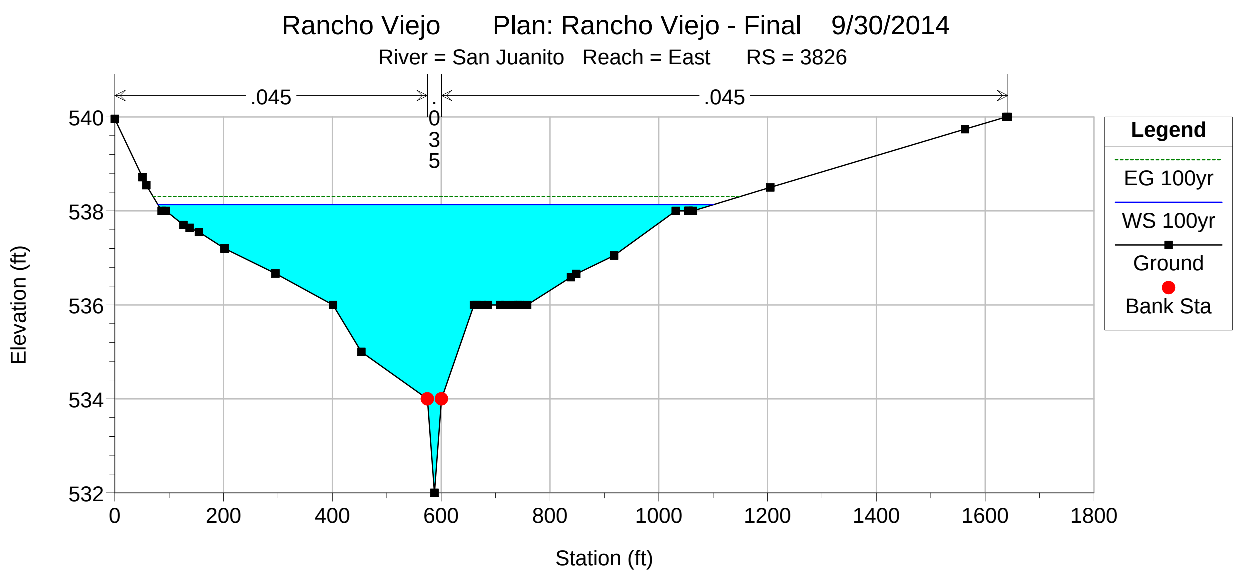
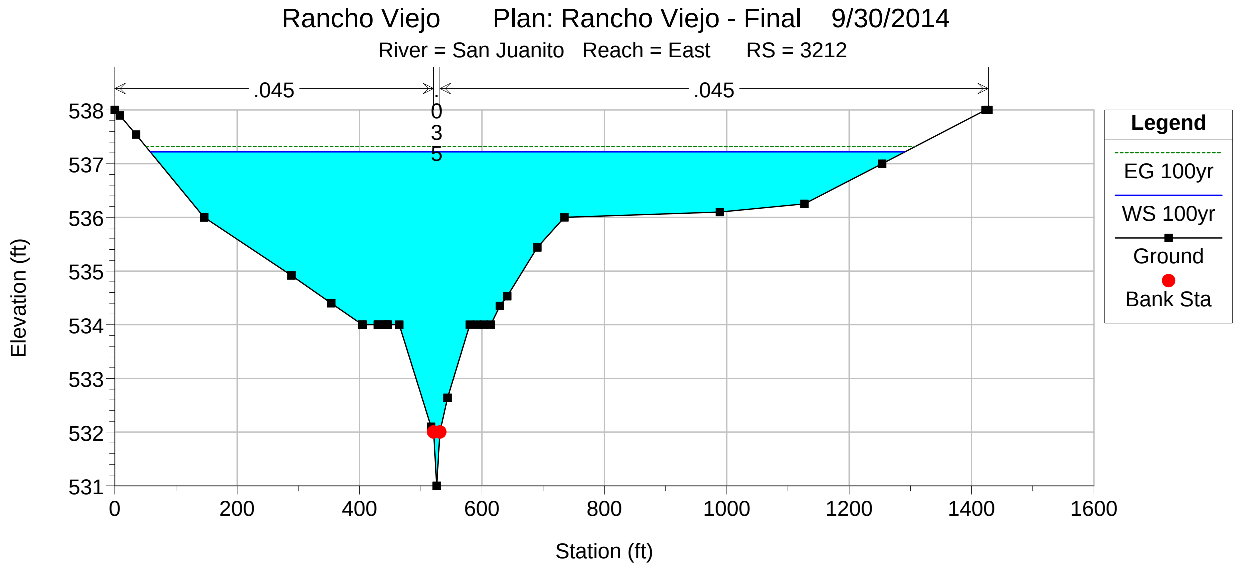
.035
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Bank Sta


Rancho Viejo Plan: Rancho Viejo - Final 9/30/2014
River = San Juanito Reach = East RS = 5451
.045
.035
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Bank Sta


Rancho Viejo Plan: Rancho Viejo - Final 9/30/2014
River = San Juanito Reach = East RS = 4936
.045
.035
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Bank Sta


Rancho Viejo Plan: Rancho Viejo - Final 9/30/2014
River = San Juanito Reach = East RS = 4579
.045
.035
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Bank Sta


Rancho Viejo Plan: Rancho Viejo - Final 9/30/2014
River = San Juanito Reach = East RS = 3826
.045
.035
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Bank Sta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Legend
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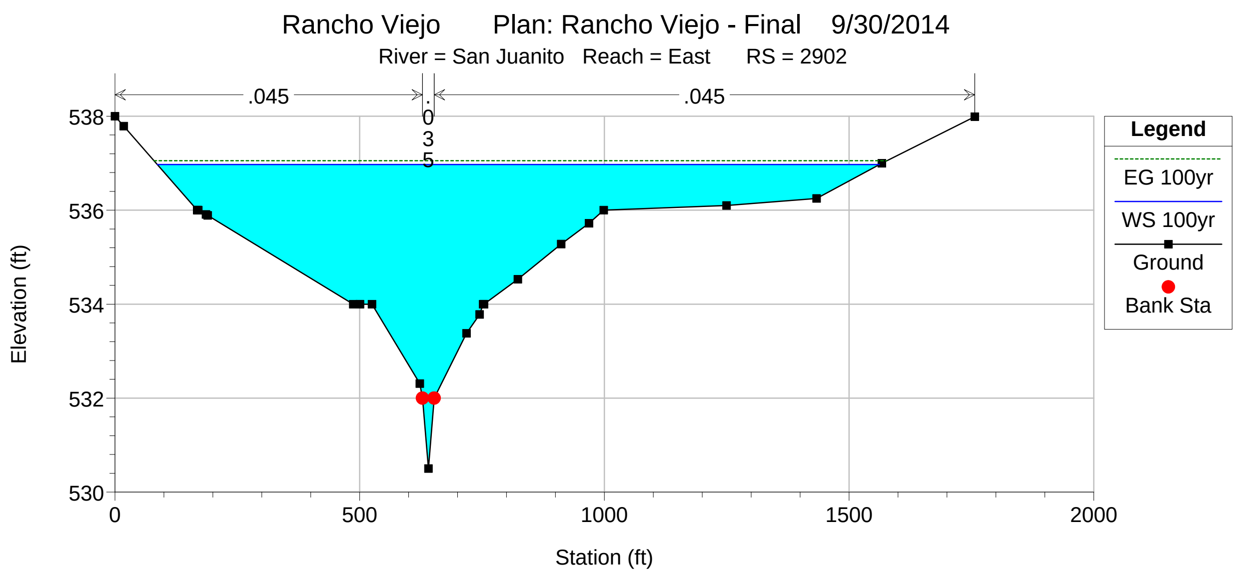
WS 100yr
Ground
Bank Sta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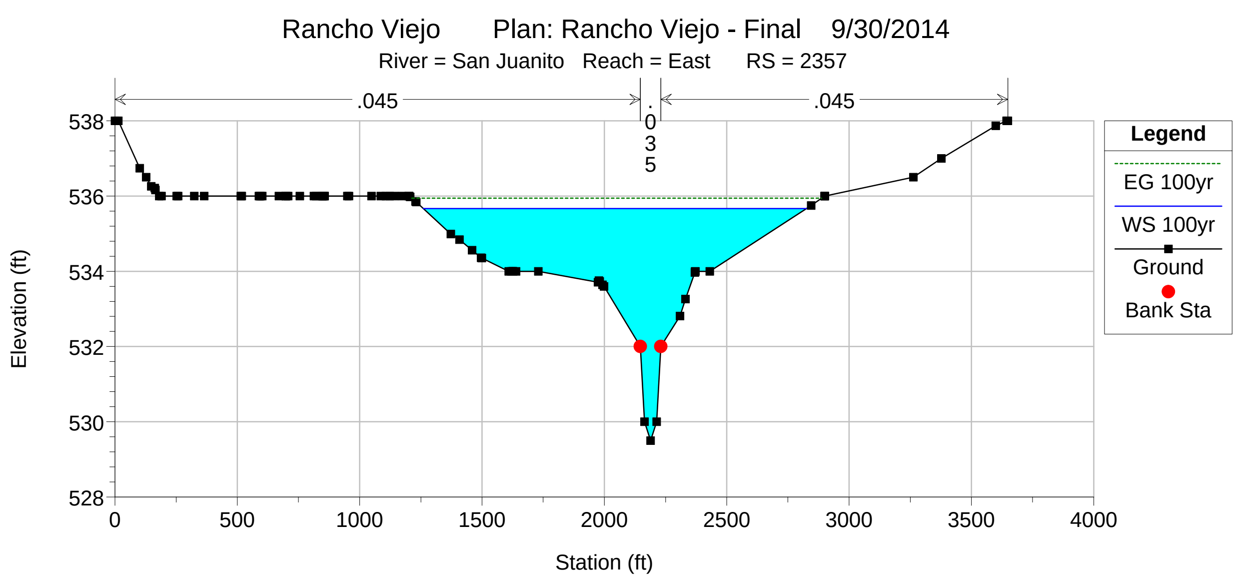
Legend
EG 100yr
WS 100yr
Ground
Bank Sta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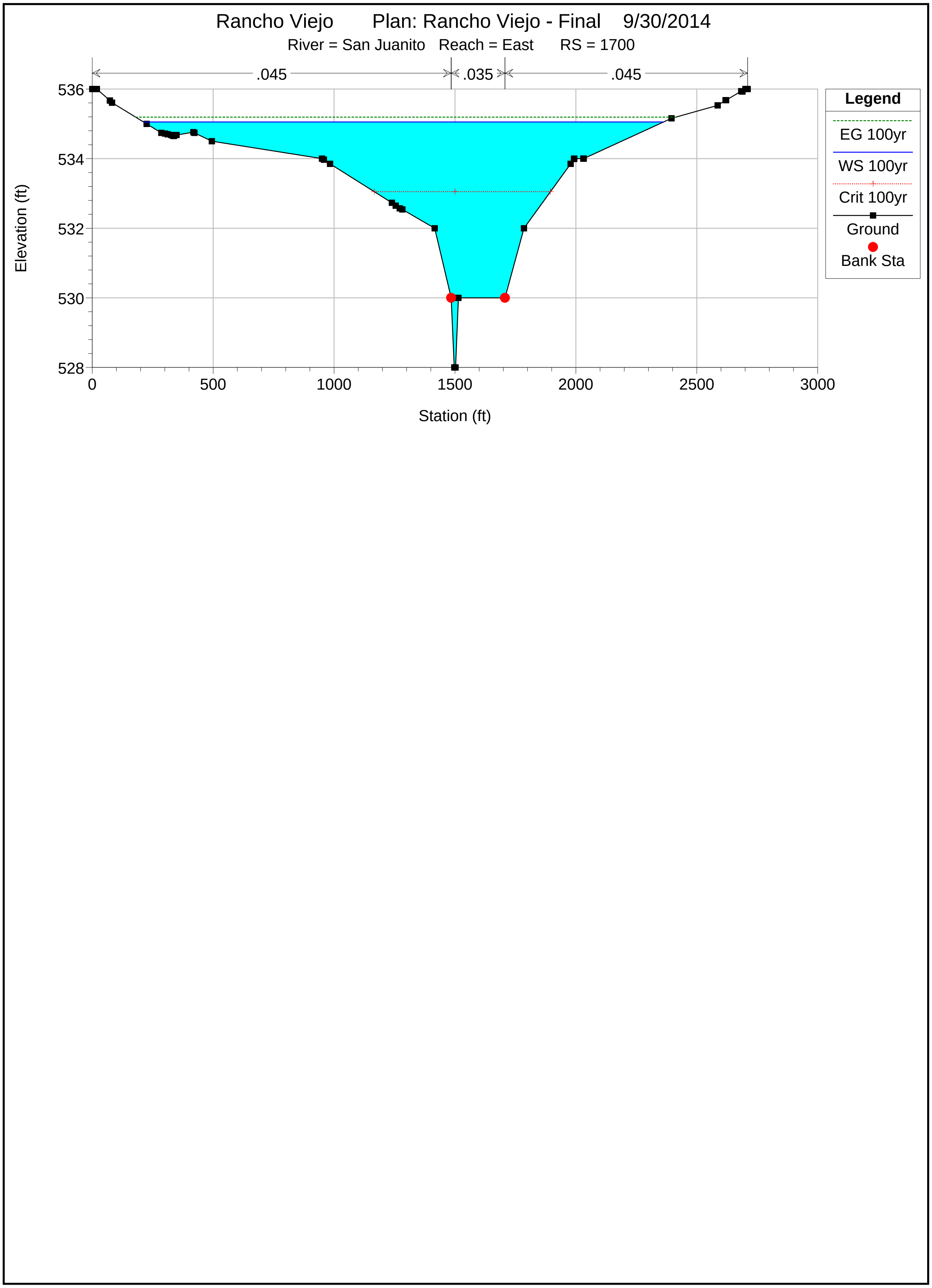
.045
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Ground
Bank Sta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River = San Juanito Reach = East RS = 1700
.045
.035
.045
536
534
532
530
528
0
500
1000
1500
2000
2500
3000
Elevation (ft)
Station (ft)
Legend
EG 100yr
WS 100yr
Crit 100yr
Ground
Bank Sta

Table 1
HEC-RAS Model Vs. Topographic Map Top Width Comparison

San Juanito - West Reach				
River Sta	Top Width Model (ft.)	Top Width Map (ft.)	Difference (ft.)	Notes
7542	4650.69	4801.45	-150.76	Width based on the elevation for the west basin HEC-HMS model results.
7488.5				Inline structure
7435	3903.1	551.52	3351.58	HEC-RAS model top width includes the ineffective flow area.
7135	2095.9	481.6	1614.3	HEC-RAS model top width includes the ineffective flow area.
7020	489.97	464.95	25.02	
6973				Bridge Structure
6900	389.8	386.89	2.91	
6785	386.19	387.05	-0.86	
6435	516.91	483.52	33.39	
6085	485.9	493.19	-7.29	
5735	498.45	508.44	-9.99	
5385	487.76	494.29	-6.53	
5035	511.43	545.24	-33.81	
4685	578.44	605.23	-26.79	
4335	891.16	899.3	-8.14	
3985	1036.34	1033.87	2.47	
3710	1140.22	1144.38	-4.16	
3220	1793.3	1798.9	-5.6	
2700	2923.62	2926.8	-3.18	
700	1862.31	2097.26	-234.95	HEC-RAS model top width does not include approximate 233-foot mound area located on the west side of cross-section.
0	1989.43	1984.55	4.88	

San Juanito - East Reach				
River Sta	Top Width Model (ft.)	Top Width Map (ft.)	Difference (ft.)	Notes
7266	801.67	780	21.67	
6131	1214.7	1253.98	-39.28	
5753	1271.44	1455.57	-184.13	HEC-RAS does not include an approximate 180-foot mound area located on the east side of cross-section.
5451	1419.33	1465.18	-45.85	HEC-RAS does not include approximate 37-foot mound area located east side of cross-section.
4936	1030.36	1049.72	-19.36	
4579	934.87	936.17	-1.3	
3826	1021.17	1021.75	-0.58	
3212	1233.09	1242.97	-9.88	
2902	1475.31	1491.04	-15.73	
2357	1565.67	1567.29	-1.62	
1700	2149.38	2152.43	-3.05	

Table 2
HEC-RAS Model Vs. Topographic Map Channel Length Comparison

San Juanito - West Reach			
River Station	Channel Length - Model (ft.)	Channel Length - Map (ft.)	Difference (ft.)
7542	113	113	0
7488.5	Inl Struct		
7435	304.38	304.00	0
7135	110.29	110.21	0
7020	119.4	119.40	0
6973	Bridge		
6900	125.5	125.00	0
6785	321.64	322.00	0
6435	381	381.3	0
6085	317.64	317.64	0
5735	379.81	379.81	0
5385	336.26	336.62	0
5035	364.41	364.41	0
4685	354.7	354.7	0
4335	343.32	343.32	0
3985	272.21	272.21	0
3710	414.86	414.79	0
3220	554.12	553.49	0
2700	2077.04	2077.04	0
700	683.45	683.46	0
0			

San Juanito - East Reach			
River Station	Channel Length - Model (ft.)	Channel Length - Map (ft.)	Difference (ft.)
7266	1154.45	1154.46	0
6131	366.34	366.34	0
5753	310	310.04	0
5451	517.31	517.31	0
4936	349.56	349.56	0
4579	760.75	760.75	0
3826	626.89	626.89	0
3212	291.78	291.55	0
2902	584.49	584.49	0
2357	562.23	562.23	0
1700	3211.13	3211.1	0

San Juanito - NW Channel Reach			
River Station	Channel Length - Model (ft.)	Channel Length - Map (ft.)	Difference (ft.)
2400	400	400.12	0
2000	400.41	400.41	0
1600	400	400	0
1200	400	400	0
800	400	400	0
400	400	400	0
0			

Appendix I

ESA Compliance Documentation

Technically Complete, March 11, 2016

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Coastal Ecological Services Field Office
3325 Green Jay Road
Alamo, TX 78516
956/784-7560/ (Fax) 956/787-8338

In Reply Refer To:
FWS/R2/CLES/

January 27, 2014

Kevin Ramberg
ACI Consulting
1001 Mopac Circle
Austin, TX 78746

Consultation No. 02ETCC00-2012-I-0032

Dear Mr. Ramberg;

Thank you for your letter and Revised Biological Assessment regarding the effects of the proposed issuance of a Conditional Letter of Map Revision (CLOMR) for the Pescadito Environmental Resource Center (PERC) in Webb County, Texas. The proposed PERC site includes 1,110 acres in rural Webb County approximately 20 miles east of Laredo, Texas. In order for the construction and operation of a municipal solid waste landfill to commence, mofications to the 100-year floodplan will be needed. Your client, Ranco Viejo Waste Management, proposes to construct and maintain various infrastructure flood control features north and west of the PERC site.

There are five species federally listed as threatened or endangered in Webb County: jaguarundi, ocelot, interior least tern, ashy dogweed and Johnston's frankenia. While the Biological Assessment concluded "no effect" determinations for ocelot, interior least tern, ashy dogweed and Johnston's frankenia, a "may affect, not likely to adversely affect" determination was made for the jaguarundi. Proposed Conservation Measures to benefit the jaguarundi include a conservation easement on a 75-foot buffer on either side of a drainage corridor (total length approximately 7,500 linear feet) as well as revegetation, light limitiations, vehicular traffic control, and a lowered speed limit.

Based on project discussions, information in your letter, and the proposed conservation measures for the jaguarundi, we concur with the not likely to adversely affect call. The Service does not provide concurrence for "no effect" determinations but by making determinations we believe that section 7(a)(2) of the Endangered Species Act has been complied with. Should project plans change or new species information become available, this determination can be reconsidered.

The Migratory Bird Treaty Act implements various treaties and conventions for the protection of migratory birds, and under the Act, taking, killing or possessing migratory birds is unlawful. We recommend activities requiring vegetation removal or disturbance avoid the peak nesting period of March through August to avoid destruction of individuals, nests or eggs. If project activities must be conducted during this time, we recommend surveying for nests prior to commencing work and if a nest is found, and if possible, we recommend a buffer of vegetation (≥ 50 ft) remain around the nest until young have fledged or the nest is abandoned.

Thank you for your concern for endangered and threatened species, migratory birds, and other wildlife resources and we appreciate the opportunity to review and comment on the proposed project. If we can be of further assistance, please contact Brunilda Fuentes-Capozello (956)784-7631.

Sincerely,

E. Dawn Whitehead

for Edith Erfling
Field Supervisor

January 9, 2014

VIA GROUND DELIVERY

Mr. Ernesto Reyes
U.S. Fish and Wildlife Service
Ecological Services Alamo Field Office
Santa Ana Refuge
3325 Green Jay
Alamo, Texas 78516

Re: Revised Biological Assessment: An Endangered Species Review for the FEMA Action Area of the Pescadito Environmental Resource Center, Webb County, Texas

Dear Mr. Reyes,

Enclosed please find documentation and analysis regarding the federal endangered species related to the Federal Emergency Management Agency (FEMA) issuance of a Conditional Letter of Map Revision (CLOMR) for the Pescadito Environmental Resource Center (PERC) in Webb County, Texas. This biological assessment has been updated from our October 21, 2013 submittal to your office based on discussions with USFWS and incorporation of conservation measures onsite.

The proposed PERC site includes 1,110 acres in rural Webb County, south of U.S. Highway 59 approximately 20 miles east of Laredo, Texas (Attachment A, Figure 1). Rancho Viejo Waste Management, LLC proposes to construct and operate a municipal solid waste landfill onsite. As part of the PERC project, Rancho Viejo Waste Management proposes modifications to the 100-year floodplain. These proposed floodplain modifications require documentation and authorization from FEMA under the CLOMR process. In 2010, FEMA issued guidance for Endangered Species Act (ESA) compliance from the FEMA CLOMR process.

As stated in the FEMA guidance for ESA compliance (see Attachment B), documentation of compliance can be either an Incidental Take Permit, Incidental Take Statement, "not likely to adversely affect" determination from the National Marine Fisheries Service or the U.S. Fish and Wildlife Service (collectively known as "the Services"), or an official letter from the Services concurring that the project has "No Effect" on listed species or critical habitat. Rancho Viejo Waste Management and aci consulting courteously request U.S. Fish and Wildlife Service (USFWS) to review the proposed project, related endangered species investigations, and effects determination described in this letter. For each species, site specific assessments were conducted.

This report presents a summary of the project, the associated FEMA action, the environmental setting, and an assessment of the action's potential to affect species protected under the federal ESA.

FEMA Regulatory Nexus

Rancho Viejo Waste Management, LLC proposes to construct and maintain various infrastructure flood control features north and west of the PERC site. The FEMA action area includes approximately 225 acres; 141 acres are located outside of the proposed PERC site (Attachment A, Figure 1).

The proposed flood control structures include:

- three floodwater detention basins north and west of the PERC site,
- one diversion channel connecting the north and northwest detention basins to the west detention basin, and
- one channel connecting the west detention basin to areas south and downstream of the PERC site.

The project engineering consultant, CB&I, is preparing and processing the FEMA CLOMR request through FEMA.

Project Location

Currently the site is entirely within the 12,000-acre Yugo Ranch owned by Rancho Viejo Cattle Company, Ltd. The ranch has been utilized as a cattle operation with scattered oil and gas production. The PERC site is favorable for development for several reasons: ideal soil and geological conditions, isolation from usable groundwater, the secluded location (and lack of potential land use conflicts), and transportation access.

Existing Environment

Physiography

The subject area encompasses approximately 1,110 acres and is located roughly 20 miles east of Laredo (Webb County) within the Texas-Tamaulipan Thornscrub ecoregion of the Southern Texas Plains. This ecoregion is distinguishable by its lightly rolling plains, low-growing thorn shrubland, and noticeable cuts throughout the landscape created by arroyos and streams. Although the subject area is within the Texas-Tamaulipan Thornscrub ecoregion, it is bound to the west by the Rio Grande Floodplain and Terraces ecoregion, which is unmistakably characterized by its dramatic change in elevation. The subject area lies at the upper headwaters of the Rio Grande Basin, approximately 20 miles north of the Rio Grande, and is bordered to the immediate northeast by the Nueces River Basin (Griffith et al. 2007). The elevation ranges from 530 feet to 570 feet above mean sea level according to the *Burrito Tank* USGS 7.5 minute topographic quadrangle (Attachment A, Figure 2).

Climate

Webb County's climate is subtropical, with hot, dry summers and relatively mild winters (Griffith et al. 2007). The summer temperatures average about 85°F and have a maximum daily average of 97°F. The winter temperatures average 58°F and have a minimum daily average of 46°F (USDA 1985). Precipitation throughout this county and ecoregion is the heaviest in the late spring and the early fall; however, transpiration and evaporation greatly exceed rainfall input (Griffith et al. 2007; USDA 1985). The total yearly precipitation is typically suitable for range vegetation, but often not for crops such as cotton, small grains, and sorghum because of the high evaporation rates. Thunderstorms occur on about 40 days each year, mostly in the summer time (USDA 1985).

Flora and Fauna

The subject area is within the Texas-Tamaulipan Thornscrub ecosystem is occupied primarily by "drought-tolerant, mostly small-leaved, and often thorn-laden small trees and shrubs, especially legumes" (Griffith et al. 2007). The most significant woody species is the honey mesquite (*Prosopis glandulosa*). Other suitable vegetation for this ecoregion includes: brasil (*Condalia hookeri*), lime pricklyash (*Zanthoxylum fagara*), Texas persimmon (*Diospyros texana*), lotebush (*Ziziphus obtusifolia*), granjeno (*Celtis pallida*), kidneywood (*Eysenhardtia texana*), coyotillo (*Karwinskia humboldtiana*), Texas paloverde (*Parkinsonia texana*), anacahuita (*Cordia boissieri*), and various species of cacti (*Opuntia* spp.). Typically xerophytic brush dominates the rocky ridges and uplands and can include species such as blackbrush (*Acacia rigidula*), guajillo (*Acacia berlandieri*), and ceniza (*Leucophyllum frutescens*). The most notable grasses are cane bluestem (*Bothriochloa barbinodis*), silver bluestem (*Bothriochloa laguroides*), multiflowered false rhodesgrass (*Trichloris pluriflora*), sideoats grama (*Bouteloua curtipendula*), pink pappusgrass (*Pappophorum bicolor*), bristlegrasses (*Setaria* spp.), lovegrasses (*Eragrostis* spp.), and tobosa (*Hilaria mutica*). However, red grama (*Bouteloua trifida*), Texas grama (*Bouteloua rigidiseta*), buffalograss (*Buchloe dactyloides*), and curleymesquite (*Hilaria belangeri*) can be found on overgrazed or drier sites in the west portion of this ecoregion (Griffith et al. 2007).

Faunal species in the Tamaulipan region at one time included numerous species despite the arid climate. Blair (1950) notes that over 60 species of mammals, 36 species of snakes, 19 lizards, two land turtles, three salamander species, and 19 amphibians are known from this ecoregion.

Geology and Soils

The subject area overlies rock of the Eocene Jackson group. This rock formation consists primarily of fine to coarse grained sandstone with some clay inclusions (USGS 2009).

