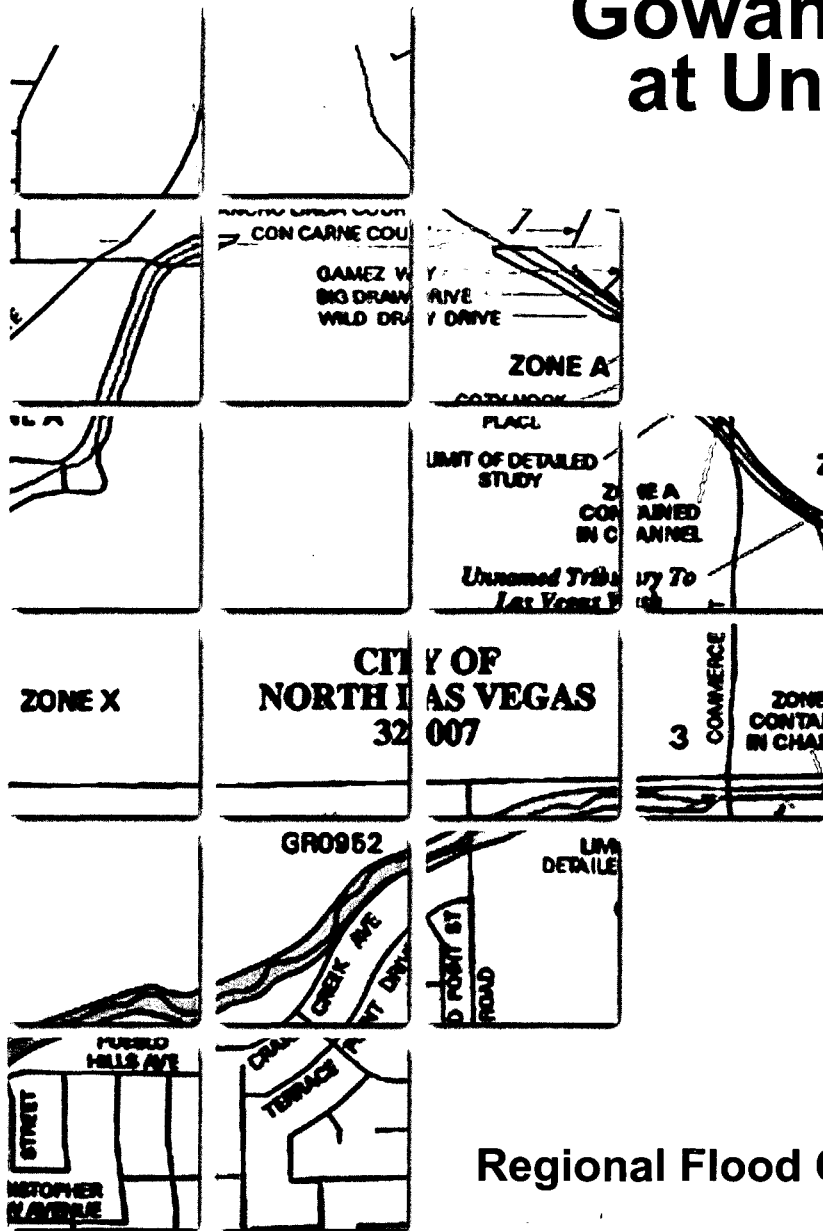


Request for Letter of Map Revision Gowan Outfall Channel at Unnamed Tributary

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



October 15, 2003



THE Louis Berger Group INC

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

04-09-0165P

December 11, 2003

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

**Re: GOWAN DETENTION BASIN OUTFALL
FEMA Case No. 04-09-0165P**

This letter is in response to your letter dated November 18, 2003 regarding the request for map revision for the above referenced project. Enclosed with this letter is the following information you requested in your letter:

- 1) Full size as-built plans (scale 1" = 40') for the project, and a letter, certified by a professional engineer, stating that the plans represent as-built conditions.
- 2) A CD-ROM containing all program files including "879-Gowan.prj".

