ELDORADO R1-60 NO. 16
LETTER OF MAP REVISION (LOMR)

5523-A017

November 2014

Prepared for:

Pardee Homes
4675 West Teco Avenue, Suite 115
Las Vegas, Nevada 89118
Phone: (702) 614-1400
Fax: (702) 614-1466

G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS

ELDORADO R1-60 NO. 16
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Pardee Homes
4675 West Teco Avenue, Suite 115
Las Vegas, Nevada 89118
Phone: (702) 614-1400
Fax: (702) 614-1466

Prepared by:

G. C. Wallace, Inc.
1555 S. Rainbow Blvd.
Las Vegas, Nevada 89146
Phone: (702) 804-2000
Fax: (702) 804-2297

G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS

G. C. WALLACE, INC.
G. C. WALLACE HOLDINGS, INC.

Writer's Contact Information:

G. Tokumi
804-2015

5523-A017

November 13, 2014

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

Subject: LOMR for the Eldorado R1-60 No. 16

Attention: LOMC Manager

G. C. Wallace, Inc. (GCW) has been contracted by Pardee Homes (PH) to complete a Letter of Map Revision (LOMR) for the Eldorado R1-60 No. 16 project within the City of North Las Vegas, Nevada based on CLOMR Case# 14-09-1440R. The project encompasses the reach of an unnamed wash between Deer Springs Way and Centennial Parkway, and west of Revere Street, tying into the existing upstream reinforced concrete arch (RCA) and downstream unnamed wash. The mapping from Deer Springs Way, to east on Deer Springs Way and to south of Deer Springs Way is approximately 2,650 feet long. The purpose of this LOMR is to revise the existing Community Panels to reflect the constructed improvements to protect downstream property and facilities and to revise the FEMA designated Zone A Special Flood Hazard Areas (SFHA). The LOMR methodology is in accordance with *Guidelines and Specifications for Flood Hazard Mapping Partners* (Reference 1).

The current FIRM panel indicates the subject reach of the unnamed wash is located within a Zone A SFHA. The affected Community Panel Map Numbers are 32003C1766F, 32003C1767F, 32003C1768F, and 32003C1769F, revised to reflect LOMR 14-09-0513P, dated March 21, 2014. See Figures 1 and 2 for the project vicinity and location. The Effective FIRM is shown on Figure 3.

The following information supporting this request for a LOMR is enclosed. This request is based on the existing and constructed improvements, which consists of a RCA and channel system that confines the unnamed wash flows. This request is based on 1-foot aerial topography dated October 12, 2013.

- Figure 1 – Vicinity Map
- Figure 2 – Location Map
- Figure 3 – Effective FIRM
- Figure 5 – Revised FIRM
- Figure 6 – Proposed FIRM
- Figure 7 – Annotated FIRM
- Notification Letter
- Approval Letters (CLOMR Case#14-09-1440R and City of North Las Vegas)
- FEMA Forms
- A check in the amount of $5,000.00 payable to the National Flood Insurance Program has been included with this submittal.
- Hydraulic Modeling Computations
- Arch Culvert Storm Drain Structural Drawings and Calculations

- Geotechnical Report
- Site Photographs
- Field Survey Information
- Operation and Maintenance Plan
- Environmental Analysis to Ensure Compliance with Endangered Species Act (ESA)
- References
- Electronic Files on disk (Aerial topography, Survey data, GIS Files, HEC-RAS Models)

Constructed Improvements

Note that all RCA and channel improvements modeling and mapping in support of this LOMR are based on the NAVD88 Datum. See Figure 5 for the location of the constructed improvements included in the attached Section 1.0 Figures and Affected FIRM Panels.

Hydrology

Hydrologic data was referenced from the *1994 Northwest Las Vegas Flood Insurance Study Restudy* (Reference 6, hereinafter refer red to as the *1994 FIS Restudy*). According to the *1994 FIS Restudy*, the unnamed wash effective flowrate is 671 cfs during the 100-year storm event. The reference information is included in the attached Section 5.0 Reference Material.

Aerial Topography and Survey Data

Topographic mapping with a contour interval of 1-foot was generated by AeroTech Mapping (flight date October 12, 2013). The vertical control is based on North American Vertical Datum of 1988 (NAVD 1988), and horizontal control is based on Nevada State Plane Coordinate System (NAD 1983/94).

Hydraulic Modeling

The hydraulic analyses for the project were performed to determine the size and stability of the constructed RCA and channel system. As indicated in the hydrologic analysis, the 100-year design flow rate is 671 cfs.

The *1994 FIS Restudy* and the Eldorado RCL No. 25 LOMR (Case# 14-09-0513P/CLOMR Case# 13-09-1647R) serve as the starting point for the hydraulic analysis for this project. The tasks performed in this study for the existing conditions analysis includes one HEC-RAS model (Section 3.0 Engineering Analysis): (1) construction of the FEMA Effective HEC-RAS model (Effective Model) from the Eldorado RCL No. 25 LOMR to provide the Duplicate Effective HEC-RAS model.

The cross section orientation, location, reach lengths, roughness factors and other modeling parameters remain the same as the submitted Eldorado RCL No. 25 LOMR model for the upstream existing portions. The reference information is included in the attached Section 5.0 Reference Materials. The output from the HEC-RAS models is included in the attached Section 3.0 Engineering Analysis.

Boundary Condition and Floodplain Tie-in Locations

Downstream: The floodplain tie-in location is approximately 1,780 feet downstream of the constructed RCA Headwall. The Duplicate Effective Model results indicate that the flow regime is subcritical.

Upstream: The floodplain tie-in location approximately 870 feet upstream of the constructed RCA Headwall. The Duplicate Effective Model results indicate that the flow regime is subcritical.

Mapping

The 100-year floodplain is based on HEC-RAS modeling for subcritical flow. The floodplain was delineated on topographic maps based on the developed improvements. The top widths calculated in the HEC-RAS model will be contained within the proposed RCA and channel improvements.

The Proposed FIRM revisions are shown on Figure 6 and the Annotated FIRM is shown on Figure 7.

GCW trusts that this submittal will provide the required information needed to support a LOMR for the subject project.

If you have any questions or require additional information, please do not hesitate to call me at (702) 804-2011.

Cordially,

G. C. WALLACE, INC.

Grant Y. Tokumi, PE
Project Manager
Flood Control Division

Encl.
cc: Jim Jordano, PH
Andrew Trelease, CCRFCD
Ryan Belsick, GCW
Gia Nguyen, GCW

REFERENCES

1. Federal Emergency Management Agency. *Guidelines and Specifications for Flood Hazard Mapping Partners.* April 2003.

2. U.S. Army Corps of Engineers, *HEC-RAS River Analysis System.* January 2010 Version 4.1.0.

3. Clark County Regional Flood Control District (CCRFCD) *Hydrologic Criteria and Drainage Design Manual.* August 1999.

4. FEMA, Department of Homeland Security, *Code of Federal Regulations - Emergency Management and Assistance.* Accessed: October 13, 2011.

5. U.S. Army Corps of Engineers, *HEC-RAS River Analysis System Hydraulic Reference Manual.* January 2010 Version 4.1.

6. CCRFCD, *Northwest Las Vegas Flood Insurance Study Restudy, Clark County, Nevada.* August 1994.

7. FEMA, *Flood Insurance Study Clark County, Nevada and Incorporated Areas,* November 2011.

8. RBF Consulting, *Eldorado RCL No. 25 LOMR.* October 2013.

SUPPORTING DOCUMENTATION FOR LOMR
ELDORADO R1-60 NO. 16

1. FIGURES AND AFFECTED FIRM PANELS (HARD COPY AND ON CD)

- Figure 1 - Vicinity Map
- Figure 2 - Location Map
- Figure 3 - Effective FIRM
- Figure 5 – LOMR Work Map
- Figure 6 – Proposed FIRM
- Figure 7 - Annotated FIRM
- Notification Letter
- Eldorado R1-60 No. 16 CLOMR Case# 14-09-1440R Approval Letter
- Eldorado R1-60 No. 16 City of North Las Vegas Approval Letter

2. FEMA FORMS (HARD COPY AND ON CD)

- MT-2 Form 1: Overview & Concurrence Form
- MT-2 Form 2: Riverine Hydrology & Hydraulics Form
- MT-2 Form 3: Riverine Structures Form
- MT-2 Form 7: Payment Information Form

3. ENGINEERING ANALYSIS

3.1 HYDRAULIC MODELING COMPUTATIONS (HARD COPY AND ON CD)

- HEC-RAS Model: Duplicate Effective Model
- HEC-RAS Model: Post Project Model with CheckRAS

3.2 STRUCTURAL DRAWINGS AND CALCULATIONS (ON CD)

3.3 GEOTECHNICAL REPORT (ON CD)

4. SUPPORTING INFORMATION (ON CD)

- Site Investigation Photographs
- Field Survey
- Operation and Maintenance Plan
- ESA Compliance
- Topography

5. REFERENCE MATERIALS (ON CD)

- Excerpts from the *Flood Insurance Restudy,* 1994
- *Flood Insurance Study Clark County and Incorporated Areas, 2011*
- *HEC-RAS River Analysis System Hydraulic Reference Manual*, 2008
- *Manning's Roughness Coefficients from Hydrologic Criteria and Drainage Design Manual*
- *Eldorado No. 25 LOMR Case No.: 14-09-0513P*

6. IMPROVEMENT PLANS (HARD COPY AND ON CD)

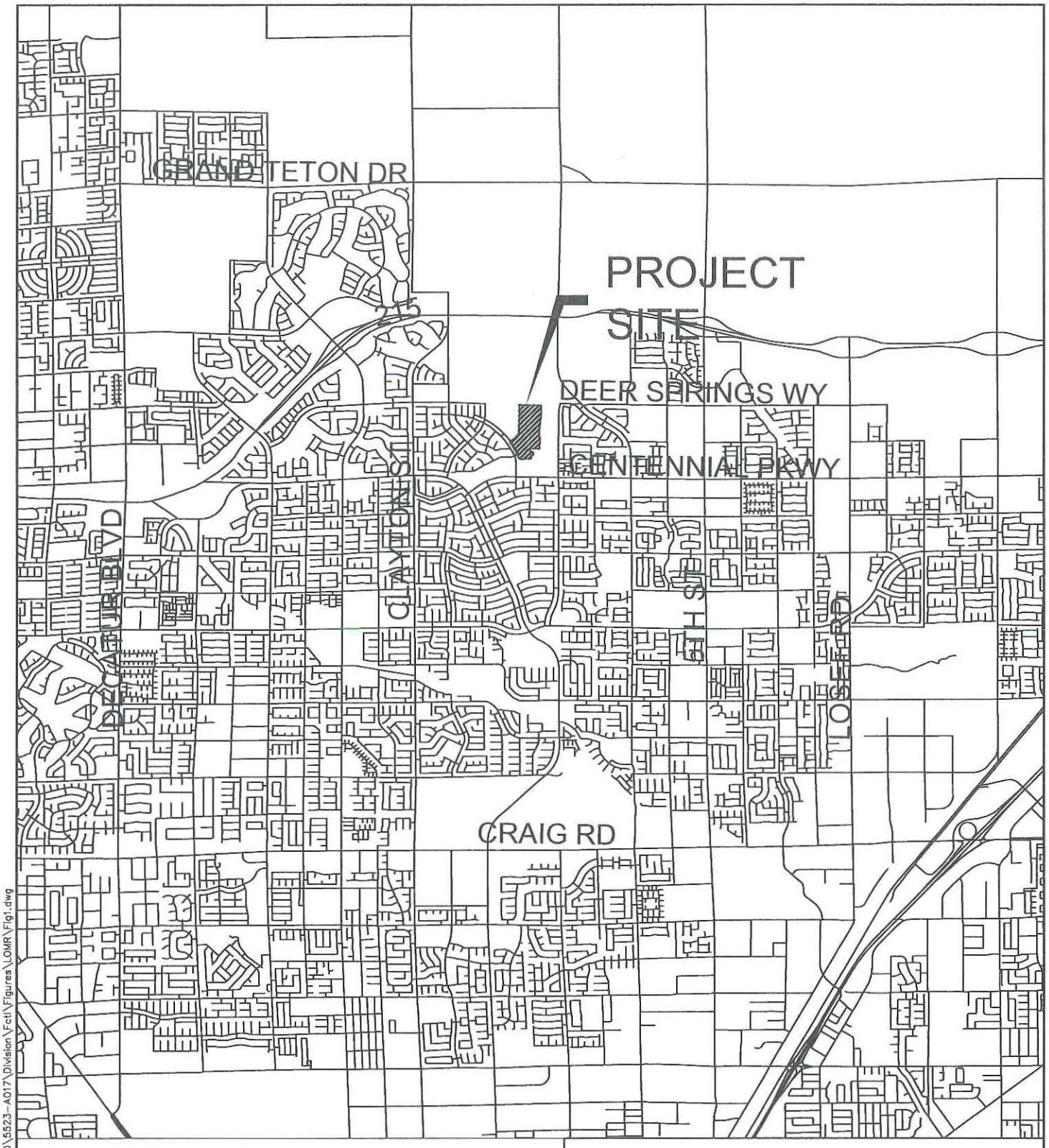
- Eldorado R1-60 No. 16
- Field Photos

7. ADDITIONAL ELECTRONIC FILES (ON CD)

- Report PDF
- GIS Shape Files

1. FIGURES AND AFFECTED FIRM PANELS

Figure 1 - Vicinity Map
Figure 2 - Location Map
Figure 3 - Effective FIRM
Figure 5 – LOMR Work Map
Figure 6 - Proposed FIRM
Figure 7 - Annotated FIRM
Notification Letter
CLOMR Case# 14-09-1440R Approval Letter
City of North Las Vegas Approval Letter



GRAPHIC SCALE

5000 0 2500 5000

(IN FEET)

1 inch = 5000 ft.

NORTH

PARDEE HOMES

ELDORADO R1-60 NO. 16

FIGURE 1

VICINITY MAP

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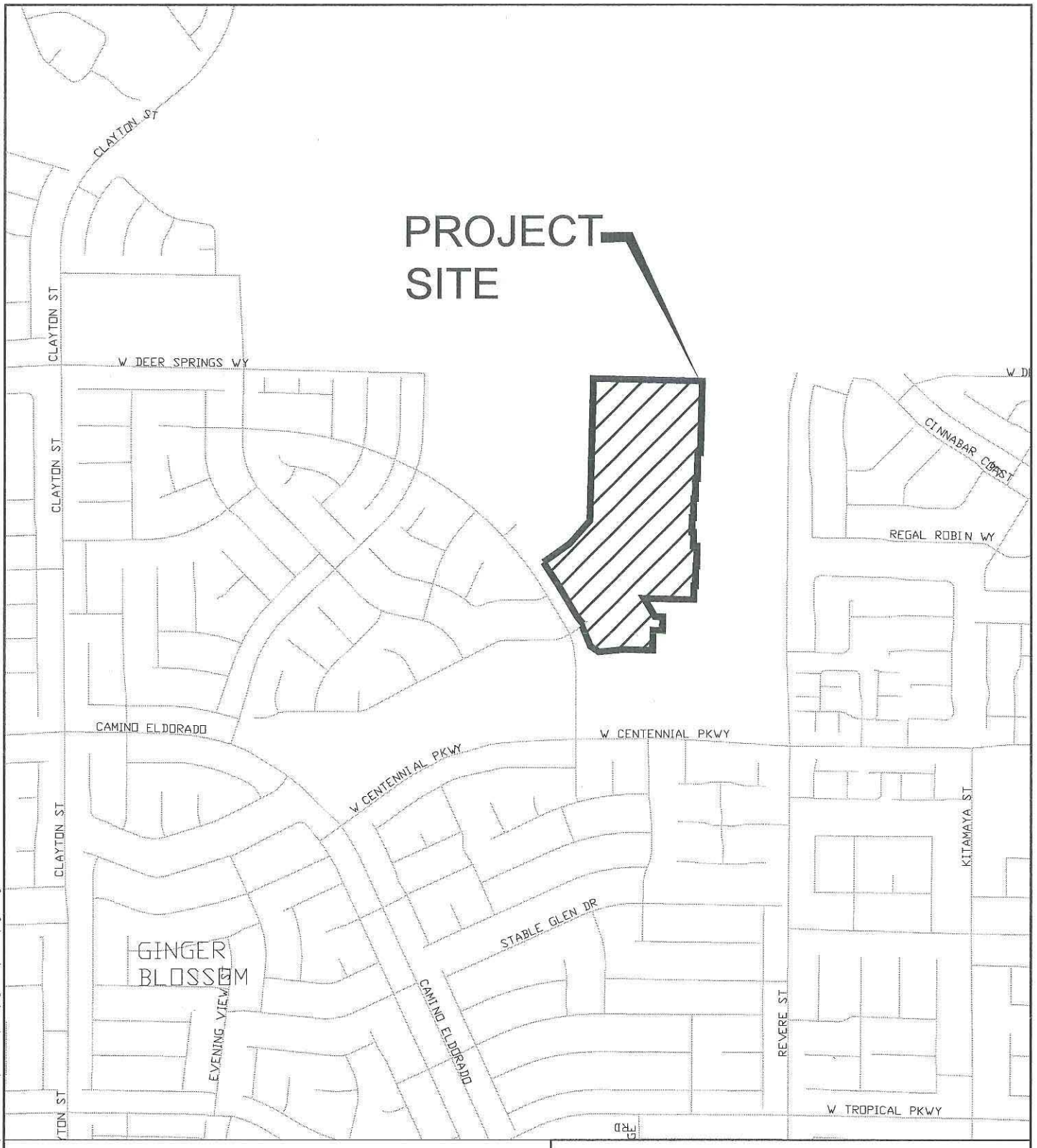

GRAPHIC SCALE

1000 0 500 1000

(IN FEET)

1 inch = 1000 ft.

NORTH

PARDEE HOMES

ELDORADO R1-60 NO.16

FIGURE 2

LOCATION MAP

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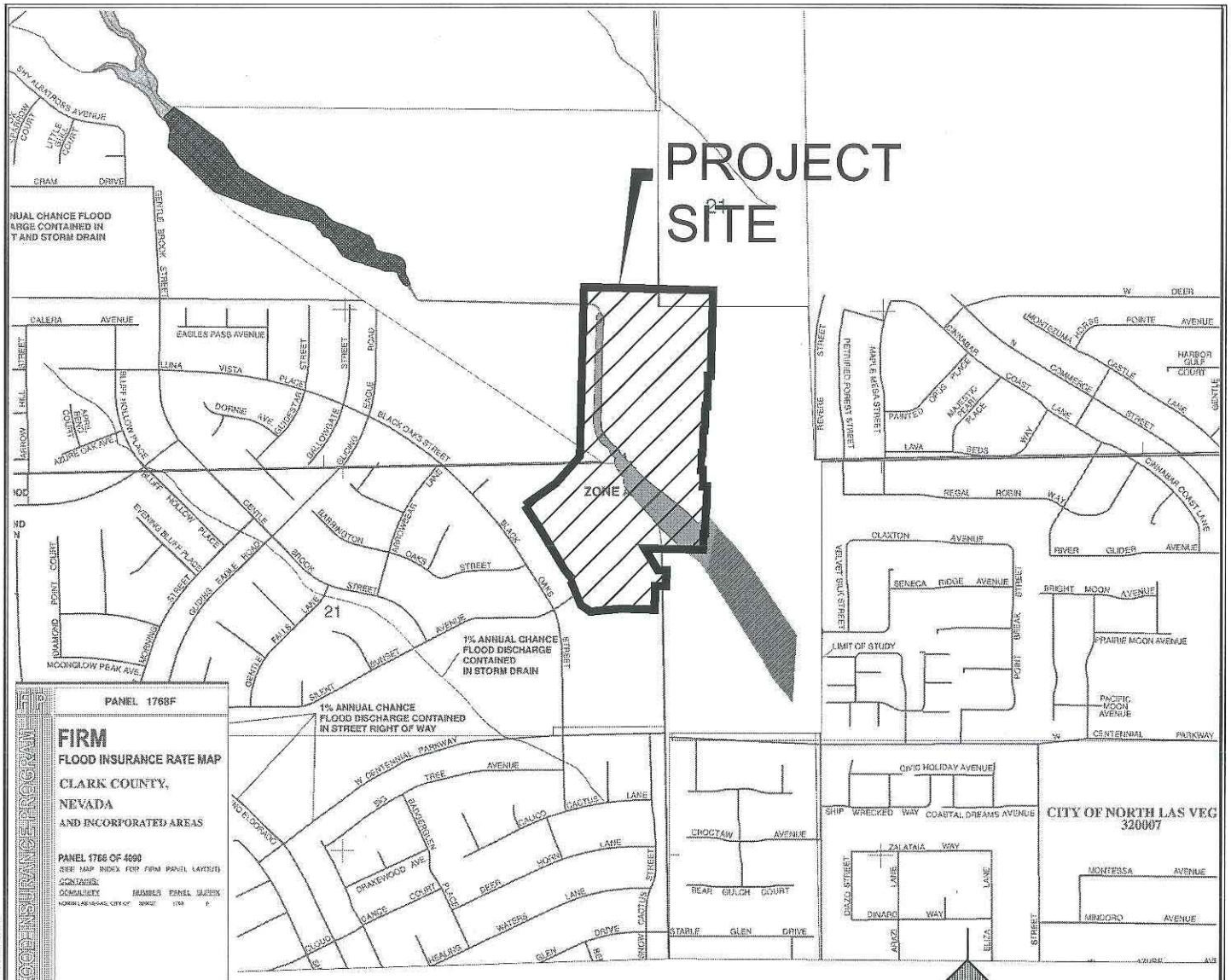

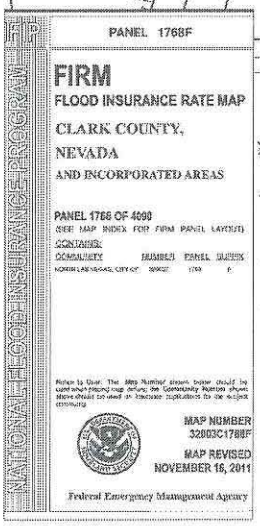

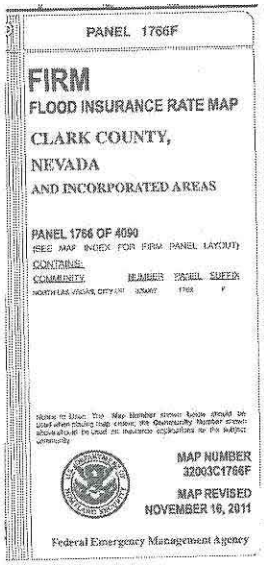

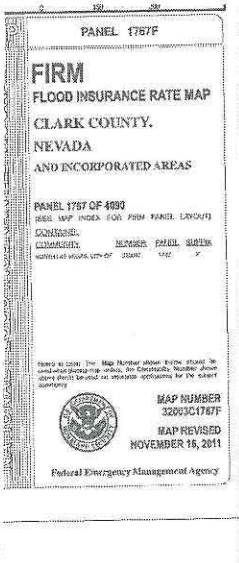

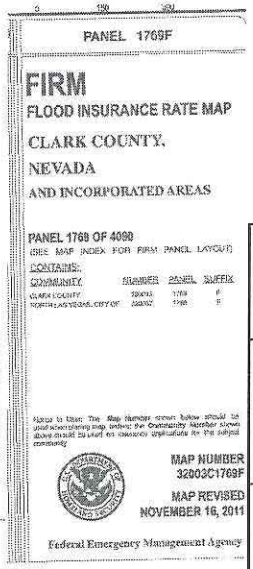

PARDEE HOMES

ELDORADO R1-60 NO. 16

FIGURE 3

EFFECTIVE F.I.R.M.

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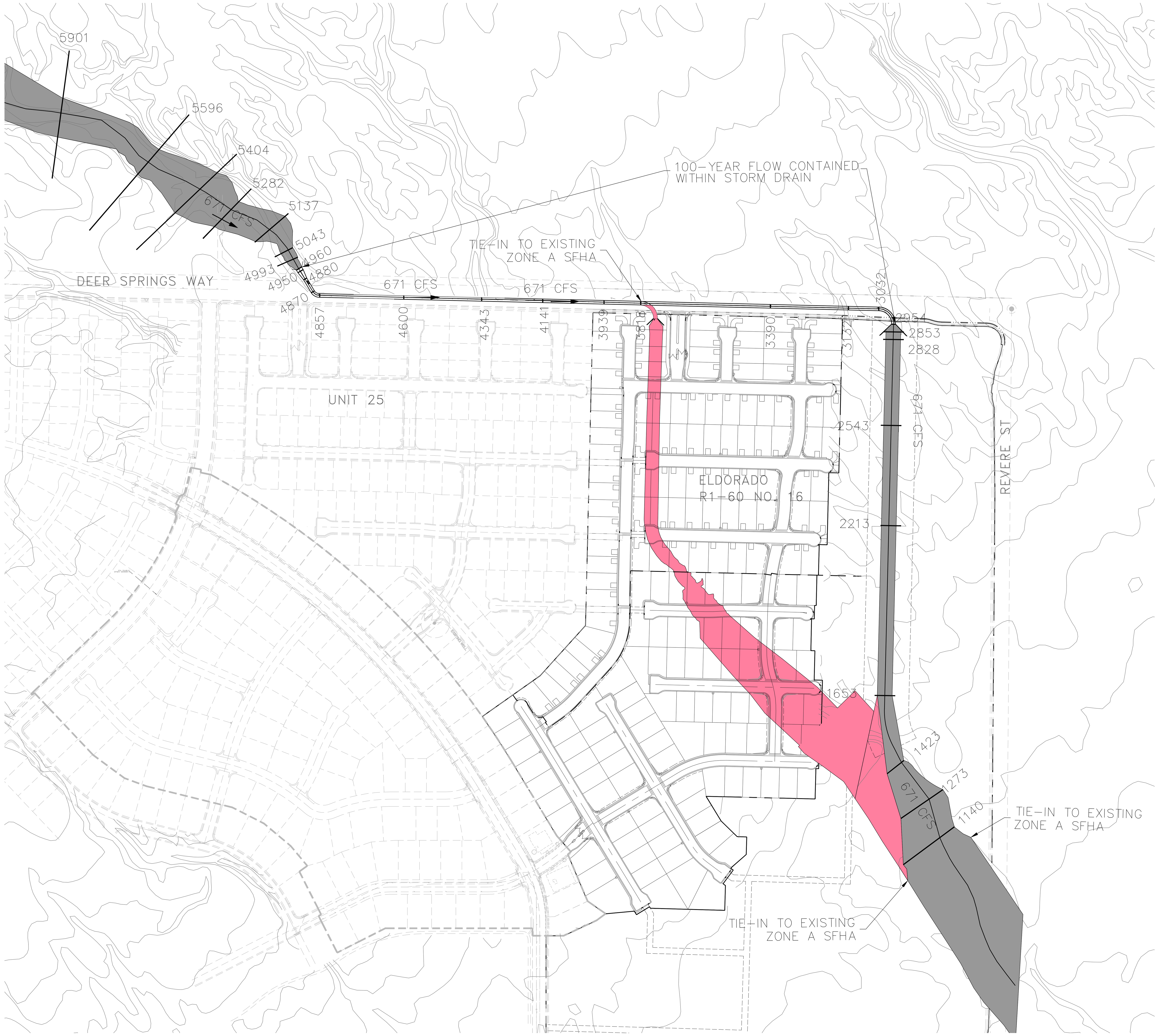


NORTH

GRAPHIC SCALE

200 0 100 200

(IN FEET)
1 inch = 200 ft.

LEGEND

2543 HEC-RAS RIVER STATION

671 CFS 100-YEAR DESIGN FLOW

ZONE A SFHA FLOODPLAIN

REMOVED FROM SFHA FLOODPLAIN

HEC-RAS SECTION SUMMARY TABLE

Sta	Q (cfs)	FL Elevation (ft)	WS Elevation (ft)	Depth (ft)	Vel (ft/s)	Froude #	Freeboard (ft)	Total Depth (ft)	Notes
5901	671	2181.55	2184.19	2.64	3.69	0.57	1.0	3.6	Existing Wash
5596	671	2178.29	2180.47	2.18	5.62	0.86	1.0	3.2	Existing Wash
5404	671	2176.8	2179.23	2.43	2.88	0.46	1.0	3.4	Existing Wash
5282	671	2175.7	2177.87	2.17	5.35	0.90	1.0	3.2	Existing Wash
5137	671	2172.9	2174.77	1.87	5.53	1.01	1.2	3.0	Existing Wash
5043	671	2163.9	2169.32	5.42	6.24	0.65	1.1	6.5	Existing Wash
4993	671	2163.9	2168.22	4.32	8.43	1.00	1.3	5.7	Existing Wash
4960	671	2161.36	2166.54	5.18	6.89	0.53	1.2	6.4	Existing 12x6 Arch Culvert
4950	671	2160.25	2166.58	6.33	6.44	0.45	1.1	7.5	Existing 12x6 Arch Culvert
4880	671	2160.04	2164.57	4.53	12.48	1.03	1.5	6.0	Existing 12x6 Arch Culvert
4870	671	2159.68	2164.21	4.53	12.47	1.03	1.5	6.0	Existing 12x6 Arch Culvert
4857	671	2159.5	2164.04	4.54	12.47	1.03	1.5	6.1	Existing 12x6 Arch Culvert
4600	671	2157.51	2162.04	4.53	12.48	1.03	1.5	6.0	Existing 12x6 Arch Culvert
4343	671	2155.66	2160.19	4.53	12.47	1.03	1.5	6.0	Existing 12x6 Arch Culvert
4141	671	2154.65	2159.18	4.53	12.47	1.03	1.5	6.0	Existing 12x6 Arch Culvert
3939	671	2153.82	2158.35	4.53	12.47	1.03	1.5	6.0	Existing 12x6 Arch Culvert
3818	671	2153.34	2157.87	4.53	12.47	1.03	1.5	6.0	Proposed 12x6 Arch Culvert
3390	671	2147.64	2152.17	4.53	12.49	1.03	1.5	6.0	Proposed 12x6 Arch Culvert
3132	671	2144.22	2148.75	4.53	12.48	1.03	1.5	6.0	Proposed 12x6 Arch Culvert
3032	671	2142.89	2147.42	4.53	12.47	1.03	1.5	6.0	Proposed 12x6 Arch Culvert
2954	671	2141.84	2146.37	4.53	12.47	1.03	1.5	6.0	Riprap D50=24"
2853	671	2141.46	2143.53	2.07	7.66	1.00	1.2	3.3	Trap Channel 50' Bottom ; 3:1 Side Slopes
2828	671	2141.08	2142.79	1.71	7.13	1.00	1.2	2.9	Trap Channel 50' Bottom ; 3:1 Side Slopes
2543	671	2136.72	2138.43	1.71	7.12	1.00	1.2	2.9	Trap Channel 50' Bottom ; 3:1 Side Slopes
2213	671	2131.67	2133.37	1.70	7.14	1.01	1.2	2.9	Trap Channel 50' Bottom ; 3:1 Side Slopes
1653	671	2123.1	2124.81	1.71	7.12	1.00	1.2	2.9	Trap Channel 50' Bottom ; 3:1 Side Slopes
1423	671	2115.1	2118.13	3.03	5.71	0.77	1.0	4.0	Existing Wash
1273	671	2112.8	2117.45	4.65	3.25	0.52	1.0	5.6	Existing Wash
1140	671	2112.2	2116.12	3.92	5.01	1.01	1.2	5.1	Existing Wash

PROJECT NO. 5523-A017

PLOT DATE: 10-15-14

G.C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
1555 S. RAINBOW BLVD · LAS VEGAS, NV 89146
T: 702.804.2000 · F: 702.804.2299 · GCWALLACE.COM

LAS VEGAS

PARDEE HOMES

ELDORADO R1-60 NO. 16

LOMR WORK MAP

DRAWING

FIG-5

1 OF 1 SHTS

NORTH

GRAPHIC SCALE

500 0 250 500

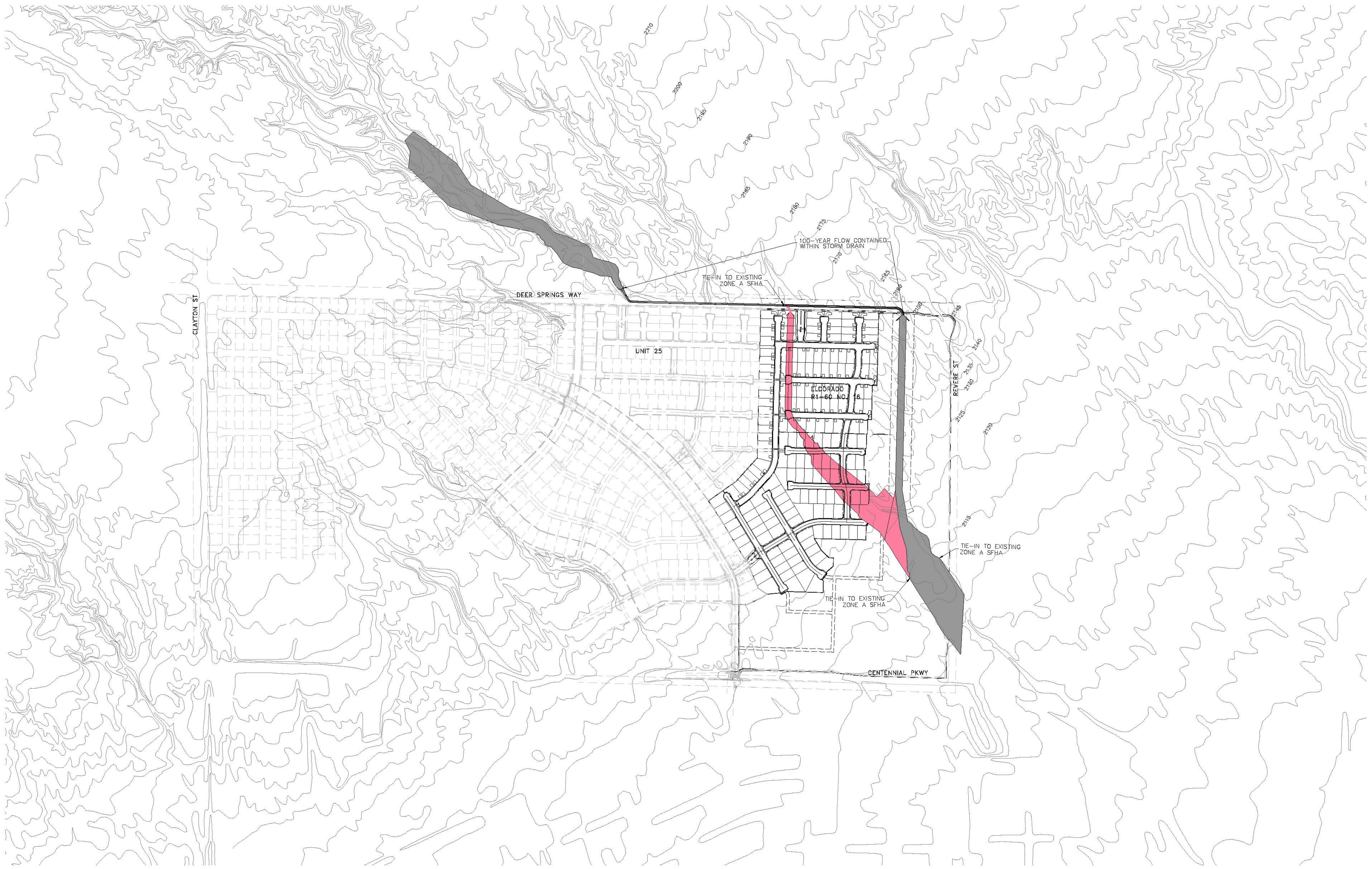
(IN FEET)

1 inch = 500 ft.

LEGEND

ZONE A SFHA FLOODPLAIN

REMOVED FROM SFHA FLOODPLAIN



PROJECT NO. 5523-A017

DESIGN:
DRAWN:
CHECK:
PLOT DATE: 10-16-14
PLOT TIME: 11:41:59

REV | DATE | DESCRIPTION | DATE | AGEN APP | DATE | GCW APP | DATE

G.C. WALLACE COMPANIES
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1555 S. RAINBOW BLVD · LAS VEGAS, NV 89146
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LAS VEGAS

PARDEE HOMES

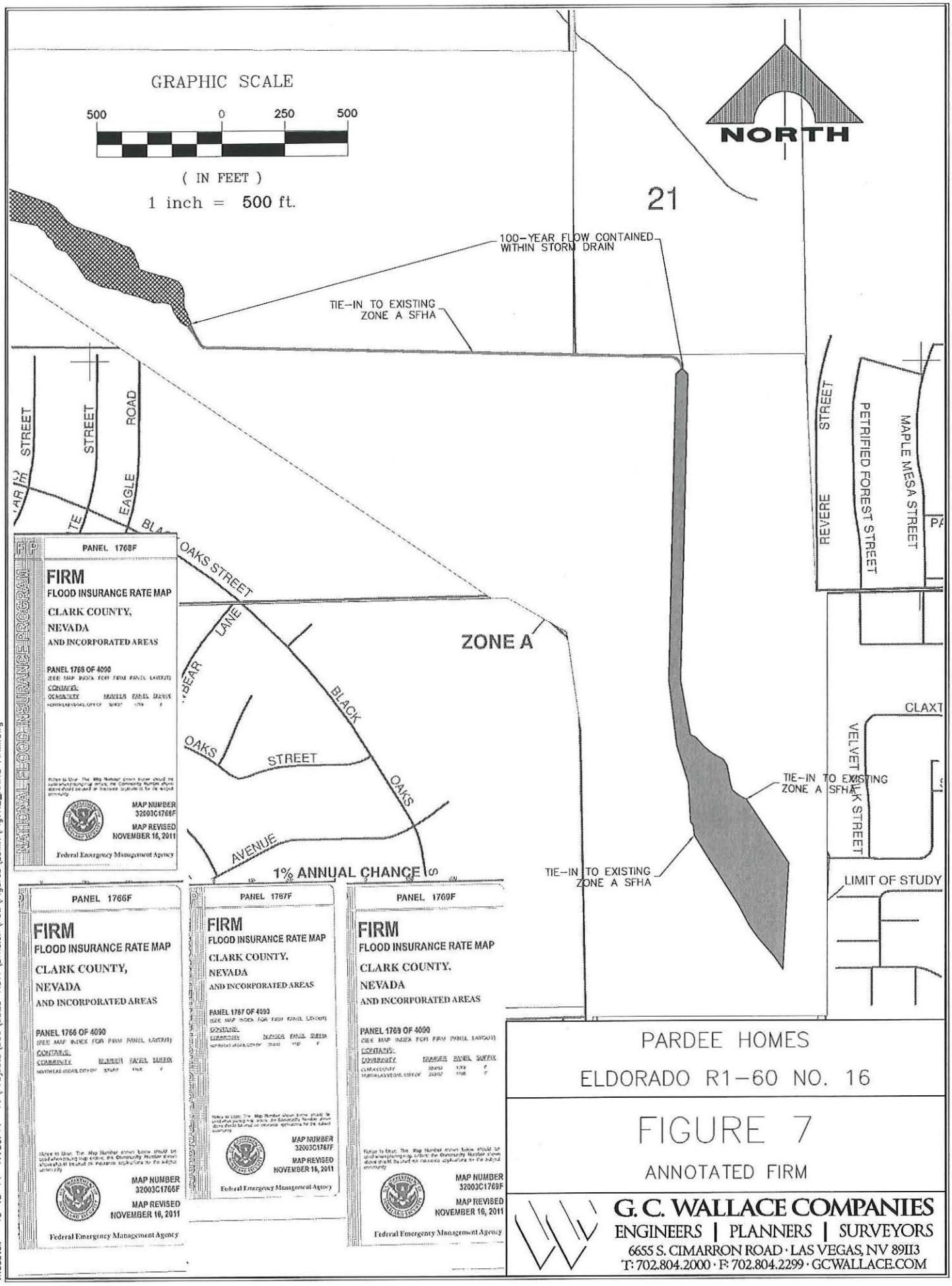
ELDORADO R1-60 NO. 16

PROPOSED FIRM

DRAWING

FIG-6

1 OF 1 SHTS



PARDEE HOMES

ELDORADO R1-60 NO. 16

FIGURE 7

ANNOTATED FIRM

G. C. WALLACE COMPANIES
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G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS

G. C. WALLACE, INC.
G. C. WALLACE HOLDINGS, INC.

Writer's Contact Information:

804-2011
jpruitt@gcwallace.com

5523-A017

March 24, 2014

Dan Hale
Vice President of Community Development
Pardee Homes
4675 W. Teco Avenue, Suite 115
Las Vegas, NV 89118

Re: Notification of Widening and Shifting of the 1% Annual Chance Floodplain

Dear Mr. Hale:

The Flood Insurance Rate Map (FIRM) for a community depicts land which has been determined to be subject to a 1% (100-year) or greater chance of flooding in any given year. The FIRM is used to determine flood insurance rates and to help the community with floodplain management.

G. G. Wallace, Inc. (GCW), is applying for a Conditional Letter of Map Revision (CLOMR) from the Federal Emergency Management Agency (DHS-FEMA) on behalf of Pardee Homes to revise FIRM Panels 32003C1766F, 32003C1767F, 32003C1768F, and 32003C1769F for the City of North Las Vegas along an unnamed wash. Pardee Homes is proposing a residential subdivision (Eldorado R1-60 No. 16) as part of the area-wide community master plan.

The CLOMR will result in the following within your property:

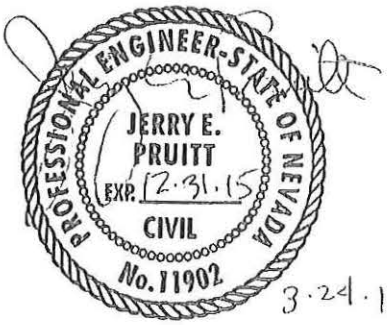
1. The floodplain through the property will shift by as much as 800' as a result of the proposed arch culvert extension. The arch culvert will contain the entire 100-year flow. Please refer to the attached annotated FIRM for a graphical representation of the change to the floodplain.

2. The maximum width of the shifted portion of the floodplain is 60.26'.

This letter is to inform you of a proposed revision of the 1% annual chance water-surface elevation and 1% annual chance floodplain on your property south of Deer Springs Way and to certify that no structures are located in areas that would be affected by increases in water surface elevations.

If you have any questions or concerns about the proposed project or its effect on your property, you may contact Mr. Dan Le of the City of North Las Vegas at 2250 Las Vegas Boulevard North, Suite 200, North Las Vegas, NV 89030, during normal business hours.

Cordially,
G. C. WALLACE, INC.



3-24-14

Jerry E. Pruitt, PE
Vice President

CLOMR

Federal Emergency Management Agency

Washington, D.C. 20472

April 23, 2014

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 14-09-1440R
Community Name: City of North Las Vegas, NV
Community No.: 320007

The Honorable John J. Lee
Mayor, City of North Las Vegas
2250 Las Vegas Boulevard North
North Las Vegas, NV 89030

Dear Mayor Lee:

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

If you have any questions regarding the floodplain management regulations for your community, the National Flood Insurance Program (NFIP) in general, or technical questions regarding this CLOMR, please contact the Director, Mitigation Division of the Federal Emergency Management Agency (FEMA) Regional Office in Oakland, California, at (510) 627-7175, or the FEMA Map Information eXchange (FMIX) toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Sincerely,

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

List of Enclosures:
Conditional Letter of Map Revision Comment Document

cc: Mr. Dan Le, P.E.
Senior Engineer
City of North Las Vegas

Mr. Jerry E. Pruitt, P.E.
Vice President
Flood Control Division
G.C. Wallace Companies

Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION
COMMENT DOCUMENT

COMMUNITY INFORMATION		PROPOSED PROJECT DESCRIPTION	BASIS OF CONDITIONAL REQUEST
COMMUNITY	City of North Las Vegas Clark County Nevada	CULVERT CHANNEL RELOCATION	HYDRAULIC ANALYSIS NEW TOPOGRAPHIC DATA
	COMMUNITY NO.: 320007		
IDENTIFIER	Eldorado R1-60 No. 16	APPROXIMATE LATITUDE & LONGITUDE: 36.282, -115.154 SOURCE: USGS QUADRANGLE DATUM: NAD 83	

AFFECTED MAP PANELS			
TYPE: FIRM*	NO.: 32003C1766F	DATE: November 16, 2011	* FIRM - Flood Insurance Rate Map
TYPE: FIRM*	NO.: 32003C1767F	DATE: November 16, 2011	
TYPE: FIRM*	NO.: 32003C1768F	DATE: November 16, 2011	
TYPE: FIRM*	NO.: 32003C1769F	DATE: November 16, 2011	

FLOODING SOURCE(S) AND REACH DESCRIPTION

Unnamed Wash - from approximately 510 feet to approximately 3,140 feet upstream of Revere Street

PROPOSED PROJECT DESCRIPTION

Flooding Source	Proposed Project	Location of Proposed Project
Unnamed Wash	New 12-foot x 6-foot Arch Culvert	from approximately 2,260 feet to approximately 3,120 feet upstream of Revere Street
	Channel Relocation	from approximately 800 feet to approximately 2,260 feet upstream of Revere Street

SUMMARY OF IMPACTS TO FLOOD HAZARD DATA

Flooding Source	Effective Flooding	Proposed Flooding	Increases	Decreases
Unnamed Wash	Zone A	Zone A	Yes	Yes

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

COMMENT

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

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

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

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Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION
COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

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

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

Base Flood WSEL Comparison Table

Flooding Source:		Base Flood WSEL Change (feet)	Location of maximum change
Proposed vs. Existing	Maximum increase	10.7	Approximately 830 feet upstream of Revere Street
	Maximum decrease	None	N/A

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

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

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

Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION
COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

DATA REQUIRED FOR FOLLOW-UP LOMR

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

• Form 1, entitled "Overview & Concurrence Form." Detailed application and certification forms must be used for requesting final revisions to the maps. Therefore, when the map revision request for the area covered by this letter is submitted, Form 1 must be included. If as-built conditions differ from the proposed plans, please submit new forms, which may be accessed at http://www.fema.gov/plan/prevent/fhm/dl_mt-2.shtm, or annotated copies of the previously submitted forms showing the revised information.

• Hydraulic analyses, for as-built conditions, of the base flood together with a topographic work map showing the revised floodplain boundaries. Please ensure that the revised information ties into the currently effective information at the downstream and upstream ends of the revised reach.

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

• As-built plans, certified by a registered professional engineer, of all proposed project elements

• Documentation of the notification to property owners who will be affected by any widening/shifting of the base floodplain and/or any BFE increases along Unnamed Wash.

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

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

Federal Emergency Management Agency
Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION
COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

• Please provide evidence that the project has complied with all terms and conditions of the incidental take permit outlined in the Biological Opinion (TE034927-0) from the U.S. Fish and Wildlife Service (USFWS) dated January 9, 2001.

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

LOMC Clearinghouse
847 South Pickett Street
Alexandria, VA 22304

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

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

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

Federal Emergency Management Agency

Washington, D.C. 20472

CONDITIONAL LETTER OF MAP REVISION
COMMENT DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

COMMUNITY REMINDERS

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

Mr. Jeff Lusk
Acting Director, Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7175

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

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

CITY OF
NORTH LAS VEGAS

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PUBLIC WORKS – DEVELOPMENT AND FLOOD CONTROL
2250 N Las Vegas Blvd., Suite 200 • North Las Vegas, Nevada 89030-6307
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www.cityofnorthlasvegas.com

December 3, 2013

Mailed via: E-mail

Jerry Pruitt, P.E.
Gia Nguyen, P.E.

GC Wallace, Inc.
1555 S. Rainbow Blvd.
Las Vegas, Nevada 89146

Re: Technical Drainage Study for Eldorado R1-60 No. 16
CNLV No. 47525

Dear Jerry:

CNLV staff has reviewed the above referenced expedited study, dated November 18, 2013, and Addendum #1, dated November 25, 2013 and found it to meet the minimum accepted standards for a technical drainage study. This acceptance is contingent upon the following conditions:

1. Concurrence must be obtained by the Clark County Regional Flood Control District (CCRFCD) since the proposed project lies within FEMA flood zone "A". Please submit a copy of this study and all addenda to CCRFCD upon acceptance from CNLV.

2. The following requirements must be met for construction within FEMA designated Special Flood Hazard Area:

   -Grading and off-site construction permits will only be issued by the CNLV Department of Public Works once the improvement plans and drainage study have been approved **and** a copy of the completed Conditional Letter of Map Revision (CLOMR) application has been submitted to FEMA for processing.
   -Building permits can be issued once a favorable CLOMR has been obtained from FEMA.
   -Certificate-of-occupancy will only be issued once a Letter of Map Revision (LOMR) has been obtained from FEMA.

3. Please coordinate with Duane McNelly, Development and Flood Control Project Leader, when submitting improvement plans for this project. Mr. McNelly can be reached at 633-2312.

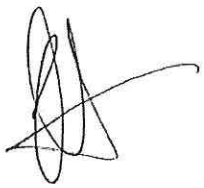
Please be advised that all land surface area disturbances over 1 acre and/or adjacent to a water way must submit a "Notice of Intent" to discharge to the Nevada Division of Environmental Protection, which certifies that a stormwater pollution prevention plan has been developed and is maintained on site. For more information, including forms and applications, see http://ndep.nv.gov/bwpc/storm01.htm.

Acceptance of this drainage study does not imply approval of the grading plan or the structural calculations associated with the drainage for this site. A detailed review of the grading plan will be performed by staff during the improvement plan review process.

Any future changes in the proposed design (or design assumptions) as outlined in the approved drainage study and the attached preliminary grading plan which affect drainage must be addressed in a Drainage Study Amendment and accepted by the CNLV Development and Flood Control Section. Additionally, conditional acceptance of a drainage study is valid for a period of one (1) year. If the proposed construction has not been completed in that time period, CNLV reserves the right to require additional conditions and/or submission and acceptance of a complete drainage study update prior to further construction of a project.

CNLV, its officials, or employees assume no liability for information, data, calculations and conclusions presented by the consulting engineers. We, therefore, make no warranties, either expressed or implied, in conducting this review. If you have any questions concerning this matter, please contact me at 633-1932.)633-1932.

Sincerely,



Dan Le, P.E., CFM
Senior Engineer
Development and Flood Control Division

2. FEMA FORMS

MT-2 Form 1: Overview & Concurrence Form
MT-2 Form 2: Riverine Hydrology & Hydraulics Form
MT-2 Form 3: Riverine Structures Form
Payment Information Form

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

OVERVIEW & CONCURRENCE FORM

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

PAPERWORK BURDEN DISCLOSURE NOTICE

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

PRIVACY ACT STATEMENT

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

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

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

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

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a (check one):

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

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

B. OVERVIEW

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

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Example: 480301 480287	City of Katy Harris County	TX TX	48473C 48201C	0005D 0220G	02/08/83 09/28/90
320007	City of North Las Vegas	NV	32003C	1766F	11/16/11
320007	City of North Las Vegas	NV	32003C	1767F	11/16/11

2. a. Flooding Source: Unnamed Wash

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

3. Project Name/Identifier: Eldorado R1-60 No. 16

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

5. Basis for Request and Type of Revision:

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

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

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

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

Structures: ☒ Channelization ☐ Levee/Floodwall ☒ Bridge/Culvert

☐ Dam ☐ Fill ☐ Other (Attach Description)

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

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☒ Yes Fee amount: $5,000

☐ No, Attach Explanation

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

D. SIGNATURE

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

Name: Grant Y. Tokumi, PE	Company: G.C. Wallace, Inc	
Mailing Address: 1555 S. Rainbow Blvd Las Vegas, Nevada 89146	Daytime Telephone No.: (702) 804-2015	Fax No.: (702) 804-2299
	E-Mail Address: gtokumi@gcwallace.com	
Signature of Requester (required): Grant Y Tokumi	Date: 11/12/14	

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

Community Official's Name and Title: Dan Le, PE - Development & Flood Control Division	Community Name: City of North Las Vegas	
Mailing Address: 2250 Las Vegas Boulevard North, Ste 200 North Las Vegas, Nevada 89030	Daytime Telephone No.: (702) 633-1932	Fax No.: (702) 633-4696
	E-Mail Address: led@cityofnorthlasvegas.com	
Community Official's Signature (required):	Date:	

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

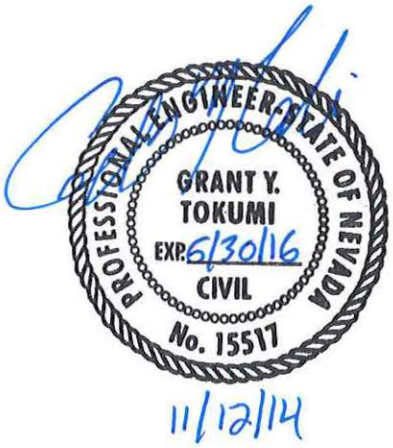
This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.2(b) and as described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

Certifier's Name: Grant Y. Tokumi, PE	License No.: 15517	Expiration Date: 06/30/16	
Company Name: G.C. Wallace, Inc.	Telephone No.: (702)804-2015	Fax No.: (702)804-2299	
Signature: Grant Y Tokumi	Date: 11/12/14	E-Mail Address: gtokumi@gcwallace.com	

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

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

Seal (Optional)



11/12/14

MT-2 FORM 1 ATTACHMENT

MT-2 Form 1

B. #1 – Community No.: 320007; Community Name: City of North Las Vegas; State: NV; Map No. 32003C; Panel No.:1768F; Effective Date: 11/16/11
B. #1 – Community No.: 320003 and 320007; Community Name: Clark County and City of North Las Vegas; State: NV; Map No. 32003C; Panel No.:1769F; Effective Date: 11/16/11

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

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

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

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

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

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

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

Flooding Source: Unnamed Wash

Note: Fill out one form for each flooding source studied

A. HYDROLOGY

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

☒ Not revised (skip to section B) ☐ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

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

Location	Drainage Area (Sq. Mi.)	Effective/FIS (cfs)	Revised (cfs)

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

☐ Statistical Analysis of Gage Records ☐ Precipitation/Runoff Model → Specify Model: _____
☐ Regional Regression Equations ☐ Other (please attach description)

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

4. Review/Approval of Analysis

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

5. Impacts of Sediment Transport on Hydrology

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

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation..

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit*	1780' downstream of proposed arch culvert headwall	1140	N/A	2116.12
Upstream Limit*	870' upstream of proposed arch culvert headwall	3818	2157.87	2157.87

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

2. Hydraulic Method/Model Used: HEC-RAS 4.1.0

3. Pre-Submittal Review of Hydraulic Models*

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

4.

Models Submitted	Natural Run		Floodway Run		Datum
Duplicate Effective Model*	File Name: eldorado.prj	Plan Name: eldorado.p10	File Name:	Plan Name:	NAVD 88
Corrected Effective Model*	File Name:	Plan Name:	File Name:	Plan Name:	
Existing or Pre-Project Conditions Model	File Name:	Plan Name:	File Name:	Plan Name:	
Revised or Post-Project Conditions Model	File Name: eldoradoLOMR.prj	Plan Name: eldoradoLOMR.p10	File Name:	Plan Name:	NAVD88
Other - (attach description)	File Name:	Plan Name:	File Name:	Plan Name:	

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

☒ Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

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

☒ Digital Mapping (GIS/CADD) Data Submitted (preferred)

Topographic Information: Flown Aerial Topography

Source: AeroTech Mapping Date: October 2013

Accuracy: See Attached.

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

☒ Annotated FIRM and/or FBFM (Required)

D. COMMON REGULATORY REQUIREMENTS*

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

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

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

   b. Does this LOMR request cause increase in the BFE and/or SFHA compared with the effective BFEs and/or SFHA? ☐ Yes ☒ No
      If Yes, please attach **proof of property owner notification and acceptance (if available)**. Elements of and examples of property owner notifications can be found in the MT-2 Form 2 Instructions.

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

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

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

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

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

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

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

MT-2 FORM 2 ATTACHMENT

MT-2 Form 2

C. Accuracy – Topography: Aero Tech Mapping, October 2013, Project accuracy to conform to generally accepted Class I. Photogrammetric Standards established by American Society of Photogrammetric & Remote Sensing (ASPRS).

DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

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

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 7 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

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

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

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

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

Flooding Source: Unnamed Wash

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

A. GENERAL

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

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

Description Of Modeled Structure

1. Name of Structure: Deer Springs Way Arch Culvert Storm Drain

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

   Location of Structure: Deer Springs Way

   Downstream Limit/Cross Section: 2954

   Upstream Limit/Cross Section: 3818

2. Name of Structure: Downstream Channel

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

   Location of Structure: West of Revere Street

   Downstream Limit/Cross Section: 1653

   Upstream Limit/Cross Section: 2954

3. Name of Structure: _____

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

   Location of Structure: _____

   Downstream Limit/Cross Section: _____

   Upstream Limit/Cross Section: _____

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

B. CHANNELIZATION

Flooding Source: Unnamed Wash

Name of Structure: Structures #2

1. Hydraulic Considerations

The channel was designed to carry 671 (cfs) and/or the 100-year flood.
The design elevation in the channel is based on (check one):

☒ Subcritical flow ☐ Critical flow ☐ Supercritical flow ☐ Energy grade line

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

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

☐ Other locations (specify): _____

2. Channel Design Plans

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

3. Accessory Structures

The channelization includes (check one):

☐ Levees [Attach Section E (Levee/Floodwall)] ☐ Drop structures ☐ Superelevated sections

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

☐ Weir ☐ Other (Describe):

4. Sediment Transport Considerations

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

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

C. BRIDGE/CULVERT

Flooding Source: Unnamed Wash

Name of Structure: Structure #1

1. This revision reflects (check one):

☐ Bridge/culvert not modeled in the FIS

☒ Modified bridge/culvert previously modeled in the FIS

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

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

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

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

4. Sediment Transport Considerations

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

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

D. DAM/BASIN

Flooding Source: _____
Name of Structure: _____

1. This request is for (check one): ☐ Existing dam/basin ☐ New dam/basin ☐ Modification of existing dam/basin

2. The dam/basin was designed by (check one): ☐ Federal agency ☐ State agency ☐ Private organization ☐ Local government agency

   Name of the agency or organization: _____

3. The Dam was permitted as (check one): ☐ Federal Dam ☐ State Dam

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

   Permit or ID number _____ Permitting Agency or Organization _____

   a. ☐ Local Government Dam ☐ Private Dam

   Provided related drawings, specification and supporting design information.

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

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

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

   ☐ Yes, provide supporting documentation with your completed Form 2.

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

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

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

6. Does the Base Flood Elevation behind the dam/basin or downstream of the dam/basin change? ☐ Yes ☐ No

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

FREQUENCY (% annual chance)	Stillwater Elevation Behind the Dam/Basin FIS	REVISED
10-year (10%)	_____	_____
50-year (2%)	_____	_____
100-year (1%)	_____	_____
500-year (0.2%)	_____	_____
Normal Pool Elevation	_____	_____

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

E. LEVEE/FLOODWALL

1. System Elements

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

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

☐ earthen embankment, dike, berm, etc. Station _____ to _____
☐ structural floodwall Station _____ to _____
☐ Other (describe): Station _____ to _____

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

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

☐ Yes ☐ No

If Yes, by which agency? _____

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

1. Plan of the levee embankment and floodwall structures. Sheet Numbers: _____
2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers: _____
3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers: _____
4. A layout detail for the embankment protection measures. Sheet Numbers: _____
5. Location, layout, and size and shape of the levee embankment features, foundation treatment, Floodwall structure, closure structures, and pump stations. Sheet Numbers: _____

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

3.0 feet or more at the downstream end and throughout	☐ Yes	☐ No
3.5 feet or more at the upstream end	☐ Yes	☐ No
4.0 feet within 100 feet upstream of all structures and/or constrictions	☐ Yes	☐ No

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater).	☐ Yes	☐ No
2.0 feet above the 1%-annual-chance stillwater surge elevation	☐ Yes	☐ No

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☐ No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

a. Openings through the levee system (check one): ☐ exists ☐ does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

a. The maximum levee slope land side is: _____

b. The maximum levee slope flood side is: _____

c. The range of velocities along the levee during the base flood is: _____ (min.) to _____ (max.)

d. Embankment material is protected by (describe what kind): _____

e. Riprap Design Parameters (check one): ☐ Velocity ☐ Tractive stress
Attach references

Reach		Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
						D_{100}	D_{50}	Thickness	
Sta	to								
Sta	to								
Sta	to								
Sta	to								
Sta	to								
Sta	to								

(Extend table on an added sheet as needed and reference each entry)

f. Is a bedding/filter analysis and design attached? ☐ Yes ☐ No

g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

a. Identify locations and describe the basis for selection of critical location for analysis:
_____

☐ Overall height: Sta.: _____, height _____ ft.

☐ Limiting foundation soil strength:

Strength ϕ = _____ degrees, c = _____ psf

Slope: SS = _____ (h) to _____ (v)

(Repeat as needed on an added sheet for additional locations)

b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):
_____

c. Summary of stability analysis results:

E. LEVEE/FLOODWALL (CONTINUED)

5. Embankment And Foundation Stability (continued)

Case	Loading Conditions	Critical Safety Factor	Criteria (Min.)
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

d. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No

If Yes, describe methodology used:

e. Was a seepage analysis for the foundation performed? ☐ Yes ☐ No

f. Were uplift pressures at the embankment landside toe checked? ☐ Yes ☐ No

g. Were seepage exit gradients checked for piping potential? ☐ Yes ☐ No

h. The duration of the base flood hydrograph against the embankment is _____ hours.

Attach engineering analysis to support construction plans.

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one): ☐ UBC (1988) ☐ Other (specify): _____

b. Stability analysis submitted provides for: ☐ Overturning ☐ Sliding If not, explain: _____

c. Loading included in the analyses were: ☐ Lateral earth @ P_A = _____ psf; P_p = _____ psf

☐ Surcharge-Slope @ _____, ☐ surface _____ psf

☐ Wind @ P_w = _____ psf

☐ Seepage (Uplift); _____ ☐ Earthquake @ P_{eq} = _____ %g

☐ 1%-annual-chance significant wave height: _____ ft.

☐ 1%-annual-chance significant wave period: _____ sec.

d. Summary of Stability Analysis Results: Factors of Safety.
Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)
Note: (Extend table on an added sheet as needed and reference)

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability (continued)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection ☐ is, ☐ is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☐ Yes ☐ No

b. The computed range of settlement is _____ ft. to _____ ft.

c. Settlement of the levee crest is determined to be primarily from : ☐ Foundation consolidation ☐ Embankment compression ☐ Other (Describe): _____

d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Draining to pressure conduit: _____ acres
Draining to ponding area: _____ acres

b. Relationships Established

Ponding elevation vs. storage	☐ Yes	☐ No
Ponding elevation vs. gravity flow	☐ Yes	☐ No
Differential head vs. gravity flow	☐ Yes	☐ No

c. The river flow duration curve is enclosed: ☐ Yes ☐ No

d. Specify the discharge capacity of the head pressure conduit: _____ cfs

e. Which flooding conditions were analyzed?

• Gravity flow (Interior Watershed)	☐ Yes	☐ No
• Common storm (River Watershed)	☐ Yes	☐ No
• Historical ponding probability	☐ Yes	☐ No
• Coastal wave overtopping	☐ Yes	☐ No

If No for any of the above, attach explanation.

e. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☐ Yes ☐ No If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is _____ cfs

h. The length of levee system used to drive this seepage rate in item g: _____ ft.

E. LEVEE/FLOODWALL (CONTINUED)

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? ☐ Yes ☐ No

If Yes, include the number of pumping plants: _____ For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? ☐ Yes ☐ No

If the pumps are electric, are there backup power sources? ☐ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem

Hydrocompaction ☐ is ☐ is not a problem

Heave differential movement due to soils of high shrink/swell ☐ is ☐ is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
☐ Yes ☐ No Attach supporting documentation

d. Sediment Transport Considerations:

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

10. Operational Plan And Criteria

a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No

b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations?
☐ Yes ☐ No

c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations?
☐ Yes ☐ No If the answer is No to any of the above, please attach supporting documentation.

E. LEVEE/FLOODWALL (CONTINUED)

11. Maintenance Plan

Please attach a copy of the fomal maintenance plan for the levee/floodwall

12. Operations and Maintenance Plan

Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

CERTIFICATION OF THE LEVEE DOCUMENTION

This certification is to be signed and sealed by a licensed registered professional engineer authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.10(e) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: _____ License No.: _____ Expiration Date: _____

Company Name: _____ Telephone No.: _____ Fax No.: _____

Signature: _____ Date: _____ E-Mail Address: _____

F. SEDIMENT TRANSPORT

Flooding Source: _____

Name of Structure: _____

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume _____ acre-feet

Debris load associated with the base flood discharge: Volume _____ acre-feet

Sediment transport rate _____ (percent concentration by volume)

Method used to estimate sediment transport: _____

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition: _____

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport: _____

Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

MT-2 FORM 3 ATTACHMENT

MT-2 Form 3

B. #4 – Based on the local topography, soil type, and cover, it is assumed that sediment transport will not have a significant impact on the results of the hydrologic or hydraulic calculations. In addition, the overall design is a closed conduit system. Because there is no opportunity for sediment to build up inside the proposed system, sedimentation was not considered for design.

C. #4 – Based on the local topography, soil type, and cover, it is assumed that sediment transport will not have a significant impact on the results of the hydrologic or hydraulic calculations. In addition, the overall design is a closed conduit system. Because there is no opportunity for sediment to build up inside the proposed system, sedimentation was not considered for design.

FEDERAL EMERGENCY MANAGEMENT AGENCY

PAYMENT INFORMATION FORM

Community Name: City of North Las Vegas, Clark County

Project Identifier: Eldorado R1-60 No. 16

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

Please make check or money order payable to the National Flood Insurance Program.

