05-09-0577R

Request for a Conditional Letter of Map Revision
Sloan Channel Improvements
Charleston Boulevard to Las Vegas Wash
Clark County, Nevada



Prepared for

CLARK COUNTY
REGIONAL FLOOD CONTROL DISTRICT

Clark County Regional Flood Control District
600 S. Grand Central Parkway
Las Vegas, NV 89155

Prepared by

PBS&J

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(702) 263-7275

January 2005

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INTRODUCTION

This request for a Conditional Letter of Map Revision (CLOMR) is to address a proposed construction project consisting of channel improvements to a portion of the Sloan Channel immediately downstream of Charleston Boulevard to its confluence with the Las Vegas Wash. The existing channel is currently located within a FEMA Flood Zone A from Charleston Boulevard to the Las Vegas Wash; please refer to **Figure 3** for the FEMA Flood Zone Map. The existing channel in the project reach is earthen with irregular erosion protection on both banks. Immediately upstream of the proposed channel improvements is the Charleston Boulevard Bridge (3 span). The Sloan Channel upstream of Charleston Boulevard is fully improved consisting of a 60' wide concrete channel, 5' deep, and 2:1 side slopes. The proposed improvements consist of approximately 7,000 feet of concrete lining of the channel bottom and sides for the entire length of the project reach. Please refer to **Figure 1 Area/Vicinity Map** for an overall view of the project area. Also, refer to **Figure 2** and **Figure 2A CCRFCD Flood Control Facilities Map** that shows existing and proposed facilities within and adjacent to the project area. Appendix E includes the improvement plans for the proposed Sloan Channel.

This study analyzes the proposed Sloan Channel improvements from Charleston Boulevard to the Las Vegas Wash and demonstrates that the proposed conditions no longer warrant the flood zone delineation as shown on the current effective FIRM Panel 2195 dated September 27, 2002.

HYDROLOGY

The regulatory discharge in the channel for the 100-year storm is 3,072 cfs at the upstream limits of the study (NODE.V4) and 3,990 cfs at the downstream limits of this study (NODE.CC). The hydrology is reported in the 1996 Flood Insurance Restudy for the Range Wash prepared by PBS&J for the Clark County Regional Flood Control District (CCRFCD) and processed by FEMA under Case No. 98-09-1054P. The corresponding hydrologic reference material and the stream node diagram has been provided in Appendix C.

It should be noted that the HGL shown on the improvement plans is based on the channel 100-year design flow of 4,200 cfs. This represents ultimate build-out condition in which the tributary watershed to the Sloan Channel is fully developed. However, the analysis of the proposed channel improvements uses the regulatory flows from 3,072 cfs to 3,990 cfs, please refer to Appendix D for flow change locations.

HYDRAULICS

Hydraulic modeling of the proposed Sloan Channel improvements was performed using the U.S. Army Corp of Engineers' River Analysis System (HEC-RAS), version 3.1.1 and conforming to local standards that are specified in the CCRFCD Hydrologic Criteria and Drainage Design Manual. The post-project conditions model for this study is based on the proposed improvement plans prepared by G.C. Wallace, see Appendix E.

Note that the hydraulic model does not include the Charleston Boulevard bridge or any portion of the improved channel upstream of Charleston Boulevard. The hydraulic model will account for the proposed improvements only which start immediately downstream of Charleston Boulevard.

SLOAN CHANNEL RESULTS

The post-project conditions model for the study reach was modeled with HEC-RAS using the mixed flow option. The upstream boundary condition for the model was set at critical depth. The downstream boundary condition for the model is the approved water surface elevation of 1694.20 feet (approximately 200' upstream of FIS Section ZO) from the effective FIRM Panel 2195. This is the effective WSEL in the Las Vegas Wash at the confluence with the Sloan Channel. The results show that the supercritical flow is contained within the channel throughout the project reach. However, the model does show that a hydraulic jump occurs between cross-sections 140 and 90. This is caused by the confluence of the Orchards Channel with the Sloan Channel where an additional 1,021 cfs is introduced to the system. The hydraulic jump results in a peak WSEL of 1709.27' at cross-section 110 with a corresponding depth of 6.37'. The rectangular portion of the concrete channel in the vicinity of the Orchards confluence is approximately 8' deep. Also note that the energy grade elevation of 1710.10 would also be contained within the channel at station 110.

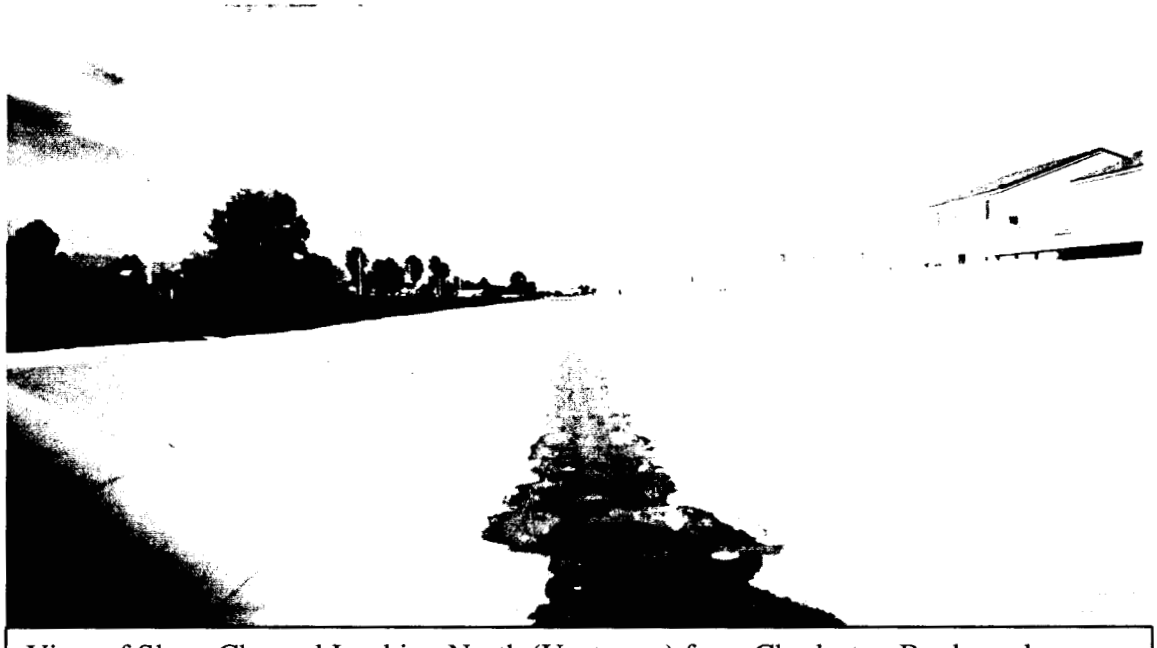
The upstream limit of the post-project conditions model results in a water surface elevation of 1724.40 feet at cross-section 210. The downstream end of the post-project conditions model results in a water surface elevation of 1694.20 feet at cross-section 10.

Figure 5 is the workmap for this study and shows the locations of the cross sections modeled in the post-project conditions. The revised Zone A boundaries and the upstream and downstream limits of this study are shown on the workmap. Please refer to **Figure 6** that shows the proposed post-project flood zone delineation.

PHOTO LOG



View of Sloan Channel Looking South (Downstream) from Charleston Boulevard



View of Sloan Channel Looking North (Upstream) from Charleston Boulevard



View of Sloan Channel Looking South (Downstream) from Sahara Avenue



View of Sloan Channel Looking North (Upstream) from Sahara Avenue

CONCLUSION

The proposed flood zone revision for the proposed Sloan Channel improvements is based on the best available data, approved improvement plans, and supporting calculations. We believe that based on this information the revisions to the Sloan Channel are acceptable. Please refer to **Figure 3 FEMA Flood Zone Map** and **Figure 4 Annotated FEMA Flood Zone Map**. **Figure 6** shows the proposed revisions to the current effective flood zone delineation.

Once approved and upon completion of the proposed channel improvements to the Sloan Channel, a request for a LOMR will be submitted with the appropriate supporting information to request revision of the current Zone A flood zone.

REFERENCES

HCDDM — Clark County Regional Flood Control District, *Hydrologic Criteria and Drainage Design Manual*, 1999.

2002 MPU — Clark County Regional Flood Control District, *2002 Master Plan Update*. Prepared by PBS&J, Louis Berger and G.C. Wallace.

HEC-RAS — U.S. Army Corps of Engineers' River Analysis System (HEC-RAS) V3.1.1, Hydrologic Engineering Center, 2002.

G.C. Wallace — GCW. *Improvement Plans for Sloan Channel.* Prepared by G.C. Wallace, dated March 2004.

PBSJ — PBS&J *1996 FIS Restudy for The Range Wash.* Prepared by PBS&J, dated February 1996.

Appendix A: FEMA Forms

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☐ Yes Fee amount: $_____

☒ No, Attach Explanation

Please see the FEMA Web site at http://www.fema.gov/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: Brian K. Loffman	Company: PBS&J	
Mailing Address: 2270 Corporate Circle Drive Suite 100 Henderson, NV 89074-7755	Daytime Telephone No.: 702-263-7275	Fax No.: 702-263-7200
	E-Mail Address: bloffman@pbsj.com	
Signature of Requester (required):		Date: 12/21/04

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 requirement that no fill be 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. 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: David Betley, P.E., Principal Engineer, Civil Engineering Division		Telephone No.: (702) 455-6108
Community Name: Clark County Unincorporated Areas	Community Official's Signature (required):	Date: 2/4/05

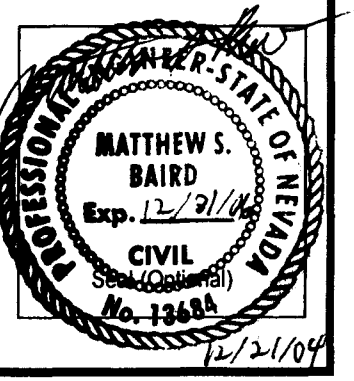
CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

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. 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: Mathew S. Baird	License No.: NV 13684	Expiration Date: 12/31/04
Company Name: PBS&J	Telephone No.: 702-263-7275	Fax No.: 702-263-7200
Signature: Matthew S. Baird		Date: 12/21/04

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



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Community Official's Name and Title: David Betley, P.E., Principal Engineer, Civil Engineering Division		Telephone No.:
Community Name: Clark County Unincorporated Areas	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. 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.

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☒ Riverine Structures Form (Form 3)	Channel is modified, addition/revision of bridge/culverts, addition/revision of levee/floodwall, addition/revision of dam
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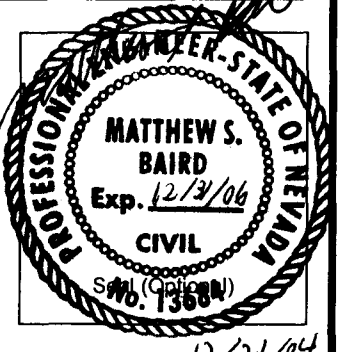
☐ Coastal Structures Form (Form 5)	Addition/revision of coastal structure
☐ Alluvial Fan Flooding Form (Form 6)	Flood control measures on alluvial fans



FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 3 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, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (3067-0148). 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.**

Flooding Source: Range 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 2) ☐ 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.)	FIS (cfs)	Revised (cfs)

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

☐ Statistical Analysis of Gage Records ☐ Precipitation/Runoff Model [TR-20, HEC-1, HEC-HMS etc.]
☐ 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. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/fhm/en_modl.shtm.

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

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

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.)	
			Effective	Proposed/Revised
Downstream Limit	FEMA Tie-In w/Las Vegas Wash	10	1694.20	1694.20
Upstream Limit	Charleston Bridge	210	N/A	1724.58

2. Hydraulic Method Used

Hydraulic Analysis HEC-RAS V3.11 [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

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. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/fhm/frm_soft.shtm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☐ Yes ☒ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name: N/A	Floodway File Name: N/A
Corrected Effective Model*	Natural File Name: N/A	Floodway File Name: N/A
Existing or Pre-Project Conditions Model	Natural File Name: N/A	Floodway File Name: N/A
Revised or Post-Project Conditions Model	Natural File Name: post.prj	Floodway File Name: N/A
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/fhm/en_modl.shtm.

C. MAPPING REQUIREMENTS

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

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,** 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 of revision.

D. COMMON REGULATORY REQUIREMENTS

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

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.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

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 added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☐ No

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

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

O.M.B. No. 3067-0148
Expires September 30, 2005

PAPERWORK REDUCTION ACT

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, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (3067-0148). 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.**

Flooding Source: Range 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 Structure

1. Name of Structure: Sloan Channel Improvements-Charleston Bl to Las Vegas Wash

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

Location of Structure: Range Wash

Downstream Limit/Cross Section: 20

Upstream Limit/Cross Section: 210

2. Name of Structure: Sahara Avenue Bridge

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

Location of Structure: Sahara Avenue at Sloan Channel

Downstream Limit/Cross Section: 40

Upstream Limit/Cross Section: 60

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: Range Wash

Name of Structure: Sloan Channel

1. Accessory Structures

The channelization includes (check one):

- ☐ Levees [Attach Section E (Levee/Floodwall)]
- ☐ Superelevated sections
- ☐ Debris basin/detention basin
- ☐ Other (Describe):
- ☐ Drop structures
- ☒ Transitions in cross sectional geometry
- ☐ Energy dissipator

2. Drawing Checklist

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

3. Hydraulic Considerations

The channel was designed to carry 4200 (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): At the confluence with the Orchards Channel (XS 100)

4. 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.

C. BRIDGE/CULVERT

Flooding Source: Range Wash

Name of Structure: Sahara Ave. Bridge

1. This revision reflects (check one):

- ☐ New bridge/culvert not modeled in the FIS
- ☐ Modified bridge/culvert previously modeled in the FIS
- ☒ New analysis of bridge/culvert previously modeled in the FIS

2. Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8): HEC-RAS V3.11
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

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.

D. DAM

Flooding Source:

Name of Structure:

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

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

   ☐ Private organization Name of the agency or organization:

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

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

4. 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.

5. Does the Base Flood Elevation behind the dam or downstream of the dam change?

   ☐ Yes ☐ No If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

Stillwater Elevation Behind the Dam

FREQUENCY (% annual chance)	FIS	REVISED
10-year (10%)		
50-year (2%)		
100-year (1%)		
500-year (0.2%)		
Normal Pool Elevation		

6. 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

E. LEVEE/FLOODWALL (CONTINUED)

2. Freeboard (continued)

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 landside is:

b. The maximum levee slope floodside 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)

4. Embankment Protection (continued)

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:

Sta. , depth to

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:

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.

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one):

☐ UBC (1988) or ☐ 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. 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.

E. LEVEE/FLOODWALL (CONTINUED)

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.

f. 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.

E. LEVEE/FLOODWALL (CONTINUED)

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.

11. Maintenance Plan

    a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No
    If No, please attach supporting documentation.

12. Operations and Maintenance Plan

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

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.

STATEMENT OF EXPLANATIONS

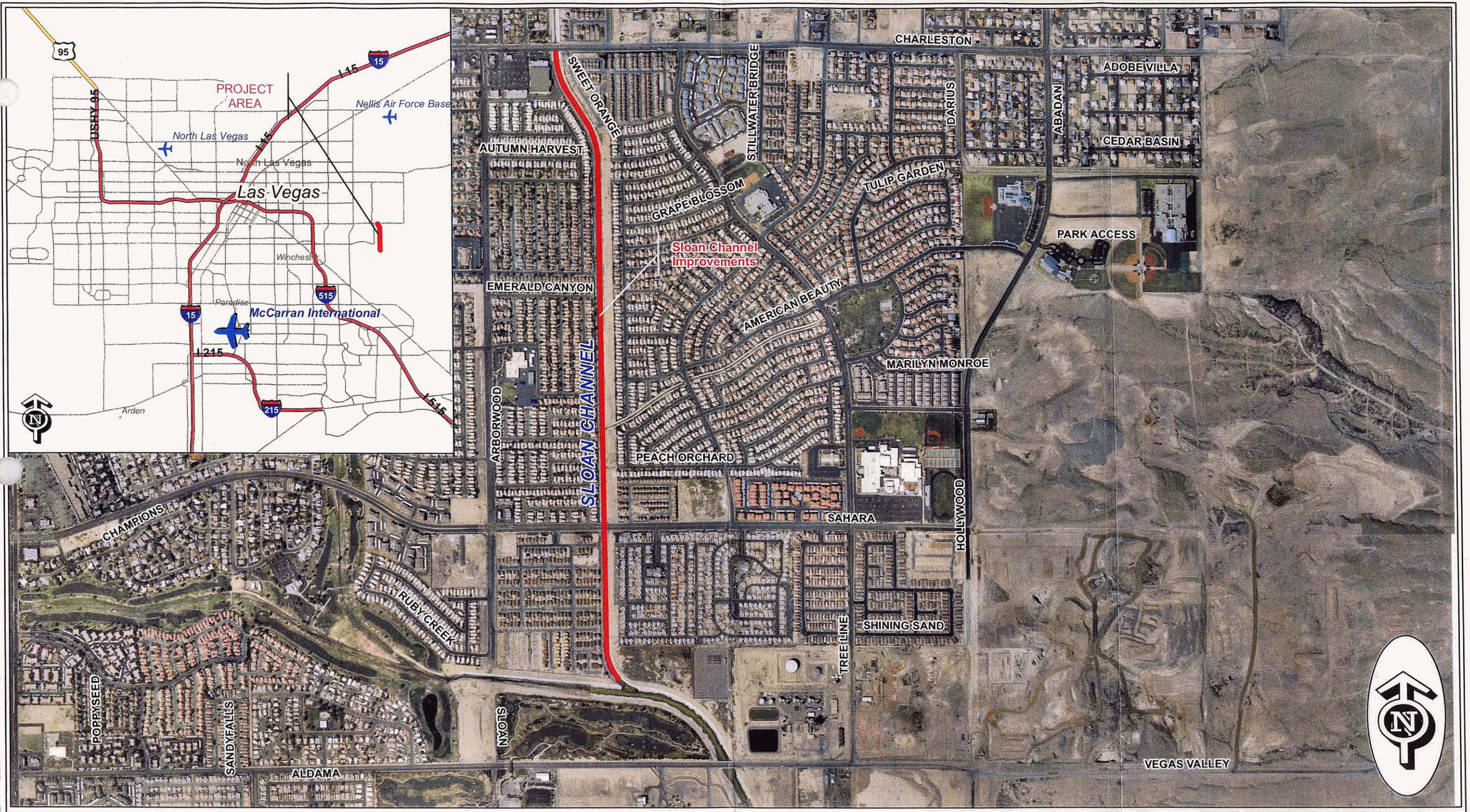
- MT-2 FORM –1

  C: Clark County Regional Flood Control District will submit fee upon receiving an invoice from FEMA.

- MT-2 FORM-3

  B-4 & C-4: Sediment transport was not considered since the channel is lined and any sediment entering the system from upstream would be transported to the channel outlet at the Las Vegas Wash.

Appendix B: Figures



GRAPHIC SCALE

,000 500 0 1,000 2,000 3,000

(In Feet)

1 inch = 1,000 ft.

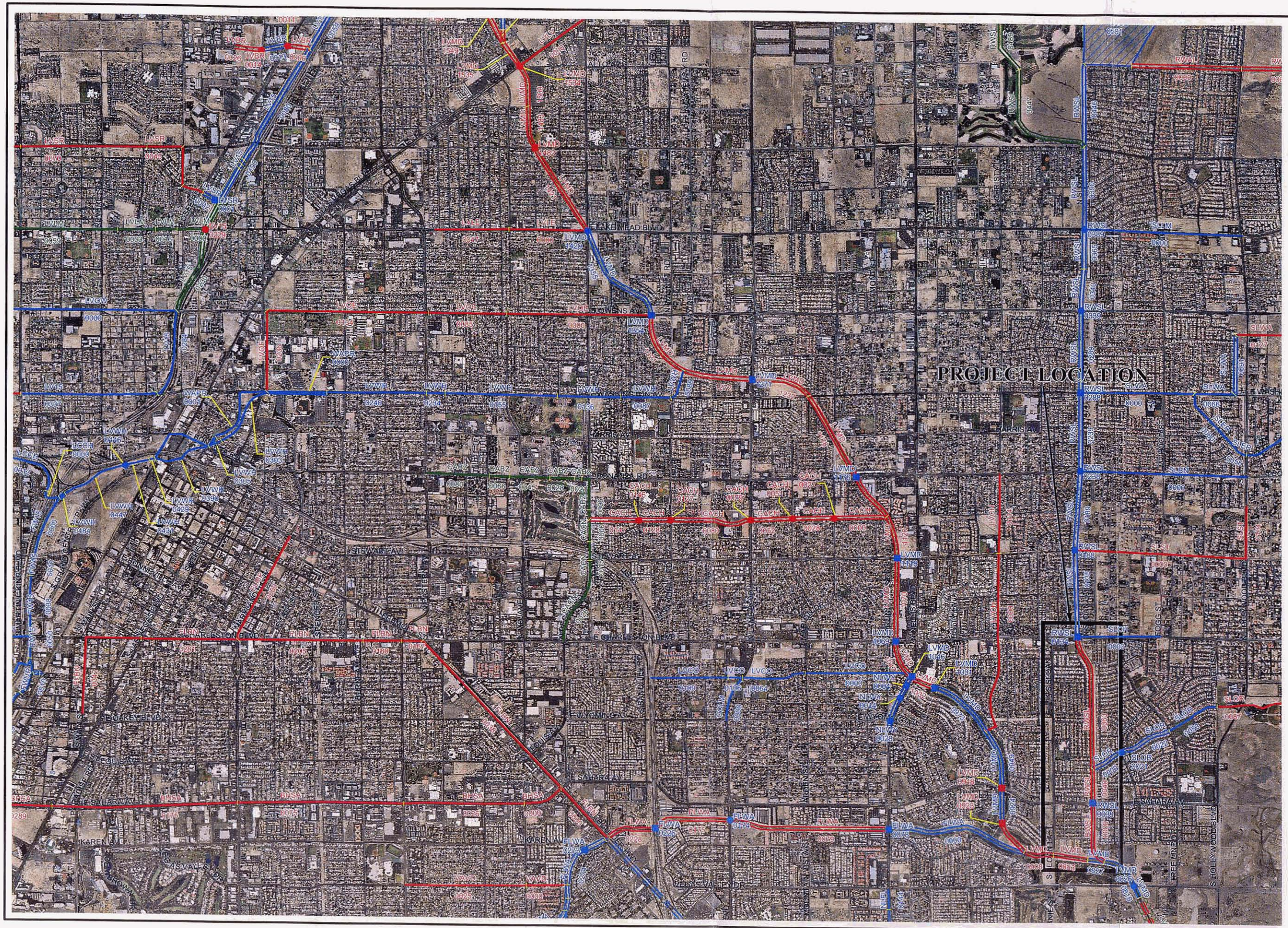
FIGURE 1: VICINITY MAP

Sloan Channel Improvements CLOMR

Proposed Channel Improvements Alignment

PBS&J
2270 Corporate Circle
Suite 100
Henderson, Nevada 89074
Tele: 702-263-7275
Fax: 702-263-7200
ENGINEERING - PLANNING - SURVEYING - CONSTRUCTION SERVICES

FIGURE 1


PROJECT LOCATION
LAKE MEAD BLVD
CHARLESTON BLVD
STEWART AVE
OAKEY BLVD
WYOMING AVE
KAREN AVE
SAHARA AVE
LAS VEGAS BLVD
LVMD 1476
LVMD 1119
LVMD 1069
LVMD 1045
LVMD 1061
LVMD 0948
LVMD 0825
LVMD 0827
LVMD 0823
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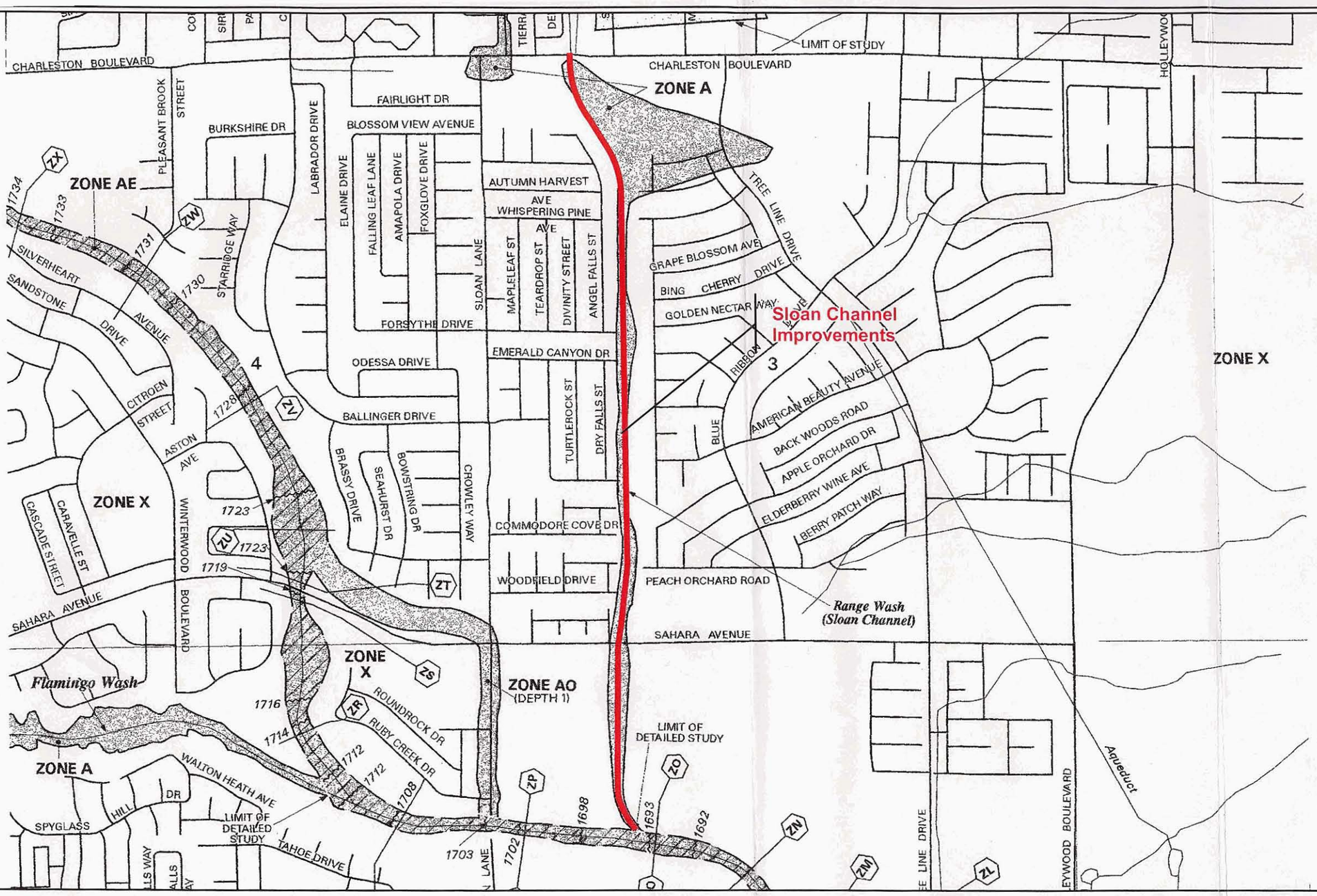
LVMD 1107
LVMD 1109
LVMD

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
BHSA		**BOULDER HIGHWAY SAHARA AVENUE**						
0000	E	72" RCP	1350	3462	CSA11*	SW3SC	7.76	0.79
0000	P1	14' X 12' RCB	1350	3462	CSA11*	SW3SC	7.76	0.79
0026	P1	12' X 12' RCB	4000	3462	CSA11*	SW3SC	7.76	1.30
0075	P1	12' X 10' RCB	5280	3462	CSA11*	SW3SC	7.76	2.11
0175	P1	14' X 13' RCB	6000	3462	CSA11*	SW3SC	7.76	0.67
0289	P1	14' X 12' RCB	2300	3462	CSA11	SW3SC	7.76	0.87
CABZ		**CEDAR AVENUE - BONANZA**						
0000	E	72" RCP	310	1085	DCA06-C	SW3SC	1.54	0.30
0000	P0	11' X 10' RCB	310	1085	DCA06-C	SW3SC	1.54	0.30
0006	E	60" RCP	1294	1085	DCA06-C	SW3SC	1.54	0.30
0006	P0	11' X 10' RCB	1294	1085	DCA06-C	SW3SC	1.54	0.30
0021	E	68" x 43 CMAP	160	943	CBN08-C	SW3SC	1.30	0.45
0021	P0	9' X 9' RCB	160	943	CBN08-C	SW3SC	1.30	0.45
0028	E	54" SSP	935	943	CBN08-C	SW3SC	1.30	0.45
0028	P0	9' X 9' RCB	935	943	CBN08-C	SW3SC	1.30	0.45
0045	E	48" SSP	1234	943	CBN08-C	SW3SC	1.30	0.80
0045	P0	9' X 8' RCB	1234	943	CBN08-C	SW3SC	1.30	0.80
0066	E	42" SSP	704	763	CBN03-C	SW3SC	1.09	0.80
0066	P0	8' X 7' RCB	704	763	CBN03-C	SW3SC	1.09	0.80
0080	E	36" SSP	1919	763	CBN03-C	SW3SC	1.09	0.75
0080	P0	8' X 6' RCB	1919	763	CBN03-C	SW3SC	1.09	0.75
CACH		**CEDAR AVENUE CHANNEL**						
0000	E	Conc Chnl 10'W 8'D 1.5:1 SS	1524	2417	CCA10-C	SW3SC	2.15	0.35
0000	P1	Conc Chnl 27'W 8'D 0:1 SS	1524	2417	CCA10-C	SW3SC	2.15	0.35
0027	E	2: 5' X 15' RCBC @ Marion	100	2417	CCA10-C	SW3SC	2.15	0.35
0027	P1	3: 12' X 8' RCBC @ Marion	100	2417	CCA10-C	SW3SC	2.15	0.35
0028	E	Conc Chnl 10'W 8'D 1.5:1 SS	1400	2417	CCA10-C	SW3SC	2.15	0.34
0028	P1	Conc Chnl 27'W 8'D 0:1 SS	1224	2417	CCA10-C	SW3SC	2.15	0.34
0051	E	2: 5' X 15' RCBC @ Page	100	2417	CCA10-C	SW3SC	2.15	0.34
0051	P1	4: 11' X 8' RCBC @ Page	100	2417	CCA10-C	SW3SC	2.15	0.34
0052	E	Conc Chnl 10'W 6'D 1.5:1 SS	1198	2417	CCA10-C	SW3SC	2.15	0.34
0052	P1	Conc Chnl 45'W 6'D 0:1 SS	1198	2417	CCA10-C	SW3SC	2.15	0.34
0079	E	2: 6' X 12' RCBC @ Lamb	100	2403	CCA08-C	SW3SC	1.95	0.30
0079	P1	4: 12' X 7' RCBC @ Lamb	100	2403	CCA08-C	SW3SC	1.95	0.30
0080	E	Conc Chnl 12'W 6'D 1.5:1 SS	2640	2403	CCA08-C	SW3SC	1.95	0.30
0080	P1	Conc Chnl 45'W 6'D 0:1 SS	2640	2403	CCA08-C	SW3SC	1.95	0.30
0127	E	3: 4' X 12' RCBC @ Sandhill	100	2403	CCA08-C	SW3SC	1.95	0.30
0127	P1	3: 12' X 8' RCBC @ Sandhill	100	2403	CCA08-C	SW3SC	1.95	0.30
0128	E	Conc Chnl 10'W 8'D 1.5:1 SS	900	2403	CCA08-C	SW3SC	1.95	0.30
0128	P1	Conc Chnl 28'W 8'D 0:1 SS	900	2403	CCA08-C	SW3SC	1.95	0.30
0146	E	2: 5.5' X 12' RCBC @ Honolulu	100	2403	CCA08-C	SW3SC	1.95	0.30
0146	P1	3: 12' X 8' RCBC @ Honolulu	100	2403	CCA08-C	SW3SC	1.95	0.30
0147	E	Conc Chnl 10'W 8'D 1.5:1 SS	1640	2403	CCA08-C	SW3SC	1.95	0.30
0147	P1	Conc Chnl 28'W 8'D 0:1 SS	1640	2403	CCA08-C	SW3SC	1.95	0.30
CACN		**CEDAR AVENUE - CHARLESTON**						
0000	E	72" RCP	800	922	CCA05	SW3SC	0.96	0.50
0000	P0	10' X 8' RCB	800	922	CCA05	SW3SC	0.96	0.50
0015	E	2: 48" RCP	600	922	CCA05	SW3SC	0.96	0.50
0015	P0	10' X 8' RCB	600	922	CCA05	SW3SC	0.96	0.50
0026	E	66" RCP	2700	922	CCA05	SW3SC	0.96	0.50
0026	P0	10' X 8' RCB	2700	922	CCA05	SW3SC	0.96	0.50
COLM		**COLORADO / LAMB**						
0000	E	72" RCP	1500	471	CCH94	SW3SC	0.63	1.17
FLBN		**FLAMINGO- BOULDER HIGHWAY NORTH**						
0000	E	Conc Chnl 5'W 6'D 2:1 SS	2200	3827	CFR03	SW5SC	12.68	0.70
0000	P1	3: 10' X 9' RCB	2200	3827	CFR03	SW5SC	12.68	0.70
0038	E	Channel - Unknown Characteristics	6600	2706	CFR04	SW3SC	3.86	0.59
0038	P1	3: 9' X 8' RCB	6600	2706	CFR04	SW3SC	3.86	0.59
0167	P1	2: 10' X 6' RCB	700	2027	CCH68-C	SW3SC	2.86	1.14
0180	P1	2: 10' X 6' RCB	1300	1777	CCH67-C	SW3SC	2.55	1.31
0205	P1	10' X 6' RCB	4000	1431	CCH63-C	SW3SC	1.88	2.30
0281	P1	2: 7' X 6' RCB	3100	1233	CCH56	SW3SC	1.64	1.33
0342	P1	10' X 6' RCB	4300	532	CCH52-C	SW3SC	0.55	0.42
FLBS		**FLAMINGO- BOULDER HIGHWAY SOUTH**						
0167	E	Unlined Median Chnl 0'W 3.5'D 9:1 SS	8850	959	CB4	FLAM3SC	1.38	0.90
FLMP		**FLAMINGO WASH-MARYLAND PARKWAY SYSTEM**						
0000	P1	8' X 6' RCB	3800	484	CCH60A-C	SW3SC	0.75	0.49
FLWA		**FLAMINGO WASH**						
0000	E	Grass Chnl 107'W 5'D 2:1 SS	4570	10241	CFW38	FLAM5SC	34.59	0.40
0078	E	3 Span Bridge 108.25'W 5.5'D @ Nellis	120	10162	CFW36	FLAM5SC	34.04	0.70
0079	E	Earth Chnl 50'W 12'D 1:1 SS	5080	10162	CFW36	FLAM5SC	34.04	1.20
0079	P1	Conc Chnl 50'W 8.5'D 1:1 SS	5080	10162	CFW36	FLAM5SC	34.04	1.20
0174	E	9: 10' X 6' RCBC @ Lamb	110	10082	CFW34	FLAM5SC	33.56	1.40
0175	E	Earth Chnl 50'W 12'D 1:1 SS	2400	10082	CFW34	FLAM5SC	33.56	0.70
0175	P1	Conc Chnl 50'W 9'D 1:1 SS	2400	10082	CFW34	FLAM5SC	33.56	0.70
0226	E	Free Span Bridge 100'W 10'D @ I-515	170	10082	CFW34	FLAM5SC	33.56	0.80
0228	E	Earth Chnl 50'W 12'D 1:1 SS	1500	10082	CFW34	FLAM5SC	33.56	0.80
0228	P1	Conc Chnl 50'W 9'D 1:1 SS	1500	10082	CFW34	FLAM5SC	33.56	0.80
0255	E	2 Span Bridge 150'W 9'D @ Boulder Hwy	65	7469	CFW31*	FLAM5SC	18.97	1.00
0256	E	Conc Chnl 60'W 7.5'D 0:1 SS	40	7469	CFW31*	FLAM5SC	18.97	1.00

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
FLWA		**FLAMINGO WASH -- continued**						
0257	E	2 Span Bridge 150'W 9'D @ Boulder Hwy	60	7469	CFW31*	FLAM5SC	18.97	1.00
0258	E	Conc Chnl 60'W 7.5'D 0:1 SS	750	7469	CFW31*	FLAM5SC	18.97	0.44
0273	E	Free Span Bridge 60'W 9.0'D @ Trailer Park	10	7469	CFW31*	FLAM5SC	18.97	0.40
0274	E	Conc Chnl 60'W 8.1'D 0:1 SS	1370	7469	CFW31*	FLAM5SC	18.97	1.00
0295	E	Conc Chnl 60'W 8.1'D 0:1 SS	430	7469	CFW31*	FLAM5SC	18.97	0.80
0307	E	Conc Chnl 60'W 8.1'D 2:1 SS	410	7469	CFW31*	FLAM5SC	18.97	0.70
0314	E	Conc Chnl 60'W 8.1'D 2:1 SS	1500	7469	CFW31	FLAM5SC	18.97	0.90
FW15		**FREEWAY CHANNEL FROM DESERT INN TO EXPRESSWAY**						
0000	E	3: 12' X 10' RCB	2074	3366	CAL96	SW4SC	10.22	0.17
0010	E	3: 12' X 10' RCB	677	3366	CAL96	SW4SC	10.22	0.17
0038	E	3: 12' X 10' RCB	1893	3284	CCCH22	SW4SC	10.04	0.17
0050	E	3: 12' X 10' RCB	812	3284	CCCH22	SW4SC	10.04	0.17
0089	E	3: 12' X 10' RCB	922	2156	COK11-C	SW3SC	7.78	0.17
0100	E	3: 12' X 9' RCB	1669	2156	COK11-C	SW3SC	7.78	0.17
FWCH		**WEST CHARLESTON DRAINS**						
0000	E	84" RCP	1600	1051	CCH22	SW3SC	1.54	0.93
FWRR		**FREEWAY CHANNEL BYPASS FACILITY RR BRANCH**						
0000	E	48" RCP	35					1.22
0010	E	Conc Chnl 5'W 5'D 0:1 SS	215					1.22
FWUP		**FREEWAY CHANNEL BYPASS FACILITY**						
0000	E	12' X 9' RCB	426	221	CH50	SW3SC	0.26	0.37
0010	E	10' X 8' RCB	804	221	CH50	SW3SC	0.26	0.37
0059	E	6' X 5' RCB	2680	221	CH50	SW3SC	0.48	0.56
FWWL		**FREEWAY CHANNEL-WALDMAN AVENUE**						
0000	E	6' X 6' RCB	1110	497	CWAL2	SW3SC	0.54	0.20
LCCH		**LAS VEGAS CREEK CHANNEL**						
0000	E	2: 12' X 7' RCB	655	2689	CLC20-C	MEADOWS4	9.47	1.28
0013	E	2: 12' X 6' RCB	2152	2689	CLC20-C	MEADOWS4	9.47	0.82
LV15		**FREEWAY CHANNEL**						
0059	E	Conc Chnl 20'W 10'D 1:1 SS	1600	4669	2CLV1D-5	CWEST4	10.41	0.18
0080	E	Conc Chnl 20'W 10'D 1:1 SS	4100	4346	CLV1D-4	CWEST4	9.61	0.18
0190	E	Conc Chnl 20'W 10'D 1:1 SS with Drop Structures	100	4185	CW1C2	NW4SC	9.04	0.18
0191	E	Conc Chnl 20'W 10'D 1:1 SS with Drop Structures	100	4185	CW1C2	NW4SC	9.04	0.18
0193	E	Conc Chnl 20'W 10'D 1:1 SS with Drop Structures	1300	4185	CW1C2	NW4SC	9.04	0.18
0210	E	Conc Chnl 8'W 8'D 1:1 SS	1000	3697	CVG24	NW3SC	7.09	0.18
0210	P0	Conc Chnl 60'W 8'D 0:1 SS	1000	3697	CVG24	NW3SC	7.09	0.18
0229	E	2: 7.5' X 3' RCBC	80	3697	CVG24	NW3SC	7.09	0.18
0229	P1	5: 14' X 8' RCBC	80	3697	CVG24	NW3SC	7.09	0.18
0230	E	Conc Chnl 8'W 8'D 1:1 SS	2900	2725	CCVG10	NW3SC	5.25	0.18
0230	P0	Conc Chnl 45'W 8'D 0:1 SS	3000	2725	CCVG10	NW3SC	5.25	0.18
0284	E	11' X 6' RCB	3000	1295	CVG10-C	NW3SC	4.82	0.56
0337	E	9' X 6' RCB	4500	1067	CWA20C	NW3SC	4.48	0.66
0424	P1	8' X 7' RCB	5500	627	CWA15-C	NW3SC	3.69	0.73
LVBR		**LAS VEGAS - BROOK**						
0000	P1	Conc Chnl 12'W 4.5'D 2:1 SS	700	994	CLV1D-5	CWEST3	0.80	2.90
0011	P1	8' X 7' RCBC @ N. 5th St	100	994	CLV1D-5	CWEST3	0.80	2.90
0013	E	Conc Chnl 12'W 4.5'D 2:1 SS	850	994	CLV1D-5	CWEST3	0.80	2.60
0014	P1	8' X 7' RCBC @ Losee	100	994	CLV1D-5	CWEST3	0.80	2.60
0026	P1	Conc Chnl 12'W 4.5'D 2:1 SS	850	994	CLV1D-5	CWEST3	0.80	4.30
LVCH		**RANGE WASH - CHRISTY LATERAL**						
0000	P1	12' X 9' RCB	6100	1072	C326B3	RW3	1.97	0.33
0114	P1	10' X 7' RCB	2600	844	C324-5	RW3	1.60	0.58
LVCO		**COLORADO AVENUE SYSTEM**						
0000	E	14' X 8' RCB	3400	1036	CNEL06	SW3SC	1.30	0.25
0064	E	10' X 8' RCB	2200	1036	CNEL06	SW3SC	1.30	0.25
0106	E	14' X 6' RCBC @ Lamb	500	830	CCCH94	SW3SC	0.98	0.25
0109	E	10' X 5' RCB	2500	394	CCH92-C	SW3SC	0.35	0.25
LVLE		**LAKE MEAD DRAIN TO LAS VEGAS WASH**						
0000	P1	12' X 9' RCB	2500	1185	CLV1B-2	CWEST3	1.28	0.40
0047	P1	12' X 7' RCB	2600	1000	CLV1B-1	CWEST3	0.97	0.50
LVLM		**LAS VEGAS WASH - LAKE MEAD**						
0000	E	54" RCP	978	1005	CLM20-C	NW3SC	1.36	4.46
0000	P0	7' X 6' RCB	978	1005	CLM20-C	NW3SC	1.36	4.46
0016	E	42" X 68" HERCP	772	1005	CLM20-C	NW3SC	1.36	1.00
0016	P0	8' X 8' RCB	772	1005	CLM20-C	NW3SC	1.36	1.00
0033	E	66" RCP	1186	1005	CLM20-C	NW3SC	1.36	1.26
0033	P0	8' X 8' RCB	1186	1005	CLM20-C	NW3SC	1.36	1.26
0059	E	66" RCP	5952	1005	CLM20-C	NW3SC	1.36	1.07
0059	P0	8' X 8' RCB	5952	1005	CLM20-C	NW3SC	1.36	1.07
LVLV		**LAS VEGAS BLVD DRAIN**						
0000	P1	2: 10' X 9' RCB	2600	1031	CLW075-4	CWEST3	1.03	0.10
LVMD		**LAS VEGAS WASH - MIDDLE**						
0639	P0	Rip Rap Levee (West) 2'	9050	18714	CRWSL	LVWSC2	200.00	0.14
0640	P2	Earth/Rip Rap/Soil Cement Chnl 170'W 13'D 3:1 SS	9150	18714	CRWSL	LVWSC2	200.00	0.21
0716	P0	Rip Rap Levee (East) 2'	9050	18714	CRWSL	LVWSC2	200.00	0.14
0819	E	Conc Chnl 120'W 13.3'D 3:1 SS	390	18714	CRWSL	LVWSC2	200.00	0.14
0826	E	10: 12' X 10' RCBC @ Vegas Valley	90	18714	CRWSL	LVWSC2	200.00	0.10
0827	E	Conc Chnl 120'W 10'D 3:1 SS	1290	18714	CRWSL	LVWSC2	200.00	0.40
0873	E	Conc Chnl 120'W 10'D 3:1 SS	550	16443	CFLWA	LVWSC2	200.00	0.40
0883	P2	Conc Chnl 120'W 10'D 2:1 SS	1120	16443	CFLWA	LVWSC2	200.00	0.40

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
LVMD		**LAS VEGAS WASH - MIDDLE -- continued**						
0908	P2	Reinforced Grass Chnl 120'W 12.5'D 2:1 SS	970	16443	CFLWA	LVWSC2	200.00	0.40
0915	E	Earth Chnl 40'W 8-10'D 1:1 SS	1300	14774	CFW37	CLVWASH5	120.82	0.50
0915	P1	Conc Chnl 120'W 8'D 0:1 SS	1300	14774	CFW37	CLVWASH5	120.82	0.50
0923	E	5 Span Bridge 50'W 5'D @ Desert Rose CC	100	14774	CFW37	CLVWASH5	120.82	0.50
0923	P1	Bridge 250'W 6'D @ Desert Rose CC with Conc Bottom	100	14774	CFW37	CLVWASH5	120.82	0.50
0924	E	Grass Chnl 400'W 4'-6'D 1:1 SS	1150	14774	CFW37	CLVWASH5	120.82	0.50
0948	E	3 Span Bridge 130'W 5'D @ Sahara	100	14763	CLVCH	CLVWASH5	120.42	0.50
0948	P1	Bridge 250'W 6'D @ Sahara with Conc Bottom	250	14763	CLVCH	CLVWASH5	120.42	0.50
0949	E	Grass Chnl 400'W 4'-6'D 1:1 SS	1900	14763	CLVCH	CLVWASH5	120.42	0.50
0973	E	Grass Chnl 400'W 4'-6'D 1:1 SS	2300	14490	CNLWY	CLVWASH5	118.33	0.30
1031	E	Free Span Bridge 50'W 10'-12'D @ Desert Rose CC	100	14490	CNLWY	CLVWASH5	118.33	0.30
1032	E	Earth Chnl 75'W 10'-12'D 1:1 SS	739	14490	CNLWY	CLVWASH5	118.33	0.30
1032	P1	Conc Chnl 75'W 11'D 1:1 SS	739	14490	CNLWY	CLVWASH5	118.33	0.30
1046	E	5 Span Bridge 75'W 10'-12'D 1:1 SS @ Nellis	120	14424	CCNEL06	CLVWASH5	117.87	0.52
1047	E	Earth Chnl 80'W 8'D 2:1 SS	1162	14176	CNEL04-2	CLVWASH5	116.57	0.50
1047	P1	Conc Chnl 120'W 8'D 0:1 SS	1162	14176	CNEL04-2	CLVWASH5	116.57	0.50
1069	E	5 Span Bridge 90'W 8'D 2:1 SS @ Charleston	120	14176	CNEL04-2	CLVWASH5	116.57	0.50
1070	E	Earth Chnl 90'W 10'-12'D 1.5:1 SS	2587	13358	CCST03-C	CLVWASH5	111.52	0.43
1070	P1	Conc Chnl 90'W 8.5'D 1.5:1 SS	2587	13358	CCST03-C	CLVWASH5	111.52	0.43
1119	E	5 Span Bridge 90'W 12'D 2:1 SS @ Stewart	120	13358	CCST03-C	CLVWASH5	111.52	0.20
1120	E	Earth Chnl 90'W 12'D 1:1 SS	1400	13255	CCCA10-C	CLVWASH5	111.05	0.20
1120	P1	Conc Chnl 90'W 10.5'D 1:1 SS	1400	13255	CCCA10-C	CLVWASH5	111.05	0.20
1148	E	Earth Chnl 70'W 18'-20'D 1.5:1 SS	1675	12581	CCBN15-C	CLVWASH5	108.05	0.41
1148	P1	Conc Chnl 70'W 9.5'D 1.5:1 SS	1675	12581	CCBN15-C	CLVWASH5	108.05	0.41
1176	E	5 Span Bridge 110'W 20'D 2:1 SS @ Bonanza	80	12581	CCBN15-C	CLVWASH5	108.05	0.57
1178	E	Earth Chnl 30'W 18'-20'D 2:1 SS	2900	12415	CLVW04-C	CLVWASH5	107.30	0.57
1178	P1	Conc Chnl 60'W 9.5'D 2:1 SS	2900	12415	CLVW04-C	CLVWASH5	107.30	0.57
1232	E	Earth Chnl 48'W 8'D 1.5:1 SS	2059	12415	CLVW04-C	CLVWASH5	107.30	0.73
1232	P1	Conc Chnl 90'W 8'D 0:1 SS	2059	12415	CLVW04-C	CLVWASH5	107.30	0.73
1271	E	4 Span Bridge 94'W 10'-12'D 2:1 SS @ Lamb	120	12372	CCLVW03	CLVWASH5	107.01	0.38
1272	E	Earth Chnl 80'W 10'D 2:1 SS	2400	11776	CLVW01	CLVWASH5	103.64	0.38
1272	P1	Conc Chnl 80'W 8.5'D 2:1 SS	2400	11776	CLVW01	CLVWASH5	103.64	0.38
1321	P1	Conc Chnl 80'W 7.5'D 2:1 SS	2200	8911	2CLV1B-2*	CLVWASH5	78.65	0.38
1354	E	5 Span Bridge 110'W 7'-8'D 2:1 SS @ Owens	120	8911	2CLV1B-2*	CLVWASH5	78.65	0.58
1355	E	Gabion Chnl 100'W 10'D 2:1 SS	3432	8911	2CLV1B-2	CLVWASH5	78.65	0.58
1420	E	7: 8'-12' X 8' RCBC	200	8892	2CLV1B-2	CCWEST5	78.65	0.60
1421	E	Earth Chnl 60'W 8'D 1:1SS	3221	8782	CLW64-4	CCWEST5	77.37	0.60
1421	P2	Conc Chnl 84'W 10'D 0:1 SS	3221	8782	CLW64-4	CCWEST5	77.37	0.33
1482	E	5: 120" CMP @ Carey	120	8782	CLW64-4	CCWEST5	77.37	0.40
1482	P2	2 Span Bridge 84'W 6.5'D @ Carey	120	8782	CLW64-4	CCWEST5	77.37	0.39
1483	E	Earth Chnl 75'W 6'D 2:1SS	2693	8782	CLW64-4	CCWEST5	77.37	0.40
1483	P2	Conc Chnl 80'W 10'D 1.5:1 SS	1300	8782	CLW64-4	CCWEST5	77.37	0.36
1509	P2	Conc Chnl 80'W 10'D 1.5:1 SS	1400	8712	2CLW1A-4	CCWEST5	76.42	0.36
1534	E	5: 12' X 7' RCBC @ Las Vegas Blvd	120	8712	2CLW1A-4	CCWEST5	76.42	0.70
1534	P2	2 Span Bridge 95.5'W 6'D @ Las Vegas Blvd	120	8712	2CLW1A-4	CCWEST5	76.42	0.70
1535	E	Earth Chnl 80'W 6'D 3:1SS	730	8578	2CLW100	CCWEST5	74.73	0.90
1535	P2	Conc Chnl 80'W 10'D 1.5:1 SS	899	8578	2CLW100	CCWEST5	74.73	0.52
1549	E	Earth Chnl 70'W 8'-10'D 1:1 SS	2376	8226	CHYPEAK	CCWEST5	74.73	0.50
1549	P2	Conc Chnl 80'W 10'D 1.5:1 SS	2218	8226	CHYPEAK	CCWEST5	74.45	0.52
LVNC		**LAS VEGAS WASH - N CHANNEL**						
0000	E	Earth Chnl 40'W 8'-10'D 2:1 SS	400	987	CLW100	CWEST5	13.99	0.70
0000	P1	Conc Chnl 12'W 5.5'D 2:1 SS	400	987	CLW100	CWEST5	13.99	0.70
0007	E	Drop Structure 18'W 2.8'D 3:1 SS	50	987	CLW100	CWEST5	13.99	0.70
0008	E	Conc Chnl 18'W 10'D 2:1 SS	1531	987	CLW100	CWEST5	13.99	0.70
LVOE		**OWENS AVENUE - EAST**						
0000	P1	15' X 10' RCB	4700	2234	CK-C	SW5	24.71	0.47
0085	P1	12' X 11' RCB	2600	2191	CG	SW5	24.39	0.62
0134	P1	12' X 9' RCB	5300	2141	CE-C	SW5	24.16	1.00
0236	P1	10' X 10' RCB	2640	1964	CH-C	SW5	23.63	1.33
LVOW		**OWENS AVENUE SYSTEM**						
0000	E	96" RCP	7700	1506	CLM16B-C	NW3SC	2.36	0.70
LVSR		**LAS VEGAS WASH - SMOKE RANCH**						
0000	E	Conc Chnl 22'W 8'D 0:1 SS	50	1451	CS1-C	NW3SC	1.59	2.32
0001	E	Free Span Bridge 22'W 10'D	50	1451	CS1-C	NW3SC	1.59	2.32
0002	E	Conc Chnl 22'W 8'D 0:1 SS	370	1451	CS1-C	NW3SC	1.59	2.32
0009	E	72" RCP	581	1451	CS1-C	NW3SC	1.59	2.32
0009	P1	10' X 6' RCB	581	1451	CS1-C	NW3SC	1.59	2.32
0020	E	60" RCP	1320	1451	CS1-C	NW3SC	1.59	3.03
0020	P1	10' X 6' RCB	1320	1451	CS1-C	NW3SC	1.59	3.03
0045	E	54" RCP	1320	1451	CS1-C	NW3SC	1.59	3.41
0045	P1	10' X 6' RCB	1320	1451	CS1-C	NW3SC	1.59	3.41
0070	E	66" RCP	4118	1126	CS	NW3SC	1.12	0.73
0070	P1	10' X 8' RCB	4118	1126	CS	NW3SC	1.12	0.73
0148	E	54" RCP	2587	1126	CS	NW3SC	1.12	0.58
0148	P1	11' X 8' RCB	2587	1126	CS	NW3SC	1.12	0.58
LVWH		**WASHINGTON AVENUE CHANNEL**						
0086	E	3: 12' X 8' RCB	1111	3997	CLVW01-C	SW5	24.96	0.33
0087	E	3: 12' X 8' RCB	1466	3997	CLVW01-C	SW5	24.96	0.33
0136	E	3: 12' X 8' RCB	2250	3918	CQ-C	SW5	24.72	0.33

ID / River Mile	Status	Facility Description	Length (ft.)	Flow (cfs)	HEC-1 Node	HEC-1 Model	Tributary Area (sq.mi.)	Channel Slope (%) **
LVWH		**WASHINGTON AVENUE CHANNEL -- continued**						
0155	E	3: 10' X 8' RCB	3773	3918	CQ-C	SW5	24.72	0.68
0234	E	2: 12' X 8' RCB	620	3718	CN-C	SW5	24.15	0.71
0240	E	2: 12' X 8' RCB	3435	3718	CN-C	SW5	24.15	1.50
0303	E	12' X 8' RCB	4000	2631	DCV1-C	SW5	23.34	0.90
0305	E	12' X 8' RCB	468	2631	DCV1-C	SW5	23.34	2.40
0390	E	12' X 8' RCB	2057	2631	DCV1-C	SW5	23.34	0.50
0429	E	Splitter Structure (2: 12' X 8' RCB)	115	5030	CLC21	SW5	22.72	1.90
0431	E	3: 14.33' X 10' RCB	766	4765	CCAL93	SW5	22.12	0.15
0446	E	3: 14.33' X 10' RCB Junction at F Street	69	4765	CCAL93	SW5	22.12	0.15
0447	E	3: 14.33' X 10' RCB	1942	4765	CCAL93	SW5	22.12	0.15
0484	E	Confluence Structure (3: 14.33' X 10' RCB)	246	4765	CCAL93	SW5	22.12	0.15
NLFL		**NELLIS FLAMINGO STORM DRAIN**						
0131	E	42" RCP	650	351	M1	FLAM3SC	0.51	0.23
0144	E	36" RCP	620	351	M1	FLAM3SC	0.51	0.20
NLWY		**NELLIS-WYOMING CHANNEL**						
0000	E	Conc Chnl 8'W 4'D 1.3:1 SS	260	342	FW35	FLAM3SC	0.47	1.71
0004	E	15' X 6' Arch Culvert	80	342	FW35	FLAM3SC	0.47	1.30
0006	E



FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY,
NEVADA AND
INCORPORATED AREAS

PANEL 2195 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LAS VEGAS, CITY OF	325276	2195	E
CLARK COUNTY, UNINCORPORATED AREAS	320003	2195	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
32003C2195 E

MAP REVISED:
SEPTEMBER 27, 2002

Federal Emergency Management Agency

GRAPHIC SCALE

1,000 500 0 1,000 2,000 3,000 4,000

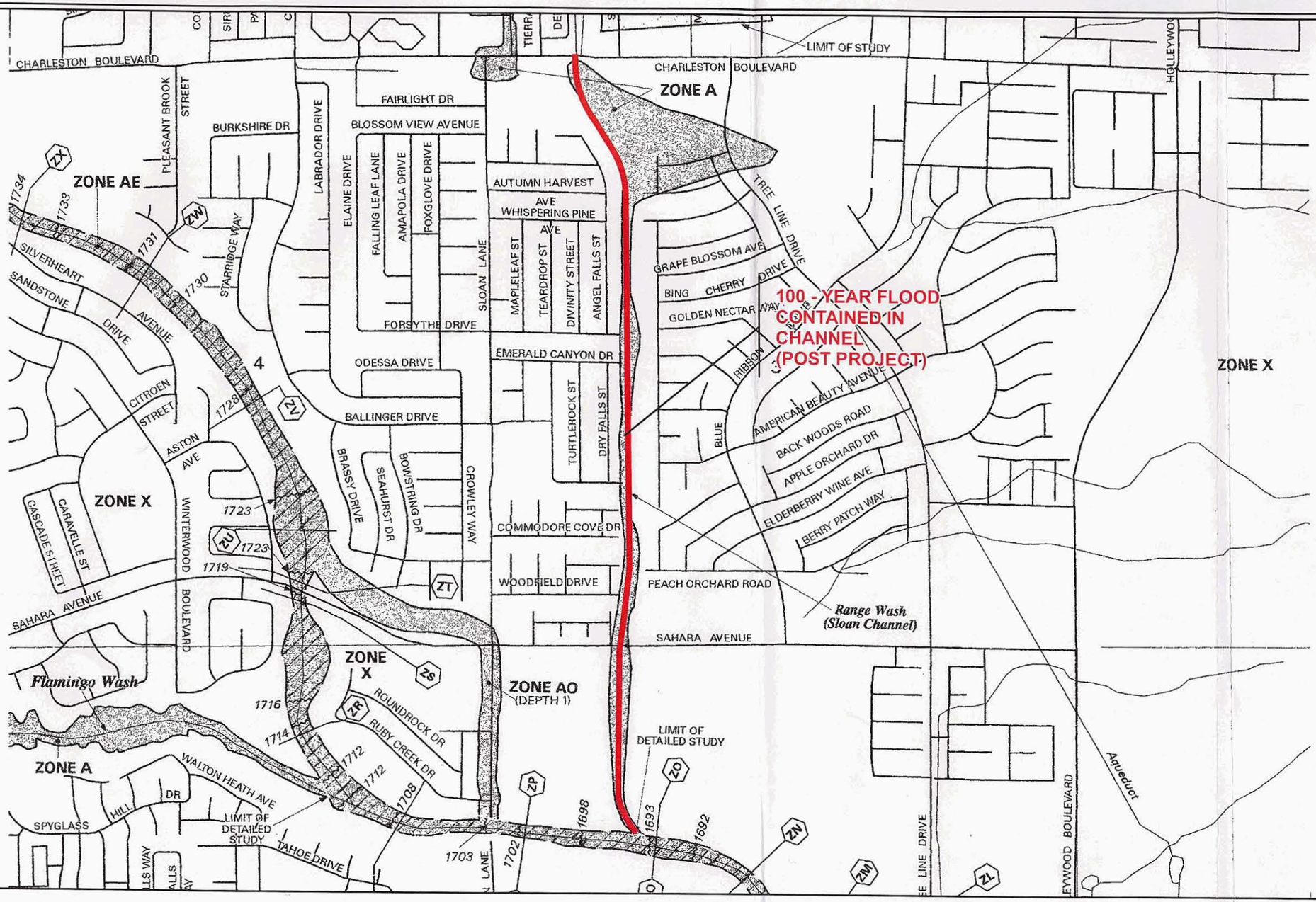
(In Feet)

1 inch = 1000 ft.

FIGURE 3

FEMA FLOODZONE MAP

PBS&J
2270 Corporate Circle
Suite 100
Henderson, Nevada 8907
Tele: 702-263-7275
Fax: 702-263-7200



ZONE A TO BE Removed

GRAPHIC SCALE

1,000 500 0 1,000 2,000 3,000 4,000

(In Feet)

1 inch = 1000 ft.

FIRM

FLOOD INSURANCE RATE MAP

CLARK COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 2195 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LAS VEGAS, CITY OF	320276	2195	E
CLARK COUNTY, UNINCORPORATED AREAS	320003	2195	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 32003C2195 E

MAP REVISED: SEPTEMBER 27, 2002

Federal Emergency Management Agency

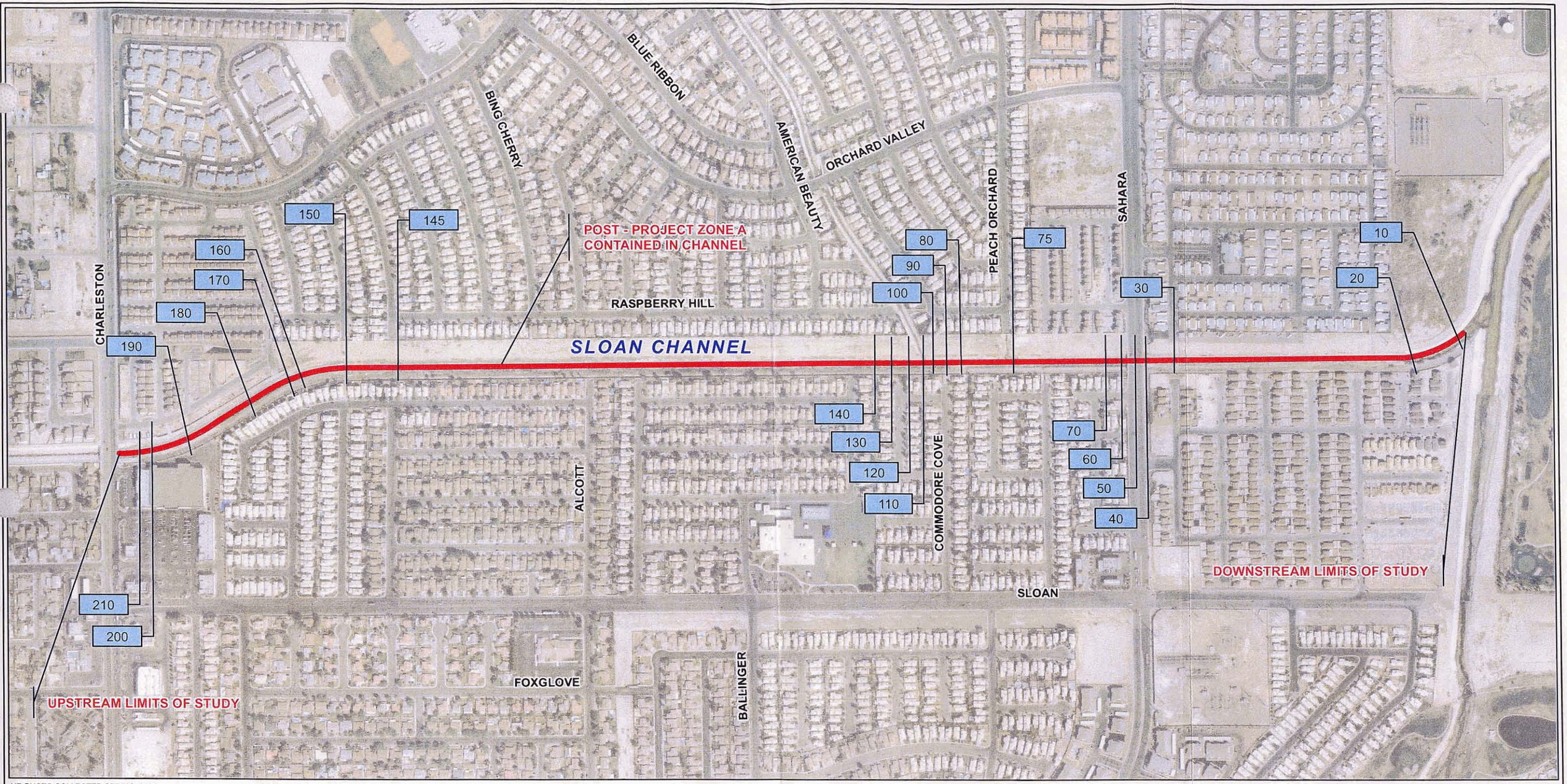
Proposed Flood Zone

FIGURE 4

ANNOTATED POST PROJECT FEMA FLOODZONE MAP

PBS&J
2270 Corporate Circle
Suite 100
Henderson, Nevada 89074
Tele: 702-263-7275
Fax: 702-263-7200

ENGINEERING - PLANNING - SURVEYING - CONSTRUCTION SERVICES



AIR PHOTO COLLECTED SPRING, 2004

500 250 0 500 1,000

(In Feet)

1 inch = 500 ft.

NOTES

1. THE HECRAS MODEL CROSS-SECTION ELEVATIONS ARE BASED ON NAVD 88.

I HEREBY CERTIFY THAT THE INFORMATION USED TO PREPARE THIS CLOMR IS IN SUBSTANTIAL CONFORMANCE WITH THE PROPOSED CHANNEL IMPROVEMENT PLANS LOCATED IN APPENDIX E.

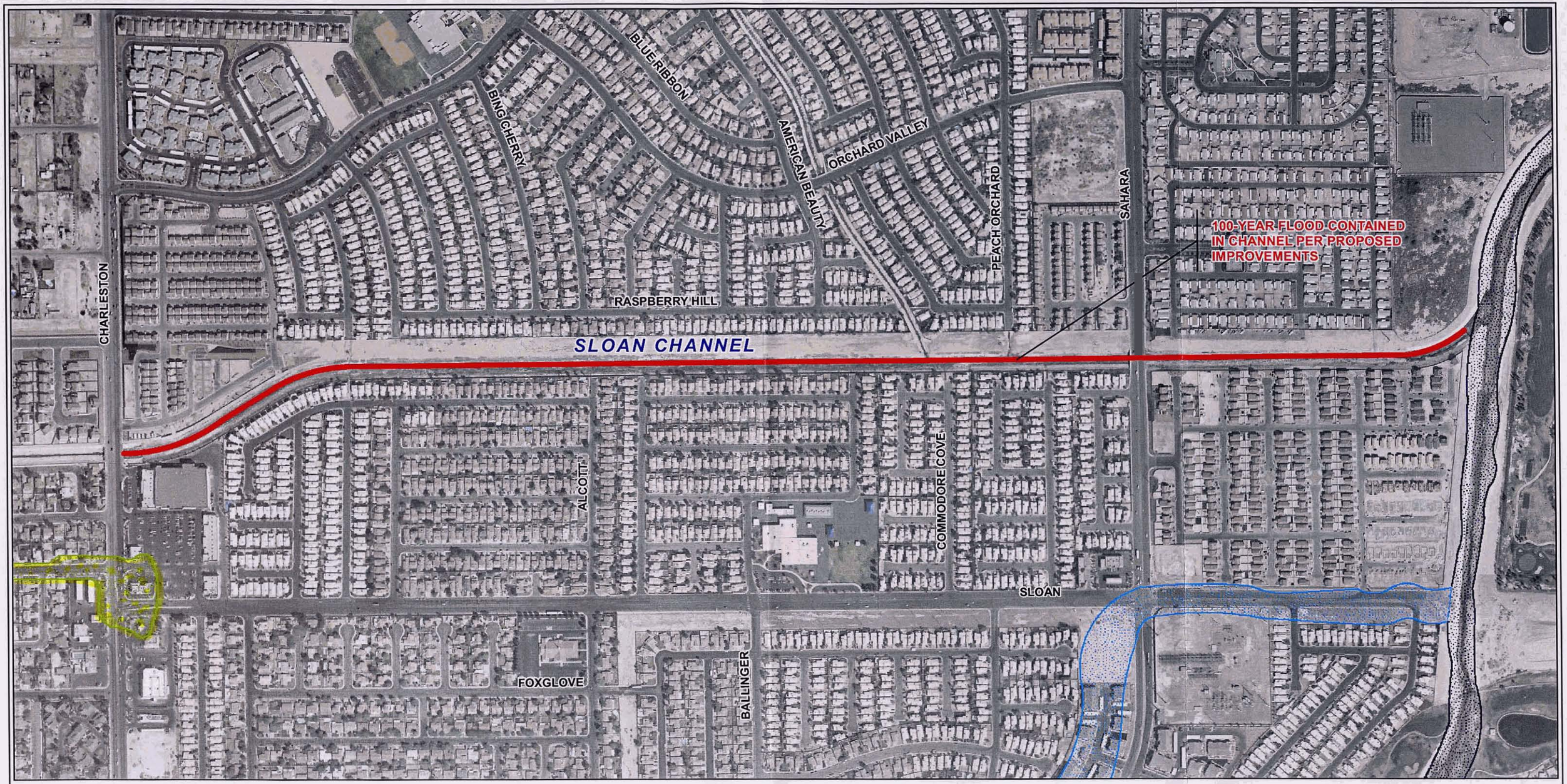
MATTHEW S. BAIRD, NV 13684 — DATE 12/21/04

POST PROJECT CONDITIONS CROSS SECTION (TYP)

WORKMAP

CHARLESTON BLVD TO LAS VEGAS WASH FIGURE 5

PBS&J
2270 Corporate Circle
Suite 100
Henderson, Nevada 89074
Tele: 702-263-7275
Fax: 702-263-7200
ENGINEERING - PLANNING - SURVEYING - CONSTRUCTION SERVICES



Proposed Flood Zone

Flood Zone

- Zone A
- Zone AE
- Zone AO

NOTES

1. THE HECRAS MODEL CROSS-SECTION ELEVATIONS ARE BASED ON NAVD 88.

500 250 0 500 1,000

(In Feet)

1 inch = 500 ft.

PROPOSED FLOODZONE

CHARLESTON BLVD TO
LAS VEGAS WASH
FIGURE 6

PBS&J
2270 Corporate Circle
Suite 100
Henderson, Nevada 89074
Tele: 702-263-7275
Fax: 702-263-7200
ENGINEERING - PLANNING - SURVEYING - CONSTRUCTION SERVICES

Appendix C: Hydrology

RFIS-CC.OUT

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   30SEP04  TIME  13:09:52   *
*                                       *
*****************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
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X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


```
          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

                    *DIAGRAM
*** FREE ***
               1    ID                    RANGE WASH - FLOOD INSURANCE RESTUDY
               2    ID              FOR: CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
               3    ID                 BY: POST, BUCKLEY, SCHUH & JERNIGAN, INC.
               4    ID                          JOB. NO. 51804
               5    ID                       HEC-1 FILE: RFIS-CC.DAT
               6    ID                          DECEMBER 1995
               7    ID
               8    ID                    EXISTING CONDITIONS DOWNSTREAM OF THE
               9    ID           CONFLUENCE DETENTION BASIN, CURRENTLY UNDER CONSTRUCTION.
              10    ID         STORM CENTERING FOR NODE V2, AT SLOAN CHANNEL DOWNSTREAM OF STEWART,
              11    ID         AND FOR NODE CC, AT THE SLOAN CHANNEL AND LAS VEGAS WASH CONFLUENCE.
              12    ID
              13    ID    ************************************************************************
              14    ID    *              FROM: CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE        *
              15    ID    *                          RANGE WASH WATERSHED                        *
              16    ID    *                JAMES M. MONTGOMERY, CONSULTING ENGINEERS, INC.       *
              17    ID    *                              JANUARY 1991                            *
              18    ID    *                  PRESENT CONDITIONS, EXISTING FACILITIES             *
              19    ID    *                   BASED ON RANGE WASH FACILITIES STUDY               *
              20    ID    *                      BOYLE ENGINEERS CORP-JULY 1989                  *
              21    ID    *                                                                      *
              22    ID    *                   (CONVERTED RK TO RM IN UPLAND SUBAREAS)            *
              23    ID    *MODIFIED TO REMOVE SUBAREAS TRIBUTARY TO WEST RANGE DIVERSION DIKE (1/91)*
              24    ID    ************************************************************************
              25    ID    *                    100-YEAR, 6-HOUR STORM, AMC 2.0                   *
              26    ID    ************************************************************************
              27    ID    * STORM DISTRIBUTION 5 (SDN 5) FOR TOTAL BASIN AREA GREATER THAN 10 SQ.MI.*
              28    ID    *  ONLY FOR DRAINAGE BASINS DOWNSTREAM OF CONFLUENCE THE DETENTION BASIN, *
              29    ID    *  JR DARF RATIO 0.85 FOR NODE V2, AT SLOAN CHANNEL DOWNSTREAM OF STEWART *
              30    ID    *  AND 0.82 FOR NODE CC, AT THE SLOAN CHANNEL/LAS VEGAS WASH CONFLUENCE.  *
              31    ID    ************************************************************************
              32    ID
              33    IT       05       0       0     200
              34    IO        5       0       0
              35    JR     PREC    0.85    0.82

              36    KK     318C
              37    KM    BASIN 318C CONTRIBUTES FLOW TO NODE M1.
              38    KM    NODE M1 GIVES THE TOTAL FLOW IN THE SLOAN CHANNEL JUST UPSTREAM OF
              39    KM    THE CONFLUENCE WITH THE RANGE WASH CHANNEL.
              40    BA     1.28
              41    PB     2.93
              42    PC     .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
              43    PC     .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
              44    PC     .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
              45    PC     .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
              46    PC     .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
              47    PC     .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
              48    PC     .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
              49    PC     .997    .999   1.00
              50    LS        0      79
              51    UD     0.75
                    *
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          LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

              52    KK     321-M
              53    KM    BASIN 321-M CONTRIBUTES FLOW TO THE RANGE WASH CHANNEL UPSTREAM OF
              54    KM    ITS CONFLUENCE WITH THE SLOAN CHANNEL.
              55    BA    0.691
              56    PB     2.77
              57    LS        0      67
              58    UD     1.66
```

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                *

 59             KK NODE.M3
 60             KM   COMBINE FLOWS FROM M1 AND M2 AT NODE M3.
 61             KM   NODE M3 IS THE TOTAL FLOW AT THE CONFLUENCE OF THE SLOAN CHANNEL
 62             KM   AND THE RANGE WASH CHANNEL AT SLOAN AND CAREY AVENUE.
 63             HC       2
                *

 64             KK   M3-S1
 65             KM   ROUTE FLOW FROM NODE M3 THROUGH THE SLOAN CHANNEL TO NODE S1.
 66             RK    2640   0.004   0.015       0    TRAP      40       3
                *

 67             KK   48A-M
 68             KM   BASIN 48A-M CONTRIBUTES FLOW TO NODE S1.
 69             BA   0.715
 70             PB    2.93
 71             LS       0      83
 72             UD    0.44
                *

 73             KK      S1
 74             KM   COMBINE FLOW FROM M3 WITH FLOW FROM BASIN 48A-M.
 75             KM   GIVES TOTAL FLOW IN THE SLOAN CHANNEL AT LAKE MEAD BLVD.
 76             HC       2
                *

 77             KK   S1-S2
 78             KM   ROUTE FLOW FROM S1 THROUGH THE SLOAN CHANNEL TO S2.
 79             RK    2640   0.002   0.015       0    TRAP      50       2
                *

 80             KK     48B
 81             KM   BASIN 48B CONTRIBUTES FLOW TO NODE R.
 82             BA   1.142
 83             PB    3.10
 84             LS       0      89
 85             UD    0.51
                *

 86             KK    R-S2
 87             KM   ROUTE FLOW FROM R THROUGH BASIN 49A-M TO NODE S2.
 88             RK   10500   0.022    0.02       0    TRAP      10      20
                *
1                                          HEC-1 INPUT                                                PAGE  3

LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 89             KK   49A-M
 90             KM   BASIN 49A-M CONTRIBUTES FLOW TO NODE S2.
 91             BA   0.693
 92             PB    2.85
 93             LS       0      79
 94             UD    0.49
                *

 95             KK NODE.S2
 96             KM   COMBINE FLOW FROM NODES S1 AND R WITH FLOW FROM BASIN 49A-M AT NODE S2.
 97             KM   GIVES TOTAL FLOW IN THE SLOAN CHANNEL AT OWENS AVENUE.
 98             HC       3
                *

 99             KK   S2-S3
100             KM   ROUTE FLOW FROM S2 THROUGH THE SLOAN CHANNEL TO S3.
101             RK    2640   0.004   0.014       0    TRAP      60       2
                *

102             KK     49C
103             KM   BASIN 49C CONTRIBUTES FLOW TO NODE S3.
104             BA   0.426
105             PB    2.85
106             LS       0      76
107             UD    0.53
                *

108             KK NODE.S3
109             KM   COMBINE FLOW FROM S2 WITH FLOW FROM BASIN 49C AT NODE S3.
110             KM   GIVES TOTAL FLOW IN THE SLOAN CHANNEL AT WASHINGTON AVE.
111             HC       2
                *

112             KK   49B-M
113             KM   BASIN 49B-M CONTRIBUTES FLOW TO NODE T1.
114             KM   NODE T1 REPRESENTS THE TOTAL FLOW TO THE DIVERSION CHANNEL ALONG
115             KM   WASHINGTON AVE. JUST UPSTREAM OF THE SLOAN CHANNEL.
116             BA   1.977
117             PB    3.00
118             LS       0      85
119             UD    0.61
                *

120             KK NODE.S4
121             KM   COMBINE FLOW FROM S3 WITH FLOW FROM T1 AT NODE S4.
122             KM   GIVES TOTAL FLOW IN THE SLOAN CHANNEL AT HARRIS AVE.
123             HC       2
                *
1                                          HEC-1 INPUT                                                PAGE  4

LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

124             KK   50B-M
125             KM   BASIN 50B-M CONTRIBUTES FLOW TO NODE V1.
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```
126          BA   0.628
127          PB    3.00
128          LS       0      80
129          UD    0.39
             *

130          KK NODE.V1
131          KM   COMBINE FLOW FROM S4 WITH FLOW FROM BASIN 50B-M AT NODE V1.
132          KM   GIVES TOTAL FLOW IN THE SLOAN CHANNEL AT BONANZA RD.
133          HC       2
             *

134          KK   V1-V2
135          KM   ROUTE FLOWS FROM V1 THROUGH THE SLOAN CHANNEL TO NODE V2.
136          RK    2640   0.008   0.014        0    TRAP      60       2
             *

137          KK   50A-M
138          KM   BASIN 50A-M CONTRIBUTES FLOW TO NODE V2.
139          BA   0.207
140          PB    2.85
141          LS       0      73
142          UD    0.46
             *

143          KK NODE.V2
144          KM   COMBINE FLOW FROM V1 WITH FLOW FROM BASIN 50A-M AT NODE V2.
145          KM   GIVES TOTAL FLOW IN THE SLOAN CHANNEL AT STEWART AVE.
146          HC       2
             *

147          KK   324-M
148          KM   BASIN 324-M CONTRIBUTES FLOW TO NODE V3.
149          BA   3.026
150          PB    2.85
151          LS       0      72
152          UD    0.77
             *

153          KK    STEW
154          KM   DIVERT FLOWS WHICH CONTINUE IN CHRISTY & LINN LANES, ETC
155          KM   FLOW IN STEWART GOES TO SLOAN CHANNEL
156          KM   FLOW IN CHRISTY GOES TOWARD LAS VEGAS WASH
157          DT      CL
158          DI       0      15     600
159          DQ       0       0     330
             *
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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

160          KK NODE.V3
161          KM   COMBINE FLOW FROM V2 WITH FLOW FROM BASIN 324-M AT NODE V3.
162          KM   GIVES TOTAL FLOW IN THE SLOAN CHANNEL
163          KM   SOUTH OF STEWART AVE.
164          HC       2
             *

165          KK   V3-V4
166          KM   ROUTE V3 THROUGH THE SLOAN CHANNEL TO V4.
167          RK    2000   0.003    0.03        0    TRAP      80       2
             *

168          KK     CLR
169          KM   RETREIVE FLOW IN CHRISTY AND LINN LANES
170          DR      CL
             *

171          KK    LINN
172          KM   FLOW IN LINN LANE GOES TO BASIN 326-A THEN TO SLOAN CHANNEL
173          KM   FLOW IN CHRISTY GOES TO LAS VEGAS WASH
174          DT   CHRIS
175          DI       0     100     500
176          DQ       0      78     390
             *

177          KK   326-A
178          KM   BASIN 326-A CONTRIBUTES FLOW TO NODE V4.
179          KM   GIVES TOTAL FLOW IN THE SECTION OF CHARLESTON BLVD. WEST OF SLOAN CHANNEL.
180          BA   0.231
181          PB    2.85
182          LS       0      79
183          UD    0.39
             *

184          KK  326-AL
185          KM   BASIN 326-A AND FLOW IN LINN LANE
186          HC       2
             *

187          KK    OR-1
188          KM   ORCHARDS OFFSITE DRAINAGE BASIN 01; CONTRIBUTES FLOW TO NODE X1.
189          KM   * BASINS WITH THE "OR" PREFIX ARE TAKEN FROM THE "CONCEPTUAL MASTER        *
190          KM   * DRAINAGE STUDY FOR LEWIS HOMES - ORCHARDS," BY PENTACORE, JANUARY, 1992. *
191          KM   * THE MAJORITY OF THE ORCHARDS SITE IS CONSTRUCTED; HOWEVER, THE PLANNED   *
192          KM   * ORCHARDS DETENTION BASIN IS NOT CONSTRUCTED. HYDROLOGY FROM THE ORCHARDS *
193          KM   * DRAINAGE STUDY HAS BEEN MODIFIED TO REPRESENT APPROXIMATE EXISTING       *
194          KM   * CONDITIONS, RATHER THAN FULLY DEVELOPED CONDITIONS.                      *
195          PB    3.00
196          BA   0.279
197          LS       0      89
198          UD    0.18
             *
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 199      KK   X1-X2
 200      KM   ROUTE X1 THROUGH BASIN OR-2 TO NODE X2.
 201      RK   10000   0.033    0.02       0    TRAP      20       10
          *

 202      KK    OR-2
 203      KM   ORCHARDS OFFSITE DRAINAGE BASIN 02; CONTRIBUTES FLOW TO NODE X2.
 204      BA   1.206
 205      PB    2.93
 206      LS       0      75
 207      UD    0.60
          *

 208      KK NODE.X2
 209      KM   COMBINE FLOW FROM X1 AND BASIN OR-2 AT NODE X2.
 210      KM   GIVES TOTAL FLOW IN THE SECTION OF CHARLESTON BLVD. EAST OF SLOAN CHANNEL.
 211      HC       2
          *

 212      KK NODE.V4
 213      KM   COMBINE FLOW FROM V3, X2 AND BASIN 326-A.
 214      KM   GIVES TOTAL FLOW TO THE SLOAN CHANNEL AT CHARLESTON BLVD.
 215      HC       3
          *

 216      KK   OR-11
 217      KM   ORCHARDS ONSITE BASIN OR-11 CONTRIBUTES FLOW TO NODE V5.
 218      BA  0.0428
 219      PB    2.85
 220      LS       0      75
 221      UD    0.20
          *

 222      KK NODE.V5
 223      KM   COMBINE FLOW FROM V4 AND BASIN OR-11.
 224      KM   TOTAL FLOW TO THE SLOAN CHANNEL APPROX. 1500 FT. SOUTH OF CHARLESTON BLVD.
 225      HC       2
          *

 226      KK   V5-Z2
 227      KM   ROUTE V5 THROUGH SLOAN CHANNEL TO THE ORCHARDS CHANNEL CONFLUENCE AT Z2.
 228      RK    2800   0.005    0.03       0    TRAP      60       2
          *

 229      KK    OR-3
 230      KM   ORCHARDS OFFSITE DRAINAGE BASIN O3.
 231      KM   GIVES FLOW TO NODE Y1, LOCATED AT CHARLESTON WEST OF HOLLYWOOD.
 232      BA   0.205
 233      PB    3.00
 234      LS       0      82
 235      UD    0.42
          *
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 236      KK   Y1-Z1
 237      KM   ROUTE NODE Y1 THROUGH BASIN OR-12 TO NODE Z1.
 238      RK    5500   0.011   0.016       0    TRAP      50       1
          *

 239      KK    OR-4
 240      KM   ORCHARDS OFFSITE DRAINAGE BASIN O4.
 241      KM   CONTRIBUTES FLOW TO NODE Y2.
 242      BA   0.448
 243      PB    3.00
 244      LS       0      88
 245      UD    0.29
          *

 246      KK   Y2-Y3
 247      KM   ROUTE NODE Y2 THROUGH BASIN OR-5 TO NODE Y3.
 248      RM       4    0.33    0.15
          *

 249      KK    OR-5
 250      KM   ORCHARDS OFFSITE DRAINAGE BASIN O5.
 251      KM   CONTRIBUTES FLOW TO NODE Y3.
 252      BA   0.373
 253      PB    3.00
 254      LS       0      77
 255      UD    0.44
          *

 256      KK      Y3
 257      KM   COMBINE FLOWS FROM Y2 AND BASIN OR-5 AT HOLLYWOOD.
 258      HC       2
          *

 259      KK   Y3-Z1
 260      KM   ROUTE Y3 THROUGH BASIN OR-12 TO NODE Z1.
 261      RK    5000   0.012   0.016       0    TRAP      50       1
          *

 262      KK   OR-6A
 263      KM   ORCHARDS OFFSITE DRAINAGE BASIN O6A.
 264      BA   0.264
 265      PB    3.00
 266      LS       0      88
 267      UD     .13
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                *

 268            KK   OR-6B
 269            KM   ORCHARDS OFFSITE DRAINAGE BASIN O6B,
 270            BA   0.160
 271            PB    3.00
 272            LS       0       89
 273            UD     .14
                *
1                                    HEC-1 INPUT                                                    PAGE  8

LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 274            KK   OR-6C
 275            KM   ORCHARDS OFFSITE DRAINAGE BASIN O6C.
 276            BA   0.191
 277            PB    3.00
 278            LS       0       87
 279            UD     .18
                *

 280            KKNODE.AA1
 281            KM   COMBINE FLOWS FROM BASINS OR-6A, OR-6B & OR-6C.
 282            HC       3
                *

 283            KK AA1-AA2
 284            KM   ROUTE AA1 THROUGH BASIN OR-7 TO NODE AA2.
 285            RM       4    0.32    0.15
                *

 286            KK    OR-7
 287            KM   ORCHARDS OFFSITE DRAINAGE BASIN O7.
 288            BA   0.613
 289            PB    3.00
 290            LS       0       77
 291            UD    0.49
                *

 292            KKNODE.AA2
 293            KM   COMBINE AA1 WITH FLOW FROM BASIN OR-7 AT NODE AA2.
 294            HC       2
                *

 295            KK  AA2-Z1
 296            KM   ROUTE AA2 THROUGH BASIN OR-12 TO NODE Z1.
 297            RK    4500   0.013   0.016       0    TRAP      50       1
                *

 298            KK    OR-8
 299            KM   ORCHARDS OFFSITE BASIN O8; CONTRIBUTES FLOW TO NODE AA3.
 300            BA   0.017
 301            PB    3.00
 302            LS       0       77
 303            UD    0.18
                *

 304            KK  R8-AA3
 305            KM   ROUTE FLOW FROM BASIN OR-8 THROUGH BASIN OR-9 TO NODE AA3 AT HOLLYWOOD.
 306            RM      10    0.82    0.15
                *
1                                    HEC-1 INPUT                                                    PAGE  9

LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 307            KK    OR-9
 308            KM   ORCHARDS OFFSITE DRAINAGE BASIN O9; CONTRIBUTES FLOW TO NODE AA3.
 309            BA   0.278
 310            PB    3.00
 311            LS       0       77
 312            UD    0.65
                *

 313            KKNODE.AA3
 314            KM   COMBINE FLOWS FROM BASINS OR-8 AND OR-9 AT NODE AA3.
 315            HC       2
                *

 316            KK  AA3-Z1
 317            KM   ROUTE AA3 THROUGH BASIN OR-12 TO NODE Z1.
 318            RK    4500   0.012   0.016       0    TRAP      50       1
                *

 319            KK   OR-12
 320            KM   ORCHARDS ONSITE DRAINAGE BASIN 12; CONTRIBUTES FLOW TO NODE Z1.
 321            BA   0.525
 322            PB    2.85
 323            LS       0       76
 324            UD    0.39
                *

 325            KK NODE.Z1
 326            KM   COMBINE FLOW FROM NODES Y1, Y3, AA2, AA3 AND BASIN OR-12 AT NODE Z1.
 327            KM   NODE Z1 REPRESENTS THE TOTAL FLOW IN THE CONCRETE-LINED ORCHARDS CHANNEL
 328            KM   TRIBUTARY TO THE SLOAN CHANNEL.
 329            HC       5
                *

 330            KK NODE.Z2
 331            KM   COMBINE FLOW FROM NODES V5 AND Z1.
 332            KM   TOTAL FLOW IN THE SLOAN CHANNEL AT ITS CONFLUENCE WITH THE ORCHARDS CHANNEL.
 333            HC       2
                *
```

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 334          KK   OR-13
 335          KM   ORCHARDS ONSITE DRAINAGE BASIN OR-13; CONTRIBUTES FLOW TO NODE Z3.
 336          BA   0.120
 337          PB    2.85
 338          LS       0       84
 339          UD    0.29
              *

 340          KK NODE.Z3
 341          KM   COMBINE FLOW FROM NODES Z2 AND BASIN OR-13 AT NODE Z3.
 342          KM   NODE Z3 IS THE TOTAL FLOW IN THE SLOAN CHANNEL AT APPROXIMATELY
 343          KM   450 FEET SOUTH OF THE ORCHARDS CHANNEL CONFLUENCE.
 344          HC       2
              *
1                                          HEC-1 INPUT                                                    PAGE 10

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 345          KK   OR-10
 346          KM   ORCHARDS OFFSITE DRAINAGE BASIN O10.
 347          KM   CONTRIBUTES FLOW TO NODE BB1, LOCATED AT THE HOLLYWOOD/SAHARA INTERSECTION.
 348          BA  0.0984
 349          PB    3.00
 350          LS       0       77
 351          UD    0.45
              *

 352          KK BB1-BB2
 353          KM   ROUTE BB1 THROUGH SAHARA AVENUE TO NODE BB2.
 354          RK    4000   0.014   0.016       0    TRAP     100       1
              *

 355          KK   OR-14
 356          KM   ORCHARDS ONSITE DRAINAGE BASIN 14; CONTRIBUTES FLOW TO NODE BB2.
 357          BA  0.0937
 358          PB    2.85
 359          LS       0       75
 360          UD    0.33
              *

 361          KKNODE.BB2
 362          KM   NODE BB2 REPRESENTS THE TOTAL FLOW IN SAHARA AVE. EAST OF THE SLOAN CHANNEL.
 363          HC       2
              *

 364          KKNODE.BB3
 365          KM   COMBINE FLOW FROM Z3 WITH FLOW FROM BB2.
 366          KM   NODE BB3 IS THE TOTAL FLOW IN SLOAN CHANNEL AT SAHARA AVE.
 367          HC       2
              *

 368          KK  BB3-CC
 369          KM   ROUTE BB3 THROUGH THE SLOAN CHANNEL TO NODE CC.
 370          RK    1700   0.006   0.025       0    TRAP      80       2
              *

 371          KK   52A-M
 372          KM   BASIN 52A-M CONTRIBUTES FLOW TO NODE CC.
 373          BA   0.286
 374          PB    2.85
 375          LS       0       73
 376          UD    0.84
              *

 377          KK NODE.CC
 378          KM   COMBINE FLOW FROM  NODE BB3 WITH FLOW FROM BASINS 326-B AND 52A-M.
 379          KM   NODE CC REPRESENTS THE TOTAL FLOW IN THE SLOAN CHANNEL JUST UPSTREAM OF
 380          KM   ITS CONFLUENCE WITH THE LAS VEGAS WASH.
 381          HC       2
              *
 382          ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    36        318C
                .
                .
    52          .       321-M
                .           .
                .           .
    59     NODE.M3............
                V
                V
    64       M3-S1
                .
                .
    67          .       48A-M
                .           .
                .           .
    73         S1............
                V
                V
    77       S1-S2
                .
                .
    80          .         48B
                .           V
                .           V
    86          .        R-S2
```
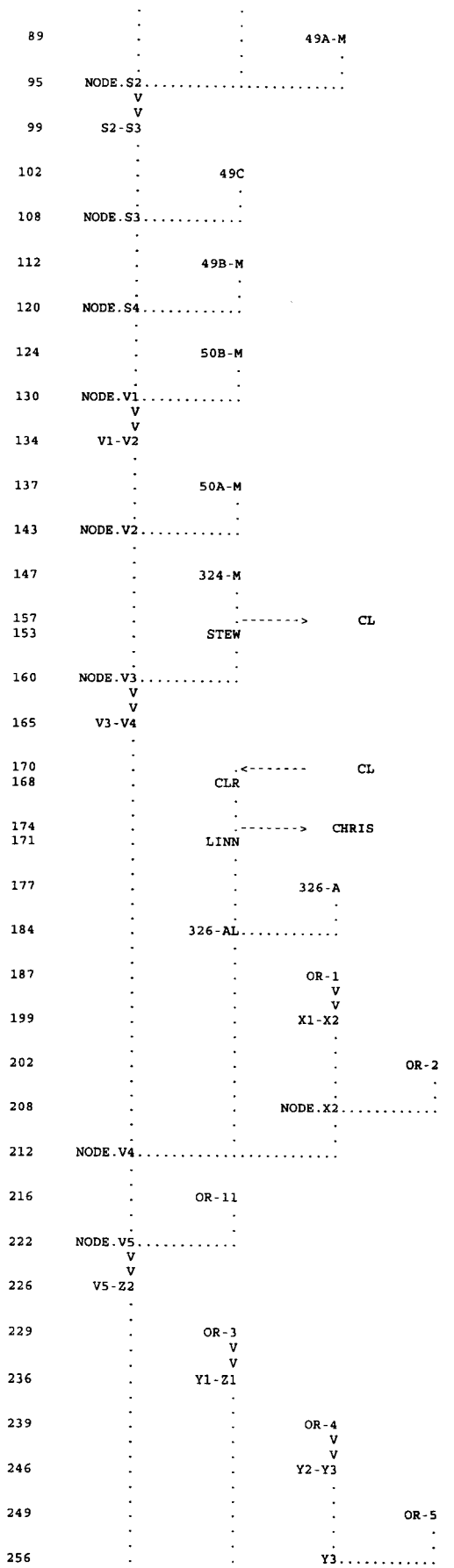
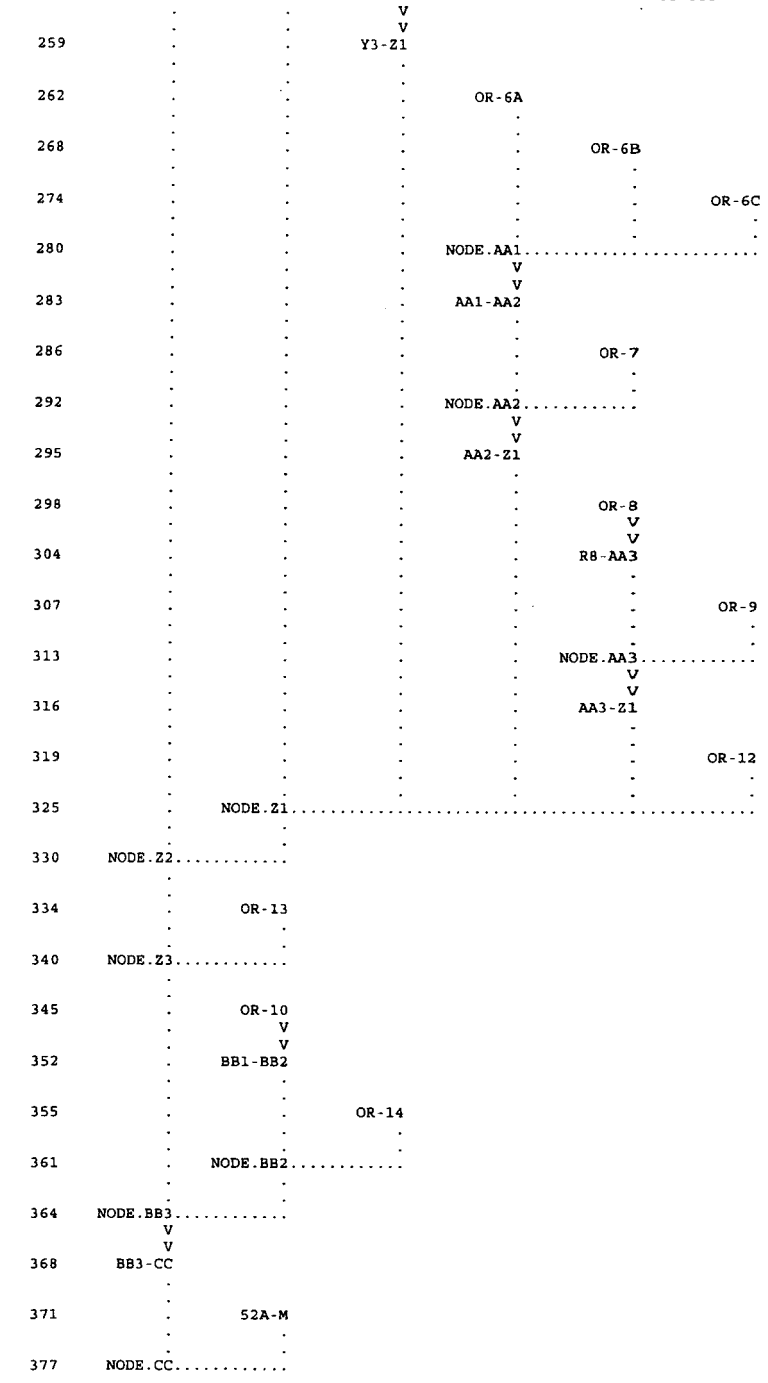


89
49A-M
95
NODE.S2
99
S2-S3
102
49C
108
NODE.S3
112
49B-M
120
NODE.S4
124
50B-M
130
NODE.V1
134
V1-V2
137
50A-M
143
NODE.V2
147
324-M
157
CL
153
STEW
160
NODE.V3
165
V3-V4
170
CL
168
CLR
174
CHRIS
171
LINN
177
326-A
184
326-AL
187
OR-1
199
X1-X2
202
OR-2
208
NODE.X2
212
NODE.V4
216
OR-11
222
NODE.V5
226
V5-Z2
229
OR-3
236
Y1-Z1
239
OR-4
246
Y2-Y3
249
OR-5
256
Y3



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   30SEP04  TIME  13:09:52   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*   HYDROLOGIC ENGINEERING CENTER       *
*        609 SECOND STREET              *
*      DAVIS, CALIFORNIA 95616          *
*         (916) 756-1104                *
*                                       *
*****************************************
```

RANGE WASH - FLOOD INSURANCE RESTUDY
FOR: CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
BY: POST, BUCKLEY, SCHUH & JERNIGAN, INC.
JOB. NO. 51804
HEC-1 FILE: RFIS-CC.DAT
DECEMBER 1995

EXISTING CONDITIONS DOWNSTREAM OF THE

CONFLUENCE DETENTION BASIN, CURRENTLY UNDER CONSTRUCTION.
STORM CENTERING FOR NODE V2, AT SLOAN CHANNEL DOWNSTREAM OF STEWART,
AND FOR NODE CC, AT THE SLOAN CHANNEL AND LAS VEGAS WASH CONFLUENCE.

```
**********************************************************************
*            FROM: CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE        *
*                          RANGE WASH WATERSHED                      *
*              JAMES M. MONTGOMERY, CONSULTING ENGINEERS, INC.       *
*                               JANUARY 1991                         *
*                PRESENT CONDITIONS, EXISTING FACILITIES            *
*                 BASED ON RANGE WASH FACILITIES STUDY              *
*                    BOYLE ENGINEERS CORP-JULY 1989                 *
*                                                                   *
*                  (CONVERTED RK TO RM IN UPLAND SUBAREAS)          *
*MODIFIED TO REMOVE SUBAREAS TRIBUTARY TO WEST RANGE DIVERSION DIKE (1/91)*
**********************************************************************
*                        100-YEAR, 6-HOUR STORM, AMC 2.0             *
**********************************************************************
* STORM DISTRIBUTION 5 (SDN 5) FOR TOTAL BASIN AREA GREATER THAN 10 SQ.MI.*
*  ONLY FOR DRAINAGE BASINS DOWNSTREAM OF CONFLUENCE THE DETENTION BASIN, *
*  JR DARF RATIO 0.85 FOR NODE V2, AT SLOAN CHANNEL DOWNSTREAM OF STEWART *
*  AND 0.82 FOR NODE CC, AT THE SLOAN CHANNEL/LAS VEGAS WASH CONFLUENCE.  *
**********************************************************************
```

```
   34 IO          OUTPUT CONTROL VARIABLES
                        IPRNT           5  PRINT CONTROL
                        IPLOT           0  PLOT CONTROL
                        QSCAL          0.  HYDROGRAPH PLOT SCALE

      IT          HYDROGRAPH TIME DATA
                        NMIN            5  MINUTES IN COMPUTATION INTERVAL
                       IDATE       1    0  STARTING DATE
                       ITIME         0000  STARTING TIME
                          NQ          200  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE       1    0  ENDING DATE
                      NDTIME        1635  ENDING TIME
                       ICENT          19  CENTURY MARK

                    COMPUTATION INTERVAL      .08 HOURS
                         TOTAL TIME BASE    16.58 HOURS

            ENGLISH UNITS
                 DRAINAGE AREA          SQUARE MILES
                 PRECIPITATION DEPTH    INCHES
                 LENGTH, ELEVATION      FEET
                 FLOW                   CUBIC FEET PER SECOND
                 STORAGE VOLUME         ACRE-FEET
                 SURFACE AREA           ACRES
                 TEMPERATURE            DEGREES FAHRENHEIT

      JP          MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

      JR          MULTI-RATIO OPTION
                      RATIOS OF PRECIPITATION
                       .85       .82
1
```

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .85	RATIO 2 .82
HYDROGRAPH AT						
+	318C	1.28	1	FLOW	312.	290.
				TIME	4.25	4.25
HYDROGRAPH AT						
+	321-M	.69	1	FLOW	45.	41.
				TIME	5.92	5.92
2 COMBINED AT						
+	NODE.M3	1.97	1	FLOW	323.	299.
				TIME	4.25	4.25
ROUTED TO						
+	M3-S1	1.97	1	FLOW	322.	298.
				TIME	4.25	4.25
HYDROGRAPH AT						
+	48A-M	.71	1	FLOW	290.	272.
				TIME	3.83	3.83
2 COMBINED AT						
+	S1	2.69	1	FLOW	545.	507.
				TIME	4.00	4.08
ROUTED TO						
+	S1-S2	2.69	1	FLOW	545.	507.
				TIME	4.08	4.08
HYDROGRAPH AT						
+	48B	1.14	1	FLOW	627.	596.
				TIME	3.92	3.92
ROUTED TO						
+	R-S2	1.14	1	FLOW	621.	589.
				TIME	4.00	4.08
HYDROGRAPH AT						

				TIME	4.08	4.08
HYDROGRAPH AT						
+	OR-11	.04	1	FLOW	14.	13.
				TIME	3.58	3.58
2 COMBINED AT						
+	NODE.V5	12.54	1	FLOW	3078.	2876.
				TIME	4.08	4.08
ROUTED TO						
+	V5-Z2	12.54	1	FLOW	3060.	2855.
				TIME	4.08	4.08
HYDROGRAPH AT						
+	OR-3	.20	1	FLOW	84.	79.
				TIME	3.83	3.83
ROUTED TO						
+	Y1-Z1	.20	1	FLOW	83.	77.
				TIME	3.92	3.92
HYDROGRAPH AT						
+	OR-4	.45	1	FLOW	293.	278.
				TIME	3.67	3.67
ROUTED TO						
+	Y2-Y3	.45	1	FLOW	258.	245.
				TIME	4.00	4.00
HYDROGRAPH AT						
+	OR-5	.37	1	FLOW	111.	102.
				TIME	3.83	3.83
2 COMBINED AT						
+	Y3	.82	1	FLOW	362.	342.
				TIME	4.00	4.00
ROUTED TO						
+	Y3-Z1	.82	1	FLOW	359.	339.
				TIME	4.08	4.08
HYDROGRAPH AT						
+	OR-6A	.26	1	FLOW	223.	212.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	OR-6B	.16	1	FLOW	140.	133.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	OR-6C	.19	1	FLOW	146.	138.
				TIME	3.58	3.58
3 COMBINED AT						
+	NODE.AA1	.62	1	FLOW	508.	483.
				TIME	3.58	3.58
ROUTED TO						
+	AA1-AA2	.62	1	FLOW	408.	387.
				TIME	3.83	3.83
HYDROGRAPH AT						
+	OR-7	.61	1	FLOW	173.	160.
				TIME	3.92	3.92
2 COMBINED AT						
+	NODE.AA2	1.23	1	FLOW	578.	544.
				TIME	3.83	3.83
ROUTED TO						
+	AA2-Z1	1.23	1	FLOW	572.	539.
				TIME	3.92	3.92
HYDROGRAPH AT						
+	OR-8	.02	1	FLOW	8.	7.
				TIME	3.58	3.58
ROUTED TO						
+	R8-AA3	.02	1	FLOW	5.	5.
				TIME	4.42	4.42
HYDROGRAPH AT						
+	OR-9	.28	1	FLOW	68.	63.
				TIME	4.08	4.08
2 COMBINED AT						
+	NODE.AA3	.29	1	FLOW	72.	66.
				TIME	4.17	4.17
ROUTED TO						
+	AA3-Z1	.29	1	FLOW	71.	66.
				TIME	4.25	4.25
HYDROGRAPH AT						
+	OR-12	.52	1	FLOW	137.	126.
				TIME	3.83	3.83
5 COMBINED AT						
+	NODE.Z1	3.07	1	FLOW	1177.	1101.
				TIME	3.92	3.92
2 COMBINED AT						
+	NODE.Z2	15.62	1	FLOW	4163.	3891.
				TIME	4.08	4.08

FOR PLAN = 1 RATIO= .85

V1-V2	MANE	.67	2419.16	241.61	1.01	5.00	2409.21	245.00	1.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4070E+03 EXCESS= .0000E+00 OUTFLOW= .4070E+03 BASIN STORAGE= .1041E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .82

V1-V2	MANE	.61	2269.59	241.59	.95	5.00	2262.06	245.00	.95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3815E+03 EXCESS= .0000E+00 OUTFLOW= .3815E+03 BASIN STORAGE= .1066E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .85

V3-V4	MANE	1.18	2614.11	247.01	.78	5.00	2610.32	245.00	.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4507E+03 EXCESS= .0000E+00 OUTFLOW= .4508E+03 BASIN STORAGE= .2760E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .82

V3-V4	MANE	1.20	2447.30	247.21	.73	5.00	2441.87	245.00	.73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4216E+03 EXCESS= .0000E+00 OUTFLOW= .4217E+03 BASIN STORAGE= .2788E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .85

X1-X2	MANE	4.27	229.82	223.45	1.51	5.00	219.70	225.00	1.51

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2230E+02 EXCESS= .0000E+00 OUTFLOW= .2254E+02 BASIN STORAGE= .2110E-03 PERCENT ERROR= -1.1

FOR PLAN = 1 RATIO= .82

X1-X2	MANE	4.24	209.83	221.69	1.43	5.00	205.56	225.00	1.43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2113E+02 EXCESS= .0000E+00 OUTFLOW= .2129E+02 BASIN STORAGE= .1659E-03 PERCENT ERROR= -.8

FOR PLAN = 1 RATIO= .85

V5-Z2	MANE	1.18	3075.27	247.18	.80	5.00	3060.30	245.00	.80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5348E+03 EXCESS= .0000E+00 OUTFLOW= .5350E+03 BASIN STORAGE= .3889E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .82

V5-Z2	MANE	1.12	2873.14	247.49	.75	5.00	2854.86	245.00	.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4997E+03 EXCESS= .0000E+00 OUTFLOW= .4999E+03 BASIN STORAGE= .3920E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .85

Y1-Z1	MANE	3.99	83.27	238.87	1.04	5.00	83.14	235.00	1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1131E+02 EXCESS= .0000E+00 OUTFLOW= .1134E+02 BASIN STORAGE= .1712E-02 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .82

Y1-Z1	MANE	4.04	77.97	235.57	.97	5.00	77.49	235.00	.97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1059E+02 EXCESS= .0000E+00 OUTFLOW= .1063E+02 BASIN STORAGE= .1776E-02 PERCENT ERROR= -.4

FOR PLAN = 1 RATIO= .85

Y3-Z1	MANE	2.13	360.97	242.90	1.13	5.00	359.37	245.00	1.13

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4939E+02 EXCESS= .0000E+00 OUTFLOW= .4946E+02 BASIN STORAGE= .1313E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .82

Y3-Z1	MANE	2.17	340.80	244.17	1.06	5.00	338.70	245.00	1.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4642E+02 EXCESS= .0000E+00 OUTFLOW= .4650E+02 BASIN STORAGE= .1471E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .85

AA2-Z1	MANE	1.52	576.80	232.93	1.10	5.00	572.49	235.00	1.10

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7186E+02 EXCESS= .0000E+00 OUTFLOW= .7197E+02 BASIN STORAGE= .1299E-02 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .82

AA2-Z1	MANE	1.63	540.39	234.43	1.03	5.00	539.02	235.00	1.03

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6749E+02 EXCESS= .0000E+00 OUTFLOW= .6759E+02 BASIN STORAGE= .1101E-02 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .85

AA3-Z1	MANE	3.45	71.41	256.18	.77	5.00	71.33	255.00	.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1214E+02 EXCESS= .0000E+00 OUTFLOW= .1216E+02 BASIN STORAGE= .1216E-02 PERCENT ERROR= -.2

```
          FOR PLAN = 1  RATIO=  .82
            AA3-Z1  MANE          3.45     66.15    256.72        .72       5.00     65.98    255.00          .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1126E+02 EXCESS= .0000E+00 OUTFLOW= .1127E+02 BASIN STORAGE= .1284E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .85
            BB1-BB2  MANE         5.00     28.84    240.58        .78       5.00     28.66    240.00          .78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4051E+01 EXCESS= .0000E+00 OUTFLOW= .4070E+01 BASIN STORAGE= .1893E-02 PERCENT ERROR=   -.5

          FOR PLAN = 1  RATIO=  .82
            BB1-BB2  MANE         5.00     26.55    244.95        .72       5.00     26.54    245.00          .72

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3754E+01 EXCESS= .0000E+00 OUTFLOW= .3767E+01 BASIN STORAGE= .2057E-02 PERCENT ERROR=   -.4

          FOR PLAN = 1  RATIO=  .85
            BB3-CC  MANE           .55   4239.29    245.74        .84       5.00   4237.45    245.00          .84

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7117E+03 EXCESS= .0000E+00 OUTFLOW= .7118E+03 BASIN STORAGE= .3026E-01 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .82
            BB3-CC  MANE           .64   3961.05    245.72        .78       5.00   3958.59    245.00          .78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6655E+03 EXCESS= .0000E+00 OUTFLOW= .6655E+03 BASIN STORAGE= .2962E-01 PERCENT ERROR=    .0


*** NORMAL END OF HEC-1 ***
```

Appendix D: Hydraulic Models

HEC-RAS Version 3.1.1 May 2003
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
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: slo_post
Project File : post.prj
Run Date and Time: 12/13/2004 4:31:33 PM

Project in English units

Project Description:

      FLOODPLAIN DETERMINATION


 STARTING WSE = NORMAL DEPTH
      SUBCRITICAL RUN



*****************************************************************************

PLAN DATA

Plan Title: Post-Project
Plan File : C:\Documents and Settings\jy18038\Desktop\PROJECTS\Sloan Channel\Post-Project\post.p01

          Geometry Title: Post-Project
          Geometry File : C:\Documents and Settings\jy18038\Desktop\PROJECTS\Sloan Channel\Post-Project\post.g01

          Flow Title    : Post-Project
          Flow File     : C:\Documents and Settings\jy18038\Desktop\PROJECTS\Sloan Channel\Post-Project\post.f01

Plan Summary Information:
Number of:  Cross Sections =   61    Mulitple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    1    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance =  0.01
    Critical depth calculaton tolerance =  0.01
    Maximum number of interations       =  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:     Mixed Flow


*****************************************************************************

FLOW DATA

Flow Title: Post-Project
Flow File : C:\Documents and Settings\jy18038\Desktop\PROJECTS\Sloan Channel\Post-Project\post.f01

Flow Data (cfs)
*************************************************************
* River          Reach          RS      *    Post-Project *
* Range Wash     Sloan Channel  210     *            3072 *
* Range Wash     Sloan Channel  145     *            3078 *
* Range Wash     Sloan Channel  100     *            3891 *
* Range Wash     Sloan Channel  75      *            3921 *
* Range Wash     Sloan Channel  60      *            3964 *
* Range Wash     Sloan Channel  40      *            3990 *
*************************************************************

Boundary Conditions
*****************************************************************************************************************
* River          Reach          Profile          *          Upstream                  Downstream    *
*****************************************************************************************************************
* Range Wash     Sloan Channel  Post-Project     *             Critical          Known WS = 1694.2 *
*****************************************************************************************************************
Changes in WS and EG
*****************************************************************************
* River          Reach          RS      Profile         Type       Value *
* Range Wash     Sloan Channel  10      Post-Project  Known WS    1694.2 *
*****************************************************************************

*****************************************************************************

GEOMETRY DATA

Geometry Title: Post-Project
Geometry File : C:\Documents and Settings\jy18038\Desktop\PROJECTS\Sloan Channel\Post-Project\post.g01

CROSS SECTION


RIVER: Range Wash
REACH: Sloan Channel      RS: 210

INPUT
```

Description: PLAN STA 118+89
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1727.2	1011.86	1721.27	1046.86	1720.22	1081.86	1721.27	1093.72	1727.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1093.72	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1000 1093.72 35.96 35.96 35.96 .1 .3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1726.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.74	Wt. n-Val.		0.015	
W.S. Elev (ft)	1724.58	Reach Len. (ft)	35.96	35.96	35.96
Crit W.S. (ft)	1724.58	Flow Area (sq ft)		290.22	
E.G. Slope (ft/ft)	*0.002215	Area (sq ft)		290.22	
Q Total (cfs)	3072.00	Flow (cfs)		3072.00	
Top Width (ft)	83.23	Top Width (ft)		83.23	
Vel Total (ft/s)	10.59	Avg. Vel. (ft/s)		10.59	
Max Chl Dpth (ft)	4.36	Hydr. Depth (ft)		3.49	
Conv. Total (cfs)	65276.0	Conv. (cfs)		65276.0	
Length Wtd. (ft)	35.96	Wetted Per. (ft)		84.83	
Min Ch El (ft)	1720.22	Shear (lb/sq ft)		0.47	
Alpha	1.00	Stream Power (lb/ft s)		5.01	
Frctn Loss (ft)		Cum Volume (acre-ft)		42.25	
C & E Loss (ft)		Cum SA (acres)		11.93	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 200

INPUT
Description: PLAN STA 119+25
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1726.22	1011.86	1720.29	1046.86	1719.24	1081.86	1720.29	1093.72	1726.22

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1093.72	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1000 1093.72 77.79 87.33 93.71 .1 .3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1726.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.46	Wt. n-Val.		0.015	
W.S. Elev (ft)	1722.56	Reach Len. (ft)	77.79	87.33	93.71
Crit W.S. (ft)	1723.60	Flow Area (sq ft)		205.76	
E.G. Slope (ft/ft)	*0.006465	Area (sq ft)		205.76	
Q Total (cfs)	3072.00	Flow (cfs)		3072.00	
Top Width (ft)	79.07	Top Width (ft)		79.07	
Vel Total (ft/s)	14.93	Avg. Vel. (ft/s)		14.93	
Max Chl Dpth (ft)	3.32	Hydr. Depth (ft)		2.60	
Conv. Total (cfs)	38207.2	Conv. (cfs)		38207.2	
Length Wtd. (ft)	87.33	Wetted Per. (ft)		80.17	
Min Ch El (ft)	1719.24	Shear (lb/sq ft)		1.04	
Alpha	1.00	Stream Power (lb/ft s)		15.46	
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)		42.05	
C & E Loss (ft)	0.17	Cum SA (acres)		11.86	

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: Range Wash
REACH: Sloan Channel RS: 197.5*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1725.87	1011.86	1719.94	1046.86	1718.89	1081.86	1719.94	1093.72	1725.87

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1093.72	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1000 1093.72 77.79 87.33 93.71 .1 .3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1725.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.95	Wt. n-Val.		0.015	
W.S. Elev (ft)	1722.42	Reach Len. (ft)	77.79	87.33	93.71
Crit W.S. (ft)	1723.25	Flow Area (sq ft)		222.93	
E.G. Slope (ft/ft)	*0.005029	Area (sq ft)		222.93	
Q Total (cfs)	3072.00	Flow (cfs)		3072.00	
Top Width (ft)	79.93	Top Width (ft)		79.93	
Vel Total (ft/s)	13.78	Avg. Vel. (ft/s)		13.78	
Max Chl Dpth (ft)	3.53	Hydr. Depth (ft)		2.79	
Conv. Total (cfs)	43321.2	Conv. (cfs)		43321.2	
Length Wtd. (ft)	87.33	Wetted Per. (ft)		81.14	
Min Ch El (ft)	1718.89	Shear (lb/sq ft)		0.86	

Alpha	1.00	Stream Power (lb/ft s)		11.89				
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)		41.62				
C & E Loss (ft)	0.15	Cum SA (acres)		11.70				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 195.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1725.52	1011.86	1719.59	1046.86	1718.54	1081.86	1719.59	1093.72	1725.52

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1093.72	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1093.72	77.79	87.33	93.71	.1 .3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1724.89	Element		0.015	
Vel Head (ft)	2.67	Wt. n-Val.		0.015	
W.S. Elev (ft)	1722.21	Reach Len. (ft)	77.79	87.33	93.71
Crit W.S. (ft)	1722.90	Flow Area (sq ft)		234.20	
E.G. Slope (ft/ft)	0.004310	Area (sq ft)		234.20	
Q Total (cfs)	3072.00	Flow (cfs)		3072.00	
Top Width (ft)	80.50	Top Width (ft)		80.50	
Vel Total (ft/s)	13.12	Avg. Vel. (ft/s)		13.12	
Max Chl Dpth (ft)	3.67	Hydr. Depth (ft)		2.91	
Conv. Total (cfs)	46791.3	Conv. (cfs)		46791.3	
Length Wtd. (ft)	87.33	Wetted Per. (ft)		81.77	
Min Ch El (ft)	1718.54	Shear (lb/sq ft)		0.77	
Alpha	1.00	Stream Power (lb/ft s)		10.11	
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)		41.16	
C & E Loss (ft)	0.08	Cum SA (acres)		11.54	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 192.5*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1725.17	1011.86	1719.24	1046.86	1718.19	1081.86	1719.24	1093.72	1725.17

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1093.72	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1093.72	77.79	87.33	93.71	.1 .3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1724.50	Element		0.015	
Vel Head (ft)	2.60	Wt. n-Val.		0.015	
W.S. Elev (ft)	1721.91	Reach Len. (ft)	77.79	87.33	93.71
Crit W.S. (ft)	1722.55	Flow Area (sq ft)		237.50	
E.G. Slope (ft/ft)	0.004126	Area (sq ft)		237.50	
Q Total (cfs)	3072.00	Flow (cfs)		3072.00	
Top Width (ft)	80.66	Top Width (ft)		80.66	
Vel Total (ft/s)	12.93	Avg. Vel. (ft/s)		12.93	
Max Chl Dpth (ft)	3.71	Hydr. Depth (ft)		2.94	
Conv. Total (cfs)	47823.8	Conv. (cfs)		47823.8	
Length Wtd. (ft)	87.33	Wetted Per. (ft)		81.95	
Min Ch El (ft)	1718.19	Shear (lb/sq ft)		0.75	
Alpha	1.00	Stream Power (lb/ft s)		9.66	
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)		40.68	
C & E Loss (ft)	0.02	Cum SA (acres)		11.38	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 190

INPUT
Description: PLAN STA 122+74
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1724.82	1011.86	1718.89	1046.86	1717.84	1081.86	1718.89	1093.72	1724.82

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1093.72	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1093.72	225.65	225.65	225.65	.1 .3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1724.15	Element			
Vel Head (ft)	2.58	Wt. n-Val.		0.015	

W.S. Elev (ft)	1721.56	Reach Len. (ft)	225.65	225.65	225.65			
Crit W.S. (ft)	1722.20	Flow Area (sq ft)		238.21				
E.G. Slope (ft/ft)	0.004088	Area (sq ft)		238.21				
Q Total (cfs)	3072.00	Flow (cfs)		3072.00				
Top Width (ft)	80.69	Top Width (ft)		80.69				
Vel Total (ft/s)	12.90	Avg. Vel. (ft/s)		12.90				
Max Chl Dpth (ft)	3.72	Hydr. Depth (ft)		2.95				
Conv. Total (cfs)	48046.7	Conv. (cfs)		48046.7				
Length Wtd. (ft)	225.65	Wetted Per. (ft)		81.99				
Min Ch El (ft)	1717.84	Shear (lb/sq ft)		0.74				
Alpha	1.00	Stream Power (lb/ft s)		9.56				
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)		40.21				
C & E Loss (ft)	0.00	Cum SA (acres)		11.22				

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 180

INPUT
Description: PLAN STA 125+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1723.92	1011.86	1717.99	1046.86	1716.94	1081.86	1717.99	1093.72	1723.92

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1093.72	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1000 1093.72 100 100 100 .1 .3

CROSS SECTION OUTPUT Profile #Post-Project

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1723.23				
Vel Head (ft)	2.54	Wt. n-Val.		0.015	
W.S. Elev (ft)	1720.69	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	1721.29	Flow Area (sq ft)		240.34	
E.G. Slope (ft/ft)	0.003976	Area (sq ft)		240.34	
Q Total (cfs)	3072.00	Flow (cfs)		3072.00	
Top Width (ft)	80.80	Top Width (ft)		80.80	
Vel Total (ft/s)	12.78	Avg. Vel. (ft/s)		12.78	
Max Chl Dpth (ft)	3.75	Hydr. Depth (ft)		2.97	
Conv. Total (cfs)	48717.9	Conv. (cfs)		48717.9	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		82.11	
Min Ch El (ft)	1716.94	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		9.29	
Frctn Loss (ft)	0.91	Cum Volume (acre-ft)		38.97	
C & E Loss (ft)	0.01	Cum SA (acres)		10.80	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 170

INPUT
Description: PLAN STA 126+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1722.67	1011.46	1716.94	1041.46	1716.04	1071.46	1716.94	1082.92	1722.67

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1000 1082.92 51.96 51.96 51.96 .1 .3

CROSS SECTION OUTPUT Profile #Post-Project

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1722.80				
Vel Head (ft)	2.81	Wt. n-Val.		0.015	
W.S. Elev (ft)	1719.99	Reach Len. (ft)	51.96	51.96	51.96
Crit W.S. (ft)	1720.68	Flow Area (sq ft)		228.44	
E.G. Slope (ft/ft)	0.004075	Area (sq ft)		228.44	
Q Total (cfs)	3072.00	Flow (cfs)		3072.00	
Top Width (ft)	72.19	Top Width (ft)		72.19	
Vel Total (ft/s)	13.45	Avg. Vel. (ft/s)		13.45	
Max Chl Dpth (ft)	3.95	Hydr. Depth (ft)		3.16	
Conv. Total (cfs)	48125.5	Conv. (cfs)		48125.5	
Length Wtd. (ft)	51.96	Wetted Per. (ft)		73.66	
Min Ch El (ft)	1716.04	Shear (lb/sq ft)		0.79	
Alpha	1.00	Stream Power (lb/ft s)		10.61	
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)		38.43	
C & E Loss (ft)	0.03	Cum SA (acres)		10.62	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 160

INPUT
Description: PLAN STA 126+52
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1722.47	1011.46	1716.74	1041.46	1715.84	1071.46	1716.74	1082.92	1722.47

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

```
 Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1000 1082.92             89.2    89.2    89.2            .1       .3

 CROSS SECTION OUTPUT  Profile #Post-Project
 ********************************************************************************************
 * E.G. Elev (ft)        * 1722.59  * Element               *  Left OB *  Channel * Right OB *
 * Vel Head (ft)         *    2.79  * Wt. n-Val.            *          *    0.015 *          *
 * W.S. Elev (ft)        * 1719.80  * Reach Len. (ft)       *   89.20  *    89.20 *   89.20  *
 * Crit W.S. (ft)        * 1720.47  * Flow Area (sq ft)     *          *   229.22 *          *
 * E.G. Slope (ft/ft)    *0.004032  * Area (sq ft)          *          *   229.22 *          *
 * Q Total (cfs)         * 3072.00  * Flow (cfs)            *          * 3072.00 *          *
 * Top Width (ft)        *   72.23  * Top Width (ft)        *          *   72.23 *          *
 * Vel Total (ft/s)      *   13.40  * Avg. Vel. (ft/s)      *          *   13.40 *          *
 * Max Chl Dpth (ft)     *    3.96  * Hydr. Depth (ft)      *          *    3.17 *          *
 * Conv. Total (cfs)     * 48378.5  * Conv. (cfs)           *          * 48378.5 *          *
 * Length Wtd. (ft)      *   89.20  * Wetted Per. (ft)      *          *   73.70 *          *
 * Min Ch El (ft)        * 1715.84  * Shear (lb/sq ft)      *          *    0.78 *          *
 * Alpha                 *    1.00  * Stream Power (lb/ft s) *          *   10.49 *          *
 * Frctn Loss (ft)       *    0.21  * Cum Volume (acre-ft)  *          *   38.16 *          *
 * C & E Loss (ft)       *    0.01  * Cum SA (acres)        *          *   10.54 *          *
 ********************************************************************************************

 CROSS SECTION


 RIVER: Range Wash
 REACH: Sloan Channel      RS: 158.*

 INPUT
 Description:
 Station Elevation Data    num=      7
      Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
 ********************************************************************************
     1000 1722.13 1010.47  1716.9 1011.74  1716.4 1042.46  1715.5  1070.2 1716.37
  1071.74 1716.54 1082.92 1722.13

 Manning's n Values        num=      3
      Sta   n Val     Sta   n Val     Sta   n Val
 ***********************************************
     1000     .015    1000     .015 1082.92     .015

 Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1000 1082.92             89.2    89.2    89.2            .1       .3

 CROSS SECTION OUTPUT  Profile #Post-Project
 ********************************************************************************************
 * E.G. Elev (ft)        * 1722.22  * Element               *  Left OB *  Channel * Right OB *
 * Vel Head (ft)         *    2.71  * Wt. n-Val.            *          *    0.015 *          *
 * W.S. Elev (ft)        * 1719.51  * Reach Len. (ft)       *   89.20  *    89.20 *   89.20  *
 * Crit W.S. (ft)        * 1720.14  * Flow Area (sq ft)     *          *   232.33 *          *
 * E.G. Slope (ft/ft)    *0.003866  * Area (sq ft)          *          *   232.33 *          *
 * Q Total (cfs)         * 3072.00  * Flow (cfs)            *          * 3072.00 *          *
 * Top Width (ft)        *   72.43  * Top Width (ft)        *          *   72.43 *          *
 * Vel Total (ft/s)      *   13.22  * Avg. Vel. (ft/s)      *          *   13.22 *          *
 * Max Chl Dpth (ft)     *    4.01  * Hydr. Depth (ft)      *          *    3.21 *          *
 * Conv. Total (cfs)     * 49405.0  * Conv. (cfs)           *          * 49405.0 *          *
 * Length Wtd. (ft)      *   89.20  * Wetted Per. (ft)      *          *   73.87 *          *
 * Min Ch El (ft)        * 1715.50  * Shear (lb/sq ft)      *          *    0.76 *          *
 * Alpha                 *    1.00  * Stream Power (lb/ft s) *          *   10.04 *          *
 * Frctn Loss (ft)       *    0.35  * Cum Volume (acre-ft)  *          *   37.68 *          *
 * C & E Loss (ft)       *    0.02  * Cum SA (acres)        *          *   10.39 *          *
 ********************************************************************************************

 CROSS SECTION


 RIVER: Range Wash
 REACH: Sloan Channel      RS: 156.*

 INPUT
 Description:
 Station Elevation Data    num=      7
      Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
 ********************************************************************************
     1000  1721.8 1010.72 1716.44 1012.01 1716.05 1043.46 1715.17 1070.52 1716.04
  1072.01 1716.34 1082.92  1721.8

 Manning's n Values        num=      3
      Sta   n Val     Sta   n Val     Sta   n Val
 ***********************************************
     1000     .015    1000     .015 1082.92     .015

 Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1000 1082.92             89.2    89.2    89.2            .1       .3

 CROSS SECTION OUTPUT  Profile #Post-Project
 ********************************************************************************************
 * E.G. Elev (ft)        * 1721.89  * Element               *  Left OB *  Channel * Right OB *
 * Vel Head (ft)         *    2.71  * Wt. n-Val.            *          *    0.015 *          *
 * W.S. Elev (ft)        * 1719.18  * Reach Len. (ft)       *   89.20  *    89.20 *   89.20  *
 * Crit W.S. (ft)        * 1719.80  * Flow Area (sq ft)     *          *   232.65 *          *
 * E.G. Slope (ft/ft)    *0.003849  * Area (sq ft)          *          *   232.65 *          *
 * Q Total (cfs)         * 3072.00  * Flow (cfs)            *          * 3072.00 *          *
 * Top Width (ft)        *   72.44  * Top Width (ft)        *          *   72.44 *          *
 * Vel Total (ft/s)      *   13.20  * Avg. Vel. (ft/s)      *          *   13.20 *          *
 * Max Chl Dpth (ft)     *    4.01  * Hydr. Depth (ft)      *          *    3.21 *          *
 * Conv. Total (cfs)     * 49519.2  * Conv. (cfs)           *          * 49519.2 *          *
 * Length Wtd. (ft)      *   89.20  * Wetted Per. (ft)      *          *   73.87 *          *
 * Min Ch El (ft)        * 1715.17  * Shear (lb/sq ft)      *          *    0.76 *          *
 * Alpha                 *    1.00  * Stream Power (lb/ft s) *          *    9.99 *          *
 * Frctn Loss (ft)       *    0.34  * Cum Volume (acre-ft)  *          *   37.21 *          *
 * C & E Loss (ft)       *    0.00  * Cum SA (acres)        *          *   10.24 *          *
 ********************************************************************************************

 CROSS SECTION


 RIVER: Range Wash
 REACH: Sloan Channel      RS: 154.*

 INPUT
 Description:
 Station Elevation Data    num=      7
```

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1721.46	1010.97	1715.98	1012.29	1715.71	1044.46	1714.83	1070.83	1715.71
1072.29	1716.15	1082.92	1721.46						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	89.2	89.2	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1721.55	Element		0.015	
Vel Head (ft)	2.71	Wt. n-Val.	89.20	89.20	89.20
W.S. Elev (ft)	1718.84	Reach Len. (ft)		232.44	
Crit W.S. (ft)	1719.47	Flow Area (sq ft)		232.44	
E.G. Slope (ft/ft)	*0.003859	Area (sq ft)		3072.00	
Q Total (cfs)	3072.00	Flow (cfs)		72.42	
Top Width (ft)	72.42	Top Width (ft)		13.22	
Vel Total (ft/s)	13.22	Avg. Vel. (ft/s)		3.21	
Max Chl Dpth (ft)	4.01	Hydr. Depth (ft)		49454.8	
Conv. Total (cfs)	49454.8	Conv. (cfs)		73.85	
Length Wtd. (ft)	89.20	Wetted Per. (ft)		0.76	
Min Ch El (ft)	1714.83	Shear (lb/sq ft)		10.02	
Alpha	1.00	Stream Power (lb/ft s)		36.73	
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)		10.09	
C & E Loss (ft)	0.00	Cum SA (acres)			

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 152.*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1721.13	1011.21	1715.52	1012.57	1715.37	1045.46	1714.5	1071.15	1715.39
1072.57	1715.95	1082.92	1721.13						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	89.2	89.2	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1721.21	Element		0.015	
Vel Head (ft)	2.69	Wt. n-Val.	89.20	89.20	89.20
W.S. Elev (ft)	1718.52	Reach Len. (ft)		233.23	
Crit W.S. (ft)	1719.14	Flow Area (sq ft)		233.23	
E.G. Slope (ft/ft)	*0.003821	Area (sq ft)		3072.00	
Q Total (cfs)	3072.00	Flow (cfs)		72.47	
Top Width (ft)	72.47	Top Width (ft)		13.17	
Vel Total (ft/s)	13.17	Avg. Vel. (ft/s)		4.02	
Max Chl Dpth (ft)	4.02	Hydr. Depth (ft)		49698.2	
Conv. Total (cfs)	49698.2	Conv. (cfs)		89.20	
Length Wtd. (ft)	89.20	Wetted Per. (ft)		1714.50	
Min Ch El (ft)	1714.50	Shear (lb/sq ft)		1.00	
Alpha	1.00	Stream Power (lb/ft s)		0.34	
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)		0.01	
C & E Loss (ft)	0.01	Cum SA (acres)			

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 150

INPUT
Description: PLAN STA 130+97
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1720.79	1011.46	1715.06	1046.46	1714.16	1071.46	1715.06	1082.92	1720.79

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	72.79	72.79	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1720.87	Element		0.015	
Vel Head (ft)	2.69	Wt. n-Val.	72.79	72.79	72.79
W.S. Elev (ft)	1718.18	Reach Len. (ft)		233.32	
Crit W.S. (ft)	1718.79	Flow Area (sq ft)		233.32	
E.G. Slope (ft/ft)	*0.003818	Area (sq ft)		3072.00	
Q Total (cfs)	3072.00	Flow (cfs)		72.46	
Top Width (ft)	72.46	Top Width (ft)		13.17	
Vel Total (ft/s)	13.17	Avg. Vel. (ft/s)		4.02	
Max Chl Dpth (ft)	4.02	Hydr. Depth (ft)		49717.3	
Conv. Total (cfs)	49717.3	Conv. (cfs)		72.79	
Length Wtd. (ft)	72.79	Wetted Per. (ft)		1714.16	
Min Ch El (ft)	1714.16	Shear (lb/sq ft)		1.00	
Alpha	1.00	Stream Power (lb/ft s)		0.34	
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)		0.00	
C & E Loss (ft)	0.00	Cum SA (acres)			

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 148.75*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1720.57	1011.46	1714.84	1046.46	1713.94	1071.46	1714.84	1082.92	1720.57

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	72.79	72.79	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1720.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.20	Wt. n-Val.		0.015	
W.S. Elev (ft)	1718.29	Reach Len. (ft)	72.79	72.79	72.79
Crit W.S. (ft)	1718.57	Flow Area (sq ft)		257.85	
E.G. Slope (ft/ft)	0.002810	Area (sq ft)		257.85	
Q Total (cfs)	3072.00	Flow (cfs)		3072.00	
Top Width (ft)	73.80	Top Width (ft)		73.80	
Vel Total (ft/s)	11.91	Avg. Vel. (ft/s)		11.91	
Max Chl Dpth (ft)	4.35	Hydr. Depth (ft)		3.49	
Conv. Total (cfs)	57947.3	Conv. (cfs)		57947.3	
Length Wtd. (ft)	72.79	Wetted Per. (ft)		75.46	
Min Ch El (ft)	1713.94	Shear (lb/sq ft)		0.60	
Alpha	1.00	Stream Power (lb/ft s)		7.14	
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)		35.37	
C & E Loss (ft)	0.24	Cum SA (acres)		9.68	

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 147.5*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1720.34	1011.46	1714.61	1046.46	1713.71	1071.46	1714.61	1082.92	1720.34

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	72.79	72.79	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1720.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.28	Wt. n-Val.		0.015	
W.S. Elev (ft)	1718.00	Reach Len. (ft)	72.79	72.79	72.79
Crit W.S. (ft)	1718.34	Flow Area (sq ft)		253.57	
E.G. Slope (ft/ft)	0.002958	Area (sq ft)		253.57	
Q Total (cfs)	3072.00	Flow (cfs)		3072.00	
Top Width (ft)	73.57	Top Width (ft)		73.57	
Vel Total (ft/s)	12.12	Avg. Vel. (ft/s)		12.12	
Max Chl Dpth (ft)	4.29	Hydr. Depth (ft)		3.45	
Conv. Total (cfs)	56482.2	Conv. (cfs)		56482.2	
Length Wtd. (ft)	72.79	Wetted Per. (ft)		75.20	
Min Ch El (ft)	1713.71	Shear (lb/sq ft)		0.62	
Alpha	1.00	Stream Power (lb/ft s)		7.54	
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)		34.94	
C & E Loss (ft)	0.01	Cum SA (acres)		9.55	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 146.25*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1720.11	1011.46	1714.39	1046.46	1713.48	1071.46	1714.39	1082.92	1720.11

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	72.79	72.79	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1720.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.26	Wt. n-Val.		0.015	
W.S. Elev (ft)	1717.79	Reach Len. (ft)	72.79	72.79	72.79
Crit W.S. (ft)	1718.12	Flow Area (sq ft)		254.65	
E.G. Slope (ft/ft)	0.002920	Area (sq ft)		254.65	
Q Total (cfs)	3072.00	Flow (cfs)		3072.00	

Top Width (ft)	73.63	Top Width (ft)			73.63		
Vel Total (ft/s)	12.06	Avg. Vel. (ft/s)			12.06		
Max Chl Dpth (ft)	4.31	Hydr. Depth (ft)			3.46		
Conv. Total (cfs)	56852.2	Conv. (cfs)			56852.2		
Length Wtd. (ft)	72.79	Wetted Per. (ft)			75.27		
Min Ch El (ft)	1713.48	Shear (lb/sq ft)			0.62		
Alpha	1.00	Stream Power (lb/ft s)			7.44		
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)			34.52		
C & E Loss (ft)	0.01	Cum SA (acres)			9.43		

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 145

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1719.89	1011.46	1714.16	1046.46	1713.26	1071.46	1714.16	1082.92	1719.89

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	189.27	189.27	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1719.83	Element		0.015	
Vel Head (ft)	2.25	Wt. n-Val.		0.015	
W.S. Elev (ft)	1717.58	Reach Len. (ft)	189.27	189.27	189.27
Crit W.S. (ft)	1717.91	Flow Area (sq ft)		255.50	
E.G. Slope (ft/ft)	0.002902	Area (sq ft)		255.50	
Q Total (cfs)	3078.00	Flow (cfs)		3078.00	
Top Width (ft)	73.67	Top Width (ft)		73.67	
Vel Total (ft/s)	12.05	Avg. Vel. (ft/s)		12.05	
Max Chl Dpth (ft)	4.32	Hydr. Depth (ft)		3.47	
Conv. Total (cfs)	57142.0	Conv. (cfs)		57142.0	
Length Wtd. (ft)	189.27	Wetted Per. (ft)		75.32	
Min Ch El (ft)	1713.26	Shear (lb/sq ft)		0.61	
Alpha	1.00	Stream Power (lb/ft s)		7.40	
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)		34.09	
C & E Loss (ft)	0.00	Cum SA (acres)		9.31	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 144.615*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1719.16	1011.37	1713.48	1012.74	1713.4	1046.08	1712.53	1071.34	1713.43	1072.74	1714.07	1082.92	1719.16

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	189.27	189.27	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1719.20	Element		0.015	
Vel Head (ft)	2.56	Wt. n-Val.		0.015	
W.S. Elev (ft)	1716.64	Reach Len. (ft)	189.27	189.27	189.27
Crit W.S. (ft)	1717.17	Flow Area (sq ft)		239.79	
E.G. Slope (ft/ft)	0.003523	Area (sq ft)		239.79	
Q Total (cfs)	3078.00	Flow (cfs)		3078.00	
Top Width (ft)	72.82	Top Width (ft)		72.82	
Vel Total (ft/s)	12.84	Avg. Vel. (ft/s)		12.84	
Max Chl Dpth (ft)	4.11	Hydr. Depth (ft)		3.29	
Conv. Total (cfs)	51855.8	Conv. (cfs)		51855.8	
Length Wtd. (ft)	189.27	Wetted Per. (ft)		74.34	
Min Ch El (ft)	1712.53	Shear (lb/sq ft)		0.71	
Alpha	1.00	Stream Power (lb/ft s)		9.11	
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)		33.01	
C & E Loss (ft)	0.03	Cum SA (acres)		8.99	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 144.230*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1718.43	1011.27	1712.79	1012.63	1712.67	1045.69	1711.8	1071.22	1712.69	1072.63	1713.28	1082.92	1718.43

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	189.27	189.27	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1718.50	Element	Left OB	Channel	Right OB	
Vel Head (ft)	2.65	Wt. n-Val.		0.015		
W.S. Elev (ft)	1715.85	Reach Len. (ft)	189.27	189.27	189.27	
Crit W.S. (ft)	1716.44	Flow Area (sq ft)		235.59		
E.G. Slope (ft/ft)	*0.003719	Area (sq ft)		235.59		
Q Total (cfs)	3078.00	Flow (cfs)		3078.00		
Top Width (ft)	72.60	Top Width (ft)		72.60		
Vel Total (ft/s)	13.06	Avg. Vel. (ft/s)		13.06		
Max Chl Dpth (ft)	4.05	Hydr. Depth (ft)		3.25		
Conv. Total (cfs)	50471.9	Conv. (cfs)		50471.9		
Length Wtd. (ft)	189.27	Wetted Per. (ft)		74.08		
Min Ch El (ft)	1711.80	Shear (lb/sq ft)		0.74		
Alpha	1.00	Stream Power (lb/ft s)		9.65		
Frctn Loss (ft)	0.69	Cum Volume (acre-ft)		31.98		
C & E Loss (ft)	0.01	Cum SA (acres)		8.67		

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 143.846*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1717.7	1011.18	1712.11	1012.52	1711.94	1045.31	1711.07	1071.1	1711.96
1072.52	1712.5	1082.92	1717.7						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	189.27	189.27	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1717.78	Element	Left OB	Channel	Right OB	
Vel Head (ft)	2.68	Wt. n-Val.		0.015		
W.S. Elev (ft)	1715.10	Reach Len. (ft)	189.27	189.27	189.27	
Crit W.S. (ft)	1715.71	Flow Area (sq ft)		234.11		
E.G. Slope (ft/ft)	*0.003791	Area (sq ft)		234.11		
Q Total (cfs)	3078.00	Flow (cfs)		3078.00		
Top Width (ft)	72.51	Top Width (ft)		72.51		
Vel Total (ft/s)	13.15	Avg. Vel. (ft/s)		13.15		
Max Chl Dpth (ft)	4.03	Hydr. Depth (ft)		3.23		
Conv. Total (cfs)	49992.8	Conv. (cfs)		49992.8		
Length Wtd. (ft)	189.27	Wetted Per. (ft)		73.97		
Min Ch El (ft)	1711.07	Shear (lb/sq ft)		0.75		
Alpha	1.00	Stream Power (lb/ft s)		9.85		
Frctn Loss (ft)	0.71	Cum Volume (acre-ft)		30.96		
C & E Loss (ft)	0.00	Cum SA (acres)		8.36		

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 143.461*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1716.97	1011.08	1711.43	1012.42	1711.21	1044.92	1710.34	1070.98	1711.22
1072.42	1711.72	1082.92	1716.97						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	189.27	189.27	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1717.06	Element	Left OB	Channel	Right OB	
Vel Head (ft)	2.70	Wt. n-Val.		0.015		
W.S. Elev (ft)	1714.36	Reach Len. (ft)	189.27	189.27	189.27	
Crit W.S. (ft)	1714.98	Flow Area (sq ft)		233.34		
E.G. Slope (ft/ft)	*0.003828	Area (sq ft)		233.34		
Q Total (cfs)	3078.00	Flow (cfs)		3078.00		
Top Width (ft)	72.47	Top Width (ft)		72.47		
Vel Total (ft/s)	13.19	Avg. Vel. (ft/s)		13.19		
Max Chl Dpth (ft)	4.02	Hydr. Depth (ft)		3.22		
Conv. Total (cfs)	49746.6	Conv. (cfs)		49746.6		
Length Wtd. (ft)	189.27	Wetted Per. (ft)		73.91		
Min Ch El (ft)	1710.34	Shear (lb/sq ft)		0.75		
Alpha	1.00	Stream Power (lb/ft s)		9.95		
Frctn Loss (ft)	0.72	Cum Volume (acre-ft)		29.94		
C & E Loss (ft)	0.00	Cum SA (acres)		8.04		

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 143.076*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

1000 1716.24 1010.99 1710.74 1012.31 1710.48 1044.54 1709.61 1070.86 1710.49
1072.31 1710.93 1082.92 1716.24

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	189.27	189.27	189.27	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1716.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.71	Wt. n-Val.		0.015	
W.S. Elev (ft)	1713.62	Reach Len. (ft)	189.27	189.27	189.27
Crit W.S. (ft)	1714.25	Flow Area (sq ft)		232.87	
E.G. Slope (ft/ft)	*0.003853	Area (sq ft)		232.87	
Q Total (cfs)	3078.00	Flow (cfs)		3078.00	
Top Width (ft)	72.45	Top Width (ft)		72.45	
Vel Total (ft/s)	13.22	Avg. Vel. (ft/s)		13.22	
Max Chl Dpth (ft)	4.01	Hydr. Depth (ft)		3.21	
Conv. Total (cfs)	49590.2	Conv. (cfs)		49590.2	
Length Wtd. (ft)	189.27	Wetted Per. (ft)		73.88	
Min Ch El (ft)	1709.61	Shear (lb/sq ft)		0.76	
Alpha	1.00	Stream Power (lb/ft s)		10.02	
Frctn Loss (ft)	0.73	Cum Volume (acre-ft)		28.93	
C & E Loss (ft)	0.00	Cum SA (acres)		7.73	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 142.692*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1715.51	1010.89	1710.06	1012.2	1709.76	1044.15	1708.88	1070.73	1709.75
1072.2	1710.15	1082.92	1715.51						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	189.27	189.27	189.27	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1715.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.71	Wt. n-Val.		0.015	
W.S. Elev (ft)	1712.89	Reach Len. (ft)	189.27	189.27	189.27
Crit W.S. (ft)	1713.52	Flow Area (sq ft)		233.01	
E.G. Slope (ft/ft)	*0.003845	Area (sq ft)		233.01	
Q Total (cfs)	3078.00	Flow (cfs)		3078.00	
Top Width (ft)	72.46	Top Width (ft)		72.46	
Vel Total (ft/s)	13.21	Avg. Vel. (ft/s)		13.21	
Max Chl Dpth (ft)	4.01	Hydr. Depth (ft)		3.22	
Conv. Total (cfs)	49640.3	Conv. (cfs)		49640.3	
Length Wtd. (ft)	189.27	Wetted Per. (ft)		73.89	
Min Ch El (ft)	1708.88	Shear (lb/sq ft)		0.76	
Alpha	1.00	Stream Power (lb/ft s)		10.00	
Frctn Loss (ft)	0.73	Cum Volume (acre-ft)		27.92	
C & E Loss (ft)	0.00	Cum SA (acres)		7.41	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 142.307*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1714.77	1010.8	1709.38	1012.1	1709.03	1043.77	1708.14	1070.61	1709.02
1072.1	1709.36	1082.92	1714.77						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	189.27	189.27	189.27	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1714.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.72	Wt. n-Val.		0.015	
W.S. Elev (ft)	1712.15	Reach Len. (ft)	189.27	189.27	189.27
Crit W.S. (ft)	1712.79	Flow Area (sq ft)		232.46	
E.G. Slope (ft/ft)	*0.003873	Area (sq ft)		232.46	
Q Total (cfs)	3078.00	Flow (cfs)		3078.00	
Top Width (ft)	72.43	Top Width (ft)		72.43	
Vel Total (ft/s)	13.24	Avg. Vel. (ft/s)		13.24	
Max Chl Dpth (ft)	4.01	Hydr. Depth (ft)		3.21	
Conv. Total (cfs)	49457.2	Conv. (cfs)		49457.2	
Length Wtd. (ft)	189.27	Wetted Per. (ft)		73.85	
Min Ch El (ft)	1708.14	Shear (lb/sq ft)		0.76	
Alpha	1.00	Stream Power (lb/ft s)		10.08	
Frctn Loss (ft)	0.73	Cum Volume (acre-ft)		26.91	
C & E Loss (ft)	0.00	Cum SA (acres)		7.10	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 141.923*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1714.04	1010.7	1708.69	1011.99	1708.3	1043.38	1707.41	1070.49	1708.28
1071.99	1708.58	1082.92	1714.04						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	189.27	189.27	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1714.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.72	Wt. n-Val.		0.015	
W.S. Elev (ft)	1711.42	Reach Len. (ft)	189.27	189.27	189.27
Crit W.S. (ft)	1712.06	Flow Area (sq ft)		232.64	
E.G. Slope (ft/ft)	0.003864	Area (sq ft)		232.64	
Q Total (cfs)	3078.00	Flow (cfs)		3078.00	
Top Width (ft)	72.44	Top Width (ft)		72.44	
Vel Total (ft/s)	13.23	Avg. Vel. (ft/s)		13.23	
Max Chl Dpth (ft)	4.01	Hydr. Depth (ft)		3.21	
Conv. Total (cfs)	49515.0	Conv. (cfs)		49515.0	
Length Wtd. (ft)	189.27	Wetted Per. (ft)		73.87	
Min Ch El (ft)	1707.41	Shear (lb/sq ft)		0.76	
Alpha	1.00	Stream Power (lb/ft s)		10.05	
Frctn Loss (ft)	0.73	Cum Volume (acre-ft)		25.90	
C & E Loss (ft)	0.00	Cum SA (acres)		6.78	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 141.538*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1713.31	1010.61	1708.01	1011.89	1707.57	1043	1706.68	1070.37	1707.55
1071.89	1707.8	1082.92	1713.31						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	189.27	189.27	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1713.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.72	Wt. n-Val.		0.015	
W.S. Elev (ft)	1710.69	Reach Len. (ft)	189.27	189.27	189.27
Crit W.S. (ft)	1711.32	Flow Area (sq ft)		232.63	
E.G. Slope (ft/ft)	0.003865	Area (sq ft)		232.63	
Q Total (cfs)	3078.00	Flow (cfs)		3078.00	
Top Width (ft)	72.43	Top Width (ft)		72.43	
Vel Total (ft/s)	13.23	Avg. Vel. (ft/s)		13.23	
Max Chl Dpth (ft)	4.01	Hydr. Depth (ft)		3.21	
Conv. Total (cfs)	49511.8	Conv. (cfs)		49511.8	
Length Wtd. (ft)	189.27	Wetted Per. (ft)		73.87	
Min Ch El (ft)	1706.68	Shear (lb/sq ft)		0.76	
Alpha	1.00	Stream Power (lb/ft s)		10.05	
Frctn Loss (ft)	0.73	Cum Volume (acre-ft)		24.89	
C & E Loss (ft)	0.00	Cum SA (acres)		6.47	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 141.153*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1712.58	1010.51	1707.33	1011.78	1706.84	1042.61	1705.95	1070.25	1706.82
1071.78	1707.01	1082.92	1712.58						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	189.27	189.27	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1712.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.72	Wt. n-Val.		0.015	
W.S. Elev (ft)	1709.96	Reach Len. (ft)	189.27	189.27	189.27
Crit W.S. (ft)	1710.59	Flow Area (sq ft)		232.68	
E.G. Slope (ft/ft)	0.003863	Area (sq ft)		232.68	
Q Total (cfs)	3078.00	Flow (cfs)		3078.00	
Top Width (ft)	72.44	Top Width (ft)		72.44	
Vel Total (ft/s)	13.23	Avg. Vel. (ft/s)		13.23	

E.G. Elev (ft)	1710.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.30	Wt. n-Val.		0.015	
W.S. Elev (ft)	1709.15	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	1708.42	Flow Area (sq ft)		336.70	
E.G. Slope (ft/ft)	0.001255	Area (sq ft)		336.70	
Q Total (cfs)	3078.00	Flow (cfs)		3078.00	
Top Width (ft)	77.96	Top Width (ft)		77.96	
Vel Total (ft/s)	9.14	Avg. Vel. (ft/s)		9.14	
Max Chl Dpth (ft)	5.39	Hydr. Depth (ft)		4.32	
Conv. Total (cfs)	86869.8	Conv. (cfs)		86869.8	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		80.11	
Min Ch El (ft)	1703.76	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)		3.01	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)		20.62	
C & E Loss (ft)	0.04	Cum SA (acres)		5.20	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 130

INPUT
Description: PLAN STA 159+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1710.2	1011.46	1704.47	1041.46	1703.57	1071.46	1704.47	1082.92	1710.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	129.35	129.35	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1710.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.18	Wt. n-Val.		0.015	
W.S. Elev (ft)	1709.18	Reach Len. (ft)	129.35	129.35	129.35
Crit W.S. (ft)		Flow Area (sq ft)		353.57	
E.G. Slope (ft/ft)	0.001084	Area (sq ft)		353.57	
Q Total (cfs)	3078.00	Flow (cfs)		3078.00	
Top Width (ft)	78.82	Top Width (ft)		78.82	
Vel Total (ft/s)	8.71	Avg. Vel. (ft/s)		8.71	
Max Chl Dpth (ft)	5.60	Hydr. Depth (ft)		4.49	
Conv. Total (cfs)	93497.2	Conv. (cfs)		93497.2	
Length Wtd. (ft)	129.35	Wetted Per. (ft)		81.07	
Min Ch El (ft)	1703.57	Shear (lb/sq ft)		0.30	
Alpha	1.00	Stream Power (lb/ft s)		2.57	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)		20.22	
C & E Loss (ft)	0.07	Cum SA (acres)		5.11	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 120

INPUT
Description: PLAN STA 160+29
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1711.59	1015.2	1703.99	1045.2	1703.09	1075.2	1703.99	1090.4	1711.59

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1090.4	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1090.4	50	50	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1710.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.94	Wt. n-Val.		0.015	
W.S. Elev (ft)	1709.22	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		395.80	
E.G. Slope (ft/ft)	0.000773	Area (sq ft)		395.80	
Q Total (cfs)	3078.00	Flow (cfs)		3078.00	
Top Width (ft)	80.93	Top Width (ft)		80.93	
Vel Total (ft/s)	7.78	Avg. Vel. (ft/s)		7.78	
Max Chl Dpth (ft)	6.13	Hydr. Depth (ft)		4.89	
Conv. Total (cfs)	110698.6	Conv. (cfs)		110698.6	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		83.43	
Min Ch El (ft)	1703.09	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)		1.78	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		19.11	
C & E Loss (ft)	0.03	Cum SA (acres)		4.87	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 110

INPUT
Description: PLAN STA 160+79
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1712.33	1000	1703.83	1031	1702.9	1072.5	1704.15	1072.5	1712.65

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1072.5	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1072.5	100	100	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1710.10	Element		0.015	
Vel Head (ft)	0.83	Wt. n-Val.		0.015	
W.S. Elev (ft)	1709.27	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)		Flow Area (sq ft)		421.13	
E.G. Slope (ft/ft)	0.000625	Area (sq ft)		421.13	
Q Total (cfs)	3078.00	Flow (cfs)		3078.00	
Top Width (ft)	72.50	Top Width (ft)		72.50	
Vel Total (ft/s)	7.31	Avg. Vel. (ft/s)		7.31	
Max Chl Dpth (ft)	6.37	Hydr. Depth (ft)		5.81	
Conv. Total (cfs)	123098.2	Conv. (cfs)		123098.2	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		83.08	
Min Ch El (ft)	1702.90	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)		1.45	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)		18.64	
C & E Loss (ft)	0.07	Cum SA (acres)		4.78	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 100

INPUT
Description: PLAN STA 161+79
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1711.95	1000	1703.45	1031	1702.52	1072.5	1703.57	1072.5	1712.27

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1072.5	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1072.5	100	100	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1709.93	Element		0.015	
Vel Head (ft)	1.56	Wt. n-Val.		0.015	
W.S. Elev (ft)	1708.37	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)		Flow Area (sq ft)		387.60	
E.G. Slope (ft/ft)	0.001300	Area (sq ft)		387.60	
Q Total (cfs)	3891.00	Flow (cfs)		3891.00	
Top Width (ft)	72.50	Top Width (ft)		72.50	
Vel Total (ft/s)	10.04	Avg. Vel. (ft/s)		10.04	
Max Chl Dpth (ft)	5.85	Hydr. Depth (ft)		5.35	
Conv. Total (cfs)	107936.6	Conv. (cfs)		107936.6	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		82.24	
Min Ch El (ft)	1702.52	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)		3.84	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		17.71	
C & E Loss (ft)	0.23	Cum SA (acres)		4.61	

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: Range Wash
REACH: Sloan Channel RS: 90

INPUT
Description: PLAN STA 162+79
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1712.14	1000	1703.61	1049	1702.14	1090.5	1703.39	1090.5	1710.16

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1090.5	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1090.5	50	50	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1709.62	Element		0.015	
Vel Head (ft)	0.80	Wt. n-Val.		0.015	
W.S. Elev (ft)	1708.82	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)		542.57	
E.G. Slope (ft/ft)	0.000558	Area (sq ft)		542.57	
Q Total (cfs)	3891.00	Flow (cfs)		3891.00	
Top Width (ft)	90.50	Top Width (ft)		90.50	
Vel Total (ft/s)	7.17	Avg. Vel. (ft/s)		7.17	
Max Chl Dpth (ft)	6.68	Hydr. Depth (ft)		6.00	
Conv. Total (cfs)	164664.6	Conv. (cfs)		164664.6	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		101.18	
Min Ch El (ft)	1702.14	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)		1.34	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		16.64	
C & E Loss (ft)	0.14	Cum SA (acres)		4.43	

```
**********************************************************************************************

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: Range Wash
REACH: Sloan Channel       RS: 80

INPUT
Description: PLAN STA 163+29
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
    1000 1708.85  1011.5 1702.85  1041.5 1701.95  1071.5 1702.85    1083 1708.85

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
    1000    .015    1000    .015    1083    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1000    1083              300     300     300             .1       .3

CROSS SECTION OUTPUT  Profile #Post-Project
**********************************************************************************************
* E.G. Elev (ft)         * 1709.43  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.16  * Wt. n-Val.           *          *    0.015  *          *
* W.S. Elev (ft)         * 1707.27  * Reach Len. (ft)      *  300.00  *  300.00  *  300.00  *
* Crit W.S. (ft)         * 1707.27  * Flow Area (sq ft)    *          *  329.71  *          *
* E.G. Slope (ft/ft)     *0.002117  * Area (sq ft)         *          *  329.71  *          *
* Q Total (cfs)          * 3891.00  * Flow (cfs)           *          * 3891.00  *          *
* Top Width (ft)         *   76.95  * Top Width (ft)       *          *   76.95  *          *
* Vel Total (ft/s)       *   11.80  * Avg. Vel. (ft/s)     *          *   11.80  *          *
* Max Chl Dpth (ft)      *    5.32  * Hydr. Depth (ft)     *          *    4.28  *          *
* Conv. Total (cfs)      * 84562.7  * Conv. (cfs)          *          * 84562.7  *          *
* Length Wtd. (ft)       *  300.00  * Wetted Per. (ft)     *          *   79.14  *          *
* Min Ch El (ft)         * 1701.95  * Shear (lb/sq ft)     *          *    0.55  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    6.50  *          *
* Frctn Loss (ft)        *    0.64  * Cum Volume (acre-ft)  *          *   16.14  *          *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)        *          *    4.33  *          *
**********************************************************************************************

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: Range Wash
REACH: Sloan Channel       RS: 75

INPUT
Description:
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
    1000 1707.45  1011.5 1701.45  1041.5 1700.55  1071.5 1701.45    1083 1707.45

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
    1000    .015    1000    .015    1083    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1000    1083             86.82   86.82   86.82             .1       .3

CROSS SECTION OUTPUT  Profile #Post-Project
**********************************************************************************************
* E.G. Elev (ft)         * 1708.43  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    3.44  * Wt. n-Val.           *          *    0.015  *          *
* W.S. Elev (ft)         * 1704.99  * Reach Len. (ft)      *   86.82  *   86.82  *   86.82  *
* Crit W.S. (ft)         * 1705.89  * Flow Area (sq ft)    *          *  263.38  *          *
* E.G. Slope (ft/ft)     *0.004256  * Area (sq ft)         *          *  263.38  *          *
* Q Total (cfs)          * 3921.00  * Flow (cfs)           *          * 3921.00  *          *
* Top Width (ft)         *   73.57  * Top Width (ft)       *          *   73.57  *          *
* Vel Total (ft/s)       *   14.89  * Avg. Vel. (ft/s)     *          *   14.89  *          *
* Max Chl Dpth (ft)      *    4.44  * Hydr. Depth (ft)     *          *    3.58  *          *
* Conv. Total (cfs)      * 60103.7  * Conv. (cfs)          *          * 60103.7  *          *
* Length Wtd. (ft)       *   86.82  * Wetted Per. (ft)     *          *   75.33  *          *
* Min Ch El (ft)         * 1700.55  * Shear (lb/sq ft)     *          *    0.93  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   13.83  *          *
* Frctn Loss (ft)        *    0.88  * Cum Volume (acre-ft)  *          *   14.10  *          *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)        *          *    3.81  *          *
**********************************************************************************************

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.
Note:    Program found supercritical flow starting at this cross section.

CROSS SECTION


RIVER: Range Wash
REACH: Sloan Channel       RS: 74.1666*

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
*****************************************************************************
   1000 1706.92 1011.47 1700.98  1011.5 1700.96 1041.49 1700.07 1071.49 1700.96
1071.52 1700.98 1082.99 1706.92

Manning's n Values         num=       3
     Sta    n Val      Sta    n Val      Sta    n Val
***********************************************
    1000     .015     1000     .015 1082.99     .015

Bank Sta: Left    Right     Lengths: Left Channel   Right      Coeff Contr.    Expan.
          1000 1082.99                86.82   86.82   86.82              .1       .3

CROSS SECTION OUTPUT  Profile #Post-Project
*****************************************************************************************************
* E.G. Elev (ft)         * 1708.03  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    3.62  * Wt. n-Val.             *         *    0.015 *          *
* W.S. Elev (ft)         * 1704.42  * Reach Len. (ft)       *   86.82  *   86.82  *   86.82  *
* Crit W.S. (ft)         * 1705.41  * Flow Area (sq ft)     *          *  256.96  *          *
* E.G. Slope (ft/ft)     *0.004596  * Area (sq ft)          *          *  256.96  *          *
* Q Total (cfs)          * 3921.00  * Flow (cfs)           *          * 3921.00  *          *
* Top Width (ft)         *   73.32  * Top Width (ft)       *          *   73.32  *          *
* Vel Total (ft/s)       *   15.26  * Avg. Vel. (ft/s)     *          *   15.26  *          *
* Max Chl Dpth (ft)      *    4.35  * Hydr. Depth (ft)     *          *    3.50  *          *
* Conv. Total (cfs)      * 57835.1  * Conv. (cfs)          *          * 57835.1  *          *
* Length Wtd. (ft)       *   86.82  * Wetted Per. (ft)     *          *   75.03  *          *
* Min Ch El (ft)         * 1700.07  * Shear (lb/sq ft)     *          *    0.98  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *   15.00  *          *
* Frctn Loss (ft)        *    0.38  * Cum Volume (acre-ft)  *          *   13.58  *          *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)        *          *    3.67  *          *
*****************************************************************************************************

CROSS SECTION


RIVER: Range Wash
REACH: Sloan Channel       RS: 73.3333*

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*****************************************************************************
   1000 1706.39 1011.47 1700.49  1011.5 1700.48 1041.49 1699.58 1071.48 1700.48
1071.51 1700.49 1082.97 1706.39

Manning's n Values         num=       3
     Sta    n Val      Sta    n Val      Sta    n Val
***********************************************
    1000     .015     1000     .015 1082.97     .015

Bank Sta: Left    Right     Lengths: Left Channel   Right      Coeff Contr.    Expan.
          1000 1082.97                86.82   86.82   86.82              .1       .3

CROSS SECTION OUTPUT  Profile #Post-Project
*****************************************************************************************************
* E.G. Elev (ft)         * 1707.61  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    3.74  * Wt. n-Val.             *         *    0.015 *          *
* W.S. Elev (ft)         * 1703.87  * Reach Len. (ft)       *   86.82  *   86.82  *   86.82  *
* Crit W.S. (ft)         * 1704.92  * Flow Area (sq ft)     *          *  252.67  *          *
* E.G. Slope (ft/ft)     *0.004845  * Area (sq ft)          *          *  252.67  *          *
* Q Total (cfs)          * 3921.00  * Flow (cfs)           *          * 3921.00  *          *
* Top Width (ft)         *   73.17  * Top Width (ft)       *          *   73.17  *          *
* Vel Total (ft/s)       *   15.52  * Avg. Vel. (ft/s)     *          *   15.52  *          *
* Max Chl Dpth (ft)      *    4.29  * Hydr. Depth (ft)     *          *    3.45  *          *
* Conv. Total (cfs)      * 56331.1  * Conv. (cfs)          *          * 56331.1  *          *
* Length Wtd. (ft)       *   86.82  * Wetted Per. (ft)     *          *   74.84  *          *
* Min Ch El (ft)         * 1699.58  * Shear (lb/sq ft)     *          *    1.02  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *   15.85  *          *
* Frctn Loss (ft)        *    0.41  * Cum Volume (acre-ft)  *          *   13.07  *          *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)        *          *    3.52  *          *
*****************************************************************************************************

CROSS SECTION


RIVER: Range Wash
REACH: Sloan Channel       RS: 72.5*

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*****************************************************************************
   1000 1705.86 1011.47    1700 1011.49 1699.99 1041.48 1699.09 1071.47 1699.99
1071.49    1700 1082.96 1705.86

Manning's n Values         num=       3
     Sta    n Val      Sta    n Val      Sta    n Val
***********************************************
    1000     .015     1000     .015 1082.96     .015

Bank Sta: Left    Right     Lengths: Left Channel   Right      Coeff Contr.    Expan.
          1000 1082.96                86.82   86.82   86.82              .1       .3

CROSS SECTION OUTPUT  Profile #Post-Project
*****************************************************************************************************
* E.G. Elev (ft)         * 1707.17  * Element                * Left OB *  Channel * Right OB *
* Vel Head (ft)          *    3.84  * Wt. n-Val.             *         *    0.015 *          *
* W.S. Elev (ft)         * 1703.33  * Reach Len. (ft)       *   86.82  *   86.82  *   86.82  *
* Crit W.S. (ft)         * 1704.43  * Flow Area (sq ft)     *          *  249.34  *          *
* E.G. Slope (ft/ft)     *0.005052  * Area (sq ft)          *          *  249.34  *          *
* Q Total (cfs)          * 3921.00  * Flow (cfs)           *          * 3921.00  *          *
* Top Width (ft)         *   73.07  * Top Width (ft)       *          *   73.07  *          *
* Vel Total (ft/s)       *   15.73  * Avg. Vel. (ft/s)     *          *   15.73  *          *
* Max Chl Dpth (ft)      *    4.24  * Hydr. Depth (ft)     *          *    3.41  *          *
* Conv. Total (cfs)      * 55165.8  * Conv. (cfs)          *          * 55165.8  *          *
* Length Wtd. (ft)       *   86.82  * Wetted Per. (ft)     *          *   74.70  *          *
* Min Ch El (ft)         * 1699.09  * Shear (lb/sq ft)     *          *    1.05  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *         *   16.55  *          *
* Frctn Loss (ft)        *    0.43  * Cum Volume (acre-ft)  *          *   12.57  *          *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)        *          *    3.38  *          *
*****************************************************************************************************
```

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 71.6666*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1705.33	1011.46	1699.52	1011.49	1699.51	1041.47	1698.61	1071.45	1699.51
1071.48	1699.52	1082.95	1705.33	.					

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.95	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.95	86.82	86.82	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1706.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.89	Wt. n-Val.		0.015	
W.S. Elev (ft)	1702.83	Reach Len. (ft)	86.82	86.82	86.82
Crit W.S. (ft)	1703.95	Flow Area (sq ft)		247.59	
E.G. Slope (ft/ft)	*0.005170	Area (sq ft)		247.59	
Q Total (cfs)	3921.00	Flow (cfs)		3921.00	
Top Width (ft)	73.07	Top Width (ft)		73.07	
Vel Total (ft/s)	15.84	Avg. Vel. (ft/s)		15.84	
Max Chl Dpth (ft)	4.22	Hydr. Depth (ft)		3.39	
Conv. Total (cfs)	54532.8	Conv. (cfs)		54532.8	
Length Wtd. (ft)	86.82	Wetted Per. (ft)		74.68	
Min Ch El (ft)	1698.61	Shear (lb/sq ft)		1.07	
Alpha	1.00	Stream Power (lb/ft s)		16.95	
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)		12.08	
C & E Loss (ft)	0.01	Cum SA (acres)		3.23	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 70.8333*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1704.8	1011.46	1699.03	1011.49	1699.02	1041.47	1698.12	1071.44	1699.02
1071.47	1699.03	1082.93	1704.8						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.93	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.93	86.82	86.82	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1706.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.95	Wt. n-Val.		0.015	
W.S. Elev (ft)	1702.31	Reach Len. (ft)	86.82	86.82	86.82
Crit W.S. (ft)	1703.46	Flow Area (sq ft)		245.88	
E.G. Slope (ft/ft)	*0.005286	Area (sq ft)		245.88	
Q Total (cfs)	3921.00	Flow (cfs)		3921.00	
Top Width (ft)	73.04	Top Width (ft)		73.04	
Vel Total (ft/s)	15.95	Avg. Vel. (ft/s)		15.95	
Max Chl Dpth (ft)	4.19	Hydr. Depth (ft)		3.37	
Conv. Total (cfs)	53928.3	Conv. (cfs)		53928.3	
Length Wtd. (ft)	86.82	Wetted Per. (ft)		74.63	
Min Ch El (ft)	1698.12	Shear (lb/sq ft)		1.09	
Alpha	1.00	Stream Power (lb/ft s)		17.34	
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)		11.59	
C & E Loss (ft)	0.01	Cum SA (acres)		3.08	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 70

INPUT
Description: PLAN STA 171+50
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1704.27	1011.46	1698.54	1041.46	1697.64	1071.46	1698.54	1082.92	1704.27

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	46.25	46.25	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1705.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.98	Wt. n-Val.		0.015	
W.S. Elev (ft)	1701.81	Reach Len. (ft)	46.25	46.25	46.25
Crit W.S. (ft)	1702.99	Flow Area (sq ft)		244.91	
E.G. Slope (ft/ft)	*0.005360	Area (sq ft)		244.91	
Q Total (cfs)	3921.00	Flow (cfs)		3921.00	
Top Width (ft)	73.10	Top Width (ft)		73.10	
Vel Total (ft/s)	16.01	Avg. Vel. (ft/s)		16.01	

Max Chl Dpth (ft)	4.17	Hydr. Depth (ft)		3.35			
Conv. Total (cfs)	53556.5	Conv. (cfs)		53556.5			
Length Wtd. (ft)	46.25	Wetted Per. (ft)		74.67			
Min Ch El (ft)	1697.64	Shear (lb/sq ft)		1.10			
Alpha	1.00	Stream Power (lb/ft s)		17.57			
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)		11.10			
C & E Loss (ft)	0.00	Cum SA (acres)		2.94			

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 60

INPUT
Description: PLAN STA 171+96
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1710.12	1000	1704	1011.46	1698.28	1041.46	1697.38	1071.46	1698.28
1082.92	1704	1082.92	1710.12						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	90	90	.3	.5

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1705.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.93	Wt. n-Val.		0.015	
W.S. Elev (ft)	1701.61	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	1702.75	Flow Area (sq ft)		249.08	
E.G. Slope (ft/ft)	*0.005204	Area (sq ft)		249.08	
Q Total (cfs)	3964.00	Flow (cfs)		3964.00	
Top Width (ft)	73.35	Top Width (ft)		73.35	
Vel Total (ft/s)	15.91	Avg. Vel. (ft/s)		15.91	
Max Chl Dpth (ft)	4.23	Hydr. Depth (ft)		3.40	
Conv. Total (cfs)	54950.2	Conv. (cfs)		54950.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		74.94	
Min Ch El (ft)	1697.38	Shear (lb/sq ft)		1.08	
Alpha	1.00	Stream Power (lb/ft s)		17.18	
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)		10.83	
C & E Loss (ft)	0.01	Cum SA (acres)		2.86	

BRIDGE

RIVER: Range Wash
REACH: Sloan Channel RS: 50

INPUT
Description: PLAN STA 171+99
Distance from Upstream XS = 2
Deck/Roadway Width = 87
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
1000	1710.12	1704.33	1082.92	1710.12	1704.33

Upstream Bridge Cross Section Data
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1710.12	1000	1704	1011.46	1698.28	1041.46	1697.38	1071.46	1698.28
1082.92	1704	1082.92	1710.12						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Coeff Contr.	Expan.
1000	1082.92	.3	.5

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
1000	1710.12	1704.33	1082.92	1710.12	1704.33

Downstream Bridge Cross Section Data
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1710.12	1000	1703.72	1011.46	1697.99	1041.46	1697.09	1071.46	1697.99
1082.92	1703.72	1082.92	1710.12						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Coeff Contr.	Expan.
1000	1082.92	.3	.5

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 1710.12
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Piers = 4

```
Pier Data
Pier Station     Upstream=1017.708    Downstream=1017.708
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
     .67    1694     .67    1705
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
     .67    1694     .67    1705

Pier Data
Pier Station     Upstream=1033.458    Downstream=1033.458
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
     .67    1694     .67    1705
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
     .67    1694     .67    1705

Pier Data
Pier Station     Upstream=1049.291    Downstream=1049.291
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
     .67    1694     .67    1705
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
     .67    1694     .67    1705

Pier Data
Pier Station     Upstream=1065.041    Downstream=1065.041
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
     .67    1694     .67    1705
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
     .67    1694     .67    1705

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #Post-Project
*****************************************************************************************
* E.G. US. (ft)          *    1705.54  * Element              *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *    1701.61  * E.G. Elev (ft)       *    1705.43  *    1705.26  *
* Q Total (cfs)          *    3964.00  * W.S. Elev (ft)       *    1701.99  *    1701.58  *
* Q Bridge (cfs)         *    3964.00  * Crit W.S. (ft)       *    1702.91  *    1702.60  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)     *       4.61  *       4.49  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)      *      14.88  *      15.38  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)     *     266.38  *     257.68  *
* Weir Submerg           *             * Froude # Chl          *       1.37  *       1.43  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)  *    2365.30  *    2395.57  *
* Min El Weir Flow (ft)  *    1710.13  * Hydr Depth (ft)       *       3.69  *       3.59  *
* Min El Prs (ft)        *    1704.33  * W.P. Total (ft)       *     107.10  *     105.58  *
* Delta EG (ft)          *    1705.54  * Conv. Total (cfs)     *   48440.5   *   46273.2   *
* Delta WS (ft)          *      -0.47  * Top Width (ft)       *      72.20  *      71.69  *
* BR Open Area (sq ft)   *     445.75  * Frctn Loss (ft)       *       0.01  *       0.42  *
* BR Open Vel (ft/s)     *      15.38  * C & E Loss (ft)       *       0.87  *       0.62  *
* Coef of Q              *             * Shear Total (lb/sq ft) *      1.04  *       1.12  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)  *     15.47  *      17.20  *
*****************************************************************************************

Note:     Momentum answer is not valid if the water surface is above the low chord or if there is weir flow.
          The momentum answer has been disregarded.
Warning: The energy equation could not be balanced within the specified number of iterations.  The
          program selected the water surface that had the least amount of error between computed and
          assumed values.
Warning: The energy equation could not be balanced within the specified number of iterations.  The
          program selected the water surface that had the least amount of error between computed and
          assumed values.

CROSS SECTION


RIVER: Range Wash
REACH: Sloan Channel      RS: 40

INPUT
Description: PLAN STA 172+86
Station Elevation Data    num=       7
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
*********************************************************************************
    1000 1710.12    1000 1703.72 1011.46 1697.99 1041.46 1697.09 1071.46 1697.99
 1082.92 1703.72 1082.92 1710.12

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
*************************************************
    1000     .015    1000     .015 1082.92     .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
          1000 1082.92           113.64  113.64  113.64             .3        .5

CROSS SECTION OUTPUT  Profile #Post-Project
```

E.G. Elev (ft)	1704.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.60	Wt. n-Val.		0.015	
W.S. Elev (ft)	1702.09	Reach Len. (ft)	113.64	113.64	113.64
Crit W.S. (ft)	1702.47	Flow Area (sq ft)		306.28	
E.G. Slope (ft/ft)	*0.002772	Area (sq ft)		306.28	
Q Total (cfs)	3964.00	Flow (cfs)		3964.00	
Top Width (ft)	76.38	Top Width (ft)		76.38	
Vel Total (ft/s)	12.94	Avg. Vel. (ft/s)		12.94	
Max Chl Dpth (ft)	5.00	Hydr. Depth (ft)		4.01	
Conv. Total (cfs)	75296.6	Conv. (cfs)		75296.6	
Length Wtd. (ft)	113.64	Wetted Per. (ft)		78.34	
Min Ch El (ft)	1697.09	Shear (lb/sq ft)		0.68	
Alpha	1.00	Stream Power (lb/ft s)		8.75	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		10.29	
C & E Loss (ft)	0.58	Cum SA (acres)		2.71	

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: Range Wash
REACH: Sloan Channel RS: 30

INPUT
Description: PLAN STA 174+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1001.53	1704.06	1011.46	1697.46	1041.46	1696.56	1071.46	1697.46	1081.36	1704.06

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1001.53	.015	1001.53	.015	1081.36	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1001.53	1081.36	96.54	96.54	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1704.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.74	Wt. n-Val.		0.015	
W.S. Elev (ft)	1701.59	Reach Len. (ft)	96.54	96.54	96.54
Crit W.S. (ft)	1702.00	Flow Area (sq ft)		300.51	
E.G. Slope (ft/ft)	*0.002820	Area (sq ft)		300.51	
Q Total (cfs)	3990.00	Flow (cfs)		3990.00	
Top Width (ft)	72.41	Top Width (ft)		72.41	
Vel Total (ft/s)	13.28	Avg. Vel. (ft/s)		13.28	
Max Chl Dpth (ft)	5.03	Hydr. Depth (ft)		4.15	
Conv. Total (cfs)	75139.2	Conv. (cfs)		75139.2	
Length Wtd. (ft)	96.54	Wetted Per. (ft)		74.94	
Min Ch El (ft)	1696.56	Shear (lb/sq ft)		0.71	
Alpha	1.00	Stream Power (lb/ft s)		9.37	
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)		9.50	
C & E Loss (ft)	0.04	Cum SA (acres)		2.52	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 29.2307*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1001.53	1703.61	1011.46	1697.01	1041.46	1696.11	1071.46	1697.01	1081.36	1703.61

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1001.53	.015	1001.53	.015	1081.36	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1001.53	1081.36	96.54	96.54	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1703.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.11	Wt. n-Val.		0.015	
W.S. Elev (ft)	1700.88	Reach Len. (ft)	96.54	96.54	96.54
Crit W.S. (ft)	1701.55	Flow Area (sq ft)		281.87	
E.G. Slope (ft/ft)	*0.003433	Area (sq ft)		281.87	
Q Total (cfs)	3990.00	Flow (cfs)		3990.00	
Top Width (ft)	71.63	Top Width (ft)		71.63	
Vel Total (ft/s)	14.16	Avg. Vel. (ft/s)		14.16	
Max Chl Dpth (ft)	4.77	Hydr. Depth (ft)		3.93	
Conv. Total (cfs)	68102.1	Conv. (cfs)		68102.1	
Length Wtd. (ft)	96.54	Wetted Per. (ft)		74.00	
Min Ch El (ft)	1696.11	Shear (lb/sq ft)		0.82	
Alpha	1.00	Stream Power (lb/ft s)		11.55	
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)		8.86	
C & E Loss (ft)	0.04	Cum SA (acres)		2.36	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 28.4615*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

```
*************************************************************************
 1001.53 1703.17 1011.46 1696.57 1041.46 1695.67 1071.46 1696.57 1081.36 1703.17

Manning's n Values         num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
 1001.53     .015 1001.53     .015 1081.36     .015

Bank Sta: Left   Right     Lengths: Left Channel   Right      Coeff Contr.    Expan.
       1001.53 1081.36              96.54   96.54   96.54              .1        .3

CROSS SECTION OUTPUT  Profile #Post-Project
*************************************************************************************************
* E.G. Elev (ft)          * 1703.63  * Element                * Left OB * Channel * Right OB *
* Vel Head (ft)           *    3.29  * Wt. n-Val.             *         *   0.015 *          *
* W.S. Elev (ft)          * 1700.33  * Reach Len. (ft)       *   96.54  *   96.54 *   96.54  *
* Crit W.S. (ft)          * 1701.11  * Flow Area (sq ft)     *          *  273.94 *          *
* E.G. Slope (ft/ft)      *0.003748  * Area (sq ft)          *          *  273.94 *          *
* Q Total (cfs)           * 3990.00  * Flow (cfs)            *          * 3990.00 *          *
* Top Width (ft)          *   71.30  * Top Width (ft)        *          *   71.30 *          *
* Vel Total (ft/s)        *   14.57  * Avg. Vel. (ft/s)      *          *   14.57 *          *
* Max Chl Dpth (ft)       *    4.66  * Hydr. Depth (ft)      *          *    3.84 *          *
* Conv. Total (cfs)       * 65172.7  * Conv. (cfs)           *          * 65172.7 *          *
* Length Wtd. (ft)        *   96.54  * Wetted Per. (ft)      *          *   73.60 *          *
* Min Ch El (ft)          * 1695.67  * Shear (lb/sq ft)      *          *    0.87 *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *         *   12.68 *          *
* Frctn Loss (ft)         *    0.35  * Cum Volume (acre-ft)  *          *    8.24 *          *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)        *          *    2.20 *          *
*************************************************************************************************

CROSS SECTION


RIVER: Range Wash
REACH: Sloan Channel       RS: 27.6923*

INPUT
Description:
Station Elevation Data     num=        5
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
*************************************************************************************
 1001.53 1702.72 1011.46 1696.12 1041.46 1695.22 1071.46 1696.12 1081.36 1702.72

Manning's n Values         num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
 1001.53     .015 1001.53     .015 1081.36     .015

Bank Sta: Left   Right     Lengths: Left Channel   Right      Coeff Contr.    Expan.
       1001.53 1081.36              96.54   96.54   96.54              .1        .3

CROSS SECTION OUTPUT  Profile #Post-Project
*************************************************************************************************
* E.G. Elev (ft)          * 1703.24  * Element                * Left OB * Channel * Right OB *
* Vel Head (ft)           *    3.43  * Wt. n-Val.             *         *   0.015 *          *
* W.S. Elev (ft)          * 1699.80  * Reach Len. (ft)       *   96.54  *   96.54 *   96.54  *
* Crit W.S. (ft)          * 1700.66  * Flow Area (sq ft)     *          *  268.37 *          *
* E.G. Slope (ft/ft)      *0.003993  * Area (sq ft)          *          *  268.37 *          *
* Q Total (cfs)           * 3990.00  * Flow (cfs)            *          * 3990.00 *          *
* Top Width (ft)          *   71.07  * Top Width (ft)        *          *   71.07 *          *
* Vel Total (ft/s)        *   14.87  * Avg. Vel. (ft/s)      *          *   14.87 *          *
* Max Chl Dpth (ft)       *    4.58  * Hydr. Depth (ft)      *          *    3.78 *          *
* Conv. Total (cfs)       * 63139.1  * Conv. (cfs)           *          * 63139.1 *          *
* Length Wtd. (ft)        *   96.54  * Wetted Per. (ft)      *          *   73.32 *          *
* Min Ch El (ft)          * 1695.22  * Shear (lb/sq ft)      *          *    0.91 *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *         *   13.57 *          *
* Frctn Loss (ft)         *    0.37  * Cum Volume (acre-ft)  *          *    7.64 *          *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)        *          *    2.04 *          *
*************************************************************************************************

CROSS SECTION


RIVER: Range Wash
REACH: Sloan Channel       RS: 26.9230*

INPUT
Description:
Station Elevation Data     num=        5
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
*************************************************************************************
 1001.53 1702.28 1011.46 1695.68 1041.46 1694.78 1071.46 1695.68 1081.36 1702.28

Manning's n Values         num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
 1001.53     .015 1001.53     .015 1081.36     .015

Bank Sta: Left   Right     Lengths: Left Channel   Right      Coeff Contr.    Expan.
       1001.53 1081.36              96.54   96.54   96.54              .1        .3

CROSS SECTION OUTPUT  Profile #Post-Project
*************************************************************************************************
* E.G. Elev (ft)          * 1702.84  * Element                * Left OB * Channel * Right OB *
* Vel Head (ft)           *    3.52  * Wt. n-Val.             *         *   0.015 *          *
* W.S. Elev (ft)          * 1699.32  * Reach Len. (ft)       *   96.54  *   96.54 *   96.54  *
* Crit W.S. (ft)          * 1700.22  * Flow Area (sq ft)     *          *  264.93 *          *
* E.G. Slope (ft/ft)      *0.004155  * Area (sq ft)          *          *  264.93 *          *
* Q Total (cfs)           * 3990.00  * Flow (cfs)            *          * 3990.00 *          *
* Top Width (ft)          *   70.92  * Top Width (ft)        *          *   70.92 *          *
* Vel Total (ft/s)        *   15.06  * Avg. Vel. (ft/s)      *          *   15.06 *          *
* Max Chl Dpth (ft)       *    4.53  * Hydr. Depth (ft)      *          *    3.74 *          *
* Conv. Total (cfs)       * 61897.4  * Conv. (cfs)           *          * 61897.4 *          *
* Length Wtd. (ft)        *   96.54  * Wetted Per. (ft)      *          *   73.15 *          *
* Min Ch El (ft)          * 1694.78  * Shear (lb/sq ft)      *          *    0.94 *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *         *   14.15 *          *
* Frctn Loss (ft)         *    0.39  * Cum Volume (acre-ft)  *          *    7.05 *          *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)        *          *    1.88 *          *
*************************************************************************************************

CROSS SECTION
```

RIVER: Range Wash
REACH: Sloan Channel RS: 26.1538*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1001.53	1701.83	1011.46	1695.23	1041.46	1694.33	1071.46	1695.23	1081.36	1701.83

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1001.53	.015	1001.53	.015	1081.36	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1001.53	1081.36	96.54	96.54	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1702.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.59	Wt. n-Val.		0.015	
W.S. Elev (ft)	1698.83	Reach Len. (ft)	96.54	96.54	96.54
Crit W.S. (ft)	1699.77	Flow Area (sq ft)		262.57	
E.G. Slope (ft/ft)	*0.004272	Area (sq ft)		262.57	
Q Total (cfs)	3990.00	Flow (cfs)		3990.00	
Top Width (ft)	70.82	Top Width (ft)		70.82	
Vel Total (ft/s)	15.20	Avg. Vel. (ft/s)		15.20	
Max Chl Dpth (ft)	4.50	Hydr. Depth (ft)		3.71	
Conv. Total (cfs)	61047.4	Conv. (cfs)		61047.4	
Length Wtd. (ft)	96.54	Wetted Per. (ft)		73.03	
Min Ch El (ft)	1694.33	Shear (lb/sq ft)		0.96	
Alpha	1.00	Stream Power (lb/ft s)		14.57	
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)		6.46	
C & E Loss (ft)	0.01	Cum SA (acres)		1.73	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 25.3846*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1001.53	1701.38	1011.46	1694.78	1041.46	1693.88	1071.46	1694.78	1081.36	1701.38

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1001.53	.015	1001.53	.015	1081.36	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1001.53	1081.36	96.54	96.54	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1701.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.64	Wt. n-Val.		0.015	
W.S. Elev (ft)	1698.35	Reach Len. (ft)	96.54	96.54	96.54
Crit W.S. (ft)	1699.32	Flow Area (sq ft)		260.66	
E.G. Slope (ft/ft)	*0.004369	Area (sq ft)		260.66	
Q Total (cfs)	3990.00	Flow (cfs)		3990.00	
Top Width (ft)	70.74	Top Width (ft)		70.74	
Vel Total (ft/s)	15.31	Avg. Vel. (ft/s)		15.31	
Max Chl Dpth (ft)	4.47	Hydr. Depth (ft)		3.68	
Conv. Total (cfs)	60362.9	Conv. (cfs)		60362.9	
Length Wtd. (ft)	96.54	Wetted Per. (ft)		72.93	
Min Ch El (ft)	1693.88	Shear (lb/sq ft)		0.97	
Alpha	1.00	Stream Power (lb/ft s)		14.92	
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)		5.88	
C & E Loss (ft)	0.01	Cum SA (acres)		1.57	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 24.6153*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1001.53	1700.94	1011.46	1694.34	1041.46	1693.44	1071.46	1694.34	1081.36	1700.94

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1001.53	.015	1001.53	.015	1081.36	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1001.53	1081.36	96.54	96.54	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1701.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.66	Wt. n-Val.		0.015	
W.S. Elev (ft)	1697.90	Reach Len. (ft)	96.54	96.54	96.54
Crit W.S. (ft)	1698.88	Flow Area (sq ft)		259.72	
E.G. Slope (ft/ft)	*0.004418	Area (sq ft)		259.72	
Q Total (cfs)	3990.00	Flow (cfs)		3990.00	
Top Width (ft)	70.70	Top Width (ft)		70.70	
Vel Total (ft/s)	15.36	Avg. Vel. (ft/s)		15.36	
Max Chl Dpth (ft)	4.46	Hydr. Depth (ft)		3.67	
Conv. Total (cfs)	60026.6	Conv. (cfs)		60026.6	
Length Wtd. (ft)	96.54	Wetted Per. (ft)		72.88	
Min Ch El (ft)	1693.44	Shear (lb/sq ft)		0.98	
Alpha	1.00	Stream Power (lb/ft s)		15.10	

Frctn Loss (ft)	0.42	Cum Volume (acre-ft)		5.31				
C & E Loss (ft)	0.00	Cum SA (acres)		1.41				

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 23.8461*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1001.53	1700.49	1011.46	1693.89	1041.46	1692.99	1071.46	1693.89	1081.36	1700.49

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1001.53	.015	1001.53	.015	1081.36	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1001.53	1081.36	96.54	96.54	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1701.13	Element		0.015	
Vel Head (ft)	3.70	Wt. n-Val.		0.015	
W.S. Elev (ft)	1697.44	Reach Len. (ft)	96.54	96.54	96.54
Crit W.S. (ft)	1698.43	Flow Area (sq ft)		258.55	
E.G. Slope (ft/ft)	0.004481	Area (sq ft)		258.55	
Q Total (cfs)	3990.00	Flow (cfs)		3990.00	
Top Width (ft)	70.65	Top Width (ft)		70.65	
Vel Total (ft/s)	15.43	Avg. Vel. (ft/s)		15.43	
Max Chl Dpth (ft)	4.44	Hydr. Depth (ft)		3.66	
Conv. Total (cfs)	59608.0	Conv. (cfs)		59608.0	
Length Wtd. (ft)	96.54	Wetted Per. (ft)		72.82	
Min Ch El (ft)	1692.99	Shear (lb/sq ft)		0.99	
Alpha	1.00	Stream Power (lb/ft s)		15.33	
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)		4.73	
C & E Loss (ft)	0.00	Cum SA (acres)		1.26	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 23.0769*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1001.53	1700.04	1011.46	1693.44	1041.46	1692.54	1071.46	1693.44	1081.36	1700.04

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1001.53	.015	1001.53	.015	1081.36	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1001.53	1081.36	96.54	96.54	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1700.70	Element		0.015	
Vel Head (ft)	3.72	Wt. n-Val.		0.015	
W.S. Elev (ft)	1696.97	Reach Len. (ft)	96.54	96.54	96.54
Crit W.S. (ft)	1697.98	Flow Area (sq ft)		257.69	
E.G. Slope (ft/ft)	0.004527	Area (sq ft)		257.69	
Q Total (cfs)	3990.00	Flow (cfs)		3990.00	
Top Width (ft)	70.61	Top Width (ft)		70.61	
Vel Total (ft/s)	15.48	Avg. Vel. (ft/s)		15.48	
Max Chl Dpth (ft)	4.43	Hydr. Depth (ft)		3.65	
Conv. Total (cfs)	59302.6	Conv. (cfs)		59302.6	
Length Wtd. (ft)	96.54	Wetted Per. (ft)		72.78	
Min Ch El (ft)	1692.54	Shear (lb/sq ft)		1.00	
Alpha	1.00	Stream Power (lb/ft s)		15.49	
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)		4.16	
C & E Loss (ft)	0.00	Cum SA (acres)		1.10	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 22.3076*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1001.53	1699.6	1011.46	1693	1041.46	1692.1	1071.46	1693	1081.36	1699.6

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1001.53	.015	1001.53	.015	1081.36	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1001.53	1081.36	96.54	96.54	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1700.25	Element		0.015	
Vel Head (ft)	3.71	Wt. n-Val.		0.015	
W.S. Elev (ft)	1696.54	Reach Len. (ft)	96.54	96.54	96.54
Crit W.S. (ft)	1697.54	Flow Area (sq ft)		258.06	
E.G. Slope (ft/ft)	0.004507	Area (sq ft)		258.06	
Q Total (cfs)	3990.00	Flow (cfs)		3990.00	

* Top Width (ft)	* 70.63	* Top Width (ft)	*	* 70.63	*
* Vel Total (ft/s)	* 15.46	* Avg. Vel. (ft/s)	*	* 15.46	*
* Max Chl Dpth (ft)	* 4.44	* Hydr. Depth (ft)	*	* 3.65	*
* Conv. Total (cfs)	* 59432.9	* Conv. (cfs)	*	* 59432.9	*
* Length Wtd. (ft)	* 96.54	* Wetted Per. (ft)	*	* 72.80	*
* Min Ch El (ft)	* 1692.10	* Shear (lb/sq ft)	*	* 1.00	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 15.42	*
* Frctn Loss (ft)	* 0.44	* Cum Volume (acre-ft)	*	* 3.59	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 0.94	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 21.5384*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1001.53	1699.15	1011.46	1692.55	1041.46	1691.65	1071.46	1692.55	1081.36	1699.15

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1001.53	.015	1001.53	.015	1081.36	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1001.53	1081.36	96.54	96.54	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
* E.G. Elev (ft)	* 1699.81	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 3.73	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 1696.08	* Reach Len. (ft)	* 96.54	* 96.54	* 96.54
* Crit W.S. (ft)	* 1697.09	* Flow Area (sq ft)	*	* 257.37	*
* E.G. Slope (ft/ft)	*0.004544	* Area (sq ft)	*	* 257.37	*
* Q Total (cfs)	* 3990.00	* Flow (cfs)	*	* 3990.00	*
* Top Width (ft)	* 70.60	* Top Width (ft)	*	* 70.60	*
* Vel Total (ft/s)	* 15.50	* Avg. Vel. (ft/s)	*	* 15.50	*
* Max Chl Dpth (ft)	* 4.43	* Hydr. Depth (ft)	*	* 3.65	*
* Conv. Total (cfs)	* 59187.5	* Conv. (cfs)	*	* 59187.5	*
* Length Wtd. (ft)	* 96.54	* Wetted Per. (ft)	*	* 72.76	*
* Min Ch El (ft)	* 1691.65	* Shear (lb/sq ft)	*	* 1.00	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 15.56	*
* Frctn Loss (ft)	* 0.44	* Cum Volume (acre-ft)	*	* 3.02	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 0.79	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 20.7692*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1001.53	1698.71	1011.46	1692.11	1041.46	1691.21	1071.46	1692.11	1081.36	1698.71

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1001.53	.015	1001.53	.015	1081.36	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1001.53	1081.36	96.54	96.54	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
* E.G. Elev (ft)	* 1699.37	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 3.73	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 1695.64	* Reach Len. (ft)	* 96.54	* 96.54	* 96.54
* Crit W.S. (ft)	* 1696.65	* Flow Area (sq ft)	*	* 257.59	*
* E.G. Slope (ft/ft)	*0.004532	* Area (sq ft)	*	* 257.59	*
* Q Total (cfs)	* 3990.00	* Flow (cfs)	*	* 3990.00	*
* Top Width (ft)	* 70.61	* Top Width (ft)	*	* 70.61	*
* Vel Total (ft/s)	* 15.49	* Avg. Vel. (ft/s)	*	* 15.49	*
* Max Chl Dpth (ft)	* 4.43	* Hydr. Depth (ft)	*	* 3.65	*
* Conv. Total (cfs)	* 59267.2	* Conv. (cfs)	*	* 59267.2	*
* Length Wtd. (ft)	* 96.54	* Wetted Per. (ft)	*	* 72.77	*
* Min Ch El (ft)	* 1691.21	* Shear (lb/sq ft)	*	* 1.00	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 15.51	*
* Frctn Loss (ft)	* 0.44	* Cum Volume (acre-ft)	*	* 2.45	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 0.63	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 20

INPUT
Description: PLAN STA 186+54
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1001.53	1698.26	1011.46	1691.66	1041.46	1690.76	1071.46	1691.66	1081.36	1698.26

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1001.53	.015	1001.53	.015	1081.36	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1001.53	1081.36	260.12	280 299.88	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1698.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.74	Wt. n-Val.		0.015	
W.S. Elev (ft)	1695.18	Reach Len. (ft)	260.12	280.00	299.88
Crit W.S. (ft)	1696.20	Flow Area (sq ft)		257.01	
E.G. Slope (ft/ft)	0.004564	Area (sq ft)		257.01	
Q Total (cfs)	3990.00	Flow (cfs)		3990.00	
Top Width (ft)	70.58	Top Width (ft)		70.58	
Vel Total (ft/s)	15.52	Avg. Vel. (ft/s)		15.52	
Max Chl Dpth (ft)	4.42	Hydr. Depth (ft)		3.64	
Conv. Total (cfs)	59062.0	Conv. (cfs)		59062.0	
Length Wtd. (ft)		Wetted Per. (ft)		72.74	
Min Ch El (ft)	1690.76	Shear (lb/sq ft)		1.01	
Alpha	1.00	Stream Power (lb/ft s)		15.63	
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)		1.88	
C & E Loss (ft)	0.00	Cum SA (acres)		0.48	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 10

INPUT
Description: PLAN STA 189+14
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1700	1020	1689.5	1082	1689.5	1096	1700

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1096	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1096	0	0	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1696.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.31	Wt. n-Val.		0.015	
W.S. Elev (ft)	1694.20	Reach Len. (ft)			
Crit W.S. (ft)		Flow Area (sq ft)		327.16	
E.G. Slope (ft/ft)	0.002316	Area (sq ft)		327.16	
Q Total (cfs)	3990.00	Flow (cfs)		3990.00	
Top Width (ft)	77.22	Top Width (ft)		77.22	
Vel Total (ft/s)	12.20	Avg. Vel. (ft/s)		12.20	
Max Chl Dpth (ft)	4.70	Hydr. Depth (ft)		4.24	
Conv. Total (cfs)	82917.9	Conv. (cfs)		82917.9	
Length Wtd. (ft)		Wetted Per. (ft)		79.94	
Min Ch El (ft)	1689.50	Shear (lb/sq ft)		0.59	
Alpha	1.00	Stream Power (lb/ft s)		7.21	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

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.
Note: The user has entered a known water surface elevation at this cross section.

