DESIGN MEMORANDUM

For the

Saratoga Pond

(an off-channel storm water pond)

Lomitas Negras Arroyo

Prepared by

Smith Engineering Company

Prepared for the

Southern Sandoval County Arroyo

Flood Control Authority

(SSCAFCA)

November 2014

SEC Project Number

114126

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Certification

I, Patrick Stovall, being duly registered as a Professional Engineer under the laws of the State of New Mexico, do hereby certify that this document was prepared under my direction and is true and correct to the best of my knowledge and belief.

Signature

11-6-2014

Date

Patrick Stovall, PE, NM # 13830

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MAP POCKET -

Figure 1 – Conceptual Level Design Saratoga Pond

CD (in Map Pocket)

Includes PDF of entire report, Word Files, Excel Files, AutoCad Files,
HEC-HMS and HEC-RAS models

1.0 GENERAL INFORMATION

1.1 Purpose, Goals and Scope

The purpose of this design memorandum is to summarize the evaluation of a small pond that was conceptually designed to be a non-jurisdictional dam or a pond, that would be located on the Lomitas Negras Arroyo west of and adjacent to Saratoga Road. **Figure A** illustrates the project location.

FIGURE A – LOCATION MAP

This pond design is unique and complex for the following reasons.

1. The pond is located between the Lomitas Negras Arroyo North Tributary and Main Branch.
2. Inflow into the pond will occur only from the Main Branch and only from higher flows that will enter the pond through a lateral weir. Low flows will by-pass the pond and drain to the Saratoga Road concrete box culverts (CBCs) (2 – 6 ft rise x 12 ft span CBCs).

Goal

The goal of the pond and lateral weir conceptual design is to try and reduce the Ultimate Conditions 100-year 24-hour storm hydrograph peak discharge to pass through the Saratoga Road box culverts and the NM 528 culverts. The purpose is to avoid overtopping or allow minimal overtopping and to

reduce the downstream FEMA floodplain that covers part of the Enchanted Hills elementary school property.

Scope

1. Conceptually design the Saratoga Pond and embankment to be a non-jurisdictional dam (pond). The embankment height will be a maximum of 6 ft tall above lowest downstream toe of embankment existing ground elevation to ensure that the pond / embankment will be a non-jurisdictional pond. The NMOSE regulations do not specify a storage volume limit if the dam height is 6 ft or less.

2. Assume the main pond will be located on the SSCAFCA owned lot immediately west of Saratoga Road. However assume that SSCAFCA may purchase the lot west of the SSCAFCA lot (or the eastern portion of that non-SSCAFCA lot) as necessary to provide the maximum storage volume for the pond.

3. Simulate the Ultimate Conditions 100-year storm hydrographs as obtained from the Montoyas Watershed Park Management Plan (Version 2.0) December 2011.

4. Assume that that the North Tributary of the Lomitas Negras Arroyo will by-pass the pond and outfall directly to the Saratoga Road box culverts.

5. Simulate a lateral weir on the south pond embankment that is parallel to the Main Branch of the Lomitas Negras Arroyo. The intent of the lateral weir is to capture high flow events only and allow Main Branch low flows to by-pass the lateral weir.

6. Assume that the emergency spillway and the principal spillway of the pond will outfall to the Saratoga Road box culverts (at the confluence of the North Tributary and Main Branch).

7. Develop a conceptual level grading plan for the pond and embankment in combination with the lateral weir, emergency and principal spillways. The grading plan data for the pond storage area and conceptual designs for the principal and emergency spillways will be the basis to develop elevation-volume-discharge data to apply in the detention pond routings within HEC-HMS Hydrologic Models. Divide the main branch hydrograph into the pond by a rating curve developed with HEC-RAS for the lateral weir.

8. Develop conceptual designs and quantity estimates for the major construction and items that include:
   A. Grading Plan for the: pond embankment, detention area
   B. Bed and bank lining
   C. Lateral weir
   D. The principal and emergency spillways;
   E. The principal spillway outfall pipe.

9. Develop an Engineer's Estimate of Probable Construction Cost based on the Conceptual Level Design.

10. Provide recommendations and conclusions

1.2 Field Observation and Topographic Mapping

Field Observation and Survey

Smith engineers conducted a field observation of the existing arroyo and pond site in the summer of 2014 as documented in photographs included in **Appendix 1**. An aerial mapping survey was conducted by Aerotech Mapping on November 26, 2013 that produced a 1-ft accurate contour map that included much of the proposed Saratoga Pond site excluding some areas to the west and upstream in the North Tributary and Main Branch of the Arroyo. Therefore, the City of Rio Rancho 2-ft contour mapping was digitally merged into the Aerotech mapping by Smith Engineering Company to prepare a comprehensive topographic map that was the basis for the conceptual design. Note the 2-ft contour mapping was extrapolated to produce 1-ft contours.

1.3 Reports, As-builts and Data by Others

Montoyas Watershed Park Management Plan (Version 2.0), Prepared by Bohannan-Huston, Inc. December 2011

The Lomitas Negras Arroyo is a Tributary of the Montoyas Arroyo. **Appendix 1** contains Drainage Map Tile 20 from that Plan that illustrates the Lomitas Negras Arroyo at Saratoga Road.

As-Built Plans - Unit 17 Sanitary Sewer Interceptor / Lift Station , Rio Rancho New Mexico. December 4, 2002.

Appendix 1 contains a copy of these as-builts that were important in setting the proposed Main Branch Arroyo bed slope in the vicinity of the proposed Saratoga Pond.

Flood Insurance Rate Map (FIRM)

Appendix 1 contains a copy of the FIRM panel that illustrates FEMA has mapped an Approximate A Zone Floodplain west of Saratoga Road that is located in the same location as the proposed Saratoga Pond.

2.0 DESIGN CRITERIA, GOALS AND SSCAFCA REQUIREMENTS

2.1 DESIGN CRITERIA

NM Office of the State Engineer (NMOSE) Dam Safety Bureau Criteria

Based on the NMOSE document titled

"Rules and Regulations Governing Dam Design, Construction and Dam Safety, Dec. 31, 2010"

The Saratoga Pond will be designed to be classified as a non-jurisdictional dam. Therefore, SSCAFCA design criteria will dictate the design.

SSCAFCA Criteria

Design and hydraulic criteria were obtained from the document titled -

"Final Development Process Manual for Southern Sandoval County Arroyo Flood Control Authority and the City of Rio Rancho, New Mexico. July 31, 2009" (DPM).

Freeboard Criteria

Note that the pond and emergency spillways were designed to accommodate the maximum portion possible of the Main Arroyo Branch 100-year 24-hour duration storm hydrograph that will enter the pond through the lateral weir. The remainder of the hydrograph that does not spill through the lateral weir will bypass the pond and outfall at Saratoga Road concrete box culverts. An emergency spillway is required to accommodate storms greater than the 100-year storm that will enter the pond through the lateral weir and all pond embankments should have an emergency spillway.

The DPM specifies 1 ft of freeboard for the 100-year storm and this will be the goal with respect to the proposed pond analysis and design and proposed arroyo channels near the pond. The DPM does not specify the 500-year storm. The pond emergency spillway and freeboard criteria applied in the conceptual pond design and routing optimization are as follows:

Principal Spillway Criteria

Shall be designed to pass part of the 100-year Ultimate Condition hydrograph and attempt to have at least 1 ft of freeboard below the top of pond embankment.

Emergency Spillway Criteria

The emergency spillway will be set at an elevation 2 ft below the top of the pond embankment and the following criteria apply:

100-year 24-hour storm: The goal will be to provide a minimum 1 ft of freeboard to top of pond embankment, and provide additional capacity for larger hydrographs as an added benefit.

Grading Slope Criteria

The DPM suggests 1V:6H slopes for earthen slopes. The DPM suggests that 0.5 % is the minimum pond invert slope and cross-slopes.

Due to the limited pond area available, steeper earthen embankment and arroyo bank slopes were required to maximize the pond volume available. Therefore the embankment and arroyo bank slopes were set at 1V:3H maximum slopes. These slopes will lined with soil cement or remain natural with gravel mulch and seeding, as described later.

Access Criteria

Maintenance access ramps shall have a 1V:10H maximum slope and maintenance gates shall be set back 50 ft from arterial or collector streets.

Outfall Pipe and Criteria

Facility outlets shall always be gravity flow whenever feasible and shall have a minimum 24-inch diameter structure with a slope such that when flowing at ¼ full the velocity is 2 ft / sec or greater.

2.2 Design Goals *(refer to Conceptual Design Plan in map pocket)*

1. Design embankment height to be the minimum required (6 ft) while minimizing the excavation required to attain the required freeboard criteria and to provide a significant peak discharge attenuation.
2. Provide for storm water quality improvement by means of the principal spillway structure design.
3. Design the principal spillway outfall pipe to be a gravity drain pipe.
4. Design the main branch and lateral weir structure to divert the maximum flows possible into the pond and allow the low flows to by-pass the lateral weir.
5. Minimize the total discharge at the Saratoga Road box culverts.

2.3 SSCAFCA Additional or Optimal Design Requirements

1. Assume a 10 to 15 ft grading offset from the SSCAFCA property lines to begin grading on all sides except western end of pond area between the north and south arroyo branches.

2. Provide one maintenance access road, 12 ft wide at a 1V:10H maximum slope.

3. Pond sediment storage - the Ultimate Conditions hydrographs have been bulked for sediment therefore do not provide additional sediment storage in the ponding area.

3.0 CONCEPTUAL LEVEL DESIGN

GENERAL DESIGN DESCRIPTION

Refer to Figure 1 in the map pocket for the plan view and design sketches in Appendix 4 for typical cross-sections.

Embankment

The pond embankment will be a maximum of 6 ft tall above the lowest downstream toe of slope. The North Tributary bed elevation of 5194 was applied as the lowest downstream toe of slope located at the northeast corner of the embankment. Therefore the top of embankment height was set at elevation 5200. The embankment will be a soil fill embankment with soil cement for protection in various locations to protect the embankment from the arroyo flows (North Tributary and the Main Arroyo), and the emergency spillway flow. Refer to the conceptual level design plan (Figure 1) in the map pocket.

A keyway trench was considered unnecessary because of the 6 ft (low) embankment height and that most of the pond water volume is below the lowest downstream embankment toe of slope.

Emergency Spillway

Due to the proposed pond location and surrounding topography, the emergency spillway will be located within the pond embankment and flow will be directed towards the existing arroyo and at the Saratoga Road box culverts. The upstream slope approaching the embankment crest, the crest and

the downstream embankment slope (emergency spillway chute) will be lined with soil cement that will be less expensive and visually appear more natural than traditional concrete. The slopes have been designed as 1V:3H built as 1 ft thick soil cement steps with an 8 ft width. The spillway was sized to pass the part of the 100-year 24-hour storm peak discharge without overtopping the top of embankment and attempted to maintain 1 ft of freeboard to top of embankment. The spillway will have a 250 ft top width. The plan view of the spillway is shown on the conceptual plan (map pocket).

Principal Spillway

The principal spillway will be a vertical walled reinforced concrete box structure 5.8 ft in height with a grate on top as a storm water quality feature to remove floatable debris. The structure will be 8 ft x 8 ft in plan view, with three sides exposed to the ponding area with the 5.8 ft tall vertical walls. There will be two rows of 8 inch diameter reverse incline ports, each with 12 ports per row (4 per side).

The principal spillway outfall pipe will be a 36 inch diameter pipe.

Appendix 4 contains conceptual design details for the following items:

Plan View – Saratoga Pond Principal Spillway

Profile View – Saratoga Pond Principal Spillway

Lateral Weir

The lateral weir will be soil cement 620 ft long with a maximum height of 1.5 ft above the main arroyo bed and the slope from the weir crest to the pond invert have been designed as 1V:3H built as 1 ft thick soil cement steps with an 8 ft width.

North Tributary Arroyo

The North Tributary Arroyo will be realigned to the north near the culverts to allow a more efficient transition into the box culverts. The arroyo bank slopes have been designed as 1V:3H slopes built as 1 ft thick soil cement steps with a 4 ft width and a maximum height of 4 ft. The bed will be lined with soil cement 1 ft thick up to the maintenance access road. The south bank will be lined with soil cement steps west of the maintenance access road. The north bank west of the maintenance access road shall be graded at 1V:3H or milder slopes along the private property lines and lined with gravel mulch and seeded.

Main Arroyo

The arroyo north and south bank slopes have been designed as 1V:3H slopes built as 1 ft thick with a 4 ft width and a maximum height of 4 ft. The bed will be lined with soil cement 1 ft thick from the box culverts to the upstream end of the transition into the soil cement section just west of the lateral weir. The bed must be lined in front of the lateral weir to ensure that the bed is stable to ensure that the water surface elevations required to spill through the lateral weir can be assured.

3.1 Design Constraints and Allowances

Refer to **Figure 1** (map pocket) for the Conceptual Level design and grading plan for the Saratoga Pond / Embankment and arroyos.

The pond design constraints are as follows:

1. Limited culvert capacity at the Saratoga Road box culverts that is about 1800 cfs with the proposed upstream channel improvements.
2. Limited pond area based on SSCAFCA ROW, the existing topography and the existing sanitary sewer line located in the Main Branch of Lomitas Negras Arroyo.
3. Large runoff hydrograph peak discharge and runoff volume with respect to the pond area available.
4. Only simulate / design a non-jurisdictional pond with a maximum embankment height of 6 ft as measured from the lowest downstream embankment slope at intersection with existing ground elevation.

The proposed arroyos / channel design constraints are as follows:

1. Limited grading to the private property lines along the south and north sides of the North Tributary and Main Branch.
2. Existing sanitary sewer line in the Main Branch. The conceptual design bed slopes were computed to ensure that the man-hole rims would not be elevated above the proposed soil cement bed.

The overall design allowances are as follows:

1. The total Ultimate Conditions peak discharge may overtop Saratoga Road, however, try and keep below 2000 cfs as specified by SSCAFCA.
2. May conceptually grade / design the pond to utilize lots (between the North Tributary and the Main Branch) to the west of the SSCAFCA property (SSCAFCA will attain required property).
3. Due to the North Tributary Arroyo poor angle of flow towards the Saratoga Box culverts, design the Tributary to extend north into the SSCAFCA owned lot just west of Saratoga Road.

3.2 Lateral Weir Options

Many lateral weir options were considered and many iterations of weir heights, channel widths in front of the weir, Manning's Roughness Coefficients and flow regime (sub-critical and supercritical) were simulated with the HEC-RAS models. **Table 1** (next page) illustrates the lateral weir rating curve for Option 8.3 that was determined as the most feasible and the rating curve for that option was adopted for the HEC-HMS hydrograph flow divide rating curve. The rating curve simulates that the Main Branch flow will divide at the lateral weir. Low flows will drain to the Saratoga Road box culverts and high flows will spill into the pond through the lateral weir. The lateral weir will be described further.

Table 1
Lateral Weir Option 8.3 Results
Rating Curve for flow divide into Saratoga Pond

Q Upstream of Weir (cfs)	Q Weir (cfs)	Q Downstream of Weir (cfs)	
0	0	0	
0.5	0	0.5	
25	0	25	
100	0	100	
200	0	200	
300	0	300	
400	0	400	
500	0.86	499.14	
600	27.37	572.12	
700	79.72	620.22	
800	141.18	658.9	
900	206.63	694.24	
1000	279.49	721.03	
1100	357.95	745.16	
1200	442.28	749.56	
1300	530.26	777.61	
1400	609.81	798.96	
1500	688.56	819.83	
1600	768.39	840.7	
1700	829.04	861.63	
1800	910.79	871.61	
1900	999.99	899.25	
2000	1073.05	928.69	
2100	1124.69	956.44	
2200	1214.31	987.81	
2300	1309.65	975.91	
2400	1377.61	997.47	
2500	1480.34	1001.05	
2600	1568.62	1021.58	
2700	1628.5	1051.42	
2800	1729.15	1082.02	
2900	1824.04	1102.1	
3000	1916.6	1116.38	
3100	1978.06	1137.73	
3200	2085.29	1153.78	
3338	2190.74	1190.51	
3350	2209.19	1183.05	actual value is correct

4.0 HEC-HMS HYDROLOGIC AND HEC-RAS HYDRAULIC MODELS

4.1 HEC-HMS HYDROLOGIC MODELS

HEC-HMS Model Data and Assumptions

HEC-HMS Program (Version 4.0). SSCAFCA provided the Ultimate Conditions 100-year 24-hour storm model from the Montoyas Watershed Park Management Plan, Version 2.0, December 2011. That model was adopted, copied and then modified to simulate the hydrologic divides at the lateral weir and analysis points required to determine the hydrograph into the Saratoga Pond and the final composite hydrograph at Saratoga Road.

Appendix 2 contains a schematic of key analysis points and the Ultimate Conditions HEC-HMS model output from the Management Plan model. In addition, **Appendix 2** contains the HEC-HMS output of the pond routings from the proposed Saratoga Pond Ultimate Conditions model.

Table 2 (next page) contains a summary of the hydrologic results for the EXISTING, DEVEX and ULTIMATE modeling scenarios from the Management Plan.

TABLE 2

HYDROLOGIC DATA SUMMARY FOR THE LOMITAS NEGRAS ARROYO

Location Description	HEC-HMS Model Element Name	Model Condition	Drainage Area	**100-year Peak Discharge**	100-year Runoff Volume
			sq mi	cfs	ac-ft
HYDROLOGIC RESULTS FROM MONTOYAS WATERSHED PARK MANAGEMENT PLAN Version 2.0 Dec. 2011					
Total at Saratoga Road	L2.106TOT	EXISTING	4.78	**3047**	262
		DEVEX	4.78	3883	341
	" " (Inflow to proposed Dam 23 - Saratoga Dam)	ULTIMATE	4.049	**3966 ***	288
SARATOGA DAM SCHEMATIC DESIGN - JURISDICTIONAL DAM, EASTERLING CONSULTANTS, APRIL 2014					
Total at Saratoga Road	Outflow from proposed Saratoga Dam	ULTIMATE	4.049	**1464**	288
HYDROLOGIC RESULTS FROM MONTOYAS WATERSHED PARK MANAGEMENT PLAN Version 2.0 Dec. 2011					
Total at NM 528	L2.107UP	EXISTING	5.133	**3132**	284
		DEVEX	5.133	3990	364
		ULTIMATE	4.402	**2226**	314
Basin between NM 528 and Dulcelina Curtis Channel Inlet	L2a.110A	EXISTING	0.095	85	6
		DEVEX	0.095	97	7
		ULTIMATE	0.095	125	8
Total at Dulcelina Curtis Channel Inlet	L2a.110AUP	EXISTING	5.228	3156	290
		DEVEX	5.228	4013	372
		ULTIMATE	4.497	2250	323
FEMA HYDROLOGIC RESULTS FROM Flood Insurance Study, Sandoval County NM and Incorporated Areas, FEMA, March 18, 2008					
Total at Dulcelina Curtis Channel Inlet - Assume same at Saratoga Rd.	AHYMO 392 Model	Existing	5.29	**776**	not provided

* This is a corrected value by SSCAFCA, as SSCAFCA found an error in the Master Plan Model, Original Master Plan value was 3675 cfs

4.2 HEC-RAS HYDRAULIC MODEL

HEC-RAS Model Data and Assumptions

HEC-RAS Program (Version 4.1.0). A steady flow model was created to determine the water surface profiles and associated hydraulics for the 100-year storm peak discharge (Ultimate Conditions). Models were prepared for the North Tributary Arroyo and for the Main Branch.

See **Figure 1** (map pocket) for the cross-section locations and orientations. The upstream limit is the natural arroyo a few hundred ft west of the proposed pond limits for the North Tributary Arroyo and the Main Branch. The downstream limit is a few hundred ft east of the Saratoga Road box culverts (2 – 6 ft rise X 12 ft span concrete box culverts (CBCs)). The culverts were simulated only in the Main Arroyo model and were assumed to be sediment free.

Centerline Stationing

All stationing referenced here is with respect to the arroyo centerline stationing defined by Smith Engineering Company.

Cross-Section Orientation

For the entire reach, cross-sections are generally oriented perpendicular to the flow direction or arroyo centerline. Some engineering judgment was required for cross-section orientation.

Cross-Section Interpolation

Interpolated sections were not included in the models.

Proposed North Tributary Arroyo and Main Arroyo Bed Slopes and Proposed Channel Description

The proposed bed slopes for both channels were defined by setting elevations required to match existing bed slopes as best possible considering the following items:

- Address toe of slope to embankment height requirements to maintain a non-jurisdictional embankment height of 6 ft or less from existing toe of slope
- To address the sanitary sewer manhole rim elevations in the Main Arroyo
- To allow the Main Arroyo bed elevations and lateral weir elevations to be set with respect the emergency spillway elevation. *The bed slope computations are included in* ***Appendix 3.***

Manning's Roughness Coefficients (n)

Natural Arroyo

The channel Roughness Coefficients for the natural arroyo sections were computed based on the procedure identified in the SSCAFCA Sediment and Erosion Design Guide, November 2008. The computed channel "n" value is 0.035 (see Table in Appendix 3).

Soil Cement Channel

For the proposed soil cement, numerous iterations of the bed widths and the lateral weir heights indicated that a value of about 0.026 is required. This "n" value could possibly be attained by

construction of a tined or scarified soil cement surface and in addition embedment of small cobble stones. Lab experiments will be required to determine what actual "n" value is required.

The channel will also require a bed transition that tapers from 80 ft upstream to about 30 ft at downstream end of weir. The transition is needed to create water surface elevations required to spill the required hydrograph through the lateral weir. To construct soil cement with this value, the soil cement must be finished with a very rough surface and possible require small cobbles embedded in the surface. This "n" value assumption must be verified and simulated with a physical model.

Overbanks

The overbank "n" value was assumed as 0.04 due to moderate small brush vegetation. Note that the overbank "n" value has little effect in this case as the water surface rarely escapes the banks.

Ineffective Flow

Ineffective flow was not considered necessary for this analysis.

Contraction and Expansion Coefficients

The default values of 0.1 and 0.3 were adopted for all typical arroyo sections. However, these were increased to 0.3 and 0.5 for sections just upstream and downstream of the Saratoga Road box culverts.

Starting Water Surface Elevation

The upstream and downstream boundary water surface computations were set to begin at critical depth as a simplified way to begin HEC-RAS water surface computations. That assumption will be refined during final design.

Flow Regime

The models were run assuming mixed flow (computes supercritical and subcritical flows as required) and the Froude Number results indicated that most sections had a Froude No. greater than 1 which implies the flow regime is supercritical or the flow may be near critical depth for most sections. Subcritical flow occurs near the box culverts as these overtop or choke and cause backwater west into the arroyos for a short distance.

HEC-RAS Model Results

North Tributary Arroyo

Refer to **Figure 1** (map pocket for the North Tributary). The proposed channel profile, cross-section plots and tabular results are included in **Appendix 3**. The hydraulic results are summarized here:

100-yr. peak discharge = 768 cfs

Velocities in the upstream soil bed channel are about 8.5 ft / sec and are 11 ft / sec in the soil cement lined section downstream of the maintenance access road.

Flow depths in the upstream soil bed are about 1.5 ft and are 1.2 ft in the soil cement lined section downstream of maintenance access road.

Based on the maximum depth, the north pond top of embankment was set at 4 ft above the proposed arroyo bed elevation and this will provide more than 1 ft of freeboard.

Main Branch Arroyo (Lateral Weir Option 8.3)

Refer to Figure 1 (map pocket for the Main Branch Arroyo). The proposed channel profile, cross-section plots and tabular results are included in **Appendix 3**.

Lateral Weir Option 8.3, Bed Description and Rating Curve

Bed adjacent to weir begins as 80 ft wide and will transition to a 30 ft wide bed at the downstream end of the weir. Manning's "n" value of 0.026 was assumed for bed and banks.

Weir height is 1.5 ft above bed elevation and weir crest profile parallels the bed profile.

Weir is 620 ft long. Twenty six cross-section including interpolated sections were applied to the weir option (these are not shown on Figure 1).

The HEC-RAS default weir coefficient of 2 was applied in the lateral weir option.

Table 1 (previous) is a summary fo the lateral weir flow divide rating curve. **Appendix 3** contains Table 5 that is the HEC-RAS output that summarizes the lateral weir flow divide rating curve and other results. This rating curve data was applied in the HEC-HMS model to simulate the lateral weir.

Main Arroyo Branch Hydraulic Results

100-yr. peak discharge = 3338 cfs
Maximum velocity = 15 ft / sec on the soil cement bed
Maximum depths are between 3 and 4 ft deep on the soil cement bed

4.3 HYDROLOGIC AND HYDRAULIC RESULTS

Pond Routing Data and Results

Appendix 2 contains Table 1 that contains the pond Elevation – Volume – Discharge data, assumptions, computations and resulting rating curves. The discharge rating curve for the 36-inch diameter culvert was determined with various depth iterations with the Culvert Master Program and the rating curve assumptions and output is included in **Appendix 2.**

Table 3 (next page) is a summary of the pond routing results that indicates that the pond will have greater than the required 1 ft of freeboard for the 100-year storm and the results are as follows:

100-year 24-hour storm = Freeboard = 2.4 ft to the top of embankment

Pond Option 1 and Lateral Weir Option 8.3 Data and Results

Figure B (after Table 3) contains a schematic that summarizes the peak discharges for arroyos, the pond outflow, the lateral weir and total flow at Saratoga Road.

TABLE 3

Saratoga Pond Detention Pond Routing Summary - Conceptual Design Option 1 based on Lateral Weir Option 8.3

Design Memorandum based on the "Montoyas Watershed Park Management Plan Version 2.0, Dec. 2011 Modified by Smith Engineering Company, October 2014

Detention Pond Name	Existing or Proposed Pond	Development / Model Condition	Return Period	Drainage Area	Peak Inflow	Peak Outflow	Inflow Runoff Volume	Outflow Runoff Volume	Maximum Storage Volume (top of embankment)	Peak Storage Volume	Peak Water Surface Elevation	Top of Principal Spillway Elevation	Emergency Spillway Elevation	Pond Invert Elevation	Max Pond Depth	Water Depth	Top of Pond Embankment Elevation	**Free board to Principal Spillway Elevation**	**Free board to Emergency Spillway Elevation**	**Free board to top of Pond Embankment**
				(sq mi)	(cfs)	(cfs)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	**(ft)**	**(ft)**	**(ft)**
a	a	b			c	c	c	c	d	c	c	d	d	d	d		d	**e**		**e**
Saratoga Pond	**Proposed**	Ultimate	100 yr-24hr	3.2680	2191	80	85.3000	85.3000	103.2445	79.8000	5197.60	5192.00	5198.00	5186.21	14	11.4	5200.00	**-5.6**	**0.4**	**2.4**
				Total area of Main Arroyo at upstream end of weir																

Footnotes for Detention Pond Routing Summary Table

a - See Conceptual Design Plan in Map Pocket

b - Existing - Existing development conditions and existing infrastructure. DEVEX - Developed - Full basin development with existing infrastructure. Ultimate - Full basin development including proposed infrastructure.

c - Results summarized from the HEC-HMS model (Appendix 2) prepared Smith Engineering to simulate the proposed Saratoga Pond

d - See elev-area-capacity-discharge data table and sources - Table 1 in Appendix 2

e- Negative number indicates the flow depth exceeds referenced elevation - no freeboard available therefore cell highlights in red

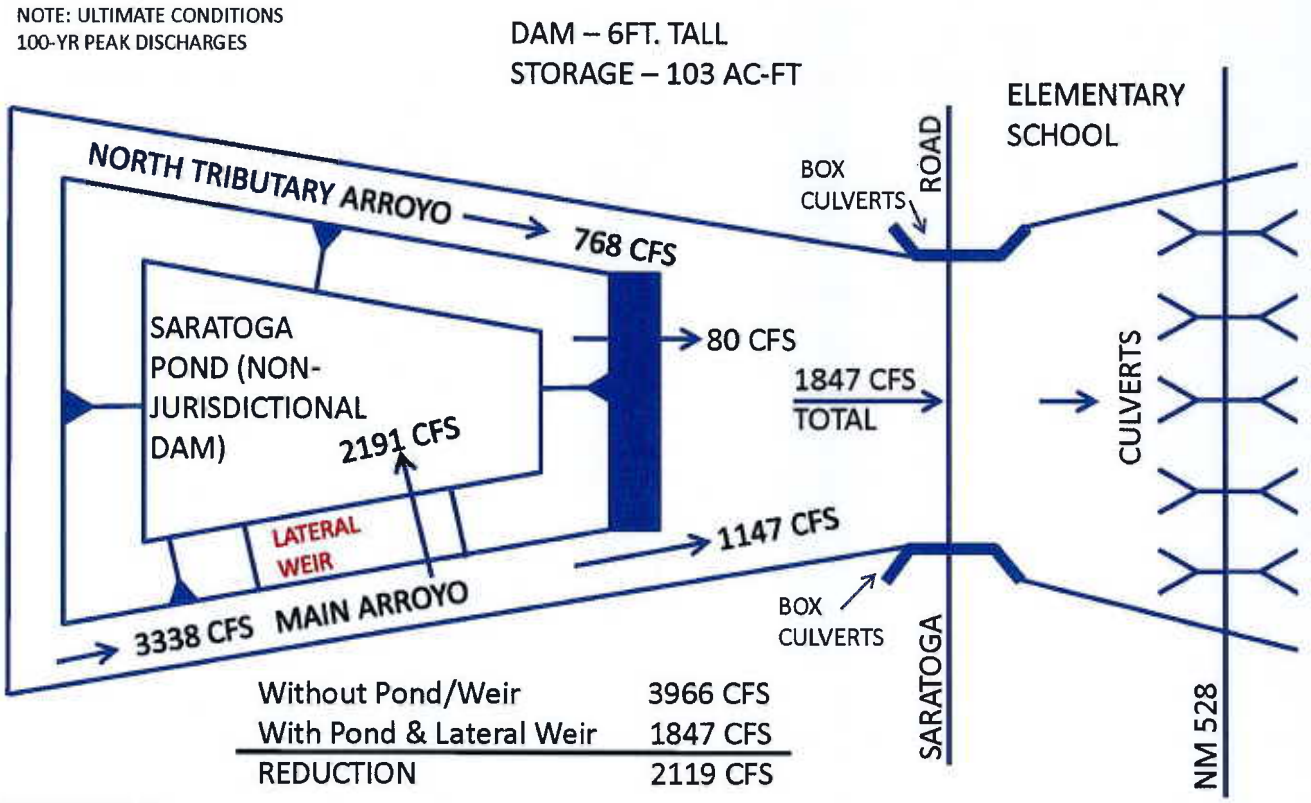


FIGURE B:
SARATOGA POND / LATERAL WEIR – FLOW SCHEMATIC

NOTE:

Peak discharges are not additive and are based on hydrograph timing

Saratoga Road Spill

The maximum capacity of the 2- 6 ft rise X 12 ft span box culverts is about 1000 cfs and the maximum 100-year peak discharge reaching the box culverts based on the total HEC-HMS output (based on the Saratoga Pond Option 1) is about 1847 cfs. The spill over the road is about 568 cfs and the flow depth over the road based on the upstream energy grade line is about 1.2 feet and would occur for just a few moments until the peak discharge recedes.

NM 528 culverts will not be overtopped with the Saratoga Pond Option 1 peak discharge. That conclusion was based on the HEC-RAS model results for a previous preliminary model developed by Smith Engineering that included the reach from Saratoga Road to the Dulcelina Curtis Channel inlet.

The model that includes the improved Main Branch and North Tributary channels upstream of Saratoga Road, the Saratoga Road box culverts and the NM 528 box culverts will be refined in the future after final design concepts have been adopted.

CONCLUSION

1. A small pond with a 6 ft tall embankment is possible and will contain the portion of the Main Arroyo hydrograph that enters the pond and the peak stage will remain below the emergency spillway crest.

2. The maximum flow depth over Saratoga Road is about 1.2 ft for just a few moments during the peak of the hydrograph.

3. The results of the hydrologic and hydraulic analyses are based on the conceptual level design as shown on **Figure 1**.

5.0 SCOUR COMPUTATIONS

Scour computations were conducted for the toe of the soil cement bank linings in the North Tributary and the main branch. **Appendix 3** contains the scour computations and the reference for these formulas. In summary, the 100-year scour depths are as follows:

North Tributary = 1.9 ft
Main Branch = 3.9 ft

These depths should be applied in final channel wall invert elevation design.

6.0 CONCEPTUAL LEVEL QUANTITY AND COST ESTIMATES

6.1 CONCEPTUAL LEVEL QUANTITY ESTIMATES

The conceptual level quantities were computed or measured based on the conceptual level design features described previously and as presented on conceptual plan in the map pocket or on the design sketches provided in **Appendix 4**. Note that soil cement steps that are 1 ft thick and 4 ft wide are proposed for the bank linings. For the emergency spillway and lateral weir, soil cement steps that are 1 ft thick and 8 ft wide are proposed due to energy and scour possibilities at these locations.

The conceptual plan (map pocket) illustrates areas and lengths of many construction items and identifies features with labels such as "SC1" which represents soil cement area 1. These labels and areas are included in the Conceptual Quantity Estimate Tables included in **Appendix 4**. The tables also summarize other design dimensions and assumptions.

Appendix 4 contains the conceptual level quantity estimates and the cut and fill quantities are summarized in a printout (cut / fill report) from AutoCAD Civil 3D Software.

Sediment Stockpile Locations

The existing SSCAFCA lot adjacent to Saratoga Road will function to store some sediment, however another location will be required to store the extreme large excess remainder of excess sediment.

6.2 ENGINEER'S CONCEPTUAL LEVEL ESTIMATE OF PROBABLE CONSTRUCTION COST

Table 4 (next page) presents the estimate of probable construction cost for only the major construction items. The table also includes comments regarding the unit cost assumptions. **Appendix 4** contains bid tab summaries from three previous dams / ponds that were evaluated in estimating unit costs and also for the recent Lomitas Negras Phase 1 project. In addition, some assumptions were developed based on previous projects designed by Smith Engineering Company.

To account for the conceptual level design, a 25% contingency factor was applied to the subtotal cost to arrive at the total estimated probable construction cost of

$4,623,139 or about $4.6 million dollars.

As stated earlier, SSCAFCA will need to purchase the lot west of the pond site as shown on the Conceptual Level Plan (Figure 1 in map pocket). The cost of this lot was not estimated at this time.

6.3 RECOMMENDATIONS and CONCLUSIONS

RECOMMENDATIONS

A physical model of the main branch of the arroyo and the lateral weir should be conducted prior to final design to ensure that the proposed dimension and weir height will function as simulated in the HEC-RAS model. In addition, if SSCAFCA decides to proceed with this project, then the property acquisition process should begin for the lot west of the proposed pond site.

CONCLUSIONS

1. The Saratoga Pond as simulated will greatly reduce overtopping at Saratoga Road as compared to the Ultimate Conditions without the Saratoga Pond and will eliminate all overtopping at NM 528.
2. The reduced discharges at Saratoga Road will provide traffic and pedestrian safety benefits at Saratoga Road and also eliminate the floodplain on the Enchanted Hills Elementary School property as compared to the Ultimate Conditions without the Saratoga Pond.

TABLE 4

ENGINEERS CONCEPTUAL LEVEL ESTIMATE OF PROBABLE COST

Saratoga Pond - Conceptual Level Design (Smith Engineering Company)

Bid Item No.	Item Description	Unit	Estimated Quantity	Unit Cost	Total Cost	Unit Cost Sources / Assumptions
	CIP = Complete in Place (includes all equipment, materials and labor), Compl. = Complete			$	$	
a			b	c		c
121	36-INCH DIA. HDPE PIPE: Pipe material, joint welding, trenching, backfill & compaction. CIP	LF	270	234.00	63,180	Assumed by Smith Engineering (78.50/LF for 36-in Solid Wall HDPE SDR 32.5 (50 psi) - obtained for SECOR Inc. 6-3-13). Assume 3X pipe cost to include installation, CIP
201	CLEARING & GRUBBING: Compl.	ACRE	18	557.00	10,026	Lomitas Negras Phase 1 Bid Award
210.6.1.1	ROUGH GRADING : Pond bottom area and areas outside the top of pond cut slopes, and outside the toe of dam slopes. Finished grades shall match plan grades or contours within 0.5 ft. Compl.	SY	52,692	1.50	79,038	Assumed by Smith Engineering based on Final Grading Cost of 1$ / SY in Sunset Pond Estimate
302	AGGREGATE BASE COURSE: Install 6-inch thick within areas shown on plans. CIP.	SY	1,000	10.00	10,000	Sunset Pond Eng. Est. of probable cost
500	REINFORCED CONCRETE STRUCTURES : Colored reinforced concrete (4,000 psi) incl. all rebar, (principal spillway). Includes excavation and backfill for structures. CIP (I1)	CY	22	500.00	11,000	Assumed by Smith Engineering based on values of 400$ and $600/ cu yd in Sunset Pond Estimate
601. S2	FILL SOIL : Fill soil material for embankment when obtained from within the limits of construction, includes, blending / mixing to obtain homogenous material / construction in lifts, rough & final grading of embankment slopes. CIP.	CY	7,000	12.00	84,000	Assumed by Smith Engineering. Sunset Pond had $3.80 / CY,
601. S3	UNCLASSIFIED EXCAVATION : Dispose of excess soils off-site to SSCAFCA designated location within 6 mi radius, compaction not required. Compl.	CY	**259,970**	**6.50**	**1,689,805**	Assumed by Smith Engineering based on Final Grading Cost of 4.50 $ / CY in Sunset Pond Estimate and add exra to include haul costs
603	RIP-RAP : Type M Rip-Rap (Std. Spec. Section 109 Table 109.A) Install 2 feet thick within areas shown on plans. Assume filter fabric is incidental to rip-rap. CIP.	CU YD	474	150.00	71,100	Sunset Pond Eng. Est. of probable cost
920.42	Existing SAS Manhole Frame & Cover to Grade, adjust to pavement grade where adjustment of concret or block barrel is requried, CIP	EA	2	3,000.00	6,000	City of Alb. Estimated Unit Prices for Contract Items 2009. City showed $721.98, Smith experience increased this to $3000
1012.4.1	NATIVE SEEDS : All disturbed areas incuding pond bottom and pond side slopes, CIP.	ACRE	3	2,727.00	8,454	Lomitas Negras Phase 1 Bid Award
1012.4.3.3	SANTA FE BROWN GRAVEL MULCH: All disturbed areas incuding pond bottom and pond side slopes, CIP.	ACRE	3	10,000.00	31,000	Sunset Pond Eng. Est. of probable cost
G. S	Gate : Install 12 ft. square tube drainage gate, CIP.	EA	1	2,000.00	2,000	Sunset Pond Eng. Est. of probable cost was $1500, Assume $2,000
F. S	FENCING : Install 5 strand barbless wood post fence. CIP.	LF	170	5.00	850	Sunset Pond Eng. Est. of probable cost
SC. S	SOIL CEMENT : Includes all materials (portland cement, native soil) labor, equipment, and placement in 1-foot thick lifts. CIP.	CY	**13,400**	**100.00**	**1,340,000**	Assumed based on unit cost provided by AMAFCA and Lomitas Negras Phase 1 Bid
CS. S	CONSTRUCTION STAKING : Includes topographic survey of over excavated surface and final as-built survey preparation, Setting monuments on top of dam. Comp.	LS	1	7,500.00	7,500	Assumed by Smith Engineering
NP. S	NPDES PERMITTING : SWPPP preparation, implementation, montitoring, record keepting, including silt fencing (3 ft tall with 5-ft steel posts at 10 ft on center) and all BMP's including initial installation and and maintenance as required. CIP.	LS	1	6,000.00	6,000	Assumed by Smith Engineering
T. S	TESTING : Testing and Approval of all soil fill, concrete, soil cement, materials, compl.	LS	1	19,000.00	19,000	Assumed by Smith Engineering
PE. S	PROFESSIONAL GEOTECHNICAL ENGINEER : Professional Geotechnical Engineer for 2 hours / day during excavation, backfill and compaction of all soils work related to embankement and principal spillway construction. Compl. (Assume 2 months =80 hours for embankment / pipe culvert @ $220/hr*	LS	1	17,600.00	17,600	Assumed by Smith Engineering
SUBTOTAL $	**3,456,553**					
M. S	MOBILIZATION: (assume 4% of subtotal cost)	LS	1	138,262.11	138,262	Assumed by Smith Engineering
DM.S	DEMOBILIZATION: (assume 3% of subtotal cost)	LS	1	103,696.58	103,697	Assumed by Smith Engineering
	SUB-TOTAL COST excluding CONTINGENCY FACTOR				**3,698,511**	
	TOTAL COST WITH 25% CONTINGENCY FACTOR				**4,623,139**	

ENGINEERS CONCEPTUAL LEVEL ESTIMATE OF PROBABLE COST

Saratoga Pond - Conceptual Level Design (Smith Engineering Company)

Bid Item No.	Item Description	Unit	Estimated Quantity	Unit Cost	Total Cost	Unit Cost Sources / Assumptions
	CIP = Complete in Place (includes all equipment, materials and labor), Compl. = Complete			**$**	**$**	
a			**b**	**c**		**c**
	FOOTNOTES, and INCIDENTALS					
a	Bid Item Numbers (example 201) are either: NM Std. Spec. Section No.s, OR, all others that end with " .S "represent Supplimental Specification Section No.s not prepared at this conceptual level design.					
b	See See Conceptual Level Design Grading Plan (map pocket), details in Design Memorandum and Quantity Cost Estimate Spreadsheet for computations / documentation of quantities					
c	See Column to right of "Total Cost" Column for Unit Price sources or assumptions					
Incidentals						
! 1	Excavation and Backfill for Structures - Std. Spec. Sect. 501.6.1.1 states this is included in the cost of the structures (Box culvert, principal spillway, soil cement and rip-rap)					
	NOTES					
1012.6.2.3	Seeding with Gravel Mulch : Class A seeding with crushed or screened gravel 3/4 in. to 1 in. maximum size with minimum of 1 fractured face. Apply to all disturbed areas without other treatments including pond bottom and pond side slopes. (Std. Spec. Sect. 1012) NOTE - AMAFCA ONY USES THIS ON SLOPES STEEPER THAN 1V:2H					

LEGEND

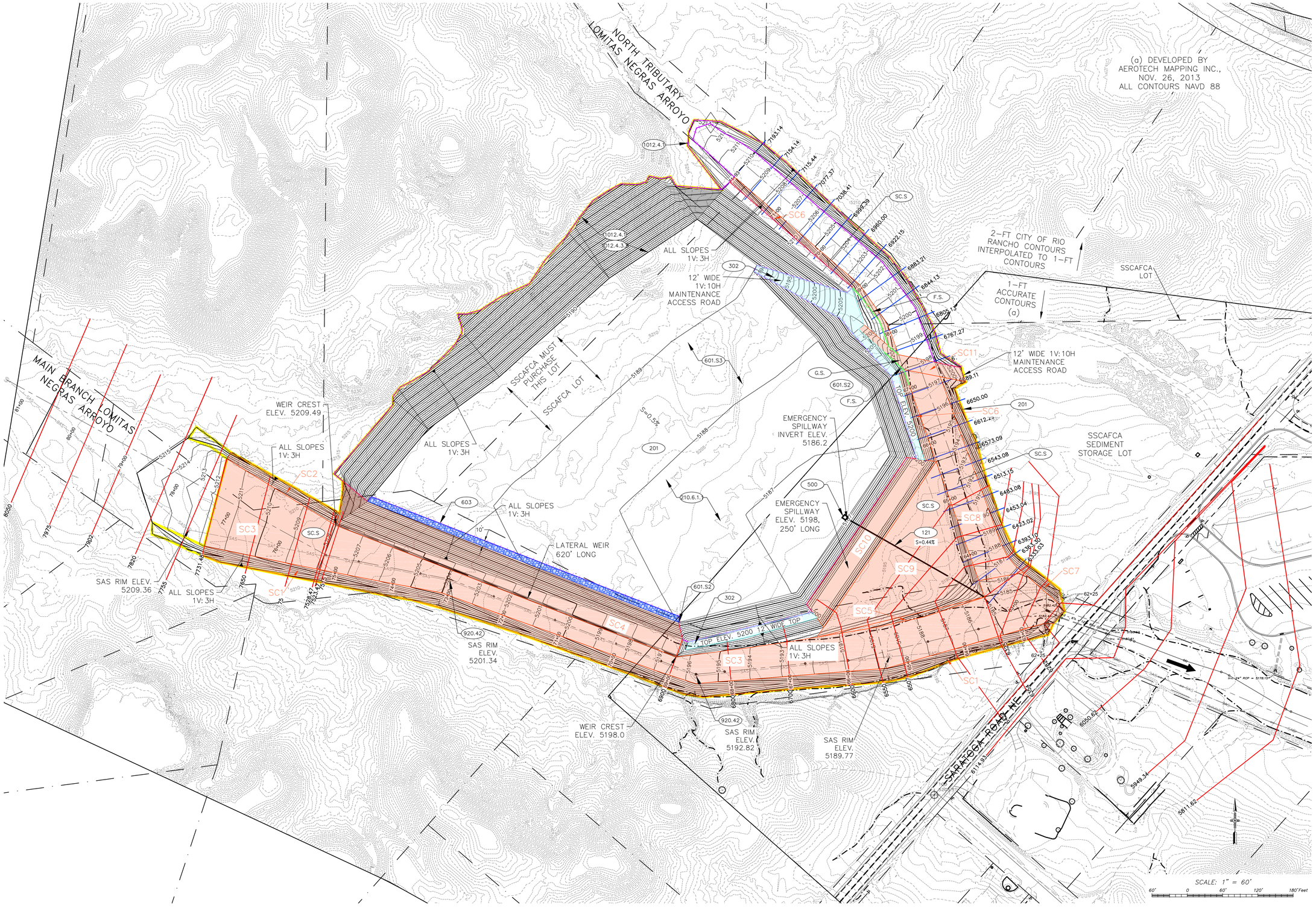
- FIVE STRAND NON–BARB WIRE FENCE
- SEEDING LIMIT
- CLEAR AND GRUB
- RIP RAP–TYPE M 2–FT THICK
- BASE COURSE 6–IN THICK
- SOIL CEMENT 1–FT THICK X 4–FT OR 8–FT WIDE 1V:3H SLOPES, STAGGERED OVERLAPPED LAYERS TO ACHIEVE SLOPES.
- 6717 MAIN BRANCH HEC–RAS CROSS SECTIONS
- 6720 NORTH TRIBUTARY HEC–RAS CROSS SECTIONS

BUILD/PAY NOTES

121	36-INCH DIA HDPE PIPE: Pipe material, joint welding, trenching, backfill & compaction. CIP
201	CLEARING & GRUBBING: Compl.
210.6.1.1	ROUGH GRADING : Pond bottom area and areas outside the top of pond cut slopes, and outside the toe of dam slopes. Finished grades shall match plan grades or contours within 0.5 ft. Compl.
302	AGGREGATE BASE COURSE: Install 6-inch thick within areas shown on plans. CIP.
500	REINFORCED CONCRETE STRUCTURES : Colored reinforced concrete (4,000 psi) incl. all rebar, (principal spillway). Includes excavation and backfill for structures. CIP
601.S2	FILL SOIL : Fill soil material for dam embankment when obtained from within the limits of construction, includes, blending / mixing to obtain homogenous material / construction in lifts, rough & final grading of dam embankment slopes. CIP.
601.S3	UNCLASSIFIED EXCAVATION : Dispose of excess soils off-site to SSCAFCA designated location within 6 mi radius, compaction not required. Compl.
603	RIP-RAP : Type M Rip-Rap (Std. Spec. Section 109 Table 109.A) Install 2 feet thick within areas shown on plans. Assume filter fabric is incidental to rip-rap. CIP.
920.42	Existing SAS Manhole Frame & Cover to Grade, adjust to pavement grade where adjustment of concrete or block barrel is required. CIP
1012.4.1	NATIVE SEEDS : All disturbed areas, CIP.
1012.4.3.3	SANTA FE BROWN GRAVEL MULCH: All disturbed pond side slopes, CIP.

G.S	Gate : Install 12 ft. square tube drainage gate, CIP.
F.S	FENCING : Install 5 strand barbless wood post fence. CIP.
SC.S	SOIL CEMENT : Includes all materials (portland cement, native soil) labor, equipment, and placement in 1-foot thick lifts.
CS.S	CONSTRUCTION STAKING : Includes topographic survey of over excavated surface and final as-built survey preparation, Setting monuments on top of dam. Comp.
NP.S	NPDES PERMITTING : SWPPP preparation, implementation, monitoring, record keeping, including silt fencing (3 ft tall with 5-ft steel posts at 10 ft on center) and all BMPs including initial installation and maintenance as required. CIP.
T .S	TESTING : Testing and Approval of all Soil Fill, concrete, soil cement, materials, compl.
PE.S	PROFESSIONAL GEOTECHNICAL ENGINEER : Professional Geotechnical Engineer for 2 hours / day during excavation, backfill and compaction of all soils work related to dam and principal spillway construction. Compl. (Assume 2 months =80 hours for dam / pipe culvert @ $220/hr*
M .S	MOBILIZATION:
DM.S	DEMOBILIZATION:

POND OPTION 1
LATERAL WEIR OPTION 8.3



PREPARED FOR SSCAFCA

PRELIMINARY NOT FOR CONSTRUCTION

SARATOGA POND
CONCEPTUAL LEVEL DESIGN

FIGURE 1

SMITH ENGINEERING COMPANY
NEW MEXICO TEXAS

JOB NO: 114126

DATE: NOVEMBER 2014

R7

Q:\SEC-----PROJECTS\114126 Lomitas Negras Off Channel Element\ENGINEERING\CADD\114126 FIGURE 1.dwg Nov 05, 2014 - 1:32pm Saved By: victoriae

APPENDIX 1

Annotated Photographs, Previous Reports, As-Built Plans and Data by Others

1. Annotated Photographs

2. Drainage Map Tile 20 of 25 from:
   Montoyas Watershed Park Management Plan, Version 2.0 December 2011, Bohannan-Huston Inc.

3. Unit 17 Sanitary Sewer Interceptor / Lift Station Rio Rancho NM (12-04-02)

4. Flood Insurance Rate Map (FIRM Panel 1894 of 2225)

Lomitas Negras Arroyo looking upstream from Saratoga Road at Main Branch, North Tributary on right. Location of proposed Saratoga Pond.

Lomitas Negras Arroyo looking upstream from Saratoga Road at Main Branch. Location of proposed Saratoga Pond

Lomitas Negras Arroyo looking upstream from previous photo and upstream from Saratoga Road at Main Branch - location of proposed Saratoga Pond

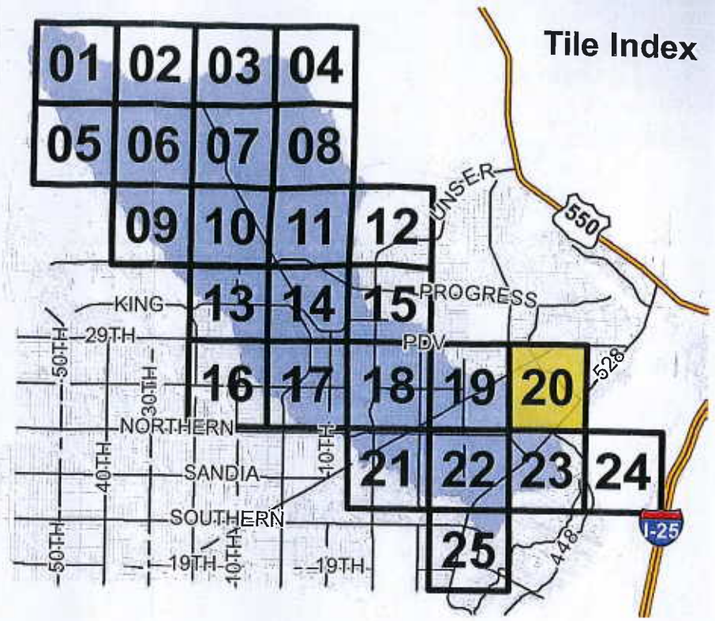
Lomitas Negras Main Branch looking downstream from previous photo at the Saratoga Road and 2 – 6 ft rise x 12 ft span box culverts

Lomitas Negras Arroyo North Tributary (left) at confluence with Main Branch (right) looking downstream - east at Saratoga Road Box and 2 - 6 ft rise X 12 ft span box culverts

Standing on Saratoga Road looking west at Lomitas Negras Arroyo Main Branch on left and the North Tributary on right at location of red marker on blue rail. Location of the proposed Saratoga Pond.

Lomitas Negras North Tributary Arroyo looking upstream - north at confluence with Main Branch, Saratoga Road to right of photo

Lomitas Negras North Tributary Arroyo looking upstream - north from previous photo.



This is a planning document. Nothing herein constitutes any commitment by SSCAFCA to construct any project, study any area, acquire any right of way or enter into any contract. This watershed management plan does not obligate SSCAFCA in any way. Drainage facility alignments, conveyance treatments, corridors, locations, rights-of-way and cost estimates are conceptual only, and may be altered or revised based upon future project analysis, changed circumstances or otherwise.

Legend

- Watershed Boundary
- Drainage Basin
- General Flow Direction
- Basin Outlet
- Lateral Erosion Envelope
- Approx 100yr flood hazard zone
- SSCAFCA Fee Simple Property
- SSCAFCA Easement
- Area w/ Approved Facility Plan
- Section Boundary
- 12 Section Number
- L2.100 Drainage Basin Number
- Existing Crossing Structure
- Natural Arroyo
- Existing Hard Channel
- Existing Soft Channel
- Existing Storm Drain
- Existing Pond/Dam
- Crossing St. Improvement
- Hard Channel
- Soft Channel
- Proposed Pond/Dam
- 12_MO_01P Existing Drainage Facility ID
- 12_MO_01P Proposed Drainage Facility ID

N

1:12,000

1 inch = 1,000 feet

0 0.1 0.2 Miles

Montoyas Watershed Park Management Plan Version 2.0

Drainage Map Tile 18

December 2011

Map Tile 20 of 25

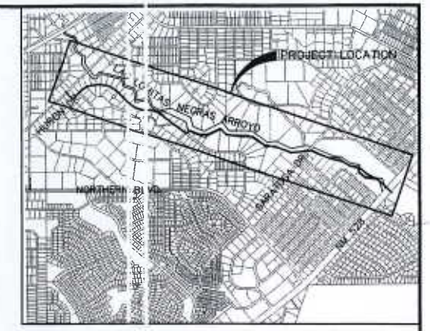
Path: h:\Projects\MOWMP\MOWMP V2.0 Review\MOWMP GIS\Drainage Map Tiles\Tile20

CITY OF RIO RANCHO
DEPARTMENT OF UTILITIES

CONSTRUCTION PLANS
FOR

UNIT 17 SANITARY SEWER INTERCEPTOR / LIFT STATION

RIO RANCHO, NEW MEXICO



VICINITY MAP

INDEX

AS CONSTRUCTED CERTIFICATION

I, DANIEL S. AGUIRRE, NMPE 11955, OF THE FIRM Wilson & Company, HEREBY CERTIFY THAT THIS PROJECT HAS BEEN CONSTRUCTED IN ACCORDANCE WITH THE DESIGN INTENT OF THE APPROVED PLAN DATED 05-07-02. THE RECORD INFORMATION EDITED ONTO THE ORIGINAL DESIGN DOCUMENT HAS BEEN OBTAINED BY RICK O. FENCL, NMPS 10202, AND DATED 09-04-02.

DANIEL S. AGUIRRE, NMPE 11955

10-24-02
DATE

** APPROVAL FOR CONSTRUCTION **

DEPARTMENT OF UTILITIES — DATE 8-10-02

DEPARTMENT OF PUBLIC WORKS — DATE 5/13/02

WILSON & COMPANY
2600 THE AMERICAN ROAD S.E.
SUITE 100
RIO RANCHO, NEW MEXICO
87124
(505) 896-8321

UNIT 17 SANITARY SEWER INTERCEPTOR / LIFT STATION

COVER SHEET

REVISIONS	NO.	DATE	REMARKS	BY

DESIGN	RSM	WCEA NO. X1218040-25	DATE	MAY 2002	
DRAWN	DMD	PROJECT NO. N/A	SHEET NO.	1	OF 21
CHECK	TKM				

T:\PROJECT:\X1218040-25\M\SHEETS\B140-25COV.DWG\05-07-02\DMD

F6, F5, E4

RCS

GENERAL NOTES:

1. ALL WORK DETAILED ON THESE PLANS, EXCEPT AS OTHERWISE PROVIDED HEREON, SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE NEW MEXICO STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1987 EDITION, AS AMENDED THROUGH APRIL 20, 1994 AND THE PROJECT CONSTRUCTION CONTRACT DOCUMENTS AND SPECIFICATIONS, OR AS AMENDED BY SPECIAL PROVISION.

2. ALL WORK ON THIS PROJECT SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL LAWS, RULES, AND REGULATIONS CONCERNING CONSTRUCTION SAFETY AND HEALTH. THESE DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY WHICH SHALL REMAIN THE CONTRACTOR'S RESPONSIBILITY.

3. THESE DRAWINGS REFLECT INFORMATION ON UTILITIES GATHERED BY SITE INSPECTION, POTHOLING, DISCUSSIONS WITH MUNICIPAL OFFICIALS, AND UTILITY COMPANY CONSTRUCTION DRAWINGS. IT IS POSSIBLE THAT THE EXACT LOCATION OF LINES AND UTILITY CONNECTION POINTS IN THE VICINITY OF THE REQUIRED WORK MAY BE DIFFERENT FROM THE LOCATION SHOWN ON THESE DRAWINGS. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL UTILITY OBSTRUCTIONS. SHOULD A CONFLICT ARISE, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.

4. THE CONTRACTOR SHALL PROTECT AND MAINTAIN IN SERVICE ALL EXISTING UTILITIES. THE CONTRACTOR SHALL ADEQUATELY SUPPORT AND PROTECT EXISTING UTILITIES AFFECTED BY THE CONTRACTOR'S OPERATIONS. IN THE EVENT THAT EXISTING UTILITIES ARE DAMAGED BY THE CONTRACTOR'S OPERATIONS, THE CONTRACTOR SHALL ARRANGE FOR AND COORDINATE PROMPT REPAIR BY THE RESPECTIVE UTILITY AND SHALL BEAR THE COST OF REPAIRS.