Type of Request:

☐ MT-1 application
☒ MT-2 application

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

☐ EDR application

FEMA Project Library
847 South Pickett Street
Alexandria, VA 22304-4605
FAX (703) 212-4090

Request No. (if known): _____ **Check No.:** 2705397 **Amount:** $5,000

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

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

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

COMPLETE THIS SECTION *ONLY* IF PAYING BY CREDIT CARD

CARD NUMBER EXP. DATE

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

_____ _____

Date Signature

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

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

DAYTIME PHONE: _____

PardeeHomes®

2120 Park Place, Suite 120
El Segundo, CA 90245
(310) 955-3100

usbank

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1222

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Check Date 10/10/2014

Vendor # 150250

Pay Exactly
*FIVE THOUSAND AND 00/100**

$*****5,000.00

VOID IF NOT CASHED IN 90 DAYS
TWO SIGNATURES REQUIRED OVER $100,000.00

TO THE ORDER OF
NATIONAL FLOOD INSURANCE PROGRAM
LOMC CLEARINGHOUSE
6730 SANTA BARBARA COURT
ELKRIDGE MD 21075

⑈02705397⑈ ⑆122235821⑆ 153497054947⑈

3.1 HYDRAULIC MODELING COMPUTATIONS

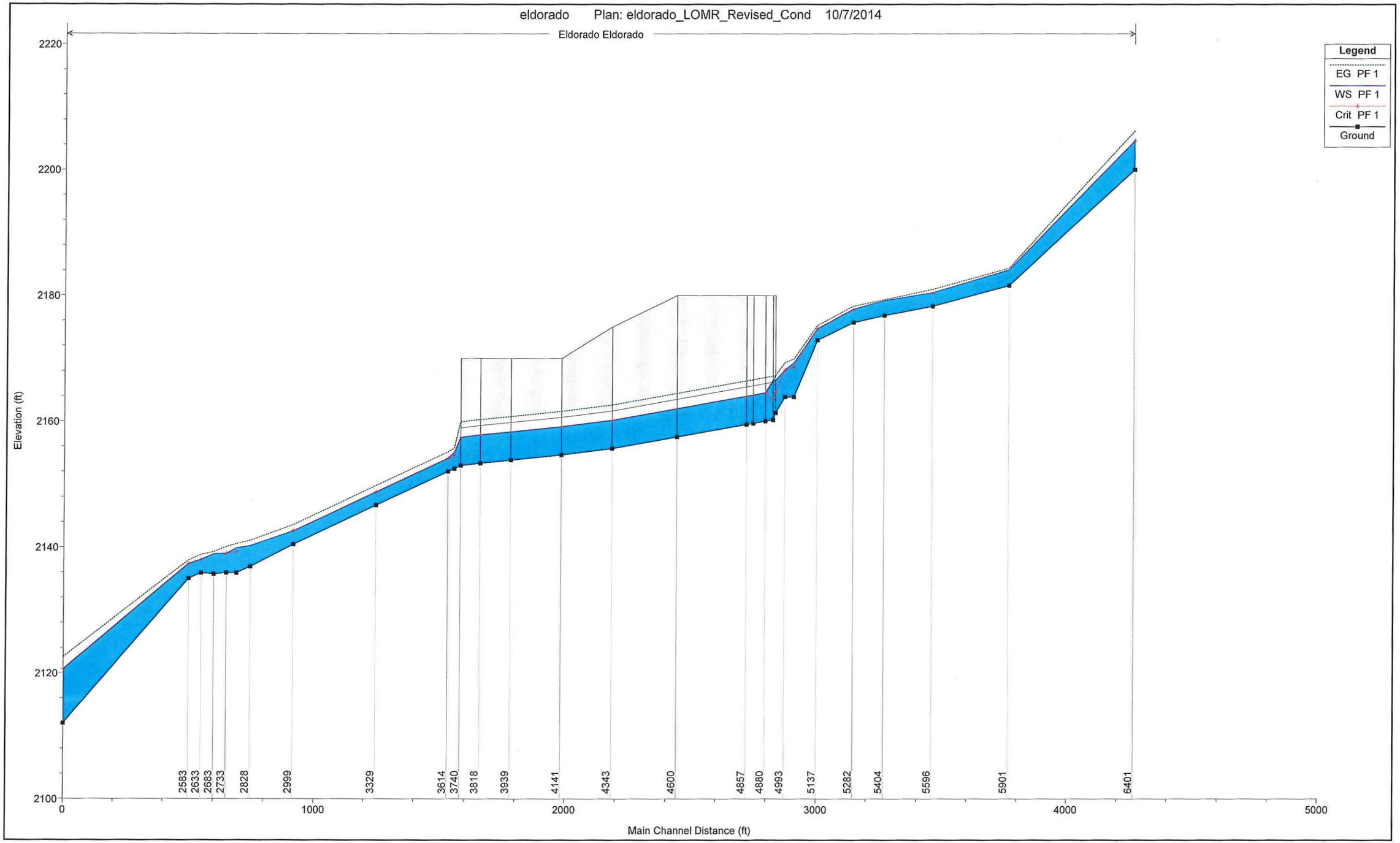
HEC-RAS Model: Duplicate Effective Model
HEC-RAS Model: Post Project Model with CheckRAS

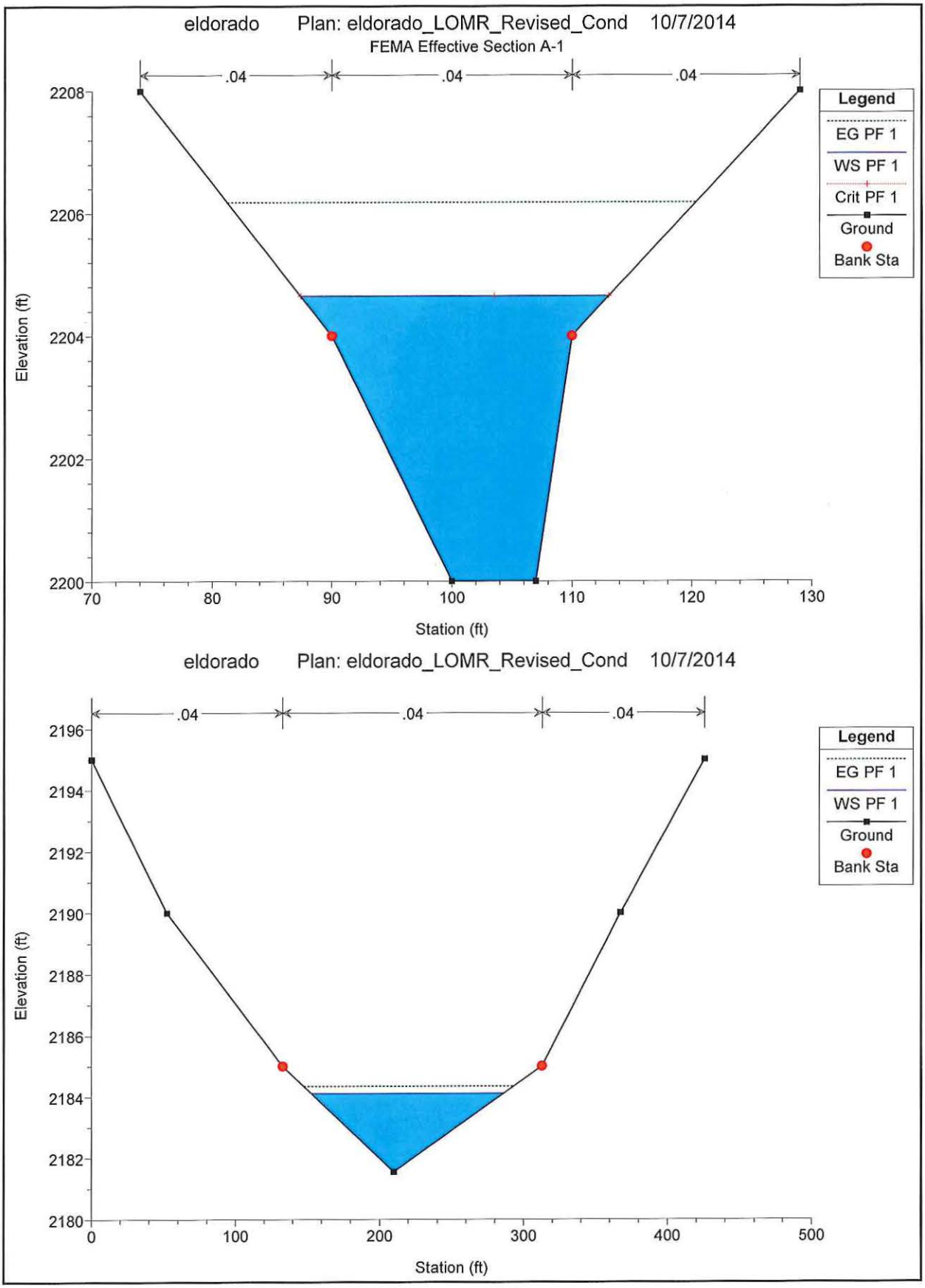
HEC-RAS Model: Duplicate Effective Model

HEC-RAS Plan: LOMRREV River: Eldorado Reach: Eldorado Profile: PF 1

Reach	River Sta	Profile	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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Eldorado	6401	PF 1	671.00	2200.00	2204.65	2204.65	2206.18	0.017031	9.95	68.84	25.68	0.96
Eldorado	5901	PF 1	671.00	2181.55	2184.11		2184.35	0.008143	3.94	170.10	133.14	0.62
Eldorado	5596	PF 1	671.00	2178.29	2180.47	2180.36	2180.96	0.015702	5.62	121.85	104.28	0.86
Eldorado	5404	PF 1	671.00	2176.80	2179.23		2179.36	0.004638	2.88	233.19	192.16	0.46
Eldorado	5282	PF 1	671.00	2175.70	2177.87	2177.78	2178.32	0.018605	5.35	125.41	115.50	0.90
Eldorado	5137	PF 1	671.00	2172.90	2174.77	2174.77	2175.25	0.024263	5.53	121.28	129.67	1.01
Eldorado	5043	PF 1	671.00	2163.90	2169.32	2168.63	2169.92	0.007688	6.24	109.14	41.93	0.65
Eldorado	4993	PF 1	671.00	2163.90	2168.22	2168.22	2169.32	0.019218	8.43	79.62	36.66	1.00
Eldorado	4960	PF 1	671.00	2161.36	2166.54	2164.62	2167.27	0.008617	6.89	97.40	12.70	0.53
Eldorado	4950	PF 1	671.00	2160.25	2166.58	2163.49	2167.22	0.001107	6.44	104.24		0.45
Eldorado	4880	PF 1	671.00	2160.04	2164.57	2164.57	2166.99	0.003461	12.48	53.78	10.96	1.03
Eldorado	4870	PF 1	671.00	2159.68	2164.21	2164.21	2166.63	0.003457	12.47	53.80	10.95	1.03
Eldorado	4857	PF 1	671.00	2159.50	2164.04	2164.04	2166.45	0.003454	12.47	53.82	10.95	1.03
Eldorado	4600	PF 1	671.00	2157.51	2162.04	2162.04	2164.46	0.003460	12.48	53.78	10.96	1.03
Eldorado	4343	PF 1	671.00	2155.66	2160.19	2160.19	2162.61	0.003456	12.47	53.81	10.95	1.03
Eldorado	4141	PF 1	671.00	2154.65	2159.18	2159.18	2161.60	0.003458	12.47	53.79	10.95	1.03
Eldorado	3939	PF 1	671.00	2153.82	2158.35	2158.35	2160.77	0.003455	12.47	53.81	10.95	1.03
Eldorado	3818	PF 1	671.00	2153.34	2157.87	2157.87	2160.29	0.003459	12.47	53.79	10.96	1.03
Eldorado	3740	PF 1	671.00	2152.95	2157.49	2157.49	2159.90	0.003452	12.47	53.83	10.95	1.03
Eldorado	3639	PF 1	671.00	2152.47	2155.12	2154.62	2155.73	0.013238	6.29	106.60	45.58	0.73
Eldorado	3614	PF 1	671.00	2152.00	2154.15	2154.15	2155.13	0.026983	7.95	84.44	43.59	1.01
Eldorado	3329	PF 1	671.00	2146.66	2148.81	2148.81	2149.79	0.005898	7.94	84.50	43.60	1.01
Eldorado	2999	PF 1	671.00	2140.44	2142.59	2142.59	2143.57	0.005914	7.95	84.43	43.59	1.01
Eldorado	2828	PF 1	671.00	2136.90	2140.23		2141.05	0.010110	7.27	93.31	35.12	0.77
Eldorado	2773	PF 1	671.00	2135.90	2139.89	2139.27	2140.53	0.006981	6.94	110.51	42.87	0.66
Eldorado	2733	PF 1	671.00	2135.90	2139.00	2139.00	2140.06	0.018919	8.26	81.25	38.62	1.00
Eldorado	2683	PF 1	671.00	2135.70	2138.93		2139.24	0.004453	4.69	155.46	72.86	0.51
Eldorado	2633	PF 1	671.00	2135.90	2138.07	2138.00	2138.80	0.018989	7.29	103.64	81.62	0.98
Eldorado	2583	PF 1	671.00	2135.00	2137.42	2137.42	2137.92	0.014030	6.77	132.55	124.20	0.86
Eldorado	2083	PF 1	671.00	2112.00	2120.66	2120.66	2122.54	0.025405	11.06	62.84	20.90	0.87

eldorado Plan: eldorado_LOMR_Revised_Cond 10/7/2014

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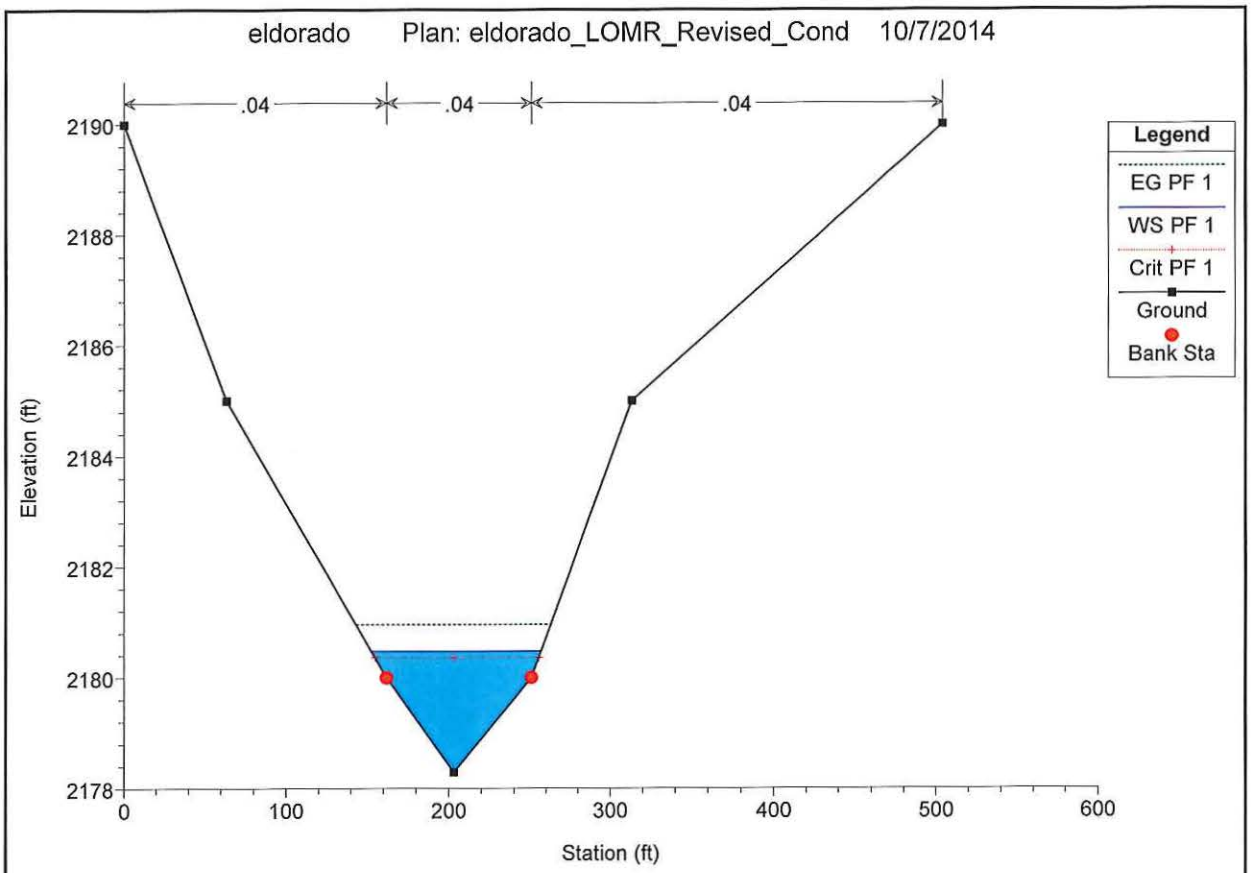
FEMA Effective Section A-1
.04
.04
.04
2208
2206
2204
2202
2200
Elevation (ft)
70
80
90
100
110
120
130
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
eldorado Plan: eldorado_LOMR_Revised_Cond 10/7/2014
.04
.04
.04
2196
2194
2192
2190
2188
2186
2184
2182
2180
Elevation (ft)
0
100
200
300
400
500
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta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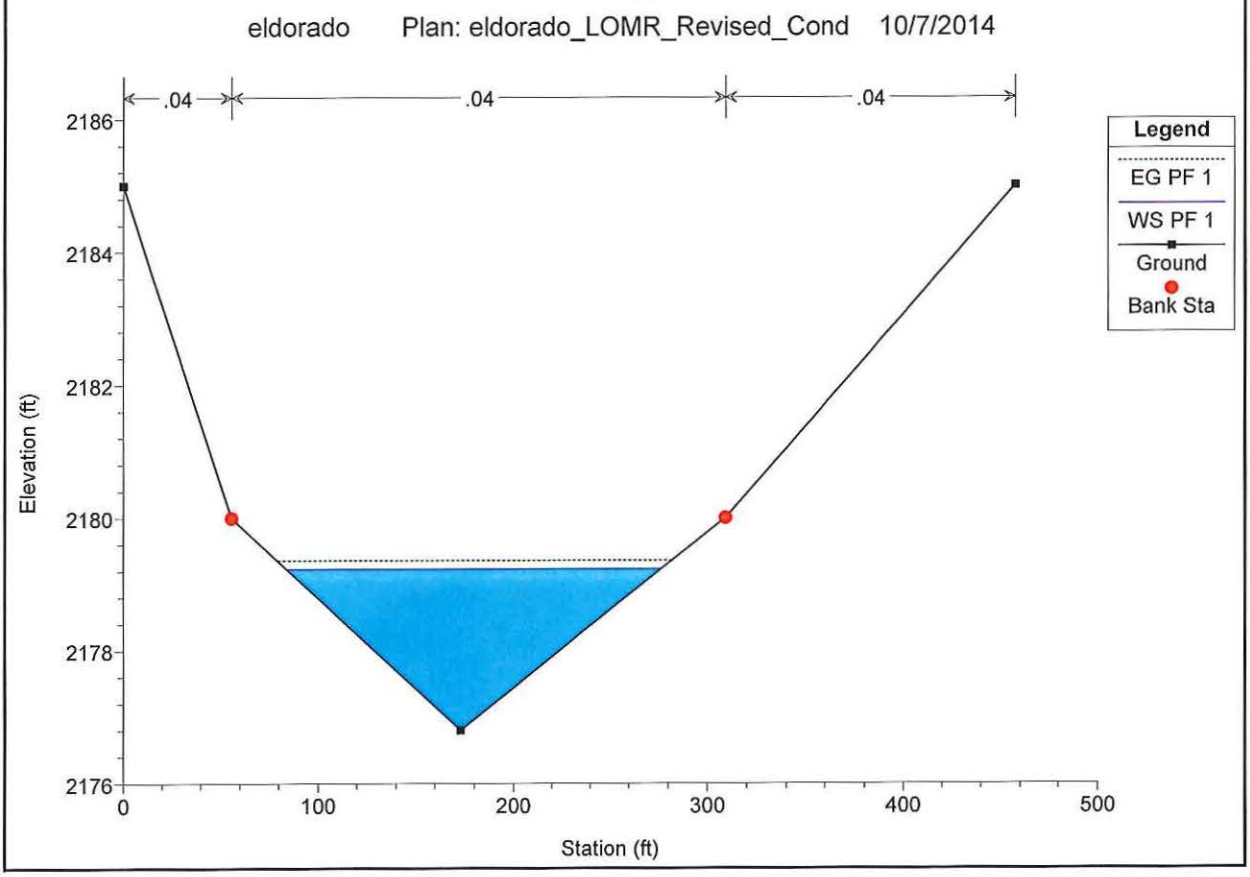
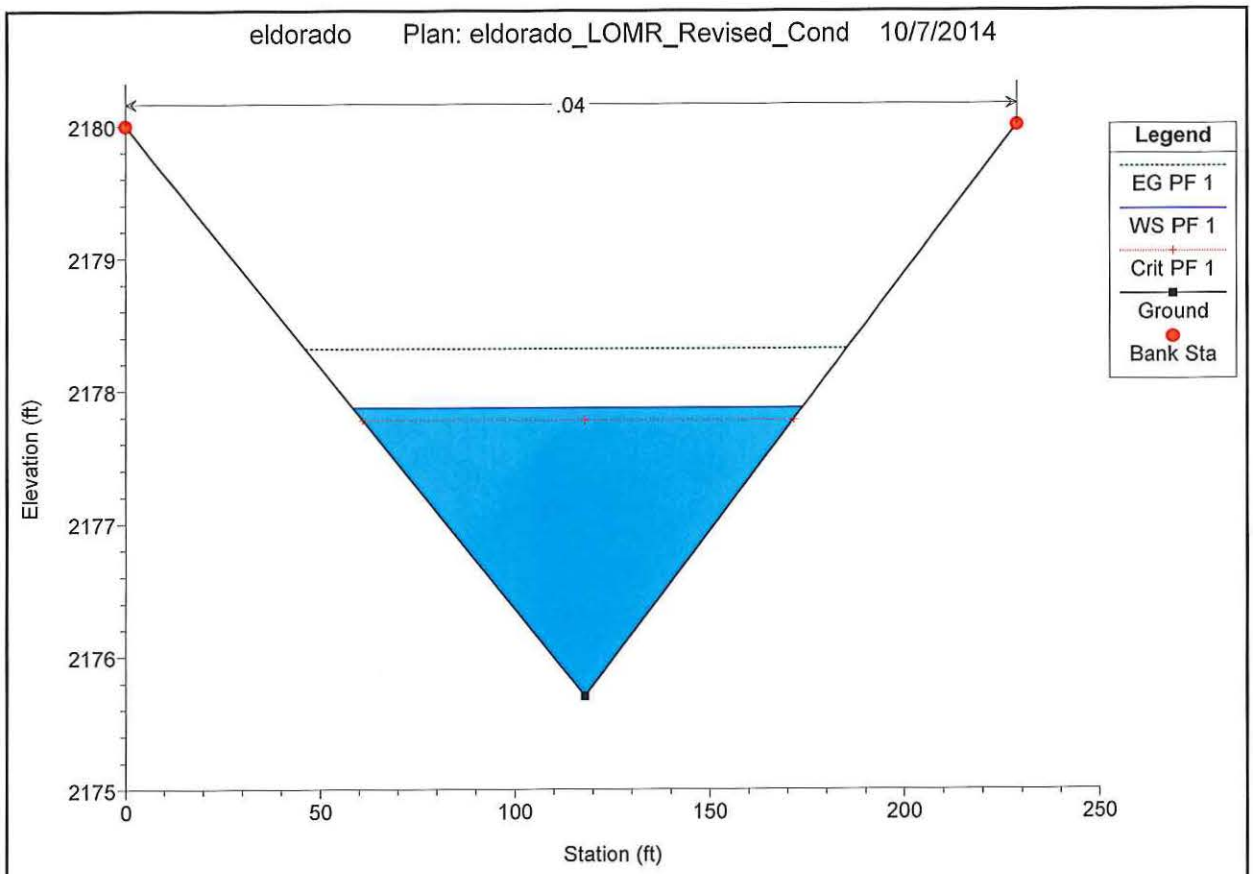
.04
.04
.04
2190
2188
2186
2184
2182
2180
2178
Elevation (ft)
0
100
200
300
400
500
600
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


eldorado Plan: eldorado_LOMR_Revised_Cond 10/7/2014
.04
.04
.04
2186
2184
2182
2180
2178
2176
Elevation (ft)
0
100
200
300
400
500
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta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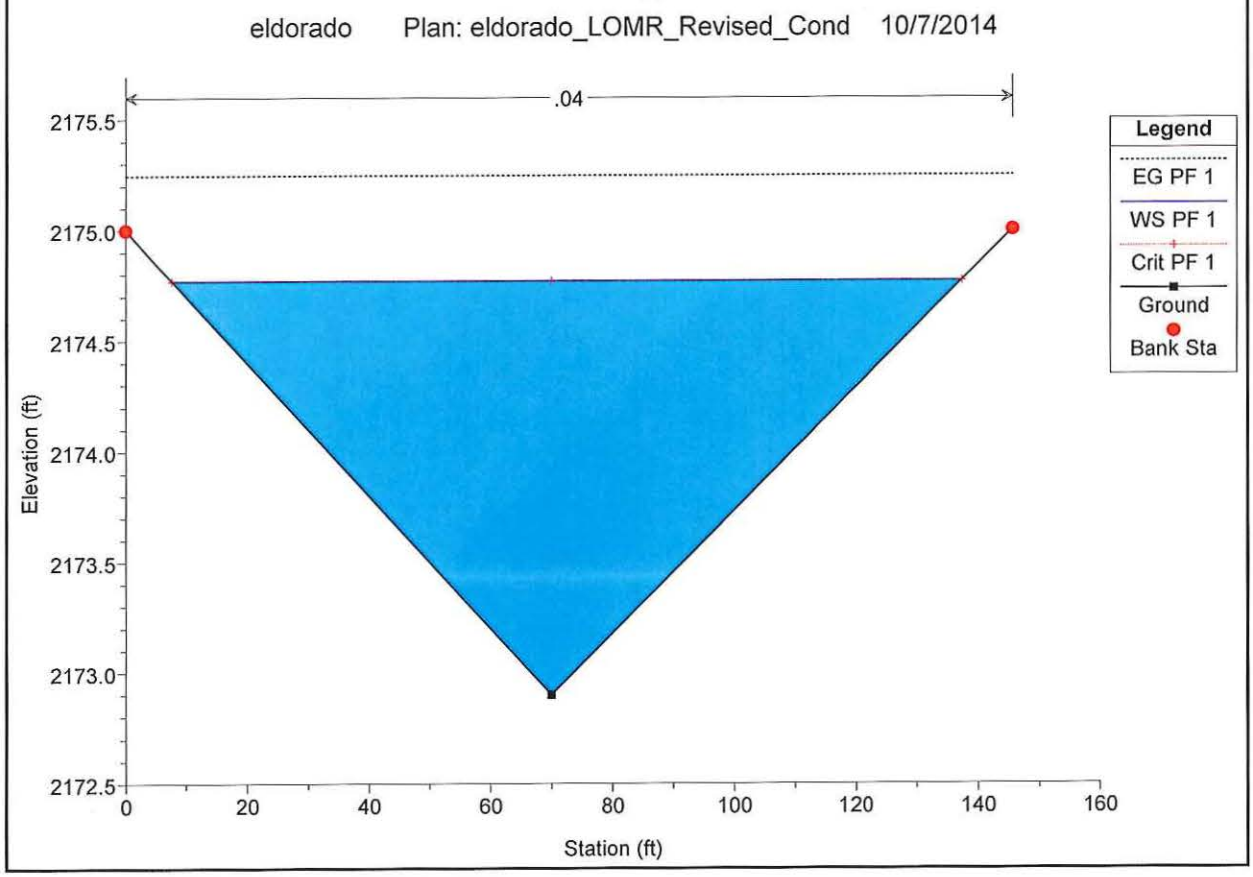
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2180
2179
2178
2177
2176
2175
0
50
100
150
200
250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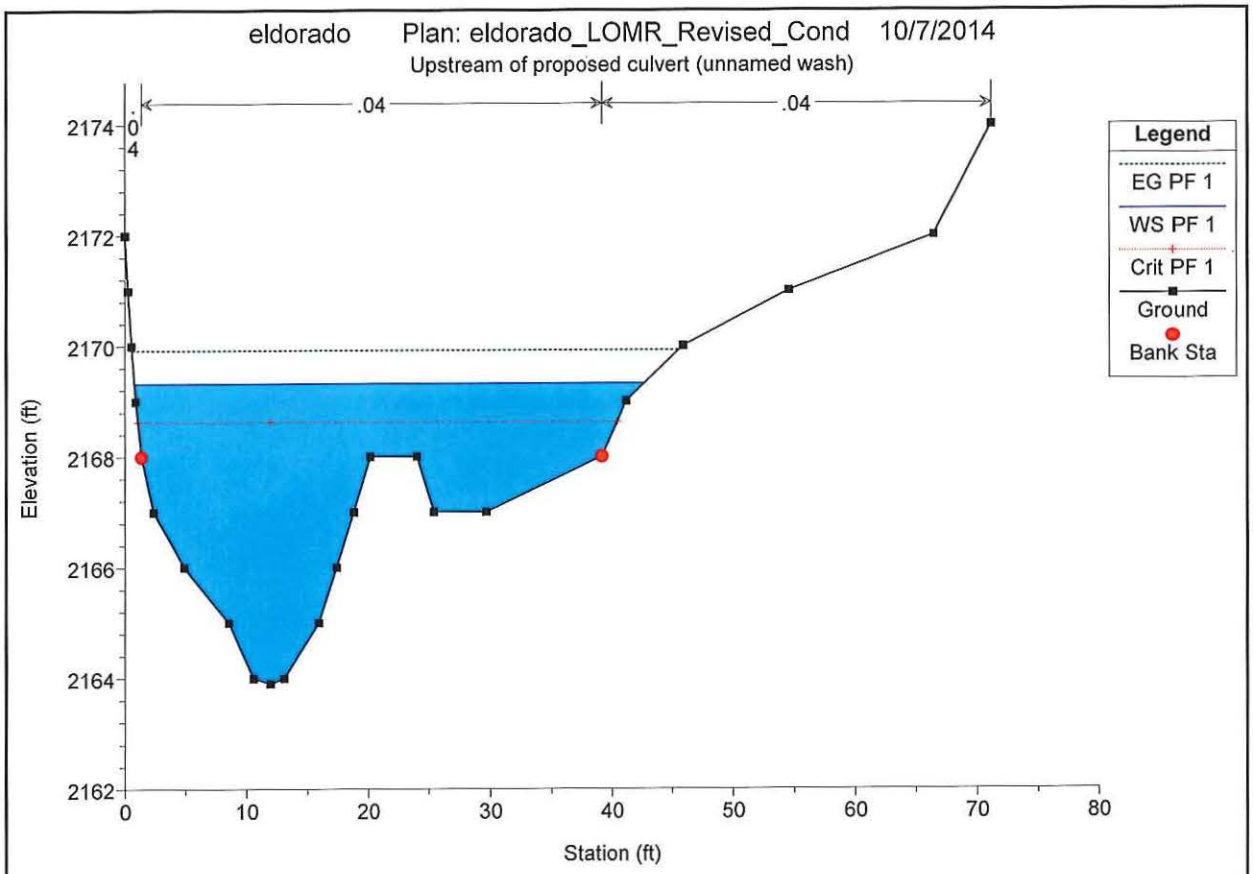
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2175.5
2175.0
2174.5
2174.0
2173.5
2173.0
2172.5
0
20
40
60
80
100
120
140
160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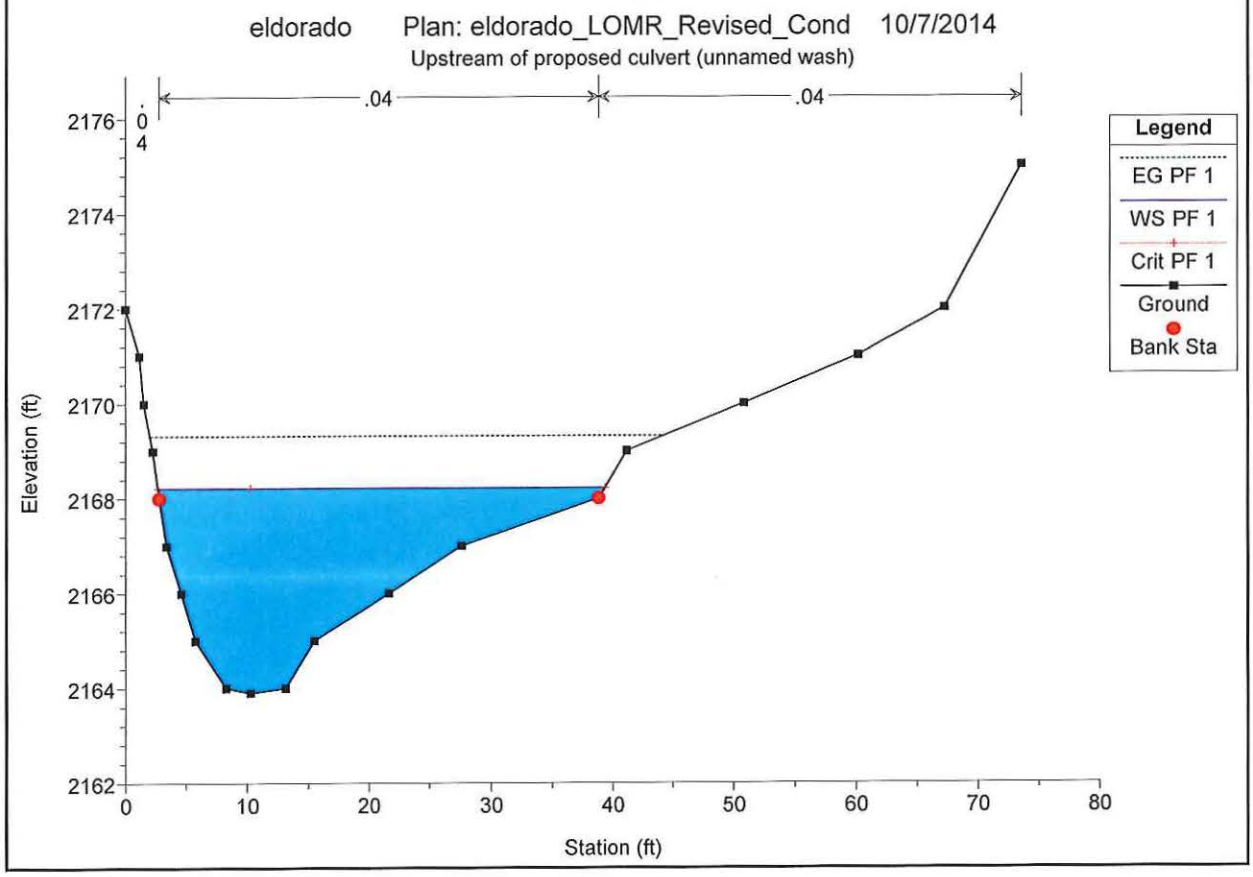
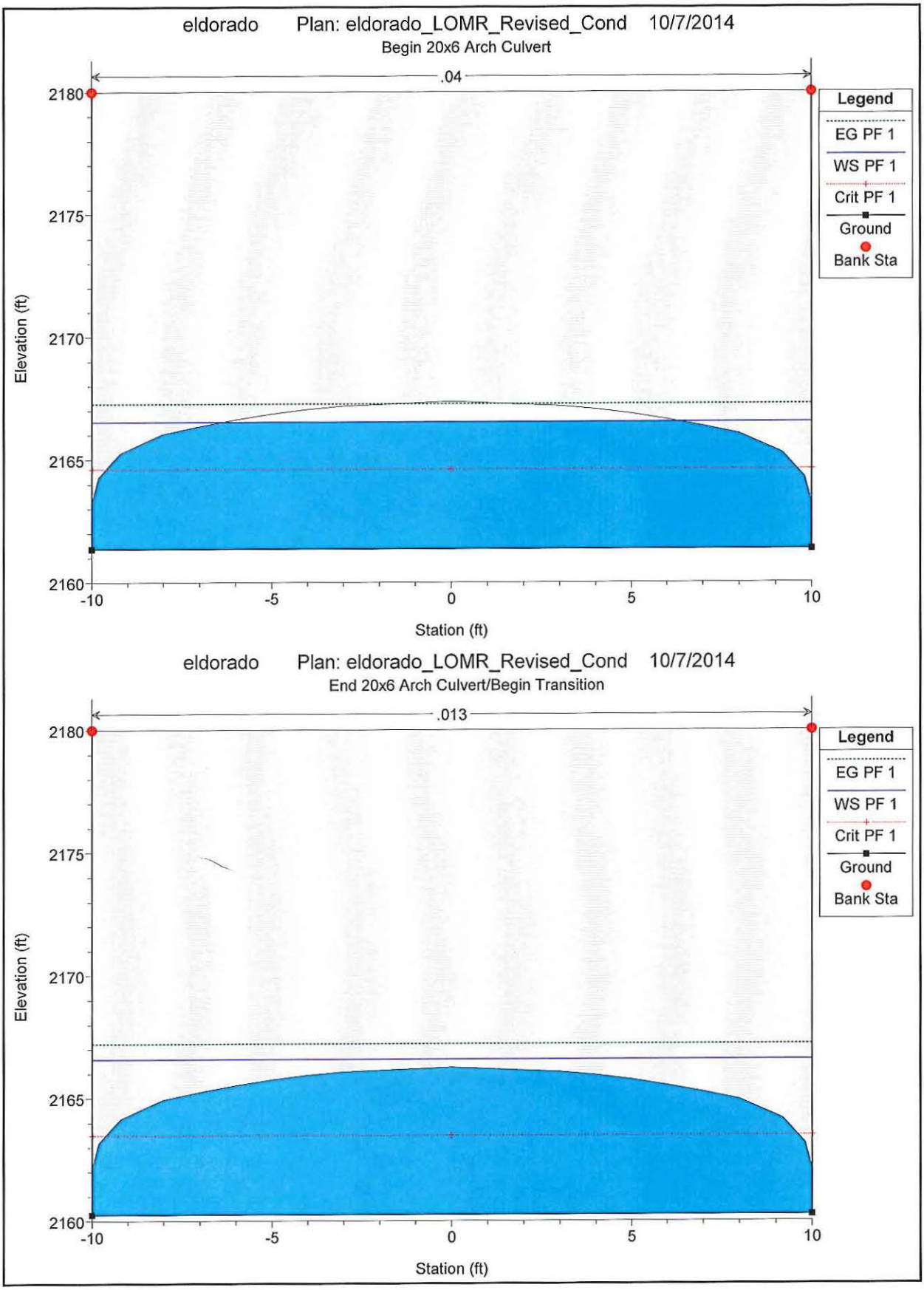
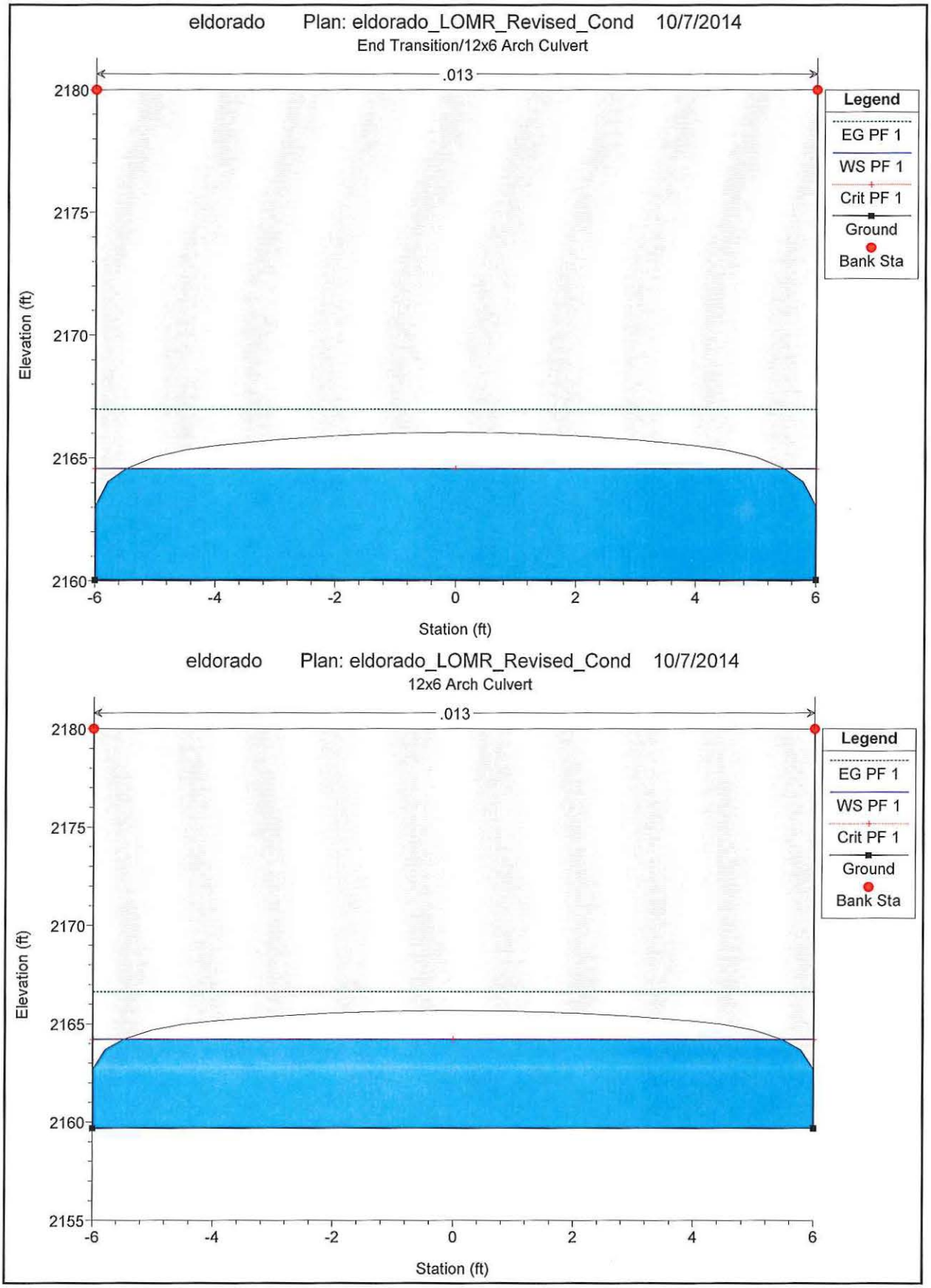
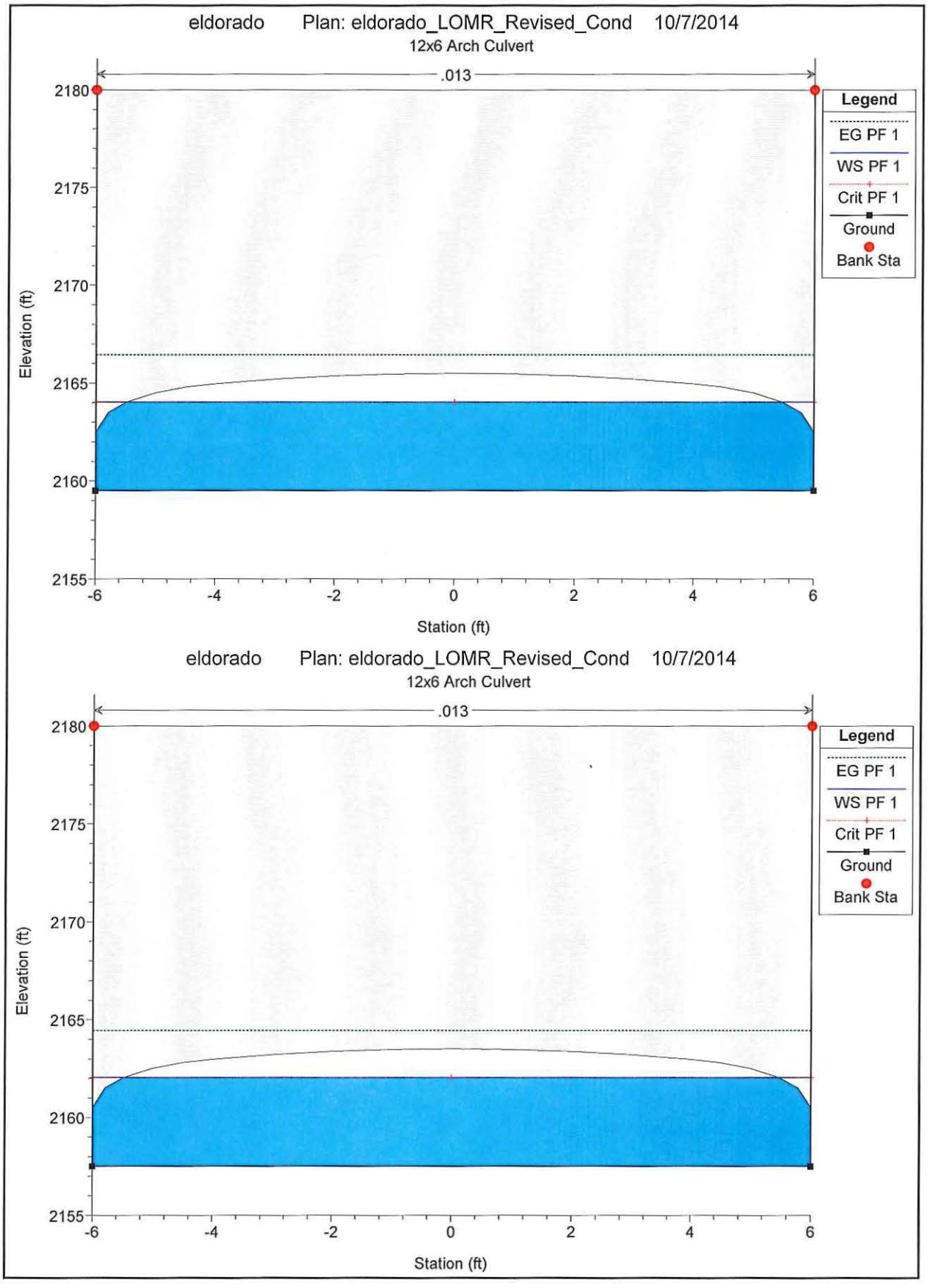
Upstream of proposed culvert (unnamed wash)
.04
.04
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2162
2164
2166
2168
2170
2172
2174
0
10
20
30
40
50
60
70
80


eldorado Plan: eldorado_LOMR_Revised_Cond 10/7/2014
Upstream of proposed culvert (unnamed wash)
.04
.04
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2162
2164
2166
2168
2170
2172
2174
2176
0
10
20
30
40
50
60
70
80


eldorado Plan: eldorado_LOMR_Revised_Cond 10/7/2014
Begin 20x6 Arch Culvert
.04
2180
2175
2170
2165
2160
Elevation (ft)
-10
-5
0
5
10
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
eldorado Plan: eldorado_LOMR_Revised_Cond 10/7/2014
End 20x6 Arch Culvert/Begin Transition
.013
2180
2175
2170
2165
2160
Elevation (ft)
-10
-5
0
5
10
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


eldorado Plan: eldorado_LOMR_Revised_Cond 10/7/2014
End Transition/12x6 Arch Culvert
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2180
2175
2170
2165
2160
-6
-4
-2
0
2
4
6
eldorado Plan: eldorado_LOMR_Revised_Cond 10/7/2014
12x6 Arch Culvert
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2180
2175
2170
2165
2160
2155
-6
-4
-2
0
2
4
6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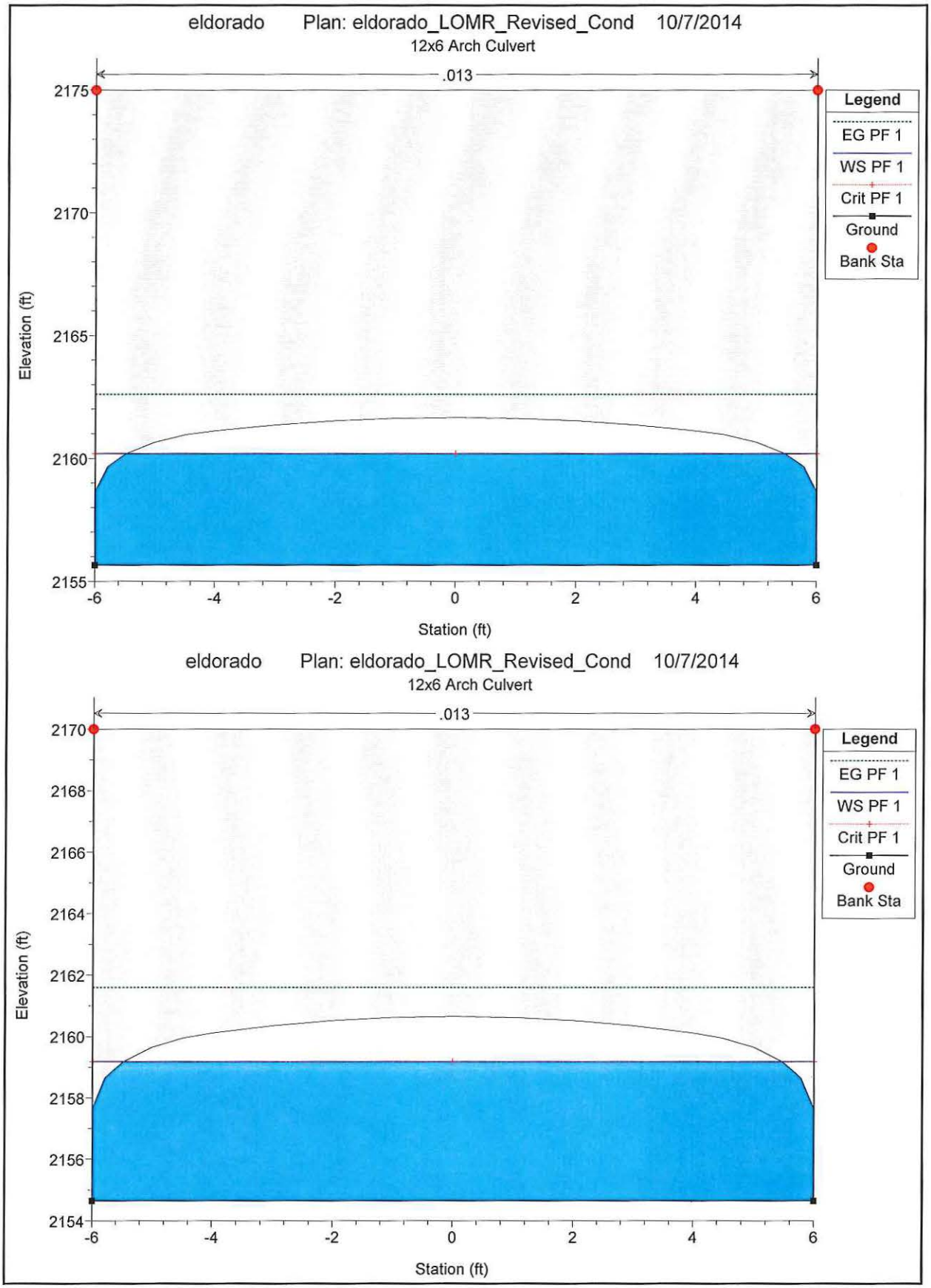
12x6 Arch Culvert
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2180
2175
2170
2165
2160
2155
-6
-4
-2
0
2
4
6
eldorado Plan: eldorado_LOMR_Revised_Cond 10/7/2014
12x6 Arch Culvert
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)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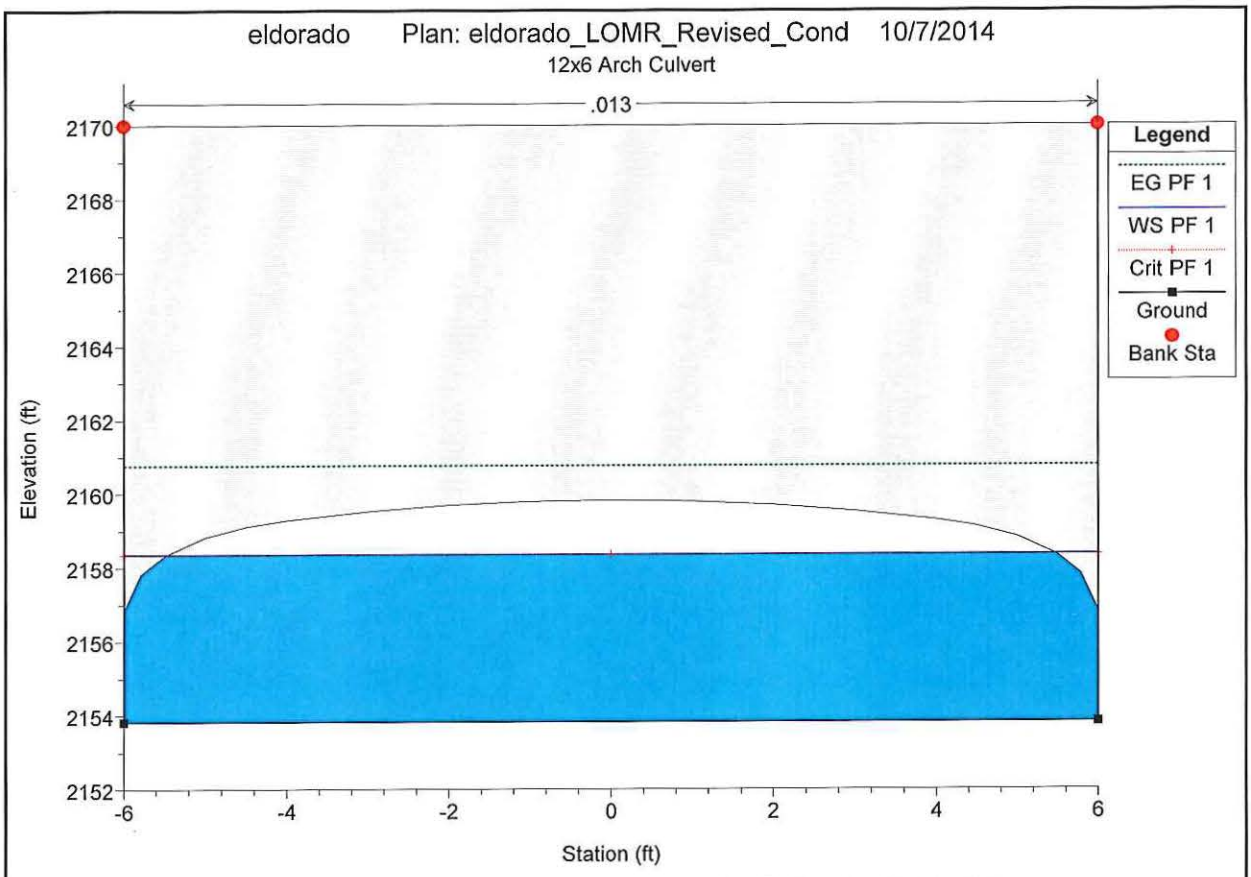
12x6 Arch Culvert
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2175
2170
2165
2160
2155
-6
-4
-2
0
2
4
6
eldorado Plan: eldorado_LOMR_Revised_Cond 10/7/2014
12x6 Arch Culvert
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2170
2168
2166
2164
2162
2160
2158
2156
2154
-6
-4
-2
0
2
4
6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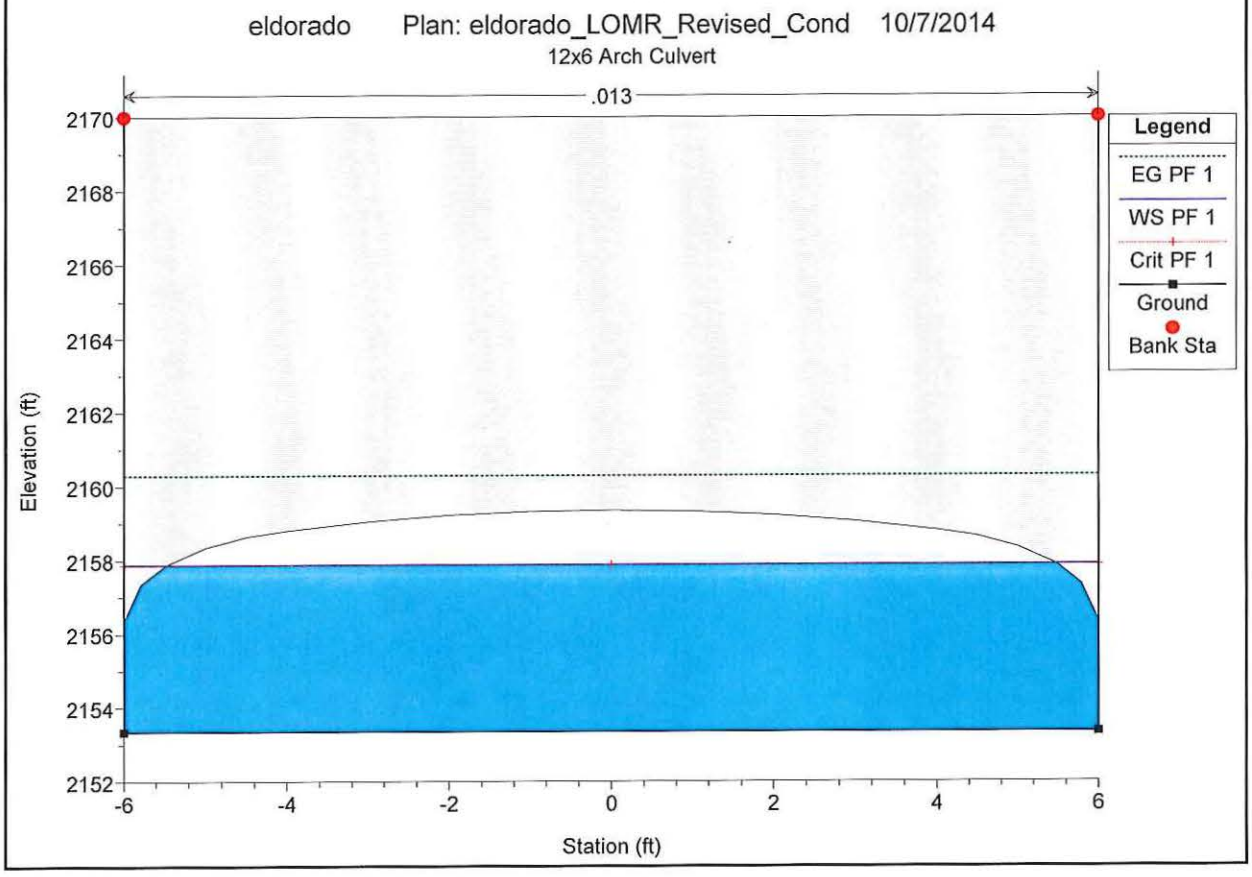
12x6 Arch Culvert
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2170
2168
2166
2164
2162
2160
2158
2156
2154
2152
-6
-4
-2
0
2
4
6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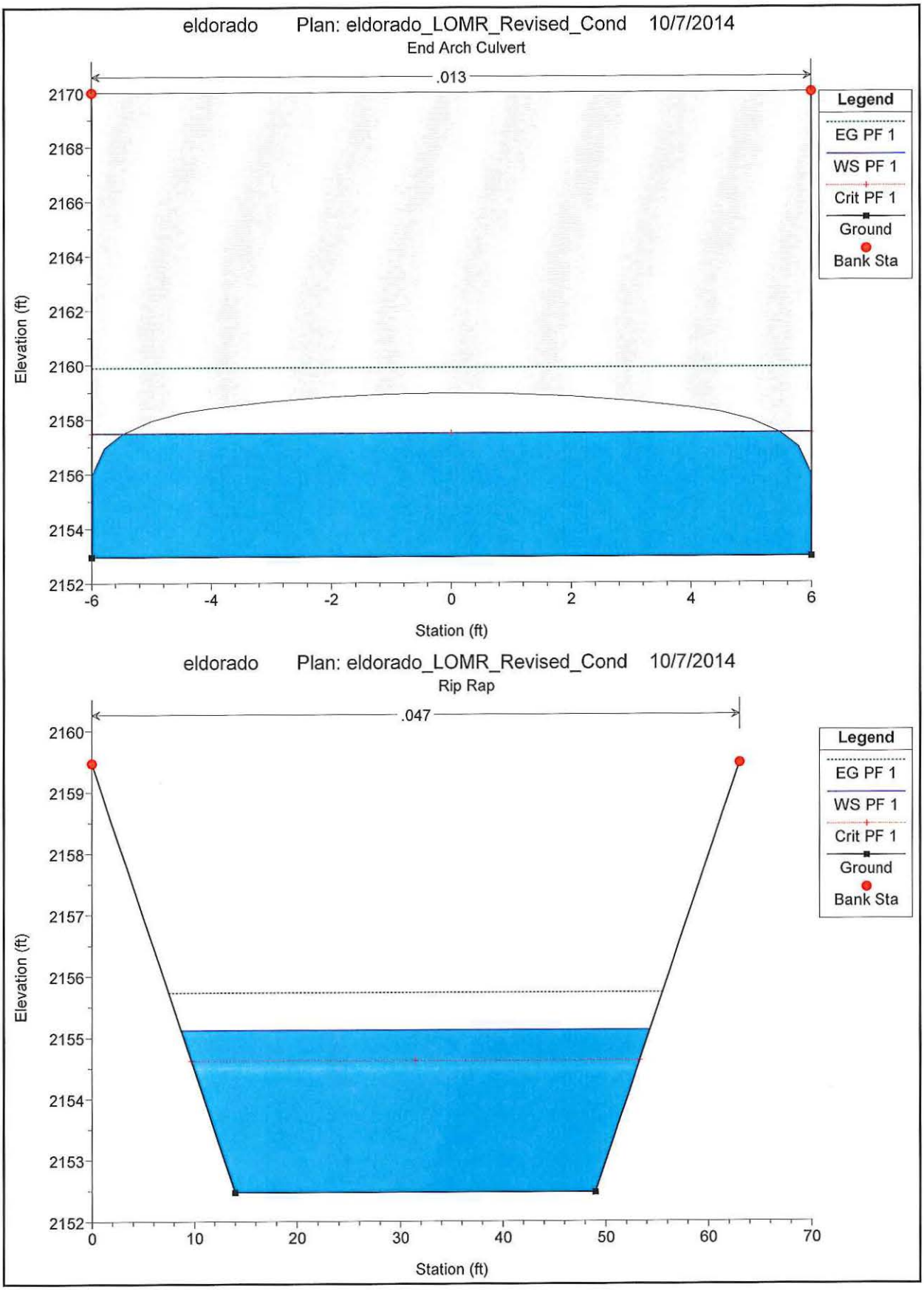
12x6 Arch Culvert
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2170
2168
2166
2164
2162
2160
2158
2156
2154
2152
-6
-4
-2
0
2
4
6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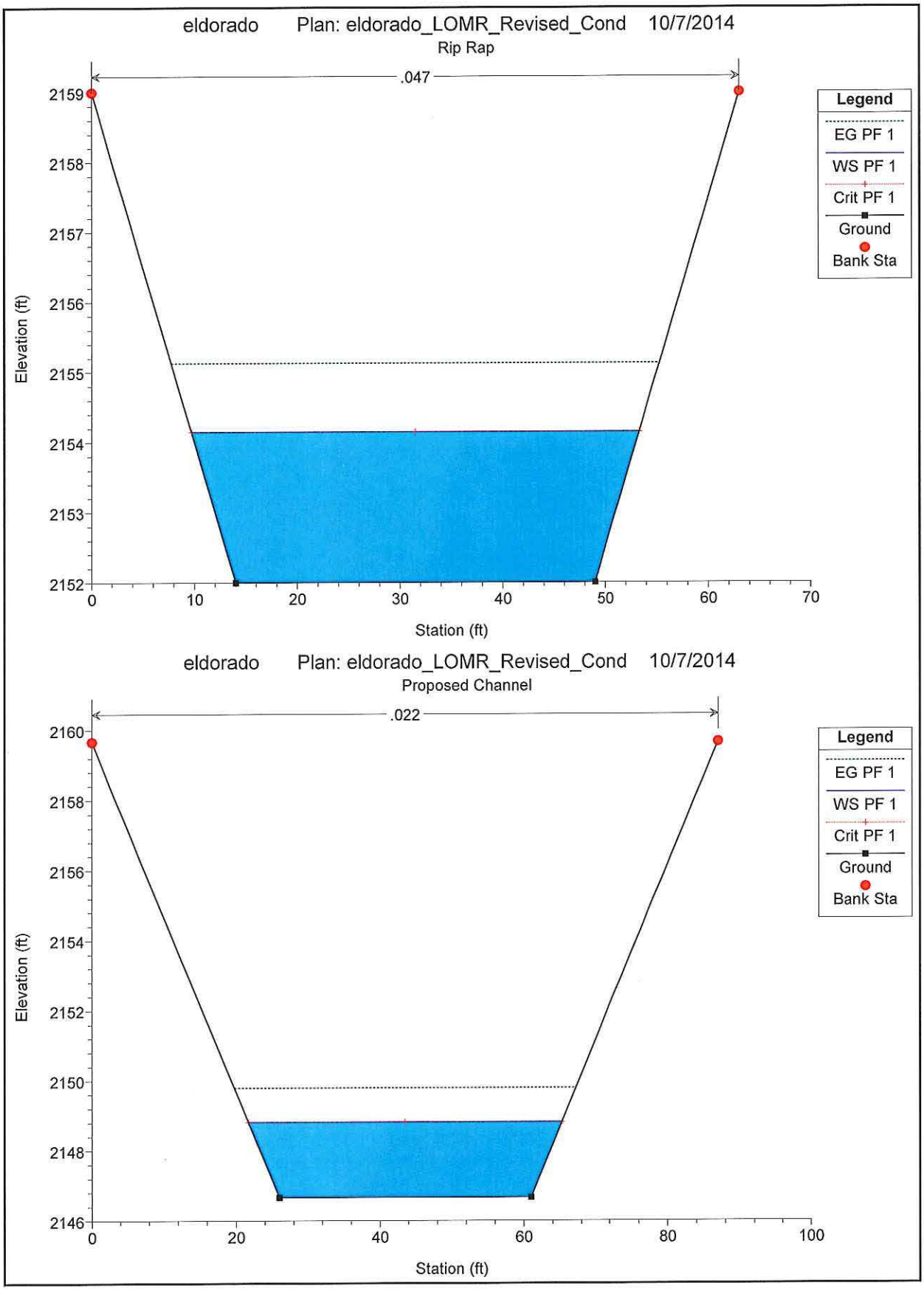
End Arch Culvert
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2170
2168
2166
2164
2162
2160
2158
2156
2154
2152
-6
-4
-2
0
2
4
6
eldorado Plan: eldorado_LOMR_Revised_Cond 10/7/2014
Rip Rap
.047
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2160
2159
2158
2157
2156
2155
2154
2153
2152
0
10
20
30
40
50
60
70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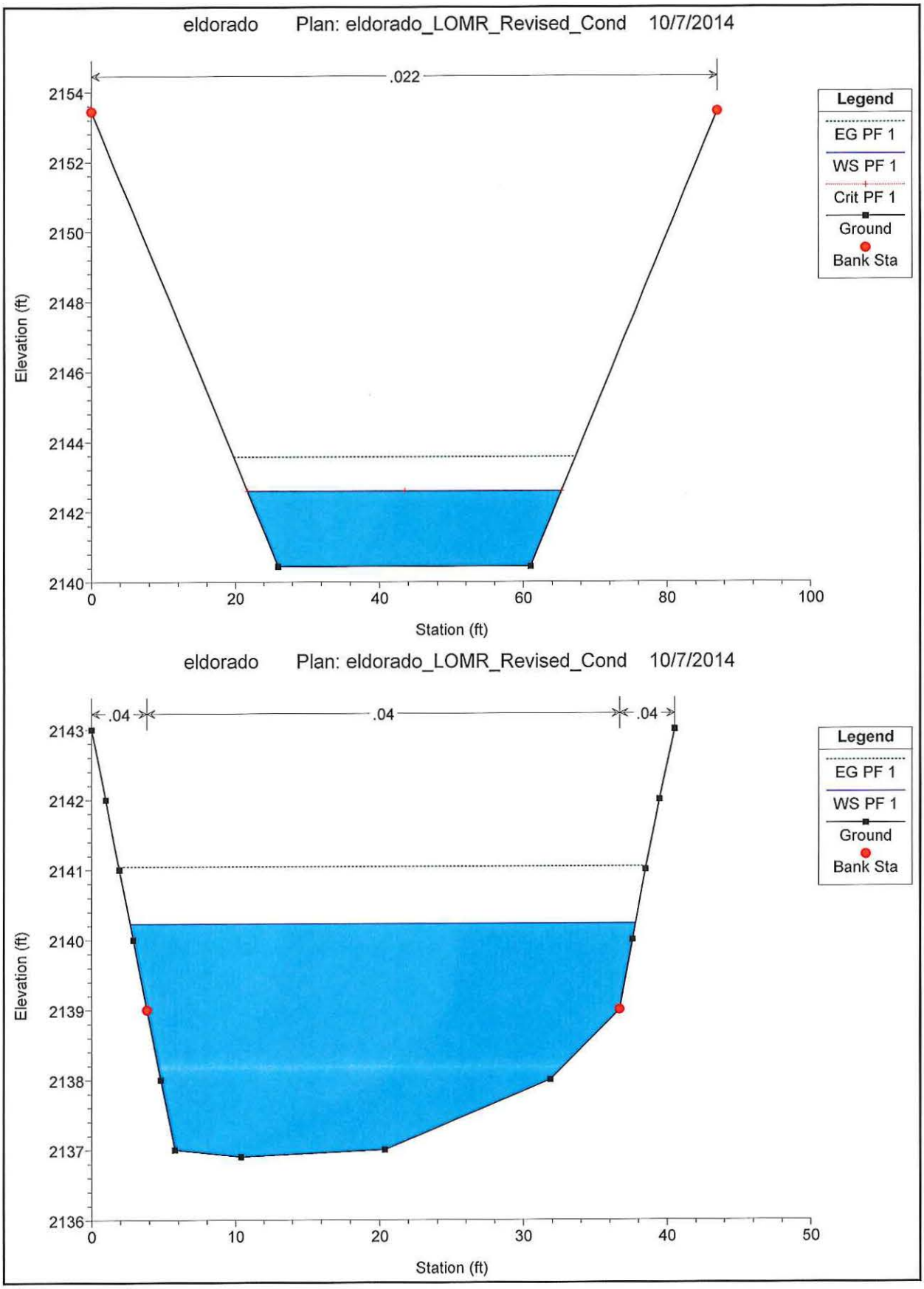
Rip Rap
.047
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2159
2158
2157
2156
2155
2154
2153
2152
0
10
20
30
40
50
60
70
eldorado Plan: eldorado_LOMR_Revised_Cond 10/7/2014
Proposed Channel
.022
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2160
2158
2156
2154
2152
2150
2148
2146
0
20
40
60
80
100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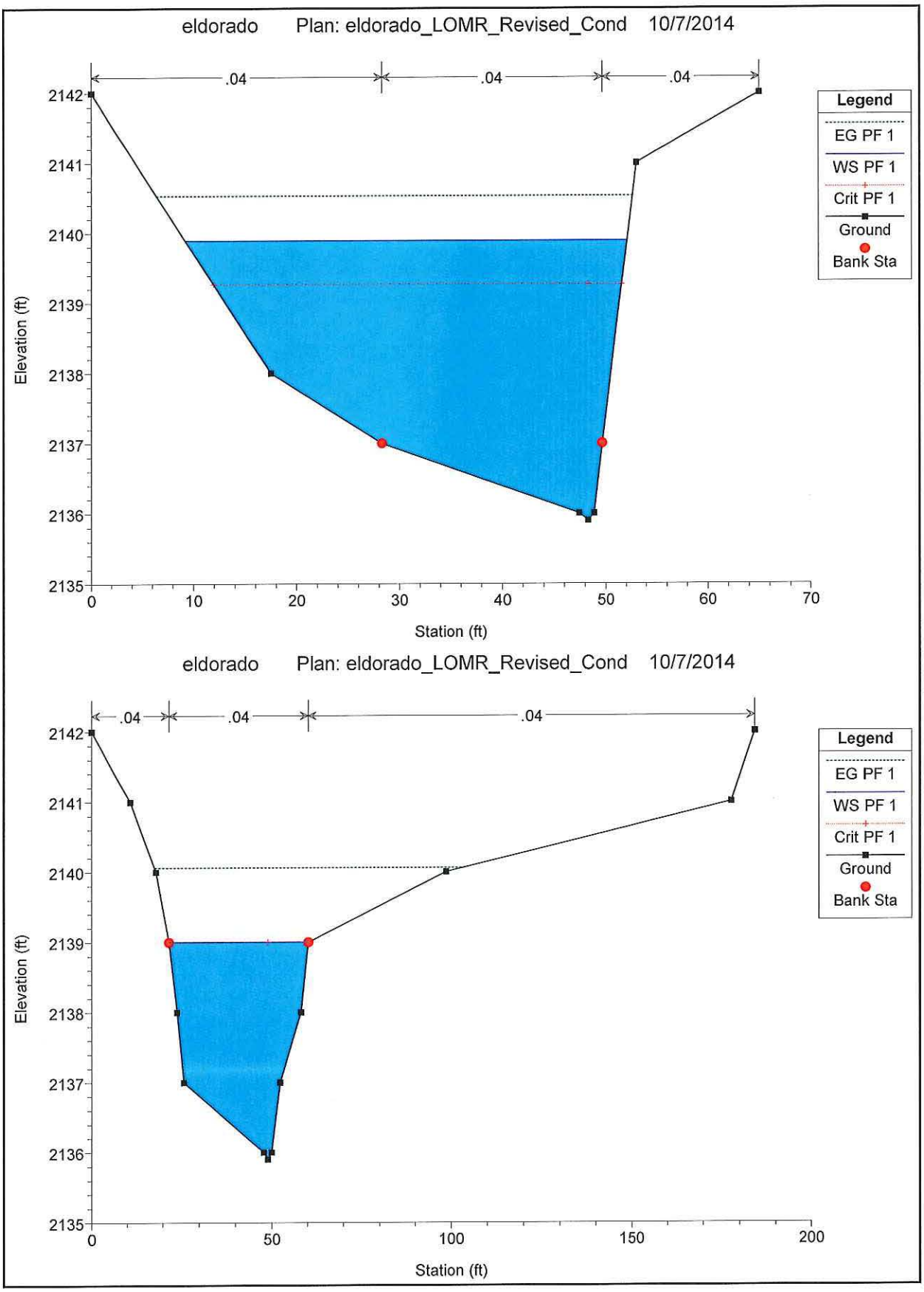
.022
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2154
2152
2150
2148
2146
2144
2142
2140
0
20
40
60
80
100
eldorado Plan: eldorado_LOMR_Revised_Cond 10/7/2014
.04
.04
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2143
2142
2141
2140
2139
2138
2137
2136
0
10
20
30
40
50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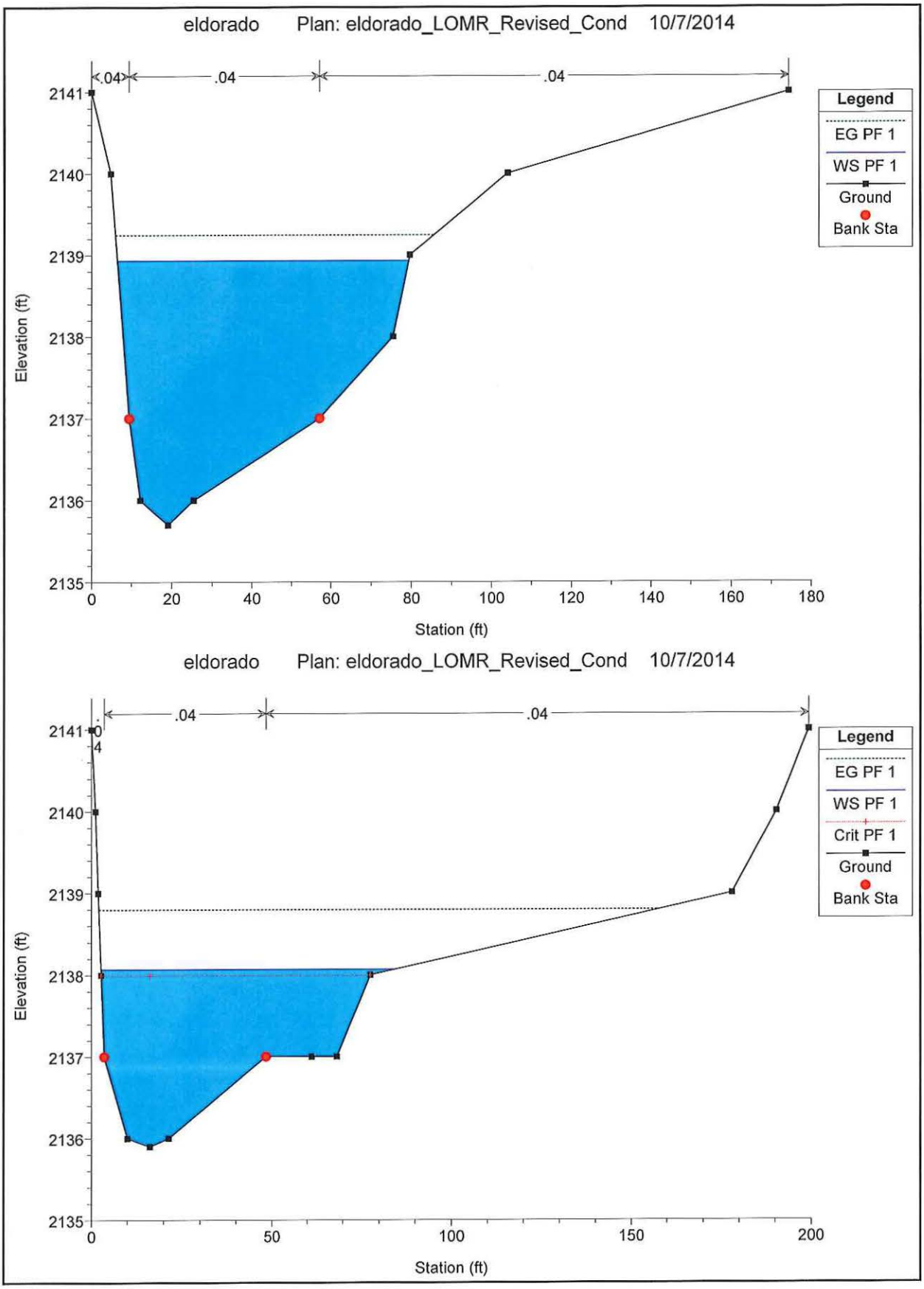
.04
.04
.04
2142
2141
2140
2139
2138
2137
2136
2135
Elevation (ft)
0
10
20
30
40
50
60
70
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
eldorado Plan: eldorado_LOMR_Revised_Cond 10/7/2014
.04
.04
.04
2142
2141
2140
2139
2138
2137
2136
2135
Elevation (ft)
0
50
100
150
200
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta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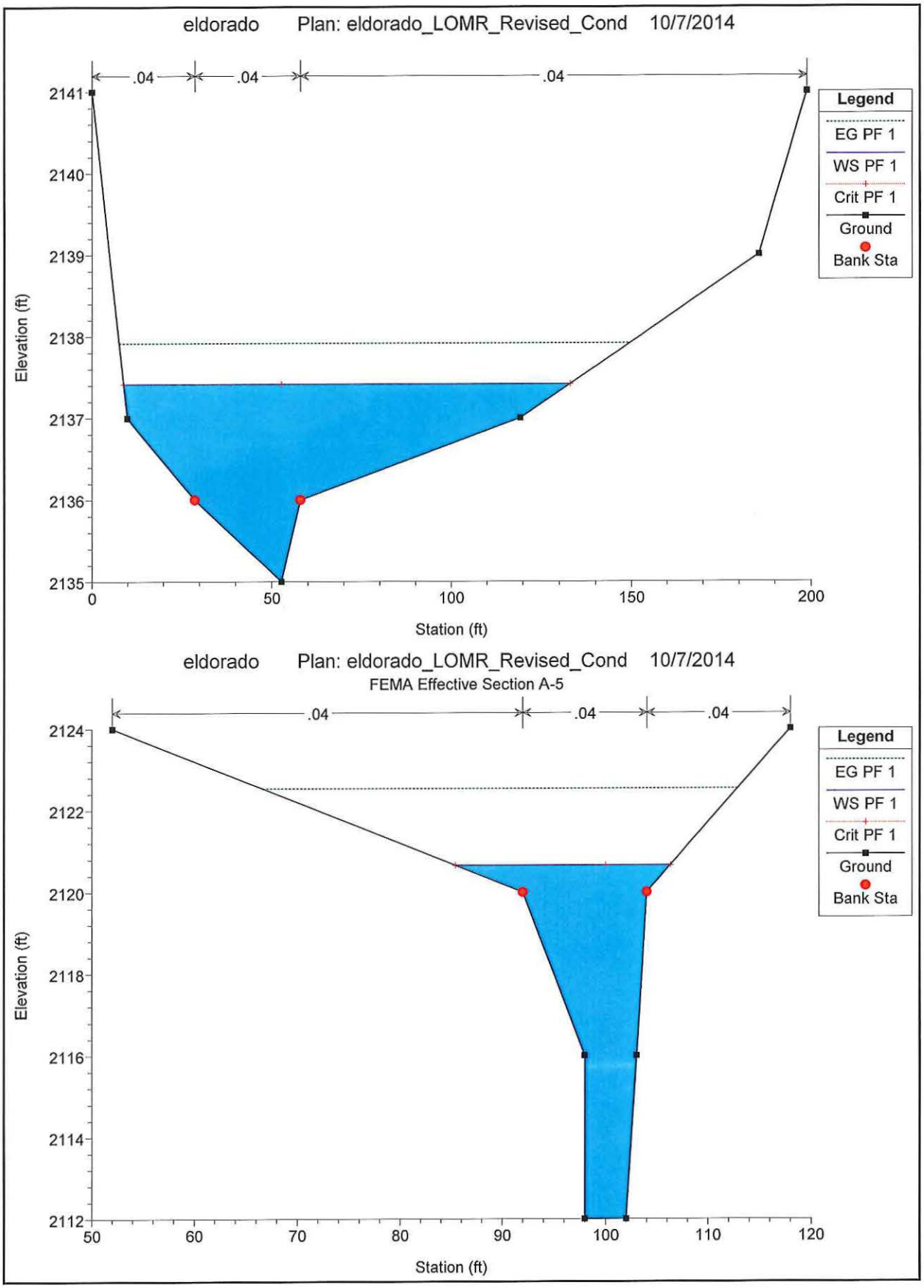
.04
.04
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
2141
2140
2139
2138
2137
2136
2135
0
20
40
60
80
100
120
140
160
180
Station (ft)
eldorado Plan: eldorado_LOMR_Revised_Cond 10/7/2014
.04
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
2141
2140
2139
2138
2137
2136
2135
0
50
100
150
200
Station (ft)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.04
.04
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
2141
2140
2139
2138
2137
2136
2135
0
50
100
150
200
Station (ft)
eldorado Plan: eldorado_LOMR_Revised_Cond 10/7/2014
FEMA Effective Section A-5
.04
.04
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
2124
2122
2120
2118
2116
2114
2112
50
60
70
80
90
100
110
120
Station (ft)