SUMMARY OF MANNING'S N VALUES

River:Range Wash

Reach	River Sta.	n1	n2	n3
Sloan Channel	210	.015	.015	.015
Sloan Channel	200	.015	.015	.015
Sloan Channel	197.5*	.015	.015	.015
Sloan Channel	195.*	.015	.015	.015
Sloan Channel	192.5*	.015	.015	.015
Sloan Channel	190	.015	.015	.015
Sloan Channel	180	.015	.015	.015
Sloan Channel	170	.015	.015	.015
Sloan Channel	160	.015	.015	.015
Sloan Channel	158.*	.015	.015	.015
Sloan Channel	156.*	.015	.015	.015
Sloan Channel	154.*	.015	.015	.015
Sloan Channel	152.*	.015	.015	.015
Sloan Channel	150	.015	.015	.015
Sloan Channel	148.75*	.015	.015	.015
Sloan Channel	147.5*	.015	.015	.015
Sloan Channel	146.25*	.015	.015	.015
Sloan Channel	145	.015	.015	.015
Sloan Channel	144.615*	.015	.015	.015
Sloan Channel	144.230*	.015	.015	.015
Sloan Channel	143.846*	.015	.015	.015
Sloan Channel	143.461*	.015	.015	.015
Sloan Channel	143.076*	.015	.015	.015
Sloan Channel	142.692*	.015	.015	.015
Sloan Channel	142.307*	.015	.015	.015
Sloan Channel	141.923*	.015	.015	.015
Sloan Channel	141.538*	.015	.015	.015
Sloan Channel	141.153*	.015	.015	.015
Sloan Channel	140.769*	.015	.015	.015
Sloan Channel	140.384*	.015	.015	.015
Sloan Channel	140	.015	.015	.015
Sloan Channel	130	.015	.015	.015
Sloan Channel	120	.015	.015	.015
Sloan Channel	110	.015	.015	.015
Sloan Channel	100	.015	.015	.015
Sloan Channel	90	.015	.015	.015
Sloan Channel	80	.015	.015	.015
Sloan Channel	75	.015	.015	.015
Sloan Channel	74.1666*	.015	.015	.015
Sloan Channel	73.3333*	.015	.015	.015
Sloan Channel	72.5*	.015	.015	.015

Reach	River Sta.	Left	Channel	Right
Sloan Channel	71.6666	.015	.015	.015
Sloan Channel	70.8333	.015	.015	.015
Sloan Channel	70	.015	.015	.015
Sloan Channel	60	.015	.015	.015
Sloan Channel	50	Bridge		
Sloan Channel	40	.015	.015	.015
Sloan Channel	30	.015	.015	.015
Sloan Channel	29.2307	.015	.015	.015
Sloan Channel	28.4615	.015	.015	.015
Sloan Channel	27.6923	.015	.015	.015
Sloan Channel	26.9230	.015	.015	.015
Sloan Channel	26.1538	.015	.015	.015
Sloan Channel	25.3846	.015	.015	.015
Sloan Channel	24.6153	.015	.015	.015
Sloan Channel	23.8461	.015	.015	.015
Sloan Channel	23.0769	.015	.015	.015
Sloan Channel	22.3076	.015	.015	.015
Sloan Channel	21.5384	.015	.015	.015
Sloan Channel	20.7692	.015	.015	.015
Sloan Channel	20	.015	.015	.015
Sloan Channel	10	.015	.015	.015

SUMMARY OF REACH LENGTHS

River: Range Wash

Reach	River Sta.	Left	Channel	Right
Sloan Channel	210	35.96	35.96	35.96
Sloan Channel	200	77.79	87.33	93.71
Sloan Channel	197.5	77.79	87.33	93.71
Sloan Channel	195.	77.79	87.33	93.71
Sloan Channel	192.5	77.79	87.33	93.71
Sloan Channel	190	225.65	225.65	225.65
Sloan Channel	180	100	100	100
Sloan Channel	170	51.96	51.96	51.96
Sloan Channel	160	89.2	89.2	89.2
Sloan Channel	158.	89.2	89.2	89.2
Sloan Channel	156.	89.2	89.2	89.2
Sloan Channel	154.	89.2	89.2	89.2
Sloan Channel	152.	89.2	89.2	89.2
Sloan Channel	150	72.79	72.79	72.79
Sloan Channel	148.75	72.79	72.79	72.79
Sloan Channel	147.5	72.79	72.79	72.79
Sloan Channel	146.25	72.79	72.79	72.79
Sloan Channel	145	189.27	189.27	189.27
Sloan Channel	144.615	189.27	189.27	189.27
Sloan Channel	144.230	189.27	189.27	189.27
Sloan Channel	143.846	189.27	189.27	189.27
Sloan Channel	143.461	189.27	189.27	189.27
Sloan Channel	143.076	189.27	189.27	189.27
Sloan Channel	142.692	189.27	189.27	189.27
Sloan Channel	142.307	189.27	189.27	189.27
Sloan Channel	141.923	189.27	189.27	189.27
Sloan Channel	141.538	189.27	189.27	189.27
Sloan Channel	141.153	189.27	189.27	189.27
Sloan Channel	140.769	189.27	189.27	189.27
Sloan Channel	140.384	189.27	189.27	189.27
Sloan Channel	140	50	50	50
Sloan Channel	130	129.35	129.35	129.35
Sloan Channel	120	50	50	50
Sloan Channel	110	100	100	100
Sloan Channel	100	100	100	100
Sloan Channel	90	50	50	50
Sloan Channel	80	300	300	300
Sloan Channel	75	86.82	86.82	86.82
Sloan Channel	74.1666	86.82	86.82	86.82
Sloan Channel	73.3333	86.82	86.82	86.82
Sloan Channel	72.5	86.82	86.82	86.82
Sloan Channel	71.6666	86.82	86.82	86.82
Sloan Channel	70.8333	86.82	86.82	86.82
Sloan Channel	70	46.25	46.25	46.25
Sloan Channel	60	90	90	90
Sloan Channel	50	Bridge		
Sloan Channel	40	113.64	113.64	113.64
Sloan Channel	30	96.54	96.54	96.54
Sloan Channel	29.2307	96.54	96.54	96.54
Sloan Channel	28.4615	96.54	96.54	96.54
Sloan Channel	27.6923	96.54	96.54	96.54
Sloan Channel	26.9230	96.54	96.54	96.54
Sloan Channel	26.1538	96.54	96.54	96.54
Sloan Channel	25.3846	96.54	96.54	96.54
Sloan Channel	24.6153	96.54	96.54	96.54
Sloan Channel	23.8461	96.54	96.54	96.54
Sloan Channel	23.0769	96.54	96.54	96.54
Sloan Channel	22.3076	96.54	96.54	96.54
Sloan Channel	21.5384	96.54	96.54	96.54
Sloan Channel	20.7692	96.54	96.54	96.54
Sloan Channel	20	260.12	280	299.88
Sloan Channel	10	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Range Wash

Reach	River Sta.	Contr.	Expan.
Sloan Channel	210	.1	.3
Sloan Channel	200	.1	.3
Sloan Channel	197.5	.1	.3
Sloan Channel	195.	.1	.3
Sloan Channel	192.5	.1	.3
Sloan Channel	190	.1	.3
Sloan Channel	180	.1	.3
Sloan Channel	170	.1	.3
Sloan Channel	160	.1	.3
Sloan Channel	158.	.1	.3

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*Sloan Channel   *    156.*   *        .1*       .3*
*Sloan Channel   *    154.*   *        .1*       .3*
*Sloan Channel   *    152.*   *        .1*       .3*
*Sloan Channel   *    150     *        .1*       .3*
*Sloan Channel   *    148.75* *        .1*       .3*
*Sloan Channel   *    147.5*  *        .1*       .3*
*Sloan Channel   *    146.25* *        .1*       .3*
*Sloan Channel   *    145     *        .1*       .3*
*Sloan Channel   *    144.615**        .1*       .3*
*Sloan Channel   *    144.230**        .1*       .3*
*Sloan Channel   *    143.846**        .1*       .3*
*Sloan Channel   *    143.461**        .1*       .3*
*Sloan Channel   *    143.076**        .1*       .3*
*Sloan Channel   *    142.692**        .1*       .3*
*Sloan Channel   *    142.307**        .1*       .3*
*Sloan Channel   *    141.923**        .1*       .3*
*Sloan Channel   *    141.538**        .1*       .3*
*Sloan Channel   *    141.153**        .1*       .3*
*Sloan Channel   *    140.769**        .1*       .3*
*Sloan Channel   *    140.384**        .1*       .3*
*Sloan Channel   *    140     *        .1*       .3*
*Sloan Channel   *    130     *        .1*       .3*
*Sloan Channel   *    120     *        .1*       .3*
*Sloan Channel   *    110     *        .1*       .3*
*Sloan Channel   *    100     *        .1*       .3*
*Sloan Channel   *    90      *        .1*       .3*
*Sloan Channel   *    80      *        .1*       .3*
*Sloan Channel   *    75      *        .1*       .3*
*Sloan Channel   *    74.1666**        .1*       .3*
*Sloan Channel   *    73.3333**        .1*       .3*
*Sloan Channel   *    72.5*   *        .1*       .3*
*Sloan Channel   *    71.6666**        .1*       .3*
*Sloan Channel   *    70.8333**        .1*       .3*
*Sloan Channel   *    70      *        .1*       .3*
*Sloan Channel   *    60      *        .3*       .5*
*Sloan Channel   *    50      *Bridge  *         *
*Sloan Channel   *    40      *        .3*       .5*
*Sloan Channel   *    30      *        .1*       .3*
*Sloan Channel   *    29.2307**        .1*       .3*
*Sloan Channel   *    28.4615**        .1*       .3*
*Sloan Channel   *    27.6923**        .1*       .3*
*Sloan Channel   *    26.9230**        .1*       .3*
*Sloan Channel   *    26.1538**        .1*       .3*
*Sloan Channel   *    25.3846**        .1*       .3*
*Sloan Channel   *    24.6153**        .1*       .3*
*Sloan Channel   *    23.8461**        .1*       .3*
*Sloan Channel   *    23.0769**        .1*       .3*
*Sloan Channel   *    22.3076**        .1*       .3*
*Sloan Channel   *    21.5384**        .1*       .3*
*Sloan Channel   *    20.7692**        .1*       .3*
*Sloan Channel   *    20      *        .1*       .3*
*Sloan Channel   *    10      *        .1*       .3*
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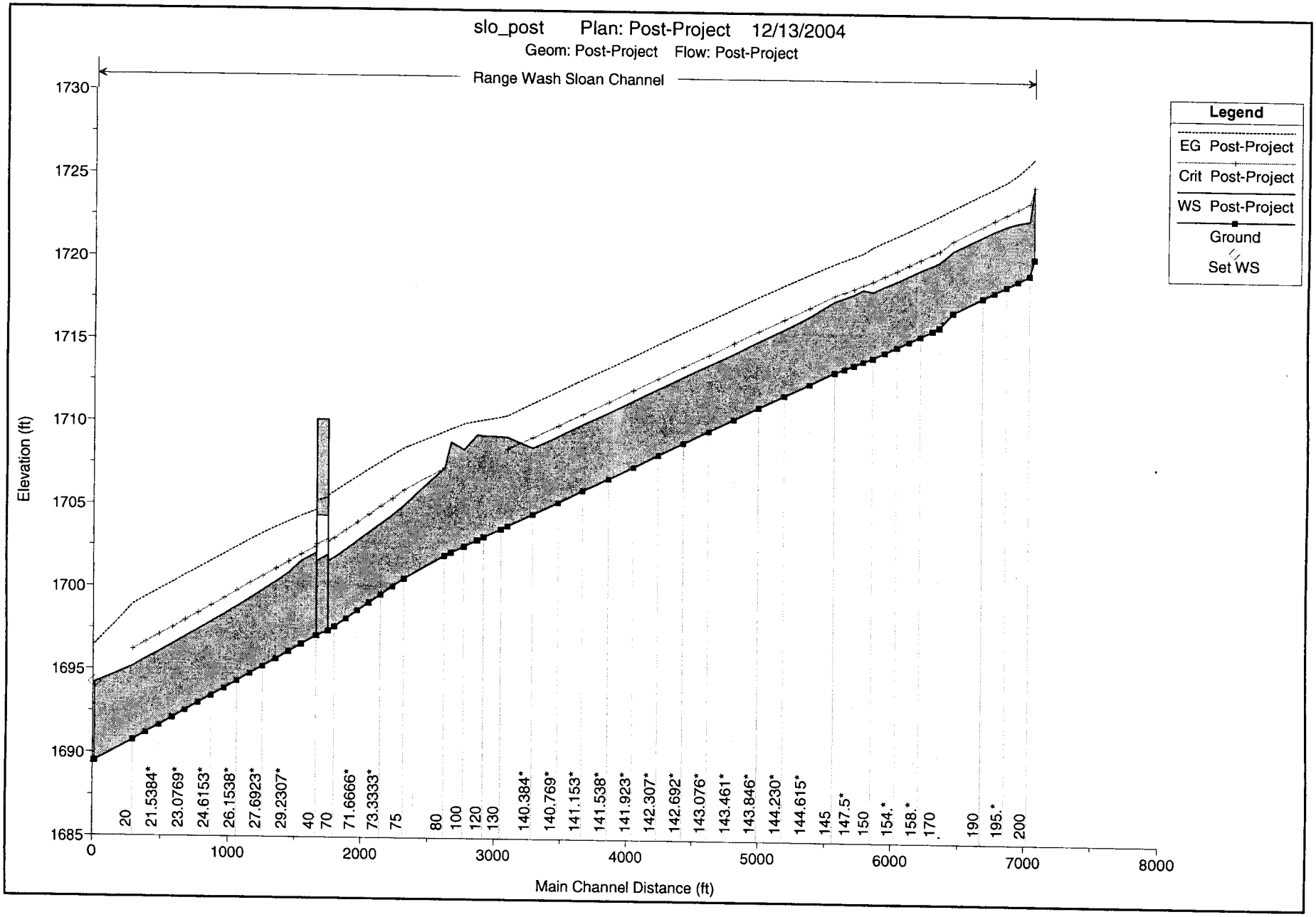
HEC-RAS Plan: Post River: Range Wash Reach: Sloan Channel Profile: Post-Project

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)	
Sloan Channel	210	Post-Project	3072.00	1720.22	1724.58	1724.58	1726.32	0.002215	10.59	290.22	83.23	1.00
Sloan Channel	200	Post-Project	3072.00	1719.24	1722.56	1723.60	1726.02	0.006465	14.93	205.76	79.07	1.63
Sloan Channel	197.5*	Post-Project	3072.00	1718.89	1722.42	1723.25	1725.37	0.005029	13.78	222.93	79.93	1.45
Sloan Channel	195.*	Post-Project	3072.00	1718.54	1722.21	1722.90	1724.89	0.004310	13.12	234.20	80.50	1.36
Sloan Channel	192.5*	Post-Project	3072.00	1718.19	1721.91	1722.55	1724.50	0.004126	12.93	237.50	80.66	1.33
Sloan Channel	190	Post-Project	3072.00	1717.84	1721.56	1722.20	1724.15	0.004088	12.90	238.21	80.69	1.32
Sloan Channel	180	Post-Project	3072.00	1716.94	1720.69	1721.29	1723.23	0.003976	12.78	240.34	80.80	1.31
Sloan Channel	170	Post-Project	3072.00	1716.04	1719.99	1720.68	1722.80	0.004075	13.45	228.44	72.19	1.33
Sloan Channel	160	Post-Project	3072.00	1715.84	1719.80	1720.47	1722.59	0.004032	13.40	229.22	72.23	1.33
Sloan Channel	158.*	Post-Project	3072.00	1715.50	1719.51	1720.14	1722.22	0.003866	13.22	232.33	72.43	1.30
Sloan Channel	156.*	Post-Project	3072.00	1715.17	1719.18	1719.80	1721.89	0.003849	13.20	232.65	72.44	1.30
Sloan Channel	154.*	Post-Project	3072.00	1714.83	1718.84	1719.47	1721.55	0.003859	13.22	232.44	72.42	1.30
Sloan Channel	152.*	Post-Project	3072.00	1714.50	1718.52	1719.14	1721.21	0.003821	13.17	233.23	72.47	1.29
Sloan Channel	150	Post-Project	3072.00	1714.16	1718.18	1718.79	1720.87	0.003818	13.17	233.32	72.46	1.29
Sloan Channel	148.75*	Post-Project	3072.00	1713.94	1718.29	1718.57	1720.50	0.002810	11.91	257.85	73.80	1.12
Sloan Channel	147.5*	Post-Project	3072.00	1713.71	1718.00	1718.34	1720.28	0.002958	12.12	253.57	73.57	1.15
Sloan Channel	146.25*	Post-Project	3072.00	1713.48	1717.79	1718.12	1720.05	0.002920	12.06	254.65	73.63	1.14
Sloan Channel	145	Post-Project	3078.00	1713.26	1717.58	1717.91	1719.83	0.002902	12.05	255.50	73.67	1.14
Sloan Channel	144.615*	Post-Project	3078.00	1712.53	1716.64	1717.17	1719.20	0.003523	12.84	239.79	72.82	1.25
Sloan Channel	144.230*	Post-Project	3078.00	1711.80	1715.85	1716.44	1718.50	0.003719	13.06	235.59	72.60	1.28
Sloan Channel	143.846*	Post-Project	3078.00	1711.07	1715.10	1715.71	1717.78	0.003791	13.15	234.11	72.51	1.29
Sloan Channel	143.461*	Post-Project	3078.00	1710.34	1714.36	1714.98	1717.06	0.003828	13.19	233.34	72.47	1.30
Sloan Channel	143.076*	Post-Project	3078.00	1709.61	1713.62	1714.25	1716.33	0.003853	13.22	232.87	72.45	1.30
Sloan Channel	142.692*	Post-Project	3078.00	1708.88	1712.89	1713.52	1715.60	0.003845	13.21	233.01	72.46	1.30
Sloan Channel	142.307*	Post-Project	3078.00	1708.14	1712.15	1712.79	1714.87	0.003873	13.24	232.46	72.43	1.30
Sloan Channel	141.923*	Post-Project	3078.00	1707.41	1711.42	1712.06	1714.14	0.003864	13.23	232.64	72.44	1.30
Sloan Channel	141.538*	Post-Project	3078.00	1706.68	1710.69	1711.32	1713.41	0.003865	13.23	232.63	72.43	1.30
Sloan Channel	141.153*	Post-Project	3078.00	1705.95	1709.96	1710.59	1712.68	0.003863	13.23	232.68	72.44	1.30
Sloan Channel	140.769*	Post-Project	3078.00	1705.22	1709.23	1709.86	1711.95	0.003862	13.23	232.72	72.44	1.30
Sloan Channel	140.384*	Post-Project	3078.00	1704.49	1708.50	1709.14	1711.21	0.003858	13.22	232.82	72.45	1.30
Sloan Channel	140	Post-Project	3078.00	1703.76	1709.15	1708.42	1710.45	0.001255	9.14	336.70	77.96	0.78
Sloan Channel	130	Post-Project	3078.00	1703.57	1709.18		1710.35	0.001084	8.71	353.57	78.82	0.72
Sloan Channel	120	Post-Project	3078.00	1703.09	1709.22		1710.16	0.000773	7.78	395.80	80.93	0.62
Sloan Channel	110	Post-Project	3078.00	1702.90	1709.27		1710.10	0.000625	7.31	421.13	72.50	0.53
Sloan Channel	100	Post-Project	3891.00	1702.52	1708.37		1709.93	0.001300	10.04	387.60	72.50	0.77
Sloan Channel	90	Post-Project	3891.00	1702.14	1708.82		1709.62	0.000558	7.17	542.57	90.50	0.52
Sloan Channel	80	Post-Project	3891.00	1701.95	1707.27	1707.27	1709.43	0.002117	11.80	329.71	76.95	1.00
Sloan Channel	75	Post-Project	3921.00	1700.55	1704.99	1705.89	1708.43	0.004256	14.89	263.38	73.57	1.39
Sloan Channel	74.1666*	Post-Project	3921.00	1700.07	1704.42	1705.41	1708.03	0.004596	15.26	256.96	73.32	1.44
Sloan Channel	73.3333*	Post-Project	3921.00	1699.58	1703.87	1704.92	1707.61	0.004845	15.52	252.67	73.17	1.47
Sloan Channel	72.5*	Post-Project	3921.00	1699.09	1703.33	1704.43	1707.17	0.005052	15.73	249.34	73.07	1.50
Sloan Channel	71.6666*	Post-Project	3921.00	1698.61	1702.83	1703.95	1706.72	0.005170	15.84	247.59	73.07	1.52
Sloan Channel	70.8333*	Post-Project	3921.00	1698.12	1702.31	1703.46	1706.26	0.005286	15.95	245.88	73.04	1.53
Sloan Channel	70	Post-Project	3921.00	1697.64	1701.81	1702.99	1705.80	0.005360	16.01	244.91	73.10	1.54
Sloan Channel	60	Post-Project	3964.00	1697.38	1701.61	1702.75	1705.54	0.005204	15.91	249.08	73.35	1.52
Sloan Channel	50		Bridge									
Sloan Channel	40	Post-Project	3964.00	1697.09	1702.09	1702.47	1704.69	0.002772	12.94	306.28	76.38	1.14
Sloan Channel	30	Post-Project	3990.00	1696.56	1701.59	1702.00	1704.33	0.002820	13.28	300.51	72.41	1.15
Sloan Channel	29.2307*	Post-Project	3990.00	1696.11	1700.88	1701.55	1703.99	0.003433	14.16	281.87	71.63	1.26
Sloan Channel	28.4615*	Post-Project	3990.00	1695.67	1700.33	1701.11	1703.63	0.003748	14.57	273.94	71.30	1.31
Sloan Channel	27.6923*	Post-Project	3990.00	1695.22	1699.80	1700.66	1703.24	0.003993	14.87	268.37	71.07	1.35
Sloan Channel	26.9230*	Post-Project	3990.00	1694.78	1699.32	1700.22	1702.84	0.004155	15.06	264.93	70.92	1.37
Sloan Channel	26.1538*	Post-Project	3990.00	1694.33	1698.83	1699.77	1702.42	0.004272	15.20	262.57	70.82	1.39
Sloan Channel	25.3846*	Post-Project	3990.00	1693.88	1698.35	1699.32	1701.99	0.004369	15.31	260.66	70.74	1.41
Sloan Channel	24.6153*	Post-Project	3990.00	1693.44	1697.90	1698.88	1701.57	0.004418	15.36	259.72	70.70	1.41
Sloan Channel	23.8461*	Post-Project	3990.00	1692.99	1697.44	1698.43	1701.13	0.004481	15.43	258.55	70.65	1.42
Sloan Channel	23.0769*	Post-Project	3990.00	1692.54	1696.97	1697.98	1700.70	0.004527	15.48	257.69	70.61	1.43
Sloan Channel	22.3076*	Post-Project	3990.00	1692.10	1696.54	1697.54	1700.25	0.004507	15.46	258.06	70.63	1.43
Sloan Channel	21.5384*	Post-Project	3990.00	1691.65	1696.08	1697.09	1699.81	0.004544	15.50	257.37	70.60	1.43
Sloan Channel	20.7692*	Post-Project	3990.00	1691.21	1695.64	1696.65	1699.37	0.004532	15.49	257.59	70.61	1.43
Sloan Channel	20	Post-Project	3990.00	1690.76	1695.18	1696.20	1698.93	0.004564	15.52	257.01	70.58	1.43
Sloan Channel	10	Post-Project	3990.00	1689.50	1694.20		1696.51	0.002316	12.20	327.16	77.22	1.04


slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
Range Wash Sloan Channel
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Set WS
Elevation (ft)
1730
1725
1720
1715
1710
1705
1700
1695
1690
1685
0
1000
2000
3000
4000
5000
6000
7000
8000
Main Channel Distance (ft)
20
21.5384*
23.0769*
24.6153*
26.1538*
27.6923*
29.2307*
40
70
71.6666*
73.3333*
75
80
100
120
130
140.384*
140.769*
141.153*
141.538*
141.923*
142.307*
142.692*
143.076*
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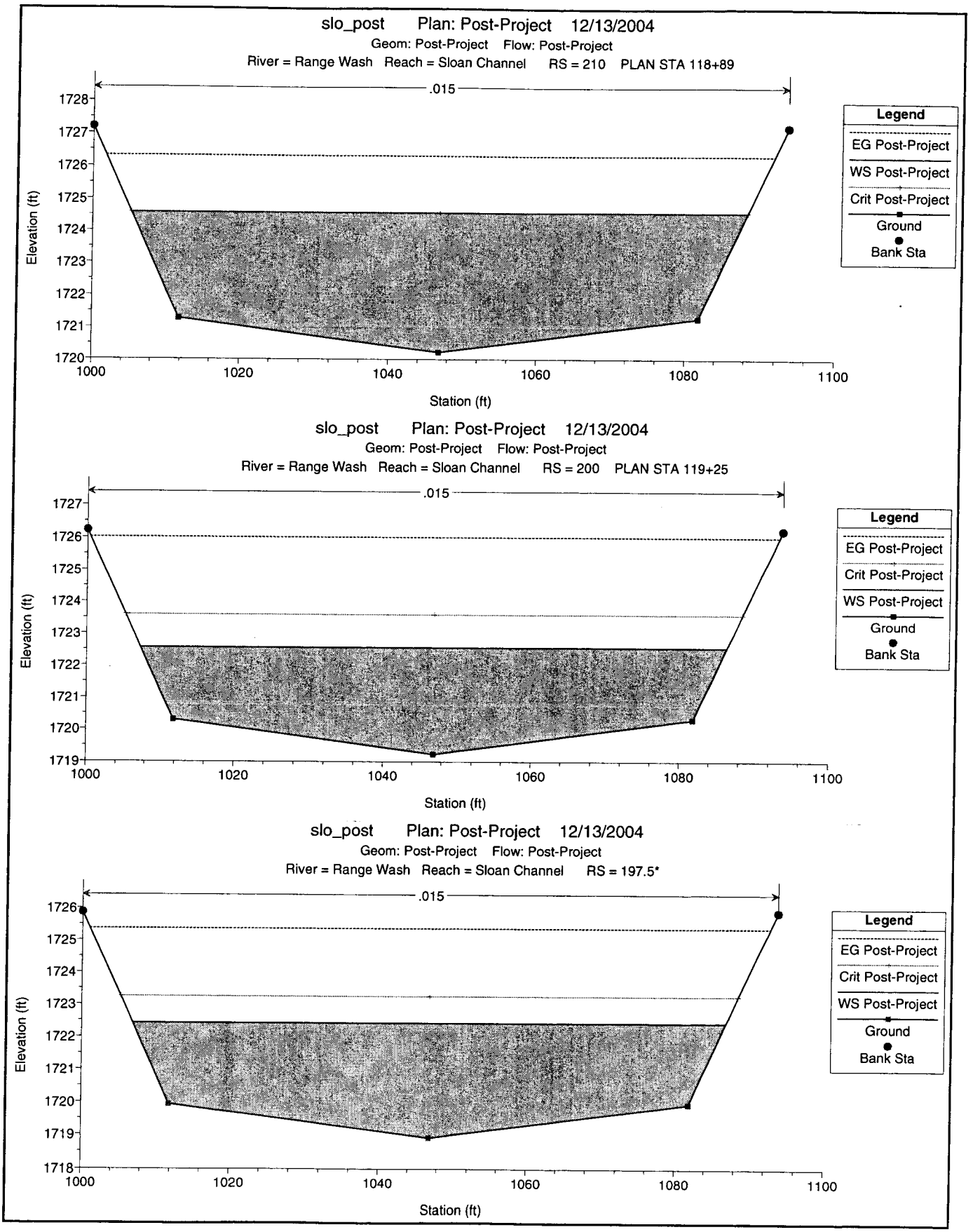
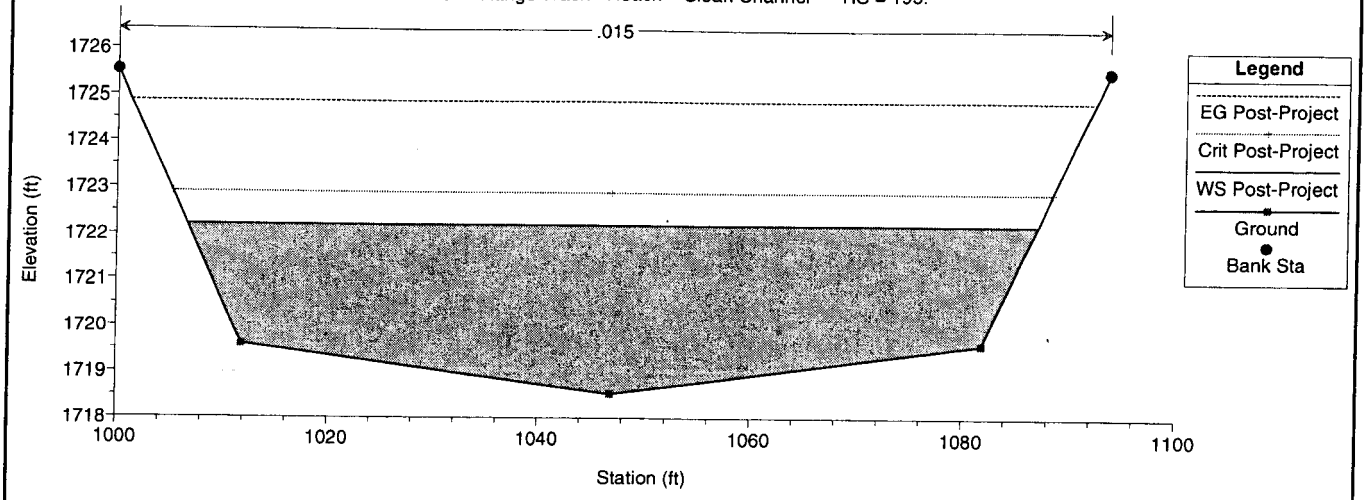
147.5*
150
154.*
158.*
170
190
195.*
200


slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 210 PLAN STA 118+89
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
WS Post-Project
Crit Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 200 PLAN STA 119+25
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 197.5*
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta

slo_post Plan: Post-Project 12/13/2004

Geom: Post-Project Flow: Post-Project

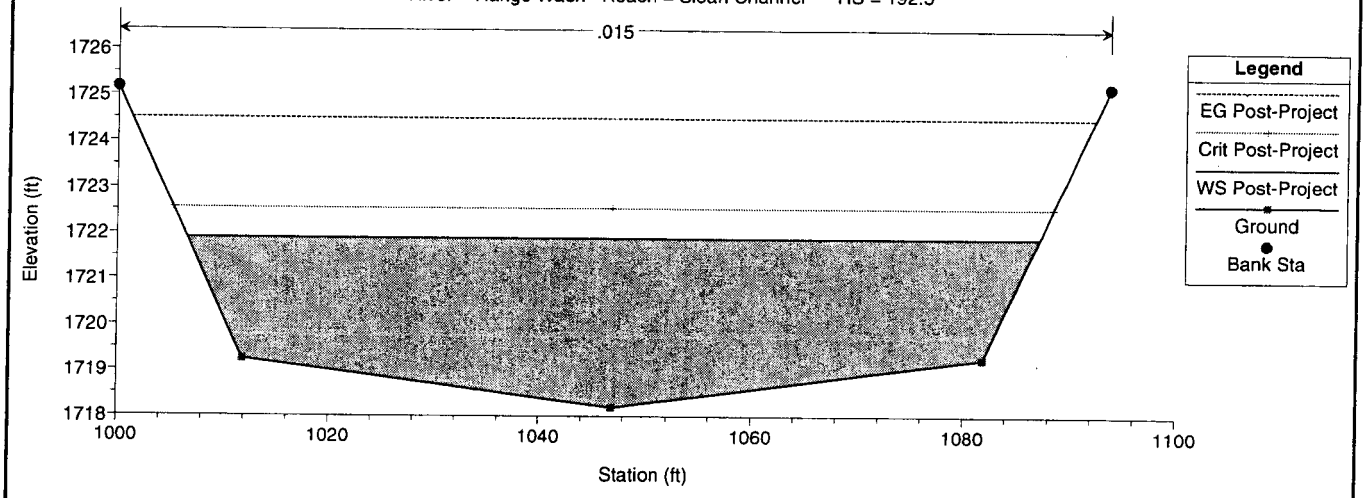
River = Range Wash Reach = Sloan Channel RS = 195.*



slo_post Plan: Post-Project 12/13/2004

Geom: Post-Project Flow: Post-Project

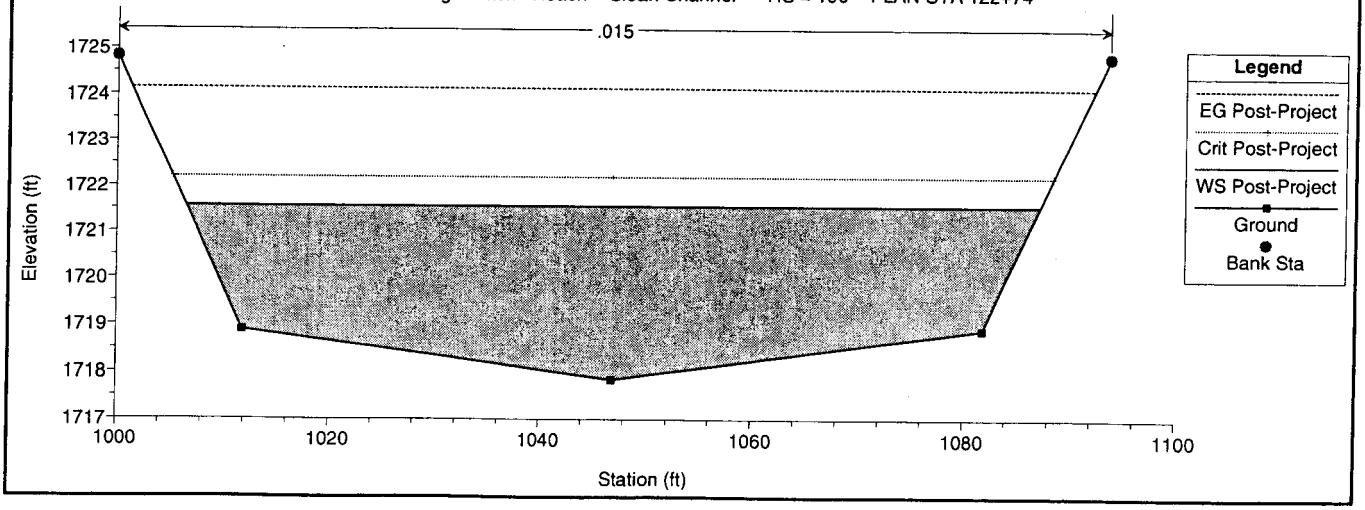
River = Range Wash Reach = Sloan Channel RS = 192.5*

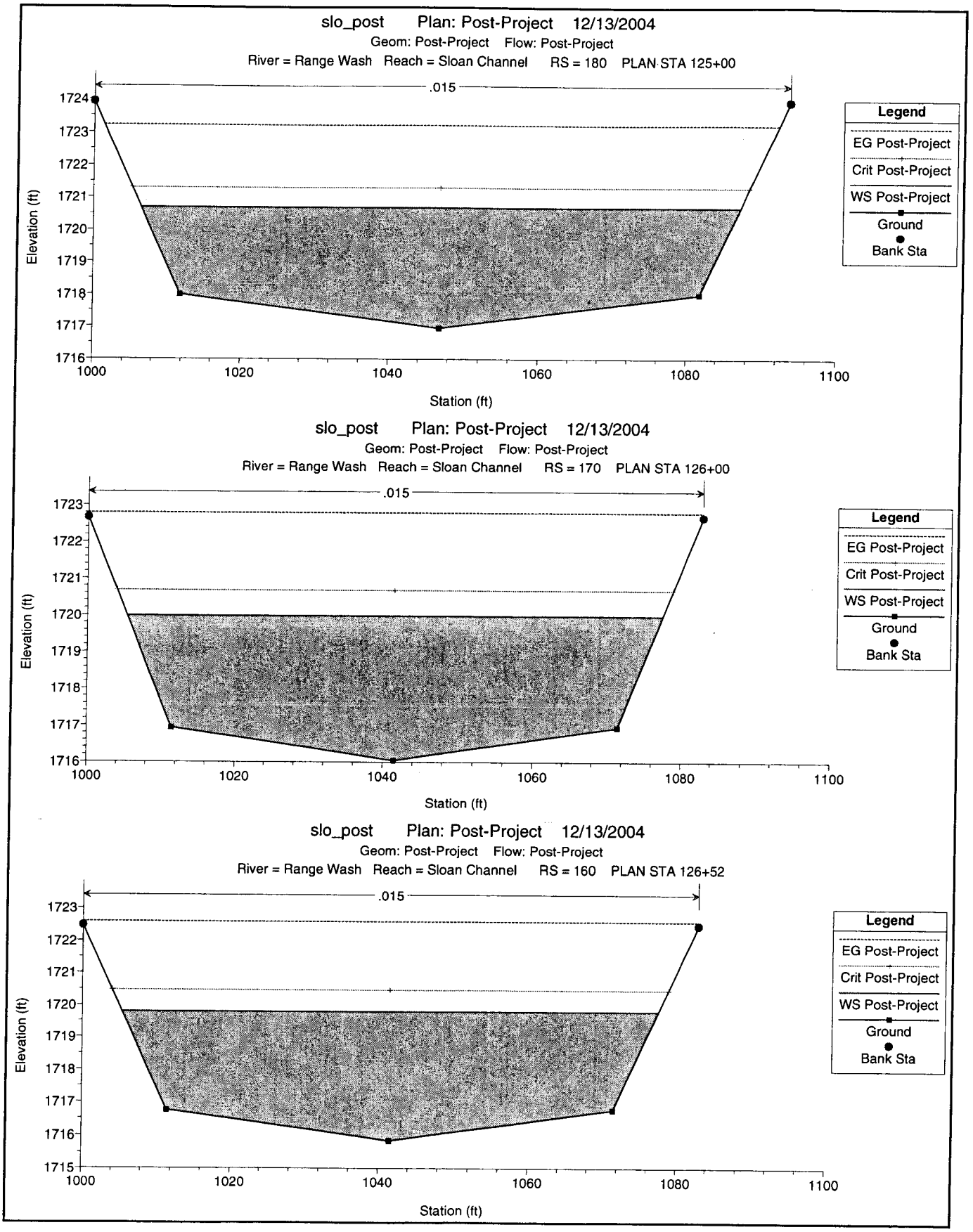


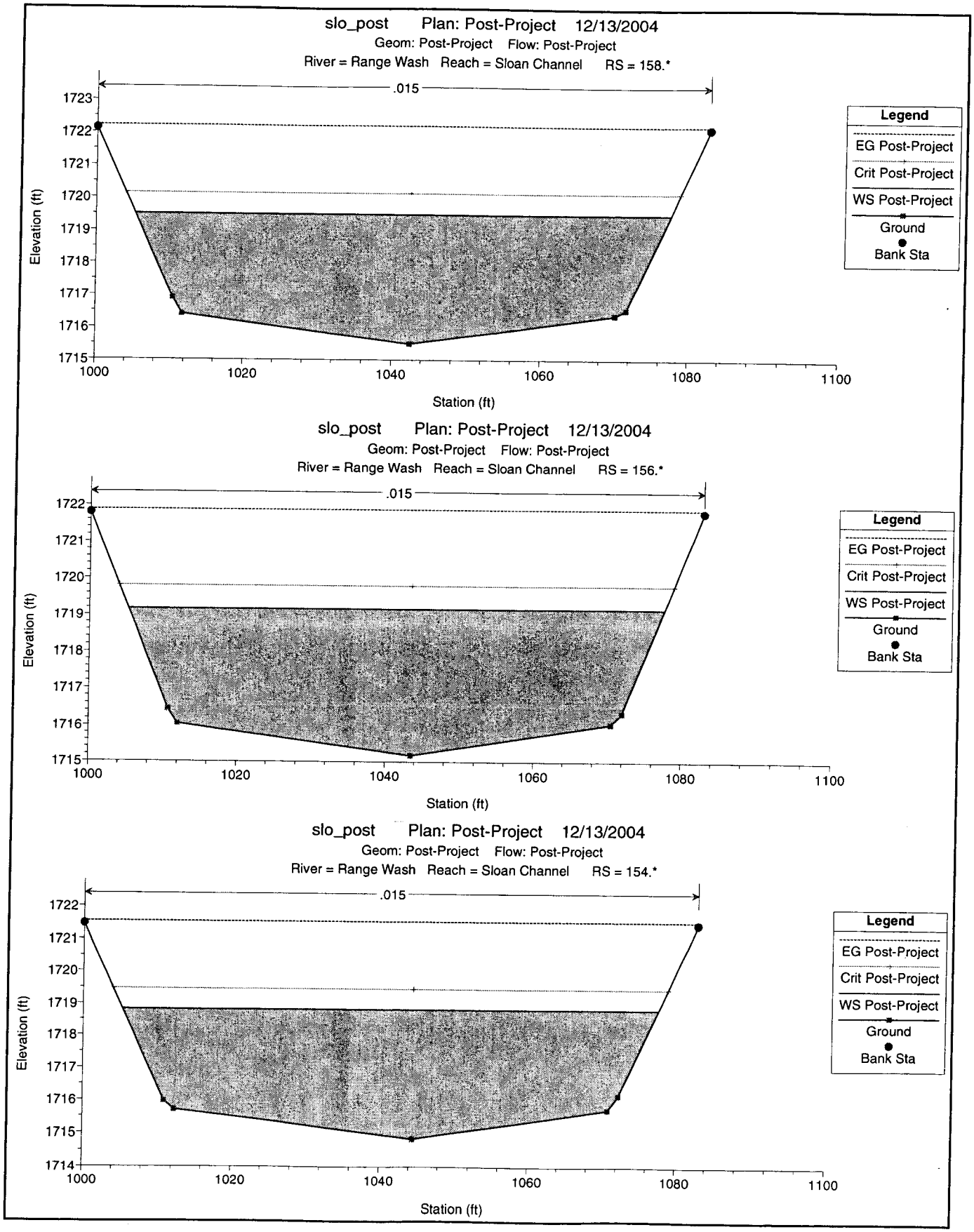
slo_post Plan: Post-Project 12/13/2004

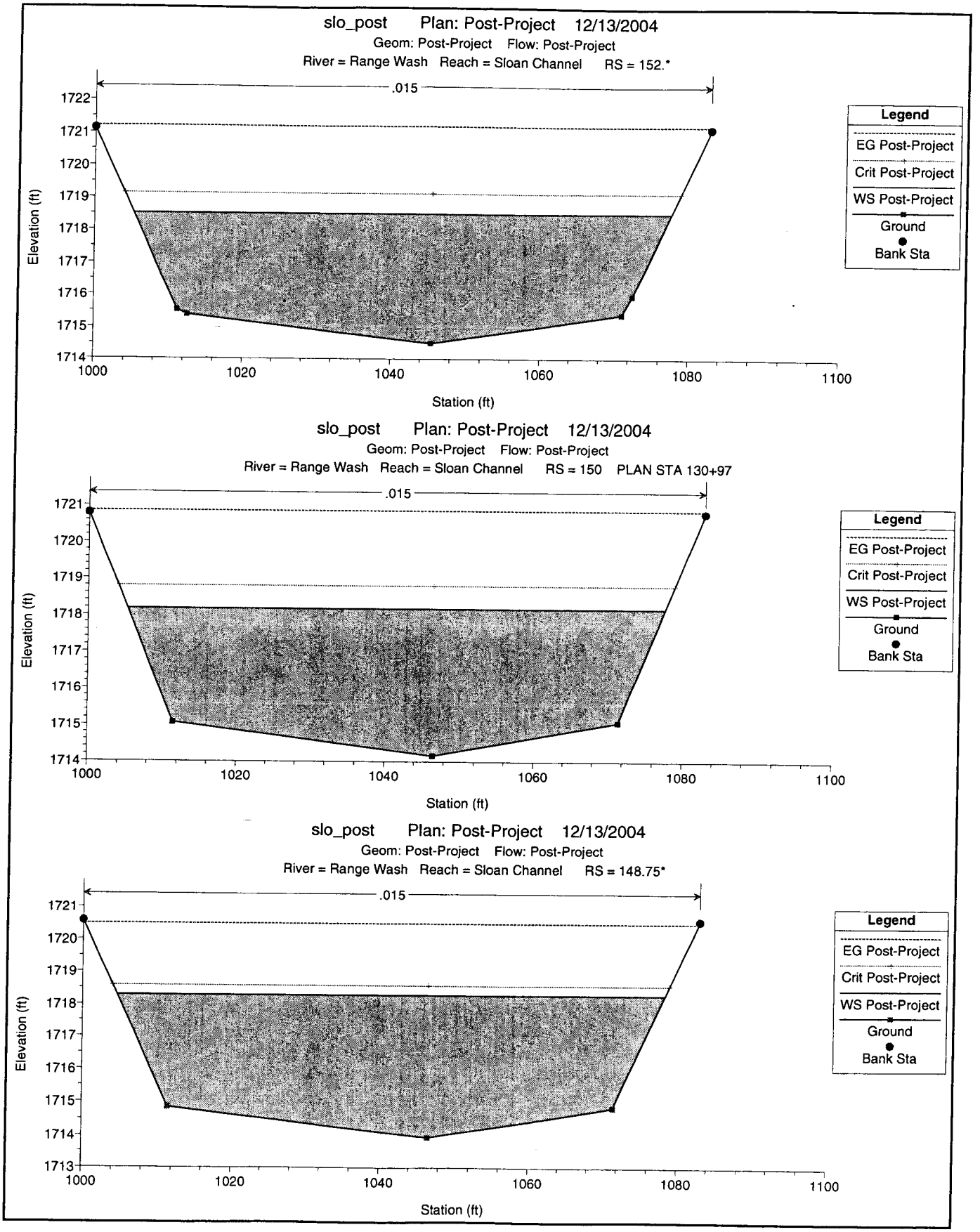
Geom: Post-Project Flow: Post-Project

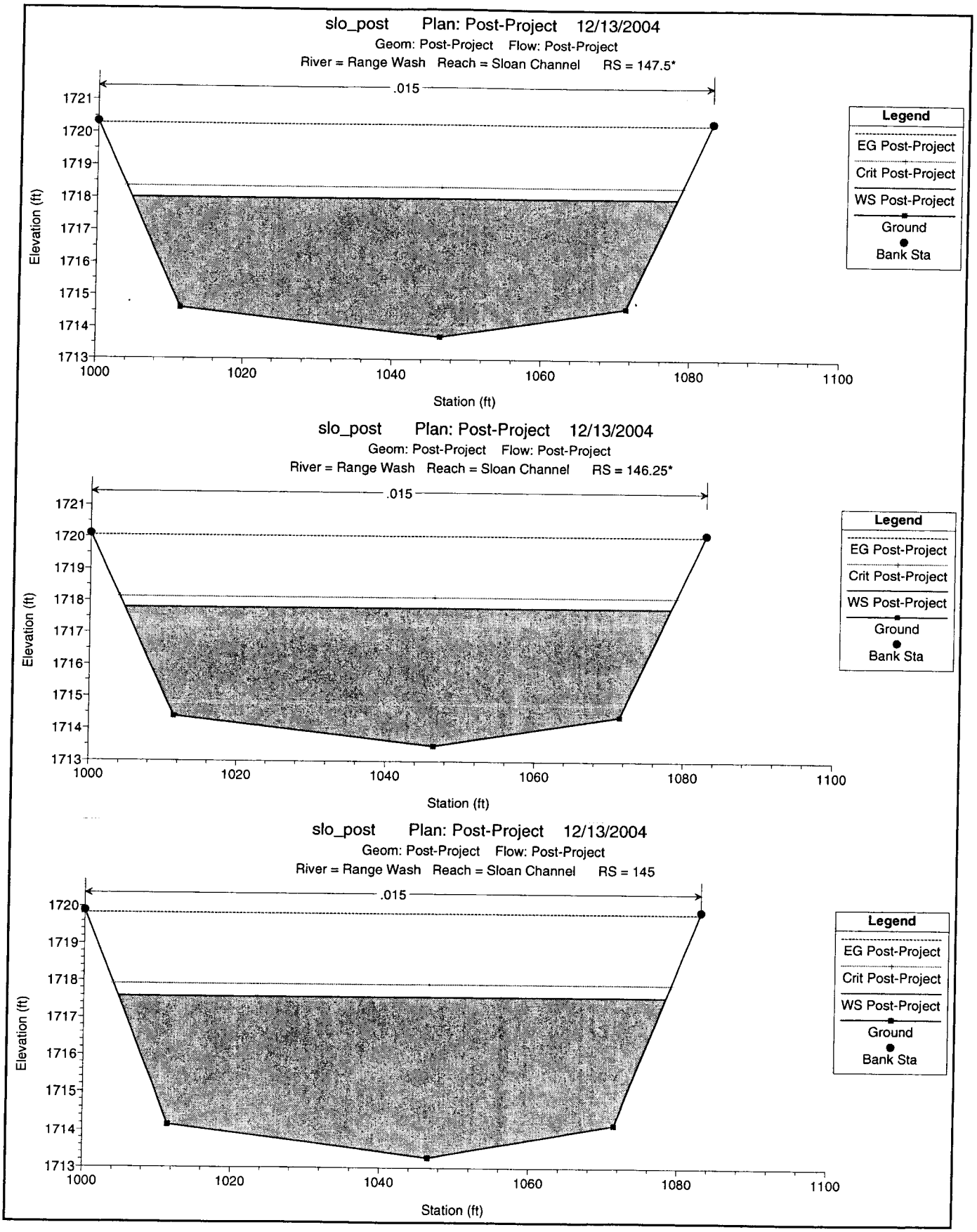
River = Range Wash Reach = Sloan Channel RS = 190 PLAN STA 122+74

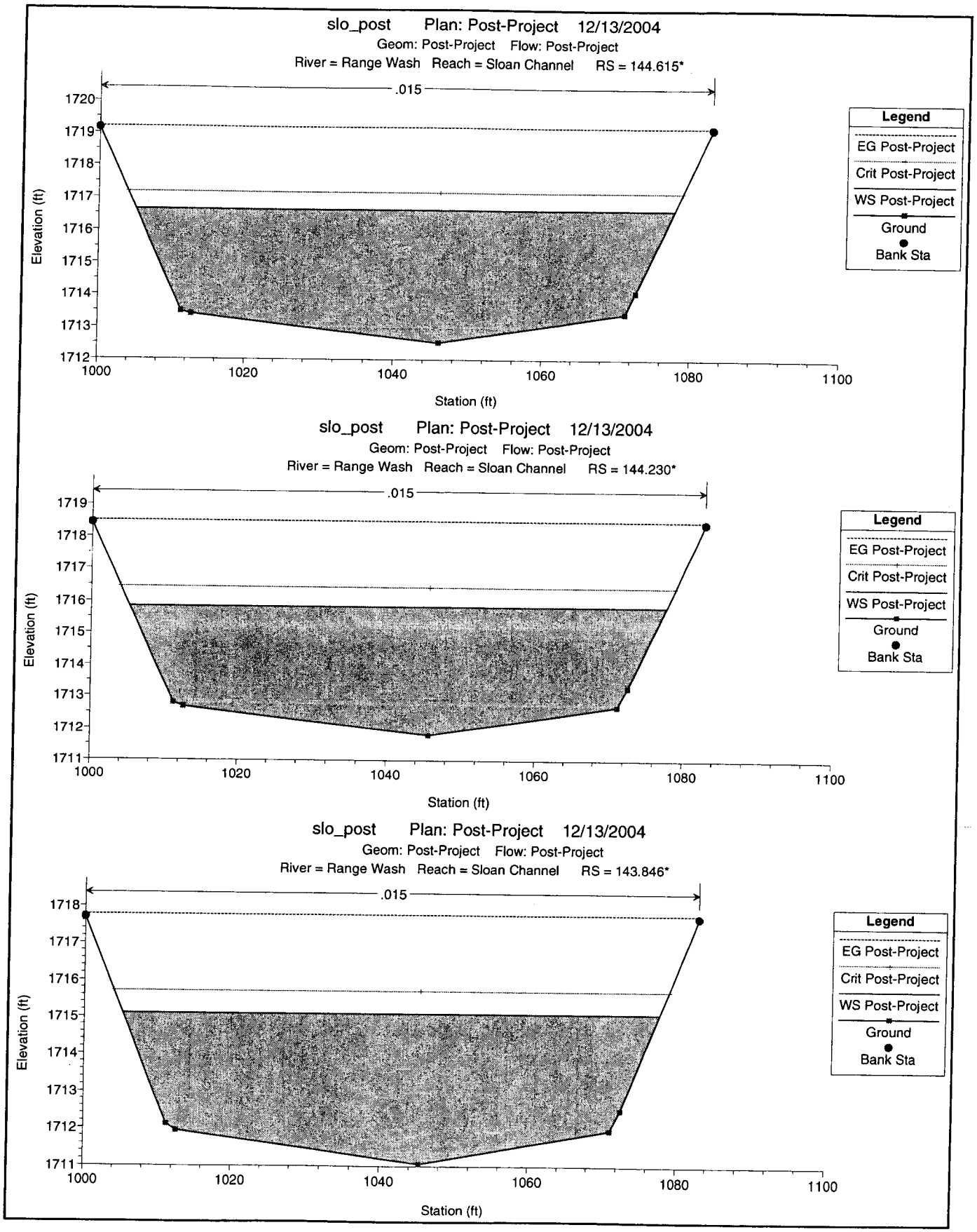


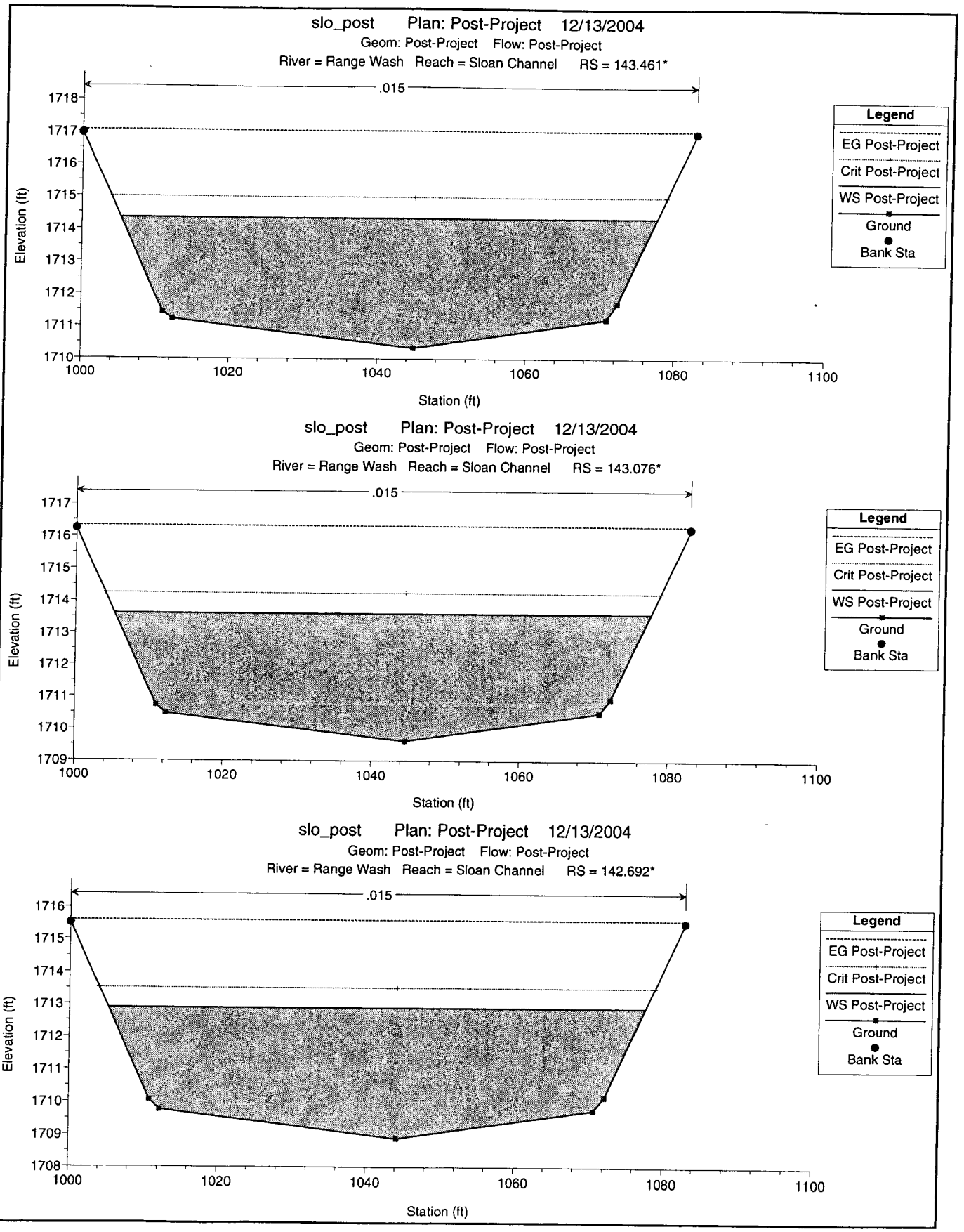

slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 180 PLAN STA 125+00
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 170 PLAN STA 126+00
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 160 PLAN STA 126+52
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta

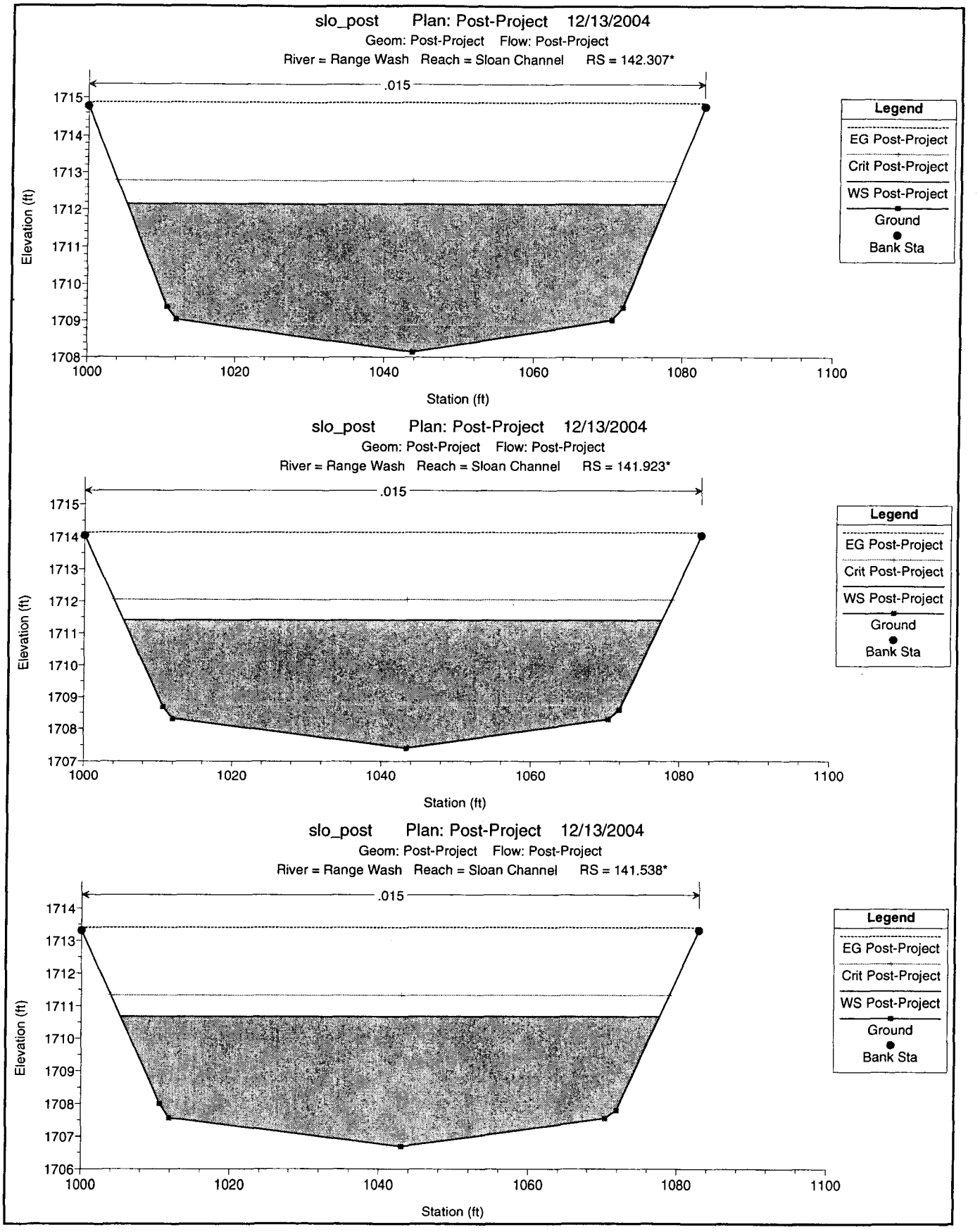

slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 158.*
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 156.*
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 154.*
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta


slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 152.*
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 150 PLAN STA 130+97
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 148.75*
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta


slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 147.5*
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 146.25*
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 145
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta


slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 144.615*
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 144.230*
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 143.846*
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta

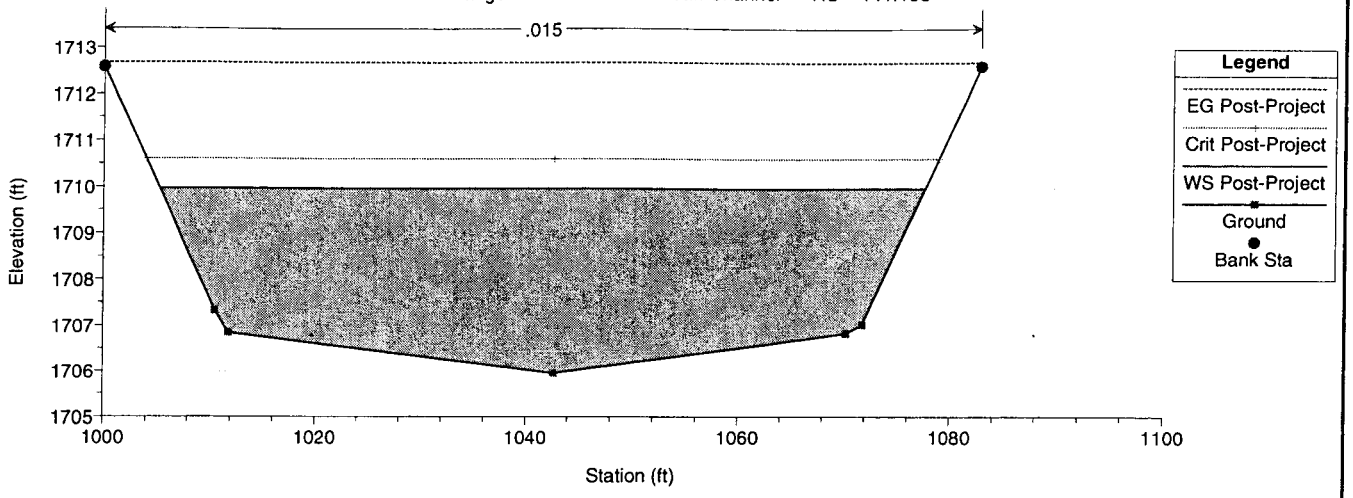

slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 143.461*
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 143.076*
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 142.692*
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta


slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 142.307*
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 141.923*
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 141.538*
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta

slo_post Plan: Post-Project 12/13/2004

Geom: Post-Project Flow: Post-Project

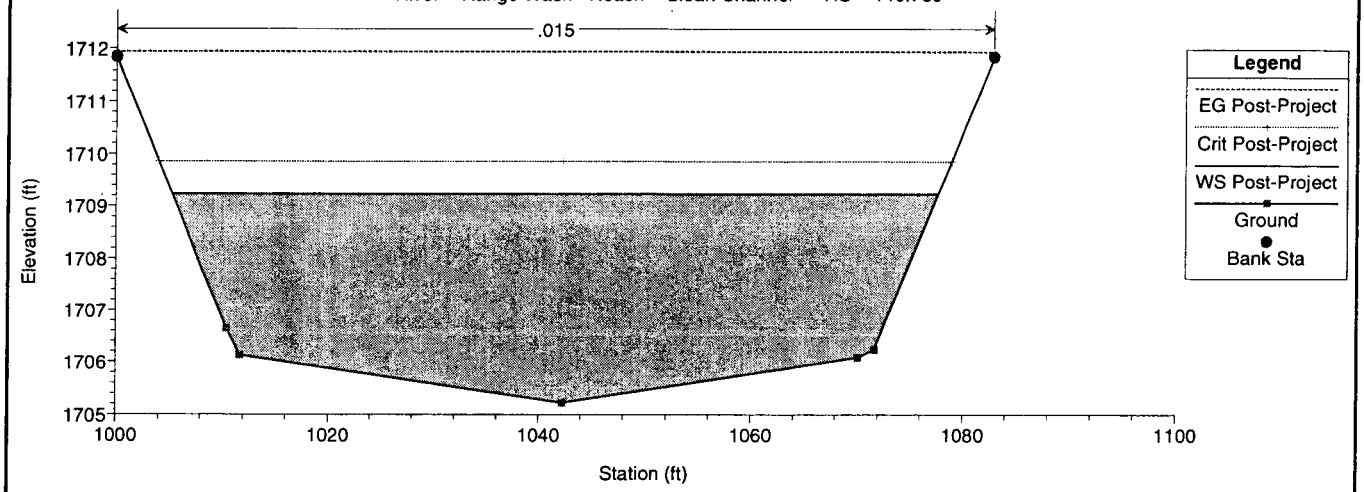
River = Range Wash Reach = Sloan Channel RS = 141.153*



slo_post Plan: Post-Project 12/13/2004

Geom: Post-Project Flow: Post-Project

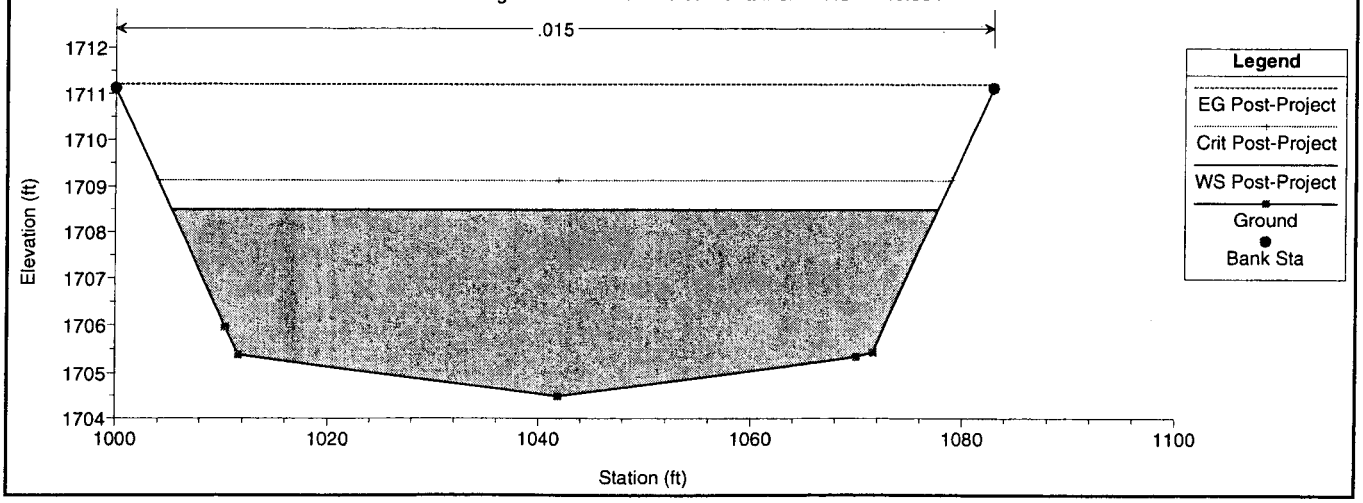
River = Range Wash Reach = Sloan Channel RS = 140.769*

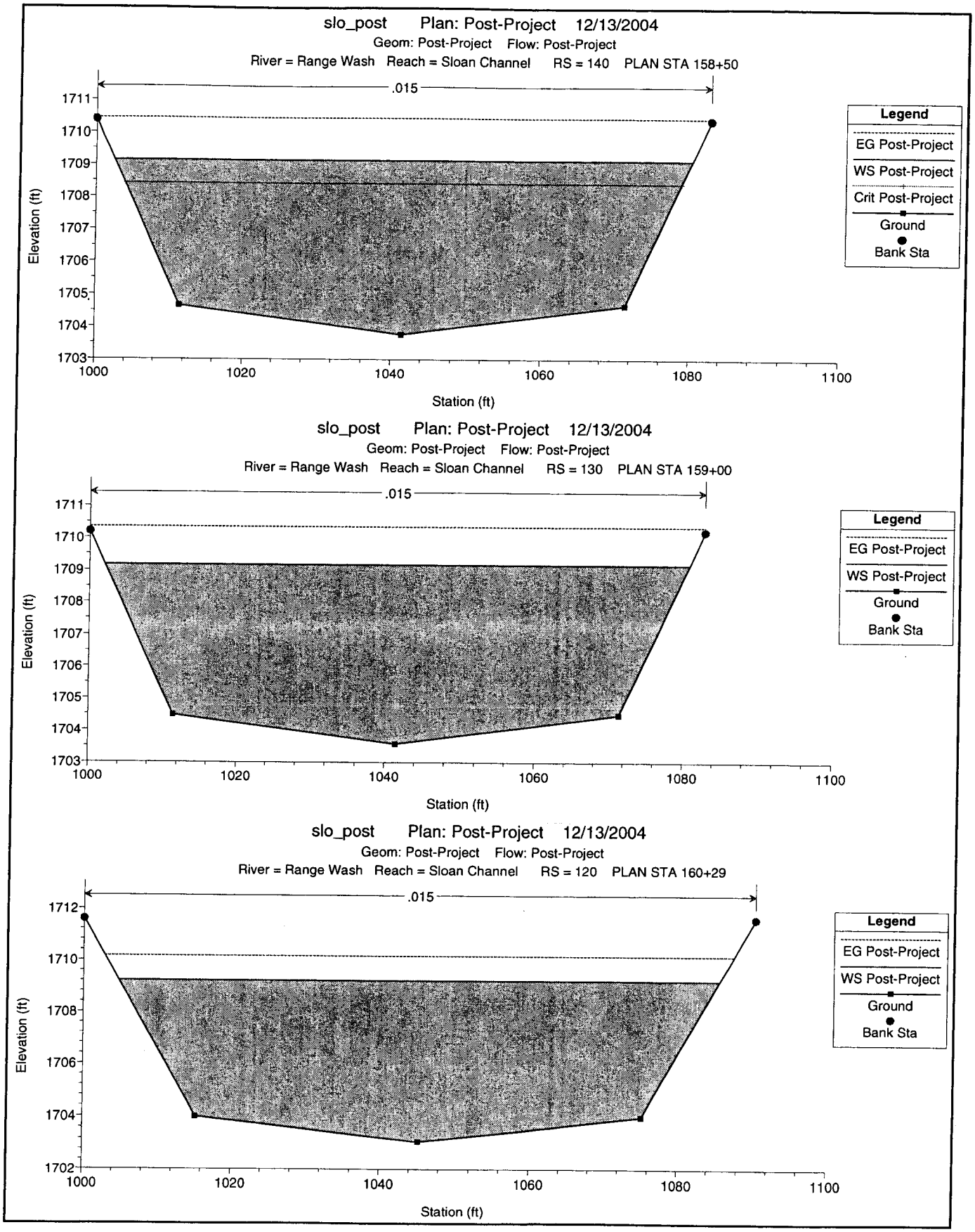


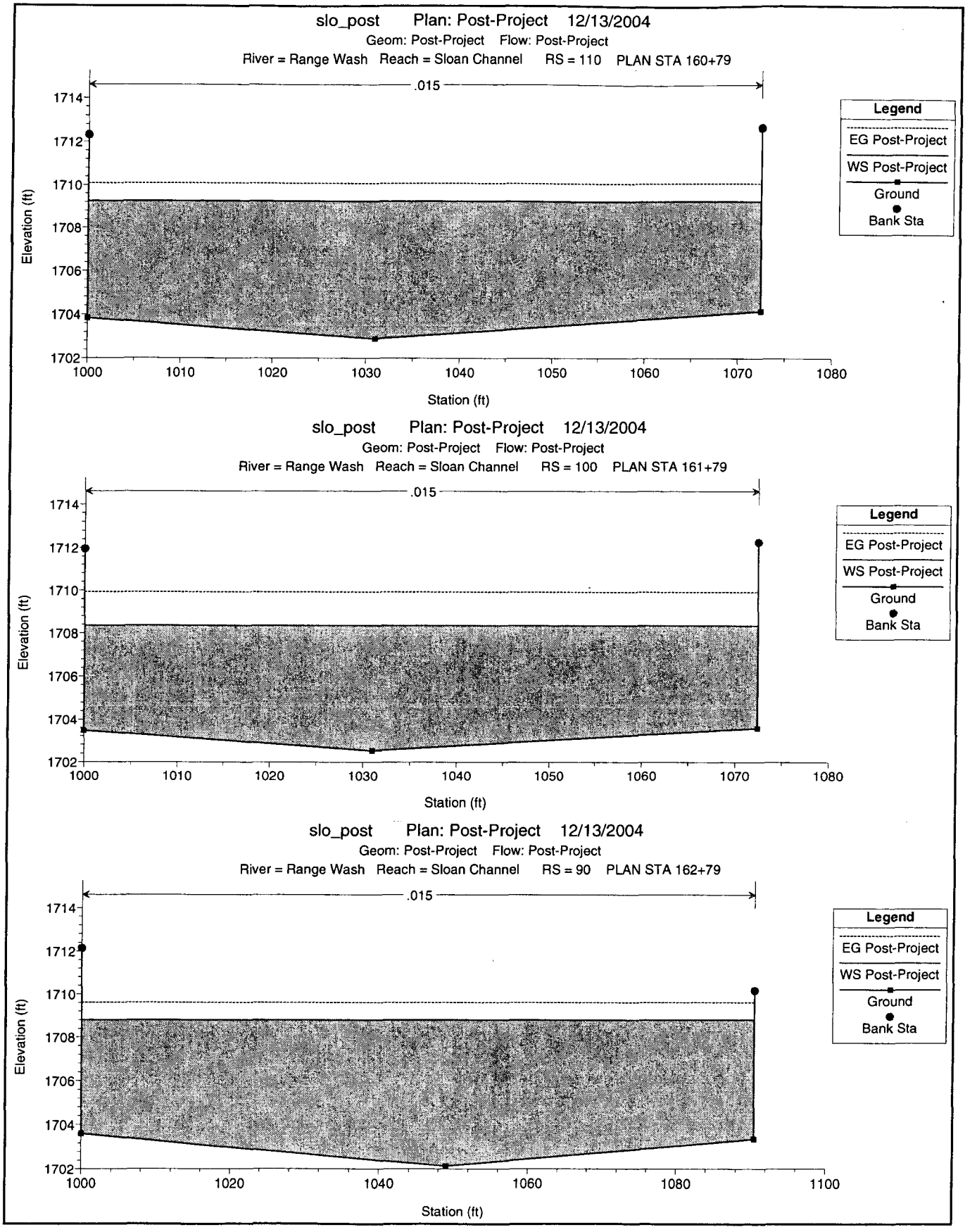
slo_post Plan: Post-Project 12/13/2004

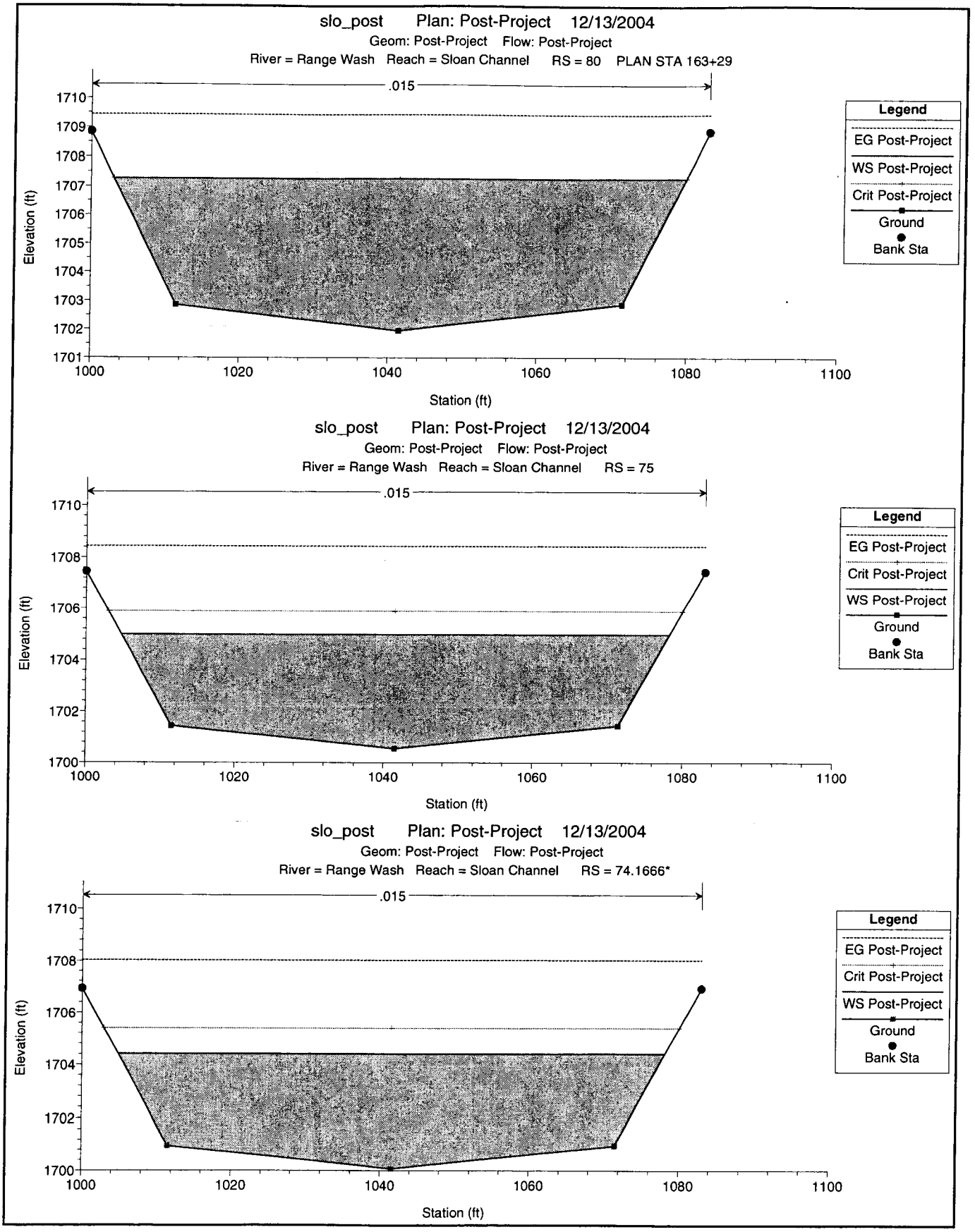
Geom: Post-Project Flow: Post-Project

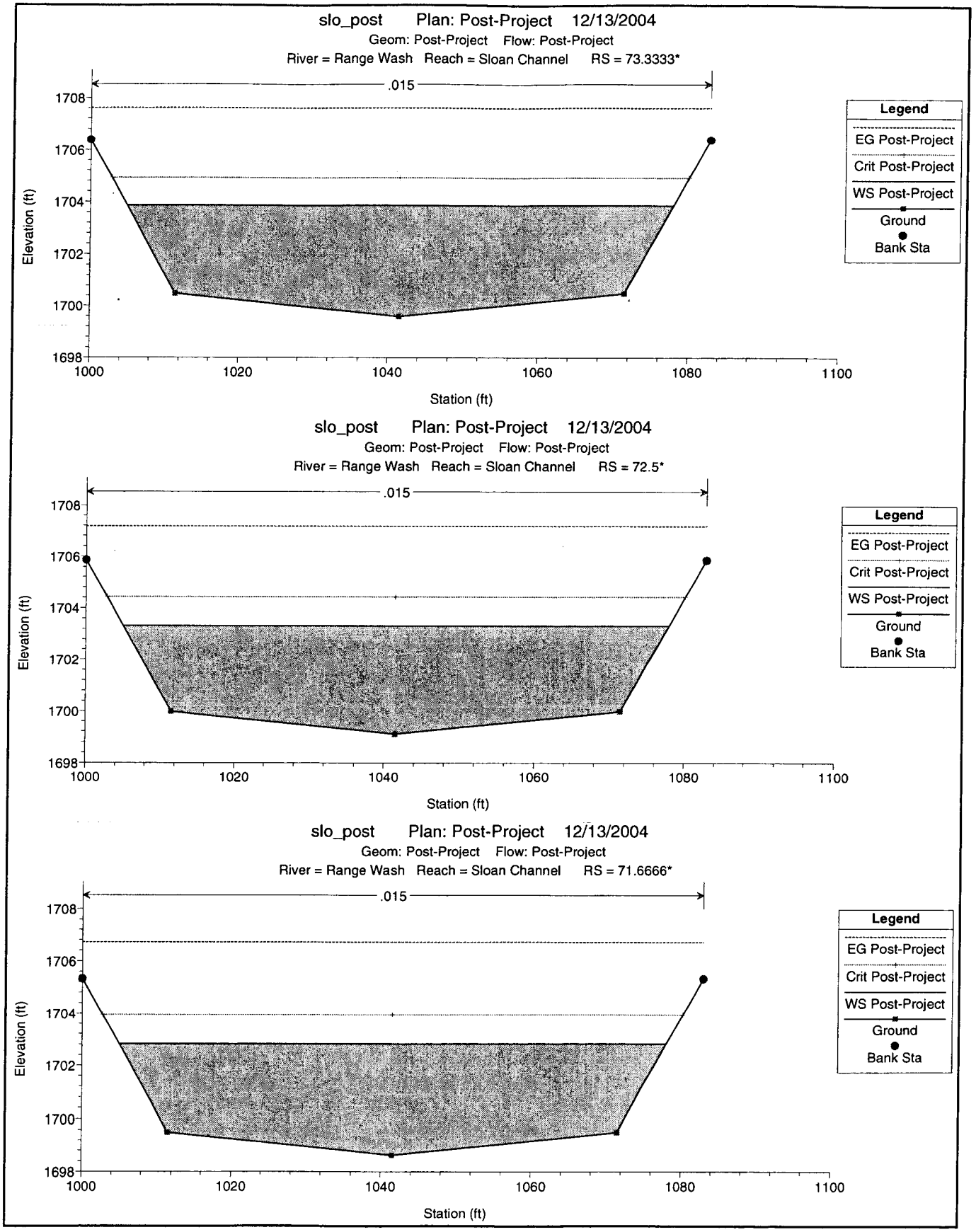
River = Range Wash Reach = Sloan Channel RS = 140.384*

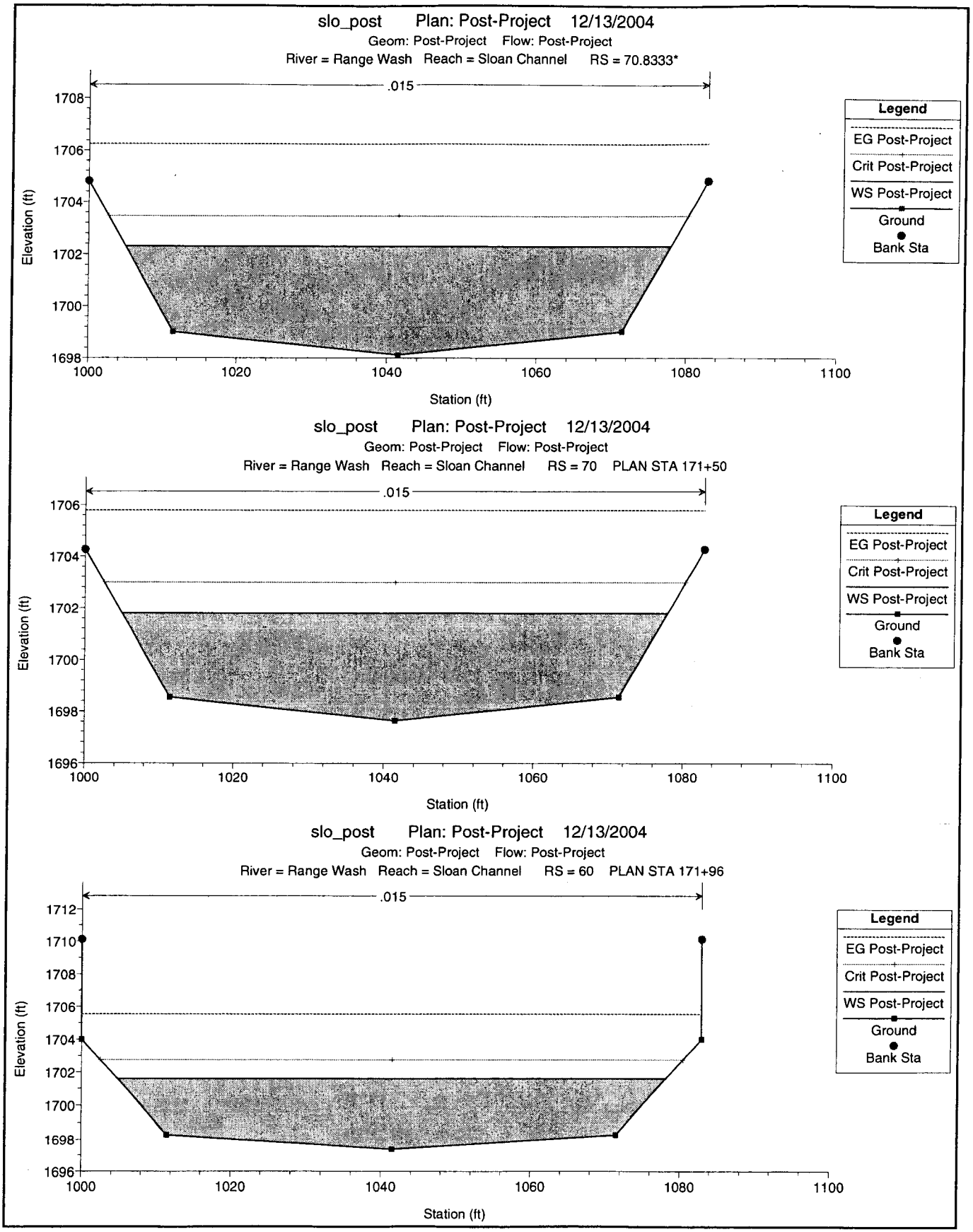


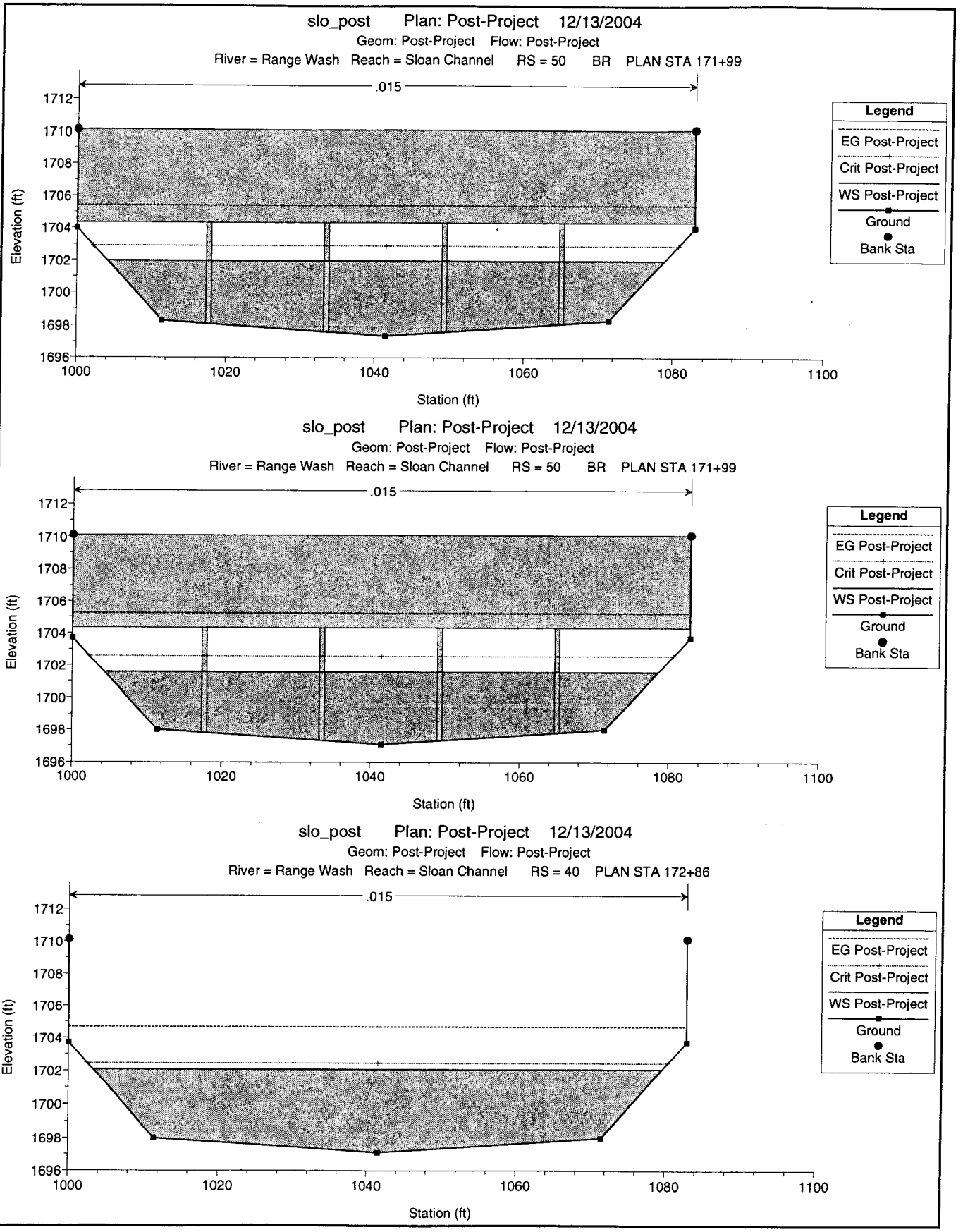

slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 140 PLAN STA 158+50
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
WS Post-Project
Crit Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 130 PLAN STA 159+00
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 120 PLAN STA 160+29
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
WS Post-Project
Ground
Bank Sta

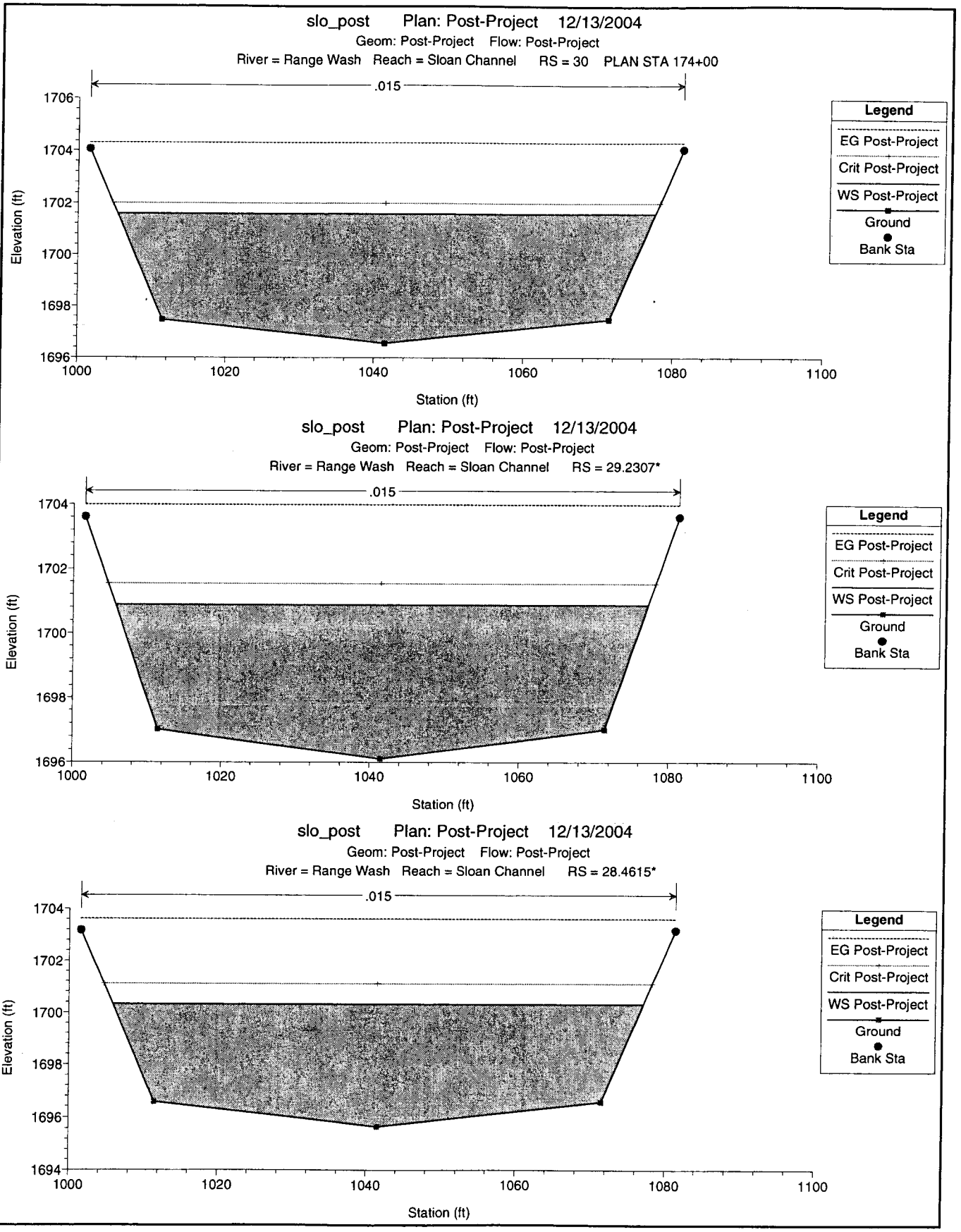

slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 110 PLAN STA 160+79
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 100 PLAN STA 161+79
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 90 PLAN STA 162+79
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
WS Post-Project
Ground
Bank Sta

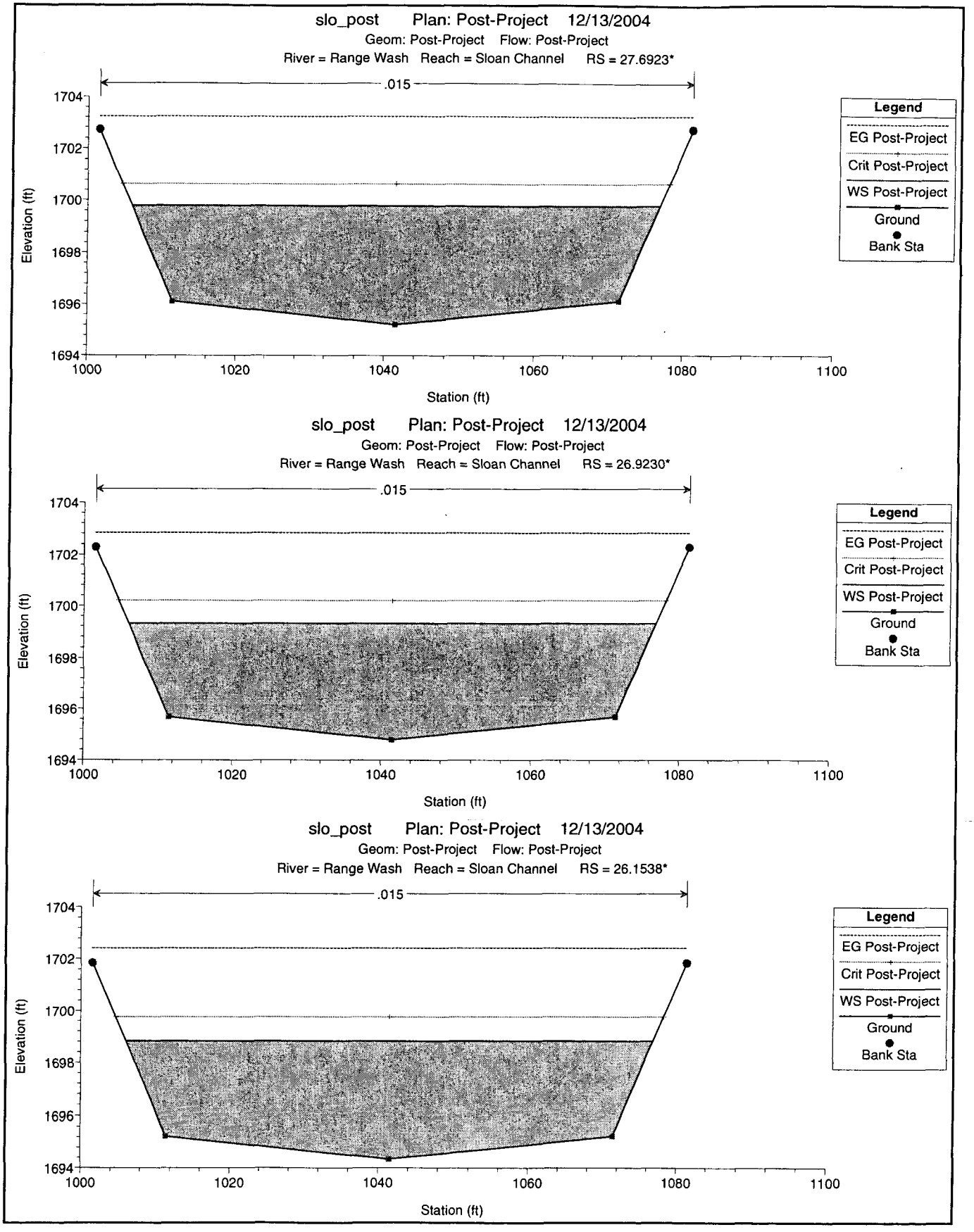

slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 80 PLAN STA 163+29
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
WS Post-Project
Crit Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 75
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 74.1666*
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta

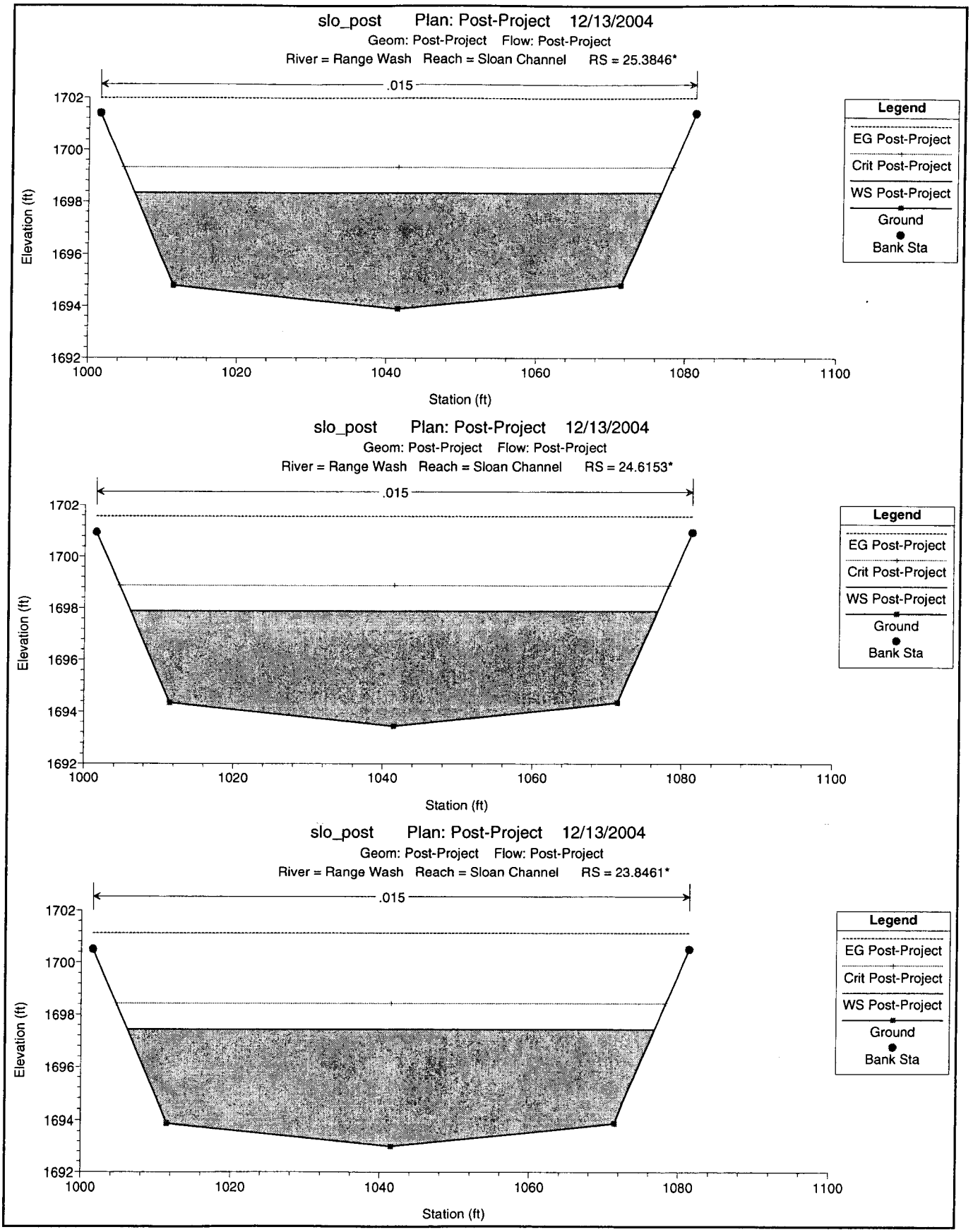

slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 73.3333*
.015
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
Elevation (ft)
Station (ft)
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 72.5*
.015
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
Elevation (ft)
Station (ft)
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 71.6666*
.015
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
Elevation (ft)
Station (ft)


slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 70.8333*
.015
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
Elevation (ft)
Station (ft)
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 70 PLAN STA 171+50
.015
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
Elevation (ft)
Station (ft)
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 60 PLAN STA 171+96
.015
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
Elevation (ft)
Station (ft)


slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 50 BR PLAN STA 171+99
.015
Elevation (ft)
1712
1710
1708
1706
1704
1702
1700
1698
1696
1000
1020
1040
1060
1080
1100
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 50 BR PLAN STA 171+99
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 40 PLAN STA 172+86
.015
Elevation (ft)
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta


slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 30 PLAN STA 174+00
.015
Elevation (ft)
1706
1704
1702
1700
1698
1696
1000
1020
1040
1060
1080
1100
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 29.2307*
.015
Elevation (ft)
1704
1702
1700
1698
1696
1000
1020
1040
1060
1080
1100
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 28.4615*
.015
Elevation (ft)
1704
1702
1700
1698
1696
1694
1000
1020
1040
1060
1080
1100
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta


slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 27.6923*
.015
Elevation (ft)
1704
1702
1700
1698
1696
1694
1000
1020
1040
1060
1080
1100
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 26.9230*
.015
Elevation (ft)
1704
1702
1700
1698
1696
1694
1000
1020
1040
1060
1080
1100
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 26.1538*
.015
Elevation (ft)
1704
1702
1700
1698
1696
1694
1000
1020
1040
1060
1080
1100
Station (ft)
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta


slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 25.3846*
.015
Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
Elevation (ft)
Station (ft)
slo_post Plan: Post-Project 12/13/2004
Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 24.6153*
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Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
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Station (ft)
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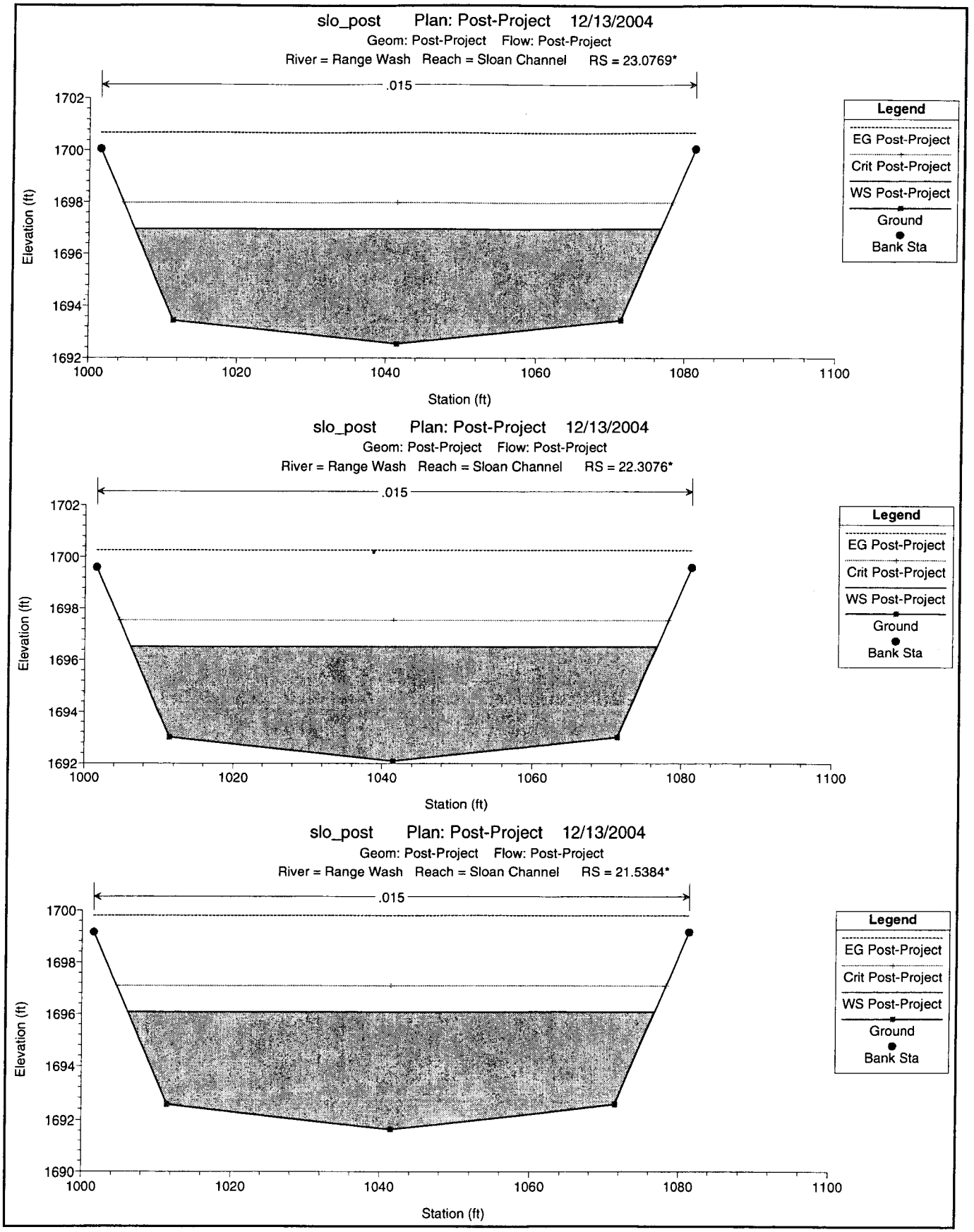
Station (ft)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WS Post-Project
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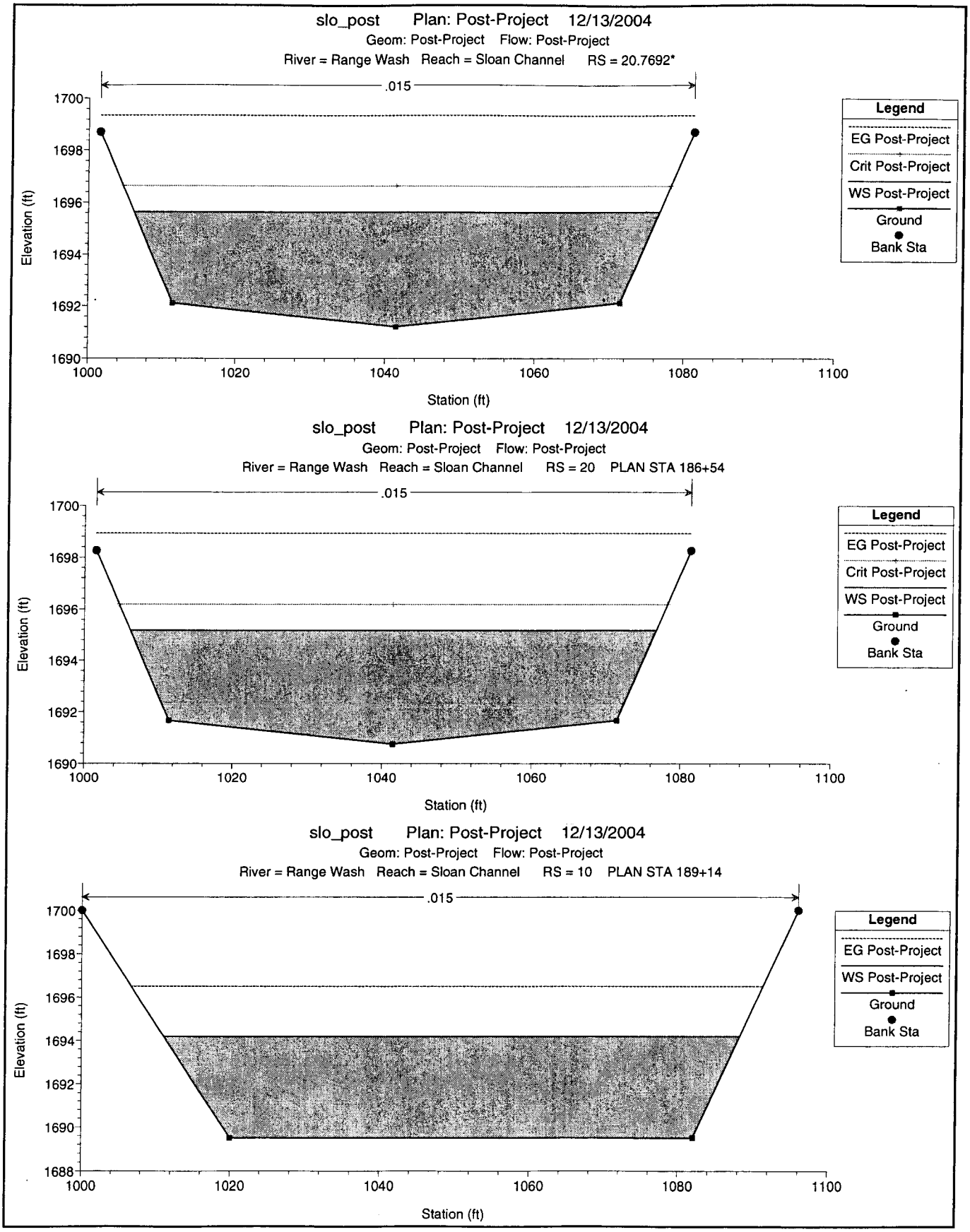
Crit Post-Project
WS Post-Project
Ground
Bank Sta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Crit Post-Project
WS Post-Project
Ground
Bank Sta
Elevation (ft)
Station (ft)
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Geom: Post-Project Flow: Post-Project
River = Range Wash Reach = Sloan Channel RS = 20 PLAN STA 186+54
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Legend
EG Post-Project
Crit Post-Project
WS Post-Project
Ground
Bank Sta
Elevation (ft)
Station (ft)
slo_post Plan: Post-Project 12/13/2004
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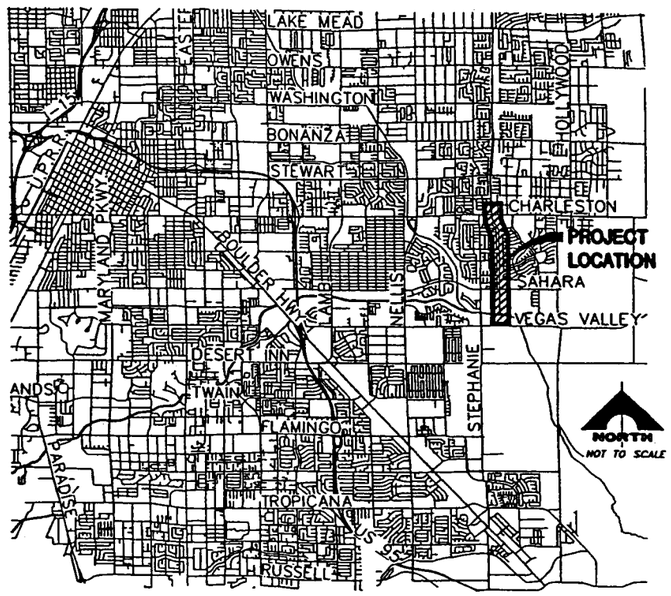
River = Range Wash Reach = Sloan Channel RS = 10 PLAN STA 189+14
.015
Legend
EG Post-Project
WS Post-Project
Ground
Bank Sta
Elevation (ft)
Station (ft)

Appendix E: Plans

F:\500-857\dwg\improv\sc_g01.dwg 03-10-04 14:06:52 RBlanchard

DEPARTMENT OF PUBLIC WORKS



Vicinity Map

NOT TO SCALE

County Commissioners

Chip Maxfield, Chairman
Myrna Williams, Vice-Chair
Yvonne Atkinson Gates
Mark A. James
Mary J. Kincaid-Chauncey
Rory Reid
Bruce L. Woodbury

SIGNATURE ON THESE PLANS WILL NOT BE CONSTRUED TO BE A PERMIT FOR OR AN APPROVAL OF ANY VIOLATION OF CLARK COUNTY SANITATION DISTRICT RULES, REGULATIONS, OR DESIGN AND CONSTRUCTION STANDARDS. THE APPROVAL OF THESE DRAWINGS DOES NOT GUARANTEE CAPACITY IN THE DISTRICT'S COLLECTION OR TREATMENT SYSTEM.

CLARK COUNTY NEVADA

"Progress as Promised"

2004
IMPROVEMENT PLANS FOR
SLOAN CHANNEL

FROM
CHARLESTON BOULEVARD TO
LAS VEGAS WASH

FUNDED BY
CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT

G.C. WALLACE, INC.
Engineers/Planners/Surveyors

County Manager

Thom Reilly

Director of Public Works

Approved:

M.J. Manning

Clark County Regional Flood Control District

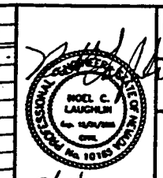
Approved:

Gale Wm. Fraser II, P.E.
General Manager/
Chief Engineer

AGENCY	PLANS REVIEWED BY	DATE
SPRINT		
LAS VEGAS VALLEY WATER DISTRICT		
SOUTHWEST GAS COMPANY		
NEVADA POWER COMPANY (TRANSMISSION)		
NEVADA POWER COMPANY (DISTRIBUTION)		
CLARK COUNTY WATER RECLAMATION DISTRICT		
COX COMMUNICATIONS LAS VEGAS, INC.		

DEPARTMENT OF PUBLIC WORKS	BY	DATE
DEPUTY DIRECTOR		
CONSTRUCTION MANAGEMENT DIVISION		
DESIGN ENGINEERING DIVISION		
MAINTENANCE MANAGEMENT DIVISION		
TRAFFIC MANAGEMENT DIVISION		
COUNTY SURVEYOR'S OFFICE		

REVISIONS		
NUMBER	DESCRIPTION	DATE

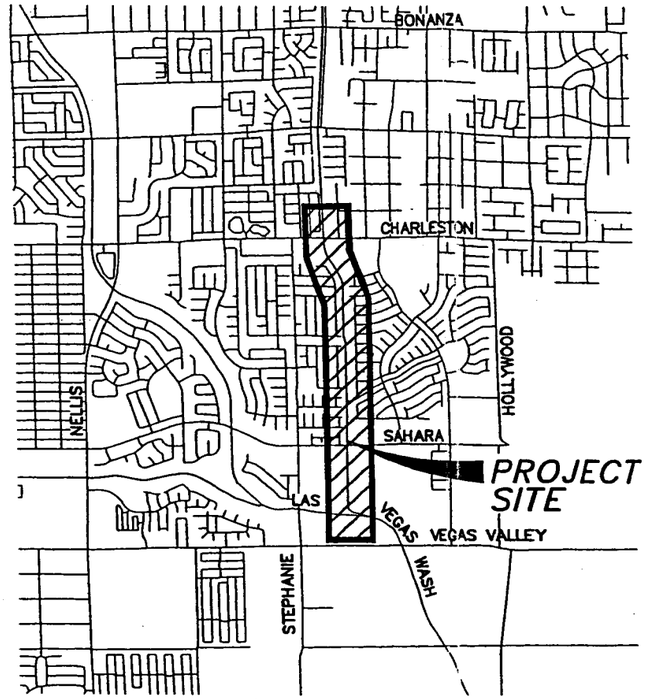


DESIGN ENGINEERING DIVISION

COVER SHEET

L-1759

BID No.:



Location Map

Index of Sheets

DRAWING NO. DESCRIPTION

General Drawings

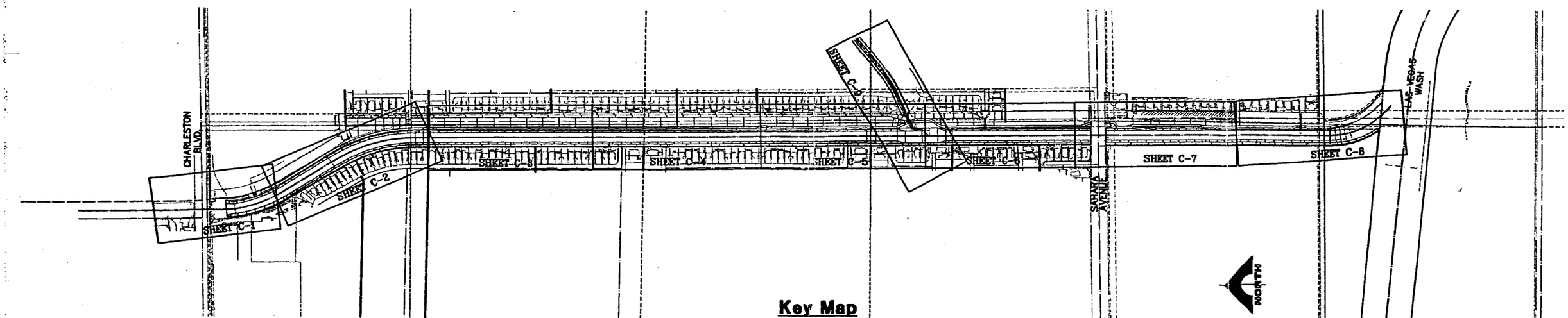
COVER SHEET
G-2 INDEX OF DRAWINGS, KEY MAP AND LOCATION MAP
G-3 GENERAL & CONSTRUCTION NOTES, LEGEND & ABBREVIATIONS
BENCHMARK, BASIS OF BEARINGS
G-4 HORIZONTAL CONTROL PLAN
G-5 ESTIMATE OF QUANTITIES
G-6 RECORD OF SURVEY

Civil Drawings

C-1 PLAN AND PROFILE STA 114+50.00 TO STA. 122+00.00
C-2 PLAN AND PROFILE STA 122+00.00 TO STA. 132+00.00
C-3 PLAN AND PROFILE STA 132+00.00 TO STA. 142+00.00
C-4 PLAN AND PROFILE STA 142+00.00 TO STA. 152+00.00
C-5 PLAN AND PROFILE STA 152+00.00 TO STA. 162+00.00
C-6 PLAN AND PROFILE STA 162+00.00 TO STA. 171+00.00
C-7 PLAN AND PROFILE STA 171+00.00 TO STA. 181+00.00
C-8 PLAN AND PROFILE STA 181+00.00 TO STA. 190+00.00
C-9 PLAN AND PROFILE (CONFLUENCE) AND LATERALS
C-10 TYPICAL CROSS SECTIONS
C-11 DETAILS
C-12 TYPICAL CROSS SECTIONS
C-13 FENCING/POST & CABLE RAILING PLAN
C-14 FENCING/POST & CABLE RAILING PLAN
C-15 ACCESS/MAINTENANCE ROAD CONTROL PLAN
C-16 ACCESS/MAINTENANCE ROAD CONTROL PLAN
C-17 DEPTH GAUGE STATION SECTIONS AND DETAILS

Structural Drawings

S-1 DETAILS
S-2 DETAILS
S-3 TYPICAL CHANNEL SECTIONS
S-4 CHANNEL TRANSITION STRUCTURES
S-5 ACCESS RAMP
S-6 ACCESS RAMP DETAILS
S-7 DETAILS



Key Map

SCALE: 1" = 400'

E	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL

INDEX OF DRAWINGS, KEY MAP AND LOCATION MAP

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

NOEL C. LAUGHLIN — STATE OF NEVADA — No. 10169 — PROFESSIONAL ENGINEER — CIVIL — 3-11-04

PROJECT No: 500-857 DRAWN BY: DW
DESIGNED BY: CHECKED BY:
APPROVED BY:

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2289

SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
G-2
SHT. 2 OF 30

LEGEND & ABBREVIATIONS

ABBREVIATION	LEGEND
= ASPHALTIC CONCRETE	(00.0) INV — EXIST. ELEVATION
= ASBESTOS CEMENT PIPE	00.0 INV — PROPOSED ELEVATION
= AIR VACUUM AIR RELIEF (VALVE)	(2356.1) — EXIST. SPOT ELEVATION
= BACK OF CURB	PROPERTY OR RIGHT-OF-WAY LINE
BOR = BEGIN CURB RETURN	CENTERLINE
BM = BENCHMARK	HYDRAULIC GRADE LINE (HGL)
= BACK OF WALK	ENERGY GRADE LINE (EGL)
= CABLE TELEVISION	EASEMENT
= CLARK COUNTY SANITATION DISTRICT	EXISTING TELEPHONE CABLE
= CENTERLINE	EXISTING FENCE
CSM = CONTROLLED LOW STRENGTH MATERIAL	EXISTING SANITARY SEWER LINE
CMP = CORRUGATED METAL PIPE	PROPOSED SANITARY SEWER LINE
CONC = CONCRETE	EXISTING WATER LINE
= DEPTH	PROPOSED WATER LINE
= DROP INLET	EXISTING GAS LINE
= DUCTILE IRON PIPE	EXISTING UNDERGROUND POWER
= EACH	EXISTING OVERHEAD POWER
EFF = EFFLUENT	EXISTING STORM DRAIN
EGL = ENERGY GRADE LINE	PROPOSED CHANNEL
= ELEVATION	PROPOSED STORM DRAIN
= EDGE OF PAVEMENT	EXISTING CABLE TELEVISION
= EXISTING	EXISTING CONTOUR
= FINISH FLOOR	SAWCUT LINE
FG = FINISH GRADE	EXISTING MANHOLE
FL = FLOW LINE	PROPOSED MANHOLE
FS = FINISH SURFACE	EXISTING FIRE HYDRANT
= FUTURE	EXISTING VALVE
= GAS	PROPOSED VALVE
= GRADE BREAK	PROPOSED DROP INLET
= GEOGRAPHIC INFORMATION SYSTEM	PROPOSED REUSE HYDRANT
HERCP = HORIZONTAL ELLIPTICAL REINFORCED CONCRETE PIPE	
= HYDRAULIC GRADE LINE	
= HIGH POINT	
= HIGH PRESSURE GAS	
= INSIDE DIAMETER	
INV = INVERT	
(L) LT = LEFT OF	
LF = LINEAL FEET	
= LOW POINT	
= LAS VEGAS AREA COMPUTER TRAFFIC SYSTEM	
= LAS VEGAS VALLEY WATER DISTRICT	
NAVD = NORTH AMERICAN VERTICAL DATUM	
NDOT = NEVADA DEPARTMENT OF TRANSPORTATION	
= NATURAL GRADE	
= OVERHEAD POWER	
= PLANTMIX BITUMINOUS SURFACE	
= PORTABLE PRECAST BARRIER RAIL	
PC = POINT OF CURVE	
PCC = POINT OF COMPOUND CURVE	
= POINT OF CURVE	
= POINT OF TANGENT	
= POINT REVERSE CURVE	
= PROPOSED	
PT = POINT OF TANGENT	
PVC = POLYVINYL CHLORIDE PIPE	
Q100 = 100 YEAR ULTIMATE CONDITION DESIGN FLOW	
) = RADIAL	
R = RIGHT OF	
= REINFORCED CONCRETE BOX	
RCP = REINFORCED CONCRETE PIPE	
RGRCP = RUBBER GASKET REINFORCED CONCRETE PIPE	
= RIGHT-OF-WAY	
= STORM DRAIN	
= STORM DRAIN MANHOLE	
= SOUTHERN NEVADA WATER AUTHORITY	
SS = SANITARY SEWER	
SSMH = SANITARY SEWER MANHOLE	
STA = STATION	
= STANDARD DRAWING NUMBER	
TC = TOP OF BACK OF CURB	
= TELEPHONE	
THK = THICK	
TMH = TOP OF MANHOLE	
TOE = TOE OF CHANNEL	
TP = TOP OF CHANNEL	
TW = TOP OF WALL	
= UNIFORM DESIGN AND CONSTRUCTION STANDARDS	
UNO = UNLESS NOTED OTHERWISE	
U.S. = UNITED STATES	
V.C. = VERTICAL CURVE	
VP = VITRIFIED CLAY PIPE	
W = WATER	
/ = WITH	
WWF = WELDED WIRE FABRIC	

CONSTRUCTION NOTES

1. CONSTRUCT 6' CHAIN-LINK FENCE (SEE DETAIL 9/C11)
2. CONSTRUCT 6' CHAIN-LINK GATE (SEE DETAIL 8/C11) (WIDTH OF GATE CALLED OUT IN PLAN VIEW)
3. CONSTRUCT CHANNEL ACCESS STEPS (SEE DETAIL 11/S2)
4. CONSTRUCT 12' DRIVEWAY PER STD. DWG. NO. 224
5. INSTALL SIGN (SEE DETAIL 8/C11)
6. INSTALL SIGN (SEE DETAIL 7/C11)
7. CONSTRUCT POST AND CABLE RAILING (SEE DETAIL 10/C11)
8. PAINTED STAFF GAUGE (SEE DETAIL 5/C11)
9. CONSTRUCT SLOPE PAVING (SEE DETAIL 3/C11)
10. CONSTRUCT PIPE CONNECTION (SEE DETAIL 8/S2)
11. CONSTRUCT RCB CONNECTION (SEE DETAIL 3/S7)
12. CONTRACTOR SHALL FIELD VERIFY AND FLAG ALL SNWA APPURTENANCES AND PROTECT FROM DAMAGE AND BEING BURIED.

REMOVAL NOTES

1. REMOVE EXISTING BLOCK WALL AND FOOTING
2. REMOVE AND SALVAGE RIPRAP
3. REMOVE EXISTING CONCRETE SPLASH PAD
4. REMOVE EXISTING 80 FT.± CHANNEL SECTION TO EXPANSION JOINT.
5. REMOVE EXISTING CHANNEL LINING.
6. REMOVE EXISTING CONCRETE SPILLWAY.
7. REMOVE EXISTING CHAIN-LINK FENCE.

CLARK COUNTY WATER RECLAMATION DISTRICT NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTE-WATER COLLECTION SYSTEMS AND THE PUBLIC WORKS CONSTRUCTION OFF SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED, AND CLARK COUNTY SUPPLEMENT TO UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE DRAWINGS AND SPECIFICATION BOOKS.
2. THESE STANDARDS SHALL APPLY TO ALL CONSTRUCTION.
3. SEWER MAINS ONLY TO BE LAID IN SEWER TRENCHES.
4. ALL LATERALS TO BE LAID AT NOT LESS THAN MINIMUM SLOPE AS SHOWN IN THESE STANDARDS.
5. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS. ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CONTROLLING AGENCY.
6. SOIL TESTING SHALL BE IN ACCORDANCE WITH SECTION 3.11 OF THESE STANDARDS.
7. ALL EXFILTRATION, INFILTRATION, AIR TESTING AND TELEVISING OF LINES SHALL BE IN ACCORDANCE WITH THESE STANDARDS.
8. CUT SHEETS MUST BE SUBMITTED TO THE AGENCY BEFORE CONSTRUCTION WILL BE PERMITTED TO START.
9. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CONTROLLING AGENCY MUST BE CLASS "A" CONTRACTORS.

CLARK COUNTY WATER RECLAMATION DISTRICT NOTES DATE

CCWRD PROJECT CONTROL NUMBER IS_____

SIGNATURE ON THESE PLANS WILL NOT BE CONSTRUED TO BE A PERMIT FOR OR AN APPROVAL OF ANY VIOLATION OF CLARK COUNTY WATER RECLAMATION DISTRICT RULES, REGULATIONS, OR DESIGN AND CONSTRUCTION STANDARDS. THE APPROVAL OF THESE DRAWINGS DOES NOT GUARANTEE CAPACITY IN THE DISTRICT'S COLLECTION OR TREATMENT SYSTEM.

LAS VEGAS VALLEY WATER DISTRICT STANDARD NOTES

LVVWD PROJECT # 25819

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN RELEASED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, 48 HOUR NOTICE SHALL BE GIVEN TO LVVWD COMMUNICATION SUPPORT CENTER (258-7171) PRIOR TO THE START OF CONSTRUCTION. NOTICE MUST BE GIVEN BY 2:00 p.m. THE BUSINESS DAY PRIOR TO A LVVWD INSPECTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.
2. ALL WORK SHALL CONFORM TO LVVWD'S STANDARD PLATES, DRAWINGS AND SPECIFICATIONS AND TO THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS (UDACS), LATEST EDITION.
3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2, SHALL BE DONE IN ACCORDANCE WITH THE MOST CURRENT DRAFT OR EDITION OF THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAY, VALLEY AND CURB GUTTERS.
8. THE FOLLOWING REQUIREMENTS MUST BE MET IN THE EVENT A WATER LINE AND SANITARY OR STORM SEWER LINE CROSS:

   A MINIMUM EIGHTEEN (18) INCH VERTICAL SEPARATION (OUTSIDE TO OUTSIDE) MUST BE MAINTAINED WHEN THE WATER LINE IS INSTALLED OVER THE SANITARY OR STORM SEWER LINE. IF THE VERTICAL SEPARATION CANNOT BE MAINTAINED OR THE WATER LINE MUST BE PLACED UNDER THE SANITARY OR STORM SEWER LINE, THE SANITARY OR STORM SEWER LINE MUST BE CONSTRUCTED WITH ONE OF THE FOLLOWING OR, AS SHOWN ON THESE PLANS:

   A. POTABLE WATER SUPPLY QUALITY MATERIAL,
   B. ENCASEMENT, WITH FOUR (4) INCH CONCRETE (MINIMUM),
   C. SLEEVING WITH POTABLE WATER SUPPLY QUALITY PIPE.

   EACH PROVISION MUST EXTEND ALONG THE SANITARY OR STORM SEWER, ON EITHER SIDE OF THE MAIN, A MINIMUM 10 FOOT DISTANCE PERPENDICULAR TO THE WATER MAIN EXTERIOR.
9. WARNING TAPE SHALL BE REQUIRED OVER ALL MAINS, ALL SIX (6) INCH DIAMETER AND LARGER SERVICE LATERALS, AND ANY SERVICE LATERAL NOT INSTALLED PERPENDICULAR TO THE MAIN IN ACCORDANCE WITH STANDARD PLATE NO. 27.
10. ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD'S DISTRIBUTION SYSTEM.
11. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 258-3152 FORTY-EIGHT (48) HOURS PRIOR TO PICKUP.
12. CONSTRUCTION MAY INTERRUPT SERVICE, WITH LVVWD APPROVAL AND PROPER NOTIFICATION, BETWEEN THE HOURS OF 10 PM AND 6 AM, SUNDAY THROUGH THURSDAY. CIRCUMSTANCES MAY REQUIRE TEMPORARY SERVICE FEEDS BE INSTALLED, WITHOUT LVVWD REIMBURSEMENT. ANY TEMPORARY SERVICE FEED MUST HAVE PRIOR LVVWD APPROVAL.
13. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE LVVWD'S PRE-APPROVED MATERIALS AND MANUFACTURER'S LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.

APPROVED FOR CONSTRUCTION

_____

LAS VEGAS VALLEY WATER DISTRICT DATE

SOUTHERN NEVADA WATER AUTHORITY CONSTRUCTION NOTES

1. CONTRACTOR SHALL FIELD LOCATE AND PROTECT ALL SNWA/SNWS APPURTENANCES INCLUDING, BUT NOT LIMITED TO AV/AR, ACCESS MANWAYS AND CATHODIC PROTECTION SYSTEMS. ALL ABOVE GROUND STRUCTURES AND AT GRADE STRUCTURES MUST BE ADJUSTED TO NEW GRADE AT CONTRACTOR'S EXPENSE. CATHODIC PROTECTION TEST STATIONS, RECTIFIERS, AND AV/AR'S MUST BE RELOCATED TO THE SIDEWALK PER SNWA STANDARDS AND AT THE CONTRACTOR'S EXPENSE. CONTRACTOR TO NOTIFY SOUTHERN NEVADA WATER AUTHORITY DEVELOPMENT PLAN REVIEW, AT (702) 862-3444 AT LEAST 48 HOURS PRIOR TO CONSTRUCTION ACTIVITY.
2. NO BUILDINGS, STRUCTURES, FENCES OR TREES SHALL BE PLACED UPON, OVER OR UNDER SAID PARCEL OF LAND FOR THE DURATION OF THIS EASEMENT EXCEPT THAT SAID PARCEL MAY BE IMPROVED AND USED FOR STREET, ROAD OR DRIVEWAY PURPOSES AND FOR OTHER UTILITIES, INSOFAR AS SUCH USE DOES NOT INTERFERE WITH ITS USE BY SNWA FOR THE PURPOSES FOR WHICH IT IS GRANTED.
3. SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

AVOID HITTING OVERHEAD POWER LINES. IT'S EASY.
CALL BEFORE YOU DO OVERHEAD
1-702-593-6111

Avoid striking underground utility lines. It's easy.
Call before you Dig.
1-800-227-2600
(NEVADA ONLY)

BASIS OF BEARINGS

SOUTH 00°18'40" EAST - BEING THE WEST LINE OF SOUTHWEST QUARTER (SW 1/4) OF SECTION 3, TOWNSHIP 21 SOUTH, RANGE 62 EAST, M.D.M., AS SHOWN BY A MAP THEREOF ON FILE IN FILE 36, PAGE 6 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

PROJECT BENCHMARK

CLARK COUNTY BM - 6C02 33SW16

RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, IN NORTHEAST CORNER OF NELLIS BLVD. AND BELPORT DR. NEAR THE PC OF NELLIS BLVD.

ELEVATION - 531.863 (M) NAVD 88
1744.954 (FT) NAVD 88

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS FOR THIS PROJECT SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION", CLARK COUNTY AREA, NEVADA LATEST EDITION, AND THE "UNIFORM DRAWINGS FOR PUBLIC WORKS CONSTRUCTION", CLARK COUNTY AREA, NEVADA LATEST EDITION, UNLESS OTHERWISE SPECIFIED BY NOTE ON THE PLANS AND/OR SPECIAL PROVISIONS. THE IMPROVEMENT STANDARDS WILL HEREAFTER BE REFERRED TO AS "CLARK COUNTY AREA STANDARD DRAWINGS.
2. 48 HOURS PRIOR TO START OF CONSTRUCTION, THE CONTRACTOR SHALL CONTACT

NEVADA POWER COMPANY	PHONE	1-800-227-2600
SPRINT-CENTRAL TELEPHONE COMPANY	PHONE	1-800-227-2600
SOUTHWEST GAS CORPORATION	PHONE	1-800-227-2600
COX COMMUNICATIONS LAS VEGAS, INC.	PHONE	384-8084
LAS VEGAS VALLEY WATER DIST.	PHONE	870-4194
CLARK COUNTY TRAFFIC MGMT. DIV.	PHONE	455-7511
CLARK COUNTY WATER RECLAMATION DISTRICT	PHONE	434-8000
SOUTHERN NEVADA WATER AUTHORITY	PHONE	862-3444

3. LOCATIONS OF UNDERGROUND UTILITIES SHOWN ON THE DRAWINGS WERE OBTAINED FROM INFORMATION RECEIVED FROM THE AFFECTABLE UTILITY COMPANIES NEITHER THE OWNER NOR ENGINEER ASSUMES ANY RESPONSIBILITY FOR UTILITIES OR STRUCTURES NOT SHOWN, OR FOR UTILITIES OR STRUCTURES NOT SHOWN AT ACTUAL LOCATIONS ON THE DRAWINGS. EXISTING SERVICE LATERALS ARE NOT SHOWN ON THESE DRAWINGS. CONTRACTOR TO VERIFY THE EXACT LOCATION OF UTILITIES PRIOR TO START OF CONSTRUCTION. THE CONTRACTOR'S RESPONSIBILITY REGARDING UTILITIES SHALL BE AS REQUIRED UNDER SECTION 107.17 OF THE UNIFORM STANDARD SPECIFICATIONS FOR CLARK COUNTY AREA, NEVADA AND AS PROVIDED IN THE SPECIFICATIONS.
4. THE CONTRACTOR SHALL NOT REMOVE TREES, SHRUBS, LAWNS, WALLS, FENCES, SIGNS, STRUCTURES, LIGHTS, OR ANY EXISTING IMPROVEMENTS OUTSIDE OF STREET RIGHT-OF-WAY, EXCEPT WHERE REQUIRED TO DO SO BY THE CONTRACT DRAWINGS OF BY THE ENGINEER.
5. REPLACEMENT, RELOCATION, OR RECONSTRUCTION OF ALL EXISTING IMPROVEMENTS INCLUDING SPRINKLER SYSTEMS, LAWNS, FENCES, WALLS, SIGNS, STEPS, SIDEWALK, DRIVEWAYS, LAWN LIGHTS, AND ALL OTHER ITEMS APPLICABLE TO THIS CONTRACT SHALL BE AS REQUIRED BY THE ENGINEER.
6. THE CONTRACTOR SHALL BACKFILL AND FINE GRADE ALL CUT OR FILL SLOPES TO MATCH EXISTING CONDITIONS TO THE SATISFACTION OF THE ENGINEER. WHERE EXISTING LAWNS ARE DAMAGED BY THE CONTRACTOR'S OPERATIONS THE CONTRACTOR SHALL SOD THE AFFECTED AREA TO A CONDITION EQUAL TO, OR BETTER TO THAT WHICH EXISTED PRIOR TO CONSTRUCTION.
7. ALL BARRICADING AND TEMPORARY TRAFFIC CONTROL DEVICES OR METHODS USED DURING CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE "NEVADA TRAFFIC CONTROL MANUAL", 1986 (OR LATEST REVISION), PUBLISHED BY THE STATE OF NEVADA DEPARTMENT OF TRANSPORTATION AND THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", EXCEPT AS OTHERWISE PROVIDED IN THE CONTRACT SPECIFICATIONS OR AS REQUIRED BY THE ENGINEER.
8. REMOVAL OR RELOCATIONS OF POWER POLES, TELEPHONE POLES, JOINTLY-OWNED POLES, AND APPURTENANCES WHICH INTERFERE WITH IMPROVEMENTS REQUIRED TO BE CONSTRUCTED UNDER THIS CONTRACT, SHALL BE THE RESPONSIBILITY OF THE RESPECTIVE UTILITY COMPANY. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION WITH THE UTILITY COMPANIES FAR ENOUGH IN ADVANCE AS TO NOT IMPACT THE SCHEDULE.
9. UNLESS OTHERWISE SHOWN ON THE CONTRACT DRAWINGS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF, RELOCATION OF ALL WATER SERVICES AND METERS WHICH INTERFERE WITH IMPROVEMENTS SHOWN ON THE CONTRACT DRAWINGS.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE VERTICAL ADJUSTMENT OF ALL EXISTING SANITARY, WATER AND STORM SEWER MANHOLES TO THE FINAL FINISH GRADES IN ACCORDANCE WITH SECTIONS 608 AND 630 OF THE "STANDARD SPECIFICATIONS".
11. SPRINT TELEPHONE COMPANY SHALL BE RESPONSIBLE FOR THE VERTICAL OR HORIZONTAL ADJUSTMENT OF ALL TELEPHONE FACILITIES WHICH INTERFERE WITH IMPROVEMENTS SHOWN ON THE CONTRACT DRAWINGS.
12. THE SOUTHWEST GAS CORPORATION SHALL BE RESPONSIBLE FOR THE REMOVAL OR RELOCATION OF ALL GAS LINES AND APPURTENANCES WHICH INTERFERE WITH IMPROVEMENTS SHOWN ON THE CONTRACT DRAWINGS.
13. ALL EXISTING TRAFFIC SIGNS, STREET LIGHTS & SIGNS TO BE REMOVED SHALL BE SALVAGED BY THE CONTRACTOR AND DELIVERED TO THE CLARK COUNTY TRAFFIC OPERATIONS DIVISION LOCATED AT 5821 E. FLAMINGO ROAD, LAS VEGAS, NEVADA WITHIN 48 HOURS OF THEIR REMOVAL.
14. EXACT LOCATIONS OF ALL SAWCUT LINES SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER. SAWCUTS, LONGITUDINAL TO THE ROADWAY, MAY BE WHEEL CUT WITH EQUIPMENT AS APPROVED BY THE ENGINEER. ALL OTHER SAWCUT SHALL BE MADE BY A ROTARY SAW.
15. ALL SANITARY SEWER CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CLARK COUNTY SANITATION DISTRICT DESIGN AND CONSTRUCTION STANDARDS.
16. THE PLANS DO NOT SHOW ALL SEWER LATERALS, SEWER FORCE MAINS AND WATER SERVICE LATERALS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REPAIRS OR RELOCATIONS OF LATERALS BROKEN OR IN CONFLICT WITH THE PROPOSED CHANNEL, STORM DRAIN OR ROADWAY CONSTRUCTION.
17. CONTRACTOR SHALL MAINTAIN CONTINUOUS SEWER SERVICE TO ALL CCSD CUSTOMERS. SEWER LATERALS CUT DURING CONSTRUCTION SHALL BE REPAIRED BY CONTRACTOR PER CCSD DESIGN AND CONSTRUCTION STANDARDS. CONTRACTOR SHALL IMMEDIATELY REPORT ANY SANITARY SEWER OR SEWER LATERALS THAT CANNOT BE RECONNECTED TO SEWER MAIN DUE TO STORM DRAIN CONFLICT. CLARK COUNTY SHALL BE RESPONSIBLE FOR PROVIDING DESUBMITTED APPROVED MAIN LINE SEWER EXTENSION PLANS TO PROVIDE NEW MAIN TO REROUTE ANY SEWERS THAT CANNOT BE RECONNECTED.
18. THE NEVADA POWER COMPANY SHALL BE RESPONSIBLE FOR THE RELOCATION OF UNDERGROUND OR OVERHEAD POWER LINES THAT INTERFERE WITH THE REQUIRED IMPROVEMENTS AS SHOWN ON THE PLANS.
19. IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL, OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING, SUCH PAVEMENT MARKING SHALL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE COUNTY TRAFFIC MANAGER.
20. LVACTS INTERCONNECT CABLE POLICY IS IN EFFECT. INTERCONNECT CABLE MUST BE MAINTAINED AT ALL TIMES. CONTRACTOR SHALL PROVIDE TEMPORARY OVERHEAD INTERCONNECT CABLE WHILE PAVEMENT CABLE IS BEING RELOCATED. TEMPORARY AERIAL INSTALLATION MUST BE ACCEPTABLE TO THE COUNTY TRAFFIC MANAGER AND TO LVACTS. ANY DAMAGE TO THIS CABLE IS DEEMED AN EMERGENCY BY LVACTS, CITY OF LAS VEGAS, CLARK COUNTY AND NDOT AND MUST BE REPAIRED IMMEDIATELY TO LVACTS' ACCEPTANCE. $2,500 PER DAY DAMAGES WILL BE ASSESSED AFTER TWENTY-FOUR (24) HOURS HAS ELAPSED FROM THE TIME OF BREAK OR DAMAGE.
21. THE CONTRACTOR SHALL DETERMINE THE LOCATION AND DEPTH OF SUSPECTED UTILITY INTERFERENCES, AND SHALL FURNISH INFORMATION ON THE SAME TO THE ENGINEER, NOT LESS THAN TEN (10) DAY PRIOR TO THE ANTICIPATED IMPACT OF THESE SUSPECTED INTERFERENCES ON HIS WORK. IF CONFLICTS EXIST, THE CONTRACTOR WILL IMMEDIATELY CONTACT THE ENGINEER AND PROVIDE THE ENGINEER WITH ALL THE NECESSARY DATA SUCH AS ELEVATIONS, HORIZONTAL LOCATIONS, ETC., AND PROVIDE THE ENGINEER WITH SKETCHES INDICATING THE PROPOSED IMPROVEMENT AND THE UTILITY CONFLICT. THE ENGINEER WILL EXAMINE AND REVIEW ALL THE DATA AND SKETCHES PROVIDED, AND WILL PROVIDE THE CONTRACTOR WITH AN ALTERNATIVE DESIGN WITHIN FIVE (5) DAYS AFTER RECEIPT OF DATA AND SKETCHES.
22. THE FOLLOWING DENSITIES WERE USED IN CALCULATING QUANTITIES FOR ASPHALT CONCRETE PAVEMENT.
    PLANTMIX BITUMINOUS SURFACING 155 LB/CF
    PLANTMIX BITUMINOUS OPEN-GRADED SURFACE 140 LB/CF

DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL

GENERAL & CONSTRUCTION NOTES, LEGEND AND ABBREVIATIONS, BENCHMARK, BASIS OF BEARINGS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER — STATE OF NEVADA — NOEL C. LAUGHLIN — No. 10165 — CIVIL — 3-11-04

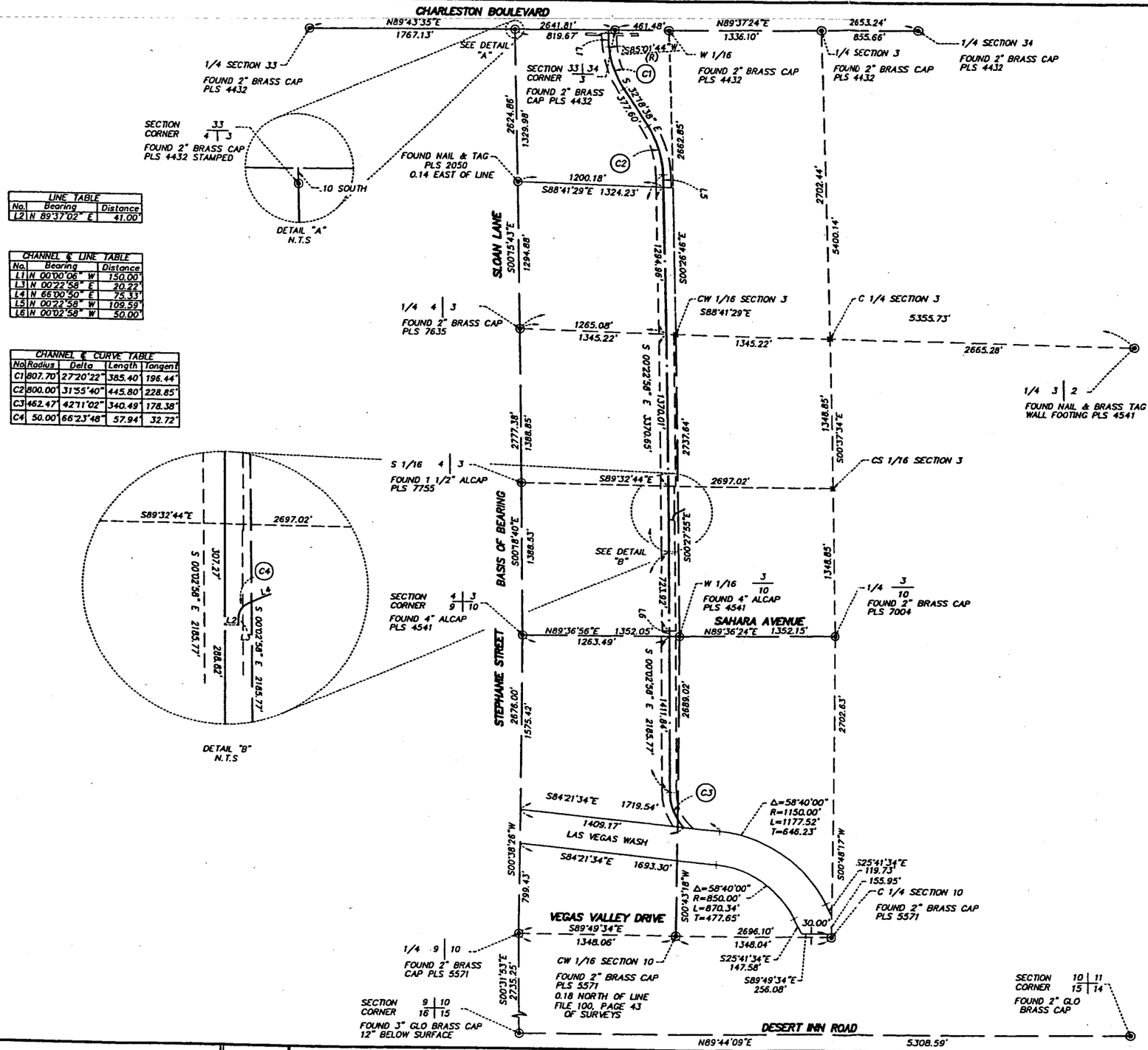
PROJECT No: 500.857 DRAWN BY: ____
DESIGNED BY: ____ CHECKED BY: ____
APPROVED BY ____

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE (702) 804-2000 • FAX (702) 804-2299

SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
G-3
SHT. 3 OF 30

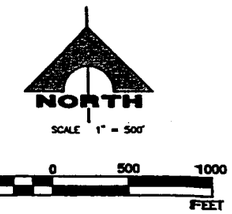
F:\500-857\dwg\improv\sc_g04.dwg 03-11-04 12:04:56 RBlanchard



LINE TABLE		
No.	Bearing	Distance
L2	N 89°37'02" E	41.00'

CHANNEL & LINE TABLE		
No.	Bearing	Distance
L1	N 00°00'06" W	150.00'
L3	N 00°22'58" E	20.22'
L4	N 66°00'50" E	75.33'
L5	N 00°22'58" W	109.59'
L6	N 00°02'58" W	50.00'

CHANNEL ℄ CURVE TABLE				
No.	Radius	Delta	Length	Tangent
C1	807.70'	27°20'22"	385.40'	196.44'
C2	800.00'	31°55'40"	445.80'	228.85'
C3	462.47'	42°11'02"	340.49'	178.38'
C4	50.00'	66°23'48"	57.94'	32.72'



BASIS OF BEARINGS

SOUTH 00°18'40" EAST, BEING THE WEST LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 3, TOWNSHIP 21 SOUTH, RANGE 62 EAST, M.D.M., CLARK COUNTY, NEVADA, AS SHOWN BY FILE 36, PAGE 6 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE CLARK COUNTY, NEVADA.

BENCHMARK

CLARK COUNTY BM – 6C02 335WW6

RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, IN THE NORTHEAST CORNER OF NELLIS BLVD. AND BELPORT DR. NEAR THE PC OF NELLIS BLVD.

ELEVATION: 531.863 METERS (NAVD 88)
1744.854 FEET (NAVD 88)

LEGEND

- ◉ FOUND MONUMENTATION AS SHOWN AND DESCRIBED
- × CALCULATED POINT
- —— —— SECTION LINE
- —— — —— QUARTER LINE
- —— — — —— 1/16 LINE

REFERENCES

FILE 36, PAGE 6 OF SURVEYS
FILE 122, PAGE 76 OF SURVEYS

NO.	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
HORIZONTAL CONTROL PLAN

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL LAND SURVEYOR – STATE OF NEVADA
DANNY E. HILL EXP. 6/30/05 NO. 9389

PROJECT No: 500.857 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: 1" = 500'
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
G-4
SHT. 4 OF 30

BASE BID SCHEDULE
Estimate of Quantities

ITEM NO.	ITEM DESCRIPTION	UNIT	TOTALS
100.01	CONSTRUCTION OFFICE	LS	1
105.01	ON-SITE MATERIAL TESTING FOR QUALITY CONTROL	LS	1
107.01	TRAFFIC CONTROL	LS	1
109.01	OWNER CAUSED DELAY ALLOWANCE	DAY	20
109.02	OWNER CAUSED DELAY ALLOWANCE ABOVE $500/DAY	DAY	20
109.03	CONSTRUCTION CONFLICTS AND ADDITIONAL WORK	LS	1
200.01	MOBILIZATION	LS	1
201.01	CLEARING AND GRUBBING	LS	1
202.01	REMOVE EXISTING SPLASH PADS (5 EACH)	LS	1
202.02	REMOVE EXISTING CHANNEL LINING FROM STA. 163+66 (RT) TO STA. 171+98 (RT)	LS	1
202.03	REMOVE EXISTING CHANNEL LINING FROM STA. 186+54 TO STA. 186+18	LS	1
202.04	REMOVE AND SALVAGE EXISTING RIPRAP ON WEST BANK FROM STA. 118+89 TO STA. 132+00	LS	1
202.05	REMOVE EXISTING BLOCK WALL AND FOOTING	LF	73
202.06	REMOVE EXISTING CHAIN-LINK FENCE	LF	515
203.01	CHANNEL EXCAVATION	CY	73,000
205.01	DEWATERING	LS	1
209.01	2-INCH DRAIN BACKFILL	CY	16,310
301.01	SELECTED MATERIAL BASE	CY	29,000
302.01	TYPE II AGGREGATE BASE	CY	4,100
302.02	TYPE II AGGREGATE BASE MAINTENANCE ROAD	CY	1,500
502.01	TRAPEZOIDAL TO TRAPEZOIDAL TRANSITION STA. 118+88.78 TO STA. 119+25	LS	1
502.02	TRAPEZOIDAL CHANNEL LINING STA. 119+38.78 TO STA. 122+58.37	LF	319.59
502.03	TRAPEZOIDAL CHANNEL TRANSITION STA. 122+58.37 TO STA. 123+00	LS	1
502.04	TRAPEZOIDAL CHANNEL LINING STA. 123+00 TO STA. 158+50	LF	3,550
502.05	TRAPEZOIDAL CHANNEL TRANSITION STA. 158+50 TO STA. 159+00	LS	1
502.06	TRAPEZOIDAL CHANNEL LINING STA. 159+00 TO STA. 160+29.41	LF	129.41
502.07	TRAPEZOIDAL TO RECTANGULAR TRANSITION STA. 160+29.41 TO STA. 160+79.41	LS	1
502.08	CONFLUENCE STRUCTURE STA. 160+79.41 TO STA. 162+79.41	LS	1
502.09	RECTANGULAR TO TRAPEZOIDAL TRANSITION STA. 162+79.41 TO STA. 163+29.41	LS	1
502.10	TRAPEZOIDAL CHANNEL LINING STA. 163+29.41 TO STA. 171+98.47; STA. 172+86.31 TO STA. 174+50; STA. 176+00 TO STA. 179+00	LF	1,332.75
502.11	CCRFCD CHANNEL GAUGE STATION	LS	1
502.12	TRAPEZOIDAL CHANNEL LINING WITH MAINTENANCE RAMP STA. 174+50 TO STA. 176+00	LS	1
502.13	MODIFIED TRAPEZOIDAL CHANNEL STA. 179+00 TO STA. 186+54.94	LF	755
502.14	TRAPEZOIDAL TO TRAPEZOIDAL TRANSITION STA. 186+54.94 TO STA. 187+18	LS	1
502.15	MAINTENANCE ROAD CROSSING STA. 130+71	LS	1
502.16	MAINTENANCE ROAD CROSSING STA. 165+68	LS	1
502.17	MAINTENANCE ROAD CROSSING STA. 184+79	LS	1
611.01	3-INCH CONCRETE SLOPE PAVEMENT	SY	34,113
616.01	6-FOOT CHAIN LINK FENCE	LF	160
616.02	POST AND CABLE RAILING	LF	2,000
627.01	PERMANENT SIGNS	EA	2
637.01	DUST PALLIATIVE	AC	13
637.02	DUST CONTROL	LS	1

ITEM NO.	ITEM DESCRIPTION	UNIT	TOTALS

NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
ESTIMATE OF QUANTITIES

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

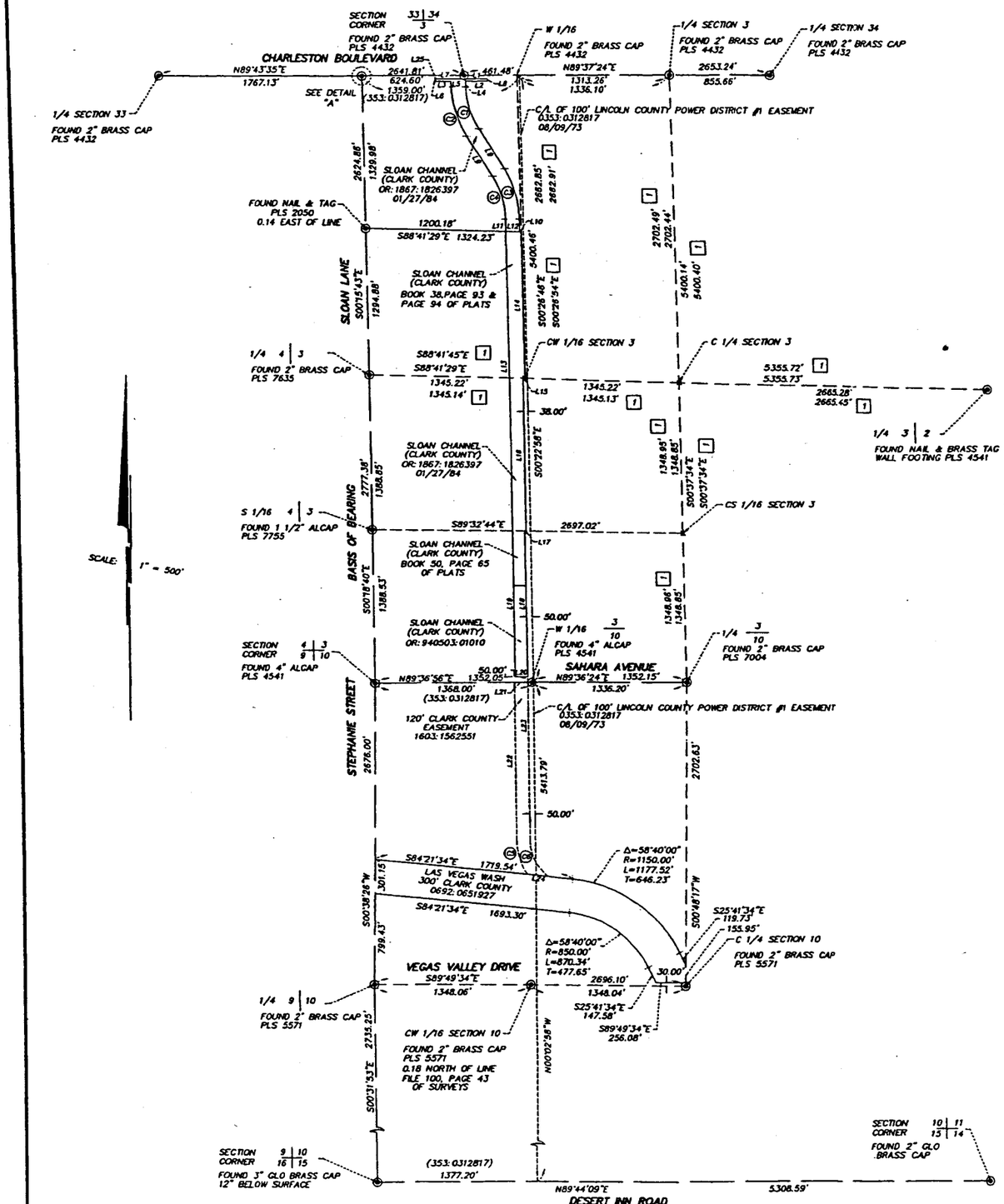
REGISTERED PROFESSIONAL ENGINEER STATE OF NEVADA NOEL C. LAUGHLIN No. 10165 CIVIL 3-11-04

PROJECT No: 500.857 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY:

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
G-5
SHT. 5 OF 30



SURVEYOR'S CERTIFICATE

I, DANNY E. HILL, A PROFESSIONAL LAND SURVEYOR LICENSED IN THE STATE OF NEVADA, CERTIFY THAT THIS MAP IS AN ACCURATE REPRESENTATION OF THE LANDS SURVEYED UNDER MY DIRECT SUPERVISION AT THE INSTANCE OF CLARK COUNTY PUBLIC WORKS. ALL SURVEY MONUMENTS FOUND OR SET ARE CORRECTLY SHOWN, OCCUPY THE POSITIONS INDICATED AND ARE SUFFICIENT TO ENABLE THE RETRACEMENT OF THE SURVEY WHICH WAS COMPLETED ON APRIL 16, 2002. THIS SURVEY PLAT DOES NOT CONSTITUTE A SUBDIVISION AS DEFINED BY NEVADA STATE LAW. THE LANDS LIE WITHIN SECTIONS 3 AND 10 TOWNSHIP 21 SOUTH, RANGE 62 EAST, M.D.M., CLARK COUNTY, NEVADA. THIS RECORD OF SURVEY IS FILED IN COMPLIANCE WITH PROVISIONS OF N.R.S. CHAPTER 278.325 AND WITH PROVISIONS OF N.R.S. CHAPTER 625.340.

DANNY E. HILL
PROFESSIONAL LAND SURVEYOR
NEVADA LICENSE NO. 9389



07 JUNE 2002
EXP. 06-30-03

BASIS OF BEARINGS

SOUTH 00°18'40" EAST, BEING THE WEST LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 3, TOWNSHIP 21 SOUTH, RANGE 62 EAST, M.D.M., CLARK COUNTY, NEVADA, AS SHOWN BY FILE 36, PAGE 6 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

NOTE:

THIS FIELD SURVEY WAS PERFORMED TO ESTABLISH AND MEMORIALIZE THE LEGAL RIGHT-OF-WAY AND/OR BOUNDARY LIMITS FOR THE CONSTRUCTION OF THE PROJECT SO THAT ALL INTERSECTIONS AND OTHER CONTROL POINTS FOR THE PROJECT CAN BE MONUMENTED IN ACCORDANCE WITH APPLICABLE STATE STATUTES AND LOCAL ORDINANCES AT THE COMPLETION OF CONSTRUCTION.

RECORDER'S NOTE:

ANY SUBSEQUENT CHANGES TO THIS MAP SHOULD BE EXAMINED AND MAY BE DETERMINED BY REFERENCE TO THE COUNTY RECORDER'S CUMULATIVE MAP INDEX.
N.R.S. 278.5695

LEGEND

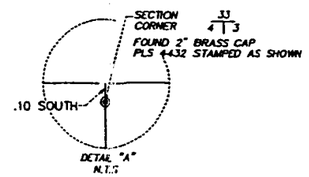
- ◎ FOUND MONUMENTATION AS SHOWN AND DESCRIBED
- x CALCULATED POINT
- —— —— SECTION LINE
- — — — QUARTER LINE
- ——— 1/16 LINE

LINE	BEARING	DISTANCE
L1	S89°37'24"W	200.01'
L2	S09°37'24"W	189.63'
L3	N89°43'35"E	136.48'
L4	N01°26'00"W	48.81'
L5	N01°26'00"W	51.30'
L6	S00°18'25"E	20.00'
L7	S89°43'35"W	250.11'
L8	S00°22'28"E	20.00'
L9	N31°11'20"W	409.00'
L10	S88°41'29"E	16.68'
L11	N00°22'58"W	107.78'
L12	S00°22'58"E	111.42'
L13	N00°22'58"W	2665.90'
L14	S00°26'46"E	1295.01'
L15	N88°41'29"W	18.11'
L16	N00°22'58"W	1369.09'
L17	N89°32'44"W	12.00'
L18	S00°22'58"E	1319.26'
L19	N00°22'58"W	1320.90'
L20	N89°36'56"E	112.00'
L21	N89°36'56"E	120.00'
L22	S00°02'58"E	1411.47'
L23	S00°02'58"E	1412.17'
L24	S84°21'34"E	180.49'
L25	S00°16'25"E	30.00'

REFERENCE MAPS

[1] FILE 36, PAGE 6 OF SURVEYS

CURVE	DELTA	RADIUS	LENGTH	TANGENT
C1	29°45'20"	738.00'	383.27'	196.06'
C2	29°45'20"	862.00'	447.66'	229.00'
C3	30°48'22"	862.00'	463.47'	237.48'
C4	30°48'22"	738.00'	396.80'	203.32'
C5	34°49'33"	527.97'	320.91'	163.59'
C6	51°31'45"	407.97'	366.91'	196.91'



500.857
SLOAN CHANNEL

SHEET 1 OF 1

RECORD OF SURVEY
FOR
CLARK COUNTY PUBLIC WORKS
SLOAN CHANNEL

THOSE PORTIONS OF LAND LYING WITHIN SECTIONS 3, AND 10, TOWNSHIP 21 SOUTH, RANGE 62 EAST, M.D.M., CLARK COUNTY, NEVADA.

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

INSTRUMENT NO. 00924
OFFICIAL RECORDS
BOOK NO. 20020607
FILED AT THE REQUEST OF
G.C. WALLACE INC.
DATE 6-7-02 AT 10:39
FILE 122 PAGE 0076
OF SURVEYS
CLARK COUNTY, NEVADA RECORDS
JUDITH A. VANDEVER, RECORDER
FEE $ 0.00 DEPUTY SH

FILE 122 PAGE 0076

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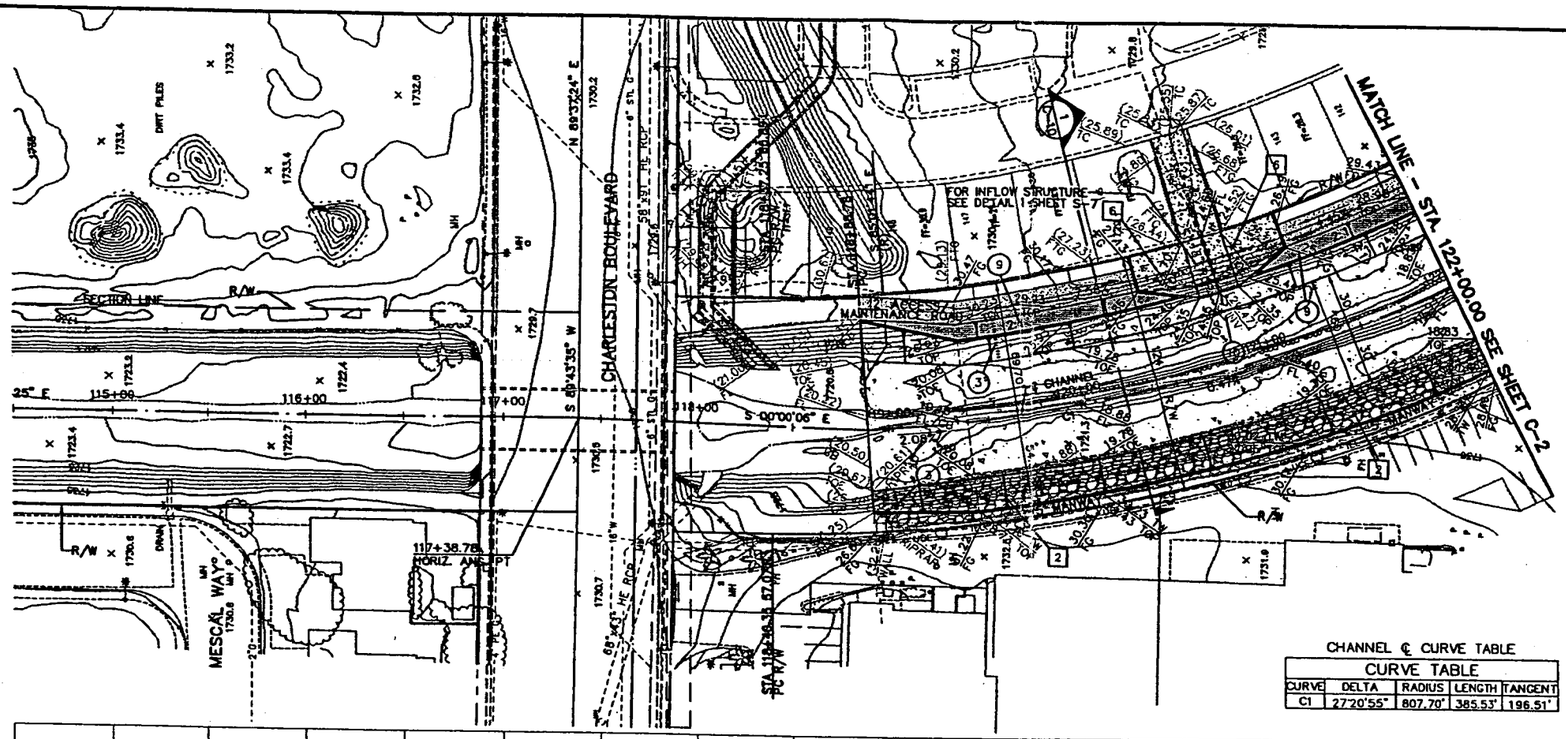
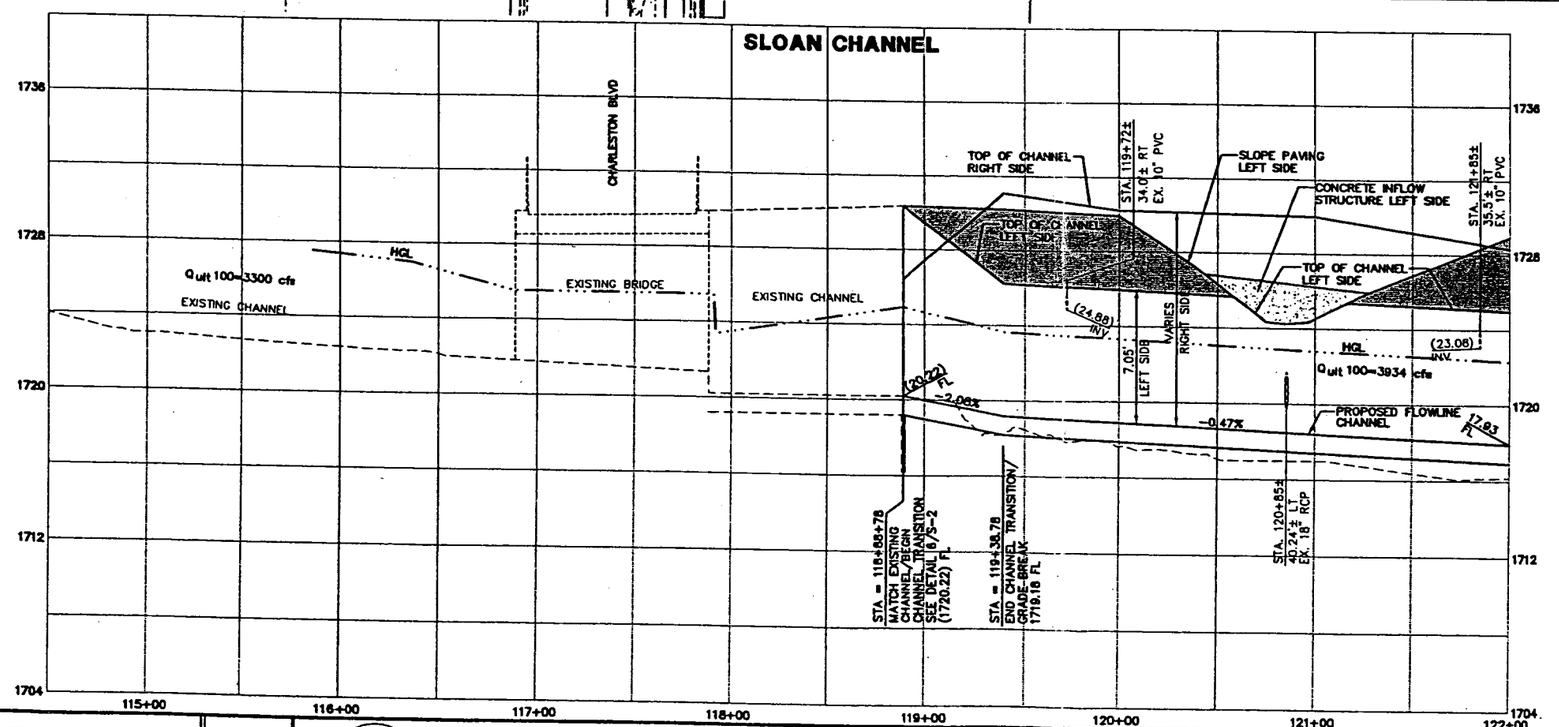
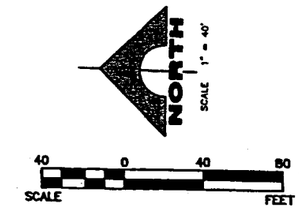


CHANNEL ℄ CURVE TABLE

CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	TANGENT
C1	27°20'55"	807.70'	385.53'	196.51'





CONSTRUCTION NOTES

(3) CONSTRUCT CHANNEL ACCESS STEPS (SEE DETAIL 11/S2)

(9) CONSTRUCT SLOPE PAVING (SEE DETAIL 3/C11)

(10) CONSTRUCT PIPE CONNECTION (SEE DETAIL 9/S2)

REMOVAL NOTES

[2] REMOVE AND SALVAGE RIPRAP

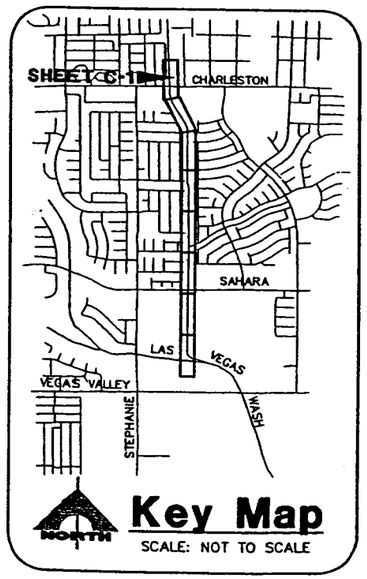
[6] REMOVE EXISTING CONCRETE SPILLWAY

NOTE:

SEE SHEETS C-13 AND C-14 FOR FENCING/POST & CABLE RAILING PLAN.







Key Map

SCALE: NOT TO SCALE

E	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL

PLAN AND PROFILE

STA. 114+50.00 TO STA. 122+00.00

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER STATE OF NEVADA NOEL C. LAUGHLIN No. 10163 CIVIL 3-11-04

PROJECT No: 500.857 DRAWN BY: DVJ

DESIGNED BY: CHECKED BY:

APPROVED BY:

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2288

SCALE	
HORIZ:	1" = 40'
VERT:	1" = 4'
FIELD BOOK	

L-1759

DRAWING NO. C-1

SHT. 7 OF 30

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SOUTHERN NEVADA WATER AUTHORITY CONSTRUCTION NOTES

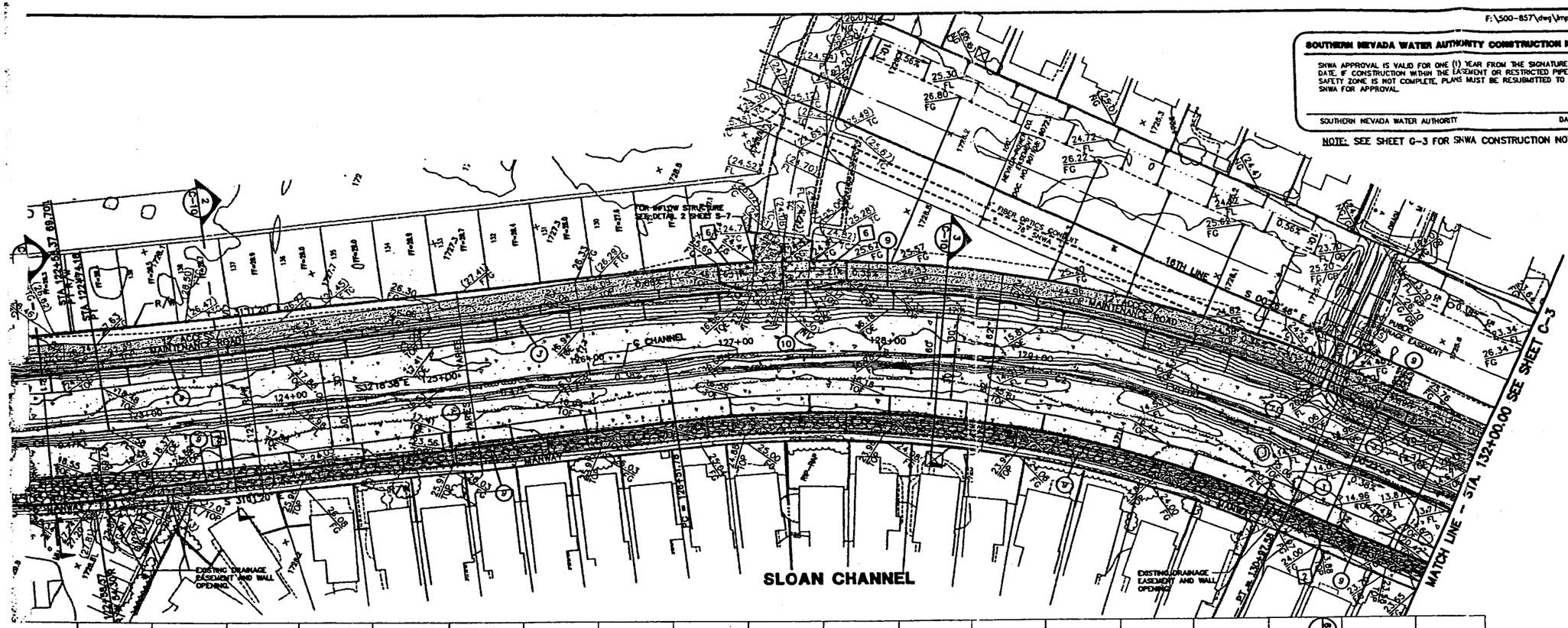
SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

SOUTHERN NEVADA WATER AUTHORITY DATE

NOTE: SEE SHEET G-3 FOR SNWA CONSTRUCTION NOTES.

NORTH SCALE 1" = 40'

40 0 40 80
SCALE FEET



CONSTRUCTION NOTES

(3) CONSTRUCT CHANNEL ACCESS STEPS (SEE DETAIL 11/S2)

(9) CONSTRUCT SLOPE PAVING (SEE DETAIL 3/C11)

(10) CONSTRUCT PIPE CONNECTION (SEE DETAIL 9/S2)

(11) CONSTRUCT RCB CONNECTION (SEE DETAIL 3/S7)

REMOVAL NOTES

[2] REMOVE AND SALVAGE RIPRAP

[6] REMOVE EXISTING CONCRETE SPILLWAY

CHANNEL ℄ CURVE TABLE

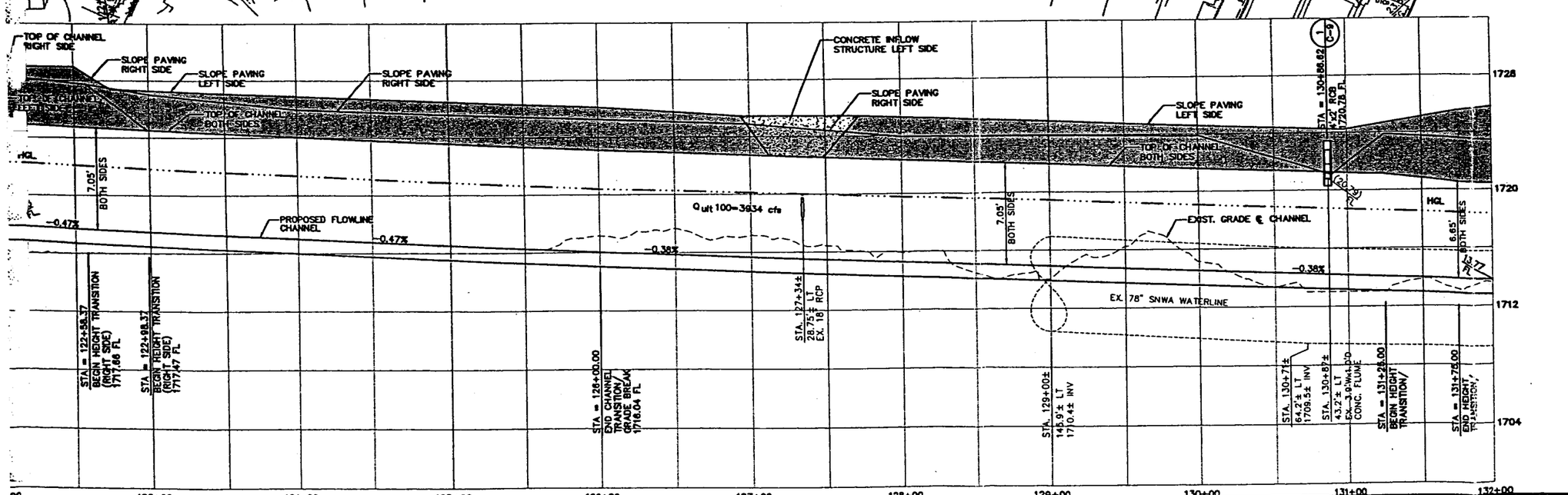
CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	TANGENT
C1	27°20'55"	807.70'	385.53'	196.51'
C2	31°55'41"	800.00'	445.80'	228.85'

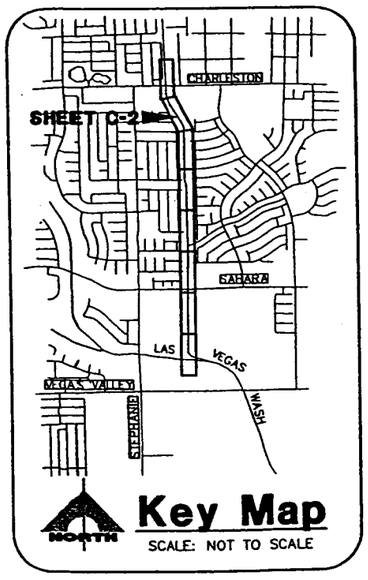
NOTE:

SEE SHEETS C-13 AND C-14 FOR FENCING/POST & CABLE RAILING PLAN.