Eight soil units occur within the subject area:

- *Aguilares sandy clay loam, 0 to 3 percent slopes (AgB*),
- *Brundage fine sandy loam, occasionally flooded (Bd),*
- *Catarina clay, 0 to 2 percent slopes (CaB),*
- *Catarina clay, occasionally flooded (CfA),*
- *Copita fine sandy loam, 0 to 3 percent slopes (CpB),*
- *Hebbronville loamy fine sand, 0 to 2 percent slopes (HeB),*
- *Moglia clay loam, 1 to 5 percent slopes (MgC), and*
- *Montell clay, saline, 0 to 2 percent slopes (MnB).*

These soils are classified within the Aguilares, Brundage, Catarina, Copita, Hebbronville, Moglia, and Montell soil series. These soils range from deep, well drained clayey or loamy soils to deep, moderately well drained saline, clayey soils (USDA 1985). Within the ecoregion, the soil series extends even further to include the Zapata series, a shallow, well drained, loamy soil on uplands (Griffith et al. 2007; USDA 1985).

ENDANGERED SPECIES BACKGROUND

According to USFWS (2013), five species are federally listed as threatened or endangered in Webb County, Texas. Provided below is information on the biology and habitat of the federally-listed endangered species in Webb County: 1) jaguarundi (*Herpailurus yagouaruondi*), 2) ocelot (*Leopardus pardalis*), 3) least tern (*Sterna antillarum athalassos*), 4) ashy dogweed (*Thymophylla tephroleuca*), and 5) Johnston's frankenia (*Frankenia johnstonii*).

Jaguarundi and Ocelot

The jaguarundi (*Herpailurus yagouaruondi*) was federally listed as endangered on June 14, 1976 (41 FR 24062-24067). The jaguarundi is a small, slender-bodied cat with a small, flattened head and long tail. According to Texas Parks and Wildlife Department, large patches (100 acres) of canopy cover and dense shrubs, or smaller patches connected by dense vegetation corridors, are vital to jaguarundi habitat (Campbell 2003). Jaguarundi are considered very rare in Texas, and the probability of encountering a jaguarundi is highly unlikely. Review of the Texas Natural Diversity Database (TNDD) managed by TPWD showed no known occurrences in Webb County (TPWD 2013) (Attachment A, Figure 3). TNDD data also indicated that the closest known occurrence of the jaguarundi was observed in 1988 and is approximately 44 miles north of the subject area in La Salle County, Texas (EO# 8138) (Attachment A, Figure 3). Review of the element occurrence information provided by TPWD, noted the sighting was generally described as crossing FM 625 (or FM 624) 20 miles east of Cotulla and continued southeast. The radius of this polygon is 8000 meters. It is interpreted through the TPWD TNDD "Shapefile Data Interpretation and Use" document that an element polygon with a radius of 8000m was a general location which had the least precision and was used when the location description was vague (TPWD 2013c). The closest known occurrence of the jaguarundi observed to the south of the subject area was in 1992 and is approximately 69 miles away in Starr County, Texas (EO# 2074) (Attachment A, Figure 3). Based on review of the element occurrence information, this element occurrence was cited from 1987 to 1993 by various TPWD performance reports. The sighting was very generally described as being along El Negro Ranch Road. The radius of this polygon is also 8000 meters; therefore, it is also believed to be less precise element polygon with a vague location description (TPWD 2013c).

The last Class A documented jaguarundi report in the United States occurred in 1986 east of Brownsville, Texas (Tewes 2012).

The ocelot (*Leopardus pardalis*) was federally listed as endangered on June 21, 1982 (47 FR 31670-31672). The ocelot is a medium-sized gray or buff spotted cat with variable dark spots, rings, blotches, and bars. Ocelots occur in the dense thorny shrub lands of the Lower Rio Grande Valley and Rio Grande Plains in areas of deep, fertile clay or loamy soils (Campbell 2003). Large patches (100 acres) of canopy cover and dense shrubs, or smaller patches connected by dense vegetation corridors, are vital to ocelot habitat (Campbell 2003). This species is predominately active at night, and spends days hiding in thick brush (Campbell 2003). As this species is predominately active at night, the probability of encountering an ocelot is highly unlikely.

Review of the TNDD data (TPWD 2013c) indicates the closest occurrence of the ocelot was observed in 1991, approximately 67 miles northwest of the subject area in Dimmit County, Texas (EO# 4510) (Attachment A, Figure 3).

Least Tern

The least tern (*Sterna antillarum athalassos*) was federally listed as endangered on May 28, 1985 [50 FR 21784-21792]. The least tern is a migrant species whose breeding range in Texas includes three reservoirs along the Rio Grande River, on the Canadian River in the northern Panhandle, on the Prairie Dog Town Fork of the Red River in the eastern Panhandle, and along the Red River (Texas/Oklahoma boundary) into Arkansas. The species winters along the Central American coast and the northern coast of South America from Venezuela to northeastern Brazil. USFWS has listed the least tern as a possible migrant through most of Texas. From late April to August, the tern uses barren to sparsely vegetated sand, shell, and gravel beaches; sandbars; islands; and salt flats associated with rivers and reservoirs. The terns prefer open habitat and avoid thick vegetation and narrow beaches. As natural nesting sites have become scarce, the terns have used sand and gravel pits, ash disposal areas of power plants, reservoir shorelines, and other manmade sites. The terns nest in a shallow hole scraped in an open sandy area, gravelly patch, or exposed flat (Campbell 2003).

Review of the TNDD data indicates that the closest known occurrence of the interior least tern is 16 miles west of the subject area (Attachment A, Figure 4). The occurrence site was documented in 1994 at Casa Blanca Lake.

Ashy Dogweed
Ashy dogweed (*Thymophylla tephroleuca*) was federally-listed as endangered on July 19, 1984 [49 FR 29232-29234]. This plant forms dense, circular clumps in open areas on sandy pockets in the Maverick-Catarina, Copita-Zapata, and Nueces-Comita soils of southern Webb and northern Zapata Counties, Texas (TPWD 2007) in level areas or in gentle, rolling topography (USFWS 2012). Ashy dogweed has been observed in areas of ground disturbance, but it is unknown if the plant prefers disturbed areas or would also flourish in undisturbed areas (TPWD 2007). Ashy dogweed grows among shrubs including mesquite, calderona (*Krameria ramosissima*), Texas lantana, goatbush (*Castela erecta*), anacahuita, and cenizo (*Leucophyllum frutescens)*. At least six populations have been identified in southern Webb County and northern Zapata County (TPWD 2013).

TNDD data indicated the closest known occurrence of ashy dogweed was observed in the 1980’s, approximately 18 miles south of the subject area in Webb and Zapata Counties, Texas (EO# 1456) (Attachment A, Figure 5). Ashy dogweed was identified at the head of the Dos Arroyos drainage during the 1980’s, then again around Mangana-Hein Road and Dolores Creek in 1994, 1999, and 2000. A review of USWFS species occurrence (2013b) found that the closest observation for ashy dogweed is approximately 16 miles southwest of the subject area (Attachment A, Figure 5).

Johnston’s Frankenia
Johnston’s frankenia (*Frankenia johnstonii*) was federally-listed as endangered on August 7, 1984 (49 FR 31418-31421). On May 22, 2003, the species was proposed for delisting (68 FR 27961). This low, sprawling shrub generally grows on open or sparsely vegetated rocky hillsides or saline flats in saline sandy or clayey soils with high gypsum content (USFWS 1988). Johnston’s frankenia is historically known from Nuevo Leon, Mexico and Starr and Zapata Counties in south Texas (USFWS 1988), but large populations were identified in western Webb County in 1999 (USFWS 2013b).

Review of the TNDD data (2013c) indicates that the closest known occurrence of Johnston’s frankenia was observed in 1999, approximately 23 miles south of the subject area in Zapata County, Texas (EO# 4180). In addition to TNDD, USFWS provided aci consulting with endangered plant site occurrence data at an August, 2013 project meeting. A review of USWFS species occurrence (2013b) found that the closest observation for Johnston's frankenia is approximately 11 miles west of the subject area (Attachment A, Figure 5).

SITE-SPECIFIC ENDANGERED SPECIES INVESTIGATIONS

Numerous site specific endangered species investigations have been completed onsite since 2011. The findings and conclusions of the various studies are summarized below and the most pertinent site specific investigations are included as attachments to this document.

Jaguarundi and Ocelot

In 2011, TRC Environmental conducted site investigations on the 1,110-acre PERC site for federally threatened and endangered species (TRC 2011a). These investigations included habitat assessments for jaguarundi and ocelot. TRC's findings determined the density and canopy cover of vegetation within the PERC site were not sufficient to be considered preferred habitat for jaguarundi or ocelot (TRC 2011a).

Following TRC's assessment of the site, Dr. Michael Tewes conducted a site assessment of the PERC site in 2012. Tewes concluded that the potential for occurrence of resident jaguarundi on the PERC site was extremely unlikely (Tewes 2012). Attachment C contains the entirety of Tewes' investigations for reference.

Upon the determination of the FEMA action area extending outside of the 1,110-acre PERC site, aci consulting conducted additional endangered species site investigations in the 141-acre portion of the FEMA action area outside of the 1,110-acre PERC site. These investigations were completed in 2013 and included habitat evaluation for jaguarundi and ocelot. aci consulting concluded the 141-acre area north and west of the PERC site did not contain the structural and compositional elements of jaguarundi and ocelot habitat, and therefore the regular utilization of the area by to the two species is very low (aci consulting 2013). Attachment D contains the entirety of the aci consulting FEMA action area endangered species assessment for reference.

Least Tern

In 2011, TRC Environmental conducted site investigations on the 1,110-acre PERC site for federally threatened and endangered species (TRC 2011a). These investigations included habitat assessments for least tern. TRC's findings determined the PERC site lacked preferred riverine habitat for least tern (TRC 2011a).

Field investigations of the 141-acre FEMA action area by aci consulting found no potential shoreline or sandbar habitat conducive for least tern habitation. The FEMA action area did not contain the structural or compositional elements to be regularly utilized by least tern (aci consulting 2013, and Attachment D).

Ashy Dogweed and Johnston's Frankenia
Previous investigations on the 1,110-acre PERC site included a presence/absence survey for ashy dogweed and Johnston's frankenia (TRC 2011b, and Attachment E). This survey was conducted within specific soil series with the potential to contain the two species. The results of the survey found no ashy dogweed or Johnston's frankenia within the subject area. As shown in Attachment A, Figure 6, two soil series exist on the PERC site with some potential for the endangered plant occurrence. These soil series extend offsite into the 141-acre FEMA action area as well. Accordingly, in 2013, aci consulting conducted a presence/absence survey for ashy dogweed and Johnston's frankenia within the 141-acre FEMA action area. The results of the survey found no ashy dogweed or Johnston's frankenia (aci consulting 2013, and Attachment D).

EFFECTS DETERMINATION AND CONCLUSION

Rancho Viejo Ventures is evaluating a 1,110 acre site in Webb County, Texas for the development of a municipal solid waste/industrial landfill. This Biological Assessment evaluated the potential for federally listed threatened and endangered species to be affected by the proposed action. This assessment builds upon the previous studies conducted on the subject.

Five species are listed as federally threatened or endangered in Webb County, Texas. Summaries for the findings of each species are included below:

Jaguarundi and Ocelot
- In 2011, TRC Environmental determined the PERC site lacked preferred habitat for jaguarundi or ocelot (TRC 2011a).
- In 2012, Michael Tewes determined that the occurrence of a resident jaguarundi on the 1,110-acre PERC site was extremely unlikely (Tewes 2012, and Attachment C). Tewes' conclusion was based on the absence of record of cats in the area and the lack of extensive thornscrub.
- In 2013, aci consulting concluded the 141-acre FEMA action area north and west of the PERC site lacked the structural and compositional elements of habitat for jaguarundi or ocelot (aci consulting 2013, and Attachment D).
- Based on the field efforts above, no effect to ocelot area anticipated for the FEMA action proposed.
- On October 21, 2013, aci consulting submitted a Biological Evaluation to USFWS documenting a no effect determination on the Jaguarundi and Ocelot. Following the submittal USFWS and aci consulting developed numerous conservation measures for the benefit of the species (Attachment E).
- Based on the field efforts, discussions with USFWS, and commitment to numerous conservations measures (See Attachment E), a "may affect, not likely to adversely affect" determination has been made for the jaguarundi.

Least Tern

- In 2011, TRC Environmental determined the PERC site lacked preferred riverine habitat for least tern (TRC 2011a).
- In 2013, aci consulting concluded the 141-acre FEMA action area north and west of the PERC site also lacked the structural and compositional elements of habitat for least tern (aci consulting 2013, and Attachment D).
- Therefore, no effect to least tern is anticipated for the FEMA action proposed.

Ashy Dogweed and Johnston's Frankenia

- In 2011, TRC Environmental completed a presence/absence survey for ashy dogweed and Johnston's frankenia within the PERC site. No ashy dogweed or Johnston's frankenia were observed. (TRC 2011b, and Attachment F).
- In 2013, aci consulting conducted a similar presence/absence survey for ashy dogweed and Johnston's frankenia within the 141-acre FEMA action area north and west of the PERC site. The survey also found no ashy dogweed or Johnston's frankenia (aci consulting 2013, and Attachment D)
- Therefore, no effect to ashy dogweed or Johnston's frankenia is anticipated for the FEMA action proposed.

Rancho Viejo Waste Management and aci consulting appreciate the ongoing USFWS assistance with the project. This biological assessment serves as transmittal of Rancho Viejo Waste Management's "no effect" determination under Section 7 of the Act for the following species: ocelot, least tern, ashy dogweed and Johnston's frankenia. This biological assessment also serves as Rancho Viejo Waste Management's "may affect, not likely to adversely affect" determination for jaguarundi. Rancho Viejo Waste Management's courteously requests USFWS concurrence with these determinations. This documentation is necessary to satisfy FEMA's request for confirmation in the form of an official letter from USFWS concurring that the project has "no effect" and to various on listed species or critical habitat and that the project is "not likely to adversely affect" jaguarundi.

If you have any questions or comments, please contact me via phone at (512) 852-3888 or via email at kramberg@aci-group.net.

Sincerely,

Kevin Ramberg
Natural Resource Division

Cc: Dawn Whitehead (with Attachments)
USFWS, Corpus Christi Ecological Services Field Office
6300 Ocean Drive, Unit 5837
Corpus Christi, TX 78412-5837

Carlos Benavides (with Attachments)
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Laredo, TX 78041

Michael Oden (with Attachments)
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Dallas, Texas 75234

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(USFWS) U.S. Fish and Wildlife Service. 2013b. Rare, Threatened, and Endangered Plant species and geologic formations in the vicinity. Map provided to aci consulting at project meeting on August 31, 2013 at USFWS Alamo Field Office. 1 pg.

(USGS) U.S. Geological Survey. 2009. Geology 24k from the Geologic Database of Texas. Texas Water Development Board and U.S. Geological Survey. Austin, Texas.

List of Attachments

Attachment A: Site Figures
- Figure 1: Proposed Project Area
- Figure 2: USGS 7.5 Minute Topographic Quadrangle: *Burrito Tank*
- Figure 3: Historical Occurrences of Jaguarundi and Ocelot
- Figure 4: Historical Occurrences of the Interior Least Tern
- Figure 5: Historical Occurrences of Ashy Dogweed and Johnston's Frankenia
- Figure 6: Endangered Plant Soil Series
- Figure 7: Riparian Conservation Corridor

Attachment B: FEMA ESA Guidance

Attachment C: Potential Presence of Jaguarundi and Their Habitat on the Proposed Site of the Pescadito Environmental Resource Center in Webb County, Texas (Tewes, 2012)

Attachment D: Endangered Species Habitat Evaluation and Presence/Absence Survey for the Pescadito Environmental Resource Center FEMA Action Areas, Webb County, Texas (aci consulting 2013)

Attachment E: Proposed Conservation Measures for the Benefit of the Jaguarundi

Attachment F: Presence/Absence Survey for Johnston's Frankenia and Ashy Dogweed, Pescadito Environmental Resource Center, Webb County, Texas (TRC, 2011b)

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Attachment A: Site Figures

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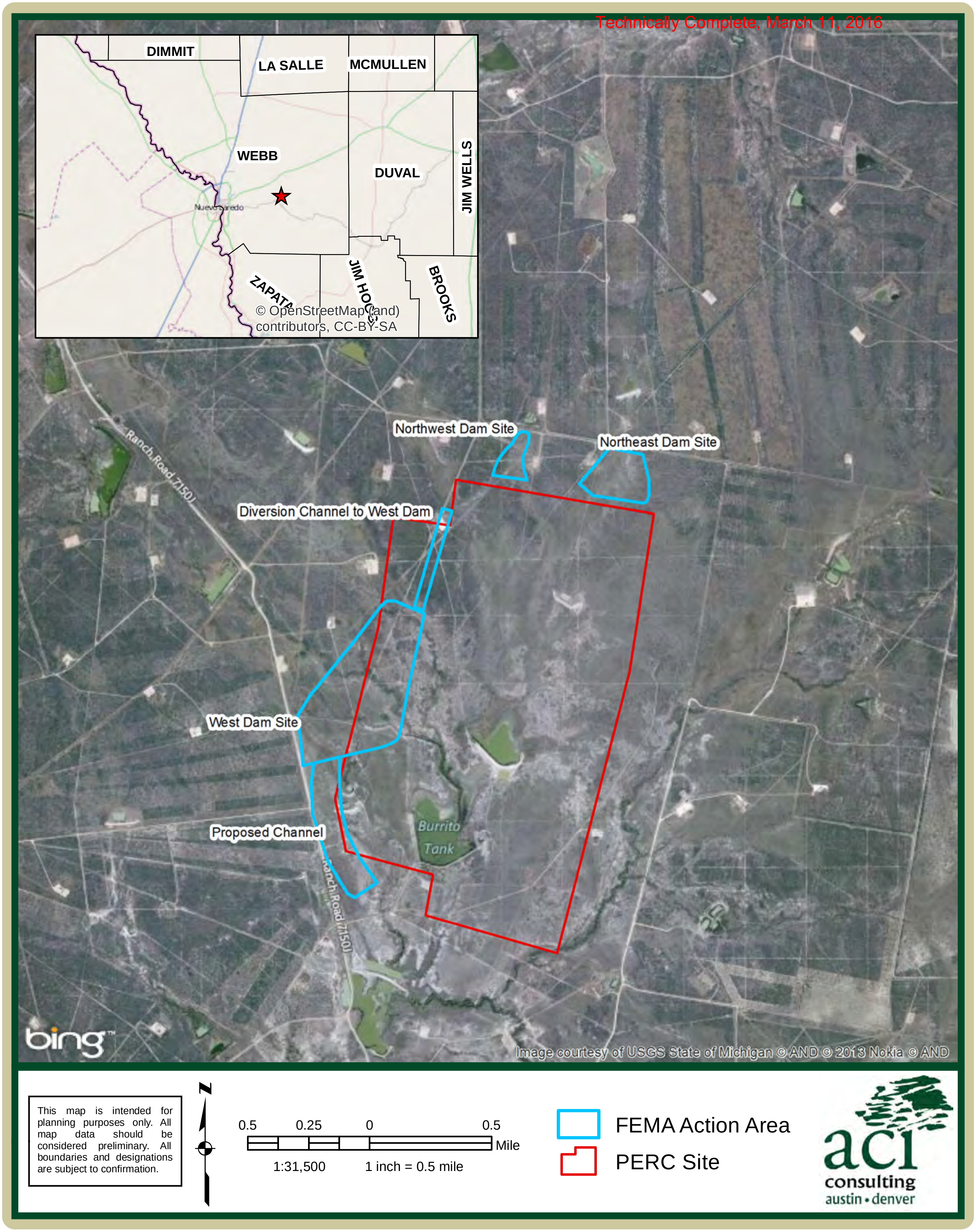
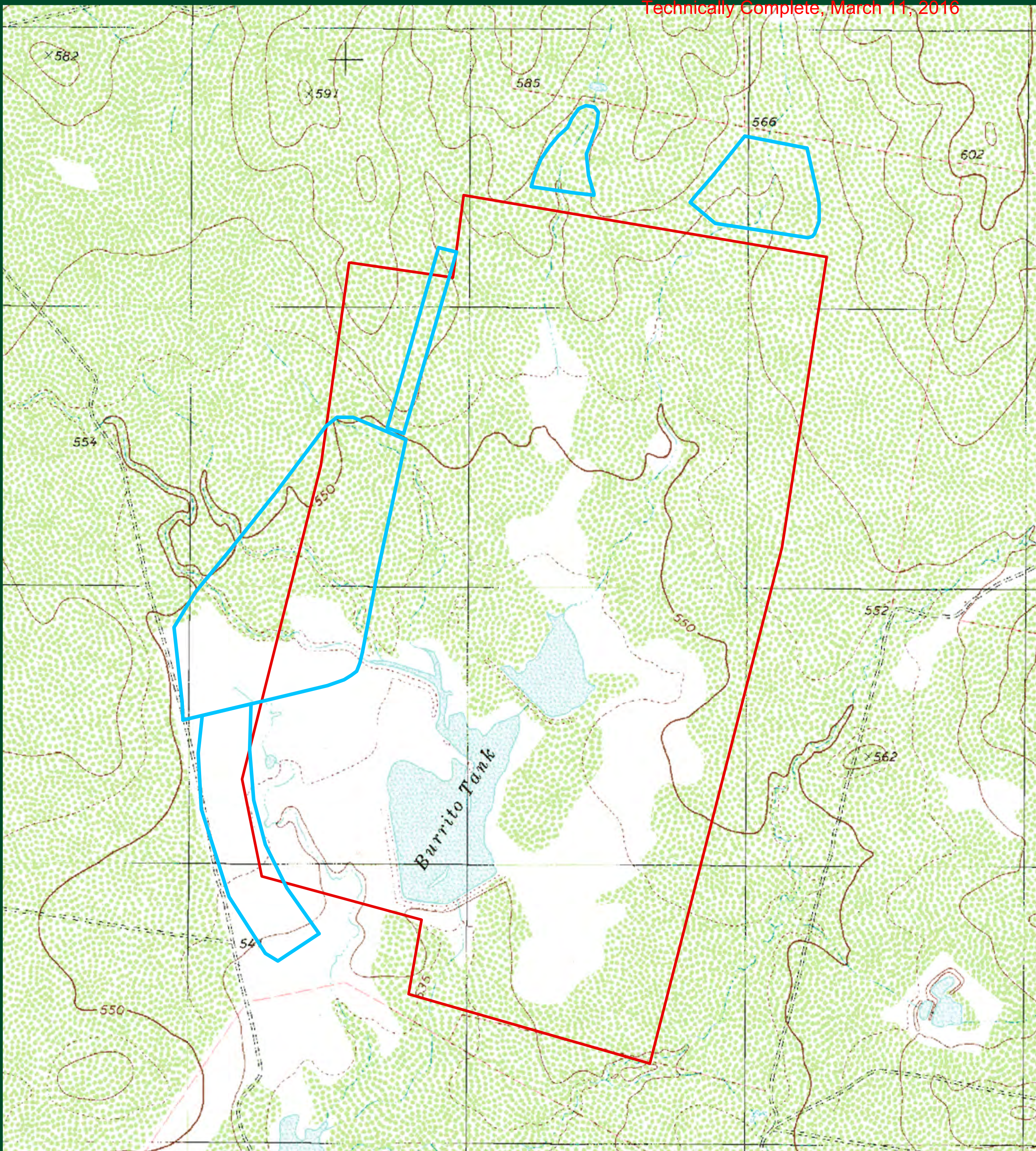


PERC Biological Assessment **January 2014**

Figure 1: Proposed Project Area

Technically Complete, March 11, 2016



This map is intended for planning purposes only. All map data should be considered preliminary. All boundaries and designations are subject to confirmation.