5. TWO WORKING DAYS PRIOR TO ANY EXCAVATION, THE CONTRACTOR SHALL CONTACT THE FOLLOWING UTILITY LOCATORS FOR SPOTTING OF EXISTING UTILITIES. THE CONTRACTOR SHALL ALSO CALL FOR RE-SPOTS AS NECESSARY TO KEEP UTILITY LOCATIONS CURRENT.

UTILITY	UTILITY LOCATOR
– ELECTRIC	NEW MEXICO ONE CALL SYSTEM, INC. (260–1990)
– TELEPHONE	NEW MEXICO ONE CALL SYSTEM, INC. (260–1990)
– GAS	NEW MEXICO ONE CALL SYSTEM, INC. (260–1990)
– WATER	CITY OF RIO RANCHO WATER AND SEWER DEPARTMENT (896–8297)
– SEWER	CITY OF RIO RANCHO WATER AND SEWER DEPARTMENT (891–5020)
– TRAFFIC SIGNALS	CITY OF RIO RANCHO PUBLIC WORKS DEPARTMENT (891–5016)
– CABLE TV	CABLE ONE (892–5114)

6. WATER AND SEWER SYSTEM FACILITIES ARE OPERATED AND CONTROLLED BY THE CITY OF RIO RANCHO, UTILITY DEPARTMENT. THE CONTRACTOR SHALL CONTACT THE UTILITY DEPARTMENT AT LEAST THREE (3) WORKING DAYS IN ADVANCE OF ANY WORK AFFECTING OR REQUIRING SHUTOFFS OF WATER OR SEWER FACILITIES. (891–5020)

7. THE CONTRACTOR IS ADVISED THAT UTILITY RELOCATIONS AND GRADE ADJUSTMENTS BY THE UTILITY COMPANIES MAY BE PERFORMED CONCURRENTLY WITH CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE FOR UTILITY WORK IN CONJUNCTION WITH CONSTRUCTION OPERATIONS AND SHALL COORDINATE THE SCHEDULING OF WORK WITH THE RESPECTIVE UTILITY COMPANIES. THE CONTRACTOR SHALL PROVIDE FOR THESE CONTINGENCIES WHEN BIDDING THE PROJECT AND NO CLAIM FOR DELAYS DUE TO UTILITY WORK WILL BE ALLOWED.

8. THE CONTRACTOR SHALL CONFINE HIS WORK TO WITHIN THE CONSTRUCTION LIMITS AND/OR PUBLIC RIGHTS–OF–WAY TO PRESERVE EXISTING VEGETATION, LANDSCAPING AND PRIVATE PROPERTY.

9. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ADJACENT PROPERTIES AT ALL TIMES DURING CONSTRUCTION.

10. THE CONTRACTOR SHALL CLEAN ALL EXISTING STRUCTURES THAT ARE TO REMAIN OPERATIONAL, PRIOR TO INITIATING STRUCTURE EXTENSION WORK. STRUCTURES SHALL BE CLEAN AT THE TIME OF FINAL PROJECT ACCEPTANCE. THIS WORK WILL BE CONSIDERED AS INCIDENTAL TO THE COMPLETION OF THE PROJECT AND NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE THEREFOR.

11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL WATER NECESSARY FOR CONSTRUCTION. THE COSTS FOR WATER SHALL BE CONSIDERED INCIDENTAL TO COMPLETION OF THE PROJECT AND NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE THEREFOR.

12. THE CONTRACTOR SHALL MAINTAIN AN UP–TO–DATE SET OF AS–BUILT PLANS FOR THE PROJECT. THESE PLANS SHALL BE KEPT CURRENT, WITHIN TWO WEEKS, AT ALL TIMES AND SHALL BE SUBJECT TO REVIEW BY THE PROJECT MANAGER THROUGHOUT THE PROJECT AND WILL BE REVIEWED BY THE PROJECT MANAGER FOR ACCURACY AND COMPLETENESS AT LEAST ONCE EVERY 30 DAYS. THE "FINAL" AS–BUILT PLANS SHALL BE SUBMITTED TO THE PROJECT MANAGER PRIOR TO FINAL PAYMENT.

13. CLEARING AND GRUBBING WILL BE A BID ITEM IN THIS PROJECT. WORK REQUIRED FOR CLEARING AND GRUBBING THE CONSTRUCTION AREA SHALL INCLUDE STOCKPILING OF TOP SOIL, AND SPREADING THE TOPSOIL ON THE LAST LIFT TO COVER TRENCHES.

14. THE SAS PUMP STATION AT NM 528 SHALL BE AS DETAILED ON SHEETS 17–19 AND AS RECOMMENDED BY THE MANUFACTURER.

15. APPLICABLE SUBMITTALS, INCLUDING BUT NOT LIMITED TO SCHEDULES, TEST RESULTS, TRAFFIC CONTROL AND MATERIALS SHALL BE TRANSMITTED TO THE CONSTRUCTION MANAGER.

16. ALL DISTURBED AREAS OUTSIDE OF ROADWAY AND ARROYO BOTTOM SHALL BE RESEEDED WITH CLASS "C" SEED PER SECTION 1011.

17. ALL CHANGES SHALL BE APPROVED BY THE CITY OF RIO RANCHO OR THEIR DESIGNATED REPRESENTATIVE.

CITY OF RIO RANCHO
DEPARTMENT OF UTILITIES

WILSON & COMPANY
2600 THE AMERICAN ROAD S.E.
SUITE 100
RIO RANCHO, NEW MEXICO
87124
(505) 896–8021

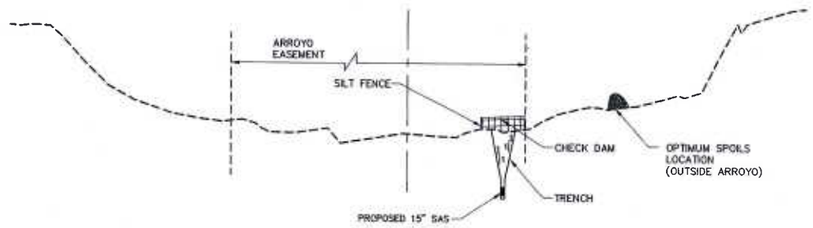
UNIT 17 SANITARY SEWER
INTERCEPTOR / LIFT STATION

GENERAL NOTES

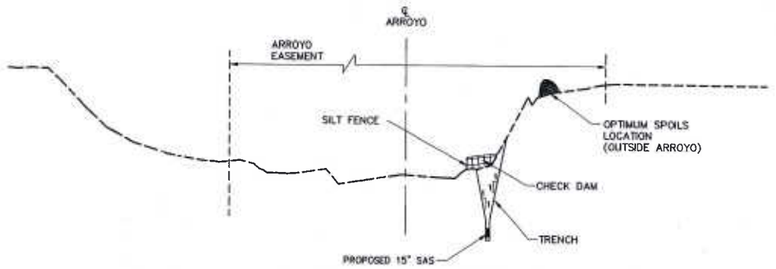
REVISIONS NO.	DATE	REMARKS	BY

DESIGN	RSM	WCEA NO.X1218040–25	DATE MAY 2002
DRAWN	KIS	PROJECT NO. N/A	SHEET NO. 2 OF 21
CHECK	TKM		

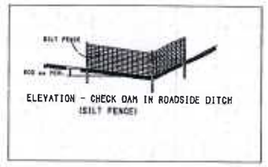
DANIEL VILLARREAL 12985 REGISTERED PROFESSIONAL ENGINEER



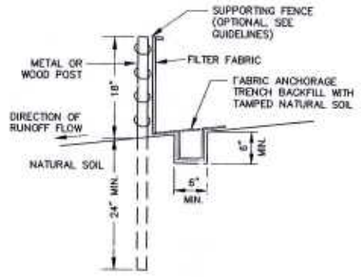
ARROYO TYPICAL SECTION A



ARROYO TYPICAL SECTION B



ELEVATION - CHECK DAM IN ROADSIDE DITCH (SILT FENCE)



ELEVATION

SILT FENCE DETAIL

NTS

GENERAL NOTES:

1. THE CONTRACTORS SHALL INSURE THAT NO SOIL ERODES FROM THE SITE INTO PUBLIC ROW OR ONTO PRIVATE PROPERTY.

2. THE CONTRACTOR SHALL PROMPTLY CLEAN UP ANY MATERIAL EXCAVATED WITHIN THE PUBLIC ROW SO THAT THE MATERIAL IS NOT SUSCEPTIBLE TO BEING WASHED DOWN THE STREET.

3. THE CONTRACTOR SHALL ENSURE THAT THE EROSION CONTROL MEASURES OUTLINED ON THIS SHEET ARE ADHERED TO DURING CONSTRUCTION.

4. ALL DISTURBED PROPERTY MUST BE RESEEDED AS A PART OF THE PROJECT.

5. ALL THE EROSION CONTROL SILT FENCE, SPOILS PILES AND CHECK DAMS SHALL BE INCLUDED AND PAID FOR UNDER THE BID ITEM "EROSION CONTROL/STORM WATER POLLUTION PREVENTION PLAN".

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND COMPLIANCE WITH THE NPDES PERMIT. THIS WORK SHALL BE PAID FOR UNDER THE BID ITEM "NPDES STORM WATER PERMITTING".

SILT FENCE GUIDELINES FOR CONTRACTOR'S USE:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE POST SPACING FOR SILT FENCE TO MINIMIZE MAINTENANCE.

1. POST SPACING SHALL BE 4 FT MAXIMUM W/O SUPPORTING FENCE, 10 FT MAXIMUM WITH SUPPORTING FENCE.

2. POSTS FOR 4 FT MAXIMUM POST SPACING SHALL BE 2" SQUARE NOMINAL SIZE OR HEAVIER WOOD POSTS OR STANDARD T OR U SECTION STEEL POSTS WEIGHING NOT LESS THAN 1.0 LB PER LINEAR FOOT.
POSTS FOR 10 FT MAXIMUM POST SPACING SHALL BE 4" SQUARE NOMINAL SIZE OR HEAVIER WOOD POSTS OR STEEL POSTS AS SPECIFIED ABOVE.

3. SUPPORTING FENCE SHALL BE FASTENED SECURELY TO POSTS WITH STAPLES OR WIRE TIES. FILTER FABRIC SHALL BE FASTENED SECURELY TO SUPPORTING FENCE WITH WIRE TIES SPACED AT 2' CENTERS ALONG THE TOP AND MID-SECTION. WHEN SUPPORTING FENCE IS NOT USED, FILTER FABRIC SHALL BE SECURELY FASTENED TO POSTS WITH STAPLES OR WIRE TIES.

5. WHEN SILT FENCE IS USED FOR CHECK DAM INSTALLED IN DITCHES A SUPPORTING FENCE SHALL BE PROVIDED AND THE POST SPACING SHALL BE 10 FT MAXIMUM.

6. STANDARD "T" OR "U" SECTION STEEL POSTS SHALL NOT BE USED WITHIN THE CONSTRUCTION CLEAR ZONE RECOVERY AREA.

GRAPHIC SCALE

(IN FEET)
1 inch = 200 ft.

LEGEND

SPOILS PILE
SILT FENCE
CHECK DAM @ ±100' INTERVALS

CITY OF RIO RANCHO
DEPARTMENT OF UTILITIES

WILSON & COMPANY
3800 THE AMERICAN ROAD S.E.
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RIO RANCHO, NEW MEXICO
87124
(505) 808-8021

UNIT 17 SANITARY SEWER INTERCEPTOR / LIFT STATION

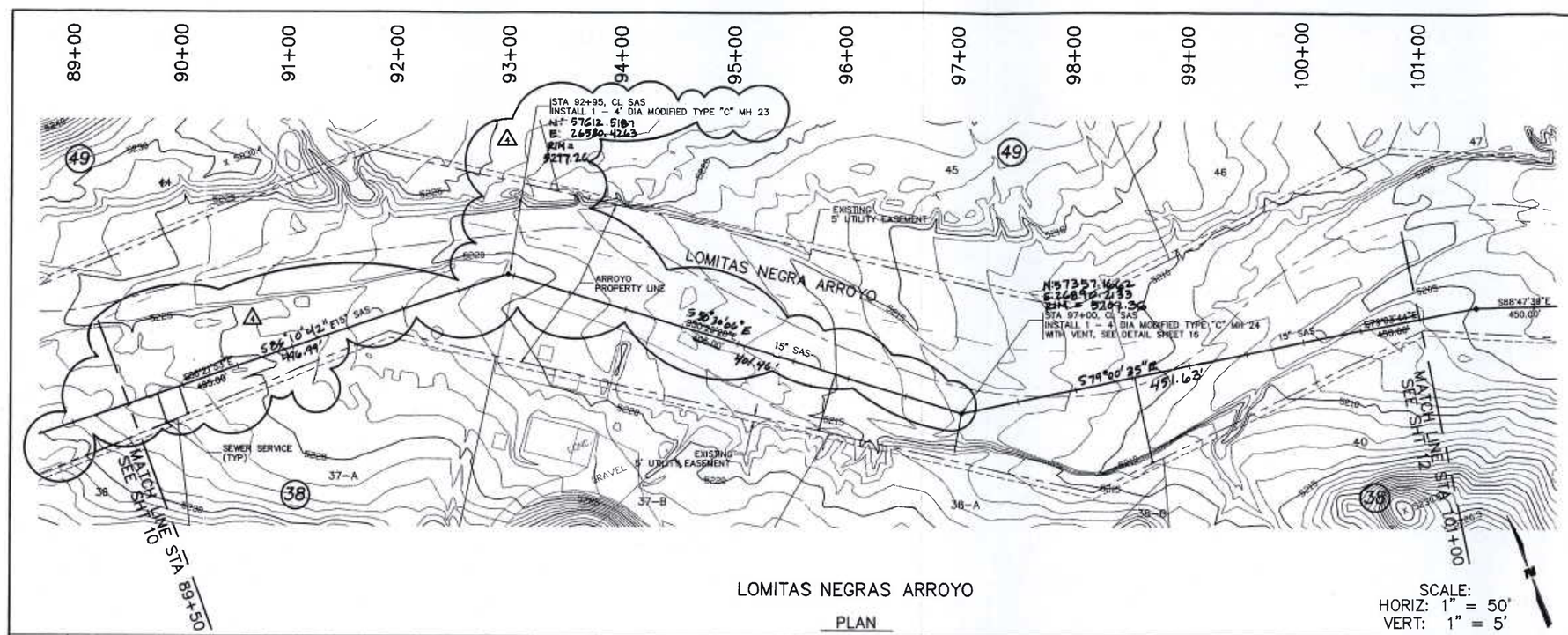
EROSION CONTROL/ STORM WATER POLLUTION PREVENTION PLAN

REVISIONS	NO.	DATE	REMARKS	BY

DESIGN	RSM	WCEA NO.	X1218040-25	DATE	MAY 2002
DRAWN	DMD	PROJECT NO.	N/A	SHEET NO.	3 OF 21
CHECK	TKM				

T:\PROJECTS\X1218040-25\M\SHEETS\8140-25P-P.E.MG\05-07-02\DMD

RCS



T:\P\ X1218040-25\W\SHEETS\PNP\8140-25PP07.DWG\07-02-02\KIS

WCEA #X1218040-25
MAY 2002

RECORD DRAWING
DATE 12-04-02

BENCH MARK	
USGS TRIANG. STA. DISK STAMPED "PUEBLO 1969"	
2.5 MI. S. OF BERNALILLO, 0.7 MI. N. OF SANDIA PUEBLO.	
0.35 MI. W. OF I-25, AND 0.25 MI. E. OF BNSF RR	
GEO POS (NAD 83), 35°15'54.79214"N, 106°33'59.04741"W	
NM STATE PLANE COORD. NAD 83 (CENTRAL ZONE)	
X=1545969.91, Y=1551970.24	
ELEVATION=5080.96 FT (NAVD 88)	

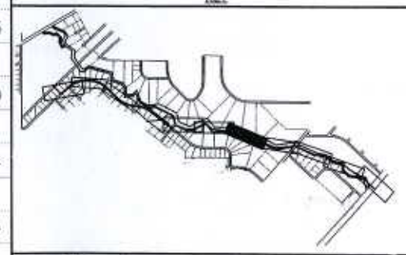
TEMPORARY BENCH MARK	
A 5/8" REBAR W/WILSON & COMPANY ALUMINUM CAP	
STAMPED "PP-29" 498 FT E. OF THE INT. OF NM. 528 AND	
NM. 448, 85 FT S. OF THE CENTER LINE OF NM 448, AND	
LYING W. OF THE FLOW LINE OF LOMITAS NEGRAS ARROYO	
GEO POS (NAD 83), 35°16'27.99877"N, 106°36'57.85708"W	
NM STATE PLANE COORD. NAD 83 (CENTRAL ZONE)	
X=1533155.82, Y=1555378.41	
ELEVATION=5125.08 FT (NAVD 88)	

LOMITAS NEGRAS ARROYO

4" SEWER SERVICES				
STA	LOT/BLK	INV @ PL	LENGTH	REMARKS
89+76.69 RT	36/38	5222.0	26.2'	2' RISER
89+96.57 RT	37A/38	5221.5	25.0'	–
95+87.95 RT	37B/38	5210.0	50.0'	–
98+52.02 RT	38A/38	5208.5	75.1'	–

NOTE:
SAS SERVICE LOCATIONS PER RIO RANCHO STD DETAIL LOC-1.
CONTRACTOR TO FIELD VERIFY HORIZONTAL AND VERTICAL LOCATION OF SAS SERVICES WITH OWNERS OF EXISTING OR UNDER CONSTRUCTION HOMES.

KEY



AS-BUILT INFORMATION
CONTRACTOR — DATE
WORK STAKED BY — DATE
FIELD INSPECTION BY — DATE

SURVEY INFORMATION
NO. — DATE — BY

CITY OF RIO RANCHO
DEPARTMENT OF UTILITIES

WILSON & COMPANY
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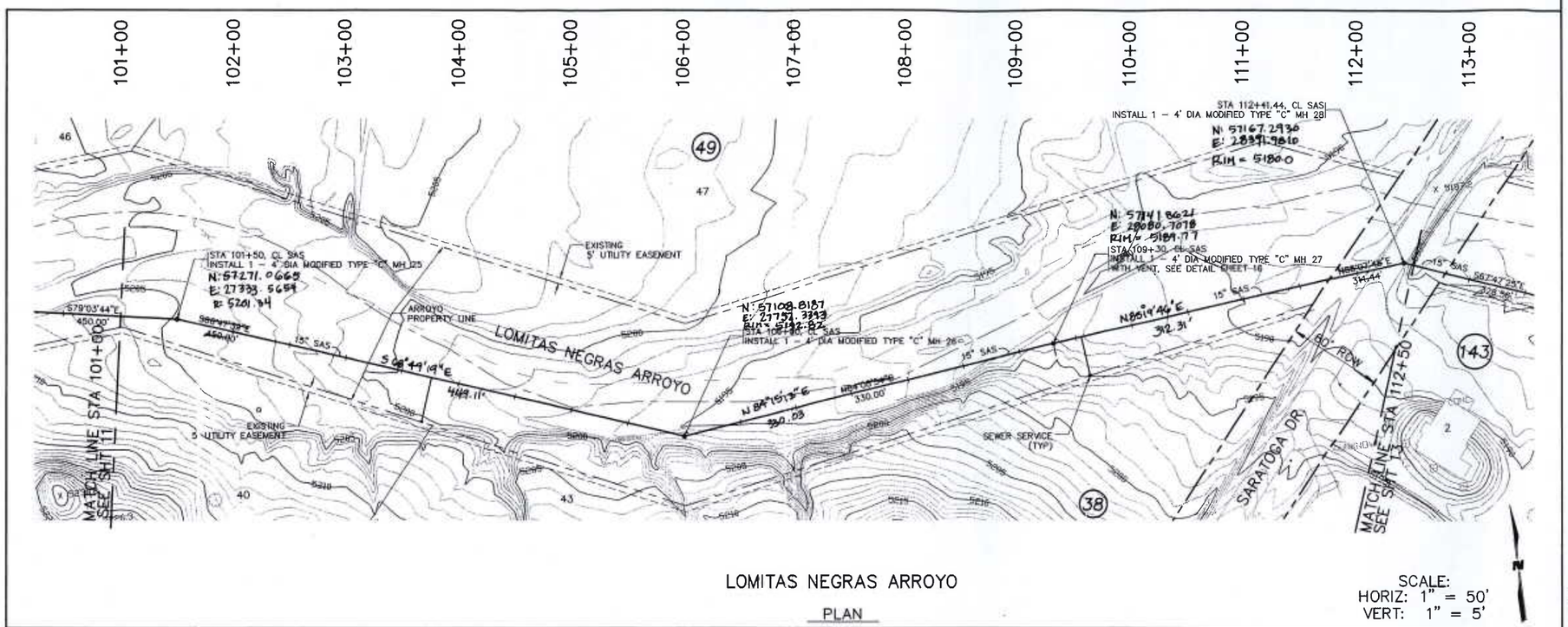
UNIT 17 SANITARY SEWER INTERCEPTOR / LIFT STATION

SANITARY SEWER PLAN & PROFILE STA 89+50 TO STA 101+00

REVISIONS	NO.	DATE	REMARKS	BY
	1	6/6/02	LOWERED SAS LINE	VKL
	2	7/2/02	RELOCATE MH # 23	RSM

DESIGN	RSM	WCEA NO. X1218040-25	DATE MAY 2002
DRAWN	KIS	PROJECT NO. N/A	SHEET NO. 11 OF 21
CHECK	RSM		

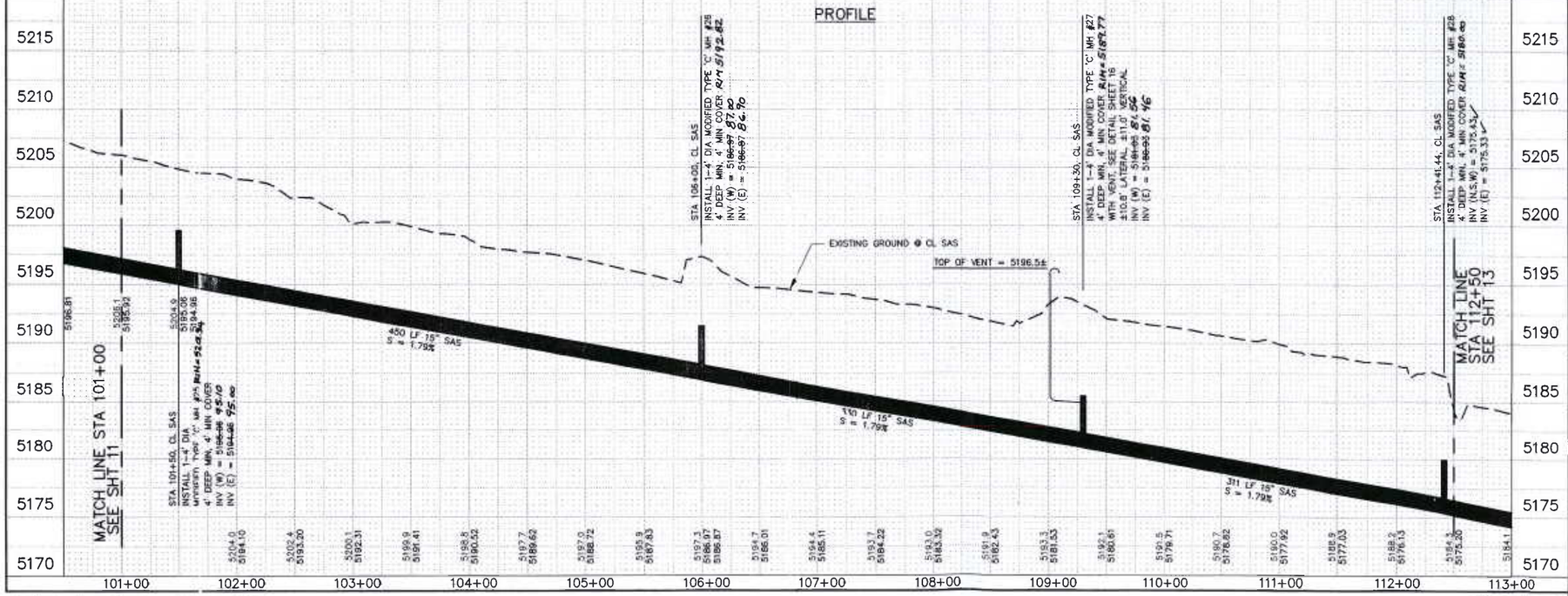


LOMITAS NEGRAS ARROYO

PLAN

SCALE:
HORIZ: 1" = 50'
VERT: 1" = 5'

PROFILE



T:\P\ X1218040-25\M\SHEETS\PNP\B140-25PP08.DWG\05-08-02\KIS

WCEA #X1218040-25
MAY 2002

TEMPORARY BENCH MARK

A 5/8" REBAR W/WILSON & COMPANY ALUMINUM CAP STAMPED "RPI-29" 498 FT E OF THE INT OF NM 528 AND NM 448, 89 FT S OF THE CENTER LINE OF NM 448, AND LYING W OF THE FLOW LINE OF LOMITAS NEGRAS ARROYO
GEO POS (NAD 83), 35°16'27.99877"N, 106°36'57.85708"W
NM STATE PLANE COORD, NAD 83 (CENTRAL ZONE)
X=1531155.82, Y=1555378.41
ELEVATION=5125.08 FT (NAVD 88)

BENCH MARK

USGS, TRIANG. STA. DISK, STAMPED "PUEBLO 1969"
2.5 MI. S OF BERNALILLO, 0.7 MI. N. OF SANDIA PUEBLO, 0.35 MI. W. OF I-25, AND 0.25 MI. E OF RHSF RR
GEO POS (NAD 83), 35°15'54.79214"N, 106°33'59.04741"W
NM STATE PLANE COORD, NAD 83 (CENTRAL ZONE)
X=1545969.91, Y=1551870.24
ELEVATION=5098.98 FT (NAVD 88)

NAVD 1988

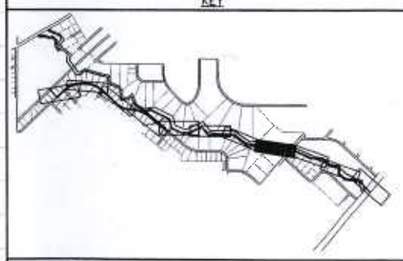
RECORD DRAWING
DATE 12-04-02

STREET NAME
4" SEWER SERVICES

STA	LOT/BLK	INV @ PL	LENGTH	REMARKS
103+76.21 RT	40/38	5195.0	39.4'	-
109+55.00 RT	43/38	5189.0	34.4'	4' RISER

NOTE:
SAS SERVICE LOCATIONS PER RIO RANCHO STD DETAIL LOC-1.
CONTRACTOR TO FIELD VERIFY HORIZONTAL AND VERTICAL LOCATION OF SAS SERVICES WITH OWNERS OF EXISTING OR UNDER CONSTRUCTION HOMES.

KEY



AS-BUILT INFORMATION
CONTRACTOR
WORK STARTED BY
WORK COMPLETED BY
DATE
DATE
DATE

SURVEY INFORMATION
NO.
DATE
BY

CITY OF RIO RANCHO
DEPARTMENT OF UTILITIES

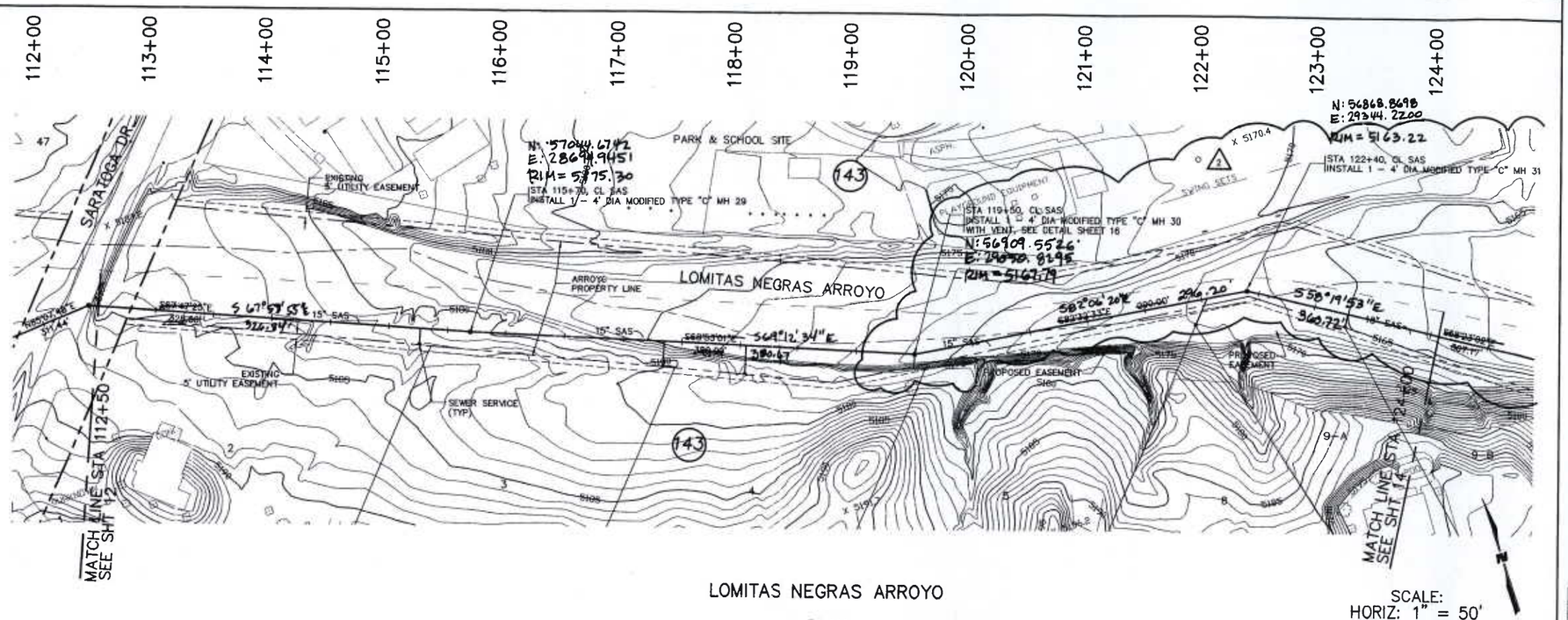
WILSON & COMPANY
2600 THE AMERICAN ROAD S.E.
SUITE 100
RIO RANCHO, NEW MEXICO
87124
(505) 898-8021

UNIT 17 SANITARY SEWER INTERCEPTOR / LIFT STATION

SANITARY SEWER PLAN & PROFILE STA 101+00 TO STA 112+50

REVISIONS	NO.	DATE	REMARKS	BY
	1	6/6/02	LOWERED SAS LINE	WIL

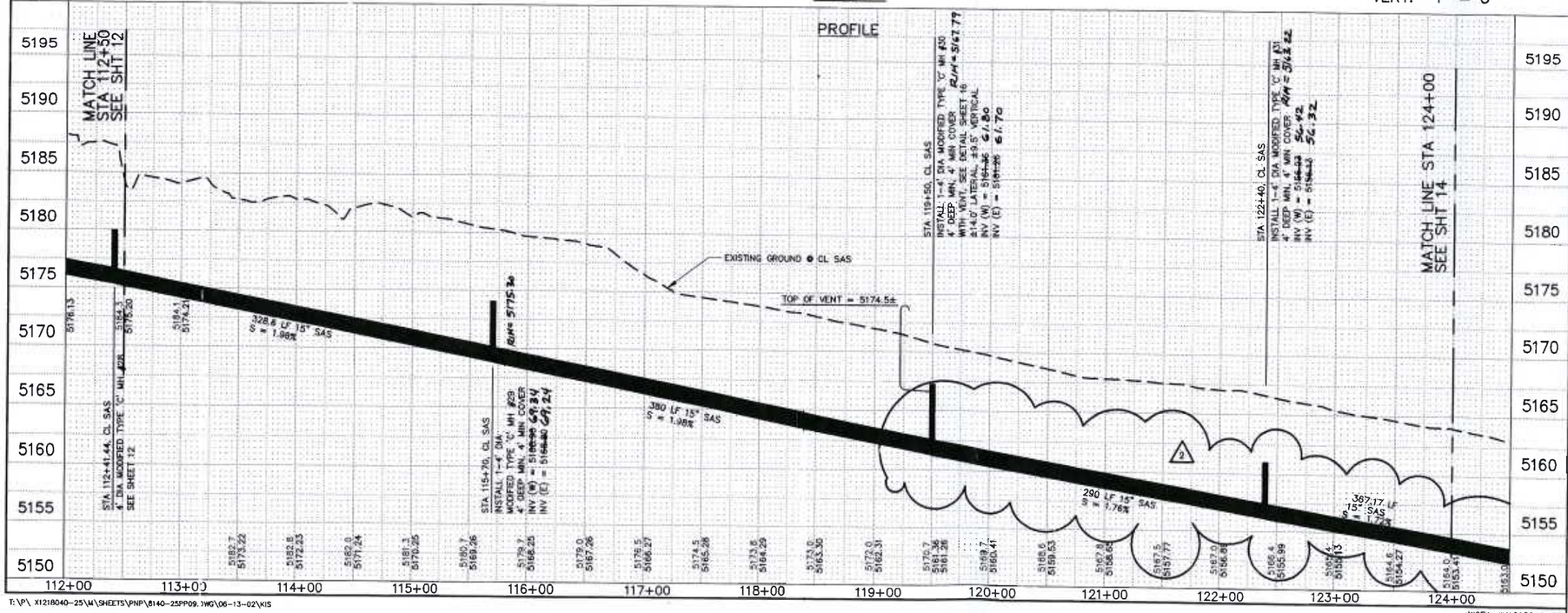
DESIGN	RSM	WCEA NO. X1218040-25	DATE MAY 2002
DRAWN	KIS	PROJECT NO. N/A	SHEET NO. 12 OF 21
CHECK	RSM		



LOMITAS NEGRAS ARROYO

PLAN

SCALE:
HORIZ: 1" = 50'
VERT: 1" = 5'



T:\P\ X1218040-25\M\SHEETS\PNP\8140-25PP09.DWG\06-13-02\KIS

WCEA #X1218040-25
MAY 2002

RECORD DRAWING
DATE 7-04-02

TEMPORARY BENCH MARK
A 5/8" REBAR W/WILSON & COMPANY ALUMINUM CAP STAMPED "PP-28" 498 FT E OF THE INT OF NM 528 AND NM 448, 89 FT S OF THE CENTER LINE OF NM 448, AND LYING W OF THE FLOW LINE OF LOMITAS NEGRAS ARROYO
GEO POS (NAD 83), 35°16'27.99877"N, 106°36'57.85708"W
NM STATE PLANE COORD, NAD 83, (CENTRAL ZONE)
X=1531155.82, Y=1565378.41
ELEVATION=5125.08 FT (NAVD 88)

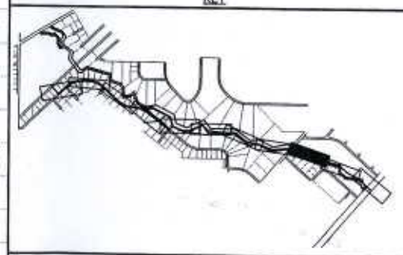
BENCH MARK
USGS TRIANG. STA DISK STAMPED "PUEBLO 1968"
2.5 MI S OF BERNALILLO, 0.7 MI N OF SANDIA PUEBLO, 0.35 MI W OF I-25, AND 0.25 MI E OF BNSF RR
GEO POS (NAD 83), 35°15'54.79214"N, 106°33'59.04741"W
NM STATE PLANE COORD, NAD 83, (CENTRAL ZONE)
X=1545969.91, Y=1551970.24
ELEVATION=5080.96 FT (NAVD 88)

LOMITAS NEGRAS ARROYO
4" SEWER SERVICES

STA	LOT/BLK	INV @ PL	LENGTH	REMARKS
115+26.92 RT	2/143	5176.5	14.3'	3' RISER
117+34.80 RT	3/143	5174.5	21.9'	4' RISER
118+05.00 RT	4/143	5172.5	24.8'	3' RISER
122+05.04 RT	5&8/143	5162.0	25.7'	DBL SVC
123+27.42 RT	9A&9B/143	5159.3	11.5'	DBL SVC

NOTE:
SAS SERVICE LOCATIONS PER RIO RANCHO STD DETAIL LOC-1. CONTRACTOR TO FIELD VERIFY HORIZONTAL AND VERTICAL LOCATION OF SAS SERVICES WITH OWNERS OF EXISTING OR UNDER CONSTRUCTION HOMES.

KEY



AS-BUILT INFORMATION
CONTRACTOR'S MARK BY DATE
ENGINEER BY DATE
SURVEYED BY DATE
COMPUTED BY DATE

SURVEY INFORMATION
NO. DATE BY

CITY OF RIO RANCHO
DEPARTMENT OF UTILITIES

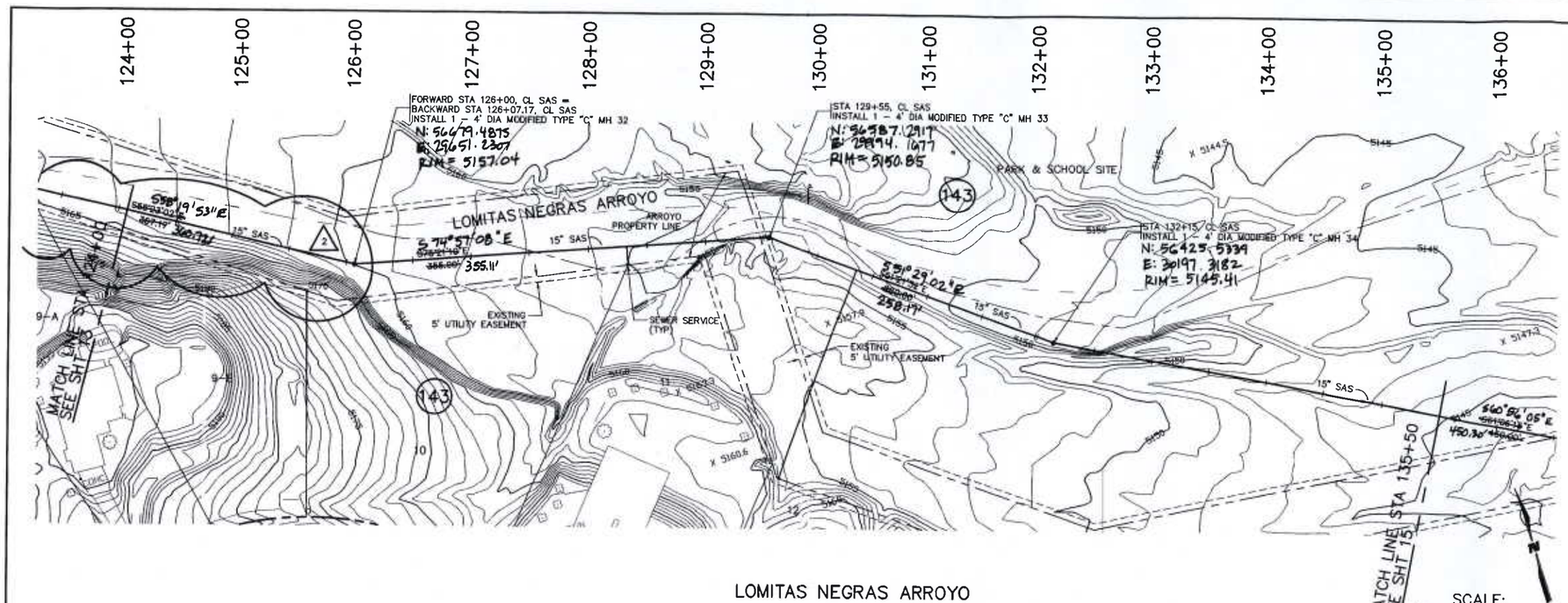
WILSON & COMPANY
3900 THE AMERICAN ROAD S.E.
SUITE 100
RIO RANCHO, NEW MEXICO
87124
(505) 898-8021

UNIT 17 SANITARY SEWER INTERCEPTOR / LIFT STATION

SANITARY SEWER PLAN & PROFILE STA 112+50 TO STA 124+00

REVISIONS	NO.	DATE	REMARKS	BY
	1	6/6/02	LOWERED SAS LINE	VKL
	2	6/13/02	RELOCATED MH #30	VKL

DESIGN	RSM	WCEA NO. X1218040-25	DATE MAY 2002
DRAWN	KIS	PROJECT NO. N/A	SHEET NO. 13 OF 21
CHECK	RSM		

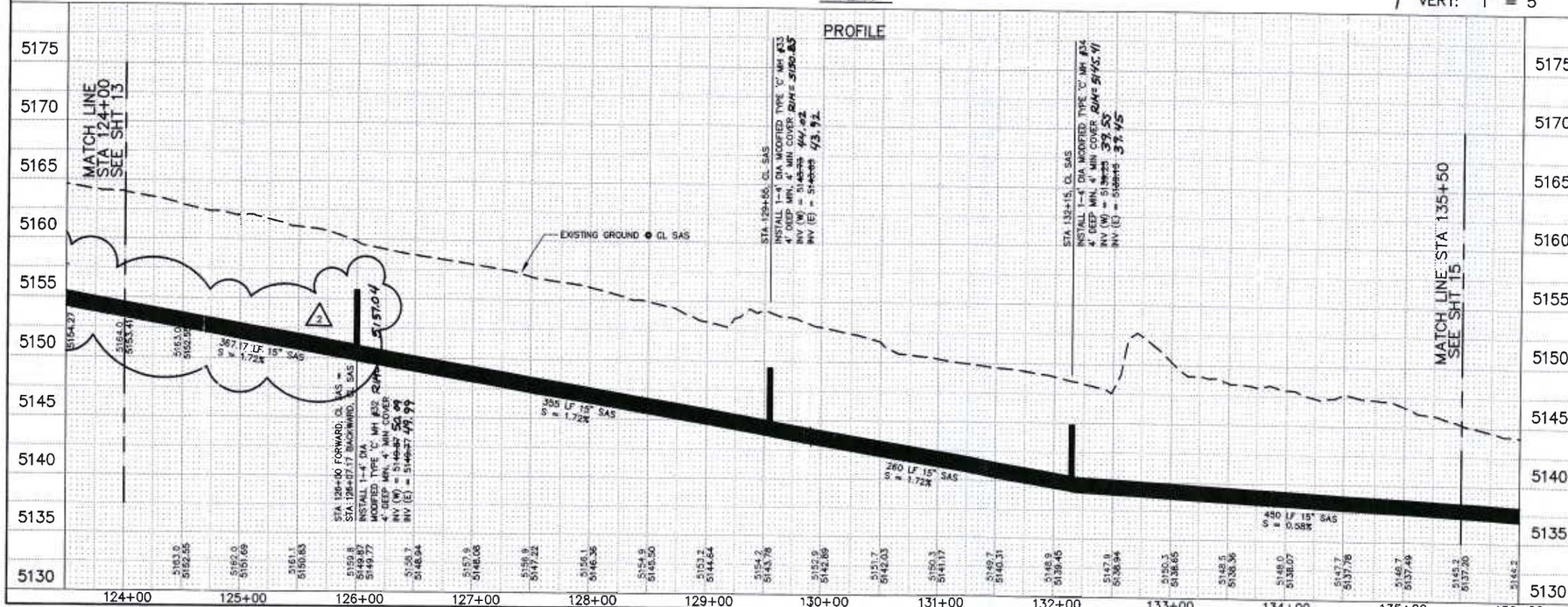


LOMITAS NEGRAS ARROYO

PLAN

SCALE:
HORIZ: 1" = 50'
VERT: 1" = 5'

PROFILE



T:\P\ X1218040-25\M\SHEETS\PNP\8140-25PP10.DWG\06-13-02\KIS

WCEA #X1218040-25
MAY 2002

RECORD DRAWING
DATE 12-04-02

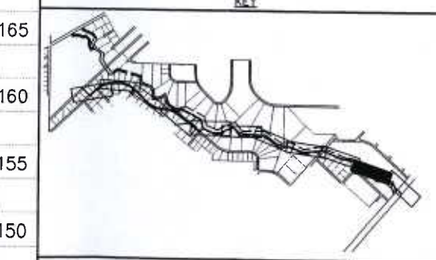
BENCH MARK	
TEMPORARY BENCH MARK	USGS TRIANG. STA DISK STAMPED "PUEBLO 1968"
A 5/8" REBAR W/WILSON & COMPANY ALUMINUM CAP STAMPED "PP-29" 498 FT E OF THE INT OF NM 528 AND NM 448, 89 FT S OF THE CENTER LINE OF NM 448, AND LYING W OF THE FLOW LINE OF LOMITAS NEGRAS ARROYO	2.5 MI S OF BERNALILLO, 0.7 MI N OF SANDIA PUEBLO, 0.35 MI W OF I-25, AND 0.25 MI E OF BNSF RR
GEO POS (NAD 83)- 35°16'27.99877"N, 106°38'57.85708"W	GEO POS (NAD 83)- 35°15'54.79214"N, 106°33'59.04741"W
NM STATE PLANE COORD, NAD 83 (CENTRAL ZONE)	NM STATE PLANE COORD, NAD 83 (CENTRAL ZONE)
X=1531155.82, Y=1555378.41	X=1545969.91, Y=1551970.24
ELEVATION=5125.08 FT (NAVD 88)	ELEVATION=5080.96 FT (NAVD 88)

LOMITAS NEGRAS ARROYO

4" SEWER SERVICES				
STA	LOT/BLK	INV @ PL	LENGTH	REMARKS
128+32.67 RT	10&11/143	5150.0	15.9'	DBL SVC
130+34.97 RT	12/143	5152.0	191.6'	–

NOTE:
SAS SERVICE LOCATIONS PER RIO RANCHO STD DETAIL LOC-1. CONTRACTOR TO FIELD VERIFY HORIZONTAL AND VERTICAL LOCATION OF SAS SERVICES WITH OWNERS OF EXISTING OR UNDER CONSTRUCTION HOMES.

KEY



AS-BUILT INFORMATION

SURVEY INFORMATION

NO.	DATE	BY

CITY OF RIO RANCHO
DEPARTMENT OF UTILITIES

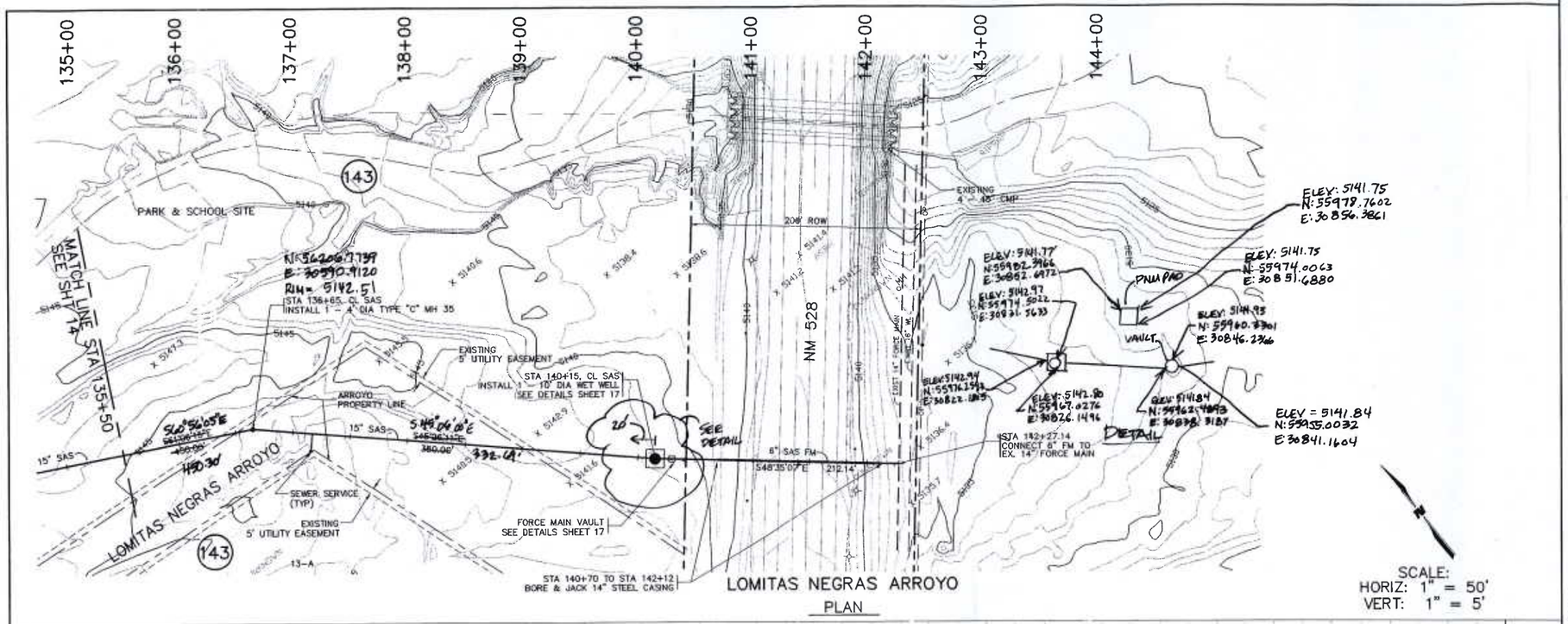
WILSON & COMPANY
2600 THE AMERICAN ROAD S.E.
SUITE 100
RIO RANCHO, NEW MEXICO
87124
(505) 898-5021

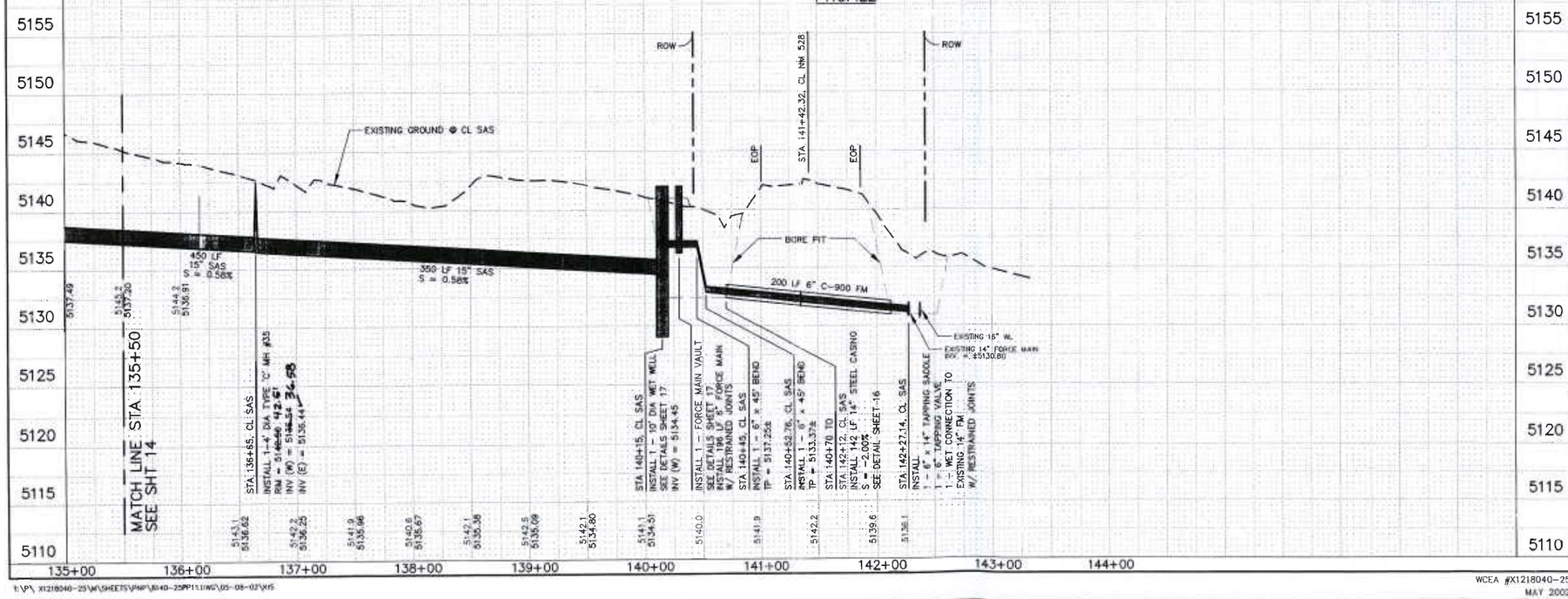
UNIT 17 SANITARY SEWER INTERCEPTOR / LIFT STATION

SANITARY SEWER PLAN & PROFILE STA 124+00 TO STA 135+50

REVISIONS	NO.	DATE	REMARKS	BY
	1	6/6/02	LOWERED SAS LINE	VKL
	2	6/13/02	RELOCATED MH # 31	KIS

DESIGN	RSM	WCEA NO. X1218040-25	DATE MAY 2002
DRAWN	KIS	PROJECT NO. N/A	SHEET NO. 14 OF 21
CHECK	RSM		





E:\P_X1218040-25\M\SHEETS\PMP\8040-25PP1LIWG\05-08-02\XS

WCEA #X1218040-25
MAY 2002

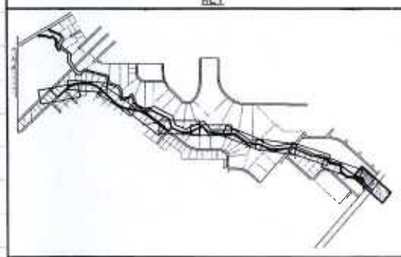
RECORD DRAWING
DATE 12-04-02

NOTE:
CONTRACTOR SHALL FIELD VERIFY HORIZONTAL AND VERTICAL LOCATIONS AND PROVIDE PROTECTION FOR ALL EXISTING UTILITIES WITHIN THE CONSTRUCTION AREA.
CONTRACTOR SHALL FIELD VERIFY HORIZONTAL AND VERTICAL LOCATION OF 14" FORCE MAIN PRIOR TO BEGINNING BORE AND JACK OPERATION.