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
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PROJECT DATA
Project Title: eldorado
Project File : eldorado.prj
Run Date and Time: 1/3/2014 9:48:08 AM

Project in English units

PLAN DATA

Plan Title: eldorado_CLOMR_Revised_Cond
Plan File : f:\Projects\500\5523-A017\Division\Fctl\Calcs\HEC-RAS\DupEffective\eldorado.p10

Geometry Title: eldorado_geo_CLOMR_REV
Geometry File : f:\Projects\500\5523-A017\Division\Fctl\Calcs\HEC-RAS\DupEffective\eldorado.g09

Flow Title : eldorado_flow_dup_eff
Flow File : f:\Projects\500\5523-A017\Division\Fctl\Calcs\HEC-RAS\DupEffective\eldorado.f04

Plan Summary Information:

Number of:	Cross Sections	= 30	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 0	Lateral Structures	=	0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: eldorado_flow_dup_eff
Flow File : f:\Projects\500\5523-A017\Division\Fctl\Calcs\HEC-RAS\DupEffective\eldorado.f04

Flow Data (cfs)

River	Reach	RS	PF 1
Eldorado	Eldorado	6401	671

Eldorado	Eldorado	5901	671

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Eldorado	Eldorado	PF 1		Normal S = 0.03

GEOMETRY DATA

Geometry Title: eldorado_geo_CLOMR_REV
Geometry File : f:\Projects\500\5523-A017\Division\Fctl\Calcs\HEC-RAS\DupEffective\eldorado.g09

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 6401

INPUT
Description: FEMA Effective Section A-1

Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
74	2208	90	2204	100	2200	107	2200	110	2204
129	2208								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
74	.04	90	.04	110	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
90	110	500	500	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2206.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.53	Wt. n-Val.	0.040	0.040	0.040
W.S. Elev (ft)	2204.65	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2204.65	Flow Area (sq ft)	0.84	66.99	1.00
E.G. Slope (ft/ft)	0.017031	Area (sq ft)	0.84	66.99	1.00
Q Total (cfs)	671.00	Flow (cfs)	1.90	666.84	2.26
Top Width (ft)	25.68	Top Width (ft)	2.60	20.00	3.09
Vel Total (ft/s)	9.75	Avg. Vel. (ft/s)	2.24	9.95	2.26
Max Chl Dpth (ft)	4.65	Hydr. Depth (ft)	0.32	3.35	0.32
Conv. Total (cfs)	5141.7	Conv. (cfs)	14.5	5109.8	17.3
Length Wtd. (ft)	500.00	Wetted Per. (ft)	2.68	22.77	3.15
Min Ch El (ft)	2200.00	Shear (lb/sq ft)	0.34	3.13	0.34
Alpha	1.04	Stream Power (lb/ft s)	129.00	0.00	0.00
Frctn Loss (ft)	5.69	Cum Volume (acre-ft)	0.18	8.82	0.46
C & E Loss (ft)	0.39	Cum SA (acres)	0.27	4.91	0.61

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 5901

INPUT
Description:

Station Elevation Data	num=	7							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2195	52.41	2190	133	2185	209.84	2181.55	312.76	2185
367.68	2190	425.57	2195						

Manning's n Values	num=	3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	133	.04	312.76	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
133	312.76	370	305	225	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2184.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.040	
W.S. Elev (ft)	2184.11	Reach Len. (ft)	370.00	305.00	225.00
Crit W.S. (ft)		Flow Area (sq ft)		170.10	
E.G. Slope (ft/ft)	0.008143	Area (sq ft)		170.10	
Q Total (cfs)	671.00	Flow (cfs)		671.00	
Top Width (ft)	133.14	Top Width (ft)		133.14	
Vel Total (ft/s)	3.94	Avg. Vel. (ft/s)		3.94	
Max Chl Dpth (ft)	2.56	Hydr. Depth (ft)		1.28	
Conv. Total (cfs)	7435.9	Conv. (cfs)		7435.9	
Length Wtd. (ft)	305.04	Wetted Per. (ft)		133.24	
Min Ch El (ft)	2181.55	Shear (lb/sq ft)		0.65	
Alpha	1.00	Stream Power (lb/ft s)	425.57	0.00	0.00
Frctn Loss (ft)	3.36	Cum Volume (acre-ft)	0.18	7.46	0.46
C & E Loss (ft)	0.02	Cum SA (acres)	0.25	4.03	0.59

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 5596

INPUT
Description:

Station Elevation Data	num=	7							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2190	63.35	2185	161.98	2180	203.12	2178.29	251.05	2180
313.37	2185	504	2190						

Manning's n Values	num=	3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.04	161.98	.04	251.05	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
161.98	251.05	192	192	192	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2180.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.	0.040	0.040	0.040

W.S. Elev (ft)	2180.47	Reach Len. (ft)	192.00	192.00	192.00
Crit W.S. (ft)	2180.36	Flow Area (sq ft)	2.20	118.25	1.39
E.G. Slope (ft/ft)	0.015702	Area (sq ft)	2.20	118.25	1.39
Q Total (cfs)	671.00	Flow (cfs)	3.92	664.61	2.47
Top Width (ft)	104.28	Top Width (ft)	9.32	89.07	5.89
Vel Total (ft/s)	5.51	Avg. Vel. (ft/s)	1.78	5.62	1.78
Max Chl Dpth (ft)	2.18	Hydr. Depth (ft)	0.24	1.33	0.24
Conv. Total (cfs)	5354.8	Conv. (cfs)	31.3	5303.8	19.7
Length Wtd. (ft)	192.00	Wetted Per. (ft)	9.34	89.14	5.91
Min Ch El (ft)	2178.29	Shear (lb/sq ft)	0.23	1.30	0.23
Alpha	1.03	Stream Power (lb/ft s)	504.00	0.00	0.00
Frctn Loss (ft)	1.50	Cum Volume (acre-ft)	0.17	6.45	0.45
C & E Loss (ft)	0.11	Cum SA (acres)	0.21	3.25	0.58

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 5404

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2185	55.8	2180	173	2176.8	309.16	2180	457.61	2185

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	55.8	.04	309.16	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
55.8	309.16	122	122	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2179.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.040	
W.S. Elev (ft)	2179.23	Reach Len. (ft)	122.00	122.00	122.00
Crit W.S. (ft)		Flow Area (sq ft)		233.19	
E.G. Slope (ft/ft)	0.004638	Area (sq ft)		233.19	
Q Total (cfs)	671.00	Flow (cfs)		671.00	
Top Width (ft)	192.16	Top Width (ft)		192.16	
Vel Total (ft/s)	2.88	Avg. Vel. (ft/s)		2.88	
Max Chl Dpth (ft)	2.43	Hydr. Depth (ft)		1.21	
Conv. Total (cfs)	9853.1	Conv. (cfs)		9853.1	
Length Wtd. (ft)	122.00	Wetted Per. (ft)		192.22	
Min Ch El (ft)	2176.80	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)	457.61	0.00	0.00
Frctn Loss (ft)	1.01	Cum Volume (acre-ft)	0.17	5.67	0.45
C & E Loss (ft)	0.03	Cum SA (acres)	0.19	2.63	0.57

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Eldorado

REACH: Eldorado RS: 5282

INPUT
Description:
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
0	2180	118	2175.7	228.7	2180

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.04	228.7	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	228.7	145	145	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2178.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.		0.040	
W.S. Elev (ft)	2177.87	Reach Len. (ft)	145.00	145.00	145.00
Crit W.S. (ft)	2177.78	Flow Area (sq ft)		125.41	
E.G. Slope (ft/ft)	0.018605	Area (sq ft)		125.41	
Q Total (cfs)	671.00	Flow (cfs)		671.00	
Top Width (ft)	115.50	Top Width (ft)		115.50	
Vel Total (ft/s)	5.35	Avg. Vel. (ft/s)		5.35	
Max Chl Dpth (ft)	2.17	Hydr. Depth (ft)		1.09	
Conv. Total (cfs)	4919.3	Conv. (cfs)		4919.3	
Length Wtd. (ft)	145.00	Wetted Per. (ft)		115.58	
Min Ch El (ft)	2175.70	Shear (lb/sq ft)		1.26	
Alpha	1.00	Stream Power (lb/ft s)	228.70	0.00	0.00
Frctn Loss (ft)	3.07	Cum Volume (acre-ft)	0.17	5.17	0.45
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	2.20	0.57

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 5137

INPUT
Description:
Station Elevation Data num= 3

Sta	Elev	Sta	Elev	Sta	Elev
0	2175	70	2172.9	145.58	2175

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	0	.04	145.58	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	145.58	94	94	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2175.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.		0.040	
W.S. Elev (ft)	2174.77	Reach Len. (ft)	94.00	94.00	94.00
Crit W.S. (ft)	2174.77	Flow Area (sq ft)		121.28	
E.G. Slope (ft/ft)	0.024263	Area (sq ft)		121.28	
Q Total (cfs)	671.00	Flow (cfs)		671.00	
Top Width (ft)	129.67	Top Width (ft)		129.67	
Vel Total (ft/s)	5.53	Avg. Vel. (ft/s)		5.53	
Max Chl Dpth (ft)	1.87	Hydr. Depth (ft)		0.94	
Conv. Total (cfs)	4307.7	Conv. (cfs)		4307.7	
Length Wtd. (ft)	94.00	Wetted Per. (ft)		129.73	
Min Ch El (ft)	2172.90	Shear (lb/sq ft)		1.42	

Alpha	1.00	Stream Power (lb/ft s)	145.58	0.00	0.00
Frctn Loss (ft)	1.18	Cum Volume (acre-ft)	0.17	4.76	0.45
C & E Loss (ft)	0.01	Cum SA (acres)	0.19	1.79	0.57

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 5043

INPUT
Description: Upstream of proposed culvert (unnamed wash)
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2172.2399979		2171.5299988		2170.8600006		21691.360001		2168
2.379997	21674.880001		21668.529999		2165	10.58	2164	11.95	2163.9
13.08	2164	15.92	2165	17.42	2166	18.79	2167	20.15	2168
24.02	2168	25.41	2167	29.67	2167	39.17	2168	41.17	2169
45.87	2170	54.55	2171	66.43	2172	71.14	2174		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.041	360001	.04	39.17	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1.360001	39.17	35	35	.4	1

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2169.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.60	Wt. n-Val.	0.040	0.040	0.040
W.S. Elev (ft)	2169.32	Reach Len. (ft)	35.00	35.00	35.00
Crit W.S. (ft)	2168.63	Flow Area (sq ft)	0.43	106.82	1.89
E.G. Slope (ft/ft)	0.007688	Area (sq ft)	0.43	106.82	1.89
Q Total (cfs)	671.00	Flow (cfs)	0.62	666.51	3.87
Top Width (ft)	41.93	Top Width (ft)	0.61	37.81	3.52
Vel Total (ft/s)	6.15	Avg. Vel. (ft/s)	1.44	6.24	2.05
Max Chl Dpth (ft)	5.42	Hydr. Depth (ft)	0.71	2.83	0.54
Conv. Total (cfs)	7652.8	Conv. (cfs)	7.0	7601.6	44.2
Length Wtd. (ft)	35.00	Wetted Per. (ft)	1.46	40.29	3.79
Min Ch El (ft)	2163.90	Shear (lb/sq ft)	0.14	1.27	0.24
Alpha	1.02	Stream Power (lb/ft s)	71.14	0.00	0.00
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	0.17	4.52	0.45
C & E Loss (ft)	0.20	Cum SA (acres)	0.19	1.61	0.56

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 4993

INPUT
Description: Upstream of proposed culvert (unnamed wash)
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2172	1.16	2171	1.51	2170	2.28	2169	2.8	2168
3.37	2167	4.59	2166	5.76	2165	8.28	2164	10.29	2163.9
13.17	2164	15.5	2165	21.7	2166	27.61	2167	38.84	2168
41.18	2169	50.84	2170	60.15	2171	67.27	2172	73.59	2175

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	2.8	.04	38.84	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
2.8	38.84	36.5	36.5	.4	1

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2169.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.10	Wt. n-Val.	0.040	0.040	0.040
W.S. Elev (ft)	2168.22	Reach Len. (ft)	36.50	36.50	36.50
Crit W.S. (ft)	2168.22	Flow Area (sq ft)	0.01	79.55	0.05
E.G. Slope (ft/ft)	0.019218	Area (sq ft)	0.01	79.55	0.05
Q Total (cfs)	671.00	Flow (cfs)	0.01	670.93	0.06
Top Width (ft)	36.66	Top Width (ft)	0.11	36.04	0.50
Vel Total (ft/s)	8.43	Avg. Vel. (ft/s)	0.70	8.43	1.10
Max Chl Dpth (ft)	4.32	Hydr. Depth (ft)	0.11	2.21	0.11
Conv. Total (cfs)	4840.2	Conv. (cfs)	0.1	4839.7	0.4
Length Wtd. (ft)	36.50	Wetted Per. (ft)	0.24	37.96	0.55
Min Ch El (ft)	2163.90	Shear (lb/sq ft)	0.06	2.51	0.12
Alpha	1.00	Stream Power (lb/ft s)	73.59	0.00	0.00
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	0.17	4.44	0.45
C & E Loss (ft)	0.37	Cum SA (acres)	0.19	1.58	0.56

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 4960

INPUT
Description: Begin 20x6 Arch Culvert
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-10	2180	-10	2161.36	10	2161.36	10	2180

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-10	.04	-10	.04	10	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-10	10	10	10	.1	.3

Cross Section Lid
num= 21

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-10	2180	2161.36	-10	2180	2163.22	-9.81	2180	2164.27
-9.2	2180	2165.26	-8	2180	2166.05	-7	2180	2166.36
-6	2180	2166.63	-5	2180	2166.86	-4	2180	2167.04
-3	2180	2167.18	0	2180	2167.36	3	2180	2167.18
4	2180	2167.04	5	2180	2166.86	6	2180	2166.63
7	2180	2166.36	8	2180	2166.05	9.2	2180	2165.26
9.81	2180	2164.27	10	2180	2163.22	10	2180	2161.36

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2167.27	Element			
Vel Head (ft)	0.74	Wt. n-Val.		0.040	
W.S. Elev (ft)	2166.54	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2164.62	Flow Area (sq ft)		97.40	
E.G. Slope (ft/ft)	0.008617	Area (sq ft)		97.40	
Q Total (cfs)	671.00	Flow (cfs)		671.00	
Top Width (ft)	12.70	Top Width (ft)		12.70	
Vel Total (ft/s)	6.89	Avg. Vel. (ft/s)		6.89	
Max Chl Dpth (ft)	5.18	Hydr. Depth (ft)		7.67	
Conv. Total (cfs)	7228.4	Conv. (cfs)		7228.4	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		34.49	
Min Ch El (ft)	2161.36	Shear (lb/sq ft)		1.52	
Alpha	1.00	Stream Power (lb/ft s)	10.00	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.17	4.37	0.45
C & E Loss (ft)	0.03	Cum SA (acres)	0.19	1.56	0.56

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 4950

INPUT
Description: End 20x6 Arch Culvert/Begin Transition
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-10	2180	-10	2160.25	10	2160.25	10	2180

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-10		-10	.013	10	

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-10	10	30	30	.1	.3

Cross Section Lid
num= 21

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-10	2180	2160.25	-10	2180	2162.11	-9.81	2180	2163.16
-9.2	2180	2164.15	-8	2180	2164.94	-7	2180	2165.25
-6	2180	2165.52	-5	2180	2165.75	-4	2180	2165.93
-3	2180	2166.07	0	2180	2166.25	3	2180	2166.07
4	2180	2165.93	5	2180	2165.75	6	2180	2165.52
7	2180	2165.25	8	2180	2164.94	9.2	2180	2164.15
9.81	2180	2163.16	10	2180	2162.11	10	2180	2160.25

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2167.22	Element			
Vel Head (ft)	0.64	Wt. n-Val.		0.013	
W.S. Elev (ft)	2166.58	Reach Len. (ft)	30.00	30.00	30.00
Crit W.S. (ft)	2163.49	Flow Area (sq ft)		104.24	
E.G. Slope (ft/ft)	0.001107	Area (sq ft)		104.24	
Q Total (cfs)	671.00	Flow (cfs)		671.00	

Top Width (ft)		Top Width (ft)			
Vel Total (ft/s)	6.44	Avg. Vel. (ft/s)		6.44	
Max Chl Dpth (ft)	6.33	Hydr. Depth (ft)			
Conv. Total (cfs)	20167.5	Conv. (cfs)		20167.5	
Length Wtd. (ft)	30.00	Wetted Per. (ft)		47.33	
Min Ch El (ft)	2160.25	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	10.00	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.17	4.34	0.45
C & E Loss (ft)	0.18	Cum SA (acres)	0.19	1.56	0.56

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 4880

INPUT
Description: End Transition/12x6 Arch Culvert
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-6	2180	-6	2160.04	6	2160.04	6	2180

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-6		-6	.013	6	

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-6	6	49.32	49.32	49.32	.1	.3

Cross Section Lid
num= 21

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-6	2180	2160.04	-6	2180	2163.04	-5.79	2180	2164.04
-5.48	2180	2164.57	-5	2180	2165.04	-4.48	2180	2165.34
-4	2180	2165.5	-3	2180	2165.74	-2	2180	2165.91
-1	2180	2166.01	0	2180	2166.04	1	2180	2166.01
2	2180	2165.91	3	2180	2165.74	4	2180	2165.5
4.48	2180	2165.34	5	2180	2165.04	5.48	2180	2164.57
5.79	2180	2164.04	6	2180	2163.04	6	2180	2160.04

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2166.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.42	Wt. n-Val.		0.013	
W.S. Elev (ft)	2164.57	Reach Len. (ft)	49.32	49.32	49.32
Crit W.S. (ft)	2164.57	Flow Area (sq ft)		53.78	
E.G. Slope (ft/ft)	0.003461	Area (sq ft)		53.78	
Q Total (cfs)	671.00	Flow (cfs)		671.00	
Top Width (ft)	10.96	Top Width (ft)		10.96	
Vel Total (ft/s)	12.48	Avg. Vel. (ft/s)		12.48	
Max Chl Dpth (ft)	4.53	Hydr. Depth (ft)		4.91	
Conv. Total (cfs)	11405.9	Conv. (cfs)		11405.9	
Length Wtd. (ft)	49.32	Wetted Per. (ft)		21.28	
Min Ch El (ft)	2160.04	Shear (lb/sq ft)		0.55	
Alpha	1.00	Stream Power (lb/ft s)	6.00	0.00	0.00
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	0.17	4.29	0.45
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	1.56	0.56

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 4870

INPUT
Description: 12x6 Arch Culvert
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-6	2180	-6	2159.68	6	2159.68	6	2180

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-6		-6	.013	6	

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-6	6	22.12	27.19	32.19	.1	.3

Cross Section Lid
num= 21

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-6	2180	2159.68	-6	2180	2162.68	-5.79	2180	2163.68
-5.48	2180	2164.21	-5	2180	2164.68	-4.48	2180	2164.98
-4	2180	2165.14	-3	2180	2165.38	-2	2180	2165.55
-1	2180	2165.65	0	2180	2165.68	1	2180	2165.65
2	2180	2165.55	3	2180	2165.38	4	2180	2165.14
4.48	2180	2164.98	5	2180	2164.68	5.48	2180	2164.21
5.79	2180	2163.68	6	2180	2162.68	6	2180	2159.68

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2166.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.42	Wt. n-Val.		0.013	
W.S. Elev (ft)	2164.21	Reach Len. (ft)	22.12	27.19	32.19
Crit W.S. (ft)	2164.21	Flow Area (sq ft)		53.80	
E.G. Slope (ft/ft)	0.003457	Area (sq ft)		53.80	
Q Total (cfs)	671.00	Flow (cfs)		671.00	
Top Width (ft)	10.95	Top Width (ft)		10.95	
Vel Total (ft/s)	12.47	Avg. Vel. (ft/s)		12.47	
Max Chl Dpth (ft)	4.53	Hydr. Depth (ft)		4.91	
Conv. Total (cfs)	11412.1	Conv. (cfs)		11412.1	
Length Wtd. (ft)	27.19	Wetted Per. (ft)		21.28	
Min Ch El (ft)	2159.68	Shear (lb/sq ft)		0.55	
Alpha	1.00	Stream Power (lb/ft s)	6.00	0.00	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.17	4.23	0.45
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	1.54	0.56

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 4857

INPUT
Description: 12x6 Arch Culvert
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

```
     -6    2180      -6  2159.5       6  2159.5       6    2180

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -6              -6    .013       6

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -6       6             277     277     277            .1       .3
Cross Section Lid
    num=      21
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -6    2180  2159.5       -6    2180  2162.5   -5.79    2180  2163.5
   -5.48    2180 2164.03       -5    2180  2164.5   -4.48    2180  2164.8
      -4    2180 2164.96       -3    2180  2165.2      -2    2180 2165.37
      -1    2180 2165.47        0    2180  2165.5       1    2180 2165.47
       2    2180 2165.37        3    2180  2165.2       4    2180 2164.96
    4.48    2180  2164.8        5    2180  2164.5    5.48    2180 2164.03
    5.79    2180  2163.5        6    2180  2162.5       6    2180  2159.5

CROSS SECTION OUTPUT  Profile #PF 1

  E.G. Elev (ft)           2166.45    Element                Left OB    Channel   Right OB
  Vel Head (ft)               2.41    Wt. n-Val.                        0.013
  W.S. Elev (ft)           2164.04    Reach Len. (ft)        277.00     277.00    277.00
  Crit W.S. (ft)           2164.04    Flow Area (sq ft)                 53.82
  E.G. Slope (ft/ft)      0.003454    Area (sq ft)                      53.82
  Q Total (cfs)             671.00    Flow (cfs)                       671.00
  Top Width (ft)             10.95    Top Width (ft)                    10.95
  Vel Total (ft/s)           12.47    Avg. Vel. (ft/s)                  12.47
  Max Chl Dpth (ft)           4.54    Hydr. Depth (ft)                   4.92
  Conv. Total (cfs)        11417.0    Conv. (cfs)                     11417.0
  Length Wtd. (ft)           277.00    Wetted Per. (ft)                  21.29
  Min Ch El (ft)           2159.50    Shear (lb/sq ft)                   0.55
  Alpha                       1.00    Stream Power (lb/ft s)    6.00     0.00      0.00
  Frctn Loss (ft)             0.96    Cum Volume (acre-ft)      0.17     4.19      0.45
  C & E Loss (ft)             0.00    Cum SA (acres)            0.19     1.54      0.56


Warning: The energy equation could not be balanced within the specified number of iterations.
The program used critical depth
        for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
        need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
        water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
        defaulted to critical depth.

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado          RS: 4600

INPUT
Description: 12x6 Arch Culvert
Station Elevation Data    num=       4
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
      -6     2180      -6  2157.51       6  2157.51       6    2180

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -6              -6    .013       6

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -6       6             257     257     257            .1       .3
Cross Section Lid
    num=      21
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
```

-6	2180	2157.51	-6	2180	2160.51	-5.79	2180	2161.51
-5.48	2180	2162.04	-5	2180	2162.51	-4.48	2180	2162.81
-4	2180	2162.97	-3	2180	2163.21	-2	2180	2163.38
-1	2180	2163.48	0	2180	2163.51	1	2180	2163.48
2	2180	2163.38	3	2180	2163.21	4	2180	2162.97
4.48	2180	2162.81	5	2180	2162.51	5.48	2180	2162.04
5.79	2180	2161.51	6	2180	2160.51	6	2180	2157.51

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2164.46	Element	Left OB	Channel	Right OB	
Vel Head (ft)	2.42	Wt. n-Val.		0.013		
W.S. Elev (ft)	2162.04	Reach Len. (ft)	257.00	257.00	257.00	
Crit W.S. (ft)	2162.04	Flow Area (sq ft)		53.78		
E.G. Slope (ft/ft)	0.003460	Area (sq ft)		53.78		
Q Total (cfs)	671.00	Flow (cfs)		671.00		
Top Width (ft)	10.96	Top Width (ft)		10.96		
Vel Total (ft/s)	12.48	Avg. Vel. (ft/s)		12.48		
Max Chl Dpth (ft)	4.53	Hydr. Depth (ft)		4.91		
Conv. Total (cfs)	11408.0	Conv. (cfs)		11408.0		
Length Wtd. (ft)	257.00	Wetted Per. (ft)		21.28		
Min Ch El (ft)	2157.51	Shear (lb/sq ft)		0.55		
Alpha	1.00	Stream Power (lb/ft s)	6.00	0.00	0.00	
Frctn Loss (ft)	0.89	Cum Volume (acre-ft)	0.17	3.85	0.45	
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	1.47	0.56	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 4343

INPUT
Description: 12x6 Arch Culvert
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-6	2175	-6	2155.66	6	2155.66	6	2175

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-6		-6	.013	6	

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-6	6	202	202	202	.1	.3

Cross Section Lid
num= 21

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-6	2175	2155.66	-6	2175	2158.66	-5.79	2175	2159.66
-5.48	2175	2160.19	-5	2175	2160.66	-4.48	2175	2160.96
-4	2175	2161.12	-3	2175	2161.36	-2	2175	2161.53
-1	2175	2161.63	0	2175	2161.66	1	2175	2161.63
2	2175	2161.53	3	2175	2161.36	4	2175	2161.12
4.48	2175	2160.96	5	2175	2160.66	5.48	2175	2160.19
5.79	2175	2159.66	6	2175	2158.66	6	2175	2155.66

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2162.61	Element	Left OB	Channel	Right OB

Vel Head (ft)	2.41	Wt. n-Val.		0.013	
W.S. Elev (ft)	2160.19	Reach Len. (ft)	202.00	202.00	202.00
Crit W.S. (ft)	2160.19	Flow Area (sq ft)		53.81	
E.G. Slope (ft/ft)	0.003456	Area (sq ft)		53.81	
Q Total (cfs)	671.00	Flow (cfs)		671.00	
Top Width (ft)	10.95	Top Width (ft)		10.95	
Vel Total (ft/s)	12.47	Avg. Vel. (ft/s)		12.47	
Max Chl Dpth (ft)	4.53	Hydr. Depth (ft)		4.91	
Conv. Total (cfs)	11413.5	Conv. (cfs)		11413.5	
Length Wtd. (ft)	202.00	Wetted Per. (ft)		21.28	
Min Ch El (ft)	2155.66	Shear (lb/sq ft)		0.55	
Alpha	1.00	Stream Power (lb/ft s)	6.00	0.00	0.00
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)	0.17	3.53	0.45
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	1.40	0.56

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 4141

INPUT
Description: 12x6 Arch Culvert
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-6	2170	-6	2154.65	6	2154.65	6	2170

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-6		-6	.013	6	

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-6	6	202	202	.1	.3

Cross Section Lid
num= 21

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-6	2170	2154.65	-6	2170	2157.65	-5.79	2170	2158.65
-5.48	2170	2159.18	-5	2170	2159.65	-4.48	2170	2159.95
-4	2170	2160.11	-3	2170	2160.35	-2	2170	2160.52
-1	2170	2160.62	0	2170	2160.65	1	2170	2160.62
2	2170	2160.52	3	2170	2160.35	4	2170	2160.11
4.48	2170	2159.95	5	2170	2159.65	5.48	2170	2159.18
5.79	2170	2158.65	6	2170	2157.65	6	2170	2154.65

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2161.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.42	Wt. n-Val.		0.013	
W.S. Elev (ft)	2159.18	Reach Len. (ft)	202.00	202.00	202.00
Crit W.S. (ft)	2159.18	Flow Area (sq ft)		53.79	
E.G. Slope (ft/ft)	0.003458	Area (sq ft)		53.79	
Q Total (cfs)	671.00	Flow (cfs)		671.00	
Top Width (ft)	10.95	Top Width (ft)		10.95	
Vel Total (ft/s)	12.47	Avg. Vel. (ft/s)		12.47	
Max Chl Dpth (ft)	4.53	Hydr. Depth (ft)		4.91	
Conv. Total (cfs)	11410.0	Conv. (cfs)		11410.0	
Length Wtd. (ft)	202.00	Wetted Per. (ft)		21.28	
Min Ch El (ft)	2154.65	Shear (lb/sq ft)		0.55	

Alpha	1.00	Stream Power (lb/ft s)	6.00	0.00	0.00
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)	0.17	3.29	0.45
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	1.35	0.56

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 3939

INPUT
Description: 12x6 Arch Culvert
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-6	2170	-6	2153.82	6	2153.82	6	2170

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-6		-6	.013	6	

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-6	6	121	121	121	.1	.3

Cross Section Lid
num= 21

Sta Hi	Cord	Lo Cord	Sta Hi	Cord	Lo Cord	Sta Hi	Cord	Lo Cord
-6	2170	2153.82	-6	2170	2156.82	-5.79	2170	2157.82
-5.48	2170	2158.35	-5	2170	2158.82	-4.48	2170	2159.12
-4	2170	2159.28	-3	2170	2159.52	-2	2170	2159.69
-1	2170	2159.79	0	2170	2159.82	1	2170	2159.79
2	2170	2159.69	3	2170	2159.52	4	2170	2159.28
4.48	2170	2159.12	5	2170	2158.82	5.48	2170	2158.35
5.79	2170	2157.82	6	2170	2156.82	6	2170	2153.82

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2160.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.41	Wt. n-Val.		0.013	
W.S. Elev (ft)	2158.35	Reach Len. (ft)	121.00	121.00	121.00
Crit W.S. (ft)	2158.35	Flow Area (sq ft)		53.81	
E.G. Slope (ft/ft)	0.003455	Area (sq ft)		53.81	
Q Total (cfs)	671.00	Flow (cfs)		671.00	
Top Width (ft)	10.95	Top Width (ft)		10.95	
Vel Total (ft/s)	12.47	Avg. Vel. (ft/s)		12.47	
Max Chl Dpth (ft)	4.53	Hydr. Depth (ft)		4.91	
Conv. Total (cfs)	11414.9	Conv. (cfs)		11414.9	
Length Wtd. (ft)	121.00	Wetted Per. (ft)		21.28	
Min Ch El (ft)	2153.82	Shear (lb/sq ft)		0.55	
Alpha	1.00	Stream Power (lb/ft s)	6.00	0.00	0.00
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)	0.17	3.04	0.45
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	1.30	0.56

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 3818

INPUT
Description: 12x6 Arch Culvert
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-6	2170	-6	2153.34	6	2153.34	6	2170

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-6		-6	.013	6	

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-6	6	86	78.53	71	.1	.3

Cross Section Lid
num= 21

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-6	2170	2153.34	-6	2170	2156.34	-5.79	2170	2157.34
-5.48	2170	2157.87	-5	2170	2158.34	-4.48	2170	2158.64
-4	2170	2158.8	-3	2170	2159.04	-2	2170	2159.21
-1	2170	2159.31	0	2170	2159.34	1	2170	2159.31
2	2170	2159.21	3	2170	2159.04	4	2170	2158.8
4.48	2170	2158.64	5	2170	2158.34	5.48	2170	2157.87
5.79	2170	2157.34	6	2170	2156.34	6	2170	2153.34

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2160.29	Element			
Vel Head (ft)	2.42	Wt. n-Val.		0.013	
W.S. Elev (ft)	2157.87	Reach Len. (ft)	86.00	78.53	71.00
Crit W.S. (ft)	2157.87	Flow Area (sq ft)		53.79	
E.G. Slope (ft/ft)	0.003459	Area (sq ft)		53.79	
Q Total (cfs)	671.00	Flow (cfs)		671.00	
Top Width (ft)	10.96	Top Width (ft)		10.96	
Vel Total (ft/s)	12.47	Avg. Vel. (ft/s)		12.47	
Max Chl Dpth (ft)	4.53	Hydr. Depth (ft)		4.91	
Conv. Total (cfs)	11409.3	Conv. (cfs)		11409.3	
Length Wtd. (ft)	78.53	Wetted Per. (ft)		21.28	
Min Ch El (ft)	2153.34	Shear (lb/sq ft)		0.55	
Alpha	1.00	Stream Power (lb/ft s)	6.00	0.00	0.00
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	0.17	2.89	0.45
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	1.27	0.56

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 3740

INPUT
Description: End Arch Culvert
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-6	2170	-6	2152.95	6	2152.95	6	2170

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

```
      -6              -6     .013        6

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           -6       6                25      25      25             .1       .3
Cross Section Lid
    num=      21
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
      -6    2170 2152.95       -6    2170 2155.95    -5.79    2170 2156.95
   -5.48    2170 2157.48       -5    2170 2157.95    -4.48    2170 2158.25
      -4    2170 2158.41       -3    2170 2158.65       -2    2170 2158.82
      -1    2170 2158.92        0    2170 2158.95        1    2170 2158.92
       2    2170 2158.82        3    2170 2158.65        4    2170 2158.41
    4.48    2170 2158.25        5    2170 2157.95     5.48    2170 2157.48
    5.79    2170 2156.95        6    2170 2155.95        6    2170 2152.95

CROSS SECTION OUTPUT  Profile #PF 1

  E.G. Elev (ft)           2159.90    Element                 Left OB    Channel   Right OB
  Vel Head (ft)               2.41    Wt. n-Val.                         0.013
  W.S. Elev (ft)           2157.49    Reach Len. (ft)          25.00     25.00      25.00
  Crit W.S. (ft)           2157.49    Flow Area (sq ft)                  53.83
  E.G. Slope (ft/ft)      0.003452    Area (sq ft)                       53.83
  Q Total (cfs)             671.00    Flow (cfs)                        671.00
  Top Width (ft)             10.95    Top Width (ft)                     10.95
  Vel Total (ft/s)           12.47    Avg. Vel. (ft/s)                   12.47
  Max Chl Dpth (ft)           4.54    Hydr. Depth (ft)                    4.92
  Conv. Total (cfs)        11419.8    Conv. (cfs)                      11419.8
  Length Wtd. (ft)           25.00    Wetted Per. (ft)                   21.29
  Min Ch El (ft)           2152.95    Shear (lb/sq ft)                    0.54
  Alpha                       1.00    Stream Power (lb/ft s)    6.00      0.00       0.00
  Frctn Loss (ft)             0.15    Cum Volume (acre-ft)      0.17      2.79       0.45
  C & E Loss (ft)             0.54    Cum SA (acres)            0.19      1.25       0.56


Warning: The energy equation could not be balanced within the specified number of iterations.
The program used critical depth
        for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
than 0.7 or greater than 1.4.
         This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
        need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
        water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
        defaulted to critical depth.

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado          RS: 3639

INPUT
Description: Rip Rap
Station Elevation Data    num=      4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0 2159.47      14 2152.47      49 2152.47      63 2159.47

Manning's n Values        num=      3
     Sta   n Val      Sta   n Val      Sta   n Val
       0               0    .047       63

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           0      63                25      25      25             .4       1

CROSS SECTION OUTPUT  Profile #PF 1
```

E.G. Elev (ft)	2155.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.62	Wt. n-Val.		0.047	
W.S. Elev (ft)	2155.12	Reach Len. (ft)	25.00	25.00	25.00
Crit W.S. (ft)	2154.62	Flow Area (sq ft)		106.60	
E.G. Slope (ft/ft)	0.013238	Area (sq ft)		106.60	
Q Total (cfs)	671.00	Flow (cfs)		671.00	
Top Width (ft)	45.58	Top Width (ft)		45.58	
Vel Total (ft/s)	6.29	Avg. Vel. (ft/s)		6.29	
Max Chl Dpth (ft)	2.65	Hydr. Depth (ft)		2.34	
Conv. Total (cfs)	5831.8	Conv. (cfs)		5831.8	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		46.83	
Min Ch El (ft)	2152.47	Shear (lb/sq ft)		1.88	
Alpha	1.00	Stream Power (lb/ft s)	63.00	0.00	0.00
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)	0.17	2.74	0.45
C & E Loss (ft)	0.15	Cum SA (acres)	0.19	1.23	0.56

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 3614

INPUT
Description: Rip Rap
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2159	14	2152	49	2152	63	2159

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0		0	.047	63	

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	63	285	285	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2155.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.98	Wt. n-Val.		0.047	
W.S. Elev (ft)	2154.15	Reach Len. (ft)	285.00	285.00	285.00
Crit W.S. (ft)	2154.15	Flow Area (sq ft)		84.44	
E.G. Slope (ft/ft)	0.026983	Area (sq ft)		84.44	
Q Total (cfs)	671.00	Flow (cfs)		671.00	
Top Width (ft)	43.59	Top Width (ft)		43.59	
Vel Total (ft/s)	7.95	Avg. Vel. (ft/s)		7.95	
Max Chl Dpth (ft)	2.15	Hydr. Depth (ft)		1.94	
Conv. Total (cfs)	4084.8	Conv. (cfs)		4084.8	
Length Wtd. (ft)	285.00	Wetted Per. (ft)		44.61	
Min Ch El (ft)	2152.00	Shear (lb/sq ft)		3.19	
Alpha	1.00	Stream Power (lb/ft s)	63.00	0.00	0.00
Frctn Loss (ft)	3.12	Cum Volume (acre-ft)	0.17	2.69	0.45
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	1.21	0.56

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 3329

INPUT
Description: Proposed Channel
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2159.66	26	2146.66	61	2146.66	87	2159.66

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0		0	.022	87	

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	87	330	330	300	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2149.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.98	Wt. n-Val.		0.022	
W.S. Elev (ft)	2148.81	Reach Len. (ft)	330.00	330.00	300.00
Crit W.S. (ft)	2148.81	Flow Area (sq ft)		84.50	
E.G. Slope (ft/ft)	0.005898	Area (sq ft)		84.50	
Q Total (cfs)	671.00	Flow (cfs)		671.00	
Top Width (ft)	43.60	Top Width (ft)		43.60	
Vel Total (ft/s)	7.94	Avg. Vel. (ft/s)		7.94	
Max Chl Dpth (ft)	2.15	Hydr. Depth (ft)		1.94	
Conv. Total (cfs)	8736.8	Conv. (cfs)		8736.8	
Length Wtd. (ft)	330.00	Wetted Per. (ft)		44.62	
Min Ch El (ft)	2146.66	Shear (lb/sq ft)		0.70	
Alpha	1.00	Stream Power (lb/ft s)	87.00	0.00	0.00
Frctn Loss (ft)	1.95	Cum Volume (acre-ft)	0.17	2.14	0.45
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	0.92	0.56

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 2999

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2153.44	26	2140.44	61	2140.44	87	2153.44

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0		0	.022	87	

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.

0	87		140	171	180	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2143.57	Element			
Vel Head (ft)	0.98	Wt. n-Val.		0.022	
W.S. Elev (ft)	2142.59	Reach Len. (ft)	140.00	171.00	180.00
Crit W.S. (ft)	2142.59	Flow Area (sq ft)		84.43	
E.G. Slope (ft/ft)	0.005914	Area (sq ft)		84.43	
Q Total (cfs)	671.00	Flow (cfs)		671.00	
Top Width (ft)	43.59	Top Width (ft)		43.59	
Vel Total (ft/s)	7.95	Avg. Vel. (ft/s)		7.95	
Max Chl Dpth (ft)	2.15	Hydr. Depth (ft)		1.94	
Conv. Total (cfs)	8725.0	Conv. (cfs)		8725.0	
Length Wtd. (ft)	170.97	Wetted Per. (ft)		44.61	
Min Ch El (ft)	2140.44	Shear (lb/sq ft)		0.70	
Alpha	1.00	Stream Power (lb/ft s)	87.00	0.00	0.00
Frctn Loss (ft)	1.30	Cum Volume (acre-ft)	0.17	1.50	0.45
C & E Loss (ft)	0.05	Cum SA (acres)	0.19	0.59	0.56

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 2828

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2143.9900017		21421.950001		21412.889999		2140	3.83	2139
4.779999	21385.760002		2137	10.39	2136.9	20.37	2137	31.87	2138
36.72	2139	37.58	2140	38.51	2141	39.48	2142	40.52	2143

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	3.83	.04	36.72	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
3.83	36.72	55	55	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2141.05	Element			
Vel Head (ft)	0.82	Wt. n-Val.	0.040	0.040	0.040
W.S. Elev (ft)	2140.23	Reach Len. (ft)	55.00	55.00	55.00
Crit W.S. (ft)		Flow Area (sq ft)	0.71	91.95	0.65
E.G. Slope (ft/ft)	0.010110	Area (sq ft)	0.71	91.95	0.65
Q Total (cfs)	671.00	Flow (cfs)	1.49	668.20	1.32
Top Width (ft)	35.12	Top Width (ft)	1.15	32.89	1.07
Vel Total (ft/s)	7.19	Avg. Vel. (ft/s)	2.10	7.27	2.02
Max Chl Dpth (ft)	3.33	Hydr. Depth (ft)	0.61	2.80	0.61
Conv. Total (cfs)	6673.4	Conv. (cfs)	14.8	6645.5	13.1
Length Wtd. (ft)	55.00	Wetted Per. (ft)	1.69	33.89	1.63
Min Ch El (ft)	2136.90	Shear (lb/sq ft)	0.27	1.71	0.25
Alpha	1.02	Stream Power (lb/ft s)	40.52	0.00	0.00
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)	0.16	1.15	0.44
C & E Loss (ft)	0.05	Cum SA (acres)	0.19	0.44	0.56

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 2773

INPUT
Description:
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2142	17.48	2138	28.29	2137	47.43	2136	48.29	2135.9
48.9	2136	49.67	2137	53	2141	64.96	2142		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	28.29	.04	49.67	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
28.29	49.67	40	40	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2140.53	Element			
Vel Head (ft)	0.64	Wt. n-Val.	0.040	0.040	0.040
W.S. Elev (ft)	2139.89	Reach Len. (ft)	40.00	40.00	40.00
Crit W.S. (ft)	2139.27	Flow Area (sq ft)	33.69	73.34	3.48
E.G. Slope (ft/ft)	0.006981	Area (sq ft)	33.69	73.34	3.48
Q Total (cfs)	671.00	Flow (cfs)	151.38	509.35	10.26
Top Width (ft)	42.87	Top Width (ft)	19.08	21.38	2.41
Vel Total (ft/s)	6.07	Avg. Vel. (ft/s)	4.49	6.94	2.95
Max Chl Dpth (ft)	3.99	Hydr. Depth (ft)	1.77	3.43	1.45
Conv. Total (cfs)	8031.0	Conv. (cfs)	1811.9	6096.3	122.9
Length Wtd. (ft)	40.00	Wetted Per. (ft)	19.34	21.91	3.76
Min Ch El (ft)	2135.90	Shear (lb/sq ft)	0.76	1.46	0.40
Alpha	1.12	Stream Power (lb/ft s)	64.96	0.00	0.00
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	0.14	1.05	0.44
C & E Loss (ft)	0.04	Cum SA (acres)	0.18	0.41	0.56

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 2733

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2142	10.92	2141	18.17	214021.70999		213924.00999		2138
25.93999	213747.84999		2136	48.95	2135.949.96999		213652.39999		2137
58.27999	213860.23999		213998.59999		2140	177.81	2141	184.29	2142

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0421.70999		.0460.23999		.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
21.7099960.23999		50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2140.06	Element			
Vel Head (ft)	1.06	Wt. n-Val.		0.040	
W.S. Elev (ft)	2139.00	Reach Len. (ft)	50.00	50.00	50.00

Crit W.S. (ft)	2139.00	Flow Area (sq ft)		81.25	
E.G. Slope (ft/ft)	0.018919	Area (sq ft)	0.00	81.25	0.00
Q Total (cfs)	671.00	Flow (cfs)		671.00	
Top Width (ft)	38.62	Top Width (ft)		38.53	0.08
Vel Total (ft/s)	8.26	Avg. Vel. (ft/s)		8.26	
Max Chl Dpth (ft)	3.10	Hydr. Depth (ft)		2.11	
Conv. Total (cfs)	4878.3	Conv. (cfs)		4878.3	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		39.54	
Min Ch El (ft)	2135.90	Shear (lb/sq ft)		2.43	
Alpha	1.00	Stream Power (lb/ft s)	184.29	0.00	0.00
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	0.13	0.97	0.44
C & E Loss (ft)	0.22	Cum SA (acres)	0.17	0.38	0.55

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 2683

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2141	4.89	2140	9.46	2137	12.2	2136	19.07	2135.7
25.51	2136	57.1	2137	75.51	2138	79.66	2139	104.05	2140
174.43	2141								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	9.46	.04	57.1	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9.46	57.1	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2139.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.040	0.040	0.040
W.S. Elev (ft)	2138.93	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	2.84	124.47	28.15
E.G. Slope (ft/ft)	0.004453	Area (sq ft)	2.84	124.47	28.15
Q Total (cfs)	671.00	Flow (cfs)	6.10	583.67	81.22
Top Width (ft)	72.86	Top Width (ft)	2.94	47.64	22.27
Vel Total (ft/s)	4.32	Avg. Vel. (ft/s)	2.15	4.69	2.89
Max Chl Dpth (ft)	3.23	Hydr. Depth (ft)	0.97	2.61	1.26
Conv. Total (cfs)	10054.9	Conv. (cfs)	91.5	8746.3	1217.1
Length Wtd. (ft)	50.00	Wetted Per. (ft)	3.52	47.85	22.41
Min Ch El (ft)	2135.70	Shear (lb/sq ft)	0.22	0.72	0.35
Alpha	1.08	Stream Power (lb/ft s)	174.43	0.00	0.00
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	0.13	0.86	0.42
C & E Loss (ft)	0.04	Cum SA (acres)	0.17	0.33	0.54

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 2633

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	21411.080002		21401.890015		21392.740005		21383.560013		2137
10.10001	213616.29001		2135.921.39001		213648.40001		213761.29001		2137
68.32001	213777.68001		2138	178.1	2139	190.4	2140	199.32	2141

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.043.560013		.0448.40001		.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
3.56001	348.40001	50	50	50	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2138.80	Element			
Vel Head (ft)	0.73	Wt. n-Val.	0.040	0.040	0.040
W.S. Elev (ft)	2138.07	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2138.00	Flow Area (sq ft)	0.47	76.43	26.75
E.G. Slope (ft/ft)	0.018989	Area (sq ft)	0.47	76.43	26.75
Q Total (cfs)	671.00	Flow (cfs)	1.16	557.42	112.42
Top Width (ft)	81.62	Top Width (ft)	0.88	44.84	35.90
Vel Total (ft/s)	6.47	Avg. Vel. (ft/s)	2.48	7.29	4.20
Max Chl Dpth (ft)	2.17	Hydr. Depth (ft)	0.53	1.70	0.75
Conv. Total (cfs)	4869.4	Conv. (cfs)	8.4	4045.2	815.8
Length Wtd. (ft)	50.00	Wetted Per. (ft)	1.38	44.94	35.95
Min Ch El (ft)	2135.90	Shear (lb/sq ft)	0.40	2.02	0.88
Alpha	1.13	Stream Power (lb/ft s)	199.32	0.00	0.00
Frctn Loss (ft)	0.81	Cum Volume (acre-ft)	0.12	0.74	0.39
C & E Loss (ft)	0.07	Cum SA (acres)	0.16	0.28	0.51

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 2583

INPUT
Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2141	9.86	2137	28.73	2136	52.72	2135	57.95	2136
119.24	2137	185.48	2139	198.83	2141				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	28.73	.04	57.95	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
28.73	57.95	500	500	500	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2137.92	Element			
Vel Head (ft)	0.50	Wt. n-Val.	0.040	0.040	0.040
W.S. Elev (ft)	2137.42	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2137.42	Flow Area (sq ft)	17.51	56.00	59.05
E.G. Slope (ft/ft)	0.014030	Area (sq ft)	17.51	56.00	59.05
Q Total (cfs)	671.00	Flow (cfs)	70.49	379.19	221.32
Top Width (ft)	124.20	Top Width (ft)	19.90	29.22	75.08
Vel Total (ft/s)	5.06	Avg. Vel. (ft/s)	4.03	6.77	3.75

Max Chl Dpth (ft)	2.42	Hydr. Depth (ft)	0.88	1.92	0.79
Conv. Total (cfs)	5664.8	Conv. (cfs)	595.1	3201.3	1868.5
Length Wtd. (ft)	500.00	Wetted Per. (ft)	20.00	29.34	75.10
Min Ch El (ft)	2135.00	Shear (lb/sq ft)	0.77	1.67	0.69
Alpha	1.26	Stream Power (lb/ft s)	198.83	0.00	0.00
Frctn Loss (ft)	9.23	Cum Volume (acre-ft)	0.11	0.67	0.34
C & E Loss (ft)	0.14	Cum SA (acres)	0.15	0.24	0.44

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 2083

INPUT
Description: FEMA Effective Section A-5
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
52	2124	92	2120	98	2116	98	2112	102	2112
103	2116	104	2120	118	2124				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
52	.04	92	.04	104	.04

Bank Sta: Left	Right	Coeff Contr.	Expan.
92	104	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2122.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.88	Wt. n-Val.	0.040	0.040	0.040
W.S. Elev (ft)	2120.66	Reach Len. (ft)			
Crit W.S. (ft)	2120.66	Flow Area (sq ft)	2.17	59.91	0.76
E.G. Slope (ft/ft)	0.025405	Area (sq ft)	2.17	59.91	0.76
Q Total (cfs)	671.00	Flow (cfs)	6.12	662.79	2.09
Top Width (ft)	20.90	Top Width (ft)	6.59	12.00	2.31
Vel Total (ft/s)	10.68	Avg. Vel. (ft/s)	2.82	11.06	2.75
Max Chl Dpth (ft)	8.66	Hydr. Depth (ft)	0.33	4.99	0.33
Conv. Total (cfs)	4209.8	Conv. (cfs)	38.4	4158.3	13.1
Length Wtd. (ft)		Wetted Per. (ft)	6.62	23.46	2.40
Min Ch El (ft)	2112.00	Shear (lb/sq ft)	0.52	4.05	0.50
Alpha	1.06	Stream Power (lb/ft s)	118.00	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Slope too steep for slope area to converge during supercritical flow calculations (normal depth is below critical depth).
Water surface set to critical depth.