Call before you Dig. 1-800-227-2600

CALL BEFORE YOU DO OVERHEAD 1-702-593-6111





Key Map

SCALE: NOT TO SCALE

DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL

PLAN AND PROFILE

STA. 122+00.00 TO STA. 132+00.00

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER - STATE OF NEVADA NOEL C. LAUGHLIN No. 10165 CIVIL 3-11-04

PROJECT No: 500.857 DRAWN BY: DWJ
DESIGNED BY: CHECKED BY:
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

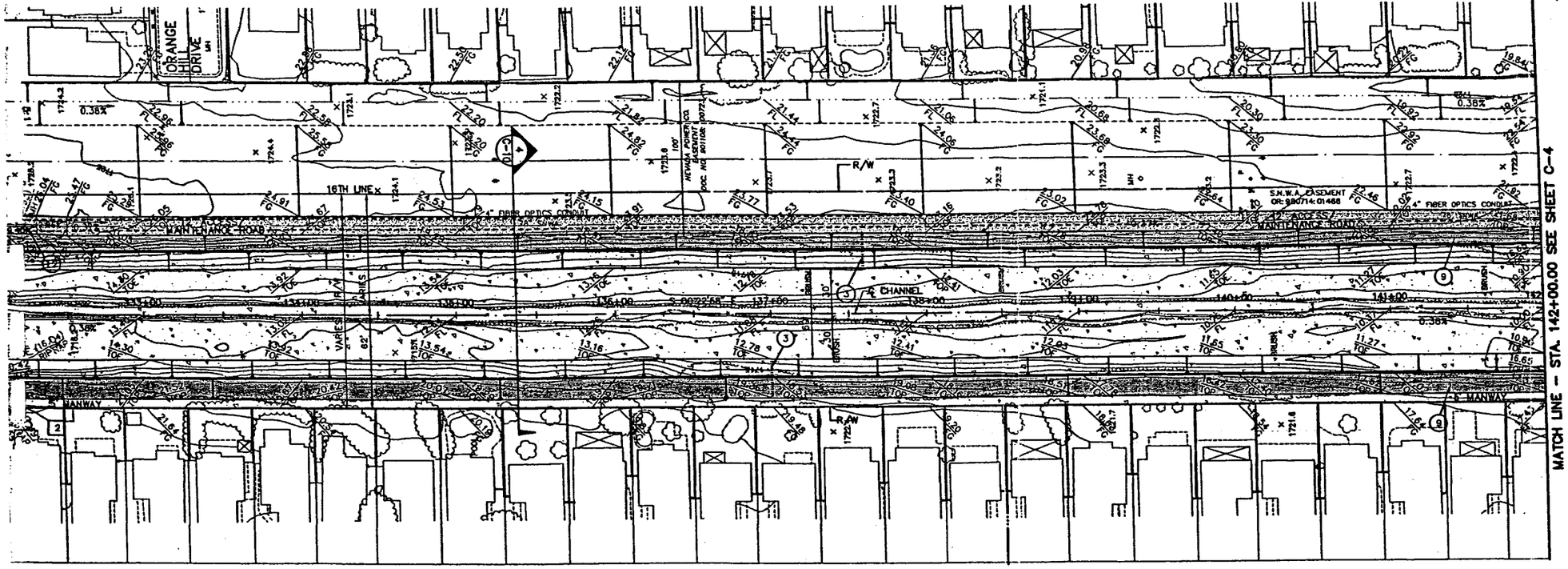
SCALE	
HORIZ:	1" = 40'
VERT:	1" = 4'
FIELD BOOK	

L-1759

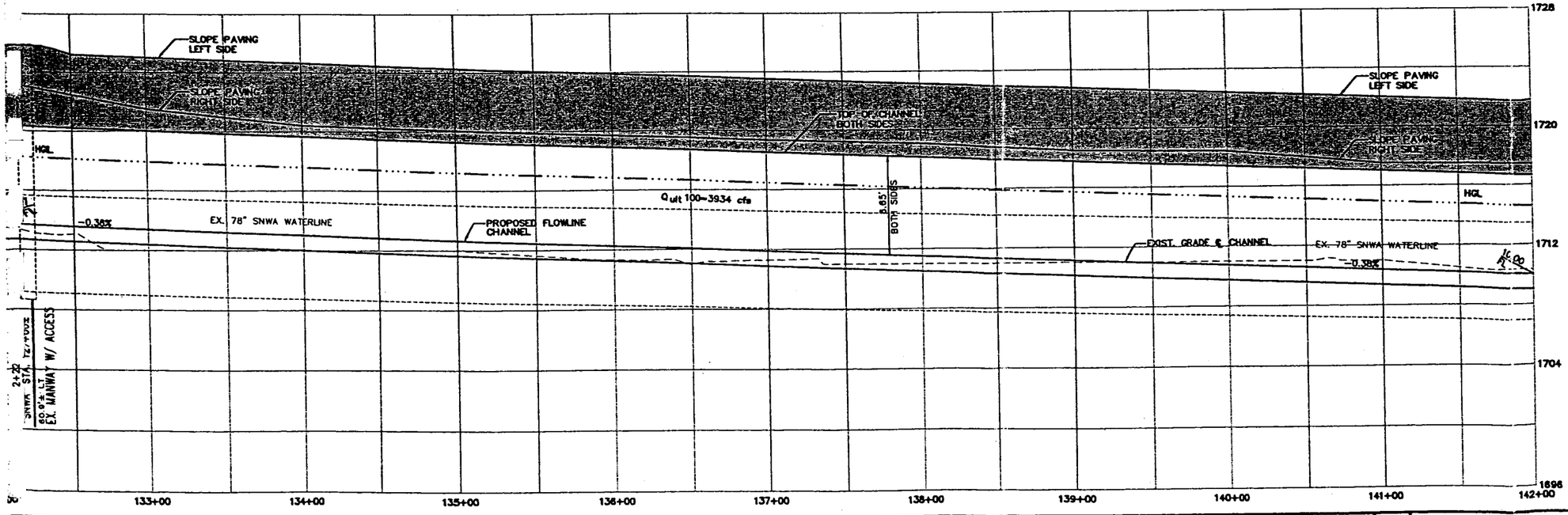
DRAWING NO. C-2

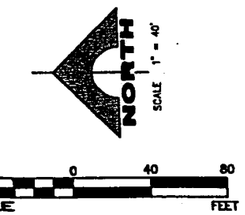
SHT. 8 OF 30

F:\500-857\dwg\improv\sc_c03.dwg 03-11-04 12:08:40 RBlanchard



SLOAN CHANNEL





CONSTRUCTION NOTES

(3) CONSTRUCT CHANNEL ACCESS STEPS (SEE DETAIL 11/S2)

(9) CONSTRUCT SLOPE PAVING (SEE DETAIL 3/C11)

(12) CONTRACTOR SHALL FIELD VERIFY AND FLAG ALL SNWA APPURTENANCES AND PROTECT FROM DAMAGE AND BEING BURIED.

REMOVAL NOTES

[2] REMOVE AND SALVAGE RIPRAP

NOTE:

SEE SHEETS C-13 AND C-14 FOR FENCING/POST & CABLE RAILING PLAN.

SOUTHERN NEVADA WATER AUTHORITY CONSTRUCTION NOTES

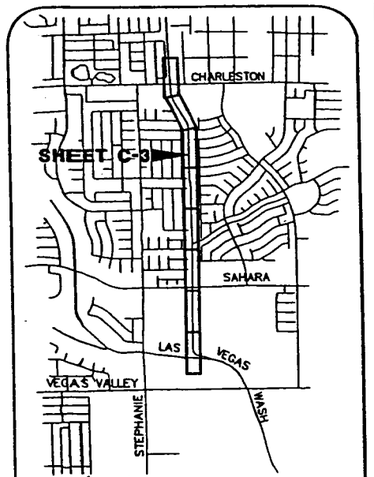
SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

SOUTHERN NEVADA WATER AUTHORITY DATE

NOTE: SEE SHEET G-3 FOR SNWA CONSTRUCTION NOTES.

Avoid cutting underground utility lines. It's costly.
Call before you Dig.
1-800-227-2600
UNDERGROUND SERVICE (NVA)

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY
CALL BEFORE YOU DO OVERHEAD
1-702-593-6111



Key Map
SCALE: NOT TO SCALE

DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
PLAN AND PROFILE
STA. 132+00.00 TO STA. 142+00.00
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER STATE OF NEVADA ROEL C. LAUGHLIN Exp. 12/31/2005 CIVIL No. 10165

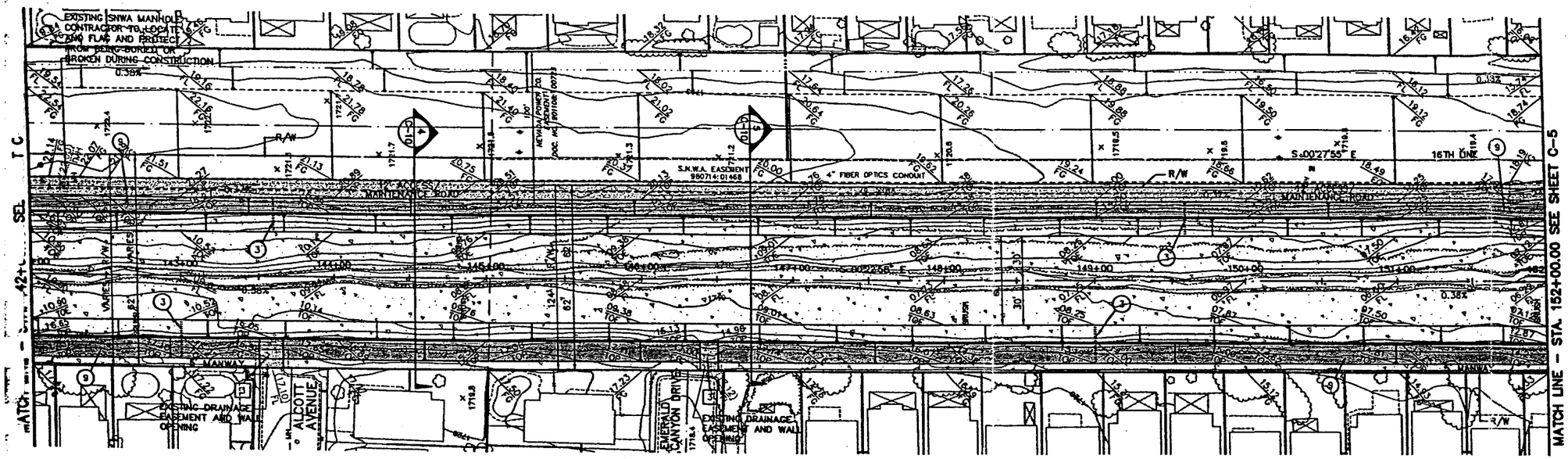
PROJECT No: 500.857 DRAWN BY: DVJ
DESIGNED BY: CHECKED BY:
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2298

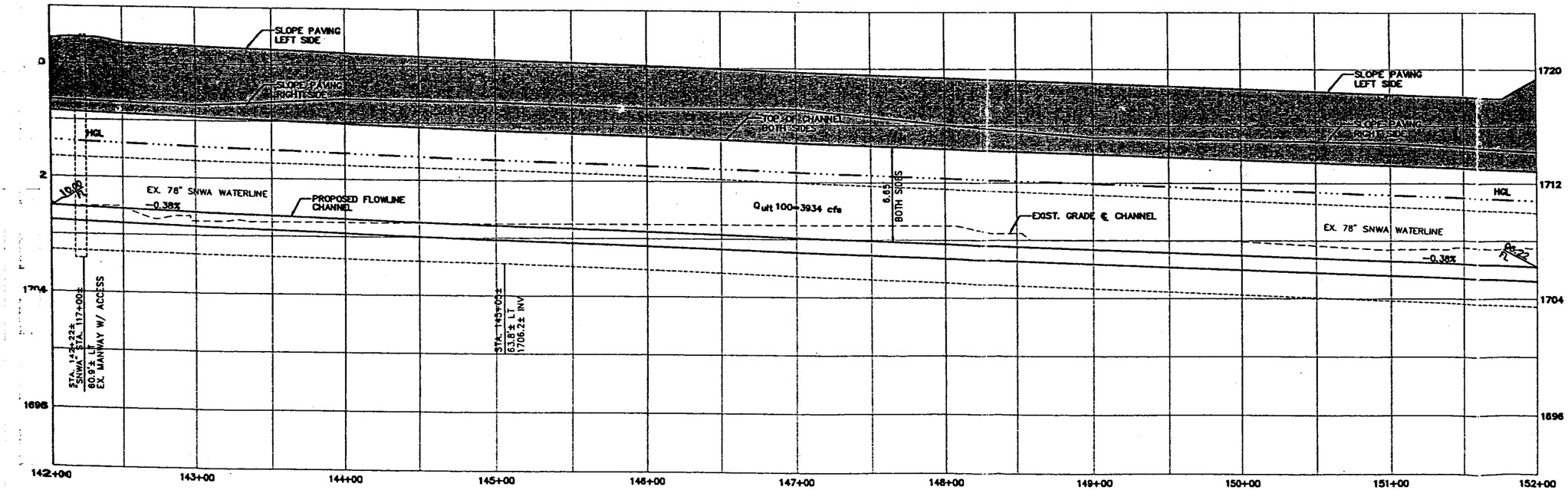
SCALE	
HORIZ:	1" = 40'
VERT:	1" = 4'
FIELD BOOK	

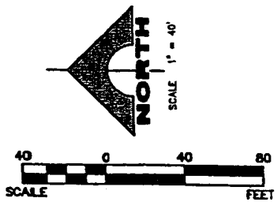
L-1759
DRAWING NO. C-3
SHT. 9 OF 30

F:\500-857\dwg\improv\sc_c04.dwg 03-11-04 12:09:48 RBlanchard



SLOAN CHANNEL





CONSTRUCTION NOTES

(3) CONSTRUCT CHANNEL ACCESS STEPS (SEE DETAIL 11/S2)

(9) CONSTRUCT SLOPE PAVING (SEE DETAIL 3/C11)

REMOVAL NOTES

[3] REMOVE EXISTING CONCRETE SPLASH PAD

NOTE:

SEE SHEETS C-13 AND C-14 FOR FENCING/POST & CABLE RAILING PLAN.

SOUTHERN NEVADA WATER AUTHORITY CONSTRUCTION NOTES

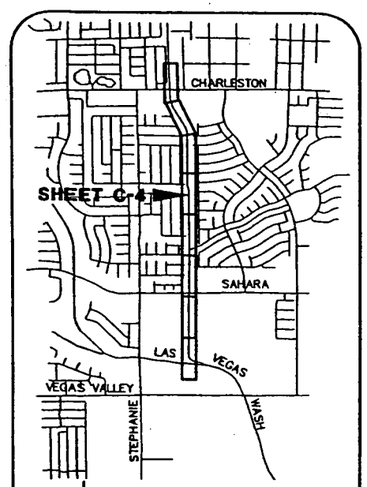
SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

SOUTHERN NEVADA WATER AUTHORITY DATE

NOTE: SEE SHEET G-3 FOR SNWA CONSTRUCTION NOTES.

Avoid cutting underground utility lines. It's costly. Call before you Dig. 1-800-227-2600 UNDERGROUND SERVICE (USA)

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-593-6111



NORTH **Key Map**

SCALE: NOT TO SCALE

DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL

PLAN AND PROFILE

STA. 142+00.00 TO STA. 152+00.00

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER – STATE OF NEVADA – NOEL L. LAUGHLIN – No. 10165 – 3-11-04

PROJECT No: 500/857 DRAWN BY: DWJ

DESIGNED BY: CHECKED BY:

APPROVED BY

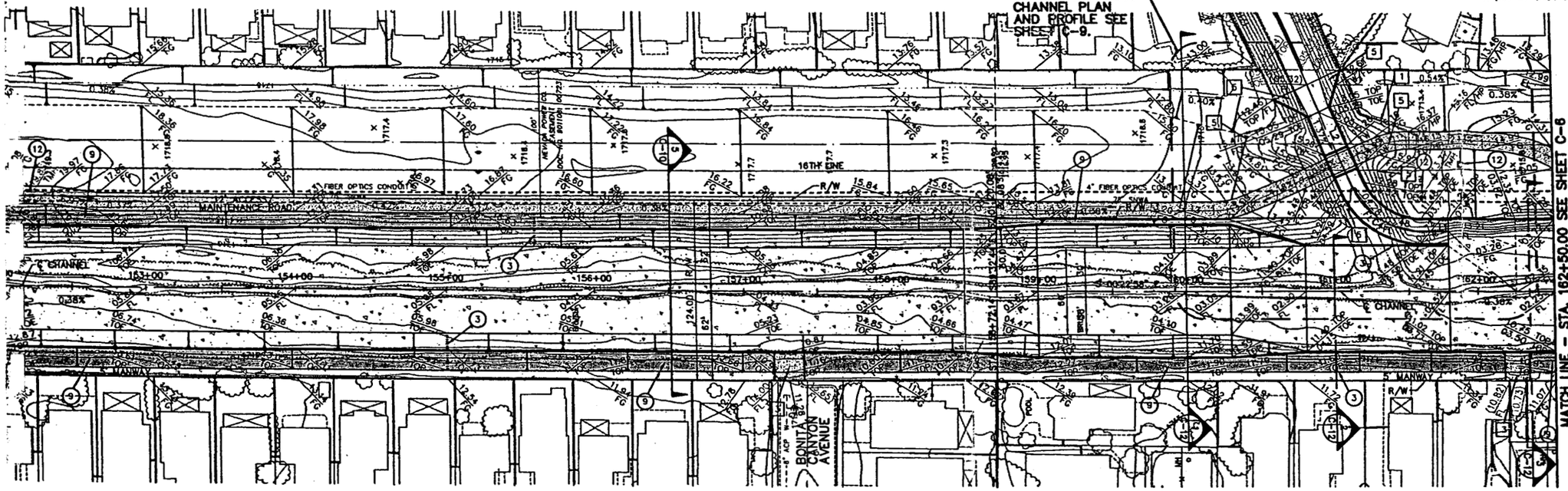
G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2290

SCALE	
HORIZ:	1" = 40'
VERT:	1" = 4'
FIELD BOOK	

L-1759

DRAWING NO. C-4

SHT. 10 OF 30



NORTH

SCALE 1" = 40'

40 0 40 80

SCALE FEET

CONSTRUCTION NOTES

(3) CONSTRUCT CHANNEL ACCESS STEPS (SEE DETAIL 11/S2)

(9) CONSTRUCT SLOPE PAVING (SEE DETAIL 3/C11)

(12) CONTRACTOR SHALL FIELD VERIFY AND FLAG ALL SNWA APPURTENANCES AND PROTECT FROM DAMAGE AND BEING BURIED.

REMOVAL NOTES

[1] REMOVE EXISTING BLOCK WALL AND FOOTING

[3] REMOVE EXISTING CONCRETE SPLASH PAD

[5] REMOVE EXISTING CHANNEL LINING.

NOTE:

SEE SHEETS C-13 AND C-14 FOR FENCING/POST & CABLE RAILING PLAN.

SOUTHERN NEVADA WATER AUTHORITY CONSTRUCTION NOTES

SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

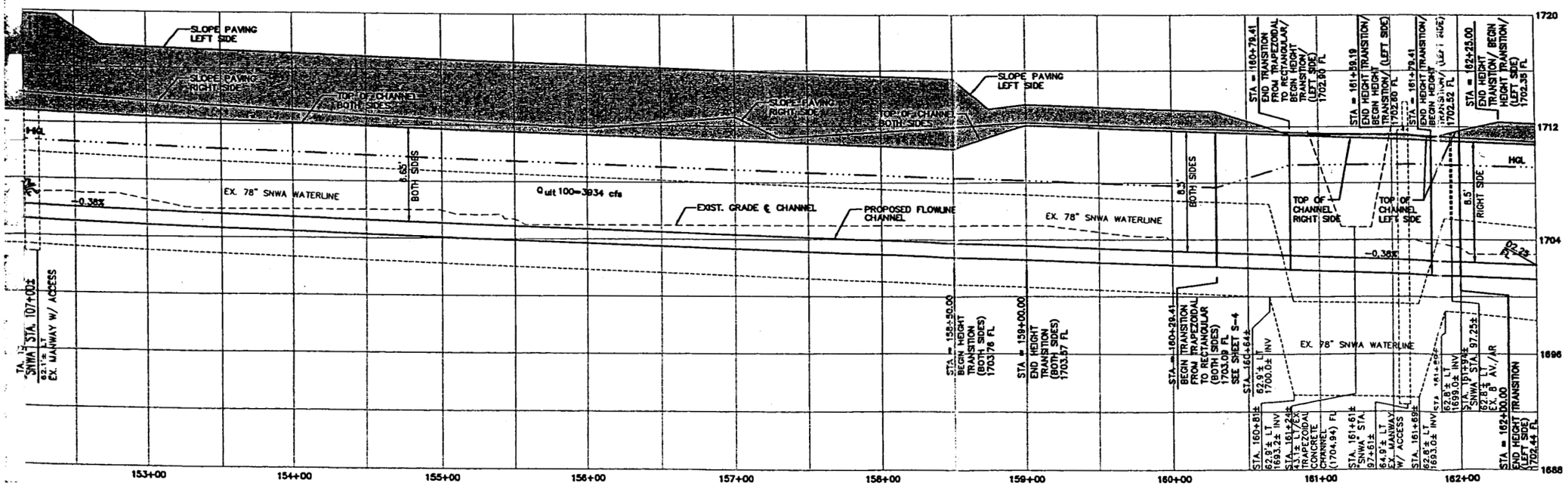
SOUTHERN NEVADA WATER AUTHORITY DATE

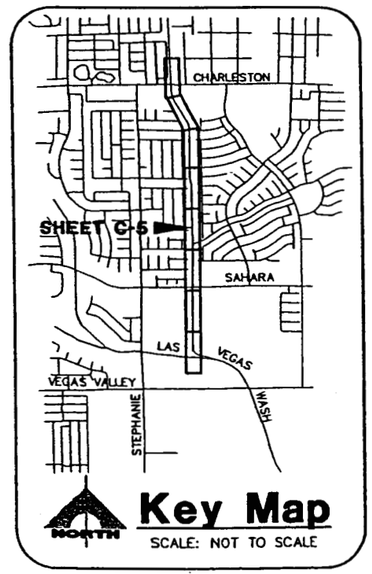
NOTE: SEE SHEET G-3 FOR SNWA CONSTRUCTION NOTES.

Avoid cutting underground utility lines. It's costly. Call before you Dig. 1-800-227-2600 (Underground Service Alert)

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD. 1-702-593-6111

SLOAN CHANNEL





Key Map

SCALE: NOT TO SCALE

NO.	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL

PLAN AND PROFILE

STA. 152+00.00 TO STA. 162+50.00

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER STATE OF NEVADA NOEL C. LAUGHLIN No. 10165 CIVIL 3-4-04

PROJECT No: 500-857 DRAWN BY: DW

DESIGNED BY: CHECKED BY:

APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE	
HORIZ:	1" = 40'
VERT:	1" = 4'
FIELD BOOK	

L-1759

DRAWING NO. C-5

SHT. 11 OF 30

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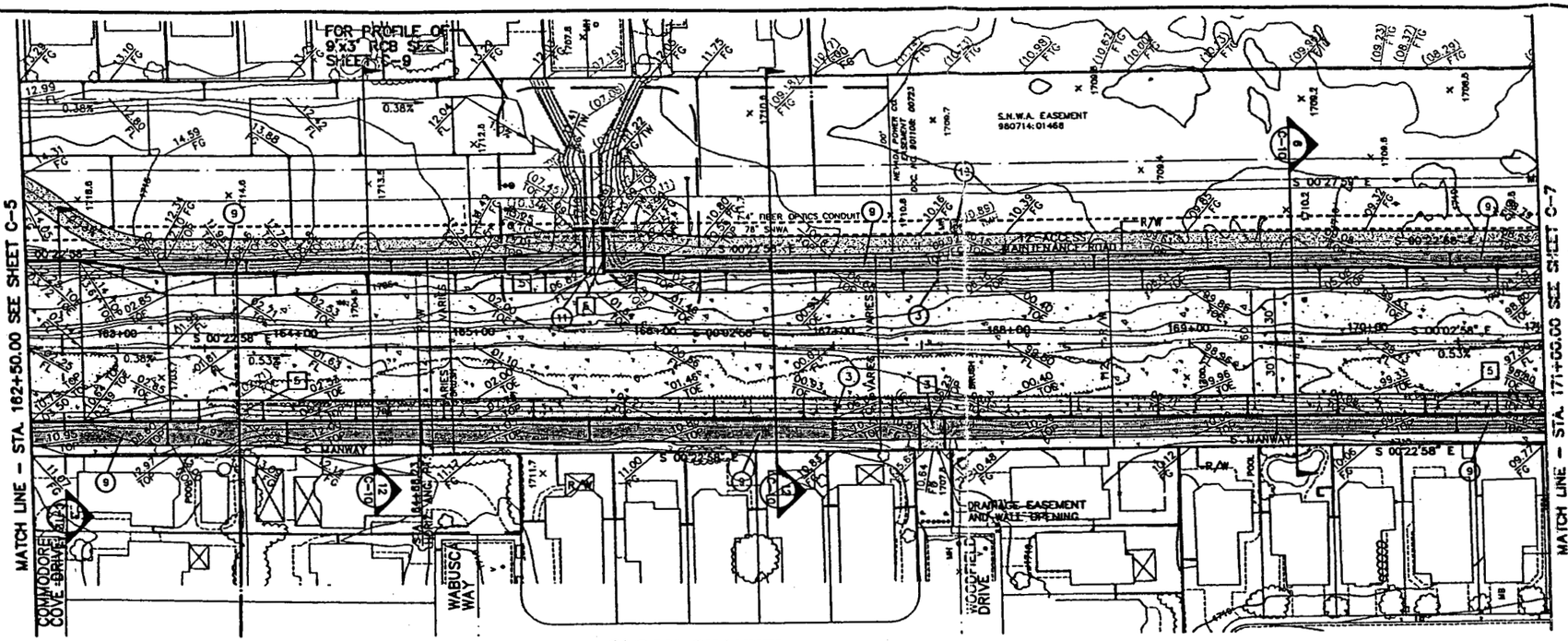
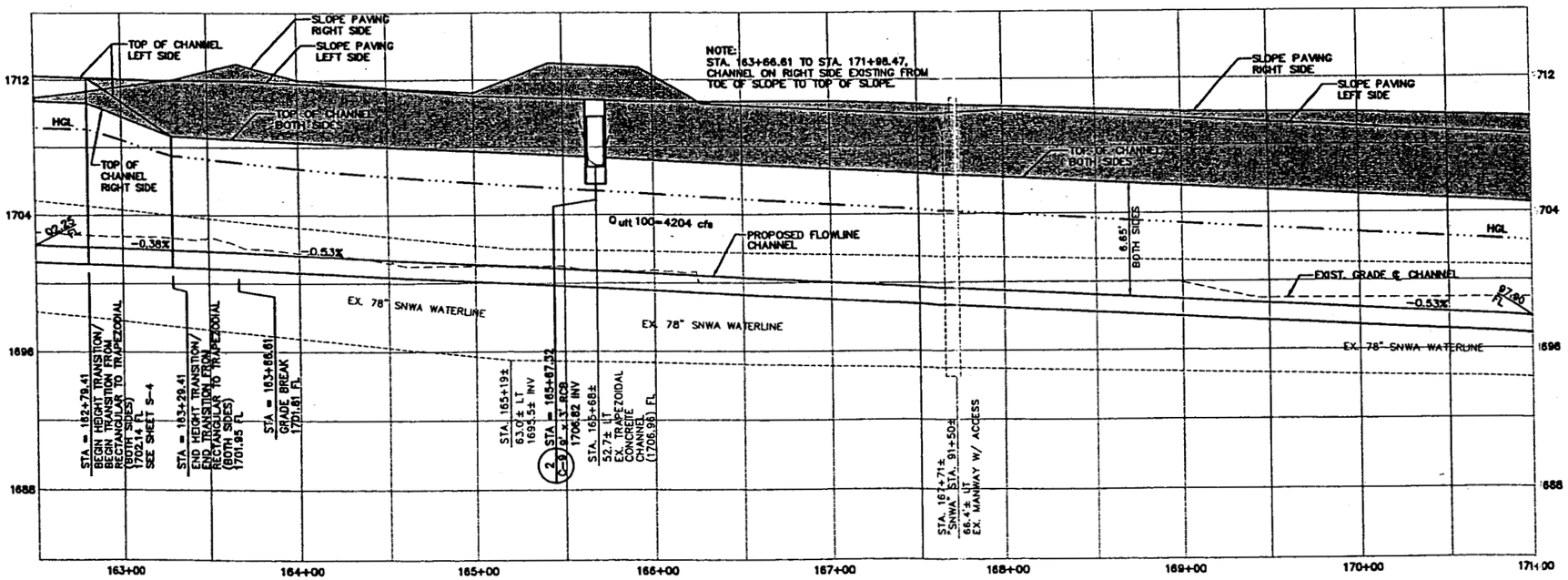


SLOAN CHANNEL



NORTH SCALE 1" = 40'

40 0 40 80 SCALE FEET

CONSTRUCTION NOTES

(3) CONSTRUCT CHANNEL ACCESS STEPS (SEE DETAIL 11/S2)

(9) CONSTRUCT SLOPE PAVING (SEE DETAIL 3/C11)

(11) CONSTRUCT RCB CONNECTION (SEE DETAIL 3/S7)

(12) CONTRACTOR SHALL FIELD VERIFY AND FLAG ALL SNWA APPURTENANCES AND PROTECT FROM DAMAGE AND BEING BURIED.

REMOVAL NOTES

[3] REMOVE EXISTING CONCRETE SPLASH PAD

[5] REMOVE EXISTING CHANNEL LINING.

NOTE:

SEE SHEETS C-13 AND C-14 FOR FENCING/POST & CABLE RAILING PLAN.

SOUTHERN NEVADA WATER AUTHORITY CONSTRUCTION NOTES

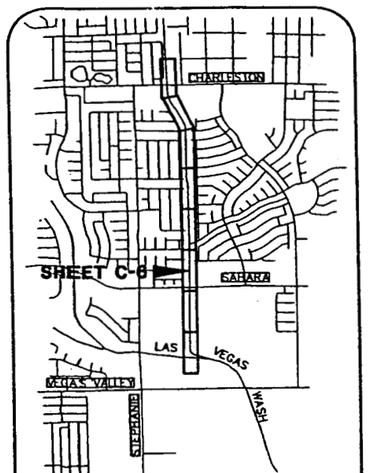
SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

SOUTHERN NEVADA WATER AUTHORITY DATE

NOTE: SEE SHEET G-3 FOR SNWA CONSTRUCTION NOTES.

Avoid cutting underground utility lines. It's easily. Call before you Dig. 1-800-227-2600 UNDERGROUND SERVICE (USA)

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-593-6111



NORTH **Key Map** SCALE: NOT TO SCALE

DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
PLAN AND PROFILE
STA. 162+50.00 TO STA. 171+00.00
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

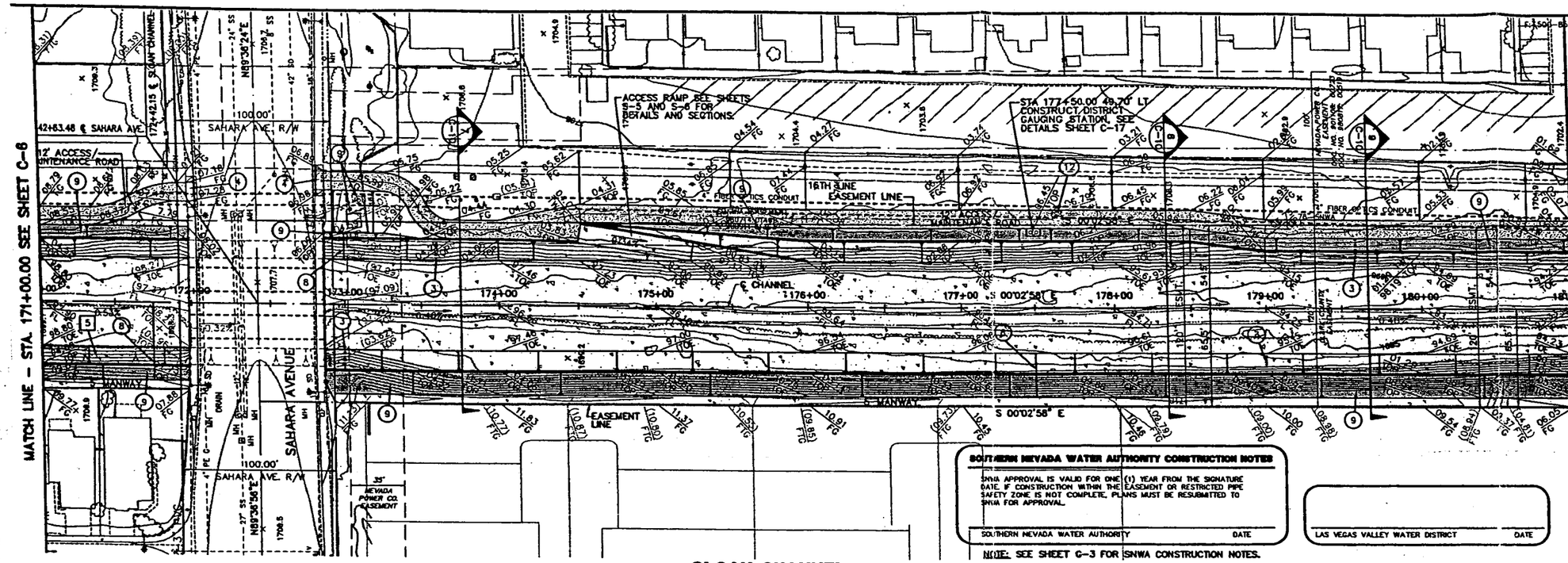
PROFESSIONAL ENGINEER STATE OF NEVADA NOEL C. LAUGHLIN No. 10165 3-11-04

PROJECT No: 500/57 DRAWN BY: DVJ
DESIGNED BY: CHECKED BY:
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
155 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE	
HORIZ:	1" = 40'
VERT:	1" = 4'
FIELD BOOK	

L-1759
DRAWING NO. C-6
SHT. 12 OF 30



SOUTHERN NEVADA WATER AUTHORITY CONSTRUCTION NOTES

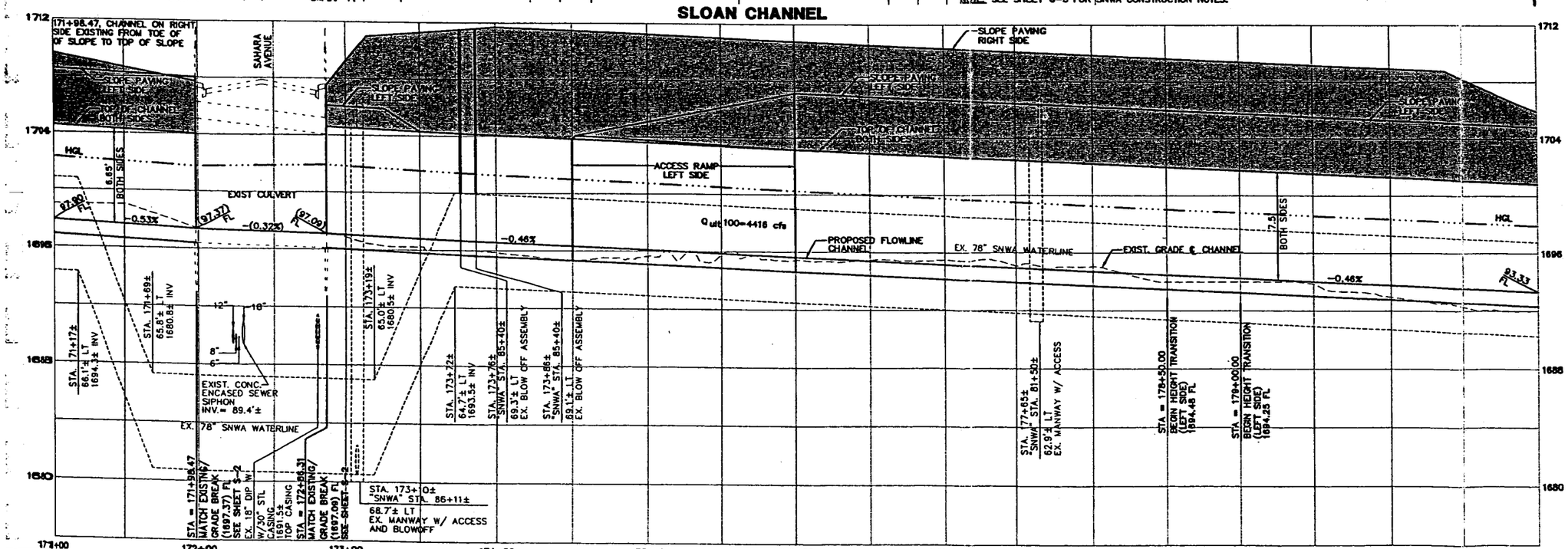
SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

SOUTHERN NEVADA WATER AUTHORITY DATE

LAS VEGAS VALLEY WATER DISTRICT DATE

NOTE: SEE SHEET C-3 FOR SNWA CONSTRUCTION NOTES.

SLOAN CHANNEL



NORTH

SCALE 1" = 40'

SCALE 40 0 40 80 FEET

CONSTRUCTION NOTES

3. CONSTRUCT CHANNEL ACCESS STEPS (SEE DETAIL 11/S2)
4. CONSTRUCT 12' DRIVEWAY PER STD. DWG. NO. 224
8. PAINTED STAFF GAUGE (SEE DETAIL 5/C11)
9. CONSTRUCT SLOPE PAVING (SEE DETAIL 3/C11)
12. CONTRACTOR SHALL FIELD VERIFY AND FLAG ALL SNWA APPURTENANCES AND PROTECT FROM DAMAGE AND BEING BURIED.

REMOVAL NOTES

5. REMOVE EXISTING CHANNEL LINING.

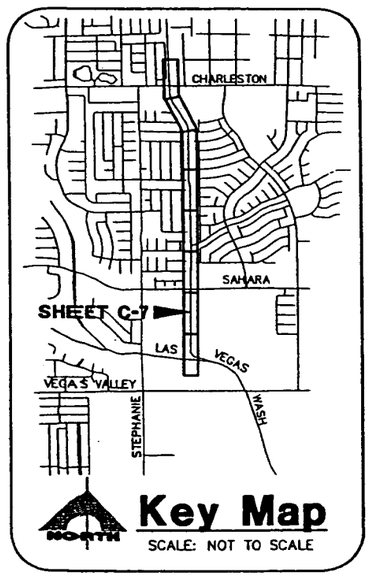
NOTE:

SEE SHEETS C-13 AND C-14 FOR FENCING/POST & CABLE RAILING PLAN.

CONTRACTOR TO EXERCISE EXTREME CARE WHEN EXCAVATING WITHIN 10 FEET (HORIZONTAL) OF SNWA WATERLINE. SNWA TO BE PRESENT DURING EXCAVATION WITHIN AFOREMENTIONED LIMITS.

Call before you Dig. 1-800-227-2600

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-593-6111



Key Map

SCALE: NOT TO SCALE

E	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
PLAN AND PROFILE
STA. 171+00.00 TO STA. 181+00.00
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROJECT No: 500.857 DRAWN BY: DVJ
DESIGNED BY: CHECKED BY:
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
159 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: 1" = 40'
VERT: 1" = 4'
FIELD BOOK

L-1759
DRAWING NO. C-7
SHT. 13 OF 30

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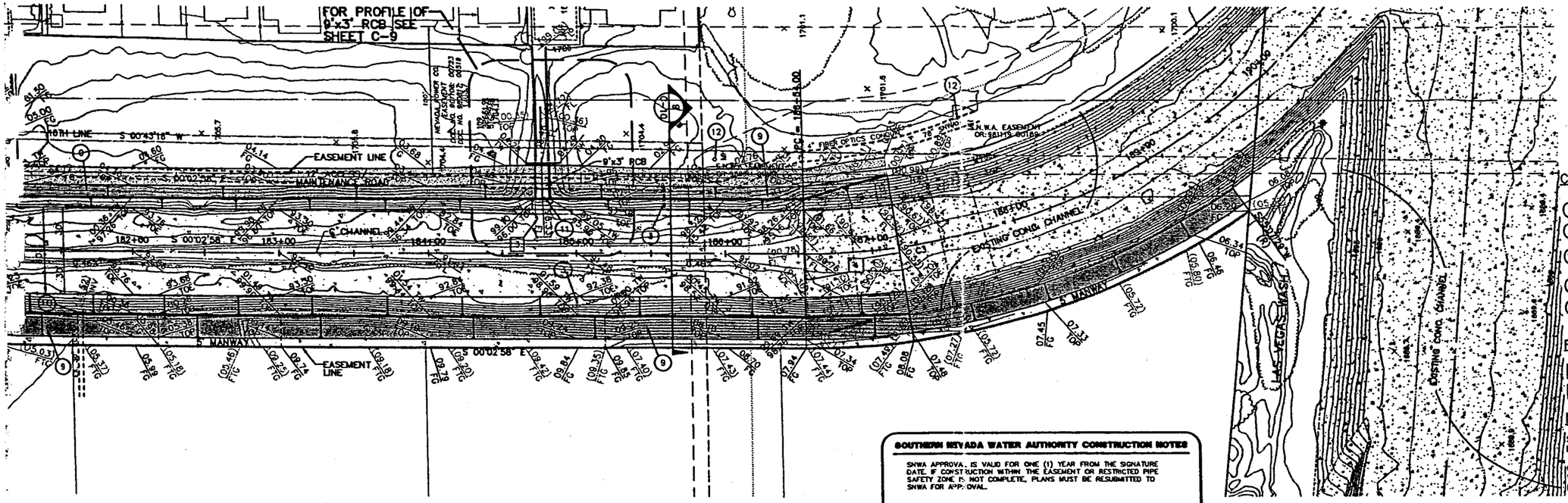
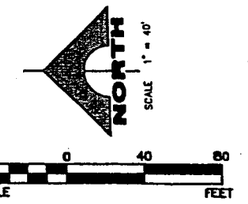




CONSTRUCTION NOTES

(3) CONSTRUCT CHANNEL ACCESS STEPS (SEE DETAIL 11/S2)
(9) CONSTRUCT SLOPE PAVING (SEE DETAIL 3/C11)
(10) CONSTRUCT PIPE CONNECTION (SEE DETAIL 9/S2)
(11) CONSTRUCT RCB CONNECTION (SEE DETAIL J/S7)
(12) CONTRACTOR SHALL FIELD VERIFY AND FLAG ALL SNWA APPURTENANCES AND PROTECT FROM DAMAGE AND BEING BURIED.

REMOVAL NOTES

[3] REMOVE EXISTING CONCRETE SPLASH PAD
[4] REMOVE EXISTING 60 FT.± CHANNEL SECTION TO EXPANSION JOINT.

NOTE:

SEE SHEETS C-13 AND C-14 FOR FENCING/POST & CABLE RAILING PLAN.

CONTRACTOR TO EXERCISE EXTREME CARE WHEN EXCAVATING WITHIN 10 FEET (HORIZONTAL) OF SNWA WATERLINE. SNWA TO BE PRESENT DURING EXCAVATION WITHIN AFOREMENTIONED LIMITS.

SOUTHERN NEVADA WATER AUTHORITY CONSTRUCTION NOTES

SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

SOUTHERN NEVADA WATER AUTHORITY DATE

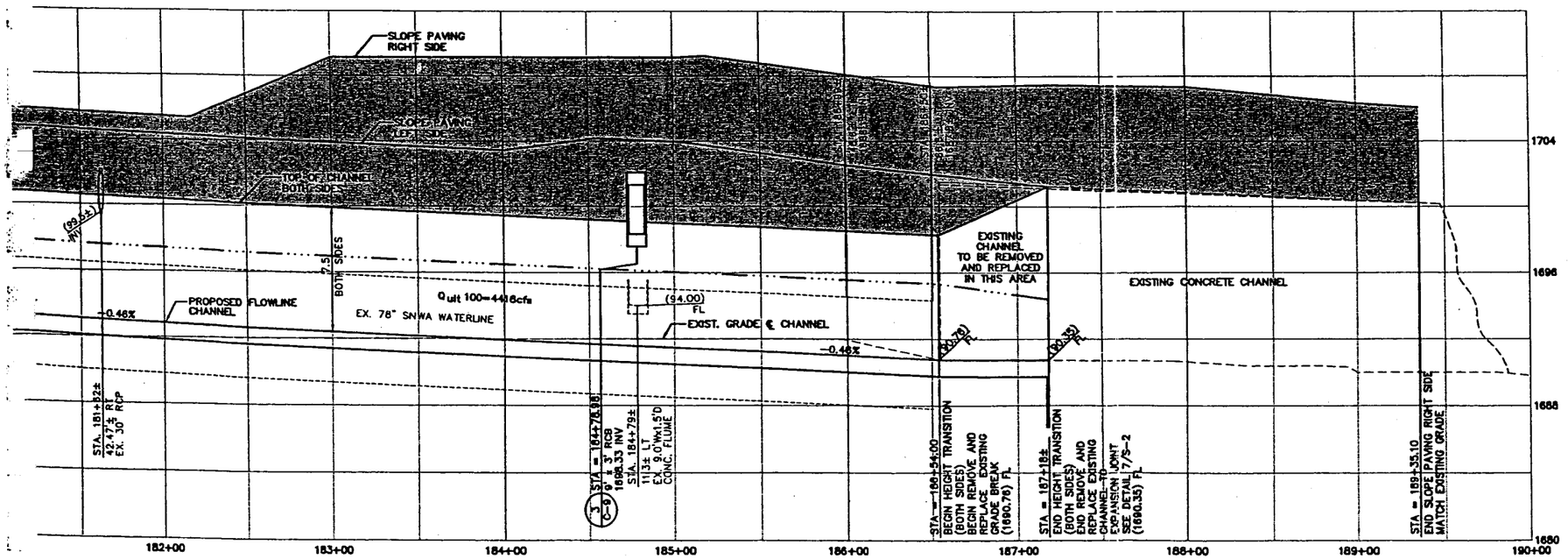
NOTE: SEE SHEET C-3 FOR SNWA CONSTRUCTION NOTES.

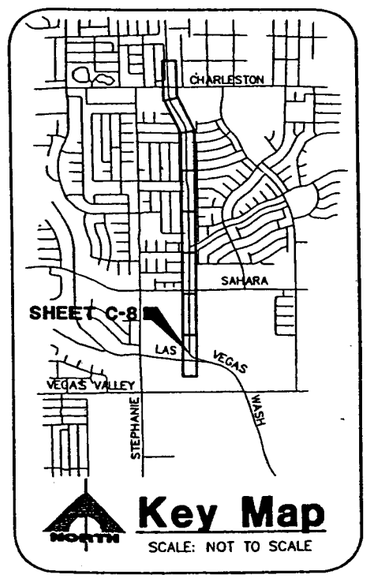
CHANNEL ℄ CURVE TABLE

CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	TANGENT
C3	51°57'23"	462.47'	419.37'	225.34'

Call before you Dig. 1-800-227-2600
1-702-593-6111

SLOAN CHANNEL





NO.	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL

PLAN AND PROFILE

STA. 181+00.00 TO STA. 190+00.00

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

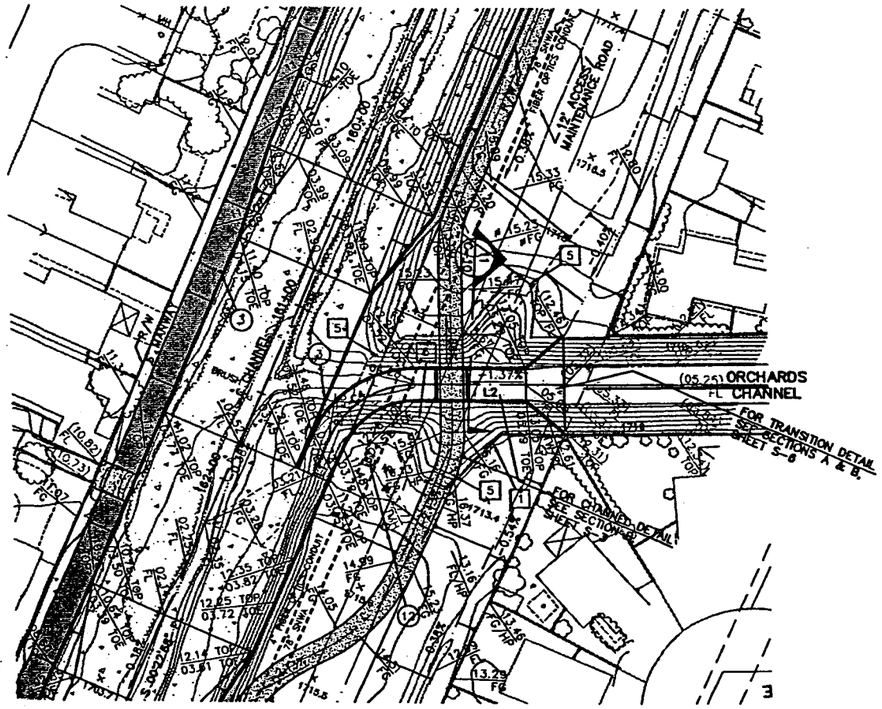
PROFESSIONAL ENGINEER STATE OF NEVADA NOEL C. LAUGHLIN No. 10165 Exp. 12/31/2005 CIVIL

PROJECT No: 500.857 DRAWN BY: DW
DESIGNED BY: CHECKED BY:
APPROVED BY:

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE	
HORIZ:	1" = 40'
VERT:	1" = 4'
FIELD BOOK	

L-1759
DRAWING NO. C-8
SHT. 14 OF 30


ORCHARDS FL CHANNEL
FOR TRANSITION DETAIL SEE SECTIONS A & B, SHEET S-6
FOR CHANNEL DETAIL SEE SECTION C, SHEET S-6
12' ACCESS MAINTENANCE ROAD
TOP OF CHANNEL BANK
TOE
FL
L1
L2
L3
L4
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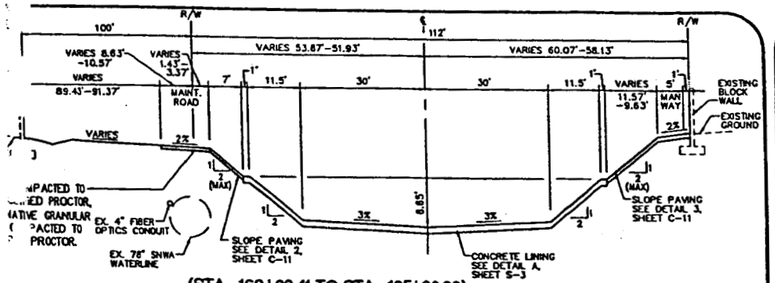
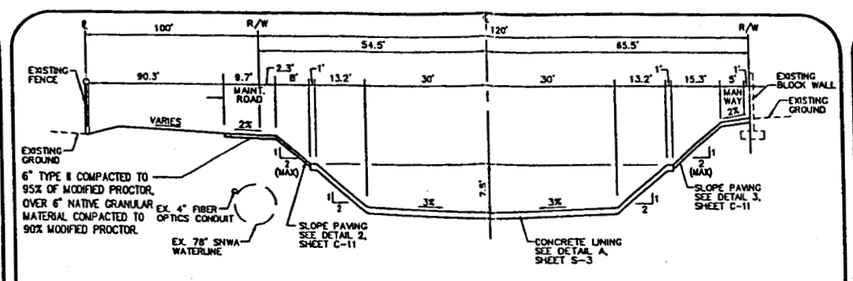


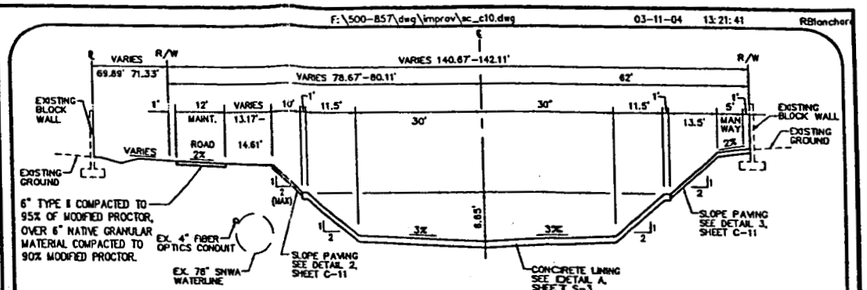
(STA. 163+29.41 TO STA. 165+00.00)
SECTION (STA. 166+27.37 TO STA. 167+50.00)
NOT TO SCALE

12 C-10



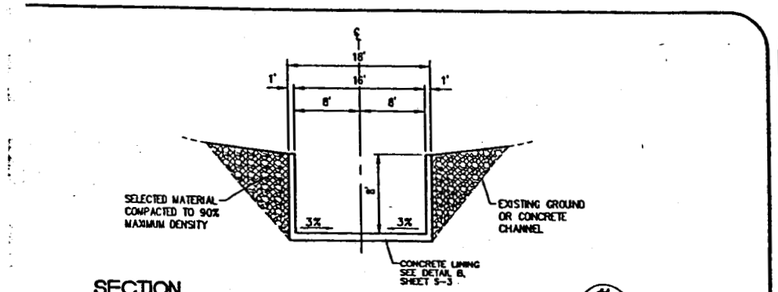
SECTION (STA. 176+00.00 TO STA. 178+50.00)
NOT TO SCALE

8 C-10



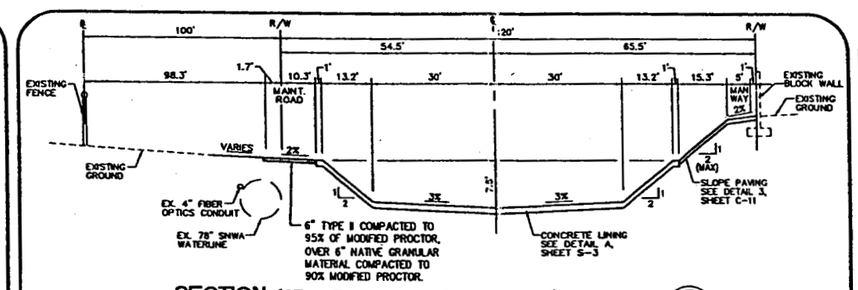
SECTION (STA. 132+09.50 TO STA. 145+03.96)
NOT TO SCALE

4 C-10



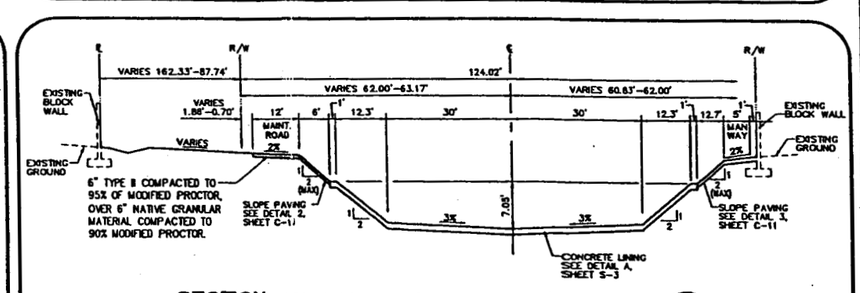
SECTION
NOT TO SCALE

11 C-10



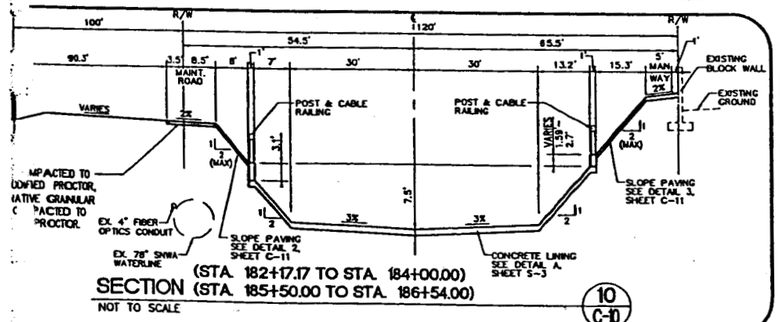
SECTION (STA. 173+70.00 TO STA. 174+00.00)
NOT TO SCALE

7 C-10



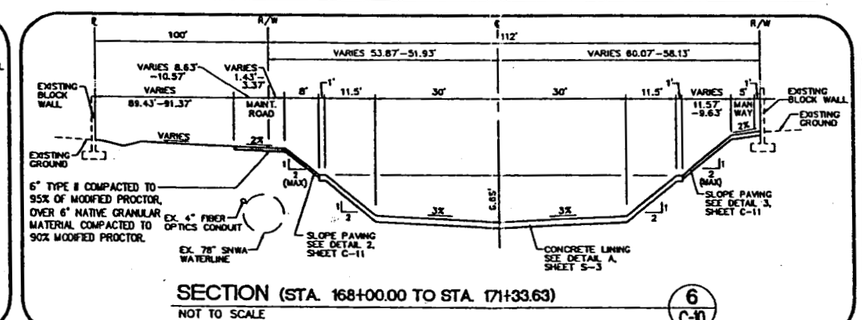
SECTION (STA. 126+67.44 TO STA. 130+80.42)
NOT TO SCALE

3 C-10



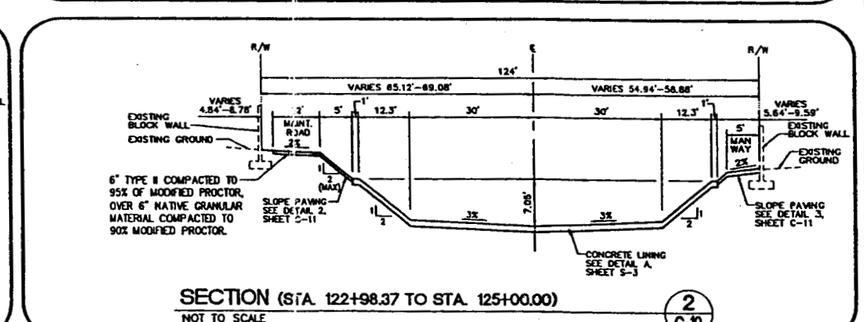
(STA. 182+17.17 TO STA. 184+00.00)
SECTION (STA. 185+50.00 TO STA. 186+54.00)
NOT TO SCALE

10 C-10



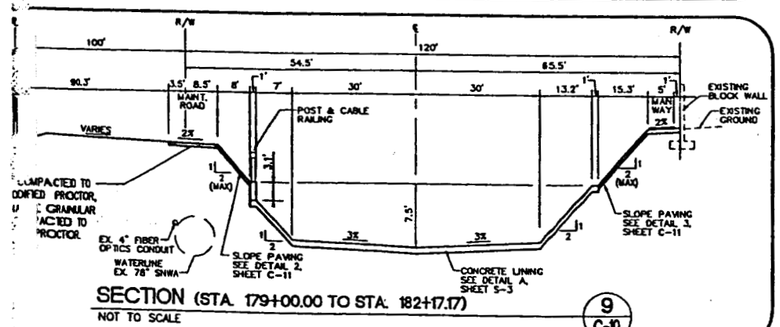
SECTION (STA. 168+00.00 TO STA. 171+33.63)
NOT TO SCALE

6 C-10



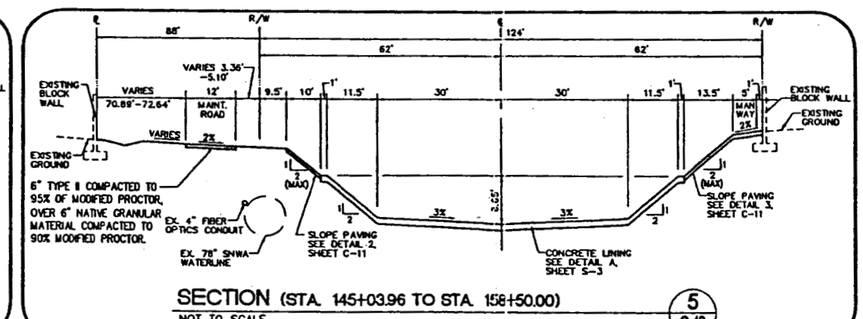
SECTION (STA. 122+98.37 TO STA. 125+00.00)
NOT TO SCALE

2 C-10



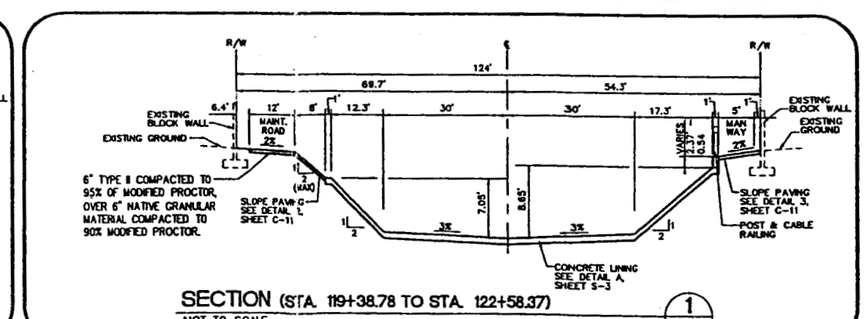
SECTION (STA. 179+00.00 TO STA. 182+17.17)
NOT TO SCALE

9 C-10



SECTION (STA. 145+03.96 TO STA. 158+50.00)
NOT TO SCALE

5 C-10



SECTION (STA. 119+38.78 TO STA. 122+58.37)
NOT TO SCALE

1 C-10

NO.	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
SECTIONS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

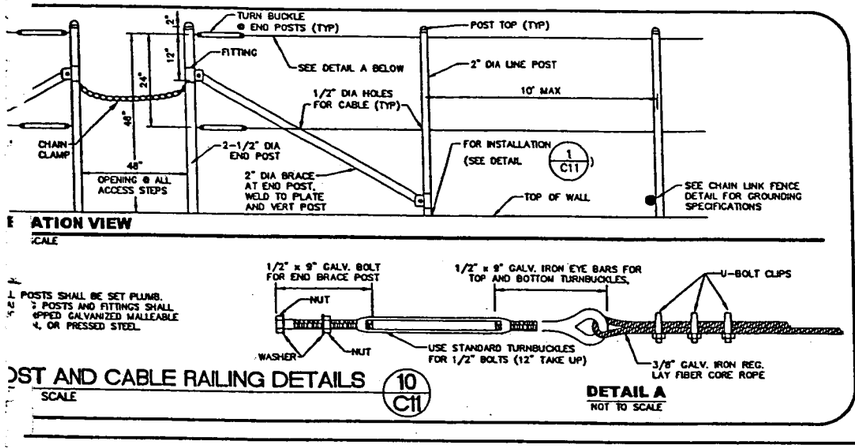
JOEL C. LAUGHLIN — No. 10165 — STATE OF NEVADA — REGISTERED PROFESSIONAL ENGINEER — Exp. 12/31/2005 CIVIL

PROJECT No: 500.857 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY

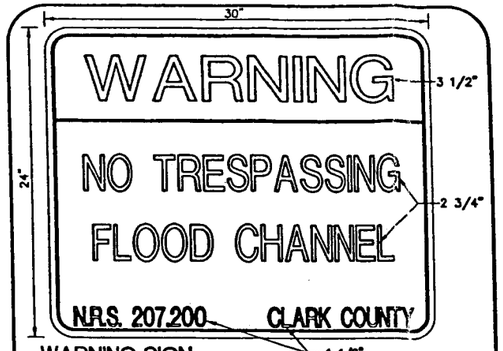
G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE (702) 804-2000 • FAX: (702) 804-2250

SCALE	
HORIZ:	NONE
VERT:	NONE
FIELD BOOK	

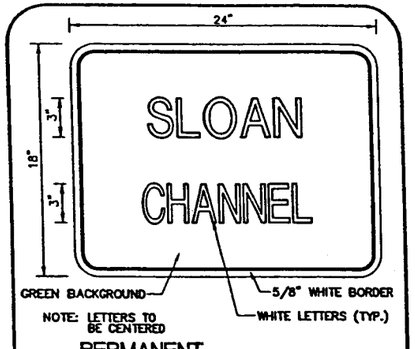
L-1759
DRAWING NO.
C-10
SHT. 16 OF 30



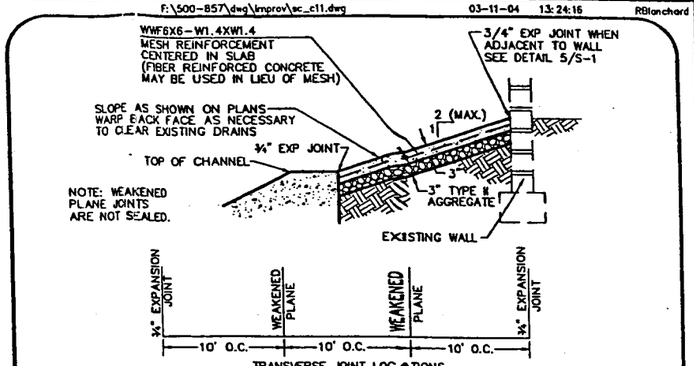
ST AND CABLE RAILING DETAILS (10/C11)
SCALE



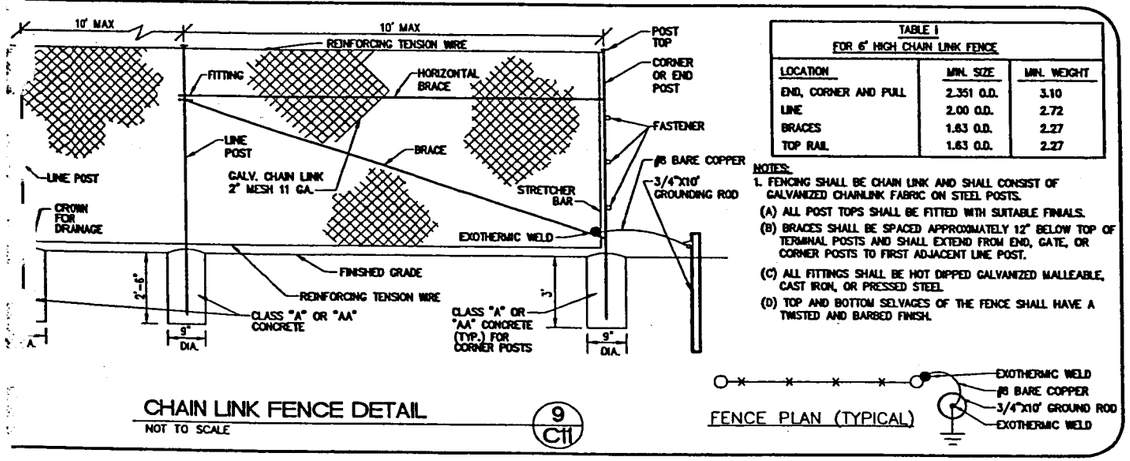
WARNING SIGN - FLOOD CHANNEL DETAIL (7/C11)
NOT TO SCALE



PERMANENT CHANNEL SIGN DETAIL (6/C11)
NOT TO SCALE



SLOPE PAVING DETAIL (3/C11)
NOT TO SCALE

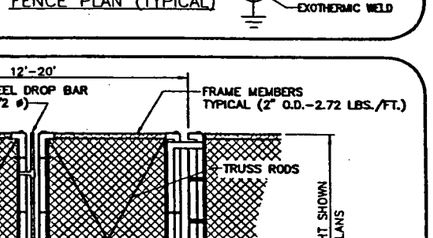


CHAIN LINK FENCE DETAIL (9/C11)
NOT TO SCALE

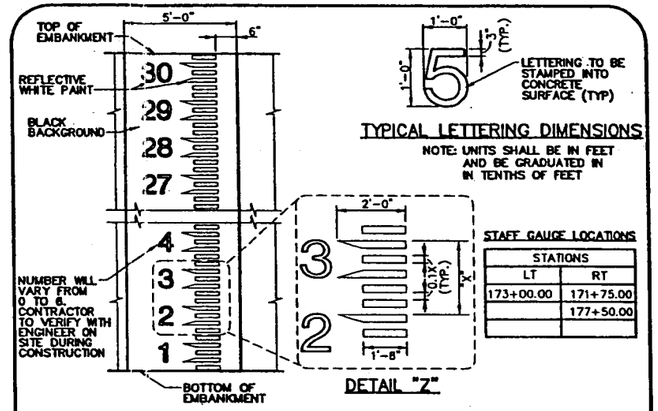
TABLE I
FOR 6' HIGH CHAIN LINK FENCE

LOCATION	MIN. SIZE	MIN. WEIGHT
END, CORNER AND PULL	2.351 O.D.	3.10
LINE	2.00 O.D.	2.72
BRACES	1.83 O.D.	2.27
TOP RAIL	1.83 O.D.	2.27

NOTES:
1. FENCING SHALL BE CHAIN LINK AND SHALL CONSIST OF GALVANIZED CHAINLINK FABRIC ON STEEL POSTS.
(A) ALL POST TOPS SHALL BE FITTED WITH SUITABLE FINIALS.
(B) BRACES SHALL BE SPACED APPROXIMATELY 12' BELOW TOP OF TERMINAL POSTS AND SHALL EXTEND FROM END, GATE, OR CORNER POSTS TO FIRST ADJACENT LINE POST.
(C) ALL FITTINGS SHALL BE HOT DIPPED GALVANIZED MALLEABLE, CAST IRON, OR PRESSED STEEL.
(D) TOP AND BOTTOM SELVAGES OF THE FENCE SHALL HAVE A TWISTED AND BARBED FINISH.



FENCE PLAN (TYPICAL)

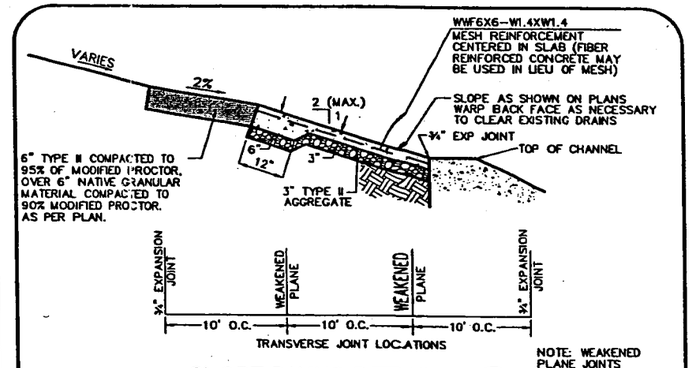


PAINTED STAFF GAUGE (5/C11)
NOT TO SCALE

TYPICAL LETTERING DIMENSIONS
NOTE: UNITS SHALL BE IN FEET AND BE GRADUATED IN IN TENTHS OF FEET

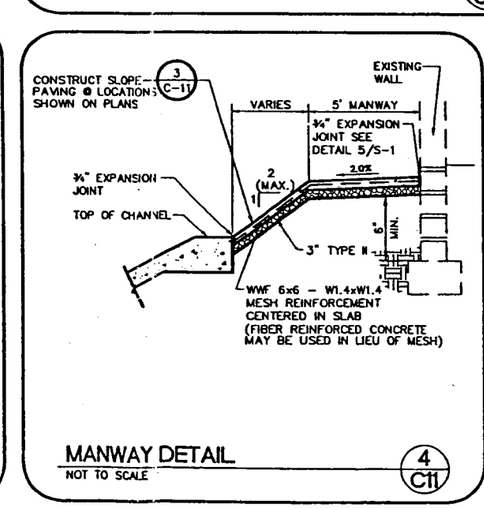
STAFF GAUGE LOCATIONS

STATIONS	
LT	RT
173+00.00	171+75.00
	177+50.00

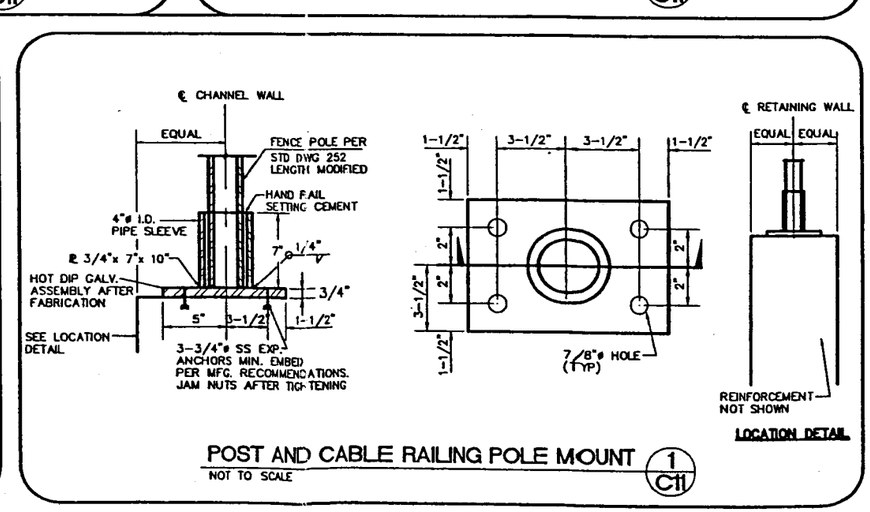


SLOPE PAVING DETAIL (2/C11)
NOT TO SCALE

CHAIN LINK GATE DETAIL (8/C11)
NOT TO SCALE



MANWAY DETAIL (4/C11)
NOT TO SCALE



POST AND CABLE RAILING POLE MOUNT (1/C11)
NOT TO SCALE

DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
DETAILS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

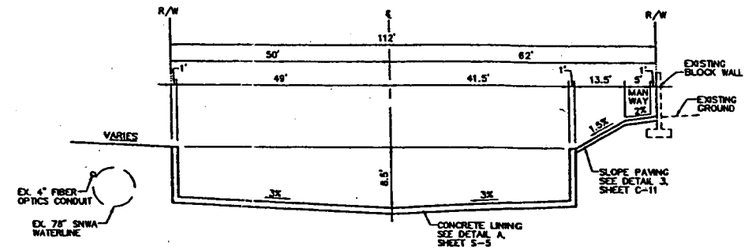
PROFESSIONAL ENGINEER STATE OF NEVADA NOEL LAUGHLIN No. 10185 CIVIL 3-11-04

PROJECT No: 500.857 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE (702) 804-2000 • FAX: (702) 804-2299

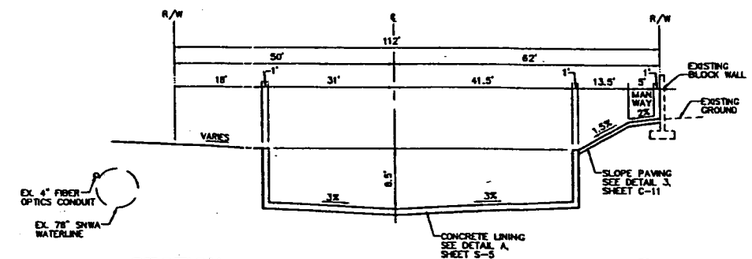
SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
C-11
SHT. 17 OF 30



SECTION (STA. 162+25.00 TO STA. 162+79.41)
NOT TO SCALE

3
C-12



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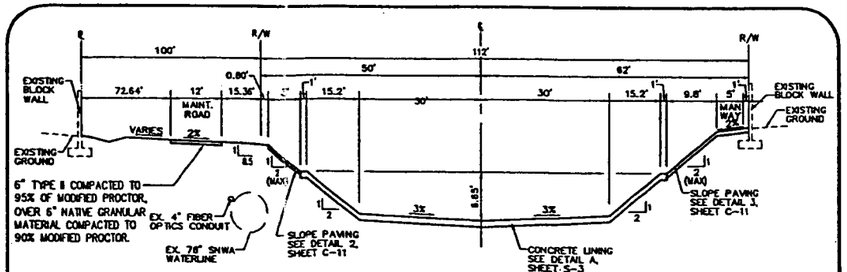
NOT TO SCALE

2
C-12



SECTION (STA. 159+00.00 TO STA. 160+29.41)
NOT TO SCALE

1
C-12

DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
SECTIONS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

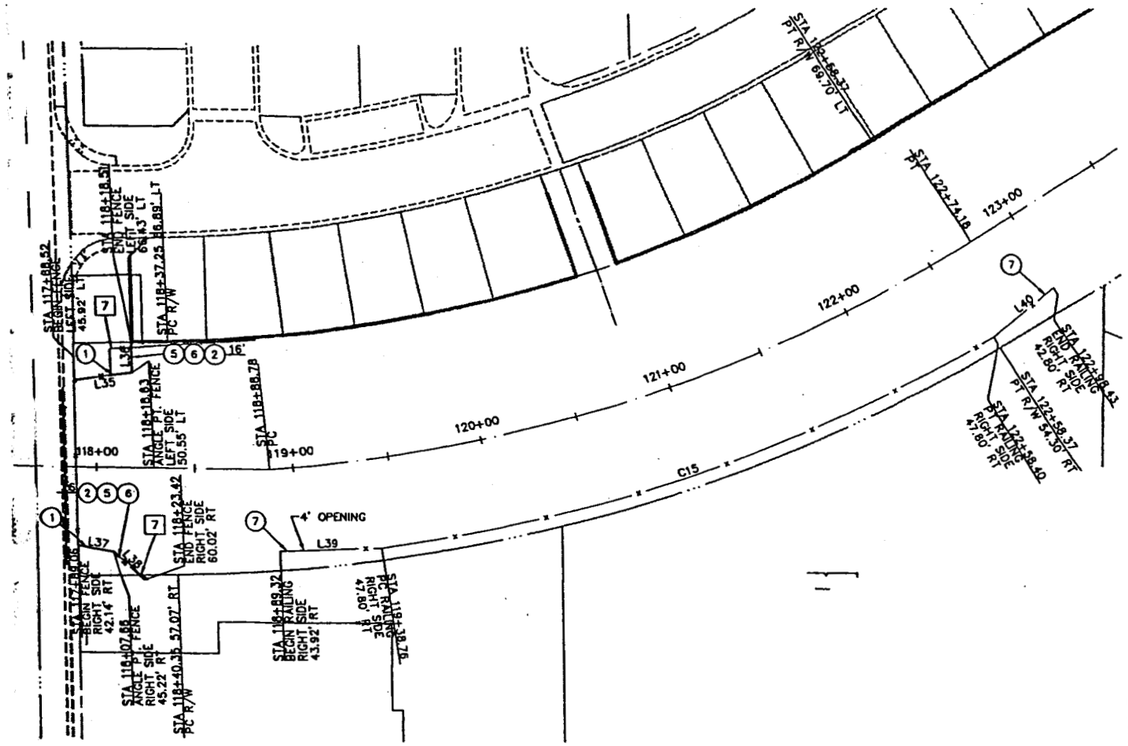
PROFESSIONAL ENGINEER STATE OF NEVADA — No. 10165 — 3-11-04

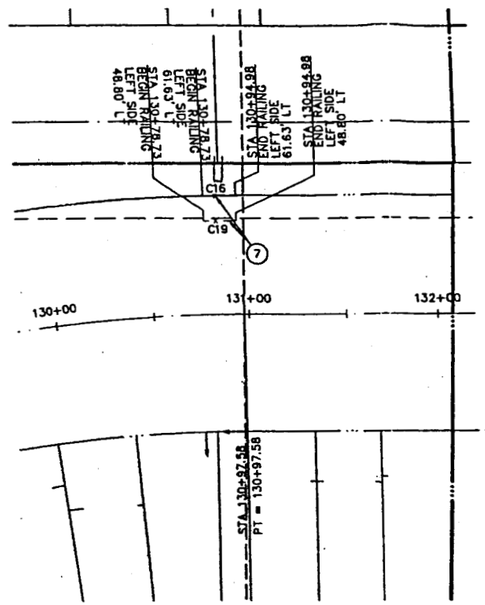
PROJECT No: 500-857 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY

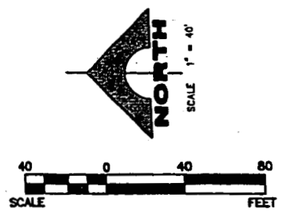
G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-3000 • FAX: (702) 804-3288

SCALE	
HORIZ:	NONE
VERT:	NONE
FIELD BOOK	

L-1759
DRAWING NO.
C-12
SHT. 18 OF 30







CONSTRUCTION NOTES

1. CONSTRUCT 6' CHAIN-LINK FENCE (SEE DETAIL 9/C11)
2. CONSTRUCT 6' CHAIN-LINK GATE (SEE DETAIL 8/C11) (WIDTH OF GATE CALLED OUT IN PLAN VIEW)
5. INSTALL SIGN (SEE DETAIL 6/C11)
6. INSTALL SIGN (SEE DETAIL 7/C11)
7. CONSTRUCT POST AND CABLE RAILING (SEE DETAIL 10/C11)

REMOVAL NOTES

7. REMOVE EXISTING CHAIN-LINK FENCE.

POST AND CABLE CURVE TABLE

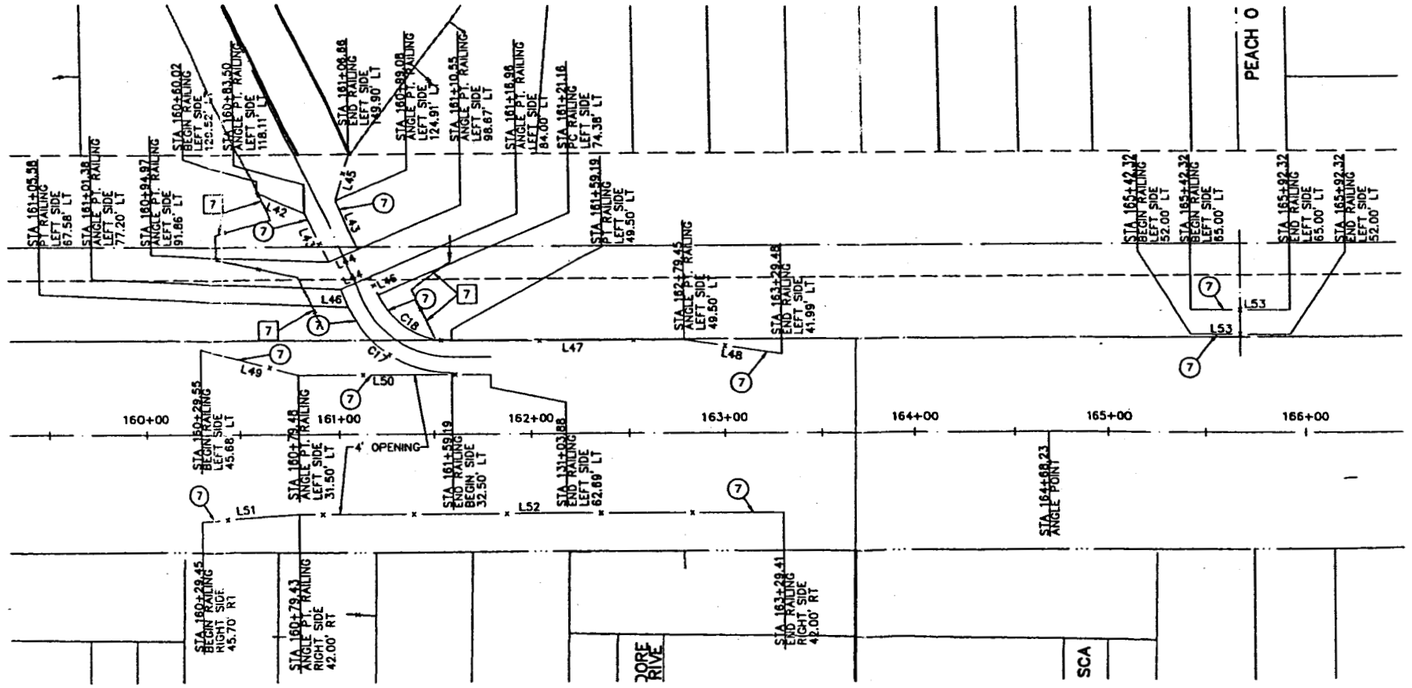
CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	TANGENT
C15	22°40'28"	855.50'	338.56'	171.52'
C16	01°09'50"	861.63'	17.50'	8.75'
C17	66°23'48"	58.50'	67.79'	38.28'
C18	66°23'48"	41.50'	48.09'	27.16'
C16	01°09'50"	848.80'	17.24'	8.62'

POST AND CABLE LINE TABLE

LINE TABLE		
LINE	BEARING	LENGTH
L39	N02°31'07"E	52.38'
L40	N39°02'59"W	41.25'
L42	N25°32'04"E	26.11'
L43	N66°00'50"E	28.64'
L44	N23°59'10"W	17.00'
L45	N73°30'24"W	26.11'
L46	N66°00'50"E	10.50'
L47	N00°22'58"W	120.26'
L48	N08°08'53"E	50.60'
L49	N15°28'19"E	51.91'
L50	N00°22'58"W	99.93'
L51	N04°36'54"W	50.12'
L52	N00°22'58"W	249.98'
L53	N00°02'58"W	50.00'

FENCE LINE TABLE

LINE TABLE		
LINE	BEARING	LENGTH
L35	N08°30'51"W	30.45'
L36	N89°33'09"E	16.00'
L37	N09°23'22"E	18.85'
L38	N43°12'16"E	21.62'



DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
FENCING/POST AND CABLE RAILING PLAN

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

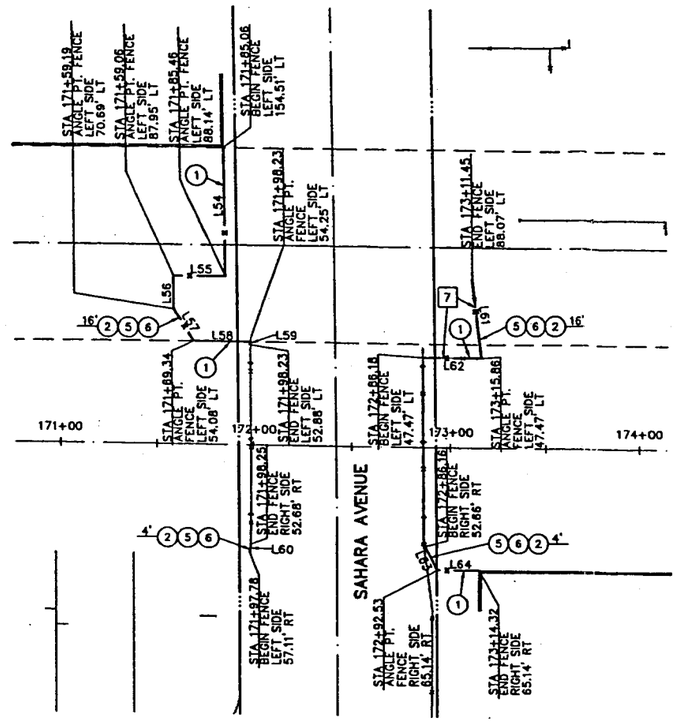
PROFESSIONAL ENGINEER STATE OF NEVADA ROBERT E. LAUGHLIN No. 10165 CIVIL 11-04

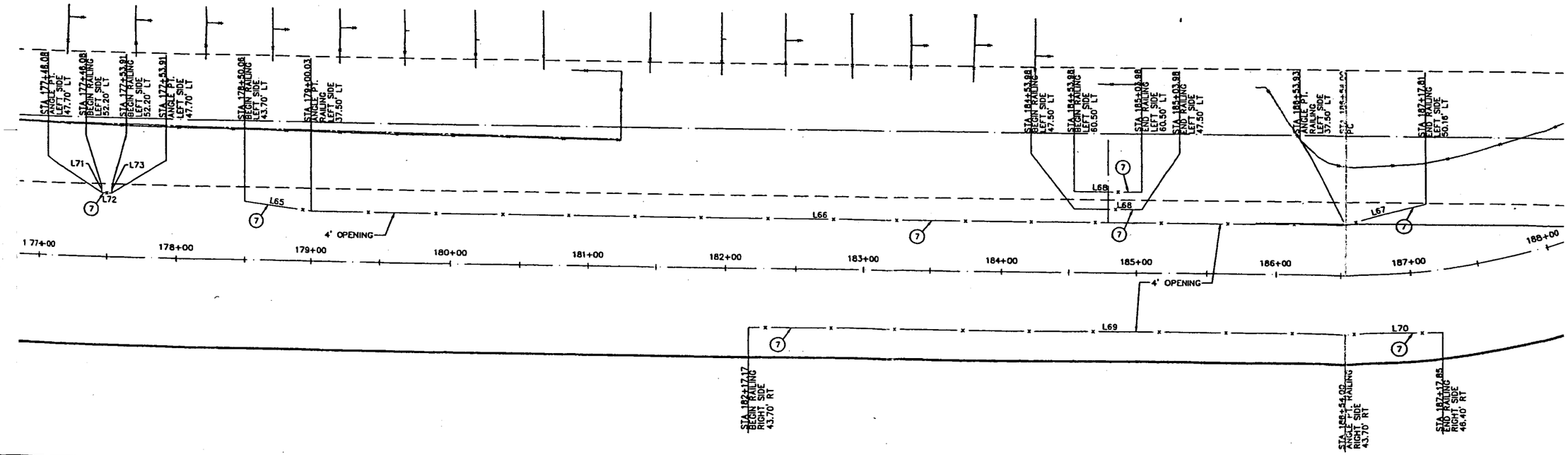
PROJECT No: 500.857 DRAWN BY: DM
DESIGNED BY: CHECKED BY:
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2286

SCALE
HORIZ: 1" = 40'
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
C-13
SHT. 19 OF 30



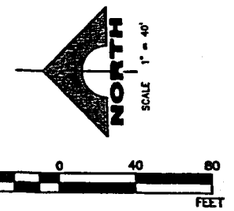


POST AND CABLE LINE TABLE

LINE TABLE		
LINE	BEARING	LENGTH
L65	N07°01'09"E	50.35'
L66	N00°02'58"W	753.89'
L67	N16°19'46"W	59.16'
L68	N00°02'58"W	50.00'
L69	N00°02'58"W	436.83'
L70	N01°48'00"W	70.06'
L71	S89°57'02"W	4.50'
L72	S00°02'58"E	7.83'
L73	S89°57'02"W	4.50'

FENCE LINE TABLE

LINE TABLE		
LINE	BEARING	LENGTH
L54	N89°36'24"E	66.37'
L55	N00°27'55"W	26.40'
L56	N89°32'05"E	17.26'
L57	N58°30'46"E	19.47'
L58	N00°22'58"W	28.89'
L59	N89°56'23"E	1.37'
L60	N83°53'00"W	4.45'
L61	N83°45'44"E	40.84'
L62	N00°02'58"W	29.68'
L63	N62°55'16"E	14.01'
L64	N00°02'58"W	21.80'



CONSTRUCTION NOTES

1. CONSTRUCT 6' CHAIN-LINK FENCE (SEE DETAIL 9/C11)
2. CONSTRUCT 6' CHAIN-LINK GATE (SEE DETAIL 8/C11) (WIDTH OF GATE CALLED OUT IN PLAN VIEW)
5. INSTALL SIGN (SEE DETAIL 6/C11)
6. INSTALL SIGN (SEE DETAIL 7/C11)
7. CONSTRUCT POST AND CABLE RAILING (SEE DETAIL 10/C11)

CONSTRUCTION NOTES

[7] REMOVE EXISTING CHAIN-LINK FENCE.

NO.	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
FENCING/POST AND CABLE RAILING PLAN

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER STATE OF NEVADA ROBERT LAUGHLIN No. 10185 CIVIL

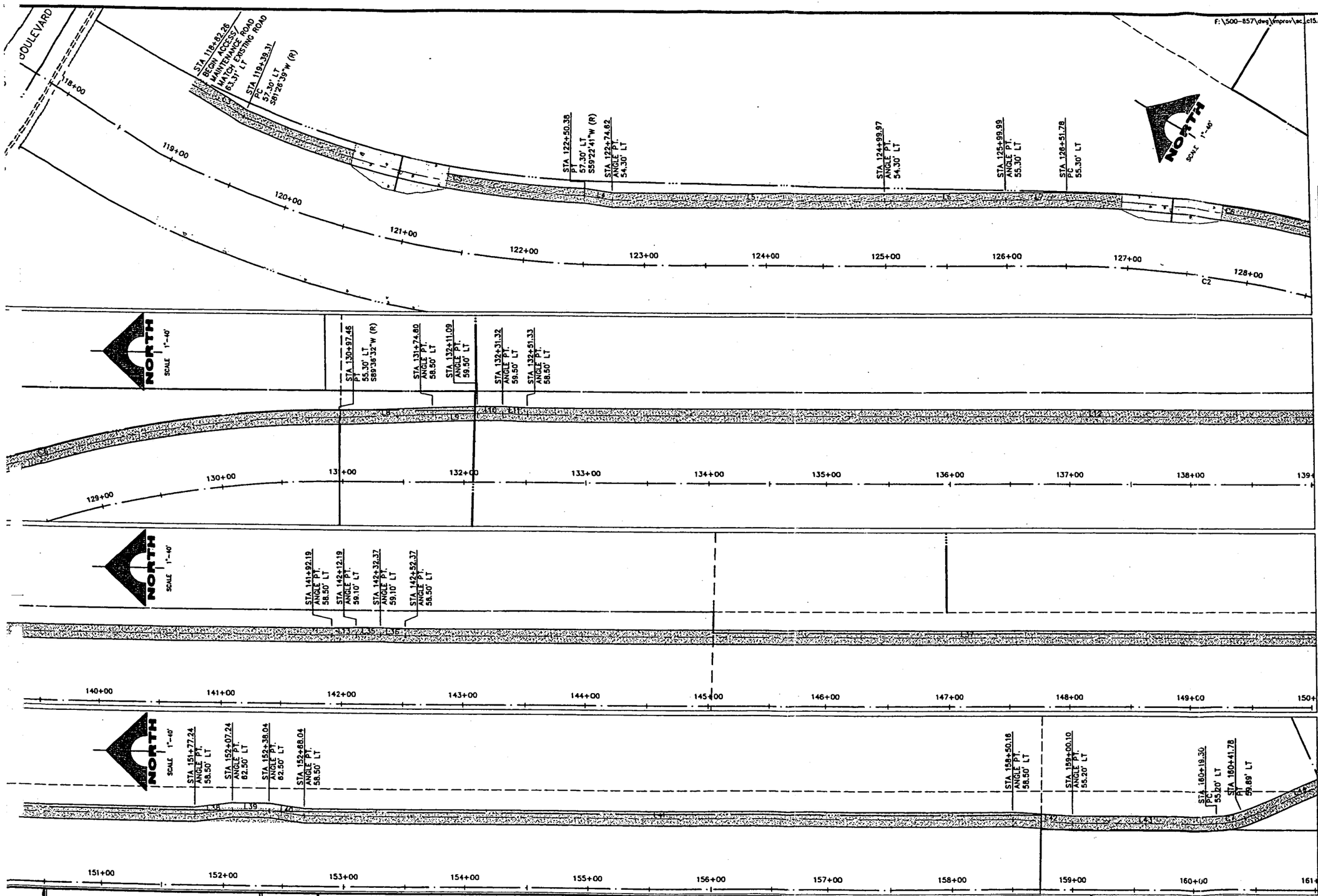
PROJECT No: 500.857 DRAWN BY: DKJ
DESIGNED BY: CHECKED BY:
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE (702) 804-2000 • FAX (702) 804-2280

SCALE
HORIZ: 1" = 40'
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
C-14
SHT. 20 OF 30

F:\500-857\dwg\improv\ac_c15.dwg 03-11-04 13:29:31 RBlanchard



ACCESS/ MAINTENANCE ROAD ℄ LINE TABLE

LINE TABLE		
LINE	BEARING	LENGTH
L3	S00°49'42"W	48.17'
L4	S23°55'17"E	22.80'
L5	S32°18'38"E	225.35'
L6	S32°53'00"E	100.03'
L7	S32°18'38"E	51.79'
L8	S02°48'57"E	77.41'
L9	S01°58'00"E	36.30'
L10	S00°02'58"E	20.23'
L11	S02°28'47"W	20.02'
L12	S00°22'58"E	940.87'
L13	S02°06'04"E	20.01'
L35	S00°22'58"E	20.18'
L36	S01°20'08"E	20.01'
L37	S00°22'58"E	924.87'
L38	S07°58'39"E	30.27'
L39	S00°22'58"E	30.80'
L40	S07°12'43"E	30.27'
L41	S00°02'58"E	582.12'
L42	S03°23'36"W	50.11'
L43	S00°22'58"E	119.19'
L44	S23°59'10"E	95.58'

ACCESS/ MAINTENANCE ROAD ℄ CURVE TABLE

CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	TANGENT
C5	22°03'58"	750.40'	289.00'	146.31'
C6	31°53'55"	855.30'	476.17'	244.43'
C7	23°36'12"	56.00'	23.07'	11.70'

NO.	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL

ACCESS/MAINTENANCE CONTROL PLAN
STA. 118+82.26 TO STA. 161+00.00
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER STATE OF NEVADA No. 10165 NOEL C. LAUGHLIN Exp. 12/31/2005 CIVIL 5-11-04

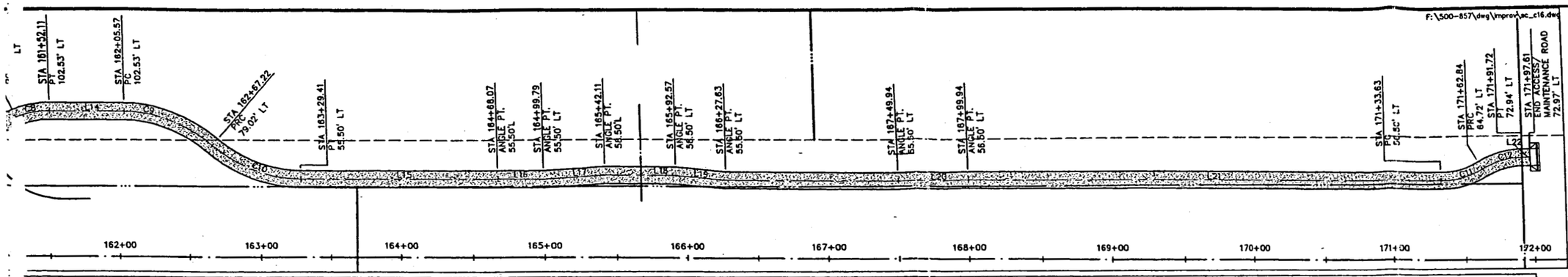
PROJECT No: 500.857 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY:

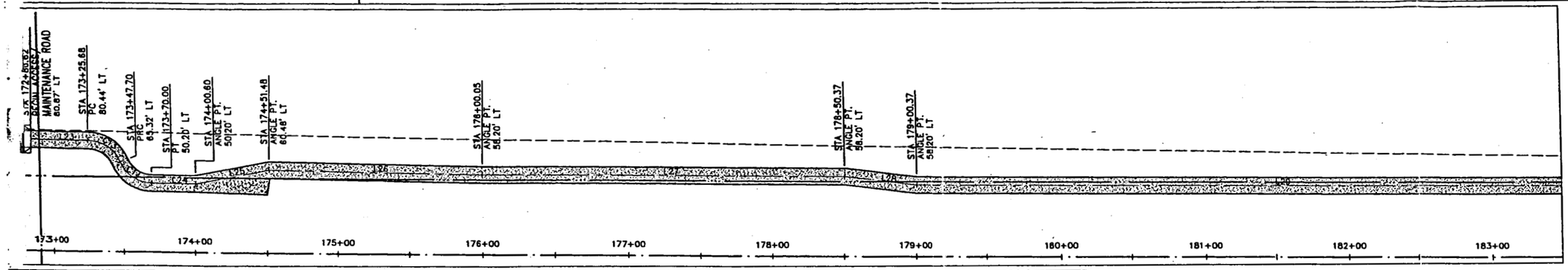
G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2220

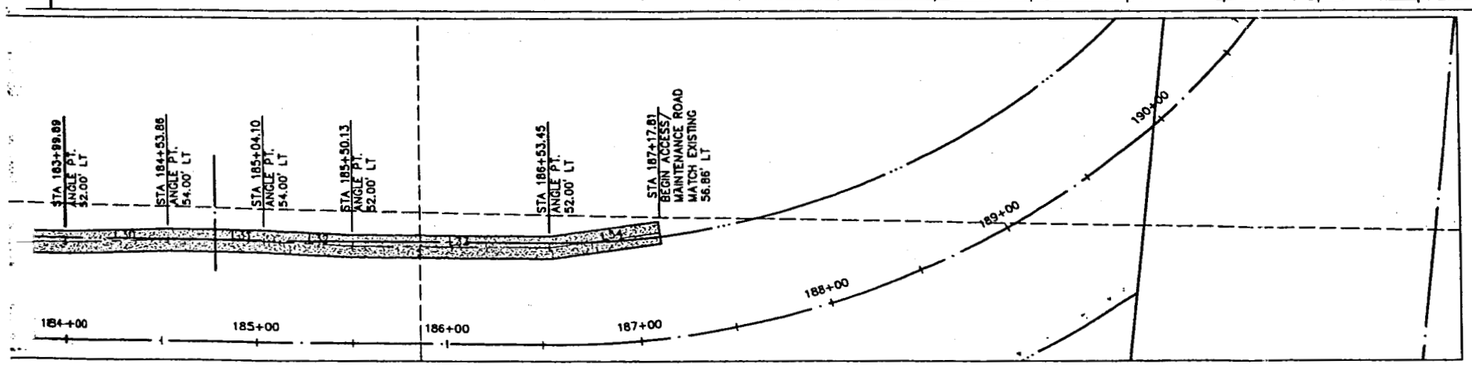
SCALE
HORIZ: 1" = 40'
VERT: 1" = 4'
FIELD BOOK

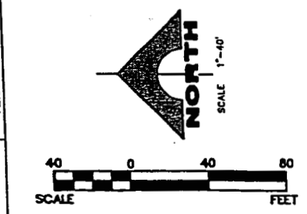
L-1759
DRAWING NO.
C-15
SHT. 21 OF 30

F:\500-857\dwg\improv\ac_c16.dwg 03-11-04 13:30:29 RBlanchard









ACCESS/ MAINTENANCE ROAD ℄ LINE TABLE

LINE TABLE		
LINE	BEARING	LENGTH
L13	S23°59'10"E	55.22'
L14	S00°02'58"E	53.46'
L15	S00°22'58"E	138.98'
L16	S00°02'58"E	31.72'
L17	N04°06'16"W	42.21'
L18	S00°02'58"E	50.47'
L19	S04°50'32"E	35.18'
L20	S01°11'43"E	122.31'
L21	S00°02'58"E	333.69'
L22	S00°23'04"E	5.89'
L23	S00°35'33"W	39.05'
L24	S00°02'58"E	30.60'
L25	S11°28'07"E	51.91'
L26	S00°49'43"W	148.58'
L27	S00°02'58"E	250.32'
L28	S07°01'09"W	50.36'
L29	S00°02'58"E	499.52'
L30	S02°10'18"E	54.01'
L31	S00°02'58"E	50.24'
L32	S02°26'19"W	46.07'
L33	S00°02'58"E	103.32'
L34	S08°39'47"E	57.00'

ACCESS/ MAINTENANCE ROAD ℄ CURVE TABLE

CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	TANGENT
C8	23°56'12"	56.00'	23.40'	11.87'
C9	41°05'27"	94.00'	67.41'	35.23'
C10	41°25'26"	94.00'	67.96'	35.54'
C11	31°26'16"	56.00'	30.73'	15.76'
C12	31°06'10"	56.00'	30.40'	15.58'
C13	67°38'26"	24.00'	28.33'	16.08'
C14	68°16'57"	24.00'	28.60'	16.27'

DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL

ACCESS/MAINTENANCE ROAD CONTROL PLAN
STA. 161+00.00 TO STA. 181+82.26
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

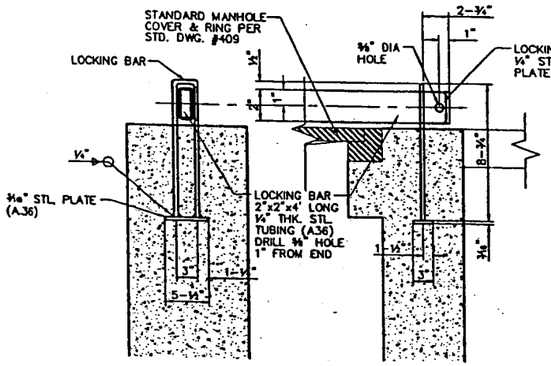
PROFESSIONAL ENGINEER STATE OF NEVADA No. 10165 LAUGHLIN CIVIL 3-11-04

PROJECT No: 500.857 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY

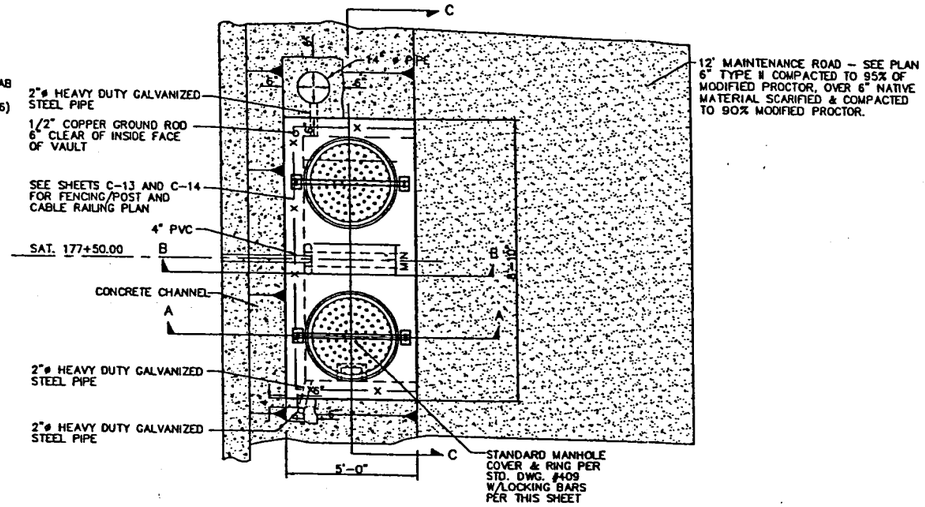
G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: 1" = 40'
VERT: 1" = 4'
FIELD BOOK

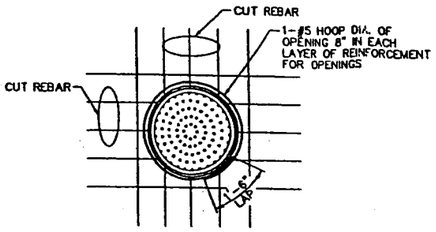
L-1759
DRAWING NO.
C-16
SHT. 22 OF 30



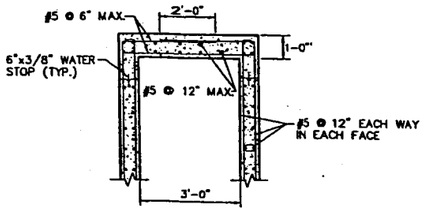
LOCKING BAR GUIDE
NOT TO SCALE



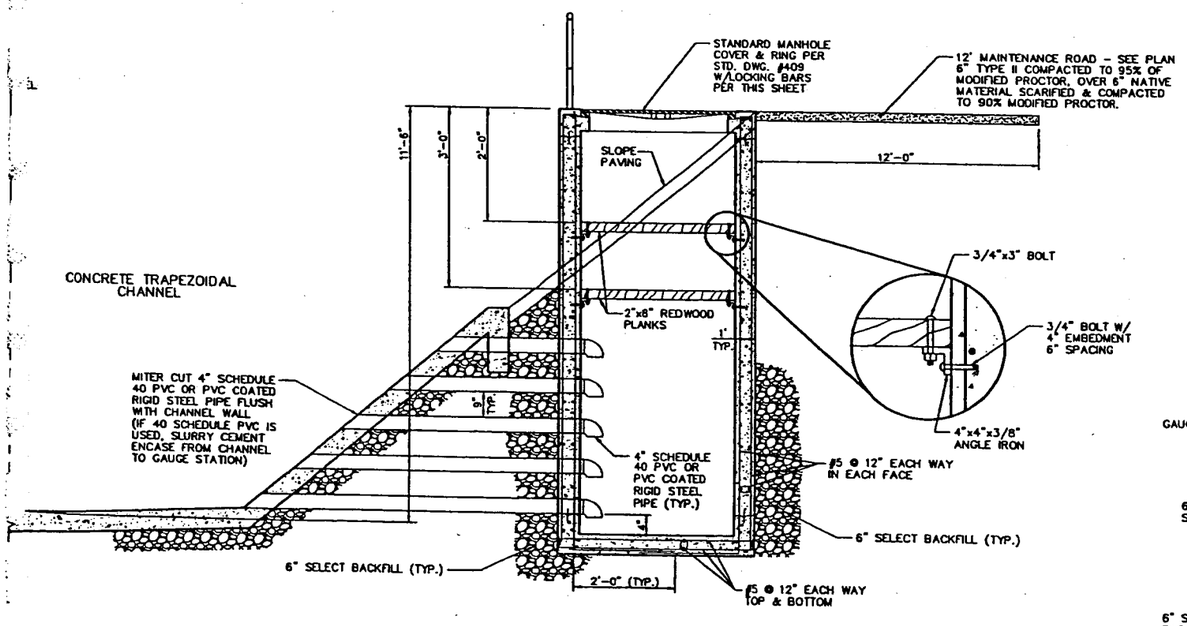
PLAN
NOT TO SCALE



DETAIL A
NOT TO SCALE



SECTION B-B
(STRUCTURAL REINFORCING BETWEEN MANHOLES)
NOT TO SCALE



SECTION A-A
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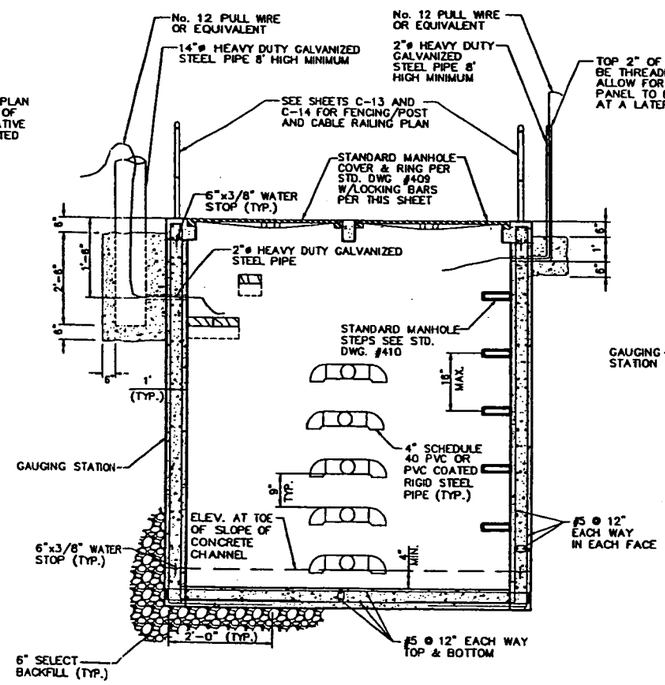
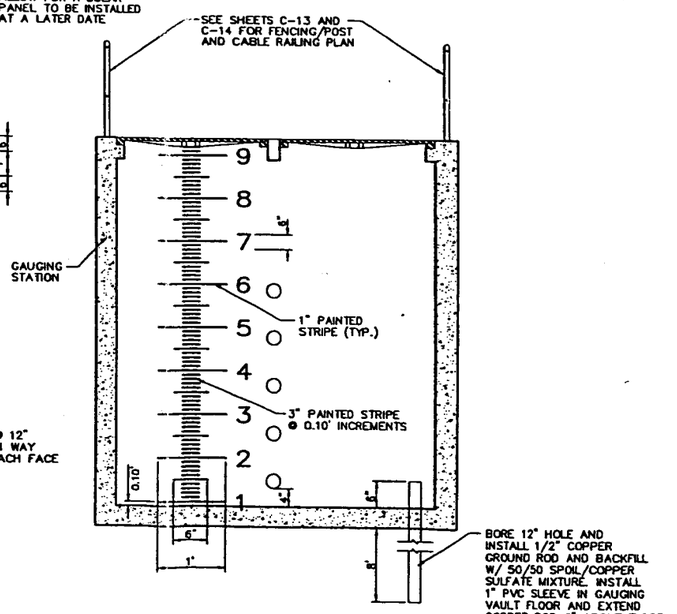


SECTION C-C
NOT TO SCALE



GAUGING STATION STENCIL DETAIL
(VIEW FROM INSIDE OF GAUGING STATION)
NOT TO SCALE

DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
GAUGING STATION
SECTION AND DETAILS
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

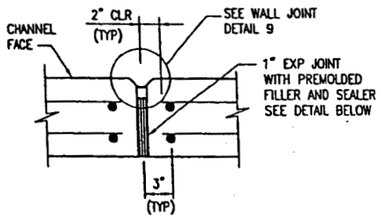
PROFESSIONAL ENGINEER STATE OF NEVADA — NOEL LAUGHLIN — No. 10165 — CIVIL — 03/31/2008

PROJECT No: 500.857 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY

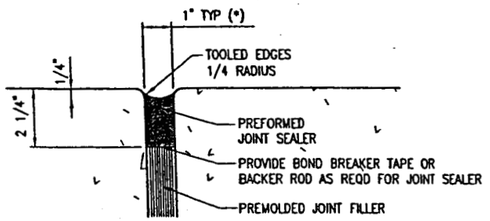
G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
C-17
SHT. 23 OF 30

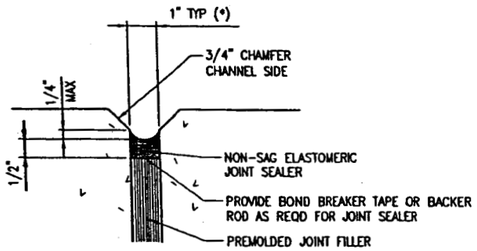


WALL EXPANSION JOINT DETAIL (8)
NOT TO SCALE

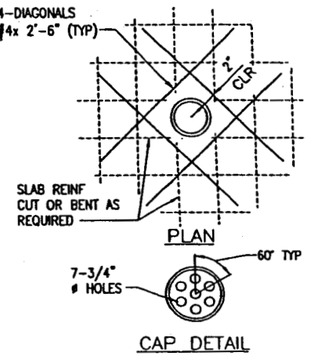


(*) UNLESS OTHERWISE NOTED

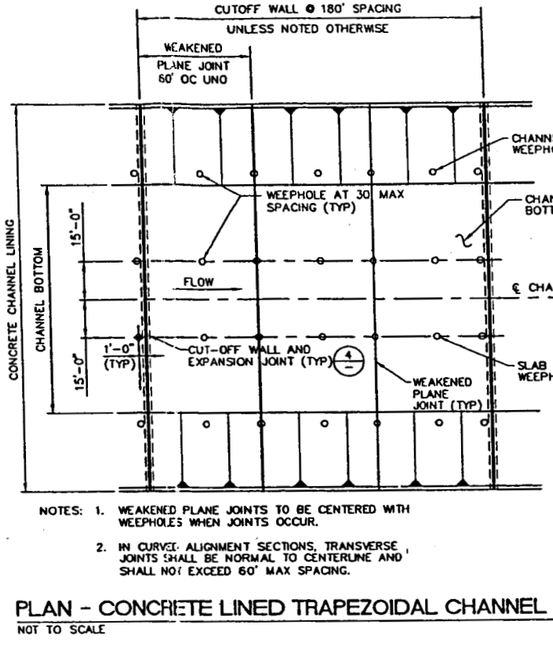
SLAB EXPANSION JOINT DETAIL (5)
NOT TO SCALE



WALL JOINT DETAIL (9)
NOT TO SCALE

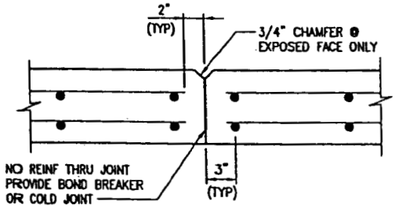


CAP DETAIL

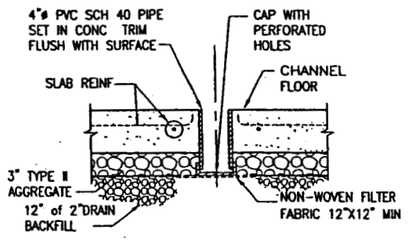


NOTES:
1. WEAKENED PLANE JOINTS TO BE CENTERED WITH WEEPHOLES WHEN JOINTS OCCUR.
2. IN CURVED ALIGNMENT SECTIONS, TRANSVERSE JOINTS SHALL BE NORMAL TO CENTERLINE AND SHALL NOT EXCEED 60' MAX SPACING.

PLAN - CONCRETE LINED TRAPEZOIDAL CHANNEL (1)
NOT TO SCALE

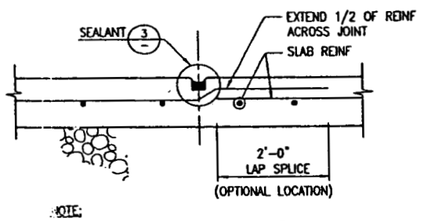


WALL CONTRACTION JOINT DETAIL (10)
NOT TO SCALE



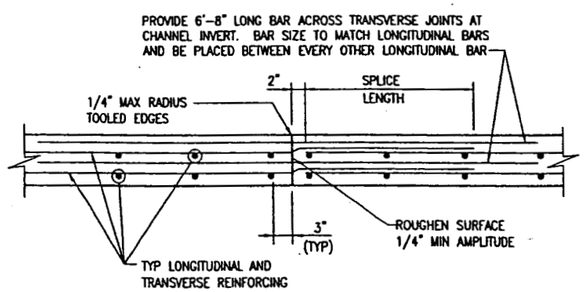
SECTION

SLAB WEEPHOLE DETAIL (6)
NOT TO SCALE

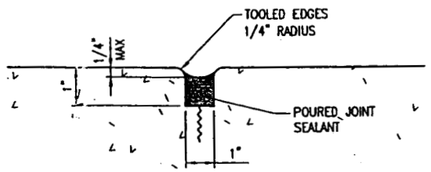


NOTE:
SPRAY GALVANIZE REINFORCING BARS 9" EACH SIDE OF WEAKENED PLANE JOINT

WEAKENED PLANE JOINT DETAIL (2)
NOT TO SCALE



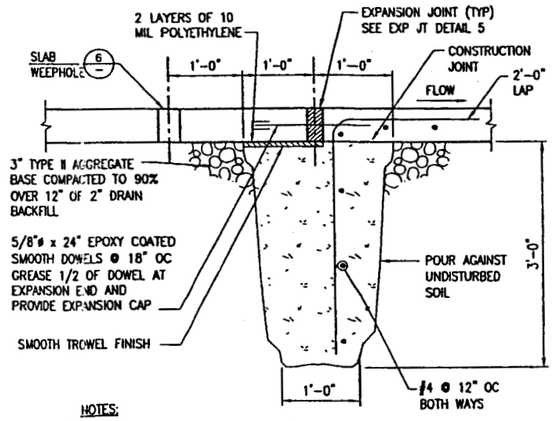
CONSTRUCTION JOINT DETAIL (7)
NOT TO SCALE



SEALANT DETAIL (3)
NOT TO SCALE

STRUCTURE NOTES

1. DESIGN SPECIFICATIONS: AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 1996" AND INTERIMS THROUGH 2000. REINFORCED CONCRETE DESIGN BASED ON LOAD FACTOR DESIGN.
2. CONSTRUCTION SPECIFICATIONS: UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA.
3. LIVE LOAD: STANDARD AASHTO HS20-44 TRUCK LOADING AND TRAFFIC SURCHARGE FROM MAINTENANCE VEHICLES (2' OF SOIL)
4. SEISMIC LOAD: ACCELERATION COEFFICIENT 0.15 g
5. CONCRETE: ALL CONCRETE SHALL BE CLASS A MODIFIED (MAJOR) EXCEPT FOR WALLS WHICH SHALL BE CLASS D MODIFIED (MAJOR). ONLY TYPE V CEMENT SHALL BE USED FOR CONCRETE IN CONTACT WITH SOIL. CONCRETE COMPRESSIVE MINIMUM STRENGTH AT 28 DAYS SHALL BE, f'c=4,500 PSI AND A MAXIMUM WATER TO CEMENT RATIO, BY WEIGHT, OF 0.45.
6. REINFORCING STEEL: ALL REINFORCING STEEL SHALL BE ASTM A615 REINFORCING STEEL STRENGTH, Fy = 60,000 PSI.
7. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4" UNLESS OTHERWISE INDICATED.
8. TRANSVERSE AND LONGITUDINAL JOINTS IN INVERT SLAB AND SIDE SLOPE SLAB OF PAVED TRAPEZOIDAL CHANNELS AND WALLS FOR RECTANGULAR CHANNELS WILL BE REQUIRED AT THE END OF EACH CONTINUOUS POURING OPERATION. SEE TYPICAL CONSTRUCTION JOINT DETAIL. TRANSVERSE CONSTRUCTION JOINTS SHALL NOT BE PLACED WITHIN 3-FEET OF A MANHOLE, WITHIN 10-FEET OF JUNCTION STRUCTURE OPENINGS, OR WITHIN 50 FEET OF AN EXPANSION JOINT.
9. ALL TRANSVERSE JOINTS IN WALLS AND SLABS (CONSTRUCTION, WEAKENED CONTRACTION AND EXPANSION) SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED UNLESS SHOWN OTHERWISE. TRANSVERSE CONSTRUCTION JOINTS SHALL BE NORMAL OR RADIAL TO CENTERLINE OF CONSTRUCTION.
10. ALL SINGLE LAYER REINFORCEMENT SHALL BE PLACED IN THE CENTER OF CONCRETE UNLESS NOTED OTHERWISE.
11. IN CURVED CHANNEL SECTIONS TRANSVERSE BARS SHALL BE PLACED NORMAL TO THE CHANNEL CENTERLINE.
12. IN CURVED CHANNEL SECTIONS, THE MAXIMUM SPACING OF BARS SHALL NOT EXCEED THAT SHOWN FOR TYPICAL SECTIONS. STEEL SHALL BE PLACED RADIALLY FROM THE MAXIMUM SPACING.
13. AT THE BEGINNING AND ENDING OF ALL POURS, A COMPLETE CURTAIN OF MAIN REINFORCEMENT SHALL BE PLACED 3-INCHES FROM THE TRANSVERSE CONSTRUCTION, CONTRACTION AND EXPANSION JOINTS.
14. NO WELDING WILL BE PERMITTED ON ANY REINFORCEMENT.
15. CHANNEL ELEVATIONS: FOR CHANNEL INVERT ELEVATIONS REFER TO THE CHANNEL PLAN AND PROFILE SHEETS LOCATED ELSEWHERE IN THIS DRAWING SET.
16. EXCAVATION AND BACKFILL: THE LIMITS OF EXCAVATION AND BACKFILL SHALL BE AS SHOWN IN THE STATE OF NEVADA, "STANDARD PLANS FOR ROAD AND BRIDGE CONSTRUCTION, JANUARY 2001," UNLESS OTHERWISE NOTED.
17. WEEPHOLES: WEEPHOLES WILL BE REQUIRED AT 30-FEET O.C. PER THE TYPICAL WEEPHOLE DETAIL FOR ALL OPEN CHANNEL STRUCTURES.
18. BEDDING MATERIALS: UNLESS NOTED OTHERWISE ALL BEDDING MATERIAL SHALL BE 3-INCHES OF TYPE II AGGREGATE BASE OVER 12 INCHES OF 2 INCH DRAIN ROCK COMPACTED TO 90% OF THE MAXIMUM DRY DENSITY AS ESTABLISHED BY ASTM TEST METHOD D-1557.



NOTES:
1. CUTOFF WALL TO BE SPACED @ 180' OC FOR TRAPEZOIDAL CHANNELS AND 180' OC FOR RECTANGULAR CHANNELS ACROSS THE ENTIRE WIDTH OF THE CHANNEL LINING.
2. CONTRACTOR TO VERIFY THAT ALL DOWELS ARE IN PLANE AND PERPINDICULAR TO JOINT PRIOR TO POURING CONCRETE.

TRANSVERSE CUT-OFF WALL EXPANSION DETAIL (4)
NOT TO SCALE

NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
CHANNEL STRUCTURES DETAILS
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

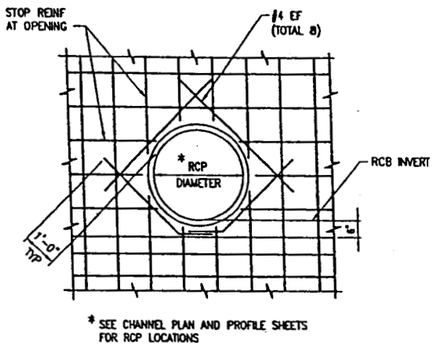
RIMAH NAZZAL — Exp. 12/31/2006 — CIVIL / STRUCTURAL — STATE OF NEVADA — PROFESSIONAL ENGINEER — No. 12971
3/11/04

PROJECT No: 500.857 DRAWN BY: NO/M
DESIGNED BY: RN CHECKED BY: RN
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
S-1
SHT. 24 OF 30

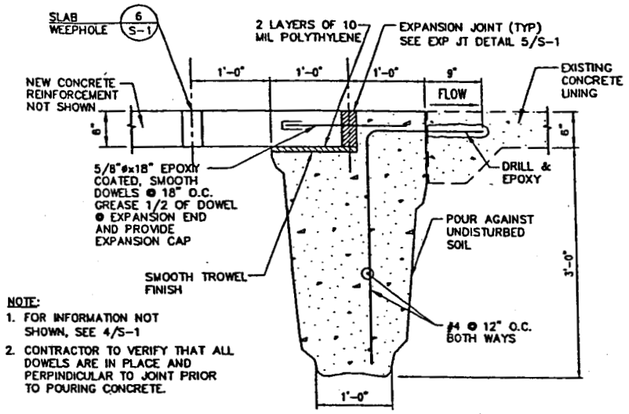


* SEE CHANNEL PLAN AND PROFILE SHEETS FOR RCP LOCATIONS

REINFORCING AROUND PIPE

NOT TO SCALE

10

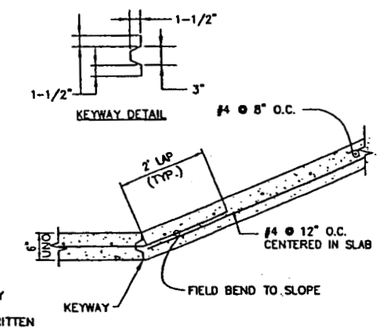


NOTE:
1. FOR INFORMATION NOT SHOWN, SEE 4/S-1
2. CONTRACTOR TO VERIFY THAT ALL DOWELS ARE IN PLACE AND PERPINDICULAR TO JOINT PRIOR TO POURING CONCRETE.

EXPANSION JOINT AND CUT-OFF WALL

NOT TO SCALE

7

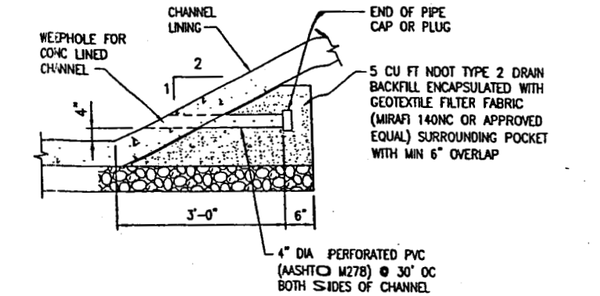


NOTE: CONTRACTOR MAY USE ALTERNATE JOINT CONFIGURATION WITH WRITTEN APPROVAL FROM OWNER

KEY JOINT DETAIL

NOT TO SCALE

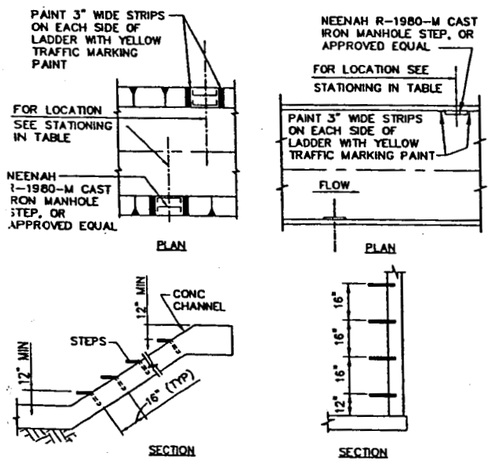
4



TRAPEZOIDAL CHANNEL WEEPHOLE

NOT TO SCALE

1



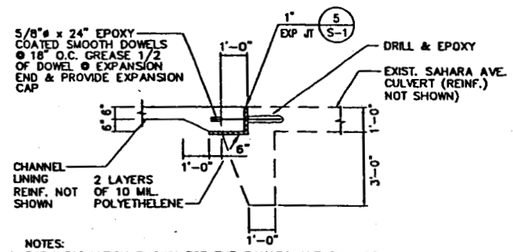
STEP LOCATIONS

STATIONS	
LT	RT
119+60.00	119+00.00
125+60.00	125+00.00
131+60.00	131+00.00
137+60.00	137+00.00
143+60.00	143+00.00
149+60.00	149+00.00
155+60.00	155+00.00
161+40.00	161+00.00
167+60.00	167+00.00
173+60.00	173+00.00
179+60.00	179+00.00
185+60.00	185+00.00

CHANNEL STEP DETAILS

NOT TO SCALE

11

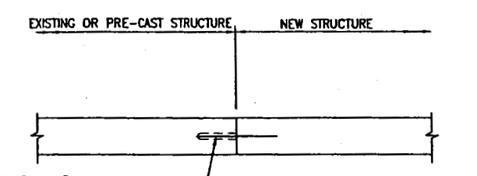


NOTES:
1. THE INFORMATION SHOWN FOR THE SAHARA AVE CULVERT IS BASED ON THE DESIGN DRAWINGS FOR SID #94. CONTRACTOR TO VERIFY THE GEOMETRY & CONDITION OF THE CULVERT TIE IN LOCATIONS.
2. EXPANSION JOINT DETAIL IS SIMILAR AT BOTH UPSTREAM AND DOWNSTREAM ENDS OF BRIDGE AT SAHARA AVE.

EXPANSION JOINT

NOT TO SCALE

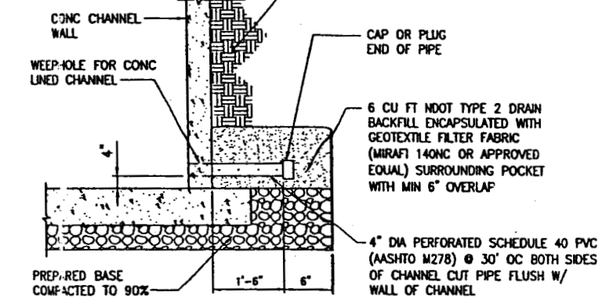
8



CONNECTION JOINT

NOT TO SCALE

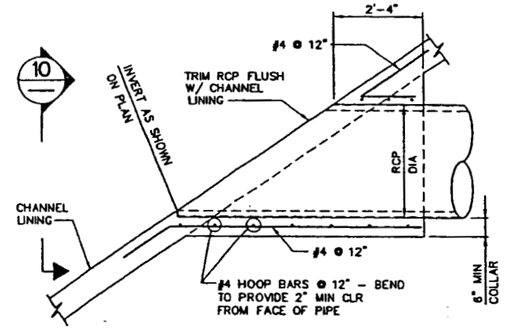
5



RECTANGULAR CHANNEL WEEPHOLE

NOT TO SCALE

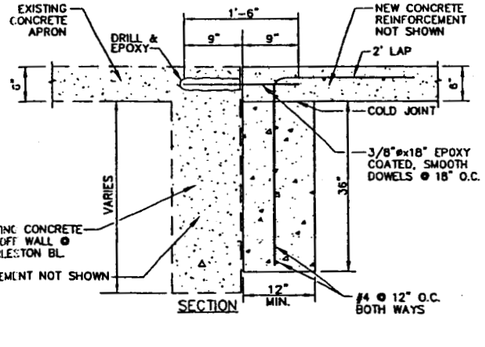
2



PIPE CONNECTION

NOT TO SCALE

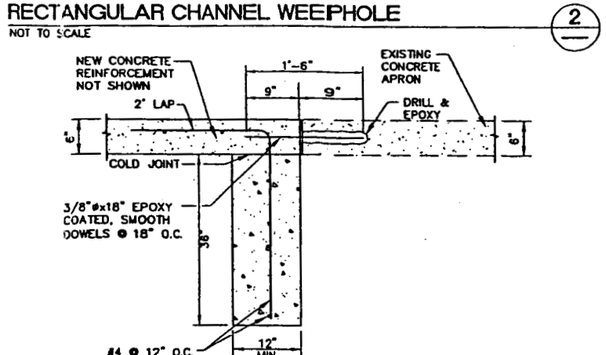
9



APRON AT CHARLESTON BLVD BRIDGE

NOT TO SCALE

6



APRON AT ORCHARDS CHANNEL

NOT TO SCALE

3

DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL

CHANNEL STRUCTURES DETAILS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER — RIMAH I. NAZZAL — Exp. 12/31/2005 — CIVIL / STRUCTURAL — No. 12977 — STATE OF NEVADA

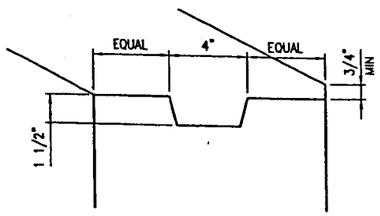
3/11/04

PROJECT No: 500-857 DRAWN BY: NO/AL
DESIGNED BY: RIN CHECKED BY: RIN
APPROVED BY

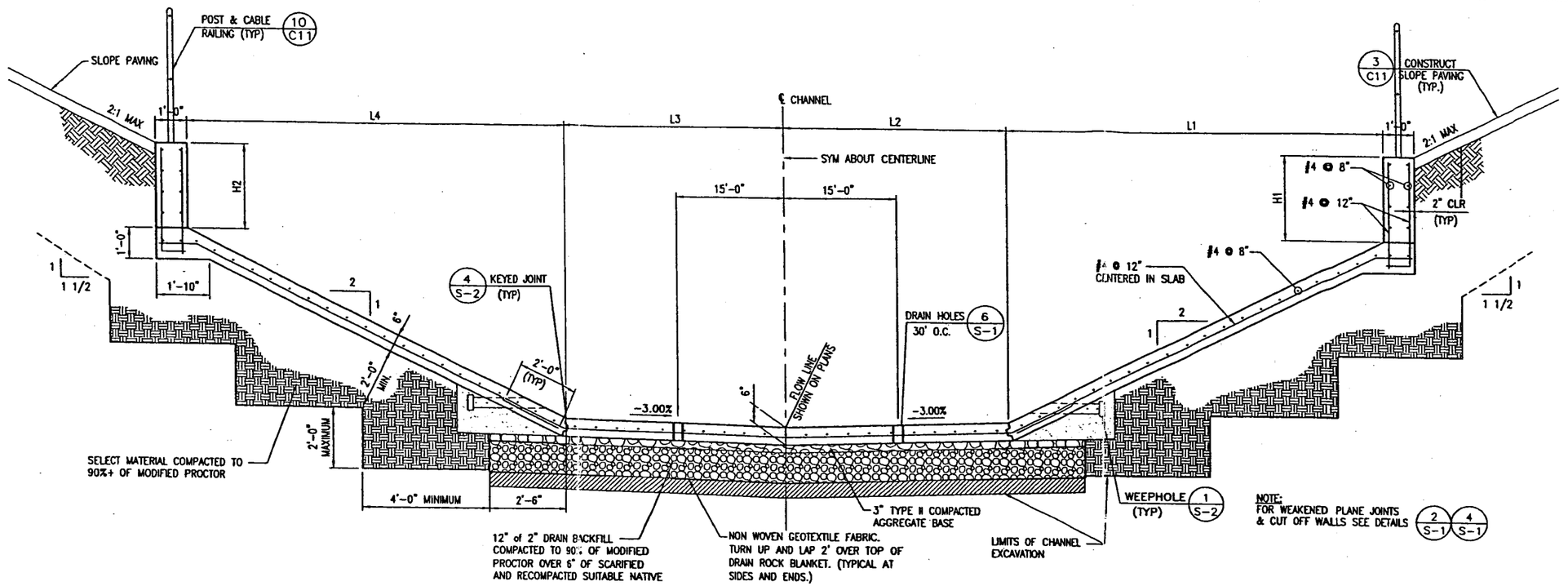
G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2291

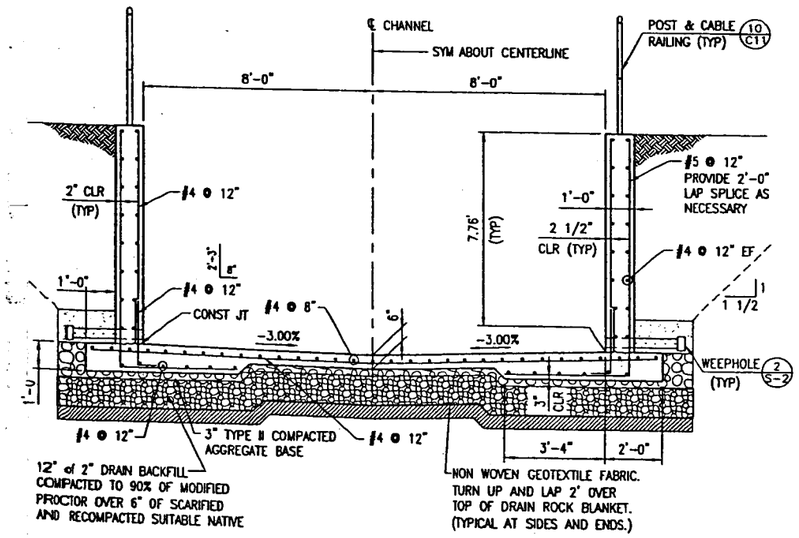
SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
S-2
SHT. 25 OF 30



KEYED JOINT (1)
NOT TO SCALE





RECTANGULAR CHANNEL SECTION (STA 161+79.41, 41.00' LT TO STA 161+09.37, 80.14' LT) (STA 161+02.56, 95.72' LT TO STA 160+91.22, 121.68' LT) (B)
NOT TO SCALE

CHANNEL REACH	L1	L2	L3	L4	H1	H2
STA. 118+88.78 TO STA. 119+38.78	VARIES LINEARLY FROM 10.94' TO 7.3'	VARIES LINEARLY FROM 32.47' TO 30'	VARIES LINEARLY FROM 35.99' TO 30'	VARIES LINEARLY FROM 20.51' TO 12.3'	VARIES LINEARLY FROM 0' TO 2.37'	–
STA. 119+38.78 TO STA. 120+68.17	17.3'	30'	30'	12.3'	VARIES LINEARLY FROM 2.37' TO 1.63'	–
STA. 120+68.17 TO STA. 120+74.33	17.3'	30'	30'	VARIES LINEARLY FROM 12.3' TO 9.93'	VARIES LINEARLY FROM 1.63' TO 1.59'	–
STA. 120+74.33 TO STA. 120+96.22	17.3'	30'	30'	9.93'	VARIES LINEARLY FROM 1.59' TO 1.47'	–
STA. 120+96.22 TO STA. 121+02.78	17.3'	30'	30'	VARIES LINEARLY FROM 9.93' TO 12.3'	VARIES LINEARLY FROM 1.47' TO 1.43'	–
STA. 121+02.78 TO STA. 122+58.37	17.3'	30'	30'	12.3'	VARIES LINEARLY FROM 1.43' TO 0.54'	–
STA. 122+58.37 TO STA. 122+98.37	VARIES LINEARLY FROM 17.3' TO 12.3'	30'	30'	12.3'	VARIES LINEARLY FROM 0.54' TO 0'	–
STA. 122+98.37 TO STA. 130+97.58	12.3'	30'	30'	12.3'	–	–
STA. 130+97.58 TO STA. 131+75.00	VARIES LINEARLY FROM 12.3' TO 11.5'	30'	30'	VARIES LINEARLY FROM 12.3' TO 11.5'	–	–
STA. 131+75.00 TO STA. 158+50.00	11.5'	30'	30'	11.5'	–	–
STA. 158+50.00 TO STA. 159+00.00	VARIES LINEARLY FROM 11.5' TO 15.2'	30'	30'	VARIES LINEARLY FROM 11.5' TO 15.2'	–	–
STA. 159+00.00 TO STA. 160+29.41	15.2'	30'	30'	15.2'	–	–
STA. 160+29.41 TO STA. 160+62.41	VARIES LINEARLY FROM 15.2' TO 5.17'	VARIES LINEARLY FROM 30' TO 37.59'	VARIES LINEARLY FROM 30' TO 30.66'	VARIES LINEARLY FROM 15.2' TO 5.17'	VARIES LINEARLY FROM 0' TO 4.79'	VARIES LINEARLY FROM 0' TO 5'
STA. 163+29.41 TO STA. 165+61.82	11.5'	30'	30'	11.5'	–	–
STA. 165+61.82 TO STA. 165+72.82	11.5'	30'	30'	10.36'	–	–
STA. 165+72.82 TO STA. 171+98.47	11.5'	30'	30'	11.5'	–	–
STA. 172+86.31 TO STA. 174+00.00	13.2'	30'	30'	13.2'	–	–
STA. 174+00.00 TO STA. 174+50.00	13.2'	30'	30'	VARIES LINEARLY FROM 13.2' TO 11.63'	–	–
STA. 176+00.00 TO STA. 178+50.00	13.2'	30'	30'	13.2'	–	–
STA. 178+50.00 TO STA. 179+00.00	13.2'	30'	30'	VARIES LINEARLY FROM 13.2' TO 7'	–	VARIES LINEARLY FROM 0' TO 3.1'
STA. 179+00.00 TO STA. 182+17.17	13.2'	30'	30'	7'	–	3.1'
STA. 182+17.17 TO STA. 185+17.69	13.2'	30'	30'	7'	VARIES LINEARLY FROM 0' TO 2.7'	3.1'
STA. 185+17.69 TO STA. 186+54.00	13.2'	30'	30'	7'	VARIES LINEARLY FROM 2.7' TO 1.43'	3.1'
STA. 186+54.00 TO STA. 187+17.89	VARIES LINEARLY FROM 13.2' TO 15.9'	30'	30'	VARIES LINEARLY FROM 7' TO 19.67'	VARIES LINEARLY FROM 1.43' TO 0'	VARIES LINEARLY FROM 3.1' TO 0'

TYPICAL TRAPEZOIDAL CHANNEL SECTION (A)
NOT TO SCALE

DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
CHANNEL STRUCTURES
TYPICAL CHANNEL SECTIONS
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

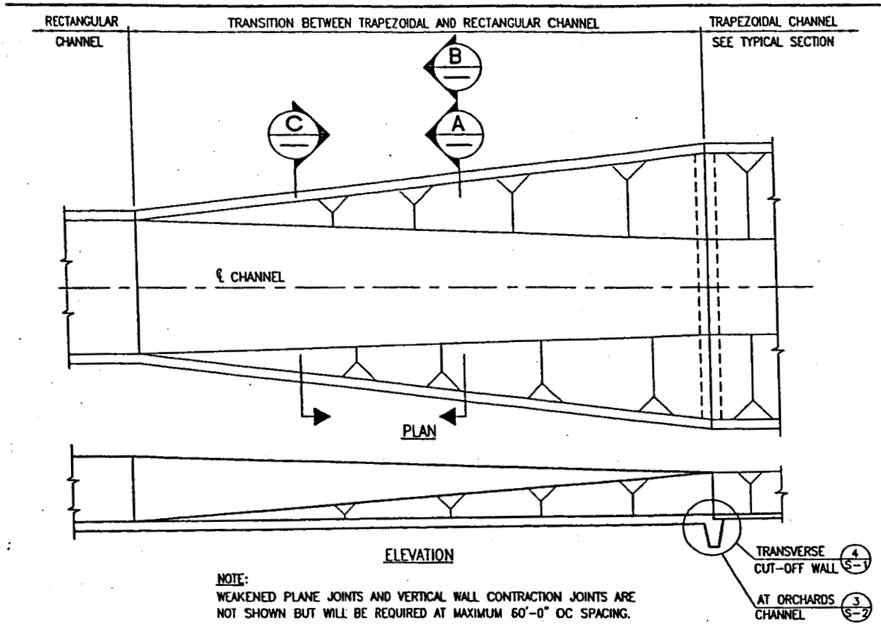
RIMAH I. NAZZAL No. 12971 CIVIL STRUCTURAL — 3/11/04

PROJECT NAME: SLOAN DRAWN BY: NO/AL
DESIGNED BY: RIN CHECKED BY: RIN
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

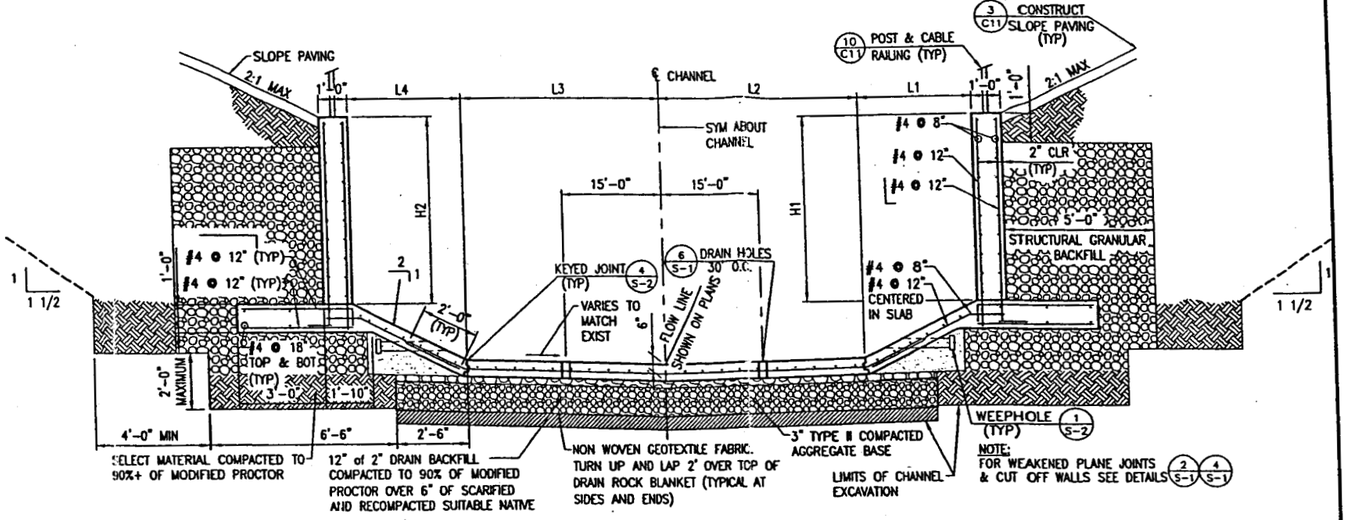
SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
S-3
SHT. 26 OF 30



NOTE:
WEAKENED PLANE JOINTS AND VERTICAL WALL CONTRACTION JOINTS ARE NOT SHOWN BUT WILL BE REQUIRED AT MAXIMUM 60'-0" OC SPACING.

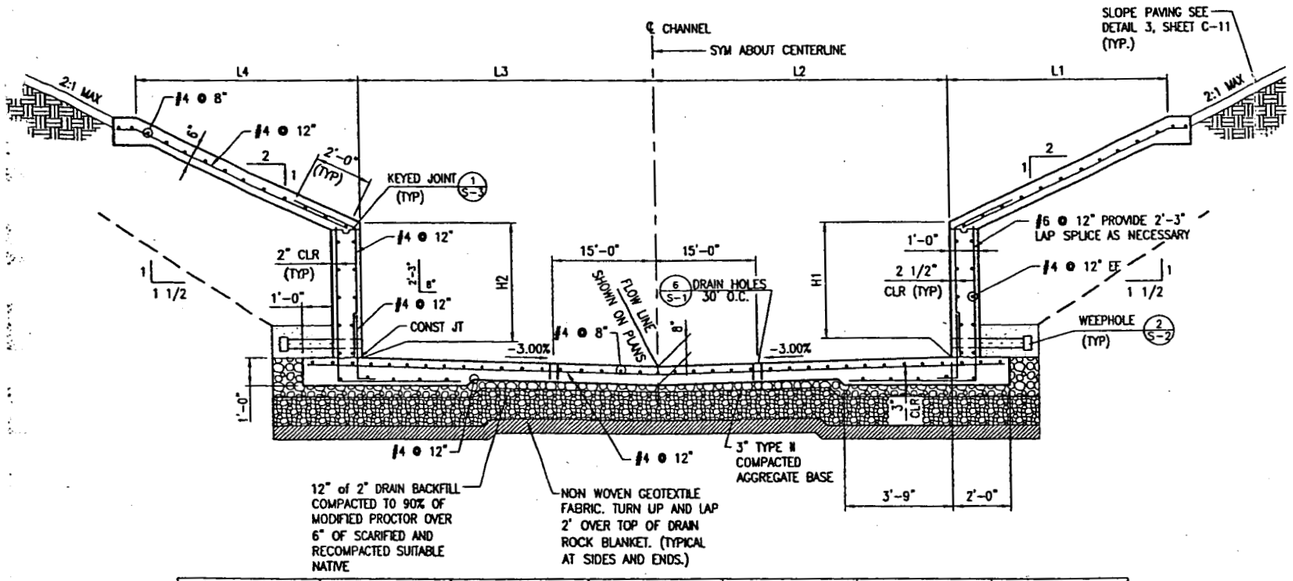
TYPICAL TRANSITION BETWEEN TRAPEZOIDAL AND RECTANGULAR CHANNEL (1)
1/8" = 1'-0"



NOTE:
FOR WEAKENED PLANE JOINTS & CUT OFF WALLS SEE DETAILS 2/S-1 4/S-1

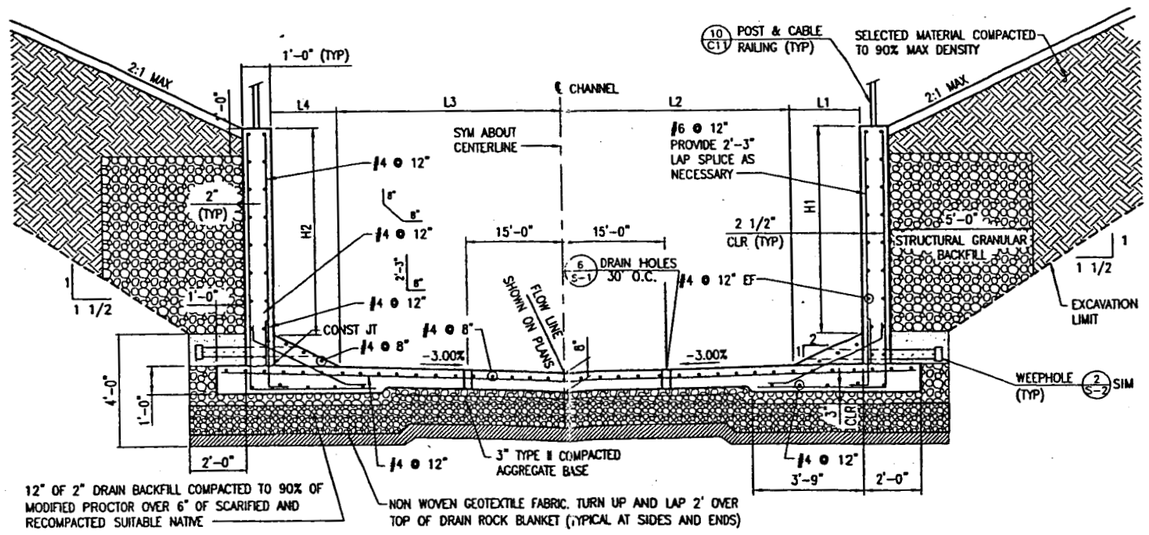
CHANNEL REACH	L1	L2	L3	L4	H1	H2
STA. 160+62.41 TO STA. 160+71.41	VARIES LINEARLY FROM 5.17' TO 2.43'	VARIES LINEARLY FROM 37.59' TO 39.66'	VARIES LINEARLY FROM 30.66' TO 30.84'	VARIES LINEARLY FROM 5.17' TO 2.43'	VARIES LINEARLY FROM 4.79' TO 6.09'	VARIES LINEARLY FROM 5' TO 6.36'

TYPICAL TRANSITION SECTION (A)
3/8" = 1'-0"



CHANNEL REACH	L1	L2	L3	L4	H1	H2
STA. 162+79.41 TO STA. 163+29.41	VARIES LINEARLY FROM 0' TO 11.5'	VARIES LINEARLY FROM 41.5' TO 30'	VARIES LINEARLY FROM 49' TO 30'	VARIES LINEARLY FROM 0' TO 11.5'	VARIES LINEARLY FROM 7.25' TO 0'	VARIES LINEARLY FROM 8.53' TO 0'

PICAL TRANSITION SECTION (C)
= 3/8"



CHANNEL REACH	L1	L2	L3	L4	H1	H2
STA. 160+71.41 TO STA. 160+79.41	VARIES LINEARLY FROM 2.43' TO 0'	VARIES LINEARLY FROM 39.66' TO 41.5'	VARIES LINEARLY FROM 30.84' TO 31'	VARIES LINEARLY FROM 2.43' TO 0'	VARIES LINEARLY FROM 6.09' TO 7.25'	VARIES LINEARLY FROM 6.36' TO 7.57'

TYPICAL TRANSITION SECTION (B)
3/8" = 1'-0"

DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
CHANNEL STRUCTURES
CHANNEL TRANSITION STRUCTURES
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

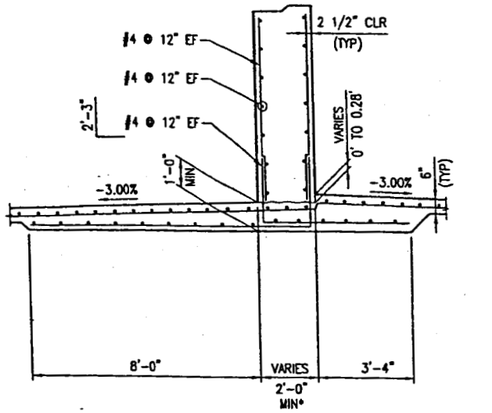
PROFESSIONAL ENGINEER STATE OF NEVADA
RIMAH I. NAZZAL
No. 12977
Exp. 12/31/2005
CIVIL / STRUCTURAL
3/11/04

PROJECT No: 500.857 DRAWN BY: NO/AL
DESIGNED BY: RIN CHECKED BY: RIN
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

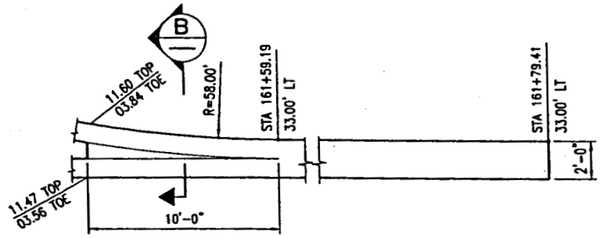
L-1759
DRAWING NO.
S-4
SHT. 27 OF 30



SECTION
3/8" = 1'-0"

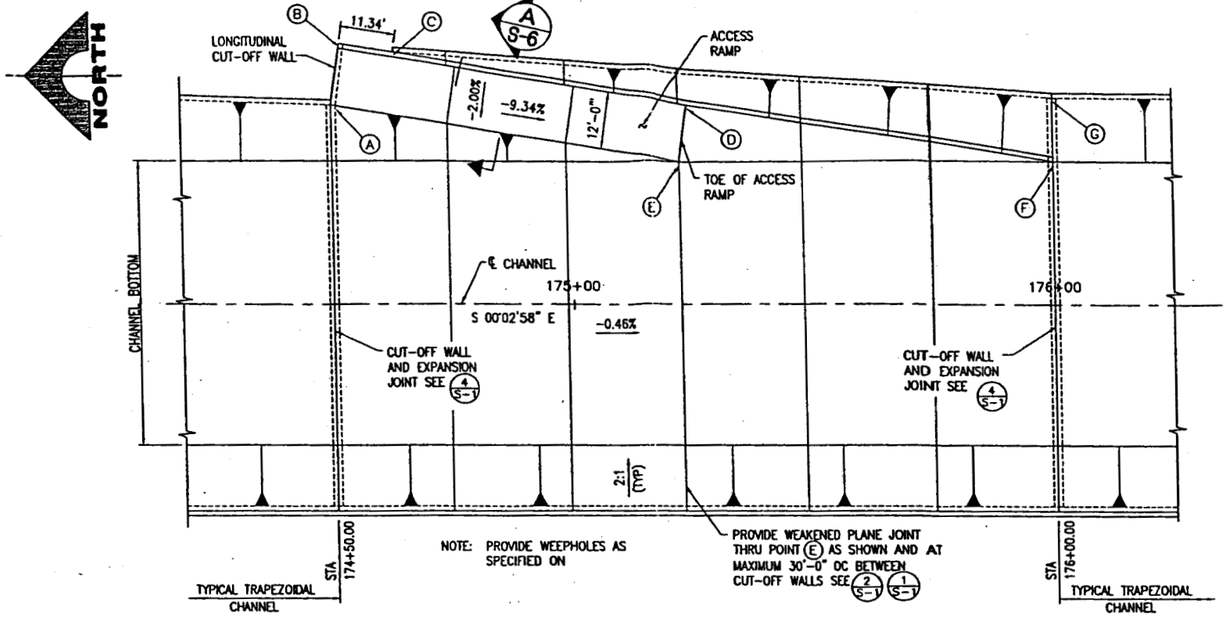
* SEE DETAIL (2/—)

(B/—)



DETAIL
1/4" = 1'-0"

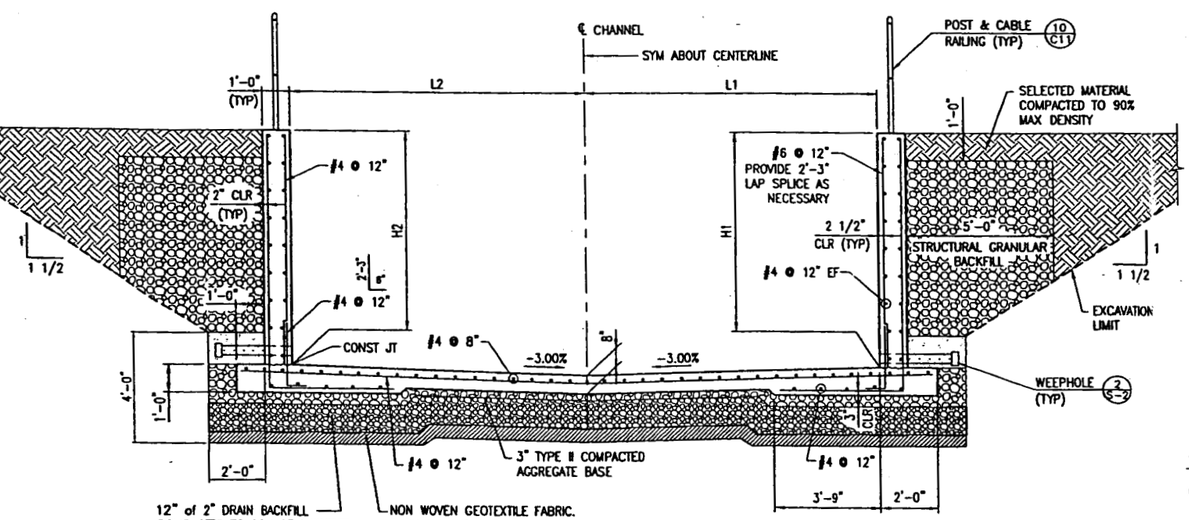
(2/—)



POINT	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	Ⓖ
RAMP 1	STA: 174+50.99	STA. 174+52.04	STA. 174+63.24	STA. 175+25.23	STA. 175+23.35	STA. 176+00.00	STA. 176+00.00
	OFFSET: 41.47' LT	OFFSET: 54.47' LT	OFFSET: 52.69' LT	OFFSET: 41.85' LT	OFFSET: 30.00' LT	OFFSET: 30.00' LT	OFFSET: 43.20' LT
	EL = 1703.83	EL = 1704.07	EL = 1703.62	EL = 1700.83 TW EL = 1697.13 TOE	EL = 1696.89	EL = 1696.54	EL = 1703.14

PLAN - TRAPEZOIDAL CHANNEL ACCESS RAMP
1/16" = 1'-0"

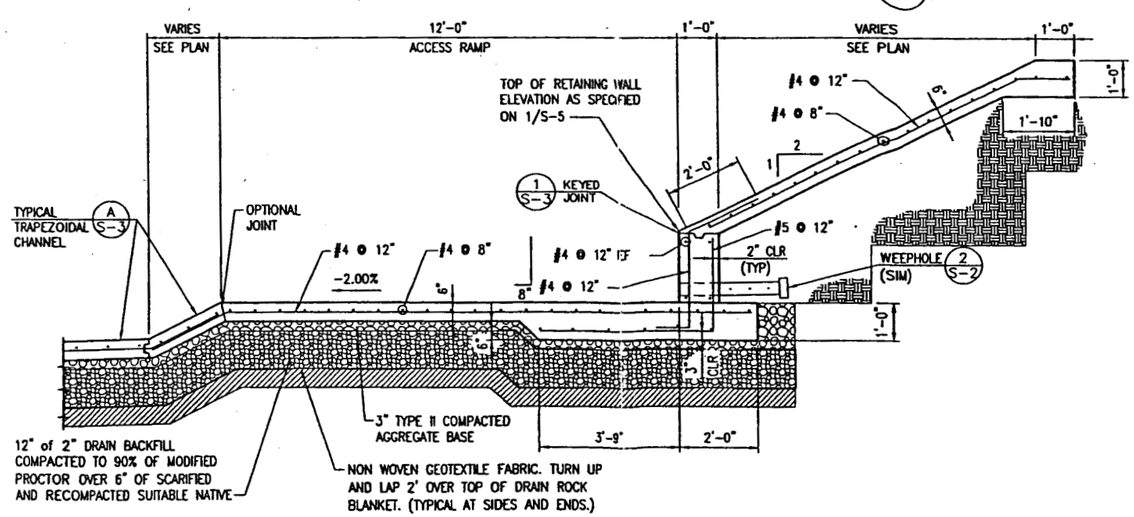
(1/—)



CHANNEL REACH	L1	L2	H1	H2
STA. 160+79.41 TO STA. 161+59.19	41.5'	31'	7.25'	VARIES LINEARLY FROM 7.57' TO 7.96'
STA. 161+59.19 TO STA. 161+79.41	41.5'	31'	7.25'	VARIES LINEARLY FROM 7.96' TO 7.76'
STA. 161+79.41 TO STA. 162+25.00	41.5'	49'	7.25'	VARIES LINEARLY FROM 7.76' TO 8.53'
STA. 162+25.00 TO STA. 162+79.41	41.5'	49'	7.25'	8.53'

RECTANGULAR CHANNEL SECTION
3/8" = 1'-0"

(A/—)



CHANNEL TRANSITION SECTION
1/2" = 1'-0"

(C/—)

DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
CHANNEL STRUCTURES
ACCESS RAMP
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

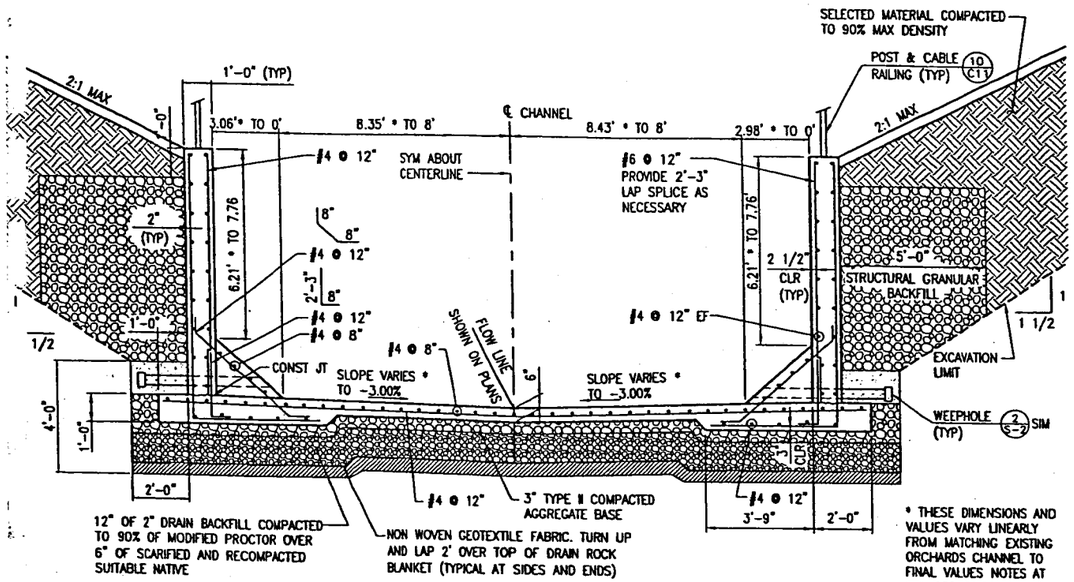
PROFESSIONAL ENGINEER STATE OF NEVADA — RIMAH I. NAZZAL — Exp. 12/31/2005 — CIVIL / STRUCTURAL — No. 12971
3/11/04

PROJECT No: 500.857 DRAWN BY: NO/AL
DESIGNED BY: RIN CHECKED BY: RIN
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

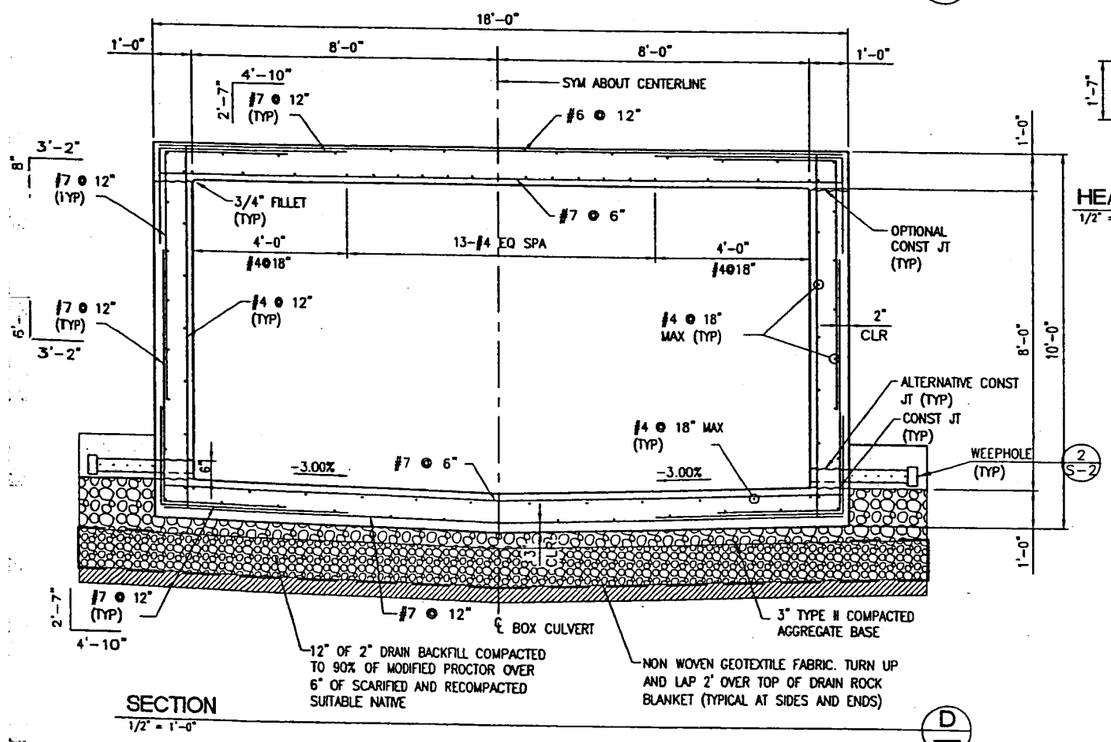
SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
S-5
SHT. 28 OF 30

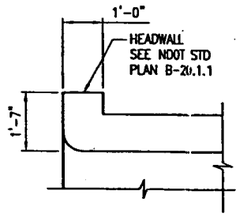


TRANSITION SECTION
3/8" = 1'-0"

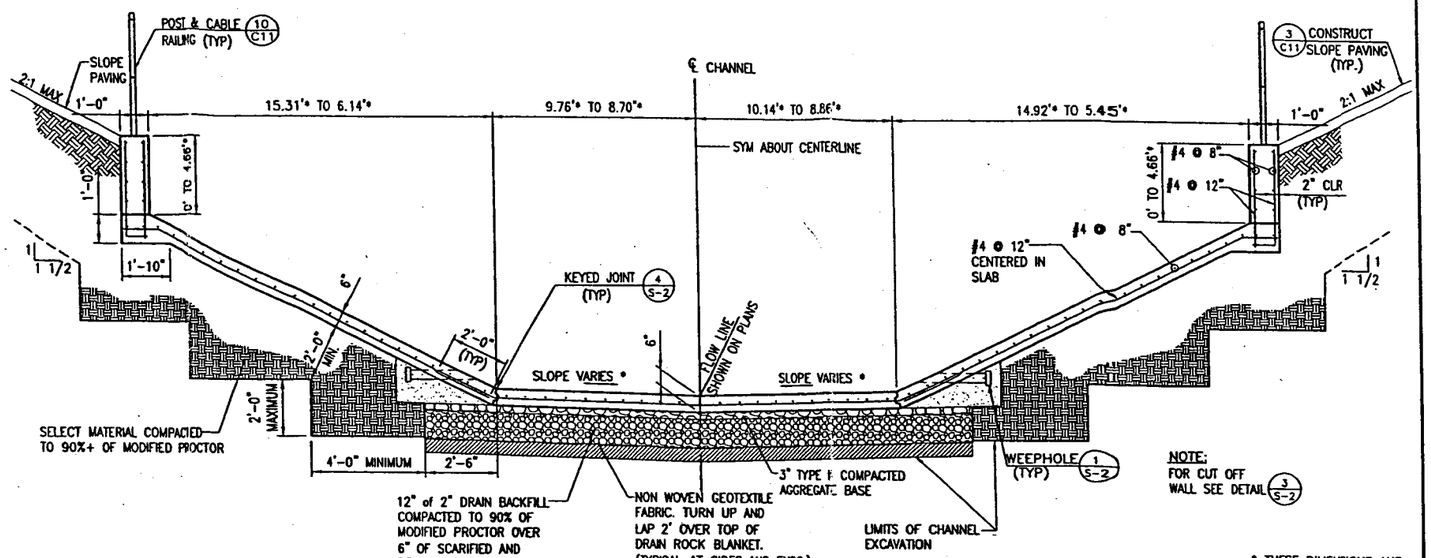
STA 160+89.62, 125.34'LT TO STA 160+91.22, 121.68'LT (C)



SECTION
1/2" = 1'-0" (D)

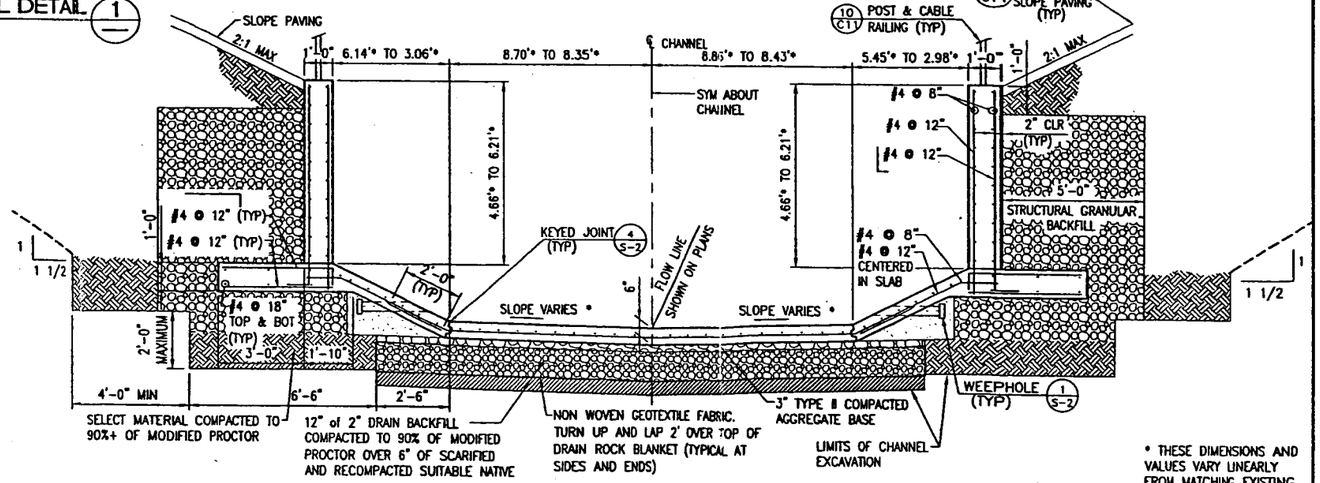


HEADWALL DETAIL 1
1/2" = 1'-0"



TRANSITION SECTION
3/8" = 1'-0"

STA 160+83.21, 140.01'LT TO STA 160+88.02, 129.01'LT (A)



TRANSITION SECTION
3/8" = 1'-0"

STA 160+88.02, 129.01'LT TO STA 160+89.62, 125.34'LT (B)

DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
ACCESS RAMP
DETAILS
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

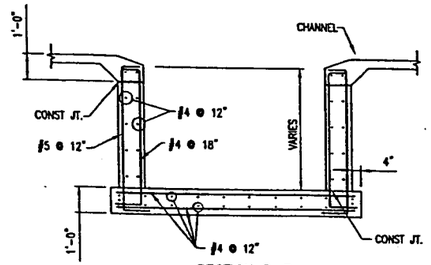
RIMAH I. NAZZAL — Exp. 12/31/2004 — CIVIL / STRUCTURAL — No. 12971 — STATE OF NEVADA — PROFESSIONAL ENGINEER
3/11/04

PROJECT No: 500.857 DRAWN BY: NO/AL
DESIGNED BY: RN CHECKED BY: RIN
APPROVED BY

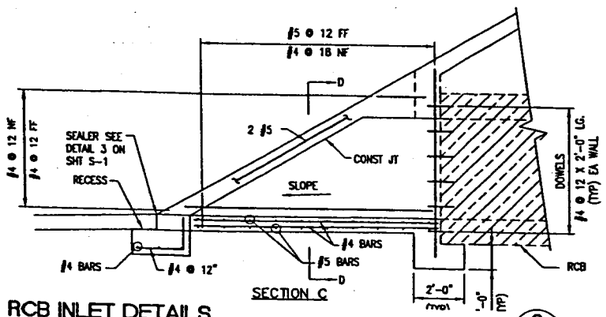
G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE	
HORIZ:	NONE
VERT:	NONE
FIELD BOOK	

L-1759
DRAWING NO. S-6
SHT. 29 OF 30



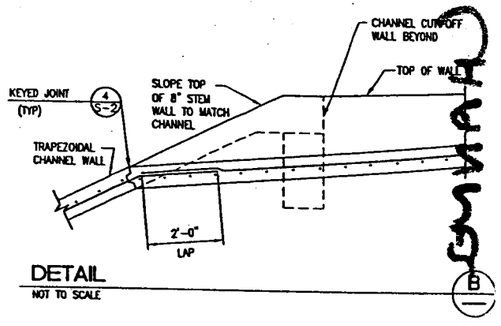
SECTION D-D



RCB INLET DETAILS

NOT TO SCALE

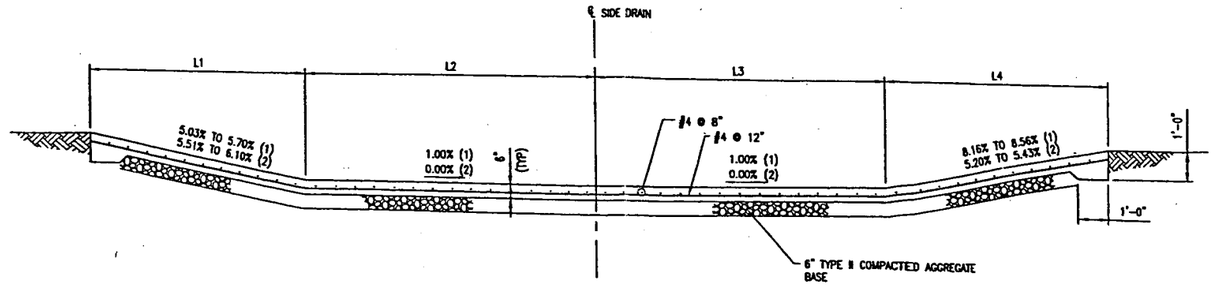
3



DETAIL

NOT TO SCALE

B

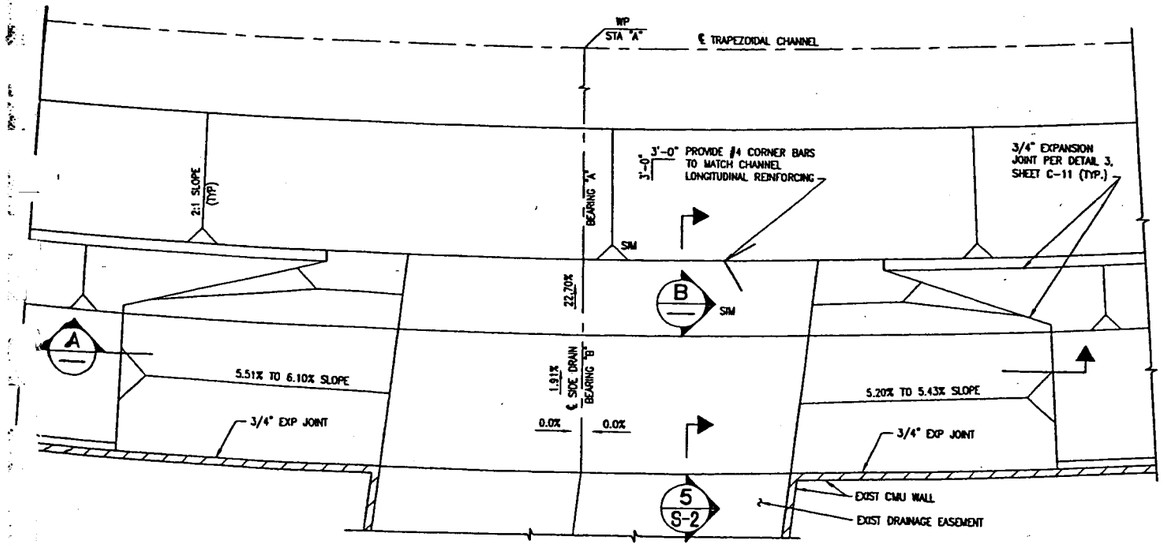


SIDE DRAIN	L1	L2	L3	L4
1	29.15' TO 28.40'	10.00'	10.00'	29.10' TO 28.40'
2	24.20' TO 25.21'	17.05' TO 18.66'	18.72' TO 20.23'	22.07' TO 24.21'

CHANNEL SECTION

NOT TO SCALE

A



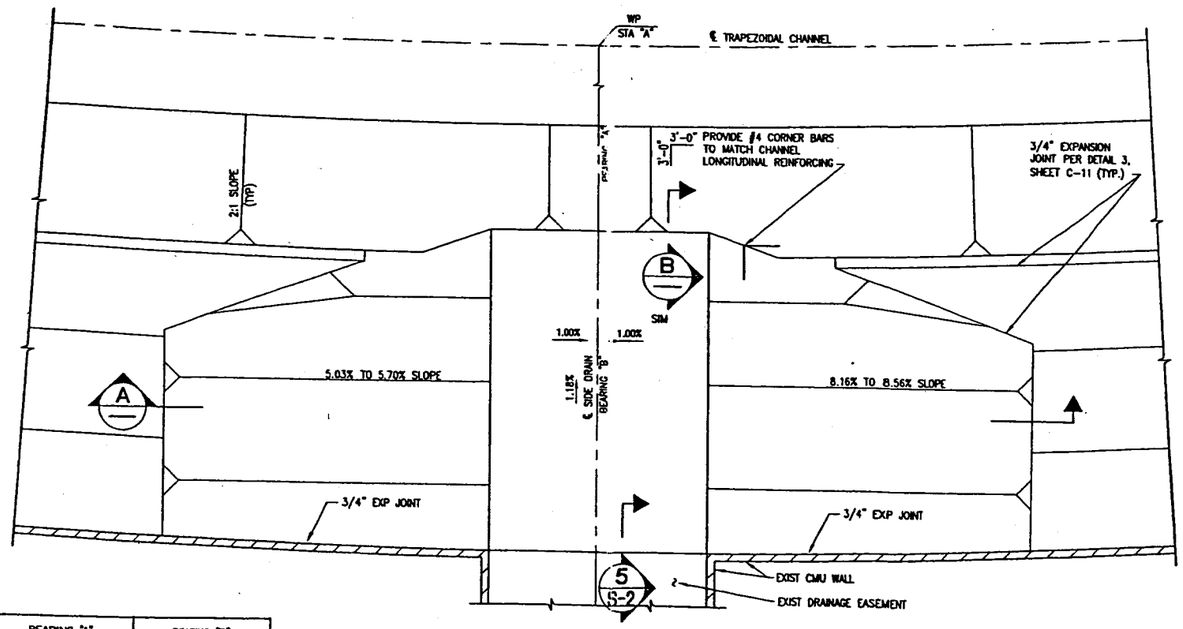
PLAN - TYPE 2 SIDE DRAIN

NOT TO SCALE

2

NOTE:
SEE CIVIL DRAWINGS FOR ELEVATIONS AND INFORMATION NOT SHOWN

	STA "A"	BEARING "A"	BEARING "B"
SIDE DRAIN 1	120+84.85	N 71°07'11" E (R)	N 71°50'27" E
SIDE DRAIN 2	127+33.01	N 63°30'25" E (R)	N 63°33'08" E



PLAN - TYPE 1 SIDE DRAIN

NOT TO SCALE

1

DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
CHANNEL STRUCTURES
DETAILS
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER STATE OF NEVADA
RIMAH I. NAZZAL
Exp. 12/31/2005
CIVIL STRUCTURAL
No. 12977
3/11/04

PROJECT No: 500.857 DRAWN BY: RB/MD/AL
DESIGNED BY: RIN CHECKED BY: RIN
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
S-7
SHT. 30 OF 30

Appendix F: Reference Material

CC NV INCORPORATED AREAS Volume I

TECHNICAL SUPPORT DATA NOTEBOOK

for

CLARK COUNTY, NEVADA AND INCORPORATED AREAS
INCLUDING:
CITY OF NORTH LAS VEGAS
AND
UNINCORPORATED AREAS OF CLARK COUNTY

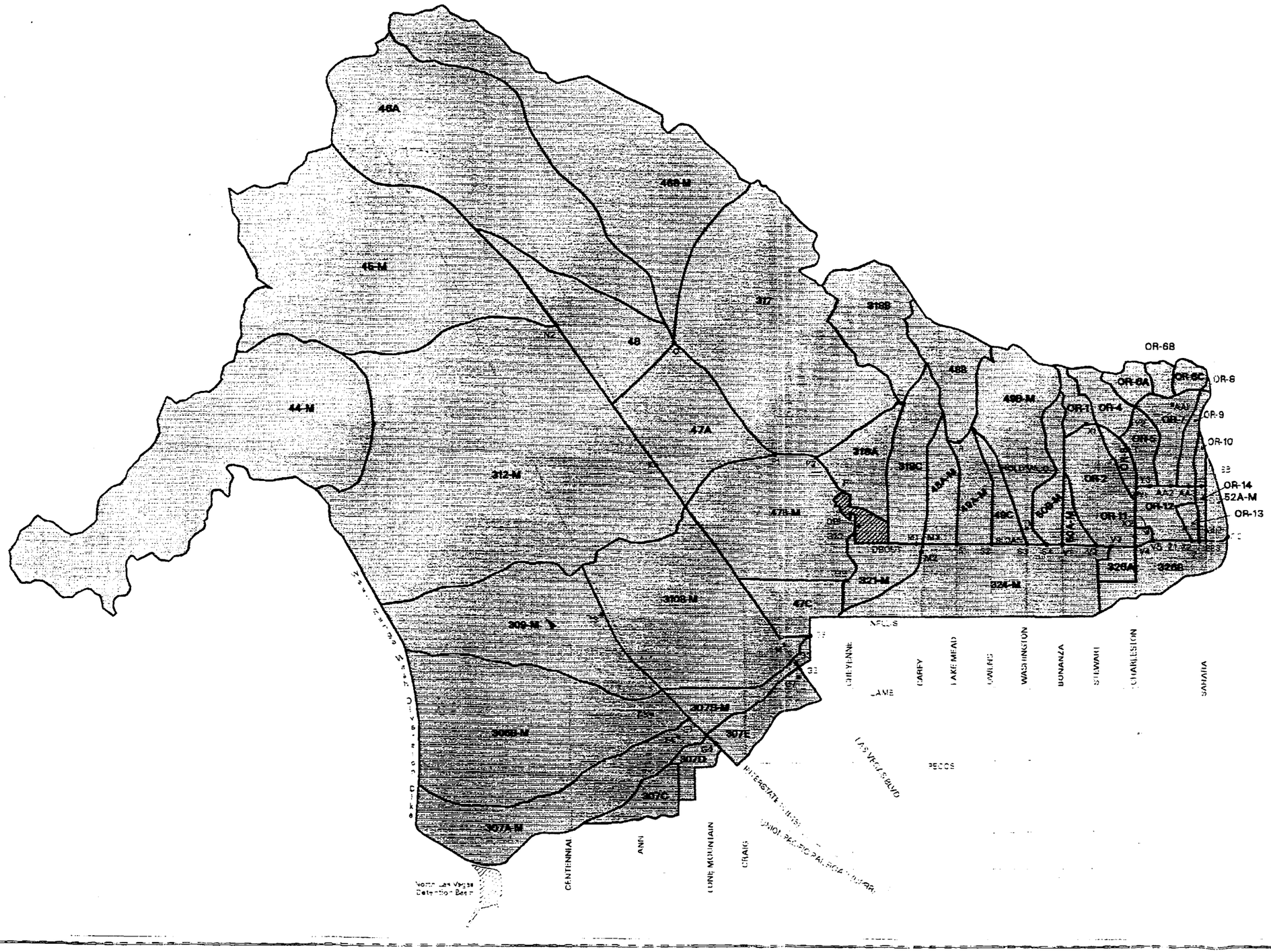
RANGE WASH
FLOOD INSURANCE STUDY RESTUDY

VOLUME 1

SECTION 1 GENERAL DOCUMENTATION
SECTION 2 ENGINEERING ANALYSES
SECTION 3 DRAFT FIS REPORT TEXT
SECTION 4 MAPPING INFORMATION
SECTION 5 REFERENCE MATERIALS
Data Collection Summary Memorandum
& Photo Log

Submitted by:	**Clark County Regional Flood Control District**
Study Contractor:	**Post, Buckley, Schuh & Jernigan, Inc.**
Date Submitted:	**February 27, 1996**