LOMITAS NEGRAS ARROYO

4" SEWER SERVICES				
STA	LOT/BLK	INV @ PL	LENGTH	REMARKS
137+17.00 RT	13A/143	5139.0	16.0	–

KEY



BENCH MARK	
TEMPORARY BENCH MARK	USGS TRIANG. STA DISK STAMPED "PUEBLO 1965"
A 5/8" REBAR W/NELSON A. COMPANY ALUMINUM CAP STAMPED "PP-29" 498 FT E OF THE INT OF NM 528 AND NM 448, 89 FT S OF THE CENTER LINE OF NM 448, AND LYING W OF THE FLOW LINE OF LOMITAS NEGRAS ARROYO	2.5 MI. S. OF BERNALILLO, 0.7 MI. N. OF SANDIA PUEBLO, 0.35 MI. W. OF I-25, AND 0.25 MI. E. OF BNSF RR
GEO. POS. (NAD. 83), 35°16'27.998777"N, 106°36'57.85708"W	GEO. POS. (NAD. 83), 35°16'54.79214"N, 106°33'59.04741"W
NM. STATE PLANE COORD. (NAD. 83) (CENTRAL ZONE)	NM. STATE PLANE COORD. (NAD. 83) (CENTRAL ZONE)
X=1531155.82, Y=1555378.41	X=1545969.91, Y=1561970.24
ELEVATION=5125.08 FT (NAVD. 88)	ELEVATION=5080.196 FT (NAVD. 88)

AS-BUILT INFORMATION

CONTRACTOR	DATE
INSPECTED BY	
STAKED BY	
SURVEYED BY	
CONSTRUCTED BY	

SURVEY INFORMATION

NO.	DATE	BY

CITY OF RIO RANCHO
DEPARTMENT OF UTILITIES

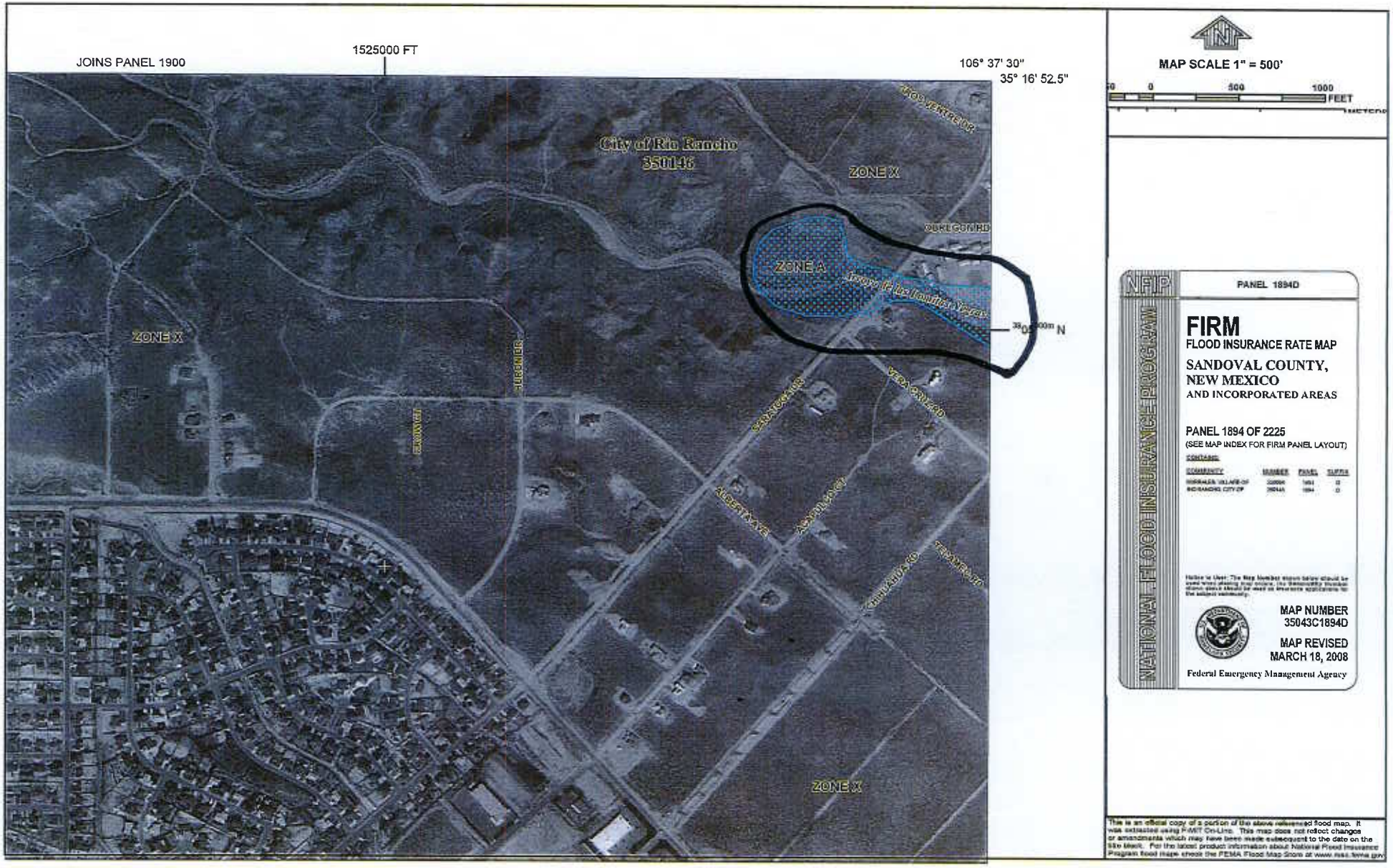
WILSON & COMPANY
3800 THE AMERICAN ROAD S.E.
SUITE 100
RIO RANCHO, NEW MEXICO
87124
(505) 888-8021

UNIT 17 SANITARY SEWER INTERCEPTOR / LIFT STATION

SANITARY SEWER PLAN & PROFILE STA 135+50 TO EOP

REVISIONS NO.	DATE	REMARKS	BY
1	6/6/02	LOWERED SAS LINE	VKL

DESIGN	RSM	WCEA NO. X1218040-25	DATE	MAY 2002	
DRAWN	KIS	PROJECT NO. N/A	SHEET NO.	15	OF 21
CHECK	RSM				


JOINS PANEL 1900
1525000 FT
106° 37' 30"
35° 16' 52.5"
City of Rio Rancho
350146
ZONE X
ZONE A
ZONE X
ZONE X
DUKE CONTRD
SARATOGA RD
VISTA ORLANDO
ALBERT AVE
ACOMA LOOP
CORRIDA RD
TRAMWAY
MAP SCALE 1" = 500'
0
500
1000
FEET
PANEL 1894D
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
SANDOVAL COUNTY,
NEW MEXICO
AND INCORPORATED AREAS
PANEL 1894 OF 2225
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY
NUMBER
PANEL
SUFFIX
MAP NUMBER
35043C1894D
MAP REVISED
MARCH 18, 2008
Federal Emergency Management Agency
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

APPENDIX 2

HEC-HMS Schematic, Output, Pond Data and Culvert Master Output

1. Ultimate Conditions Output from the Management Plan, Dec. 2011

2. HEC-HMS Schematic for the Proposed Saratoga Pond

3. Ultimate Conditions Output from
   Smith Engineering Saratoga Pond and Lateral Weir Option

4. Table 1 – Saratoga Pond Option 1 – Elevation – Volume – Discharge Data and Computations

5. Culvert Master (to generate rating curve for principal spillway outfall pipe)

   Table R1 – Rating Curve for Saratoga Pond Outfall Pipe

   Culvert Master Output

9-2-14

ULT ULTIMATE

Project: MontoyasDamImprovements Simulation Run: Run 1

Start of Run: 01Jul2010, 00:00
End of Run: 05Jul2010, 00:00
Compute Time: 13May2014, 15:08:24

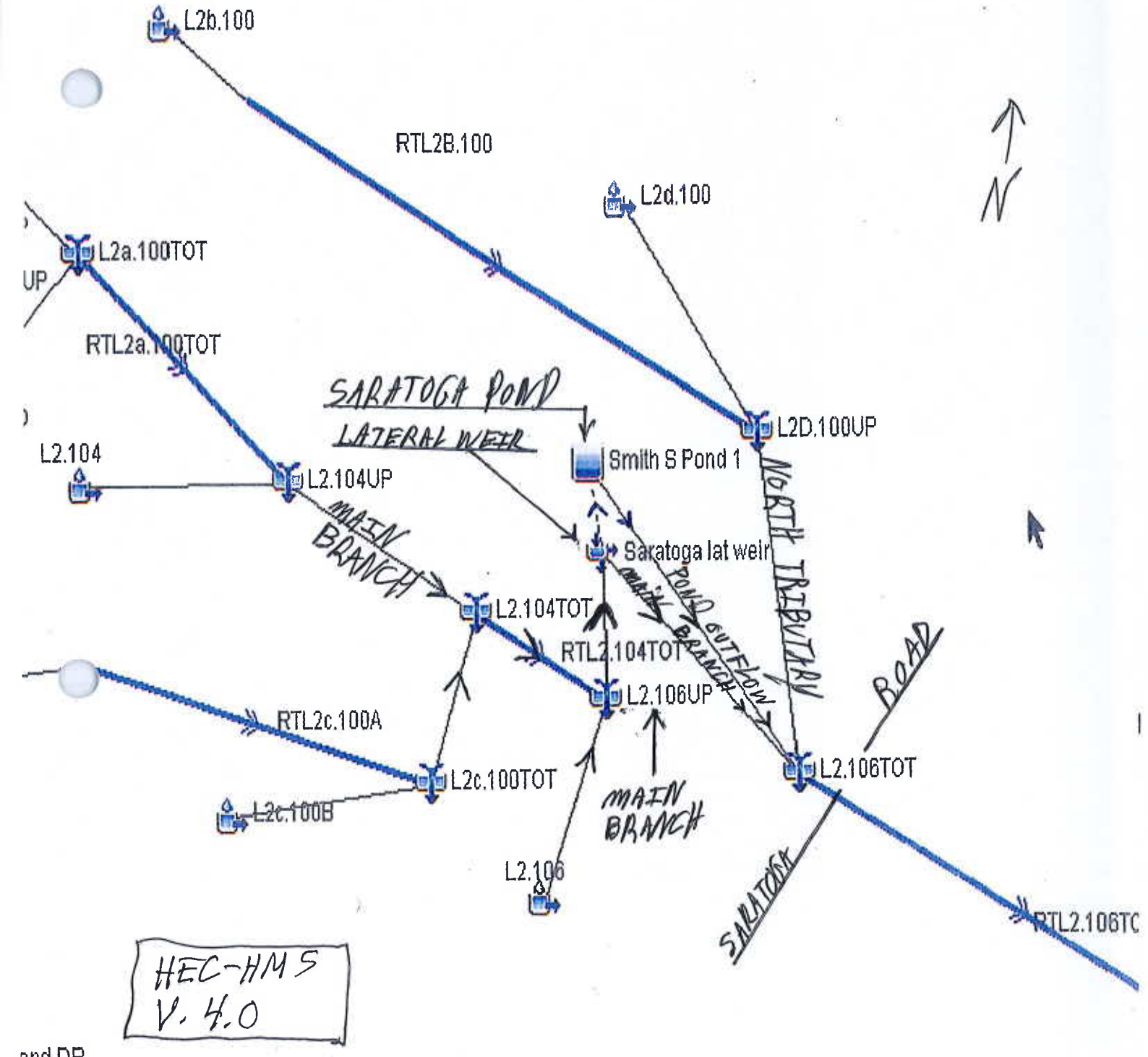
Basin Model: Montoyas Arroyo
Meteorologic Model: Met 1
Control Specifications: Control 1

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
L2.106	0.231	267.0	01Jul2010, 01:36	12.2
L2.106UP (MAIN BRANCH)	3.268	3337.7	01Jul2010, 01:56	232.0
L2d.100	0.415	463.3	01Jul2010, 01:40	29.7
L2D.100UP (NORTH TRIB)	0.781	768.0	01Jul2010, 01:46	55.8
L2.106TOT	4.049	3966.3	01Jul2010, 01:56	287.8

TOTAL AT SARATOGA RD

FROM HEC-HMS model FROM MONTOYAS WATERSHED PARK MANAGEMENT PLAN, VERSION 2.0 DEC-2011

(model provided by SSCAFCA 5-13-14



LOMITAS NEGRAS ARROYO

HEC-HMS SCHEMATIC FOR PROPOSED SARATOGA POND

LATERAL WEIR OPTION 8.3

Project: Saratoga Pond (montoyas wat Simulation Run: Saratoga Pond Option 1

Junction: L2.106TOT — AT SARATOGA RD.

Start of Run: 01Jul2010, 00:00
End of Run: 05Jul2010, 00:00
Compute Time: 16Oct2014, 11:13:21

Basin Model: Smith Saratoga O1
Meteorologic Model: Met 1
Control Specifications: Control 1

TOTAL ALL HYDROGRAPHS

Volume Units: AC-FT

Computed Results

Peak Discharge: 1845.7 (CFS)
Volume: 287.8 (AC-FT)

Date/Time of Peak Discharge: 01Jul2010, 01:54

HEC-HMS V 4.0

LATERAL WEIR OPTION 8.3

Project: Saratoga Pond (montoyas wat Simulation Run: Saratoga Pond Option 1

Reservoir: Smith S Pond 1

Start of Run:	01Jul2010, 00:00	Basin Model:	Smith Saratoga O1
End of Run:	05Jul2010, 00:00	Meteorologic Model:	Met 1
Compute Time:	16Oct2014, 11:13:21	Control Specifications:	Control 1

Volume Units: AC-FT

Computed Results

Peak Inflow:	2190.5 (CFS)	Date/Time of Peak Inflow:	01Jul2010, 01:56
Peak Discharge:	79.7 (CFS)	Date/Time of Peak Discharge:	01Jul2010, 02:40
Inflow Volume:	85.3 (AC-FT)	Peak Storage:	79.8 (AC-FT)
Discharge Volume:	85.3 (AC-FT)	Peak Elevation:	5197.6 (FT)

→ EMERGENCY SPILL @ 5198

HEC-HMS V 4.0

LATERAL WEIR OPTION 8.3

Project: Saratoga Pond (montoyas wat Simulation Run: Saratoga Pond Option 1

Diversion: Saratoga lat weir OPTION 8.2

Start of Run:	01Jul2010, 00:00	Basin Model:	Smith Saratoga O1
End of Run:	05Jul2010, 00:00	Meteorologic Model:	Met 1
Compute Time:	16Oct2014, 11:13:21	Control Specifications:	Control 1

Volume Units: AC-FT

Computed Results

Peak Inflow:	3337.7 (CFS)	Date/Time of Peak Inflow:	01Jul2010, 01:56
Peak Discharge:	1147.2 (CFS)	Date/Time of Peak Discharge:	01Jul2010, 01:56
Peak Diversion:	2190.5 (CFS)	Date/Time of Peak Diversion:	01Jul2010, 01:56
Inflow Volume:	232.0 (AC-FT)		
Discharge Volume:	146.7 (AC-FT)	Diversion Volume:	85.3 (AC-FT)

INTO POND

TO SARATOGA BOX CULVERTS

HEC-HMS V 4.0

LATERAL WEIR OPTION 8.3

Project: Saratoga Pond (montoyas wat Simulation Run: Saratoga Pond Option 1

Junction: L2.106UP → MAIN ARROYO AT LATERAL WEIR

Start of Run:	01Jul2010, 00:00	Basin Model:	Smith Saratoga O1
End of Run:	05Jul2010, 00:00	Meteorologic Model:	Met 1
Compute Time:	16Oct2014, 11:13:21	Control Specifications:	Control 1

Volume Units: AC-FT

Computed Results

Peak Discharge: 3337.7 (CFS) Date/Time of Peak Discharge: 01Jul2010, 01:56

Volume: 232.0 (AC-FT)

HEC-HMS V 4.0

Project: Saratoga Pond (montoyas wat Simulation Run: Saratoga Pond Option 1

Junction: L2D.100UP → NORTH BRANCH AT SARATOGA BOX CULVERTS

Start of Run:	01Jul2010, 00:00	Basin Model:	Smith Saratoga O1
End of Run:	05Jul2010, 00:00	Meteorologic Model:	Met 1
Compute Time:	16Oct2014, 11:13:21	Control Specifications:	Control 1

Volume Units: AC-FT

Computed Results

Peak Discharge: 768.0 (CFS) Date/Time of Peak Discharge: 01Jul2010, 01:46

Volume: 55.8 (AC-FT)

HEC-HMS V4.0

TABLE 1 **10/14/2014**

Saratoga Pond - Option 1

Elevation - Volume - Discharge Data and Computations

Option Description - Based on Conceptual Grading Plan (Figure 1 - Map Pocket) dated 10/14/14. Embankment height 6 ft. tall , pond inside side slopes 1V:3H. See below for principal, emergency and outfall pipe information.

grey box means must input data

Contour Elevation NAVD 1988	Depth	Contour Area	Incremental Volume	Incremental Volume	Cumulative Volume	(A) 1st Row of Reverse Incline Ports Discharge	(A) 2nd Row of Reverse Incline Ports Discharge	(A) Principal Spillway Grate Discharge	Principal Spillway 36-in. Outfall Pipe Discharge	Total Principal Spillway / Outfall Pipe Discharge	Emergency Spillway Discharge	Total Discharge Rating Curve	Comment
		Principal Spillway Orifice Diameter (Inches)				8	8		36				
		Number of Orifices				12	12		1				
(ft)		(sq ft)	(cu ft)	(ac-ft)	(ac-ft)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	
(d)						(a)	(a)	(b)	(c)	(e)	(b)		
5186.21	0.0	0	0	0.0000	0.0000	0.0	0.0	0.0	0.0	0.0	0.0	0	Pond bottom and principal spillway structure invert
5187.00	0.8	30,197	11,928	0.2738	0.2738	0.0	0.0	0.0	3.0	0.0	0.0	1	Highest Invert 1st row of reverse incline ports
5188.00	1.8	125,907	78,052	1.7918	2.0657	19.8	0.0	0.0	13.0	13.0	0.0	13	
5189.00	2.8	237,168	181,537	4.1675	6.2332	28.0	0.0	0.0	29.0	28.0	0.0	28	Highest Invert of 2nd row of reverse incline ports
5190.00	3.8	355,243	296,206	6.7999	13.0331	34.4	19.8	0.0	47.0	47.0	0.0	47	
5191.00	4.8	362,296	358,770	8.2362	21.2693	39.7	28.0	0.0	56.0	56.0	0.0	56	
5192.00	5.8	369,625	365,961	8.4013	29.6706	44.3	34.4	0.0	62.0	62.0	0.0	62	Top of principal spillway grate
5193.00	6.8	377,021	373,323	8.5703	38.2410	48.6	39.7	72.0	65.0	65.0	0.0	65	
5194.00	7.8	384,481	380,751	8.7408	46.9818	52.5	44.3	203.6	69.0	69.0	0.0	69	
5195.00	8.8	391,996	388,238	8.9127	55.8945	56.1	48.6	374.1	72.0	72.0	0.0	72	
5196.00	9.8	399,566	395,781	9.0859	64.9804	59.5	52.5	576.0	75.0	75.0	0.0	75	
5197.00	10.8	407,636	403,601	9.2654	74.2458	62.7	56.1	805.0	78.0	78.0	0.0	78	
5198.00	11.8	416,767	412,201	9.4628	83.7087	65.8	59.5	1058.2	81.0	81.0	0.0	81	Emergency spillway Elevation
5198.20	12.0	418,512	83,528	1.9175	85.6262	66.4	60.2	1111.5	81.6	81.6	58.1	140	
5198.40	12.2	420,257	83,877	1.9255	87.5517	67.0	60.8	1165.7	82.2	82.2	164.4	247	
5198.60	12.4	422,002	84,226	1.9336	89.4853	67.5	61.4	1220.8	82.8	82.8	302.1	385	
5198.80	12.6	423,747	84,575	1.9416	91.4269	68.1	62.1	1276.7	83.4	83.4	465.1	549	
5199.00	12.8	425,491	421,129	9.6678	93.3764	68.7	62.7	1333.5	84.0	84.0	650.0	734	
5199.20	13.0	427,236	422,874	9.7079	95.3340	69.3	63.3	1391.0	84.6	84.6	854.4	939	
5199.40	13.2	428,981	424,619	9.7479	97.2996	69.8	64.0	1449.4	85.2	85.2	1,076.7	1162	
5199.60	13.4	430,726	426,364	9.7880	99.2733	70.4	64.6	1508.5	85.8	85.8	1,315.5	1401	
5199.80	13.6	432,471	428,109	9.8280	101.2549	71.0	65.2	1568.5	86.4	86.4	1,569.7	1656	
5200.00	13.8	434,216	429,854	9.8681	103.2445	71.5	65.8	1629.2	87.0	87.0	1,838.5	1925	Top of pond embankment

(a) Orfice equation and coefficient were obtained from Equation 4-10 and Table 4-3 from "Handbook of Hydraulics" Sixth Edition, by Brater & King, 1976.

$Q = Ca\sqrt{2gh}$ C = 0.590 g=32.2 ft/sec^2, a=area (sq ft) h=head (ft)

$a = \pi D^2/4$ (full area formula)

Principal Spill. Pipe radius r in feet = 1.50

(b) Emergency Spillway flows were computed based on the following data used in the weir equation

Q = CLH^ 1.5 C = discharge coeffient, L = spillway length perp. to flow (ft), H = head (ft)

(b) Emergergency Spillway C =	2.6	L =	250	Emer. Spill. El	5198
(b) Grate / Weir C =	3	L =	24	El. 8'x8' grate	5191

(e) The combined discharge of the reverse incline ports and the grate (top of vertical walls) will govern the discharge until the principal spillway outfall pipe becomes fully submerged. When the sum of the "A" columns is greater than outfall pipe capacity then outfall pipe capacity governs the discharge

(b) Weir equation and "C" coefficients were obtained from Equation 5-10 and Table 5-3 from "Handbook of Hydraulics" Sixth Edition, by Brater & King, 1976. See Appendix 4 for plan and profile of principal spillway

(d) Data Source : Contours from about pond bottom at dam toe west are from CORR 4 ft contour interval mapping interpolated by Smith to 1-ft contours. From pond bottom east to Saratoga are from 1-foot accurate contour mapping provided by Aerotech Mapping for the Lomitas Negras Phase 1 improvements.

(c) Rating curve computed with Culvert Master - headwater & tailwater assumptions included in Table R1 and Culvert Master output in Appendix 2

Assume Emergency Spillway must be set at 5198.00, interpolate areas and other computations at 0.2 ft to attain a refine the values between emergency spillway and top of dam

ELEV	AREA	Delta Area	AREAS	values
5198.00	416,767		416,767	
5198.20		1,745	418,512	418,512
5198.40		1,745	420,257	420,257
5198.60		1,745	422,002	422,002
5198.80		1,745	423,747	423,747
5199.00		1,745	425,491	425,491
5199.20		1,745	427,236	427,236
5199.40		1,745	428,981	428,981
5199.60		1,745	430,726	430,726
5198.80		1,745	432,471	432,471
5200.00	434,216	1,745	434,216	

Assume Emergency Spillway must be set at 5198.00, interpolate Culvert Master Q's at 0.2 ft to compute culvert Q's to correspond to emergency spillway elevations

ELEV	DISCHARGE	Delta Q	Q
5198.00	81		81.0
5198.20		0.6	81.6
5198.40		0.6	82.2
5198.60		0.6	82.8
5198.80		0.6	83.4
5199.00		0.6	84.0
5199.20		0.6	84.6
5199.40		0.6	85.2
5199.60		0.6	85.8
5198.80		0.6	86.4
5200.00	87	0.6	87.0

TABLE 1 **10/14/2014**

Saratoga Pond - Option 1

Elevation - Volume - Discharge Data and Computations

VALUES TO PASTE IN HEC-HMS

Values	Values	Values
	Cumulative	
Elev.	Volume	Discharge
ft	ac-ft	cfs
5186.21	0.0000	0
5187	0.2738	1
5188	2.0657	13
5189	6.2332	28
5190	13.0331	47
5191	21.2693	56
5192	29.6706	62
5193	38.2410	65
5194	46.9818	69
5195	55.8945	72
5196	64.9804	75
5197	74.2458	78
5198	83.7087	81
5198.2	85.6262	140
5198.4	87.5517	247
5198.6	89.4853	385
5198.8	91.4269	549
5199	93.3764	734
5199.2	95.3340	939
5199.4	97.2996	1162
5199.6	99.2733	1401
5199.8	101.2549	1656
5200	103.2445	1925

Table R1

Rating Curve Parameters for Small Saratoga Pond Outfall Pipe (e) -

Headwater Depth	Upstream Invert Elevation	Headwater Elevation	Downstream Invert Elevation	Tailwater Elevation	Tailwater Depth	Length	Slope	Manning's 'n'	Pipe Size	Pipe Shape
ft	ft	ft	ft	ft	ft	ft	ft/ft		ft	
	a	b	a c	d		a	a			
0	5186.2	5186.2	5185	5185.0	0.0	270	0.0044	0.013	36	round
0.8		5187.0		5185.4	0.4					
1.8		5188.0		5185.9	0.9					
2.8		5189.0		5186.4	1.4					
3.8		5190.0		5186.9	1.9					
4.8		5191.0		5187.4	2.4					
5.8		5192.0		5187.9	2.9					
6.8		5193.0		5188.4	3.4					
7.8		5194.0		5188.9	3.9					
8.8		5195.0		5189.4	4.4					
9.8		5196.0		5189.9	4.9					
10.8		5197.0		5190.4	5.4					
11.8		5198.0		5190.9	5.9					
12.0		5198.2		5191.0	6.0					
12.2		5198.4		5191.1	6.1					
12.4		5198.6		5191.2	6.2					
12.6		5198.8		5191.3	6.3					
12.8		5199.0		5191.4	6.4					
13.0		5199.2		5191.5	6.5					
13.2		5199.4		5191.6	6.6					
13.4		5199.6		5191.7	6.7					
13.6		5199.8		5191.8	6.8					
13.8		5200.0		5191.9	6.9					

a- Based on Conceptual grading plan

b- Headwater elevation = depth + upstream invert elevation

c- Based on 1-ft contour map based on aerial photogrammetry provided by Aerotech Mapping and SSCAFCA provide mapping

d- Tailwater elevation assumption = (1/2* headwater depth) + downstream invert elevation

e- Applied in Culvert Master calculations- see output in Appendix

Culvert Calculator Report
HW 0.8

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	5,187.00	ft	Headwater Depth/Height	0.27	
Computed Headwater Elev	5,187.00	ft	Discharge	2.86	cfs
Inlet Control HW Elev.	5,186.90	ft	Tailwater Elevation	5,185.40	ft
Outlet Control HW Elev.	5,187.00	ft	Control Type	Entrance Control	

Grades					
Upstream Invert	5,186.20	ft	Downstream Invert	5,185.00	ft
Length	270.00	ft	Constructed Slope	0.004444	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	0.52	ft
Slope Type	Steep		Normal Depth	0.52	ft
Flow Regime	Supercritical		Critical Depth	0.53	ft
Velocity Downstream	3.53	ft/s	Critical Slope	0.004093	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.00	ft
Section Size	36 inch		Rise	3.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	5,187.00	ft	Upstream Velocity Head	0.18	ft
Ke	0.50		Entrance Loss	0.09	ft

Inlet Control Properties					
Inlet Control HW Elev.	5,186.90	ft	Flow Control	Unsubmerged	
Inlet Type	Square edge w/headwall		Area Full	7.1	ft²
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
HW 1.8

Solve For: Discharge

Culvert Summary			
Allowable HW Elevation	5,188.00 ft	Headwater Depth/Height	0.60
Computed Headwater Elev	5,188.00 ft	Discharge	13.20 cfs
Inlet Control HW Elev.	5,187.81 ft	Tailwater Elevation	5,185.90 ft
Outlet Control HW Elev.	5,188.00 ft	Control Type	Entrance Control

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Grades			
Upstream Invert	5,186.20 ft	Downstream Invert	5,185.00 ft
Length	270.00 ft	Constructed Slope	0.004444 ft/ft

Hydraulic Profile			
Profile	S2	Depth, Downstream	1.12 ft
Slope Type	Steep	Normal Depth	1.12 ft
Flow Regime	Supercritical	Critical Depth	1.16 ft
Velocity Downstream	5.48 ft/s	Critical Slope	0.003963 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	3.00 ft
Section Size	36 inch	Rise	3.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	5,188.00 ft	Upstream Velocity Head	0.43 ft
Ke	0.50	Entrance Loss	0.21 ft

Inlet Control Properties			
Inlet Control HW Elev.	5,187.81 ft	Flow Control	Unsubmerged
Inlet Type	Square edge w/headwall	Area Full	7.1 ft²
K	0.00980	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	1
C	0.03980	Equation Form	1
Y	0.67000		

Culvert Calculator Report
HW 2.8

Solve For: Discharge

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Culvert Summary					
Allowable HW Elevation	5,189.00	ft	Headwater Depth/Height	0.93	
Computed Headwater Elev	5,189.00	ft	Discharge	28.77	cfs
Inlet Control HW Elev.	5,188.81	ft	Tailwater Elevation	5,186.40	ft
Outlet Control HW Elev.	5,189.00	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	5,186.20	ft	Downstream Invert	5,185.00	ft
Length	270.00	ft	Constructed Slope	0.004444	ft/ft

Hydraulic Profile					
Profile	M2		Depth, Downstream	1.74	ft
Slope Type	Mild		Normal Depth	1.76	ft
Flow Regime	Subcritical		Critical Depth	1.74	ft
Velocity Downstream	6.78	ft/s	Critical Slope	0.004609	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.00	ft
Section Size	36 inch		Rise	3.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	5,189.00	ft	Upstream Velocity Head	0.70	ft
Ke	0.50		Entrance Loss	0.35	ft

Inlet Control Properties					
Inlet Control HW Elev.	5,188.81	ft	Flow Control	Unsubmerged	
Inlet Type	Square edge w/headwall		Area Full	7.1	ft²
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
HW 3.8

Solve For: Discharge

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Culvert Summary					
Allowable HW Elevation	5,190.00	ft	Headwater Depth/Height	1.27	
Computed Headwater Elev	5,190.00	ft	Discharge	46.77	cfs
Inlet Control HW Elev.	5,189.96	ft	Tailwater Elevation	5,186.90	ft
Outlet Control HW Elev.	5,190.00	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	5,186.20	ft	Downstream Invert	5,185.00	ft
Length	270.00	ft	Constructed Slope	0.004444	ft/ft

Hydraulic Profile					
Profile	M2		Depth, Downstream	2.23	ft
Slope Type	Mild		Normal Depth	2.63	ft
Flow Regime	Subcritical		Critical Depth	2.23	ft
Velocity Downstream	8.31	ft/s	Critical Slope	0.006054	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.00	ft
Section Size	36 inch		Rise	3.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	5,190.00	ft	Upstream Velocity Head	0.81	ft
Ke	0.50		Entrance Loss	0.41	ft

Inlet Control Properties					
Inlet Control HW Elev.	5,189.96	ft	Flow Control	Transition	
Inlet Type	Square edge w/headwall		Area Full	7.1	ft²
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
HW 4.8

Solve For: Discharge

56

Culvert Summary					
Allowable HW Elevation	5,191.00	ft	Headwater Depth/Height	1.60	
Computed Headwater Elev	5,191.00	ft	Discharge	55.80	cfs
Inlet Control HW Elev.	5,190.68	ft	Tailwater Elevation	5,187.40	ft
Outlet Control HW Elev.	5,191.00	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	5,186.20	ft	Downstream Invert	5,185.00	ft
Length	270.00	ft	Constructed Slope	0.004444	ft/ft

Hydraulic Profile					
Profile	CompositeM2PressureProfile		Depth, Downstream	2.42	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	2.42	ft
Velocity Downstream	9.12	ft/s	Critical Slope	0.007193	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.00	ft
Section Size	36 inch		Rise	3.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	5,191.00	ft	Upstream Velocity Head	0.97	ft
Ke	0.50		Entrance Loss	0.48	ft

Inlet Control Properties					
Inlet Control HW Elev.	5,190.68	ft	Flow Control	Submerged	
Inlet Type	Square edge w/headwall		Area Full	7.1	ft²
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
HW 5.8

Solve For: Discharge

62

Culvert Summary					
Allowable HW Elevation	5,192.00	ft	Headwater Depth/Height	1.93	
Computed Headwater Elev	5,192.00	ft	Discharge	61.74	cfs
Inlet Control HW Elev.	5,191.24	ft	Tailwater Elevation	5,187.90	ft
Outlet Control HW Elev.	5,192.00	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	5,186.20	ft	Downstream Invert	5,185.00	ft
Length	270.00	ft	Constructed Slope	0.004444	ft/ft

Hydraulic Profile					
Profile	CompositeM2PressureProfile		Depth, Downstream	2.90	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	2.53	ft
Velocity Downstream	8.82	ft/s	Critical Slope	0.008157	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.00	ft
Section Size	36 inch		Rise	3.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	5,192.00	ft	Upstream Velocity Head	1.19	ft
Ke	0.50		Entrance Loss	0.59	ft

Inlet Control Properties					
Inlet Control HW Elev.	5,191.24	ft	Flow Control	Submerged	
Inlet Type	Square edge w/headwall		Area Full	7.1	ft²
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
HW 6.8

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	5,193.00	ft	Headwater Depth/Height	2.27	
Computed Headwater Elev	5,193.00	ft	Discharge	65.46	cfs
Inlet Control HW Elev.	5,191.62	ft	Tailwater Elevation	5,188.40	ft
Outlet Control HW Elev.	5,193.00	ft	Control Type	Outlet Control	

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Grades					
Upstream Invert	5,186.20	ft	Downstream Invert	5,185.00	ft
Length	270.00	ft	Constructed Slope	0.004444	ft/ft

Hydraulic Profile					
Profile	PressureProfile		Depth, Downstream	3.40	ft
Slope Type	N/A		Normal Depth	N/A	ft
Flow Regime	N/A		Critical Depth	2.59	ft
Velocity Downstream	9.26	ft/s	Critical Slope	0.008863	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.00	ft
Section Size	36 inch		Rise	3.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	5,193.00	ft	Upstream Velocity Head	1.33	ft
Ke	0.50		Entrance Loss	0.67	ft

Inlet Control Properties					
Inlet Control HW Elev.	5,191.62	ft	Flow Control	Submerged	
Inlet Type	Square edge w/headwall		Area Full	7.1	ft²
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
HW 7.8

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	5,194.00	ft	Headwater Depth/Height	2.60	
Computed Headwater Elev	5,194.00	ft	Discharge	68.93	cfs
Inlet Control HW Elev.	5,191.99	ft	Tailwater Elevation	5,188.90	ft
Outlet Control HW Elev.	5,194.00	ft	Control Type	Outlet Control	

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Grades					
Upstream Invert	5,186.20	ft	Downstream Invert	5,185.00	ft
Length	270.00	ft	Constructed Slope	0.004444	ft/ft

Hydraulic Profile					
Profile	PressureProfile		Depth, Downstream	3.90	ft
Slope Type	N/A		Normal Depth	N/A	ft
Flow Regime	N/A		Critical Depth	2.64	ft
Velocity Downstream	9.75	ft/s	Critical Slope	0.009597	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.00	ft
Section Size	36 inch		Rise	3.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	5,194.00	ft	Upstream Velocity Head	1.48	ft
Ke	0.50		Entrance Loss	0.74	ft

Inlet Control Properties					
Inlet Control HW Elev.	5,191.99	ft	Flow Control	Submerged	
Inlet Type	Square edge w/headwall		Area Full	7.1	ft²
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
HW 8.8

Solve For: Discharge

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Culvert Summary					
Allowable HW Elevation	5,195.00	ft	Headwater Depth/Height	2.93	
Computed Headwater Elev	5,195.00	ft	Discharge	72.22	cfs
Inlet Control HW Elev.	5,192.36	ft	Tailwater Elevation	5,189.40	ft
Outlet Control HW Elev.	5,195.00	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	5,186.20	ft	Downstream Invert	5,185.00	ft
Length	270.00	ft	Constructed Slope	0.004444	ft/ft

Hydraulic Profile					
Profile	PressureProfile		Depth, Downstream	4.40	ft
Slope Type	N/A		Normal Depth	N/A	ft
Flow Regime	N/A		Critical Depth	2.69	ft
Velocity Downstream	10.22	ft/s	Critical Slope	0.010368	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.00	ft
Section Size	36 inch		Rise	3.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	5,195.00	ft	Upstream Velocity Head	1.62	ft
Ke	0.50		Entrance Loss	0.81	ft

Inlet Control Properties					
Inlet Control HW Elev.	5,192.36	ft	Flow Control	Submerged	
Inlet Type	Square edge w/headwall		Area Full	7.1	ft²
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
HW 9.8

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	5,196.00	ft	Headwater Depth/Height	3.27	
Computed Headwater Elev	5,196.00	ft	Discharge	75.38	cfs
Inlet Control HW Elev.	5,192.73	ft	Tailwater Elevation	5,189.90	ft
Outlet Control HW Elev.	5,196.00	ft	Control Type	Outlet Control	

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Grades					
Upstream Invert	5,186.20	ft	Downstream Invert	5,185.00	ft
Length	270.00	ft	Constructed Slope	0.004444	ft/ft

Hydraulic Profile					
Profile	PressureProfile		Depth, Downstream	4.90	ft
Slope Type	N/A		Normal Depth	N/A	ft
Flow Regime	N/A		Critical Depth	2.72	ft
Velocity Downstream	10.66	ft/s	Critical Slope	0.011173	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.00	ft
Section Size	36 inch		Rise	3.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	5,196.00	ft	Upstream Velocity Head	1.77	ft
Ke	0.50		Entrance Loss	0.88	ft

Inlet Control Properties					
Inlet Control HW Elev.	5,192.73	ft	Flow Control	Submerged	
Inlet Type	Square edge w/headwall		Area Full	7.1	ft²
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
HW 10.8

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	5,197.00	ft	Headwater Depth/Height	3.60	
Computed Headwater Elev	5,197.00	ft	Discharge	78.41	cfs
Inlet Control HW Elev.	5,193.10	ft	Tailwater Elevation	5,190.40	ft
Outlet Control HW Elev.	5,197.00	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	5,186.20	ft	Downstream Invert	5,185.00	ft
Length	270.00	ft	Constructed Slope	0.004444	ft/ft

Hydraulic Profile					
Profile	PressureProfile		Depth, Downstream	5.40	ft
Slope Type	N/A		Normal Depth	N/A	ft
Flow Regime	N/A		Critical Depth	2.76	ft
Velocity Downstream	11.09	ft/s	Critical Slope	0.012008	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.00	ft
Section Size	36 inch		Rise	3.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	5,197.00	ft	Upstream Velocity Head	1.91	ft
Ke	0.50		Entrance Loss	0.96	ft

Inlet Control Properties					
Inlet Control HW Elev.	5,193.10	ft	Flow Control	Submerged	
Inlet Type	Square edge w/headwall		Area Full	7.1	ft²
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
HW 11.8

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	5,198.00	ft	Headwater Depth/Height	3.93	
Computed Headwater Elev	5,198.00	ft	Discharge	81.32	cfs
Inlet Control HW Elev.	5,193.47	ft	Tailwater Elevation	5,190.90	ft
Outlet Control HW Elev.	5,198.00	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	5,186.20	ft	Downstream Invert	5,185.00	ft
Length	270.00	ft	Constructed Slope	0.004444	ft/ft

Hydraulic Profile					
Profile	PressureProfile		Depth, Downstream	5.90	ft
Slope Type	N/A		Normal Depth	N/A	ft
Flow Regime	N/A		Critical Depth	2.78	ft
Velocity Downstream	11.51	ft/s	Critical Slope	0.012870	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.00	ft
Section Size	36 inch		Rise	3.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	5,198.00	ft	Upstream Velocity Head	2.06	ft
Ke	0.50		Entrance Loss	1.03	ft

Inlet Control Properties					
Inlet Control HW Elev.	5,193.47	ft	Flow Control	Submerged	
Inlet Type	Square edge w/headwall		Area Full	7.1	ft²
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
HW 13.8

Solve For: Discharge

Culvert Summary				
Allowable HW Elevation	5,200.00 ft	Headwater Depth/Height	4.60	
Computed Headwater Elev	5,200.00 ft	Discharge	86.86	cfs
Inlet Control HW Elev.	5,194.21 ft	Tailwater Elevation	5,191.90	ft
Outlet Control HW Elev.	5,200.00 ft	Control Type	Outlet Control	

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Grades				
Upstream Invert	5,186.20 ft	Downstream Invert	5,185.00	ft
Length	270.00 ft	Constructed Slope	0.004444	ft/ft

Hydraulic Profile				
Profile	PressureProfile	Depth, Downstream	6.90	ft
Slope Type	N/A	Normal Depth	N/A	ft
Flow Regime	N/A	Critical Depth	2.83	ft
Velocity Downstream	12.29 ft/s	Critical Slope	0.014662	ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	3.00 ft
Section Size	36 inch	Rise	3.00 ft
Number Sections	1		

Outlet Control Properties				
Outlet Control HW Elev.	5,200.00 ft	Upstream Velocity Head	2.35	ft
Ke	0.50	Entrance Loss	1.17	ft

Inlet Control Properties				
Inlet Control HW Elev.	5,194.21 ft	Flow Control	Submerged	
Inlet Type	Square edge w/headwall	Area Full	7.1	ft²
K	0.00980	HDS 5 Chart	1	
M	2.00000	HDS 5 Scale	1	
C	0.03980	Equation Form	1	
Y	0.67000			

APPENDIX 3

HEC-RAS Input Calculations, Output and Scour Computations

Input Data Calculations

Table 1 Sediment Gradation Data
Table 2 Sediment Transport Data and Manning's Roughness Coefficient Computation
Table 3 Slope Computations – Proposed North Tributary
Table 4 Slope Computations – Proposed Main Branch
Table 5 HEC-RAS Lateral Weir Flow Diversion Rating Curve

Proposed North Tributary Arroyo – HEC-RAS Model Output (a)

Summary Table
Profile Plot
Cross-Section Plots

Proposed Main Branch Tributary Arroyo – HEC-RAS Model Output (a)

Summary Table
Profile Plot
Cross-Section Plots

(a) Models included on CD in map pocket

Scour Computations

Table 10 North Tributary Scour Computations at Bank Lining
Table 11 Main Branch Scour Computations at Bank Lining

TABLE 1 SUMMARY OF SEDIMENT GRADATION DATA

Summary of Lomitas Negras Arroyo and Dulcelina Curtis and Harvey Jones Channels

Sediment Gradation Data provided by SSCAFCA dated March 15, 2013 (A)

and from the SSCAFCA Sediment and Erosion Design Guide. Nov. 2008 (pages 3.20 and 3.21)

Sample Description	D84	D16	D50	Percent Gravel	COMMENT
	mm	mm	mm	%	
Visual average of sieve analyses data (March 15, 2013) (A) plotted by Smith Engineering see attached	0.3	0.08	0.19	none	Very similar to Sample S14 below
S14 (SSCAFCA Guide pages 3.20 & 3.21))	0.38	0.09	0.19	4	The upper watershed sample is similar to the data above
S13 (SSCAFCA Guide pages 3.20 and 3.21)	7.38	0.21	1.31	42	This sample may represent coarser material that deposited due to backwater at culverts just upstream of NM 528 where the sample was taken

A - Samples from sediment spoil piles from Dulcelina Curtis and Harvey Jones channels.

X8e Vinyard

Environmental • Geotechnical • Materials Testing • Geosciences • Engineering

March 15, 2013

Southern Sandoval County
Arroyo Flood Control Authority
1041 Commercial Dr., NE
Rio Rancho, NM 87124

Attention: Mr. Dave Gatterman, P.E.

Project: Spoils Pile Evaluation
X8e Vinyard Project No.: 13-2-048

Dear Sir or Madam:

As requested, X8e Vinyard has performed hand auger test holes for the subject project. Our field personnel performed three hand auger test holes to depths of four feet on three onsite stockpiles. Logs of our hand auger are presented in the attached Figures 1 and 2.

The stockpiled soils were sampled and tested for grain size determination and Atterberg limits. The soils tested consisted of SAND, slightly silty and silty SAND. The test results are presented in the attached Table No. 1.

Based on the results of our testing the stockpiles soils are considered satisfactory for use as engineered fill for roadways, and building pads provided all deleterious material are removed from the stockpiled soil. However, in conformance to the Unified Soil Classification System, the soils classify as SAND (SP) and silty SAND (SM). These soils are highly permeable and are not considered satisfactory for use on water retention projects.

We appreciate this opportunity to be of service to you. If you have additional questions please contact us at your convenience.

Respectfully Submitted

Robert K. Abeyta, S.E.T.

X8e Vinyard

Joel A. Warriner, Sr., P.E.

JAW/cm

LOG OF TEST HOLE NO. 1 (South)

Project: Spoil Piles
Elevation: N/A
Depth to Groundwater: Not Encountered

Project No.: 13-2-048
Date Drilled: 3/12/2013
Drilling Method: Hand Auger

Depth, feet	Blows/foot	Sample Type	Dry Density, pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
1					1,2	SP	SAND, slightly silty, dry
2							
3							
4					1,2		Slightly moist
5							
6							

Note: Poorly graded sand 1'-4' no change on both test hole numbers 1 and 2.

LOG OF TEST HOLE NO. 2 (North)

Elevation: N/A
Depth to Groundwater: Not Encountered

Date Drilled: 3/12/2013
Drilling Method: Hand Auger

Depth, feet	Blows/Foot	Sample Type	Dry Density, pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
1					1,2	SP	SAND, slightly silty
2							
3							
4							
5					1,2	SM	SAND, silty
6							

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 1

LOG OF TEST HOLE NO. 3 (Inlet)

Project: Spoil Piles (South)
Elevation: N/A
Depth to Groundwater: Not Encountered

Project No.: 13-2-048
Date Drilled: 3/12/2013
Drilling Method: Hand Auger

Depth, feet	Blows/Foot	Sample Type	Dry Density, pcf	Water Content, %	Additional Testing	Unified Classification	Material Description
1 2 3 4					1	SP	SAND, slightly silty, slightly moist
5 6					1	SM	SAND, silty, slightly moist

Note: No material change 1'-4'.

ADDITIONAL TESTS: 1= Sieve Analysis 2= Atterberg Limits 3=Direct Shear 4=R-Value 5=Other

Figure: 3

SUMMARY OF LABORATORY TEST DATA

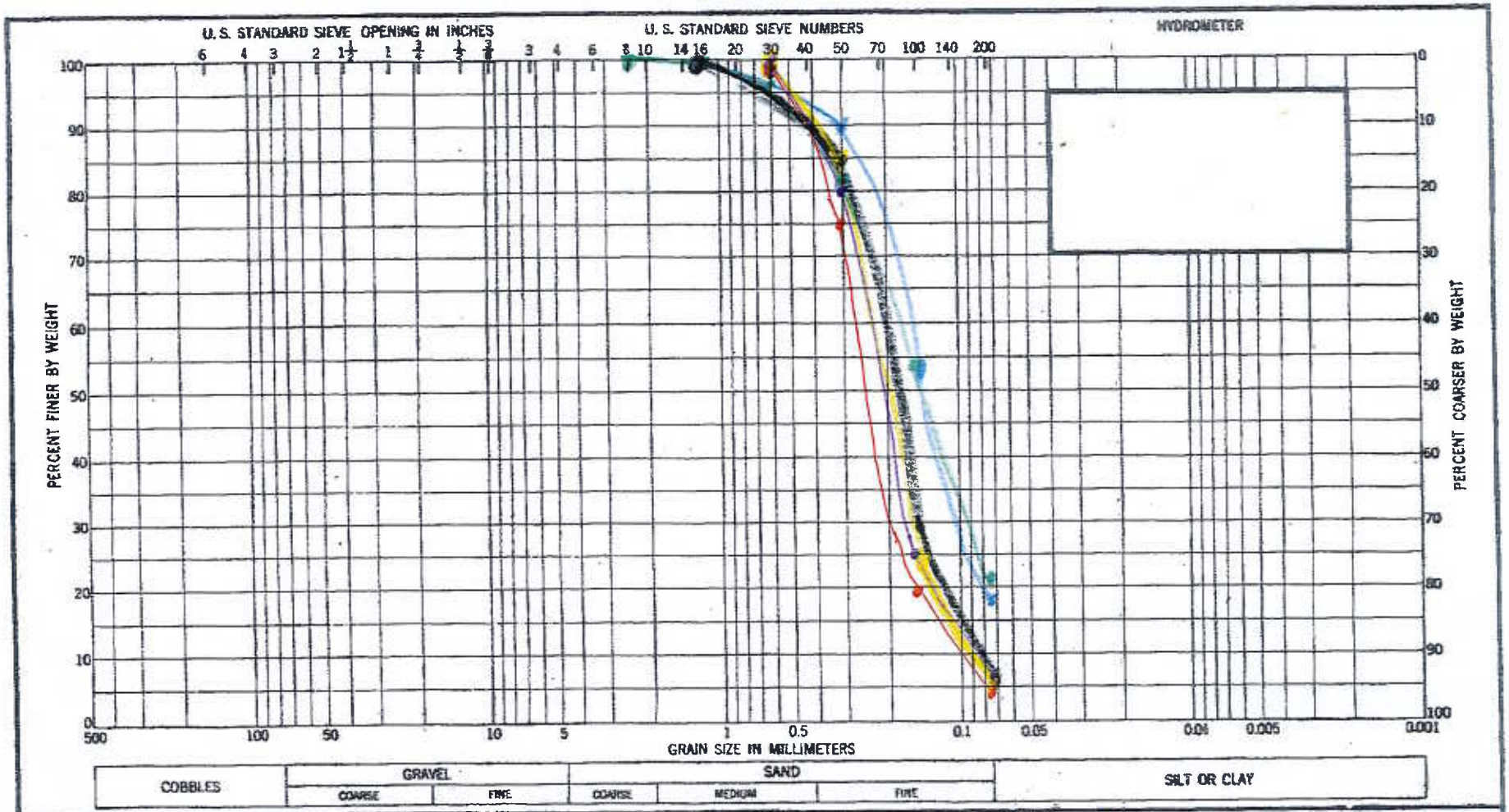
	Test Hole	Depth (feet)	Unified Classification	Natural Dry Density (pcf)	Natural Moisture Content (%)	Atterberg Limits		SIEVE ANALYSIS-% PASSING BY WEIGHT										Description
						LL	PI	1 1/2"	3/4"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	
1	1	1	SP			NV	NP							100	80	25	5.9	SAND, slightly silty
2	1	4	SP			NV	NP							99	75	19	4.9	SAND, slightly silty
3	2	1	SM			NV	NP					100	99	97	81	54	20.8	SAND, silty
4	2	4	SP			NV	NP							100	85	24	5.0	SAND, slightly silty
5	3	1	SP			NV	NP						100	99	85	29	5.3	SAND, slightly silty
6	3	4	SM			NV	NP						100	99	90	53	18.2	SAND, silty

SEE PLOT NEXT PAGE

X8e Vinyard Project No.: 13-2-048

Project: Spoil Piles

Table No.: 1



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI

GRADATION CURVES

1
2
3
4
5
6

SEE PREVIOUS PAGE

ENG FORM 1 MAY 63 2087

TABLE 2

MANNING'S ROUGHNESS COEFFICIENT COMPUTATIONS for EXISTING ARROYO

UPPER REGIME FLOW EQUATION (slopes greater than 0.6

n = (1.0213 * (R / D50) ^ 0.0662 * S ^ 0.0395 * G ^ 0.1282) * 0.034 * D50 ^ 0.167 (A) (B)

Arroyo and Reach Location for Hydraulic Analysis = Lomitas Negras Arroyo 800 ft upstream of Saratoga Road in the Main South Branch

Sediment Sample S13 (B)

HEC-RAS Section No.	Discharge (Q)	Hydraulic Radius (R)	Channel Slope (S)	D84	D50	D16	Gradation Coefficient (G)	n
	cfs	ft	ft / ft	mm	mm	mm		
From Weir Option 4 (n was set at 0.03)								
7180	1176	2	0.018	7.38	1.31	0.21	5.9358	**0.040**

Arroyo and Reach Location for Hydraulic Analysis = Lomitas Negras Arroyo 800 ft upstream of Saratoga Road in the Main South Branch

Sediment Sample S14 (B)

HEC-RAS Section No.	Discharge (Q)	Hydraulic Radius (R)	Channel Slope (S)	D84	D50	D16	Gradation Coefficient (G)	n
	cfs	ft	ft / ft	mm	mm	mm		
From Weir Option 4 (n was set at 0.03)								
7180	1176	2	0.018	0.38	0.19	0.09	2.0556	**0.029**

AVERAGE

Since the 2 Samples are very different, assume the average of computed n values **Average =** **0.034**

(A) From page 3.9 of Sediment Erosion Design Guide, Nov. 2008.
n = Manning's Roughness Coefficient,
R = hydraulic radius (area / wetted perimeter) (ft)
S = Channel Slope (ft / ft)
G = gradation coefficient = 0.5 (D84 / D50 + D50 / D16)

(B) From page 3.21 of Sediment Erosion Design Guide, Nov. 2008. Lomitas Negras Arroyo

TABLE 3

North Tributary Bed Slope Computations (Saratoga Boxes Upstream) WEIR OPTION 8.3

Lomitas Negras Arroyo - possible off-channel pond just west of Saratoga Rd. The lateral weir will allow only high flows to spill into the possible Saratoga Pond (non jurisdictional)

See Figure for location of Stations, HEC-RAS Sections, Weir

Proposed Arroyo Bed Slope - From Boxes to North Corner of Dam

Location Description	HEC-RAS Profile Station at Cross Section	Invert Elevation	Slope	Centerline Distance Between Stations (upstream to downstream)	Invert Elevation Change from Previous Section	COMMENT
	ft	ft	ft / ft	ft	ft	
Proposed HEC-RAS Sections - Build a trapezoidal shaped channel upstream of dam embankment						
Items in this box are set as constants to compute invert elevations						
Bed Invert at Saratoga Box	6225	5182.42		**Length = ft**		Conceptual Design as of 9-9-2014
			0.03328	**348**		
North Corner of Dam at N. Trib.	6573	5194				
Computed invert elevations and distances between sections						
Saratog Box upst. Invert	6225	5182.42				
	6242	5183		17.43	0.58	
	6272	5184		30.05	1.00	
	6303	5185		30.05	1.00	
	6333	5186		30.05	1.00	
	6363	5187		30.05	1.00	
	6393	5188		30.05	1.00	
	6423	5189		30.05	1.00	
	6453	5190		30.05	1.00	
	6483	5191		30.05	1.00	
	6513	5192		30.05	1.00	
	6543	5193		30.05	1.00	
North Corner of Dam at N. Trib.	6573	5194		30.05	1.00	

TABLE 3

North Tributary Bed Slope Computations (Saratoga Boxes Upstream) WEIR OPTION 8.3

Lomitas Negras Arroyo - possible off-channel pond just west of Saratoga Rd. The lateral weir will allow only high flows to spill into the possible Saratoga Pond (non jurisdictional)

See Figure for location of Stations, HEC-RAS Sections, Weir

Proposed Arroyo Bed Slope - North Corner of Dam to Upstream End Proposed Grading

Location Description	HEC-RAS Profile Station at Cross Section	Invert Elevation	Slope	Centerline Distance Between Stations (upstream to downstream)	Invert Elevation Change from Previous Section	COMMENT
	ft	ft	ft / ft	ft	ft	
Proposed HEC-RAS Sections - Build a trapezoidal shaped channel upstream of dam embankment						
Items in this box are set as constants to compute invert elevations						
North Corner of Dam at N. Trib.	6573	5194		**Length = ft**		Conceptual Design as of 9-9-2014
			0.02580	**620**		
Top of Alignment Beginning of Berm	7193	5210				
Computed invert elevations and distances between sections						
North Corner of Dam at N. Trib.	6573	5194				
	6611.6	5195		38.76	1.00	
	6650.4	5196		38.76	1.00	
	6689.2	5197		38.76	1.00	
	6727.9	5198		38.76	1.00	
	6766.7	5199		38.76	1.00	
	6805.4	5200		38.76	1.00	
	6844.2	5201		38.76	1.00	
	6882.9	5202		38.76	1.00	
	6921.7	5203		38.76	1.00	
	6960.5	5204		38.76	1.00	
	6999.2	5205		38.76	1.00	
	7038.0	5206		38.76	1.00	
	7076.7	5207		38.76	1.00	
	7115.5	5208		38.76	1.00	
	7154.2	5209		38.76	1.00	
Top of Alignment Beginning of Berm	7193.0	5210		38.76	1.00	

TABLE 4

SLOPE COMPUTATIONS FOR ARROYO BED (Saratoga Boxes Upstream) WEIR OPTION 8.3

Lomitas Negras Arroyo - possible off-channel pond just west of Saratoga Rd. The lateral weir will allow only high flows to spill into the possible Saratoga Pond (non jurisdictional)

See Figure for location of Stations, HEC-RAS Sections, Weir

Proposed Arroyo Bed Slope - From Boxes to begin Weir

Location Description	HEC-RAS Profile Station at Cross Section	Invert Elevation	Slope	Centerline Distance Between Stations (upstream to downstream)	Invert Elevation Change from Previous Section	COMMENT
	ft	ft	ft / ft	ft	ft	
Proposed HEC-RAS Sections - Build a trapezoidal shaped channel upstream of dam embankment						
Items in this box are set as constants to compute invert elevations						
Bed Invert at Saratoga Box	6225	5182.46		**Length = ft**		Conceptual Design as of 9-9-2014
			0.02080	**675**		
Bed invert at d.s. end of weir	6900	5196.5				
Computed invert elevations and distances between sections						
Saratog Box upst. Invert	6225	5182.46				
	6241.92	5182.81		16.92	0.35	
	6282	5183.65		40.08	0.83	
	6325	5184.54		43.00	0.89	
	6354	5185.14		29.00	0.60	
	6422	5186.56		68.00	1.41	
	6507	5188.33		85.00	1.77	
1st SAS Manhole	6527	5188.74		20.00	0.42	
NOTE the actual rim elev. =	6527	5189.77				CONCLUSION - Raise proposed bed elevation at 1st MH to MH Rim Elev. SEE NEXT COMPUTATION
	6550	5189.22		23.00	0.48	
	6600	5190.26		50.00	1.04	
	6700	5192.34		100.00	2.08	
	6800	5194.42		100.00	2.08	
Downst end of Weir	6900	5196.50		373.00	7.76	

TABLE 4

SLOPE COMPUTATIONS FOR ARROYO BED (Saratoga Boxes Upstream) WEIR OPTION 8.3

Lomitas Negras Arroyo - possible off-channel pond just west of Saratoga Rd. The lateral weir will allow only high flows to spill into the possible Saratoga Pond (non jurisdictional)

See Figure for location of Stations, HEC-RAS Sections, Weir

Proposed Arroyo Bed Slope - From Boxes to 1st SAS Manhole

Location Description	HEC-RAS Profile Station at Cross Section	Invert Elevation	Slope	Centerline Distance Between Stations (upstream to downstream)	Invert Elevation Change from Previous Section	COMMENT
	ft	ft	ft / ft	ft	ft	
Proposed HEC-RAS Sections - Build a trapezoidal shaped channel upstream of dam embankment						
Items in this box are set as constants to compute invert elevations						
Bed Invert at Saratoga Box	6225	5182.46		**Length = ft**		
			0.02421	**302**		
1st SAS Manhole	6527	5189.77				
Computed invert elevations and distances between sections						
Saratog Box upst. Invert	6225	5182.46				
	6240	5182.82		15.00	0.36	
	6275	5183.67		35.00	0.85	
	6350	5185.49		75.00	1.82	
	6440	5187.66		90.00	2.18	
1st SAS Manhole	6527	5189.77		87.00	2.11	
NOTE the actual rim elev. =	6527	5189.77				CONCLUSION -the proposed bed elevation at the 1st MH location must equal the MH Rim Elev.