SUMMARY OF MANNING'S N VALUES

River:Eldorado

Reach	River Sta.	n1	n2	n3
Eldorado	6401	.04	.04	.04
Eldorado	5901	.04	.04	.04
Eldorado	5596	.04	.04	.04
Eldorado	5404	.04	.04	.04
Eldorado	5282	.04	.04	.04
Eldorado	5137	.04	.04	.04
Eldorado	5043	.04	.04	.04
Eldorado	4993	.04	.04	.04
Eldorado	4960	.04	.04	.04
Eldorado	4950		.013	
Eldorado	4880		.013	
Eldorado	4870		.013	
Eldorado	4857		.013	
Eldorado	4600		.013	
Eldorado	4343		.013	
Eldorado	4141		.013	
Eldorado	3939		.013	
Eldorado	3818		.013	
Eldorado	3740		.013	
Eldorado	3639		.047	
Eldorado	3614		.047	
Eldorado	3329		.022	
Eldorado	2999		.022	
Eldorado	2828	.04	.04	.04
Eldorado	2773	.04	.04	.04
Eldorado	2733	.04	.04	.04
Eldorado	2683	.04	.04	.04
Eldorado	2633	.04	.04	.04
Eldorado	2583	.04	.04	.04
Eldorado	2083	.04	.04	.04

SUMMARY OF REACH LENGTHS

River: Eldorado

Reach	River Sta.	Left	Channel	Right
Eldorado	6401	500	500	500
Eldorado	5901	370	305	225
Eldorado	5596	192	192	192
Eldorado	5404	122	122	122
Eldorado	5282	145	145	145
Eldorado	5137	94	94	94
Eldorado	5043	35	35	35
Eldorado	4993	36.5	36.5	36.5
Eldorado	4960	10	10	10
Eldorado	4950	30	30	30
Eldorado	4880	49.32	49.32	49.32
Eldorado	4870	22.12	27.19	32.19
Eldorado	4857	277	277	277
Eldorado	4600	257	257	257
Eldorado	4343	202	202	202
Eldorado	4141	202	202	202
Eldorado	3939	121	121	121
Eldorado	3818	86	78.53	71
Eldorado	3740	25	25	25
Eldorado	3639	25	25	25
Eldorado	3614	285	285	285
Eldorado	3329	330	330	300
Eldorado	2999	140	171	180
Eldorado	2828	55	55	55
Eldorado	2773	40	40	40
Eldorado	2733	50	50	50
Eldorado	2683	50	50	50
Eldorado	2633	50	50	50

Eldorado	2583	500	500	500
Eldorado	2083			

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Eldorado

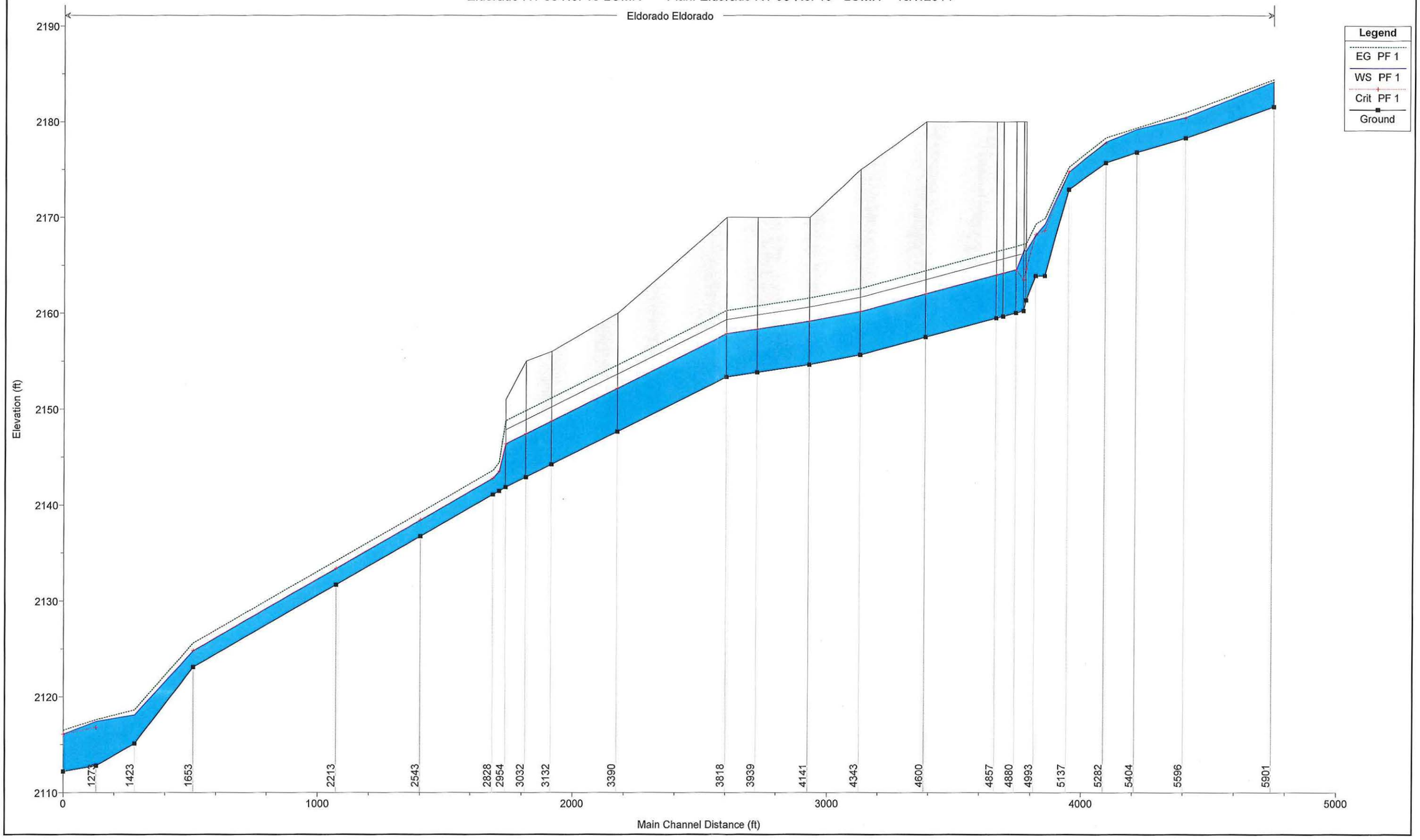
Reach	River Sta.	Contr.	Expan.
Eldorado	6401	.1	.3
Eldorado	5901	.1	.3
Eldorado	5596	.1	.3
Eldorado	5404	.1	.3
Eldorado	5282	.1	.3
Eldorado	5137	.1	.3
Eldorado	5043	.4	1
Eldorado	4993	.4	1
Eldorado	4960	.1	.3
Eldorado	4950	.1	.3
Eldorado	4880	.1	.3
Eldorado	4870	.1	.3
Eldorado	4857	.1	.3
Eldorado	4600	.1	.3
Eldorado	4343	.1	.3
Eldorado	4141	.1	.3
Eldorado	3939	.1	.3
Eldorado	3818	.1	.3
Eldorado	3740	.1	.3
Eldorado	3639	.4	1
Eldorado	3614	.1	.3
Eldorado	3329	.1	.3
Eldorado	2999	.1	.3
Eldorado	2828	.1	.3
Eldorado	2773	.1	.3
Eldorado	2733	.1	.3
Eldorado	2683	.1	.3
Eldorado	2633	.1	.3
Eldorado	2583	.1	.3
Eldorado	2083	.1	.3

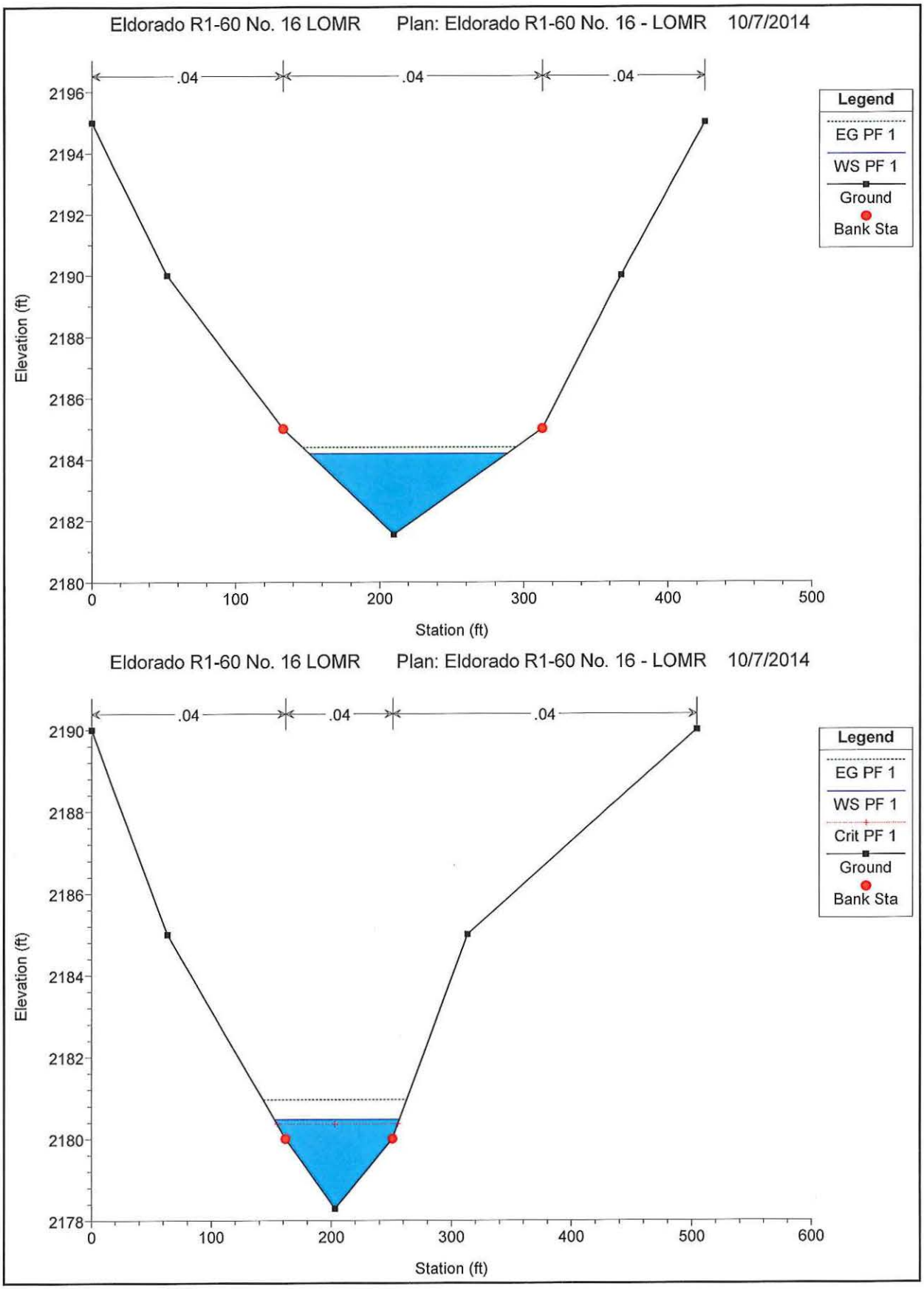
HEC-RAS Model: Post Project Model with CheckRAS

HEC-RAS Plan: LOMR River: Eldorado Reach: Eldorado Profile: PF 1

Reach	River Sta	Profile	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
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Eldorado	5901	PF 1	671.00	2181.55	2184.19		2184.40	0.006819	3.69	181.80	137.64	0.57
Eldorado	5596	PF 1	671.00	2178.29	2180.47	2180.36	2180.96	0.015702	5.62	121.85	104.28	0.86
Eldorado	5404	PF 1	671.00	2176.80	2179.23		2179.36	0.004638	2.88	233.19	192.16	0.46
Eldorado	5282	PF 1	671.00	2175.70	2177.87	2177.78	2178.32	0.018605	5.35	125.41	115.50	0.90
Eldorado	5137	PF 1	671.00	2172.90	2174.77	2174.77	2175.25	0.024263	5.53	121.28	129.67	1.01
Eldorado	5043	PF 1	671.00	2163.90	2169.32	2168.63	2169.92	0.007688	6.24	109.14	41.93	0.65
Eldorado	4993	PF 1	671.00	2163.90	2168.22	2168.22	2169.32	0.019218	8.43	79.62	36.66	1.00
Eldorado	4960	PF 1	671.00	2161.36	2166.54	2164.62	2167.27	0.008617	6.89	97.40	12.70	0.53
Eldorado	4950	PF 1	671.00	2160.25	2166.58	2163.49	2167.22	0.001107	6.44	104.24		0.45
Eldorado	4880	PF 1	671.00	2160.04	2164.57	2164.57	2166.99	0.003461	12.48	53.78	10.96	1.03
Eldorado	4870	PF 1	671.00	2159.68	2164.21	2164.21	2166.63	0.003457	12.47	53.80	10.95	1.03
Eldorado	4857	PF 1	671.00	2159.50	2164.04	2164.04	2166.45	0.003454	12.47	53.82	10.95	1.03
Eldorado	4600	PF 1	671.00	2157.51	2162.04	2162.04	2164.46	0.003460	12.48	53.78	10.96	1.03
Eldorado	4343	PF 1	671.00	2155.66	2160.19	2160.19	2162.61	0.003456	12.47	53.81	10.95	1.03
Eldorado	4141	PF 1	671.00	2154.65	2159.18	2159.18	2161.60	0.003458	12.47	53.79	10.95	1.03
Eldorado	3939	PF 1	671.00	2153.82	2158.35	2158.35	2160.77	0.003455	12.47	53.81	10.95	1.03
Eldorado	3818	PF 1	671.00	2153.34	2157.87	2157.87	2160.29	0.003459	12.47	53.79	10.96	1.03
Eldorado	3390	PF 1	671.00	2147.64	2152.17	2152.17	2154.59	0.003468	12.49	53.74	10.96	1.03
Eldorado	3132	PF 1	671.00	2144.22	2148.75	2148.75	2151.17	0.003463	12.48	53.76	10.96	1.03
Eldorado	3032	PF 1	671.00	2142.89	2147.42	2147.42	2149.84	0.003456	12.47	53.81	10.95	1.03
Eldorado	2954	PF 1	671.00	2141.84	2146.37	2146.37	2148.79	0.032738	12.47	53.80	10.95	1.03
Eldorado	2853	PF 1	671.00	2141.46	2143.53	2143.53	2144.45	0.019690	7.66	87.56	48.44	1.00
Eldorado	2828	PF 1	671.00	2141.08	2142.79	2142.79	2143.58	0.008030	7.13	94.13	60.24	1.00
Eldorado	2543	PF 1	671.00	2136.72	2138.43	2138.43	2139.22	0.007991	7.12	94.28	60.26	1.00
Eldorado	2213	PF 1	671.00	2131.67	2133.37	2133.37	2134.17	0.008089	7.14	93.91	60.22	1.01
Eldorado	1653	PF 1	671.00	2123.10	2124.81	2124.81	2125.60	0.008010	7.12	94.21	60.25	1.00
Eldorado	1423	PF 1	671.00	2115.10	2118.13		2118.64	0.008933	5.71	117.51	67.94	0.77
Eldorado	1273	PF 1	671.00	2112.80	2117.45	2116.83	2117.61	0.004477	3.25	206.38	167.27	0.52
Eldorado	1140	PF 1	671.00	2112.20	2116.12	2116.11	2116.51	0.020006	5.01	134.05	175.35	1.01

Eldorado R1-60 No. 16 LOMR Plan: Eldorado R1-60 No. 16 - LOMR 10/7/2014

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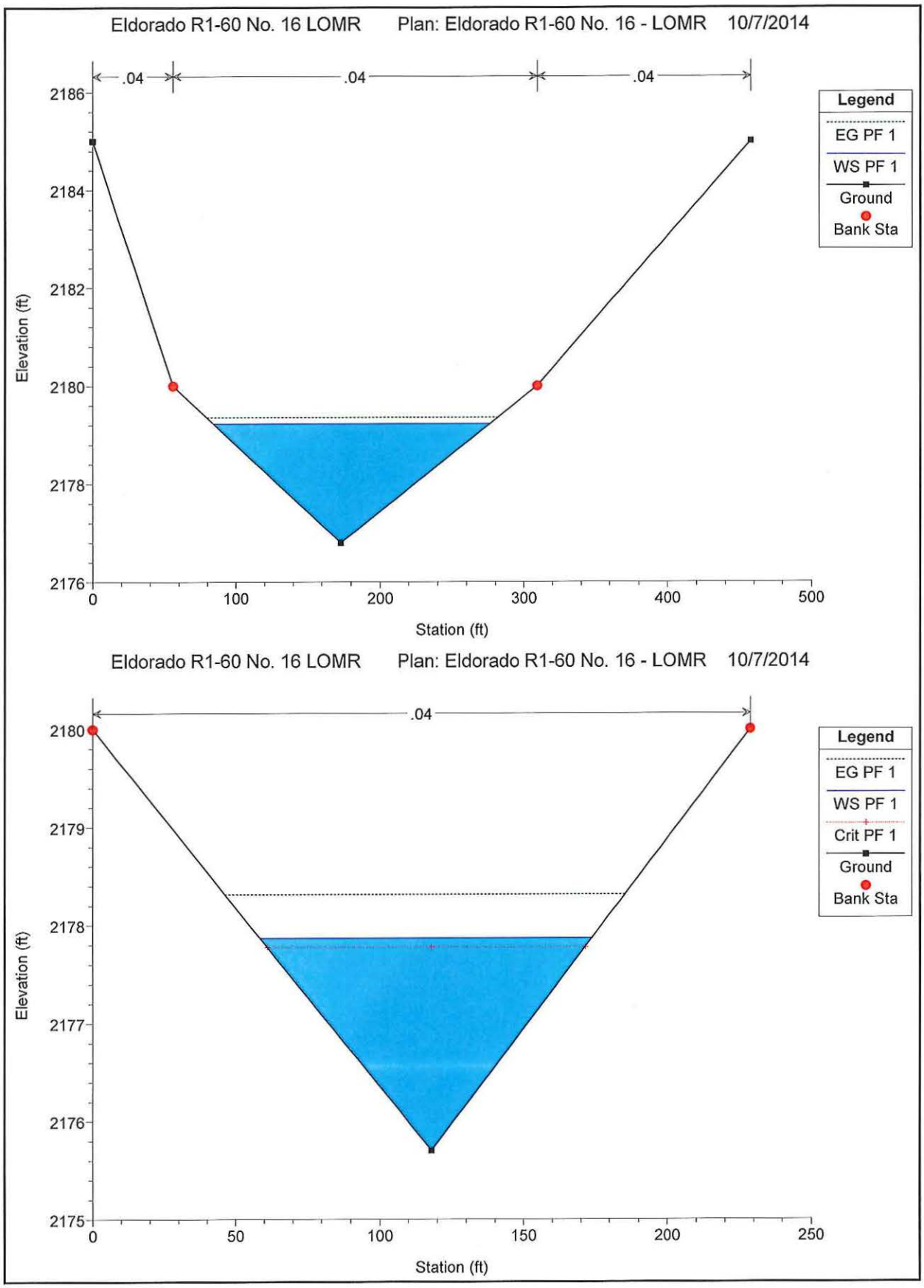
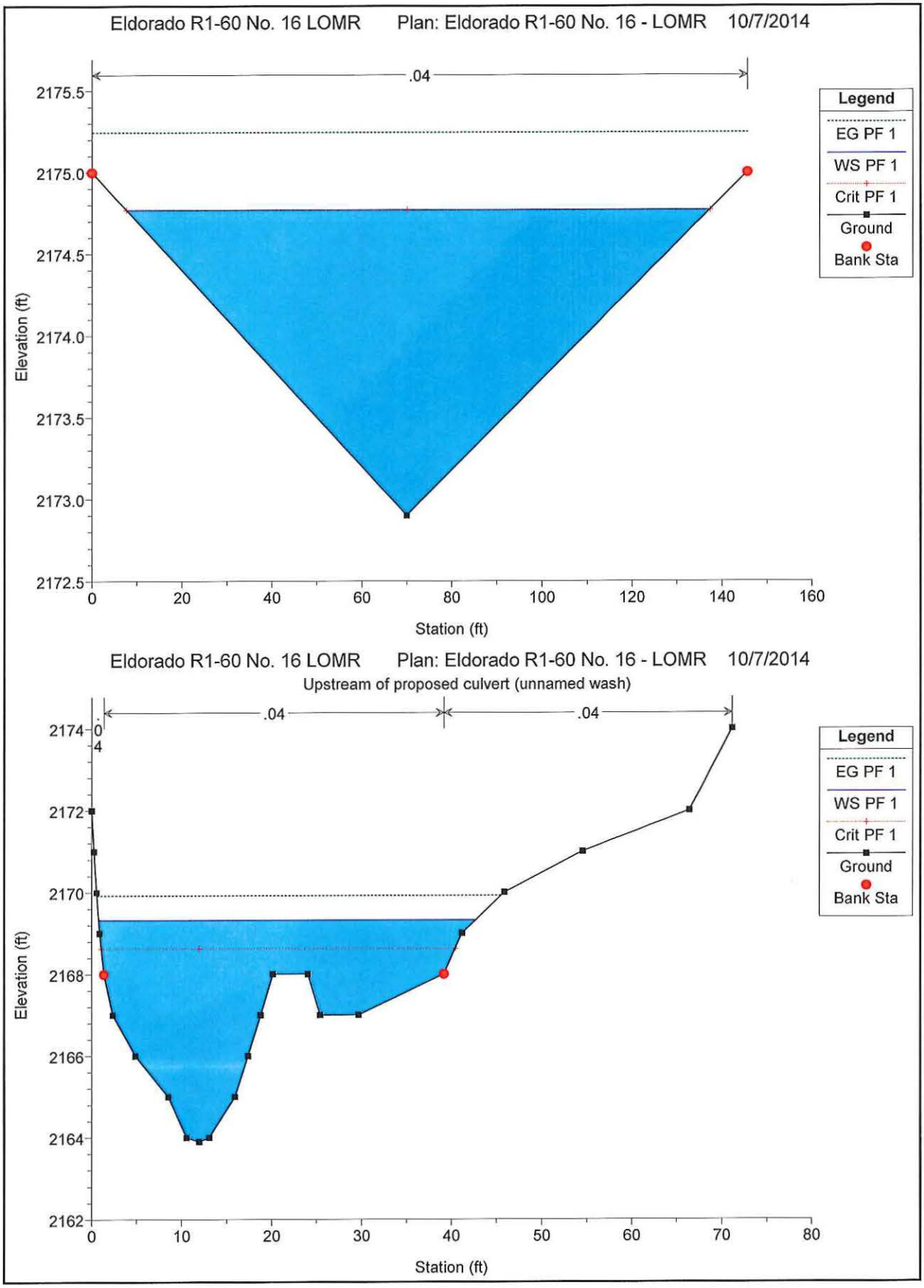
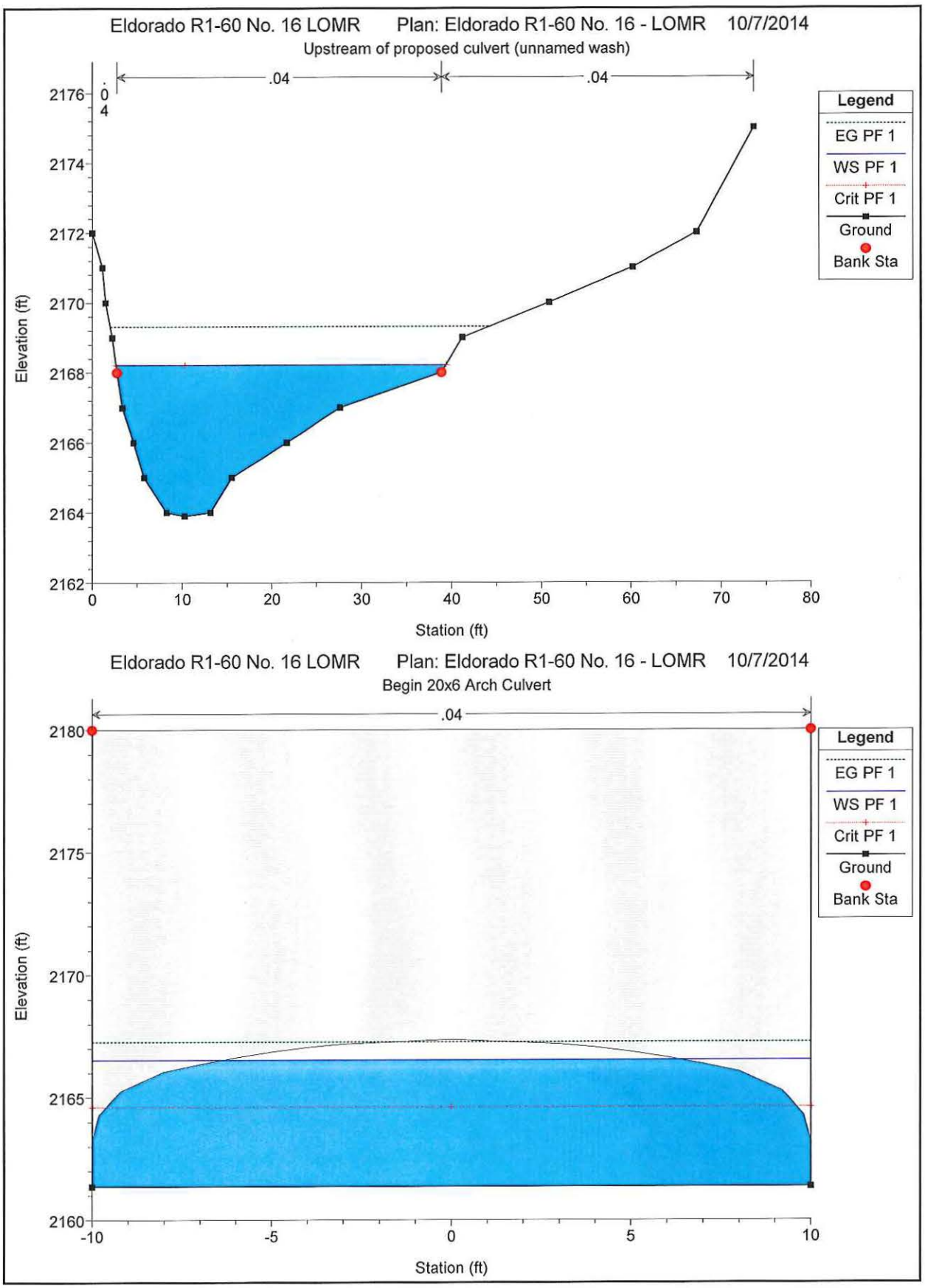
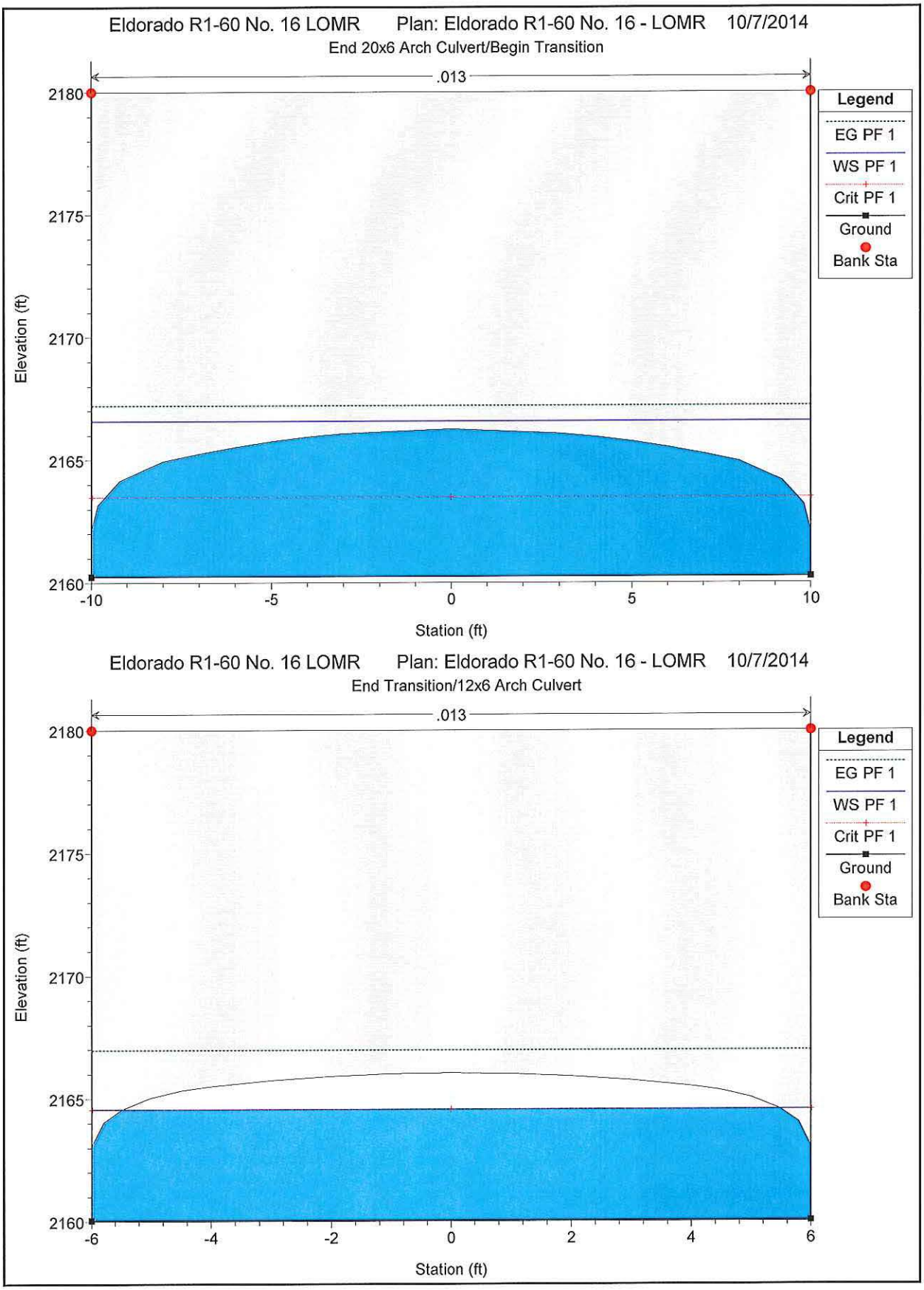
.04
.04
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
2196
2194
2192
2190
2188
2186
2184
2182
2180
0
100
200
300
400
500
Station (ft)
Eldorado R1-60 No. 16 LOMR Plan: Eldorado R1-60 No. 16 - LOMR 10/7/2014
.04
.04
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
2190
2188
2186
2184
2182
2180
2178
0
100
200
300
400
500
600
Station (ft)


Eldorado R1-60 No. 16 LOMR
Plan: Eldorado R1-60 No. 16 - LOMR
10/7/2014
.04
.04
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
2186
2184
2182
2180
2178
2176
0
100
200
300
400
500
Station (ft)
Eldorado R1-60 No. 16 LOMR
Plan: Eldorado R1-60 No. 16 - LOMR
10/7/2014
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
2180
2179
2178
2177
2176
2175
0
50
100
150
200
250
Station (ft)


Eldorado R1-60 No. 16 LOMR Plan: Eldorado R1-60 No. 16 - LOMR 10/7/2014
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2175.5
2175.0
2174.5
2174.0
2173.5
2173.0
2172.5
0
20
40
60
80
100
120
140
160
Eldorado R1-60 No. 16 LOMR Plan: Eldorado R1-60 No. 16 - LOMR 10/7/2014
Upstream of proposed culvert (unnamed wash)
.04
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2174
2172
2170
2168
2166
2164
2162
0
10
20
30
40
50
60
70
80


Eldorado R1-60 No. 16 LOMR Plan: Eldorado R1-60 No. 16 - LOMR 10/7/2014
Upstream of proposed culvert (unnamed wash)
.04
.04
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2176
2174
2172
2170
2168
2166
2164
2162
0
10
20
30
40
50
60
70
80
Eldorado R1-60 No. 16 LOMR Plan: Eldorado R1-60 No. 16 - LOMR 10/7/2014
Begin 20x6 Arch Culvert
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2180
2175
2170
2165
2160
-10
-5
0
5
10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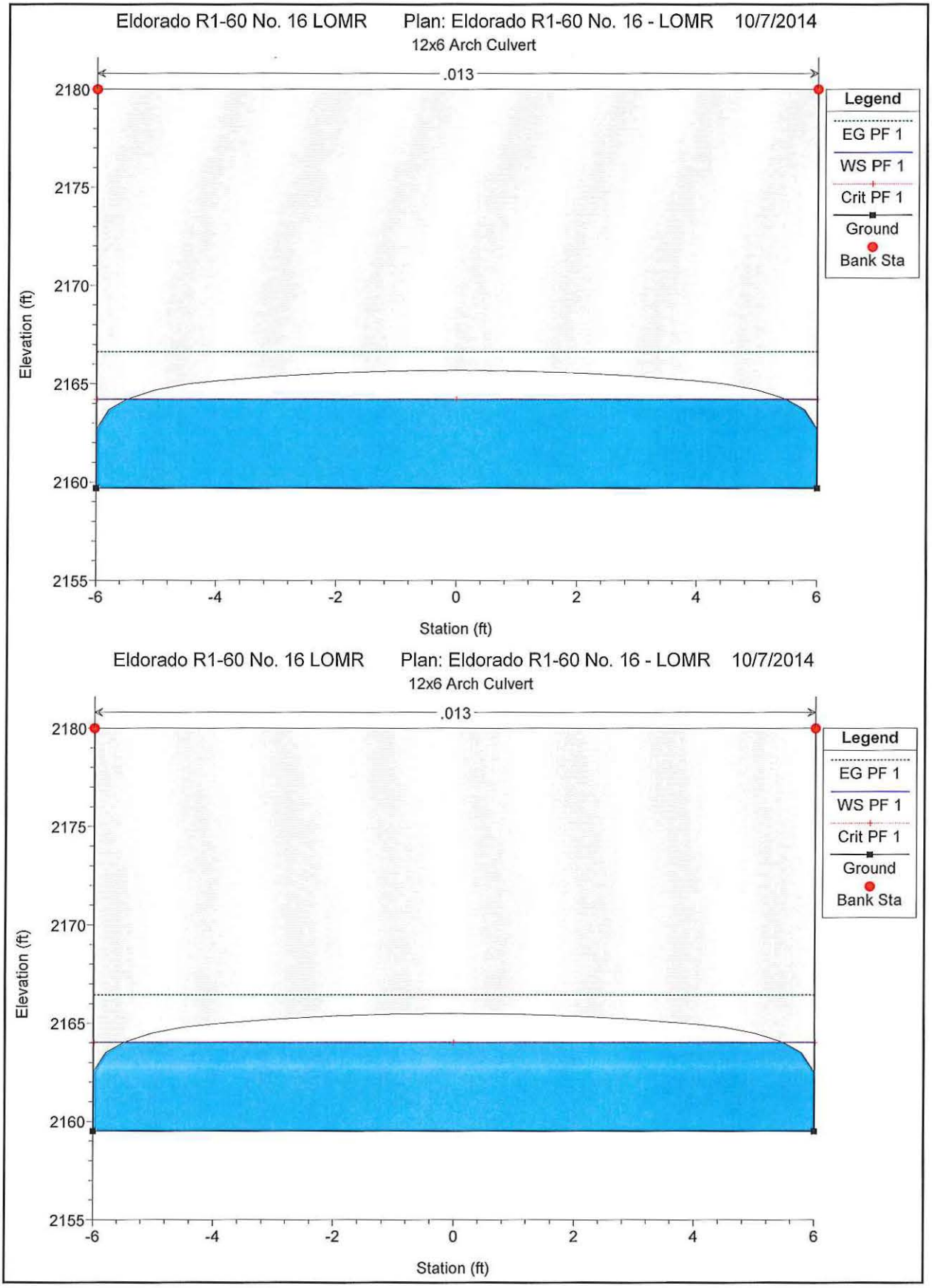
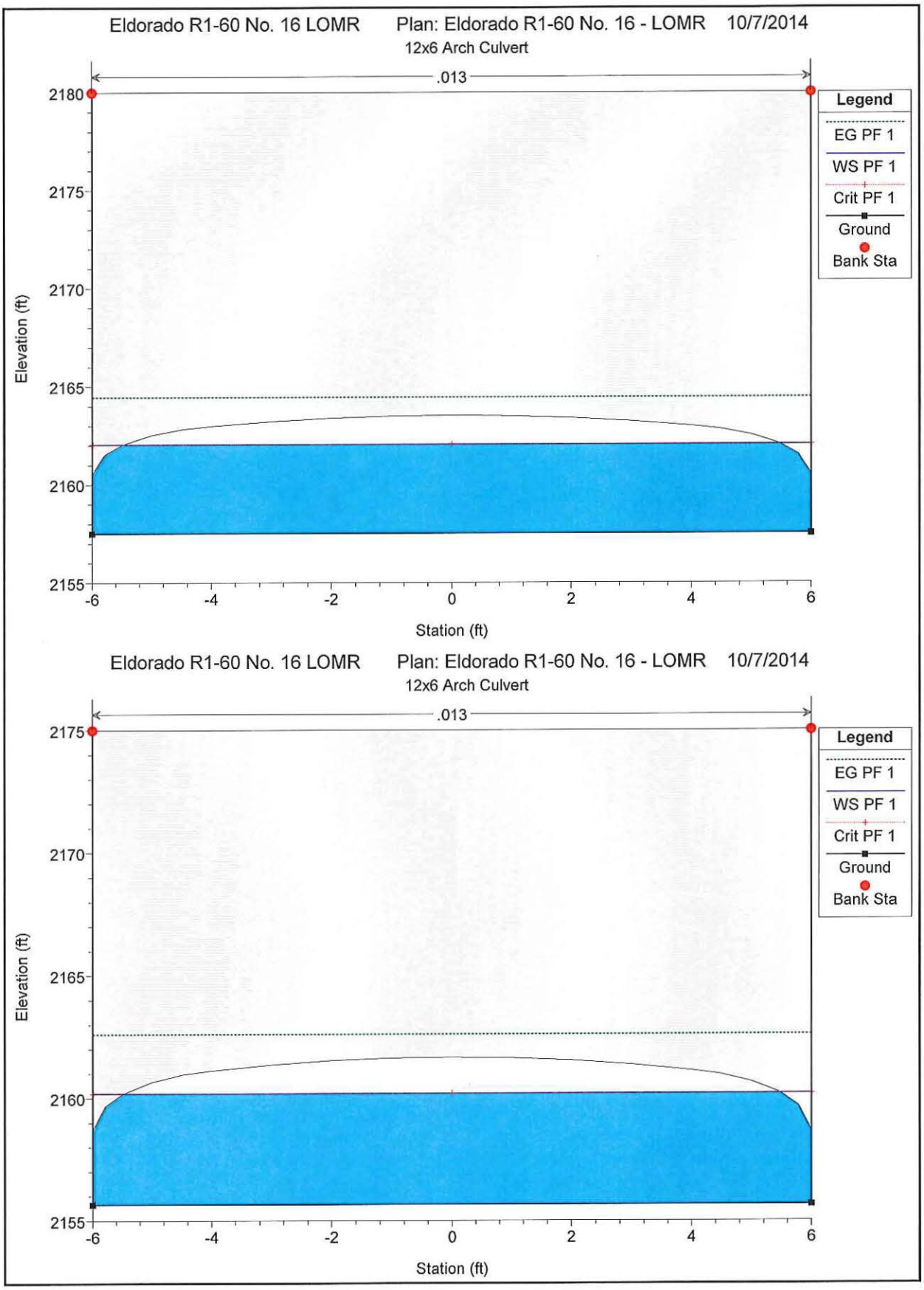
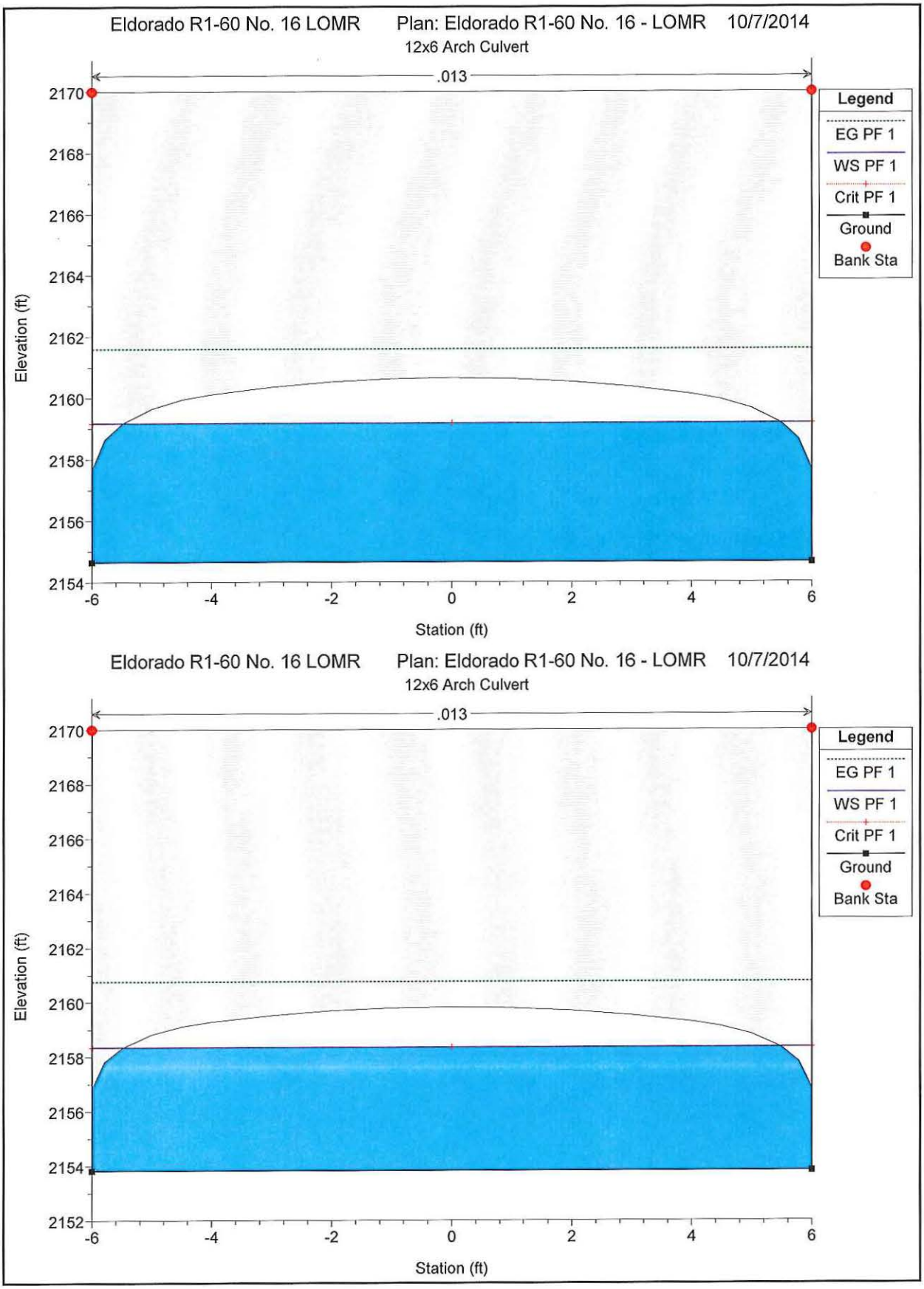
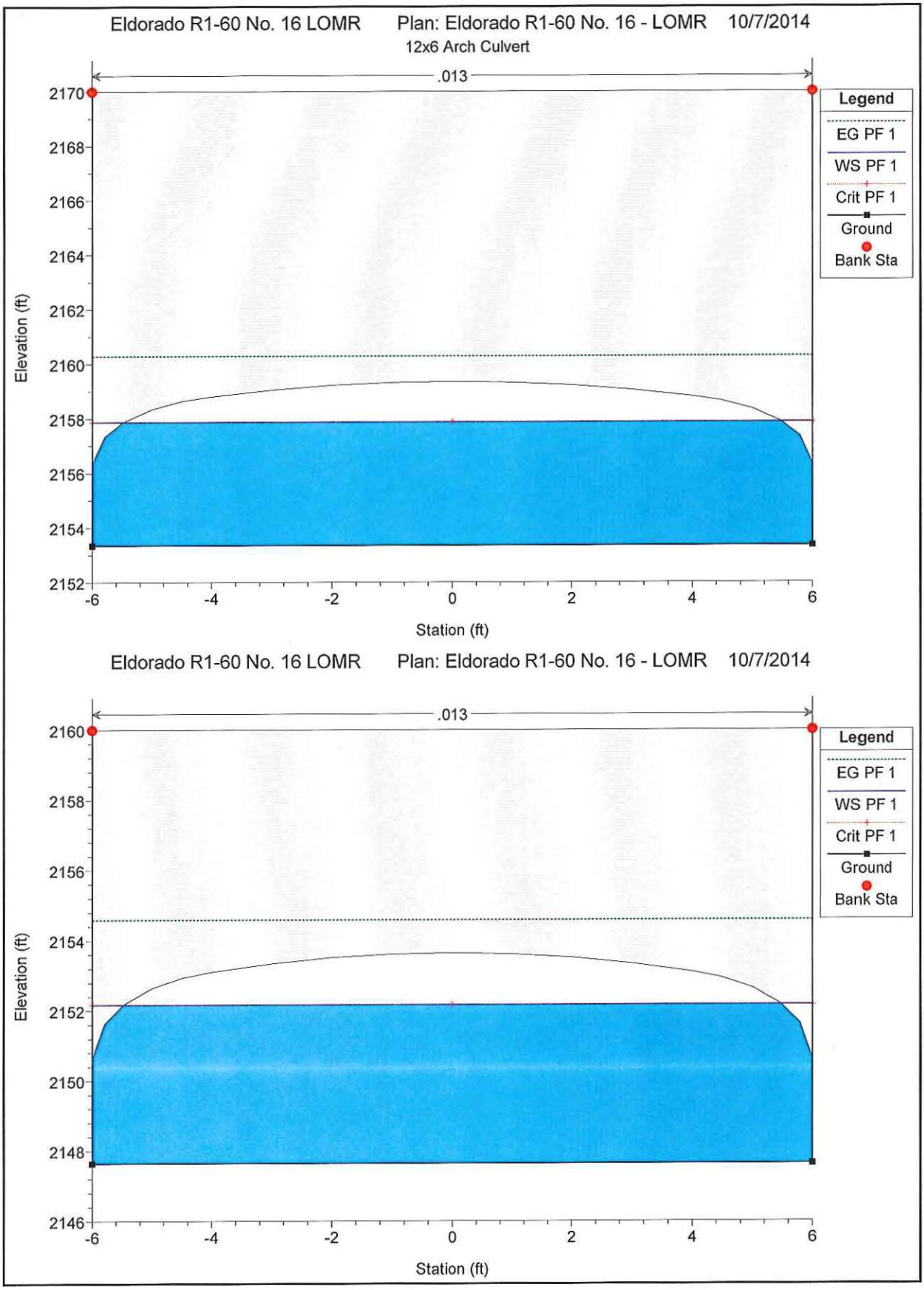
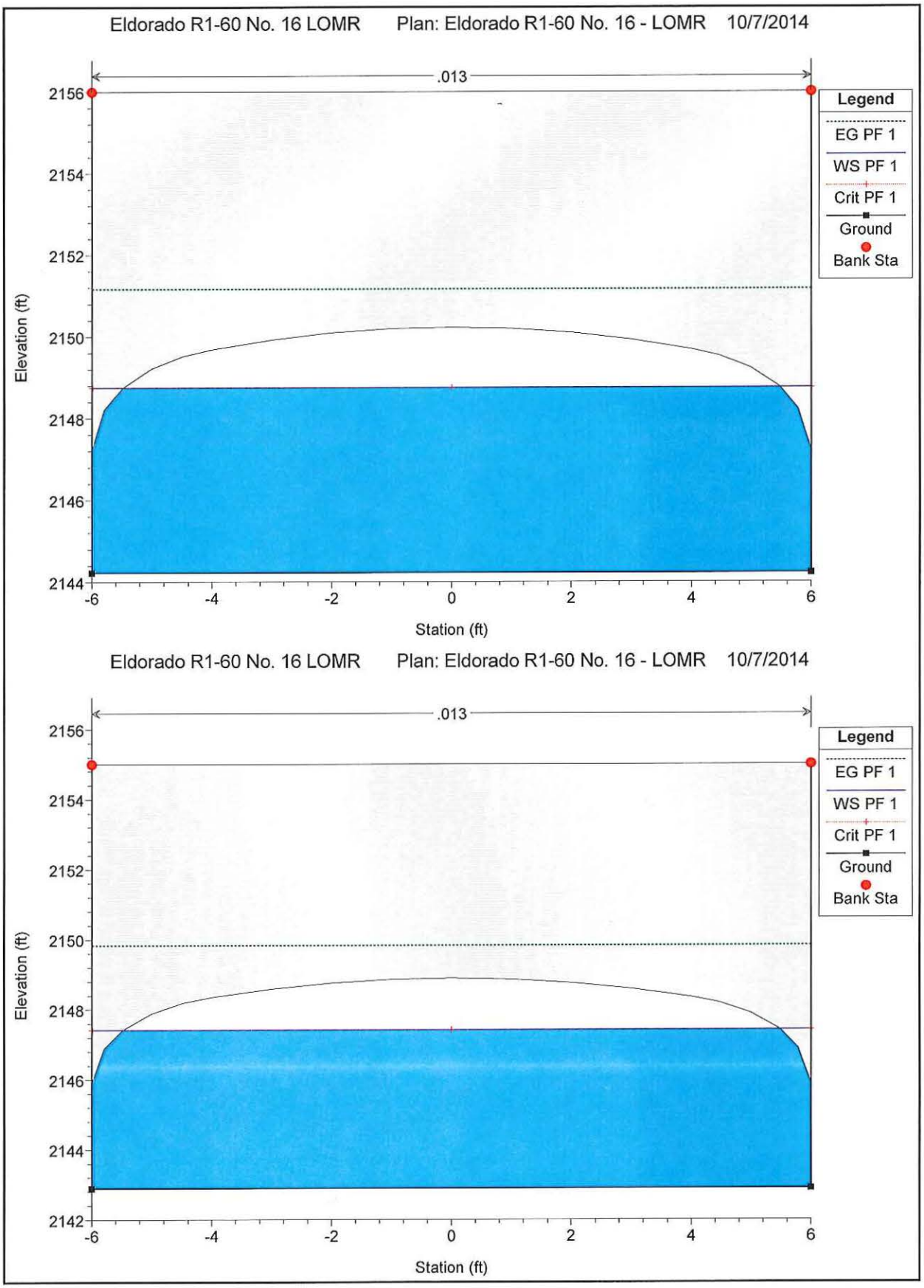
End 20x6 Arch Culvert/Begin Transition
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
2180
2175
2170
2165
2160
-10
-5
0
5
10
Station (ft)
Eldorado R1-60 No. 16 LOMR Plan: Eldorado R1-60 No. 16 - LOMR 10/7/2014
End Transition/12x6 Arch Culvert
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
2180
2175
2170
2165
2160
-6
-4
-2
0
2
4
6
Station (ft)

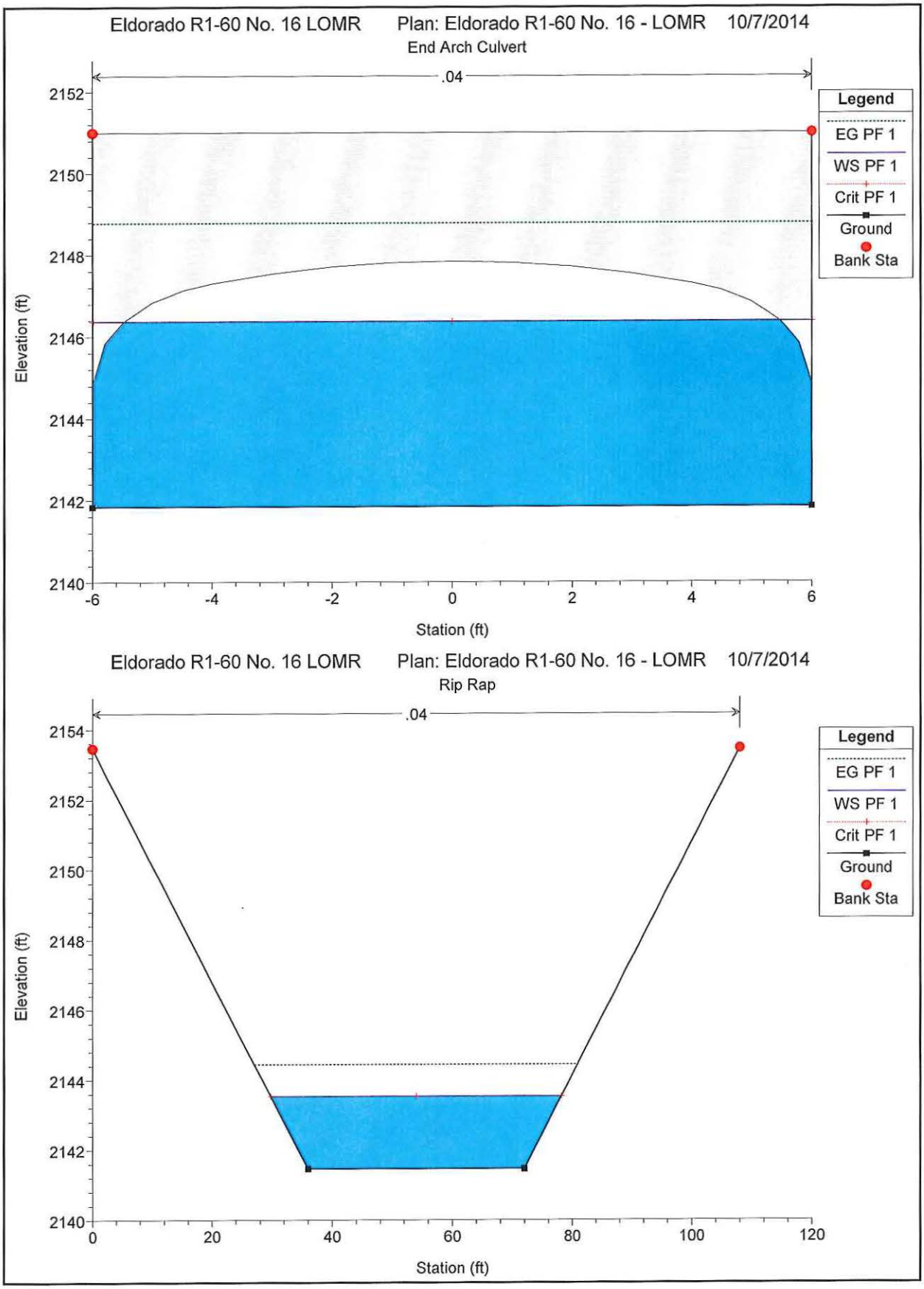

Eldorado R1-60 No. 16 LOMR
Plan: Eldorado R1-60 No. 16 - LOMR
10/7/2014
12x6 Arch Culvert
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2180
2175
2170
2165
2160
2155
-6
-4
-2
0
2
4
6
Eldorado R1-60 No. 16 LOMR
Plan: Eldorado R1-60 No. 16 - LOMR
10/7/2014
12x6 Arch Culvert
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

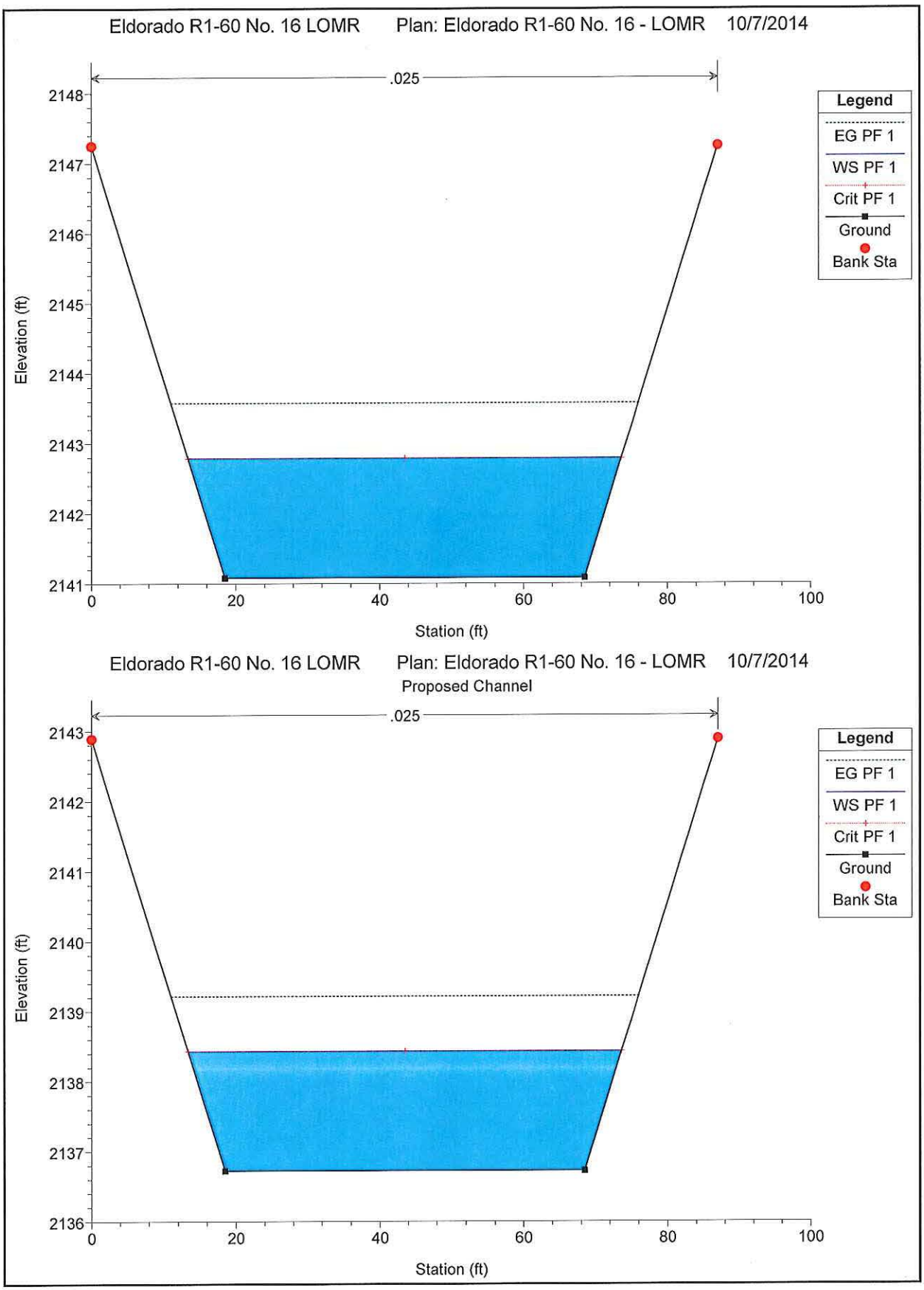

Eldorado R1-60 No. 16 LOMR
Plan: Eldorado R1-60 No. 16 - LOMR
10/7/2014
12x6 Arch Culvert
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2180
2175
2170
2165
2160
2155
-6
-4
-2
0
2
4
6
Eldorado R1-60 No. 16 LOMR
Plan: Eldorado R1-60 No. 16 - LOMR
10/7/2014
12x6 Arch Culvert
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2175
2170
2165
2160
2155
-6
-4
-2
0
2
4
6

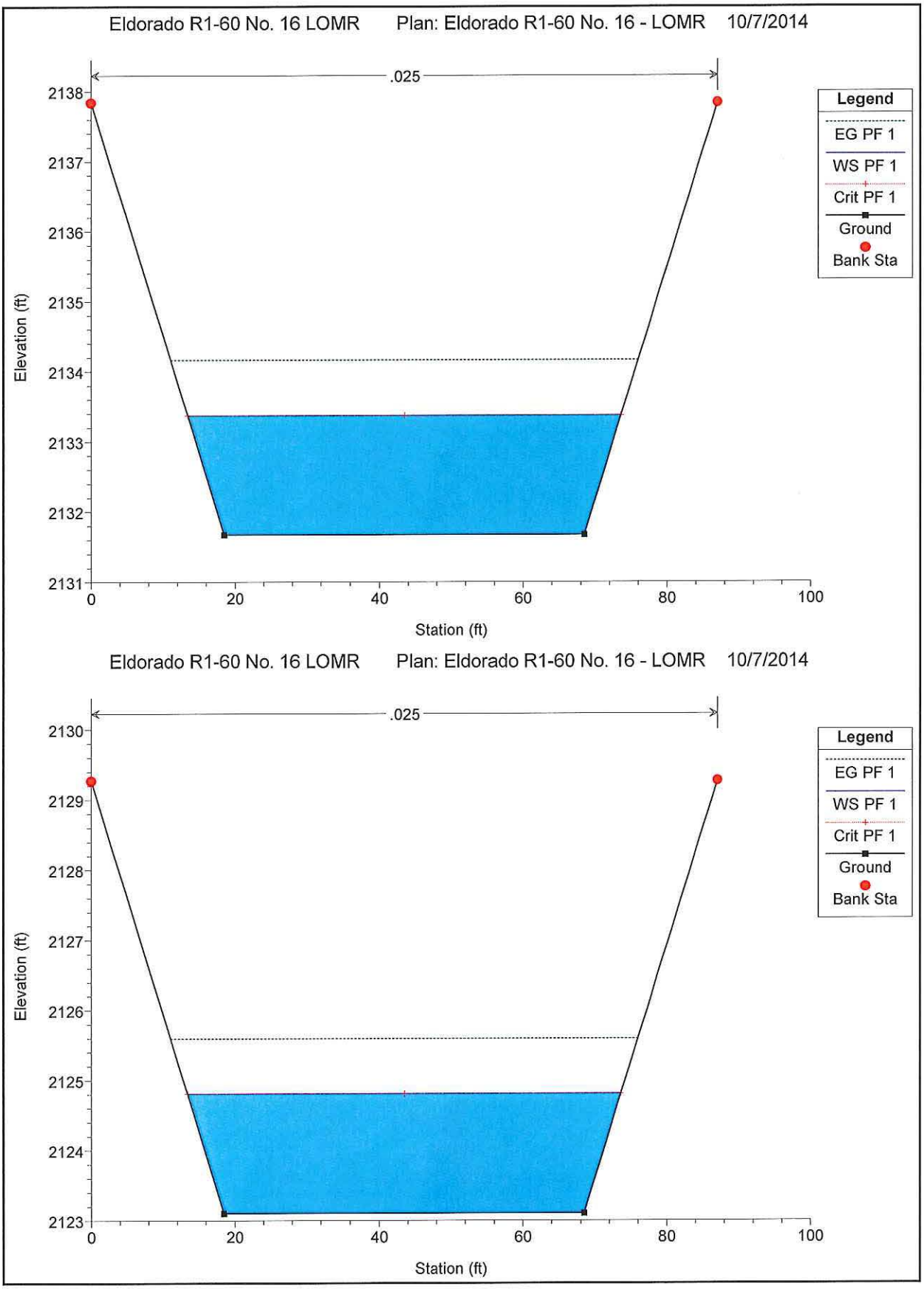

Eldorado R1-60 No. 16 LOMR
Plan: Eldorado R1-60 No. 16 - LOMR
10/7/2014
12x6 Arch Culvert
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2170
2168
2166
2164
2162
2160
2158
2156
2154
-6
-4
-2
0
2
4
6
Eldorado R1-60 No. 16 LOMR
Plan: Eldorado R1-60 No. 16 - LOMR
10/7/2014
12x6 Arch Culvert
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2170
2168
2166
2164
2162
2160
2158
2156
2154
2152
-6
-4
-2
0
2
4
6

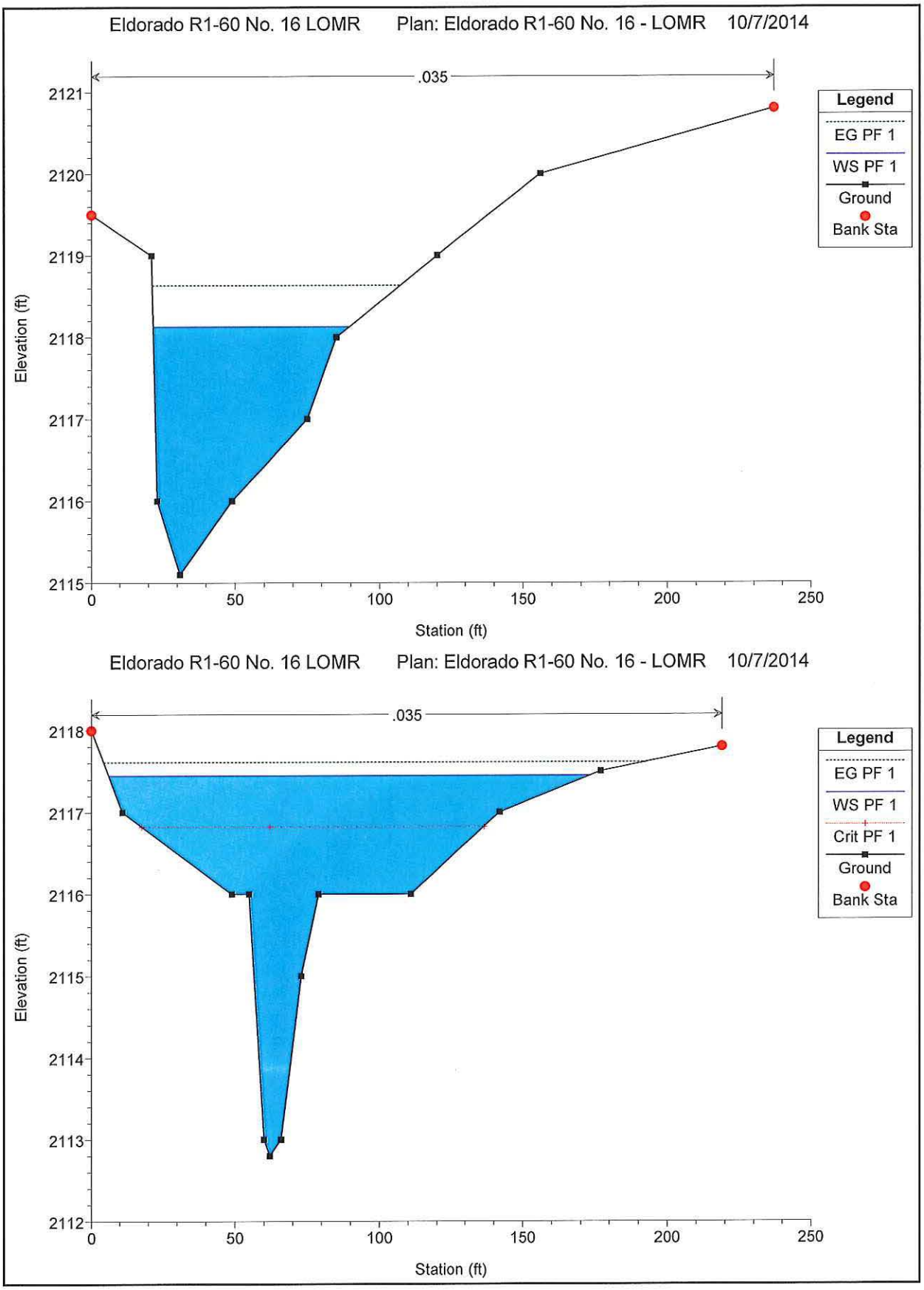

Eldorado R1-60 No. 16 LOMR
Plan: Eldorado R1-60 No. 16 - LOMR
10/7/2014
12x6 Arch Culvert
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2170
2168
2166
2164
2162
2160
2158
2156
2154
2152
-6
-4
-2
0
2
4
6
Eldorado R1-60 No. 16 LOMR
Plan: Eldorado R1-60 No. 16 - LOMR
10/7/2014
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2160
2158
2156
2154
2152
2150
2148
2146
-6
-4
-2
0
2
4
6

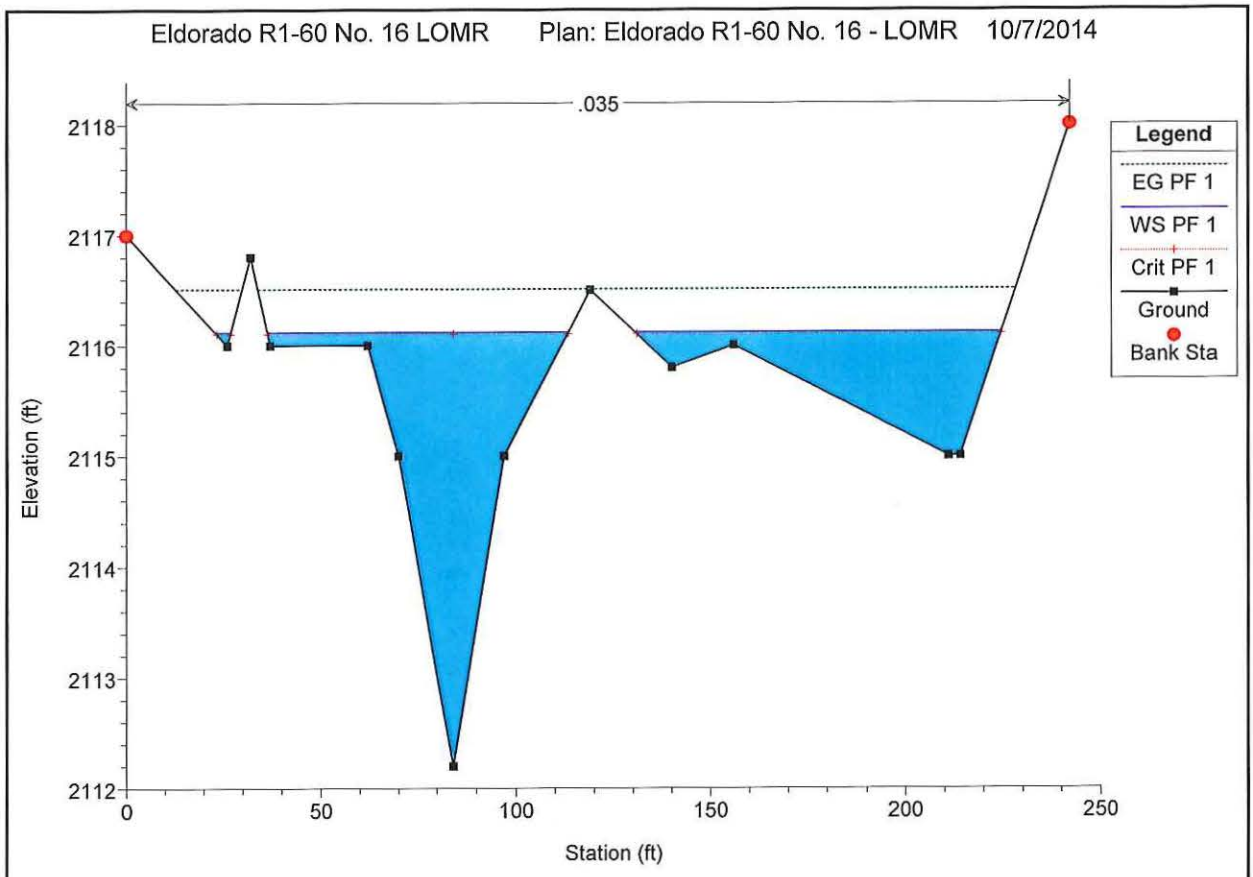

Eldorado R1-60 No. 16 LOMR Plan: Eldorado R1-60 No. 16 - LOMR 10/7/2014
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2156
2154
2152
2150
2148
2146
2144
-6
-4
-2
0
2
4
6
Eldorado R1-60 No. 16 LOMR Plan: Eldorado R1-60 No. 16 - LOMR 10/7/2014
.013
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2156
2154
2152
2150
2148
2146
2144
2142
-6
-4
-2
0
2
4
6


Eldorado R1-60 No. 16 LOMR
Plan: Eldorado R1-60 No. 16 - LOMR
10/7/2014
End Arch Culvert
.04
2152
2150
2148
2146
2144
2142
2140
Elevation (ft)
-6
-4
-2
0
2
4
6
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Eldorado R1-60 No. 16 LOMR
Plan: Eldorado R1-60 No. 16 - LOMR
10/7/2014
Rip Rap
.04
2154
2152
2150
2148
2146
2144
2142
2140
Elevation (ft)
0
20
40
60
80
100
120
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


Eldorado R1-60 No. 16 LOMR
Plan: Eldorado R1-60 No. 16 - LOMR
10/7/2014
.025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2148
2147
2146
2145
2144
2143
2142
2141
0
20
40
60
80
100
Eldorado R1-60 No. 16 LOMR
Plan: Eldorado R1-60 No. 16 - LOMR
10/7/2014
Proposed Channel
.025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2143
2142
2141
2140
2139
2138
2137
2136
0
20
40
60
80
100


Eldorado R1-60 No. 16 LOMR Plan: Eldorado R1-60 No. 16 - LOMR 10/7/2014
.025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2138
2137
2136
2135
2134
2133
2132
2131
0
20
40
60
80
100
Eldorado R1-60 No. 16 LOMR Plan: Eldorado R1-60 No. 16 - LOMR 10/7/2014
.025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2130
2129
2128
2127
2126
2125
2124
2123
0
20
40
60
80
100


Eldorado R1-60 No. 16 LOMR
Plan: Eldorado R1-60 No. 16 - LOMR
10/7/2014
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2121
2120
2119
2118
2117
2116
2115
0
50
100
150
200
250
Eldorado R1-60 No. 16 LOMR
Plan: Eldorado R1-60 No. 16 - LOMR
10/7/2014
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2118
2117
2116
2115
2114
2113
2112
0
50
100
150
200
250


Eldorado R1-60 No. 16 LOMR
Plan: Eldorado R1-60 No. 16 - LOMR
10/7/2014
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
2118
2117
2116
2115
2114
2113
2112
0
50
100
150
200
250

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX         XXXX        XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Eldorado R1-60 No. 16 LOMR
Project File : eldoradoLOMR.prj
Run Date and Time: 10/7/2014 1:36:50 PM

Project in English units

PLAN DATA

Plan Title: Eldorado R1-60 No. 16 - LOMR
Plan File : f:\Projects\500\5523-A017\Division\Fctl\Calcs\HEC-RAS\LOMR\eldoradoLOMR.p10

Geometry Title: Eldorado R1-60 No. 16 - LOMR
Geometry File : f:\Projects\500\5523-A017\Division\Fctl\Calcs\HEC-RAS\LOMR\eldoradoLOMR.g09

Flow Title : Eldorado R1-60 No. 16 - LOMR
Flow File : f:\Projects\500\5523-A017\Division\Fctl\Calcs\HEC-RAS\LOMR\eldoradoLOMR.f04

Plan Summary Information:

Number of:	Cross Sections	= 29	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 0	Lateral Structures	=	0

Computational Information

Water surface calculation tolerance	= 0.01
Critical depth calculation tolerance	= 0.01
Maximum number of iterations	= 20
Maximum difference tolerance	= 0.3
Flow tolerance factor	= 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Eldorado R1-60 No. 16 - LOMR
Flow File : f:\Projects\500\5523-A017\Division\Fctl\Calcs\HEC-RAS\LOMR\eldoradoLOMR.f04

Flow Data (cfs)

River	Reach	RS	PF 1
Eldorado	Eldorado	5901	671

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Eldorado	Eldorado	PF 1	Normal S = 0.01	Normal S = 0.02

GEOMETRY DATA

Geometry Title: Eldorado R1-60 No. 16 - LOMR
Geometry File : f:\Projects\500\5523-A017\Division\Fctl\Calcs\HEC-RAS\LOMR\eldoradoLOMR.g09

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 5901

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2195	52.41	2190	133	2185	209.84	2181.55	312.76	2185
367.68	2190	425.57	2195						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	133	.04	312.76	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
133	312.76	370	344	310	.1	.3

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 5596

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2190	63.35	2185	161.98	2180	203.12	2178.29	251.05	2180
313.37	2185	504	2190						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	161.98	.04	251.05	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
161.98	251.05	192	192	192	.1	.3

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 5404

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2185	55.8	2180	173	2176.8	309.16	2180	457.61	2185

Manning's n Values num= 3

```
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .04    55.8     .04  309.16     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          55.8  309.16              122     122     122             .1       .3

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado           RS: 5282

INPUT
Description:
Station Elevation Data    num=       3
     Sta     Elev     Sta     Elev     Sta     Elev
       0     2180     118   2175.7   228.7     2180

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .04       0     .04   228.7     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0   228.7              145     145     145             .1       .3

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado           RS: 5137

INPUT
Description:
Station Elevation Data    num=       3
     Sta     Elev     Sta     Elev     Sta     Elev
       0     2175      70   2172.9   145.58    2175

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .04       0     .04   145.58     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0  145.58              94      94      94             .1       .3

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado           RS: 5043

INPUT
Description: Upstream of proposed culvert (unnamed wash)
Station Elevation Data    num=      24
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
       0  2172.2399979     2171.5299988  2170.8600006  21691.360001     2168
2.379997  21674.880001  21668.529999     2165    10.58     2164    11.95   2163.9
   13.08     2164    15.92     2165    17.42     2166    18.79     2167    20.15     2168
   24.02     2168    25.41     2167    29.67     2167    39.17     2168    41.17     2169
   45.87     2170    54.55     2171    66.43     2172    71.14     2174

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .041.360001     .04    39.17     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      1.360001   39.17              35      35      35             .4         1

CROSS SECTION


RIVER: Eldorado
```

REACH: Eldorado RS: 4993

INPUT
Description: Upstream of proposed culvert (unnamed wash)
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2172	1.16	2171	1.51	2170	2.28	2169	2.8	2168
3.37	2167	4.59	2166	5.76	2165	8.28	2164	10.29	2163.9
13.17	2164	15.5	2165	21.7	2166	27.61	2167	38.84	2168
41.18	2169	50.84	2170	60.15	2171	67.27	2172	73.59	2175

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	2.8	.04	38.84	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
2.8	38.84	36.5	36.5	.4	1

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 4960

INPUT
Description: Begin 20x6 Arch Culvert
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-10	2180	-10	2161.36	10	2161.36	10	2180

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-10	.04	-10	.04	10	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-10	10	10	10	.1	.3

Cross Section Lid
num= 21

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-10	2180	2161.36	-10	2180	2163.22	-9.81	2180	2164.27
-9.2	2180	2165.26	-8	2180	2166.05	-7	2180	2166.36
-6	2180	2166.63	-5	2180	2166.86	-4	2180	2167.04
-3	2180	2167.18	0	2180	2167.36	3	2180	2167.18
4	2180	2167.04	5	2180	2166.86	6	2180	2166.63
7	2180	2166.36	8	2180	2166.05	9.2	2180	2165.26
9.81	2180	2164.27	10	2180	2163.22	10	2180	2161.36

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 4950

INPUT
Description: End 20x6 Arch Culvert/Begin Transition
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-10	2180	-10	2160.25	10	2160.25	10	2180