FIGURE 5A: Drainage Basins



LEGEND

Drainage Basins

Detention Basins

Concentration Point ID

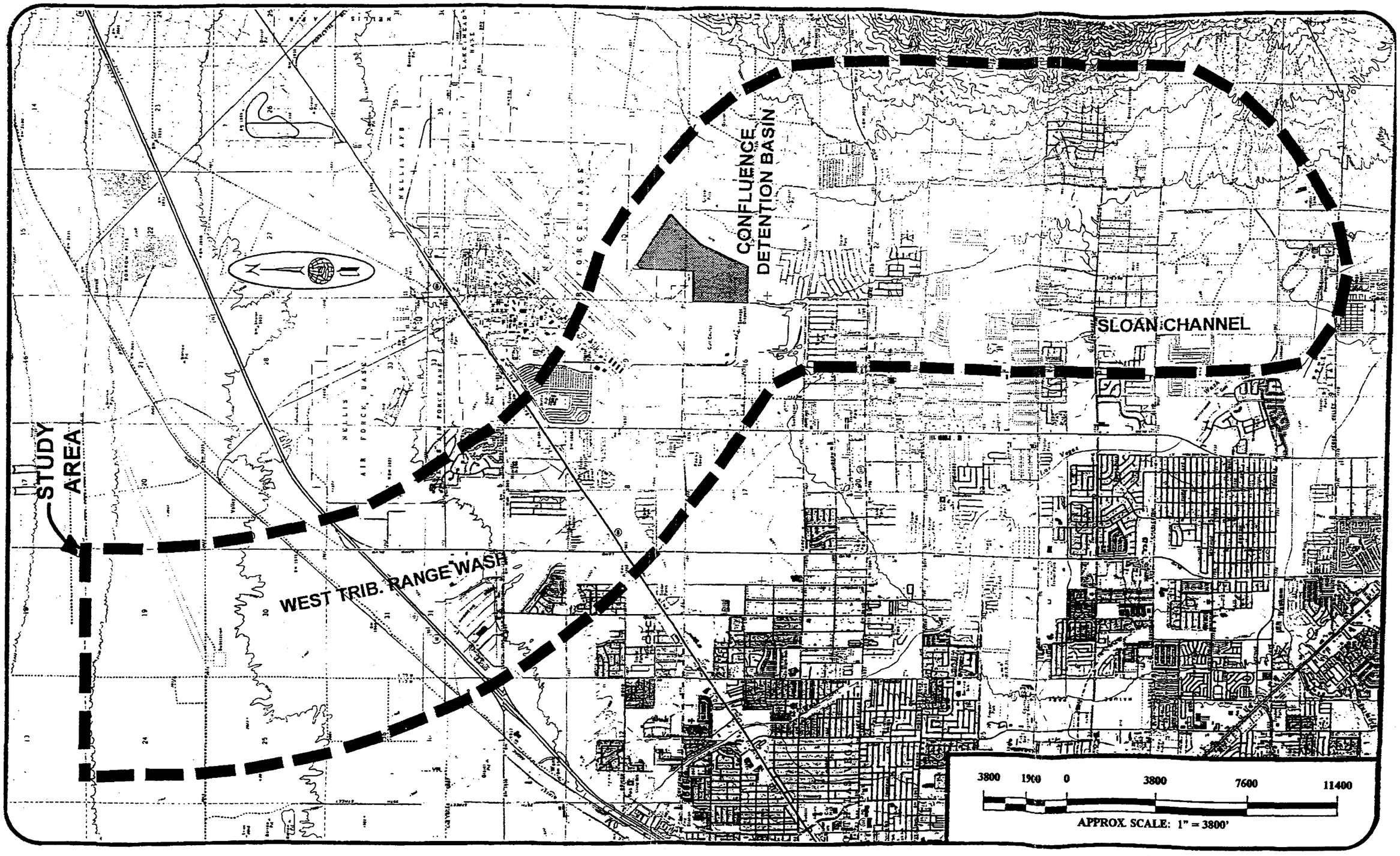
49A-M Basin ID

GRAPHIC SCALE

2 1.5 1 0.5 0 1 2

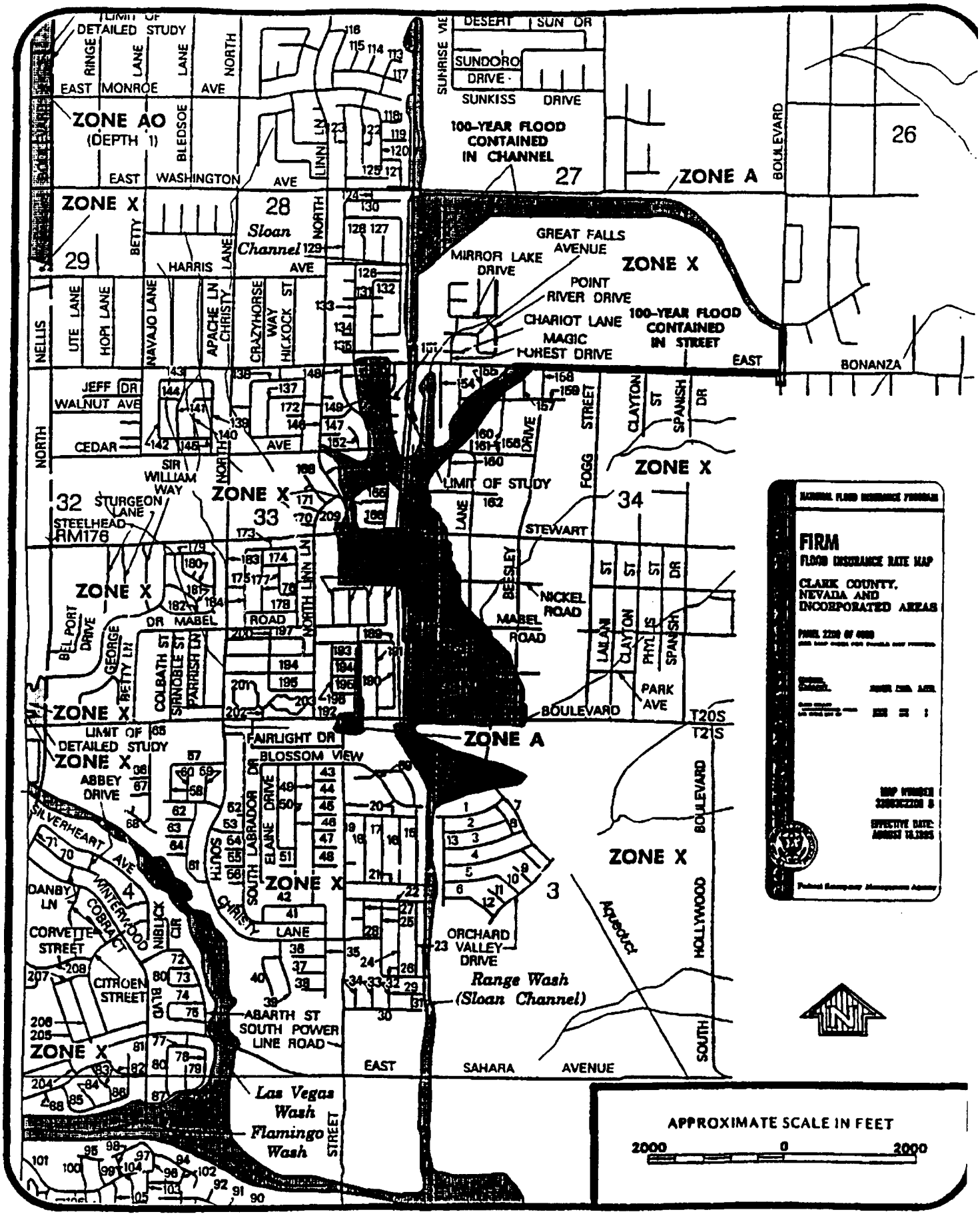
(IN MILES)

SCALE:1 Inch = 7800 feet



LIMITS OF STUDY AREA

POST, BUCKLEY, SCHUH & JERNIGAN



DFIRM 1995

POST, BUCKLEY, SCHUH & JERNIGAN
ENGINEERING • PLANNING • SURVEYING • CONSTRUCTION SERVICES

RFIS-CC.OUT

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
          *DIAGRAM
** FREE ***
    1     ID                    RANGE WASH - FLOOD INSURANCE RESTUDY
    2     ID              FOR: CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
    3     ID                  BY: POST, BUCKLEY, SCHUH & JERNIGAN, INC.
    4     ID                              JOB. NO. 51804
    5     ID                          HEC-1 FILE: RFIS-CC.DAT
    6     ID                               DECEMBER 1995
    7     ID
    8     ID                    EXISTING CONDITIONS DOWNSTREAM OF THE
    9     ID           CONFLUENCE DETENTION BASIN, CURRENTLY UNDER CONSTRUCTION.
   10     ID         STORM CENTERING FOR NODE V2, AT SLOAN CHANNEL DOWNSTREAM OF STEWART,
   11     ID         AND FOR NODE CC, AT THE SLOAN CHANNEL AND LAS VEGAS WASH CONFLUENCE.
   12     ID
   13     ID    ********************************************************************************
   14     ID    *              FROM: CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE                  *
   15     ID    *                           RANGE WASH WATERSHED                                 *
   16     ID    *                JAMES M. MONTGOMERY, CONSULTING ENGINEERS, INC.                 *
   17     ID    *                                 JANUARY 1991                                   *
   18     ID    *                  PRESENT CONDITIONS, EXISTING FACILITIES                      *
   19     ID    *                   BASED ON RANGE WASH FACILITIES STUDY                        *
   20     ID    *                      BOYLE ENGINEERS CORP-JULY 1989                           *
   21     ID    *                                                                               *
   22     ID    *                   (CONVERTED RK TO RM IN UPLAND SUBAREAS)                     *
   23     ID    *MODIFIED TO REMOVE SUBAREAS TRIBUTARY TO WEST RANGE DIVERSION DIKE (1/91)*
   24     ID    ********************************************************************************
   25     ID    *                        100-YEAR, 6-HOUR STORM, AMC 2.0                         *
   26     ID    ********************************************************************************
   27     ID    * STORM DISTRIBUTION 5 (SDN 5) FOR TOTAL BASIN AREA GREATER THAN 10 SQ.MI.*
   28     ID    *  ONLY FOR DRAINAGE BASINS DOWNSTREAM OF CONFLUENCE THE DETENTION BASIN, *
   29     ID    *  JR DARF RATIO 0.85 FOR NODE V2, AT SLOAN CHANNEL DOWNSTREAM OF STEWART *
   30     ID    *  AND 0.82 FOR NODE CC, AT THE SLOAN CHANNEL/LAS VEGAS WASH CONFLUENCE.  *
   31     ID    ********************************************************************************
   32     ID
   33     IT      05       0       0     200
   34     IO       5       0       0
   35     JR    PREC    0.85    0.82

   36     KK    318C
   37     KM    BASIN 318C CONTRIBUTES FLOW TO NODE M1.
   38     KM    NODE M1 GIVES THE TOTAL FLOW IN THE SLOAN CHANNEL JUST UPSTREAM OF
   39     KM    THE CONFLUENCE WITH THE RANGE WASH CHANNEL.
   40     BA     1.28
   41     PB     2.93
   42     PC    .000    .020    .059    .080    .110    .144    .150    .160    .168    .171
   43     PC    .180    .182    .187    .190    .197    .202    .210    .220    .230    .241
   44     PC    .250    .259    .265    .280    .290    .300    .305    .309    .310    .317
   45     PC    .321    .327    .333    .346    .361    .381    .408    .430    .477    .514
   46     PC    .561    .630    .710    .720    .731    .752    .779    .790    .795    .804
   47     PC    .810    .820    .826    .840    .859    .889    .910    .938    .966    .970
   48     PC    .974    .979    .981    .983    .985    .989    .990    .992    .993    .996
   49     PC    .997    .999   1.00
   50     LS      0      79
   51     UD   0.75
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  52      KK   321-M
  53      KM   BASIN 321-M CONTRIBUTES FLOW TO THE RANGE WASH CHANNEL UPSTREAM OF
  54      KM   ITS CONFLUENCE WITH THE SLOAN CHANNEL.
  55      BA   0.691
  56      PB    2.77
  57      LS       0      67
  58      UD    1.66
          *

  59      KK NODE.M3
  60      KM   COMBINE FLOWS FROM M1 AND M2 AT NODE M3.
  61      KM   NODE M3 IS THE TOTAL FLOW AT THE CONFLUENCE OF THE SLOAN CHANNEL
  62      KM   AND THE RANGE WASH CHANNEL AT SLOAN AND CAREY AVENUE.
  63      HC       2
          *

  64      KK   M3-S1
  65      KM   ROUTE FLOW FROM NODE M3 THROUGH THE SLOAN CHANNEL TO NODE S1.
  66      RK    2640   0.004   0.015       0    TRAP       40       3
          *

  67      KK   48A-M
  68      KM   BASIN 48A-M CONTRIBUTES FLOW TO NODE S1.
  69      BA   0.715
  70      PB    2.93
  71      LS       0      83
  72      UD    0.44
          *

  73      KK      S1
  74      KM   COMBINE FLOW FROM M3 WITH FLOW FROM BASIN 48A-M.
  75      KM   GIVES TOTAL FLOW IN THE SLOAN CHANNEL AT LAKE MEAD BLVD.
  76      HC       2
          *

  77      KK   S1-S2
  78      KM   ROUTE FLOW FROM S1 THROUGH THE SLOAN CHANNEL TO S2.
  79      RK    2640   0.002   0.015       0    TRAP       50       2
          *

  80      KK     48B
  81      KM   BASIN 48B CONTRIBUTES FLOW TO NODE R.
  82      BA   1.142
  83      PB    3.10
  84      LS       0      89
  85      UD    0.51
          *

  86      KK    R-S2
  87      KM   ROUTE FLOW FROM R THROUGH BASIN 49A-M TO NODE S2.
  88      RK   10500   0.022    0.02       0    TRAP       10      20
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  89      KK   49A-M
  90      KM   BASIN 49A-M CONTRIBUTES FLOW TO NODE S2.
  91      BA   0.693
  92      PB    2.85
  93      LS       0      79
  94      UD    0.49
          *

  95      KK NODE.S2
  96      KM   COMBINE FLOW FROM NODES S1 AND R WITH FLOW FROM BASIN 49A-M AT NODE S2.
  97      KM   GIVES TOTAL FLOW IN THE SLOAN CHANNEL AT OWENS AVENUE.
  98      HC       3
          *

  99      KK   S2-S3
 100      KM   ROUTE FLOW FROM S2 THROUGH THE SLOAN CHANNEL TO S3.
 101      RK    2640   0.004   0.014       0    TRAP      60       2
          *

 102      KK     49C
 103      KM   BASIN 49C CONTRIBUTES FLOW TO NODE S3.
 104      BA   0.426
 105      PB    2.85
 106      LS       0      76
 107      UD    0.53
          *

 108      KK NODE.S3
 109      KM   COMBINE FLOW FROM S2 WITH FLOW FROM BASIN 49C AT NODE S3.
 110      KM   GIVES TOTAL FLOW IN THE SLOAN CHANNEL AT WASHINGTON AVE.
 111      HC       2
          *

 112      KK   49B-M
 113      KM   BASIN 49B-M CONTRIBUTES FLOW TO NODE T1.
 114      KM   NODE T1 REPRESENTS THE TOTAL FLOW TO THE DIVERSION CHANNEL ALONG
 115      KM   WASHINGTON AVE. JUST UPSTREAM OF THE SLOAN CHANNEL.
 116      BA   1.977
 117      PB    3.00
 118      LS       0      85
 119      UD    0.61
          *

 120      KK NODE.S4
 121      KM   COMBINE FLOW FROM S3 WITH FLOW FROM T1 AT NODE S4.
 122      KM   GIVES TOTAL FLOW IN THE SLOAN CHANNEL AT HARRIS AVE.
 123      HC       2
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  124     KK   50B-M
  125     KM   BASIN 50B-M CONTRIBUTES FLOW TO NODE V1.
  126     BA   0.628
  127     PB    3.00
  128     LS       0      80
  129     UD    0.39
          *

  130     KK NODE.V1
  131     KM   COMBINE FLOW FROM S4 WITH FLOW FROM BASIN 50B-M AT NODE V1.
  132     KM   GIVES TOTAL FLOW IN THE SLOAN CHANNEL AT BONANZA RD.
  133     HC       2
          *

  134     KK   V1-V2
  135     KM   ROUTE FLOWS FROM V1 THROUGH THE SLOAN CHANNEL TO NODE V2.
  136     RK    2640   0.008   0.014       0    TRAP      60       2
          *

  137     KK   50A-M
  138     KM   BASIN 50A-M CONTRIBUTES FLOW TO NODE V2.
  139     BA   0.207
  140     PB    2.85
  141     LS       0      73
  142     UD    0.46
          *

  143     KK NODE.V2
  144     KM   COMBINE FLOW FROM V1 WITH FLOW FROM BASIN 50A-M AT NODE V2.
  145     KM   GIVES TOTAL FLOW IN THE SLOAN CHANNEL AT STEWART AVE.
  146     HC       2
          *

  147     KK   324-M
  148     KM   BASIN 324-M CONTRIBUTES FLOW TO NODE V3.
  149     BA   3.026
  150     PB    2.85
  151     LS       0      72
  152     UD    0.77
          *

  153     KK    STEW
  154     KM   DIVERT FLOWS WHICH CONTINUE IN CHRISTY & LINN LANES, ETC
  155     KM   FLOW IN STEWART GOES TO SLOAN CHANNEL
  156     KM   FLOW IN CHRISTY GOES TOWARD LAS VEGAS WASH
  157     DT      CL
  158     DI       0      15     600
  159     DQ       0       0     330
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  160     KK NODE.V3
  161     KM   COMBINE FLOW FROM V2 WITH FLOW FROM BASIN 324-M AT NODE V3.
  162     KM   GIVES TOTAL FLOW IN THE SLOAN CHANNEL
  163     KM   SOUTH OF STEWART AVE.
  164     HC       2
          *

  165     KK   V3-V4
  166     KM   ROUTE V3 THROUGH THE SLOAN CHANNEL TO V4.
  167     RK    2000   0.003    0.03       0    TRAP      80       2
          *

  168     KK     CLR
  169     KM   RETREIVE FLOW IN CHRISTY AND LINN LANES
  170     DR      CL
          *

  171     KK    LINN
  172     KM   FLOW IN LINN LANE GOES TO BASIN 326-A THEN TO SLOAN CHANNEL
  173     KM   FLOW IN CHRISTY GOES TO LAS VEGAS WASH
  174     DT   CHRIS
  175     DI       0     100     500
  176     DQ       0      78     390
          *

  177     KK   326-A
  178     KM   BASIN 326-A CONTRIBUTES FLOW TO NODE V4.
  179     KM   GIVES TOTAL FLOW IN THE SECTION OF CHARLESTON BLVD. WEST OF SLOAN CHANNEL.
  180     BA   0.231
  181     PB    2.85
  182     LS       0      79
  183     UD    0.39
          *

  184     KK  326-AL
  185     KM   BASIN 326-A AND FLOW IN LINN LANE
  186     HC       2
          *

  187     KK    OR-1
  188     KM   ORCHARDS OFFSITE DRAINAGE BASIN 01; CONTRIBUTES FLOW TO NODE X1.
  189     KM   * BASINS WITH THE "OR" PREFIX ARE TAKEN FROM THE "CONCEPTUAL MASTER        *
  190     KM   * DRAINAGE STUDY FOR LEWIS HOMES - ORCHARDS," BY PENTACORE, JANUARY, 1992. *
  191     KM   * THE MAJORITY OF THE ORCHARDS SITE IS CONSTRUCTED; HOWEVER, THE PLANNED   *
  192     KM   * ORCHARDS DETENTION BASIN IS NOT CONSTRUCTED. HYDROLOGY FROM THE ORCHARDS *
  193     KM   * DRAINAGE STUDY HAS BEEN MODIFIED TO REPRESENT APPROXIMATE EXISTING       *
  194     KM   * CONDITIONS, RATHER THAN FULLY DEVELOPED CONDITIONS.                      *
  195     PB    3.00
  196     BA   0.279
  197     LS       0      89
  198     UD    0.18
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  199     KK   X1-X2
  200     KM   ROUTE X1 THROUGH BASIN OR-2 TO NODE X2.
  201     RK   10000   0.033    0.02       0    TRAP      20       10
          *

  202     KK    OR-2
  203     KM   ORCHARDS OFFSITE DRAINAGE BASIN 02; CONTRIBUTES FLOW TO NODE X2.
  204     BA   1.206
  205     PB    2.93
  206     LS       0       75
  207     UD    0.60
          *

  208     KK NODE.X2
  209     KM   COMBINE FLOW FROM X1 AND BASIN OR-2 AT NODE X2.
  210     KM   GIVES TOTAL FLOW IN THE SECTION OF CHARLESTON BLVD. EAST OF SLOAN CHANNEL.
  211     HC       2
          *

  212     KK NODE.V4
  213     KM   COMBINE FLOW FROM V3, X2 AND BASIN 326-A.
  214     KM   GIVES TOTAL FLOW TO THE SLOAN CHANNEL AT CHARLESTON BLVD.
  215     HC       3
          *

  216     KK   OR-11
  217     KM   ORCHARDS ONSITE BASIN OR-11 CONTRIBUTES FLOW TO NODE V5.
  218     BA  0.0428
  219     PB    2.85
  220     LS       0       75
  221     UD    0.20
          *

  222     KK NODE.V5
  223     KM   COMBINE FLOW FROM V4 AND BASIN OR-11.
  224     KM   TOTAL FLOW TO THE SLOAN CHANNEL APPROX. 1500 FT. SOUTH OF CHARLESTON BLVD.
  225     HC       2
          *

  226     KK   V5-Z2
  227     KM   ROUTE V5 THROUGH SLOAN CHANNEL TO THE ORCHARDS CHANNEL CONFLUENCE AT Z2.
  228     RK    2800   0.005    0.03       0    TRAP      60       2
          *

  229     KK    OR-3
  230     KM   ORCHARDS OFFSITE DRAINAGE BASIN 03.
  231     KM   GIVES FLOW TO NODE Y1, LOCATED AT CHARLESTON WEST OF HOLLYWOOD.
  232     BA   0.205
  233     PB    3.00
  234     LS       0       82
  235     UD    0.42
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  236     KK   Y1-Z1
  237     KM   ROUTE NODE Y1 THROUGH BASIN OR-12 TO NODE Z1.
  238     RK    5500   0.011   0.016       0    TRAP      50       1
          *

  239     KK    OR-4
  240     KM   ORCHARDS OFFSITE DRAINAGE BASIN 04.
  241     KM   CONTRIBUTES FLOW TO NODE Y2.
  242     BA   0.448
  243     PB    3.00
  244     LS       0      88
  245     UD    0.29
          *

  246     KK   Y2-Y3
  247     KM   ROUTE NODE Y2 THROUGH BASIN OR-5 TO NODE Y3.
  248     RM       4    0.33    0.15
          *

  249     KK    OR-5
  250     KM   ORCHARDS OFFSITE DRAINAGE BASIN 05.
  251     KM   CONTRIBUTES FLOW TO NODE Y3.
  252     BA   0.373
  253     PB    3.00
  254     LS       0      77
  255     UD    0.44
          *

  256     KK      Y3
  257     KM   COMBINE FLOWS FROM Y2 AND BASIN OR-5 AT HOLLYWOOD.
  258     HC       2
          *

  259     KK   Y3-Z1
  260     KM   ROUTE Y3 THROUGH BASIN OR-12 TO NODE Z1.
  261     RK    5000   0.012   0.016       0    TRAP      50       1
          *

  262     KK   OR-6A
  263     KM   ORCHARDS OFFSITE DRAINAGE BASIN 06A.
  264     BA   0.264
  265     PB    3.00
  266     LS       0      88
  267     UD     .13
          *

  268     KK   OR-6B
  269     KM   ORCHARDS OFFSITE DRAINAGE BASIN 06B,
  270     BA   0.160
  271     PB    3.00
  272     LS       0      89
  273     UD     .14
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  274     KK   OR-6C
  275     KM   ORCHARDS OFFSITE DRAINAGE BASIN 06C.
  276     BA   0.191
  277     PB    3.00
  278     LS      0      87
  279     UD    .18
          *

  280     KKNODE.AA1
  281     KM   COMBINE FLOWS FROM BASINS OR-6A, OR-6B & OR-6C.
  282     HC      3
          *

  283     KK AA1-AA2
  284     KM   ROUTE AA1 THROUGH BASIN OR-7 TO NODE AA2.
  285     RM      4    0.32    0.15
          *

  286     KK    OR-7
  287     KM   ORCHARDS OFFSITE DRAINAGE BASIN 07.
  288     BA   0.613
  289     PB    3.00
  290     LS      0      77
  291     UD    0.49
          *

  292     KKNODE.AA2
  293     KM   COMBINE AA1 WITH FLOW FROM BASIN OR-7 AT NODE AA2.
  294     HC      2
          *

  295     KK  AA2-Z1
  296     KM   ROUTE AA2 THROUGH BASIN OR-12 TO NODE Z1.
  297     RK    4500   0.013   0.016      0    TRAP      50       1
          *

  298     KK    OR-8
  299     KM   ORCHARDS OFFSITE BASIN 08; CONTRIBUTES FLOW TO NODE AA3.
  300     BA   0.017
  301     PB    3.00
  302     LS      0      77
  303     UD   0.18
          *

  304     KK  R8-AA3
  305     KM   ROUTE FLOW FROM BASIN OR-8 THROUGH BASIN OR-9 TO NODE AA3 AT HOLLYWOOD.
  306     RM     10    0.82    0.15
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  307     KK    OR-9
  308     KM   ORCHARDS OFFSITE DRAINAGE BASIN 09; CONTRIBUTES FLOW TO NODE AA3.
  309     BA   0.278
  310     PB    3.00
  311     LS       0      77
  312     UD    0.65
          *

  313     KKNODE.AA3
  314     KM   COMBINE FLOWS FROM BASINS OR-8 AND OR-9 AT NODE AA3.
  315     HC       2
          *

  316     KK  AA3-Z1
  317     KM   ROUTE AA3 THROUGH BASIN OR-12 TO NODE Z1.
  318     RK    4500   0.012   0.016       0    TRAP      50       1
          *

  319     KK   OR-12
  320     KM   ORCHARDS ONSITE DRAINAGE BASIN 12; CONTRIBUTES FLOW TO NODE Z1.
  321     BA   0.525
  322     PB    2.85
  323     LS       0      76
  324     UD    0.39
          *

  325     KK NODE.Z1
  326     KM   COMBINE FLOW FROM NODES Y1, Y3, AA2, AA3 AND BASIN OR-12 AT NODE Z1.
  327     KM   NODE Z1 REPRESENTS THE TOTAL FLOW IN THE CONCRETE-LINED ORCHARDS CHANNEL
  328     KM   TRIBUTARY TO THE SLOAN CHANNEL.
  329     HC       5
          *

  330     KK NODE.Z2
  331     KM   COMBINE FLOW FROM NODES V5 AND Z1.
  332     KM   TOTAL FLOW IN THE SLOAN CHANNEL AT ITS CONFLUENCE WITH THE ORCHARDS CHANNEL.
  333     HC       2
          *

  334     KK   OR-13
  335     KM   ORCHARDS ONSITE DRAINAGE BASIN OR-13; CONTRIBUTES FLOW TO NODE Z3.
  336     BA   0.120
  337     PB    2.85
  338     LS       0      84
  339     UD    0.29
          *

  340     KK NODE.Z3
  341     KM   COMBINE FLOW FROM NODES Z2 AND BASIN OR-13 AT NODE Z3.
  342     KM   NODE Z3 IS THE TOTAL FLOW IN THE SLOAN CHANNEL AT APPROXIMATELY
  343     KM   450 FEET SOUTH OF THE ORCHARDS CHANNEL CONFLUENCE.
  344     HC       2
          *
```

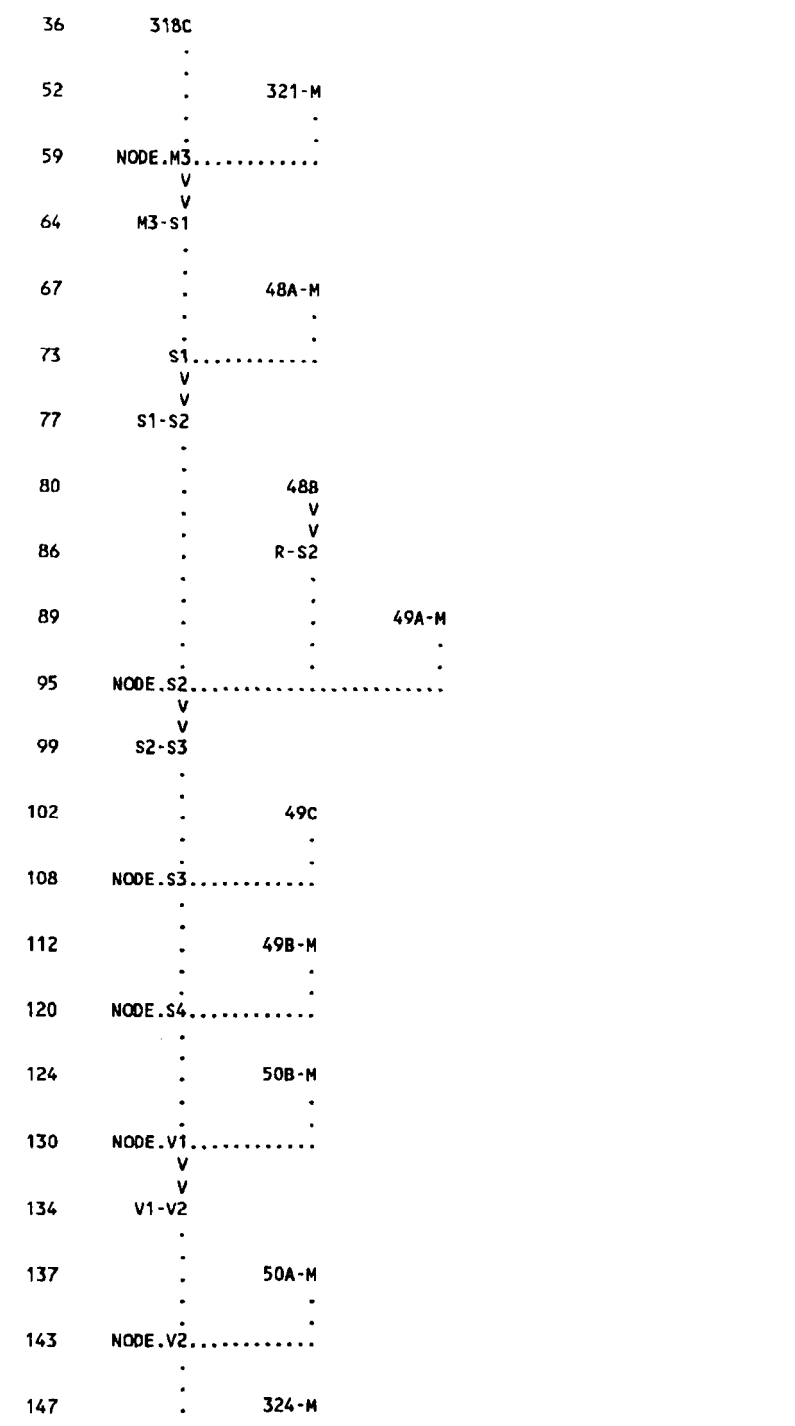
```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  345     KK   OR-10
  346     KM   ORCHARDS OFFSITE DRAINAGE BASIN O10.
  347     KM   CONTRIBUTES FLOW TO NODE BB1, LOCATED AT THE HOLLYWOOD/SAHARA INTERSECTION.
  348     BA  0.0984
  349     PB   3.00
  350     LS      0      77
  351     UD   0.45
          *

  352     KK BB1-BB2
  353     KM   ROUTE BB1 THROUGH SAHARA AVENUE TO NODE BB2.
  354     RK    4000   0.014   0.016       0    TRAP     100       1
          *

  355     KK   OR-14
  356     KM   ORCHARDS ONSITE DRAINAGE BASIN 14; CONTRIBUTES FLOW TO NODE BB2.
  357     BA  0.0937
  358     PB   2.85
  359     LS      0      75
  360     UD   0.33
          *

  361     KKNODE.BB2
  362     KM   NODE BB2 REPRESENTS THE TOTAL FLOW IN SAHARA AVE. EAST OF THE SLOAN CHANNEL.
  363     HC      2
          *

  364     KKNODE.BB3
  365     KM   COMBINE FLOW FROM Z3 WITH FLOW FROM BB2.
  366     KM   NODE BB3 IS THE TOTAL FLOW IN SLOAN CHANNEL AT SAHARA AVE.
  367     HC      2
          *

  368     KK  BB3-CC
  369     KM   ROUTE BB3 THROUGH THE SLOAN CHANNEL TO NODE CC.
  370     RK    1700   0.006   0.025       0    TRAP      80       2
          *

  371     KK   52A-M
  372     KM   BASIN 52A-M CONTRIBUTES FLOW TO NODE CC.
  373     BA   0.286
  374     PB   2.85
  375     LS      0      73
  376     UD   0.84
          *

  377     KK NODE.CC
  378     KM   COMBINE FLOW FROM  NODE BB3 WITH FLOW FROM BASINS 326-B AND 52A-M.
  379     KM   NODE CC REPRESENTS THE TOTAL FLOW IN THE SLOAN CHANNEL JUST UPSTREAM OF
  380     KM   ITS CONFLUENCE WITH THE LAS VEGAS WASH.
  381     HC      2
          *
  382     ZZ
```

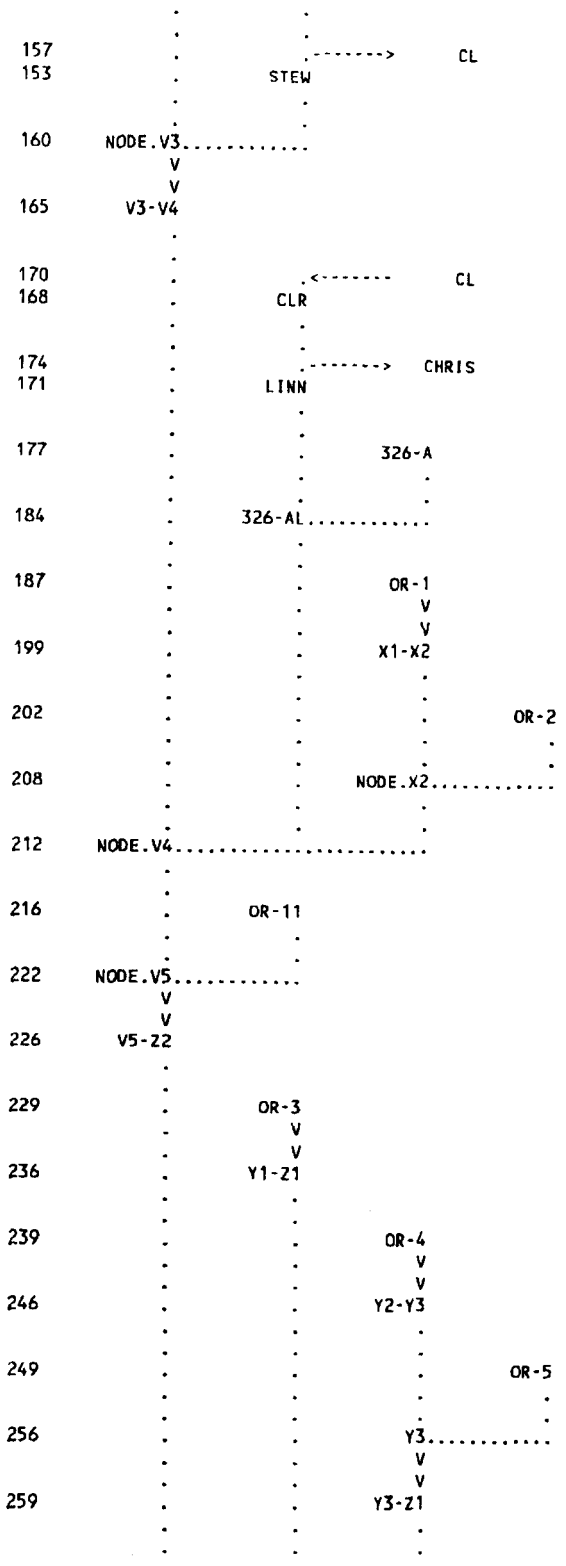
1

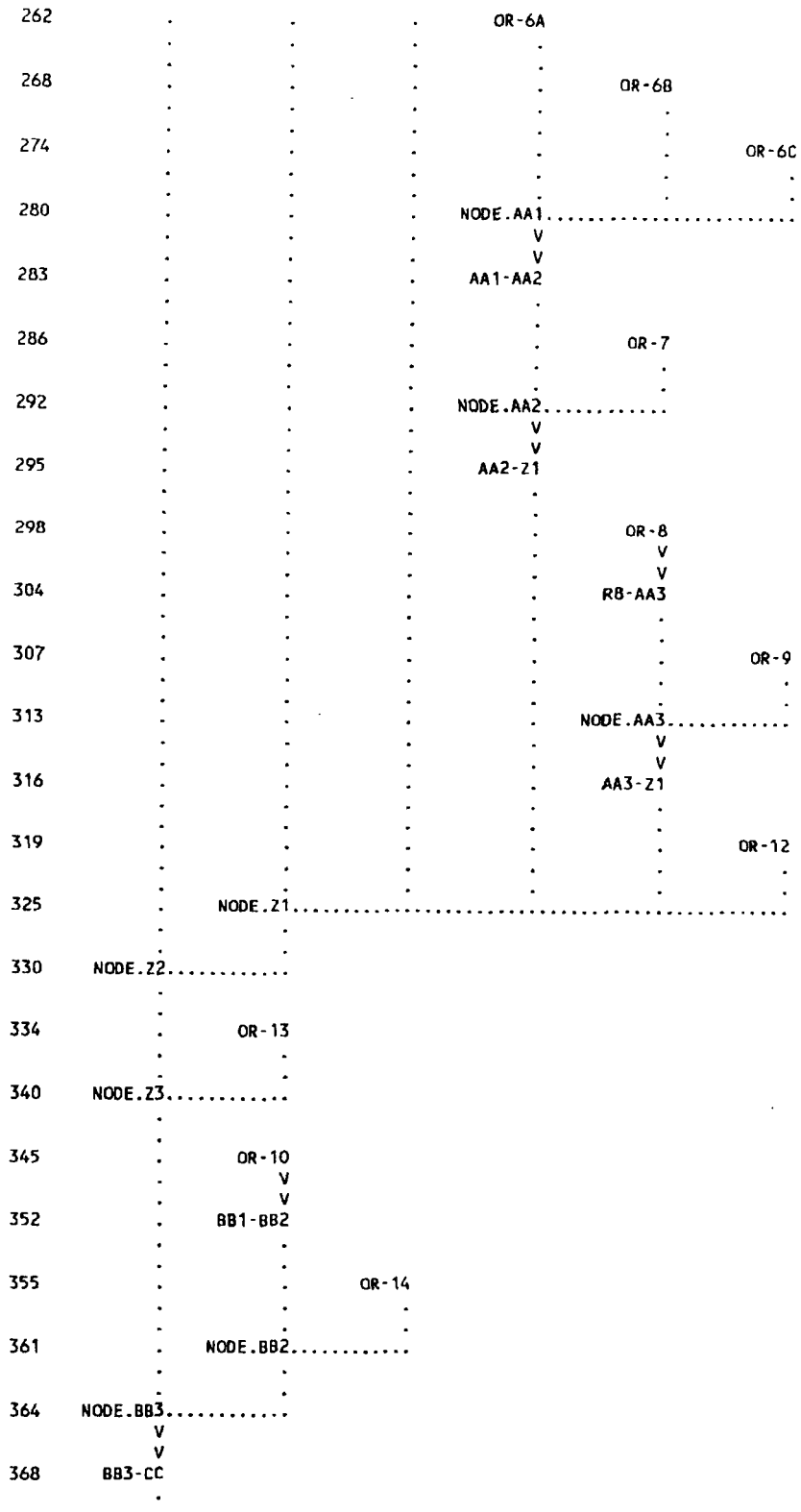
SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING
(.) CONNECTOR
(---->) DIVERSION OR PUMP FLOW
(<----) RETURN OF DIVERTED OR PUMPED FLOW




157
153
STEW
CL
160
NODE.V3
165
V3-V4
170
168
CLR
CL
174
171
LINN
CHRIS
177
326-A
184
326-AL
187
OR-1
199
X1-X2
202
OR-2
208
NODE.X2
212
NODE.V4
216
OR-11
222
NODE.V5
226
V5-Z2
229
OR-3
236
Y1-Z1
239
OR-4
246
Y2-Y3
249
OR-5
256
Y3
259
Y3-Z1


262
OR-6A
268
OR-6B
274
OR-6C
280
NODE.AA1
283
AA1-AA2
286
OR-7
292
NODE.AA2
295
AA2-Z1
298
OR-8
304
R8-AA3
307
OR-9
313
NODE.AA3
316
AA3-Z1
319
OR-12
325
NODE.Z1
330
NODE.Z2
334
OR-13
340
NODE.Z3
345
OR-10
352
BB1-BB2
355
OR-14
361
NODE.BB2
364
NODE.BB3
368
BB3-CC

```
                .
371             .       52A-M
                .         .
                .         .
377     NODE.CC.............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             SEPTEMBER 1990            *
*              VERSION 4.0              *
*                                       *
*   RUN DATE  01/12/1996  TIME  09:54:56 *
*                                       *
*****************************************
```


```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*          (916) 756-1104               *
*                                       *
*****************************************
```


RANGE WASH - FLOOD INSURANCE RESTUDY
FOR: CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT
BY: POST, BUCKLEY, SCHUH & JERNIGAN, INC.
JOB. NO. 51804
HEC-1 FILE: RFIS-CC.DAT
DECEMBER 1995

EXISTING CONDITIONS DOWNSTREAM OF THE
CONFLUENCE DETENTION BASIN, CURRENTLY UNDER CONSTRUCTION.
STORM CENTERING FOR NODE V2, AT SLOAN CHANNEL DOWNSTREAM OF STEWART,
AND FOR NODE CC, AT THE SLOAN CHANNEL AND LAS VEGAS WASH CONFLUENCE.

```
*************************************************************************
*             FROM: CCRFCD LAS VEGAS VALLEY MASTER PLAN UPDATE          *
*                          RANGE WASH WATERSHED                         *
*                 JAMES M. MONTGOMERY, CONSULTING ENGINEERS, INC.       *
*                          JANUARY 1991                                 *
*                   PRESENT CONDITIONS, EXISTING FACILITIES             *
*                    BASED ON RANGE WASH FACILITIES STUDY               *
*                       BOYLE ENGINEERS CORP-JULY 1989                  *
*                                                                       *
*                   (CONVERTED RK TO RM IN UPLAND SUBAREAS)             *
*MODIFIED TO REMOVE SUBAREAS TRIBUTARY TO WEST RANGE DIVERSION DIKE (1/91)*
*************************************************************************
*                      100-YEAR, 6-HOUR STORM, AMC 2.0                  *
*************************************************************************
* STORM DISTRIBUTION 5 (SDN 5) FOR TOTAL BASIN AREA GREATER THAN 10 SQ.MI.*
*  ONLY FOR DRAINAGE BASINS DOWNSTREAM OF CONFLUENCE THE DETENTION BASIN, *
*  JR DARF RATIO 0.85 FOR NODE V2, AT SLOAN CHANNEL DOWNSTREAM OF STEWART *
*  AND 0.82 FOR NODE CC, AT THE SLOAN CHANNEL/LAS VEGAS WASH CONFLUENCE.  *
*************************************************************************
```

```
34 IO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE

   IT          HYDROGRAPH TIME DATA
                     NMIN          5  MINUTES IN COMPUTATION INTERVAL
                    IDATE      1   0  STARTING DATE
                    ITIME       0000  STARTING TIME
                       NQ        200  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE      1   0  ENDING DATE
                   NDTIME       1635  ENDING TIME
                    ICENT         19  CENTURY MARK

                 COMPUTATION INTERVAL      .08 HOURS
                      TOTAL TIME BASE    16.58 HOURS

       ENGLISH UNITS
            DRAINAGE AREA         SQUARE MILES
            PRECIPITATION DEPTH   INCHES
            LENGTH, ELEVATION     FEET
            FLOW                  CUBIC FEET PER SECOND
            STORAGE VOLUME        ACRE-FEET
            SURFACE AREA          ACRES
            TEMPERATURE           DEGREES FAHRENHEIT

   JP          MULTI-PLAN OPTION
                    NPLAN          1  NUMBER OF PLANS

   JR          MULTI-RATIO OPTION
                   RATIOS OF PRECIPITATION
                   .85       .82
```

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .85	RATIO 2 .82
HYDROGRAPH AT						
+	318C	1.28	1	FLOW	312.	290.
				TIME	4.25	4.25
HYDROGRAPH AT						
+	321-M	.69	1	FLOW	45.	41.
				TIME	5.92	5.92
2 COMBINED AT						
+	NODE.M3	1.97	1	FLOW	323.	299.
				TIME	4.25	4.25
ROUTED TO						
+	M3-S1	1.97	1	FLOW	322.	298.
				TIME	4.25	4.25
HYDROGRAPH AT						
+	48A-M	.71	1	FLOW	290.	272.
				TIME	3.83	3.83
2 COMBINED AT						
+	S1	2.69	1	FLOW	545.	507.
				TIME	4.00	4.08
ROUTED TO						
+	S1-S2	2.69	1	FLOW	545.	507.
				TIME	4.08	4.08
HYDROGRAPH AT						
+	48B	1.14	1	FLOW	627.	596.
				TIME	3.92	3.92
ROUTED TO						
+	R-S2	1.14	1	FLOW	621.	589.
				TIME	4.00	4.08
HYDROGRAPH AT						
+	49A-M	.69	1	FLOW	200.	185.
				TIME	3.92	3.92
3 COMBINED AT						
+	NODE.S2	4.52	1	FLOW	1352.	1268.
				TIME	4.00	4.08
ROUTED TO						
+	S2-S3	4.52	1	FLOW	1351.	1268.
				TIME	4.08	4.08
HYDROGRAPH AT						
+	49C	.43	1	FLOW	96.	88.
				TIME	4.00	4.00
2 COMBINED AT						
+	NODE.S3	4.95	1	FLOW	1445.	1355.
				TIME	4.08	4.08
HYDROGRAPH AT						
+	49B-M	1.98	1	FLOW	788.	742.
				TIME	4.00	4.00

2 COMBINED AT						
+	NODE.S4	6.92	1	FLOW	2225.	2090.
				TIME	4.08	4.08
HYDROGRAPH AT						
•	50B-M	.63	1	FLOW	237.	221.
				TIME	3.75	3.75
2 COMBINED AT						
•	NODE.V1	7.55	1	FLOW	2420.	2270.
				TIME	4.00	4.00
ROUTED TO						
+	V1-V2	7.55	1	FLOW	2409.	2262.
				TIME	4.08	4.08
HYDROGRAPH AT						
+	50A-M	.21	1	FLOW	40.	36.
				TIME	3.92	3.92
2 COMBINED AT						
•	NODE.V2	7.76	1	FLOW	2446.	2296.
				TIME	4.08	4.08
HYDROGRAPH AT						
+	324-M	3.03	1	FLOW	407.	368.
				TIME	4.33	4.33
DIVERSION TO						
•	CL	3.03	1	FLOW	221.	199.
				TIME	4.33	4.33
HYDROGRAPH AT						
+	STEW	3.03	1	FLOW	186.	169.
				TIME	4.33	4.33
2 COMBINED AT						
+	NODE.V3	10.78	1	FLOW	2618.	2450.
				TIME	4.08	4.08
ROUTED TO						
+	V3-V4	10.78	1	FLOW	2610.	2442.
				TIME	4.08	4.08
HYDROGRAPH AT						
+	CLR	.00	1	FLOW	221.	199.
				TIME	4.33	4.33
DIVERSION TO						
+	CHRIS	.00	1	FLOW	172.	155.
				TIME	4.33	4.33
HYDROGRAPH AT						
+	LINN	.00	1	FLOW	49.	44.
				TIME	4.33	4.33
HYDROGRAPH AT						
+	326-A	.23	1	FLOW	74.	68.
				TIME	3.75	3.75
2 COMBINED AT						
+	326-AL	.23	1	FLOW	106.	97.
				TIME	3.92	3.92
HYDROGRAPH AT						
•	OR-1	.28	1	FLOW	231.	220.
				TIME	3.58	3.58
ROUTED TO						
+	X1-X2	.28	1	FLOW	220.	206.
				TIME	3.75	3.75

HYDROGRAPH AT						
•	OR-2	1.21	1	FLOW	254.	233.
				TIME	4.08	4.08
2 COMBINED AT						
+	NODE.X2	1.49	1	FLOW	408.	376.
				TIME	3.75	3.75
3 COMBINED AT						
•	NODE.V4	12.50	1	FLOW	3072.	2870.
				TIME	4.08	4.08
HYDROGRAPH AT						
+	OR-11	.04	1	FLOW	14.	13.
				TIME	3.58	3.58
2 COMBINED AT						
+	NODE.V5	12.54	1	FLOW	3078.	2876.
				TIME	4.08	4.08
ROUTED TO						
+	V5-Z2	12.54	1	FLOW	3060.	2855.
				TIME	4.08	4.08
HYDROGRAPH AT						
+	OR-3	.20	1	FLOW	84.	79.
				TIME	3.83	3.83
ROUTED TO						
+	Y1-Z1	.20	1	FLOW	83.	77.
				TIME	3.92	3.92
HYDROGRAPH AT						
+	OR-4	.45	1	FLOW	293.	278.
				TIME	3.67	3.67
ROUTED TO						
+	Y2-Y3	.45	1	FLOW	258.	245.
				TIME	4.00	4.00
HYDROGRAPH AT						
+	OR-5	.37	1	FLOW	111.	102.
				TIME	3.83	3.83
2 COMBINED AT						
•	Y3	.82	1	FLOW	362.	342.
				TIME	4.00	4.00
ROUTED TO						
•	Y3-Z1	.82	1	FLOW	359.	339.
				TIME	4.08	4.08
HYDROGRAPH AT						
+	OR-6A	.26	1	FLOW	223.	212.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	OR-6B	.16	1	FLOW	140.	133.
				TIME	3.58	3.58
HYDROGRAPH AT						
+	OR-6C	.19	1	FLOW	146.	138.
				TIME	3.58	3.58
3 COMBINED AT						
+	NODE.AA1	.62	1	FLOW	508.	483.
				TIME	3.58	3.58
ROUTED TO						
+	AA1-AA2	.62	1	FLOW	408.	387.

				TIME	3.83	3.83
HYDROGRAPH AT						
+	OR-7	.61	1	FLOW	173.	160.
				TIME	3.92	3.92
2 COMBINED AT						
+	NODE.AA2	1.23	1	FLOW	578.	544.
				TIME	3.83	3.83
ROUTED TO						
+	AA2-Z1	1.23	1	FLOW	572.	539.
				TIME	3.92	3.92
HYDROGRAPH AT						
+	OR-8	.02	1	FLOW	8.	7.
				TIME	3.58	3.58
ROUTED TO						
+	R8-AA3	.02	1	FLOW	5.	5.
				TIME	4.42	4.42
HYDROGRAPH AT						
+	OR-9	.28	1	FLOW	68.	63.
				TIME	4.08	4.08
2 COMBINED AT						
+	NODE.AA3	.29	1	FLOW	72.	66.
				TIME	4.17	4.17
ROUTED TO						
+	AA3-Z1	.29	1	FLOW	71.	66.
				TIME	4.25	4.25
HYDROGRAPH AT						
+	OR-12	.52	1	FLOW	137.	126.
				TIME	3.83	3.83
5 COMBINED AT						
+	NODE.Z1	3.07	1	FLOW	1177.	1101.
				TIME	3.92	3.92
2 COMBINED AT						
+	NODE.Z2	15.62	1	FLOW	4163.	3891.
				TIME	4.08	4.08
HYDROGRAPH AT						
+	OR-13	.12	1	FLOW	60.	56.
				TIME	3.67	3.67
2 COMBINED AT						
+	NODE.Z3	15.74	1	FLOW	4195.	3921.
				TIME	4.08	4.08
HYDROGRAPH AT						
•	OR-10	.10	1	FLOW	29.	27.
				TIME	3.83	3.83
ROUTED TO						
•	BB1-BB2	.10	1	FLOW	29.	27.
				TIME	4.00	4.08
HYDROGRAPH AT						
+	OR-14	.09	1	FLOW	25.	23.
				TIME	3.75	3.75
2 COMBINED AT						
+	NODE.BB2	.19	1	FLOW	48.	44.
				TIME	3.92	4.00
2 COMBINED AT						

+	NODE.883	15.93	1	FLOW	4241.	3964.
				TIME	4.08	4.08
ROUTED TO						
+	BB3-CC	15.93	1	FLOW	4237.	3959.
				TIME	4.08	4.08
HYDROGRAPH AT						
+	52A-M	.29	1	FLOW	40.	36.
				TIME	4.33	4.42
2 COMBINED AT						
+	NODE.CC	16.22	1	FLOW	4272.	3990.
				TIME	4.08	4.08

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= .85									
M3-S1	MANE	1.68	322.74	257.86	.64	5.00	321.79	255.00	.64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6771E+02 EXCESS= .0000E+00 OUTFLOW= .6772E+02 BASIN STORAGE= .9168E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .82									
M3-S1	MANE	1.73	298.79	257.22	.60	5.00	297.91	255.00	.60

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6258E+02 EXCESS= .0000E+00 OUTFLOW= .6259E+02 BASIN STORAGE= .8285E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .85									
S1-S2	MANE	1.72	544.60	244.89	.75	5.00	544.60	245.00	.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1077E+03 EXCESS= .0000E+00 OUTFLOW= .1077E+03 BASIN STORAGE= .6011E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .82									
S1-S2	MANE	1.73	506.81	245.43	.70	5.00	506.78	245.00	.70

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1001E+03 EXCESS= .0000E+00 OUTFLOW= .1001E+03 BASIN STORAGE= .5599E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .85									
R-S2	MANE	4.46	624.64	240.81	1.58	5.00	621.18	240.00	1.58

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9583E+02 EXCESS= .0000E+00 OUTFLOW= .9603E+02 BASIN STORAGE= .2964E-03 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .82									
R-S2	MANE	4.54	593.72	241.41	1.49	5.00	589.08	245.00	1.49

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9084E+02 EXCESS= .0000E+00 OUTFLOW= .9100E+02 BASIN STORAGE= .3480E-03 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .85									
S2-S3	MANE	.99	1351.53	242.33	.97	5.00	1351.22	245.00	.97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2328E+03 EXCESS= .0000E+00 OUTFLOW= .2329E+03 BASIN STORAGE= .9229E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .82									
S2-S3	MANE	.99	1268.16	245.48	.90	5.00	1268.07	245.00	.90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2181E+03 EXCESS= .0000E+00 OUTFLOW= .2181E+03 BASIN STORAGE= .8398E-02 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .85									
V1-V2	MANE	.67	2419.16	241.61	1.01	5.00	2409.21	245.00	1.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4070E+03 EXCESS= .0000E+00 OUTFLOW= .4070E+03 BASIN STORAGE= .1041E-01 PERCENT ERROR= .0

```
          FOR PLAN = 1  RATIO=  .82
            V1-V2  MANE          .61   2269.59    241.59       .95      5.00   2262.06    245.00         .95

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3815E+03 EXCESS= .0000E+00 OUTFLOW= .3815E+03 BASIN STORAGE= .1066E-01 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .85
            V3-V4  MANE          1.18   2614.11    247.01       .78      5.00   2610.32    245.00         .78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4507E+03 EXCESS= .0000E+00 OUTFLOW= .4508E+03 BASIN STORAGE= .2760E-01 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .82
            V3-V4  MANE          1.20   2447.30    247.22       .73      5.00   2441.87    245.00         .73

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4216E+03 EXCESS= .0000E+00 OUTFLOW= .4217E+03 BASIN STORAGE= .2788E-01 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .85
            X1-X2  MANE          4.27    229.82    223.45      1.51      5.00    219.70    225.00        1.51

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2230E+02 EXCESS= .0000E+00 OUTFLOW= .2254E+02 BASIN STORAGE= .2110E-03 PERCENT ERROR=  -1.1

          FOR PLAN = 1  RATIO=  .82
            X1-X2  MANE          4.24    209.83    221.69      1.43      5.00    205.56    225.00        1.43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2113E+02 EXCESS= .0000E+00 OUTFLOW= .2129E+02 BASIN STORAGE= .1659E-03 PERCENT ERROR=   -.8

          FOR PLAN = 1  RATIO=  .85
            V5-Z2  MANE          1.18   3075.27    247.18       .80      5.00   3060.30    245.00         .80

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5348E+03 EXCESS= .0000E+00 OUTFLOW= .5350E+03 BASIN STORAGE= .3889E-01 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .82
            V5-Z2  MANE          1.12   2873.14    247.49       .75      5.00   2854.86    245.00         .75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4997E+03 EXCESS= .0000E+00 OUTFLOW= .4999E+03 BASIN STORAGE= .3920E-01 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .85
            Y1-Z1  MANE          3.99     83.27    238.87      1.04      5.00     83.14    235.00        1.04

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1131E+02 EXCESS= .0000E+00 OUTFLOW= .1134E+02 BASIN STORAGE= .1712E-02 PERCENT ERROR=   -.3

          FOR PLAN = 1  RATIO=  .82
            Y1-Z1  MANE          4.04     77.97    235.57       .97      5.00     77.49    235.00         .97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1059E+02 EXCESS= .0000E+00 OUTFLOW= .1063E+02 BASIN STORAGE= .1776E-02 PERCENT ERROR=   -.4

          FOR PLAN = 1  RATIO=  .85
            Y3-Z1  MANE          2.13    360.97    242.90      1.13      5.00    359.37    245.00        1.13

INUITY SUMMARY (AC-FT) - INFLOW= .4939E+02 EXCESS= .0000E+00 OUTFLOW= .4946E+02 BASIN STORAGE= .1313E-02 PERCENT ERROR=   -.2
```

```
          FOR PLAN = 1  RATIO=  .82
            Y3-Z1  MANE          2.17    340.80    244.17      1.06      5.00    338.70    245.00        1.06

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .4642E+02 EXCESS= .0000E+00 OUTFLOW= .4650E+02 BASIN STORAGE= .1471E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .85
            AA2-Z1  MANE         1.52    576.80    232.93      1.10      5.00    572.49    235.00        1.10

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .7186E+02 EXCESS= .0000E+00 OUTFLOW= .7197E+02 BASIN STORAGE= .1299E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .82
            AA2-Z1  MANE         1.63    540.39    234.43      1.03      5.00    539.02    235.00        1.03

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .6749E+02 EXCESS= .0000E+00 OUTFLOW= .6759E+02 BASIN STORAGE= .1101E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .85
            AA3-Z1  MANE         3.45     71.41    256.18       .77      5.00     71.33    255.00         .77

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1214E+02 EXCESS= .0000E+00 OUTFLOW= .1216E+02 BASIN STORAGE= .1216E-02 PERCENT ERROR=   -.2

          FOR PLAN = 1  RATIO=  .82
            AA3-Z1  MANE         3.45     66.15    256.72       .72      5.00     65.98    255.00         .72

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1126E+02 EXCESS= .0000E+00 OUTFLOW= .1127E+02 BASIN STORAGE= .1284E-02 PERCENT ERROR=   -.1

          FOR PLAN = 1  RATIO=  .85
            BB1-BB2  MANE        5.00     28.84    240.58       .78      5.00     28.66    240.00         .78

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .4051E+01 EXCESS= .0000E+00 OUTFLOW= .4070E+01 BASIN STORAGE= .1893E-02 PERCENT ERROR=   -.5

          FOR PLAN = 1  RATIO=  .82
            BB1-BB2  MANE        5.00     26.55    244.95       .72      5.00     26.54    245.00         .72

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .3754E+01 EXCESS= .0000E+00 OUTFLOW= .3767E+01 BASIN STORAGE= .2057E-02 PERCENT ERROR=   -.4

          FOR PLAN = 1  RATIO=  .85
            BB3-CC  MANE          .55   4239.29    245.74       .84      5.00   4237.45    245.00         .84

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .7117E+03 EXCESS= .0000E+00 OUTFLOW= .7118E+03 BASIN STORAGE= .3026E-01 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO=  .82
            BB3-CC  MANE          .64   3961.05    245.72       .78      5.00   3958.59    245.00         .78

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .6655E+03 EXCESS= .0000E+00 OUTFLOW= .6655E+03 BASIN STORAGE= .2962E-01 PERCENT ERROR=    .0