TABLE 4

SLOPE COMPUTATIONS FOR ARROYO BED (Saratoga Boxes Upstream) WEIR OPTION 8.3

Lomitas Negras Arroyo - possible off-channel pond just west of Saratoga Rd. The lateral weir will allow only high flows to spill into the possible Saratoga Pond (non jurisdictional)

See Figure for location of Stations, HEC-RAS Sections, Weir

Proposed Arroyo Bed Slope - 1st SAS Manhole to 2nd SAS Manhole

Location Description	HEC-RAS Profile Station at Cross Section	Invert Elevation	Slope	Centerline Distance Between Stations (upstream to downstream)	Invert Elevation Change from Previous Section	COMMENT
	ft	ft	ft / ft	ft	ft	

Proposed HEC-RAS Sections - Build a trapezoidal shaped channel upstream of dam embankment

Items in this box are set as constants to compute invert elevations

1st SAS Manhole	6527	5189.77		**Length = ft**		
			0.00924	**330**		
2nd SAS Manhole	6857	5192.82				

This slope is too mild and the bed elev near the downsteram end of weir must be at 5196.5 for weir to function, therefore begin a new calc and compute slope from begin of weir near 2nd MH to 1st MH

TABLE 4

SLOPE COMPUTATIONS FOR ARROYO BED (Saratoga Boxes Upstream) WEIR OPTION 8.3

Lomitas Negras Arroyo - possible off-channel pond just west of Saratoga Rd. The lateral weir will allow only high flows to spill into the possible Saratoga Pond (non jurisdictional)

See Figure for location of Stations, HEC-RAS Sections, Weir

Proposed Arroyo Bed Slope - From downst. End of weir to 1st SAS Manhole

Location Description	HEC-RAS Profile Station at Cross Section	Invert Elevation	Slope	Centerline Distance Between Stations (upstream to downstream)	Invert Elevation Change from Previous Section	COMMENT
	ft	ft	ft / ft	ft	ft	
Proposed HEC-RAS Sections - Build a trapezoidal shaped channel upstream of dam embankment						
Items in this box are set as constants to compute invert elevations						
1st SAS Manhole	6527	5189.77		**Length = ft**		
			0.01804	**373**		
Bed at Downst end weir	6900	5196.5				
Computed invert elevations and distances between sections						
1st SAS Manhole	6527	5189.77				
	6550	5190.18		23.00	0.41	
	6600	5191.09		50.00	0.90	
	6700	5192.89		100.00	1.80	
	6800					
2nd SAS Manhole	6857	5195.72		157.00	2.83	
NOTE the actual rim elev. =	6857	5192.82				CONCLUSION -the proposed bed at the 2nd SAS MH will equal the MH rim elev.
Bed at downst. End weir	6900	5196.50		43.00	3.68	

TABLE 4

SLOPE COMPUTATIONS FOR ARROYO BED (Saratoga Boxes Upstream) WEIR OPTION 8.3

Lomitas Negras Arroyo - possible off-channel pond just west of Saratoga Rd. The lateral weir will allow only high flows to spill into the possible Saratoga Pond (non jurisdictional)

See Figure for location of Stations, HEC-RAS Sections, Weir

Proposed Arroyo Bed Slope - From downst. End of weir to Upstream end of lined bed

Location Description	HEC-RAS Profile Station at Cross Section	Invert Elevation	Slope	Centerline Distance Between Stations (upstream to downstream)	Invert Elevation Change from Previous Section	COMMENT
	ft	ft	ft / ft	ft	ft	
Proposed HEC-RAS Sections - Build a trapezoidal shaped channel upstream of dam embankment						
Items in this box are set as constants to compute invert elevations						
Bed at Downstr end of weir	6900	5196.5		**Length = ft**		WEIR CREST ELEV.
			0.01842	**825**		add 1.5 ft to bed elev
Upstream of Beginning of Lined Channel	7725	5211.7				
Computed invert elevations and distances between sections						
Beg at D.S. end of weir	6900	5196.5				5198.00
section at weir	6975	5197.88		75.00	1.38	5199.38
section at weir	7050	5199.26		75.00	1.38	5200.76
section at weir	7125	5200.65		75.00	1.38	5202.15
section at weir	7200	5202.03		75.00	1.38	5203.53
section at weir	7275	5203.41		75.00	1.38	5204.91
3rd SAS Manhole	7308	5204.02		33.00	0.61	-----
NOTE the actual rim elev. =	7308	5201.34				CONCLUSION - 3rd MH must be elevated 2.64 ft to be at prop bed elev.
section at weir	7311.18	5204.08		3.18	2.74	5205.58
section at weir - angle point S. bank	7350	5204.79		38.82	0.72	5206.29
	7417	5206.03		67.00	1.23	5207.53
	7425	5206.17		8.00	0.15	-----
	7500	5207.55		75.00	1.38	-----

TABLE 4

SLOPE COMPUTATIONS FOR ARROYO BED (Saratoga Boxes Upstream) WEIR OPTION 8.3

Lomitas Negras Arroyo - possible off-channel pond just west of Saratoga Rd. The lateral weir will allow only high flows to spill into the possible Saratoga Pond (non jurisdictional)

See Figure for location of Stations, HEC-RAS Sections, Weir						
Bed at upst. End weir	7523.47	5207.99		23.47	0.43	-----
5 ft upstream of weir	7528.47	5208.08		5.00	0.09	-----
	7575	5208.94				
	7650	5210.32		121.53	2.24	-----
Begin the hardened bed	7731.48	5211.82				
Just Upstream of beginning of the hardened bed	7735	5211.88		85.00	1.57	-----
Section at 4th MH	7755	5212.25		20.00	0.37	CONCLUSION -the 4th MH will remain about 2.89 ft lower than the existing sand bed
Note 4th MH Rim Elev =	7755	5209.36		0.00	-2.89	-----
All SECTIONS starting with 7755 and upstream are natural channel sections (no grading)						
Compute 36-in. Pipe Slope - From Pond Invert at Principal Spillway to Station 63+50						
COMPUTE 36-in. Pipe Slope from Pond invert to outfall in main branch						
Items in this box are set as constants to compute invert elevations						
36-in. pipe outfall at main branch Sta. 6350	0	5185		**Length = ft**		
			0.00437	**270**		
Pond Inv. At Principal Spillway	270	5186.18				

Table 5 - Weir Option 8.3 Rating Curve - Saratoga Pond

Profile	Q US (cfs)	Q Leaving Total (cfs)	Q DS (cfs)	Q Weir (cfs)	Wr Top Wdth (ft)	Weir Max Depth (ft)	Weir Avg Depth (ft)	Min El Weir Flow (ft)	E.G. US. (ft)	W.S. US. (ft)	E.G. DS (ft)	W.S. DS (ft)
	0	0	0	0								
PF 1	0.5	0	0.5	0				5198	5207.92	5207.92	5196.5	5196.49
PF 2	25	0	25	0				5198	5208.12	5208.04	5196.87	5196.7
PF 3	100	0	100	0				5198	5208.45	5208.24	5197.47	5197.05
PF 4	200	0	200	0				5198	5208.78	5208.44	5198.08	5197.36
PF 5	300	0	300	0				5198	5209.06	5208.59	5198.55	5197.64
PF 6	400	0	400	0				5198	5209.31	5208.72	5198.98	5197.85
PF 7	500	0.86	499.14	0.86	93.48	0.05	0.03	5198	5209.53	5208.86	5199.37	5198.05
PF 8	600	27.37	572.12	27.37	448.26	0.17	0.09	5198	5209.73	5208.99	5199.65	5198.16
PF 9	700	79.72	620.22	79.72	485.57	0.3	0.19	5198	5209.92	5209.12	5199.83	5198.23
PF 10	800	141.18	658.9	141.18	522.64	0.43	0.26	5198	5210.11	5209.22	5199.97	5198.29
PF 11	900	206.63	694.24	206.63	559.71	0.55	0.32	5198	5210.29	5209.33	5200.11	5198.33
PF 12	1000	279.49	721.03	279.49	615.74	0.66	0.36	5198	5210.45	5209.46	5200.2	5198.37
PF 13	1100	357.95	745.16	357.95	620	0.75	0.43	5198	5210.61	5209.56	5200.28	5198.41
PF 14	1200	442.28	749.56	442.28	620	0.83	0.49	5198	5210.77	5209.66	5200.31	5198.4
PF 15	1300	530.26	777.61	530.26	620	0.91	0.56	5198	5210.92	5209.76	5200.34	5198.49
PF 16	1400	609.81	798.96	609.81	620	0.98	0.62	5198	5211.05	5209.97	5200.41	5198.52
PF 17	1500	688.56	819.83	688.56	620	1.04	0.67	5198	5211.19	5210.07	5200.49	5198.53
PF 18	1600	768.39	840.7	768.39	620	1.11	0.72	5198	5211.32	5210.15	5200.56	5198.56
PF 19	1700	829.04	861.63	829.04	620	1.15	0.76	5198	5211.46	5210.24	5200.61	5198.59
PF 20	1800	910.79	871.61	910.79	620	1.23	0.81	5198	5211.59	5210.33	5200.66	5198.59
PF 21	1900	999.99	899.25	999.99	620	1.29	0.86	5198	5211.72	5210.41	5200.75	5198.62
PF 22	2000	1073.05	928.69	1073.05	620	1.34	0.9	5198	5211.84	5210.48	5200.84	5198.66
PF 23	2100	1124.69	956.44	1124.69	620	1.34	0.93	5198	5211.97	5210.56	5200.94	5198.68
PF 24	2200	1214.31	987.81	1214.31	620	1.39	0.98	5198	5212.09	5210.65	5201.04	5198.71

Table 5 - Weir Option 8.3 Rating Curve - Saratoga Pond

Profile	Q US	Q Leaving Total	Q DS	Q Weir	Wr Top Wdth	Weir Max Depth	Weir Avg Depth	Min El Weir Flow	E.G. US.	W.S. US.	E.G. DS	W.S. DS
	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
PF 25	2300	1309.65	975.91	1309.65	620	1.5	1.03	5198	5212.21	5210.73	5200.99	5198.71
PF 26	2400	1377.61	997.47	1377.61	620	1.56	1.06	5198	5212.33	5210.83	5201.05	5198.74
PF 27	2500	1480.34	1001.05	1480.34	620	1.66	1.11	5198	5212.44	5210.91	5201.08	5198.73
PF 28	2600	1568.62	1021.58	1568.62	620	1.7	1.15	5198	5212.55	5210.98	5201.15	5198.75
PF 29	2700	1628.5	1051.42	1628.5	620	1.72	1.18	5198	5212.66	5211.05	5201.23	5198.79
PF 30	2800	1729.15	1082.02	1729.15	620	1.78	1.23	5198	5212.78	5211.12	5201.32	5198.82
PF 31	2900	1824.04	1102.1	1824.04	620	1.83	1.28	5198	5212.88	5211.19	5201.38	5198.84
PF 32	3000	1916.6	1116.38	1916.6	620	1.89	1.32	5198	5212.99	5211.26	5201.43	5198.85
PF 33	3100	1978.06	1137.73	1978.06	620	1.92	1.35	5198	5213.1	5211.33	5201.5	5198.88
PF 34	3200	2085.29	1153.78	2085.29	620	1.98	1.39	5198	5213.2	5211.4	5201.55	5198.89
PF 35	3338	2190.74	1190.51	2190.74	620	2.07	1.44	5198	5213.35	5211.49	5201.66	5198.93
PF 36	3350	2209.19	1183.05	2209.19	620	2.08	1.45	5198	5213.36	5211.51	5201.64	5198.92

Proposed North Tributary Arroyo – HEC-RAS Model Output (a)

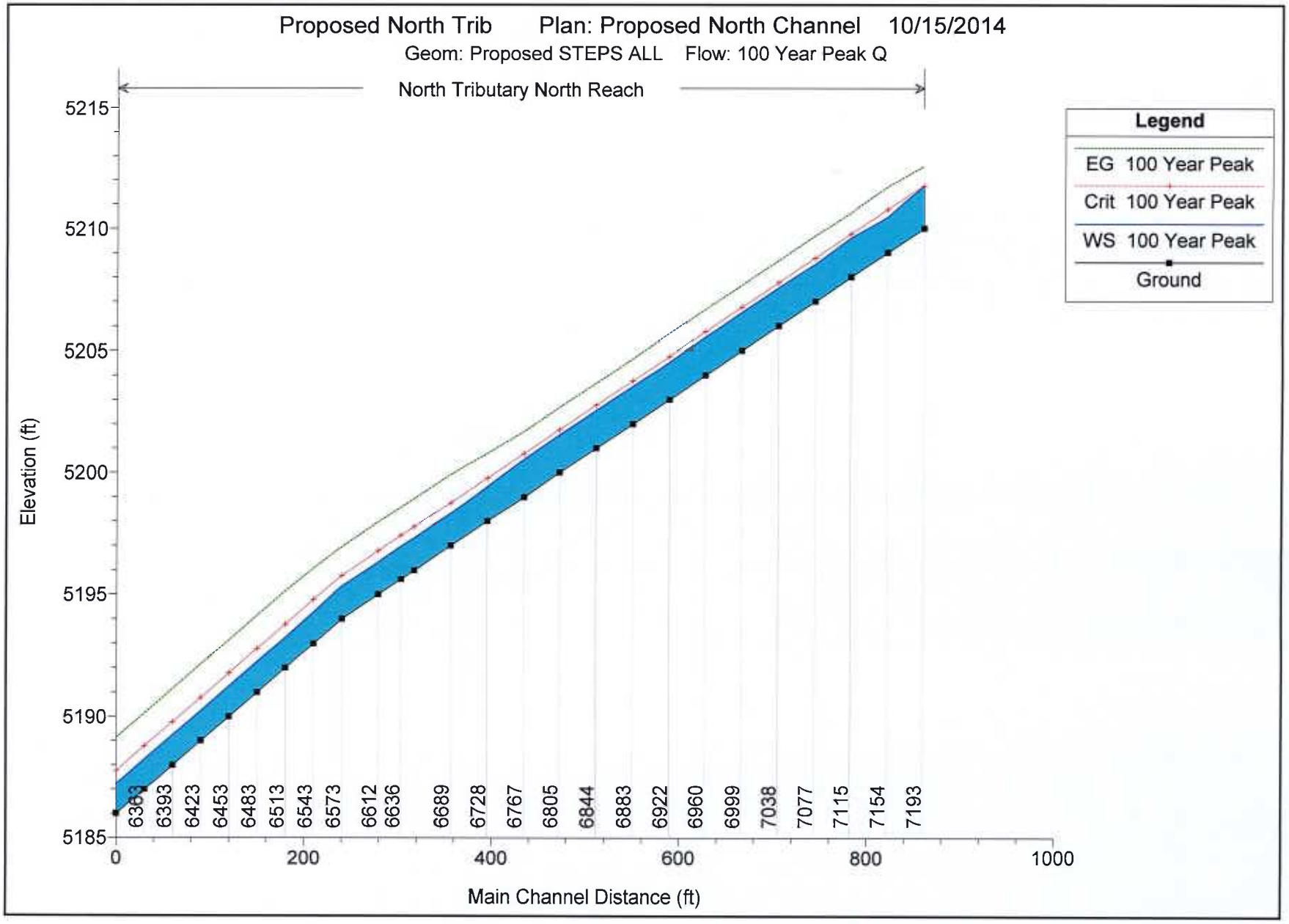
Summary Table

Profile Plot

Cross-Section Plots

North Tributary Lomitas Negras Arroyo HEC-RAS Summary for 100 Year Peak Discharge

River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Hydr Radius	Shear Chan	Hydr Depth C	Max Chl Dpth
	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)	(lb/sq ft)	(ft)	(ft)
7193	768	5210	5211.77	5211.77	5212.61	0.015981	7.34	104.61	63.32	1.01	1.6	1.6	1.65	1.77
7154	768	5209	5210.47	5210.77	5211.72	0.030623	8.99	85.39	62.4	1.35	1.33	2.55	1.37	1.47
7115	768	5208	5209.61	5209.77	5210.64	0.022512	8.17	93.98	62.82	1.18	1.45	2.04	1.5	1.61
7077	768	5207	5208.52	5208.77	5209.69	0.027387	8.69	88.41	62.55	1.29	1.37	2.35	1.41	1.52
7038	768	5206	5207.57	5207.77	5208.66	0.024346	8.37	91.72	62.71	1.22	1.42	2.16	1.46	1.57
6999	768	5205	5206.55	5206.77	5207.67	0.025668	8.51	90.22	62.64	1.25	1.4	2.24	1.44	1.55
6960	768	5204	5205.54	5205.77	5206.67	0.025752	8.52	90.12	62.63	1.25	1.4	2.25	1.44	1.54
6922	768	5203	5204.54	5204.77	5205.68	0.026149	8.56	89.7	62.61	1.26	1.39	2.27	1.43	1.54
6883	768	5202	5203.55	5203.77	5204.67	0.025557	8.5	90.34	62.64	1.25	1.4	2.24	1.44	1.55
6844	768	5201	5202.55	5202.77	5203.67	0.025557	8.5	90.34	62.64	1.25	1.4	2.24	1.44	1.55
6805	768	5200	5201.55	5201.77	5202.67	0.025363	8.48	90.55	62.65	1.24	1.4	2.22	1.45	1.55
6767	768	5199	5200.53	5200.77	5201.68	0.026524	8.6	89.3	62.59	1.27	1.39	2.3	1.43	1.53
6728	768	5198	5199.41	5199.77	5200.78	0.019357	9.38	81.86	62.23	1.44	1.28	1.55	1.32	1.41
6689	768	5197	5198.32	5198.77	5199.9	0.024583	10.1	76.01	61.95	1.61	1.2	1.84	1.23	1.32
6650	768	5196	5197.31	5197.77	5198.92	0.025421	10.21	75.23	61.91	1.63	1.19	1.88	1.21	1.3
6636	768	5195.63	5196.97	5197.43	5198.57	0.025218	10.17	75.52	61	1.61	1.19	1.87	1.24	1.34
6612	768	5195	5196.33	5196.8	5197.96	0.025848	10.25	74.96	61	1.63	1.18	1.9	1.23	1.33
6573	768	5194	5195.33	5195.79	5196.95	0.025547	10.21	75.22	61	1.62	1.18	1.88	1.23	1.33
6543	768	5193	5194.26	5194.79	5196.09	0.031149	10.85	70.82	61	1.77	1.11	2.17	1.16	1.26
6513	768	5192	5193.24	5193.79	5195.12	0.032658	11	69.8	61	1.81	1.1	2.24	1.14	1.24
6483	768	5191	5192.24	5192.8	5194.13	0.033027	11.04	69.56	61	1.82	1.1	2.26	1.14	1.24
6453	768	5190	5191.24	5191.79	5193.13	0.03312	11.05	69.51	61	1.82	1.09	2.26	1.14	1.24
6423	768	5189	5190.24	5190.79	5192.14	0.033402	11.08	69.33	61	1.83	1.09	2.28	1.14	1.23
6393	768	5188	5189.24	5189.79	5191.14	0.033214	11.06	69.45	61	1.83	1.09	2.27	1.14	1.24
6363	768	5187	5188.24	5188.79	5190.13	0.03312	11.05	69.51	61	1.82	1.09	2.26	1.14	1.24
6333	768	5186	5187.24	5187.79	5189.14	0.033354	11.07	69.36	61	1.83	1.09	2.28	1.14	1.24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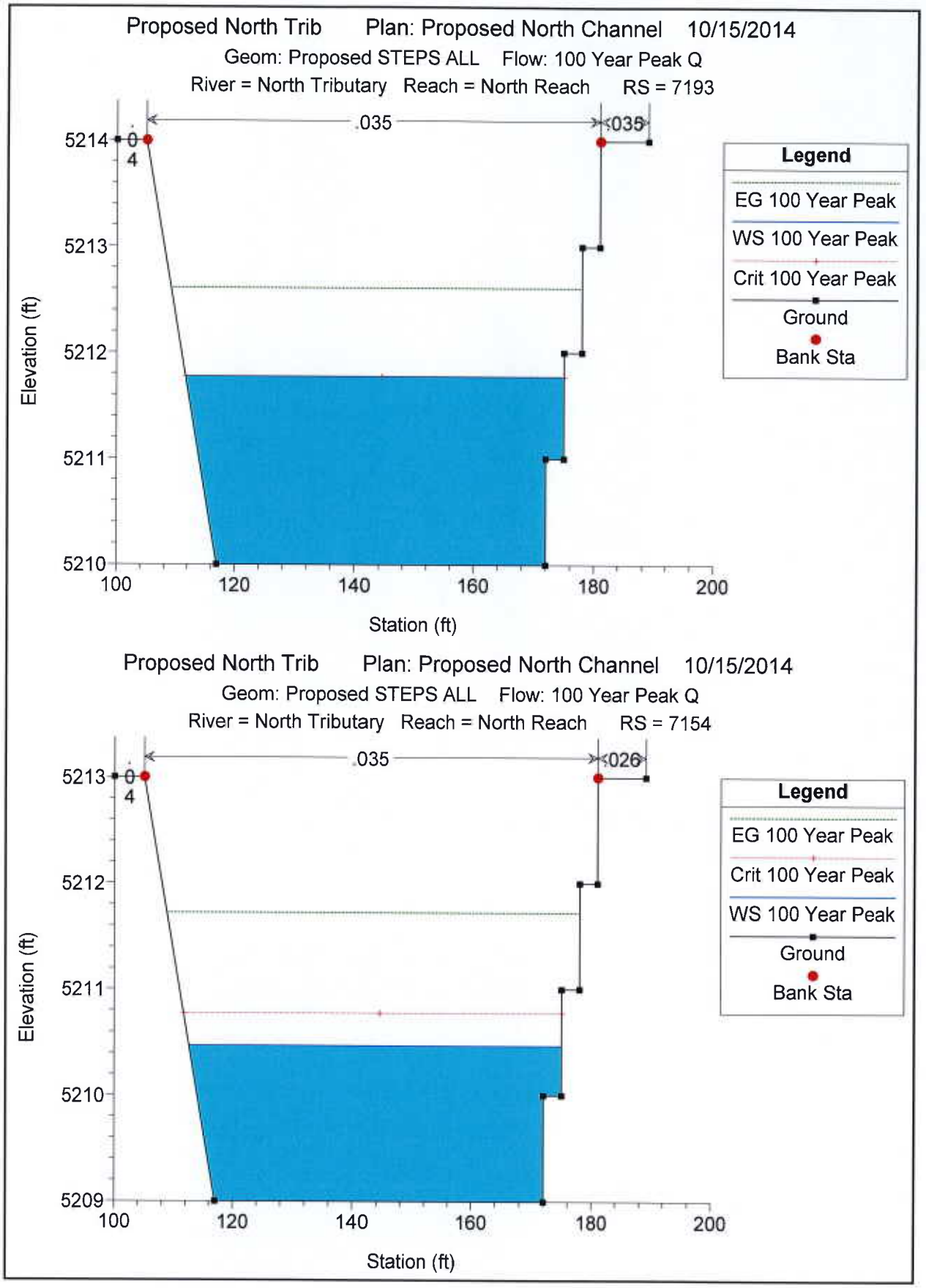
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
North Tributary North Reach
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Elevation (ft)
5215
5210
5205
5200
5195
5190
5185
6363
6393
6423
6453
6483
6513
6543
6573
6612
6636
6689
6728
6767
6805
6844
6883
6922
6960
6999
7038
7077
7115
7154
7193
0
200
400
600
800
1000
Main Channel Distance (ft)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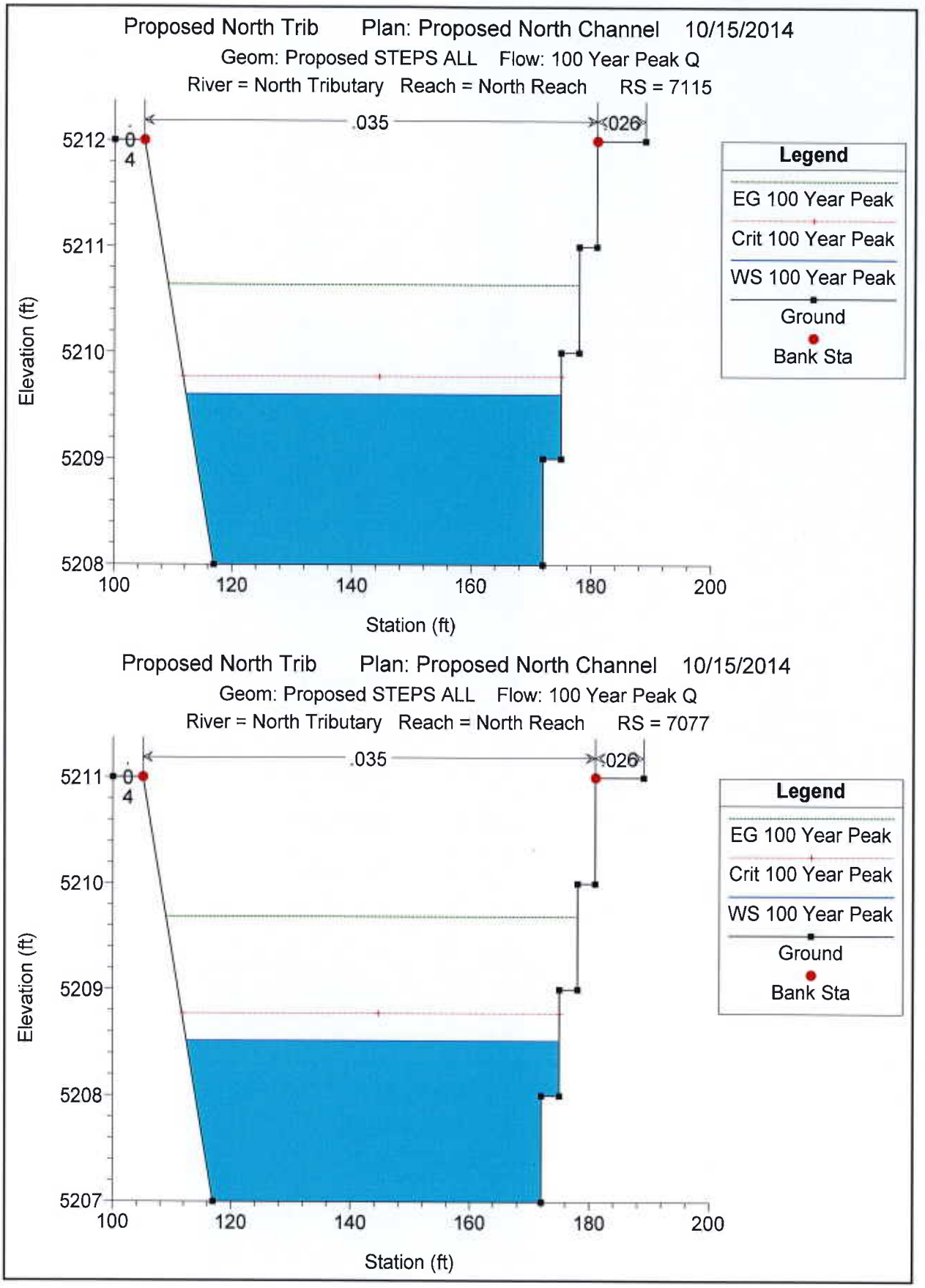
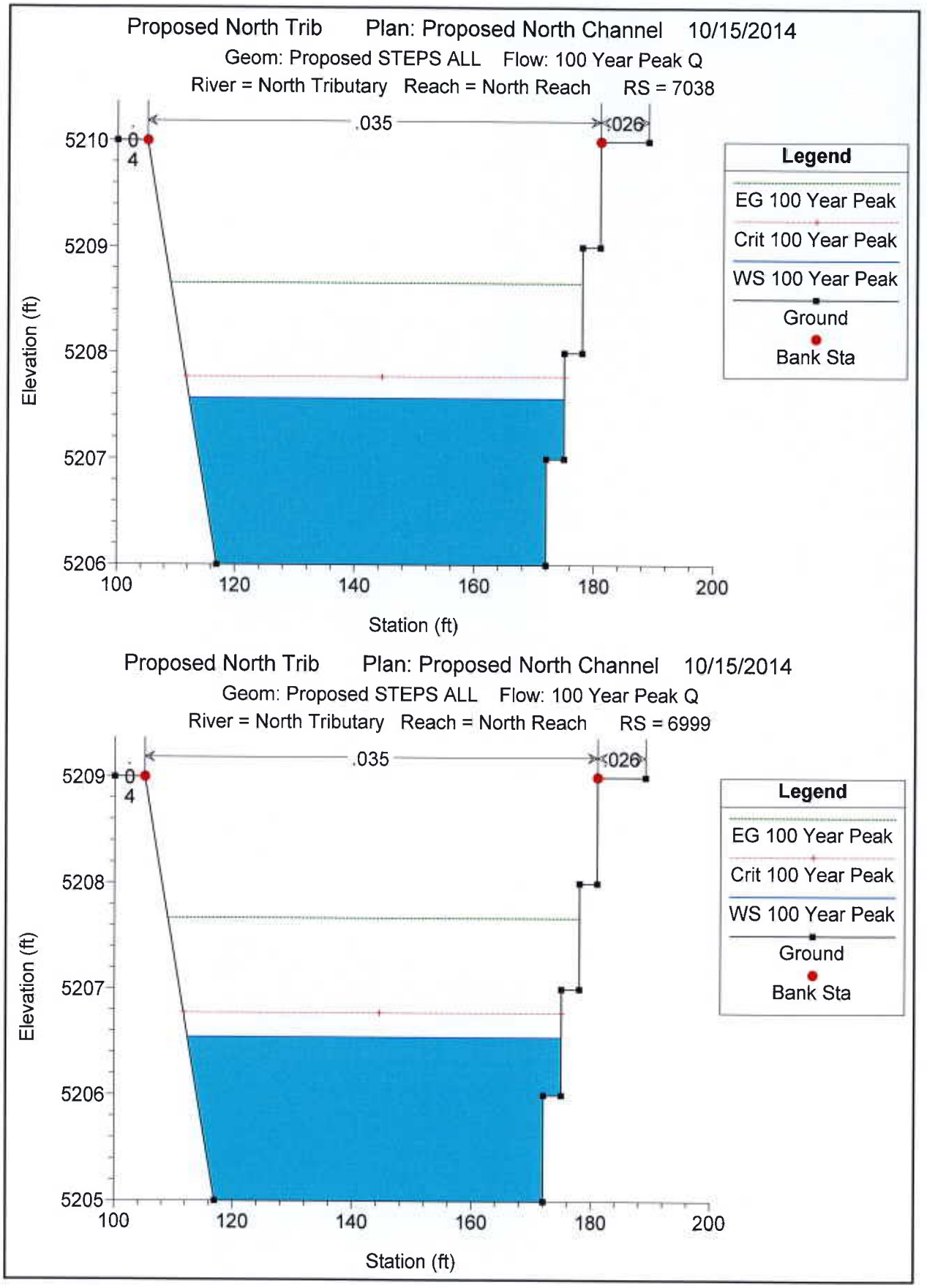
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 7193
.035
.035
.04
Legend
EG 100 Year Peak
WS 100 Year Peak
Crit 100 Year Peak
Ground
Bank Sta
Elevation (ft)
5214
5213
5212
5211
5210
100
120
140
160
180
200
Station (ft)
Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 7154
.035
.026
.04
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta
Elevation (ft)
5213
5212
5211
5210
5209
100
120
140
160
180
200
Station (ft)


Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 7115
.035
.026
0.04
5212
5211
5210
5209
5208
Elevation (ft)
100
120
140
160
180
200
Station (ft)
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta
Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 7077
.035
.026
0.04
5211
5210
5209
5208
5207
Elevation (ft)
100
120
140
160
180
200
Station (ft)
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta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Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 7038
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.04
5210
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5208
5207
5206
Elevation (ft)
100
120
140
160
180
200
Station (ft)
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta
Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 6999
.035
.026
.04
5209
5208
5207
5206
5205
Elevation (ft)
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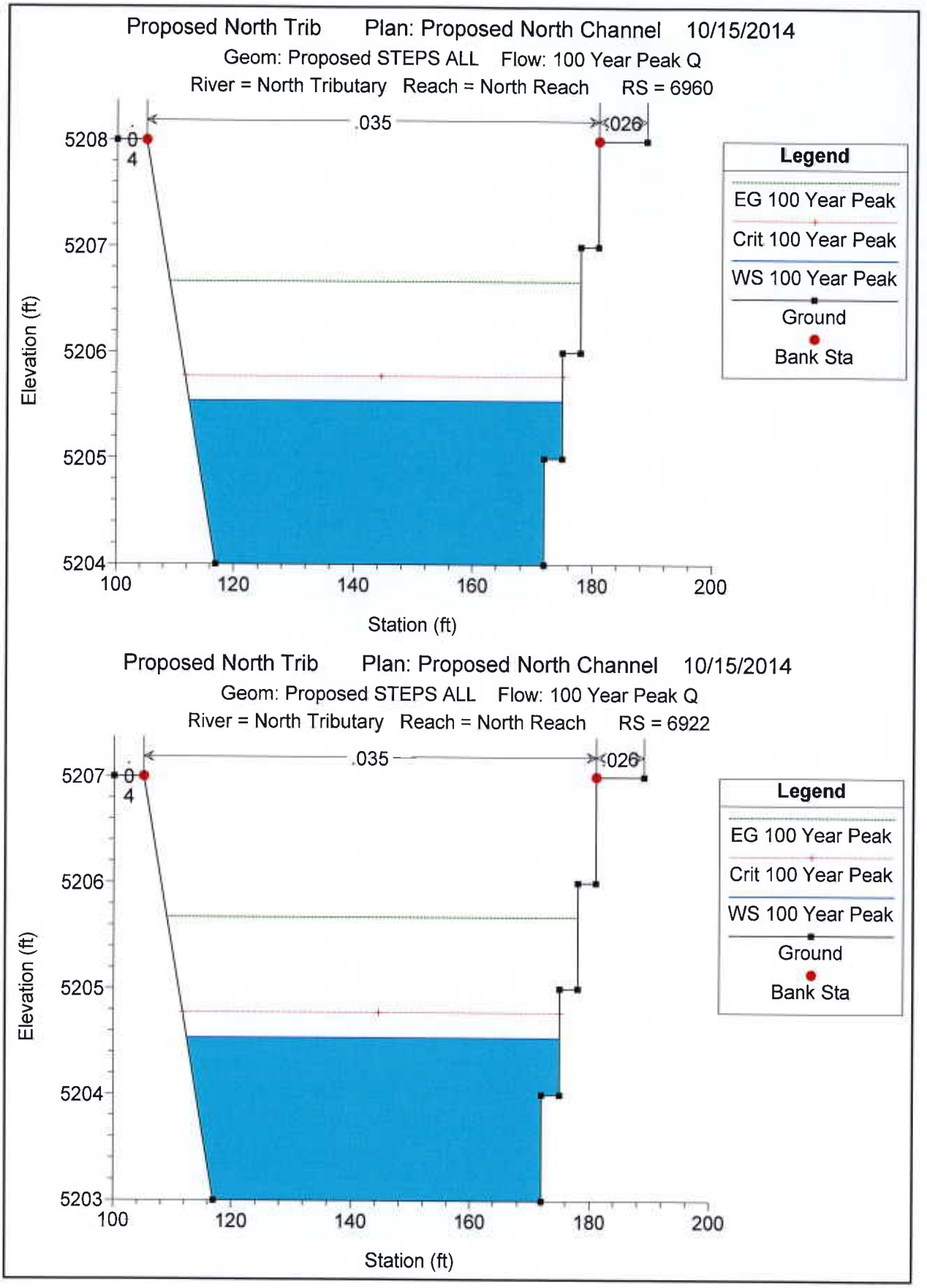
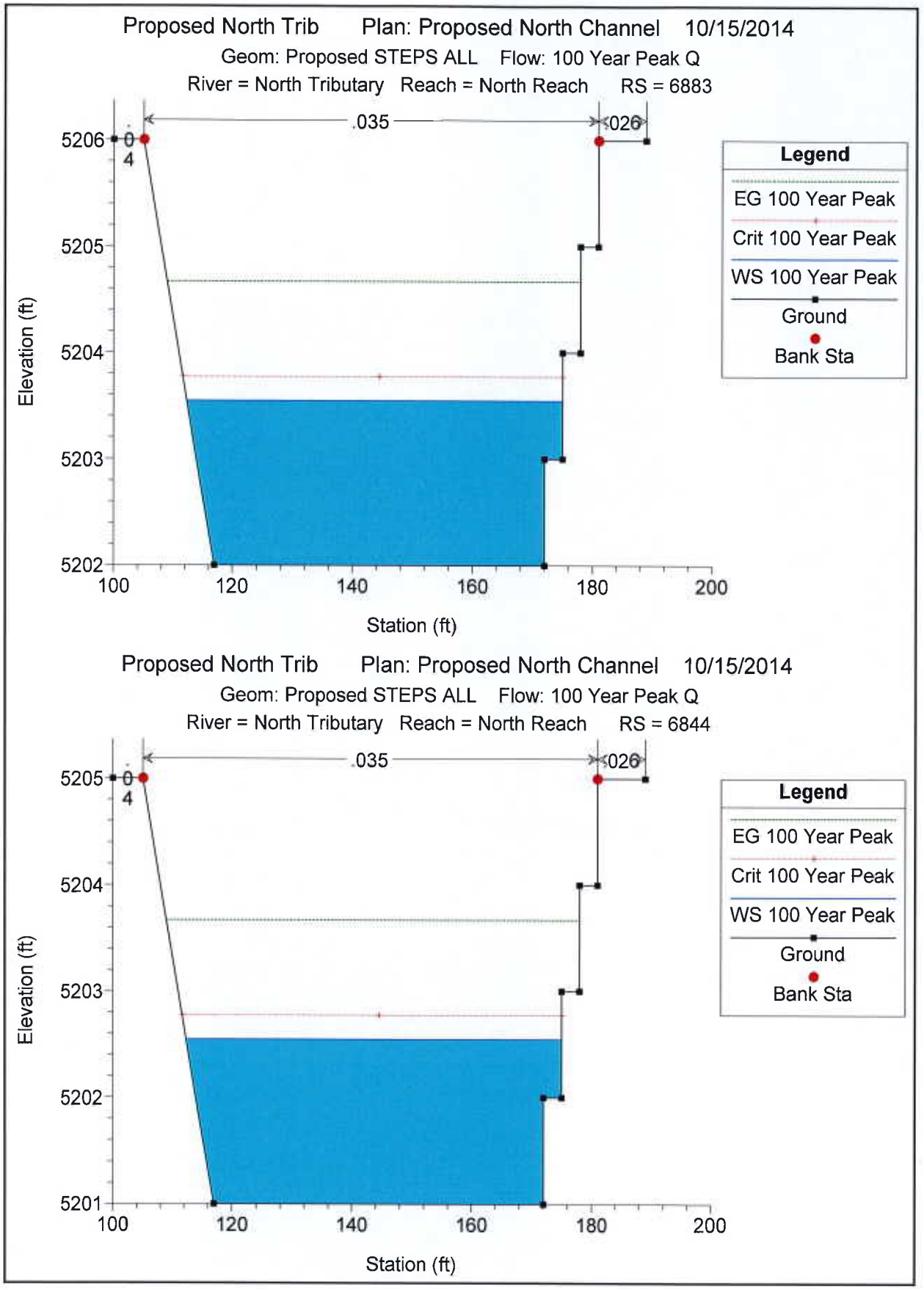
120
140
160
180
200
Station (ft)
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta


Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 6960
.035
.026
.04
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta
Elevation (ft)
5208
5207
5206
5205
5204
100
120
140
160
180
200
Station (ft)
Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 6922
.035
.026
.04
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta
Elevation (ft)
5207
5206
5205
5204
5203
100
120
140
160
180
200
Station (ft)


Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 6883
.035
026
.04
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta
Elevation (ft)
5206
5205
5204
5203
5202
100
120
140
160
180
200
Station (ft)
Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 6844
.035
026
.04
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta
Elevation (ft)
5205
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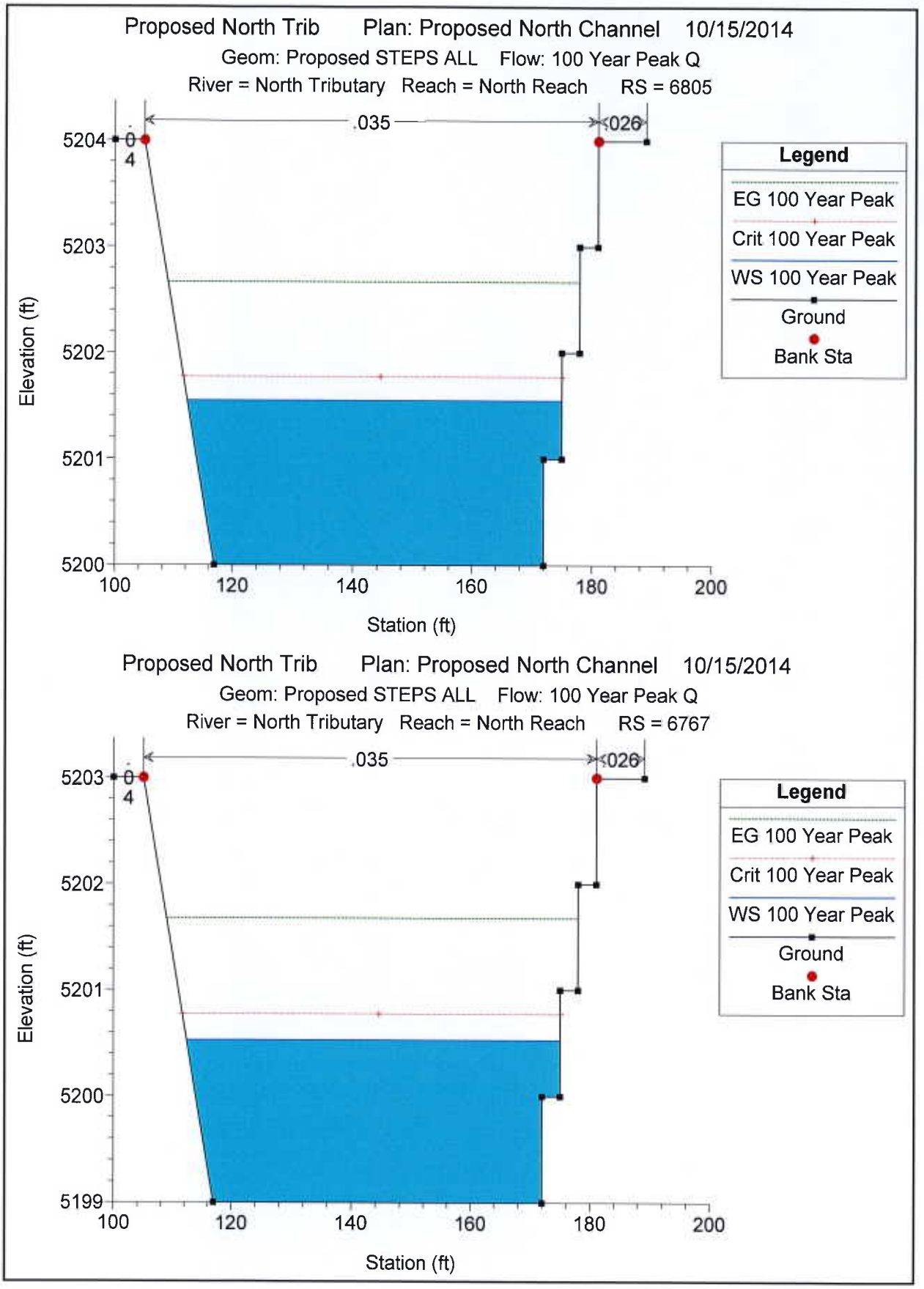
5203
5202
5201
100
120
140
160
180
200
Station (ft)


Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 6805
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.04
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta
Elevation (ft)
5204
5203
5202
5201
5200
100
120
140
160
180
200
Station (ft)
Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 6767
.035
.026
.04
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta
Elevation (ft)
5203
5202
5201
5200
5199
100
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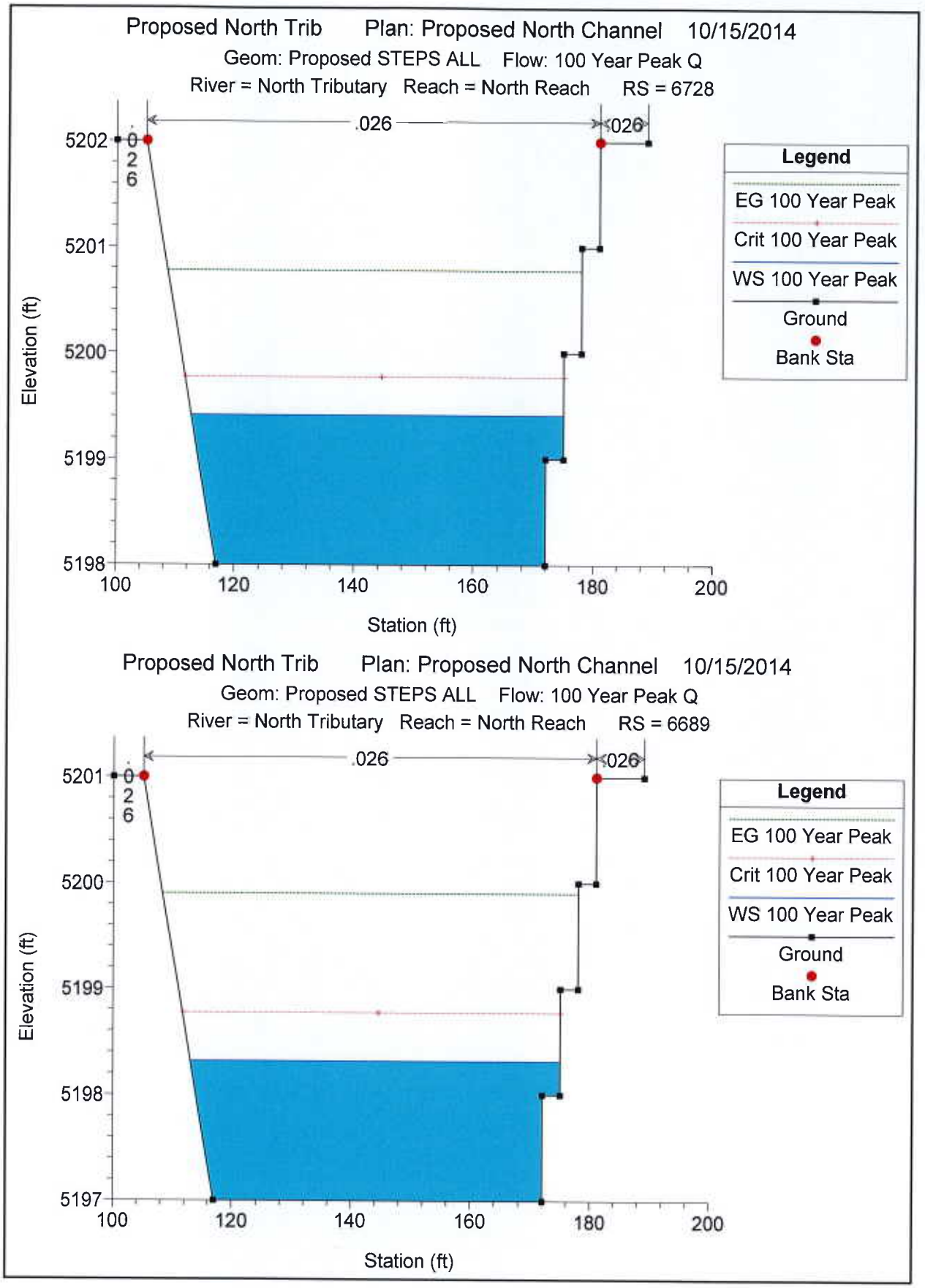
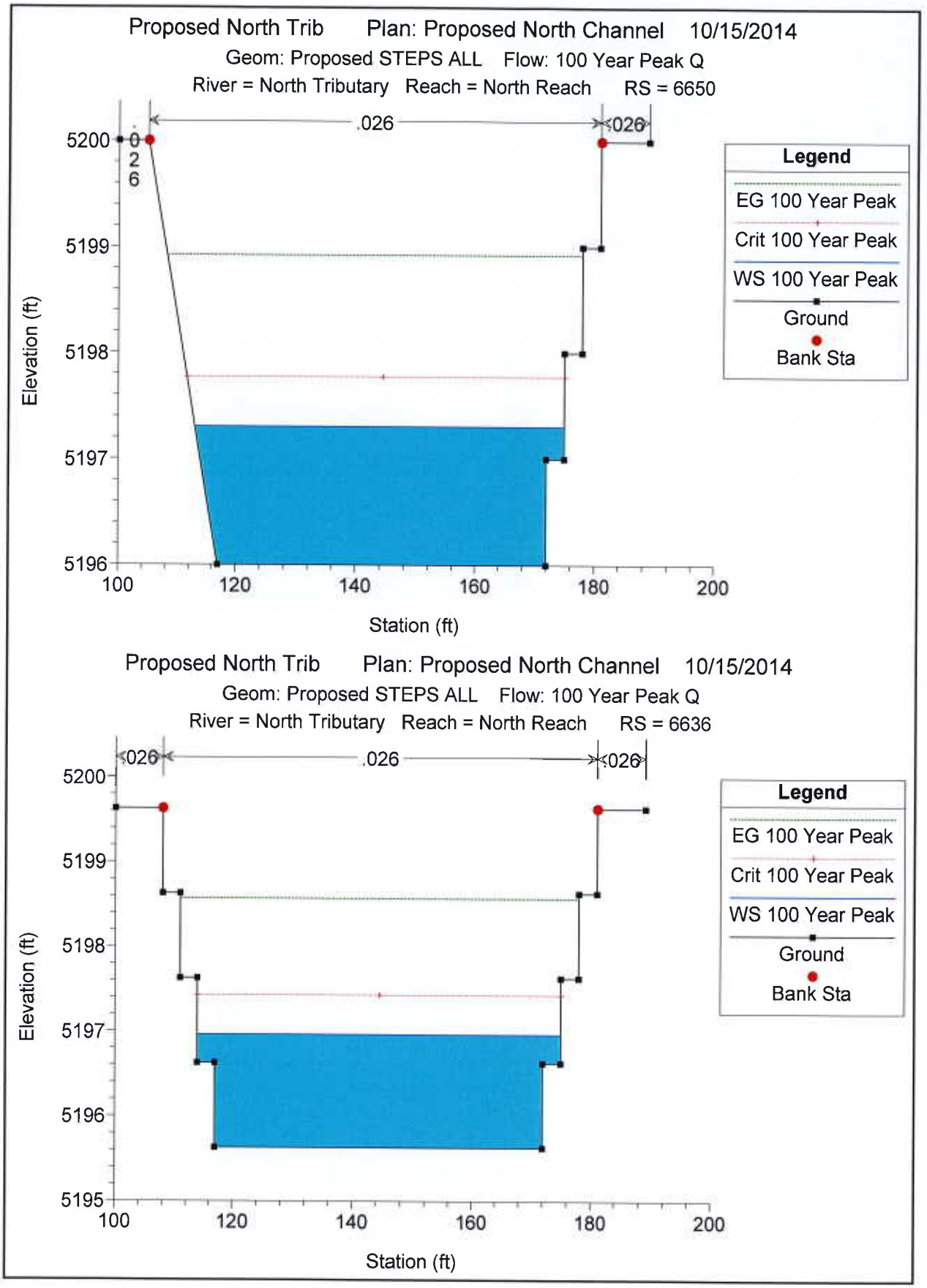
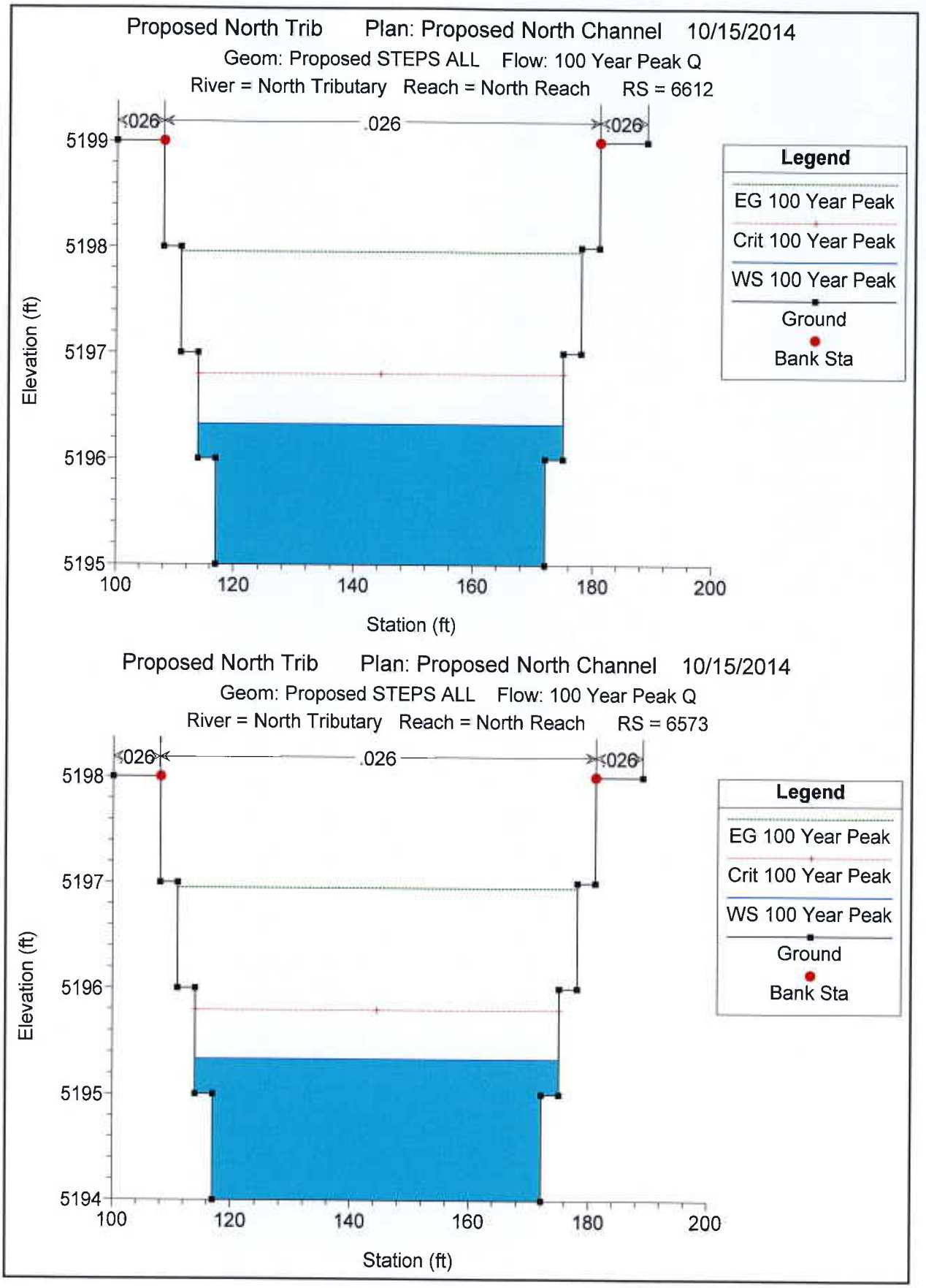
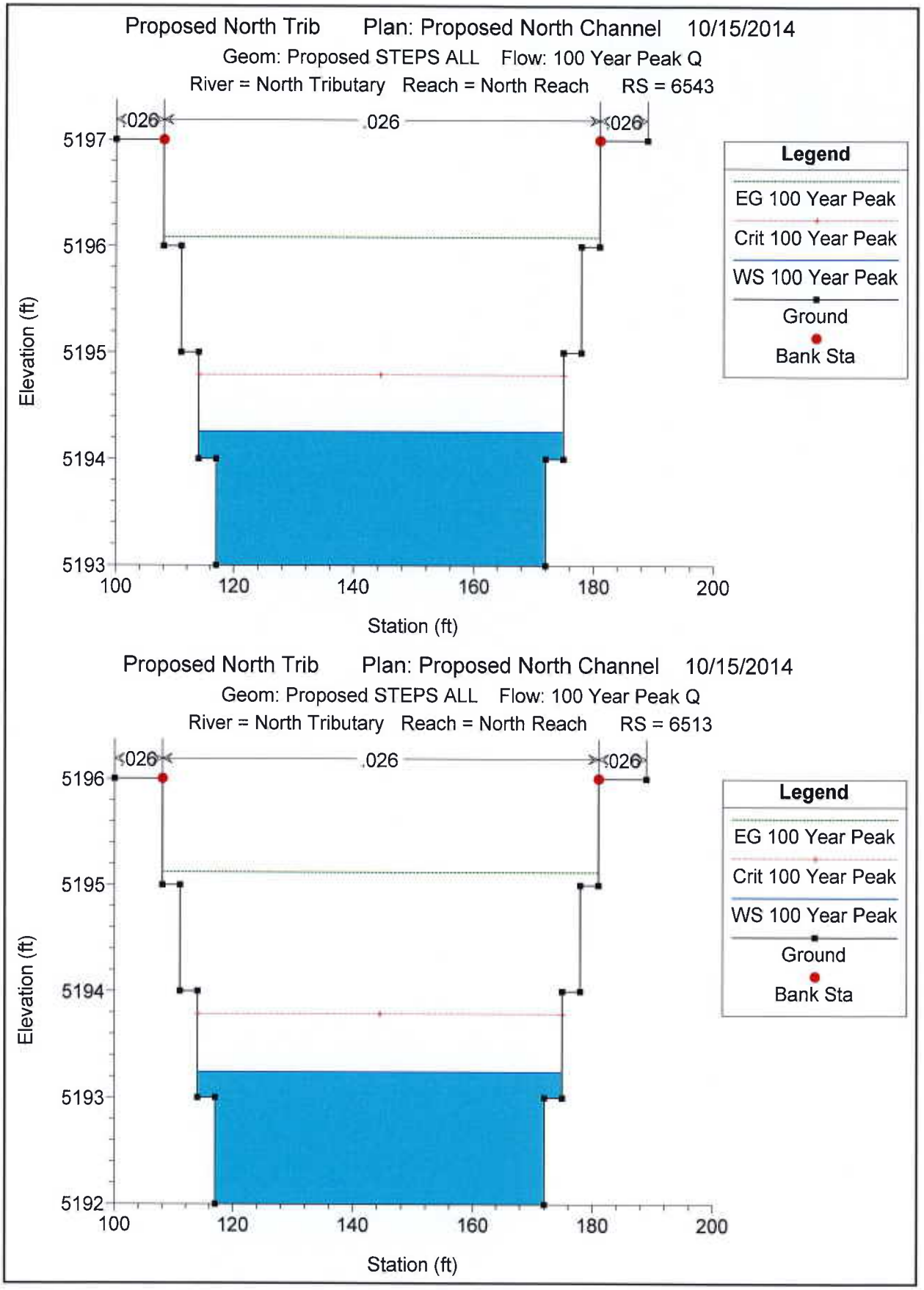
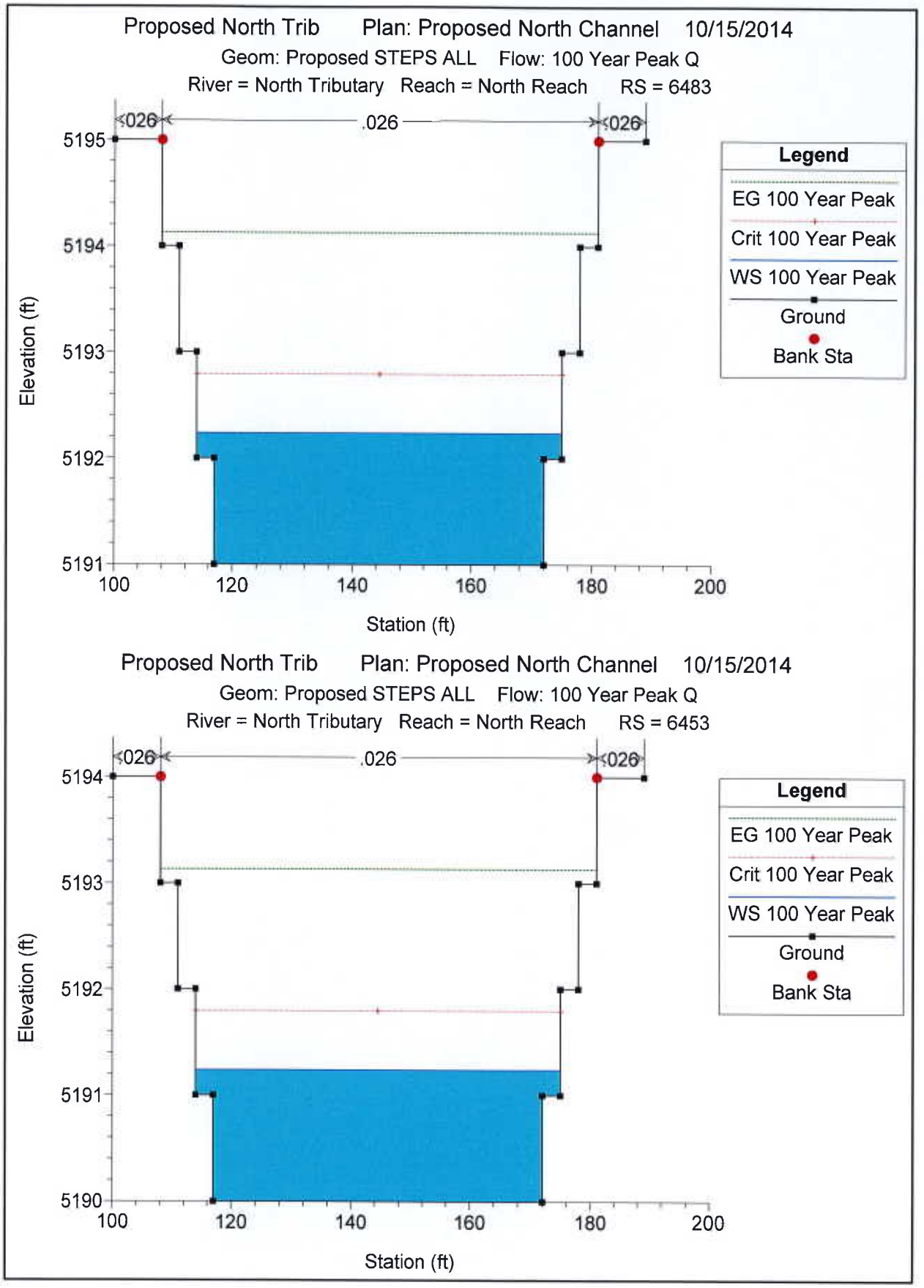
140
160
180
200
Station (ft)