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-10		-10	.013	10	

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-10	10	30	30	.1	.3

Cross Section Lid
num= 21

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-10	2180	2160.25	-10	2180	2162.11	-9.81	2180	2163.16
-9.2	2180	2164.15	-8	2180	2164.94	-7	2180	2165.25
-6	2180	2165.52	-5	2180	2165.75	-4	2180	2165.93

```
      -3    2180 2166.07        0    2180 2166.25        3    2180 2166.07
       4    2180 2165.93        5    2180 2165.75        6    2180 2165.52
       7    2180 2165.25        8    2180 2164.94      9.2    2180 2164.15
    9.81    2180 2163.16       10    2180 2162.11       10    2180 2160.25

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado           RS: 4880

INPUT
Description: End Transition/12x6 Arch Culvert
Station Elevation Data    num=       4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
      -6     2180       -6 2160.04        6 2160.04        6     2180

Manning's n Values        num=       3
     Sta    n Val      Sta    n Val      Sta    n Val
      -6                -6     .013        6

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -6       6             49.32   49.32   49.32             .1       .3
Cross Section Lid
    num=       21
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
      -6    2180 2160.04       -6    2180 2163.04   -5.79    2180 2164.04
   -5.48    2180 2164.57       -5    2180 2165.04   -4.48    2180 2165.34
      -4    2180  2165.5       -3    2180 2165.74      -2    2180 2165.91
      -1    2180 2166.01        0    2180 2166.04       1    2180 2166.01
       2    2180 2165.91        3    2180 2165.74       4    2180  2165.5
    4.48    2180 2165.34        5    2180 2165.04    5.48    2180 2164.57
    5.79    2180 2164.04        6    2180 2163.04       6    2180 2160.04

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado           RS: 4870

INPUT
Description: 12x6 Arch Culvert
Station Elevation Data    num=       4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
      -6     2180       -6 2159.68        6 2159.68        6     2180

Manning's n Values        num=       3
     Sta    n Val      Sta    n Val      Sta    n Val
      -6                -6     .013        6

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -6       6             22.12   27.19   32.19             .1       .3
Cross Section Lid
    num=       21
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
      -6    2180 2159.68       -6    2180 2162.68   -5.79    2180 2163.68
   -5.48    2180 2164.21       -5    2180 2164.68   -4.48    2180 2164.98
      -4    2180 2165.14       -3    2180 2165.38      -2    2180 2165.55
      -1    2180 2165.65        0    2180 2165.68       1    2180 2165.65
       2    2180 2165.55        3    2180 2165.38       4    2180 2165.14
    4.48    2180 2164.98        5    2180 2164.68    5.48    2180 2164.21
    5.79    2180 2163.68        6    2180 2162.68       6    2180 2159.68

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado           RS: 4857

INPUT
Description: 12x6 Arch Culvert
```

```
Station Elevation Data    num=       4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
      -6     2180       -6  2159.5         6  2159.5         6     2180

Manning's n Values        num=       3
     Sta    n Val      Sta    n Val      Sta    n Val
      -6                -6     .013        6

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           -6       6              277     277     277             .1       .3
Cross Section Lid
    num=       21
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
      -6     2180  2159.5       -6     2180  2162.5   -5.79     2180  2163.5
   -5.48     2180 2164.03       -5     2180  2164.5   -4.48     2180  2164.8
      -4     2180 2164.96       -3     2180  2165.2      -2     2180 2165.37
      -1     2180 2165.47        0     2180  2165.5       1     2180 2165.47
       2     2180 2165.37        3     2180  2165.2       4     2180 2164.96
    4.48     2180  2164.8        5     2180  2164.5    5.48     2180 2164.03
    5.79     2180  2163.5        6     2180  2162.5       6     2180  2159.5

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado           RS: 4600

INPUT
Description: 12x6 Arch Culvert
Station Elevation Data    num=       4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
      -6     2180       -6 2157.51         6 2157.51         6     2180

Manning's n Values        num=       3
     Sta    n Val      Sta    n Val      Sta    n Val
      -6                -6     .013        6

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           -6       6              257     257     257             .1       .3
Cross Section Lid
    num=       21
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
      -6     2180 2157.51       -6     2180 2160.51   -5.79     2180 2161.51
   -5.48     2180 2162.04       -5     2180 2162.51   -4.48     2180 2162.81
      -4     2180 2162.97       -3     2180 2163.21      -2     2180 2163.38
      -1     2180 2163.48        0     2180 2163.51       1     2180 2163.48
       2     2180 2163.38        3     2180 2163.21       4     2180 2162.97
    4.48     2180 2162.81        5     2180 2162.51    5.48     2180 2162.04
    5.79     2180 2161.51        6     2180 2160.51       6     2180 2157.51

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado           RS: 4343

INPUT
Description: 12x6 Arch Culvert
Station Elevation Data    num=       4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
      -6     2175       -6 2155.66         6 2155.66         6     2175

Manning's n Values        num=       3
     Sta    n Val      Sta    n Val      Sta    n Val
      -6                -6     .013        6

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           -6       6              202     202     202             .1       .3
Cross Section Lid
    num=       21
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
```

```
    -6    2175 2155.66      -6    2175 2158.66   -5.79    2175 2159.66
 -5.48    2175 2160.19      -5    2175 2160.66   -4.48    2175 2160.96
    -4    2175 2161.12      -3    2175 2161.36      -2    2175 2161.53
    -1    2175 2161.63       0    2175 2161.66       1    2175 2161.63
     2    2175 2161.53       3    2175 2161.36       4    2175 2161.12
  4.48    2175 2160.96       5    2175 2160.66    5.48    2175 2160.19
  5.79    2175 2159.66       6    2175 2158.66       6    2175 2155.66

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado           RS: 4141

INPUT
Description: 12x6 Arch Culvert
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -6    2170      -6 2154.65       6 2154.65       6    2170

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
      -6               -6    .013       6

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           -6       6              202     202     202             .1       .3
Cross Section Lid
    num=      21
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -6    2170 2154.65      -6    2170 2157.65   -5.79    2170 2158.65
 -5.48    2170 2159.18      -5    2170 2159.65   -4.48    2170 2159.95
    -4    2170 2160.11      -3    2170 2160.35      -2    2170 2160.52
    -1    2170 2160.62       0    2170 2160.65       1    2170 2160.62
     2    2170 2160.52       3    2170 2160.35       4    2170 2160.11
  4.48    2170 2159.95       5    2170 2159.65    5.48    2170 2159.18
  5.79    2170 2158.65       6    2170 2157.65       6    2170 2154.65

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado           RS: 3939

INPUT
Description: 12x6 Arch Culvert
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -6    2170      -6 2153.82       6 2153.82       6    2170

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
      -6               -6    .013       6

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           -6       6              121     121     121             .1       .3
Cross Section Lid
    num=      21
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -6    2170 2153.82      -6    2170 2156.82   -5.79    2170 2157.82
 -5.48    2170 2158.35      -5    2170 2158.82   -4.48    2170 2159.12
    -4    2170 2159.28      -3    2170 2159.52      -2    2170 2159.69
    -1    2170 2159.79       0    2170 2159.82       1    2170 2159.79
     2    2170 2159.69       3    2170 2159.52       4    2170 2159.28
  4.48    2170 2159.12       5    2170 2158.82    5.48    2170 2158.35
  5.79    2170 2157.82       6    2170 2156.82       6    2170 2153.82

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado           RS: 3818
```

```
INPUT
Description: 12x6 Arch Culvert
Station Elevation Data    num=       4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
      -6     2170       -6  2153.34        6  2153.34        6     2170

Manning's n Values        num=       3
     Sta    n Val      Sta    n Val      Sta    n Val
      -6                -6     .013        6

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -6       6           428.28  428.28  428.28             .1       .3
Cross Section Lid
    num=       21
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
      -6     2170 2153.34       -6     2170 2156.34   -5.79     2170 2157.34
   -5.48     2170 2157.87       -5     2170 2158.34   -4.48     2170 2158.64
      -4     2170  2158.8       -3     2170 2159.04      -2     2170 2159.21
      -1     2170 2159.31        0     2170 2159.34       1     2170 2159.31
       2     2170 2159.21        3     2170 2159.04       4     2170  2158.8
    4.48     2170 2158.64        5     2170 2158.34    5.48     2170 2157.87
    5.79     2170 2157.34        6     2170 2156.34       6     2170 2153.34

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado           RS: 3390

INPUT
Description:
Station Elevation Data    num=       4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
      -6     2160       -6  2147.64        6  2147.64        6     2160

Manning's n Values        num=       3
     Sta    n Val      Sta    n Val      Sta    n Val
      -6                -6     .013        6

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -6       6           257.75  257.75  257.75             .1       .3
Cross Section Lid
    num=       21
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
      -6     2160 2147.64       -6     2160 2150.64   -5.79     2160 2151.64
   -5.48     2160 2152.17       -5     2160 2152.64   -4.48     2160 2152.94
      -4     2160  2153.1       -3     2160 2153.34      -2     2160 2153.51
      -1     2160 2153.61        0     2160 2153.64       1     2160 2153.61
       2     2160 2153.51        3     2160 2153.34       4     2160  2153.1
    4.48     2160 2152.94        5     2160 2152.64    5.48     2160 2152.17
    5.79     2160 2151.64        6     2160 2150.64       6     2160 2147.64

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado           RS: 3132

INPUT
Description:
Station Elevation Data    num=       4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
      -6     2156       -6  2144.22        6  2144.22        6     2156

Manning's n Values        num=       3
     Sta    n Val      Sta    n Val      Sta    n Val
      -6                -6     .013        6

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -6       6                100     100     100             .1       .3
```

Cross Section Lid
num= 21

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-6	2156	2144.22	-6	2156	2147.22	-5.79	2156	2148.22
-5.48	2156	2148.75	-5	2156	2149.22	-4.48	2156	2149.52
-4	2156	2149.68	-3	2156	2149.92	-2	2156	2150.09
-1	2156	2150.19	0	2156	2150.22	1	2156	2150.19
2	2156	2150.09	3	2156	2149.92	4	2156	2149.68
4.48	2156	2149.52	5	2156	2149.22	5.48	2156	2148.75
5.79	2156	2148.22	6	2156	2147.22	6	2156	2144.22

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 3032

INPUT
Description:
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-6	2155	-6	2142.89	6	2142.89	6	2155

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-6		-6	.013	6	

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-6	6	86	78.54	71	.1	.3

Cross Section Lid
num= 21

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-6	2155	2142.89	-6	2155	2145.89	-5.79	2155	2146.89
-5.48	2155	2147.42	-5	2155	2147.89	-4.48	2155	2148.19
-4	2155	2148.35	-3	2155	2148.59	-2	2155	2148.76
-1	2155	2148.86	0	2155	2148.89	1	2155	2148.86
2	2155	2148.76	3	2155	2148.59	4	2155	2148.35
4.48	2155	2148.19	5	2155	2147.89	5.48	2155	2147.42
5.79	2155	2146.89	6	2155	2145.89	6	2155	2142.89

CROSS SECTION

RIVER: Eldorado
REACH: Eldorado RS: 2954

INPUT
Description: End Arch Culvert
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-6	2151	-6	2141.84	6	2141.84	6	2151

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-6		-6	.04	6	

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
-6	6	25	25	25	.4	1

Cross Section Lid
num= 21

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-6	2151	2141.84	-6	2151	2144.84	-5.79	2151	2145.84
-5.48	2151	2146.37	-5	2151	2146.84	-4.48	2151	2147.14
-4	2151	2147.3	-3	2151	2147.54	-2	2151	2147.71
-1	2151	2147.81	0	2151	2147.84	1	2151	2147.81
2	2151	2147.71	3	2151	2147.54	4	2151	2147.3
4.48	2151	2147.14	5	2151	2146.84	5.48	2151	2146.37
5.79	2151	2145.84	6	2151	2144.84	6	2151	2141.84

CROSS SECTION

```
RIVER: Eldorado
REACH: Eldorado          RS: 2853

INPUT
Description: Rip Rap
Station Elevation Data    num=       4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0 2153.46       36 2141.46       72 2141.46      108 2153.46

Manning's n Values        num=       3
     Sta    n Val      Sta    n Val      Sta    n Val
       0      .04        0      .04      108      .04

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.   Expan.
             0     108               25      25      25              .1       .3

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado          RS: 2828

INPUT
Description:
Station Elevation Data    num=       4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0 2147.25     18.5 2141.08     68.5 2141.08       87 2147.25

Manning's n Values        num=       3
     Sta    n Val      Sta    n Val      Sta    n Val
       0     .025        0     .025       87     .025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.   Expan.
             0      87              285     285     285              .1       .3

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado          RS: 2543

INPUT
Description: Proposed Channel
Station Elevation Data    num=       4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0 2142.89     18.5 2136.72     68.5 2136.72       87 2142.89

Manning's n Values        num=       3
     Sta    n Val      Sta    n Val      Sta    n Val
       0     .025        0     .025       87     .025

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.   Expan.
             0      87              330     330     330              .1       .3

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado          RS: 2213

INPUT
Description:
Station Elevation Data    num=       4
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0 2137.84     18.5 2131.67     68.5 2131.67       87 2137.84

Manning's n Values        num=       3
     Sta    n Val      Sta    n Val      Sta    n Val
       0     .025        0     .025       87     .025
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      87             560     560     560             .1       .3

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado          RS: 1653

INPUT
Description:
Station Elevation Data    num=       4
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
       0  2129.27    18.5   2123.1    68.5   2123.1      87  2129.27

Manning's n Values        num=       3
     Sta    n Val     Sta    n Val     Sta    n Val
       0     .025       0     .025      87     .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0      87             201     230     347             .1       .3

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado          RS: 1423

INPUT
Description:
Station Elevation Data    num=      10
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
       0   2119.5      21     2119      23     2116      31   2115.1      49     2116
      75     2117      85     2118     120     2119     156     2120     237   2120.8

Manning's n Values        num=       3
     Sta    n Val     Sta    n Val     Sta    n Val
       0     .035       0     .035     237     .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     237             150     150     150             .1       .3

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado          RS: 1273

INPUT
Description:
Station Elevation Data    num=      13
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
       0     2118      11     2117      49     2116      55     2116      60     2113
      62   2112.8      66     2113      73     2115      79     2116     111     2116
     142     2117     177   2117.5     219   2117.8

Manning's n Values        num=       3
     Sta    n Val     Sta    n Val     Sta    n Val
       0     .035       0     .035     219     .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
             0     219             130     130     130             .1       .3

CROSS SECTION


RIVER: Eldorado
REACH: Eldorado          RS: 1140

INPUT
Description:
```

Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2117	26	2116	32	2116.8	37	2116	62	2116
70	2115	84	2112.2	97	2115	119	2116.5	140	2115.8
156	2116	211	2115	214	2115	242	2118		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	0	.035	242	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	242	0	0	.1	.3

SUMMARY OF MANNING'S N VALUES

River:Eldorado

Reach	River Sta.	n1	n2	n3
Eldorado	5901	.04	.04	.04
Eldorado	5596	.04	.04	.04
Eldorado	5404	.04	.04	.04
Eldorado	5282	.04	.04	.04
Eldorado	5137	.04	.04	.04
Eldorado	5043	.04	.04	.04
Eldorado	4993	.04	.04	.04
Eldorado	4960	.04	.04	.04
Eldorado	4950		.013	
Eldorado	4880		.013	
Eldorado	4870		.013	
Eldorado	4857		.013	
Eldorado	4600		.013	
Eldorado	4343		.013	
Eldorado	4141		.013	
Eldorado	3939		.013	
Eldorado	3818		.013	
Eldorado	3390		.013	
Eldorado	3132		.013	
Eldorado	3032		.013	
Eldorado	2954		.04	
Eldorado	2853	.04	.04	.04
Eldorado	2828	.025	.025	.025
Eldorado	2543	.025	.025	.025
Eldorado	2213	.025	.025	.025
Eldorado	1653	.025	.025	.025
Eldorado	1423	.035	.035	.035
Eldorado	1273	.035	.035	.035
Eldorado	1140	.035	.035	.035

SUMMARY OF REACH LENGTHS

River: Eldorado

Reach	River Sta.	Left	Channel	Right
Eldorado	5901	370	344	310
Eldorado	5596	192	192	192
Eldorado	5404	122	122	122
Eldorado	5282	145	145	145
Eldorado	5137	94	94	94
Eldorado	5043	35	35	35
Eldorado	4993	36.5	36.5	36.5
Eldorado	4960	10	10	10
Eldorado	4950	30	30	30
Eldorado	4880	49.32	49.32	49.32
Eldorado	4870	22.12	27.19	32.19

Eldorado	4857	277	277	277
Eldorado	4600	257	257	257
Eldorado	4343	202	202	202
Eldorado	4141	202	202	202
Eldorado	3939	121	121	121
Eldorado	3818	428.28	428.28	428.28
Eldorado	3390	257.75	257.75	257.75
Eldorado	3132	100	100	100
Eldorado	3032	86	78.54	71
Eldorado	2954	25	25	25
Eldorado	2853	25	25	25
Eldorado	2828	285	285	285
Eldorado	2543	330	330	330
Eldorado	2213	560	560	560
Eldorado	1653	201	230	347
Eldorado	1423	150	150	150
Eldorado	1273	130	130	130
Eldorado	1140	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Eldorado

Reach	River Sta.	Contr.	Expan.
Eldorado	5901	.1	.3
Eldorado	5596	.1	.3
Eldorado	5404	.1	.3
Eldorado	5282	.1	.3
Eldorado	5137	.1	.3
Eldorado	5043	.4	1
Eldorado	4993	.4	1
Eldorado	4960	.1	.3
Eldorado	4950	.1	.3
Eldorado	4880	.1	.3
Eldorado	4870	.1	.3
Eldorado	4857	.1	.3
Eldorado	4600	.1	.3
Eldorado	4343	.1	.3
Eldorado	4141	.1	.3
Eldorado	3939	.1	.3
Eldorado	3818	.1	.3
Eldorado	3390	.1	.3
Eldorado	3132	.1	.3
Eldorado	3032	.1	.3
Eldorado	2954	.4	1
Eldorado	2853	.1	.3
Eldorado	2828	.1	.3
Eldorado	2543	.1	.3
Eldorado	2213	.1	.3
Eldorado	1653	.1	.3
Eldorado	1423	.1	.3
Eldorado	1273	.1	.3
Eldorado	1140	.1	.3

cHECk-RAS Report

HEC-RAS Project:	*eldoradolomr.prj*
Plan File:	*eldoradolomr.p10*
Geometry File:	*eldoradolomr.g09*
Flow File:	*eldoradolomr.f04*
Report Date:	*10/8/2014*

Message ID	Message	Cross sections affected	Comments
NT RC 05	The left overbank n-value of $nlob$ and the right overbank n-value of $nrob$ are less than or equal to the channel n-value of nch. Follow the procedure in (FHWA, 1984) to compute the n-value for the natural floodplain and the channel. Or follow the procedure in (USGS, 1977) to compute the n-value for urban development. Please submit supporting information on the evaluation of n-values.	4993; 5043; 5404; 5596; 5901	N-VALUES ARE BASED ON EFFECTIVE FIRM MODEL.
NT TL 02	Contraction and expansion loss coefficients are cc and ce, respectively. However, this cross section is not at a hydraulic structure. They should be equal to 0.1 and 0.3 according to page 5-8 of the HEC-RAS Hydraulic Reference Manual (HEC, 2010).	2954; 4993; 5043	THESE SECTIONS ARE LOCATED IMMEDIATELY UPSTREAM OR DOWNSTREAM OF HYDRAULIC STRUCTURES.
XS DC 02	Constant discharge used for the entire profile for $assignedname$ flood. At least two discharges should be selected; one at the mouth and the other at the middle of the watershed or above the confluence of a tributary. Or provide explanation why only one discharge should be used. Other flood frequencies should also be checked.		FLOW RATE IS THE EFFECTIVE FLOW RATE THROUGH THE ENTIRE REACH.
XS EC 01L	Cross section extended vertically. Flow Code will be EL. The $assignedname$ WSEL of $wsel$ is higher than the starting GR station elevation of $grelv$. The Left_Sta_Eff is equal to the starting GR station. If there is divided flow then cross section should be trimmed or the ineffective flow station should be used to block the divided flow. If there is no divided flow then the cross section should be expanded to cover the $assignedname$ floodplain.The HEC-RAS geometry file may need to be recreated using a GIS program. Or provide explanation why the cross section should not be expanded.	2954; 3032; 3132; 3390; 3818; 3939; 4141; 4343; 4600; 4857; 4870; 4880; 4950; 4960	THESE SECTIONS MODEL AN ARCH CULVERT WITH VERTICAL WALLS.

XS EC 01R	Cross section extended vertically. Flow Code will be ER. The $assignedname$ WSEL of $wsel$ is higher than the ending GR station elevation of $grelv$. The Rght_Sta_Eff is equal to the ending GR station. If there is divided flow then the cross section should be trimmed or the ineffective flow station should be used to block the divided flow. If there is no divided flow then the cross section should be expanded to cover the $assignedname$ floodplain. The HEC-RAS geometry file may need to be recreated using a GIS program. Or provide explanation why the cross section should not be expanded.	2954; 3032; 3132; 3390; 3818; 3939; 4141; 4343; 4600; 4857; 4870; 4880; 4950; 4960	THESE SECTIONS MODEL AN ARCH CULVERT WITH VERTICAL WALLS.
XS GD 01	'Cross Section Lid' option is used for this section. Instead, the bridge or culvert option should be used. Cross Section Lid option may be used to model small obstructions, such as, pipe crossing or if the type of flow through the lid sections and the main stream is in super critical flow, or if there is lateral weir flow between Sections 3 and 2 of a structure.	2954; 3032; 3132; 3390; 3818; 3939; 4141; 4343; 4600; 4857; 4870; 4880; 4950; 4960	THE LID OPTION WAS USED SINCE THE FLOW THROUGH THE CULVERT IS SUPER-CRITICAL.

3.2 STRUCTURAL CALCULATIONS (ON CD)

3.3 GEOTECHNICAL REPORT (ON CD)

4. SUPPORTING INFORMATION (ON CD)

Site Investigation Photographs
Field Survey
Operation and Maintenance Plan
ESA Compliance
Topography

5. REFERENCE MATERIALS (ON CD)

Excerpts from the *Flood Insurance Restudy*, 1994
Flood Insurance Study Clark County and Incorporated Areas, 2011
HEC-RAS River Analysis System Hydraulic Reference Manual, 2008
Manning's Roughness Coefficients from Hydrologic Criteria and Drainage Design Manual
Eldorado No. 25 LOMR Case No.:14-09-0513P

6. IMPROVEMENT PLANS (HARD COPY AND ON CD)

Eldorado R1-60 No. 16
Field Photos

GENERAL STRUCTURAL NOTES

GENERAL REQUIREMENTS

1. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE STRUCTURAL ENGINEERS IN THIS OR SIMILAR LOCALITIES. THEY NECESSARILY ASSUME THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND /OR WORKMEN WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, IT IS UNDERSTOOD THAT THE CONTRACTOR WILL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR ALL MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.

2. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DESIGN AND PROVIDE ADEQUATE SHORING, BRACING, FORM-WORK, ETC... AS REQUIRED FOR THE PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. CONSTRUCTION MATERIALS SHALL BE UNIFORMLY SPREAD OUT SUCH THAT DESIGN LIVE LOAD PER SQUARE FOOT AS STATED HEREIN IS NOT EXCEEDED. VISITS TO THE SITE BY THE STRUCTURAL ENGINEER SHALL NOT INCLUDE INSPECTION OF THE ABOVE ITEMS.

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATION PROCEDURES INCLUDING SHORING AND PROTECTION OF ADJACENT PROPERTY, STRUCTURES, STREETS AND UTILITIES IN ACCORDANCE WITH THE LOCAL BUILDING DEPARTMENT. ALL WORK OR CONSTRUCTION SHALL COMPLY WITH ALL APPLICABLE BUILDING CODES, REGULATIONS AND SAFETY REQUIREMENTS.

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL DIMENSIONS, CONDITIONS AND ELEVATIONS WITH CIVIL DRAWINGS PRIOR TO START OF CONSTRUCTION. THE CONTRACTOR SHALL INFORM THE CIVIL ENGINEER AND/OR STRUCTURAL ENGINEER IN WRITING OF ANY DISCREPANCIES OR OMISSIONS NOTED ON THE DRAWINGS. ANY SUCH DISCREPANCY, OMISSION, OR VARIATION NOT REPORTED BEFORE START OF CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. WHERE DISCREPANCIES OCCUR IN THESE DRAWINGS, NOTES AND DETAILS ON DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL STRUCTURAL NOTES AND TYPICAL DETAILS.

5. WHERE REFERENCE IS MADE TO VARIOUS TEST STANDARDS FOR MATERIALS, SUCH STANDARDS SHALL BE THE LATEST EDITION AND/OR ADDENDA.

6. OPTIONS ARE FOR CONTRACTOR'S CONVENIENCE. IF ANY OPTION IS USED, THE CONTRACTOR SHALL USE THE LATEST EDITION AND/OR ADDENDA.

7. ESTABLISH AND VERIFY ALL OPENINGS AND INSERTS FOR CIVIL AND ELECTRICAL REQUIREMENTS WITH APPROPRIATE TRADES, DRAWINGS AND SUBCONTRACTORS PRIOR TO CONSTRUCTION.

8. OWNER SHALL BE RESPONSIBLE FOR THE COSTS OF ALL INSPECTIONS WHETHER PERFORMED BY AN AGENCY, INDEPENDENT CONSULTANT OR STRUCTURAL ENGINEER ALL INSPECTIONS REQUIRED BY THE BUILDING CODES, LOCAL BUILDING DEPARTMENTS OR BY THESE PLANS SHALL BE PROVIDED BY AN INDEPENDENT INSPECTION COMPANY OR THE BUILDING DEPARTMENT. SITE VISITS BY THE ENGINEER DO NOT CONSTITUTE AN INSPECTION, UNLESS SPECIFICALLY CONTRACTED FOR.

9. SHOP DRAWINGS SHALL BE SUBMITTED FOR ALL STRUCTURAL ITEMS. SHOP DRAWINGS ARE REVIEWED ONLY FOR GENERAL COMPLIANCE WITH THE STRUCTURAL DRAWINGS. REVIEW DOES NOT INDICATE THAT THE SHOP DRAWINGS ARE CORRECT OR COMPLETE. RESPONSIBILITY FOR CORRECTNESS SHALL REST WITH THE CONTRACTOR. ANY CHANGES, SUBSTITUTIONS, OR DEVIATIONS FROM CONTRACT DRAWINGS SHALL BE CLOUDED. ANY OF THE AFOREMENTIONED SHALL NOT BE CONSIDERED APPROVED AFTER ENGINEERS REVIEW UNLESS SPECIFICALLY NOTED ACCORDINGLY. THE SHOP DRAWINGS DO NOT SUPERSEDE OR REPLACE THE ORIGINAL CONTRACT DRAWINGS. ANY ENGINEERING PROVIDED BY OTHERS AND SUBMITTED FOR REVIEW SHALL BEAR THE SEAL OF AN APPROPRIATELY REGISTERED ENGINEER. ES2 SHALL NOT BE RESPONSIBLE FOR THE ADEQUACY OF ENGINEERING DESIGNS PERFORMED BY THE OTHERS. ALLOW 5 WORKING DAYS FOR THE ENGINEER OF RECORD'S REVIEW. ONE COPY OF EACH SUBMITTAL WILL BE RETAINED BY THE ENGINEER OF RECORD.

DESIGN BASIS

1. DEER SPRINGS WAY ARCH CULVERT
2. CODE.......AASHTO 1996 ed. STANDARD SPECIFICATIONS
3. DEAD LOAD:
   STRUCTURE SELF WEIGHT CONCRETE.......150 pcf
   VARYING COVER WITH A SOIL BACKFILL DENSITY.......120 pcf
4. LIVE LOAD.......HS20-44 LOADING

GEOTECHNICAL REPORT

1. THE FOUNDATIONS FOR THE ABOVE REFERENCED PROJECT ARE DESIGNED WITH RECOMMENDATIONS FROM:

   FIRM: GEOTEK INC. PROJECT NO.: 11531-LVR6 DATE: NOV 27, 2013
   AND LETTER DATED DEC. 16, 2013

   ALL RECOMMENDATIONS LISTED WITH IN THIS REPORT REGARDING SITE PREPARATION, GRADING, COMPACTION TESTS, INSPECTIONS ETC. SHALL BE FOLLOWED WITH STRICT ADHERENCE AND SHALL BE COMPLETED PRIOR TO CONSTRUCTION.

CONCRETE

1. MIN. 28 DAY COMPRESSIVE STRENGTH, f'c, SHALL BE 4500 PSI.
2. CEMENT SHALL BE TYPE V AND MAX W/C RATIO SHALL BE 0.45
3. CONCRETE SHALL BE TESTED IN ACCORDANCE WITH ASTM C 42 SPECIFICATION.
4. CONCRETE MIXES SHALL BE DESIGNED BY A CERTIFIED LABORATORY AND APPROVED BY ES2.
5. ALL CONCRETE SHALL BE REGULAR WEIGHT OF 145 POUNDS PER CUBIC FOOT USING HARDROCK AGGREGATES CONFORMING TO TO ASTM C33. WATER SHALL BE CLEAN AND POTABLE.
6. CONCRETE FOR SLABS ON GRADE SHALL BE CONSOLIDATED USING SURFACE VIBRATION METHODS. ALL OTHER CONCRETE SHALL BE CONSOLIDATED USING INTERNAL VIBRATION METHODS. REMOVE ALL DEBRIS FROM FORMS BEFORE PLACING CONCRETE. CONCRETE SHALL NOT BE DROPPED THROUGH REINFORCING STEEL SO AS TO CAUSE SEGREGATION OF AGGREGATES. UNCONFINED FALL OF CONCRETE SHALL NOT EXCEED 5 FEET.
7. ALL ITEMS TO BE CAST IN CONCRETE SUCH AS REINFORCING, DOWELS, BOLTS, ANCHORS, SLEEVES, ETC., SHALL BE SECURELY POSITIONED PRIOR TO CONCRETE PLACEMENT.
8. SHOTCRETE PROPORTIONS SHALL BE SELECTED THAT ALLOW SUITABLE PLACEMENT PROCEDURES USING THE DELIVERY EQUIPMENT SELECTED AND SHALL RESULT IN FINISHED IN-PLACE HARDENED SHOTCRETE MEETING THE STRENGTH REQUIREMENTS STATED HERE-IN. COARSE AGGREGATE, IF USED, SHALL NOT EXCEED 3/8 INCH. ANY REBOUND OR ACCUMULATED LOOSE AGGREGATE SHALL BE REMOVED FROM THE SURFACES TO BE COVERED PRIOR TO PLACING THE INITIAL OR ANY SUCCEEDING LAYERS OF SHOTCRETE. REBOUND SHALL NOT BE REUSED AS AGGREGATE.
9. SHOTCRETE PLACEMENT SHALL BE PLACED ACCORDING TO ACI 506R-90. PRE-CONSTRUCTION TESTING OF SHOTCRETE IS NOT REQUIRED PROVIDED THE CONTRACTOR DEMONSTRATES TO THE BUILDING OFFICIAL, BY MEANS APPROVED BY THE BUILDING OFFICIAL, ACCEPTED SHOTCRETE WORK USING SIMILAR EQUIPMENT UNDER SIMILAR CIRCUMSTANCES WITH THE SAME PERSONNEL.
10. FINISHING:
    ACCORDING TO THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS CLARK COUNTY, ONLY SURFACES EXPOSED TO VIEW AFTER BACKFILL IS PLACED REQUIRE FINISHING (EITHER ORDINARY OR FINE). HOWEVER, IT IS REQUIRED THAT THE EXTERIOR SHOTCRETE SURFACE IS MADE SMOOTH WITH A STEEL TROWEL OR FRESNO TO FACILITATE THE APPLICATION OF WATERPROOFING. THIS FINISH SHALL HAVE NO REQUIREMENTS FOR FLATNESS. HOWEVER, THE SURFACE SHALL BE FREE FROM STONE POCKETS, DEPRESSIONS OR PROJECTIONS IN EXCESS OF 1/4 INCH BEYOND THE SURFACE. INVERT EXPOSED SURFACE SHALL BE ORDINARY BROOM FINISH.

    ADMIXTURES:
    ONLY ADMIXTURES PERMITTED BY THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS CLARK COUNTY SHALL BE ALLOWED.

    CURING:
    CURING ON THE OUTSIDE SURFACE AND INSIDE SURFACE AFTER FORM REMOVAL SHALL BE BY MEANS OF LIQUID MEMBRANE-FORMING COMPOUND MEETING THE REQUIREMENTS OF THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS' CONSTRUCTION OFF-SITE IMPROVEMENTS CLARK COUNTY. A BULKHEAD SHALL BE PLACED AT THE END OF THE CULVERT TO STOP WIND MOVEMENT THROUGH THE CULVERT IMMEDIATELY AFTER CONCRETE PLACEMENT.
11. COMPLETED SHOTCRETE WORK SHALL BE CHECKED VISUALLY DURING CONSTRUCTION AND PRIOR TO FINAL APPROVAL OF SHOTCRETE FOR REINFORCING BAR EMBEDMENT, VOIDS, ROCK POCKETS, SAND STREAKS AND SIMILAR DEFICIENCIES. THE SPECIAL INSPECTOR SHALL EXAMINE.
12. SURFACES OF STEEL FORMS SHALL BE COATED W/ AN ICC APPROVED FORM RELEASE OIL.
13. SHOTCRETE NOZZLEMAN SHALL BE CERTIFIED PER ACI 506.3R-91.

CONCRETE CONT

14. SHOTCRETE MAY BE USED IN LIEU OF POURED IN PLACE CONCRETE ON ALL ARCHES, WALLS, MANHOLE BASES (ATTACHED DIRECTLY TO ARCH).
15. SLABS SHALL BE POURED IN PLACE.
16. AT CONTRACTORS OPTION CUT OFF WALLS MAY UTILIZE A 3/8" MINUS AGGREGATE IN MIX DESIGN.

REINFORCING STEEL

1. REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A615. REINFORCING SHALL BE GRADE 60 (FY = 60 KSI) DEFORMED BARS FOR ALL BARS #4 AND LARGER AND ALL BARS USED FOR CONCRETE WALLS. REINFORCING MAY BE GRADE 40 (FY = 40 KSI) DEFORMED BARS FOR ALL BARS #3 AND SMALLER UNLESS NOTED OTHERWISE ON PLANS OR DETAILS. ALL REINFORCING TO BE WELDED SHALL BE ASTM A706, GRADE 60 ALLOY WELDABLE STEEL.

2. ALL DIMENSIONS SHOWING THE LOCATION OF REINFORCING STEEL NOT NOTED AS "CLEAR" OR "CLR" ARE TO CENTER OF STEEL. MINIMUM COVER FOR NON-PRESTRESSED CONCRETE REINFORCING SHALL BE AS FOLLOWS, UNLESS NOTED OTHERWISE ON PLANS OR DETAILS:

EXPOSURE CONDITION	COVER	TOLERANCES: (+/-)
FOOTINGS & SLABS ON GRADE:	3"	3/8"
WALLS & SLABS EXPOSED TO EARTH OR WEATHER:	1 1/2"	3/8"
#6 BAR OR LARGER:	2"	1/2"
INTERIOR SLABS:	1 1/2"	1/2"

3. LAP SPLICES OF REINFORCING STEEL IN CONCRETE BEAMS, SLABS AND FOOTINGS SHALL BE ACCORDING TO ACI 318-99 CPT 12 OR LAP SCHEDULE WHERE PRESENT, UNLESS NOTED OTHERWISE. SPLICES MAY BE CONTACT OR NON-CONTACT SPLICES. NO TACK WELDING OF REINFORCING BARS ALLOWED. LATEST ACI CODE AND DETAILING MANUAL APPLY. PROVIDE BENT CORNER BARS TO MATCH AND LAP WITH HORIZONTAL BARS AT ALL CORNERS AND INTERSECTIONS PER TYPICAL DETAILS. VERTICAL WALL BARS SHALL BE SPLICED AT OR NEAR FLOOR LINES. SPLICE BARS TOP BARS AT CENTER LINE OF SPAN AND BOTTOM BARS AT THE SUPPORT IN SPANDRELS, BEAMS, GRADE BEAMS, ETC..., UNLESS NOTED OTHERWISE.

REBAR LAP SCHEDULE				
BAR	#3	#4	#5	#6
LAP	31"	31"	39"	48"

4. ALL REINFORCING SHALL BE BENT COLD. BARS SHALL NOT BE UNBENT AND RE-BENT EXCEPT AS NOTED ON PLAN. FIELD BENDING OF REBAR SHALL NOT BE ALLOWED EXCEPT AS NOTED ON PLAN. BENDS AND HOOKS SHALL CONFORM TO ACI STANDARD 315-80.
5. WELDING OF REINFORCING BARS, METAL INSERTS, AND CONNECTIONS SHALL CONFORM WITH ACI 318 CHAPTER 12, AND SHALL BE MADE ONLY AT LOCATIONS SHOWN ON PLANS OR DETAILS.
6. REINFORCING BAR SPACING SHOWN ON PLANS ARE MAXIMUM ON CENTERS. ALL BARS SHALL BE DETAILED AND PLACED PER CRSI SPECIFICATIONS AND HANDBOOK. DOWEL ALL VERTICAL REINFORCING TO FOUNDATION. SECURELY TIE ALL BARS IN LOCATION BEFORE PLACING CONCRETE.

INSPECTIONS

1. THE SPECIAL INSPECTORS SHALL PROVIDE INSPECTIONS DURING PLACEMENT OF BACKFILL, REINFORCEMENT, SHOTCRETING, CONCRETE, AND EPOXY DOWELING. THE INSPECTOR SHALL SUBMIT A STATEMENT TO THE OWNER, HYDRO ARCH, AND ES2 INDICATING COMPLIANCE WITH THE PLANS AND SPECIFICATIONS.
2. SPECIAL INSPECTION OF THE FILL AROUND THE CULVERT SHALL BE PROVIDED AT A FREQUENCY AS NECESSARY TO ENSURE THAT PROPER FILL AND COMPACTION IS ACHIEVED. COMPACTION TESTS FOR EACH LIFT SHALL BE TAKEN PER EVERY 2500 SQUARE FEET PLACED AS A MINIMUM. THE SPECIAL INSPECTOR SHALL SUBMIT A COMPLIANCE REPORT TO THE OWNER, HYDRO ARCH, AND ES2 DOCUMENTING FILL TYPE AND PROCEDURES OF PLACEMENT.

DEFERRED SUBMITTALS

1. ALL ITEMS CONSIDERED IN THESE DESIGN DOCUMENTS AS BY OTHERS ARE NOTED AS DEFERRED SUBMITTALS. THE FOLLOWING WILL INCLUDE BUT NOT BE LIMITED TO:

   CONCRETE MIX DESIGN

   REINFORCING SHOP DRAWING
2. PRIOR TO SUBMITTAL OF DEFERRED ITEMS TO PLAN REVIEW, THEY SHALL BE SUBMITTED TO OUR OFFICE FOR REVIEW.

WATER PROOFING

1. THE EXTERIOR SURFACE OF THE CONCRETE ARCH SHALL BE WATERPROOFED W/ AN EPRO ECOBASED II PRODUCT OR EQUAL. INSTALLATION SHALL BE IN ACCORDANCE W/ MANUFACTURE RECOMMENDATIONS FOR SPECIFICATIONS SEE EPRO WEB SITE EPROSERV.COM/PSI_SET.HTM

EPOXY ANCHORAGE

1. EPOXY GROUTED DOWELS SHALL BE INSTALLED USING:

A. HILTI HIT HY-150 ADHESIVE ANCHOR SYSTEM

B. SIMPSON STRONG-TIE SET ADHESIVE ANCHOR SYSTEM

INSTALL THE ABOVE SYSTEMS PER THE ICC REPORT AND MFR'S RECOMMENDATIONS.

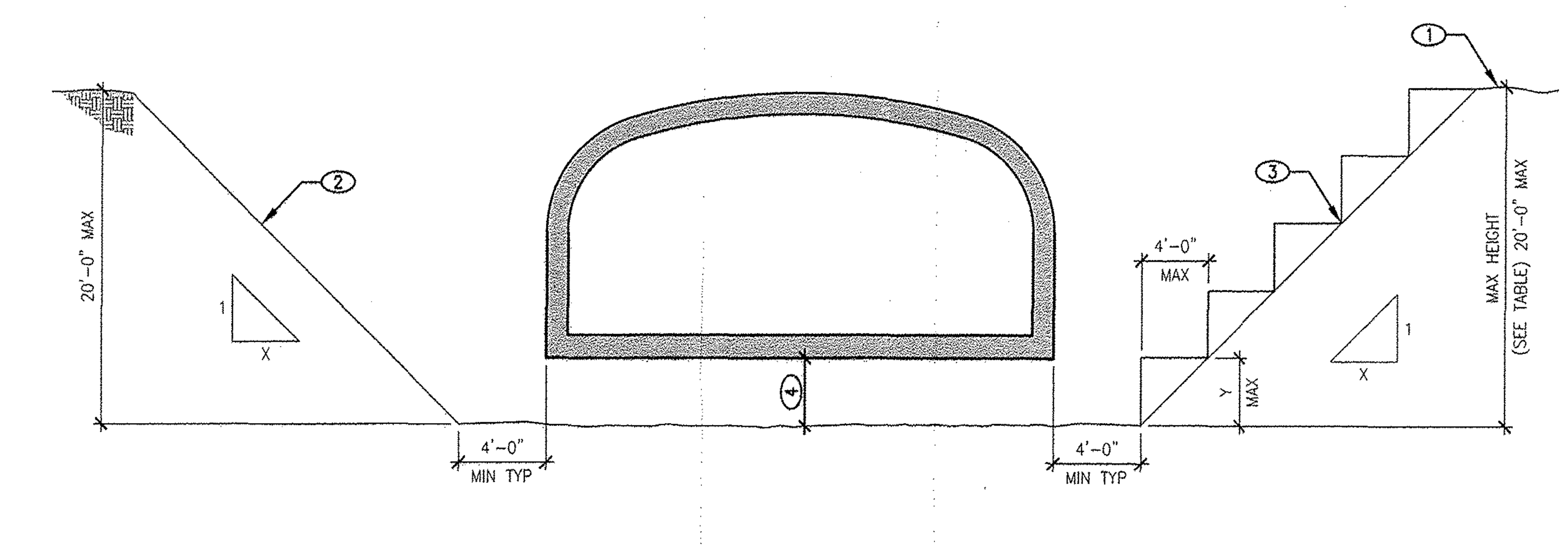
ALTERNATE EPOXY GROUT SYSTEMS WITH CURRENT ICC APPROVAL MAY BE SUBMITTED BY THE CONTRACTOR FOR APPROVAL.

SHEET INDEX

SHEET NO	SHEET TITLE
S0.1	GSN, STD ABBREVIATIONS, SHEET INDEX
S1.1	PLAN VIEW
S1.2	PLAN VIEW
S2.1	SECTIONS
S2.2	TYPICAL MANHOLE SECTIONS
S2.3	TYPICAL POST AND CABLE DETAIL

STANDARD ABBREVIATIONS

ACI	AMERICAN CONCRETE INSTITUTE
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIAL
℄	CENTER LINE
CLR	CLEAR
CLR	CLEAR
CONC	CONCRETE
CONT	CONTINUOUS
DIA OR ø	DIAMETER
DWG	DRAWING
EF	EACH FACE
ELEV	ELEVATION
EQ	EQUAL
FLR	FLOOR
FTG	FOOTING
GSN	GENERAL STRUCTURAL NOTES
KSI	KIPS PER SQUARE INCH
MFR	MANUFACTURER
MAX	MAXIMUM
MECH	MECHANICAL
MIN	MINIMUM
MISC	MISCELLANEOUS
NTS	NOT TO SCALE
OC	ON CENTER
OPP	OPPOSITE
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
REQ'D	REQUIRED
SIM	SIMILAR
T&B	TOP AND BOTTOM
TOF	TOP OF FOOTING
TOPC	TOP OF PILECAP
TOW	TOP OF WALL
UBC	UNIFORM BUILDING CODE
UNO	UNLESS NOTED OTHERWISE
VERT	VERTICAL
W/	WITH
W/O	WITHOUT
WT	WEIGHT

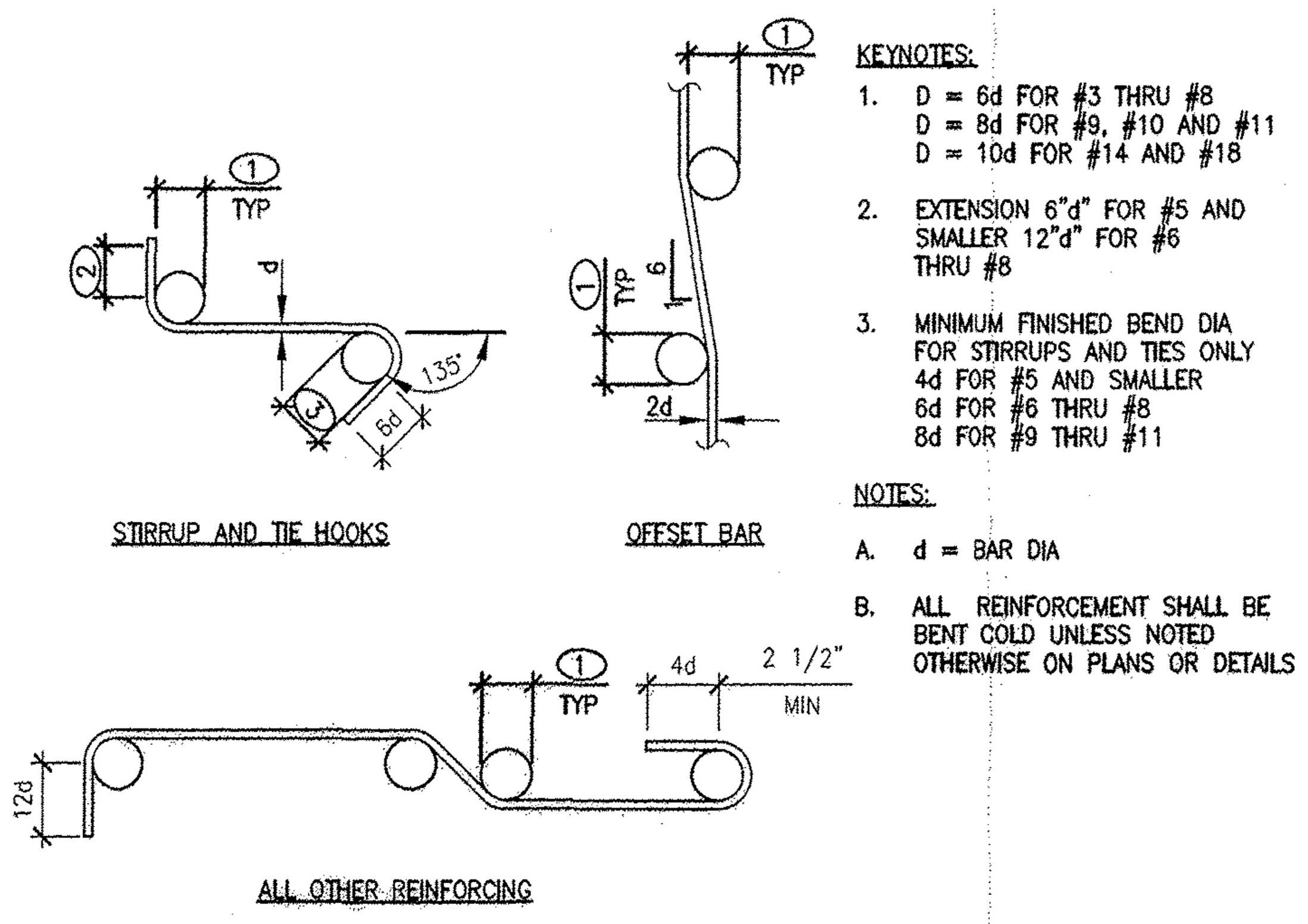


KEYNOTES:
1. FINISHED GRADE
2. SIMPLE SLOPE EXCAVATION
3. MULTIPLE BENCH EXCAVATION
4. OVER EXCAVATE AS REQUIRED FOR FILL PLACEMENT
5. COORDINATE EXCAVATION SOIL WITH OSHA 29 CFR 1926 SUBPART P TO DETERMINE SOIL TYPE A, B OR C.
6. THE INFORMATION PRESENTED IS A GUIDELINE TO EXCAVATION BASED ON OSHA 29 CFR 1926 SUBPART P. TO DETERMINE WHERE SHORING IS REQUIRED AND FOR FURTHER INFORMATION SEE OSHA 29 CFR 1926

SOIL TYPE	(X) HORIZONTAL	(Y) MULT BENCH
A	3/4	5'-0"
B	1	4'-0"
C	1 1/2	NA

RECOMMEND EXCAVATION GUIDELINES PER OSHA 29 CFR 1926 SUBPART P

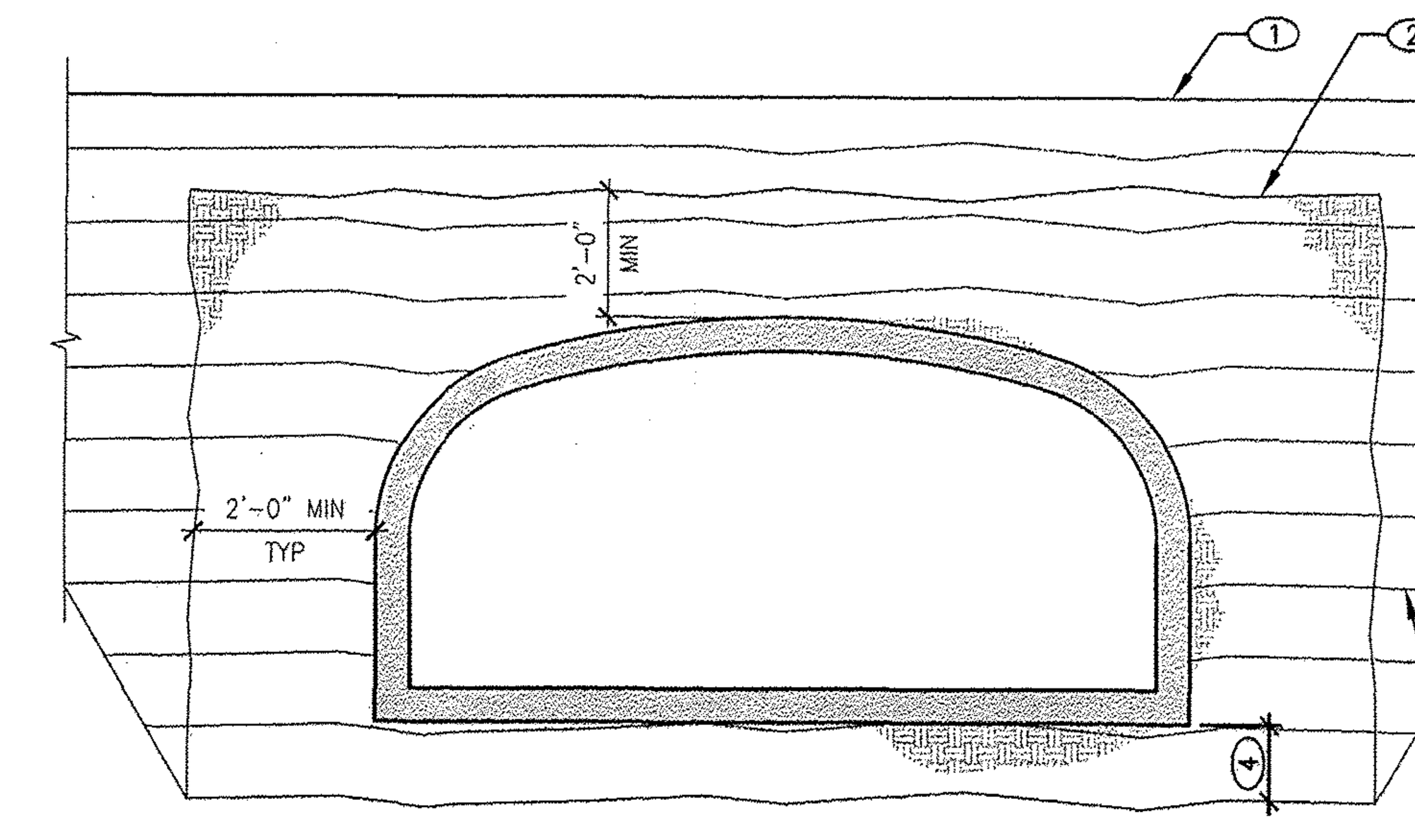
1 TYPICAL EXCAVATION REQUIREMENTS
NO SCALE



KEYNOTES:
1. D = 6d FOR #3 THRU #8
   D = 8d FOR #9, #10 AND #11
   D = 10d FOR #14 AND #18
2. EXTENSION 6"d" FOR #5 AND SMALLER 12"d" FOR #6 THRU #8
3. MINIMUM FINISHED BEND DIA FOR STIRRUPS AND TIES ONLY
   4d FOR #5 AND SMALLER
   6d FOR #6 THRU #8
   8d FOR #9 THRU #11

NOTES:
A. d = BAR DIA
B. ALL REINFORCEMENT SHALL BE BENT COLD UNLESS NOTED OTHERWISE ON PLANS OR DETAILS

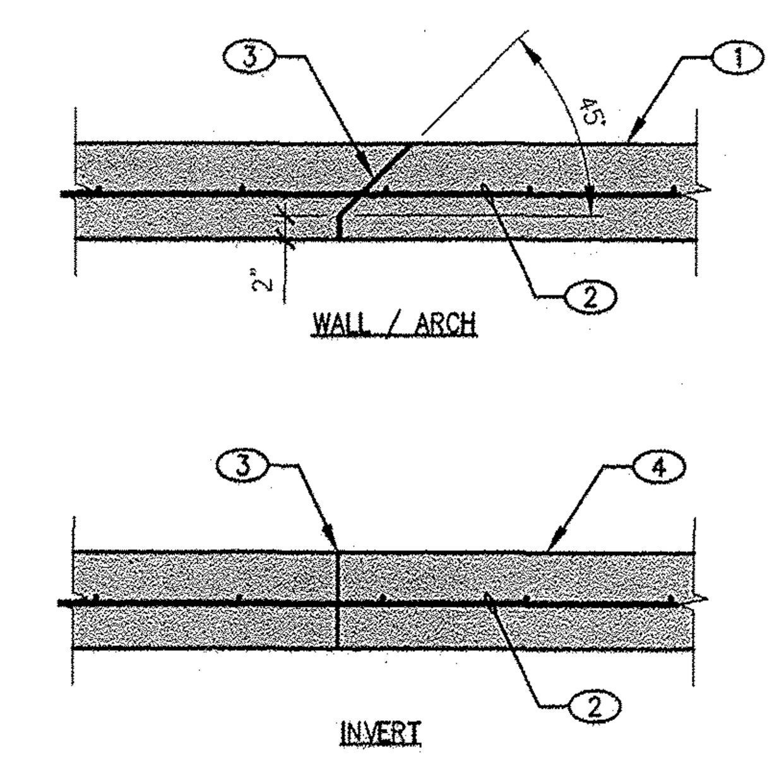
4 STANDARD REBAR BENDING DETAILS
NO SCALE



KEYNOTES:
1. FINISHED GRADE
2. MIN LIMITS OF STRUCTURAL BACKFILL ZONE (SEE NOTES BELOW FOR STRUCTURAL BACKFILL REQUIREMENTS). FOR FILL HEIGHT LESS THAN 2'-0" THE FINISH GRADE SHALL BE THE BOUNDARY LINE FOR THE BACKFILL ZONE.
3. BACKFILLING OPERATIONS OUTSIDE THE STRUCTURAL BACKFILL ZONE SHALL BE PER THE GEOTECHNICAL REPORT.
4. ALL ARCH CULVERT SUBGRADE MATERIALS SHOULD BE SCARIFIED AND PROCESSED TO A MINIMUM DEPTH OF 24 INCHES AND COMPACTED TO A RELATIVE COMPACTION OF 90 PERCENT NEAR OPTIMUM MOISTURE CONTENT. TEN INCHES OF TYPE II AGGREGATE BASE MATERIAL SHOULD BE PLACED ON THE COMPACTED SUBGRADE MATERIALS. THE TYPE II AGGREGATE BASE SHOULD BE COMPACTED TO A MINIMUM RELATIVE COMPACTION OF 95 PERCENT AT OR BELOW OPTIMUM MOISTURE CONTENT.

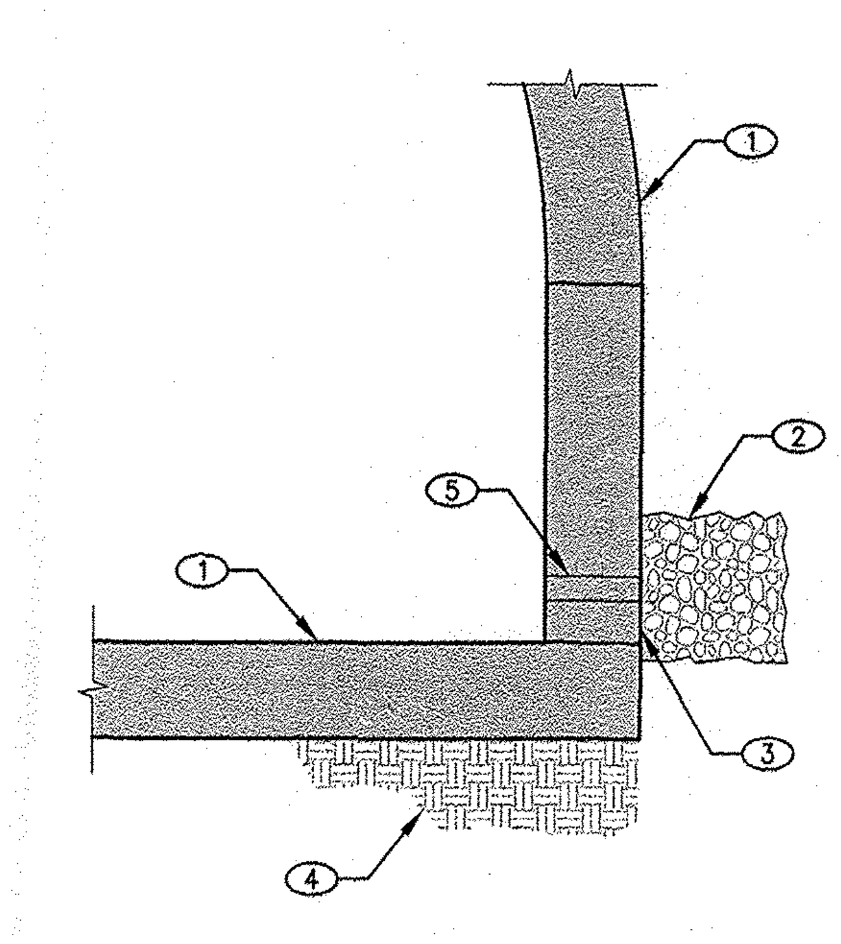
NOTES:
A. THE MIN REQUIREMENTS FOR SUBBASE PREP AND BACKFILL ARE LISTED BELOW. GEOTECHNICAL ENGINEER MAY REQUIRE ADDITIONAL REQUIREMENTS.
B. BACKFILL WITHIN 2'-0" OF ARCH OR STEM WALLS SHALL CONSIST OF WELL GRADED 3" MINUS GRANULAR MATERIAL OF A MIN SOIL CLASS OF SM OR SP PER THE UNIFIED CLASSIFICATION SYSTEM, ASTM D-2487-69.
C. PLACEMENT OF THE FILL AT THE STEM WALLS AND OVER THE ARCH MAY BEGIN WHEN THE CONCRETE STRENGTH HAS REACHED 2800 psi COMPRESSIVE STRENGTH. FILL SHALL BE PLACED IN 8" MAXIMUM VERTICAL LIFTS AND COMPACTED TO 95% OF DRY DENSITY. LIFTS SHALL BE PLACED SYMMETRICALLY EACH SIDE ALONG THE FULL LENGTH OF CULVERT WITH A MAXIMUM BACKFILL LIFT HEIGHT DIFFERENTIAL OF 1'-0". MAXIMUM DRY DENSITY SHALL BE DETERMINED PER THE GEOTECHNICAL REPORT. BACKFILL SHALL BE COMPACTED PER GEOTECHNICAL REPORT.
D. NO EQUIPMENT WEIGHING MORE THAN A 3 YARD RUBBER TIRE LOADER (928 CATERPILLAR OR EQUIVALENT) SHALL BE ALLOWED TO PASS OVER THE STRUCTURE UNTIL THE SPECIFIED FILL IS IN PLACE. HEAVY EQUIPMENT SUCH AS SCRAPERS AND CRANES SHALL NOT BE ALLOWED TO PASS OVER THE STRUCTURE UNLESS SPECIFIC WRITTEN PERMISSION IS OBTAINED BY THE STRUCTURAL ENGINEER.
E. SHOTCRETE REBOUND MAY BE USED AS BACKFILL.

2 TYPICAL BACKFILL AND SUBGRADE PREPARATION REQUIREMENTS
NO SCALE



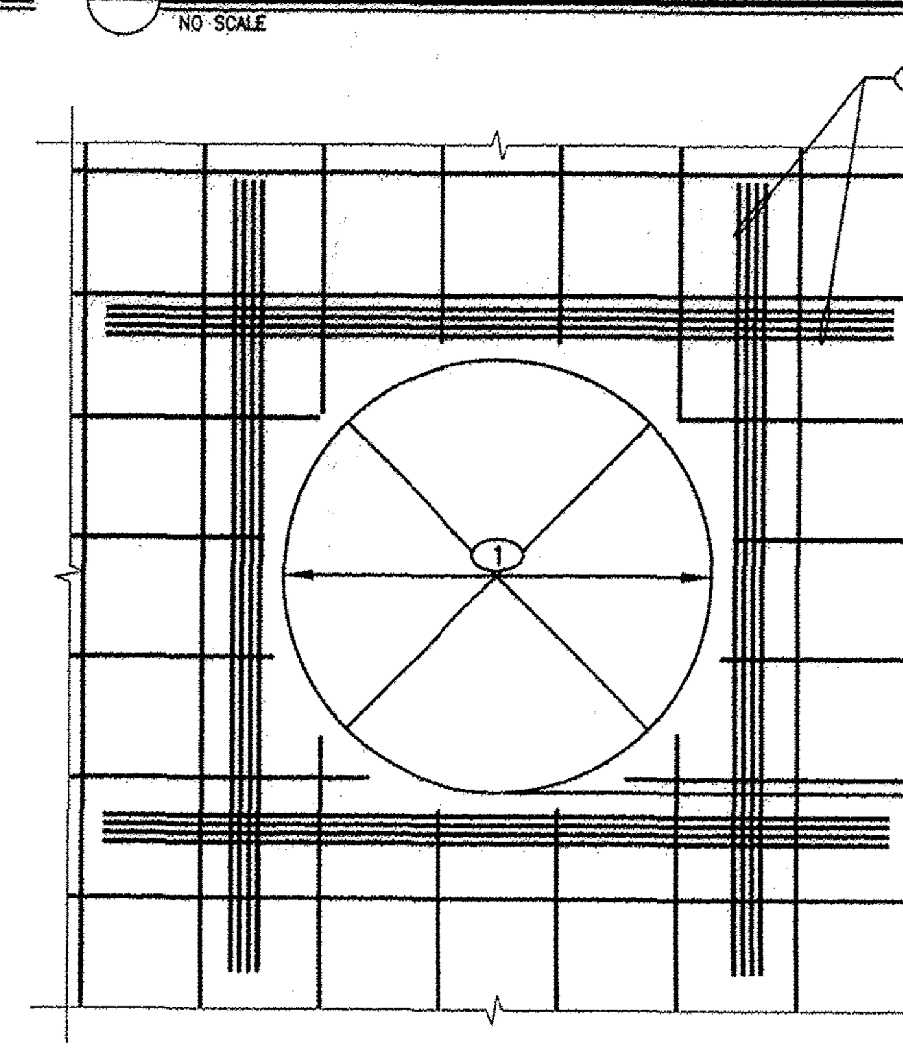
KEYNOTES:
1. CONCRETE WALL OR ARCH
2. REINF PER DETAILS
3. CONSTRUCTION JOINT
4. INVERT

5 CONSTRUCTION JOINT IN WALL, ARCH, OR INVERT
NO SCALE



KEYNOTES:
1. CONCRETE WALL OR ARCH
2. (2) CUBIC FOOT OF FREE DRAIN MATERIAL WRAPPED IN FILTER FABRIC AT EACH WEEP HOLE
3. REMOVE WATER PROOFING AS OCCURS AT AREAS WHERE DRAIN ROCK TOUCHES CULVERT WALL
4. COMPACT BACKFILL, SEE GEOTECHNICAL REPORT
5. 2"ø WEEP HOLE EACH SIDE OF CULVERT, SEE PLANS AND DETAILS FOR SPACING

6 WEEP HOLE DRAIN REQUIREMENTS
NO SCALE



KEYNOTES:
1. OPENING DIAMETER 4'-0" MAX UNO
2. NUMBER OF ADDED BARS EQUAL TO THE NUMBER OF BARS INTERRUPTED BY OPENING.
3. U.N.O. EXTEND BARS PAST EDGE OF OPENING EQUAL TO LAP LENGTH OF BAR PER LAP SCHEDULE

NOTES:
A. LOCATION AS SHOWN PER CIVIL DRAWINGS AS OCCURS

3 TYPICAL OPENING IN ARCHED CULVERT
NO SCALE

SEAL: GREG A. MEYER, Exp. 12/31/15, CIVIL/STRUCTURAL, No. 15053, REGISTERED PROFESSIONAL ENGINEER, STATE OF NEVADA
April 25, 2014

ENGINEERING SYSTEM SOLUTIONS
7312 W CHEYENNE AVE. STE 1
LAS VEGAS, NV 89129
PHONE: (702) 616-3107
FAX: (702) 616-3725
www.es2eng.com
STRUCTURAL • MEP • STEEL DETAILING • BUILDING COMMISSIONING

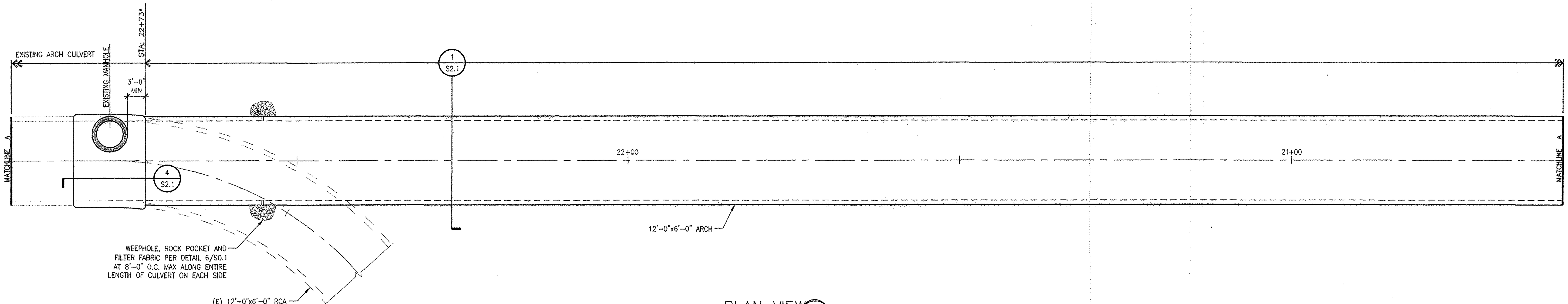
PROJECT: EL DORADO R1-60 NO.16 ARCH CULVERT. STORM DRAIN. NORTH LAS VEGAS, NEVADA

SHEET TITLE: GSN, STD ABBREVIATIONS, SHT INDEX

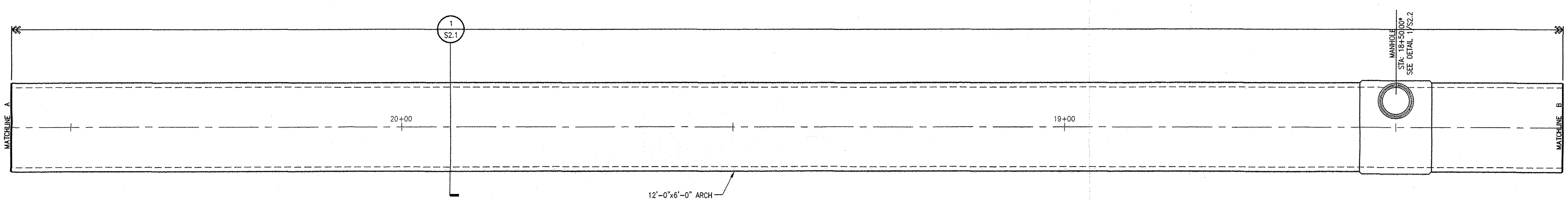
REV.	DESCRIPTION	DATE

DRAWN: SLK | CHECKED: GAM
DATE: DEC 17, 2013
PROJECT NUMBER: STR13.6027
SHEET NUMBER: S0.1

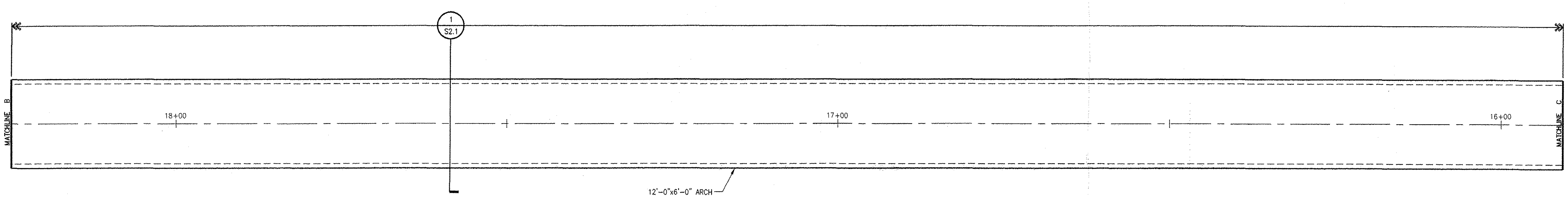
* DIMENSIONS SHOWN ARE APPROXIMATED BASED ON THE CIVIL DRAWINGS. REFERENCE CIVIL DRAWINGS FOR EXACT DIMENSIONS AND STATIONS.