 *** NORMAL END OF HEC-1 ***
```

Appendix G: Data CD

05-09-0577R

RESPONSE TO COMMENTS
SLOAN CHANNEL IMPROVEMENTS
REQUEST FOR
CONDITIONAL LETTER OF MAP REVISION

Case No.: 05-09-0577R
Community: Clark County, Nevada
Community No.: 320003

Prepared for:

Clark County Regional Flood Control District
500 South Grand Central Parkway
Las Vegas, NV 89155

Prepared by:

PBS&J
2270 Corporate Circle, Suite 100
Henderson, Nevada 89074

Reference Number: 511606.00
March, 2005

March 28, 2005

Ms. Sheila M. Norlin
National LOMC Manager
Michael Baker Jr., Inc.
3601 Eisenhower Avenue
Alexandria, Virginia 22304-6425

RE: CASE NO.: 05-09-0577R
COMMUNITY: CLARK COUNTY, NV
COMMUNITY NO.: 320003

Dear Ms. Norlin:

Submitted for your review is the Response to Comments for the Sloan Channel Improvements Request for Conditional Letter of Map Revision.

If you have any questions regarding this report, please contact our office at (702) 263-7275.

Sincerely,

PBS&J



3/28/05

Brian K. Loffman, CFM
Hydrologist

Matt Baird, P.E., CFM
Sr. Program Manager

The response to comments in a letter dated March 8, 2005 from Michael Baker Jr., Inc. (MBJ) are included below, see Appendix A for a copy of the comment letter.

Comment 1: **The starting water surface elevation (WSEL) for a tributary should be based on the slope-area method at a cross section on the tributary located just upstream of the confluence with the main stream. The submitted proposed conditions HEC-RAS model for Range Wash uses a known WSEL for the starting WSEL. Please provide a HEC-RAS hydraulic model for Range Wash with the starting WSEL computed by the slope-area method at a cross section on Range Wash located just upstream of the confluence with Las Vegas Wash.**

Response 1: As described in the original submittal (dated January 2005) the WSEL used in the HEC-RAS model at the downstream end (1694.20') was interpolated from the BFE's at the confluence of the proposed channel and Las Vegas Wash. A normal depth section taken at the downstream portion of the proposed channel (Section 10) shows a WSEL of 1693.40 and is 0.80' lower than the WSEL obtained from the BFE's. Therefore, the HEC-RAS model presented in the original submittal is actually more conservative. Please refer to Appendix B for the Flowmaster normal depth calculation for cross-section 10. PBS&J recommends the use of the higher starting WSEL to ensure that all future development in the area is properly elevated above the 100-year WSEL. However, PBS&J has revised the HEC-RAS model as requested using a starting WSEL (1693.40) obtained from the normal depth calculation.

It should also be noted that an error in the HEC-RAS model was discovered during the preparation of this report. The error is limited to cross-section 10 at the downstream end of the model and is located in the existing concrete channel section as shown on Sheet C-8 of the design plans. The geometry for the cross-section was taken from the 1-foot contours and a channel bottom width of 62 feet was used in the model. However, the bottom width of the proposed channel has a constant width of 60-feet. It is unlikely a change in the bottom width occurred at the transition from the proposed to existing channel. Therefore, PBS&J has revised the bottom width of cross-section 10 to 60-feet to match the design plans. The model revision did not result in a change to the WSEL at cross-section 10 or any of the upstream cross-sections.

A CD containing the electronic files for the revised HEC-RAS models has been included in Appendix C.

Comment 2: **The submitted design plans for Sloan Channel are not shown at an accurate scale, and the scale reduction is not exact. Please provide the design plans for Sloan Channel, certified by a registered professional engineer or land surveyor, at an accurate scale.**

Response 2: Please refer to appendix C for a complete full size set of the Sloan Channel Improvement Plans and a CD containing a PDF set of the approved design plans.

Appendix A: Comment Letter

NATIONAL FLOOD INSURANCE PROGRAM
FEMA MAP COORDINATION CONTRACTOR

March 8, 2005

Mr. Kevin Eubanks, P.E., CFM
Assistant General Manager
Clark County Regional Flood Control District
600 South Grand Central Parkway, Suite 300
Las Vegas, NV 89106

IN REPLY REFER TO:
Case No.: 05-09-0577R
Community: Clark County, NV
Community No.: 320003

316-AD

Dear Mr. Eubanks:

This responds to your request dated February 14, 2005, that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) issue a conditional revision to the Flood Insurance Rate Map (FIRM) for Clark County, Nevada and Incorporated Areas. Pertinent information about the request is listed below.

Identifier:	Range Wash Channelization – Charleston Boulevard to Las Vegas Wash
Flooding Source:	Range Wash
FIRM Panel(s) Affected:	32003C2195 E

The data required to complete our review, which must be submitted within 90 days of the date of this letter, are listed on the enclosed summary.

If we do not receive the required data within 90 days, we will suspend our processing of your request. Any data submitted after 90 days will be treated as an original submittal and will be subject to all submittal/payment procedures, including the flat review and processing fee for requests of this type established by the current fee schedule.

If you are unable to meet the 90-day deadline for submittal of required items, and would like us to continue processing your request, you must request an extension of the deadline. This request must be submitted to us in writing and must provide (1) the reason why the data cannot be submitted within the requested timeframe, and (2) a new date for the submittal of the data. FEMA receives a very large volume of requests and cannot maintain inactive requests for an indefinite period of time. Therefore, the fees will be forfeited for any request for which neither the requested data nor a written extension request is received within 90 days.

If you have general questions about your request, FEMA policy, or the National Flood Insurance Program, please call the FEMA Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627). If you

have specific questions concerning your request, please call the Revisions Coordinator for your State, Mr. Sacha Tohme, CFM, who may be reached at (703) 960-8800, ext. 3028.

Sincerely,

Sheila M. Norlin, CFM
National LOMC Manager
Michael Baker Jr., Inc.

Enclosures

cc: Mr. Dave Betley, P.E.
Principal Engineer
Civil Engineering Division
Department of Development Services
Clark County

Mr. Mathew S. Baird, P.E., CFM
Senior Program Manager
PBS&J

NATIONAL FLOOD INSURANCE PROGRAM
FEMA MAP COORDINATION CONTRACTOR

Summary of Additional Data Required to Support a
Conditional Letter of Map Revision

Case No.: 05-09-0577R

Requester: Mr. Kevin Eubanks, P.E., CFM

Community: Clark County, NV

Community No.: 320003

The issues listed below must be addressed before we can continue the review of your request.

1. The starting water-surface elevation (WSEL) for a tributary should be based on the slope-area method at a cross section on the tributary located just upstream of the confluence with the main stream. The submitted proposed conditions HEC-RAS model for Range Wash uses a known WSEL for the starting WSEL. Please provide a HEC-RAS hydraulic model for Range Wash with the starting WSEL computed by the slope-area method at a cross section on Range Wash located just upstream of the confluence with Las Vegas Wash.

2. The submitted design plans for Sloan Channel are not shown at an accurate scale, and the scale reduction is not exact. Please provide the design plans for Sloan Channel, certified by a registered professional engineer or land surveyor, at an accurate scale.

Please send the required data directly to us at the address shown at the bottom of this page. For identification purposes, please include the case number referenced above on all correspondence.

Effective September 1, 2002, FEMA revised the fee schedule for reviewing and processing requests for conditional and final modifications to published flood information and maps. A copy of the notice summarizing the current fee schedule, which was published in the *Federal Register*, is enclosed for your information. In accordance with this schedule, the fee for your request is $4,000 and must be submitted before we can continue processing your request. Payment of this fee must be made in the form of a check or money order, payable in U.S. funds to the National Flood Insurance Program, or a credit card payment. For identification purposes, the case number referenced above must be included on the check or money order. We will not perform a detailed technical review of your request until we receive this payment.

Payment must be forwarded to one of the addresses listed below.

Using U.S. Postal Service:
Federal Emergency Management Agency
Fee-Charge System Administrator
P.O. Box 22787
Alexandria, VA 22304

Using overnight service:
FEMA Fee-Charge System Administrator
c/o Michael Baker Jr., Inc.
3601 Eisenhower Avenue
Alexandria, VA 22304

Appendix B: Flowmaster Calculation Worksheet

Worksheet for Cross-Section 10

Project Description		
Flow Element:	Irregular Section	
Friction Method:	Manning Formula	
Solve For:	Normal Depth	

Input Data		
Channel Slope:	0.46000	%
Discharge:	3990.00	ft^3/s

Options		
Current Roughness Weighted Meth	ImprovedLotters	
Open Channel Weighted Roughnes	ImprovedLotters	
Closed Channel Weighted Roughne	Hortons	

Results		
Roughness Coefficient:	0.015	
Water Surface Elevation:	1693.40	ft
Elevation Range:	1689.50 to 1700.00 ft	
Flow Area:	260.29	ft^2
Wetted Perimeter:	75.53	ft
Top Width:	73.38	ft
Normal Depth:	3.90	ft
Critical Depth:	4.91	ft
Critical Slope:	0.00210	ft/ft
Velocity:	15.33	ft/s
Velocity Head:	3.65	ft
Specific Energy:	7.55	ft
Froude Number:	1.43	
Flow Type:	Supercritical	

Segment Roughness

Start Station	End Station	Roughness Coefficient
(0+00, 1700.00)	(0+96, 1700.00)	0.015

Section Geometry

Station	Elevation
0+00	1700.00
0+21	1689.50

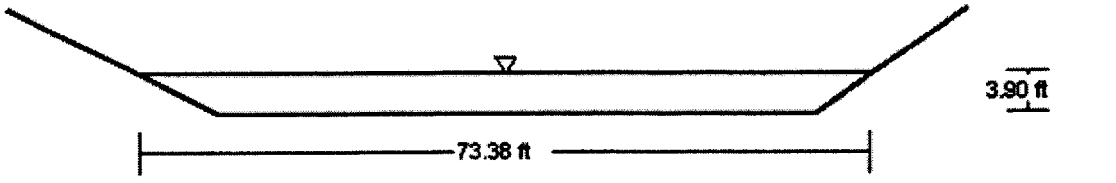
Worksheet for Cross-Section 10

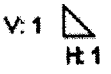
Station	Elevation
0+81	1689.50
0+96	1700.00

Cross Section for Cross-Section 10

Project Description		
Flow Element:	Irregular Section	
Friction Method:	Manning Formula	
Solve For:	Normal Depth	

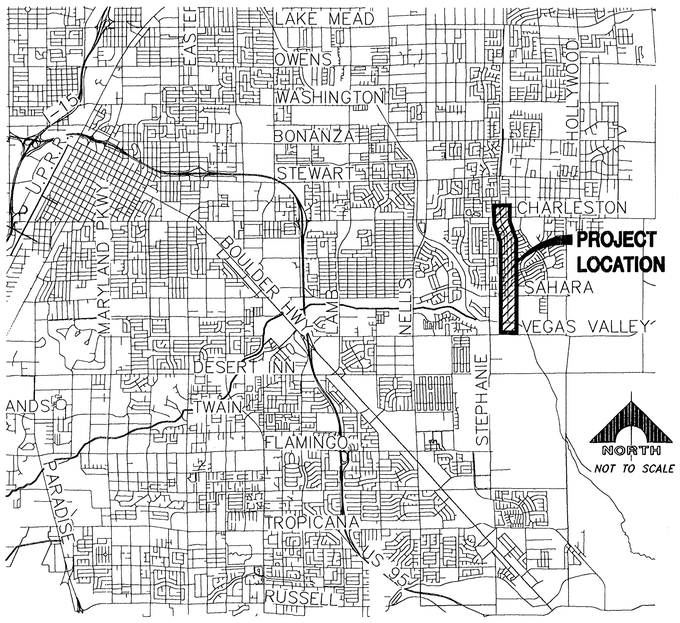
Section Data		
Roughness Coefficient:	0.015	
Channel Slope:	0.46000	%
Normal Depth:	3.90	ft
Elevation Range:	1689.50 to 1700.00 ft	
Discharge:	3990.00	ft^3/s





Appendix C: Sloan Channel Plans & CD

DEPARTMENT OF PUBLIC WORKS



Vicinity Map

NOT TO SCALE

CLARK COUNTY NEVADA

"Progress as Promised"

2004 IMPROVEMENT PLANS FOR SLOAN CHANNEL

FROM CHARLESTON BOULEVARD TO LAS VEGAS WASH

FUNDED BY

CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT

County Manager

Thom Reilly

Director of Public Works

Approved:

M.J. Manning

Clark County Regional Flood Control District

Approved:

Gale Wm. Fraser II, P.E.
General Manager/
Chief Engineer

County Commissioners

Chip Maxfield, Chairman
Myrna Williams, Vice-Chair
Yvonne Atkinson Gates
Mark A. James
Mary J. Kincaid-Chauncey
Rory Reid
Bruce L. Woodbury

SIGNATURE ON THESE PLANS WILL NOT BE CONSTRUED TO BE A PERMIT FOR OR AN APPROVAL OF ANY VIOLATION OF CLARK COUNTY SANITATION DISTRICT RULES, REGULATIONS, OR DESIGN AND CONSTRUCTION STANDARDS. THE APPROVAL OF THESE DRAWINGS DOES NOT GUARANTEE CAPACITY IN THE DISTRICT'S COLLECTION OR TREATMENT SYSTEM.

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

"The affixed Sprint Nevada 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."

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

AGENCY	PLANS REVIEWED BY	DATE
SPRINT		9-3-04
LAS VEGAS VALLEY WATER DISTRICT		4/5/04
SOUTHWEST GAS COMPANY	Thomas Crum	4-4-4
NEVADA POWER COMPANY (TRANSMISSION)		9/3/04
NEVADA POWER COMPANY (DISTRIBUTION)		9-8-04
CLARK COUNTY WATER RECLAMATION DISTRICT		3/12/04
COX COMMUNICATIONS LAS VEGAS, INC.		9/9/04

DEPARTMENT OF PUBLIC WORKS	BY	DATE
DEPUTY DIRECTOR		3-16-2004
CONSTRUCTION MANAGEMENT DIVISION		3/16/04
DESIGN ENGINEERING DIVISION		3-16-04
MAINTENANCE MANAGEMENT DIVISION		3-16-04
TRAFFIC MANAGEMENT DIVISION		3/16/04
COUNTY SURVEYOR'S OFFICE		3/16/2004

REVISIONS NUMBER	DESCRIPTION	DATE

PROFESSIONAL ENGINEER STATE OF NEVADA NOEL LAUGHLIN Exp. 12/31/2005 CIVIL No. 10165

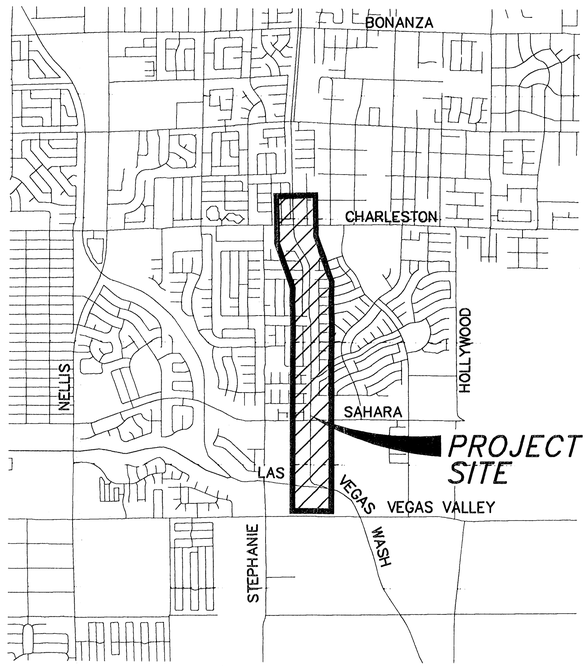
3-12-04

DESIGN ENGINEERING DIVISION

COVER SHEET

L-1759

BID No.: 5524-04



Location Map

Index of Sheets

DRAWING NO. **DESCRIPTION**

General Drawings

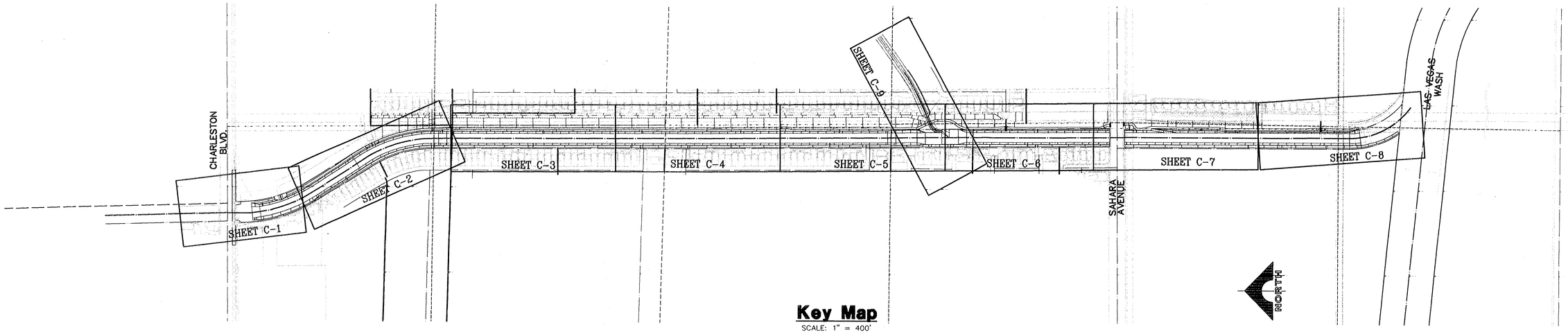
	COVER SHEET
G-2	INDEX OF DRAWINGS, KEY MAP AND LOCATION MAP
G-3	GENERAL & CONSTRUCTION NOTES, LEGEND & ABBREVIATIONS BENCHMARK, BASIS OF BEARINGS
G-4	HORIZONTAL CONTROL PLAN
G-5	ESTIMATE OF QUANTITIES
G-6	RECORD OF SURVEY

Civil Drawings

C-1	PLAN AND PROFILE STA. 114+50.00 TO STA. 122+00.00
C-2	PLAN AND PROFILE STA. 122+00.00 TO STA. 132+00.00
C-3	PLAN AND PROFILE STA. 132+00.00 TO STA. 142+00.00
C-4	PLAN AND PROFILE STA. 142+00.00 TO STA. 152+00.00
C-5	PLAN AND PROFILE STA. 152+00.00 TO STA. 162+00.00
C-6	PLAN AND PROFILE STA. 162+00.00 TO STA. 171+00.00
C-7	PLAN AND PROFILE STA. 171+00.00 TO STA. 181+00.00
C-8	PLAN AND PROFILE STA. 181+00.00 TO STA. 190+00.00
C-9	PLAN AND PROFILE (CONFLUENCE) AND LATERALS
C-10	TYPICAL CROSS SECTIONS
C-11	DETAILS
C-12	TYPICAL CROSS SECTIONS
C-13	FENCING/POST & CABLE RAILING PLAN
C-14	FENCING/POST & CABLE RAILING PLAN
C-15	ACCESS/MAINTENANCE ROAD CONTROL PLAN
C-16	ACCESS/MAINTENANCE ROAD CONTROL PLAN
C-17	DEPTH GAUGE STATION SECTIONS AND DETAILS

Structural Drawings

S-1	DETAILS
S-2	DETAILS
S-3	TYPICAL CHANNEL SECTIONS
S-4	CHANNEL TRANSITION STRUCTURES
S-5	ACCESS RAMP
S-6	ACCESS RAMP DETAILS
S-7	DETAILS



Key Map

SCALE: 1" = 400'

REV. NO. | DATE | DESCRIPTION | APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL

INDEX OF DRAWINGS, KEY MAP AND LOCATION MAP

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

NOEL C. LAUGHLIN — Exp. 12/31/2005 — CIVIL — No. 10165 — PROFESSIONAL ENGINEER — STATE OF NEVADA — 4-5-04

PROJECT No: 500.857 DRAWN BY: DVJ
DESIGNED BY: _____ CHECKED BY: _____
APPROVED BY _____

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
G-2
SHT. 2 OF 30

LEGEND & ABBREVIATIONS

ABBREVIATION

AC = ASPHALTIC CONCRETE
ACP = ASBESTOS CEMENT PIPE
AVAR = AIR VACUUM AIR RELIEF (VALVE)
BC = BACK OF CURB
BCR = BEGIN CURB RETURN
BM = BENCHMARK
BW = BACK OF WALK
CATV = CABLE TELEVISION
CCSD = CLARK COUNTY SANITATION DISTRICT
CL/℄ = CENTERLINE
CLSM = CONTROLLED LOW STRENGTH MATERIAL
CMP = CORRUGATED METAL PIPE
CONC. = CONCRETE
D = DEPTH
DI = DROP INLET
DIP = DUCTILE IRON PIPE
EA. = EACH
EFF = EFFLUENT
EGL = ENERGY GRADE LINE
ELEV./ EL = ELEVATION
EP = EDGE OF PAVEMENT
EXIST./ EX = EXISTING
FF = FINISH FLOOR
FG = FINISH GRADE
FL = FLOW LINE
FS = FINISH SURFACE
FUT = FUTURE
G = GAS
GB = GRADE BREAK
GIS = GEOGRAPHIC INFORMATION SYSTEM
HERCP = HORIZONTAL ELLIPTICAL REINFORCED CONCRETE PIPE
HGL = HYDRAULIC GRADE LINE
HP = HIGH POINT
HPG = HIGH PRESSURE GAS
I.D. = INSIDE DIAMETER
INV = INVERT
L / LT = LEFT OF
LF = LINEAR FEET
LP = LOW POINT
LVACTS = LAS VEGAS AREA COMPUTER TRAFFIC SYSTEM
LVVWD = LAS VEGAS VALLEY WATER DISTRICT
NAVD = NORTH AMERICAN VERTICAL DATUM
NDOT = NEVADA DEPARTMENT OF TRANSPORTATION
NG = NATURAL GRADE
OHP = OVERHEAD POWER
PBS = PLANTMIX BITUMINOUS SURFACE
PBCBR = PORTABLE PRECAST BARRIER RAIL
PC = POINT OF CURVE
PCC = POINT OF COMPOUND CURVE
POC = POINT OF CURVE
POT = POINT OF TANGENT
PRC = POINT REVERSE CURVE
PROP = PROPOSED
PT = POINT OF TANGENT
PVC = POLYVINYL CHLORIDE PIPE
$Q_{ult}100$ = 100 YEAR ULTIMATE CONDITION DESIGN FLOW
(R) = RADIAL
R / RT = RIGHT OF
RCB = REINFORCED CONCRETE BOX
RCP = REINFORCED CONCRETE PIPE
RGRCP = RUBBER GASKET REINFORCED CONCRETE PIPE
R/W = RIGHT-OF-WAY
SD = STORM DRAIN
SDMH = STORM DRAIN MANHOLE
SNWA = SOUTHERN NEVADA WATER AUTHORITY
SS = SANITARY SEWER
SSMH = SANITARY SEWER MANHOLE
STA = STATION
STD.DWG.NO. = STANDARD DRAWING NUMBER
TC = TOP OF BACK OF CURB
TEL = TELEPHONE
THK = THICK
TMH = TOP OF MANHOLE
TOE = TOE OF CHANNEL
TOP = TOP OF CHANNEL
TW = TOP OF WALL
UDACS = UNIFORM DESIGN AND CONSTRUCTION STANDARDS
UNO = UNLESS NOTED OTHERWISE
U.S. = UNITED STATES
V.C. = VERTICAL CURVE
VCP = VERIFIED CLAY PIPE
W = WATER
W/ = WITH
WWF = WELDED WIRE FABRIC

LEGEND

(650.61) / INV — EXIST. ELEVATION
00.0 / INV — PROPOSED ELEVATION
(23.67) / S — EXIST. SPOT ELEVATION
PROPERTY OR RIGHT-OF-WAY LINE
CENTERLINE
HYDRAULIC GRADE LINE (HGL)
ENERGY GRADE LINE (EGL)
EASEMENT
T — EXISTING TELEPHONE CABLE
EXISTING FENCE
SS — EXISTING SANITARY SEWER LINE
SS — PROPOSED SANITARY SEWER LINE
W — EXISTING WATER LINE
W — PROPOSED WATER LINE
G — EXISTING GAS LINE
UGE — EXISTING UNDERGROUND POWER
OHP — EXISTING OVERHEAD POWER
SD — EXISTING STORM DRAIN
CHANNEL — PROPOSED CHANNEL
SD — PROPOSED STORM DRAIN
CATV — EXISTING CABLE TELEVISION
EXISTING CONTOUR
SAWCUT LINE
EXISTING MANHOLE
PROPOSED MANHOLE
EXISTING FIRE HYDRANT
EXISTING VALVE
PROPOSED VALVE
PROPOSED DROP INLET
PROPOSED REUSE HYDRANT

CONSTRUCTION NOTES

1. CONSTRUCT 6' CHAIN-LINK FENCE (SEE DETAIL 9/C11)
2. CONSTRUCT 6' CHAIN-LINK GATE (SEE DETAIL 8/C11) (WIDTH OF GATE CALLED OUT IN PLAN VIEW)
3. CONSTRUCT CHANNEL ACCESS STEPS (SEE DETAIL 11/S2)
4. CONSTRUCT 12' DRIVEWAY PER STD. DWG. NO. 224
5. INSTALL SIGN (SEE DETAIL 6/C11)
6. INSTALL SIGN (SEE DETAIL 7/C11)
7. CONSTRUCT POST AND CABLE RAILING (SEE DETAIL 10/C11)
8. PAINTED STAFF GAUGE (SEE DETAIL 5/C11)
9. CONSTRUCT SLOPE PAVING (SEE DETAIL 3/C11)
10. CONSTRUCT PIPE CONNECTION (SEE DETAIL 9/S2)
11. CONSTRUCT RCB CONNECTION (SEE DETAIL 3/S7)
12. CONTRACTOR SHALL FIELD VERIFY AND FLAG ALL SNWA APPURTENANCES AND PROTECT FROM DAMAGE AND BEING BURIED.

REMOVAL NOTES

1. REMOVE EXISTING BLOCK WALL AND FOOTING
2. REMOVE AND SALVAGE RIPRAP
3. REMOVE EXISTING CONCRETE SPLASH PAD
4. REMOVE EXISTING 60 FT.± CHANNEL SECTION TO EXPANSION JOINT.
5. REMOVE EXISTING CHANNEL LINING.
6. REMOVE EXISTING CONCRETE SPILLWAY.
7. REMOVE EXISTING CHAIN-LINK FENCE.

CLARK COUNTY WATER RECLAMATION DISTRICT NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE DESIGN AND CONSTRUCTION STANDARDS FOR WASTE-WATER COLLECTION SYSTEMS AND THE PUBLIC WORKS CONSTRUCTION OFF SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA, AS AMENDED, AND CLARK COUNTY SUPPLEMENT TO UNIFORM STANDARD DRAWINGS AND SPECIFICATIONS. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE AWARE OF THE CONTENTS OF THE ABOVE DRAWINGS AND SPECIFICATION BOOKS.
2. THESE STANDARDS SHALL APPLY TO ALL CONSTRUCTION.
3. SEWER MAINS ONLY TO BE LAID IN SEWER TRENCHES.
4. ALL LATERALS TO BE LAID AT NOT LESS THAN MINIMUM SLOPE AS SHOWN IN THESE STANDARDS.
5. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO PERFORM CONSTRUCTION AS PER PLANS. ANY ADDITIONS, DELETIONS, OR CHANGES SHALL FIRST MEET WITH THE APPROVAL OF THE CONTROLLING AGENCY.
6. SOIL TESTING SHALL BE IN ACCORDANCE WITH SECTION 3.11 OF THESE STANDARDS.
7. ALL EXFILTRATION, INFILTRATION, AIR TESTING AND TELEVISING OF LINES SHALL BE IN ACCORDANCE WITH THESE STANDARDS.
8. CUT SHEETS MUST BE SUBMITTED TO THE AGENCY BEFORE CONSTRUCTION WILL BE PERMITTED TO START.
9. ALL CONTRACTORS INSTALLING SEWER MAINS THAT WILL BE UNDER THE JURISDICTION OF THE CONTROLLING AGENCY MUST BE CLASS "A" CONTRACTORS.

CLARK COUNTY WATER RECLAMATION DISTRICT NOTES DATE

CCWRD PROJECT CONTROL NUMBER IS_____.

SIGNATURE ON THESE PLANS WILL NOT BE CONSTRUED TO BE A PERMIT FOR OR AN APPROVAL OF ANY VIOLATION OF CLARK COUNTY WATER RECLAMATION DISTRICT RULES, REGULATIONS, OR DESIGN AND CONSTRUCTION STANDARDS. THE APPROVAL OF THESE DRAWINGS DOES NOT GUARANTEE CAPACITY IN THE DISTRICT'S COLLECTION OR TREATMENT SYSTEM.

LAS VEGAS VALLEY WATER DISTRICT STANDARD NOTES

LVVWD PROJECT # 25819

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN RELEASED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, 48 HOUR NOTICE SHALL BE GIVEN TO LVVWD COMMUNICATION SUPPORT CENTER (258-7171) PRIOR TO THE START OF CONSTRUCTION. NOTICE MUST BE GIVEN BY 2:00 p.m. THE BUSINESS DAY PRIOR TO A LVVWD INSPECTION. WHEN REQUESTING INSPECTIONS, PLEASE REFER TO THE PROJECT # IDENTIFIED ABOVE.
2. ALL WORK SHALL CONFORM TO LVVWD'S STANDARD PLATES, DRAWINGS AND SPECIFICATIONS AND TO THE UNIFORM DESIGN AND CONSTRUCTION STANDARDS FOR WATER DISTRIBUTION SYSTEMS (UDACS), LATEST EDITION.
3. ALL WORK, EXCEPT AS MODIFIED BY THESE PLANS OR BY NOTE 2, SHALL BE DONE IN ACCORDANCE WITH THE MOST CURRENT DRAFT OR EDITION OF THE UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION OFFSITE IMPROVEMENT, CLARK COUNTY AREA.
4. A SINGLE PIPE MATERIAL SHALL BE USED THROUGHOUT THE PROJECT UNLESS OTHERWISE APPROVED BY THE LVVWD.
5. ALL SERVICE LATERALS TWO (2) INCHES IN DIAMETER AND SMALLER SHALL BE COPPER TUBING WITH LVVWD APPROVED SERVICE SADDLES.
6. ALL WATER METER BOXES SHALL BE LOCATED OUTSIDE OF DRIVEWAY AREAS.
7. ALL VALVES SHALL BE LOCATED OUTSIDE OF DRIVEWAY, VALLEY AND CURB GUTTERS.
8. THE FOLLOWING REQUIREMENTS MUST BE MET IN THE EVENT A WATER LINE AND SANITARY OR STORM SEWER LINE CROSS:

   A MINIMUM EIGHTEEN (18) INCH VERTICAL SEPARATION (OUTSIDE TO OUTSIDE) MUST BE MAINTAINED WHEN THE WATER LINE IS INSTALLED OVER THE SANITARY OR STORM SEWER LINE. IF THE VERTICAL SEPARATION CANNOT BE MAINTAINED OR THE WATER LINE MUST BE PLACED UNDER THE SANITARY OR STORM SEWER LINE, THE SANITARY OR STORM SEWER LINE MUST BE CONSTRUCTED WITH ONE OF THE FOLLOWING OR, AS SHOWN ON THESE PLANS:

   A. POTABLE WATER SUPPLY QUALITY MATERIAL,
   B. ENCASEMENT, WITH FOUR (4) INCH CONCRETE (MINIMUM),
   C. SLEEVING WITH POTABLE WATER SUPPLY QUALITY PIPE.

   EACH PROVISION MUST EXTEND ALONG THE SANITARY OR STORM SEWER, ON EITHER SIDE OF THE MAIN, A MINIMUM 10 FOOT DISTANCE PERPENDICULAR TO THE WATER MAIN EXTERIOR.
9. WARNING TAPE SHALL BE REQUIRED OVER ALL MAINS, ALL SIX (6) INCH DIAMETER AND LARGER SERVICE LATERALS, AND ANY SERVICE LATERAL NOT INSTALLED PERPENDICULAR TO THE MAIN IN ACCORDANCE WITH STANDARD PLATE NO. 27.
10. ALL WATER FACILITIES SHALL BE FILLED, DISINFECTED, PRESSURE TESTED, FLUSHED, FILLED AND AN ACCEPTABLE WATER SAMPLE OBTAINED, PRIOR TO CONNECTION TO THE LVVWD'S DISTRIBUTION SYSTEM.
11. THE CONTRACTOR MUST OBTAIN ALL METERS TWO (2) INCHES AND SMALLER FROM LVVWD CENTRAL STORES. TELEPHONE 258-3152 FORTY-EIGHT (48) HOURS PRIOR TO PICKUP.
12. CONSTRUCTION MAY INTERRUPT SERVICE, WITH LVVWD APPROVAL AND PROPER NOTIFICATION, BETWEEN THE HOURS OF 10 PM AND 6 AM, SUNDAY THROUGH THURSDAY. CIRCUMSTANCES MAY REQUIRE TEMPORARY SERVICE FEEDS BE INSTALLED, WITHOUT LVVWD REIMBURSEMENT. ANY TEMPORARY SERVICE FEED MUST HAVE PRIOR LVVWD APPROVAL.
13. ALL WATER FACILITY CONSTRUCTION MATERIALS USED MUST BE AS LISTED ON THE LVVWD'S PRE-APPROVED MATERIALS AND MANUFACTURER'S LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.

APPROVED FOR CONSTRUCTION

Robert J. Morgan 4/5/04

LAS VEGAS VALLEY WATER DISTRICT DATE

SOUTHERN NEVADA WATER AUTHORITY CONSTRUCTION NOTES

1. CONTRACTOR SHALL FIELD LOCATE AND PROTECT ALL SNWA/SNWS APPURTENANCES INCLUDING, BUT NOT LIMITED TO AV/AR, ACCESS MANWAYS AND CATHODIC PROTECTION SYSTEMS. ALL ABOVE GROUND STRUCTURES AND AT GRADE STRUCTURES MUST BE ADJUSTED TO NEW GRADE AT CONTRACTOR'S EXPENSE. CATHODIC PROTECTION TEST STATIONS, RECTIFIERS, AND AV/AR'S MUST BE RELOCATED TO THE SIDEWALK PER SNWA STANDARDS AND AT THE CONTRACTOR'S EXPENSE. CONTRACTOR TO NOTIFY SOUTHERN NEVADA WATER AUTHORITY DEVELOPMENT PLAN REVIEW, AT (702) 862-3444 AT LEAST 48 HOURS PRIOR TO CONSTRUCTION ACTIVITY.
2. NO BUILDINGS, STRUCTURES, FENCES OR TREES SHALL BE PLACED UPON, OVER OR UNDER SAID PARCEL OF LAND FOR THE DURATION OF THIS EASEMENT EXCEPT THAT SAID PARCEL MAY BE IMPROVED AND USED FOR STREET, ROAD OR DRIVEWAY PURPOSES AND FOR OTHER UTILITIES, INSOFAR AS SUCH USE DOES NOT INTERFERE WITH ITS USE BY SNWA FOR THE PURPOSES FOR WHICH IT IS GRANTED.
3. SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.



BASIS OF BEARINGS

SOUTH 00°18'40" EAST - BEING THE WEST LINE OF SOUTHWEST QUARTER (SW 1/4) OF SECTION 3, TOWNSHIP 21 SOUTH, RANGE 62 EAST, M.D.M. AS SHOWN BY A MAP THEREOF ON FILE IN FILE 36, PAGE 6 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

Avoid cutting underground utility lines. It's costly.
Call before you Dig.
1-800-227-2600
UNDERGROUND SERVICE (USA)

PROJECT BENCHMARK

CLARK COUNTY BM - 6C02 33SW16

RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, IN NORTHEAST CORNER OF NELLIS BLVD. AND BELPORT DR. NEAR THE PC OF NELLIS BLVD.

ELEVATION - 531.863 (M) NAVD 88
1744.954 (FT) NAVD 88

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS FOR THIS PROJECT SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION", CLARK COUNTY AREA, NEVADA LATEST EDITION, AND THE "UNIFORM DRAWINGS FOR PUBLIC WORKS CONSTRUCTION", CLARK COUNTY AREA, NEVADA LATEST EDITION, UNLESS OTHERWISE SPECIFIED BY NOTE ON THE PLANS AND/OR SPECIAL PROVISIONS. THE IMPROVEMENT STANDARDS WILL HEREAFTER BE REFERRED TO AS "CLARK COUNTY AREA STANDARD DRAWINGS.
2. 48 HOURS PRIOR TO START OF CONSTRUCTION, THE CONTRACTOR SHALL CONTACT

NEVADA POWER COMPANY	PHONE	1-800-227-2600
SPRINT-CENTRAL TELEPHONE COMPANY	PHONE	1-800-227-2600
SOUTHWEST GAS CORPORATION	PHONE	1-800-227-2600
COX COMMUNICATIONS LAS VEGAS, INC.	PHONE	384-8084
LAS VEGAS VALLEY WATER DIST.	PHONE	870-4194
CLARK COUNTY TRAFFIC MGMT. DIV.	PHONE	455-7511
CLARK COUNTY WATER RECLAMATION DISTRICT	PHONE	434-8000
SOUTHERN NEVADA WATER AUTHORITY	PHONE	862-3444

3. LOCATIONS OF UNDERGROUND UTILITIES SHOWN ON THE DRAWINGS WERE OBTAINED FROM INFORMATION RECEIVED FROM THE APPLICABLE UTILITY COMPANIES NEITHER THE OWNER NOR ENGINEER ASSUMES ANY RESPONSIBILITY FOR UTILITIES OR STRUCTURES NOT SHOWN, OR FOR UTILITIES OR STRUCTURES NOT SHOWN AT ACTUAL LOCATIONS ON THE DRAWINGS. EXISTING SERVICE LATERALS ARE NOT SHOWN ON THESE DRAWINGS. CONTRACTOR TO VERIFY THE EXACT LOCATION OF UTILITIES PRIOR TO START OF CONSTRUCTION. THE CONTRACTOR'S RESPONSIBILITY REGARDING UTILITIES SHALL BE AS REQUIRED UNDER SECTION 107.17 OF THE UNIFORM STANDARD SPECIFICATIONS FOR CLARK COUNTY AREA, NEVADA AND AS PROVIDED IN THE SPECIFICATIONS.
4. THE CONTRACTOR SHALL NOT REMOVE TREES, SHRUBS, LAWNS, WALLS, FENCES, SIGNS, STRUCTURES, LIGHTS, OR ANY EXISTING IMPROVEMENTS OUTSIDE OF STREET RIGHT-OF-WAY, EXCEPT WHERE REQUIRED TO DO SO BY THE CONTRACT DRAWINGS OR BY THE ENGINEER.
5. REPLACEMENT, RELOCATION, OR RECONSTRUCTION OF ALL EXISTING IMPROVEMENTS INCLUDING SPRINKLER SYSTEMS, LAWNS, FENCES, WALLS, SIGNS, STEPS, SIDEWALK, DRIVEWAYS, LAWN LIGHTS, AND ALL OTHER ITEMS APPLICABLE TO THIS CONTRACT SHALL BE AS REQUIRED BY THE ENGINEER.
6. THE CONTRACTOR SHALL BACKFILL AND FINE GRADE ALL CUT OR FILL SLOPES TO MATCH EXISTING CONDITIONS TO THE SATISFACTION OF THE ENGINEER, WHERE EXISTING LAWNS ARE DAMAGED BY THE CONTRACTOR'S OPERATIONS THE CONTRACTOR SHALL SOD THE AFFECTED AREA TO A CONDITION EQUAL TO, OR BETTER TO THAT WHICH EXISTED PRIOR TO CONSTRUCTION.
7. ALL BARRICADING AND TEMPORARY TRAFFIC CONTROL DEVICES OR METHODS USED DURING CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE "NEVADA TRAFFIC CONTROL MANUAL", 1986 (OR LATEST REVISION), PUBLISHED BY THE STATE OF NEVADA DEPARTMENT OF TRANSPORTATION AND THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", EXCEPT AS OTHERWISE PROVIDED IN THE CONTRACT SPECIFICATIONS OR AS REQUIRED BY THE ENGINEER.
8. REMOVAL OR RELOCATIONS OF POWER POLES, TELEPHONE POLES, JOINTLY-OWNED POLES, AND APPURTENANCES WHICH INTERFERE WITH IMPROVEMENTS REQUIRED TO BE CONSTRUCTED UNDER THIS CONTRACT, SHALL BE THE RESPONSIBILITY OF THE RESPECTIVE UTILITY COMPANY. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION WITH THE UTILITY COMPANIES FAR ENOUGH IN ADVANCE AS TO NOT IMPACT THE SCHEDULE.
9. UNLESS OTHERWISE SHOWN ON THE CONTRACT DRAWINGS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OR RELOCATION OF ALL WATER SERVICES AND METERS WHICH INTERFERE WITH IMPROVEMENTS SHOWN ON THE CONTRACT DRAWINGS.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE VERTICAL ADJUSTMENT OF ALL EXISTING SANITARY, WATER AND STORM SEWER MANHOLES TO THE FINAL FINISH GRADES IN ACCORDANCE WITH SECTIONS 609 AND 630 OF THE "STANDARD SPECIFICATIONS".
11. SPRINT TELEPHONE COMPANY SHALL BE RESPONSIBLE FOR THE VERTICAL OR HORIZONTAL ADJUSTMENT OF ALL TELEPHONE FACILITIES WHICH INTERFERE WITH IMPROVEMENTS SHOWN ON THE CONTRACT DRAWINGS.
12. ALL EXISTING TRAFFIC SIGNS, STREET LIGHTS & SIGNS TO BE REMOVED SHALL BE SALVAGED BY THE CONTRACTOR AND DELIVERED TO THE CLARK COUNTY TRAFFIC OPERATIONS DIVISION LOCATED AT 5821 E. FLAMINGO ROAD, LAS VEGAS, NEVADA WITHIN 48 HOURS OF THEIR REMOVAL.
13. EXACT LOCATIONS OF ALL SAWCUT LINES SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER. SAWCUTS, LONGITUDINAL TO THE ROADWAY, MAY BE WHEEL CUT WITH EQUIPMENT AS APPROVED BY THE ENGINEER. ALL OTHER SAWCUT SHALL BE MADE BY A ROTARY SAW.
14. ALL SANITARY SEWER CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CLARK COUNTY SANITATION DISTRICT DESIGN AND CONSTRUCTION STANDARDS.
15. THE PLANS DO NOT SHOW ALL SEWER LATERALS, SEWER FORCE MAINS AND WATER SERVICE LATERALS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REPAIRS OR RELOCATIONS OF LATERALS BROKEN OR IN CONFLICT WITH THE PROPOSED CHANNEL, STORM DRAIN OR ROADWAY CONSTRUCTION.
16. CONTRACTOR SHALL MAINTAIN CONTINUOUS SEWER SERVICE TO ALL CCSD CUSTOMERS. SEWER LATERALS CUT DURING CONSTRUCTION SHALL BE REPAIRED BY CONTRACTOR PER CCSD DESIGN AND CONSTRUCTION STANDARDS. CONTRACTOR SHALL IMMEDIATELY REPORT ANY SANITARY SEWER OR SEWER LATERALS THAT CANNOT BE RECONNECTED TO SEWER MAIN DUE TO STORM DRAIN CONFLICT. CLARK COUNTY SHALL BE RESPONSIBLE FOR PROVIDING RESUBMITTED APPROVED MAIN LINE SEWER EXTENSION PLANS TO PROVIDE NEW MAIN TO REROUTE ANY SEWERS THAT CANNOT BE RECONNECTED.
17. THE NEVADA POWER COMPANY SHALL BE RESPONSIBLE FOR THE RELOCATION OF UNDERGROUND OR OVERHEAD POWER LINES THAT INTERFERE WITH THE REQUIRED IMPROVEMENTS AS SHOWN ON THE PLANS.
18. IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL, OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING, SUCH PAVEMENT MARKING SHALL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE COUNTY TRAFFIC MANAGER.
19. LVACTS INTERCONNECT CABLE POLICY IS IN EFFECT. INTERCONNECT CABLE MUST BE MAINTAINED AT ALL TIMES. CONTRACTOR SHALL PROVIDE TEMPORARY OVERHEAD INTERCONNECT CABLE WHILE PAVEMENT CABLE IS BEING RELOCATED. TEMPORARY AERIAL INSTALLATION MUST BE ACCEPTABLE TO THE COUNTY TRAFFIC MANAGER AND TO LVACTS. ANY DAMAGE TO THIS CABLE IS DEEMED AN EMERGENCY BY LVACTS, CITY OF LAS VEGAS, CLARK COUNTY AND NDOT AND MUST BE REPAIRED IMMEDIATELY TO LVACTS' ACCEPTANCE. $2,500 PER DAY DAMAGES WILL BE ASSESSED AFTER TWENTY-FOUR (24) HOURS HAS ELAPSED FROM THE TIME OF BREAK OR DAMAGE.
20. THE CONTRACTOR SHALL DETERMINE THE LOCATION AND DEPTH OF SUSPECTED UTILITY INTERFERENCES, AND SHALL FURNISH INFORMATION ON THE SAME TO THE ENGINEER, NOT LESS THAN TEN (10) DAY PRIOR TO THE ANTICIPATED IMPACT OF THESE SUSPECTED INTERFERENCES ON HIS WORK. IF CONFLICTS EXIST, THE CONTRACTOR WILL IMMEDIATELY CONTACT THE ENGINEER AND PROVIDE THE ENGINEER WITH ALL THE NECESSARY DATA SUCH AS ELEVATIONS, HORIZONTAL LOCATIONS, ETC., AND PROVIDE THE ENGINEER WITH SKETCHES INDICATING THE PROPOSED IMPROVEMENT AND THE UTILITY CONFLICT. THE ENGINEER WILL EXAMINE AND REVIEW ALL THE DATA AND SKETCHES PROVIDED, AND WILL PROVIDE THE CONTRACTOR WITH AN ALTERNATIVE DESIGN WITHIN FIVE (5) DAYS AFTER RECEIPT OF DATA AND SKETCHES.
21. THE FOLLOWING DENSITIES WERE USED IN CALCULATING QUANTITIES FOR ASPHALT CONCRETE PAVEMENT.
    PLANTMIX BITUMINOUS SURFACING 155 LB/CF
    PLANTMIX BITUMINOUS OPEN-GRADED SURFACE 140 LB/CF

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL

GENERAL & CONSTRUCTION NOTES, LEGEND AND ABBREVIATIONS, BENCHMARK, BASIS OF BEARINGS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

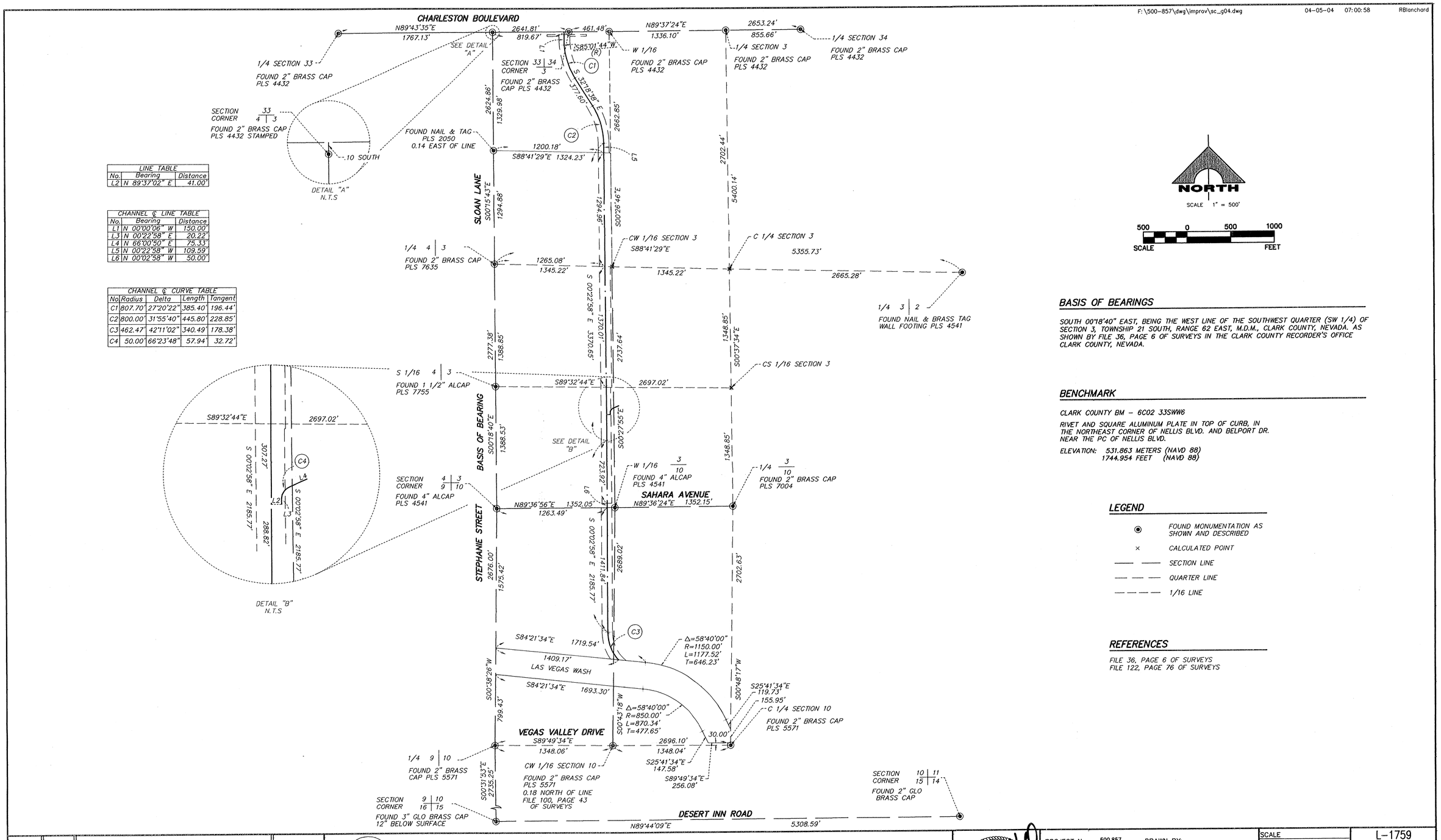
NOEL G. LAUGHLIN — Exp. 12/31/2005 — CIVIL — No. 10165 — STATE OF NEVADA — PROFESSIONAL ENGINEER — 4-5-04

PROJECT No: 500.857 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
G-3
SHT. 3 OF 30



LINE TABLE		
No.	Bearing	Distance
L2	N 89°37'02" E	41.00'

CHANNEL ℄ LINE TABLE		
No.	Bearing	Distance
L1	N 00°00'06" W	150.00'
L3	N 00°22'58" E	20.22'
L4	N 66°00'50" E	75.33'
L5	N 00°22'58" W	109.59'
L6	N 00°02'58" W	50.00'

CHANNEL ℄ CURVE TABLE				
No	Radius	Delta	Length	Tangent
C1	807.70'	27°20'22"	385.40'	196.44'
C2	800.00'	31°55'40"	445.80'	228.85'
C3	462.47'	42°11'02"	340.49'	178.38'
C4	50.00'	66°23'48"	57.94'	32.72'

NORTH

SCALE 1" = 500'

500 0 500 1000

SCALE FEET

BASIS OF BEARINGS

SOUTH 00°18'40" EAST, BEING THE WEST LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 3, TOWNSHIP 21 SOUTH, RANGE 62 EAST, M.D.M., CLARK COUNTY, NEVADA. AS SHOWN BY FILE 36, PAGE 6 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE CLARK COUNTY, NEVADA.

BENCHMARK

CLARK COUNTY BM – 6C02 33SWW6

RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, IN THE NORTHEAST CORNER OF NELLIS BLVD. AND BELPORT DR. NEAR THE PC OF NELLIS BLVD.

ELEVATION: 531.863 METERS (NAVD 88)
1744.954 FEET (NAVD 88)

LEGEND

- ◉ FOUND MONUMENTATION AS SHOWN AND DESCRIBED
- × CALCULATED POINT
- —— —— SECTION LINE
- — — — QUARTER LINE
- — — — — 1/16 LINE

REFERENCES

FILE 36, PAGE 6 OF SURVEYS
FILE 122, PAGE 76 OF SURVEYS

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
HORIZONTAL CONTROL PLAN

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

LAND SURVEYOR DANNY E. HILL EXP.6/30/05 STATE OF NEVADA NO. 9389
5 APRIL 2004

PROJECT No: 500.857 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: 1" = 500'
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
G-4
SHT. 4 OF 30

BASE BID SCHEDULE
Estimate of Quantities

ITEM NO.	ITEM DESCRIPTION	UNIT	TOTALS
100.01	CONSTRUCTION OFFICE	LS	1
105.01	ON-SITE MATERIAL TESTING FOR QUALITY CONTROL	LS	1
107.01	TRAFFIC CONTROL	LS	1
109.01	OWNER CAUSED DELAY ALLOWANCE	DAY	20
109.02	OWNER CAUSED DELAY ALLOWANCE ABOVE $500/DAY	DAY	20
109.03	CONSTRUCTION CONFLICTS AND ADDITIONAL WORK	LS	1
200.01	MOBILIZATION	LS	1
201.01	CLEARING AND GRUBBING	LS	1
202.01	REMOVE EXISTING SPLASH PADS (5 EACH)	LS	1
202.02	REMOVE EXISTING CHANNEL LINING FROM STA. 163+66 (RT) TO STA. 171+98 (RT)	LS	1
202.03	REMOVE EXISTING CHANNEL LINING FROM STA. 186+54 TO STA. 186+18	LS	1
202.04	REMOVE AND SALVAGE EXISTING RIPRAP ON WEST BANK FROM STA. 118+89 TO STA. 132+00	LS	1
202.05	REMOVE EXISTING BLOCK WALL AND FOOTING	LF	73
202.06	REMOVE EXISTING CHAIN-LINK FENCE	LF	515
203.01	CHANNEL EXCAVATION	CY	73,000
205.01	DEWATERING	LS	1
209.01	2-INCH DRAIN BACKFILL	CY	16,310
301.01	SELECTED MATERIAL BASE	CY	29,000
302.01	TYPE II AGGREGATE BASE	CY	4,100
302.02	TYPE II AGGREGATE BASE MAINTENANCE ROAD	CY	1,500
502.01	TRAPEZOIDAL TO TRAPEZOIDAL TRANSITION STA. 118+88.78 TO STA. 119+25	LS	1
502.02	TRAPEZOIDAL CHANNEL LINING STA. 119+38.78 TO STA. 122+58.37	LF	319.59
502.03	TRAPEZOIDAL CHANNEL TRANSITION STA. 122+58.37 TO STA. 123+00	LS	1
502.04	TRAPEZOIDAL CHANNEL LINING STA. 123+00 TO STA. 158+50	LF	3,550
502.05	TRAPEZOIDAL CHANNEL TRANSITION STA. 158+50 TO STA. 159+00	LS	1
502.06	TRAPEZOIDAL CHANNEL LINING STA. 159+00 TO STA. 160+29.41	LF	129.41
502.07	TRAPEZOIDAL TO RECTANGULAR TRANSITION STA. 160+29.41 TO STA. 160+79.41	LS	1
502.08	CONFLUENCE STRUCTURE STA. 160+79.41 TO STA. 162+79.41	LS	1
502.09	RECTANGULAR TO TRAPEZOIDAL TRANSITION STA. 162+79.41 TO STA. 163+29.41	LS	1
502.10	TRAPEZOIDAL CHANNEL LINING STA. 163+29.41 TO STA. 171+98.47; STA. 172+86.31 TO STA. 174+50; STA. 176+00 TO STA. 179+00	LF	1,332.75
502.11	CCRFCD CHANNEL GAUGE STATION	LS	1
502.12	TRAPEZOIDAL CHANNEL LINING WITH MAINTENANCE RAMP STA. 174+50 TO STA. 176+00	LS	1
502.13	MODIFIED TRAPEZOIDAL CHANNEL STA. 179+00 TO STA. 186+54.94	LF	755
502.14	TRAPEZOIDAL TO TRAPEZOIDAL TRANSITION STA. 186+54.94 TO STA. 187+18	LS	1
502.15	MAINTENANCE ROAD CROSSING STA. 130+71	LS	1
502.16	MAINTENANCE ROAD CROSSING STA. 165+68	LS	1
502.17	MAINTENANCE ROAD CROSSING STA. 184+79	LS	1
611.01	3-INCH CONCRETE SLOPE PAVEMENT	SY	34,113
616.01	6-FOOT CHAIN LINK FENCE	LF	160
616.02	POST AND CABLE RAILING	LF	2,000
627.01	PERMANENT SIGNS	EA	2
637.01	DUST PALLIATIVE	AC	13
637.02	DUST CONTROL	LS	1

ITEM NO.	ITEM DESCRIPTION	UNIT	TOTALS

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
ESTIMATE OF QUANTITIES

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

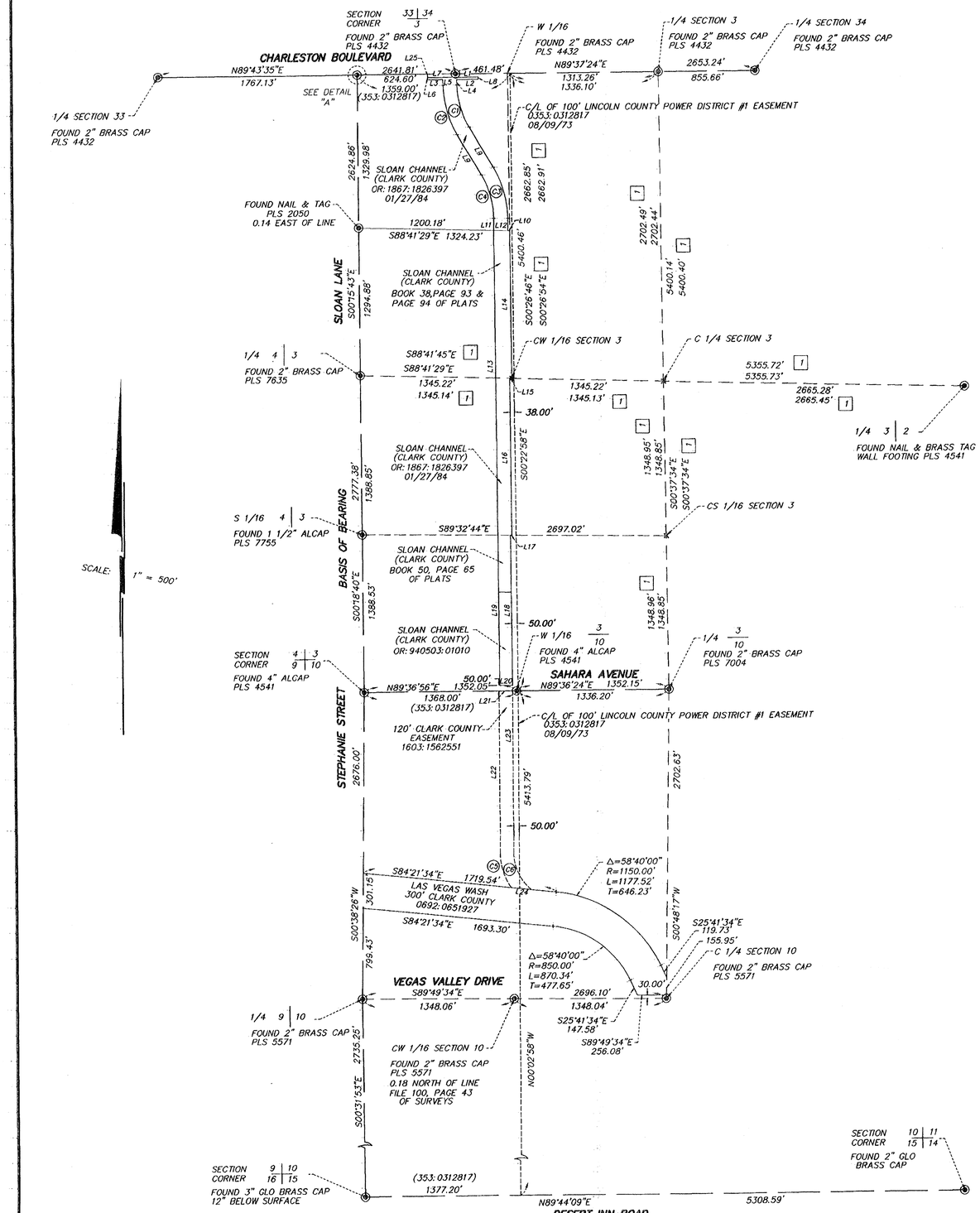
PROFESSIONAL ENGINEER STATE OF NEVADA
NOEL C. LAUGHLIN
Exp. 12/31/2005
CIVIL
No. 10165
4-5-04

PROJECT No: 500.857 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
G-5
SHT. 5 OF 30



SURVEYOR'S CERTIFICATE

I, DANNY E. HILL, A PROFESSIONAL LAND SURVEYOR LICENSED IN THE STATE OF NEVADA, CERTIFY THAT THIS MAP IS AN ACCURATE REPRESENTATION OF THE LANDS SURVEYED UNDER MY DIRECT SUPERVISION AT THE INSTANCE OF CLARK COUNTY PUBLIC WORKS. ALL SURVEY MONUMENTS FOUND OR SET ARE CORRECTLY SHOWN, OCCUPY THE POSITIONS INDICATED AND ARE SUFFICIENT TO ENABLE THE RETRACEMENT OF THE SURVEY WHICH WAS COMPLETED ON APRIL 16, 2002. THIS SURVEY PLAT DOES NOT CONSTITUTE A SUBDIVISION AS DEFINED BY NEVADA STATE LAW, THE LANDS LIE WITHIN SECTIONS 3 AND 10 TOWNSHIP 21 SOUTH, RANGE 62 EAST, M.D.M., CLARK COUNTY, NEVADA. THIS RECORD OF SURVEY IS FILED IN COMPLIANCE WITH PROVISIONS OF N.R.S. CHAPTER 278.325 AND WITH PROVISIONS OF N.R.S. CHAPTER 625.340.

DANNY E. HILL
PROFESSIONAL LAND SURVEYOR
NEVADA LICENSE NO. 9389

PROFESSIONAL LAND SURVEYOR — DANNY E. HILL — NO. 9389 — STATE OF NEVADA

07 JUNE 2002
EXP. 06-30-03

BASIS OF BEARINGS

SOUTH 00°18'40" EAST, BEING THE WEST LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 3, TOWNSHIP 21 SOUTH, RANGE 62 EAST, M.D.M., CLARK COUNTY, NEVADA. AS SHOWN BY FILE 36, PAGE 6 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE, CLARK COUNTY, NEVADA.

NOTE:

THIS FIELD SURVEY WAS PERFORMED TO ESTABLISH AND MEMORIALIZE THE LEGAL RIGHT-OF-WAY AND/OR BOUNDARY LIMITS FOR THE CONSTRUCTION OF THE PROJECT SO THAT ALL INTERSECTIONS AND OTHER CONTROL POINTS FOR THE PROJECT CAN BE MONUMENTED IN ACCORDANCE WITH APPLICABLE STATE STATUTES AND LOCAL ORDINANCES AT THE COMPLETION OF CONSTRUCTION.

RECORDER'S NOTE:

ANY SUBSEQUENT CHANGES TO THIS MAP SHOULD BE EXAMINED AND MAY BE DETERMINED BY REFERENCE TO THE COUNTY RECORDER'S CUMULATIVE MAP INDEX.
N.R.S. 278.5695

LEGEND

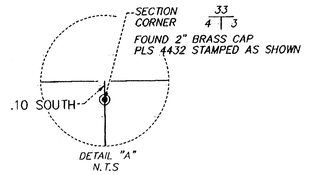
- ◉ FOUND MONUMENTATION AS SHOWN AND DESCRIBED
- × CALCULATED POINT
- —— —— SECTION LINE
- — — — QUARTER LINE
- — — — — 1/16 LINE

LINE	BEARING	DISTANCE
L1	S89°37'24"W	200.01'
L2	S89°37'24"W	189.63'
L3	N89°43'35"E	136.48'
L4	N01°26'00"W	48.81'
L5	N01°26'00"W	51.30'
L6	S00°16'25"E	20.00'
L7	S89°43'35"W	250.11'
L8	S00°22'58"E	20.00'
L9	N31°11'20"W	409.00'
L10	S88°41'29"E	16.68'
L11	N00°22'58"W	107.76'
L12	S00°22'58"E	111.42'
L13	N00°22'58"W	2665.90'
L14	S00°26'46"E	1295.01'
L15	N88°41'29"W	18.11'
L16	N00°22'58"W	1369.09'
L17	N89°32'44"W	12.00'
L18	S00°22'58"E	1319.28'
L19	N00°22'58"W	1320.90'
L20	N89°36'56"E	112.00'
L21	N89°36'56"E	120.00'
L22	S00°02'58"E	1411.47'
L23	S00°02'58"E	1412.17'
L24	S84°21'34"E	180.49'
L25	S00°16'25"E	30.00'

REFERENCE MAPS

[1] FILE 36, PAGE 6 OF SURVEYS

CURVE	DELTA	RADIUS	LENGTH	TANGENT
C1	29°45'20"	738.00'	383.27'	196.06'
C2	29°45'20"	882.00'	447.66'	229.00'
C3	30°48'22"	882.00'	463.47'	237.48'
C4	30°48'22"	738.00'	396.80'	203.32'
C5	34°49'33"	527.97'	320.91'	165.59'
C6	51°31'45"	407.97'	366.91'	196.91'



500.857
SLOAN CHANNEL

SHEET 1 OF 1

RECORD OF SURVEY
FOR
CLARK COUNTY PUBLIC WORKS
SLOAN CHANNEL

THOSE PORTIONS OF LAND LYING WITHIN SECTIONS 3, AND 10, TOWNSHIP 21 SOUTH, RANGE 62 EAST, M.D.M., CLARK COUNTY, NEVADA.

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146

INSTRUMENT NO. 00924
OFFICIAL RECORDS
BOOK NO. 20020607
FILED AT THE REQUEST OF
G.C. WALLACE INC.
DATE 6-7-02 AT 10:39
FILE 122 PAGE 0076
OF SURVEYS
CLARK COUNTY, NEVADA RECORDS
JUDITH A. VANDEVER, RECORDER
FEE $ 0.00 DEPUTY GX

JOB# 500.857

FILE 122 PAGE 0076

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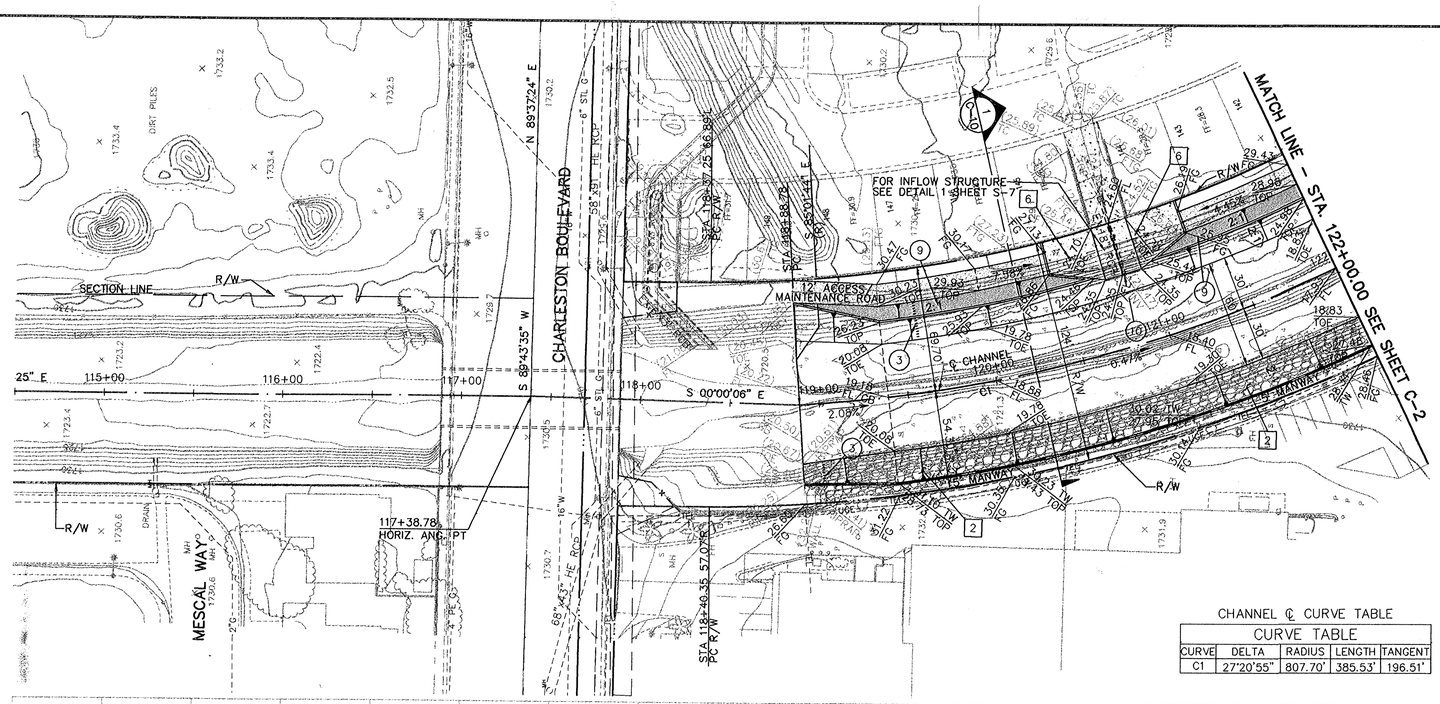
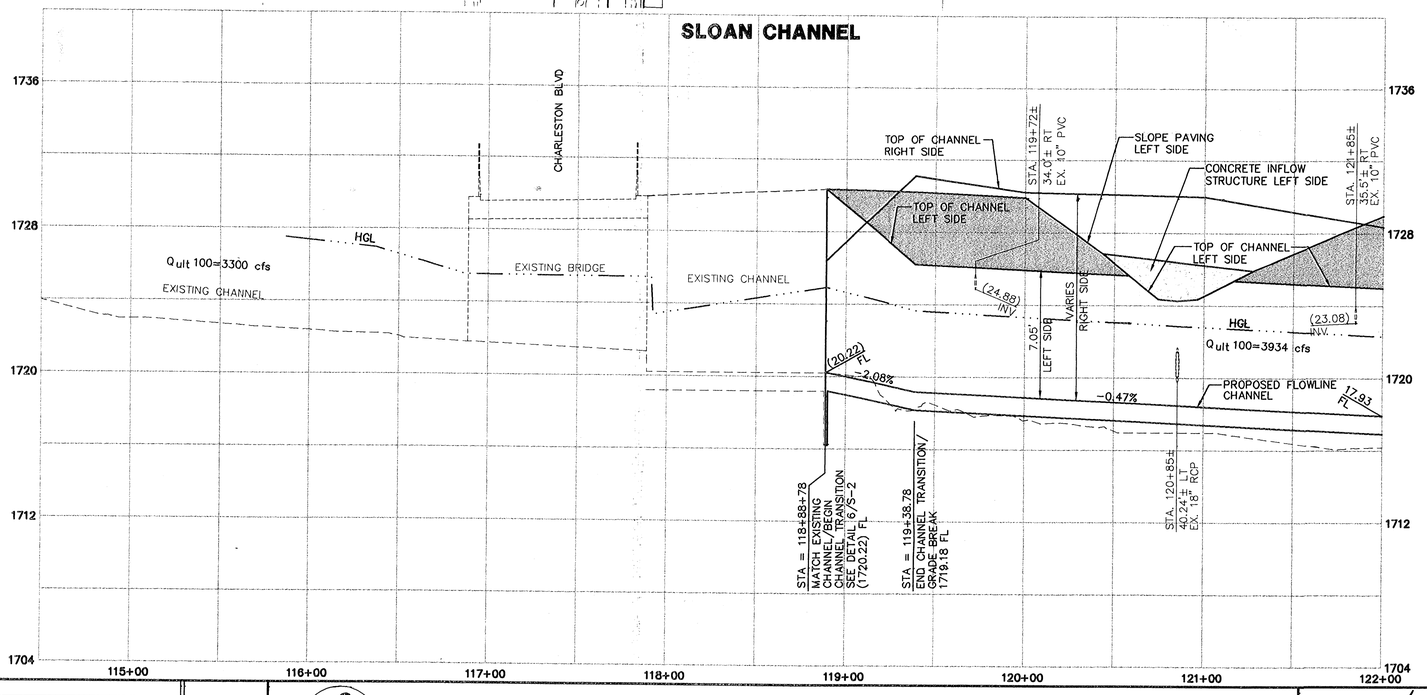
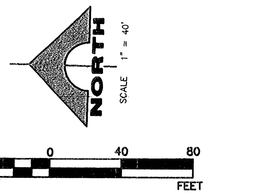


CHANNEL ℄ CURVE TABLE

CURVE TABLE

CURVE	DELTA	RADIUS	LENGTH	TANGENT
C1	27°20'55"	807.70'	385.53'	196.51'





CONSTRUCTION NOTES

(3) CONSTRUCT CHANNEL ACCESS STEPS (SEE DETAIL 11/S2)

(9) CONSTRUCT SLOPE PAVING (SEE DETAIL 3/C11)

(10) CONSTRUCT PIPE CONNECTION (SEE DETAIL 9/S2)

REMOVAL NOTES

[2] REMOVE AND SALVAGE RIPRAP

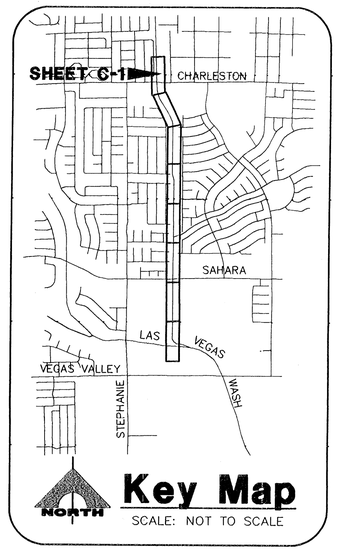
[6] REMOVE EXISTING CONCRETE SPILLWAY

NOTE:

SEE SHEETS C-13 AND C-14 FOR FENCING/POST & CABLE RAILING PLAN.

Avoid cutting underground utility lines. It's costly.
Call before you Dig.
1-800-227-2600
UNDERGROUND SERVICE (USA)

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.
CALL BEFORE YOU DO OVERHEAD
1-702-593-6111



REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL

PLAN AND PROFILE

STA. 114+50.00 TO STA. 122+00.00

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER NOEL C. LAUGHLIN Exp. 12/31/2005 CIVIL No. 10158 STATE OF NEVADA 4-5-04

PROJECT No: 500.857 DRAWN BY: DVJ

DESIGNED BY: _____ CHECKED BY: _____

APPROVED BY _____

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: 1" = 40'
VERT: 1" = 4'
FIELD BOOK

L-1759
DRAWING NO.
C-1
SHT. 7 OF 30

F:\500-857\dwg\improv\sc_c02.dwg 04-05-04 08:20:23 RBlanchard

SOUTHERN NEVADA WATER AUTHORITY CONSTRUCTION NOTES

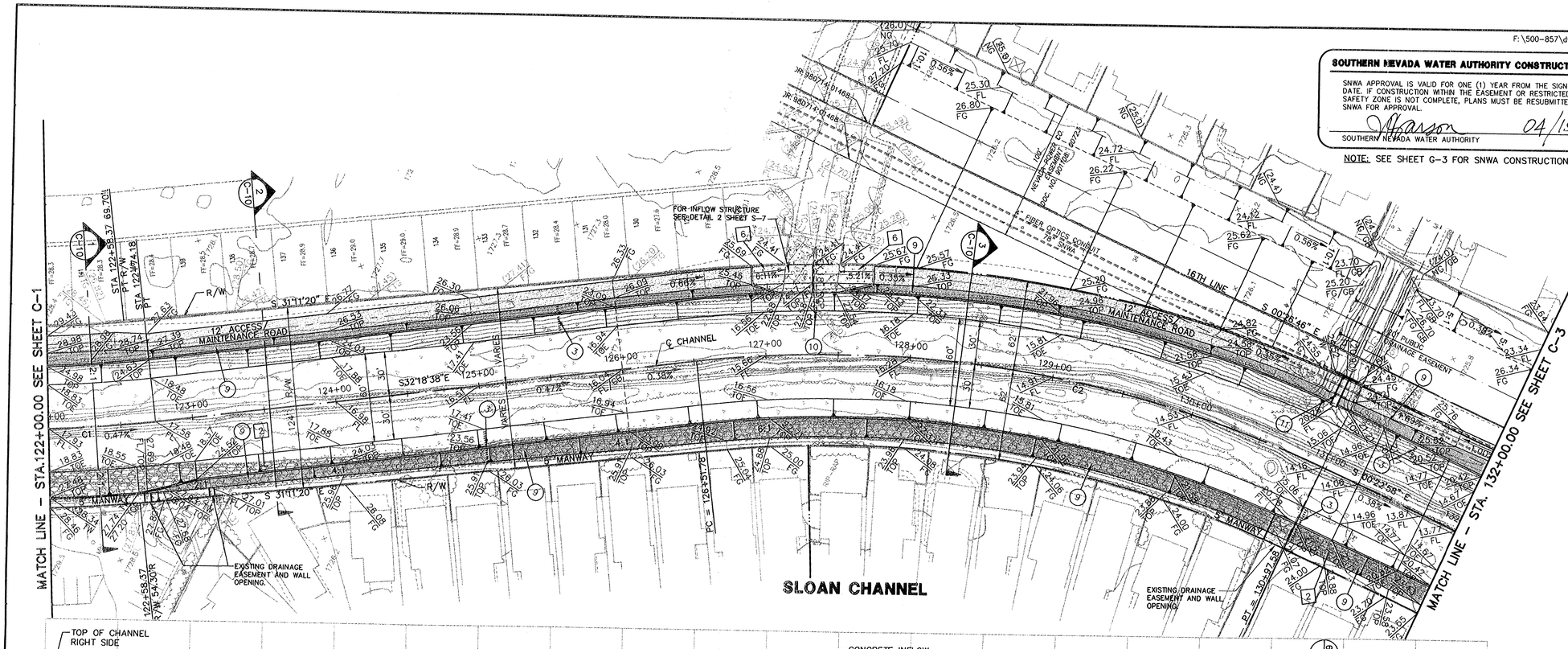
SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

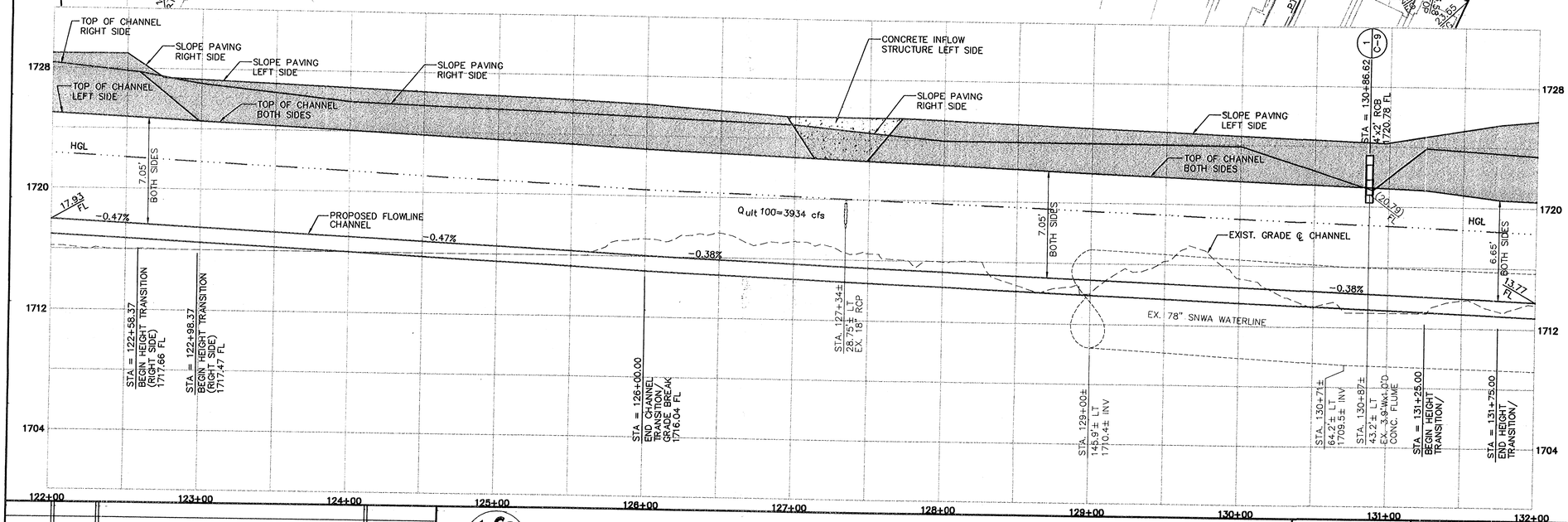
SOUTHERN NEVADA WATER AUTHORITY — 04/15/04 DATE

NOTE: SEE SHEET G-3 FOR SNWA CONSTRUCTION NOTES.

NORTH SCALE 1" = 40'

SCALE 40 0 40 80 FEET





CONSTRUCTION NOTES

(3) CONSTRUCT CHANNEL ACCESS STEPS (SEE DETAIL 11/S2)

(9) CONSTRUCT SLOPE PAVING (SEE DETAIL 3/C11)

(10) CONSTRUCT PIPE CONNECTION (SEE DETAIL 9/S2)

(11) CONSTRUCT RCB CONNECTION (SEE DETAIL 3/S7)

REMOVAL NOTES

[2] REMOVE AND SALVAGE RIPRAP

[6] REMOVE EXISTING CONCRETE SPILLWAY

CHANNEL ℄ CURVE TABLE

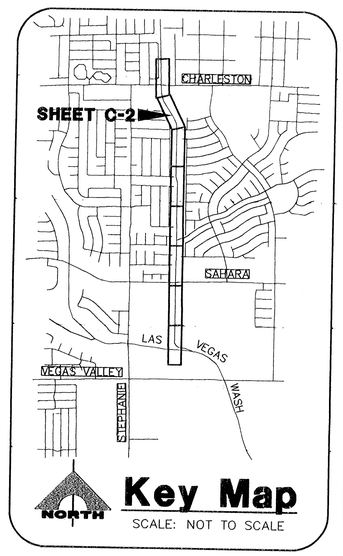
CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	TANGENT
C1	27°20'55"	807.70'	385.53'	196.51'
C2	31°55'41"	800.00'	445.80'	228.85'

NOTE:

SEE SHEETS C-13 AND C-14 FOR FENCING/POST & CABLE RAILING PLAN.

Avoid cutting underground utility lines. It's costly. Call before you Dig. 1-800-227-2600 UNDERGROUND SERVICE (USA)

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-593-6111



REV. NO.	DATE	DESCRIPTION	APPROVED

SLOAN CHANNEL
PLAN AND PROFILE
STA. 122+00.00 TO STA. 132+00.00
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

NOEL C. LAUGHLIN Exp. 12/31/2005 CIVIL No. 10165 STATE OF NEVADA 4-5-04

PROJECT No: 500.857 DRAWN BY: DWJ
DESIGNED BY: _____ CHECKED BY: _____
APPROVED BY _____

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: 1" = 40'
VERT: 1" = 4'
FIELD BOOK

L-1759
DRAWING NO.
C-2
SHT. 8 OF 30

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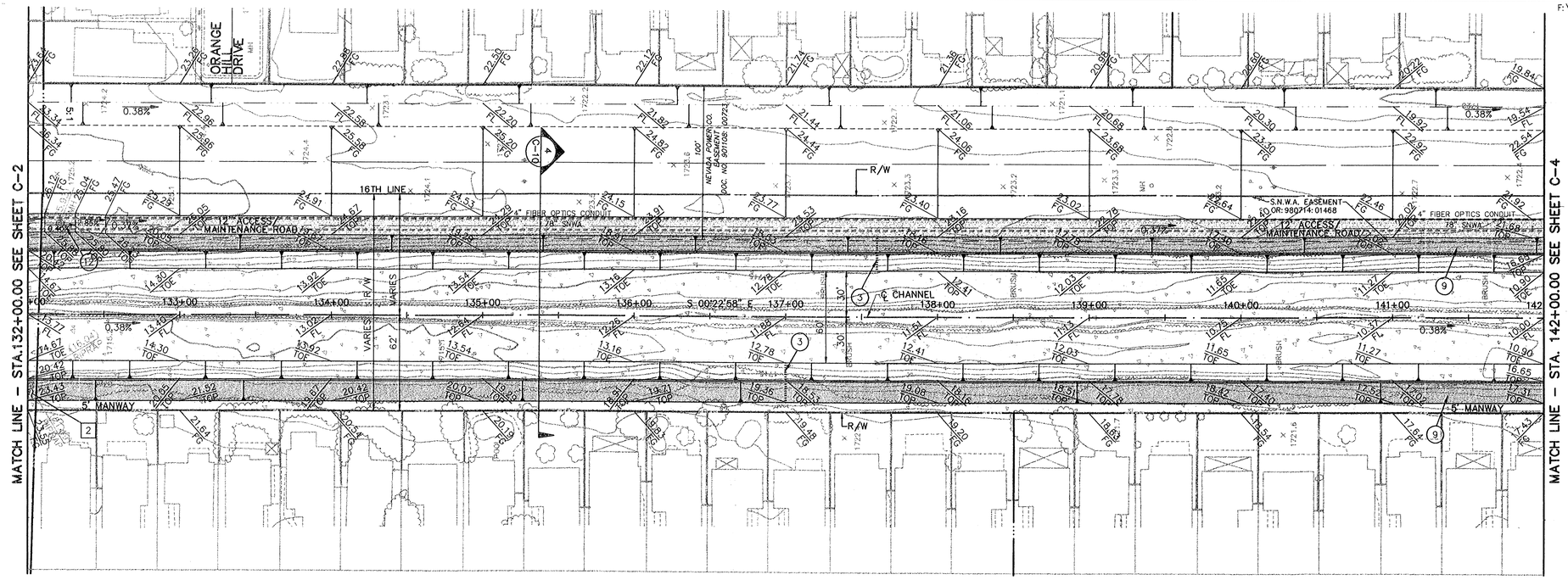
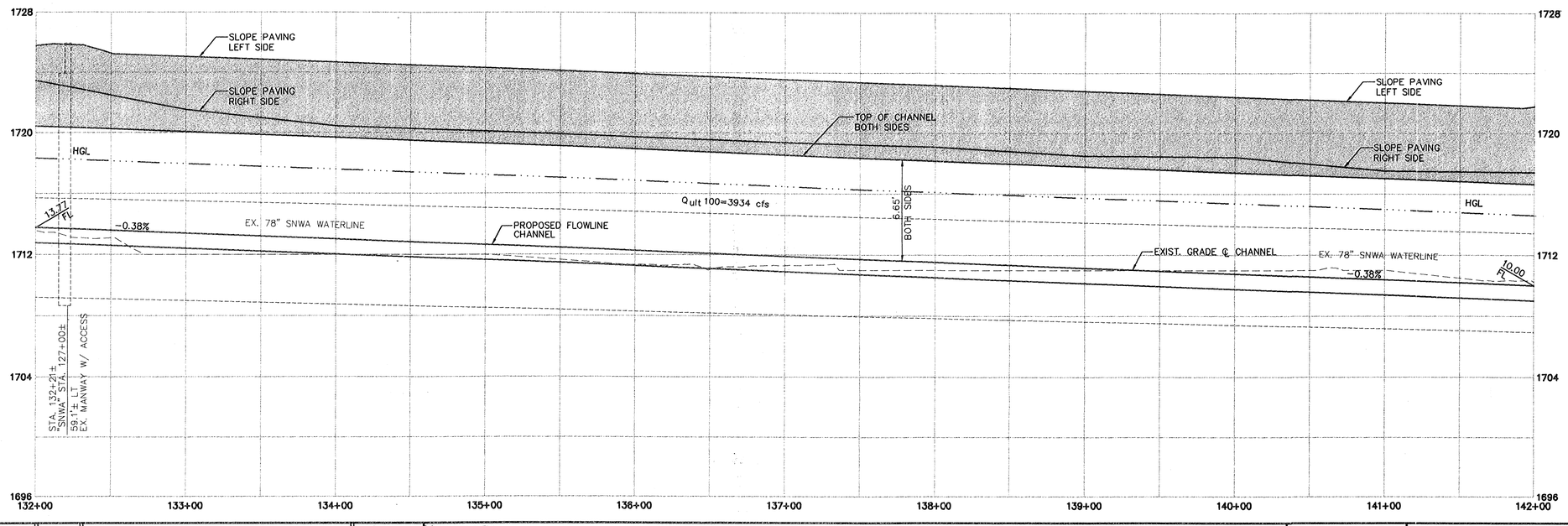


SLOAN CHANNEL



CONSTRUCTION NOTES

(3) CONSTRUCT CHANNEL ACCESS STEPS (SEE DETAIL 11/S2)

(9) CONSTRUCT SLOPE PAVING (SEE DETAIL 3/C11)

(12) CONTRACTOR SHALL FIELD VERIFY AND FLAG ALL SNWA APPURTENANCES AND PROTECT FROM DAMAGE AND BEING BURIED.

REMOVAL NOTES

[2] REMOVE AND SALVAGE RIPRAP

NOTE:

SEE SHEETS C-13 AND C-14 FOR FENCING/POST & CABLE RAILING PLAN.

SOUTHERN NEVADA WATER AUTHORITY CONSTRUCTION NOTES

SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

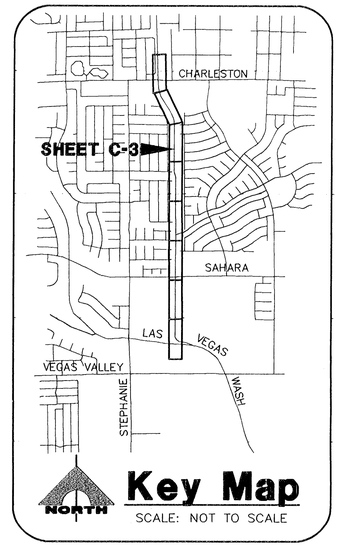
Manson 04/15/04

SOUTHERN NEVADA WATER AUTHORITY DATE

NOTE: SEE SHEET G-3 FOR SNWA CONSTRUCTION NOTES.

Avoid cutting underground utility lines. It's costly. Call before you Dig. 1-800-227-2600 UNDERGROUND SERVICE (USA)

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-593-6111



Key Map

SCALE: NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	APPROVED

SLOAN CHANNEL

PLAN AND PROFILE

STA. 132+00.00 TO STA. 142+00.00

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

NOEL C. LAUGHLIN Exp. 12/31/2005 CIVIL No. 10165 PROFESSIONAL ENGINEER STATE OF NEVADA 4-5-04

PROJECT No: 500.857 DRAWN BY: DWJ

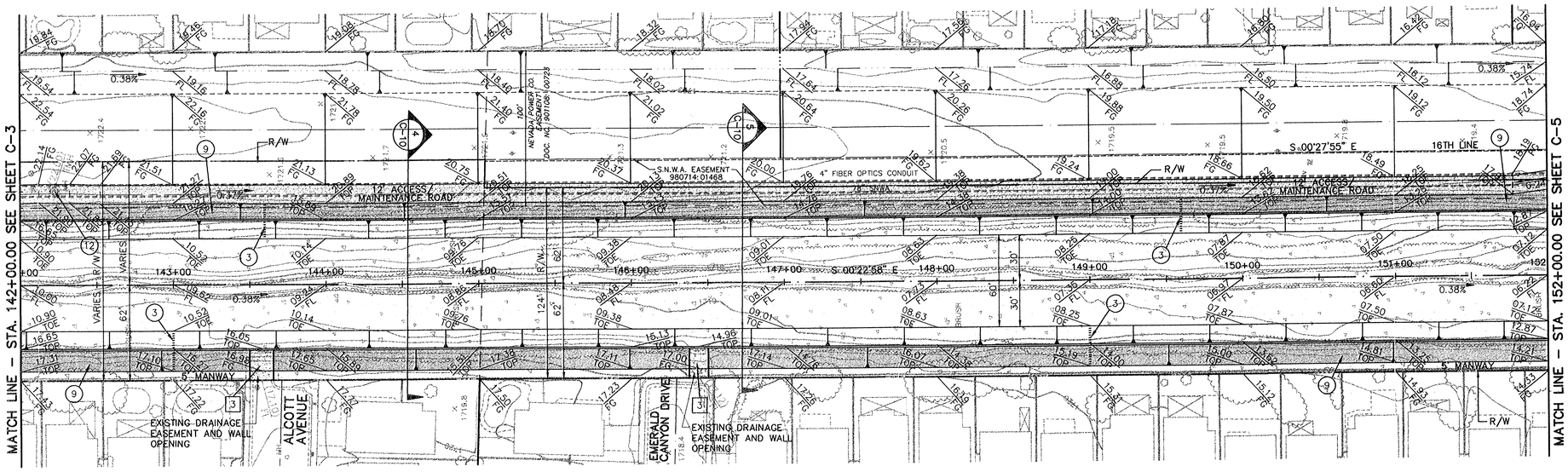
DESIGNED BY: _____ CHECKED BY: _____

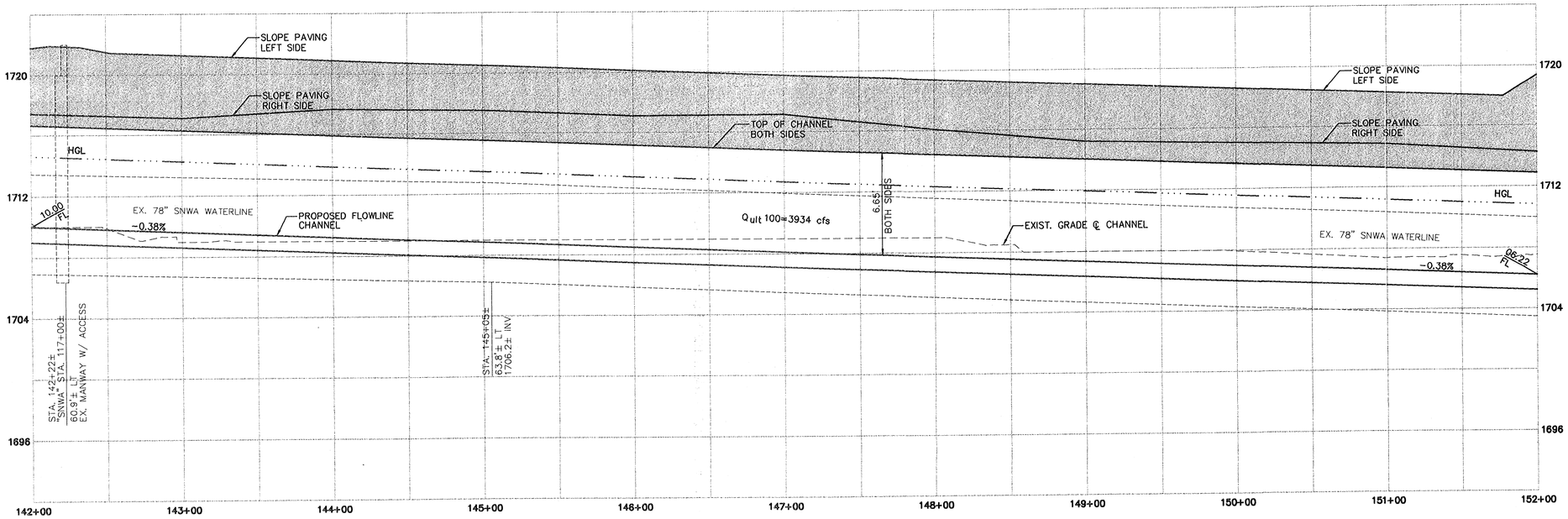
APPROVED BY _____

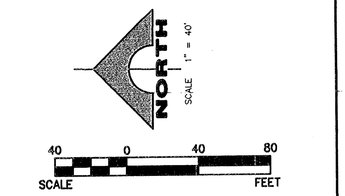
G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: 1" = 40'
VERT: 1" = 4'
FIELD BOOK

L-1759
DRAWING NO.
C-3
SHT. 9 OF 30







CONSTRUCTION NOTES

(3) CONSTRUCT CHANNEL ACCESS STEPS (SEE DETAIL 11/S2)

(9) CONSTRUCT SLOPE PAVING (SEE DETAIL 3/C11)

(12) CONTRACTOR SHALL FIELD VERIFY AND FLAG ALL SNWA APPURTENANCES AND PROTECT FROM DAMAGE AND BEING BURIED.

REMOVAL NOTES

[3] REMOVE EXISTING CONCRETE SPLASH PAD

NOTE:

SEE SHEETS C-13 AND C-14 FOR FENCING/POST & CABLE RAILING PLAN.

SOUTHERN NEVADA WATER AUTHORITY CONSTRUCTION NOTES

SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

SOUTHERN NEVADA WATER AUTHORITY — DATE 04/15/04

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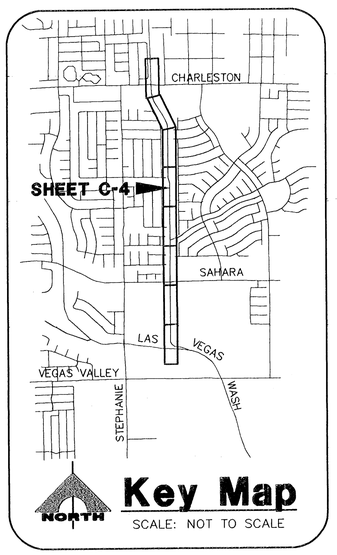

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
PLAN AND PROFILE
STA. 142+00.00 TO STA. 152+00.00
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER — NOEL LAUGHLIN — Exp. 12/31/2005 — CIVIL — No. 10169 — STATE OF NEVADA — 4-5-04

PROJECT No: 500.857 DRAWN BY: DWJ
DESIGNED BY: CHECKED BY:
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: 1" = 40'
VERT: 1" = 4'
FIELD BOOK

L-1759
DRAWING NO.
C-4
SHT. 10 OF 30

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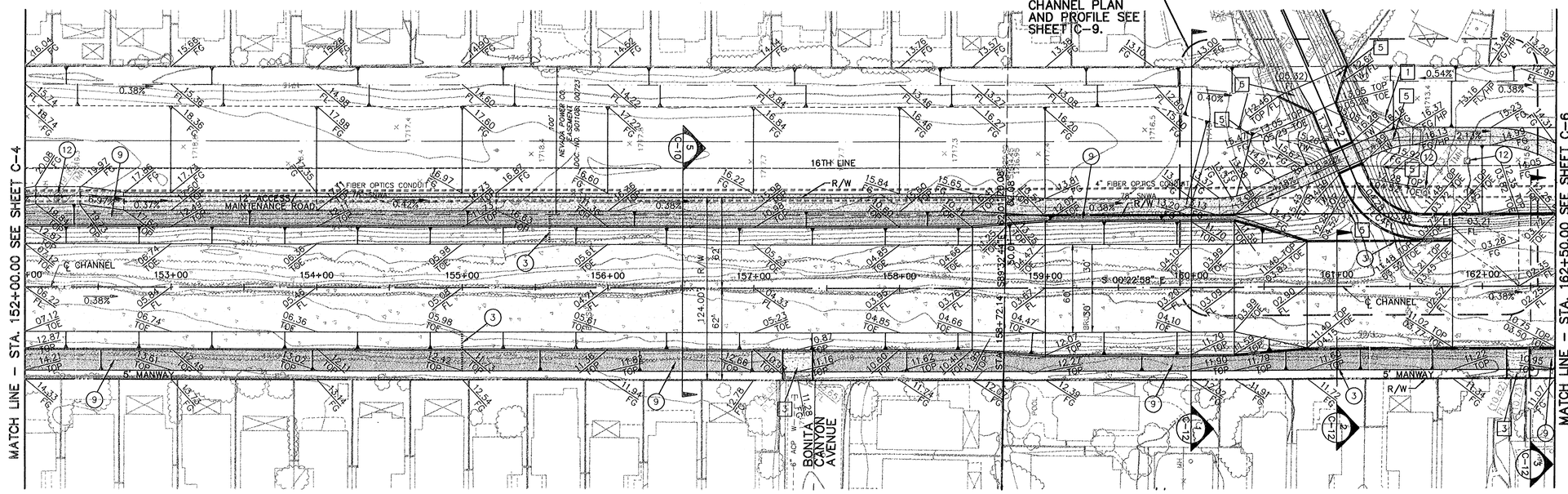
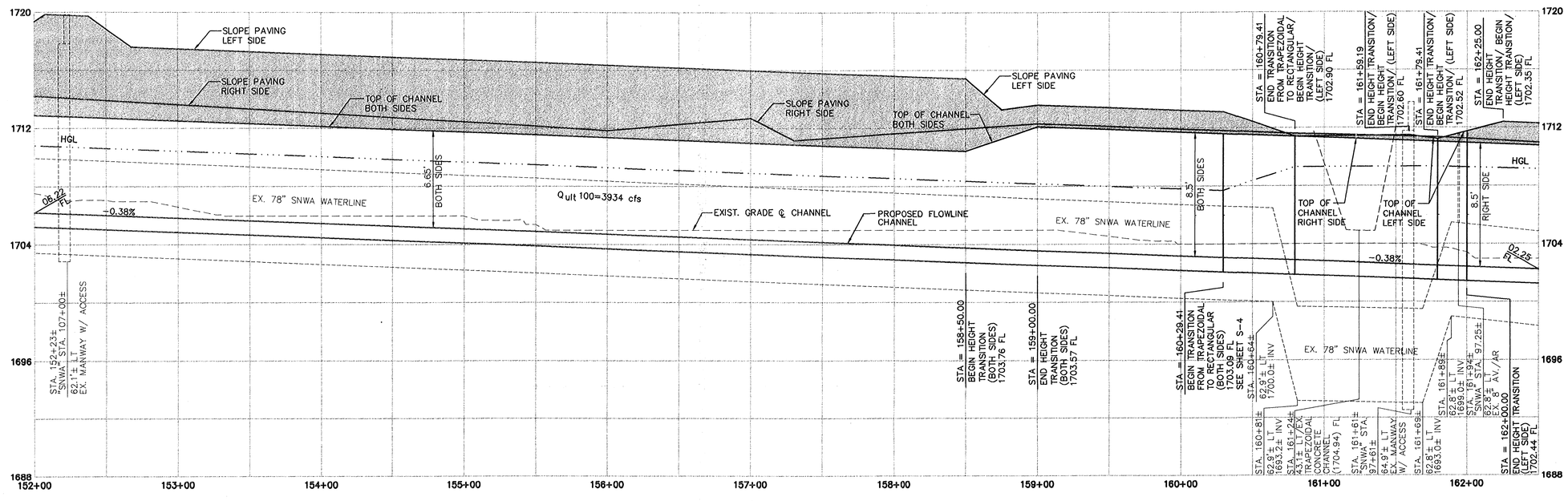
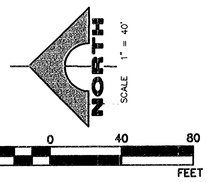


SLOAN CHANNEL





CONSTRUCTION NOTES

(3) CONSTRUCT CHANNEL ACCESS STEPS (SEE DETAIL 11/S2)

(9) CONSTRUCT SLOPE PAVING (SEE DETAIL 3/C11)

(12) CONTRACTOR SHALL FIELD VERIFY AND FLAG ALL SNWA APPURTENANCES AND PROTECT FROM DAMAGE AND BEING BURIED.

REMOVAL NOTES

[1] REMOVE EXISTING BLOCK WALL AND FOOTING

[3] REMOVE EXISTING CONCRETE SPLASH PAD

[5] REMOVE EXISTING CHANNEL LINING.

NOTE:

SEE SHEETS C-13 AND C-14 FOR FENCING/POST & CABLE RAILING PLAN.

SOUTHERN NEVADA WATER AUTHORITY CONSTRUCTION NOTES

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SOUTHERN NEVADA WATER AUTHORITY 04/15/04 DATE

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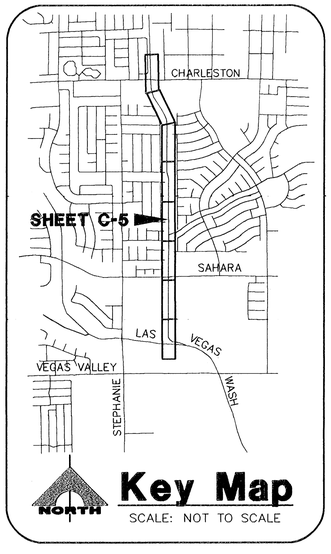
1-702-593-6111



REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
PLAN AND PROFILE
STA. 152+00.00 TO STA. 162+50.00
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

NOEL C. LAUGHLIN Exp. 12/31/2005 CIVIL No. 10165 STATE OF NEVADA PROFESSIONAL ENGINEER 4-5-04

PROJECT No: 500.857 DRAWN BY: DVJ
DESIGNED BY: _____ CHECKED BY: _____
APPROVED BY _____

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: 1" = 40'
VERT: 1" = 4'
FIELD BOOK

L-1759
DRAWING NO.
C-5
SHT. 11 OF 30

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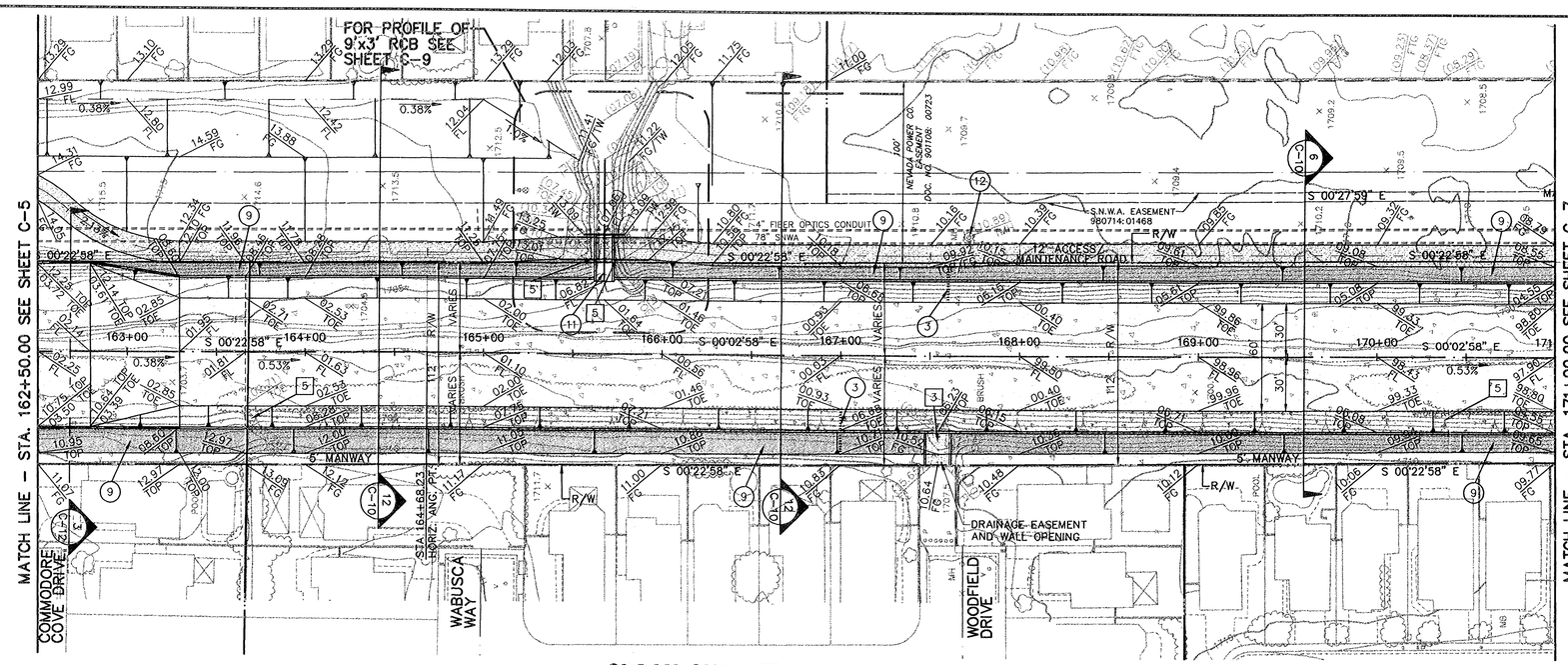
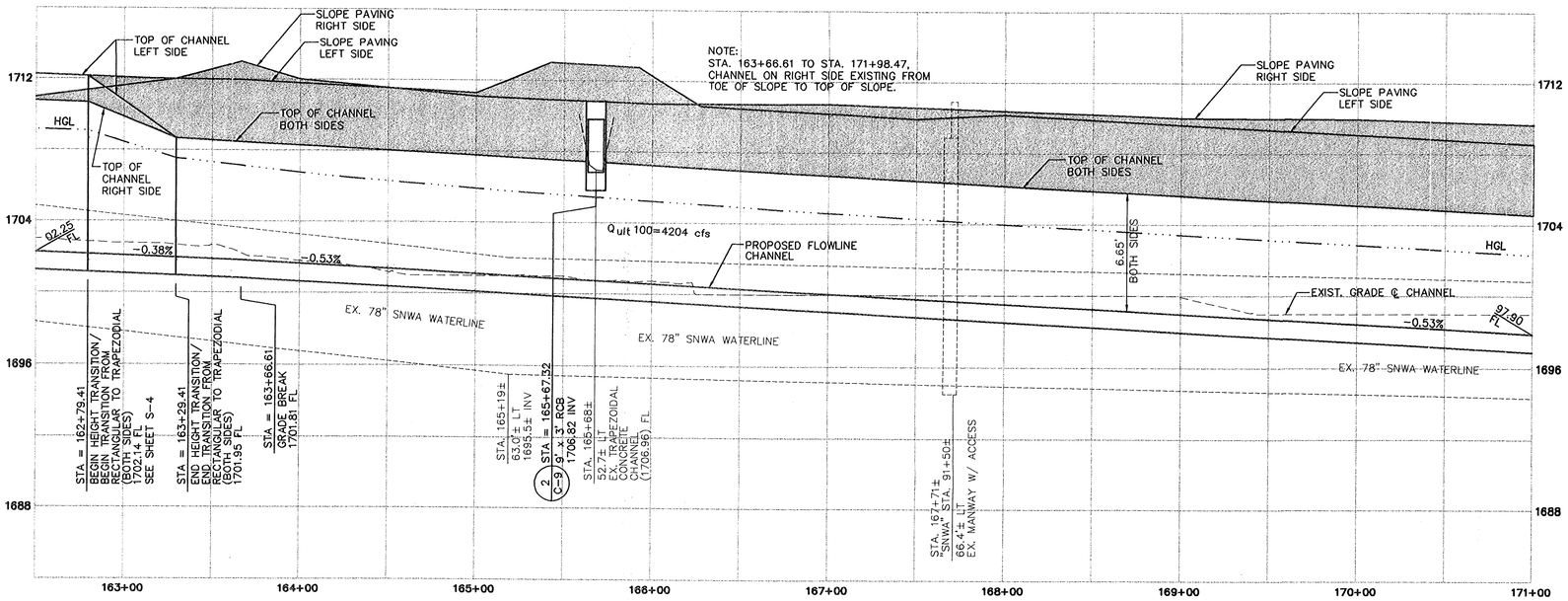


SLOAN CHANNEL



NORTH SCALE 1" = 40'

40 0 40 80 SCALE FEET

CONSTRUCTION NOTES

(3) CONSTRUCT CHANNEL ACCESS STEPS (SEE DETAIL 11/S2)

(9) CONSTRUCT SLOPE PAVING (SEE DETAIL 3/C11)

(11) CONSTRUCT RCB CONNECTION (SEE DETAIL 3/S7)

(12) CONTRACTOR SHALL FIELD VERIFY AND FLAG ALL SNWA APPURTENANCES AND PROTECT FROM DAMAGE AND BEING BURIED.

REMOVAL NOTES

[3] REMOVE EXISTING CONCRETE SPLASH PAD

[5] REMOVE EXISTING CHANNEL LINING.

NOTE:

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SOUTHERN NEVADA WATER AUTHORITY CONSTRUCTION NOTES

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SOUTHERN NEVADA WATER AUTHORITY 04/15/04 DATE

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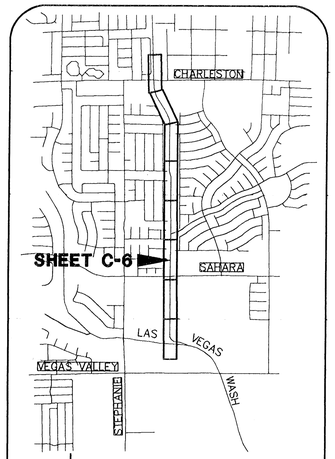


NORTH **Key Map** SCALE: NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
PLAN AND PROFILE
STA. 162+50.00 TO STA. 171+00.00
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER - STATE OF NEVADA NOEL C. LAUGHLIN Exp. 12/31/2005 CIVIL No. 10165 4-5-04

PROJECT No: 500.857 DRAWN BY: DVJ
DESIGNED BY: CHECKED BY:
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE	
HORIZ:	1" = 40'
VERT:	1" = 4'
FIELD BOOK	

L-1759
DRAWING NO. C-6
SHT. 12 OF 30

F:\500-857\dwg\improv\sc_c07.dwg 04-05-04 08:57:42 RBlanchard

MATCH LINE – STA. 171+00.00 SEE SHEET C-6

MATCH LINE – STA. 181+00.00 SEE SHEET C-8

42+63.48 ℄ SAHARA AVE.

172+42.15 ℄ SLOAN CHANNEL

N89°36'24"E

100.00' SAHARA AVE. R/W

12' ACCESS/ MAINTENANCE ROAD

ACCESS RAMP SEE SHEETS S-5 AND S-6 FOR DETAILS AND SECTIONS.

STA 177+50.00 49.70' LT CONSTRUCT DISTRICT GAUGING STATION, SEE DETAILS SHEET C-17

SN.W.A. EASEMENT 980714:01468 980911:01363

FIBER OPTICS CONDUIT

4" FIBER OPTICS CONDUIT

16TH LINE EASEMENT LINE

℄ CHANNEL

S 00°02'58" E

0.46%

0.53%

5' MANWAY

SAHARA AVENUE

35' NEVADA POWER CO. EASEMENT

EASEMENT LINE

100.00' SAHARA AVE. R/W

N89°36'56"E

27" SS

3" PVC

172+00 173+00 174+00 175+00 176+00 177+00 178+00 179+00 180+00 181

SOUTHERN NEVADA WATER AUTHORITY CONSTRUCTION NOTES

SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

SOUTHERN NEVADA WATER AUTHORITY — DATE 04/15/04

LAS VEGAS VALLEY WATER DISTRICT — DATE 4/5/04

NOTE: SEE SHEET G-3 FOR SNWA CONSTRUCTION NOTES.

NORTH

SCALE 1" = 40'

40 0 40 80

SCALE FEET

CONSTRUCTION NOTES

(3) CONSTRUCT CHANNEL ACCESS STEPS (SEE DETAIL 11/S2)

(4) CONSTRUCT 12' DRIVEWAY PER STD. DWG. NO. 224

(8) PAINTED STAFF GAUGE (SEE DETAIL 5/C11)

(9) CONSTRUCT SLOPE PAVING (SEE DETAIL 3/C11)

(12) CONTRACTOR SHALL FIELD VERIFY AND FLAG ALL SNWA APPURTENANCES AND PROTECT FROM DAMAGE AND BEING BURIED.

REMOVAL NOTES

[5] REMOVE EXISTING CHANNEL LINING.

NOTE:

SEE SHEETS C-13 AND C-14 FOR FENCING/POST & CABLE RAILING PLAN.

CONTRACTOR TO EXERCISE EXTREME CARE WHEN EXCAVATING WITHIN 10 FEET (HORIZONTAL) OF SNWA WATERLINE. SNWA TO BE PRESENT DURING EXCAVATION WITHIN AFOREMENTIONED LIMITS.

Avoid cutting underground utility lines. It's costly.
Call before you Dig.
1-800-227-2600
UNDERGROUND SERVICE (USA)

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY
CALL BEFORE YOU DO OVERHEAD
1-702-593-6111

SLOAN CHANNEL

1712 1704 1696 1688 1680

171+98.47, CHANNEL ON RIGHT SIDE EXISTING FROM TOE OF SLOPE TO TOP OF SLOPE

SAHARA AVENUE

SLOPE PAVING LEFT SIDE

TOP OF CHANNEL BOTH SIDES

SLOPE PAVING RIGHT SIDE

ACCESS RAMP LEFT SIDE

HGL

6.65' BOTH SIDES

17.5' BOTH SIDES

EXIST CULVERT

97.90 FL

(97.37) FL

(97.09) FL

-0.53%

-(0.32%)

-0.46%

$Q_{ult\,100}$=4416 cfs

PROPOSED FLOWLINE CHANNEL

EX. 78" SNWA WATERLINE

EXIST. GRADE ℄ CHANNEL

93.33 FL

STA. 171+17± 66.1'± LT 1694.3± INV.

STA. 171+69± 65.8'± LT 1680.8± INV

12" 18" 8" 6"

EXIST. CONC. ENCASED SEWER SIPHON INV.= 89.4'±

STA. 173+19± 65.0'± LT 1680.5± INV

STA. 173+72± 64.7'± LT 1693.5± INV

STA. 173+76± SNWA STA. 85+40± 69.3'± LT EX. BLOW OFF ASSEMBLY

STA. 173+86± SNWA STA. 85+40± 68.1'± LT EX. BLOW OFF ASSEMBLY

STA. 177+65± SNWA STA. 81+50± 62.9'± LT EX. MANWAY W/ ACCESS

STA. 178+50.00 BEGIN HEIGHT TRANSITION (LEFT SIDE) 1694.48 FL

STA. 179+00.00 BEGIN HEIGHT TRANSITION (LEFT SIDE) 1694.25 FL

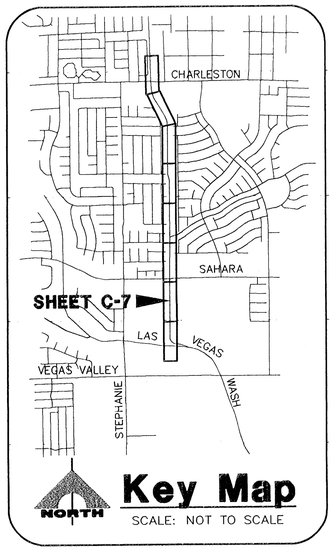
STA = 171+98.47 MATCH EXISTING/ GRADE BREAK (1697.37) FL SEE SHEET S-2

EX. 18" DIP W/ 30" STL CASING 1691.5± TOP CASING

STA = 172+98.31 MATCH EXISTING/ GRADE BREAK (1697.09) FL SEE SHEET S-2

STA. 173+10± "SNWA" STA. 86+11± 68.7'± LT EX. MANWAY W/ ACCESS AND BLOWOFF

171+00 172+00 173+00 174+00 175+00 176+00 177+00 178+00 179+00 180+00 181+00



Key Map
SCALE: NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
PLAN AND PROFILE
STA. 171+00.00 TO STA. 181+00.00
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

NOEL C. LAUGHLIN Exp. 12/31/2005 CIVIL No. 10165 STATE OF NEVADA PROFESSIONAL ENGINEER 4-5-04

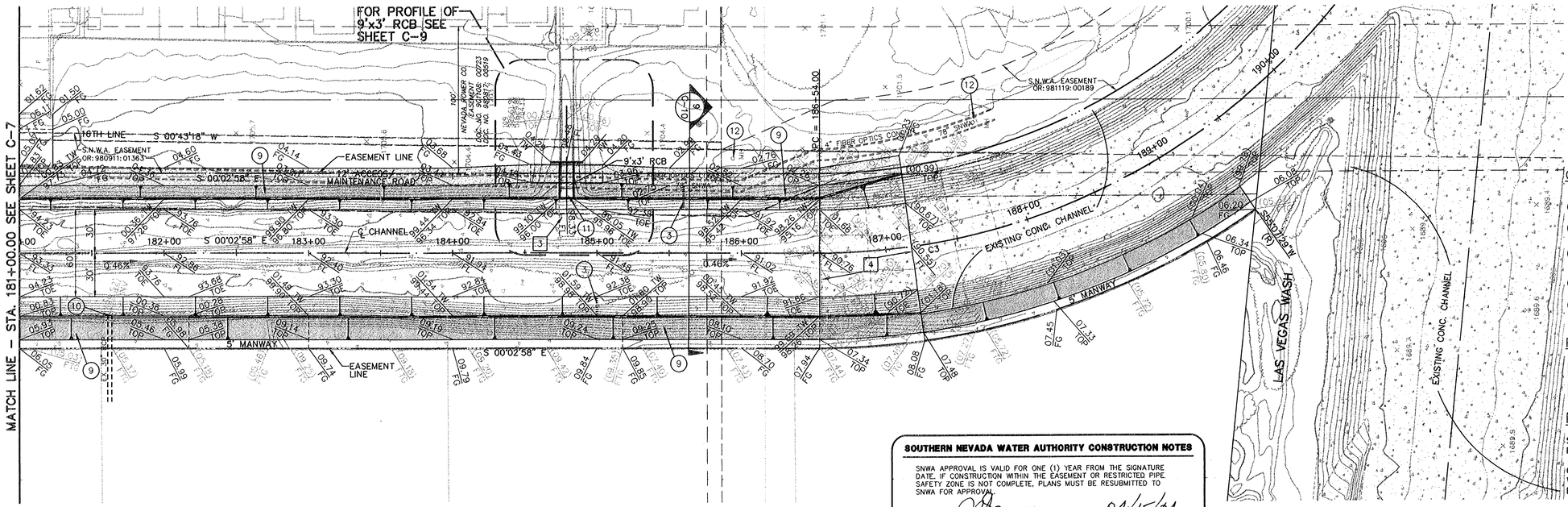
PROJECT No: 500.857 DRAWN BY: DWJ
DESIGNED BY: CHECKED BY:
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: 1" = 40'
VERT: 1" = 4'
FIELD BOOK

L-1759
DRAWING NO. C-7
SHT. 13 OF 30

F:\500-857\dwg\improv\sc_c08.dwg 04-05-04 09:00:50 RBlanchard



NORTH
SCALE 1" = 40'

40 0 40 80
SCALE FEET

CONSTRUCTION NOTES

(3) CONSTRUCT CHANNEL ACCESS STEPS (SEE DETAIL 11/S2)

(9) CONSTRUCT SLOPE PAVING (SEE DETAIL 3/C11)

(10) CONSTRUCT PIPE CONNECTION (SEE DETAIL 9/S2)

(11) CONSTRUCT RCB CONNECTION (SEE DETAIL 3/S7)

(12) CONTRACTOR SHALL FIELD VERIFY AND FLAG ALL SNWA APPURTENANCES AND PROTECT FROM DAMAGE AND BEING BURIED.

REMOVAL NOTES

[3] REMOVE EXISTING CONCRETE SPLASH PAD

[4] REMOVE EXISTING 60 FT.± CHANNEL SECTION TO EXPANSION JOINT.

NOTE:

SEE SHEETS C-13 AND C-14 FOR FENCING/POST & CABLE RAILING PLAN.

CONTRACTOR TO EXERCISE EXTREME CARE WHEN EXCAVATING WITHIN 10 FEET (HORIZONTAL) OF SNWA WATERLINE. SNWA TO BE PRESENT DURING EXCAVATION WITHIN AFOREMENTIONED LIMITS.

SOUTHERN NEVADA WATER AUTHORITY CONSTRUCTION NOTES

SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

SOUTHERN NEVADA WATER AUTHORITY — DATE 04/15/04

NOTE: SEE SHEET G-3 FOR SNWA CONSTRUCTION NOTES.

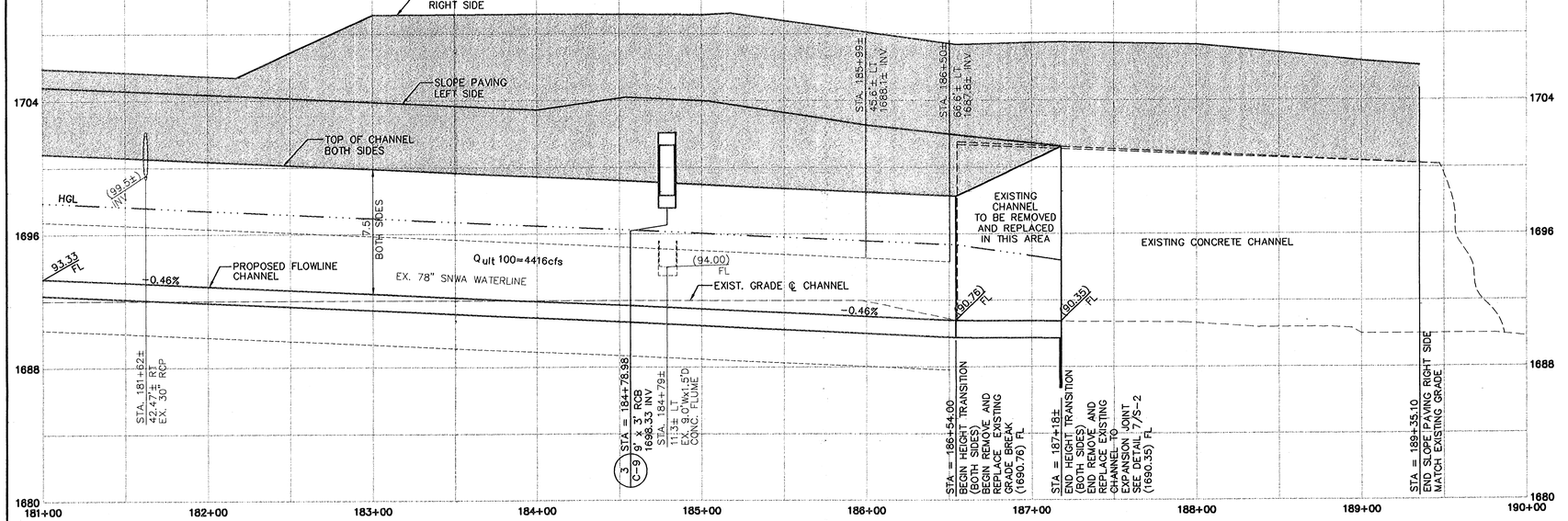
SLOAN CHANNEL

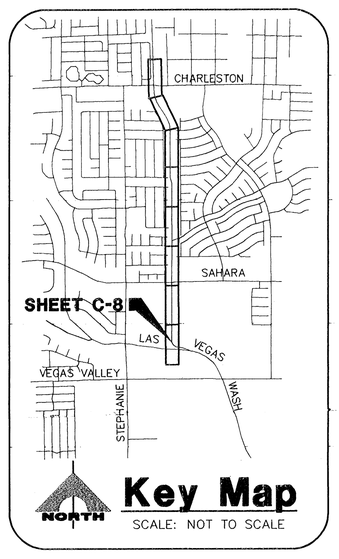
CHANNEL ℄ CURVE TABLE

CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	TANGENT
C3	51°57'23"	462.47'	419.37'	225.34'

Avoid cutting underground utility lines. It's costly. Call before you Dig. 1-800-227-2600 UNDERGROUND SERVICE (USA)

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY. CALL BEFORE YOU DO OVERHEAD 1-702-593-6111





REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
PLAN AND PROFILE
STA. 181+00.00 TO STA. 190+00.00
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

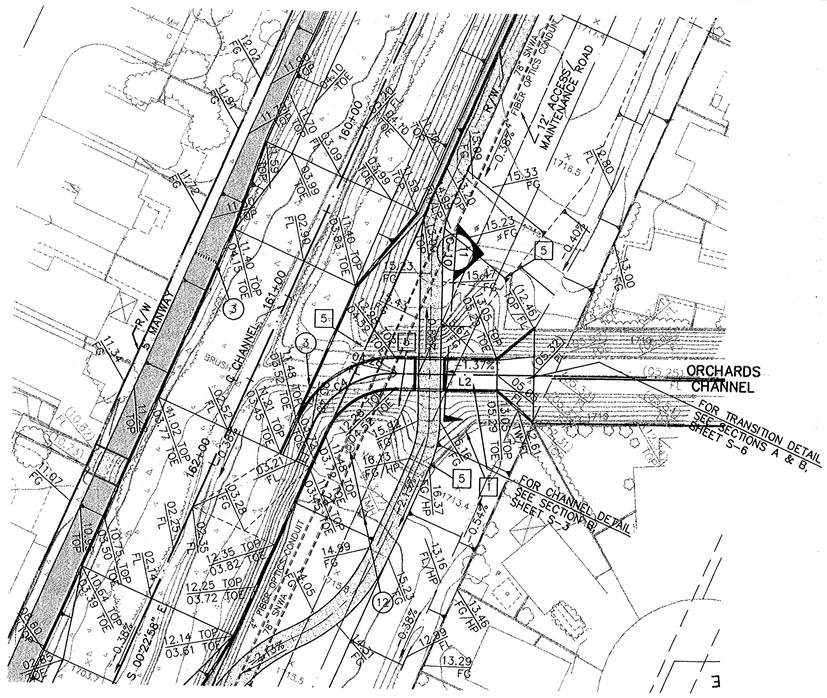
NOEL C. LAUGHLIN Exp. 12/31/2005 CIVIL No. 10165 STATE OF NEVADA PROFESSIONAL ENGINEER 4-5-04

PROJECT No: 500.857 DRAWN BY: DVJ
DESIGNED BY: CHECKED BY:
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: 1" = 40'
VERT: 1" = 4'
FIELD BOOK

L-1759
DRAWING NO.
C-8
SHT. 14 OF 30

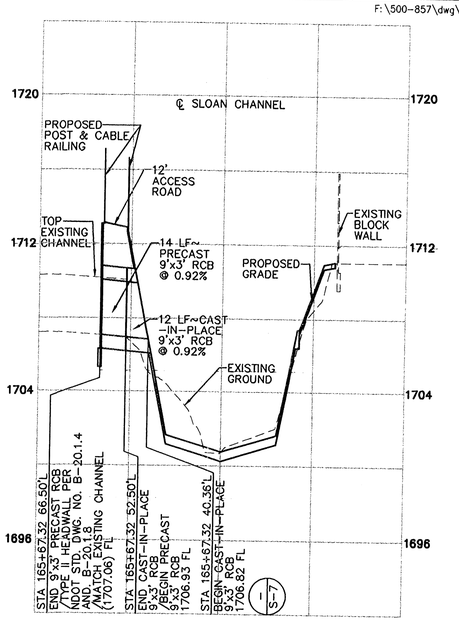


SOUTHERN NEVADA WATER AUTHORITY CONSTRUCTION NOTES

SNWA APPROVAL IS VALID FOR ONE (1) YEAR FROM THE SIGNATURE DATE. IF CONSTRUCTION WITHIN THE EASEMENT OR RESTRICTED PIPE SAFETY ZONE IS NOT COMPLETE, PLANS MUST BE RESUBMITTED TO SNWA FOR APPROVAL.

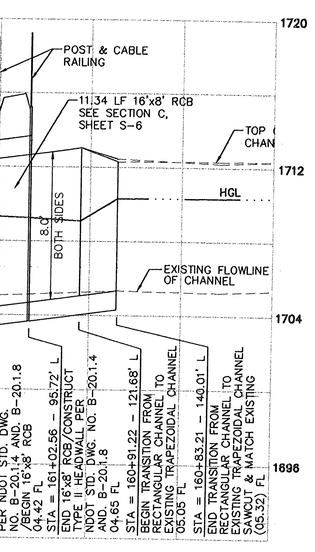
SOUTHERN NEVADA WATER AUTHORITY — 04/15/04 DATE

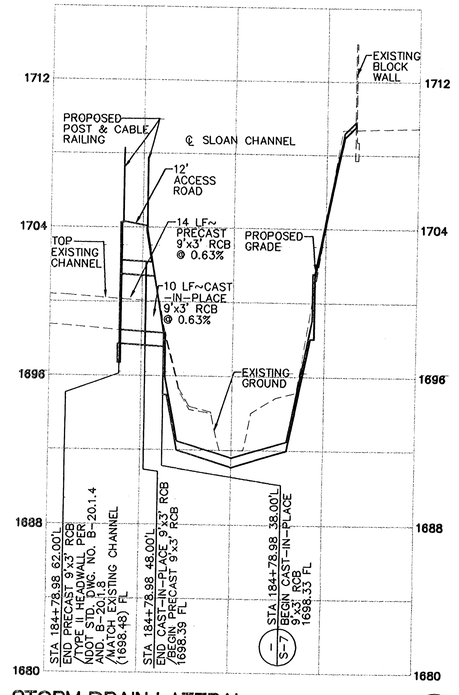
NOTE: SEE SHEET G-3 FOR SNWA CONSTRUCTION NOTES.



STORM DRAIN LATERAL (STA. 165+67.32)

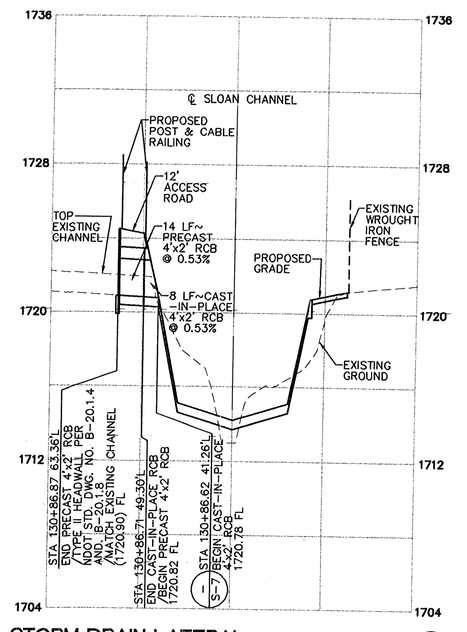
NOT TO SCALE — 2 / C9





STORM DRAIN LATERAL (STA. 184+78.98)

NOT TO SCALE — 3 / C9



STORM DRAIN LATERAL (STA. 130+86.62)

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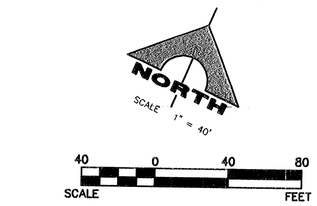

CONSTRUCTION NOTES

(3) CONSTRUCT CHANNEL ACCESS STEPS (SEE DETAIL 11/S2)

(9) CONSTRUCT SLOPE PAVING (SEE DETAIL 3/C11)

(12) CONTRACTOR SHALL FIELD VERIFY AND FLAG ALL SNWA APPURTENANCES AND PROTECT FROM DAMAGE AND BEING BURIED.

REMOVAL NOTES

[1] REMOVE EXISTING BLOCK WALL AND FOOTING

[5] REMOVE EXISTING CHANNEL LINING.

NOTE:

SEE SHEETS C-13 AND C-14 FOR FENCING/POST & CABLE RAILING PLAN.

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UNDERGROUND SERVICE (USA)

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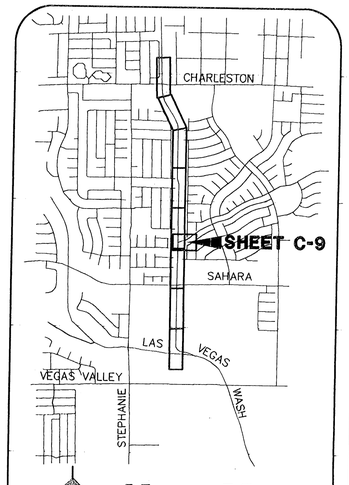


REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
PLAN AND PROFILE (CONFLUENCE) AND LATERALS
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

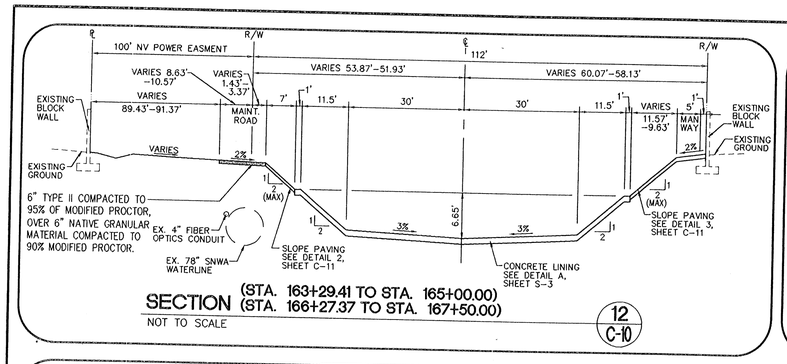
PROFESSIONAL ENGINEER STATE OF NEVADA — NOEL C. LAUGHLIN — Exp. 12/31/2005 — CIVIL — No. 10165 — 4-5-04

PROJECT No: 500.857 DRAWN BY: DVJ
DESIGNED BY: _____ CHECKED BY: _____
APPROVED BY _____

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE	
HORIZ:	1" = 40'
VERT:	1" = 4'
FIELD BOOK	

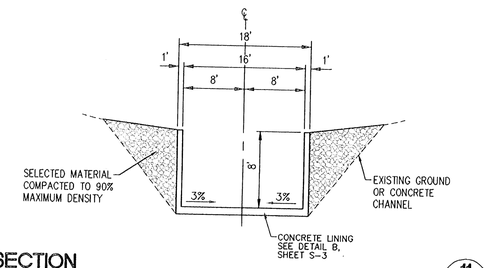
L-1759
DRAWING NO.
C-9
SHT. 15 OF 30



SECTION (STA. 163+29.41 TO STA. 165+00.00)
(STA. 166+27.37 TO STA. 167+50.00)

NOT TO SCALE

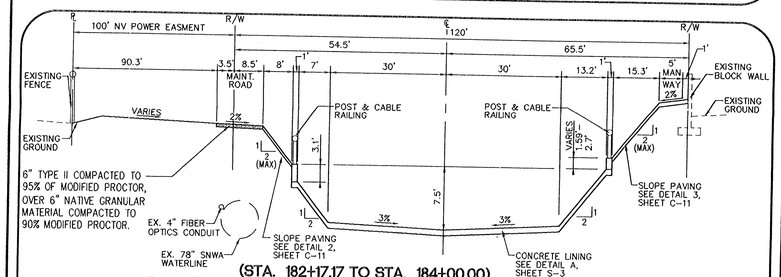
12 C-10



SECTION

NOT TO SCALE

11 C-10



SECTION (STA. 182+17.17 TO STA. 184+00.00)
(STA. 185+50.00 TO STA. 186+54.00)

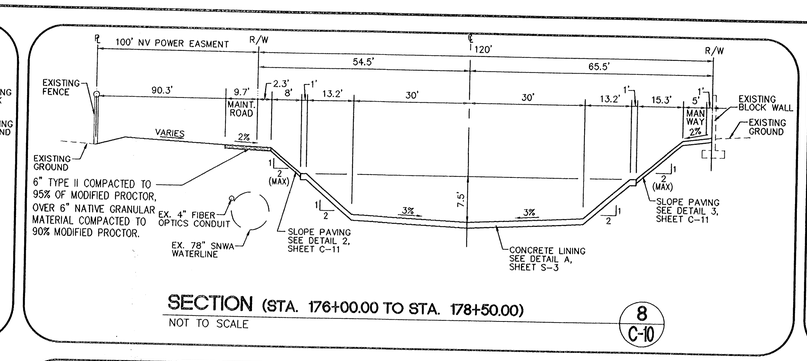
NOT TO SCALE

10 C-10

SECTION (STA. 179+00.00 TO STA. 182+17.17)

NOT TO SCALE

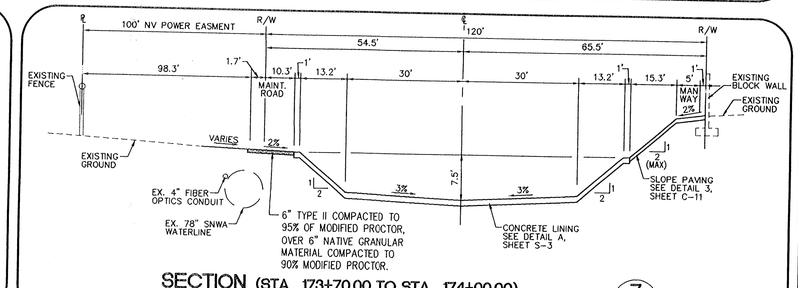
9 C-10



SECTION (STA. 176+00.00 TO STA. 178+50.00)

NOT TO SCALE

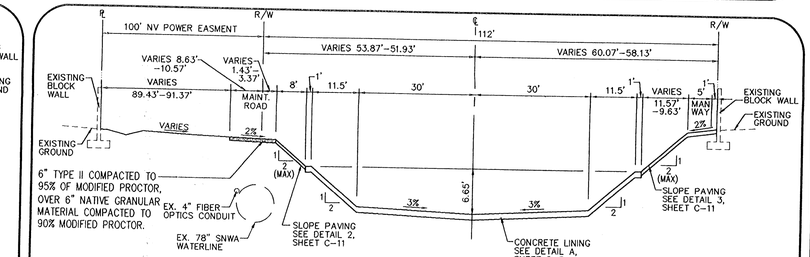
8 C-10



SECTION (STA. 173+70.00 TO STA. 174+00.00)

NOT TO SCALE

7 C-10



SECTION (STA. 168+00.00 TO STA. 171+33.63)

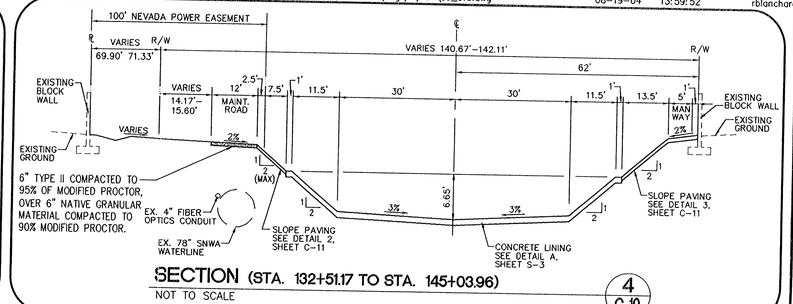
NOT TO SCALE

6 C-10

SECTION (STA. 145+03.96 TO STA. 158+50.00)

NOT TO SCALE

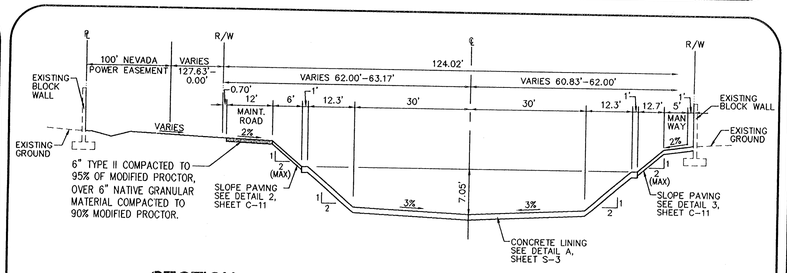
5 C-10



SECTION (STA. 132+51.17 TO STA. 145+03.96)

NOT TO SCALE

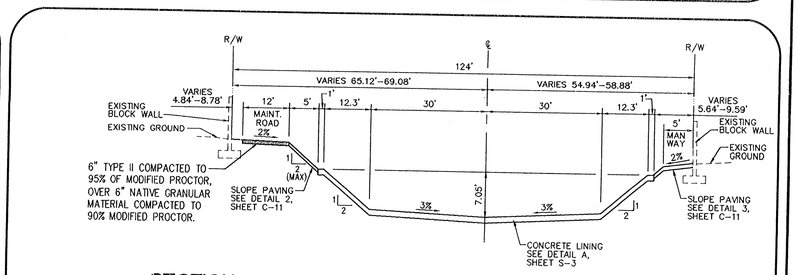
4 C-10



SECTION (STA. 126+67.44 TO STA. 129+63.93)

NOT TO SCALE

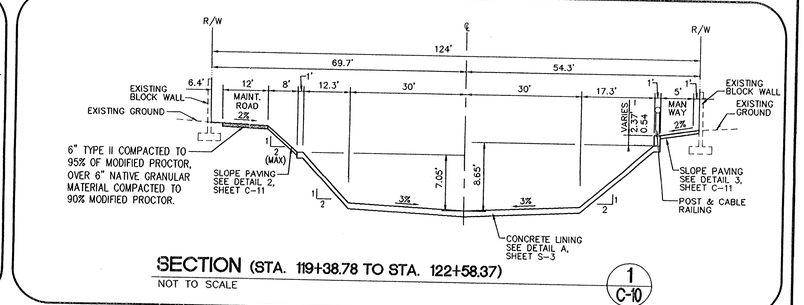
3 C-10



SECTION (STA. 122+98.37 TO STA. 125+00.00)

NOT TO SCALE

2 C-10



SECTION (STA. 119+38.78 TO STA. 122+58.37)

NOT TO SCALE

1 C-10

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
SECTIONS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

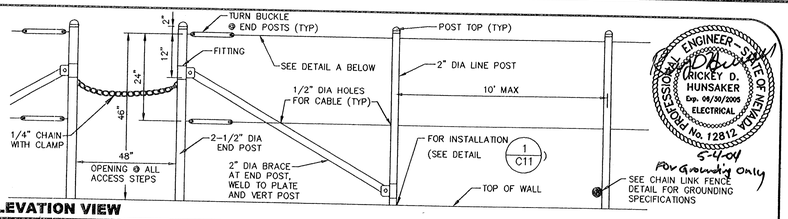
PROFESSIONAL ENGINEER STATE OF NEVADA NOEL C. LAUGHLIN Exp. 12/31/2005 CIVIL No. 10165 4-5-04

PROJECT No: 500.857 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

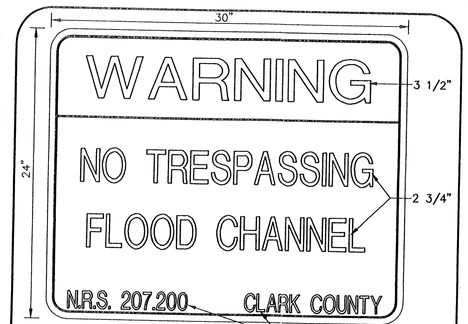
SCALE	
HORIZ:	NONE
VERT:	NONE
FIELD BOOK	

L-1759
DRAWING NO.
C-10
SHT. 16 OF 30



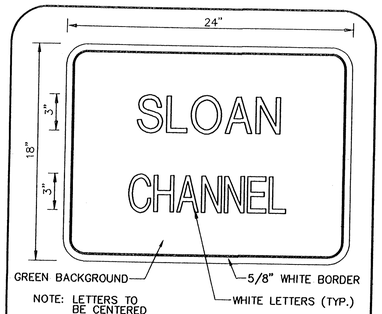
POST AND CABLE RAILING DETAILS

NOT TO SCALE — 10 C11



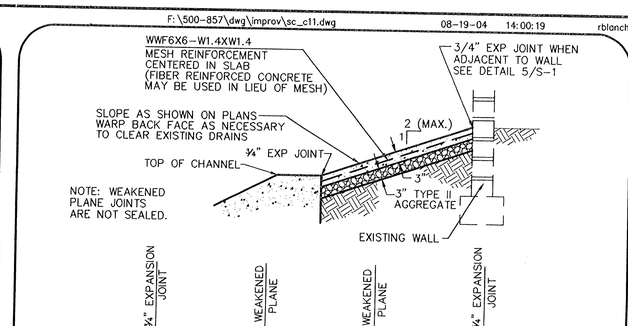
WARNING SIGN - FLOOD CHANNEL DETAIL

NOT TO SCALE — 7 C11



PERMANENT CHANNEL SIGN DETAIL

NOT TO SCALE — 6 C11



SLOPE PAVING DETAIL

NOT TO SCALE — 3 C11

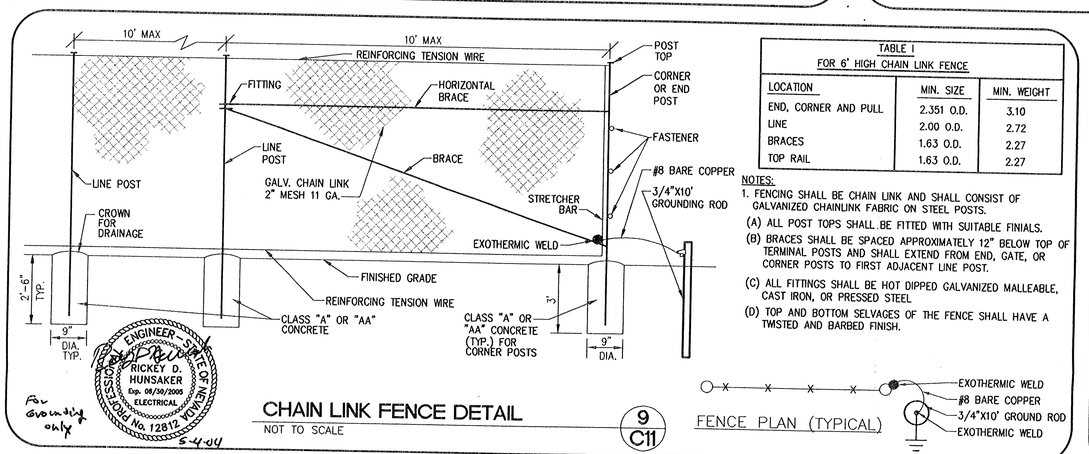


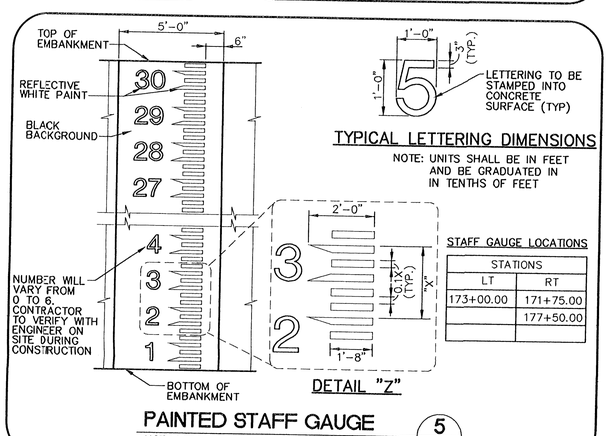
TABLE I FOR 6' HIGH CHAIN LINK FENCE		
LOCATION	MIN. SIZE	MIN. WEIGHT
END, CORNER AND PULL	2.351 O.D.	3.10
LINE	2.00 O.D.	2.72
BRACES	1.63 O.D.	2.27
TOP RAIL	1.63 O.D.	2.27

NOTES:
1. FENCING SHALL BE CHAIN LINK AND SHALL CONSIST OF GALVANIZED CHAINLINK FABRIC ON STEEL POSTS.
(A) ALL POST TOPS SHALL BE FITTED WITH SUITABLE FINIALS.
(B) BRACES SHALL BE SPACED APPROXIMATELY 12" BELOW TOP OF TERMINAL POSTS AND SHALL EXTEND FROM END, GATE, OR CORNER POSTS TO FIRST ADJACENT LINE POST.
(C) ALL FITTINGS SHALL BE HOT DIPPED GALVANIZED MALLEABLE, CAST IRON, OR PRESSED STEEL
(D) TOP AND BOTTOM SELVAGES OF THE FENCE SHALL HAVE A TWISTED AND BARBED FINISH.

CHAIN LINK FENCE DETAIL

NOT TO SCALE — 9 C11

FENCE PLAN (TYPICAL)



PAINTED STAFF GAUGE

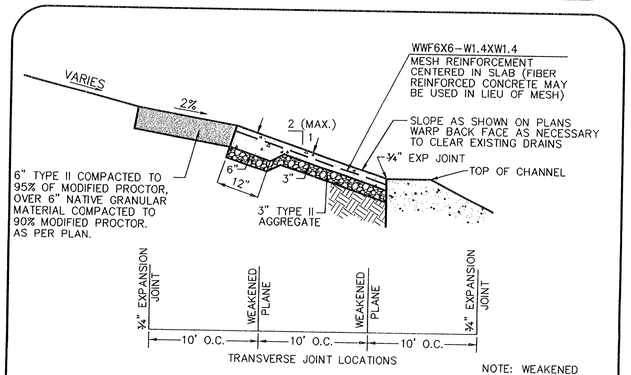
NOT TO SCALE — 5 C11

TYPICAL LETTERING DIMENSIONS

NOTE: UNITS SHALL BE IN FEET AND BE GRADUATED IN IN TENTHS OF FEET

STAFF GAUGE LOCATIONS

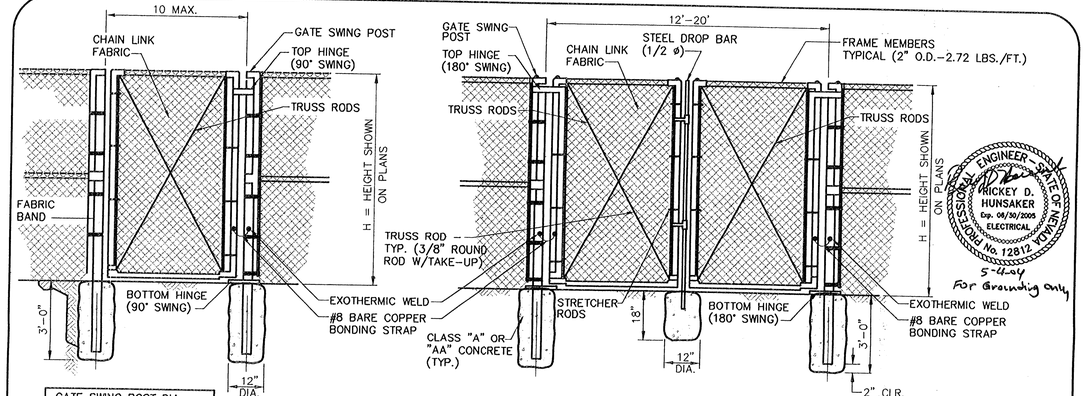
STATIONS	
LT	RT
173+00.00	171+75.00
	177+50.00



SLOPE PAVING DETAIL

NOTE: WEAKENED PLANE JOINTS ARE NOT SEALED.

NOT TO SCALE — 2 C11

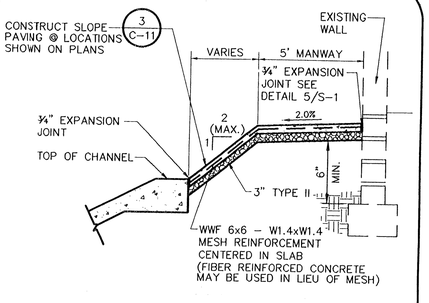


GATE SWING POST DIA.	
GATE SIZE	PIPE DIA.
6' AND LESS	3"O.D.-5.79 LB/ FT
6' - 10'	4"O.D.-9.10 LB/ FT

CHAIN LINK GATE DETAIL

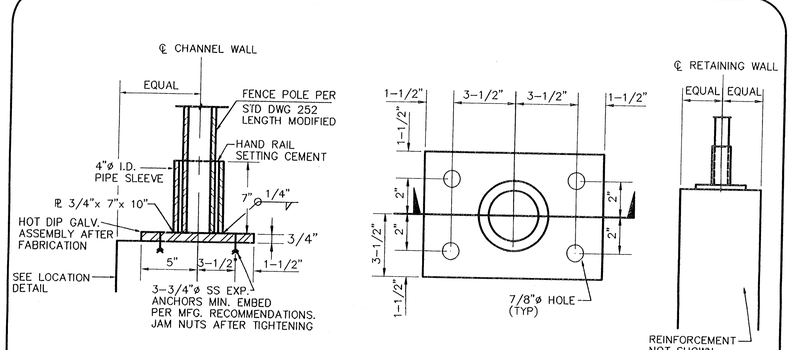
NOT TO SCALE — 8 C11

GATE SWING POST DIA.	
GATE SIZE	PIPE DIA.
6' AND LESS	3"O.D.-5.79 LB/ FT
6' - 10'	4"O.D.-9.10 LB/ FT



MANWAY DETAIL

NOT TO SCALE — 4 C11



POST AND CABLE RAILING POLE MOUNT

NOT TO SCALE — 1 C11

REV. NO.	DATE	DESCRIPTION	APPROVED

SLOAN CHANNEL
DETAILS

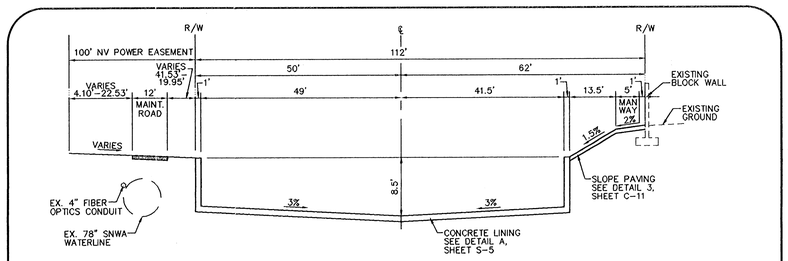
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROJECT No: 500.857 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

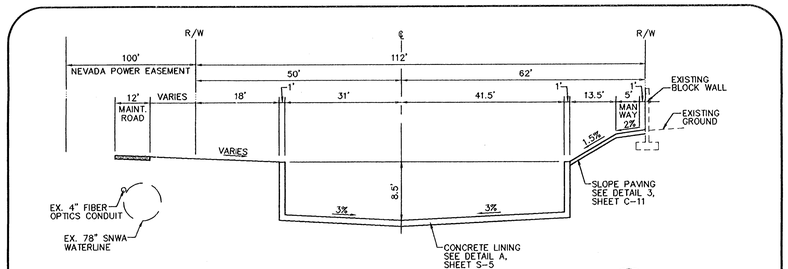
SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
C-11
SHT. 17 OF 30



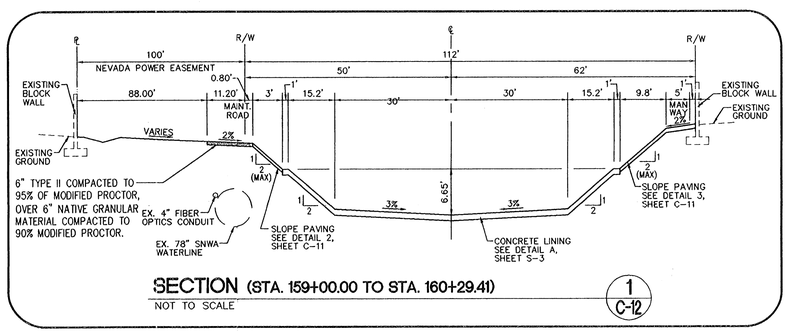
SECTION (STA. 162+25.00 TO STA. 162+79.41) — 3 / C-12

NOT TO SCALE



SECTION (STA. 160+79.41 TO STA. 161+59.19) — 2 / C-12

NOT TO SCALE



SECTION (STA. 159+00.00 TO STA. 160+29.41) — 1 / C-12

NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
SECTIONS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

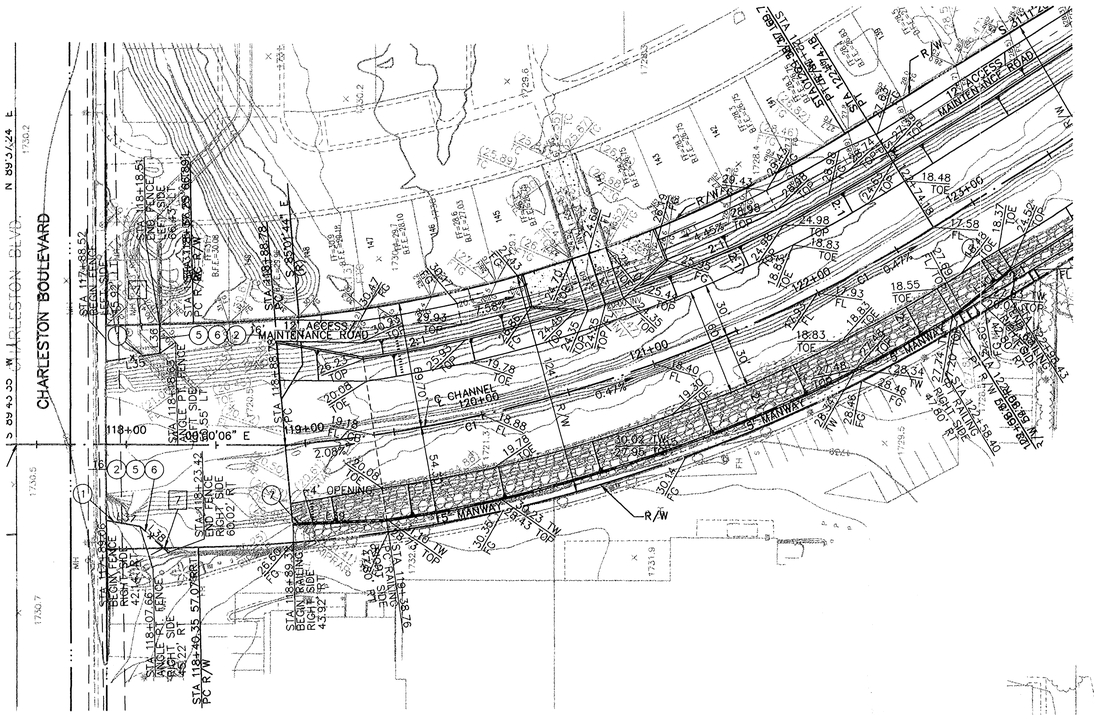
PROFESSIONAL ENGINEER STATE OF NEVADA — NOEL C. LAUGHLIN — Exp. 12/31/2005 — CIVIL — No. 10185 — 4-5-04

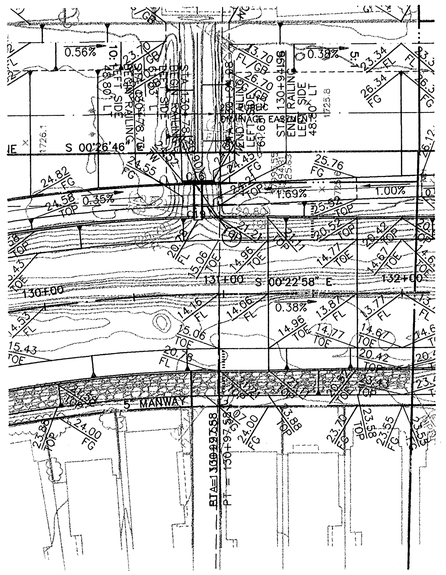
PROJECT No: 500.857 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY

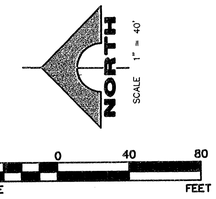
G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
C-12
SHT. 18 OF 30





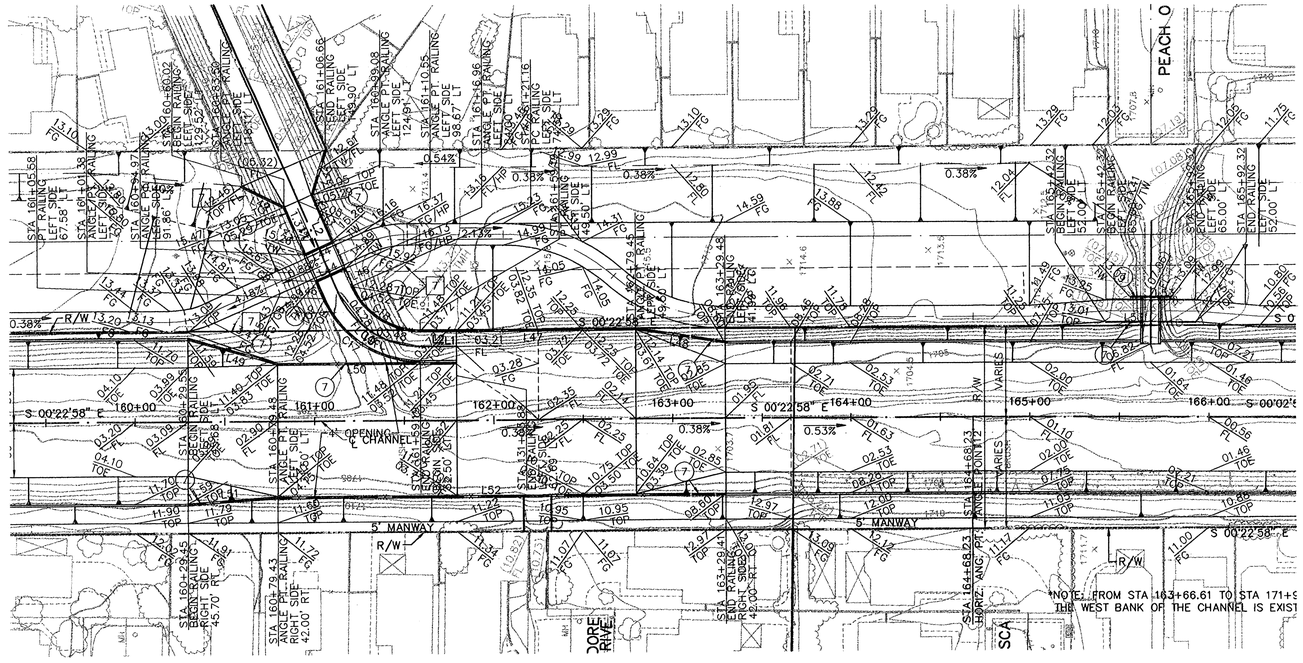


CONSTRUCTION NOTES

1. CONSTRUCT 6' CHAIN-LINK FENCE (SEE DETAIL 9/C11)
2. CONSTRUCT 6' CHAIN-LINK GATE (SEE DETAIL 8/C11) (WIDTH OF GATE CALLED OUT IN PLAN VIEW)
5. INSTALL SIGN (SEE DETAIL 6/C11)
6. INSTALL SIGN (SEE DETAIL 7/C11)
7. CONSTRUCT POST AND CABLE RAILING (SEE DETAIL 10/C11)

REMOVAL NOTES

7. REMOVE EXISTING CHAIN-LINK FENCE.



POST AND CABLE CURVE TABLE

CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	TANGENT
C15	22°40'28"	855.50'	338.56'	171.52'
C16	01°09'50"	861.63'	17.50'	8.75'
C17	66°23'48"	58.50'	67.79'	38.28'
C18	66°23'48"	41.50'	48.09'	27.16'
C16	01°09'50"	848.80'	17.24'	8.62'

POST AND CABLE LINE TABLE

LINE TABLE		
LINE	BEARING	LENGTH
L39	N02°31'07"E	52.38'
L40	N39°02'59"W	41.25'
L42	N25°32'04"E	26.11'
L43	N66°00'50"E	28.64'
L44	N23°59'10"W	17.00'
L45	N73°30'24"W	26.11'
L46	N66°00'50"E	10.50'
L47	N00°22'58"W	120.26'
L48	N08°08'53"E	50.60'
L49	N15°28'19"E	51.91'
L50	N00°22'58"W	99.93'
L51	N04°36'54"W	50.12'
L52	N00°22'58"W	249.98'
L53	N00°02'58"W	50.00'

FENCE LINE TABLE

LINE TABLE		
LINE	BEARING	LENGTH
L35	N08°30'51"W	30.45'
L36	N89°33'09"E	16.00'
L37	N09°23'22"E	18.85'
L38	N43°12'16"E	21.62'

REV. NO.	DATE	DESCRIPTION	APPROVED

SLOAN CHANNEL
FENCING/POST AND CABLE RAILING PLAN

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

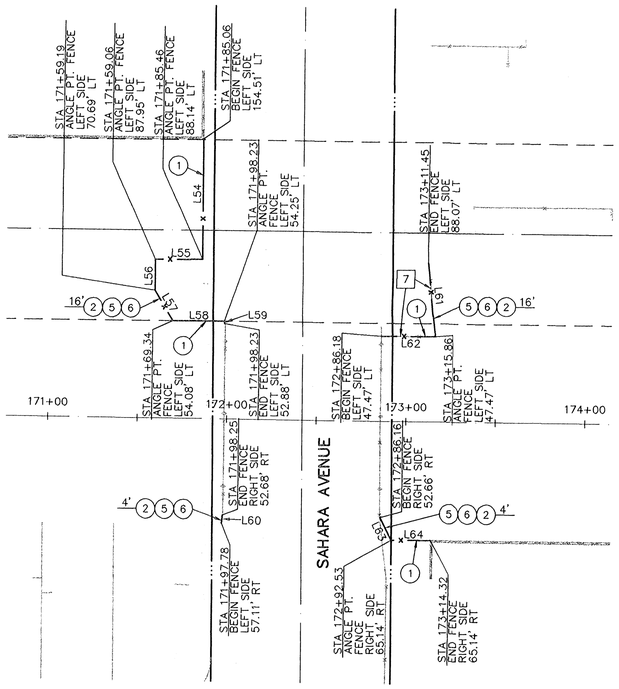
PROFESSIONAL ENGINEER STATE OF NEVADA NOEL C. LAUGHLIN Exp. 12/31/2005 CIVIL No. 10165 4-5-04

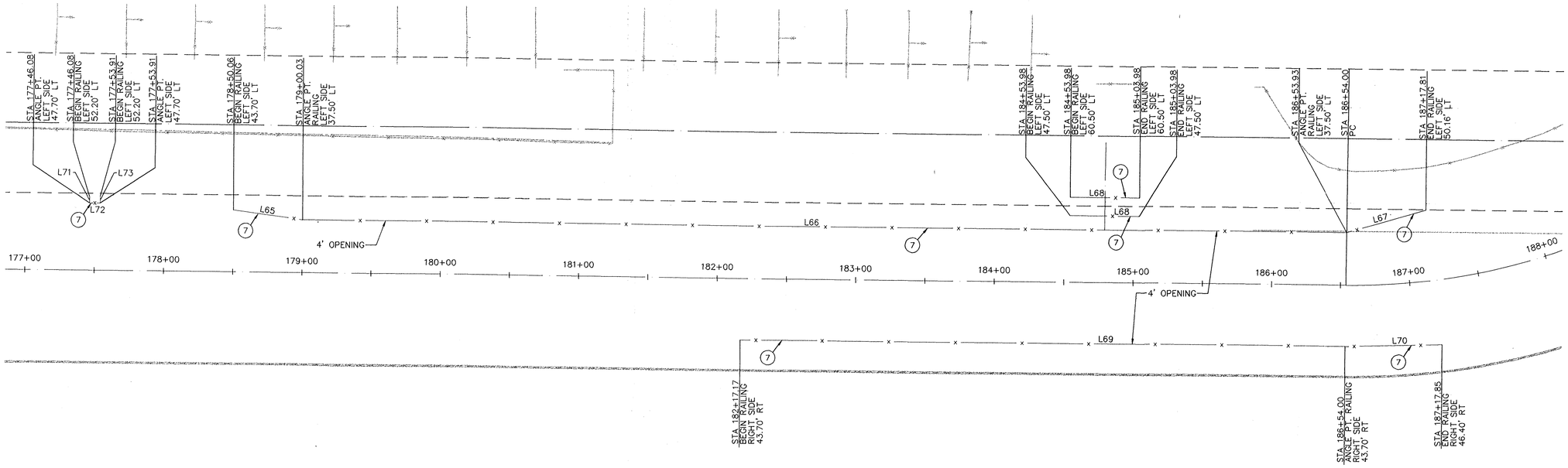
PROJECT No: 500.857 DRAWN BY: DWJ
DESIGNED BY: CHECKED BY:
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: 1" = 40'
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
C-13
SHT. 19 OF 30





POST AND CABLE LINE TABLE

LINE TABLE		
LINE	BEARING	LENGTH
L65	N07°01'09"E	50.35'
L66	N00°02'58"W	753.89'
L67	N16°19'46"W	59.16'
L68	N00°02'58"W	50.00'
L69	N00°02'58"W	436.83'
L70	N01°48'00"W	70.06'
L71	S89°57'02"W	4.50'
L72	S00°02'58"E	7.83'
L73	S89°57'02"W	4.50'

FENCE LINE TABLE

LINE TABLE		
LINE	BEARING	LENGTH
L54	N89°36'24"E	66.37'
L55	N00°27'55"W	26.40'
L56	N89°32'05"E	17.26'
L57	N58°30'46"E	19.47'
L58	N00°22'58"W	28.89'
L59	N89°56'23"E	1.37'
L60	N83°53'00"W	4.45'
L61	N83°45'44"E	40.84'
L62	N00°02'58"W	29.68'
L63	N62°55'16"E	14.01'
L64	N00°02'58"W	21.80'

NORTH

SCALE 1" = 40'

40 0 40 80

SCALE FEET

CONSTRUCTION NOTES

1. CONSTRUCT 6' CHAIN-LINK FENCE (SEE DETAIL 9/C11)
2. CONSTRUCT 6' CHAIN-LINK GATE (SEE DETAIL 8/C11) (WIDTH OF GATE CALLED OUT IN PLAN VIEW)
5. INSTALL SIGN (SEE DETAIL 6/C11)
6. INSTALL SIGN (SEE DETAIL 7/C11)
7. CONSTRUCT POST AND CABLE RAILING (SEE DETAIL 10/C11)

CONSTRUCTION NOTES

7. REMOVE EXISTING CHAIN-LINK FENCE.

REV. NO.	DATE	DESCRIPTION	APPROVED

SLOAN CHANNEL

FENCING/POST AND CABLE RAILING PLAN

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER STATE OF NEVADA NOEL C. LAUGHLIN Exp. 12/31/2005 CIVIL No. 10165 4-5-04

PROJECT No: 500.857 DRAWN BY: DVJ

DESIGNED BY: CHECKED BY:

APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE

HORIZ: 1" = 40'

VERT: NONE

FIELD BOOK

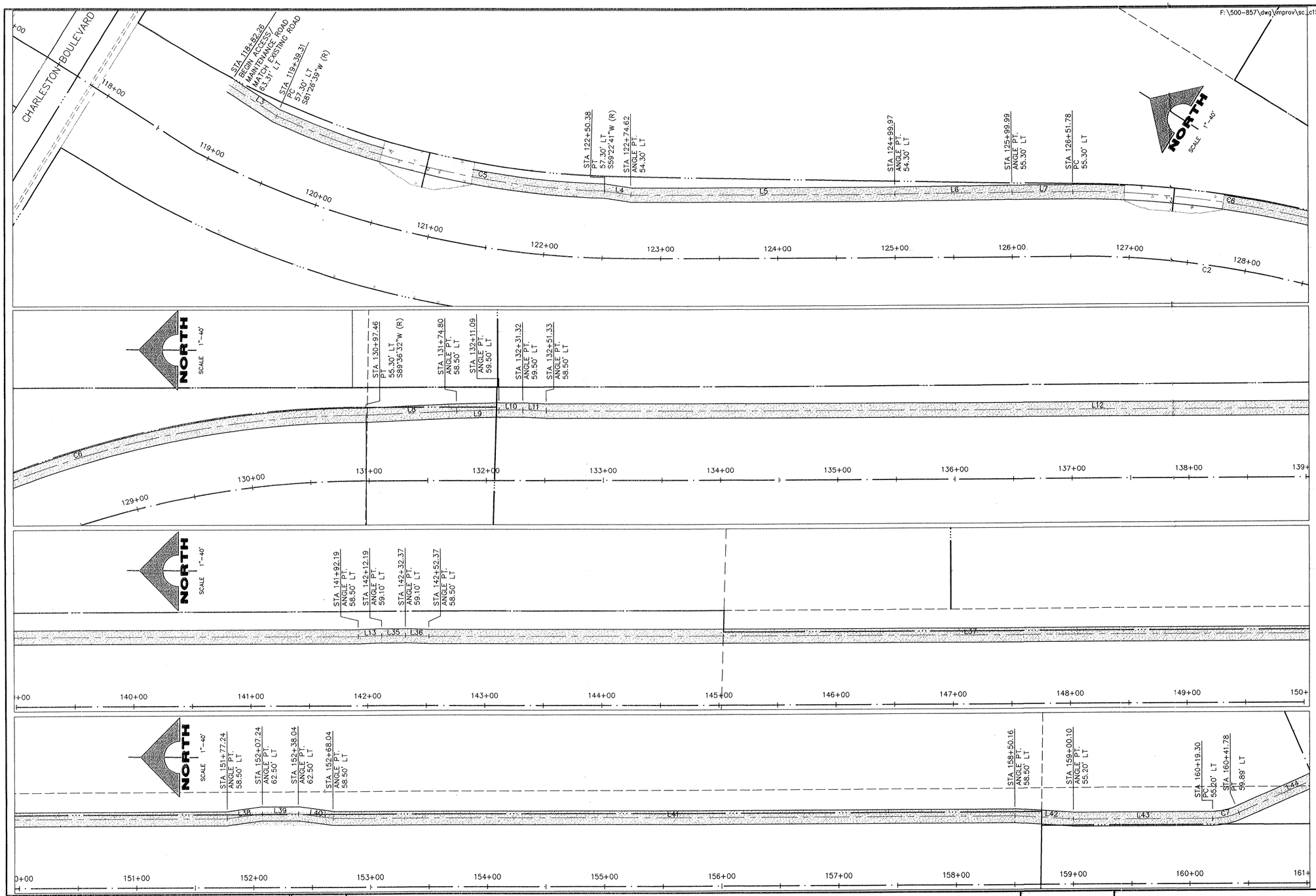
L-1759

DRAWING NO.

C-14

SHT. 20 OF 30

F:\500-857\dwg\improv\sc_c15.dwg 04-05-04 09:03:38 RBlanchard



40 0 40 80
SCALE FEET

ACCESS/ MAINTENANCE ROAD ℄ LINE TABLE

LINE TABLE		
LINE	BEARING	LENGTH
L3	S00°49'42"W	48.17'
L4	S23°55'17"E	22.80'
L5	S32°18'38"E	225.35'
L6	S32°53'00"E	100.03'
L7	S32°18'38"E	51.79'
L8	S02°48'57"E	77.41'
L9	S01°58'00"E	36.30'
L10	S00°02'58"E	20.23'
L11	S02°28'47"W	20.02'
L12	S00°22'58"E	940.87'
L13	S02°06'04"E	20.01'
L35	S00°22'58"E	20.18'
L36	S01°20'08"E	20.01'
L37	S00°22'58"E	924.87'
L38	S07°58'39"E	30.27'
L39	S00°22'58"E	30.80'
L40	S07°12'43"E	30.27'
L41	S00°02'58"E	582.12'
L42	S03°23'36"W	50.11'
L43	S00°22'58"E	119.19'
L44	S23°59'10"E	95.58'

ACCESS/ MAINTENANCE ROAD ℄ CURVE TABLE

CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	TANGENT
C5	22°03'58"	750.40'	289.00'	146.31'
C6	31°53'55"	855.30'	476.17'	244.43'
C7	23°36'12"	56.00'	23.07'	11.70'

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL

ACCESS/MAINTENANCE CONTROL PLAN

STA. 118+82.26 TO STA. 161+00.00

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER STATE OF NEVADA
NOEL C. LAUGHLIN
Exp. 12/31/2005
CIVIL
No. 10185
4-5-04

PROJECT No: 500.857 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: 1" = 40'
VERT: 1" = 4'
FIELD BOOK

L-1759
DRAWING NO.
C-15
SHT. 21 OF 30

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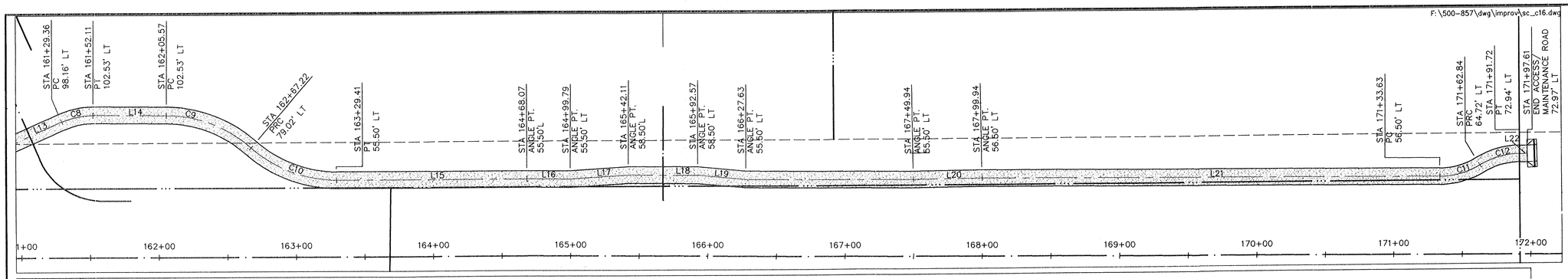
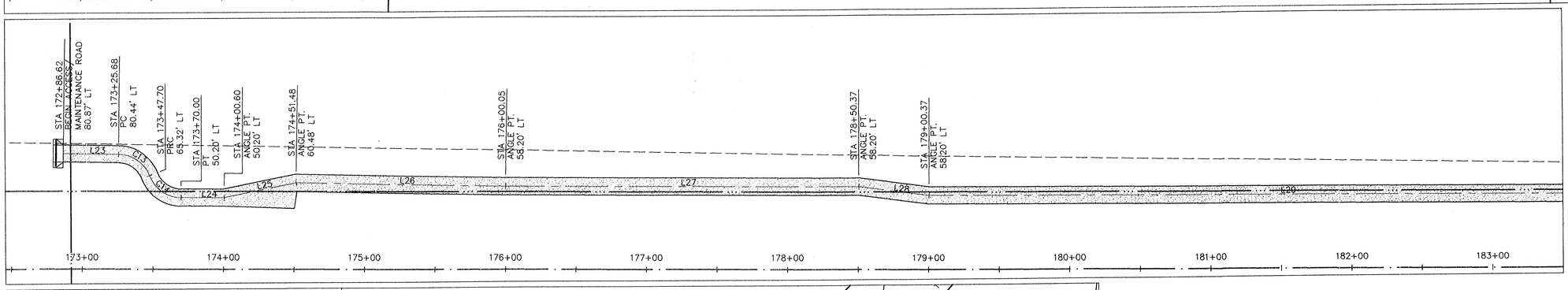
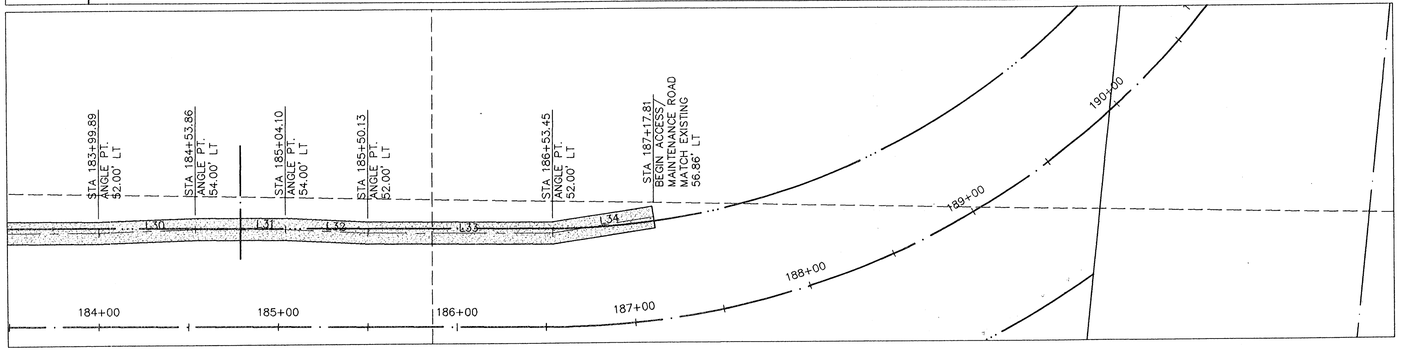
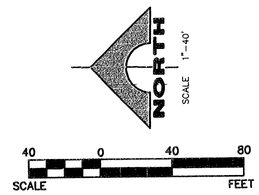








ACCESS/ MAINTENANCE ROAD ℄ LINE TABLE

LINE TABLE		
LINE	BEARING	LENGTH
L13	S23°59'10"E	55.22'
L14	S00°02'58"E	53.46'
L15	S00°22'58"E	138.98'
L16	S00°02'58"E	31.72'
L17	N04°06'16"W	42.21'
L18	S00°02'58"E	50.47'
L19	S04°50'32"E	35.18'
L20	S01°11'43"E	122.31'
L21	S00°02'58"E	333.69'
L22	S00°23'04"E	5.89'
L23	S00°35'33"W	39.05'
L24	S00°02'58"E	30.60'
L25	S11°28'07"E	51.91'
L26	S00°49'43"W	148.58'
L27	S00°02'58"E	250.32'
L28	S07°01'09"W	50.38'
L29	S00°02'58"E	499.52'
L30	S02°10'18"E	54.01'
L31	S00°02'58"E	50.24'
L32	S02°26'19"W	46.07'
L33	S00°02'58"E	103.32'
L34	S08°39'47"E	57.00'

ACCESS/ MAINTENANCE ROAD ℄ CURVE TABLE

CURVE TABLE				
CURVE	DELTA	RADIUS	LENGTH	TANGENT
C8	23°56'12"	56.00'	23.40'	11.87'
C9	41°05'27"	94.00'	67.41'	35.23'
C10	41°25'26"	94.00'	67.96'	35.54'
C11	31°26'16"	56.00'	30.73'	15.76'
C12	31°06'10"	56.00'	30.40'	15.58'
C13	67°38'26"	24.00'	28.33'	16.08'
C14	68°16'57"	24.00'	28.60'	16.27'

REV. NO.	DATE	DESCRIPTION	APPROVED

SLOAN CHANNEL

ACCESS/MAINTENANCE ROAD CONTROL PLAN
STA. 161+00.00 TO STA. 181+82.26
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

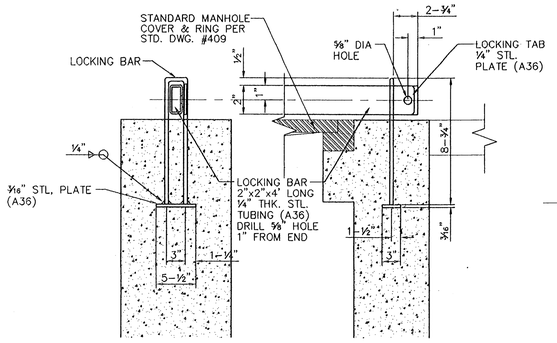
PROFESSIONAL ENGINEER STATE OF NEVADA NOEL O. LAUGHLIN Exp. 12/31/2005 CIVIL No. 10165 4-5-04

PROJECT No: 500.857 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY:

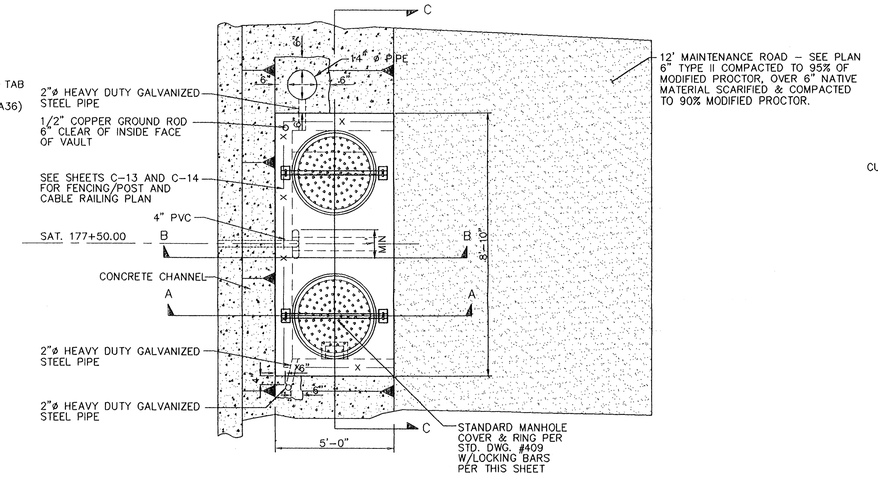
G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: 1" = 40'
VERT: 1" = 4'
FIELD BOOK

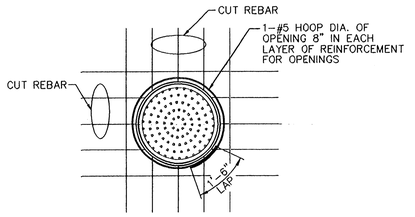
L-1759
DRAWING NO.
C-16
SHT. 22 OF 30



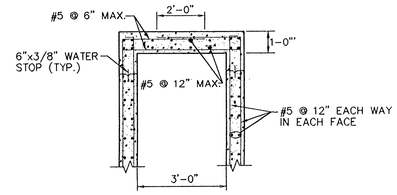
LOCKING BAR GUIDE
NOT TO SCALE



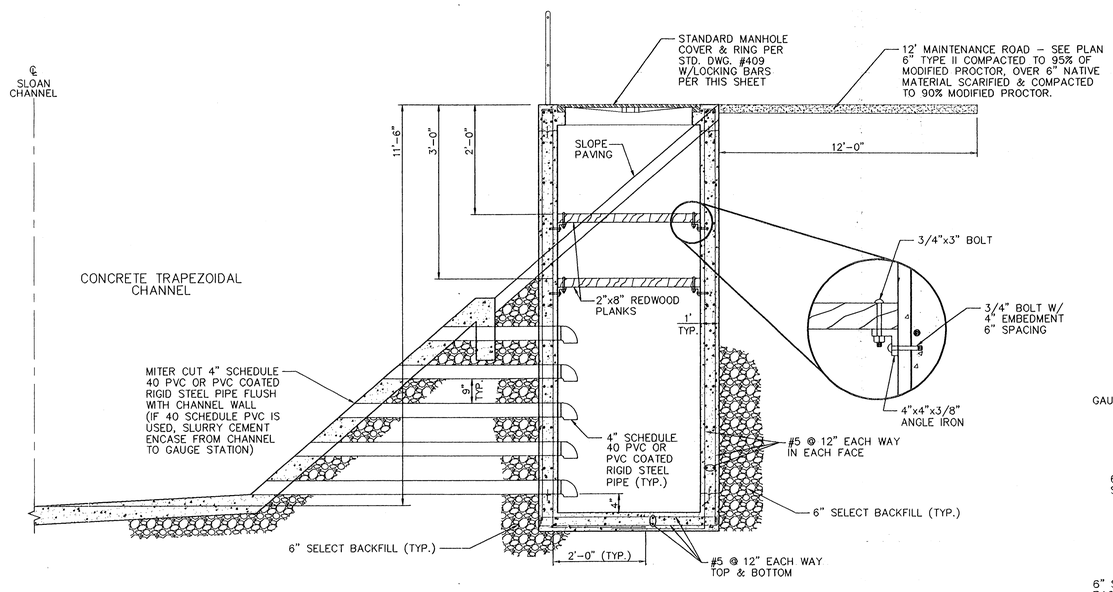
PLAN
NOT TO SCALE



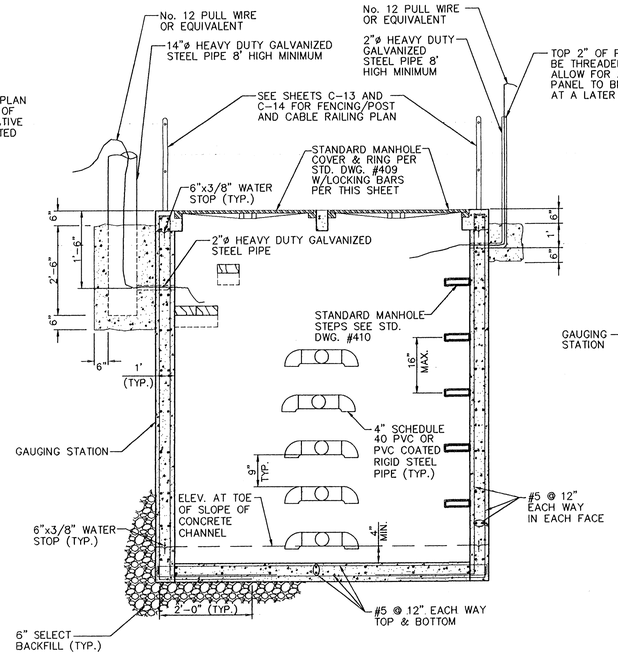
DETAIL A
NOT TO SCALE



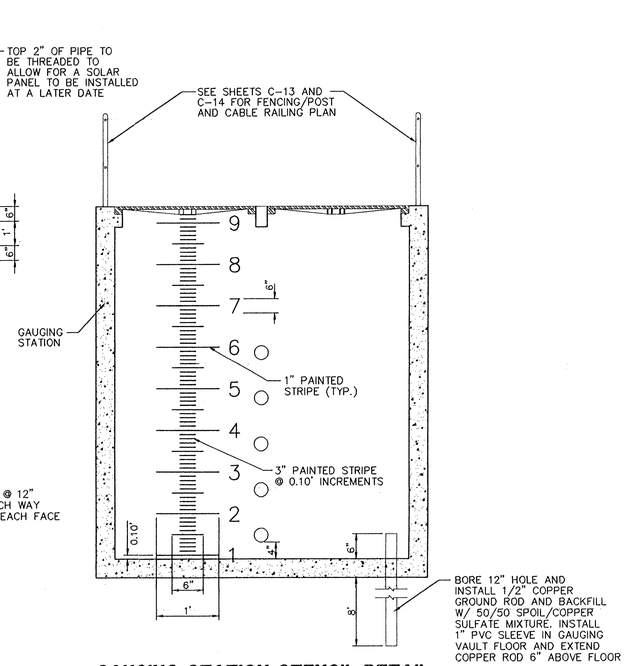
SECTION B-B
(STRUCTURAL REINFORCING BETWEEN MANHOLES)
NOT TO SCALE



SECTION A-A
NOT TO SCALE



SECTION C-C
NOT TO SCALE



GAUGING STATION STENCIL DETAIL
(VIEW FROM INSIDE OF GAUGING STATION)
NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	APPROVED

SLOAN CHANNEL
GAUGING STATION
SECTION AND DETAILS
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

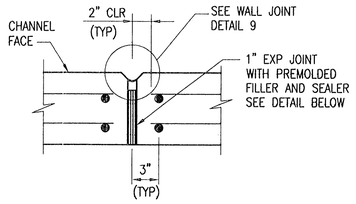
NOEL C. LAUGHLIN — Exp. 12/31/2005 — CIVIL — No. 10165 — STATE OF NEVADA — REGISTERED ENGINEER
4-5-04

PROJECT No: 500.857 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE	
HORIZ:	NONE
VERT:	NONE
FIELD BOOK	

L-1759
DRAWING NO. C-17
SHT. 23 OF 30



WALL EXPANSION JOINT DETAIL (8)
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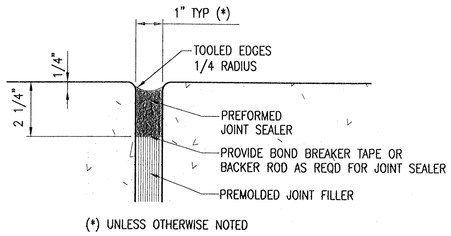
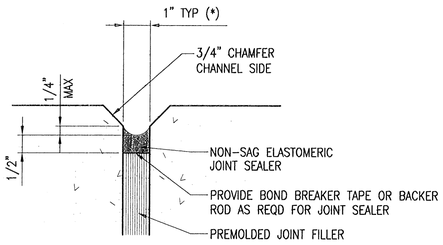
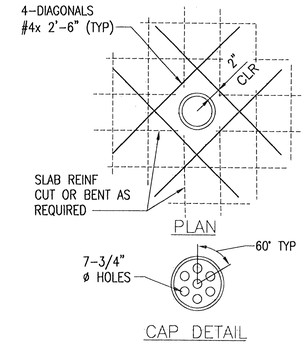


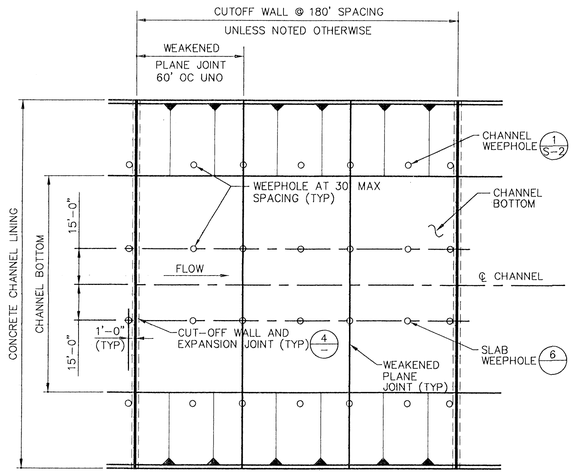
(*) UNLESS OTHERWISE NOTED

SLAB EXPANSION JOINT DETAIL (5)
NOT TO SCALE



WALL JOINT DETAIL (9)
NOT TO SCALE



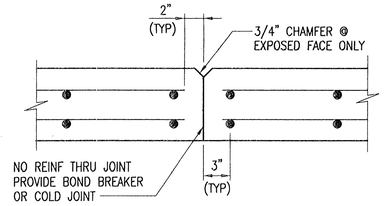


NOTES:
1. WEAKENED PLANE JOINTS TO BE CENTERED WITH WEEPHOLES WHEN JOINTS OCCUR.
2. IN CURVED ALIGNMENT SECTIONS, TRANSVERSE JOINTS SHALL BE NORMAL TO CENTERLINE AND SHALL NOT EXCEED 60' MAX SPACING.

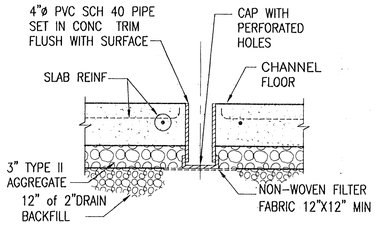
PLAN - CONCRETE LINED TRAPEZOIDAL CHANNEL (1)
NOT TO SCALE

STRUCTURE NOTES

1. DESIGN SPECIFICATIONS: AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 1996" AND INTERIMS THROUGH 2000. REINFORCED CONCRETE DESIGN BASED ON LOAD FACTOR DESIGN.
2. CONSTRUCTION SPECIFICATIONS: UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA.
3. LIVE LOAD: STANDARD AASHTO HS20-44 TRUCK LOADING AND TRAFFIC SURCHARGE FROM MAINTENANCE VEHICLES (2' OF SOIL)
4. SEISMIC LOAD: ACCELERATION COEFFICIENT 0.15 g
5. CONCRETE: ALL CONCRETE SHALL BE CLASS A MODIFIED (MAJOR) EXCEPT FOR WALLS WHICH SHALL BE CLASS D MODIFIED (MAJOR). ONLY TYPE V CEMENT SHALL BE USED FOR CONCRETE IN CONTACT WITH SOIL. CONCRETE COMPRESSIVE MINIMUM STRENGTH AT 28 DAYS SHALL BE, f'c=4,500 PSI AND A MAXIMUM WATER TO CEMENT RATIO, BY WEIGHT, OF 0.45.
6. REINFORCING STEEL: ALL REINFORCING STEEL SHALL BE ASTM A615 REINFORCING STEEL STRENGTH, Fy = 60,000 PSI.
7. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4" UNLESS OTHERWISE INDICATED.
8. TRANSVERSE AND LONGITUDINAL JOINTS IN INVERT SLAB AND SIDE SLOPE SLAB OF PAVED TRAPEZOIDAL CHANNELS AND WALLS FOR RECTANGULAR CHANNELS WILL BE REQUIRED AT THE END OF EACH CONTINUOUS POURING OPERATION. SEE TYPICAL CONSTRUCTION JOINT DETAIL. TRANSVERSE CONSTRUCTION JOINTS SHALL NOT BE PLACED WITHIN 3-FEET OF A MANHOLE, WITHIN 10-FEET OF JUNCTION STRUCTURE OPENINGS, OR WITHIN 50 FEET OF AN EXPANSION JOINT.
9. ALL TRANSVERSE JOINTS IN WALLS AND SLABS (CONSTRUCTION, WEAKENED CONTRACTION AND EXPANSION) SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED UNLESS SHOWN OTHERWISE. TRANSVERSE CONSTRUCTION JOINTS SHALL BE NORMAL OR RADIAL TO CENTERLINE OF CONSTRUCTION.
10. ALL SINGLE LAYER REINFORCEMENT SHALL BE PLACED IN THE CENTER OF CONCRETE UNLESS NOTED OTHERWISE.
11. IN CURVED CHANNEL SECTIONS TRANSVERSE BARS SHALL BE PLACED NORMAL TO THE CHANNEL CENTERLINE.
12. IN CURVED CHANNEL SECTIONS, THE MAXIMUM SPACING OF BARS SHALL NOT EXCEED THAT SHOWN FOR TYPICAL SECTIONS. STEEL SHALL BE PLACED RADIALLY FROM THE MAXIMUM SPACING.
13. AT THE BEGINNING AND ENDING OF ALL POURS, A COMPLETE CURTAIN OF MAIN REINFORCEMENT SHALL BE PLACED 3-INCHES FROM THE TRANSVERSE CONSTRUCTION, CONTRACTION AND EXPANSION JOINTS.
14. NO WELDING WILL BE PERMITTED ON ANY REINFORCEMENT.
15. CHANNEL ELEVATIONS: FOR CHANNEL INVERT ELEVATIONS REFER TO THE CHANNEL PLAN AND PROFILE SHEETS LOCATED ELSEWHERE IN THIS DRAWING SET.
16. EXCAVATION AND BACKFILL: THE LIMITS OF EXCAVATION AND BACKFILL SHALL BE AS SHOWN IN THE STATE OF NEVADA, "STANDARD PLANS FOR ROAD AND BRIDGE CONSTRUCTION, JANUARY 2001," UNLESS OTHERWISE NOTED.
17. WEEPHOLES: WEEPHOLES WILL BE REQUIRED AT 30-FEET O.C. PER THE TYPICAL WEEPHOLE DETAIL FOR ALL OPEN CHANNEL STRUCTURES.
18. BEDDING MATERIALS: UNLESS NOTED OTHERWISE ALL BEDDING MATERIAL SHALL BE 3-INCHES OF TYPE II AGGREGATE BASE OVER 12 INCHES OF 2 INCH DRAIN ROCK COMPACTED TO 90% OF THE MAXIMUM DRY DENSITY AS ESTABLISHED BY ASTM TEST METHOD D-1557.

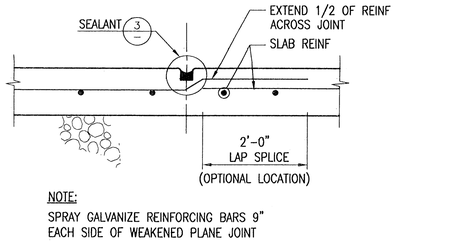


WALL CONTRACTION JOINT DETAIL (10)
NOT TO SCALE



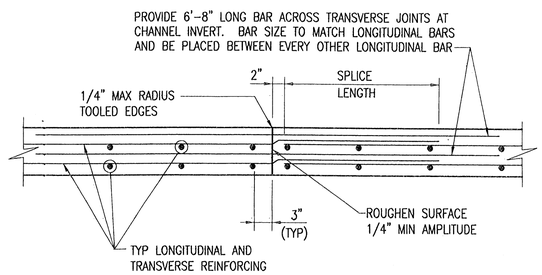
SECTION

SLAB WEEPHOLE DETAIL (6)
NOT TO SCALE

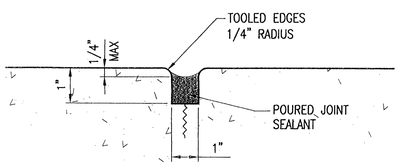


NOTE:
SPRAY GALVANIZE REINFORCING BARS 9" EACH SIDE OF WEAKENED PLANE JOINT

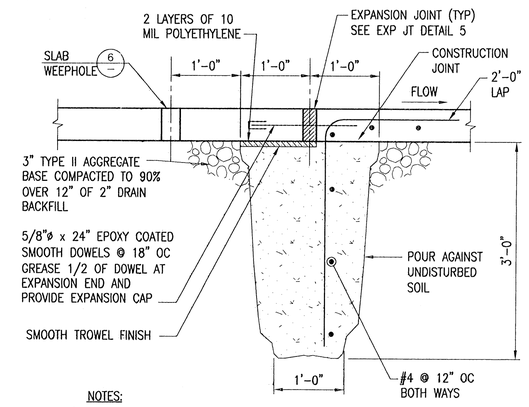
WEAKENED PLANE JOINT DETAIL (2)
NOT TO SCALE



CONSTRUCTION JOINT DETAIL (7)
NOT TO SCALE



SEALANT DETAIL (3)
NOT TO SCALE



NOTES:
1. CUTOFF WALL TO BE SPACED @ 180' OC FOR TRAPEZOIDAL CHANNELS AND 180' OC FOR RECTANGULAR CHANNELS ACROSS THE ENTIRE WIDTH OF THE CHANNEL LINING.
2. CONTRACTOR TO VERIFY THAT ALL DOWELS ARE IN PLANE AND PERPINDICULAR TO JOINT PRIOR TO POURING CONCRETE.

TRANSVERSE CUT-OFF WALL EXPANSION DETAIL (4)
NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
CHANNEL STRUCTURES DETAILS
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

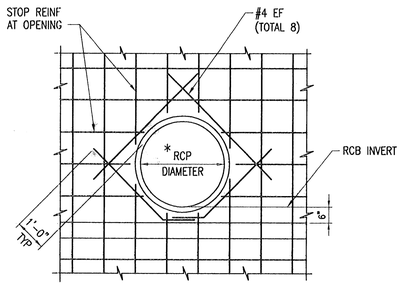
PROFESSIONAL ENGINEER STATE OF NEVADA
RIMAH I. NAZZAL
Exp. 12/31/2005
CIVIL / STRUCTURAL
No. 12977
4/5/04

PROJECT No: 500.857 DRAWN BY: NO/AL
DESIGNED BY: RIN CHECKED BY: RIN
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
S-1
SHT. 24 OF 30

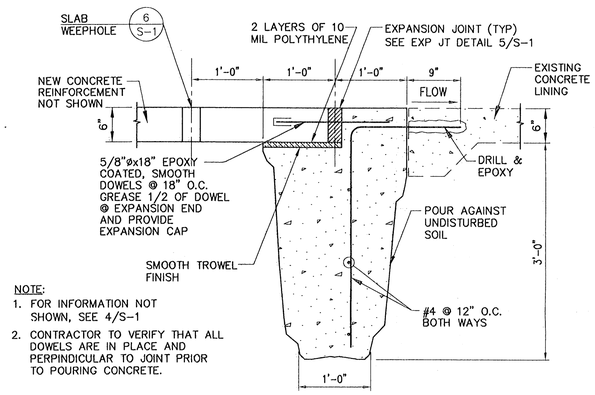


* SEE CHANNEL PLAN AND PROFILE SHEETS FOR RCP LOCATIONS

REINFORCING AROUND PIPE

NOT TO SCALE

10

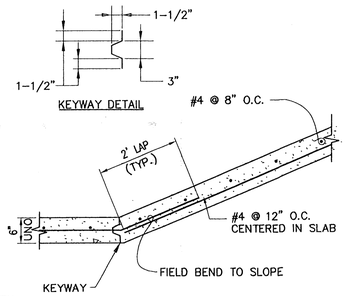


NOTE:
1. FOR INFORMATION NOT SHOWN, SEE 4/S-1
2. CONTRACTOR TO VERIFY THAT ALL DOWELS ARE IN PLACE AND PERPINDICULAR TO JOINT PRIOR TO POURING CONCRETE.

EXPANSION JOINT AND CUT-OFF WALL

NOT TO SCALE

7

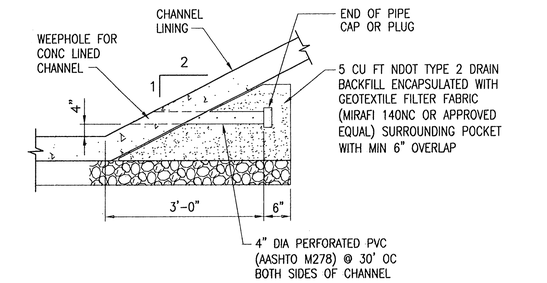


NOTE: CONTRACTOR MAY USE ALTERNATE JOINT CONFIGURATION WITH WRITTEN APPROVAL FROM OWNER

KEY JOINT DETAIL

NOT TO SCALE

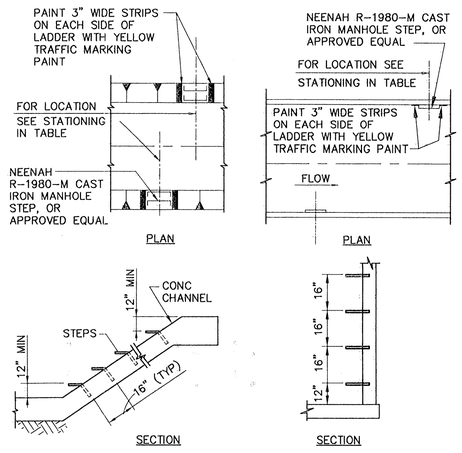
4



TRAPEZOIDAL CHANNEL WEEPHOLE

NOT TO SCALE

1



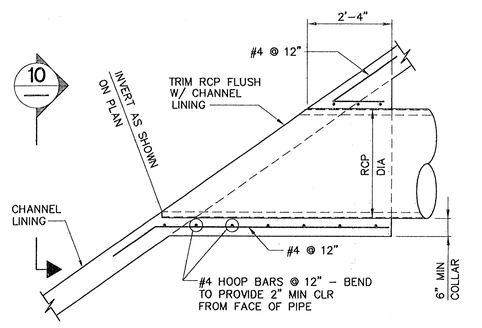
STEP LOCATIONS

STATIONS	
LT	RT
119+60.00	119+00.00
125+60.00	125+00.00
131+60.00	131+00.00
137+60.00	137+00.00
143+60.00	143+00.00
149+60.00	149+00.00
155+60.00	155+00.00
161+40.00	161+00.00
167+60.00	167+00.00
173+60.00	173+00.00
179+60.00	179+00.00
185+60.00	185+00.00

CHANNEL STEP DETAILS

NOT TO SCALE

11

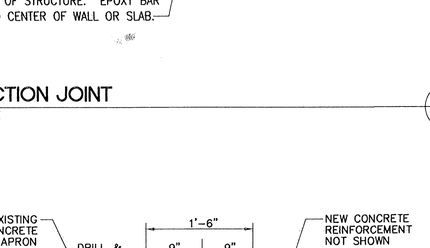


NOTES:
1. THE INFORMATION SHOWN FOR THE SAHARA AVE CULVERT IS BASED ON THE DESIGN DRAWINGS FOR SID #94. CONTRACTOR TO VERIFY THE GEOMETRY & CONDITION OF THE CULVERT TIE IN LOCATIONS.
2. EXPANSION JOINT DETAIL IS SIMILAR AT BOTH UPSTREAM AND DOWNSTREAM ENDS OF BRIDGE AT SAHARA AVE.

EXPANSION JOINT

NOT TO SCALE

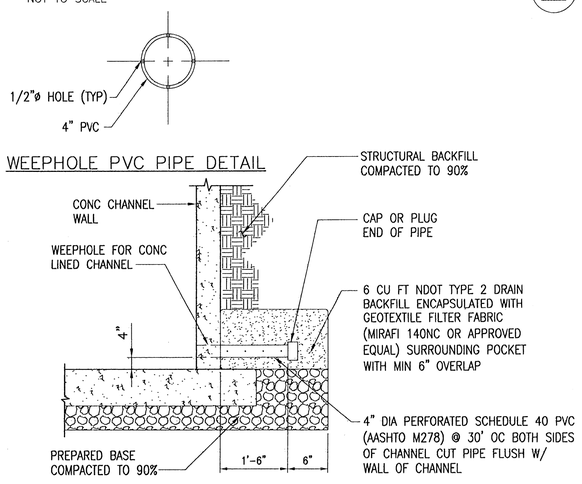
8



CONNECTION JOINT

NOT TO SCALE

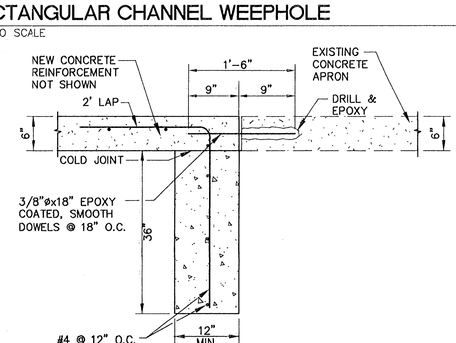
5



RECTANGULAR CHANNEL WEEPHOLE

NOT TO SCALE

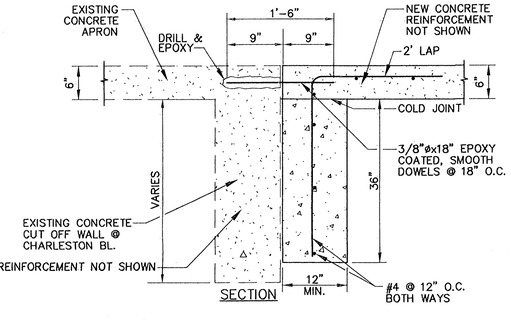
2



PIPE CONNECTION

NOT TO SCALE

9



APRON AT CHARLESTON BLVD BRIDGE

NOT TO SCALE

6

APRON AT ORCHARDS CHANNEL

NOT TO SCALE

3

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL

CHANNEL STRUCTURES DETAILS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER STATE OF NEVADA
RIMAH NAZZAL
Exp. 12/31/2005
CIVIL / STRUCTURAL
No. 12977
4/5/04

PROJECT No: 500.857 DRAWN BY: NO/AL
DESIGNED BY: RIN CHECKED BY: RIN
APPROVED BY

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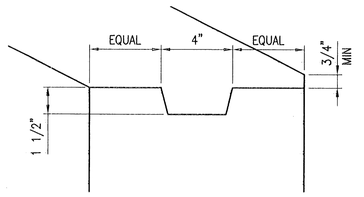
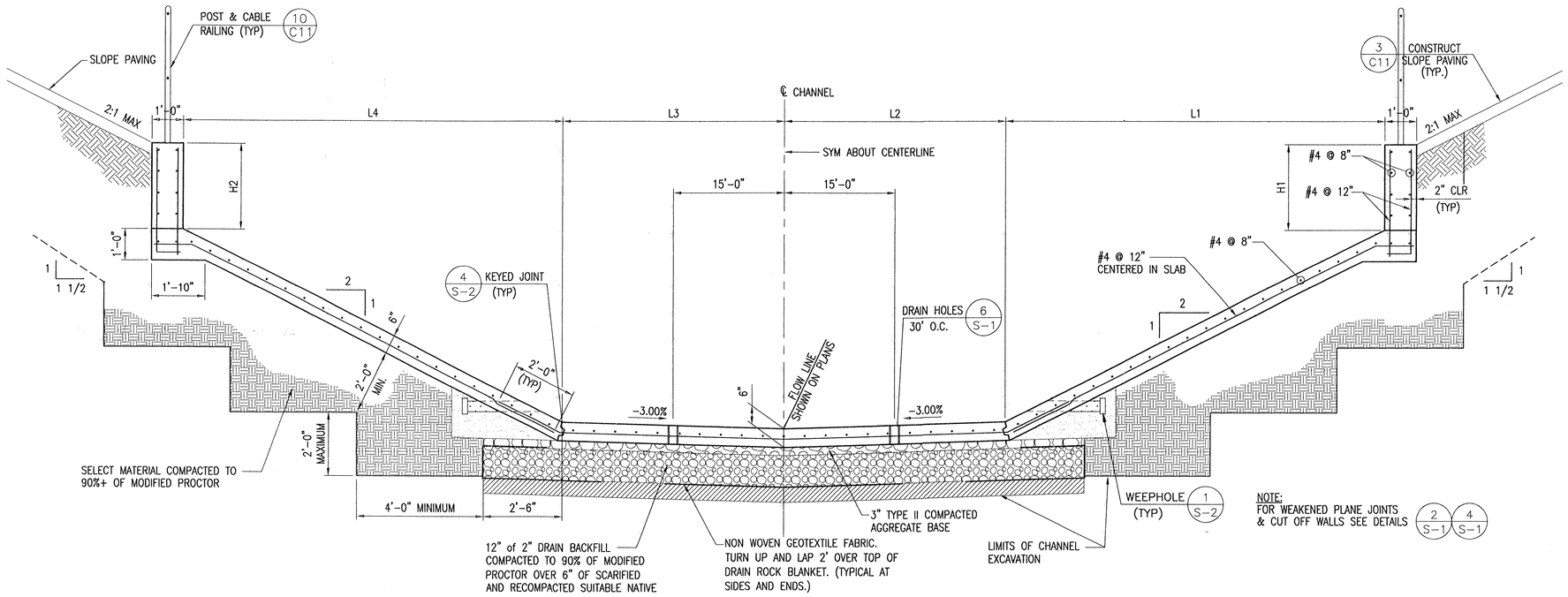
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

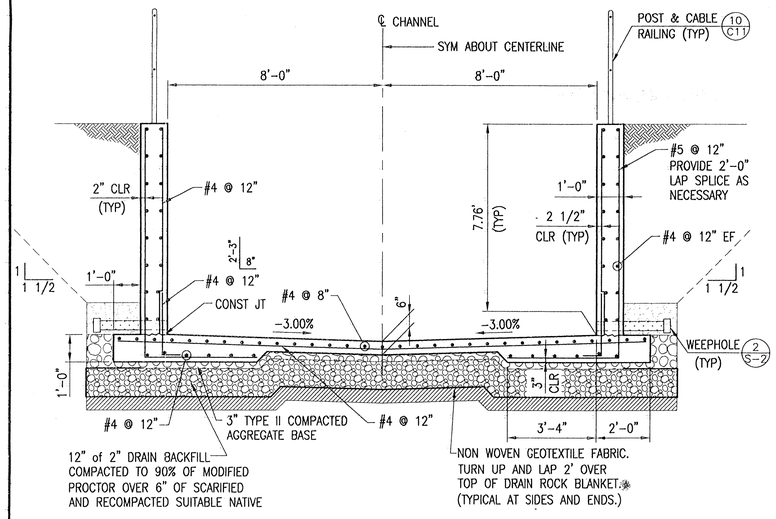
L-1759
DRAWING NO.
S-2
SHT. 25 OF 30



KEYED JOINT (1)
NOT TO SCALE



NOTE:
FOR WEAKENED PLANE JOINTS & CUT OFF WALLS SEE DETAILS 2/S-1 4/S-1



RECTANGULAR CHANNEL SECTION (STA 161+79.41, 41.00' LT TO STA 161+09.37, 80.14' LT) (STA 161+02.56, 95.72' LT TO STA 160+91.22, 121.68' LT) (B)
NOT TO SCALE

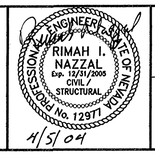
CHANNEL REACH	L1	L2	L3	L4	H1	H2
STA. 118+88.78 TO STA. 119+38.78	VARIES LINEARLY FROM 10.94' TO 17.3'	VARIES LINEARLY FROM 32.47' TO 30'	VARIES LINEARLY FROM 35.99' TO 30'	VARIES LINEARLY FROM 20.51' TO 12.3'	VARIES LINEARLY FROM 0' TO 2.37'	–
STA. 119+38.78 TO STA. 120+68.17	17.3'	30'	30'	12.3'	VARIES LINEARLY FROM 2.37' TO 1.63'	–
STA. 120+68.17 TO STA. 120+74.33	17.3'	30'	30'	VARIES LINEARLY FROM 12.3' TO 9.93'	VARIES LINEARLY FROM 1.63' TO 1.59'	–
STA. 120+74.33 TO STA. 120+96.22	17.3'	30'	30'	9.93'	VARIES LINEARLY FROM 1.59' TO 1.47'	–
STA. 120+96.22 TO STA. 121+02.78	17.3'	30'	30'	VARIES LINEARLY FROM 9.93' TO 12.3'	VARIES LINEARLY FROM 1.47' TO 1.43'	–
STA. 121+02.78 TO STA. 122+58.37	17.3'	30'	30'	12.3'	VARIES LINEARLY FROM 1.43' TO 0.54'	–
STA. 122+58.37 TO STA. 122+98.37	VARIES LINEARLY FROM 17.3' TO 12.3'	30'	30'	12.3'	VARIES LINEARLY FROM 0.54' TO 0'	–
STA. 122+98.37 TO STA. 130+97.58	12.3'	30'	30'	12.3'	–	–
STA. 130+97.58 TO STA. 131+75.00	VARIES LINEARLY FROM 12.3' TO 11.5'	30'	30'	VARIES LINEARLY FROM 12.3' TO 11.5'	–	–
STA. 131+75.00 TO STA. 158+50.00	11.5'	30'	30'	11.5'	–	–
STA. 158+50.00 TO STA. 159+00.00	VARIES LINEARLY FROM 11.5' TO 15.2'	30'	30'	VARIES LINEARLY FROM 11.5' TO 15.2'	–	–
STA. 159+00.00 TO STA. 160+29.41	15.2'	30'	30'	15.2'	–	–
STA. 160+29.41 TO STA. 160+62.41	VARIES LINEARLY FROM 15.2' TO 5.17'	VARIES LINEARLY FROM 30' TO 37.59'	VARIES LINEARLY FROM 30' TO 30.66'	VARIES LINEARLY FROM 15.2' TO 5.17'	VARIES LINEARLY FROM 0' TO 4.79'	VARIES LINEARLY FROM 0' TO 5'
STA. 163+29.41 TO STA. 165+61.82	11.5'	30'	30'	11.5'	–	–
STA. 165+61.82 TO STA. 165+72.82	11.5'	30'	30'	10.36'	–	–
STA. 165+72.82 TO STA. 171+98.47	11.5'	30'	30'	11.5'	–	–
STA. 172+86.31 TO STA. 174+00.00	13.2'	30'	30'	13.2'	–	–
STA. 174+00.00 TO STA. 174+50.00	13.2'	30'	30'	VARIES LINEARLY FROM 13.2' TO 11.63'	–	–
STA. 176+00.00 TO STA. 178+50.00	13.2'	30'	30'	13.2'	–	–
STA. 178+50.00 TO STA. 179+00.00	13.2'	30'	30'	VARIES LINEARLY FROM 13.2' TO 7'	–	VARIES LINEARLY FROM 0' TO 3.1'
STA. 179+00.00 TO STA. 182+17.17	13.2'	30'	30'	7'	–	3.1'
STA. 182+17.17 TO STA. 185+17.69	13.2'	30'	30'	7'	VARIES LINEARLY FROM 0' TO 2.7'	3.1'
STA. 185+17.69 TO STA. 186+54.00	13.2'	30'	30'	7'	VARIES LINEARLY FROM 2.7' TO 1.43'	3.1'
STA. 186+54.00 TO STA. 187+17.89	VARIES LINEARLY FROM 13.2' TO 15.9'	30'	30'	VARIES LINEARLY FROM 7' TO 19.67'	VARIES LINEARLY FROM 1.43' TO 0'	VARIES LINEARLY FROM 3.1' TO 0'

TYPICAL TRAPEZOIDAL CHANNEL SECTION (A)
NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
CHANNEL STRUCTURES
TYPICAL CHANNEL SECTIONS
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

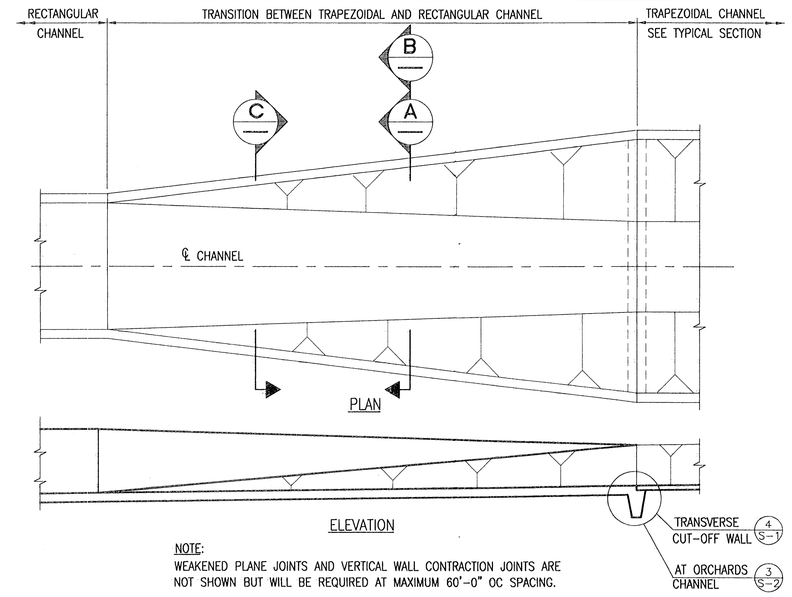


PROJECT No's: 500.857 DRAWN BY: NO/AL
DESIGNED BY: RIN CHECKED BY: RIN
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

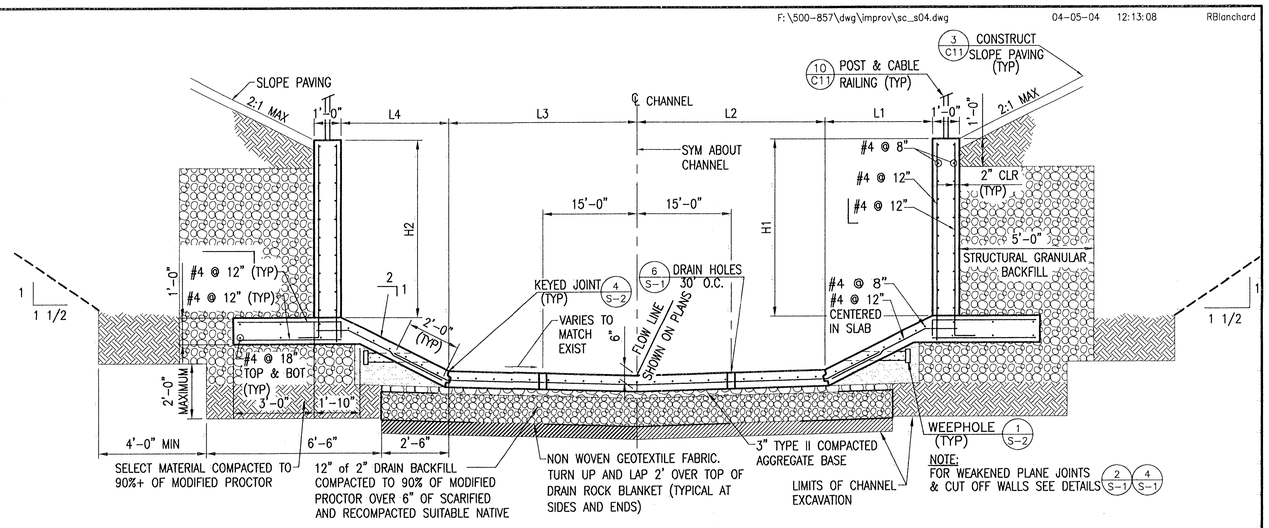
L-1759
DRAWING NO.
S-3
SHT. 26 OF 30



NOTE:
WEAKENED PLANE JOINTS AND VERTICAL WALL CONTRACTION JOINTS ARE NOT SHOWN BUT WILL BE REQUIRED AT MAXIMUM 60'-0" OC SPACING.

TYPICAL TRANSITION BETWEEN TRAPEZOIDAL AND RECTANGULAR CHANNEL 1

1/8" = 1'-0"

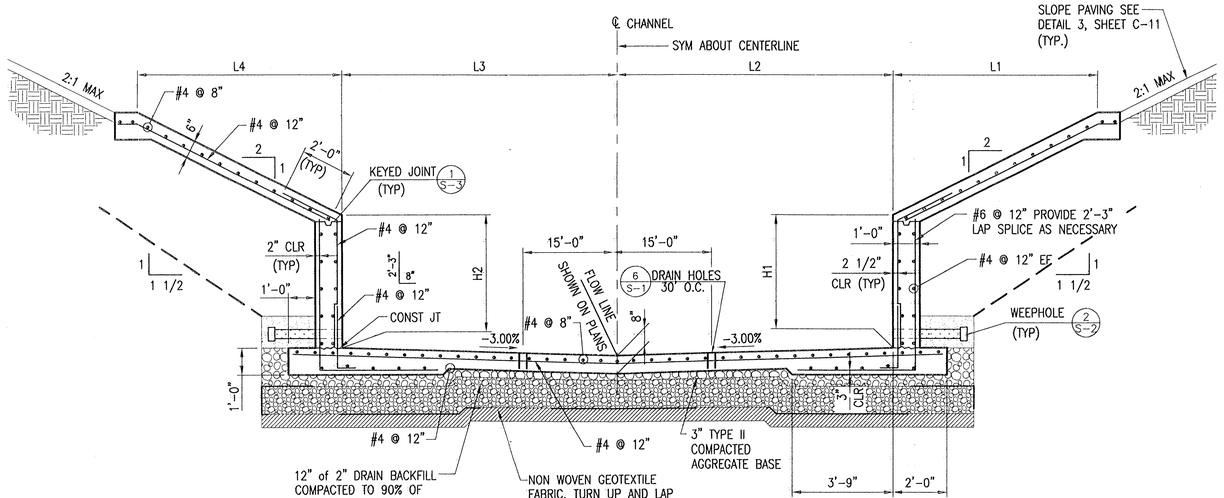


NOTE:
FOR WEAKENED PLANE JOINTS & CUT OFF WALLS SEE DETAILS 2/S-1 4/S-1

CHANNEL REACH	L1	L2	L3	L4	H1	H2
STA. 160+62.41 TO STA. 160+71.41	VARIES LINEARLY FROM 5.17' TO 2.43'	VARIES LINEARLY FROM 37.59' TO 39.66'	VARIES LINEARLY FROM 30.66' TO 30.84'	VARIES LINEARLY FROM 5.17' TO 2.43'	VARIES LINEARLY FROM 4.79' TO 6.09'	VARIES LINEARLY FROM 5' TO 6.36'

TYPICAL TRANSITION SECTION A

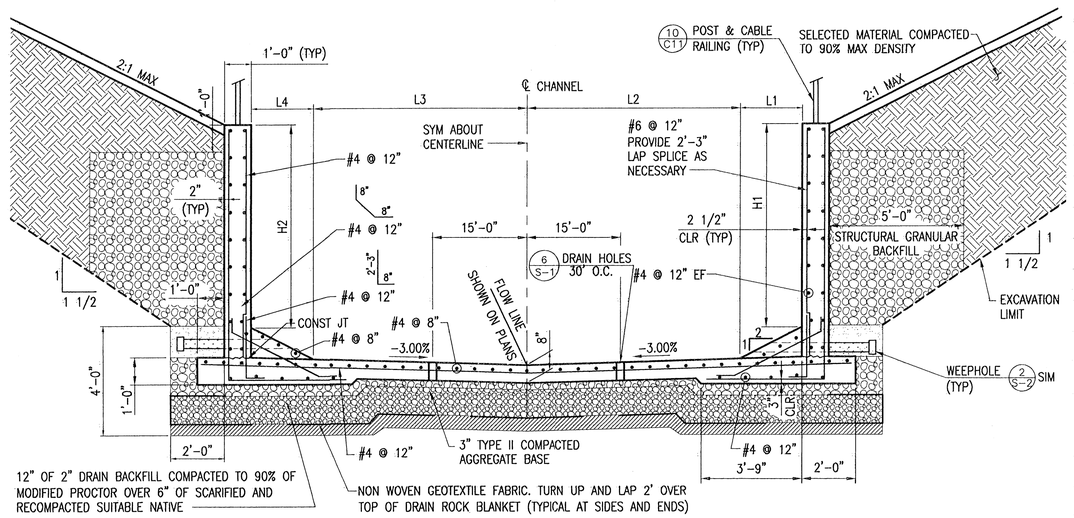
3/8" = 1'-0"



CHANNEL REACH	L1	L2	L3	L4	H1	H2
STA. 162+79.41 TO STA. 163+29.41	VARIES LINEARLY FROM 0' TO 11.5'	VARIES LINEARLY FROM 41.5' TO 30'	VARIES LINEARLY FROM 49' TO 30'	VARIES LINEARLY FROM 0' TO 11.5'	VARIES LINEARLY FROM 7.25' TO 0'	VARIES LINEARLY FROM 8.53' TO 0'

TYPICAL TRANSITION SECTION C

3/8" = 1'-0"



CHANNEL REACH	L1	L2	L3	L4	H1	H2
STA. 160+71.41 TO STA. 160+79.41	VARIES LINEARLY FROM 2.43' TO 0'	VARIES LINEARLY FROM 39.66' TO 41.5'	VARIES LINEARLY FROM 30.84' TO 31'	VARIES LINEARLY FROM 2.43' TO 0'	VARIES LINEARLY FROM 6.09' TO 7.25'	VARIES LINEARLY FROM 6.36' TO 7.57'

TYPICAL TRANSITION SECTION B

3/8" = 1'-0"

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
CHANNEL STRUCTURES
CHANNEL TRANSITION STRUCTURES
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

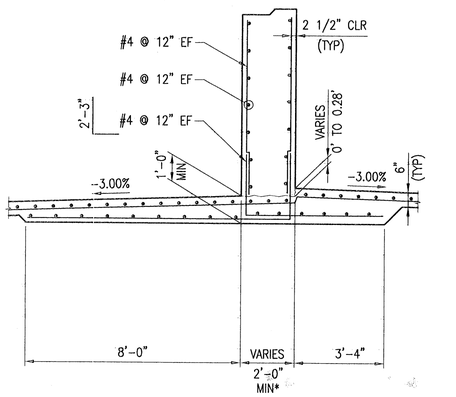
PROFESSIONAL ENGINEER STATE OF NEVADA
RIMAH I. NAZZAL
Exp. 12/31/2005
CIVIL / STRUCTURAL
No. 12977
4/5/2004

PROJECT No: 500.857 DRAWN BY: NO/AL
DESIGNED BY: RIN CHECKED BY: RIN
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

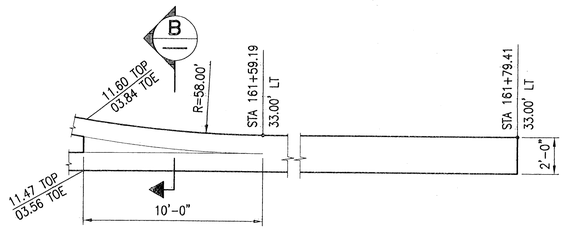
SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
S-4
SHT. 27 OF 30



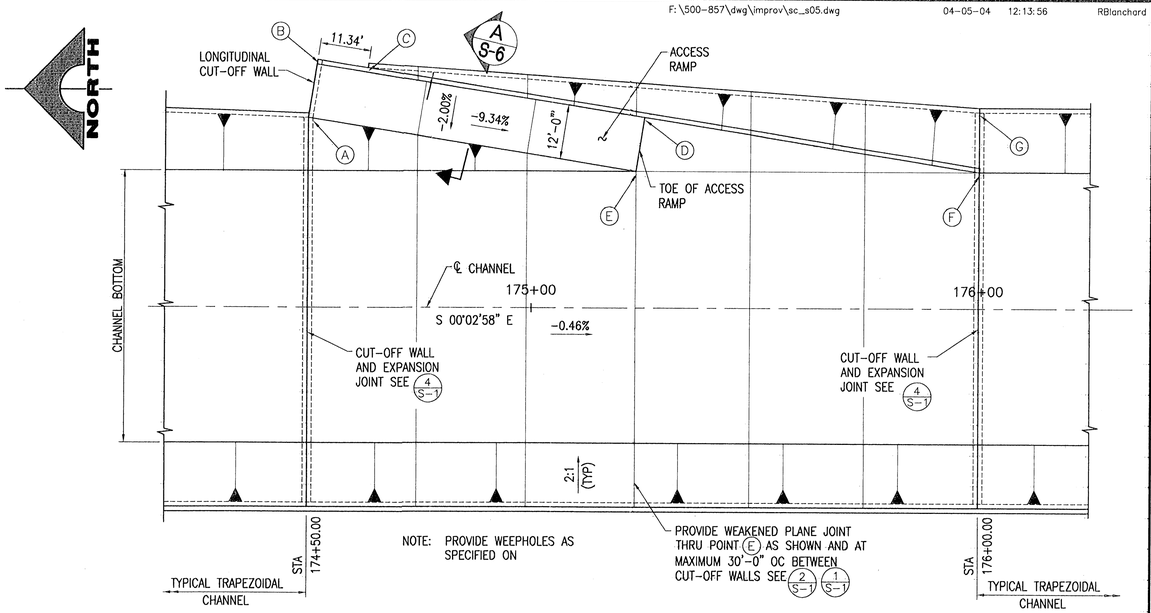
SECTION
3/8" = 1'-0"

B/—



DETAIL
1/4" = 1'-0"

2/—

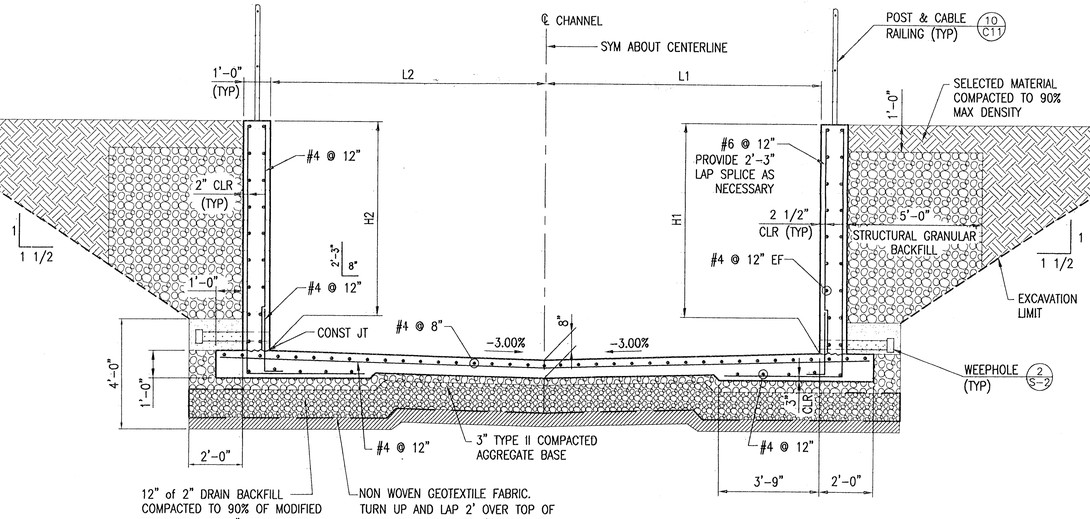


NOTE: PROVIDE WEEPHOLES AS SPECIFIED ON

POINT	A	B	C	D	E	F	G
RAMP 1	STA: 174+50.99	STA. 174+52.04	STA. 174+63.24	STA. 175+25.23	STA. 175+23.35	STA. 176+00.00	STA. 176+00.00
	OFFSET: 41.47' LT	OFFSET: 54.47' LT	OFFSET: 52.69' LT	OFFSET: 41.85' LT	OFFSET: 30.00' LT	OFFSET: 30.00' LT	OFFSET: 43.20' LT
	EL = 1703.83	EL = 1704.07	EL = 1703.62	EL = 1700.83 TW EL = 1697.13 TOE	EL = 1696.89	EL = 1696.54	EL = 1703.14

PLAN - TRAPEZOIDAL CHANNEL ACCESS RAMP
1/16" = 1'-0"

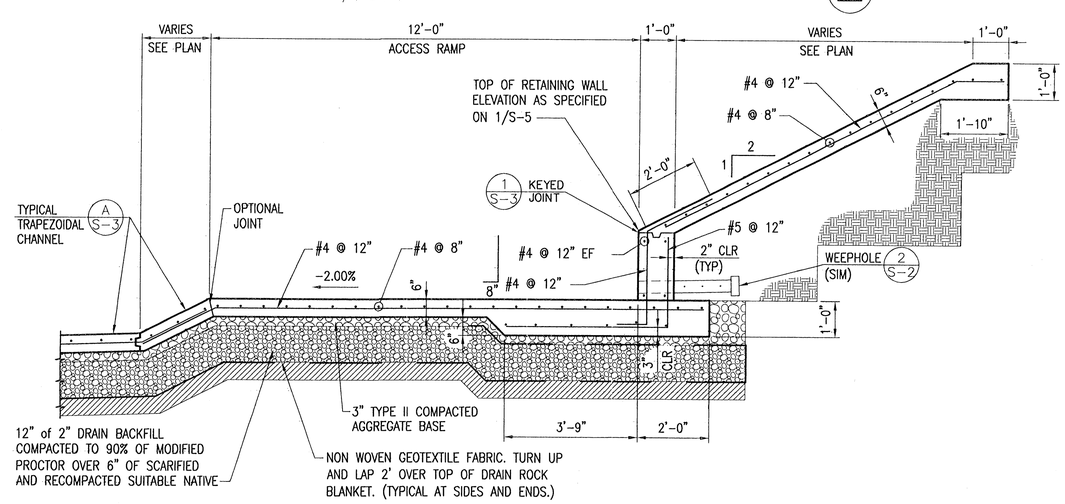
1/—



CHANNEL REACH	L1	L2	H1	H2
STA. 160+79.41 TO STA. 161+59.19	41.5'	31'	7.25'	VARIES LINEARLY FROM 7.57' TO 7.96'
STA. 161+59.19 TO STA. 161+79.41	41.5'	31'	7.25'	VARIES LINEARLY FROM 7.96' TO 7.76'
STA. 161+79.41 TO STA. 162+25.00	41.5'	49'	7.25'	VARIES LINEARLY FROM 7.76' TO 8.53'
STA. 162+25.00 TO STA. 162+79.41	41.5'	49'	7.25'	8.53'

RECTANGULAR CHANNEL SECTION
3/8" = 1'-0"

A/—



CHANNEL TRANSITION SECTION
1/2" = 1'-0"

C/—

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
CHANNEL STRUCTURES
ACCESS RAMP
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

STATE OF NEVADA — REGISTERED ENGINEER — RIMAH I. NAZZAL — Exp. 12/31/2005 — CIVIL / STRUCTURAL — No. 12977 — 4/5/04

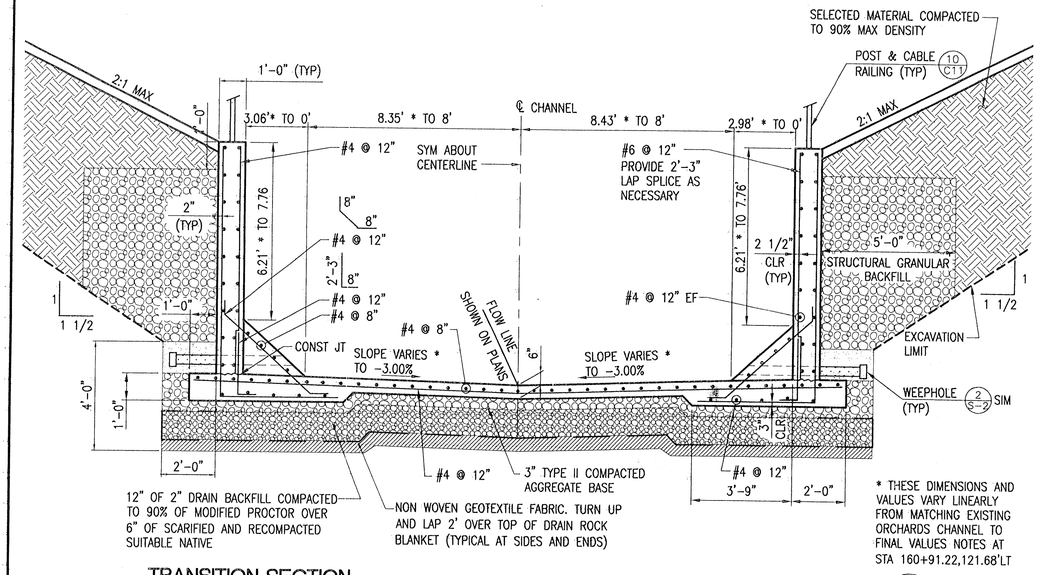
PROJECT No: 500.857 DRAWN BY: NO/AL
DESIGNED BY: RIN CHECKED BY: RIN
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
S-5
SHT. 28 OF 30

F:\500-857\dwg\improv\sc_s06.dwg 04-05-04 12:15:04 RBlanchard

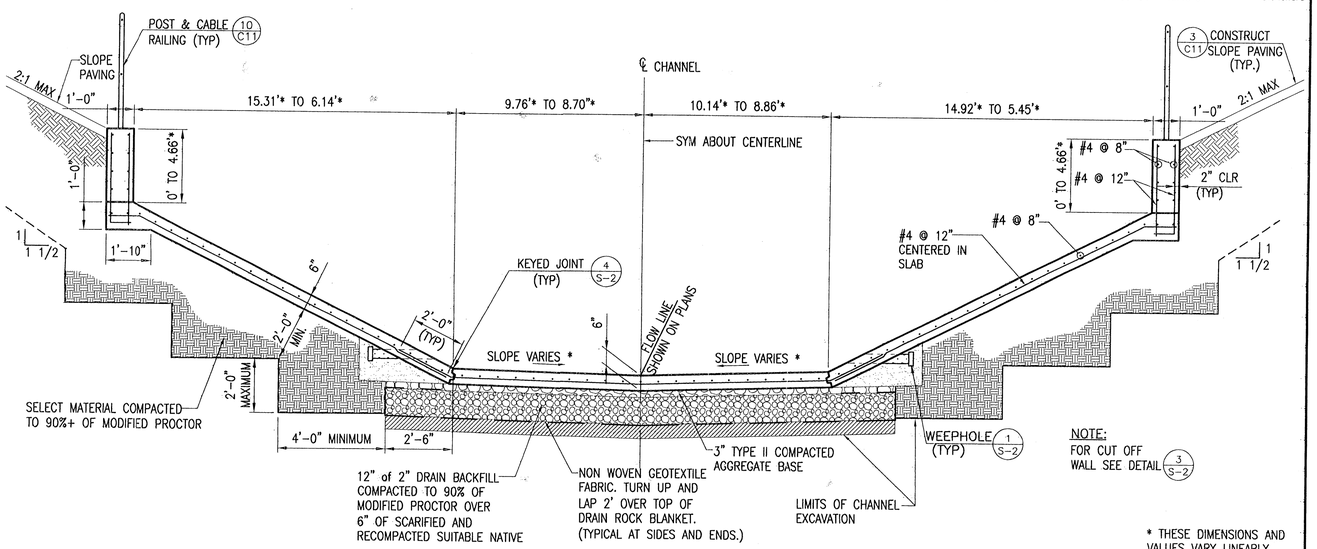


* THESE DIMENSIONS AND VALUES VARY LINEARLY FROM MATCHING EXISTING ORCHARDS CHANNEL TO FINAL VALUES NOTES AT STA 160+91.22,121.68'LT

TRANSITION SECTION C

3/8" = 1'-0"

STA 160+89.62, 125.34'LT TO STA 160+91.22, 121.68'LT



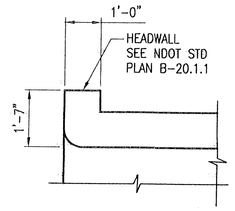
NOTE:
FOR CUT OFF WALL SEE DETAIL 3 S-2

* THESE DIMENSIONS AND VALUES VARY LINEARLY FROM MATCHING EXISTING ORCHARDS CHANNEL TO FINAL VALUES NOTES AT STA 160+91.22,121.68'LT

TRANSITION SECTION A

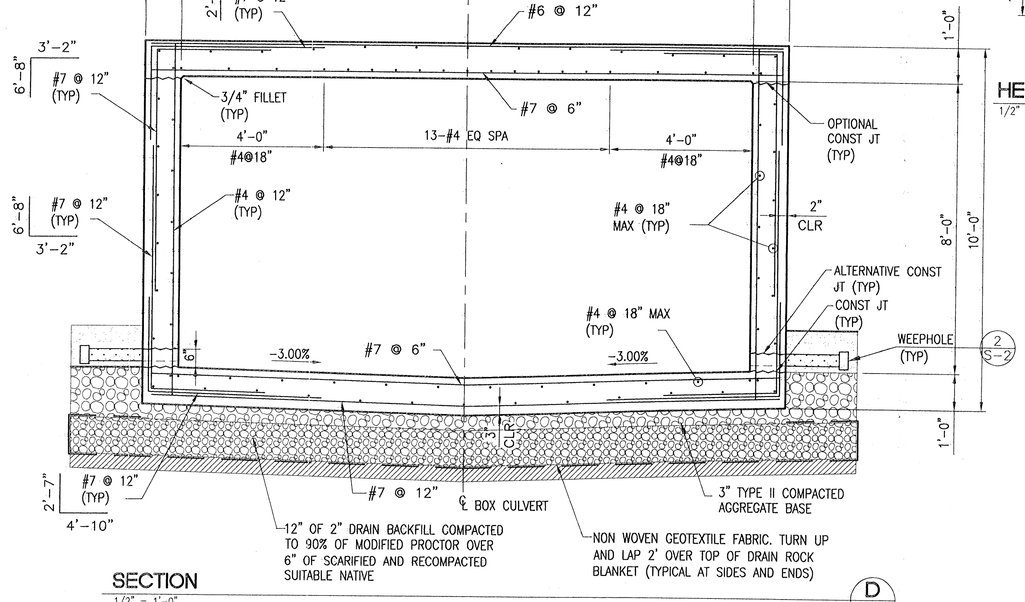
3/8" = 1'-0"

STA 160+83.21, 140.01'LT TO STA 160+88.02, 129.01'LT



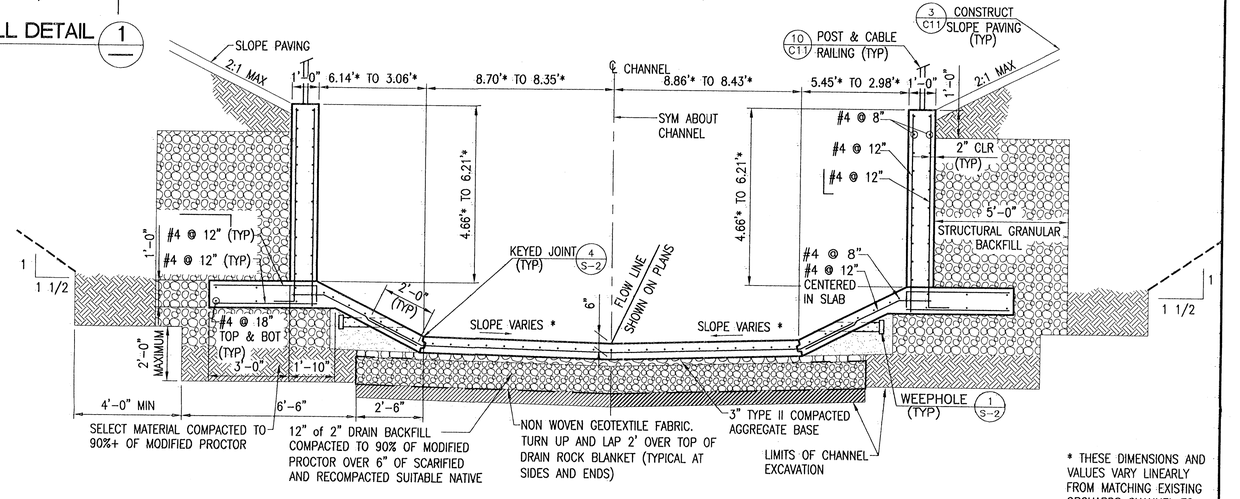
HEADWALL DETAIL 1

1/2" = 1'-0"



SECTION D

1/2" = 1'-0"



* THESE DIMENSIONS AND VALUES VARY LINEARLY FROM MATCHING EXISTING ORCHARDS CHANNEL TO FINAL VALUES NOTES AT STA 160+91.22,121.68'LT

TRANSITION SECTION B

3/8" = 1'-0"

STA 160+88.02, 129.01'LT TO STA 160+89.62, 125.34'LT

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
ACCESS RAMP
DETAILS
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

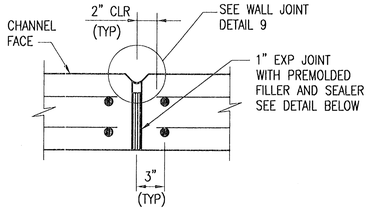
PROFESSIONAL ENGINEER — RIMAH I. NAZZAL, Exp. 12/31/2005, CIVIL / STRUCTURAL, No. 12971, STATE OF NEVADA
4/5/04

PROJECT No: 500.857 DRAWN BY: NO/AL
DESIGNED BY: RIN CHECKED BY: RIN
APPROVED BY

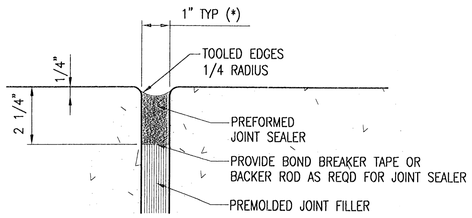
G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
S-6
SHT. 29 OF 30

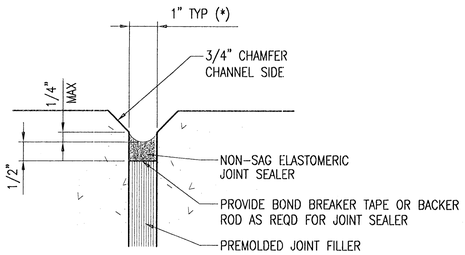


WALL EXPANSION JOINT DETAIL 8
NOT TO SCALE

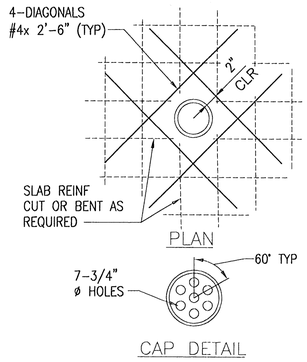


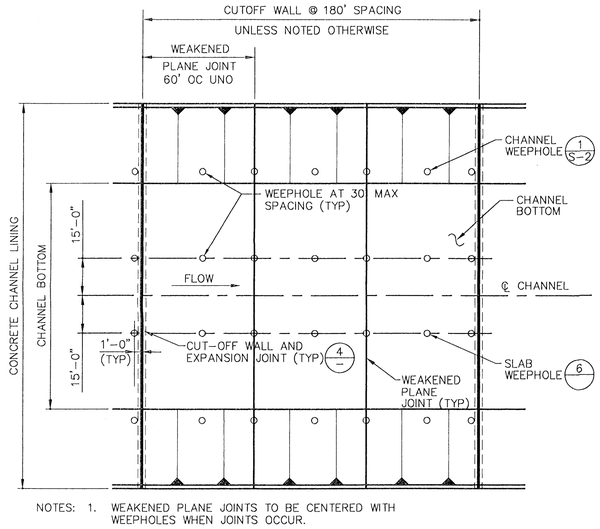
(*) UNLESS OTHERWISE NOTED

SLAB EXPANSION JOINT DETAIL 5
NOT TO SCALE



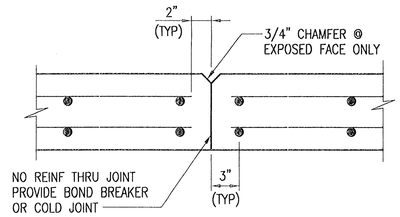
WALL JOINT DETAIL 9
NOT TO SCALE



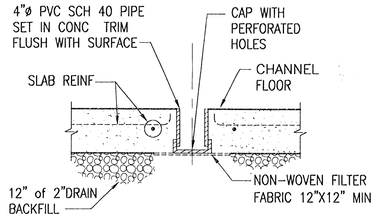


NOTES:
1. WEAKENED PLANE JOINTS TO BE CENTERED WITH WEEPHOLES WHEN JOINTS OCCUR.
2. IN CURVED ALIGNMENT SECTIONS, TRANSVERSE JOINTS SHALL BE NORMAL TO CENTERLINE AND SHALL NOT EXCEED 60' MAX SPACING.

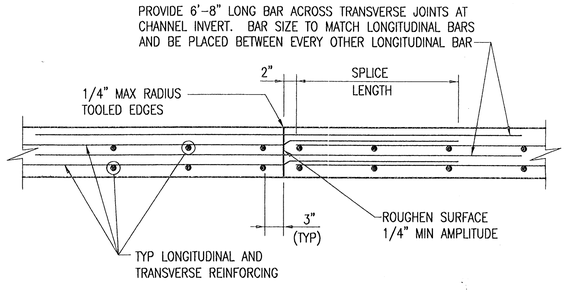
PLAN - CONCRETE LINED TRAPEZOIDAL CHANNEL 1
NOT TO SCALE



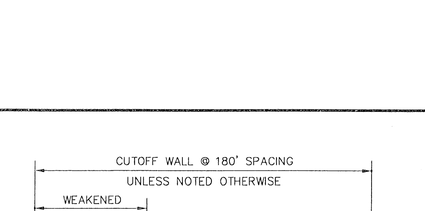
WALL CONTRACTION JOINT DETAIL 10
NOT TO SCALE



SLAB WEEPHOLE DETAIL 6
NOT TO SCALE

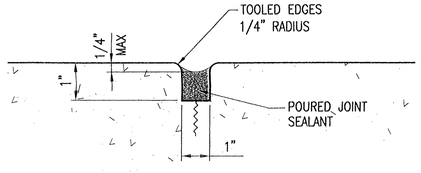


CONSTRUCTION JOINT DETAIL 7
NOT TO SCALE



NOTE:
SPRAY GALVANIZE REINFORCING BARS 9" EACH SIDE OF WEAKENED PLANE JOINT

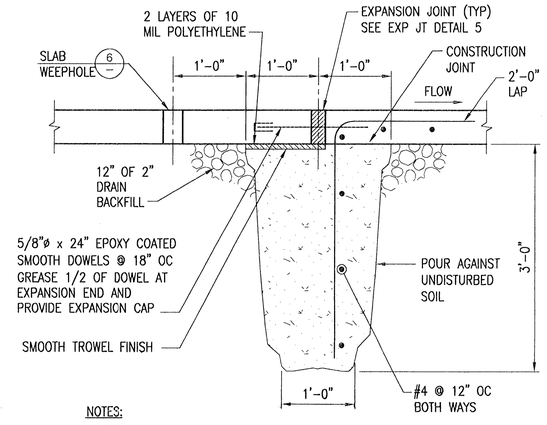
WEAKENED PLANE JOINT DETAIL 2
NOT TO SCALE



SEALANT DETAIL 3
NOT TO SCALE

STRUCTURE NOTES

1. DESIGN SPECIFICATIONS: AASHTO "STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 1996" AND INTERIMS THROUGH 2000. REINFORCED CONCRETE DESIGN BASED ON LOAD FACTOR DESIGN.
2. CONSTRUCTION SPECIFICATIONS: UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, OFF-SITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA.
3. LIVE LOAD: STANDARD AASHTO HS20-44 TRUCK LOADING AND TRAFFIC SURCHARGE FROM MAINTENANCE VEHICLES (2' OF SOIL)
4. SEISMIC LOAD: ACCELERATION COEFFICIENT 0.15 g
5. CONCRETE: ALL CONCRETE SHALL BE CLASS A MODIFIED (MAJOR) EXCEPT FOR WALLS WHICH SHALL BE CLASS D MODIFIED (MAJOR). ONLY TYPE V CEMENT SHALL BE USED FOR CONCRETE IN CONTACT WITH SOIL. CONCRETE COMPRESSIVE MINIMUM STRENGTH AT 28 DAYS SHALL BE, f'c=4,500 PSI AND A MAXIMUM WATER TO CEMENT RATIO, BY WEIGHT, OF 0.45.
6. REINFORCING STEEL: ALL REINFORCING STEEL SHALL BE ASTM A615 REINFORCING STEEL STRENGTH, Fy = 60,000 PSI.
7. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4" UNLESS OTHERWISE INDICATED.
8. TRANSVERSE AND LONGITUDINAL JOINTS IN INVERT SLAB AND SIDE SLOPE SLAB OF PAVED TRAPEZOIDAL CHANNELS AND WALLS FOR RECTANGULAR CHANNELS WILL BE REQUIRED AT THE END OF EACH CONTINUOUS POURING OPERATION. SEE TYPICAL CONSTRUCTION JOINT DETAIL. TRANSVERSE CONSTRUCTION JOINTS SHALL NOT BE PLACED WITHIN 3-FEET OF A MANHOLE, WITHIN 10-FEET OF JUNCTION STRUCTURE OPENINGS, OR WITHIN 50 FEET OF AN EXPANSION JOINT.
9. ALL TRANSVERSE JOINTS IN WALLS AND SLABS (CONSTRUCTION, WEAKENED CONTRACTION AND EXPANSION) SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED UNLESS SHOWN OTHERWISE. TRANSVERSE CONSTRUCTION JOINTS SHALL BE NORMAL OR RADIAL TO CENTERLINE OF CONSTRUCTION.
10. ALL SINGLE LAYER REINFORCEMENT SHALL BE PLACED IN THE CENTER OF CONCRETE UNLESS NOTED OTHERWISE.
11. IN CURVED CHANNEL SECTIONS TRANSVERSE BARS SHALL BE PLACED NORMAL TO THE CHANNEL CENTERLINE.
12. IN CURVED CHANNEL SECTIONS, THE MAXIMUM SPACING OF BARS SHALL NOT EXCEED THAT SHOWN FOR TYPICAL SECTIONS. STEEL SHALL BE PLACED RADIALLY FROM THE MAXIMUM SPACING.
13. AT THE BEGINNING AND ENDING OF ALL POURS, A COMPLETE CURTAIN OF MAIN REINFORCEMENT SHALL BE PLACED 3-INCHES FROM THE TRANSVERSE CONSTRUCTION, CONTRACTION AND EXPANSION JOINTS.
14. NO WELDING WILL BE PERMITTED ON ANY REINFORCEMENT.
15. CHANNEL ELEVATIONS: FOR CHANNEL INVERT ELEVATIONS REFER TO THE CHANNEL PLAN AND PROFILE SHEETS LOCATED ELSEWHERE IN THIS DRAWING SET.
16. EXCAVATION AND BACKFILL: THE LIMITS OF EXCAVATION AND BACKFILL SHALL BE AS SHOWN IN THE STATE OF NEVADA, "STANDARD PLANS FOR ROAD AND BRIDGE CONSTRUCTION, JANUARY 2001," UNLESS OTHERWISE NOTED.
17. WEEPHOLES: WEEPHOLES WILL BE REQUIRED AT 30-FEET O.C. PER THE TYPICAL WEEPHOLE DETAIL FOR ALL OPEN CHANNEL STRUCTURES.
18. BEDDING MATERIALS: UNLESS NOTED OTHERWISE ALL BEDDING MATERIAL SHALL BE 3-INCHES OF TYPE II AGGREGATE BASE OVER 12 INCHES OF 2 INCH DRAIN ROCK COMPACTED TO 90% OF THE MAXIMUM DRY DENSITY AS ESTABLISHED BY ASTM TEST METHOD D-1557.



NOTES:
1. CUTOFF WALL TO BE SPACED @ 180' OC FOR TRAPEZOIDAL CHANNELS AND 180' OC FOR RECTANGULAR CHANNELS ACROSS THE ENTIRE WIDTH OF THE CHANNEL LINING.
2. CONTRACTOR TO VERIFY THAT ALL DOWELS ARE IN PLANE AND PERPINDICULAR TO JOINT PRIOR TO POURING CONCRETE.

TRANSVERSE CUT-OFF WALL EXPANSION DETAIL 4
NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
CHANNEL STRUCTURES DETAILS
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER STATE OF NEVADA
RIMAH I. NAZZAL
Exp. 12/31/2005
No. 12977
CIVIL / STRUCTURAL
9/8/04

PROJECT No: 500.857 DRAWN BY: NO/AL
DESIGNED BY: RIN CHECKED BY: RIN
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G.C. WALLACE, INC.
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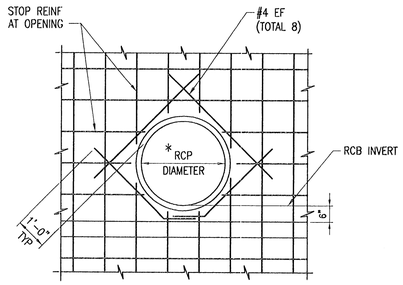
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

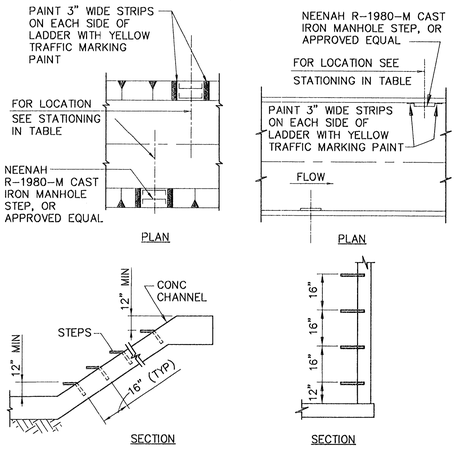
SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
S-1
SHT. 24 OF 30



* SEE CHANNEL PLAN AND PROFILE SHEETS FOR RCP LOCATIONS

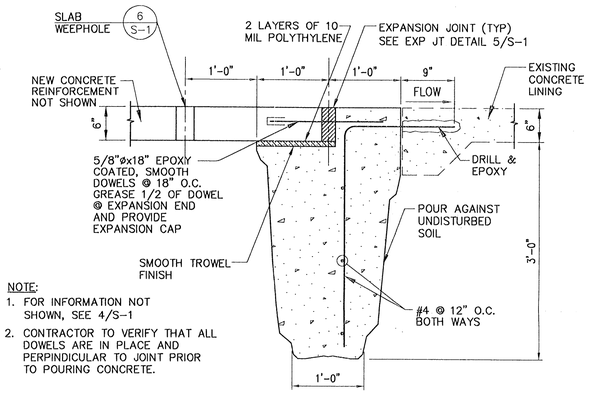
REINFORCING AROUND PIPE
NOT TO SCALE — 10



STEP LOCATIONS

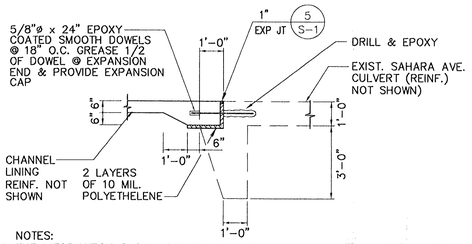
STATIONS	
LT	RT
119+60.00	119+00.00
125+60.00	125+00.00
131+60.00	131+00.00
137+60.00	137+00.00
143+60.00	143+00.00
149+60.00	149+00.00
155+60.00	155+00.00
161+40.00	161+00.00
167+60.00	167+00.00
173+60.00	173+00.00
179+60.00	179+00.00
185+60.00	185+00.00

CHANNEL STEP DETAILS
NOT TO SCALE — 11



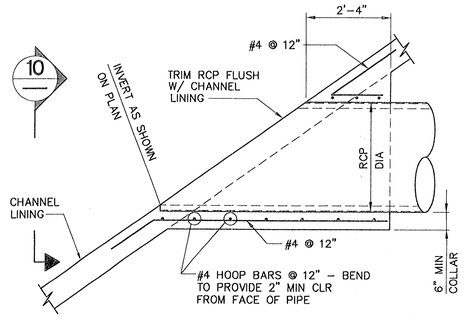
NOTE:
1. FOR INFORMATION NOT SHOWN, SEE 4/S-1
2. CONTRACTOR TO VERIFY THAT ALL DOWELS ARE IN PLACE AND PERPINDICULAR TO JOINT PRIOR TO POURING CONCRETE.

EXPANSION JOINT AND CUT-OFF WALL
NOT TO SCALE — 7

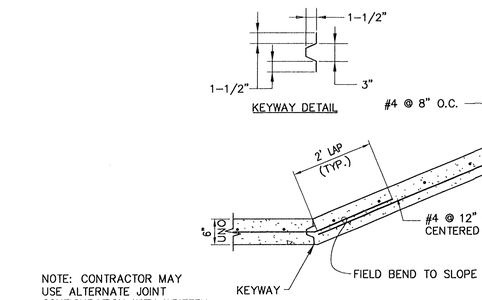


NOTES:
1. THE INFORMATION SHOWN FOR THE SAHARA AVE CULVERT IS BASED ON THE DESIGN DRAWINGS FOR SID #94. CONTRACTOR TO VERIFY THE GEOMETRY & CONDITION OF THE CULVERT TIE IN LOCATIONS.
2. EXPANSION JOINT DETAIL IS SIMILAR AT BOTH UPSTREAM AND DOWNSTREAM ENDS OF BRIDGE AT SAHARA AVE.

EXPANSION JOINT
NOT TO SCALE — 8

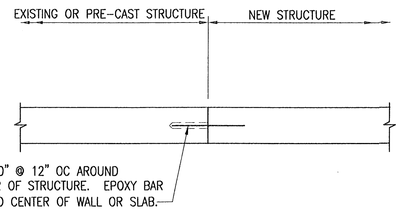


PIPE CONNECTION
NOT TO SCALE — 9

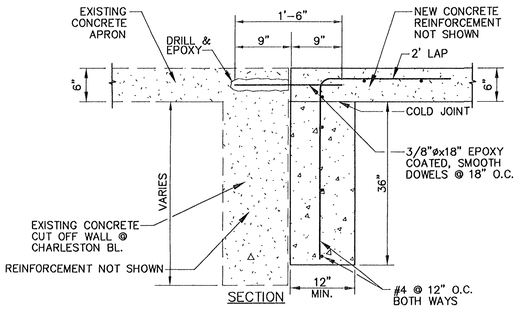


NOTE: CONTRACTOR MAY USE ALTERNATE JOINT CONFIGURATION WITH WRITTEN APPROVAL FROM OWNER

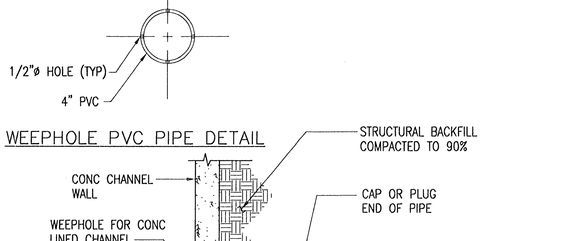
KEY JOINT DETAIL
NOT TO SCALE — 4



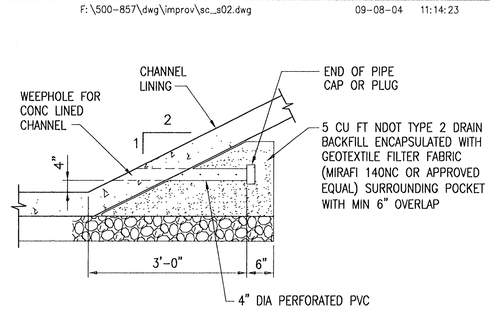
CONNECTION JOINT
NOT TO SCALE — 5



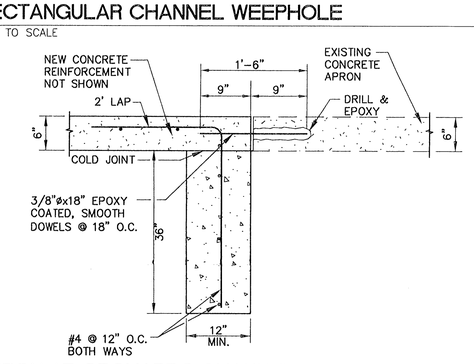
APRON AT CHARLESTON BLVD BRIDGE
NOT TO SCALE — 6



TRAPEZOIDAL CHANNEL WEEPHOLE
NOT TO SCALE — 1



RECTANGULAR CHANNEL WEEPHOLE
NOT TO SCALE — 2

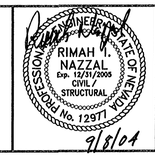


APRON AT ORCHARDS CHANNEL
NOT TO SCALE — 3

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
CHANNEL STRUCTURES
DETAILS
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

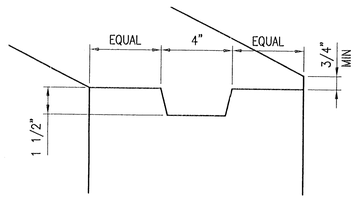


PROJECT No: 500.857 DRAWN BY: NO/AL
DESIGNED BY: RIN CHECKED BY: RIN
APPROVED BY

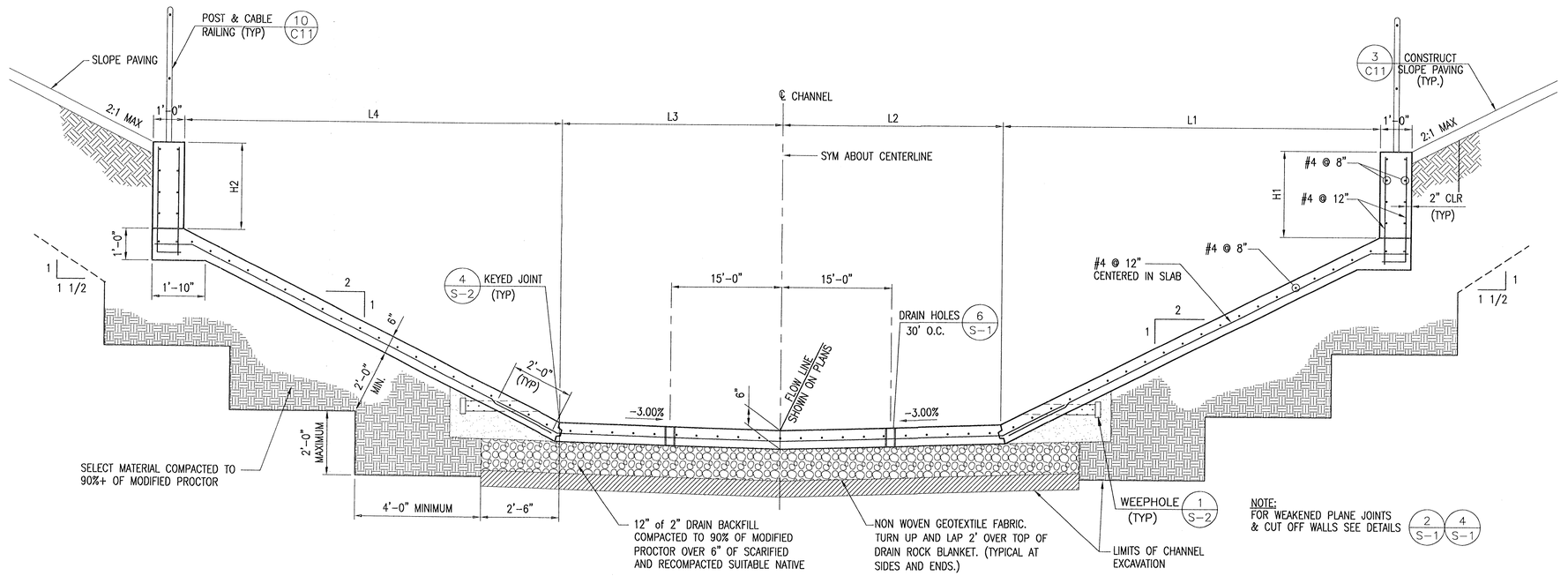
G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

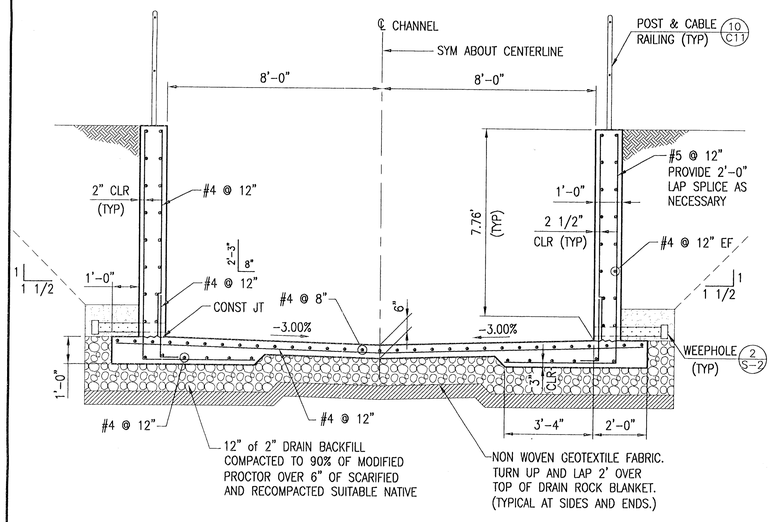
SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
S-2
SHT. 25 OF 30



KEYED JOINT (1)
NOT TO SCALE





RECTANGULAR CHANNEL SECTION (STA 161+79.41, 41.00' LT TO STA 161+09.37, 80.14' LT) (STA 161+02.56, 95.72' LT TO STA 160+91.22, 121.68' LT) (B)
NOT TO SCALE

CHANNEL REACH	L1	L2	L3	L4	H1	H2
STA. 118+88.78 TO STA. 119+38.78	VARIES LINEARLY FROM 10.94' TO 17.3'	VARIES LINEARLY FROM 32.47' TO 30'	VARIES LINEARLY FROM 35.99' TO 30'	VARIES LINEARLY FROM 20.51' TO 12.3'	VARIES LINEARLY FROM 0' TO 2.37'	–
STA. 119+38.78 TO STA. 120+68.17	17.3'	30'	30'	12.3'	VARIES LINEARLY FROM 2.37' TO 1.63'	–
STA. 120+68.17 TO STA. 120+74.33	17.3'	30'	30'	VARIES LINEARLY FROM 12.3' TO 9.93'	VARIES LINEARLY FROM 1.63' TO 1.59'	–
STA. 120+74.33 TO STA. 120+96.22	17.3'	30'	30'	9.93'	VARIES LINEARLY FROM 1.59' TO 1.47'	–
STA. 120+96.22 TO STA. 121+02.78	17.3'	30'	30'	VARIES LINEARLY FROM 9.93' TO 12.3'	VARIES LINEARLY FROM 1.47' TO 1.43'	–
STA. 121+02.78 TO STA. 122+58.37	17.3'	30'	30'	12.3'	VARIES LINEARLY FROM 1.43' TO 0.54'	–
STA. 122+58.37 TO STA. 122+98.37	VARIES LINEARLY FROM 17.3' TO 12.3'	30'	30'	12.3'	VARIES LINEARLY FROM 0.54' TO 0'	–
STA. 122+98.37 TO STA. 130+97.58	12.3'	30'	30'	12.3'	–	–
STA. 130+97.58 TO STA. 131+75.00	VARIES LINEARLY FROM 12.3' TO 11.5'	30'	30'	VARIES LINEARLY FROM 12.3' TO 11.5'	–	–
STA. 131+75.00 TO STA. 158+50.00	11.5'	30'	30'	11.5'	–	–
STA. 158+50.00 TO STA. 159+00.00	VARIES LINEARLY FROM 11.5' TO 15.2'	30'	30'	VARIES LINEARLY FROM 11.5' TO 15.2'	–	–
STA. 159+00.00 TO STA. 160+29.41	15.2'	30'	30'	15.2'	–	–
STA. 160+29.41 TO STA. 160+62.41	VARIES LINEARLY FROM 15.2' TO 5.17'	VARIES LINEARLY FROM 30' TO 37.59'	VARIES LINEARLY FROM 30' TO 30.66'	VARIES LINEARLY FROM 15.2' TO 5.17'	VARIES LINEARLY FROM 0' TO 4.79'	VARIES LINEARLY FROM 0' TO 5'
STA. 163+29.41 TO STA. 165+61.82	11.5'	30'	30'	11.5'	–	–
STA. 165+61.82 TO STA. 165+72.82	11.5'	30'	30'	10.36'	–	–
STA. 165+72.82 TO STA. 171+98.47	11.5'	30'	30'	11.5'	–	–
STA. 172+86.31 TO STA. 174+00.00	13.2'	30'	30'	13.2'	–	–
STA. 174+00.00 TO STA. 174+50.00	13.2'	30'	30'	VARIES LINEARLY FROM 13.2' TO 11.63'	–	–
STA. 176+00.00 TO STA. 178+50.00	13.2'	30'	30'	13.2'	–	–
STA. 178+50.00 TO STA. 179+00.00	13.2'	30'	30'	VARIES LINEARLY FROM 13.2' TO 7'	–	VARIES LINEARLY FROM 0' TO 3.1'
STA. 179+00.00 TO STA. 182+17.17	13.2'	30'	30'	7'	–	3.1'
STA. 182+17.17 TO STA. 185+17.69	13.2'	30'	30'	7'	VARIES LINEARLY FROM 0' TO 2.7'	3.1'
STA. 185+17.69 TO STA. 186+54.00	13.2'	30'	30'	7'	VARIES LINEARLY FROM 2.7' TO 1.43'	3.1'
STA. 186+54.00 TO STA. 187+17.89	VARIES LINEARLY FROM 13.2' TO 15.9'	30'	30'	VARIES LINEARLY FROM 7' TO 19.67'	VARIES LINEARLY FROM 1.43' TO 0'	VARIES LINEARLY FROM 3.1' TO 0'

TYPICAL TRAPEZOIDAL CHANNEL SECTION (A)
NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
CHANNEL STRUCTURES
TYPICAL CHANNEL SECTIONS
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

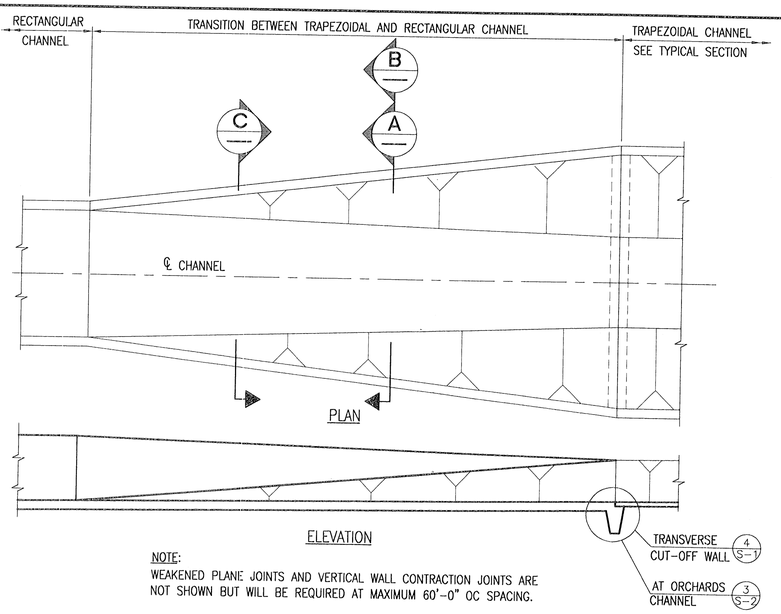
RIMAH NAZZAL Exp. 12/31/2005 CIVIL / STRUCTURAL No. 12977 STATE OF NEVADA
9/8/04

PROJECT No's: 500.857 DRAWN BY: NO/AL
DESIGNED BY: RIN CHECKED BY: RIN
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

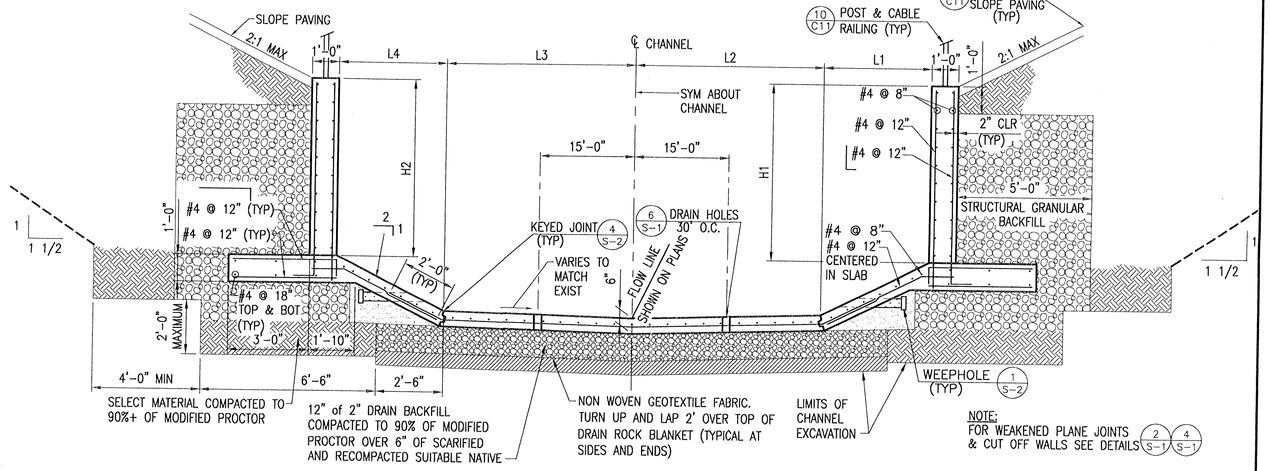
L-1759
DRAWING NO.
S-3
SHT. 26 OF 30



NOTE:
WEAKENED PLANE JOINTS AND VERTICAL WALL CONTRACTION JOINTS ARE NOT SHOWN BUT WILL BE REQUIRED AT MAXIMUM 60'-0" OC SPACING.

TYPICAL TRANSITION BETWEEN TRAPEZOIDAL AND RECTANGULAR CHANNEL 1

1/8" = 1'-0"

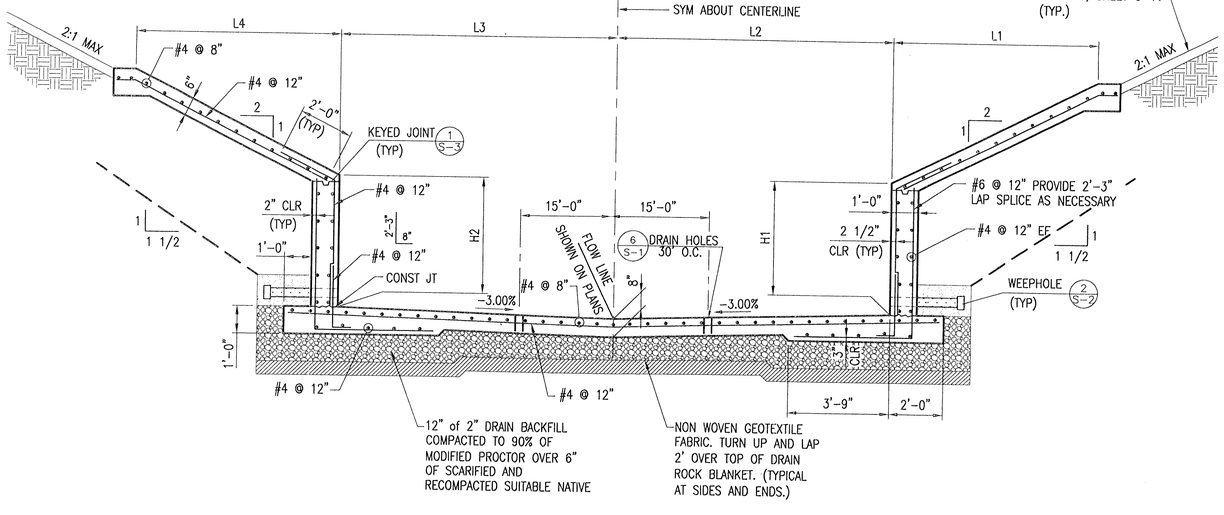


NOTE:
FOR WEAKENED PLANE JOINTS & CUT OFF WALLS SEE DETAILS 2 S-1 4 S-1

CHANNEL REACH	L1	L2	L3	L4	H1	H2
STA. 160+62.41 TO STA. 160+71.41	VARIES LINEARLY FROM 5.17' TO 2.43'	VARIES LINEARLY FROM 37.59' TO 39.66'	VARIES LINEARLY FROM 30.66' TO 30.84'	VARIES LINEARLY FROM 5.17' TO 2.43'	VARIES LINEARLY FROM 4.79' TO 6.09'	VARIES LINEARLY FROM 5' TO 6.36'

TYPICAL TRANSITION SECTION A

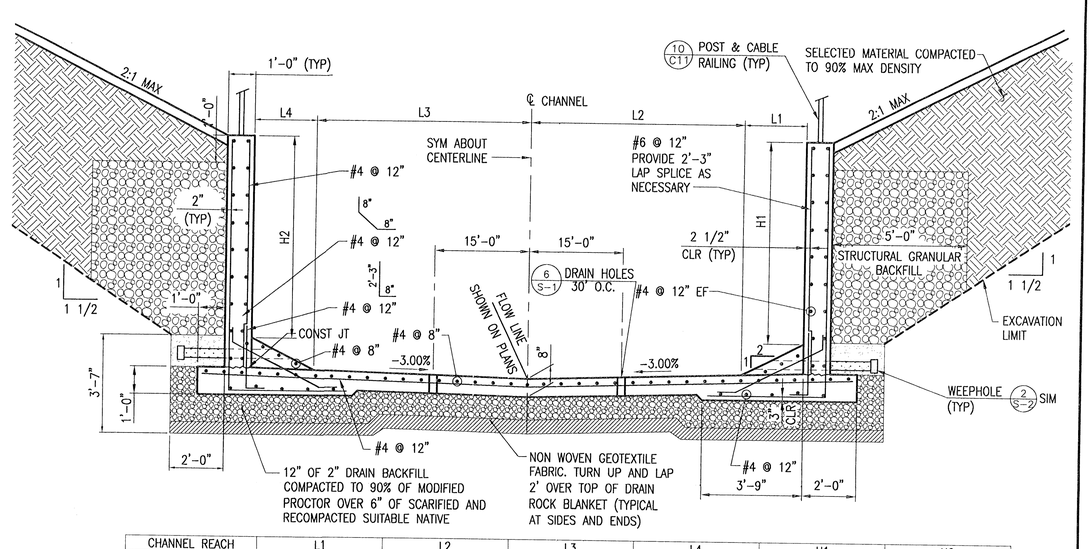
3/8" = 1'-0"



CHANNEL REACH	L1	L2	L3	L4	H1	H2
STA. 162+79.41 TO STA. 163+29.41	VARIES LINEARLY FROM 0' TO 11.5'	VARIES LINEARLY FROM 41.5' TO 30'	VARIES LINEARLY FROM 49' TO 30'	VARIES LINEARLY FROM 0' TO 11.5'	VARIES LINEARLY FROM 7.25' TO 0'	VARIES LINEARLY FROM 8.53' TO 0'

TYPICAL TRANSITION SECTION C

3/8" = 1'-0"



CHANNEL REACH	L1	L2	L3	L4	H1	H2
STA. 160+71.41 TO STA. 160+79.41	VARIES LINEARLY FROM 2.43' TO 0'	VARIES LINEARLY FROM 39.66' TO 41.5'	VARIES LINEARLY FROM 30.84' TO 31'	VARIES LINEARLY FROM 2.43' TO 0'	VARIES LINEARLY FROM 6.09' TO 7.25'	VARIES LINEARLY FROM 6.36' TO 7.57'

TYPICAL TRANSITION SECTION B

3/8" = 1'-0"

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
CHANNEL STRUCTURES
CHANNEL TRANSITION STRUCTURES
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

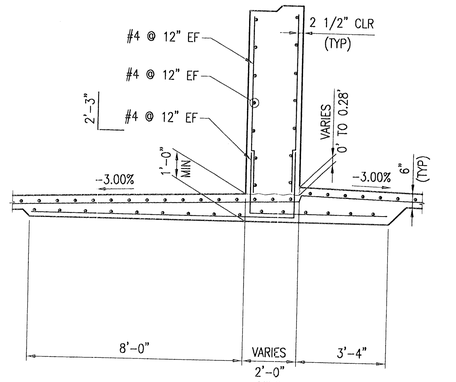
PROFESSIONAL ENGINEER STATE OF NEVADA
RIMAH H. NAZZAL
Exp. 12/31/2006
CIVIL / STRUCTURAL
No. 12977
9/8/04

PROJECT No: 500.857 DRAWN BY: NO/AL
DESIGNED BY: RIN CHECKED BY: RIN
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

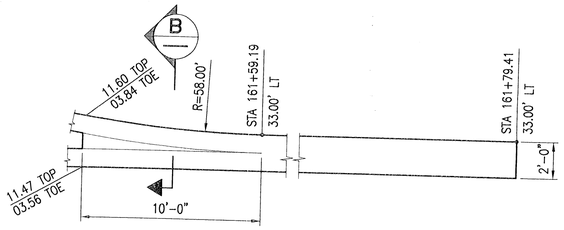
SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
S-4
SHT. 27 OF 30

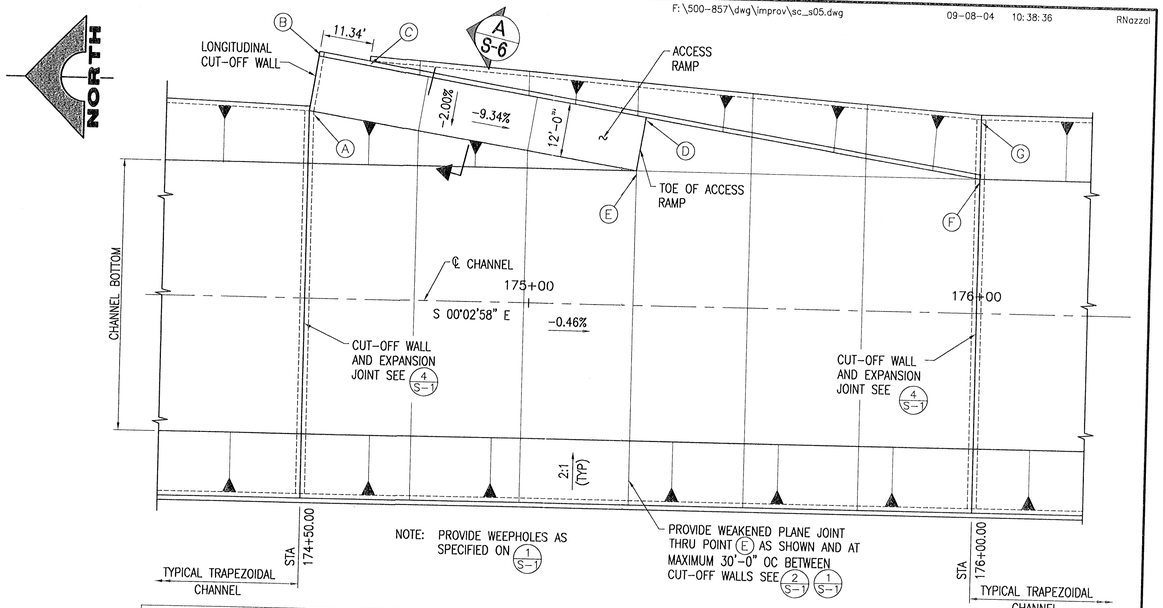


SECTION
3/8" = 1'-0"

* SEE DETAIL (2) — B

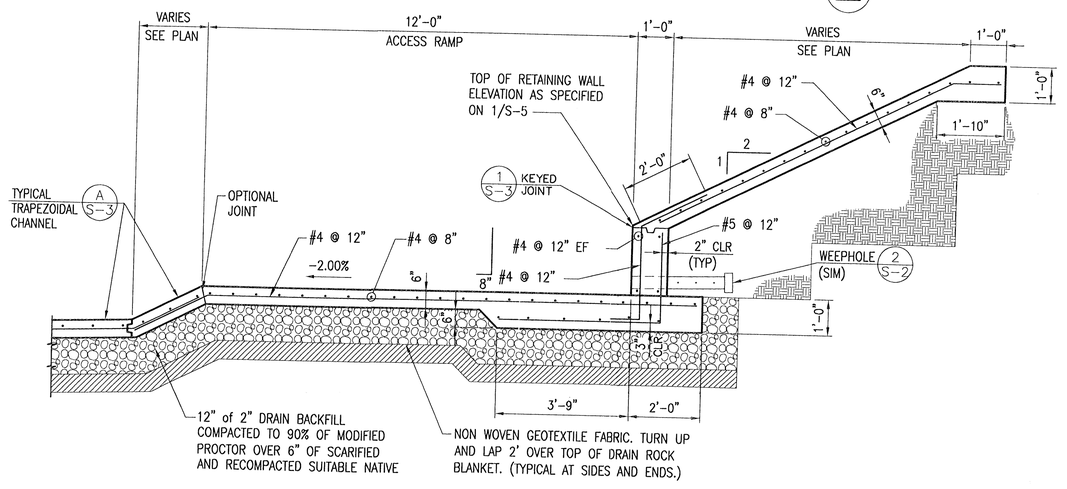


DETAIL
1/4" = 1'-0" — 2

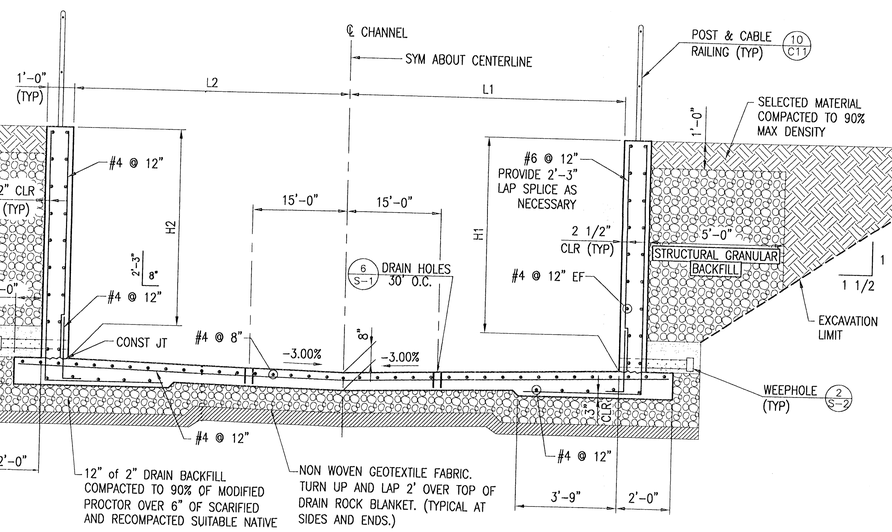


POINT	(A)	(B)	(C)	(D)	(E)	(F)	(G)
RAMP 1	STA: 174+50.99	STA. 174+52.04	STA. 174+63.24	STA. 175+25.23	STA. 175+23.35	STA. 176+00.00	STA. 176+00.00
	OFFSET: 41.47' LT	OFFSET: 54.47' LT	OFFSET: 52.69' LT	OFFSET: 41.85' LT	OFFSET: 30.00' LT	OFFSET: 30.00' LT	OFFSET: 43.20' LT
	EL = 1703.83	EL = 1704.07	EL = 1703.62	EL = 1700.83 TW EL = 1697.13 TOE	EL = 1696.89	EL = 1696.54	EL = 1703.14

PLAN - TRAPEZOIDAL CHANNEL ACCESS RAMP
1/16" = 1'-0" — 1



CHANNEL TRANSITION SECTION
1/2" = 1'-0" — C



CHANNEL REACH	L1	L2	H1	H2
STA. 160+79.41 TO STA. 161+59.19	41.5'	31'	7.25'	VARIES LINEARLY FROM 7.57' TO 7.96'
STA. 161+59.19 TO STA. 161+79.41	41.5'	31'	7.25'	VARIES LINEARLY FROM 7.96' TO 7.76'
STA. 161+79.41 TO STA. 162+25.00	41.5'	49'	7.25'	VARIES LINEARLY FROM 7.76' TO 8.53'
STA. 162+25.00 TO STA. 162+79.41	41.5'	49'	7.25'	8.53'

RECTANGULAR CHANNEL SECTION
3/8" = 1'-0" — A

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
CHANNEL STRUCTURES
ACCESS RAMP
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER STATE OF NEVADA
RIMAH N. NAZZAL
Exp. 12/31/2005
CIVIL / STRUCTURAL
No. 12977
9/8/04

PROJECT No: 500.857 DRAWN BY: NO/AL
DESIGNED BY: RIN CHECKED BY: RIN
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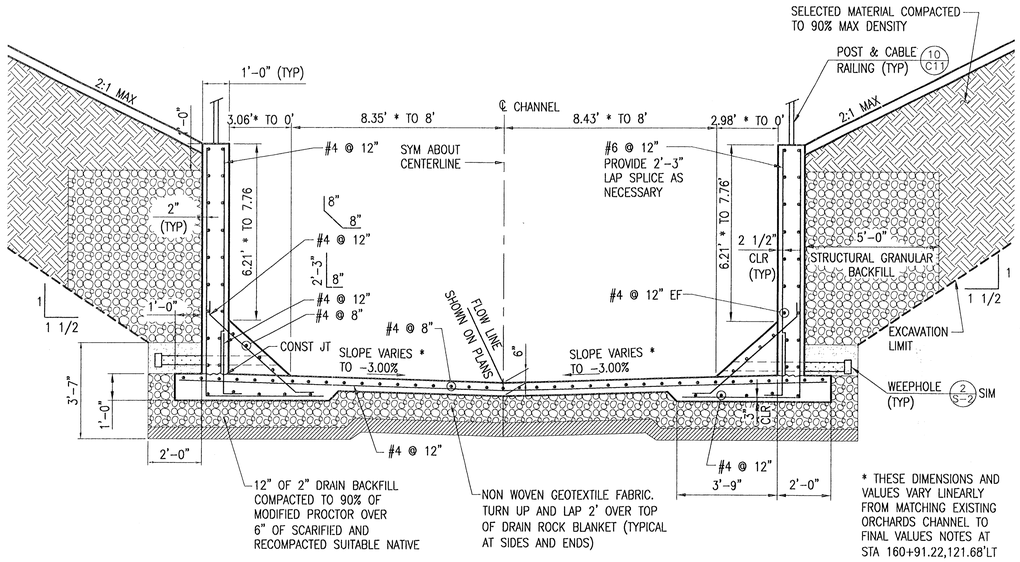
SCALE
HORIZ: NONE
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
S-5
SHT. 28 OF 30

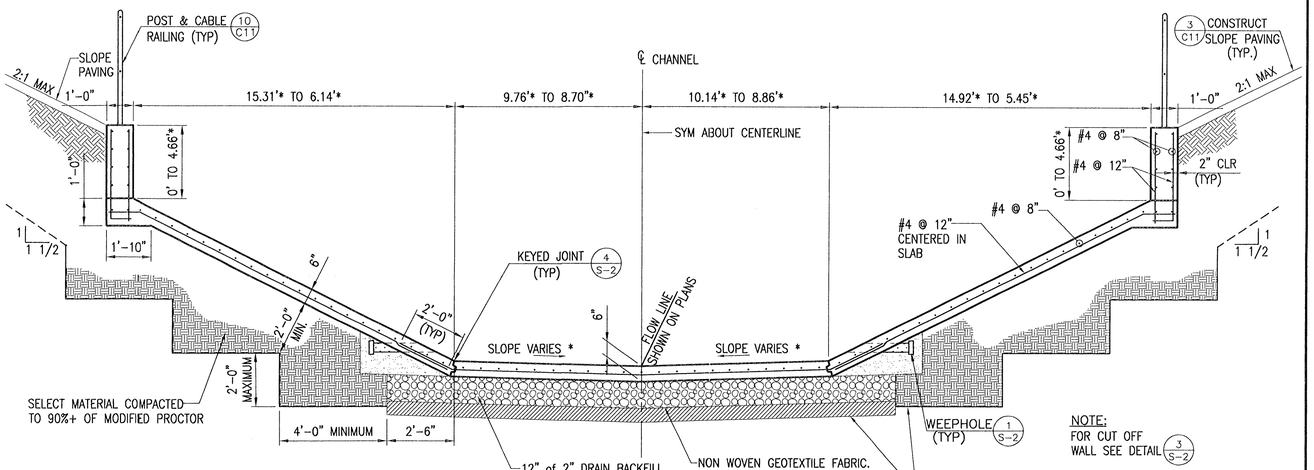


* THESE DIMENSIONS AND VALUES VARY LINEARLY FROM MATCHING EXISTING ORCHARDS CHANNEL TO FINAL VALUES NOTES AT STA 160+91.22,121.68'LT

TRANSITION SECTION C

3/8" = 1'-0"

STA 160+89.62, 125.34'LT TO STA 160+91.22, 121.68'LT



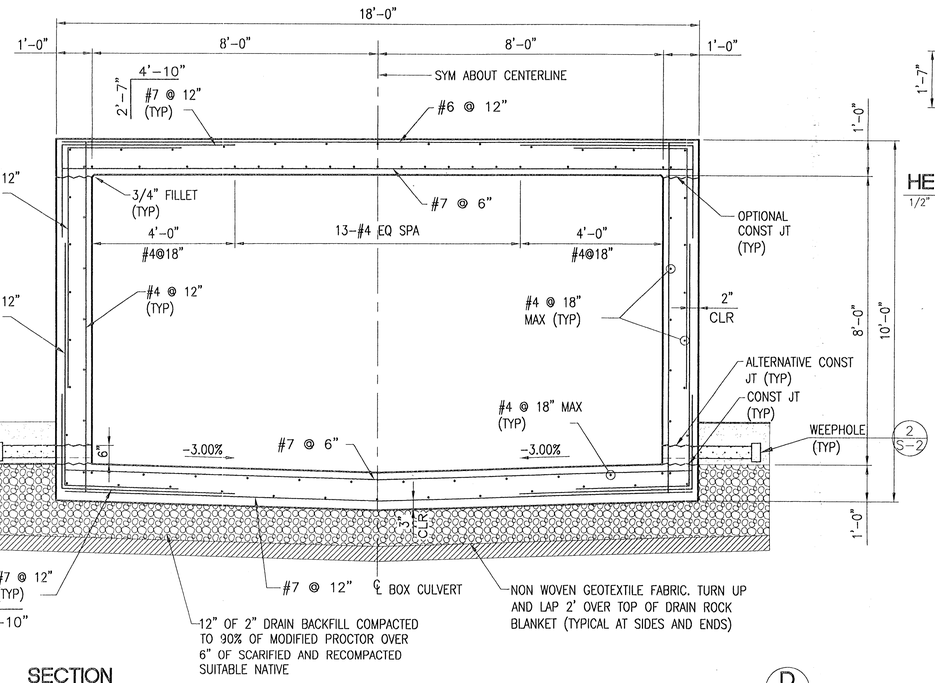
NOTE:
FOR CUT OFF WALL SEE DETAIL 3/S-2

* THESE DIMENSIONS AND VALUES VARY LINEARLY FROM MATCHING EXISTING ORCHARDS CHANNEL TO FINAL VALUES NOTES AT STA 160+91.22,121.68'LT

TRANSITION SECTION A

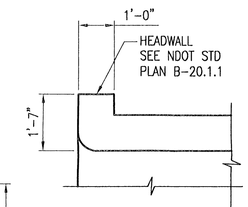
3/8" = 1'-0"

STA 160+83.21, 140.01'LT TO STA 160+88.02, 129.01'LT



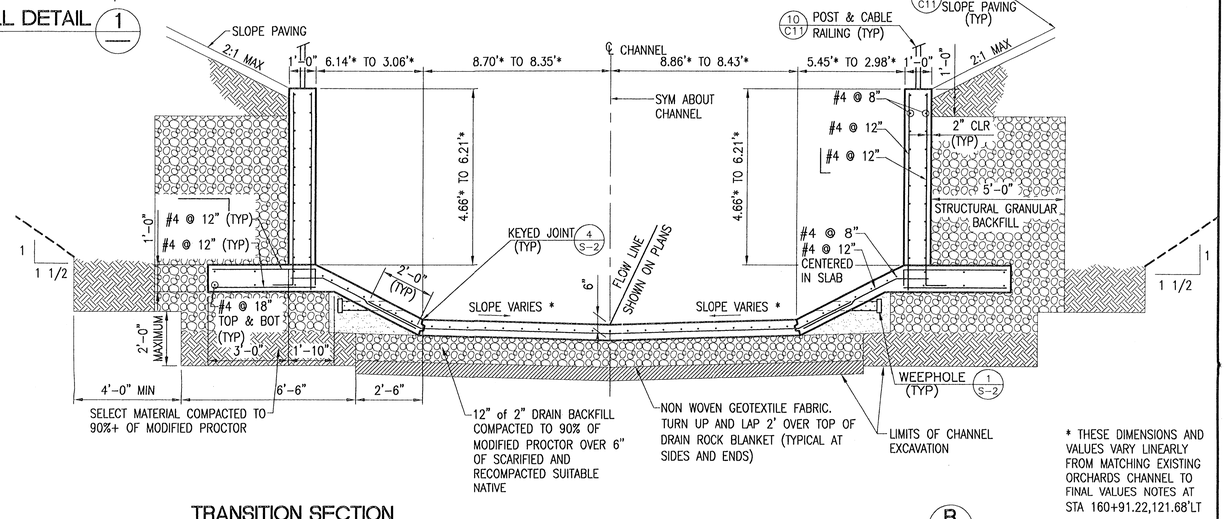
SECTION D

1/2" = 1'-0"



HEADWALL DETAIL 1

1/2" = 1'-0"



* THESE DIMENSIONS AND VALUES VARY LINEARLY FROM MATCHING EXISTING ORCHARDS CHANNEL TO FINAL VALUES NOTES AT STA 160+91.22,121.68'LT

TRANSITION SECTION B

3/8" = 1'-0"

STA 160+88.02, 129.01'LT TO STA 160+89.62, 125.34'LT

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL
ACCESS RAMP
DETAILS
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER STATE OF NEVADA
RIMAH NAZZAL
Exp. 12/31/2005
CIVIL / STRUCTURAL
No. 12977
9/8/04

PROJECT No: 500.857 DRAWN BY: NO/AL
DESIGNED BY: RIN CHECKED BY: RIN
APPROVED BY

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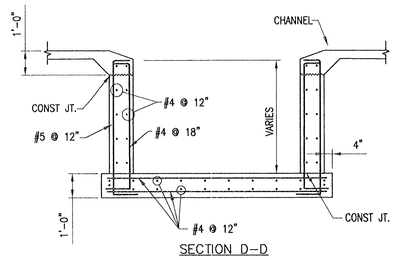
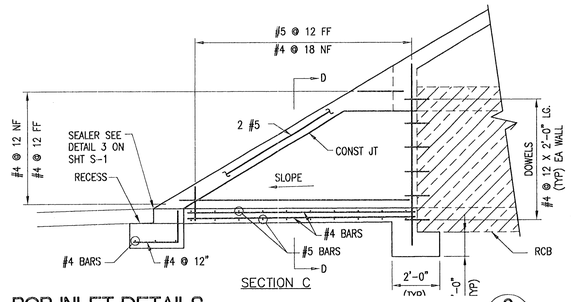
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE	
HORIZ:	NONE
VERT:	NONE
FIELD BOOK	

L-1759
DRAWING NO.
S-6
SHT. 29 OF 30



SECTION D-D

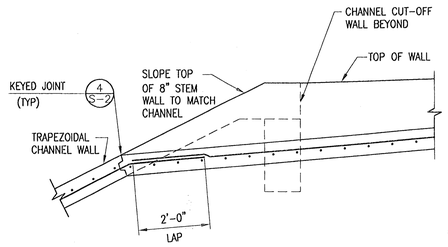


SECTION C

RCB INLET DETAILS

NOT TO SCALE

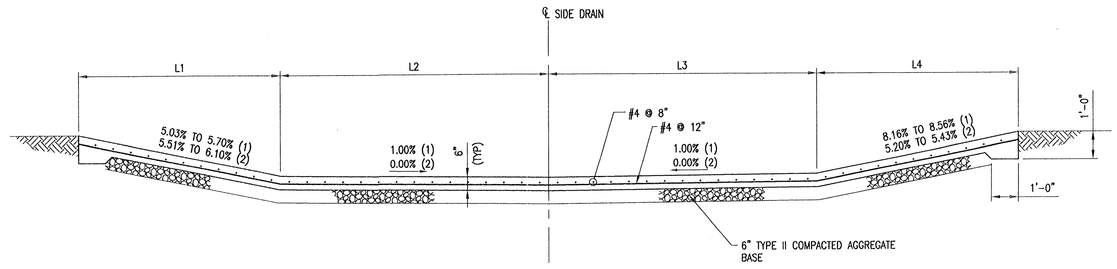
3



DETAIL

NOT TO SCALE

B



SIDE DRAIN	L1	L2	L3	L4
1	29.15' TO 28.40'	10.00'	10.00'	29.10' TO 28.40'
2	24.20' TO 25.21'	17.05' TO 18.66'	18.72' TO 20.23'	22.07' TO 24.21'

CHANNEL SECTION

NOT TO SCALE

A

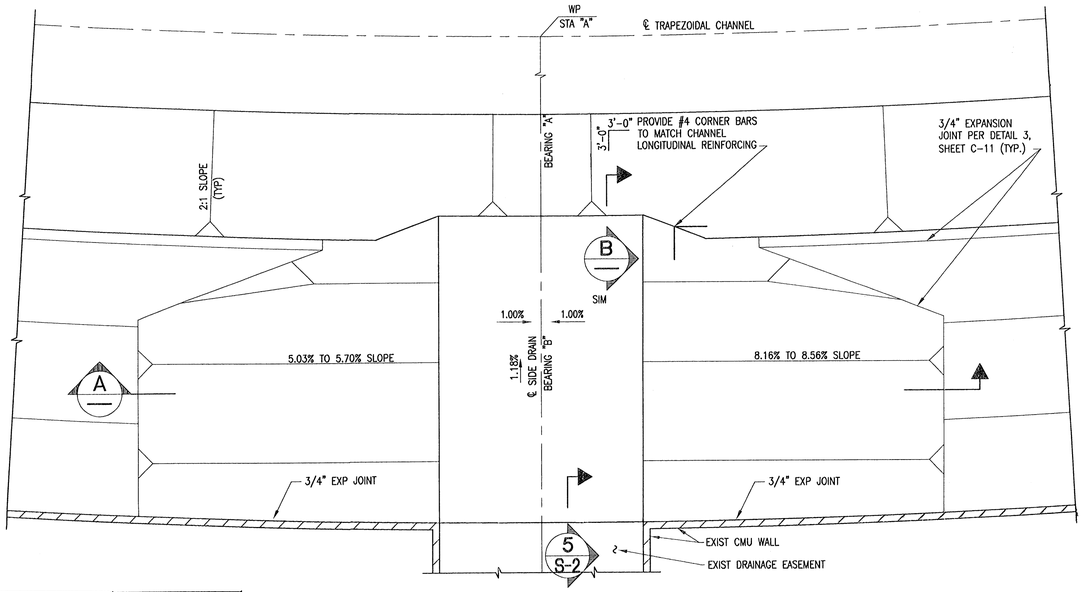
PLAN - TYPE 2 SIDE DRAIN

NOT TO SCALE

2

NOTE:
SEE CIVIL DRAWINGS FOR ELEVATIONS AND INFORMATION NOT SHOWN

	STA "A"	BEARING "A"	BEARING "B"
SIDE DRAIN 1	120+84.85	N 71°07'11" E (R)	N 71°50'27" E
SIDE DRAIN 2	127+33.01	N 63°30'25" E (R)	N 63°33'08" E



PLAN - TYPE 1 SIDE DRAIN

NOT TO SCALE

1

REV. NO.	DATE	DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

SLOAN CHANNEL

CHANNEL STRUCTURES DETAILS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER STATE OF NEVADA
RIMAH NAZZAL
Exp. 12/31/2005
CIVIL / STRUCTURAL
No. 12977
9/6/04

PROJECT No: 500.857 DRAWN BY: RB/NO/AL
DESIGNED BY: RIN CHECKED BY: RIN
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE	
HORIZ:	NONE
VERT:	NONE
FIELD BOOK	

L-1759

DRAWING NO.

S-7

SHT. 30 OF 30

November 20, 2006

Mr. Kevin Eubanks, P.E., CFM
Clark County Regional Flood Control District
600 South Grand Central Parkway, Ste 300
Las Vegas, Nevada 89155

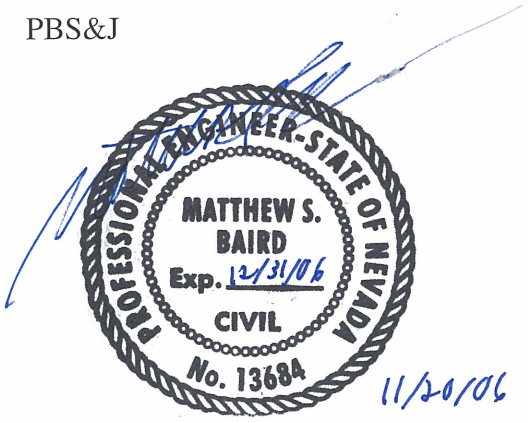
RE: SLOAN CHANNEL LETTER OF MAP REVISION

Dear Mr. Eubanks,

At your request, PBS&J has prepared a revised hydraulic model for the Sloan Channel improvements. The HEC-RAS model was extended upstream of the Charleston Boulevard bridge by appending the Sloan Channel CLOMR model with HEC-2 cross-sections taken from the Range Wash FIS.

Sincerely,

PBS&J



Matthew S. Baird, P.E., CFM
Lic. 13684, Nevada

Model Methodology

Hydraulic modeling of the Sloan Channel was performed using the U.S. Army Corps of Engineers' River Analysis System (HEC-RAS), version 3.1.3. The hydraulic modeling conforms to local standards that are specified in the CCRFCD Hydrologic Criteria and Drainage Design Manual.

Datum Conversion

The hydraulic model prepared for the Range Wash Flood Insurance Study (FIS) was prepared using HEC-2 and used elevations based on National Geodetic Vertical Datum of 1929 (NGVD 29). The Sloan Channel improvement plans and the HEC-RAS model submitted in the CLOMR used elevations based on North American Vertical Datum of 1988 (NAVD 88). The HEC-2 cross-section data extracted from the Range Wash FIS was converted to NAVD 88 by adding 2.46 feet. The datum conversion is based on a comparison of published NAVD 88 and NGVD 29 elevations for Clark County Benchmark 6C02 33SWW6. Please refer to this Appendix for the detailed datum conversion process.

Model Description

The hydraulic model prepared for the Sloan Channel CLOMR was revised per the condition in the CLOMR approval letter dated June 16, 2005 under Case No. 05-09-0577R. The condition stated that the LOMR submittal must include a revised hydraulic model that extended the analysis upstream through the bridge at Charleston Boulevard until a hydraulic tie-in was achieved. The CLOMR HEC-RAS model terminated at Station 118+89, approximately 100-feet downstream of Charleston Boulevard. Please refer to the HEC-RAS Cross-Section Map included in this Appendix.

The HEC-RAS model prepared for the Sloan Channel CLOMR was extended upstream by adding a portion of the HEC-2 sections from the Range Wash FIS. The Range Wash FIS was the technical basis of FEMA Case No. 98-09-1054P and constitutes the effective data for this area. The model was extended approximately 510-feet upstream of the Charleston Bridge to FIS station 101+49 (plan station 112+09). As previously discussed, the HEC-2 sections were converted to elevations based on NAVD 88. The bridge at Charleston Boulevard was modeled as a special bridge in the FIS HEC-2 model. It should be noted that some, but not all, of the HEC-2 bridge cross-section data can be inputted directly into HEC-RAS, such as pier and ineffective flow data. Differences in WSEL's can be expected due to the known computational differences between HEC-2 and HEC-RAS. The HEC-2 special bridge routines use a trapezoidal approximation for low flow calculations (Yarnell equation and class B flow check with the momentum equation). The HEC-RAS program uses the actual bridge opening geometry for all flow methodologies. Also, the HEC-2 program uses a single pier (of equivalent width to the sum total width of all piers) placed in the middle of the trapezoid. In the HEC-RAS software, all of the piers are defined separately, and the hydraulic computations are performed by evaluating the water surface and impact on each pier individually.

The model was prepared with two flow profiles to simulate the design flow of 2,870 cfs and the FIS flow of 3,300 cfs through the Charleston Bridge. The slope-area method was used as the upstream boundary condition (0.42%) at FIS station 101+49 (plan station 112+09). Please refer to the Tables below that compare the WSEL's between the FIS and the model prepared for this LOMR. Table 1 is a comparison between the FIS HEC-2 model run with 3,300 cfs and the current HEC-RAS LOMR model run with 2,870 cfs. Table 2 is a comparison between the FIS HEC-2 model run with 3,300 cfs and the current HEC-RAS LOMR model run with 3,300 cfs.

Table 1
FIS HEC-2 3,300 cfs/LOMR HEC-RAS 2,870 cfs

FIS Station	Plan Station	HEC-2 CWSEL (FIS)	Datum Adjusted HEC-2 CWSEL	HEC-RAS CWSEL	Difference in WSEL
101+49	112+09	1725.58	1728.04	1727.63	-0.41*
104+23	114+87	1724.22	1726.68	1726.35	-0.33
105+74	116+40	1723.59	1726.05	1727.45	1.40
106+23	116+90	1722.95	1725.41	1727.59	2.18
106+24	116+91	1725.00	1727.46	1727.60	0.14
107+24	117+91	1722.63	1725.09	1725.15	0.06
107+25	117+92	1720.95	1723.41	1723.17	-0.24

*WSEL within 0.5 feet at terminus of model

Table 2
FIS HEC-2 3,300 cfs/LOMR HEC-RAS 3,300 cfs

FIS Station	Plan Station	HEC-2 CWSEL (FIS)	Datum Adjusted HEC-2 CWSEL	HEC-RAS CWSEL	Difference in WSEL
101+49	112+09	1725.58	1728.04	1727.91	-0.13*
104+23	114+87	1724.22	1726.68	1726.65	-0.03
105+74	116+40	1723.59	1726.05	1727.92	1.87
106+23	116+90	1722.95	1725.41	1728.08	2.67
106+24	116+91	1725.00	1727.46	1728.08	0.62
107+24	117+91	1722.63	1725.09	1725.49	0.40
107+25	117+92	1720.95	1723.41	1723.46	0.05

*WSEL within 0.5 feet at terminus of model

Results

The results show that both models (FIS flow & design flow) tie-in to the effective WSEL to within 0.5'. A digital copy of the HEC-RAS model has been provided on a data CD located in this Appendix.

Datum Conversion

Datum Conversion

Clark County Benchmark 6C02 33SWW6
Benchmark used for vertical control for the Sloan Channel Improvements

NAVD88 = 1744.954 feet
NGVD29 = 1742.497 feet

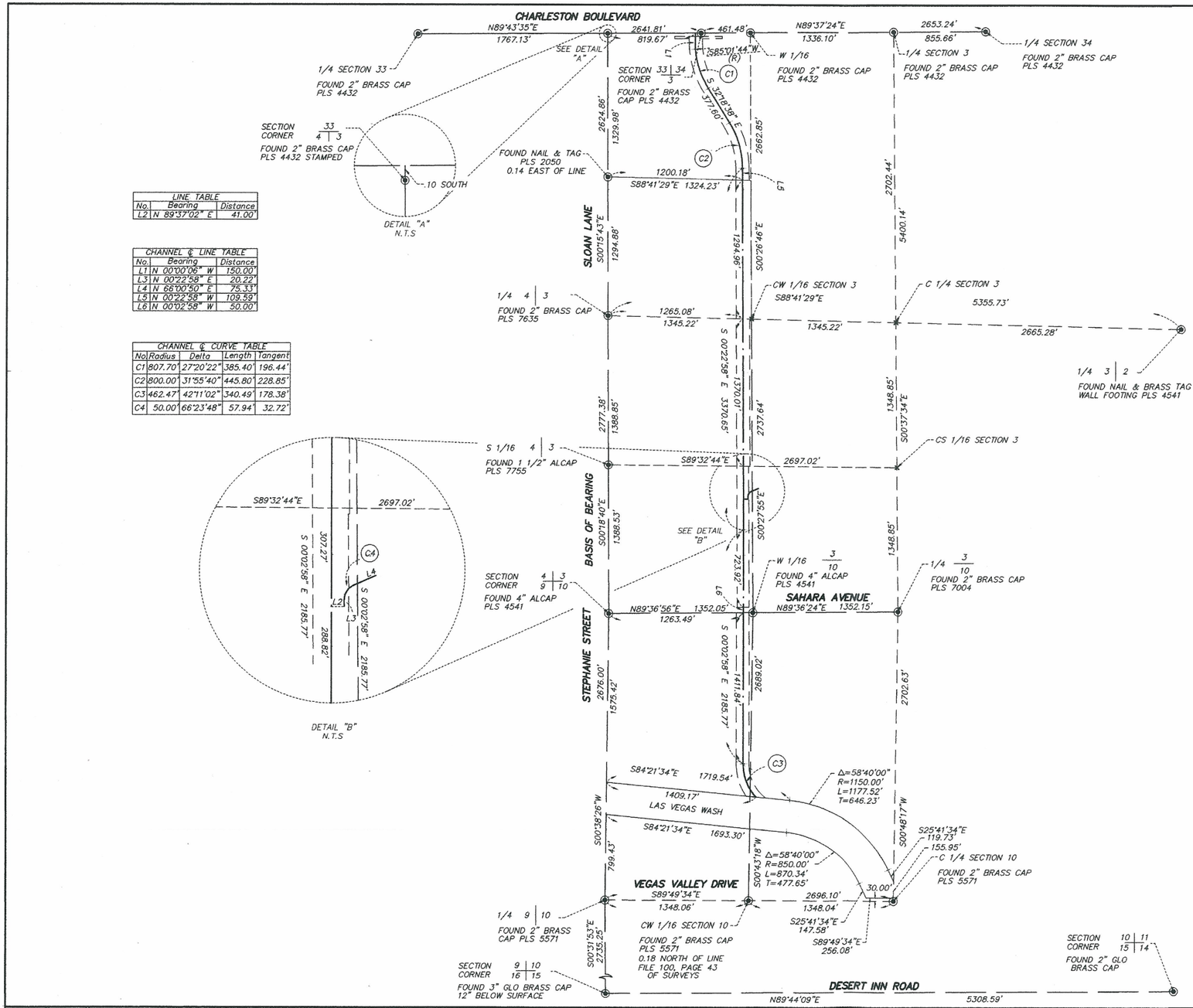
NGVD29 to NAVD88 conversion = add 2.46 feet

NAVD88 elevation listed as 531.863 meters.

Conversion to U.S. Survey Feet = (Meters x 3.2808)

531.863 x 3.2808 = 1744.954

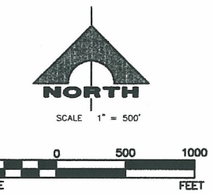
F:\500-857\dwg\improv\sc_g04.dwg 04-05-04 07:00:58 RBlanchard



LINE TABLE		
No.	Bearing	Distance
L2	N 89°57'02" E	41.00'

CHANNEL ℄ LINE TABLE		
No.	Bearing	Distance
L1	N 00°00'06" W	150.00'
L3	N 00°22'58" E	20.22'
L4	N 66°00'50" E	75.33'
L5	N 00°22'58" W	109.59'
L6	N 00°02'58" W	50.00'

CHANNEL ℄ CURVE TABLE				
No.	Radius	Delta	Length	Tangent
C1	807.70'	27°20'22"	385.40'	196.44'
C2	800.00'	31°55'40"	445.80'	228.85'
C3	462.47'	42°11'02"	340.49'	178.38'
C4	50.00'	66°23'48"	57.94'	32.72'



BASIS OF BEARINGS

SOUTH 00°18'40" EAST, BEING THE WEST LINE OF THE SOUTHWEST QUARTER (SW 1/4) OF SECTION 3, TOWNSHIP 21 SOUTH, RANGE 62 EAST, M.D.M., CLARK COUNTY, NEVADA. AS SHOWN BY FILE 36, PAGE 6 OF SURVEYS IN THE CLARK COUNTY RECORDER'S OFFICE CLARK COUNTY, NEVADA.

BENCHMARK

CLARK COUNTY BM - 6C02 33SWW6

RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, IN THE NORTHEAST CORNER OF NELLIS BLVD. AND BELPORT DR. NEAR THE PC OF NELLIS BLVD.

ELEVATION: 531.863 METERS (NAVD 88)
1744.954 FEET (NAVD 88)

LEGEND

- ◉ FOUND MONUMENTATION AS SHOWN AND DESCRIBED
- × CALCULATED POINT
- —— —— SECTION LINE
- — — — QUARTER LINE
- — — — — 1/16 LINE

REFERENCES

FILE 36, PAGE 6 OF SURVEYS
FILE 122, PAGE 76 OF SURVEYS

REV. NO.	DATE	DESCRIPTION	APPROVED

SLOAN CHANNEL
HORIZONTAL CONTROL PLAN

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

DANNY E. HILL EXP.6/30/05 LICENSED LAND SURVEYOR NO. 9389 STATE OF NEVADA
5 APRIL 2004

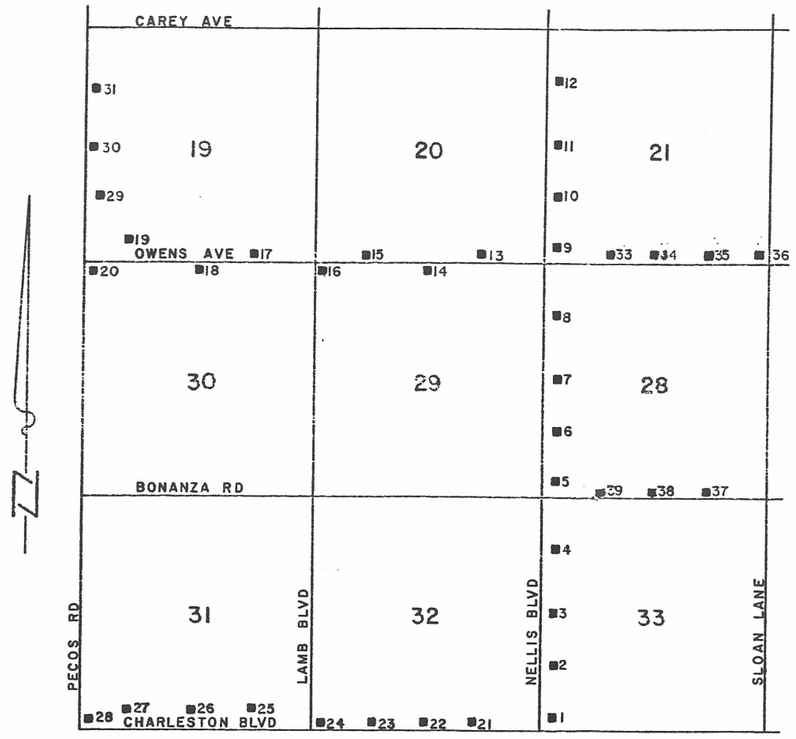
PROJECT No: 500.857 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY

G.C. WALLACE, INC.
Engineers/Planners/Surveyors
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89146
TELEPHONE: (702) 804-2000 • FAX: (702) 804-2299

SCALE
HORIZ: 1" = 500'
VERT: NONE
FIELD BOOK

L-1759
DRAWING NO.
G-4
SHT. 4 OF 30

TOWNSHIP 20 SOUTH, RANGE 62 EAST
SOUTHWEST QUARTER



Nº	STATION	ELEVATION	DESCRIPTION
1	6C02 33SWS	1739.619	Set drive rivet in a 2"X2" Aluminum plate, in drilled hole, with epoxy glue in top of curb, Northeast corner of Nellis Blvd. & Charleston Blvd. near the PC of Nellis Bl.
2	6C02 33SWW6	1742.497	Set drive rivet in a 2"X2" Aluminum plate, in drilled hole, with epoxy glue in top of curb, Northeast corner of Nellis Blvd. & Belport Drive.
3	6C02 33W4	1748.529	Found 2" dome head brass cap reference monument in TC, Northeast corner of Nellis Blvd. & Stewart Ave. near the PC of Nellis Blvd.
4	6C02 33NWW6	1752.893	Set drive rivet in a 2"X2" Aluminum plate, in drilled hole, with epoxy glue in top of curb, Northeast corner of Nellis Blvd. & Cedar Ave. near the PC of Nellis Blvd.
5	6C02 28SWS	1759.623	Found 2" dome head brass cap reference monument in TC, Northeast corner of Nellis Blvd. & Bonanza Road, near the PC of Nellis Blvd.
6	6C02 28SWW6	1761.465	Found 2" dome head brass cap reference monument in TC, Northeast corner of Nellis Blvd. & Harris Ave. near the PC of Nellis Blvd.
7	6C02 28W4	1765.754	Set drive rivet in a 2"X2" Aluminum plate, in drilled hole, with epoxy glue in top of curb, Northeast corner of Nellis Blvd. & Washington Ave. near the PC of Nellis Bl.
8	6C02 28NWW6	1770.508	Set drive rivet in a 2"X2" Aluminum plate, in drilled hole, with epoxy glue in top of curb, Northeast corner of Nellis Blvd. & Monroe Ave. near the PC of Nellis Bl.
9	6C02 21SWS	1775.857	Found 2" dome head brass cap reference monument in TC, Northeast corner of Nellis Blvd. & Owens Ave. near the PC of Nellis Blvd.
10	6C02 21SWW6	1781.158	Set drive rivet in a 2"X2" Aluminum plate, in drilled hole, with epoxy glue in top of curb, Northeast corner of Nellis Blvd. & Kell Lane, near the PC of Nellis Bl.
11	6C02 21W4	1786.151	Found 2" dome head brass cap reference monument in TC, Northeast corner of Nellis Blvd. & Lake Mead Blvd. near the PC of Nellis Blvd.
12	6C02 21NWW6	1791.669	Found 2" dome head brass cap reference monument in TC, Northeast corner of Nellis Blvd. & Judson Ave. near the PC of Nellis Blvd.

CLARK COUNTY VERTICAL CONTROL

CLARK COUNTY, NEVADA

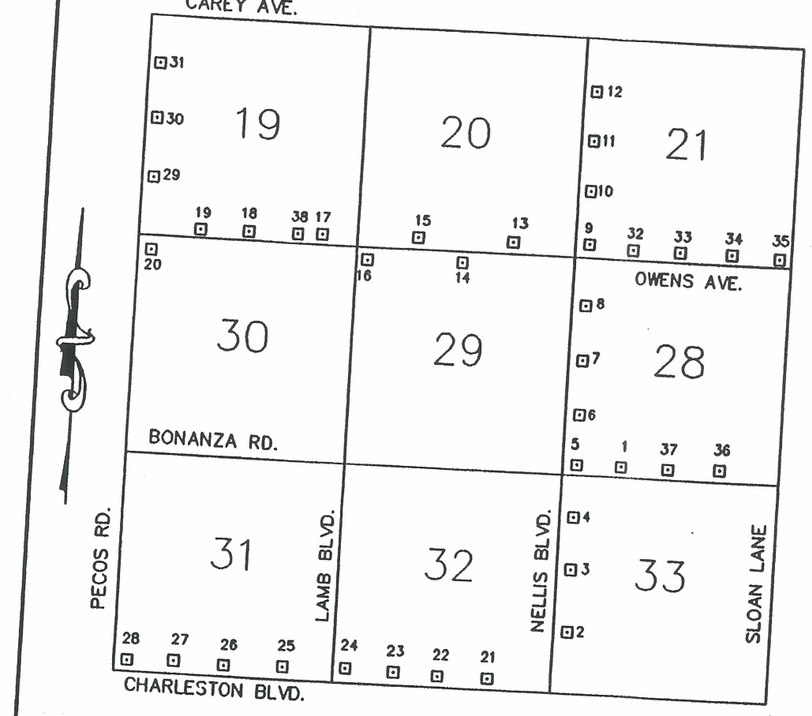
LOCAL DATUM

REVISION DATE 1987

NATIONAL GEODETIC VERTICAL DATUM OF 1929

DRAWING Nº 20-62-SW A

TOWNSHIP 20 SOUTH, RANGE 62 EAST
SOUTHWEST QUARTER



NORTH AMERICAN VERTICAL DATUM OF 1988

ALL ELEVATIONS IN METERS

No.	STATION	ELEVATION (METERS)	DESCRIPTION
1	7C02 28SSW6	535.491	2" BRASS CAP REFERENCE MONUMENT IN TOP OF CURB, IN THE NORTHEAST CORNER OF BONANZA RD. AND BETTY LN. NEAR THE PC OF BONANZA RD.
2	6C02 33SWW6	531.863	RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, IN THE NORTHEAST CORNER OF NELLIS BLVD. AND BELPORT DR.
3	6C02 33W4	533.689	2" BRASS CAP REFERENCE MONUMENT IN TOP OF CURB, IN THE NORTHEAST CORNER OF NELLIS BLVD. AND STEWART AVE. NEAR THE PC OF NELLIS BLVD.
4	6C02 33NWW6	535.023	RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, IN THE NORTHEAST CORNER OF NELLIS BLVD. AND CEDAR AVE. NEAR THE PC OF NELLIS BLVD.
5	6C02 28SWS	537.077	2" BRASS CAP REFERENCE MONUMENT IN TOP OF CURB, IN THE NORTHEAST CORNER OF NELLIS BLVD. AND BONANZA ROAD, NEAR THE PC OF NELLIS BLVD.
6	6C02 28SWW6	537.638	2" BRASS CAP REFERENCE MONUMENT IN TOP OF CURB, IN THE NORTHEAST CORNER OF NELLIS BLVD. AND HARRIS AVE. NEAR THE PC OF NELLIS BLVD.
7	6C02 28W4	538.945	RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, IN THE NORTHEAST CORNER OF NELLIS BLVD. AND WASHINGTON AVE. NEAR THE PC OF NELLIS BLVD.
8	6C02 28NWW6	540.398	RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, IN THE NORTHEAST CORNER OF NELLIS BLVD. AND MONROE AVE. NEAR THE PC OF NELLIS BLVD.
9	6C02 21SWS	542.032	BRASS CAP REFERENCE MONUMENT IN TOP OF CURB, IN THE NORTHEAST CORNER OF NELLIS BLVD. AND OWENS AVE. NEAR THE PC OF NELLIS BLVD.
10	6C02 21SWW6	543.647	RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, IN THE NORTHEAST CORNER OF NELLIS BLVD. AND KELL LANE, NEAR THE PC OF NELLIS BLVD.
11	6C02 21W4	545.167	BRASS CAP REFERENCE MONUMENT IN TOP OF CURB, IN THE NORTHEAST CORNER OF NELLIS BLVD. AND LAKE MEAD BLVD. NEAR THE PC OF NELLIS BLVD.

CLARK COUNTY VERTICAL CONTROL

CLARK COUNTY SURVEYOR'S OFFICE
6655 W. SAHARA AVE.–BLDG B–ROOM 102
LAS VEGAS, NEVADA 89102
(702) 455–7726

CONVERSION FACTOR

METERS x $\left(\frac{3937}{1200}\right)$ = U.S. SURVEY FEET

REVISION DATE 1992

20–62
SW A

Cross-Section Map

HEC-RAS Model
Sloanr.prj

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp 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: sloanr
Project File : sloanr.prj
Run Date and Time: 11/19/2006 1:39:31 PM

Project in English units

Project Description:

FLOODPLAIN DETERMINATION
FILES: BASE2.DWG, BASE2.DAT

STARTING WSE = NORMAL DEPTH
SUBCRITICAL RUN

****

PLAN DATA

Plan Title: Plan 03
Plan File : l:\PROJECTS\511606-CLOMR's\Sloan Channel\LOMR for CCRFCD\HEC-RAS\sloanr.p03

Geometry Title: sloanr
Geometry File : l:\PROJECTS\511606-CLOMR's\Sloan Channel\LOMR for CCRFCD\HEC-RAS\sloanr.g02

Flow Title : sloanr
Flow File : l:\PROJECTS\511606-CLOMR's\Sloan Channel\LOMR for CCRFCD\HEC-RAS\sloanr.f02

Plan Summary Information:
Number of: Cross Sections = 69 Multiple Openings = 0
Culverts = 0 Inline Structures = 0
Bridges = 2 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: Mixed Flow

****

FLOW DATA

Flow Title: sloanr
Flow File : l:\PROJECTS\511606-CLOMR's\Sloan Channel\LOMR for CCRFCD\HEC-RAS\sloanr.f02

Flow Data (cfs)

River	Reach	RS	Post-Project	PF 2
Range Wash	Sloan Channel	225	2870	3300
Range Wash	Sloan Channel	220	2870	3300
Range Wash	Sloan Channel	210	2870	3300
Range Wash	Sloan Channel	100	3891	3300
Range Wash	Sloan Channel	40	3990	3300

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Range Wash	Sloan Channel	Post-Project	Normal S = 0.0042	Known WS = 1693.4

Changes in WS and EG

River	Reach	RS	Profile	Type	Value
Range Wash	Sloan Channel	10	Post-Project	Known WS	1693

****

GEOMETRY DATA

Geometry Title: sloanr
Geometry File : l:\PROJECTS\511606-CLOMR's\Sloan Channel\LOMR for CCRFCD\HEC-RAS\sloanr.g02

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 225

INPUT
Description: plan station 112+09 (FIS station 101+49)
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1730.46	10	1724.46	40	1724.16	70	1724.46	80	1730.86

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	80	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 80 274 274 274 .1 .3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1730.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.76	Wt. n-Val.		0.015	
W.S. Elev (ft)	1727.63	Reach Len. (ft)	274.00	274.00	274.00
Crit W.S. (ft)	1728.30	Flow Area (sq ft)		215.29	
E.G. Slope (ft/ft)	*0.004207	Area (sq ft)		215.29	
Q Total (cfs)	2870.00	Flow (cfs)		2870.00	
Top Width (ft)	70.23	Top Width (ft)		70.23	
Vel Total (ft/s)	13.33	Avg. Vel. (ft/s)		13.33	
Max Chl Dpth (ft)	3.47	Hydr. Depth (ft)		3.07	
Conv. Total (cfs)	44248.5	Conv. (cfs)		44248.5	
Length Wtd. (ft)	274.00	Wetted Per. (ft)		72.04	
Min Ch El (ft)	1724.16	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)		10.46	
Frctn Loss (ft)		Cum Volume (acre-ft)		44.17	
C & E Loss (ft)		Cum SA (acres)		12.80	

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	1730.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.05	Wt. n-Val.		0.015	
W.S. Elev (ft)	1727.91	Reach Len. (ft)	274.00	274.00	274.00
Crit W.S. (ft)	1728.68	Flow Area (sq ft)		235.50	
E.G. Slope (ft/ft)	*0.004207	Area (sq ft)		235.50	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	71.15	Top Width (ft)		71.15	
Vel Total (ft/s)	14.01	Avg. Vel. (ft/s)		14.01	
Max Chl Dpth (ft)	3.75	Hydr. Depth (ft)		3.31	
Conv. Total (cfs)	50875.8	Conv. (cfs)		50875.8	
Length Wtd. (ft)	274.00	Wetted Per. (ft)		73.12	
Min Ch El (ft)	1724.16	Shear (lb/sq ft)		0.85	
Alpha	1.00	Stream Power (lb/ft s)		11.85	
Frctn Loss (ft)		Cum Volume (acre-ft)		42.91	
C & E Loss (ft)		Cum SA (acres)		12.79	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 220

INPUT
Description: plan station 114+87 u/s of Charleston Bridge (FIS 104+23)
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1731.34	10	1723.19	40	1722.89	70	1723.19	80	1730.59

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	80	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
0 80 151 151 151 .1 .3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1729.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.86	Wt. n-Val.		0.015	
W.S. Elev (ft)	1726.35	Reach Len. (ft)	151.00	151.00	151.00
Crit W.S. (ft)	1727.06	Flow Area (sq ft)		211.55	
E.G. Slope (ft/ft)	*0.004319	Area (sq ft)		211.55	
Q Total (cfs)	2870.00	Flow (cfs)		2870.00	
Top Width (ft)	68.15	Top Width (ft)		68.15	
Vel Total (ft/s)	13.57	Avg. Vel. (ft/s)		13.57	
Max Chl Dpth (ft)	3.46	Hydr. Depth (ft)		3.10	
Conv. Total (cfs)	43671.3	Conv. (cfs)		43671.3	
Length Wtd. (ft)	151.00	Wetted Per. (ft)		70.32	
Min Ch El (ft)	1722.89	Shear (lb/sq ft)		0.81	
Alpha	1.00	Stream Power (lb/ft s)		11.00	
Frctn Loss (ft)	1.17	Cum Volume (acre-ft)		42.82	
C & E Loss (ft)	0.01	Cum SA (acres)		12.37	

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 OUTPUT Profile #PF 2

E.G. Elev (ft)	1729.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.15	Wt. n-Val.		0.015	
W.S. Elev (ft)	1726.65	Reach Len. (ft)	151.00	151.00	151.00
Crit W.S. (ft)	1727.44	Flow Area (sq ft)		231.88	

* E.G. Slope (ft/ft)	*0.004283	* Area (sq ft)	*	* 231.88	*	*
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	*	*
* Top Width (ft)	* 68.92	* Top Width (ft)	*	* 68.92	*	*
* Vel Total (ft/s)	* 14.23	* Avg. Vel. (ft/s)	*	* 14.23	*	*
* Max Chl Dpth (ft)	* 3.76	* Hydr. Depth (ft)	*	* 3.36	*	*
* Conv. Total (cfs)	* 50425.7	* Conv. (cfs)	*	* 50425.7	*	*
* Length Wtd. (ft)	* 151.00	* Wetted Per. (ft)	*	* 71.29	*	*
* Min Ch El (ft)	* 1722.89	* Shear (lb/sq ft)	*	* 0.87	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 12.38	*	*
* Frctn Loss (ft)	* 1.16	* Cum Volume (acre-ft)	*	* 41.44	*	*
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	* 12.35	*	*

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: Range Wash
REACH: Sloan Channel RS: 215

INPUT
Description: Plan Station 116+40 u/s of Charleston Bridge (FIS 105+74)
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1731	10	1722.56	40	1722.26	70	1722.56	80	1730.3

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	80	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	80	50	50	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1728.61	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 1.16	* Wt. n-Val.	*	* 0.015	*	*
* W.S. Elev (ft)	* 1727.45	* Reach Len. (ft)	* 50.00	* 50.00	* 50.00	*
* Crit W.S. (ft)	* 1726.44	* Flow Area (sq ft)	*	* 331.87	*	*
* E.G. Slope (ft/ft)	*0.001060	* Area (sq ft)	*	* 331.87	*	*
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00	*	*
* Top Width (ft)	* 72.11	* Top Width (ft)	*	* 72.11	*	*
* Vel Total (ft/s)	* 8.65	* Avg. Vel. (ft/s)	*	* 8.65	*	*
* Max Chl Dpth (ft)	* 5.19	* Hydr. Depth (ft)	*	* 4.60	*	*
* Conv. Total (cfs)	* 88166.5	* Conv. (cfs)	*	* 88166.5	*	*
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)	*	* 75.57	*	*
* Min Ch El (ft)	* 1722.26	* Shear (lb/sq ft)	*	* 0.29	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 2.51	*	*
* Frctn Loss (ft)	* 0.04	* Cum Volume (acre-ft)	*	* 41.88	*	*
* C & E Loss (ft)	* 0.08	* Cum SA (acres)	*	* 12.12	*	*

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1729.18	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 1.26	* Wt. n-Val.	*	* 0.015	*	*
* W.S. Elev (ft)	* 1727.92	* Reach Len. (ft)	* 50.00	* 50.00	* 50.00	*
* Crit W.S. (ft)	* 1726.82	* Flow Area (sq ft)	*	* 366.08	*	*
* E.G. Slope (ft/ft)	*0.001037	* Area (sq ft)	*	* 366.08	*	*
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	*	*
* Top Width (ft)	* 73.27	* Top Width (ft)	*	* 73.27	*	*
* Vel Total (ft/s)	* 9.01	* Avg. Vel. (ft/s)	*	* 9.01	*	*
* Max Chl Dpth (ft)	* 5.66	* Hydr. Depth (ft)	*	* 5.00	*	*
* Conv. Total (cfs)	*102476.5	* Conv. (cfs)	*	*102476.5	*	*
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)	*	* 77.07	*	*
* Min Ch El (ft)	* 1722.26	* Shear (lb/sq ft)	*	* 0.31	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 2.77	*	*
* Frctn Loss (ft)	* 0.04	* Cum Volume (acre-ft)	*	* 40.40	*	*
* C & E Loss (ft)	* 0.09	* Cum SA (acres)	*	* 12.10	*	*

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 213

INPUT
Description: plan station 116+90 u/s of Charleston Bridge (FIS 106+23)
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1730.16	13	1722.26	45	1722.01	75	1722.26	85	1730.16

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	85	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	85	1	1	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1728.48	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.89	* Wt. n-Val.	*	* 0.015	*	*
* W.S. Elev (ft)	* 1727.59	* Reach Len. (ft)	* 1.00	* 1.00	* 1.00	*
* Crit W.S. (ft)	*	* Flow Area (sq ft)	*	* 379.91	*	*

* E.G. Slope (ft/ft)	*0.000739	* Area (sq ft)	*	* 379.91	*
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00	*
* Top Width (ft)	* 77.53	* Top Width (ft)	*	* 77.53	*
* Vel Total (ft/s)	* 7.55	* Avg. Vel. (ft/s)	*	* 7.55	*
* Max Chl Dpth (ft)	* 5.58	* Hydr. Depth (ft)	*	* 4.90	*
* Conv. Total (cfs)	*105555.9	* Conv. (cfs)	*	*105555.9	*
* Length Wtd. (ft)	* 1.00	* Wetted Per. (ft)	*	* 80.88	*
* Min Ch El (ft)	* 1722.01	* Shear (lb/sq ft)	*	* 0.22	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 1.64	*
* Frctn Loss (ft)	* 0.00	* Cum Volume (acre-ft)	*	* 41.47	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 12.04	*

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1729.05	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.97	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 1728.08	* Reach Len. (ft)	* 1.00	* 1.00	* 1.00 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	*	* 417.75	*
* E.G. Slope (ft/ft)	*0.000732	* Area (sq ft)	*	* 417.75	*
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	*
* Top Width (ft)	* 78.94	* Top Width (ft)	*	* 78.94	*
* Vel Total (ft/s)	* 7.90	* Avg. Vel. (ft/s)	*	* 7.90	*
* Max Chl Dpth (ft)	* 6.07	* Hydr. Depth (ft)	*	* 5.29	*
* Conv. Total (cfs)	*121938.7	* Conv. (cfs)	*	*121938.7	*
* Length Wtd. (ft)	* 1.00	* Wetted Per. (ft)	*	* 82.59	*
* Min Ch El (ft)	* 1722.01	* Shear (lb/sq ft)	*	* 0.23	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 1.83	*
* Frctn Loss (ft)	* 0.00	* Cum Volume (acre-ft)	*	* 39.95	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 12.01	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 212

INPUT
Description: plan station 116+91 u/s of Charleston Bridge (FIS 106+24)
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1730.15	13	1722.25	45	1722	75	1722.25	85	1730.15

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	85	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	85	100	100	.2	.4

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1728.48	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.88	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 1727.60	* Reach Len. (ft)	* 0.10	* 0.10	* 0.10 *
* Crit W.S. (ft)	* 1726.05	* Flow Area (sq ft)	*	* 380.85	*
* E.G. Slope (ft/ft)	*0.000734	* Area (sq ft)	*	* 380.85	*
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00	*
* Top Width (ft)	* 77.57	* Top Width (ft)	*	* 77.57	*
* Vel Total (ft/s)	* 7.54	* Avg. Vel. (ft/s)	*	* 7.54	*
* Max Chl Dpth (ft)	* 5.60	* Hydr. Depth (ft)	*	* 4.91	*
* Conv. Total (cfs)	*105952.9	* Conv. (cfs)	*	*105952.9	*
* Length Wtd. (ft)	* 0.10	* Wetted Per. (ft)	*	* 80.92	*
* Min Ch El (ft)	* 1722.00	* Shear (lb/sq ft)	*	* 0.22	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 1.62	*
* Frctn Loss (ft)	*	* Cum Volume (acre-ft)	*	* 41.46	*
* C & E Loss (ft)	*	* Cum SA (acres)	*	* 12.04	*

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 OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1729.05	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.96	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 1728.08	* Reach Len. (ft)	* 0.10	* 0.10	* 0.10 *
* Crit W.S. (ft)	* 1726.42	* Flow Area (sq ft)	*	* 418.70	*
* E.G. Slope (ft/ft)	*0.000727	* Area (sq ft)	*	* 418.70	*
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	*
* Top Width (ft)	* 78.97	* Top Width (ft)	*	* 78.97	*
* Vel Total (ft/s)	* 7.88	* Avg. Vel. (ft/s)	*	* 7.88	*
* Max Chl Dpth (ft)	* 6.08	* Hydr. Depth (ft)	*	* 5.30	*
* Conv. Total (cfs)	*122361.0	* Conv. (cfs)	*	*122361.0	*
* Length Wtd. (ft)	* 0.10	* Wetted Per. (ft)	*	* 82.63	*
* Min Ch El (ft)	* 1722.00	* Shear (lb/sq ft)	*	* 0.23	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 1.81	*
* Frctn Loss (ft)	*	* Cum Volume (acre-ft)	*	* 39.94	*
* C & E Loss (ft)	*	* Cum SA (acres)	*	* 12.01	*

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.

BRIDGE

RIVER: Range Wash
REACH: Sloan Channel RS: 211.5