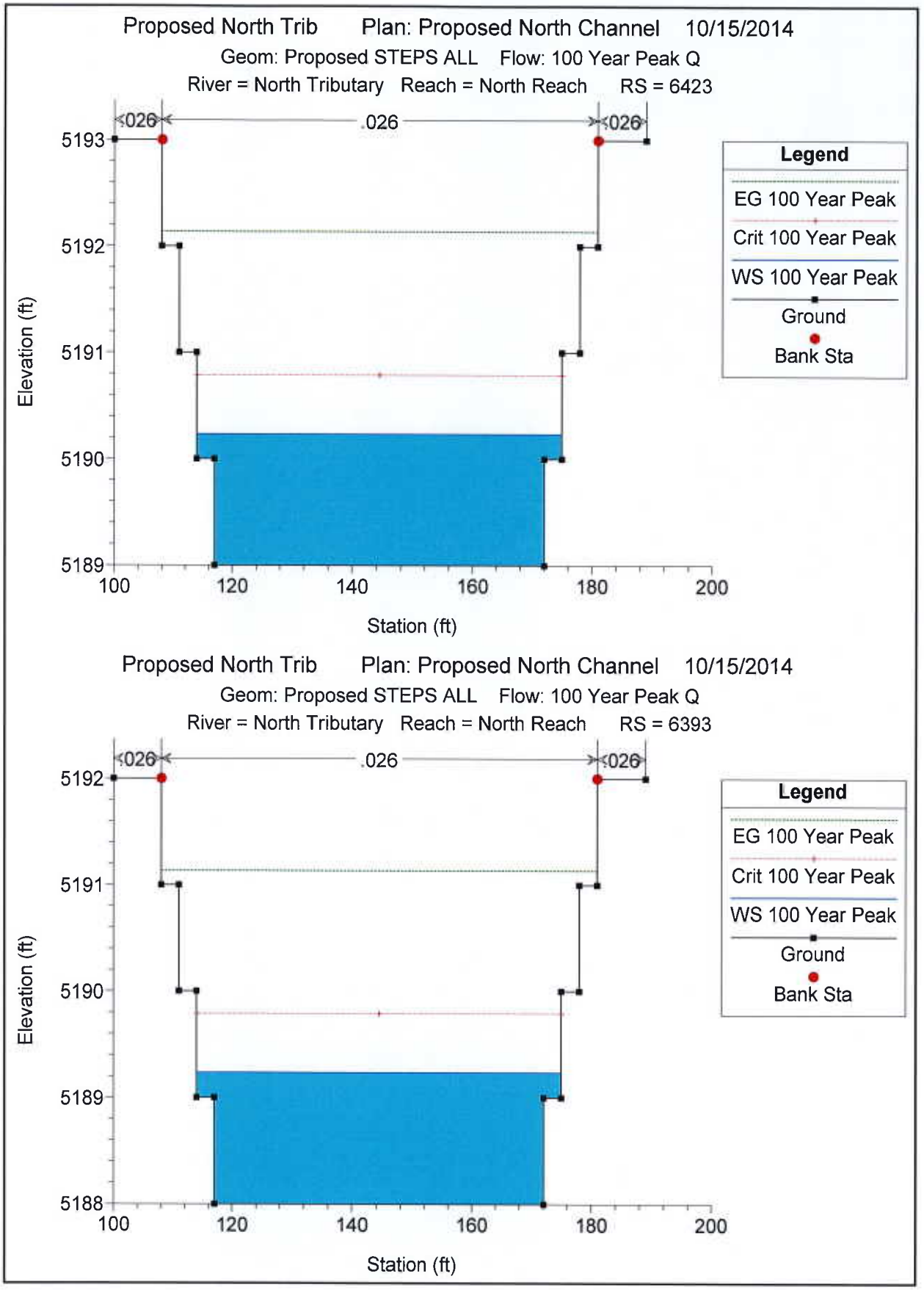

Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 6728
.026
.026
.026
5202
5201
5200
5199
5198
Elevation (ft)
100
120
140
160
180
200
Station (ft)
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta
Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 6689
.026
.026
.026
5201
5200
5199
5198
5197
Elevation (ft)
100
120
140
160
180
200
Station (ft)
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta

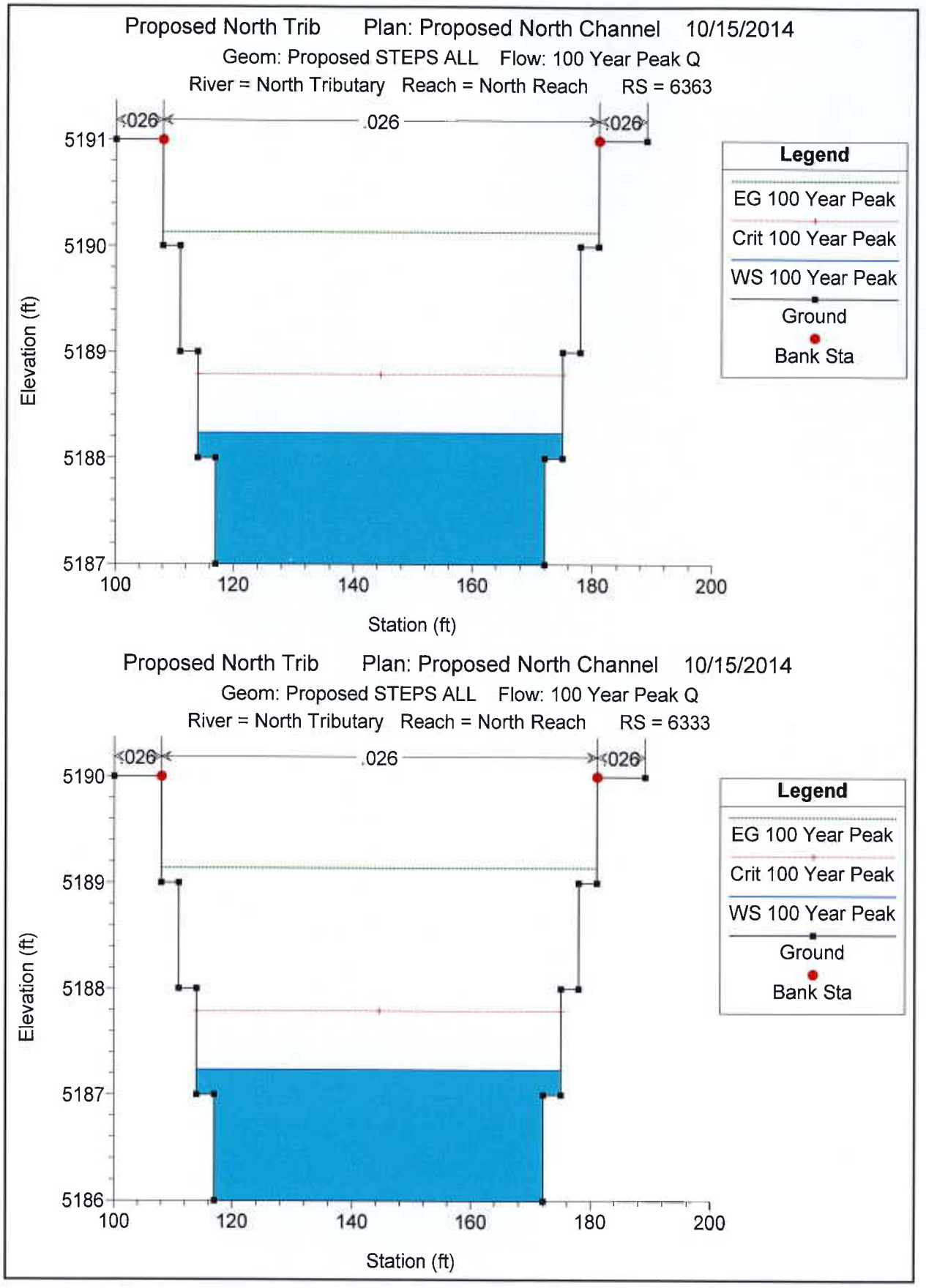

Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 6650
.026
.026
.026
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta
Elevation (ft)
5200
5199
5198
5197
5196
100
120
140
160
180
200
Station (ft)
Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 6636
.026
.026
.026
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta
Elevation (ft)
5200
5199
5198
5197
5196
5195
100
120
140
160
180
200
Station (ft)


Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 6612
.026
.026
.026
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta
Elevation (ft)
5199
5198
5197
5196
5195
100
120
140
160
180
200
Station (ft)
Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 6573
.026
.026
.026
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta
Elevation (ft)
5198
5197
5196
5195
5194
100
120
140
160
180
200
Station (ft)


Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 6543
.026
.026
.026
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta
Elevation (ft)
5197
5196
5195
5194
5193
100
120
140
160
180
200
Station (ft)
Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 6513
.026
.026
.026
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta
Elevation (ft)
5196
5195
5194
5193
5192
100
120
140
160
180
200
Station (ft)


Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 6483
.026
.026
.026
5195
5194
5193
5192
5191
Elevation (ft)
100
120
140
160
180
200
Station (ft)
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta
Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 6453
.026
.026
.026
5194
5193
5192
5191
5190
Elevation (ft)
100
120
140
160
180
200
Station (ft)
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta


Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 6423
.026
.026
.026
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta
Elevation (ft)
5193
5192
5191
5190
5189
100
120
140
160
180
200
Station (ft)
Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 6393
.026
.026
.026
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta
Elevation (ft)
5192
5191
5190
5189
5188
100
120
140
160
180
200
Station (ft)


Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 6363
.026
.026
.026
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta
Elevation (ft)
5191
5190
5189
5188
5187
100
120
140
160
180
200
Station (ft)
Proposed North Trib Plan: Proposed North Channel 10/15/2014
Geom: Proposed STEPS ALL Flow: 100 Year Peak Q
River = North Tributary Reach = North Reach RS = 6333
.026
.026
.026
Legend
EG 100 Year Peak
Crit 100 Year Peak
WS 100 Year Peak
Ground
Bank Sta
Elevation (ft)
5190
5189
5188
5187
5186
100
120
140
160
180
200
Station (ft)

Proposed Main Branch Tributary Arroyo – HEC-RAS Model Output (a)

Summary Table

Profile Plot

Cross-Section Plots

(a) Models included on CD in map pocket

TABLE

SARATOGA ROAD BOX CULVERTS (2 - 6 ft rise X 12 ft span CBCs) **HEC-RAS CULVERT SUMMARY TABLE**

RESULTS FOR WEIR OPTION 8.3 - Purpose of this Table to Determine Approximate Capacity of the Saratoga Road Box Culverts.

Filename = Weir Option 6, Plan Name = Weir Option 8.3, Geometry File Name = Weir Option 8.3 Flow File Name= Weir Option 8.3

Q100 Year Approaching Culverts - 1191 cfs

Reach	River Sta	Profile	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min El Weir Flow	Q Culv Group	Q Weir	Delta WS	Culv Vel US	Culv Vel DS
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
Weir Option 6	6200 Culvert #1	PF 1	5189.5	5188.91	5188.92	5189.5	5189.02	**1103.3**	87.21	4.89	11.4	16.64
Minimum Elevation on Road =			5189									
Flow Depth on Road based on EGL =			0.5									

CONCLUSION - Assume the culvert capacity is about 1000 cfs assuming culverts are clean.

RESULTS FOR NO WEIR OPTION - Purpose of this Table to Determine Approximate Capacity of the Saratoga Road Box Culverts the HMS Peak Discharge that is based on the Lateral Weir, the Saratoga Pond and the North Branch.

Filename = Weir Option 6, Plan Name = No Weir, Geometry File Name = No Weir, Flow File Name= HMS 100-YR Q

Q100 Year Approaching Culverts - 1847 cfs

Reach	River Sta	Profile	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min El Weir Flow	Q Culv Group	Q Weir	Delta WS	Culv Vel US	Culv Vel DS
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
Weir Option 6	6200 Culvert #1	PF 1	5190.23	5188.7	5189.79	5190.23	5189.02	1278.88	568.13	3.51	11.97	17.24
Minimum Elevation on Road =			5189									
Flow Depth on Road based on EGL =			1.23									

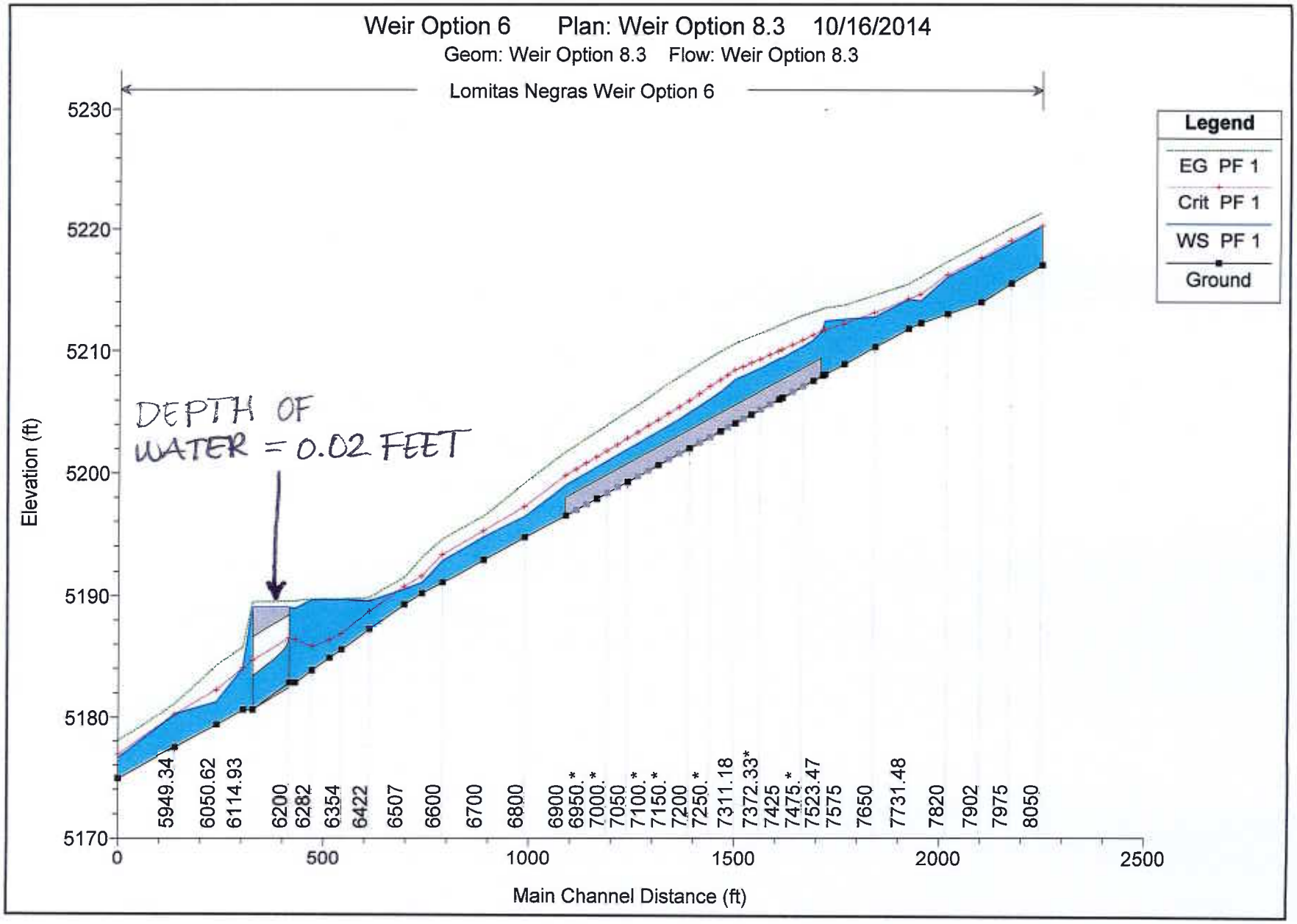
CONCLUSION - Assume the culvert capacity is about 1000 cfs assuming culverts are clean.

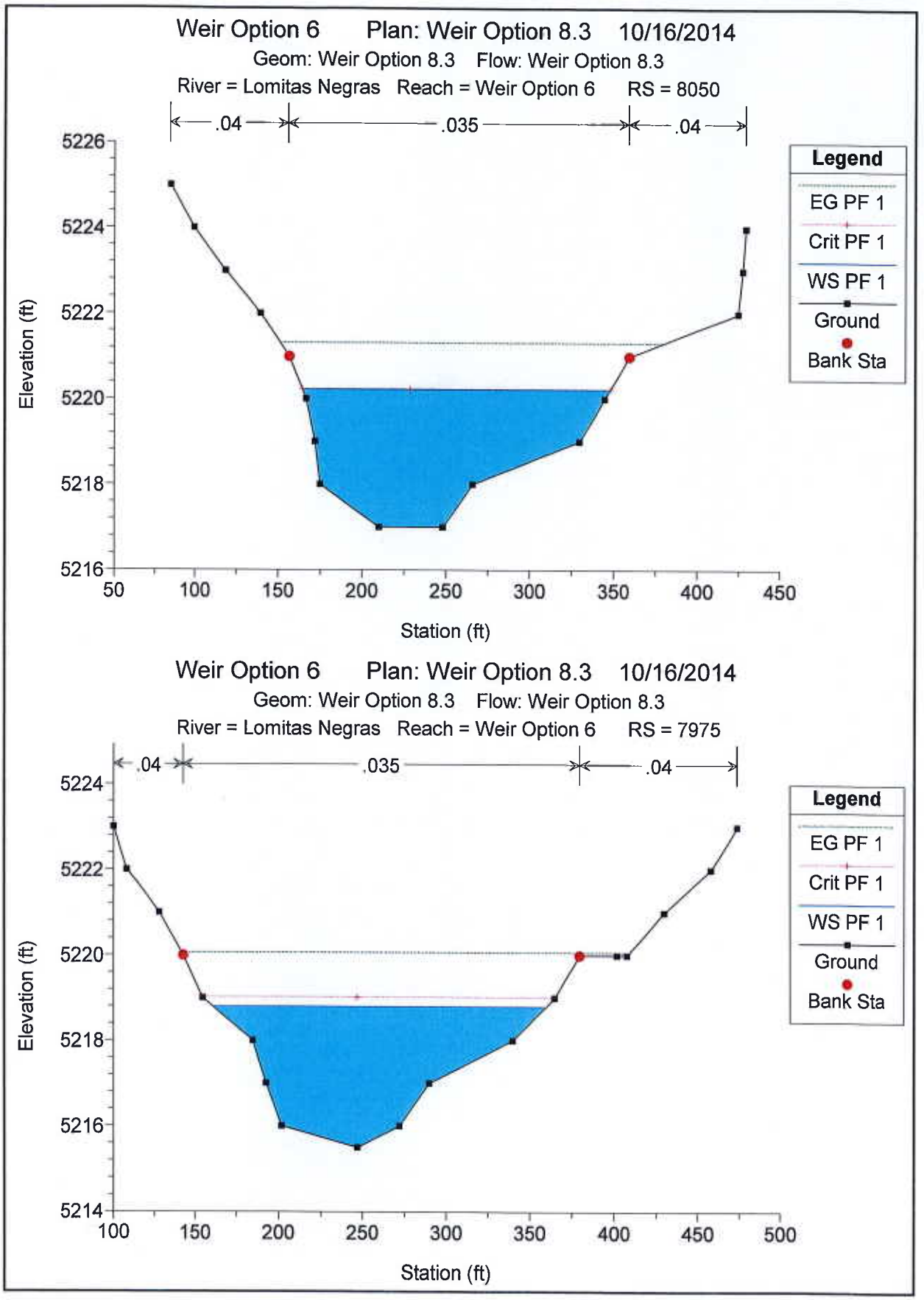
Main Tributary Lomitas Negras Arroyo HEC-RAS Summary for 100 Year Peak Discharge

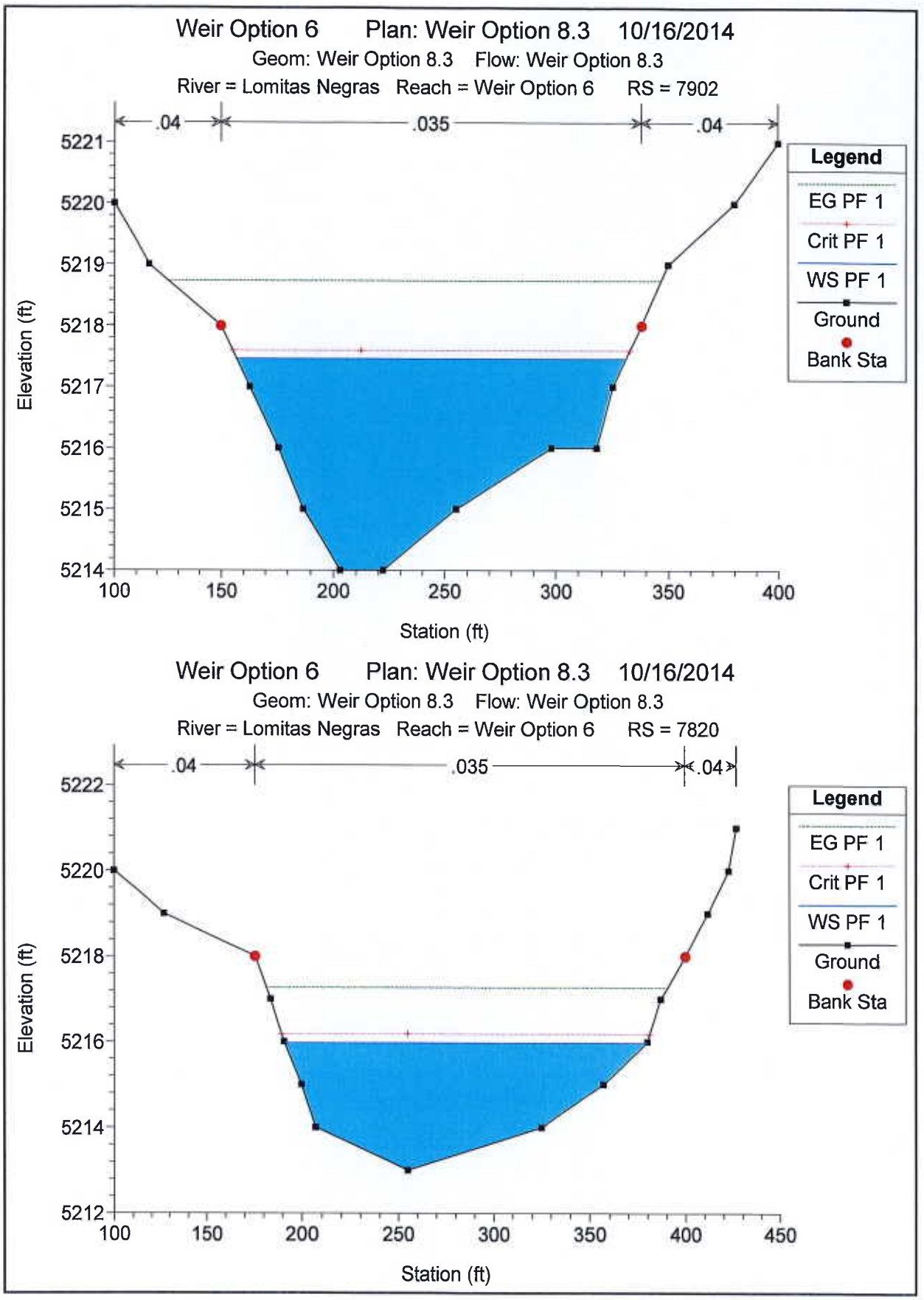
River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Hydr Radius	Shear Chan	Hydr Depth C	Max Chl Dpth
	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)	(lb/sq ft)	(ft)	(ft)
8050	3338	5217	5220.23	5220.23	5221.32	0.013902	8.38	398.51	183.74	1	2.16	1.88	2.17	3.23
7975	3338	5215.5	5218.8	5219.03	5220.07	0.019963	9.04	369.05	199.12	1.17	1.85	2.31	1.85	3.3
7902	3338	5214	5217.46	5217.6	5218.74	0.016844	9.07	368.02	174	1.1	2.11	2.22	2.12	3.46
7820	3338	5213	5215.98	5216.18	5217.27	0.019133	9.13	365.54	188.33	1.16	1.94	2.32	1.94	2.98
7755	3338	5212.25	5214.06	5214.61	5215.99	0.018189	11.25	301.63	178.19	1.49	1.69	2	1.77	1.81
7731.48	3338	5211.82	5214.21	5214.26	5215.43	0.008285	8.85	377.02	165	1.03	2.22	1.15	2.28	2.39
7650	3338	5210.32	5212.72	5213.1	5214.54	0.01262	10.83	308.32	136	1.27	2.19	1.73	2.27	2.4
7575	3338	5208.94	5212.51	5212.19	5213.72	0.005323	8.82	378.61	116	0.86	3.07	1.02	3.26	3.57
7528.47	3338	5208.08	5212.36	5211.7	5213.49	0.003977	8.51	395.78	115.75	0.76	3.18	0.9	3.92	4.28
7523.47	3338	5207.99	5211.66	5211.66	5213.4	0.007104	10.63	317.62	93	1.01	3.17	1.45	3.47	3.67
7515	at Struct													
7500	3239	5207.55	5210.84	5211.29	5213.14	0.011052	12.24	267.66	88.78	1.23	2.81	2.01	3.07	3.29
7475.*	3124	5207.09	5210.31	5210.88	5212.82	0.012546	12.8	247.11	84.28	1.3	2.72	2.21	2.99	3.22
7450.*	3013	5206.63	5209.85	5210.47	5212.49	0.013279	13.11	232.87	79.78	1.34	2.7	2.33	2.98	3.22
7425	2901	5206.17	5209.42	5210.08	5212.15	0.013766	13.34	220.4	75.28	1.36	2.7	2.41	2.99	3.25
7417	2864	5206.03	5209.31	5209.95	5212.03	0.01358	13.32	218.11	73.84	1.35	2.71	2.4	3.02	3.28
7394.66*	2758	5205.62	5208.95	5209.66	5211.72	0.013752	13.45	208.13	69.82	1.36	2.72	2.44	3.05	3.32
7372.33*	2648	5205.2	5208.58	5209.32	5211.4	0.01393	13.58	198.08	65.81	1.36	2.73	2.49	3.08	3.37
7350	2534	5204.79	5208.23	5209.01	5211.09	0.014024	13.69	188.25	61.79	1.37	2.74	2.52	3.12	3.44
7330.59*	2430	5204.44	5207.94	5208.71	5210.81	0.013924	13.72	180.37	58.4	1.36	2.76	2.52	3.17	3.5
7311.18	2322	5204.08	5207.64	5208.46	5210.54	0.014001	13.8	171.59	55	1.36	2.76	2.55	3.2	3.56
7293.09*	2228	5203.75	5207.09	5208.03	5210.23	0.016552	14.35	158.23	54.5	1.46	2.59	2.82	2.99	3.34
7275	2147	5203.41	5206.61	5207.6	5209.9	0.018471	14.68	148.97	54	1.53	2.47	3	2.84	3.2
7250.*	2048	5202.95	5206.03	5207.06	5209.41	0.020198	14.89	140.1	53.33	1.59	2.36	3.13	2.71	3.08

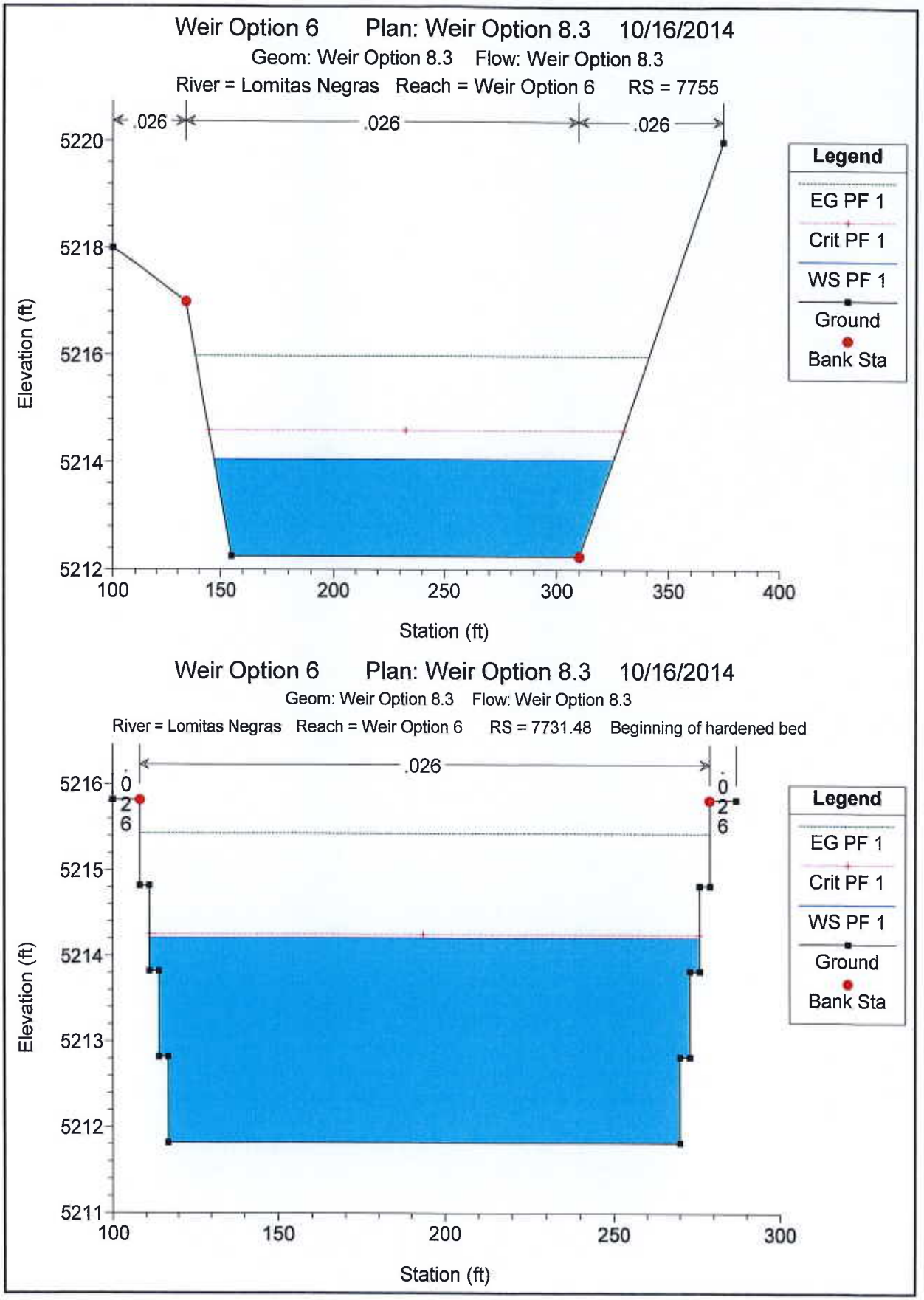
Main Tributary Lomitas Negras Arroyo HEC-RAS Summary for 100 Year Peak Discharge														
River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Hydr Radius	Shear Chan	Hydr Depth C	Max Chl Dpth
	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)	(lb/sq ft)	(ft)	(ft)
7225.*	1959	5202.49	5205.48	5206.48	5208.9	0.01977	14.97	133.48	49.67	1.58	2.4	3.14	2.79	2.99
7200	1879	5202.03	5204.94	5205.92	5208.39	0.020814	15.04	127.36	49	1.61	2.32	3.2	2.71	2.91
7175.*	1805	5201.57	5204.38	5205.4	5207.86	0.021921	15.09	121.93	48.67	1.65	2.25	3.26	2.61	2.81
7150.*	1737	5201.11	5203.86	5204.88	5207.31	0.02244	15.02	117.91	48.33	1.66	2.19	3.26	2.55	2.75
7125	1674	5200.65	5203.36	5204.35	5206.73	0.022471	14.85	114.89	48	1.66	2.15	3.2	2.5	2.71
7100.*	1613	5200.19	5202.9	5203.86	5206.13	0.021616	14.54	113.08	47.33	1.62	2.14	3.07	2.5	2.71
7075.*	1553	5199.72	5202.4	5203.33	5205.57	0.021681	14.42	109.81	46.67	1.62	2.11	3.04	2.46	2.67
7050	1495	5199.26	5201.92	5202.83	5205.01	0.021381	14.23	107.19	46	1.6	2.09	2.97	2.44	2.66
7025.*	1440	5198.8	5201.42	5202.31	5204.46	0.02159	14.13	103.97	45.5	1.61	2.05	2.94	2.4	2.61
7000.*	1387	5198.34	5200.92	5201.81	5203.91	0.021566	13.98	101.21	45	1.6	2.02	2.89	2.36	2.58
6975	1336	5197.88	5200.43	5201.3	5203.35	0.021493	13.82	98.6	44.5	1.6	1.99	2.84	2.33	2.55
6950.*	1287	5197.42	5199.94	5200.79	5202.8	0.021413	13.67	96.05	44	1.59	1.96	2.79	2.3	2.52
6925.*	1239	5196.96	5199.46	5200.28	5202.24	0.021339	13.51	93.56	43.5	1.58	1.93	2.74	2.27	2.5
6900	1193	5196.5	5198.97	5199.78	5201.69	0.021252	13.36	91.14	43	1.57	1.9	2.69	2.24	2.47
6800	1191	5194.7	5196.38	5197.21	5199.12	0.031848	13.28	89.66	57	1.87	1.49	2.95	1.57	1.68
6700	1191	5192.89	5194.68	5195.17	5196.4	0.018874	10.52	113.17	70.33	1.46	1.55	1.83	1.61	1.79
6600	1191	5191.09	5192.79	5193.27	5194.5	0.018829	10.51	113.31	71.09	1.47	1.55	1.82	1.59	1.7
6550	1191	5190.18	5191.02	5191.59	5193.02	0.05138	11.35	105.04	125	2.18	0.82	2.63	0.84	0.84
6507	1191	5189.29	5190.46	5190.7	5191.46	0.018653	8.1	148.08	137	1.37	1.05	1.23	1.09	1.17
6422	1191	5187.23	5189.52	5188.71	5189.79	0.002264	4.17	284.61	140	0.52	1.91	0.27	2.03	2.29
6354	1191	5185.58	5189.64	5186.85	5189.69	0.000197	1.9	626.41	182.31	0.17	3.29	0.04	3.84	4.06
6325	1191	5184.88	5189.63	5186.37	5189.69	0.000176	1.98	621.97	188.46	0.17	3.17	0.05	4.48	4.75
6282	1191	5183.84	5189.6	5185.83	5189.67	0.000187	2.27	584.96	174.18	0.17	3.21	0.06	5.37	5.76
6241.92	1191	5182.87	5188.91	5186.36	5189.51	0.00106	6.17	192.83	141.87	0.44	6.04	0.4	6.04	6.04

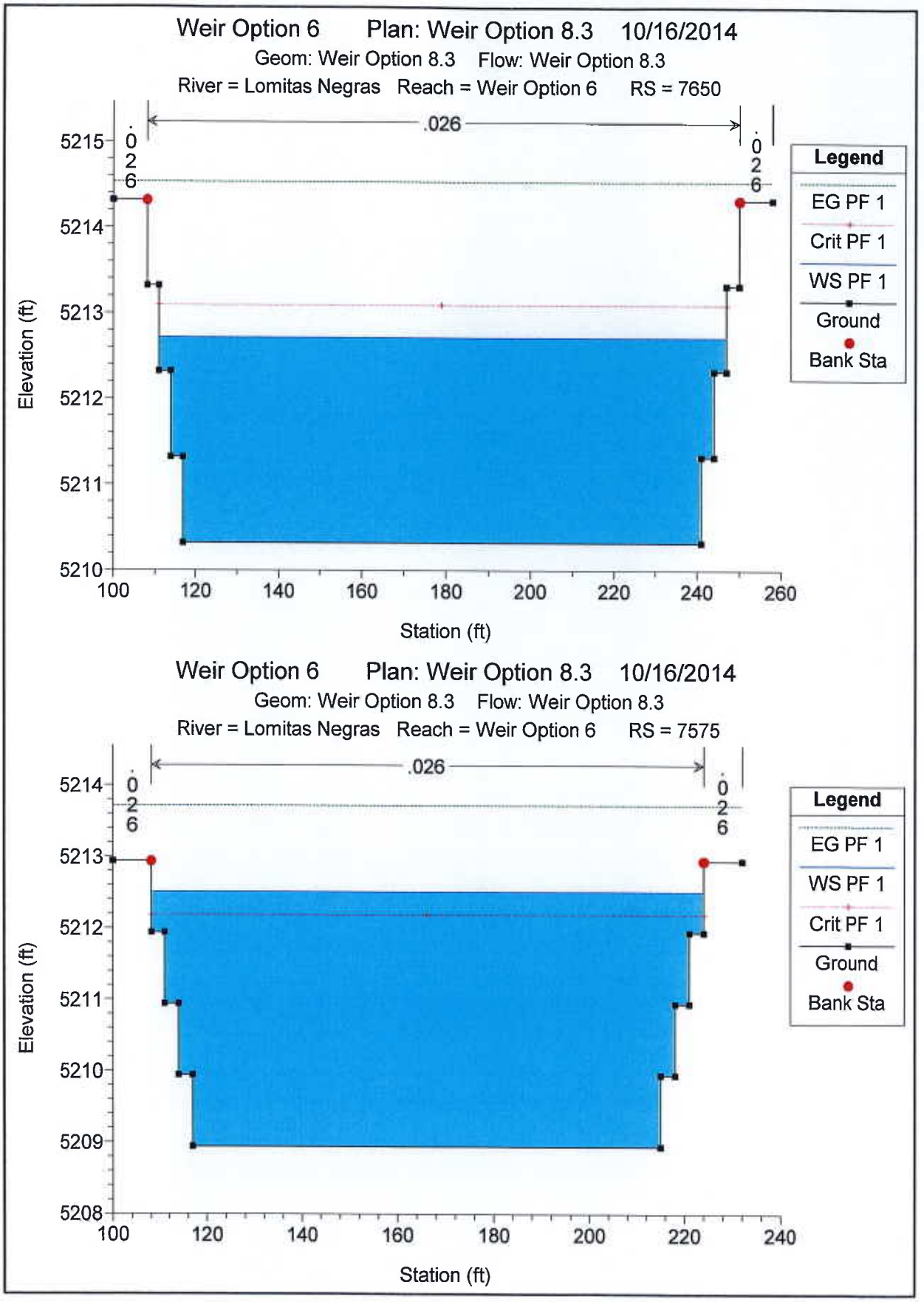
Main Tributary Lomitas Negras Arroyo HEC-RAS Summary for 100 Year Peak Discharge														
River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	Hydr Radius	Shear Chan	Hydr Depth C	Max Chl Dpth
	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(ft)	(lb/sq ft)	(ft)	(ft)
6200	Culvert													
6114.93	1191	5180.62	5184.02	5184.02	5185.74	0.008827	10.53	113.09	72.11	1.01	3.4	1.87	3.4	3.4
6050.62	1191	5179.41	5181.18	5182.24	5184.19	0.058149	13.91	85.58	53.14	1.93	1.58	5.75	1.61	1.77
5949.34	1191	5177.51	5180.21	5180.23	5181.05	0.015859	7.35	161.98	99.37	1.01	1.61	1.6	1.63	2.7
5811.62	1191	5174.92	5176.53	5176.89	5178	0.029287	9.73	122.32	76.75	1.36	1.55	2.83	1.59	1.61

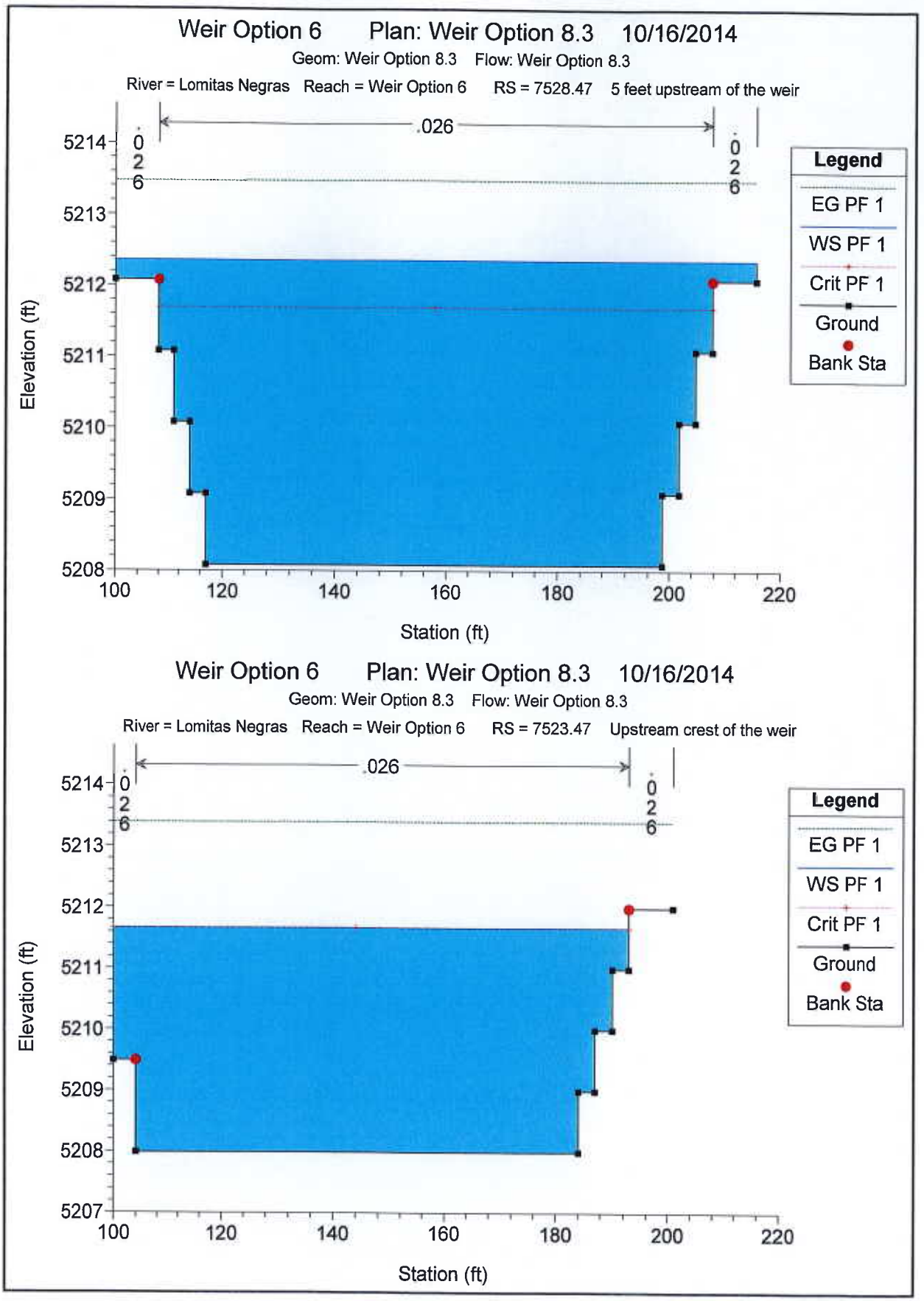

Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
Lomitas Negras Weir Option 6
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
DEPTH OF WATER = 0.02 FEET
Elevation (ft)
5230
5220
5210
5200
5190
5180
5170
0
500
1000
1500
2000
2500
Main Channel Distance (ft)
5949.34
6050.62
6114.93
6200
6282
6354
6422
6507
6600
6700
6800
6900
6950.*
7000.*
7050
7100.*
7150.*
7200.*
7250.*
7311.18
7372.33*
7425
7475.*
7523.47
7575
7650
7731.48
7820
7902
7975
8050

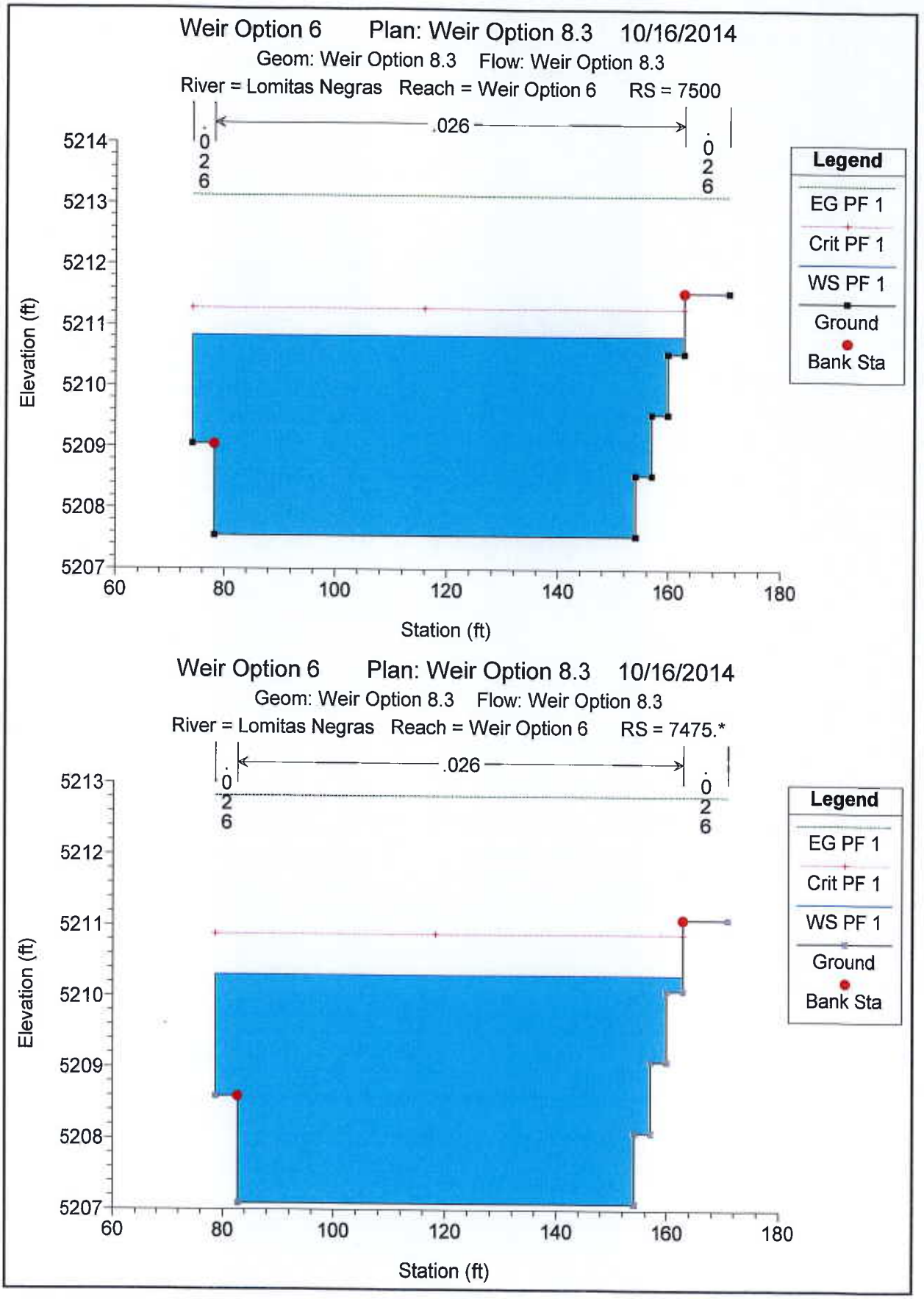

Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 8050
.04
.035
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7975
.04
.035
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

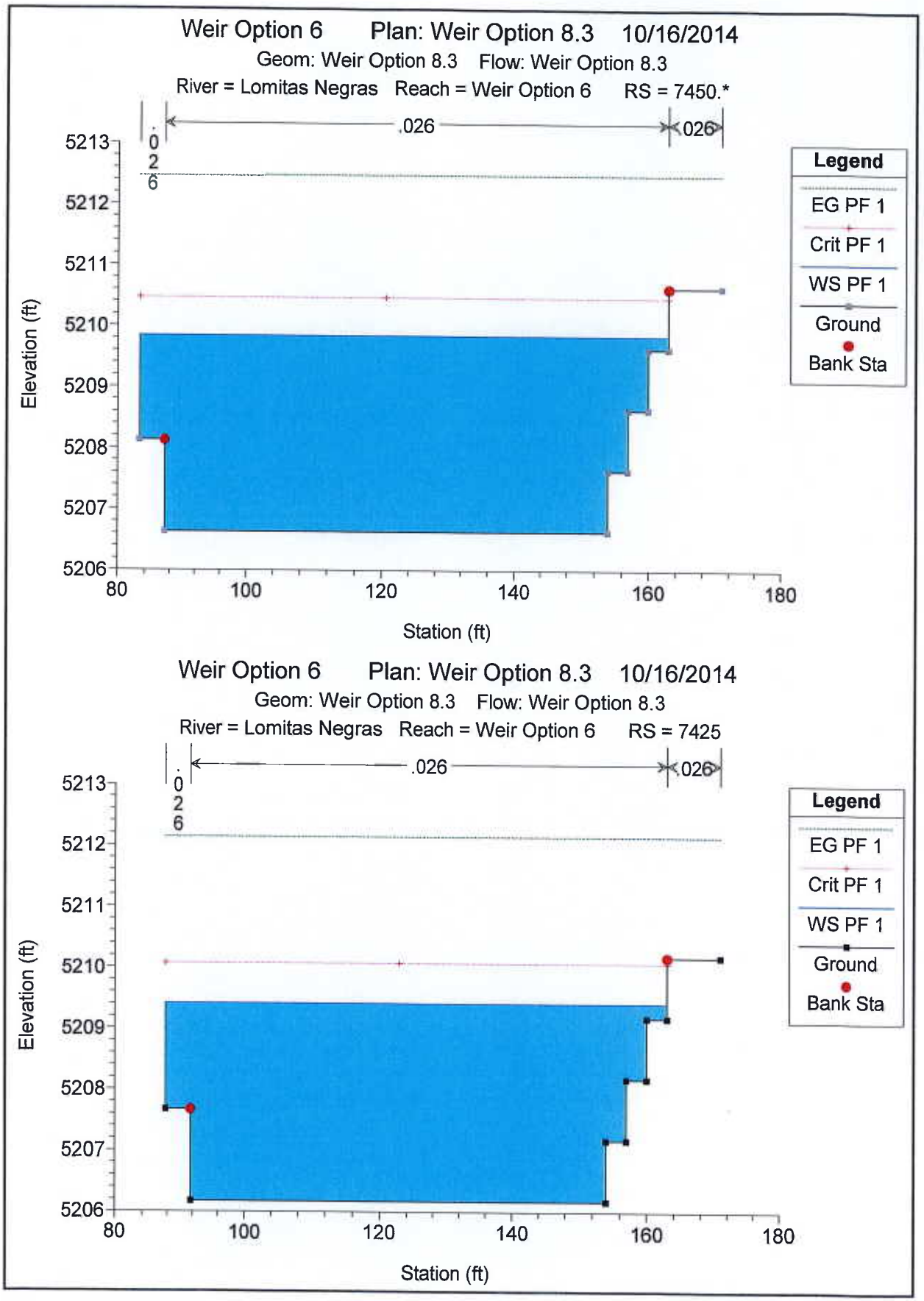

Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7902
.04
.035
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7820
.04
.035
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

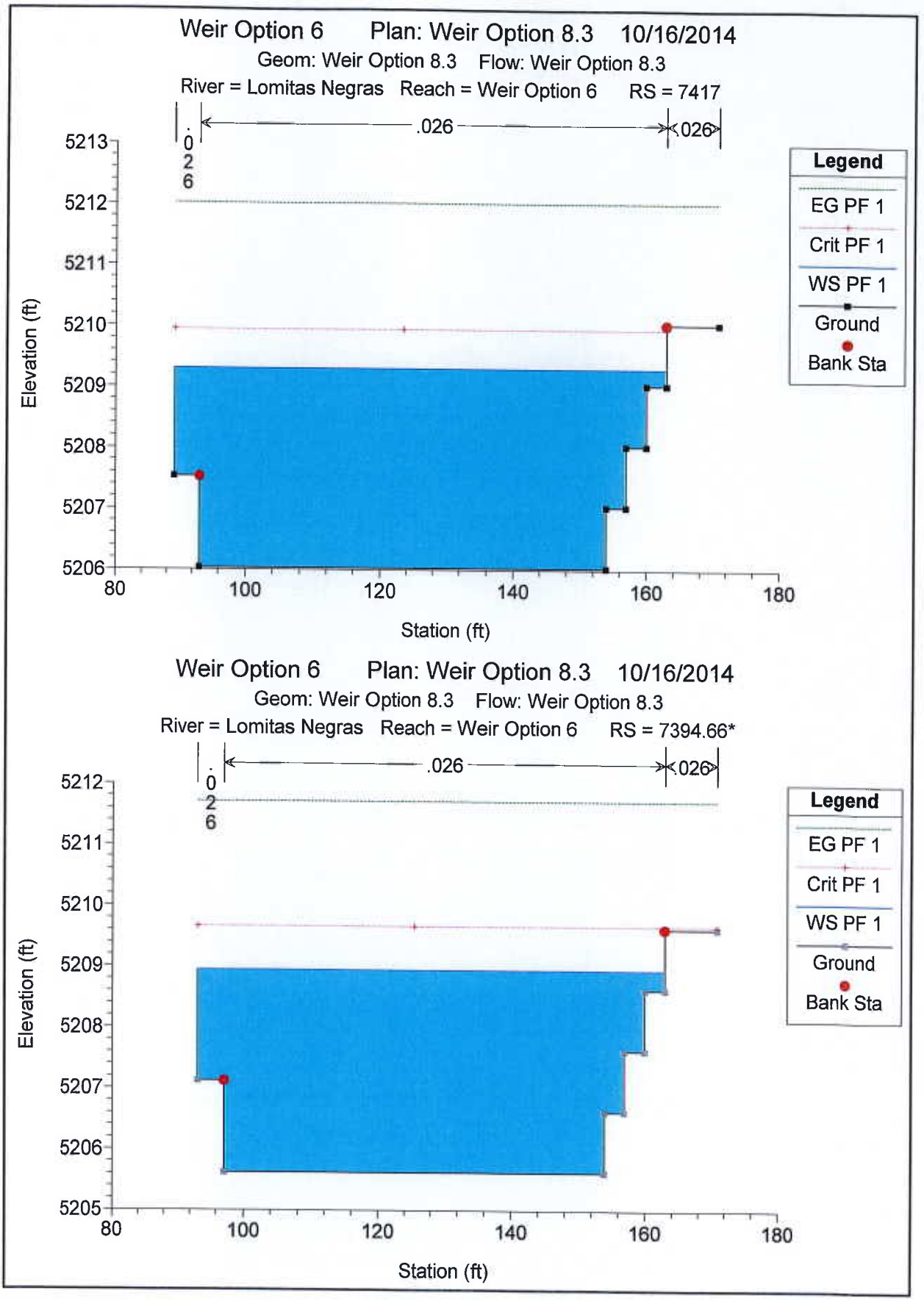

Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7755
.026
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
5220
5218
5216
5214
5212
100
150
200
250
300
350
400
Station (ft)
Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7731.48 Beginning of hardened bed
.026
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
5216
5215
5214
5213
5212
5211
100
150
200
250
300
Station (ft)

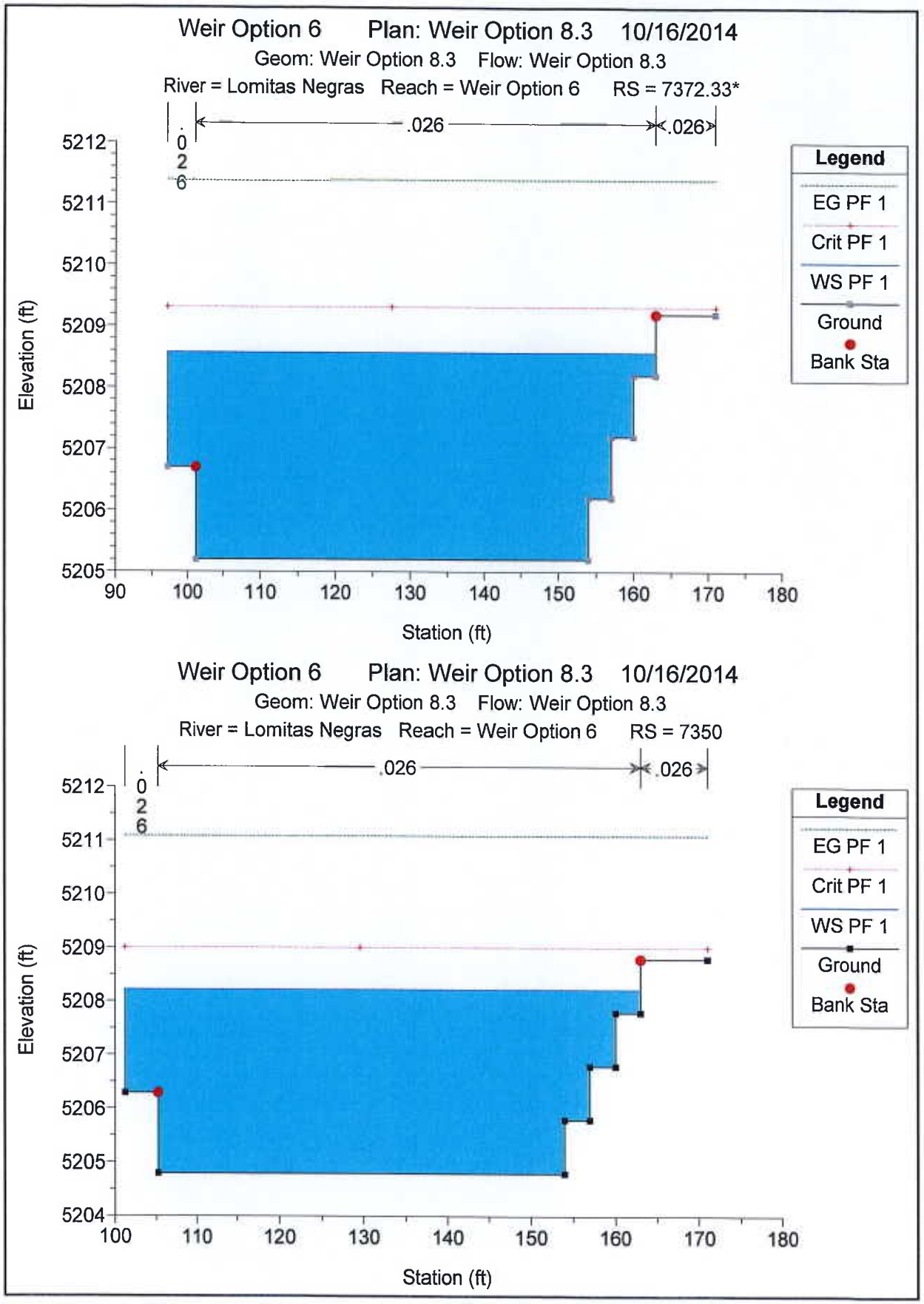

Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7650
.026
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
5215
5214
5213
5212
5211
5210
100
120
140
160
180
200
220
240
260
Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7575
.026
.026
.026
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
5214
5213
5212
5211
5210
5209
5208
100
120
140
160
180
200
220
240