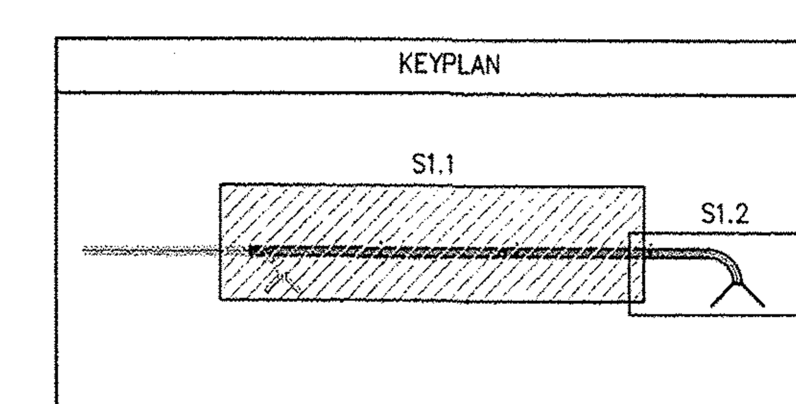
PLAN VIEW SCALE: 1/8"=1'-0"



PLAN VIEW SCALE: 1/8"=1'-0"



PLAN VIEW SCALE: 1/8"=1'-0"



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GREG A. MEYER Exp. 12/31/15 CIVIL/STRUCTURAL No. 15053 REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA
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7312 W CHEYENNE AVE, STE 1
LAS VEGAS, NV 89129
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PROJECT:
EL DORADO R1-60 NO.16 ARCH CULVERT, STORM DRAIN.
NORTH LAS VEGAS, NEVADA

SHEET TITLE:
PLAN VIEW

REV.	DESCRIPTION	DATE

DRAWN: SLK
CHECKED: GAM

DATE: DEC 17, 2013
PROJECT NUMBER: STR13.6027
SHEET NUMBER:
S1.1

PRINTED: Apr 25, 2014

PLAN VIEW

SCALE: 1/8"=1'-0"

* DIMENSIONS SHOWN ARE APPROXIMATED BASED ON THE CIVIL DRAWINGS. REFERENCE CIVIL DRAWINGS FOR EXACT DIMENSIONS AND STATIONS.

KEYPLAN

SEAL:

April 25, 2014

ENGINEERING SYSTEM SOLUTIONS
7312 W CHEYENNE AVE. STE 1
LAS VEGAS, NV 89129
PHONE: (702) 616-3107
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STRUCTURAL • MEP • STEEL DETAILING • BUILDING COMMISSIONING

PROJECT:

EL DORADO R1-60 NO.16
ARCH CULVERT. STORM DRAIN.
NORTH LAS VEGAS, NEVADA

SHEET TITLE:

PLAN VIEW

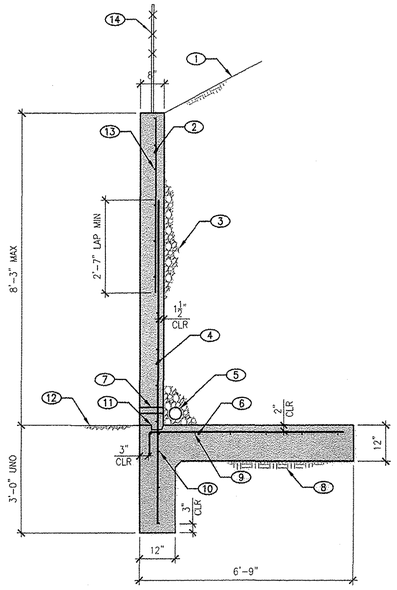
REV:	DESCRIPTION:	DATE:

DRAWN:	CHECKED:
SLK	GAM

DATE: DEC 17, 2013
PROJECT NUMBER: STR13.6027
SHEET NUMBER:

S1.2

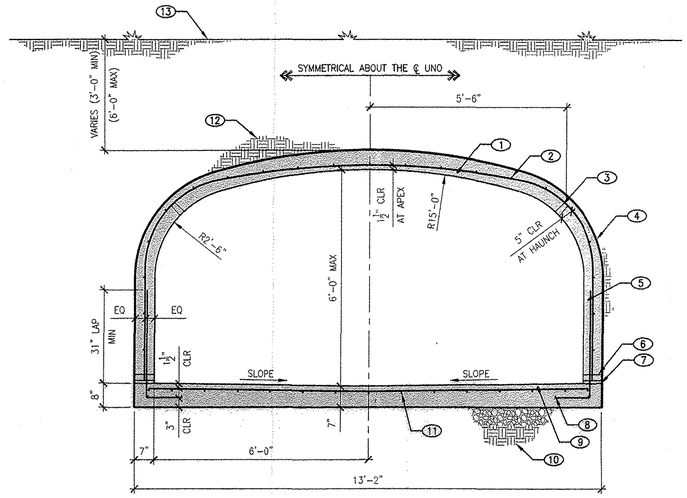
PRINTED: Apr 25, 2014



KEYNOTES:

1. FINAL GRADE. 3:1 MAX SLOPE
2. #4 AT 18" O.C. VERT
3. BACKFILL MATERIAL AND PROCEDURE PER GEOTECHNICAL REPORT AND PROVIDE 12" MIN FREE DRAINAGE GRANULAR BACKFILL FULL HEIGHT OF WALL
4. #5 x 84" DOWEL AT 6" O.C.
5. 4"ø PERFORATED PVC PIPE W/ FILTER FABRIC
6. #5 TRANSVERSE AT 12" O.C. W/ STD HOOK (12" / 8")
7. WEEP HOLE, ROCK POCKET AND FILTER FABRIC AT 8' O.C. PER TYPICAL DETAIL 6/S0.1
8. COMPACTED SUB GRADE PER GEOTECHNICAL REPORT
9. #4 AT 12" O.C. LONGITUDINAL
10. #4 AT 12" O.C. HORIZ
11. 1 1/2" DEEP x 4" KEY
12. FINAL GRADE PER CIVIL DRAWINGS, TOP OF GRADE TO MATCH TOP OF FOOTING MIN
13. #4 AT 12" O.C. HORIZ
14. FALL PROTECTION PER CIVIL OR TYPICAL DETAIL

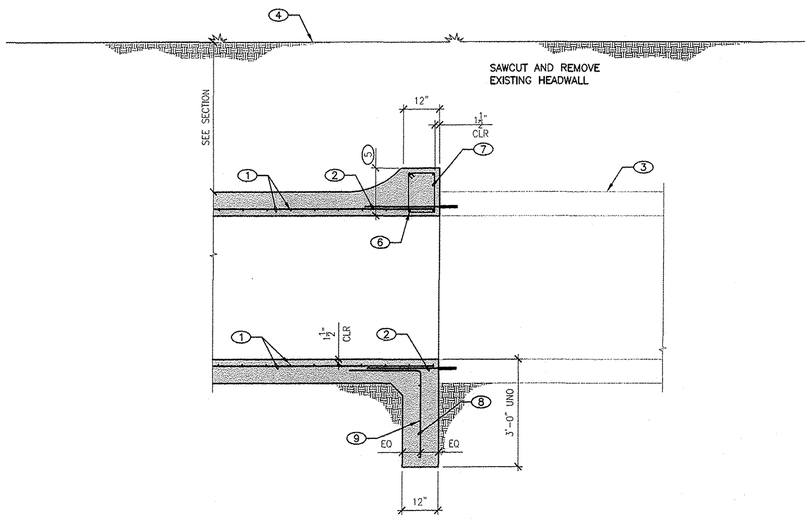
3 WING WALL SECTION
NO SCALE



KEYNOTES:

1. #4 AT 9" O.C. TRANSVERSE
2. #4 AT 12" O.C. LONGITUDINAL LAP 18" MIN
3. REBAR CHAIR POINT
4. WATER PROOF MEMBRANE COVER ARCH AND WALL ONLY
5. #4 DOWEL AT 9" O.C. W/ 12" HOOK AT BASE
6. 2"ø WEEP HOLE PER PLAN
7. ROUGHEN CONSTRUCTION JOINT, PER GSN
8. (2) #4 CONT LONGITUDINAL LAP 18" MIN
9. #4 AT 9" O.C. TRANSVERSE
10. BEDDING PER GSN
11. #4 AT 12" O.C. LONGITUDINAL LAP 18" MIN
12. BACKFILL PER GSN
13. FINAL GRADE

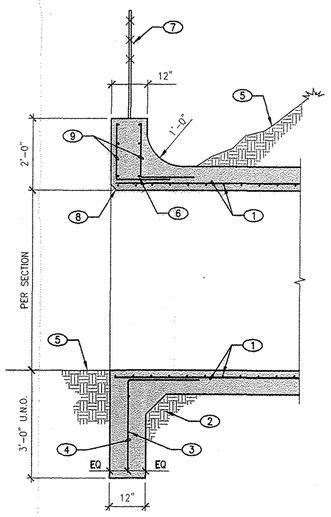
1 CULVERT SECTION 12'-0" x 6'-0" ARCH
NO SCALE



KEYNOTES:

1. CULVERT REINFORCING, SEE SECTION
2. #4x24 AT 12" O.C. DRILL AND EPOXY W/ EPOXY ADHESIVE
3. EXISTING CULVERT
4. FINAL GRADE
5. 16" THICK TO FOLLOW PROFILE OF ARCH
6. (2) #4 TOP AND BOTTOM CONT TO INVERT W/ DOWEL TO MATCH AND LAP AT BASE
7. #3 TIES AT 12" O.C.
8. #4 AT 12" O.C. (24" / 30")
9. #4 AT 12" O.C. HORIZONTAL

4 ARCH CULVERT TO EXISTING ARCH CULVERT
NO SCALE



KEYNOTES:

1. SEE APPROPRIATE SECTION FOR REINF REQUIREMENTS
2. BEDDING PER GSN
3. #4 AT 12" O.C.
4. #4 AT 12" O.C. (24" / 30")
5. 2:1 MAX FINAL GRADE PER CIVIL DRAWINGS
6. (4) #4 AT 12" O.C., HORIZONTAL
7. FALL PROTECTION PER CIVIL OR TYPICAL DETAIL
8. 2" CHAMFER
9. #4 AT 12" O.C. VERTICAL W/ 18" HOOK AT BASE

2 RCB HEAD WALL
NO SCALE

SEAL:
CRAIG A. MEYER — STATE OF NEVADA — REGISTERED PROFESSIONAL ENGINEER — No. 9053 — CIVIL — Exp. 12/31/15
April 25, 2014

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LAS VEGAS, NV 89129
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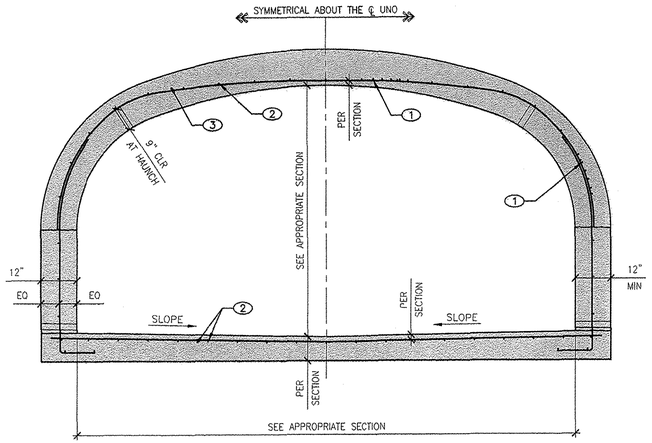
PROJECT:
EL DORADO R1-60 NO.16
ARCH CULVERT. STORM DRAIN.
NORTH LAS VEGAS, NEVADA

SHEET TITLE:
12'x6' ARCH SECTIONS

REV.	DESCRIPTION	DATE

DRAWN: SLK | CHECKED: GAM

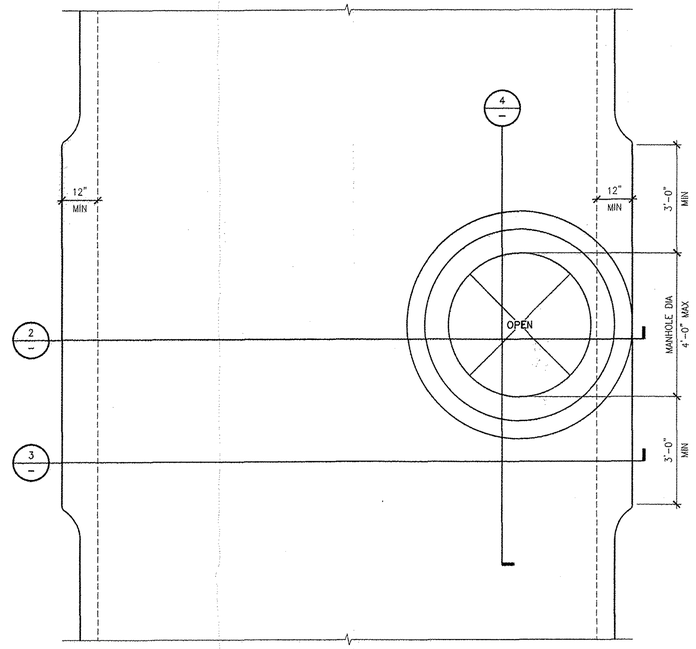
DATE: DEC 17, 2013
PROJECT NUMBER: STR13.6027
SHEET NUMBER: S2.1



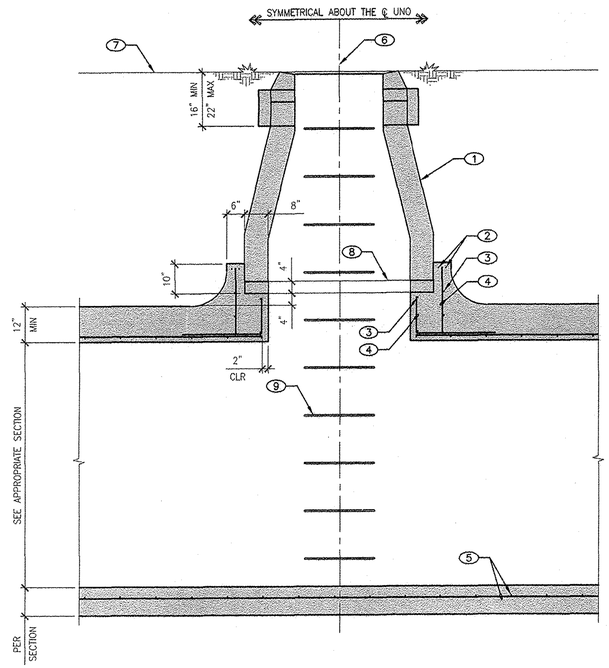
KEYNOTES:

1. (5) #5x10'-0" LONG AT 3" O.C. LONGITUDINAL EA SIDE OF OPENING
2. REINF PER CULVERT SECTION
3. TRANS REINF=TYP REINF PER SECTION PLUS INTERUPTED TRANS BARS AT MAN HOLE OPENING EQ SPACED OVER 3'-0" ON EA SIDE OF CULVERT

   EXAMPLE: #4 AT 6" O.C. TRANS TYP IN A 48" HOLE 8 BARS INTERUPTED TOTAL BARS OVER 3'-0" (8+36"/6)= (14) #4 AT 2 1/2" O.C. SPACING #4 AT 2 1/2" OVER 3'-0"



1 TYPICAL PLAN AT MANHOLE
NO SCALE



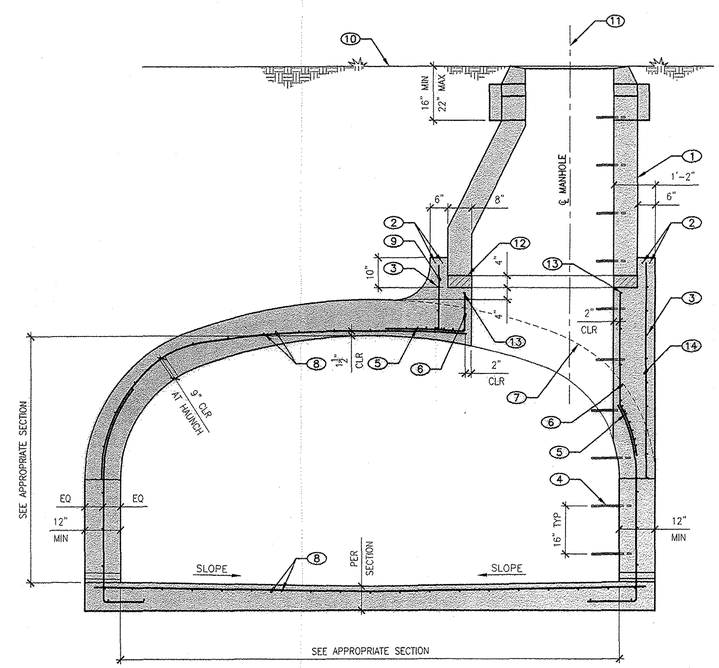
KEYNOTES:

1. TYPE I OR IA MANHOLE ASSEMBLY PER CLARK COUNTY UNIFORM STANDARD DRAWING NO. 403 OR 404 USE OF TYPE I OR IA SHALL BE DETERMINED BASED ON THE FINAL COVER REQUIRED
2. (2) #4 CONT AT TOP OF WALL
3. #4 AT 8" O.C. HORIZONTAL
4. #4 AT 8" O.C. VARIES / VARIES / 18"
5. REINF PER CULVERT SECTION
6. REFERENCE CIVIL DRAWINGS FOR MANHOLE STATIONING
7. FINISHED GRADE
8. STYROFOAM FILL BETWEEN CULVERT AND MANHOLE ASSEMBLY
9. MANHOLE STEPS PER CLARK COUNTY UNIFORM STANDARD DRAWING NO. 410

NOTES:

A. FOR ITEMS SHOWN BUT NOT NOTED SEE DETAILS 1;2, AND 3 THIS SHEET

3 TYPICAL SECTION AT THICKENED ARCH AT MANHOLE
NO SCALE

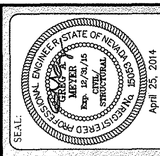


KEYNOTES:

1. TYPE I OR IA MANHOLE ASSEMBLY PER CLARK COUNTY UNIFORM STANDARD DRAWING NO. 403 OR 404 USE OF TYPE I OR IA SHALL BE DETERMINED BASED ON THE FINAL COVER REQUIRED
2. (2) #4 CONT AT TOP OF WALL
3. #4 AT 8" O.C.
4. MANHOLE STEPS PER CLARK COUNTY UNIFORM STANDARD DRAWING NO. 410
5. (5) #5x10'-0" LONG AT 3" O.C. LONGITUDINAL EA SIDE OF OPENING
6. #4 AT 8" O.C. VARIES / VARIES / 18"
7. ARCH BEYOND
8. REINF PER CULVERT SECTION
9. #4 AT 8" O.C. VARIES / VARIES / 18"
10. FINISHED GRADE
11. REFERENCE CIVIL DRAWINGS FOR MANHOLE STATIONING
12. STYROFOAM FILL BETWEEN CULVERT AND MANHOLE ASSEMBLY
13. #4 AT 8" O.C.
14. #4 AT 8" O.C. VERT

2 TYPICAL SECTION AT MANHOLE
NO SCALE

4 TYPICAL SECTION AT MANHOLE
NO SCALE

SEAL:


April 25, 2014

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PROJECT:
EL DORADO R1-60 NO.16
ARCH CULVERT, STORM DRAIN.
NORTH LAS VEGAS, NEVADA

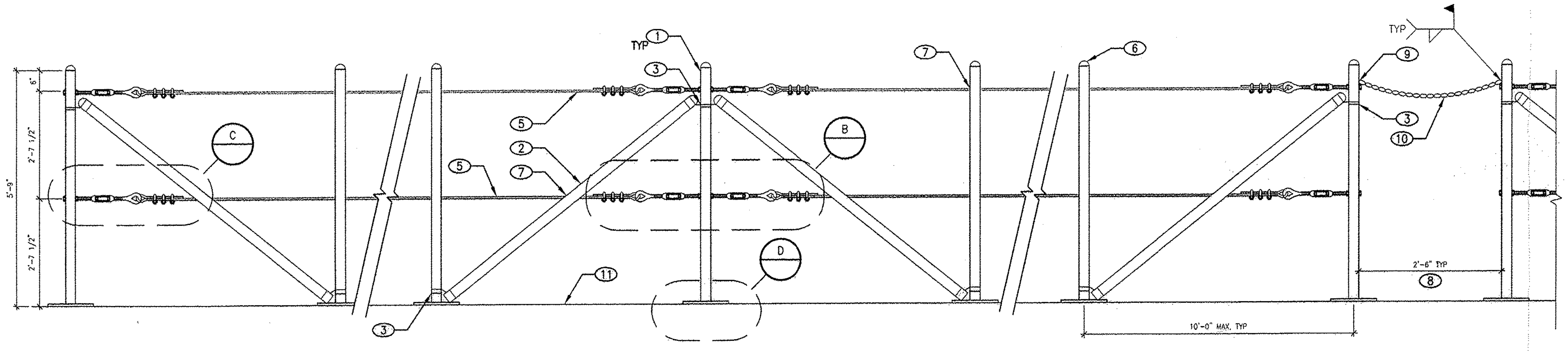
SHEET TITLE:
ARCH AT MANHOLE SECTIONS

REV.	DESCRIPTION	DATE

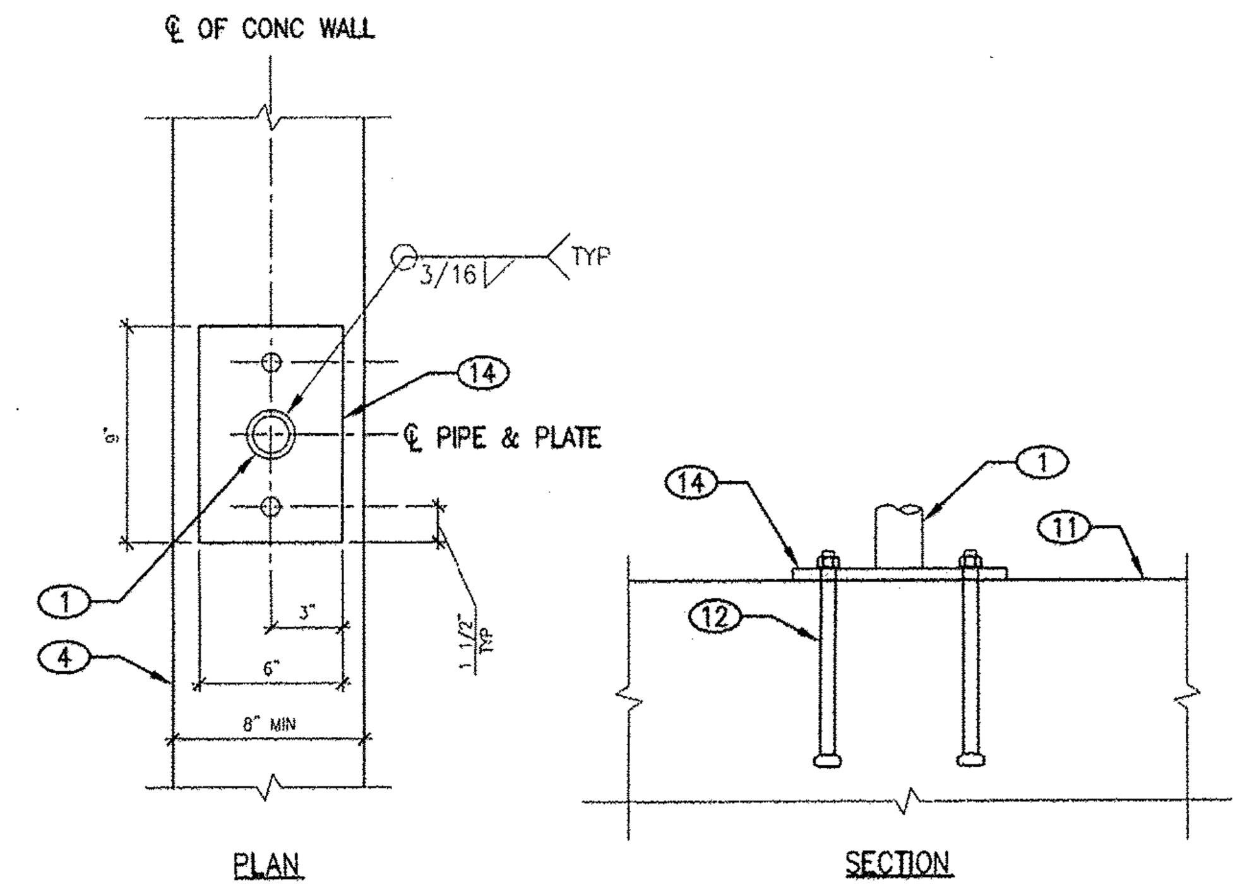
DRAWN: SLK | CHECKED: GAM

DATE: DEC 17, 2013
PROJECT NUMBER: STR13.6027
SHEET NUMBER:

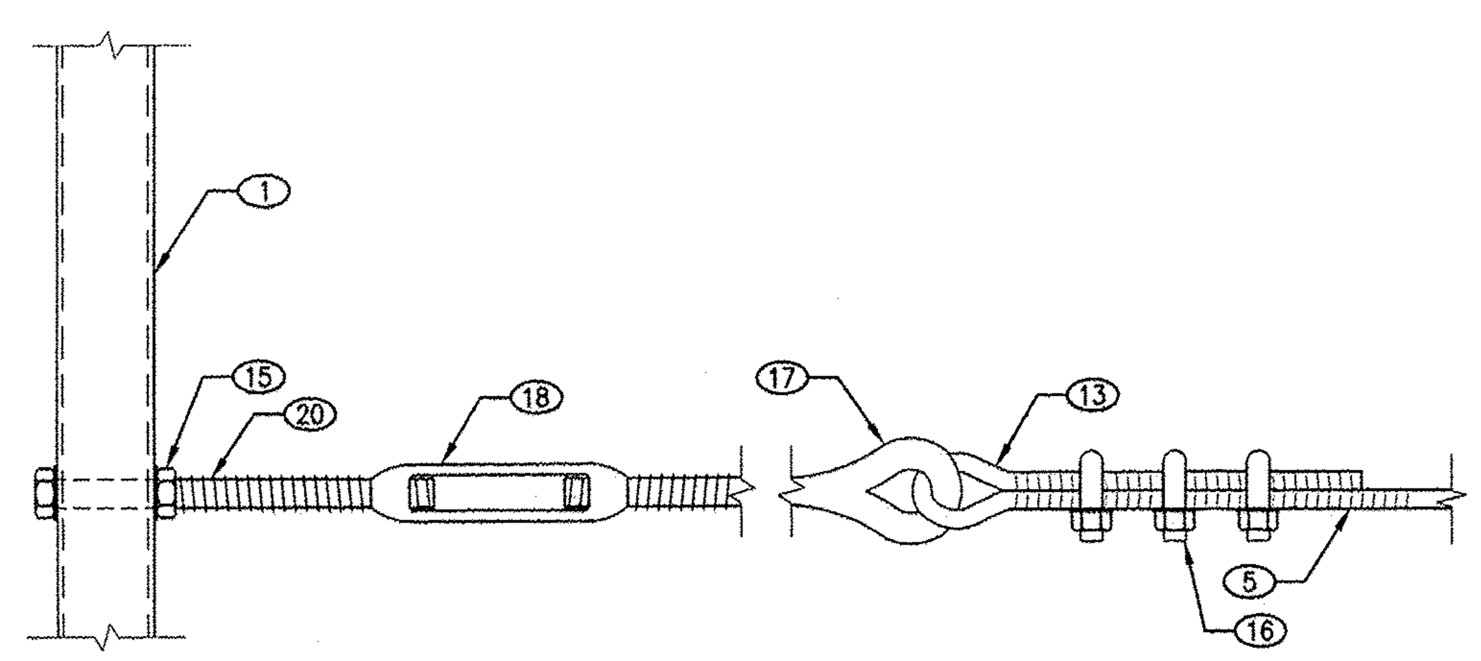
S2.2



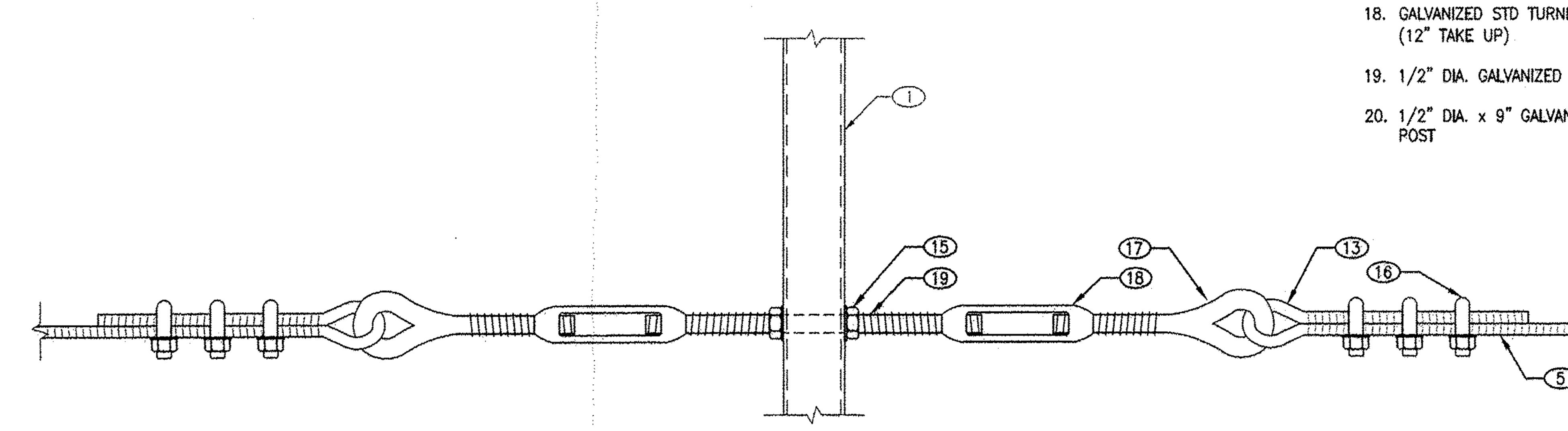
A ELEVATION
NO SCALE



D CLOSE-UP AT BASE PLATE CONNECTION
NO SCALE



C CLOSE-UP AT CABLE AT END POST
NO SCALE



B CLOSE-UP AT CABLE AT BRACE POST
NO SCALE

1 TYPICAL POST AND CABLE FENCE DETAIL
NO SCALE

NOTES:

A. CABLE TO POST (SECTIONS B AND C) CONNECTIONS TO BE USED AT UPPER AND LOWER CABLES.

B. BRACE RAILS SHALL BE PLACED A MAXIMUM OF 200' O.C., AT END POSTS, AND WHERE FENCE CHANGES AT AN ANGLE (E.G. CORNERS IN PLAN DIMENSIONS, OR SLOPE CHANGES AT TOP OF WALL).

C. ALL STEEL OT BE HOT-DIPPED GALVANIZED. ANY GALVANIZING DAMAGED DURING CONSTRUCTION SHALL BE PAINTED W/ (2) COATS OF ALUMINUM PAINT. (GALVANOX OR APPROVED EQUAL).

D. POST/BRACE SHALL BE ASTM A53, GRADE B.

E. PLATES SHALL BE ASTM A36

F. WELDING SHALL BE E70 ELECTRODE

G. GALVANIZED BRACE BANDS SIZED FOR 1500 LBS (WORKING LOAD).

KEYNOTES:

1. 2" DIA SCH 80 GALVANIZED POST
2. 2" DIA SCH 80 GALVANIZED BRACE RAIL (TYP)
3. 2" DIA GALVANIZED BRACE BAND
4. CHANNEL WALL
5. 3/8" DIA. GALVANIZED AIRCRAFT CABLE
6. POST TOP
7. 3/4" DIA HOLE IN POST AND BRACE RAIL FOR CABLE (TYP)
8. ACCESS OPENING AS REQUIRED. SEE CIVIL FOR LOCATION.
9. REMOVABLE LATCH
10. 3/4" GALVANIZED CHAIN
11. TOP OF WALL
12. 5/8"ø F1554 GR. 36 HEADED BOLTS. 8" MIN. EMBEDMENT INTO CONC WALL
13. 3/8"" STD WIRE ROPE THIMBLE
14. 1/2" THICK GALV PLATE
15. NUT AND WASHER AT EACH SIDE OF POST
16. GALVANIZED WIRE ROPE CLIPS (TYP)
17. 1/2"x0'-9" GALVANIZED IRON EYE BARS
18. GALVANIZED STD TURNBUCKLE FOR 1/2" DIA BOLTS (12" TAKE UP)
19. 1/2" DIA. GALVANIZED THREADED ROD
20. 1/2" DIA. x 9" GALVANIZED BOLT FOR END BRACE POST

SEAL: GREG A. MEYER, Exp. 12/31/15, CIVIL/STRUCTURAL, No. 15053, STATE OF NEVADA, REGISTERED PROFESSIONAL ENGINEER — April 25, 2014

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7312 W CHEYENNE AVE, STE 1
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PROJECT:
EL DORADO R1-60 NO.16
ARCH CULVERT. STORM DRAIN.
NORTH LAS VEGAS, NEVADA

SHEET TITLE:
TYPICAL SECTIONS

REV.	DESCRIPTION	DATE

DRAWN: SLK | CHECKED: GAM

DATE: DEC 17, 2013
PROJECT NUMBER: STR13.6027
SHEET NUMBER:

S2.3

IMPROVEMENT PLANS
FOR
ELDORADO R1-60 NO. 16
DEER SPRINGS WAY

A PORTION OF APN # 124-21-711-074

INDEX OF DRAWINGS

GENERAL PROJECT REQUIREMENTS AND GENERAL NOTES

I. PREFACE

A. ALL MAPS, TECHNICAL STUDIES, REPORTS, DESIGNS, CONSTRUCTION DRAWINGS, SPECIFICATIONS AND SPECIAL TECHNICAL REQUIREMENTS ASSOCIATED WITH THE PROJECT AND IMPROVEMENTS PRESENTED HEREIN HAS BEEN ACCOMPLISHED UNDER THE SUPERVISION OF RESPONSIBLE PROFESSIONAL(S) HAVING THE APPROPRIATE REGISTRATION TO SERVE IN THIS CAPACITY BASED ON THE SCOPE OF THIS SPECIFIC PROJECT, AND IN ACCORDANCE WITH THE STATUTORY PROVISIONS OF THE NEVADA REVISED STATUTES (NRS) AND THE NEVADA ADMINISTRATIVE CODE (NAC) INCLUDING:
NRS 278, 338, NRS 623, NRS 625; NAC 338, NAC 623 AND NAC 625
CERTIFICATION SIGNIFYING COMPLIANCE WITH STATUTORY AND RELATED ADMINISTRATIVE CODE REQUIREMENTS IS HEREBY PROVIDED BY THE RESPONSIBLE PROFESSIONAL(S) IN THE FORM OF A STAMP OR SEAL PLACED ON THE PROJECT DOCUMENTS.

B. THE PROJECT AND ALL IMPROVEMENTS RELATED THERETO AS ILLUSTRATED ON THE PROJECT DRAWINGS MUST CONFORM TO NORTH LAS VEGAS MUNICIPAL CODE INCLUDING THE TITLES AND CHAPTERS NOTED BELOW:
- TITLE 2, CHAPTER 2.36 ADMINISTRATIVE FEES
- TITLE 8, CHAPTERS 8.16, 8.50 FIRE CODE AND STORMWATER REGULATIONS
- TITLE 10, CHAPTER 10.16 TRAFFIC CONTROL DEVICES
- TITLE 10, CHAPTER 10.52 TEMPORARY TRAFFIC CONTROL REGULATIONS
- TITLE 12, CHAPTER 12.08 PUBLIC W ORKS PROJECT PERMIT AND PERFORMANCE REGULATIONS
- TITLE 13 PUBLIC SERVICES
- TITLE 15 UNIFORM REGULATIONS FOR THE CONTROL OF DRAINAGE
- TITLE 16 SUBDIVISIONS

IT IS EXPECTED THAT THESE TITLES AND CHAPTERS, AS A MINIMUM, WILL BE APPLIED ON A PROJECT SPECIFIC BASIS AND NOT CONSTRUED TO BE ALL INCLUSIVE OR EXCLUSIVE. THE PROJECT IS ALSO EXPECTED TO CONFORM WITH REVISIONS IN THE NORTH LAS VEGAS MUNICIPAL CODE AS IT MAY BE REVISED FROM TIME TO TIME.

C. PROJECT REVIEW BY REPRESENTATIVES OF THE CITY OF NORTH LAS VEGAS IS INTENDED TO COMPLEMENT AND ASSIST THE RESPONSIBLE PROFESSIONAL(S) IN ADVANCING A PROJECT THAT IS IN COMPLIANCE WITH CITY OF NORTH LAS VEGAS REQUIREMENTS, AND IS CONSISTENT WITH PUBLIC BENEFIT, HEALTH, SAFETY, AND WELFARE. REVIEW IS NOT AN ASSURANCE OF PROJECT FEASIBILITY, PROFESSIONAL AND TECHNICAL ACCURACY, OR CONFORMANCE WITH SPECIAL CONDITIONS IMPOSED BY PUBLIC AGENCIES, INCLUDING THE NORTH LAS VEGAS PLANNING COMMISSION.

D. APPROVAL OF THESE IMPROVEMENT PLANS AND SPECIFICATIONS IS MADE BASED ON THE REPRESENTATIONS MADE BY THE PROFESSIONAL(S) THAT THEY HAVE DISCHARGED THEIR RESPONSIBILITIES AND PREPARED COMPLETE DOCUMENTS WHICH COMPLY WITH CITY OF NORTH LAS VEGAS REQUIREMENTS FOR CONSTRUCTION OF THE IMPROVEMENTS DEPICTED HEREIN.

E. IF CONSTRUCTION HAS NOT COMMENCED WITHIN, OR IN THE EVENT OF AN INTERRUPTION IN CONSTRUCTION FOR A PERIOD OF, ONE (1) YEAR AFTER THE MOST RECENT APPROVAL DATE NOTED HEREON, THESE IMPROVEMENT PLANS MUST BE RESUBMITTED FOR EVALUATION BY THE CITY OF NORTH LAS VEGAS FOR POSSIBLE DESIGN UPDATE.

II STANDARD SPECIFICATIONS AND STANDARD DRAWINGS FOR GENERAL CONSTRUCTION

A. ALL IMPROVEMENTS SHOWN ON THESE CONSTRUCTION DRAWINGS SHALL BE IMPLEMENTED IN ACCORDANCE WITH THE 'UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC W ORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA,' LATEST EDITION. APPROVED REVISIONS TO THESE STANDARDS ARE POSTED ON THE REGIONAL TRANSPORTATION COMMISSION OF SOUTHERN NEVADA WEBSITE.

B. EXCEPTIONS TO THESE STANDARDS ARE NOTED BELOW:
1. ALL PROVISIONS DIRECTLY RELATED TO THOSE PROCEDURES USED TO SOLICIT COMPETITIVE BIDS AND TO AWARD AND EXECUTE CONTRACTS FOR PUBLIC AGENCY PROJECTS.
2. THE CITY OF NORTH LAS VEGAS TRENCH BACKFILL POLICY DATED AUGUST 15, 1996, SHALL HE IMPLEMENTED FOR THIS PROJECT. COPIES OF THE TRENCH BACKFILL POLICY CAN BE OBTAINED FROM THE DEPARTMENT OF PUBLIC W ORKS, CONSTRUCTION SERVICES DIVISION, 2250 LAS VEGAS BLVD., N., SUITE 610 NORTH LAS VEGAS, NEVADA 89030, 633-1206.
3. THE CITY OF NORTH LAS VEGAS POLICY REGARDING GRADING AND CONSTRUCTION ON OR IN CLOSE PROXIMITY TO GEOLOGIC FAULTS AND GROUND FISSURES. COPIES OF THE POLICY CAN BE OBTAINED FROM THE DEPARTMENT OF PUBLIC W ORKS, CONSTRUCTION SERVICES DIVISION, 2250 LAS VEGAS BLVD., N., SUITE 610 NORTH LAS VEGAS, NEVADA 89030, 633-1206.
4. WHERE ALLOWED, CURB AND GUTTER HAVING A DESIGN GRADE OF 0.5 PERCENT OR LESS SHALL BE CONSTRUCTED BY FORMING. FORM GRADES AND ELEVATIONS SHALL BE VERIFIED PRIOR TO PLACEMENT OF CONCRETE AND WATER FLOW TESTED AS SOON AFTER PLACEMENT AS CURING ALLOWS.
5. 'NO PARKING' ZONES AT CURB RETURNS, FIRE HYDRANT ZONES AND SCHOOL ZONES SHALL HE PAINTED RED TO THE LIMITS NOTED ON THE PLANS, OR IF NOT SHOWN ON THE PLANS, TO THE LIMITS ESTABLISHED BY THE CITY OF NORTH LAS VEGAS TRAFFIC ENGINEER.

C. MODIFICATIONS AND CLARIFICATIONS TO THESE STANDARDS ARE NOTED BELOW:
1. THE CONTRACTOR SHALL MAKE A PROJECT SITE VISIT WITH PLANS-IN-HAND PRIOR TO CONSTRUCTION TO CONFIRM PROJECT CONSTRUCTABILITY, AND SHALL IMMEDIATELY NOTIFY THE PROFESSIONAL OF ANY CONSTRUCTABILITY PROBLEMS.
2. INFORMATION NOTED ON THE PLANS CONCERNING THE EXISTENCE AND LOCATION OF EXISTING WET UNDERGROUND UTILITIES AND OTHER UNDERGROUND STRUCTURES WERE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. THE CITY OF NORTH LAS VEGAS, PROFESSIONAL, AND OWNER MAKE NO ASSURANCES CONCERNING THE ACCURACY OF SUCH INFORMATION. THE CONTRACTOR SHALL EXERCISE CAUTION AND USE BEST AVAILABLE CONSTRUCTION TECHNIQUES TO DETERMINE THE ACTUAL LOCATION OF AND PROTECTION FOR ALL UNDERGROUND UTILITIES WHETHER OR NOT THEY ARE SHOWN ON THE PLANS. AT A MINIMUM, THE CONTRACTOR SHALL:
   CALL BEFORE YOU DIG 1-800-227-2600
   CALL BEFORE YOU OVERHEAD 1-702-227-2929
3. THE CONTRACTOR IS RESPONSIBLE FOR SECURING ALL PROJECT PERMITS AND COMPLYING WITH ALL TERMS AND CONDITIONS IMPOSED BY THE PERMITTING AGENCIES. AGENCIES OTHER THAN THE NORTH LAS VEGAS PUBLIC WORKS DEPARTMENT THAT MAY HAVE JURISDICTION OR REGULATORY AUTHORITY CONCERNING THE PROJECT INCLUDE:
   CITY OF NORTH LAS VEGAS BUILDING DEPARTMENT
   CLARK COUNTY HEALTH DISTRICT – DIVISION OF AIR QUALITY MANAGEMENT
   NEVADA DEPARTMENT OF TRANSPORTATION
   NEVADA DEPARTMENT OF ENVIRONMENTAL PROTECTION
   US ARMY CORPS OF ENGINEERS
   NEVADA DIVISION OF WATER RESOURCES
4. THE CONTRACTOR SHALL PROVIDE AT LEAST SEVENTY-TWO (72) HOURS NOTICE TO EACH OF THE FOLLOWING AGENCIES CONFIRMING THE SCHEDULED START OF CONSTRUCTION

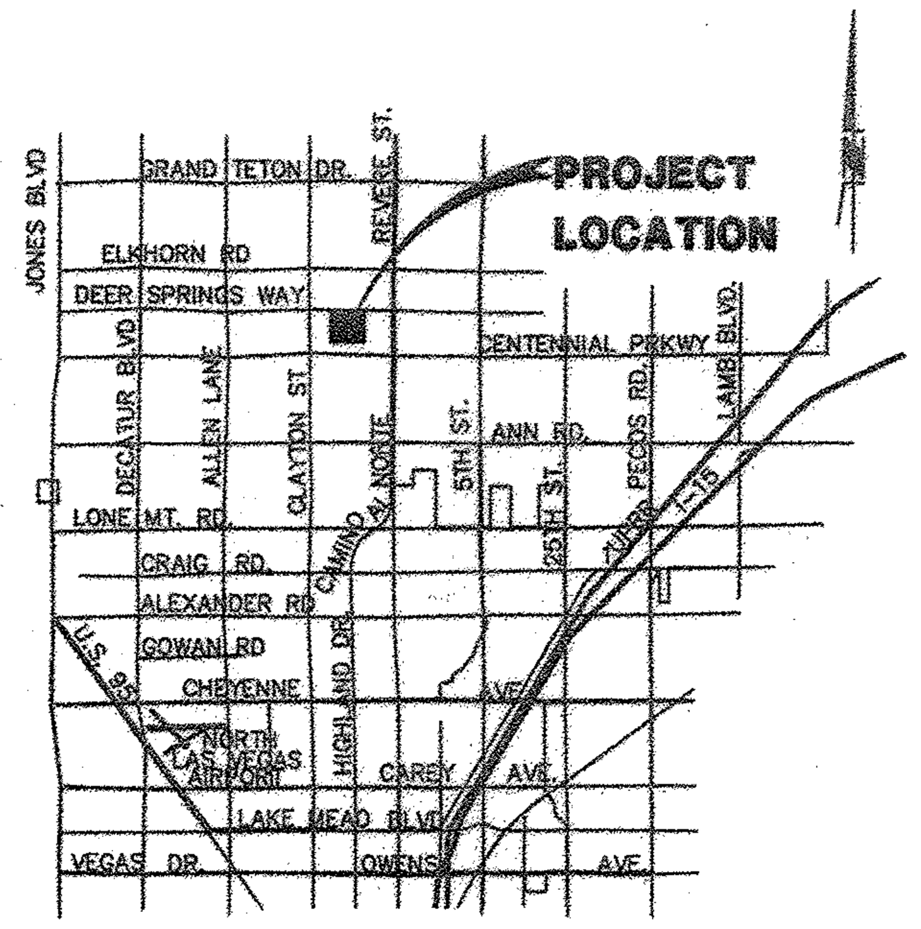
CITY OF NORTH LAS VEGAS UTILITIES DIVISION	(702)633-1290
COX COMMUNICATION	(702)385-3644
NV ENERGY	(702)227-2600
CENTURY LINK	(702)227-2600
SOUTHWEST GAS CORPORATION	~~(702)227-2600~~ (702) 651-2111

5. THE CONTRACTOR SHALL EXERCISE CAUTION AND USE CONSTRUCTION TECHNIQUES TO PROTECT AND PRESERVE EXISTING PERMANENT SURVEY MONUMENTS. ALL SURVEY MONUMENTS DISTURBED SHALL BE REPLACED AND/OR REHABILITATED IN ACCORDANCE WITH STANDARDS BY A PROFESSIONAL LAND SURVEYOR RETAINED BY THE CONTRACTOR.
6. THE CONTRACTOR SHALL EXERCISE CAUTION AND USE CONSTRUCTION TECHNIQUES TO PROTECT AND PRESERVE EXISTING PUBLIC AND PRIVATE FEATURES LOCATED IN CLOSE PROXIMITY TO OR ABUTTING IMPROVEMENTS SHOWN ON THESE PLANS. RESTORATION OF DAMAGED FEATURES SHALL BE ACCOMPLISHED BY THE CONTRACTOR AT THE CONTRACTOR*S EXPENSE TO THE SATISFACTION OF THE CITY OF NORTH LAS VEGAS* REPRESENTATIVE.
7. THE LOCATION OF ALL SAWCUT LINES FOR THE PROJECT MAY BE DETERMINED BY THE CITY OF NORTH LAS VEGAS IF THE LOCATION IS NOT CLEARLY SHOWN ON THE PLANS OR IF EXISTING CONDITIONS REQUIRE ADJUSTMENT TO THE LOCATION SHOWN ON THE PLANS.
8. THE CONTRACTOR SHALL COOPERATE AND COORDINATE WITH THE CITY OF NORTH LAS VEGAS* REPRESENTATIVE IN PROVIDING INGRESS AND EGRESS TO ABUTTING PROPERTIES, AND SHALL PROTECT SUCH PROPERTIES FROM PROJECT RELATED STORM WATER AND NUISANCE RUNOFF BY PROVIDING TEMPORARY POSITIVE DRAINAGE CONTROL.
9. PLANTMIX BITUMINOUS SHALL BE FINISHED TO A HEIGHT OF BETWEEN 3/8 INCHES AND 5/8 INCHES ABOVE THE LIP OF CURB GUTTERS AND VALLEY GUTTERS.
10. FOG SEAL SHALL BE APPLIED TO PLANTMIX BITUMINOUS SURFACES AFTER ALL CORRECTIONS AND ADJUSTMENTS HAVE BEEN MADE.
11. TYPE V CEMENT SHALL BE USED FOR ALL OFF-SITE IMPROVEMENTS AND THE MIX SHALL BE DESIGNED FOR SOLUBLE SULFATES IN THE SUBGRADE OF 1.5 PERCENT OR GREATER BASED ON SUBGRADE MATERIAL SAMPLING AND TESTING. ALL MIX DESIGNS SHALL BE PROJECT SPECIFIC AND APPROVED BY THE CITY OF NORTH LAS VEGAS REPRESENTATIVE PRIOR TO PLACEMENTS.
12. ALL MANHOLES, VALVE BOXES, JUNCTION STRUCTURES, VAULTS AND CLEANOUTS THAT ARE LOCATED WITHIN THE ROADWAY LIMITS SHALL BE CONSTRUCTED TO, AND PLATED AT SUBGRADE LEVEL UNTIL SUCH TIME AS THE AGGREGATE BASE AND PLANTMIX BITUMINOUS SURFACE HAS BEEN COMPLETED. THEREAFTER, THESE ITEMS SHALL BE ADJUSTED TO FINISH GRADE.
13. UTILITY BOXES AND VAULTS LOCATED IN THE SIDEWALK AREA ARE TO BE CONSTRUCTED TO THE FINISH DESIGN GRADE. THE ELEVATION SHALL BE CONSISTENT WITH THAT REQUIRED FOR THE STANDARD CONCRETE CITY OF NORTH LAS VEGAS SIDEWALK EVEN IF THE CONCRETE SIDEWALK CONSTRUCTION IS DEFERRED TO A FUTURE DATE.
14. THE CONTRACTOR SHALL PROVIDE REASONABLE ACCOMMODATIONS FOR CITY OF NORTH LAS VEGAS PERSONNEL TO OBTAIN GPS/GIS DATA ON ALL UNDERGROUND UTILITIES AND INFRASTRUCTURE.
15. ALL OFF-SITE IMPROVEMENT SUBGRADE MUST BE CERTIFIED BY THE GEOTECHNICAL ENGINEER OF RECORD.

REVISED: MARCH 25, 2014

Pardee Homes

OWNER/DEVELOPER:
PARDEE HOMES OF NEVADA
4675 W TECO AVE, SUITE 115
LAS VEGAS, NV 89118
(702) 614-1400
(702) 614-1466 (FAX)



VICINITY MAP
N.T.S.

APPROVALS

JENNIFER E. DOODY, P.E. CFM — DATE 4/2/14
DEPUTY DIRECTOR, PUBLIC WORKS DEPARTMENT

ROBERT McLAUGHLIN, P.E. — DATE 5/26/14
MANAGER, DEVELOPMENT AND FLOOD CONTROL

LORENA CANDELARIO, SR/WA — DATE 5/27/14
MANAGER, REAL PROPERTY SERVICES DIVISION

ALYSSA REYNOLDS, P.E. PTOE — DATE 5-7-14
CNLV TRAFFIC ENGINEER

CNLV FIRE DEPARTMENT — DATE 5/7/14

Max Hughes — DATE 3/24/14
SOUTHWEST GAS CORPORATION

NEVADA ENERGY — Mary Ma[illegible] — DATE 3-27-2014

NEVADA ENERGY ACKNOWLEDGES THAT WE HAVE RECEIVED YOUR PLANS AND WILL PROVIDE SERVICE TO ALL ELECTRICAL NEEDS ASSOCATED WITH THIS PROJECT. NEVADA POWER COMPANY RESERVES THE RIGHT TO ADDRESS ANY EXISTING OR FUTURE CONFLICTS ONCE THE FINAL DESIGN IS COMPLETED. THE NEW SERVICE AND THE RESOLUTION OF ANY CONFLICTS WILL BE ACCOMPLISHED PURSUANT TO THE NEVADA PUBLIC UTILITY COMMISSION'S RULES AND REGULATIONS.

CALL BEFORE YOU DIG: 1-800-227-2600

Diane Schaner — DATE 3-27-14
CENTRAL TELEPHONE COMPANY, DBA CENTURY LINK

THE AFFIXED CENTRAL TELEPHONE COMPANY, DBA CENTURY LINK APPROVAL DOES NOT ASSUME OR GUARANTEE LIABILITY FOR KNOWN OR UNKNOWN CONFLICTS WITH EXISTING OR PROPOSED IMPROVEMENTS. RESOLUTION OF ANY CONFLICT WILL BE ACCOMPLISHED PURSUANT TO LOCAL ORDINANCES, NEVADA REVISED STATUTES AND/OR PUBLIC UTILITY COMMISSION RULES AND REGULATIONS.

Peggy Miller — DATE 3-28-14
COX COMMUNICATIONS – LAS VEGAS, INC.

PROFESSIONAL ENGINEER, STATE OF NEVADA — GIA D. NGUYEN — CIVIL — No. 14918 — DATE: 3/11/14

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP

PROJECT NO. 5523-A017
DESIGN: GN
DRAWN: GN
CHECK: GN
PLOT DATE: 03-17-14
PLOT TIME: 13:44:18

G.C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
1555 S. RAINBOW BLVD. · LAS VEGAS, NV 89146
T:702.804.2000 · F:702.804.2299 · GCWALLACE.COM
LAS VEGAS

F:\Projects\500\5523-A017\DWG\Production\Deer Springs Way\A017-G1.dwg
Quongvinh Nguyen

PARDEE HOMES
ELDORADO R1-60 NO. 16
DEER SPRINGS WAY
COVER SHEET

DRAWING
1
1 OF 14 SHTS

CNLV # 47955

LEGEND

1	LOT NUMBER	[54.10]	FUTURE ELEVATION
1	BLOCK NUMBER	59.33 TC or FG	GRADE BREAK ELEVATION
PAD= 00.0 F.F. = 00.0	PAD ELEVATION FINISH FLOOR ELEVATION	56.22 TC or FG	PROPOSED ELEVATION
PAD= (00.0) F.F. = (00.0)	EXISTING PAD ELEVATION EXIST. FINISH FLOOR ELEV.	(56.21)	EXISTING ELEVATION
			RIGHT-OF-WAY
	SCARP		PROPERTY LINE
4510	EXISTING CONTOUR (5' INTERVAL)		CENTER LINE
	EXISTING CONTOUR (1' INTERVAL)		RETAINING WALL
			KNEE WALL
▨	CONCRETE DRIVEWAY		PERIMETER WALL
TF	TOP OF FOOTING		STORM DRAIN LINE
TW	TOP OF RETAINING WALL	▨	SIDEWALK
SDMH	STORM DRAIN MANHOLE		DITCH OR SWALE
	SVZ - SIGHT VISIBILITY ZONE, NO STRUCTURES/ LANDSCAPING TALLER THAN 24"		CURB TRANSITION AT SIDEWALK RAMP (ROLL CURB TO "L" CURB)

STANDARD SPECIFICATION AND STANDARD DRAWINGS FOR WATER LINE CONSTRUCTION

A. ALL WATER IMPROVEMENTS SHOWN ON THESE CONSTRUCTION DRAWINGS SHALL CONFORM TO THE STANDARDS DESCRIBED BELOW, AND IN ORDER OF PRECEDENCE SHOWN.
  1. "CITY OF NORTH LAS VEGAS MUNICIPAL WATER SERVICE DISTRICT SERVICE RULES AND REGULATIONS,"LATESTP EDITION.
  2. "UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS, CLARK COUNTY NEVADA,"LATEST EDITION.
  3. "UNIFORM STANDARD SPECIFICATION FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA,"LATEST EDITION.

B. EXCEPTIONS TO THESE STANDARDS ARE NOTED BELOW:
  1. NO WATER MAIN MAY BE SHUT DOWN TO MAKE CONNECTIONS WITHOUT PRIOR APPROVAL OF THE CITY OF NORTH LAS VEGAS REPRESENTATIVE.
  2. MATERIALS USED FOR WATER DISTRIBUTION FACILITIES SHALL BE INCLUDED ON THE "CITY OF NORTH LAS VEGAS APPROVED MATERIALS LIST,"LATEST REVISION, OR SPECIFICALLY IDENTIFIED AND APPROVED ON THESE PLANS.
  3. ALL WATER METERS TWO (2) INCHES AND SMALLER SHALL BE INSTALLED BY THE CITY OF NORTH LAS VEGAS. NOTE THAT ALL LOCATIONS MUST BE CLEARLY IDENTIFIED AND MARKED AT THE SITE. THE SERVICE LINES, LATERALS, METER BOXES AND SIDEWALKS OR COLLARS MUST ALL BE INSTALLED AND SET AT GRADE OR THE METER WILL NOT BE SET.
  4. THE CITY OF NORTH LAS VEGAS' TRENCH BACKFILL POLICY, DATED AUGUST 15, 1996, SHALL BE ADHERED TO FOR THIS PROJECT.

C. MODIFICATION AND CLARIFICATION TO THESE STANDARDS ARE AS NOTED BELOW:
  1. WATER METERING REQUIREMENTS FOR NEW DEVELOPMENT:
     A. SEPARATE DOMESTIC AND FIRE SERVICES (WHERE APPLICABLE) ARE REQUIRED FOR EACH DWELLING UNIT, PUBLIC, QUASI-PUBLIC, COMMERCIAL, AND/OR INDUSTRIAL OCCUPANCY LOCATED ON A SINGLE PARCEL OR LOT.
     B. IN THE EVENT THAT A BUILDING WITHIN AN INDUSTRIAL OR COMMERCIAL SUBDIVISION IS DIVIDED, SEPARATE DOMESTIC SERVICES ARE REQUIRED FOR EACH UNIT.
     C. EACH PARCEL OR LOT OF A COMMERCIAL OR RESIDENTIAL SUBDIVISION WILL HAVE A MINIMUM OF ONE (1) METERED DOMESTIC SERVICE. WHEN A FIRE SERVICE IS REQUIRED, EACH PARCEL OR LOT WILL HAVE A MINIMUM OF ONE (1) FIRE SERVICE. THE CITY, AT ITS OPTION, MAY ALLOW A COMMUNAL FIRE SERVICE PROVIDED THE PROPERTY OWNERS FIRST ESTABLISH A PROPERTY MANAGEMENT ASSOCIATION WHICH ACCEPTS RESPONSIBILITY FOR THE PAYMENT OF WATER BILLS AND THE MAINTENANCE AND OPERATION OF THE FIRE LINES AND THE BACKFLOW PREVENTION ASSEMBLY.
  2. FIRE AND DOMESTIC WATER SERVICES AS APPROVED ON THIS PLAN, ARE INTENDED SPECIFICALLY FOR THE LOT AND USE SHOWN, AND ARE NOT INTENDED TO SERVE ADDITIONAL PARCELS OR STRUCTURES WHICH MAY BE CREATED IN THE FUTURE. IN THE EVENT THAT THE PARCELS AND/OR LOTS SHOWN ON THIS PLAN ARE FURTHER DIVIDED TO CREATE ADDITIONAL PARCELS OR LOTS, THE OWNER IS REQUIRED TO PROVIDE SEPARATE FIRE AND DOMESTIC WATER SERVICES TO EACH.
  3. CONNECTION TO PUBLIC FIRE HYDRANTS SHALL NOT BE MADE FOR DOMESTIC AND/OR PRIVATE FIRE SERVICE.
  4. ALL SERVICE LATERALS TWO (2) INCHES AND SMALLER SHALL BE COPPER TUBING WITH APPROVED SERVICE SADDLES. CORPORATION STOPS AND ANGLE METER STOPS SHALL BE THE SAME SIZE AS THE SERVICE LATERAL. ANGLE METER STOPS AND METER SHALL BE CENTERED IN METER THE BOX.
  5. UDACS PLATES NO. 1 AND 3- REVISE NOTE TO READ "COUPLINGS ARE NOT ALLOWED BETWEEN THE CORPORATION STOP AND THE ANGLE METER".
  6. ALL METERS TO BE INSTALLED IN THE CITY OF NORTH LAS VEGAS WATER SYSTEM, INCLUDING DCDAS MUST BE COMPATIBLE WITH THE SENSUS AMR PROTOCOL (A.K.A. INVENSYS) AND MUST BE INSTALLED WITH THE ENCODED REGISTER. METERS THAT ARE FULLY COMPATIBLE ARE: SENSUS/INVENSYS ECR/WP MODELS (5/8"AND LARGER) NEPTUNE AUTOREAD MODELS (3"AND LARGER) & METRON/T2 INNOV8 (ALL SIZES).
  7. ANY PARCEL RECEIVING WATER FROM THE PUBLIC DISTRIBUTION SYSTEM FROM MULTIPLE CONNECTIONS IS REQUIRED TO UTILIZE THE SAME METER MANUFACTURER. FOR MASTER METERED MULTI-FAMILY RESIDENTIAL, THE METERS SHALL BE OF THE SAME MANUFACTURER, MODEL, AND SIZE.
  8. ALL METER BOXES SHALL BE EQUIPPED WITH TRAFFIC BEARING COVERS AND INSTALLED TO FINISH DESIGN GRADE AND ELEVATION. IF SUCH IS NOT SHOWN ON THE PLANS, THE ELEVATION WILL BE ESTABLISHED BY THE CITY OF NORTH LAS VEGAS REPRESENTATIVE.
  9. ANY BLOCK WALL OR OTHER FENCE SHALL BE DESIGNED AND CONSTRUCTED AROUND THE OUTSIDE OF THE EASEMENT(S), TO ALLOW THE CITY DIRECT ACCESS TO VAULT(S) AND INLET PIPING FROM THE ADJACENT RIGHT OF-WAY.
  10. NO UTILITY BOXES SHALL BE LOCATED IN DRIVEWAY APPROACHES, UNLESS APPROVED BY THE UTILITIES DIVISION.
  11. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE CITY OF NORTH LAS VEGAS REPRESENTATIVE.
  12. THE ON-SITE WATER LINES AND APPURTENANCES ARE PRIVATE FACILITIES NOT TO BE OPERATED OR MAINTAINED BY THE CITY OF NORTH LAS VEGAS, UNLESS OTHERWISE SPECIFIED ON CIVIL IMPROVEMENTS PLANS.
  13. ALL VALVES WILL BE LOCATED OUTSIDE OF DRIVEWAYS, VALLEY GUTTERS, AND CURB GUTTERS.
  14. A MINIMUM OF TWO (2) VALVES SHALL BE LOCATED AT EVERY MAINLINE TEE, OR THREE (3) VALVES AT EVERY MAINLINE CROSS.
  15. ALL NEW FIRE HYDRANTS SHALL HAVE A 5-1/4 INCH VALVE OPENING.
  16. TWO SOURCES OF WATER SUPPLY ARE REQUIRED FOR ANY DEVELOPMENT WITH ANY COMBINATION OF MORE THAN THREE (3) FIRE HYDRANTS (PUBLIC OR PRIVATE) OR FIRE SERVICES.
  17. MINIMUM SEPARATIONS BETWEEN FIRE SYSTEMS AND DOMESTIC WATER MAINS SHALL BE SIX (6)-FEET HORIZONTALLY FROM EXTERIOR PIPE WALLS AND EIGHTEEN (18)-INCHES VERTICALLY. MINIMUM SEPARATION FROM SEWER LINES SHALL BE TEN (10)-FEET HORIZONTALLY.
  18. PIPE DETECTOR RIBBON AND LOCATOR BALLS SHALL BE REQUIRED ABOVE ALL WATER MAINS, SERVICE LATERALS THAT ARE SIX (6) INCHES AND LARGER, AND ANY SERVICE LATERAL NOT INSTALLED PERPENDICULAR TO THE MAIN LINE.
  19. ALL WATER MAINS SHALL BE FILLED, PRESSURE TESTED TO 200 PSI, DISINFECTED, FLUSHED, REFILLED AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION BY THE CITY. CONTACT THE CITY OF NORTH LAS VEGAS UTILITY DIVISION TWENTY-FOUR (24) HOURS IN ADVANCE TO SCHEDULE SAMPLING.
  20. ALL BACKFLOW PREVENTION ASSEMBLIES SHALL BE TESTED AND CERTIFIED BY THE CITY OF NORTH LAS VEGAS PRIOR TO PLACING THE WATER SYSTEM IN SERVICE. NO WATER SHALL BE TAKEN FROM A SERVICE REQUIRING BACKFLOW PREVENTION UNTIL THE REDUCED PRESSURE PRINCIPLE ASSEMBLY HAS BEEN SUCCESSFULLY TESTED BY THE CNLV. CONTACT THE CITY OF NORTH LAS VEGAS TWENTY-FOUR (24) HOURS IN ADVANCE TO SCHEDULE TESTING.
  21. LIMITS OF ASPHALT PATCHES TO BE DETERMINED IN THE FIELD BY A CITY OF NORTH LAS VEGAS INSPECTOR. PATCHES WILL BE A MINIMUM OF TWELVE (12)-FEET MACHINE REPLACED.
  22. SCHEDULE UTILITY INSPECTIONS ONLINE AT HTTP://CNLV-WEBINSPECTION.CITYOFNORTHLASVEGAS.COM/. UTILITY INSPECTIONS MUST BE SCHEDULED ONLINE BY 2:00 P.M. FOR INSPECTIONS TO OCCUR THE FOLLOWING NORMAL WORKING DAY (MONDAY THROUGH FRIDAY). FOR AFTER HOURS UTILITY INSPECTIONS, INCLUDING WEEKENDS, CONTACT UTILITY CUSTOMER SERVICE AT (702) 633-1277 TO SET UP AN ACCOUNT.
  23. RECORD DRAWINGS SHALL BE PREPARED, SIGNED AND SUBMITTED TO THE CITY OF NORTH LAS VEGAS REPRESENTATIVE PRIOR TO FINAL ACCEPTANCE OF ANY WATER DISTRIBUTION FACILITIES TO BE OWNED, OPERATED OR MAINTAINED BY THE CITY OF NORTH LAS VEGAS.

D. SHUTDOWN REQUIREMENTS AND INFORMATION:
  1. CONTACT THE UTILITIES DEPARTMENT SEVEN (7) WORKING DAYS PRIOR TO ANY ANTICIPATED SHUTDOWN FOR COORDINATION PURPOSES. THE CONTRACTOR SHALL NOT OPEN/CLOSE ANY VALVES WITHIN THE CITY'S WATER DISTRIBUTION SYSTEM. THE UTILITIES DEPARTMENT CONTACT NUMBER IS 633-1285.
  2. FOR COMMERCIAL PROPERTIES, PROVIDE WRITTEN NOTIFICATION AND VERBAL COORDINATION BETWEEN THE UTILITIES DEPARTMENT AND THE COMMERCIAL PROPERTY OWNER(S) A MINIMUM OF SEVEN (7) WORKING DAYS PRIOR TO ANTICIPATED SHUTDOWN. THE COMMERCIAL OWNER(S) SHALL HAVE THE ABILITY TO PROVIDE INPUT IN SCHEDULING SHUTDOWNS.
  3. FOR RESIDENTIAL PROPERTIES, PROVIDE WRITTEN NOTIFICATION TO RESIDENTIAL PROPERTIES A MINIMUM OF 48 HOURS PRIOR TO ANTICIPATED SHUTDOWN.
     CITY OF NORTH LAS VEGAS
  4. WORKING DAYS ARE DEEMED TO BE MONDAY THROUGH THURSDAY FOR SHUTDOWN PURPOSES.
  5. SHUTDOWNS ARE ANTICIPATED TO BE NIGHT WORK. FINAL DECISIONS SHALL BE AT THE DISCRETION OF THE UTILITIES DEPARTMENT.
  6. THE SHUTDOWN, RELOCATION, AND/OR ADJUSTMENT OF WATER LINES SHALL BE AS APPROVED BY THE CITY OF LAS VEGAS UTILITIES DEPARTMENT. SHUTDOWNS CANNOT BE GUARANTEED BY THE DEPARTMENT. LINESTOPS OR "INSERT-A-VALVES" MAY BE REQUIRED TO COMPLETE THE WORK, AT THE DISCRETION OF THE UTILITIES DEPARTMENT. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH THE WORK.

REVISED: MARCH 25, 2014

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ABBREVIATIONS

AC	ASPHALTIC CONCRETE
BSW	BACK OF SIDEWALK
BVC	BEGIN VERTICAL CURVE
C.C.A.S.D.	CLARK COUNTY AREA STANDARD DRAWING
CONC	CONCRETE
EVC	END VERTICAL CURVE
FF	FINISH FLOOR
FG	FINISH GRADE
FL	FLOW LINE
GB	GRADE BREAK
HP	HIGH POINT
INV	INVERT ELEVATION
LF	LINEAR FEET
NPC	NEVADA POWER COMPANY
RET.	RETAINING WALL
R.O.W., R/W	RIGHT OF WAY
SW	SIDEWALK
TC	TOP OF CURB
TF	TOP OF FOOTING
TW	TOP OF WALL
TB	TOP OF BERM
UDACS	UNIFORM DESIGN AND CONSTRUCTION STANDARDS
(F.A.S.T.)	FREEWAY AND ARTERIAL SYSTEM OF TRANSPORTATION

EARTHWORK (GRADING COMPLETED W/ PHASE II)

RAW CUT = 46,686 C.Y.
RAW FILL = 1,134 C.Y.