```
INPUT
Description: Charleston Bridge
Distance from Upstream XS =       .1
Deck/Roadway Width        =    99.8
Weir Coefficient          =       3
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
**********************************************
       0 1729.77 1728.52      85 1729.52 1728.52

Upstream Bridge Cross Section Data
Station Elevation Data    num=       5
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*********************************************************************************
       0 1730.15      13 1722.25      45    1722      75 1722.25      85 1730.15

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .015       0    .015      85    .015

Bank Sta: Left   Right    Coeff Contr.   Expan.
             0      85             .2       .4

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
**********************************************
       0 1729.77 1728.52      80 1729.77 1728.52

Downstream Bridge Cross Section Data
Station Elevation Data    num=       5
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*********************************************************************************
       0 1730.16      10 1721.76      40  1721.5      70 1721.76      80 1730.16

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0    .015       0    .015      80    .015

Bank Sta: Left   Right    Coeff Contr.   Expan.
             0      80             .2       .4

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         = 1729.52
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  2

Pier Data
Pier Station     Upstream=      30    Downstream=      25
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2    1722       2 1728.52
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2    1722       2 1729.77

Pier Data
Pier Station     Upstream=      60    Downstream=      55
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2    1722       2 1728.52
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2    1722       2 1729.77

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Yarnell                KVal =      .9
Selected Low Flow Methods = Yarnell

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT  Profile #Post-Project
*************************************************************************************************
* E.G. US. (ft)          *    1728.48  * Element               *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *    1727.60  * E.G. Elev (ft)        *    1728.38  *    1727.80  *
* Q Total (cfs)          *    2870.00  * W.S. Elev (ft)        *    1727.21  *    1725.86  *
* Q Bridge (cfs)         *    2870.00  * Crit W.S. (ft)        *    1726.24  *    1725.86  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)     *       5.21  *       4.36  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)      *       8.67  *      11.17  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)     *     331.05  *     257.03  *
* Weir Submerg           *             * Froude # Chl          *       0.71  *       1.00  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)  *    1583.34  *    1524.29  *
* Min El Weir Flow (ft)  *    1729.78  * Hydr Depth (ft)       *       4.57  *       3.91  *
```

* Min El Prs (ft)	* 1728.52	* W.P. Total (ft)	* 95.94	* 85.69 *
* Delta EG (ft)	* 0.64	* Conv. Total (cfs)	* 74884.1	* 52957.8 *
* Delta WS (ft)	* 2.44	* Top Width (ft)	* 72.45	* 65.77 *
* BR Open Area (sq ft)	* 428.13	* Frctn Loss (ft)	*	* *
* BR Open Vel (ft/s)	* 11.17	* C & E Loss (ft)	*	* *
* Coef of Q	*	* Shear Total (lb/sq ft)	* 0.32	* 0.55 *
* Br Sel Method	* Momentum	* Power Total (lb/ft s)	* 2.74	* 6.14 *

Warning: Pier drag coefficient of 2.0 assumed for Class B flow.
Warning: The momentum, Class B, supercritical, water surface downstream of the bridge had a higher energy than the upstream cross section. This is not physically possible. The downstream water surface has been computed by taking the momentum result inside of the bridge and performing an energy balance.
Note: The momentum method has computed a class B profile.
Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
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.

BRIDGE OUTPUT Profile #PF 2

* E.G. US. (ft)	* 1729.05	* Element	*Inside BR US	*Inside BR DS *
* W.S. US. (ft)	* 1728.08	* E.G. Elev (ft)	* 1728.94	* 1728.37 *
* Q Total (cfs)	* 3300.00	* W.S. Elev (ft)	* 1727.66	* 1726.25 *
* Q Bridge (cfs)	* 3300.00	* Crit W.S. (ft)	* 1726.60	* 1726.25 *
* Q Weir (cfs)	*	* Max Chl Dpth (ft)	* 5.66	* 4.74 *
* Weir Sta Lft (ft)	*	* Vel Total (ft/s)	* 9.07	* 11.69 *
* Weir Sta Rgt (ft)	*	* Flow Area (sq ft)	* 363.80	* 282.36 *
* Weir Submerg	*	* Froude # Chl	* 0.72	* 1.00 *
* Weir Max Depth (ft)	*	* Specif Force (cu ft)	* 1895.87	* 1829.97 *
* Min El Weir Flow (ft)	* 1729.78	* Hydr Depth (ft)	* 4.93	* 4.23 *
* Min El Prs (ft)	* 1728.52	* W.P. Total (ft)	* 99.32	* 88.41 *
* Delta EG (ft)	* 0.63	* Conv. Total (cfs)	* 85633.1	* 60663.5 *
* Delta WS (ft)	* 2.59	* Top Width (ft)	* 73.76	* 66.68 *
* BR Open Area (sq ft)	* 428.13	* Frctn Loss (ft)	*	* *
* BR Open Vel (ft/s)	* 11.69	* C & E Loss (ft)	*	* *
* Coef of Q	*	* Shear Total (lb/sq ft)	* 0.34	* 0.59 *
* Br Sel Method	* Momentum	* Power Total (lb/ft s)	* 3.08	* 6.90 *

Warning: Pier drag coefficient of 2.0 assumed for Class B flow.
Warning: The momentum, Class B, supercritical, water surface downstream of the bridge had a higher energy than the upstream cross section. This is not physically possible. The downstream water surface has been computed by taking the momentum result inside of the bridge and performing an energy balance.
Note: Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow. The Yarnell answer has been disregarded.
Note: The momentum method has computed a class B profile.
Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
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: Range Wash
REACH: Sloan Channel RS: 211

INPUT
Description: plan station 117+90 d/s of Charleston Bridge (FIS 107+24)
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1730.16	10	1721.76	40	1721.5	70	1721.76	80	1730.16

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	80	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	80	1	1	.2	.4

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1727.68	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 2.52	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1725.15	* Reach Len. (ft)	* 1.00	* 1.00	* 1.00 *
* Crit W.S. (ft)	* 1725.67	* Flow Area (sq ft)	*	* 225.10	* *
* E.G. Slope (ft/ft)	*0.003527	* Area (sq ft)	*	* 225.10	* *
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00	* *
* Top Width (ft)	* 68.08	* Top Width (ft)	*	* 68.08	* *
* Vel Total (ft/s)	* 12.75	* Avg. Vel. (ft/s)	*	* 12.75	* *
* Max Chl Dpth (ft)	* 3.65	* Hydr. Depth (ft)	*	* 3.31	* *
* Conv. Total (cfs)	* 48325.9	* Conv. (cfs)	*	* 48325.9	* *
* Length Wtd. (ft)	* 1.00	* Wetted Per. (ft)	*	* 70.55	* *
* Min Ch El (ft)	* 1721.50	* Shear (lb/sq ft)	*	* 0.70	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 8.96	* *
* Frctn Loss (ft)	*	* Cum Volume (acre-ft)	*	* 40.79	* *
* C & E Loss (ft)	*	* Cum SA (acres)	*	* 11.88	* *

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: The energy method has computed a class B profile.

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1728.24	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 2.75	* Wt. n-Val.	*	* 0.015	* *

* W.S. Elev (ft)	* 1725.49	* Reach Len. (ft)	* 1.00	* 1.00	* 1.00 *
* Crit W.S. (ft)	* 1726.04	* Flow Area (sq ft)	*	* 247.97	* *
* E.G. Slope (ft/ft)	*0.003444	* Area (sq ft)	*	* 247.97	* *
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	* *
* Top Width (ft)	* 68.87	* Top Width (ft)	*	* 68.87	* *
* Vel Total (ft/s)	* 13.31	* Avg. Vel. (ft/s)	*	* 13.31	* *
* Max Chl Dpth (ft)	* 3.99	* Hydr. Depth (ft)	*	* 3.60	* *
* Conv. Total (cfs)	* 56232.7	* Conv. (cfs)	*	* 56232.7	* *
* Length Wtd. (ft)	* 1.00	* Wetted Per. (ft)	*	* 71.59	* *
* Min Ch El (ft)	* 1721.50	* Shear (lb/sq ft)	*	* 0.74	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 9.91	* *
* Frctn Loss (ft)	*	* Cum Volume (acre-ft)	*	* 39.20	* *
* C & E Loss (ft)	*	* Cum SA (acres)	*	* 11.85	* *

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: The energy method has computed a class B profile.

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 210.5

INPUT
Description: plan station 117+92 d/s of Charleston Bridge (FIS 107+25)
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	1729.02	13	1720.62	45	1720.36	75	1720.62	85	1729.02

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.015	0	.015	85	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
0	85	97	97	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1727.34	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 4.17	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1723.17	* Reach Len. (ft)	* 97.00	* 97.00	* 97.00 *
* Crit W.S. (ft)	* 1724.42	* Flow Area (sq ft)	*	* 175.14	* *
* E.G. Slope (ft/ft)	*0.008159	* Area (sq ft)	*	* 175.14	* *
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00	* *
* Top Width (ft)	* 68.99	* Top Width (ft)	*	* 68.99	* *
* Vel Total (ft/s)	* 16.39	* Avg. Vel. (ft/s)	*	* 16.39	* *
* Max Chl Dpth (ft)	* 2.81	* Hydr. Depth (ft)	*	* 2.54	* *
* Conv. Total (cfs)	* 31773.6	* Conv. (cfs)	*	* 31773.6	* *
* Length Wtd. (ft)	* 97.00	* Wetted Per. (ft)	*	* 70.67	* *
* Min Ch El (ft)	* 1720.36	* Shear (lb/sq ft)	*	* 1.26	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 20.69	* *
* Frctn Loss (ft)	* 0.01	* Cum Volume (acre-ft)	*	* 40.79	* *
* C & E Loss (ft)	* 0.33	* Cum SA (acres)	*	* 11.88	* *

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 OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1727.89	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 4.43	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1723.46	* Reach Len. (ft)	* 97.00	* 97.00	* 97.00 *
* Crit W.S. (ft)	* 1724.80	* Flow Area (sq ft)	*	* 195.34	* *
* E.G. Slope (ft/ft)	*0.007637	* Area (sq ft)	*	* 195.34	* *
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	* *
* Top Width (ft)	* 69.78	* Top Width (ft)	*	* 69.78	* *
* Vel Total (ft/s)	* 16.89	* Avg. Vel. (ft/s)	*	* 16.89	* *
* Max Chl Dpth (ft)	* 3.10	* Hydr. Depth (ft)	*	* 2.80	* *
* Conv. Total (cfs)	* 37761.7	* Conv. (cfs)	*	* 37761.7	* *
* Length Wtd. (ft)	* 97.00	* Wetted Per. (ft)	*	* 71.66	* *
* Min Ch El (ft)	* 1720.36	* Shear (lb/sq ft)	*	* 1.30	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 21.96	* *
* Frctn Loss (ft)	* 0.00	* Cum Volume (acre-ft)	*	* 39.19	* *
* C & E Loss (ft)	* 0.34	* Cum SA (acres)	*	* 11.85	* *

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: Range Wash
REACH: Sloan Channel RS: 210

INPUT
Description: PLAN STA 118+89
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1727.2	1011.86	1721.27	1046.86	1720.22	1081.86	1721.27	1093.72	1727.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1093.72	.015

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1000 1093.72             35.96   35.96   35.96          .1       .3

CROSS SECTION OUTPUT  Profile #Post-Project
**********************************************************************************************
* E.G. Elev (ft)        * 1726.29  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)         *    2.50  * Wt. n-Val.           *          *    0.015  *          *
* W.S. Elev (ft)        * 1723.79  * Reach Len. (ft)      *   35.96  *   35.96  *   35.96  *
* Crit W.S. (ft)        * 1724.40  * Flow Area (sq ft)    *          *  226.17  *          *
* E.G. Slope (ft/ft)    *0.004195  * Area (sq ft)         *          *  226.17  *          *
* Q Total (cfs)         * 2870.00  * Flow (cfs)           *          * 2870.00  *          *
* Top Width (ft)        *   80.10  * Top Width (ft)       *          *   80.10  *          *
* Vel Total (ft/s)      *   12.69  * Avg. Vel. (ft/s)     *          *   12.69  *          *
* Max Chl Dpth (ft)     *    3.57  * Hydr. Depth (ft)     *          *    2.82  *          *
* Conv. Total (cfs)     * 44309.0  * Conv. (cfs)          *          * 44309.0  *          *
* Length Wtd. (ft)      *   35.96  * Wetted Per. (ft)     *          *   81.32  *          *
* Min Ch El (ft)        * 1720.22  * Shear (lb/sq ft)     *          *    0.73  *          *
* Alpha                 *    1.00  * Stream Power (lb/ft s) *          *    9.24  *          *
* Frctn Loss (ft)       *    0.55  * Cum Volume (acre-ft)  *          *   40.34  *          *
* C & E Loss (ft)       *    0.50  * Cum SA (acres)        *          *   11.71  *          *
**********************************************************************************************

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.

CROSS SECTION OUTPUT  Profile #PF 2
**********************************************************************************************
* E.G. Elev (ft)        * 1726.87  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)         *    2.87  * Wt. n-Val.           *          *    0.015  *          *
* W.S. Elev (ft)        * 1724.00  * Reach Len. (ft)      *   35.96  *   35.96  *   35.96  *
* Crit W.S. (ft)        * 1724.74  * Flow Area (sq ft)    *          *  242.60  *          *
* E.G. Slope (ft/ft)    *0.004456  * Area (sq ft)         *          *  242.60  *          *
* Q Total (cfs)         * 3300.00  * Flow (cfs)           *          * 3300.00  *          *
* Top Width (ft)        *   80.91  * Top Width (ft)       *          *   80.91  *          *
* Vel Total (ft/s)      *   13.60  * Avg. Vel. (ft/s)     *          *   13.60  *          *
* Max Chl Dpth (ft)     *    3.78  * Hydr. Depth (ft)     *          *    3.00  *          *
* Conv. Total (cfs)     * 49433.7  * Conv. (cfs)          *          * 49433.7  *          *
* Length Wtd. (ft)      *   35.96  * Wetted Per. (ft)     *          *   82.23  *          *
* Min Ch El (ft)        * 1720.22  * Shear (lb/sq ft)     *          *    0.82  *          *
* Alpha                 *    1.00  * Stream Power (lb/ft s) *          *   11.16  *          *
* Frctn Loss (ft)       *    0.56  * Cum Volume (acre-ft)  *          *   38.71  *          *
* C & E Loss (ft)       *    0.47  * Cum SA (acres)        *          *   11.68  *          *
**********************************************************************************************

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.

CROSS SECTION


RIVER: Range Wash
REACH: Sloan Channel      RS: 200

INPUT
Description: PLAN STA 119+25
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
    1000 1726.22 1011.86 1720.29 1046.86 1719.24 1081.86 1720.29 1093.72 1726.22

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
    1000    .015    1000    .015 1093.72    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1000 1093.72             44.45   49.9   53.55          .1       .3

CROSS SECTION OUTPUT  Profile #Post-Project
**********************************************************************************************
* E.G. Elev (ft)        * 1725.98  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)         *    3.66  * Wt. n-Val.           *          *    0.015  *          *
* W.S. Elev (ft)        * 1722.32  * Reach Len. (ft)      *   44.45  *   49.90  *   53.55  *
* Crit W.S. (ft)        * 1723.42  * Flow Area (sq ft)    *          *  186.96  *          *
* E.G. Slope (ft/ft)    *0.007627  * Area (sq ft)         *          *  186.96  *          *
* Q Total (cfs)         * 2870.00  * Flow (cfs)           *          * 2870.00  *          *
* Top Width (ft)        *   78.11  * Top Width (ft)       *          *   78.11  *          *
* Vel Total (ft/s)      *   15.35  * Avg. Vel. (ft/s)     *          *   15.35  *          *
* Max Chl Dpth (ft)     *    3.08  * Hydr. Depth (ft)     *          *    2.39  *          *
* Conv. Total (cfs)     * 32862.5  * Conv. (cfs)          *          * 32862.5  *          *
* Length Wtd. (ft)      *   49.90  * Wetted Per. (ft)     *          *   79.10  *          *
* Min Ch El (ft)        * 1719.24  * Shear (lb/sq ft)     *          *    1.13  *          *
* Alpha                 *    1.00  * Stream Power (lb/ft s) *          *   17.28  *          *
* Frctn Loss (ft)       *    0.20  * Cum Volume (acre-ft)  *          *   40.17  *          *
* C & E Loss (ft)       *    0.12  * Cum SA (acres)        *          *   11.64  *          *
**********************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.

CROSS SECTION OUTPUT  Profile #PF 2
**********************************************************************************************
* E.G. Elev (ft)        * 1726.55  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)         *    4.00  * Wt. n-Val.           *          *    0.015  *          *
* W.S. Elev (ft)        * 1722.56  * Reach Len. (ft)      *   44.45  *   49.90  *   53.55  *
* Crit W.S. (ft)        * 1723.76  * Flow Area (sq ft)    *          *  205.66  *          *
* E.G. Slope (ft/ft)    *0.007471  * Area (sq ft)         *          *  205.66  *          *
* Q Total (cfs)         * 3300.00  * Flow (cfs)           *          * 3300.00  *          *
* Top Width (ft)        *   79.07  * Top Width (ft)       *          *   79.07  *          *
* Vel Total (ft/s)      *   16.05  * Avg. Vel. (ft/s)     *          *   16.05  *          *
* Max Chl Dpth (ft)     *    3.32  * Hydr. Depth (ft)     *          *    2.60  *          *
* Conv. Total (cfs)     * 38179.0  * Conv. (cfs)          *          * 38179.0  *          *
```

* Length Wtd. (ft)	* 49.90	* Wetted Per. (ft)	*	* 80.17	*
* Min Ch El (ft)	* 1719.24	* Shear (lb/sq ft)	*	* 1.20	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 19.20	*
* Frctn Loss (ft)	* 0.20	* Cum Volume (acre-ft)	*	* 38.52	*
* C & E Loss (ft)	* 0.11	* Cum SA (acres)	*	* 11.61	*

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 198.571*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1726.02	1011.86	1720.09	1046.86	1719.04	1081.86	1720.09	1093.72	1726.02

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1093.72	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1093.72	44.45	49.9	53.55	.1 .3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1725.51	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 3.25	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1722.27	* Reach Len. (ft)	* 44.45	* 49.90	* 53.55 *
* Crit W.S. (ft)	* 1723.22	* Flow Area (sq ft)	*	* 198.44	* *
* E.G. Slope (ft/ft)	*0.006322	* Area (sq ft)	*	* 198.44	* *
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00	* *
* Top Width (ft)	* 78.70	* Top Width (ft)	*	* 78.70	* *
* Vel Total (ft/s)	* 14.46	* Avg. Vel. (ft/s)	*	* 14.46	* *
* Max Chl Dpth (ft)	* 3.22	* Hydr. Depth (ft)	*	* 2.52	* *
* Conv. Total (cfs)	* 36095.3	* Conv. (cfs)	*	* 36095.3	* *
* Length Wtd. (ft)	* 49.90	* Wetted Per. (ft)	*	* 79.76	* *
* Min Ch El (ft)	* 1719.04	* Shear (lb/sq ft)	*	* 0.98	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 14.20	* *
* Frctn Loss (ft)	* 0.35	* Cum Volume (acre-ft)	*	* 39.95	* *
* C & E Loss (ft)	* 0.12	* Cum SA (acres)	*	* 11.55	* *

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1726.10	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 3.60	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1722.50	* Reach Len. (ft)	* 44.45	* 49.90	* 53.55 *
* Crit W.S. (ft)	* 1723.56	* Flow Area (sq ft)	*	* 216.76	* *
* E.G. Slope (ft/ft)	*0.006336	* Area (sq ft)	*	* 216.76	* *
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	* *
* Top Width (ft)	* 79.62	* Top Width (ft)	*	* 79.62	* *
* Vel Total (ft/s)	* 15.22	* Avg. Vel. (ft/s)	*	* 15.22	* *
* Max Chl Dpth (ft)	* 3.46	* Hydr. Depth (ft)	*	* 2.72	* *
* Conv. Total (cfs)	* 41457.9	* Conv. (cfs)	*	* 41457.9	* *
* Length Wtd. (ft)	* 49.90	* Wetted Per. (ft)	*	* 80.79	* *
* Min Ch El (ft)	* 1719.04	* Shear (lb/sq ft)	*	* 1.06	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 16.16	* *
* Frctn Loss (ft)	* 0.34	* Cum Volume (acre-ft)	*	* 38.28	* *
* C & E Loss (ft)	* 0.12	* Cum SA (acres)	*	* 11.52	* *

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 197.142*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1725.82	1011.86	1719.89	1046.86	1718.84	1081.86	1719.89	1093.72	1725.82

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1093.72	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1093.72	44.45	49.9	53.55	.1 .3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1725.13	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 2.94	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1722.20	* Reach Len. (ft)	* 44.45	* 49.90	* 53.55 *
* Crit W.S. (ft)	* 1723.02	* Flow Area (sq ft)	*	* 208.71	* *
* E.G. Slope (ft/ft)	*0.005395	* Area (sq ft)	*	* 208.71	* *
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00	* *
* Top Width (ft)	* 79.22	* Top Width (ft)	*	* 79.22	* *
* Vel Total (ft/s)	* 13.75	* Avg. Vel. (ft/s)	*	* 13.75	* *
* Max Chl Dpth (ft)	* 3.35	* Hydr. Depth (ft)	*	* 2.63	* *
* Conv. Total (cfs)	* 39072.2	* Conv. (cfs)	*	* 39072.2	* *
* Length Wtd. (ft)	* 49.90	* Wetted Per. (ft)	*	* 80.34	* *
* Min Ch El (ft)	* 1718.84	* Shear (lb/sq ft)	*	* 0.88	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 12.03	* *
* Frctn Loss (ft)	* 0.29	* Cum Volume (acre-ft)	*	* 39.71	* *

* C & E Loss (ft)	* 0.09	* Cum SA (acres)	*	* 11.46	*

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
* E.G. Elev (ft)	* 1725.71	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 3.29	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 1722.42	* Reach Len. (ft)	* 44.45	* 49.90	* 53.55
* Crit W.S. (ft)	* 1723.36	* Flow Area (sq ft)	*	* 226.73	*
* E.G. Slope (ft/ft)	*0.005504	* Area (sq ft)	*	* 226.73	*
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	*
* Top Width (ft)	* 80.12	* Top Width (ft)	*	* 80.12	*
* Vel Total (ft/s)	* 14.55	* Avg. Vel. (ft/s)	*	* 14.55	*
* Max Chl Dpth (ft)	* 3.58	* Hydr. Depth (ft)	*	* 2.83	*
* Conv. Total (cfs)	* 44482.8	* Conv. (cfs)	*	* 44482.8	*
* Length Wtd. (ft)	* 49.90	* Wetted Per. (ft)	*	* 81.35	*
* Min Ch El (ft)	* 1718.84	* Shear (lb/sq ft)	*	* 0.96	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 13.94	*
* Frctn Loss (ft)	* 0.29	* Cum Volume (acre-ft)	*	* 38.03	*
* C & E Loss (ft)	* 0.09	* Cum SA (acres)	*	* 11.43	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 195.714*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1725.62	1011.86	1719.69	1046.86	1718.64	1081.86	1719.69	1093.72	1725.62

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1093.72	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1093.72	44.45	49.9	53.55 .1	.3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
* E.G. Elev (ft)	* 1724.81	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 2.71	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 1722.10	* Reach Len. (ft)	* 44.45	* 49.90	* 53.55
* Crit W.S. (ft)	* 1722.82	* Flow Area (sq ft)	*	* 217.26	*
* E.G. Slope (ft/ft)	*0.004758	* Area (sq ft)	*	* 217.26	*
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00	*
* Top Width (ft)	* 79.65	* Top Width (ft)	*	* 79.65	*
* Vel Total (ft/s)	* 13.21	* Avg. Vel. (ft/s)	*	* 13.21	*
* Max Chl Dpth (ft)	* 3.46	* Hydr. Depth (ft)	*	* 2.73	*
* Conv. Total (cfs)	* 41609.5	* Conv. (cfs)	*	* 41609.5	*
* Length Wtd. (ft)	* 49.90	* Wetted Per. (ft)	*	* 80.82	*
* Min Ch El (ft)	* 1718.64	* Shear (lb/sq ft)	*	* 0.80	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 10.55	*
* Frctn Loss (ft)	* 0.25	* Cum Volume (acre-ft)	*	* 39.47	*
* C & E Loss (ft)	* 0.07	* Cum SA (acres)	*	* 11.37	*

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
* E.G. Elev (ft)	* 1725.38	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 3.06	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 1722.33	* Reach Len. (ft)	* 44.45	* 49.90	* 53.55
* Crit W.S. (ft)	* 1723.16	* Flow Area (sq ft)	*	* 235.23	*
* E.G. Slope (ft/ft)	*0.004906	* Area (sq ft)	*	* 235.23	*
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	*
* Top Width (ft)	* 80.55	* Top Width (ft)	*	* 80.55	*
* Vel Total (ft/s)	* 14.03	* Avg. Vel. (ft/s)	*	* 14.03	*
* Max Chl Dpth (ft)	* 3.69	* Hydr. Depth (ft)	*	* 2.92	*
* Conv. Total (cfs)	* 47113.5	* Conv. (cfs)	*	* 47113.5	*
* Length Wtd. (ft)	* 49.90	* Wetted Per. (ft)	*	* 81.82	*
* Min Ch El (ft)	* 1718.64	* Shear (lb/sq ft)	*	* 0.88	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 12.35	*
* Frctn Loss (ft)	* 0.26	* Cum Volume (acre-ft)	*	* 37.76	*
* C & E Loss (ft)	* 0.07	* Cum SA (acres)	*	* 11.34	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 194.285*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1725.42	1011.86	1719.49	1046.86	1718.44	1081.86	1719.49	1093.72	1725.42

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1093.72	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1093.72	44.45	49.9	53.55 .1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1724.54	* Element	* Left OB	* Channel	* Right OB
* Vel Head (ft)	* 2.56	* Wt. n-Val.	*	* 0.015	*

* W.S. Elev (ft)	* 1721.98	* Reach Len. (ft)	* 44.45	* 49.90	* 53.55 *
* Crit W.S. (ft)	* 1722.62	* Flow Area (sq ft)	*	* 223.45	* *
* E.G. Slope (ft/ft)	*0.004357	* Area (sq ft)	*	* 223.45	* *
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00	* *
* Top Width (ft)	* 79.96	* Top Width (ft)	*	* 79.96	* *
* Vel Total (ft/s)	* 12.84	* Avg. Vel. (ft/s)	*	* 12.84	* *
* Max Chl Dpth (ft)	* 3.54	* Hydr. Depth (ft)	*	* 2.79	* *
* Conv. Total (cfs)	* 43479.9	* Conv. (cfs)	*	* 43479.9	* *
* Length Wtd. (ft)	* 49.90	* Wetted Per. (ft)	*	* 81.17	* *
* Min Ch El (ft)	* 1718.44	* Shear (lb/sq ft)	*	* 0.75	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 9.62	* *
* Frctn Loss (ft)	* 0.23	* Cum Volume (acre-ft)	*	* 39.22	* *
* C & E Loss (ft)	* 0.04	* Cum SA (acres)	*	* 11.28	* *

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1725.10	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 2.89	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1722.21	* Reach Len. (ft)	* 44.45	* 49.90	* 53.55 *
* Crit W.S. (ft)	* 1722.96	* Flow Area (sq ft)	*	* 241.85	* *
* E.G. Slope (ft/ft)	*0.004500	* Area (sq ft)	*	* 241.85	* *
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	* *
* Top Width (ft)	* 80.87	* Top Width (ft)	*	* 80.87	* *
* Vel Total (ft/s)	* 13.64	* Avg. Vel. (ft/s)	*	* 13.64	* *
* Max Chl Dpth (ft)	* 3.77	* Hydr. Depth (ft)	*	* 2.99	* *
* Conv. Total (cfs)	* 49195.6	* Conv. (cfs)	*	* 49195.6	* *
* Length Wtd. (ft)	* 49.90	* Wetted Per. (ft)	*	* 82.19	* *
* Min Ch El (ft)	* 1718.44	* Shear (lb/sq ft)	*	* 0.83	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 11.28	* *
* Frctn Loss (ft)	* 0.23	* Cum Volume (acre-ft)	*	* 37.49	* *
* C & E Loss (ft)	* 0.05	* Cum SA (acres)	*	* 11.25	* *

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 192.857*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1725.22	1011.86	1719.29	1046.86	1718.24	1081.86	1719.29	1093.72	1725.22

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1093.72	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1093.72	44.45	49.9	53.55 .1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1724.32	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 2.51	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1721.81	* Reach Len. (ft)	* 44.45	* 49.90	* 53.55 *
* Crit W.S. (ft)	* 1722.42	* Flow Area (sq ft)	*	* 225.91	* *
* E.G. Slope (ft/ft)	*0.004210	* Area (sq ft)	*	* 225.91	* *
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00	* *
* Top Width (ft)	* 80.08	* Top Width (ft)	*	* 80.08	* *
* Vel Total (ft/s)	* 12.70	* Avg. Vel. (ft/s)	*	* 12.70	* *
* Max Chl Dpth (ft)	* 3.57	* Hydr. Depth (ft)	*	* 2.82	* *
* Conv. Total (cfs)	* 44231.1	* Conv. (cfs)	*	* 44231.1	* *
* Length Wtd. (ft)	* 49.90	* Wetted Per. (ft)	*	* 81.30	* *
* Min Ch El (ft)	* 1718.24	* Shear (lb/sq ft)	*	* 0.73	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 9.28	* *
* Frctn Loss (ft)	* 0.21	* Cum Volume (acre-ft)	*	* 38.96	* *
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	*	* 11.19	* *

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1724.87	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 2.82	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1722.05	* Reach Len. (ft)	* 44.45	* 49.90	* 53.55 *
* Crit W.S. (ft)	* 1722.76	* Flow Area (sq ft)	*	* 244.95	* *
* E.G. Slope (ft/ft)	*0.004324	* Area (sq ft)	*	* 244.95	* *
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	* *
* Top Width (ft)	* 81.03	* Top Width (ft)	*	* 81.03	* *
* Vel Total (ft/s)	* 13.47	* Avg. Vel. (ft/s)	*	* 13.47	* *
* Max Chl Dpth (ft)	* 3.81	* Hydr. Depth (ft)	*	* 3.02	* *
* Conv. Total (cfs)	* 50182.3	* Conv. (cfs)	*	* 50182.3	* *
* Length Wtd. (ft)	* 49.90	* Wetted Per. (ft)	*	* 82.36	* *
* Min Ch El (ft)	* 1718.24	* Shear (lb/sq ft)	*	* 0.80	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 10.82	* *
* Frctn Loss (ft)	* 0.22	* Cum Volume (acre-ft)	*	* 37.21	* *
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	*	* 11.15	* *

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 191.428*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1725.02	1011.86	1719.09	1046.86	1718.04	1081.86	1719.09	1093.72	1725.02

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1093.72	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1000 1093.72 44.45 49.9 53.55 .1 .3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1724.11	Element		0.015	
Vel Head (ft)	2.49	Wt. n-Val.		0.015	
W.S. Elev (ft)	1721.62	Reach Len. (ft)	44.45	49.90	53.55
Crit W.S. (ft)	1722.22	Flow Area (sq ft)		226.63	
E.G. Slope (ft/ft)	*0.004169	Area (sq ft)		226.63	
Q Total (cfs)	2870.00	Flow (cfs)		2870.00	
Top Width (ft)	80.12	Top Width (ft)		80.12	
Vel Total (ft/s)	12.66	Avg. Vel. (ft/s)		12.66	
Max Chl Dpth (ft)	3.58	Hydr. Depth (ft)		2.83	
Conv. Total (cfs)	44451.4	Conv. (cfs)		44451.4	
Length Wtd. (ft)	49.90	Wetted Per. (ft)		81.34	
Min Ch El (ft)	1718.04	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		9.18	
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)		38.70	
C & E Loss (ft)	0.00	Cum SA (acres)		11.10	

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	1724.64	Element		0.015	
Vel Head (ft)	2.77	Wt. n-Val.		0.015	
W.S. Elev (ft)	1721.88	Reach Len. (ft)	44.45	49.90	53.55
Crit W.S. (ft)	1722.56	Flow Area (sq ft)		247.17	
E.G. Slope (ft/ft)	*0.004204	Area (sq ft)		247.17	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	81.14	Top Width (ft)		81.14	
Vel Total (ft/s)	13.35	Avg. Vel. (ft/s)		13.35	
Max Chl Dpth (ft)	3.83	Hydr. Depth (ft)		3.05	
Conv. Total (cfs)	50893.0	Conv. (cfs)		50893.0	
Length Wtd. (ft)	49.90	Wetted Per. (ft)		82.48	
Min Ch El (ft)	1718.04	Shear (lb/sq ft)		0.79	
Alpha	1.00	Stream Power (lb/ft s)		10.50	
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)		36.93	
C & E Loss (ft)	0.02	Cum SA (acres)		11.06	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 190

INPUT
Description: PLAN STA 122+74
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1724.82	1011.86	1718.89	1046.86	1717.84	1081.86	1718.89	1093.72	1724.82

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1093.72	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1000 1093.72 45.13 45.13 45.13 .1 .3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1723.91	Element		0.015	
Vel Head (ft)	2.49	Wt. n-Val.		0.015	
W.S. Elev (ft)	1721.42	Reach Len. (ft)	45.13	45.13	45.13
Crit W.S. (ft)	1722.02	Flow Area (sq ft)		226.63	
E.G. Slope (ft/ft)	*0.004169	Area (sq ft)		226.63	
Q Total (cfs)	2870.00	Flow (cfs)		2870.00	
Top Width (ft)	80.12	Top Width (ft)		80.12	
Vel Total (ft/s)	12.66	Avg. Vel. (ft/s)		12.66	
Max Chl Dpth (ft)	3.58	Hydr. Depth (ft)		2.83	
Conv. Total (cfs)	44449.8	Conv. (cfs)		44449.8	
Length Wtd. (ft)	45.13	Wetted Per. (ft)		81.34	
Min Ch El (ft)	1717.84	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		9.18	
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)		38.44	
C & E Loss (ft)	0.00	Cum SA (acres)		11.01	

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	1724.44	Element		0.015	
Vel Head (ft)	2.77	Wt. n-Val.		0.015	
W.S. Elev (ft)	1721.67	Reach Len. (ft)	45.13	45.13	45.13
Crit W.S. (ft)	1722.36	Flow Area (sq ft)		247.17	
E.G. Slope (ft/ft)	*0.004205	Area (sq ft)		247.17	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	81.14	Top Width (ft)		81.14	
Vel Total (ft/s)	13.35	Avg. Vel. (ft/s)		13.35	
Max Chl Dpth (ft)	3.83	Hydr. Depth (ft)		3.05	
Conv. Total (cfs)	50891.3	Conv. (cfs)		50891.3	
Length Wtd. (ft)	45.13	Wetted Per. (ft)		82.48	
Min Ch El (ft)	1717.84	Shear (lb/sq ft)		0.79	
Alpha	1.00	Stream Power (lb/ft s)		10.50	
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)		36.64	
C & E Loss (ft)	0.00	Cum SA (acres)		10.97	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 188.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1724.64	1011.86	1718.71	1046.86	1717.66	1081.86	1718.71	1093.72	1724.64

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1093.72	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1093.72	45.13	45.13	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1723.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.49	Wt. n-Val.		0.015	
W.S. Elev (ft)	1721.24	Reach Len. (ft)	45.13	45.13	45.13
Crit W.S. (ft)	1721.84	Flow Area (sq ft)		226.63	
E.G. Slope (ft/ft)	*0.004169	Area (sq ft)		226.63	
Q Total (cfs)	2870.00	Flow (cfs)		2870.00	
Top Width (ft)	80.12	Top Width (ft)		80.12	
Vel Total (ft/s)	12.66	Avg. Vel. (ft/s)		12.66	
Max Chl Dpth (ft)	3.58	Hydr. Depth (ft)		2.83	
Conv. Total (cfs)	44451.4	Conv. (cfs)		44451.4	
Length Wtd. (ft)	45.13	Wetted Per. (ft)		81.34	
Min Ch El (ft)	1717.66	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		9.18	
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)		38.21	
C & E Loss (ft)	0.00	Cum SA (acres)		10.92	

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	1724.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.77	Wt. n-Val.		0.015	
W.S. Elev (ft)	1721.50	Reach Len. (ft)	45.13	45.13	45.13
Crit W.S. (ft)	1722.20	Flow Area (sq ft)		247.17	
E.G. Slope (ft/ft)	*0.004204	Area (sq ft)		247.17	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	81.14	Top Width (ft)		81.14	
Vel Total (ft/s)	13.35	Avg. Vel. (ft/s)		13.35	
Max Chl Dpth (ft)	3.83	Hydr. Depth (ft)		3.05	
Conv. Total (cfs)	50893.0	Conv. (cfs)		50893.0	
Length Wtd. (ft)	45.13	Wetted Per. (ft)		82.48	
Min Ch El (ft)	1717.66	Shear (lb/sq ft)		0.79	
Alpha	1.00	Stream Power (lb/ft s)		10.50	
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)		36.39	
C & E Loss (ft)	0.00	Cum SA (acres)		10.88	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 186.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1724.46	1011.86	1718.53	1046.86	1717.48	1081.86	1718.53	1093.72	1724.46

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1093.72	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1093.72	45.13	45.13	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1723.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.49	Wt. n-Val.		0.015	
W.S. Elev (ft)	1721.06	Reach Len. (ft)	45.13	45.13	45.13
Crit W.S. (ft)	1721.67	Flow Area (sq ft)		226.63	
E.G. Slope (ft/ft)	*0.004169	Area (sq ft)		226.63	
Q Total (cfs)	2870.00	Flow (cfs)		2870.00	
Top Width (ft)	80.12	Top Width (ft)		80.12	
Vel Total (ft/s)	12.66	Avg. Vel. (ft/s)		12.66	
Max Chl Dpth (ft)	3.58	Hydr. Depth (ft)		2.83	
Conv. Total (cfs)	44449.8	Conv. (cfs)		44449.8	
Length Wtd. (ft)	45.13	Wetted Per. (ft)		81.34	
Min Ch El (ft)	1717.48	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		9.18	
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)		37.97	
C & E Loss (ft)	0.00	Cum SA (acres)		10.84	

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	1724.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.77	Wt. n-Val.		0.015	
W.S. Elev (ft)	1721.31	Reach Len. (ft)	45.13	45.13	45.13
Crit W.S. (ft)	1722.02	Flow Area (sq ft)		247.17	
E.G. Slope (ft/ft)	*0.004205	Area (sq ft)		247.17	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	

* Top Width (ft)	* 81.14	* Top Width (ft)	*	* 81.14 * *
* Vel Total (ft/s)	* 13.35	* Avg. Vel. (ft/s)	*	* 13.35 * *
* Max Chl Dpth (ft)	* 3.83	* Hydr. Depth (ft)	*	* 3.05 * *
* Conv. Total (cfs)	* 50891.3	* Conv. (cfs)	*	* 50891.3 * *
* Length Wtd. (ft)	* 45.13	* Wetted Per. (ft)	*	* 82.48 * *
* Min Ch El (ft)	* 1717.48	* Shear (lb/sq ft)	*	* 0.79 * *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 10.50 * *
* Frctn Loss (ft)	* 0.19	* Cum Volume (acre-ft)	*	* 36.13 * *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 10.80 * *

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 184.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1724.28	1011.86	1718.35	1046.86	1717.3	1081.86	1718.35	1093.72	1724.28

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1093.72	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1093.72	45.13	45.13	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1723.37	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 2.49	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1720.88	* Reach Len. (ft)	* 45.13	* 45.13	* 45.13 *
* Crit W.S. (ft)	* 1721.49	* Flow Area (sq ft)	*	* 226.63	* *
* E.G. Slope (ft/ft)	*0.004169	* Area (sq ft)	*	* 226.63	* *
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00	* *
* Top Width (ft)	* 80.12	* Top Width (ft)	*	* 80.12	* *
* Vel Total (ft/s)	* 12.66	* Avg. Vel. (ft/s)	*	* 12.66	* *
* Max Chl Dpth (ft)	* 3.58	* Hydr. Depth (ft)	*	* 2.83	* *
* Conv. Total (cfs)	* 44451.4	* Conv. (cfs)	*	* 44451.4	* *
* Length Wtd. (ft)	* 45.13	* Wetted Per. (ft)	*	* 81.34	* *
* Min Ch El (ft)	* 1717.30	* Shear (lb/sq ft)	*	* 0.73	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 9.18	* *
* Frctn Loss (ft)	* 0.19	* Cum Volume (acre-ft)	*	* 37.74	* *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 10.76	* *

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1723.90	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 2.77	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1721.14	* Reach Len. (ft)	* 45.13	* 45.13	* 45.13 *
* Crit W.S. (ft)	* 1721.84	* Flow Area (sq ft)	*	* 247.17	* *
* E.G. Slope (ft/ft)	*0.004204	* Area (sq ft)	*	* 247.17	* *
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	* *
* Top Width (ft)	* 81.14	* Top Width (ft)	*	* 81.14	* *
* Vel Total (ft/s)	* 13.35	* Avg. Vel. (ft/s)	*	* 13.35	* *
* Max Chl Dpth (ft)	* 3.83	* Hydr. Depth (ft)	*	* 3.05	* *
* Conv. Total (cfs)	* 50893.0	* Conv. (cfs)	*	* 50893.0	* *
* Length Wtd. (ft)	* 45.13	* Wetted Per. (ft)	*	* 82.48	* *
* Min Ch El (ft)	* 1717.30	* Shear (lb/sq ft)	*	* 0.79	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 10.50	* *
* Frctn Loss (ft)	* 0.19	* Cum Volume (acre-ft)	*	* 35.88	* *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 10.72	* *

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 182.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1724.1	1011.86	1718.17	1046.86	1717.12	1081.86	1718.17	1093.72	1724.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1093.72	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1093.72	45.13	45.13	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1723.19	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 2.49	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1720.70	* Reach Len. (ft)	* 45.13	* 45.13	* 45.13 *
* Crit W.S. (ft)	* 1721.31	* Flow Area (sq ft)	*	* 226.63	* *
* E.G. Slope (ft/ft)	*0.004169	* Area (sq ft)	*	* 226.63	* *
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00	* *
* Top Width (ft)	* 80.12	* Top Width (ft)	*	* 80.12	* *
* Vel Total (ft/s)	* 12.66	* Avg. Vel. (ft/s)	*	* 12.66	* *
* Max Chl Dpth (ft)	* 3.58	* Hydr. Depth (ft)	*	* 2.83	* *
* Conv. Total (cfs)	* 44449.8	* Conv. (cfs)	*	* 44449.8	* *
* Length Wtd. (ft)	* 45.13	* Wetted Per. (ft)	*	* 81.34	* *
* Min Ch El (ft)	* 1717.12	* Shear (lb/sq ft)	*	* 0.73	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 9.18	* *

* Frctn Loss (ft)	* 0.19	* Cum Volume (acre-ft)	*	* 37.50	*	*	*	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 10.67	*	*	*	*

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1723.72	* Element	*	Left OB *	Channel	* Right OB *		
* Vel Head (ft)	* 2.77	* Wt. n-Val.	*	*	0.015	*	*	*
* W.S. Elev (ft)	* 1720.95	* Reach Len. (ft)	*	45.13 *	45.13	* 45.13 *	*	*
* Crit W.S. (ft)	* 1721.66	* Flow Area (sq ft)	*	*	247.17	*	*	*
* E.G. Slope (ft/ft)	*0.004205	* Area (sq ft)	*	*	247.17	*	*	*
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	*	3300.00	*	*	*
* Top Width (ft)	* 81.14	* Top Width (ft)	*	*	81.14	*	*	*
* Vel Total (ft/s)	* 13.35	* Avg. Vel. (ft/s)	*	*	13.35	*	*	*
* Max Chl Dpth (ft)	* 3.83	* Hydr. Depth (ft)	*	*	3.05	*	*	*
* Conv. Total (cfs)	* 50891.3	* Conv. (cfs)	*	*	50891.3	*	*	*
* Length Wtd. (ft)	* 45.13	* Wetted Per. (ft)	*	*	82.48	*	*	*
* Min Ch El (ft)	* 1717.12	* Shear (lb/sq ft)	*	*	0.79	*	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	*	10.50	*	*	*
* Frctn Loss (ft)	* 0.19	* Cum Volume (acre-ft)	*	*	35.62	*	*	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	*	10.63	*	*	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 180

INPUT
Description: PLAN STA 125+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1723.92	1011.86	1717.99	1046.86	1716.94	1081.86	1717.99	1093.72	1723.92

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1093.72	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1093.72	100	100	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1723.01	* Element	*	Left OB *	Channel	* Right OB *		
* Vel Head (ft)	* 2.49	* Wt. n-Val.	*	*	0.015	*	*	*
* W.S. Elev (ft)	* 1720.52	* Reach Len. (ft)	*	100.00 *	100.00	* 100.00 *	*	*
* Crit W.S. (ft)	* 1721.13	* Flow Area (sq ft)	*	*	226.63	*	*	*
* E.G. Slope (ft/ft)	*0.004169	* Area (sq ft)	*	*	226.63	*	*	*
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	*	2870.00	*	*	*
* Top Width (ft)	* 80.12	* Top Width (ft)	*	*	80.12	*	*	*
* Vel Total (ft/s)	* 12.66	* Avg. Vel. (ft/s)	*	*	12.66	*	*	*
* Max Chl Dpth (ft)	* 3.58	* Hydr. Depth (ft)	*	*	2.83	*	*	*
* Conv. Total (cfs)	* 44449.8	* Conv. (cfs)	*	*	44449.8	*	*	*
* Length Wtd. (ft)	* 100.00	* Wetted Per. (ft)	*	*	81.34	*	*	*
* Min Ch El (ft)	* 1716.94	* Shear (lb/sq ft)	*	*	0.73	*	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	*	9.18	*	*	*
* Frctn Loss (ft)	* 0.19	* Cum Volume (acre-ft)	*	*	37.27	*	*	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	*	10.59	*	*	*

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1723.54	* Element	*	Left OB *	Channel	* Right OB *		
* Vel Head (ft)	* 2.77	* Wt. n-Val.	*	*	0.015	*	*	*
* W.S. Elev (ft)	* 1720.77	* Reach Len. (ft)	*	100.00 *	100.00	* 100.00 *	*	*
* Crit W.S. (ft)	* 1721.47	* Flow Area (sq ft)	*	*	247.17	*	*	*
* E.G. Slope (ft/ft)	*0.004205	* Area (sq ft)	*	*	247.17	*	*	*
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	*	3300.00	*	*	*
* Top Width (ft)	* 81.14	* Top Width (ft)	*	*	81.14	*	*	*
* Vel Total (ft/s)	* 13.35	* Avg. Vel. (ft/s)	*	*	13.35	*	*	*
* Max Chl Dpth (ft)	* 3.83	* Hydr. Depth (ft)	*	*	3.05	*	*	*
* Conv. Total (cfs)	* 50891.3	* Conv. (cfs)	*	*	50891.3	*	*	*
* Length Wtd. (ft)	* 100.00	* Wetted Per. (ft)	*	*	82.48	*	*	*
* Min Ch El (ft)	* 1716.94	* Shear (lb/sq ft)	*	*	0.79	*	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	*	10.50	*	*	*
* Frctn Loss (ft)	* 0.19	* Cum Volume (acre-ft)	*	*	35.36	*	*	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	*	10.55	*	*	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 170

INPUT
Description: PLAN STA 126+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1722.67	1011.46	1716.94	1041.46	1716.04	1071.46	1716.94	1082.92	1722.67

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	51.96	51.96	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1722.56	* Element	*	Left OB *	Channel	* Right OB *

* Vel Head (ft)	* 2.76	* Wt. n-Val.	*		* 0.015	*		*
* W.S. Elev (ft)	* 1719.81	* Reach Len. (ft)	*	51.96	* 51.96	*	51.96	*
* Crit W.S. (ft)	* 1720.50	* Flow Area (sq ft)	*		* 215.41	*		*
* E.G. Slope (ft/ft)	*0.004262	* Area (sq ft)	*		* 215.41	*		*
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*		* 2870.00	*		*
* Top Width (ft)	* 71.47	* Top Width (ft)	*		* 71.47	*		*
* Vel Total (ft/s)	* 13.32	* Avg. Vel. (ft/s)	*		* 13.32	*		*
* Max Chl Dpth (ft)	* 3.77	* Hydr. Depth (ft)	*		* 3.01	*		*
* Conv. Total (cfs)	* 43961.6	* Conv. (cfs)	*		* 43961.6	*		*
* Length Wtd. (ft)	* 51.96	* Wetted Per. (ft)	*		* 72.85	*		*
* Min Ch El (ft)	* 1716.04	* Shear (lb/sq ft)	*		* 0.79	*		*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*		* 10.48	*		*
* Frctn Loss (ft)	* 0.42	* Cum Volume (acre-ft)	*		* 36.76	*		*
* C & E Loss (ft)	* 0.03	* Cum SA (acres)	*		* 10.42	*		*

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1723.10	* Element	*	Left OB	* Channel	*	Right OB	*
* Vel Head (ft)	* 2.98	* Wt. n-Val.	*		* 0.015	*		*
* W.S. Elev (ft)	* 1720.12	* Reach Len. (ft)	*	51.96	* 51.96	*	51.96	*
* Crit W.S. (ft)	* 1720.87	* Flow Area (sq ft)	*		* 238.08	*		*
* E.G. Slope (ft/ft)	*0.004141	* Area (sq ft)	*		* 238.08	*		*
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*		* 3300.00	*		*
* Top Width (ft)	* 72.72	* Top Width (ft)	*		* 72.72	*		*
* Vel Total (ft/s)	* 13.86	* Avg. Vel. (ft/s)	*		* 13.86	*		*
* Max Chl Dpth (ft)	* 4.08	* Hydr. Depth (ft)	*		* 3.27	*		*
* Conv. Total (cfs)	* 51282.2	* Conv. (cfs)	*		* 51282.2	*		*
* Length Wtd. (ft)	* 51.96	* Wetted Per. (ft)	*		* 74.25	*		*
* Min Ch El (ft)	* 1716.04	* Shear (lb/sq ft)	*		* 0.83	*		*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*		* 11.49	*		*
* Frctn Loss (ft)	* 0.42	* Cum Volume (acre-ft)	*		* 34.81	*		*
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	*		* 10.37	*		*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 160

INPUT
Description: PLAN STA 126+52
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1722.47	1011.46	1716.74	1041.46	1715.84	1071.46	1716.74	1082.92	1722.47

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	74.33	74.33	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1722.33	* Element	*	Left OB	* Channel	*	Right OB	*
* Vel Head (ft)	* 2.69	* Wt. n-Val.	*		* 0.015	*		*
* W.S. Elev (ft)	* 1719.65	* Reach Len. (ft)	*	74.33	* 74.33	*	74.33	*
* Crit W.S. (ft)	* 1720.30	* Flow Area (sq ft)	*		* 218.16	*		*
* E.G. Slope (ft/ft)	*0.004098	* Area (sq ft)	*		* 218.16	*		*
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*		* 2870.00	*		*
* Top Width (ft)	* 71.62	* Top Width (ft)	*		* 71.62	*		*
* Vel Total (ft/s)	* 13.16	* Avg. Vel. (ft/s)	*		* 13.16	*		*
* Max Chl Dpth (ft)	* 3.80	* Hydr. Depth (ft)	*		* 3.05	*		*
* Conv. Total (cfs)	* 44832.0	* Conv. (cfs)	*		* 44832.0	*		*
* Length Wtd. (ft)	* 74.33	* Wetted Per. (ft)	*		* 73.02	*		*
* Min Ch El (ft)	* 1715.84	* Shear (lb/sq ft)	*		* 0.76	*		*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*		* 10.06	*		*
* Frctn Loss (ft)	* 0.22	* Cum Volume (acre-ft)	*		* 36.50	*		*
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	*		* 10.33	*		*

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1722.88	* Element	*	Left OB	* Channel	*	Right OB	*
* Vel Head (ft)	* 2.93	* Wt. n-Val.	*		* 0.015	*		*
* W.S. Elev (ft)	* 1719.95	* Reach Len. (ft)	*	74.33	* 74.33	*	74.33	*
* Crit W.S. (ft)	* 1720.67	* Flow Area (sq ft)	*		* 240.13	*		*
* E.G. Slope (ft/ft)	*0.004033	* Area (sq ft)	*		* 240.13	*		*
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*		* 3300.00	*		*
* Top Width (ft)	* 72.84	* Top Width (ft)	*		* 72.84	*		*
* Vel Total (ft/s)	* 13.74	* Avg. Vel. (ft/s)	*		* 13.74	*		*
* Max Chl Dpth (ft)	* 4.11	* Hydr. Depth (ft)	*		* 3.30	*		*
* Conv. Total (cfs)	* 51960.7	* Conv. (cfs)	*		* 51960.7	*		*
* Length Wtd. (ft)	* 74.33	* Wetted Per. (ft)	*		* 74.38	*		*
* Min Ch El (ft)	*-1715.84	* Shear (lb/sq ft)	*		* 0.81	*		*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*		* 11.17	*		*
* Frctn Loss (ft)	* 0.21	* Cum Volume (acre-ft)	*		* 34.52	*		*
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	*		* 10.28	*		*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 158.333*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1722.19	1010.43	1716.97	1011.69	1716.45	1042.29	1715.56	1070.15	1716.42

1071.69 1716.58 1082.92 1722.19

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

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

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
1000	1082.92	74.33	74.33	74.33	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1722.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.61	Wt. n-Val.		0.015	
W.S. Elev (ft)	1719.41	Reach Len. (ft)	74.33	74.33	74.33
Crit W.S. (ft)	1720.02	Flow Area (sq ft)		221.52	
E.G. Slope (ft/ft)	*0.003907	Area (sq ft)		221.52	
Q Total (cfs)	2870.00	Flow (cfs)		2870.00	
Top Width (ft)	71.81	Top Width (ft)		71.81	
Vel Total (ft/s)	12.96	Avg. Vel. (ft/s)		12.96	
Max Chl Dpth (ft)	3.85	Hydr. Depth (ft)		3.08	
Conv. Total (cfs)	45914.8	Conv. (cfs)		45914.8	
Length Wtd. (ft)	74.33	Wetted Per. (ft)		73.19	
Min Ch El (ft)	1715.56	Shear (lb/sq ft)		0.74	
Alpha	1.00	Stream Power (lb/ft s)		9.56	
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)		36.13	
C & E Loss (ft)	0.02	Cum SA (acres)		10.21	

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	1722.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.87	Wt. n-Val.		0.015	
W.S. Elev (ft)	1719.71	Reach Len. (ft)	74.33	74.33	74.33
Crit W.S. (ft)	1720.39	Flow Area (sq ft)		242.91	
E.G. Slope (ft/ft)	*0.003891	Area (sq ft)		242.91	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	72.99	Top Width (ft)		72.99	
Vel Total (ft/s)	13.59	Avg. Vel. (ft/s)		13.59	
Max Chl Dpth (ft)	4.15	Hydr. Depth (ft)		3.33	
Conv. Total (cfs)	52904.0	Conv. (cfs)		52904.0	
Length Wtd. (ft)	74.33	Wetted Per. (ft)		74.52	
Min Ch El (ft)	1715.56	Shear (lb/sq ft)		0.79	
Alpha	1.00	Stream Power (lb/ft s)		10.76	
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)		34.11	
C & E Loss (ft)	0.02	Cum SA (acres)		10.16	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 156.666*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1721.91	1010.64	1716.59	1011.92	1716.17	1043.13	1715.28	1070.41	1716.15
1071.92	1716.41	1082.92	1721.91						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

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

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
1000	1082.92	74.33	74.33	74.33	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1721.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.58	Wt. n-Val.		0.015	
W.S. Elev (ft)	1719.15	Reach Len. (ft)	74.33	74.33	74.33
Crit W.S. (ft)	1719.74	Flow Area (sq ft)		222.46	
E.G. Slope (ft/ft)	*0.003856	Area (sq ft)		222.46	
Q Total (cfs)	2870.00	Flow (cfs)		2870.00	
Top Width (ft)	71.88	Top Width (ft)		71.88	
Vel Total (ft/s)	12.90	Avg. Vel. (ft/s)		12.90	
Max Chl Dpth (ft)	3.87	Hydr. Depth (ft)		3.10	
Conv. Total (cfs)	46219.4	Conv. (cfs)		46219.4	
Length Wtd. (ft)	74.33	Wetted Per. (ft)		73.24	
Min Ch El (ft)	1715.28	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		9.43	
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)		35.75	
C & E Loss (ft)	0.01	Cum SA (acres)		10.09	

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	1722.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.85	Wt. n-Val.		0.015	
W.S. Elev (ft)	1719.44	Reach Len. (ft)	74.33	74.33	74.33
Crit W.S. (ft)	1720.11	Flow Area (sq ft)		243.76	
E.G. Slope (ft/ft)	*0.003849	Area (sq ft)		243.76	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	73.05	Top Width (ft)		73.05	
Vel Total (ft/s)	13.54	Avg. Vel. (ft/s)		13.54	
Max Chl Dpth (ft)	4.16	Hydr. Depth (ft)		3.34	
Conv. Total (cfs)	53193.4	Conv. (cfs)		53193.4	
Length Wtd. (ft)	74.33	Wetted Per. (ft)		74.56	
Min Ch El (ft)	1715.28	Shear (lb/sq ft)		0.79	
Alpha	1.00	Stream Power (lb/ft s)		10.63	
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)		33.69	
C & E Loss (ft)	0.01	Cum SA (acres)		10.04	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 155.*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1721.63	1010.84	1716.21	1012.15	1715.88	1043.96		1715	1070.67
1715.88	1072.15	1716.25	1082.92	1721.63					

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1000 1082.92 74.33 74.33 74.33 .1 .3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1721.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.58	Wt. n-Val.		0.015	
W.S. Elev (ft)	1718.87	Reach Len. (ft)	74.33	74.33	74.33
Crit W.S. (ft)	1719.46	Flow Area (sq ft)		222.44	
E.G. Slope (ft/ft)	*0.003856	Area (sq ft)		222.44	
Q Total (cfs)	2870.00	Flow (cfs)		2870.00	
Top Width (ft)	71.87	Top Width (ft)		71.87	
Vel Total (ft/s)	12.90	Avg. Vel. (ft/s)		12.90	
Max Chl Dpth (ft)	3.87	Hydr. Depth (ft)		3.10	
Conv. Total (cfs)	46218.1	Conv. (cfs)		46218.1	
Length Wtd. (ft)	74.33	Wetted Per. (ft)		73.23	
Min Ch El (ft)	1715.00	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		9.43	
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)		35.37	
C & E Loss (ft)	0.00	Cum SA (acres)		9.96	

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	1722.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.85	Wt. n-Val.		0.015	
W.S. Elev (ft)	1719.16	Reach Len. (ft)	74.33	74.33	74.33
Crit W.S. (ft)	1719.83	Flow Area (sq ft)		243.74	
E.G. Slope (ft/ft)	*0.003849	Area (sq ft)		243.74	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	73.05	Top Width (ft)		73.05	
Vel Total (ft/s)	13.54	Avg. Vel. (ft/s)		13.54	
Max Chl Dpth (ft)	4.16	Hydr. Depth (ft)		3.34	
Conv. Total (cfs)	53191.8	Conv. (cfs)		53191.8	
Length Wtd. (ft)	74.33	Wetted Per. (ft)		74.54	
Min Ch El (ft)	1715.00	Shear (lb/sq ft)		0.79	
Alpha	1.00	Stream Power (lb/ft s)		10.64	
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)		33.28	
C & E Loss (ft)	0.00	Cum SA (acres)		9.91	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 153.333*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1721.35	1011.05	1715.83	1012.38	1715.6	1044.79	1714.72	1070.94	1715.6
1072.38	1716.08	1082.92	1721.35						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1000 1082.92 74.33 74.33 74.33 .1 .3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1721.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.58	Wt. n-Val.		0.015	
W.S. Elev (ft)	1718.59	Reach Len. (ft)	74.33	74.33	74.33
Crit W.S. (ft)	1719.18	Flow Area (sq ft)		222.49	
E.G. Slope (ft/ft)	*0.003854	Area (sq ft)		222.49	
Q Total (cfs)	2870.00	Flow (cfs)		2870.00	
Top Width (ft)	71.87	Top Width (ft)		71.87	
Vel Total (ft/s)	12.90	Avg. Vel. (ft/s)		12.90	
Max Chl Dpth (ft)	3.87	Hydr. Depth (ft)		3.10	
Conv. Total (cfs)	46230.6	Conv. (cfs)		46230.6	
Length Wtd. (ft)	74.33	Wetted Per. (ft)		73.24	
Min Ch El (ft)	1714.72	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		9.43	
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)		34.99	
C & E Loss (ft)	0.00	Cum SA (acres)		9.84	

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	1721.73	Element	Left OB	Channel	Right OB

* Vel Head (ft)	* 2.85	* Wt. n-Val.	*	* 0.015	*			
* W.S. Elev (ft)	* 1718.88	* Reach Len. (ft)	* 74.33	* 74.33	*	74.33	*	
* Crit W.S. (ft)	* 1719.55	* Flow Area (sq ft)	*	* 243.79	*			
* E.G. Slope (ft/ft)	*0.003847	* Area (sq ft)	*	* 243.79	*			
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	*			
* Top Width (ft)	* 73.05	* Top Width (ft)	*	* 73.05	*			
* Vel Total (ft/s)	* 13.54	* Avg. Vel. (ft/s)	*	* 13.54	*			
* Max Chl Dpth (ft)	* 4.16	* Hydr. Depth (ft)	*	* 3.34	*			
* Conv. Total (cfs)	* 53204.7	* Conv. (cfs)	*	* 53204.7	*			
* Length Wtd. (ft)	* 74.33	* Wetted Per. (ft)	*	* 74.55	*			
* Min Ch El (ft)	* 1714.72	* Shear (lb/sq ft)	*	* 0.79	*			
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 10.63	*			
* Frctn Loss (ft)	* 0.29	* Cum Volume (acre-ft)	*	* 32.86	*			
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 9.79	*			

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 151.666*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1721.07	1011.25	1715.44	1012.61	1715.31	1045.63	1714.44	1071.2	1715.33
1072.61	1715.92	1082.92	1721.07						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	74.33	74.33	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1720.89	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 2.58	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 1718.31	* Reach Len. (ft)	* 74.33	* 74.33	* 74.33 *
* Crit W.S. (ft)	* 1718.90	* Flow Area (sq ft)	*	* 222.64	*
* E.G. Slope (ft/ft)	*0.003847	* Area (sq ft)	*	* 222.64	*
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00	*
* Top Width (ft)	* 71.88	* Top Width (ft)	*	* 71.88	*
* Vel Total (ft/s)	* 12.89	* Avg. Vel. (ft/s)	*	* 12.89	*
* Max Chl Dpth (ft)	* 3.87	* Hydr. Depth (ft)	*	* 3.10	*
* Conv. Total (cfs)	* 46271.3	* Conv. (cfs)	*	* 46271.3	*
* Length Wtd. (ft)	* 74.33	* Wetted Per. (ft)	*	* 73.27	*
* Min Ch El (ft)	* 1714.44	* Shear (lb/sq ft)	*	* 0.73	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 9.41	*
* Frctn Loss (ft)	* 0.29	* Cum Volume (acre-ft)	*	* 34.61	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 9.72	*

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1721.44	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 2.84	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 1718.60	* Reach Len. (ft)	* 74.33	* 74.33	* 74.33 *
* Crit W.S. (ft)	* 1719.27	* Flow Area (sq ft)	*	* 243.94	*
* E.G. Slope (ft/ft)	*0.003841	* Area (sq ft)	*	* 243.94	*
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	*
* Top Width (ft)	* 73.05	* Top Width (ft)	*	* 73.05	*
* Vel Total (ft/s)	* 13.53	* Avg. Vel. (ft/s)	*	* 13.53	*
* Max Chl Dpth (ft)	* 4.16	* Hydr. Depth (ft)	*	* 3.34	*
* Conv. Total (cfs)	* 53247.1	* Conv. (cfs)	*	* 53247.1	*
* Length Wtd. (ft)	* 74.33	* Wetted Per. (ft)	*	* 74.58	*
* Min Ch El (ft)	* 1714.44	* Shear (lb/sq ft)	*	* 0.78	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 10.61	*
* Frctn Loss (ft)	* 0.29	* Cum Volume (acre-ft)	*	* 32.45	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 9.66	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 150

INPUT
Description: PLAN STA 130+97
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1720.79	1011.46	1715.06	1046.46	1714.16	1071.46	1715.06	1082.92	1720.79

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	196.55	196.55	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1720.61	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 2.58	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 1718.03	* Reach Len. (ft)	* 196.55	* 196.55	* 196.55 *
* Crit W.S. (ft)	* 1718.62	* Flow Area (sq ft)	*	* 222.76	*
* E.G. Slope (ft/ft)	*0.003843	* Area (sq ft)	*	* 222.76	*
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00	*
* Top Width (ft)	* 71.88	* Top Width (ft)	*	* 71.88	*

* Vel Total (ft/s)	* 12.88	* Avg. Vel. (ft/s)	*	*	12.88	*	*
* Max Chl Dpth (ft)	* 3.87	* Hydr. Depth (ft)	*	*	3.10	*	*
* Conv. Total (cfs)	* 46296.5	* Conv. (cfs)	*	*	46296.5	*	*
* Length Wtd. (ft)	* 196.55	* Wetted Per. (ft)	*	*	73.31	*	*
* Min Ch El (ft)	* 1714.16	* Shear (lb/sq ft)	*	*	0.73	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	*	9.39	*	*
* Frctn Loss (ft)	* 0.29	* Cum Volume (acre-ft)	*	*	34.23	*	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	*	9.60	*	*

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1721.16	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 2.84	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1718.32	* Reach Len. (ft)	* 196.55	* 196.55	* 196.55 *
* Crit W.S. (ft)	* 1718.99	* Flow Area (sq ft)	*	* 244.06	* *
* E.G. Slope (ft/ft)	*0.003837	* Area (sq ft)	*	* 244.06	* *
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	* *
* Top Width (ft)	* 73.05	* Top Width (ft)	*	* 73.05	* *
* Vel Total (ft/s)	* 13.52	* Avg. Vel. (ft/s)	*	* 13.52	* *
* Max Chl Dpth (ft)	* 4.16	* Hydr. Depth (ft)	*	* 3.34	* *
* Conv. Total (cfs)	* 53272.3	* Conv. (cfs)	*	* 53272.3	* *
* Length Wtd. (ft)	* 196.55	* Wetted Per. (ft)	*	* 74.62	* *
* Min Ch El (ft)	* 1714.16	* Shear (lb/sq ft)	*	* 0.78	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 10.59	* *
* Frctn Loss (ft)	* 0.29	* Cum Volume (acre-ft)	*	* 32.03	* *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 9.54	* *

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 149.285*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1720.05	1011.37	1714.36	1012.74	1714.28	1046.1	1713.42	1071.35	1714.31
1072.74	1714.96	1082.92	1720.05						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	196.55	196.55	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1719.86	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 2.56	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1717.30	* Reach Len. (ft)	* 196.55	* 196.55	* 196.55 *
* Crit W.S. (ft)	* 1717.87	* Flow Area (sq ft)	*	* 223.51	* *
* E.G. Slope (ft/ft)	*0.003802	* Area (sq ft)	*	* 223.51	* *
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00	* *
* Top Width (ft)	* 71.91	* Top Width (ft)	*	* 71.91	* *
* Vel Total (ft/s)	* 12.84	* Avg. Vel. (ft/s)	*	* 12.84	* *
* Max Chl Dpth (ft)	* 3.88	* Hydr. Depth (ft)	*	* 3.11	* *
* Conv. Total (cfs)	* 46546.1	* Conv. (cfs)	*	* 46546.1	* *
* Length Wtd. (ft)	* 196.55	* Wetted Per. (ft)	*	* 73.33	* *
* Min Ch El (ft)	* 1713.42	* Shear (lb/sq ft)	*	* 0.72	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 9.29	* *
* Frctn Loss (ft)	* 0.75	* Cum Volume (acre-ft)	*	* 33.22	* *
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	* 9.27	* *

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1720.41	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 2.82	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1717.59	* Reach Len. (ft)	* 196.55	* 196.55	* 196.55 *
* Crit W.S. (ft)	* 1718.25	* Flow Area (sq ft)	*	* 244.75	* *
* E.G. Slope (ft/ft)	*0.003803	* Area (sq ft)	*	* 244.75	* *
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	* *
* Top Width (ft)	* 73.08	* Top Width (ft)	*	* 73.08	* *
* Vel Total (ft/s)	* 13.48	* Avg. Vel. (ft/s)	*	* 13.48	* *
* Max Chl Dpth (ft)	* 4.17	* Hydr. Depth (ft)	*	* 3.35	* *
* Conv. Total (cfs)	* 53510.8	* Conv. (cfs)	*	* 53510.8	* *
* Length Wtd. (ft)	* 196.55	* Wetted Per. (ft)	*	* 74.64	* *
* Min Ch El (ft)	* 1713.42	* Shear (lb/sq ft)	*	* 0.78	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 10.50	* *
* Frctn Loss (ft)	* 0.75	* Cum Volume (acre-ft)	*	* 30.93	* *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 9.21	* *

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 148.571*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1719.3	1011.28	1713.66	1012.64	1713.54	1045.75	1712.67	1071.24	1713.57
1072.64	1714.17	1082.92	1719.3						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

```
    1000    .015    1000    .015 1082.92    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
          1000 1082.92           196.55  196.55  196.55            .1        .3

CROSS SECTION OUTPUT  Profile #Post-Project
**********************************************************************************************
* E.G. Elev (ft)         * 1719.11  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.56  * Wt. n-Val.           *          *    0.015  *          *
* W.S. Elev (ft)         * 1716.56  * Reach Len. (ft)      *  196.55  *  196.55  *  196.55  *
* Crit W.S. (ft)         * 1717.13  * Flow Area (sq ft)    *          *  223.68  *          *
* E.G. Slope (ft/ft)     *0.003792  * Area (sq ft)         *          *  223.68  *          *
* Q Total (cfs)          * 2870.00  * Flow (cfs)           *          * 2870.00  *          *
* Top Width (ft)         *   71.93  * Top Width (ft)       *          *   71.93  *          *
* Vel Total (ft/s)       *   12.83  * Avg. Vel. (ft/s)     *          *   12.83  *          *
* Max Chl Dpth (ft)      *    3.89  * Hydr. Depth (ft)     *          *    3.11  *          *
* Conv. Total (cfs)      * 46604.4  * Conv. (cfs)          *          * 46604.4  *          *
* Length Wtd. (ft)       *  196.55  * Wetted Per. (ft)     *          *   73.33  *          *
* Min Ch El (ft)         * 1712.67  * Shear (lb/sq ft)     *          *    0.72  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *        *    9.27  *          *
* Frctn Loss (ft)        *    0.75  * Cum Volume (acre-ft)  *          *   32.21  *          *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)        *          *    8.95  *          *
**********************************************************************************************

CROSS SECTION OUTPUT  Profile #PF 2
**********************************************************************************************
* E.G. Elev (ft)         * 1719.67  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.82  * Wt. n-Val.           *          *    0.015  *          *
* W.S. Elev (ft)         * 1716.85  * Reach Len. (ft)      *  196.55  *  196.55  *  196.55  *
* Crit W.S. (ft)         * 1717.52  * Flow Area (sq ft)    *          *  244.93  *          *
* E.G. Slope (ft/ft)     *0.003794  * Area (sq ft)         *          *  244.93  *          *
* Q Total (cfs)          * 3300.00  * Flow (cfs)           *          * 3300.00  *          *
* Top Width (ft)         *   73.10  * Top Width (ft)       *          *   73.10  *          *
* Vel Total (ft/s)       *   13.47  * Avg. Vel. (ft/s)     *          *   13.47  *          *
* Max Chl Dpth (ft)      *    4.18  * Hydr. Depth (ft)     *          *    3.35  *          *
* Conv. Total (cfs)      * 53576.3  * Conv. (cfs)          *          * 53576.3  *          *
* Length Wtd. (ft)       *  196.55  * Wetted Per. (ft)     *          *   74.64  *          *
* Min Ch El (ft)         * 1712.67  * Shear (lb/sq ft)     *          *    0.78  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *        *   10.47  *          *
* Frctn Loss (ft)        *    0.75  * Cum Volume (acre-ft)  *          *   29.82  *          *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)        *          *    8.88  *          *
**********************************************************************************************

CROSS SECTION


RIVER: Range Wash
REACH: Sloan Channel      RS: 147.857*

INPUT
Description:
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
    1000 1718.56  1011.2 1712.96 1012.55  1712.8 1045.39 1711.93 1071.12 1712.82
 1072.55 1713.37 1082.92 1718.56

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
    1000    .015    1000    .015 1082.92    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
          1000 1082.92           196.55  196.55  196.55            .1        .3

CROSS SECTION OUTPUT  Profile #Post-Project
**********************************************************************************************
* E.G. Elev (ft)         * 1718.37  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.55  * Wt. n-Val.           *          *    0.015  *          *
* W.S. Elev (ft)         * 1715.82  * Reach Len. (ft)      *  196.55  *  196.55  *  196.55  *
* Crit W.S. (ft)         * 1716.39  * Flow Area (sq ft)    *          *  223.82  *          *
* E.G. Slope (ft/ft)     *0.003785  * Area (sq ft)         *          *  223.82  *          *
* Q Total (cfs)          * 2870.00  * Flow (cfs)           *          * 2870.00  *          *
* Top Width (ft)         *   71.95  * Top Width (ft)       *          *   71.95  *          *
* Vel Total (ft/s)       *   12.82  * Avg. Vel. (ft/s)     *          *   12.82  *          *
* Max Chl Dpth (ft)      *    3.89  * Hydr. Depth (ft)     *          *    3.11  *          *
* Conv. Total (cfs)      * 46650.7  * Conv. (cfs)          *          * 46650.7  *          *
* Length Wtd. (ft)       *  196.55  * Wetted Per. (ft)     *          *   73.34  *          *
* Min Ch El (ft)         * 1711.93  * Shear (lb/sq ft)     *          *    0.72  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *        *    9.25  *          *
* Frctn Loss (ft)        *    0.74  * Cum Volume (acre-ft)  *          *   31.20  *          *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)        *          *    8.62  *          *
**********************************************************************************************

CROSS SECTION OUTPUT  Profile #PF 2
**********************************************************************************************
* E.G. Elev (ft)         * 1718.92  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.82  * Wt. n-Val.           *          *    0.015  *          *
* W.S. Elev (ft)         * 1716.11  * Reach Len. (ft)      *  196.55  *  196.55  *  196.55  *
* Crit W.S. (ft)         * 1716.78  * Flow Area (sq ft)    *          *  245.07  *          *
* E.G. Slope (ft/ft)     *0.003787  * Area (sq ft)         *          *  245.07  *          *
* Q Total (cfs)          * 3300.00  * Flow (cfs)           *          * 3300.00  *          *
* Top Width (ft)         *   73.12  * Top Width (ft)       *          *   73.12  *          *
* Vel Total (ft/s)       *   13.47  * Avg. Vel. (ft/s)     *          *   13.47  *          *
* Max Chl Dpth (ft)      *    4.18  * Hydr. Depth (ft)     *          *    3.35  *          *
* Conv. Total (cfs)      * 53627.1  * Conv. (cfs)          *          * 53627.1  *          *
* Length Wtd. (ft)       *  196.55  * Wetted Per. (ft)     *          *   74.65  *          *
* Min Ch El (ft)         * 1711.93  * Shear (lb/sq ft)     *          *    0.78  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *        *   10.45  *          *
* Frctn Loss (ft)        *    0.74  * Cum Volume (acre-ft)  *          *   28.72  *          *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)        *          *    8.55  *          *
**********************************************************************************************

CROSS SECTION
```

RIVER: Range Wash
REACH: Sloan Channel RS: 147.142*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1717.82	1011.11	1712.26	1012.45	1712.06	1045.03	1711.19	1071.01	1712.08
1072.45	1712.58	1082.92	1717.82						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	196.55	196.55 196.55	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1717.63	Element			
Vel Head (ft)	2.55	Wt. n-Val.		0.015	
W.S. Elev (ft)	1715.08	Reach Len. (ft)	196.55	196.55	196.55
Crit W.S. (ft)	1715.65	Flow Area (sq ft)		223.80	
E.G. Slope (ft/ft)	*0.003786	Area (sq ft)		223.80	
Q Total (cfs)	2870.00	Flow (cfs)		2870.00	
Top Width (ft)	71.95	Top Width (ft)		71.95	
Vel Total (ft/s)	12.82	Avg. Vel. (ft/s)		12.82	
Max Chl Dpth (ft)	3.89	Hydr. Depth (ft)		3.11	
Conv. Total (cfs)	46645.1	Conv. (cfs)		46645.1	
Length Wtd. (ft)	196.55	Wetted Per. (ft)		73.33	
Min Ch El (ft)	1711.19	Shear (lb/sq ft)		0.72	
Alpha	1.00	Stream Power (lb/ft s)		9.25	
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)		30.19	
C & E Loss (ft)	0.00	Cum SA (acres)		8.30	

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	1718.18	Element			
Vel Head (ft)	2.82	Wt. n-Val.		0.015	
W.S. Elev (ft)	1715.37	Reach Len. (ft)	196.55	196.55	196.55
Crit W.S. (ft)	1716.04	Flow Area (sq ft)		245.05	
E.G. Slope (ft/ft)	*0.003787	Area (sq ft)		245.05	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	73.12	Top Width (ft)		73.12	
Vel Total (ft/s)	13.47	Avg. Vel. (ft/s)		13.47	
Max Chl Dpth (ft)	4.18	Hydr. Depth (ft)		3.35	
Conv. Total (cfs)	53622.1	Conv. (cfs)		53622.1	
Length Wtd. (ft)	196.55	Wetted Per. (ft)		74.64	
Min Ch El (ft)	1711.19	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)		10.45	
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)		27.61	
C & E Loss (ft)	0.00	Cum SA (acres)		8.22	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 146.428*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1717.08	1011.02	1711.57	1012.35	1711.32	1044.67	1710.45	1070.9	1711.33
1072.35	1711.79	1082.92	1717.08						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	196.55	196.55 196.55	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1716.89	Element			
Vel Head (ft)	2.55	Wt. n-Val.		0.015	
W.S. Elev (ft)	1714.34	Reach Len. (ft)	196.55	196.55	196.55
Crit W.S. (ft)	1714.91	Flow Area (sq ft)		223.89	
E.G. Slope (ft/ft)	*0.003780	Area (sq ft)		223.89	
Q Total (cfs)	2870.00	Flow (cfs)		2870.00	
Top Width (ft)	71.95	Top Width (ft)		71.95	
Vel Total (ft/s)	12.82	Avg. Vel. (ft/s)		12.82	
Max Chl Dpth (ft)	3.89	Hydr. Depth (ft)		3.11	
Conv. Total (cfs)	46679.1	Conv. (cfs)		46679.1	
Length Wtd. (ft)	196.55	Wetted Per. (ft)		73.32	
Min Ch El (ft)	1710.45	Shear (lb/sq ft)		0.72	
Alpha	1.00	Stream Power (lb/ft s)		9.24	
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)		29.18	
C & E Loss (ft)	0.00	Cum SA (acres)		7.97	

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	1717.44	Element			
Vel Head (ft)	2.81	Wt. n-Val.		0.015	
W.S. Elev (ft)	1714.63	Reach Len. (ft)	196.55	196.55	196.55
Crit W.S. (ft)	1715.30	Flow Area (sq ft)		245.14	
E.G. Slope (ft/ft)	*0.003782	Area (sq ft)		245.14	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	

* Top Width (ft)	* 73.12	* Top Width (ft)	*	*	73.12	*	*
* Vel Total (ft/s)	* 13.46	* Avg. Vel. (ft/s)	*	*	13.46	*	*
* Max Chl Dpth (ft)	* 4.18	* Hydr. Depth (ft)	*	*	3.35	*	*
* Conv. Total (cfs)	* 53657.4	* Conv. (cfs)	*	*	53657.4	*	*
* Length Wtd. (ft)	* 196.55	* Wetted Per. (ft)	*	*	74.63	*	*
* Min Ch El (ft)	* 1710.45	* Shear (lb/sq ft)	*	*	0.78	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	*	10.44	*	*
* Frctn Loss (ft)	* 0.74	* Cum Volume (acre-ft)	*	*	26.50	*	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	*	7.89	*	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 145.714*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1716.33	1010.93	1710.87	1012.25	1710.58	1044.32	1709.7	1070.79	1710.58
1072.25	1711	1082.92	1716.33						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	196.55	196.55	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1716.14	* Element	* Left OB *	Channel *	Right OB *
* Vel Head (ft)	* 2.55	* Wt. n-Val.	*	* 0.015 *	*
* W.S. Elev (ft)	* 1713.59	* Reach Len. (ft)	* 196.55 *	196.55 *	196.55 *
* Crit W.S. (ft)	* 1714.16	* Flow Area (sq ft)	*	* 224.09 *	*
* E.G. Slope (ft/ft)	*0.003769	* Area (sq ft)	*	* 224.09 *	*
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00 *	*
* Top Width (ft)	* 71.96	* Top Width (ft)	*	* 71.96 *	*
* Vel Total (ft/s)	* 12.81	* Avg. Vel. (ft/s)	*	* 12.81 *	*
* Max Chl Dpth (ft)	* 3.89	* Hydr. Depth (ft)	*	* 3.11 *	*
* Conv. Total (cfs)	* 46748.8	* Conv. (cfs)	*	* 46748.8 *	*
* Length Wtd. (ft)	* 196.55	* Wetted Per. (ft)	*	* 73.33 *	*
* Min Ch El (ft)	* 1709.70	* Shear (lb/sq ft)	*	* 0.72 *	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 9.21 *	*
* Frctn Loss (ft)	* 0.74	* Cum Volume (acre-ft)	*	* 28.17 *	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 7.65 *	*

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1716.69	* Element	* Left OB *	Channel *	Right OB *
* Vel Head (ft)	* 2.81	* Wt. n-Val.	*	* 0.015 *	*
* W.S. Elev (ft)	* 1713.89	* Reach Len. (ft)	* 196.55 *	196.55 *	196.55 *
* Crit W.S. (ft)	* 1714.55	* Flow Area (sq ft)	*	* 245.32 *	*
* E.G. Slope (ft/ft)	*0.003773	* Area (sq ft)	*	* 245.32 *	*
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00 *	*
* Top Width (ft)	* 73.13	* Top Width (ft)	*	* 73.13 *	*
* Vel Total (ft/s)	* 13.45	* Avg. Vel. (ft/s)	*	* 13.45 *	*
* Max Chl Dpth (ft)	* 4.18	* Hydr. Depth (ft)	*	* 3.35 *	*
* Conv. Total (cfs)	* 53722.0	* Conv. (cfs)	*	* 53722.0 *	*
* Length Wtd. (ft)	* 196.55	* Wetted Per. (ft)	*	* 74.64 *	*
* Min Ch El (ft)	* 1709.70	* Shear (lb/sq ft)	*	* 0.77 *	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 10.42 *	*
* Frctn Loss (ft)	* 0.74	* Cum Volume (acre-ft)	*	* 25.40 *	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 7.56 *	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 145.*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1715.59	1010.84	1710.17	1012.15	1709.84	1043.96	1708.96	1070.67	1709.84
1072.15	1710.21	1082.92	1715.59						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	196.55	196.55	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1715.40	* Element	* Left OB *	Channel *	Right OB *
* Vel Head (ft)	* 2.55	* Wt. n-Val.	*	* 0.015 *	*
* W.S. Elev (ft)	* 1712.85	* Reach Len. (ft)	* 196.55 *	196.55 *	196.55 *
* Crit W.S. (ft)	* 1713.42	* Flow Area (sq ft)	*	* 224.10 *	*
* E.G. Slope (ft/ft)	*0.003769	* Area (sq ft)	*	* 224.10 *	*
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00 *	*
* Top Width (ft)	* 71.96	* Top Width (ft)	*	* 71.96 *	*
* Vel Total (ft/s)	* 12.81	* Avg. Vel. (ft/s)	*	* 12.81 *	*
* Max Chl Dpth (ft)	* 3.89	* Hydr. Depth (ft)	*	* 3.11 *	*
* Conv. Total (cfs)	* 46750.1	* Conv. (cfs)	*	* 46750.1 *	*
* Length Wtd. (ft)	* 196.55	* Wetted Per. (ft)	*	* 73.33 *	*

* Min Ch El (ft)	* 1708.96	* Shear (lb/sq ft)	*	* 0.72	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 9.21	*
* Frctn Loss (ft)	* 0.74	* Cum Volume (acre-ft)	*	* 27.16	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 7.32	*

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1715.95	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 2.81	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 1713.15	* Reach Len. (ft)	* 196.55	* 196.55	* 196.55 *
* Crit W.S. (ft)	* 1713.81	* Flow Area (sq ft)	*	* 245.33	*
* E.G. Slope (ft/ft)	*0.003773	* Area (sq ft)	*	* 245.33	*
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	*
* Top Width (ft)	* 73.13	* Top Width (ft)	*	* 73.13	*
* Vel Total (ft/s)	* 13.45	* Avg. Vel. (ft/s)	*	* 13.45	*
* Max Chl Dpth (ft)	* 4.18	* Hydr. Depth (ft)	*	* 3.35	*
* Conv. Total (cfs)	* 53723.9	* Conv. (cfs)	*	* 53723.9	*
* Length Wtd. (ft)	* 196.55	* Wetted Per. (ft)	*	* 74.64	*
* Min Ch El (ft)	* 1708.96	* Shear (lb/sq ft)	*	* 0.77	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 10.41	*
* Frctn Loss (ft)	* 0.74	* Cum Volume (acre-ft)	*	* 24.29	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 7.23	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 144.285*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1714.85	1010.76	1709.47	1012.05	1709.1	1043.6	1708.22	1070.56	1709.09
1072.05	1709.41	1082.92	1714.85						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	196.55	196.55	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1714.65	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 2.54	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 1712.11	* Reach Len. (ft)	* 196.55	* 196.55	* 196.55 *
* Crit W.S. (ft)	* 1712.68	* Flow Area (sq ft)	*	* 224.29	*
* E.G. Slope (ft/ft)	*0.003759	* Area (sq ft)	*	* 224.29	*
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00	*
* Top Width (ft)	* 71.97	* Top Width (ft)	*	* 71.97	*
* Vel Total (ft/s)	* 12.80	* Avg. Vel. (ft/s)	*	* 12.80	*
* Max Chl Dpth (ft)	* 3.89	* Hydr. Depth (ft)	*	* 3.12	*
* Conv. Total (cfs)	* 46810.7	* Conv. (cfs)	*	* 46810.7	*
* Length Wtd. (ft)	* 196.55	* Wetted Per. (ft)	*	* 73.35	*
* Min Ch El (ft)	* 1708.22	* Shear (lb/sq ft)	*	* 0.72	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 9.18	*
* Frctn Loss (ft)	* 0.74	* Cum Volume (acre-ft)	*	* 26.15	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 7.00	*

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1715.21	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 2.81	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 1712.41	* Reach Len. (ft)	* 196.55	* 196.55	* 196.55 *
* Crit W.S. (ft)	* 1713.07	* Flow Area (sq ft)	*	* 245.52	*
* E.G. Slope (ft/ft)	*0.003764	* Area (sq ft)	*	* 245.52	*
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	*
* Top Width (ft)	* 73.14	* Top Width (ft)	*	* 73.14	*
* Vel Total (ft/s)	* 13.44	* Avg. Vel. (ft/s)	*	* 13.44	*
* Max Chl Dpth (ft)	* 4.18	* Hydr. Depth (ft)	*	* 3.36	*
* Conv. Total (cfs)	* 53788.5	* Conv. (cfs)	*	* 53788.5	*
* Length Wtd. (ft)	* 196.55	* Wetted Per. (ft)	*	* 74.66	*
* Min Ch El (ft)	* 1708.22	* Shear (lb/sq ft)	*	* 0.77	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 10.39	*
* Frctn Loss (ft)	* 0.74	* Cum Volume (acre-ft)	*	* 23.18	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 6.90	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 143.571*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1714.1	1010.67	1708.77	1011.95	1708.36	1043.25	1707.47	1070.45	1708.34
1071.95	1708.62	1082.92	1714.1						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	196.55	196.55	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1713.91	Element		0.015	
Vel Head (ft)	2.56	Wt. n-Val.		0.015	
W.S. Elev (ft)	1711.36	Reach Len. (ft)	196.55	196.55	196.55
Crit W.S. (ft)	1711.93	Flow Area (sq ft)		223.66	
E.G. Slope (ft/ft)	*0.003792	Area (sq ft)		223.66	
Q Total (cfs)	2870.00	Flow (cfs)		2870.00	
Top Width (ft)	71.93	Top Width (ft)		71.93	
Vel Total (ft/s)	12.83	Avg. Vel. (ft/s)		12.83	
Max Chl Dpth (ft)	3.89	Hydr. Depth (ft)		3.11	
Conv. Total (cfs)	46607.2	Conv. (cfs)		46607.2	
Length Wtd. (ft)	196.55	Wetted Per. (ft)		73.31	
Min Ch El (ft)	1707.47	Shear (lb/sq ft)		0.72	
Alpha	1.00	Stream Power (lb/ft s)		9.27	
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)		25.14	
C & E Loss (ft)	0.00	Cum SA (acres)		6.67	

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	1714.47	Element		0.015	
Vel Head (ft)	2.82	Wt. n-Val.		0.015	
W.S. Elev (ft)	1711.65	Reach Len. (ft)	196.55	196.55	196.55
Crit W.S. (ft)	1712.32	Flow Area (sq ft)		244.99	
E.G. Slope (ft/ft)	*0.003789	Area (sq ft)		244.99	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	73.11	Top Width (ft)		73.11	
Vel Total (ft/s)	13.47	Avg. Vel. (ft/s)		13.47	
Max Chl Dpth (ft)	4.18	Hydr. Depth (ft)		3.35	
Conv. Total (cfs)	53607.4	Conv. (cfs)		53607.4	
Length Wtd. (ft)	196.55	Wetted Per. (ft)		74.62	
Min Ch El (ft)	1707.47	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)		10.46	
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)		22.08	
C & E Loss (ft)	0.00	Cum SA (acres)		6.57	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 142.857*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1713.36	1010.58	1708.07	1011.85	1707.62	1042.89	1706.73	1070.34	1707.6
1071.85	1707.83	1082.92	1713.36						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	196.55	196.55	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1713.17	Element		0.015	
Vel Head (ft)	2.56	Wt. n-Val.		0.015	
W.S. Elev (ft)	1710.62	Reach Len. (ft)	196.55	196.55	196.55
Crit W.S. (ft)	1711.19	Flow Area (sq ft)		223.71	
E.G. Slope (ft/ft)	*0.003790	Area (sq ft)		223.71	
Q Total (cfs)	2870.00	Flow (cfs)		2870.00	
Top Width (ft)	71.94	Top Width (ft)		71.94	
Vel Total (ft/s)	12.83	Avg. Vel. (ft/s)		12.83	
Max Chl Dpth (ft)	3.89	Hydr. Depth (ft)		3.11	
Conv. Total (cfs)	46617.9	Conv. (cfs)		46617.9	
Length Wtd. (ft)	196.55	Wetted Per. (ft)		73.32	
Min Ch El (ft)	1706.73	Shear (lb/sq ft)		0.72	
Alpha	1.00	Stream Power (lb/ft s)		9.26	
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)		24.13	
C & E Loss (ft)	0.00	Cum SA (acres)		6.35	

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	1713.73	Element		0.015	
Vel Head (ft)	2.82	Wt. n-Val.		0.015	
W.S. Elev (ft)	1710.91	Reach Len. (ft)	196.55	196.55	196.55
Crit W.S. (ft)	1711.58	Flow Area (sq ft)		245.03	
E.G. Slope (ft/ft)	*0.003788	Area (sq ft)		245.03	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	73.12	Top Width (ft)		73.12	
Vel Total (ft/s)	13.47	Avg. Vel. (ft/s)		13.47	
Max Chl Dpth (ft)	4.18	Hydr. Depth (ft)		3.35	
Conv. Total (cfs)	53619.0	Conv. (cfs)		53619.0	
Length Wtd. (ft)	196.55	Wetted Per. (ft)		74.64	
Min Ch El (ft)	1706.73	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)		10.46	
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)		20.97	
C & E Loss (ft)	0.00	Cum SA (acres)		6.24	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 142.142*

INPUT

Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1712.62	1010.49	1707.37	1011.76	1706.88	1042.53	1705.99	1070.23	1706.85
1071.76	1707.04	1082.92	1712.62						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1000 1082.92 196.55 196.55 196.55 .1 .3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1712.43	Element			
Vel Head (ft)	2.55	Wt. n-Val.		0.015	
W.S. Elev (ft)	1709.88	Reach Len. (ft)	196.55	196.55	196.55
Crit W.S. (ft)	1710.45	Flow Area (sq ft)		223.92	
E.G. Slope (ft/ft)	*0.003779	Area (sq ft)		223.92	
Q Total (cfs)	2870.00	Flow (cfs)		2870.00	
Top Width (ft)	71.95	Top Width (ft)		71.95	
Vel Total (ft/s)	12.82	Avg. Vel. (ft/s)		12.82	
Max Chl Dpth (ft)	3.89	Hydr. Depth (ft)		3.11	
Conv. Total (cfs)	46684.0	Conv. (cfs)		46684.0	
Length Wtd. (ft)	196.55	Wetted Per. (ft)		73.34	
Min Ch El (ft)	1705.99	Shear (lb/sq ft)		0.72	
Alpha	1.00	Stream Power (lb/ft s)		9.23	
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)		23.12	
C & E Loss (ft)	0.00	Cum SA (acres)		6.03	

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	1712.98	Element			
Vel Head (ft)	2.81	Wt. n-Val.		0.015	
W.S. Elev (ft)	1710.17	Reach Len. (ft)	196.55	196.55	196.55
Crit W.S. (ft)	1710.84	Flow Area (sq ft)		245.25	
E.G. Slope (ft/ft)	*0.003778	Area (sq ft)		245.25	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	73.13	Top Width (ft)		73.13	
Vel Total (ft/s)	13.46	Avg. Vel. (ft/s)		13.46	
Max Chl Dpth (ft)	4.18	Hydr. Depth (ft)		3.35	
Conv. Total (cfs)	53689.2	Conv. (cfs)		53689.2	
Length Wtd. (ft)	196.55	Wetted Per. (ft)		74.66	
Min Ch El (ft)	1705.99	Shear (lb/sq ft)		0.77	
Alpha	1.00	Stream Power (lb/ft s)		10.43	
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)		19.87	
C & E Loss (ft)	0.00	Cum SA (acres)		5.91	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 141.428*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1711.88	1010.4	1706.67	1011.66	1706.14	1042.17	1705.25	1070.11	1706.11
1071.66	1706.24	1082.92	1711.88						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1000 1082.92 196.55 196.55 196.55 .1 .3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1711.69	Element			
Vel Head (ft)	2.55	Wt. n-Val.		0.015	
W.S. Elev (ft)	1709.14	Reach Len. (ft)	196.55	196.55	196.55
Crit W.S. (ft)	1709.71	Flow Area (sq ft)		224.03	
E.G. Slope (ft/ft)	*0.003775	Area (sq ft)		224.03	
Q Total (cfs)	2870.00	Flow (cfs)		2870.00	
Top Width (ft)	71.97	Top Width (ft)		71.97	
Vel Total (ft/s)	12.81	Avg. Vel. (ft/s)		12.81	
Max Chl Dpth (ft)	3.89	Hydr. Depth (ft)		3.11	
Conv. Total (cfs)	46709.8	Conv. (cfs)		46709.8	
Length Wtd. (ft)	196.55	Wetted Per. (ft)		73.37	
Min Ch El (ft)	1705.25	Shear (lb/sq ft)		0.72	
Alpha	1.00	Stream Power (lb/ft s)		9.22	
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)		22.11	
C & E Loss (ft)	0.00	Cum SA (acres)		5.70	

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	1712.24	Element			
Vel Head (ft)	2.81	Wt. n-Val.		0.015	
W.S. Elev (ft)	1709.43	Reach Len. (ft)	196.55	196.55	196.55
Crit W.S. (ft)	1710.10	Flow Area (sq ft)		245.37	
E.G. Slope (ft/ft)	*0.003774	Area (sq ft)		245.37	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	73.14	Top Width (ft)		73.14	
Vel Total (ft/s)	13.45	Avg. Vel. (ft/s)		13.45	
Max Chl Dpth (ft)	4.18	Hydr. Depth (ft)		3.35	
Conv. Total (cfs)	53717.5	Conv. (cfs)		53717.5	

* Length Wtd. (ft)	* 196.55	* Wetted Per. (ft)	*	*	74.68	*	*
* Min Ch El (ft)	* 1705.25	* Shear (lb/sq ft)	*	*	0.77	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	*	10.41	*	*
* Frctn Loss (ft)	* 0.74	* Cum Volume (acre-ft)	*	*	18.76	*	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	*	5.58	*	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 140.714*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1711.13	1010.31	1705.98	1011.56	1705.4	1041.82	1704.5	1070	1705.36
1071.56	1705.45	1082.92	1711.13						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	196.55	196.55	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1710.94	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 2.54	* Wt. n-Val.	*	* 0.015	*	*
* W.S. Elev (ft)	* 1708.39	* Reach Len. (ft)	* 196.55	* 196.55	* 196.55	*
* Crit W.S. (ft)	* 1708.97	* Flow Area (sq ft)	*	* 224.36	*	*
* E.G. Slope (ft/ft)	*0.003758	* Area (sq ft)	*	* 224.36	*	*
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00	*	*
* Top Width (ft)	* 71.97	* Top Width (ft)	*	* 71.97	*	*
* Vel Total (ft/s)	* 12.79	* Avg. Vel. (ft/s)	*	* 12.79	*	*
* Max Chl Dpth (ft)	* 3.89	* Hydr. Depth (ft)	*	* 3.12	*	*
* Conv. Total (cfs)	* 46814.7	* Conv. (cfs)	*	* 46814.7	*	*
* Length Wtd. (ft)	* 196.55	* Wetted Per. (ft)	*	* 73.39	*	*
* Min Ch El (ft)	* 1704.50	* Shear (lb/sq ft)	*	* 0.72	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 9.18	*	*
* Frctn Loss (ft)	* 0.74	* Cum Volume (acre-ft)	*	* 21.10	*	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 5.38	*	*

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1711.49	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 2.80	* Wt. n-Val.	*	* 0.015	*	*
* W.S. Elev (ft)	* 1708.69	* Reach Len. (ft)	* 196.55	* 196.55	* 196.55	*
* Crit W.S. (ft)	* 1709.35	* Flow Area (sq ft)	*	* 245.71	*	*
* E.G. Slope (ft/ft)	*0.003758	* Area (sq ft)	*	* 245.71	*	*
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	*	*
* Top Width (ft)	* 73.15	* Top Width (ft)	*	* 73.15	*	*
* Vel Total (ft/s)	* 13.43	* Avg. Vel. (ft/s)	*	* 13.43	*	*
* Max Chl Dpth (ft)	* 4.19	* Hydr. Depth (ft)	*	* 3.36	*	*
* Conv. Total (cfs)	* 53832.5	* Conv. (cfs)	*	* 53832.5	*	*
* Length Wtd. (ft)	* 196.55	* Wetted Per. (ft)	*	* 74.71	*	*
* Min Ch El (ft)	* 1704.50	* Shear (lb/sq ft)	*	* 0.77	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 10.36	*	*
* Frctn Loss (ft)	* 0.74	* Cum Volume (acre-ft)	*	* 17.65	*	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 5.25	*	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 140

INPUT
Description: PLAN STA 158+50
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1710.39	1011.46	1704.66	1041.46	1703.76	1071.46	1704.66	1082.92	1710.39

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	50	50	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1710.37	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 1.04	* Wt. n-Val.	*	* 0.015	*	*
* W.S. Elev (ft)	* 1709.34	* Reach Len. (ft)	* 50.00	* 50.00	* 50.00	*
* Crit W.S. (ft)	* 1708.23	* Flow Area (sq ft)	*	* 351.20	*	*
* E.G. Slope (ft/ft)	*0.000962	* Area (sq ft)	*	* 351.20	*	*
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00	*	*
* Top Width (ft)	* 78.70	* Top Width (ft)	*	* 78.70	*	*
* Vel Total (ft/s)	* 8.17	* Avg. Vel. (ft/s)	*	* 8.17	*	*
* Max Chl Dpth (ft)	* 5.57	* Hydr. Depth (ft)	*	* 4.46	*	*
* Conv. Total (cfs)	* 92555.6	* Conv. (cfs)	*	* 92555.6	*	*
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)	*	* 80.93	*	*
* Min Ch El (ft)	* 1703.76	* Shear (lb/sq ft)	*	* 0.26	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 2.13	*	*
* Frctn Loss (ft)	* 0.04	* Cum Volume (acre-ft)	*	* 19.80	*	*
* C & E Loss (ft)	* 0.03	* Cum SA (acres)	*	* 5.04	*	*

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	1710.75	Element	Left OB	Channel	Right OB	
Vel Head (ft)	2.80	Wt. n-Val.		0.015		
W.S. Elev (ft)	1707.95	Reach Len. (ft)	50.00	50.00	50.00	
Crit W.S. (ft)	1708.61	Flow Area (sq ft)		245.91		
E.G. Slope (ft/ft)	*0.003750	Area (sq ft)		245.91		
Q Total (cfs)	3300.00	Flow (cfs)		3300.00		
Top Width (ft)	73.15	Top Width (ft)		73.15		
Vel Total (ft/s)	13.42	Avg. Vel. (ft/s)		13.42		
Max Chl Dpth (ft)	4.19	Hydr. Depth (ft)		3.36		
Conv. Total (cfs)	53892.0	Conv. (cfs)		53892.0		
Length Wtd. (ft)	50.00	Wetted Per. (ft)		74.73		
Min Ch El (ft)	1703.76	Shear (lb/sq ft)		0.77		
Alpha	1.00	Stream Power (lb/ft s)		10.34		
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)		16.54		
C & E Loss (ft)	0.00	Cum SA (acres)		4.92		

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 130

INPUT
Description: PLAN STA 159+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1710.2	1011.46	1704.47	1041.46	1703.57	1071.46	1704.47	1082.92	1710.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	129.35	129.35	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1710.30	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.95	Wt. n-Val.		0.015		
W.S. Elev (ft)	1709.35	Reach Len. (ft)	129.35	129.35	129.35	
Crit W.S. (ft)		Flow Area (sq ft)		367.67		
E.G. Slope (ft/ft)	*0.000838	Area (sq ft)		367.67		
Q Total (cfs)	2870.00	Flow (cfs)		2870.00		
Top Width (ft)	79.53	Top Width (ft)		79.53		
Vel Total (ft/s)	7.81	Avg. Vel. (ft/s)		7.81		
Max Chl Dpth (ft)	5.78	Hydr. Depth (ft)		4.62		
Conv. Total (cfs)	99145.9	Conv. (cfs)		99145.9		
Length Wtd. (ft)	129.35	Wetted Per. (ft)		81.86		
Min Ch El (ft)	1703.57	Shear (lb/sq ft)		0.23		
Alpha	1.00	Stream Power (lb/ft s)		1.83		
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)		19.39		
C & E Loss (ft)	0.05	Cum SA (acres)		4.95		

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	1710.55	Element	Left OB	Channel	Right OB	
Vel Head (ft)	2.79	Wt. n-Val.		0.015		
W.S. Elev (ft)	1707.76	Reach Len. (ft)	129.35	129.35	129.35	
Crit W.S. (ft)	1708.42	Flow Area (sq ft)		246.08		
E.G. Slope (ft/ft)	*0.003742	Area (sq ft)		246.08		
Q Total (cfs)	3300.00	Flow (cfs)		3300.00		
Top Width (ft)	73.16	Top Width (ft)		73.16		
Vel Total (ft/s)	13.41	Avg. Vel. (ft/s)		13.41		
Max Chl Dpth (ft)	4.19	Hydr. Depth (ft)		3.36		
Conv. Total (cfs)	53949.0	Conv. (cfs)		53949.0		
Length Wtd. (ft)	129.35	Wetted Per. (ft)		74.74		
Min Ch El (ft)	1703.57	Shear (lb/sq ft)		0.77		
Alpha	1.00	Stream Power (lb/ft s)		10.31		
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)		16.26		
C & E Loss (ft)	0.00	Cum SA (acres)		4.83		

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 120

INPUT
Description: PLAN STA 160+29
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1711.59	1015.2	1703.99	1045.2	1703.09	1075.2	1703.99	1090.4	1711.59

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1090.4	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1090.4	50	50	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1710.15	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.76	Wt. n-Val.		0.015		

* W.S. Elev (ft)	* 1709.39	* Reach Len. (ft)	* 50.00	* 50.00	* 50.00 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	*	* 409.02	* *
* E.G. Slope (ft/ft)	*0.000609	* Area (sq ft)	*	* 409.02	* *
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00	* *
* Top Width (ft)	* 81.59	* Top Width (ft)	*	* 81.59	* *
* Vel Total (ft/s)	* 7.02	* Avg. Vel. (ft/s)	*	* 7.02	* *
* Max Chl Dpth (ft)	* 6.30	* Hydr. Depth (ft)	*	* 5.01	* *
* Conv. Total (cfs)	*116255.5	* Conv. (cfs)	*	*116255.5	* *
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)	*	* 84.16	* *
* Min Ch El (ft)	* 1703.09	* Shear (lb/sq ft)	*	* 0.18	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 1.30	* *
* Frctn Loss (ft)	* 0.03	* Cum Volume (acre-ft)	*	* 18.23	* *
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	*	* 4.71	* *

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1710.07	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 2.79	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1707.28	* Reach Len. (ft)	* 50.00	* 50.00	* 50.00 *
* Crit W.S. (ft)	* 1707.93	* Flow Area (sq ft)	*	* 246.08	* *
* E.G. Slope (ft/ft)	*0.003742	* Area (sq ft)	*	* 246.08	* *
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	* *
* Top Width (ft)	* 73.16	* Top Width (ft)	*	* 73.16	* *
* Vel Total (ft/s)	* 13.41	* Avg. Vel. (ft/s)	*	* 13.41	* *
* Max Chl Dpth (ft)	* 4.19	* Hydr. Depth (ft)	*	* 3.36	* *
* Conv. Total (cfs)	* 53948.9	* Conv. (cfs)	*	* 53948.9	* *
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)	*	* 74.74	* *
* Min Ch El (ft)	* 1703.09	* Shear (lb/sq ft)	*	* 0.77	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 10.31	* *
* Frctn Loss (ft)	* 0.48	* Cum Volume (acre-ft)	*	* 15.53	* *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 4.62	* *

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 110

INPUT
Description: PLAN STA 160+79
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1712.33	1000	1703.83	1031	1702.9	1072.5	1704.15	1072.5	1712.65

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1072.5	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1072.5	100	100	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1710.10	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.69	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1709.41	* Reach Len. (ft)	* 100.00	* 100.00	* 100.00 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	*	* 431.89	* *
* E.G. Slope (ft/ft)	*0.000502	* Area (sq ft)	*	* 431.89	* *
* Q Total (cfs)	* 2870.00	* Flow (cfs)	*	* 2870.00	* *
* Top Width (ft)	* 72.50	* Top Width (ft)	*	* 72.50	* *
* Vel Total (ft/s)	* 6.65	* Avg. Vel. (ft/s)	*	* 6.65	* *
* Max Chl Dpth (ft)	* 6.51	* Hydr. Depth (ft)	*	* 5.96	* *
* Conv. Total (cfs)	*128080.7	* Conv. (cfs)	*	*128080.7	* *
* Length Wtd. (ft)	* 100.00	* Wetted Per. (ft)	*	* 83.38	* *
* Min Ch El (ft)	* 1702.90	* Shear (lb/sq ft)	*	* 0.16	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 1.08	* *
* Frctn Loss (ft)	* 0.08	* Cum Volume (acre-ft)	*	* 17.75	* *
* C & E Loss (ft)	* 0.09	* Cum SA (acres)	*	* 4.62	* *

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1709.81	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 3.17	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1706.64	* Reach Len. (ft)	* 100.00	* 100.00	* 100.00 *
* Crit W.S. (ft)	* 1707.46	* Flow Area (sq ft)	*	* 230.83	* *
* E.G. Slope (ft/ft)	*0.004888	* Area (sq ft)	*	* 230.83	* *
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	* *
* Top Width (ft)	* 72.50	* Top Width (ft)	*	* 72.50	* *
* Vel Total (ft/s)	* 14.30	* Avg. Vel. (ft/s)	*	* 14.30	* *
* Max Chl Dpth (ft)	* 3.74	* Hydr. Depth (ft)	*	* 3.18	* *
* Conv. Total (cfs)	* 47201.5	* Conv. (cfs)	*	* 47201.5	* *
* Length Wtd. (ft)	* 100.00	* Wetted Per. (ft)	*	* 77.83	* *
* Min Ch El (ft)	* 1702.90	* Shear (lb/sq ft)	*	* 0.90	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 12.94	* *
* Frctn Loss (ft)	* 0.21	* Cum Volume (acre-ft)	*	* 15.25	* *
* C & E Loss (ft)	* 0.04	* Cum SA (acres)	*	* 4.53	* *

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 100

INPUT
Description: PLAN STA 161+79
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

```
*****************************************************************************
    1000 1711.95    1000 1703.45    1031 1702.52  1072.5 1703.57  1072.5 1712.27

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    1000    .015    1000    .015  1072.5    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1000  1072.5               100     100     100           .1       .3

CROSS SECTION OUTPUT  Profile #Post-Project
*************************************************************************************************
* E.G. Elev (ft)         * 1709.93  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.57  * Wt. n-Val.            *          *    0.015  *          *
* W.S. Elev (ft)         * 1708.36  * Reach Len. (ft)      *  100.00  *  100.00  *  100.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)     *          *  387.42  *          *
* E.G. Slope (ft/ft)     *0.001301  * Area (sq ft)          *          *  387.42  *          *
* Q Total (cfs)          * 3891.00  * Flow (cfs)            *          * 3891.00  *          *
* Top Width (ft)         *   72.50  * Top Width (ft)        *          *   72.50  *          *
* Vel Total (ft/s)       *   10.04  * Avg. Vel. (ft/s)      *          *   10.04  *          *
* Max Chl Dpth (ft)      *    5.84  * Hydr. Depth (ft)      *          *    5.34  *          *
* Conv. Total (cfs)      *107854.8  * Conv. (cfs)          *          *107854.8  *          *
* Length Wtd. (ft)       *  100.00  * Wetted Per. (ft)      *          *   82.23  *          *
* Min Ch El (ft)         * 1702.52  * Shear (lb/sq ft)     *          *    0.38  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    3.84  *          *
* Frctn Loss (ft)        *    0.08  * Cum Volume (acre-ft)  *          *   16.81  *          *
* C & E Loss (ft)        *    0.23  * Cum SA (acres)        *          *    4.45  *          *
*************************************************************************************************

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 OUTPUT  Profile #PF 2
*************************************************************************************************
* E.G. Elev (ft)         * 1709.30  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    3.01  * Wt. n-Val.            *          *    0.015  *          *
* W.S. Elev (ft)         * 1706.29  * Reach Len. (ft)      *  100.00  *  100.00  *  100.00  *
* Crit W.S. (ft)         * 1707.01  * Flow Area (sq ft)     *          *  237.09  *          *
* E.G. Slope (ft/ft)     *0.004490  * Area (sq ft)          *          *  237.09  *          *
* Q Total (cfs)          * 3300.00  * Flow (cfs)            *          * 3300.00  *          *
* Top Width (ft)         *   72.50  * Top Width (ft)        *          *   72.50  *          *
* Vel Total (ft/s)       *   13.92  * Avg. Vel. (ft/s)      *          *   13.92  *          *
* Max Chl Dpth (ft)      *    3.77  * Hydr. Depth (ft)      *          *    3.27  *          *
* Conv. Total (cfs)      * 49246.9  * Conv. (cfs)          *          * 49246.9  *          *
* Length Wtd. (ft)       *  100.00  * Wetted Per. (ft)      *          *   78.09  *          *
* Min Ch El (ft)         * 1702.52  * Shear (lb/sq ft)     *          *    0.85  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   11.85  *          *
* Frctn Loss (ft)        *    0.47  * Cum Volume (acre-ft)  *          *   14.72  *          *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)        *          *    4.37  *          *
*************************************************************************************************

CROSS SECTION


RIVER: Range Wash
REACH: Sloan Channel      RS: 90

INPUT
Description: PLAN STA 162+79
Station Elevation Data    num=       5
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
*****************************************************************************
    1000 1712.14    1000 1703.61    1049 1702.14  1090.5 1703.39  1090.5 1710.16

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    1000    .015    1000    .015  1090.5    .015

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1000  1090.5               50      50      50           .1       .3

CROSS SECTION OUTPUT  Profile #Post-Project
*************************************************************************************************
* E.G. Elev (ft)         * 1709.62  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.80  * Wt. n-Val.            *          *    0.015  *          *
* W.S. Elev (ft)         * 1708.82  * Reach Len. (ft)      *   50.00  *   50.00  *   50.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)     *          *  542.38  *          *
* E.G. Slope (ft/ft)     *0.000559  * Area (sq ft)          *          *  542.38  *          *
* Q Total (cfs)          * 3891.00  * Flow (cfs)            *          * 3891.00  *          *
* Top Width (ft)         *   90.50  * Top Width (ft)        *          *   90.50  *          *
* Vel Total (ft/s)       *    7.17  * Avg. Vel. (ft/s)      *          *    7.17  *          *
* Max Chl Dpth (ft)      *    6.68  * Hydr. Depth (ft)      *          *    5.99  *          *
* Conv. Total (cfs)      *164574.1  * Conv. (cfs)          *          *164574.1  *          *
* Length Wtd. (ft)       *   50.00  * Wetted Per. (ft)      *          *  101.18  *          *
* Min Ch El (ft)         * 1702.14  * Shear (lb/sq ft)     *          *    0.19  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    1.34  *          *
* Frctn Loss (ft)        *    0.05  * Cum Volume (acre-ft)  *          *   15.74  *          *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)        *          *    4.26  *          *
*************************************************************************************************

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 OUTPUT  Profile #PF 2
*************************************************************************************************
* E.G. Elev (ft)         * 1708.93  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.71  * Wt. n-Val.            *          *    0.015  *          *
* W.S. Elev (ft)         * 1708.22  * Reach Len. (ft)      *   50.00  *   50.00  *   50.00  *
* Crit W.S. (ft)         * 1706.28  * Flow Area (sq ft)     *          *  488.54  *          *
* E.G. Slope (ft/ft)     *0.000561  * Area (sq ft)          *          *  488.54  *          *
```

* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	*
* Top Width (ft)	* 90.50	* Top Width (ft)	*	* 90.50	*
* Vel Total (ft/s)	* 6.75	* Avg. Vel. (ft/s)	*	* 6.75	*
* Max Chl Dpth (ft)	* 6.08	* Hydr. Depth (ft)	*	* 5.40	*
* Conv. Total (cfs)	*139350.2	* Conv. (cfs)	*	*139350.2	*
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)	*	* 99.99	*
* Min Ch El (ft)	* 1702.14	* Shear (lb/sq ft)	*	* 0.17	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 1.16	*
* Frctn Loss (ft)	* 0.05	* Cum Volume (acre-ft)	*	* 13.88	*
* C & E Loss (ft)	* 0.12	* Cum SA (acres)	*	* 4.18	*

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.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 80

INPUT
Description: PLAN STA 163+29
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1708.85	1011.5	1702.85	1041.5	1701.95	1071.5	1702.85	1083	1708.85

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1083	.015

Bank Sta: Left 1000 Right 1083 Lengths: Left Channel 91.21 Right 91.21 Coeff Contr. .1 Expan. .3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1709.43	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 2.15	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1707.28	* Reach Len. (ft)	* 91.21	* 91.21	* 91.21 *
* Crit W.S. (ft)	* 1707.28	* Flow Area (sq ft)	*	* 330.74	* *
* E.G. Slope (ft/ft)	*0.002097	* Area (sq ft)	*	* 330.74	* *
* Q Total (cfs)	* 3891.00	* Flow (cfs)	*	* 3891.00	* *
* Top Width (ft)	* 77.00	* Top Width (ft)	*	* 77.00	* *
* Vel Total (ft/s)	* 11.76	* Avg. Vel. (ft/s)	*	* 11.76	* *
* Max Chl Dpth (ft)	* 5.33	* Hydr. Depth (ft)	*	* 4.30	* *
* Conv. Total (cfs)	* 84963.4	* Conv. (cfs)	*	* 84963.4	* *
* Length Wtd. (ft)	* 91.21	* Wetted Per. (ft)	*	* 79.20	* *
* Min Ch El (ft)	* 1701.95	* Shear (lb/sq ft)	*	* 0.55	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 6.43	* *
* Frctn Loss (ft)	* 0.19	* Cum Volume (acre-ft)	*	* 15.24	* *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 4.17	* *

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
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 OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1708.76	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 1.96	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1706.80	* Reach Len. (ft)	* 91.21	* 91.21	* 91.21 *
* Crit W.S. (ft)	* 1706.80	* Flow Area (sq ft)	*	* 294.08	* *
* E.G. Slope (ft/ft)	*0.002154	* Area (sq ft)	*	* 294.08	* *
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	* *
* Top Width (ft)	* 75.15	* Top Width (ft)	*	* 75.15	* *
* Vel Total (ft/s)	* 11.22	* Avg. Vel. (ft/s)	*	* 11.22	* *
* Max Chl Dpth (ft)	* 4.85	* Hydr. Depth (ft)	*	* 3.91	* *
* Conv. Total (cfs)	* 71106.5	* Conv. (cfs)	*	* 71106.5	* *
* Length Wtd. (ft)	* 91.21	* Wetted Per. (ft)	*	* 77.12	* *
* Min Ch El (ft)	* 1701.95	* Shear (lb/sq ft)	*	* 0.51	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 5.75	* *
* Frctn Loss (ft)	* 0.20	* Cum Volume (acre-ft)	*	* 13.44	* *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 4.08	* *

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
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: Range Wash
REACH: Sloan Channel RS: 78.8888*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1708.34	1011.47	1702.38	1011.5	1702.37	1041.5	1701.47	1071.49	1702.37
1071.52	1702.38	1082.99	1708.34						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.99	.015

Bank Sta: Left 1000 Right 1082.99 Lengths: Left Channel Right 91.21 91.21 91.21 Coeff Contr. .1 Expan. .3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1709.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.95	Wt. n-Val.		0.015	
W.S. Elev (ft)	1706.17	Reach Len. (ft)	91.21	91.21	91.21
Crit W.S. (ft)	1706.80	Flow Area (sq ft)		282.42	
E.G. Slope (ft/ft)	*0.003390	Area (sq ft)		282.42	
Q Total (cfs)	3891.00	Flow (cfs)		3891.00	
Top Width (ft)	74.62	Top Width (ft)		74.62	
Vel Total (ft/s)	13.78	Avg. Vel. (ft/s)		13.78	
Max Chl Dpth (ft)	4.69	Hydr. Depth (ft)		3.78	
Conv. Total (cfs)	66831.1	Conv. (cfs)		66831.1	
Length Wtd. (ft)	91.21	Wetted Per. (ft)		76.50	
Min Ch El (ft)	1701.47	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)		10.76	
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)		14.60	
C & E Loss (ft)	0.08	Cum SA (acres)		4.01	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	1708.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.71	Wt. n-Val.		0.015	
W.S. Elev (ft)	1705.72	Reach Len. (ft)	91.21	91.21	91.21
Crit W.S. (ft)	1706.32	Flow Area (sq ft)		249.92	
E.G. Slope (ft/ft)	*0.003543	Area (sq ft)		249.92	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	72.92	Top Width (ft)		72.92	
Vel Total (ft/s)	13.20	Avg. Vel. (ft/s)		13.20	
Max Chl Dpth (ft)	4.25	Hydr. Depth (ft)		3.43	
Conv. Total (cfs)	55439.1	Conv. (cfs)		55439.1	
Length Wtd. (ft)	91.21	Wetted Per. (ft)		74.59	
Min Ch El (ft)	1701.47	Shear (lb/sq ft)		0.74	
Alpha	1.00	Stream Power (lb/ft s)		9.79	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)		12.87	
C & E Loss (ft)	0.08	Cum SA (acres)		3.93	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 77.7777*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1707.83	1011.47	1701.9	1011.5	1701.89	1041.49	1700.99	1071.48	1701.89
1071.51	1701.9	1082.98	1707.83						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.98	.015

Bank Sta: Left 1000 Right 1082.98 Lengths: Left Channel 91.21 Right 91.21 91.21 Coeff Contr. .1 Expan. .3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1708.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.24	Wt. n-Val.		0.015	
W.S. Elev (ft)	1705.51	Reach Len. (ft)	91.21	91.21	91.21
Crit W.S. (ft)	1706.32	Flow Area (sq ft)		269.37	
E.G. Slope (ft/ft)	*0.003919	Area (sq ft)		269.37	
Q Total (cfs)	3891.00	Flow (cfs)		3891.00	
Top Width (ft)	74.00	Top Width (ft)		74.00	
Vel Total (ft/s)	14.44	Avg. Vel. (ft/s)		14.44	
Max Chl Dpth (ft)	4.52	Hydr. Depth (ft)		3.64	
Conv. Total (cfs)	62151.1	Conv. (cfs)		62151.1	
Length Wtd. (ft)	91.21	Wetted Per. (ft)		75.78	
Min Ch El (ft)	1700.99	Shear (lb/sq ft)		0.87	
Alpha	1.00	Stream Power (lb/ft s)		12.56	
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)		14.02	
C & E Loss (ft)	0.03	Cum SA (acres)		3.85	

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	1708.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.96	Wt. n-Val.		0.015	
W.S. Elev (ft)	1705.09	Reach Len. (ft)	91.21	91.21	91.21
Crit W.S. (ft)	1705.84	Flow Area (sq ft)		238.94	
E.G. Slope (ft/ft)	*0.004071	Area (sq ft)		238.94	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	72.39	Top Width (ft)		72.39	
Vel Total (ft/s)	13.81	Avg. Vel. (ft/s)		13.81	
Max Chl Dpth (ft)	4.10	Hydr. Depth (ft)		3.30	
Conv. Total (cfs)	51722.6	Conv. (cfs)		51722.6	
Length Wtd. (ft)	91.21	Wetted Per. (ft)		73.97	
Min Ch El (ft)	1700.99	Shear (lb/sq ft)		0.82	

* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 11.34	*	*
* Frctn Loss (ft)	* 0.35	* Cum Volume (acre-ft)	*	* 12.35	*	*
* C & E Loss (ft)	* 0.03	* Cum SA (acres)	*	* 3.78	*	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 76.6666*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1707.32	1011.47	1701.42	1011.5	1701.41	1041.49	1700.51	1071.48	1701.41
1071.51	1701.42	1082.97	1707.32						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.97	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.97	91.21	91.21	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1708.35	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 3.42	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1704.93	* Reach Len. (ft)	* 91.21	* 91.21	* 91.21 *
* Crit W.S. (ft)	* 1705.84	* Flow Area (sq ft)	*	* 262.14	* *
* E.G. Slope (ft/ft)	*0.004263	* Area (sq ft)	*	* 262.14	* *
* Q Total (cfs)	* 3891.00	* Flow (cfs)	*	* 3891.00	* *
* Top Width (ft)	* 73.67	* Top Width (ft)	*	* 73.67	* *
* Vel Total (ft/s)	* 14.84	* Avg. Vel. (ft/s)	*	* 14.84	* *
* Max Chl Dpth (ft)	* 4.42	* Hydr. Depth (ft)	*	* 3.56	* *
* Conv. Total (cfs)	* 59593.0	* Conv. (cfs)	*	* 59593.0	* *
* Length Wtd. (ft)	* 91.21	* Wetted Per. (ft)	*	* 75.40	* *
* Min Ch El (ft)	* 1700.51	* Shear (lb/sq ft)	*	* 0.93	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 13.73	* *
* Frctn Loss (ft)	* 0.37	* Cum Volume (acre-ft)	*	* 13.47	* *
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	*	* 3.70	* *

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1707.65	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 3.12	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1704.52	* Reach Len. (ft)	* 91.21	* 91.21	* 91.21 *
* Crit W.S. (ft)	* 1705.36	* Flow Area (sq ft)	*	* 232.68	* *
* E.G. Slope (ft/ft)	*0.004421	* Area (sq ft)	*	* 232.68	* *
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	* *
* Top Width (ft)	* 72.10	* Top Width (ft)	*	* 72.10	* *
* Vel Total (ft/s)	* 14.18	* Avg. Vel. (ft/s)	*	* 14.18	* *
* Max Chl Dpth (ft)	* 4.01	* Hydr. Depth (ft)	*	* 3.23	* *
* Conv. Total (cfs)	* 49632.8	* Conv. (cfs)	*	* 49632.8	* *
* Length Wtd. (ft)	* 91.21	* Wetted Per. (ft)	*	* 73.64	* *
* Min Ch El (ft)	* 1700.51	* Shear (lb/sq ft)	*	* 0.87	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 12.37	* *
* Frctn Loss (ft)	* 0.39	* Cum Volume (acre-ft)	*	* 11.86	* *
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	*	* 3.63	* *

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 75.5555*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1706.81	1011.47	1700.94	1011.5	1700.93	1041.48	1700.03	1071.47	1700.93
1071.5	1700.94	1082.96	1706.81						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.96	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.96	91.21	91.21	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1707.94	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 3.56	* Wt. n-Val.	*	* 0.015	* *
* W.S. Elev (ft)	* 1704.38	* Reach Len. (ft)	* 91.21	* 91.21	* 91.21 *
* Crit W.S. (ft)	* 1705.36	* Flow Area (sq ft)	*	* 257.14	* *
* E.G. Slope (ft/ft)	*0.004526	* Area (sq ft)	*	* 257.14	* *
* Q Total (cfs)	* 3891.00	* Flow (cfs)	*	* 3891.00	* *
* Top Width (ft)	* 73.46	* Top Width (ft)	*	* 73.46	* *
* Vel Total (ft/s)	* 15.13	* Avg. Vel. (ft/s)	*	* 15.13	* *
* Max Chl Dpth (ft)	* 4.35	* Hydr. Depth (ft)	*	* 3.50	* *
* Conv. Total (cfs)	* 57838.5	* Conv. (cfs)	*	* 57838.5	* *
* Length Wtd. (ft)	* 91.21	* Wetted Per. (ft)	*	* 75.15	* *
* Min Ch El (ft)	* 1700.03	* Shear (lb/sq ft)	*	* 0.97	* *
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 14.63	* *
* Frctn Loss (ft)	* 0.40	* Cum Volume (acre-ft)	*	* 12.92	* *
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	* 3.55	* *

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	1707.22	Element	Left OB	Channel	Right OB	
Vel Head (ft)	3.23	Wt. n-Val.		0.015		
W.S. Elev (ft)	1703.99	Reach Len. (ft)	91.21	91.21	91.21	
Crit W.S. (ft)	1704.88	Flow Area (sq ft)		228.65		
E.G. Slope (ft/ft)	*0.004668	Area (sq ft)		228.65		
Q Total (cfs)	3300.00	Flow (cfs)		3300.00		
Top Width (ft)	71.93	Top Width (ft)		71.93		
Vel Total (ft/s)	14.43	Avg. Vel. (ft/s)		14.43		
Max Chl Dpth (ft)	3.96	Hydr. Depth (ft)		3.18		
Conv. Total (cfs)	48298.1	Conv. (cfs)		48298.1		
Length Wtd. (ft)	91.21	Wetted Per. (ft)		73.43		
Min Ch El (ft)	1700.03	Shear (lb/sq ft)		0.91		
Alpha	1.00	Stream Power (lb/ft s)		13.10		
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)		11.38		
C & E Loss (ft)	0.01	Cum SA (acres)		3.47		

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 74.4444*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1706.31	1011.46	1700.46	1011.49	1700.46	1041.48	1699.56	1071.46	1700.46
1071.49	1700.46	1082.96	1706.31						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.96	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.96	91.21	91.21	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1707.51	Element	Left OB	Channel	Right OB	
Vel Head (ft)	3.64	Wt. n-Val.		0.015		
W.S. Elev (ft)	1703.86	Reach Len. (ft)	91.21	91.21	91.21	
Crit W.S. (ft)	1704.89	Flow Area (sq ft)		253.99		
E.G. Slope (ft/ft)	*0.004705	Area (sq ft)		253.99		
Q Total (cfs)	3891.00	Flow (cfs)		3891.00		
Top Width (ft)	73.37	Top Width (ft)		73.37		
Vel Total (ft/s)	15.32	Avg. Vel. (ft/s)		15.32		
Max Chl Dpth (ft)	4.30	Hydr. Depth (ft)		3.46		
Conv. Total (cfs)	56724.6	Conv. (cfs)		56724.6		
Length Wtd. (ft)	91.21	Wetted Per. (ft)		75.03		
Min Ch El (ft)	1699.56	Shear (lb/sq ft)		0.99		
Alpha	1.00	Stream Power (lb/ft s)		15.23		
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)		12.39		
C & E Loss (ft)	0.01	Cum SA (acres)		3.39		

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	1706.78	Element	Left OB	Channel	Right OB	
Vel Head (ft)	3.29	Wt. n-Val.		0.015		
W.S. Elev (ft)	1703.49	Reach Len. (ft)	91.21	91.21	91.21	
Crit W.S. (ft)	1704.41	Flow Area (sq ft)		226.68		
E.G. Slope (ft/ft)	*0.004800	Area (sq ft)		226.68		
Q Total (cfs)	3300.00	Flow (cfs)		3300.00		
Top Width (ft)	71.90	Top Width (ft)		71.90		
Vel Total (ft/s)	14.56	Avg. Vel. (ft/s)		14.56		
Max Chl Dpth (ft)	3.93	Hydr. Depth (ft)		3.15		
Conv. Total (cfs)	47631.5	Conv. (cfs)		47631.5		
Length Wtd. (ft)	91.21	Wetted Per. (ft)		73.38		
Min Ch El (ft)	1699.56	Shear (lb/sq ft)		0.93		
Alpha	1.00	Stream Power (lb/ft s)		13.48		
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)		10.90		
C & E Loss (ft)	0.01	Cum SA (acres)		3.32		

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 73.3333*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1705.8	1011.46	1699.98	1011.49	1699.98	1041.47	1699.08	1071.45	1699.98
1071.48	1699.98	1082.95	1705.8						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.95	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.95	91.21	91.21	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1707.06	Element	Left OB	Channel	Right OB	
Vel Head (ft)	3.71	Wt. n-Val.		0.015		
W.S. Elev (ft)	1703.35	Reach Len. (ft)	91.21	91.21	91.21	

* Crit W.S. (ft)	* 1704.41	* Flow Area (sq ft)	*	*	251.78	*	*
* E.G. Slope (ft/ft)	*0.004837	* Area (sq ft)	*	*	251.78	*	*
* Q Total (cfs)	* 3891.00	* Flow (cfs)	*	*	3891.00	*	*
* Top Width (ft)	* 73.31	* Top Width (ft)	*	*	73.31	*	*
* Vel Total (ft/s)	* 15.45	* Avg. Vel. (ft/s)	*	*	15.45	*	*
* Max Chl Dpth (ft)	* 4.27	* Hydr. Depth (ft)	*	*	3.43	*	*
* Conv. Total (cfs)	* 55947.3	* Conv. (cfs)	*	*	55947.3	*	*
* Length Wtd. (ft)	* 91.21	* Wetted Per. (ft)	*	*	74.95	*	*
* Min Ch El (ft)	* 1699.08	* Shear (lb/sq ft)	*	*	1.01	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	*	15.68	*	*
* Frctn Loss (ft)	* 0.44	* Cum Volume (acre-ft)	*	*	11.86	*	*
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	*	3.24	*	*

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1706.33	* Element	* Left OB	*	Channel	* Right OB	*
* Vel Head (ft)	* 3.35	* Wt. n-Val.	*	*	0.015	*	*
* W.S. Elev (ft)	* 1702.98	* Reach Len. (ft)	* 91.21	*	91.21	* 91.21	*
* Crit W.S. (ft)	* 1703.93	* Flow Area (sq ft)	*	*	224.80	*	*
* E.G. Slope (ft/ft)	*0.004929	* Area (sq ft)	*	*	224.80	*	*
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	*	3300.00	*	*
* Top Width (ft)	* 71.84	* Top Width (ft)	*	*	71.84	*	*
* Vel Total (ft/s)	* 14.68	* Avg. Vel. (ft/s)	*	*	14.68	*	*
* Max Chl Dpth (ft)	* 3.90	* Hydr. Depth (ft)	*	*	3.13	*	*
* Conv. Total (cfs)	* 47004.6	* Conv. (cfs)	*	*	47004.6	*	*
* Length Wtd. (ft)	* 91.21	* Wetted Per. (ft)	*	*	73.30	*	*
* Min Ch El (ft)	* 1699.08	* Shear (lb/sq ft)	*	*	0.94	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	*	13.85	*	*
* Frctn Loss (ft)	* 0.44	* Cum Volume (acre-ft)	*	*	10.43	*	*
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	*	3.17	*	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 72.2222*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1705.29	1011.46	1699.5	1011.49	1699.5	1041.47	1698.6	1071.45	1699.5
1071.48	1699.5	1082.94	1705.29						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.94	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.94	91.21	91.21	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1706.61	* Element	* Left OB	*	Channel	* Right OB	*
* Vel Head (ft)	* 3.76	* Wt. n-Val.	*	*	0.015	*	*
* W.S. Elev (ft)	* 1702.85	* Reach Len. (ft)	* 91.21	*	91.21	* 91.21	*
* Crit W.S. (ft)	* 1703.93	* Flow Area (sq ft)	*	*	250.00	*	*
* E.G. Slope (ft/ft)	*0.004948	* Area (sq ft)	*	*	250.00	*	*
* Q Total (cfs)	* 3891.00	* Flow (cfs)	*	*	3891.00	*	*
* Top Width (ft)	* 73.27	* Top Width (ft)	*	*	73.27	*	*
* Vel Total (ft/s)	* 15.56	* Avg. Vel. (ft/s)	*	*	15.56	*	*
* Max Chl Dpth (ft)	* 4.25	* Hydr. Depth (ft)	*	*	3.41	*	*
* Conv. Total (cfs)	* 55317.4	* Conv. (cfs)	*	*	55317.4	*	*
* Length Wtd. (ft)	* 91.21	* Wetted Per. (ft)	*	*	74.89	*	*
* Min Ch El (ft)	* 1698.60	* Shear (lb/sq ft)	*	*	1.03	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	*	16.05	*	*
* Frctn Loss (ft)	* 0.45	* Cum Volume (acre-ft)	*	*	11.33	*	*
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	*	3.08	*	*

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1705.87	* Element	* Left OB	*	Channel	* Right OB	*
* Vel Head (ft)	* 3.39	* Wt. n-Val.	*	*	0.015	*	*
* W.S. Elev (ft)	* 1702.48	* Reach Len. (ft)	* 91.21	*	91.21	* 91.21	*
* Crit W.S. (ft)	* 1703.45	* Flow Area (sq ft)	*	*	223.42	*	*
* E.G. Slope (ft/ft)	*0.005027	* Area (sq ft)	*	*	223.42	*	*
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	*	3300.00	*	*
* Top Width (ft)	* 71.82	* Top Width (ft)	*	*	71.82	*	*
* Vel Total (ft/s)	* 14.77	* Avg. Vel. (ft/s)	*	*	14.77	*	*
* Max Chl Dpth (ft)	* 3.88	* Hydr. Depth (ft)	*	*	3.11	*	*
* Conv. Total (cfs)	* 46541.6	* Conv. (cfs)	*	*	46541.6	*	*
* Length Wtd. (ft)	* 91.21	* Wetted Per. (ft)	*	*	73.26	*	*
* Min Ch El (ft)	* 1698.60	* Shear (lb/sq ft)	*	*	0.96	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	*	14.14	*	*
* Frctn Loss (ft)	* 0.45	* Cum Volume (acre-ft)	*	*	9.96	*	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	*	3.02	*	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 71.1111*

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1704.78	1011.46	1699.02	1011.49	1699.02	1041.46	1698.12	1071.44	1699.02
1071.47	1699.02	1082.93	1704.78						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.93	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.93	91.21	91.21	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1706.15	Element			
Vel Head (ft)	3.80	Wt. n-Val.		0.015	
W.S. Elev (ft)	1702.35	Reach Len. (ft)	91.21	91.21	91.21
Crit W.S. (ft)	1703.45	Flow Area (sq ft)		248.71	
E.G. Slope (ft/ft)	*0.005031	Area (sq ft)		248.71	
Q Total (cfs)	3891.00	Flow (cfs)		3891.00	
Top Width (ft)	73.25	Top Width (ft)		73.25	
Vel Total (ft/s)	15.64	Avg. Vel. (ft/s)		15.64	
Max Chl Dpth (ft)	4.23	Hydr. Depth (ft)		3.40	
Conv. Total (cfs)	54857.4	Conv. (cfs)		54857.4	
Length Wtd. (ft)	91.21	Wetted Per. (ft)		74.86	
Min Ch El (ft)	1698.12	Shear (lb/sq ft)		1.04	
Alpha	1.00	Stream Power (lb/ft s)		16.33	
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)		10.81	
C & E Loss (ft)	0.00	Cum SA (acres)		2.93	

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	1705.40	Element			
Vel Head (ft)	3.42	Wt. n-Val.		0.015	
W.S. Elev (ft)	1701.99	Reach Len. (ft)	91.21	91.21	91.21
Crit W.S. (ft)	1702.96	Flow Area (sq ft)		222.47	
E.G. Slope (ft/ft)	*0.005098	Area (sq ft)		222.47	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	71.81	Top Width (ft)		71.81	
Vel Total (ft/s)	14.83	Avg. Vel. (ft/s)		14.83	
Max Chl Dpth (ft)	3.87	Hydr. Depth (ft)		3.10	
Conv. Total (cfs)	46219.2	Conv. (cfs)		46219.2	
Length Wtd. (ft)	91.21	Wetted Per. (ft)		73.25	
Min Ch El (ft)	1698.12	Shear (lb/sq ft)		0.97	
Alpha	1.00	Stream Power (lb/ft s)		14.34	
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)		9.49	
C & E Loss (ft)	0.00	Cum SA (acres)		2.87	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 70

INPUT
Description: PLAN STA 171+50
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1704.27	1011.46	1698.54	1041.46	1697.64	1071.46	1698.54	1082.92	1704.27

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1082.92	46.25	46.25	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

			Left OB	Channel	Right OB
E.G. Elev (ft)	1705.68	Element			
Vel Head (ft)	3.83	Wt. n-Val.		0.015	
W.S. Elev (ft)	1701.85	Reach Len. (ft)	46.25	46.25	46.25
Crit W.S. (ft)	1702.97	Flow Area (sq ft)		247.75	
E.G. Slope (ft/ft)	*0.005095	Area (sq ft)		247.75	
Q Total (cfs)	3891.00	Flow (cfs)		3891.00	
Top Width (ft)	73.25	Top Width (ft)		73.25	
Vel Total (ft/s)	15.71	Avg. Vel. (ft/s)		15.71	
Max Chl Dpth (ft)	4.21	Hydr. Depth (ft)		3.38	
Conv. Total (cfs)	54511.3	Conv. (cfs)		54511.3	
Length Wtd. (ft)	46.25	Wetted Per. (ft)		74.84	
Min Ch El (ft)	1697.64	Shear (lb/sq ft)		1.05	
Alpha	1.00	Stream Power (lb/ft s)		16.54	
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)		10.29	
C & E Loss (ft)	0.00	Cum SA (acres)		2.78	

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	1704.93	Element			
Vel Head (ft)	3.44	Wt. n-Val.		0.015	
W.S. Elev (ft)	1701.50	Reach Len. (ft)	46.25	46.25	46.25
Crit W.S. (ft)	1702.47	Flow Area (sq ft)		221.78	
E.G. Slope (ft/ft)	*0.005150	Area (sq ft)		221.78	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	71.82	Top Width (ft)		71.82	
Vel Total (ft/s)	14.88	Avg. Vel. (ft/s)		14.88	
Max Chl Dpth (ft)	3.86	Hydr. Depth (ft)		3.09	
Conv. Total (cfs)	45982.6	Conv. (cfs)		45982.6	
Length Wtd. (ft)	46.25	Wetted Per. (ft)		73.24	
Min Ch El (ft)	1697.64	Shear (lb/sq ft)		0.97	
Alpha	1.00	Stream Power (lb/ft s)		14.49	
Frctn Loss (ft)	0.47	Cum Volume (acre-ft)		9.03	
C & E Loss (ft)	0.00	Cum SA (acres)		2.72	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 60

INPUT
Description: PLAN STA 171+96
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1710.12	1000	1704	1011.46	1698.28	1041.46	1697.38	1071.46	1698.28
1082.92	1704	1082.92	1710.12						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1000 1082.92 90 90 90 .3 .5

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1705.44	Element	Left OB	Channel	Right OB	
Vel Head (ft)	3.86	Wt. n-Val.		0.015		
W.S. Elev (ft)	1701.58	Reach Len. (ft)	2.00	2.00	2.00	
Crit W.S. (ft)	1702.71	Flow Area (sq ft)		246.64		
E.G. Slope (ft/ft)	*0.005167	Area (sq ft)		246.64		
Q Total (cfs)	3891.00	Flow (cfs)		3891.00		
Top Width (ft)	73.21	Top Width (ft)		73.21		
Vel Total (ft/s)	15.78	Avg. Vel. (ft/s)		15.78		
Max Chl Dpth (ft)	4.20	Hydr. Depth (ft)		3.37		
Conv. Total (cfs)	54130.1	Conv. (cfs)		54130.1		
Length Wtd. (ft)		Wetted Per. (ft)		74.80		
Min Ch El (ft)	1697.38	Shear (lb/sq ft)		1.06		
Alpha	1.00	Stream Power (lb/ft s)		16.78		
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)		10.03		
C & E Loss (ft)	0.00	Cum SA (acres)		2.70		

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	1704.69	Element	Left OB	Channel	Right OB	
Vel Head (ft)	3.47	Wt. n-Val.		0.015		
W.S. Elev (ft)	1701.22	Reach Len. (ft)	2.00	2.00	2.00	
Crit W.S. (ft)	1702.21	Flow Area (sq ft)		220.79		
E.G. Slope (ft/ft)	*0.005223	Area (sq ft)		220.79		
Q Total (cfs)	3300.00	Flow (cfs)		3300.00		
Top Width (ft)	71.78	Top Width (ft)		71.78		
Vel Total (ft/s)	14.95	Avg. Vel. (ft/s)		14.95		
Max Chl Dpth (ft)	3.84	Hydr. Depth (ft)		3.08		
Conv. Total (cfs)	45661.0	Conv. (cfs)		45661.0		
Length Wtd. (ft)		Wetted Per. (ft)		73.20		
Min Ch El (ft)	1697.38	Shear (lb/sq ft)		0.98		
Alpha	1.00	Stream Power (lb/ft s)		14.70		
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)		8.79		
C & E Loss (ft)	0.00	Cum SA (acres)		2.65		

BRIDGE

RIVER: Range Wash
REACH: Sloan Channel RS: 50

INPUT
Description: PLAN STA 171+99
Distance from Upstream XS = 2
Deck/Roadway Width = 87
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
1000 1710.12	1704.33	1082.92	1710.12	1704.33

Upstream Bridge Cross Section Data
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1710.12	1000	1704	1011.46	1698.28	1041.46	1697.38	1071.46	1698.28
1082.92	1704	1082.92	1710.12						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left Right Coeff Contr. Expan.
1000 1082.92 .3 .5

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
1000 1710.12	1704.33	1082.92	1710.12	1704.33

Downstream Bridge Cross Section Data
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1710.12	1000	1703.72	1011.46	1697.99	1041.46	1697.09	1071.46	1697.99
1082.92	1703.72	1082.92	1710.12						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left Right Coeff Contr. Expan.
1000 1082.92 .3 .5

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 1710.12
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Piers = 4

Pier Data
Pier Station Upstream=1017.708 Downstream=1017.708

Upstream num= 2			
Width	Elev	Width	Elev
.67	1694	.67	1705
Downstream num= 2			
Width	Elev	Width	Elev
.67	1694	.67	1705

Pier Data
Pier Station Upstream=1033.458 Downstream=1033.458

Upstream num= 2			
Width	Elev	Width	Elev
.67	1694	.67	1705
Downstream num= 2			
Width	Elev	Width	Elev
.67	1694	.67	1705

Pier Data
Pier Station Upstream=1049.291 Downstream=1049.291

Upstream num= 2			
Width	Elev	Width	Elev
.67	1694	.67	1705
Downstream num= 2			
Width	Elev	Width	Elev
.67	1694	.67	1705

Pier Data
Pier Station Upstream=1065.041 Downstream=1065.041

Upstream num= 2			
Width	Elev	Width	Elev
.67	1694	.67	1705
Downstream num= 2			
Width	Elev	Width	Elev
.67	1694	.67	1705

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Energy Only

Additional Bridge Parameters
Add Friction component to Momentum
Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth
inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT Profile #Post-Project

E.G. US. (ft)	1705.44	Element	Inside BR US	Inside BR DS	
W.S. US. (ft)	1701.58	E.G. Elev (ft)	1705.01	1704.72	
Q Total (cfs)	3891.00	W.S. Elev (ft)	1702.83	1702.55	
Q Bridge (cfs)	3891.00	Crit W.S. (ft)	1702.83	1702.55	
Q Weir (cfs)		Max Chl Dpth (ft)	5.45	5.46	
Weir Sta Lft (ft)		Vel Total (ft/s)	11.86	11.84	
Weir Sta Rgt (ft)		Flow Area (sq ft)	328.17	328.65	
Weir Submerg		Froude # Chl	1.00	1.00	
Weir Max Depth (ft)		Specif Force (cu ft)	2214.54	2214.74	
Min El Weir Flow (ft)	1710.13	Hydr Depth (ft)	4.34	4.35	
Min El Prs (ft)	1704.33	W.P. Total (ft)	117.54	117.60	
Delta EG (ft)	-22.11	Conv. Total (cfs)	64459.7	64594.4	
Delta WS (ft)	-0.46	Top Width (ft)	75.55	75.55	
BR Open Area (sq ft)	445.75	Frctn Loss (ft)		0.32	
BR Open Vel (ft/s)	11.86	C & E Loss (ft)		0.00	
Coef of Q		Shear Total (lb/sq ft)	0.64	0.63	
Br Sel Method	Energy only	Power Total (lb/ft s)	7.53	7.50	

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
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 equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and

assumed values.

BRIDGE OUTPUT Profile #PF 2

E.G. US. (ft)	1704.69	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	1701.22	E.G. Elev (ft)	1704.33	1704.04
Q Total (cfs)	3300.00	W.S. Elev (ft)	1702.36	1702.06
Q Bridge (cfs)	3300.00	Crit W.S. (ft)	1702.36	1702.06
Q Weir (cfs)		Max Chl Dpth (ft)	4.98	4.97
Weir Sta Lft (ft)		Vel Total (ft/s)	11.26	11.30
Weir Sta Rgt (ft)		Flow Area (sq ft)	293.01	292.09
Weir Submerg		Froude # Chl	1.00	1.00
Weir Max Depth (ft)		Specif Force (cu ft)	1789.69	1789.83
Min El Weir Flow (ft)	1710.13	Hydr Depth (ft)	3.98	3.97
Min El Prs (ft)	1704.33	W.P. Total (ft)	111.66	111.48
Delta EG (ft)	-23.41	Conv. Total (cfs)	55222.1	54989.8
Delta WS (ft)	-0.36	Top Width (ft)	73.67	73.59
BR Open Area (sq ft)	445.75	Frctn Loss (ft)		0.31
BR Open Vel (ft/s)	11.30	C & E Loss (ft)		0.00
Coef of Q		Shear Total (lb/sq ft)	0.59	0.59
Br Sel Method	Energy only	Power Total (lb/ft s)	6.59	6.66

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
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 equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 40

INPUT
Description: PLAN STA 172+86
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1710.12	1000	1703.72	1011.46	1697.99	1041.46	1697.09	1071.46	1697.99
1082.92	1703.72	1082.92	1710.12						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1082.92	.015

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1000 1082.92 113.64 113.64 113.64 .3 .5

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1704.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.57	Wt. n-Val.		0.015	
W.S. Elev (ft)	1702.03	Reach Len. (ft)	113.64	113.64	113.64
Crit W.S. (ft)	1702.41	Flow Area (sq ft)		302.33	
E.G. Slope (ft/ft)	0.002778	Area (sq ft)		302.33	
Q Total (cfs)	3891.00	Flow (cfs)		3891.00	
Top Width (ft)	76.17	Top Width (ft)		76.17	
Vel Total (ft/s)	12.87	Avg. Vel. (ft/s)		12.87	
Max Chl Dpth (ft)	4.94	Hydr. Depth (ft)		3.97	
Conv. Total (cfs)	73828.0	Conv. (cfs)		73828.0	
Length Wtd. (ft)	113.64	Wetted Per. (ft)		78.11	
Min Ch El (ft)	1697.09	Shear (lb/sq ft)		0.67	
Alpha	1.00	Stream Power (lb/ft s)		8.64	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		10.01	
C & E Loss (ft)	0.11	Cum SA (acres)		2.70	

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	1703.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.35	Wt. n-Val.		0.015	
W.S. Elev (ft)	1701.58	Reach Len. (ft)	113.64	113.64	113.64
Crit W.S. (ft)	1701.93	Flow Area (sq ft)		268.49	
E.G. Slope (ft/ft)	0.002866	Area (sq ft)		268.49	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	74.38	Top Width (ft)		74.38	
Vel Total (ft/s)	12.29	Avg. Vel. (ft/s)		12.29	
Max Chl Dpth (ft)	4.49	Hydr. Depth (ft)		3.61	
Conv. Total (cfs)	61640.1	Conv. (cfs)		61640.1	
Length Wtd. (ft)	113.64	Wetted Per. (ft)		76.10	
Min Ch El (ft)	1697.09	Shear (lb/sq ft)		0.63	
Alpha	1.00	Stream Power (lb/ft s)		7.76	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		8.78	
C & E Loss (ft)	0.11	Cum SA (acres)		2.64	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 30

INPUT
Description: PLAN STA 174+00
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1001.53	1704.06	1011.46	1697.46	1041.46	1696.56	1071.46	1697.46	1081.36	1704.06

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1001.53	.015	1001.53	.015	1081.36	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1001.53	1081.36	179.28	179.28	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1704.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.59	Wt. n-Val.		0.015	
W.S. Elev (ft)	1701.71	Reach Len. (ft)	179.28	179.28	179.28
Crit W.S. (ft)	1702.01	Flow Area (sq ft)		308.96	
E.G. Slope (ft/ft)	*0.002590	Area (sq ft)		308.96	
Q Total (cfs)	3990.00	Flow (cfs)		3990.00	
Top Width (ft)	72.76	Top Width (ft)		72.76	
Vel Total (ft/s)	12.91	Avg. Vel. (ft/s)		12.91	
Max Chl Dpth (ft)	5.15	Hydr. Depth (ft)		4.25	
Conv. Total (cfs)	78402.0	Conv. (cfs)		78402.0	
Length Wtd. (ft)	179.28	Wetted Per. (ft)		75.36	
Min Ch El (ft)	1696.56	Shear (lb/sq ft)		0.66	
Alpha	1.00	Stream Power (lb/ft s)		8.56	
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)		9.22	
C & E Loss (ft)	0.01	Cum SA (acres)		2.50	

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	1703.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.53	Wt. n-Val.		0.015	
W.S. Elev (ft)	1701.00	Reach Len. (ft)	179.28	179.28	179.28
Crit W.S. (ft)	1701.43	Flow Area (sq ft)		258.53	
E.G. Slope (ft/ft)	*0.003066	Area (sq ft)		258.53	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	70.65	Top Width (ft)		70.65	
Vel Total (ft/s)	12.76	Avg. Vel. (ft/s)		12.76	
Max Chl Dpth (ft)	4.44	Hydr. Depth (ft)		3.66	
Conv. Total (cfs)	59600.4	Conv. (cfs)		59600.4	
Length Wtd. (ft)	179.28	Wetted Per. (ft)		72.82	
Min Ch El (ft)	1696.56	Shear (lb/sq ft)		0.68	
Alpha	1.00	Stream Power (lb/ft s)		8.67	
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)		8.09	
C & E Loss (ft)	0.06	Cum SA (acres)		2.45	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 28.5714*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1001.53	1703.23	1011.46	1696.63	1041.46	1695.73	1071.46	1696.63	1081.36	1703.23

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1001.53	.015	1001.53	.015	1081.36	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1001.53	1081.36	179.28	179.28	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1703.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.27	Wt. n-Val.		0.015	
W.S. Elev (ft)	1700.40	Reach Len. (ft)	179.28	179.28	179.28
Crit W.S. (ft)	1701.17	Flow Area (sq ft)		274.83	
E.G. Slope (ft/ft)	*0.003711	Area (sq ft)		274.83	
Q Total (cfs)	3990.00	Flow (cfs)		3990.00	
Top Width (ft)	71.34	Top Width (ft)		71.34	
Vel Total (ft/s)	14.52	Avg. Vel. (ft/s)		14.52	
Max Chl Dpth (ft)	4.67	Hydr. Depth (ft)		3.85	
Conv. Total (cfs)	65500.0	Conv. (cfs)		65500.0	
Length Wtd. (ft)	179.28	Wetted Per. (ft)		73.65	
Min Ch El (ft)	1695.73	Shear (lb/sq ft)		0.86	
Alpha	1.00	Stream Power (lb/ft s)		12.55	
Frctn Loss (ft)	0.55	Cum Volume (acre-ft)		8.02	
C & E Loss (ft)	0.07	Cum SA (acres)		2.21	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	1702.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.99	Wt. n-Val.		0.015	
W.S. Elev (ft)	1699.88	Reach Len. (ft)	179.28	179.28	179.28
Crit W.S. (ft)	1700.60	Flow Area (sq ft)		238.00	
E.G. Slope (ft/ft)	*0.003961	Area (sq ft)		238.00	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	69.77	Top Width (ft)		69.77	
Vel Total (ft/s)	13.87	Avg. Vel. (ft/s)		13.87	
Max Chl Dpth (ft)	4.15	Hydr. Depth (ft)		3.41	
Conv. Total (cfs)	52433.3	Conv. (cfs)		52433.3	
Length Wtd. (ft)	179.28	Wetted Per. (ft)		71.76	
Min Ch El (ft)	1695.73	Shear (lb/sq ft)		0.82	
Alpha	1.00	Stream Power (lb/ft s)		11.37	
Frctn Loss (ft)	0.62	Cum Volume (acre-ft)		7.07	
C & E Loss (ft)	0.05	Cum SA (acres)		2.16	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 27.1428*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1001.53	1702.4	1011.46	1695.8	1041.46	1694.9	1071.46	1695.8	1081.36	1702.4

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1001.53	.015	1001.53	.015	1081.36	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1001.53	1081.36	179.28	179.28	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1702.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.50	Wt. n-Val.		0.015	
W.S. Elev (ft)	1699.45	Reach Len. (ft)	179.28	179.28	179.28
Crit W.S. (ft)	1700.34	Flow Area (sq ft)		265.71	
E.G. Slope (ft/ft)	*0.004118	Area (sq ft)		265.71	
Q Total (cfs)	3990.00	Flow (cfs)		3990.00	
Top Width (ft)	70.95	Top Width (ft)		70.95	
Vel Total (ft/s)	15.02	Avg. Vel. (ft/s)		15.02	
Max Chl Dpth (ft)	4.55	Hydr. Depth (ft)		3.74	
Conv. Total (cfs)	62178.7	Conv. (cfs)		62178.7	
Length Wtd. (ft)	179.28	Wetted Per. (ft)		73.19	
Min Ch El (ft)	1694.90	Shear (lb/sq ft)		0.93	
Alpha	1.00	Stream Power (lb/ft s)		14.02	
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)		6.90	
C & E Loss (ft)	0.02	Cum SA (acres)		1.91	

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	1702.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.14	Wt. n-Val.		0.015	
W.S. Elev (ft)	1698.97	Reach Len. (ft)	179.28	179.28	179.28
Crit W.S. (ft)	1699.77	Flow Area (sq ft)		232.05	
E.G. Slope (ft/ft)	*0.004286	Area (sq ft)		232.05	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	69.51	Top Width (ft)		69.51	
Vel Total (ft/s)	14.22	Avg. Vel. (ft/s)		14.22	
Max Chl Dpth (ft)	4.07	Hydr. Depth (ft)		3.34	
Conv. Total (cfs)	50408.2	Conv. (cfs)		50408.2	
Length Wtd. (ft)	179.28	Wetted Per. (ft)		71.46	
Min Ch El (ft)	1694.90	Shear (lb/sq ft)		0.87	
Alpha	1.00	Stream Power (lb/ft s)		12.36	
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)		6.10	
C & E Loss (ft)	0.02	Cum SA (acres)		1.88	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 25.7142*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1001.53	1701.57	1011.46	1694.97	1041.46	1694.07	1071.46	1694.97	1081.36	1701.57

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1001.53	.015	1001.53	.015	1081.36	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1001.53	1081.36	179.28	179.28	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1702.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.63	Wt. n-Val.		0.015	
W.S. Elev (ft)	1698.55	Reach Len. (ft)	179.28	179.28	179.28
Crit W.S. (ft)	1699.51	Flow Area (sq ft)		261.14	
E.G. Slope (ft/ft)	*0.004345	Area (sq ft)		261.14	
Q Total (cfs)	3990.00	Flow (cfs)		3990.00	
Top Width (ft)	70.76	Top Width (ft)		70.76	
Vel Total (ft/s)	15.28	Avg. Vel. (ft/s)		15.28	
Max Chl Dpth (ft)	4.48	Hydr. Depth (ft)		3.69	
Conv. Total (cfs)	60533.0	Conv. (cfs)		60533.0	
Length Wtd. (ft)	179.28	Wetted Per. (ft)		72.95	
Min Ch El (ft)	1694.07	Shear (lb/sq ft)		0.97	
Alpha	1.00	Stream Power (lb/ft s)		14.83	
Frctn Loss (ft)	0.76	Cum Volume (acre-ft)		5.82	
C & E Loss (ft)	0.01	Cum SA (acres)		1.62	

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	1701.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.23	Wt. n-Val.		0.015	
W.S. Elev (ft)	1698.09	Reach Len. (ft)	179.28	179.28	179.28

* Crit W.S. (ft)	* 1698.94	* Flow Area (sq ft)	*	* 228.97	*
* E.G. Slope (ft/ft)	*0.004467	* Area (sq ft)	*	* 228.97	*
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	*
* Top Width (ft)	* 69.38	* Top Width (ft)	*	* 69.38	*
* Vel Total (ft/s)	* 14.41	* Avg. Vel. (ft/s)	*	* 14.41	*
* Max Chl Dpth (ft)	* 4.02	* Hydr. Depth (ft)	*	* 3.30	*
* Conv. Total (cfs)	* 49372.7	* Conv. (cfs)	*	* 49372.7	*
* Length Wtd. (ft)	* 179.28	* Wetted Per. (ft)	*	* 71.30	*
* Min Ch El (ft)	* 1694.07	* Shear (lb/sq ft)	*	* 0.90	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 12.91	*
* Frctn Loss (ft)	* 0.78	* Cum Volume (acre-ft)	*	* 5.16	*
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	* 1.59	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 24.2857*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1001.53	1700.75	1011.46	1694.15	1041.46	1693.25	1071.46	1694.15	1081.36	1700.75

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1001.53	.015	1001.53	.015	1081.36	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1001.53	1081.36	179.28	179.28	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1701.38	* Element	* Left OB *	Channel *	Right OB *
* Vel Head (ft)	* 3.68	* Wt. n-Val.	*	* 0.015 *	*
* W.S. Elev (ft)	* 1697.71	* Reach Len. (ft)	* 179.28 *	179.28 *	179.28 *
* Crit W.S. (ft)	* 1698.69	* Flow Area (sq ft)	*	* 259.32 *	*
* E.G. Slope (ft/ft)	*0.004440	* Area (sq ft)	*	* 259.32 *	*
* Q Total (cfs)	* 3990.00	* Flow (cfs)	*	* 3990.00 *	*
* Top Width (ft)	* 70.68	* Top Width (ft)	*	* 70.68 *	*
* Vel Total (ft/s)	* 15.39	* Avg. Vel. (ft/s)	*	* 15.39 *	*
* Max Chl Dpth (ft)	* 4.46	* Hydr. Depth (ft)	*	* 3.67 *	*
* Conv. Total (cfs)	* 59881.8	* Conv. (cfs)	*	* 59881.8 *	*
* Length Wtd. (ft)	* 179.28	* Wetted Per. (ft)	*	* 72.86 *	*
* Min Ch El (ft)	* 1693.25	* Shear (lb/sq ft)	*	* 0.99 *	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 15.18 *	*
* Frctn Loss (ft)	* 0.79	* Cum Volume (acre-ft)	*	* 4.75 *	*
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	* 1.33 *	*

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1700.51	* Element	* Left OB *	Channel *	Right OB *
* Vel Head (ft)	* 3.25	* Wt. n-Val.	*	* 0.015 *	*
* W.S. Elev (ft)	* 1697.26	* Reach Len. (ft)	* 179.28 *	179.28 *	179.28 *
* Crit W.S. (ft)	* 1698.12	* Flow Area (sq ft)	*	* 228.12 *	*
* E.G. Slope (ft/ft)	*0.004519	* Area (sq ft)	*	* 228.12 *	*
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00 *	*
* Top Width (ft)	* 69.34	* Top Width (ft)	*	* 69.34 *	*
* Vel Total (ft/s)	* 14.47	* Avg. Vel. (ft/s)	*	* 14.47 *	*
* Max Chl Dpth (ft)	* 4.01	* Hydr. Depth (ft)	*	* 3.29 *	*
* Conv. Total (cfs)	* 49089.0	* Conv. (cfs)	*	* 49089.0 *	*
* Length Wtd. (ft)	* 179.28	* Wetted Per. (ft)	*	* 71.25 *	*
* Min Ch El (ft)	* 1693.25	* Shear (lb/sq ft)	*	* 0.90 *	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 13.07 *	*
* Frctn Loss (ft)	* 0.81	* Cum Volume (acre-ft)	*	* 4.21 *	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 1.31 *	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 22.8571*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1001.53	1699.92	1011.46	1693.32	1041.46	1692.42	1071.46	1693.32	1081.36	1699.92

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1001.53	.015	1001.53	.015	1081.36	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1001.53	1081.36	179.28	179.28	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1700.57	* Element	* Left OB *	Channel *	Right OB *
* Vel Head (ft)	* 3.72	* Wt. n-Val.	*	* 0.015 *	*
* W.S. Elev (ft)	* 1696.85	* Reach Len. (ft)	* 179.28 *	179.28 *	179.28 *
* Crit W.S. (ft)	* 1697.86	* Flow Area (sq ft)	*	* 257.80 *	*
* E.G. Slope (ft/ft)	*0.004521	* Area (sq ft)	*	* 257.80 *	*
* Q Total (cfs)	* 3990.00	* Flow (cfs)	*	* 3990.00 *	*
* Top Width (ft)	* 70.62	* Top Width (ft)	*	* 70.62 *	*
* Vel Total (ft/s)	* 15.48	* Avg. Vel. (ft/s)	*	* 15.48 *	*
* Max Chl Dpth (ft)	* 4.43	* Hydr. Depth (ft)	*	* 3.65 *	*
* Conv. Total (cfs)	* 59342.5	* Conv. (cfs)	*	* 59342.5 *	*

* Length Wtd. (ft)	* 179.28	* Wetted Per. (ft)	*	* 72.78	*
* Min Ch El (ft)	* 1692.42	* Shear (lb/sq ft)	*	* 1.00	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 15.47	*
* Frctn Loss (ft)	* 0.80	* Cum Volume (acre-ft)	*	* 3.68	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 1.04	*

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1699.69	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 3.27	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 1696.42	* Reach Len. (ft)	* 179.28	* 179.28	* 179.28 *
* Crit W.S. (ft)	* 1697.29	* Flow Area (sq ft)	*	* 227.25	*
* E.G. Slope (ft/ft)	*0.004573	* Area (sq ft)	*	* 227.25	*
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	*
* Top Width (ft)	* 69.31	* Top Width (ft)	*	* 69.31	*
* Vel Total (ft/s)	* 14.52	* Avg. Vel. (ft/s)	*	* 14.52	*
* Max Chl Dpth (ft)	* 4.00	* Hydr. Depth (ft)	*	* 3.28	*
* Conv. Total (cfs)	* 48799.0	* Conv. (cfs)	*	* 48799.0	*
* Length Wtd. (ft)	* 179.28	* Wetted Per. (ft)	*	* 71.21	*
* Min Ch El (ft)	* 1692.42	* Shear (lb/sq ft)	*	* 0.91	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 13.23	*
* Frctn Loss (ft)	* 0.82	* Cum Volume (acre-ft)	*	* 3.28	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 1.02	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 21.4285*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1001.53	1699.09	1011.46	1692.49	1041.46	1691.59	1071.46	1692.49	1081.36	1699.09

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1001.53	.015	1001.53	.015	1081.36	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1001.53	1081.36	179.28	179.28	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

* E.G. Elev (ft)	* 1699.76	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 3.74	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 1696.01	* Reach Len. (ft)	* 179.28	* 179.28	* 179.28 *
* Crit W.S. (ft)	* 1697.03	* Flow Area (sq ft)	*	* 256.95	*
* E.G. Slope (ft/ft)	*0.004568	* Area (sq ft)	*	* 256.95	*
* Q Total (cfs)	* 3990.00	* Flow (cfs)	*	* 3990.00	*
* Top Width (ft)	* 70.58	* Top Width (ft)	*	* 70.58	*
* Vel Total (ft/s)	* 15.53	* Avg. Vel. (ft/s)	*	* 15.53	*
* Max Chl Dpth (ft)	* 4.42	* Hydr. Depth (ft)	*	* 3.64	*
* Conv. Total (cfs)	* 59037.5	* Conv. (cfs)	*	* 59037.5	*
* Length Wtd. (ft)	* 179.28	* Wetted Per. (ft)	*	* 72.74	*
* Min Ch El (ft)	* 1691.59	* Shear (lb/sq ft)	*	* 1.01	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 15.64	*
* Frctn Loss (ft)	* 0.81	* Cum Volume (acre-ft)	*	* 2.62	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 0.75	*

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 1698.86	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 3.28	* Wt. n-Val.	*	* 0.015	*
* W.S. Elev (ft)	* 1695.59	* Reach Len. (ft)	* 179.28	* 179.28	* 179.28 *
* Crit W.S. (ft)	* 1696.46	* Flow Area (sq ft)	*	* 227.10	*
* E.G. Slope (ft/ft)	*0.004583	* Area (sq ft)	*	* 227.10	*
* Q Total (cfs)	* 3300.00	* Flow (cfs)	*	* 3300.00	*
* Top Width (ft)	* 69.30	* Top Width (ft)	*	* 69.30	*
* Vel Total (ft/s)	* 14.53	* Avg. Vel. (ft/s)	*	* 14.53	*
* Max Chl Dpth (ft)	* 4.00	* Hydr. Depth (ft)	*	* 3.28	*
* Conv. Total (cfs)	* 48746.6	* Conv. (cfs)	*	* 48746.6	*
* Length Wtd. (ft)	* 179.28	* Wetted Per. (ft)	*	* 71.20	*
* Min Ch El (ft)	* 1691.59	* Shear (lb/sq ft)	*	* 0.91	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 13.26	*
* Frctn Loss (ft)	* 0.82	* Cum Volume (acre-ft)	*	* 2.34	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	* 0.74	*

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 20

INPUT
Description: PLAN STA 186+54
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1001.53	1698.26	1011.46	1691.66	1041.46	1690.76	1071.46	1691.66	1081.36	1698.26

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1001.53	.015	1001.53	.015	1081.36	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1001.53	1081.36	260.12	280 299.88	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1698.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.75	Wt. n-Val.		0.015	
W.S. Elev (ft)	1695.18	Reach Len. (ft)	260.12	280.00	299.88
Crit W.S. (ft)	1696.20	Flow Area (sq ft)		256.78	
E.G. Slope (ft/ft)	*0.004577	Area (sq ft)		256.78	
Q Total (cfs)	3990.00	Flow (cfs)		3990.00	
Top Width (ft)	70.57	Top Width (ft)		70.57	
Vel Total (ft/s)	15.54	Avg. Vel. (ft/s)		15.54	
Max Chl Dpth (ft)	4.42	Hydr. Depth (ft)		3.64	
Conv. Total (cfs)	58979.3	Conv. (cfs)		58979.3	
Length Wtd. (ft)		Wetted Per. (ft)		72.73	
Min Ch El (ft)	1690.76	Shear (lb/sq ft)		1.01	
Alpha	1.00	Stream Power (lb/ft s)		15.67	
Frctn Loss (ft)	0.82	Cum Volume (acre-ft)		1.57	
C & E Loss (ft)	0.00	Cum SA (acres)		0.46	

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	1698.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.28	Wt. n-Val.		0.015	
W.S. Elev (ft)	1694.75	Reach Len. (ft)	260.12	280.00	299.88
Crit W.S. (ft)	1695.63	Flow Area (sq ft)		227.03	
E.G. Slope (ft/ft)	*0.004587	Area (sq ft)		227.03	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	69.30	Top Width (ft)		69.30	
Vel Total (ft/s)	14.54	Avg. Vel. (ft/s)		14.54	
Max Chl Dpth (ft)	3.99	Hydr. Depth (ft)		3.28	
Conv. Total (cfs)	48724.0	Conv. (cfs)		48724.0	
Length Wtd. (ft)	280.00	Wetted Per. (ft)		71.19	
Min Ch El (ft)	1690.76	Shear (lb/sq ft)		0.91	
Alpha	1.00	Stream Power (lb/ft s)		13.27	
Frctn Loss (ft)	0.82	Cum Volume (acre-ft)		1.41	
C & E Loss (ft)	0.00	Cum SA (acres)		0.45	

CROSS SECTION

RIVER: Range Wash
REACH: Sloan Channel RS: 10

INPUT
Description: PLAN STA 189+14
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1700	1021	1689.5	1081	1689.5	1096	1700

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.015	1000	.015	1096	.015

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1000	1096	0	0	.1	.3

CROSS SECTION OUTPUT Profile #Post-Project

E.G. Elev (ft)	1697.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.63	Wt. n-Val.		0.015	
W.S. Elev (ft)	1693.00	Reach Len. (ft)			
Crit W.S. (ft)		Flow Area (sq ft)		231.00	
E.G. Slope (ft/ft)	*0.006656	Area (sq ft)		231.00	
Q Total (cfs)	3990.00	Flow (cfs)		3990.00	
Top Width (ft)	72.00	Top Width (ft)		72.00	
Vel Total (ft/s)	17.27	Avg. Vel. (ft/s)		17.27	
Max Chl Dpth (ft)	3.50	Hydr. Depth (ft)		3.21	
Conv. Total (cfs)	48907.9	Conv. (cfs)		48907.9	
Length Wtd. (ft)		Wetted Per. (ft)		73.93	
Min Ch El (ft)	1689.50	Shear (lb/sq ft)		1.30	
Alpha	1.00	Stream Power (lb/ft s)		22.43	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

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.
Note: The user has entered a known water surface elevation at this cross section.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	1696.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.80	Wt. n-Val.		0.015	
W.S. Elev (ft)	1692.72	Reach Len. (ft)			
Crit W.S. (ft)	1693.85	Flow Area (sq ft)		210.99	
E.G. Slope (ft/ft)	*0.006035	Area (sq ft)		210.99	
Q Total (cfs)	3300.00	Flow (cfs)		3300.00	
Top Width (ft)	71.04	Top Width (ft)		71.04	
Vel Total (ft/s)	15.64	Avg. Vel. (ft/s)		15.64	
Max Chl Dpth (ft)	3.22	Hydr. Depth (ft)		2.97	
Conv. Total (cfs)	42480.3	Conv. (cfs)		42480.3	
Length Wtd. (ft)		Wetted Per. (ft)		72.82	
Min Ch El (ft)	1689.50	Shear (lb/sq ft)		1.09	
Alpha	1.00	Stream Power (lb/ft s)		17.07	
Frctn Loss (ft)	1.47	Cum Volume (acre-ft)			
C & E Loss (ft)	0.05	Cum SA (acres)			

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.