N

0.3 0.15 0 0.3 Mile

1:19,000 1 inch = 0.3 mile

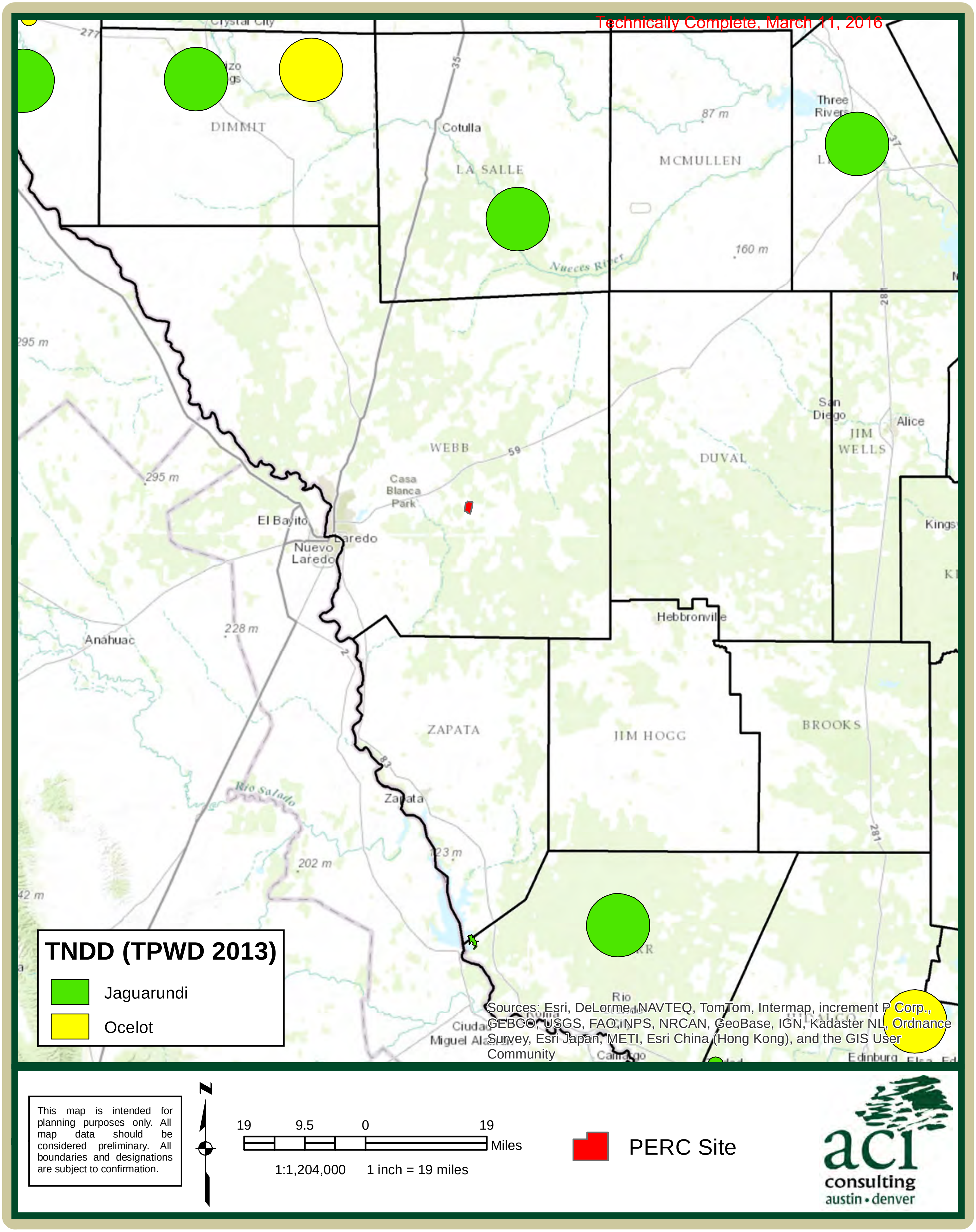
FEMA Action Area

PERC Site

aci consulting
austin • denver

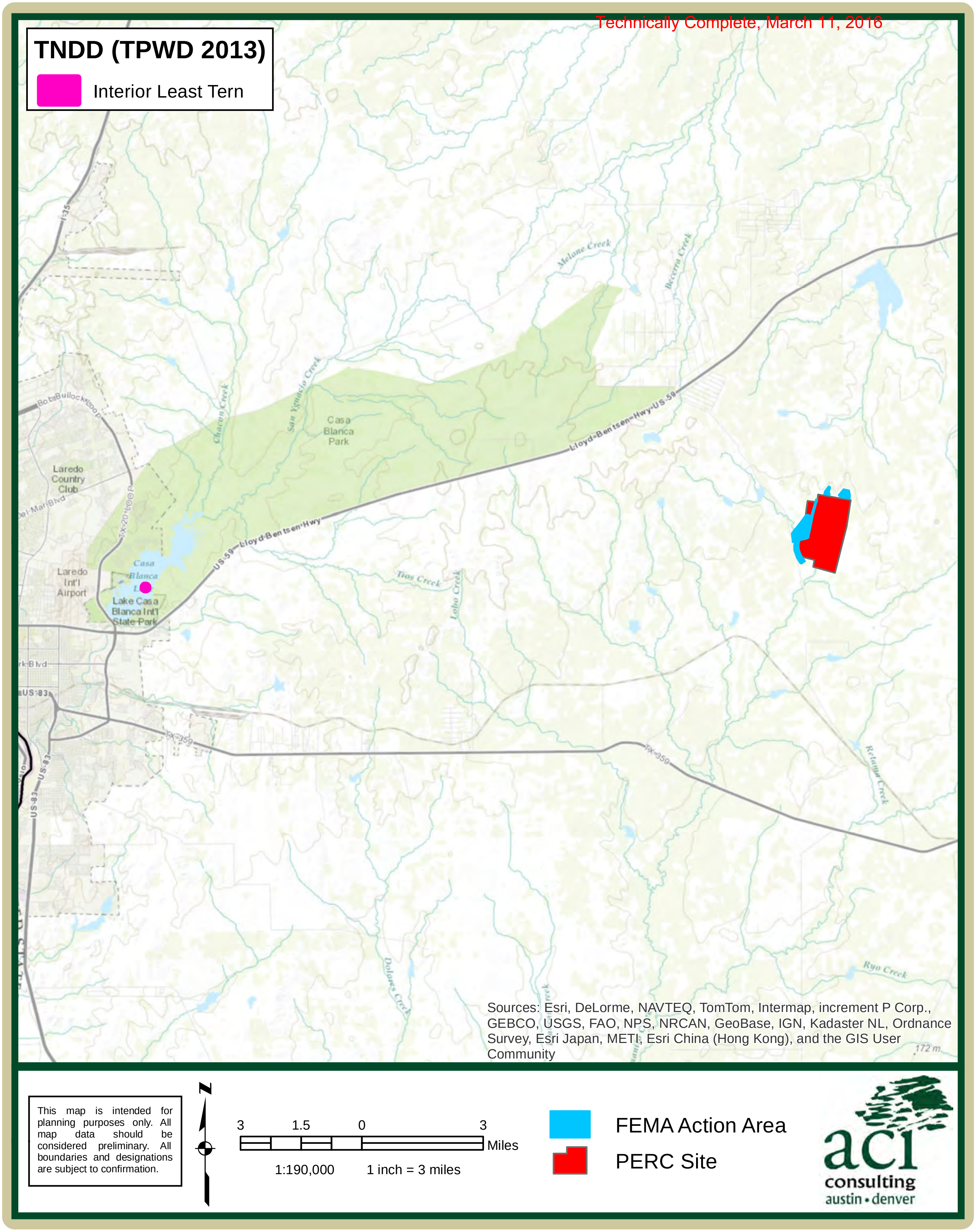
PERC Biological Assessment **January 2014**

Figure 2: USGS 7.5 Minute Topographic Quadrangle: ***Burrito Tank***



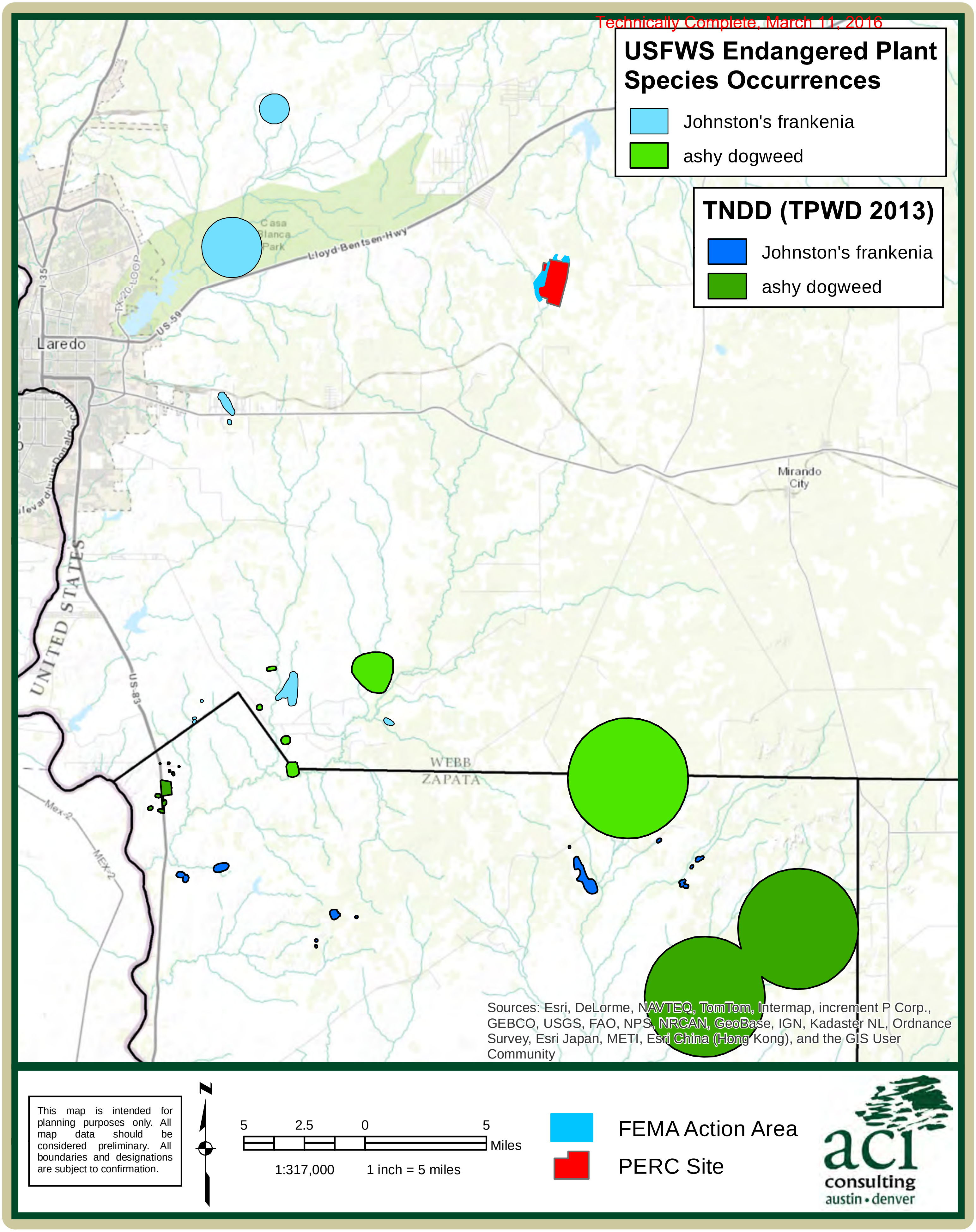
PERC Biological Assessment **January 2014**

Figure 3: Historical Occurrences of Jaguarundi and Ocelot



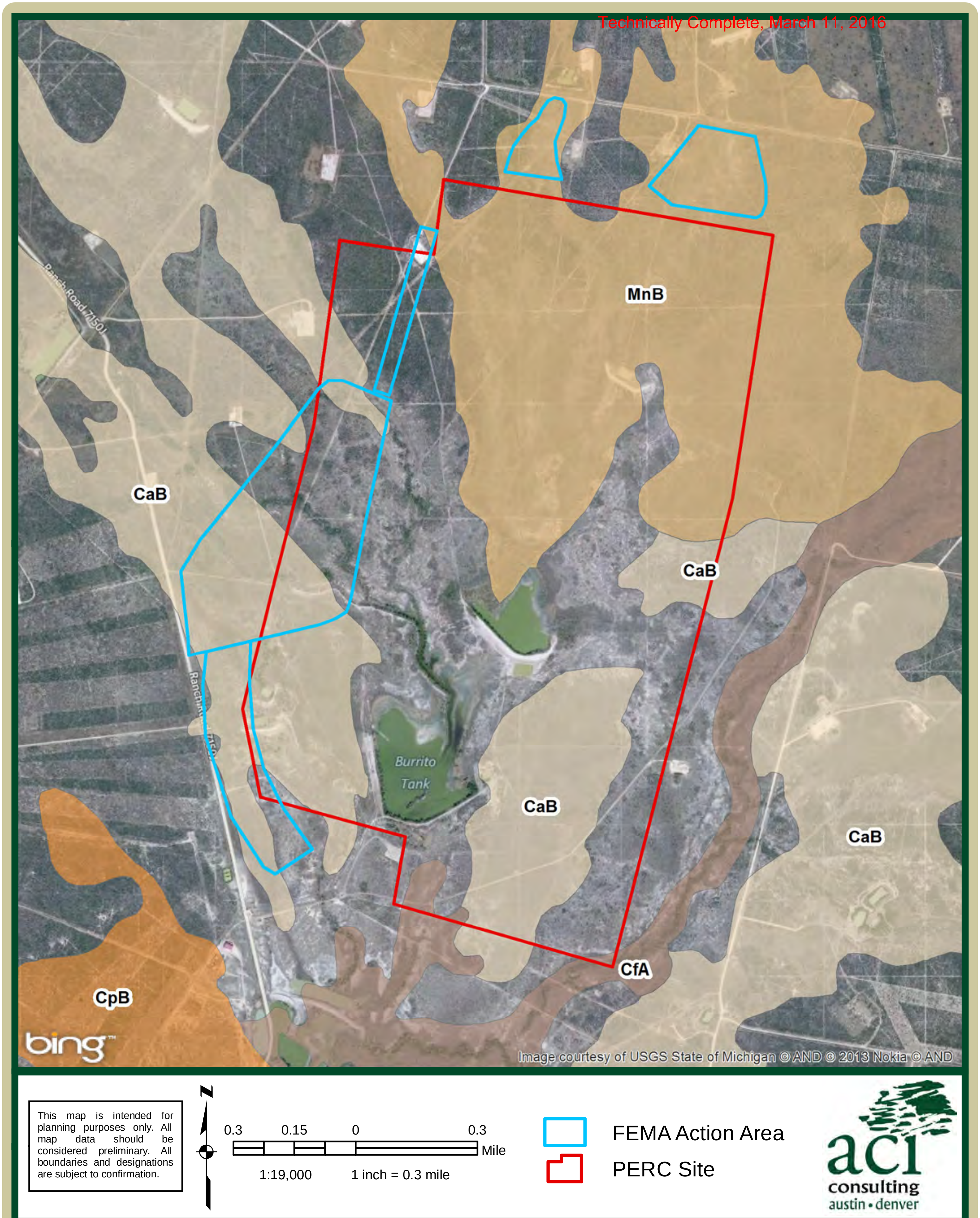
PERC Biological Assessment **January 2014**

Figure 4: Historical Occurrences of the Interior Least Tern



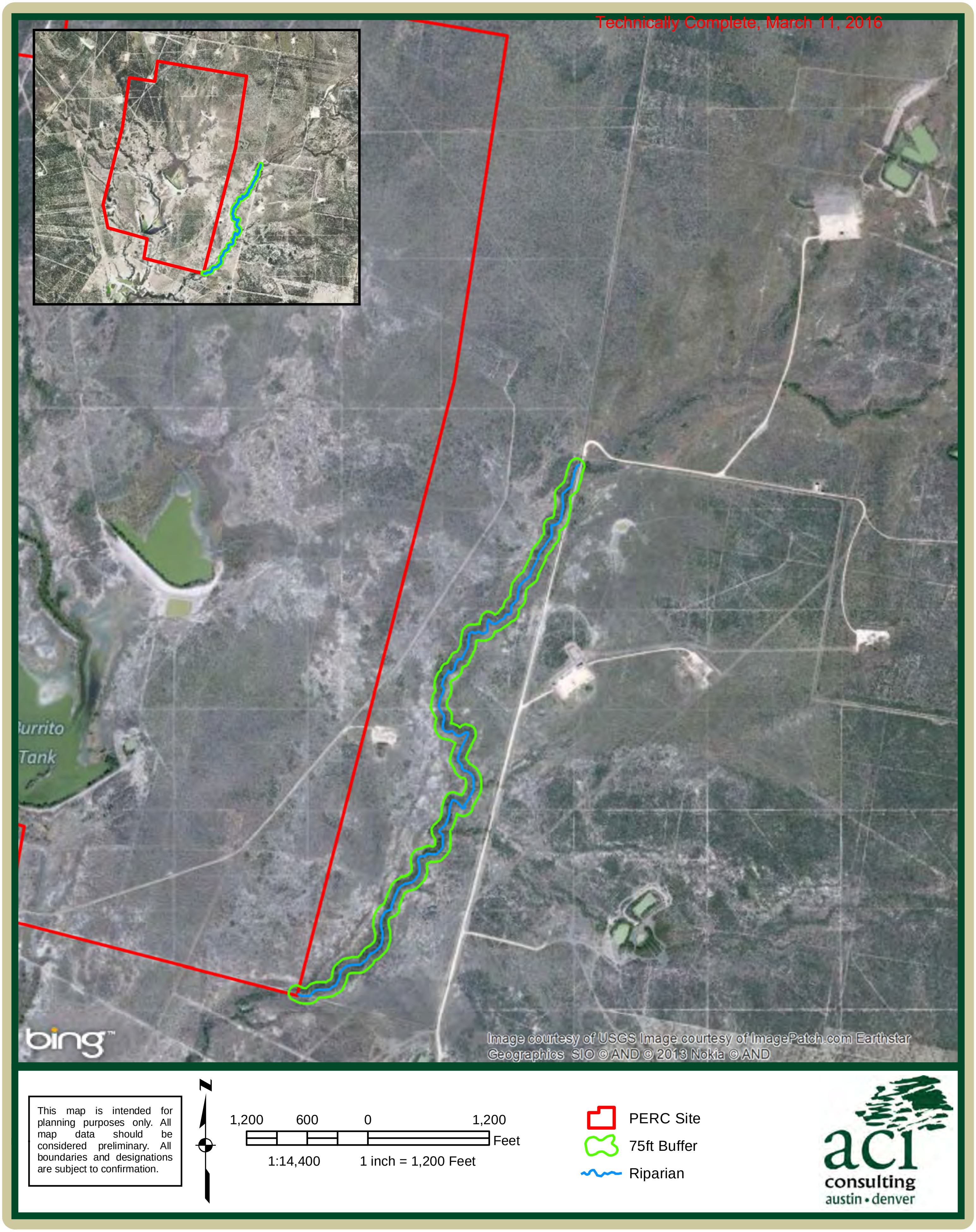
PERC Biological Assessment **January 2014**

Figure 5: Historical Occurrences of Ashy Dogweed and Johnston's Frankenia



PERC Biological Assessment **January 2014**

Figure 6: Endangered Plant Species Soils



PERC Biological Assessment **January 2014**

Figure 7: Riparian Conservation Corridor

Attachment B: FEMA ESA Guidance

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Technically Complete, March 11, 2016

U.S. Department of Homeland Security
500 C Street SW
Washington, DC 20472

FEMA

August 18, 2010

MEMORANDUM FOR: Regional Division Directors
Regions I - X

FROM: Doug Bellomo, P.E.
Director, Risk Analysis Division

SUBJECT: Procedure Memorandum 64 – Compliance with the Endangered Species Act (ESA) for Letters of Map Change

EFFECTIVE DATE: All Conditional Letter of Map Change submittals received as of October 1, 2010

Background: The purpose of the ESA is to conserve threatened and endangered species and the ecosystems upon which they depend. Congress passed the ESA in 1973 with recognition that the natural heritage of the United States was of "esthetic, ecological, educational, recreational, and scientific value to our Nation and its people." Congress understood that, without protection, many of our nation's living resources would become extinct. Species at risk of extinction are considered endangered, whereas species that are likely to become endangered in the foreseeable future are considered threatened. At present approximately 1,900 species are listed as threatened or endangered under the ESA. The U.S. Department of Interior's Fish and Wildlife Service and the U.S. Department of Commerce's National Marine Fisheries Service (collectively known as "the Services") share responsibility for implementing the ESA.

Section 7 of the ESA requires each federal agency to insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any listed species or result in the destruction of adverse modification of designated critical habitat[1].

Section 9 of the ESA prohibits anyone from "taking" or "harming" endangered wildlife and similar prohibitions are generally extended through regulations for threatened wildlife. If an action might harm[2] a threatened or endangered species, an incidental take authorization is required from the Services under Sections 7 or 10 of the ESA.

Issue: Conditional Letters of Map Change (LOMCs) are issued before a physical action occurs in the floodplain and are FEMA's comments as to whether the proposed project would meet minimum National Flood Insurance Program (NFIP) requirements and how the proposed changes would impact the NFIP maps. Because Conditional Letters of Map Revision based-on Fill (CLOMR-Fs) and Conditional Letters

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[1] In accordance with Section 4 of the ESA, critical habitat includes specific areas essential to conservation of a species and those areas which may require special management considerations or protection.

[2] Harm can arise from "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering" [50 CFR Part 17.3].

of Map Revision (CLOMRs) are submitted to FEMA prior to construction, there is an opportunity to identify if threatened and endangered species may be affected by the potential project. If potential adverse impacts could occur, then the Services may require changes to the proposed activity and/or mitigation.

For LOMC requests involving floodplain activities that have already occurred, private individuals and local and state jurisdictions are required to comply with the ESA independently of FEMA's process. These requests do not provide the same opportunity as Conditional LOMCs for FEMA to comment on the project because map changes are issued only after the physical action has been undertaken.

The following table provides a general summary of FEMA's ESA requirements.

Request	ESA-related Action	ESA Requirement Related to FEMA Process
Conditional LOMC Requests		
CLOMA	No physical modification to floodplain is proposed.	ESA compliance is required independently of FEMA's process. The community needs to ensure that permits are obtained per requirement under Section 60.3(a)(2) of FEMA's regulations.
CLOMR-F	Proposed placement of fill in the floodplain.	ESA compliance must be documented to FEMA prior to issuance of CLOMR-F. FEMA must receive confirmation of ESA compliance from the Services.
CLOMR	Proposed modifications of floodplains, floodways, or flood elevations based on physical and/or structural changes.	ESA compliance must be documented to FEMA prior to issuance of CLOMR. FEMA must receive confirmation of ESA compliance from the Services.
LOMC Requests		
LOMA	No physical modification to floodplain has occurred.	ESA compliance is required independently of FEMA's process. The community needs to ensure that permits are obtained per requirement under Section 60.3(a)(2) of FEMA's regulations.
LOMR-F	Placement of fill in floodplain has occurred.	ESA compliance is required independently of FEMA's process. The community needs to ensure that permits are obtained per requirement under Section 60.3(a)(2) of FEMA's regulations.
LOMR	Modifications of floodplains, floodways, or flood elevations have occurred based on physical and/or structural changes.	ESA compliance is required independently of FEMA's process. The community needs to ensure that permits are obtained per requirement under Section 60.3(a)(2) of FEMA's regulations.

Action Taken: For CLOMR-F and CLOMR applications, the submittal will be reviewed based on:

- Required data elements cited in the NFIP regulations
- Required data elements cited in the MT-1 and MT-2 Application/Certification Form instructions
- Demonstrated compliance with the ESA

The CLOMR-F or CLOMR request will be processed by FEMA only after FEMA receives documentation from the requestor that demonstrates compliance with the ESA. The requestor must demonstrate ESA compliance by submitting to FEMA either an Incidental Take Permit, Incidental Take Statement, "not likely to adversely affect" determination from the Services or an official letter from the Services concurring that the project has "No Effect" on listed species or critical habitat. If the project is likely to cause jeopardy to listed species or adverse modification of critical habitat, then FEMA shall deny the Conditional LOMC request. This Procedure Memorandum will not change the review process for Conditional Letters of Map Amendment (CLOMA), Letter of Map Amendment (LOMA), Letter of Map Revision based-on Fill (LOMR-F), or Letter of Map Revision (LOMR) applications. In addition, FEMA's Cooperating Technical Partners will be required to comply with this Procedure Memorandum.

Attachment:
Guidance for Compliance with the Endangered Species Act for Conditional Letters of Map Change

Cc: See Distribution List

Distribution List (electronic distribution only):

Office of Chief Counsel

Risk Analysis Division

Risk Reduction Division

Environmental and Historic Preservation Unit

Regional Mitigation Divisions

Regional Environmental Officers

Legislative Affairs Division

Production and Technical Services Contractors

Customer and Data Services Contractor

Cooperating Technical Partners

Guidance for Compliance with the Endangered Species Act for Conditional Letters of Map Change

This document supplements the Federal Emergency Management Agency's (FEMA's) Procedure Memorandum No. 64. It highlights additional resources and frequently asked questions to help guide Conditional Letter of Map Revision (CLOMR) and Conditional Letter of Map Revision based on Fill (CLOMR-F) applicants in the Endangered Species Act (ESA) compliance process. The following sections identify helpful web resources, while the final section includes responses to frequently asked questions.

NATIONAL FLOOD INSURANCE PROGRAM AND LETTERS OF MAP CHANGE

Additional information about the National Flood Insurance Program (NFIP) and Letters of Map Change (LOMC) is available from FEMA.

NFIP: http://www.fema.gov/hazard/flood/info.shtm
LOMCs: http://www.fema.gov/hazard/map/lomc.shtm

ESA OF 1973

Additional information about the ESA and Endangered Species Programs is available from the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS). These two agencies, collectively known as "the Services," share responsibility for implementing the ESA and assisting all individuals (public and private) in the ESA compliance process.

NMFS: http://www.nmfs.noaa.gov/pr/laws/esa/
USFWS: http://www.fws.gov/endangered/whatwedo.html

GETTING STARTED WITH ESA COMPLIANCE AND WHO TO CONTACT

CLOMR and CLOMR-F applicants are responsible for demonstrating to FEMA that ESA compliance has been achieved prior to FEMA's review of a CLOMR or CLOMR-F application. The applicant may begin by contacting a local Service office, State wildlife agency office, or independent biologist to identify whether threatened or endangered species exist on the subject property and whether the project associated with the CLOMR or CLOMR-F request would adversely affect the species. These entities are also available to discuss questions pertaining to listed species and ESA compliance.

NMFS Regional Offices: http://www.nmfs.noaa.gov/regional.htm
USFWS Office Directory: http://www.fws.gov/offices/

DEMONSTRATING COMPLIANCE WITH THE ESA

If species may be affected adversely by the project, the applicant (as a non-Federal entity) would be required to obtain compliance through the Section 10 process. This process includes applying for an Incidental Take Permit (ITP) and preparing a habitat conservation plan (HCP). Additional information about Section 10 requirements and the permit application process is available from NMFS and USFWS.

ITPs and NMFS: http://www.nmfs.noaa.gov/pr/permits/faq_esapermits.htm
ITPs and USFWS: http://www.fws.gov/endangered/hcp/hcpplan.html
HCPs and NMFS: http://www.nwr.noaa.gov/Salmon-Habitat/Habitat-Conservation-Plans/Index.cfm
HCPs and USFWS: http://www.fws.gov/endangered/hcp/index.html
NMFS Permit applications: http://www.nmfs.noaa.gov/pr/permits/esa_permits.htm
USFWS Permit application: http://www.fws.gov/forms/3-200-56.pdf

To demonstrate to FEMA that ESA compliance has been achieved, the requestor must provide an ITP, an Incidental Take Statement, a "not likely to adversely affect" determination from the Services, or an official letter from the Services concurring that the project has "No Effect" on proposed or listed species or designated critical habitat. If the project is likely to cause jeopardy of a species' continued existence or adverse modification to designated critical habitat, then FEMA shall refuse to review the CLOMR or CLOMR-F request without prior project approval from the Services. If a Federal entity is involved in a proposal or project for which a CLOMR or CLOMR-F has been requested, then the applicant may coordinate with that agency to demonstrate to FEMA that Section 7 ESA compliance has been achieved through that other Federal agency.

Frequently Asked Questions

For which map change applications does FEMA require demonstrated ESA compliance?
FEMA requires applicants to demonstrate compliance for CLOMRs and CLOMR-Fs only.

Why is ESA compliance required before FEMA can review my CLOMR or CLOMR-F application?
All individuals in this country (private and public) have a legal responsibility to comply with the ESA. FEMA recognizes that potential projects for which a CLOMR or CLOMR-F has been requested may affect threatened and endangered species. As a result, FEMA requires documentation to show that potential projects comply with the ESA before a CLOMR or CLOMR-F application can be reviewed.

Why does FEMA not require demonstration of ESA compliance for other LOMC applications?
Many LOMC requests involve floodplain activities that have occurred already. As a result, FEMA does not have the opportunity to comment on these projects in terms of ESA compliance prior to the physical changes taking place. Private individuals and local and state jurisdictions are required to comply with the ESA independently of FEMA's process.

What will FEMA require from CLOMR and CLOMR-F applicants to demonstrate ESA compliance?
As part of the CLOMR or CLOMR-F application, the requestor must provide an ITP, an Incidental Take Statement, a "not likely to adversely affect" determination from the Services, or an official letter from the Services concurring that the project has "No Effect" on proposed or listed species or designated critical habitat.

How much time will be required to achieve ESA Compliance?
The timeframe needed to achieve ESA compliance will depend entirely on the complexity of the project, the extent to which species may be affected by the project, the quality of biological analyses conducted by the applicant, and the review process as determined by the Services. Therefore, we recommend that LOMC applicants coordinate with the Services as soon as possible within the project development process.

Who is available to answer my questions about ESA compliance?
NMFS and the USFWS both have staff available around the country to answer questions about threatened and endangered species and ESA compliance. Refer to the *NMFS Regional Offices* and *USFWS Office Directory* links on Page 1 of this guidance document to identify the nearest available Service office. FEMA does not have staff available to assist with this process.