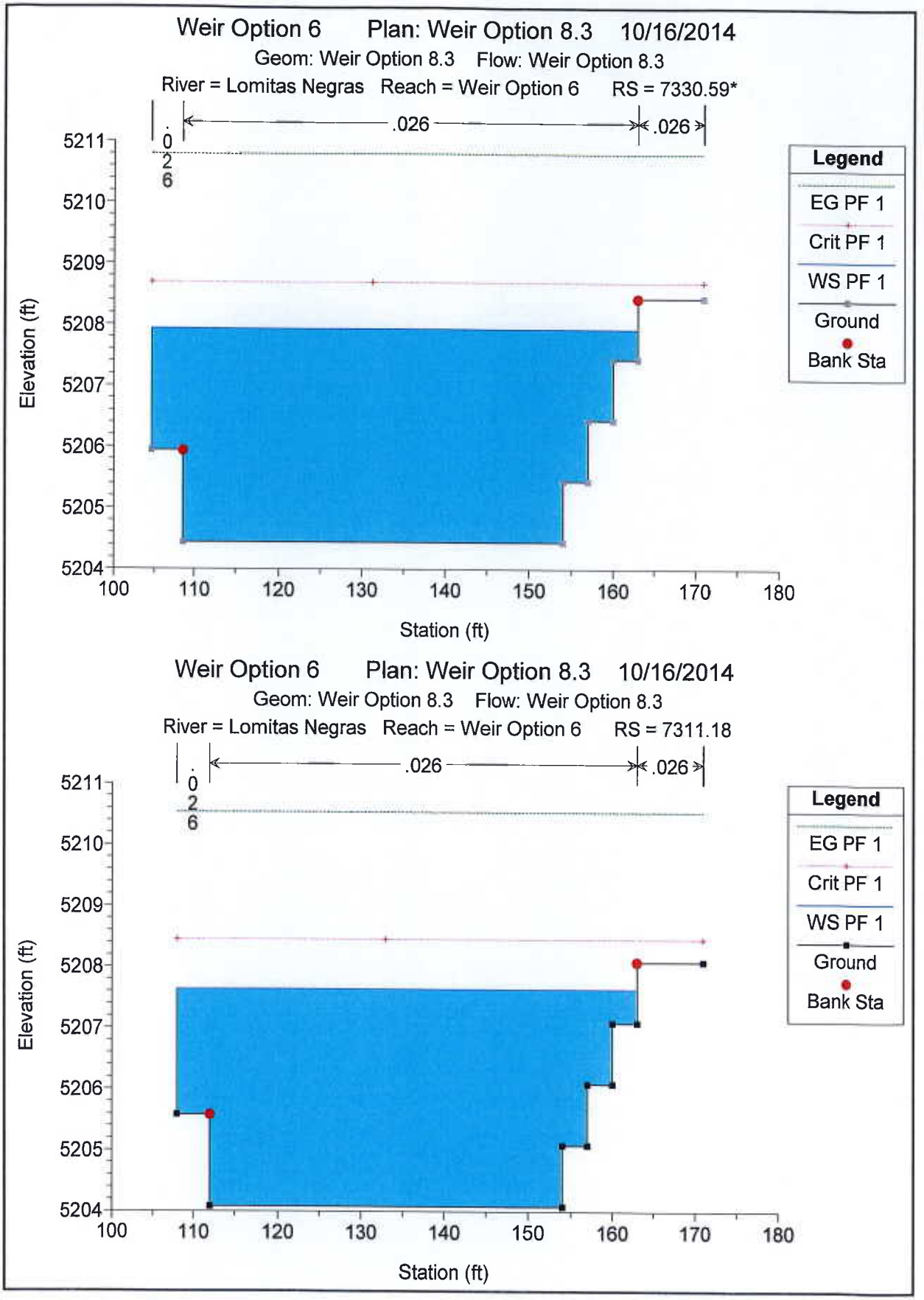

Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7528.47 5 feet upstream of the weir
.026
.026
.026
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
5214
5213
5212
5211
5210
5209
5208
100
120
140
160
180
200
220
Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7523.47 Upstream crest of the weir
.026
.026
.026
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
5214
5213
5212
5211
5210
5209
5208
5207
100
120
140
160
180
200
220

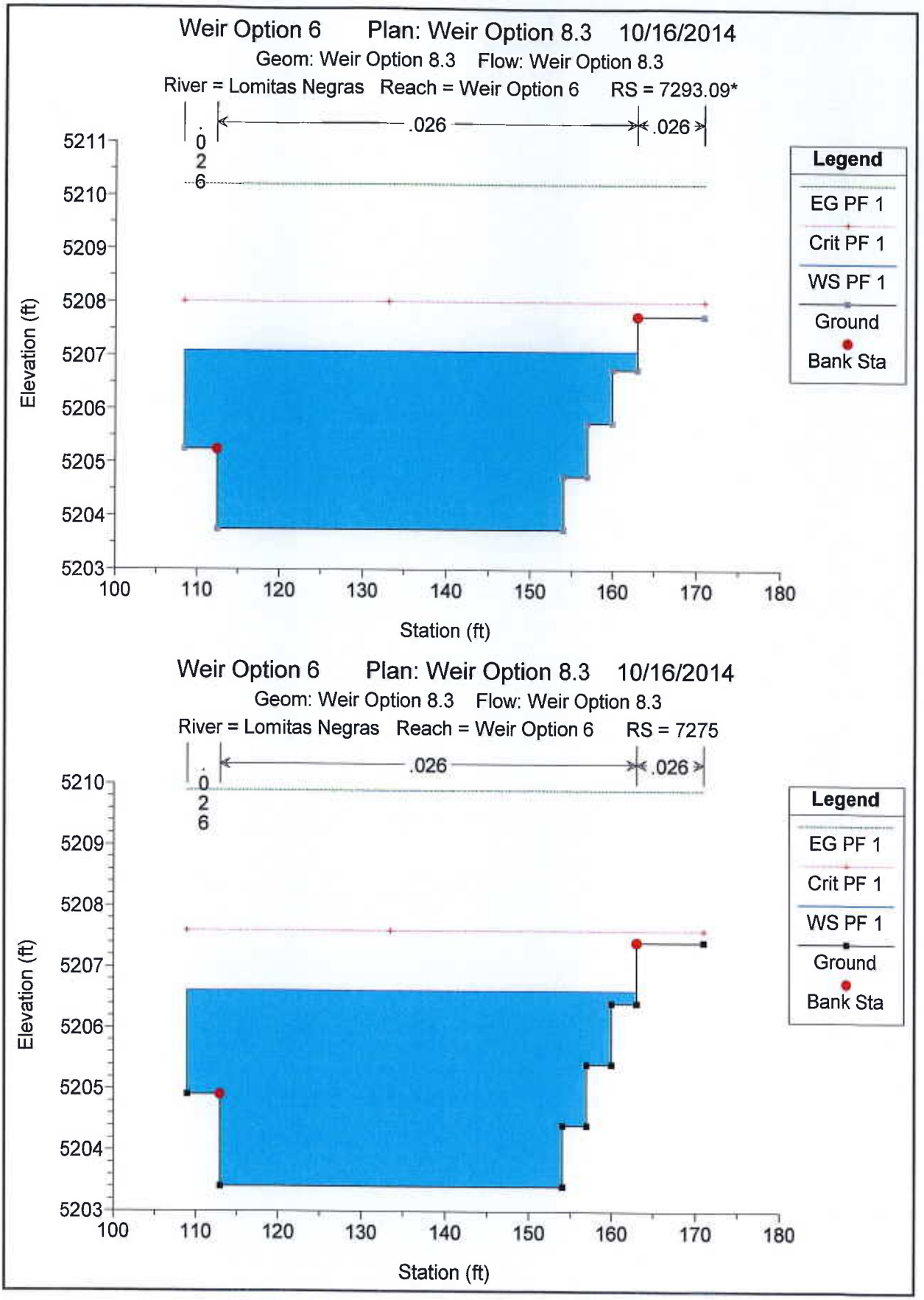

Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7500
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
5214
5213
5212
5211
5210
5209
5208
5207
60
80
100
120
140
160
180
Station (ft)
Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7475.*
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
5213
5212
5211
5210
5209
5208
5207
60
80
100
120
140
160
180
Station (ft)

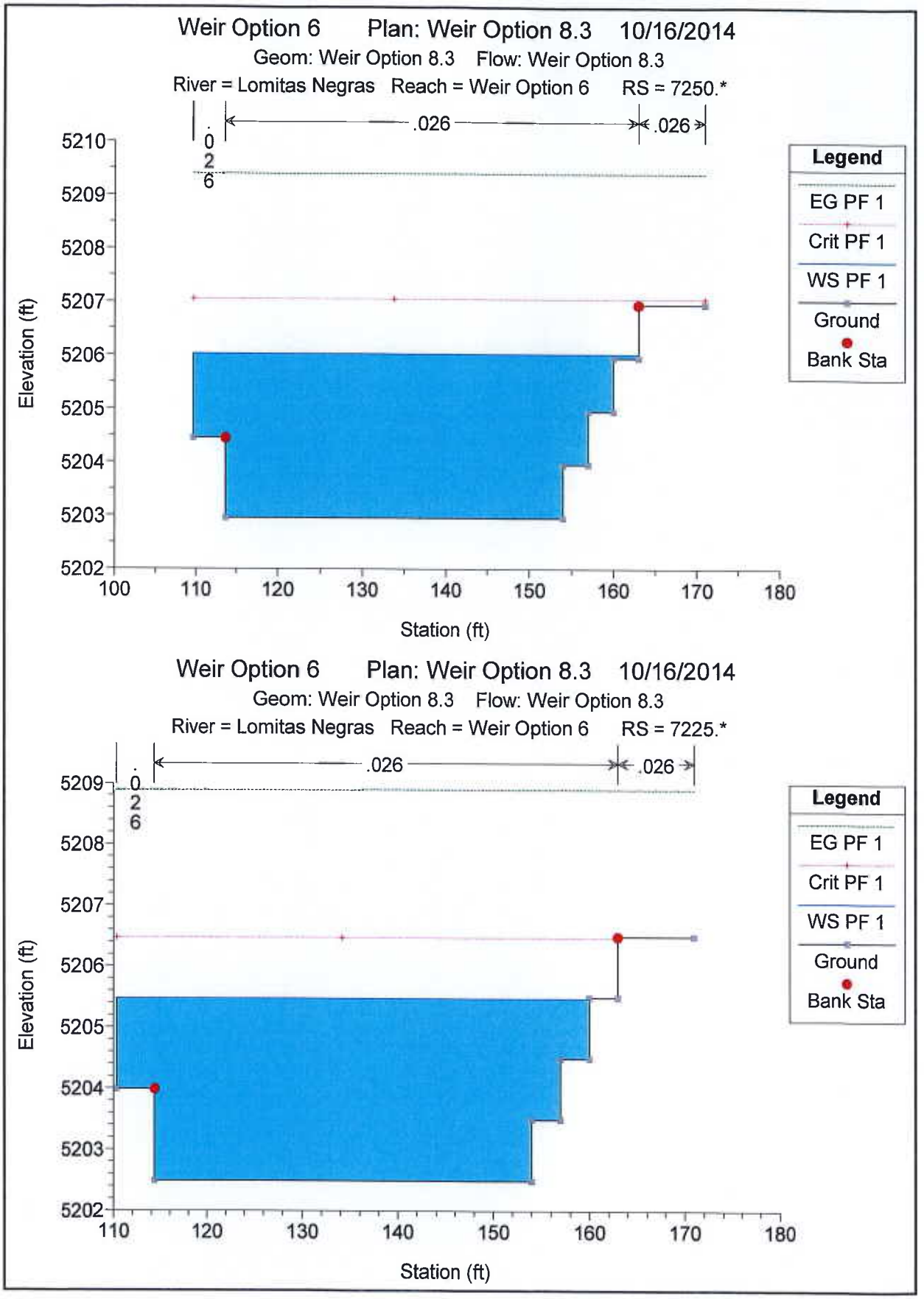

Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7450.*
.026
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
5213
5212
5211
5210
5209
5208
5207
5206
80
100
120
140
160
180
Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7425
.026
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
5213
5212
5211
5210
5209
5208
5207
5206
80
100
120
140
160
180

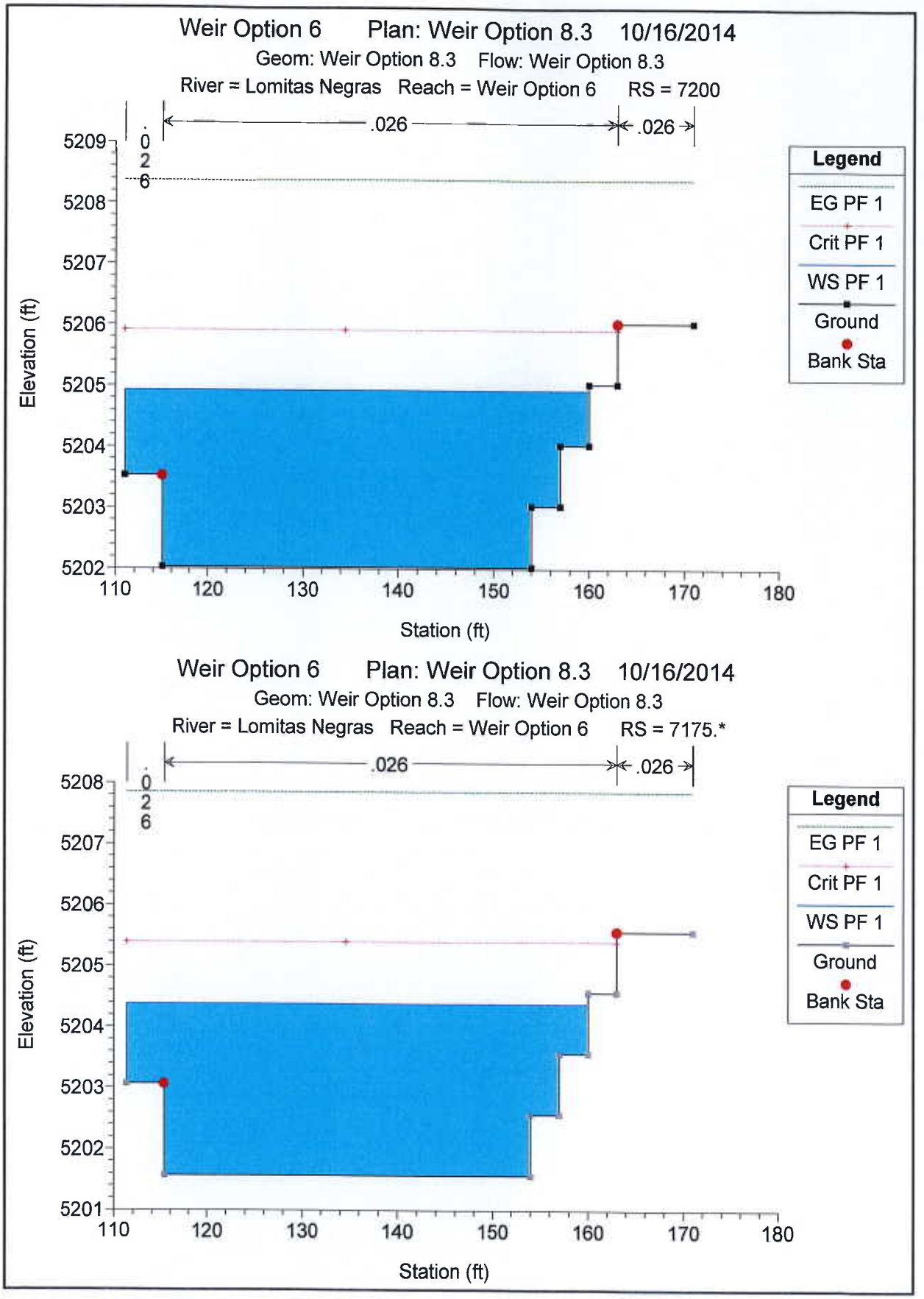

Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7417
.026
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
5213
5212
5211
5210
5209
5208
5207
5206
80
100
120
140
160
180
Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7394.66*
.026
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
5212
5211
5210
5209
5208
5207
5206
5205
80
100
120
140
160
180

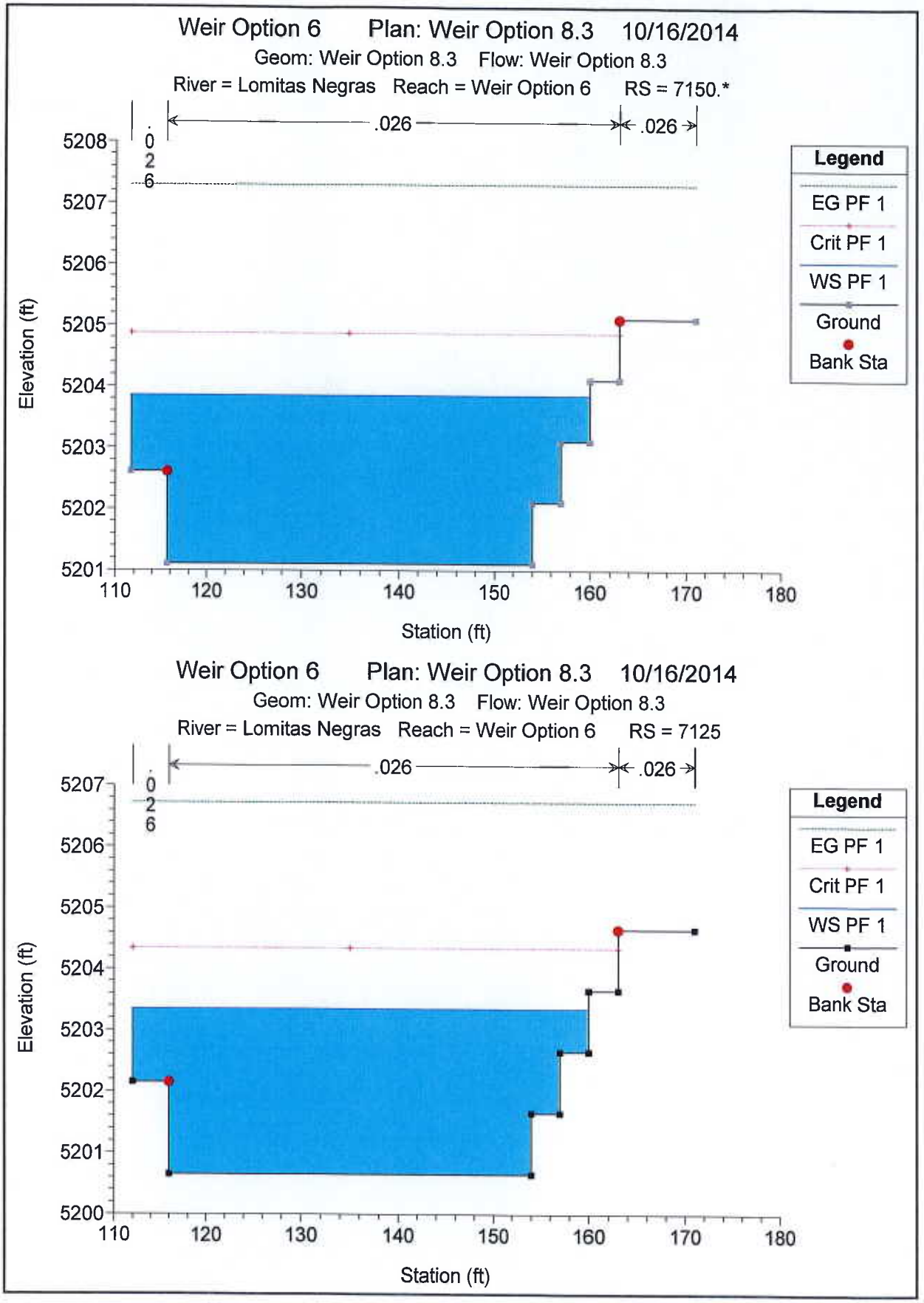

Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7372.33*
.026
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7350
.026
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7330.59*
.026
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
5211
5210
5209
5208
5207
5206
5205
5204
100
110
120
130
140
150
160
170
180
Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7311.18
.026
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
5211
5210
5209
5208
5207
5206
5205
5204
100
110
120
130
140
150
160
170
180


Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7293.09*
.026
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7275
.026
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7250.*
.026
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
5210
5209
5208
5207
5206
5205
5204
5203
5202
100
110
120
130
140
150
160
170
180
Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7225.*
.026
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
5209
5208
5207
5206
5205
5204
5203
5202
110
120
130
140
150
160
170
180


Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7200
.026
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
5209
5208
5207
5206
5205
5204
5203
5202
110
120
130
140
150
160
170
180
Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7175.*
.026
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
5208
5207
5206
5205
5204
5203
5202
5201
110
120
130
140
150
160
170
180


Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7150.*
.026
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
5208
5207
5206
5205
5204
5203
5202
5201
110
120
130
140
150
160
170
180
Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 7125
.026
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
5207
5206
5205
5204
5203
5202
5201
5200
110
120
130
140
150
160
170
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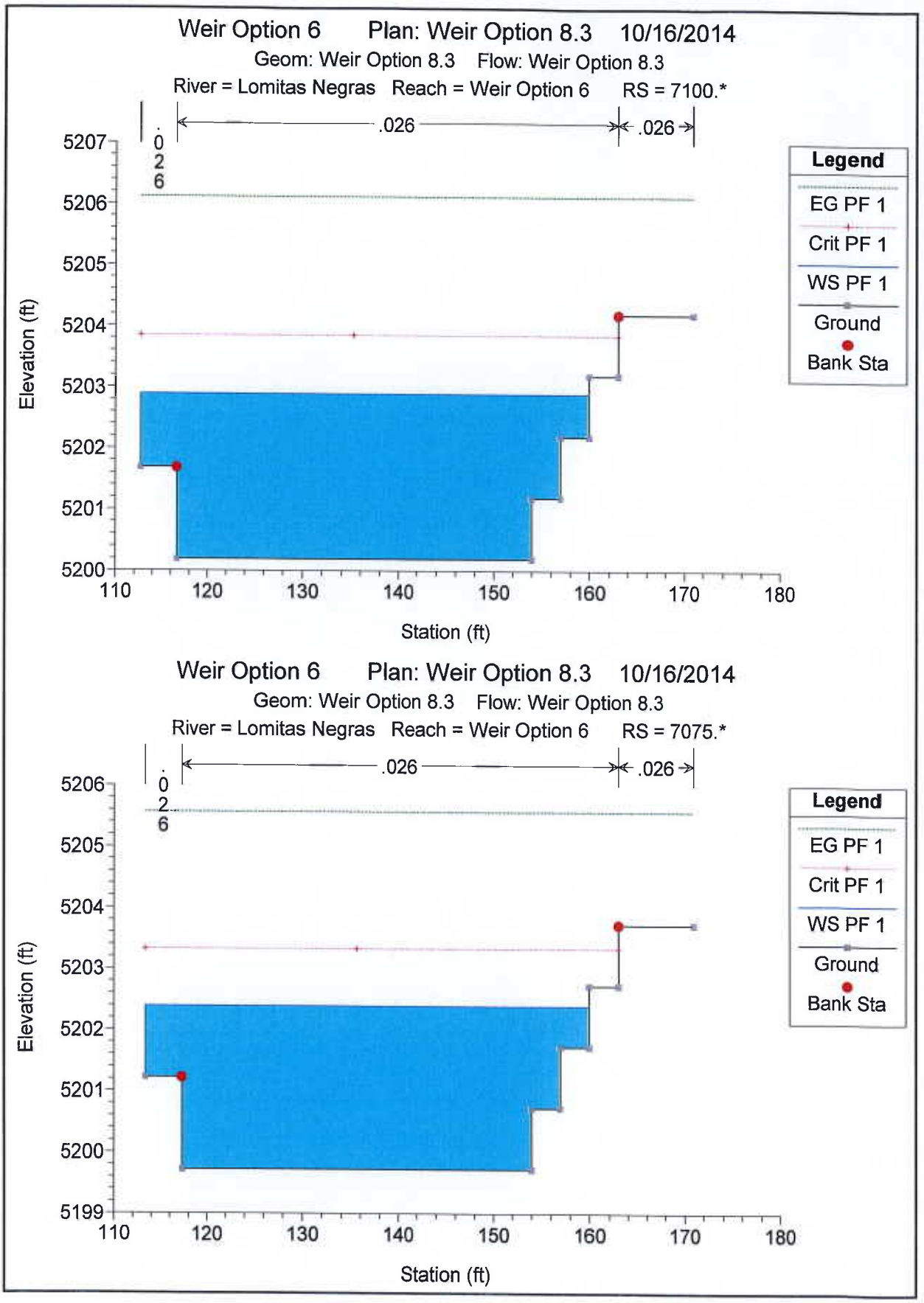
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.026
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Ground
Bank Sta
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Station (ft)
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Geom: Weir Option 8.3 Flow: Weir Option 8.3
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Crit PF 1
WS PF 1
Ground
Bank Sta
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Station (ft)
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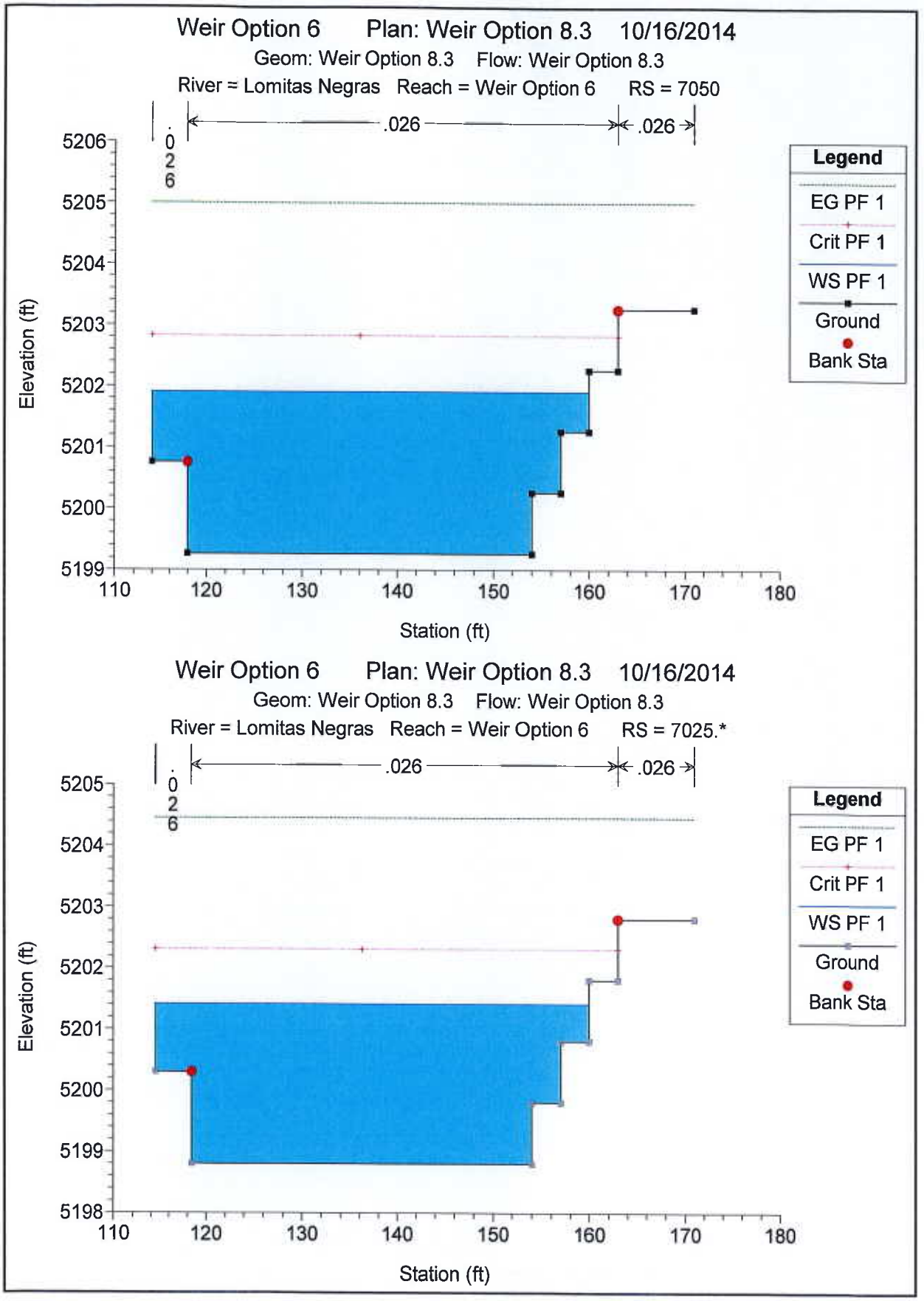
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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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Geom: Weir Option 8.3 Flow: Weir Option 8.3
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Legend
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Bank Sta
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Station (ft)
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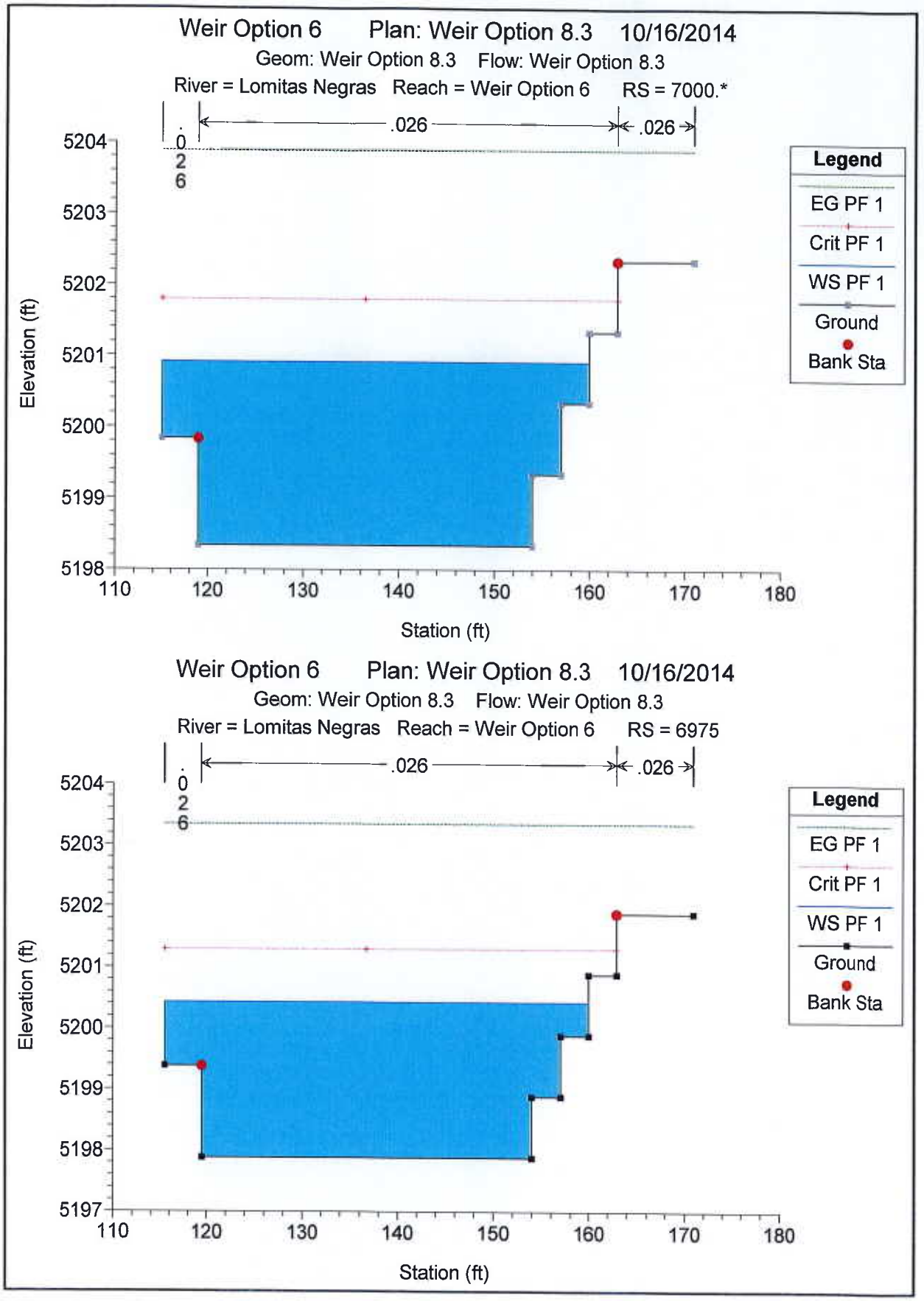
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Crit PF 1
WS PF 1
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Bank Sta
Elevation (ft)
Station (ft)
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Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 6975
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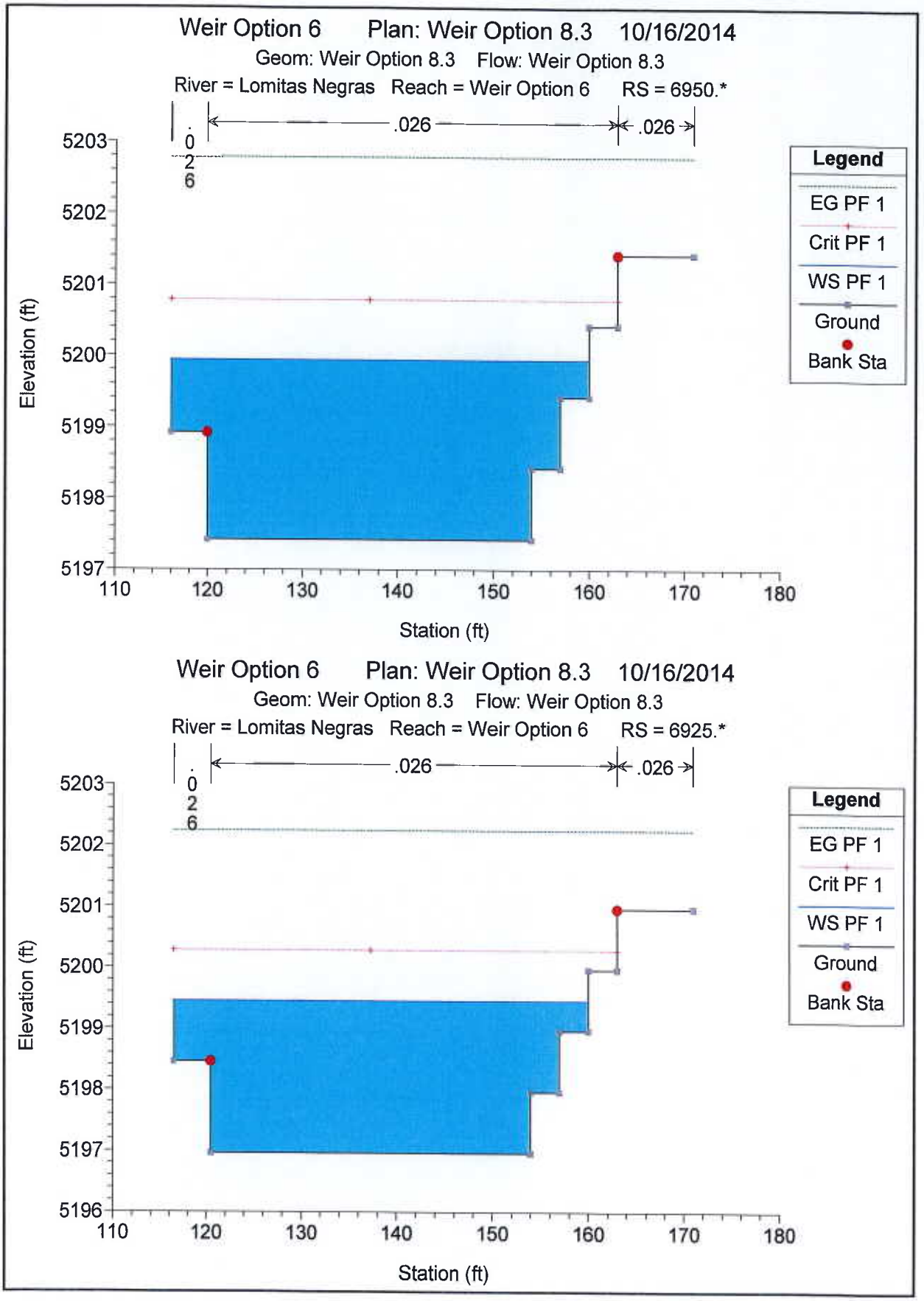
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Legend
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WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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5197
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Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 6925.*
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
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Station (ft)
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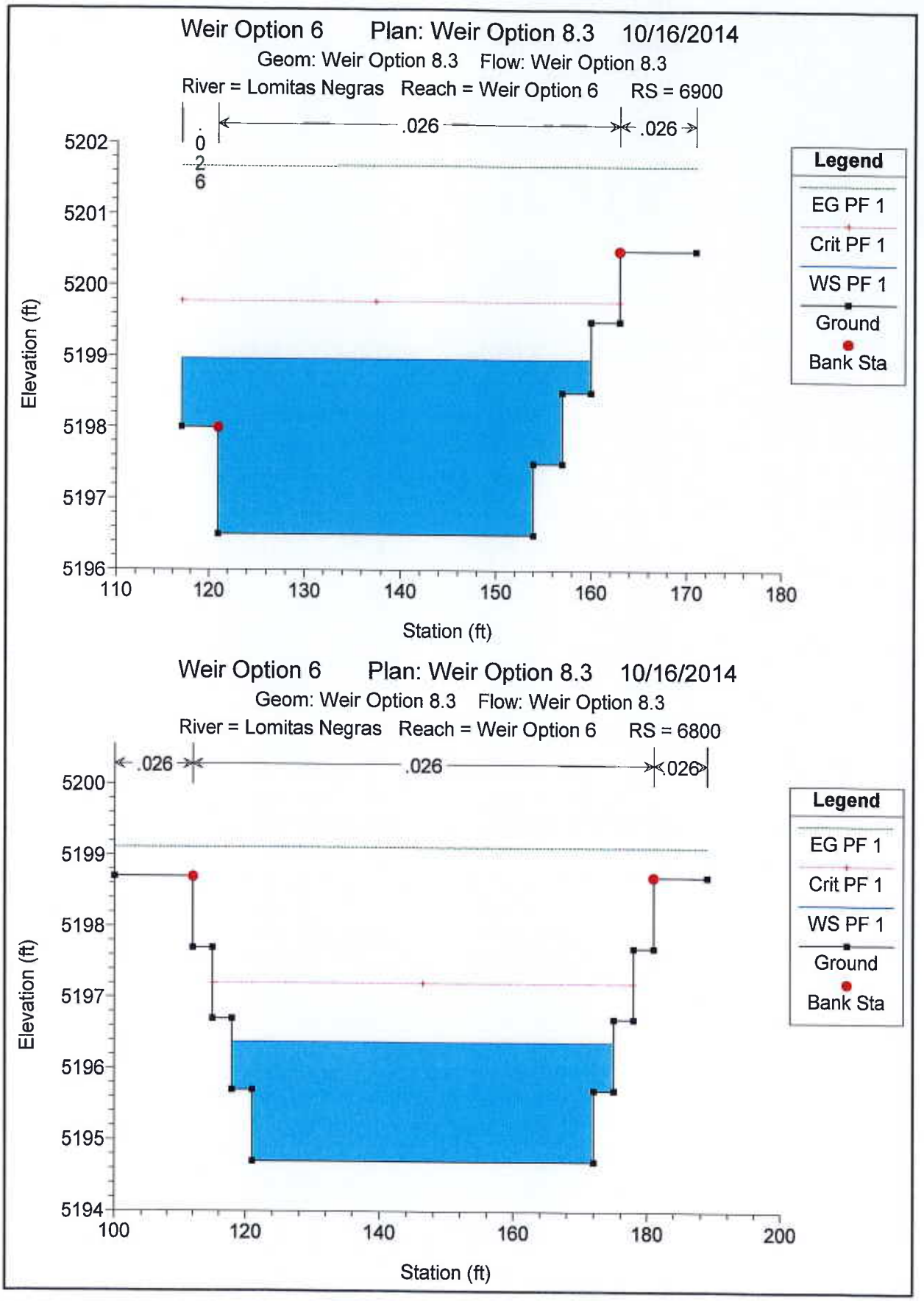
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Legend
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Crit PF 1
WS PF 1
Ground
Bank Sta
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Station (ft)
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Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 6800
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Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
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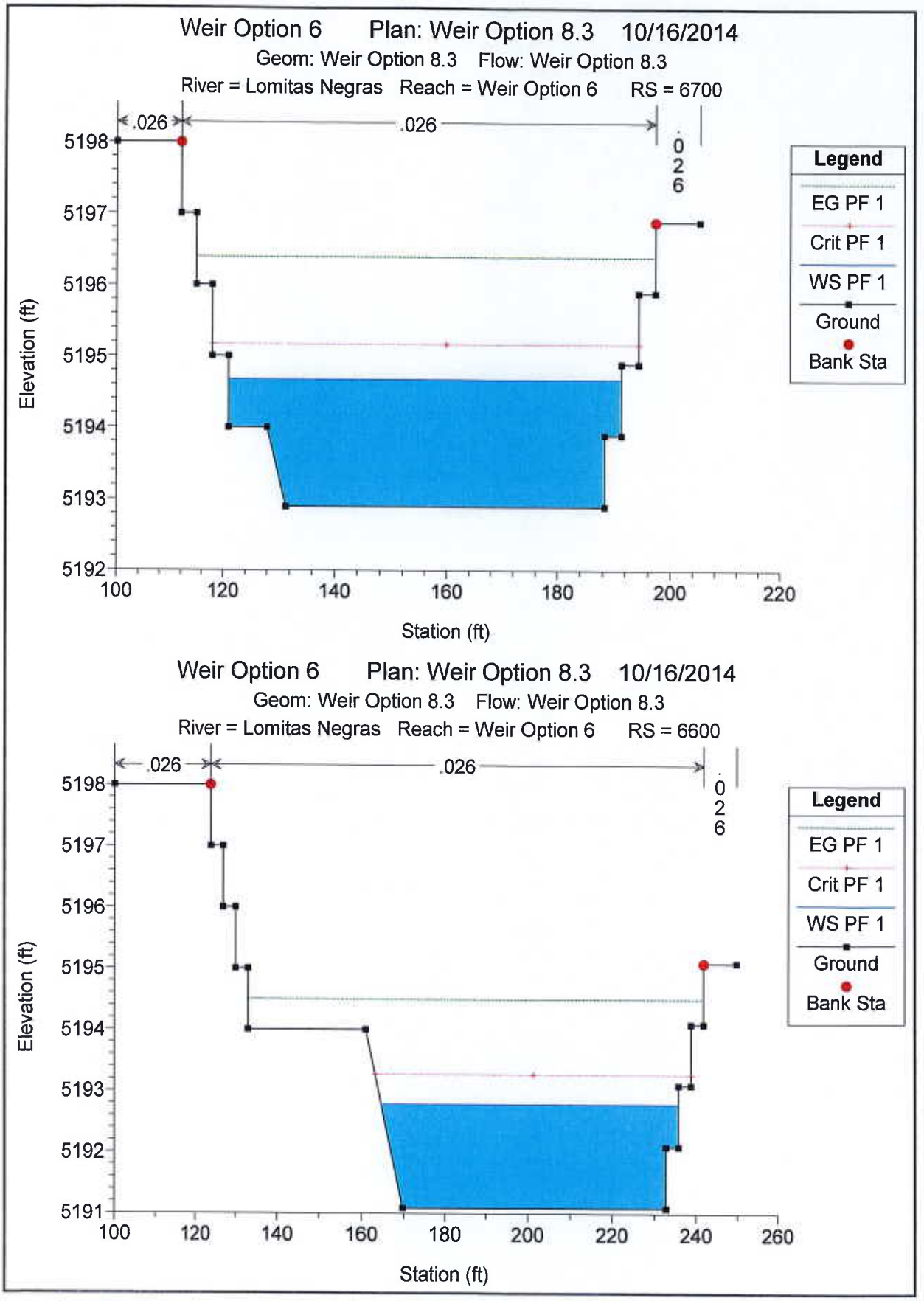
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.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
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Station (ft)
5198
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5192
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160
180
200
220
Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 6600
.026
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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240
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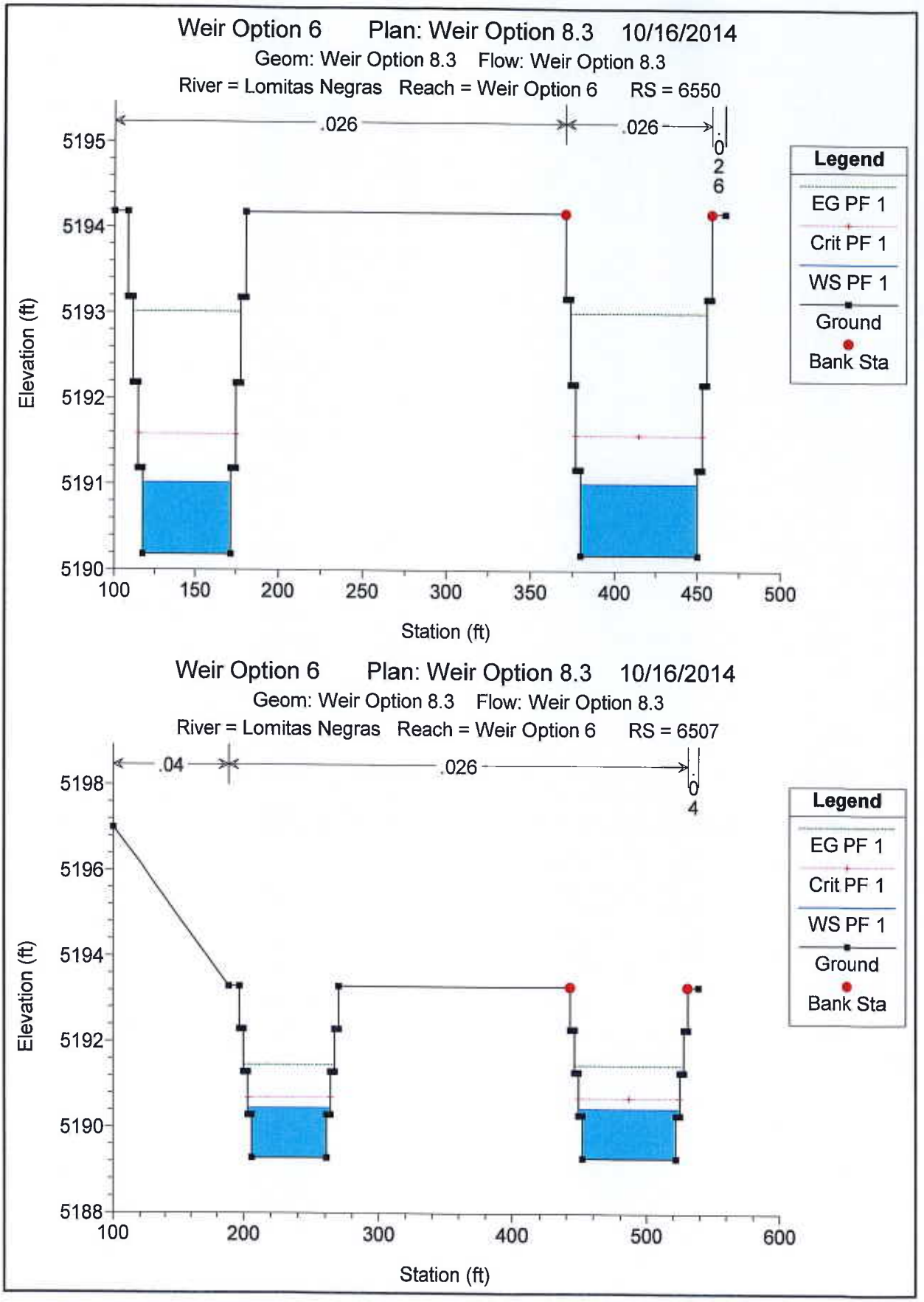
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.026
.026
.026
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 6507
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.04
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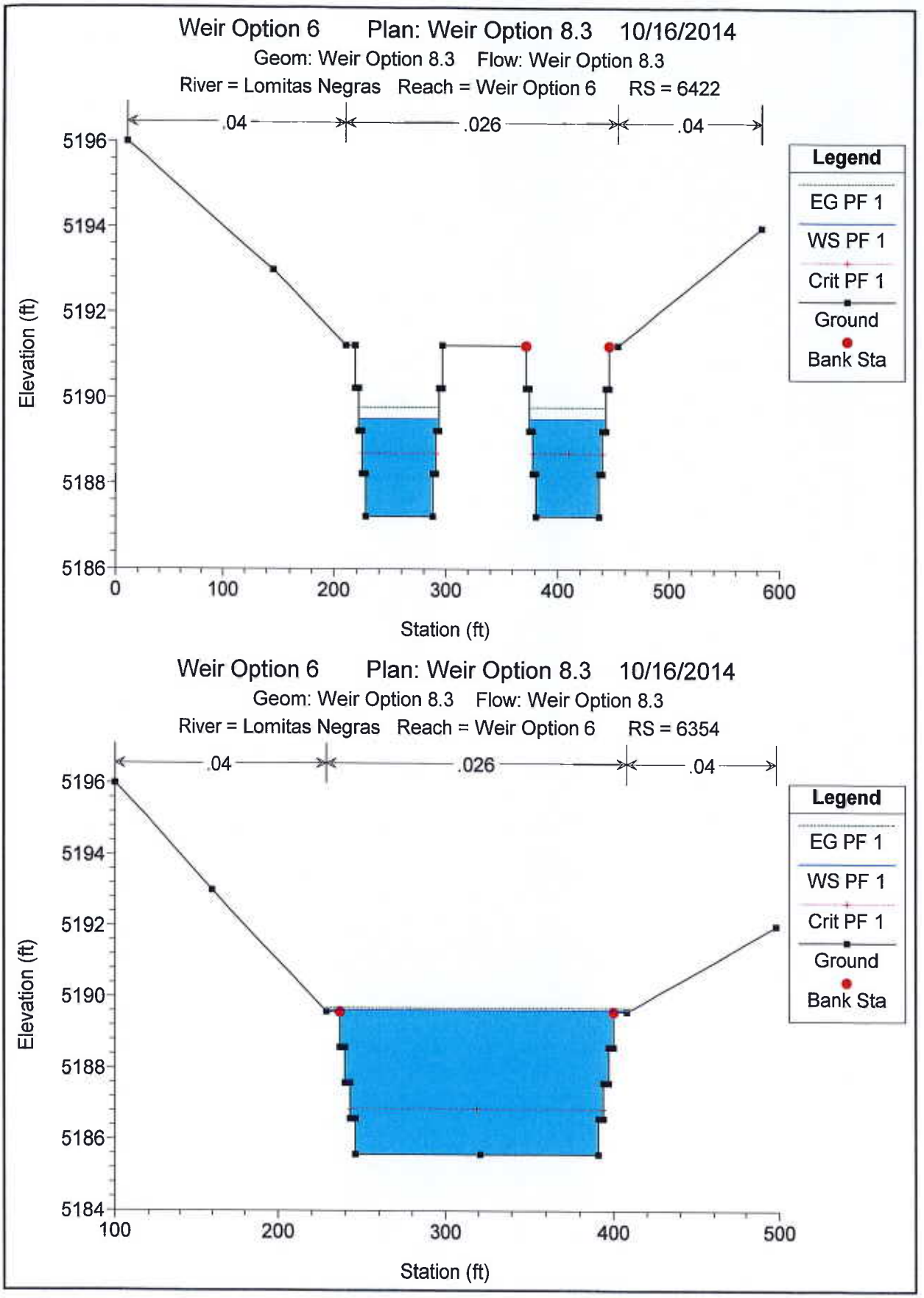
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 6422
.04
.026
.04
Legend
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WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
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5194
5192
5190
5188
5186
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100
200
300
400
500
600
Station (ft)
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Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 6354
.04
.026
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
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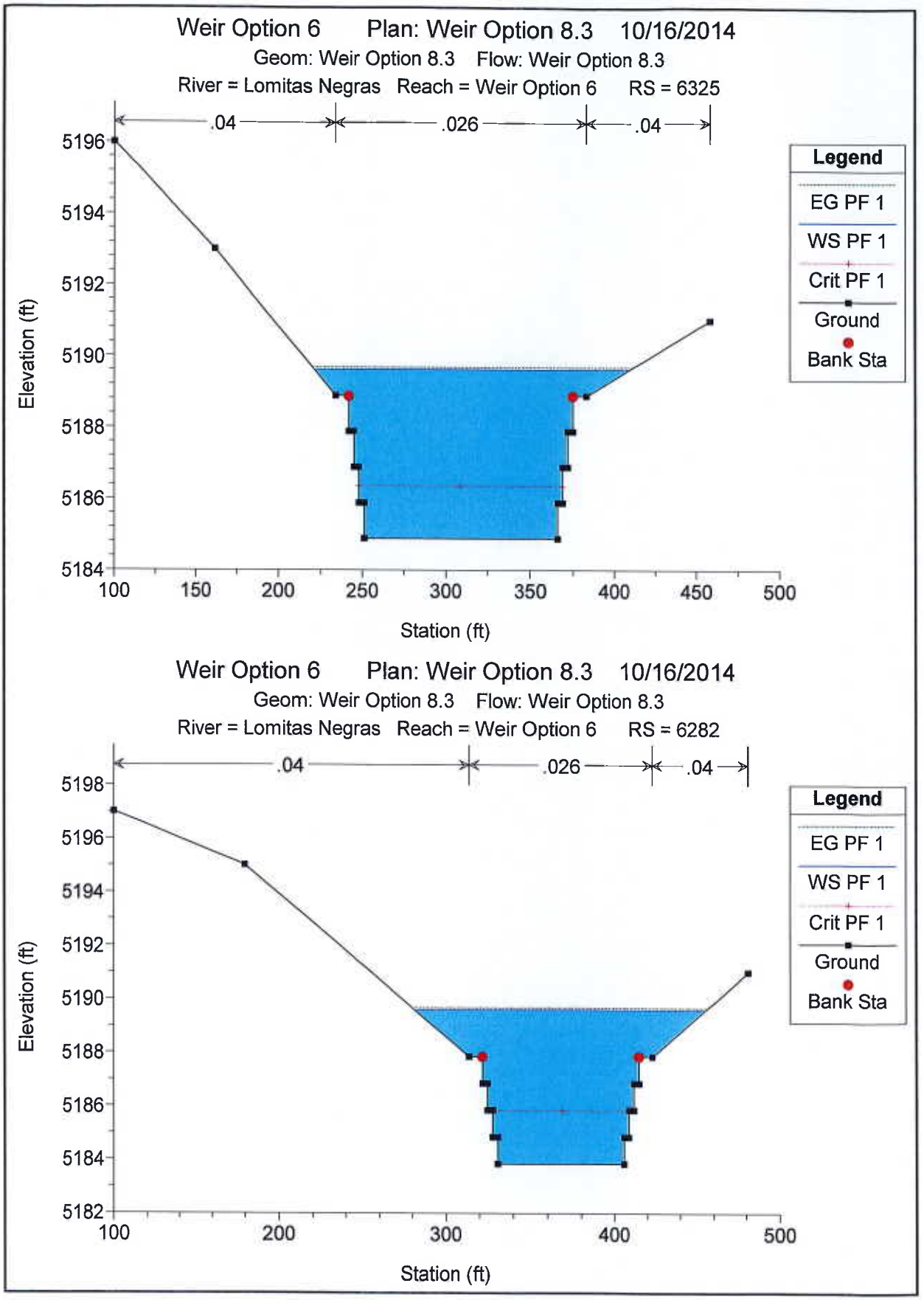
5194
5192
5190
5188
5186
5184
100
200
300
400
500
Station (ft)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Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 6325
.04
.026
.04
Elevation (ft)
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5194
5192
5190
5188
5186
5184
100
150
200
250
300
350
400
450
500
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
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Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 6282
.04
.026
.04
Elevation (ft)
5198
5196
5194
5192
5190
5188
5186
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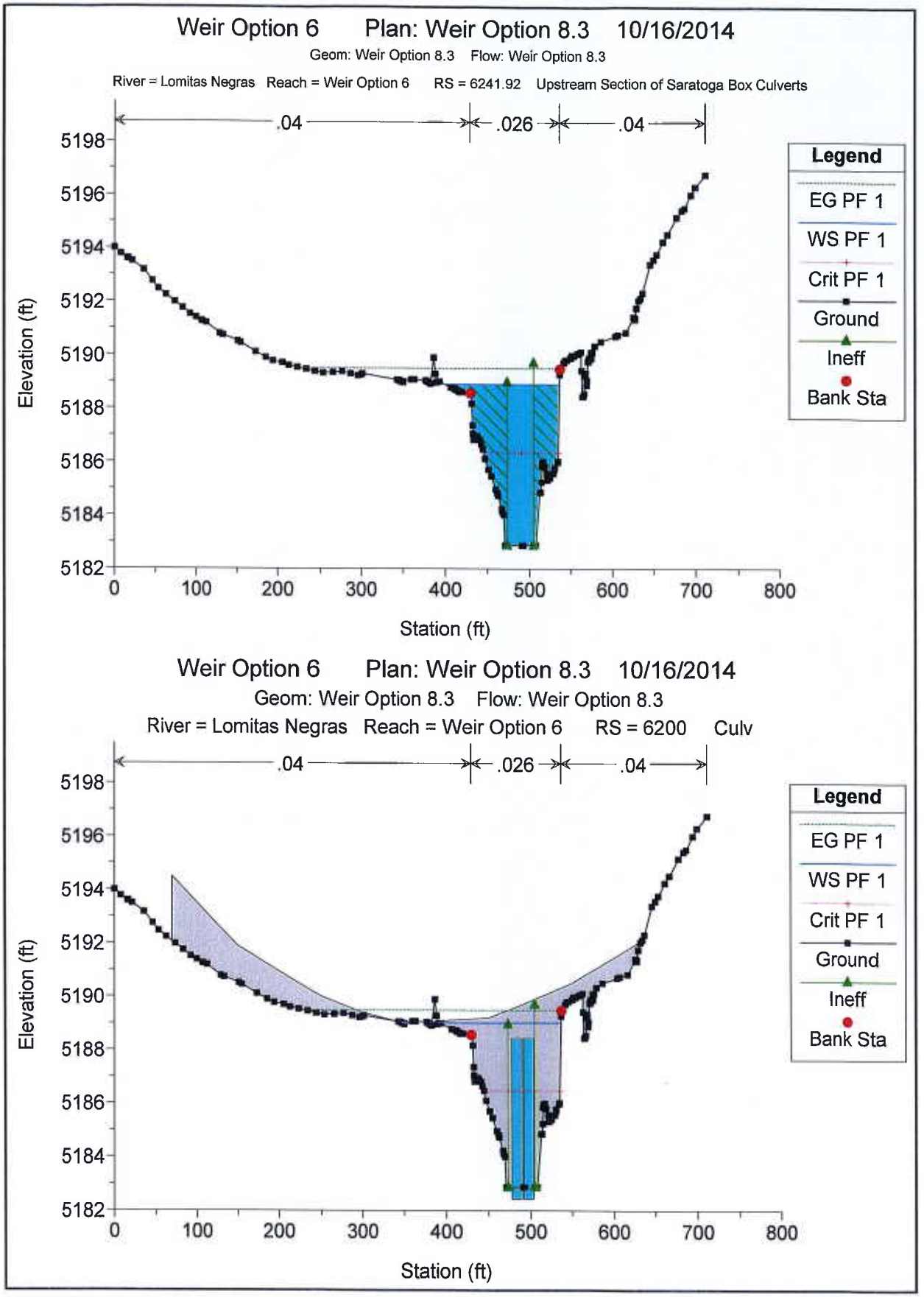
200
300
400
500
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta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Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 6241.92 Upstream Section of Saratoga Box Culverts
.04
.026
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
5198
5196
5194
5192
5190
5188
5186
5184
5182
0
100
200
300
400
500
600
700
800
Station (ft)
Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
River = Lomitas Negras Reach = Weir Option 6 RS = 6200 Culv
.04
.026
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
5198
5196
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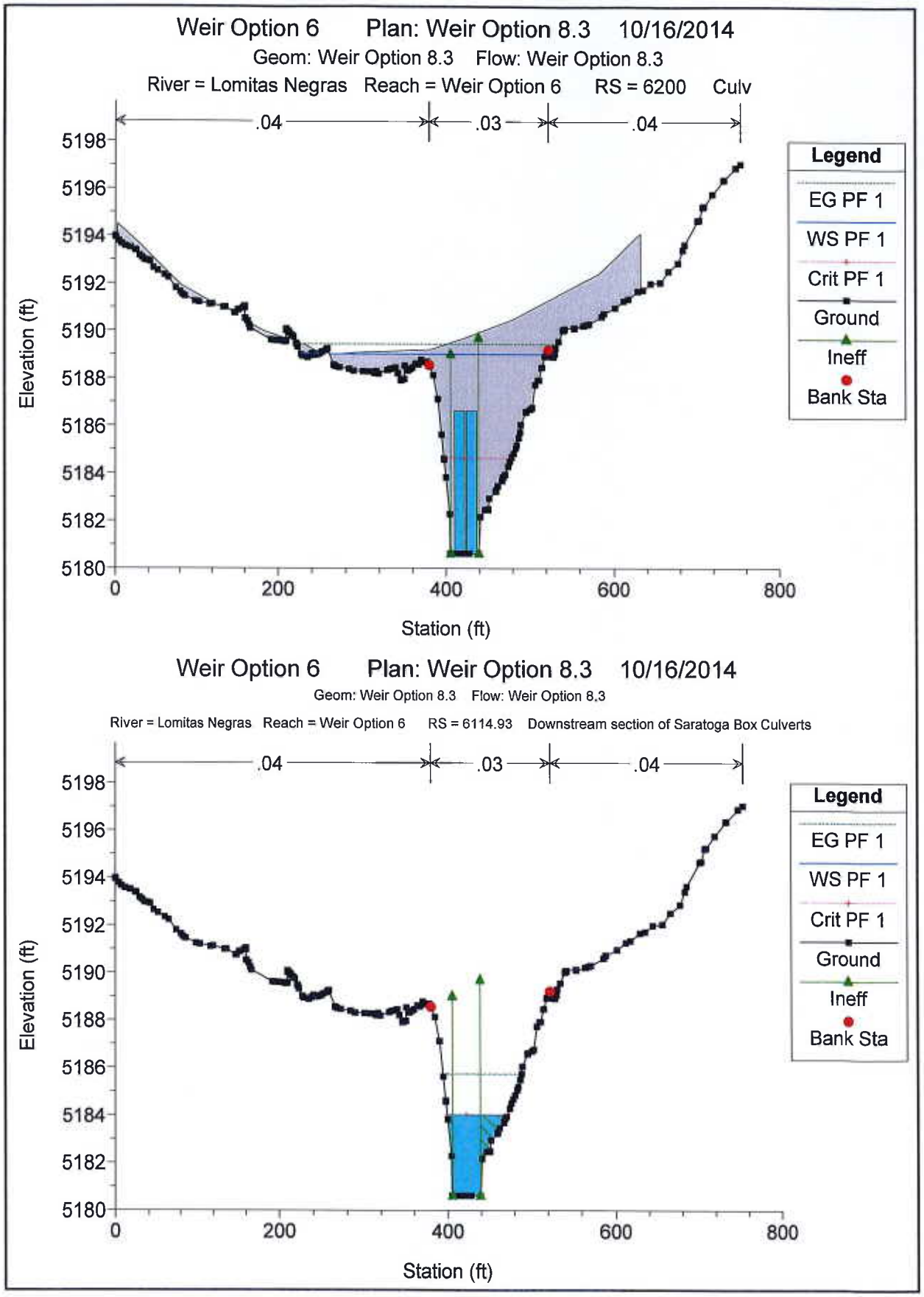
600
700
800
Station (ft)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.04
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Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
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5186
5184
5182
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400
600
800
Station (ft)
Weir Option 6 Plan: Weir Option 8.3 10/16/2014
Geom: Weir Option 8.3 Flow: Weir Option 8.3
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.04
.03
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Legend
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WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
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400
600
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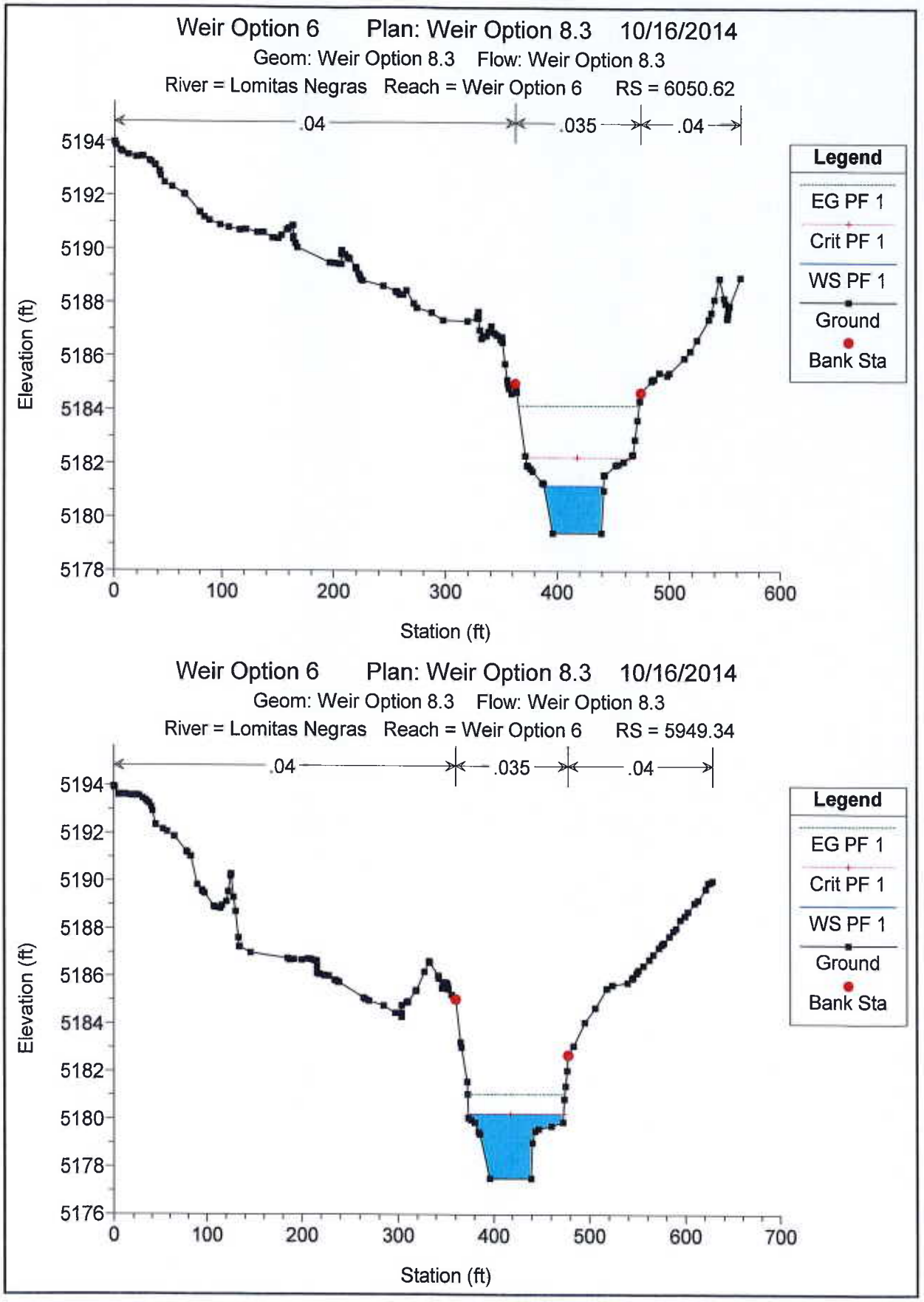
Station (ft)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.035
.04
Legend
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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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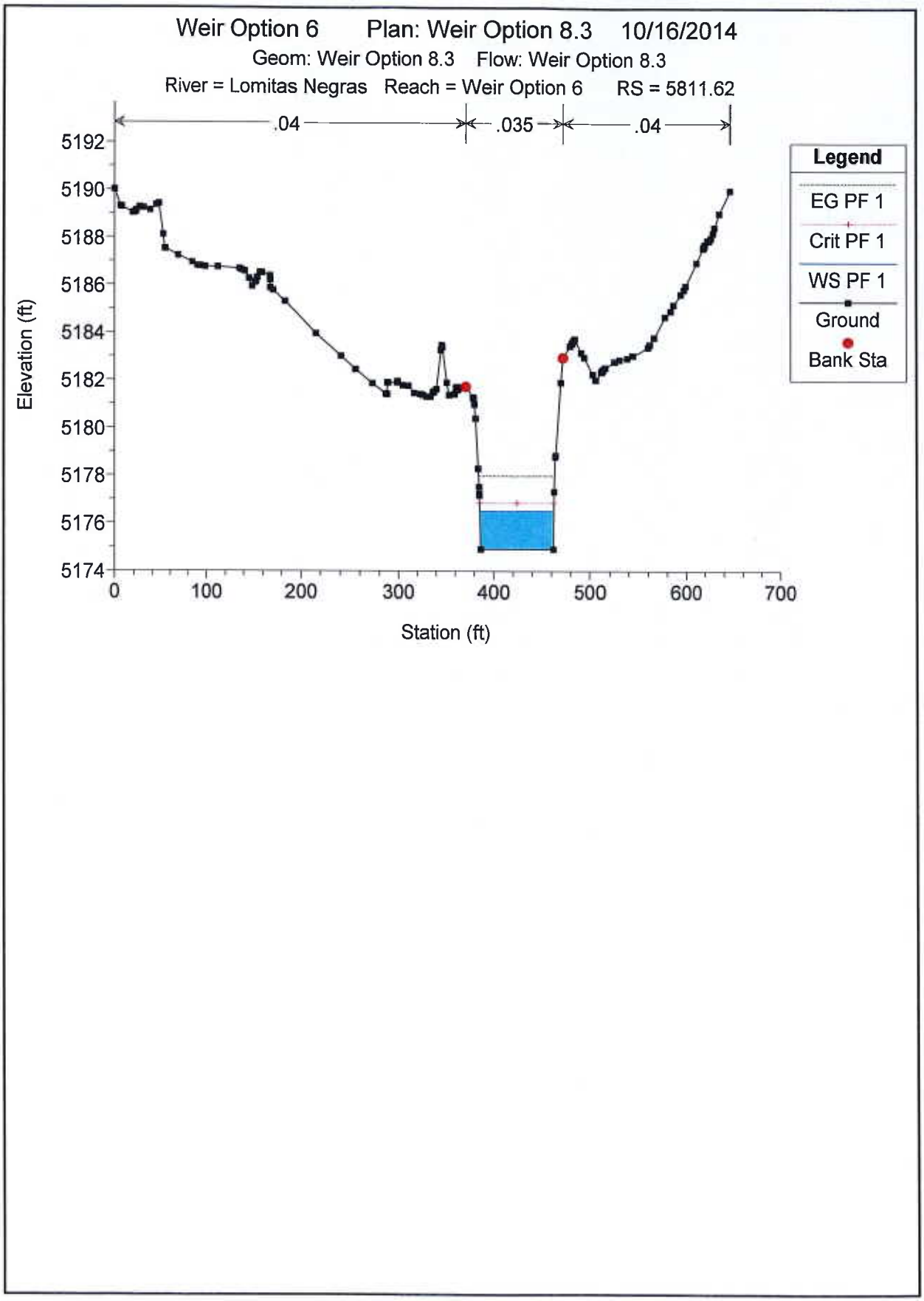
Bank Sta
Elevation (ft)
Station (ft)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Legend
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Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
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5190
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5184
5182
5180
5178
5176
5174
0
100
200
300
400
500
600
700
Station (ft)