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SUMMARY OF MANNING'S N VALUES

River:Range Wash

Reach	River Sta.	n1	n2	n3
Sloan Channel	225	.015	.015	.015
Sloan Channel	220	.015	.015	.015
Sloan Channel	215	.015	.015	.015
Sloan Channel	213	.015	.015	.015
Sloan Channel	212	.015	.015	.015
Sloan Channel	211.5	Bridge		
Sloan Channel	211	.015	.015	.015
Sloan Channel	210.5	.015	.015	.015
Sloan Channel	210	.015	.015	.015
Sloan Channel	200	.015	.015	.015
Sloan Channel	198.571*	.015	.015	.015
Sloan Channel	197.142*	.015	.015	.015
Sloan Channel	195.714*	.015	.015	.015
Sloan Channel	194.285*	.015	.015	.015
Sloan Channel	192.857*	.015	.015	.015
Sloan Channel	191.428*	.015	.015	.015
Sloan Channel	190	.015	.015	.015
Sloan Channel	188.*	.015	.015	.015
Sloan Channel	186.*	.015	.015	.015
Sloan Channel	184.*	.015	.015	.015
Sloan Channel	182.*	.015	.015	.015
Sloan Channel	180	.015	.015	.015
Sloan Channel	170	.015	.015	.015
Sloan Channel	160	.015	.015	.015
Sloan Channel	158.333*	.015	.015	.015
Sloan Channel	156.666*	.015	.015	.015
Sloan Channel	155.*	.015	.015	.015
Sloan Channel	153.333*	.015	.015	.015
Sloan Channel	151.666*	.015	.015	.015
Sloan Channel	150	.015	.015	.015
Sloan Channel	149.285*	.015	.015	.015
Sloan Channel	148.571*	.015	.015	.015
Sloan Channel	147.857*	.015	.015	.015
Sloan Channel	147.142*	.015	.015	.015
Sloan Channel	146.428*	.015	.015	.015
Sloan Channel	145.714*	.015	.015	.015
Sloan Channel	145.*	.015	.015	.015
Sloan Channel	144.285*	.015	.015	.015
Sloan Channel	143.571*	.015	.015	.015
Sloan Channel	142.857*	.015	.015	.015
Sloan Channel	142.142*	.015	.015	.015
Sloan Channel	141.428*	.015	.015	.015
Sloan Channel	140.714*	.015	.015	.015
Sloan Channel	140	.015	.015	.015
Sloan Channel	130	.015	.015	.015
Sloan Channel	120	.015	.015	.015
Sloan Channel	110	.015	.015	.015
Sloan Channel	100	.015	.015	.015
Sloan Channel	90	.015	.015	.015
Sloan Channel	80	.015	.015	.015
Sloan Channel	78.8888*	.015	.015	.015
Sloan Channel	77.7777*	.015	.015	.015
Sloan Channel	76.6666*	.015	.015	.015
Sloan Channel	75.5555*	.015	.015	.015
Sloan Channel	74.4444*	.015	.015	.015
Sloan Channel	73.3333*	.015	.015	.015
Sloan Channel	72.2222*	.015	.015	.015
Sloan Channel	71.1111*	.015	.015	.015
Sloan Channel	70	.015	.015	.015
Sloan Channel	60	.015	.015	.015
Sloan Channel	50	Bridge		
Sloan Channel	40	.015	.015	.015
Sloan Channel	30	.015	.015	.015
Sloan Channel	28.5714*	.015	.015	.015
Sloan Channel	27.1428*	.015	.015	.015
Sloan Channel	25.7142*	.015	.015	.015
Sloan Channel	24.2857*	.015	.015	.015
Sloan Channel	22.8571*	.015	.015	.015
Sloan Channel	21.4285*	.015	.015	.015
Sloan Channel	20	.015	.015	.015
Sloan Channel	10	.015	.015	.015

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SUMMARY OF REACH LENGTHS

River: Range Wash

Reach	River Sta.	Left	Channel	Right
Sloan Channel	225	274	274	274
Sloan Channel	220	151	151	151
Sloan Channel	215	50	50	50
Sloan Channel	213	1	1	1
Sloan Channel	212	100	100	100
Sloan Channel	211.5	Bridge		
Sloan Channel	211	1	1	1
Sloan Channel	210.5	97	97	97
Sloan Channel	210	35.96	35.96	35.96
Sloan Channel	200	44.45	49.9	53.55
Sloan Channel	198.571*	44.45	49.9	53.55
Sloan Channel	197.142*	44.45	49.9	53.55
Sloan Channel	195.714*	44.45	49.9	53.55
Sloan Channel	194.285*	44.45	49.9	53.55
Sloan Channel	192.857*	44.45	49.9	53.55

*Sloan Channel	*	191.428*	*	44.45*	49.9*	53.55*
*Sloan Channel	*	190	*	45.13*	45.13*	45.13*
*Sloan Channel	*	188.*	*	45.13*	45.13*	45.13*
*Sloan Channel	*	186.*	*	45.13*	45.13*	45.13*
*Sloan Channel	*	184.*	*	45.13*	45.13*	45.13*
*Sloan Channel	*	182.*	*	45.13*	45.13*	45.13*
*Sloan Channel	*	180	*	100*	100*	100*
*Sloan Channel	*	170	*	51.96*	51.96*	51.96*
*Sloan Channel	*	160	*	74.33*	74.33*	74.33*
*Sloan Channel	*	158.333*	*	74.33*	74.33*	74.33*
*Sloan Channel	*	156.666*	*	74.33*	74.33*	74.33*
*Sloan Channel	*	155.*	*	74.33*	74.33*	74.33*
*Sloan Channel	*	153.333*	*	74.33*	74.33*	74.33*
*Sloan Channel	*	151.666*	*	74.33*	74.33*	74.33*
*Sloan Channel	*	150	*	196.55*	196.55*	196.55*
*Sloan Channel	*	149.285*	*	196.55*	196.55*	196.55*
*Sloan Channel	*	148.571*	*	196.55*	196.55*	196.55*
*Sloan Channel	*	147.857*	*	196.55*	196.55*	196.55*
*Sloan Channel	*	147.142*	*	196.55*	196.55*	196.55*
*Sloan Channel	*	146.428*	*	196.55*	196.55*	196.55*
*Sloan Channel	*	145.714*	*	196.55*	196.55*	196.55*
*Sloan Channel	*	145.*	*	196.55*	196.55*	196.55*
*Sloan Channel	*	144.285*	*	196.55*	196.55*	196.55*
*Sloan Channel	*	143.571*	*	196.55*	196.55*	196.55*
*Sloan Channel	*	142.857*	*	196.55*	196.55*	196.55*
*Sloan Channel	*	142.142*	*	196.55*	196.55*	196.55*
*Sloan Channel	*	141.428*	*	196.55*	196.55*	196.55*
*Sloan Channel	*	140.714*	*	196.55*	196.55*	196.55*
*Sloan Channel	*	140	*	50*	50*	50*
*Sloan Channel	*	130	*	129.35*	129.35*	129.35*
*Sloan Channel	*	120	*	50*	50*	50*
*Sloan Channel	*	110	*	100*	100*	100*
*Sloan Channel	*	100	*	100*	100*	100*
*Sloan Channel	*	90	*	50*	50*	50*
*Sloan Channel	*	80	*	91.21*	91.21*	91.21*
*Sloan Channel	*	78.8888*	*	91.21*	91.21*	91.21*
*Sloan Channel	*	77.7777*	*	91.21*	91.21*	91.21*
*Sloan Channel	*	76.6666*	*	91.21*	91.21*	91.21*
*Sloan Channel	*	75.5555*	*	91.21*	91.21*	91.21*
*Sloan Channel	*	74.4444*	*	91.21*	91.21*	91.21*
*Sloan Channel	*	73.3333*	*	91.21*	91.21*	91.21*
*Sloan Channel	*	72.2222*	*	91.21*	91.21*	91.21*
*Sloan Channel	*	71.1111*	*	91.21*	91.21*	91.21*
*Sloan Channel	*	70	*	46.25*	46.25*	46.25*
*Sloan Channel	*	60	*	90*	90*	90*
*Sloan Channel	*	50	*Bridge	*	*	*
*Sloan Channel	*	40	*	113.64*	113.64*	113.64*
*Sloan Channel	*	30	*	179.28*	179.28*	179.28*
*Sloan Channel	*	28.5714*	*	179.28*	179.28*	179.28*
*Sloan Channel	*	27.1428*	*	179.28*	179.28*	179.28*
*Sloan Channel	*	25.7142*	*	179.28*	179.28*	179.28*
*Sloan Channel	*	24.2857*	*	179.28*	179.28*	179.28*
*Sloan Channel	*	22.8571*	*	179.28*	179.28*	179.28*
*Sloan Channel	*	21.4285*	*	179.28*	179.28*	179.28*
*Sloan Channel	*	20	*	260.12*	280*	299.88*
*Sloan Channel	*	10	*	0*	0*	0*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Range Wash

Reach	River Sta.	Contr.	Expan.
*Sloan Channel	225	.1	.3
*Sloan Channel	220	.1	.3
*Sloan Channel	215	.1	.3
*Sloan Channel	213	.1	.3
*Sloan Channel	212	.2	.4
*Sloan Channel	211.5	*Bridge	*
*Sloan Channel	211	.2	.4
*Sloan Channel	210.5	.1	.3
*Sloan Channel	210	.1	.3
*Sloan Channel	200	.1	.3
*Sloan Channel	198.571**	.1	.3
*Sloan Channel	197.142**	.1	.3
*Sloan Channel	195.714**	.1	.3
*Sloan Channel	194.285**	.1	.3
*Sloan Channel	192.857**	.1	.3
*Sloan Channel	191.428**	.1	.3
*Sloan Channel	190	.1	.3
*Sloan Channel	188.*	.1	.3
*Sloan Channel	186.*	.1	.3
*Sloan Channel	184.*	.1	.3
*Sloan Channel	182.*	.1	.3
*Sloan Channel	180	.1	.3
*Sloan Channel	170	.1	.3
*Sloan Channel	160	.1	.3
*Sloan Channel	158.333**	.1	.3
*Sloan Channel	156.666**	.1	.3
*Sloan Channel	155.*	.1	.3
*Sloan Channel	153.333**	.1	.3
*Sloan Channel	151.666**	.1	.3
*Sloan Channel	150	.1	.3
*Sloan Channel	149.285**	.1	.3
*Sloan Channel	148.571**	.1	.3
*Sloan Channel	147.857**	.1	.3
*Sloan Channel	147.142**	.1	.3
*Sloan Channel	146.428**	.1	.3
*Sloan Channel	145.714**	.1	.3
*Sloan Channel	145.*	.1	.3
*Sloan Channel	144.285**	.1	.3
*Sloan Channel	143.571**	.1	.3
*Sloan Channel	142.857**	.1	.3

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*Sloan Channel   *    142.142**       .1*       .3*
*Sloan Channel   *    141.428**       .1*       .3*
*Sloan Channel   *    140.714**       .1*       .3*
*Sloan Channel   *    140     *       .1*       .3*
*Sloan Channel   *    130     *       .1*       .3*
*Sloan Channel   *    120     *       .1*       .3*
*Sloan Channel   *    110     *       .1*       .3*
*Sloan Channel   *    100     *       .1*       .3*
*Sloan Channel   *    90      *       .1*       .3*
*Sloan Channel   *    80      *       .1*       .3*
*Sloan Channel   *    78.8888**       .1*       .3*
*Sloan Channel   *    77.7777**       .1*       .3*
*Sloan Channel   *    76.6666**       .1*       .3*
*Sloan Channel   *    75.5555**       .1*       .3*
*Sloan Channel   *    74.4444**       .1*       .3*
*Sloan Channel   *    73.3333**       .1*       .3*
*Sloan Channel   *    72.2222**       .1*       .3*
*Sloan Channel   *    71.1111**       .1*       .3*
*Sloan Channel   *    70      *       .1*       .3*
*Sloan Channel   *    60      *       .3*       .5*
*Sloan Channel   *    50      *Bridge   *         *
*Sloan Channel   *    40      *       .3*       .5*
*Sloan Channel   *    30      *       .1*       .3*
*Sloan Channel   *    28.5714**       .1*       .3*
*Sloan Channel   *    27.1428**       .1*       .3*
*Sloan Channel   *    25.7142**       .1*       .3*
*Sloan Channel   *    24.2857**       .1*       .3*
*Sloan Channel   *    22.8571**       .1*       .3*
*Sloan Channel   *    21.4285**       .1*       .3*
*Sloan Channel   *    20      *       .1*       .3*
*Sloan Channel   *    10      *       .1*       .3*
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ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Plan 03

River: Range Wash  Reach: Sloan Channel     RS: 220     Profile: Post-Project
     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.
River: Range Wash  Reach: Sloan Channel     RS: 220     Profile: PF 2
     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.
River: Range Wash  Reach: Sloan Channel     RS: 215     Profile: Post-Project
     Note:   Hydraulic jump has occurred between this cross section and the previous upstream section.
River: Range Wash  Reach: Sloan Channel     RS: 215     Profile: PF 2
     Note:   Hydraulic jump has occurred between this cross section and the previous upstream section.
River: Range Wash  Reach: Sloan Channel     RS: 212     Profile: Post-Project
     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.
River: Range Wash  Reach: Sloan Channel     RS: 212     Profile: PF 2
     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.
River: Range Wash  Reach: Sloan Channel     RS: 211.5     Profile: Post-Project
     Warning:Pier drag coefficient of 2.0 assumed for Class B flow.
     Warning:The momentum, Class B, supercritical, water surface downstream of the bridge had a higher energy than the upstream
             cross section.  This is not physically possible.  The downstream water surface has been computed by taking the
             momentum result inside of the bridge and performing an energy balance.
     Note:   The momentum method has computed a class B profile.
River: Range Wash  Reach: Sloan Channel     RS: 211.5     Profile: Post-Project Downstream
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program selected the water
             surface that had the least amount of error between computed and assumed values.
     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.
River: Range Wash  Reach: Sloan Channel     RS: 211.5     Profile: PF 2
     Warning:Pier drag coefficient of 2.0 assumed for Class B flow.
     Warning:The momentum, Class B, supercritical, water surface downstream of the bridge had a higher energy than the upstream
             cross section.  This is not physically possible.  The downstream water surface has been computed by taking the
             momentum result inside of the bridge and performing an energy balance.
     Note:   Yarnell answer is not valid if the water surface is above the low chord or if there is weir flow.  The Yarnell answer
             has been disregarded.
     Note:   The momentum method has computed a class B profile.
River: Range Wash  Reach: Sloan Channel     RS: 211.5     Profile: PF 2 Downstream
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program selected the water
             surface that had the least amount of error between computed and assumed values.
     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.
River: Range Wash  Reach: Sloan Channel     RS: 211     Profile: Post-Project
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Note:   The energy method has computed a class B profile.
River: Range Wash  Reach: Sloan Channel     RS: 211     Profile: PF 2
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Note:   The energy method has computed a class B profile.
River: Range Wash  Reach: Sloan Channel     RS: 210.5     Profile: Post-Project
     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.
River: Range Wash  Reach: Sloan Channel     RS: 210.5     Profile: PF 2
     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.
River: Range Wash  Reach: Sloan Channel     RS: 210     Profile: Post-Project
     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.
River: Range Wash  Reach: Sloan Channel     RS: 210     Profile: PF 2
     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.
River: Range Wash  Reach: Sloan Channel     RS: 200     Profile: Post-Project
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
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River: Range Wash Reach: Sloan Channel RS: 200 Profile: PF 2
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: Range Wash Reach: Sloan Channel RS: 140 Profile: Post-Project
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: Range Wash Reach: Sloan Channel RS: 110 Profile: Post-Project
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: Range Wash Reach: Sloan Channel RS: 100 Profile: Post-Project
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.
River: Range Wash Reach: Sloan Channel RS: 90 Profile: Post-Project
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.
River: Range Wash Reach: Sloan Channel RS: 90 Profile: PF 2
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.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: Range Wash Reach: Sloan Channel RS: 80 Profile: Post-Project
Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
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.
River: Range Wash Reach: Sloan Channel RS: 80 Profile: PF 2
Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
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.
River: Range Wash Reach: Sloan Channel RS: 78.8888* Profile: Post-Project
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: Range Wash Reach: Sloan Channel RS: 78.8888* Profile: PF 2
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: Range Wash Reach: Sloan Channel RS: 50 Profile: Post-Project
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
River: Range Wash Reach: Sloan Channel RS: 50 Profile: Post-Project Upstream
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.
River: Range Wash Reach: Sloan Channel RS: 50 Profile: Post-Project Downstream
Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
River: Range Wash Reach: Sloan Channel RS: 50 Profile: PF 2
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
River: Range Wash Reach: Sloan Channel RS: 50 Profile: PF 2 Upstream
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.
River: Range Wash Reach: Sloan Channel RS: 50 Profile: PF 2 Downstream
Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
River: Range Wash Reach: Sloan Channel RS: 28.5714* Profile: Post-Project
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: Range Wash Reach: Sloan Channel RS: 10 Profile: Post-Project
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.
Note: The user has entered a known water surface elevation at this cross section.
River: Range Wash Reach: Sloan Channel RS: 10 Profile: PF 2
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.

HEC-RAS Plan: Plan 03 River: Range Wash Reach: Sloan Channel

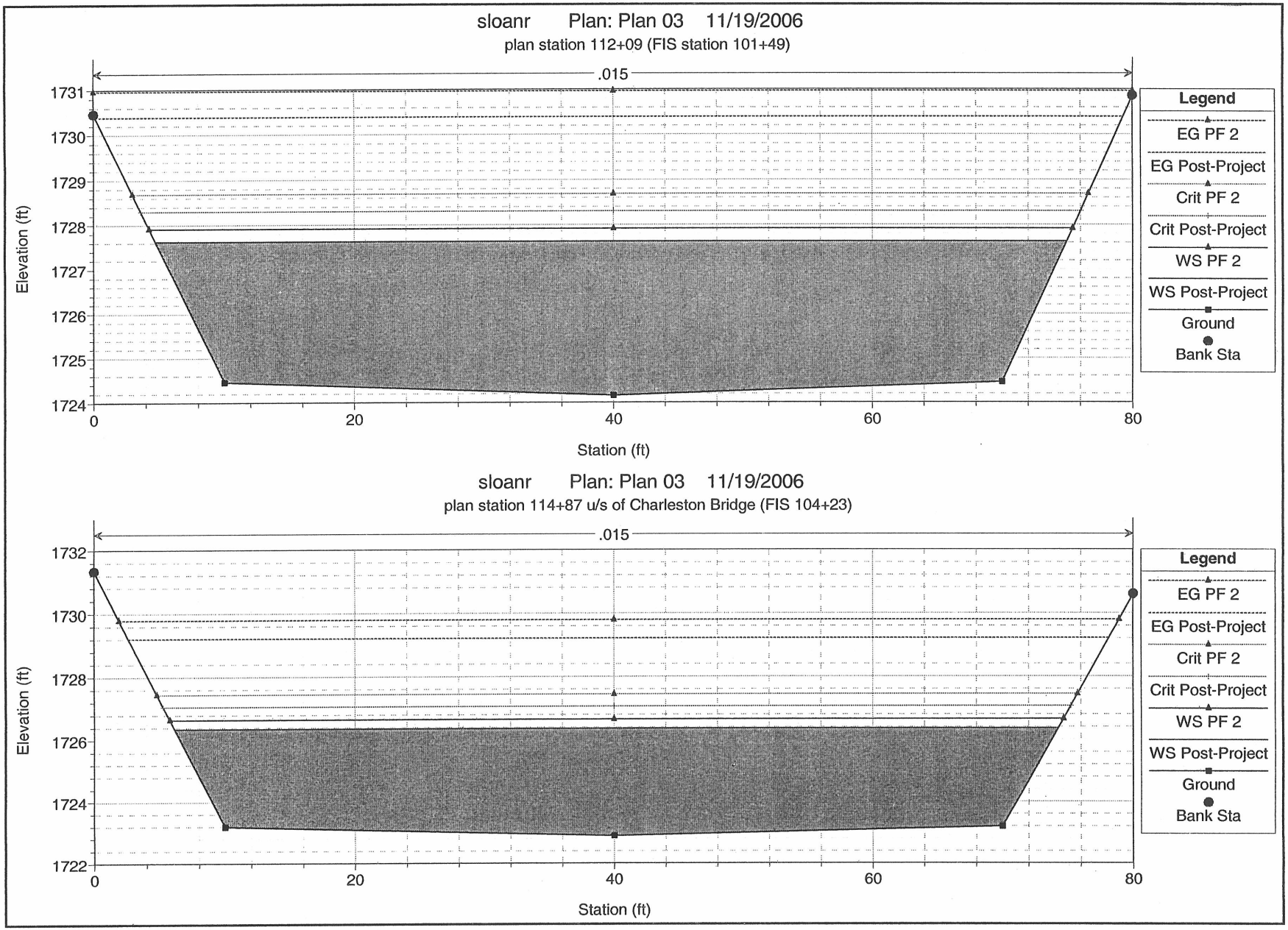
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Sloan Channel	225	Post-Project	2870.00	1724.16	1727.63	1728.30	1730.39	0.004207	13.33	215.29	70.23	1.34
Sloan Channel	225	PF 2	3300.00	1724.16	1727.91	1728.68	1730.96	0.004207	14.01	235.50	71.15	1.36
Sloan Channel	220	Post-Project	2870.00	1722.89	1726.35	1727.06	1729.21	0.004319	13.57	211.55	68.15	1.36
Sloan Channel	220	PF 2	3300.00	1722.89	1726.65	1727.44	1729.79	0.004283	14.23	231.88	68.92	1.37
Sloan Channel	215	Post-Project	2870.00	1722.26	1727.45	1726.44	1728.61	0.001060	8.65	331.87	72.11	0.71
Sloan Channel	215	PF 2	3300.00	1722.26	1727.92	1726.82	1729.18	0.001037	9.01	366.08	73.27	0.71
Sloan Channel	213	Post-Project	2870.00	1722.01	1727.59		1728.48	0.000739	7.55	379.91	77.53	0.60
Sloan Channel	213	PF 2	3300.00	1722.01	1728.08		1729.05	0.000732	7.90	417.75	78.94	0.61
Sloan Channel	212	Post-Project	2870.00	1722.00	1727.60	1726.05	1728.48	0.000734	7.54	380.85	77.57	0.60
Sloan Channel	212	PF 2	3300.00	1722.00	1728.08	1726.42	1729.05	0.000727	7.88	418.70	78.97	0.60
Sloan Channel	211.5		Bridge									
Sloan Channel	211	Post-Project	2870.00	1721.50	1725.15	1725.67	1727.68	0.003527	12.75	225.10	68.08	1.24
Sloan Channel	211	PF 2	3300.00	1721.50	1725.49	1726.04	1728.24	0.003444	13.31	247.97	68.87	1.24
Sloan Channel	210.5	Post-Project	2870.00	1720.36	1723.17	1724.42	1727.34	0.008159	16.39	175.14	68.99	1.81
Sloan Channel	210.5	PF 2	3300.00	1720.36	1723.46	1724.80	1727.89	0.007637	16.89	195.34	69.78	1.78
Sloan Channel	210	Post-Project	2870.00	1720.22	1723.79	1724.40	1726.29	0.004195	12.69	226.17	80.10	1.33
Sloan Channel	210	PF 2	3300.00	1720.22	1724.00	1724.74	1726.87	0.004456	13.60	242.60	80.91	1.38
Sloan Channel	200	Post-Project	2870.00	1719.24	1722.32	1723.42	1725.98	0.007627	15.35	186.96	78.11	1.75
Sloan Channel	200	PF 2	3300.00	1719.24	1722.56	1723.76	1726.55	0.007471	16.05	205.66	79.07	1.75
Sloan Channel	198.571*	Post-Project	2870.00	1719.04	1722.27	1723.22	1725.51	0.006322	14.46	198.44	78.70	1.61
Sloan Channel	198.571*	PF 2	3300.00	1719.04	1722.50	1723.56	1726.10	0.006336	15.22	216.76	79.62	1.63
Sloan Channel	197.142*	Post-Project	2870.00	1718.84	1722.20	1723.02	1725.13	0.005395	13.75	208.71	79.22	1.49
Sloan Channel	197.142*	PF 2	3300.00	1718.84	1722.42	1723.36	1725.71	0.005504	14.55	226.73	80.12	1.52
Sloan Channel	195.714*	Post-Project	2870.00	1718.64	1722.10	1722.82	1724.81	0.004758	13.21	217.26	79.65	1.41
Sloan Channel	195.714*	PF 2	3300.00	1718.64	1722.33	1723.16	1725.38	0.004906	14.03	235.23	80.55	1.45
Sloan Channel	194.285*	Post-Project	2870.00	1718.44	1721.98	1722.62	1724.54	0.004357	12.84	223.45	79.96	1.35
Sloan Channel	194.285*	PF 2	3300.00	1718.44	1722.21	1722.96	1725.10	0.004500	13.64	241.85	80.87	1.39
Sloan Channel	192.857*	Post-Project	2870.00	1718.24	1721.81	1722.42	1724.32	0.004210	12.70	225.91	80.08	1.33
Sloan Channel	192.857*	PF 2	3300.00	1718.24	1722.05	1722.76	1724.87	0.004324	13.47	244.95	81.03	1.37
Sloan Channel	191.428*	Post-Project	2870.00	1718.04	1721.62	1722.22	1724.11	0.004169	12.66	226.63	80.12	1.33
Sloan Channel	191.428*	PF 2	3300.00	1718.04	1721.88	1722.56	1724.64	0.004204	13.35	247.17	81.14	1.35
Sloan Channel	190	Post-Project	2870.00	1717.84	1721.42	1722.02	1723.91	0.004169	12.66	226.63	80.12	1.33
Sloan Channel	190	PF 2	3300.00	1717.84	1721.67	1722.36	1724.44	0.004205	13.35	247.17	81.14	1.35
Sloan Channel	188.*	Post-Project	2870.00	1717.66	1721.24	1721.84	1723.73	0.004169	12.66	226.63	80.12	1.33
Sloan Channel	188.*	PF 2	3300.00	1717.66	1721.50	1722.20	1724.26	0.004204	13.35	247.17	81.14	1.35
Sloan Channel	186.*	Post-Project	2870.00	1717.48	1721.06	1721.67	1723.55	0.004169	12.66	226.63	80.12	1.33
Sloan Channel	186.*	PF 2	3300.00	1717.48	1721.31	1722.02	1724.08	0.004205	13.35	247.17	81.14	1.35
Sloan Channel	184.*	Post-Project	2870.00	1717.30	1720.88	1721.49	1723.37	0.004169	12.66	226.63	80.12	1.33
Sloan Channel	184.*	PF 2	3300.00	1717.30	1721.14	1721.84	1723.90	0.004204	13.35	247.17	81.14	1.35
Sloan Channel	182.*	Post-Project	2870.00	1717.12	1720.70	1721.31	1723.19	0.004169	12.66	226.63	80.12	1.33
Sloan Channel	182.*	PF 2	3300.00	1717.12	1720.95	1721.66	1723.72	0.004205	13.35	247.17	81.14	1.35
Sloan Channel	180	Post-Project	2870.00	1716.94	1720.52	1721.13	1723.01	0.004169	12.66	226.63	80.12	1.33
Sloan Channel	180	PF 2	3300.00	1716.94	1720.77	1721.47	1723.54	0.004205	13.35	247.17	81.14	1.35
Sloan Channel	170	Post-Project	2870.00	1716.04	1719.81	1720.50	1722.56	0.004262	13.32	215.41	71.47	1.35
Sloan Channel	170	PF 2	3300.00	1716.04	1720.12	1720.87	1723.10	0.004141	13.86	238.08	72.72	1.35
Sloan Channel	160	Post-Project	2870.00	1715.84	1719.65	1720.30	1722.33	0.004098	13.16	218.16	71.62	1.33
Sloan Channel	160	PF 2	3300.00	1715.84	1719.95	1720.67	1722.88	0.004033	13.74	240.13	72.84	1.33
Sloan Channel	158.333*	Post-Project	2870.00	1715.56	1719.41	1720.02	1722.02	0.003507	12.96	221.52	71.81	1.30
Sloan Channel	158.333*	PF 2	3300.00	1715.56	1719.71	1720.39	1722.57	0.003891	13.59	242.91	72.99	1.31
Sloan Channel	156.666*	Post-Project	2870.00	1715.28	1719.15	1719.74	1721.73	0.003856	12.90	222.46	71.88	1.29
Sloan Channel	156.666*	PF 2	3300.00	1715.28	1719.44	1720.11	1722.29	0.003849	13.54	243.76	73.05	1.31
Sloan Channel	155.*	Post-Project	2870.00	1715.00	1718.87	1719.46	1721.45	0.003856	12.90	222.44	71.87	1.29
Sloan Channel	155.*	PF 2	3300.00	1715.00	1719.16	1719.83	1722.01	0.003849	13.54	243.74	73.05	1.31

HEC-RAS Plan: Plan 03 River: Range Wash Reach: Sloan Channel (Continued)

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)	
Sloan Channel	153.333*	Post-Project	2870.00	1714.72	1718.59	1719.18	1721.17	0.003854	12.90	222.49	71.87	1.29
Sloan Channel	153.333*	PF 2	3300.00	1714.72	1718.88	1719.55	1721.73	0.003847	13.54	243.79	73.05	1.31
Sloan Channel	151.666*	Post-Project	2870.00	1714.44	1718.31	1718.90	1720.89	0.003847	12.89	222.64	71.88	1.29
Sloan Channel	151.666*	PF 2	3300.00	1714.44	1718.60	1719.27	1721.44	0.003841	13.53	243.94	73.05	1.30
Sloan Channel	150	Post-Project	2870.00	1714.16	1718.03	1718.62	1720.61	0.003843	12.88	222.76	71.88	1.29
Sloan Channel	150	PF 2	3300.00	1714.16	1718.32	1718.99	1721.16	0.003837	13.52	244.06	73.05	1.30
Sloan Channel	149.285*	Post-Project	2870.00	1713.42	1717.30	1717.87	1719.86	0.003802	12.84	223.51	71.91	1.28
Sloan Channel	149.285*	PF 2	3300.00	1713.42	1717.59	1718.25	1720.41	0.003803	13.48	244.75	73.08	1.30
Sloan Channel	148.571*	Post-Project	2870.00	1712.67	1716.56	1717.13	1719.11	0.003792	12.83	223.68	71.93	1.28
Sloan Channel	148.571*	PF 2	3300.00	1712.67	1716.85	1717.52	1719.67	0.003794	13.47	244.93	73.10	1.30
Sloan Channel	147.857*	Post-Project	2870.00	1711.93	1715.82	1716.39	1718.37	0.003785	12.82	223.82	71.95	1.28
Sloan Channel	147.857*	PF 2	3300.00	1711.93	1716.11	1716.78	1718.92	0.003787	13.47	245.07	73.12	1.30
Sloan Channel	147.142*	Post-Project	2870.00	1711.19	1715.08	1715.65	1717.63	0.003786	12.82	223.80	71.95	1.28
Sloan Channel	147.142*	PF 2	3300.00	1711.19	1715.37	1716.04	1718.18	0.003787	13.47	245.05	73.12	1.30
Sloan Channel	146.428*	Post-Project	2870.00	1710.45	1714.34	1714.91	1716.89	0.003780	12.82	223.89	71.95	1.28
Sloan Channel	146.428*	PF 2	3300.00	1710.45	1714.63	1715.30	1717.44	0.003782	13.46	245.14	73.12	1.30
Sloan Channel	145.714*	Post-Project	2870.00	1709.70	1713.59	1714.16	1716.14	0.003769	12.81	224.09	71.96	1.28
Sloan Channel	145.714*	PF 2	3300.00	1709.70	1713.89	1714.55	1716.69	0.003773	13.45	245.32	73.13	1.29
Sloan Channel	145.*	Post-Project	2870.00	1708.96	1712.85	1713.42	1715.40	0.003769	12.81	224.10	71.96	1.28
Sloan Channel	145.*	PF 2	3300.00	1708.96	1713.15	1713.81	1715.95	0.003773	13.45	245.33	73.13	1.29
Sloan Channel	144.285*	Post-Project	2870.00	1708.22	1712.11	1712.68	1714.65	0.003759	12.80	224.29	71.97	1.28
Sloan Channel	144.285*	PF 2	3300.00	1708.22	1712.41	1713.07	1715.21	0.003764	13.44	245.52	73.14	1.29
Sloan Channel	143.571*	Post-Project	2870.00	1707.47	1711.36	1711.93	1713.91	0.003792	12.83	223.66	71.93	1.28
Sloan Channel	143.571*	PF 2	3300.00	1707.47	1711.65	1712.32	1714.47	0.003789	13.47	244.99	73.11	1.30
Sloan Channel	142.857*	Post-Project	2870.00	1706.73	1710.62	1711.19	1713.17	0.003790	12.83	223.71	71.94	1.28
Sloan Channel	142.857*	PF 2	3300.00	1706.73	1710.91	1711.58	1713.73	0.003788	13.47	245.03	73.12	1.30
Sloan Channel	142.142*	Post-Project	2870.00	1705.99	1709.88	1710.45	1712.43	0.003779	12.82	223.92	71.95	1.28
Sloan Channel	142.142*	PF 2	3300.00	1705.99	1710.17	1710.84	1712.98	0.003778	13.46	245.25	73.13	1.29
Sloan Channel	141.428*	Post-Project	2870.00	1705.25	1709.14	1709.71	1711.69	0.003775	12.81	224.03	71.97	1.28
Sloan Channel	141.428*	PF 2	3300.00	1705.25	1709.43	1710.10	1712.24	0.003774	13.45	245.37	73.14	1.29
Sloan Channel	140.714*	Post-Project	2870.00	1704.50	1708.39	1708.97	1710.94	0.003758	12.79	224.36	71.97	1.28
Sloan Channel	140.714*	PF 2	3300.00	1704.50	1708.69	1709.35	1711.49	0.003758	13.43	245.71	73.15	1.29
Sloan Channel	140	Post-Project	2870.00	1703.76	1709.34	1708.23	1710.37	0.000962	8.17	351.20	78.70	0.68
Sloan Channel	140	PF 2	3300.00	1703.76	1707.95	1708.61	1710.75	0.003750	13.42	245.91	73.15	1.29
Sloan Channel	130	Post-Project	2870.00	1703.57	1709.35		1710.30	0.000838	7.81	367.67	79.53	0.64
Sloan Channel	130	PF 2	3300.00	1703.57	1707.76	1708.42	1710.55	0.003742	13.41	246.08	73.16	1.29
Sloan Channel	120	Post-Project	2870.00	1703.09	1709.39		1710.15	0.000609	7.02	409.02	81.59	0.55
Sloan Channel	120	PF 2	3300.00	1703.09	1707.28	1707.93	1710.07	0.003742	13.41	246.08	73.16	1.29
Sloan Channel	110	Post-Project	2870.00	1702.90	1709.41		1710.10	0.000502	6.65	431.89	72.50	0.48
Sloan Channel	110	PF 2	3300.00	1702.90	1706.64	1707.46	1709.81	0.004888	14.30	230.83	72.50	1.41
Sloan Channel	100	Post-Project	3891.00	1702.52	1708.36		1709.93	0.001301	10.04	387.42	72.50	0.77
Sloan Channel	100	PF 2	3300.00	1702.52	1706.29	1707.01	1709.30	0.004490	13.92	237.09	72.50	1.36
Sloan Channel	90	Post-Project	3891.00	1702.14	1708.82		1709.62	0.000559	7.17	542.38	90.50	0.52
Sloan Channel	90	PF 2	3300.00	1702.14	1708.22	1706.28	1708.93	0.000561	6.75	488.54	90.50	0.51
Sloan Channel	80	Post-Project	3891.00	1701.95	1707.28	1707.28	1709.43	0.002097	11.76	330.74	77.00	1.00
Sloan Channel	80	PF 2	3300.00	1701.95	1706.80	1706.80	1708.76	0.002154	11.22	294.08	75.15	1.00
Sloan Channel	78.8888*	Post-Project	3891.00	1701.47	1706.17	1706.80	1709.11	0.003390	13.78	282.42	74.62	1.25
Sloan Channel	78.8888*	PF 2	3300.00	1701.47	1705.72	1706.32	1708.43	0.003543	13.20	249.92	72.92	1.26
Sloan Channel	77.7777*	Post-Project	3891.00	1700.99	1705.51	1706.32	1708.75	0.003919	14.44	269.37	74.00	1.33
Sloan Channel	77.7777*	PF 2	3300.00	1700.99	1705.09	1705.84	1708.05	0.004071	13.81	238.94	72.39	1.34
Sloan Channel	76.6666*	Post-Project	3891.00	1700.51	1704.93	1705.84	1708.35	0.004263	14.84	262.14	73.67	1.39
Sloan Channel	76.6666*	PF 2	3300.00	1700.51	1704.52	1705.36	1707.65	0.004421	14.18	232.68	72.10	1.39

HEC-RAS Plan: Plan 03 River: Range Wash Reach: Sloan Channel (Continued)

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)	
Sloan Channel	75.5555*	Post-Project	3891.00	1700.03	1704.38	1705.36	1707.94	0.004526	15.13	257.14	73.46	1.43
Sloan Channel	75.5555*	PF 2	3300.00	1700.03	1703.99	1704.88	1707.22	0.004668	14.43	228.65	71.93	1.43
Sloan Channel	74.4444*	Post-Project	3891.00	1699.56	1703.86	1704.89	1707.51	0.004705	15.32	253.99	73.37	1.45
Sloan Channel	74.4444*	PF 2	3300.00	1699.56	1703.49	1704.41	1706.78	0.004800	14.56	226.68	71.90	1.44
Sloan Channel	73.3333*	Post-Project	3891.00	1699.08	1703.35	1704.41	1707.06	0.004837	15.45	251.78	73.31	1.47
Sloan Channel	73.3333*	PF 2	3300.00	1699.08	1702.98	1703.93	1706.33	0.004929	14.68	224.80	71.84	1.46
Sloan Channel	72.2222*	Post-Project	3891.00	1698.60	1702.85	1703.93	1706.61	0.004948	15.56	250.00	73.27	1.48
Sloan Channel	72.2222*	PF 2	3300.00	1698.60	1702.48	1703.45	1705.87	0.005027	14.77	223.42	71.82	1.48
Sloan Channel	71.1111*	Post-Project	3891.00	1698.12	1702.35	1703.45	1706.15	0.005031	15.64	248.71	73.25	1.50
Sloan Channel	71.1111*	PF 2	3300.00	1698.12	1701.99	1702.96	1705.40	0.005098	14.83	222.47	71.81	1.49
Sloan Channel	70	Post-Project	3891.00	1697.64	1701.85	1702.97	1705.68	0.005095	15.71	247.75	73.25	1.50
Sloan Channel	70	PF 2	3300.00	1697.64	1701.50	1702.47	1704.93	0.005150	14.88	221.78	71.82	1.49
Sloan Channel	60	Post-Project	3891.00	1697.38	1701.58	1702.71	1705.44	0.005167	15.78	246.64	73.21	1.51
Sloan Channel	60	PF 2	3300.00	1697.38	1701.22	1702.21	1704.69	0.005223	14.95	220.79	71.78	1.50
Sloan Channel	50		Bridge									
Sloan Channel	40	Post-Project	3891.00	1697.09	1702.03	1702.41	1704.61	0.002778	12.87	302.33	76.17	1.14
Sloan Channel	40	PF 2	3300.00	1697.09	1701.58	1701.93	1703.93	0.002866	12.29	268.49	74.38	1.14
Sloan Channel	30	Post-Project	3990.00	1696.56	1701.71	1702.01	1704.30	0.002590	12.91	308.96	72.76	1.10
Sloan Channel	30	PF 2	3300.00	1696.56	1701.00	1701.43	1703.53	0.003066	12.76	258.53	70.65	1.18
Sloan Channel	28.5714*	Post-Project	3990.00	1695.73	1700.40	1701.17	1703.68	0.003711	14.52	274.83	71.34	1.30
Sloan Channel	28.5714*	PF 2	3300.00	1695.73	1699.88	1700.60	1702.87	0.003961	13.87	238.00	69.77	1.32
Sloan Channel	27.1428*	Post-Project	3990.00	1694.90	1699.45	1700.34	1702.95	0.004118	15.02	265.71	70.95	1.37
Sloan Channel	27.1428*	PF 2	3300.00	1694.90	1698.97	1699.77	1702.11	0.004286	14.22	232.05	69.51	1.37
Sloan Channel	25.7142*	Post-Project	3990.00	1694.07	1698.55	1699.51	1702.18	0.004345	15.28	261.14	70.76	1.40
Sloan Channel	25.7142*	PF 2	3300.00	1694.07	1698.09	1698.94	1701.32	0.004467	14.41	228.97	69.38	1.40
Sloan Channel	24.2857*	Post-Project	3990.00	1693.25	1697.71	1698.69	1701.38	0.004440	15.39	259.32	70.68	1.42
Sloan Channel	24.2857*	PF 2	3300.00	1693.25	1697.26	1698.12	1700.51	0.004519	14.47	228.12	69.34	1.41
Sloan Channel	22.8571*	Post-Project	3990.00	1692.42	1696.85	1697.86	1700.57	0.004521	15.48	257.80	70.62	1.43
Sloan Channel	22.8571*	PF 2	3300.00	1692.42	1696.42	1697.29	1699.69	0.004573	14.52	227.25	69.31	1.41
Sloan Channel	21.4285*	Post-Project	3990.00	1691.59	1696.01	1697.03	1699.76	0.004568	15.53	256.95	70.58	1.43
Sloan Channel	21.4285*	PF 2	3300.00	1691.59	1695.59	1696.46	1698.86	0.004583	14.53	227.10	69.30	1.41
Sloan Channel	20	Post-Project	3990.00	1690.76	1695.18	1696.20	1698.93	0.004577	15.54	256.78	70.57	1.44
Sloan Channel	20	PF 2	3300.00	1690.76	1694.75	1695.63	1698.04	0.004587	14.54	227.03	69.30	1.42
Sloan Channel	10	Post-Project	3990.00	1689.50	1693.00		1697.63	0.006656	17.27	231.00	72.00	1.70
Sloan Channel	10	PF 2	3300.00	1689.50	1692.72	1693.85	1696.52	0.006035	15.64	210.99	71.04	1.60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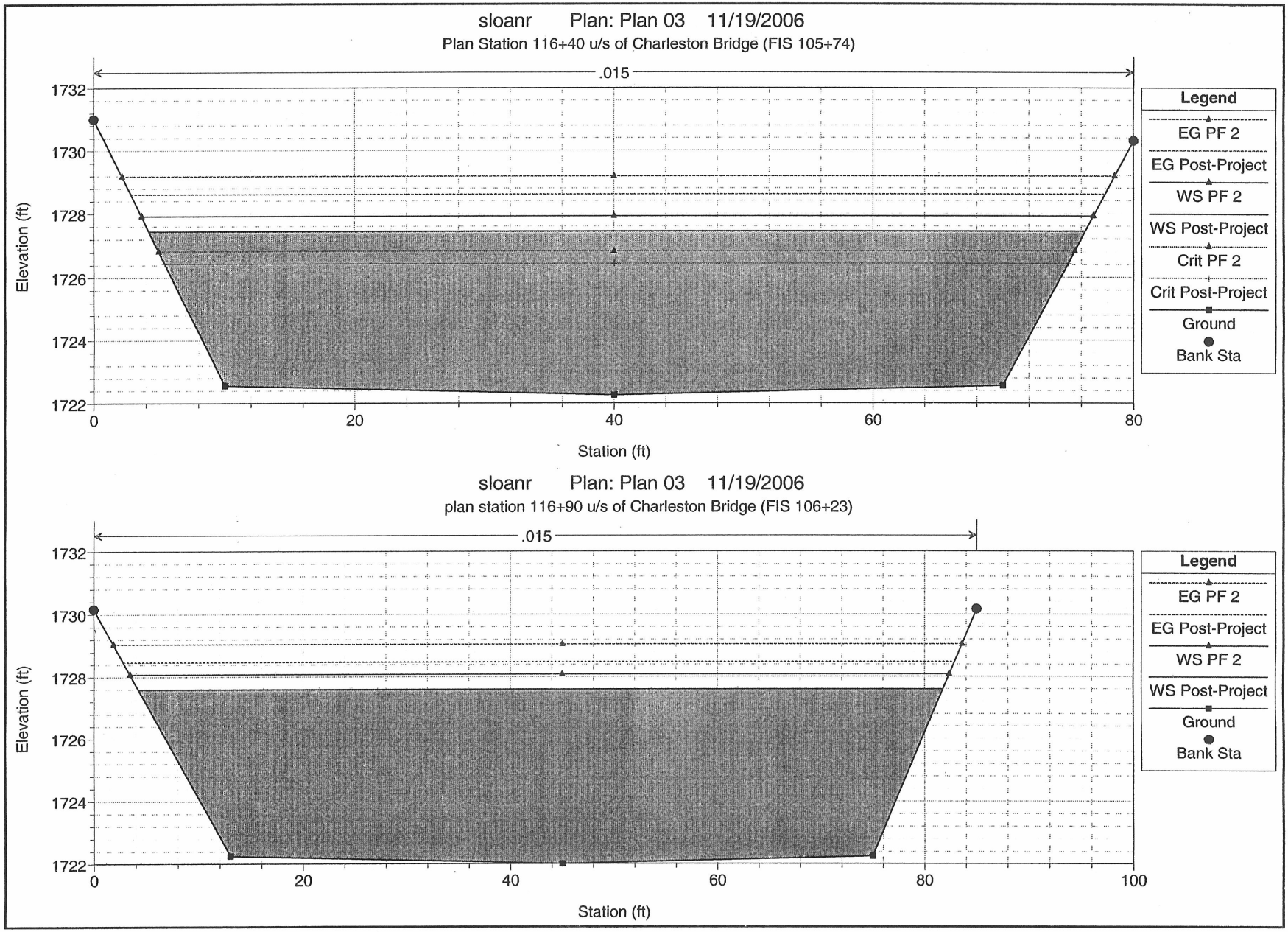
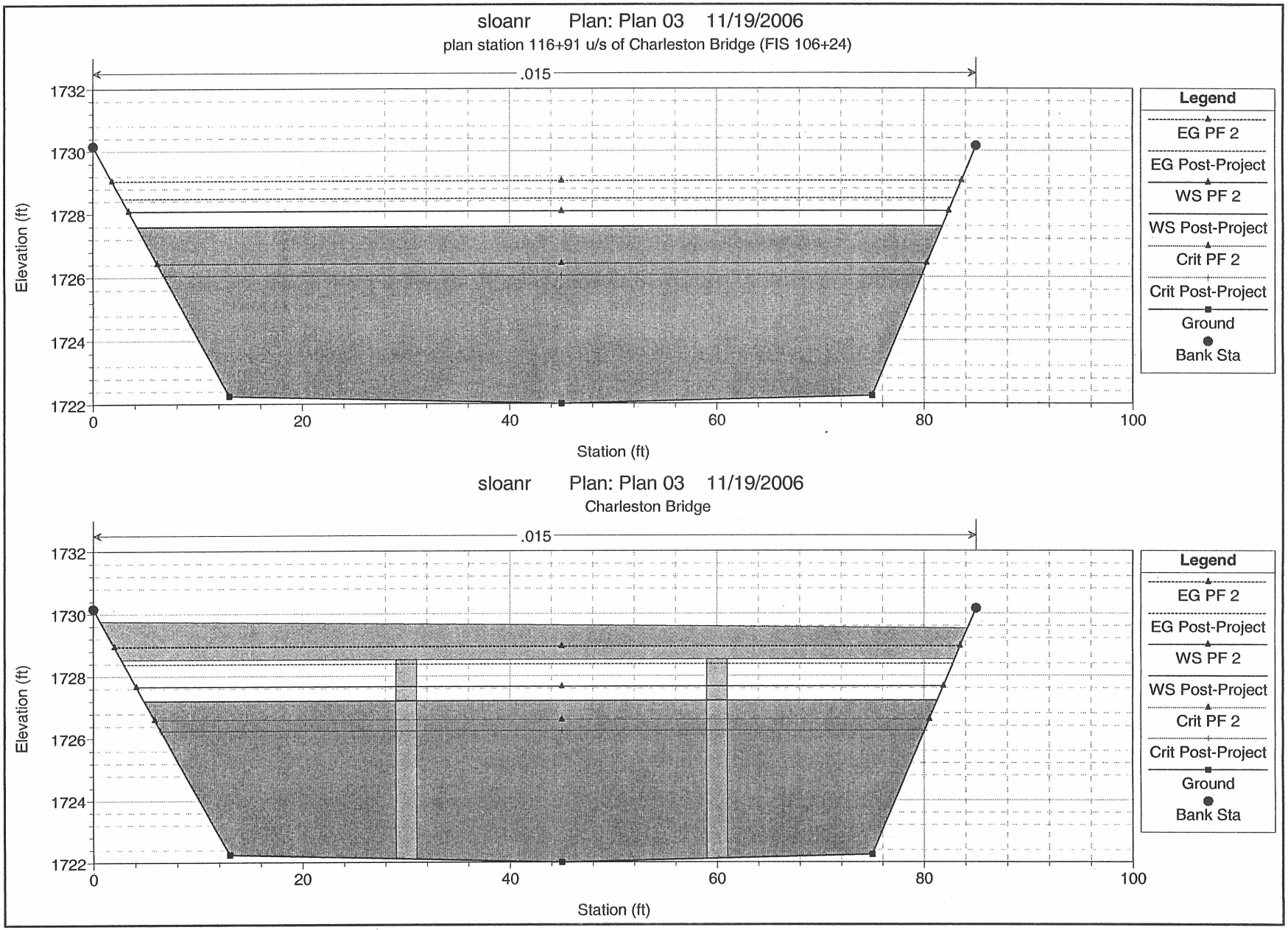
plan station 112+09 (FIS station 101+49)
.015
Elevation (ft)
1731
1730
1729
1728
1727
1726
1725
1724
0
20
40
60
80
Station (ft)
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta
sloanr Plan: Plan 03 11/19/2006
plan station 114+87 u/s of Charleston Bridge (FIS 104+23)
.015
Elevation (ft)
1732
1730
1728
1726
1724
1722
0
20
40
60
80
Station (ft)
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta


sloanr Plan: Plan 03 11/19/2006
Plan Station 116+40 u/s of Charleston Bridge (FIS 105+74)
.015
Elevation (ft)
1732
1730
1728
1726
1724
1722
0
20
40
60
80
Station (ft)
Legend
EG PF 2
EG Post-Project
WS PF 2
WS Post-Project
Crit PF 2
Crit Post-Project
Ground
Bank Sta
sloanr Plan: Plan 03 11/19/2006
plan station 116+90 u/s of Charleston Bridge (FIS 106+23)
.015
Elevation (ft)
1732
1730
1728
1726
1724
1722
0
20
40
60
80
100
Station (ft)
Legend
EG PF 2
EG Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta


sloanr Plan: Plan 03 11/19/2006
plan station 116+91 u/s of Charleston Bridge (FIS 106+24)
.015
1732
1730
1728
1726
1724
1722
Elevation (ft)
0
20
40
60
80
100
Station (ft)
Legend
EG PF 2
EG Post-Project
WS PF 2
WS Post-Project
Crit PF 2
Crit Post-Project
Ground
Bank Sta
sloanr Plan: Plan 03 11/19/2006
Charleston Bridge
.015
1732
1730
1728
1726
1724
1722
Elevation (ft)
0
20
40
60
80
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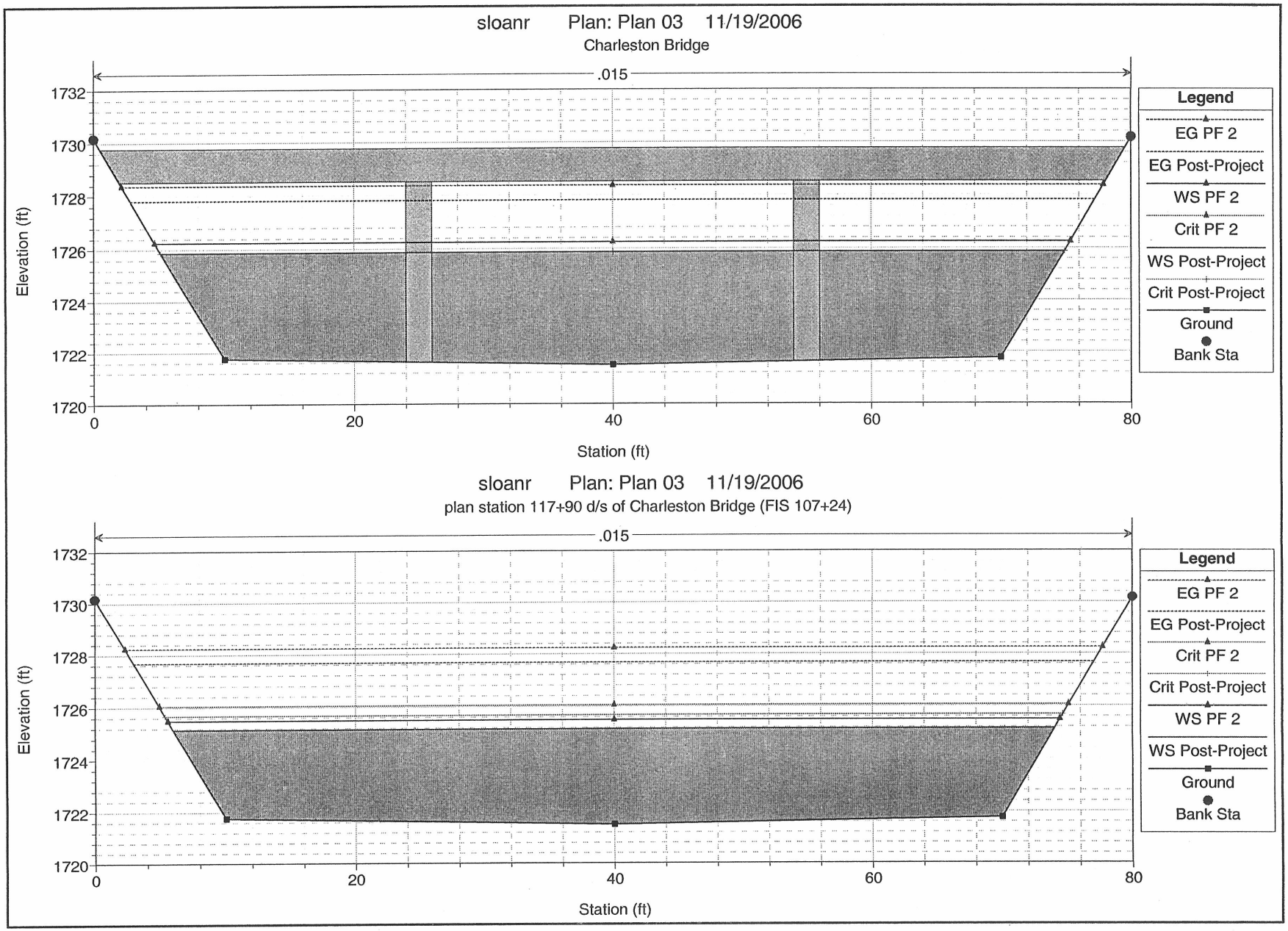
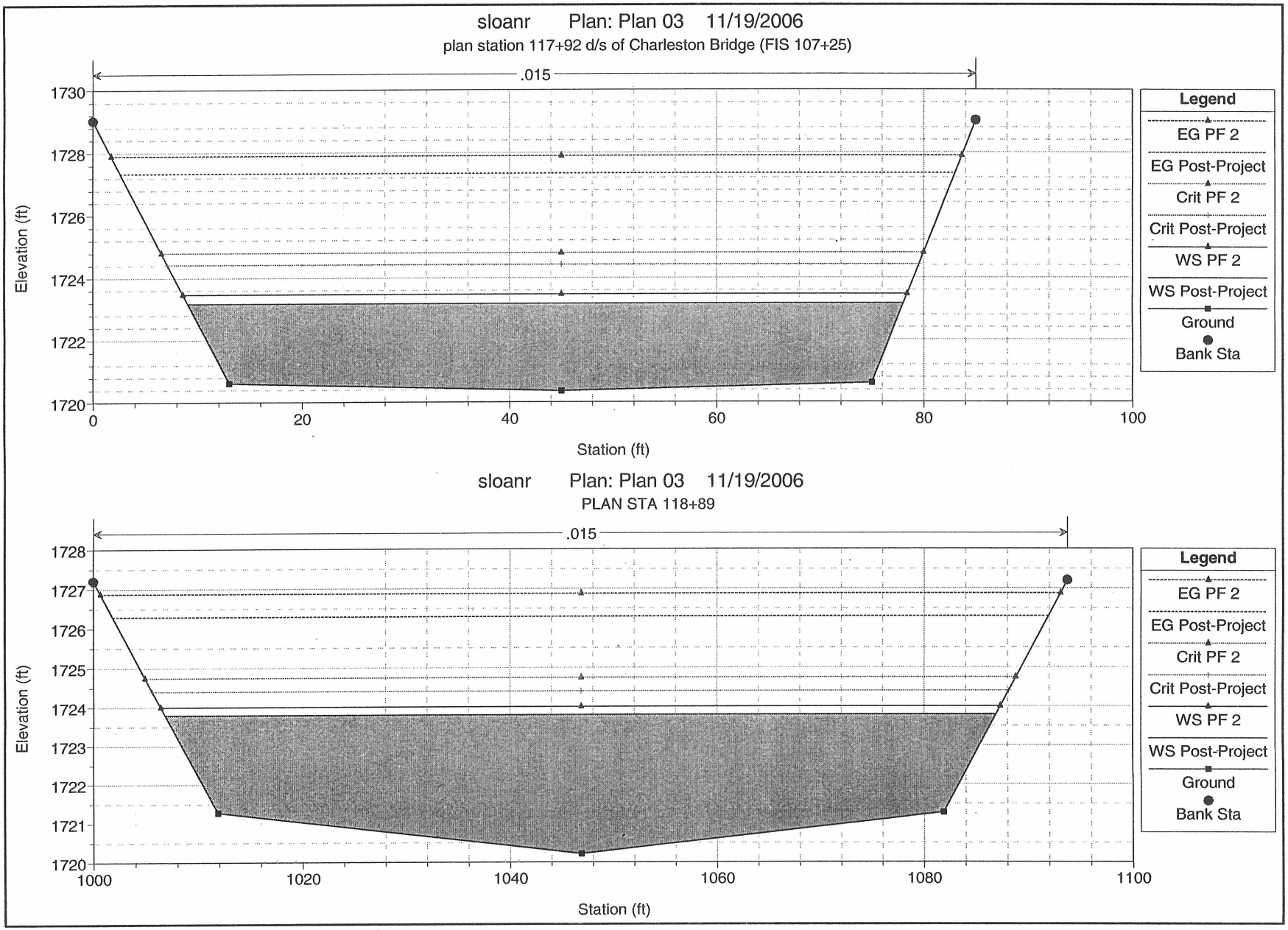
Station (ft)
Legend
EG PF 2
EG Post-Project
WS PF 2
WS Post-Project
Crit PF 2
Crit Post-Project
Ground
Bank Sta


sloanr Plan: Plan 03 11/19/2006
Charleston Bridge
.015
1732
1730
1728
1726
1724
1722
1720
Elevation (ft)
0
20
40
60
80
Station (ft)
Legend
EG PF 2
EG Post-Project
WS PF 2
Crit PF 2
WS Post-Project
Crit Post-Project
Ground
Bank Sta
sloanr Plan: Plan 03 11/19/2006
plan station 117+90 d/s of Charleston Bridge (FIS 107+24)
.015
1732
1730
1728
1726
1724
1722
1720
Elevation (ft)
0
20
40
60
80
Station (ft)
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta


sloanr Plan: Plan 03 11/19/2006
plan station 117+92 d/s of Charleston Bridge (FIS 107+25)
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Elevation (ft)
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1728
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1720
0
20
40
60
80
100
Station (ft)
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta
sloanr Plan: Plan 03 11/19/2006
PLAN STA 118+89
.015
Elevation (ft)
1728
1727
1726
1725
1724
1723
1722
1721
1720
1000
1020
1040
1060
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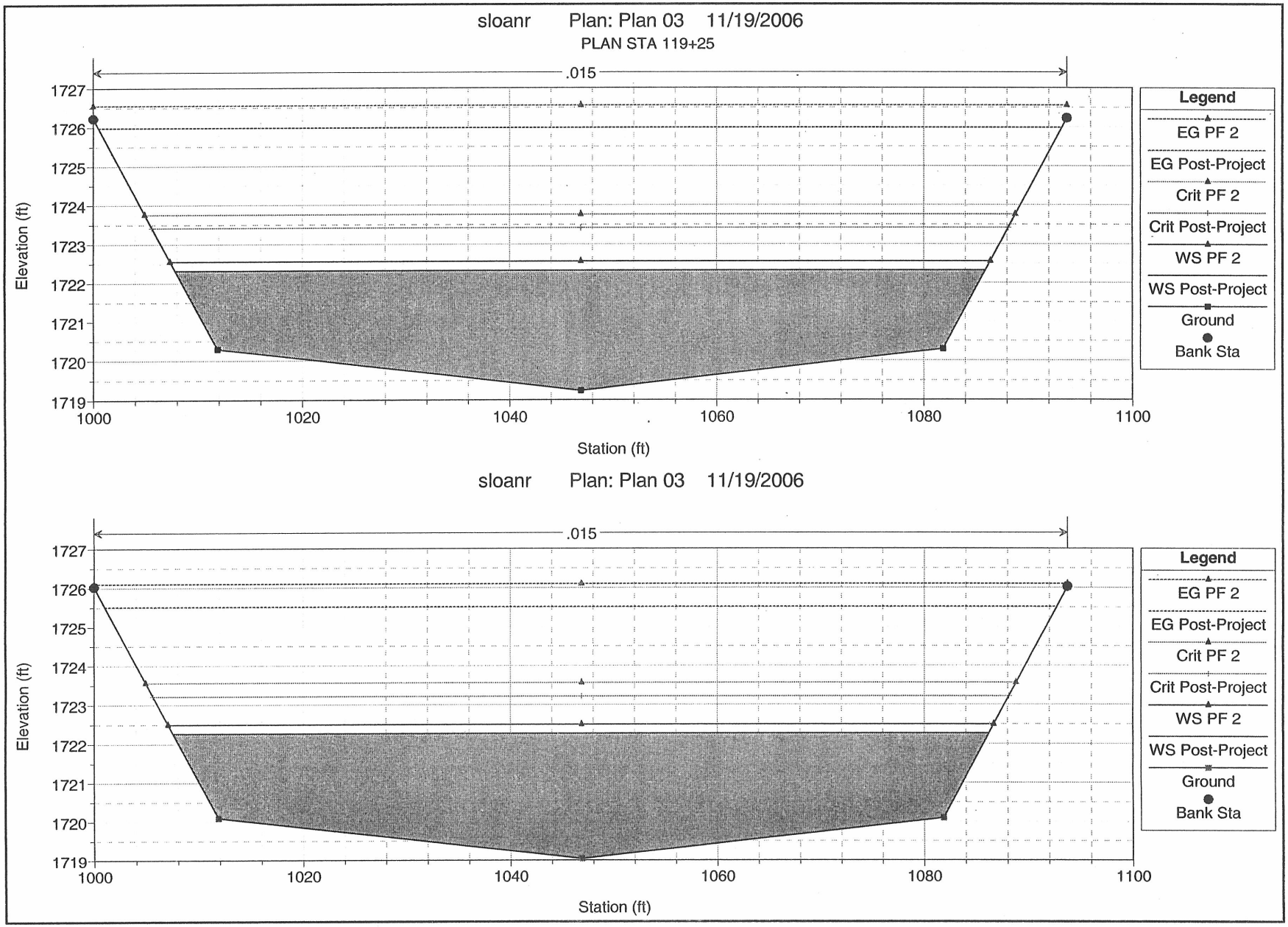
1100
Station (ft)
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta


sloanr Plan: Plan 03 11/19/2006
PLAN STA 119+25
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Elevation (ft)
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1724
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1000
1020
1040
1060
1080
1100
Station (ft)
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta
sloanr Plan: Plan 03 11/19/2006
.015
Elevation (ft)
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1720
1719
1000
1020
1040
1060
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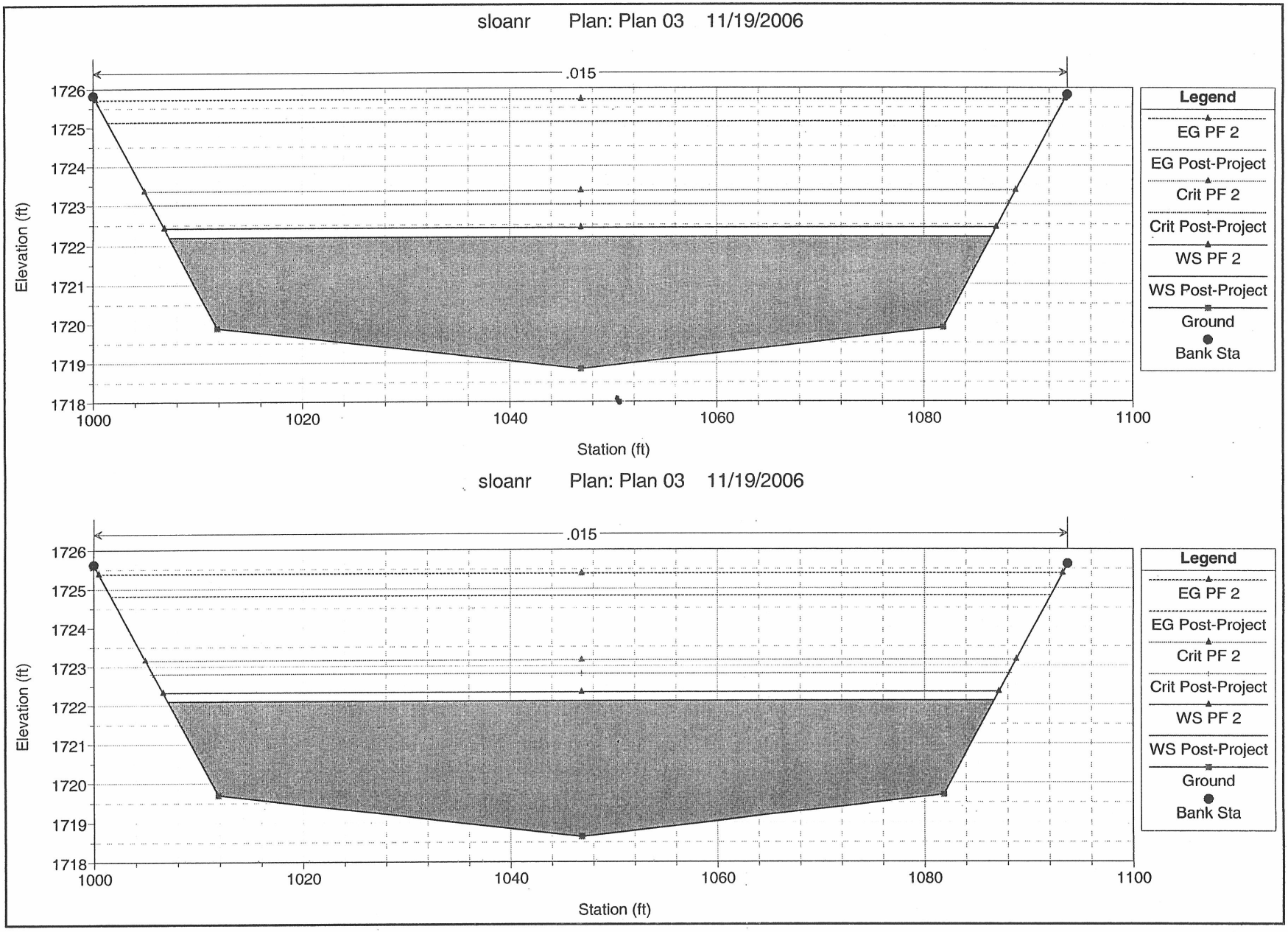
1100
Station (ft)
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta


sloanr Plan: Plan 03 11/19/2006
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1719
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Elevation (ft)
1000
1020
1040
1060
1080
1100
Station (ft)
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta
sloanr Plan: Plan 03 11/19/2006
.015
1726
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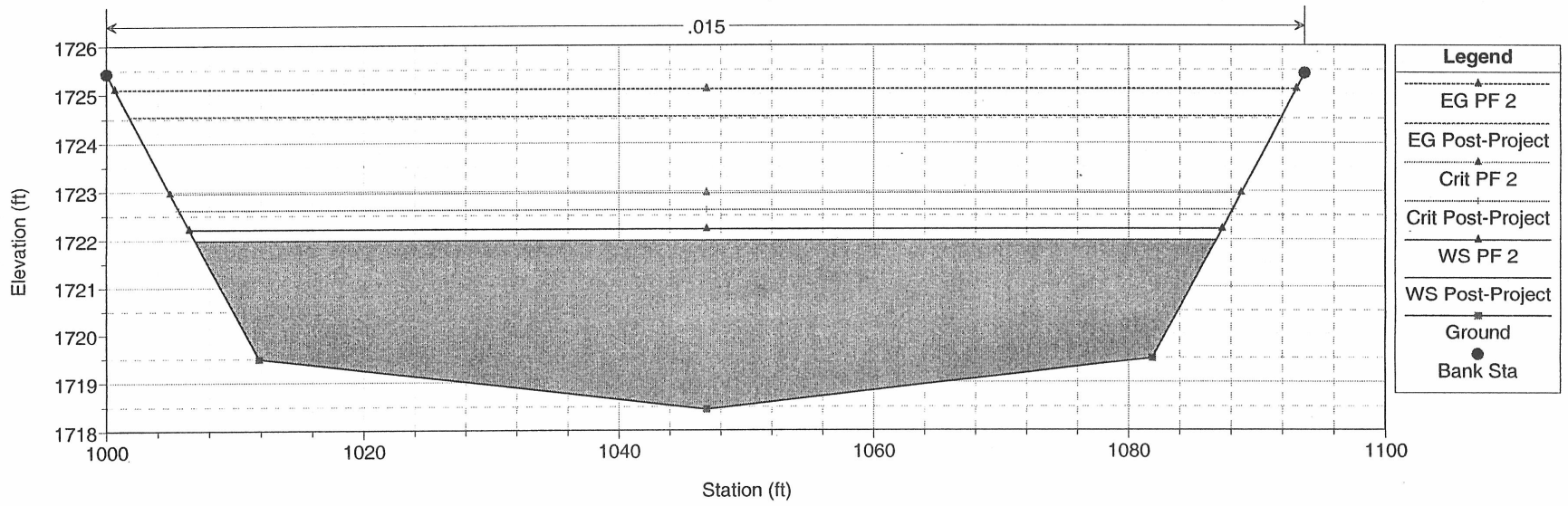
1718
Elevation (ft)
1000
1020
1040
1060
1080
1100
Station (ft)
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta

sloanr Plan: Plan 03 11/19/2006



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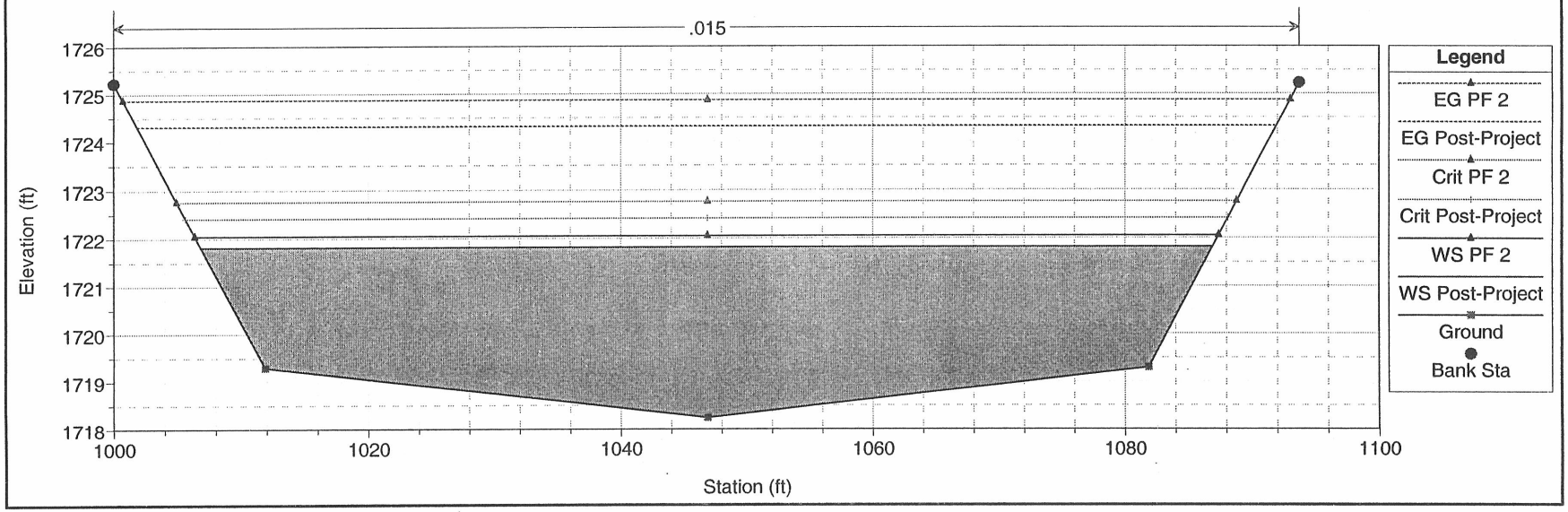
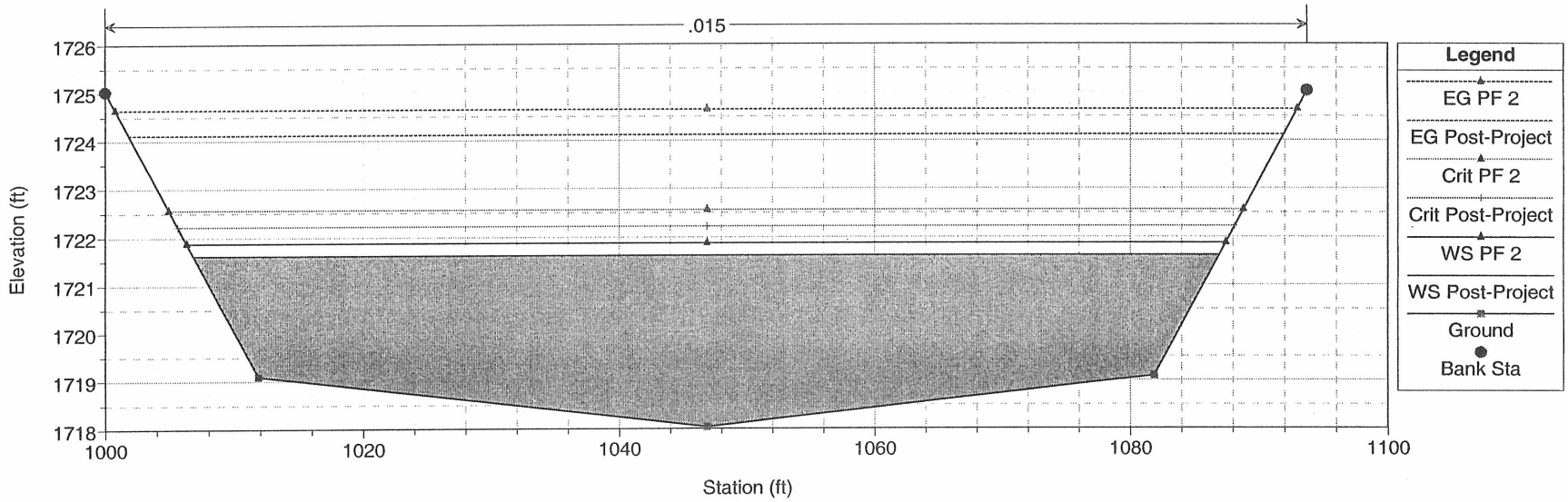
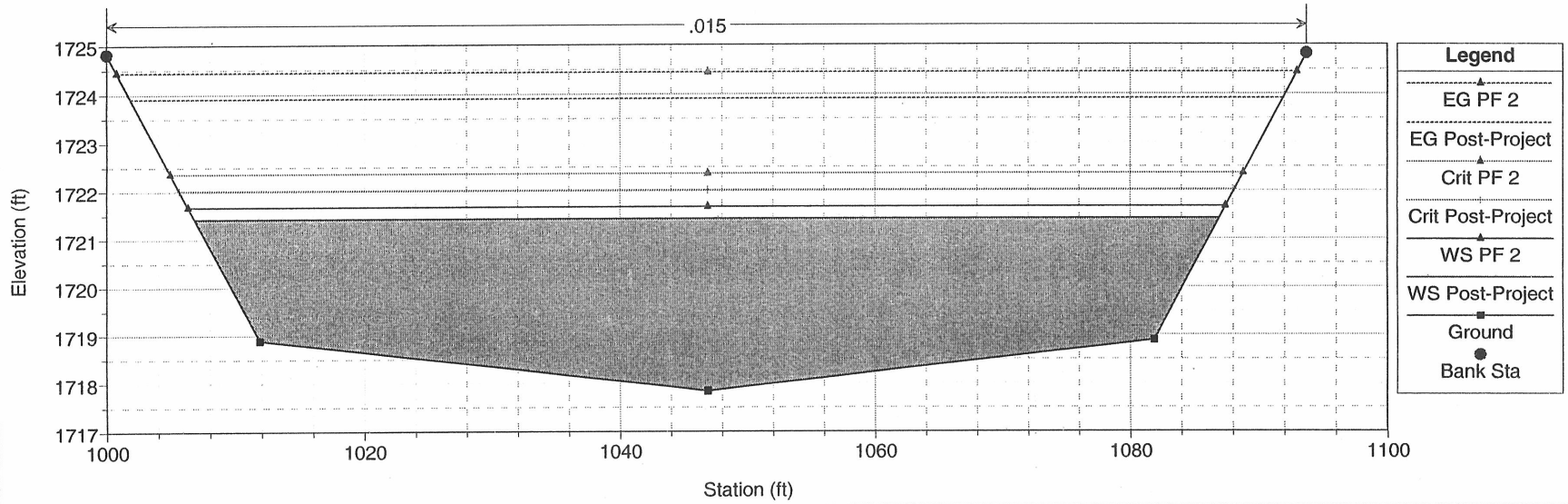


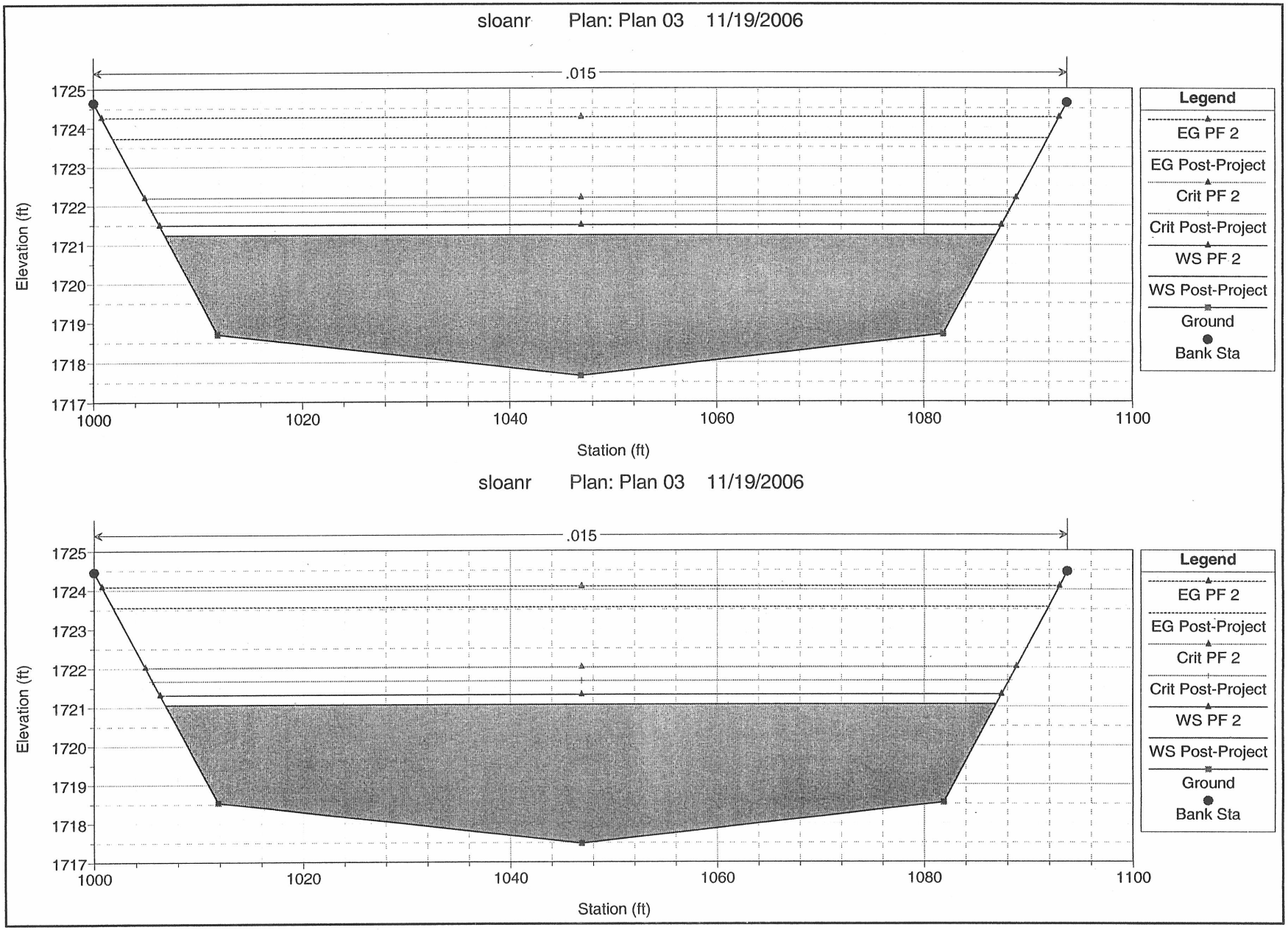
sloanr Plan: Plan 03 11/19/2006



sloanr Plan: Plan 03 11/19/2006

PLAN STA 122+74




sloanr Plan: Plan 03 11/19/2006
.015
Elevation (ft)
1725
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1718
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1000
1020
1040
1060
1080
1100
Station (ft)
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta
sloanr Plan: Plan 03 11/19/2006
.015
Elevation (ft)
1725
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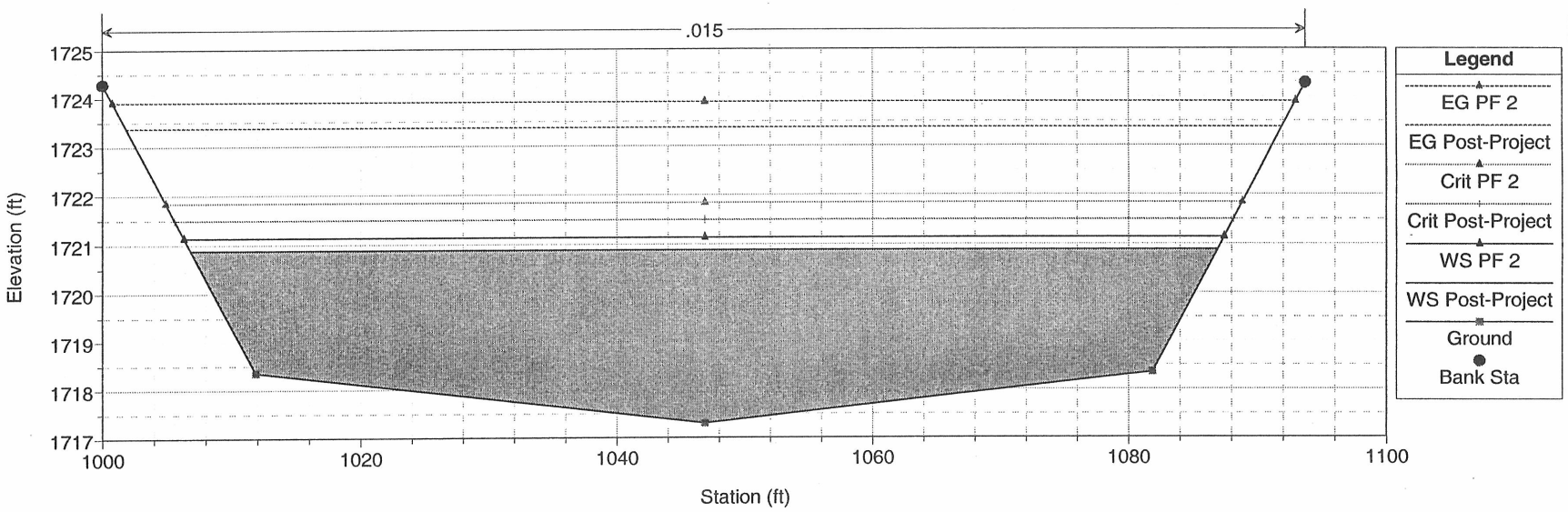
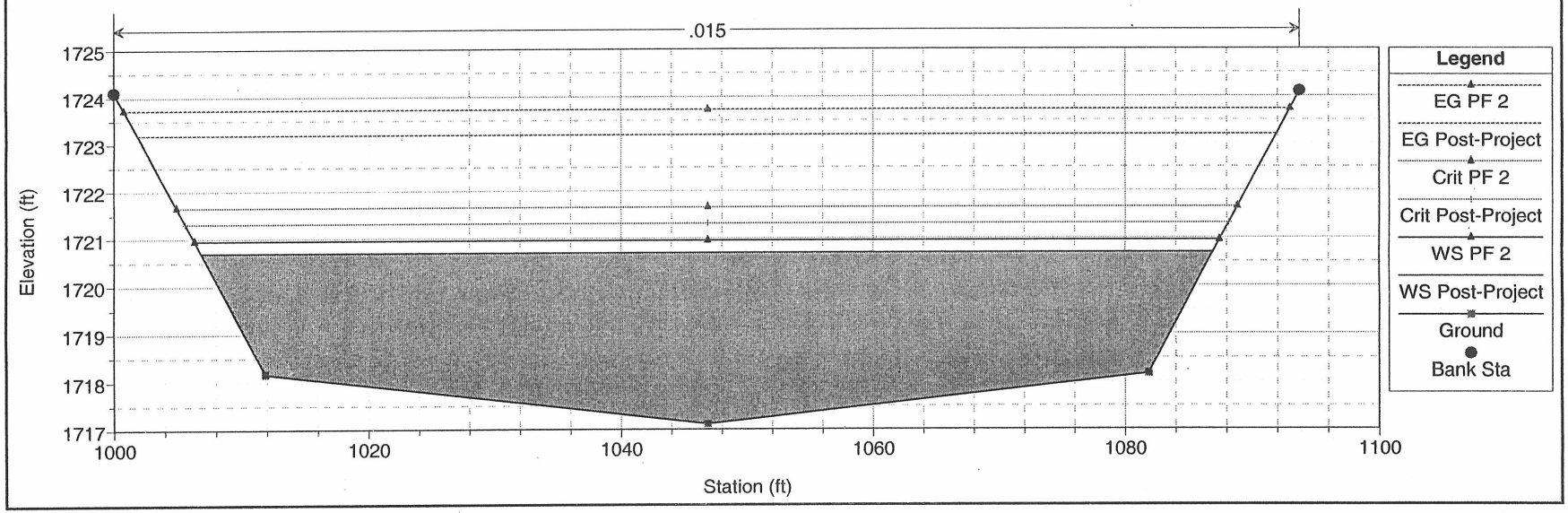
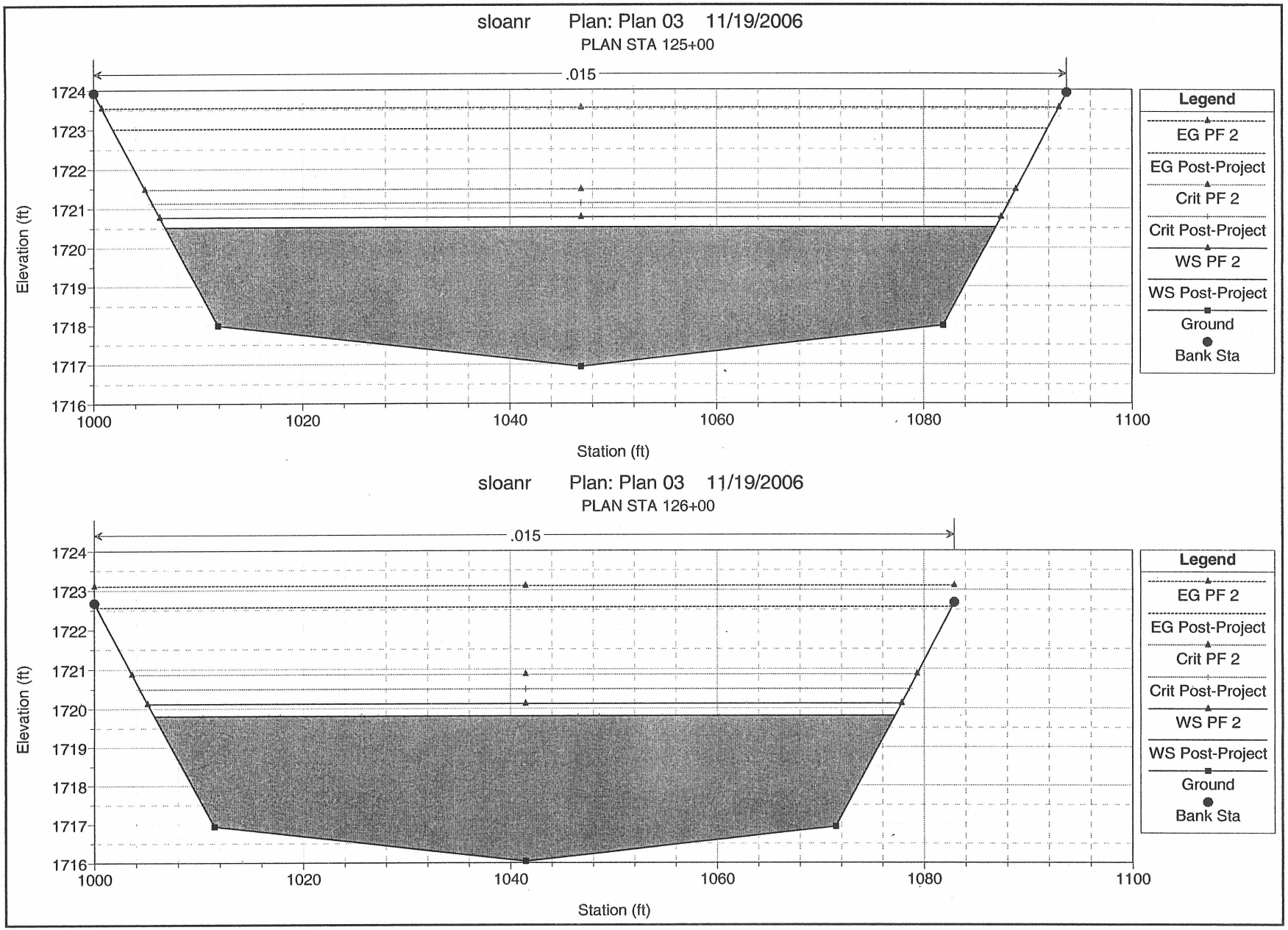
1721
1720
1719
1718
1717
1000
1020
1040
1060
1080
1100
Station (ft)
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta

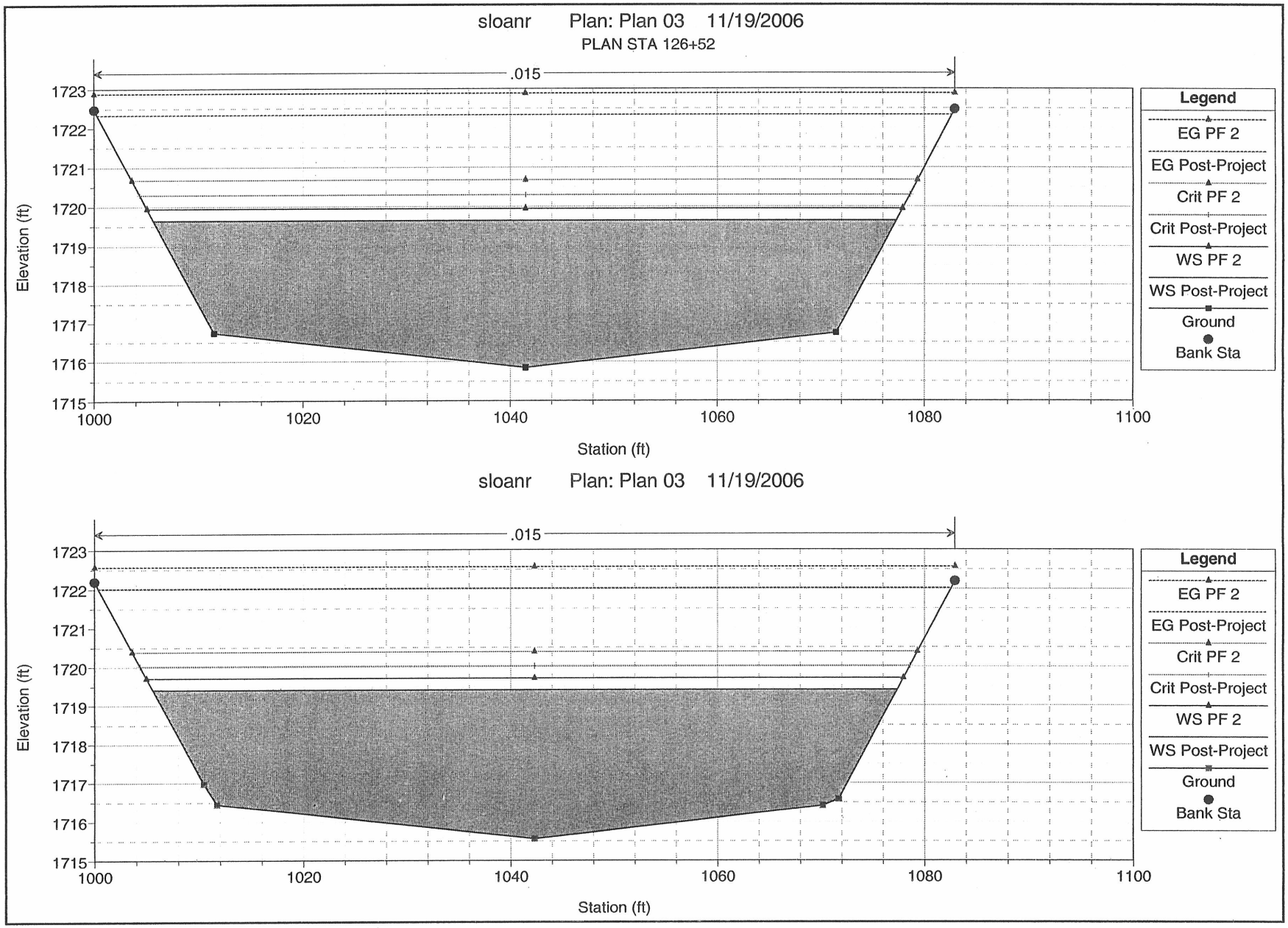
sloanr Plan: Plan 03 11/19/2006



sloanr Plan: Plan 03 11/19/2006




sloanr Plan: Plan 03 11/19/2006
PLAN STA 125+00
.015
Elevation (ft)
1724
1723
1722
1721
1720
1719
1718
1717
1716
1000
1020
1040
1060
1080
1100
Station (ft)
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta
sloanr Plan: Plan 03 11/19/2006
PLAN STA 126+00
.015
Elevation (ft)
1724
1723
1722
1721
1720
1719
1718
1717
1716
1000
1020
1040
1060
1080
1100
Station (ft)
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta


sloanr Plan: Plan 03 11/19/2006
PLAN STA 126+52
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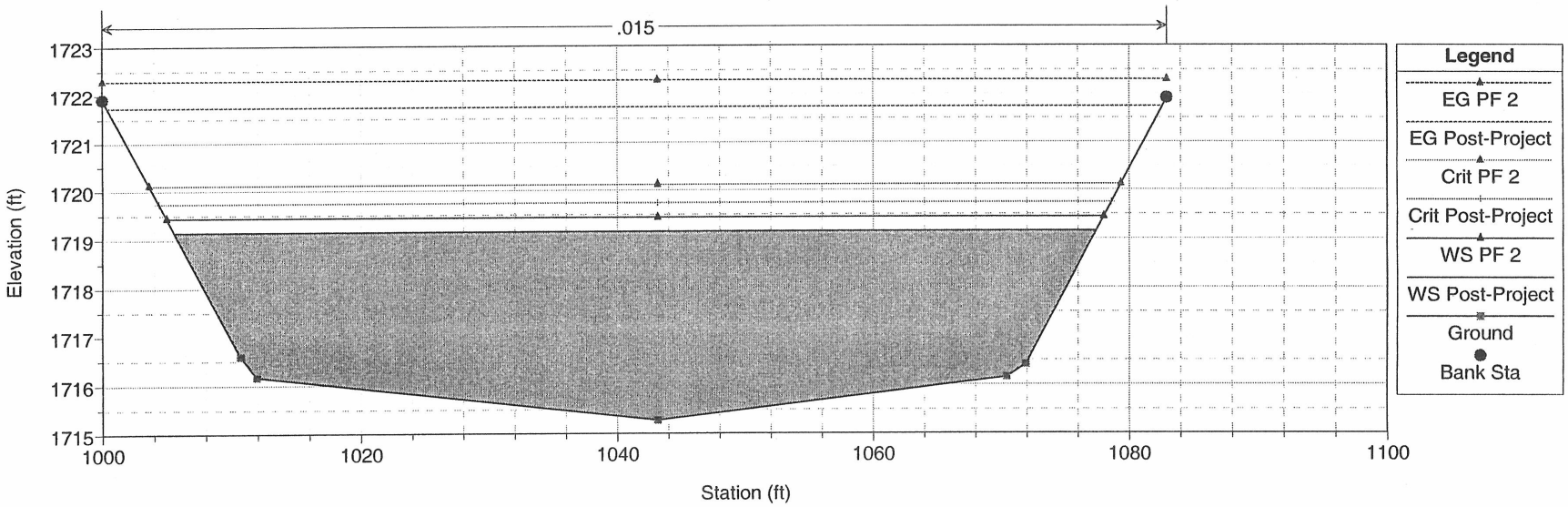
Elevation (ft)
1723
1722
1721
1720
1719
1718
1717
1716
1715
1000
1020
1040
1060
1080
1100
Station (ft)
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta
sloanr Plan: Plan 03 11/19/2006
.015
Elevation (ft)
1723
1722
1721
1720
1719
1718
1717
1716
1715
1000
1020
1040
1060
1080
1100
Station (ft)
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta

sloanr Plan: Plan 03 11/19/2006



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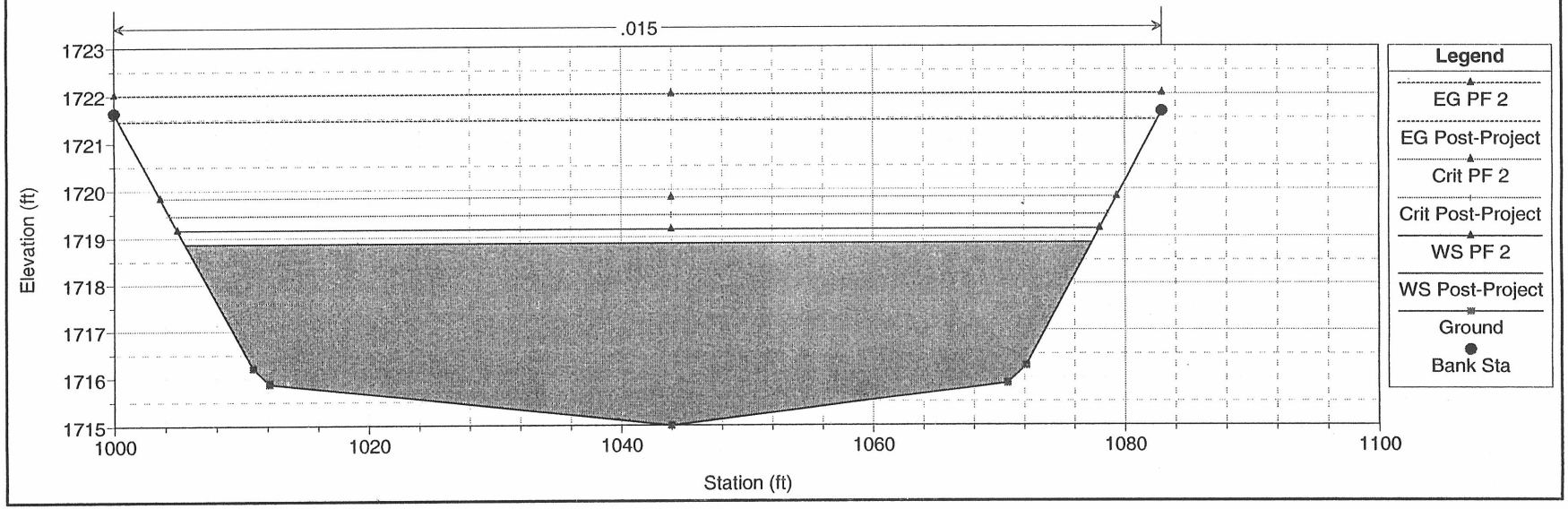

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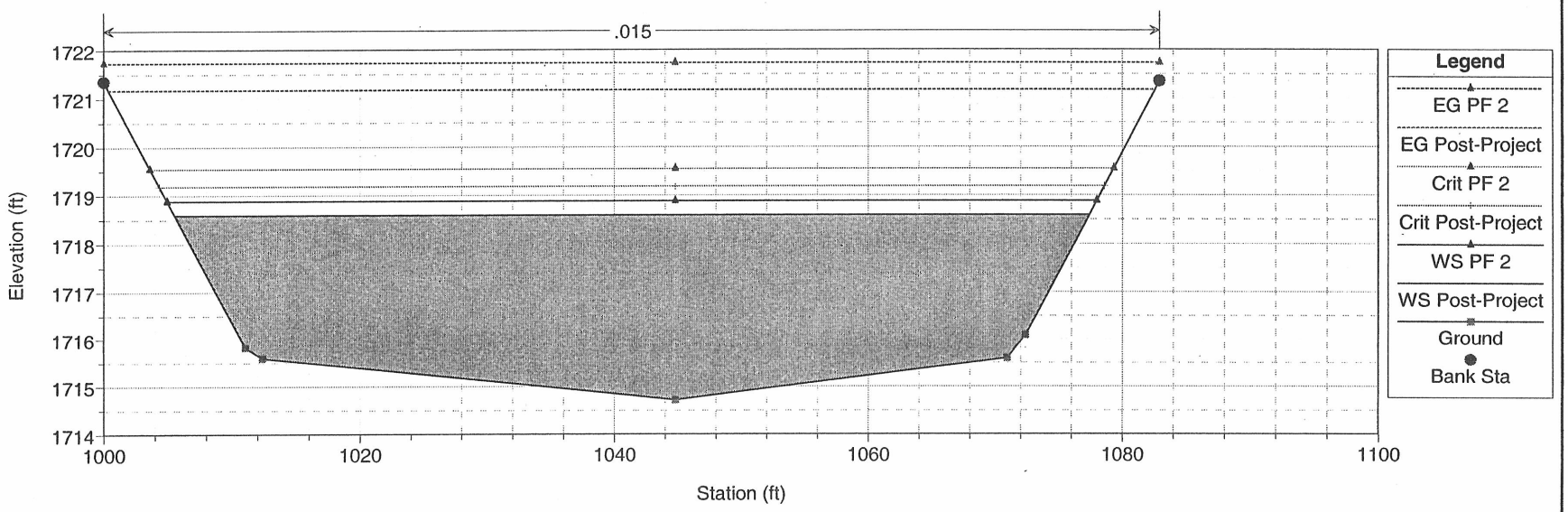

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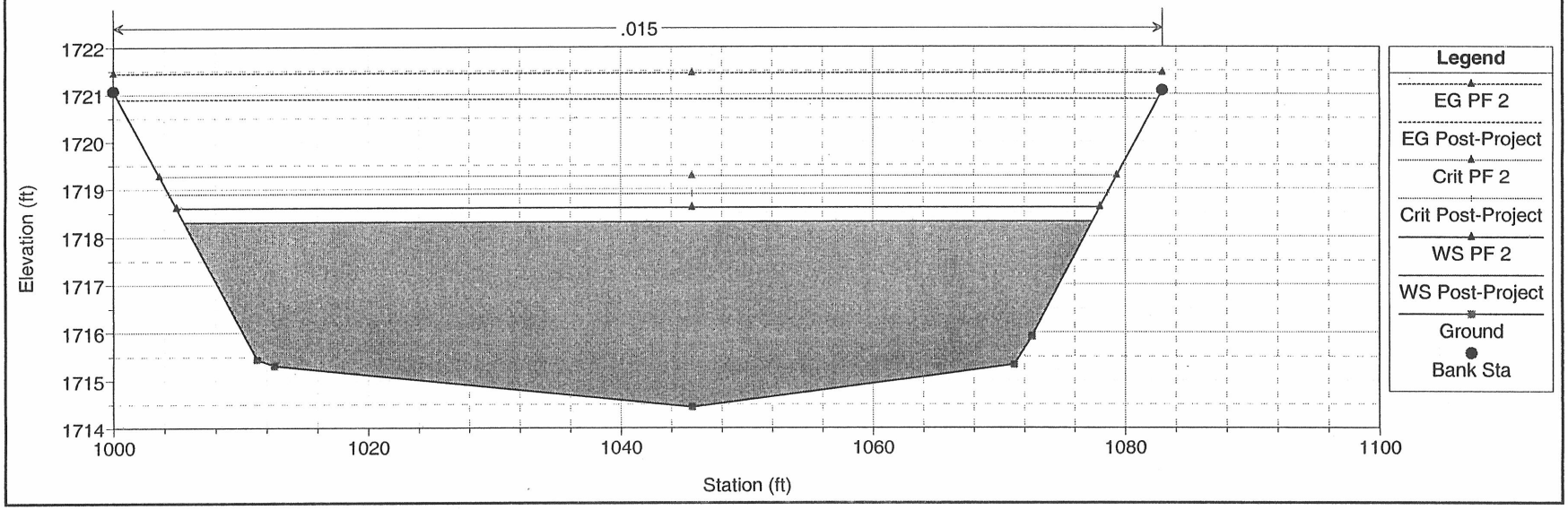

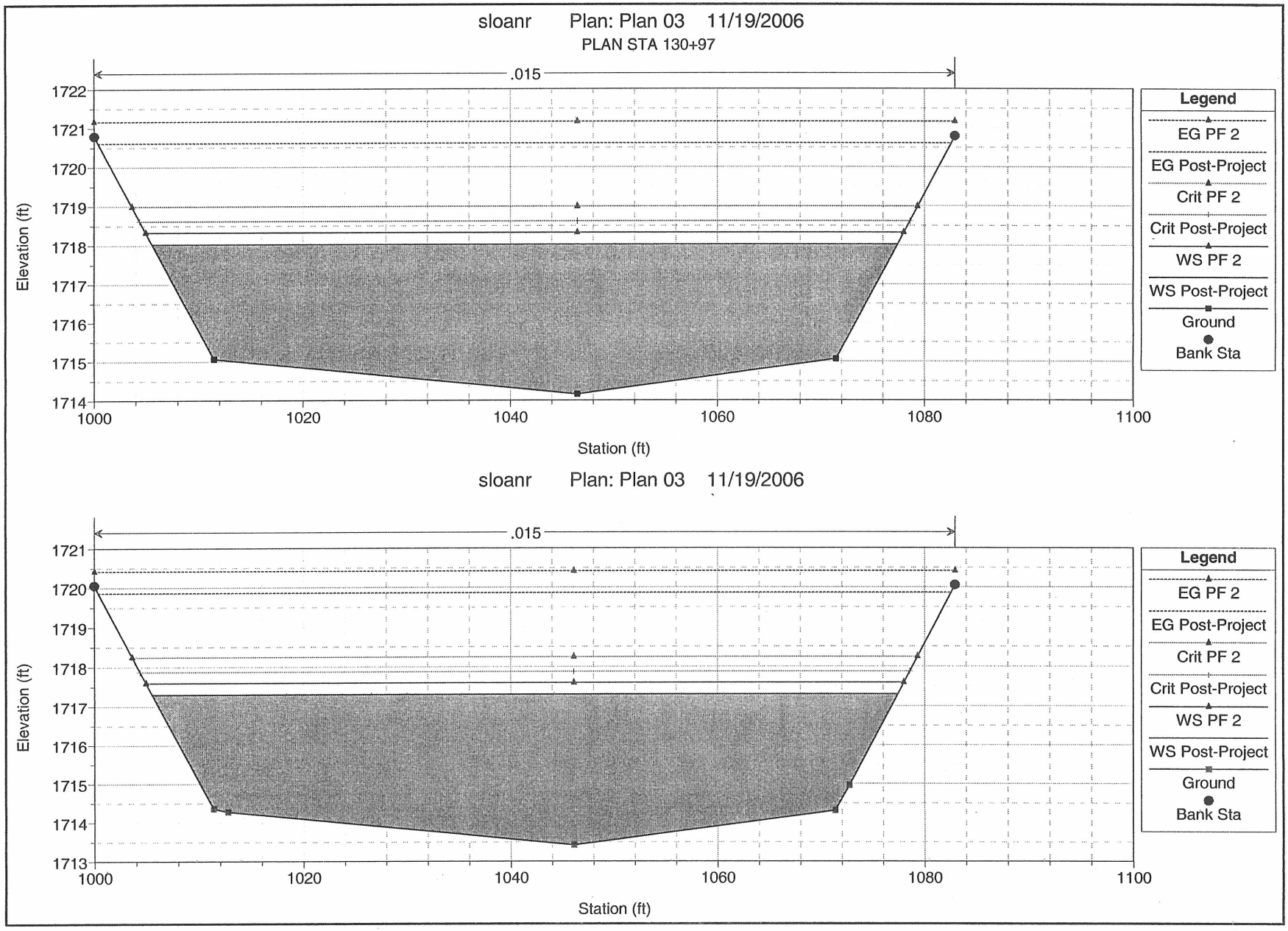
sloanr Plan: Plan 03 11/19/2006
PLAN STA 130+97
.015
Elevation (ft)
Station (ft)
1722
1721
1720
1719
1718
1717
1716
1715
1714
1000
1020
1040
1060
1080
1100
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta
sloanr Plan: Plan 03 11/19/2006
.015
Elevation (ft)
Station (ft)
1721
1720
1719
1718
1717
1716
1715
1714
1713
1000
1020
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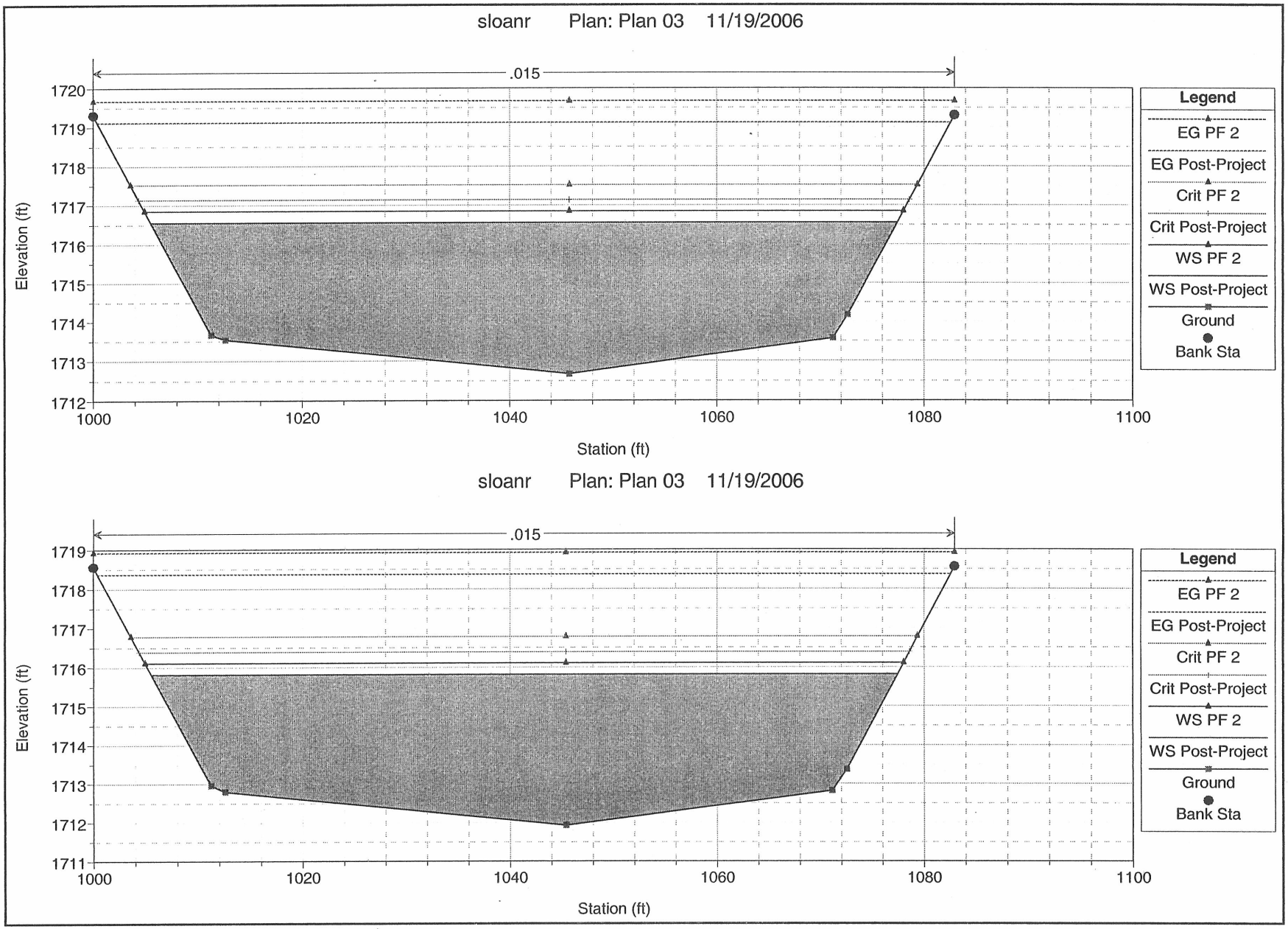
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta


sloanr Plan: Plan 03 11/19/2006
.015
Elevation (ft)
1720
1719
1718
1717
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1714
1713
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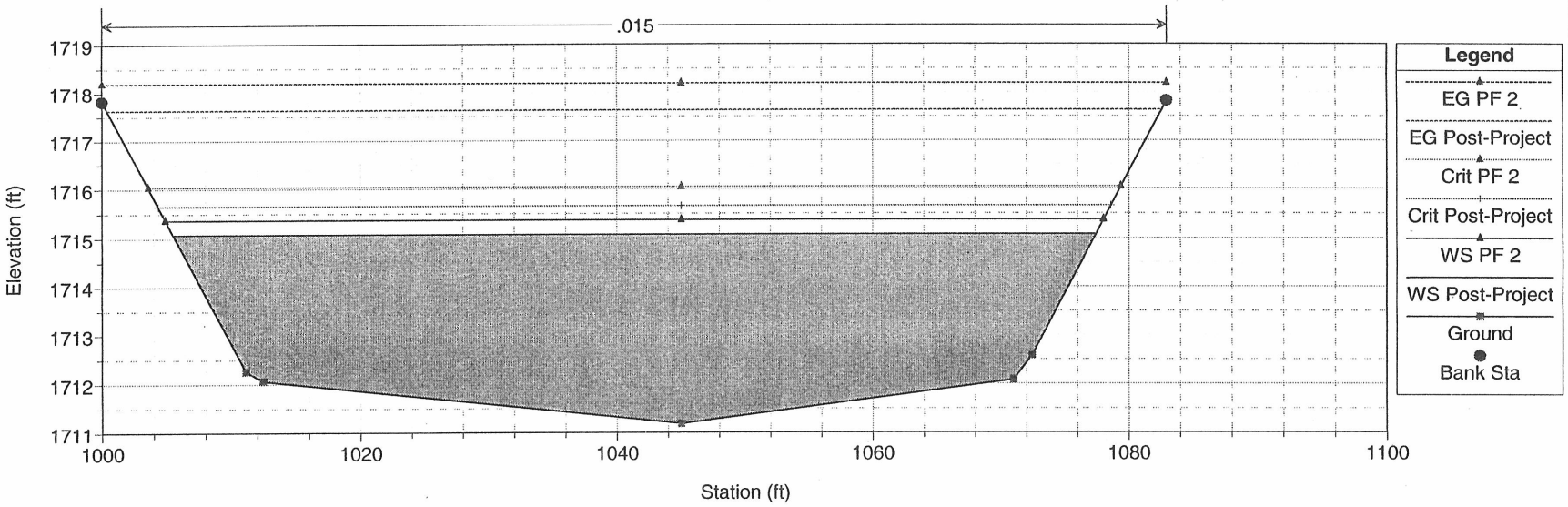
1000
1020
1040
1060
1080
1100
Station (ft)
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta
sloanr Plan: Plan 03 11/19/2006
.015
Elevation (ft)
1719
1718
1717
1716
1715
1714
1713
1712
1711
1000
1020
1040
1060
1080
1100
Station (ft)
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta

sloanr Plan: Plan 03 11/19/2006



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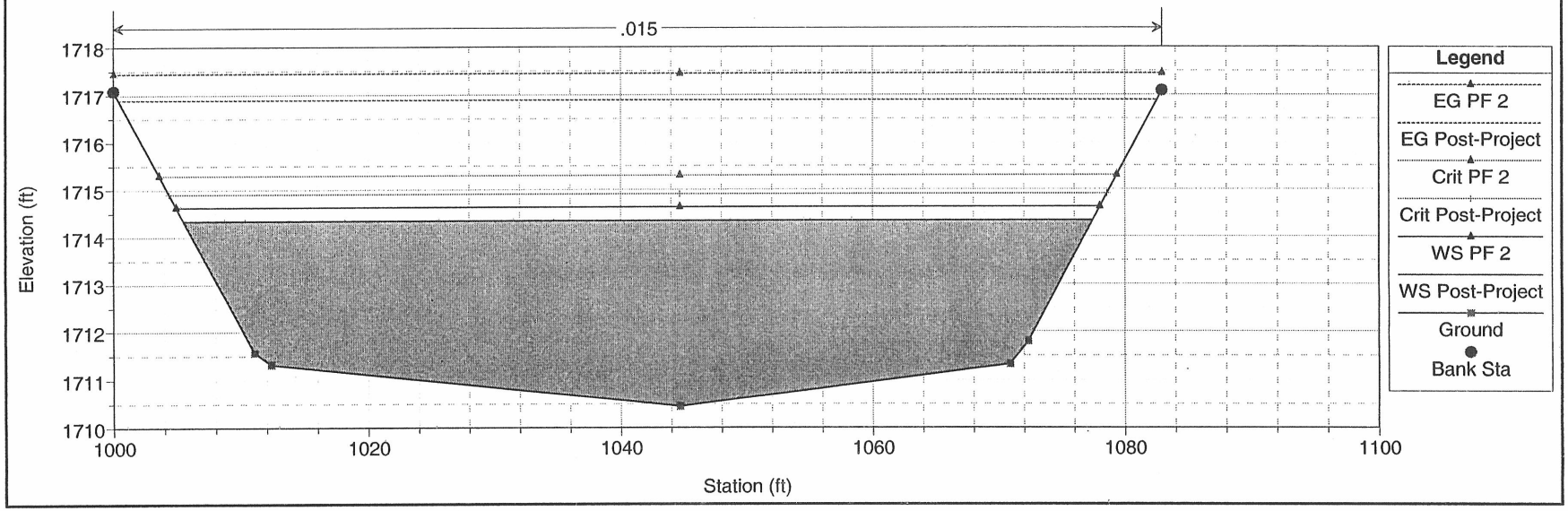

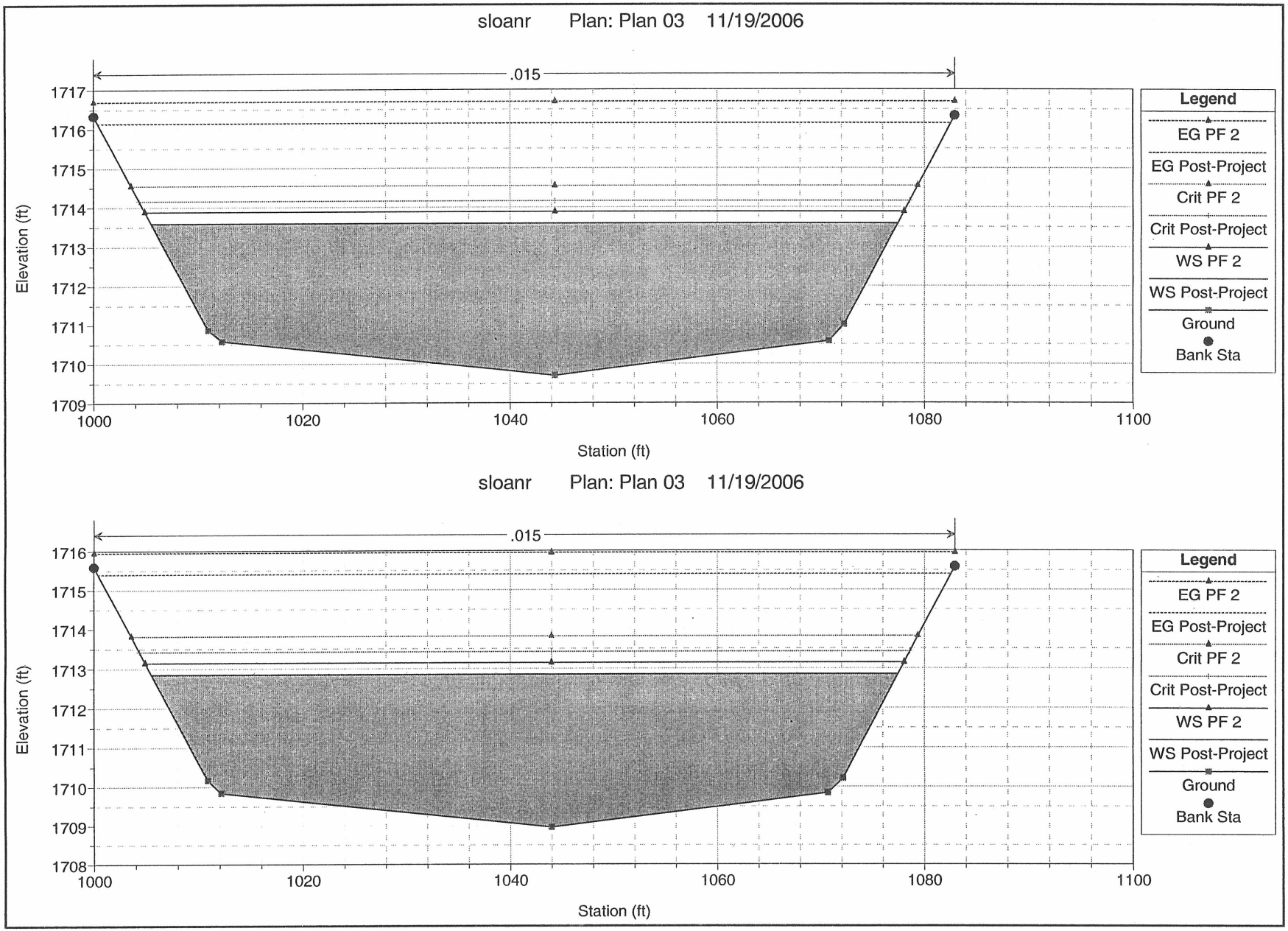
sloanr Plan: Plan 03 11/19/2006
.015
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Elevation (ft)
1000
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1100
Station (ft)
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta
sloanr Plan: Plan 03 11/19/2006
.015
1716
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1708
Elevation (ft)
1000
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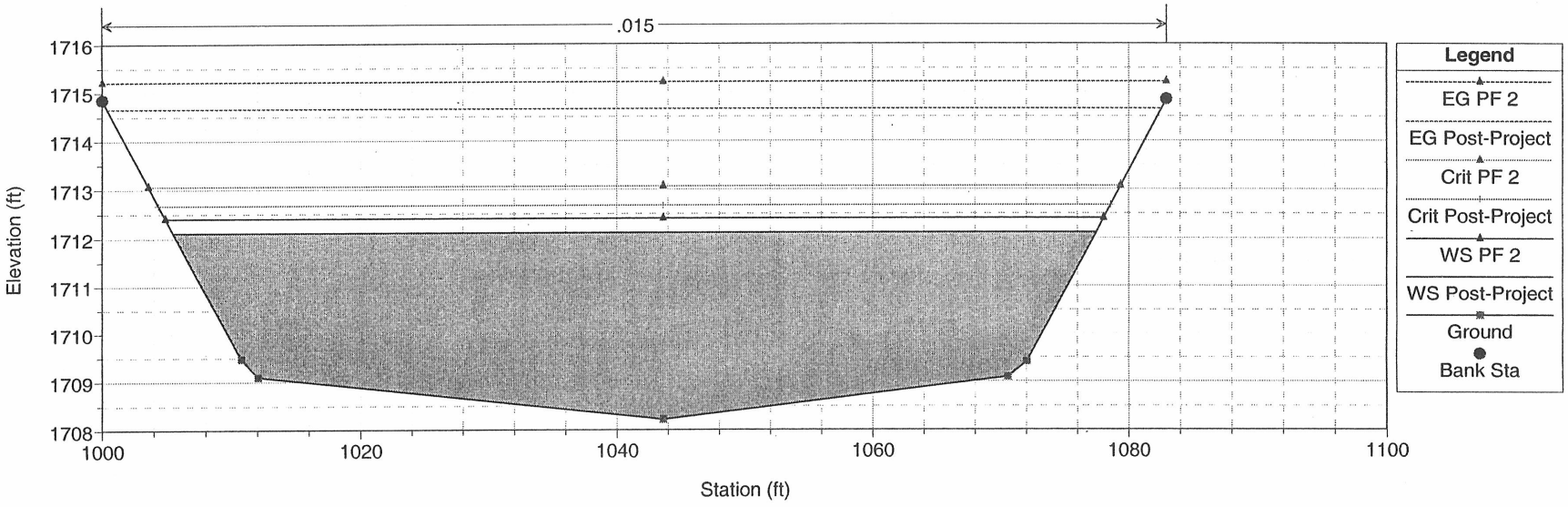
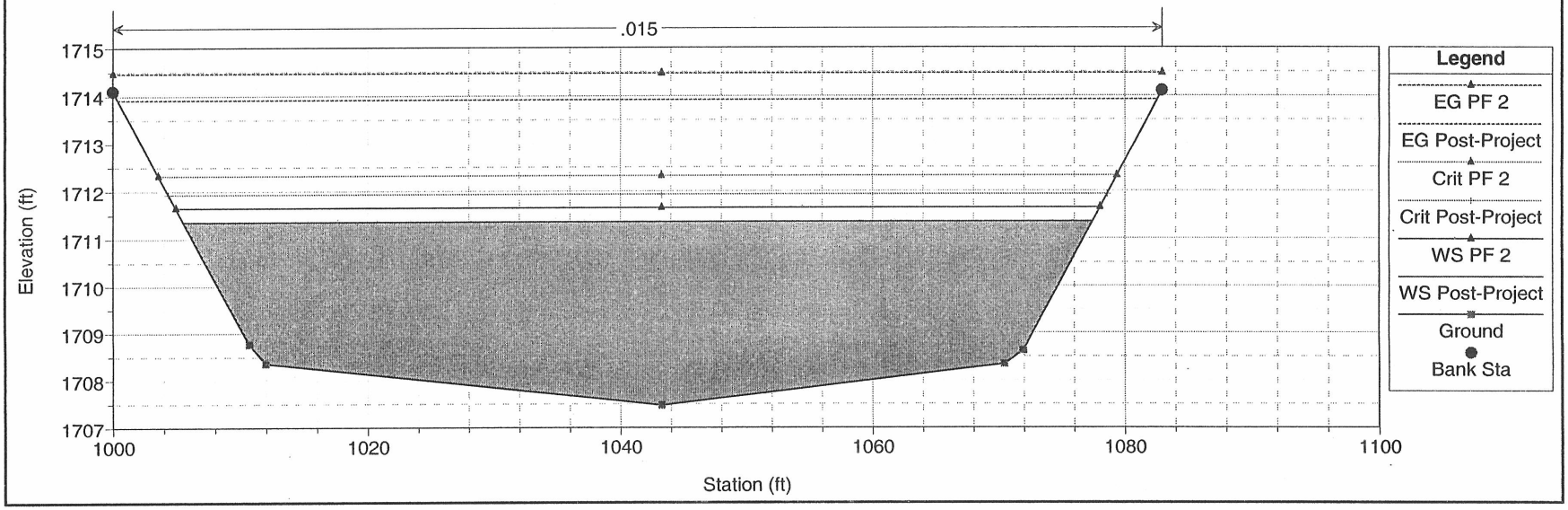
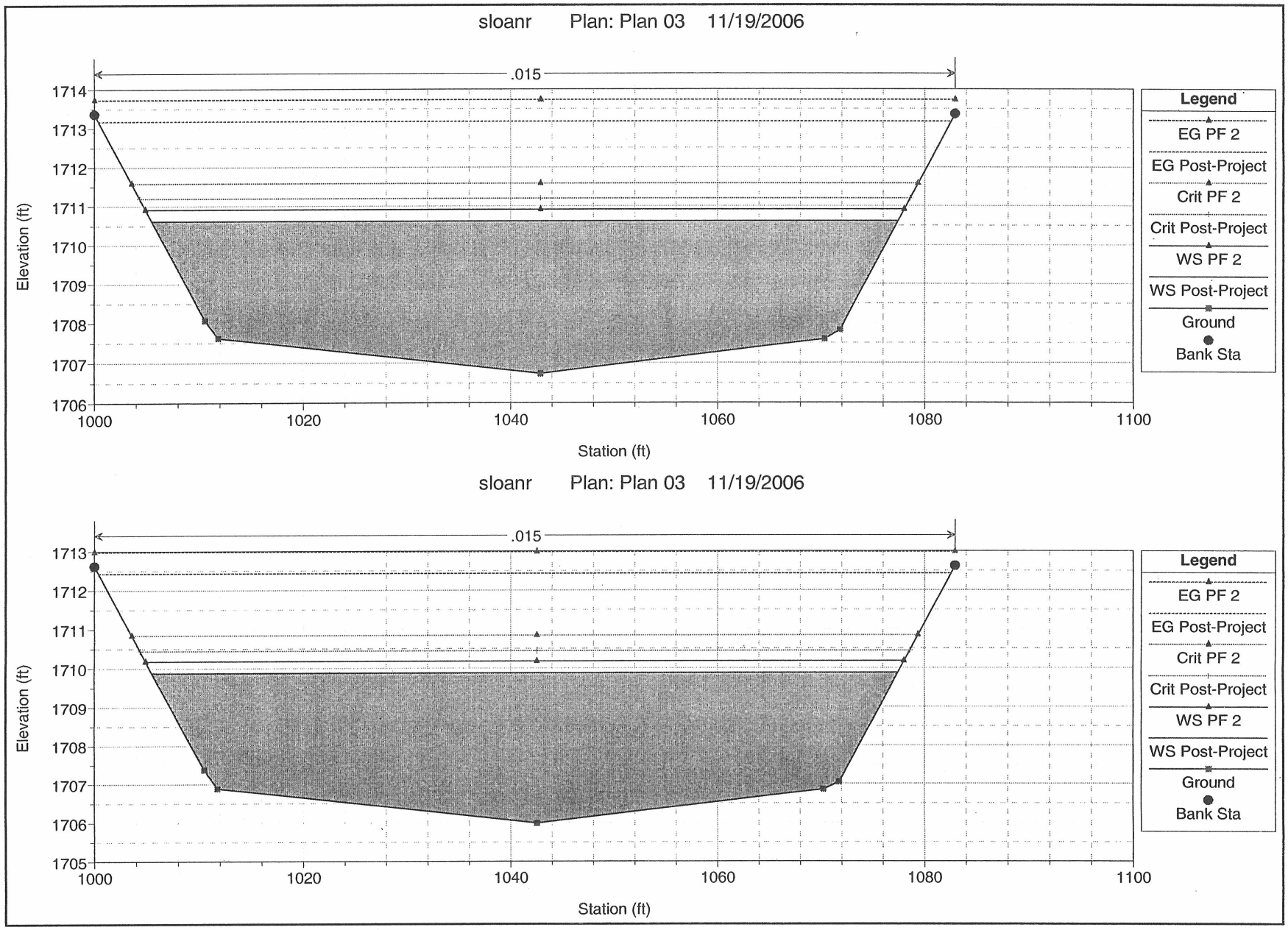
1060
1080
1100
Station (ft)
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta

sloanr Plan: Plan 03 11/19/2006



sloanr Plan: Plan 03 11/19/2006




sloanr Plan: Plan 03 11/19/2006
.015
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1706
Elevation (ft)
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1060
1080
1100
Station (ft)
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta
sloanr Plan: Plan 03 11/19/2006
.015
1713
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1705
Elevation (ft)
1000
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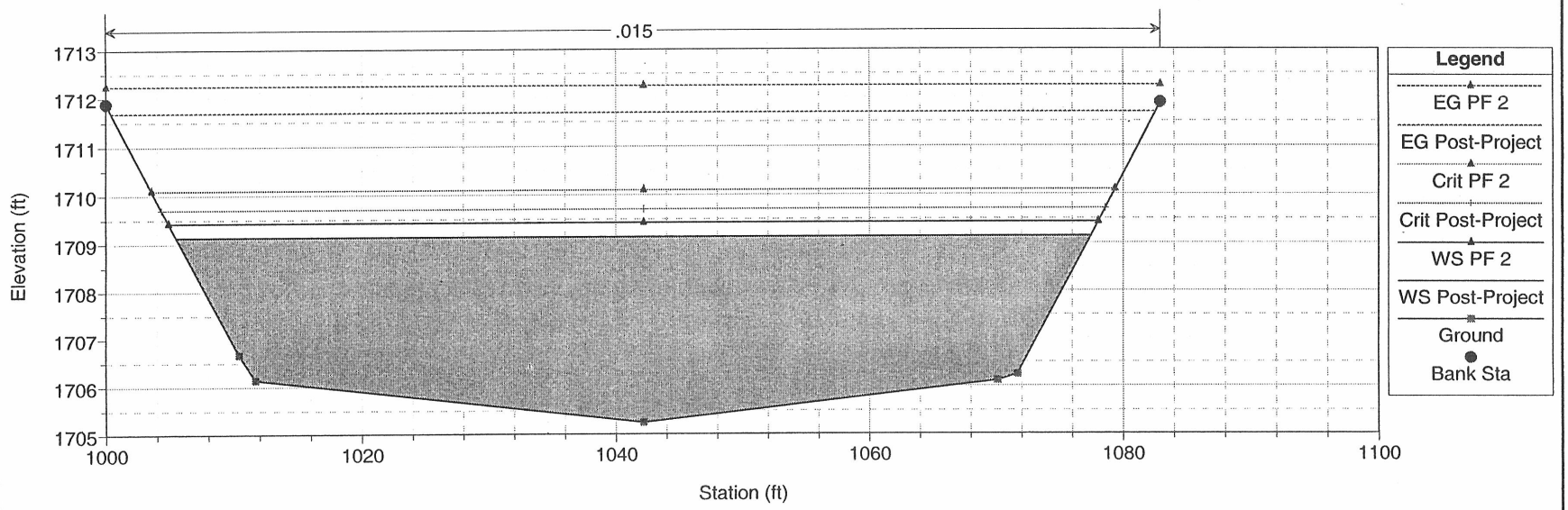
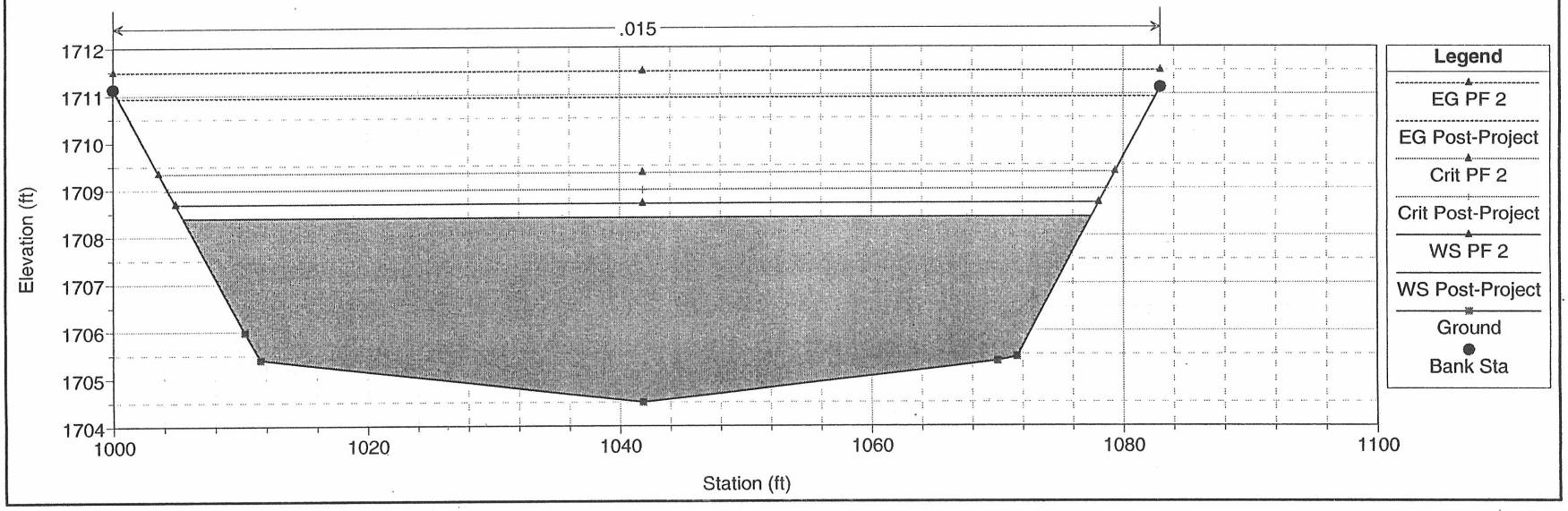
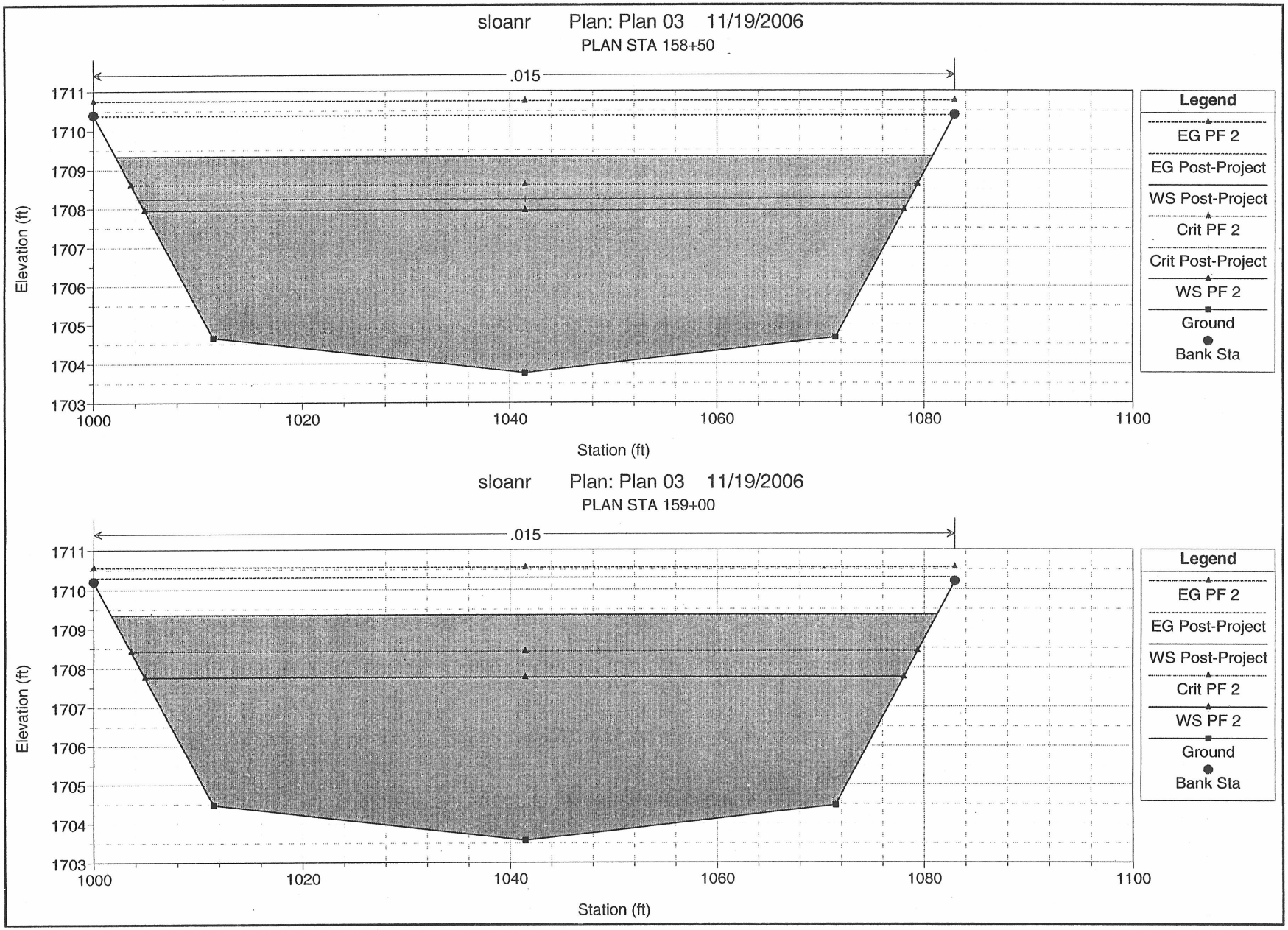
1080
1100
Station (ft)
Legend
EG PF 2
EG Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
WS Post-Project
Ground
Bank Sta

sloanr Plan: Plan 03 11/19/2006



sloanr Plan: Plan 03 11/19/2006




sloanr Plan: Plan 03 11/19/2006
PLAN STA 158+50
.015
Elevation (ft)
1711
1710
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1708
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1704
1703
1000
1020
1040
1060
1080
1100
Station (ft)
Legend
EG PF 2
EG Post-Project
WS Post-Project
Crit PF 2
Crit Post-Project
WS PF 2
Ground
Bank Sta
sloanr Plan: Plan 03 11/19/2006
PLAN STA 159+00
.015
Elevation (ft)
1711
1710
1709
1708
1707
1706
1705
1704
1703
1000
1020
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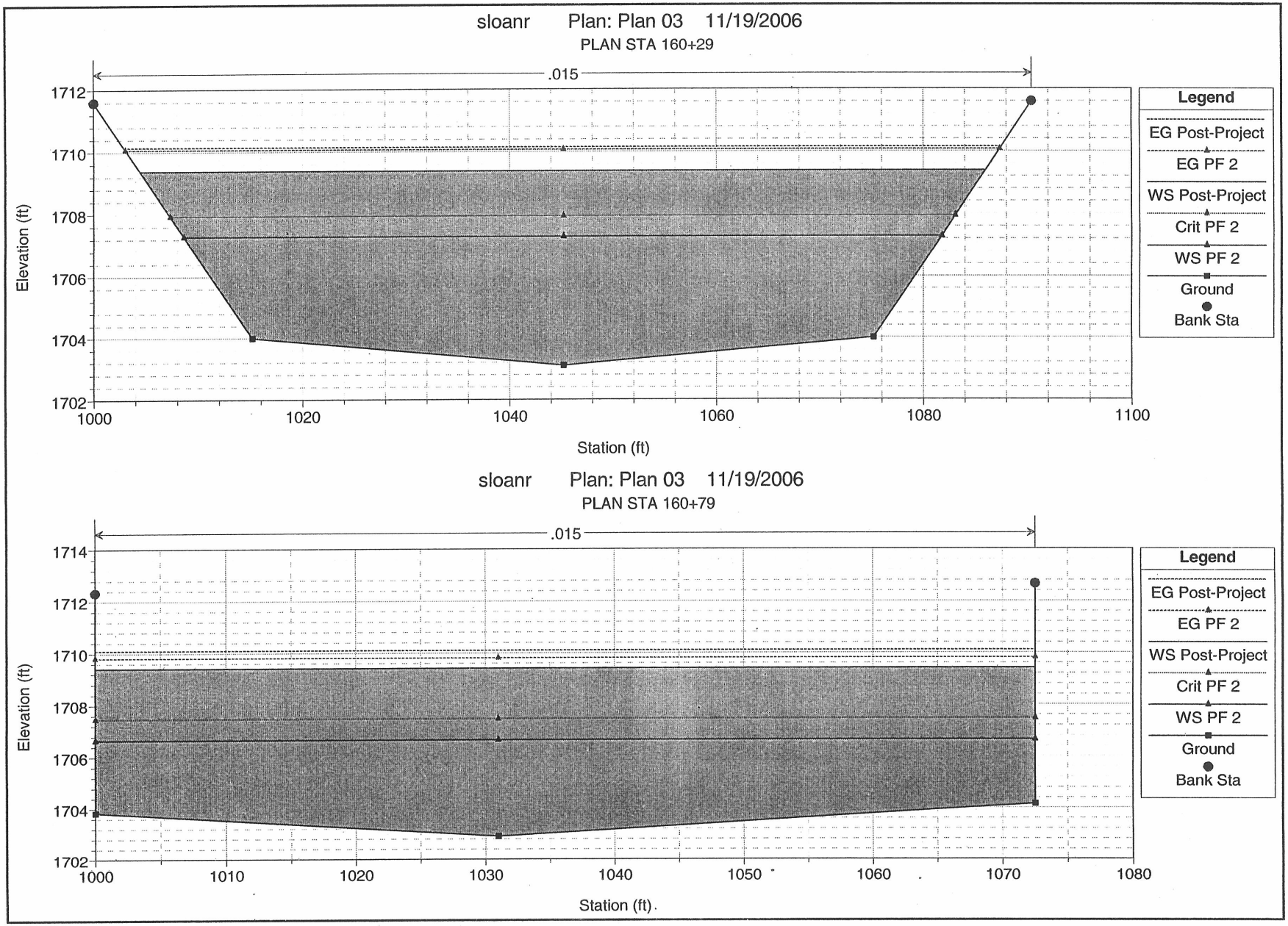
1100
Station (ft)
Legend
EG PF 2
EG Post-Project
WS Post-Project
Crit PF 2
WS PF 2
Ground
Bank Sta


sloanr Plan: Plan 03 11/19/2006
PLAN STA 160+29
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Elevation (ft)
1712
1710
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1706
1704
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1000
1020
1040
1060
1080
1100
Station (ft)
Legend
EG Post-Project
EG PF 2
WS Post-Project
Crit PF 2
WS PF 2
Ground
Bank Sta
sloanr Plan: Plan 03 11/19/2006
PLAN STA 160+79
.015
Elevation (ft)
1714
1712
1710
1708
1706
1704
1702
1000
1010
1020
1030
1040
1050
1060
1070
1080
Station (ft)
Legend
EG Post-Project
EG PF 2
WS Post-Project
Crit PF 2
WS PF 2
Ground
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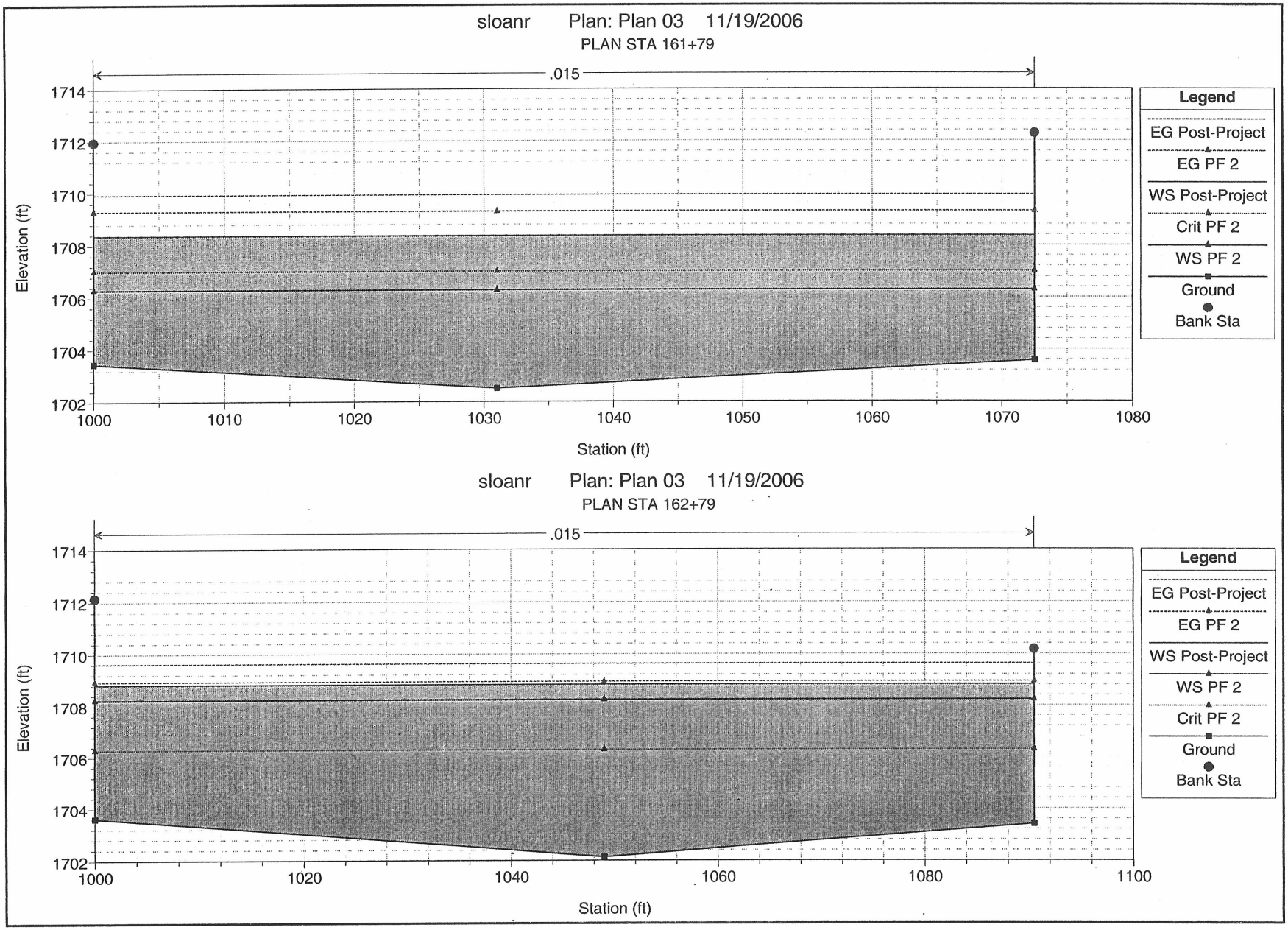
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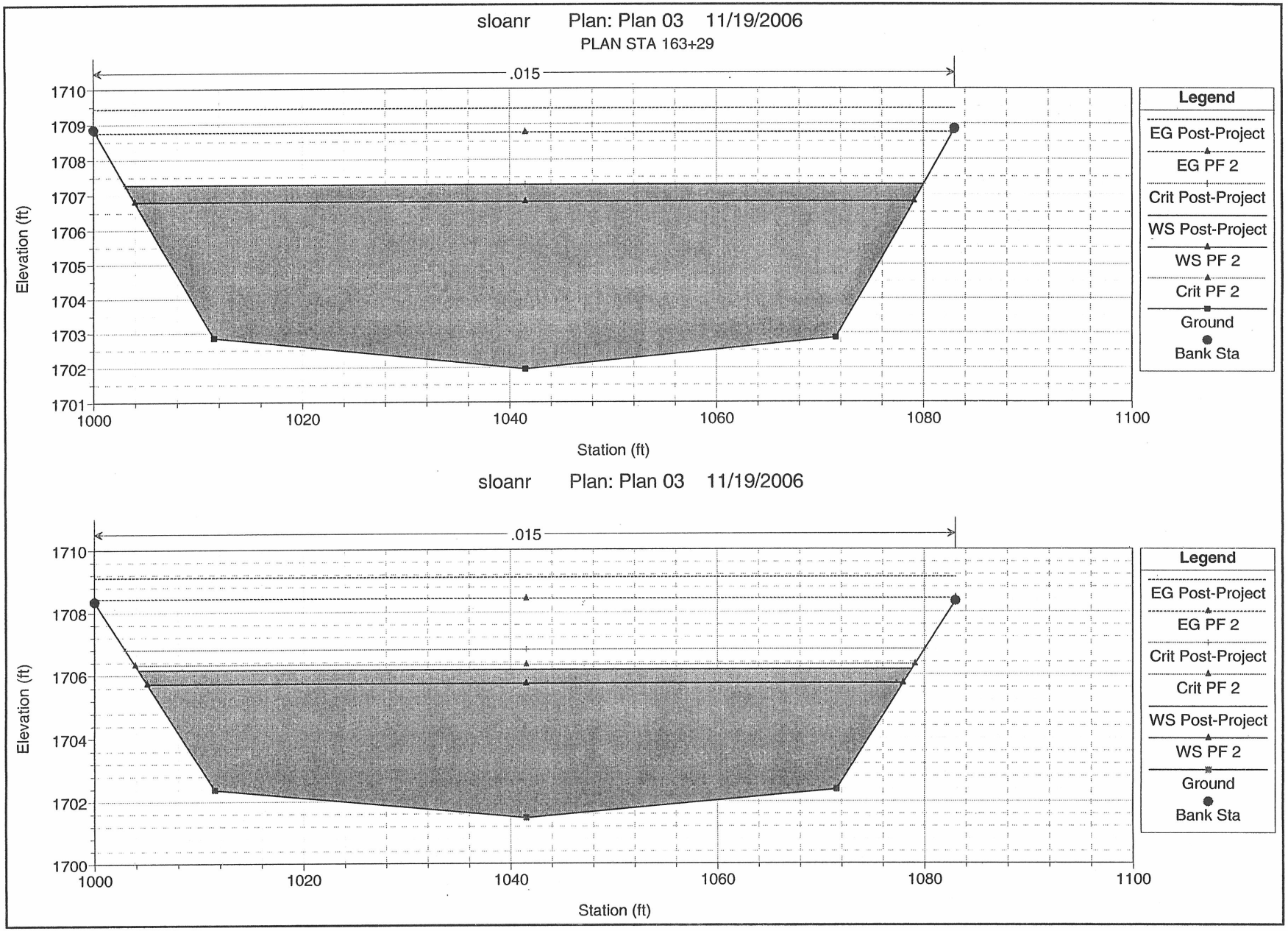
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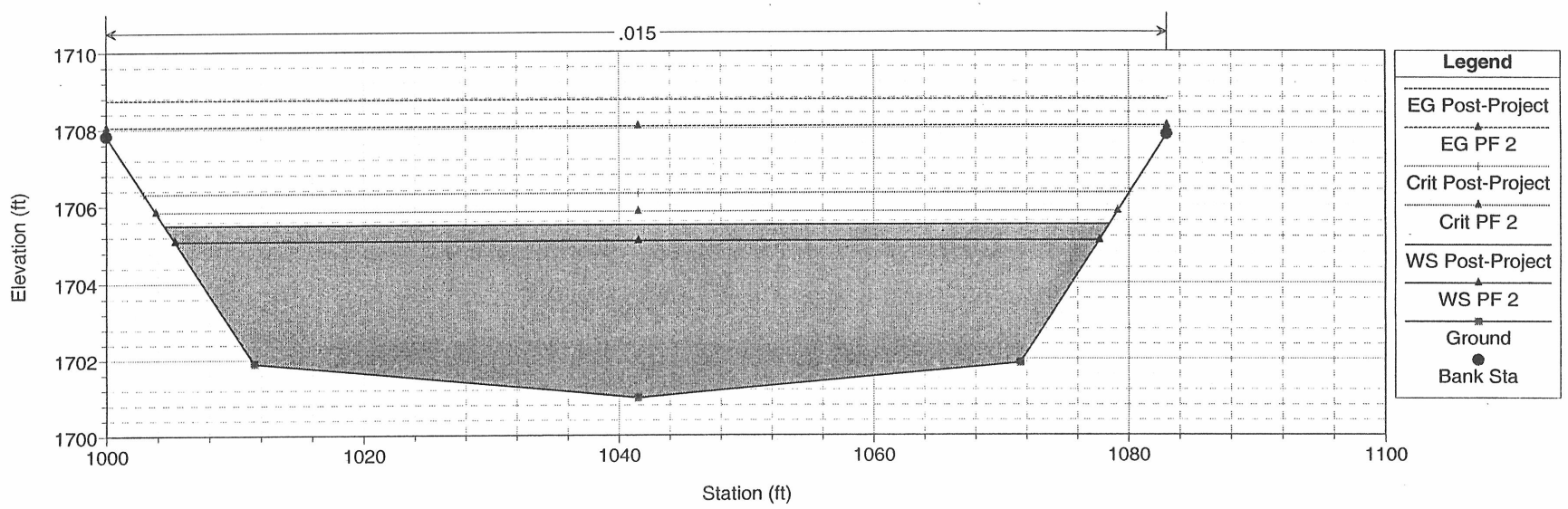

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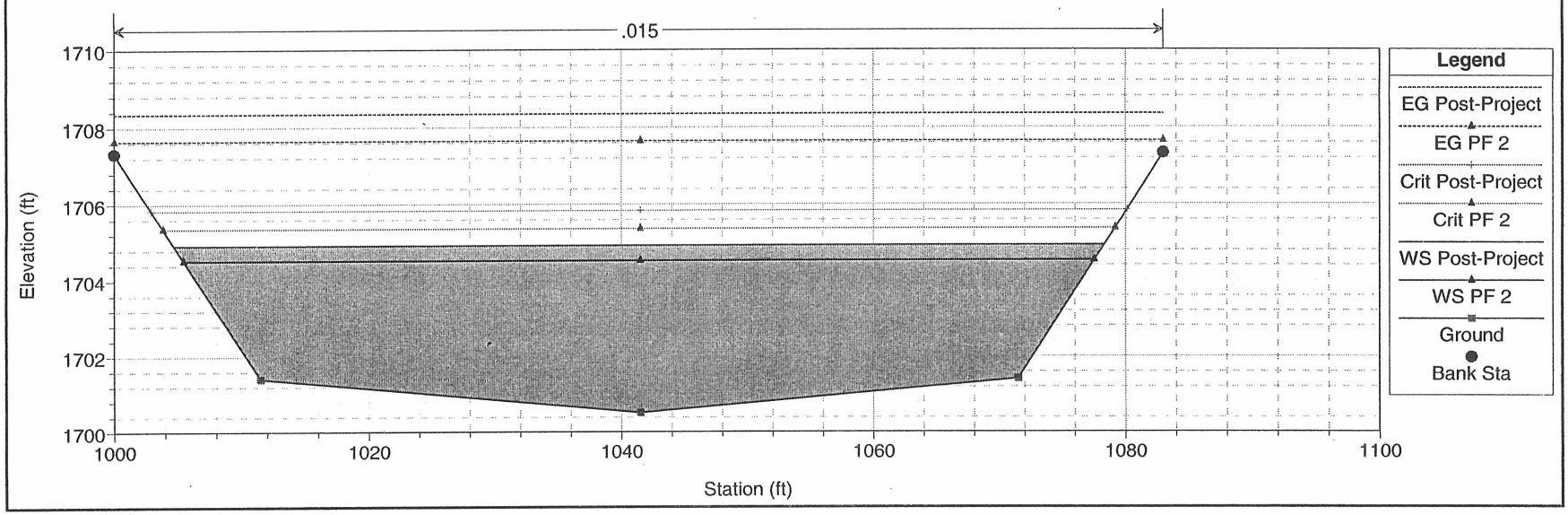

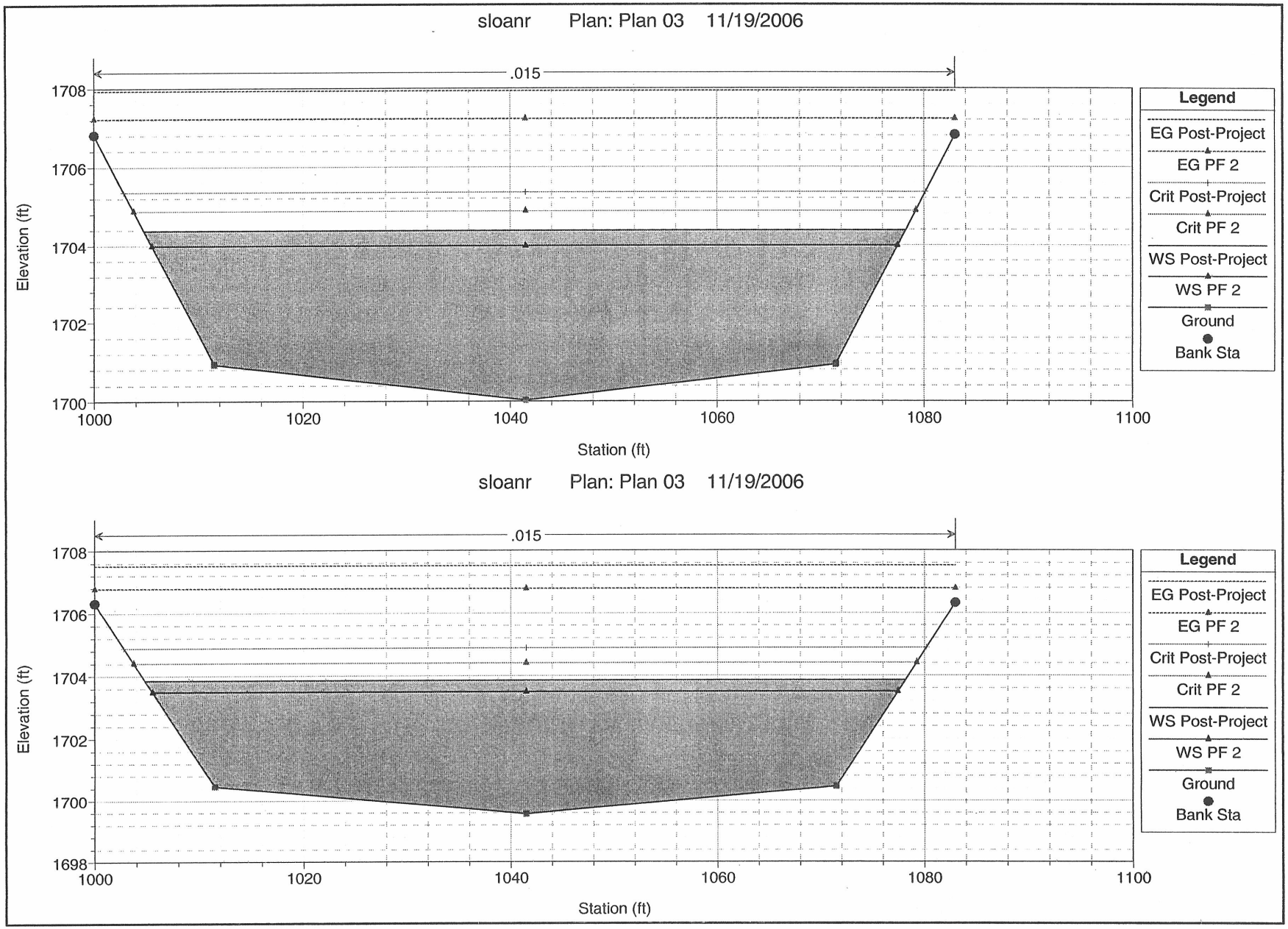
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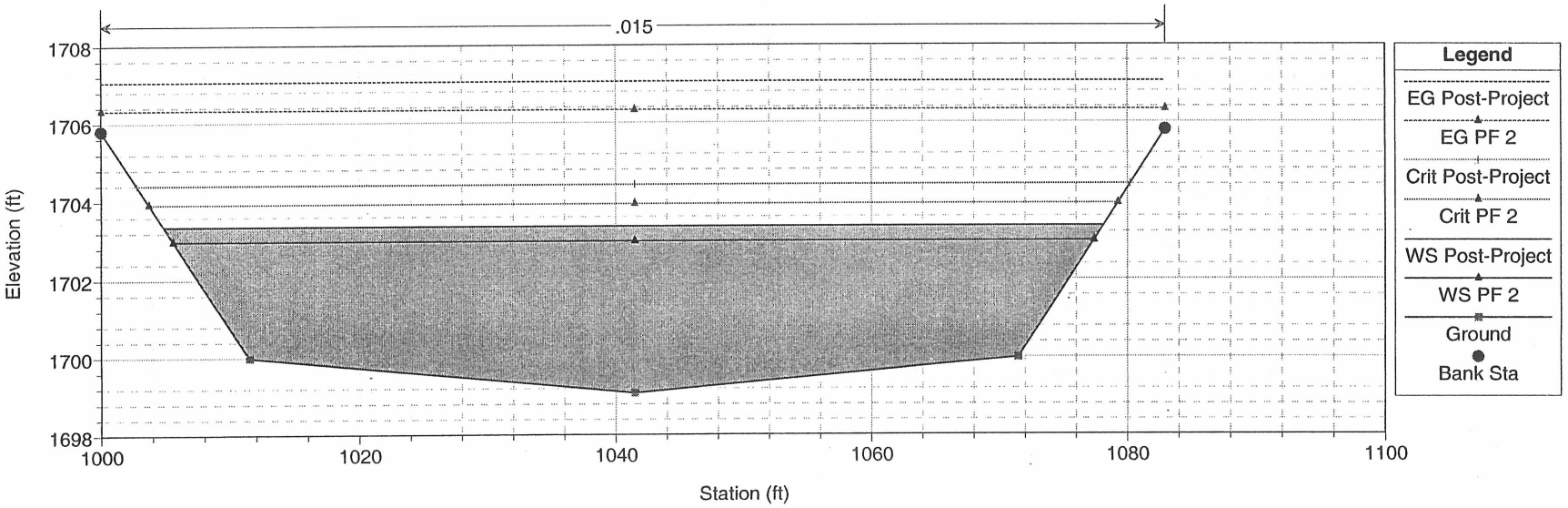

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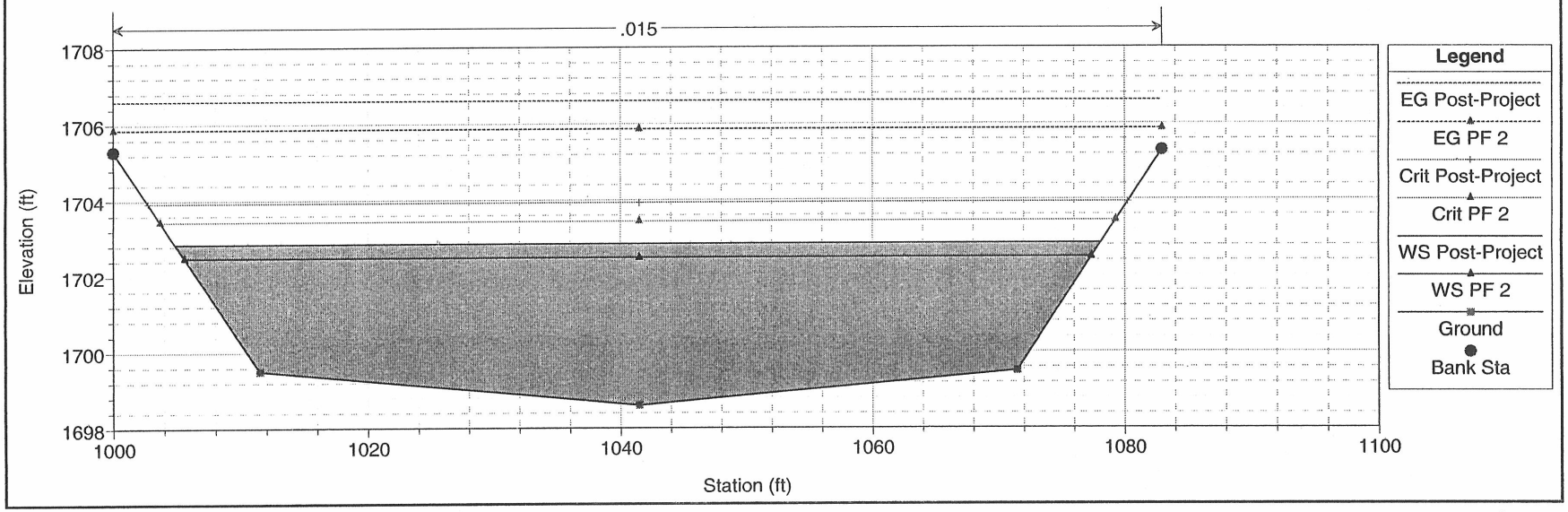

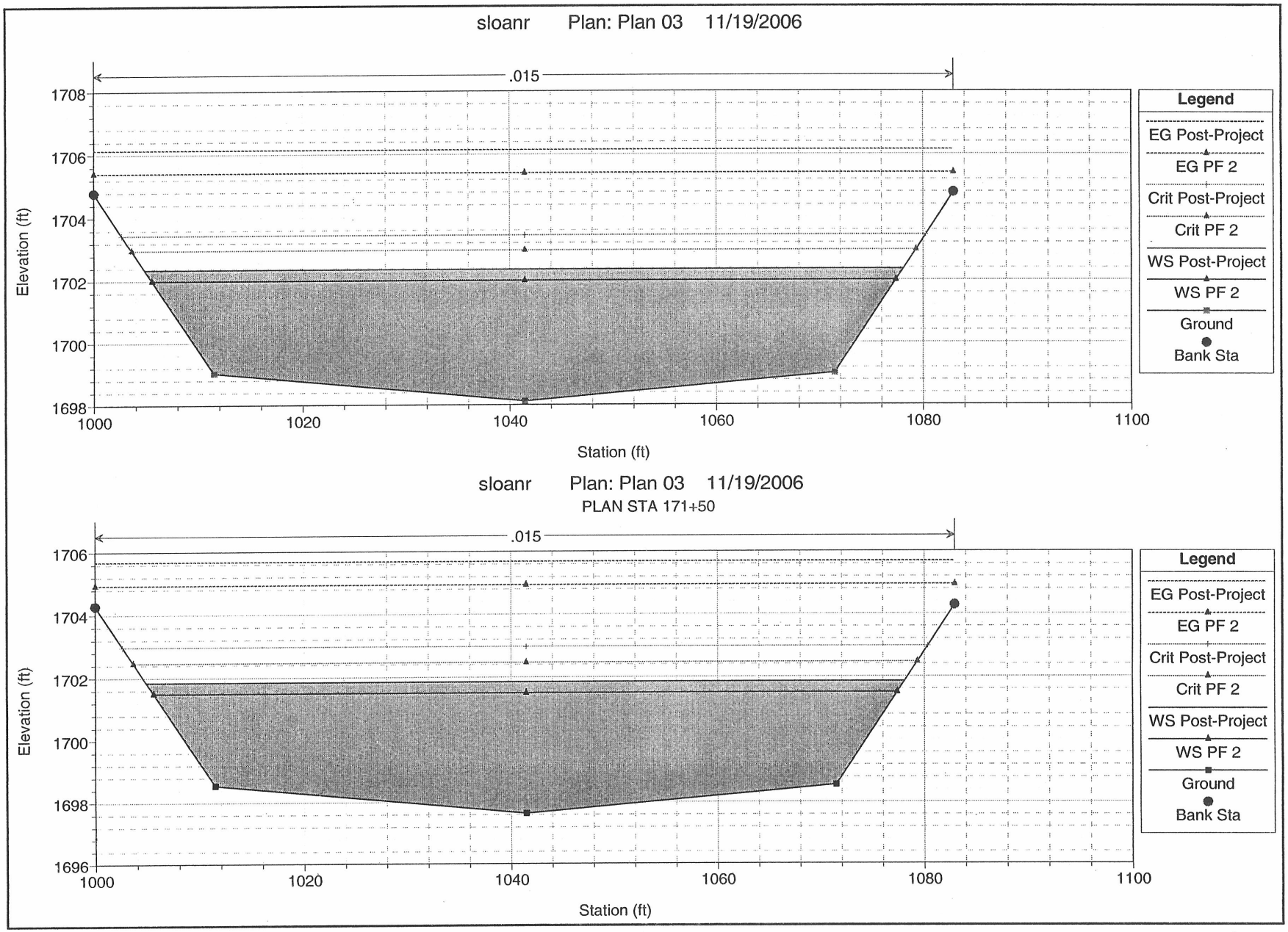
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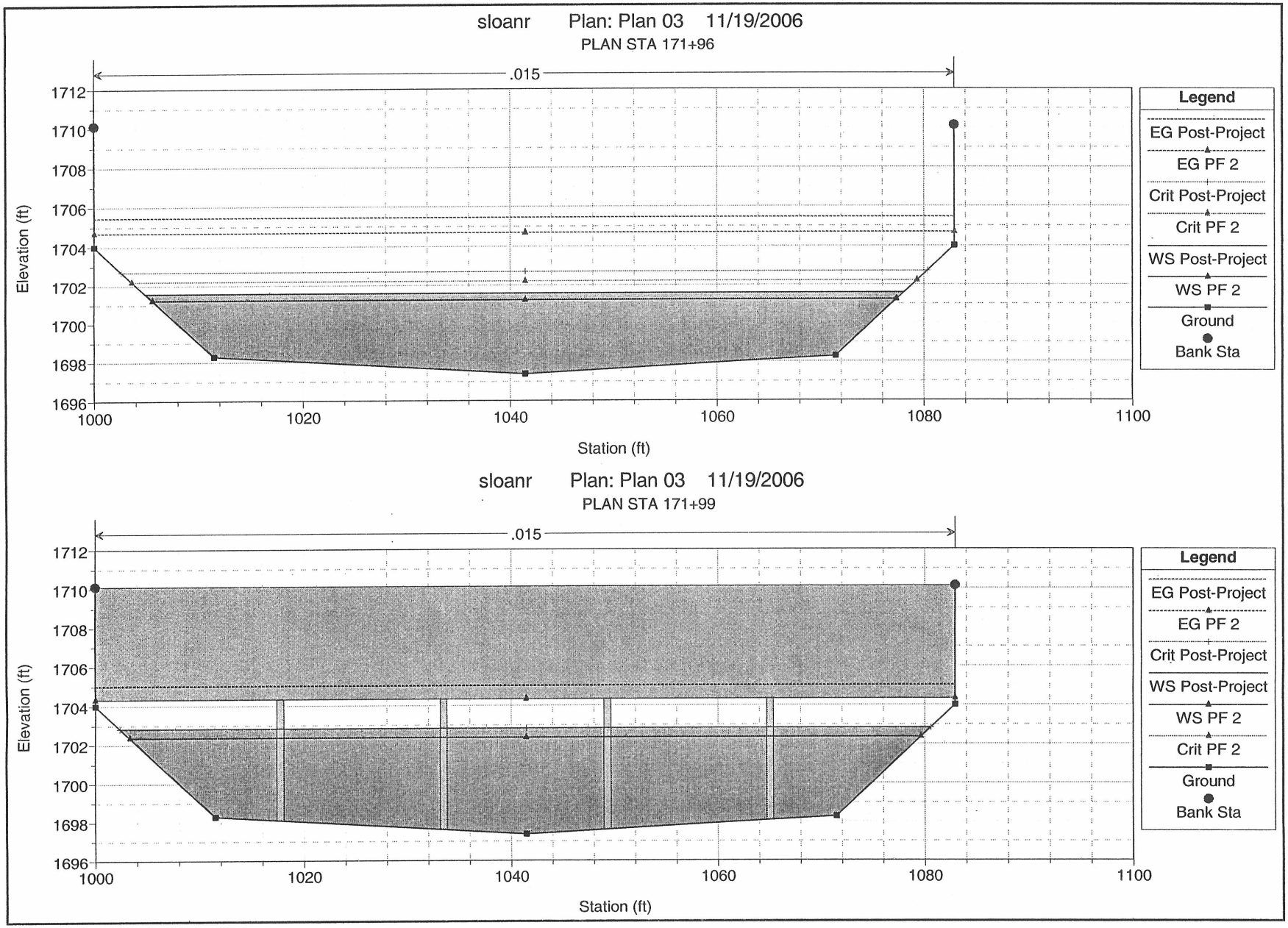
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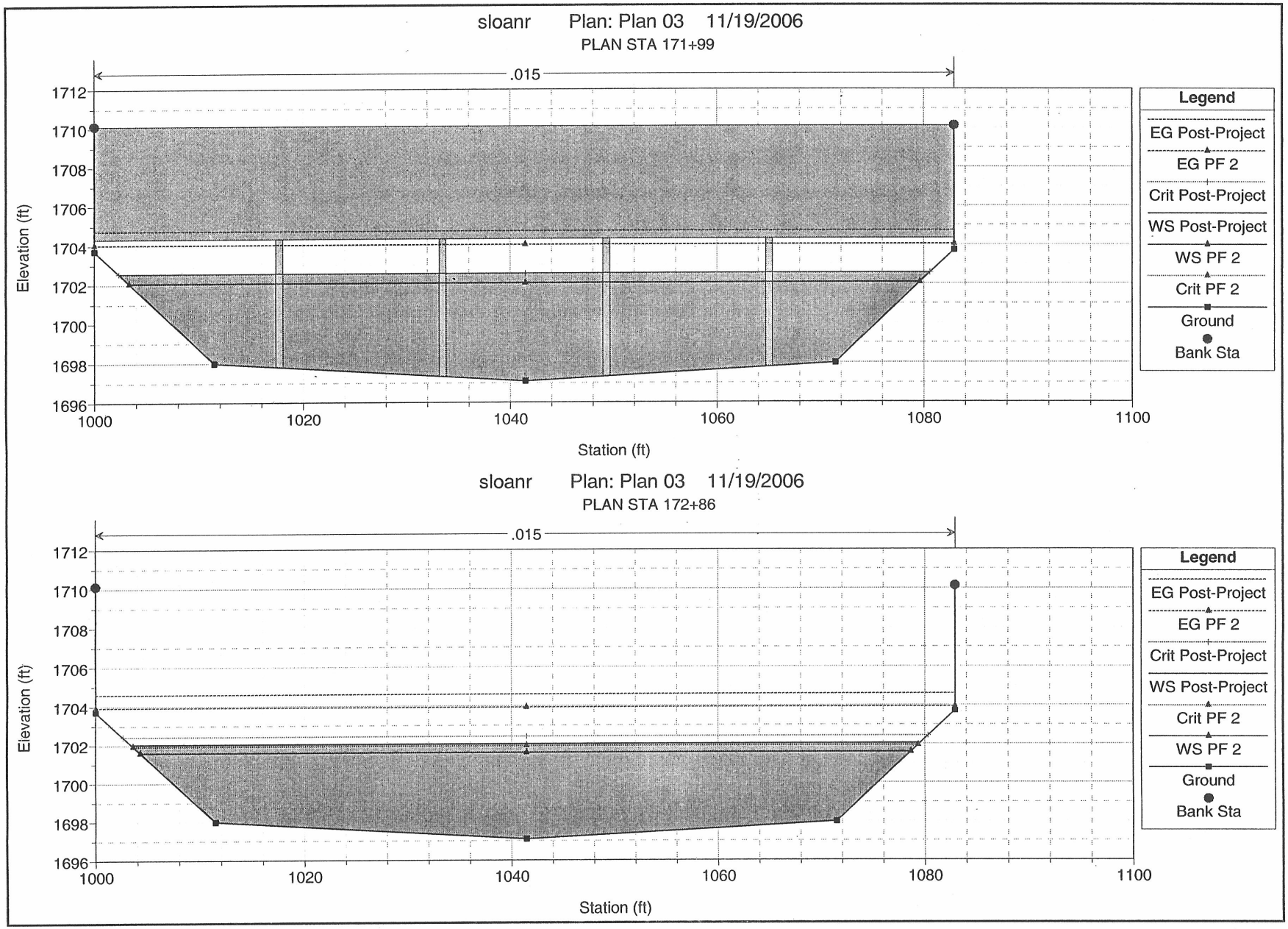
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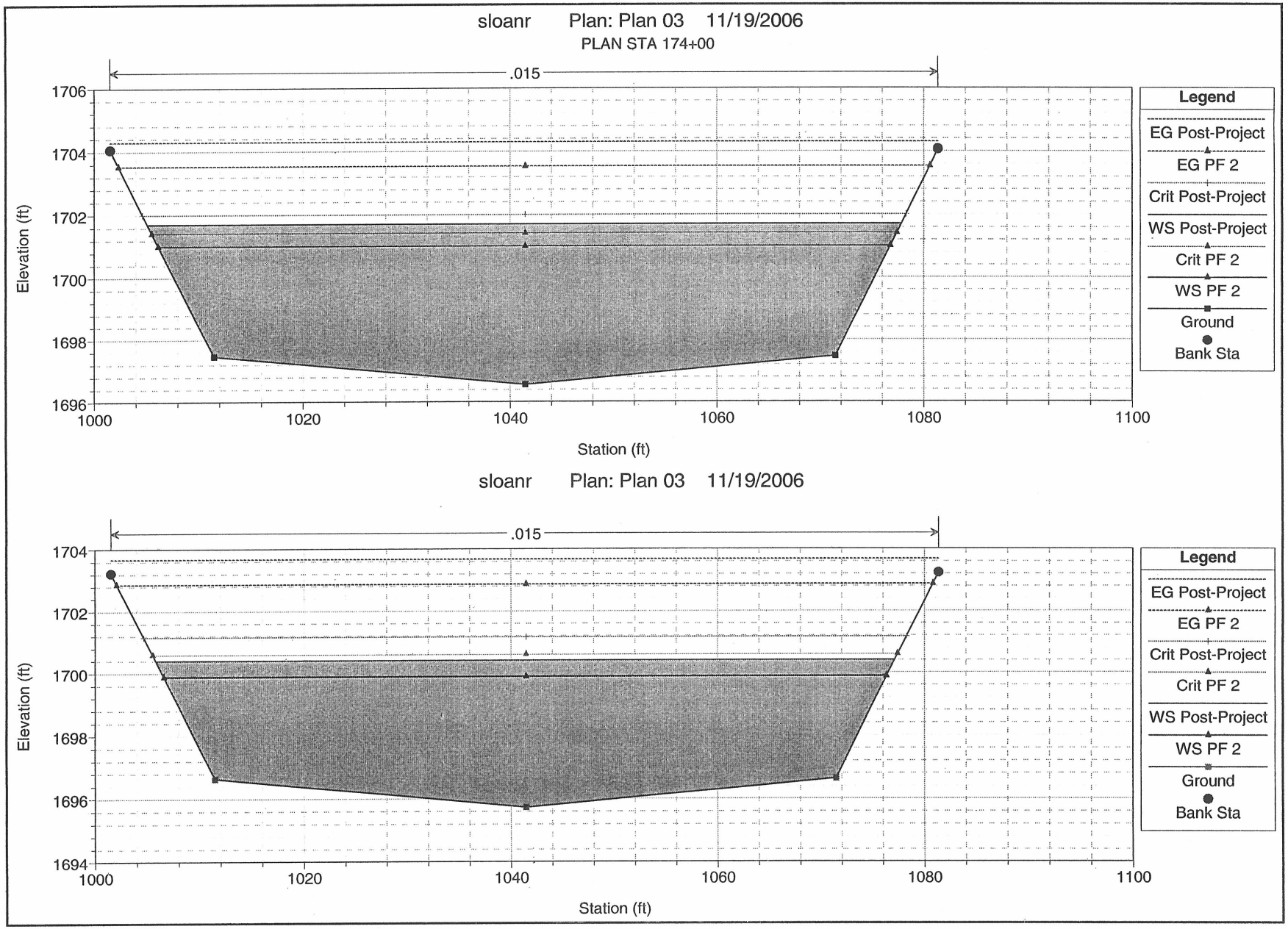
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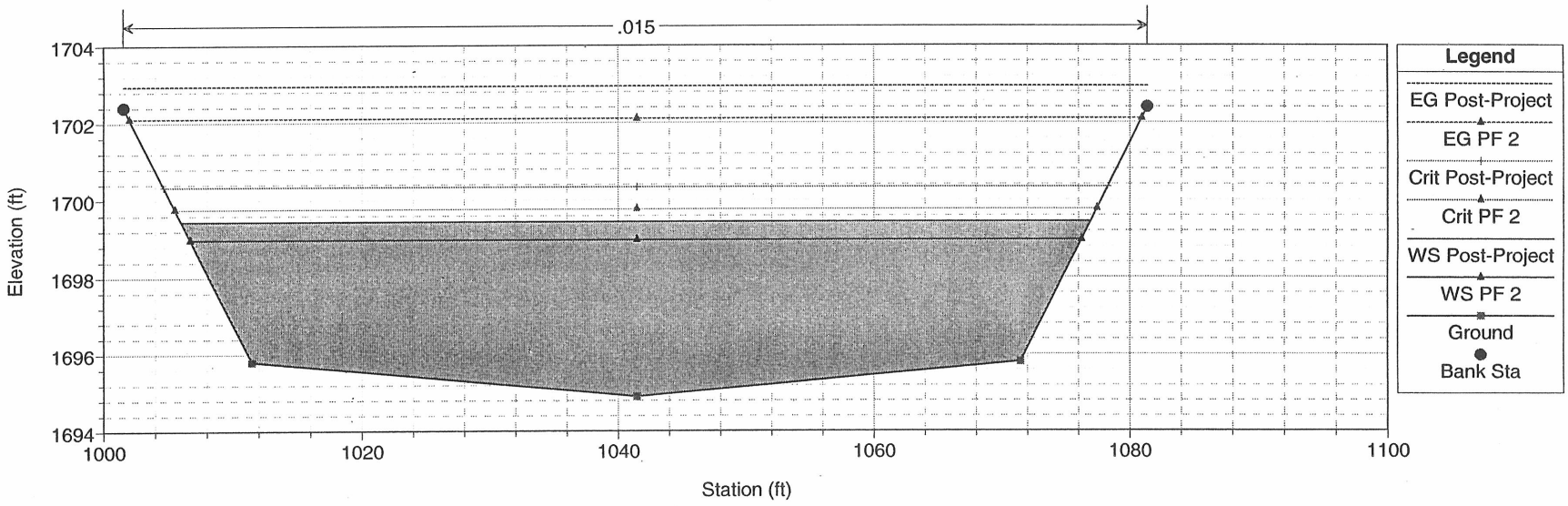

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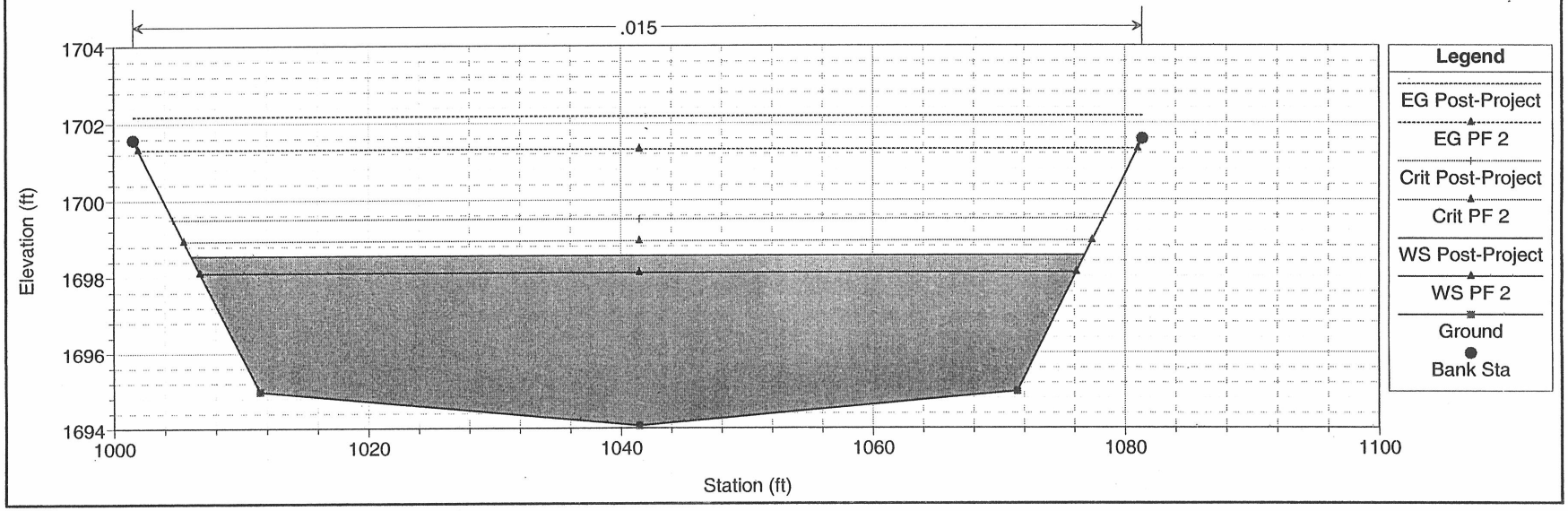

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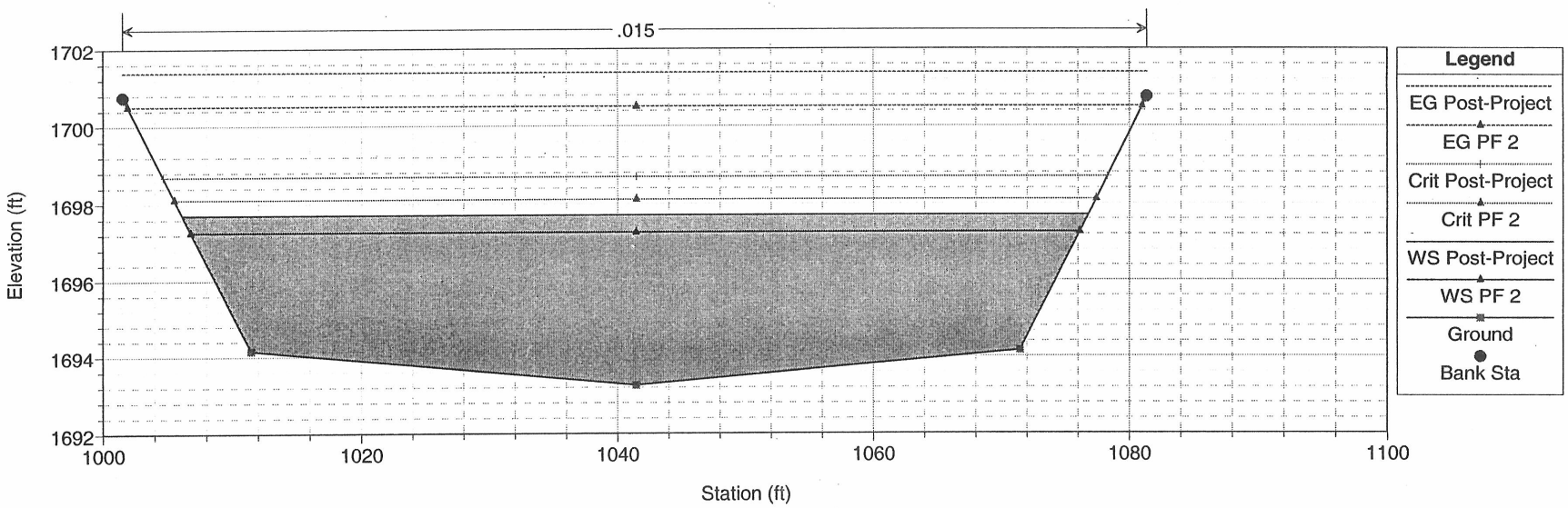

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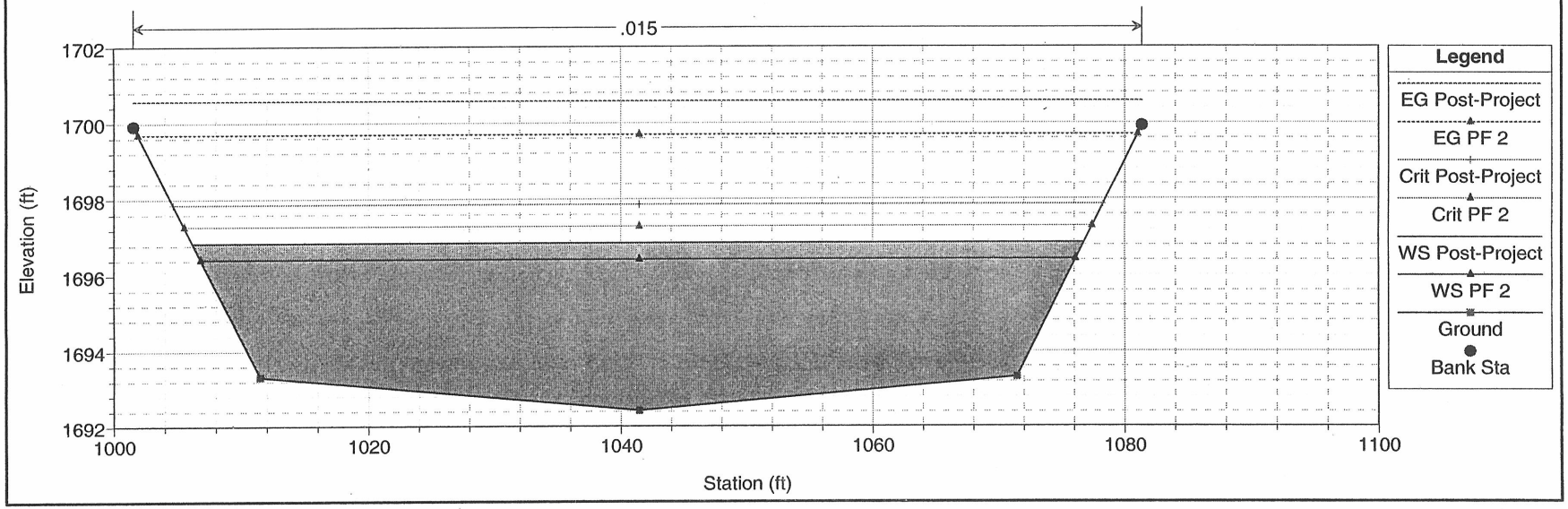

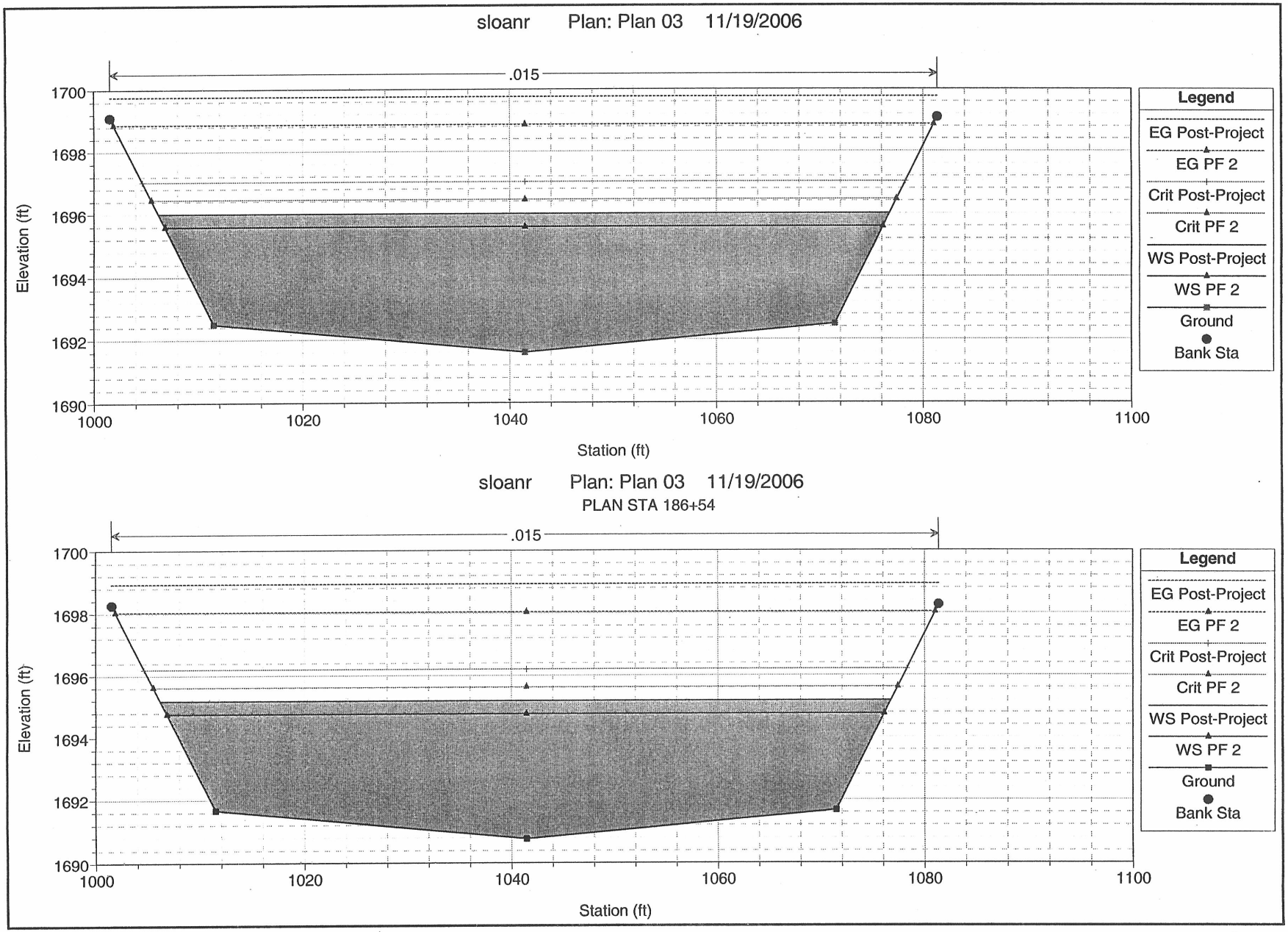
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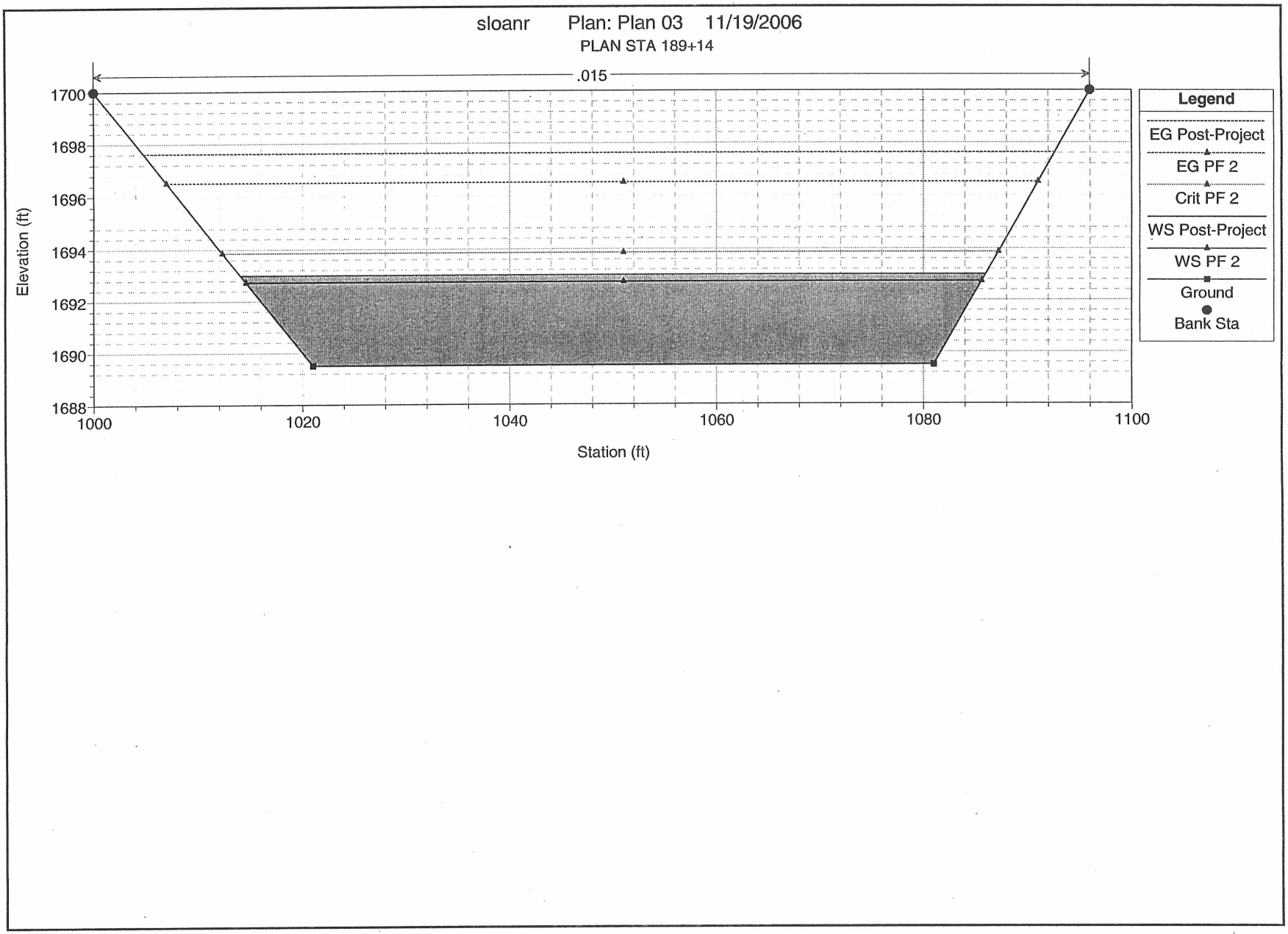
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Range Wash FIS Reference Material

HEC-2 Data

TECHNICAL SUPPORT DATA NOTEBOOK

for

CLARK COUNTY, NEVADA AND INCORPORATED AREAS
INCLUDING:
CITY OF NORTH LAS VEGAS
AND
UNINCORPORATED AREAS OF CLARK COUNTY

RANGE WASH
FLOOD INSURANCE STUDY RESTUDY

VOLUME 5

SECTION 5 REFERENCE MATERIALS
Sloan Channel & Developer Improvements
Documentation

Submitted by:	Clark County Regional Flood Control District
Study Contractor:	Post, Buckley, Schuh & Jernigan, Inc.
Date Submitted:	February 27, 1996

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VOLUME 5

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5.5 Sloan Channel & Developer Improvements Documentation

5.5.1 Predesign Report Sloan Channel Owens Avenue to Las Vegas Wash

DRAFT
PREDESIGN MEMORANDUM
SLOAN CHANNEL - OWENS AVENUE TO THE LAS VEGAS WASH

May 1993

Prepared for:

Clark County Public Works
6655 West Sahara Avenue
Las Vegas, Nevada 89102

Prepared by:

G. C. Wallace, Inc.
1555 South Rainbow Boulevard
Las Vegas, Nevada 89102

I. INTRODUCTION

The Sloan Channel improvements from Owens Avenue to the Las Vegas Wash confluence is part of the current Clark County Regional Flood Control District (CCRFCD) Master Plan Update of the Las Vegas Valley. This facility is intended to convey storm flows from the Range Wash drainage basin to the Las Vegas Wash. Other CCRFCD Master Plan facilities will eventually limit the 100-year return period flow in the Sloan Channel to 3,300 cfs. The location of the project is shown on Figure 1.