How do I determine if there are threatened or endangered species or critical habitat in my project area?
The applicant may begin by contacting a local Service office, state wildlife agency office, or independent biologist to identify whether threatened or endangered species exist on the subject property and whether the project associated with the CLOMR or CLOMR-F would adversely affect the species.

Do I need to hire a biologist for this process?

While hiring a biologist may be unnecessary, doing so may help facilitate the process. Biologists familiar with subject species and the regulatory process can help adequately complete many of the studies required as part of the Section 10 process and fulfill other Section 10 requirements.

How are the following ESA-related terms defined?

"Take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct and may include habitat modification or degradation.

"Harm" can arise from significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

"Section 7" requires all Federal agencies, in consultation with USFWS or NMFS, to use their authorities to further the purpose of the ESA and to ensure that their actions are not likely to jeopardize the continued existence of listed species or result in destruction or adverse modification of critical habitat.

"Section 10" lays out the guidelines under which a permit may be issued to non-Federal parties to authorize prohibited activities, such as take of endangered or threatened species.

"ITP" or incidental take permit is a permit issued under section 10(a)(1)(B) of the ESA to a non-Federal party undertaking an otherwise lawful project that might result in the "take" of an endangered or threatened species. Application for an incidental take permit is subject to certain requirements, including preparation by the permit applicant of a HCP.

"HCP" or habitat conservation plan is a legally binding plan that outlines ways of maintaining, enhancing, and protecting a given habitat type needed to protect species. It usually includes measures to minimize impacts and may include provisions for permanently protecting land, restoring habitat, and relocating plants or animals to another area. An HCP is required before an incidental take permit may be issued to non-Federal parties.

Other ESA-related terms not described here may be defined on the following website:
http://www.fws.gov/endangered/pdfs/glossary.pdf

Attachment C: Potential Presence of Jaguarundi and Their Habitat on the Proposed Site of the Pescadito Environmental Resource Center in Webb County, Texas (Tewes, 2012)

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Potential Presence of Jaguarundi and Their Habitat on the Proposed Site of the Pescadito Environmental Resource Center in Webb County, Texas

Michael E. Tewes, Ph.D.
Certified Wildlife Biologist
Cat Research and Management Consultants

Summary

The objective of this brief assessment was to visit the Yugo Ranch in Webb County and evaluate a proposed disposal site for the possible occurrence of endangered jaguarundi (*Herpailurus yagouaroundi*) and their habitat. The occurrence of a resident jaguarundi is extremely unlikely. This conclusion is based, in large part, to the absence of recent or historical records of these cats in this area, and the lack of extensive dense thornshrub communities currently occurring on the project site. Extremely dense thornshrub communities were believed to be important to historical occurrence of jaguarundi in the Lower Rio Grande Valley of South Texas. Most of the proposed project site and surrounding area is open rangeland dominated by a forb-grass-cactus community lacking a dominant shrub or tree layer. One site that was less than 10 acres supported some woody cover of approximately 75-85% horizontal cover, and this canopy cover was too sparse to be considered jaguarundi habitat. A dispersing or transient jaguarundi is extremely unlikely.

Introduction

The possible presence of jaguarundi and their habitat were evaluated on the proposed site of the Pescadito Environmental Resource Center in Webb County, Texas, during 4 March 2012. This report describes the relevant biology of this endangered cat and discusses the findings of the site visit.

The jaguarundi is represented in the United States only by their occurrence in southern Texas (Tewes 1986, Tewes and Everett 1986, Tewes and Schmidly 1987). It is listed as endangered by the U.S. Fish and Wildlife Service and the Texas Parks and Wildlife Department (TPWD) (Tewes and Schmidly 1987).

Considerable concern over the persistence of this cat in Texas has been expressed by resource managers and research scientists in recent years (Tewes 1983, Tewes and Miller 1987, Tewes 1988, Tewes 1990, Tewes 2001). Also, project developers and various governmental agencies often request impact evaluations of projects upon endangered cats. Finally, the development of the federal Jaguarundi Recovery Plan is currently in progress, and will discuss the status of the jaguarundi.

Tewes and Everett (1986) reported on the status and distribution of jaguarundi in Texas. The survey was initially performed in 1982 and surveys have continued to the present in Texas and northeast Mexico. In addition, Arturo Caso and Michael Tewes initiated field research on the jaguarundi in Mexico during 1990.

Background

Information about jaguarundi habitat is scarce and mostly anecdotal. We have radio-collared several jaguarundis in Mexico. Data from these studies indicated that jaguarundis co-occurred with radio-collared ocelots on the same ranches. The jaguarundis occupied sites covered with dense forest canopies, riparian strips, and areas void of woody cover but heavily dominated with tall, dense bunchgrasses. Continuous bunchgrass communities can also provide the dense vertical cover in the lower layer that seems important to these cats. However, the location of these bunchgrass communities near extremely dense woody communities that can be used for escape cover may be a requisite for jaguarundi use. Because previous studies in Mexico demonstrated the co-occurrence of jaguarundi and ocelot in the same thornshrub communities, many biologists use information about ocelot habitat as a surrogate for jaguarundi habitat.

Considerable field research has occurred in the Lower Rio Grande Valley and, to a lesser extent, over other portions of southern Texas. This research has indicated that ocelots are primarily nocturnal, secretive, and occupy extremely dense cover (Tewes and Schmidly 1987).

The ocelot requires dense thornshrub canopies for optimal cover. Shindle and Tewes (1998) examined the species composition of several thornshrub tracts used intensively by ocelots on the Laguna Atascosa Refuge in Cameron County. These are the same woody species also believed to have been previously used by jaguarundis in the Lower Rio Grande Valley. The primary thornshrub species constituting ocelot cover (>5% canopy cover) included Berlandier fiddlewood (*Citharexylum berlandieri*), colima (*Zanthoxylum fagara*), crucita (*Eupatorium adoratum*), desert olive (*Forestiera angustifolia*), granjeno (*Celtis pallida*), and snake-eyes (*Phaulothamnus spinescens*).

Optimal cover (i.e., Class A) consists of dense, mostly continuous stands of thornshrub with greater than 95% horizontal cover within the shrub layer. This community type of dense shrubs is uncommon, covering less than 1% of southern Texas (Tewes and Everitt 1986). "Sub-optimal" or "marginal" cover has a horizontal canopy ranging 75-95% closure of the shrub layer. Discussion of the value of suboptimal or marginal cover for ocelots is relevant primarily when these marginal tracts occur near optimal tracts. These categories provide an objective basis of evaluating the presence and potential utility of ocelot cover, and in turn as an ecological surrogate for jaguarundi.

The lower stratum (i.e., shrub layer) is most important to the jaguarundi because they spend most of their time at that level. Our previous research on the jaguarundi indicated the critical reliance of this feline on dense woody cover for foraging and social interactions. Also, dense vertical cover may provide some niche segregation from ocelots, bobcats, and probably coyotes, three carnivores that are suspected as potential competitors or antagonists of the jaguarundi.

Potential Presence of Jaguarundi

The presence of jaguarundis are difficult to detect. The size and shape of tracks and scats (i.e., feces) overlap with feral cats, young bobcats, and young ocelots. There are few inferential or diagnostic techniques that can identify the presence of jaguarundis, although use of remote cameras to identify jaguarundi presence has been successful in Mexico (Tewes, personal observation). The use of these techniques on this project site is not recommended because of the extremely low probability of jaguarundi presence.

The last documented jaguarundi (Class A) report in the United States occurred a short distance east of Brownsville, Texas, during April 1986. A photograph of a possible jaguarundi occurred on the U.S. Fish and Wildlife tract adjacent to the Audubon Sabal Palm Wildlife Sanctuary during the early 1990s. The observer declared it was a jaguarundi and the poor quality photograph suggested it may have been a jaguarundi.

Another verbal account described a trapper who caught two jaguarundis in Willacy County and released them on the Voshell Unit of the Texas Parks and Wildlife Department located near Brownsville, Texas, during the early 1970s. I observed photographs of these two jaguarundis in a captive environment. Other reports of jaguarundis have been documented in the Lower Rio Grande Valley during the 1900s. However, a Class A or documented report of a jaguarundi throughout the remaining area of Texas has never been documented or successfully verified, either during the 1800s or 1900s. And with the prevalence of remote wildlife cameras (Heilbrun et al. 2003) or “deer cams”, a jaguarundi population would have likely been identified over the past 10 years.

We have documented road mortality of jaguarundis in Mexico, and it should be expected in areas supporting a jaguarundi population. The last documented jaguarundi road mortality in Texas occurred in 1986 about 2 miles east of Brownsville. This paucity of records is another reason we believe jaguarundis are rare or nonexistent in the Rio Grande Valley of Texas.

Site Evaluation

The site visit of the Yugo Ranch occurred on 4 March 2012 in order to qualitatively observe the thornshrub cover.

During the site visit, the following criteria were used to evaluate the value (good, marginal, poor) of the thornshrub communities on and around the proposed project site (Tewes 1986). Thornshrub communities with >85% horizontal cover (HC) and >6 ft height (HT) were identified as good quality. Sites with 75-85% HC and >6 ft HT were assessed as marginal quality. If the thornshrub layer was generally <75% HC or <6 ft HT, then the sites were evaluated as poor quality.

No areas were identified as good quality, and only one small area (about 10 acres) was considered as marginal quality. Most of the area lacked a significant tree or shrub layer, and was dominated with a grass-forb-cactus community. The reported salinity in some of the soil is likely responsible for the poor habitat conditions for endangered cats.

An important consideration in assessing thornshrub for endangered cat cover is the presence of proper soil types (Harveson et al. 2004). Many of the soils on the proposed site of the Pescadito Environmental Resource Center are shallow, rocky, and offer poor support for the dense thornshrub that jaguarundis prefer. In addition, some areas reportedly have saline soils, further reducing the likelihood of thornshrub development for endangered cats (Harveson et al. 2004). The small 10 acres of thornshrub of marginal quality has no value for jaguarundis because the surrounding landscape matrix is poor habitat and isolates this small tract. It is insufficient to support even an individual jaguarundi.

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Technically Complete, March 11, 2016

A report on

Potential Presence of Jaguarundi and Their Habitat on the Proposed Site of the Pescadito Environmental Resource Center in Webb County, Texas

by

Dr. Michael E. Tewes
Certified Wildlife Biologist
Cat Research and Management Consultants

Attachment D: Presence/Absence Survey for Johnston's Frankenia and Ashy Dogweed, Pescadito Environmental Resource Center, Webb County, Texas (TRC, 2011b)

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Presence/Absence Survey for Johnston’s Frankenia and Ashy Dogweed

Pescadito Environmental Resource Center Project

Webb County, Texas

Prepared For: **Rancho Viejo Waste Management, LLC**
Webb County, Texas

Prepared By: **TRC Environmental Corporation**
Austin, Texas

August 2011

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Technically Complete, March 11, 2016

Presence/Absence Survey for Johnston's Frankenia and Ashy Dogweed

Pescadito Environmental Resource Center Project

Webb County, Texas

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August 2011

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1.0 INTRODUCTION

TRC Environmental Corporation (TRC) was contracted by Rancho Viejo Waste Management, LLC to obtain environmental clearances and consultations for a proposed 1,110-acre landfill facility near Laredo, Webb County, Texas (Project). A site location map is included as Figure 1. The Project area is located within open ranchland currently stocked with cattle.

There are two federally and state-listed endangered plants that may occur in Webb County (USFWS 2011; TPWD 2011): Johnston's frankenia (*Frankenia johnstonii*) and ashy dogweed (*Thymophylla tephroleuca*). A TRC field reconnaissance survey of the Project area in November 2009 identified potentially suitable habitat for Johnston's frankenia and ashy dogweed. Subsequently, TRC conducted a presence/absence survey for the two protected plant species within the Project survey area. This report describes the results of the presence/absence survey conducted in March 29 to 31, 2011.

2.0 METHODS

In Texas, Johnston's frankenia is typically found on saline or clayey soils having high gypsum content, including Maverick, Catarina, Copita, Montell, and Zapata soils (USFWS 1988). Known populations of ashy dogweed are located on sandy pockets of Maverick-Catarina, Copita-Zapata, and Nueces-Comita soils near the border of Webb and Zapata counties, with the nearest recorded occurrence of this species located approximately 20 miles southwest of the Project area (TXNDD 2011).

A review of the United States Department of Agriculture (USDA) National Resource Conservation Service (NRCS) Web Soil Survey (USDA – NRCS 2011) identified four soil map units within the Project area: Aguilares sandy clay loam (AgB), Montell clay (MnB), Catarina clay (CaB), and Brundage fine sandy loam (Bd; Figure 2). Areas consisting of Montell and Catarina clays would be surveyed for Johnston's frankenia and ashy dogweed. Since one known occurrence of ashy dogweed occurs along the border of Hebbronville soils and Aguilares soils (TxNDD 2011), it was determined that areas consisting of Aguilares sandy clay loam would also be surveyed for ashy dogweed. No known occurrences of either ashy dogweed or Johnston's frankenia exist for Brundage fine sandy loam; therefore, this soil map unit was not included in the survey.

Surveys were performed by two qualified biologists, Gena Janssen and Barrett Clark, along multiple transects within individual soil map units. Transect widths varied based on field conditions (e.g., narrow widths in areas of dense vegetation and wider widths in areas of open to sparse vegetation). Representative plant lists were recorded by soil map unit (with the exception of the Brundage fine sandy loam), and illustrative digital photographs were taken as the landscape or habitats changed.

3.0 RESULTS

Overall range conditions of the Project area were extremely dry from drought and severely overgrazed, with some areas mechanically altered by root-plowing or similar clearing methods in the past. Large areas of bare ground were present, including notably absent herbaceous cover across much of the Project area. The survey results, including observed species of vegetation, are presented by the three high priority soil map unit classifications: Aguilares fine sandy loam, Montell clay, and Catarina clay.

3.1 Aguilares Fine Sandy Loam

Vegetation within the Aguilares fine sandy loam was relatively dense compared to the other soil map units within the Project area. Vegetation within this soil map unit was particularly dense along the northern portion of the Project area. Species diversity was relatively higher within this soil map unit than those of the other soil map units. Ashy dogweed was not observed during the survey. Johnston's frankenia was not expected to be present in this soil type and none were observed. Representative vegetation communities of the Aguilares fine sandy loam soil map units are presented in Photos 1 – 3.

Observed woody species included honey mesquite (*Prosopis glandulosa*), dwarf screw-bean mesquite (*Prosopis reptans*), common goldenweed (*Isocoma coronopifolia*), knife-leaf condalia (*Condalia spathulata*), desert yaupon (*Schaefferia cuneifolia*), guayacan (*Guaiacum angustifolium*), allthorn (*Koeberlinia spinosa*), lotebush (*Ziziphus obtusifolia*), oreja de perro (*Tiquilia canescens*), blackbrush (*Acacia rigidula*), whitebrush (*Aloysia gratissima*), saladillo (*Varilla texana*), coma (*Sideroxylon celastrina*), creosote (*Larrea tridentata*), Tulipan del monte (*Hibiscus martianus*), goat-bush (*Castela texana*), orange zexmenia (*Wedelia texana*), paloverde (*Parkinsonia texana*), guajillo (*Acacia berlandieri*), coppery false fanpetals (*Billieturnera helleri*), leather stem (*Jatropha dioica*), and popote (*Ephedra antisyphilitica*).

Observed herbaceous species included sueada (*Sueada* sp.), Dahlberg daisy (*Thymophylla tenuiloba*), and buffelgrass (*Pennisetum ciliare*). Observed cacti species included Texas prickly pear (*Opuntia engelmannii*), tasajillo (*Opuntia leptocaulis*), dog cholla (*Opuntia schottii*), pitaya (*Echinocereus enneacanthus*), rat-tail cactus (*Wilcoxia poselgeri*), horse crippler (*Echinocactus texensis*), nipple cactus (*Mammillaria heyderi*), Berlandier's alicoche (*Echinocereus berlandieri*), and Fitch's hedgehog cactus (*Echinocereus reichenbachii* var. *fitchii*).

Photo 1. Typical Aguilares fine sandy loam vegetation. Dominant species included honey mesquite and Texas prickly pear.

Photo 2. Typical Aguilares fine sandy loam vegetation. A mosaic of bare ground was present throughout this soil map unit.

Photo 3. Typical Aguilares fine sandy loam vegetation. Dense vegetation was present in many areas.

3.2 Montell Clay

Areas of Montell clay within the Project area were dominated by clusters of saladillo and Texas prickly pear, forming a mosaic with large expanses of bare ground and other woody species. Vegetation density was variable across the Montell clay soil map units. The dominant landscape feature in many areas consisted of bare ground while some areas exhibited higher vegetation density, such as along drainages and swales. Johnston's frankenia was not observed during the survey. Ashy dogweed was not expected to be present in this soil type and none were observed. Representative vegetation communities of the Montell clay soil map units are presented in Photos 4 – 6.

Observed woody species included honey mesquite, dwarf screw-bean mesquite, saladillo, blackbrush, lotebush, common goldenweed, goat-bush, coppery false fanpetals, desert yaupon, guayacan, allthorn, white brush, knife-leaf condalia, leather stem, sueada, rough agave (*Agave scabra*), snake-eyes (*Phaulothamnus spinescens*), twisted acacia (*Acacia schaffneri*), Texas broomweed (*Gutierrezia texana*), palma pita (*Yucca treculeana*), and sea ox-eye daisy (*Borrichia frutescens*).

Observed herbaceous species included jicamilla (*Jatropha cathartica*), bitterweed (*Hymenoxys odorata*), whorled dropseed (*Sporobolus pyramidatus*), and buffelgrass. Observed cacti species included Texas prickly pear, tasajillo, pitaya, Fitch's hedgehog cactus, horse crippler, nipple cactus, longmamma nipple cactus (*Mammillaria sphaerica*), and miniature barrel cactus (*Thelocactus setispinus*). Species recorded near the stock ponds included smallhead sneezeweed (*Helenium microcephalum*), Plains coreopsis (*Coreopsis tinctoria*), bearded dalea (*Dalea pogonanthera*), Carolina wolfberry (*Lycium carolinianum*), retama (*Parkinsonia aculeata*), and Gregg keelpod (*Synthlipsis greggii*).

Photo 4. Typical Montell clay vegetation. Many areas consisted of a mosaic of saladillo and Texas prickly pear clusters, bare ground, and clusters of other woody species.

Photo 5. Typical Montell clay vegetation. Some areas exhibited increased vegetation density(background).

Photo 6. Typical Montell clay vegetation. In many areas, bare ground was the dominant landscape feature.

3.3 Catarina Clay

Areas of Catarina clay soil map units within the Project area contained relatively low species diversity and were dominated by honey mesquite, Texas prickly pear, saladillo, and (in the western portion of the Project area) Texas broomweed. Vegetation density was variable across the Catarina clay soil map units and ranged from large areas of bare ground to areas of higher density shrubland. Johnston's frankenia and ashy dogweed were not observed during the survey. Representative vegetation communities of the Catarina clay soil map units are presented in Photos 7 – 10.

Observed woody species included saladillo, honey mesquite, dwarf screw-bean mesquite, goat-bush, guayacan, knife-leaf condalia, common goldenweed, lotebush, snake-eyes, leather stem, jicamilla, palma pita, broomweed, sueada, coppery false fanpetals, Dahlberg daisy, Texas prickly pear, tasajillo, horse crippler, pitaya, Fitch's hedgehog cactus, miniature barrel cactus, nipple cactus, and root cactus (*Ancistrocactus scheeri*). The two identifiable grasses in these areas were whorled dropseed and red grama (*Bouteloua trifida*).

Photo 7. Typical Catarina clay vegetation. In some areas, bare ground was the dominant landscape feature.

Photo 8. Typical Catarina clay vegetation. Severe overgrazing was evident throughout the Project area.

Photo 9. Typical Catarina clay vegetation. Increased vegetation density was located in the southeastern Catarina clay soil map unit.

Photo 10. Typical Catarina clay vegetation. Within the western Catarina clay soil map unit, broomweed was an additional dominant species.

4.0 CONCLUSION

TRC was contracted by Rancho Viejo Waste Management, LLC to conduct a biological survey in order to identify the presence of two federally and state-listed endangered plant species, ashy dogweed and Johnston's frankenia, for the proposed Project. Ashy dogweed and Johnston's frankenia were not observed within any of the high priority soil map units of the Project area during the March 2011 survey. Based on review of background data and the results of the field investigation, qualified biologists from TRC determined that ashy dogweed and Johnston's frankenia are not present within the Project survey area.

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FIGURE 1

SITE LOCATION MAP

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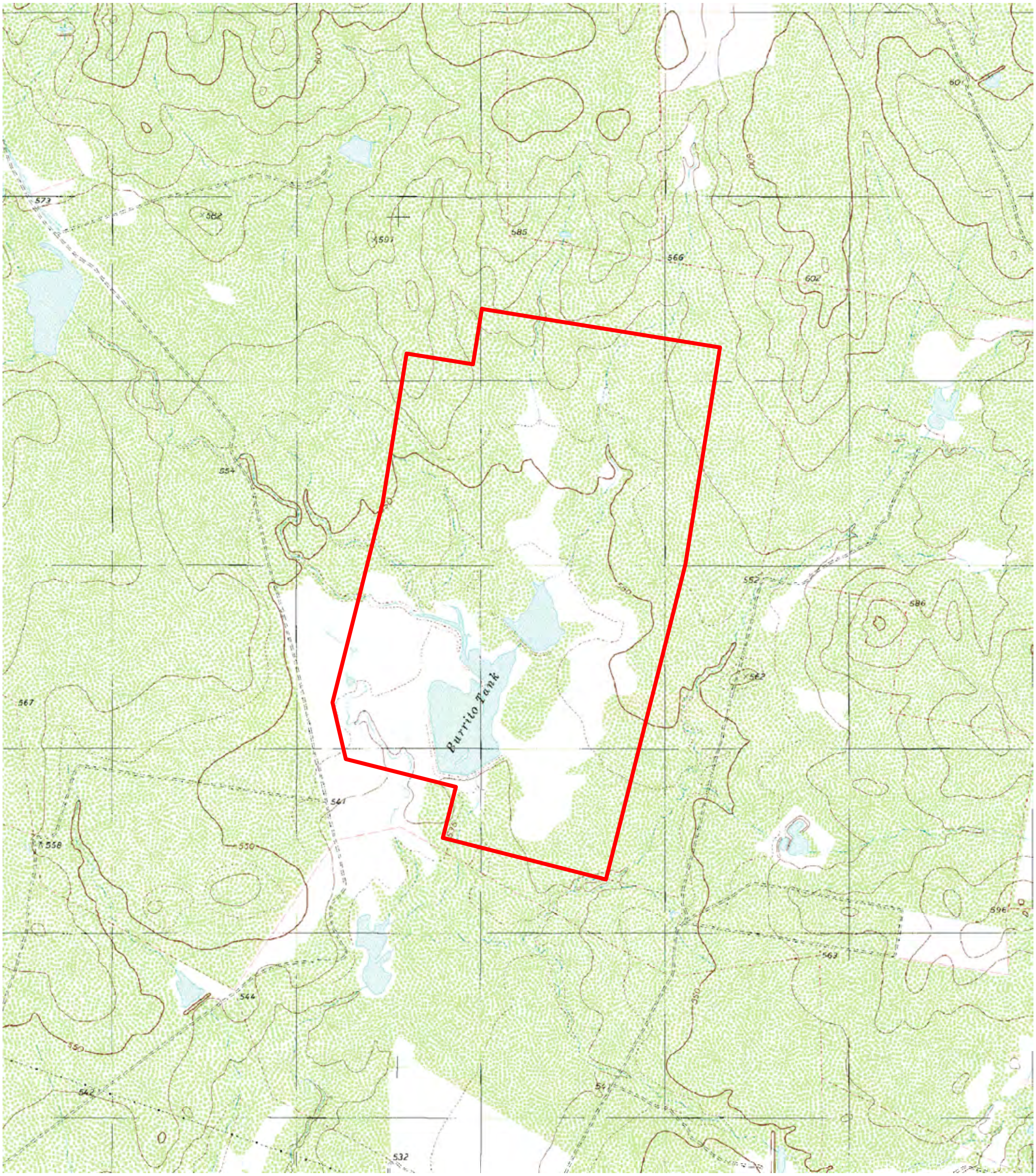
Technically Complete, March 11, 2016



LEGEND

— Survey Area

N

0 1,000 2,000
Feet

Source: U.S.G.S 7.5-Minute Series Topographic Map, Burrito Tank (1980), Texas.

SITE LOCATION MAP

WEBB COUNTY, TEXAS

PROJECT NO.: 182277	DATE: 5/18/2011	
TRC	505 EAST HUNTLAND DRIVE SUITE 250 AUSTIN, TEXAS 78752 512-329-6080	FIGURE 1

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FIGURE 2

SOILS MAP

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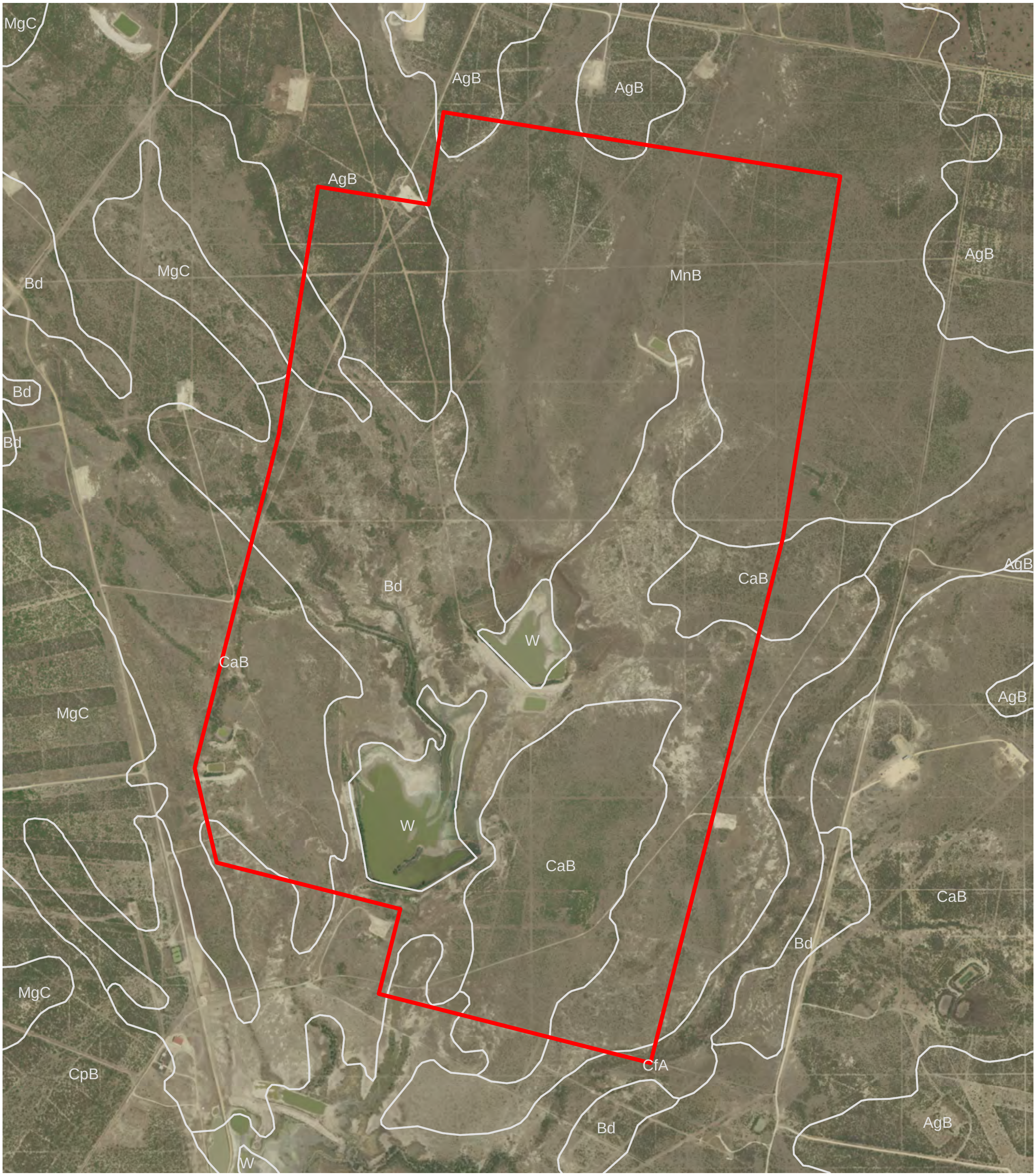
Technically Complete, March 11, 2016



LEGEND

— Survey Area

Source: Soil Survey Geographic (SSURGO) Database for Webb County, Texas

SOILS MAP

WEBB COUNTY, TEXAS

PROJECT NO.: 182277	DATE: 5/18/2011	
TRC	505 EAST HUNTLAND DRIVE SUITE 250 AUSTIN, TEXAS 78752 512-329-6080	FIGURE 2

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Attachment E: Proposed Conservation Measures for the Benefit of the Jaguarundi

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Pescadito Environmental Resource Center, Webb County
Proposed Conservation Measures for the Benefit of the Jaguarundi

- **Riparian Conservation Corridor:** Ranch Viejo Waste Management will set aside Riparian Conservation Corridor (RCC) east of the PERC site. The RCC will include a 75-foot buffer on either side of a drainage corridor. The RCC is approximately 7,700 linear feet long as proposed. The area would be set aside in conservation easement or deed restriction. The RCC is shown as Figure 7 in Attachment A of this biological assessment.

