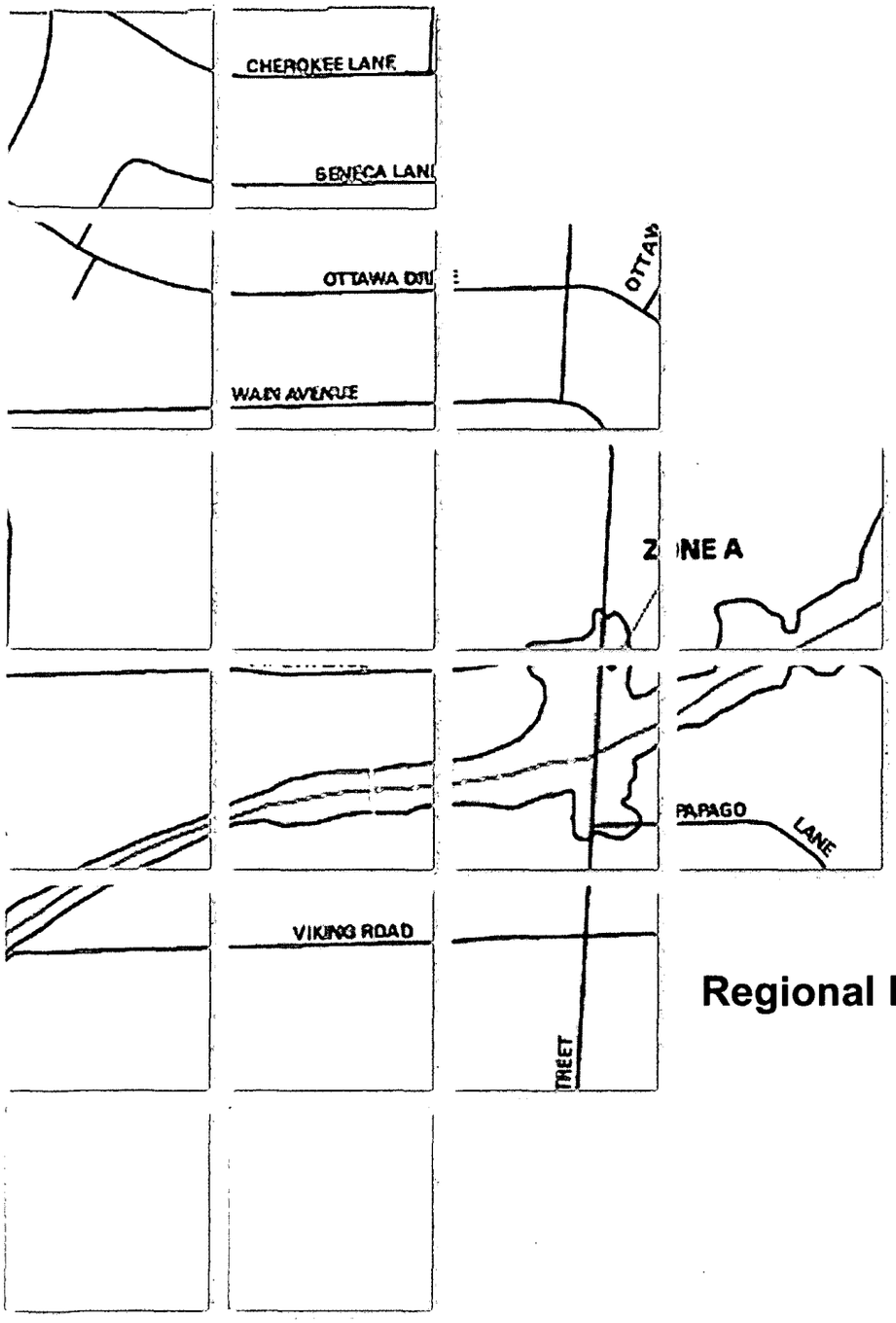
Request for Letter of Map Revision
Flamingo Wash
at Spencer Street
Clark County, Nevada



Submitted to:

Clark County Regional Flood Control District

REGIONAL FLOOD CONTROL DISTRICT

Submitted by:

The Louis Berger Group, Inc.
Las Vegas, Nevada

REVISED 11/26/03

October 15, 2003

04-09-0167P

THE Louis Berger Group INC

500 Amigo Court, Suite 100, Las Vegas, NV 89119
Tel 702.736.6632 • Fax 702.736.0704

RFCD

2003 DEC 11 PM 1:13

December 11, 2003

Ms. Andrea L. Ryan, P.E., Director
Engineering Division
Michael Baker Jr., Inc.
3601 Eisenhower Avenue
Alexandria, VA 22304-6435

Re: FLAMINGO WASH – MARYLAND PARKWAY TO SPENCER STREET
FEMA Case No. 04-09-0167P

This letter is in response to your letter dated November 13, 2003 regarding the request for map revision for the above referenced project. Enclosed with this letter is the following information requested in your letter:

1) A letter, certified by a professional engineer, stating that the plans represent as-built conditions; and,

2) Effective HEC-2, Corrected Effective HEC-RAS, and Post Project Conditions HEC-RAS hydraulic models revised to reflect the effective discharge value of 5,300 cfs.

The revisions to the HEC-RAS models necessitated changes to the report text, Riverine Hydrology & Hydraulics Form 2, Statement of Explanations, CHECK-RAS, and program files on the CD-ROM. Please replace the appropriate data in the previously submitted notebook with the enclosed revised sections and CD-ROM.

If you should require additional information, or have any questions regarding this request, do not hesitate to contact me.

Sincerely,

THE LOUIS BERGER GROUP, INC.

Syndi Dudley

Syndi J. Dudley, P.E.
Director of Water Resources

cc: Kevin Eubanks, Clark County Regional Flood Control District
David Betley, Clark County Department of Public Works

MWH
MONTGOMERY WATSON HARZA

December 9, 2003

Mr. Max Yuan
Federal Emergency Management Agency
Hazard Study Branch
Federal Insurance and Mitigation Administration
500 C Street, SW
Washington, DC 20472

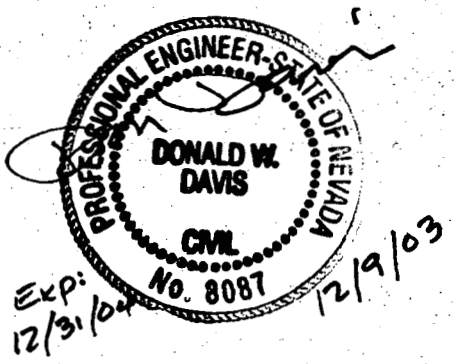
Subject: Flamingo Wash, Maryland Parkway to Spencer Street, Phase I
Bid Number 4906-01, Project Number F990813

Dear Mr. Yuan:

This letter is written to certify "as-built" conditions for the above referenced project. Construction on this portion of the Flamingo Wash was completed in October 2002. The structures, including the channel, storm drain, energy dissipation and related facilities, were all constructed in substantial accordance with the project improvement plans sealed by the design engineer on August 3, 2001. The flood control facilities are currently functioning.

If you have any questions or need additional information, please call the undersigned at (702) 878-8010 or Ms. Kathleen Kingston with Clark County Department of Public Works at (702) 455-6080.

Sincerely,



Donald W. Davis, P.E..
Supervising Engineer

DD:br

cc: Syndi Dudley, Louis Berger Group
Kathleen Kingston, Clark County Department of Public Works
Denis Cederburg, Clark County Department of Public Works
File: 1410464.033580.3.1.7

3014 West Charleston Blvd.
Las Vegas, Nevada
89102-1944

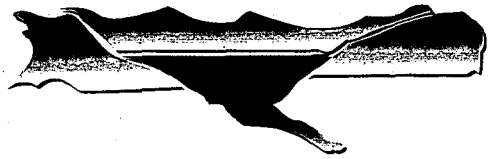
Tel: 702 878 8010
Fax: 702 878 7833

Delivering Innovative Projects and Solutions Worldwide

Request for Letter of Map Revision
Flamingo Wash
at Spencer Street
Clark County, Nevada

Prepared for:
CLARK COUNTY
REGIONAL FLOOD CONTROL DISTRICT
500 S. Grand Central Parkway
Las Vegas, NV 89155

CLARK COUNTY
REGIONAL FLOOD CONTROL DISTRICT



Prepared by:
THE Louis Berger Group, INC.
500 Amigo Court, Suite 100
Las Vegas, Nevada 89119
(702) 736-6632

November 26, 2003

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I. INTRODUCTION

This study provides hydraulic models and as-built plans in support of the Letter of Map Revision for the Flamingo Wash Maryland Parkway to Spencer Street Phase 1 improvements in Clark County, Nevada. The project consisted of approximately 1,070 ft of rectangular concrete channel improvements, replacement of box culverts with a free-span bridge, and construction of an energy dissipater at the downstream end (see Appendix D).

2.0 PRE-PROJECT CONDITIONS

Prior to construction of Flamingo Wash - Maryland Parkway to Spencer Street Phase I, the reinforced box culverts at Spencer Street did not have capacity to convey the 100-year flood. The wash in the project reach was earthen with discontinuous erosion protection on both banks. In July 1999, floodwater overtopped the Spencer Street box culvert and caused severe damage to the structure.

Figure 1 of Appendix B shows the limits of the pre-project (effective) 100-year special flood hazard area, Zone A, reflecting the backwater at the Spencer Street bridge. The effective 100-year flow in the project reach is 5,300 cfs. The effective special flood hazard area was modeled and delineated in the 1997 Flood Insurance Study (FIS) Restudy for the Flamingo Wash in Clark County, Nevada prepared by G.C. Wallace Inc. for the Clark County Regional Flood Control District.

3.0 POST-PROJECT CONDITIONS

Phase I of Flamingo Wash - Maryland Parkway to Spencer Street included the replacement of four 10 ft x 6 ft box culverts under Spencer Street with a single span bridge. The new bridge has an opening height of 10 ft and a span of 35 ft. The total open area is approximately 350 square feet.

A rectangular concrete channel was constructed between the bridge and the existing concrete lining located approximately 870 ft upstream of the bridge. The channel width varies from 45 ft to 35 ft wide, and the depth from 7.1 ft to 9 ft, respectively. Downstream of the bridge, the channel transitions to 50' wide before discharging into a sloped hydraulic jump basin. The basin was constructed to dissipate energy prior to releasing the flow into the grass-lined downstream reach of the wash.

As-built plans of the Flamingo Wash – Maryland Parkway to Spencer Street Phase I improvements are provided in Appendix D. It should be noted that the HGL shown on the as-built plans is based on the channel 100-year design flow of 5,610 cfs, which represents future development in the upstream watershed.

With construction of the Flamingo Wash Phase I improvements, the 100-year flood is now contained within the channel as shown on the annotated FIRM, Figure 2 of Appendix B.

4.0 HYDRAULIC MODELS

4.1 Effective and Corrected Effective HEC-2 Models

A hydraulic model was prepared in the FIS for the reach of Flamingo Wash between Imperial Palace and Spencer Street. The "effective" FIS model was performed for the subcritical flow regime using the US Army Corps of Engineers HEC-2 Water Surface Profile computer program. Since the existing wash in the project reach was previously unlined, the subcritical model established the effective base flood elevations (BFEs).

The Louis Berger Group, Inc. (Berger) used the effective FIS model with two modifications. First, the model was imported into HEC-RAS; and second, the section and bridge elevations were raised by a factor of 2.26 ft to adjust them from the National Geodetic Vertical Datum of 1929 (NGVD29) to the North America Vertical Datum of 1988 (NAVD88). Datum conversion calculations are provided in Appendix C.

The modified FIS model is referred to herein as the "corrected" effective HEC-RAS model. A comparison of the results is provided in Table 1. Both the effective and corrected effective models are provided in Appendix C.

Table 1. Comparison of Effective and Duplicate Effective Models

Station[1]	Effective FIS HEC-2 Model BFEs (ft)[2]	Duplicate Effective HEC-RAS Model BFEs (ft)[2]	Difference (ft)[3]	Corrected Effective HEC-RAS Model BFEs (ft)
180	1963.07	1963.10	0.03	1965.36
170	1961.62	1961.63	0.01	1963.89
160	1959.36	1959.35	-0.01	1961.61
150	1957.97	1957.95	-0.02	1960.21
140	1956.17	1956.16	-0.01	1958.42
130	1955.65	1955.67	0.02	1957.93
120	1955.02	1955.02	0.00	1957.28
110	1954.70	1954.70	0.00	1956.96
100	1952.50	1952.52	0.02	1954.78
90	1950.37	1950.40	0.03	1952.66
80	1948.39	1948.39	0.00	1950.65
70	1948.37	1948.38	0.01	1950.64
60	1944.38	1944.56	0.18	1946.82
50	1943.58	1944.33	0.75	1946.59
40	1940.75	1940.78	0.03	1943.04
30	1935.76	1935.79	0.03	1938.05
20	1933.32	1933.41	0.09	1935.67
10	1930.20	1930.22	0.02	1932.48

[1] Only sections in the vicinity of, and relevant to, the project reach are shown.
[2] Elevations shown are based on NGVD 29 benchmark.
[3] The differences in water surface elevations are associated with the differences in the critical depth calculation preformed by HEC-2 and HEC-RAS. HEC-2 calculates critical depth to ±2.5% of the flow depth; whereas, HEC-RAS calculates critical depth to ±0.01 foot.

4.2 Post-Project HEC-RAS Model

Under post-project conditions, supercritical flow is maintained throughout the entire project length, except at the energy dissipater. The energy dissipater was designed to create and control a hydraulic jump in order to slow the flow prior to releasing it into the downstream channel. The results of the mixed flow post-project model are compared to the corrected effective HEC-RAS model in Table 2. A copy of the HEC-RAS model is provided in Appendix C. Note that the post-project model includes only those sections affected by the project improvements (Stations 10 through 180).

Table 2. Comparison of Effective and Post-Project Models

Station[1]	Corrected Effective HEC-RAS Model BFEs (ft)[2]	Post-Project HEC-RAS Model BFEs (ft)[2]	Difference (ft)
180	1965.36	1965.36	0.00
170	1963.89	1963.89	0.00
160	1961.61	1961.61	0.00
150	1960.21	1958.60	-1.61
140	1958.42	1955.95	-2.47
130	1957.93	1955.44	-2.49
120	1957.28	1954.99	-2.29
110	1956.96	1954.60	-2.36
100	1954.78	1952.70	-2.08
90	1952.66	1950.86	-1.80
80	1950.65	1950.67	0.02
70	1950.64	1946.22	-4.42
60	1946.82	1944.34	-2.48
50	1946.59	1937.49	-9.10
40	1943.04	1936.99	-6.05
30	1938.05	1933.95	-4.10
20	1935.67	1932.39	-3.28
10	1932.48	1932.43	-0.05

[1] The proposed Flood Zone 'A' ties into the existing Flood Zone 'A' at Station 180 and Station 10. Stations 20 through 100 were revised to reflect post-project conditions.

[2] Elevations shown are based on NAVD 88 benchmark.

Figure 3 in Appendix B is a work map showing the locations of the HEC-2 cross-sections, the effective and revised Zone 'A' boundaries, and the upstream and downstream limits of this study. On Figure 3, circled station numbers were taken directly from the effective FIS model, and those enclosed by a square were created for the purposes of this study.

The limits of the post-project models were extended upstream and downstream of the project improvements a sufficient distance to "tie" into the corrected effective FIS models. At the upstream end, the post-project model ties into the corrected effective FIS model at Station 180, with BFE equal to 1965.36. Critical depth was used for the upstream boundary condition because nearly all of the HEC-2 cross-sections from the effective model contained computed flows at critical depth. The post-project model ties into the subcritical corrected effective FIS model at Station 10, BFE equal to 1932.48 ft.

While preparing this request for LOMR, it was noticed that the line work delineating the Flamingo Wash Zone 'A' appears to be shifted south

between Cambridge and Spencer Streets. As part of this submittal, we have adjusted this flood zone northward approximately 20 feet, to better agree with the boundaries of the wash.

5.0 CONCLUSION

Project improvements, including the free span bridge at Spencer and concrete channel lining, were incorporated into the corrected effective FIS HEC-RAS model. The results of the hydraulic analysis indicate that the 100-year flood will be contained within the channel for the entire length of the project.

APPENDIX A
FEMA Forms

FEDERAL EMERGENCY MANAGEMENT AGENCY

OVERVIEW & CONCURRENCE FORM

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

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hour 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.**

A. REQUESTED RESPONSE FROM FEMA

This request is for a (check one):

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

☒ LOMR: A letter from FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See Parts 60 & 65 of the NFIP Regulations.)

B. OVERVIEW

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

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301	City of Katy	TX	480301	0005D	02/08/83
480287	Harris County	TX	48201C	0220G	09/28/90
320003	Clark County Unincorporated Areas	NV	32003C	2557E	09/27/02

2. Flooding Source: Flamingo Wash

3. Project Name/Identifier: Maryland Parkway to Spencer Street - Phase 1

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

5. Basis for Request and Type of Revision:

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

☒ Physical Change ☐ Improved Methodology/Data

☐ Regulatory Floodway Revision ☐ Other (Attach Description)

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

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

Types of Flooding:	☒ Riverine	☐ Coastal	☐ Shallow Flooding (e.g., Zones AO and AH)
	☐ Alluvial fan	☐ Lakes	☐ Other (Attach Description)
Structures:	☒ Channelization	☐ Levee/Floodwall	☒ Bridge/Culvert
	☐ Dam	☐ Fill	☒ Other, Attach Description

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: Syndi J. Flippin-Dudley, Ph.D, P.E.	Company: The Louis Berger Group, Inc.	
Mailing Address: 500 East Amigo Court Suite 100 Las Vegas NV 89119	Daytime Telephone No.: (702)-736-6632	Fax No.: (702)-736-0704
	E-Mail Address: sdudley@louisberger.com	
Signature of Requester (required): Syndi J. Flippin-Dudley		Date: 10/15/03

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)-455-4808
Community Name: Clark County Unincorporated Areas	Community Official's Signature (required):	Date: 10/15/03

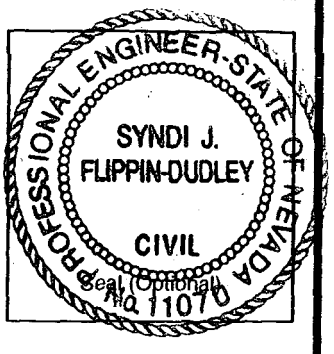
CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

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: Syndi J. Flippin-Dudley	License No.: 11070	Expiration Date: 6/30/05
Company Name: The Louis Berger Group, Inc.	Telephone No.: (702)-736-6632	Fax No.: (702)-736-0704
Signature: Syndi J. Flippin-Dudley		Date: 10/15/03

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



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: Flamingo 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	Downstream X-section on FIS	10	1932.48	1932.43
Upstream Limit	Existing Drop Structure	180	1965.36	1965.36

2. Hydraulic Method Used

Hydraulic Analysis HEC-RAS V3.1.1 [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: 879_D_Spnc.p01	Floodway File Name:
Corrected Effective Model*	Natural File Name: 879_D_Spnc.p02	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: base2a.out	Floodway File Name:
Revised or Post-Project Conditions Model	Natural File Name: 879_D_Spnc.p03	Floodway File Name:
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:
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: Maryland Parkway to Spencer Street Phase 1 Improvments**

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

   Location of Structure: Flamingo Wash from Spencer Street to existing concrete channel upstream

   Downstream Limit/Cross Section: 20

   Upstream Limit/Cross Section: 81

2. **Name of Structure: Spencer Street Bridge**

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

   Location of Structure: Flamingo Wash

   Downstream Limit/Cross Section: 40

   Upstream Limit/Cross Section: 50

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: Flamingo Wash

Name of Structure: Maryland Parkway to Spencer Street Phase 1 Improvments

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 5,300 (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): Energy dissipator

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: Flamingo Wash

Name of Structure: Spencer Street 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 V3.1.1
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.

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.

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.

Department of Public Works

500 S Grand Central Pky • PO Box 554000 • Las Vegas NV 89155-4000
(702) 455-6000 • Fax (702) 455-6040

M.J. Manning, Director • E-Mail: mjm@co.clark.nv.us

October 21, 2003

Mr. Max Yuan
Federal Emergency Management Agency
Hazard Study Branch
Federal Insurance and Mitigation Administration
500 C Street, SW
Washington, DC 20472

FLAMINGO WASH, MARYLAND PARKWAY TO SPENCER STREET- PHASE I
Bid Number 4906-01, Project Number F990813

Dear Mr. Yuan:

This letter is written to certify "as-built" conditions for the above project. Construction on this portion of the Flamingo Wash was completed in October 2002. The structures, including the channel, storm drain, energy dissipation and related facilities, were all constructed in substantial accordance with the project improvement plans sealed by the design engineer on August 3, 2001. The flood control facilities are currently functioning.

If you have any questions or need additional information, please call the undersigned at (702) 455-6080.

M. J. MANNING
DIRECTOR OF PUBLIC WORKS

BY: Kathleen L Kingston
KATHLEEN L. KINGSTON, P. E.
Senior Engineer

KLK:dbm

cc: Syndi Dudley, Louis Berger Group
Denis Cederburg, Deputy Director of Public Works

F990813\036d

EXPLANATIONS

Explanation of CHECK-RAS Output Messages (Form 2, Section B-3)

- The hydraulic model is of a concrete lined channel which has a Manning's n value of 0.015.
- The flow is contained in the channel therefore there is no overbank flow.
- Expansion and contraction losses are minimal at bridges because the channel has uniform geometry.
- The downstream reach distances for sections 140 and 90 were taken from the effective FIS model and were not modified.

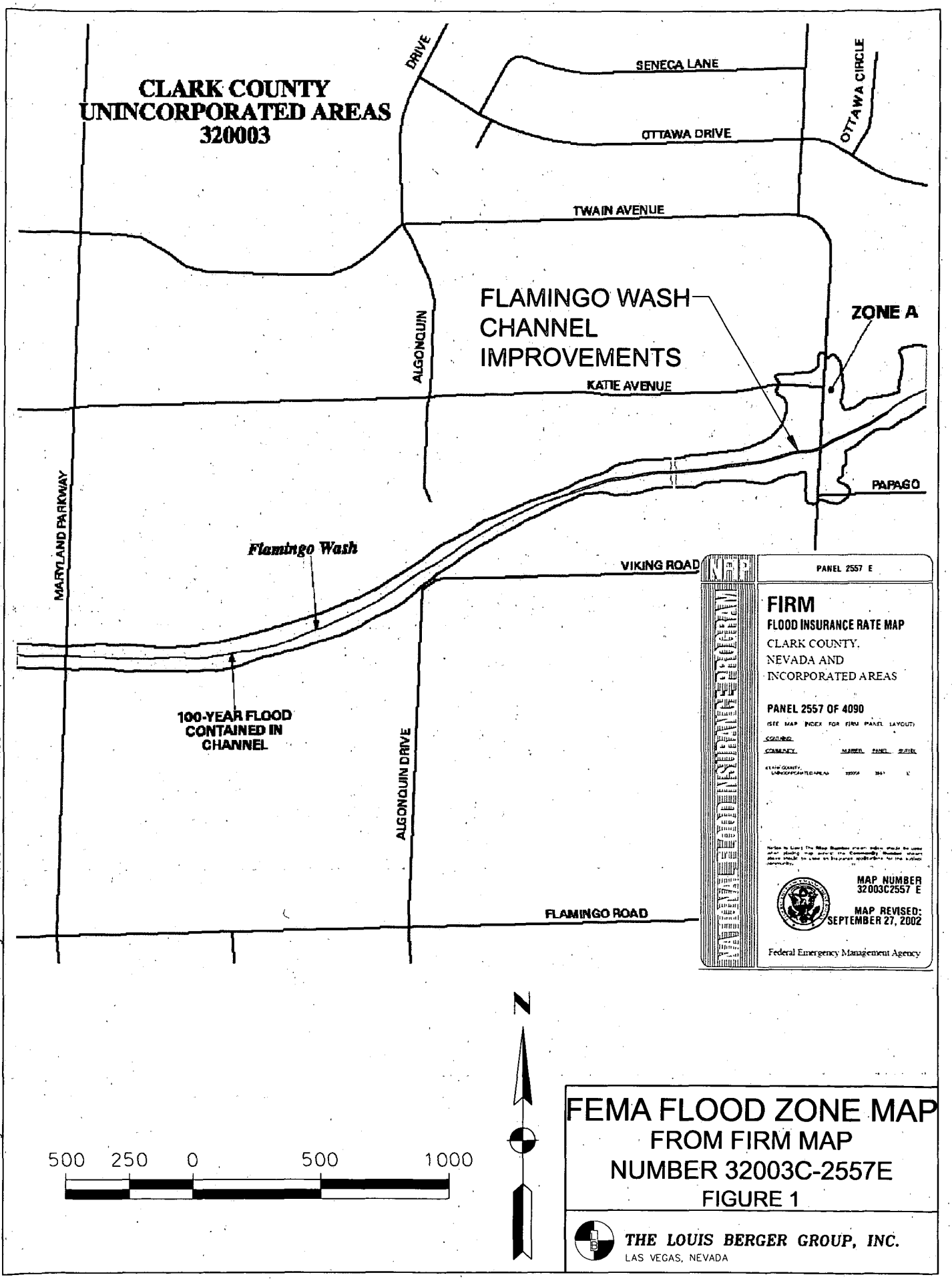
Explanation of Supercritical Depth (Form 3, Section B-3)

Supercritical flow in the channel exists. Routine maintenance of the channel will be preformed therefore the potential for a hydraulic jump in the channel is minimal. There is an energy dissipater downstream of the Spencer Street Bridge that forces a hydraulic jump to occur. The height of the channel is increased through the energy dissipater to insure that the hydraulic jump is contained with in the channel.

Explanation of Sediment Transport (Form 3, Section B-4 & Section C-4)

Sediment transport was not considered because its effect on water surface elevations is negligible.

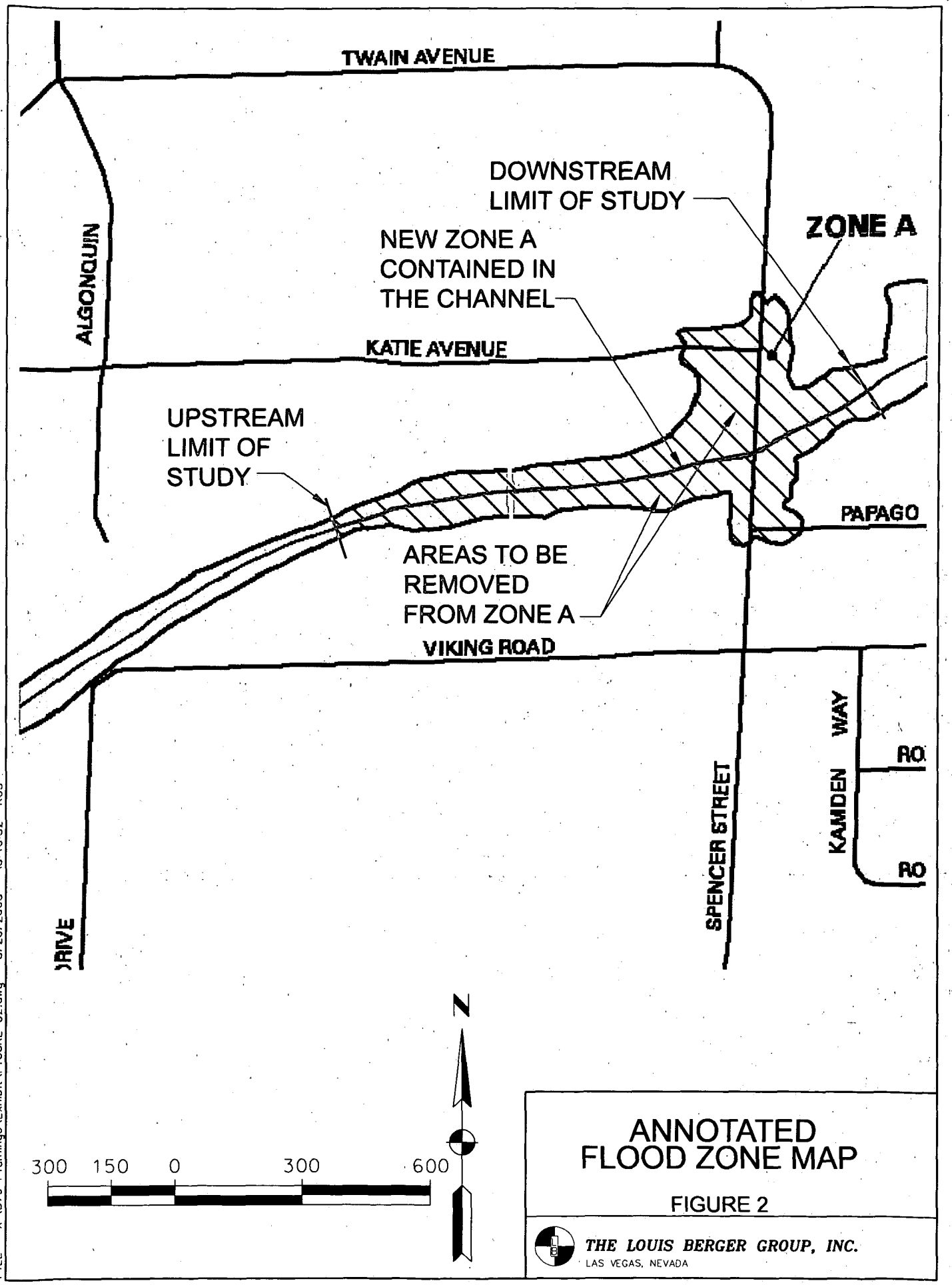
APPENDIX B
Figures



FEMA FLOOD ZONE MAP
FROM FIRM MAP NUMBER 32003C-2557E
FIGURE 1

THE LOUIS BERGER GROUP, INC.
LAS VEGAS, NEVADA

FILE: X:\879-Flamingo\Exhibit\2557E-FIGURE-01.dwg - 8/26/2003 - 8:45:44 RGS



ANNOTATED FLOOD ZONE MAP

FIGURE 2

THE LOUIS BERGER GROUP, INC.
LAS VEGAS, NEVADA

FILE: X:\879-Flamingo\Exhibit\FIGURE-02.dwg - 8/26/2003 - 13:40:32 RGS

Photo 1 - Energy Dissipator and End of Concrete Channel Downstream of Spencer Street

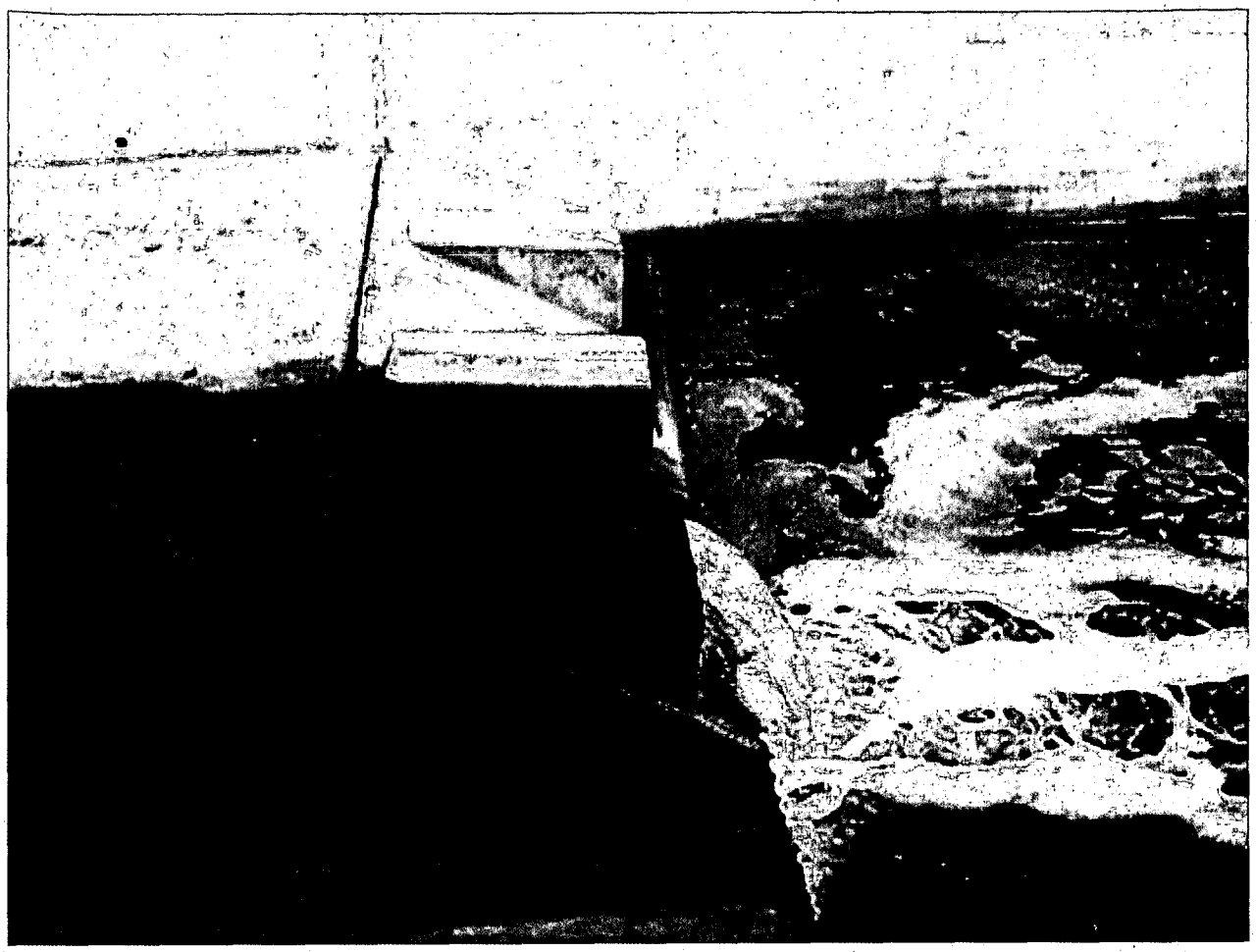


Photo 2 - Energy Dissipator Downstream of Spencer Street

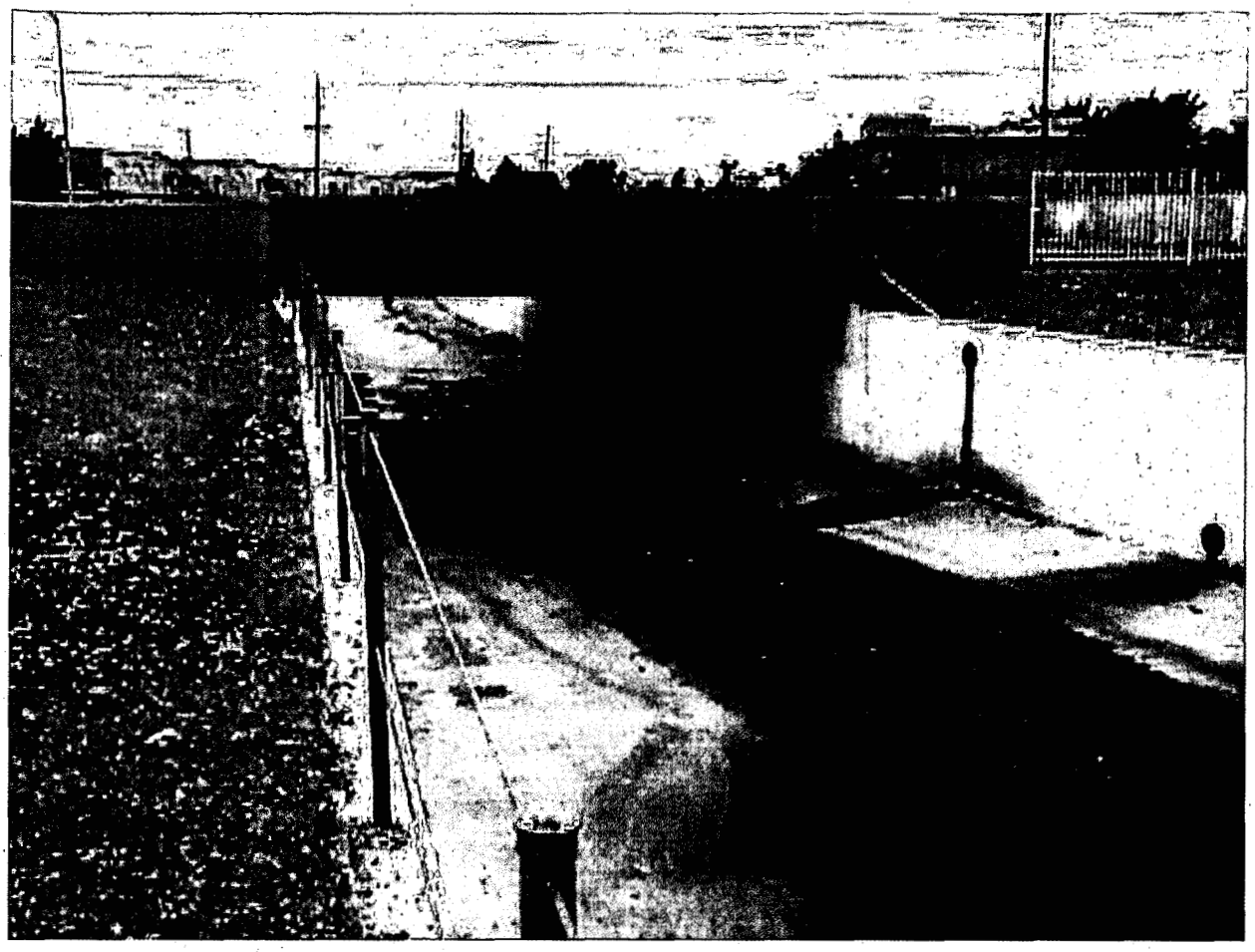


Photo 3 - Spencer Street Bridge Looking Upsteam

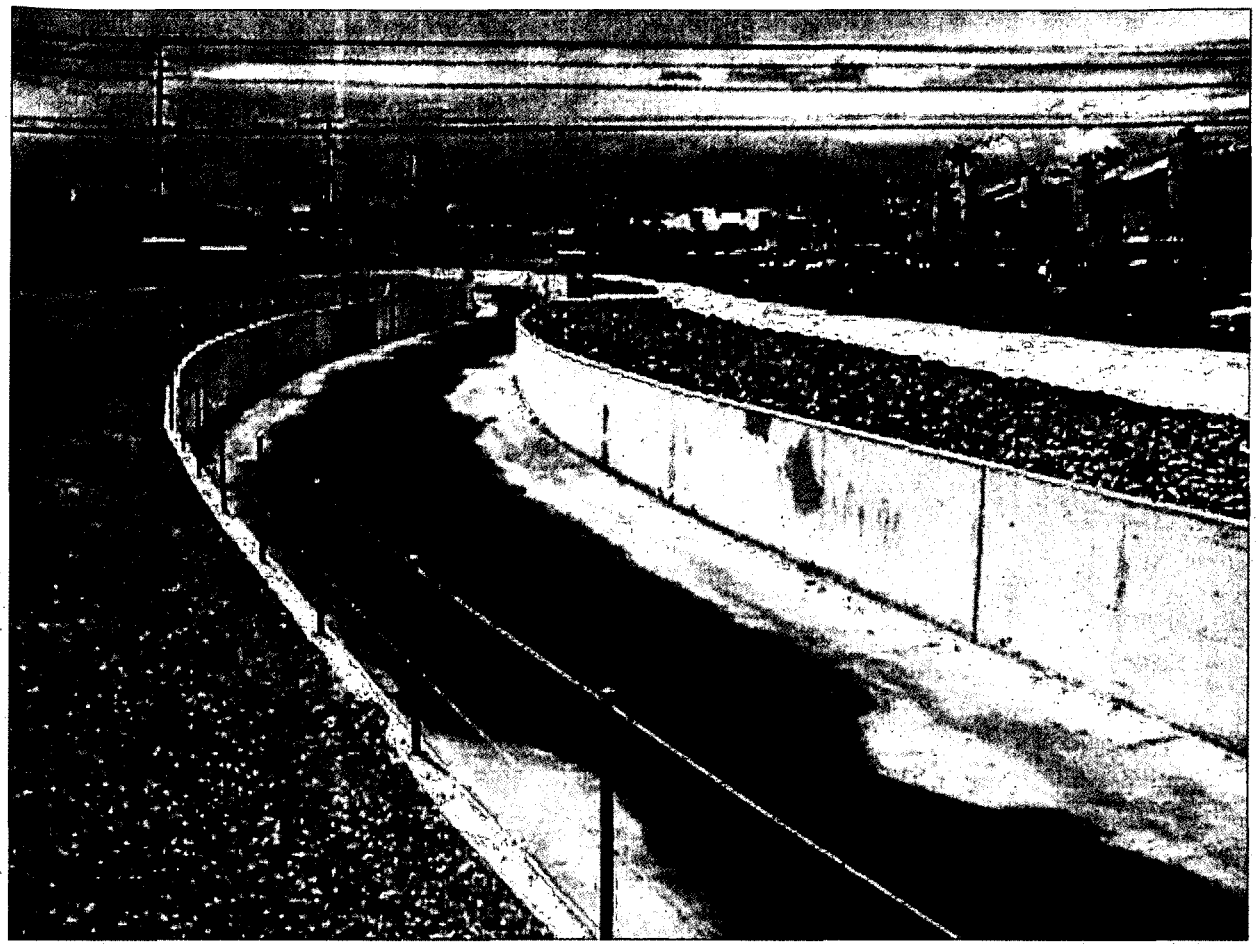


Photo 4 - Concrete Channel Looking Upstream

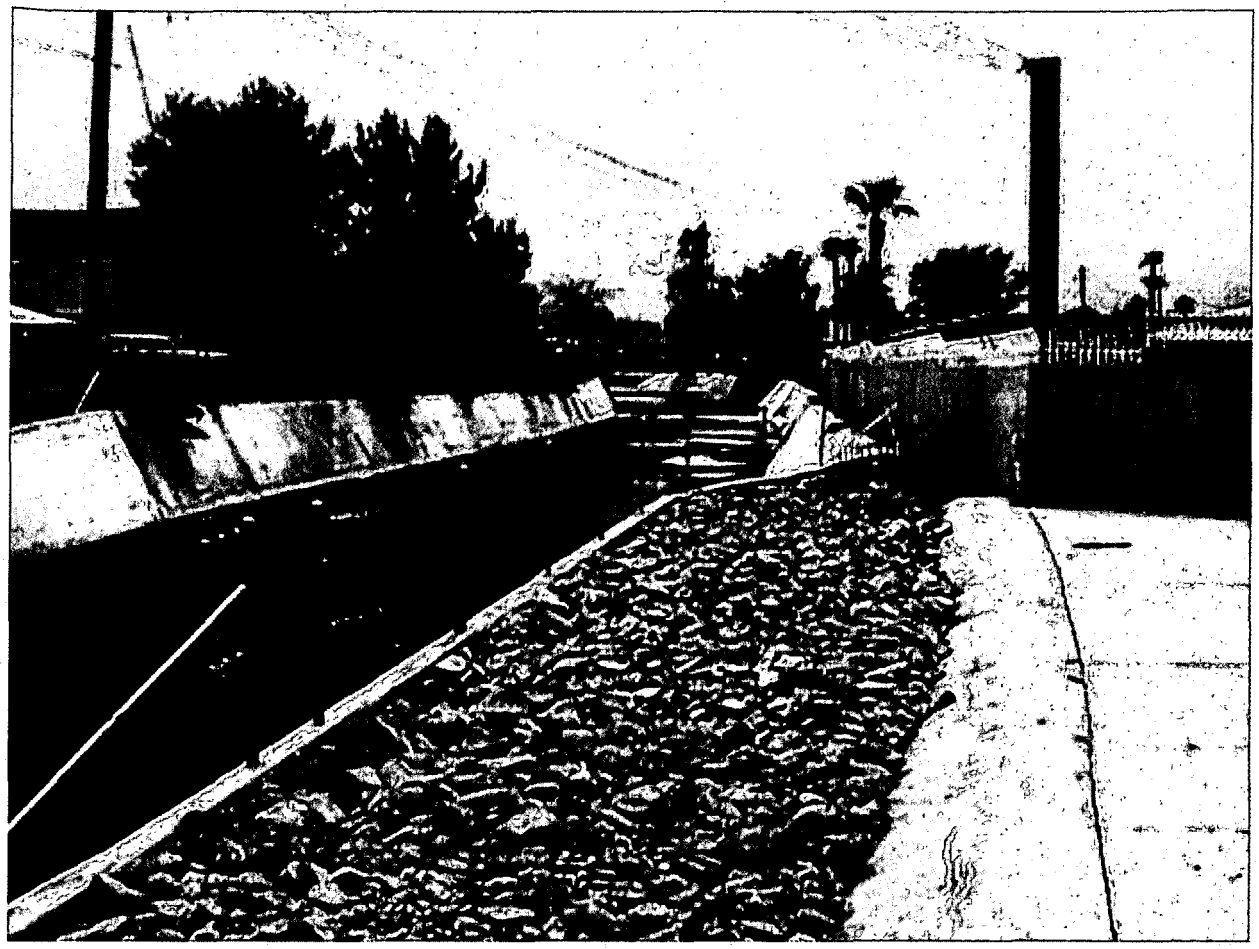


Photo 5 - Connection to Existing Concrete Channel

TWAIN

TWAIN

ALG

KATIE

MARYLAND

CAMBRIDGE

SPENCER

DOWNSTREAM LIMIT OF STUDY

UPSTREAM LIMIT OF STUDY

FLAMINGO WASH

VIKING

KAMDEN

ROXFORD

ROXBURY

ALGONQUIN

FLAMINGO

NEVSO

TAMAR

ESCONC

MARYLAND

GROVE

CLAYMONT

COTTAGE GROVE

LIMIT OF STUDY

FLOODWAY

EXISTING ZONE "A" BOUNDARY

EXISTING ZONE "A" BOUNDARY SHIFTED NORTH TO LINE UP WITH CHANNEL.

POST PROJECT ZONE A CONTAINED IN CHANNEL

SPENCER STREET BRIDGE

2012.7 2015.4 2016.6 2020 2019.1 2008.4 1999.9 1988.6 2001.1 2000 1995.7 1991 1984.9 1985.1 1970.5 1968.4 1968.8 1971.7 1961.8 1947.2 1944.4 1940 1931.9 1936 1947.4 1951.9 1958.5 1964.4 1967.2 1973.1 1976.1 1983.2 1985.2 1985.3 1993.7 2007.8 2007.3 2011.1 2012 2020 2020.8 2024.6 2009.4 2002.1 1998.9 2007.9 2013.9 2014.2 2027.4 2021.7 2012.9 2010.6

10 20 22 24 26 28 30 35 40 50 55 60 65 70 75 81 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300

NOTES:

1. THE VERTICAL CONTROL IS BASED ON THE NGVD 29 AND HORIZONTAL CONTROL IS BASED ON THE NAVD 83, UTILIZING CLARK COUNTY MONUMENTS.
2. THE CORRECTION FACTOR FROM NGVD 29 TO NAVD 88 IS +2.26 ft. THE HECRAS MODEL CROSS-SECTION ELEVATIONS ARE BASED ON NAVD 88.
3. PLAN MODIFIED FROM "FLAMINGO WASH FIS-RESTUDY IMPERIAL PALACE TO SPENCER STREET CROSS SECTION EXHIBIT" PREPARED BY G.C. WALLACE INC. DATED 11-11-1997.
4. THE EXISTING FLOOD ZONE LIMITS SHOWN HEREON ARE FROM THE CLARK COUNTY GIS DATA.

LEGEND

(150) FLAMINGO WASH FIS RESTUDY CROSS SECTION (TYP)

[130] POST PROJECT CONDITIONS CROSS SECTION (TYP)

PROFESSIONAL ENGINEER-STATE OF NEVADA SYNDI L. FLIPPIN-HUDLEY EXP 12/31/05 CIVIL No. 11070 10/15/03

N

200 100 0 200 400 800

WORK MAP

FLAMINGO WASH AT SPENCER

FIGURE 3

THE LOUIS BERGER GROUP, INC.
LAS VEGAS, NEVADA

FILE NAME: X:\879-Flamingo\Exhibit\879-FIGURE-03.dgn - 10/15/2003 - 12:53:11 JPS

APPENDIX C
Hydraulic Models

Effective Model HEC-2 Output File (NGVD 29)

```
1*******************************************
 *  HEC-2 WATER SURFACE PROFILES           *
 *                                         *
 *  Version   4.6.2;  May 1991             *
 *                                         *
 *  RUN DATE    26NOV03    TIME   13:46:16  *
 *******************************************
```

```
 *****************************************
 *  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    X
XXXXXXX  XXXX     X         XXXXX    XXXXX
X     X  X        X                 X
X     X  X        X     X           X
X     X  XXXXXXX   XXXXX             XXXXXXX
```

```
1
    26NOV03      13:46:16                                                    PAGE    1
```

```
 ************************************
  HEC-2 WATER SURFACE PROFILES

  Version   4.6.2;  May 1991
 ************************************
```

THIS RUN EXECUTED 26NOV03 13:46:16

```
 T1      550.032
 T2      FLAMINGO WASH FIS RESTUDY
 T3      FLOODPLAIN DETERMINATION
 T4      FILES: BASE2.DWG, BASE2.DAT
 T4      STARTING WSE = NORMAL DEPTH
 T4      SUBCRITICAL RUN

 J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                 2                           0.01                          5500      1930

 J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      -1                  -1                                      -2        -6

 J3  VARIABLE CODES FOR SUMMARY PRINTOUT

     100                   150

 NC    0.035      0.035       0.03        0.1         0.3
 X1       10         32    1220.49    1306.65
 GR   1935.1       1000       1934    1049.49        1932    1095.06        1930    1144.27    1928.13    1220.49
 GR     1928    1220.83       1926    1228.41        1924     1235.7     1923.35    1237.99       1922     1249.9
 GR   1921.7    1252.38       1922    1254.61        1924    1271.01     1924.23    1272.95    1925.54    1279.8
```

GR	1926	1285.65	1928	1306.65	1930	1322.46	1931.03	1329.96	1932	1344.12
GR	1934	1372.27	1936	1402.27	1936.46	1409.32	1936.88	1418.36	1938	1426.01
GR	1939	1436.49	1940	1496.07	1940.85	1580.86	1942	1671.03	1942.26	1677.54
GR	1942.4	1685.16	1944	1718.9						
NC	0.035	0.035	0.03							
X1	20	35	1227.96	1305.87	314.44	275.67	297.76			
GR	1936	1000	1935.65	1006.11	1934	1064.7	1932	1208.86	1931.19	1227.96
GR	1930	1233.9	1928	1243.73	1926	1253.48	1925.75	1254.71	1924.4	1278.37
GR	1925.1	1284.64	1926	1286.28	1928	1290.47	1930	1294.74	1931.66	1298.29
GR	1932	1305.87	1934	1329.91	1936	1346.51	1938	1362.32	1940	1377.32
GR	1940.2	1379.3	1940.6	1458.06	1940	1497.53	1939.68	1514.53	1939.62	1517.34
GR	1939.5	1549.95	1939.75	1574.13	1940	1575.86	1941.16	1586.4	1942	1601.6
GR	1942.2	1603.5	1944	1614.3	1945.22	1621.6	1945.43	1765.27	1946	1766.42
NC	0.025	0.025	0.015							
X1	30	28	1130.52	1218.84	407.19	429.8	417.8			
GR	1941.1	1000	1941.1	1090.06	1940.79	1103.29	1940	1130.52	1938	1133.35
GR	1936	1135.91	1934	1138.18	1932	1140.33	1930	1142.47	1929.61	1142.75
GR	1929.4	1159.96	1928.83	1167.49	1930	1172.19	1930.19	1173.44	1930.28	1191.06
GR	1930	1194.2	1929.29	1201.75	1930	1203.16	1932	1207.08	1934	1211
GR	1936	1214.92	1938	1218.84	1939.89	1222.54	1940	1224.83	1941.2	1249.47

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GR	1942	1260.06	1942.66	1268.85	1944	1274.05				
NC	0.025	0.025	0.015							
X1	40	12	1133.81	1184.19	10	10	10			
X3	0			1133.81	1942	1184.19	1942			
GR	1941.3	1000	1941.45	1090.13	1941.22	1104.02	1940	1133.81	1933.6	1133.81
GR	1933.6	1184.19	1940	1184.19	1940	1206.88	1941.22	1232.32	1942	1242.6
GR	1942.6	1251.47	1944	1256.84						
NC	0.025	0.025	0.015							
SB	0.9	1.56	2.6	170	50.38	2.38	240	0	1934.6	1933.6
X1	50	12	1184.49	1234.87	112.85	117.18	115.08			
X2			1	1939.599	1943.13			1.33		
X3	0			1184.49	1945	1234.87	1945			
GR	1942.5	1000	1943.06	1093.5	1942.65	1100.84	1942.61	1115.98	1942	1129.89
GR	1942	1184.49	1934.6	1184.49	1934.6	1234.87	1943	1234.87	1943	1239.96
GR	1943.2	1254.01	1943.64	1350.42						
NC	0.025	0.025	0.015							
QT	1	5300								
X1	60	27	1059.71	1149.4	375.8	397.17	387.41			
GR	1949.4	1000	1948	1015.95	1947.88	1017.39	1946.17	1047.07	1946	1049.22
GR	1945.2	1059.71	1944	1062.77	1942	1067.82	1940	1072.95	1939.77	1073.57
GR	1939.5	1090.82	1938	1094.84	1936.76	1097.96	1936.87	1110.33	1938	1113.23
GR	1939.2	1116.15	1939.37	1137.83	1940	1138.84	1942	1142.41	1944	1145.9
GR	1946	1149.4	1947.75	1152.54	1948	1155.14	1949.08	1165.1	1949.24	1192.51
GR	1950	1202.7	1950.32	1206.97						
NC	0.025	0.025	0.015							
X1	70	23	1062.67	1154.22	427.31	406.33	417.23			
GR	1952	1000	1951.01	1048.35	1950	1062.67	1949.99	1063.36	1948	1067.18
GR	1946	1070.79	1944	1074.17	1942.83	1076	1943.1	1084.29	1942	1099.07
GR	1941.8	1099.92	1941.57	1112.55	1942	1115.39	1943.17	1121.4	1943.35	1139.21
GR	1944	1140.31	1946	1143.61	1948	1146.85	1950	1149.96	1951.72	1152.28

GR	1952	1154.22	1953.75	1165.11	1953.84	1194.64				
NC	0.025	0.025	0.015							
X1	80	19	1056.35	1140.68	1	1	1			
GR	1952	1000	1952	1002.13	1951.45	1036.88	1950.33	1056.35	1950	1056.92
GR	1948	1060.33	1946	1063.74	1944	1067.15	1942.6	1068.83	1942.6	1132.22
GR	1944	1132.98	1946	1136.05	1948	1138.66	1950	1140.68	1951.88	1142.98
GR	1952	1143.96	1954	1156.72	1954	1157.77	1954.38	1201.02		
NC	0.025	0.025	0.015							
X1	90	23	1052.98	1113.6	53.02	56.59	51.93			
GR	1955.2	1000	1954	1006.02	1953.68	1007.66	1952.47	1022.15	1952	1035.65
GR	1951.6	1045.56	1951.07	1052.98	1950	1054.57	1948	1057.59	1946	1060.63
GR	1944	1063.71	1943.1	1065.06	1943.1	1105.06	1944	1109.3	1946	1110.15
GR	1948	1110.99	1950	1111.87	1952	1112.94	1953.03	1113.6	1954	1119.02
GR	1954.3	1121.63	1954	1145.66	1953.67	1187.07				

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NC	0.025	0.025	0.015							
X1	100	27	1068.7	1129.14	346.14	339.84	342.73			
GR	1958.9	1000	1959.19	1057.4	1958.29	1068.55	1958	1068.7	1956	1070.39
GR	1954	1071.98	1952	1073.58	1950	1075.17	1948	1076.75	1946	1078.32
GR	1944.7	1079	1944.7	1119	1946	1119.77	1948	1121.07	1950	1122.37
GR	1952	1123.68	1954	1124.99	1956	1126.31	1956.84	1126.86	1958	1129.14
GR	1960	1133.08	1961.7	1136.43	1962	1161.01	1962	1164.12	1962	1169.92
GR	1962.1	1180.79	1963.48	1218.41						
NC	0.025	0.025	0.015							
X1	110	25	1070.23	1130.3	1	1	1			
GR	1958	1000	1959.26	1058.72	1958.52	1069.8	1958	1070.23	1956	1071.86
GR	1954	1073.49	1952	1075.13	1950	1076.77	1948	1078.41	1947.23	1079.37
GR	1947.2	1119.37	1948	1122.31	1950	1123.63	1952	1124.96	1954	1126.29
GR	1956	1127.61	1956.94	1128.23	1958	1130.3	1960	1134.23	1961.78	1137.72
GR	1962	1156.11	1962	1162.57	1962	1167.55	1962.22	1180.81	1963.53	1218.4
NC	0.025	0.025	0.015							
X1	120	27	1082.95	1140.72	25.32	22.42	24.78			
GR	1959.7	1000	1960	1034.06	1960.7	1069.3	1960	1077.37	1959.54	1081.8
GR	1958	1082.95	1956	1084.44	1954	1085.94	1952	1087.44	1950	1088.93
GR	1948	1090.43	1947.5	1090.88	1947.5	1130.88	1948	1133.47	1950	1134.85
GR	1952	1136.24	1954	1137.62	1956	1138.99	1957.22	1139.81	1958	1140.72
GR	1960	1142.7	1962	1144.46	1962.02	1148.81	1962	1152.73	1962	1157.77
GR	1962.4	1185.25	1963.78	1223.58						
NC	0.025	0.025	0.015							
X1	130	24	1091.34	1145.53	125.29	125.61	125.31			
GR	1963	1000	1962	1082.33	1960	1086.89	1958.57	1090.09	1958	1091.34
GR	1956	1092.89	1954	1094.44	1952	1095.99	1950	1097.54	1948	1099.5
GR	1948	1139.5	1950	1141.65	1952	1142.63	1954	1143.6	1956	1144.57
GR	1958	1145.53	1960	1147.33	1961.39	1148.78	1962	1151.72	1962.83	1155.18
GR	1964	1156.8	1964.47	1157.37	1965.16	1174.08	1965.71	1213.65		
NC	0.025	0.025	0.015							
X1	140	25	1123.53	1181.8	57.23	56.76	55.76			
GR	1965.1	1000	1964	1109.48	1964.09	1112.94	1962	1117.49	1960	1121.87
GR	1959.2	1123.53	1958	1124.74	1956	1126.67	1954	1128.54	1952	1130.26
GR	1950	1131.84	1948.5	1132.5	1948.5	1172.5	1950	1175.19	1952	1176.29

GR	1954	1177.52	1956	1178.95	1958	1180.42	1959.86	1181.8	1960	1182.12
GR	1962	1186.57	1964	1191.03	1966	1195.47	1966.85	1197.34	1966.36	1258.33
NC	0.025	0.025	0.015							
X1	150	24	1135	1193.6	1	1	1			
GR	1965.4	1000	1964.25	1124.53	1964	1124.8	1962	1129.47	1960	1133.87
GR	1959.5	1135	1958	1136.46	1956	1138.43	1954	1140.4	1952	1142.4
GR	1950.5	1143.5	1950.5	1183.5	1952	1187.45	1954	1189.03	1956	1190.57
GR	1958	1192.09	1959.99	1193.6	1960	1193.68	1962	1198.04	1964	1202.42
GR	1966	1206.72	1966.89	1208.61	1967.17	1222.54	1966.39	1280.29		

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NC	0.025	0.025	0.015							
X1	160	21	1022.9	1081.97	119.51	110.97	114.85			
GR	1964	1000	1962	1020.85	1961.14	1022.9	1960	1024.28	1958	1026.68
GR	1956	1029.05	1954	1031.39	1952	1033.69	1951.76	1033.96	1951.77	1074.55
GR	1952	1074.73	1954	1076.3	1956	1077.86	1958	1079.44	1960	1081.05
GR	1961.1	1081.97	1962	1085.8	1964	1091.98	1966	1097.23	1966.68	1098.86
GR	1967.1	1124.37								
NC	0.025	0.025	0.015							
X1	170	24	1021.94	1098.85	98.31	96.38	97.13			
GR	1967	1000	1966	1012.58	1965.99	1012.86	1964	1017.32	1962	1021.94
GR	1961.3	1023.53	1960	1025.98	1958	1029.63	1956	1033.27	1954	1036.91
GR	1952.3	1039.96	1952.49	1078.78	1952.8	1090.15	1954	1091.24	1956	1093.09
GR	1958	1094.94	1960	1096.8	1961.88	1098.54	1962	1098.85	1964	1103.45
GR	1966	1107.87	1968	1112.15	1968.22	1112.6	1968.32	1119.73		
NC	0.03	0.03	0.025							
X1	180	37	1105.54	1192.93	358.08	374.39	363.91			
GR	1970	1000	1969.41	1028.94	1968.36	1064.62	1968.63	1086	1970	1087.29
GR	1970.1	1087.42	1970	1100.03	1969.97	1105.54	1968	1109.38	1966	1113.23
GR	1964	1117.01	1962	1120.79	1960	1124.58	1958	1128.36	1956.15	1131.88
GR	1956.8	1143	1956	1147.31	1955.07	1152.03	1956	1170.74	1955.93	1170.74
GR	1958	1176.71	1959.49	1180.23	1960	1180.82	1962	1183.17	1964	1185.58
GR	1966	1188.01	1968	1190.47	1970	1192.93	1972	1195.38	1974	1197.84
GR	1975.3	1199.53	1976	1202.18	1976.53	1204.15	1978	1230.41	1978.06	1230.73
GR	1979.6	1268.21	1980	1278.63						
NC	0.03	0.03	0.025							
X1	190	42	1045.63	1134.18	349.99	362.07	356.25			
GR	1980	1000	1979.83	1002.64	1978.63	1026.03	1978	1042.24	1977.86	1045.63
GR	1976	1048.01	1974.65	1049.5	1974	1051.69	1972.2	1057.64	1972	1057.83
GR	1970	1059.68	1968	1061.56	1966	1063.46	1964	1065.36	1962	1067.28
GR	1960.4	1068.9	1960.4	1079.82	1960	1081.62	1958	1090.14	1957.64	1091.57
GR	1957.9	1101.67	1958	1101.76	1960	1106.43	1960.85	1108.4	1962	1111.96
GR	1963.3	1116.18	1964	1117.03	1966	1119.5	1968	1121.97	1970	1124.43
GR	1972	1126.89	1974	1129.33	1976	1131.76	1978	1134.18	1980	1136.59
GR	1980.8	1137.6	1981.5	1143.92	1982	1150.97	1982.99	1166.12	1984	1176.63
GR	1984.3	1179.97	1984.45	1222.66						
NC	0.03	0.03	0.025							
X1	200	35	1081.17	1169.9	344.1	367.63	357.38			
GR	1979.8	1000	1979.18	1029.49	1979.12	1052.59	1978.6	1067.43	1978	1077.24
GR	1977.7	1081.17	1976	1083.12	1974	1085.36	1972	1087.6	1970	1089.84
GR	1968	1092.07	1966	1094.26	1964	1096.33	1963.25	1097.1	1962.44	1108.96
GR	1963.4	1118.36	1963.2	1132.05	1964	1134.42	1965.81	1139.65	1966	1140.91

GR	1968	1152.85	1968.07	1153.21	1970	1155.03	1972	1156.9	1974	1158.74
GR	1976	1160.58	1978	1162.42	1980	1164.26	1982	1166.1	1984	1167.93
GR	1986	1169.8	1986.14	1169.9	1985.91	1175.55	1988	1199.66	1988.33	1203.15

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NC	0.025	0.025	0.015							
X1	210	28	1020.72	1112.24	218.28	223.05	220.26			
GR	1984	1000	1984.02	1005.21	1982.67	1015.97	1982	1020.72	1980	1024.38
GR	1978	1026.77	1976	1029.13	1974	1031.45	1972	1033.74	1970	1036.02
GR	1968	1038.3	1966	1040.57	1965.48	1041.23	1965.56	1087.58	1966	1088.46
GR	1968	1090.47	1970	1092.59	1972	1094.71	1974	1096.83	1976	1098.95
GR	1978	1101.07	1980	1103.2	1982	1105.33	1984	1107.49	1986	1109.84
GR	1986.9	1112.24	1987.25	1118.07	1988	1138.44				
NC	0.025	0.025	0.015							
X1	220	7	1044.15	1104.44	96.67	97.77	95.38			
X3	0			1044.15	1987	1104.44	1987			
GR	1986.2	1000	1986.57	1044.15	1968.66	1044.15	1968.66	1094.4	1986	1094.4
GR	1986.8	1104.44	1986.9	1141.04						
NC	0.025	0.025	0.015							
SB	0.9	1.56	2.6	115	50.25	2.25	576	0	1969.76	1968.66
X1	230	6	1059.76	1110.01	105.83	104.98	106.05			
X2			1	1981.76	1987.6			1.33		
X3	0			1059.76	1987.2	1110.01	1987.2			
GR	1987.1	1000	1987.1	1059.76	1969.76	1059.76	1969.76	1110.01	1987.1	1110.01
GR	1987.1	1161.77								
NC	0.025	0.025	0.025							
X1	240	24	1023.48	1114.49	100.09	99.49	98.95			
GR	1986	1000	1985.03	1014.57	1984.8	1023.48	1984	1025.31	1982	1030.02
GR	1980	1034.87	1978	1039.77	1976	1044.7	1975.59	1045.71	1975.71	1065.01
GR	1975.9	1076.65	1976	1079.47	1976.57	1085.82	1978	1090.42	1980	1094.27
GR	1982	1098.12	1984	1101.96	1986	1105.8	1988	1109.64	1990	1113.5
GR	1990.5	1114.49	1992.03	1119.47	1992	1119.74	1992.15	1125.82		
NC	0.025	0.025	0.025							
X1	250	29	1057.08	1169.75	483.82	467.47	478.12			
GR	1997.3	1000	1996	1025.03	1994	1057.08	1993.84	1059.01	1992	1061.82
GR	1990	1064.74	1988	1067.62	1986	1070.5	1984.57	1072.52	1984.32	1091.51
GR	1984	1092.06	1982	1095.54	1980	1099.12	1978.65	1101.59	1979.52	1114.22
GR	1980	1115.21	1982	1119.32	1982.68	1120.71	1982.27	1141.82	1984	1145.49
GR	1986	1149.77	1988	1154.11	1990	1158.51	1992	1162.95	1994	1167.41
GR	1995	1169.75	1994.48	1179.68	1996	1217.96	1998	1250.87		
NC	0.025	0.025	0.025							
X1	260	32	1125.84	1217.45	458.42	414.37	437.75			
GR	2002	1000	2000	1099.97	1999.98	1125.84	1998	1129.08	1996	1132.43
GR	1994	1135.78	1992	1139.14	1990.39	1141.83	1990.13	1157.45	1990	1157.66
GR	1988	1160.93	1986	1164.19	1984	1167.44	1982.24	1170.27	1982.12	1181.56
GR	1984	1184.35	1984.49	1185.06	1986	1192.93	1986.42	1195.31	1986.94	1204.85
GR	1988	1205.87	1990	1207.79	1992	1209.67	1994	1211.5	1996	1213.28
GR	1998	1214.99	2000	1216.64	2001.02	1217.45	2002	1230.77	2002.83	1241.5
GR	2002.6	1268.79	2003.91	1441.11						