GENERAL STORMWATER NOTES

1. THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE PUBLIC RIGHTS OF WAY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTIVES MAY BE REQUIRED OF THE OWNER OR HIS/HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN THE CITY OF NORTH LAS VEGAS AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY; REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.5.
4. AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS, AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER ANY RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUPPRESSION OF LAND DISTURBANCE ACTIVITIES. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR100000, SECTION III.A.12.
5. ACCUMULATED SEDIMENT IN BMPS SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

REVISED: MARCH 25, 2014

GENERAL FIRE DEPARTMENT NOTES

1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH NORTH LAS VEGAS'STANDARD SPECIFICATIONS AND DRAWINGS.
2. THE CONTRACTOR IS RESPONSIBLE FOR COMPLIANCE WITH THE 2009 INTERNATIONAL FIRE CODE, CHAPTER 14, DURING CONSTRUCTION.
3. WHERE ACCESS TO OR WITHIN A STRUCTURE OR AREA IS RESTRICTED BECAUSE OF SECURED OPENINGS OR WHERE IMMEDIATE ACCESS IS NECESSARY FOR LIFE-SAVING OR FIRE-FIGHTING PURPOSES, THE FIRE CODE OFFICIAL IS AUTHORIZED TO REQUIRE A KEY BOX TO BE INSTALLED IN AN APPROVED LOCATION. BUILDINGS WITH FIRE SPRINKLER OR FIRE ALARM SYSTEMS, OR BUILDINGS NOT EQUIPPED WITH AND EXTERIOR MEANS OF ELECTRICAL DISCONNECT, SHALL BE PROVIDED WITH A KEY BOX. THE KEY BOX SHALL BE OF AN APPROVED TYPE, INSTALLED WITH THE TOP OF THE BOX BEING 5 FEET TO 6 ½ FEET ABOVE FINISHED GRADE AND SHALL CONTAIN KEYS TO GAIN NECESSARY ACCESS. FOR MORE INFORMATION AND AN APPLICATION, PLEASE CALL 633-1102.
4. A MINIMUM OF ONE FIRE DEPARTMENT APPARATUS ACCESS ROAD IS REQUIRED TO ALL BUILDINGS. THE FIRE CODE OFFICIAL IS AUTHORIZED TO REQUIRE MORE THAN ONE FIRE APPARATUS ACCESS ROAD WHEN IT IS DETERMINED THAT A SINGLE MEANS OF ACCESS IS INSUFFICIENT. APPROVED SECONDARY ACCESS SHALL BE PROVIDED FOR GROUPS OF 20 OR MORE DWELLING UNITS, ROAD(S) WITH DEAD ENDS OR WITH A SINGLE POINT OF ACCESS IN EXCESS OF 600 FEET AND FOR ALL COMMERCIAL AND INDUSTRIAL DEVELOPMENTS. FIRE APPARATUS ROADS SHALL HAVE AN UNOBSTRUCTED WIDTH OF NOT LESS THAN 24 FEET, EXCLUSIVE OF SHOULDERS, EXCEPT FOR APPROVED ACCESS GATES IN ACCORDANCE WITH SECTION 503.6 OF THE INTERNATIONAL FIRE CODE, PROVIDED NO PARKING IS ALLOWED, NOT LESS THAN 32 FEET IF PARALLEL PARKING IS ALLOWED ON ONE SIDE, AND NOT LESS THAN 40 FEET IF PARALLEL PARKING IS ALLOWED ON BOTH SIDES AND AN UNOBSTRUCTED VERTICAL CLEARANCE OF NOT LESS THAN 13 FEET 6 INCHES. FOR GROUP R, DIVISION 3 RESIDENTIAL SUBDIVISION, THE MINIMUM WIDTH OF THE FIRE APPARATUS ACCESS ROAD IS 36 FEET, MEASURED FACE OF CURB TO FACE OF CURB.
5. FIRE APPARATUS ACCESS ROADS SHALL BE MARKED WHERE REQUIRED TO PROHIBIT PARKING AND OTHER OBSTRUCTIONS. MARKING SHALL CONSIST OF PAINTING THE CURB, OR THE SIDE OF THE STREET, WHERE NO CURB IS PRESENT, WITH A SUITABLE COAT OF INDUSTRIAL RED ENAMEL ALONG THE ENTIRE LENGTH OF ROAD WHERE PARKING IS PROHIBITED. EACH SECTION OF CURB THAT IS PAINTED RED SHALL ALSO BE MARKED BY SIGNAGE STATING "NO PARKING FIRE LANE". SIGNS ARE TO BE INSTALLED NO HIGHER THAN 10 FEET OR LESS THAN 6 FEET FROM THE SURFACE OF THE ROADWAY. SIGNS SHALL BE LOCATED AT EACH END OF PAINTED CURB, AND ADDITIONALLY IN BETWEEN SO THAT THE MAXIMUM SEPARATION BETWEEN SIGNS IS 100 FEET, AS MEASURED ALONG THE CENTERLINE OF THE FIRE APPARATUS ACCESS ROAD.
6. GATES RESTRICTING TRAFFIC ACROSS ACCESS LANES SHALL BE OPERABLE BY THE FIRE DEPARTMENT. GATES SHALL BE ELECTRICALLY POWERED, PROVIDED WITH AN AVI LOOP, AND HAVE A BACK-UP BATTERY SYSTEM IN CASE OF NORMAL POWER LOSS. THE AVI LOOP SHALL BE LOCATED 10 FEET PERPENDICULARLY FROM THE FACE OF THE ACCESS GATE ALONG THE ROUTE OF ARRIVAL, 10 FEET FROM THE PUBLIC RIGHT-OF-WAY, AND THE LOOP SHALL BE MARKED BY WAY OF A GREEN REFLECTIVE MARKER ON THE ACCESS LANE. A FIRE DEPARTMENT PERMIT IS REQUIRED TO INSTALL A GATE THAT OBSTRUCTS A FIRE APPARATUS ACCESS ROAD. A SEPARATE PERMIT IS REQUIRED FOR EACH GATED ENTRANCE.
7. DEAD-ENDS LONGER THAN 150 FEET SHALL BE PROVIDED WITH A CLEAR TURNAROUND WITH A DIAMETER OF 104 FEET FOR COMMERCIAL AND MULTI-FAMILY R-1 AND R-2 OCCUPANCIES AND 90 FEET FOR R-3 OCCUPANCIES AND SINGLE-FAMILY DWELLINGS (BUILT UNDER THE IRC ONLY).
8. IN ALL RESIDENTIAL AREAS (R-3 OCCUPANCIES AND SINGLE-FAMILY DWELLING BUILT UNDER THE IRC ONLY), HYDRANTS SHALL BE SPACED NOT TO EXCEED 500 FEET, OR 600 FEET IF ALL HOMES ARE PROTECTED BY APPROVED AUTOMATIC FIRE SPRINKLERS SYSTEMS. IN ALL COMMERCIAL AND INDUSTRIAL AREAS, INCLUDING MULTI-FAMILY R-1 AND R-2 OCCUPANCIES, HYDRANTS SHALL BE SPACED NOT TO EXCEED 300 FEET, OR 400 FEET IF ALL BUILDINGS ARE PROTECTED BY APPROVED AUTOMATIC SPRINKLER SYSTEMS AND 1000 FEET WHERE NOT REQUIRED FOR STRUCTURES TO PROVIDE FOR TRANSPORTATION HAZARDS. HYDRANT SPACING MAY BE INCREASED BY 100 FEET IF ALL STRUCTURES WITHIN THE DEVELOPMENT ARE PROVIDED WITH SPRINKLER PROTECTION. THERE IS NO ALLOWABLE INCREASE FOR HYDRANTS INSTALLED FOR TRANSPORTATION HAZARDS.
9. ON ANY RESIDENTIAL OR COMMERCIAL CONSTRUCTION PROJECT, ACCESSIBLE FIRE HYDRANTS SHALL BE INSTALLED BEFORE ACTUAL CONSTRUCTION COMMENCES. FIRE HYDRANTS SHALL BE PROVIDED WITHIN 300 FEET OF COMBUSTIBLE MATERIAL STORAGE AND FRAMING CONSTRUCTION. A HYDRANT FLOW TEST IS REQUIRED, WHICH SHALL INCLUDE STATIC PRESSURE AND WATER FLOW VOLUME SHOWING THE ABILITY TO MEET THE REQUIRED FIRE FLOW, AND MUST BE PRESENTED TO THE NORTH LAS VEGAS FIRE DEPARTMENT AND PUBLIC WORKS.
10. NO FIRE HYDRANTS SHALL BE LOCATED WITHIN SIX (6) FEET OF A DRIVEWAY, POWER POLE, LIGHT STANDARD, OR ANY OTHER OBSTRUCTION OR WITHIN FIFTEEN (15) FEET OF A CURB RETURN OR DRIVEWAY IN AN INDUSTRIAL OR COMMERCIAL AREA. FOR WALL, FENCE AND PLANTER LOCATIONS, A PERIMETER AROUND THE HYDRANT MEASURING A MINIMUM OF 3 FEET FROM ITS EXTERIOR SHALL BE MAINTAINED CLEAR OF ALL OBSTRUCTIONS AT ALL TIMES. FIRE HYDRANTS SHALL BE LOCATED 4 FEET TO 7 FEET FROM THE BACK OF CURB. WHERE IT IS NOT POSSIBLE TO LOCATE THE HYDRANT A MINIMUM OF 4 FEET FROM THE BACK OF THE CURB, THE HYDRANT SHALL BE PROTECTED AGAINST VEHICULAR IMPACT IN ACCORDANCE WITH SECTION 312 OF THE 2009 OF THE INTERNATIONAL FIRE CODE.
11. THE MAXIMUM ALLOWABLE REDUCTION IN REQUIRED FIRE FLOW FOR SPRINKLERED FACILITIES IS 50%. A REDUCTION IN THE REQUIRED FIRE FLOW OF 25% IS PERMITTED IN BUILDINGS WITH: FLOORS USED FOR HUMAN OCCUPANCY MORE THAN 3 STORIES IN HEIGHT OR MORE THAN 55 FEET ABOVE THE LOWEST LEVEL OF FIRE APPARATUS ACCESS; OR CONTAINING HIGH-PILED COMBUSTIBLE STORAGE PROTECTED BY OTHER THAN ESFR FIRE SPRINKLERS; OR FLAMMABLE/COMBUSTIBLE LIQUIDS IN EXCESS OF THE MAXIMUM ALLOWABLE QUANTITY; OR HAZARDOUS MATERIALS IN EXCESS OF THE MAXIMUM ALLOWABLE QUANTITY. A REDUCTION IN THE REQUIRED FIRE FLOW OF 50% IS PERMITTED IN BUILDINGS WITH HIGH-PILED COMBUSTIBLE STORAGE PROTECTED BY ESFR FIRE SPRINKLERS. THE RESULTING FIRE FLOW FOR ALL BUILDINGS SHALL NOT BE LESS THAN 1,500 GALLONS PER MINUTE FOR THE PRESCRIBED DURATION AS SPECIFIED IN TABLE B105.1 OF THE 2009 INTERNATIONAL FIRE CODE.
12. WHEN AUTOMATIC FIRE PROTECTION IS REQUIRED, THE FIRE DEPARTMENT CONNECTION (FDC) SHALL BE SO LOCATED THAT FIRE APPARATUS AND HOSE CONNECTED TO SUPPLY THE SYSTEM WILL NOT OBSTRUCT ACCESS TO THE BUILDING FOR OTHER FIRE APPARATUS. IT SHALL BE LOCATED ON THE STREET SIDE OF BUILDINGS, FULLY VISIBLE AND RECOGNIZABLE FROM THE STREET OR NEAREST POINT OF FIRE DEPARTMENT VEHICLE ACCESS. IMMEDIATE ACCESS TO FDC SHALL BE MAINTAINED AT ALL TIMES AND WITHOUT OBSTRUCTION BY FENCES, BUSHES, TREES, WALLS OR ANY OTHER FIXED OR MOVEABLE OBJECT. A WORKING SPACE OF NOT LESS THAN 36 INCHES IN WIDTH, 36 INCHES IN DEPTH AND 78 INCHES IN HEIGHT NOT INCLUDING ANY DOORS OR WINDOWS, SHALL BE PROVIDED AND MAINTAINED IN FRONT OF AND TO THE SIDES OF WALL-MOUNTED FIRE DEPARTMENT CONNECTIONS AND AROUND THE CIRCUMFERENCE OF FREE-STANDING FIRE DEPARTMENT CONNECTIONS. THE MAXIMUM DISTANCE FROM A FIRE HYDRANT TO A FDC SUPPLYING FIRE SPRINKLERS AND/OR STANDPIPES SHALL NOT EXCEED 100 FEET, AS MEASURED BY AN APPROVED ROUTE. AN APPROVED ROUTE IS DEFINED AS AN UNOBSTRUCTED PATH OF TRAVEL ON WHICH FIRE APPARATUS CAN MANEUVER AND ON WHICH HOSE CAN EASILY BE LAID.

REVISED: MARCH 25, 2014

GENERAL GRADING AND DRAINAGE NOTES

1. PURSUANT TO CITY OF NORTH LAS VEGAS ORDINANCE NUMBER 1172, THE CONTRACTOR IS REQUIRED TO SECURE A GRADING PERMIT PRIOR TO COMMENCING WORK.
2. THE CONTRACTOR SHALL SECURE A PERMIT FOR ANY OFF-SITE CONSTRUCTION.
3. THE CONTRACTOR'S OPERATIONS SHALL NOT TRESPASS BEYOND THE PROJECT PROPERTY LINES UNLESS A PERMIT OR WRITTEN AUTHORIZATION HAS BEEN OBTAINED FROM THE PROPERTY OWNER(S) INVOLVED. COPIES OF SUCH WRITTEN AUTHORIZATION SHALL BE FURNISHED TO THE CITY OF NORTH LAS VEGAS'REPRESENTATIVE PRIOR TO START OF CONSTRUCTION.
4. THE CITY OF NORTH LAS VEGAS CONSTRUCTION SERVICES SHALL BE NOTIFIED ONE (1) WORKING DAY BEFORE ANY ON-SITE CONSTRUCTION WORK BEGINS.
5. AN APPROVED GRADING AND DRAINAGE PLAN SHALL BE ON THE JOB SITE AT ALL TIMES. DEVIATIONS FROM THE APPROVED PLAN WILL REQUIRE SUBMITTAL OF A FORMAL REVISED PLAN FOR REVIEW AND APPROVAL.
6. ALL CONSTRUCTION SURVEY CONTROL SHALL BE DONE BY A LICENSED PROFESSIONAL LAND SURVEYOR IN ACCORDANCE WITH APPLICABLE STATUTES AND CODES. THE CONTRACTOR SHALL PROVIDE COMPETENT RESOURCES TO ASSURE BUILDING PAD AND BUILDING FLOOR ELEVATIONS CONFORM TO THOSE SHOWN ON THE CONSTRUCTION DRAWINGS. FURTHERMORE, THE CONTRACTOR SHALL PROVIDE THE CITY OF NORTH LAS VEGAS BUILDING DEPARTMENT WITH:
   A. CERTIFICATION OF "BUILDING FLOOR ELEVATIONS"IN CRITICAL DRAINAGE AREAS.
   B. CERTIFICATES OF "BUILDING PAD ELEVATIONS"IN NONCRITICAL AREAS.
7. THE CONTRACTOR SHALL CERTIFY TO THE CITY OF NORTH LAS VEGAS CONSTRUCTION SERVICES DIVISION THAT ALL FILLS, FOUNDATIONS AND SUBGRADES MEET THE MINIMUM COMPACTION REQUIREMENTS. CERTIFICATION SHALL BE MADE PRIOR TO POURING CONCRETE.

REVISED: MARCH 25, 2014

GENERAL TRAFFIC NOTES

1. ALL BARRICADING, CONSTRUCTION SIGNING, TRAFFIC DELINEATION AND MARKINGS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND/OR WORK ZONE TRAFFIC CONTROL HANDBOOK. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO SEE THAT ALL TRAFFIC CONTROL DEVICES ARE PROPERLY INSTALLED AND MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT. CONTACT THE CITY OF NORTH LAS VEGAS' CITY TRAFFIC ENGINEER FOR SPECIFIC TRAFFIC CONTROL REQUIREMENTS.
2. IF THE PROJECT IMPROVEMENTS NECESSITATE TEMPORARY REMOVAL AND/OR RELOCATION OF TRAFFIC CONTROL SIGNS, MARKINGS OR ANY OTHER TRAFFIC CONTROL DEVICES, THEY SHALL BE MAINTAINED THROUGHOUT THE ENTIRE DURATION OF THE PROJECT AND SHALL BE RESTORED TO THE SATISFACTION OF CITY OF NORTH LAS VEGAS' CONSTRUCTION SERVICES MANAGER.
3. PERMANENT PAVEMENT MARKING SHALL BE REQUIRED FOR ALL RIGHTS-OF-WAY 80 FEET WIDE OR GREATER WHICH INCLUDE HALF STREET IMPROVEMENTS UNLESS OTHERWISE NOTED. NEW PAVEMENT MARKINGS DESIGNS SHALL INCORPORATE INTO ANY EXISTING BORDERING MARKINGS. PAINTED MARKINGS SHALL NOT BE USED FOR TEMPORARY CONDITIONS. ALL TEMPORARY MARKINGS SHALL BE A REMOVABLE GRADE TAPE. ALL OTHER MARKINGS SHALL BE PER CLARK COUNTY UNIFORM STANDARD DRAWING 244 THRU 248 AND MEET THE SATISFACTION OF THE CITY TRAFFIC ENGINEER.
4. ALL PERMANENT TRAFFIC CONTROL DEVICES REQUIRED BY CITY TRAFFIC ENGINEER SHALL BE PROPERLY INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE MUTCD AND/OR THE RTC STANDARDS PRIOR TO ALLOWING ANY PUBLIC TRAFFIC ONTO THE STREETS, REGARDLESS OF THE STATUS OF THEIR COMPLETION.
5. FIBER OPTIC CONDUIT SCHEDULE 40 PVC IS REQUIRED ON ALL RIGHTS-OF-WAY 80 FEET AND GREATER, SIZE SHALL BE 4 INCHES, UNLESS OTHERWISE SPECIFIED. PULL BOXES AND COVERS SHALL BE MADE OF REINFORCED POLYMER CONCRETE MATERIALS AND PULL BOX COVERS SHALL BE STAMPED WITH CNLV FIBER. PULL BOXES SHALL BE OF TYPE P 30 WITH STRAIGHT BOTTOM ENTRY AND EXITS. SPACING OF PULL BOXES SHALL BE 450 FEET, MAXIMUM 500 FEET APART, IF CONSTRUCTION LIMITS ARE LESS THAN 450 FEET, AND ONE PULL BOX SHALL BE INSTALLED. ALL FIBER CONDUITS AT LIMIT OF CONSTRUCTION SHALL BE STUBBED AND CAPPED 5 FEET PAST PROPERTY LINE AND/OR CONNECTED TO EXISTING FIBER CONDUIT. ALL CONDUITS SHALL BE CLEANED, BLOWN OUT, MANDREL(ED) AND SHALL HAVE A 200 LB. PULL LINE AND A NUMBER 8 AWG THW TRACE WIRE. PULL LINE AND WIRE SHALL BE SECURED AT BOTH ENDS AND CAPPED.
6. ALL INTERSECTIONS WITH 80 FEET/80 FEET RIGHTS-OF-WAY AND GREATER SHALL BE IN ACCORDANCE WITH CLARK COUNTY UNIFORM STANDARD DRAWING 404.1306. LOCATION OF FUTURE SIGNAL POLE FOUNDATION SHALL BE TYPE L AND LOCATED CENTER OF RADIUS AS IN ACCORDANCE WITH CLARK COUNTY UNIFORM STANDARD DRAWING 404.1300 UNLESS OTHERWISE NOTED.
7. ALL DEVELOPMENT PLANS SHALL HAVE A MASTER STREET LIGHTING AND TRAFFIC CONTROL (SIGNING AND STRIPING) PLAN SHEET CONTAINED IN THE SET WHICH INCLUDES ALL UNITS AND/OR PHASES OF THE PROJECT.
8. ALL TEMPORARY REGULATORY SIGNAGE SHALL BE GROUND MOUNTED IN ACCORDANCE WITH CLARK COUNTY UNIFORM STANDARD DRAWING 249 AND MEET THE MOST RECENT MUTCD REQUIREMENTS.
9. "NO PARKING" ZONES AT CURB RETURNS, FIRE HYDRANT ZONES AND SCHOOL ZONES SHALL BE PAINTED RED TO THE LIMITS NOTED ON THE PLANS.
10. PRIVATE STREET NAME SIGNS SHALL HAVE A WHITE BACKGROUND WITH BLACK LETTERING.

REVISED: MARCH 25, 2014

GENERAL STREETLIGHT NOTES

1. STREETLIGHTS SHALL BE LIGHT EMITTING DIODE (LED) PER CITY OF NORTH LAS VEGAS STANDARDS AND SPECIFICATIONS.
2. THE LOCATIONS OF CONDUIT ENDS OF ALL CONDUIT IN STRUCTURES OR TERMINATING AT CURBS SHALL BE MARKED BY A (X) AT LEAST 3 INCHES HIGH CUT INTO THE FACE OF CURBS, GUTTER, OR WALL DIRECTLY ABOVE THE CONDUIT. ALL CONDUITS AT LIMITS OF CONSTRUCTION SHALL BE STUBBED AND CAPPED 5 FEET PAST PROPERTY LINE AND/OR CONNECTED TO EXISTING STREET LIGHTING CONDUIT.
3. ALL CONDUITS SHALL BE 2 INCHES PVC SCHEDULE 40 AND SHALL HAVE A MINIMUM OF 24 INCHES OF COVER IN ALL AREAS.
4. ALL CONDUITS FOR FUTURE USE SHALL BE BLOWN OUT WITH COMPRESSED AIR, CLEANED AND PROVIDED WITH A 200 POUND PULL LINE; ALL ENDS OF CONDUITS SHALL BE CAPPED. ALL PULL BOXES AND COVERS SHALL BE MADE OF REINFORCED POLYMER CONCRETE MATERIALS AND PULL BOX COVERS SHALL BE STAMPED WITH STREET LIGHT. ALL PULL BOXES SHALL BE # 3½, UNLESS OTHERWISE NOTED.
5. LAMP CHARACTERISTICS SHALL CONFORM IN GENERAL TO THE PROVISIONS OF THE CLARK COUNTY UNIFORM STANDARDS SPECIFICATIONS 623 L.02.03. WATTAGE SHALL BE AS SHOWN ON THE PLANS.
6. ALL SERVICE PANELS SHALL BE PER CLARK COUNTY UNIFORM STANDARD SPECIFICATION DRAWING NO. 330. THE PHOTO CELL SHALL BE A TYPE II, TORK 2007 OR EQUAL AND BE MOUNTED TO THE ON TOP OF THE NEAREST PERMANENT STREET LIGHT POLE. A SWITCH SHALL BE INCLUDED FOR MANUAL OPERATION (USS 623 L.02.06).
7. ALL CONSTRUCTION SHALL CONFORM TO UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, CITY OF NORTH LAS VEGAS, AND UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, CLARK COUNTY, NEVADA, UNLESS OTHERWISE NOTED.
8. TRAFFIC OPERATIONS (633-1264) SHALL BE NOTIFIED 24 HOURS IN ADVANCE TO SCHEDULE AN INSPECTION OF THE WIRING MAKEUP /SERVICE POINT. A COMPLETED SET OF MYLAR AS-BUILDS MUST BE SUBMITTED TO CONSTRUCTION SERVICES UPON COMPLETION OF WORK.
9. STREET LIGHTS SHALL BE PLACED IN ACCORDANCE WITH UNIFORM STANDARD DRAWING NUMBER 320 THRU 320A, UNLESS OTHERWISE NOTED. STANDARDS AND MAST ARMS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A-120.
10. STREETLIGHT SERVICE POINT LOCATIONS SHALL BE PROVIDED ON THE OFF-SITE IMPROVEMENTS PLANS AND AS-BUILT PLANS.
11. INTERNAL RESIDENTIAL STREETS AND EXTERNAL ARTERIAL, COLLECTOR STREETS SHALL HAVE SEPARATE SERVICE POINTS (RCOC / PEDESTALS), ALL SERVICES SHALL BE LIMITED TO 80 PERCENT CAPACITY.
12. AN EMPTY 2 INCHES SCHEDULE 40 PVC SHALL BE PLACE BETWEEN INTERNAL AND EXTERNAL STREET LIGHTING CIRCUIT.
13. NO STREET LIGHTING CIRCUITS SHALL CROSS ANY ARTERIAL OR COLLECTOR STREETS (EXCLUDING FEEDERS AND HOME RUNS).

REVISED: MARCH 25, 2014

GEOTECHNICAL REPORT

GEOTECHNICAL REPORT WAS PREPARED BY GEOTEK RESIDENTIAL LLC PROJECT NO.11531-LVR6 DATED NOV 27, 2013

BENCHMARK

CITY OF NORTH LAS VEGAS BENCHMARK NLV9121S6
RIVET AND 2" ROUND ALUMINUM DISK SET IN THE TOP OF CURB, LOCATED APPROX. 60 NORTH OF THE NORTHEAST NORTH BCR OF THE INTERSECTION OF BLACK OAKS STREET AND GLIDING EAGLE ROAD.

ELEVATION 666.873 METERS
2187.90 FEET

NAVD88 DATUM

PER CITY OF NORTH LAS VEGAS VERTICAL CONTROL BENCHMARK BOOK REVISED NOVEMBER 01, 2009

**NOTE: CONTRACTOR TO ADD 1.783 FEET TO ALL EXISTING APPROVED ELDORADO PLANS.

BASIS OF BEARINGS

SOUTH 88°38'19" EAST BEING THE BEARING OF THE NORTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 21, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN BY MAP OF ELDORADO R1-60 MO. 16 TM NO. 22 PHASE 1 ON FILE IN BOOK 131, PAGE 36 OF PLATS, OFFICIAL RECORDS,

QUANTITY ESTIMATE

NOTE: CONTRACTOR TO VERIFY QUANTITIES FOR BIDDING PURPOSES

SEWER-PUBLIC (341010)

DESCRIPTION	UNIT	TOTAL
8" PVC SANITARY SEWER PIPE	LF	–
4" PVC SANITARY SEWER LATERAL (PRIVATE)	LF	–
48" DIA. SANITARY SEWER MANHOLE	EA	–
CONNECT TO EXISTING	EA	–

DRAINAGE-PUBLIC (341020)

DESCRIPTION	UNIT	TOTAL
12' X 6' ARCH CULVERT	LF	865
20' X 8' ARCH CULVERT	LF	–
TRANSITION CULVERT	LF	–
48" SD MANHOLE	EA	2
24" RCP	LF	–
RIPRAP (D50=6")	CY	1
RIPRAP (D50=3')	CY	418
RIPRAP (D50=12")	CY	183
RIPRAP (D50=8")	CY	360

WATER-PUBLIC (341030)

DESCRIPTION	UNIT	TOTAL
WATER LATERAL	LF	–
IRRIGATION SLEEVES	LF	270
8" PVC WATER LINE	LF	37
12" PVC WATER LINE	LF	824
FH W/6" GV & 6" PVC LAT. UDACS PLATE NO. 40	EA	1
8" GATE VALVE	EA	1
12" GATE VALVE	EA	2
CAP & 2" B.O.	EA	2
CONNECT TO EXISTING	EA	1

CURB/GUTTER/CROSS GUTTER (35100) PUBLIC

DESCRIPTION	UNIT	TOTAL
"L" TYPE CURB AND GUTTER	LF	749
8' CONCRETE VALLEY GUTTER	SF	716
SIDEWALK UNDERDRAIN	EA	2

WALKWAYS (35150) PUBLIC

DESCRIPTION	UNIT	TOTAL
5' WIDE ATTACHED CONCRETE SIDEWALK	SF	3,745
ADA RAMP WITH ACCESSORIES	EA	2

PAVING (35200) PUBLIC

DESCRIPTION	UNIT	TOTAL
5.5" AC. PAVEMENT.	SY	3,084
TYPE II AGGREGATE BASE MATERIAL	CY	1,684
EXCAVATION	CY	46,686

STREET LIGHTS (35250) PUBLIC

DESCRIPTION	UNIT	TOTAL
150 W HPS STREETLIGHT	EA	5
2" STREET LIGHT CONDUIT	LF	824
3" FIBER OPTIC CONDUIT	LF	824
NO. 3 1/2 PULL BOX	EA	1
125 AMP SERVICE PEDESTAL	EA	–

STREET SIGNS/STRIPING (35300) PUBLIC

DESCRIPTION	UNIT	TOTAL
STREET SIGN	EA	10
STOP SIGN	EA	1
TYPE 1 CENTERLINE	LF	717
8" WIDE WHITE PAINTED LINE	LF	808

UTILITY SERVICES & PROVIDER

SEWER AND WATER - CITY OF NORTH LAS VEGAS
CABLE - COX COMMUNICATION
POWER - NEVADA ENERGY
GAS - SOUTHWEST GAS
TELEPHONE - CENTRAL TELEPHONE COMPANY D/B/A CENTURY LINK

STANDARD SPECIFICATIONS AND STANDARD DRAWINGS FOR SEWER LINE CONSTRUCTION

A. ALL SEWER LINES (WASTEWATER COLLECTION SYSTEMS) SHOWN ON THESE CONSTRUCTION DRAWINGS SHALL CONFORM TO THE STANDARDS DESCRIBED BELOW, AND IN ACCORDANCE WITH THE PRECEDENT SHOWN:
  1. "DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS, SOUTHERN NEVADA,"LATEST EDITION.
  2. "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA,"LATEST EDITION.

B. EXCEPTIONS TO THESE STANDARDS ARE NOTED BELOW:
  1. MATERIALS USED FOR WASTEWATER COLLECTION SYSTEMS SHALL BE INCLUDED IN THE CITY OF NORTH LAS VEGAS APPROVED MATERIALS LIST, LATEST EDITION, OR SPECIFICALLY IDENTIFIED AND APPROVED ON THESE PLANS.
  2. THE CITY OF NORTH LAS VEGAS TRENCH BACKFILL POLICY, DATED AUGUST 15, 1996 SHALL BE ADHERED TO FOR THIS PROJECT.
  3. THE CONTRACTOR SHALL INSCRIBE "S", 3-INCHES IN HEIGHT, INTO THE CURB AT THE POINT WHERE THE SEWER LATERAL ENTERS EACH SUBDIVISION LOT OR PRIVATE LAND PARCEL.

C. MODIFICATIONS AND CLARIFICATION TO THESE STANDARDS ARE NOTED BELOW:
  1. ALL SANITARY SEWER MANHOLE BASES FOR NEW PIPE MUST BE PRECAST PER DESIGN AND CONSTRUCTION STANDARDS FOR WASTEWATER COLLECTION SYSTEMS PLATES SD-1A, 1B AND 9.
  2. LIMITS OF ASPHALT PATCHES TO BE DETERMINED IN THE FIELD BY A CITY OF NORTH LAS VEGAS INSPECTOR. PATCHES WILL BE A MINIMUM OF TWELVE (12)-FEET, MACHINE REPLACED.
  3. THE ON-SITE SEWER LINES AND APPURTENANCES ARE PRIVATE FACILITIES NOT TO BE OPERATED OR MAINTAINED BY THE CITY OF NORTH LAS VEGAS, UNLESS OTHERWISE SPECIFIED ON CIVIL IMPROVEMENT PLANS.
  4. SEWER SERVICES AS APPROVED ON THIS PLAN, ARE INTENDED SPECIFICALLY FOR THE LOT AND USE SHOWN, AND ARE NOT INTENDED TO SERVE ADDITIONAL PARCELS OR STRUCTURES WHICH MAY BE CREATED IN THE FUTURE. IN THE EVENT THAT THE PARCELS AND/OR LOTS SHOWN ON THIS PLAN ARE FURTHER DIVIDED TO CREATE ADDITIONAL PARCELS OR LOTS, THE OWNER IS REQUIRED TO PROVIDE SEPARATE SEWER SERVICES TO EACH.
  5. SCHEDULE UTILITY INSPECTIONS ONLINE AT HTTP://CNLV-WEBINSPECTION.CITYOFNORTHLASVEGAS.COM/. UTILITY INSPECTIONS MUST BE SCHEDULED ONLINE BY 2:00 P.M. FOR INSPECTIONS TO OCCUR THE FOLLOWING NORMAL WORKING DAY (MONDAY THROUGH FRIDAY). FOR AFTER HOURS UTILITY INSPECTIONS, INCLUDING WEEKENDS, CONTACT UTILITY CUSTOMER SERVICE AT (702) 633-1277 TO SET UP AN ACCOUNT.
  6. RECORD DRAWINGS SHALL BE PREPARED, SIGNED AND SUBMITTED TO THE CITY OF NORTH LAS VEGAS PRIOR TO ACCEPTANCE OF ANY WASTEWATER COLLECTION SYSTEMS TO BE OWNED, OPERATED, OR MAINTAINED BY THE CITY OF NORTH LAS VEGAS.
  7. PIPE DETECTOR RIBBON AND LOCATOR BALLS SHALL ALSO BE REQUIRED ABOVE ALL SEWER MAINS.

D. ADJUSTING MANHOLES:
  1. WHEN ADJUSTING MANHOLES, THE CONTRACTOR SHALL INSTALLED PLYWOOD COVERS IN SANITARY SEWER MANHOLE INVERTS AS WELL AS STEEL PLATE COVERS MANHOLES (AFTER MANHOLERINGS/FRAMES ARE REMOVED) TO PREVENT DEBRIS FROM ENTERING SEWER MANHOLES AND CORRESPONDING LINES. DEBRIS IN THE MANHOLES SHALL BE REMOVED PRIOR TO PLYWOOD REMOVAL.
  2. PLYWOOD AND STEEL COVERS FOR MANHOLES SHALL BE INSTALLED AND REMOVED IN THE PRESENCE OF THE UTILITIES INSPECTOR. ALL DEBRIS DROPPED INTO THE SEWER MANHOLES AND CORRESPONDING LINES SHALL BE RETRIEVED AT THE CONTRACTOR 'S EXPENSE. THE CONTRACTOR SHALL CLEAN (E.G., JET VAC OR EQUIVALENT) THE DEBRIS OUT OF THE AFFECTED MANHOLES AND/OR SEWER LINES IN THE PRESENCE OF THE UTILITIES INSPECTOR AND APPROVED BY THE UTILITIES INSPECTOR.

REVISED: MARCH 25, 2014

GIA D. NGUYEN
No. 14918
Exp. 12/31/2015
CIVIL

DATE: 4/26/14

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP

PROJECT NO.
5523-A017
DESIGN: QN
DRAWN: QN
CHECK: GDN
PLOT DATE: 04-24-14
PLOT TIME: 17:01:41

G.C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
1555 S. RAINBOW BLVD · LAS VEGAS, NV 89146
T:702.804.2000 · F:702.804.2299 · GCWALLACE.COM
LAS VEGAS

F:\Projects\500\5523-A017\DWG\Production\Deer Springs Way\A017-C1.dwg
Quangvinh Nguyen

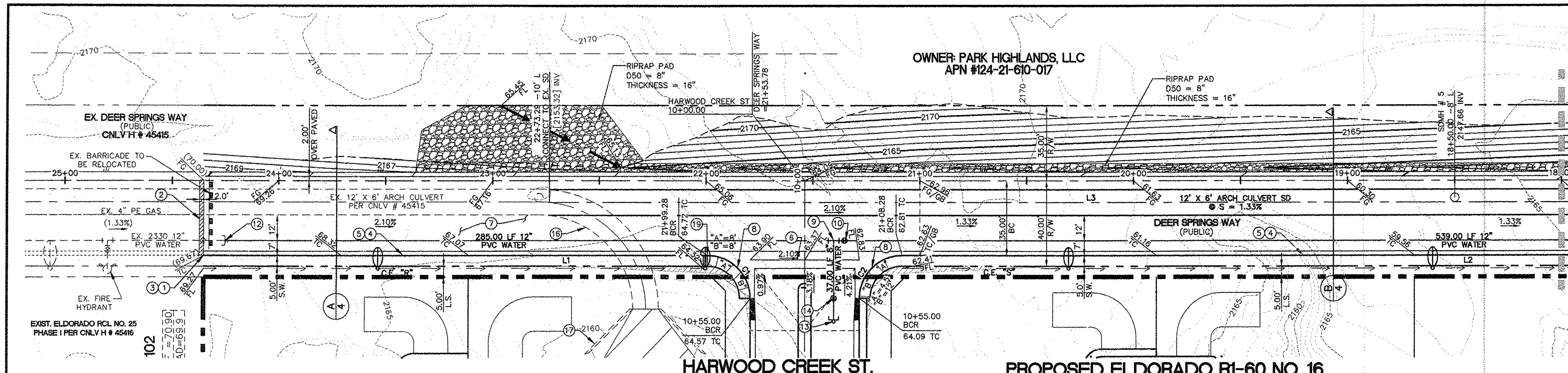
PARDEE HOMES

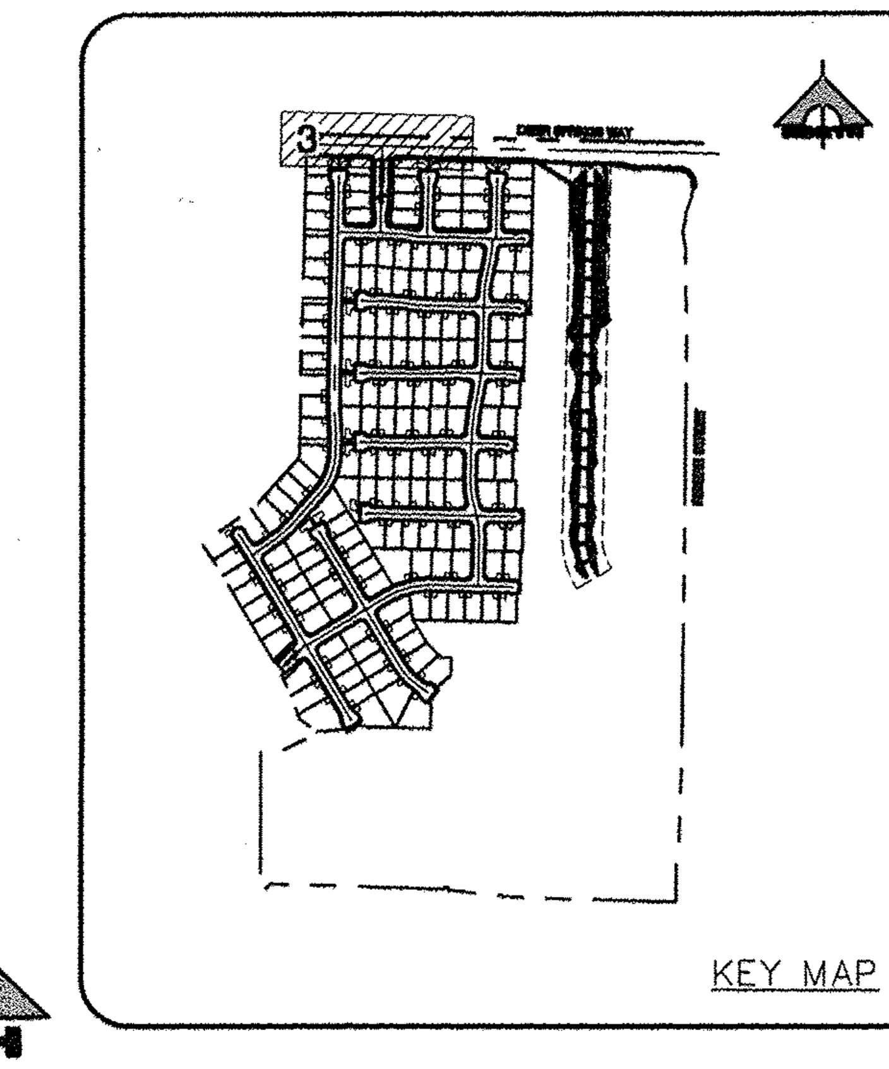
ELDORADO R1-60 NO. 16
DEER SPRINGS WAY

GENERAL NOTES AND
QUANTITIES ESTIMATE

DRAWING
2
2 OF 14 SHTS

CNLV # 47955





Line Table			
Line #	Length	Direction	Note
L1	236.00	S88° 38' 26"E	CURB & GUTTER
L2	449.80	S88° 38' 26"E	CURB & GUTTER
L3	781.04	N88° 38' 26"W	CL OF STORM DRAIN

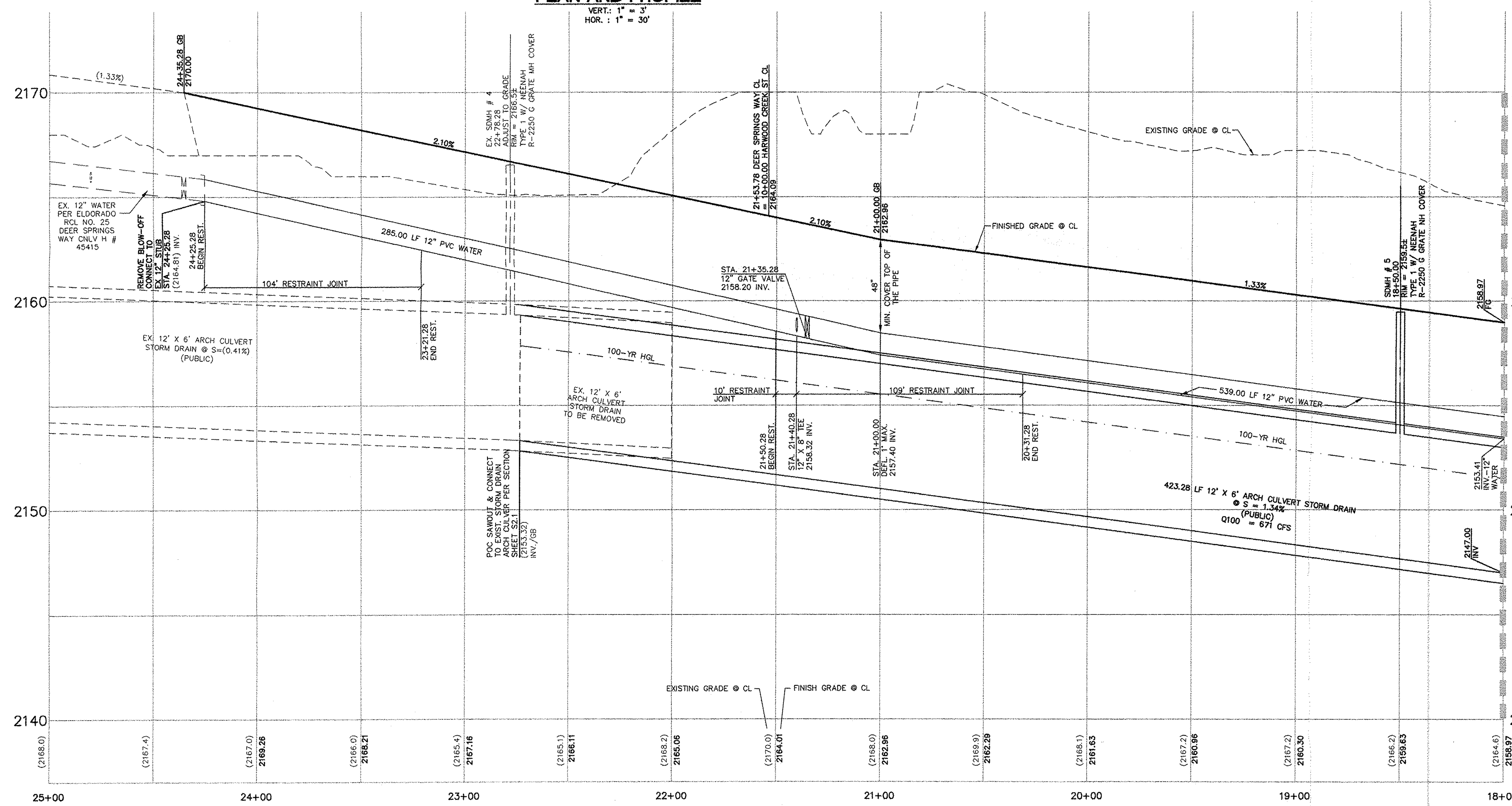
Curve Table				
Curve #	Length	Radius	Delta	Tangent
C1	31.42'	20.00'	090° 00' 00"	20.00'
C2	31.42'	20.00'	090° 00' 00"	20.00'

30' 0' 15' 30' 60'
SCALE: 1" = 30'

DEER SPRINGS WAY (PUBLIC)

PLAN AND PROFILE

VERT.: 1" = 3'
HOR.: 1" = 30'



CONSTRUCTION NOTES

1. MATCH TO EXISTING CURB. CONTRACTOR SHALL VERIFY EXISTING LOCATION & ELEV. PRIOR TO CONSTRUCTION.
2. SAWCUT AND MATCH EXISTING PAVEMENT.
3. EXISTING CURB & GUTTER AND SIDEWALK–PROTECT IN PLACE.
4. CONSTRUCT "L" TYPE CURB & GUTTER PER USDCCA NO. 216.
5. CONSTRUCT CONCRETE SIDEWALK PER USDCCA NO. 234.
6. CONSTRUCT 8' WIDE VALLEY GUTTER PER USDCCA NO. 228.
7. INSTALL 5.5" AC OVER 18.5" TYPE II BASE. SEE SOILS REPORT PREPARED BY GEOTEK FOR MORE DETAILS.
8. CONSTRUCT HANDICAP RAMP PER USDCCA NO. 235, CASE I. SEE PLAN FOR "A" AND "B" DIMENSION.
9. INSTALL 12" X 8" TEE PER UDACS PLATE NO. 31.
10. INSTALL 12" GATE VALVE PER UDACS PLATE NO. 39.
11. INSTALL FIRE HYDRANT, VALVES, TEE, & 6" WATER LINE PER UDACS PLATE NO. 40.
12. REMOVE 2" BLOW-OFF & CAP AND CONNECT TO EXIST. 12" WATER.
13. INSTALL 8" CAP & 2" BLOW-OFF PER UDACS PLATE NO. 36.
14. INSTALL 8" GATE VALVE PER UDACS PLATE NO. 39.
15. INSTALL 12" CAP & 2" BLOW-OFF PER UDACS PLATE NO. 36.
16. EXIST. ARCH CULVERT TO BE REMOVED.
17. EXIST. HEADWALL & WINGWALL TO BE REMOVED.
18. CONSTRUCT TRAPEZOIDAL CHANNEL PER DETAIL A OR B SHEET 6.
19. CONSTRUCT SIDEWALK UNDERDRAIN PER USDCCA NO. 236.

CNLV UTILITY DEPARTMENT DISCLAIMER:

A STATEMENT OF UNDERSTANDING BETWEEN THE CITY OF NORTH LAS VEGAS UTILITY DEPARTMENT (CITY) AND ANY AND ALL SUBSEQUENT USERS OF INFORMATION OBTAINED HEREFROM: THE PLANS AND SUPPORTING INFORMATION IS FURNISHED BY THE CITY, AND IS ACCEPTED/USED BY THE RECIPIENT WITH THE UNDERSTANDING THAT THE CITY MAKES NO WARRANTIES, EXPRESS OR IMPLIED, CONCERNING THE ACCURACY, COMPLETENESS, RELIABILITY, OR SUITABILITY OF SAID PLANS OR ANY SUPPORTING DATA AND FURTHER UNDERSTANDS THAT ALL USERS ARE ACTING AT THEIR OWN RISK. THE CITY SHALL BE UNDER NO LIABILITY WHATSOEVER RESULTING FROM ANY USE OF THIS INFORMATION. THIS INFORMATION SHOULD NOT BE RELIED UPON AS THE SOLE BASIS FOR EXISTING WATER AND/OR SEWER LOCATIONS. THE ENGINEER SHALL CHECK AND VERIFY ALL DIMENSIONS AND LOCATIONS OF EXISTING UTILITIES

NOTE TO CONTRACTOR

EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

BASIS OF BEARINGS

SOUTH 88°38'19" EAST BEING THE BEARING OF THE NORTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 21, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN BY MAP OF ELDORADO R1-60 MO. 16 TM NO. 22 PHASE 1 ON FILE IN BOOK 131, PAGE 36 OF PLATS, OFFICIAL RECORDS.

BENCHMARK

CITY OF NORTH LAS VEGAS BENCHMARK NLV9121S6
RIVET AND 2" ROUND ALUMINUM DISK SET IN THE TOP OF CURB, LOCATED APPROX. 60 NORTH OF THE NORTHEAST NORTH BCR OF THE INTERSECTION OF BLACK OAKS STREET AND GLIDING EAGLE ROAD.

ELEVATION 666.873 METERS
2187.90 FEET
NAVD88 DATUM
PER CITY OF NORTH LAS VEGAS VERTICAL CONTROL BENCHMARK BOOK REVISED NOVEMBER 01, 2009

**NOTE: CONTRACTOR TO ADD 1.783 FEET TO ALL EXISTING APPROVED ELDORADO PLANS.

DRAINAGE STUDY COMPLIANCE

I, GIA D. NGUYEN, HEREBY CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY ON FILE (CNLV #47525) WITH THE CITY OF NORTH LAS VEGAS.

GIA D. NGUYEN, P.E. — DATE 4/26/14
NEVADA PE #14918

ROBERT McLAUGHLIN, P.E. — DATE 5/28/14
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION

RELEASED FOR
☐ BID
☑ CONSTRUCTION

PARDEE HOMES OF NEVADA — DATE 06-04-14

PROJECT NO. 5523-A017
DESIGN: GN
DRAWN: GN
CHECK: GDN
PLOT DATE: 04-24-14
PLOT TIME: 16:21:29

G.C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
1555 S. RAINBOW BLVD • LAS VEGAS, NV 89146
T:702.804.2000 • F:702.804.2299 • GCWALLACE.COM

LAS VEGAS

F:\Projects\500\5523-A017\DWG\Production\Deer Springs Way\A017-PP.dwg
Quangvinh Nguyen

PARDEE HOMES

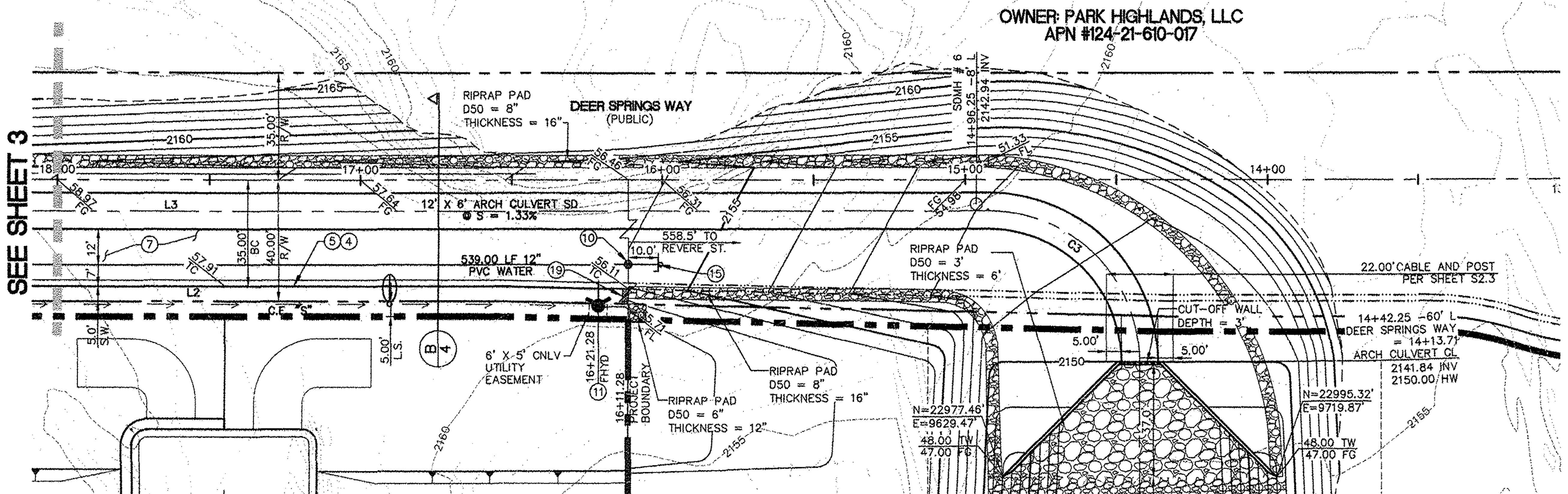
ELDORADO R1-60 NO. 16
DEER SPRINGS WAY

DEER SPRINGS WAY
STA. 18+00.00 TO STA. 25+00.00
PLAN AND PROFILE

REV | DATE | DESCRIPTION | DATE | AGEN APP | DATE | GCW APP | DATE

DRAWING
3
3 OF 14 SHTS

CNLV # 47955



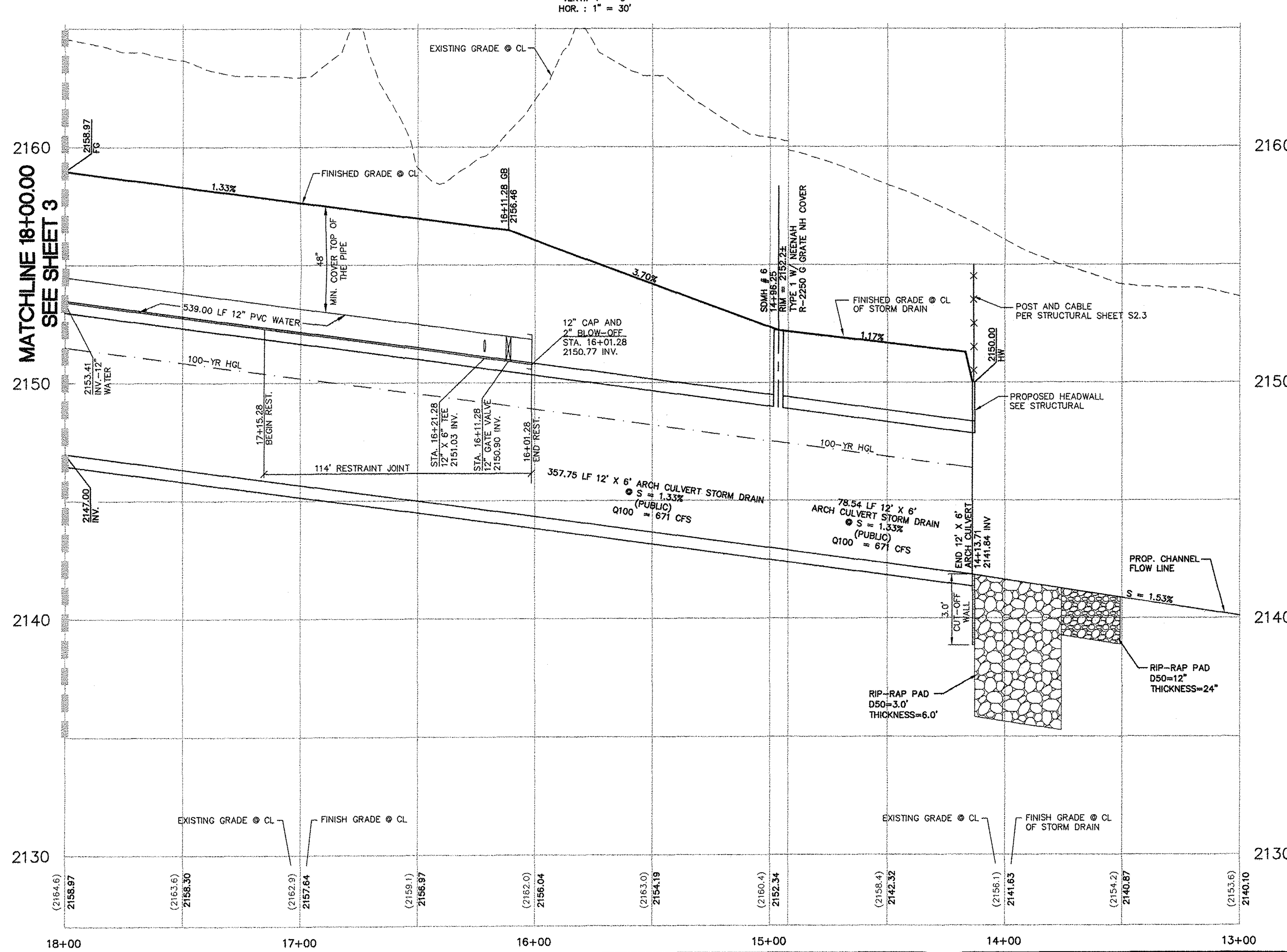
PROPOSED ELDORADO R1-60 NO. 16 PHASE 1 PER CNLV H #

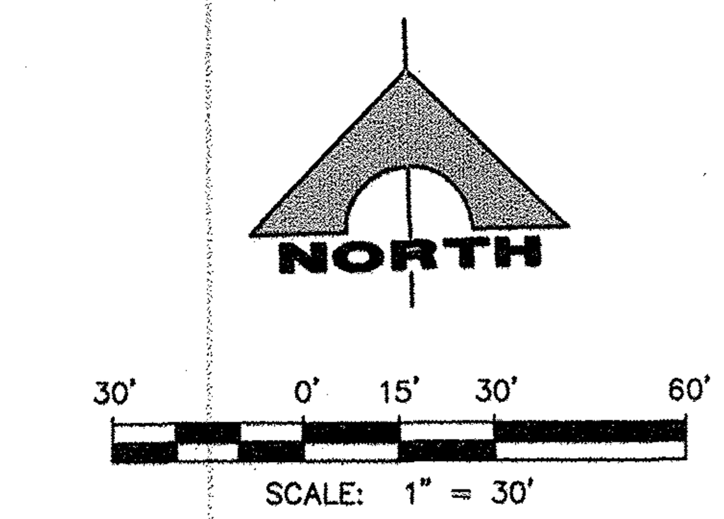
DEER SPRINGS WAY (PUBLIC)

MATCHLINE - SEE SHEET 5

PLAN AND PROFILE

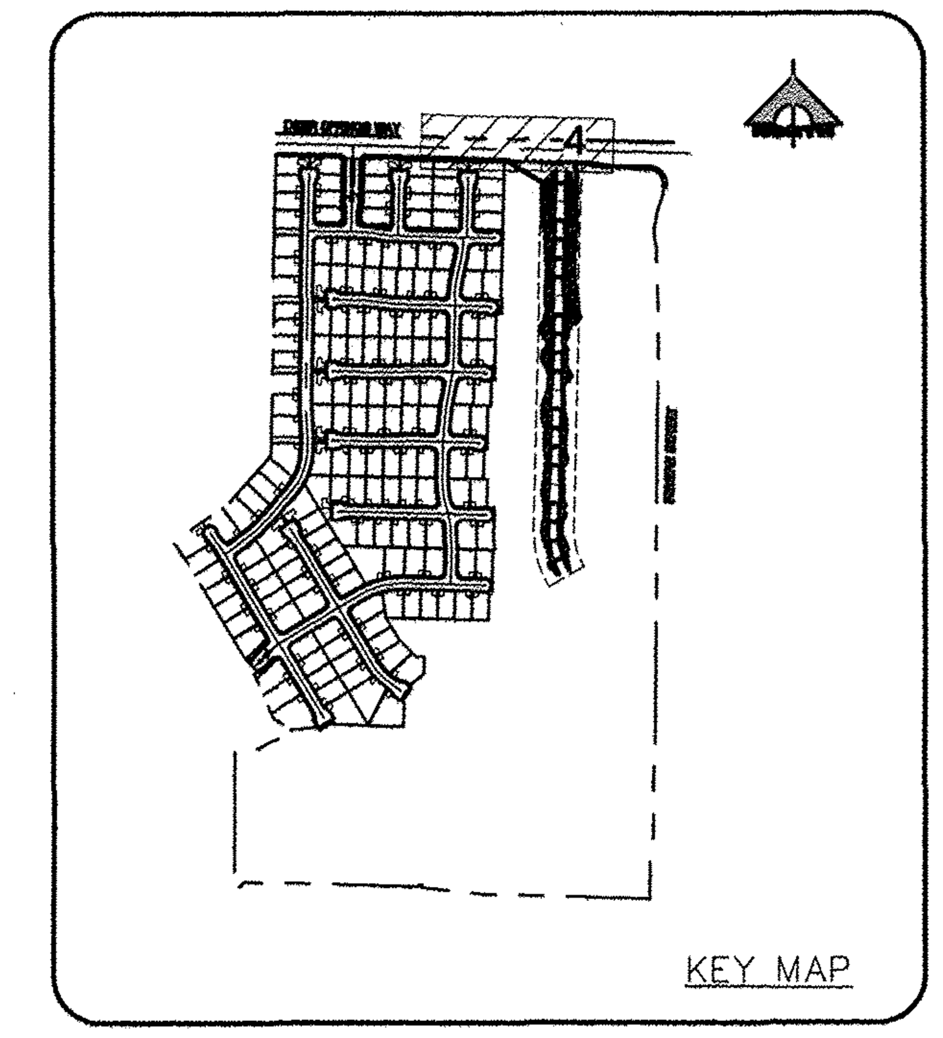
VERT.: 1" = 3'
HOR.: 1" = 30'





Line Table			
Line #	Length	Direction	Note
L2	449.80	S88° 38' 26"E	CURB & GUTTER
L3	781.04	N88° 38' 26"W	CL OF STORM DRAIN

Curve Table				
Curve #	Length	Radius	Delta	Tangent
C3	78.29'	50.00'	089° 42' 49"	49.75'



KEY MAP

CONSTRUCTION NOTES

1. MATCH TO EXISTING CURB. CONTRACTOR SHALL VERIFY EXISTING LOCATION & ELEV. PRIOR TO CONSTRUCTION.
2. SAWCUT AND MATCH EXISTING PAVEMENT.
3. EXISTING CURB & GUTTER AND SIDEWALK-PROTECT IN PLACE.
4. CONSTRUCT "L" TYPE CURB & GUTTER PER USDCCA NO. 216.
5. CONSTRUCT CONCRETE SIDEWALK PER USDCCA NO. 234.
6. CONSTRUCT 8' WIDE VALLEY GUTTER PER USDCCA NO. 228.
7. INSTALL 5.5" AC OVER 18.5" TYPE II BASE. SEE SOILS REPORT PREPARED BY GEOTEK FOR MORE DETAILS.
8. CONSTRUCT HANDICAP RAMP PER USDCCA NO. 235, CASE I. SEE PLAN FOR "A" AND "B" DIMENSION.
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10. INSTALL 12" GATE VALVE PER UDACS PLATE NO. 39.
11. INSTALL FIRE HYDRANT, VALVES, TEE, & 6" WATER LINE PER UDACS PLATE NO. 40.
12. REMOVE 2" BLOW-OFF & CAP AND CONNECT TO EXIST. 12" WATER.
13. INSTALL 8" CAP & 2" BLOW-OFF PER UDACS PLATE NO. 36.
14. INSTALL 8" GATE VALVE PER UDACS PLATE NO. 39.
15. INSTALL 12" CAP & 2" BLOW-OFF PER UDACS PLATE NO. 36.
16. EXIST. ARCH CULVERT TO BE REMOVED.
17. EXIST. HEADWALL & WINGWALL TO BE REMOVED.
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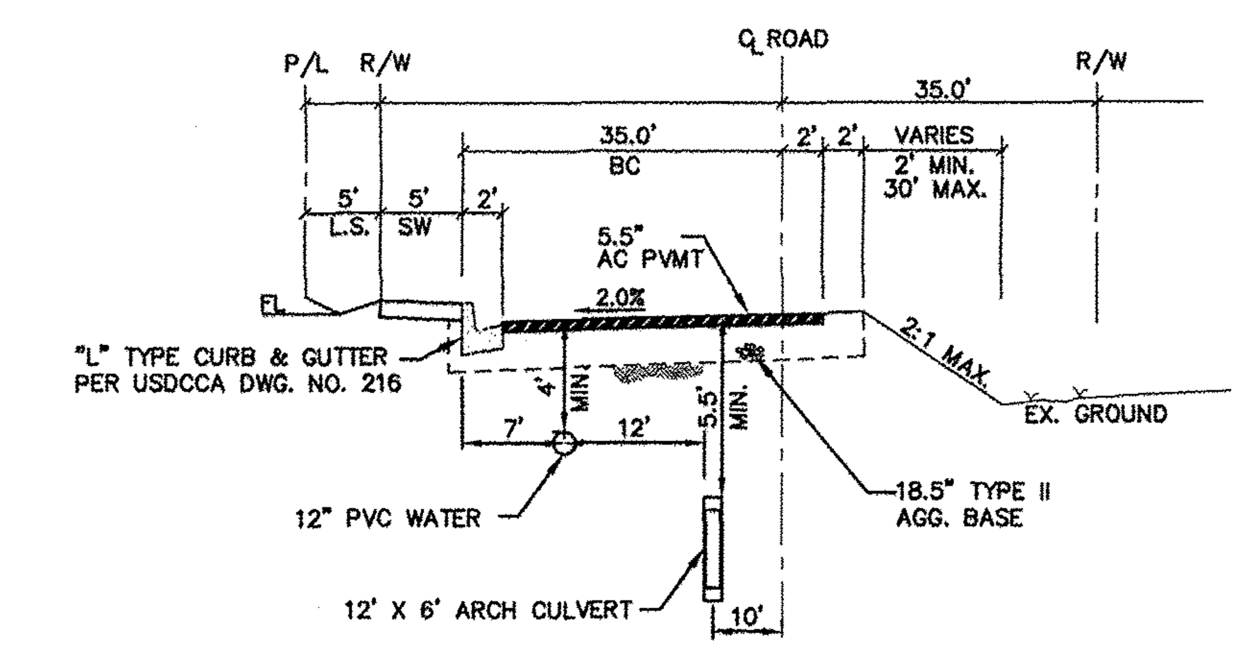
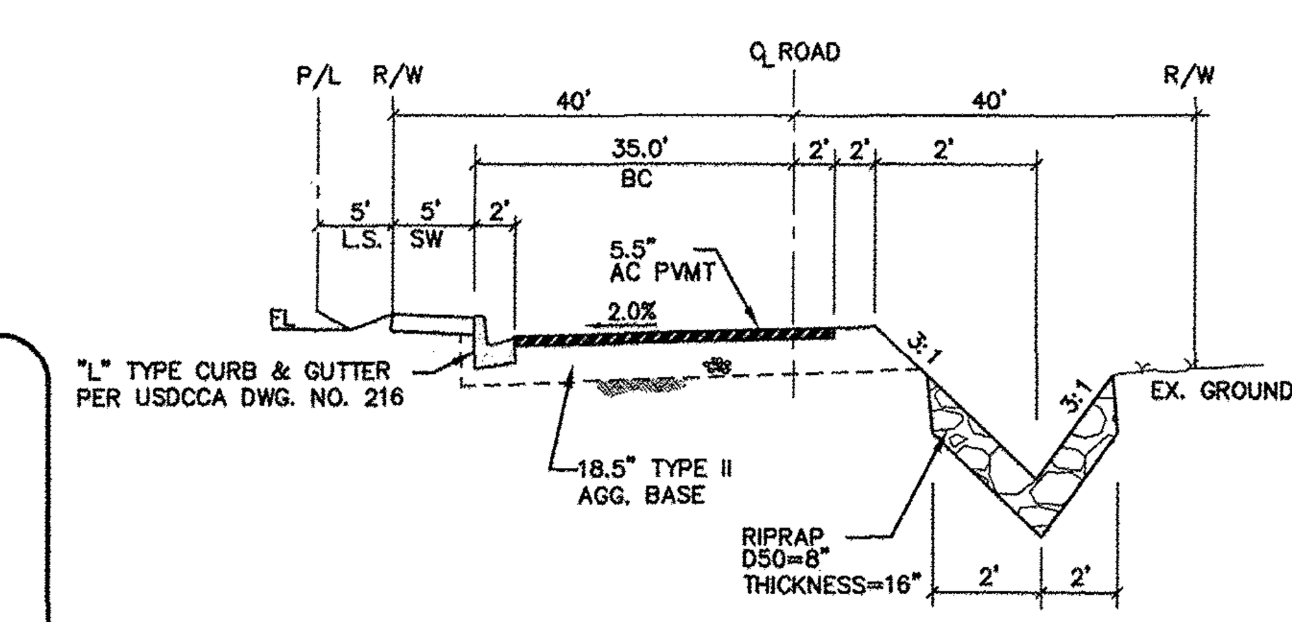


40' - HALF STREET DEER SPRINGS WAY (PUBLIC) (A)

SCALE: NTS



40' - HALF STREET DEER SPRINGS WAY (PUBLIC) WITH RIPRAP (B)

SCALE: NTS

CNLV UTILITY DEPARTMENT DISCLAIMER:

A STATEMENT OF UNDERSTANDING BETWEEN THE CITY OF NORTH LAS VEGAS UTILITY DEPARTMENT (CITY) AND ANY AND ALL SUBSEQUENT USERS OF INFORMATION OBTAINED HEREFROM: THE PLANS AND SUPPORTING INFORMATION IS FURNISHED BY THE CITY, AND IS ACCEPTED/USED BY THE RECIPIENT WITH THE UNDERSTANDING THAT THE CITY MAKES NO WARRANTIES, EXPRESS OR IMPLIED, CONCERNING THE ACCURACY, COMPLETENESS, RELIABILITY, OR SUITABILITY OF SAID PLANS OR ANY SUPPORTING DATA AND FURTHER UNDERSTANDS THAT ALL USERS ARE ACTING AT THEIR OWN RISK. THE CITY SHALL BE UNDER NO LIABILITY WHATSOEVER RESULTING FROM ANY USE OF THIS INFORMATION. THIS INFORMATION SHOULD NOT BE RELIED UPON AS THE SOLE BASIS FOR EXISTING WATER AND/OR SEWER LOCATIONS. THE ENGINEER SHALL CHECK AND VERIFY ALL DIMENSIONS AND LOCATIONS OF EXISTING UTILITIES

DRAINAGE STUDY COMPLIANCE

I, GIA D. NGUYEN, HEREBY CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY ON FILE (CNLV #47525) WITH THE CITY OF NORTH LAS VEGAS.