Scour Computations

Table 10 North Tributary Scour Computations at Bank Lining

Table 11 Main Branch Scour Computations at Bank Lining

TABLE 10

Proposed North Branch of Lomitas Negras Arroyo - West of Saratoga Rd

Scour Computation Along a Floodwall - Flow Parallel to walls, and floodwalls along both banks

100-year design flood for the ULTIMATE development condition

See Conceptual Plan and Profile for HEC-RAS Section Locations

Y_1	Pi	Fr	Ys
ft			ft
a		a	b

Station and Description - Upstream of proposed Maintenance access road along south bank

HEC-RAS Section 7077			
1.29	3.14	1.29	1.9

FOOTNOTES

1 - Sediment and Erosion Design Guide. Mussetter Engineering Inc., November 2008.

Scour Equation : Equation 3.62 , Ref. 1

a - Obtained from HEC-RAS output

b - $Y_s = Y_1 * (0.73 + 0.14 * 3.14 * Fr^{\wedge})$

Definition of Terms

Ys = depth of scour hole measured from mean bed level to bottom of scour hole

Y_1 = average upstream flow depth in the main channel

Fr = Froude Number at location

Cell requires data input

Cell uses equation to compute value

TABLE 11

Proposed Main Branch of Lomitas Negras Arroyo - West of Saratoga Rd

Scour Computation Along a Floodwall - Flow Parallel to walls, and floodwalls along both banks

100-year design flood for the ULTIMATE development condition

See Conceptual Plan and Profile for HEC-RAS Cross-Section Locations

Y_1	Pi	Fr	Ys
ft			ft
a		a	b

Station and Description - Upstream of soil cement bed section north and south banks

HEC-RAS Section 7820			
2.98	3.14	1.16	3.9

FOOTNOTES

1 - Sediment and Erosion Design Guide. Mussetter Engineering Inc., November 2008.

Scour Equation : Equation 3.62 , Ref. 1

a - Obtained from HEC-RAS output

b - $Y_s = Y_1*(0.73 + 0.14 * 3.14 * Fr^{\wedge})$

Definition of Terms

Ys = depth of scour hole measured from mean bed leve to bottomof scour hole

Y_1 = average upstream flow depth in the main channel

Fr = Froude Number at location

Cell requires data input

Cell uses equation to compute value

APPENDIX 4

Quantity Computations and Unit Prices

Conceptual Design Sketches

Principal Spillway Plan View
Principal Spillway Profile
Emergency Spillway Profile
Soil Cement Bank Lining Typical Cross-Section (North Tributary and Main Branch)
Lateral Weir, Bed and Bank Lining Cross-Section

Quantity Computations

Soil Cement and Miscellaneous Quantity Computations
Cut / Fill Report (output from AutoCAD Civil 3D)

Bid Tab Summaries from Previous Dams and Arroyo Projects:

A. Sunset Pond and Storm Drain (provided by SSCAFCA)
B. Boca Negra Dam (provided by AMAFCA)
C. La Pressa Dam (provided by AMAFCA)
D. Phase 1 - Lomitas Negras Arroyo Storm Water Quality Improvement Project

AND

Computation by Smith Engineering of a combined unit price for soil cement based on the Phase 1 – Lomitas Negras Arroyo Bid Price. In that project soil cement and portand cement were each a separate bid item.

Therefore – compute a unit cost for soil cement complete in place that includes the Portland cement content.

Conceptual Design Sketches

Principal Spillway Plan View

Principal Spillway Profile

Emergency Spillway Profile

Soil Cement Bank Lining Typical Cross-Section (North Tributary and Main Branch)

Lateral Weir, Bed and Bank Lining Cross-Section

Quantity Computations

Soil Cement and Miscellaneous Quantity Computations

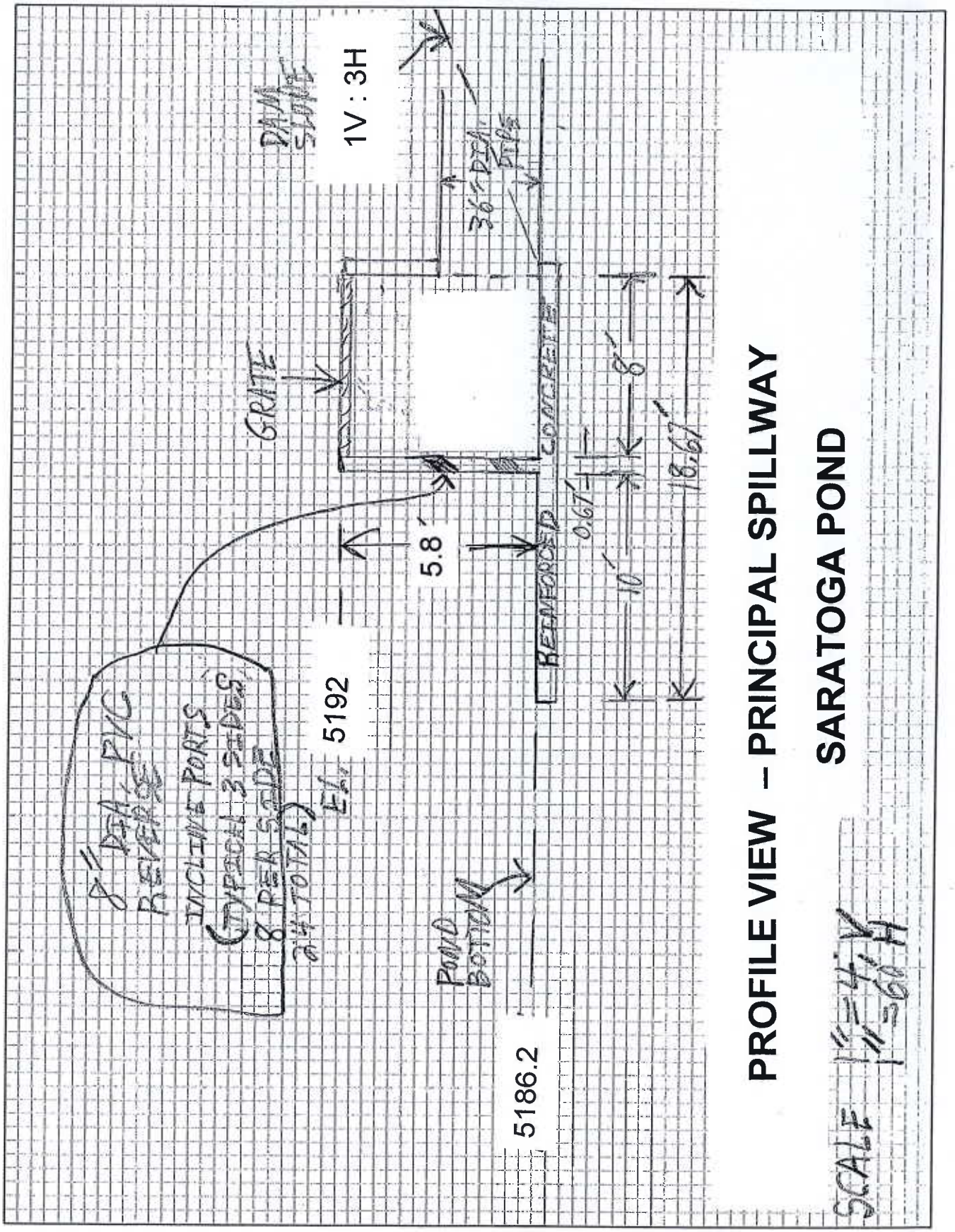
Cut / Fill Report (output from AutoCAD Civil 3D)

SMITH ENGINEERING COMPANY

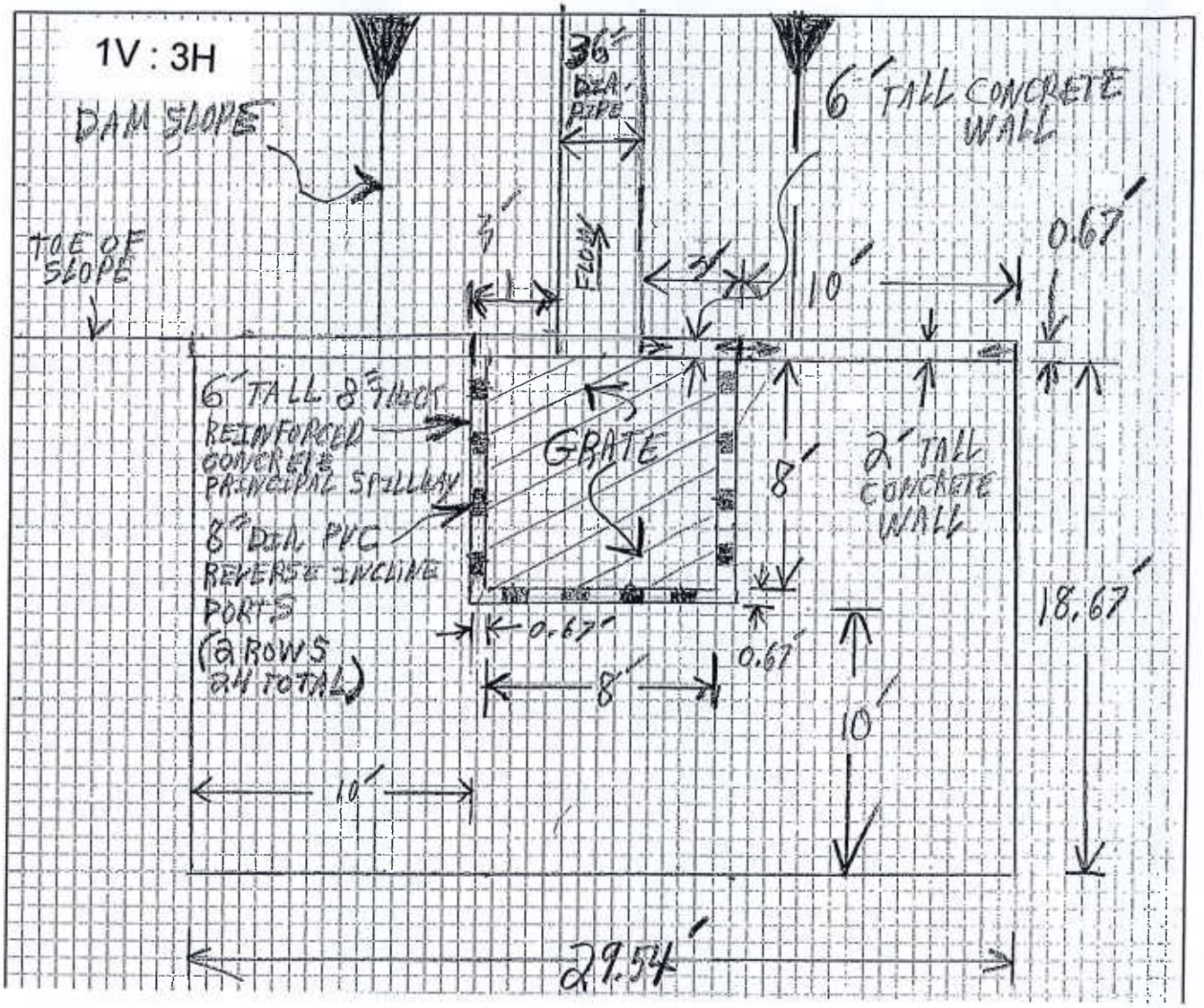
PROJECT [redacted] SHEET NO. ____ OF ____

SUBJECT CONCEPTUAL SPILLWAY DESIGN PROJECT NO. [redacted]

BY PS DATE [redacted] CHECKED BY ____ DATE ____



Smith Engineering Company
2201 San Pedro NE Bldg. #4, Suite 200 Albuquerque, New Mexico 87110 505/884-0700 Fax 505/884-2376



PLAN VIEW – PRINCIPAL SPILLWAY

SARATOGA POND

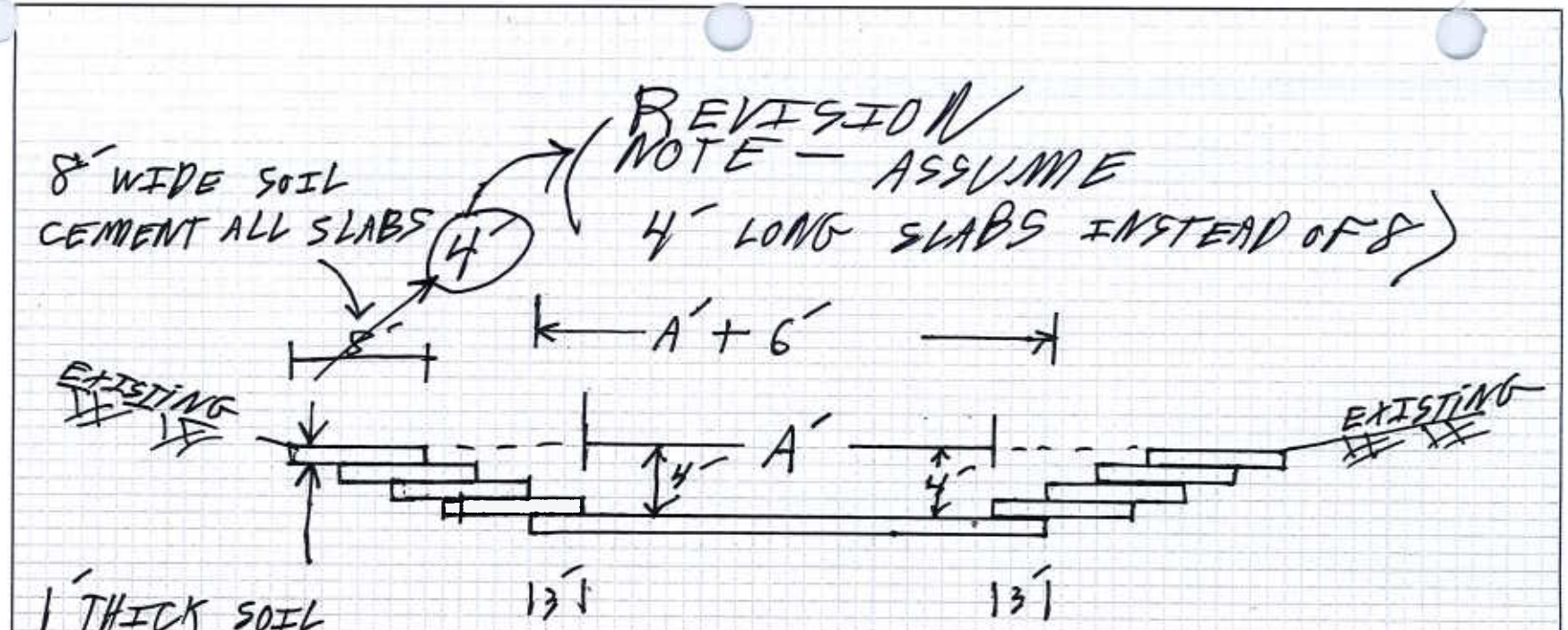
SCALE 1"=60'

Smith Engineering Company
2201 San Pedro NE Bldg. #4, Suite 200 Albuquerque, New Mexico 87110 505/884-0700 Fax 505/884-2376

PROJECT _____ SHEET NO. _____ OF _____

SUBJECT _____ PROJECT NO. _____

BY _____ DATE ___/___/___ CHECKED BY _____ DATE ___/___/___



A' = MAIN BRANCH BOTTOM WIDTH VARIES - SEE PLAN FIG. 1

A' = FT. NORTH TRIBUTARY REACH 1 ONLY - SEE PLAN FIG. 1

TYPICAL CROSS-SECTION - NORTH TRIBUTARY AND MAIN BRANCH

SCALE 1" = 1' VERT & HOR.

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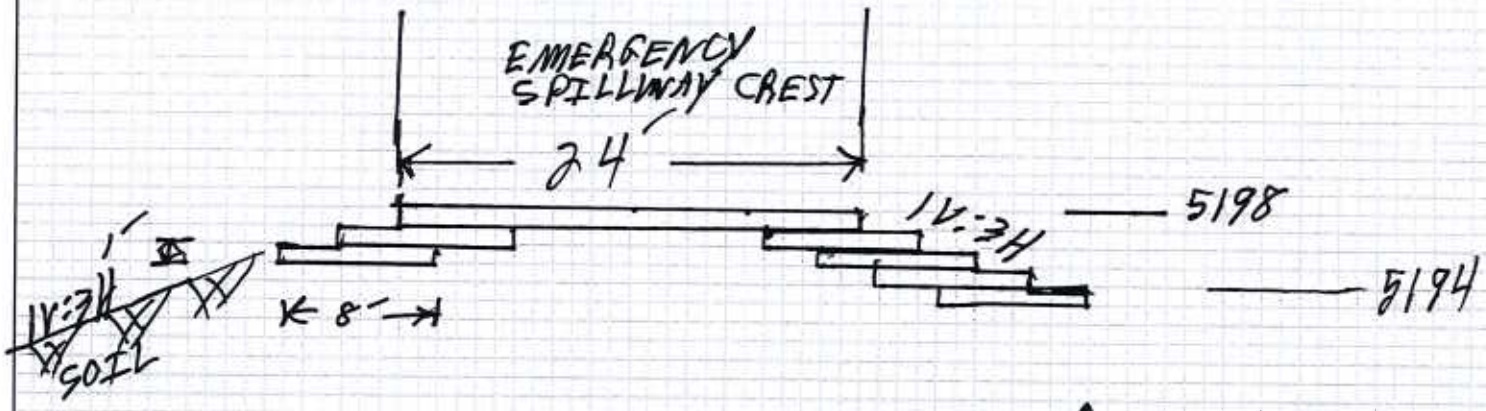
6400 Uptown Boulevard, N.E. Suite 500E Albuquerque, New Mexico 87110 505/884-0700 Fax 505/884-2376

PROJECT _____ SHEET NO. _____ OF _____

SUBJECT _____ PROJECT NO. _____

BY _____ DATE _____/_____/_____ CHECKED BY _____ DATE _____/_____/_____



NOTE - ALL SLABS EXCEPT CREST (24') SLAB ARE 1' THICK x 8' LONG SOIL CEMENT

DOWNSTREAM TOE OF DAM

PROFILE - EMERGENCY SPILLWAY SARATOGA POND

SCALE 1" = 10' VERT & HOR.

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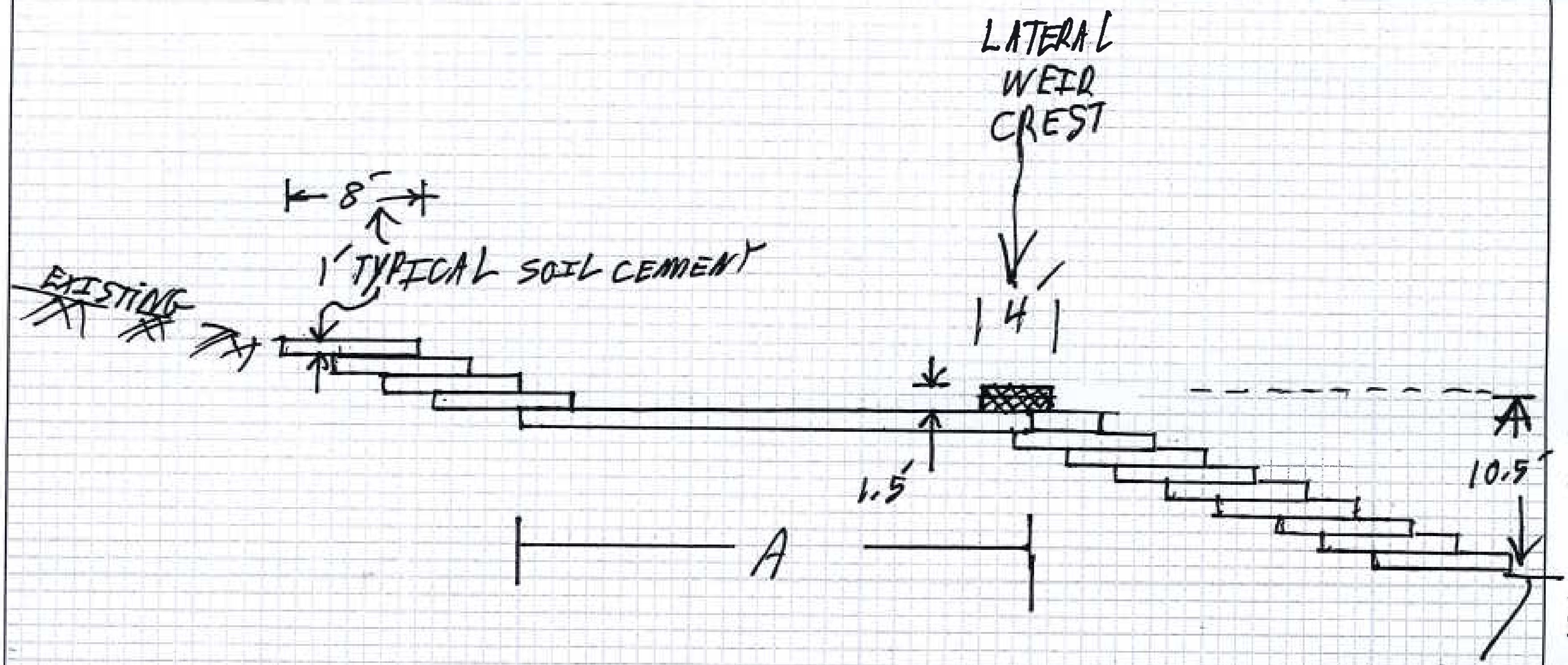
6400 Uptown Boulevard, N.E. Suite 500E Albuquerque, New Mexico 87110 505/884-0700 Fax 505/884-2376

PROJECT ____ SHEET NO. ____ OF ____
SUBJECT ____ PROJECT NO. ____
BY ____ DATE / / CHECKED BY ____ DATE / /



A - BED WIDTH VARIES, SEE PLAN VIEW FIG. 1

TYPICAL CROSS-SECTION - LATERAL WEIR BED AND BANK

SCALE 1" = 10' VERT. AND HOR.

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E-Mail: SECNM@worldnet.att.net

Quantity Computations

Soil Cement and Miscellaneous Quantity Computations

Cut / Fill Report (output from AutoCAD Civil 3D)

Saratoga Pond - Conceptual Level Design QUANTITY ESTIMATES

Pat Stovall

Soil Cement Bank, Bed Emergency Spillway Maint. Road Structures

Assumptions

Emergency Spillway and Lateral Weir Slabs - 1 ft. thick, 8 ft. wide, stair step to achieve 1V:3H side slopes

Channel Bank Slabs - 1 ft. thick, 4 ft. wide, stair step to achieve 1V:3H side slopes

Typical Cross-Section No. (see typical sections included in Appendix 4 and the Plan View Grading Plan)	Total number of slabs in cross section	Slab Width	Slab Thickness	length along bank	Volume	**Volume**
		ft	ft	ft	cu ft	cy
SC 1 South Wall on Main Trib	4	4	1	1,476	23,616	875
SC 2 Upstream North Wall above Weir	4	4	1	217	3,472	129
SC 5 North Bank Downstream of Weir and Dam face on Main Trib	4	4	1	530	8,480	314
SC 6 South Bank Downstream of Weir and Dam face on North Trib	4	4	1	845	13,520	501
SC 7 North Wall on North Trib	4	4	1	400	6,400	237
SC 4 Weir						
SC4 Weir Crest	1	4	1	620	2,480	92
SC4 Weir Steps to pond bottom	10	8	1	620	49,600	1,837
SC 10 Emergency Spillway						
SC 10 Emerg Spill pond side to crest	2	8	1	280	4,480	166
SC 10 Emerg Spill down side to crest	4	8	1	280	8,960	332
SC 10 Emergency Spillway crest	1	24	1	280	6,720	249

Typical Cross-Section No.	Total number of slabs in cross section	Slab Area (ACAD or measured)	Slab Thickness		Volume	Volume
		sq ft	ft		cu ft	cy
SC 3 Main Trib Channel Bottom (ACAD)	1	95,323	1		95,323	3,530
SC 8 North Trib Channel Bottom (assume 61 ft width x 385 length = 23485	4	23,485	1		93,940	3,479
SC 9 Just Below Emergency Spillway						

assume triangle =0.5(200 x 330) = 33000 sqft	1	33,000	1		33,000	1,222	
SC 11 Maint. Road to top of dam (assume 12 ft width x 230 length = 2760 sq ft	4	2,760	1		11,040	409	
						CU YD	
				TOTAL VOLUME		13,372	
				Assume		13,400	

Saratoga Pond - Conceptual Level Quantity Estimates

REFER TO "CONCEPTUAL DESIGN" 24" x 36" Plan Sheet in Map Pocket and other design sketches and computations in Appendix 4

REINFORCED STRUCTURAL CONCRETE

	PRINCIPAL SPILLWAY REINFORCED CONCRETE STRUCTURE MATERIAL VOLUME						
STRUCTURE LOCATION TYPE AND GENERAL SHAPE	Length	Width or Height	Thickness			Volume	Volume
	L	W	Y				
	ft	ft	ft			cu ft	CU YD
See design sketches in Appendix 4							
Spillway slab including 10 ft extra on all sides	29.54	18.67	0.67			370	14
Vertical principal spillway walls	31.3	6	0.67			126	5
Vertical 2 ft walls along toe of slope (to assist in sediment trash removal from slab	20	2	0.67			27	1
					TOTAL		19
					assume 15 % cont.		3
					TOTAL		22

BASE COURSE MATERIAL

STRUCTURE LOCATION TYPE AND GENERAL SHAPE	Side Slopes	Length	Width	Area	Thickenss		Volume	Area
		L	A					
	1V: ?H	ft	ft	sq ft	ft		CU YD	SY
BC 1 -Maint. Access Road from top embankment to pond bot		255	12	3060	0.5			340
BC 2 - North top embankment to maint access road		320	12	3840	1.5			427
BC 3 - South Top of Embankment to lateral weir		170	12	2040	2.5			227
			TOTAL	8940				
							TOTAL	993
			assume 142 lbs / cu ft				Assume	1,000
			if compute tons of Base Course					

CUT & FILL VOLUMES - Embankment and Pond Area Excavation

STRUCTURE LOCATION TYPE AND GENERAL SHAPE	Volume
	CU YD
Embankment Fill - (a)	**5,600**
Pond Excavation Haul and Dispose Excess Soil - (a)	**273,370**

(a) See Cut & Fill Report attached (Computed with AutoCAD Civil 3D software)

(a) FILL SOIL FOR EMBANKMENT - up to top of embankment elev. Of 5200

STRUCTURE LOCATION TYPE AND GENERAL SHAPE	Side Slopes	Length top of embankment at el. 5200	Embankment top width	Embankment height	Embankment Bottom width	Embankment Cross-Section Area	Volume	**Volume**
				TRAPEZOIDAL MATERIAL VOLUME				
		L	W	Y	Y			
	1V: ?H	ft	ft	ft	ft	sq ft	cu ft	**CU YD**
Trapezoidal Fill for Embankment (height is 6 feet above lowest toe of slope, however, assume 7 feet for 1 more layer of select fill, no keyway trench intended)	3	650	12	7	54	231	150150	5561
	assume 1 more foot for depth							
						TOTAL		**5561**
						ASSUME		**5,600**

CLEAR AND GRUB -

STRUCTURE LOCATION TYPE AND GENERAL SHAPE				area	area			area
				sq ft	sq yd			acres
Entire pemimenter of disturbed area Measured in autocad				788996	87666			18
						TOTAL		**18**

NATIVE SEEDING -

STRUCTURE LOCATION TYPE AND GENERAL SHAPE				Area	Area			Area
				sq ft	Sq yd			ACRES
Description -Begin with the outer Clear and Grub / reseeding boundary, then subtract the Soil Cement Areas, Base Course Areas, Rip-Rap Areas and pond bottom to compute the total Seeding area .								
Pond Bottom and 1V:3H slopes pond interior / embankments not lined with soil cement or base course (measured in CAD)				461673				**10.6**
Now subtract pond bottom area				-339961				**-7.8**
North Tributary along north bank				12553				**0.3**
TOTAL				**134265**	**14918**			**3.1**
							TOTAL	**3.1**

SANTA FE BROWN GRAVEL MULCH								
STRUCTURE LOCATION TYPE AND GENERAL SHAPE				Area	Area			Area
				sq ft	Sq yd			ACRES
Description -Begin with the outer Clear and Grub / reseeding boundary, then subtract the Soil Cement Areas, Base Course Areas, Rip-Rap Areas and pond bottom to compute the total Seeding area .								
Pond Bottom and 1V:3H slopes pond interior / embankments not lined with soil cement or base course (measured in CAD)				461673				**10.6**
Now subtract pond bottom area				-339961				**-7.8**
North Tributary along north bank				12553				**0.3**
TOTAL				**134265**	**14918**			**3.1**
							TOTAL	**3.1**

PERIMETER WIRE FENCE								
STRUCTURE LOCATION TYPE AND GENERAL SHAPE								Length
								ft
Measured on Map - just along mild slopes near gate to top of dam								170
						TOTAL		**170**

36-inch Diameter Principal Spillway Outfall Pipe								
STRUCTURE LOCATION TYPE AND GENERAL SHAPE								Length
								ft
Measured on Map								270
						TOTAL		**270**

RIP -RAP								
STRUCTURE LOCATION TYPE AND GENERAL SHAPE	Side Slopes	Length	Width	Area	Thickenss	Volume	**Volume**	Area
		L	A					
	1V: ?H	ft	ft	sq ft	ft	cu ft	**CU YD**	SY
At toe of lateral weir		640	10	6400	2	12800	**474**	711

SARATOGA POND

Cut/Fill Report

Generated: 2014-10-14 13:26:21

By user: jaredl

Drawing: Q:\SEC---PROJECTS\114126 Lomitas Negras Off Channel Element\ENGINEERING\CADD\Q:\SEC---PROJECTS\114126 Lomitas Negras Off Channel Element\ENGINEERING\CADD\114126 Grading Plan COPY.dwg

Volume Summary

Name	Type	Cut Factor	Fill Factor	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
EARTHWORK	full	1.00	1.00	800975.12	280370.13	6451.95	273918.18<Cut>

Totals

	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
Total	800975.12	280370.13	6451.95	273918.18<Cut>

* Value adjusted by cut or fill factor other than 1.0

BASED ON CONCEPTUAL GRADING PLAN IN MAP POCKET

SEE PAGE 2 OF 2 attached

PROJECT SARATOGA POND SHEET NO. ____ OF ____

SUBJECT EMBANKMENT FILL PROJECT NO. ____

BY ____ DATE / / CHECKED BY PS DATE 10/15/14

EMBANKMENT FILL = 5600 CY

COMPUTED IN SPREADSHEET (ATTACHED)

ASSUME 25% LOSS FOR COMPACTION

∴ FILL VOLUME = 5600 CY

× 1.25

= 7000 CY

* ASSUME EXISTING SOILS MAY BE USED IN EMBANKMENT.

TOTAL CUT = 280,370 CY

− 7000 CY

= HAUL & DISPOSE = 273,370 CY

* ASSUME EXISTING SOILS WILL BE USED FOR SOIL CEMENT (13,400 CY)

273,370 CY

− 13,400

ASSUME TOTAL HAUL & DISPOSE = 259,970 CY

Smith Engineering Company
2201 San Pedro NE Bldg. #4, Suite 200 Albuquerque, New Mexico 87110 505/884-0700

Bid Tab Summaries from Previous Dams and Arroyo Projects:

A. Sunset Pond and Storm Drain (provided by SSCAFCA)

B. Boca Negra Dam (provided by AMAFCA)

C. La Pressa Dam (provided by AMAFCA)

D. Phase 1 - Lomitas Negras Arroyo Storm Water Quality Improvement Project

Computation by Smith Engineering of a combined unit price for soil cement based on the Phase 1 – Lomitas Negras Arroyo Bid Price. In that project soil cement and portand cement were each a separate bid item

Therefore – compute a unit cost for soil cement complete in place that includes the portland cement content.

SSCAFCA SUNSET POND AND STORM DRAIN
BID PROPOSAL

ENGINEER'S OPINION OF PROBABLE COST 1/10/08 FROM SSCAFCA 5-31-13

BIDDER'S COMPANY NAME: _____

ITEM NUMBER	ITEM DESCRIPTION	UNIT TYPE	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT	
						DIRT LOAD/HAUL ONLY
LOT 'B' SUNSET POND AND STORM DRAIN						
B.1	MOBILIZATION, DEMOBILIZATION	LS	XXXX	$30,000.00	$30,000.00	$5,000.00
B.2	DEVELOP & IMPLEMENT STORM DRAINAGE DISCHARGE SWP3	LS	XXXX	$5,000.00	$5,000.00	$5,000.00
B.3	CONSTRUCTION STAKING BY THE CONTRACTOR	LS	XXXX	$10,000.00	$10,000.00	$10,000.00
B.4	CONTROL OF STORM AND NUISANCE FLOW	LS	XXXX	$6,000.00	$6,000.00	$6,000.00
B.5	ACCESS AND ON-SITE TRAFFIC CONTROL	LS	XXXX	$2,500.00	$2,500.00	$2,500.00
B.6	CLEARING AND GRUBBING	AC	6.0	$1,000.00	$6,000.00	$6,000.00
B.7	UNCLASSIFIED EXCAVATION, DISPOSE OF EXCESS OFF-SITE TO CONTRACTOR PROVIDED SITE, STOCKPILE, PLACE AND COMPACT ON-SITE EMBANKMENT.	CY	60,000.0	$3.80	$228,000.00	
B.8	FINAL GRADING, CIP	SY	24,000.0	$1.00	$24,000.00	
B.9	SUBGRADE PREPARATION	SY	1,050.0	$1.25	$1,312.50	
B.10	COLORED REINFORCED CONCRETE SLAB ON-GRADE, CIP	CY	50.0	$150.00	$7,500.00	
B.11	ALLOWANCE FOR PURCHASE AND DELIVERY OF STONE MONOLITHS, ALL SIZES	ALLOWANCE	XXXX		$20,000.00	
B.12	PLACE STONE MONOLITHS INCL. EXCAVATION, CONCRETE FOOTINGS, COMPACTION AND INCIDENTALS, ALL SIZES	EA	50.0	$1,000.00	$50,000.00	
B.13	24" SIDEWALK CULVERT, CIP	LF	35.0	$500.00	$17,500.00	
B.14	ANGULAR STONE FOR DRAINAGE SWALES, CIP	CY	80.0	$60.00	$4,800.00	
B.15	6" BASE COURSE PAVING ACCESS RAMP/PATH TYPE 'A'	SY	950.0	$10.00	$9,500.00	
B.16	COMPACTED EARTHEN RAMP/PATH TYPE 'B'	SY	1,000.0	$5.00	$5,000.00	
B.17	COMPACTED EARTHEN RAMP/PATH TYPE 'C'	SY	2,000.0	$5.00	$10,000.00	
B.18	SEPARATION GEOTEXTILE, NMDOT CLASS 3, CIP	SF	4,500.0	$1.00	$4,500.00	
B.19	REINFORCED CONCRETE SPILLWAY WALL FOOTING & STEM WALL, NOT COLORED, INCL SUBGRADE CIP	CY	110.0	$400.00	$44,000.00	
B.20	COLORED REINFORCED CONCRETE SPILLWAY WALL W/ SPECIAL FINISH	CY	115.0	$600.00	$69,000.00	
B.21	PNM GASLINE CROSSING	LS	1.0	$5,000.00	$5,000.00	
B.22	POND OUTLET, CIP INCL. ORIFICE.	EA	1.0	$10,000.00	$10,000.00	
B.23	24" DUCTILE IRON STORM DRAIN IN TRENCH	LF	175.0	$90.00	$15,750.00	
B.24	SELECT MATERIAL BACKFILL AT POND OUTLET PIPE INCL. PREPARATION, INSTALLATION AND COMPACTION, CIP	CY	100.0	$45.00	$4,500.00	
B.25	REINFORCED CONCRETE CUTOFF COLLAR, CIP	EA	1.0	$10,000.00	$10,000.00	
B.26	WYOMING BENTONITE BLANKET, CIP, 1/4" THICK	SF	130.0	$20.00	$2,600.00	
B.27	24" RCP CL III STORM DRAIN IN TRENCH	LF	20.0	$50.00	$1,000.00	
B.28	36" RCP CL III STORM DRAIN IN TRENCH	LF	736.0	$65.00	$47,840.00	
B.29	36" RCP CL III 45 DEGREE BEND	EA	1.0	$1,000.00	$1,000.00	

BIDDER'S COMPANY NAME: _____

ITEM NUMBER	ITEM DESCRIPTION	UNIT TYPE	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT
B30	36" RCP END SECTION	EA	1.0	$1,500.00	$1,500.00
B.31	24" RCP CL III SUBOUT W/ PLUG	EA	3.0	$2,000.00	$6,000.00
B.32	6' DIA MANHOLE, CIP	EA	3.0	$7,500.00	$22,500.00
B.33	8' DIA MANHOLE, CIP	EA	1.0	$9,000.00	$9,000.00
B.34	TRENCH & BACKFILL, 18" TO 36" PIPE, LESS THAN 8' DEPTH	LF	305.0	$20.00	$6,100.00
B.35	TRENCH & BACKFILL, 18" TO 36" PIPE, 8' TO 12' DEPTH	LF	215.0	$25.00	$5,375.00
B.36	TRENCH & BACKFILL, 18" TO 36" PIPE, 12' TO 16' DEPTH	LF	115.0	$35.00	$4,025.00
B.37	RESIDENTIAL ASPHALT PAVING, REMOVE & REPLACE, CIP	SY	610.0	$30.00	$18,300.00
B.38	FILTER AGGREGATE FOR RIPRAP, CIP	SY	110.0	$30.00	$3,300.00
B.39	WIRE ENCLOSED TYPE VL RIPRAP, CIP	CY	36.0	$150.00	$5,400.00
B.40	12' SQUARE TUBE DRAINAGE GATE, CIP	EA	4.0	$1,500.00	$6,000.00
B.41	5 STRAND BARBLESS WIRE WOOD POST FENCE, CIP	LF	2,820.0	$5.00	$14,100.00
B.42	8"X8" WOODEN LANDSCAPE BOLLARDS	EA	12.0	$500.00	$6,000.00
B.43	NATIVE GRASS SEEDING	AC	6.0	$2,500.00	$15,000.00
B.44	"SANTA FE BROWN" GRAVEL MULCH	AC	6.0	$10,000.00	$60,000.00
SPBB	**LOT 'B' SUNSET POND TOTAL BASE BID, ITEMS B.1 - B.44**				$834,902.50

ENGINEER'S OPINION OF
PROBABLE COST 1/10/08

BIDDER'S COMPANY NAME: _____

ITEM NUMBER	ITEM DESCRIPTION	UNIT TYPE	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT

Excavation Bid Data from recent projects.
Lowest three unit prices

Project	Yardage		Lowest three unit prices $/CY		Average
Dam No. 1 (exc & embankment)	2,300	$4.50	$8.00	$8.00	$6.83
Sediment Ph 1 Northern Sed.	13,000	$2.70	$3.47	$4.05	$3.41
Sediment Ph 1 Lomitas Negras	49,000	$3.47	$3.47	$4.05	$3.66
Sediment Ph 2 Venada Channel	46,000	$4.80	---	---	$4.80
Sediment Ph 2 Enchanted Hills Dams	52,000	$3.20	---	---	$3.20
Sediment Ph 3 Alt 'A' Exc. (haul to waste)	73,000	$3.35	$4.50	$6.60	$4.82
Averages for haul to waste		$3.67	$4.86	$5.68	$4.45
Sediment Ph 3 Alt 'X' Exc. (haul to landfill)	73,000	$3.35	$4.50	$5.15	$4.33
Sediment Ph 3 Haul to landfill $/CYMI		$0.13	$1.35	$2.50	$1.33

ENGINEER'S OPINION OF
PROBABLE COST 1/10/08

BIDDER'S COMPANY NAME: _____

ITEM NUMBER	ITEM DESCRIPTION	UNIT TYPE	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT	
	LOT 'B' ALTERNATE 'K'					
	DELIVER EXCESS EXCAVATION TO SSCAFCA PROVIDED OFF-SITE LOCATION					
	INCORPORATE THE FOLLOWING BID ITEMS. USE THE SAME UNIT PRICE FOR ITEM B.7K.1 AS ITEM B.7 IN THE BASE BID. UNIT PRICES FOR ITEMS B.7.B -					
B.7K.1	UNCLASSIFIED EXCAVATION, DISPOSE OF EXCESS OFF-SITE TO CONTRACTOR PROVIDED SITE, STOCKPILE, PLACE AND COMPACT ON-SITE EMBANKMENT.	CY	-60,000.0	$3.80	-$228,000.00	
B.7K.2	UNCLASSIFIED EXCAVATION, DISPOSE OF EXCESS OFF-SITE TO SSCAFCA PROVIDED SITE AS DIRECTED. STOCKPILE MANAGEMENT REQUIRED. COMPACTION NOT REQUIRED.	CY	55,000.0	$4.50	$247,500.00	$247,500.00
B.7K.4	HAUL TO SSCAFCA PROVIDED STOCKPILE LOCATION WITHIN 6 MILE RADIUS OF SITE, COMPACTION NOT REQUIRED.	CY-MI	330,000.0	$1.35	$445,500.00	$74,250.00
BKST	**LOT 'B' ALTERNATE 'K' SUBTOTAL, BID ITEMS B.7K.1 -**				$465,000.00	
SPBB	LOT 'B' SUNSET POND BASE BID, ITEMS B.1 - B.44, TRANSFER AMOUNT FROM ITEM SPBB ABOVE				$834,902.50	
SPTK	**LOT 'B' SUNSET POND TOTAL BID W/ ALTERNATE 'K' , ITEM BKST + SPBB**				$1,299,902.50	
	Load/Haul dirt only - separate contract 1 mile haul.					$356,250.00