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NC	0.025	0.025	0.02							
X1	270	16	1119.93	1157.26	213.44	213.44	213.69			
X3	0			1119.93	1999	1157.26	1999			
GR	1998.6	1000	1998.21	1067.08	1998	1077.71	1997.87	1089.69	1998	1095.71
GR	1998.1	1098.35	1998	1119.93	1983.4	1119.93	1983.4	1157.26	1998	1157.26
GR	2000	1175.33	2000.38	1176.08	2002	1184.44	2002.72	1188.02	2002.76	1209.37
GR	2004	1230.11								
NC	0.025	0.025	0.02							
SB	0.9	1.56	2.6	94	37.33	1.33	360	0	1984.3	1983.4
X1	280	17	1088.14	1124.47	110.45	115.15	110.04			
X2			1	1994.3	1997.3			1.33		
X3	0			1088.14	1999	1124.47	1999			
GR	2006	1000	2005.55	1016.53	2004	1023.84	2002	1033.33	2000.41	1040.84
GR	2000	1045.99	1999.38	1053.66	1998	1071.53	1997.96	1088.14	1984.3	1088.14
GR	1984.3	1124.47	1997.88	1124.47	1998	1130.07	1998.01	1135.33	1998	1135.45
GR	1997.3	1158.85	1998	1171.46						
NC	0.025	0.025	0.025							
QT	1	3900								
X1	290	27	1087.68	1216.15	402.5	479.38	451.82			
GR	2012.9	1000	2012.48	1087.68	2012	1088.64	2010	1092.64	2008	1096.63
GR	2006	1100.61	2004	1104.6	2002	1108.58	2000.01	1112.53	2000	1112.78
GR	1999.1	1129	1998	1131.23	1996	1134.95	1994	1138.62	1993.63	1139.29
GR	1993.7	1156.13	1994	1156.77	1996	1161.74	1998	1166.26	1998.4	1167.13
GR	2000	1187.26	2001.03	1198.95	2002	1203.24	2004	1211.29	2005.27	1216.15
GR	2006	1237.37	2006	1253.12						
NC	0.025	0.025	0.025							
X1	300	38	1101.61	1253.69	445.34	406.87	430.29			
GR	2022	1000	2023.2	1052.04	2023.19	1099.68	2022	1101.61	2020	1104.85
GR	2018	1108.13	2016	1111.46	2014	1114.82	2012	1118.18	2010.62	1120.51
GR	2010.6	1138.37	2010	1139.8	2008	1144.21	2006	1148.61	2004	1153
GR	2003.1	1154.97	2002	1161.54	2001.94	1161.9	2002	1162.1	2003.16	1166.76
GR	2004	1168.39	2006	1172.05	2008	1175.68	2010	1179.14	2012	1182.49
GR	2012.8	1183.85	2012.62	1222.77	2013.26	1227.82	2014	1230.57	2016	1238.32
GR	2016.5	1240.47	2018	1243.56	2020	1247.79	2022	1252.02	2022.49	1253.69
GR	2022.9	1271	2024	1310.6	2024.22	1318.33				
NC	0.025	0.025	0.015							
X1	310	9	1036.87	1067.87	360.41	351.83	353.38			
X3	0			1036.87	2020	1067.87	2020			
GR	2020.2	1000	2020	1012.51	2019.76	1026.57	2018	1036.87	2008	1036.87
GR	2008	1067.87	2018	1067.87	2018.74	1089.14	2020	1105.23		
NC	0.025	0.025	0.015							
SB	0.9	1.56	2.6	58	31	1	210	0	2008.4	2008
X1	320	6	1074.88	1105.88	89.08	89.25	86.84			
X2			1	2015.4	2020.2			1.33		
X3	0			1074.88	2021	1105.88	2021			
GR	2022	1000	2020	1074.88	2008.4	1074.88	2008.4	1105.88	2020	1105.88
GR	2020.4	1120.7								

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NC	0.035	0.035	0.03

X1	330	32	1073.22	1159.42	407.14	409.75	409.02			
GR	2028.2	1000	2028	1028.29	2027.94	1033.37	2026.74	1044.04	2028	1061.85
GR	2028.6	1070.03	2028	1073.22	2027.23	1077.02	2026	1081.25	2024	1088.07
GR	2022	1094.83	2020	1101.57	2019.81	1102.13	2018	1104.59	2016	1107.4
GR	2015.2	1108.46	2014.22	1116.23	2015.11	1124.64	2016	1126.01	2018	1129.12
GR	2020	1132.3	2020.97	1133.92	2021.77	1151.67	2022	1152.07	2024	1155.53
GR	2026	1158.82	2026.16	1159.42	2026.49	1168.36	2026.56	1198.52	2028	1224.16
GR	2028	1226.25	2028	1243.69						
NC	0.035	0.035	0.03							
X1	340	23	1056.91	1165.92	416.01	411.16	414.66			
GR	2034	1000	2033.54	1041.15	2032.89	1056.91	2032	1071.73	2031.99	1071.84
GR	2030	1076.76	2028	1081.57	2026	1086.12	2024	1090.12	2023.05	1093.65
GR	2022	1113.5	2021.92	1114.5	2022	1115.38	2022.98	1128.04	2024	1134.12
GR	2025.2	1141.02	2026	1143.48	2028	1149.7	2030	1155.88	2031.85	1161.5
GR	2032	1165.92	2032.4	1227.24	2032.47	1306.6				
NC	0.025	0.025	0.015							
X1	350	8	1014	1077.2	391.21	407.9	400.22			
X3	0			1014	2036	1077.2	2036			
GR	2035.1	1000	2034	1014	2025.9	1014	2025.9	1077.2	2034	1077.2
GR	2036	1086.37	2036.2	1094.88	2036.44	1095.33				
NC	0.025	0.025	0.015							
SB	0.9	1.56	2.6	70	63.2	3.2	480	0	2025.9	2025.9
X1	360	8	1023.92	1087.12	69.15	67.58	69.23			
X2			1	2033.9	2036.06			1.33		
X3	0			1023.92	2037	1087.12	2037			
GR	2036	1000	2036.27	1011.98	2036	1023.92	2025.9	1023.92	2025.9	1087.12
GR	2036	1087.12	2036.11	1091.98	2036.81	1114.07				
NC	0.025	0.025	0.015							
X1	370	23	1037.84	1109.55	67.22	66.57	66.95			
GR	2039.2	1000	2039.54	1028.04	2038	1035.22	2037.44	1037.84	2036	1044.09
GR	2034	1048.46	2032	1052.89	2030	1057.17	2028	1060.8	2028	1064.5
GR	2028	1081.98	2028	1089.63	2028	1099.06	2028	1106.03	2030	1106.68
GR	2032	1107.62	2034	1108.62	2035.81	1109.55	2036	1112.07	2036.77	1118.39
GR	2037.6	1131.72	2038	1190.66	2038	1190.72				
NC	0.025	0.025	0.015							
X1	380	17	1037.66	1118.27	1	1	1			
GR	2039.3	1000	2039.67	1028.22	2038	1035.96	2037.63	1037.66	2036	1043.96
GR	2034	1049.96	2032	1055.19	2030	1060.04	2030	1066.79	2030	1104.28
GR	2032	1106.78	2034	1108.4	2035.83	1109.57	2036	1111.36	2036.85	1118.27
GR	2037.7	1131.66	2038	1190.48						
NC	0.035	0.035	0.03							
X1	390	28	1040.49	1129.17	384.6	427.73	409.92			
GR	2043.5	1000	2043.12	1008.96	2044	1038.32	2044.06	1040.22	2044	1040.49
GR	2043.9	1040.61	2044	1040.96	2044.44	1044.41	2044	1045.36	2042	1049.72
GR	2040	1054.05	2038	1058.31	2036	1062.53	2034	1066.73	2033.2	1068.42
GR	2033.1	1081	2032.17	1087.19	2033.73	1092.76	2033.91	1107.36	2034	1107.55

GR	2036	1112.48	2038	1117.34	2040	1122.11	2042	1126.83	2042.99	1129.17
GR	2042	1141.02	2042.83	1171.51	2042.75	1213.88				
NC	0.025	0.025	0.015							

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X1      400        26     1023.26     1125.1     427.56     379.77     400.26
GR   2043.4      1000        2044    1008.84    2044.48    1016.77     2044.6    1018.87    2044.76    1023.26
GR     2044   1029.09     2043.84    1030.28       2042    1035.42       2040       1041       2038    1046.59
GR     2036   1052.17     2034.55    1056.13       2034    1071.56    2033.36    1076.02       2034    1078.19
GR   2034.8   1081.88     2035.08    1097.23       2036    1100.89    2036.84    1104.16       2038    1107.49
GR     2040   1113.12        2042    1118.75    2043.92    1124.26       2044     1125.1       2046     1147.4
GR     2048    1170.4

NC    0.025     0.025       0.015
X1      410        27     1023.15     1123.94          1          1          1
GR   2043.5      1000        2044    1007.48    2044.57    1016.63    2044.79    1018.64    2044.89    1023.15
GR     2044    1030.2     2044.01    1030.29       2042    1035.51       2040    1040.71       2038    1045.88
GR     2036   1051.03     2035.83     1051.5    2034.27     1053.8       2034    1065.18    2033.41    1076.18
GR   2033.8   1083.76        2034    1088.34    2034.44    1098.59    2035.86    1100.44       2036    1101.24
GR     2038   1106.68        2040    1112.44       2042     1118.2    2043.99    1123.94       2044    1124.08
GR     2046    1146.2        2048    1169.51

NC    0.025     0.025       0.015
X1      420        24     1043.78     1135.75      57.42      58.75      57.86
GR   2044.5      1000     2044.02     1013.17    2045.14     1029.1    2045.24    1031.49    2045.15    1043.78
GR     2044   1044.56        2042    1045.39       2040    1046.21       2038    1047.01       2036    1047.78
GR   2034.3    1048.4        2034    1070.27    2033.65    1090.96       2034    1102.69    2034.75     1134.3
GR     2036   1134.46        2038    1134.73       2040       1135       2042    1135.29       2044    1135.59
GR     2045   1135.75        2046    1151.17       2048    1177.91    2048.44    1184.02

NC    0.025     0.025       0.015
X1      430        11     1060.08     1090.66     208.31     211.94     208.45
X3        0                           1060.08       2048    1090.66       2048
GR     2049      1000        2048      1009.5    2047.54    1017.61     2046.6    1060.08    2034.15    1060.08
GR   2034.1   1090.66      2046.6    1090.66    2046.27    1095.89    2046.88    1121.19    2047.37    1136.94
GR   2047.3   1157.66

NC    0.025     0.025       0.015
SB     1.25      1.56         2.6        31.5      30.58       0.58        300          0    2048.53    2034.15
X1      440        15     1046.07     1076.65    1470.06    1457.21    1463.68
X2                              1     2058.53    2060.53                               2
X3        0                           1046.07       2060    1076.65       2060
GR   2058.6      1000     2059.32     1015.39    2058.81    1046.07    2048.53    1046.07    2048.53    1076.65
GR   2058.8   1076.65        2060    1087.37       2062    1090.99       2064    1094.51    2065.63    1098.52
GR     2066   1100.87      2066.3    1103.82       2066    1113.26    2065.91    1115.86    2065.96     1135.4

NC    0.025     0.025       0.015
X1      450        21     1069.16     1100.27     388.92      404.9     397.95
GR   2063.1      1000     2062.46      1062.1     2062.1    1069.08       2062    1069.16       2060    1070.84
GR     2058   1072.51        2056    1074.19       2054    1075.87    2052.22    1077.38    2052.71    1098.84
GR     2054   1099.01        2056    1099.27       2058    1099.53       2060    1099.79       2062    1100.06
GR   2062.4   1100.27     2062.24    1102.13       2064    1106.77    2065.41     1110.3       2066    1138.35
GR     2068   1229.16
1
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NC    0.025     0.025       0.015
X1      460        23     1069.93     1105.01     393.56     408.01     401.61
GR   2067.7      1000     2067.03     1064.15       2068    1069.93    2068.18    1070.53       2068    1070.67
GR     2066    1072.3        2064    1073.93       2062    1075.55       2060    1077.18       2058    1078.81
GR   2057.4   1079.29     2057.56     1100.18       2058    1100.27       2060     1100.7       2062    1101.09
GR     2064   1101.46        2066    1101.81    2066.59    1101.91       2068    1105.01    2068.95       1107
GR     2070   1116.39     2070.87    1124.41       2070     1214.9
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NC    0.025     0.025     0.015
X1      470        21   1076.93   1115.33    402.75    394.14    398.77
GR   2073.8      1000   2072.77    1065.9   2073.13   1076.93      2072   1077.24      2070   1078.56
GR     2068   1079.79      2066   1080.99      2064   1082.22   2062.67   1083.04   2062.71   1107.09
GR     2064   1107.31      2066   1107.65      2068   1108.01      2070   1108.51   2071.42   1108.98
GR     2072   1110.03      2074   1114.41   2074.36   1115.33      2074   1124.29    2073.8   1135.27
GR     2074   1315.22

NC    0.025     0.025     0.015
X1      480        21   1026.66   1163.79    213.66     185.9    192.99
X3        0                      1026.66      2076   1163.79      2076
GR   2073.6      1000   2073.75   1014.61      2074   1017.95   2074.97   1026.66      2074   1030.55
GR     2072    1042.8      2070   1054.27      2068   1065.84      2066   1074.47   2064.18    1079.6
GR   2064.2   1126.09      2066   1130.87      2068   1136.31      2070   1145.62      2072   1154.99
GR   2073.1   1163.79   2073.64   1179.89      2074   1182.32      2074   1184.45   2073.75   1196.44
GR   2073.7   1218.52

NC      0.1       0.1     0.016
NH        5       0.1    1078.9     0.016   1133.91       0.1      1380     0.016    1473.5       0.1
NH   1592.8
QT        1      1950
X1      490        26      1380    1473.5    137.94    134.7    133.56
X3        0                      1380      2077   1473.5      2077
GR   2076.2      1000      2076   1070.44   2075.7    1078.9   2075.65   1093.59   2074.77   1095.59
GR   2075.1   1113.21   2074.62   1131.24   2075.52   1133.91   2075.42    1139.4    2074.8   1147.24
GR   2074.6   1237.96   2074.44   1262.26   2075.25      1380      2074   1384.16   2072.88   1388.18
GR   2073.4    1392.2   2072.56   1396.28   2072.65   1422.63   2072.87   1453.13   2073.88   1455.88
GR     2074    1460.2   2074.02   1460.41   2075.24    1473.5      2076   1489.31   2076.27   1548.19
GR   2076.6    1592.8

NC      0.1       0.1     0.016
NH        5       0.1   1085.11     0.016   1149.87       0.1   1383.37     0.016   1469.12       0.1
NH   1584.8
X1      500        29   1383.37    1469.12    201.63    205.58    201.53
X3        0                      1383.37      2079   1469.12      2079
GR   2077.9      1000      2078   1079.54   2078.04   1084.64      2078   1085.11   2077.79   1096.49
GR     2077   1098.93   2076.88   1117.48   2076.69   1135.33   2077.46   1137.07    2076.9   1141.08
GR     2078   1148.66   2078.19   1149.87      2078   1161.08   2077.06   1239.92   2076.66   1266.66
GR     2076   1383.37      2076    1383.6   2075.41   1391.31   2075.55   1394.62   2074.64   1397.49
GR   2074.8   1425.39   2074.83   1456.48   2075.69   1459.45    2075.8   1463.28      2076   1464.24
GR   2076.8   1469.12   2077.99   1555.71      2078   1559.68      2078    1584.8
1
     26NOV03      13:46:16                                                                PAGE   10


NC      0.1       0.1     0.016
NH        5       0.1   1084.93     0.016   1136.15       0.1   1383.68     0.016   1470.61       0.1
NH   1543.7
X1      510        28   1383.68    1470.61    200.34    198.87    199.21
X3        0                      1383.68      2081   1470.61      2081
GR   2080.5      1000      2080   1069.72   2079.8    1084.93   2079.47   1096.82   2078.88   1098.95
GR   2079.3   1116.36   2078.64   1134.53   2079.78   1136.15   2079.18   1140.94   2079.36   1149.29
GR     2080   1183.52      2080   1201.45   2078.71    1236.9   2078.59   1265.15   2079.65   1292.21
GR   2078.4   1383.68      2078   1386.37   2077.43      1390   2077.38   1394.06   2076.69   1397.95
GR   2076.7   1425.28   2076.58   1455.81   2077.08   1458.62   2077.38   1463.12      2078   1465.32
GR   2079.5   1470.61      2080    1485.7   2080.44    1543.7

NC      0.1       0.1     0.016
```

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NH       5       0.1    1084.05     0.016    1123.94       0.1    1366.83     0.016    1457.45       0.1
NH    1523
X1     520        29    1366.83    1457.45     198.12    199.29     199.24
X3       0                        1366.83       2082   1457.45       2082
GR  2081.5      1000    2081.42    1074.05    2081.73   1084.05    2080.98   1087.47    2081.18   1103.48
GR    2081   1121.11    2081.86    1123.94    2081.43    1128.1    2082.01   1134.95    2081.95   1146.76
GR    2082   1147.04       2082    1203.66    2081.83   1213.57    2081.16   1228.52    2080.95   1263.15
GR  2080.5   1366.83       2080    1370.04    2078.47   1378.27    2079.13   1381.53    2078.01   1385.19
GR    2078   1386.82       2078    1398.81    2078.24   1413.06    2078.26    1444.5    2079.01   1446.85
GR  2079.4   1450.39       2080    1453.11    2080.92   1457.45    2081.93      1523

NC     0.1       0.1      0.016
NH       5       0.1    1082.96     0.016    1123.08       0.1    1346.74     0.016     1431.3       0.1
NH    1601
X1     530        22    1346.74     1431.3     210.23    241.33     227.48
X3       0                        1346.74       2084    1431.3       2084
GR  2083.2      1000     2083.7    1072.53    2083.71   1082.96    2082.35   1086.89     2082.9   1102.27
GR  2082.6   1119.01    2083.62    1123.08    2083.29   1128.26    2083.02   1136.13    2083.01   1241.73
GR  2082.6   1346.74       2082    1350.59    2080.52   1359.41     2081.3   1362.33    2079.98   1367.32
GR  2080.1   1393.44    2080.61    1421.98    2081.51   1425.57     2081.9   1430.88       2082    1431.3
GR    2084   1513.51       2084       1601

NC     0.1       0.1      0.016
NH       5       0.1    1034.63     0.016    1082.12       0.1    1155.7      0.016    1242.61       0.1
NH  1662.5
X1     540        30     1155.7    1235.18     173.09    201.13     189.3
X3       0                        1155.7       2085   1235.18       2085
GR  2085.3      1000    2084.14    1027.87    2084.28   1034.63       2084   1036.59    2083.69   1038.99
GR  2083.3   1056.98    2083.17    1073.21       2084   1074.74    2084.32    1075.3       2084   1077.59
GR  2083.7   1080.12       2084    1081.27    2084.31   1082.12    2084.15   1103.24       2084   1125.27
GR    2083    1155.7    2082.23    1161.51    2082.99   1165.34    2082.14   1167.92       2082   1174.17
GR  2081.4   1199.23       2082    1213.92    2082.61   1230.67    2083.48   1235.18    2083.43   1242.61
GR    2084   1265.06    2083.87    1279.58       2084   1288.94       2086    1635.3    2086.16    1662.5

NC     0.1       0.1      0.016
X1     550        11    1113.83     1286.4     237.87    248.39     244.36
X3       0                        1113.83       2087    1286.4       2087
GR    2086      1000       2086    1006.83    2085.22   1113.83    2084.16   1169.33    2084.02   1177.67
GR    2084   1177.78       2084    1240.62    2084.59   1242.98    2084.41   1250.04       2086   1277.72
GR  2086.6    1286.4
1
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NC   0.016     0.016     0.015
QT       1      3900
X1     560        19    1011.29    1090.36      63.57     64.65     67.51
GR  2090.9   1009.62    2084.97    1009.62       2084   1011.29       2082   1014.16       2080   1017.23
GR    2078   1020.53    2077.65    1021.06       2076   1034.43       2076   1048.77    2076.12   1053.14
GR    2078   1053.74       2080    1054.61       2082   1055.47    2083.53   1056.15    2083.54   1085.21
GR    2084    1086.7    2085.15    1090.36    2085.23   1098.87    2088.23   1098.87


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     26NOV03      13:46:16                                                                  PAGE   12

     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 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
ALLOWABLE ERROR FOR CRITICAL DEPTH DETERMINATION (ALLDC) = 2.000 PERCENT OF THE DEPTH

CCHV= .100 CEHV= .300
*SECNO 10.000
3720 CRITICAL DEPTH ASSUMED

10.000	8.50	1930.20	1930.20	1930.00	1931.98	1.78	.00	.00	1928.13
5500.0	291.9	5142.0	66.1	87.1	466.3	19.1	.0	.0	1928.00
.00	3.35	11.03	3.45	.035	.030	.035	.000	1921.70	1139.32
.005307	0.	0.	0.	0	8	5	.00	184.60	1323.92

*SECNO 20.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

20.000	8.92	1933.32	1933.32	.00	1935.22	1.90	1.56	.04	1931.19
5500.0	290.5	5185.3	24.2	95.9	456.1	10.5	3.9	1.4	1932.00
.01	3.03	11.37	2.31	.035	.030	.035	.000	1924.40	1113.63
.005174	314.	298.	276.	0	8	0	.00	208.12	1321.75

*SECNO 30.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

30.000	6.93	1935.76	1935.76	.00	1938.47	2.71	1.29	.24	1940.00
5500.0	.0	5500.0	.0	.0	416.7	.0	8.6	2.7	1938.00
.02	.00	13.20	.00	.000	.015	.000	.000	1928.83	1136.18
.002049	407.	418.	430.	0	15	0	.00	78.28	1214.46

*SECNO 40.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1133.8 1184.2 TYPE= 1 TARGET= 50.380
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

ELENCL= 1942.00 ELENCR= 1942.00

40.000	7.15	1940.75	1940.75	.00	1944.37	3.62	.02	.27	1940.00

5500.0	.0	5500.0	.0	.0	360.4	.0	8.7	2.7	1942.00
.02	.00	15.26	.00	.000	.015	.000	.000	1933.60	1133.81
.002365	10.	10.	10.	0	8	0	.00	50.38	1184.19

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 1939.65 , NOT 1940.75 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.90	1.56	2.60	170.00	50.38	2.38	240.00	.00	1934.60	1933.60

*SECNO 50.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.42

PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
1953.48	1947.40	.00	2011.	3490.	240.	240.	1939.60	1943.13	170.

3470 ENCROACHMENT STATIONS= 1184.5 1234.9 TYPE= 1 TARGET= 50.380
ELENCL= 1945.00 ELENCR= 1945.00

50.000	8.98	1943.58	.00	.00	1945.88	2.29	1.51	.00	1942.00
5500.0	.0	5500.0	.0	.0	452.5	.0	9.8	2.9	1945.00
.02	.00	12.16	.00	.000	.015	.000	.000	1934.60	1184.49
.001174	113.	115.	117.	5	0	4	.00	50.38	1234.87

*SECNO 60.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

60.000	7.62	1944.38	1944.38	.00	1946.90	2.51	.59	.07	1945.20
5300.0	.0	5300.0	.0	.0	416.6	.0	13.6	3.5	1946.00
.03	.00	12.72	.00	.000	.015	.000	.000	1936.76	1061.80
.002073	376.	387.	397.	0	15	0	.00	84.77	1146.57

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 70.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

70.000	6.80	1948.37	1948.37	.00	1950.94	2.58	.86	.02	1950.00

5300.0	.0	5300.0	.0	.0	411.4	.0	17.6	4.3	1952.00
.04	.00	12.88	.00	.000	.015	.000	.000	1941.57	1066.48
.002036	427.	417.	406.	0	11	0	.00	80.94	1147.42

*SECNO 80.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

80.000	5.79	1948.39	1948.39	.00	1950.98	2.59	.00	.00	1950.33
5300.0	.0	5300.0	.0	.0	410.2	.0	17.6	4.3	1950.00
.04	.00	12.92	.00	.000	.015	.000	.000	1942.60	1059.66
.002032	1.	1.	1.	0	11	0	.00	79.40	1139.06

*SECNO 90.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

90.000	7.27	1950.37	1950.37	.00	1953.58	3.21	.11	.19	1951.07
5300.0	.0	5300.0	.0	.0	368.4	.0	18.1	4.4	1953.03
.04	.00	14.39	.00	.000	.015	.000	.000	1943.10	1054.03
.002065	53.	52.	57.	0	11	0	.00	58.04	1112.07

*SECNO 100.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

100.000	7.80	1952.50	1952.50	.00	1956.01	3.51	.72	.09	1958.00
5300.0	.0	5300.0	.0	.0	352.6	.0	20.9	4.8	1958.00
.04	.00	15.03	.00	.000	.015	.000	.000	1944.70	1073.18
.002123	346.	343.	340.	0	8	0	.00	50.82	1124.01

*SECNO 110.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

110.000	7.50	1954.70	1954.70	.00	1958.06	3.35	.00	.02	1958.00
5300.0	.0	5300.0	.0	.0	360.6	.0	20.9	4.8	1958.00
.04	.00	14.70	.00	.000	.015	.000	.000	1947.20	1072.92
.002059	1.	1.	1.	0	8	0	.00	53.84	1126.76

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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

*SECNO 120.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

120.000	7.52	1955.02	1955.02	.00	1958.42	3.40	.05	.01	1958.00
5300.0	.0	5300.0	.0	.0	358.3	.0	21.1	4.8	1958.00
.04	.00	14.79	.00	.000	.015	.000	.000	1947.50	1085.18

.002086	25.	25.	22.	0	5	0	.00	53.14	1138.32

*SECNO 130.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

130.000	7.65	1955.65	1955.65	.00	1959.14	3.49	.26	.03	1958.00
5300.0	.0	5300.0	.0	.0	353.6	.0	22.1	5.0	1958.00
.05	.00	14.99	.00	.000	.015	.000	.000	1948.00	1093.16
.002111	125.	125.	126.	0	8	0	.00	51.24	1144.40

*SECNO 140.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

140.000	7.67	1956.17	1956.17	.00	1959.59	3.42	.12	.01	1959.20
5300.0	.0	5300.0	.0	.0	357.0	.0	22.6	5.0	1959.86
.05	.00	14.85	.00	.000	.015	.000	.000	1948.50	1126.51
.002091	57.	56.	57.	0	5	0	.00	52.57	1179.07

*SECNO 150.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

150.000	7.47	1957.97	1957.97	.00	1961.26	3.29	.00	.01	1959.50
5300.0	.0	5300.0	.0	.0	364.1	.0	22.6	5.0	1959.99
.05	.00	14.56	.00	.000	.015	.000	.000	1950.50	1136.49
.002038	1.	1.	1.	0	8	0	.00	55.57	1192.06

*SECNO 160.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

160.000	7.60	1959.36	1959.36	.00	1962.64	3.29	.23	.00	1961.14
5300.0	.0	5300.0	.0	.0	364.3	.0	23.6	5.2	1961.10
.05	.00	14.55	.00	.000	.015	.000	.000	1951.76	1025.05
.002033	120.	115.	111.	0	5	0	.00	55.48	1080.53

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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

*SECNO 170.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.78

170.000	9.32	1961.62	1959.03	.00	1962.94	1.32	.10	.20	1962.00
5300.0	.0	5300.0	.0	.0	575.2	.0	24.6	5.3	1962.00
.05	.00	9.21	.00	.000	.015	.000	.000	1952.30	1022.79
.000641	98.	97.	96.	5	11	0	.00	75.51	1098.30

*SECNO 180.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

180.000	8.00	1963.07	1963.07	.00	1966.04	2.97	.52	.49	1969.97
5300.0	.0	5300.0	.0	.0	383.5	.0	28.6	5.9	1970.00
.06	.00	13.82	.00	.000	.025	.000	.000	1955.07	1118.76
.005561	358.	364.	374.	0	15	0	.00	65.70	1184.46

*SECNO 190.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

190.000	9.21	1966.85	1966.85	.00	1970.05	3.20	1.98	.07	1977.86
5300.0	.0	5300.0	.0	.0	369.4	.0	31.7	6.4	1978.00
.07	.00	14.35	.00	.000	.025	.000	.000	1957.64	1062.65
.005536	350.	356.	362.	0	8	0	.00	57.91	1120.55

*SECNO 200.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

200.000	8.06	1970.50	1970.50	.00	1973.44	2.93	1.99	.03	1977.70
5300.0	.0	5300.0	.0	.0	385.6	.0	34.8	6.9	1986.14
.07	.00	13.74	.00	.000	.025	.000	.000	1962.44	1089.27
.005582	344.	357.	368.	0	11	0	.00	66.23	1155.50

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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

*SECNO 210.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

210.000	6.98	1972.46	1972.46	.00	1975.53	3.07	.69	.04	1982.00
5300.0	.0	5300.0	.0	.0	377.2	.0	36.7	7.3	1986.90
.08	.00	14.05	.00	.000	.015	.000	.000	1965.48	1033.21
.002020	218.	220.	223.	0	11	0	.00	61.98	1095.20

*SECNO 220.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1044.2 1104.4 TYPE= 1 TARGET= 60.290
ELENCL= 1987.00 ELENCR= 1987.00

220.000	7.00	1975.66	1975.66	.00	1979.19	3.53	.21	.14	1986.57
5300.0	.0	5300.0	.0	.0	351.7	.0	37.5	7.4	1987.00
.08	.00	15.07	.00	.000	.015	.000	.000	1968.66	1044.15

.002397	97.	95.	98.	0	5	0	.00	50.25	1094.40

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 1974.60 , NOT 1975.66 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.90	1.56	2.60	115.00	50.25	2.25	576.00	.00	1969.76	1968.66

*SECNO 230.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.41

CLASS B LOW FLOW

3420 BRIDGE W.S.= 1976.44 BRIDGE VELOCITY= 15.27 CALCULATED CHANNEL AREA= 321.

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
.00	1980.78	.00	0.	5300.	576.	576.	1981.76	1987.60	0.

1

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

3470 ENCROACHMENT STATIONS= 1059.8 1110.0 TYPE= 1 TARGET= 50.250
ELENCL= 1987.20 ELENCR= 1987.20

230.000	8.77	1978.53	.00	.00	1980.78	2.24	1.59	.00	1987.10
5300.0	.0	5300.0	.0	.0	440.9	.0	38.5	7.5	1987.20
.08	.00	12.02	.00	.000	.015	.000	.000	1969.76	1059.76
.001213	106.	106.	105.	0	0	0	.00	50.25	1110.01

*SECNO 240.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

240.000	7.26	1982.85	1982.85	.00	1985.65	2.79	.22	.16	1984.80
5300.0	.0	5300.0	.0	.0	395.2	.0	39.4	7.6	1990.50
.09	.00	13.41	.00	.000	.025	.000	.000	1975.59	1028.01
.005513	100.	99.	99.	0	15	0	.00	71.75	1099.76

*SECNO 250.000
7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

250.000	8.94	1987.59	1987.59	.00	1990.11	2.52	2.73	.03	1994.00
5300.0	.0	5300.0	.0	.0	415.8	.0	43.9	8.5	1995.00
.10	.00	12.75	.00	.000	.025	.000	.000	1978.65	1068.21
.005924	484.	478.	467.	0	11	0	.00	85.01	1153.22

*SECNO 260.000

7185 MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

260.000	10.17	1992.29	1992.29	.00	1995.08	2.79	2.56	.08	1999.98
5300.0	.0	5300.0	.0	.0	395.7	.0	48.0	9.3	2001.02
.10	.00	13.40	.00	.000	.025	.000	.000	1982.12	1138.65
.005753	458.	438.	414.	0	8	0	.00	71.29	1209.94

*SECNO 270.000

3301 HV CHANGED MORE THAN HVINS

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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

3470 ENCROACHMENT STATIONS= 1119.9 1157.3 TYPE= 1 TARGET= 37.330
ELENCL= 1999.00 ELENCR= 1999.00

270.000	9.27	1992.67	1991.95	.00	1996.31	3.64	.98	.26	1998.00
5300.0	.0	5300.0	.0	.0	346.2	.0	49.8	9.6	1999.00
.11	.00	15.31	.00	.000	.020	.000	.000	1983.40	1119.93
.003731	213.	214.	213.	3	11	0	.00	37.33	1157.26

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 1990.77 , NOT 1992.67 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.90	1.56	2.60	94.00	37.33	1.33	360.00	.00	1984.30	1983.40

*SECNO 280.000

3301 HV CHANGED MORE THAN HVINS

PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
1997.92	1997.77	.00	75.	5214.	360.	360.	1994.30	1997.30	94.

3470 ENCROACHMENT STATIONS= 1088.1 1124.5 TYPE= 1 TARGET= 36.330
ELENCL= 1999.00 ELENCR= 1999.00

280.000	10.40	1994.70	.00	.00	1997.75	3.05	1.44	.00	1997.96
5300.0	.0	5300.0	.0	.0	378.0	.0	50.7	9.6	1999.00
.11	.00	14.02	.00	.000	.020	.000	.000	1984.30	1088.14
.002868	110.	110.	115.	4	0	2	.00	36.33	1124.47

*SECNO 290.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

290.000	7.98	2001.61	2001.61	.00	2003.57	1.96	1.75	.11	2012.48
3900.0	.0	3900.0	.0	.0	347.0	.0	54.4	10.3	2005.27
.12	.00	11.24	.00	.000	.025	.000	.000	1993.63	1109.36
.006359	403.	452.	479.	0	19	0	.00	92.14	1201.50

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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

*SECNO 300.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

300.000	10.59	2012.53	2012.53	.00	2014.71	2.18	2.46	.07	2022.00
3900.0	.0	3900.0	.0	.0	328.9	.0	57.8	11.1	2022.49
.13	.00	11.86	.00	.000	.025	.000	.000	2001.94	1117.29
.005150	445.	430.	407.	0	10	0	.00	66.10	1183.39

*SECNO 310.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1036.9 1067.9 TYPE= 1 TARGET= 31.000
ELENCL= 2020.00 ELENCR= 2020.00

310.000	7.87	2015.87	2015.87	.00	2019.84	3.97	1.33	.54	2018.00
3900.0	.0	3900.0	.0	.0	244.0	.0	60.1	11.5	2020.00
.14	.00	15.99	.00	.000	.015	.000	.000	2008.00	1036.87
.002875	360.	353.	352.	0	15	0	.00	31.00	1067.87

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 2014.87 , NOT 2015.87 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD

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      .90      1.56      2.60      58.00     31.00      1.00    210.00       .00   2008.40   2008.00

*SECNO 320.000
3280 CROSS SECTION    320.00 EXTENDED       .31 FEET

3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.89

PRESSURE AND WEIR FLOW,  Weir Submergence Based on TRAPEZOIDAL Shape

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    26NOV03       13:46:16                                                                                    PAGE   21

     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        BAREA    TRAPEZOID      ELLC       ELTRD      WEIRLN
                                                                       AREA
   2024.22    2020.63       .00       468.      3429.       210.       210.     2015.40    2020.20        58.


 3470 ENCROACHMENT STATIONS=      1074.9     1105.9  TYPE=       1  TARGET=        31.000
  ELENCL=    2021.00  ELENCR=    2021.00
    320.000     12.31    2020.71        .00        .00    2022.33       1.62       2.49        .00    2020.00
     3900.0        .0     3900.0         .0         .0      381.4         .0       60.7       11.6    2021.00
        .14        .00      10.22        .00       .000       .015       .000       .000    2008.40    1074.88
    .000803       89.       87.        89.          3          0          2        .00      31.00    1105.88


 *SECNO 330.000

 3301 HV CHANGED MORE THAN HVINS

 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
    330.000      9.55    2023.77    2023.77        .00    2026.20       2.43        .78        .24    2028.00
     3900.0        .0     3900.0         .0         .0      311.7         .0       64.0       12.0    2026.16
        .15        .00      12.51        .00       .000       .030       .000       .000    2014.22    1088.84
    .008833      407.      409.       410.          0         19          0        .00      66.29    1155.13


 *SECNO 340.000
 7185 MINIMUM SPECIFIC ENERGY
 3720 CRITICAL DEPTH ASSUMED
    340.000      6.59    2028.51    2028.51        .00    2030.81       2.30       3.56        .01    2032.89
     3900.0        .0     3900.0         .0         .0      320.4         .0       67.0       12.7    2032.00
        .16        .00      12.17        .00       .000       .030       .000       .000    2021.92    1080.35
    .008371      416.      415.       411.          0         19          0        .00      70.92    1151.27


 *SECNO 350.000
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7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1014.0 1077.2 TYPE= 1 TARGET= 63.200
ELENCL= 2036.00 ELENCR= 2036.00

350.000	4.89	2030.79	2030.79	.00	2033.26	2.47	1.61	.05	2034.00
3900.0	.0	3900.0	.0	.0	309.3	.0	69.9	13.3	2036.00
.17	.00	12.61	.00	.000	.015	.000	.000	2025.90	1014.00
.002362	391.	400.	408.	0	15	0	.00	63.20	1077.20

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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

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 2030.01 , NOT 2030.79 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	.90	1.56	2.60	70.00	63.20	3.20	480.00	.00	2025.90	2025.90

*SECNO 360.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.46

CLASS B LOW FLOW

3420 BRIDGE W.S.= 2030.98 BRIDGE VELOCITY= 12.79 CALCULATED CHANNEL AREA= 305.

EGPRS	EGLWC	H3	QWEIR	QLOW	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
.00	2033.65	.00	0.	3900.	480.	480.	2033.90	2036.06	0.

3470 ENCROACHMENT STATIONS= 1023.9 1087.1 TYPE= 1 TARGET= 63.200
ELENCL= 2037.00 ELENCR= 2037.00

360.000	6.23	2032.13	.00	.00	2033.65	1.52	.39	.00	2036.00
3900.0	.0	3900.0	.0	.0	393.7	.0	70.4	13.4	2037.00
.17	.00	9.91	.00	.000	.015	.000	.000	2025.90	1023.92
.001109	69.	69.	68.	0	0	0	.00	63.20	1087.12

*SECNO 370.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

370.000	5.82	2033.82	2033.82	.00	2036.39	2.57	.10	.31	2037.44
3900.0	.0	3900.0	.0	.0	303.2	.0	71.0	13.5	2035.81
.17	.00	12.86	.00	.000	.015	.000	.000	2028.00	1048.85
.002156	67.	67.	67.	0	11	0	.00	59.68	1108.53

1

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 380.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

380.000	5.71	2035.71	2035.71	.00	2038.15	2.44	.00	.01	2037.63
3900.0	.0	3900.0	.0	.0	311.4	.0	71.0	13.5	2036.85
.17	.00	12.52	.00	.000	.015	.000	.000	2030.00	1044.82
.002114	1.	1.	1.	0	8	0	.00	64.68	1109.50

*SECNO 390.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

390.000	7.17	2039.34	2039.34	.00	2041.78	2.44	1.54	.00	2044.00
3900.0	.0	3900.0	.0	.0	311.3	.0	73.9	14.1	2042.99
.18	.00	12.53	.00	.000	.030	.000	.000	2032.17	1055.45
.008386	385.	410.	428.	0	11	0	.00	65.09	1120.54

*SECNO 400.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.91

400.000	8.08	2041.44	2040.16	.00	2042.77	1.33	.88	.11	2044.76
3900.0	.0	3900.0	.0	.0	421.7	.0	77.3	14.8	2044.00
.19	.00	9.25	.00	.000	.015	.000	.000	2033.36	1036.98
.000992	428.	400.	380.	3	11	0	.00	80.20	1117.18

*SECNO 410.000

410.000	8.34	2041.75	2039.71	.00	2042.80	1.05	.00	.03	2044.89
3900.0	.0	3900.0	.0	.0	474.1	.0	77.3	14.8	2043.99
.19	.00	8.23	.00	.000	.015	.000	.000	2033.41	1036.15
.000691	1.	1.	1.	2	15	0	.00	81.34	1117.49

*SECNO 420.000

3301 HV CHANGED MORE THAN HVINS

1

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

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.82

420.000	8.79	2042.44	2038.08	.00	2042.88	.44	.02	.06	2045.15
3900.0	.0	3900.0	.0	.0	732.6	.0	78.1	14.9	2045.00
.20	.00	5.32	.00	.000	.015	.000	.000	2033.65	1045.21
.000210	57.	58.	59.	2	11	0	.00	90.15	1135.36

*SECNO 430.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1060.1 1090.7 TYPE= 1 TARGET= 30.580
ELENCL= 2048.00 ELENCR= 2048.00

430.000	7.96	2042.06	2042.06	.00	2046.07	4.01	.11	1.07	2046.60
3900.0	.0	3900.0	.0	.0	242.6	.0	80.4	15.2	2048.00
.20	.00	16.08	.00	.000	.015	.000	.000	2034.10	1060.08
.002906	208.	208.	212.	0	11	0	.00	30.58	1090.66

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 2041.29 , NOT 2042.06 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	1.56	2.60	31.50	30.58	.58	300.00	.00	2048.53	2034.15

*SECNO 440.000
6790 POSSIBLE INVALID SOLUTION 20 TRIALS OF EG NOT ENOUGH
FINAL QWEIR + QPR = 8287. DOES NOT EQUAL ACTUAL Q = 3900.

3301 HV CHANGED MORE THAN HVINS

PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

1

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	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
2046.15	2060.72	.01	0.	8287.	300.	300.	2058.53	2060.53	32.

3470 ENCROACHMENT STATIONS= 1046.1 1076.7 TYPE= 1 TARGET= 30.580
ELENCL= 2060.00 ELENCR= 2060.00

440.000	8.59	2057.12	.00	.00	2060.54	3.42	14.47	.00	2058.81
3900.0	.0	3900.0	.0	.0	262.6	.0	88.9	16.2	2060.00
.23	.00	14.85	.00	.000	.015	.000	.000	2048.53	1046.07
.002315	1470.	1464.	1457.	5	0	20	.00	30.58	1076.65

*SECNO 450.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

450.000	9.49	2061.71	2061.71	.00	2065.76	4.05	.99	.19	2062.00
3900.0	.0	3900.0	.0	.0	241.6	.0	91.2	16.5	2062.40
.23	.00	16.15	.00	.000	.015	.000	.000	2052.22	1069.41
.002654	389.	398.	405.	0	8	0	.00	30.62	1100.02

*SECNO 460.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

460.000	9.36	2066.76	2066.76	.00	2070.93	4.17	1.09	.04	2068.00
3900.0	.0	3900.0	.0	.0	237.9	.0	93.4	16.7	2068.00
.24	.00	16.39	.00	.000	.015	.000	.000	2057.40	1071.68
.002759	394.	402.	408.	0	8	0	.00	30.60	1102.28

*SECNO 470.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

470.000	8.95	2071.62	2071.62	.00	2075.50	3.88	1.06	.03	2073.13
3900.0	.0	3900.0	.0	.0	246.9	.0	95.7	17.0	2074.36
.25	.00	15.80	.00	.000	.015	.000	.000	2062.67	1077.49
.002545	403.	399.	394.	0	8	0	.00	31.85	1109.34

1

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 480.000
3280 CROSS SECTION 480.00 EXTENDED 2.00 FEET

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 5.24

3470 ENCROACHMENT STATIONS= 1026.7 1163.8 TYPE= 1 TARGET= 137.130
ELENCL= 2076.00 ELENCR= 2076.00

480.000	11.53	2075.71	2069.57	.00	2075.91	.21	.05	.37	2074.97
3900.0	.0	3900.0	.0	.0	1066.1	.0	98.6	17.4	2076.00
.26	.00	3.66	.00	.000	.015	.000	.000	2064.18	1026.66
.000093	214.	193.	186.	3	14	0	.00	137.13	1163.79

1490 NH CARD USED
*SECNO 490.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1380.0 1473.5 TYPE= 1 TARGET= 93.500
ELENCL= 2077.00 ELENCR= 2077.00

490.000	3.00	2075.56	2075.56	.00	2076.76	1.20	.02	.30	2075.25
1950.0	.0	1950.0	.0	.0	221.4	.0	100.5	17.8	2077.00
.27	.00	8.81	.00	.000	.016	.000	.000	2072.56	1380.00
.002891	138.	134.	135.	0	14	0	.00	93.50	1473.50

1490 NH CARD USED
*SECNO 500.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1383.4 1469.1 TYPE= 1 TARGET= 85.750
ELENCL= 2079.00 ELENCR= 2079.00

500.000	2.94	2077.58	2077.58	.00	2078.85	1.27	.57	.02	2076.00
1950.0	.0	1950.0	.0	.0	215.8	.0	101.5	18.2	2079.00
.27	.00	9.03	.00	.000	.016	.000	.000	2074.64	1383.37
.002814	202.	202.	206.	0	8	0	.00	85.75	1469.12

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

1490 NH CARD USED
*SECNO 510.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1383.7 1470.6 TYPE= 1 TARGET= 86.930
ELENCL= 2081.00 ELENCR= 2081.00

510.000	2.90	2079.48	2079.48	.00	2080.75	1.27	.56	.00	2078.40
1950.0	.0	1950.0	.0	.0	216.0	.0	102.5	18.6	2081.00

.28	.00	9.03	.00	.000	.016	.000	.000	2076.58	1383.68
.002823	200.	199.	199.	0	5	0	.00	86.86	1470.54

1490 NH CARD USED
*SECNO 520.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1366.8 1457.4 TYPE= 1 TARGET= 90.620
ELENCL= 2082.00 ELENCR= 2082.00

520.000	3.00	2081.00	2081.00	.00	2082.23	1.23	.57	.00	2080.50
1950.0	.0	1950.0	.0	.0	219.3	.0	103.5	19.0	2082.00
.28	.00	8.89	.00	.000	.016	.000	.000	2078.00	1366.83
.002856	198.	199.	199.	0	8	0	.00	90.62	1457.45

1490 NH CARD USED
*SECNO 530.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1346.7 1431.3 TYPE= 1 TARGET= 84.560
ELENCL= 2084.00 ELENCR= 2084.00

530.000	3.15	2083.13	2083.13	.00	2084.42	1.29	.65	.02	2082.60
1950.0	.0	1950.0	.0	.0	214.0	.0	104.7	19.4	2084.00
.29	.00	9.11	.00	.000	.016	.000	.000	2079.98	1346.74
.002865	210.	227.	241.	0	8	0	.00	84.56	1431.30

1490 NH CARD USED
*SECNO 540.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

1

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

3470 ENCROACHMENT STATIONS= 1155.7 1235.2 TYPE= 1 TARGET= 79.480
ELENCL= 2085.00 ELENCR= 2085.00

540.000	3.28	2084.68	2084.68	.00	2086.05	1.37	.55	.03	2083.00
1950.0	.0	1950.0	.0	.0	207.3	.0	105.6	19.8	2085.00
.30	.00	9.40	.00	.000	.016	.000	.000	2081.40	1155.70
.002931	173.	189.	201.	0	8	0	.00	79.48	1235.18

*SECNO 550.000

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 1113.8 1286.4 TYPE= 1 TARGET= 172.570
ELENCL= 2087.00 ELENCR= 2087.00

550.000	2.10	2086.10	2086.10	.00	2086.92	.82	.75	.05	2085.22
1950.0	.0	1950.0	.0	.0	267.8	.0	106.9	20.5	2087.00
.31	.00	7.28	.00	.000	.016	.000	.000	2084.00	1113.83
.003237	238.	244.	248.	0	14	0	.00	165.35	1279.18

*SECNO 560.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 4.04

560.000	9.98	2085.98	2084.29	.00	2087.09	1.11	.08	.09	2084.00
3900.0	5.9	3879.9	14.2	2.5	457.5	6.7	107.5	20.7	2085.15
.31	2.34	8.48	2.11	.016	.015	.016	.000	2076.00	1009.62
.000793	64.	68.	65.	2	23	0	.00	89.25	1098.87

THIS RUN EXECUTED 26NOV03 13:46:16

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HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
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NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

FLOODPLAIN DETERMINATION

SUMMARY PRINTOUT TABLE 100

	SECNO	EGLWC	ELLC	EGPRS	ELTRD	QPR	QWEIR	CLASS	H3	DEPTH	CWSEL	VCH	EG
*	50.000	1947.40	1939.60	1953.48	1943.13	3489.83	2011.25	30.00	.00	8.98	1943.58	12.16	1945.88
*	230.000	1980.78	1981.76	.00	1987.60	5300.00	.00	2.00	.00	8.77	1978.53	12.02	1980.78
*	280.000	1997.77	1994.30	1997.92	1997.30	5214.18	74.70	30.00	.00	10.40	1994.70	14.02	1997.75
*	320.000	2020.63	2015.40	2024.22	2020.20	3428.95	468.26	30.00	.00	12.31	2020.71	10.22	2022.33
*	360.000	2033.65	2033.90	.00	2036.06	3900.00	.00	2.00	.00	6.23	2032.13	9.91	2033.65
*	440.000	2060.72	2058.53	2046.15	2060.53	8286.56	.08	30.00	.01	8.59	2057.12	14.85	2060.54

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	10.000	.00	.00	.00	1921.70	5500.00	1930.20	1930.20	1931.98	53.07	11.03	572.50	754.96
*	20.000	297.76	.00	.00	1924.40	5500.00	1933.32	1933.32	1935.22	51.74	11.37	562.50	764.65
*	30.000	417.80	.00	.00	1928.83	5500.00	1935.76	1935.76	1938.47	20.49	13.20	416.67	1215.16
*	40.000	10.00	.00	.00	1933.60	5500.00	1940.75	1940.75	1944.37	23.65	15.26	360.42	1131.07
*	50.000	115.08	1943.13	1939.60	1934.60	5500.00	1943.58	.00	1945.88	11.74	12.16	452.47	1605.42
*	60.000	387.41	.00	.00	1936.76	5300.00	1944.38	1944.38	1946.90	20.73	12.72	416.57	1164.04
*	70.000	417.23	.00	.00	1941.57	5300.00	1948.37	1948.37	1950.94	20.36	12.88	411.36	1174.59
*	80.000	1.00	.00	.00	1942.60	5300.00	1948.39	1948.39	1950.98	20.32	12.92	410.21	1175.72
*	90.000	51.93	.00	.00	1943.10	5300.00	1950.37	1950.37	1953.58	20.65	14.39	368.37	1166.20
*	100.000	342.73	.00	.00	1944.70	5300.00	1952.50	1952.50	1956.01	21.23	15.03	352.64	1150.38
*	110.000	1.00	.00	.00	1947.20	5300.00	1954.70	1954.70	1958.06	20.59	14.70	360.59	1168.07
*	120.000	24.78	.00	.00	1947.50	5300.00	1955.02	1955.02	1958.42	20.86	14.79	358.25	1160.36
*	130.000	125.31	.00	.00	1948.00	5300.00	1955.65	1955.65	1959.14	21.11	14.99	353.61	1153.64
*	140.000	55.76	.00	.00	1948.50	5300.00	1956.17	1956.17	1959.59	20.91	14.85	356.98	1159.00
*	150.000	1.00	.00	.00	1950.50	5300.00	1957.97	1957.97	1961.26	20.38	14.56	364.11	1173.91
*	160.000	114.85	.00	.00	1951.76	5300.00	1959.36	1959.36	1962.64	20.33	14.55	364.28	1175.60
*	170.000	97.13	.00	.00	1952.30	5300.00	1961.62	1959.03	1962.94	6.41	9.21	575.23	2092.60
*	180.000	363.91	.00	.00	1955.07	5300.00	1963.07	1963.07	1966.04	55.61	13.82	383.48	710.71
*	190.000	356.25	.00	.00	1957.64	5300.00	1966.85	1966.85	1970.05	55.36	14.35	369.42	712.34
*	200.000	357.38	.00	.00	1962.44	5300.00	1970.50	1970.50	1973.44	55.82	13.74	385.61	709.39
*	210.000	220.26	.00	.00	1965.48	5300.00	1972.46	1972.46	1975.53	20.20	14.05	377.22	1179.25
*	220.000	95.38	.00	.00	1968.66	5300.00	1975.66	1975.66	1979.19	23.97	15.07	351.74	1082.44
*	230.000	106.05	1987.60	1981.76	1969.76	5300.00	1978.53	.00	1980.78	12.13	12.02	440.93	1522.04
*	240.000	98.95	.00	.00	1975.59	5300.00	1982.85	1982.85	1985.65	55.13	13.41	395.19	713.82

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	250.000	478.12	.00	.00	1978.65	5300.00	1987.59	1987.59	1990.11	59.24	12.75	415.75	688.58

*	260.000	437.75	.00	.00	1982.12	5300.00	1992.29	1992.29	1995.08	57.53	13.40	395.67	698.76
	270.000	213.69	.00	.00	1983.40	5300.00	1992.67	1991.95	1996.31	37.31	15.31	346.17	867.66
*	280.000	110.04	1997.30	1994.30	1984.30	5300.00	1994.70	.00	1997.75	28.68	14.02	377.95	989.64
*	290.000	451.82	.00	.00	1993.63	3900.00	2001.61	2001.61	2003.57	63.59	11.24	347.01	489.07
*	300.000	430.29	.00	.00	2001.94	3900.00	2012.53	2012.53	2014.71	51.50	11.86	328.87	543.47
*	310.000	353.38	.00	.00	2008.00	3900.00	2015.87	2015.87	2019.84	28.75	15.99	243.96	727.29
*	320.000	86.84	2020.20	2015.40	2008.40	3900.00	2020.71	.00	2022.33	8.03	10.22	381.45	1375.97
*	330.000	409.02	.00	.00	2014.22	3900.00	2023.77	2023.77	2026.20	88.33	12.51	311.67	414.98
*	340.000	414.66	.00	.00	2021.92	3900.00	2028.51	2028.51	2030.81	83.71	12.17	320.45	426.26
*	350.000	400.22	.00	.00	2025.90	3900.00	2030.79	2030.79	2033.26	23.62	12.61	309.28	802.39
*	360.000	69.23	2036.06	2033.90	2025.90	3900.00	2032.13	.00	2033.65	11.09	9.91	393.70	1171.27
*	370.000	66.95	.00	.00	2028.00	3900.00	2033.82	2033.82	2036.39	21.56	12.86	303.25	839.87
*	380.000	1.00	.00	.00	2030.00	3900.00	2035.71	2035.71	2038.15	21.14	12.52	311.43	848.26
*	390.000	409.92	.00	.00	2032.17	3900.00	2039.34	2039.34	2041.78	83.86	12.53	311.30	425.87
*	400.000	400.26	.00	.00	2033.36	3900.00	2041.44	2040.16	2042.77	9.92	9.25	421.69	1238.16
	410.000	1.00	.00	.00	2033.41	3900.00	2041.75	2039.71	2042.80	6.91	8.23	474.09	1483.61
*	420.000	57.86	.00	.00	2033.65	3900.00	2042.44	2038.08	2042.88	2.10	5.32	732.59	2694.15
*	430.000	208.45	.00	.00	2034.10	3900.00	2042.06	2042.06	2046.07	29.06	16.08	242.59	723.52
*	440.000	1463.68	2060.53	2058.53	2048.53	3900.00	2057.12	.00	2060.54	23.15	14.85	262.62	810.62
*	450.000	397.95	.00	.00	2052.22	3900.00	2061.71	2061.71	2065.76	26.54	16.15	241.55	757.01
*	460.000	401.61	.00	.00	2057.40	3900.00	2066.76	2066.76	2070.93	27.59	16.39	237.91	742.42
*	470.000	398.77	.00	.00	2062.67	3900.00	2071.62	2071.62	2075.50	25.45	15.80	246.87	773.14
*	480.000	192.99	.00	.00	2064.18	3900.00	2075.71	2069.57	2075.91	.93	3.66	1066.10	4048.35
*	490.000	133.56	.00	.00	2072.56	1950.00	2075.56	2075.56	2076.76	28.91	8.81	221.40	362.69
*	500.000	201.53	.00	.00	2074.64	1950.00	2077.58	2077.58	2078.85	28.14	9.03	215.83	367.62

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
*	510.000	199.21	.00	.00	2076.58	1950.00	2079.48	2079.48	2080.75	28.23	9.03	216.04	366.99
*	520.000	199.24	.00	.00	2078.00	1950.00	2081.00	2081.00	2082.23	28.56	8.89	219.25	364.87

*	530.000	227.48	.00	.00	2079.98	1950.00	2083.13	2083.13	2084.42	28.65	9.11	214.05	364.33
*	540.000	189.30	.00	.00	2081.40	1950.00	2084.68	2084.68	2086.05	29.31	9.40	207.34	360.18
*	550.000	244.36	.00	.00	2084.00	1950.00	2086.10	2086.10	2086.92	32.37	7.28	267.76	342.74
*	560.000	67.51	.00	.00	2076.00	3900.00	2085.98	2084.29	2087.09	7.93	8.48	466.68	1384.97

1

FLOODPLAIN DETERMINATION

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	10.000	5500.00	1930.20	.00	.00	.20	184.60	.00
*	20.000	5500.00	1933.32	.00	3.12	.00	208.12	297.76
*	30.000	5500.00	1935.76	.00	2.44	.00	78.28	417.80
*	40.000	5500.00	1940.75	.00	4.99	.00	50.38	10.00
*	50.000	5500.00	1943.58	.00	2.83	.00	50.38	115.08
*	60.000	5300.00	1944.38	.00	.80	.00	84.77	387.41
*	70.000	5300.00	1948.37	.00	3.99	.00	80.94	417.23
*	80.000	5300.00	1948.39	.00	.03	.00	79.40	1.00
*	90.000	5300.00	1950.37	.00	1.97	.00	58.04	51.93
*	100.000	5300.00	1952.50	.00	2.13	.00	50.82	342.73
*	110.000	5300.00	1954.70	.00	2.21	.00	53.84	1.00
*	120.000	5300.00	1955.02	.00	.31	.00	53.14	24.78
*	130.000	5300.00	1955.65	.00	.63	.00	51.24	125.31
*	140.000	5300.00	1956.17	.00	.52	.00	52.57	55.76
*	150.000	5300.00	1957.97	.00	1.80	.00	55.57	1.00
*	160.000	5300.00	1959.36	.00	1.39	.00	55.48	114.85
*	170.000	5300.00	1961.62	.00	2.27	.00	75.51	97.13
*	180.000	5300.00	1963.07	.00	1.45	.00	65.70	363.91
*	190.000	5300.00	1966.85	.00	3.78	.00	57.91	356.25
*	200.000	5300.00	1970.50	.00	3.65	.00	66.23	357.38

*	210.000	5300.00	1972.46	.00	1.96	.00	61.98	220.26
*	220.000	5300.00	1975.66	.00	3.20	.00	50.25	95.38
*	230.000	5300.00	1978.53	.00	2.88	.00	50.25	106.05
*	240.000	5300.00	1982.85	.00	4.32	.00	71.75	98.95

1

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	250.000	5300.00	1987.59	.00	4.74	.00	85.01	478.12
*	260.000	5300.00	1992.29	.00	4.70	.00	71.29	437.75
	270.000	5300.00	1992.67	.00	.38	.00	37.33	213.69
*	280.000	5300.00	1994.70	.00	2.03	.00	36.33	110.04
*	290.000	3900.00	2001.61	.00	6.91	.00	92.14	451.82
*	300.000	3900.00	2012.53	.00	10.92	.00	66.10	430.29
*	310.000	3900.00	2015.87	.00	3.34	.00	31.00	353.38
*	320.000	3900.00	2020.71	.00	4.84	.00	31.00	86.84
*	330.000	3900.00	2023.77	.00	3.07	.00	66.29	409.02
•	340.000	3900.00	2028.51	.00	4.74	.00	70.92	414.66
*	350.000	3900.00	2030.79	.00	2.29	.00	63.20	400.22
*	360.000	3900.00	2032.13	.00	1.34	.00	63.20	69.23
*	370.000	3900.00	2033.82	.00	1.69	.00	59.68	66.95
*	380.000	3900.00	2035.71	.00	1.89	.00	64.68	1.00
*	390.000	3900.00	2039.34	.00	3.63	.00	65.09	409.92
*	400.000	3900.00	2041.44	.00	2.10	.00	80.20	400.26
	410.000	3900.00	2041.75	.00	.31	.00	81.34	1.00
*	420.000	3900.00	2042.44	.00	.69	.00	90.15	57.86
*	430.000	3900.00	2042.06	.00	-.38	.00	30.58	208.45
*	440.000	3900.00	2057.12	.00	15.06	.00	30.58	1463.68
*	450.000	3900.00	2061.71	.00	4.59	.00	30.62	397.95
*	460.000	3900.00	2066.76	.00	5.05	.00	30.60	401.61
•	470.000	3900.00	2071.62	.00	4.86	.00	31.85	398.77

*	480.000	3900.00	2075.71	.00	4.08	.00	137.13	192.99
*	490.000	1950.00	2075.56	.00	-.15	.00	93.50	133.56
*	500.000	1950.00	2077.58	.00	2.02	.00	85.75	201.53

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	510.000	1950.00	2079.48	.00	1.90	.00	86.86	199.21
*	520.000	1950.00	2081.00	.00	1.52	.00	90.62	199.24
*	530.000	1950.00	2083.13	.00	2.13	.00	84.56	227.48
*	540.000	1950.00	2084.68	.00	1.55	.00	79.48	189.30
*	550.000	1950.00	2086.10	.00	1.42	.00	165.35	244.36
*	560.000	3900.00	2085.98	.00	-.12	.00	89.25	67.51

SUMMARY OF ERRORS AND SPECIAL NOTES

CAUTION SECNO= 10.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

CAUTION SECNO= 20.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 20.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 30.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 30.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 40.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 40.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 50.000 PROFILE= 1 HYDRAULIC JUMP D.S.
WARNING SECNO= 50.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 60.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 60.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 70.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 70.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 80.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 80.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 90.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 90.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 100.000 PROFILE= 1 CRITICAL DEPTH ASSUMED

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 WARNING SECNO=    170.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 CAUTION SECNO=    180.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY
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    26NOV03      13:46:16                                                PAGE   37


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 CAUTION SECNO=    200.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=    230.000  PROFILE=  1  HYDRAULIC JUMP D.S.
 WARNING SECNO=    230.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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 CAUTION SECNO=    290.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
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 CAUTION SECNO=    300.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
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 WARNING SECNO=    320.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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    26NOV03      13:46:16                                                    PAGE   38


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 WARNING SECNO=    400.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 WARNING SECNO=    420.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

 CAUTION SECNO=    430.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
 CAUTION SECNO=    430.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

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 CAUTION SECNO=    440.000  PROFILE=  1  20 TRIALS OF EG NOT ENOUGH

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 CAUTION SECNO=    450.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

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 CAUTION SECNO=    460.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

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 CAUTION SECNO=    490.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

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 CAUTION SECNO=    500.000  PROFILE=  1  MINIMUM SPECIFIC ENERGY

 CAUTION SECNO=    510.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
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WARNING SECNO=     560.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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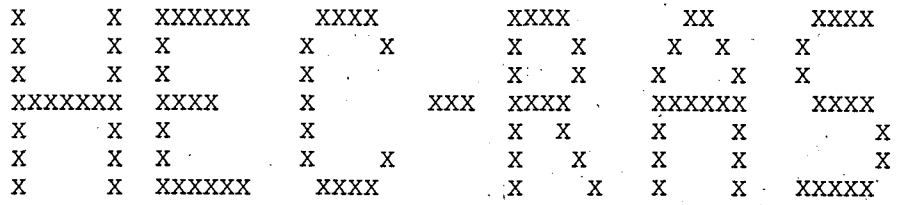
Corrected Effective Model HEC-RAS Output File (NAVD88)

Corrected Effective Model HEC-RAS Output File (NAVD88)

HEC-RAS Version 3.0.1 Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104



PROJECT DATA
Project Title: Flamingo Wash at Spencer
Project File : 879_D_Spnc.prj
Run Date and Time: 12/1/2003 10:54:37 AM

Project in English units

Project Description:
FLAMINGO WASH
  LETTER OF MAP REVISION
  EXISTING CHANNEL TO SPENCER
STREET
  STARTING WSE = NORMAL DEPTH
  SUBCRITICAL RUN

PLAN DATA

Plan Title: Corrected Geometry
Plan File : C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.p02

        Geometry Title: Corrected Geometry
        Geometry File : C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.g02

        Flow Title   : HEC-2 Flow
        Flow File   : C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.f01

Plan Summary Information:
Number of: Cross Sections = 18 Mulitple Openings = 0
Culverts = 0 Inline Weirs = 0
Bridges = 1

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 at all cross sections
Conveyance Calculation Method: Between every coordinate point (HEC2 Style)
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: HEC-2 Flow
Flow File : C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.f01

Flow Data (cfs)

River	Reach	RS	PF 1
RIVER-1	Reach-1	180	5300
RIVER-1	Reach-1	50	5500

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
RIVER-1	Reach-1	PF 1	Normal S = .01	Normal S = .01

GEOMETRY DATA

Geometry Title: Corrected Geometry
Geometry File : C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.g02

CROSS SECTION RIVER: RIVER-1

REACH: Reach-1 RS: 180

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1972.26	1028.94	1971.67	1064.62	1970.62	1086	1970.89	1087.29	1972.26
1087.42	1972.36	1100.03	1972.26	1105.54	1972.23	1109.38	1970.26	1113.23	1968.26
1117.01	1966.26	1120.79	1964.26	1124.58	1962.26	1128.36	1960.26	1131.88	1958.41
1143	1959.06	1147.31	1958.26	1152.03	1957.33	1170.74	1958.26	1170.74	1958.19
1176.71	1960.26	1180.23	1961.75	1180.82	1962.26	1183.17	1964.26	1185.58	1966.26
1188.01	1968.26	1190.47	1970.26	1192.93	1972.26	1195.38	1974.26	1197.84	1976.26
1199.53	1977.56	1202.18	1978.26	1204.15	1978.79	1230.41	1980.26	1230.73	1980.32
1268.21	1981.86	1278.63	1982.26						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.03	1105.54	.025	1192.93	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1105.54	1192.93	358.08	363.91	374.39	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1968.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.94	Wt. n-Val.		0.025	
W.S. Elev (ft)	1965.36	Reach Len. (ft)	358.08	363.91	374.39
Crit W.S. (ft)	1965.36	Flow Area (sq ft)		385.49	
E.G. Slope (ft/ft)	0.005478	Area (sq ft)		385.49	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	65.80	Top Width (ft)		65.80	
Vel Total (ft/s)	13.75	Avg. Vel. (ft/s)		13.75	
Max Chl Dpth (ft)	8.03	Hydr. Depth (ft)		5.86	
Conv. Total (cfs)	71606.9	Conv. (cfs)		71606.9	
Length Wtd. (ft)	363.91	Wetted Per. (ft)		69.77	
Min Ch El (ft)	1957.33	Shear (lb/sq ft)		1.89	
Alpha	1.00	Stream Power (lb/ft s)		25.98	
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)	1.41	27.54	0.27
C & E Loss (ft)	0.48	Cum SA (acres)	1.47	4.50	0.29

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

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 170

INPUT
Description:
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1969.26	1012.58	1968.26	1012.86	1968.25	1017.32	1966.26	1021.94	1964.26
1023.53	1963.56	1025.98	1962.26	1029.63	1960.26	1033.27	1958.26	1036.91	1956.26
1039.96	1954.56	1078.78	1954.75	1090.15	1955.06	1091.24	1956.26	1093.09	1958.26
1094.94	1960.26	1096.8	1962.26	1098.54	1964.14	1098.85	1964.26	1103.45	1966.26
1107.87	1968.26	1112.15	1970.26	1112.6	1970.48	1119.73	1970.58		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1021.94	.015	1098.85	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1021.94	1098.85	98.31	97.13	96.38	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1965.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.32	Wt. n-Val.		0.015	
W.S. Elev (ft)	1963.88	Reach Len. (ft)	98.31	97.13	96.38
Crit W.S. (ft)	1961.29	Flow Area (sq ft)		574.96	
E.G. Slope (ft/ft)	0.000642	Area (sq ft)		574.96	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	75.50	Top Width (ft)		75.50	
Vel Total (ft/s)	9.22	Avg. Vel. (ft/s)		9.22	
Max Chl Dpth (ft)	9.32	Hydr. Depth (ft)		7.62	
Conv. Total (cfs)	209096.1	Conv. (cfs)		209096.1	
Length Wtd. (ft)	97.13	Wetted Per. (ft)		81.74	
Min Ch El (ft)	1954.56	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)		2.60	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	1.41	23.52	0.27
C & E Loss (ft)	0.20	Cum SA (acres)	1.47	3.91	0.29

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: RIVER-1

REACH: Reach-1 RS: 160

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1966.26	1020.85	1964.26	1022.9	1963.4	1024.28	1962.26	1026.68	1960.26
1029.05	1958.26	1031.39	1956.26	1033.69	1954.26	1033.96	1954.02	1074.55	1954.03
1074.73	1954.26	1076.3	1956.26	1077.86	1958.26	1079.44	1960.26	1081.05	1962.26
1081.97	1963.36	1085.8	1964.26	1091.98	1966.26	1097.23	1968.26	1098.86	1968.94
1124.37	1969.36								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1022.9	.015	1081.97	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1022.9	1081.97	119.51	114.85	110.97	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1964.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.29	Wt. n-Val.		0.015	
W.S. Elev (ft)	1961.61	Reach Len. (ft)	119.51	114.85	110.97
Crit W.S. (ft)	1961.61	Flow Area (sq ft)		363.92	
E.G. Slope (ft/ft)	0.002039	Area (sq ft)		363.92	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	55.47	Top Width (ft)		55.47	
Vel Total (ft/s)	14.56	Avg. Vel. (ft/s)		14.56	
Max Chl Dpth (ft)	7.59	Hydr. Depth (ft)		6.56	
Conv. Total (cfs)	117380.3	Conv. (cfs)		117380.3	
Length Wtd. (ft)	114.85	Wetted Per. (ft)		61.94	
Min Ch El (ft)	1954.02	Shear (lb/sq ft)		0.75	
Alpha	1.00	Stream Power (lb/ft s)		10.89	
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	1.41	22.48	0.27
C & E Loss (ft)	0.00	Cum SA (acres)	1.47	3.77	0.29

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: RIVER-1
REACH: Reach-1 RS: 150

INPUT
Description:
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1967.66	1124.53	1966.51	1124.8	1966.26	1129.47	1964.26	1133.87	1962.26
1135	1961.76	1136.46	1960.26	1138.43	1958.26	1140.4	1956.26	1142.4	1954.26
1143.5	1952.76	1183.5	1952.76	1187.45	1954.26	1189.03	1956.26	1190.57	1958.26
1192.09	1960.26	1193.6	1962.25	1193.68	1962.26	1198.04	1964.26	1202.42	1966.26
1206.72	1968.26	1208.61	1969.15	1222.54	1969.43	1280.29	1968.65		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1135	.015	1193.6	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1135	1193.6	1	1	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1963.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.31	Wt. n-Val.		0.015	
W.S. Elev (ft)	1960.21	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	1960.21	Flow Area (sq ft)		363.26	
E.G. Slope (ft/ft)	0.002053	Area (sq ft)		363.26	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	55.54	Top Width (ft)		55.54	
Vel Total (ft/s)	14.59	Avg. Vel. (ft/s)		14.59	
Max Chl Dpth (ft)	7.45	Hydr. Depth (ft)		6.54	
Conv. Total (cfs)	116973.6	Conv. (cfs)		116973.6	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		61.98	
Min Ch El (ft)	1952.76	Shear (lb/sq ft)		0.75	
Alpha	1.00	Stream Power (lb/ft s)		10.96	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	1.41	21.52	0.27
C & E Loss (ft)	0.01	Cum SA (acres)	1.47	3.62	0.29

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: RIVER-1
REACH: Reach-1 RS: 140

INPUT
Description:

Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1967.36	1109.48	1966.26	1112.94	1966.35	1117.49	1964.26	1121.87	1962.26
1123.53	1961.46	1124.74	1960.26	1126.67	1958.26	1128.54	1956.26	1130.26	1954.26
1131.84	1952.26	1132.5	1950.76	1172.5	1950.76	1175.19	1952.26	1176.29	1954.26
1177.52	1956.26	1178.95	1958.26	1180.42	1960.26	1181.8	1962.12	1182.12	1962.26
1186.57	1964.26	1191.03	1966.26	1195.47	1968.26	1197.34	1969.11	1258.33	1968.62

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1123.53	.015	1181.8	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1123.53	1181.8	57.23	55.76	56.76	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1961.85	Wt. n-Val.		0.015	
Vel Head (ft)	3.43	Reach Len. (ft)	57.23	55.76	56.76
W.S. Elev (ft)	1958.42	Flow Area (sq ft)		356.72	
Crit W.S. (ft)	1958.42	Area (sq ft)		356.72	
E.G. Slope (ft/ft)	0.002096	Flow (cfs)		5300.00	
Q Total (cfs)	5300.00	Top Width (ft)		52.56	
Top Width (ft)	52.56	Avg. Vel. (ft/s)		14.86	
Vel Total (ft/s)	14.86	Hydr. Depth (ft)		6.79	
Max Chl Dpth (ft)	7.66	Conv. (cfs)		115764.7	
Conv. Total (cfs)	115764.7	Wetted Per. (ft)		60.16	
Length Wtd. (ft)	55.76	Shear (lb/sq ft)		0.78	
Min Ch El (ft)	1950.76	Stream Power (lb/ft s)		11.53	
Alpha	1.00	Cum Volume (acre-ft)	1.41	21.51	0.27
Frctn Loss (ft)	0.12	Cum SA (acres)	1.47	3.62	0.29
C & E Loss (ft)	0.00				

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

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 130

INPUT
Description:
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1965.26	1082.33	1964.26	1086.89	1962.26	1090.09	1960.83	1091.34	1960.26
1092.89	1958.26	1094.44	1956.26	1095.99	1954.26	1097.54	1952.26	1099.5	1950.26

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 1139.5 1950.26 1141.65 1952.26 1142.63 1954.26  1143.6 1956.26 1144.57 1958.26
1145.53 1960.26 1147.33 1962.26 1148.78 1963.65 1151.72 1964.26 1155.18 1965.09
 1156.8 1966.26 1157.37 1966.73 1174.08 1967.42 1213.65 1967.97

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .025 1091.34    .015 1145.53    .025

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
       1091.34 1145.53           125.29  125.31  125.61             .1        .3

CROSS SECTION OUTPUT    Profile #PF 1

  E.G. Elev (ft)           1961.40    Element                Left OB    Channel   Right OB
  Vel Head (ft)               3.47    Wt. n-Val.                        0.015
  W.S. Elev (ft)           1957.93    Reach Len. (ft)        125.29     125.31     125.61
  Crit W.S. (ft)           1957.93    Flow Area (sq ft)                 354.55
  E.G. Slope (ft/ft)      0.002094    Area (sq ft)                      354.55
  Q Total (cfs)            5300.00    Flow (cfs)                       5300.00
  Top Width (ft)             51.27    Top Width (ft)                     51.27
  Vel Total (ft/s)           14.95    Avg. Vel. (ft/s)                   14.95
  Max Chl Dpth (ft)           7.67    Hydr. Depth (ft)                    6.92
  Conv. Total (cfs)       115808.0    Conv. (cfs)                     115808.0
  Length Wtd. (ft)           125.31   Wetted Per. (ft)                   59.22
  Min Ch El (ft)           1950.26    Shear (lb/sq ft)                    0.78
  Alpha                       1.00    Stream Power (lb/ft s)             11.70
  Frctn Loss (ft)             0.26    Cum Volume (acre-ft)       1.41    21.05      0.27
  C & E Loss (ft)             0.02    Cum SA (acres)             1.47     3.55      0.29


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

CROSS SECTION          RIVER: RIVER-1
REACH: Reach-1            RS: 120

INPUT
Description:
Station Elevation Data    num=      27
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    1000 1961.96 1034.06 1962.26  1069.3 1962.96 1077.37 1962.26  1081.8  1961.8
 1082.95 1960.26 1084.44 1958.26 1085.94 1956.26 1087.44 1954.26 1088.93 1952.26
 1090.43 1950.26 1090.88 1949.76 1130.88 1949.76 1133.47 1950.26 1134.85 1952.26
 1136.24 1954.26 1137.62 1956.26 1138.99 1958.26 1139.81 1959.48 1140.72 1960.26
  1142.7 1962.26 1144.46 1964.26 1148.81 1964.28 1152.73 1964.26 1157.77 1964.26
 1185.25 1964.66 1223.58 1966.04
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Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1082.95	.015	1140.72	.025

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
1082.95	1140.72	25.32	24.78	22.42	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1960.68	Element			
Vel Head (ft)	3.40	Wt. n-Val.		0.015	
W.S. Elev (ft)	1957.28	Reach Len. (ft)	25.32	24.78	22.42
Crit W.S. (ft)	1957.28	Flow Area (sq ft)		358.16	
E.G. Slope (ft/ft)	0.002088	Area (sq ft)		358.16	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	53.14	Top Width (ft)		53.14	
Vel Total (ft/s)	14.80	Avg. Vel. (ft/s)		14.80	
Max Chl Dpth (ft)	7.52	Hydr. Depth (ft)		6.74	
Conv. Total (cfs)	115978.9	Conv. (cfs)		115978.9	
Length Wtd. (ft)	24.78	Wetted Per. (ft)		60.60	
Min Ch El (ft)	1949.76	Shear (lb/sq ft)		0.77	
Alpha	1.00	Stream Power (lb/ft s)		11.40	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	1.41	20.03	0.27
C & E Loss (ft)	0.01	Cum SA (acres)	1.47	3.40	0.29

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: RIVER-1
REACH: Reach-1 RS: 110

INPUT
Description:
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1960.26	1058.72	1961.52	1069.8	1960.78	1070.23	1960.26	1071.86	1958.26
1073.49	1956.26	1075.13	1954.26	1076.77	1952.26	1078.41	1950.26	1079.37	1949.49
1119.37	1949.46	1122.31	1950.26	1123.63	1952.26	1124.96	1954.26	1126.29	1956.26
1127.61	1958.26	1128.23	1959.2	1130.3	1960.26	1134.23	1962.26	1137.72	1964.04
1156.11	1964.26	1162.57	1964.26	1167.55	1964.26	1180.81	1964.48	1218.4	1965.79

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

1000 .025 1070.23 .015 1130.3 .025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1070.23	1130.3	1	1	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1960.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.36	Wt. n-Val.		0.015	
W.S. Elev (ft)	1956.96	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	1956.96	Flow Area (sq ft)		360.31	
E.G. Slope (ft/ft)	0.002064	Area (sq ft)		360.31	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	53.83	Top Width (ft)		53.83	
Vel Total (ft/s)	14.71	Avg. Vel. (ft/s)		14.71	
Max Chl Dpth (ft)	7.50	Hydr. Depth (ft)		6.69	
Conv. Total (cfs)	116658.0	Conv. (cfs)		116658.0	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		60.98	
Min Ch El (ft)	1949.46	Shear (lb/sq ft)		0.76	
Alpha	1.00	Stream Power (lb/ft s)		11.20	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	1.41	19.83	0.27
C & E Loss (ft)	0.01	Cum SA (acres)	1.47	3.37	0.29

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: RIVER-1
REACH: Reach-1 RS: 100

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1961.16	1057.4	1961.45	1068.55	1960.55	1068.7	1960.26	1070.39	1958.26
1071.98	1956.26	1073.58	1954.26	1075.17	1952.26	1076.75	1950.26	1078.32	1948.26
1079	1946.96	1119	1946.96	1119.77	1948.26	1121.07	1950.26	1122.37	1952.26
1123.68	1954.26	1124.99	1956.26	1126.31	1958.26	1126.86	1959.1	1129.14	1960.26
1133.08	1962.26	1136.43	1963.96	1161.01	1964.26	1164.12	1964.26	1169.92	1964.26
1180.79	1964.36	1218.41	1965.74						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1068.7	.015	1129.14	.025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1068.7 1129.14 346.14 342.73 339.84 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1958.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.49	Wt. n-Val.		0.015	
W.S. Elev (ft)	1954.78	Reach Len. (ft)	346.14	342.73	339.84
Crit W.S. (ft)	1954.78	Flow Area (sq ft)		353.78	
E.G. Slope (ft/ft)	0.002103	Area (sq ft)		353.78	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	50.86	Top Width (ft)		50.86	
Vel Total (ft/s)	14.98	Avg. Vel. (ft/s)		14.98	
Max Chl Dpth (ft)	7.82	Hydr. Depth (ft)		6.96	
Conv. Total (cfs)	115573.9	Conv. (cfs)		115573.9	
Length Wtd. (ft)	342.73	Wetted Per. (ft)		59.07	
Min Ch El (ft)	1946.96	Shear (lb/sq ft)		0.79	
Alpha	1.00	Stream Power (lb/ft s)		11.78	
Frctn Loss (ft)	0.71	Cum Volume (acre-ft)	1.41	19.82	0.27
C & E Loss (ft)	0.09	Cum SA (acres)	1.47	3.37	0.29

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: RIVER-1
REACH: Reach-1 RS: 90

INPUT
Description:
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1957.46	1006.02	1956.26	1007.66	1955.94	1022.15	1954.73	1035.65	1954.26
1045.56	1953.86	1052.98	1953.33	1054.57	1952.26	1057.59	1950.26	1060.63	1948.26
1063.71	1946.26	1065.06	1945.36	1105.06	1945.36	1109.3	1946.26	1110.15	1948.26
1110.99	1950.26	1111.87	1952.26	1112.94	1954.26	1113.6	1955.29	1119.02	1956.26
1121.63	1956.56	1145.66	1956.26	1187.07	1955.93				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1052.98	.015	1113.6	.025

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

1052.98	1113.6		53.02	51.93	56.59	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1955.84	Element			
Vel Head (ft)	3.19	Wt. n-Val.		0.015	
W.S. Elev (ft)	1952.66	Reach Len. (ft)	53.02	51.93	56.59
Crit W.S. (ft)	1952.66	Flow Area (sq ft)		370.05	
E.G. Slope (ft/ft)	0.002038	Area (sq ft)		370.05	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	58.10	Top Width (ft)		58.10	
Vel Total (ft/s)	14.32	Avg. Vel. (ft/s)		14.32	
Max Chl Dpth (ft)	7.30	Hydr. Depth (ft)		6.37	
Conv. Total (cfs)	117388.5	Conv. (cfs)		117388.5	
Length Wtd. (ft)	51.93	Wetted Per. (ft)		64.57	
Min Ch El (ft)	1945.36	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		10.45	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	1.41	16.97	0.27
C & E Loss (ft)	0.18	Cum SA (acres)	1.47	2.94	0.29

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

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 80

INPUT
Description:
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1954.26	1002.13	1954.26	1036.88	1953.71	1056.35	1952.59	1056.92	1952.26
1060.33	1950.26	1063.74	1948.26	1067.15	1946.26	1068.83	1944.86	1132.22	1944.86
1132.98	1946.26	1136.05	1948.26	1138.66	1950.26	1140.68	1952.26	1142.98	1954.14
1143.96	1954.26	1156.72	1956.26	1157.77	1956.26	1201.02	1956.64		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1056.35	.015	1140.68	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1056.35	1140.68	1	1	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1953.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.60	Wt. n-Val.		0.015	
W.S. Elev (ft)	1950.65	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	1950.65	Flow Area (sq ft)		409.60	
E.G. Slope (ft/ft)	0.002042	Area (sq ft)		409.60	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	79.38	Top Width (ft)		79.38	
Vel Total (ft/s)	12.94	Avg. Vel. (ft/s)		12.94	
Max Chl Dpth (ft)	5.79	Hydr. Depth (ft)		5.16	
Conv. Total (cfs)	117296.6	Conv. (cfs)		117296.6	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		83.34	
Min Ch El (ft)	1944.86	Shear (lb/sq ft)		0.63	
Alpha	1.00	Stream Power (lb/ft s)		8.11	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	1.41	16.50	0.27
C & E Loss (ft)	0.01	Cum SA (acres)	1.47	2.86	0.29

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: RIVER-1
REACH: Reach-1 RS: 70

INPUT
Description:
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1954.26	1048.35	1953.27	1062.67	1952.26	1063.36	1952.25	1067.18	1950.26
1070.79	1948.26	1074.17	1946.26	1076	1945.09	1084.29	1945.36	1099.07	1944.26
1099.92	1944.06	1112.55	1943.83	1115.39	1944.26	1121.4	1945.43	1139.21	1945.61
1140.31	1946.26	1143.61	1948.26	1146.85	1950.26	1149.96	1952.26	1152.28	1953.98
1154.22	1954.26	1165.11	1956.01	1194.64	1956.1				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1062.67	.015	1154.22	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1062.67	1154.22	427.31	417.23	406.33	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1953.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.56	Wt. n-Val.		0.015	
W.S. Elev (ft)	1950.64	Reach Len. (ft)	427.31	417.23	406.33
Crit W.S. (ft)	1950.64	Flow Area (sq ft)		412.57	
E.G. Slope (ft/ft)	0.002018	Area (sq ft)		412.57	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	81.00	Top Width (ft)		81.00	
Vel Total (ft/s)	12.85	Avg. Vel. (ft/s)		12.85	
Max Chl Dpth (ft)	6.81	Hydr. Depth (ft)		5.09	
Conv. Total (cfs)	117968.9	Conv. (cfs)		117968.9	
Length Wtd. (ft)	417.23	Wetted Per. (ft)		84.13	
Min Ch El (ft)	1943.83	Shear (lb/sq ft)		0.62	
Alpha	1.00	Stream Power (lb/ft s)		7.94	
Frctn Loss (ft)	0.81	Cum Volume (acre-ft)	1.41	16.50	0.27
C & E Loss (ft)	0.07	Cum SA (acres)	1.47	2.86	0.29

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: RIVER-1
REACH: Reach-1 RS: 60

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1951.66	1015.95	1950.26	1017.39	1950.14	1047.07	1948.43	1049.22	1948.26
1059.71	1947.46	1062.77	1946.26	1067.82	1944.26	1072.95	1942.26	1073.57	1942.03
1090.82	1941.76	1094.84	1940.26	1097.96	1939.02	1110.33	1939.13	1113.23	1940.26
1116.15	1941.46	1137.83	1941.63	1138.84	1942.26	1142.41	1944.26	1145.9	1946.26
1149.4	1948.26	1152.54	1950.01	1155.14	1950.26	1165.1	1951.34	1192.51	1951.5
1202.7	1952.26	1206.97	1952.58						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1059.71	.015	1149.4	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1059.71	1149.4	375.8	387.41	397.17	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1949.16	Element	Left OB	Channel	Right OB

Vel Head (ft)	2.34	Wt. n-Val.		0.015	
W.S. Elev (ft)	1946.82	Reach Len. (ft)	375.80	387.41	397.17
Crit W.S. (ft)	1946.68	Flow Area (sq ft)		431.33	
E.G. Slope (ft/ft)	0.001869	Area (sq ft)		431.33	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	85.52	Top Width (ft)		85.52	
Vel Total (ft/s)	12.29	Avg. Vel. (ft/s)		12.29	
Max Chl Dpth (ft)	7.80	Hydr. Depth (ft)		5.04	
Conv. Total (cfs)	122580.6	Conv. (cfs)		122580.6	
Length Wtd. (ft)	387.41	Wetted Per. (ft)		88.76	
Min Ch El (ft)	1939.02	Shear (lb/sq ft)		0.57	
Alpha	1.00	Stream Power (lb/ft s)		6.97	
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)	1.41	12.45	0.27
C & E Loss (ft)	0.12	Cum SA (acres)	1.47	2.06	0.29

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: RIVER-1
REACH: Reach-1 RS: 50

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1944.76	1093.5	1945.32	1100.84	1944.91	1115.98	1944.87	1129.89	1944.26
1184.49	1944.26	1184.49	1936.86	1234.87	1936.86	1234.87	1945.26	1239.96	1945.26
1254.01	1945.46	1350.42	1945.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1184.49	.015	1234.87	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1184.49	1234.87	112.85	115.08	117.18	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
1000	1184.49	1947.26	1234.87	1350.42	1947.26

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1948.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.96	Wt. n-Val.		0.015	
W.S. Elev (ft)	1946.59	Reach Len. (ft)	0.10	0.10	0.10
Crit W.S. (ft)	1944.04	Flow Area (sq ft)		490.11	
E.G. Slope (ft/ft)	0.000955	Area (sq ft)		490.11	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.38	Top Width (ft)		50.38	

Vel Total (ft/s)	11.22	Avg. Vel. (ft/s)		11.22	
Max Chl Dpth (ft)	9.73	Hydr. Depth (ft)		9.73	
Conv. Total (cfs)	177966.6	Conv. (cfs)		177966.6	
Length Wtd. (ft)	0.10	Wetted Per. (ft)		69.84	
Min Ch El (ft)	1936.86	Shear (lb/sq ft)		0.42	
Alpha	1.00	Stream Power (lb/ft s)		4.70	
Frctn Loss (ft)		Cum Volume (acre-ft)	1.41	8.36	0.27
C & E Loss (ft)		Cum SA (acres)	1.47	1.46	0.29

BRIDGE RIVER: RIVER-1
REACH: Reach-1 RS: 45

INPUT
Description: Bridge #1

Distance from Upstream XS = .1
Deck/Roadway Width = 114.88
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
1000	1945.39	1935.86	1184.49	1945.39	1935.86	1184.49	1945.391	941.859
1234.87	1945.391	941.859	1234.87	1945.39	1935.86	1350.42	1945.39	1935.86

Upstream Bridge Cross Section Data
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1944.76	1093.5	1945.32	1100.84	1944.91	1115.98	1944.87	1129.89	1944.26
1184.49	1944.26	1184.49	1936.86	1234.87	1936.86	1234.87	1945.26	1239.96	1945.26
1254.01	1945.46	1350.42	1945.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1184.49	.015	1234.87	.025

Bank Sta: Left	Right	Coeff Contr.	Expan.
1184.49	1234.87	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
1000	1184.49	1947.26	1234.87	1350.42	1947.26

Downstream Deck/Roadway Coordinates
num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
1000	1945.39	1935.86	1133.81	1945.39	1935.86	1133.81	1945.391	941.859
1184.19	1945.391	941.859	1184.19	1945.39	1935.86	1350.42	1945.39	1935.86

Downstream Bridge Cross Section Data