- **FEMA Flood Control Structures Revegetation:** The detention basins will be constructed in upland areas from onsite soil, top dressed with topsoil, and vegetated with native grasses and forbs. The three dams will also be vegetated with native grasses and forbs. Both diversion channels will be open, grass lined drainage swales. Woody vegetation will be controlled within the drainage swales for flow control purposes; however, native tree and shrub growth will be encouraged outside of the swales. Where necessary the dams and swales will be reinforced with erosion control blankets (ECB) or turf reinforcement mats (TRM). The Caeser Kleberg Wildlife Research Institute's South Texas Natives seed project has tested different native species; the program works with commercial growers to provide commercially available seed sources for those that are specifically adapted to South Texas. Not all the species are always commercially available and economical; therefore, the native species to be planted may be limited. Other ground cover species or stabilization may be required for high erosion areas, however native species will be the preferred method of restoration.

- **Light Limitations:** To avoid impacts to nocturnal wildlife, where outdoor lighting is required to provide supplemental light on facilities or parking areas, downshield lighting will be utilized. This lighting will be kept to the minimum necessary to safely illuminate areas accessed by personnel. Lighting will be installed to not shine on adjacent undeveloped areas.

- **Speed Reduction:** Vehicle travel speeds on access and infrastructure roads within the subject area will be determined by the site development engineer. The maximum allowed travel speed may vary between daylight and nighttime hours based on line-of-sight in order to limit encounters with and impacts to nocturnal wildlife. Speed limits may be decreased if the frequency of wildlife encounters increases beyond what was originally anticipated but may not be increased above the engineered design speed.

- **Vehicle Traffic Control:** Vehicle movements will be restricted to only what is necessary for PERC Site operations within designated road/infrastructure corridors. Any off-road vehicle movement will require prior coordination with site management.

- **Training:** All Rancho Viejo Waste Management, LLC personnel and contractors whose duties require them to regularly operate beyond the primary entrance of the subject area will complete environmental training regarding wildlife.

Attachment F: Endangered Species Habitat Evaluation and Presence/Absence Survey for the Pescadito Environmental Resource Center FEMA Action Areas, Webb County, Texas (aci 2013)

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aci consulting
austin • denver

Technically Complete, March 11, 2016

Endangered Species Habitat Evaluation and Presence/Absence Survey for the Pescadito Environmental Resource Center FEMA Action Areas

Webb County, Texas

October 2013

Submitted to:
Rancho Viejo Waste Management, LLC
1116 Calle del Norte
Laredo, TX, 78041

Prepared By:
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aci Project No.: 05-12-053

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October 2013

Endangered Species Habitat Evaluation and Presence/Absence Survey for the Pescadito Environmental Resource Center FEMA Action Area

1.0 INTRODUCTION

The purpose of this report is to assess the potential for federally-listed endangered species within the additional Federal Emergency Management Agency (FEMA) action area associated with the proposed Pescadito Environmental Resource Center (PERC) site in Webb County, Texas. This report presents the findings of a habitat evaluation for the least tern, ocelot, and jaguarundi and the findings of a presence/absence survey for ashy dogweed and Johnston's frankenia.

This report is to supplement previous endangered species investigations by others for areas within the 1,110 acre PERC site.

Species listed as endangered or threatened by the U.S. Fish and Wildlife Service (USFWS) are protected by the Endangered Species Act, which prohibits "take." "Take" is defined in the Act as "harass, harm, pursue, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." "Harm" has been defined to include activities that modify or degrade habitat in a way that significantly impairs essential behavior patterns and results in death or injury. Alteration of the quality and/or quantity of endangered species habitat may "harm" the listed species that inhabit those areas. A number of potential impacts, directly or indirectly related to human activities, are of concern to USFWS and may be regulated by that agency to prevent "take" or "harm" of these listed species.

2.0 PROJECT LOCATION AND BACKGROUND

The existing PERC site is approximately 1,110 acres in rural Webb County, south of U.S. Highway 59, approximately 20 miles east of Laredo, Texas. Rancho Viejo Waste Management proposes to construct and operate a municipal solid waste landfill on site.

The FEMA action area includes approximately 225 acres inside and outside of the PERC site. The FEMA action area includes approximately 141 acres outside of the PERC site, located to the north and west of the existing PERC site. For the purposes of this report, the study area will focus on these additional 141 acres, hereafter referred to as the subject area, located outside of the existing PERC site (Figure 1).

The proposed FEMA flood control project includes floodwater detention basin and diversion channels. Specifically, the proposed FEMA flood control structures include:

- Northwest Basin, North Basin and West Basin: three floodwater detention basins north and west of the PERC site,
- Northwest Channel: one diversion channel connecting the north and northwest detention basins to the west detention basin, and
- West Channel: one channel connecting the west detention basin to areas south and downstream of the PERC site.

3.0 EXISTING ENVIRONMENT

3.1 Vegetation

According to the Texas Parks and Wildlife "Vegetation Types of Texas" map, the subject area is located within two vegetation types: Mesquite-Blackbrush Brush and Other Native or Introduced Grasses (McMahan et al. 1984). The majority of the FEMA action area is located within the Mesquite-Blackbrush Brush vegetation type and the remaining acreage is classified within the Other Native or Introduced Grasses vegetation type.

Common plants associated with the Mesquite-Blackbrush Brush vegetation type include, but are not limited to: lotebush (*Ziziphus obtusifolia*), cenizo (*Leucophyllum frutescens*), guajillo (*Acacia berlandieri*), desert olive (*Forestiera pubescens var. pubescens*), althorn (*Koeberlinia spinosa*), whitebrush (*Aloysia gratissima*), bluewood (*Condalia hookeri*), granjeno (*Celtis pallida*), guayacan (*Guaiacum angustifolium)*, leatherstem (*Jatropha dioca*), Texas prickly pear (*Opuntia engelmannii*), tasajillo (*Opuntia leptocaulis*), kidneywood (*Eysenhardtia texana*), yucca (*Yucca* spp.), desert yaupon (*Schaefferia cuneifolia)*, goatbush (*Castela erecta subsp. texana*), purple three-awn (*Aristida purpurea*), pink pappusgrass (*Pappophorum bicolor*), hairy tridens (*Erioneuron pilosum*), slim tridens (*Tridens muticus*), hairy grama (*Bouteloua hirsute)*, mat euphorbia (*Euphorbia* spp.), coldenia (*Coldenia* spp.), dogweed (*Thymophylla* spp.), knotweed leafflower (*Polygonum* spp.), and two-leaved senna (*Senna roemeriana*).

Common plants associated with the Other Native or Introduced Grasses vegetation type include, but are not limited to: mixed native or introduced grasses and forbs within grassland sites or mixed herbaceous areas that form from the clearing of woody vegetation. This vegetation type is found in areas where brush has been cleared and is subject to change due to the regrowth of brush.

3.2 Topography

According to the *Burrito Tank* USGS 7.5 Minute Topographic Quadrangle Map the elevation of the subject area ranges from 540 feet above mean sea level (MSL) to 570 feet above MSL (Figure 2).

3.3 Soils

Five soil units are present within the FEMA action area (SCS 1985). The five soil units are as follows:

- *Aguilares sandy clay loam, 0 to 3 percent slopes (AgB)*
- *Brundage fine sandy loam, occasionally flooded (Bd)*
- *Catarina clay, 0 to 2 percent slopes (CaB)*
- *Moglia clay loam, 1 to 5 percent slopes (MgC)*
- *Montell clay, saline, 0 to 2 percent slopes (MnB)*

4.0 ENDANGERED SPECIES BACKGROUND

According to USFWS (2013a), five species are federally-listed as endangered in Webb County, Texas: 1) Gulf Coast jaguarundi, 2) ocelot, 3) least tern, 4) ashy dogweed, and 5) Johnston's frankenia.

4.1 Jaguarundi and Ocelot

The jaguarundi (*Herpailurus yagouaruondi*) was federally-listed as endangered on June 14, 1976 (41 FR 24062-24067). The jaguarundi is a small, slender-bodied cat with a small, flattened head and long tail. According to the Texas Parks and Wildlife (TPWD), large patches (100 acres) of canopy cover and dense shrubs, or smaller patches connected by dense vegetation corridors, are vital to jaguarundi habitat (Campbell 2003). This species is considered very rare in Texas, and the probability of encountering a jaguarundi is highly unlikely.

Texas Parks and Wildlife maintains a database of rare species occurrence in Texas, the Texas Natural Diversity Database (TNDD). Review of the Texas Natural Diversity Database (TNDD) managed by TPWD showed no known occurrences in Webb County (TPWD 2013c). It also indicated that the closest known occurrence of the jaguarundi observed to the north of the subject area was in 1988, and is approximately 44 miles away in La Salle County, Texas (EO# 8138). Review of the element occurrence information provided by TPWD, noted the sighting was generally described as crossing FM 625 (or FM 624) 20 miles east of Cotulla and continued southeast. The radius of this polygon is 8000 meters. It is interpreted through the TPWD TNDD "Shapefile Data Interpretation and Use" document that an element polygon with a radius of 8000m was a general location which had the least precision and was used when the location description was vague (TPWD 2013c).

The closest known occurrence of the jaguarundi observed to the south of the subject area was in 1992 and is approximately 69 miles away in Starr County, Texas (EO# 2074) (Figure 3). Based on review of the element occurrence information, this element occurrence was cited from 1987 to 1993 by various TPWD performance reports. The sighting was very generally described as being along El Negro Ranch Road. The radius of this polygon is also 8000 meters; therefore, it is also believed to be less precise element polygon with a vague location description (TPWD 2013c). The last Class A documented jaguarundi report in the United States occurred in 1986 east of Brownsville, Texas (Tewes 2012).

The ocelot (*Leopardus pardalis*) was federally-listed as endangered on June 21, 1982 (47 FR 31670-31672). The ocelot is a medium-sized gray or buff spotted cat with variable dark spots, rings, blotches, and bars. Ocelots occur in the dense thorny shrub lands of the Lower Rio Grande Valley and Rio Grande Plains in areas of deep, fertile clay or loamy soils (Campbell 2003). According to TPWD, large patches (100 acres) of canopy cover and dense shrubs, or smaller patches connected by dense vegetation corridors, are also vital to ocelot habitat (Campbell 2003). This species is predominately active at night, and spends the daytime hiding in thick brush (Campbell 2003). As this species is predominately active at night, the probability of encountering an ocelot is highly unlikely.

Review of the TNDD data (TPWD 2013c) indicates the closest occurrence of the ocelot was observed in 1991, approximately 67 miles northwest of the subject area in Dimmit County, Texas (EO# 4510) (Figure 3).

<u>Previous Studies</u>
Previous studies conducted by Michael Tewes on Rancho Viejo, including the 1,110-acre PERC landfill site (Tewes 2012), found the ranch to not be jaguarundi habitat. Tewes (2012) noted a 10-acre patch of thornscrub in the northwest section of the PERC site as containing 75-85% horizontal cover, but that the area was too sparse to be considered jaguarundi habitat.

Studies by aci consulting (2012) of the 3,980 acres south of the PERC site found open rangeland mixed with open thornshrub. Areas containing thornshrub and woody vegetation did not include the requisite density, canopy cover, and acreage to be considered jaguarundi habitat. Similar to the jaguarundi, the site does not provide the requisite thornshrub/riparian density, canopy cover, and acreage to be considered ocelot habitat (aci consulting 2012).

4.2 Least tern

The least tern (*Sterna antillarum athalassos*) was federally-listed as endangered on May 28, 1985 (USFWS 1985). The least tern is a migrant species whose breeding range in Texas includes three reservoirs along the Rio Grande River, the Canadian River in the northern Panhandle, the Prairie Dog Town Fork of the Red River in the eastern

Panhandle, and along the Red River (Texas/Oklahoma boundary) into Arkansas. The species winters along the Central American coast and the northern coast of South America from Venezuela to northeastern Brazil. USFWS has listed the least tern as a possible migrant through most of Texas. From late April to August, this tern uses barren to sparsely vegetated sand, shell, and gravel beaches; sandbars; islands; and salt flats associated with rivers and reservoirs. These terns prefer open habitat and avoid thick vegetation and narrow beaches. As natural nesting sites have become scarce, the terns have used sand and gravel pits, ash disposal areas of power plants, reservoir shorelines, and other manmade sites. The terns nest in a shallow hole scraped in an open sandy area, gravelly patch, or exposed flat (Campbell 2003).

Review of TWPD TNDD data (2013c) indicates that the closest known occurrence of the least tern is approximately 16 miles west of the subject area (Figure 4). The occurrence site was documented in 1994 at Casa Blanca Lake (EO# 4157).

<u>Previous Studies</u>
Review of the PERC site by TRC Consultants (2011a) found no potential for shore habitat for the least tern.

Studies of the 3,980 acres south of the PERC site by aci consulting (2012) found no additional areas of potential shore habitat for the least tern within the area.

4.3 Ashy Dogweed and Johnston's Frankenia

Ashy dogweed (*Thymophylla tephroleuca*) was federally-listed as endangered on July 19, 1984 (49 FR 29232-29234). This plant forms dense, circular clumps in open areas on sandy pockets in the Maverick-Catarina, Copita-Zapata, and Nueces-Comita soils of southern Webb and northern Zapata Counties, Texas (TPWD 2007), occurring in level areas or in gentle, rolling topography (USFWS 2013). Ashy dogweed has been observed in areas of ground disturbance; it is unknown if the plant prefers disturbed areas or would also flourish in undisturbed areas (TPWD 2007). Ashy dogweed grows among shrubs including mesquite (*Prosopis* spp.), calderona (*Krameria ramosissima*), Texas lantana (*Lantana urticoides*), goatbush, anacahuita (*Cordia boissieri*), and cenizo.

Johnston's frankenia (*Frankenia johnstonii*) was federally-listed as endangered on August 7, 1984 (49 FR 31418-31421). On May 22, 2003, the species was proposed for delisting (68 FR 27961). This low, sprawling shrub generally grows on open or sparsely vegetated rocky hillsides or saline flats in saline sandy or clayey soils with high gypsum content (USFWS 1988). Johnston's frankenia is historically known from Nuevo Leon, Mexico, and Starr and Zapata Counties, in south Texas (USFWS 1988).

According to the TPWD species pages (2013a), Johnston's frankenia and ashy dogweed require specific soil types. Johnston's frankenia prefers high saline soils that are often rocky or eroding and reddish in color such as the Maverick soil series. TPWD references ashy dogweed associated with sandy pocket areas from the Maverick-Catarina, Copita-Zapata, and Nueces-Comita soil series (TPWD 2013b).

A review of the Natural Resource Conservation Service Soil Survey for Webb County, Texas (SCS 1985), found that two out of the five soils found in the subject area correspond with the soil series conducive to the two endangered plants (Figure 5). These soils include the Catarina clay, 0 to 2 percent slopes (CaB) and the Montell clay, saline, 0 to 2 percent slopes (MnB) soils series.

Review of the TNDD data (2013c) indicates that the closest known occurrence of Johnston's frankenia was observed in 1999, approximately 23 miles south of the subject area in Zapata County, Texas (EO# 4180). TNDD data indicated the closest known occurrence of ashy dogweed was observed in the 1980's, approximately 18 miles south of the subject area in Webb and Zapata Counties, Texas (EO# 1456). In addition to TNDD, USFWS provided aci consulting with endangered plant site occurrence data at an August, 2013 project meeting. A review of USWFS species occurrence (2013b) found that the closest observation for Johnston's frankenia is approximately 11 miles west of the subject area and ashy dogweed is approximately 16 miles southwest of the subject area (Figure 6).

Previous Studies

Previous investigations on the PERC landfill site included a presence/absence survey for ashy dogweed and Johnston's frankenia (TRC 2011b). This survey was conducted within the specific soil series' with the potential to contain the two species: the Catarina clay, 0 to 2 percent slopes (CaB) and the Montell clay, saline, 0 to 2 percent slopes (MnB) soils series. The results of the survey found no ashy dogweed or Johnston's frankenia within the PERC site.

5.0 METHODOLOGY

In August 2013, aci consulting ecologists surveyed the 141-acre subject area for endangered species. Field investigations included habitat evaluations for ocelot, jaguarundi, and least tern and a presence/absence survey for ashy dogweed and Johnston's frankenia within the conducive soil series'.

aci consulting surveyors walked transects across the subject area particularly focusing on areas with the soil series' determined to have potential for the endangered plant species' growth (Figure 5). While conducting the presence/absence survey for the endangered plants, aci consulting documented and assessed the vegetative communities within the subject area, where forty-six vegetation assessment points were recorded. At each vegetation assessment point, aci consulting recorded vegetation height, percent canopy cover of thornshrub, where, if present, and the dominant woody vegetation observed. aci consulting additionally documented the existing site conditions by recording photographs in the four cardinal directions at each vegetation assessment point. Locations of waypoints were recorded using a Garmin Global Positioning System (GPS) Receiver. Digital photographs were taken using the Theodolite application on an iPhone 5 running the iOS operating system Version 6.1.4.

The locations of the 46 investigation locations are delineated in Figure 7 and the corresponding photographic log of the points is contained in Appendix B.

6.0 FINDINGS

The findings of the field investigations from the assessments performed in August, 2013, by **aci consulting** ecologists for each of the five federally-listed species is listed below.

6.1 Jaguarundi and Ocelot

The FEMA action area includes five different flood control structures (three basins and two diversion channels). The vegetative elements of each feature are summarized in Table 1.

Table 1: Vegetative Assessment of FEMA Action Area

Feature	Vegetation Max Height (Average of area)	Percent Canopy Cover (Average of area)	Dominant Vegetation	Potential Jaguarundi / Ocelot Habitat
Northeast Dam Site	4.2 - 4.8 feet	4% - 6%	Mesquite, Cactus	Very low
Northwest Dam Site	3.3 - 9.4 feet	13.8% - 18.1%	Mesquite	Very low
Diversion Channel to West Dam	4.5 - 9 feet	5% - 10%	Mesquite	Very low
West Dam Site	3.1 - 7.3 feet	7.9% - 9.5%	Mesquite	Very low
Proposed Channel	3.2 - 6.5 feet	7% - 8.2%	Mesquite	Very low
141-acre Composite	3.6 - 7.4 feet	7.5% - 10.4%	Mesquite	Very low

The vegetation within the 141-acre FEMA action area is very similar to the 1,110-acre PERC site, consisting of open ranchland dominated by forb-grass-cactus vegetation. Appendix B contains representative photographs from the study area. As a whole the study subject area contains low height of woody vegetation (3.6 to 7.4 feet), low canopy cover of thornscrub (7.5% to 10.4%), and is dominated by open rangeland or mesquite growth, when present. Select areas contained up to 50% close canopy thornscrub up to 15 feet in height; however, these select areas were not common or contiguous throughout the landscape.

The investigations found that, similar to other regional studies, the FEMA action area did not contain the structural or compositional elements to be regularly utilized by jaguarundi or ocelot.

6.2 Least tern

Field investigations of the 141-acre FEMA action area by aci consulting found no potential shoreline or sandbar habitat conducive for least tern habitation. The FEMA action area did not contain the structural or compositional elements to be regularly utilized by least tern.

6.3 Ashy Dogweed and Johnston's Frankenia

aci consulting surveyed the FEMA study area, with particular focus on the two soil series' with the potential for occurrence of ashy dogweed and Johnston's frankenia in August 2013; however, transects were walked across the entire 141-acre FEMA action area. The results of the survey found no ashy dogweed or Johnston's frankenia within the FEMA action area.

7.0 CONCLUSION

Rancho Viejo Waste Management is evaluating a site in Webb County, Texas, for the development of a municipal solid waste/industrial landfill, the PERC site. This evaluation began within the review of a 1,110-acre original landfill site. Five FEMA floodplain control structures are associated with the project extent outside of the PERC site. Accordingly, the endangered species evaluation has been expanded to include approximately 141 acres to the north and west of the proposed PERC landfill site. This report evaluated the potential for federally-listed threatened and endangered species habitat within the 141-acre subject area, and builds upon previous studies conducted on the original landfill site.

Five species are federally-listed as threatened or endangered in Webb County, Texas. Summaries of the findings for each species are as follows:

- **Jaguarundi and Ocelot:** The proposed landfill site was previously reviewed by Dr. Michael Tewes (2012), the preeminent expert on the species. Dr. Tewes dismissed the original landfill site as habitat for the species based primarily on the lack of developed canopy cover and riparian corridor, and the long distance from the Rio Grande River. In 2012, aci consulting investigated 3,980 acres south and west of the PERC site and found that these areas did not provide the requisite thornshrub/riparian density, canopy cover, and minimum acreage to be considered jaguarundi or ocelot habitat (aci consulting 2012). In August 2013, aci consulting evaluated the FEMA action area for the constituent elements of jaguarundi and ocelot habitat. The investigations found that, similar to other regional studies, the FEMA action area did not contain the structural or compositional elements to be regularly utilized by jaguarundi or ocelot.

- **Interior Least Tern:** Field investigations of the 141-acre FEMA action area by aci consulting found no potential shoreline or sandbar habitat conducive for least tern habitation. The FEMA action area did not contain the structural or compositional elements to be regularly utilized by least tern.

- **Ashy Dogweed and Johnston's Frankenia:** aci consulting surveyed the FEMA study area, with particular focus on the two soil series' with the potential for occurrence of ashy dogweed and Johnston's frankenia in August 2013. The results of the survey found no ashy dogweed or Johnston's frankenia within the FEMA action area.

8.0 REFERENCES

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(USFWS) U.S. Fish and Wildlife Service. 2013b. Rare, Threatened, and Endangered Plant species and geologic formations in the vicinity. Map provided to aci consulting at project meeting on August 31, 2013 at USFWS Alamo Field Office. 1 pg.

Appendix A: Figures

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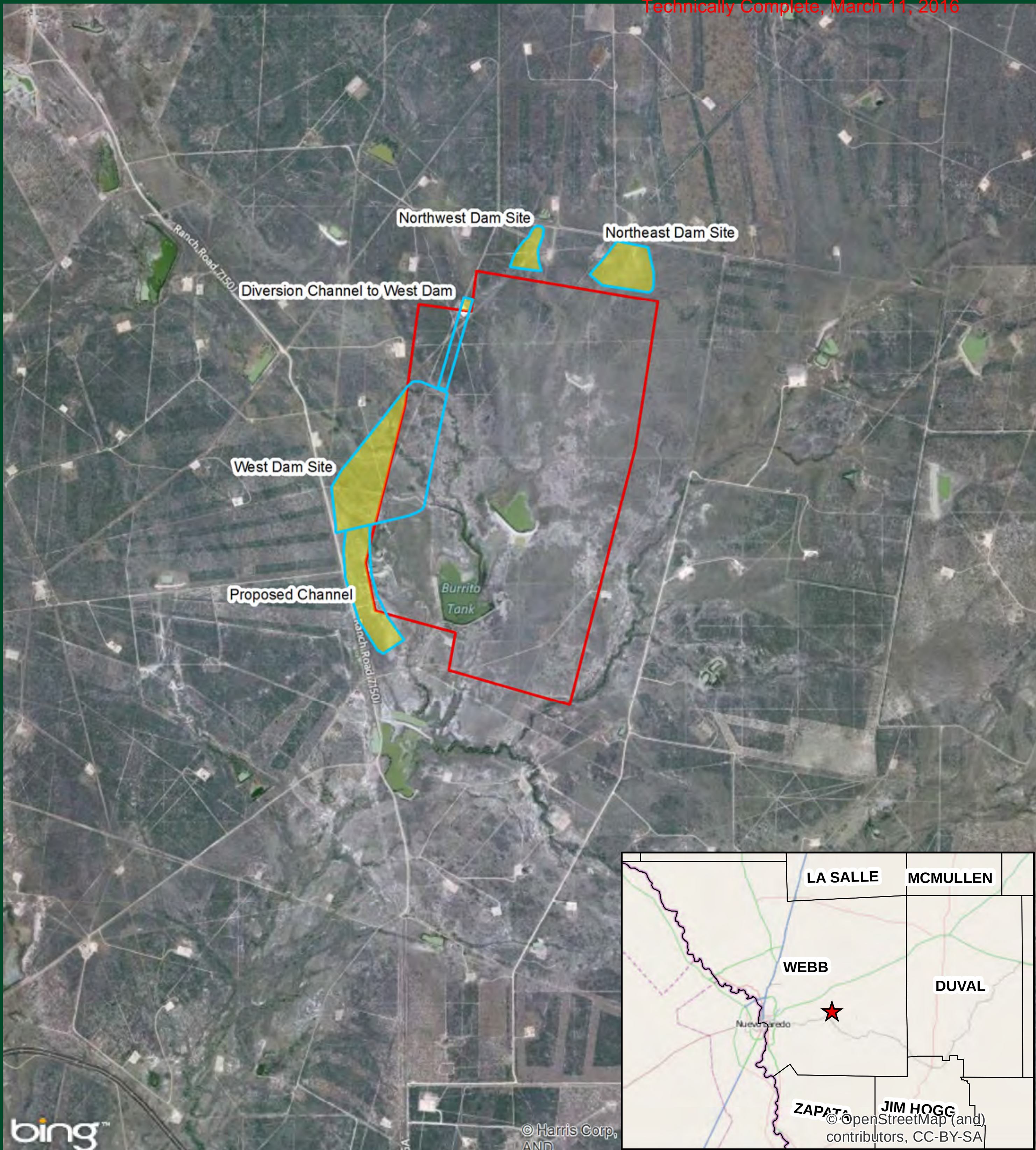
Technically Complete, March 11, 2016



This map is intended for planning purposes only. All map data should be considered preliminary. All boundaries and designations are subject to confirmation.