BOCA NEGRA DETENTION DAM PROJECT

BID TABULATION

5/31/2013

ITEM NO.	ITEM DESCRIPTION	UNIT	QTY	ENGINEERS ESTIMATE		SALLS BROTHERS		RMCI		STAR PAVING		AUI		MERIDIAN		MOUNTAIN STATES CONSTRUCTION	
				PRICE	AMOUNT	PRICE	AMOUNT	PRICE	AMOUNT	PRICE	AMOUNT	PRICE	AMOUNT	PRICE	AMOUNT	PRICE	AMOUNT
	BID LOT #I - DAM BID LOT																
1	CLEARING AND GRUBBING	AC	19	800.00	15,200.00	300.97	5,718.43	750.00	14,250.00	850.00	16,150.00	830.00	15,770.00	2,000.00	38,000.00	900.00	17,100.00
2	UNCLASSIFIED EXCAVATION	CY	128,506	3.80	488,322.80	1.85	237,736.10	2.90	372,667.40	3.50	449,771.00	3.40	436,920.40	2.10	269,862.60	2.55	327,690.30
3	FOUNDATION TREATMENT	SY	20,100	5.50	110,550.00	2.91	58,491.00	5.50	110,550.00	6.00	120,600.00	6.60	132,660.00	4.00	80,400.00	3.75	75,375.00
4	EXPORT OF EXCESS MATERIAL	CY	35,000	5.00	175,000.00	2.00	70,000.00	4.75	166,250.00	5.50	192,500.00	5.30	185,500.00	7.00	245,000.00	4.40	154,000.00
5	OVEREXCAVATE AND RECOMPACT UPSTREAM TOE OF	SY	18,000	1.50	27,000.00	3.90	70,200.00	2.50	45,000.00	3.50	63,000.00	2.80	50,400.00	4.00	72,000.00	2.50	45,000.00
6	ROCK EXCAVATION- SURFACE	CY	3,000	45.00	135,000.00	83.17	249,510.00	23.00	69,000.00	26.50	79,500.00	37.00	111,000.00	39.00	117,000.00	31.00	93,000.00
7	PORTLAND CEMENT FOR SOIL CEMENT	TON	1,340	175.00	234,500.00	160.00	214,400.00	140.00	187,600.00	137.00	183,580.00	135.00	180,900.00	130.00	174,200.00	125.00	167,500.00
8	SOIL CEMENT PLACEMENT	CY	6,290	55.00	345,950.00	42.90	269,841.00	55.00	345,950.00	80.00	503,200.00	79.00	496,910.00	60.00	377,400.00	78.00	490,620.00
9	REM & DISPOSE WATERLINE, ALL SIZES	LF	2,205	8.00	17,640.00	4.45	9,812.25	4.60	10,143.00	7.00	15,435.00	4.00	8,820.00	13.00	28,665.00	6.00	13,230.00
10	PCC CONCRETE CLASS A, INCL. REINFORCING, SLOPE	CY	20	600.00	12,000.00	373.91	7,478.20	490.00	9,800.00	450.00	9,000.00	487.00	9,740.00	545.00	10,900.00	625.00	12,500.00
11	PCC CONCRETE CLASS A, INCL. REINFORCING, CONC.	CY	10	600.00	6,000.00	348.75	3,487.50	775.00	7,750.00	1,000.00	10,000.00	599.00	5,990.00	290.00	2,900.00	750.00	7,500.00
12	6" THICK PCC CONCRETE INCL. REIN., CUT OFF WALLS	CY	2	600.00	1,200.00	452.15	904.30	520.00	1,040.00	750.00	1,500.00	1,759.00	3,518.00	349.00	698.00	2,500.00	5,000.00
13	6" PCC W/ 6X6X6 WELDED WIRE MESH	SY	84	75.00	6,300.00	88.19	7,407.96	85.00	7,140.00	66.00	5,544.00	86.00	7,224.00	92.00	7,728.00	110.00	9,240.00
14	4" THICK PCC SHOTCRETE INCL. REINFORCING, TINTED	SY	100	6.50	650.00	68.34	6,834.00	82.00	8,200.00	122.00	12,200.00	73.00	7,300.00	60.00	6,000.00	100.00	10,000.00
15	NOT USED																
16	PRINCIPAL SPILLWAY PORTED RISER STRUCTURE	EA	1	30,000.00	30,000.00	39,518.85	39,518.85	40,000.00	40,000.00	34,000.00	34,000.00	46,514.00	46,514.00	57,000.00	57,000.00	61,000.00	61,000.00
17	SECONDARY SPILLWAY PORTED RISER STRUCTURE	EA	1	25,000.00	25,000.00	32,703.79	32,703.79	34,000.00	34,000.00	31,000.00	31,000.00	39,754.00	39,754.00	51,000.00	51,000.00	54,000.00	54,000.00
18	RISER DEPTH MARKER	SF	24	25.00	600.00	108.99	2,615.76	60.00	1,440.00	91.00	2,184.00	57.00	1,368.00	160.00	3,840.00	70.00	1,680.00
19	4'x4' CBC WITH BATTERED SIDES	LF	288	350.00	100,800.00	467.74	134,709.12	595.00	171,360.00	300.00	86,400.00	569.00	163,872.00	550.00	158,400.00	675.00	194,400.00
20	8'x8' CBC WITH BATTERED SIDES	LF	201	985.00	197,985.00	1,373.01	275,975.01	1,160.00	233,160.00	765.00	153,765.00	817.00	164,217.00	1,100.00	221,100.00	950.00	190,950.00
21	JUNCTION BOX, 4'X4' CBC TO 48" RCP	LS	1	25,000.00	25,000.00	27,615.37	27,615.37	32,000.00	32,000.00	12,000.00	12,000.00	17,984.00	17,984.00	21,000.00	21,000.00	28,000.00	28,000.00
22	4' DIA. PILL BOX INLET	EA	1	3,500.00	3,500.00	3,829.27	3,829.27	1,400.00	1,400.00	4,500.00	4,500.00	3,224.00	3,224.00	1,400.00	1,400.00	4,000.00	4,000.00
23	8" SUBGRADE PREPARATION	SY	9,920	1.00	9,920.00	1.14	11,308.80	1.00	9,920.00	1.20	11,904.00	1.20	11,904.00	2.00	19,840.00	1.40	13,888.00
24	NOT USED																
25	6" THICK AGGREGATE BASE COURSE	SY	9,920	7.50	74,400.00	5.00	49,600.00	7.10	70,432.00	6.00	59,520.00	6.50	64,480.00	10.00	99,200.00	6.00	59,520.00
26	4" SP III PAVING	SY	2,281	21.00	47,901.00	21.24	48,448.44	21.50	49,041.50	20.75	47,330.75	21.00	47,901.00	20.00	45,620.00	22.00	50,182.00
27	3" SP IV PAVING	SY	5,000	19.00	95,000.00	17.50	87,500.00	18.60	93,000.00	15.50	77,500.00	16.00	80,000.00	17.00	85,000.00	16.00	80,000.00
28	PRIME COAT	SY	7,281	0.75	5,460.75	0.40	2,912.40	0.50	3,640.50	0.50	3,640.50	1.10	8,009.10	0.60	4,368.60	1.00	7,281.00
29	TACK COAT	SY	2,281	0.50	1,140.50	0.33	752.73	0.30	684.30	0.30	684.30	0.37	843.97	0.30	684.30	0.25	570.25
30	4 STRAND SMOOTH WIRE FENCE	LF	3,640	7.00	25,480.00	4.26	15,506.40	3.70	13,468.00	4.20	15,288.00	3.80	13,832.00	5.00	18,200.00	4.00	14,560.00
31	PIPE GATE	EA	6	1,500.00	9,000.00	1,449.45	8,696.70	1,260.00	7,560.00	1,050.00	6,300.00	1,272.00	7,632.00	1,700.00	10,200.00	1,000.00	6,000.00
32	PEDESTRIAN WALK GAP	EA	3	1,200.00	3,600.00	788.30	2,364.90	700.00	2,100.00	790.00	2,370.00	693.00	2,079.00	1,600.00	4,800.00	750.00	2,250.00
33	RIP RAP CLASS C	CY	1,400	60.00	84,000.00	53.55	74,970.00	28.00	39,200.00	135.00	189,000.00	34.00	47,600.00	46.00	64,400.00	63.00	88,200.00
34	RIP RAP CLASS D	CY	2,400	95.00	228,000.00	54.44	130,656.00	28.00	67,200.00	135.00	324,000.00	34.00	81,600.00	42.00	100,800.00	65.00	156,000.00
35	3' DIA. BOULDER FEATURES	EA	24	95.00	2,280.00	82.47	1,979.28	75.00	1,800.00	449.82	10,795.68	83.00	1,992.00	245.00	5,880.00	100.00	2,400.00
36	REMOVABLE BOLLARDS	EA	9	600.00	5,400.00	344.83	3,103.47	400.00	3,600.00	400.00	3,600.00	800.00	7,200.00	500.00	4,500.00	600.00	5,400.00
37	MONUMENTS	EA	5	500.00	2,500.00	277.65	1,388.25	370.00	1,850.00	350.00	1,750.00	819.00	4,095.00	600.00	3,000.00	400.00	2,000.00
38	SEEDING TYPE "A" W/STRAW MULCH	AC	1	1,500.00	1,500.00	1,238.39	1,238.39	925.00	925.00	950.00	950.00	933.00	933.00	840.00	840.00	1,000.00	1,000.00
39	SEEDING TYPE "B" W/STRAW MULCH	AC	10	1,500.00	15,000.00	1,238.39	12,383.90	925.00	9,250.00	950.00	9,500.00	922.00	9,220.00	840.00	8,400.00	1,000.00	10,000.00
40	SEEDING TYPE "C" W/GRAVEL MULCH	AC	2	14,500.00	29,000.00	6,558.60	13,117.20	12,750.00	25,500.00	12,750.00	25,500.00	12,724.00	25,448.00	11,400.00	22,800.00	12,000.00	24,000.00
41	SEEDING TYPE "D" W/GRAVEL MULCH	AC	7	14,500.00	101,500.00	6,614.53	46,301.71	12,750.00	89,250.00	12,750.00	89,250.00	12,724.00	89,068.00	11,400.00	79,800.00	12,000.00	84,000.00
42	CARSONITE GAS LINE MARKERS	EA	12	200.00	2,400.00	366.18	4,394.16	75.00	900.00	175.00	2,100.00	109.00	1,308.00	110.00	1,320.00	100.00	1,200.00
	BID LOT #I SUB TOTAL				2,701,680.05		2,245,410.64		2,358,021.70		2,866,812.23		2,594,730.47		2,524,146.50		2,570,236.55
	BID LOT #II - TRAIL/OUTLET BID LOT																
43	12" SUBGRADE PREP (TRAIL)	SY	700	1.25	875.00	1.27	889.00	1.00	700.00	1.20	840.00	3.90	2,730.00	2.00	1,400.00	1.40	980.00
44	3" AC SP IV (TRAIL)	SY	700	19.00	13,300.00	17.66	12,362.00	18.60	13,020.00	15.75	11,025.00	19.00	13,300.00	18.00	12,600.00	16.00	11,200.00
45	3' DIA. BOULDER FEATURES	EA	18	95.00	1,710.00	82.50	1,485.00	96.00	1,728.00	450.00	8,100.00	83.00	1,494.00	200.00	3,600.00	100.00	1,800.00
46	4" SOLID PREFORMED PLAST. STRIPE (ANY COLOR)	LF	9950	1.00	9,950.00	0.83	8,258.50	0.75	7,462.50	1.12	11,144.00	0.73	7,263.50	1.00	9,950.00	1.05	10,447.50
47	4" DASHED PREFORMED PLAST. STRIPE (ANY COLOR)	LF	3800	1.00	3,800.00	0.83	3,154.00	0.75	2,850.00	0.36	1,368.00	0.73	2,774.00	1.00	3,800.00	0.35	1,330.00
48	PREFORMED PLASTIC SYMBOL- ARROW	EA	2	150.00	300.00	158.93	317.86	145.00	290.00	168.00	336.00	139.00	278.00	150.00	300.00	200.00	400.00
49	PREFORMED PLASTIC SYMBOL - BIKE & SLOW	EA	2	150.00	300.00	540.37	1,080.74	490.00	980.00	450.00	900.00	474.00	948.00	500.00	1,000.00	500.00	1,000.00
50	BENCHES	EA	2	500.00	1,000.00	3,211.56	6,423.12	1,600.00	3,200.00	1,600.00	3,200.00	3,358.00	6,716.00	1,700.00	3,400.00	2,000.00	4,000.00
51	ALUMINUM PANEL SIGN	SF	15	22.00	330.00	23.84	357.60	20.00	300.00	22.40	336.00	21.00	315.00	19.00	285.00	30.00	450.00
52	SQUARE TUBE STEEL POSTS & BASE FOR ALUMINUM PANEL SIGN	LF	20	10.00	200.00	11.13	222.60	10.00	200.00	11.00	220.00	10.00	200.00	10.00	200.00	15.00	300.00
	BID LOT #II SUB TOTAL				31,765.00		34,550.42		30,730.50		37,469.00		36,018.50		36,535.00		31,907.50
	BID LOT #III - GENERAL BID LOT																
53	MOBILIZATION	LS	1	90,000.00	90,000.00	150,000.00	150,000.00	330,000.00	330,000.00	260,000.00	260,000.00	400,000.00	400,000.00	419,363.50	419,363.50	370,000.00	370,000.00
54	PRECONSTRUCTION VIDEO OF SITE	LS	1	2,500.00	2,500.00	1,523.70	1,523.70	600.00	600.00	1,350.00	1,350.00	1,672.00	1,672.00	4,000.00	4,000.00	2,000.00	2,000.00
55	RESIDENTIAL PRECONSTRUCTION SURVEYS	EA	20	250.00	5,000.00	442.64	8,852.80	750.00	15,000.00	560.00	11,200.00	708.00	14,160.00	600.00	12,000.00	400.00	8,000.00
56	PROJECT SIGN	EA	2	500.00	1,000.00	781.94	1,563.88	650.00	1,300.00	400.00	800.00	687.00	1,374.00	700.00	1,400.00	450.00	900.00
57	CONSTRUCTION STAKING, COMPL.	LS	1	60,000.00	60,000.00	70,056.00	70,056.00	25,000.00	25,000.00	67,000.00	67,000.00	31,038.00	31,038.00	50,500.00	50,500.00	63,000.00	63,000.00
58	NPDES (EPA) STORM WATER PERMITTING/SWPPP	LS	1	3,500.00	3,500.00	6,764.10	6,764.10	2,000.00	2,000.00	10,000.00	10,000.00	6,814.00	6,814.00	7,000.00	7,000.00	18,000.00	18,000.00
59	PROTECTION OF PROJECT FROM WATER DURING CONSTRUCTION	LS	1	5,000.00	5,000.00	4,312.41	4,312.41	2,000.00	2,000.00	10,000.00	10,000.00	10,232.00	10,232.00	40,000.00	40,000.00	12,300.00	12,300.00
60	CONSTRUCTION TRAFFIC CONTROL & BARRICADING	LS	1	12,000.00	12,000.00	12,280.73	12,280.73	2,000.00	2,000.00	8,000.00	8,000.00	3,683.00	3,683.00	5,000.00	5,000.00	8,000.00	8,000.00
61	UTILITY ALLOWANCE	ALLOW	1	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00
	BID LOT #III SUB TOTAL				189,000.00		265,353.62		387,900.00		378,350.00		478,973.00		549,263.50		492,200.00

BOCA NEGRA DAM

PROVIDED BY AMAFCA

5-31-13

1 OF 2

	BID LOT #IV - ATRISCO SDSWATERLINE BID LOT	UNIT	QTY	PRICE	AMOUNT	PRICE	AMOUNT	PRICE	AMOUNT	PRICE	AMOUNT	PRICE	AMOUNT	PRICE	AMOUNT	PRICE	AMOUNT
62	REMOVE AC PAVEMENT, ANY THICKNESS	SY	8200	6.00	49,200.00	4.26	34,932.00	3.45	28,290.00	5.00	41,000.00	3.40	27,880.00	1.20	9,840.00	1.30	10,660.00
63	12" SUBGRADE PREP (ATRISCO MAINTENANCE RD)	SY	6620	1.25	8,275.00	1.24	8,208.80	1.00	6,620.00	1.20	7,944.00	1.30	8,606.00	2.00	13,240.00	1.40	9,268.00
64	6" THICK GRAVEL BASE COURSE (ATRISCO MAINTENANCE RD)	SY	5200	7.50	39,000.00	5.00	26,000.00	7.10	36,920.00	6.00	31,200.00	6.50	33,800.00	10.00	52,000.00	6.00	31,200.00
65	18" RCP CLASS III	LF	320	24.00	7,680.00	26.28	8,409.60	17.00	5,440.00	21.00	6,720.00	17.00	5,440.00	18.00	5,760.00	20.00	6,400.00
66	54" RCP CLASS III	LF	918	95.00	87,210.00	128.92	118,348.56	105.00	96,390.00	121.00	111,078.00	109.00	100,062.00	129.00	118,422.00	120.00	110,160.00
67	60" RCP CLASS III	LF	1480	145.00	214,600.00	165.30	244,644.00	135.00	199,800.00	153.00	226,440.00	142.00	210,160.00	165.00	244,200.00	160.00	236,800.00
68	66" RCP CLASS III	LF	189	175.00	33,075.00	197.63	37,352.07	165.00	31,185.00	181.00	34,209.00	166.00	31,374.00	196.00	37,044.00	190.00	35,910.00
69	96" RCP CLASS III	LF	48	280.00	13,440.00	492.59	23,644.32	375.00	18,000.00	400.00	19,200.00	430.00	20,640.00	512.00	24,576.00	500.00	24,000.00
70	18" RCP FLARED END SECTION	EA	3	600.00	1,800.00	539.20	1,617.60	555.00	1,665.00	455.00	1,365.00	617.00	1,851.00	667.00	2,001.00	750.00	2,250.00
71	TRENCH, BACKFILL & COMPACT 18-36", 8-12' DEEP	LF	320	25.00	8,000.00	13.05	4,176.00	25.00	8,000.00	25.00	8,000.00	47.00	15,040.00	56.00	17,920.00	58.00	18,560.00
72	TRENCH, BACKFILL & COMPACT 42-66", 0-8' DEEP	LF	957	25.00	23,925.00	13.14	12,574.98	34.00	32,538.00	19.00	18,183.00	43.00	41,151.00	60.00	57,420.00	53.00	50,721.00
73	TRENCH, BACKFILL & COMPACT 42-66", 8-12' DEEP	LF	1000	55.00	55,000.00	13.98	13,980.00	34.00	34,000.00	23.00	23,000.00	53.00	53,000.00	60.00	60,000.00	65.00	65,000.00
74	TRENCH, BACKFILL & COMPACT 42-66", 12-16' DEEP	LF	150	80.00	12,000.00	17.16	2,574.00	36.00	5,400.00	36.00	5,400.00	88.00	13,200.00	80.00	12,000.00	106.00	15,900.00
75	TRENCH, BACKFILL & COMPACT 42-66", 16-20' DEEP	LF	130	125.00	16,250.00	25.38	3,299.40	66.00	8,580.00	46.00	5,980.00	101.00	13,130.00	80.00	10,400.00	125.00	16,250.00
76	TRENCH, BACKFILL & COMPACT 42-66", > 20' DEEP	LF	350	150.00	52,500.00	29.14	10,199.00	67.00	23,450.00	53.00	18,550.00	123.00	43,050.00	78.00	27,300.00	150.00	52,500.00
77	TRENCH, BACKFILL AND COMPACT 96", ANY DEPTH	LF	48	190.00	9,120.00	13.98	671.04	130.00	6,240.00	62.00	2,976.00	55.00	2,640.00	221.00	10,608.00	80.00	3,840.00
78	ROCK EXCAVATION - TRENCHING	CY	4200	50.00	210,000.00	41.22	173,124.00	58.00	243,600.00	18.00	75,600.00	43.00	180,600.00	27.00	113,400.00	48.00	201,600.00
79	8' DIA MH TYPE C OR E 6-10' DEEP	EA	6	7,500.00	45,000.00	7,711.54	46,269.24	9,900.00	59,400.00	6,100.00	36,600.00	7,962.00	47,772.00	10,000.00	60,000.00	10,000.00	60,000.00
80	8' DIA MH TYPE C OR E 10-14' DEEP	EA	2	8,500.00	17,000.00	8,634.11	17,268.22	11,000.00	22,000.00	7,600.00	15,200.00	6,858.00	13,716.00	13,000.00	26,000.00	12,000.00	24,000.00
81	8' DIA MH TYPE C OR E 14-18' DEEP	EA	1	9,500.00	9,500.00	10,382.98	10,382.98	13,000.00	13,000.00	9,200.00	9,200.00	8,919.00	8,919.00	14,000.00	14,000.00	15,000.00	15,000.00
82	8' DIA MH TYPE C OR E > 18' DEEP	EA	1	15,000.00	15,000.00	13,625.17	13,625.17	17,800.00	17,800.00	10,750.00	10,750.00	11,851.00	11,851.00	20,000.00	20,000.00	13,000.00	13,000.00
83	TEE MH, 96", 10-14' DEEP	EA	1	8,500.00	8,500.00	10,420.26	10,420.26	14,000.00	14,000.00	9,200.00	9,200.00	6,807.00	6,807.00	9,000.00	9,000.00	8,000.00	8,000.00
84	84" RING CHAMBER COMPLETE	LS	1	14,500.00	14,500.00	25,614.74	25,614.74	21,000.00	21,000.00	18,000.00	18,000.00	21,363.00	21,363.00	34,000.00	34,000.00	22,000.00	22,000.00
85	16" WL PIPE, ANY DEPTH	LF	1320	98.00	129,360.00	59.75	78,870.00	60.00	79,200.00	65.00	85,800.00	62.00	81,840.00	85.00	112,200.00	70.00	92,400.00
86	16" NON-PRESS CONNECTION	EA	3	1,500.00	4,500.00	4,945.31	14,835.93	4,100.00	12,300.00	2,900.00	8,700.00	1,202.00	3,606.00	1,274.00	3,822.00	1,500.00	4,500.00
87	12" WL PIPE, ANY DEPTH	LF	640	45.00	28,800.00	30.01	19,206.40	32.00	20,480.00	37.50	24,000.00	36.00	23,040.00	50.00	32,000.00	43.00	27,520.00
88	12" NON-PRESS CONNECTION	EA	1	1500.00	1,500.00	1,638.10	1,638.10	3,800.00	3,800.00	1,400.00	1,400.00	1,202.00	1,202.00	1,500.00	1,500.00	1,500.00	1,500.00
89	DI FITTING 4-14"	LB	3000	3.00	9,000.00	0.98	2,940.00	1.00	3,000.00	0.85	2,550.00	2.00	6,000.00	1.00	3,000.00	2.50	7,500.00
90	DI FITTING 16-36"	LB	5700	4.00	22,800.00	2.12	12,084.00	1.50	8,550.00	0.95	5,415.00	2.41	13,737.00	1.60	9,120.00	3.00	17,100.00
91	JOINT RESTRAINTS @ BELL	EA	100	175.00	17,500.00	303.14	30,314.00	250.00	25,000.00	325.00	32,500.00	272.00	27,200.00	150.00	15,000.00	280.00	28,000.00
92	JOINT RESTRAINTS @ FITTING	EA	30	175.00	5,250.00	174.18	5,225.40	175.00	5,250.00	220.00	6,600.00	184.00	5,520.00	200.00	6,000.00	215.00	6,450.00
93	2" AIR/VAC RELEASE W/BOX AND APPURTENANCES	EA	1	4000.00	4,000.00	7,732.28	7,732.28	5,000.00	5,000.00	3,500.00	3,500.00	4,792.00	4,792.00	9,000.00	9,000.00	5,500.00	5,500.00
94	WELL WASH OUTLET, CIP	LS	1	5,000.00	5,000.00	9,025.43	9,025.43	8,500.00	8,500.00	9,100.00	9,100.00	10,511.00	10,511.00	11,000.00	11,000.00	13,000.00	13,000.00
	BID LOT #IV SUB TOTAL				1,178,285.00		1,029,207.52		1,104,398.00		915,360.00		1,089,500.00		1,181,773.00		1,236,489.00
	TOTAL				4,100,730.05		3,574,522.20		3,881,050.20		4,197,991.23		4,199,221.97		4,291,716.00		4,330,833.05
	Engineer Estimate as Read				$ 4,101,280.05												
	BID TAB DISCREPANCY																

I, Christopher Perea, P.E. do hereby certify that this bid tabulation was prepared under my supervision and I am a duly registered professional engineer under the laws of the State of New Mexico.

WILSON & COMPANY

La Presa

LA PRESSA DAM

BID TABULATION — PROVIDED BY AMAFCA

5-31-13

ITEM NO.	ITEM DESCRIPTION	UNIT	QTY	ENGINEERS ESTIMATE PRICE	ENGINEERS ESTIMATE AMOUNT	SALLS BROTHERS PRICE	SALLS BROTHERS AMOUNT	RMCI PRICE	RMCI AMOUNT	STAR PAVING PRICE	STAR PAVING AMOUNT	AJAC ENTERPRISES PRICE	AJAC ENTERPRISES AMOUNT	MERIDIAN PRICE	MERIDIAN AMOUNT
1	MOBILIZATION	LS	1	XXXXX	50,000.00	60,539.41	60,539.41	104,000.00	104,000.00	330,000.00	330,000.00	83,000.00	83,000.00	134,000.00	134,000.00
2	CONSTRUCTION STAKING (NOT MULTI-USE TRAIL)	LS	1	XXXXX	10,000.00	29,400.86	29,400.86	15,000.00	15,000.00	21,600.00	21,600.00	45,000.00	45,000.00	20,000.00	20,000.00
3	NPDES PERMIT	LS	1	XXXXX	5,000.00	1,577.45	1,577.45	2,000.00	2,000.00	3,200.00	3,200.00	11,000.00	11,000.00	22,000.00	22,000.00
4	PROTECTION OF PROJECT FROM WATER DURING	LS	1	XXXXX	10,000.00	6,688.00	6,688.00	1,000.00	1,000.00	5,000.00	5,000.00	80,000.00	80,000.00	24,000.00	24,000.00
5	CONSTRUCTION TRAFFIC CONTROL & BARRICADING	LS	1	XXXXX	10,000.00	13,072.00	13,072.00	3,000.00	3,000.00	11,000.00	11,000.00	40,000.00	40,000.00	26,000.00	26,000.00
6	PRE-CONSTRUCTION VIDEO OF THE SITE, COMPL.	LS	1	XXXXX	5,000.00	1,268.66	1,268.66	4,000.00	4,000.00	2,100.00	2,100.00	3,500.00	3,500.00	1,800.00	1,800.00
7	RESIDENTIAL PRE-CONSTRUCTION SURVEYS, COMPL.	EA	73	400.00	29,200.00	305.80	22,323.24	600.00	43,800.00	500.00	36,500.00	300.00	21,900.00	500.00	36,500.00
8	CONSTRUCTION PROJECT SIGN	EA	2	700.00	1,400.00	719.42	1,438.84	800.00	1,600.00	690.00	1,380.00	1,000.00	2,000.00	691.00	1,382.00
9	UTILITY ALLOWANCE	AL	1	XXXXX	10,000.00	10,600.00	10,600.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00
10	REMOVE EXISTING PLACED RIP RAP AND SALVAGE FOR	CY	1,165	70.00	81,550.00	37.31	43,486.15	12.00	13,980.00	0.10	116.50	12.00	13,980.00	20.00	23,300.00
11	REMOVAL & DISPOSAL OF GROUTED BOULDERS	CY	876	50.00	43,800.00	46.96	41,134.00	15.00	12,825.00	2.15	1,883.40	16.00	10,128.00	[illegible]	40,000.00
12	REM & DISPOSE EXISTING CBC'S, CIP	CY	265	80.00	21,200.00	93.63	24,827.95	110.00	29,150.00	90.00	23,850.00	30.00	7,950.00	55.00	14,575.00
13	CLEARING AND GRUBBING	AC	26	1,000.00	26,000.00	100.00	2,600.00	480.00	12,480.00	875.00	22,750.00	1,200.00	31,200.00	2,000.00	52,000.00
14	UNCLASSIFIED EXCAVATION (INCLUDES STOCKPILING AND	CY	128,510	2.00	257,020.00	1.60	205,476.50	3.60	462,636.00	4.00	514,040.00	4.50	578,295.00	6.60	848,166.00
15	FOUNDATION TREATMENT	SY	20,100	2.50	50,250.00	3.35	67,335.00	5.70	114,570.00	5.75	115,575.00	5.50	110,550.00	4.00	80,400.00
16	PRINCIPAL SPILLWAY PORTED RISER STRUCTURE	EA	1	30,000.00	30,000.00	40,747.37	40,747.37	30,000.00	30,000.00	26,500.00	26,500.00	52,000.00	52,000.00	41,000.00	41,000.00
17	LOW FLOW PORTED RISER STRUCTURE COMPLETE	EA	1	15,000.00	15,000.00	20,452.31	20,452.31	7,500.00	7,500.00	7,000.00	7,000.00	30,000.00	30,000.00	10,000.00	10,000.00
18	36" RCP PENETRATION INTO 8'x4' CBC, CIP	EA	1	10,000.00	10,000.00	7,581.02	7,581.02	2,500.00	2,500.00	3,400.00	3,400.00	12,000.00	12,000.00	11,000.00	11,000.00
19	12" SUBGRADE PREPARATION	SY	40,000	1.75	70,000.00	1.57	62,800.00	1.10	44,000.00	1.00	40,000.00	2.00	80,000.00	2.00	80,000.00
20	8" BASALT BASE COURSE	SY	8,500	9.00	76,500.00	4.80	40,800.00	19.00	161,500.00	6.00	51,000.00	10.00	85,000.00	9.00	76,500.00
21	3" ASPHALT, RESIDENTIAL TYPE "C"	SY	400	[illegible]	8,400.00	19.15	15,320.00	19.00	15,200.00	16.50	13,200.00	39.00	31,200.00	15.00	12,000.00
22	6" PCC CONCRETE INCL. REIN, CIP	SY	600	75.00	45,000.00	75.65	45,390.00	99.00	59,400.00	74.00	44,400.00	144.00	86,400.00	76.00	45,600.00
23	18" THICK DUMPED RIP RAP	CY	1,000	45.00	45,000.00	53.67	53,670.00	41.00	41,000.00	80.00	80,000.00	70.00	70,000.00	92.00	92,000.00
24	2' THICK GROUTED BASALT BOULDERS	CY	4,100	65.00	266,500.00	72.81	298,521.00	120.00	492,000.00	160.00	656,000.00	110.00	451,000.00	165.00	676,500.00
25	3' THICK GROUTED BASALT BOULDERS	CY	2,800	95.00	266,000.00	93.27	261,156.00	130.00	364,000.00	193.00	540,400.00	140.00	392,000.00	208.00	582,400.00
26	EXISTING CONCRETE CURB & GUTTER, REMOVE & DISPOSE	LF	20	5.00	100.00	11.92	238.40	9.00	180.00	7.50	150.00	800.00	16,000.00	20.00	400.00
27	6" THICK PCC CONCRETE HEADER CURB, CIP	LF	100	18.00	1,800.00	30.11	3,011.00	15.00	1,400.00	16.00	1,600.00	17.00	1,700.00	24.00	2,400.00
28	DRIVEPAD, 8" THICK INCL. REINFORCEMENT	SY	10	45.00	450.00	40.68	406.80	50.00	500.00	59.00	590.00	100.00	1,000.00	121.00	1,210.00
29	18" RCP CLASS III	LF	40	60.00	2,400.00	24.90	996.00	17.00	680.00	36.00	1,440.00	100.00	4,000.00	19.00	760.00
30	24" RCP CLASS III	LF	388	65.00	25,220.00	34.42	13,354.96	25.00	9,700.00	45.00	17,460.00	67.00	25,996.00	28.00	10,864.00
31	24" CMP, CIP	LF	562	40.00	22,480.00	3.66	2,056.92	18.00	10,116.00	45.00	25,290.00	50.00	28,100.00	20.00	11,240.00
32	30" RCP CLASS III	LF	23	72.00	1,656.00	51.20	1,177.60	39.00	897.00	67.00	1,541.00	180.00	4,140.00	43.00	989.00
33	36" RCP CLASS III	LF	410	86.00	35,260.00	58.87	14,049.70	[illegible]	11,580.00	43.00	17,630.00	40.00	16,400.00	61.00	25,010.00
34	42" RCP CLASS III	LF	62	120.00	7,440.00	93.14	5,774.68	74.00	4,588.00	100.00	6,200.00	130.00	8,060.00	83.00	5,146.00
35	60" RCP CLASS III	LF	30	270.00	8,100.00	178.69	5,360.70	145.00	4,350.00	190.00	5,700.00	250.00	7,500.00	157.00	4,710.00
36	STRUCTURAL CLASS "AA" CONCRETE FOR CBC	CY	155	340.00	52,700.00	527.73	81,798.15	450.00	69,750.00	250.00	38,750.00	660.00	102,300.00	504.00	78,120.00
37	GRADE 60 REINFORCING BARS FOR CBC	LB	23,300	1.15	26,795.00	2.45	57,085.00	1.00	23,300.00	1.00	23,300.00	1.40	32,620.00	1.00	23,300.00
38	TRENCH, BACKFILL & COMPACT 18-36", 0-8' DEEP	LF	1,223	35.00	42,805.00	13.30	16,276.07	25.00	30,575.00	15.00	18,345.00	25.00	30,575.00	32.00	39,136.00
39	TRENCH, BACKFILL & COMPACT 42-60", 0-8' DEEP	LF	93	60.00	5,580.00	13.69	1,273.17	88.00	8,184.00	25.00	2,325.00	54.00	4,998.00	121.00	11,253.00
40	TRENCH FOR 8'x4' CBC	LF	120	30.00	3,600.00	18.98	2,277.60	30.00	3,600.00	25.00	3,000.00	83.00	9,960.00	85.00	10,200.00
41	5' DIA MH TYPE E 0-10' DEEP	EA	5	4,500.00	22,500.00	5,440.95	27,204.75	6,000.00	30,000.00	5,000.00	25,000.00	4,100.00	20,500.00	5,400.00	27,000.00
42	5' DIA MH TYPE E 14-18' DEEP	EA	1	6,500.00	6,500.00	7,885.00	7,885.00	8,950.00	8,950.00	6,000.00	6,000.00	6,000.00	6,000.00	7,700.00	7,700.00
43	FURNISH & INSTALL DOUBLE ENTRANCE SIGN	EA	1	12,000.00	12,000.00	21,593.69	21,593.69	13,000.00	13,000.00	17,500.00	17,500.00	61,000.00	61,000.00	23,000.00	23,000.00
44	REMOVE & DISPOSE EXISTING BARBED WIRE FENCE	LF	1,500	5.00	7,500.00	0.75	1,125.00	0.60	900.00	[illegible]	550.00	0.65	975.00	2.00	3,000.00
45	REMOVE & DISPOSE EXISTING CHAINLINK FENCE	LF	320	12.00	3,840.00	3.96	1,267.20	2.50	800.00	3.30	1,056.00	2.60	832.00	3.00	960.00
46	REMOVE AND RELOCATE EXISTING CHAINLINK FENCE	LF	3,100	5.00	15,500.00	11.05	34,255.00	10.00	31,000.00	9.15	28,365.00	10.00	23,790.00	9.00	27,900.00
47	REMOVE AND RELOCATE EXISTING PIPE GATE	EA	1	500.00	500.00	825.05	825.05	520.00	520.00	680.00	680.00	598.00	598.00	700.00	700.00
48	REMOVE AND SALVAGE EXISTING PIPE RAIL FENCE TO	LF	56	5.00	280.00	11.81	661.36	5.00	280.00	9.75	546.00	5.00	280.00	9.00	504.00
49	4 STRAND SMOOTH WIRE FENCE	LF	365	3.00	1,095.00	8.25	3,011.25	7.00	2,555.00	6.80	2,482.00	7.60	2,774.00	7.00	2,555.00
50	14' PIPE GATE	EA	3	1,500.00	4,500.00	1,485.05	4,455.15	1,300.00	3,900.00	1,225.00	3,675.00	1,300.00	3,900.00	1,200.00	3,600.00
51	PIPE RAIL FENCE	LF	56	65.00	3,640.00	64.00	3,584.00	70.00	3,920.00	51.00	2,856.00	75.00	4,200.00	50.00	2,800.00
52	PEDESTRIAN ACCESS	EA	2	600.00	1,200.00	824.03	1,648.06	1,200.00	2,400.00	780.00	1,520.00	970.00	1,940.00	900.00	1,800.00
53	SEEDING TYPE "A" W/STRAW MULCH	AC	5.28	1,425.00	7,524.00	1,127.52	5,953.33	2,250.00	14,130.00	1,725.00	10,885.80	2,700.00	14,256.00	2,100.00	11,088.00
54	SEEDING TYPE "B" W/STRAW MULCH	AC	6.50	1,500.00	9,750.00	1,081.13	7,027.35	2,100.00	13,650.00	1,625.00	19,882.50	2,500.00	16,250.00	2,000.00	13,000.00
55	SEEDING TYPE "C" W/GRAVEL MULCH	AC	3.00	10,000.00	30,000.00	16,859.98	50,579.94	14,300.00	42,900.00	13,650.00	41,890.00	16,700.00	50,100.00	14,000.00	42,000.00
56	SEEDING TYPE "D" W/GRAVEL MULCH	AC	3.00	15,000.00	30,000.00	16,898.87	50,696.61	14,000.00	42,000.00	13,740.00	41,220.00	16,000.00	48,000.00	13,000.00	39,000.00
57	BAT HOUSE	EA	2	1,000.00	2,000.00	516.32	1,032.64	2,000.00	4,000.00	950.00	1,900.00	1,300.00	2,600.00	1,036.00	2,072.00
58	REM & DISPOSE WATERLINE, ALL SIZES	LF	283	5.00	1,415.00	12.89	3,647.87	12.00	3,396.00	5.00	1,415.00	20.00	5,660.00	9.00	2,547.00
59	12" WL PIPE	LF	324	50.00	16,200.00	30.26	9,804.24	35.00	11,340.00	45.00	14,580.00	22.00	7,128.00	42.00	13,608.00
60	12" NON-PRESS CONNECTION	EA	2	400.00	800.00	841.08	1,682.16	2,000.00	4,000.00	1,040.00	2,080.00	1,300.00	2,600.00	835.00	1,670.00
61	DI FITTING 4-12"	LB	2,760	3.00	8,280.00	1.22	3,367.20	2.00	5,520.00	0.75	2,070.00	7.00	19,320.00	2.00	5,520.00
62	JOINT RESTRAINTS @ BELL	EA	20	100.00	2,000.00	209.86	4,197.20	150.00	3,000.00	205.00	4,100.00	260.00	5,200.00	441.00	8,820.00
63	JOINT RESTRAINTS @ FITTING	EA	20	100.00	2,000.00	142.14	2,842.80	175.00	3,500.00	175.00	3,500.00	265.00	5,300.00	207.00	4,140.00
64	12" GATE VALVE, CIP	EA	2	4,000.00	8,000.00	2,749.49	5,498.98	2,500.00	5,000.00	2,200.00	4,400.00	6,000.00	12,000.00	2,323.00	4,646.00
	SUB TOTAL				1,977,460.00		1,621,866.00		2,696,288.00		2,853,653.65		2,940,194.00		3,226,100.00

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	MULTI-USE TRAIL AND UNSER SIGNALS														
65	3" ASPHALT, RESIDENTIAL TYPE "D"	SY	2,700	8.00	21,600.00	19.15	51,705.00	19.00	51,300.00	19.50	44,550.00	39.00	105,300.00	16.00	43,200.00
66	EXISTING SIDEWALK, REMOVE & DISPOSE	SY	130	7.80	1,014.00	12.25	1,592.50	12.00	1,560.00	9.00	1,170.00	19.50	2,548.00	10.00	1,300.00
67	EXISTING CONCRETE CURB & GUTTER, REMOVE & DISPOSE	LF	160	2.80	448.00	15.14	2,422.40	8.00	1,280.00	8.00	1,280.00	25.00	4,000.00	10.00	1,600.00
68	CONCRETE SIDEWALK, 4" THICK, INCL. WHEELCHAIR RAMPS	SY	130	42.00	5,460.00	39.17	5,092.10	60.00	7,800.00	57.00	7,410.00	40.00	5,200.00	62.00	8,060.00
70	4" SOLID WHITE THERMOPLASTIC PAVEMENT STRIPE	LF	160	20.00	3,200.00	13.65	2,184.00	20.00	3,200.00	18.50	2,960.00	21.00	3,360.00	16.00	2,560.00
71	4" DASHED YELLOW THERMOPLASTIC PAVEMENT STRIPE	LF	5,000	1.00	5,000.00	0.99	4,940.00	0.75	4,500.00	1.75	7,500.00	1.50	9,000.00	1.00	6,000.00
72	12" SOLID WHITE THERMOPLASTIC PAVEMENT STRIPE	LF	3,000	1.00	3,000.00	0.99	2,970.00	0.75	2,250.00	0.95	1,892.00	0.81	3,402.00	1.00	3,000.00
73	ALUMINUM PANEL SIGN	SF	300	2.50	1,490.00	2.53	1,203.00	5.00	3,000.00	3.85	1,838.00	5.00	2,550.00	2.00	1,200.00
74	REMOVABLE BOLLARD	EA	1	20.00	3,000.00	20.77	3,277.00	12.00	1,260.00	22.00	2,200.00	26.00	2,600.00	12.00	1,260.00
75	STATIONARY BOLLARD	EA	3	350.00	350.00	478.73	478.73	700.00	700.00	859.00	859.00	800.00	800.00	700.00	700.00
76	GUARD RAIL, W-BEAM TYPE A42	LF	2315	200.00	600.00	571.13	1,713.39	425.00	1,275.00	410.00	1,230.00	490.00	1,470.00	400.00	1,200.00
77	IMPACT ATTENUATOR	EA	3	30.00	71,250.00	29.77	54,078.75	18.20	43,225.00	17.30	42,037.50	21.00	49,875.00	17.00	40,375.00
78	METAL BARRIER TYPE "A" END ANCHORAGE	EA	1	2,550.00	7,650.00	2,697.59	7,921.27	2,950.00	7,050.00	2,350.00	7,830.00	3,000.00	9,000.00	2,500.00	7,500.00
79	SQUARE TUBE STEEL POSTS & BASE FOR ALUMINUM PANEL	LF	150	3,600.00	2,500.00	824.04	824.04	-1,150.00	1,150.00	1,092.00	1,092.00	1,320.00	1,320.00	1,100.00	1,100.00
80	6' CHAIN LINK FENCE, CIP	LF	200	10.00	1,800.00	10.23	1,634.50	10.00	1,600.00	12.00	1,920.00	14.00	2,240.00	10.00	1,600.00
81	PEDESTRIAN COUNTDOWN SIGNALS	EA	8	35.00	23,000.00	17.23	15,351.60	18.00	14,720.00	14.25	13,110.00	18.00	16,560.00	14.00	12,880.00
82	PEDESTRIAN PUSH BUTTON STATION	EA	6	700.00	4,200.00	888.59	5,311.54	-820.00	3,480.00	993.00	3,390.00	970.00	4,020.00	700.00	4,200.00
83	2" RIGID ELECTRIC CONDUIT	LF	N/A	200.00	1,200.00	308.81	1,900.84	580.00	980.00	155.00	930.00	190.00	1,140.00	175.00	1,050.00
84	5/C CABLE	LF	600	10.00	0.00	0.00	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	0.00
85	10' PEDESTAL W/ FOUNDATION	EA	1	4.00	3,350.00	2.68	2,361.60	1.00	830.00	0.72	600.40	0.80	736.00	1.50	1,230.00
86	INSTALL NEW 3" CONDUIT (PVC) BY DIRECTIONAL BORE	LS	1	750.00	750.00	1,643.46	1,643.46	1,200.00	1,200.00	1,175.00	1,175.00	1,400.00	1,400.00	1,200.00	1,200.00
87	CONSTRUCTION STAKING FOR MULTI-USE TRAIL	LS	1	200000	9,000.00	11,951.58	11,951.58	-8,000.00	8,000.00	5,700.00	5,700.00	10,500.00	10,500.00	9,200.00	9,200.00
88	CONSTRUCTION TRAFFIC CONTROL & BARRICADING FOR	LS	1	100000	3,000.00	3,350.11	3,350.11	-3,000.00	3,000.00	2,700.00	2,700.00	5,000.00	5,000.00	2,800.00	2,800.00
	SUB TOTAL			300000	3,000.00	4,491.74	4,491.74	-2,500.00	2,500.00	9,500.00	9,500.00	14,000.00	14,000.00	15,000.00	15,000.00
	TOTAL				171,232.00		187,695.27		166,820.00-		165,217.50		254,811.00		193,705.00
	Engineer Estimate as Read				2,146,692.00		2,019,361.27		2,769,508.00		3,056,071.45		3,195,605.50		3,369,891.00
	BID TAB DISCREPANCY				$ 2,124,462.00										

I, Christopher Perea, P.E., do hereby certify that this bid tabulation was prepared under my supervision and I am a duly registered professional engineer under the laws of the State of New Mexico.

WILSON &COMPANY

CHRISTOPHER A. PEREA
NEW MEXICO
13669
REGISTERED PROFESSIONAL ENGINEER

3-2-12

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CONTINUATION SHEET

Owner: The Southern Sandoval County Arroyo Flood Control Authority

Contractor: Salls Brothers Construction, Inc.
P.O. Box 66239
Albuquerque, NM 87193-6239

Project: Lomitas Negras Water Quality Facility, Phase 1

Project No. (Contractor): 21021

Application No: Three (3)

Application Date: 7/7/2014

Period To: 6/16/2014

Bid Item	Phase	Description	Estimated Quantity	Unit	Unit Price	Amount	This Period Quantity	This Period Amount	Previous Period Quantity	Previous Period Amount	To Date Quantity	To Date Amount	Change Order Quantity	Change Order Amount	Revised Contract Amount Quantity	Revised Contract Amount Amount	Overruns / Underruns Quantity	Overruns / Underruns Amount
		BASE BID																
201	301	Clear & Grubbing	3.50	AC	$ 556.94	$ 1,949.29		$ -	3.50	$ 1,949.29	3.50	$ 1,949.29			3.50	$ 1,949.29	0.00	$0.00
203.4.2	302	Unclassified Excavation	62,113.00	CY	$ 2.20	$ 136,648.60	1,797.00	$ 3,953.40	60,774.00	$ 133,702.80	62,571.00	$ 137,656.20	458.00	1,007.60	62,571.00	$ 137,656.20	0.00	$0.00
206	303	Subgrade Preparation	5,700.00	SY	$ 5.80	$ 33,060.00	1,957.89	$ 11,355.76	2,697.00	$ 15,642.60	4,654.89	$ 26,998.36	-1,045.11	(6,061.64)	4,654.89	$ 26,998.36	0.00	$0.00
210.6.1.1	304	Rough Grading	45,184.00	SY	$ 0.48	$ 21,688.32	40,560.00	$ 19,468.80	8,846.00	$ 4,246.08	49,406.00	$ 23,714.88	4,222.00	2,026.56	49,406.00	$ 23,714.88	0.00	$0.00
402	305	Guard Rail Extensions	1.00	LS	$ 3,240.38	$ 3,240.38		$ -	1.00	$ 3,240.38	1.00	$ 3,240.38			1.00	$ 3,240.38	0.00	$0.00
411	306	Gate Post	8.00	EA	$ 569.30	$ 4,554.40	8.00	$ 4,554.40	0.00	$ -	8.00	$ 4,554.40			8.00	$ 4,554.40	0.00	$0.00
509	307	Cement, PC for Soil Cement	878.00	TON	$ 188.69	$ 165,669.82	330.08	$ 62,282.80	377.92	$ 71,309.72	708.00	$ 133,592.52	-170.00	(32,077.30)	708.00	$ 133,592.52	0.00	$0.00
513	308	Soil Cement	5,915.00	CY	$ 60.12	$ 355,609.80	2,453.00	$ 147,474.36	2,152.82	$ 129,427.54	4,605.82	$ 276,901.90	-1,309.18	(78,707.90)	4,605.82	$ 276,901.90	0.00	$0.00
521	309	Steel Plate Sediment Gage	814.00	LBS	$ 25.01	$ 20,358.14	814.00	$ 20,358.14	0.00	$ -	814.00	$ 20,358.14			814.00	$ 20,358.14	0.00	$0.00
1012	310	Native Grass Seeding	2.00	AC	$ 2,727.21	$ 5,454.42	3.25	$ 8,863.43	0.00	$ -	3.25	$ 8,863.43	1.25	3,409.01	3.25	$ 8,863.43	0.00	$0.00
1503	311	Mobilization - Demobilization	1.00	LS	$ 73,848.20	$ 73,848.20	0.50	$ 36,924.10	0.50	$ 36,924.10	1.00	$ 73,848.20			1.00	$ 73,848.20	0.00	$0.00
1504	312	Temporary Polution Control	1.00	LS	$ 1,329.53	$ 1,329.53	0.30	$ 398.86	0.70	$ 930.67	1.00	$ 1,329.53			1.00	$ 1,329.53	0.00	$0.00
1505	313	Control of Storm Water and Nuisance Flow	1.00	LS	$ 22,774.52	$ 22,774.52	0.30	$ 6,832.36	0.70	$ 15,942.16	1.00	$ 22,774.52			1.00	$ 22,774.52	0.00	$0.00
1506	314	Construction Staking	1.00	LS	$ 14,602.57	$ 14,602.57	0.30	$ 4,380.77	0.70	$ 10,221.80	1.00	$ 14,602.57			1.00	$ 14,602.57	0.00	$0.00
1507	315	Testing, Quality Assurance, and Submittals	1.00	LS	$ 13,300.63	$ 13,300.63	0.30	$ 3,990.19	0.70	$ 9,310.44	1.00	$ 13,300.63			1.00	$ 13,300.63	0.00	$0.00
1508	316	Project Record Documents	1.00	LS	$ 7,500.00	$ 7,500.00	1.00	$ 7,500.00	0.00	$ -	1.00	$ 7,500.00			1.00	$ 7,500.00	0.00	$0.00
1509	317	Removal and Disposal of Existing Soil Cement	3,741.00	CY	$ 65.00	$ 243,165.00	197.00	$ 12,805.00	347.48	$ 22,586.20	544.48	$ 35,391.20	-3,196.52	(207,773.80)	544.48	$ 35,391.20	0.00	$0.00
1510	318	Cleaning Existing Soil Cement	1.00	LS	$ 5,000.00	$ 5,000.00	0.30	$ 1,500.00	0.70	$ 3,500.00	1.00	$ 5,000.00			1.00	$ 5,000.00	0.00	$0.00
		BASE BID - Subtotal				**$ 1,129,753.62**		**$ 352,642.36**		**$ 458,933.79**		**$ 811,576.15**		**$ (318,177.47)**		**$ 811,576.15**		

Total	**$ 1,129,753.62**	**$ 352,642.36**	**$ 458,933.79**	**$ 811,576.15**	**$ (318,177.47)**	**$ 811,576.15**
SUBTOTAL		**$ 352,642.36**	**$ 458,933.79**	**$ 811,576.15**		
NMGRT @ 7.4375%		$ 26,227.78	$ 34,133.20	$ 60,360.98		
TOTAL		**$ 378,870.14**	**$ 493,066.99**	**$ 871,937.13**		

BID TABULATION

Lomitas Negras Water Quality Facility, Phase 1

Bid Item No.	Item Description	Unit	Estimated Quantity	Unit Cost	Total Cost
	CIP = Complete In Place (includes all equipment, materials and labor). Compl. = Complete			$	$
	BASE BID				
201	CLEARING AND GRUBBING: CONTRACTOR SHALL CLEAR AND GRUB ALL ARROYO OVER BANK DISTURBED AREAS. INCLUDES HAUL AND DISPOSAL. Std. Spec. Sect. 201. Compl.	ACRE	3.5	556.94	1,949.29
203.4.2	UNCLASSIFIED EXCAVATION: INCLUDES UNCLASSIFIED EXCAVATION, AND STOCKPILING MATERIAL TO BE USED AS SOIL CEMENT, HAUL AND DISPOSAL OF EXCESS MATERIAL TO SSCAFCA DESIGNATED SPOIL SITES. Sup. Spec. Sect. 203. Compl.	CY	62,113	2.20	136,648.60
206	SUBGRADE PREPARATION: INCLUDES COMPACTING AND FINISHING THE SUBGRADE UNDER STRUCTURES TO WITHIN 0.1 FEET OF SPECIFIED ELEVATION. Sup. Spec. Sect. 206. CIP	SY	5,700	5.80	33,060.00
210.6.1.1	ROUGH GRADING: GRADE ARROYO BOTTOM AND ARROYO OVER BANK AREAS. FINISHED GRADES SHALL MATCH PLAN GRADES WITHIN 0.5 FT. Std. Spec. Sect. 210. Compl.	SY	45,184	.48	21,688.32
402	GUARD RAIL EXTENSIONS: REMOVE AND RE-INSTALL EXISTNG GUARD RAILS AT NORTH & SOUTH DIKES. INCLUDES, NEW WOOD POSTS, GALVANIZED SCREWS, BOLTS, WASHERS, NUTS, & WIRE. CIP	LS	1	3,240.38	3,240.38
411	GATE POST: INSTALL 8 - 6 FT. LENGTH, 4-IN. DIA. SCHED. 40 STEEL POSTS. INCLUDES MATERIALS, WELDING CABLE LOOP, PAINT, INSTALLATION AND LABOR. Std. Spec. Sect. 157. CIP	EA	8	569.30	4,554.40
509	CEMENT: PORTLAND CEMENT FOR SOIL CEMENT (Refer to Geotechnical Report). Compl.	TON	878	188.69	165,669.82
513	SOIL CEMENT: BUILD SOIL CEMENT STRUCTURES, TRANSITIONS, DIKES WITH ON-SITE SOILS AS AGGREGATE. EXCAVATION AND BACKFILL AT STRUCTURES ARE INCIDENTAL. Sup. Spec. Sect. 513. CIP	CY	5,915	60.12	355,609.80
521	STEEL PLATE SEDIMENT GAGE: BUILD, INSTALL 1/8-IN. STEEL PLATES, PER WIDTHS, LENGTHS AND LOCATIONS ON PLANS. INCLUDES ALL MATERIALS, BOLTS AND LABOR. Std. Spec. Sect. 520. CIP	LBS	814	25.01	20,358.14
1012	NATIVE GRASS SEEDING: SEED (Hydro Seed) ALL ARROYO OVER BANK DISTURBED AREAS. Std. Spec. Sect. 1012 and Sup. Spec. Sect. 1012. CIP	ACRE	2	2,727.21	5,454.42
1503	MOBILIZATION – DEMOBILIZATION: Sup. Spec. Sect. 1503. Compl.	LS	1	73,848.20	73,848.20
1504	TEMPORARY POLLUTION CONTROL: SWPPP DOCUMENT PROVIDED BY SSCAFCA. INCLUDES N.O.I., N.O.T., SWPPP MAINTENANCE AND RECORD KEEPING and PREPARATION OF A TEMPORARY EROSION AND SEDIMENT CONTROL PLAN. Sup. Spec. Sect. 1504. CIP	LS	1	1,329.53	1,329.53
1505	CONTROL OF STORM WATER AND NUISANCE FLOW: BUILD DIKES AND DITCHES AS REQURIED TO KEEP WORK AREA FREE FROM WATER. Sup. Spec. Sect.. 1505. CIP	LS	1	22,774.52	22,774.52
1506	CONSTRUCTION STAKING: Sup. Spec. Sect. 1506. Compl.	LS	1	14,602.57	14,602.57
1507	TESTING, QUALITY ASSURANCE AND SUBMITTALS: Sup. Spec. Sect. 1507. Compl. (Allowance Item)	LS	1	13,300.63	13,300.63
1508	PROJECT RECORD DOCUMENTS: Sup. Spec. Sect. 1508. Compl.	LS	1	7,500.00	7,500.00
1509	REMOVAL AND DISPOSAL OF EXISTING SOIL CEMENT: REMOVE, AND DISPOSE (HAUL TO A LANDFILLL OR OTHER MEANS IN ACCORADANCE WITH LOCAL REGULATIONS), ONLY AT LOCATIONS SHOWN ON PLANS. Sup. Spec. Sect. 1509	CY	3,741	65.00	243,165.00
1510	CLEANING EXISTING SOIL CEMENT: CLEAN EXISTING SOIL CEMENT ONLY IN LOCATIONS WHERE NEW SOIL CEMENT SHALL JOIN EXISTING SOIL CEMENT AND ONLY LOCATIONS INDICATED ON PLANS. Sup. Spec. Sect. 1510	LS	1	5,000.00	5,000.00
	TOTAL COST Excluding NMGRT	–	–	–	1,129,753.62
	ADDITIVE ALTERNATE BID ITEM				
111	COLORANT FOR SOIL CEMENT: ($ / CY YD of SOIL CEMENT): Assume 2 lbs powder colorant / 95 lbs of portland cement for Base Bid portland cement. Sup. Spec. Section 111	CY	5,915	58.70	347,210.50
	TOTAL of BASE BID and ADDITIVE ALTERNATE BID (Excluding NMGRT)	–	–	–	1,476,964.12

BID TABULATION

Lomitas Negras Water Quality Facility, Phase 1

Bid Item No.	Item Description	Unit	Estimated Quantity	Unit Cost	Total Cost
	CIP = Complete in Place (includes all equipment, materials and labor). Compl. = Complete			$	$
	DEDUCTIVE ALTERNATE BID ITEMS (A)				
206	SUBGRADE PREPARATION: INCLUDES COMPACTING AND FINISHING THE SUBGRADE UNDER STRUCTURE 2 TO WITHIN 0.1 FEET OF SPECIFIED ELEVATION. Sup. Spec. Sect. 206. CIP	SY	-902	5.80	5,231.60
509	CEMENT: PORTLAND CEMENTSOIL CEMENT (FOR STRUCTURE 2 AND ADJACENT BANKS) (Refer to Geotechnical Report). Compl.	TON	-139	188.69	26,227.91
513	SOIL CEMENT: BUILD SOIL CEMENT STRUCTURE 2 AND ADJACENT TRANSITIONS, ON-SITE SOILS AS AGGREGATE. EXCAVATION AND BACKFILL AT STRUCTURES ARE INCIDENTAL. Sup. Spec. Sect. 513. CIP	CY	-938	60.12	56,392.56
1509	REMOVAL AND DISPOSAL OF EXISTING SOIL CEMENT: REMOVE, AND DISPOSE (HAUL TO A LANDFILLL OR OTHER MEANS IN ACCORADANCE WITH LOCAL REGULATIONS), STRUCTURE 2 TO 1 (Sta. 11+00 to ta. 14+10) and BANKS NEAR STRUCTURE 2, ON PLANS. Sup. Spec. Sect. 1509	CY	-3,101	65.00	201,565.00
	TOTAL COST TO BE DEDUCTED FROM BASE BID Excluding NMGRT	--	--	--	289,417.07
(A)	Unit Costs for Deductive Alternate Bid Items must be the same as for the Base Bid Items				

Lomitas Negras Phase 1 (Unit Bid Prices)

Desciption	Quantity	Unit	Cost/Unit	Total
Soil Cement (not including cement)	4605.82	CY	$60.12	$276,901.90
Cement (for Soil Cement)	646.7	TON	$188.69	$122,025.82
Total:				$398,927.72
Soil Cement (including 8% cement content)	**4605.82**	**CY**	**$86.61**	**$398,927.72**

Desciption	Quantity	Unit	Cost/Unit	Total
Soil Cement (not including cement)	4605.82	CY	$60.12	$276,901.90
Cement (for Soil Cement)	808.5	TON	$188.69	$152,555.87
Total:				$429,457.76
Soil Cement (including 10% cement content)	**4605.82**	**CY**	**$93.24**	**$429,457.76**

Desciption	Quantity	Unit	Cost/Unit	Total
Soil Cement (not including cement)	4605.82	CY	$60.12	$276,901.90
Cement (for Soil Cement)	970	TON	$188.69	$183,029.30
Total:				$459,931.20
Soil Cement (including 12% cement content)	**4605.82**	**CY**	**$99.86**	**$459,931.20**

ASSUME $100/CY