```
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    1000 1943.56 1090.13 1943.71 1104.02 1943.48 1133.81 1942.26 1133.81 1935.86
 1184.19 1935.86 1184.19 1942.26 1206.88 1942.26 1232.32 1943.48  1242.6 1944.26
 1251.47 1944.86 1256.84 1946.26

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .025 1133.81    .015 1184.19    .025

Bank Sta: Left   Right    Coeff Contr.   Expan.
       1133.81 1184.19              .1       .3
Blocked Obstructions     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    1000 1133.81 1944.26 1184.19 1256.84 1944.26

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           = 1945.39
Energy head used in spillway design           =
Spillway height used in design                =
Weir crest shape                              = Broad Crested

Number of Piers =  1

Pier Data
Pier Station     Upstream= 1209.68    Downstream=    1159
Upstream     num=       2
    Width   Elev    Width   Elev
    2.38 1936.86    2.381941.859
Downstream     num=       2
    Width   Elev    Width   Elev
    2.38 1935.86    2.381941.859

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
      Yarnell                  KVal =      .9
Selected Low Flow Methods = Yarnell

High Flow Method
      Pressure and Weir flow
          Submerged Inlet Cd          =
          Submerged Inlet + Outlet Cd =.8006408
          Max Low Cord                =1941.859

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 #PF 1
Opening : Single BR

			Inside BR US	Inside BR DS
E.G. US. (ft)	1948.55	Element		
W.S. US. (ft)	1946.59	E.G. Elev (ft)	1948.54	1948.28
Q Total (cfs)	5500.00	W.S. Elev (ft)	1946.59	1946.59
Q Bridge (cfs)	3622.39	Crit W.S. (ft)	1948.71	1947.10
Q Weir (cfs)	1877.62	Max Chl Dpth (ft)	9.73	10.73
Weir Sta Lft (ft)	1000.00	Vel Total (ft/s)	18.31	9.26
Weir Sta Rgt (ft)	1350.42	Flow Area (sq ft)	300.32	594.26
Weir Submerg	0.00	Froude # Chl	0.07	0.04
Weir Max Depth (ft)	3.15	Specif Force (cu ft)	4898.86	4215.67
Min El Weir Flow (ft)	1945.40	Hydr Depth (ft)	5.96	2.31
Min El Prs (ft)	1941.86	W.P. Total (ft)	168.77	378.47
Delta EG (ft)	1.92	Conv. Total (cfs)		
Delta WS (ft)	3.55	Top Width (ft)	50.38	256.84
BR Open Area (sq ft)	239.95	Frctn Loss (ft)		
BR Open Vel (ft/s)	15.10	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)		
Br Sel Method	Press/Weir	Power Total (lb/ft s)		

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 downstream water surface is above the minimum elevation for pressure flow. The orifice equations were used for pressure flow.
Warning: The cross section had to be extended vertically during the critical depth calculations.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: For the cross section inside the bridge at the upstream end, the water surface and energy have been projected from the upstream cross section. The selected bridge modeling method does not compute answers inside the bridge.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The cross section had to be extended vertically during the critical depth calculations.
Warning: The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: For the cross section inside the bridge at the downstream end, the energy is based on critical depth over the weir. The water surface has been projected.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 40

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1943.56	1090.13	1943.71	1104.02	1943.48	1133.81	1942.26	1133.81	1935.86
1184.19	1935.86	1184.19	1942.26	1206.88	1942.26	1232.32	1943.48	1242.6	1944.26
1251.47	1944.86	1256.84	1946.26						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1133.81	.015	1184.19	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1133.81	1184.19	10	10	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
1000	1133.81	1944.26	1184.19	1256.84	1944.26

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1946.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.59	Wt. n-Val.		0.015	
W.S. Elev (ft)	1943.04	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	1943.04	Flow Area (sq ft)		361.54	
E.G. Slope (ft/ft)	0.002380	Area (sq ft)		361.54	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.38	Top Width (ft)		50.38	
Vel Total (ft/s)	15.21	Avg. Vel. (ft/s)		15.21	
Max Chl Dpth (ft)	7.18	Hydr. Depth (ft)		7.18	
Conv. Total (cfs)	112741.2	Conv. (cfs)		112741.2	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		64.73	
Min Ch El (ft)	1935.86	Shear (lb/sq ft)		0.83	
Alpha	1.00	Stream Power (lb/ft s)		12.62	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	1.20	7.50	0.16
C & E Loss (ft)	0.28	Cum SA (acres)	1.29	1.33	0.19

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

CROSS SECTION RIVER: RIVER-1

REACH: Reach-1 RS: 30

INPUT
Description:
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1943.36	1090.06	1943.36	1103.29	1943.05	1130.52	1942.26	1133.35	1940.26
1135.91	1938.26	1138.18	1936.26	1140.33	1934.26	1142.47	1932.26	1142.75	1931.87
1159.96	1931.66	1167.49	1931.09	1172.19	1932.26	1173.44	1932.45	1191.06	1932.54
1194.2	1932.26	1201.75	1931.55	1203.16	1932.26	1207.08	1934.26	1211	1936.26
1214.92	1938.26	1218.84	1940.26	1222.54	1942.15	1224.83	1942.26	1249.47	1943.46
1260.06	1944.26	1268.85	1944.92	1274.05	1946.26				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1130.52	.015	1218.84	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1130.52	1218.84	407.19	417.8	429.8	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1940.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.67	Wt. n-Val.		0.015	
W.S. Elev (ft)	1938.05	Reach Len. (ft)	407.19	417.80	429.80
Crit W.S. (ft)	1938.05	Flow Area (sq ft)		419.08	
E.G. Slope (ft/ft)	0.002014	Area (sq ft)		419.08	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	78.37	Top Width (ft)		78.37	
Vel Total (ft/s)	13.12	Avg. Vel. (ft/s)		13.12	
Max Chl Dpth (ft)	6.96	Hydr. Depth (ft)		5.35	
Conv. Total (cfs)	122563.2	Conv. (cfs)		122563.2	
Length Wtd. (ft)	417.52	Wetted Per. (ft)		82.61	
Min Ch El (ft)	1931.09	Shear (lb/sq ft)		0.64	
Alpha	1.00	Stream Power (lb/ft s)		8.37	
Frctn Loss (ft)	1.25	Cum Volume (acre-ft)	1.20	7.41	0.16
C & E Loss (ft)	0.26	Cum SA (acres)	1.29	1.31	0.19

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

that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 20

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1938.26	1006.11	1937.91	1064.7	1936.26	1208.86	1934.26	1227.96	1933.45
1233.9	1932.26	1243.73	1930.26	1253.48	1928.26	1254.71	1928.01	1278.37	1926.66
1284.64	1927.36	1286.28	1928.26	1290.47	1930.26	1294.74	1932.26	1298.29	1933.92
1305.87	1934.26	1329.91	1936.26	1346.51	1938.26	1362.32	1940.26	1377.32	1942.26
1379.3	1942.46	1458.06	1942.86	1497.53	1942.26	1514.53	1941.94	1517.34	1941.88
1549.95	1941.76	1574.13	1942.01	1575.86	1942.26	1586.4	1943.42	1601.6	1944.26
1603.5	1944.46	1614.3	1946.26	1621.6	1947.48	1765.27	1947.69	1766.42	1948.26

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.035	1227.96	.03	1305.87	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1227.96	1305.87	314.44	297.76	275.67	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1937.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.81	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	1935.67	Reach Len. (ft)	314.44	297.76	275.67
Crit W.S. (ft)	1935.67	Flow Area (sq ft)	105.97	462.83	11.90
E.G. Slope (ft/ft)	0.004868	Area (sq ft)	105.97	462.83	11.90
Q Total (cfs)	5500.00	Flow (cfs)	319.48	5152.70	27.82
Top Width (ft)	215.35	Top Width (ft)	120.52	77.91	16.91
Vel Total (ft/s)	9.47	Avg. Vel. (ft/s)	3.01	11.13	2.34
Max Chl Dpth (ft)	9.01	Hydr. Depth (ft)	0.88	5.94	0.70
Conv. Total (cfs)	78831.1	Conv. (cfs)	4579.1	73853.4	398.7
Length Wtd. (ft)	298.50	Wetted Per. (ft)	120.55	80.04	16.97
Min Ch El (ft)	1926.66	Shear (lb/sq ft)	0.27	1.76	0.21
Alpha	1.30	Stream Power (lb/ft s)	0.81	19.56	0.50
Frctn Loss (ft)	1.51	Cum Volume (acre-ft)	0.70	3.18	0.10
C & E Loss (ft)	0.02	Cum SA (acres)	0.73	0.56	0.11

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: RIVER-1
REACH: Reach-1 RS: 10

INPUT
Description:
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1937.36	1049.49	1936.26	1095.06	1934.26	1144.27	1932.26	1220.49	1930.39
1220.83	1930.26	1228.41	1928.26	1235.7	1926.26	1237.99	1925.61	1249.9	1924.26
1252.38	1923.96	1254.61	1924.26	1271.01	1926.26	1272.95	1926.49	1279.8	1927.8
1285.65	1928.26	1306.65	1930.26	1322.46	1932.26	1329.96	1933.29	1344.12	1934.26
1372.27	1936.26	1402.27	1938.26	1409.32	1938.72	1418.36	1939.14	1426.01	1940.26
1436.49	1941.26	1496.07	1942.26	1580.86	1943.11	1671.03	1944.26	1677.54	1944.52
1685.16	1944.66	1718.9	1946.26						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.035	1220.49	.03	1306.65	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1220.49	1306.65	0	0	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1934.24	Element			
Vel Head (ft)	1.76	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	1932.48	Reach Len. (ft)			
Crit W.S. (ft)	1932.48	Flow Area (sq ft)	88.37	467.64	19.41
E.G. Slope (ft/ft)	0.005245	Area (sq ft)	88.37	467.64	19.41
Q Total (cfs)	5500.00	Flow (cfs)	296.93	5135.89	67.18
Top Width (ft)	185.10	Top Width (ft)	81.55	86.16	17.39
Vel Total (ft/s)	9.56	Avg. Vel. (ft/s)	3.36	10.98	3.46
Max Chl Dpth (ft)	8.52	Hydr. Depth (ft)	1.08	5.43	1.12
Conv. Total (cfs)	75944.4	Conv. (cfs)	4100.1	70916.7	927.6
Length Wtd. (ft)		Wetted Per. (ft)	81.58	87.29	17.53
Min Ch El (ft)	1923.96	Shear (lb/sq ft)	0.35	1.75	0.36
Alpha	1.24	Stream Power (lb/ft s)	1.19	19.27	1.25
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

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

SUMMARY OF MANNING'S N VALUES

River:RIVER-1

Reach	River Sta.	n1	n2	n3
Reach-1	180	.03	.025	.03
Reach-1	170	.025	.015	.025
Reach-1	160	.025	.015	.025
Reach-1	150	.025	.015	.025
Reach-1	140	.025	.015	.025
Reach-1	130	.025	.015	.025
Reach-1	120	.025	.015	.025
Reach-1	110	.025	.015	.025
Reach-1	100	.025	.015	.025
Reach-1	90	.025	.015	.025
Reach-1	80	.025	.015	.025
Reach-1	70	.025	.015	.025
Reach-1	60	.025	.015	.025
Reach-1	50	.025	.015	.025
Reach-1	45	Bridge		
Reach-1	40	.025	.015	.025
Reach-1	30	.025	.015	.025
Reach-1	20	.035	.03	.035
Reach-1	10	.035	.03	.035

SUMMARY OF REACH LENGTHS

River: RIVER-1

Reach	River Sta.	Left	Channel	Right
Reach-1	180	358.08	363.91	374.39
Reach-1	170	98.31	97.13	96.38
Reach-1	160	119.51	114.85	110.97
Reach-1	150	1	1	1
Reach-1	140	57.23	55.76	56.76
Reach-1	130	125.29	125.31	125.61
Reach-1	120	25.32	24.78	22.42
Reach-1	110	1	1	1
Reach-1	100	346.14	342.73	339.84
Reach-1	90	53.02	51.93	56.59
Reach-1	80	1	1	1
Reach-1	70	427.31	417.23	406.33
Reach-1	60	375.8	387.41	397.17
Reach-1	50	112.85	115.08	117.18
Reach-1	45	Bridge		

Reach-1	40	10	10	10
Reach-1	30	407.19	417.8	429.8
Reach-1	20	314.44	297.76	275.67
Reach-1	10	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RIVER-1

Reach	River Sta.	Contr.	Expan.
Reach-1	180	.1	.3
Reach-1	170	.1	.3
Reach-1	160	.1	.3
Reach-1	150	.1	.3
Reach-1	140	.1	.3
Reach-1	130	.1	.3
Reach-1	120	.1	.3
Reach-1	110	.1	.3
Reach-1	100	.1	.3
Reach-1	90	.1	.3
Reach-1	80	.1	.3
Reach-1	70	.1	.3
Reach-1	60	.1	.3
Reach-1	50	.1	.3
Reach-1	45	Bridge	
Reach-1	40	.1	.3
Reach-1	30	.1	.3
Reach-1	20	.1	.3
Reach-1	10	.1	.3

Profile Output Table - CHECKRAS

Reach	River Sta	Froude # Chl	Top Wdth Act	Conv.	Total	Prof Delta WS	Left Sta Eff	Enc Sta L	Center Station	Enc Sta R	Rght Sta Eff	Min Ch El	Left Stagn	Right Stagn					
			(ft)	(cfs)		(ft)	(ft)	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)					
Reach-1	180		1.00	65.80	71606.9		1118.70			1149.24		1184.50	1957.33						
Reach-1	170		0.59	75.50	209096.1		1022.80			1060.40		1098.30	1954.56						
Reach-1	160		1.00	55.47	117380.3		1025.06			1052.44		1080.53	1954.02						
Reach-1	150		1.01	55.54	116973.6		1136.51												

1164.30		1192.05	1952.76			
Reach-1	140		1.01	52.56	115764.7	1126.51
1152.67		1179.07	1950.76			
Reach-1	130		1.00	51.27	115808.0	1093.15
1118.44		1144.41	1950.26			
Reach-1	120		1.00	53.14	115978.9	1085.18
1111.84		1138.32	1949.76			
Reach-1	110		1.00	53.83	116658.0	1072.92
1100.27		1126.75	1949.46			
Reach-1	100		1.00	50.86	115573.9	1073.16
1098.92		1124.02	1946.96			
Reach-1	90		1.00	58.10	117388.5	1053.98
1083.29		1112.08	1945.36			
Reach-1	80		1.00	79.38	117296.6	1059.67
1098.52		1139.05	1944.86			
Reach-1	70		1.00	81.00	117968.9	1066.45
1108.45		1147.44	1943.83			
Reach-1	60		0.96	85.52	122580.6	1061.35
1104.56		1146.87	1939.02			
Reach-1	50		0.63	50.38	177966.6	1184.49
1209.68		1234.87	1936.86			
Reach-1	45	BR U	0.07	50.38		1184.49
1209.68		1234.87	1936.86			
Reach-1	45	BR D	0.04	256.84		1000.00
1159.00		1256.84	1935.86			
Reach-1	40		1.00	50.38	112741.2	1133.81
1159.00		1184.19	1935.86			
Reach-1	30		1.00	78.37	122563.2	1136.14
1174.68		1214.52	1931.09			
Reach-1	20		0.80	215.35	78831.1	1107.44
1266.92		1322.78	1926.66			
Reach-1	10		0.83	185.10	75944.4	1138.94
1263.57		1324.04	1923.96			

HEC-RAS Plan: Corrected River: RIVER-1 Reach: Reach-1 Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	180	PF 1	5300.00	1957.33	1965.36	1965.36	1968.30	0.005478	13.75	385.49	65.80	1.00
Reach-1	170	PF 1	5300.00	1954.56	1963.89	1961.29	1965.20	0.000642	9.22	575.14	75.51	0.59
Reach-1	160	PF 1	5300.00	1954.02	1961.61	1961.61	1964.90	0.002039	14.56	363.92	55.47	1.00
Reach-1	150	PF 1	5300.00	1952.76	1960.21	1960.21	1963.52	0.002053	14.59	363.26	55.54	1.01
Reach-1	140	PF 1	5300.00	1950.76	1958.42	1958.42	1961.85	0.002096	14.86	356.72	52.56	1.01
Reach-1	130	PF 1	5300.00	1950.26	1957.93	1957.93	1961.40	0.002094	14.95	354.55	51.27	1.00
Reach-1	120	PF 1	5300.00	1949.76	1957.28	1957.28	1960.68	0.002088	14.80	358.16	53.14	1.00
Reach-1	110	PF 1	5300.00	1949.46	1956.96	1956.96	1960.32	0.002064	14.71	360.31	53.83	1.00
Reach-1	100	PF 1	5300.00	1946.96	1954.78	1954.78	1958.27	0.002103	14.98	353.78	50.86	1.00
Reach-1	90	PF 1	5300.00	1945.36	1952.66	1952.66	1955.84	0.002038	14.32	370.05	58.10	1.00
Reach-1	80	PF 1	5300.00	1944.86	1950.65	1950.65	1953.25	0.002042	12.94	409.60	79.38	1.00
Reach-1	70	PF 1	5300.00	1943.83	1950.64	1950.64	1953.20	0.002018	12.85	412.57	81.00	1.00
Reach-1	60	PF 1	5300.00	1939.02	1946.82	1946.68	1949.16	0.001860	12.27	432.09	85.56	0.96
Reach-1	50	PF 1	5500.00	1936.86	1946.59	1944.04	1948.55	0.000953	11.22	490.41	50.38	0.63
Reach-1	45		Bridge									
Reach-1	40	PF 1	5500.00	1935.86	1943.04	1943.04	1946.63	0.002380	15.21	361.54	50.38	1.00
Reach-1	30	PF 1	5500.00	1931.09	1938.05	1938.05	1940.73	0.002014	13.12	419.08	78.37	1.00
Reach-1	20	PF 1	5500.00	1926.66	1935.67	1935.67	1937.48	0.004868	11.13	580.70	215.35	0.80
Reach-1	10	PF 1	5500.00	1923.96	1932.48	1932.48	1934.24	0.005245	10.98	575.42	185.10	0.83

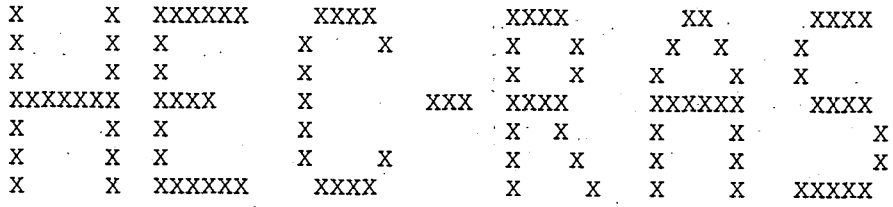
HEC-RAS Plan: Corrected River: RIVER-1 Reach: Reach-1 Profile: PF 1

Reach	River Sta	Profile	E.G. US.	Min El Prs	BR Open Area	Prs O WS	Q Total	Min El Weir Flow	Q Weir	Delta EG
			(ft)	(ft)	(sq ft)	(ft)	(cfs)	(ft)	(cfs)	(ft)
Reach-1	45	PF 1	1948.55	1941.86	239.95		5500.00	1945.40	1879.03	1.92

Post-Project Conditions HEC-RAS Output File

Post-Project Conditions HEC-RAS Output File

HEC-RAS Version 3.0.1 Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104



PROJECT DATA
Project Title: Flamingo Wash at Spencer
Project File : 879_D_Spnc.prj
Run Date and Time: 12/1/2003 9:57:57 AM

Project in English units

Project Description:
FLAMINGO WASH
  LETTER OF MAP REVISION
  EXISTING CHANNEL TO SPENCER
STREET
  STARTING WSE = NORMAL DEPTH
  SUBCRITICAL RUN

PLAN DATA

Plan Title: Post Project
Plan File : C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.p03

        Geometry Title: Post Project Geometry
        Geometry File : C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.g03

        Flow Title   : Post Project
        Flow File   : C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.f02

Plan Summary Information:
Number of: Cross Sections = 50 Mulitple Openings = 0
Culverts = 0 Inline Weirs = 0
Bridges = 1

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\jdouglas\Desktop\HEC-Ras\879_D_Spnc.f02

Flow Data (cfs)

River	Reach	RS	PF 1
RIVER-1	Reach-1	180	5300
RIVER-1	Reach-1	50	5500

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
RIVER-1	Reach-1	PF 1	Critical	Normal S = .01

GEOMETRY DATA

Geometry Title: Post Project Geometry
Geometry File : C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.g03

CROSS SECTION RIVER: RIVER-1

REACH: Reach-1 RS: 180

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1972.26	1028.94	1971.67	1064.62	1970.62	1086	1970.89	1087.29	1972.26
1087.42	1972.36	1100.03	1972.26	1105.54	1972.23	1109.38	1970.26	1113.23	1968.26
1117.01	1966.26	1120.79	1964.26	1124.58	1962.26	1128.36	1960.26	1131.88	1958.41
1143	1959.06	1147.31	1958.26	1152.03	1957.33	1170.74	1958.26	1170.74	1958.19
1176.71	1960.26	1180.23	1961.75	1180.82	1962.26	1183.17	1964.26	1185.58	1966.26
1188.01	1968.26	1190.47	1970.26	1192.93	1972.26	1195.38	1974.26	1197.84	1976.26
1199.53	1977.56	1202.18	1978.26	1204.15	1978.79	1230.41	1980.26	1230.73	1980.32
1268.21	1981.86	1278.63	1982.26						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.03	1105.54	.025	1192.93	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1105.54	1192.93	358.08	363.91	374.39	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1968.30	Element			
Vel Head (ft)	2.94	Wt. n-Val.		0.025	
W.S. Elev (ft)	1965.36	Reach Len. (ft)	358.08	363.91	374.39
Crit W.S. (ft)	1965.36	Flow Area (sq ft)		385.47	
E.G. Slope (ft/ft)	0.005479	Area (sq ft)		385.47	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	65.80	Top Width (ft)		65.80	
Vel Total (ft/s)	13.75	Avg. Vel. (ft/s)		13.75	
Max Chl Dpth (ft)	8.03	Hydr. Depth (ft)		5.86	
Conv. Total (cfs)	71600.3	Conv. (cfs)		71600.3	
Length Wtd. (ft)	363.91	Wetted Per. (ft)		69.77	
Min Ch El (ft)	1957.33	Shear (lb/sq ft)		1.89	
Alpha	1.00	Stream Power (lb/ft s)		25.98	
Frctn Loss (ft)		Cum Volume (acre-ft)	0.37	19.82	0.07
C & E Loss (ft)		Cum SA (acres)	0.35	3.40	0.07

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 170

INPUT
Description:
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1969.26	1012.58	1968.26	1012.86	1968.25	1017.32	1966.26	1021.94	1964.26

1023.53 1963.56 1025.98 1962.26 1029.63 1960.26 1033.27 1958.26 1036.91 1956.26
1039.96 1954.56 1078.78 1954.75 1090.15 1955.06 1091.24 1956.26 1093.09 1958.26
1094.94 1960.26 1096.8 1962.26 1098.54 1964.14 1098.85 1964.26 1103.45 1966.26
1107.87 1968.26 1112.15 1970.26 1112.6 1970.48 1119.73 1970.58

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1021.94	.015	1098.85	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1021.94	1098.85	98.31	97.13	96.38	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1965.20	Element			
Vel Head (ft)	1.32	Wt. n-Val.		0.015	
W.S. Elev (ft)	1963.89	Reach Len. (ft)	98.31	97.13	96.38
Crit W.S. (ft)	1961.31	Flow Area (sq ft)		575.14	
E.G. Slope (ft/ft)	0.000642	Area (sq ft)		575.14	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	75.51	Top Width (ft)		75.51	
Vel Total (ft/s)	9.22	Avg. Vel. (ft/s)		9.22	
Max Chl Dpth (ft)	9.32	Hydr. Depth (ft)		7.62	
Conv. Total (cfs)	209191.8	Conv. (cfs)		209191.8	
Length Wtd. (ft)	97.13	Wetted Per. (ft)		81.75	
Min Ch El (ft)	1954.56	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)		2.60	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.37	15.81	0.07
C & E Loss (ft)	0.20	Cum SA (acres)	0.35	2.81	0.07

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: RIVER-1
REACH: Reach-1 RS: 160

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1966.26	1020.85	1964.26	1022.9	1963.4	1024.28	1962.26	1026.68	1960.26
1029.05	1958.26	1031.39	1956.26	1033.69	1954.26	1033.96	1954.02	1074.55	1954.03
1074.73	1954.26	1076.3	1956.26	1077.86	1958.26	1079.44	1960.26	1081.05	1962.26
1081.97	1963.36	1085.8	1964.26	1091.98	1966.26	1097.23	1968.26	1098.86	1968.94
1124.37	1969.36								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1022.9	.015	1081.97	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1022.9	1081.97	119.51	114.85	110.97	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1964.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.29	Wt. n-Val.		0.015	
W.S. Elev (ft)	1961.61	Reach Len. (ft)	119.51	114.85	110.97
Crit W.S. (ft)	1961.61	Flow Area (sq ft)		363.92	
E.G. Slope (ft/ft)	0.002039	Area (sq ft)		363.92	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	55.47	Top Width (ft)		55.47	
Vel Total (ft/s)	14.56	Avg. Vel. (ft/s)		14.56	
Max Chl Dpth (ft)	7.59	Hydr. Depth (ft)		6.56	
Conv. Total (cfs)	117380.3	Conv. (cfs)		117380.3	
Length Wtd. (ft)	114.85	Wetted Per. (ft)		61.94	
Min Ch El (ft)	1954.02	Shear (lb/sq ft)		0.75	
Alpha	1.00	Stream Power (lb/ft s)		10.89	
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.37	14.76	0.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.35	2.67	0.07

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: RIVER-1
REACH: Reach-1 RS: 150

INPUT
Description:
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1967.66	1124.53	1966.51	1124.8	1966.26	1129.47	1964.26	1133.87	1962.26
1135	1961.76	1136.46	1960.26	1138.43	1958.26	1140.4	1956.26	1142.4	1954.26
1143.5	1952.76	1183.5	1952.76	1187.45	1954.26	1189.03	1956.26	1190.57	1958.26
1192.09	1960.26	1193.6	1962.25	1193.68	1962.26	1198.04	1964.26	1202.42	1966.26
1206.72	1968.26	1208.61	1969.15	1222.54	1969.43	1280.29	1968.65		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1135	.015	1193.6	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1135	1193.6	1	1	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1964.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.72	Wt. n-Val.		0.015	
W.S. Elev (ft)	1958.60	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	1960.22	Flow Area (sq ft)		276.25	
E.G. Slope (ft/ft)	0.004649	Area (sq ft)		276.25	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	52.74	Top Width (ft)		52.74	
Vel Total (ft/s)	19.19	Avg. Vel. (ft/s)		19.19	
Max Chl Dpth (ft)	5.84	Hydr. Depth (ft)		5.24	
Conv. Total (cfs)	77729.7	Conv. (cfs)		77729.7	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		57.71	
Min Ch El (ft)	1952.76	Shear (lb/sq ft)		1.39	
Alpha	1.00	Stream Power (lb/ft s)		26.66	
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	0.37	13.92	0.07
C & E Loss (ft)	0.24	Cum SA (acres)	0.35	2.53	0.07

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: Program found supercritical flow starting at this cross section.

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 140

INPUT
Description:
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1967.36	1109.48	1966.26	1112.94	1966.35	1117.49	1964.26	1121.87	1962.26
1123.53	1961.46	1124.74	1960.26	1126.67	1958.26	1128.54	1956.26	1130.26	1954.26
1131.84	1952.26	1132.5	1950.76	1172.5	1950.76	1175.19	1952.26	1176.29	1954.26
1177.52	1956.26	1178.95	1958.26	1180.42	1960.26	1181.8	1962.12	1182.12	1962.26
1186.57	1964.26	1191.03	1966.26	1195.47	1968.26	1197.34	1969.11	1258.33	1968.62

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1123.53	.015	1181.8	.025

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

1123.53	1181.8	57.23	55.76	56.76	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1964.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.12	Wt. n-Val.		0.015	
W.S. Elev (ft)	1955.95	Reach Len. (ft)	57.23	55.76	56.76
Crit W.S. (ft)	1958.44	Flow Area (sq ft)		231.74	
E.G. Slope (ft/ft)	0.007598	Area (sq ft)		231.74	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	48.52	Top Width (ft)		48.52	
Vel Total (ft/s)	22.87	Avg. Vel. (ft/s)		22.87	
Max Chl Dpth (ft)	5.19	Hydr. Depth (ft)		4.78	
Conv. Total (cfs)	60803.4	Conv. (cfs)		60803.4	
Length Wtd. (ft)	55.76	Wetted Per. (ft)		53.76	
Min Ch El (ft)	1950.76	Shear (lb/sq ft)		2.04	
Alpha	1.00	Stream Power (lb/ft s)		46.76	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.37	13.91	0.07
C & E Loss (ft)	0.24	Cum SA (acres)	0.35	2.52	0.07

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: RIVER-1
REACH: Reach-1 RS: 130

INPUT
Description:
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1965.26	1082.33	1964.26	1086.89	1962.26	1090.09	1960.83	1091.34	1960.26
1092.89	1958.26	1094.44	1956.26	1095.99	1954.26	1097.54	1952.26	1099.5	1950.26
1139.5	1950.26	1141.65	1952.26	1142.63	1954.26	1143.6	1956.26	1144.57	1958.26
1145.53	1960.26	1147.33	1962.26	1148.78	1963.65	1151.72	1964.26	1155.18	1965.09
1156.8	1966.26	1157.37	1966.73	1174.08	1967.42	1213.65	1967.97		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1091.34	.015	1145.53	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1091.34	1145.53	125.29	125.31	125.61	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1963.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.20	Wt. n-Val.		0.015	
W.S. Elev (ft)	1955.44	Reach Len. (ft)	125.29	125.31	125.61

Crit W.S. (ft)	1957.93	Flow Area (sq ft)		230.61		
E.G. Slope (ft/ft)	0.007633	Area (sq ft)		230.61		
Q Total (cfs)	5300.00	Flow (cfs)		5300.00		
Top Width (ft)	48.12	Top Width (ft)		48.12		
Vel Total (ft/s)	22.98	Avg. Vel. (ft/s)		22.98		
Max Chl Dpth (ft)	5.18	Hydr. Depth (ft)		4.79		
Conv. Total (cfs)	60664.7	Conv. (cfs)		60664.7		
Length Wtd. (ft)	125.31	Wetted Per. (ft)		53.29		
Min Ch El (ft)	1950.26	Shear (lb/sq ft)		2.06		
Alpha	1.00	Stream Power (lb/ft s)		47.39		
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)	0.37	13.61	0.07	
C & E Loss (ft)	0.01	Cum SA (acres)	0.35	2.46	0.07	

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 120

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1961.96	1034.06	1962.26	1069.3	1962.96	1077.37	1962.26	1081.8	1961.8
1082.95	1960.26	1084.44	1958.26	1085.94	1956.26	1087.44	1954.26	1088.93	1952.26
1090.43	1950.26	1090.88	1949.76	1130.88	1949.76	1133.47	1950.26	1134.85	1952.26
1136.24	1954.26	1137.62	1956.26	1138.99	1958.26	1139.81	1959.48	1140.72	1960.26
1142.7	1962.26	1144.46	1964.26	1148.81	1964.28	1152.73	1964.26	1157.77	1964.26
1185.25	1964.66	1223.58	1966.04						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1082.95	.015	1140.72	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1082.95	1140.72	25.32	24.78	22.42	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1962.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.55	Wt. n-Val.		0.015	
W.S. Elev (ft)	1954.99	Reach Len. (ft)	25.32	24.78	22.42
Crit W.S. (ft)	1957.27	Flow Area (sq ft)		240.42	
E.G. Slope (ft/ft)	0.006924	Area (sq ft)		240.42	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	49.85	Top Width (ft)		49.85	
Vel Total (ft/s)	22.05	Avg. Vel. (ft/s)		22.05	
Max Chl Dpth (ft)	5.23	Hydr. Depth (ft)		4.82	
Conv. Total (cfs)	63694.8	Conv. (cfs)		63694.8	
Length Wtd. (ft)	24.78	Wetted Per. (ft)		54.97	
Min Ch El (ft)	1949.76	Shear (lb/sq ft)		1.89	

Alpha	1.00	Stream Power (lb/ft s)		41.68	
Frctn Loss (ft)	0.91	Cum Volume (acre-ft)	0.37	12.94	0.07
C & E Loss (ft)	0.20	Cum SA (acres)	0.35	2.32	0.07

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: RIVER-1
REACH: Reach-1 RS: 110

INPUT
Description:
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1960.26	1058.72	1961.52	1069.8	1960.78	1070.23	1960.26	1071.86	1958.26
1073.49	1956.26	1075.13	1954.26	1076.77	1952.26	1078.41	1950.26	1079.37	1949.49
1119.37	1949.46	1122.31	1950.26	1123.63	1952.26	1124.96	1954.26	1126.29	1956.26
1127.61	1958.26	1128.23	1959.2	1130.3	1960.26	1134.23	1962.26	1137.72	1964.04
1156.11	1964.26	1162.57	1964.26	1167.55	1964.26	1180.81	1964.48	1218.4	1965.79

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1070.23	.015	1130.3	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1070.23	1130.3	1	1	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1962.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.74	Wt. n-Val.		0.015	
W.S. Elev (ft)	1954.60	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)	1956.96	Flow Area (sq ft)		237.36	
E.G. Slope (ft/ft)	0.007247	Area (sq ft)		237.36	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	50.33	Top Width (ft)		50.33	
Vel Total (ft/s)	22.33	Avg. Vel. (ft/s)		22.33	
Max Chl Dpth (ft)	5.14	Hydr. Depth (ft)		4.72	
Conv. Total (cfs)	62257.1	Conv. (cfs)		62257.1	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		55.09	
Min Ch El (ft)	1949.46	Shear (lb/sq ft)		1.95	
Alpha	1.00	Stream Power (lb/ft s)		43.53	
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	0.37	12.80	0.07
C & E Loss (ft)	0.02	Cum SA (acres)	0.35	2.29	0.07

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 100

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1961.93	1057.4	1962.22	1068.55	1961.32	1068.7	1961.03	1070.39	1959.03
1071.98	1957.03	1073.58	1955.03	1075.17	1953.03	1076.75	1951.03	1078.32	1949.03
1079	1947.73	1119	1947.73	1119.77	1949.03	1121.07	1951.03	1122.37	1953.03
1123.68	1955.03	1124.99	1957.03	1126.31	1959.03	1126.86	1959.87	1129.14	1961.03
1133.08	1963.03	1136.43	1964.73	1161.01	1965.03	1164.12	1965.03	1169.92	1965.03
1180.79	1965.13	1218.41	1966.51						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1068.7	.015	1129.14	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1068.7	1129.14	346.14	342.73	339.84	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1962.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.46	Wt. n-Val.		0.015	
W.S. Elev (ft)	1952.70	Reach Len. (ft)	346.14	342.73	339.84
Crit W.S. (ft)	1955.55	Flow Area (sq ft)		214.74	
E.G. Slope (ft/ft)	0.009375	Area (sq ft)		214.74	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	46.72	Top Width (ft)		46.72	
Vel Total (ft/s)	24.68	Avg. Vel. (ft/s)		24.68	
Max Chl Dpth (ft)	4.97	Hydr. Depth (ft)		4.60	
Conv. Total (cfs)	54738.3	Conv. (cfs)		54738.3	
Length Wtd. (ft)	342.73	Wetted Per. (ft)		52.03	
Min Ch El (ft)	1947.73	Shear (lb/sq ft)		2.42	
Alpha	1.00	Stream Power (lb/ft s)		59.62	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.37	12.80	0.07
C & E Loss (ft)	0.17	Cum SA (acres)	0.35	2.29	0.07

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: RIVER-1
REACH: Reach-1 RS: 90

INPUT
Description:
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1958.08	1006.02	1956.88	1007.66	1956.56	1022.15	1955.35	1035.65	1954.88
1045.56	1954.48	1052.98	1953.95	1054.57	1952.88	1057.59	1950.88	1060.63	1948.88
1063.71	1946.88	1065.06	1945.98	1105.06	1945.98	1109.3	1946.88	1110.15	1948.88
1110.99	1950.88	1111.87	1952.88	1112.94	1954.88	1113.6	1955.91	1119.02	1956.88
1121.63	1957.18	1145.66	1956.88	1187.07	1956.55				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1052.98	.015	1113.6	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1052.98	1113.6	53.02	51.93	56.59	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1958.74	Element			
Vel Head (ft)	7.88	Wt. n-Val.		0.015	
W.S. Elev (ft)	1950.86	Reach Len. (ft)	53.02	51.93	56.59
Crit W.S. (ft)	1953.25	Flow Area (sq ft)		235.27	
E.G. Slope (ft/ft)	0.007910	Area (sq ft)		235.27	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	53.35	Top Width (ft)		53.35	
Vel Total (ft/s)	22.53	Avg. Vel. (ft/s)		22.53	
Max Chl Dpth (ft)	4.88	Hydr. Depth (ft)		4.41	
Conv. Total (cfs)	59592.8	Conv. (cfs)		59592.8	
Length Wtd. (ft)	51.93	Wetted Per. (ft)		57.54	
Min Ch El (ft)	1945.98	Shear (lb/sq ft)		2.02	
Alpha	1.00	Stream Power (lb/ft s)		45.48	
Frctn Loss (ft)	2.95	Cum Volume (acre-ft)	0.37	11.03	0.07
C & E Loss (ft)	0.47	Cum SA (acres)	0.35	1.90	0.07

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: RIVER-1
REACH: Reach-1 RS: 81

INPUT
Description: Begining of Phase 1 Improvements
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1954.26	1002.13	1954.26	1036.88	1953.71	1070.25	1953.68	1078.25	1945.72
1121.75	1945.72	1129.75	1953.68	1142.98	1954.14	1143.96	1954.26	1156.72	1956.26
1157.77	1956.26	1201.02	1956.64						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1070.25	.015	1129.75	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1070.25	1129.75	50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1958.25	Element			
Vel Head (ft)	7.58	Wt. n-Val.		0.015	
W.S. Elev (ft)	1950.67	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	1952.99	Flow Area (sq ft)		239.88	
E.G. Slope (ft/ft)	0.007413	Area (sq ft)		239.88	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	53.45	Top Width (ft)		53.45	
Vel Total (ft/s)	22.09	Avg. Vel. (ft/s)		22.09	
Max Chl Dpth (ft)	4.95	Hydr. Depth (ft)		4.49	
Conv. Total (cfs)	61556.8	Conv. (cfs)		61556.8	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		57.53	
Min Ch El (ft)	1945.72	Shear (lb/sq ft)		1.93	
Alpha	1.00	Stream Power (lb/ft s)		42.63	
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	0.37	10.74	0.07
C & E Loss (ft)	0.09	Cum SA (acres)	0.35	1.83	0.07

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 75

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1077.5	1952.32	1077.5	1944.52	1100	1944.07	1122.5	1944.52	1122.5	1952.32

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1077.5	.025	1077.5	.015	1122.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1077.5	1122.5	151.76	151.76	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1957.78	Element			
Vel Head (ft)	8.43	Wt. n-Val.		0.015	
W.S. Elev (ft)	1949.35	Reach Len. (ft)	151.76	151.76	151.76
Crit W.S. (ft)	1951.85	Flow Area (sq ft)		227.51	
E.G. Slope (ft/ft)	0.008262	Area (sq ft)		227.51	

Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	23.30	Avg. Vel. (ft/s)		23.30	
Max Chl Dpth (ft)	5.28	Hydr. Depth (ft)		5.06	
Conv. Total (cfs)	58308.1	Conv. (cfs)		58308.1	
Length Wtd. (ft)	151.76	Wetted Per. (ft)		54.67	
Min Ch El (ft)	1944.07	Shear (lb/sq ft)		2.15	
Alpha	1.00	Stream Power (lb/ft s)		50.00	
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	0.37	10.47	0.07
C & E Loss (ft)	0.08	Cum SA (acres)	0.35	1.78	0.07

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: RIVER-1
REACH: Reach-1 RS: 70

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1077.5	1949.6	1077.5	1941.8	1100	1941.35	1122.5	1941.8	1122.5	1949.6

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1077.5	.025	1077.5	.015	1122.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1077.5	1122.5	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1956.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.98	Wt. n-Val.		0.015	
W.S. Elev (ft)	1946.22	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	1949.12	Flow Area (sq ft)		209.11	
E.G. Slope (ft/ft)	0.010727	Area (sq ft)		209.11	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	25.35	Avg. Vel. (ft/s)		25.35	
Max Chl Dpth (ft)	4.87	Hydr. Depth (ft)		4.65	
Conv. Total (cfs)	51173.2	Conv. (cfs)		51173.2	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		53.85	
Min Ch El (ft)	1941.35	Shear (lb/sq ft)		2.60	
Alpha	1.00	Stream Power (lb/ft s)		65.91	
Frctn Loss (ft)	1.42	Cum Volume (acre-ft)	0.37	9.71	0.07
C & E Loss (ft)	0.15	Cum SA (acres)	0.35	1.62	0.07

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: RIVER-1
REACH: Reach-1 RS: 65

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1082.5	1947.71	1082.5	1939.91	1100	1939.56	1117.5	1939.91	1117.5	1947.71

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1082.5	.025	1082.5	.015	1117.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1082.5	1117.5	100	100	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1955.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.97	Wt. n-Val.		0.015	
W.S. Elev (ft)	1946.04	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	1948.66	Flow Area (sq ft)		220.55	
E.G. Slope (ft/ft)	0.007546	Area (sq ft)		220.55	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	35.00	Top Width (ft)		35.00	
Vel Total (ft/s)	24.03	Avg. Vel. (ft/s)		24.03	
Max Chl Dpth (ft)	6.48	Hydr. Depth (ft)		6.30	
Conv. Total (cfs)	61013.1	Conv. (cfs)		61013.1	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		47.26	
Min Ch El (ft)	1939.56	Shear (lb/sq ft)		2.20	
Alpha	1.00	Stream Power (lb/ft s)		52.83	
Frctn Loss (ft)	0.89	Cum Volume (acre-ft)	0.37	9.22	0.07
C & E Loss (ft)	0.30	Cum SA (acres)	0.35	1.53	0.07

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: RIVER-1
REACH: Reach-1 RS: 60

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1082.5	1947.48	1082.5	1938.48	1100	1938.13	1117.5	1938.48	1117.5	1947.48

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1082.5	.025	1082.5	.015	1117.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1082.5	1117.5	166.19	166.19	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1954.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.78	Wt. n-Val.		0.015	
W.S. Elev (ft)	1944.34	Reach Len. (ft)	166.19	166.19	166.19
Crit W.S. (ft)	1947.22	Flow Area (sq ft)		211.19	
E.G. Slope (ft/ft)	0.008588	Area (sq ft)		211.19	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	35.00	Top Width (ft)		35.00	
Vel Total (ft/s)	25.10	Avg. Vel. (ft/s)		25.10	
Max Chl Dpth (ft)	6.21	Hydr. Depth (ft)		6.03	
Conv. Total (cfs)	57190.8	Conv. (cfs)		57190.8	
Length Wtd. (ft)	166.19	Wetted Per. (ft)		46.73	
Min Ch El (ft)	1938.13	Shear (lb/sq ft)		2.42	
Alpha	1.00	Stream Power (lb/ft s)		60.82	
Frctn Loss (ft)	0.80	Cum Volume (acre-ft)	0.37	8.73	0.07
C & E Loss (ft)	0.08	Cum SA (acres)	0.35	1.45	0.07

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: RIVER-1
REACH: Reach-1 RS: 55

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1082.5	1945.1	1082.5	1936.1	1100	1935.75	1117.5	1936.1	1117.5	1945.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1082.5	.025	1082.5	.015	1117.5	.025

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

1082.5	1117.5	290.11	288.11	286.11	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1952.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.81	Wt. n-Val.		0.015	
W.S. Elev (ft)	1941.66	Reach Len. (ft)	290.11	288.11	286.11
Crit W.S. (ft)	1944.85	Flow Area (sq ft)		200.83	
E.G. Slope (ft/ft)	0.009985	Area (sq ft)		200.83	
Q Total (cfs)	5300.00	Flow (cfs)		5300.00	
Top Width (ft)	35.00	Top Width (ft)		35.00	
Vel Total (ft/s)	26.39	Avg. Vel. (ft/s)		26.39	
Max Chl Dpth (ft)	5.91	Hydr. Depth (ft)		5.74	
Conv. Total (cfs)	53040.5	Conv. (cfs)		53040.5	
Length Wtd. (ft)	288.11	Wetted Per. (ft)		46.13	
Min Ch El (ft)	1935.75	Shear (lb/sq ft)		2.71	
Alpha	1.00	Stream Power (lb/ft s)		71.61	
Frctn Loss (ft)	1.54	Cum Volume (acre-ft)	0.37	7.94	0.07
C & E Loss (ft)	0.10	Cum SA (acres)	0.35	1.32	0.07

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: RIVER-1
REACH: Reach-1 RS: 50

INPUT
Description:
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1942.6	1093.5	1943.16	1100.84	1942.75	1115.98	1942.71	1129.89	1942.1
1182.5	1940.98	1182.5	1931.98	1200	1931.63	1217.5	1931.98	1217.5	1940.98
1239.96	1943.1	1254.01	1943.3	1350.42	1943.74				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1182.5	.015	1217.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1182.5	1217.5	101	99	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
1000	1182.5	1943.63	1217.5	1350.42	1943.63

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1949.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.86	Wt. n-Val.		0.015	
W.S. Elev (ft)	1937.49	Reach Len. (ft)	0.10	0.10	0.10
Crit W.S. (ft)	1940.95	Flow Area (sq ft)		199.05	
E.G. Slope (ft/ft)	0.011043	Area (sq ft)		199.05	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	35.00	Top Width (ft)		35.00	
Vel Total (ft/s)	27.63	Avg. Vel. (ft/s)		27.63	
Max Chl Dpth (ft)	5.86	Hydr. Depth (ft)		5.69	
Conv. Total (cfs)	52337.3	Conv. (cfs)		52337.3	
Length Wtd. (ft)	0.10	Wetted Per. (ft)		46.03	
Min Ch El (ft)	1931.63	Shear (lb/sq ft)		2.98	
Alpha	1.00	Stream Power (lb/ft s)		82.38	
Frctn Loss (ft)	3.03	Cum Volume (acre-ft)	0.37	6.62	0.07
C & E Loss (ft)	0.10	Cum SA (acres)	0.35	1.08	0.07

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.