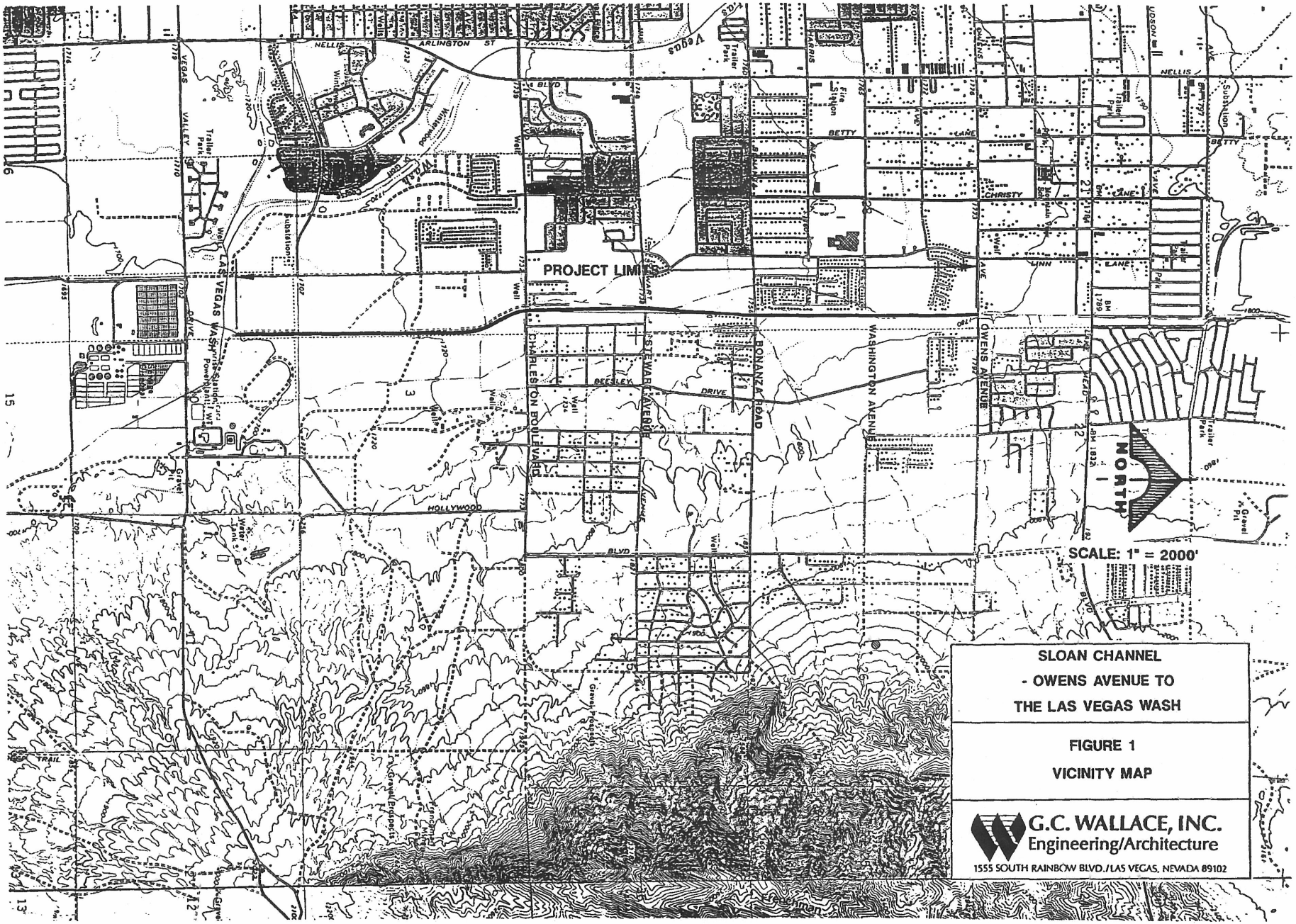
The Sloan Channel from Owens Avenue south to the Las Vegas Wash is currently an excavated, earthlined channel with an approximate bottom width of 60 feet and side slopes of roughly 2:1 (H:V). The Sloan Channel is crossed by five existing roadways in the project area. Bridges are present over the Sloan Channel at Washington Avenue and Charleston Boulevard. Reinforced Concrete Box (RCB) culvert crossings are present at Owens Avenue, Bonanza Road, and Stewart Avenue (see Figure 2). The length of this project is approximately 17,590 feet (3.3 miles).

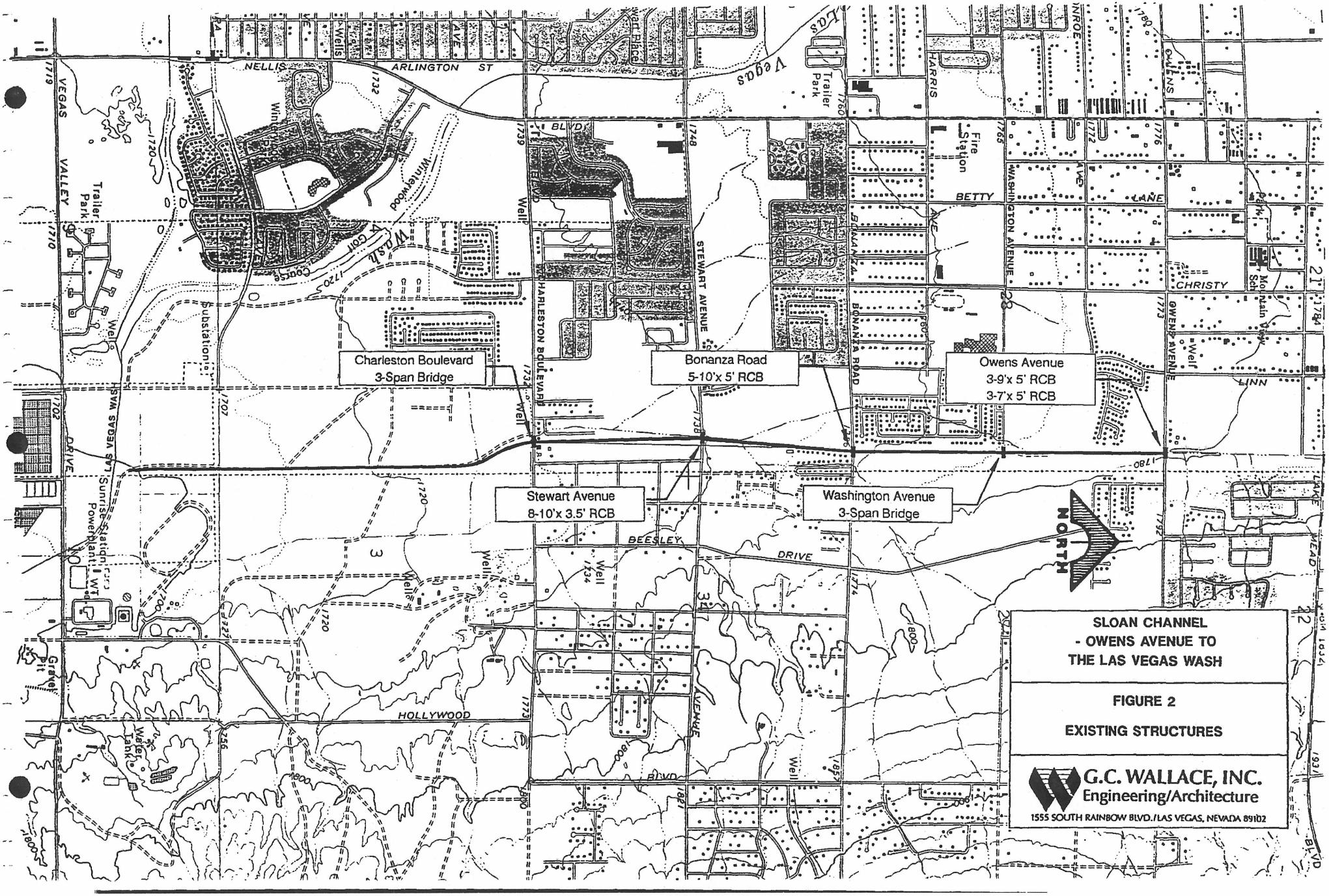
Improvement drawings for this reach of Sloan Channel were previously prepared by Boyle Engineering Corporation (Boyle) in 1986. However, the project was not constructed. Boyle's design for the Sloan Channel proposed a trapezoidal, concrete-lined channel with side slopes varying from 1.5:1 (H:V) to 2:1 (H:V), and a bottom width varying from 60 feet to 70 feet.

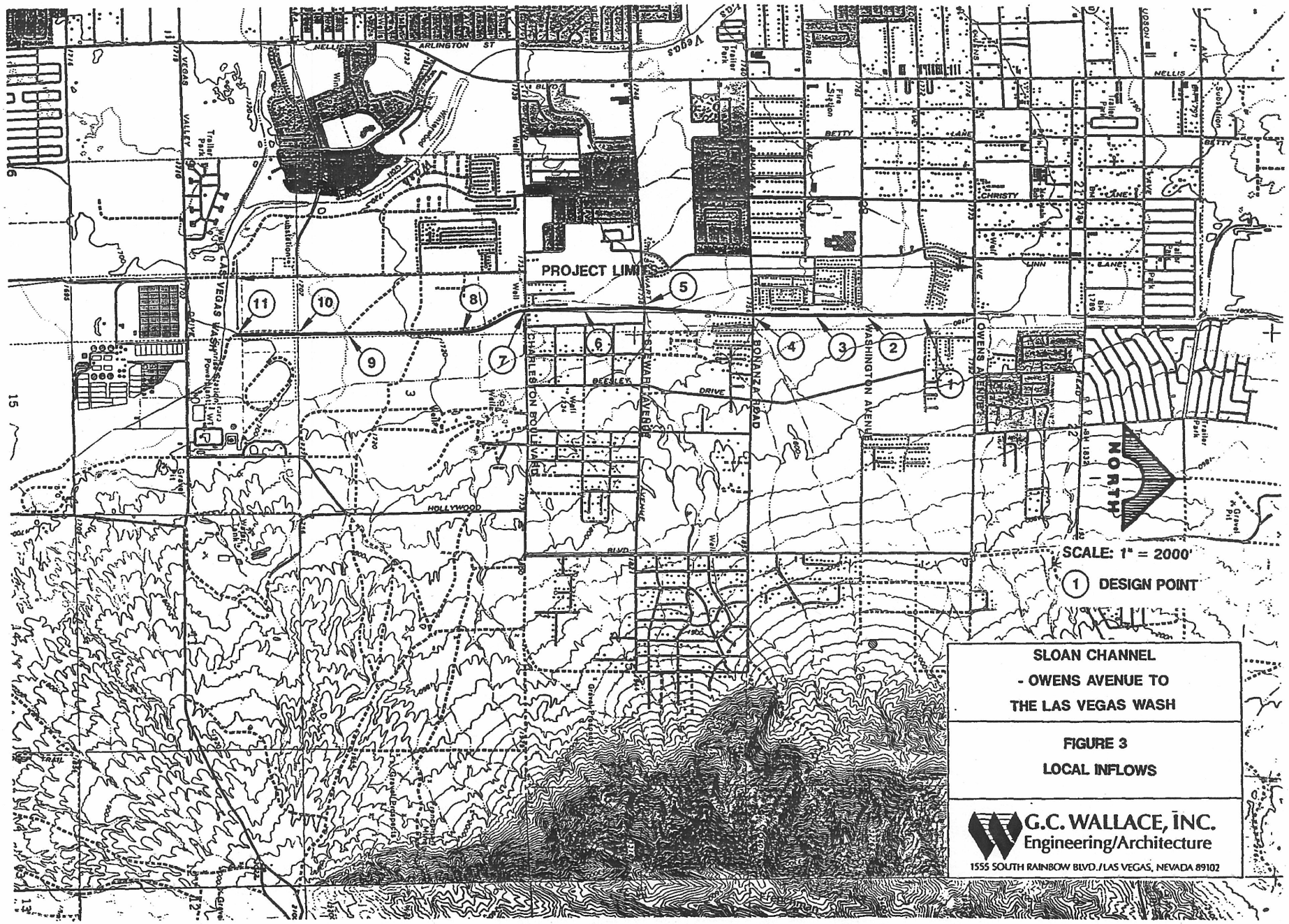
II. SCOPE

The purpose and scope of this Predesign Memorandum is to :

- Present the results of an update to a previous geotechnical investigation and field reconnaissance to document surficial soils and subsurface conditions along the channel alignment.


PROJECT LIMITS
NORTH
SCALE: 1" = 2000'
SLOAN CHANNEL
- OWENS AVENUE TO
THE LAS VEGAS WASH
FIGURE 1
VICINITY MAP
G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102


Charleston Boulevard
3-Span Bridge
Bonanza Road
5-10'x 5' RCB
Owens Avenue
3-9'x 5' RCB
3-7'x 5' RCB
Stewart Avenue
8-10'x 3.5' RCB
Washington Avenue
3-Span Bridge
NORTH
SLOAN CHANNEL
- OWENS AVENUE TO
THE LAS VEGAS WASH
FIGURE 2
EXISTING STRUCTURES
G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102


PROJECT LIMIT
NORTH
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SLOAN CHANNEL
- OWENS AVENUE TO
THE LAS VEGAS WASH
FIGURE 3
LOCAL INFLOWS
G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

- Present the results of a hydraulic analysis of the Boyle design using design flows of 3,300 cfs with freeboard as required in the CCRFCD Hydrologic Criteria and Drainage Design Manual (Manual), and 6,000 cfs without freeboard.

  The design flow of 3,300 cfs is the ultimate flow that will be conveyed in the Sloan Channel when the Confluence Detention Basin has been constructed. The Confluence Detention Basin is a CCRFCD Master Plan facility that is to be located just south of Nellis Air Force Base. This detention facility will detain flows from the eastern and western tributaries of the Range Wash watershed. This facility is presently under design.

  The design flow of 6,000 cfs is an interim flow for the Sloan Channel prior to the construction of the Confluence Detention Basin. This design flow is based on existing diversion facilities within the upper portions of the western tributary of the Range Wash being place.

- Provide a review and evaluation of the 1986 Boyle design for the Sloan Channel from Owens Avenue to the Las Vegas Wash using current design as criteria as set forth in the CCRFCD Manual.

- Present a hydrologic analysis of the watershed which contributes storm runoff directly to this reach of the Sloan Channel. The hydrologic analysis will identify points of local inflow into the Sloan Channel within the project limits and quantify the flows at these points.

- Provide recommendations for the following:

  - the adequacy of the previous design to convey the design flows of 3,300 cfs with freeboard and 6,000 cfs without freeboard;

- mitigation measures to protect the channel improvements from local inflows;
- the adequacy of the previous design to meet current design standards;
- the need for additional Special Services as described in Section 2.03 of the Professional Engineering Services Contract for this project.

III. SUMMARY OF UPDATED GEOTECHNICAL INVESTIGATION

As part of this predesign memorandum, the geotechnical investigation for this reach of the Sloan Channel was updated. Converse Consultants Southwest, Inc. (Converse) was employed to update their geotechnical investigation which had been prepared for the 1986 Boyle design of this project. The updated geotechnical report is included in this predesign memorandum as Appendix A.

Converse performed three (3) additional exploratory borings as part of the updated soils report. The subsoils encountered in this update and the previous investigation generally consisted of soft to firm silts and clays overlying very stiff clays and silts, and medium dense sands. The laboratory test results yield soils that are compressible, have low to moderate dry densities, low to high degree of solubility, a low to high clay swell potential, low to moderate chemical heave potential, and contain sulfate salts.

Groundwater was encountered in the three borings performed with the update and several locations in the original investigation. It should be noted that the three borings performed with the update were located south of Charleston Boulevard. These boring locations were selected to identify the extents of groundwater in the reach of this project south of Charleston Boulevard in light of the higher than normal precipitation in the year proceeding the preparation of this report.

No additional geotechnical services for design are anticipated at this time.

IV. REVIEW OF PREVIOUS DESIGN

The 1986 Boyle design of the Sloan Channel from Owens Avenue to the Las Vegas Wash was prepared prior to the publication of the CCRFCD Hydrologic Criteria and Drainage Design Manual (Manual). The Manual has established design parameters for concrete lined channels constructed within the Clark County area. The 1986 design for the Sloan Channel was reviewed using the currently accepted CCRFCD criteria and the updated geotechnical report. The following is a summary of the evaluation of the 1986 Boyle design using current criteria.

- Most of the channel lining (approximately 15,990 feet) is shown to have a side slope of greater than 2:1 (H:V). Section 705.7.1.1 b) of the Manual lists a maximum side os slope of 2:1 (H:V) for non-structurally reinforced walls.

- The longitudinal and transverse reinforcement of the channel lining shown on the Boyle design does not meet current criteria as set forth in Section 705.7.1.5 b) of the Manual. The Boyle design calls for #5 bars at 12-inch spacing for longitudinal reinforcement, and #5 bars at 18-inch spacing for transverse reinforcement. This equates to a steel area to concrete cross sectional area ratio of 0.0043 for the longitudinal reinforcement of 0.0028 for the transverse reinforcement. The Manual requires a ratio of longitudinal steel area to concrete cross sectional area greater than 0.005 (but not less than #4 rebar at 12-inch spacing). The transverse steel area to concrete cross section is to be greater than 0.0025 (but not less than #4 rebar at 12-inch spacing). To meet current CCRFCD Design Standards, the minimum longitudinal steel required for the 6-inch lining shown on the Boyle drawings needs to be #6 rebar at 12-inch spacing, and the transverse steel needs to be #4 rebar at 12-inch spacing.

- The 1986 design does not require the top 12-inches of earth surface within 10-feet of the concrete channel lip to be compacted to at least 90 percent of the

maximum density per ASTM 1557 as required in Section 705.7.1.6 d) of the Manual.

- The Boyle design does not include longitudinal or transverse cutoff walls. The Manual requires that transverse cutoff walls shall be constructed at a maximum spacing of 90 feet and shall extend a minimum of 3-feet below the bottom of the concrete lining. Longitudinal cutoff walls along the top of the bank at a minimum depth of 3-feet are also required by the Manual. However; due to the fact that much of the west side of the channel is protected from the surface inflows by existing masonry walls, the longitudinal cutoff wall could be omitted for portions of the west side of the channel.

- Maintenance access per Section 707.2 of the Manual appears to be met. Since the channel top width is greater than 30-feet, the maintenance road can be located in the bottom of the channel. The 1986 design, apparently, utilized this concept.

- Ladder-type steps per Section 707.3 b) of the Manual need to be incorporated into the channel design.

- The updated geotechnical investigation recommends "Concrete panels on the channel sides and bottom be supported by a blanket of granular filter material that is a least 6-inches and 12-inches thick, respectively." The 1986 design shows a 6-inch blanket of Type 2 drain backfill throughout.

Considerations for development which has occurred or is presently ongoing along the Sloan Channel alignment need to be made. Numerous residential developments have been, or are being constructed along the channel alignment. A number of these developments discharge storm flows directly into the Sloan Channel via storm drains and/or surface outlets. Design consideration should be made to incorporate the features constructed after 1986 into overall design of the channel.

The majority of the development which has taken place since the 1986 design was prepared is located south of Charleston Boulevard. Peachtree, a master planned development on the east side of the Sloan Channel, will discharge approximately 1,200 cfs into the Sloan Channel via a concrete lined channel to be located 1,200 feet north of the Sahara Avenue alignment.

Developments on the west side of the Sloan Channel south of Charleston Boulevard, including Sunrise Valley Garden Homes, Sunrise Valley Unit 8, and Stonebridge D2A, also discharge local storm flows into the Sloan Channel via surface inlets.

The access ramp/surface inlet shown at Station 41+21 should be moved. An apartment development adjacent to this location has intercepted and diverted the surface flows which formerly entered the channel at this location. This access ramp/surface inlet could be relocated approximately 250-feet north at the northern boundary of the aforementioned apartment development and provide surface flow access the channel.

An existing wash intersects the Sloan Channel from the west just south of Stewart Avenue. The 1986 design shows this wash being blocked by the construction of the channel improvements. This wash bisects an undeveloped parcel of land. As will be presented in the section of this Predesign Memorandum entitled Hydrology, a considerable amount of storm runoff (580 cfs in a 100-year storm) presently is conveyed to the Sloan Channel across the undeveloped parcel in this wash. The undeveloped parcel does not have improvements on Stewart Avenue to contain local storm flows within the Stewart Avenue right-of-way. Considerations must be given to either containing storm flow along Stewart Avenue, or providing means to safely introduce flows from this wash into the Sloan Channel.

Since the 1986 design for the Sloan Channel was prepared, the CCRFCD Master Plan (October 1986) and the Master Plan Update (August 1991) have been published. The 1991 Master Plan Update identifies existing and proposed drainage

facilities of regional significance for the Las Vegas Valley area. A review of the Master Plan Update shows existing and proposed collector systems from the east tying into the Sloan Channel. The collector system intersect the Sloan Channel at the major roadway crossings within the project area. The 1991 Master Plan Update lists the following collector facilities (see Figures F-11 and F-15 of the Master Plan Update):

Owens Avenue	60-inch RCP
Washington Avenue	90-inch RCP
Bonanza Road	72-inch RCP (existing)
Stewart Avenue	66-inch RCP
Charleston Boulevard	20 ft. W, 6.5 ft. D, rip-rap channel

The existing facilities and the proposed facilities shown on the Boyle Drawings at these locations are as follows:

Owens Avenue	54-inch RCP (proposed)
Washington Avenue	60-inch RCP stub (existing)
Bonanza Road	72-inch RCP (existing)
Stewart Avenue	43" x 68" HE RCP (54" equiv. stub) (existing)
Charleston Boulevard	48" x 91" in HE RCP (72" equiv.) (existing)

All of the existing facilities and proposed facilities shown on the Boyle drawings are located in the downstream transition structures of the RCB culverts or bridges at these locations. Accommodations could be made to update existing facilities that differ from the Master Plan facilities as part of this project. However, the Master Plan is only a guide, and the facilities at these locations may change when detailed drainage studies and designs are prepared.

Utilities

No utility conflicts are anticipated with the construction of this project. GCW preliminary utility research indicates that, with the exception of the future bridge crossing of Sahara Avenue at the Sloan Channel, all existing utilities are located beneath the existing bridge and RCB culvert structures at major roadway crossings. However, we have not received written responses from all of the utility companies at this time.

An inverted sewer siphon is present under the Sloan Channel in the Sahara Avenue alignment. This inverted siphon was designed to accommodate the future improvements to the Sloan Channel and the future RCB culvert at Sahara Avenue. The top of pipe for the siphon is approximately 6-feet below the proposed invert of the channel.

The Clark County Sanitation District (CCSD) has indicated that the Betty Lane Relief Sewer is currently being designed. The Relief Sewer will be located in the general vicinity of Owens Avenue and the Sloan Channel. The Betty Lane Relief Sewer will approach the Sloan Channel from the east in Owens Avenue. The relief sewer will need to cross the Sloan Channel in the vicinity of Owens Avenue. The sewer line crossing could most easily be accomplished just downstream of the existing concrete transition structure associated with the Owens Avenue RCB culvert. Provided that the sewer line is constructed prior to or in conjunction with the Sloan Channel improvements, the existing RCB and transition structure at Owens Avenue can remain in place. The CCSD has indicated that the construction of this relief sewer is scheduled for late 1993. The design and/or construction of the Sloan Channel will need to be coordinated with the CCSD and their contractor.

Right-of-Way

Preliminary right-of-way research indicates that continuous right-of-way and easements of sufficient width exists to construct the proposed basic channel improvements throughout the project area with the exception of an 873 foot long portion located immediately north of Sahara Avenue. This needed right-of-way is a portion of an undeveloped 25 acre parcel identified by APN 320-160-005.

Additional minor right-of-ways and/or construction easements requirements may be identified during the design phase of the project.

The Record-of-Survey, and right-of-way research are currently ongoing and will be submitted with the final Predesign Memorandum as per Section 2.02 I of the Professional Engineering Services Contract.

V. HYDROLOGY

The purpose and scope of the Hydrology section of this report was to establish the localized inflows to the Sloan Channel between Owens Avenue and the Las Vegas Wash. A detailed explanation of the model and the modeling techniques and calculations are contained in Appendix "B" of this report.

Methodology

The hydrologic methods used to establish the localized inflows to the Sloan Channel between Owens Avenue and Las Vegas Wash are based on methods established in the "Clark County Regional Flood Control District Hydrologic Criteria and Drainage Manual" (Manual). The hydrologic model utilized in this study is an HEC-1 flood hydrograph package developed by the U.S. Army Corps of Engineers, Hydrologic Engineering Center.

The rainfall relationships were generated using adjusted rainfall and a 6 hour SDN-3 distribution curve. A detailed explanation of the methodology and modeling is contained in Appendix "B."

Analysis

Two conditions were analyzed. Alternative 1 assumes existing conditions with ultimate buildout within the drainage area. Alternative 2 is the ultimate development condition and assumes future CCRFCD Master Plan facilities in place. Two detention basins have significant impact to the local runoff generated between Owens Avenue and the Las Vegas Wash. These are identified as facilities SLW/0154 and SLST/0169 on Figures F-12 and F-16 of 1991 Flood Control Master Plan Update. The facilities dampen peak flows generated on the Sunrise Mountain and route flows down Washington Avenue and Stewart Avenue into the Sloan Channel.

Figure No. 3 shows locations where inflow are calculated into the channel. Peak flow values for Alternative 1 and Alternative 2 are contained in Tables 1 and 2, respectively.

TABLE 1
LOCAL INFLOW INTO SLOAN CHANNEL
EXISTING CONDITION

Point Location*	Cross Street	INFLOW (cfs) East 10-Year	East 100-Year	West 10-Year	West 100-Year
1	Monroe Ave.	31	99		
2	Washington Ave.	505	1339		
3	Harris Ave.	5	39		
4	Bonanza Road	449	1232		
5	Stewart Ave.	178	665	169	579
6	Sunrise Ave.	44	133		
7	Charleston Blvd.	161	470	57	146
8	–	11	59	33	64
9	–	532	1206	10	22
10	Sahara Ave.	57	164	20	45
11	–	101	208	28	63

*See Figure 3

TABLE 2
LOCAL INFLOW INTO SLOAN CHANNEL
ULTIMATE DEVELOPMENT CONDITION

		INFLOW (cfs)			
		East		West	
Point Location*	Cross Street	10-Year	100-Year	10-Year	100-Year
1	Monroe Ave.	31	99		
2	Washington Ave.	177	449		
3	Harris Ave.	5	39		
4	Bonanza Road	77	356		
5	Stewart Ave.	196	581	169	579
6	Sunrise Ave	44	133		
7	Charleston Blvd.	46	233	57	146
8	--	11	59	33	64
9	--	532	1206	10	22
10	Sahara Ave.	57	164	20	45
11	--	101	208	28	63

*See Figure 3

The detailed HEC-1 model used for this analysis only identified those storm flow that enter the Sloan Channel south of Owens Avenue. The accumulative impact of the inflows generated by the model suggest that, at least under existing conditions in the local watershed, the local inflows may control the 100-year peak storm flow in the Sloan Channel south of Washington Avenue. Therefore, a preliminary hydrologic analysis of the Sloan Channel watershed from Carey Avenue to the Las Vegas Wash was prepared. The model indicates that the local inflows will exceed the design flow of 3,300 cfs as far north as Bonanza Road. The peak flows in the channel generated by the local inflows for existing and ultimate conditions are listed in Table 3 below:

TABLE 3
SLOAN CHANNEL
LOCAL 100-YEAR PEAK FLOWS

Location	Existing Condition (Carey to LV Wash)	Ultimate Local Inflows with Regional Facilities (Carey to LV Wash)
Washington Ave.	3100	1340
Bonanza Road	3400	1640
Stewart Avenue	3660	2010
Charleston Blvd.	4225	2250
Sahara Avenue	4900	3230
Las Vegas Wash	4975	3300

The proposed channel sections will convey the calculated flows within current design standards. Preliminary calculations indicate that the Charleston Bridge has capacity to pass a flow of 4,225, but the culvert at Stewart Avenue may experience some minor overtopping (approximately 50 cfs) for a flow of 3,660 cfs. The County may want to prepare a detailed study of the inflows to the Sloan Channel south of Carey Avenue (the outfall of the Confluence Detention Basin) to determine if the future bridge structure at Sahara Avenue needs to be sized for a flow greater than 3,300 cfs. As Table 3 indicates, ultimately, Regional facilities in the local watershed will reduce the local inflows to less than the design flow of 3,300 cfs.

VI. HYDRAULICS

Methodology

Water surface profiles for the Sloan Channel were calculated using the U.S. Army Corps of Engineers HEC-2 "Water Surface Profiles" computer program. Profiles were calculated assuming both supercritical and subcritical flow regimes. Bridges and culverts were modeled using the special bridge subroutine. Slope and channel

configurations are based on the Boyle drawings provided by the Clark County Public Works Department.

Channel stationings were taken from the above mentioned design drawings. Cross section numbers in the HEC-2 model correspond to the channel stationing. Cross sections were taken approximately every 300 feet with additional sections taken at grade breaks, transitions, bridge crossings and culvert crossings. Per contract requirements, models were prepared for both a 3,300 cfs and a 6,000 cfs flow. The calculated water surface elevation for the two flow models are contained in Tables 4 and 6.

Analysis

In general, it was determined that the typical channel sections proposed by the 1986 Boyle drawings have sufficient capacity to convey the 3,300 cfs, and meet current CCRFCD requirements for depth, velocity and freeboard. However, it was found that the existing culvert crossings at Stewart Avenue and Bonanza Road lack capacity to convey the 3,300 cfs flow with freeboard. The models suggest that the 3,300 cfs will pass through the culvert crossings at these locations in a pressure flow condition. The bridge crossings at Washington Avenue and Charleston Boulevard had sufficient capacity to pass 3,300 cfs with freeboard. A tabulation of the channel and bridge flow depths are contained in Table 5.

With a flow of 6,000 cfs in the channel, both the culvert crossings at Bonanza Road and Stewart Avenue and the bridge crossings at Washington Avenue and Charleston Boulevard are overtopped. The amount of flow overtopping in the case of the culvert crossing is significant (1,700 to 2,100 cfs) and exceeds the depth velocity criteria allowed within the CCRFCD Manual. At Washington Avenue and Charleston Boulevard bridges, the overflow is minimal. The majority of the proposed channel will meet CCRFCD Manual requirement for freeboard and will

convey the 6,000 cfs flow except where the bridge and culvert crossings lack capacity. The data for the 6,000 cfs flow is contained in Table 6.

VII. COST ESTIMATE

A preliminary cost estimate for the construction of this project is presented in Table 8. The cost estimate was prepared for two phases of construction. The limits of Phase I are from Owens Avenue to Stewart Avenue. Phase II extends from Stewart Avenue to the Las Vegas Wash.

The quantities shown for Overexcavation, are based on roughly 2 feet of overexcavation below the invert and benched excavation on the sides as described in the geotechnical report. The quantities for Imported Drain Backfill, and Recompact Native Material are based on 6 inches of drain backfill under the channel lining and the balance of the excavated prism being filled with recompacted native material. Chain-link fence quantities were estimated for portions of the channel with no adjacent, existing development. Channel lining quantities are shown in square feet. The unit price was adjusted to account for incidental items such as cutoff walls and access ramps.

TABLE 4
HYDRAULIC CHARACTERISTICS OF SLOAN CHANNEL/EXISTING DESIGN DRAWINGS
DESIGN FLOW (Q = 3300 cfs)

STATION	FLOW	DEPTH	INV.ELV	CWSEL	RB.ELV	LB.ELV	VCH	FB	FB+DEPT	CH.DEPTH
137.48	3300	4.54	771.47	776.01	778.77	778.77	11.37	1.47	6.0	7.3
437.48	3300	3.86	770.31	774.17	777.61	777.61	13.67	1.54	5.4	7.3
737.48	3300	3.85	769.16	773.01	776.46	776.46	13.67	1.54	5.4	7.3
1037.50	3300	3.85	768.00	771.86	775.30	775.30	13.68	1.54	5.4	7.3
1337.50	3300	3.85	766.85	770.70	774.15	774.15	13.66	1.54	5.4	7.3
1637.50	3300	3.85	765.69	769.55	772.99	772.99	13.67	1.54	5.4	7.3
1937.50	3300	3.85	764.54	768.39	771.84	771.84	13.66	1.54	5.4	7.3
2237.50	3300	3.85	763.38	767.24	770.68	770.68	13.67	1.54	5.4	7.3
2532.20	3300	3.86	762.25	766.11	769.55	769.55	13.66	1.54	5.4	7.3
2572.70	3300	5.54	762.10	767.64	769.40	769.40	12.98	1.57	7.1	7.3
2652.70	3300	3.61	761.80	765.41	768.70	768.70	14.10	1.54	5.2	6.9
2712.20	3300	4.48	761.36	765.84	768.33	768.33	11.53	1.48	6.0	6.97
3012.20	3300	3.60	759.83	763.43	766.80	766.80	14.75	1.57	5.2	6.97
3312.20	3300	3.57	758.30	761.88	765.27	765.27	14.90	1.57	5.1	6.97
3612.20	3300	3.56	756.77	760.33	763.74	763.74	14.94	1.57	5.1	6.97
3912.20	3300	3.56	755.24	758.80	762.21	762.21	14.95	1.57	5.1	6.97
4121.00	3300	3.56	754.17	757.73	761.14	761.14	14.95	1.57	5.1	6.97
4222.00	3300	3.56	753.66	757.22	760.63	760.63	14.95	1.57	5.1	6.97
4512.20	3300	3.54	752.13	755.66	759.10	759.10	15.07	1.57	5.1	6.97
4812.20	3300	3.57	750.60	754.16	757.57	757.57	14.93	1.57	5.1	6.97
5100.00	3300	3.56	749.13	752.69	756.10	756.10	14.96	1.57	5.1	6.97
5147.30	3300	3.81	748.94	752.75	755.90	755.91	13.87	1.54	5.4	6.97
5168.30	3300	6.30	747.50	753.80	754.46	754.47	13.20	1.61	7.9	6.97
5268.30	3300	7.37	746.80	754.17	754.00	754.00	8.62	1.42	8.8	7.2
5290.10	3300	3.02	746.86	749.88	753.79	753.79	17.98	1.65	4.7	6.93
5484.00	3300	3.15	745.40	748.56	752.34	752.34	17.18	1.63	4.8	6.94
5590.10	3300	3.15	744.61	747.78	751.55	751.55	17.09	1.63	4.8	6.94
5890.10	3300	3.20	742.36	745.55	749.30	749.30	16.89	1.62	4.8	6.94
6190.10	3300	3.20	740.11	743.30	747.05	747.05	16.91	1.62	4.8	6.94
6208.70	3300	3.17	739.93	743.11	746.87	746.87	17.01	1.62	4.8	6.94
6508.70	3300	3.59	738.46	742.06	745.40	745.40	14.79	1.57	5.2	6.94
6808.70	3300	3.59	736.99	740.59	743.93	743.93	14.77	1.57	5.2	6.94
7108.70	3300	3.59	735.52	739.12	742.46	742.46	14.76	1.57	5.2	6.94
7480.00	3300	3.60	733.70	737.31	740.64	740.64	14.75	1.57	5.2	6.94
7584.70	3300	3.60	733.19	736.80	740.13	740.13	14.75	1.57	5.2	6.94
7662.60	3300	4.31	732.80	737.11	739.10	739.10	11.94	1.49	5.8	6.3
7747.50	3300	4.79	732.19	736.98	738.49	738.49	11.79	1.50	6.3	6.3
7847.50	3300	6.81	731.30	738.11	737.60	737.60	7.03	1.33	8.1	6.3
8049.30	3300	3.11	730.45	733.56	736.75	736.75	17.34	1.63	4.7	6.3
8156.70	3300	3.39	730.00	733.39	736.30	736.70	15.73	1.59	5.0	6.7

TABLE 4 (Cont.)
HYDRAULIC CHARACTERISTICS OF SLOAN CHANNEL/EXISTING DESIGN DRAWINGS
SUPERCRITICAL FLOW (Q = 3300 cfs)

STATION	FLOW	DEPTH	INV.ELV	CWSEL	RB.ELV	LB.ELV	VCH	FB	FB+DEPT	CH.DEPTH
8349.30	3300	3.70	729.19	732.89	735.49	735.89	14.23	1.55	5.3	6.7
8649.30	3300	3.75	727.92	731.67	734.22	734.62	14.00	1.54	5.3	6.7
8949.30	3300	3.75	726.65	730.40	732.95	733.35	14.02	1.54	5.3	6.7
9249.30	3300	3.75	725.39	729.14	731.69	732.09	14.02	1.54	5.3	6.7
9549.30	3300	3.75	724.12	727.87	730.42	730.82	14.03	1.54	5.3	6.7
9849.30	3300	3.75	722.86	726.60	729.16	729.56	14.03	1.54	5.3	6.7
10149.00	3300	3.89	721.70	725.58	728.00	728.40	13.41	1.53	5.4	6.7
10423.00	3300	3.79	720.43	724.22	728.88	728.13	14.09	1.55	5.3	7.7
10574.00	3300	3.79	719.80	723.59	728.54	727.84	14.09	1.55	5.3	8.04
10623.00	3300	3.40	719.55	722.95	727.70	727.70	14.86	1.56	5.0	8.15
10624.00	3300	5.46	719.54	725.00	727.69	727.69	14.81	1.65	7.1	8.15
10724.00	3300	3.59	719.04	722.63	727.70	727.70	14.35	1.55	5.1	8.66
10725.00	3300	3.05	717.90	720.95	726.56	726.56	17.21	1.62	4.7	8.66
10830.00	3300	4.20	717.80	722.02	723.15	728.10	12.03	1.49	5.7	10.3
10900.00	3300	3.19	717.52	720.71	723.82	723.82	14.57	1.54	4.7	6.3
11191.00	3300	3.65	716.35	720.00	723.85	723.85	12.65	1.49	5.1	7.5
11491.00	3300	3.44	714.99	718.43	722.49	722.49	13.56	1.51	5.0	7.5
11791.00	3300	3.40	713.63	717.04	721.13	721.13	13.70	1.52	4.9	7.5
12091.00	3300	3.40	712.27	715.67	719.77	719.77	13.72	1.52	4.9	7.5
12430.00	3300	3.40	710.74	714.14	718.24	718.24	13.72	1.52	4.9	7.5
12730.00	3300	3.48	709.45	712.93	716.95	716.95	13.38	1.51	5.0	7.5
13030.00	3300	3.45	708.16	711.61	715.66	715.66	13.50	1.51	5.0	7.5
13330.00	3300	3.46	706.87	710.33	714.37	714.37	13.48	1.51	5.0	7.5
13630.00	3300	3.45	705.58	709.03	713.08	713.08	13.51	1.51	5.0	7.5
13930.00	3300	3.46	704.29	707.75	711.79	711.79	13.48	1.51	5.0	7.5
14230.00	3300	3.46	703.00	706.46	710.50	710.50	13.49	1.51	5.0	7.5
14500.00	3300	3.45	701.84	705.28	709.34	709.34	13.52	1.51	5.0	7.5
14900.00	3300	3.45	700.12	703.57	707.62	707.62	13.49	1.51	5.0	7.5
15130.00	3300	3.45	699.13	702.58	706.63	706.63	13.50	1.51	5.0	7.5
15430.00	3300	3.46	697.84	701.30	705.34	705.34	13.48	1.51	5.0	7.5
15730.00	3300	3.45	696.55	700.00	704.05	704.05	13.51	1.51	5.0	7.5
16030.00	3300	3.46	695.26	698.72	702.76	702.76	13.48	1.51	5.0	7.5
16330.00	3300	3.45	693.97	697.42	701.47	701.47	13.51	1.51	5.0	7.5
16630.00	3300	3.46	692.68	696.14	700.18	700.18	13.48	1.51	5.0	7.5
16930.00	3300	3.45	691.39	694.84	698.89	698.89	13.51	1.51	5.0	7.5
17230.00	3300	3.46	690.10	693.56	697.60	697.60	13.49	1.51	5.0	7.5
17410.00	3300	3.45	689.32	692.77	696.82	696.82	13.51	1.51	5.0	7.5

TABLE 5
BRIDGE INFORMATION DESIGN Q=3300 CFS.

CHANNEL STATION	BRIDGE ID.	UPSTREAM INFO.		BRIDGE INFO.				DOWNSTREAM INFO.	
		DEPTH (FT.)	VELOCIT (FPS)	BRIDGE AREA (SQ.FT.)	DEPTH AT UPSTREAM FACE (FT.)	Q PASSING THRU BRIDGE (CFS)	Q OVERTOPPING ROADWAY (CFS)	DEPTH (FT.)	VELOCITY (FPS)
19+37 *		3.9	13.7						
25+32	WASHINGTON	3.9	13.7						
25+72	BRIDGE			437	5.5	3300	0		
26+52								3.6	14.1
33+12 *								3.6	14.9
33+12 *		3.6	14.9						
51+47	BONANZA	3.8	13.9						
51+68	5(10'X5')			250	6.3	3300	0		
52+68	RCB.							7.4	8.6
52+90								3.0	18.0
58+90 *								3.2	19.9
58+08 *		3.6	14.8						
76+62	STEWART	4.3	11.9						
77+47	8(10'X3.5')			280	4.8	3300	0		
78+47	RCB.							6.8	7.0
80+49								3.1	17.3
83+49 *								3.7	14.2
101+49 *		3.9	13.5						
105+74	CHARLESTON	3.8	14.1						
106+23	BRIDGE	3.4	14.9						
106+24				437	5.5	3300	0		
107+24								3.6	14.4
107+25								3.1	17.2
108+30								4.3	12.0
117+91 *								3.4	13.7

* TYPICAL CHANNEL CROSS SECTIONS

TABLE 6
HYDRAULIC CHARACTERISTICS OF SLOAN CHANNEL/EXISTING DESIGN DRAWINGS
DESIGN FLOW (Q = 6000 cfs)

STATION	FLOW	DEPTH	INV.ELV	CWSEL	RB.ELV	LB.ELV	VCH	FB	FB+DEPTH	CH.DEPTH
137.48	6000	6.55	771.47	778.02	778.77	778.77	13.54	1.63	8.2	7.3
437.48	6000	5.64	770.31	775.96	777.61	777.61	16.12	1.72	7.4	7.3
737.48	6000	5.51	769.16	774.67	776.46	776.46	16.54	1.73	7.2	7.3
1037.50	6000	5.47	768.00	773.47	775.30	775.30	16.70	1.74	7.2	7.3
1337.50	6000	5.45	766.85	772.30	774.15	774.15	16.78	1.74	7.2	7.3
1637.50	6000	5.44	765.69	771.13	772.99	772.99	16.81	1.74	7.2	7.3
1937.50	6000	5.43	764.54	769.97	771.84	771.84	16.83	1.74	7.2	7.3
2237.50	6000	5.43	763.38	768.81	770.68	770.68	16.84	1.74	7.2	7.3
2532.20	6000	5.42	762.25	767.67	769.55	769.55	16.85	1.74	7.2	7.3
2572.70	6000	8.01	762.10	770.11	769.40	769.40	13.01	1.65	9.7	7.3
2652.70	6000	8.34	761.80	770.14	768.70	768.70	9.87	1.50	9.8	6.9
2712.20	6000	5.62	761.36	766.98	768.33	768.33	16.19	1.72	7.3	6.97
3012.20	6000	5.25	759.83	765.08	766.80	766.80	17.51	1.76	7.0	6.97
3312.20	6000	5.12	758.30	763.42	765.27	765.27	18.01	1.78	6.9	6.97
3612.20	6000	5.06	756.77	761.85	763.74	763.74	18.24	1.78	6.8	6.97
3912.20	6000	5.04	755.24	760.28	762.21	762.21	18.32	1.79	6.8	6.97
4121.00	6000	5.03	754.17	759.20	761.14	761.14	18.38	1.79	6.8	6.97
4222.00	6000	5.03	753.66	758.69	760.63	760.63	18.39	1.79	6.8	6.97
4512.20	6000	4.99	752.13	757.12	759.10	759.10	18.53	1.79	6.8	6.97
4812.20	6000	4.99	750.60	755.59	757.57	757.57	18.50	1.79	6.8	6.97
5100.00	6000	5.00	749.13	754.13	756.10	756.10	18.48	1.79	6.8	6.97
5147.30	6000	9.32	748.94	758.26	755.90	755.91	9.03	1.48	10.8	6.97
5168.30	6000	9.39	747.50	754.52	756.89	754.47	15.73	1.83	11.2	6.97
5268.30	6000	7.37	746.80	757.65	754.00	754.00	17.30	1.84	9.2	7.2
5290.10	6000	4.26	746.86	751.12	753.79	753.79	20.30	1.82	6.1	6.93
5484.00	6000	4.38	745.40	749.78	752.34	752.34	20.52	1.84	6.2	6.94
5590.10	6000	4.42	744.61	749.02	751.55	751.55	20.60	1.85	6.3	6.94
5890.10	6000	4.47	742.36	746.82	749.30	749.30	20.77	1.86	6.3	6.94
6190.10	6000	4.48	740.11	744.58	747.05	747.05	20.86	1.86	6.3	6.94
6208.70	6000	4.47	739.93	744.40	746.87	746.87	20.93	1.86	6.3	6.94
6508.70	6000	4.88	738.46	743.35	745.40	745.40	18.96	1.80	6.7	6.94
6808.70	6000	5.02	736.99	742.01	743.93	743.93	18.34	1.79	6.8	6.94
7108.70	6000	5.07	735.52	740.60	742.46	742.46	18.24	1.78	6.9	6.94
7480.00	6000	5.06	733.70	738.77	740.64	740.64	18.24	1.78	6.8	6.94
7584.70	6000	5.06	733.19	738.26	740.13	740.13	18.23	1.78	6.8	6.94
7662.60	6000	8.29	732.80	741.09	739.10	739.10	10.21	1.52	9.8	6.3
7747.50	6000	7.14	732.19	739.33	738.49	738.49	15.34	1.74	8.9	6.3
7847.50	6000	10.24	731.30	741.54	737.60	737.60	8.07	1.44	11.7	6.3
8049.30	6000	4.44	730.45	734.89	736.75	736.75	21.01	1.86	6.3	6.3
8156.70	6000	4.69	730.00	734.69	736.30	736.70	19.78	1.83	6.5	6.7

(Cont.)

TABLE 6 (Cont.)
HYDRAULIC CHARACTERISTICS OF SLOAN CHANNEL/EXISTING DESIGN DRAWINGS
DESIGN FLOW (Q = 6000 cfs)

STATION	FLOW	DEPTH	INV.ELV	CWSEL	RB.ELV	LB.ELV	VCH	FB	FB+DEPTH	CH.DEPTH
8349.30	6000	5.00	729.19	734.43	735.49	735.89	17.34	1.74	6.7	6.7
8649.30	6000	5.23	727.92	733.18	734.22	734.62	17.28	1.75	7.0	6.7
8949.30	6000	5.26	726.65	731.93	732.95	733.35	17.26	1.75	7.0	6.7
9249.30	6000	5.27	725.39	730.66	731.69	732.09	17.27	1.75	7.0	6.7
9549.30	6000	5.27	724.12	729.39	730.42	730.82	17.27	1.75	7.0	6.7
9849.30	6000	5.27	722.86	728.13	729.16	729.56	17.28	1.75	7.0	6.7
10149.00	6000	5.41	721.70	727.10	728.00	728.40	16.78	1.74	7.1	6.7
10423.00	6000	5.44	720.43	725.87	728.88	728.13	17.08	1.75	7.2	7.7
10574.00	6000	5.44	719.80	725.24	728.54	727.84	17.13	1.75	7.2	8.04
10623.00	6000	6.31	719.55	725.86	727.70	727.70	13.58	1.63	7.9	8.15
10624.00	6000	7.90	719.54	727.44	727.69	727.69	12.77	1.64	9.5	8.15
10724.00	6000	8.59	719.04	727.63	727.70	727.70	9.68	1.50	10.1	8.66
10725.00	6000	4.78	717.90	722.68	726.56	726.56	18.94	1.80	6.6	8.66
10830.00	6000	5.96	717.80	723.76	723.15	728.10	15.15	1.69	7.6	10.3
10900.00	6000	4.53	717.52	722.05	723.82	723.82	17.74	1.73	6.3	6.3
11191.00	6000	5.01	716.35	721.36	723.85	723.85	16.06	1.69	6.7	7.5
11491.00	6000	4.88	714.99	719.87	722.49	722.49	16.59	1.70	6.6	7.5
11791.00	6000	4.81	713.63	718.44	721.13	721.13	16.85	1.71	6.5	7.5
12091.00	6000	4.78	712.27	717.06	719.77	719.77	16.94	1.71	6.5	7.5
12430.00	6000	4.77	710.74	715.51	718.24	718.24	16.98	1.71	6.5	7.5
12730.00	6000	4.84	709.45	714.29	716.95	716.95	16.72	1.71	6.5	7.5
13030.00	6000	4.85	708.16	713.00	715.66	715.66	16.72	1.71	6.6	7.5
13330.00	6000	4.85	706.87	711.71	714.37	714.37	16.72	1.71	6.6	7.5
13630.00	6000	4.84	705.58	710.42	713.08	713.08	16.73	1.71	6.5	7.5
13930.00	6000	4.83	704.29	709.12	711.79	711.79	16.75	1.71	6.5	7.5
14230.00	6000	4.84	703.00	707.84	710.50	710.50	16.71	1.71	6.5	7.5
14500.00	6000	4.85	701.84	706.68	709.34	709.34	16.71	1.71	6.6	7.5
14900.00	6000	4.83	700.12	704.95	707.62	707.62	16.74	1.71	6.5	7.5
15130.00	6000	4.84	699.13	703.97	706.63	706.63	16.71	1.71	6.5	7.5
15430.00	6000	4.85	697.84	702.69	705.34	705.34	16.71	1.71	6.6	7.5
15730.00	6000	4.85	696.55	701.39	704.05	704.05	16.72	1.71	6.6	7.5
16030.00	6000	4.85	695.26	700.10	702.76	702.76	16.73	1.71	6.6	7.5
16330.00	6000	4.84	693.97	698.81	701.47	701.47	16.73	1.71	6.5	7.5
16630.00	6000	4.84	692.68	697.52	700.18	700.18	16.73	1.71	6.5	7.5
16930.00	6000	4.84	691.39	696.23	698.89	698.89	16.73	1.71	6.5	7.5
17230.00	6000	4.83	690.10	694.93	697.60	697.60	16.75	1.71	6.5	7.5
17410.00	6000	4.84	689.32	694.16	696.82	696.82	16.72	1.71	6.5	7.5

TABLE 7
BRIDGE INFORMATION DESIGN Q = 6000 CFS.

CHANNEL STATION	BRIDGE ID.	UPSTREAM INFO		BRIDGE INFO.				DOWNSTREAM INFO.	
		DEPTH (FT.)	VELOCIT (FPS)	BRIDGE AREA (SQ.FT.)	DEPTH AT UPSTREAM FACE (FT.)	Q PASSING THRU BRIDGE (CFS)	Q OVERTOPPING ROADWAY (CFS)	DEPTH (FT.)	VELOCITY (FPS)
19+37 *		5.4	16.8						
25+32	WASHINGTON	5.4	16.9						
25+72	BRIDGE			437	8.0	5689	319		
26+52								8.3	9.9
27+12								5.6	16.2
33+12 *								5.1	18.2
33+12 *		5.1	18.2						
51+47	BONANZA	9.3	9.0						
51+68	5(10'X5')			250	9.4	3932	2074		
52+68	RCB							10.9	10.6
52+90								4.3	22.2
58+90 *								4.5	21.0
58+08 *		5.0	18.4						
76+62	STEWART	8.3	10.2						
77+47	8(10'X3.5')			280	7.1	4296	1727		
78+47	RCB.							10.2	8.1
80+49								4.4	21.0
83+49 *								5.0	18.4
101+49 *		5.4	16.8						
105+74	CHARLESTON	5.4	17.1						
106+23	BRIDGE	6.3	13.6						
106+24				437	7.9	5580	419		
107+24								8.6	9.7
107+25								4.8	18.9
108+30								4.4	11.9
117+91 *								5.0	16.1

* TYPICAL CHANNEL CROSS SECTIONS

TABLE 8

SLOAN CHANNEL 7320 LINEAR FEET
PHASE I - OWENS TO STEWART
PRELIMINARY COST ESTIMATE

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	EXTENSION
OVEREXCAVATION	CY	54,900	$4.00	$219,600
IMPORTED DRAIN BACKFILL	CY	12,444	$10.00	$124,440
RECOMPACT NATIVE MATERIAL	CY	42,456	$1.50	$63,684
MAJOR SURFACE INLETS	EA	2	$50,000.00	$100,000
CHAIN LINK FENCE	LF	8,700	$10.00	$87,000
CHANNEL LINING	SF	668,316	$6.00	$4,009,896
		TOTAL		$4,604,620

SLOAN CHANNEL 7682 LINEAR FEET 60' B. WIDTH
PHASE II - STEWART TO LV WASH 1600 LINEAR FEET 70' B. WIDTH
PRELIMINARY COST ESTIMATE

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	EXTENSION
OVEREXCAVATION	CY	70,735	$4.00	$282,940
IMPORTED DRAIN BACKFILL	CY	16,099	$10.00	$160,994
RECOMPACT NATIVE MATERIAL	CY	54,636	$1.50	$81,953
MAJOR SURFACE INLETS	EA	3	$50,000.00	$150,000
CHAIN LINK FENCE	LF	13,300	$10.00	$133,000
CHANNEL LINING	SF	863,447	$6.00	$5,180,680
		TOTAL		$5,989,567

GRAND TOTAL PHASE I AND PHASE II $10,594,187

VIII. RECOMMENDATIONS AND CONCLUSIONS

The channel section proposed in the 1986 Boyle design has adequate capacity to safely convey the design flows of 3,300 cfs and 6,000 cfs with freeboard except at the bridge and culvert crossings. The existing RCB culverts and bridges within the project limits have adequate capacity to convey the design flow of 3,300 cfs without overtopping. However, all of the culverts and bridges are overtopped for the design flow of 6,000 cfs. The flows that overtop the bridges at Washington Avenue and Charleston Boulevard are relatively minor (319 cfs and 419 cfs, respectively) in respect to the design flow of 6,000 cfs. These flows could be diverted back into the Sloan Channel via a surface inlet constructed within the Sloan Lane right-of-way.

The overtopping flows at the culverts at Bonanza Road and Stewart Avenue for the flow of 6,000 cfs are significant (2,074 cfs and 1,727 cfs, respectively). However, the Confluence Detention Basin is currently under design and is scheduled for a construction start in 1994. The Confluence Detention Basin will reduce the design flow for the Sloan Channel to 3,300 cfs. Based on this information, the detention basin will be in place before the culverts at Bonanza Road and Stewart Avenue could be redesigned and reconstructed. Therefore, the existing facilities are recommended to be left in place.

Provisions to accept local inflows into the Sloan Channel need to be incorporated into the design drawings. Significant inflows will be incurred at the points shown on Table 1 and Table 2. Future Master Plan facilities will eventually reduce the magnitude of the local inflows at some points. The surface inlets shown in the 1986 design were most likely sized for flows determined using hydrologic criteria which is not currently accepted. The surface inlets need to be reanalyzed to account for the updated local inflows and flow patterns presented in this memorandum. Major surface inlets need to be constructed on the east side of the channel at Owens Avenue and Washington Avenue, on the east and west side of the channel at Stewart

Avenue, and on the east side of the channel at Charleston Boulevard. Major surface inlets at existing roadway crossings should be similar in design to the existing surface inlet at Bonanza Road. This inlet consists of a warped pavement section for Sloan Lane adjacent to the Sloan Channel (and a depressed section of curb and gutter and sidewalk to act as the surface inlet. Minor surface inlets or, inlets at inflow points not associated with the major roadway crossing, should be similar to the surface inlets shown on the 1986 design. These inlets will consist of a depressed section of channel lining and upstream erosion protection to prevent undermining of the channel lining. The size and configuration of each inlet will be determined by the amount of inflow, allowable inlet velocities, and local topographic features. Provisions also need to be made to protect the proposed channel improvements from storm flows which are discharged directly into the Sloan Channel from adjacent residential developments.

The 1986 Sloan Channel design does not meet the currently accepted CCRFCD criteria for open channel design for the following items: steel area, transverse and longitudinal cutoff walls, safety ladders, and side slopes.

Based on work performed in the preparation of this Predesign Memorandum, the following recommendations are made:

- Based on the magnitude of the design flows for the Sloan Channel, the portion of Sloan Channel from Owens Avenue to the Las Vegas Wash confluence must be improved as a fully-lined, concrete trapezoidal channel. The existing, earth-lined channel section does not have adequate capacity to safely convey the design flows. The recommended improvements will protect the existing bridge and culvert structures at the major roadway crossings and will protect the surrounding residential developments.

- New design drawing for the Sloan Channel should be prepared that will incorporate current design standards, the updated soils information, and

current development conditions. The updated channel design will include 2:1 (H:V) side slopes, transverse and longitudinal cutoff walls, safety ladders, and steel areas per CCRFCD criteria. Portions of the longitudinal cutoff wall on the west side of the channel could be omitted where the channel will be protected from surface inflows by existing masonry walls. A low flow channel will also be incorporated into the channel design in order to contain nuisance flows in the center of the channel.

- No new bridges or modifications to existing culvert structures are recommended at this time. The existing culverts and bridges have capacity to convey the design flow of 3,300 cfs within the proposed channel sections. Regional facilities will soon be constructed that will limit the upstream inflow into this portion of the Sloan Channel to 3,300 cfs.

- The existing storm drain stubs for future Master Plan storm drains should not be constructed or reconstructed at this time, but rather should be placed at such a time that the future Master Plan facilities are designed.

- Surface runoff approaching the Sloan Channel from the west at Stewart Avenue can be introduced to the Sloan Channel either by perpetuating the existing flow pattern across an undeveloped parcel, or by constructing a channel parallel to Stewart Avenue along the frontage of the vacant parcel to the Sloan Channel. Presently, major storm flows in Stewart Avenue from the west are introduced into the Sloan Channel via an existing wash which bisects an undeveloped parcel located in the southwest quadrant of Sloan Channel and Stewart Avenue. The existing wash could be partially filled and regraded in order to improve the hydraulics of the confluence with Sloan Channel. The invert of the wash should be raised sufficiently so that minor flows conveyed in the Sloan Channel would not inundate this property. The wash should be concrete lined within the right-of-way for Sloan Channel with a concrete cutoff wall at the right-of-way line to prevent undermining the lining. An

easement would be required through this property to construct these improvements.

Runoff in Stewart Avenue could also be conveyed into the Sloan Channel by construction an interceptor channel along the south side of Stewart Avenue adjacent to the vacant parcel. In this option, the channel would act as a side weir to remove flows from Stewart Avenue. This option would require the construction of a warped pavement section in Stewart Avenue to force flows into the interceptor channel. The exact size and configuration of the channel can be determined when more detailed topographic data is available. Preliminary estimates indicated that a 20-foot wide, rectangular, concrete-lined channel at a slope of 0.4% could convey the 100-year flow of 580 cfs at a depth of 2.8 feet. The construction of this channel would require the acquisition of some right-of-way from the vacant parcel.

The construction of the channel along the south side of Stewart Avenue is recommended for construction. This channel will provide a one-time solution to the introduction of surface flows into the Sloan Channel at this location. Whereas, the improvements to the existing wash across the vacant parcel would only be a temporary solution. In the future, if an upsized storm drain is constructed within Stewart Avenue, it could be connected to the proposed channel.

The HEC-1 model prepared to identify local inflows into the Sloan Channel within the project limits for existing conditions suggests that local inflows into the Sloan Channel may exceed the design flow of 3,300 cfs in the middle and lower reaches of the project. A preliminary analysis of the entire watershed that contributes local inflows to the Sloan Channel south of the Confluence Detention Basin (Carey Avenue) indicates that the accumulation of local inflows into the channel will exceed 3,300 cfs as far north as Bonanza Road. A detailed hydrologic analysis of the local watershed for the Sloan Channel

north of Owens Avenue is beyond the scope of this Predesign Memorandum. While it appears that the existing structures will convey these flows, Clark County may want to perform a detailed hydrologic analysis for the Sloan Channel watershed to insure that the future culvert structure at Sahara Avenue is adequately sized.

Hydraulic Analysis

The water surface profile for the Sloan Channel was computed for supercritical and subcritical flow conditions beginning with critical flow depth approximately 137 feet downstream from the Owens Avenue RCB culvert. The channel stationing starts at 1+37.48 per the 1986 channel design drawing Boyle provided by Clark County Public Works.

The cross section locations are taken from the above mentioned design drawing. The cross section numbers in the HEC-2 model correspond to the channel stationing. Cross sections were taken at 300 foot intervals through the length of the channel. Additional sections were taken at grade breaks, transitions and culvert crossings. The channel cross section geometry and channel flow line were matched as closely as possible to the Boyle design mentioned above.

The design flows to be used in the HEC-2 model were established by the contract as 3,300 cfs and 6,000 cfs.

To evaluate the existing culverts and bridges, the special bridge routine was selected.

The computed water surface elevations and hydraulic characteristics of the channel 3,300 cfs and 6,000 cfs are shown in Table C1 and Table C2. A printout of each HEC-2 model run is also contained in this Appendix.

Channel Capacity

Per existing design drawings from Station 0+00 to Station 105+74, and from Station 125+30 to end of channel, the channel bottom width is 60 feet, the side slopes are 1.5:1 (H:V), and the depth varies from 6 feet to 7.5 feet. From Station 108+30 to Station 124+30 the channel bottom width is 70 feet, the side slopes are 1.5:1 (H:V), and the depth varies from 5.3 feet to 7.5 feet. The analysis shows the design flow of 3,300 cfs is contained in the typical channel section and meets the CCRFCD freeboard requirements. The invert slope of the channel is sufficient to maintain supercritical flow for both design

flows. The existing bridges and culverts will cause a backwater effect immediately upstream from these structures. The backwater effect will cause the flow to pass from supercritical to subcritical for a short distance upstream from the structures. The channel flows do not have sufficient energy to sustain a strong hydraulic jump. An undular jump (Fr = $1 < x < 1.7$) can be expected upstream from the bridges and culverts.

The super-elevation of the water surface for both design flows caused by the reverse curve in the channel alignment located south of Charleston Boulevard was calculated per Equation 730 of the Manual. The calculated super-elevations in the reverse curve for 3,300 cfs and 6,000 cfs is on the order of 0.6 feet and 1.0 feet, respectively.

The design flow of 6,000 cfs is contained within a typical section of the Sloan Channel without freeboard.

Bridge and Culvert Capacity

To evaluate the bridge and culvert capacities, the special bridge routine was used in the HEC-2 analysis. The design flow of 3,300 cfs passes through the Washington and Charleston bridges as Class B low flow, and passes through the Bonanza Road and Stewart Avenue culverts as pressure flow.

The design flow of 6,000 cfs passes through and overflows the above mentioned bridges and culverts as pressure and weir flow. The restriction of flow at the bridges and culverts will cause a backwater upstream from these structures, and will cause overflow from the channel onto adjacent properties and streets.

A summary of bridge information and ponding depth is shown in Table C3 and Table C4 for the 3,300 cfs and the 6,000 cfs design flows.

TABLE B2
LOCAL INFLOW INTO SLOAN CHANNEL
EXISTING CONDITION

Point Location*	Cross Street	INFLOW (cfs) East 10-Year	East 100-Year	West 10-Year	West 100-Year
1	Monroe Ave.	31	99		
2	Washington Ave.	505	1339		
3	Harris Ave.	5	39		
4	Bonanza Road	449	1232		
5	Stewart Ave.	178	665	169	579
6	Sunrise Ave.	44	133		
7	Charleston Blvd.	161	470	57	146
8	--	11	59	33	64
9	--	532	1206	10	22
10	Sahara Ave.	57	164	20	45
11	--	101	208	28	63

TABLE B3
LOCAL INFLOW INTO SLOAN CHANNEL
ULTIMATE DEVELOPMENT CONDITION

Point Location*	Cross Street	INFLOW (cfs) East 10-Year	East 100-Year	West 10-Year	West 100-Year
1	Monroe Ave.	31	99		
2	Washington Ave.	177	449		
3	Harris Ave.	5	39		
4	Bonanza Road	77	356		
5	Stewart Ave.	169	579	169	579
6	Sunrise Ave	44	133		
7	Charleston Blvd.	46	233	57	146
8	--	11	59	33	64
9	--	532	1206	10	22
10	Sahara Ave.	57	164	20	45
11	--	101	208	28	63

TABLE C1

HYDRAULIC CHARACTERISTICS OF SLOAN CHANNEL/EXISTING DESIGN DRAWINGS

DESIGN FLOW (Q = 3300 cfs)

STATION	FLOW	DEPTH	INV.ELV	CWSEL	LB.ELV	LB.ELV	VCH	FB	FB+DEPTH	ICH.DEPTH
137.48	3300	4.54	771.47	776.01	778.77	778.77	11.37	1.47	6.0	7.3
437.48	3300	3.86	770.31	774.17	777.61	777.61	13.67	1.54	5.4	7.3
737.48	3300	3.85	769.16	773.01	776.46	776.46	13.67	1.54	5.4	7.3
1037.50	3300	3.85	768.00	771.86	775.30	775.30	13.68	1.54	5.4	7.3
1337.50	3300	3.85	766.85	770.70	774.15	774.15	13.66	1.54	5.4	7.3
1637.50	3300	3.85	765.69	769.55	772.99	772.99	13.67	1.54	5.4	7.3
1937.50	3300	3.85	764.54	768.39	771.84	771.84	13.66	1.54	5.4	7.3
2237.50	3300	3.85	763.38	767.24	770.68	770.68	13.67	1.54	5.4	7.3
2532.20	3300	3.86	762.25	766.11	769.55	769.55	13.66	1.54	5.4	7.3
2572.70	3300	5.54	762.10	767.64	769.40	769.40	12.98	1.57	7.1	7.3
2652.70	3300	3.61	761.80	765.41	768.70	768.70	14.10	1.54	5.2	6.9
2712.20	3300	4.48	761.36	765.84	768.33	768.33	11.53	1.48	6.0	6.97
3012.20	3300	3.60	759.83	763.43	766.80	766.80	14.75	1.57	5.2	6.97
3312.20	3300	3.57	758.30	761.88	765.27	765.27	14.90	1.57	5.1	6.97
3612.20	3300	3.56	756.77	760.33	763.74	763.74	14.94	1.57	5.1	6.97
3912.20	3300	3.56	755.24	758.80	762.21	762.21	14.95	1.57	5.1	6.97
4121.00	3300	3.56	754.17	757.73	761.14	761.14	14.95	1.57	5.1	6.97
4222.00	3300	3.56	753.66	757.22	760.63	760.63	14.95	1.57	5.1	6.97
4512.20	3300	3.54	752.13	755.66	759.10	759.10	15.07	1.57	5.1	6.97
4812.20	3300	3.57	750.60	754.16	757.57	757.57	14.93	1.57	5.1	6.97

TABLE C1 Continue
HYDRAULIC CHARACTERISTICS OF SLOAN CHANNEL/EXISTING DESIGN DRAWINGS
SUPERCRITICAL FLOW (Q = 3300 cfs)

STATION	FLOW	DEPTH	INV.ELV	CWSEL	LB.ELV	LB.ELV	VCH	FB	FB+DEPTH	ICH.DEPTH
5100.00	3300	3.56	749.13	752.69	756.10	756.10	14.96	1.57	5.1	6.97
5147.30	3300	3.81	748.94	752.75	755.90	755.91	13.87	1.54	5.4	6.97
5168.30	3300	6.30	747.50	753.80	754.46	754.47	13.20	1.61	7.9	6.97
5268.30	3300	7.37	746.80	754.17	754.00	754.00	8.62	1.42	8.8	7.2
5290.10	3300	3.02	746.86	749.88	753.79	753.79	17.98	1.65	4.7	6.93
5484.00	3300	3.15	745.40	748.56	752.34	752.34	17.18	1.63	4.8	6.94
5590.10	3300	3.15	744.61	747.78	751.55	751.55	17.09	1.63	4.8	6.94
5890.10	3300	3.20	742.36	745.55	749.30	749.30	16.89	1.62	4.8	6.94
6190.10	3300	3.20	740.11	743.30	747.05	747.05	16.91	1.62	4.8	6.94
6208.70	3300	3.17	739.93	743.11	746.87	746.87	17.01	1.62	4.8	6.94
6508.70	3300	3.59	738.46	742.06	745.40	745.40	14.79	1.57	5.2	6.94
6808.70	3300	3.59	736.99	740.59	743.93	743.93	14.77	1.57	5.2	6.94
7108.70	3300	3.59	735.52	739.12	742.46	742.46	14.76	1.57	5.2	6.94
7480.60	3300	3.60	733.70	737.31	740.64	740.64	14.75	1.57	5.2	6.94
7584.70	3300	3.60	733.19	736.80	740.13	740.13	14.75	1.57	5.2	6.94
7662.60	3300	4.31	732.80	737.11	739.10	739.10	11.94	1.49	5.8	6.3
7747.50	3300	4.79	732.19	736.98	738.49	738.49	11.79	1.50	6.3	6.3
7847.50	3300	6.81	731.30	738.11	737.60	737.60	7.03	1.33	8.1	6.3
8049.30	3300	3.11	730.45	733.56	736.75	736.75	17.34	1.63	4.7	6.3
8156.70	3300	3.39	730.00	733.39	736.30	736.70	15.73	1.59	5.0	6.7

TABLE C1 Continue

HYDRAULIC CHARACTERISTICS OF SLOAN CHANNEL/EXISTING DESIGN DRAWINGS

SUPERCRITICAL FLOW (Q = 3300 cfs)

STATION	FLOW	DEPTH	INV.ELV	CWSEL	LB.ELV	LB.ELV	VCH	FB	FB+DEPTH	
8349.30	3300	3.70	729.19	732.89	735.49	735.89	14.23	1.55	5.3	6.7
8649.30	3300	3.75	727.92	731.67	734.22	734.62	14.00	1.54	5.3	6.7
8949.30	3300	3.75	726.65	730.40	732.95	733.35	14.02	1.54	5.3	6.7
9249.30	3300	3.75	725.39	729.14	731.69	732.09	14.02	1.54	5.3	6.7
9549.30	3300	3.75	724.12	727.87	730.42	730.82	14.03	1.54	5.3	6.7
9849.30	3300	3.75	722.86	726.60	729.16	729.56	14.03	1.54	5.3	6.7
10149.00	3300	3.89	721.70	725.58	728.00	728.40	13.41	1.53	5.4	6.7
10423.00	3300	3.79	720.43	724.22	728.08	728.13	14.09	1.55	5.3	7.7
10574.00	3300	3.79	719.80	723.59	726.54	727.84	14.09	1.55	5.3	8.04
10623.00	3300	3.40	719.55	722.95	727.70	727.70	14.86	1.56	5.0	8.15
10624.00	3300	5.46	719.54	725.00	727.69	727.69	14.81	1.65	7.1	8.15
10724.00	3300	3.59	719.04	722.63	727.70	727.70	14.35	1.55	5.1	8.66
10725.00	3300	3.05	717.90	720.95	726.56	726.56	17.21	1.62	4.7	8.66
10830.00	3300	4.20	717.80	722.02	723.15	728.10	12.03	1.49	5.7	10.3
10900.00	3300	3.19	717.52	720.71	723.82	723.82	14.57	1.54	4.7	6.3
11191.00	3300	3.65	716.35	720.00	723.85	723.85	12.65	1.49	5.1	7.5
11491.00	3300	3.44	714.99	718.43	722.49	722.49	13.56	1.51	5.0	7.5
11791.00	3300	3.40	713.63	717.04	721.13	721.13	13.78	1.52	4.9	7.5
12091.00	3300	3.40	712.27	715.67	719.77	719.77	13.72	1.52	4.9	7.5
12430.00	3300	3.40	710.74	714.14	718.24	718.24	13.72	1.52	4.9	7.5

abutment

TABLE C2
HYDRAULIC CHARACTERISTICS OF SLOAN CHANNEL/EXISTING DESIGN DRAWINGS
DESIGN FLOW (Q = 6000 cfs)

STATION	FLOW	DEPTH	INV.ELV	CWSEL	LB.ELV	LB.ELV	VCH	FB	FB+DEPTH	ICH.DEPTH	
137.48	6000	6.55	771.47	778.02	778.77	778.77	13.54	1.63	8.2	7.3	6.6
437.48	6000	5.64	770.31	775.96	777.61	777.61	16.12	1.72	7.4	7.3	5.6
737.48	6000	5.51	769.16	774.67	776.46	776.46	16.54	1.73	7.2	7.3	
1037.50	6000	5.47	768.00	773.47	775.30	775.30	16.70	1.74	7.2	7.3	
1337.50	6000	5.45	766.85	772.30	774.15	774.15	16.78	1.74	7.2	7.3	
1637.50	6000	5.44	765.69	771.13	772.99	772.99	16.81	1.74	7.2	7.3	
1937.50	6000	5.43	764.54	769.97	771.84	771.84	16.83	1.74	7.2	7.3	
2237.50	6000	5.43	763.38	768.81	770.68	770.68	16.84	1.74	7.2	7.3	
2532.20	6000	5.42	762.25	767.67	769.55	769.55	16.85	1.74	7.2	7.3	
2572.70	6000	8.81	762.10	770.11	769.40	769.40	13.81	1.65	9.7	7.3	8.0
2652.70	6000	8.34	761.80	770.14	768.70	768.70	9.87	1.50	9.8	6.9	8.3
2712.20	6000	5.62	761.36	766.98	768.33	768.33	16.19	1.72	7.3	6.97	5.6
3012.20	6000	5.25	759.83	765.08	766.80	766.80	17.51	1.76	7.0	6.97	
3312.20	6000	5.12	758.30	763.42	765.27	765.27	18.01	1.78	6.9	6.97	
3612.20	6000	5.06	756.77	761.85	763.74	763.74	18.24	1.78	6.8	6.97	
3912.20	6000	5.04	755.24	760.28	762.21	762.21	18.32	1.79	6.8	6.97	
4121.00	6000	5.03	754.17	759.20	761.14	761.14	18.38	1.79	6.8	6.97	
4222.00	6000	5.03	753.66	758.69	760.63	760.63	18.39	1.79	6.8	6.97	
4512.20	6000	4.99	752.13	757.12	759.10	759.10	18.53	1.79	6.8	6.97	
4812.20	6000	4.99	750.60	755.59	757.57	757.57	18.50	1.79	6.8	6.97	

TABLE C2 CONTINUE
HYDRAULIC CHARACTERISTICS OF SLOAN CHANNEL/EXISTING DESIGN DRAWINGS
DESIGN FLOW (Q = 6000 cfs)

STATION	FLOW	DEPTH	INV.ELV	CWSEL	LB.ELV	LB.ELV	VCH	FB	FB+DEPTH	CH.DEPTH	
5100.00	6000	5.00	749.13	754.13	756.10	756.10	18.48	1.79	6.8	6.97	
5147.30	6000	9.32	748.94	758.26	755.90	755.91	9.03	1.48	10.8	6.97	9.3
5168.30	6000	9.39	747.50	754.52	756.89	754.47	15.73	1.83	11.2	6.97	9.4
5268.30	6000	7.37	746.80	757.65	754.00	754.00	17.30	1.84	9.2	7.2	7.4
5290.10	6000	4.26	746.86	751.12	753.79	753.79	20.30	1.82	6.1	6.93	
5484.00	6000	4.38	745.40	749.78	752.34	752.34	20.52	1.84	6.2	6.94	
5590.10	6000	4.42	744.61	749.02	751.55	751.55	20.60	1.85	6.3	6.94	
5890.10	6000	4.47	742.36	746.82	749.30	749.30	20.77	1.86	6.3	6.94	
6190.10	6000	4.48	740.11	744.58	747.05	747.05	20.86	1.86	6.3	6.94	
6208.70	6000	4.47	739.93	744.40	746.87	746.87	20.93	1.86	6.3	6.94	
6508.70	6000	4.88	738.46	743.35	745.40	745.40	18.96	1.80	6.7	6.94	
6808.70	6000	5.02	736.99	742.01	743.93	743.93	18.34	1.79	6.8	6.94	
7108.70	6000	5.07	735.52	740.60	742.46	742.46	18.24	1.78	6.9	6.94	
7480.00	6000	5.06	733.70	738.77	740.64	740.64	18.24	1.78	6.8	6.94	
7584.70	6000	5.06	733.19	738.26	740.13	740.13	18.23	1.78	6.8	6.94	
7662.60	6000	8.29	732.80	741.09	739.10	739.10	10.21	1.52	9.8	6.3	8.3
7747.50	6000	7.14	732.19	739.33	738.49	738.49	15.34	1.74	8.9	6.3	7.1
7847.50	6000	10.24	731.30	741.54	737.60	737.60	8.07	1.44	11.7	6.3	10.2
8049.30	6000	4.44	730.45	734.89	736.75	736.75	21.01	1.86	6.3	6.3	
8156.70	6000	4.69	730.00	734.69	736.30	736.70	19.78	1.83	6.5	6.7	

TABLE C2 CONTINUE

HYDRAULIC CHARACTERISTICS OF SLOAN CHANNEL/EXISTING DESIGN DRAWINGS

DESIGN FLOW (Q = 6000 cfs)

STATION	FLOW	DEPTH	INV.ELV	CWSEL	LB.ELV	LB.ELV	VCH	FB	FB+DEPTH	CH.DEPTH	
8349.30	6000	5.00	729.19	734.43	735.49	735.89	17.34	1.74	6.7	6.7	
8649.30	6000	5.23	727.92	733.18	734.22	734.62	17.28	1.75	7.0	6.7	
8949.30	6000	5.26	726.65	731.93	732.95	733.35	17.26	1.75	7.0	6.7	
9249.30	6000	5.27	725.39	730.66	731.69	732.09	17.27	1.75	7.0	6.7	
9549.30	6000	5.27	724.12	729.39	730.42	730.82	17.27	1.75	7.0	6.7	
9849.30	6000	5.27	722.86	728.13	729.16	729.56	17.28	1.75	7.0	6.7	
10149.00	6000	5.41	721.70	727.10	728.00	728.40	16.78	1.74	7.1	6.7	
10423.00	6000	5.44	720.43	725.87	728.88	728.13	17.08	1.75	7.2	7.7	
10574.00	6000	5.44	719.80	725.24	728.54	727.84	17.13	1.75	7.2	8.04	
10623.00	6000	6.31	719.55	725.86	727.70	727.70	13.58	1.63	7.9	8.15	
10624.00	6000	7.90	719.54	727.44	727.69	727.69	12.77	1.64	9.5	8.15	7.9
10724.00	6000	8.59	719.04	727.63	727.70	727.70	9.68	1.50	10.1	8.66	8.6
10725.00	6000	4.78	717.90	722.68	726.56	726.56	18.94	1.80	6.6	8.66	
10830.00	6000	5.96	717.80	723.76	723.15	728.10	15.15	1.69	7.6	10.3	
10980.00	6000	4.53	717.52	722.05	723.82	723.82	17.74	1.73	6.3	6.3	
11191.00	6000	5.01	716.35	721.36	723.85	723.85	16.06	1.69	6.7	7.5	
11491.00	6000	4.88	714.99	719.87	722.49	722.49	16.59	1.70	6.6	7.5	
11791.00	6000	4.81	713.63	718.44	721.13	721.13	16.85	1.71	6.5	7.5	
12091.00	6000	4.78	712.27	717.06	719.77	719.77	16.94	1.71	6.5	7.5	
12430.00	6000	4.77	710.74	715.51	718.24	718.24	16.98	1.71	6.5	7.5	

TABLE C3

BRIDGE INFORMATION DESIGN Q=3300 CFS.

STATION	BRIDGE ID.	UPSTREAM INFO DEPTH (FT.)	UPSTREAM INFO VELOCITY (FPS)	BRIDGE INFO B.AREA (SQFT)	BRIDGE INFO PONDING DEPTH (FT.)	BRIDGE INFO Q.THRU (CFS)	BRIDGE INFO WIER Q (CFS)
11937 *		3.86	13.66				
12532	WSHINGTON	3.86	13.66				
12572	BRIDGE			437	5.54	3300	0
12652							
13312 *							
13312 *		3.57	14.92				
15147	BANANZA	3.81	13.87				
15168	5(10'X5')			250	6.3	3300	0
	PCB.						
15268							
[illegible]00							
15890 *							
16888 *		3.59	14.77				
17662	STEWART	4.31	11.94				
17747	8(10'X3.5			280	4.79	3300	0
	RCB.						
17847							
18049							
18349 *							
110149 *		3.89	13.47				
110574	CHARESTON	3.8	14.08				
110623	BRIDGE	3.4	14.86				
110624				437	5.46	3300	0
110724							
110725							
110830							
111791 *							

* CHANNEL TYPICAL CROSS SECTIONS

TABLE C4

BRIDGE INFORMATION DESIGN Q=6000 CFS.

STATION		BRIDGE ID.	UPSTREAM INFO DEPTH (FT.)	UPSTREAM INFO VELOCITY (FPS)	BRIDGE INFO B.AREA (SQFT)	BRIDGE INFO PONDING DEPTH (FT.)	BRIDGE INFO Q.THRU (CFS)	BRIDGE INFO WIER Q (CFS)	DOWNSTREAM INFO. DEPTH (FT.)	DOWNSTREAM INFO. VELOCITY (FPS)
11937	*		5.43	16.83						
12532		WSHINGTON	5.42	16.85						
12572		BRIDGE			437	8.81	5683	319		
12652									8.34	9.87
12712									5.62	16.19
13312	*								5.06	18.24
13312	*		5.06	18.24						
15147		BANANZA	9.32	9.03						
15168		5(10'X5')			250	9.39	3932	2074		
		PCB.								
15268									10.85	10.6
15290									4.26	22.19
15890	*								4.47	21.04
16808	*		5.02	18.37						
17662		STEWART	8.29	10.21						
17747		8(10'X3.5			280	7.14	4296	1727		
		RCB.								
17847									10.24	8.07
18049									4.44	21.01
18349	*								5	18.36
110149	*		5.41	16.78						
110574		CHARESTON	5.44	17.13						
110623		BRIDGE	6.31	13.58						
110624					437	7.9	5580	419		
110724									8.59	9.68
110725									4.78	18.94
110830									4.36	11.91
111791	*								5.01	16.86

* CHANNEL TYPICAL CROSS SECTIONS

DATE

CLIENT CCPW JOB NO 500.710 CALC BY NCL

DESCRIPTION SLOAN CHANNEL - SUPERELEVATION CHECKED BY

SUPERELEVATION FOR REVERSE CURVES SOUTH OF CHARLESTON

EQ. 730 FROM THE CCRFCD MANUAL

$S_e = \frac{V^2 T_W}{g r}$ WHERE: S_e = SUPERELEVATION (ft)

T_W = TOP WIDTH OF FLOW (ft)

g = ACCEL. OF GRAVITY (ft/sec^2)

r = RADIUS OF CURVE (ft)

*CURVE 1 (STA 107+75.83 TO STA 111+91.30)

$r = 853.02$ ft

3300 cfs (X-SECT 10900)

$V = 14.57$ fps

$T_W = 80.97$ ft

$S_e = \frac{(14.57)^2 (80.97)}{(32.17)(853.02)} = 0.62$ ft

6000 cfs

$V = 17.74$ fps

$T_W = 86.14$ ft

$S_e = \frac{(17.74)^2 (86.14)}{(32.17)(853.02)} = 0.99$ ft

(CON'T.)

G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

DATE

CLIENT CCPW JOB NO. CALC BY NCI

DESCRIPTION SLOAN CHANNEL - SUPERELEVATION CHECKED BY

*CURVE 2 (STA 1116+00.30 TO 120+30.43)

r = 800 ft

3300 cfs (X-SECT 11791.00)

V = 13.70 ft

TW = 79.62 ft

$$S_e = \frac{(13.70)^2(79.62)}{(32.17)(800)} = \boxed{0.58 \text{ ft}}$$

6000 cfs

V = 16.85 fps

TW = 84.05 ft

$$S_e = \frac{(16.85)^2(84.05)}{(32.17)(800)} = \boxed{0.93 \text{ ft}}$$

EN-3-N

SHEET 2 OF 2

G.C. WALLACE, INC.
Engineering/Architecture
1555 SOUTH RAINBOW BLVD./LAS VEGAS, NEVADA 89102

SUBCRITICAL FLOW

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**********************************************
*  HEC-2 WATER SURFACE PROFILES              *
*                                            *
*  Version   4.6.2;  May 1991                *
*                                            *
*  RUN DATE    05APR93    TIME   10:27:13     *
**********************************************
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**************************************
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*  609 SECOND STREET, SUITE D        *
*  DAVIS, CALIFORNIA 95616-4687      *
*          (916) 756-1104            *
**************************************
```


```
X     X  XXXXXXX   XXXXX             XXXXX
X     X  X        X     X           X     X
X     X  X        X                       X
XXXXXXX  XXXX     X         XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX  XXXXX              XXXXXXX
```

THIS RUN EXECUTED 05APR93 10:27:18

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************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
************************************


T1      SLOAN CHANNEL HYDRAULICS
T2      FROM OWNES AVENUE TO LAS VEGAS WASH CONF
T3      SUBCRITICAL RUN            FILE:SLCH.SUB

J1  ICHECK    INQ      NINV     IDIR     STRT     METRIC   HVINS    Q        WSEL     FQ

      0        2        0        0       -1        0        0        0       732       0

J2  NPROF     IPLOT    PRFVS    XSECV    XSECH    FN       ALLDC    IBW      CHNIM    ITRACE

      0        0       -1        0        0        0       -1        0        0        0


J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     38       43        8       42        1       53       54       55       29       56

MC    .015     .015     .015      .1       .3
QT       2     3300     6000
X1   17410        5        0     82.5        0        0        0
GR  696.83        0   689.68    11.25   689.33    41.25   689.66    71.25   696.83    82.5

X1   17230        0        0        0      180      180      180                .77

X1   16930        0        0        0      300      300      300               1.29

X1   16630        0        0        0      300      300      300               1.29

X1   16330        0        0        0      300      300      300               1.29

X1   16030        0        0        0      300      300      300               1.29

X1   15730        0        0        0      300      300      300               1.29

X1   15430        0        0        0      300      300      300               1.29

X1   15130        0        0        0      300      300      300               1.29

X1   14900        0        0        0      230      230      230                .99

X1   14500        0        0        0      400      400      400               1.72
```

X1	14230	0	0	0	270	270	270		1.161	
X1	13930	0	0	0	300	300	300		1.29	
X1	13630	0	0	0	300	300	300		1.29	
X1	13330	0	0	0	300	300	300		1.29	
X1	13030	0	0	0	300	300	300		1.29	
X1	12730	0	0	0	300	300	300		1.29	
X1	12430	0	0	0	300	300	300		1.29	
X1	12091	0	0	0	339	339	339		1.5357	
X1	11791	0	0	0	300	300	300		1.359	
X1	11491	0	0	0	300	300	300		1.359	
X1	11191	5	0	92.5	300	300	300			
GR	723.85	0	716.70	11.25	716.35	46.25	716.70	81.25	723.85	92.5
X1	10900	5	0	93	291	291	291			
GR	723.82	0	717.67	10	717.52	45	717.87	80	723.82	93
X1	10830	5		80	0	0	0			
GR	723.15		718.1	10	717.8	40	718.1	70	728.10	80
X1	10725	0	0	85	105	105	105		.1	
X1	10724	5	0	85	1	1	1			
X3	10							727.3	727.3	
GR	727.7		719.3	13	719.04	45	719.3	75	727.7	85
NC	.015	.015	.015	.3	.4					
SB	.90	1.27	3		62	4	437	1.5	719.55	719.04
X1	10624	0		0	100	100	100		.31	
X2			1	726.15	727.4			1.33		
X3	10							727.4	727.4	
BT	7		727.4		6.5	730		8.5	727.6	
BT	40	727.4		71.5	727.4		73.5	730		80
BT	727.4									
X1	10574	5	0	80	49	49	49			
GR	726.54	0	720.1	10	719.80	40	720.1	70	728.54	80
NC	.015	.015	.015	.1	.3					
X1	10423	5		80	151	151	151			
GR	728.88		720.73	10	720.43	40	720.73	70	726.13	80

X1	10149	0	0	0	274	274	274		1.27	
X1	9849.3			80	300	300	300		1.16	
X1	9549.3			80	300	300	300		1.26	
X1	9249.3			80	300	300	300		1.27	
X1	8949.3			80	300	300	300		1.26	
X1	8649.3			80	300	300	300		1.27	
X1	8349.3			80	300	300	300		1.27	
X1	8156.7	5		80	193	193	193			
GR	736.3		730.3	10	730.6	40	730.3	70	736.7	80
X1	8049.3	5		80	107	107	107			
GR	735.75		730.75	10	730.45	40	730.75	70	736.75	80
X1	7847.5	0	0	0	201.8	199	200		.85	
X3	10							739.07	739.07	
NC	.015	.015	.015	.3	.5					
SB	.50	1.27	3		87	6.8	280		732.2	731.31
X1	7747.5	0	0	0	100	100	100		.90	
X2			1	735.5	739.17			1.33		
X3	10							739.17	739.17	
BT	3		735.1		45	739.1		90	739.1	
X1	7662.6	5		80	83.9	95.2	85.5			
GR	739.1		733.1	10	732.80	40	733.1	70	739.1	80
NC	.015	.015	.015	.1	.3					
X1	7584.7	5		80	77.9	77.9	77.9			
GR	740.03		733.39	10	733.19	40	733.39	70	740.03	80
X1	7480.0	0		80	104.7	104.7	104.7		.5	
X1	7108.7			80	371	371	371		1.82	
X1	6808.7			80	300	300	300		1.47	
X1	6508.7			80	300	300	300		1.47	
X1	6208.7			80	300	300	300		1.47	
X1	6190.1			80	18	18	18		.18	

X1	5890.1			80	300	300	300		2.25	
X1	5590.1			80	300	300	300		2.25	
X1	5484	5		80	106	106	106			
GR	752.34		745.7	10	745.4	40	745.7	70	752.34	80
NC	.015	.015	.015	.2	.4					
X1	5290.1	5		80	194	194	194			
GR	753.79		747.16	10	746.86	40	747.16	70	753.79	80
X1	5268.3	5	0	52.7	21.8	21.8	21.8			
X3	10							755.4	755.4	
GR	754.0		747.0	.1	746.8	25	747.0	52.6	754.0	52.7
NC	.015	.015	.015	.2	.4					
SB	.50	1.27	3		53.7	2.7	250		747.3	746.3
X1	5168.3	0		0	100	100	100		.7	
X2			1	752.5	755.5			1.33		
X3	10							755.5	755.5	
BT	5		756.14		20	755.66		46	755.52	
BT	76	755.62		96	755.72					
X1	5147.3	5		80	20	20	20			
GR	755.5		748.24	10	748.94	40	749.24	70	755.91	80
NC	.015	.015	.015	.2	.4					
X1	5100.0	0	0	0	47.3	47.3	47.3		.19	
X1	4812.2			60	288	288	288		1.47	
X1	4512.2			80	300	300	300		1.53	
X1	4222.0			80	290	290	290		1.53	
X1	4121.0			80	101	101	101		.51	
X1	3912.2			80	209	209	209		1.07	
X1	3612.2			80	300	300	300		1.53	
X1	3312.2			60	300	300	300		1.53	
X1	3012.2			80	300	300	300		1.53	
X1	2712.2	5		60	300	300	300			
GR	768.33		761.66	10	761.36	40	761.66	70	768.33	80

X1	2652.7	7		81	60	60	60			
X3	10							770.4	770.4	
GR	768.7		767.8	.1	762.2	8	761.8	40	762.2	72
GR	767.8	80.9	768.7	81						
SB	.90	1.27	3		62	4	437	1.5	762.1	761.82
X1	2572.7	5		81	80	80	80			
X2			1	758.88	770.13			1.33		
X3	10							770.5	770.5	
BT	7		770.13		6.5	772.8		8.5	770.2	
BT	40	769.68		71.5	770.2		73.5	772.8		80
BT	770.13									
GR	769.4		762.4	10.5	762.1	40.5	762.4	70.5	769.4	81
X1	2532.2	5		81	40.5	40.5	40.5			
GR	769.55		762.55	10.5	762.25	40.5	762.55	70.5	769.55	81
X1	2237.5	5		81	295	295	295			
GR	770.68		763.68	10.5	763.38	40.5	763.63	70.5	770.68	81
X1	1937.5			81	300	300	300		1.155	
X1	1637.5	0	0	0	300	300	300		1.155	
X1	1337.5	0	0	0	300	300	300		1.155	
X1	1037.5	0	0	0	300	300	300		1.155	
X1	737.48	0	0	0	300	300	300		1.155	
X1	437.48	0	0	0	300	300	300		1.155	
X1	137.48	5	0	81	300	300	300			
GR	778.77	0	771.77	10.5	771.47	40.5	771.77	70.5	778.77	81

SECND	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV= .100 CEHV= .300
*SECND 17410.000
3720 CRITICAL DEPTH ASSUMED

17410.000	4.56	693.89	693.89	732.00	695.89	1.99	.00	.00	696.83
3300.0	.0	3300.0	.0	.0	291.1	.0	.0	.0	696.83
.00	.00	11.33	.00	.000	.015	.000	.000	689.33	4.52
.002173	0.	0.	0.	0	19	0	.00	73.23	77.88

*SECND 17230.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

17230.000	4.55	694.65	694.65	.00	696.66	2.00	.39	.00	697.60
3300.0	.0	3300.0	.0	.0	290.5	.0	1.2	.3	697.60
.00	.00	11.35	.00	.000	.015	.000	.000	690.10	4.64
.002186	180.	180.	180.	0	5	0	.00	73.23	77.86

*SECND 16930.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

16930.000	4.55	695.95	695.95	.00	697.95	2.00	.66	.00	698.89
3300.0	.0	3300.0	.0	.0	290.6	.0	3.2	.6	698.89
.01	.00	11.35	.00	.000	.015	.000	.000	691.39	4.63
.002185	300.	300.	300.	0	5	0	.00	73.23	77.87

*SECND 16630.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

16630.000	4.55	697.23	697.23	.00	699.24	2.00	.66	.00	700.18
3300.0	.0	3300.0	.0	.0	290.5	.0	5.2	1.3	700.18
.02	.00	11.36	.00	.000	.015	.000	.000	692.68	4.64
.002187	300.	300.	300.	0	5	0	.00	73.23	77.86

*SECND 16330.000
7185 MINIMUM SPECIFIC ENERGY

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	OLOB	OCH	OROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
3720 CRITICAL DEPTH ASSUMED									
16330.000	4.55	698.52	698.52	.00	700.53	2.00	.66	.00	701.47
3300.0	.0	3300.0	.0	.0	290.6	.0	7.2	1.8	701.47
.03	.00	11.36	.00	.000	.015	.000	.000	693.97	4.63
.002185	300.	300.	300.	0	5	0	.00	73.23	77.87
*SECNO 16030.000									
7185 MINIMUM SPECIFIC ENERGY									
3720 CRITICAL DEPTH ASSUMED									
16030.000	4.55	699.81	699.81	.00	701.82	2.00	.65	.00	702.76
3300.0	.0	3300.0	.0	.0	290.5	.0	9.2	2.3	702.76
.03	.00	11.35	.00	.000	.015	.000	.000	695.26	4.64
.002187	300.	300.	300.	0	5	0	.00	73.23	77.86
*SECNO 15730.000									
7185 MINIMUM SPECIFIC ENERGY									
3720 CRITICAL DEPTH ASSUMED									
15730.000	4.55	701.10	701.10	.00	703.11	2.00	.66	.00	704.05
3300.0	.0	3300.0	.0	.0	290.6	.0	11.2	2.8	704.05
.04	.00	11.35	.00	.000	.015	.000	.000	696.53	4.63
.002183	300.	300.	300.	0	5	0	.00	73.23	77.87
*SECNO 15430.000									
7185 MINIMUM SPECIFIC ENERGY									
3720 CRITICAL DEPTH ASSUMED									
15430.000	4.55	702.39	702.39	.00	704.40	2.00	.66	.00	705.34
3300.0	.0	3300.0	.0	.0	290.5	.0	13.2	3.3	705.34
.05	.00	11.35	.00	.000	.015	.000	.000	697.84	4.64
.002187	300.	300.	300.	0	5	0	.00	73.23	77.86
*SECNO 15130.000									
7185 MINIMUM SPECIFIC ENERGY									
3720 CRITICAL DEPTH ASSUMED									
15130.000	4.55	703.68	703.68	.00	705.69	2.00	.66	.00	706.63
3300.0	.0	3300.0	.0	.0	290.6	.0	15.2	3.8	706.63
.06	.00	11.36	.00	.000	.015	.000	.000	699.13	4.63
.002185	300.	300.	300.	0	5	0	.00	73.23	77.87

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 14900.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

14900.000	4.55	704.67	704.67	.00	706.68	2.00	.50	.00	707.62
3300.0	.0	3300.0	.0	.0	290.5	.0	16.7	4.2	707.62
.06	.00	11.36	.00	.000	.015	.000	.000	700.12	4.64
.002167	230.	230.	230.	0	5	0	.00	73.23	77.86

*SECNO 14500.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

14500.000	4.55	706.35	706.35	.00	708.40	2.00	.67	.00	709.34
3300.0	.0	3300.0	.0	.0	290.6	.0	19.4	4.9	709.34
.07	.00	11.35	.00	.000	.015	.000	.000	701.84	4.63
.002185	400.	400.	400.	0	5	0	.00	73.23	77.87

*SECNO 14230.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

14230.000	4.55	707.55	707.55	.00	709.56	2.00	.55	.00	710.50
3300.0	.0	3300.0	.0	.0	290.3	.0	21.2	5.3	710.50
.06	.00	11.36	.00	.000	.015	.000	.000	703.00	4.64
.002187	270.	270.	270.	0	5	0	.00	73.23	77.86

*SECNO 13930.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

13930.000	4.55	708.84	708.84	.00	710.85	2.00	.66	.00	711.79
3300.0	.0	3300.0	.0	.0	290.6	.0	23.2	5.9	711.79
.09	.00	11.36	.00	.000	.015	.000	.000	704.29	4.64
.002186	300.	300.	300.	0	5	0	.00	73.23	77.86

*SECNO 13630.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

13630.000	4.55	710.14	710.14	.00	712.14	2.00	.66	.00	713.08
3300.0	.0	3300.0	.0	.0	290.6	.0	25.2	6.4	713.08
.09	.00	11.36	.00	.000	.015	.000	.000	705.58	4.63
.002185	300.	300.	300.	0	5	0	.00	73.23	77.87

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 13330.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

13330.000	4.55	711.42	711.42	.00	713.43	2.00	.66	.00	714.37
3300.0	.0	3300.0	.0	.0	290.5	.0	27.2	6.9	714.37
.10	.00	11.36	.00	.000	.015	.000	.000	706.87	4.64
.002187	300.	300.	300.	0	5	0	.00	73.23	77.86

*SECNO 13030.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

13030.000	4.55	712.72	712.72	.00	714.72	2.00	.66	.00	715.66
3300.0	.0	3300.0	.0	.0	290.6	.0	29.2	7.4	715.66
.11	.00	11.35	.00	.000	.015	.000	.000	708.15	4.53
.002185	300.	300.	300.	0	5	0	.00	73.23	77.87

*SECNO 12730.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

12730.000	4.55	714.00	714.00	.00	716.01	2.00	.66	.00	716.95
3300.0	.0	3300.0	.0	.0	290.5	.0	31.2	7.9	716.95
.11	.00	11.36	.00	.000	.015	.000	.000	709.45	4.64
.002187	300.	300.	300.	0	5	0	.00	73.23	77.86

*SECNO 12430.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

12430.000	4.55	715.30	715.30	.00	717.30	2.00	.66	.00	718.24
3300.0	.0	3300.0	.0	.0	290.6	.0	33.2	8.4	718.24
.12	.00	11.35	.00	.000	.015	.000	.000	710.74	4.63
.002185	300.	300.	300.	0	5	0	.00	73.23	77.87

*SECNO 12091.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

12091.000	4.55	716.83	716.83	.00	718.83	2.00	.74	.00	719.78
3300.0	.0	3300.0	.0	.0	290.5	.0	35.5	8.9	719.78
.13	.00	11.36	.00	.000	.015	.000	.000	712.29	4.64
.002187	339.	339.	339.	0	5	0	.00	73.23	77.86

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	CLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 11791.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

11791.000	4.55	718.19	718.19	.00	720.19	2.00	.66	.00	721.14
3300.0	.0	3300.0	.0	.0	290.6	.0	37.5	9.4	721.14
.14	.00	11.36	.00	.000	.015	.000	.000	713.64	4.64
.002186	300.	300.	300.	0	5	0	.00	73.23	77.86

*SECNO 11491.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

11491.000	4.55	719.55	719.55	.00	721.55	2.00	.66	.00	722.49
3300.0	.0	3300.0	.0	.0	290.6	.0	35.5	10.0	722.49
.14	.00	11.36	.00	.000	.015	.000	.000	714.99	4.63
.002185	300.	300.	300.	0	5	0	.00	73.23	77.87

*SECNO 11191.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

11191.000	4.18	720.51	720.51	.00	722.37	1.86	.65	.01	723.65
3300.0	.0	3300.0	.0	.0	301.4	.0	41.5	10.5	723.35
.15	.00	10.95	.00	.000	.015	.000	.000	715.35	5.26
.002220	300.	300.	300.	0	11	0	.00	81.97	87.24

*SECNO 10900.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

10900.000	4.13	721.65	721.65	.00	723.47	1.82	.65	.00	723.82
3300.0	.0	3300.0	.0	.0	304.5	.0	43.5	11.0	723.82
.16	.00	10.84	.00	.000	.015	.000	.000	717.52	3.65
.002234	291.	291.	291.	0	3	0	.00	84.61	88.26

*SECNO 10830.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

10830.000	4.53	722.33	722.33	.00	724.35	2.01	.00	.06	723.15
3300.0	.0	3300.0	.0	.0	288.7	.0	43.5	11.0	723.10
.16	.00	11.39	.00	.000	.015	.000	.000	717.80	1.52
.002195	0.	0.	0.	0	8	0	.00	72.62	74.23

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 10725.000

3301 HV CHANGED MORE THAN HVINS

10725.000	5.23	723.13	722.43	.00	724.58	1.45	.16	.06	723.25
3300.0	.0	3300.0	.0	.0	341.1	.0	44.3	11.2	728.20
.16	.00	9.68	.00	.000	.015	.000	.000	717.90	.24
.001332	105.	105.	105.	5	5	0	.00	74.69	74.93

*SECNO 10724.000

3301 HV CHANGED MORE THAN HVINS

7165 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 727.30 ELREA= 727.30

10724.000	4.44	723.48	723.48	.00	725.47	1.99	.00	.16	727.70
3300.0	.0	3300.0	.0	.0	291.5	.0	44.3	11.2	727.70
.16	.00	11.32	.00	.000	.015	.000	.000	719.04	5.52
.002164	1.	1.	1.	0	11	0	.00	73.45	75.58

CCHV= .200 CEHV= .400

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 722.63 , NOT 723.46 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SE	XK	XKOR	COFQ	RDLEN	BWC	BWP	FAREA	ES	ELCHU	ELCHD
	.50	1.27	3.00	.00	52.00	4.00	437.00	1.30	719.55	715.04

*SECNO 10624.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.46

CLASS 2 LOW FLOW

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3420 BRIDGE W.S.= 723.76 BRIDGE VELOCITY= 11.42 CALCULATED CHANNEL AREA= 271.

EGPRS	EGLWC	H3	DWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
724.61	726.30	.00	0.	3300.	437.	448.	726.15	727.40	0.

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 727.40 ELREA= 727.40

10624.000	5.54	725.09	.00	.00	726.30	1.21	.33	.00	726.21
3300.0	.0	3300.0	.0	.0	373.4	.0	45.1	11.4	726.21
.17	.00	8.84	.00	.000	.015	.000	.000	719.35	4.83
.001019	100.	100.	100.	0	0	0	.00	76.45	31.25

*SECNO 10574.000

10574.000	5.12	724.92	724.35	.00	726.51	1.59	.06	.15	728.54
3300.0	.0	3300.0	.0	.0	326.0	.0	45.5	11.5	728.54
.17	.00	10.12	.00	.000	.015	.000	.000	715.30	4.26
.001471	49.	49.	49.	2	15	0	.00	71.43	75.72

CCHV= .100 CEHV= .300
*SECNO 10423.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

10423.000	4.55	724.98	724.98	.00	727.03	2.05	.27	.14	728.58
3300.0	.0	3300.0	.0	.0	287.3	.0	46.5	11.7	728.13
.17	.00	11.49	.00	.000	.015	.000	.000	720.43	4.78
.002197	151.	151.	151.	0	11	0	.00	70.96	75.74

*SECNO 10149.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

10149.000	4.56	726.26	726.26	.00	728.30	2.04	.60	.00	730.15
3300.0	.0	3300.0	.0	.0	287.6	.0	48.3	12.2	729.40
.18	.00	11.47	.00	.000	.015	.000	.000	721.70	4.78
.002190	274.	274.	274.	0	5	0	.00	70.97	75.75

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

+SECNO 8349.300
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

8349.300	4.55	733.74	733.74	.00	735.79	2.04	.66	.00	737.64
3300.0	.0	3300.0	.0	.0	287.6	.0	60.2	15.1	736.89
.22	.00	11.46	.00	.000	.015	.000	.000	729.15	4.76
.002192	300.	300.	300.	0	5	0	.00	70.97	75.75

+SECNO 8156.700
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

8156.700	4.51	734.51	734.51	.00	736.52	2.00	.48	.00	736.30
3300.0	.0	3300.0	.0	.0	290.6	.0	61.5	15.4	736.79
.23	.00	11.35	.00	.000	.015	.000	.000	730.01	2.95
.002198	193.	193.	193.	0	5	0	.00	73.61	76.53

+SECNO 8049.300
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

8049.300	4.52	734.97	734.97	.00	736.95	1.99	.43	.00	736.75
3300.0	.0	3300.0	.0	.0	291.7	.0	62.2	15.6	736.75
.23	.00	11.31	.00	.000	.015	.000	.000	730.45	2.97
.002183	107.	107.	107.	0	5	0	.00	74.06	77.03

+SECNO 7847.300
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3455 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 739.07 ELREA= 739.07

7847.300	4.52	735.82	735.82	.00	737.80	1.99	.44	.00	737.60
3300.0	.0	3300.0	.0	.0	291.7	.0	63.5	15.9	737.60
.23	.00	11.31	.00	.000	.015	.000	.000	731.30	2.97
.002186	202.	200.	199.	0	5	0	.00	74.06	77.03

CCHV= .300 CEHV= .500

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 734.17 , NOT 735.82 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.90	1.27	3.00	.00	87.00	6.50	280.00	.00	732.20	731.31

*SECNO 7747.500
PRESS FLOW BECAUSE EGLWC OF 738.73 EXCEEDS 1.5 DEPTH
PRESSURE FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
738.56	738.73	.00	0.	3300.	280.	265.	735.50	739.17	0.

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF
3693 PROBABLE MINIMUM SPECIFIC ENERGY

3493 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 739.17 ELREA= 739.17

7747.500	4.52	736.72	736.72	.00	738.70	1.98	.22	.03	738.50
3300.0	.0	3300.0	.0	.0	292.1	.0	64.2	16.1	738.50
.24	.00	11.30	.00	.000	.015	.000	.000	732.20	2.96
.002176	100.	100.	100.	20	5	0	.00	74.06	77.04

*SECNO 7662.600
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

7662.500	4.52	737.32	737.32	.00	739.30	1.99	.20	.00	739.10
3300.0	.0	3300.0	.0	.0	291.6	.0	64.8	16.3	739.10
.24	.00	11.32	.00	.000	.015	.000	.000	732.80	2.97
.002188	84.	90.	95.	0	3	0	.00	74.05	77.03

CCHV= .100 CEHV= .300
*SECNO 7584.700
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

7584.700	4.47	737.66	737.66	.00	739.68	2.02	.17	.01	740.03
3300.0	.0	3300.0	.0	.0	289.3	.0	65.3	16.4	740.03
.24	.00	11.40	.00	.000	.015	.000	.000	733.19	3.57
.002204	78.	78.	76.	0	5	0	.00	72.85	76.43

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	OLOB	QCH	OROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 6190.100
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

6190.100	4.46	744.58	744.58	.00	746.59	2.01	.04	.00	746.94
3300.0	.0	3300.0	.0	.0	290.1	.0	74.6	18.7	746.94
.27	.00	11.38	.00	.000	.015	.000	.000	740.10	3.56
.002150	18.	18.	18.	0	5	0	.00	72.88	76.44

*SECNO 5890.100
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5890.100	4.46	746.83	746.83	.00	748.84	2.01	.55	.00	749.19
3300.0	.0	3300.0	.0	.0	290.2	.0	76.6	19.2	749.19
.28	.00	11.37	.00	.000	.015	.000	.000	742.35	3.56
.002168	300.	300.	300.	0	5	0	.00	72.86	76.44

*SECNO 5590.100
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5590.100	4.46	749.08	749.08	.00	751.09	2.01	.66	.00	751.44
3300.0	.0	3300.0	.0	.0	290.1	.0	78.6	19.7	751.44
.25	.00	11.38	.00	.000	.015	.000	.000	744.60	3.56
.002190	300.	300.	300.	0	5	0	.00	72.88	76.44

*SECNO 5484.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5484.000	4.54	749.94	749.94	.00	751.94	2.00	.23	.00	752.34
3300.0	.0	3300.0	.0	.0	290.7	.0	79.3	19.9	752.34
.29	.00	11.35	.00	.000	.015	.000	.000	745.40	3.61
.002170	106.	106.	106.	0	5	0	.00	72.78	76.39

CCHV= .200 CEHV= .400
*SECNO 5290.100
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5290.100	4.53	751.39	751.39	.00	753.40	2.01	.42	.01	753.79
3300.0	.0	3300.0	.0	.0	289.7	.0	80.6	20.2	753.79
.30	.00	11.39	.00	.000	.015	.000	.000	746.86	3.62
.002192	194.	194.	194.	0	5	0	.00	72.76	76.38

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 5268.300
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3455 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 755.40 ELREA= 755.40

5268.300	3.06	751.86	751.86	.00	754.35	2.49	.05	.19	754.00
3300.0	.0	3300.0	.0	.0	260.5	.0	60.8	20.3	754.00
.30	.00	12.67	.00	.000	.015	.000	.000	746.80	.03
.002422	22.	22.	22.	0	3	0	.00	52.64	52.67

CCHV= .200 CEHV= .400

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 750.95 , NOT 751.86 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XR	XKOR	CDFG	RDLEN	BWC	BWF	BAREA	SS	ELCHC	ELCHC
	.30	1.27	3.00	.00	52.70	2.70	250.00	.00	747.30	748.30

*SECNO 5168.300
PRESS FLOW BECAUSE EGLWC OF 755.30 EXCEEDS 1.5 DEPTH

3301 HV CHANGED MORE THAN HVINS

PRESSURE FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
755.29	755.30	.00	0.	3300.	250.	260.	752.5[illegible]	755.30	0.

3455 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 755.50 ELREA= 755.50

5168.300	6.09	753.59	.00	.00	755.29	1.71	.94	.00	754.70
3300.0	.0	3300.0	.0	.0	314.9	.0	81.4	20.4	754.70
.30	.00	10.46	.00	.000	.013	.000	.000	747.50	.02
.001345	100.	100.	100.	4	0	0	.00	52.57	52.53

*SECNO 5147.300
7185 MINIMUM SPECIFIC ENERGY

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	%OL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
3720 CRITICAL DEPTH ASSUMED									
5147.300	4.53	753.47	753.47	.00	755.49	2.01	.03	.12	755.90
3300.0	.0	3300.0	.0	.0	289.6	.0	81.6	20.4	755.91
.30	.00	11.39	.00	.000	.015	.000	.000	748.54	3.64
.002188	20.	20.	20.	0	15	0	.00	72.70	76.35
CCHV= .200 CEHV= .400									
*SECNO 5100.000									
7185 MINIMUM SPECIFIC ENERGY									
3720 CRITICAL DEPTH ASSUMED									
5100.000	4.53	753.66	753.66	.00	755.68	2.01	.10	.00	756.09
3300.0	.0	3300.0	.0	.0	289.9	.0	81.9	20.5	756.10
.30	.00	11.38	.00	.000	.015	.000	.000	749.13	3.64
.002187	47.	47.	47.	0	5	0	.00	72.70	76.35
*SECNO 4812.300									
7185 MINIMUM SPECIFIC ENERGY									
3720 CRITICAL DEPTH ASSUMED									
4812.200	4.53	755.13	755.13	.00	757.15	2.01	.63	.00	757.56
3300.0	.0	3300.0	.0	.0	286.3	.0	83.8	21.0	757.57
.31	.00	11.38	.00	.000	.015	.000	.000	750.60	3.64
.002187	288.	288.	288.	0	5	0	.00	72.70	76.35
*SECNO 4512.200									
7185 MINIMUM SPECIFIC ENERGY									
3720 CRITICAL DEPTH ASSUMED									
4512.200	4.53	756.66	756.66	.00	758.68	2.01	.66	.00	759.09
3300.0	.0	3300.0	.0	.0	289.9	.0	85.8	21.5	759.10
.32	.00	11.38	.00	.000	.015	.000	.000	752.13	3.64
.002187	300.	300.	300.	0	5	0	.00	72.70	76.35
*SECNO 4222.000									
7185 MINIMUM SPECIFIC ENERGY									
3720 CRITICAL DEPTH ASSUMED									
4222.000	4.53	758.19	758.19	.00	760.21	2.01	.63	.00	760.62
3300.0	.0	3300.0	.0	.0	289.9	.0	87.7	22.0	760.63
.32	.00	11.38	.00	.000	.015	.000	.000	753.66	3.64
.002187	290.	290.	290.	0	5	0	.00	72.70	76.35

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	OLOB	OCH	OROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4121.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4121.000	4.53	758.70	758.70	.00	760.72	2.01	.22	.00	761.13
3300.0	.0	3300.0	.0	.0	289.9	.0	88.4	22.1	761.14
.32	.00	11.38	.00	.000	.015	.000	.000	754.17	3.64
.002187	101.	101.	101.	0	5	0	.00	72.70	76.35

*SECNO 3912.200
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3912.200	4.53	759.77	759.77	.00	761.79	2.01	.46	.00	762.20
3300.0	.0	3300.0	.0	.0	289.9	.0	89.6	22.5	762.21
.33	.00	11.38	.00	.000	.015	.000	.000	755.24	3.64
.002187	209.	209.	209.	0	5	0	.00	72.70	76.35

*SECNO 3612.200
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3612.200	4.53	761.30	761.30	.00	763.32	2.01	.66	.00	763.73
3300.0	.0	3300.0	.0	.0	289.9	.0	91.8	23.0	763.74
.34	.00	11.38	.00	.000	.015	.000	.000	756.77	3.64
.002187	300.	300.	300.	0	5	0	.00	72.70	76.35

*SECNO 3312.200
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3312.200	4.53	762.83	762.83	.00	764.85	2.01	.65	.00	765.26
3300.0	.0	3300.0	.0	.0	289.9	.0	93.8	23.5	765.27
.34	.00	11.38	.00	.000	.015	.000	.000	758.30	3.64
.002187	300.	300.	300.	0	5	0	.00	72.70	76.35

*SECNO 3012.200
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3012.200	4.53	764.36	764.36	.00	766.38	2.01	.65	.00	766.79
3300.0	.0	3300.0	.0	.0	289.9	.0	95.3	24.0	766.80
.33	.00	11.38	.00	.000	.015	.000	.000	759.83	3.64
.002187	300.	300.	300.	0	5	0	.00	72.70	76.35

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 2712.200
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2712.200	4.53	765.89	765.89	.00	767.91	2.01	.66	.00	766.33
3300.0	.0	3300.0	.0	.0	289.9	.0	97.8	24.5	768.33
.35	.00	11.38	.00	.000	.015	.000	.000	761.36	3.65
.002187	300.	300.	300.	0	5	0	.00	72.69	76.35

*SECNO 2552.700
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 770.40 ELREA= 770.40

2552.700	4.43	766.23	766.23	.00	768.17	1.95	.13	.01	768.70
3300.0	.0	3300.0	.0	.0	334.7	.0	38.2	24.6	768.70
.35	.00	11.20	.00	.000	.015	.000	.000	761.80	3.32
.002189	60.	60.	60.	0	6	0	.00	76.08	76.40

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 765.41 , NOT 766.23 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB XK	XKOR	COFQ	ROLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
.50	1.27	3.00	.00	82.00	4.00	437.00	1.50	762.11	761.82

*SECNO 2573.700

3301 HV CHANGED MORE THAN HVINS

CLASS B LOW FLOW

3420 BRIDGE W.S.= 766.43 BRIDGE VELOCITY= 11.42 CALCULATED CHANNEL AREA= 273.

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
.00	768.87	.00	0.	3300.	437.	462.	768.88	770.13	0.

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 770.50 ELREA= 770.50

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
2572.700	5.45	767.55	.00	.00	768.87	1.32	.70	.00	765.40
3300.0	.0	3300.0	.0	.0	357.8	.0	98.8	24.7	769.40
.36	.00	5.22	.00	.000	.015	.000	.000	762.10	2.77
.001146	80.	80.	80.	0	0	0	.00	75.45	78.23
*SECNO 2532.200									
2532.200	5.29	767.54	766.78	.00	768.96	1.41	.05	.04	759.55
3300.0	.0	3300.0	.0	.0	346.2	.0	99.1	24.8	769.55
.36	.00	5.53	.00	.000	.015	.000	.000	762.25	3.01
.001270	41.	41.	41.	2	15	0	.00	74.55	77.99
*SECNO 2237.500									
3301 HV CHANGED MORE THAN HVINS									
7185 MINIMUM SPECIFIC ENERGY									
3720 CRITICAL DEPTH ASSUMED									
2237.500	4.54	767.92	767.92	.00	769.93	2.01	.48	.34	770.63
3300.0	.0	3300.0	.0	.0	350.4	.0	101.3	25.3	770.68
.37	.00	11.37	.00	.000	.015	.000	.000	753.33	4.14
.002176	235.	235.	235.	0	11	0	.00	72.72	76.86
*SECNO 1937.500									
7185 MINIMUM SPECIFIC ENERGY									
3720 CRITICAL DEPTH ASSUMED									
1937.500	4.53	769.07	769.07	.00	771.08	2.01	.55	.00	771.84
3300.0	.0	3300.0	.0	.0	289.8	.0	103.3	25.8	771.84
.38	.00	11.39	.00	.000	.015	.000	.000	764.54	4.15
.002190	300.	300.	300.	3	5	0	.00	72.70	76.85
*SECNO 1637.500									
7185 MINIMUM SPECIFIC ENERGY									
3720 CRITICAL DEPTH ASSUMED									
1637.500	4.53	770.22	770.22	.00	772.24	2.01	.66	.00	772.99
3300.0	.0	3300.0	.0	.0	289.9	.0	105.2	26.3	772.99
.39	.00	11.38	.00	.000	.015	.000	.000	765.69	4.15
.002187	300.	300.	300.	0	5	0	.00	72.70	76.85

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 1337.500
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1337.500	4.53	771.38	771.38	.00	773.39	2.01	.66	.00	774.15
3300.0	.0	3300.0	.0	.0	289.9	.0	107.2	26.8	774.13
.39	.00	11.38	.00	.000	.015	.000	.000	765.65	4.15
.002187	300.	300.	300.	0	5	0	.00	72.70	76.85

*SECNO 1037.500
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1037.500	4.53	772.53	772.53	.00	774.55	2.01	.66	.00	775.30
3300.0	.0	3300.0	.0	.0	289.9	.0	109.2	27.3	775.30
.40	.00	11.38	.00	.000	.015	.000	.000	768.00	4.15
.002188	300.	300.	300.	0	5	0	.00	72.70	76.85

*SECNO 737.480
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

737.480	4.53	773.69	773.69	.00	775.70	2.01	.66	.00	776.46
3300.0	.0	3300.0	.0	.0	289.8	.0	111.2	27.8	776.46
.41	.00	11.39	.00	.000	.015	.000	.000	769.16	4.15
.002188	300.	300.	300.	0	5	0	.00	72.70	76.85

*SECNO 437.480
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

437.480	4.53	774.84	774.84	.00	776.85	2.01	.66	.00	777.61
3300.0	.0	3300.0	.0	.0	289.9	.0	113.2	28.3	777.61
.42	.00	11.38	.00	.000	.015	.000	.000	770.31	4.15
.002187	300.	300.	300.	0	5	0	.00	72.70	76.85

*SECNO 137.480
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

137.480	4.53	775.00	776.00	.00	778.02	2.01	.66	.00	778.77
3300.0	.0	3300.0	.0	.0	289.9	.0	115.2	28.8	775.77
.42	.00	11.38	.00	.000	.015	.000	.000	771.47	4.15
.002187	300.	300.	300.	0	5	0	.00	72.70	76.85

```
T1     SLOAN CHANNEL HYDRAULICS
T2     FROM OWNES AVENUE TO LAS VEGAS WASH CONF
T3     SUBCRITICAL RUN              FILE:SLSUB.HI

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    AVINS     Q         WSEL      FQ

                3                   0        -1                            0         3

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLOC     IBW       CHNIM     ITRACE

     15                  -1                                      -1
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 2

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS

CCHV= .100 CEHV= .300
*SECNO 17410.000
2096 WSEL NOT GIVEN, AVG OF MAX, MIN USED
3720 CRITICAL DEPTH ASSUMED

17410.000	6.57	695.90	695.90	.00	698.73	2.83	.00	.00	696.83
6000.0	.0	6000.0	.0	.0	444.8	.0	.0	.0	696.83
.00	.00	13.45	.00	.000	.015	.000	.000	689.33	1.46
.001383	0.	0.	0.	0	13	0	.00	79.58	81.04

*SECNO 17230.000
7135 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

17230.000	6.58	696.68	696.68	.00	699.50	2.82	.38	.00	697.80
6000.0	.0	6000.0	.0	.0	445.1	.0	1.8	.3	697.80
.01	.00	13.46	.00	.000	.015	.000	.000	690.10	1.45
.001980	180.	180.	180.	0	5	0	.00	79.39	81.05

*SECNO 16930.000
7135 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

16930.000	6.58	697.97	697.97	.00	700.79	2.82	.39	.00	698.85
6000.0	.0	6000.0	.0	.0	445.0	.0	4.9	.9	698.85
.01	.00	13.46	.00	.000	.015	.000	.000	691.39	1.45
.001980	300.	300.	300.	0	5	0	.00	79.59	81.05

*SECNO 16630.000
7135 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

16630.000	6.58	699.26	699.26	.00	702.08	2.82	.59	.00	700.18
6000.0	.0	6000.0	.0	.0	445.0	.0	8.0	1.4	700.18
.02	.00	13.46	.00	.000	.015	.000	.000	692.68	1.45
.001980	300.	300.	300.	0	5	0	.00	79.39	81.05

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

+SECNO 16330.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

16330.000	6.58	700.55	700.55	.00	703.37	2.82	.59	.00	701.47
6000.0	.0	6000.0	.0	.0	445.0	.0	11.0	2.0	701.47
.02	.00	13.48	.00	.000	.015	.000	.000	593.97	1.45
.001980	300.	300.	300.	0	5	0	.00	79.59	81.05

+SECNO 16030.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

16030.000	6.58	701.84	701.84	.00	704.66	2.82	.59	.00	702.76
6000.0	.0	6000.0	.0	.0	445.0	.0	14.1	2.5	702.76
.03	.00	13.48	.00	.000	.015	.000	.000	595.26	1.45
.001980	300.	300.	300.	0	5	0	.00	79.59	81.05

+SECNO 15730.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

15730.000	6.58	703.13	703.13	.00	705.95	2.82	.59	.00	704.05
6000.0	.0	6000.0	.0	.0	445.0	.0	17.2	3.1	704.05
.03	.00	13.48	.00	.000	.015	.000	.000	596.55	1.45
.001980	300.	300.	300.	0	5	0	.00	79.59	81.05

+SECNO 15430.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

15430.000	6.58	704.42	704.42	.00	707.24	2.82	.59	.00	705.34
6000.0	.0	6000.0	.0	.0	445.0	.0	20.3	3.6	705.34
.04	.00	13.48	.00	.000	.015	.000	.000	597.34	1.45
.001980	300.	300.	300.	0	5	0	.00	79.59	81.05

+SECNO 15130.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

15130.000	6.58	705.71	705.71	.00	708.53	2.82	.59	.00	706.63
6000.0	.0	6000.0	.0	.0	445.0	.0	23.3	4.2	706.63
.05	.00	13.48	.00	.000	.015	.000	.000	598.13	1.45
.001980	300.	300.	300.	0	5	0	.00	79.59	81.05

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 14900.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

14900.000	6.58	706.70	706.70	.00	709.52	2.82	.46	.00	707.62
6000.0	.0	6000.0	.0	.0	445.0	.0	25.6	4.6	707.62
.05	.00	13.48	.00	.000	.015	.000	.000	700.12	1.45
.001980	230.	230.	230.	0	3	0	.00	79.59	81.05

*SECNO 14500.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

14500.000	6.58	706.42	706.42	.00	711.24	2.82	.79	.00	709.34
6000.0	.0	6000.0	.0	.0	445.0	.0	29.7	5.3	709.34
.05	.00	13.48	.00	.000	.015	.000	.000	701.84	1.45
.001980	400.	400.	400.	0	5	0	.00	79.59	81.05

*SECNO 14230.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

14230.000	6.58	709.58	709.58	.00	712.40	2.82	.53	.00	710.50
6000.0	.0	6000.0	.0	.0	445.0	.0	32.5	5.8	710.50
.07	.00	13.48	.00	.000	.015	.000	.000	703.00	1.45
.001980	270.	270.	270.	0	3	0	.00	79.59	81.05

*SECNO 13930.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

13930.000	6.58	710.87	710.87	.00	713.69	2.82	.59	.00	711.79
6000.0	.0	6000.0	.0	.0	445.0	.0	35.6	6.4	711.79
.07	.00	13.48	.00	.000	.015	.000	.000	704.29	1.45
.001980	300.	300.	300.	0	5	0	.00	79.59	81.05

*SECNO 13630.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

13630.000	6.58	712.16	712.16	.00	714.98	2.82	.59	.00	713.08
6000.0	.0	6000.0	.0	.0	445.0	.0	38.6	6.9	713.08
.08	.00	13.48	.00	.000	.015	.000	.000	705.53	1.45
.001980	300.	300.	300.	0	5	0	.00	79.59	81.05

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

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*SECNO 13330.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 13330.000     6.58   713.45   713.45      .00   716.27     2.82      .59      .00   714.37
    6000.0       .0   6000.0       .0       .0    445.0       .0     41.7      7.5   714.37
       .08      .00    13.48      .00     .000     .015     .000     .000   706.87     1.45
   .001980     300.     300.     300.        0        5        0      .00    79.59    81.03


*SECNO 13030.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 13330.000     6.58   714.74   714.74      .00   717.58     2.82      .59      .00   715.66
    6000.0       .0   6000.0       .0       .0    445.0       .0     44.7      8.0   715.66
       .08      .00    13.48      .00     .000     .015     .000     .000   708.18     1.45
   .001980     300.     300.     300.        0        5        0      .00    79.59    81.03


*SECNO 12730.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 12730.000     6.58   716.03   716.03      .00   718.85     2.82      .59      .00   715.98
    6000.0       .0   6000.0       .0       .0    445.0       .0     47.8      8.6   716.98
       .10      .00    13.48      .00     .000     .015     .000     .000   709.45     1.45
   .001980     300.     300.     300.        0        5        0      .00    79.59    81.03


*SECNO 12430.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 12430.000     6.58   717.32   717.32      .00   720.14     2.82      .59      .00   718.24
    6000.0       .0   6000.0       .0       .0    445.0       .0     50.9      9.1   718.24
       .10      .00    13.48      .00     .000     .015     .000     .000   710.74     1.45
   .001980     300.     300.     300.        0        5        0      .00    79.59    81.03


*SECNO 12091.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
 12091.000     6.58   716.85   716.85      .00   721.67     2.82      .67      .00   719.78
    6000.0       .0   6000.0       .0       .0    445.0       .0     54.3      9.7   719.78
       .11      .00    13.45      .00     .000     .015     .000     .000   713.25     1.45
   .001980     339.     339.     339.        0        5        0      .00    79.59    81.03
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SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	OLOB	OCH	OROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 11751.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

11751.000	6.58	720.21	720.21	.00	723.03	2.82	.59	.00	721.14
6000.0	.0	6000.0	.0	.0	445.0	.0	57.4	10.3	721.14
.12	.00	13.48	.00	.000	.015	.000	.000	713.54	1.45
.001980	300.	300.	300.	0	5	0	.00	79.59	81.05

*SECNO 11491.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

11491.000	6.58	721.57	721.57	.00	724.39	2.82	.59	.00	722.49
6000.0	.0	6000.0	.0	.0	443.0	.0	60.5	10.8	722.49
.12	.00	13.48	.00	.000	.015	.000	.000	714.89	1.45
.001980	300.	300.	300.	0	5	0	.00	79.53	81.05

*SECNO 11191.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

11191.000	6.02	722.37	722.37	.00	725.01	2.63	.50	.02	723.35
6000.0	.0	6000.0	.0	.0	459.4	.0	53.6	11.4	723.85
.13	.00	13.35	.00	.000	.015	.000	.000	716.35	2.33
.002011	300.	300.	300.	0	11	0	.00	87.83	90.17

*SECNO 10500.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

10500.000	5.55	723.48	723.48	.00	725.18	2.57	.53	.01	723.62
6000.0	.0	6000.0	.0	.0	465.2	.0	66.7	12.0	723.62
.13	.00	12.87	.00	.000	.015	.000	.000	717.52	.56
.002008	291.	291.	291.	3	2	0	.00	91.70	92.27

*SECNO 10830.000
3280 CROSS SECTION 10830.00 EXTENDED 1.17 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

10830.000	6.32	724.32	724.32	.00	727.23	2.91	.00	.10	723.15
6000.0	.0	6000.3	.3	.0	433.5	.0	66.7	12.0	728.10
.13	.00	13.55	.00	.000	.015	.000	.000	717.80	.00
.002012	0.	0.	0.	0	8	0	.00	76.23	76.23

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 10725.000
3280 CROSS SECTION 10725.00 EXTENDED 1.58 FEET

3301 HV CHANGED MORE THAN HVINS

10725.000	7.33	725.23	724.43	.00	727.47	2.23	.17	.07	723.23
6000.0	.0	6000.0	.0	.0	500.4	.0	67.8	12.2	728.20
.14	.20	11.55	.00	.000	.015	.000	.000	717.90	.00
.001338	105.	105.	105.	5	5	0	.00	77.03	77.03

*SECNO 10724.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3455 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 727.30 ELREA= 727.30

10724.000	8.44	725.48	725.48	.00	728.32	2.84	.00	.15	727.70
6000.0	.0	6000.0	.0	.0	443.7	.0	67.8	12.2	727.70
.14	.00	13.32	.00	.000	.015	.000	.000	719.04	3.43
.001393	1.	1.	1.	0	11	0	.00	78.53	82.33

CCHV= .200 CEHV= .400

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 724.35 , NOT 725.48 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKOR	CDFQ	RDLEN	BWC	BWP	BAREA	BS	ELCHU	ELCHD
	.90	1.27	3.00	.00	62.00	4.00	437.00	1.50	719.55	719.04

*SECNO 10624.000
PRESS FLOW BECAUSE EGLWC OF 730.40 EXCEEDS 1.5 DEPTH
PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

EGPRS	EGLWC	H3	QWEIR	QPR	AREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
729.20	730.40	.00	317.	5680.	437.	448.	726.15	727.40	72.

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF
3693 PROBABLE MINIMUM SPECIFIC ENERGY

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 727.40 ELREA= 727.40

10624.000	6.52	726.97	726.93	.00	728.83	2.76	.20	.30	728.31
6000.0	.0	6000.0	.0	.0	430.1	.0	66.8	12.4	728.31
.14	.00	13.33	.00	.000	.015	.000	.000	719.65	3.31
.001905	100.	100.	100.	20	5	2	.00	75.15	82.46

+SECNO 10574.000
7183 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

10574.000	6.65	726.45	726.45	.00	729.37	3.52	.10	.06	726.54
6000.0	.0	6000.0	.0	.0	437.7	.0	68.3	12.4	728.54
.14	.00	13.71	.00	.000	.015	.000	.000	719.80	2.48
.001975	49.	49.	49.	0	5	0	.00	75.05	77.52

CCHV= .100 CEHV= .300
+SECNO 10423.000
7135 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

10423.000	6.60	727.03	727.03	.00	729.54	2.51	.30	.00	728.56
6000.0	.0	6000.0	.0	.0	438.0	.0	70.5	12.7	728.13
.14	.00	13.70	.00	.000	.015	.000	.000	720.43	2.27
.001595	151.	151.	151.	0	5	0	.00	76.24	76.51

+SECNO 10149.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

10149.000	5.61	728.31	728.31	.00	731.21	2.90	.55	.00	730.15
6000.0	.0	6000.0	.0	.0	438.9	.0	73.6	13.2	729.40
.15	.00	13.67	.00	.000	.015	.000	.000	721.70	2.25
.001987	274.	274.	274.	0	5	0	.00	76.27	78.53

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	AV	aL	QLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 9349.300
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

9849.300	6.61	729.47	729.47	.00	732.37	2.90	.60	.00	731.31
6000.0	.0	6000.0	.0	.0	438.8	.0	76.6	13.7	730.56
.15	.00	13.68	.00	.000	.015	.000	.000	732.86	2.26
.001989	300.	300.	300.	0	5	0	.00	76.26	78.52

*SECNO 9549.300
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

9549.300	6.61	730.73	730.73	.00	733.63	2.90	.61	.00	732.57
6000.0	.0	6000.0	.0	.0	438.8	.0	79.7	14.2	731.82
.16	.00	13.68	.00	.000	.015	.000	.000	734.12	2.25
.001989	300.	300.	300.	0	5	0	.00	76.26	78.52

*SECNO 9249.300
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

9249.300	6.61	732.38	732.00	.38	734.38	2.50	.60	.00	733.34
6000.0	.0	6000.0	.0	.0	438.8	.0	82.7	14.8	733.03
.17	.00	13.68	.00	.000	.015	.000	.000	735.39	2.25
.001989	300.	300.	300.	0	5	0	.00	76.26	78.52

*SECNO 8949.300
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

8949.300	6.61	733.25	733.25	.00	735.15	2.50	.60	.00	735.10
6000.0	.0	6000.0	.0	.0	438.8	.0	85.7	15.3	734.35
.17	.00	13.68	.00	.000	.015	.000	.000	736.65	2.25
.001989	300.	300.	300.	0	5	0	.00	76.26	78.52

*SECNO 8649.300
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

8649.300	6.61	734.53	734.53	.00	737.43	2.90	.60	.00	736.37
6000.0	.0	6000.0	.0	.0	438.8	.0	88.7	15.8	735.62
.18	.00	13.68	.00	.000	.015	.000	.000	737.92	2.25
.001989	300.	300.	300.	0	5	0	.00	76.26	78.52

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
J	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 8349.300
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

8349.300	6.61	735.80	735.80	.00	736.70	2.90	.60	.00	737.64
6000.0	.0	6000.0	.0	.0	436.3	.0	91.8	16.3	736.85
.19	.00	13.68	.00	.000	.015	.000	.000	729.19	2.26
.001585	300.	300.	300.	0	5	0	.00	76.26	76.52

*SECNO 8156.700
3280 CROSS SECTION 8156.70 EXTENDED .21 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

8156.700	6.51	735.51	735.51	.00	736.35	2.84	.35	.01	735.30
6000.0	.0	6000.0	.0	.0	443.9	.0	93.7	16.7	736.70
.19	.00	13.52	.00	.000	.015	.000	.000	730.00	.00
.002003	193.	193.	193.	0	5	0	.00	79.70	79.79

*SECNO 8049.300
3280 CROSS SECTION 8049.30 EXTENDED .31 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

8049.300	6.51	736.56	736.56	.00	739.77	2.82	.21	.00	736.75
6000.0	.0	6000.0	.0	.0	448.5	.0	94.3	16.9	736.75
.19	.00	13.47	.00	.000	.015	.000	.000	730.45	.00
.001550	107.	107.	107.	0	5	0	.00	80.00	80.00

*SECNO 7847.500
3280 CROSS SECTION 7847.50 EXTENDED .21 FEET

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 739.07 ELREA= 739.07

7847.500	6.51	737.81	737.81	.00	740.63	2.82	.40	.00	737.80
6000.0	.0	6000.0	.0	.0	445.6	.0	96.3	17.2	737.60
.20	.00	13.47	.00	.000	.015	.000	.300	731.30	.00
.001982	202.	200.	199.	0	5	0	.00	80.00	80.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= .300 CEHV= .500

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 735.57 , NOT 737.81 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKOR	COFQ	RDLEN	EWC	BWP	EAREA	SS	ELCHU	ELCHD
	.50	1.27	3.00	.00	37.00	6.80	260.00	.00	732.20	731.31

*SECNO 7747.500
3280 CROSS SECTION 7747.50 EXTENDED 2.85 FEET

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, XRATIO = 1.76

PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

ESPRS	EGLWC	HS	QWEIR	QFR	SAREA	TRAPEZOID AREA	ELLE	ELTRD	WEIRLN
746.86	742.14	.00	1700.	4323.	280.	255.	735.50	735.17	90.

7747.500	8.35	741.15	.00	.00	742.51	1.36	1.89	.00	738.50
6000.0	.0	6000.0	.0	.0	641.2	.0	98.1	17.4	738.50
.20	.00	9.36	.00	.000	.015	.000	.000	732.20	.00
.000638	100.	100.	100.	3	0	2	.00	80.00	80.00

*SECNO 7662.600
3280 CROSS SECTION 7662.60 EXTENDED 1.99 FEET

7662.600	8.29	741.09	739.33	.00	742.70	1.62	.06	.13	739.10
6000.0	.0	6000.0	.0	.0	587.9	.0	99.4	17.6	739.10
.20	.00	10.21	.00	.000	.015	.000	.000	732.80	.00
.000834	84.	90.	95.	2	15	0	.00	80.00	80.00

CCHV= .100 CEHV= .300
*SECNO 7584.700
3280 CROSS SECTION 7584.70 EXTENDED .95 FEET

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL .	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
7584.700	7.79	740.98	735.69	.00	742.85	1.87	.07	.08	740.03
6000.0	.0	6000.0	.0	.0	547.1	.0	100.4	17.7	740.03
.20	.00	10.97	.00	.000	.015	.000	.000	733.19	.00
.001038	78.	78.	78.	2	15	0	.00	80.00	80.00

*SECNO 7460.000
3280 CROSS SECTION 7460.00 EXTENDED .29 FEET

7460.000	7.13	740.81	740.19	.00	743.10	2.29	.13	.13	740.53
6000.0	.0	6000.0	.0	.0	453.8	.0	101.5	17.5	740.53
.21	.00	12.13	.00	.000	.015	.000	.000	733.65	.00
.001431	105.	105.	105.	2	15	0	.00	80.00	80.00

*SECNO 7106.700

3301 HV CHANGED MORE THAN HVINS

7133 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

7106.700	5.50	742.01	742.01	.00	744.85	2.84	.62	.16	742.33
6000.0	.0	6000.0	.0	.0	443.9	.0	105.6	18.6	742.33
.21	.00	13.52	.00	.000	.015	.000	.000	735.51	.51
.001983	371.	371.	371.	0	11	0	.00	78.38	79.49

*SECNO 6606.700
7133 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

6606.700	5.51	743.43	743.43	.00	746.32	2.83	.59	.00	743.82
6000.0	.0	6000.0	.0	.0	444.3	.0	108.7	19.2	743.82
.22	.00	13.51	.00	.000	.015	.000	.000	736.56	.50
.001978	300.	300.	300.	0	5	0	.00	78.95	79.50

*SECNO 6506.700
7133 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

6506.700	5.51	744.96	744.96	.00	747.79	2.83	.59	.00	745.29
6000.0	.0	6000.0	.0	.0	444.3	.0	111.7	19.7	745.29
.23	.00	13.50	.00	.000	.015	.000	.000	738.45	.50
.001978	300.	300.	300.	0	5	0	.00	79.00	79.50

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	CLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 6208.700
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

6208.700	6.51	746.43	746.43	.00	749.26	2.83	.59	.00	746.75
6000.0	.0	6000.0	.0	.0	444.3	.0	114.8	30.2	746.76
.23	.00	13.50	.00	.000	.015	.000	.000	739.92	.50
.001976	300.	300.	300.	0	5	0	.00	75.00	75.50

*SECNO 6190.100
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

6190.100	6.51	746.51	746.51	.00	749.44	2.93	.59	.00	746.84
6000.0	.0	6000.0	.0	.0	444.3	.0	115.0	30.2	746.84
.23	.00	13.50	.00	.000	.015	.000	.000	740.10	.50
.001976	18.	18.	18.	0	5	0	.00	75.00	75.50

*SECNO 5990.100
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5990.100	6.51	748.86	748.86	.00	751.69	2.83	.59	.00	748.15
6000.0	.0	6000.0	.0	.0	444.3	.0	118.1	30.8	748.15
.24	.00	13.50	.00	.000	.015	.000	.000	742.35	.50
.001976	300.	300.	300.	0	5	0	.00	75.00	75.50

*SECNO 5590.100
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5590.100	6.51	751.11	751.11	.00	753.94	2.83	.59	.00	751.44
6000.0	.0	6000.0	.0	.0	444.3	.0	121.1	31.4	751.44
.24	.00	13.50	.00	.000	.015	.000	.000	744.60	.50
.001978	300.	300.	300.	0	5	0	.00	75.00	75.50

*SECNO 5484.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5484.000	5.57	751.57	751.57	.00	754.80	2.83	.21	.00	752.34
6000.0	.0	6000.0	.0	.0	444.6	.0	133.2	31.6	752.34
.25	.00	13.50	.00	.000	.015	.000	.000	745.40	.55
.001970	106.	106.	106.	0	5	0	.00	73.89	73.45

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	OLOB	OCH	OROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= .200 CEHV= .400
*SECNO 5290.100
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5290.100	6.56	753.42	753.42	.00	756.26	2.84	.38	.00	753.79
6000.0	.0	6000.0	.0	.0	443.9	.0	124.2	21.9	753.79
.25	.00	13.52	.00	.000	.015	.000	.000	746.86	.55
.001980	194.	194.	194.	0	3	0	.00	76.89	79.45

*SECNO 5258.300
3280 CROSS SECTION 5258.30 EXTENDED .25 FEET

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 755.40 ELREA= 755.40

5258.300	7.49	754.29	754.29	.00	757.99	3.70	.62	.35	754.11
5000.0	.0	5000.0	.0	.0	385.6	.0	124.4	21.3	754.03
.25	.00	15.44	.00	.000	.015	.000	.000	746.80	.90
.002321	22.	22.	22.	0	8	0	.00	52.70	52.70

CCHV= .200 CEHV= .400

SPECIAL BRIDGE

5297 DOWNSTREAM ELEV IS 753.98 , XQT 754.29 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKOR	CDFG	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.90	1.27	3.00	.00	52.70	2.70	250.00	.00	747.30	745.80

*SECNO 5168.300
3280 CROSS SECTION 5168.30 EXTENDED 2.37 FEET

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.45

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
765.65	760.39	.00	2012.	3993.	250.	250.	752.50	755.50	36.

5168.300	5.57	757.07	.00	.00	759.32	2.25	1.33	.00	754.70
6000.0	.0	6000.0	.0	.0	496.2	.0	125.4	22.1	754.70
.25	.00	13.64	.00	.000	.015	.000	.000	747.50	.00
.001105	100.	100.	100.	4	0	3	.00	52.70	52.70

*SECNO 5147.300
3280 CROSS SECTION 5147.30 EXTENDED 2.36 FEET

3301 HV CHANGED MORE THAN HVINS

5147.300	3.32	758.25	755.51	.00	759.53	1.27	.02	.20	755.30
6000.0	.0	6000.0	.0	.0	564.3	.0	125.8	22.1	755.51
.25	.00	3.03	.00	.000	.015	.000	.000	748.94	.00
.000588	20.	20.	20.	4	14	0	.00	80.00	80.00

CCHV= .300 CEHV= .400
*SECNO 5100.000
3280 CROSS SECTION 5100.00 EXTENDED 2.13 FEET

5100.000	3.12	758.25	755.69	.00	759.58	1.33	.03	.03	756.09
6000.0	.0	6000.0	.0	.0	548.3	.0	126.4	22.2	756.10
.25	.00	3.25	.00	.000	.015	.000	.000	749.13	.00
.000512	47.	47.	47.	3	13	0	.00	80.00	80.00

*SECNO 4812.200
3280 CROSS SECTION 4812.20 EXTENDED .47 FEET

3301 HV CHANGED MORE THAN HVINS

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	CLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .69

4812.200	7.42	758.02	757.16	.00	760.15	2.13	.25	.32	757.56
6000.0	.0	6000.0	.0	.0	512.8	.0	130.2	22.7	757.57
.26	.00	11.70	.00	.000	.015	.000	.000	750.60	.00
.001270	288.	288.	288.	2	15	0	.00	80.00	80.00

+SECNO 4512.200

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4512.200	5.56	758.69	758.65	.00	761.53	2.84	.47	.29	759.05
6000.0	.0	6000.0	.0	.0	443.8	.0	133.3	23.3	759.10
.27	.01	13.53	.00	.000	.015	.000	.000	753.13	.60
.001962	300.	300.	300.	0	11	0	.00	78.79	79.39

+SECNO 4222.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4222.000	5.56	758.22	758.22	.00	761.05	2.84	.37	.00	758.62
6000.0	.0	6000.0	.0	.0	443.8	.0	135.4	23.8	758.63
.27	.00	13.52	.00	.000	.015	.000	.000	753.66	.59
.001979	290.	290.	290.	0	5	0	.00	78.80	79.39

+SECNO 4121.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4121.000	5.56	758.73	758.73	.00	761.57	2.84	.20	.00	759.13
6000.0	.0	6000.0	.0	.0	443.8	.0	137.3	24.0	759.14
.26	.00	13.52	.00	.000	.015	.000	.000	754.17	.59
.001979	101.	101.	101.	0	5	0	.00	78.80	79.39

+SECNO 3912.200
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3912.200	6.56	761.80	761.80	.00	764.64	2.84	.41	.00	762.30
6000.0	.0	6000.0	.0	.0	443.8	.0	139.6	24.3	762.21
.26	.00	13.52	.00	.000	.015	.000	.000	755.24	.59
.001979	209.	209.	209.	0	5	0	.00	78.80	79.39

SECNO	DEPTH	CWSEL	CRIWS	WSELR	EG	HV	HL	DLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 3812.200
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3812.200	5.56	763.33	753.33	.00	765.17	2.84	.59	.00	763.73
6000.0	.0	6000.0	.0	.0	443.7	.0	142.7	24.9	763.74
.29	.00	13.52	.00	.000	.015	.000	.000	755.77	.59
.001980	300.	300.	300.	0	5	0	.00	78.80	79.39

*SECNO 3312.200
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3312.200	5.57	764.87	764.87	.00	767.70	2.84	.59	.00	765.28
6000.0	.0	6000.0	.0	.0	443.8	.0	145.7	23.4	765.27
.29	.00	13.52	.00	.000	.015	.000	.000	758.38	.59
.001979	300.	300.	300.	0	5	0	.00	78.80	79.39

*SECNO 3012.200
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3012.200	5.55	765.39	755.39	.00	768.23	2.84	.59	.00	766.79
6000.0	.0	6000.0	.0	.0	443.7	.0	148.8	26.0	765.80
.30	.00	13.52	.00	.000	.015	.000	.000	759.33	.59
.001980	300.	300.	300.	0	5	0	.00	78.80	79.39

*SECNO 2712.200
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2712.200	5.55	767.92	767.92	.00	770.75	2.84	.59	.00	768.33
6000.0	.0	6000.0	.0	.0	443.7	.0	151.8	26.5	768.33
.31	.00	13.52	.00	.000	.015	.000	.000	761.35	.61
.001979	300.	300.	300.	0	5	0	.00	78.78	79.39

*SECNO 2652.700
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3455 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 770.40 ELREA= 770.40

2652.700	6.37	768.17	768.17	.00	770.93	2.78	.13	.01	768.70
6000.0	.0	6000.0	.0	.0	448.3	.0	152.4	25.6	768.70
.31	.00	13.35	.00	.000	.015	.000	.000	761.80	.06
.001585	60.	60.	60.	0	8	0	.00	60.86	60.34

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 767.13 , NOT 768.17 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.30	1.27	3.00	.00	62.00	4.00	437.00	1.50	762.10	761.82

*SECNO 2572.700
PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

ESPRS	EELWC	HS	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
771.89	771.84	.00	364.	5634.	437.	468.	768.66	770.13	71.

3565 30 TRIALS ATTEMPTED WSEL,CWSEL
3710 WSEL ASSUMED BASED ON MIN DIFF
3593 PROBABLE MINIMUM SPECIFIC ENERGY

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 770.50 ELREA= 770.50

2572.700	6.63	768.73	768.66	.00	771.50	2.77	.16	.34	769.40
6000.0	.0	6000.0	.0	.0	443.1	.0	153.3	25.8	769.40
.31	.00	13.36	.00	.000	.015	.000	.000	762.10	1.30
.001910	80.	80.	80.	20	8	2	.00	79.00	80.00

*SECNO 2532.200
7135 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2532.200	6.54	768.79	768.79	.00	771.65	2.86	.09	.03	769.55
6000.0	.0	6000.0	.0	.0	442.2	.0	153.7	26.8	769.55
.31	.00	13.57	.00	.000	.015	.000	.000	762.25	1.13
.002001	41.	41.	41.	0	5	0	.00	78.73	79.67

*SECNO 2237.500
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

2237.500	6.56	769.94	769.94	.00	772.78	2.84	.55	.00	770.55
6000.0	.0	6000.0	.0	.0	443.6	.0	156.7	27.4	770.68
.31	.00	13.52	.00	.000	.015	.000	.000	763.38	1.10
.001579	295.	295.	295.	0	5	0	.00	78.79	79.90

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 1937.500
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1937.500	6.56	771.10	771.10	.00	773.94	2.84	.59	.00	771.84
6000.0	.0	6000.0	.0	.0	443.5	.0	159.7	27.9	771.84
.32	.00	13.53	.00	.000	.015	.000	.000	764.54	1.11
.001983	300.	300.	300.	0	5	0	.00	78.76	79.89

*SECNO 1637.500
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1637.500	6.56	772.25	772.25	.00	775.09	2.84	.59	.00	772.99
6000.0	.0	6000.0	.0	.0	443.5	.0	162.8	28.5	772.99
.33	.00	13.53	.00	.000	.015	.000	.000	763.69	1.11
.001581	300.	300.	300.	0	5	0	.00	78.79	79.89

*SECNO 1337.500
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1337.500	6.56	773.41	773.41	.00	776.25	2.84	.59	.00	774.15
6000.0	.0	6000.0	.0	.0	443.5	.0	165.8	29.1	774.15
.33	.00	13.53	.00	.000	.015	.000	.000	766.83	1.11
.001983	300.	300.	300.	0	5	0	.00	78.76	79.89

*SECNO 1037.500
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1037.500	6.56	774.56	774.56	.00	777.40	2.84	.59	.00	775.30
6000.0	.0	6000.0	.0	.0	443.5	.0	168.9	29.5	775.30
.34	.00	13.53	.00	.000	.015	.000	.000	765.00	1.11
.001983	300.	300.	300.	0	5	0	.00	78.79	79.89

*SECNO 737.480
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

737.480	6.56	775.72	775.72	.00	778.56	2.84	.59	.00	776.46
6000.0	.0	6000.0	.0	.0	443.5	.0	172.0	30.1	776.46
.35	.00	13.53	.00	.000	.015	.000	.000	769.15	1.11
.001983	300.	300.	300.	0	5	0	.00	78.76	79.89

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOSL	XLCH	XLOSR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 437.480
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

437.480	6.56	776.87	776.87	.00	779.71	2.84	.59	.00	777.61
6000.0	.0	6000.0	.0	.0	443.6	.0	175.0	30.8	777.61
.35	.00	13.53	.00	.000	.015	.000	.000	770.31	1.11
.001982	300.	300.	300.	0	5	0	.00	76.79	75.83

*SECNO 137.480
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

137.480	6.56	773.03	776.03	.00	780.87	3.84	.59	.00	773.77
6000.0	.0	6000.0	.0	.0	443.5	.0	173.1	31.2	778.77
.36	.00	13.53	.00	.000	.015	.000	.000	771.47	1.11
.001982	300.	300.	300.	0	5	0	.00	76.79	75.83

THIS RUN EXECUTED 05APR93 10:45:33

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

SUBCRITICAL RUN

SUMMARY PRINTOUT

	SECNO	Q	DEPTH	ELMIN	CWSEL	SSTA	ENDST	VLOB	VCH	VROB
*	17410.000	3300.00	4.56	688.33	693.85	4.63	77.88	.00	11.33	.00
*	17410.000	6000.00	6.57	689.33	695.90	1.46	81.04	.00	13.49	.00
*	17230.000	3300.00	4.55	690.10	694.65	4.64	77.86	.00	11.36	.00
*	17230.000	6000.00	6.58	690.10	696.68	1.45	81.05	.00	13.48	.00
*	16930.000	3300.00	4.55	691.33	695.95	4.63	77.87	.00	11.35	.00
*	16930.000	6000.00	6.58	691.33	697.97	1.45	81.05	.00	13.48	.00
*	16630.000	3300.00	4.55	692.68	697.23	4.64	77.86	.00	11.36	.00
*	16630.000	6000.00	6.58	692.68	699.26	1.45	81.05	.00	13.48	.00
*	16330.000	3300.00	4.55	693.97	698.52	4.63	77.87	.00	11.36	.00
*	16330.000	6000.00	6.58	693.97	700.55	1.45	81.05	.00	13.48	.00
*	16030.000	3300.00	4.55	695.26	699.81	4.64	77.86	.00	11.36	.00
*	16030.000	6000.00	6.58	695.26	701.84	1.45	81.05	.00	13.48	.00
*	15730.000	3300.00	4.55	696.55	701.10	4.63	77.87	.00	11.35	.00
*	15730.000	6000.00	6.58	696.55	703.13	1.45	81.05	.00	13.48	.00
*	15430.000	3300.00	4.55	697.84	702.39	4.64	77.86	.00	11.36	.00
*	15430.000	6000.00	6.58	697.84	704.42	1.45	81.05	.00	13.48	.00
*	15130.000	3300.00	4.55	699.13	703.68	4.63	77.87	.00	11.36	.00
*	15130.000	6000.00	6.58	699.13	705.71	1.45	81.05	.00	13.48	.00
*	14900.000	3300.00	4.55	700.12	704.67	4.64	77.86	.00	11.36	.00
*	14900.000	6000.00	6.58	700.12	706.70	1.45	81.05	.00	13.48	.00
*	14600.000	3300.00	4.55	701.84	706.39	4.63	77.87	.00	11.35	.00
*	14600.000	6000.00	6.58	701.84	708.42	1.45	81.05	.00	13.48	.00

	SECNO	Q	DEPTH	ELMIN	CWSEL	SSTA	ENDST	VLOB	VCH	VROB
*	14230.000	3300.00	4.55	703.00	707.55	4.64	77.86	.00	11.36	.00
*	14230.000	6000.00	6.58	703.00	709.58	1.45	81.05	.00	13.48	.00
*	13930.000	3300.00	4.55	704.29	708.84	4.64	77.86	.00	11.36	.00
*	13930.000	6000.00	6.56	704.29	710.87	1.45	81.05	.00	13.48	.00
*	13630.000	3300.00	4.53	705.58	710.14	4.63	77.87	.00	11.36	.00
*	13630.000	6000.00	6.53	705.58	712.16	1.45	81.05	.00	13.48	.00
*	13330.000	3300.00	4.52	706.87	711.42	4.64	77.86	.00	11.36	.00
*	13330.000	6000.00	6.56	706.87	713.45	1.45	81.05	.00	13.48	.00
*	13030.000	3300.00	4.55	708.16	712.72	4.63	77.87	.00	11.35	.00
*	13030.000	6000.00	6.58	708.16	714.74	1.45	81.05	.00	13.48	.00
*	12730.000	3300.00	4.55	709.45	714.00	4.64	77.86	.00	11.36	.00
*	12730.000	6000.00	6.53	709.45	715.03	1.45	81.05	.00	13.48	.00
*	12430.000	3300.00	4.55	710.74	715.30	4.63	77.87	.00	11.35	.00
*	12430.000	6000.00	6.58	710.74	717.32	1.45	81.05	.00	13.48	.00
*	12081.000	3300.00	4.55	712.28	716.83	4.64	77.86	.00	11.36	.00
*	12081.000	6000.00	6.58	712.28	718.85	1.45	81.05	.00	13.48	.00
*	11781.000	3300.00	4.55	713.54	718.19	4.64	77.86	.00	11.36	.00
*	11781.000	6000.00	6.58	713.54	720.31	1.45	81.05	.00	13.48	.00
*	11481.000	3300.00	4.52	714.99	719.55	4.63	77.87	.00	11.36	.00
*	11481.000	6000.00	6.53	714.99	721.57	1.45	81.05	.00	13.48	.00
*	11181.000	3300.00	4.16	716.33	720.31	5.26	87.24	.00	10.95	.00
*	11181.000	6000.00	6.02	716.35	722.37	2.33	90.17	.00	13.05	.00
*	10900.000	3300.00	4.13	717.52	721.65	3.65	88.26	.00	10.84	.00
*	10900.000	6000.00	5.95	717.52	723.46	.56	92.27	.00	12.87	.00
*	10630.000	3300.00	4.53	717.80	722.33	1.62	74.23	.00	11.39	.00
*	10630.000	6000.00	6.52	717.80	724.32	.00	76.32	.00	13.53	.00
	10725.000	3300.00	5.23	717.90	723.13	.24	74.93	.00	9.68	.00
	10725.000	6000.00	7.33	717.90	725.23	.00	77.03	.00	11.99	.00
*	10724.000	3300.00	4.44	719.04	723.48	6.52	79.98	.00	11.32	.00
*	10724.000	6000.00	6.44	719.04	725.48	3.43	82.35	.00	13.52	.00
*	10524.000	3300.00	5.54	719.55	725.09	4.83	81.38	.00	8.64	.00
*	10524.000	6000.00	6.52	719.55	726.07	3.31	82.46	.00	13.33	.00
	10574.000	3300.00	5.12	719.80	724.92	4.28	75.72	.00	10.12	.00
*	10574.000	6000.00	6.65	719.80	726.45	2.46	77.52	.00	13.71	.00

	SECND	Q	DEPTH	ELMIN	CWSEL	SSTA	ENDST	VLOB	VCH	VROB
*	10423.000	3300.00	4.55	720.43	724.98	4.78	75.74	.00	11.45	.00
*	10423.000	6000.00	5.60	720.43	727.03	2.27	78.51	.00	13.70	.00
*	10149.000	3300.00	4.56	721.70	726.26	4.78	75.75	.00	11.47	.00
*	10149.000	6000.00	5.61	721.70	728.31	2.26	78.53	.00	13.67	.00
*	9849.300	3300.00	4.55	722.66	727.41	4.78	75.75	.00	11.48	.00
*	9849.300	6000.00	6.61	722.86	729.47	2.26	78.52	.00	13.68	.00
*	9549.300	3300.00	4.55	724.12	728.67	4.78	75.75	.00	11.48	.00
*	9549.300	6000.00	5.61	724.12	730.73	2.26	78.52	.00	13.68	.00
*	9249.300	3300.00	4.55	725.39	729.94	4.78	75.75	.00	11.48	.00
*	9249.300	6000.00	5.61	725.39	732.00	2.26	78.52	.00	13.68	.00
*	8949.300	3300.00	4.55	726.65	731.20	4.78	75.75	.00	11.48	.00
*	8949.300	6000.00	5.61	726.65	733.26	2.26	78.52	.00	13.68	.00
*	8649.300	3300.00	4.55	727.92	732.47	4.78	75.75	.00	11.48	.00
*	8649.300	6000.00	5.61	727.92	734.53	2.26	78.52	.00	13.68	.00
*	8349.300	3300.00	4.55	729.19	733.74	4.78	75.75	.00	11.48	.00
*	8349.300	6000.00	5.61	729.19	735.80	2.26	78.52	.00	13.68	.00
*	8156.700	3300.00	4.51	730.00	734.51	2.98	76.33	.00	11.33	.00
*	8156.700	6000.00	5.51	730.00	736.51	.00	79.70	.00	13.58	.00
*	8049.300	3300.00	4.52	730.45	734.97	2.97	77.03	.00	11.31	.00
*	8049.300	6000.00	5.51	730.45	736.56	.00	80.00	.00	13.47	.00
*	7847.500	3300.00	4.52	731.30	735.82	2.97	77.03	.00	11.31	.00
*	7547.500	6000.00	5.51	731.30	737.81	.00	80.00	.00	13.47	.00
*	7747.500	3300.00	4.52	732.20	736.72	2.96	77.04	.00	11.30	.00
*	7747.500	6000.00	5.55	732.20	741.15	.00	80.00	.00	9.38	.00
*	7662.600	3300.00	4.52	732.80	737.32	2.97	77.03	.00	11.32	.00
	7662.600	6000.00	6.25	732.80	741.09	.00	80.00	.00	10.21	.00
*	7584.700	3300.00	4.47	733.19	737.66	3.57	76.43	.00	11.40	.00
	7584.700	6000.00	7.79	733.19	740.98	.00	80.00	.00	10.97	.00
*	7480.000	3300.00	4.48	733.69	738.17	3.56	76.44	.00	11.37	.00
	7480.000	6000.00	7.12	733.69	740.81	.00	80.00	.00	12.15	.00
*	7108.700	3300.00	4.48	735.51	739.99	3.56	76.44	.00	11.37	.00
*	7108.700	6000.00	5.50	735.51	742.01	.51	79.49	.00	13.53	.00
*	6808.700	3300.00	4.48	736.98	741.46	3.56	76.44	.00	11.37	.00
*	6808.700	6000.00	6.51	736.98	743.49	.50	79.50	.00	13.31	.00

	SECNO	Q	DEPTH	ELMIN	CWSEL	SSTA	ENDST	VLOB	VCH	VROB
*	6508.700	3300.00	4.48	738.45	742.93	3.56	76.44	.00	11.38	.00
*	6508.700	6000.00	6.51	738.45	744.96	.50	79.50	.00	13.50	.00
*	6208.700	3300.00	4.48	739.92	744.40	3.56	76.44	.00	11.37	.00
*	6208.700	6000.00	6.51	739.92	746.43	.50	79.50	.00	13.50	.00
*	6190.100	3300.00	4.48	740.10	744.58	3.56	76.44	.00	11.38	.00
*	6190.100	6000.00	6.51	740.10	746.61	.50	79.50	.00	13.50	.00
*	5890.100	3300.00	4.48	742.35	746.83	3.56	76.44	.00	11.37	.00
*	5890.100	6000.00	6.51	742.35	748.86	.50	79.50	.00	13.50	.00
*	5590.100	3300.00	4.48	744.60	749.08	3.56	76.44	.00	11.38	.00
*	5590.100	6000.00	6.51	744.60	751.11	.50	79.50	.00	13.50	.00
*	5484.000	3300.00	4.54	745.40	749.94	3.61	76.39	.00	11.35	.00
*	5484.000	6000.00	6.57	745.40	751.97	.55	79.45	.00	13.50	.00
*	5290.100	3300.00	4.53	746.86	751.39	3.62	76.38	.00	11.39	.00
*	5290.100	6000.00	6.56	746.86	753.42	.55	79.45	.00	13.52	.00
*	5268.300	3300.00	5.06	746.80	751.86	.03	52.67	.00	12.67	.00
*	5268.300	6000.00	7.45	746.80	754.25	.00	52.70	.00	15.44	.00
*	5168.300	3300.00	5.03	747.50	752.53	.12	53.63	.00	10.48	.00
*	5168.300	6000.00	6.57	747.50	757.07	.00	52.70	.00	12.04	.00
*	5147.300	3300.00	4.53	748.34	752.87	3.64	76.35	.00	11.33	.00
	5147.300	6000.00	5.32	748.34	753.66	.00	80.00	.00	9.33	.00
*	5100.000	3300.00	4.53	749.13	753.66	3.64	76.35	.00	11.38	.00
	5100.000	6000.00	5.12	749.13	754.25	.00	80.00	.00	9.25	.00
*	4812.200	3300.00	4.53	750.60	755.13	3.64	76.35	.00	11.38	.00
*	4812.200	6000.00	7.42	750.60	758.02	.00	80.00	.00	11.70	.00
*	4512.200	3300.00	4.53	752.13	756.66	3.64	76.35	.00	11.38	.00
*	4512.200	6000.00	6.56	752.13	758.69	.60	79.39	.00	13.53	.00
*	4222.000	3300.00	4.53	753.66	758.19	3.64	76.35	.00	11.38	.00
*	4222.000	6000.00	6.56	753.66	760.22	.59	79.39	.00	13.52	.00
*	4121.000	3300.00	4.53	754.17	758.70	3.64	76.35	.00	11.38	.00
*	4121.000	6000.00	6.55	754.17	760.73	.59	79.39	.00	13.52	.00
*	3912.200	3300.00	4.53	755.24	759.77	3.64	76.35	.00	11.38	.00
*	3912.200	6000.00	6.56	755.24	761.80	.59	79.39	.00	13.52	.00
*	3812.200	3300.00	4.53	756.77	761.30	3.64	76.35	.00	11.38	.00
*	3812.200	6000.00	6.56	756.77	763.33	.59	79.39	.00	13.53	.00

	SECNO	Q	DEPTH	ELMIN	CWSEL	SSTA	ENDST	VLCB	VCH	VRGB
*	3312.200	3300.00	4.53	758.30	762.63	3.64	76.35	.00	11.38	.00
*	3312.200	6000.00	6.57	758.30	764.87	.59	79.39	.00	13.52	.00
*	3012.200	3300.00	4.53	759.83	764.36	3.64	76.35	.00	11.38	.00
*	3012.200	6000.00	6.56	759.83	766.39	.59	79.39	.00	13.52	.00
*	2712.200	3300.00	4.53	761.36	765.89	3.65	76.35	.00	11.38	.00
*	2712.200	6000.00	6.56	761.36	767.92	.61	79.39	.00	13.52	.00
*	2652.700	3300.00	4.43	761.80	766.23	2.32	78.40	.00	11.20	.00
*	2652.700	6000.00	6.37	761.80	768.17	.06	80.94	.00	13.38	.00
*	2572.700	3300.00	5.45	762.10	767.55	2.77	78.23	.00	9.22	.00
*	2572.700	6000.00	6.63	762.10	768.73	1.00	80.00	.00	13.35	.00
	2532.200	3300.00	5.29	762.25	767.54	3.01	77.99	.00	9.53	.00
*	2532.200	6000.00	6.54	762.25	768.79	1.13	79.87	.00	13.57	.00
*	2237.500	3300.00	4.54	763.38	767.92	4.14	76.86	.00	11.37	.00
*	2237.500	6000.00	6.56	763.38	769.94	1.10	79.90	.00	13.52	.00
*	1937.500	3300.00	4.53	764.54	769.07	4.15	76.85	.00	11.39	.00
*	1937.500	6000.00	6.56	764.54	771.10	1.11	79.89	.00	13.53	.00
*	1637.500	3300.00	4.53	765.69	770.22	4.15	76.85	.00	11.38	.00
*	1637.500	6000.00	6.56	765.69	772.25	1.11	79.89	.00	13.53	.00
*	1337.500	3300.00	4.53	766.85	771.38	4.15	76.85	.00	11.38	.00
*	1337.500	6000.00	6.56	766.85	773.41	1.11	79.89	.00	13.53	.00
*	1037.500	3300.00	4.53	768.00	772.53	4.15	76.85	.00	11.38	.00
*	1037.500	6000.00	6.56	768.00	774.56	1.11	79.89	.00	13.53	.00
*	737.480	3300.00	4.53	769.16	773.69	4.15	76.85	.00	11.39	.00
*	737.480	6000.00	6.56	769.16	775.72	1.11	79.89	.00	13.53	.00
*	437.480	3300.00	4.53	770.31	774.84	4.15	76.85	.00	11.38	.00
*	437.480	6000.00	6.56	770.31	776.87	1.11	79.89	.00	13.53	.00
*	137.480	3300.00	4.53	771.47	776.00	4.15	76.85	.00	11.38	.00
*	137.480	6000.00	6.56	771.47	778.03	1.11	79.89	.00	13.53	.00

SUMMARY OF ERRORS AND SPECIAL NOTES

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CAUTION SECNO= 17410.000 PROFILE= 2 CRITICAL DEPTH ASSUMED

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WARNING SECNO=  10624.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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CAUTION SECNO= 2652.700 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 2572.700 PROFILE= 1 HYDRAULIC JUMP D.S.
CAUTION SECNO= 2572.700 PROFILE= 2 PREABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 2572.700 PROFILE= 2 WSEL ASSUMED BASED ON MIN DIFF
CAUTION SECNO= 2572.700 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 2572.700 PROFILE= 2 HYDRAULIC JUMP D.S.

CAUTION SECNO= 2532.200 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 2532.200 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 2237.500 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 2237.500 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 2237.500 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 2237.500 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1937.500 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1937.500 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1937.500 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1937.500 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1637.500 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1637.500 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1637.500 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1637.500 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1337.500 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1337.500 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1337.500 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1337.500 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 1037.500 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1037.500 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 1037.500 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 1037.500 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 737.480 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 737.480 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 737.480 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 737.480 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 437.480 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 437.480 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 437.480 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 437.480 PROFILE= 2 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 137.480 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 137.480 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 137.480 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 137.480 PROFILE= 2 MINIMUM SPECIFIC ENERGY

Data CD



GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)

1 inch = 200 ft.

FIGURE 1: HEC-RAS CROSS-SECTION MAP

Sloan Channel LOMR

HEC-RAS Cross-Section — STA 116+91 (FIS 106+24)

Note: Aerial Photo as of April 2006

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FIGURE 1