N

0.6 0.3 0 0.6 Miles

1:38,000 1 inch = 0.6 mile

Subject Area (141 ac)

FEMA Action Area (225 ac)

PERC Site (1,110 ac)

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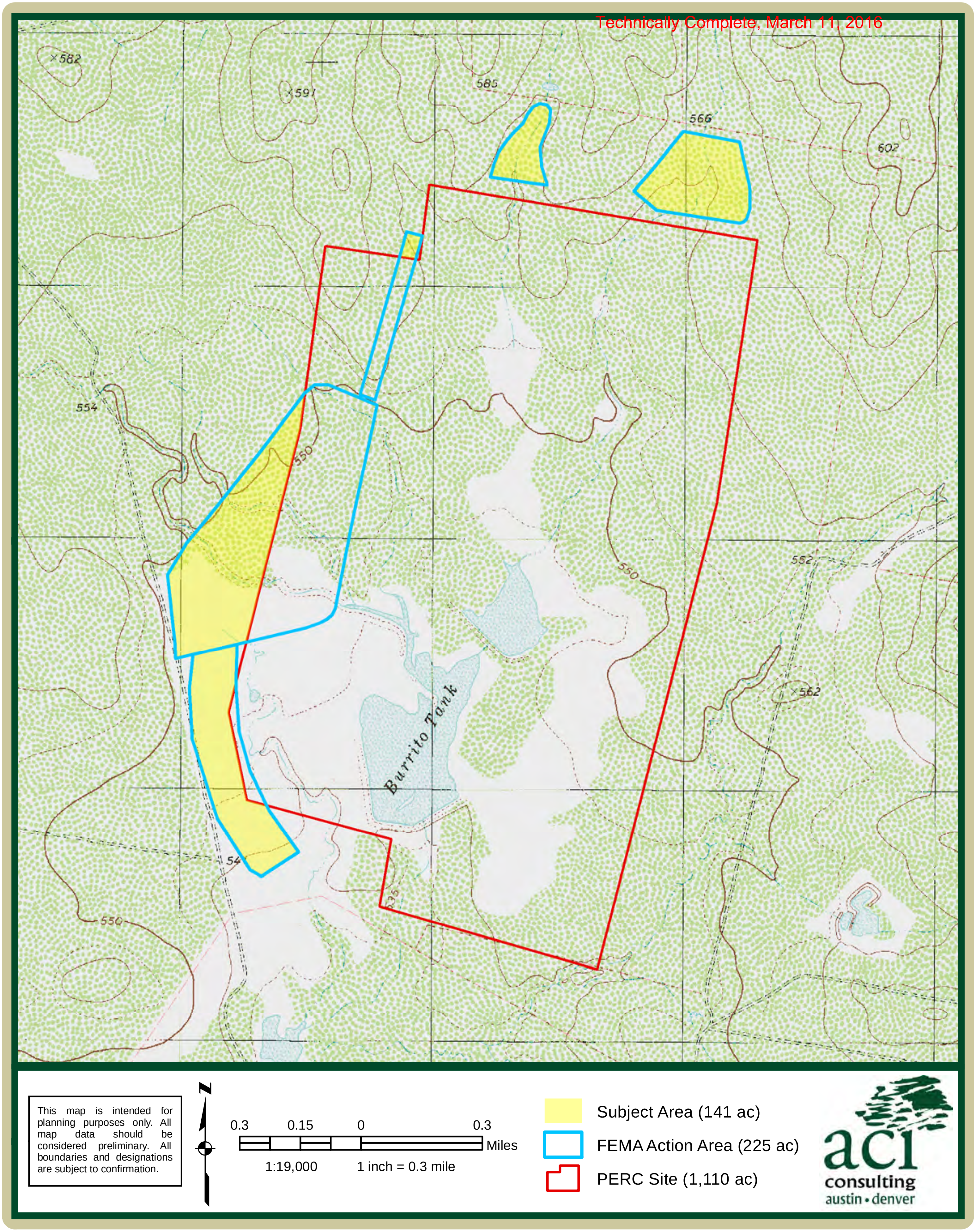
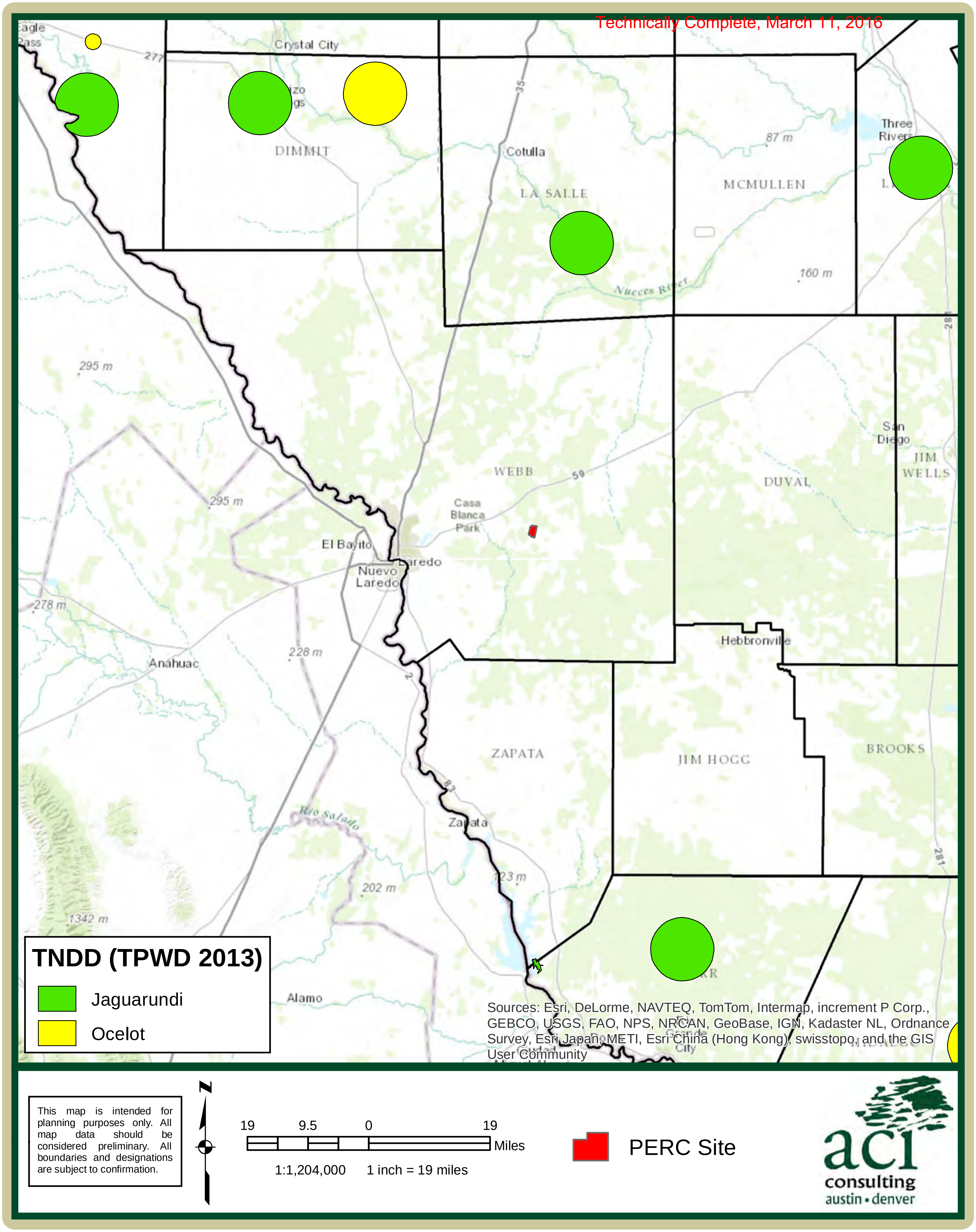
PERC FEMA Action Area Endangered Species Report **October 2013**

Figure 1: Subject Area



PERC FEMA Action Area Endangered Species Report **October 2013**

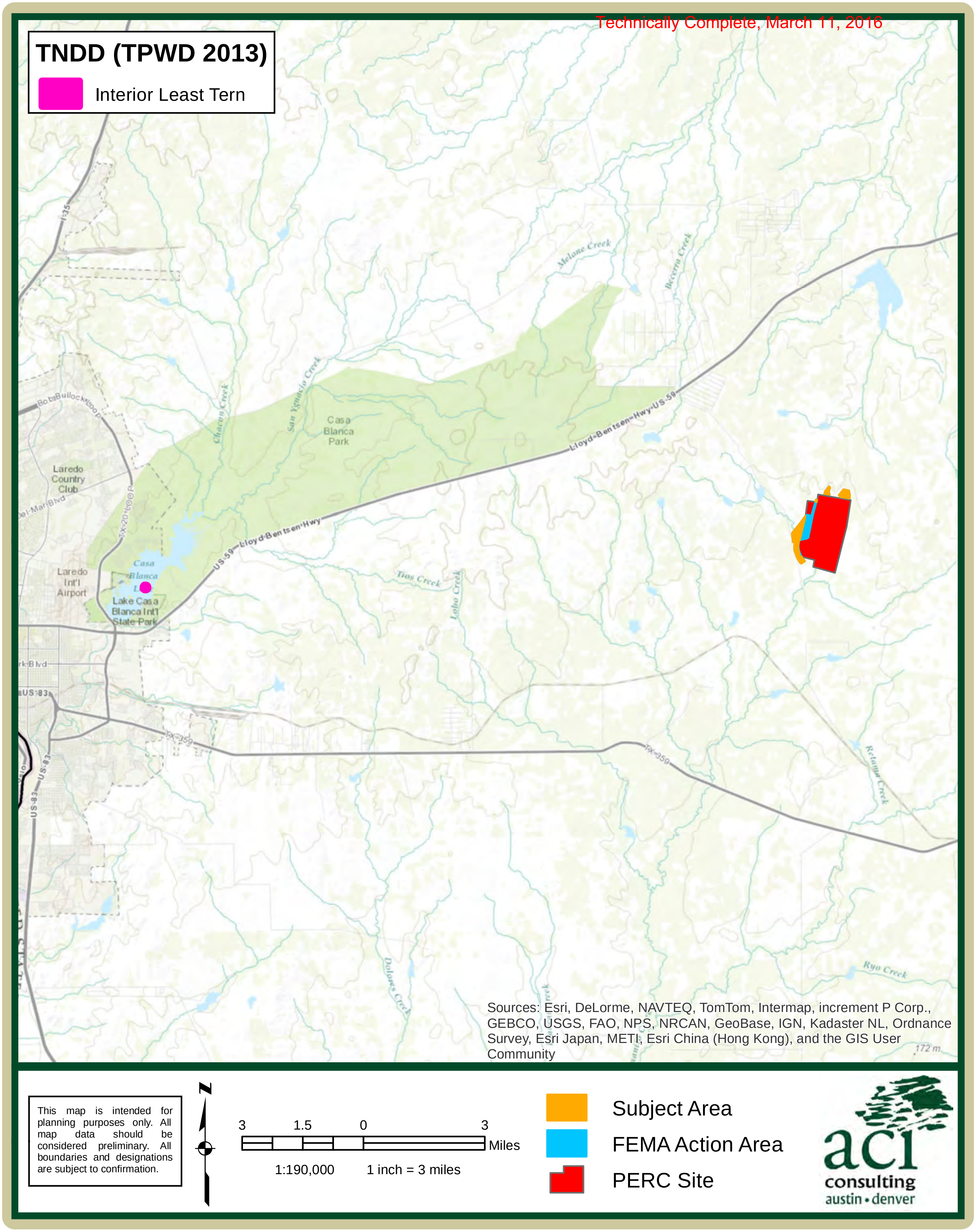
Figure 2: Topography



PERC FEMA Action Area Endangered Species Report **October 2013**

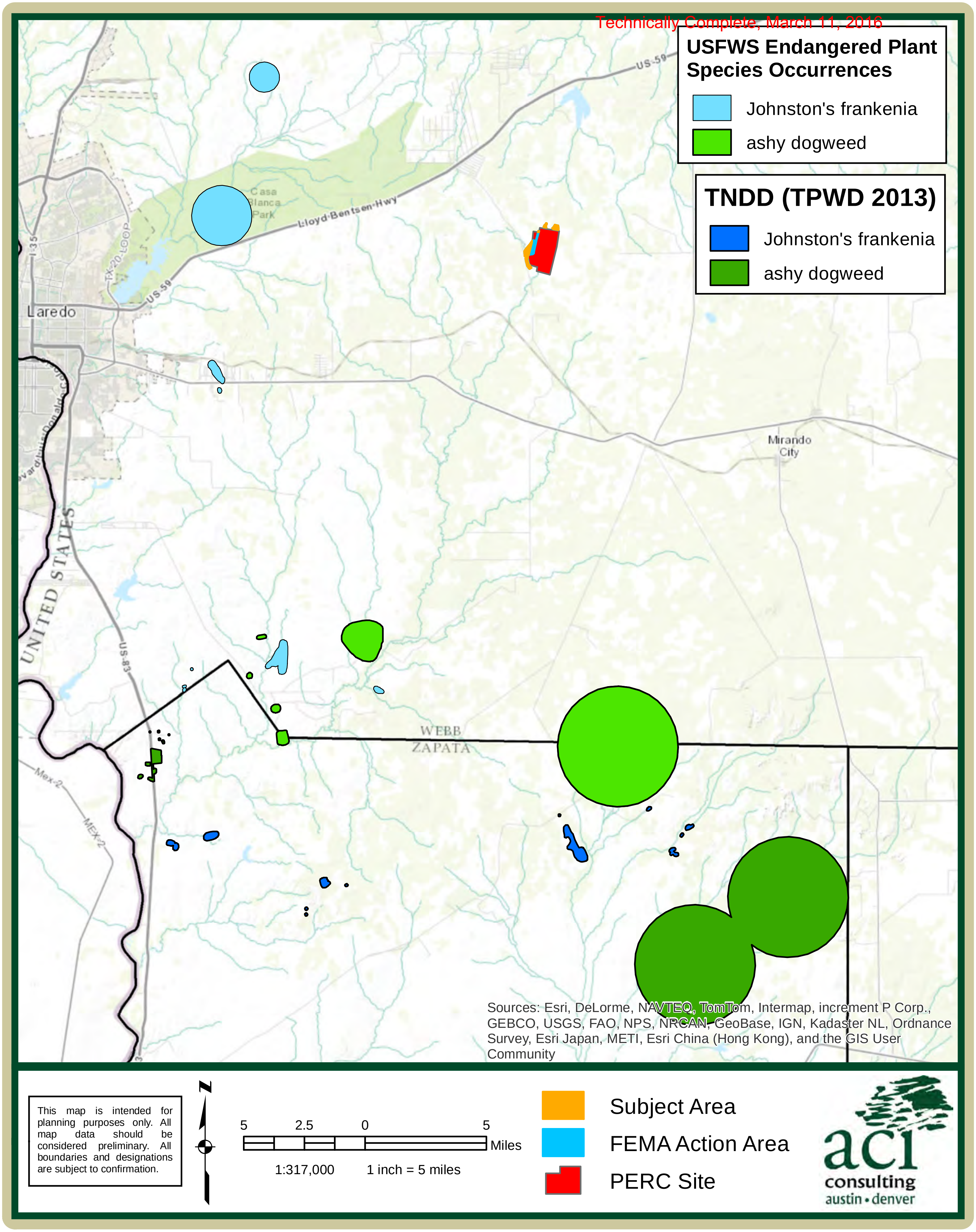
Figure 3: Endangered Feline Species Occurrences

Technically Complete, March 11, 2016



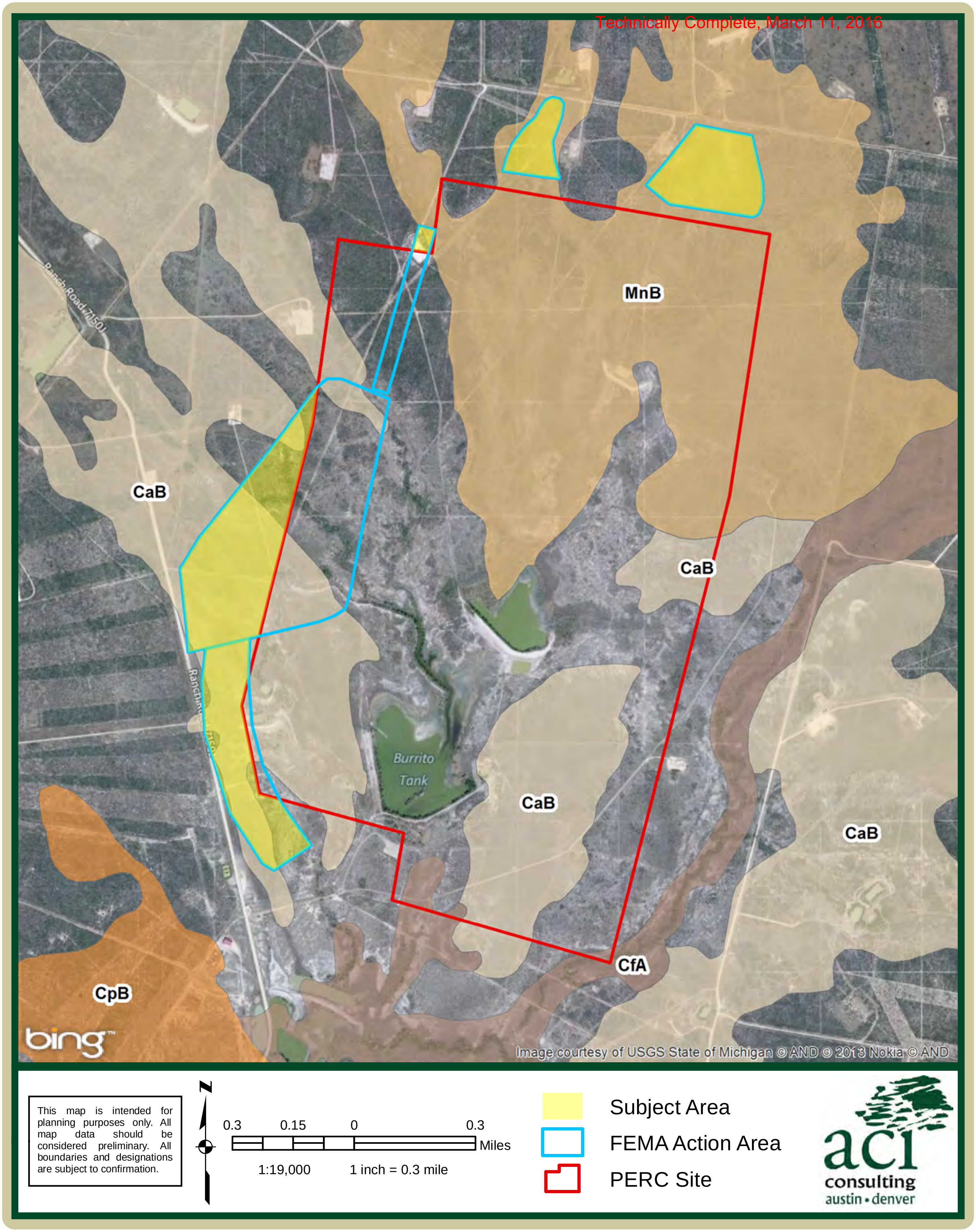
PERC FEMA Action Area Endangered Species Report **October 2013**

Figure 4: Interior Least Tern Occurrence



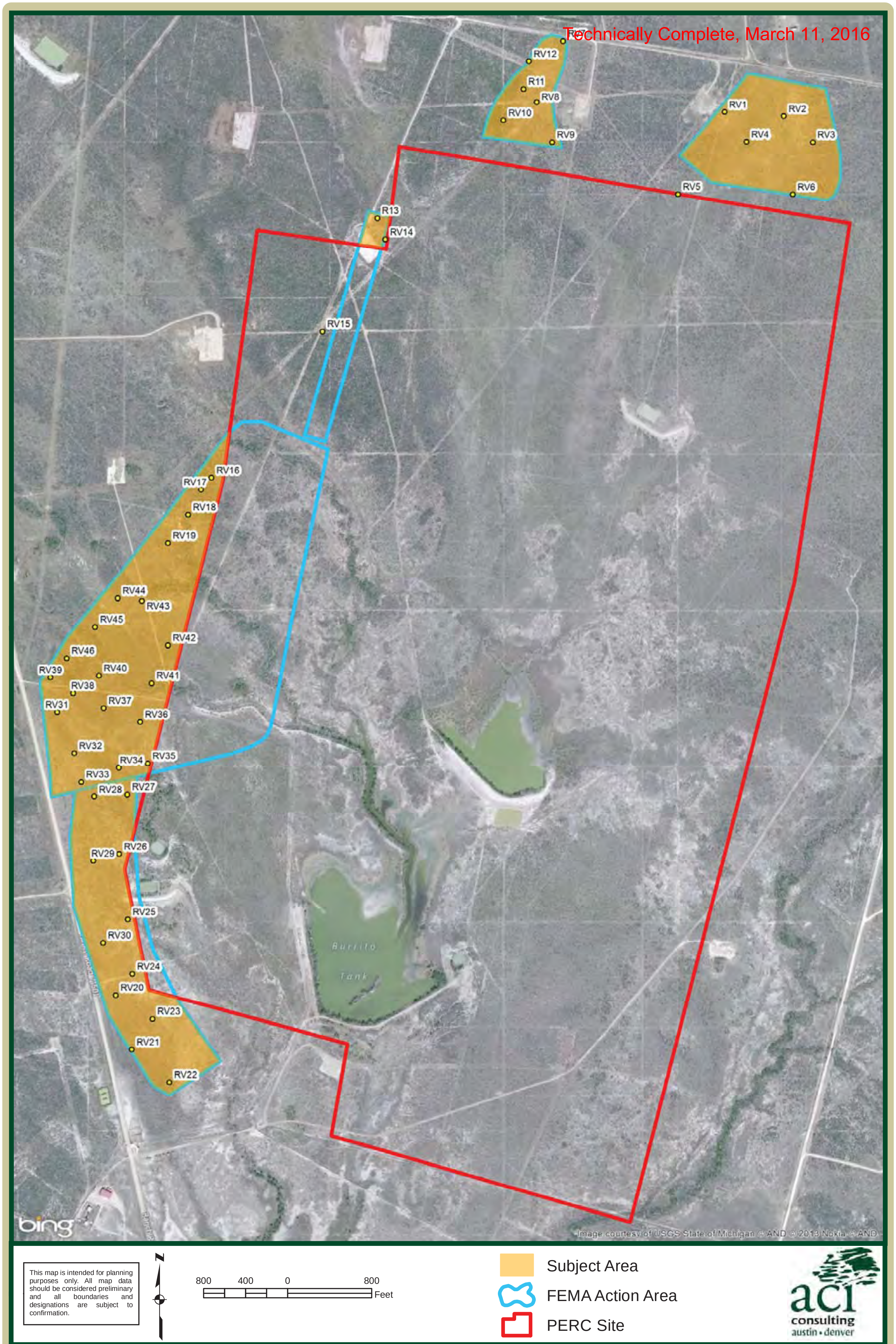
PERC FEMA Action Area Endangered Species Report **October 2013**

Figure 5: Endangered Plant Species Occurrence



PERC FEMA Action Area Endangered Species Report **October 2013**

Figure 6: Endangered Plant Species Soils



PERC FEMA Action Area Endangered Species Report **October 2013**

Figure 7: Field Investigation Waypoints (Corresponds to Photo Log in Appendix B)

Appendix B: Photo Log

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Date Taken: August 21, 2013
Photo #: 1

Direction: Northeast

Location: RV1

Description: No vegetative cover

Date Taken: August 21, 2013
Photo #: 2

Direction: Northeast

Location: RV1

Description: No vegetative cover

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Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 3

Direction: Southwest

Location: RV1

Description: No vegetative cover

Date Taken: August 21, 2013
Photo #: 4

Direction: West

Location: RV1

Description: No vegetative cover

Technically Complete, March 11, 2016

Rancho Viejo - Additional FEMA Acreage

Date Taken August 21, 2013 | Photo # 5

Direction
East

Location
RV2

Description
Scrub Shrub Cover = 0-5%
Vegetation HT = maximum height was 6 feet
Species Observed = mesquite
Notes = low veg cover

Date Taken August 21, 2013 | Photo # 6

Direction
North

Location
RV2

Description
Scrub Shrub Cover = 0-5%
Vegetation HT = maximum height was 6 feet
Species Observed = mesquite
Notes = low veg cover

Rancho Viejo - Additional FEMA Acreage

Date Taken August 21, 2013 | Photo # 7

Direction
South

Location
RV2

Description
Scrub Shrub Cover = 0-5%
Vegetation HT = maximum height was 6 feet
Species Observed = mesquite
Notes = low veg cover

Date Taken August 21, 2013 | Photo # 8

Direction
West

Location
RV2

Description
Scrub Shrub Cover = 0-5%
Vegetation HT = maximum height was 6 feet
Species Observed = mesquite
Notes = low veg cover

Technically Complete, March 11, 2016

Date Taken	Photo #
August 21, 2013	9

Direction
East

Location
RV3

Description
Scrub Shrub Cover = 0-5%
Vegetation HT = 6 feet
Species Observed = mesquite (isolated)
Notes = no veg cover

Date Taken	Photo #
August 21, 2013	10

Direction
North

Location
RV3

Description
Scrub Shrub Cover = 0-5%
Vegetation HT = 6 feet
Species Observed = mesquite (isolated)
Notes = no veg cover

Rancho Viejo - Additional FEMA Acreage

Date Taken	Photo #
August 21, 2013	11

Direction
South

Location
RV3

Description
Scrub Shrub Cover = 0-5%
Vegetation HT = 6 feet
Species Observed = mesquite (isolated)
Notes = no veg cover

Date Taken	Photo #
August 21, 2013	12

Direction
West

Location
RV3

Description
Scrub Shrub Cover = 0-5%
Vegetation HT = 6 feet
Species Observed = mesquite (isolated)
Notes = no veg cover

Technically Complete, March 11, 2016

Date Taken	Photo #
August 21, 2013	13

Direction
East

Location
RV4

Description
Scrub Shrub Cover = None
Vegetation HT = 3 feet
Species Observed = cactus
Notes = no veg cover

Date Taken	Photo #
August 21, 2013	14

Direction
North

Location
RV4

Description
Scrub Shrub Cover = None
Vegetation HT = 3 feet
Species Observed = cactus
Notes = no veg cover