BRIDGE RIVER: RIVER-1
REACH: Reach-1 RS: 45

INPUT
Description: Bridge #1

Distance from Upstream XS = .1
Deck/Roadway Width = 98.8
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
1000	1943.8	1941.63	1182.5	1943.8	1941.63	1182.5	1943.8	1941.63
1217.5	1943.8	1941.63	1217.5	1943.8	1941.63	1350.42	1943.8	1941.63

Upstream Bridge Cross Section Data
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1942.6	1093.5	1943.16	1100.84	1942.75	1115.98	1942.71	1129.89	1942.1
1182.5	1940.98	1182.5	1931.98	1200	1931.63	1217.5	1931.98	1217.5	1940.98
1239.96	1943.1	1254.01	1943.3	1350.42	1943.74				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.025	1182.5	.015	1217.5	.025

Bank Sta: Left Right Coeff Contr. Expan.

```
       1182.5  1217.5              .1       .3
Blocked Obstructions     num=        2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    1000  1182.5 1943.63  1217.5 1350.42 1943.63

Downstream  Deck/Roadway Coordinates
    num=        6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    1000  1943.8 1941.63  1132.5  1943.8 1941.63  1132.5  1943.8 1941.63
  1167.5  1943.8 1941.63  1167.5  1943.8 1941.63 1350.42  1943.8 1941.63

Downstream Bridge Cross Section Data
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    1000 1940.65 1090.13  1940.8 1104.02 1941.12  1132.5 1941.12  1132.5 1931.12
    1150 1930.77  1167.5 1931.12  1167.5 1941.12 1206.88 1941.12 1232.32 1941.12
  1242.6 1941.35 1251.47 1941.95 1256.84 1943.35

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .025  1132.5    .015  1167.5    .025

Bank Sta: Left   Right    Coeff Contr.   Expan.
        1132.5  1167.5              .1       .3
Blocked Obstructions     num=        2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
    1000  1132.5 1943.77  1167.5 1256.84 1943.77

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         = 1943.13
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum              Cd   =     1.2
Selected Low Flow Methods = Momentum

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =.8006408
           Max Low Cord                = 1941.63
```

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 #PF 1
Opening : Single BR

			Inside BR US	Inside BR DS
E.G. US. (ft)	1947.50	Element		
W.S. US. (ft)	1937.49	E.G. Elev (ft)	1949.35	1947.49
Q Total (cfs)	5500.00	W.S. Elev (ft)	1937.49	1936.99
Q Bridge (cfs)	5500.00	Crit W.S. (ft)	1940.97	1940.11
Q Weir (cfs)		Max Chl Dpth (ft)	5.86	6.22
Weir Sta Lft (ft)		Vel Total (ft/s)	27.63	26.01
Weir Sta Rgt (ft)		Flow Area (sq ft)	199.05	211.44
Weir Submerg		Froude # Chl	2.04	1.87
Weir Max Depth (ft)		Specif Force (cu ft)	5285.78	5219.15
Min El Weir Flow (ft)	1943.81	Hydr Depth (ft)	5.69	6.04
Min El Prs (ft)	1941.63	W.P. Total (ft)	46.03	46.74
Delta EG (ft)	0.00	Conv. Total (cfs)	52337.3	57291.1
Delta WS (ft)	0.51	Top Width (ft)	35.00	35.00
BR Open Area (sq ft)	343.88	Frctn Loss (ft)		
BR Open Vel (ft/s)	27.63	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	2.98	2.60
Br Sel Method	Momentum	Power Total (lb/ft s)	82.38	67.71

Warning: The cross section had to be extended vertically during the critical depth calculations.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The cross section had to be extended vertically during the critical depth calculations.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 40

INPUT
Description:
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	1940.65	1090.13	1940.8	1104.02	1941.12	1132.5	1941.12	1132.5	1931.12
1150	1930.77	1167.5	1931.12	1167.5	1941.12	1206.88	1941.12	1232.32	1941.12
1242.6	1941.35	1251.47	1941.95	1256.84	1943.35				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

1000	.025	1132.5	.015	1167.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1132.5	1167.5	15	15	15 .1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
1000	1132.5	1943.77	1167.5	1256.84	1943.77

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1947.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.51	Wt. n-Val.		0.015	
W.S. Elev (ft)	1936.99	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	1940.10	Flow Area (sq ft)		211.41	
E.G. Slope (ft/ft)	0.009220	Area (sq ft)		211.41	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	35.00	Top Width (ft)		35.00	
Vel Total (ft/s)	26.02	Avg. Vel. (ft/s)		26.02	
Max Chl Dpth (ft)	6.22	Hydr. Depth (ft)		6.04	
Conv. Total (cfs)	57280.7	Conv. (cfs)		57280.7	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		46.74	
Min Ch El (ft)	1930.77	Shear (lb/sq ft)		2.60	
Alpha	1.00	Stream Power (lb/ft s)		67.73	
Frctn Loss (ft)		Cum Volume (acre-ft)	0.37	6.15	0.07
C & E Loss (ft)		Cum SA (acres)	0.35	1.00	0.07

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 35

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1082.5	1940.99	1082.5	1930.99	1100	1930.64	1117.5	1930.99	1117.5	1940.99

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1082.5	.025	1082.5	.015	1117.5	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1082.5	1117.5	102	102	102 .1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1947.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.51	Wt. n-Val.		0.015	
W.S. Elev (ft)	1936.86	Reach Len. (ft)	102.00	102.00	102.00
Crit W.S. (ft)	1939.97	Flow Area (sq ft)		211.41	

E.G. Slope (ft/ft)	0.009220	Area (sq ft)		211.41		
Q Total (cfs)	5500.00	Flow (cfs)		5500.00		
Top Width (ft)	35.00	Top Width (ft)		35.00		
Vel Total (ft/s)	26.02	Avg. Vel. (ft/s)		26.02		
Max Chl Dpth (ft)	6.22	Hydr. Depth (ft)		6.04		
Conv. Total (cfs)	57280.7	Conv. (cfs)		57280.7		
Length Wtd. (ft)	102.00	Wetted Per. (ft)		46.74		
Min Ch El (ft)	1930.64	Shear (lb/sq ft)		2.60		
Alpha	1.00	Stream Power (lb/ft s)		67.73		
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	0.37	6.08	0.07	
C & E Loss (ft)	0.00	Cum SA (acres)	0.35	0.99	0.07	

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 30

INPUT
Description: Begining of Energy Dissipator
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1075	1940.25	1075	1930.25	1100	1929.75	1125	1930.25	1125	1940.25

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1075	.025	1075	.015	1125	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1075	1125	2.49	2.49	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1946.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.08	Wt. n-Val.		0.015	
W.S. Elev (ft)	1933.95	Reach Len. (ft)	2.49	2.49	2.49
Crit W.S. (ft)	1937.21	Flow Area (sq ft)		197.23	
E.G. Slope (ft/ft)	0.015283	Area (sq ft)		197.23	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	27.89	Avg. Vel. (ft/s)		27.89	
Max Chl Dpth (ft)	4.19	Hydr. Depth (ft)		3.94	
Conv. Total (cfs)	44488.9	Conv. (cfs)		44488.9	
Length Wtd. (ft)	2.49	Wetted Per. (ft)		57.40	
Min Ch El (ft)	1929.75	Shear (lb/sq ft)		3.28	
Alpha	1.00	Stream Power (lb/ft s)		91.43	
Frctn Loss (ft)	1.19	Cum Volume (acre-ft)	0.37	5.60	0.07
C & E Loss (ft)	0.16	Cum SA (acres)	0.35	0.89	0.07

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: RIVER-1
REACH: Reach-1 RS: 29.6*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1075	1940.3	1075	1929.2	1100	1928.7	1125	1929.2	1125	1940.3

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1075	.025	1075	.04	1125	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1075	1125	2.49 2.49	2.49	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1945.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	13.10	Wt. n-Val.		0.040	
W.S. Elev (ft)	1932.74	Reach Len. (ft)	2.49	2.49	2.49
Crit W.S. (ft)	1936.16	Flow Area (sq ft)		189.37	
E.G. Slope (ft/ft)	0.123543	Area (sq ft)		189.37	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	29.04	Avg. Vel. (ft/s)		29.04	
Max Chl Dpth (ft)	4.04	Hydr. Depth (ft)		3.79	
Conv. Total (cfs)	15647.8	Conv. (cfs)		15647.8	
Length Wtd. (ft)	2.49	Wetted Per. (ft)		57.08	
Min Ch El (ft)	1928.70	Shear (lb/sq ft)		25.59	
Alpha	1.00	Stream Power (lb/ft s)		743.11	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.37	5.59	0.07
C & E Loss (ft)	0.10	Cum SA (acres)	0.35	0.89	0.07

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: RIVER-1
REACH: Reach-1 RS: 29.2*

INPUT
Description:

Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1075	1940.36	1075	1928.16	1100	1927.66	1125	1928.16	1125	1940.36

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1075	.025	1075	.04	1125	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1075	1125	2.49	2.49	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1945.44	Element			
Vel Head (ft)	13.84	Wt. n-Val.		0.040	
W.S. Elev (ft)	1931.59	Reach Len. (ft)	2.49	2.49	2.49
Crit W.S. (ft)	1935.13	Flow Area (sq ft)		184.20	
E.G. Slope (ft/ft)	0.134844	Area (sq ft)		184.20	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	29.86	Avg. Vel. (ft/s)		29.86	
Max Chl Dpth (ft)	3.93	Hydr. Depth (ft)		3.68	
Conv. Total (cfs)	14977.8	Conv. (cfs)		14977.8	
Length Wtd. (ft)	2.49	Wetted Per. (ft)		56.88	
Min Ch El (ft)	1927.66	Shear (lb/sq ft)		27.26	
Alpha	1.00	Stream Power (lb/ft s)		814.03	
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.37	5.58	0.07
C & E Loss (ft)	0.07	Cum SA (acres)	0.35	0.89	0.07

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: RIVER-1
REACH: Reach-1 RS: 28.8*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1075	1940.41	1075	1927.11	1100	1926.61	1125	1927.11	1125	1940.41

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1075	.025	1075	.04	1125	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1075	1125	2.49	2.49	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1945.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	14.56	Wt. n-Val.		0.040	
W.S. Elev (ft)	1930.45	Reach Len. (ft)	2.49	2.49	2.49
Crit W.S. (ft)	1934.07	Flow Area (sq ft)		179.59	
E.G. Slope (ft/ft)	0.146092	Area (sq ft)		179.59	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	30.63	Avg. Vel. (ft/s)		30.63	
Max Chl Dpth (ft)	3.84	Hydr. Depth (ft)		3.59	
Conv. Total (cfs)	14389.6	Conv. (cfs)		14389.6	
Length Wtd. (ft)	2.49	Wetted Per. (ft)		56.69	
Min Ch El (ft)	1926.61	Shear (lb/sq ft)		28.89	
Alpha	1.00	Stream Power (lb/ft s)		884.81	
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	0.37	5.57	0.07
C & E Loss (ft)	0.07	Cum SA (acres)	0.35	0.88	0.07

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: RIVER-1
REACH: Reach-1 RS: 28.4*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1075	1940.47	1075	1926.07	1100	1925.57	1125	1926.07	1125	1940.47

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1075	.025	1075	.04	1125	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1075	1125	2.49	2.49	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1944.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	15.24	Wt. n-Val.		0.040	
W.S. Elev (ft)	1929.33	Reach Len. (ft)	2.49	2.49	2.49
Crit W.S. (ft)	1933.03	Flow Area (sq ft)		175.56	
E.G. Slope (ft/ft)	0.156972	Area (sq ft)		175.56	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	31.33	Avg. Vel. (ft/s)		31.33	
Max Chl Dpth (ft)	3.76	Hydr. Depth (ft)		3.51	

Conv. Total (cfs)	13882.0	Conv. (cfs)		13882.0	
Length Wtd. (ft)	2.49	Wetted Per. (ft)		56.53	
Min Ch El (ft)	1925.57	Shear (lb/sq ft)		30.43	
Alpha	1.00	Stream Power (lb/ft s)		953.41	
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	0.37	5.56	0.07
C & E Loss (ft)	0.07	Cum SA (acres)	0.35	0.88	0.07

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: RIVER-1
REACH: Reach-1 RS: 28

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1075	1940.52	1075	1925.02	1100	1924.52	1125	1925.02	1125	1940.52

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1075	.025	1075	.015	1125	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1075	1125	12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1944.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	16.17	Wt. n-Val.		0.015	
W.S. Elev (ft)	1928.18	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1931.98	Flow Area (sq ft)		170.43	
E.G. Slope (ft/ft)	0.024248	Area (sq ft)		170.43	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	32.27	Avg. Vel. (ft/s)		32.27	
Max Chl Dpth (ft)	3.66	Hydr. Depth (ft)		3.41	
Conv. Total (cfs)	35320.0	Conv. (cfs)		35320.0	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		56.33	
Min Ch El (ft)	1924.52	Shear (lb/sq ft)		4.58	
Alpha	1.00	Stream Power (lb/ft s)		147.82	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.37	5.55	0.07
C & E Loss (ft)	0.09	Cum SA (acres)	0.35	0.88	0.07

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: RIVER-1
REACH: Reach-1 RS: 27.6666*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1075	1940.48	1075	1924.98	1100	1924.48	1125	1924.98	1125	1940.48

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1075	.025	1075	.015	1125	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1075	1125	12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1943.94	Element			
Vel Head (ft)	15.76	Wt. n-Val.		0.015	
W.S. Elev (ft)	1928.18	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1931.94	Flow Area (sq ft)		172.66	
E.G. Slope (ft/ft)	0.023270	Area (sq ft)		172.66	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	31.85	Avg. Vel. (ft/s)		31.85	
Max Chl Dpth (ft)	3.70	Hydr. Depth (ft)		3.45	
Conv. Total (cfs)	36054.8	Conv. (cfs)		36054.8	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		56.42	
Min Ch El (ft)	1924.48	Shear (lb/sq ft)		4.45	
Alpha	1.00	Stream Power (lb/ft s)		141.63	
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	0.37	5.50	0.07
C & E Loss (ft)	0.12	Cum SA (acres)	0.35	0.87	0.07

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 27.3333*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1075	1940.45	1075	1924.95	1100	1924.45	1125	1924.95	1125	1940.45

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1075	.025	1075	.015	1125	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1075	1125	12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.10	Wt. n-Val.		0.015	
W.S. Elev (ft)	1937.76	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1931.91	Flow Area (sq ft)		652.82	
E.G. Slope (ft/ft)	0.000408	Area (sq ft)		652.82	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	8.42	Avg. Vel. (ft/s)		8.42	
Max Chl Dpth (ft)	13.31	Hydr. Depth (ft)		13.06	
Conv. Total (cfs)	272139.1	Conv. (cfs)		272139.1	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		75.62	
Min Ch El (ft)	1924.45	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)		1.85	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.37	5.39	0.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.35	0.85	0.07

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

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 27.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1075	1940.41	1075	1924.91	1100	1924.41	1125	1924.91	1125	1940.41

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1075	.025	1075	.015	1125	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1075	1125	12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.10	Wt. n-Val.		0.015	
W.S. Elev (ft)	1937.76	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)		Flow Area (sq ft)		654.80	
E.G. Slope (ft/ft)	0.000405	Area (sq ft)		654.80	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	

Top Width (ft)	50.00	Top Width (ft)		50.00		
Vel Total (ft/s)	8.40	Avg. Vel. (ft/s)		8.40		
Max Chl Dpth (ft)	13.35	Hydr. Depth (ft)		13.10		
Conv. Total (cfs)	273327.6	Conv. (cfs)		273327.6		
Length Wtd. (ft)	12.00	Wetted Per. (ft)		75.70		
Min Ch El (ft)	1924.41	Shear (lb/sq ft)		0.22		
Alpha	1.00	Stream Power (lb/ft s)		1.84		
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.37	5.21	0.07	
C & E Loss (ft)	0.00	Cum SA (acres)	0.35	0.84	0.07	

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 26.6666*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1075	1940.37	1075	1924.87	1100	1924.37	1125	1924.87	1125	1940.37

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1075	.025	1075	.015	1125	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1075	1125	12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.09	Wt. n-Val.		0.015	
W.S. Elev (ft)	1937.76	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)		Flow Area (sq ft)		656.79	
E.G. Slope (ft/ft)	0.000401	Area (sq ft)		656.79	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	8.37	Avg. Vel. (ft/s)		8.37	
Max Chl Dpth (ft)	13.39	Hydr. Depth (ft)		13.14	
Conv. Total (cfs)	274520.8	Conv. (cfs)		274520.8	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		75.78	
Min Ch El (ft)	1924.37	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)		1.82	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.37	5.03	0.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.35	0.82	0.07

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 26.3333*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1075	1940.34	1075	1924.84	1100	1924.34	1125	1924.84	1125	1940.34

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1075	.025	1075	.015	1125	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1075	1125	12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1938.84	Element			
Vel Head (ft)	1.08	Wt. n-Val.		0.015	
W.S. Elev (ft)	1937.75	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)		Flow Area (sq ft)		658.22	
E.G. Slope (ft/ft)	0.000399	Area (sq ft)		658.22	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	8.36	Avg. Vel. (ft/s)		8.36	
Max Chl Dpth (ft)	13.41	Hydr. Depth (ft)		13.16	
Conv. Total (cfs)	275378.1	Conv. (cfs)		275378.1	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		75.84	
Min Ch El (ft)	1924.34	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)		1.81	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.37	4.84	0.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.35	0.81	0.07

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 26

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1075	1940.3	1075	1924.8	1100	1924.3	1125	1924.8	1125	1940.3

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1075	.025	1075	.015	1125	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1075	1125	1	1	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.08	Wt. n-Val.		0.015	
W.S. Elev (ft)	1937.75	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)		Flow Area (sq ft)		660.21	
E.G. Slope (ft/ft)	0.000395	Area (sq ft)		660.21	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	8.33	Avg. Vel. (ft/s)		8.33	
Max Chl Dpth (ft)	13.45	Hydr. Depth (ft)		13.20	
Conv. Total (cfs)	276569.8	Conv. (cfs)		276569.8	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		75.92	
Min Ch El (ft)	1924.30	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)		1.79	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.37	4.66	0.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.35	0.80	0.07

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 25.3333*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1075	1940.41	1075	1924.97	1100	1924.47	1125	1924.97	1125	1940.41

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1075	.025	1075	.018	1125	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1075	1125	1	1	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.11	Wt. n-Val.		0.018	
W.S. Elev (ft)	1937.72	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)		Flow Area (sq ft)		649.77	
E.G. Slope (ft/ft)	0.000596	Area (sq ft)		649.77	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	8.46	Avg. Vel. (ft/s)		8.46	
Max Chl Dpth (ft)	13.25	Hydr. Depth (ft)		13.00	
Conv. Total (cfs)	225260.9	Conv. (cfs)		225260.9	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		75.50	
Min Ch El (ft)	1924.47	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)		2.71	

Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.37	4.65	0.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.35	0.80	0.07

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 24.6666*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1075	1940.51	1075	1925.13	1100	1924.63	1125	1925.13	1125	1940.51

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1075	.025	1075	.022	1125	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1075	1125	1	1	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.15	Wt. n-Val.		0.022	
W.S. Elev (ft)	1937.68	Reach Len. (ft)	1.00	1.00	1.00
Crit W.S. (ft)		Flow Area (sq ft)		639.81	
E.G. Slope (ft/ft)	0.000931	Area (sq ft)		639.81	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	8.60	Avg. Vel. (ft/s)		8.60	
Max Chl Dpth (ft)	13.05	Hydr. Depth (ft)		12.80	
Conv. Total (cfs)	180256.7	Conv. (cfs)		180256.7	
Length Wtd. (ft)	1.00	Wetted Per. (ft)		75.10	
Min Ch El (ft)	1924.63	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)		4.26	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.37	4.63	0.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.35	0.79	0.07

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 24

INPUT
Description: End of Energy Dissipator
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1075	1940.62	1075	1925.3	1100	1924.8	1125	1925.3	1125	1940.62

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1075	.025	1075	.025	1125	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1075	1125	6	6	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1938.82	Element			
Vel Head (ft)	1.19	Wt. n-Val.		0.025	
W.S. Elev (ft)	1937.63	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)		Flow Area (sq ft)		629.08	
E.G. Slope (ft/ft)	0.001262	Area (sq ft)		629.08	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	50.00	Top Width (ft)		50.00	
Vel Total (ft/s)	8.74	Avg. Vel. (ft/s)		8.74	
Max Chl Dpth (ft)	12.83	Hydr. Depth (ft)		12.58	
Conv. Total (cfs)	154807.4	Conv. (cfs)		154807.4	
Length Wtd. (ft)	6.00	Wetted Per. (ft)		74.67	
Min Ch El (ft)	1924.80	Shear (lb/sq ft)		0.66	
Alpha	1.00	Stream Power (lb/ft s)		5.80	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.37	4.62	0.07
C & E Loss (ft)	0.01	Cum SA (acres)	0.35	0.79	0.07

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 23.6*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1072.45	1940.47	1078.45	1925.21	1100	1924.78	1121.55	1925.21	1127.55	1940.47

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1072.45	.025	1072.45	.025	1127.55	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1072.45	1127.55	6	6	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1938.80	Element			
Vel Head (ft)	1.32	Wt. n-Val.		0.025	
W.S. Elev (ft)	1937.48	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)		Flow Area (sq ft)		597.38	
E.G. Slope (ft/ft)	0.001362	Area (sq ft)		597.38	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	

Top Width (ft)	52.75	Top Width (ft)		52.75	
Vel Total (ft/s)	9.21	Avg. Vel. (ft/s)		9.21	
Max Chl Dpth (ft)	12.70	Hydr. Depth (ft)		11.32	
Conv. Total (cfs)	149016.4	Conv. (cfs)		149016.4	
Length Wtd. (ft)	6.00	Wetted Per. (ft)		69.48	
Min Ch El (ft)	1924.78	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)		6.73	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.37	4.53	0.07
C & E Loss (ft)	0.02	Cum SA (acres)	0.35	0.79	0.07

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 23.2*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1069.9	1940.32	1081.9	1925.13	1100	1924.76	1118.1	1925.13	1130.1	1940.32

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1069.9	.025	1069.9	.025	1130.1	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1069.9	1130.1	6	6	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1938.77	Wt. n-Val.		0.025	
Vel Head (ft)	1.48	Reach Len. (ft)	6.00	6.00	6.00
W.S. Elev (ft)	1937.30	Flow Area (sq ft)		564.06	
Crit W.S. (ft)		Area (sq ft)		564.06	
E.G. Slope (ft/ft)	0.001578	Flow (cfs)		5500.00	
Q Total (cfs)	5500.00	Top Width (ft)		55.42	
Top Width (ft)	55.42	Avg. Vel. (ft/s)		9.75	
Vel Total (ft/s)	9.75	Hydr. Depth (ft)		10.18	
Max Chl Dpth (ft)	12.54	Conv. (cfs)		138445.2	
Conv. Total (cfs)	138445.2	Wetted Per. (ft)		67.22	
Length Wtd. (ft)	6.00	Shear (lb/sq ft)		0.83	
Min Ch El (ft)	1924.76	Stream Power (lb/ft s)		8.06	
Alpha	1.00	Cum Volume (acre-ft)	0.37	4.45	0.07
Frctn Loss (ft)	0.01	Cum SA (acres)	0.35	0.78	0.07
C & E Loss (ft)	0.02				

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 22.8*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1067.35	1940.17	1085.35	1925.04	1100	1924.75	1114.65	1925.04	1132.65	1940.17

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1067.35	.025	1067.35	.025	1132.65	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1067.35	1132.65	6	6	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1938.74	Element			
Vel Head (ft)	1.68	Wt. n-Val.		0.025	
W.S. Elev (ft)	1937.06	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)		Flow Area (sq ft)		528.17	
E.G. Slope (ft/ft)	0.001943	Area (sq ft)		528.17	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	57.89	Top Width (ft)		57.89	
Vel Total (ft/s)	10.41	Avg. Vel. (ft/s)		10.41	
Max Chl Dpth (ft)	12.31	Hydr. Depth (ft)		9.12	
Conv. Total (cfs)	124770.0	Conv. (cfs)		124770.0	
Length Wtd. (ft)	6.00	Wetted Per. (ft)		66.66	
Min Ch El (ft)	1924.75	Shear (lb/sq ft)		0.96	
Alpha	1.00	Stream Power (lb/ft s)		10.01	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.37	4.38	0.07
C & E Loss (ft)	0.03	Cum SA (acres)	0.35	0.77	0.07

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 22.4*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1064.8	1940.02	1088.8	1924.95	1100	1924.73	1111.2	1924.95	1135.2	1940.02

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1064.8	.025	1064.8	.025	1135.2	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1064.8	1135.2	6	6	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.99	Wt. n-Val.		0.025	
W.S. Elev (ft)	1936.71	Reach Len. (ft)	6.00	6.00	6.00
Crit W.S. (ft)		Flow Area (sq ft)		485.93	
E.G. Slope (ft/ft)	0.002564	Area (sq ft)		485.93	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	59.85	Top Width (ft)		59.85	
Vel Total (ft/s)	11.32	Avg. Vel. (ft/s)		11.32	
Max Chl Dpth (ft)	11.98	Hydr. Depth (ft)		8.12	
Conv. Total (cfs)	108627.4	Conv. (cfs)		108627.4	
Length Wtd. (ft)	6.00	Wetted Per. (ft)		66.62	
Min Ch El (ft)	1924.73	Shear (lb/sq ft)		1.17	
Alpha	1.00	Stream Power (lb/ft s)		13.21	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.37	4.31	0.07
C & E Loss (ft)	0.13	Cum SA (acres)	0.35	0.76	0.07

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: RIVER-1
REACH: Reach-1 RS: 22

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1062.25	1939.865	1092.25	1924.865	1100	1924.71	1107.75	1924.865	1137.75	1939.865

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1062.25	.025	1062.25	.025	1137.75	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1062.25	1137.75	12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.33	Wt. n-Val.		0.025	
W.S. Elev (ft)	1935.21	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1935.21	Flow Area (sq ft)		375.72	
E.G. Slope (ft/ft)	0.005464	Area (sq ft)		375.72	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	56.89	Top Width (ft)		56.89	
Vel Total (ft/s)	14.64	Avg. Vel. (ft/s)		14.64	

Max Chl Dpth (ft)	10.50	Hydr. Depth (ft)		6.60	
Conv. Total (cfs)	74407.0	Conv. (cfs)		74407.0	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		61.78	
Min Ch El (ft)	1924.71	Shear (lb/sq ft)		2.07	
Alpha	1.00	Stream Power (lb/ft s)		30.37	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.37	4.25	0.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.35	0.75	0.07

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: RIVER-1
REACH: Reach-1 RS: 21.8*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1062.46	1939.5	1091.8	1924.84	1100	1924.67	1108.2	1924.84	1137.54	1939.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1062.46	.025	1062.46	.025	1137.54	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1062.46	1137.54	12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.91	Wt. n-Val.		0.025	
W.S. Elev (ft)	1934.50	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1935.03	Flow Area (sq ft)		346.57	
E.G. Slope (ft/ft)	0.006822	Area (sq ft)		346.57	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	55.07	Top Width (ft)		55.07	
Vel Total (ft/s)	15.87	Avg. Vel. (ft/s)		15.87	
Max Chl Dpth (ft)	9.83	Hydr. Depth (ft)		6.29	
Conv. Total (cfs)	66590.1	Conv. (cfs)		66590.1	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		59.63	
Min Ch El (ft)	1924.67	Shear (lb/sq ft)		2.48	
Alpha	1.00	Stream Power (lb/ft s)		39.28	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.37	4.15	0.07
C & E Loss (ft)	0.06	Cum SA (acres)	0.35	0.74	0.07

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: RIVER-1
REACH: Reach-1 RS: 21.6*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1062.68	1939.14	1091.34	1924.81	1100	1924.64	1108.66	1924.81	1137.32	1939.14

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1062.68	.025	1062.68	.025	1137.32	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1062.68	1137.32	12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.30	Wt. n-Val.		0.025	
W.S. Elev (ft)	1934.85	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1934.85	Flow Area (sq ft)		377.06	
E.G. Slope (ft/ft)	0.005452	Area (sq ft)		377.06	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	57.49	Top Width (ft)		57.49	
Vel Total (ft/s)	14.59	Avg. Vel. (ft/s)		14.59	
Max Chl Dpth (ft)	10.21	Hydr. Depth (ft)		6.56	
Conv. Total (cfs)	74485.8	Conv. (cfs)		74485.8	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		62.23	
Min Ch El (ft)	1924.64	Shear (lb/sq ft)		2.06	
Alpha	1.00	Stream Power (lb/ft s)		30.08	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.37	4.05	0.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.35	0.72	0.07

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: RIVER-1
REACH: Reach-1 RS: 21.4*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1062.9	1938.78	1090.89	1924.78	1100	1924.6	1109.11	1924.78	1137.1	1938.78

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1062.9	.025	1062.9	.025	1137.1	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1062.9	1137.1	12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1938.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.87	Wt. n-Val.		0.025	
W.S. Elev (ft)	1934.16	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1934.68	Flow Area (sq ft)		348.51	
E.G. Slope (ft/ft)	0.006777	Area (sq ft)		348.51	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	55.73	Top Width (ft)		55.73	
Vel Total (ft/s)	15.78	Avg. Vel. (ft/s)		15.78	
Max Chl Dpth (ft)	9.56	Hydr. Depth (ft)		6.25	
Conv. Total (cfs)	66811.7	Conv. (cfs)		66811.7	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		60.17	
Min Ch El (ft)	1924.60	Shear (lb/sq ft)		2.45	
Alpha	1.00	Stream Power (lb/ft s)		38.68	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.37	3.95	0.07
C & E Loss (ft)	0.06	Cum SA (acres)	0.35	0.71	0.07

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: RIVER-1
REACH: Reach-1 RS: 21.2*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1063.11	1938.41	1090.43	1924.75	1100	1924.56	1109.57	1924.75	1136.89	1938.41

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1063.11	.025	1063.11	.025	1136.89	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1063.11	1136.89	12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1937.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.30	Wt. n-Val.		0.025	
W.S. Elev (ft)	1934.48	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1934.48	Flow Area (sq ft)		377.56	
E.G. Slope (ft/ft)	0.005479	Area (sq ft)		377.56	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	58.07	Top Width (ft)		58.07	
Vel Total (ft/s)	14.57	Avg. Vel. (ft/s)		14.57	
Max Chl Dpth (ft)	9.92	Hydr. Depth (ft)		6.50	
Conv. Total (cfs)	74301.3	Conv. (cfs)		74301.3	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		62.67	
Min Ch El (ft)	1924.56	Shear (lb/sq ft)		2.06	
Alpha	1.00	Stream Power (lb/ft s)		30.02	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.37	3.85	0.07
C & E Loss (ft)	0.17	Cum SA (acres)	0.35	0.69	0.07

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: RIVER-1
REACH: Reach-1 RS: 21.*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1063.32	1938.05	1089.97	1924.73	1100	1924.52	1110.03	1924.73	1136.68	1938.05

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1063.32	.025	1063.32	.025	1136.68	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1063.32	1136.68	12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1937.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.82	Wt. n-Val.		0.025	
W.S. Elev (ft)	1933.84	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1934.33	Flow Area (sq ft)		350.82	
E.G. Slope (ft/ft)	0.006724	Area (sq ft)		350.82	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	

Top Width (ft)	56.51	Top Width (ft)		56.51	
Vel Total (ft/s)	15.68	Avg. Vel. (ft/s)		15.68	
Max Chl Dpth (ft)	9.32	Hydr. Depth (ft)		6.21	
Conv. Total (cfs)	67072.1	Conv. (cfs)		67072.1	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		60.81	
Min Ch El (ft)	1924.52	Shear (lb/sq ft)		2.42	
Alpha	1.00	Stream Power (lb/ft s)		37.97	
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.37	3.75	0.07
C & E Loss (ft)	0.05	Cum SA (acres)	0.35	0.68	0.07

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: RIVER-1
REACH: Reach-1 RS: 20.8*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1063.54	1937.69	1089.52	1924.7	1100	1924.49	1110.48	1924.7	1136.46	1937.69

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1063.54	.025	1063.54	.025	1136.46	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1063.54	1136.46	12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1937.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.08	Wt. n-Val.		0.025	
W.S. Elev (ft)	1933.46	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1934.17	Flow Area (sq ft)		339.35	
E.G. Slope (ft/ft)	0.007402	Area (sq ft)		339.35	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	56.00	Top Width (ft)		56.00	
Vel Total (ft/s)	16.21	Avg. Vel. (ft/s)		16.21	
Max Chl Dpth (ft)	8.97	Hydr. Depth (ft)		6.06	
Conv. Total (cfs)	63925.5	Conv. (cfs)		63925.5	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		60.15	
Min Ch El (ft)	1924.49	Shear (lb/sq ft)		2.61	
Alpha	1.00	Stream Power (lb/ft s)		42.26	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.37	3.65	0.07
C & E Loss (ft)	0.03	Cum SA (acres)	0.35	0.66	0.07

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 20.6*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1063.76	1937.32	1089.06	1924.67	1100	1924.45	1110.94	1924.67	1136.24	1937.32

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1063.76	.025	1063.76	.025	1136.24	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1063.76	1136.24	12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1937.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.29	Wt. n-Val.		0.025	
W.S. Elev (ft)	1933.14	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1934.00	Flow Area (sq ft)		330.99	
E.G. Slope (ft/ft)	0.007973	Area (sq ft)		330.99	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	55.74	Top Width (ft)		55.74	
Vel Total (ft/s)	16.62	Avg. Vel. (ft/s)		16.62	
Max Chl Dpth (ft)	8.69	Hydr. Depth (ft)		5.94	
Conv. Total (cfs)	61595.6	Conv. (cfs)		61595.6	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		59.75	
Min Ch El (ft)	1924.45	Shear (lb/sq ft)		2.76	
Alpha	1.00	Stream Power (lb/ft s)		45.82	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.37	3.56	0.07
C & E Loss (ft)	0.02	Cum SA (acres)	0.35	0.65	0.07

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 20.4*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1063.97	1936.96	1088.61	1924.64	1100	1924.41	1111.39	1924.64	1136.03	1936.96

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1063.97	.025	1063.97	.025	1136.03	.025

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

1063.97 1136.03		12	12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1937.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.45	Wt. n-Val.		0.025	
W.S. Elev (ft)	1932.86	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1933.84	Flow Area (sq ft)		325.02	
E.G. Slope (ft/ft)	0.008434	Area (sq ft)		325.02	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	55.66	Top Width (ft)		55.66	
Vel Total (ft/s)	16.92	Avg. Vel. (ft/s)		16.92	
Max Chl Dpth (ft)	8.45	Hydr. Depth (ft)		5.84	
Conv. Total (cfs)	59887.4	Conv. (cfs)		59887.4	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		59.55	
Min Ch El (ft)	1924.41	Shear (lb/sq ft)		2.87	
Alpha	1.00	Stream Power (lb/ft s)		48.64	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.37	3.47	0.07
C & E Loss (ft)	0.02	Cum SA (acres)	0.35	0.63	0.07

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 20.2*

INPUT
Description:
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1064.19	1936.6	1088.15	1924.61	1100	1924.38	1111.85	1924.61	1135.81	1936.6

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1064.19	.025	1064.19	.025	1135.81	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1064.19	1135.81	12	12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1937.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.57	Wt. n-Val.		0.025	
W.S. Elev (ft)	1932.62	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	1933.69	Flow Area (sq ft)		320.47	
E.G. Slope (ft/ft)	0.008827	Area (sq ft)		320.47	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	55.69	Top Width (ft)		55.69	
Vel Total (ft/s)	17.16	Avg. Vel. (ft/s)		17.16	
Max Chl Dpth (ft)	8.23	Hydr. Depth (ft)		5.75	
Conv. Total (cfs)	58541.5	Conv. (cfs)		58541.5	

Length Wtd. (ft)	12.00	Wetted Per. (ft)		59.48	
Min Ch El (ft)	1924.38	Shear (lb/sq ft)		2.97	
Alpha	1.00	Stream Power (lb/ft s)		50.96	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.37	3.38	0.07
C & E Loss (ft)	0.01	Cum SA (acres)	0.35	0.61	0.07

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 20

INPUT
Description: End of Phase 1 Improvements
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1064.4	1936.23	6 1087.7	1924.58	6 1100	1924.34	1112.3	1924.58	6 1135.6	1936.23

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1064.4	.025	1064.4	.025	1135.6	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1064.4	1135.6	382.58	367.78	346.32	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1937.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.68	Wt. n-Val.		0.025	
W.S. Elev (ft)	1932.39	Reach Len. (ft)	382.58	367.78	346.32
Crit W.S. (ft)	1933.54	Flow Area (sq ft)		316.95	
E.G. Slope (ft/ft)	0.009166	Area (sq ft)		316.95	
Q Total (cfs)	5500.00	Flow (cfs)		5500.00	
Top Width (ft)	55.83	Top Width (ft)		55.83	
Vel Total (ft/s)	17.35	Avg. Vel. (ft/s)		17.35	
Max Chl Dpth (ft)	8.05	Hydr. Depth (ft)		5.68	
Conv. Total (cfs)	57447.6	Conv. (cfs)		57447.6	
Length Wtd. (ft)		Wetted Per. (ft)		59.52	
Min Ch El (ft)	1924.34	Shear (lb/sq ft)		3.05	
Alpha	1.00	Stream Power (lb/ft s)		52.88	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.37	3.30	0.07
C & E Loss (ft)	0.01	Cum SA (acres)	0.35	0.60	0.07

CROSS SECTION RIVER: RIVER-1
REACH: Reach-1 RS: 10

INPUT
Description:
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

1000	1937.36	1049.49	1936.26	1095.06	1934.26	1144.27	1932.26	1220.49	1930.39
1220.83	1930.26	1228.41	1928.26	1235.7	1926.26	1237.99	1925.61	1249.9	1924.26
1252.38	1923.96	1254.61	1924.26	1271.01	1926.26	1272.95	1926.49	1279.8	1927.8
1285.65	1928.26	1306.65	1930.26	1322.46	1932.26	1329.96	1933.29	1344.12	1934.26
1372.27	1936.26	1402.27	1938.26	1409.32	1938.72	1418.36	1939.14	1426.01	1940.26
1436.49	1941.26	1496.07	1942.26	1580.86	1943.11	1671.03	1944.26	1677.54	1944.52
1685.16	1944.66	1718.9	1946.26						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.035	1220.49	.03	1306.65	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1220.49	1306.65	0	0	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	1934.25	Element			
Vel Head (ft)	1.82	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	1932.43	Reach Len. (ft)			
Crit W.S. (ft)	1932.43	Flow Area (sq ft)	84.57	463.60	18.60
E.G. Slope (ft/ft)	0.005458	Area (sq ft)	84.57	463.60	18.60
Q Total (cfs)	5500.00	Flow (cfs)	274.31	5164.19	61.51
Top Width (ft)	183.61	Top Width (ft)	80.40	86.16	17.05
Vel Total (ft/s)	9.70	Avg. Vel. (ft/s)	3.24	11.14	3.31
Max Chl Dpth (ft)	8.47	Hydr. Depth (ft)	1.05	5.38	1.09
Conv. Total (cfs)	74444.3	Conv. (cfs)	3712.8	69898.9	832.5
Length Wtd. (ft)		Wetted Per. (ft)	80.43	87.29	17.18
Min Ch El (ft)	1923.96	Shear (lb/sq ft)	0.36	1.81	0.37
Alpha	1.24	Stream Power (lb/ft s)	1.16	20.16	1.22
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section. This may indicate the need for additional cross sections.

SUMMARY OF MANNING'S N VALUES

River:RIVER-1

Reach	River Sta.	n1	n2	n3

Reach-1	180	.03	.025	.03
Reach-1	170	.025	.015	.025
Reach-1	160	.025	.015	.025
Reach-1	150	.025	.015	.025
Reach-1	140	.025	.015	.025
Reach-1	130	.025	.015	.025
Reach-1	120	.025	.015	.025
Reach-1	110	.025	.015	.025
Reach-1	100	.025	.015	.025
Reach-1	90	.025	.015	.025
Reach-1	81	.025	.015	.025
Reach-1	75	.025	.015	.025
Reach-1	70	.025	.015	.025
Reach-1	65	.025	.015	.025
Reach-1	60	.025	.015	.025
Reach-1	55	.025	.015	.025
Reach-1	50	.025	.015	.025
Reach-1	45	Bridge		
Reach-1	40	.025	.015	.025
Reach-1	35	.025	.015	.025
Reach-1	30	.025	.015	.025
Reach-1	29.6*	.025	.04	.025
Reach-1	29.2*	.025	.04	.025
Reach-1	28.8*	.025	.04	.025
Reach-1	28.4*	.025	.04	.025
Reach-1	28	.025	.015	.025
Reach-1	27.6666*	.025	.015	.025
Reach-1	27.3333*	.025	.015	.025
Reach-1	27.*	.025	.015	.025
Reach-1	26.6666*	.025	.015	.025
Reach-1	26.3333*	.025	.015	.025
Reach-1	26	.025	.015	.025
Reach-1	25.3333*	.025	.018	.025
Reach-1	24.6666*	.025	.022	.025
Reach-1	24	.025	.025	.025
Reach-1	23.6*	.025	.025	.025
Reach-1	23.2*	.025	.025	.025
Reach-1	22.8*	.025	.025	.025
Reach-1	22.4*	.025	.025	.025
Reach-1	22	.025	.025	.025
Reach-1	21.8*	.025	.025	.025
Reach-1	21.6*	.025	.025	.025
Reach-1	21.4*	.025	.025	.025
Reach-1	21.2*	.025	.025	.025
Reach-1	21.*	.025	.025	.025
Reach-1	20.8*	.025	.025	.025
Reach-1	20.6*	.025	.025	.025
Reach-1	20.4*	.025	.025	.025
Reach-1	20.2*	.025	.025	.025

Reach-1	20	.025	.025	.025
Reach-1	10	.035	.03	.035

SUMMARY OF REACH LENGTHS

River: RIVER-1

Reach	River Sta.	Left	Channel	Right
Reach-1	180	358.08	363.91	374.39
Reach-1	170	98.31	97.13	96.38
Reach-1	160	119.51	114.85	110.97
Reach-1	150	1	1	1
Reach-1	140	57.23	55.76	56.76
Reach-1	130	125.29	125.31	125.61
Reach-1	120	25.32	24.78	22.42
Reach-1	110	1	1	1
Reach-1	100	346.14	342.73	339.84
Reach-1	90	53.02	51.93	56.59
Reach-1	81	50	50	50
Reach-1	75	151.76	151.76	151.76
Reach-1	70	100	100	100
Reach-1	65	100	100	100
Reach-1	60	166.19	166.19	166.19
Reach-1	55	290.11	288.11	286.11
Reach-1	50	101	99	97
Reach-1	45	Bridge		
Reach-1	40	15	15	15
Reach-1	35	102	102	102
Reach-1	30	2.49	2.49	2.49
Reach-1	29.6*	2.49	2.49	2.49
Reach-1	29.2*	2.49	2.49	2.49
Reach-1	28.8*	2.49	2.49	2.49
Reach-1	28.4*	2.49	2.49	2.49
Reach-1	28	12	12	12
Reach-1	27.6666*	12	12	12
Reach-1	27.3333*	12	12	12
Reach-1	27.*	12	12	12
Reach-1	26.6666*	12	12	12
Reach-1	26.3333*	12	12	12
Reach-1	26	1	1	1
Reach-1	25.3333*	1	1	1
Reach-1	24.6666*	1	1	1
Reach-1	24	6	6	6
Reach-1	23.6*	6	6	6
Reach-1	23.2*	6	6	6

Reach-1	22.8*	6	6	6
Reach-1	22.4*	6	6	6
Reach-1	22	12	12	12
Reach-1	21.8*	12	12	12
Reach-1	21.6*	12	12	12
Reach-1	21.4*	12	12	12
Reach-1	21.2*	12	12	12
Reach-1	21.*	12	12	12
Reach-1	20.8*	12	12	12
Reach-1	20.6*	12	12	12
Reach-1	20.4*	12	12	12
Reach-1	20.2*	12	12	12
Reach-1	20	382.58	367.78	346.32
Reach-1	10	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RIVER-1

Reach	River Sta.	Contr.	Expan.
Reach-1	180	.1	.3
Reach-1	170	.1	.3
Reach-1	160	.1	.3
Reach-1	150	.1	.3
Reach-1	140	.1	.3
Reach-1	130	.1	.3
Reach-1	120	.1	.3
Reach-1	110	.1	.3
Reach-1	100	.1	.3
Reach-1	90	.1	.3
Reach-1	81	.1	.3
Reach-1	75	.1	.3
Reach-1	70	.1	.3
Reach-1	65	.1	.3
Reach-1	60	.1	.3
Reach-1	55	.1	.3
Reach-1	50	.1	.3
Reach-1	45	Bridge	
Reach-1	40	.1	.3
Reach-1	35	.1	.3
Reach-1	30	.1	.3
Reach-1	29.6*	.1	.3
Reach-1	29.2*	.1	.3
Reach-1	28.8*	.1	.3
Reach-1	28.4*	.1	.3

Reach-1	28	.1	.3
Reach-1	27.6666*	.1	.3
Reach-1	27.3333*	.1	.3
Reach-1	27.*	.1	.3
Reach-1	26.6666*	.1	.3
Reach-1	26.3333*	.1	.3
Reach-1	26	.1	.3
Reach-1	25.3333*	.1	.3
Reach-1	24.6666*	.1	.3
Reach-1	24	.1	.3
Reach-1	23.6*	.1	.3
Reach-1	23.2*	.1	.3
Reach-1	22.8*	.1	.3
Reach-1	22.4*	.1	.3
Reach-1	22	.1	.3
Reach-1	21.8*	.1	.3
Reach-1	21.6*	.1	.3
Reach-1	21.4*	.1	.3
Reach-1	21.2*	.1	.3
Reach-1	21.*	.1	.3
Reach-1	20.8*	.1	.3
Reach-1	20.6*	.1	.3
Reach-1	20.4*	.1	.3
Reach-1	20.2*	.1	.3
Reach-1	20	.1	.3
Reach-1	10	.1	.3

Profile Output Table - CHECKRAS

Reach	River Sta	Froude # Chl	Top Wdth Act	Conv.	Total	Prof Delta WS	Left Sta Eff	Enc Sta L	Center Station	Enc Sta R	Rght Sta Eff	Min Ch El	Left Stagn	Right Stagn
			(ft)		(cfs)	(ft)	(ft)	(ft)		(ft)	(ft)	(ft)	(ft)	(ft)
Reach-1	180		1.00		65.80	71600.3			1118.70	1149.24		1184.50	1957.33	
Reach-1	170		0.59		75.51	209191.8			1022.79	1060.40		1098.30	1954.56	
Reach-1	160		1.00		55.47	117380.3			1025.06	1052.44		1080.53	1954.02	
Reach-1	150		1.48		52.74	77729.7			1138.09	1164.30		1190.83	1952.76	
Reach-1	140		1.84		48.52	60803.4			1128.81	1152.67		1177.33	1950.76	
Reach-1	130		1.85		48.12	60664.7			1095.08	1118.44		1143.20	1950.26	
Reach-1	120		1.77		49.85	63694.8			1086.89	1111.84		1136.74	1949.76	

Reach-1	110		1.81	50.33	62257.1	1074.85
1100.27		1125.19	1949.46			
Reach-1	100		2.03	46.72	54738.3	1075.43
1098.92		1122.16	1947.73			
Reach-1	90		1.89	53.35	59592.8	1057.63
1083.29		1110.98	1945.98			
Reach-1	81		1.84	53.45	61556.8	1073.28
1100.00		1126.72	1945.72			
Reach-1	75		1.83	45.00	58308.1	1077.50
1100.00		1122.50	1944.07			
Reach-1	70		2.07	45.00	51173.2	1077.50
1100.00		1122.50	1941.35			
Reach-1	65		1.69	35.00	61013.1	1082.50
1100.00		1117.50	1939.56			
Reach-1	60		1.80	35.00	57190.8	1082.50
1100.00		1117.50	1938.13			
Reach-1	55		1.94	35.00	53040.5	1082.50
1100.00		1117.50	1935.75			
Reach-1	50		2.04	35.00	52337.3	1182.50
1200.00		1217.50	1931.63			
Reach-1	45	BR U	2.04	35.00	52337.3	1182.50
1200.00		1217.50	1931.63			
Reach-1	45	BR D	1.87	35.00	57291.1	1132.50
1150.00		1167.50	1930.77			
Reach-1	40		1.87	35.00	57280.7	1132.50
1150.00		1167.50	1930.77			
Reach-1	35		1.87	35.00	57280.7	1082.50
1100.00		1117.50	1930.64			
Reach-1	30		2.47	50.00	44488.9	1075.00
1100.00		1125.00	1929.75			
Reach-1	29.6*		2.63	50.00	15647.8	1075.00
1100.00		1125.00	1928.70			
Reach-1	29.2*		2.74	50.00	14977.8	1075.00
1100.00		1125.00	1927.66			
Reach-1	28.8*		2.85	50.00	14389.6	1075.00
1100.00		1125.00	1926.61			
Reach-1	28.4*		2.95	50.00	13882.0	1075.00
1100.00		1125.00	1925.57			
Reach-1	28		3.08	50.00	35320.0	1075.00
1100.00		1125.00	1924.52			
Reach-1	27.6666*		3.02	50.00	36054.8	1075.00
1100.00		1125.00	1924.48			
Reach-1	27.3333*		0.41	50.00	272139.1	1075.00
1100.00		1125.00	1924.45			
Reach-1	27.*		0.41	50.00	273327.6	1075.00
1100.00		1125.00	1924.41			
Reach-1	26.6666*		0.41	50.00	274520.8	1075.00
1100.00		1125.00	1924.37			
Reach-1	26.3333*		0.41	50.00	275378.1	1075.00

1100.00		1125.00	1924.34			
Reach-1	26		0.40	50.00	276569.8	1075.00
1100.00		1125.00	1924.30			
Reach-1	25.3333*		0.41	50.00	225260.9	1075.00
1100.00		1125.00	1924.47			
Reach-1	24.6666*		0.42	50.00	180256.7	1075.00
1100.00		1125.00	1924.63			
Reach-1	24		0.43	50.00	154807.4	1075.00
1100.00		1125.00	1924.80			
Reach-1	23.6*		0.48	52.75	149016.4	1073.63
1100.00		1126.38	1924.78			
Reach-1	23.2*		0.54	55.42	138445.2	1072.29
1100.00		1127.71	1924.76			
Reach-1	22.8*		0.61	57.89	124770.0	1071.05
1100.00		1128.95	1924.75			
Reach-1	22.4*		0.70	59.85	108627.4	1070.08
1100.00		1129.92	1924.73			
Reach-1	22		1.00	56.89	74407.0	1071.56
1100.00		1128.45	1924.71			
Reach-1	21.8*		1.11	55.07	66590.1	1072.47
1100.00		1127.53	1924.67			
Reach-1	21.6*		1.00	57.49	74485.8	1071.26
1100.00		1128.74	1924.64			
Reach-1	21.4*		1.11	55.73	66811.7	1072.14
1100.00		1127.87	1924.60			
Reach-1	21.2*		1.01	58.07	74301.3	1070.96
1100.00		1129.04	1924.56			
Reach-1	21.*		1.11	56.51	67072.1	1071.75
1100.00		1128.25	1924.52			
Reach-1	20.8*		1.16	56.00	63925.5	1072.00
1100.00		1128.00	1924.49			
Reach-1	20.6*		1.20	55.74	61595.6	1072.13
1100.00		1127.87	1924.45			
Reach-1	20.4*		1.23	55.66	59887.4	1072.17
1100.00		1127.83	1924.41			
Reach-1	20.2*		1.26	55.69	58541.5	1072.15
1100.00		1127.85	1924.38			
Reach-1	20		1.28	55.83	57447.6	1072.09
1100.00		1127.91	1924.34			
Reach-1	10		0.85	183.61	74444.3	1140.09
1263.57		1323.70	1923.96			

HEC-RAS Plan: Post River: RIVER-1 Reach: Reach-1 Profile: PF 1

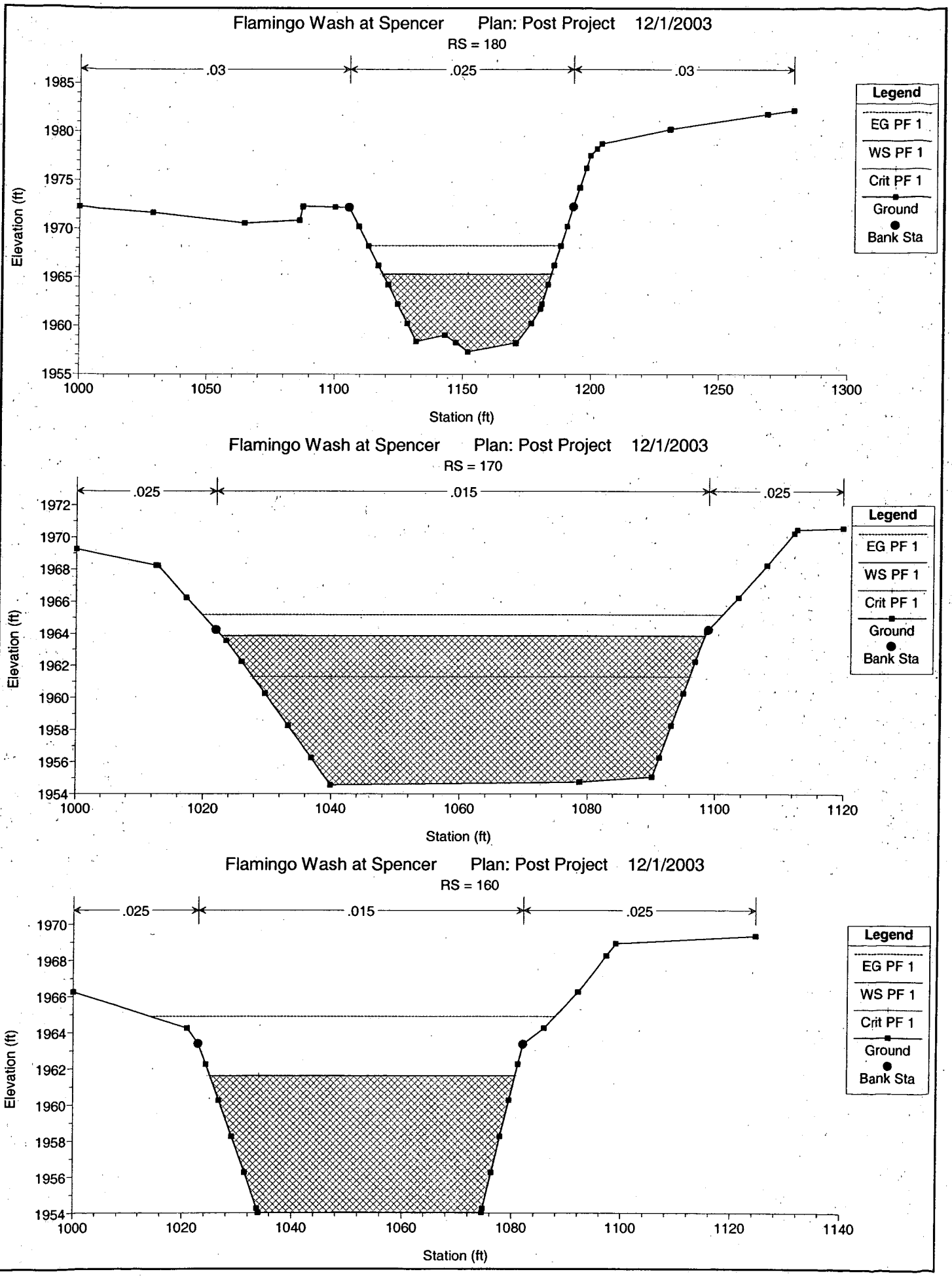
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	180	PF 1	5300.00	1957.33	1965.36	1965.36	1968.30	0.005479	13.75	385.47	65.80	1.00
Reach-1	170	PF 1	5300.00	1954.56	1963.89	1961.31	1965.20	0.000642	9.22	575.14	75.51	0.59
Reach-1	160	PF 1	5300.00	1954.02	1961.61	1961.61	1964.90	0.002039	14.56	363.92	55.47	1.00
Reach-1	150	PF 1	5300.00	1952.76	1958.60	1960.22	1964.32	0.004649	19.19	276.25	52.74	1.48
Reach-1	140	PF 1	5300.00	1950.76	1955.95	1958.44	1964.07	0.007598	22.87	231.74	48.52	1.84
Reach-1	130	PF 1	5300.00	1950.26	1955.44	1957.93	1963.64	0.007633	22.98	230.61	48.12	1.85
Reach-1	120	PF 1	5300.00	1949.76	1954.99	1957.27	1962.54	0.006924	22.05	240.42	49.85	1.77
Reach-1	110	PF 1	5300.00	1949.46	1954.60	1956.96	1962.34	0.007247	22.33	237.36	50.33	1.81
Reach-1	100	PF 1	5300.00	1947.73	1952.70	1955.55	1962.16	0.009375	24.68	214.74	46.72	2.03
Reach-1	90	PF 1	5300.00	1945.98	1950.86	1953.25	1958.74	0.007910	22.53	235.27	53.35	1.89
Reach-1	81	PF 1	5300.00	1945.72	1950.67	1952.99	1958.25	0.007413	22.09	239.88	53.45	1.84
Reach-1	75	PF 1	5300.00	1944.07	1949.35	1951.85	1957.78	0.008262	23.30	227.51	45.00	1.83
Reach-1	70	PF 1	5300.00	1941.35	1946.22	1949.12	1956.20	0.010727	25.35	209.11	45.00	2.07
Reach-1	65	PF 1	5300.00	1939.56	1946.04	1948.66	1955.00	0.007546	24.03	220.55	35.00	1.69
Reach-1	60	PF 1	5300.00	1938.13	1944.34	1947.22	1954.12	0.008588	25.10	211.19	35.00	1.80
Reach-1	55	PF 1	5300.00	1935.75	1941.66	1944.85	1952.48	0.009985	26.39	200.83	35.00	1.94
Reach-1	50	PF 1	5500.00	1931.63	1937.49	1940.95	1949.35	0.011043	27.63	199.05	35.00	2.04
Reach-1	45		Bridge									
Reach-1	40	PF 1	5500.00	1930.77	1936.99	1940.10	1947.50	0.009220	26.02	211.41	35.00	1.87
Reach-1	35	PF 1	5500.00	1930.64	1936.86	1939.97	1947.37	0.009220	26.02	211.41	35.00	1.87
Reach-1	30	PF 1	5500.00	1929.75	1933.95	1937.21	1946.02	0.015283	27.89	197.23	50.00	2.47
Reach-1	29.6*	PF 1	5500.00	1928.70	1932.74	1936.16	1945.84	0.123543	29.04	189.37	50.00	2.63
Reach-1	29.2*	PF 1	5500.00	1927.66	1931.59	1935.13	1945.44	0.134844	29.86	184.20	50.00	2.74
Reach-1	28.8*	PF 1	5500.00	1926.61	1930.45	1934.07	1945.02	0.146092	30.63	179.59	50.00	2.85
Reach-1	28.4*	PF 1	5500.00	1925.57	1929.33	1933.03	1944.57	0.156972	31.33	175.56	50.00	2.95
Reach-1	28	PF 1	5500.00	1924.52	1928.18	1931.98	1944.35	0.024248	32.27	170.43	50.00	3.08
Reach-1	27.6666*	PF 1	5500.00	1924.48	1928.18	1931.94	1943.94	0.023270	31.85	172.66	50.00	3.02
Reach-1	27.3333*	PF 1	5500.00	1924.45	1937.76	1931.91	1938.86	0.000408	8.42	652.82	50.00	0.41
Reach-1	27.*	PF 1	5500.00	1924.41	1937.76		1938.85	0.000405	8.40	654.80	50.00	0.41
Reach-1	26.6666*	PF 1	5500.00	1924.37	1937.76		1938.85	0.000401	8.37	656.79	50.00	0.41
Reach-1	26.3333*	PF 1	5500.00	1924.34	1937.75		1938.84	0.000399	8.36	658.22	50.00	0.41
Reach-1	26	PF 1	5500.00	1924.30	1937.75		1938.83	0.000395	8.33	660.21	50.00	0.40
Reach-1	25.3333*	PF 1	5500.00	1924.47	1937.72		1938.83	0.000596	8.46	649.77	50.00	0.41
Reach-1	24.6666*	PF 1	5500.00	1924.63	1937.68		1938.82	0.000931	8.60	639.81	50.00	0.42
Reach-1	24	PF 1	5500.00	1924.80	1937.63		1938.82	0.001262	8.74	629.08	50.00	0.43
Reach-1	23.6*	PF 1	5500.00	1924.78	1937.48		1938.80	0.001362	9.21	597.38	52.75	0.48
Reach-1	23.2*	PF 1	5500.00	1924.76	1937.30		1938.77	0.001578	9.75	564.06	55.42	0.54
Reach-1	22.8*	PF 1	5500.00	1924.75	1937.06		1938.74	0.001943	10.41	528.17	57.89	0.61
Reach-1	22.4*	PF 1	5500.00	1924.73	1936.71		1938.70	0.002564	11.32	485.93	59.85	0.70
Reach-1	22	PF 1	5500.00	1924.71	1935.21	1935.21	1938.54	0.005464	14.64	375.72	56.89	1.00
Reach-1	21.8*	PF 1	5500.00	1924.67	1934.50	1935.03	1938.41	0.006822	15.87	346.57	55.07	1.11
Reach-1	21.6*	PF 1	5500.00	1924.64	1934.85	1934.85	1938.16	0.005452	14.59	377.06	57.49	1.00

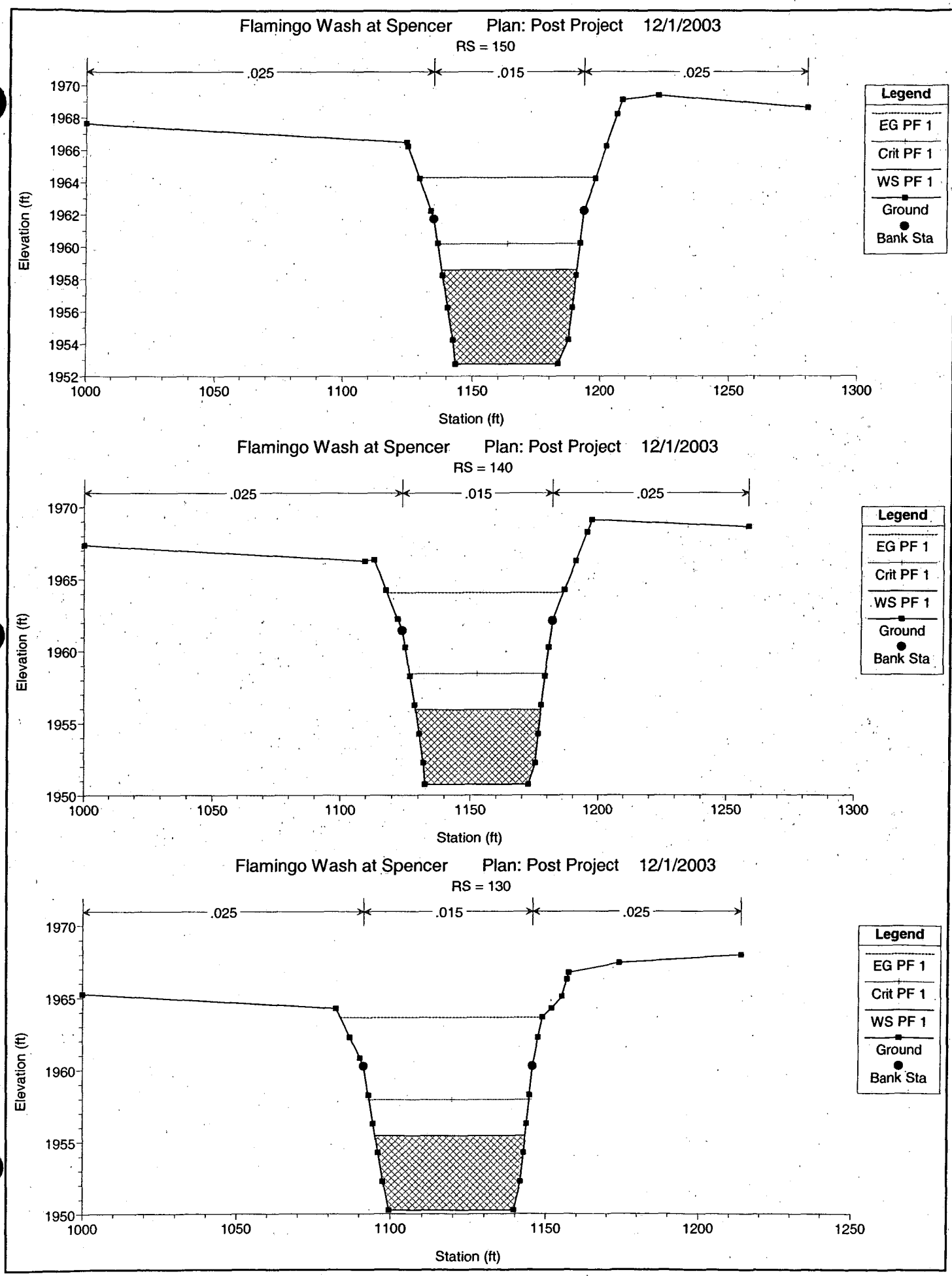
HEC-RAS Plan: Post River: RIVER-1 Reach: Reach-1 Profile: PF 1 (Continued)

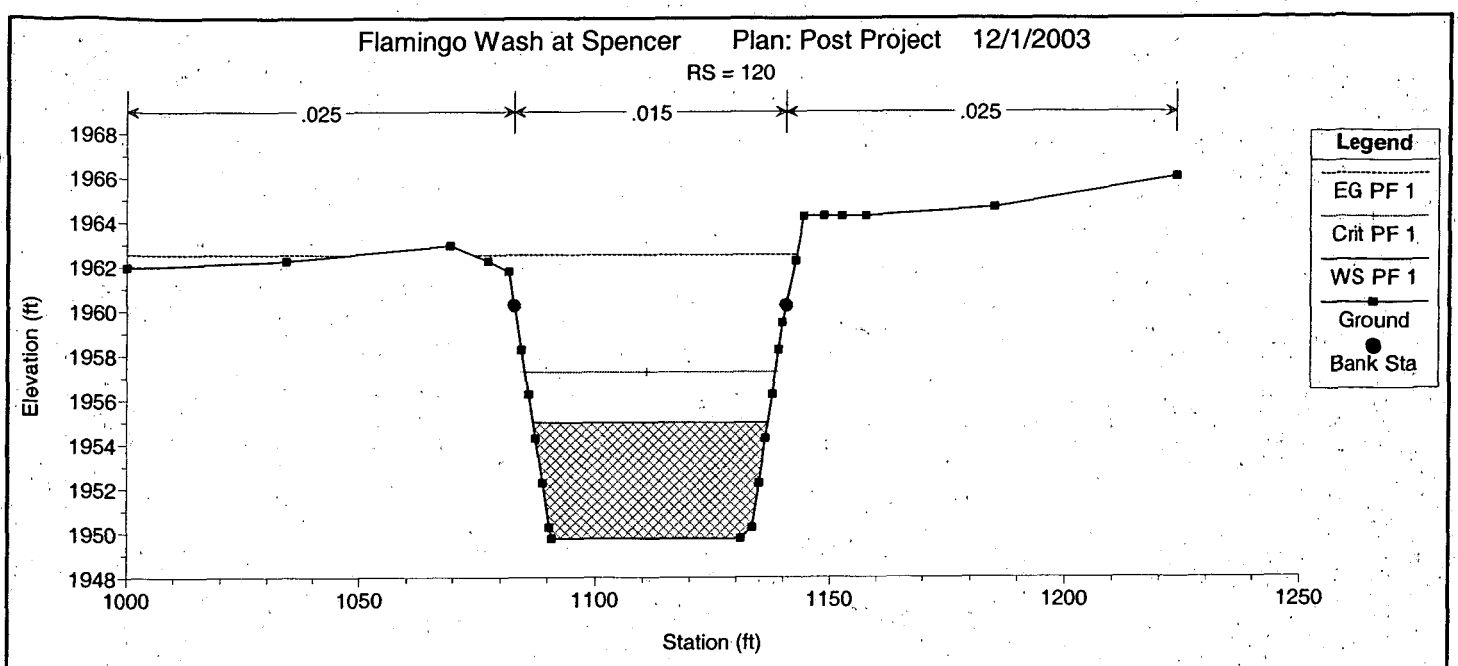
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	21.4*	PF 1	5500.00	1924.60	1934.16	1934.68	1938.03	0.006777	15.78	348.51	55.73	1.11
Reach-1	21.2*	PF 1	5500.00	1924.56	1934.48	1934.48	1937.78	0.005479	14.57	377.56	58.07	1.01
Reach-1	21.*	PF 1	5500.00	1924.52	1933.84	1934.33	1937.66	0.006724	15.68	350.82	56.51	1.11
Reach-1	20.8*	PF 1	5500.00	1924.49	1933.46	1934.17	1937.54	0.007402	16.21	339.35	56.00	1.16
Reach-1	20.6*	PF 1	5500.00	1924.45	1933.14	1934.00	1937.42	0.007973	16.62	330.99	55.74	1.20
Reach-1	20.4*	PF 1	5500.00	1924.41	1932.86	1933.84	1937.31	0.008434	16.92	325.02	55.66	1.23
Reach-1	20.2*	PF 1	5500.00	1924.38	1932.62	1933.69	1937.19	0.008827	17.16	320.47	55.69	1.26
Reach-1	20	PF 1	5500.00	1924.34	1932.39	1933.54	1937.07	0.009166	17.35	316.95	55.83	1.28
Reach-1	10	PF 1	5500.00	1923.96	1932.43	1932.43	1934.25	0.005458	11.14	566.77	183.61	0.85