GIA D. NGUYEN, P.E. — 4/25/14 DATE
NEVADA PE #14918

BASIS OF BEARINGS

SOUTH 88°38'19" EAST BEING THE BEARING OF THE NORTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 21, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN BY MAP OF ELDORADO R1-60 MO. 16 TM NO. 22 PHASE 1 ON FILE IN BOOK 131, PAGE 36 OF PLATS, OFFICIAL RECORDS,

BENCHMARK

CITY OF NORTH LAS VEGAS BENCHMARK NLV9121S6
RIVET AND 2" ROUND ALUMINUM DISK SET IN THE TOP OF CURB, LOCATED APPROX. 60 NORTH OF THE NORTHEAST NORTH BCR OF THE INTERSECTION OF BLACK OAKS STREET AND GLIDING EAGLE ROAD.

ELEVATION 666.873 METERS
2187.90 FEET

NAVD88 DATUM

PER CITY OF NORTH LAS VEGAS VERTICAL CONTROL BENCHMARK BOOK REVISED NOVEMBER 01, 2009

**NOTE: CONTRACTOR TO ADD 1.783 FEET TO ALL EXISTING APPROVED ELDORADO PLANS.

NOTE TO CONTRACTOR

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ROBERT McLAUGHLIN, P.E. — 5/28/14 DATE
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION

RELEASED FOR ☐ BID ☑ CONSTRUCTION

PARDEE HOMES OF NEVADA — 06.04.14 DATE

GIA D. NGUYEN — STATE OF NEVADA — No. 14918 — PROFESSIONAL ENGINEER — 4/25/14

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP	DATE

PROJECT NO. 5523-A017
DESIGN: GN
DRAWN: GN
CHECK: GDN
PLOT DATE: 04-24-14
PLOT TIME: 16:22:07

G.C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
1555 S. RAINBOW BLVD. · LAS VEGAS, NV 89146
T: 702.804.2000 · F: 702.804.2299 · GCWALLACE.COM

LAS VEGAS

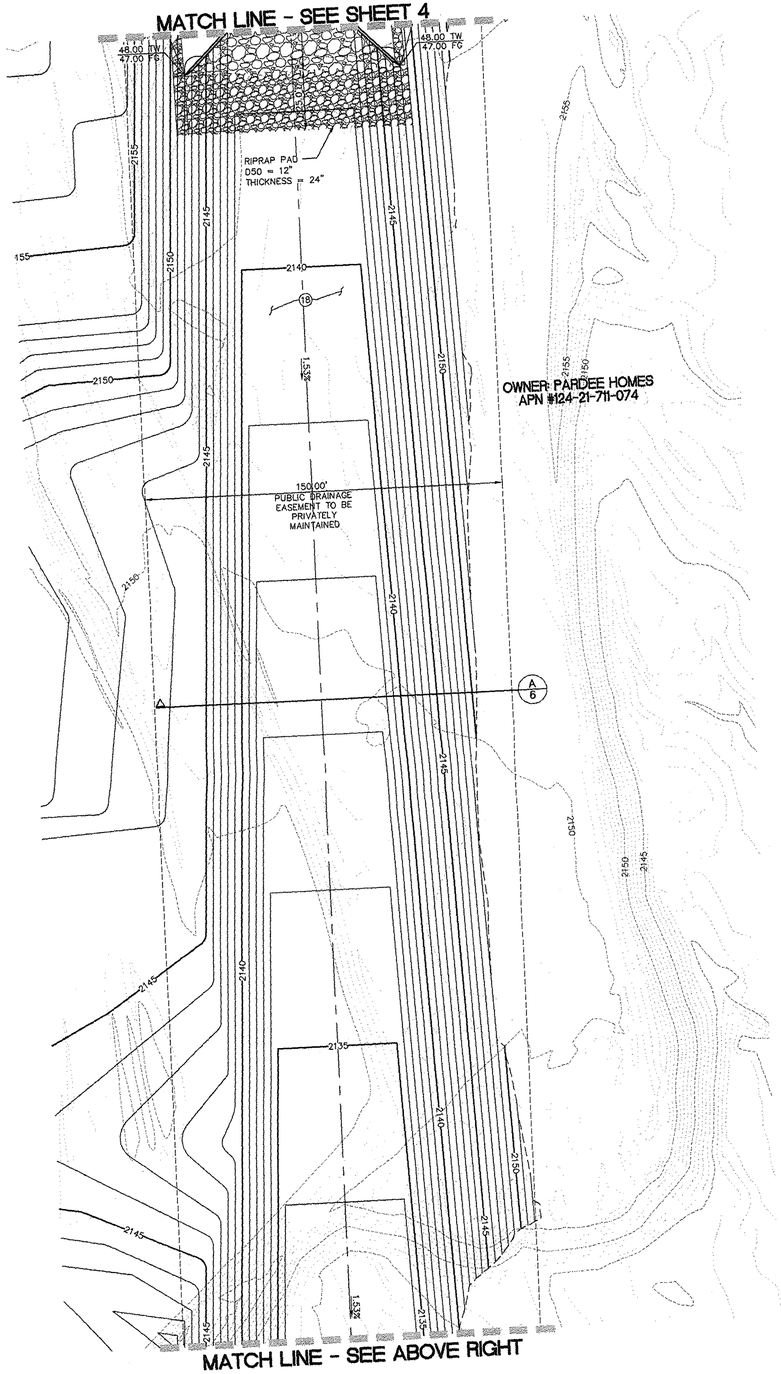
PARDEE HOMES

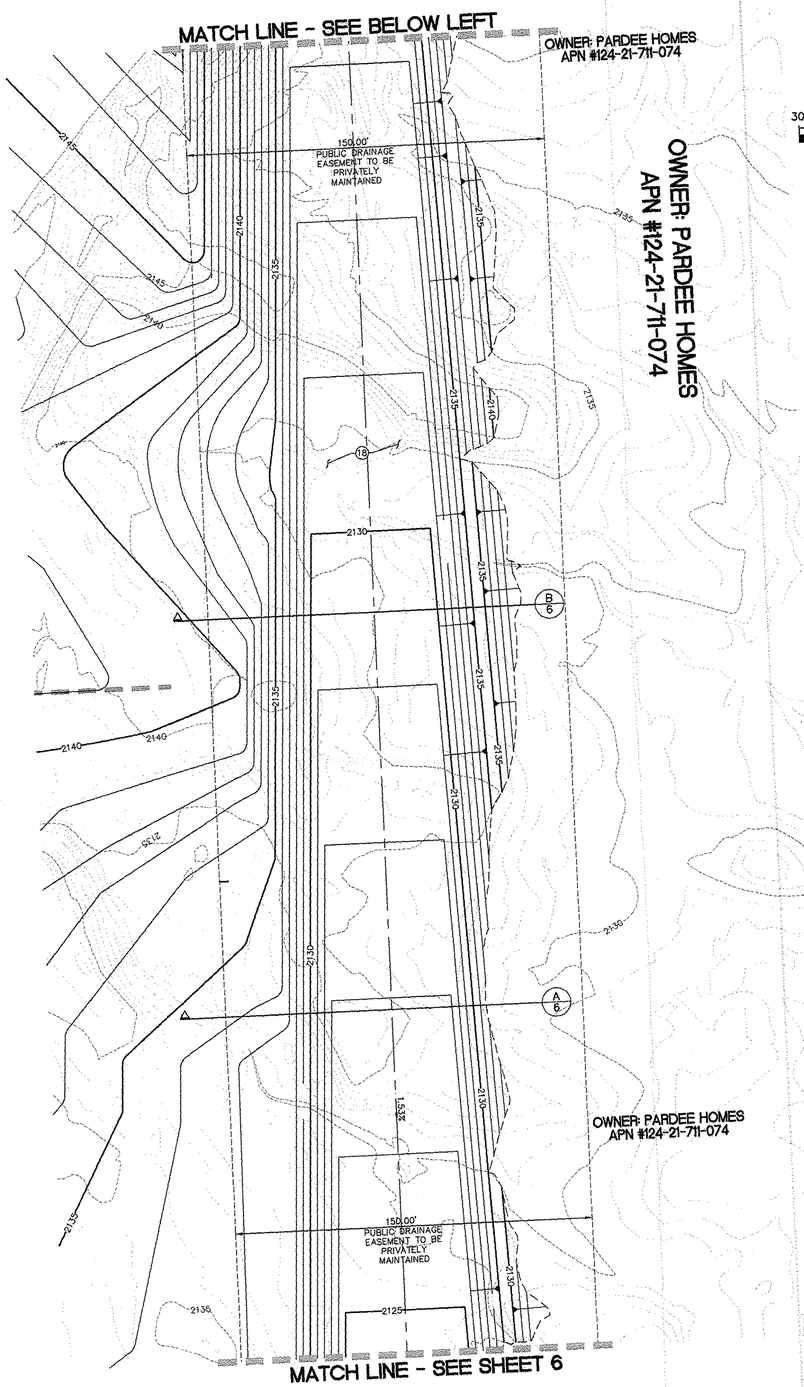
ELDORADO R1-60 NO. 16
DEER SPRINGS WAY

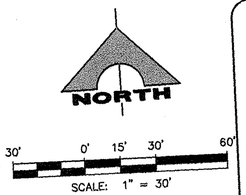
DEER SPRINGS WAY
STA 13+00.00 TO STA 18+00.00
PLAN AND PROFILE

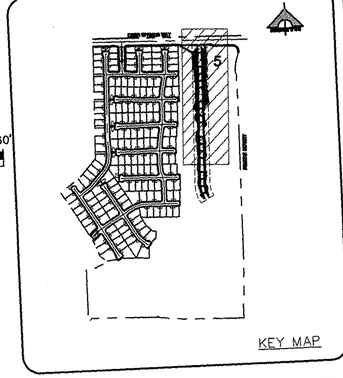
DRAWING 4
4 OF 14 SHTS

CNLV # 47955









CONSTRUCTION NOTES

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18. CONSTRUCT TRAPEZOIDAL CHANNEL PER DETAIL A OR B SHEET 6.
19. CONSTRUCT SIDEWALK UNDERDRAIN PER USDCCA NO. 236.

STORMWATER MANAGEMENT NOTES

1. STANDARD NOTE NO. 1: THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL EACH DAY REMOVE ALL SEDIMENT, MUD, CONSTRUCTION DEBRIS, OR OTHER POTENTIAL POLLUTANTS THAT MAY HAVE BEEN DISCHARGED TO, OR ACCUMULATED IN, THE PUBLIC RIGHTS OF WAY OF THE CLARK COUNTY AS A RESULT OF CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS SITE DEVELOPMENT OR CONSTRUCTION PROJECT. SUCH MATERIALS SHALL BE PREVENTED FROM ENTERING THE STORM SEWER SYSTEM.
2. STANDARD NOTE NO. 2: ADDITIONAL CONSTRUCTION SITE DISCHARGE BEST MANAGEMENT PRACTICES MAY BE REQUIRED OF THE OWNER AND HIS OR HER AGENTS DUE TO UNFORESEEN EROSION PROBLEMS OR IF THE SUBMITTED PLAN DOES NOT MEET THE PERFORMANCE STANDARDS SPECIFIED IN THE TITLE 24.40 AND THE LAS VEGAS VALLEY CONSTRUCTION SITE BMP GUIDANCE MANUAL.
3. STANDARD NOTE NO. 3: TEMPORARY OR PERMANENT STABILIZATION PRACTICES WILL BE INSTALLED ON DISTURBED AREAS AS SOON AS PRACTICABLE AND NO LATER THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY OR PERMANENTLY CEASED. SOME EXCEPTIONS MAY APPLY. REFER TO THE NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR 100000, SECTION III.A.5.
4. STANDARD NOTE NO. 4: AT A MINIMUM, THE CONTRACTOR OR HIS AGENT SHALL INSPECT ALL DISTURBED AREAS, AREAS USED FOR STORAGE OF MATERIALS AND EQUIPMENT THAT ARE EXPOSED TO PRECIPITATION, VEHICLE ENTRANCE AND EXIT LOCATIONS AND ALL BMPS WEEKLY, AND WITHIN 24 HOURS AFTER ANY RAIN EVENT OF 0.5 INCHES OR MORE. THE CONTRACTOR OR HIS AGENT SHALL UPDATE OR MODIFY THE STORMWATER POLLUTION PREVENTION PLAN AS NECESSARY. SOME EXCEPTIONS TO WEEKLY INSPECTIONS MAY APPLY, SUCH AS SUSPENSION OF LAND DISTURBANCE ACTIVITIES. REFER TO NEVADA STORMWATER GENERAL PERMIT FOR CONSTRUCTION ACTIVITY NVR 100000, SECTION III.A.12.
5. STANDARD NOTE NO. 5: ACCUMULATED SEDIMENT IN BMPS SHALL BE REMOVED WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT OR PRIOR TO THE NEXT ANTICIPATED STORM EVENT, WHICHEVER IS EARLIER. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

NOTE

1. SOILS REPORT PREPARED BY GEOTEK RESIDENTIAL, LLC ON NOVEMBER 27, 2013 – GEOTEK RESIDENTIAL LLC PROJECT NO.11531–LVR6
2. CONSTRUCTION FOR BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE BUILDING SAFETY AND MAINTENANCE DEPARTMENT
3. WALLS CONSTRUCTED OTHER THAN THOSE AS DETAILED ON THIS SHEET ARE TO BE CONSTRUCTED BY WALL SUB–CONTRACTOR. DETAILS AND STRUCTURAL CALCS AS PREPARED BY OTHERS.
4. BLOCK END WALLS FOR ESTIMATING PURPOSES ONLY. ACTUAL LENGTHS TO BE DETERMINED IN FIELD
5. NO OBJECT OVER 24" OTHER THAN TRAFFIC CONTROL DEVICES AND STREET LIGHT POLES CAN BE CONSTRUCTED OR INSTALLED WITHIN THE SIGHT VISIBILITY ZONE.
6. ALL PRIVATE STREETS ARE TO BE DEDICATED AS PUBLIC DRAINAGE EASEMENT AND PUBLIC UTILITY EASEMENT TO BE PRIVATELY MAINTAINED.
7. REBAR IS REQUIRED AROUND ALL PULL BOXES, VAULTS AND OTHER APPURTENANCES AS REQUIRED BY THE CONSTRUCTION SERVICES INSPECTOR.

Robert C. McLaughlin 5/28/14
ROBERT McLAUGHLIN, P.E. DATE
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION

DRAINAGE STUDY COMPLIANCE

I, GIA D. NGUYEN, HEREBY CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY ON FILE (CNLV #47525) WITH THE CITY OF NORTH LAS VEGAS.

Gia D. Nguyen 4/25/14
GIA D. NGUYEN, P.E. DATE
NEVADA PE #14918

RELEASED FOR ☐ BID ☑ CONSTRUCTION

06-04-14
PARDEE HOMES OF NEVADA DATE

BENCHMARK

CITY OF NORTH LAS VEGAS BENCHMARK NLV912156
RIVET AND 2" ROUND ALUMINUM DISK SET IN THE TOP OF CURB, LOCATED APPROX. 60 NORTH OF THE NORTHEAST NORTH BCR OF THE INTERSECTION OF BLACK OAKS STREET AND GLIDING EAGLE ROAD.

ELEVATION 666.873 METERS
2187.90 FEET

NAVD88 DATUM
PER CITY OF NORTH LAS VEGAS VERTICAL CONTROL BENCHMARK BOOK REVISED NOVEMBER 01, 2009

**NOTE: CONTRACTOR TO ADD 1.783 FEET TO ALL EXISTING APPROVED ELDORADO PLANS.

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FEMA FLOOD ZONE DESIGNATION

THIS PROJECT IS LOCATED WITHIN A FEMA DESIGNATED FLOOD ZONE A PER FIRM PANEL 32003C1756F DATED NOVEMBER 16, 2011, AND FIRM PANEL 32003C1768F DATED NOVEMBER 16, 2011.

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STATE OF NEVADA — GIA D. NGUYEN — No. 14918 — PROFESSIONAL ENGINEER — DATE: 12/31/2015

REV	DATE	DESCRIPTION
	DATE	AGEN. APP
	DATE	GCW APP
	DATE: 4/25/14	

PROJECT NO. 5523-A017
DESIGN: QN
DRAWN: QN
CHECK: GDN
PLOT DATE: 04-24-14
PLOT TIME: 16:23:05

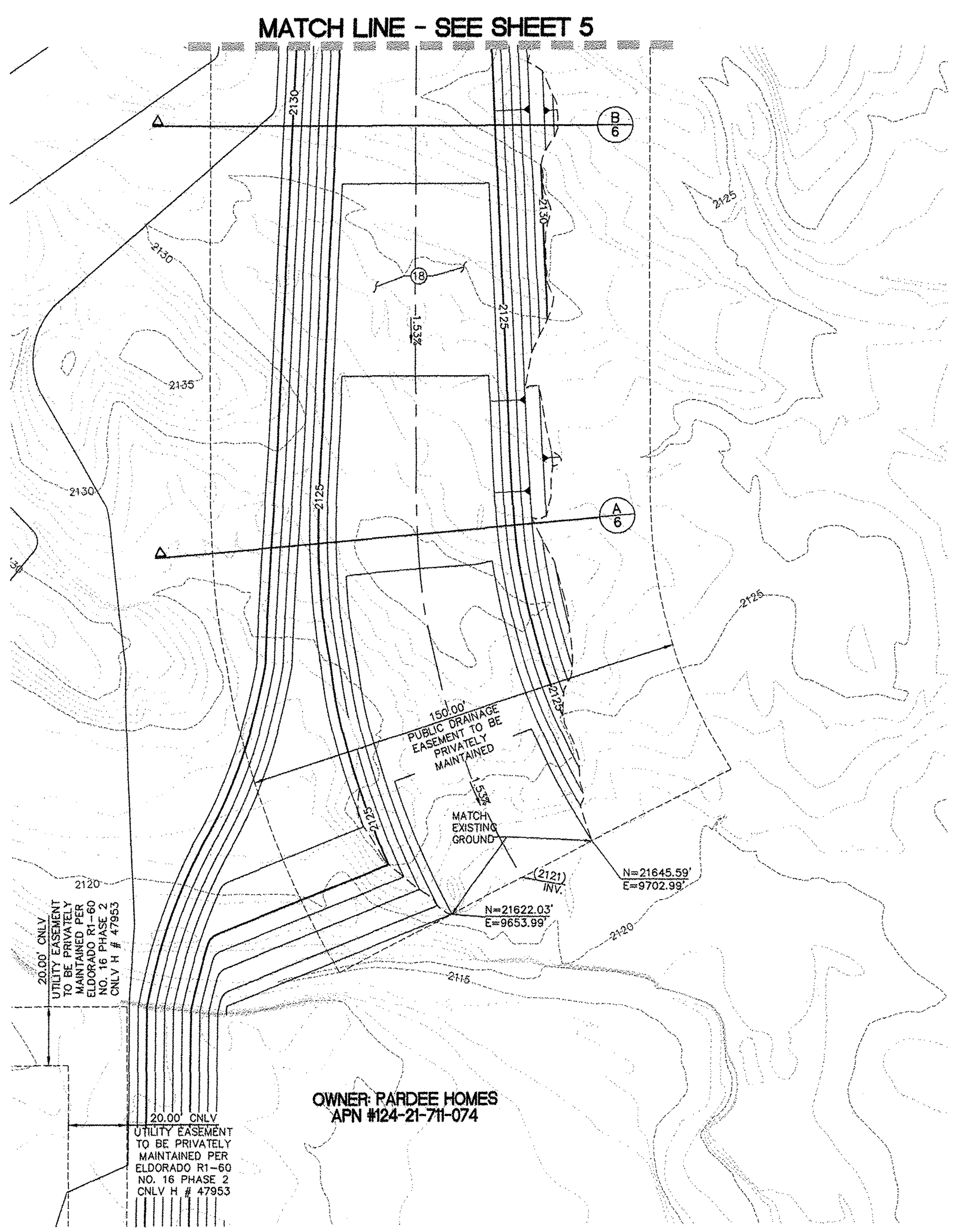
G.C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
1555 S. RAINBOW BLVD. LAS VEGAS NV 89146
T: 702.804.2000 F: 702.804.2299 GCWALLACE.COM
LAS VEGAS

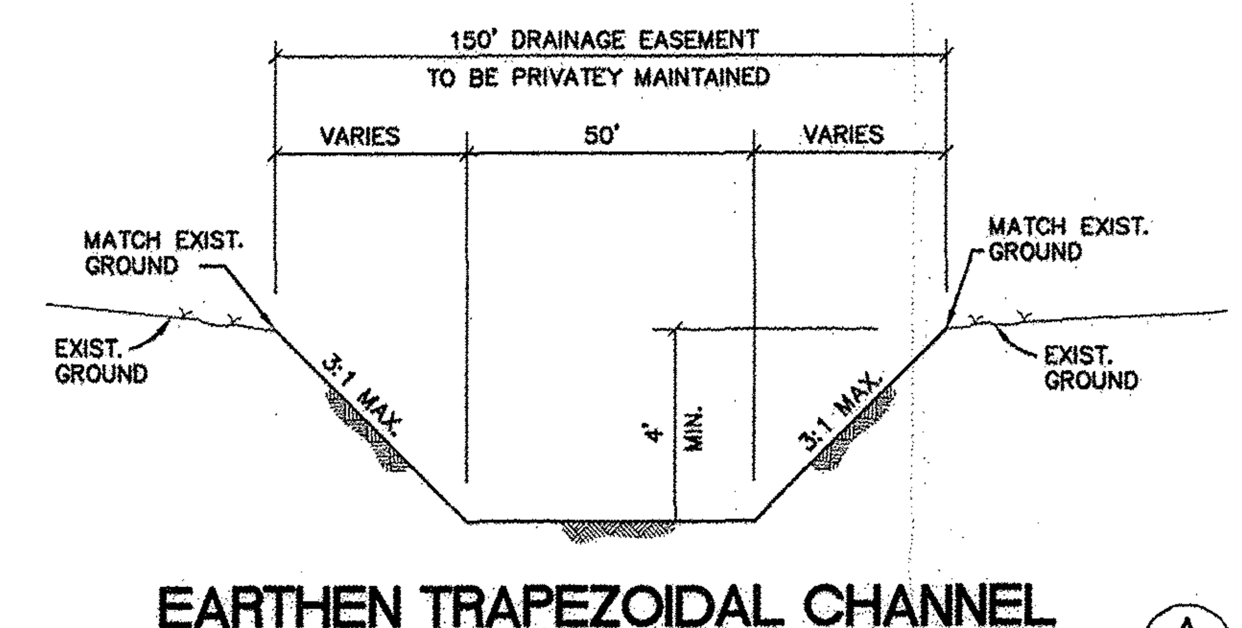
F:\Projects\5523-A017\DWG\Production\Deer Springs Way\A017-GD.dwg
Quangvinh Nguyen

PARDEE HOMES
ELDORADO R1-60 NO. 16
DEER SPRINGS WAY
GRADING PLAN 1

DRAWING 5
5 OF 14 SHTS

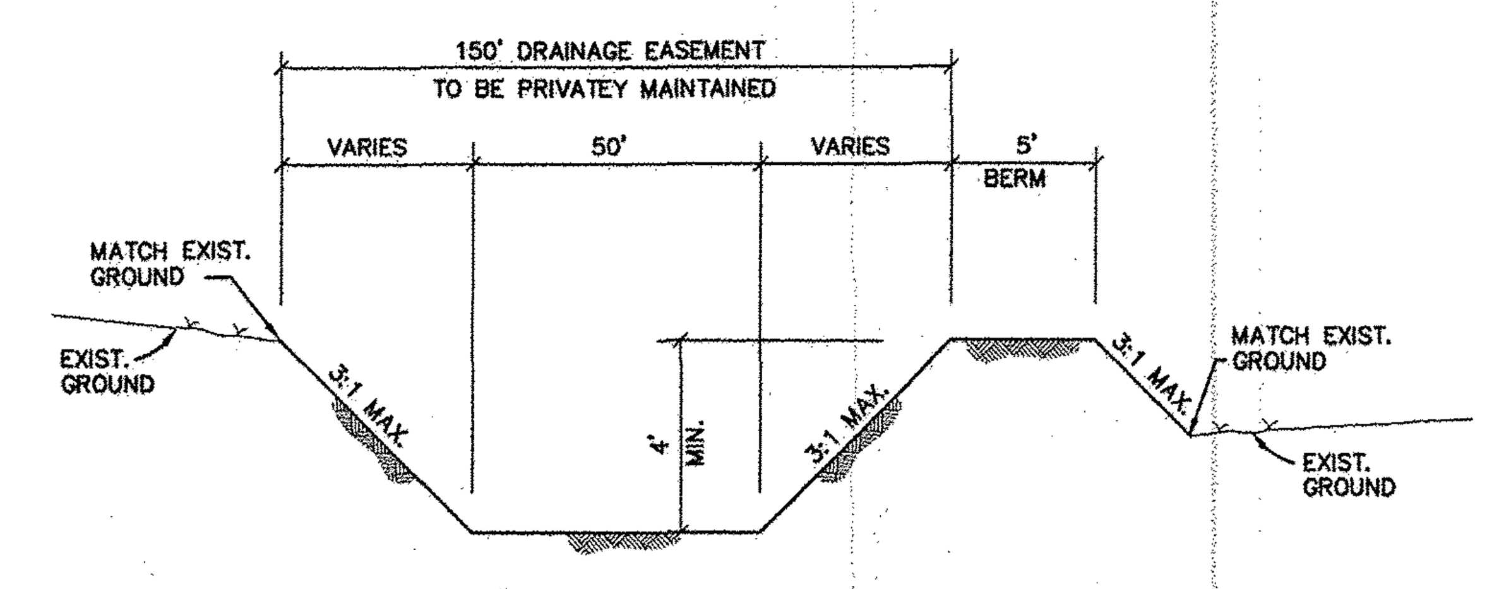
CNLV # 47955





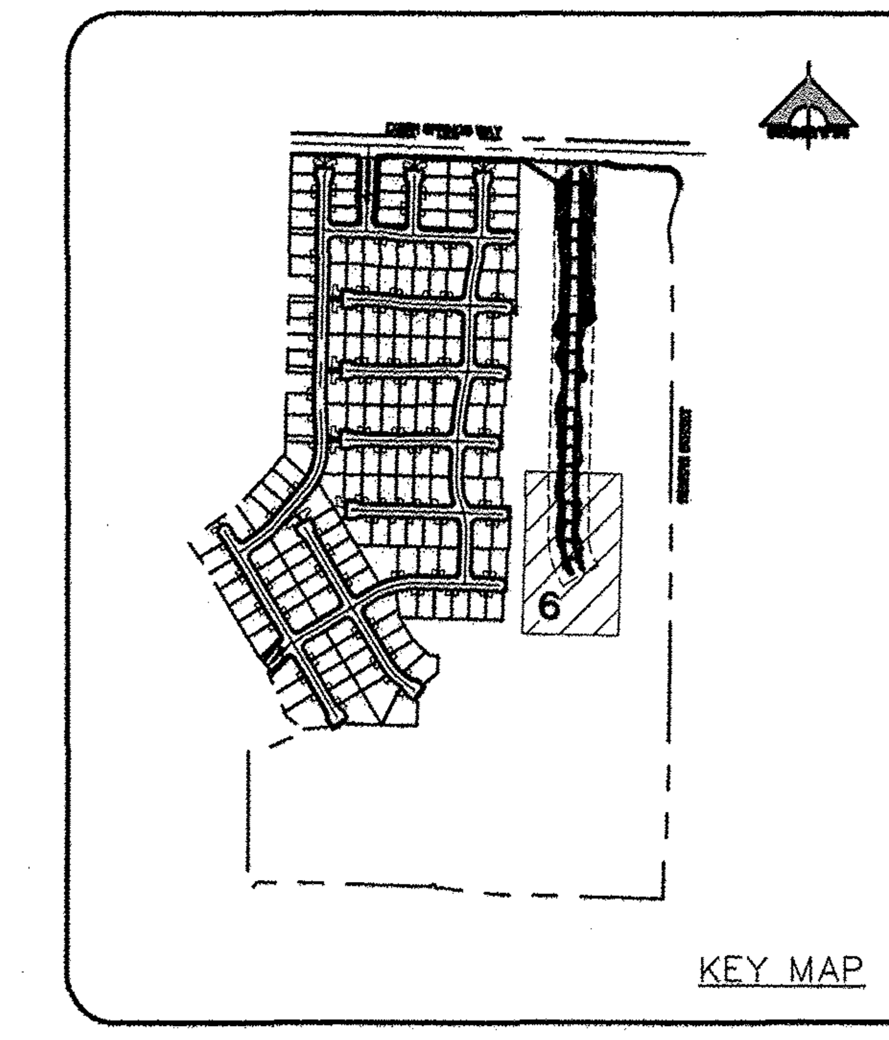
EARTHEN TRAPEZOIDAL CHANNEL (A)

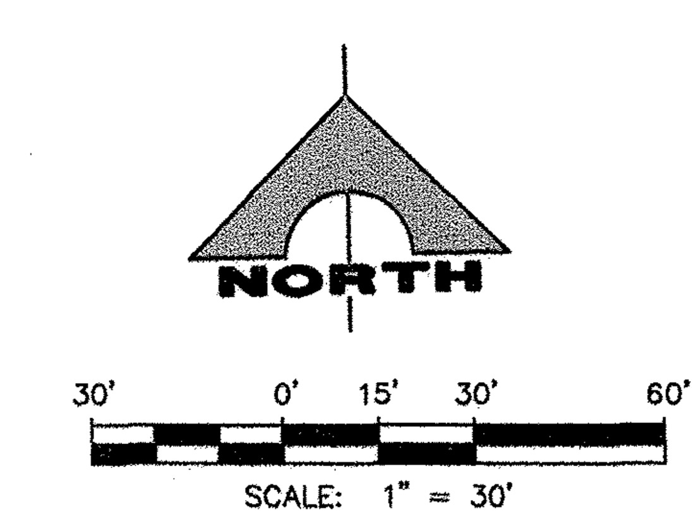
SCALE: NTS



EARTHEN TRAPEZOIDAL CHANNEL (B)

SCALE: NTS





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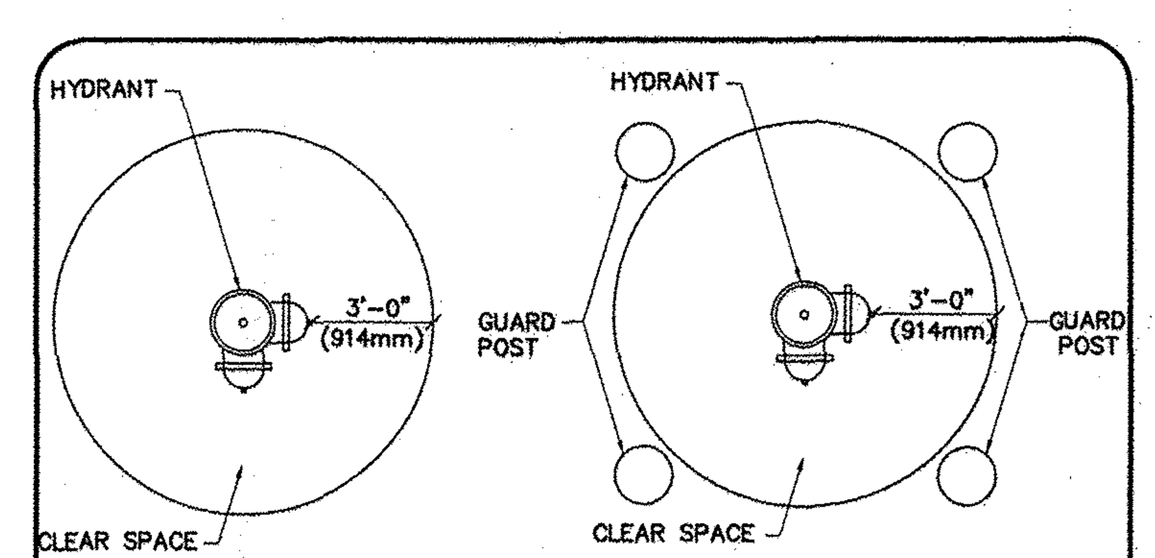
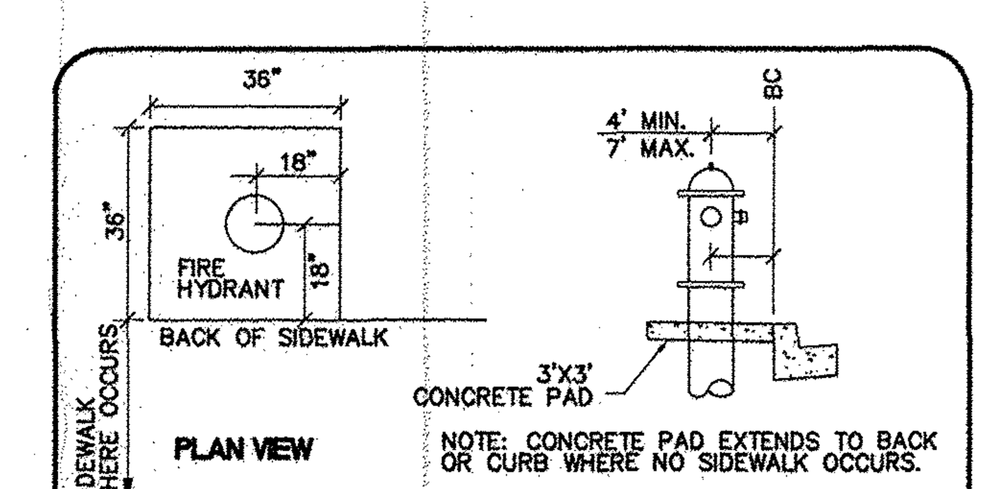


FIGURE 508.5.5
HYDRANT CLEARANCE

FIGURE 508.5.6
HYDRANT IMPACT PROTECTION



FIRE HYDRANT LOCATION DETAIL

SCALE: NOT TO SCALE

ROBERT McLAUGHLIN, P.E. 5/28/14
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION DATE

RELEASED FOR
☐ BID
☑ CONSTRUCTION

PARDEE HOMES OF NEVADA 06.04.14
DATE

BENCHMARK

CITY OF NORTH LAS VEGAS BENCHMARK NLV9121S6
RIVET AND 2" ROUND ALUMINUM DISK SET IN THE TOP OF CURB, LOCATED APPROX. 60 NORTH OF THE NORTHEAST NORTH BCR OF THE INTERSECTION OF BLACK OAKS STREET AND GLIDING EAGLE ROAD.

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GIA D. NGUYEN, P.E. 4/25/14
NEVADA PE #14918 DATE

PROFESSIONAL ENGINEER, STATE OF NEVADA — GIA D. NGUYEN, CIVIL, No. 14918

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP	DATE

PROJECT NO. **5523-A017**
DESIGN: QN
DRAWN: QN
CHECK: GDN
PLOT DATE: 04-24-14
PLOT TIME: 16:23:23

G.C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
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LAS VEGAS

F:\Projects\500\5523-A017\DWG\Production\Deer Springs Way\A017-GD.dwg
Quangvinh Nguyen

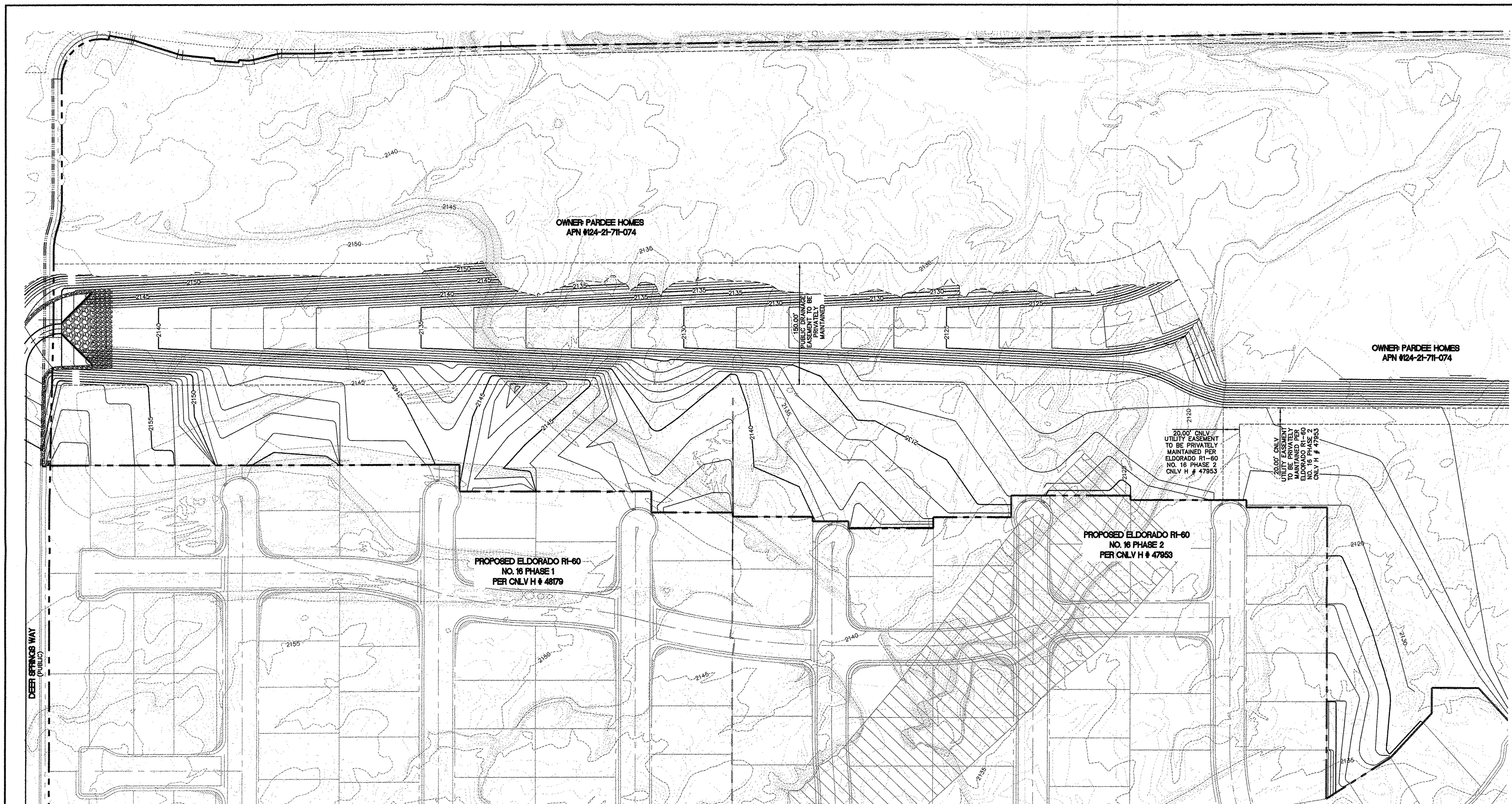
PARDEE HOMES

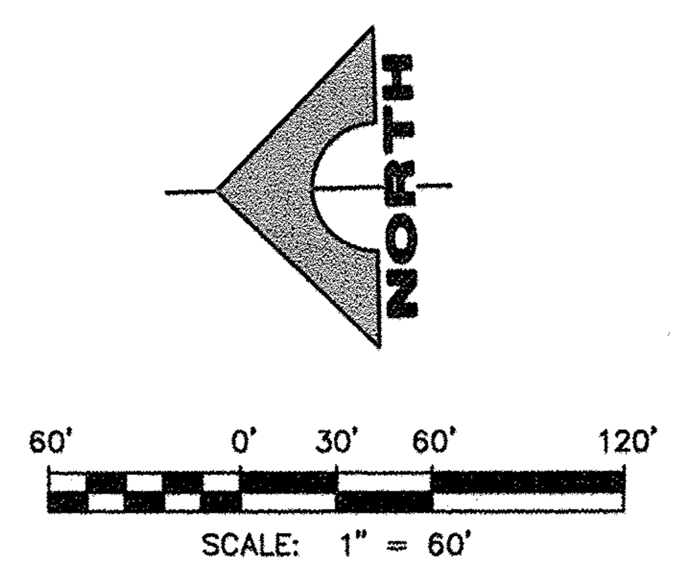
ELDORADO R1-60 NO. 16 DEER SPRINGS WAY

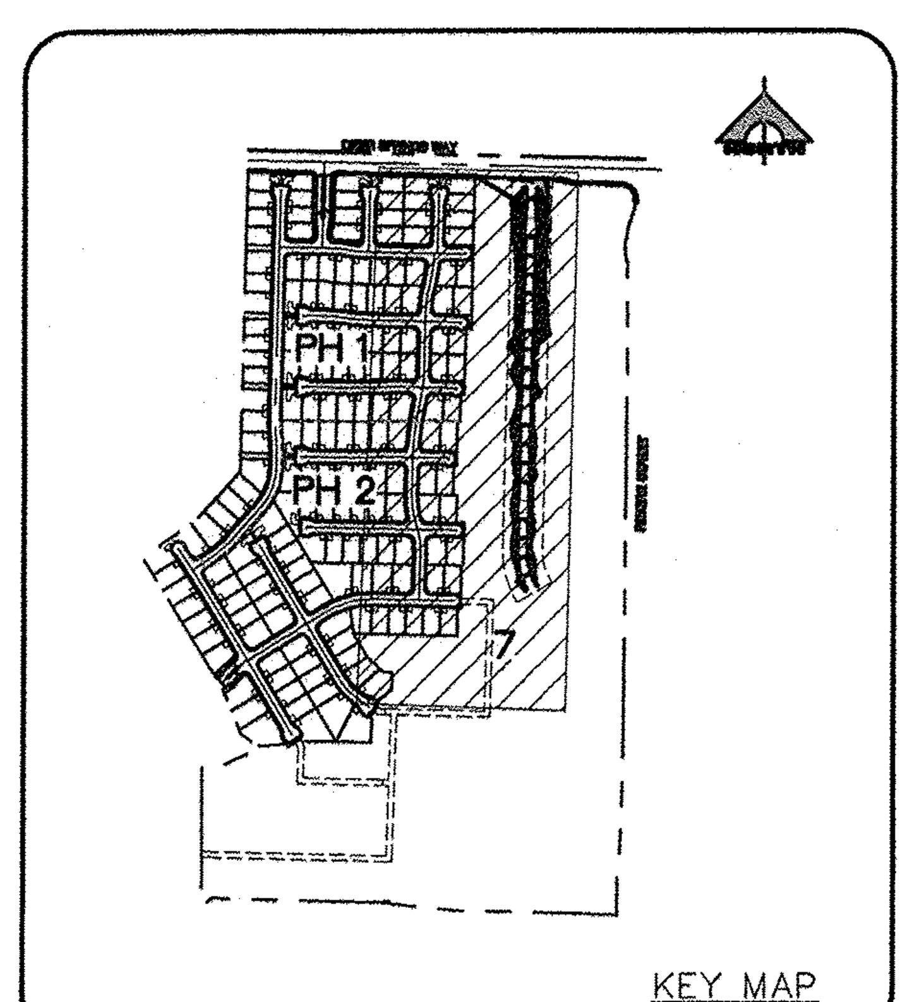
GRADING PLAN 2

DRAWING **6**
6 OF 14 SHTS

CNLV # 47955







NOTE

1. SOILS REPORT PREPARED BY GEOTEK RESIDENTIAL, LLC ON NOVEMBER 27, 2013 – GEOTEK RESIDENTIAL LLC PROJECT NO.11531-LVR6
2. CONSTRUCTION FOR BLOCK WALLS REQUIRES A SEPARATE BUILDING PERMIT AND APPROVAL BY THE BUILDING SAFETY AND MAINTENANCE DEPARTMENT
3. WALLS CONSTRUCTED OTHER THAN THOSE AS DETAILED ON THIS SHEET ARE TO BE CONSTRUCTED BY WALL SUB-CONTRACTOR, DETAILS AND STRUCTURAL CALCS AS PREPARED BY OTHERS.
4. BLOCK END WALLS FOR ESTIMATING PURPOSES ONLY. ACTUAL LENGTHS TO BE DETERMINED IN FIELD
5. NO OBJECT OVER 24" OTHER THAN TRAFFIC CONTROL DEVICES AND STREET LIGHT POLES CAN BE CONSTRUCTED OR INSTALLED WITHIN THE SIGHT VISIBILITY ZONE.
6. ALL PRIVATE STREETS ARE TO BE DEDICATED AS PUBLIC DRAINAGE EASEMENT AND PUBLIC UTILITY EASEMENT TO BE PRIVATELY MAINTAINED.
7. REBAR IS REQUIRED AROUND ALL PULL BOXES, VAULTS AND OTHER APPURTENANCES AS REQUIRED BY THE CONSTRUCTION SERVICES INSPECTOR.

BENCHMARK

CITY OF NORTH LAS VEGAS BENCHMARK NLV9121S6
RIVET AND 2" ROUND ALUMINUM DISK SET IN THE TOP OF CURB, LOCATED APPROX. 60 NORTH OF THE NORTHEAST NORTH BCR OF THE INTERSECTION OF BLACK OAKS STREET AND GLIDING EAGLE ROAD.

ELEVATION 666.873 METERS
2187.90 FEET

NAVD88 DATUM

PER CITY OF NORTH LAS VEGAS VERTICAL CONTROL BENCHMARK BOOK REVISED NOVEMBER 01, 2009

**NOTE: CONTRACTOR TO ADD 1.783 FEET TO ALL EXISTING APPROVED ELDORADO PLANS.

BASIS OF BEARINGS

SOUTH 88°38'19" EAST BEING THE BEARING OF THE NORTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 21, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN BY MAP OF ELDORADO R1-60 MO. 16 TM NO. 22 PHASE 1 ON FILE IN BOOK 131, PAGE 36 OF PLATS, OFFICIAL RECORDS,

NOTE TO CONTRACTOR

EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

DRAINAGE STUDY COMPLIANCE

I, GIA D. NGUYEN, HEREBY CERTIFY THAT THIS GRADING PLAN CONFORMS TO THE APPROVED DRAINAGE STUDY ON FILE (CNLV #47525) WITH THE CITY OF NORTH LAS VEGAS.

4/25/14
GIA D. NGUYEN, P.E. DATE
NEVADA PE #14918

FEMA FLOOD ZONE DESIGNATION

THIS PROJECT IS LOCATED WITHIN A FEMA DESIGNATED FLOOD ZONE A PER FIRM PANEL 32003C1766F DATED NOVEMBER 16, 2011, AND FIRM PANEL 32003C1768F DATED NOVEMBER 16, 2011.

5/28/14
ROBERT McLAUGHLIN, P.E. DATE
MANAGER, DEVELOPMENT AND FLOOD CONTROL DIVISION

RELEASED FOR
☐ BID
☑ CONSTRUCTION

06.09.14
PARDEE HOMES OF NEVADA DATE

REV	DATE	DESCRIPTION	DATE	AGEN APP	DATE	GCW APP

PROFESSIONAL ENGINEER STATE OF NEVADA GIA D. NGUYEN CIVIL No. 14918 Exp. 12/31/2015
DATE: 4/25/14

PROJECT NO. 5523-A017
DESIGN: QN
DRAWN: QN
CHECK: GDN
PLOT DATE: 04-25-14
PLOT TIME: 09:16:07

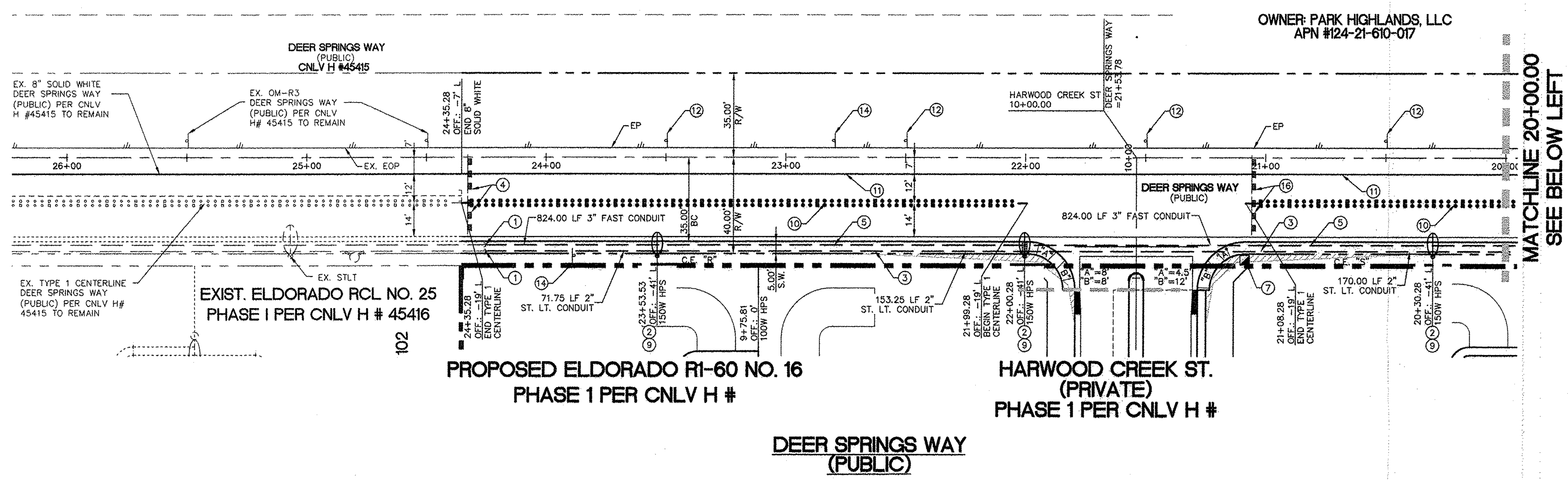
G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
1555 S. RAINBOW BLVD · LAS VEGAS, NV 89146
T: 702.804.2000 · F: 702.804.2299 · GCWALLACE.COM
LAS VEGAS

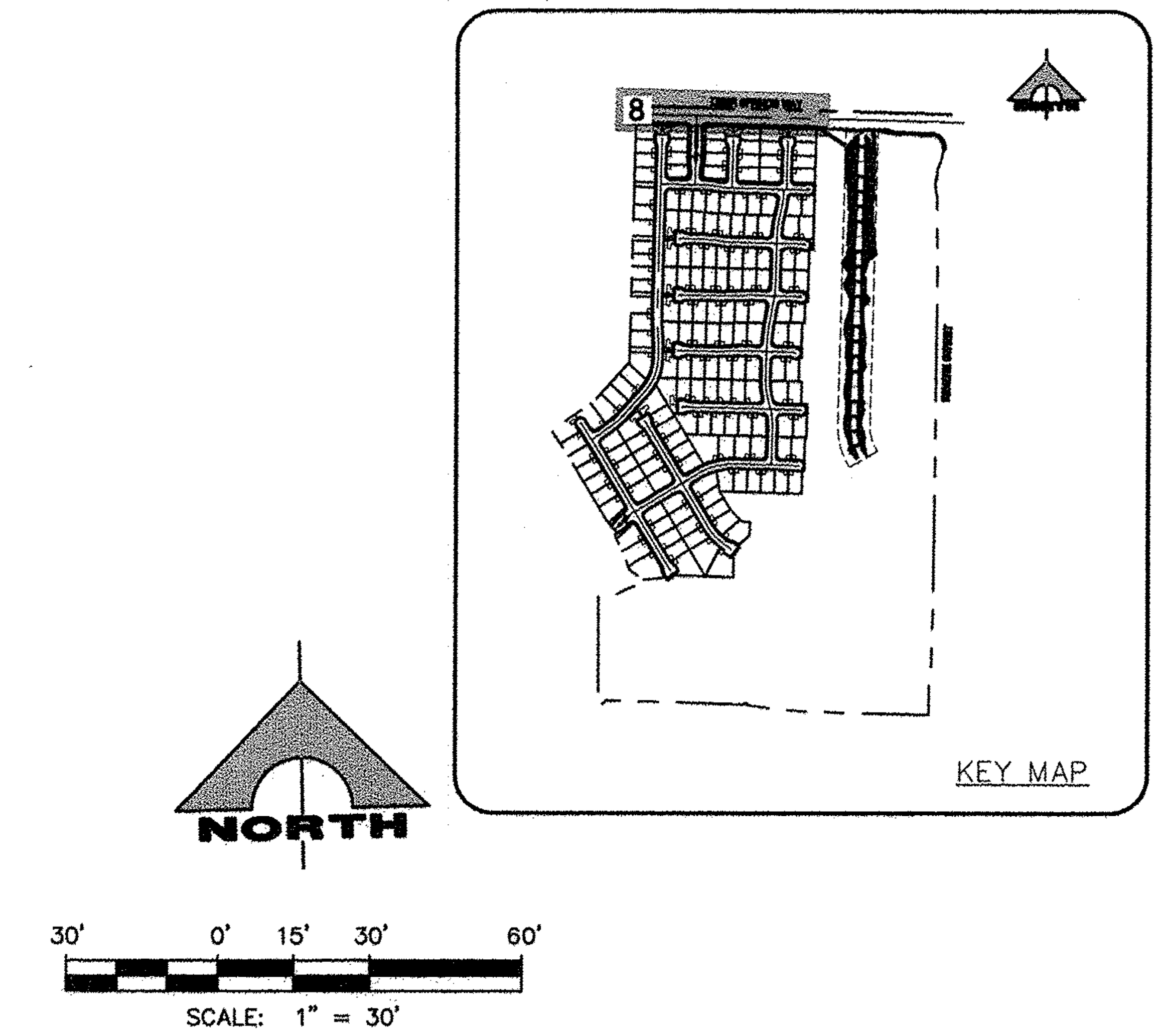
F:\Projects\500\5523-A017\DWG\Production\Deer Springs Way\A017-OFF_GD.dwg
Quangvinh Nguyen

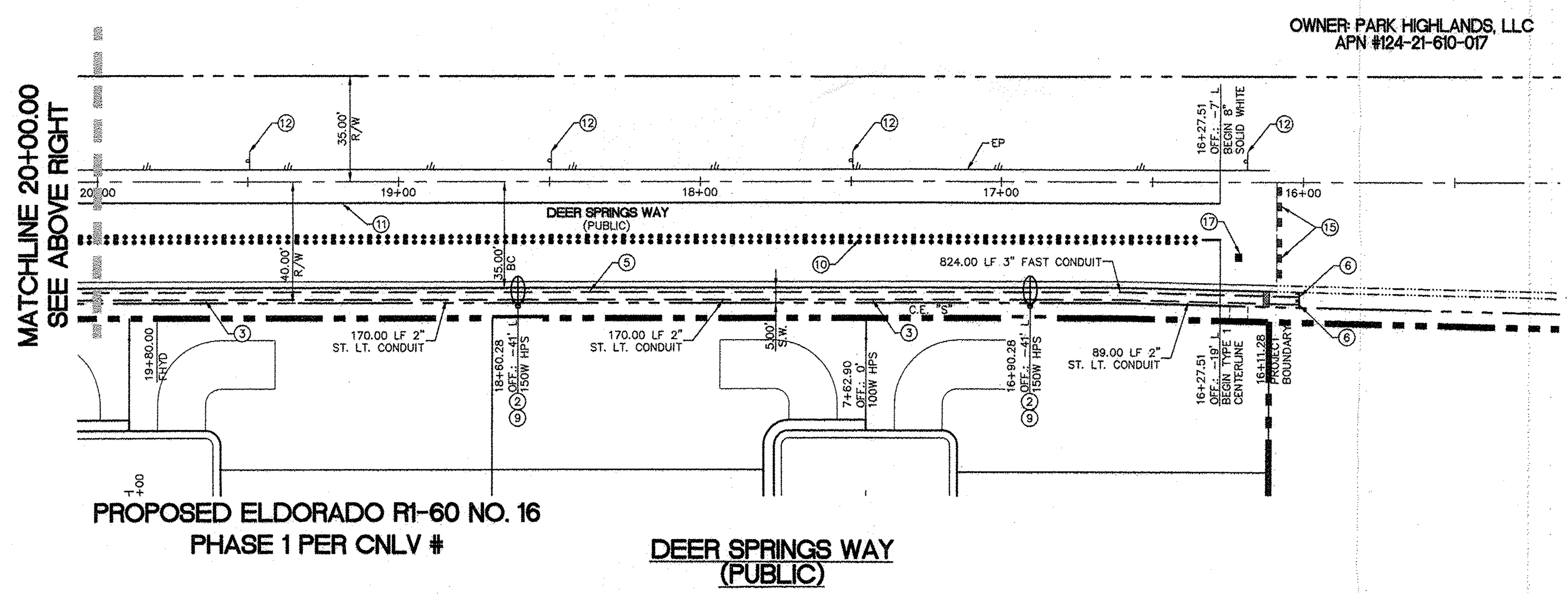
PARDEE HOMES
ELDORADO R1-60 NO. 16 DEER SPRINGS WAY
OFFSITE GRADING

DRAWING
7
7 OF 14 SHTS

CNLV # 47955





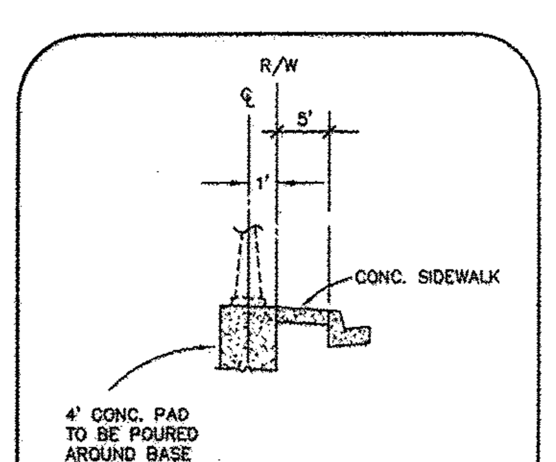


CONSTRUCTION NOTES

1. CONNECT TO EXISTING CONDUIT.
2. INSTALL 150 W LED STREET LIGHT, STREET LIGHT FOUNDATION PER CCAUSD 314, 320, AND 321.
3. INSTALL 2" STREET LIGHT CONDUIT.
4. EXISTING BARRICADE TO BE RELOCATED.
5. INSTALL 3" FAST CONDUIT.
6. STUB AND CAP 10' PASS PROPERTY LINE.
7. INSTALL 3 1/2 PULL BOX.
8. INSTALL 24" STOP BAR.
9. INSTALL "NO PARKING ANY TIME" (Ⓡ) R8-3A SIGN ON STREET LIGHT POLE.
10. INSTALL TYPE 1 CENTER LINE PER CCAUSD DWG NO 244.
11. INSTALL 8" SOLID WHITE (TAPE OR PAINT).
12. INSTALL TYPE 3 OBJECT MARKER, OM-3R @ 100'.
13. NOT USED.
14. INSTALL 25 MPH SPEED LIMIT SIGN.
15. INSTALL TYPE III BARRICADE WITH TWO R11-2 ROAD CLOSE SIGNS WITH 12' OPENING FOR MAINTAINANCE VEHICLE.
16. RELOCATED TYPE III BARRICADE.
17. INSTALL BLUE COLORED REFLECTIVE RAISED PAVEMENT MARKERS.

LEGEND

- STREET NAME SIGN (D3) WITH 30" STOP SIGN (R1-1)
- NO OUTLET SIGN (W14-2P)
- SIGN - SEE PLAN FOR SPECIFICATION
- TYPE III BARRICADE WITH TWO R11-2 ROAD CLOSE SIGNS, AND PAVEMENT ENDS (W8-3) SIGN
- 125 AMP PAD MOUNT SERVICE PEDESTAL
- 150 W LED STREET LIGHT
- NO 3 1/2 PULL BOX
- EXISTING STREET LIGHT
- OM-3R
- SPEED LIMIT 25 — SPEED LIMIT SIGN



TYPICAL 75' STREET
STREET LIGHT LOCATION PLAN
SEE CCPWSD DWG # 320

NOTE TO CONTRACTOR

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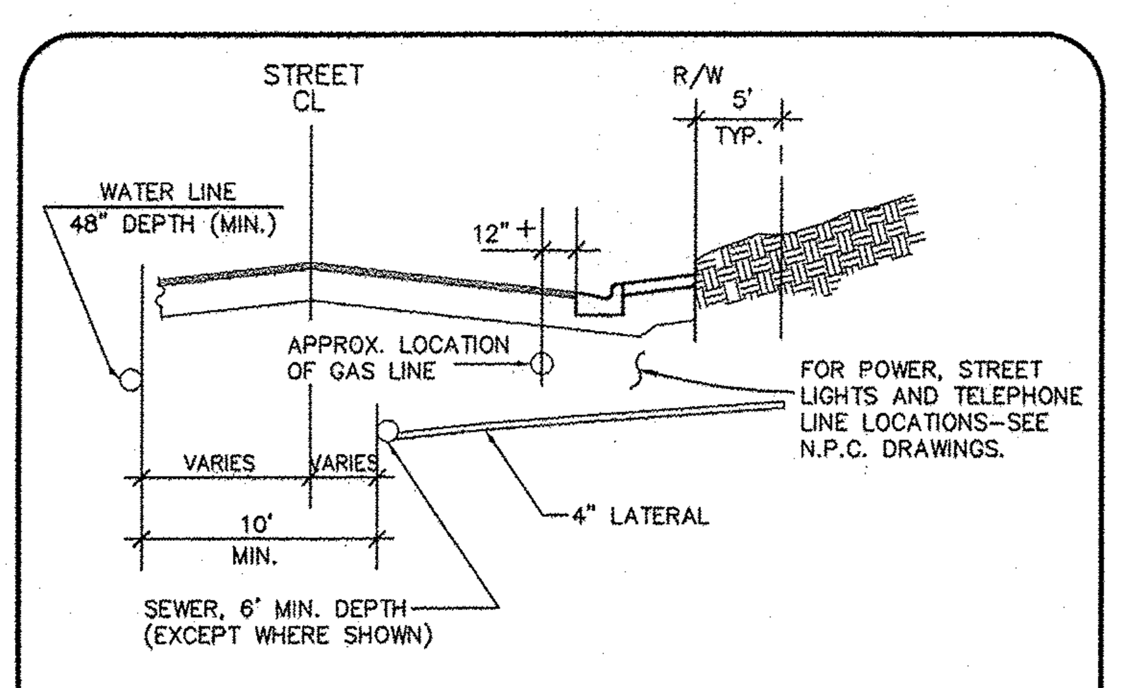

UNDERGROUND UTILITIES LOCATION

TYPICAL STREET SECTION

STREET LIGHT CIRCUIT CAPACITY VERIFICATION

CIRCUIT "A"

CIRCUIT CAPACITY	= 60 AMPS
MAXIMUM CONTINUOUS AMP DRAW OR 80% OF CIRCUIT CAPACITY	= 48 AMPS
AVAILABLE LOAD FROM ELDORADO RCL NO. 25	= 39.6 AMPS
PROPOSED LUMINAIRE LOAD TO CIRCUIT	
(5) NUMBER OF 150 WATTS AT 1.2 AMPS	= 6.0 AMPS
(X) NUMBER OF 250 WATTS AT 1.5 AMPS	= - AMPS
(X) NUMBER OF 400 WATTS AT 3.9 AMPS	= - AMPS
TOTAL PROPOSED LOAD	= 6.0 AMPS
REMAINING AVAILABLE LOAD	= 33.6 AMPS

AS OF 12/03/13 BY ____ MARK J. FAKLER, P.E. #9911

(EXIST. SERVICE PEDESTAL LOCATED DEER SPRINS WAY STATION 28+40)

BASIS OF BEARINGS

SOUTH 88°38'19" EAST BEING THE BEARING OF THE NORTH LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 21, TOWNSHIP 19 SOUTH, RANGE 61 EAST, M.D.M., CITY OF NORTH LAS VEGAS, CLARK COUNTY, NEVADA AS SHOWN BY MAP OF ELDORADO R1-60 MO. 16 TM NO. 22 PHASE 1 ON FILE IN BOOK 131, PAGE 36 OF PLATS, OFFICIAL RECORDS,

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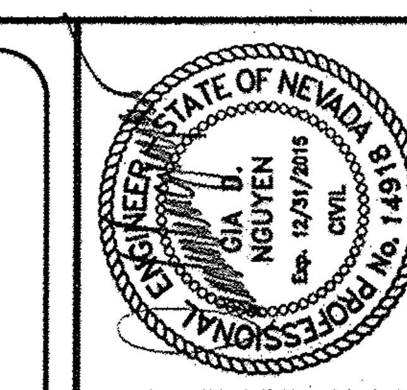
**NOTE: CONTRACTOR TO ADD 1.783 FEET TO ALL EXISTING APPROVED ELDORADO PLANS.

ALYSSA REYNOLDS, P.E. PTOE — 5-7-14
CNLV TRAFFIC ENGINEER — DATE

RELEASED FOR ☐ BID ☑ CONSTRUCTION

PARDEE HOMES OF NEVADA — 06.09.14 DATE



PROJECT NO. 5523-A017
DESIGN: QN
DRAWN: QN
CHECK: GDN
PLOT DATE: 04-24-14
PLOT TIME: 16:23:54

REV	DATE	DESCRIPTION	AGEN APP	DATE	CCW APP	DATE

G.C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
1555 S. RAINBOW BLVD · LAS VEGAS, NV 89146
T: 702.804.2000 · F: 702.804.2299 · GCWALLACE.COM
LAS VEGAS

F:\Projects\500\5523-A017\DWG\Production\Deer Springs Way\A017-TR.dwg
Quangvinh Nguyen

PARDEE HOMES

ELDORADO R1-60 NO. 16
DEER SPRINGS WAY

STREET LIGHT AND TRAFFIC PLAN

DRAWING 8
8 OF 14 SHTS

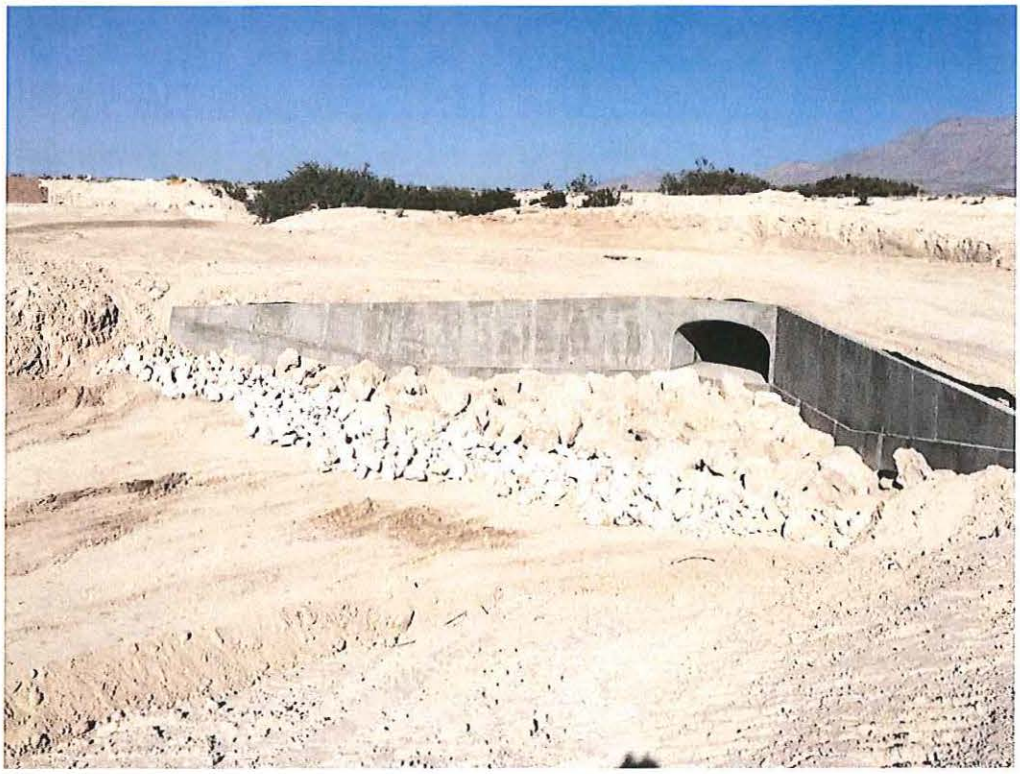
CNLV # 47955

IMPROVEMENT PLANS
FOR ELDORADO R1-60 NO. 16
LOMR CERTIFICATION

Based on field observations, I certify that the existing improvements substantially conform to the design drawings for the following improvement plans:

Eldorado R1-60 No. 16, Stamped by Gia D. Nguyen,

Grant Tokumi, Project Manager
GC Wallace, Inc.



Facing northwest. Outlet of 12x6 arch culvert storm drain.

Facing south. Graded earthen channel south of the 12x6 arch culvert outlet.

Facing southeast. Graded earthen channel transition into existing wash.

7. ELECTRONIC FILES (ON CD)

Report PDF
GIS Shape Files