Rancho Viejo - Additional FEMA Acreage

Date Taken	Photo #
August 21, 2013	15

Direction
South

Location
RV4

Description
Scrub Shrub Cover = None
Vegetation HT = 3 feet
Species Observed = cactus
Notes = no veg cover

Date Taken	Photo #
August 21, 2013	16

Direction
West

Location
RV4

Description
Scrub Shrub Cover = None
Vegetation HT = 3 feet
Species Observed = cactus
Notes = no veg cover

Technically Complete, March 11, 2016

Date Taken August 21, 2013
Photo # 17

Direction
East

Location
RV5

Description
Scrub Shrub Cover = None
Vegetation HT = 2-3 feet
Species Observed = cactus, mesquite
Notes = no veg cover

Date Taken August 21, 2013
Photo # 18

Direction
North

Location
RV5

Description
Scrub Shrub Cover = None
Vegetation HT = 2-3 feet
Species Observed = cactus, mesquite
Notes = no veg cover

Rancho Viejo - Additional FEMA Acreage

Date Taken August 21, 2013
Photo # 19

Direction
South

Location
RV5

Description
Scrub Shrub Cover = None
Vegetation HT = 2-3 feet
Species Observed = cactus, mesquite
Notes = no veg cover

Date Taken August 21, 2013
Photo # 20

Direction
West

Location
RV5

Description
Scrub Shrub Cover = None
Vegetation HT = 2-3 feet
Species Observed = cactus, mesquite
Notes = no veg cover

Technically Complete, March 11, 2016

Date Taken Photo #
August 21, 2013 21

Direction
East

Location
RV6

Description
Scrub Shrub Cover = 20%
Vegetation HT = 4-6 feet
Species Observed = cactus, quail
Notes = no veg cover

Date Taken Photo #
August 21, 2013 22

Direction
North

Location
RV6

Description
Scrub Shrub Cover = 20%
Vegetation HT = 4-6 feet
Species Observed = cactus, quail
Notes = no veg cover

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Rancho Viejo - Additional FEMA Acreage

Date Taken Photo #
August 21, 2013 23

Direction
South

Location
RV6

Description
Scrub Shrub Cover = 20%
Vegetation HT = 4-6 feet
Species Observed = cactus, quail
Notes = no veg cover

Date Taken Photo #
August 21, 2013 24

Direction
West

Location
RV6

Description
Scrub Shrub Cover = 20%
Vegetation HT = 4-6 feet
Species Observed = cactus, quail
Notes = no veg cover

Technically Complete, March 11, 2016

Date Taken August 21, 2013 | Photo # 25

Direction
Northeast

Location
RV7

Description
Scrub Shrub Cover = 15%
Vegetation HT = 4-15 feet
Species Observed = mesquite
Notes = no dense cover

Date Taken August 21, 2013 | Photo # 26

Direction
Northeast

Location
RV7

Description
Scrub Shrub Cover = 15%
Vegetation HT = 4-15 feet
Species Observed = mesquite
Notes = no dense cover

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Rancho Viejo - Additional FEMA Acreage

Date Taken August 21, 2013 | Photo # 27

Direction
South

Location
RV7

Description
Scrub Shrub Cover = 15%
Vegetation HT = 4-15 feet
Species Observed = mesquite
Notes = no dense cover

Date Taken August 21, 2013 | Photo # 28

Direction
West

Location
RV7

Description
Scrub Shrub Cover = 15%
Vegetation HT = 4-15 feet
Species Observed = mesquite
Notes = no dense cover

Technically Complete, March 11, 2016

Date Taken: August 21, 2013
Photo #: 29

Direction: East

Location: RV8

Description
Scrub Shrub Cover = None
Vegetation HT = 2-6 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 30

Direction: North

Location: RV8

Description
Scrub Shrub Cover = None
Vegetation HT = 2-6 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 31

Direction: South

Location: RV8

Description
Scrub Shrub Cover = None
Vegetation HT = 2-6 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 32

Direction: West

Location: RV8

Description
Scrub Shrub Cover = None
Vegetation HT = 2-6 feet
Species Observed = mesquite

Technically Complete, March 11, 2016

Rancho Viejo - Additional FEMA Acreage

Date Taken August 21, 2013 | Photo # 33

Direction
East

Location
RV9

Description
Scrub Shrub Cover = 10-15%
Vegetation HT = 3-8 feet
Species Observed = mesquite (isolated)

Date Taken August 21, 2013 | Photo # 34

Direction
North

Location
RV9

Description
Scrub Shrub Cover = 10-15%
Vegetation HT = 3-8 feet
Species Observed = mesquite (isolated)

Rancho Viejo - Additional FEMA Acreage

Date Taken August 21, 2013 | Photo # 35

Direction
South

Location
RV9

Description
Scrub Shrub Cover = 10-15%
Vegetation HT = 3-8 feet
Species Observed = mesquite (isolated)

Date Taken August 21, 2013 | Photo # 36

Direction
West

Location
RV9

Description
Scrub Shrub Cover = 10-15%
Vegetation HT = 3-8 feet
Species Observed = mesquite (isolated)

Technically Complete, March 11, 2016

Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 37

Direction: Southwest

Location: RV9

Description:
Scrub Shrub Cover = 10-15%
Vegetation HT = 3-8 feet
Species Observed = mesquite (isolated)

Date Taken: August 21, 2013
Photo #: 38

Direction: Southwest

Location: RV9

Description:
Scrub Shrub Cover = 10-15%
Vegetation HT = 3-8 feet
Species Observed = mesquite (isolated)

Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 39

Direction: East

Location: RV10

Description:
Scrub Shrub Cover = 50-60%
Vegetation HT = 4-10 feet
Species Observed = mesquite, lotebush, cactus

Date Taken: August 21, 2013
Photo #: 40

Direction: North

Location: RV10

Description:
Scrub Shrub Cover = 50-60%
Vegetation HT = 4-10 feet
Species Observed = mesquite, lotebush, cactus

Technically Complete, March 11, 2016

Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 41

Direction
South

Location
RV10

Description
Scrub Shrub Cover = 50-60%
Vegetation HT = 4-10 feet
Species Observed = mesquite, lotebush, cactus

Date Taken: August 21, 2013
Photo #: 42

Direction
West

Location
RV10

Description
Scrub Shrub Cover = 50-60%
Vegetation HT = 4-10 feet
Species Observed = mesquite, lotebush, cactus

Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 43

Direction
East

Location
RV11

Description
Scrub Shrub Cover = 10-15%
Vegetation HT = 4-10 feet
Species Observed = mesquite
Notes = low area

Date Taken: August 21, 2013
Photo #: 44

Direction
North

Location
RV11

Description
Scrub Shrub Cover = 10-15%
Vegetation HT = 4-10 feet
Species Observed = mesquite
Notes = low area

Technically Complete, March 11, 2016

Date Taken
August 21, 2013

Photo #
45

Direction
South

Location
RV11

Description
Scrub Shrub Cover = 10-15%
Vegetation HT = 4-10 feet
Species Observed = mesquite
Notes = low area

Date Taken
August 21, 2013

Photo #
46

Direction
West

Location
RV11

Description
Scrub Shrub Cover = 10-15%
Vegetation HT = 4-10 feet
Species Observed = mesquite
Notes = low area

Date Taken
August 21, 2013

Photo #
47

Direction
East

Location
RV12

Description
Scrub Shrub Cover = 0-5%
Vegetation HT = 3-8 feet
Species Observed = mesquite
Notes = good surface visibility

Date Taken
August 21, 2013

Photo #
48

Direction
Northeast

Location
RV12

Description
Scrub Shrub Cover = 0-5%
Vegetation HT = 3-8 feet
Species Observed = mesquite
Notes = good surface visibility

Date Taken: August 21, 2013
Photo #: 49

Direction: South

Location: RV12

Description
Scrub Shrub Cover = 0-5%
Vegetation HT = 3-8 feet
Species Observed = mesquite
Notes = good surface visibility

Date Taken: August 21, 2013
Photo #: 50

Direction: West

Location: RV12

Description
Scrub Shrub Cover = 0-5%
Vegetation HT = 3-8 feet
Species Observed = mesquite
Notes = good surface visibility

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Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 51

Direction: East

Location: RV13

Description
Scrub Shrub Cover = 5%
Vegetation HT = 5-10 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 52

Direction: North

Location: RV13

Description
Scrub Shrub Cover = 5%
Vegetation HT = 5-10 feet
Species Observed = mesquite

Technically Complete, March 11, 2016

Date Taken August 21, 2013

Photo # 53

Direction
South

Location
RV13

Description
Scrub Shrub Cover = 5%
Vegetation HT = 5-10 feet
Species Observed = mesquite

Date Taken August 21, 2013

Photo # 54

Direction
West

Location
RV13

Description
Scrub Shrub Cover = 5%
Vegetation HT = 5-10 feet
Species Observed = mesquite

Date Taken August 21, 2013

Photo # 55

Direction
East

Location
RV14 - Just North of Pad Site

Description
Scrub Shrub Cover = 5-15%
Vegetation HT = 4-8 feet
Species Observed = mesquite

Date Taken August 21, 2013

Photo # 56

Direction
North

Location
RV14 - Just North of Pad Site

Description
Scrub Shrub Cover = 5-15%
Vegetation HT = 4-8 feet
Species Observed = mesquite

Technically Complete, March 11, 2016

Date Taken: August 21, 2013
Photo #: 57

Direction: South

Location: RV14 - Just North of Pad Site

Description:
Scrub Shrub Cover = 5-15%
Vegetation HT = 4-8 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 58

Direction: West

Location: RV14 - Just North of Pad Site

Description:
Scrub Shrub Cover = 5-15%
Vegetation HT = 4-8 feet
Species Observed = mesquite

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Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 59

Direction: East

Location: RV15 - Inside Project Area at Deer Stand

Description

Date Taken: August 21, 2013
Photo #: 60

Direction: Northeast

Location: RV15 - Inside Project Area at Deer Stand

Description

Technically Complete, March 11, 2016

Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013

Photo #: 61

Direction: South

Location: RV15 - Inside Project Area at Deer Stand

Description

Date Taken: August 21, 2013

Photo #: 62

Direction: West

Location: RV15 - Inside Project Area at Deer Stand

Description

Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013

Photo #: 63

Direction: East

Location: RV16 - West Dam

Description
Scrub Shrub Cover = 10-15%
Vegetation HT = 4-8 feet
Species Observed = mesquite

Date Taken: August 21, 2013

Photo #: 64

Direction: North

Location: RV16 - West Dam

Description
Scrub Shrub Cover = 10-15%
Vegetation HT = 4-8 feet
Species Observed = mesquite

Technically Complete, March 11, 2016

Date Taken: August 21, 2013
Photo #: 65

Direction: South

Location: RV16 - West Dam

Description:
Scrub Shrub Cover = 10-15%
Vegetation HT = 4-8 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 66

Direction: West

Location: RV16 - West Dam

Description:
Scrub Shrub Cover = 10-15%
Vegetation HT = 4-8 feet
Species Observed = mesquite

Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 67

Direction: East

Location: RV17 - Inside Endangered Plant Soils

Description:
Scrub Shrub Cover = 15%
Vegetation HT = 5-8 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 68

Direction: North

Location: RV17 - Inside Endangered Plant Soils

Description:
Scrub Shrub Cover = 15%
Vegetation HT = 5-8 feet
Species Observed = mesquite

Technically Complete, March 11, 2016

Date Taken: August 21, 2013
Photo #: 69

Direction: South

Location: RV17 - Inside Endangered Plant Soils

Description:
Scrub Shrub Cover = 15%
Vegetation HT = 5-8 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 70

Direction: West

Location: RV17 - Inside Endangered Plant Soils

Description:
Scrub Shrub Cover = 15%
Vegetation HT = 5-8 feet
Species Observed = mesquite

Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 71

Direction: South

Location: RV18 - Inside Endangered Plant Soils

Description:
Scrub Shrub Cover = 10%
Vegetation HT = 5 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 72

Direction: East

Location: RV18 - Inside Endangered Plant Soils

Description:
Scrub Shrub Cover = 10%
Vegetation HT = 5 feet
Species Observed = mesquite

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Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 73

Direction
North

Location
RV18 - Inside Endangered Plant Soils

Description
Scrub Shrub Cover = 10%
Vegetation HT = 5 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 74

Direction
West

Location
RV18 - Inside Endangered Plant Soils

Description
Scrub Shrub Cover = 10%
Vegetation HT = 5 feet
Species Observed = mesquite

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Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 75

Direction
East

Location
RV19 - Outside of Endangered Plant Soils

Description
Scrub Shrub Cover = 10-15%
Vegetation HT = 3-10 feet
Species Observed = mesquite, cactus

Date Taken: August 21, 2013
Photo #: 76

Direction
North

Location
RV19 - Outside of Endangered Plant Soils

Description
Scrub Shrub Cover = 10-15%
Vegetation HT = 3-10 feet
Species Observed = mesquite, cactus

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Date Taken
August 21, 2013

Photo #
77

Direction
South

Location
RV19 - Outside of Endangered Plant Soils

Description
Scrub Shrub Cover = 10-15%
Vegetation HT = 3-10 feet
Species Observed = mesquite, cactus

Date Taken
August 21, 2013

Photo #
78

Direction
West

Location
RV19 - Outside of Endangered Plant Soils

Description
Scrub Shrub Cover = 10-15%
Vegetation HT = 3-10 feet
Species Observed = mesquite, cactus

Rancho Viejo - Additional FEMA Acreage

Date Taken
August 21, 2013

Photo #
79

Direction
East

Location
RV20 - Proposed Channel

Description
Scrub Shrub Cover = 5%
Vegetation HT = 3-6 feet
Species Observed = mesquite
Notes = overgrazed

Date Taken
August 21, 2013

Photo #
80

Direction
North

Location
RV20 - Proposed Channel

Description
Scrub Shrub Cover = 5%
Vegetation HT = 3-6 feet
Species Observed = mesquite
Notes = overgrazed

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Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 81

Direction: South

Location: RV20 - Proposed Channel

Description:
Scrub Shrub Cover = 5%
Vegetation HT = 3-6 feet
Species Observed = mesquite
Notes = overgrazed

Date Taken: August 21, 2013
Photo #: 82

Direction: West

Location: RV20 - Proposed Channel

Description:
Scrub Shrub Cover = 5%
Vegetation HT = 3-6 feet
Species Observed = mesquite
Notes = overgrazed

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Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 83

Direction: East

Location: RV21

Description:
Scrub Shrub Cover = 10%
Vegetation HT = 3-5 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 84

Direction: North

Location: RV21

Description:
Scrub Shrub Cover = 10%
Vegetation HT = 3-5 feet
Species Observed = mesquite

Technically Complete, March 11, 2016

Date Taken Photo #
August 21, 2013 85

Direction
South

Location
RV21

Description
Scrub Shrub Cover = 10%
Vegetation HT = 3-5 feet
Species Observed = mesquite

Date Taken Photo #
August 21, 2013 86

Direction
West

Location
RV21

Description
Scrub Shrub Cover = 10%
Vegetation HT = 3-5 feet
Species Observed = mesquite

Rancho Viejo - Additional FEMA Acreage

Date Taken Photo #
August 21, 2013 87

Direction
East

Location
RV22

Description
Scrub Shrub Cover = 15-20%
Vegetation HT = 5-8 feet
Species Observed = mesquite

Date Taken Photo #
August 21, 2013 88

Direction
North

Location
RV22

Description
Scrub Shrub Cover = 15-20%
Vegetation HT = 5-8 feet
Species Observed = mesquite

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Rancho Viejo - Additional FEMA Acreage

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Date Taken	Photo #
August 21, 2013	89

Direction
South

Location
RV22

Description
Scrub Shrub Cover = 15-20%
Vegetation HT = 5-8 feet
Species Observed = mesquite

Date Taken	Photo #
August 21, 2013	90

Direction
West

Location
RV22

Description
Scrub Shrub Cover = 15-20%
Vegetation HT = 5-8 feet
Species Observed = mesquite

Rancho Viejo - Additional FEMA Acreage

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Date Taken	Photo #
August 21, 2013	91

Direction
North

Location
RV23

Description
Scrub Shrub Cover = None
Vegetation HT = 2-4 feet
Species Observed = mesquite
Notes = good ground visibility

Date Taken	Photo #
August 21, 2013	92

Direction
East

Location
RV23

Description
Scrub Shrub Cover = None
Vegetation HT = 2-4 feet
Species Observed = mesquite
Notes = good ground visibility

Technically Complete, March 11, 2016

Date Taken: August 21, 2013
Photo #: 93

Direction
South

Location
RV23

Description
Scrub Shrub Cover = None
Vegetation HT = 2-4 feet
Species Observed = mesquite
Notes = good ground visibility

Date Taken: August 21, 2013
Photo #: 94

Direction
West

Location
RV23

Description
Scrub Shrub Cover = None
Vegetation HT = 2-4 feet
Species Observed = mesquite
Notes = good ground visibility

Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 95

Direction
North

Location
RV24

Description
Scrub Shrub Cover = 10%
Vegetation HT = 4-7 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 96

Direction
East

Location
RV24

Description
Scrub Shrub Cover = 10%
Vegetation HT = 4-7 feet
Species Observed = mesquite

Technically Complete, March 11, 2016

Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 97
Direction: South
Location: RV24
Description:
Scrub Shrub Cover = 10%
Vegetation HT = 4-7 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 98
Direction: West
Location: RV24
Description:
Scrub Shrub Cover = 10%
Vegetation HT = 4-7 feet
Species Observed = mesquite

Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 99
Direction: North
Location: RV25
Description:
Scrub Shrub Cover = 10%
Vegetation HT = 6-8 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 100
Direction: East
Location: RV25
Description:
Scrub Shrub Cover = 10%
Vegetation HT = 6-8 feet
Species Observed = mesquite

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Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 101

Direction: South

Location: RV25

Description
Scrub Shrub Cover = 10%
Vegetation HT = 6-8 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 102

Direction: West

Location: RV25

Description
Scrub Shrub Cover = 10%
Vegetation HT = 6-8 feet
Species Observed = mesquite

Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 103

Direction: North

Location: RV26

Description
Scrub Shrub Cover = 0-2%
Vegetation HT = 1-3 feet
Species Observed = mesquite (isolated)
Notes = overgrazed

Date Taken: August 21, 2013
Photo #: 104

Direction: East

Location: RV26

Description
Scrub Shrub Cover = 0-2%
Vegetation HT = 1-3 feet
Species Observed = mesquite (isolated)
Notes = overgrazed

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Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 105

Direction: South

Location: RV26

Description
Scrub Shrub Cover = 0-2%
Vegetation HT = 1-3 feet
Species Observed = mesquite (isolated)
Notes = overgrazed

Date Taken: August 21, 2013
Photo #: 106

Direction: West

Location: RV26

Description
Scrub Shrub Cover = 0-2%
Vegetation HT = 1-3 feet
Species Observed = mesquite (isolated)
Notes = overgrazed

Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 107

Direction: North

Location: RV27

Description
Scrub Shrub Cover = 10%
Vegetation HT = 4-10 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 108

Direction: East

Location: RV27

Description
Scrub Shrub Cover = 10%
Vegetation HT = 4-10 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 109

Direction: South

Location: RV27

Description:
Scrub Shrub Cover = 10%
Vegetation HT = 4-10 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 110

Direction: West

Location: RV27

Description:
Scrub Shrub Cover = 10%
Vegetation HT = 4-10 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 111

Direction: North

Location: RV28

Description:
Scrub Shrub Cover = 5-10%
Vegetation HT = 2-8 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 112

Direction: Northeast

Location: RV28

Description:
Scrub Shrub Cover = 5-10%
Vegetation HT = 2-8 feet
Species Observed = mesquite

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Date Taken August 21, 2013
Photo # 113

Direction
South

Location
RV28

Description
Scrub Shrub Cover = 5-10%
Vegetation HT = 2-8 feet
Species Observed = mesquite

Date Taken August 21, 2013
Photo # 114

Direction
West

Location
RV28

Description
Scrub Shrub Cover = 5-10%
Vegetation HT = 2-8 feet
Species Observed = mesquite

Rancho Viejo - Additional FEMA Acreage

Date Taken August 21, 2013
Photo # 115

Direction
North

Location
RV29

Description
Scrub Shrub Cover = 5%
Vegetation HT = 2-6 feet
Species Observed = mesquite
Notes = overgrazed

Date Taken August 21, 2013
Photo # 116

Direction
East

Location
RV29

Description
Scrub Shrub Cover = 5%
Vegetation HT = 2-6 feet
Species Observed = mesquite
Notes = overgrazed

Technically Complete, March 11, 2016

Date Taken: August 21, 2013
Photo #: 117

Direction
Northeast

Location
RV29

Description
Scrub Shrub Cover = 5%
Vegetation HT = 2-6 feet
Species Observed = mesquite
Notes = overgrazed

Date Taken: August 21, 2013
Photo #: 118

Direction
West

Location
RV29

Description
Scrub Shrub Cover = 5%
Vegetation HT = 2-6 feet
Species Observed = mesquite
Notes = overgrazed

Date Taken: August 21, 2013
Photo #: 119

Direction
North

Location
RV31 - West Pond

Description
Scrub Shrub Cover = 10%
Vegetation HT = 2-15 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 120

Direction
East

Location
RV31 - West Pond

Description
Scrub Shrub Cover = 10%
Vegetation HT = 2-15 feet
Species Observed = mesquite

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Rancho Viejo - Additional FEMA Acreage

Date Taken	Photo #
August 21, 2013	121

Direction
South

Location
RV31 - West Pond

Description
Scrub Shrub Cover = 10%
Vegetation HT = 2-15 feet
Species Observed = mesquite

Date Taken	Photo #
August 21, 2013	122

Direction
West

Location
RV31 - West Pond

Description
Scrub Shrub Cover = 10%
Vegetation HT = 2-15 feet
Species Observed = mesquite

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Rancho Viejo - Additional FEMA Acreage

Date Taken	Photo #
August 21, 2013	123

Direction
North

Location
RV32

Description
Scrub Shrub Cover = 10%
Vegetation HT = 3-6 feet
Species Observed = mesquite

Date Taken	Photo #
August 21, 2013	124

Direction
East

Location
RV32

Description
Scrub Shrub Cover = 10%
Vegetation HT = 3-6 feet
Species Observed = mesquite

Technically Complete, March 11, 2016

Date Taken August 21, 2013 | Photo # 125

Direction
South

Location
RV32

Description
Scrub Shrub Cover = 10%
Vegetation HT = 3-6 feet
Species Observed = mesquite

Date Taken August 21, 2013 | Photo # 126

Direction
West

Location
RV32

Description
Scrub Shrub Cover = 10%
Vegetation HT = 3-6 feet
Species Observed = mesquite

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Rancho Viejo - Additional FEMA Acreage

Date Taken August 21, 2013 | Photo # 127

Direction
North

Location
RV33

Description
Scrub Shrub Cover = 5%
Vegetation HT = 4-6 feet
Species Observed = mesquite

Date Taken August 21, 2013 | Photo # 128

Direction
East

Location
RV33

Description
Scrub Shrub Cover = 5%
Vegetation HT = 4-6 feet
Species Observed = mesquite

Technically Complete, March 11, 2016

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Date Taken August 21, 2013

Photo # 129

Direction South

Location RV33

Description
Scrub Shrub Cover = 5%
Vegetation HT = 4-6 feet
Species Observed = mesquite

Date Taken August 21, 2013

Photo # 130

Direction West

Location RV33

Description
Scrub Shrub Cover = 5%
Vegetation HT = 4-6 feet
Species Observed = mesquite

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Rancho Viejo - Additional FEMA Acreage

Date Taken August 21, 2013

Photo # 131

Direction North

Location RV34

Description
Scrub Shrub Cover = 15%
Vegetation HT = 5-10 feet
Species Observed = mesquite

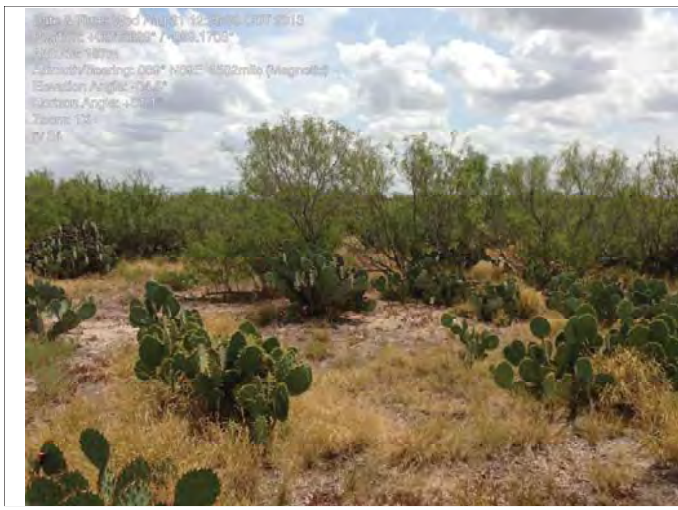
Date Taken August 21, 2013

Photo # 132

Direction East

Location RV34

Description
Scrub Shrub Cover = 15%
Vegetation HT = 5-10 feet
Species Observed = mesquite



Date Taken: August 21, 2013
Photo #: 133

Direction: South

Location: RV34

Description:
Scrub Shrub Cover = 15%
Vegetation HT = 5-10 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 134

Direction: West

Location: RV34

Description:
Scrub Shrub Cover = 15%
Vegetation HT = 5-10 feet
Species Observed = mesquite

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Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 135

Direction: North

Location: RV35

Description:
Scrub Shrub Cover = 0-2%
Vegetation HT = 1-3 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 136

Direction: East

Location: RV35

Description:
Scrub Shrub Cover = 0-2%
Vegetation HT = 1-3 feet
Species Observed = mesquite

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Date Taken: August 21, 2013
Photo #: 137

Direction
South

Location
RV35

Description
Scrub Shrub Cover = 0-2%
Vegetation HT = 1-3 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 138

Direction
West

Location
RV35

Description
Scrub Shrub Cover = 0-2%
Vegetation HT = 1-3 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 139

Direction
North

Location
RV36

Description
Scrub Shrub Cover = 0-2%
Vegetation HT = 0-1 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 140

Direction
East

Location
RV36

Description
Scrub Shrub Cover = 0-2%
Vegetation HT = 0-1 feet
Species Observed = mesquite

Date Taken
August 21, 2013

Photo #
141

Direction
South

Location
RV36

Description
Scrub Shrub Cover = 0-2%
Vegetation HT = 0-1 feet
Species Observed = mesquite

Date Taken
August 21, 2013

Photo #
142

Direction
North

Location
RV37

Description
Scrub Shrub Cover = 10%
Vegetation HT = 1-3 feet
Species Observed = mesquite

Date Taken
August 21, 2013

Photo #
143

Direction
East

Location
RV37

Description
Scrub Shrub Cover = 10%
Vegetation HT = 1-3 feet
Species Observed = mesquite

Date Taken
August 21, 2013

Photo #
144

Direction
South

Location
RV37

Description
Scrub Shrub Cover = 10%
Vegetation HT = 1-3 feet
Species Observed = mesquite

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Date Taken August 21, 2013 | Photo # 145