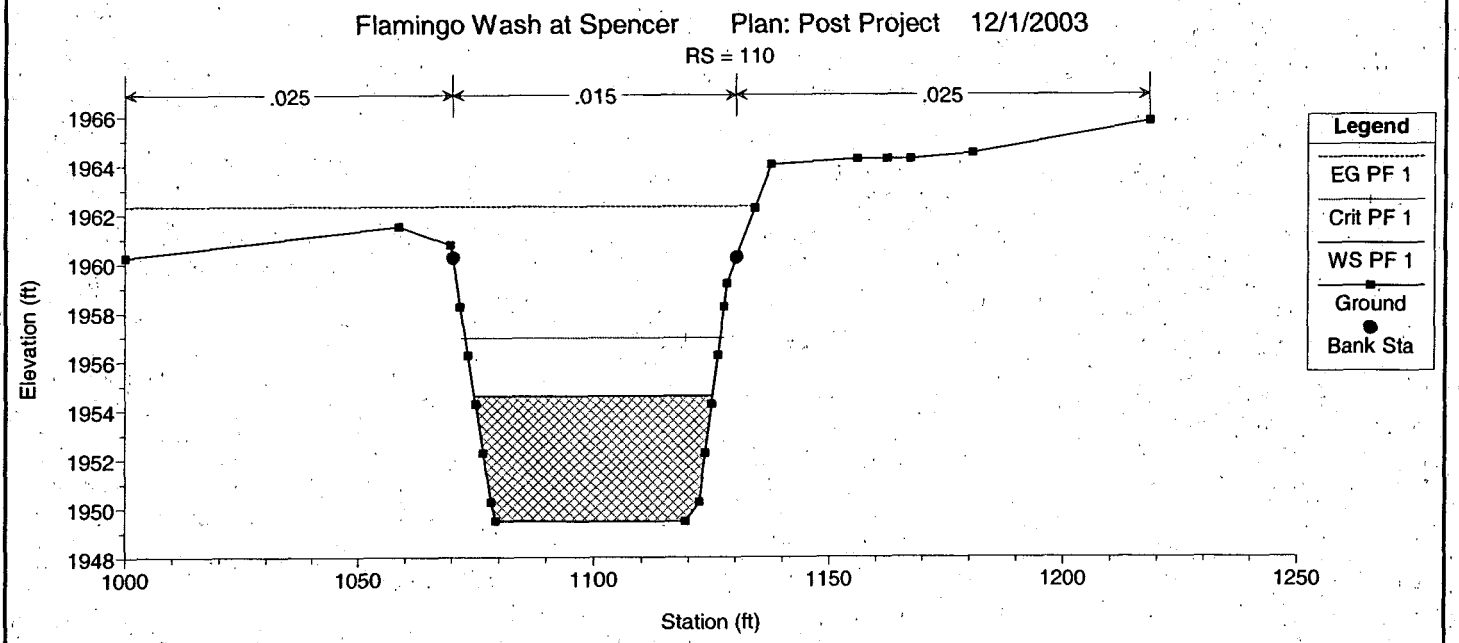
HEC-RAS Plan: Post River: RIVER-1 Reach: Reach-1 Profile: PF 1

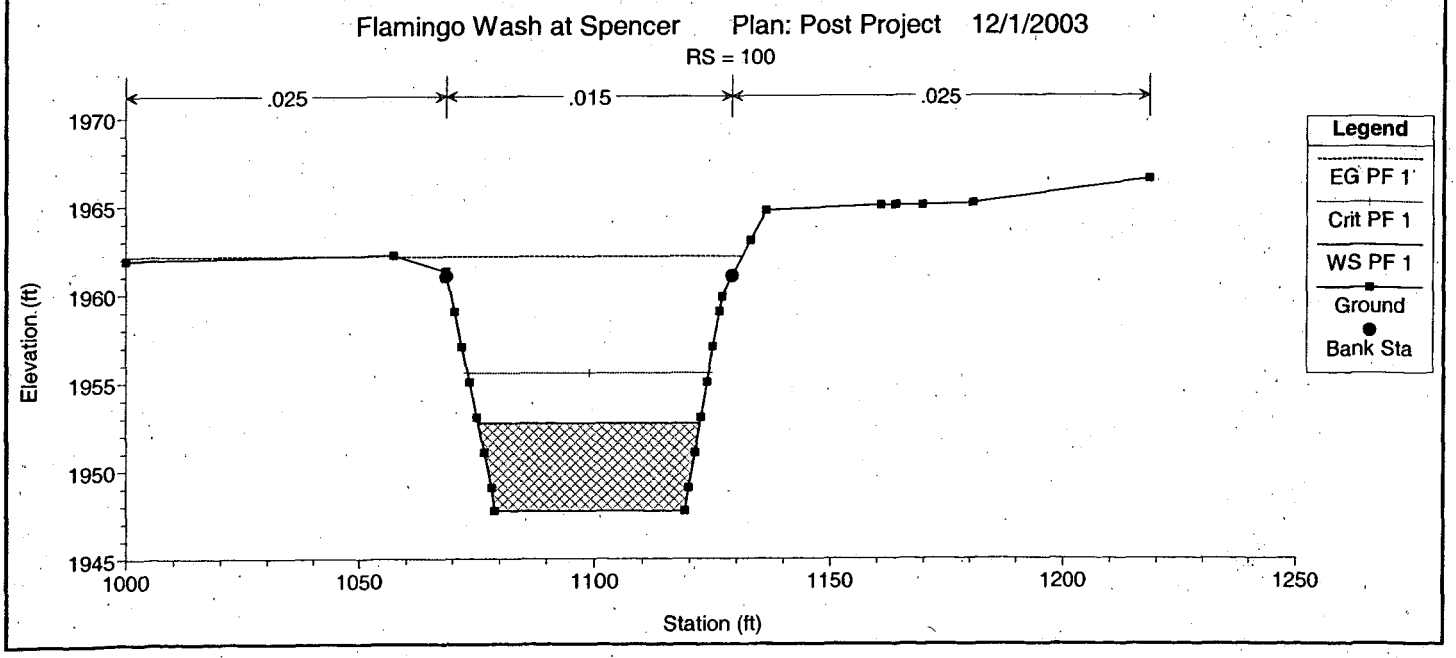
Reach	River Sta	Profile	E.G. US.	Min El Prs	BR Open Area	Prs O WS	Q Total	Min El Weir Flow	Q Weir	Delta EG
			(ft)	(ft)	(sq ft)	(ft)	(cfs)	(ft)	(cfs)	(ft)
Reach-1	45	PF 1	1947.50	1941.63	343.88	1937.49	5500.00	1943.81		0.00

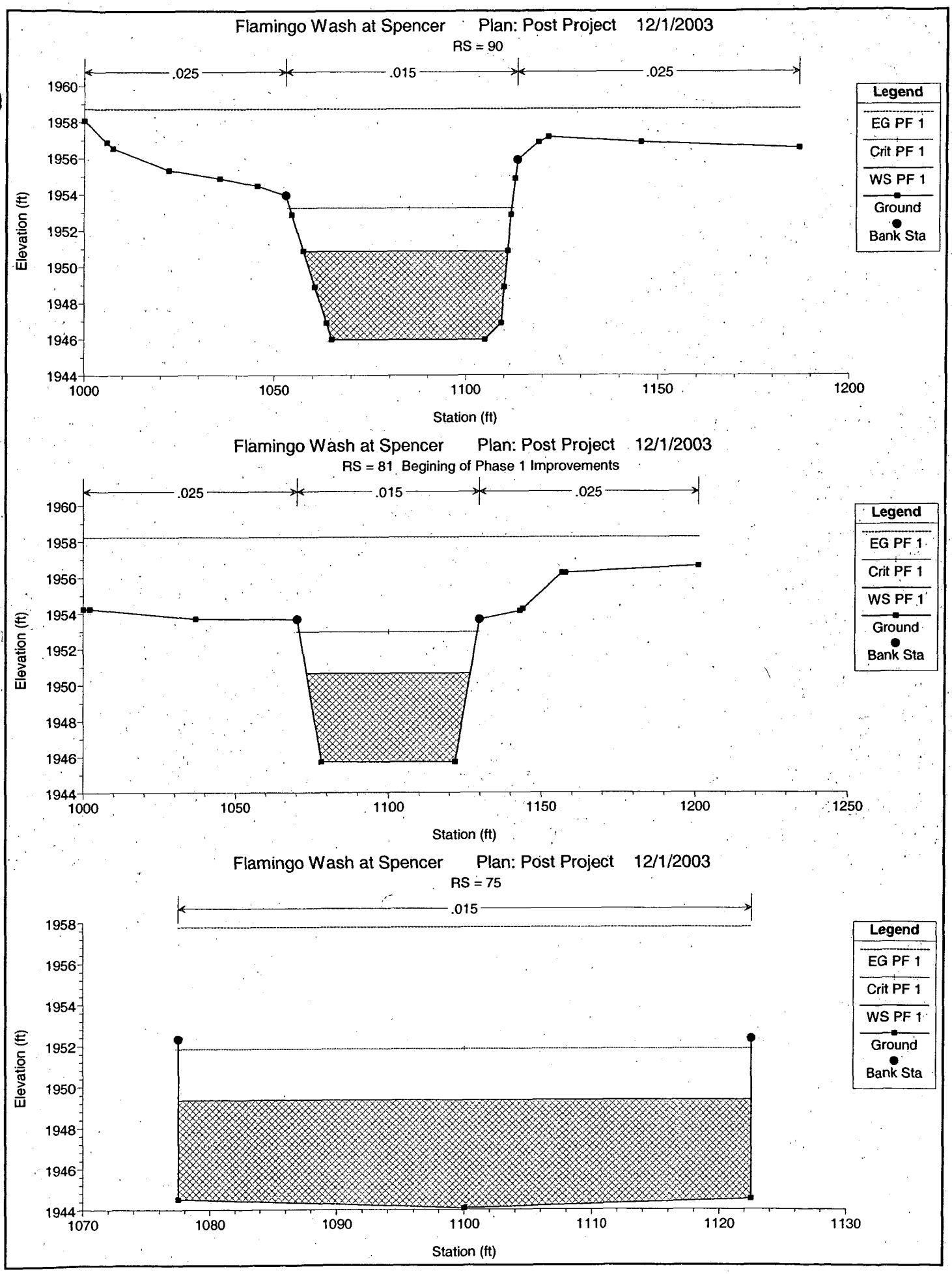

Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 180
.03
.025
.03
Elevation (ft)
1985
1980
1975
1970
1965
1960
1955
1000
1050
1100
1150
1200
1250
1300
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 170
.025
.015
.025
Elevation (ft)
1972
1970
1968
1966
1964
1962
1960
1958
1956
1954
1000
1020
1040
1060
1080
1100
1120
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 160
.025
.015
.025
Elevation (ft)
1970
1968
1966
1964
1962
1960
1958
1956
1954
1000
1020
1040
1060
1080
1100
1120
1140
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

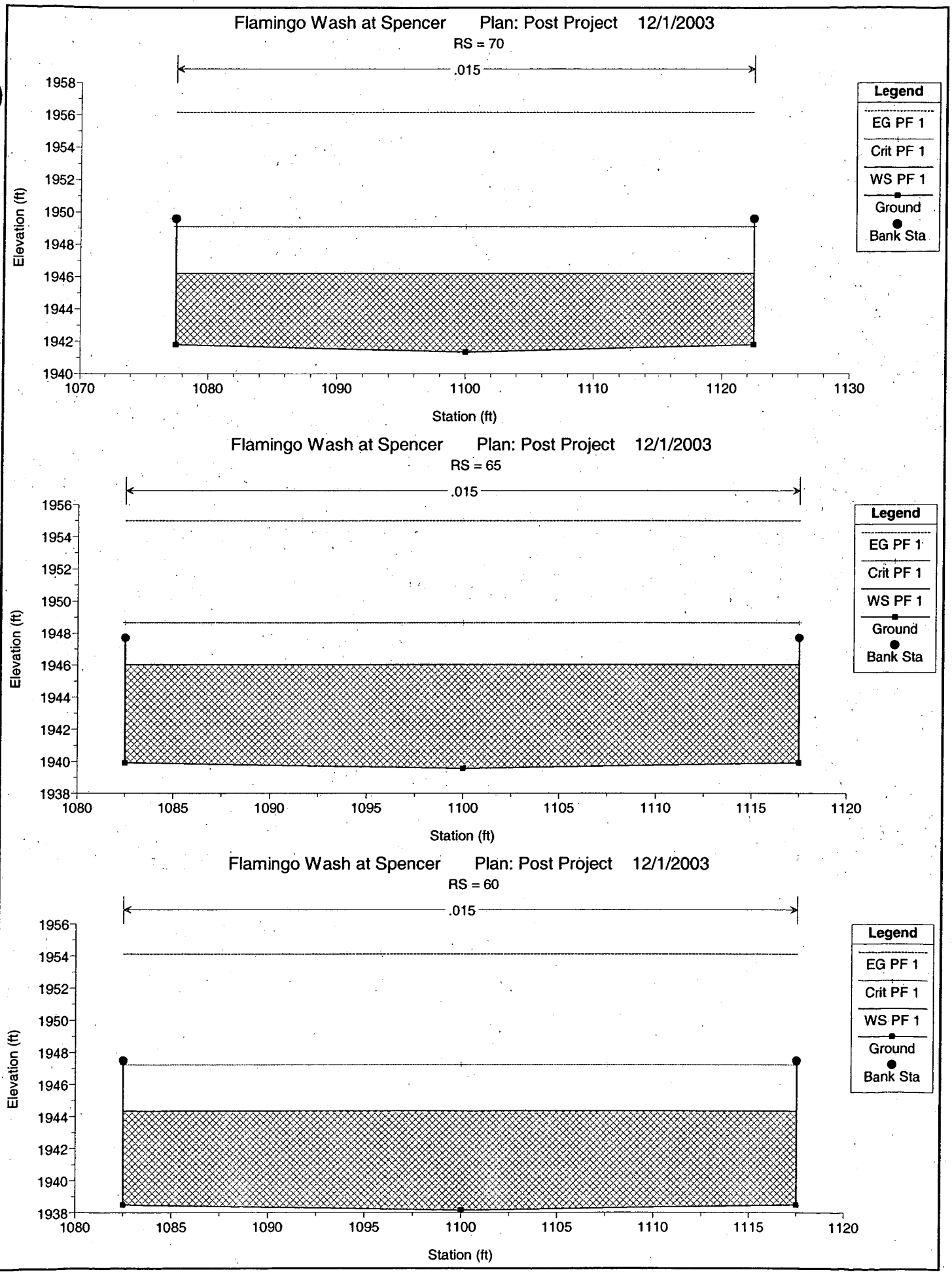

Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 150
.025
.015
.025
1970
1968
1966
1964
1962
1960
1958
1956
1954
1952
Elevation (ft)
1000
1050
1100
1150
1200
1250
1300
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 140
.025
.015
.025
1970
1965
1960
1955
1950
Elevation (ft)
1000
1050
1100
1150
1200
1250
1300
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 130
.025
.015
.025
1970
1965
1960
1955
1950
Elevation (ft)
1000
1050
1100
1150
1200
1250
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

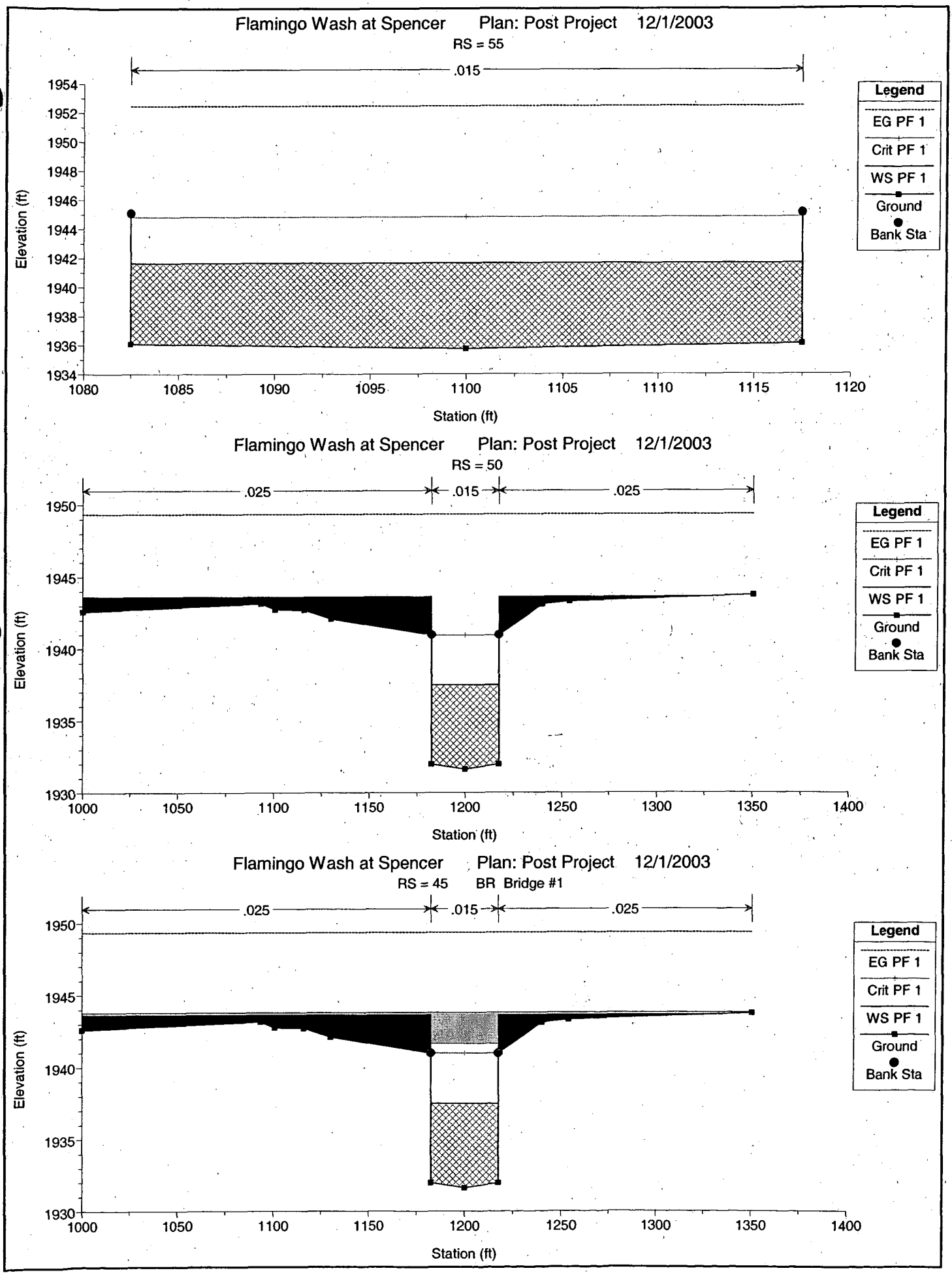

Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 120
.025
.015
.025
Elevation (ft)
1968
1966
1964
1962
1960
1958
1956
1954
1952
1950
1948
1000
1050
1100
1150
1200
1250
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

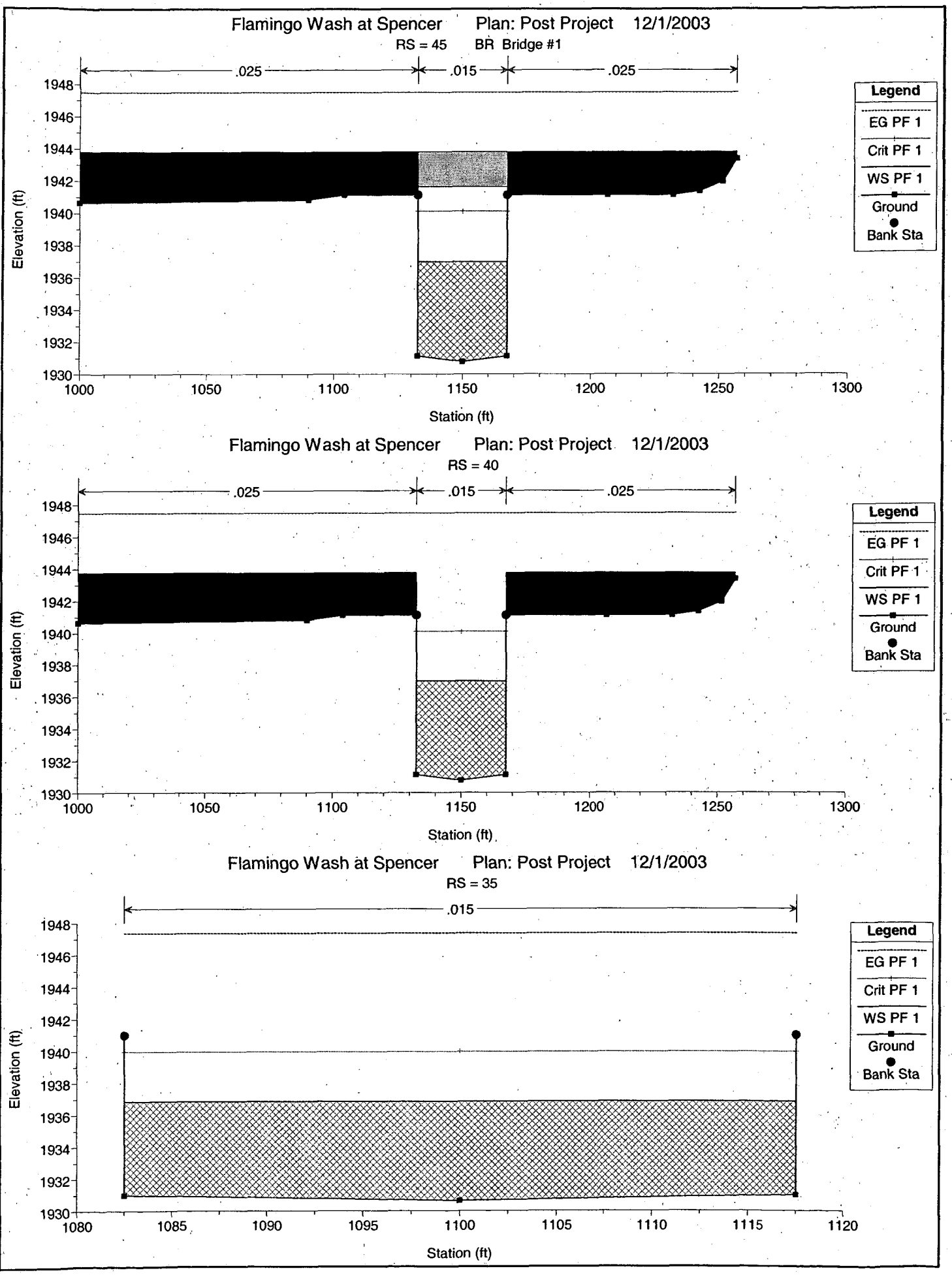

Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 110
.025
.015
.025
Elevation (ft)
1966
1964
1962
1960
1958
1956
1954
1952
1950
1948
1000
1050
1100
1150
1200
1250
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

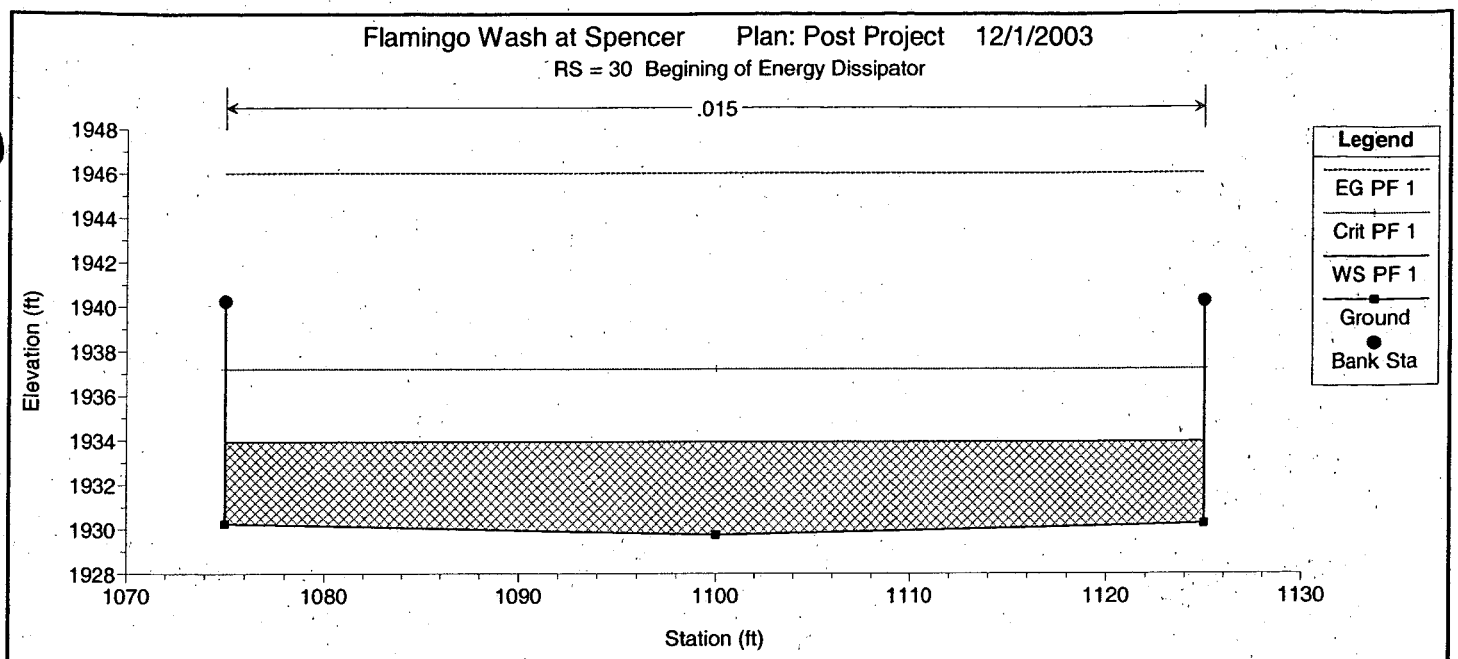

Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 100
.025
.015
.025
Elevation (ft)
1970
1965
1960
1955
1950
1945
1000
1050
1100
1150
1200
1250
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

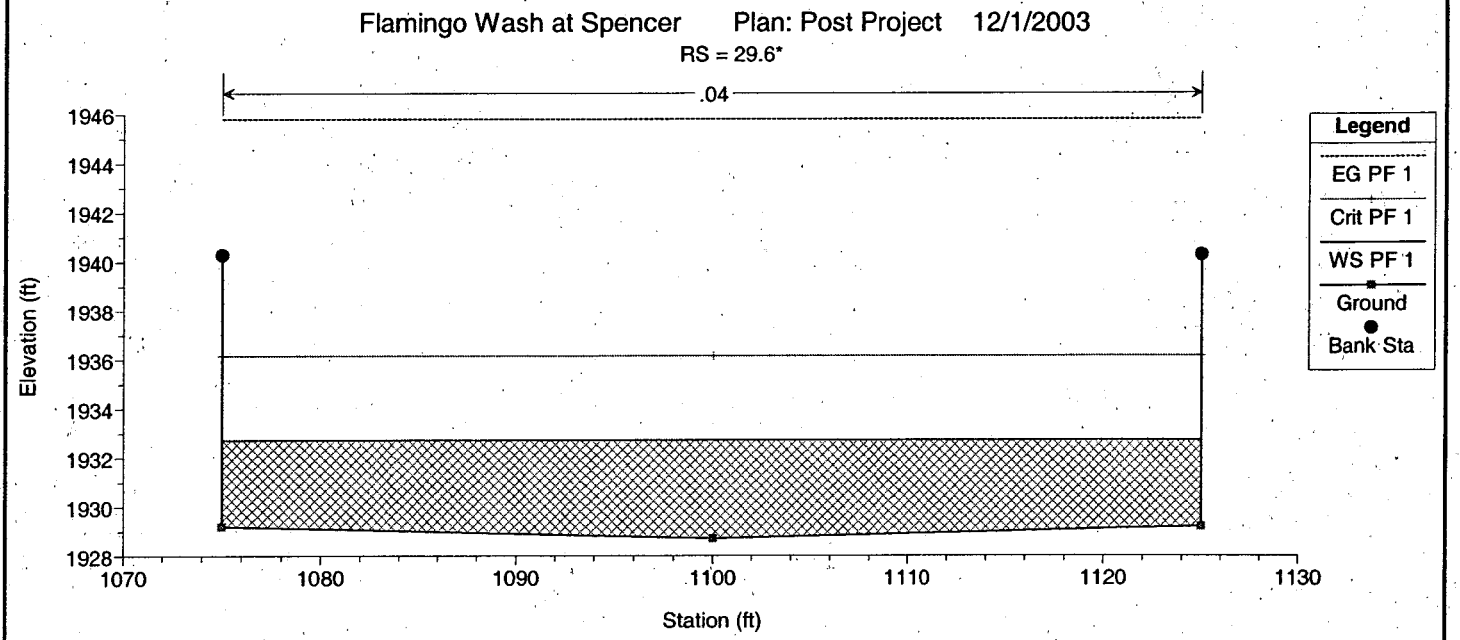

Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 90
.025
.015
.025
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 81 Begining of Phase 1 Improvements
.025
.015
.025
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 75
.015
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

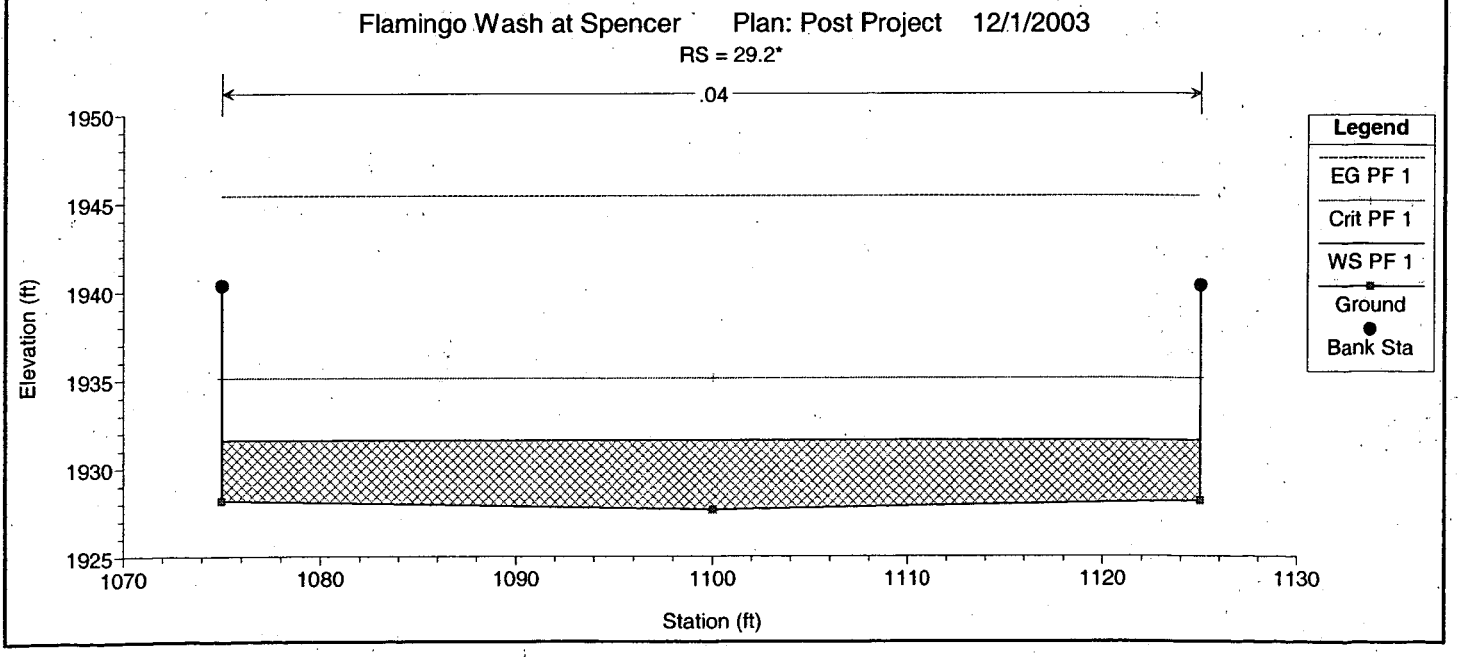

Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 70
.015
Elevation (ft)
1958
1956
1954
1952
1950
1948
1946
1944
1942
1940
1070
1080
1090
1100
1110
1120
1130
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 65
.015
Elevation (ft)
1956
1954
1952
1950
1948
1946
1944
1942
1940
1938
1080
1085
1090
1095
1100
1105
1110
1115
1120
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 60
.015
Elevation (ft)
1956
1954
1952
1950
1948
1946
1944
1942
1940
1938
1080
1085
1090
1095
1100
1105
1110
1115
1120
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

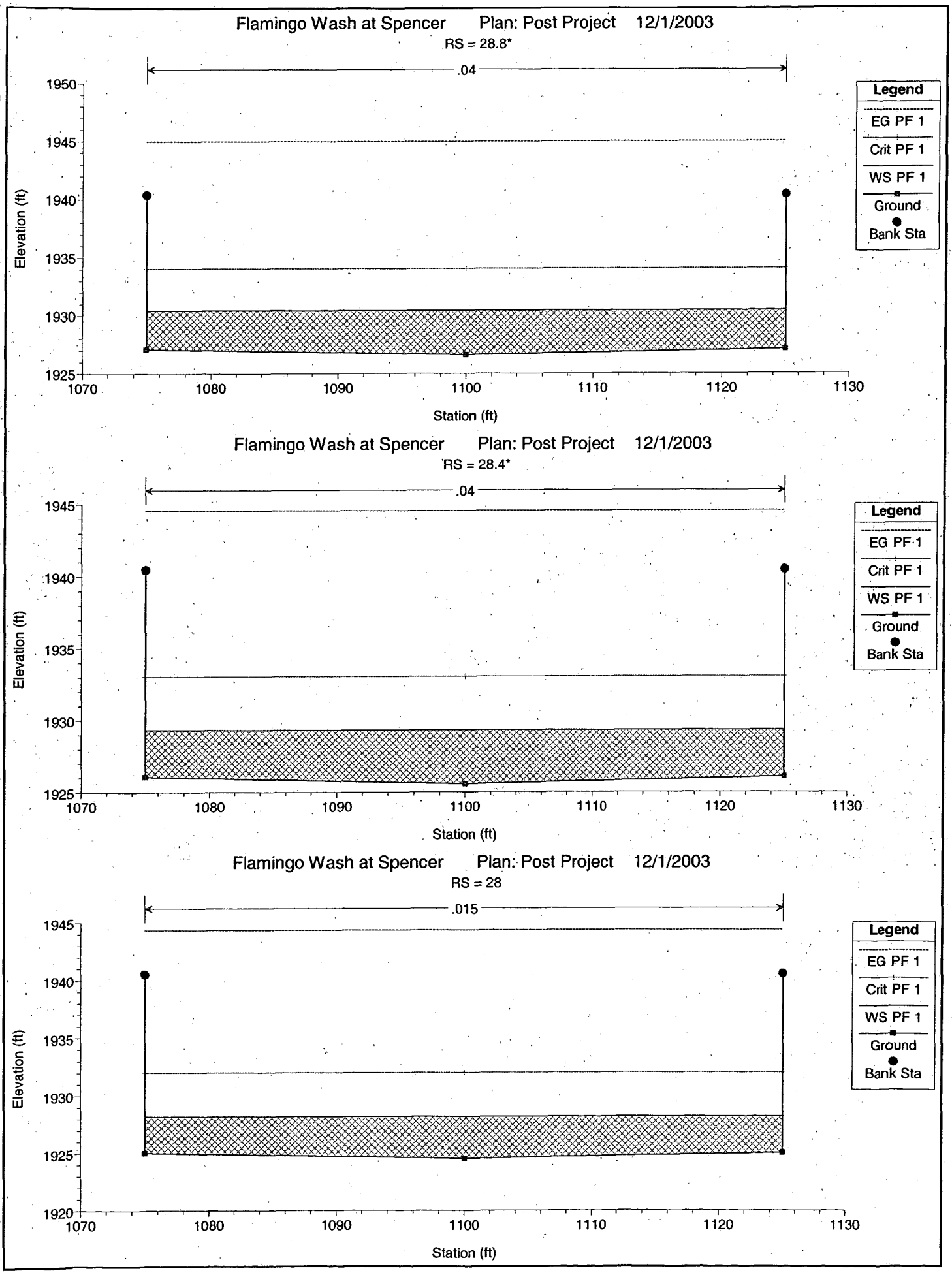

Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 55
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 50
.025
.015
.025
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 45 BR Bridge #1
.025
.015
.025
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

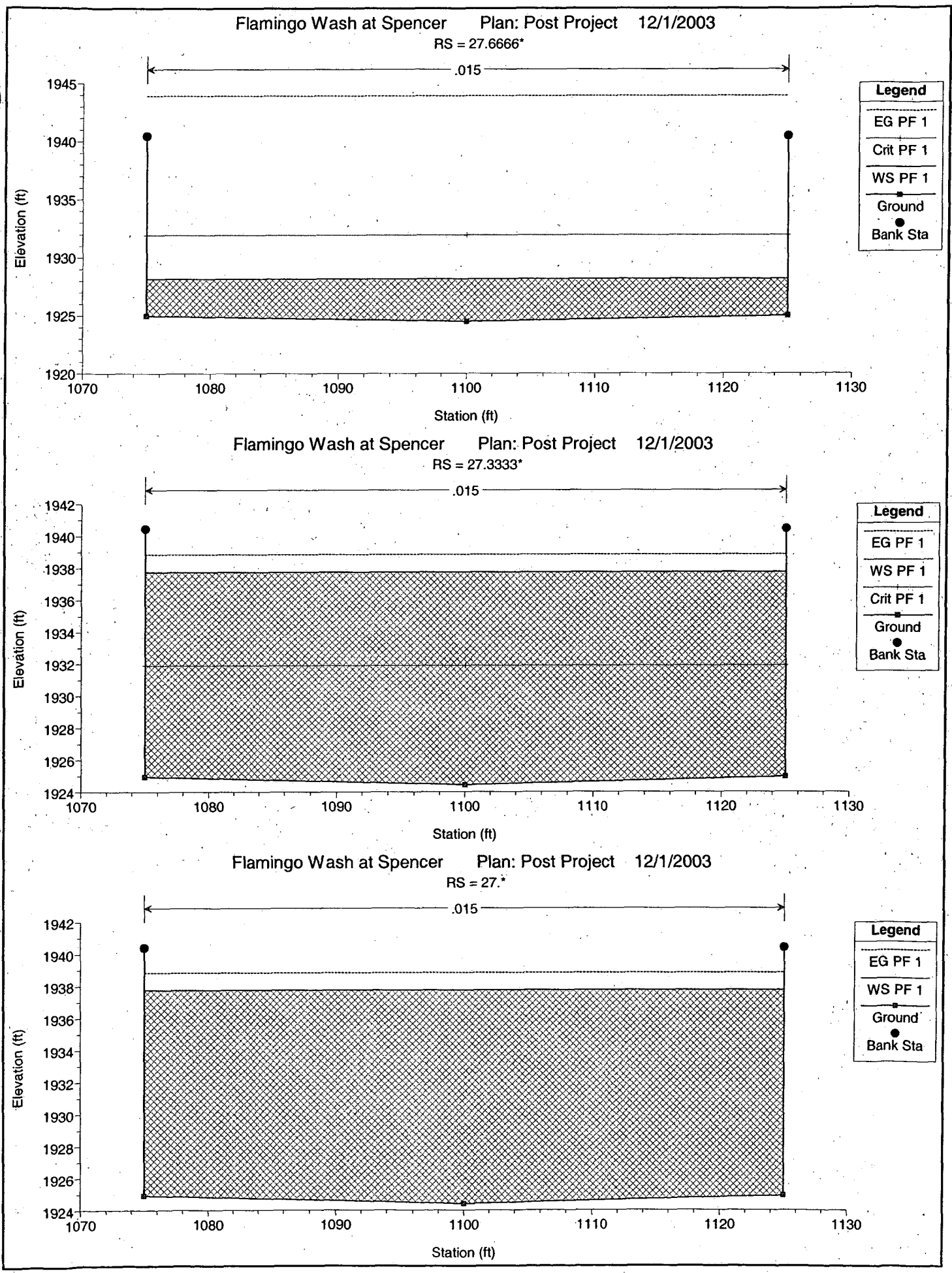

Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 45 BR Bridge #1
.025
.015
.025
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 40
.025
.015
.025
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 35
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

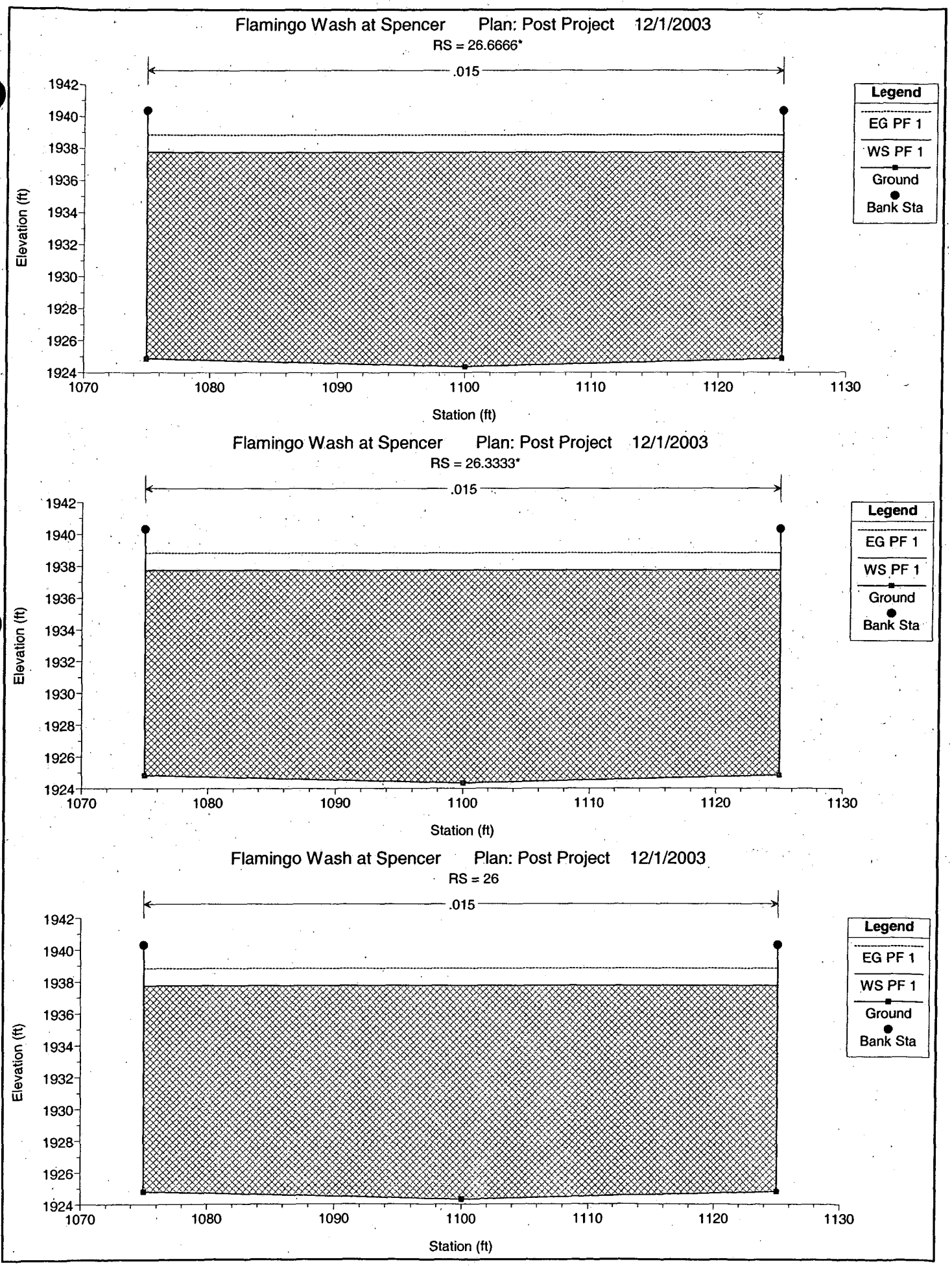

Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 30 Begining of Energy Dissipator
.015
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

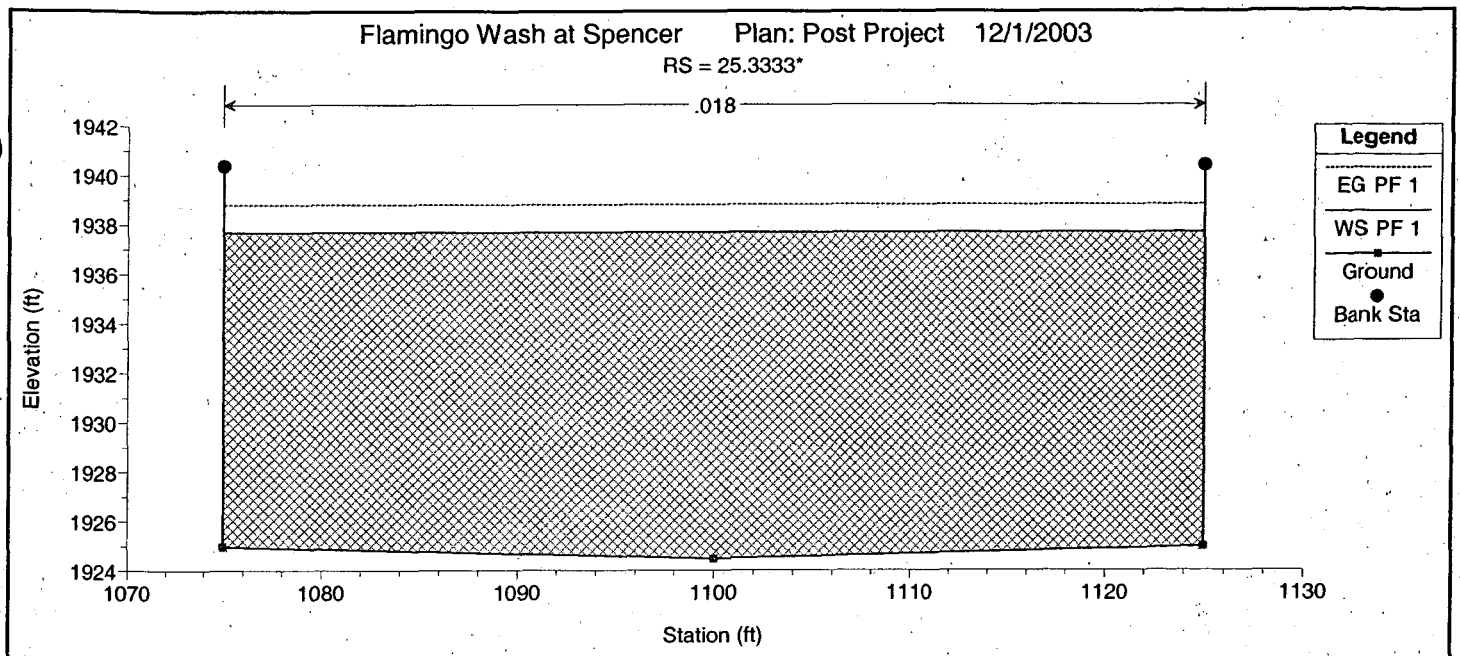

Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 29.6*
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

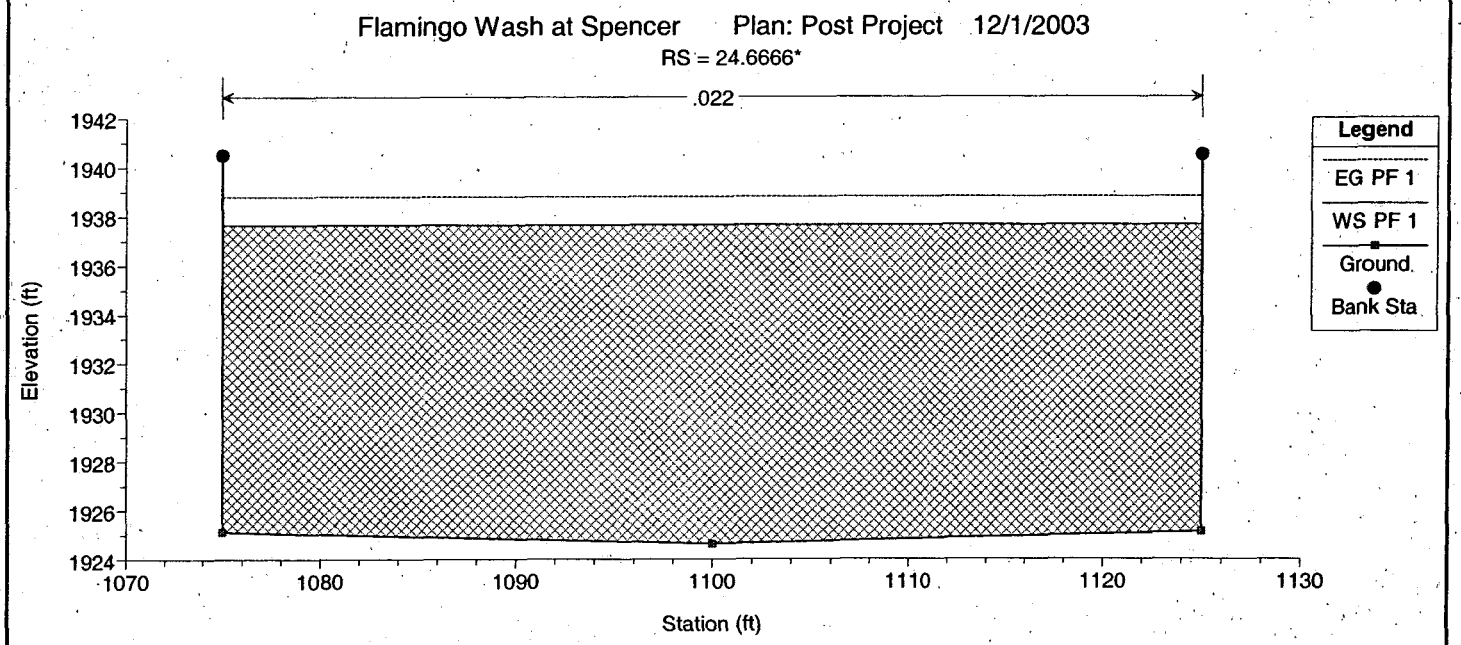

Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 29.2*
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

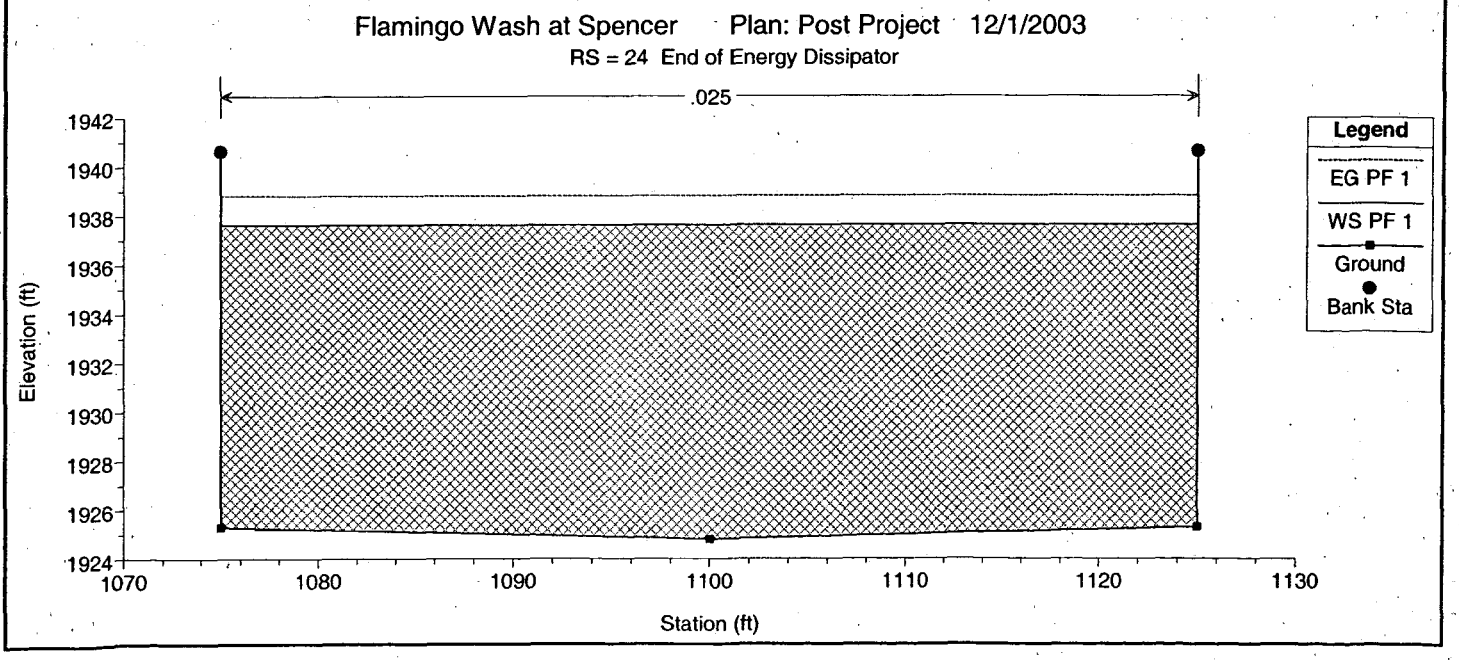

Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 28.8*
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1950
1945
1940
1935
1930
1925
1070
1080
1090
1100
1110
1120
1130
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 28.4*
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1945
1940
1935
1930
1925
1070
1080
1090
1100
1110
1120
1130
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 28
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1945
1940
1935
1930
1925
1920
1070
1080
1090
1100
1110
1120
1130

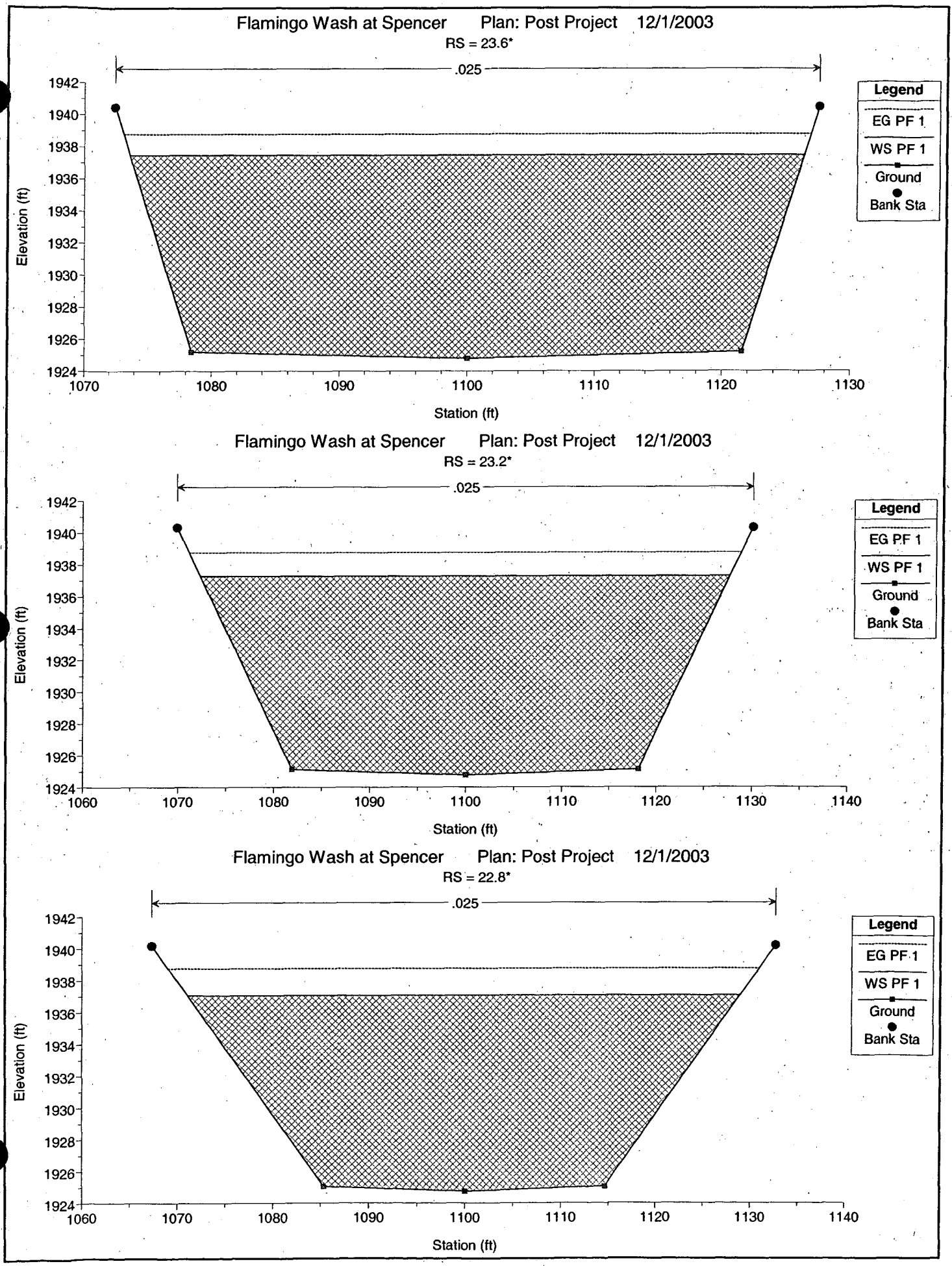

Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 27.6666*
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1945
1940
1935
1930
1925
1920
1070
1080
1090
1100
1110
1120
1130
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 27.3333*
.015
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1942
1940
1938
1936
1934
1932
1930
1928
1926
1924
1070
1080
1090
1100
1110
1120
1130
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 27.*
.015
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1942
1940
1938
1936
1934
1932
1930
1928
1926
1924
1070
1080
1090
1100
1110
1120
1130

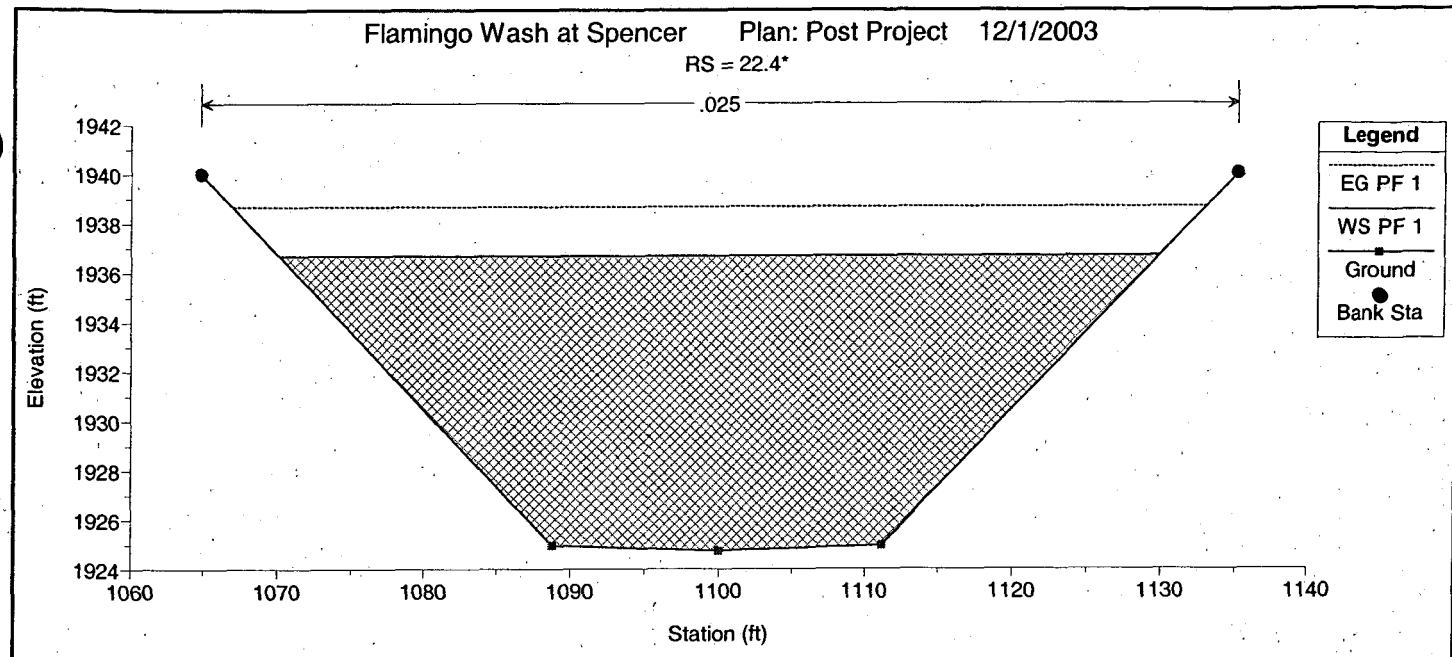

Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 26.6666*
.015
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1942
1940
1938
1936
1934
1932
1930
1928
1926
1924
1070
1080
1090
1100
1110
1120
1130
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 26.3333*
.015
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 26
.015
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

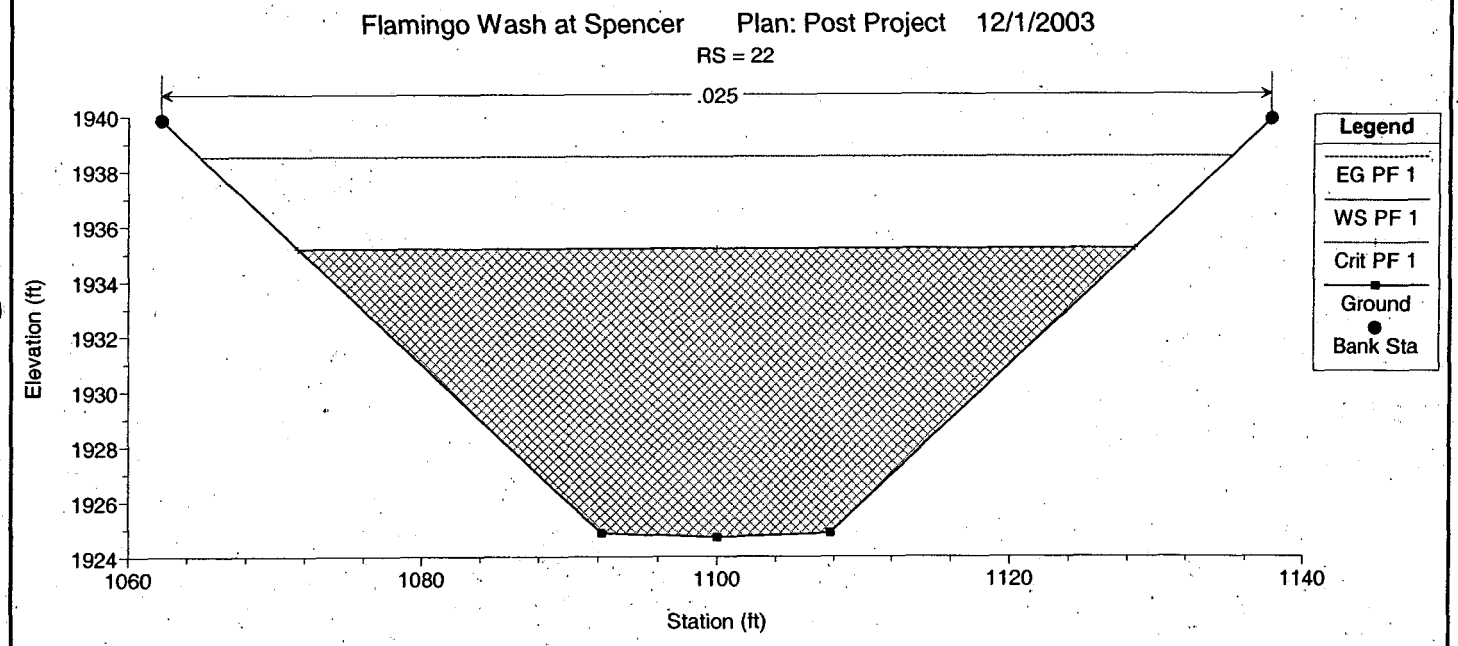

Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 25.3333*
.018
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
1942
1940
1938
1936
1934
1932
1930
1928
1926
1924
1070
1080
1090
1100
1110
1120
1130
Station (ft)

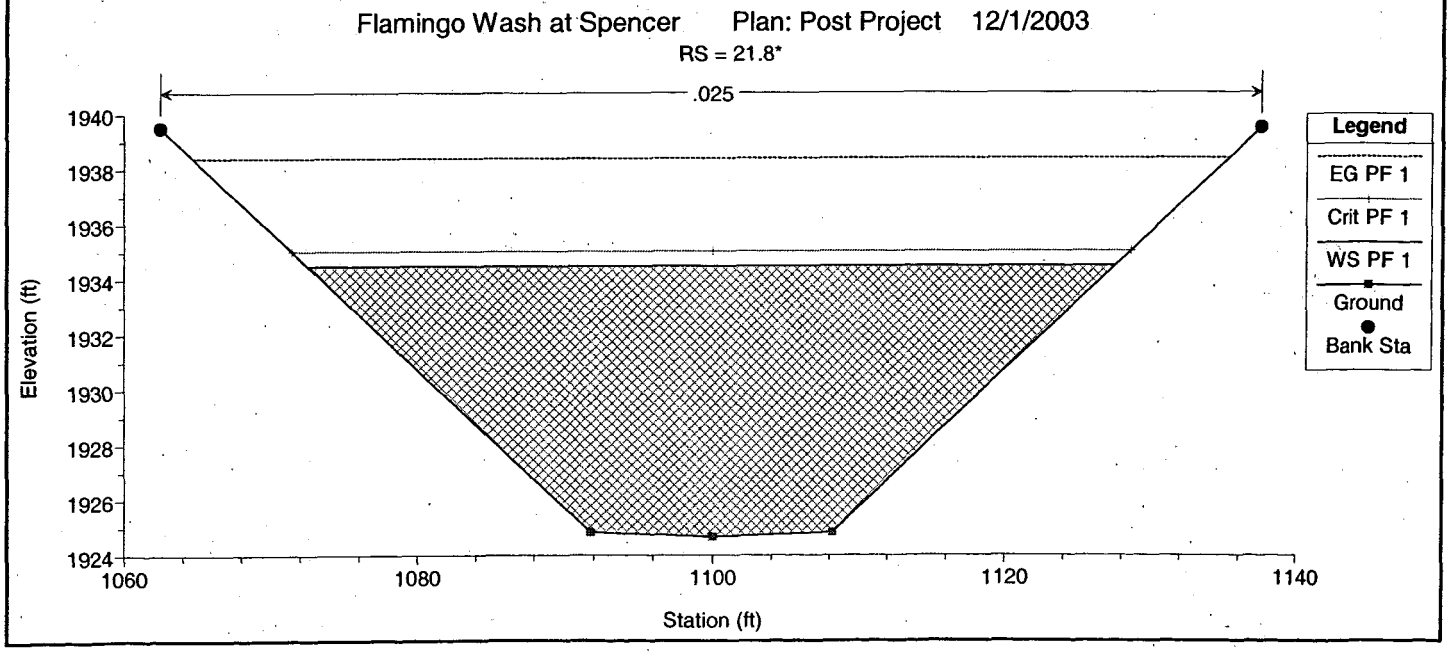

Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 24.6666*
.022
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
1942
1940
1938
1936
1934
1932
1930
1928
1926
1924
1070
1080
1090
1100
1110
1120
1130
Station (ft)


Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 24 End of Energy Dissipator
.025
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
1942
1940
1938
1936
1934
1932
1930
1928
1926
1924
1070
1080
1090
1100
1110
1120
1130
Station (ft)


Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 23.6*
.025
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1942
1940
1938
1936
1934
1932
1930
1928
1926
1924
1070
1080
1090
1100
1110
1120
1130
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 23.2*
.025
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1942
1940
1938
1936
1934
1932
1930
1928
1926
1924
1060
1070
1080
1090
1100
1110
1120
1130
1140
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 22.8*
.025
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1942
1940
1938
1936
1934
1932
1930
1928
1926
1924
1060
1070
1080
1090
1100
1110
1120
1130
1140

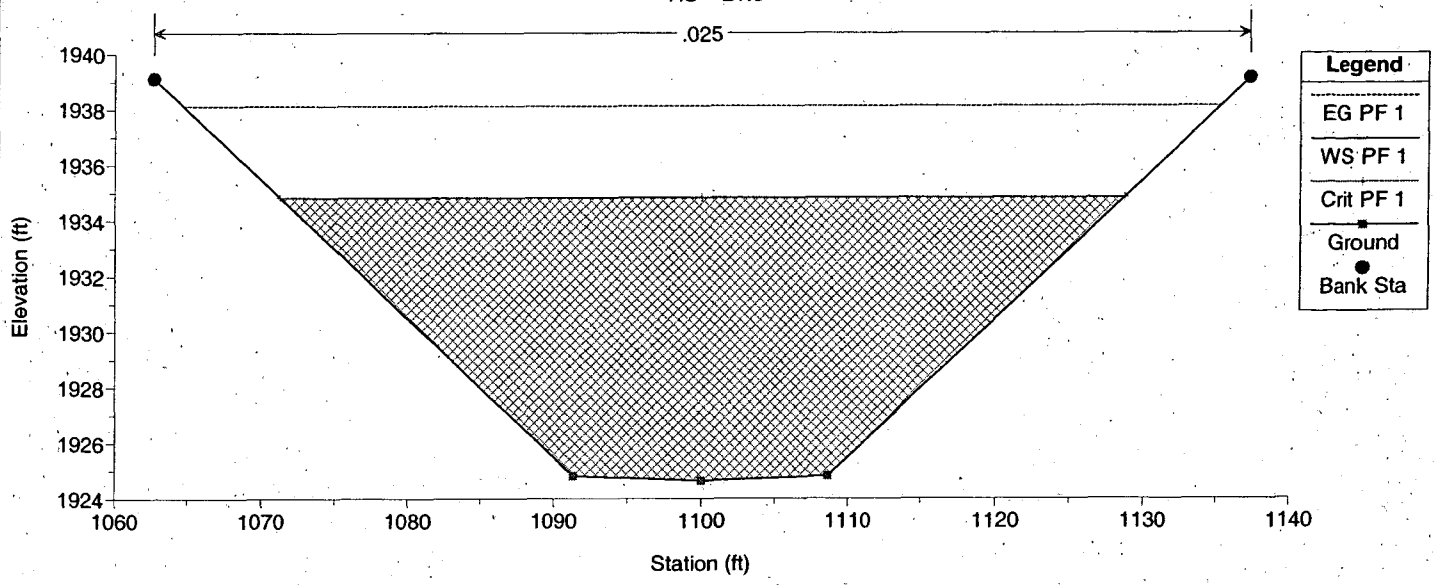

Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 22.4*
.025
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1942
1940
1938
1936
1934
1932
1930
1928
1926
1924
1060
1070
1080
1090
1100
1110
1120
1130
1140


Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 22
.025
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1940
1938
1936
1934
1932
1930
1928
1926
1924
1060
1080
1100
1120
1140


Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 21.8*
.025
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1940
1938
1936
1934
1932
1930
1928
1926
1924
1060
1080
1100
1120
1140

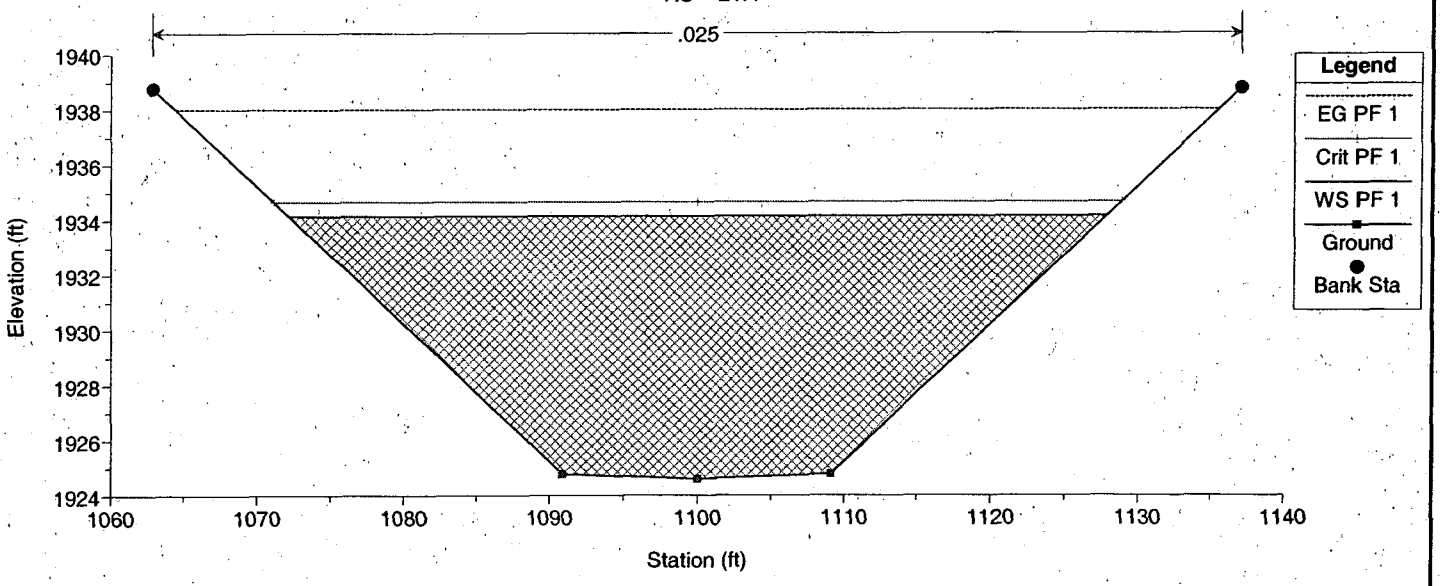
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RS = 21.6*



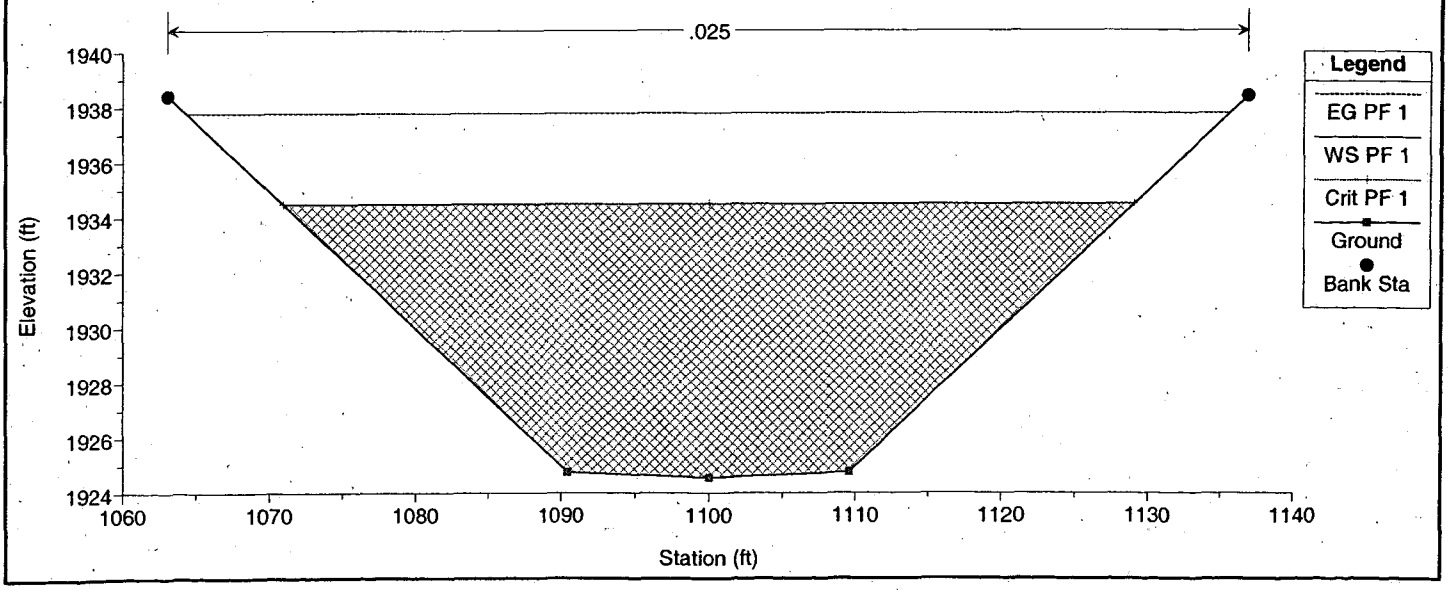
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

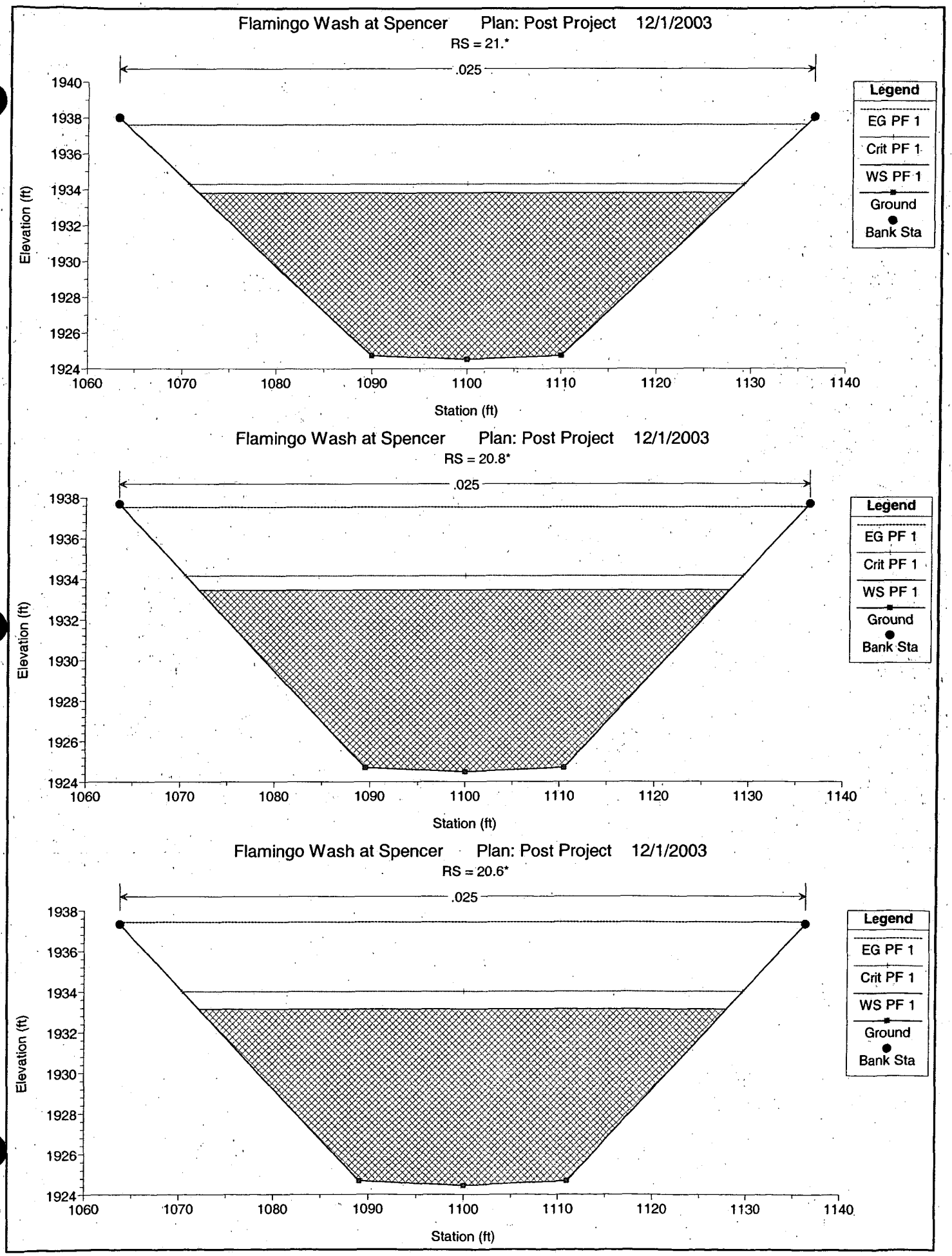
RS = 21.4*

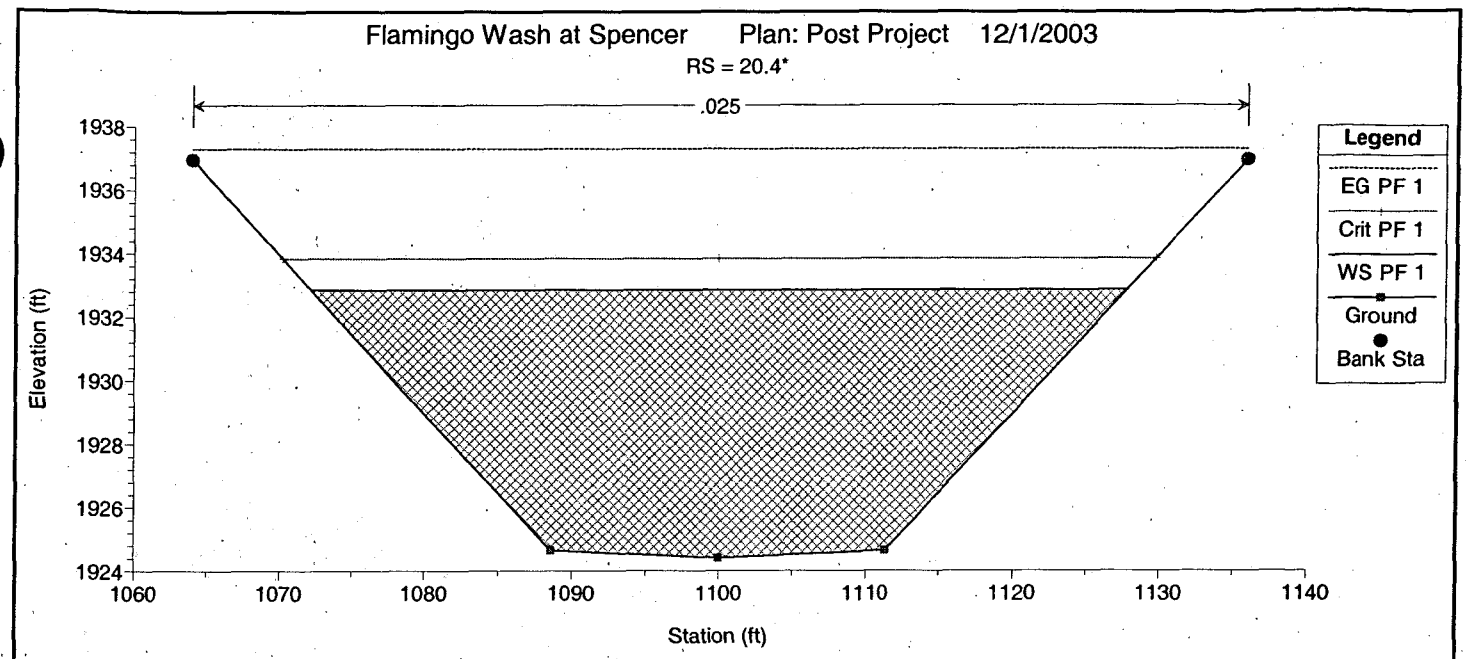


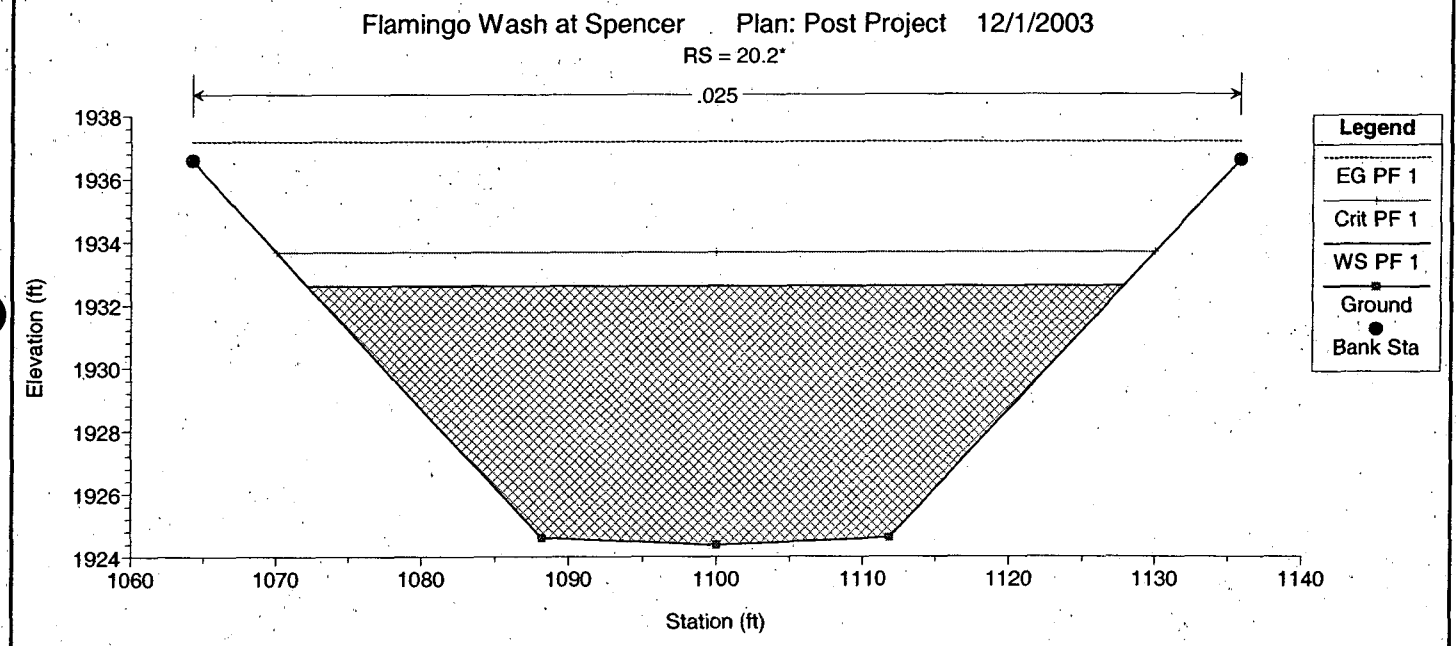
Flamingo Wash at Spencer Plan: Post Project 12/1/2003

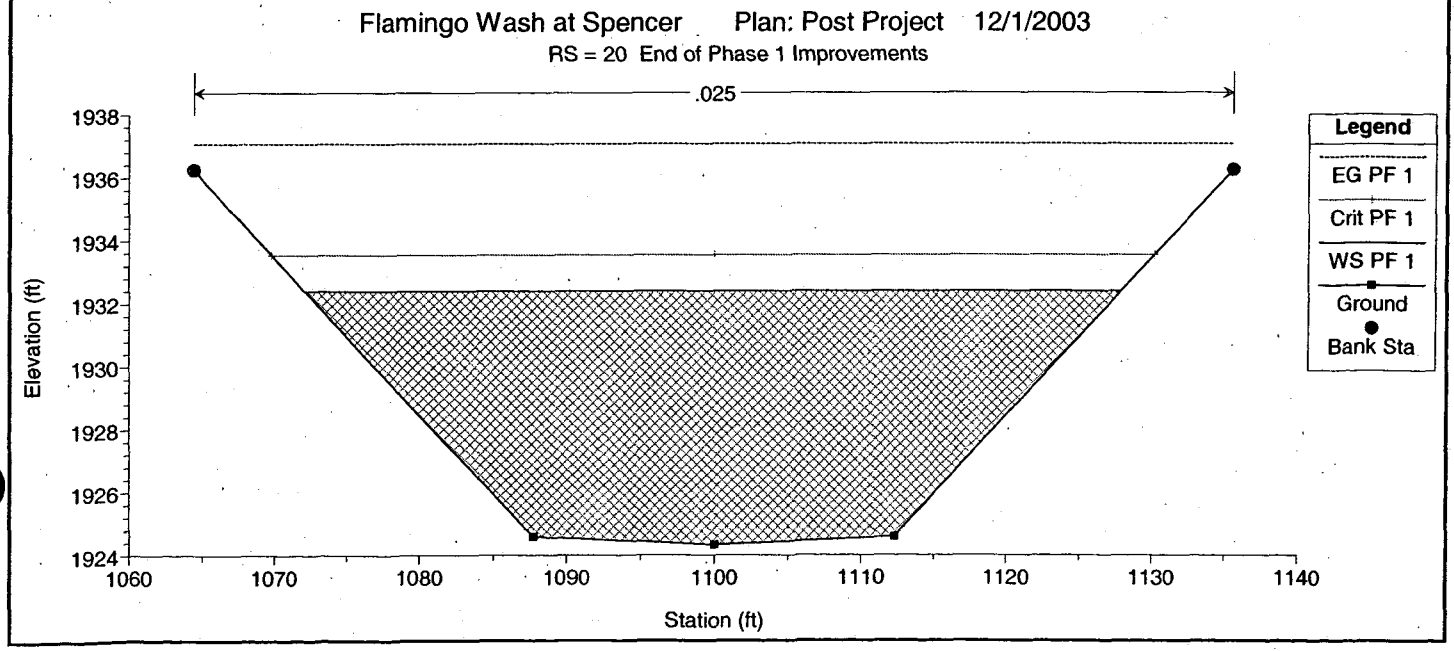
RS = 21.2*

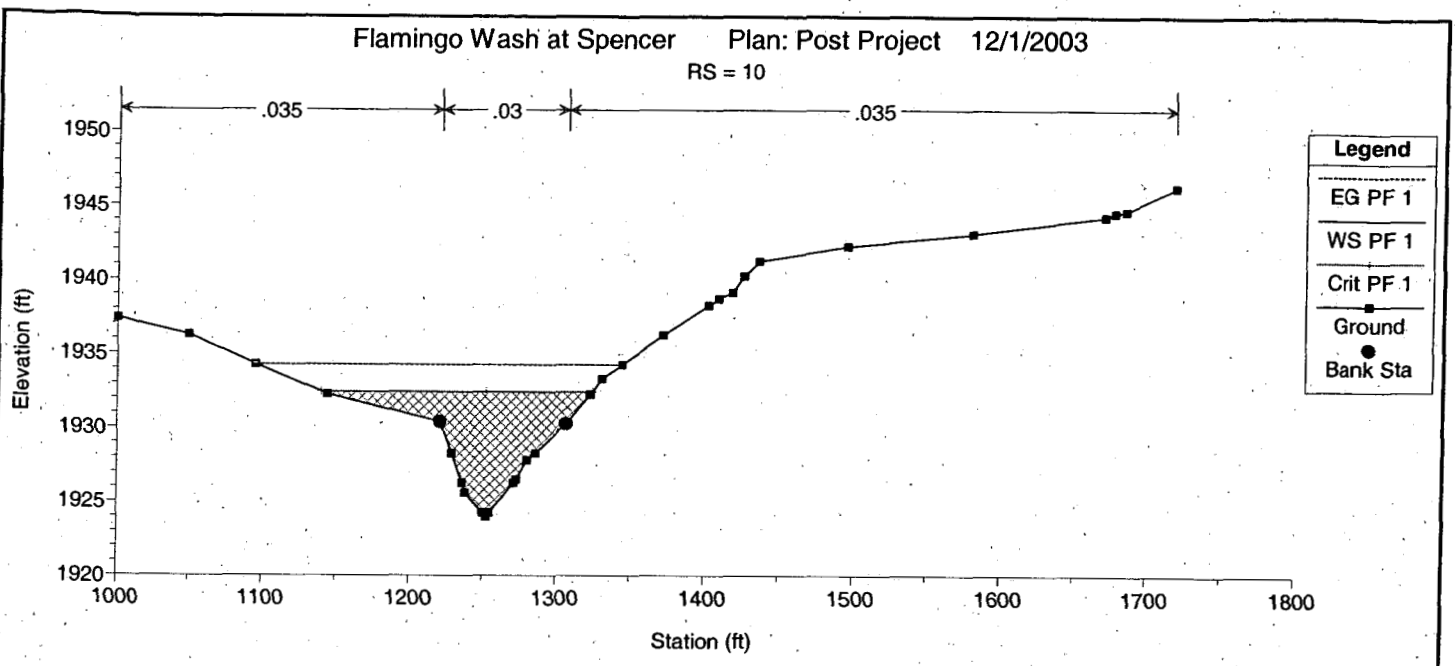



Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 21.*
.025
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1940
1938
1936
1934
1932
1930
1928
1926
1924
1060
1070
1080
1090
1100
1110
1120
1130
1140
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 20.8*
.025
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1938
1936
1934
1932
1930
1928
1926
1924
1060
1070
1080
1090
1100
1110
1120
1130
1140
Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 20.6*
.025
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1938
1936
1934
1932
1930
1928
1926
1924
1060
1070
1080
1090
1100
1110
1120
1130
1140


Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 20.4*
.025
Elevation (ft)
1938
1936
1934
1932
1930
1928
1926
1924
1060
1070
1080
1090
1100
1110
1120
1130
1140
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

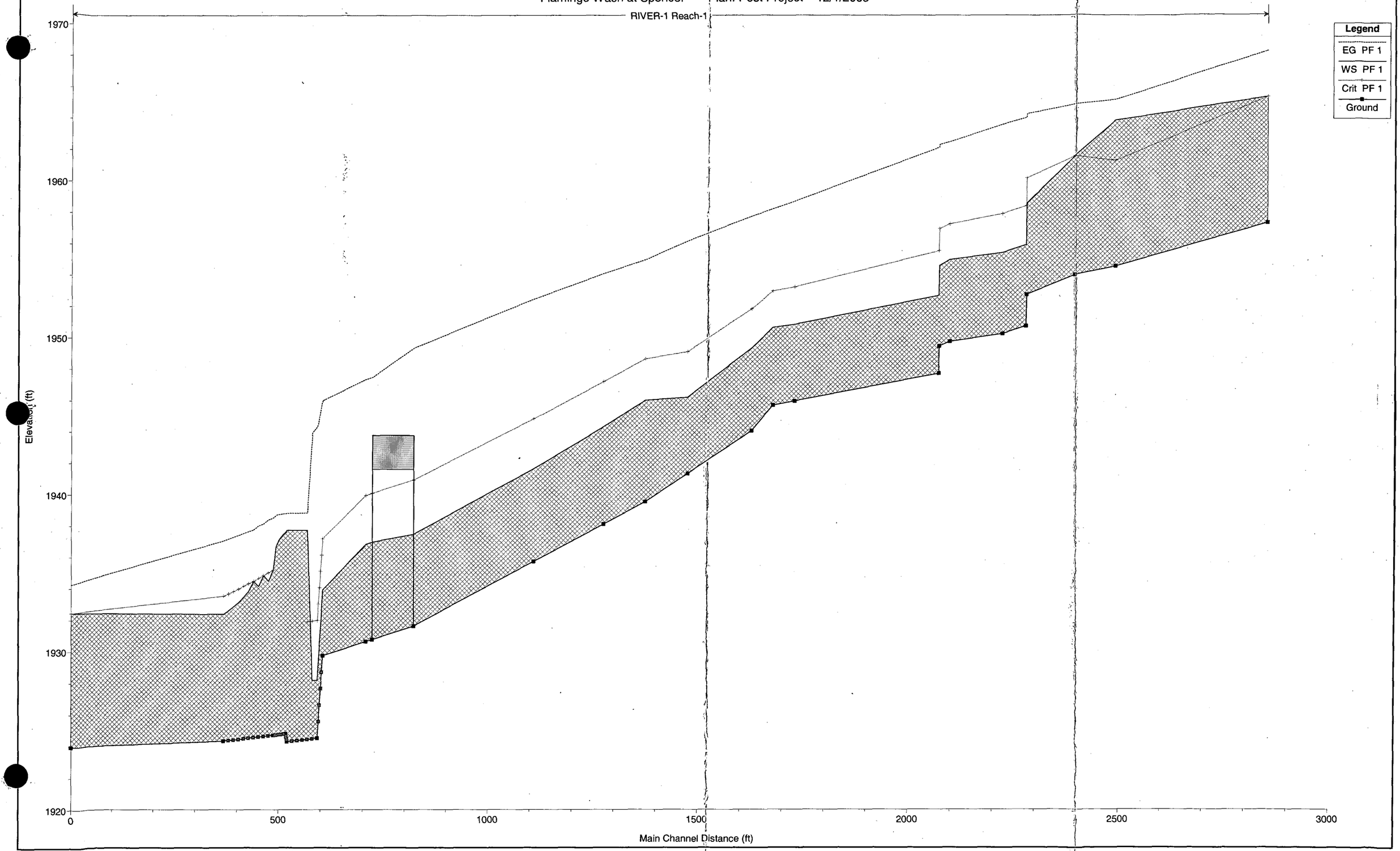

Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 20.2*
.025
Elevation (ft)
1938
1936
1934
1932
1930
1928
1926
1924
1060
1070
1080
1090
1100
1110
1120
1130
1140
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta


Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 20 End of Phase 1 Improvements
.025
Elevation (ft)
1938
1936
1934
1932
1930
1928
1926
1924
1060
1070
1080
1090
1100
1110
1120
1130
1140
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta


Flamingo Wash at Spencer Plan: Post Project 12/1/2003
RS = 10
.035
.03
.035
Elevation (ft)
1950
1945
1940
1935
1930
1925
1920
1000
1100
1200
1300
1400
1500
1600
1700
1800
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

Flamingo Wash at Spencer Plan: Post Project 12/1/2003

RIVER-1 Reach-1



CHECK-RAS Output Files

CHECK-RAS Output Files

CHECK-RAS Program: NT Check
Manning's n Value and Transition Loss Coefficient Review

Project File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.prj
Plan File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.p02
Geometry File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.g02
Flow File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.f01
Report File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.nt
Selected profiles: PF 1
Date: 12/1/2003
Time: 10:58:55 AM

SECNO	STRUCTURE	NLOB	NCHL	NROB	CNTR	EXP
RIVER-1,Reach-1						
180		0.03	0.025	0.03	0.1	0.3
170		0.025	0.015	0.025	0.1	0.3
160		0.025	0.015	0.025	0.1	0.3
150		0.025	0.015	0.025	0.1	0.3
140		0.025	0.015	0.025	0.1	0.3
130		0.025	0.015	0.025	0.1	0.3
120		0.025	0.015	0.025	0.1	0.3
110		0.025	0.015	0.025	0.1	0.3
100		0.025	0.015	0.025	0.1	0.3
90		0.025	0.015	0.025	0.1	0.3
80		0.025	0.015	0.025	0.1	0.3
70		0.025	0.015	0.025	0.1	0.3
60		0.025	0.015	0.025	0.1	0.3
50		0.025	0.015	0.025	0.1	0.3
45	Bridge-Up	0.025	0.015	0.025	0.1	0.3
45	Bridge-Dn	0.025	0.015	0.025	0.1	0.3
40		0.025	0.015	0.025	0.1	0.3
30		0.025	0.015	0.025	0.1	0.3
20		0.035	0.03	0.035	0.1	0.3
10		0.035	0.03	0.035	0.1	0.3

---Summary of Statistics---

	Minimum	Maximum
Left Overbank n Value:	0.025	0.035
Right Overbank n Value:	0.025	0.035
Channel n Value:	0.015	0.03
Contraction Coefficient:	0.1	0.1
Expansion Coefficient:	0.3	0.3

ROUGHNESS COEFFICIENT CHECK

RS: 180
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 180
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 180
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 170
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 170
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 170
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 160
NT RC 01 Left overbank n value is less than 0.035

The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 160
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 160
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 150
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 150
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 150
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 140
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 140
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 140
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 130
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 130
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 130
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 120
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 120
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 120
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 110
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 110
NT RC 01 Right overbank n value is less than 0.035

The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 110
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 100
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 100
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 100
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 90
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 90
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 90
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 80
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 80
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 80
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 70
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 70
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 70
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 60
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 60
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 60
NT RC 03 Channel n value is equal to or less than 0.025

The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 50
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 50
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 50
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 45
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 45
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 45
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 45
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 45
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 45
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 40
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 40
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 40
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 30
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 30
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 30
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

TRANSITION LOSS COEFFICIENT CHECK

RS: 60
NT TL 01 This is section 4
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

RS: 50
NT TL 01 This is section 3
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

RS: 45
NT TL 01 This is section Bridge-Up
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

RS: 45
NT TL 01 This is section Bridge-Dn
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

RS: 40
NT TL 01 This is section 2
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

ROUGHNESS COEFFICIENT AT STRUCTURES

RS: 45
NT RS 02 The channel n value of 0.015 for the upstream internal bridge opening
section is equal or larger than the channel n value of 0.015 at Section 3.
Usually, the channel n value of the bridge opening section is
less than the channel n value of Section 3.
The selection of the n value(s) should be reevaluated.

RS: 45
NT RS 02 The channel n value of 0.015 for the downstream internal bridge opening
section is equal or larger than the channel n value of 0.015 at Section 2
Usually, the channel n value of the bridge opening section is
less than the channel n value of Section 2.
The selection of the n value(s) should be reevaluated.

---END---

CHECK-RAS Program, XS Check
Cross Section Location and Alignment Review

Project File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.prj
Plan File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.p02
Geometry File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.g02
Flow File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.f01
Report File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.xs
Selected profiles: PF 1
Date: 12/1/2003
Time: 10:58:55 AM

SECNO	Len Lob	Len Chl	Len Rob	TopWdthAct	Q Total	Flow Code
RIVER-1,Reach-1						
180	358.08	363.91	374.39	65.8	5300	C
170	98.31	97.13	96.38	75.5	5300	
160	119.51	114.85	110.97	55.47	5300	C
150	1	1	1	55.54	5300	C
140	57.23	55.76	56.76	52.56	5300	C
130	125.29	125.31	125.61	51.27	5300	C
120	25.32	24.78	22.42	53.14	5300	C
110	1	1	1	53.83	5300	C
100	346.14	342.73	339.84	50.86	5300	C
90	53.02	51.93	56.59	58.1	5300	C
80	1	1	1	79.38	5300	C
70	427.31	417.23	406.33	81	5300	C
60	375.8	387.41	397.17	85.52	5300	
50	112.85	115.08	117.18	50.38	5500	E,B
45	Single BR-Up					
45	Single BR-Dn					
40	10	10	10	50.38	5500	C,B
30	407.19	417.8	429.8	78.37	5500	C
20	314.44	297.76	275.67	215.35	5500	C
10	0	0	0	185.1	5500	C

B=blocked obstruction XS SC 05
C=critial depth XS SC 03
D=divided flow XS SC 01
E=cross section extended XS SC 02
K=known water-surface XS SC 04

DISTANCE CHECK

RS: 140
XS DT 01 Both right and left overbank distances are longer than the channel distance.

RS: 90
XS DT 01 Both right and left overbank distances are longer than the channel distance.

SPACING CHECK

INEFFECTIVE FLOW CHECK

DISCHARGE CHECK

LOCATION CHECK

RS: 170
XS LC 01 Lenchl Up/TopwdthAct Dn = 1.75
MaxChlDpth Up/MaxChlDpth Dn = 1.23
TopwdthAct Up/TopwdthAct Dn = 1.36
This cross section is located too far upstream from the critical depth cross section.

BOUNDARY CONDITION CHECK

XS BC 02 The name of the stream is RIVER-1,Reach-1

Normal S = .01 is specified as the downstream boundary
for profile PF 1

XS BC 02 The name of the stream is RIVER-1,Reach-1
Normal S = .01 is specified as the upstream boundary
for profile PF 1

-END---

CHECK-RAS Program: Structure Check

Project File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.prj
Plan File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.p02
Geometry File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.g02
Flow File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.f01
[redacted]port File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.br
[redacted]lected profiles: PF 1
Date: 12/1/2003
Time: 10:58:56 AM

RS	MaxLoChord	MnTpRd	EGEL	WSEL	MinChEl	Structure
RIVER-1,Reach-1						
180			1968.3	1965.36	1957.33	
170			1965.2	1963.88	1954.56	
160			1964.9	1961.61	1954.02	
150			1963.52	1960.21	1952.76	
140			1961.85	1958.42	1950.76	
130			1961.4	1957.93	1950.26	
120			1960.68	1957.28	1949.76	
110			1960.32	1956.96	1949.46	
100			1958.27	1954.78	1946.96	
90			1955.84	1952.66	1945.36	
80			1953.25	1950.65	1944.86	
70			1953.2	1950.64	1943.83	
60			1949.16	1946.82	1939.02	
50			1948.55	1946.59	1936.86	
40			1946.63	1943.04	1935.86	
30			1940.73	1938.05	1931.09	
20			1937.48	1935.67	1926.66	
10			1934.24	1932.48	1923.96	

RIVER/REACH: RIVER-1, Reach-1
RIVER STATION: 45
TYPE OF STRUCTURE: Bridge

[redacted]scription: Bridge #1
Distance from Upstream XS: 0.1
Deck/Roadway Width: 114.88
Weir Coefficient: 2.6
Maximum allowable submergence for weir flow: 0.95
Elevation at which weir flow begins: 1945.39
Weir crest shape: Broad Crested

Sec	River Station	Length Channel	WSEL	Surch.	EGEL	TopWidth Actual	
4	60	387.41	1946.82		1949.16	85.52	
3	50	115.08	1946.59		1948.55	50.38	
	45	114.88	0		0	Null	Single BR-Up
	45	0.10	0		0	Null	Single BR-Dn
2	40	10.00	1943.04		1946.63	50.38	
1	30	417.80	1938.05		1940.73	78.37	

Ineffective Flow, Section 3			Ineffective Flow, Section 2		
Sta L	Sta R	Elev	Sta L	Sta R	Elev

BRIDGE:
Bridge Name: Single BR
LowFlowMethod: Yarnell
Momentum Cd: 0
HighFlowMethod: Pressure and Weir flow
[redacted]luiceGate Cd: 0 Submerged Cd: 0.8006408

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

```
MaxLowChord:   1941.86  MinTopRd:  0              MinElPrs:       1941.86

Opening Type      StagStaL    StagStaR  EncStaL   EncStaR   LIfStaS  RIfStaS
-------------------------------------------------------------------------
idge                                                          0        0      U
                                                              0        0      D

                  LAbutSt     RAbutSt   LMnTpRd   RMnTpRd   MnTpRd    MxLoCd
-------------------------------------------------------------------------
Single BR         1184.49     1234.87   1945.39   1945.39   1945.39   1941.86 U
                  1133.81     1184.19   1945.39   1945.39   1945.39   1941.86 D

Name          Q Total.  Q Struc   Q Weir    Selected Method     Flow Type
-------------------------------------------------------------------------
Single BR     5500      3622.39   1877.62   Press/Weir          UNKNOWN
-------------------------------------------------------------------------

GEOMETRIC CHECK
------------------

TYPE OF FLOW CHECK
-------------------

RS:       45 This is Single BR
BR TF 01  Type of flow is UNKNOWN.
          CHECKRAS can not find MxLoCd or MnTpRd elevation
          or the given conditions do not satisfy the type of flow
          specified in the CHECK-RAS program.
          Please review the ground and road data, and encroachment stations.
          or please review the messages, BR LF 01, BR PF 01, BR PF 02, BR LW 01
          BR PW 01 for bridges to determine the type of flow.

---END
```

CHECK-RAS Program: NT Check
Manning's n Value and Transition Loss Coefficient Review

Project File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.prj
Plan File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.p03
Geometry File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.g03
[redacted]ow File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.f02
[redacted]port File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.nt
Selected profiles: PF 1
Date: 12/1/2003
Time: 11:02:20 AM

SECNO	STRUCTURE	NLOB	NCHL	NROB	CNTR	EXP
RIVER-1,Reach-1						
180		0.03	0.025	0.03	0.1	0.3
170		0.025	0.015	0.025	0.1	0.3
160		0.025	0.015	0.025	0.1	0.3
150		0.025	0.015	0.025	0.1	0.3
140		0.025	0.015	0.025	0.1	0.3
130		0.025	0.015	0.025	0.1	0.3
120		0.025	0.015	0.025	0.1	0.3
110		0.025	0.015	0.025	0.1	0.3
100		0.025	0.015	0.025	0.1	0.3
90		0.025	0.015	0.025	0.1	0.3
81		0.025	0.015	0.025	0.1	0.3
75		-----	0.025	0.025	0.1	0.3
		-----	0.015	-----		
70		-----	0.025	0.025	0.1	0.3
		-----	0.015	-----		
65		-----	0.015	0.025	0.1	0.3
		-----	0.025	-----		
60		-----	0.025	0.025	0.1	0.3
		-----	0.015	-----		
55		-----	0.025	0.025	0.1	0.3
		-----	0.015	-----		
50		0.025	0.015	0.025	0.1	0.3
45	Bridge-Up	0.025	0.015	0.025	0.1	0.3
45	Bridge-Dn	0.025	0.015	0.025	0.1	0.3
[redacted]		0.025	0.015	0.025	0.1	0.3
[redacted]		-----	0.025	0.025	0.1	0.3
		-----	0.015	-----		
30		-----	0.025	0.025	0.1	0.3
		-----	0.015	-----		
29.6		-----	0.04	0.025	0.1	0.3
		-----	0.025	-----		
29.2		-----	0.04	0.025	0.1	0.3
		-----	0.025	-----		
28.8		-----	0.025	0.025	0.1	0.3
		-----	0.04	-----		
28.4		-----	0.025	0.025	0.1	0.3
		-----	0.04	-----		
28		-----	0.015	0.025	0.1	0.3
		-----	0.025	-----		
27.6666		-----	0.025	0.025	0.1	0.3
		-----	0.015	-----		
27.3333		-----	0.025	0.025	0.1	0.3
		-----	0.015	-----		
27		-----	0.025	0.025	0.1	0.3
		-----	0.015	-----		
26.6666		-----	0.025	0.025	0.1	0.3
		-----	0.015	-----		
26.3333		-----	0.025	0.025	0.1	0.3
		-----	0.015	-----		
26		-----	0.025	0.025	0.1	0.3
		-----	0.015	-----		
25.3333		-----	0.025	0.025	0.1	0.3
		-----	0.018	-----		
24.6666		-----	0.025	0.025	0.1	0.3
		-----	0.022	-----		
24		-----	0.025	0.025	0.1	0.3
		-----	0.025	-----		
23.6		-----	0.025	0.025	0.1	0.3
		-----	0.025	-----		
[redacted].2		-----	0.025	0.025	0.1	0.3
		-----	0.025	-----		
22.8		-----	0.025	0.025	0.1	0.3
		-----	0.025	-----		
22.4		-----	0.025	0.025	0.1	0.3
		-----	0.025	-----		
22		-----	0.025	0.025	0.1	0.3
		-----	0.025	-----		
21.8		-----	0.025	0.025	0.1	0.3
		-----	0.025	-----		

21.6	-----	0.025	0.025	0.1	0.3
	-----	0.025	-----		
21.4	-----	0.025	0.025	0.1	0.3
	-----	0.025	-----		
21.2	-----	0.025	0.025	0.1	0.3
	-----	0.025	-----		
	-----	0.025	0.025	0.1	0.3
	-----	0.025	-----		
20.8	-----	0.025	0.025	0.1	0.3
	-----	0.025	-----		
20.6	-----	0.025	0.025	0.1	0.3
	-----	0.025	-----		
20.4	-----	0.025	0.025	0.1	0.3
	-----	0.025	-----		
20.2	-----	0.025	0.025	0.1	0.3
	-----	0.025	-----		
20	-----	0.025	0.025	0.1	0.3
	-----	0.025	-----		
10	0.035	0.03	0.035	0.1	0.3

---Summary of Statistics---

	Minimum	Maximum
Left Overbank n Value:	0.025	0.035
Right Overbank n Value:	0.025	0.035
Channel n Value:	0.015	0.04
Contraction Coefficient:	0.1	0.1
Expansion Coefficient:	0.3	0.3

ROUGHNESS COEFFICIENT CHECK

RS: 180
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 180
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 180
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 170
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 170
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 170
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 160
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 160
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 160
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 150
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.

The n value should be reevaluated.

RS: 150
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 150
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 140
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 140
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 140
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 130
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 130
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 130
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 120
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 120
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 120
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 110
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 110
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 110
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 100
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 100
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.

The n value should be reevaluated.

RS: 100
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 90
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 90
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 90
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 81
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 81
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 81
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 75
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 75
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 70
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 70
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 65
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 65
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 60
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 60
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 55

NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 55
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 50
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 50
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 50
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 45
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 45
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 45
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 45
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 45
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 45
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 40
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 40
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 40
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 35
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 35
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 30
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 30
RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 29.6
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 29.2
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 28.8
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 28.4
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 28
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 28
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 27.6666
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 27.6666
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 27.3333
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 27.3333
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 27
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 27
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

: 26.6666
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 26.6666
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 26.3333
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 26.3333
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 26
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 26
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 25.3333
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 25.3333
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 24.6666
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 24.6666
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 24
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 24
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 23.6
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 23.6
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 23.2
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 23.2
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a
concrete lined channel.

RS: 22.8
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 22.8
NT RC 03 Channel n value is equal to or less than 0.025

The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 22.4
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 22.4
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 22
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 22
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 21.8
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 21.8
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 21.6
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 21.6
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 21.4
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 21.4
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 21.2
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 21.2
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 21
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 21
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 20.8
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 20.8
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 20.6
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 20.6
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 20.4
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 20.4
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 20.2
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 20.2
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

RS: 20
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 20
NT RC 03 Channel n value is equal to or less than 0.025
The n value of the channel is usually larger than 0.025.
The n value should be reevaluated it if is not representing a concrete lined channel.

TRANSITION LOSS COEFFICIENT CHECK

RS: 55
NT TL 01 This is section 4
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

RS: 50
NT TL 01 This is section 3
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

RS: 45
NT TL 01 This is section Bridge-Up
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

RS: 45
NT TL 01 This is section Bridge-Dn
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

RS: 40
NT TL 01 This is section 2
Contraction and expansion loss coefficients are 0.1 and 0.3
They should be equal to 0.3 and 0.5 respectively.

ROUGHNESS COEFFICIENT AT STRUCTURES

RS: 45
NT RS 02 The channel n value of 0.015 for the upstream internal bridge opening section is equal or larger than the channel n value of 0.015 at Section 3.

Usually, the channel n value of the bridge opening section is
less than the channel n value of Section 3.
The selection of the n value(s) should be reevaluated.

RS: 45
NT RS 02 The channel n value of 0.015 for the downstream internal bridge opening
section is equal or larger than the channel n value of 0.015 at Section 2
Usually, the channel n value of the bridge opening section is
less than the channel n value of Section 2.
The selection of the n value(s) should be reevaluated.

---END---

CHECK-RAS Program, XS Check
Cross Section Location and Alignment Review

Project File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.prj
Plan File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.p03
Geometry File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.g03
Flow File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.f02
Report File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.xs
Selected profiles: PF 1
Date: 12/1/2003
Time: 11:02:21 AM

SECNO	Len Lob	Len Chl	Len Rob	TopWdthAct	Q Total	Flow Code
RIVER-1,Reach-1						
180	358.08	363.91	374.39	65.8	5300	C
170	98.31	97.13	96.38	75.51	5300	
160	119.51	114.85	110.97	55.47	5300	C
150	1	1	1	52.74	5300	
140	57.23	55.76	56.76	48.52	5300	
130	125.29	125.31	125.61	48.12	5300	
120	25.32	24.78	22.42	49.85	5300	
110	1	1	1	50.33	5300	
100	346.14	342.73	339.84	46.72	5300	
90	53.02	51.93	56.59	53.35	5300	
81	50	50	50	53.45	5300	
75	151.76	151.76	151.76	45	5300	
70	100	100	100	45	5300	
65	100	100	100	35	5300	
60	166.19	166.19	166.19	35	5300	
55	290.11	288.11	286.11	35	5300	
50	101	99	97	35	5500	B
45	Single BR-Up					
45	Single BR-Dn					
40	15	15	15	35	5500	B
35	102	102	102	35	5500	
30	2.49	2.49	2.49	50	5500	
29.6	2.49	2.49	2.49	50	5500	
29.2	2.49	2.49	2.49	50	5500	
28.8	2.49	2.49	2.49	50	5500	
28.4	2.49	2.49	2.49	50	5500	
28	12	12	12	50	5500	
27.6666	12	12	12	50	5500	
27.3333	12	12	12	50	5500	
27	12	12	12	50	5500	
26.6666	12	12	12	50	5500	
26.3333	12	12	12	50	5500	
26	1	1	1	50	5500	
25.3333	1	1	1	50	5500	
24.6666	1	1	1	50	5500	
24	6	6	6	50	5500	
23.6	6	6	6	52.75	5500	
23.2	6	6	6	55.42	5500	
22.8	6	6	6	57.89	5500	
22.4	6	6	6	59.85	5500	
22	12	12	12	56.89	5500	C
21.8	12	12	12	55.07	5500	
21.6	12	12	12	57.49	5500	C
21.4	12	12	12	55.73	5500	
21.2	12	12	12	58.07	5500	C
21	12	12	12	56.51	5500	
20.8	12	12	12	56	5500	
20.6	12	12	12	55.74	5500	
20.4	12	12	12	55.66	5500	
20.2	12	12	12	55.69	5500	
20	382.58	367.78	346.32	55.83	5500	
10	0	0	0	183.61	5500	C

B=blocked obstruction XS SC 05
C=critial depth XS SC 03
D=divided flow XS SC 01
E=cross section extended XS SC 02
K=known water-surface XS SC 04

DISTANCE CHECK

RS: 140
XS DT 01 Both right and left overbank distances are
longer than the channel distance.

RS: 90
XS DT 01 Both right and left overbank distances are
longer than the channel distance.

SPACING CHECK

INEFFECTIVE FLOW CHECK

DISCHARGE CHECK

LOCATION CHECK

RS: 170
XS LC 01 Lenchl Up/TopwdthAct Dn = 1.75
MaxChlDpth Up/MaxChlDpth Dn = 1.23
TopwdthAct Up/TopwdthAct Dn = 1.36
This cross section is located too far upstream from the
critical depth cross section.

BOUNDARY CONDITION CHECK

XS BC 02 The name of the stream is RIVER-1,Reach-1
Normal S = .01 is specified as the downstream boundary
for profile PF 1

XS BC 02 The name of the stream is RIVER-1,Reach-1
Critical is specified as the upstream boundary
for profile PF 1

XS FR 02 The profile is computed as mixed flow regime.

---END---

CHECK-RAS Program: Structure Check

Project File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.prj
Plan File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.p03
Geometry File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.g03
Flow File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.f02
[redacted]port File: C:\Documents and Settings\jdouglas\Desktop\HEC-Ras\879_D_Spnc.br
[redacted]lected profiles: PF 1
Date: 12/1/2003
Time: 11:02:22 AM

RS	MaxLoChord	MnTpRd	EGEL	WSEL	MinChEl	Structure
RIVER-1,Reach-1						
180			1968.3	1965.36	1957.33	
170			1965.2	1963.89	1954.56	
160			1964.9	1961.61	1954.02	
150			1964.32	1958.6	1952.76	
140			1964.07	1955.95	1950.76	
130			1963.64	1955.44	1950.26	
120			1962.54	1954.99	1949.76	
110			1962.34	1954.6	1949.46	
100			1962.16	1952.7	1947.73	
90			1958.74	1950.86	1945.98	
81			1958.25	1950.67	1945.72	
75			1957.78	1949.35	1944.07	
70			1956.2	1946.22	1941.35	
65			1955	1946.04	1939.56	
60			1954.12	1944.34	1938.13	
55			1952.48	1941.66	1935.75	
50			1949.35	1937.49	1931.63	
40			1947.5	1936.99	1930.77	
35			1947.37	1936.86	1930.64	
30			1946.02	1933.95	1929.75	
29.6			1945.84	1932.74	1928.7	
29.2			1945.44	1931.59	1927.66	
28.8			1945.02	1930.45	1926.61	
28.4			1944.57	1929.33	1925.57	
28			1944.35	1928.18	1924.52	
[redacted]7.6666			1943.94	1928.18	1924.48	
[redacted].3333			1938.86	1937.76	1924.45	
27			1938.85	1937.76	1924.41	
26.6666			1938.85	1937.76	1924.37	
26.3333			1938.84	1937.75	1924.34	
26			1938.83	1937.75	1924.3	
25.3333			1938.83	1937.72	1924.47	
24.6666			1938.82	1937.68	1924.63	
24			1938.82	1937.63	1924.8	
23.6			1938.8	1937.48	1924.78	
23.2			1938.77	1937.3	1924.76	
22.8			1938.74	1937.06	1924.75	
22.4			1938.7	1936.71	1924.73	
22			1938.54	1935.21	1924.71	
21.8			1938.41	1934.5	1924.67	
21.6			1938.16	1934.85	1924.64	
21.4			1938.03	1934.16	1924.6	
21.2			1937.78	1934.48	1924.56	
21			1937.66	1933.84	1924.52	
20.8			1937.54	1933.46	1924.49	
20.6			1937.42	1933.14	1924.45	
20.4			1937.31	1932.86	1924.41	
20.2			1937.19	1932.62	1924.38	
20			1937.07	1932.39	1924.34	
10			1934.25	1932.43	1923.96	

RIVER/REACH: RIVER-1, Reach-1
RIVER STATION: 45
TYPE OF STRUCTURE: Bridge

Description:	Bridge #1
[redacted]stance from Upstream XS:	0.1
[redacted]k/Roadway Width:	98.8
Weir Coefficient:	2.6
Maximum allowable submergence for weir flow:	0.95
Elevation at which weir flow begins:	1943.13
Weir crest shape:	Broad Crested

Sec	River Station	Length Channel	WSEL	Surch.	EGEL	TopWidth Actual

4	55	288.11	1941.66	1952.48	35	
3	50	99.00	1937.49	1949.35	35	
	45	98.80	0	0	Null	Single BR-Up
	45	0.10	0	0	Null	Single BR-Dn
2	40	15.00	1936.99	1947.5	35	
	35	102.00	1936.86	1947.37	35	

Ineffective Flow, Section 3			Ineffective Flow, Section 2		
Sta L	Sta R	Elev	Sta L	Sta R	Elev

BRIDGE:
Bridge Name: Single BR
LowFlowMethod: Momentum
Momentum Cd: 1.2
HighFlowMethod: Pressure and Weir flow
SluiceGate Cd: 0 Submerged Cd: 0.8006408

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

MaxLowChord: 1941.63 MinTopRd: 0 MinElPrs: 1941.63

Opening Type	StagStaL	StagStaR	EncStaL	EncStaR	LIfStaS	RIfStaS	
Bridge					0	0	U
					0	0	D

	LAbutSt	RAbutSt	LMnTpRd	RMnTpRd	MnTpRd	MxLoCd	
Single BR	1151.97	1217.50	1943.80	1943.80	1943.80	1941.63	U
	1000.00	1246.74	1943.80	1943.80	1943.80	1941.63	D

Name	Q Total	Q Struc	Q Weir	Selected Method	Flow Type
Single BR	5500	5500	0	Momentum	UNKNOWN

GEOMETRIC CHECK

RS: 45
ST GD 04 There is only one bridge. This is upstream bridge section.
However, the low chord line crosses the ground line at more than
two locations.
The ground and deck/roadway data should be checked.

RS: 45
ST GD 03 The end station of 1350.42 from downstream road/weir data
is greater than the end station of 1256.84 from downstream internal
section.
The high chord elevation of 1943.8 for the end road/weir station is
greater than the ground elevation of 1943.35 for the end ground station.
The EGEL at section 3 of 1949.35 is greater than the ground elevation.
The road/weir data should be included in the ground data

RS: 45
ST GD 04 There is only one bridge. This is downstream bridge section.
However, the low chord line crosses the ground line at more than
two locations.
The ground and deck/roadway data should be checked.

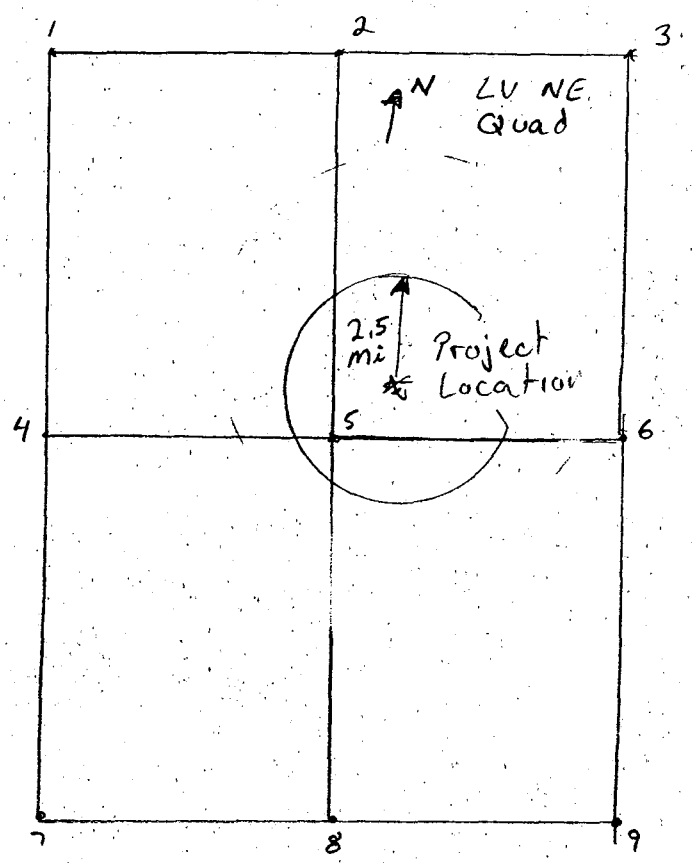
---END

NGVD29 to NAVD88 Datum Conversion

The Louis Berger Group, Inc.

BY GSD DATE 7-1-03
CHKD. BY ___ DATE ___
SUBJECT Flamingo Wash Datum Conversion

SHEET NO. 1 OF 1
PROJECT 879



Quad Name	Corner (#)	Latitude	Longitude	NGVD → NAVD Conversion
Las Vegas NE	SW (5)	36° 07' 30"	115° 07' 30"	+ 2.14 feet
	NW (2)	36° 15' 00"	115° 07' 30"	+ 2.23 feet
	NE (3)	36° 15' 0"	115° 0" 0"	+ 2.36 feet
	SE (6)	36° 07' 30"	115° 0' 0"	+ 2.30 feet

Average Conversion Factor = (2.14 + 2.23 + 2.36 + 2.30) / 4 = +2.26

Maximum Offset = 2.26 - 2.14 = 0.12 feet

0.12 < 0.25 ∴ Multiple Conversion is NOT Required

APPENDIX D
As-Built Plans

DEPARTMENT OF PUBLIC WORKS

INDEX OF SHEETS

County Commissioners

Dario Herrera, Chairman
Myrna Williams, Vice Chair
Yvonne Atkinson Gates
Erin Kenny
Mary J. Kincaid-Chauncey
Chip Maxfield
Bruce L. Woodbury

CLARK COUNTY NEVADA

"Progress as Promised"

AUGUST 2001

IMPROVEMENT PLANS FOR

FLAMINGO WASH

MARYLAND PARKWAY TO SPENCER STREET

PHASE I

CLARK COUNTY, NEVADA

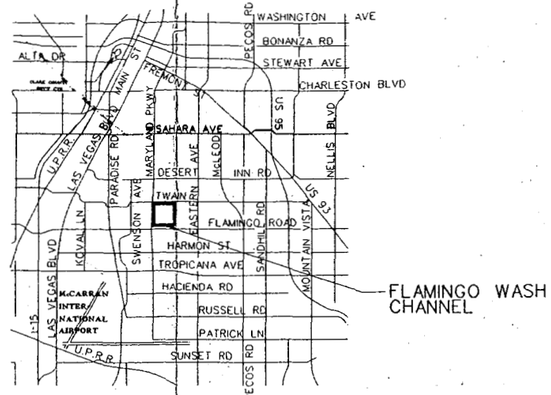
FUNDED BY

CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT

DESIGNED BY: MONTGOMERY WATSON HARZA

Las Vegas, Nevada

MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV. 89102
(702) 878-8010



Vicinity Map

NOT TO SCALE

County Manager

Thomas F. Reilly

Director of Public Works

Approved:

M.J. Manning, R.P.E.

Clark County Regional Flood Control District

General Manager / Chief Engineer

Approved:

Gale Wm. Fraser, II, P.E.

PROFESSIONAL ENGINEER - STATE OF NEVADA
DONALD W. DAVIS
CIVIL
No. 8087

1-10-03
WITH UPDATED MYLARS CONFORMED

L-1646

BID #4906-01 FLAMINGO WASH MARYLAND PARKWAY TO SPENCER STREET PHASE I

AGENCY	PLANS REVIEWED BY	DATE
SPRINT		12/3/01
LAS VEGAS VALLEY WATER DISTRICT		8-06-01
SOUTHWEST GAS COMPANY		8-3-01
NEVADA POWER COMPANY, DISTRIBUTION		8-3-01
NEVADA POWER COMPANY, TRANSMISSION		11-16-01
CLARK COUNTY SANITATION DISTRICT		8/3/01
COX COMMUNICATIONS LAS VEGAS, INC.		8/6/01

DEPARTMENT OF PUBLIC WORKS	BY	DATE
DEPUTY DIRECTOR		11.30.01
COMMUNITY DEVELOPMENT DIVISION		8-7-01
CONSTRUCTION MANAGEMENT DIVISION		8-7-01
DESIGN ENGINEERING DIVISION		8-7-01
MAINTENANCE MANAGEMENT DIVISION		8-7-01
TRAFFIC MANAGEMENT DIVISION		8/7/01
COUNTY SURVEYOR'S OFFICE		8-07-2001

REVISIONS NUMBER	DESCRIPTION	DATE

C-1

L-1646

ITEM NO	ITEM DESCRIPTION	QUANTITY	UNIT
105.01	Quality Control	1	LS
107.01	Traffic Control	1	LS
108.01	Videotaping	1	LS
109.01	Construction Conflicts & Additional Work	1	LS
109.02	Historical Owner Caused Delay Allowance	5	DAYS
[illegible]03	Historical Owner Caused Delay Allowance Additional Amount over $500.00/Day	5	DAYS
[illegible]0.01	Mobilization	1	LS
202.01	Demolition and Removal of Spencer Street Bridge	1	LS
202.02	Remove Concrete Curb and Gutter	177	LF
202.03	Remove Concrete Sidewalk	708	SF
202.04	Debris Removal/Clearing and Grubbing	1	LS
203.01	Channel Excavation	16,660	CY
203.02	Compacted Backfill	13,880	CY
209.01	Drain Backfill	1,713	CY
217.01	Dewatering	1	LS
302.01	Type II Aggregate Base	520	CY
402.01	Plantmix Bituminous Surface	385	TON
502.01	Concrete Channel Transition Station 23+65.42 to Station 24+15.42	50	LF
502.02	45' Wide Rectangular Concrete Channel Station 22+13.66 to Station 23+65.42	152	LF
502.03	Rectangular Concrete Transition Station 21+13.66 to Station 22+13.66	100	LF
502.04	35' Wide Rectangular Concrete Channel Station 15+61.05 to Station 21+13.66	553	LF
502.05	Channel Access Ramp 1	1	LS
502.06	Channel Access Ramp 2	1	LS
502.07	Energy Dissipation Structure and Transition Station 12+62.42 to Station 14+46.92	1	LS
502.08	Spencer Street Bridge Station 14+46.92 to Station 15+61.05	1	LS
502.09	Stilling Well	1	LS
603.01	Class III 12" Storm Drain Pipe	132	LF
603.02	Class III 18" Storm Drain Pipe	30	LF
603.03	Class III 24" Storm Drain Pipe	67	LF
[illegible]4	Class III 36" Reinforced Concrete Pipe	74	LF
[illegible]5	Class III 48" Reinforced Concrete Pipe	244	LF
609.01	32' Type "DM" Drop Inlet	1	EA
609.02	52' Type "DM" Drop Inlet	1	EA
609.03	4' Type "A" Drop Inlet	1	EA
609.04	Manhole Structure No. 1	1	EA
609.05	Manhole Structure No. 2	1	EA
609.06	Reconstruct NDOT Type 4 Manhole	1	EA
610.01	Grouted Heavy Riprap Channel Lining	1,400	CY
610.02	Light Riprap	653	CY
611.01	Concrete Slope Paving	4,275	SF
613.01	"L" Type Curb & Gutter	219	LF
613.02	Concrete Sidewalk	1,093	SF
613.03	Concrete Driveway	500	SF
613.04	Cross Gutter	823	SF
616.01	Post and Cable Railing	2,500	LF
616.02	6' Tubular Steel Fence	320	LF
616.03	14' Tubular Steel Double Swing Gate	2	EA
616.04	5' Tubular Steel Single Swing Gate	1	EA
616.05	24' Tubular Steel Double Swing Gate	1	EA
616.06	CMU/Tubular Steel Fencing	93	LF
623.01	Install Street Light Pole and Luminaire	2	EA
623.02	Remove and Replace Streetlight Pole and Luminaire	1	EA
629.01	8" Water Line Relocation at Spencer Street	1	LS
633.01	Non-Reflective Pavement Markers	144	EA
633.02	Reflective Pavement Markers	48	EA
637.01	Dust Control	1	LS
[illegible]2	Dust Control Palliative	1.04	AC

GENERAL NOTES

1 ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE UNIFORM STANDARD DRAWINGS AND "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" CLARK COUNTY AREA, NEVADA LATEST EDITION AND DEPARTMENT OF PUBLIC WORKS CLARK COUNTY, NEVADA, "IMPROVEMENT STANDARDS 1983, REVISED MAY 1990," UNLESS OTHERWISE SPECIFIED BY NOTE ON THE PLANS AND/OR SPECIAL PROVISIONS. THE IMPROVEMENT STANDARDS WILL HEREINAFTER BE REFERRED TO AS "CLARK COUNTY STANDARD DRAWINGS".

2 TRAFFIC SIGNAL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS' CONSTRUCTION OFFSITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA VOLUME II" LATEST EDITION.

3 WHENEVER ANY ITEM OF WORK IS SPECIFIED FOR CONSTRUCTION IN ACCORDANCE WITH "UNIFORM STANDARD DRAWINGS" IT WILL BE A REFERENCE TO THE "UNIFORM STANDARD DRAWINGS FOR PUBLIC WORKS' CONSTRUCTION OFFSITE IMPROVEMENTS, CLARK COUNTY AREA, NEVADA 1986".

4 ALL UTILITIES SHOWN ARE BELIEVED TO BE ACCURATELY LOCATED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE LOCATION OF ALL UTILITIES LIKELY TO BE AFFECTED. 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) DAYS 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.

5 CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES AT LEAST SEVENTY-TWO (72) HOURS PRIOR TO BEGINNING CONSTRUCTION.

6 THE SOUTHWEST GAS COMPANY SHALL BE RESPONSIBLE FOR THE REMOVAL, RELOCATION OR ADJUSTMENT OF ALL GAS LINES AND APPURTENANCES THAT INTERFERE WITH THE REQUIRED IMPROVEMENTS AS SHOWN ON THE PLANS. THE CONTRACTOR SHALL COORDINATE WITH THE SOUTHWEST GAS COMPANY CONTRACTOR WHEN GAS LINE RELOCATIONS ARE PERFORMED IN CONCURRENCE WITH CONSTRUCTION OF THE REQUIRED IMPROVEMENTS AS SHOWN ON THE PLANS.

7 THE SPRINT CENTRAL TELEPHONE COMPANY SHALL BE RESPONSIBLE FOR THE ADJUSTMENT OF TELEPHONE MANHOLES AND RELOCATIONS OF TELEPHONE POLES AND UNDERGROUND TELEPHONE LINES THAT INTERFERE WITH THE REQUIRED IMPROVEMENTS AS SHOWN ON THE PLANS.

8 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.

9 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE VERTICAL ADJUSTMENT OF ALL LAS VEGAS VALLEY WATER DISTRICT FACILITIES AND CLARK COUNTY SANITATION DISTRICT MANHOLES AS INDICATED ON THE PLANS OR IN THE SPECIAL PROVISIONS UNLESS OTHERWISE INDICATED.

10 THE CONTRACTOR SHALL NOT REMOVE TREES, SHRUBS, LAWNS, WALL, FENCES, SIGNS, STRUCTURES, LIGHTS OR ANY OTHER IMPROVEMENTS OUTSIDE THE RIGHT-OF-WAY EXCEPT **WHERE REQUIRED TO DO SO BY THE CONTRACT DRAWINGS OR AS DIRECTED BY THE ENGINEER.**

11 EXACT LOCATIONS OF ALL SAWCUT LINES SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER. THOSE SAWCUTS THAT ARE LONGITUDINAL TO THE ROADWAY MAY BE WHEEL CUT WITH EQUIPMENT AS APPROVED BY THE ENGINEER. ALL OTHER SAWCUTS SHALL BE MADE BY A ROTARY SAW.

12 IF THE IMPROVEMENTS NECESSITATE THE OBLITERATION, TEMPORARY OBSTRUCTION, TEMPORARY REMOVAL, OR RELOCATION OF ANY EXISTING TRAFFIC PAVEMENT MARKING REQUIRED TO REMAIN, SUCH PAVEMENT MARKING SHALL BE RESTORED OR REPLACED WITH LIKE MATERIALS TO THE SATISFACTION OF THE COUNTY TRAFFIC MANAGER.

13 CONTRACTOR MUST CONTACT CLARK COUNTY TRAFFIC MANAGEMENT DIVISION, OPERATIONS UNIT AT (702) 455-7511 FOR LOCATIONS OF STREET LIGHTING, TRAFFIC SIGNALS, LAS VEGAS AREA COMPUTER TRAFFIC SYSTEM (LVACTS) INTERCONNECT CABLE AT LEAST FORTY-EIGHT (48) HOURS PRIOR TO WORKING IN THE AREA. CLARK COUNTY IS NOT A MEMBER OF CALL BEFORE YOU DIG (UNDERGROUND SERVICE ALERT) AND A CALL TO THAT ORGANIZATION DOES NOT RELIEVE THE CONTRACTOR OF LIABILITY FOR CLARK COUNTY FACILITIES.

BASIS OF BEARING

NORTH 02° 51'17" EAST BEING THE WEST LINE OF THE SOUTHWEST 1/4 OF SECTION 14, TOWNSHIP 21 SOUTH, RANGE 61 EAST, M.D.M., AS SHOWN PER MARYLAND PLAZA RECORDED IN BOOK 68 PAGE 75 OF PLATS.

BENCHMARKS

CLARK COUNTY BENCHMARK NO. 6C11 14SWW6 DESCRIBED AS: RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB, EAST SIDE OF MARYLAND PKWY. AT THE NORTH SIDE OF THE FLAMINGO WASH.

EL 1988.79 (NAVD-88)
EL 606.183 (METERS)

CLARK COUNTY FIRE DEPARTMENT DATE

Call before you Overhead 1-702-593-6111

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

LVVWD STANDARD NOTES

LVVWD PROJECT * 23969

1. NO WORK SHALL BEGIN UNTIL THE WATER PLANS HAVE BEEN RELEASED FOR CONSTRUCTION BY THE LVVWD. FOLLOWING WATER PLAN APPROVAL, 48 HOURS NOTICE SHALL BE GIVEN TO THE LVVWD COMMUNICATION SUPPORT CENTER (258-7171) PRIOR TO THE START OF CONSTRUCTION. NOTICE MUST BE GIVEN BY 2:00 PM 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 DRIVEWAYS, 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 MANUFACTURERS LISTING FOR NEW FACILITIES, LATEST REVISION, OR SPECIFICALLY APPROVED ON THESE PLANS.

8/06/01
DATE

ABBREVIATIONS

ABC	AGGREGATE BASE COURSE	MIN	MINIMUM
AC	ACRE	NDOT	NEVADA DEPARTMENT OF TRANSPORTATION
ACP	ASBESTOS CEMENT PIPE	NTS	NOT TO SCALE
AGG	AGGREGATE	OC	ON CENTER
APPROX	APPROXIMATELY	OD	OUTSIDE DIAMETER
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	OF	OUTER FACE
AWWA	AMERICAN WATER WORKS ASSOCIATION	OHP	OVERHEAD POWERLINE
BC	BACK OF CURB	PBS	PLANTMIX BITUMINOUS SURFACE
BOT	BOTTOM	PC	POINT OF CURVATURE
BSW	BACK OF SIDEWALK	PI	POINT OF INTERSECTION
C	CONDUIT	PL	PROPERTY LINE
CC	CLARK COUNTY	POB	POINT OF BEGINNING
CCRFCD	CLARK COUNTY REGIONAL FLOOD CONTROL DISTRICT	POE	POINT OF ENDING
C&G	CURB AND GUTTER	PT	POINT OF TANGENCY
CL	CENTERLINE	PVC	POLY VINYL CHLORIDE
CLR	CLEARANCE	PVMT	PAVEMENT
CMP	CORRUGATED METAL PIPE	R	RADIUS
COMM DWY	COMMERCIAL DRIVEWAY	RCB	REINFORCED CONCRETE BOX
CONC	CONCRETE	RCP	REINFORCED CONCRETE PIPE
CONST	CONSTRUCTION OR CONSTRUCT	REINF	REINFORCED
CONT	CONTINUOUS	ROFC	RATE OF FLOW CONTROL
CY	CUBIC YARD	RP	RADIUS POINT
DI	DROP INLET	RT	RIGHT
DIA	DIAMETER	R/W	RIGHT-OF-WAY
DIAG	DIAGONAL	S	SLOPE
DIP	DUCTILE IRON PIPE	SC	SCALE
DWG	DRAWING	SD	STORM DRAIN
DWY	DRIVEWAY	SF	SQUARE FEET
EA	EACH	SIM	SIMILAR
EF	EACH FACE	SPA	SPACED
ELEV	ELEVATION	SPEC'S	PROJECT SPECIFICATIONS
EOP	END OF PROJECT	SSMH	SANITARY SEWER MANHOLE
EP	EDGE OF PAVEMENT	STA	STATION
EW	EACH WAY	STD	STANDARD
EXIST	EXISTING	STL	STEEL
FG	FINISHED GRADE	SW	SIDEWALK
FL	FLOW LINE	T	TELEPHONE
FND	FOUND	TBSW	TOP BACK OF SIDEWALK
FW	FLAMINGO WASH	TC	TOP OF CURB
G	NATURAL GAS	T.C.E.	TEMPORARY CONSTRUCTION EASEMENT
GB	GRADE BREAK	TH	TEST HOLE
H	WALL HEIGHT	TOS	TOE OF SLOPE
HDPE	HIGH DENSITY POLY ETHALENE	T.O.W.	TOP OF WALL
HPS	HIGH PRESSURE SODIUM	TP	TOP OF PIPE
ID	INSIDE DIAMETER	TRANS	TRANSITION
IF	INNER FACE	TRAP	TRAPEZOIDAL
INV	INVERT	(TYP)	TYPICAL
LF	LINEAR FEET	USD	UNIFORM STANDARD DRAWING
LS	LUMP SUM	VC	VERTICAL CURVE
LT	LEFT	VCP	VITRIFIED CLAY PIPE
LVVWD	LAS VEGAS VALLEY WATER DISTRICT	VG	VALLEY GUTTER
MAT'L	MATERIAL	VPC	VERTICAL POINT OF CURVE
MAX	MAXIMUM	VPI	VERTICAL POINT OF INTERSECTION
MH	MANHOLE	VPT	VERTICAL POINT OF TANGENCY
		W	WATT
		WS	WATER SURFACE

LEGEND

- A/1/4 REMOVAL ITEM, CONSTRUCTION ITEM, TRAFFIC ITEM
- 5+00 CENTERLINE W/STATION
- RIGHT-OF-WAY LINE
- PROPERTY LINE
- TEMPORARY CONSTRUCTION EASEMENT
- PROPOSED RIGHT-OF-WAY LINE
- PROPOSED 250 W HPS STREETLIGHT
- PROPOSED 400 W HPS STREETLIGHT
- EXISTING/PROPOSED/FUTURE DROP INLET
- EXISTING/PROPOSED CURB & GUTTER
- SEWER / SEWER EXISTING/PROPOSED UNDERGROUND UTILITY
- EXISTING/PROPOSED/ADJUST MANHOLE
- EXISTING/PROPOSED/ADJUST PULLBOX
- EXISTING/PROPOSED/ADJUST WATER OR GAS VALVE
- EXISTING/PROPOSED EDGE OF PAVEMENT
- EXISTING/PROPOSED DRIVEWAY
- EXISTING BLOCKWALL/FENCE
- (99.32)/99.32 EXISTING/PROPOSED ELEVATION
- 3 CURVE DATA NOTATION
- EXISTING TELEPHONE AND/OR POWER POLE
- EXISTING/PROPOSED FIRE HYDRANT
- EXISTING/PROPOSED SERVICE PEDESTAL
- PAVEMENT TRANSITION
- EXISTING MAILBOX
- BENCHMARK
- POTHOLE NUMBER
- EXISTING/ADJUST WATER METER
- SAWCUT LINE
- EXISTING/PROPOSED CONTROLLER CABINET
- EXISTING/PROPOSED SIDEWALK RAMP
- TOP OF SLOPE
- FILL SLOPE
- CUT SLOPE
- DAYLIGHT LINE
- TUBULAR STEEL FENCE
- A/C-1 SECTION/DETAIL
- POST & CABLE RAILING

REV No	DATE	DESCRIPTION	APPROVED
2	9/24/01	ADDED CMU/TUBULAR STEEL FENCING (ADD.#3)	
1	9/24/01	REVISED QUANTITY PER ADDENDUM #3	

MWH MONTGOMERY WATSON HARZA
Las Vegas, Nevada
MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV. 89102
(702) 878-8010

FLAMINGO WASH

BENCHMARK, GENERAL & CONSTRUCTION NOTES, BASIS OF BEARING, LEGEND & ABBREVIATIONS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

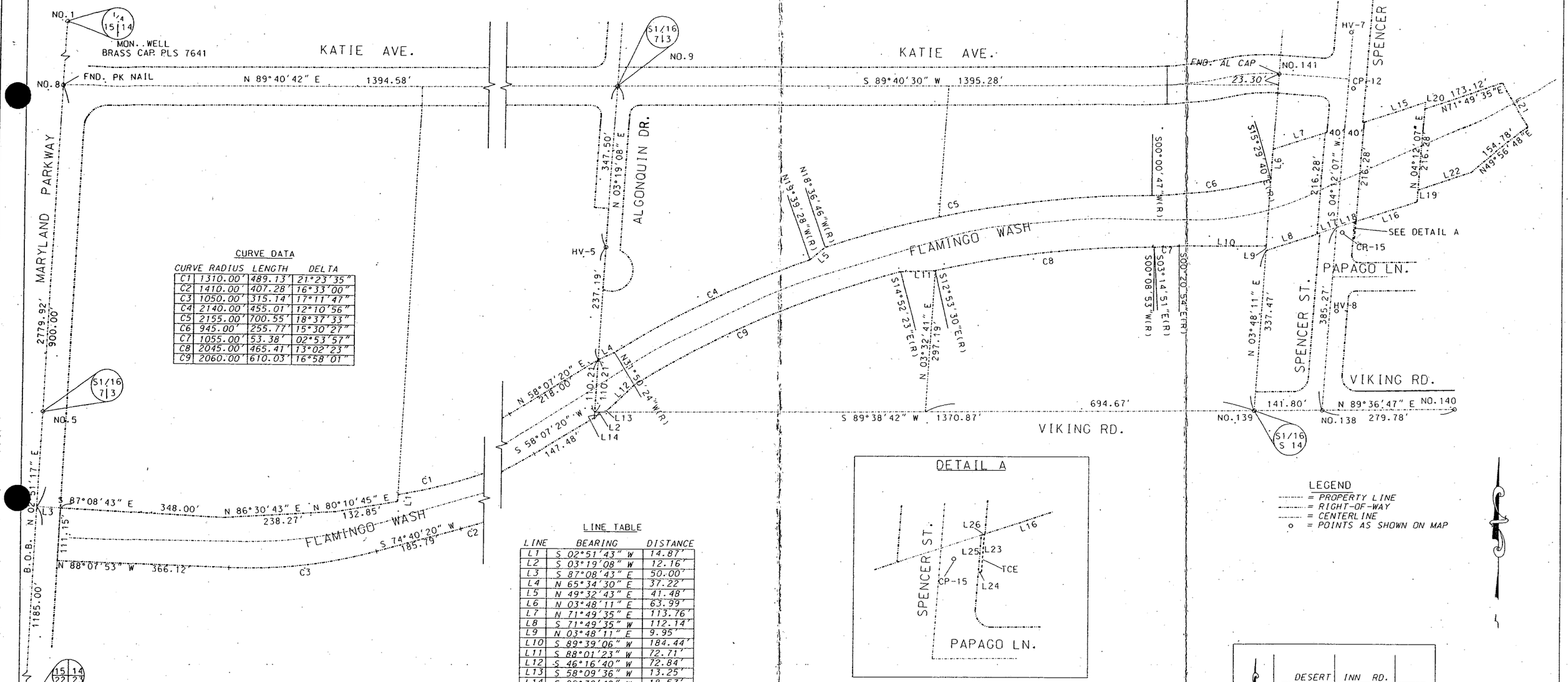
PROFESSIONAL ENGINEER STATE OF NEVADA DONALD W. DAVIS CIVIL No. 8087

DESIGNED BY:	KJS
DRAWN BY:	FAO
CHECKED BY:	DWD
DATE:	7/30/2001

SCALE	
HORIZ:	NONE
VERT:	NONE
FIELD BOOK	NONE

SHEET No **C-2**

L-1646



CURVE DATA

CURVE	RADIUS	LENGTH	DELTA
C1	1310.00'	489.13'	21°23'35"
C2	1410.00'	407.28'	16°33'00"
C3	1050.00'	315.14'	17°11'47"
C4	2140.00'	455.01'	12°10'56"
C5	2155.00'	700.55'	18°37'33"
C6	945.00'	255.77'	15°30'27"
C7	1055.00'	53.38'	02°53'57"
C8	2045.00'	465.41'	13°02'23"
C9	2060.00'	610.03'	16°58'01"

LINE TABLE

LINE	BEARING	DISTANCE
L1	S 02°51'43" W	14.87'
L2	S 03°19'08" W	12.16'
L3	S 87°08'43" E	50.00'
L4	N 65°34'30" E	37.22'
L5	N 49°32'43" E	41.48'
L6	N 03°48'11" E	63.99'
L7	N 71°49'35" E	113.76'
L8	S 71°49'35" W	112.14'
L9	N 03°48'11" E	9.95'
L10	S 89°39'06" W	184.44'
L11	S 88°01'23" W	72.71'
L12	S 46°16'40" W	72.84'
L13	S 58°09'36" W	13.25'
L14	S 89°38'42" W	18.57'
L15	N 71°49'35" E	135.00'
L16	S 71°49'35" W	135.00'
L17	S 71°49'35" W	43.26'
L18	N 71°49'35" E	43.26'
L19	N 04°12'07" E	24.20'
L20	S 04°12'07" E	13.99'
L21	N 29°11'58" W	109.01'
L22	N 71°49'35" E	118.13'
L23	S 04°12'07" W	35.99'
L24	N 85°47'53" W	3.00'
L25	N 04°12'07" E	34.75'
L26	N 71°49'35" E	3.24'

BASIS OF BEARINGS

NORTH 02°51'17" EAST BEING THE WEST LINE OF THE SOUTHWEST QUARTER OF SECTION 14. TOWNSHIP 21 SOUTH. RANGE 61 EAST. M.D.M.. AS SHOWN PER MARYLAND PLAZA RECORDED IN BOOK 68 PAGE 75 OF PLATS.

BENCH MARK

CLARK CO. NO. 6C11-14SWW6
RIVET AND SQUARE ALUMINUM PLATE IN TOP OF CURB. EAST SIDE OF MARYLAND PKWY. AT NORTH SIDE OF FLAMINGO WASH.
ELEVATION: 606.183 (M) 1988.785 (F)

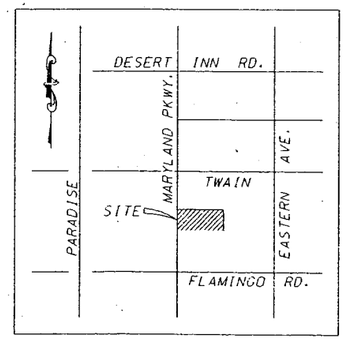
DETAIL A

COORDINATE LIST (PROJECT COORDINATES)

POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
NO.1	10000.000	10000.000		WELL/B CAP PLS 7641
NO.3	7223.529	9861.545		WELL/B CAP PLS 7755
NO.5	8611.891	9930.779		BRASS CAP PLS 7004
NO.8	9305.948	9965.390		PK NAIL
NO.9	9313.777	11359.949		ALUM. CAP PLS 7704
HV-5	8966.865	11339.831	1967.95	ALUM. CAP PLS 3161
HV-7	9433.812	12906.635	1943.93	PK NAIL
HV-8	8838.029	12879.973	1947.19	PK NAIL
CP-12	9314.5673	12912.094		PK NAIL
CP-15	9003.703	12891.140		PK NAIL
NO.138	8629.617	12850.935		ALUM. CAP PLS 7004
NO.139	8628.659	12709.137		ALUM. CAP
NO.140	8631.506	13130.707		ALUM. CAP PLS 4046
NO.141	9344.964	12756.306		ALUM. CAP

LEGEND

- = PROPERTY LINE
- = RIGHT-OF-WAY
- = CENTERLINE
- o = POINTS AS SHOWN ON MAP



VICINITY MAP

NOT TO SCALE

REV No	DATE	DESCRIPTION	APPROVED

MWH MONTGOMERY WATSON HARZA — Las Vegas, Nevada
MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD.
LAS VEGAS, NV. 89102
(702) 878-8010

FLAMINGO WASH

HORIZONTAL & VERTICAL CONTROL PLAN

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL LAND SURVEYOR — STATE OF NEVADA — ESLYN BRENNER — No. 5088 — 8-3-01

DESIGNED BY:	EB
DRAWN BY:	SB
CHECKED BY:	EB
DATE:	7/30/2001

SCALE	
HORIZ:	1" = 100'
VERT:	-
FIELD BOOK	6AI - 90

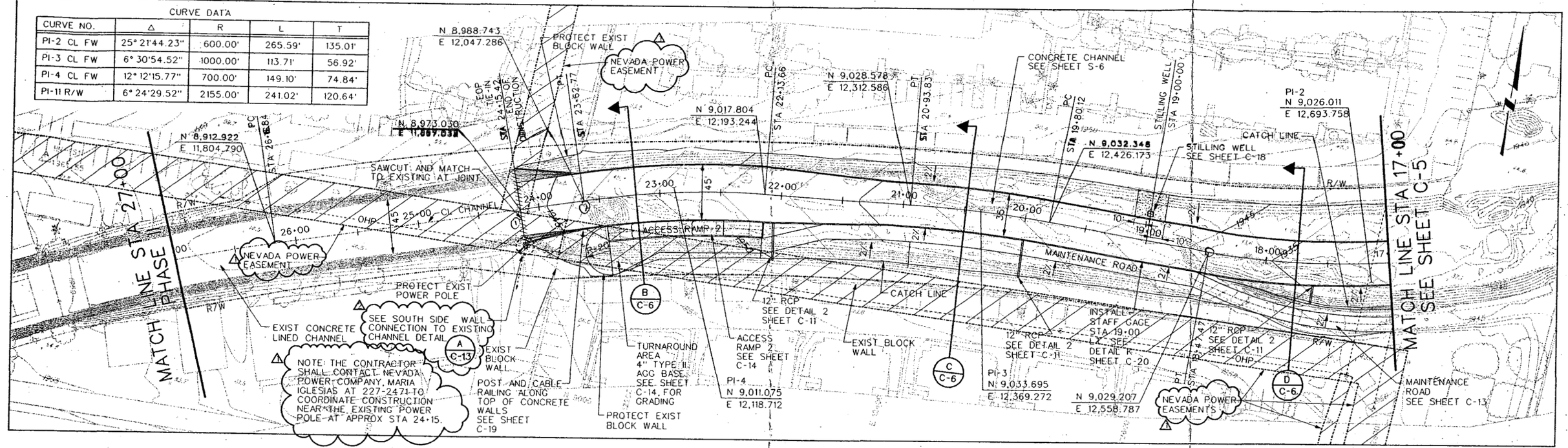
SHEET No **C-3**

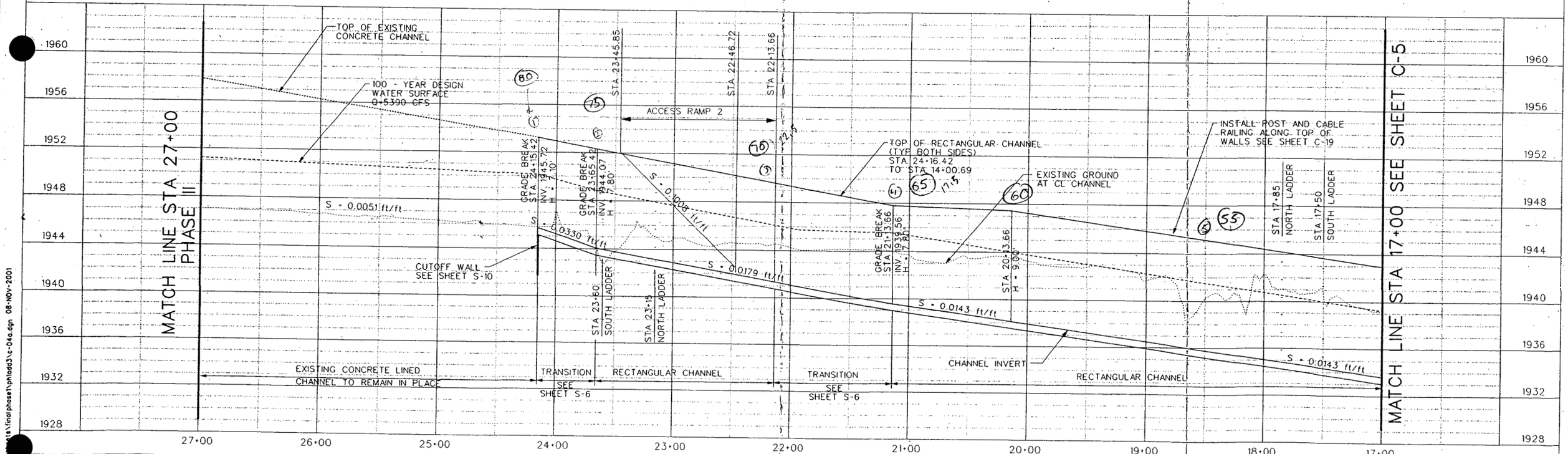
L-1646

g:\vcpw\flamingo wash\plansheets\final phase1\c-03.dgn 02-AUG-2001

CURVE DATA

CURVE NO.	Δ	R	L	T
PI-2 CL FW	25° 21'44.23"	600.00'	265.59'	135.01'
PI-3 CL FW	6° 30'54.52"	1000.00'	113.71'	56.92'
PI-4 CL FW	12° 12'15.77"	700.00'	149.10'	74.84'
PI-11 R/W	6° 24'29.52"	2155.00'	241.02'	120.64'





REV No	DATE	DESCRIPTION	APPROVED
2	9/24/01	ADDED DETAIL CALLOUT PER ADDENDUM #3	
1	9/24/01	ADDED NEVADA POWER NOTES & EASEMENTS	

MWH MONTGOMERY WATSON HARZA
Las Vegas, Nevada

MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV. 89102
(702) 878-8010

CLARK COUNTY NEVADA

FLAMINGO WASH

CHANNEL PLAN & PROFILE, STA 24+15.42 TO STA 17+00.00

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

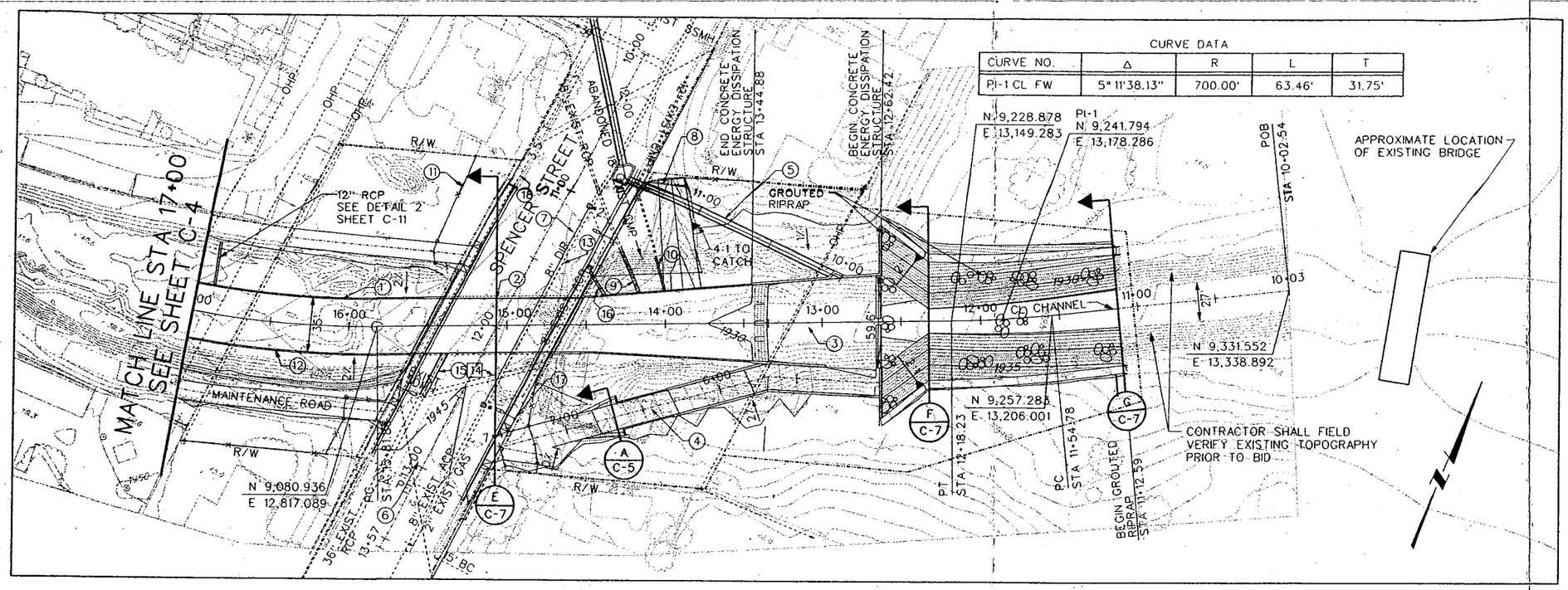
PROFESSIONAL ENGINEER STATE OF NEVADA DONALD W. DAVIS CIVIL No. 8067 11/15/01

DESIGNED BY:	KJS
DRAWN BY:	KJS
CHECKED BY:	DWD
DATE:	7/30/2001

SCALE
HORIZ: 1" = 40'
VERT: 1" = 4'
FIELD BOOK NONE

SHEET No
C-4
L-1646

g:\ccpw\flamingo wash\Plans\Sheets\final phase\phase3\c-04a.dgn 08-NOV-2001



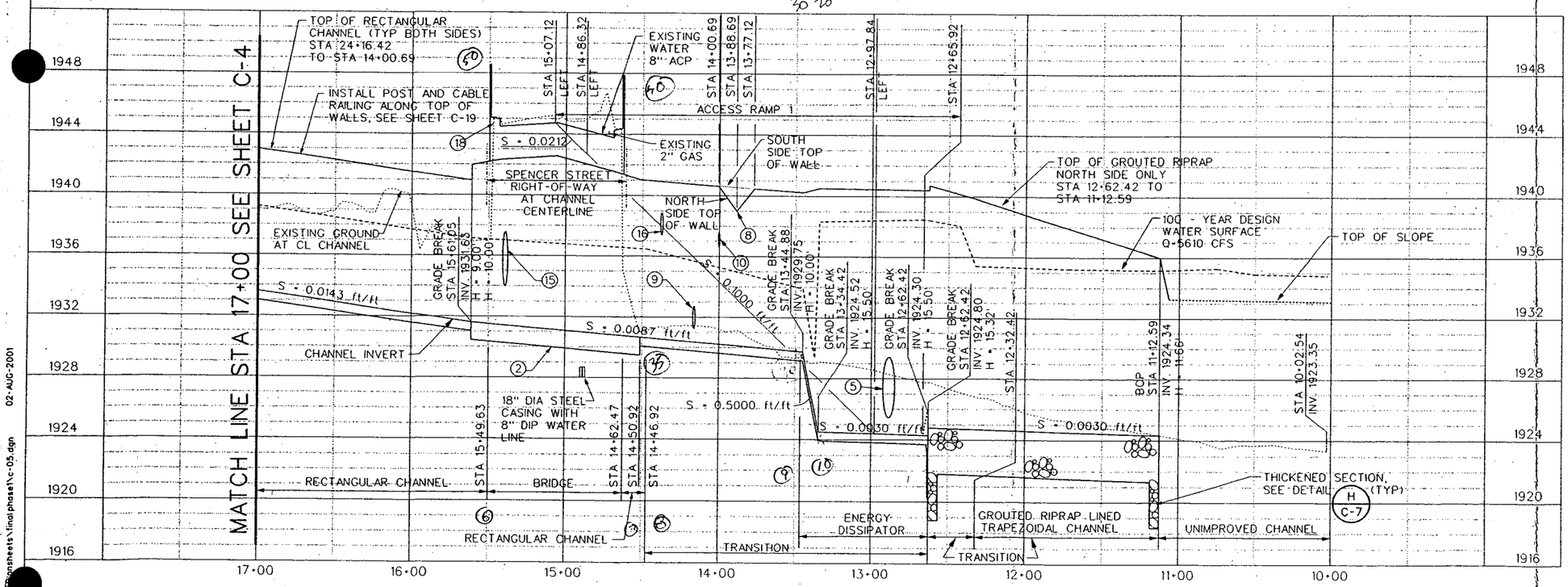
CURVE DATA

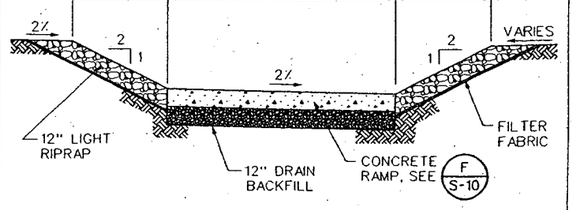
CURVE NO.	Δ	R	L	T
PI-1 CL FW	5° 11'38.13"	700.00'	63.46'	31.75'

KEY NOTES

1. CONCRETE CHANNEL, SEE SHEET S-7
2. CONCRETE BRIDGE, SEE SHEET S-2 & S-3
3. CONCRETE ENERGY DISSIPATION STRUCTURE, SEE SHEET S-7
4. CONCRETE RAMP, SEE SHEETS C-14 & S-7
5. STORM DRAIN, SEE SHEET C-11
6. SPENCER STREET ROADWAY IMPROVEMENTS, SEE SHEET C-10
7. **RELOCATE 8" WATER LINE, SEE SHEETS C-10 & C-16**
8. RECONSTRUCT CONCRETE APRON, SEE SHEET C-17
9. EXTEND EXISTING 18" SD, SEE SHEET C-12
10. 12" SD, CONNECT TO EXISTING 12" CMP, SEE SHEET C-12
11. FENCING PLAN, SEE SHEET C-15
12. POST AND CABLE RAILING, SEE SHEET C-19
13. RELOCATE GAS LINE BY SOUTHWEST GAS
14. REMOVE EXIST 36" RCP;
15. RECONSTRUCT MANHOLE AND EXTEND 36"RCP, SEE SHEET C-12
16. 18" SD, SEE SHEET C-12
17. STREET LIGHTING PLAN, SEE SHEET C-15
18. RELOCATE 3.5" T BY SPRINT

LVVWD 8/03/01 DATE





SECTION A C-5
NTS

02-AUG-2001
g:\ccpw\flamingo wash\plansheets\finalphase1\c-05.dgn

REV No	DATE	DESCRIPTION	APPROVED

MWH MONTGOMERY WATSON HARZA
Las Vegas, Nevada
MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV. 89102
(702) 878-8010

CLARK COUNTY NEVADA

FLAMINGO WASH

CHANNEL PLAN & PROFILE, STA 17+00.00 TO STA 11+12.59

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

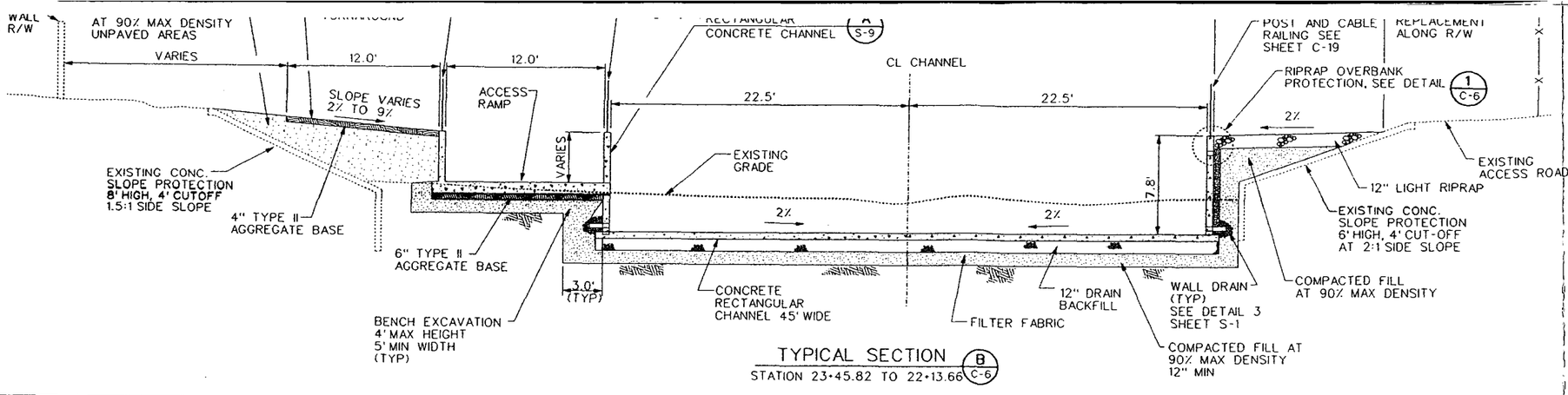
PROFESSIONAL ENGINEER - STATE OF NEVADA - DONALD W. DAVIS - CIVIL - No. 8087 - 8/31/01

DESIGNED BY:	KJS
DRAWN BY:	KJS
CHECKED BY:	DWD
DATE:	7/30/2001

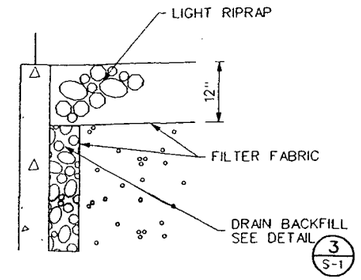
SCALE	
HORIZ:	1" = 40'
VERT:	1" = 4'
FIELD BOOK	NONE

SHEET No **C-5**

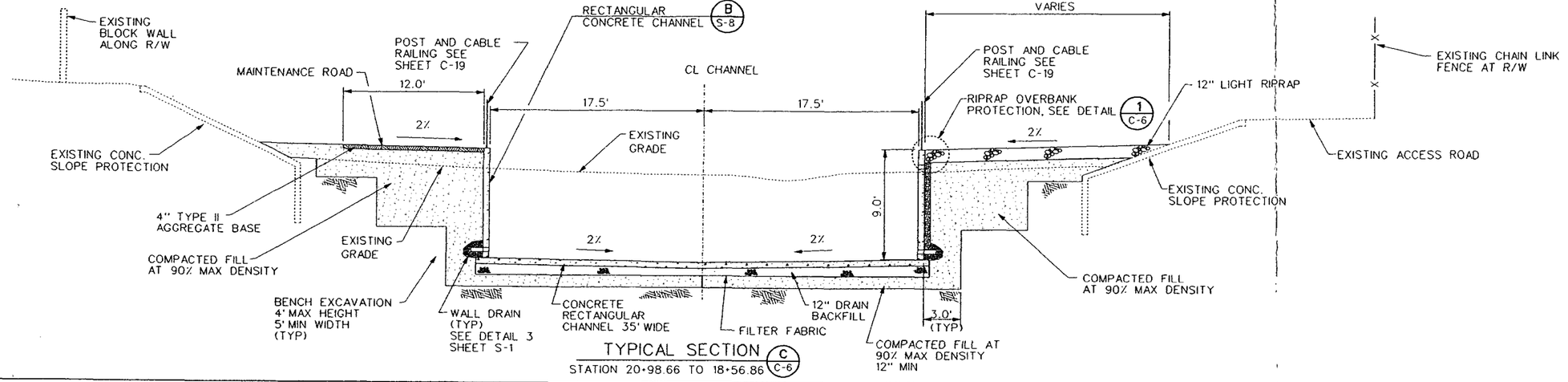
L-1646



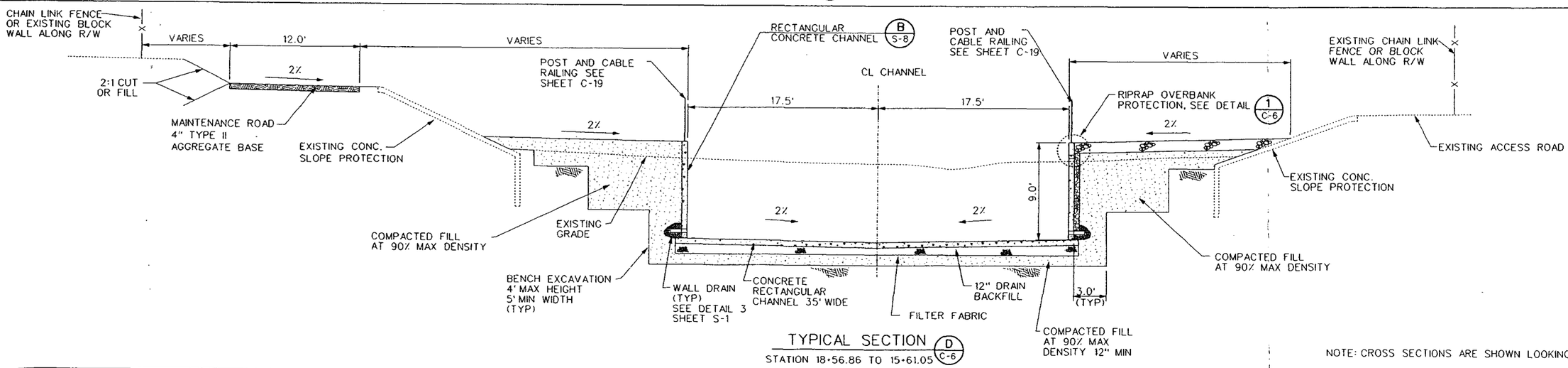
TYPICAL SECTION B C-6
STATION 23+45.82 TO 22+13.66



RIPRAP OVERBANK PROTECTION DETAIL 1 C-6
NTS



TYPICAL SECTION C C-6
STATION 20+98.66 TO 18+56.86



TYPICAL SECTION D C-6
STATION 18+56.86 TO 15+61.05

NOTE: CROSS SECTIONS ARE SHOWN LOOKING UPSTREAM

REV No	DATE	DESCRIPTION	APPROVED

MWH MONTGOMERY WATSON HARZA
Las Vegas, Nevada
MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV. 89102
(702) 878-8010

FLAMINGO WASH

CHANNEL SECTIONS & DETAILS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER STATE OF NEVADA DONALD W. DAVIS CIVIL No. 8087 8/31/01

DESIGNED BY:	DWD
DRAWN BY:	JRE
CHECKED BY:	DWD
DATE:	7/30/2001

SCALE	
HORIZ:	1" = 5'
VERT:	1" = 5'
FIELD BOOK	NONE

SHEET No C-6

L-1646

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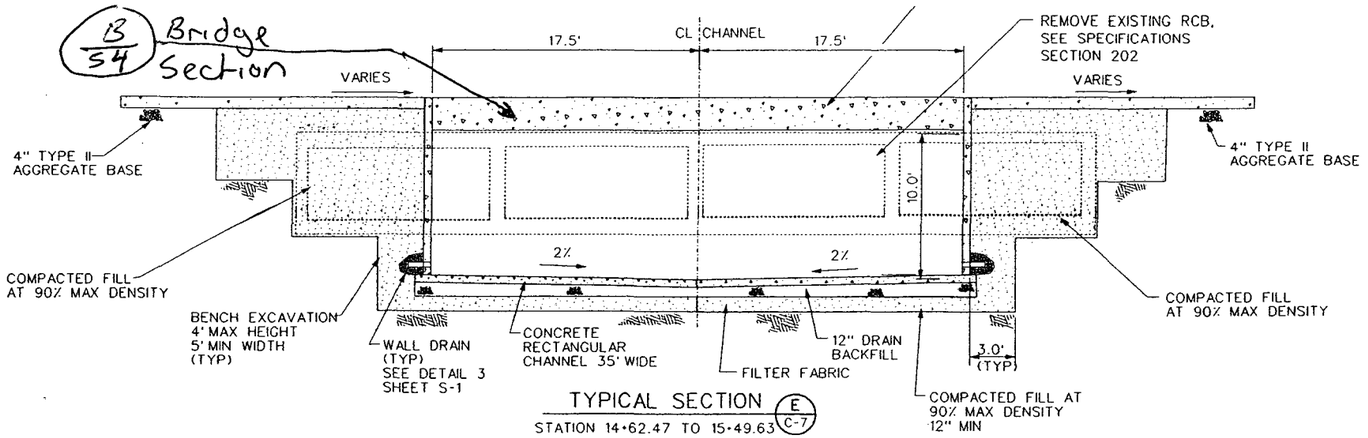
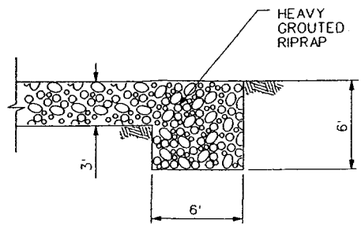
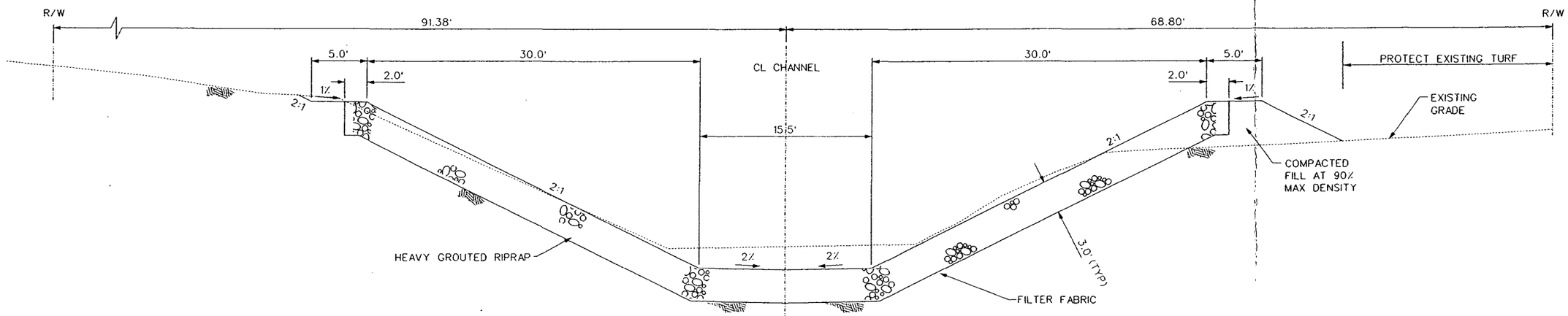
(B/54) Bridge Section



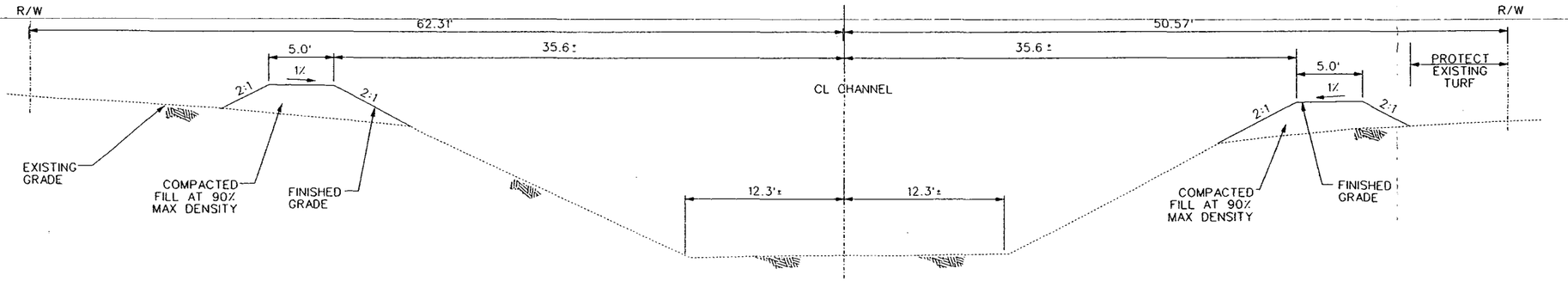
TYPICAL SECTION (E / C-7)
STATION 14+62.47 TO 15+49.63



THICKENED GROUTED RIPRAP SECTION (H / C-7)
NTS



SECTION (F / C-7)
STATION 12+32.42



SECTION (G / C-7)
STATION 11+12.59

NOTE: CROSS SECTIONS ARE SHOWN LOOKING UPSTREAM

REV No	DATE	DESCRIPTION	APPROVED

MWH MONTGOMERY WATSON HARZA
Las Vegas, Nevada
MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV. 89102
(702) 878-8010

FLAMINGO WASH

CHANNEL SECTIONS & DETAILS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER STATE OF NEVADA DONALD W DAVIS CIVIL No. 6087 7/30/01

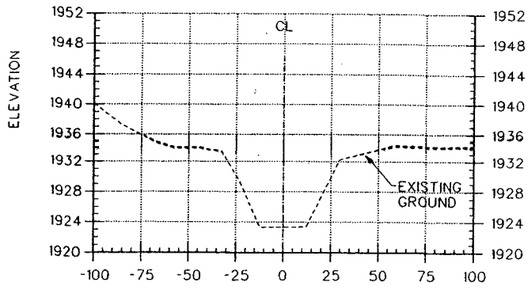
DESIGNED BY:	DWD
DRAWN BY:	JRE
CHECKED BY:	DWD
DATE:	7/30/2001

SCALE	
HORIZ:	1" = 5'
VERT:	1" = 5'
FIELD BOOK	NONE

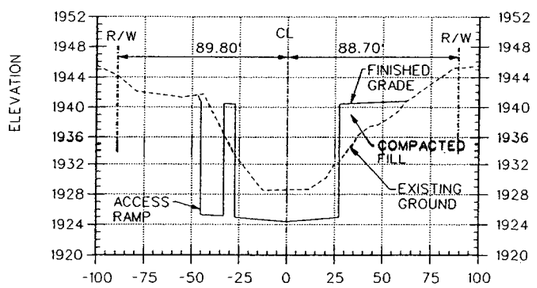
SHEET No C-7

L-1646

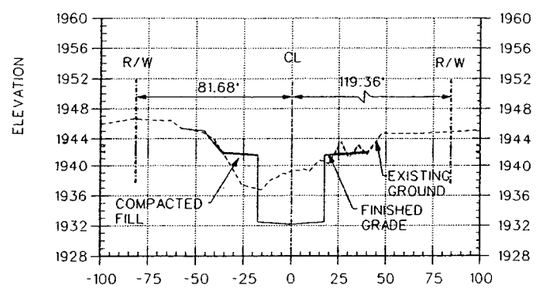
g:\ccpw\flamingo wash\plansheets\finalphase1\c-07.dgn 02-AUG-2001



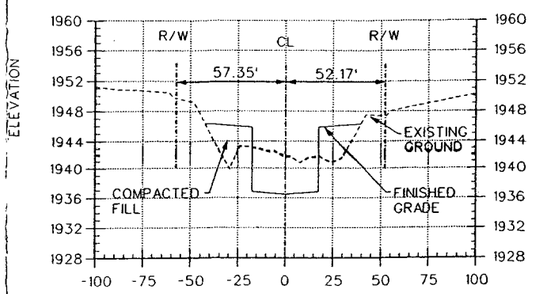
10+03



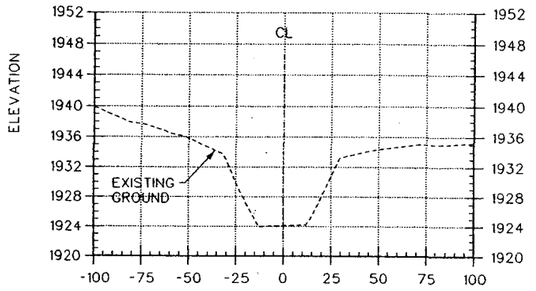
13+00



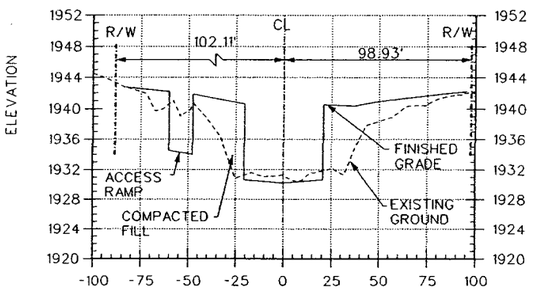
16+00



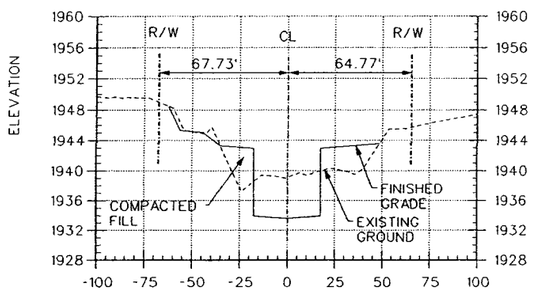
19+00



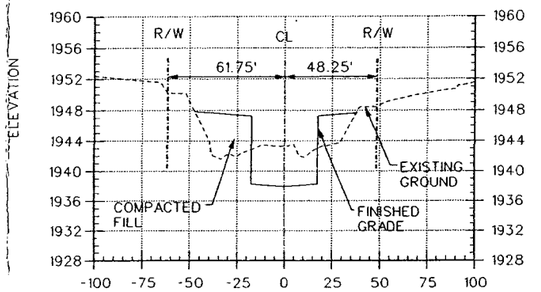
11+00



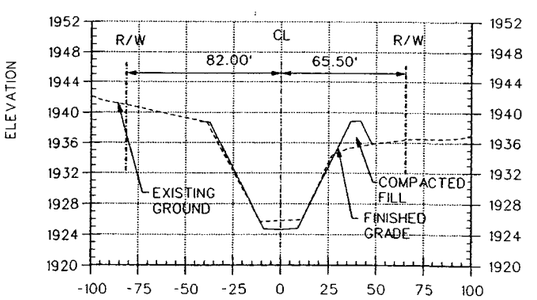
14+00



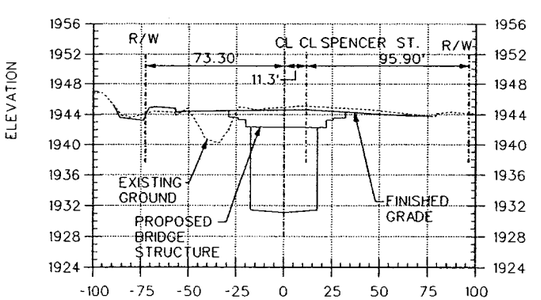
17+00



20+00



12+00



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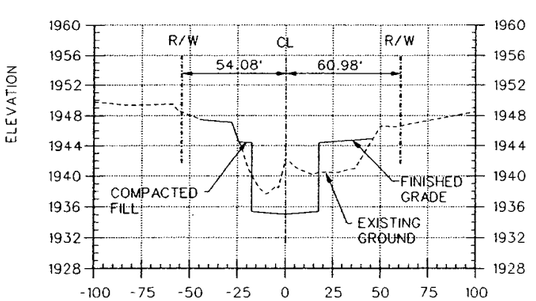
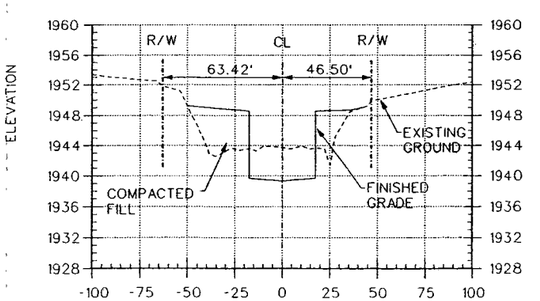


18+00



21+00

NOTE: CROSS SECTIONS ARE SHOWN LOOKING UPSTREAM

REV No	DATE	DESCRIPTION	APPROVED

MWH MONTGOMERY WATSON HARZA
Las Vegas, Nevada
MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV. 89102
(702) 878-8010

CLARK COUNTY NEVADA

FLAMINGO WASH

CHANNEL CROSS SECTIONS, STA 10+03.00 TO STA 21+00.00

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

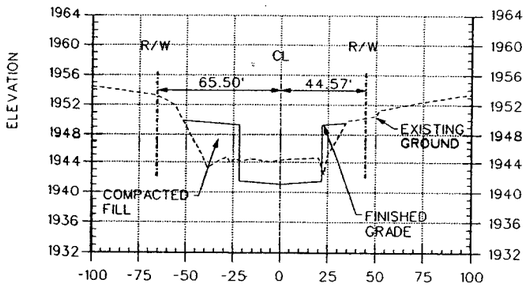
PROFESSIONAL ENGINEER - STATE OF NEVADA
RONALD W. DAVIS
CIVIL
No. 8087

DESIGNED BY:	KJS
DRAWN BY:	FAO
CHECKED BY:	DWD
DATE:	7/30/2001

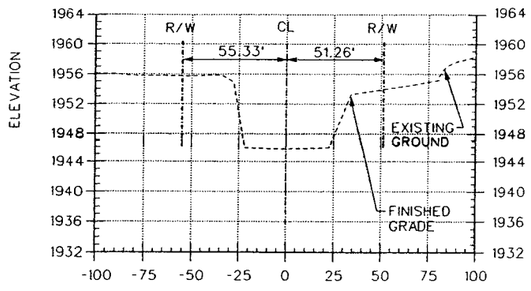
SCALE
HORIZ: 1" = 40'
VERT: 1" = 10'
FIELD BOOK NONE

SHEET No
C-8
L-1646

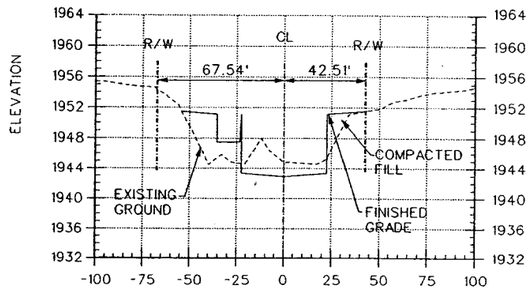
g:\ccpw\flamingo wash\Plansheets\finalphase1\c-08.dgn 02-AUG-2001



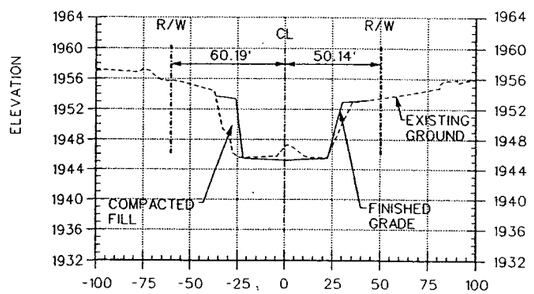
22+00



24+16



23+00



24+00

NOTE: CROSS SECTIONS ARE SHOWN LOOKING UPSTREAM

REV No	DATE	DESCRIPTION	APPROVED

MWH
MONTGOMERY WATSON HARZA
Las Vegas, Nevada

MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV. 89102
(702) 878-8010

CLARK COUNTY NEVADA

FLAMINGO WASH

CHANNEL CROSS SECTIONS, STA 22+00.00 TO STA 24+16.00

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER STATE OF NEVADA
DONALD W. DAVIS
CIVIL
No. 8087
8/31/01

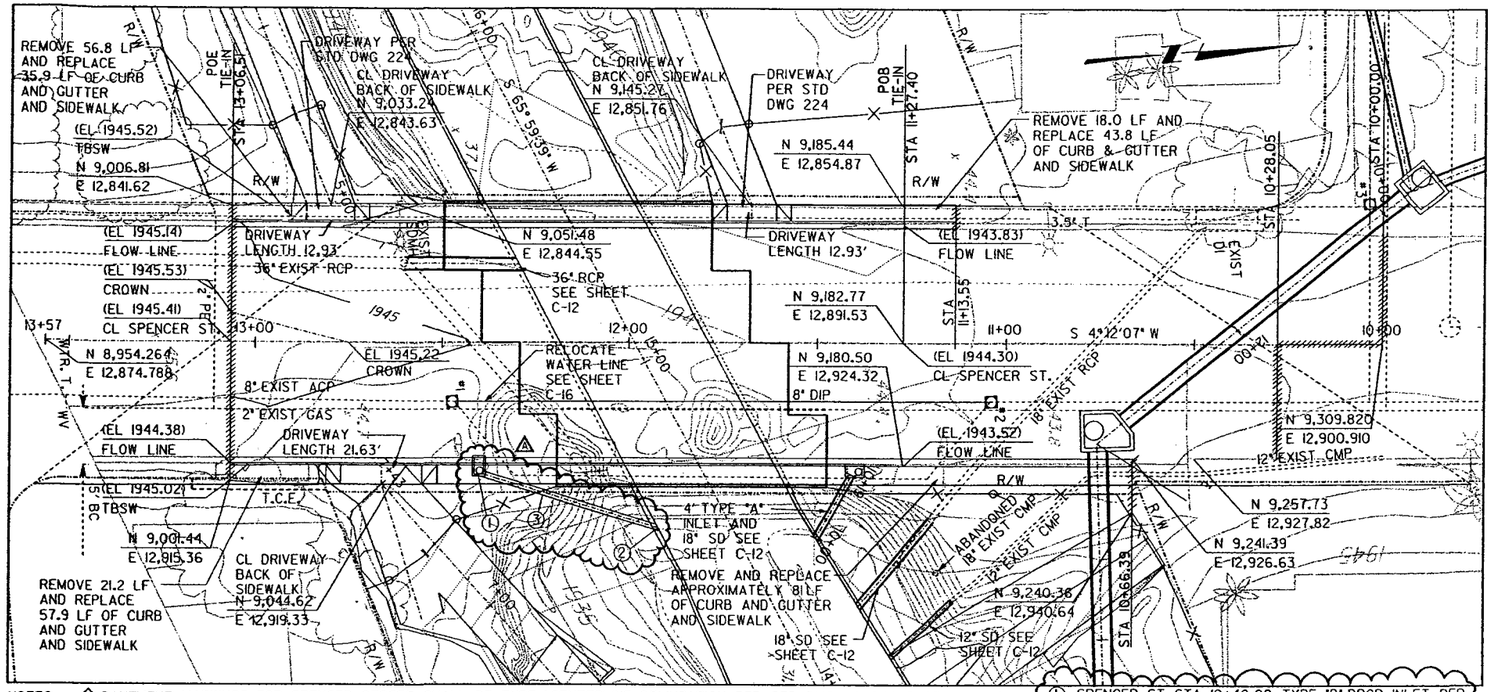
DESIGNED BY:	KJS
DRAWN BY:	FAO
CHECKED BY:	DWD
DATE:	7/30/2001

SCALE
HORIZ: 1" = 40'
VERT: 1" = 10'
FIELD BOOK NONE

SHEET No
C-9

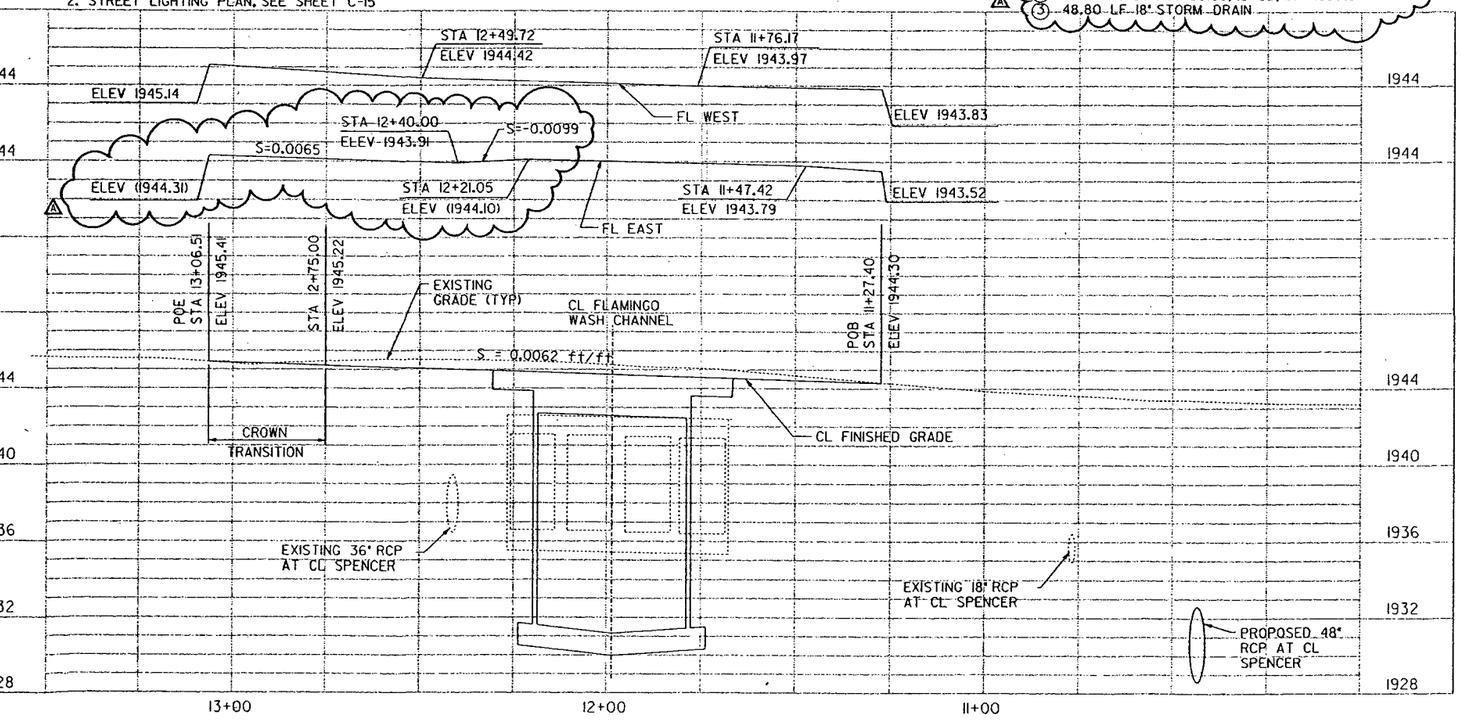
L-1646

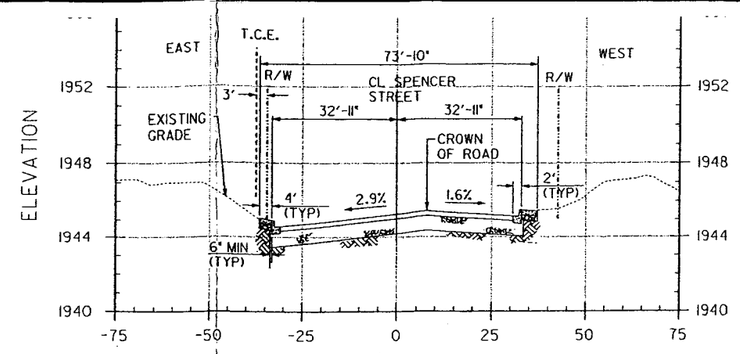
g:\ccp=\flamingo wash\Plansheets\finalphase1\c-09.dgn 02-AUG-2001



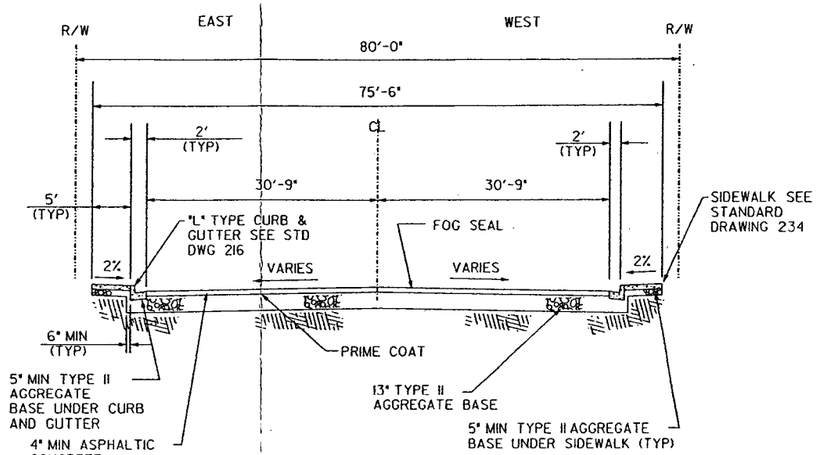
NOTES:
1. ⚠1 PAVEMENT MARKINGS FOR SPENCER STREET SHALL BE TYPE I CENTERLINE DELINEATION PER STD DWG NO. 244. TYPE 4 LANE DELINEATION PER STD DWG NO. 244A (12 FEET EACH SIDE OF CENTERLINE) FROM STA 10+34.09 TO STA 13+52.87
2. STREET LIGHTING PLAN, SEE SHEET C-15

⚠2
① SPENCER ST STA 12+40.00, TYPE "B" DROP INLET PER STD DWG 412, D=3.00', INV=1940.91
② CHANNEL STA 14+59.55, 18" SD, INV 1938.34
③ 48.80 LF 18" STORM DRAIN