Direction
West

Location
RV37

Description
Scrub Shrub Cover = 10%
Vegetation HT = 1-3 feet
Species Observed = mesquite

Date Taken August 21, 2013 | Photo # 146

Direction
North

Location
RV38

Description
Scrub Shrub Cover = 5%
Vegetation HT = 0-4 feet
Species Observed = mesquite

Date Taken August 21, 2013 | Photo # 147

Direction
East

Location
RV38

Description
Scrub Shrub Cover = 5%
Vegetation HT = 0-4 feet
Species Observed = mesquite

Date Taken August 21, 2013 | Photo # 148

Direction
South

Location
RV38

Description
Scrub Shrub Cover = 5%
Vegetation HT = 0-4 feet
Species Observed = mesquite

Technically Complete, March 11, 2016

Date Taken August 21, 2013

Photo # 149

Direction
West

Location
RV38

Description
Scrub Shrub Cover = 5%
Vegetation HT = 0-4 feet
Species Observed = mesquite

Date Taken August 21, 2013

Photo # 150

Direction
North

Location
RV39

Description
Scrub Shrub Cover = 5-10%
Vegetation HT = 4-11 feet
Species Observed = mesquite

Rancho Viejo - Additional FEMA Acreage

Date Taken August 21, 2013

Photo # 151

Direction
East

Location
RV39

Description
Scrub Shrub Cover = 5-10%
Vegetation HT = 4-11 feet
Species Observed = mesquite

Date Taken August 21, 2013

Photo # 152

Direction
South

Location
RV39

Description
Scrub Shrub Cover = 5-10%
Vegetation HT = 4-11 feet
Species Observed = mesquite

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Rancho Viejo - Additional FEMA Acreage

Date Taken
August 21, 2013

Photo #
153

Direction
West

Location
RV39

Description
Scrub Shrub Cover = 5-10%
Vegetation HT = 4-11 feet
Species Observed = mesquite

Date Taken
August 21, 2013

Photo #
154

Direction
Northwest

Location
RV40

Description
Scrub Shrub Cover = 0-2%
Vegetation HT = 0-4 feet
Species Observed = mesquite

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Rancho Viejo - Additional FEMA Acreage

Date Taken
August 21, 2013

Photo #
155

Direction
East

Location
RV40

Description
Scrub Shrub Cover = 0-2%
Vegetation HT = 0-4 feet
Species Observed = mesquite

Date Taken
August 21, 2013

Photo #
156

Direction
South

Location
RV40

Description
Scrub Shrub Cover = 0-2%
Vegetation HT = 0-4 feet
Species Observed = mesquite

Date Taken August 21, 2013 | Photo # 157

Direction
West

Location
RV40

Description
Scrub Shrub Cover = 0-2%
Vegetation HT = 0-4 feet
Species Observed = mesquite

Date Taken August 21, 2013 | Photo # 158

Direction
North

Location
RV41

Description
Scrub Shrub Cover = 10-15%
Vegetation HT = 3-8 feet
Species Observed = mesquite

Date Taken August 21, 2013 | Photo # 159

Direction
East

Location
RV41

Description
Scrub Shrub Cover = 10-15%
Vegetation HT = 3-8 feet
Species Observed = mesquite

Date Taken August 21, 2013 | Photo # 160

Direction
South

Location
RV41

Description
Scrub Shrub Cover = 10-15%
Vegetation HT = 3-8 feet
Species Observed = mesquite

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Date Taken August 21, 2013
Photo # 161

Direction
West

Location
RV41

Description
Scrub Shrub Cover = 10-15%
Vegetation HT = 3-8 feet
Species Observed = mesquite

Date Taken August 21, 2013
Photo # 162

Direction
North

Location
RV42

Description
Scrub Shrub Cover = 15%
Vegetation HT = 4-11 feet
Species Observed = mesquite

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Date Taken August 21, 2013
Photo # 163

Direction
East

Location
RV42

Description
Scrub Shrub Cover = 15%
Vegetation HT = 4-11 feet
Species Observed = mesquite

Date Taken August 21, 2013
Photo # 164

Direction
South

Location
RV42

Description
Scrub Shrub Cover = 15%
Vegetation HT = 4-11 feet
Species Observed = mesquite

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Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 165

Direction
West

Location
RV42

Description
Scrub Shrub Cover = 15%
Vegetation HT = 4-11 feet
Species Observed = mesquite

Date Taken: August 21, 2013
Photo #: 166

Direction
North

Location
RV43

Description
Scrub Shrub Cover = 10%
Vegetation HT = 8-12 feet
Species Observed = mesquite, roadrunner

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Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013
Photo #: 167

Direction
East

Location
RV43

Description
Scrub Shrub Cover = 10%
Vegetation HT = 8-12 feet
Species Observed = mesquite, roadrunner

Date Taken: August 21, 2013
Photo #: 168

Direction
South

Location
RV43

Description
Scrub Shrub Cover = 10%
Vegetation HT = 8-12 feet
Species Observed = mesquite, roadrunner

Technically Complete, March 11, 2016

Date Taken	Photo #
August 21, 2013	169

Direction
West

Location
RV43

Description
Scrub Shrub Cover = 10%
Vegetation HT = 8-12 feet
Species Observed = mesquite, roadrunner

Date Taken	Photo #
August 21, 2013	170

Direction
North

Location
RV44

Description
Scrub Shrub Cover = 10%
Vegetation HT = 4-7 feet
Species Observed = mesquite

Date Taken	Photo #
August 21, 2013	171

Direction
East

Location
RV44

Description
Scrub Shrub Cover = 10%
Vegetation HT = 4-7 feet
Species Observed = mesquite

Date Taken	Photo #
August 21, 2013	172

Direction
South

Location
RV44

Description
Scrub Shrub Cover = 10%
Vegetation HT = 4-7 feet
Species Observed = mesquite

Technically Complete, March 11, 2016

Date Taken August 21, 2013

Photo # 173

Direction West

Location RV44

Description
Scrub Shrub Cover = 10%
Vegetation HT = 4-7 feet
Species Observed = mesquite

Date Taken August 21, 2013

Photo # 174

Direction North

Location RV45

Description
Scrub Shrub Cover = 5-10%
Vegetation HT = 3-8 feet
Species Observed = mesquite

Rancho Viejo - Additional FEMA Acreage

Date Taken August 21, 2013

Photo # 175

Direction East

Location RV45

Description
Scrub Shrub Cover = 5-10%
Vegetation HT = 3-8 feet
Species Observed = mesquite

Date Taken August 21, 2013

Photo # 176

Direction South

Location RV45

Description
Scrub Shrub Cover = 5-10%
Vegetation HT = 3-8 feet
Species Observed = mesquite

Technically Complete, March 11, 2016

Date Taken	Photo #
August 21, 2013	177

Direction
West

Location
RV45

Description
Scrub Shrub Cover = 5-10%
Vegetation HT = 3-8 feet
Species Observed = mesquite

Date Taken	Photo #
August 21, 2013	178

Direction
North

Location
RV46

Description
Scrub Shrub Cover = 0-2%
Vegetation HT = 1-4 feet
Species Observed = mesquite, cactus

Rancho Viejo - Additional FEMA Acreage

Date Taken	Photo #
August 21, 2013	179

Direction
East

Location
RV46

Description
Scrub Shrub Cover = 0-2%
Vegetation HT = 1-4 feet
Species Observed = mesquite, cactus

Date Taken	Photo #
August 21, 2013	180

Direction
South

Location
RV46

Description
Scrub Shrub Cover = 0-2%
Vegetation HT = 1-4 feet
Species Observed = mesquite, cactus

Technically Complete, March 11, 2016

Technically Complete, March 11, 2016

aci consulting austin • denver

Rancho Viejo - Additional FEMA Acreage

Date Taken: August 21, 2013

Photo #: 181

Direction: West

Location: RV46

Description:
Scrub Shrub Cover = 0-2%
Vegetation HT = 1-4 feet
Species Observed = mesquite, cactus

Appendix J

Supporting Models and Shapefiles

Attachment 1 in Response to Request for additional information (AD-04) dated October 6, 2014
Case No.: 14-06-1606R
Community: Webb County, TX
Community No.: 481059

Issue:

"Our detailed review revealed that the base (1-percent-annual-chance) water-surface elevations (WSELs) increased greater than 1.0 foot when compared to the existing and proposed conditions as a result of the project along Unnamed Tributaries to San Juanito Creek. Therefore, please provide the following evidence that the project meets the requirements of Paragraph 65.12(a) of the National Flood Insurance Program regulations as stated below.

a. An evaluation of alternatives that would not result in an increase in base flood WSELs of more than 1.0 foot and an explanation why these alternatives are not feasible."

In response, the following is offered:

The proposed project, Pescadito Environmental Resource Center (PERC), will be a comprehensive facility for the management of materials discarded by society. This type of facility will go beyond traditional landfill disposal in the management of solid wastes, green waste, electronic waste and recyclables are an essential component of society's infrastructure.

The location chosen for this project was identified as being naturally suitable for a solid waste disposal site in 1977 (*Land Resources of Texas*; R.S Kier, L.E. Garner and L.F. Brown, Jr.; The Bureau of Economic Geology; 1977). The soils are primarily clay and are highly saline. Usable groundwater resources are extremely deep (>1,000 feet) and any near surface groundwater is highly saline, making it a low priority for development. Although oil and gas reserves are developed in the area, at the proposed site, none have been determined to be economically feasible. The design, however, has taken this into consideration and will allow for its development in the future should economics change.

The existing topography in the area is extremely flat, resulting in an extremely wide, and shallow, floodplain and the existing stock tanks do very little to attenuate the flooding. Construction of the project will impact a named reservoir, Burrito Tank, and possibly several smaller stock tanks. All affected reservoirs are owned by the applicant, Rancho Viejo Waste Management, LLC, or by its parent, Rancho Viejo Cattle Company, Ltd. In order to approximate effects of the tanks, storage and discharge relationships were developed and utilized for simulation of the pre- project conditions in the CLOMR analysis. Therefore, all existing features were included in the pre-project conditions analysis. It should be noted that, after reviewing the delineation of the FEMA floodplain with respect to the existing tanks, the tanks will likely not have any significant attenuation effect on the peak discharge. The 100-year flood is so broad in the vicinity of the tanks it appears there is sufficient area to carry the flows which will bypass the tanks' zones of impact.

The proposed landfill is located in an ideal location considering soil, groundwater, land use, and oil and gas activities (past, present, and future). No other location is equally plausible as it is impossible to find an area of appropriate size in Eastern Webb County that does not have floodplain issues due to the prevailing flat topography and rapid runoff soil conditions. The site is located at the top of the Rio Grande watershed area, resulting in a minimum amount of impacts, such as:

- less rainfall runoff;
- less 100-year flood volume to be managed;
- less impact to well-developed riparian corridors;
- impact to fewer existing water features;
- fewer jurisdictional wetlands to contend with, and;
- fewer and much smaller bridge or other structures for crossing drainage features.

See attached annotated Figures 1 – 3.

- Figure 1 – General Topographic Map showing facility boundary and River Basin limits just to the north
- Figure 2 – Existing Drainage Basin map from CLOMR submittal
- Figure 3 – River Basins from Rancho Viejo Jurisdictional Waters Report

Further, extensive surveys of the property have determined there to be a lack of wetlands or threatened and endangered species in the area which further reinforces this site as a preferred alternative. The applicant endeavored to find an upland location that was reasonably close to the headwater conditions to minimize any impacts to floodplains and/or wetlands. The proposed location meets those criteria.

The following alternatives could be implemented that would result in less than a 1.0-foot increase in base fold elevation have been evaluated against the currently proposed alternative.

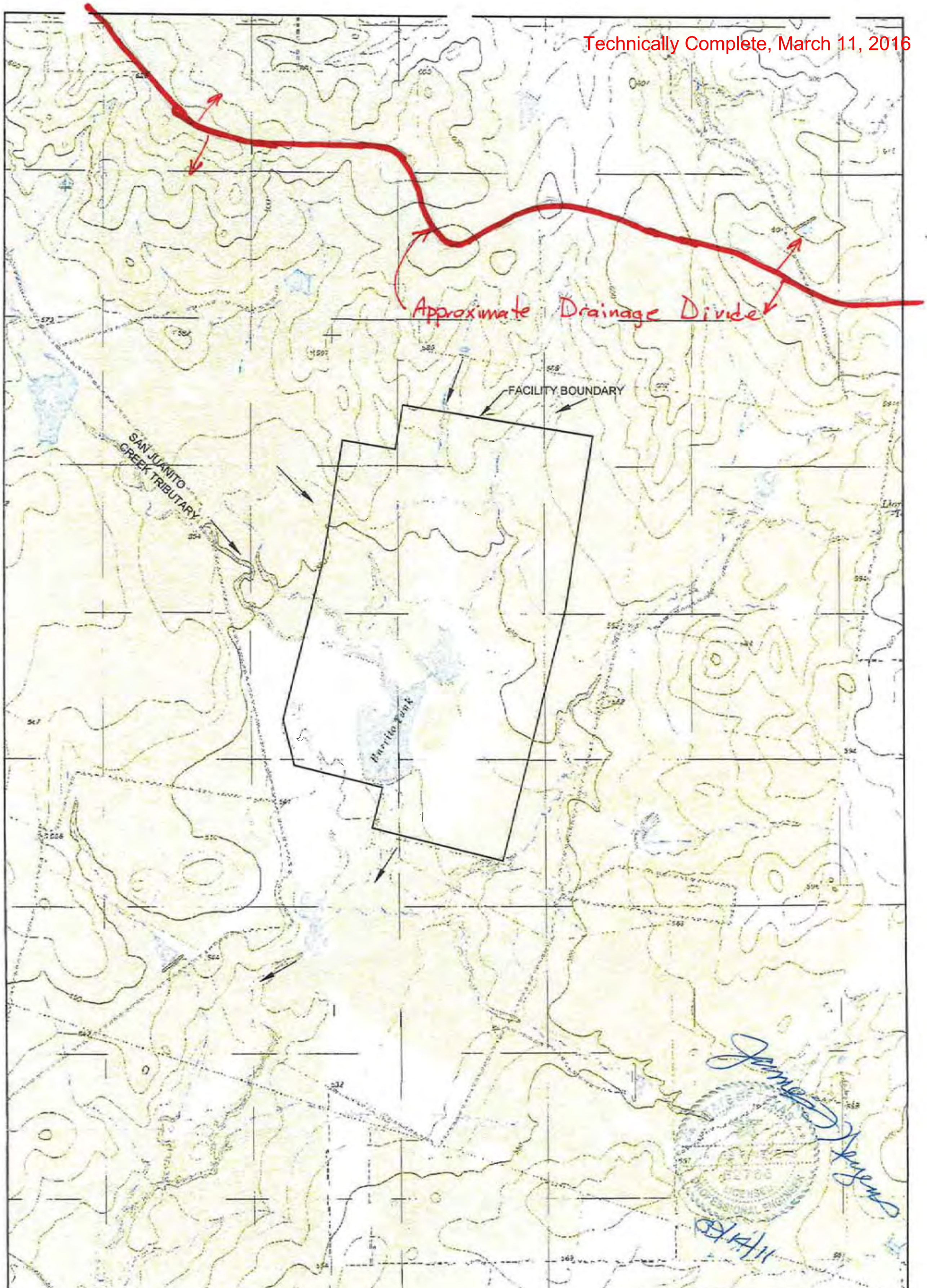
- Over-excavation of West Detention Basin and increase in downstream channel width
- Multiple upstream detention basins
- Channelization without storage
- Relocate project to alternate location in eastern Webb County

The following table outlines the potential alternatives along with the positive and negative implications of each.

Alternative	Pros	Cons
currently proposed CLOMR design	1. Minimal impact to endangered & threatened species. 2. No impact to any jurisdictional wetlands. 3. Minimal impact to present/future oil & gas recovery. 4. Base flood elevation increase behind new west detention pond dam and immediately downstream, is on property owned by applicant, or its parent company. 5. About as high in the Rio Grande watershed as practically possible – minimal 100-year flood volume for management. 6. No increase in discharge or base flood elevation downstream of the project, i.e., off-site.	1. Upstream and downstream base flood elevation increase associated with west detention pond and channel but only occur within the applicant's controlled property
Same layout as currently proposed CLOMR but with excavated west detention pond and increased downstream channel width to maintain less than 1-foot increase in base flood elevation	1. No impact to any jurisdictional wetlands. 2. Minimal impact to present/future oil & gas recovery. 3. About as high in the watershed as practically possible – minimal 100-year flood volume for management. 4. No increase in discharge or base flood elevation downstream of the project, i.e., off-site.	1. Significant excavation cost. 2. Will require large pump station + O&M cost to maintain detention capability which will have other environmental impacts such as increased carbon footprint due to the operation of the pump. 3. Disposal of excavated soil is potential problem. 4. Potential for some impact to endangered & threatened species, i.e. riparian area into west pond (San Juanito Creek Tributary).
Same layout as currently proposed CLOMR but with multiple detention ponds upstream and increased downstream channel width to maintain less than 1-foot increase in base flood elevation	1. No increase in base flood elevation. 2. About as high in the watershed as practically possible – minimal 100-year flood volume for management. 3. No increase in discharge or base flood elevation downstream of the project, i.e., off-site.	1. Increase in total area of required improvements on both San Juanito Creek Tributary and Trib 2 to San Juanito Creek Tributary. 2. Potential for some impact to endangered & threatened species. 3. Potential for some impact to wetlands. 4. Significant excavation costs and associated environmental impacts due to increased excavation quantities.
Increased width and improvements to channel with no detention basins	1. None apparent.	1. Potential downstream (off-site) increase in base flood elevation and run-off velocities. 2. Significant costs for flow improvements to channel.

Alternative	Pros	Cons
Move project to a different location or watershed in Eastern Webb County	1. None apparent.	1. Difficult to find an area of appropriate size in Eastern Webb County that does not have similar floodplain issues due to the prevailing flat topography and rapid runoff soil conditions. 2. Negates detailed siting study. 3. Possible wetlands and endangered & threatened species issues with other sites.

In summary, the available alternatives do not result in desired improvements to flood conditions and the only practical solution has been proposed. Please note that the cross-sectional areas that show an increase greater than one foot are within the project area that is being developed; therefore an accurate comparison between pre and post conditions are difficult because the channel geometries are different. In both upstream and downstream areas of the proposed project where the cross-section areas are the same for both pre and post conditions, the increase in water surface elevations are less than 1 foot and in most cases show a decrease for post developed conditions.



Annotated by Michael W. Oden, P.E. 67165
TBPE Firm F-5650

NOTES:
1. FLOW DIRECTION INDICATED BY ARROWS.
2. NO NAMED STREAMS SHOWN ON MAP.

0 1000 2000 4000
SCALE IN FEET
1" = 2000'

N

SOURCE
U.S.G.S. 7.5-MINUTE SERIES TOPOGRAPHIC MAP, BURRITO TANK (1980), TEXAS.

Figure 1

REV. 1 9/14/11 ADDED STREAM INFORMATION

GENERAL TOPOGRAPHIC MAP

PESCADITO ENVIRONMENTAL RESOURCE CENTER
MSW PERMIT NO. 2374
WEBB COUNTY, TEXAS

PROJECT NO.	170401	DWG FILE	170401-MSW-II-6
DRAWN BY.	CL	DATE	02/14/11

TRC
505 EAST HUNTLAND DRIVE
SUITE 250
AUSTIN, TEXAS 78752
(512) 329-6080

~~FIGURE 6~~
~~PART II~~
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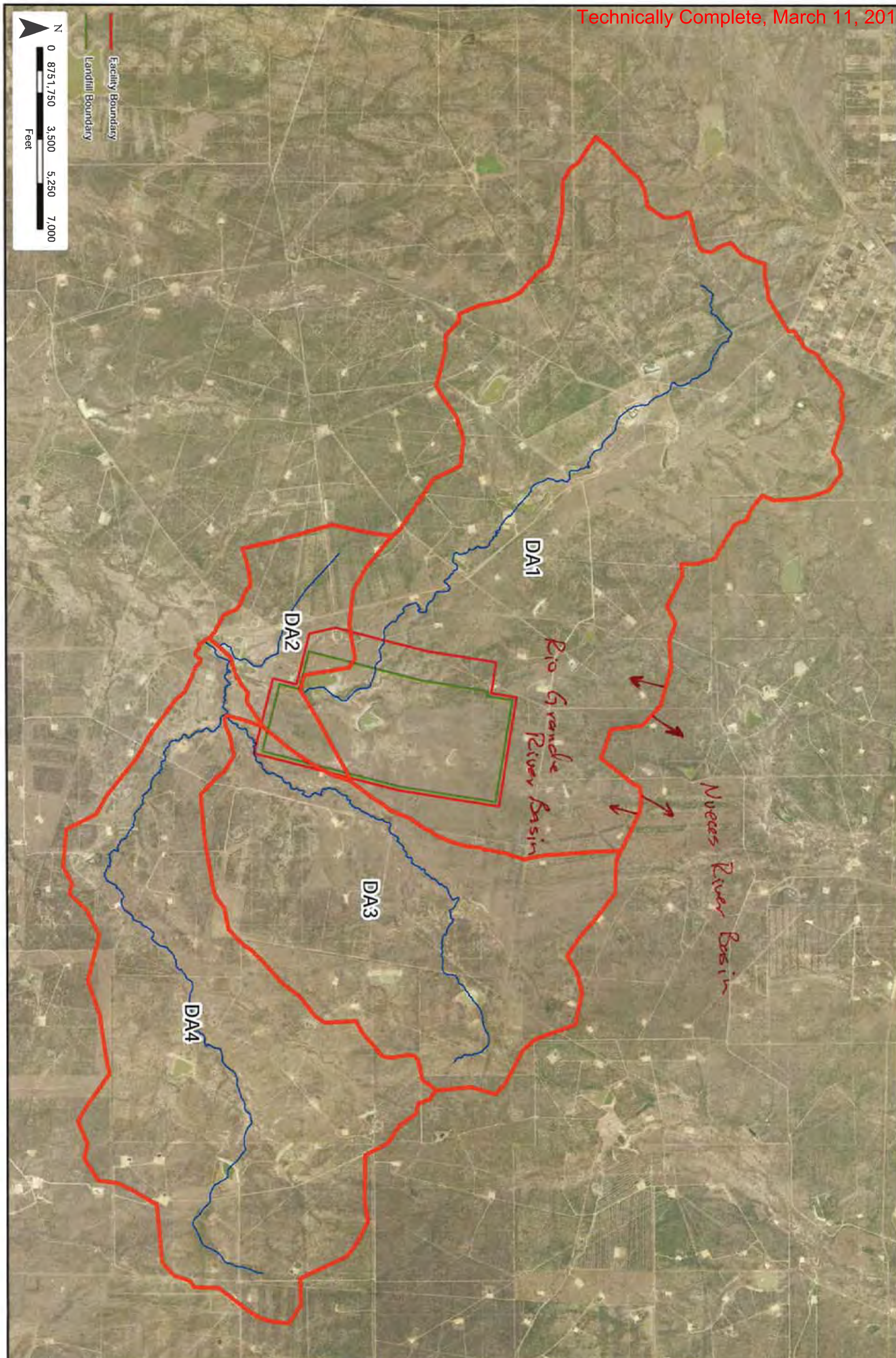

Figure 2: Existing Drainage Basins

Figure 2

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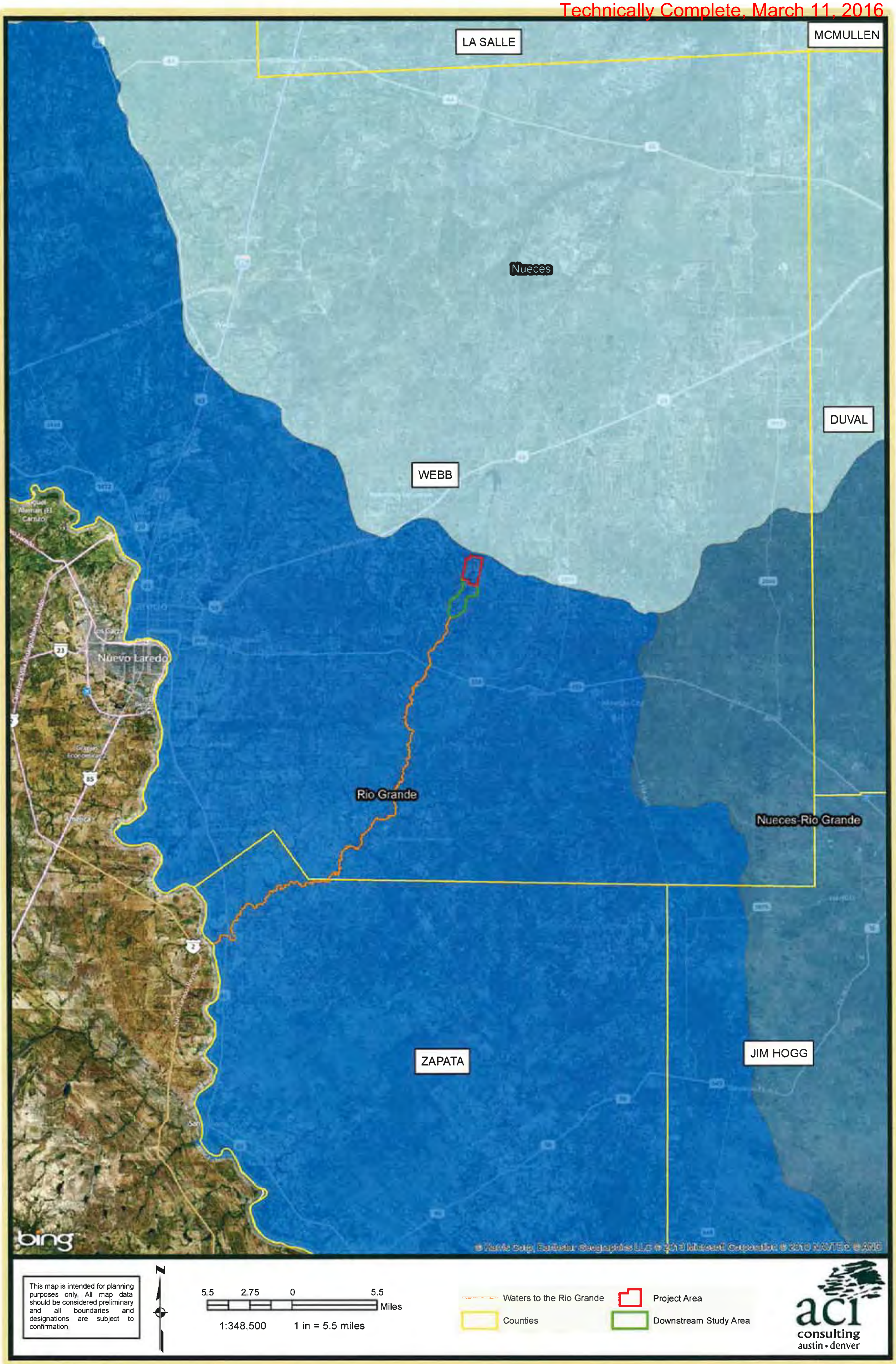

Rancho Viejo Proposedl Jurisdictional Waters Report **March 2013**

Figure 3: River Basins

Figure 3