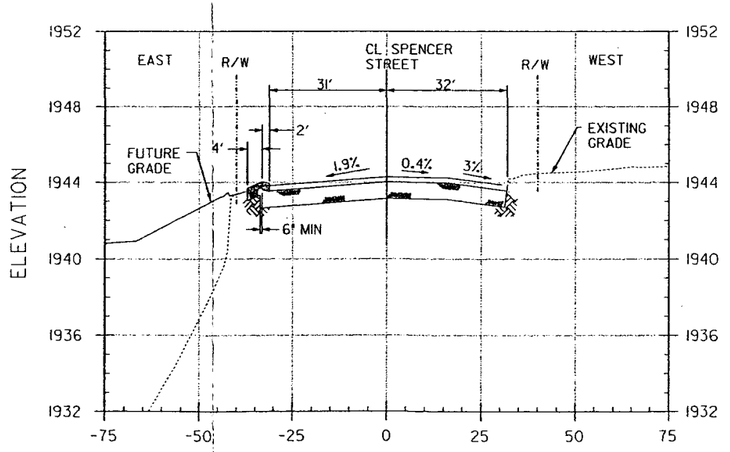


EXISTING AT STA 13+06.51



TYPICAL SPENCER ST. SECTION
NTS

STATIONS 11+27.40 TO BRIDGE SLAB & BRIDGE SLAB TO 12+75.00



EXISTING AT STA 11+27.40

REV No	DATE	DESCRIPTION	APPROVED
⚠2	8/6/02	REVISED FL EAST, ADDED DROP INLET & 18" SD	

MWH MONTGOMERYWATSON HARZA — Las Vegas, Nevada
MONTGOMERY WATSON HARZA, 3014 WEST CHARLESTON BLVD, LAS VEGAS, NV. 89102, (702) 878-8010

FLAMINGO WASH

SPENCER STREET PLAN & PROFILE

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

RONALD W. DAVIS — PROFESSIONAL ENGINEER — STATE OF NEVADA — CIVIL — No. 6087 — 7/30/01

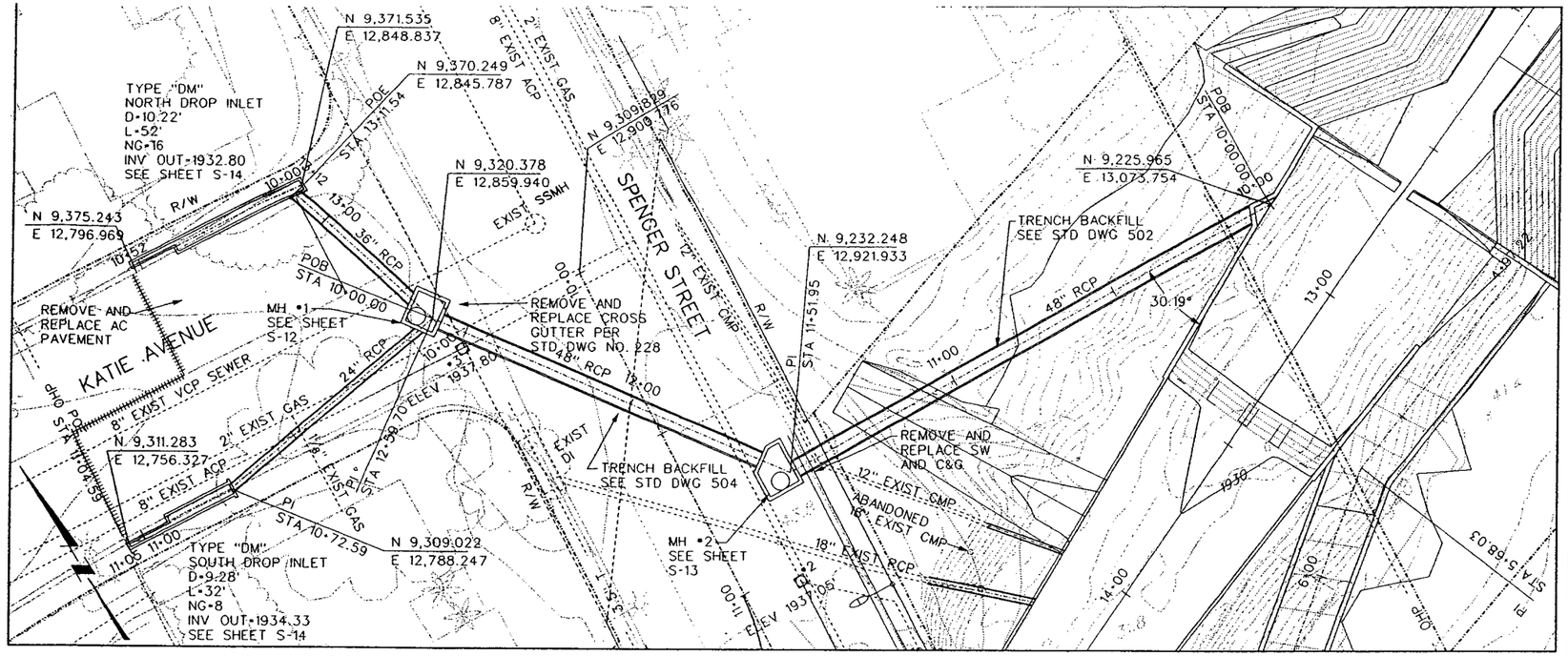
DESIGNED BY:	KJS
DRAWN BY:	FAO
CHECKED BY:	DWD
DATE:	7/30/2001

SCALE	
HORIZ:	1" = 20'
VERT:	1" = 4'
FIELD BOOK	NONE

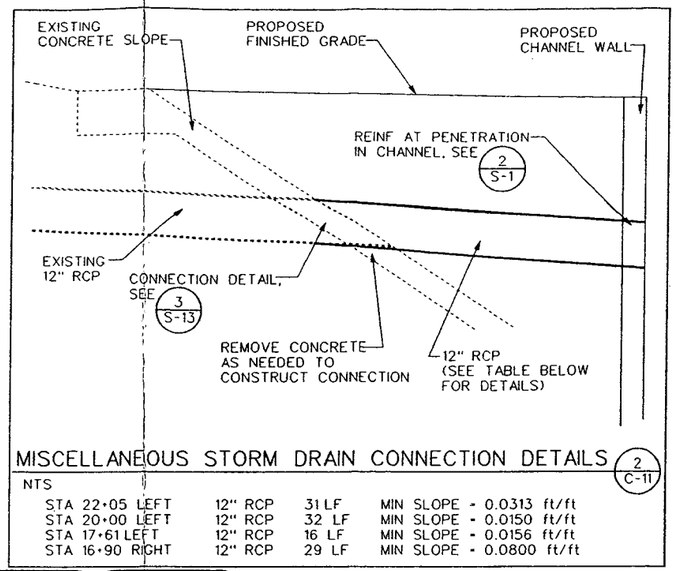
SHEET No **C-10**

L-1646

30-DEC-2002
gn:\cpw\flamingo...\construct_services\phlc-10a.dgn



NOTES: (1) PAVEMENT MARKINGS FOR KATIE AVENUE SHALL BE TYPE 1 CENTERLINE DELINEATION PER STD. DWG. NO. 244



MISCELLANEOUS STORM DRAIN CONNECTION DETAILS (2 / C-11)

NTS

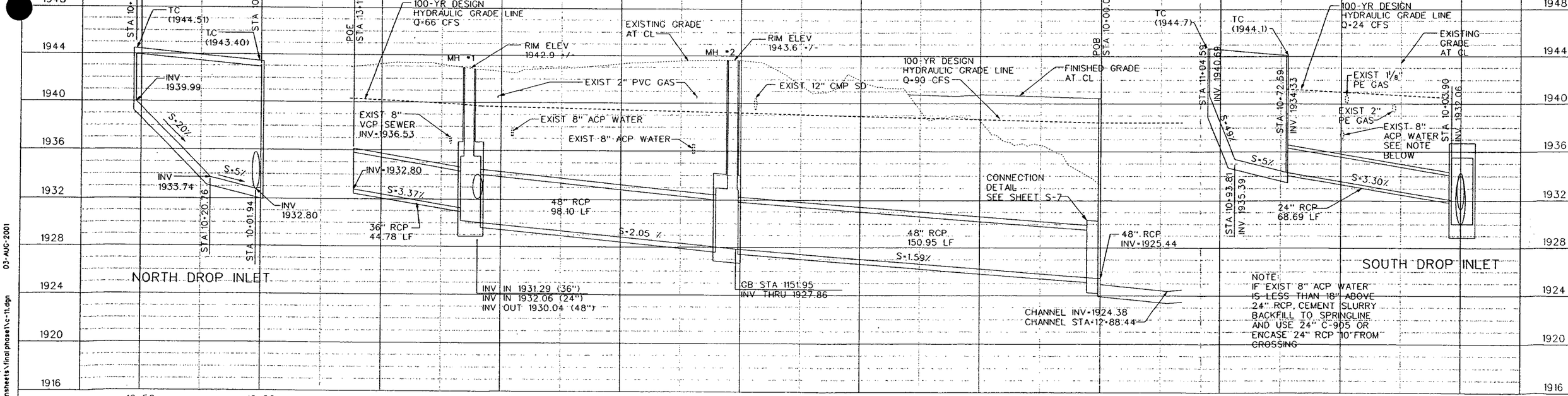
STA 22+05 LEFT	12" RCP	31 LF	MIN SLOPE = 0.0313 ft/ft
STA 20+00 LEFT	12" RCP	32 LF	MIN SLOPE = 0.0150 ft/ft
STA 17+61 LEFT	12" RCP	16 LF	MIN SLOPE = 0.0156 ft/ft
STA 16+90 RIGHT	12" RCP	29 LF	MIN SLOPE = 0.0800 ft/ft

Avoid overhead power line contact
Call before you Overhead 1-702-593-6111

Avoid digging underground utility lines. It's costly.
Call before you Dig. 1-800-227-2600

PROTECT WATERLINES IN PLACE. WHEREVER A WATERLINE IS WITHIN 18" ABOVE A STORM DRAIN LINE, OR WHERE COMPACTION UNDER A WATERLINE CAN NOT BE MET, BACKFILL TRENCH WITH CEMENT SLURRY OR FLOWABLE FILL TO THE SPRINGLINE OF THE WATERLINE. THIS REQUIREMENT IS FOR STRUCTURAL SUPPORT ONLY. ADDITIONAL HEALTH REGULATIONS MAY APPLY PER UDACS 2.19

LVVWD 8/03/01 DATE



REV No	DATE	DESCRIPTION	APPROVED

MWH MONTGOMERY WATSON HARZA — Las Vegas, Nevada

MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV. 89102
(702) 878-8010

FLAMINGO WASH

STORM DRAIN PLAN & PROFILE, STA 10+00.00 TO STA 13+13.23

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER · STATE OF NEVADA · DONALD W. DAVIS · CIVIL · No. 8087 · 10/19

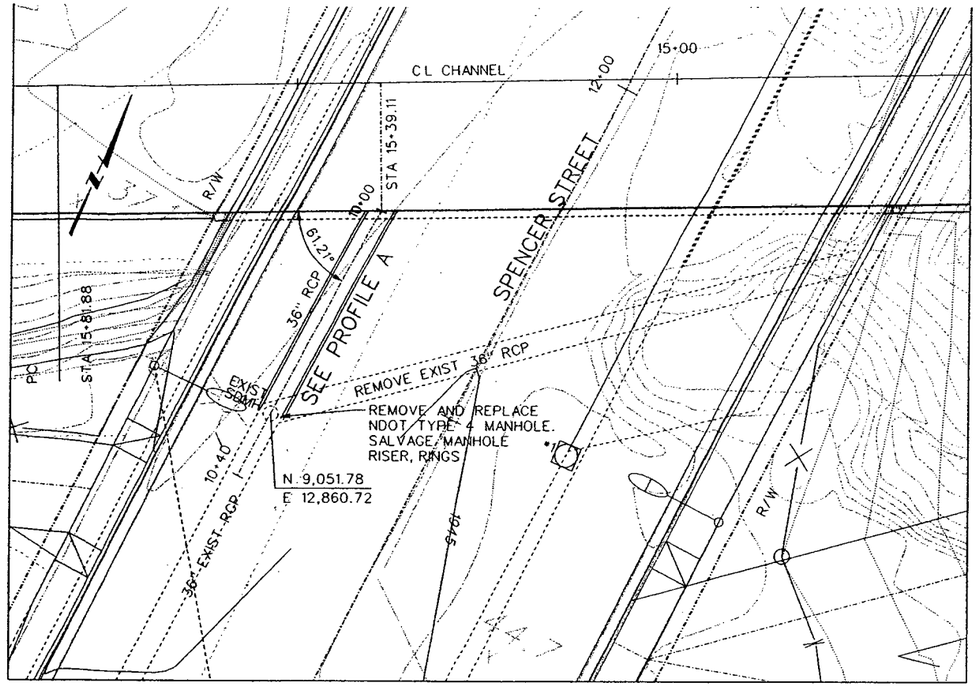
DESIGNED BY:	MKW
DRAWN BY:	MKW
CHECKED BY:	DWD
DATE:	7/30/2001

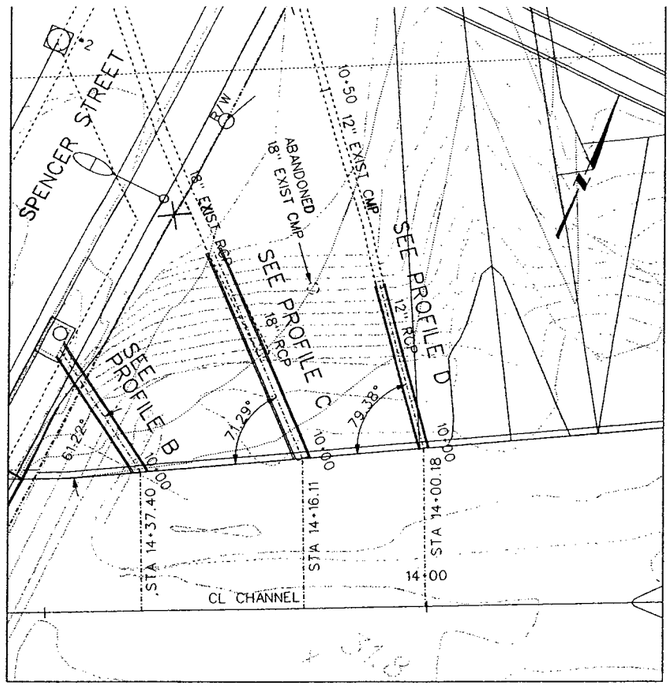
SCALE	
HORIZ:	1" = 20'
VERT:	1" = 4'
FIELD BOOK	NONE

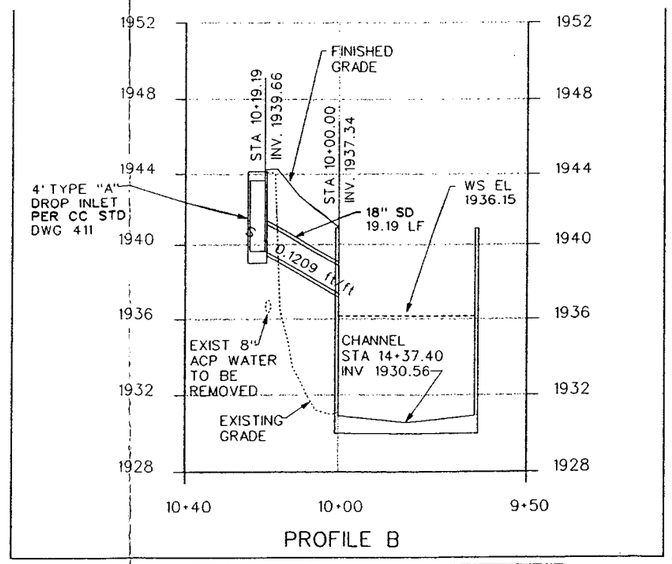
SHEET No **C-11**

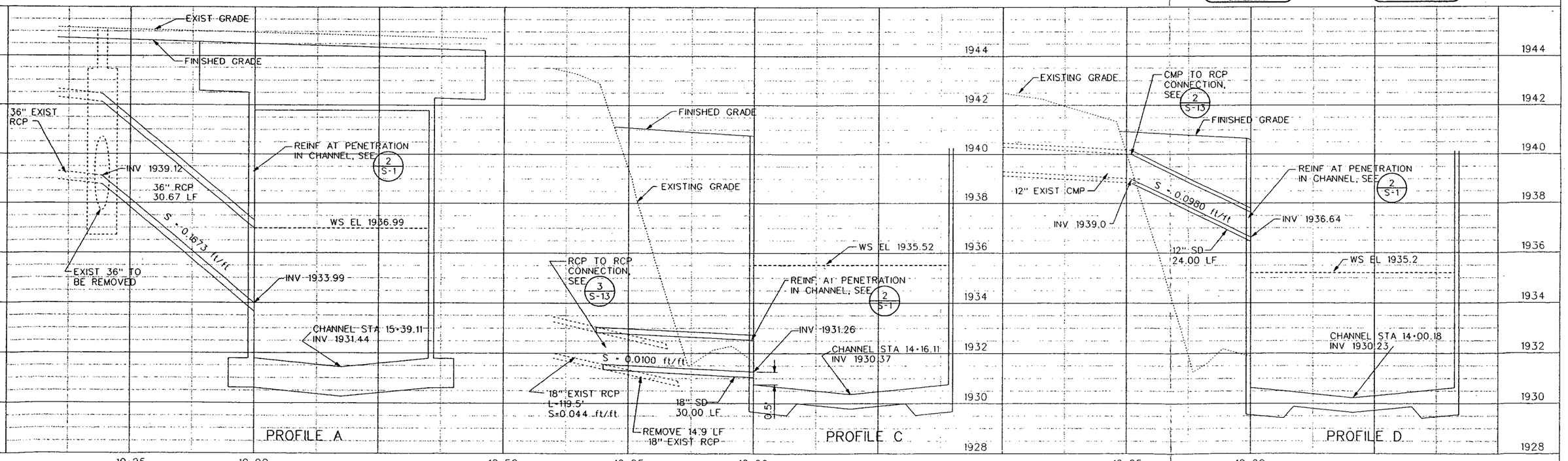
L-1646

g:\lcpw\flamingo wash\finalplansheets\final phase1\c-11.dgn 03-AUG-2001









REV No	DATE	DESCRIPTION	APPROVED

MWH MONTGOMERY WATSON HARZA
Las Vegas, Nevada
MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV. 89102
(702) 878-8010

CLARK COUNTY NEVADA

FLAMINGO WASH

STORM DRAIN CONNECTIONS, PLAN & PROFILE & DETAILS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER STATE OF NEVADA DONALD W. DAVIS CIVIL No. 8087

DESIGNED BY:	MKW
DRAWN BY:	MKW
CHECKED BY:	DWD
DATE:	7/30/2001

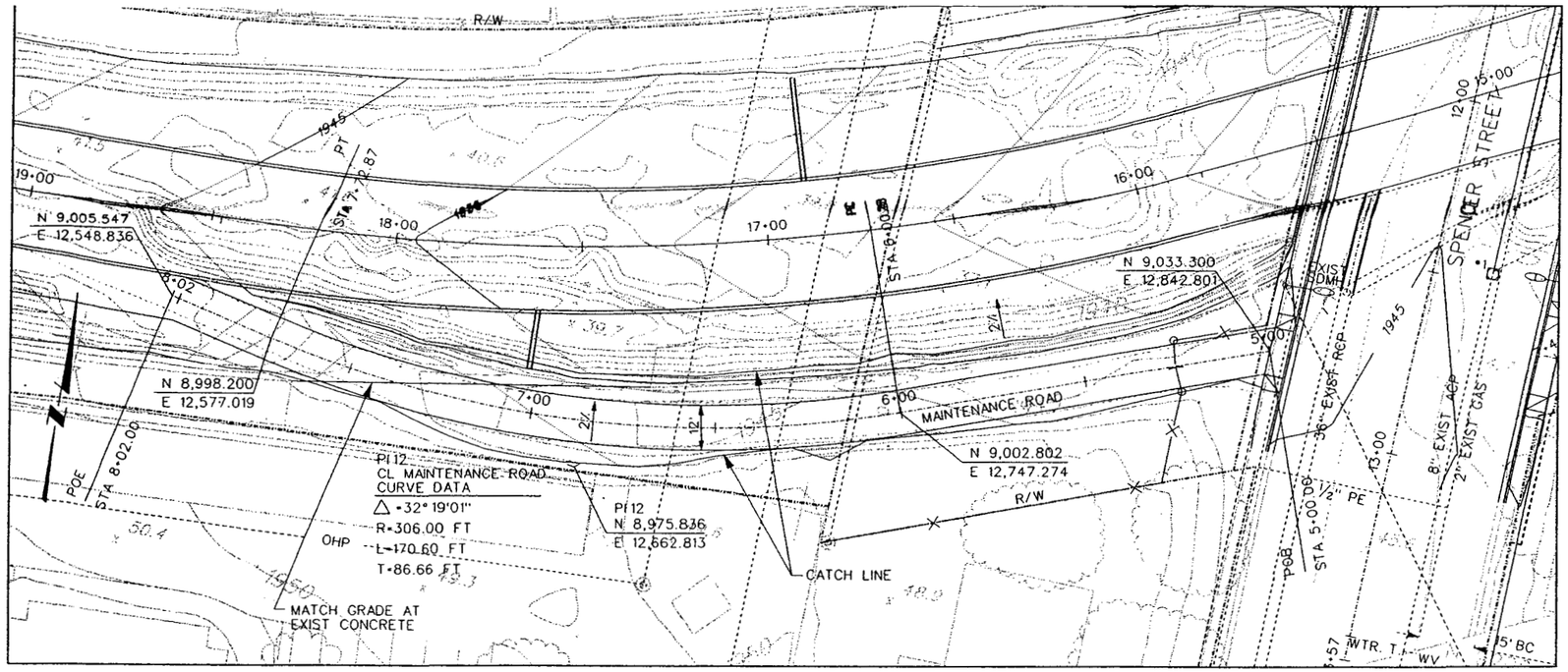
SCALE	
HORIZ:	1" = 10'
VERT:	1" = 2'
FIELD BOOK	NONE

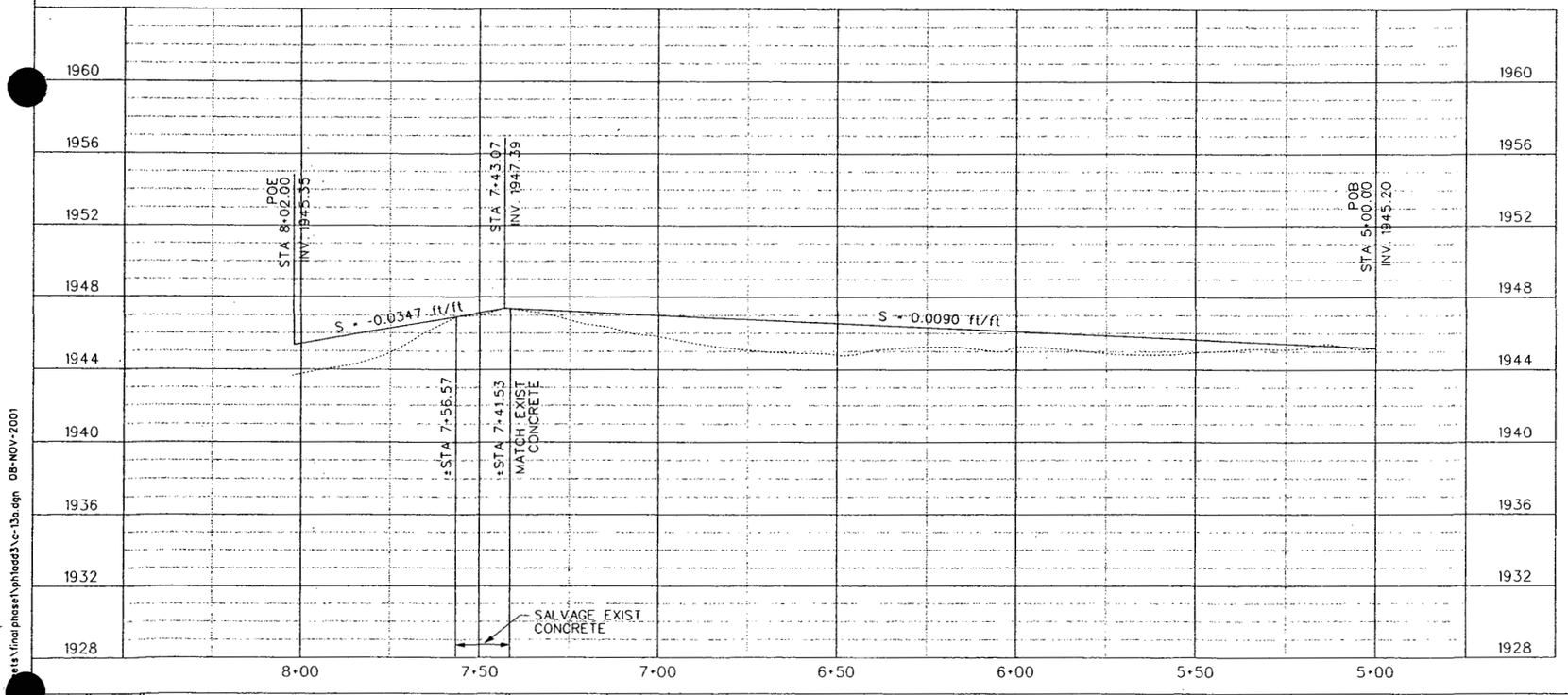
SHEET No **C-12**

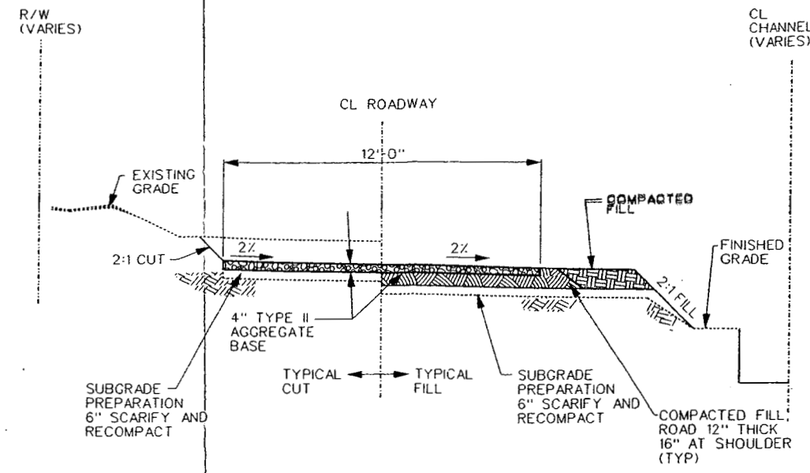
L-1646

02-AUG-2001

g:\cep\flamingo wash\plansheets\final phase1\c-12.dgn



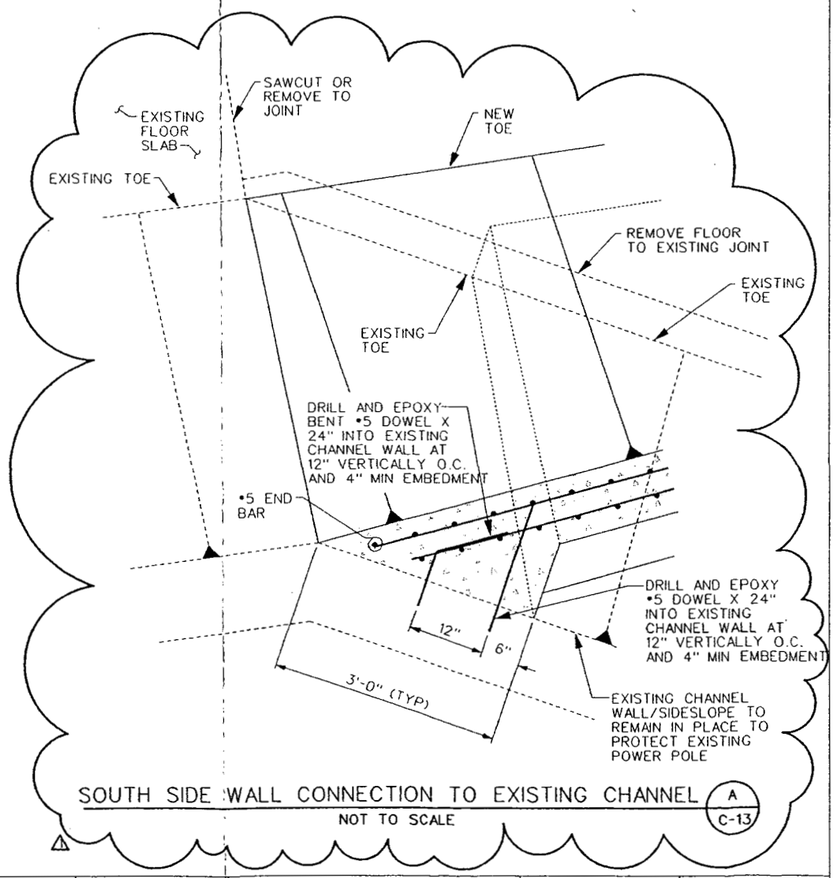




TYPICAL SECTION SHOWN LOOKING UPSTREAM

TYPICAL MAINTENANCE ROAD SECTION

NOT TO SCALE



SOUTH SIDE WALL CONNECTION TO EXISTING CHANNEL

NOT TO SCALE

A / C-13

REV No	DATE	DESCRIPTION	APPROVED
1	9/24/01	ADDED WALL CONNECTION DETAIL PER ADDENDUM #3	

MWH
MONTGOMERY WATSON HARZA
Las Vegas, Nevada
MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV. 89102
(702) 878-8010

CLARK COUNTY NEVADA

FLAMINGO WASH

MAINTENANCE ROAD PLAN & PROFILE, STA 5+00.00 TO STA 8+02.00

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER STATE OF NEVADA DONALD W. DAVIS CIVIL No. 6067 11/5/01

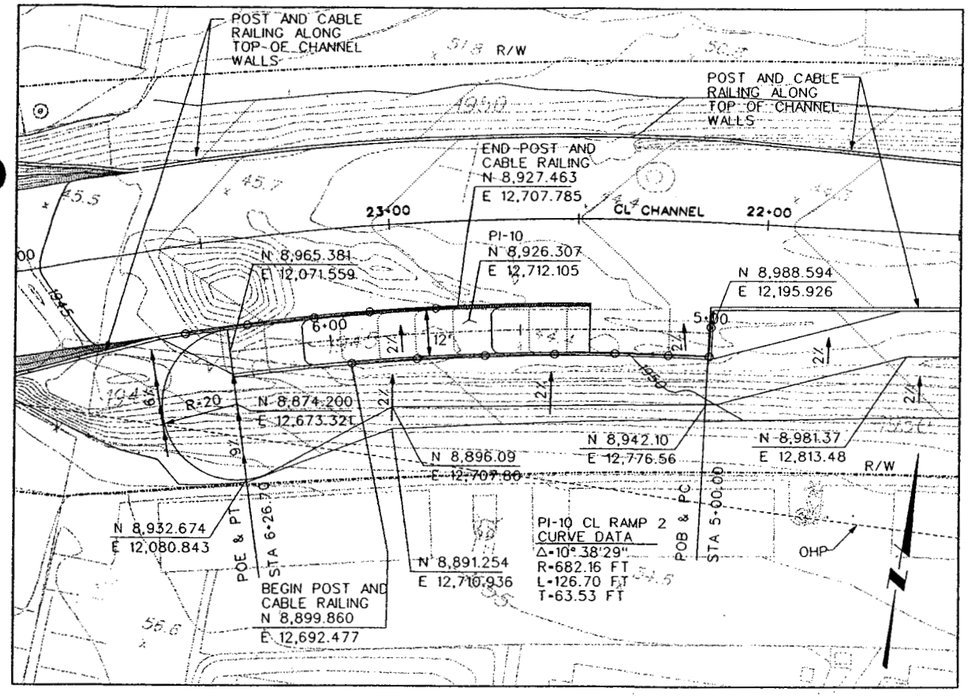
DESIGNED BY:	KJS
DRAWN BY:	MKW
CHECKED BY:	DWD
DATE:	7/30/2001

SCALE	
HORIZ:	1" = 20'
VERT:	1" = 4'
FIELD BOOK	NONE

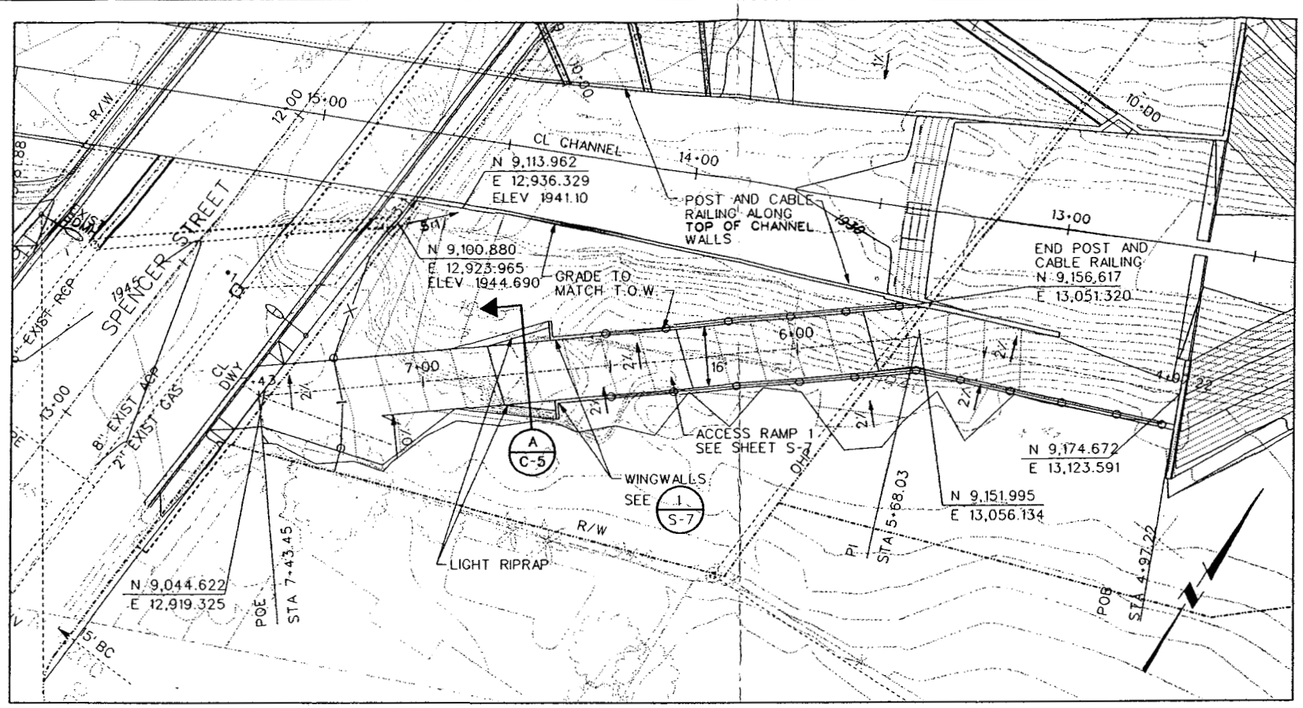
SHEET No **C-13**

L-1646

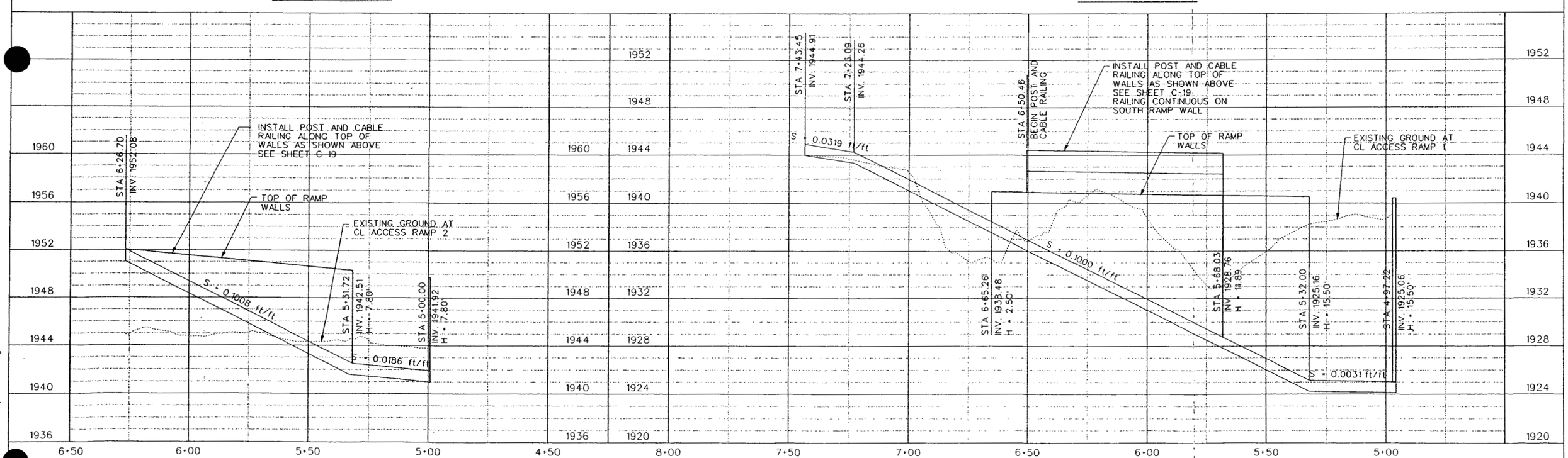
g:\ccpw\flamingo wash\plan sets\final phase1\phase03\c-13a.dgn 08-NOV-2001



ACCESS RAMP 2



ACCESS RAMP 1



REV No	DATE	DESCRIPTION	APPROVED

MWH
MONTGOMERY WATSON HARZA
Las Vegas, Nevada

MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV. 89102
(702) 878-8010

CLARK COUNTY NEVADA

FLAMINGO WASH

ACCESS RAMPS PLAN & PROFILE

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER - STATE OF NEVADA
DONALD W. DAVIS
CIVIL
No. 8087
5/31/01

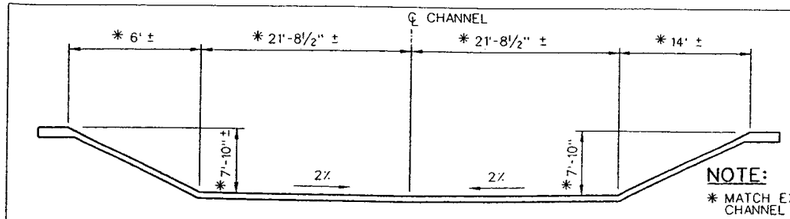
DESIGNED BY:	KJS
DRAWN BY:	MKW
CHECKED BY:	DWD
DATE:	7/30/2001

SCALE	
HORIZ:	1" = 20'
VERT:	1" = 4'
FIELD BOOK	NONE

SHEET No
C-14

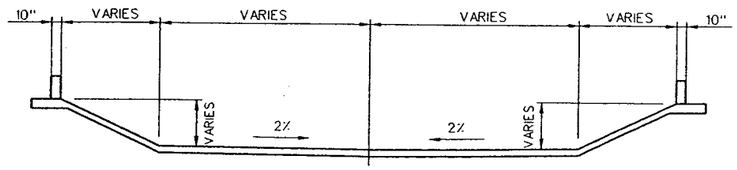
L-1646

02-AUG-2001
g:\ccpw\flamingo wash\Plansheets\final phase1\c-14.dgn

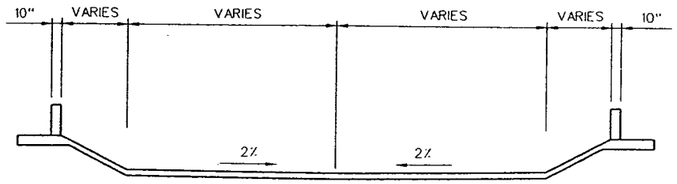


NOTE:
* MATCH EXISTING CHANNEL

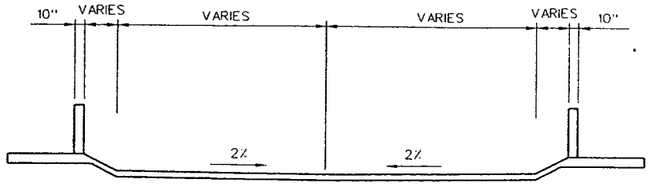
AT BEGINNING OF TRANSITION CHANNEL STA. 24+15.42



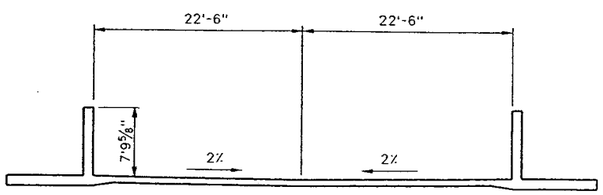
AT 3/4 POINT



AT 1/2 POINT



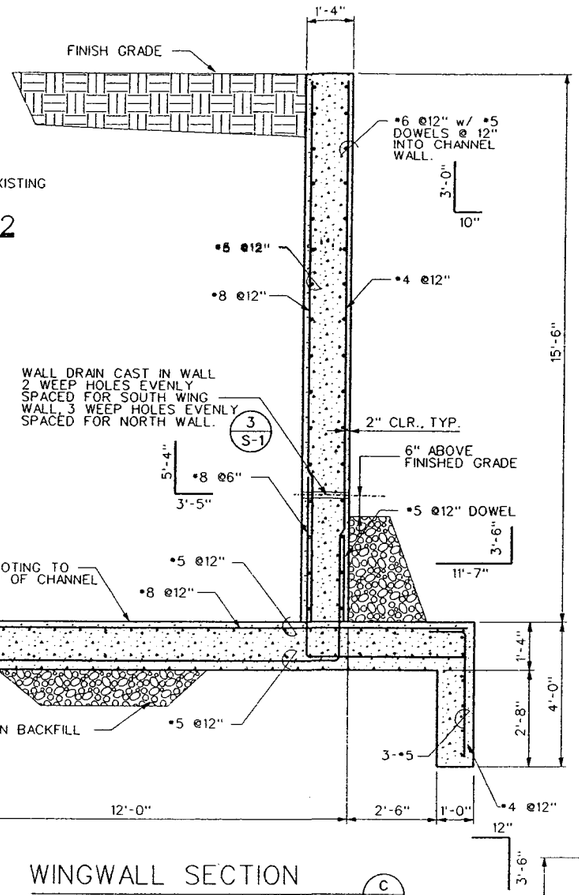
AT 1/4 POINT



AT END OF TRANSITION STA. 23+65.42

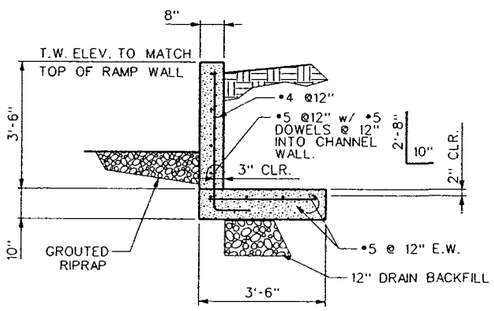
WALL SECTIONS AT TRANSITION CHANNEL STA. 23+65.42 TO STA. 24+15.42

SCALE: N.T.S. (1/S-8)



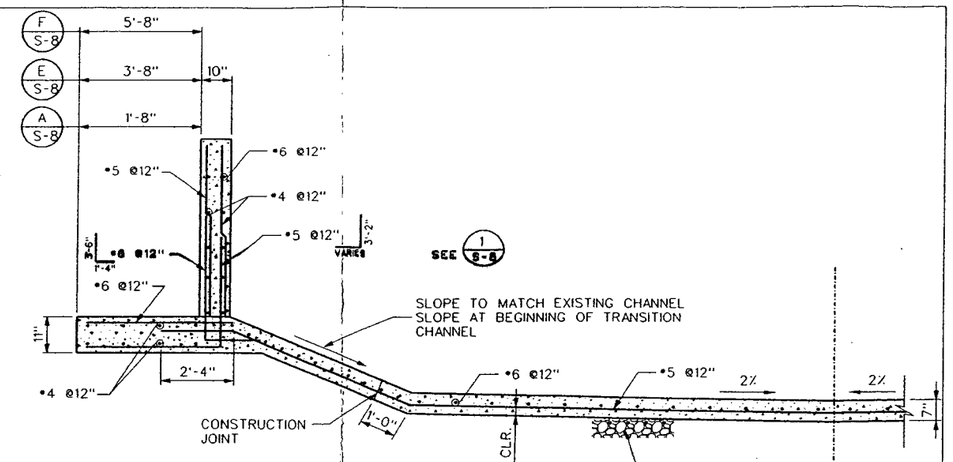
WINGWALL SECTION

SCALE: 1/2" = 1'-0" (C/S-8)



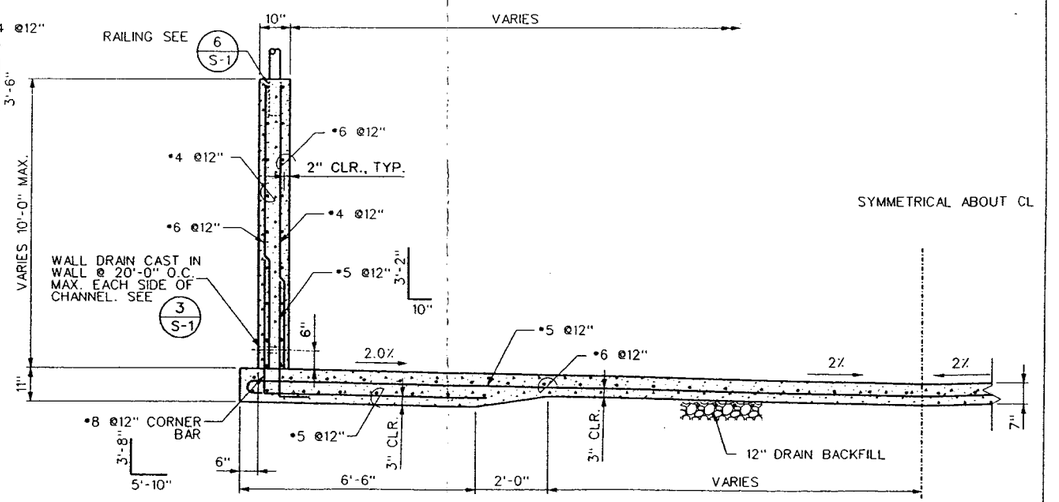
WINGWALL SECTION

SCALE: 1/2" = 1'-0" (D/S-8)



TRANSITION CHANNEL SECTION

SCALE: NTS (A/S-8, E/S-8, F/S-8)



CHANNEL SECTION

SCALE: 1/2" = 1'-0" (B/S-8)

R2H ENGINEERING INC.
CONSULTING STRUCTURAL ENGINEERS
840 GRIER DRIVE, SUITE 320
LAS VEGAS, NEVADA 89119
PHONE (702) 260-7000
FAX (702) 260-7070

00019-S08.DGN

REV No	DATE	DESCRIPTION	APPROVED

MWH MONTGOMERY WATSON HARZA
Las Vegas, Nevada
MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV. 89102
(702) 878-8010

FLAMINGO WASH

CHANNEL SECTIONS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

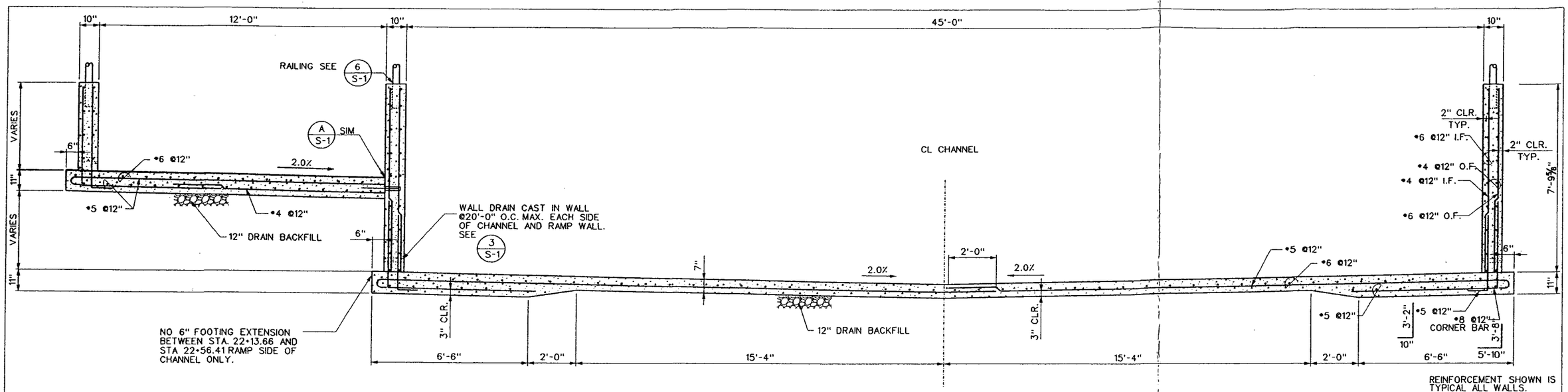
PROFESSIONAL ENGINEER - STATE OF NEVADA — DAVID W. SEELEY — No. 11175

DESIGNED BY:	DWS
DRAWN BY:	ALA
CHECKED BY:	DWS
DATE:	7/30/2001

SCALE	
HORIZ:	AS SHOWN
VERT:	AS SHOWN
FIELD BOOK	NONE

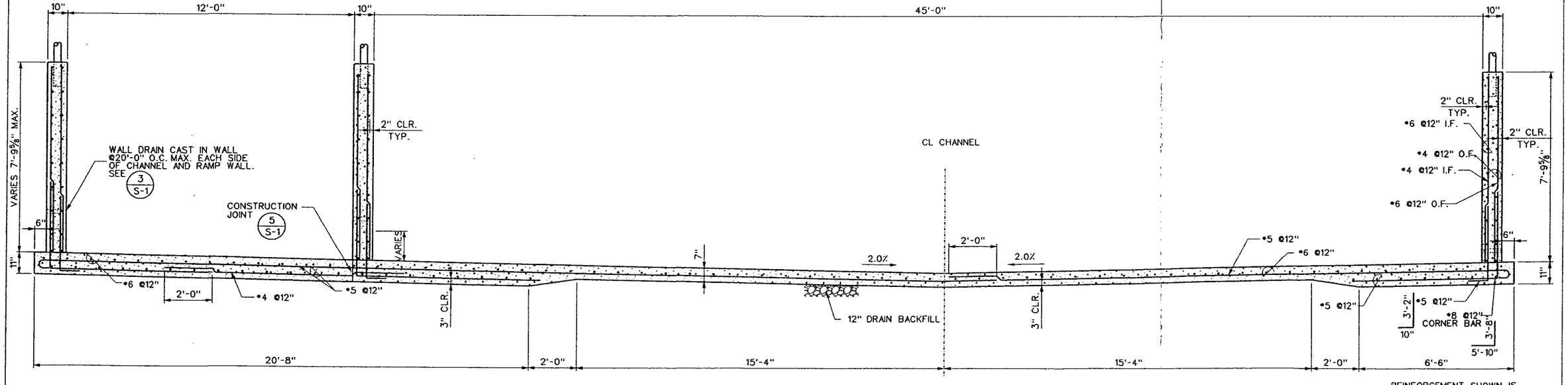
SHEET No **S-8**

L-1646



CHANNEL SECTION AT RAMP 2 (A/S-9)

SCALE: 1/2" = 1'-0"



CHANNEL SECTION AT RAMP 2 (B/S-9)

SCALE: 1/2" = 1'-0"

R2H ENGINEERING INC.
CONSULTING STRUCTURAL ENGINEERS
840 GRIER DRIVE, SUITE 320
LAS VEGAS, NEVADA 89119
PHONE (702) 260-7000
FAX (702) 260-7070

00019-S09.DGN

REV No	DATE	DESCRIPTION	APPROVED

MWH
MONTGOMERY WATSON HARZA
Las Vegas, Nevada
MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV. 89102
(702) 878-8010

FLAMINGO WASH

CHANNEL SECTIONS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

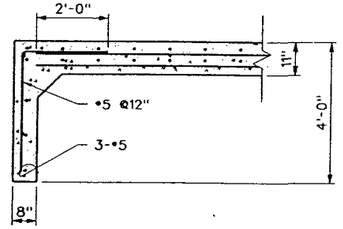
PROFESSIONAL ENGINEER-STATE OF NEVADA DAVID W. SEELEY NO. 11751 8/6/01

DESIGNED BY:	DWS
DRAWN BY:	ALA
CHECKED BY:	DWS
DATE:	7/30/2001

SCALE
HORIZ: AS SHOWN
VERT: AS SHOWN
FIELD BOOK NONE

SHEET No **S-9**

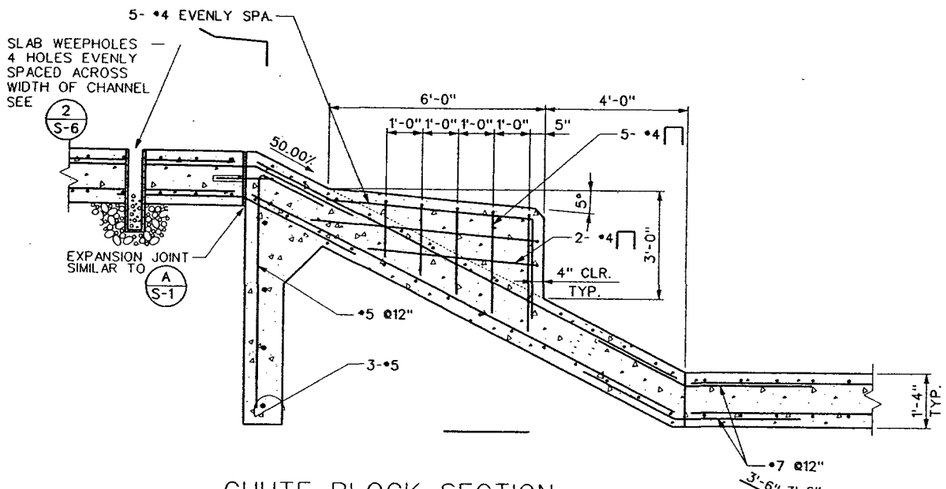
L-1646



CUTOFF RAMP SECTION

SCALE: 1/2" = 1'-0"

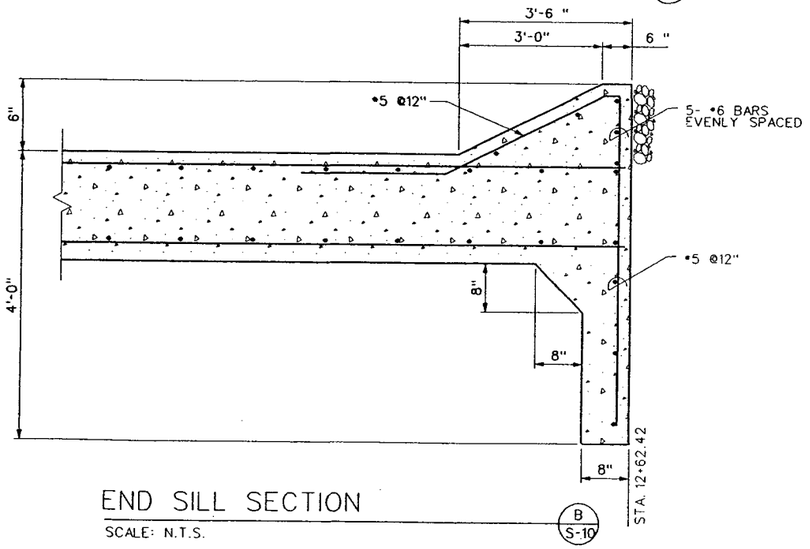
(1 / S-10)



CHUTE BLOCK SECTION

SCALE: 1/2" = 1'-0"

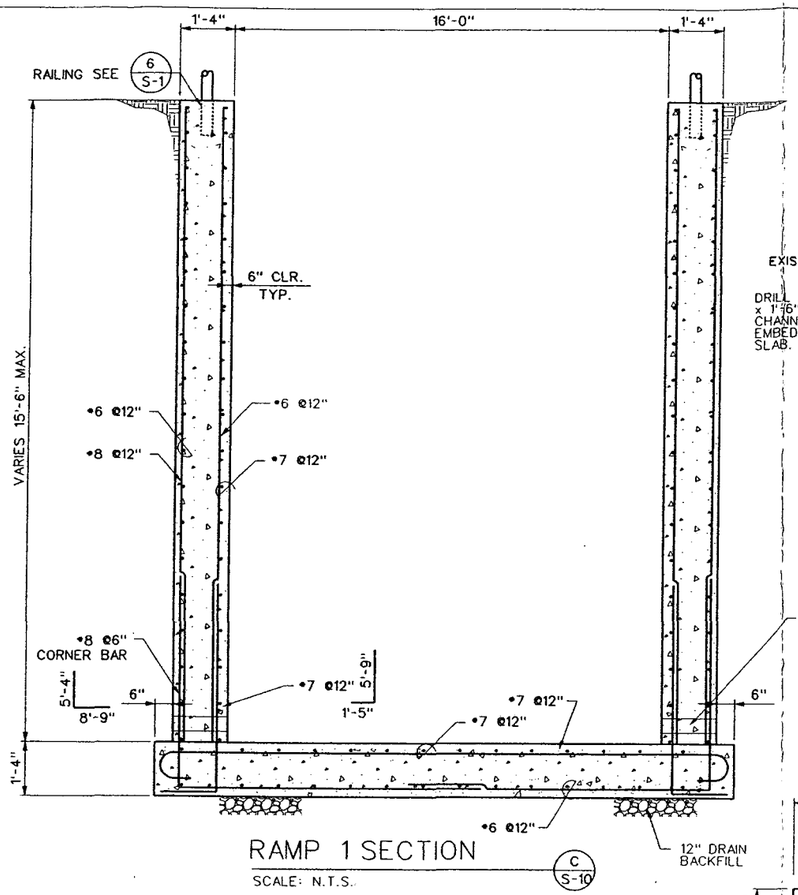
(A / S-10)



END SILL SECTION

SCALE: N.T.S.

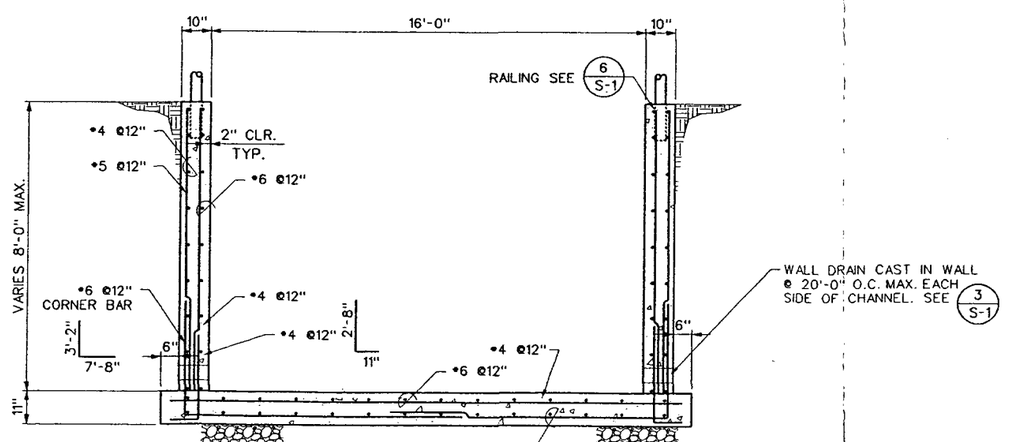
(B / S-10)



RAMP 1 SECTION

SCALE: N.T.S.

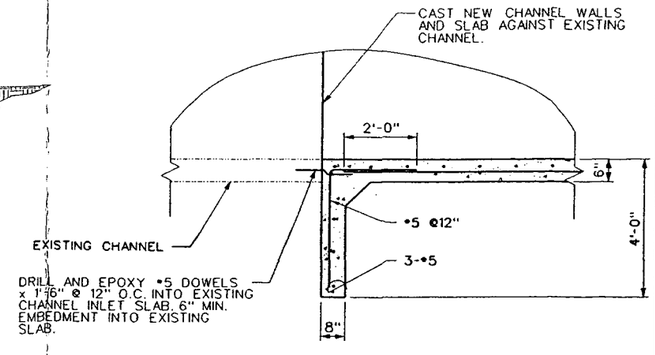
(C / S-10)



RAMP 1 SECTION

SCALE: N.T.S.

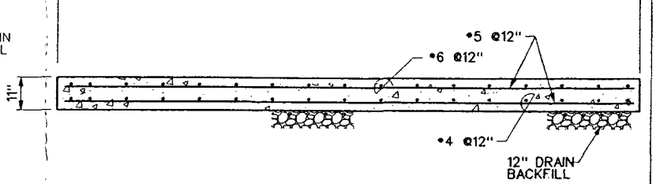
(D / S-10)



CUTOFF WALL SECTION

SCALE: 1/2" = 1'-0"

(E / S-10)



RAMP 1 SECTION

SCALE: 1/2" = 1'-0"

(F / S-10)

R2H ENGINEERING INC.
CONSULTING STRUCTURAL ENGINEERS
840 GRIER DRIVE, SUITE 320
LAS VEGAS, NEVADA 89119
PHONE (702) 260-7000
FAX (702) 260-7070

00019-S10.DGN

REV No	DATE	DESCRIPTION	APPROVED

MWH
MONTGOMERY WATSON HARZA
Las Vegas, Nevada
MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV. 89102
(702) 878-8010

FLAMINGO WASH

CHANNEL & RAMP SECTIONS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER - STATE OF NEVADA — DAVID W. SEELEY — No. 11751 — CIVIL

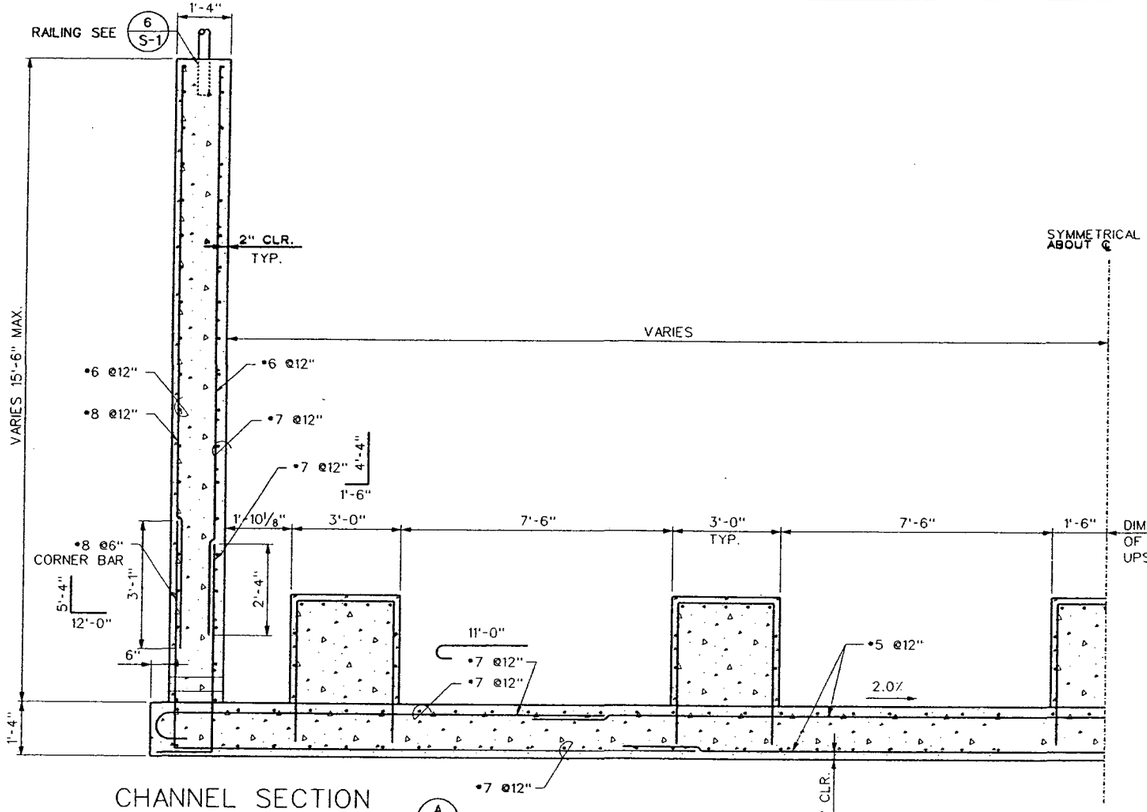
DESIGNED BY:	DWS
DRAWN BY:	ALA
CHECKED BY:	DWS
DATE:	7/30/2001

SCALE	
HORIZ:	AS SHOWN
VERT:	AS SHOWN
FIELD BOOK	NONE

SHEET No

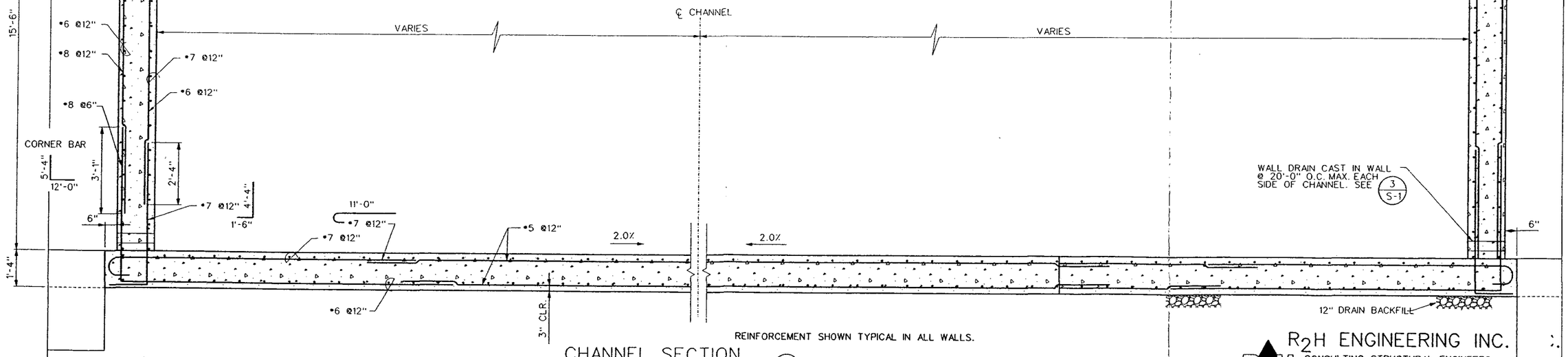
S-10

L-1646



CHANNEL SECTION

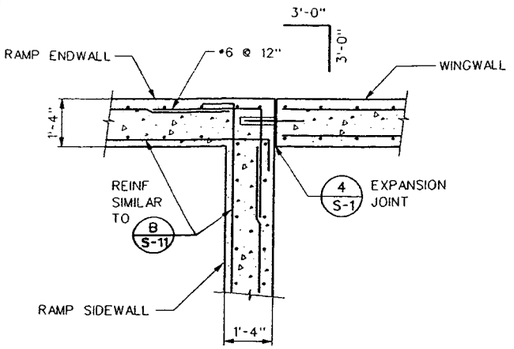
SCALE: N.T.S. (A/S-11)



REINFORCEMENT SHOWN TYPICAL IN ALL WALLS.

CHANNEL SECTION

SCALE: N.T.S. (B/S-11)



SECTION

SCALE: 1/2" = 1'-0" (C/S-11)

R2H ENGINEERING INC.
CONSULTING STRUCTURAL ENGINEERS
840 GRIER DRIVE, SUITE 320
LAS VEGAS, NEVADA 89119
PHONE (702) 260-7000
FAX (702) 260-7070

00019-S11.DGN

REV No	DATE	DESCRIPTION	APPROVED

MWH
MONTGOMERY WATSON HARZA
Las Vegas, Nevada
MONTGOMERY WATSON HARZA
3014 WEST CHARLESTON BLVD
LAS VEGAS, NV. 89102
(702) 878-8010

FLAMINGO WASH

CHANNEL SECTIONS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER - STATE OF NEVADA — DAVID W. SEELEY — CIVIL — No. 11151

DESIGNED BY:	DWS
DRAWN BY:	ALA
CHECKED BY:	DWS
DATE:	7/30/2001

SCALE	
HORIZ:	AS SHOWN
VERT:	AS SHOWN
FIELD BOOK	NONE

SHEET No **S-11**