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

RFCD
2003 DEC 11 PM 1:13

cc: Kevin Eubanks, Clark County Regional Flood Control District
Steven Casmus, Clark County Department of Public Works

Mayor
Michael L. Montandon

Council Members
William E. Robinson
Stephanie S. Smith
Shari Buck
Robert L. Eliason



Your Community of Choice

City Manager
Gregory E. Rose

Assistant City Manager
Dan Tarwater

Public Works Department - Development & Flood Control

2266 Civic Center Drive • North Las Vegas, Nevada 89030
Telephone: (702) 633-1200 • Fax: (702) 649-4696
www.cityofnorthlasvegas.com

December 10, 2003

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

Re: Gowan Detention Basin Outfall Structure

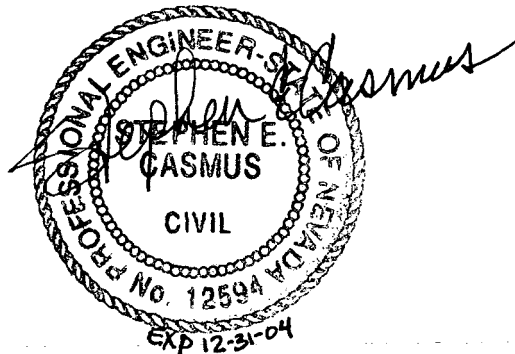
Dear Mr. Yuan:

This letter is written to certify "as-built" conditions for the subject project. The structure was constructed in substantial compliance with the project improvement plans signed and stamped by Dennis E. Fritz, P. E. (NV PE # 6758) on December 19, 1990 as recorded on the "as-built" revision dated September 28, 1992. The flood control structure is complete and functioning.

If you have any questions concerning this matter, please contact me at (702) 633-1912.

Sincerely,

Stephen E. Casmus, P. E.
Senior Engineer
Development and Flood Control Division

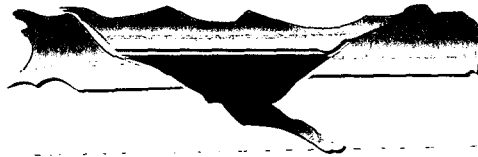


cc: Syndi Dudley, Louis Berger Group
Kevin Eubanks, Clark County Regional Flood Control District

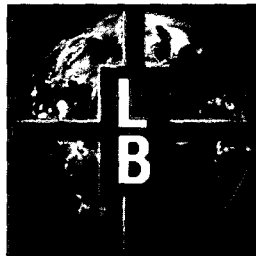
**Request for Letter of Map Revision
Gowan Outfall Channel
at Unnamed Tributary
Clark County, Nevada**

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

C L A R K C O U N T Y
REGIONAL FLOOD CONTROL DISTRICT



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



October 15, 2003



PROJECT SUMMARY

This submittal package provides hydraulic modeling and as-built plans in support of the request for a Letter of Map Revision for the Gowan Outfall Channel at its confluence with the Unnamed Tributary to the Las Vegas Wash.

The concrete-lined Gowan Outfall Channel was constructed approximately 12 years ago as part of the regional drainage system for the Gowan Detention Basin, located approximately 6 miles upstream of the study area. Prior to its construction, flood flows were naturally conveyed in a series of washes as shallow concentrated flow and sheet flow. Only the lower 800 ft of the natural wash has been designated as a 100-year flood hazard area, Zone 'A', on the effective FIRM (see Figure 1 in Appendix B). The limits of study are the upper boundary of the Zone 'A' and the confluence with the Unnamed Tributary.

As-built plans of the Gowan Outfall Channel are contained in Appendix E. At the upstream limits of the study, the Gowan Outfall Channel is trapezoidal, 7 ft deep with a 20 ft bottom width and 2:1 side slopes. Midway downstream, the channel transitions into a 30 ft x 7 ft rectangular concrete channel, and approximately 400 ft upstream of the confluence with the Unnamed Tributary the channel transitions into a 25 ft x 10 ft rectangular concrete channel for 300 ft. Just upstream of the confluence, the channel depth increases to 13 ft.

The hydrologic and hydraulic data used to delineate the Zone 'A' on the effective FIRM were not available for use in this study. However, the Flood Insurance Study for Clark County, Nevada and Incorporated Areas (revised: September 27, 2002) provides 100-year peak discharges for the Unnamed Tributary (see excerpt from FIS in Appendix C). At Lone Mountain Road, the 100-year peak discharge in the Unnamed Tributary is 4,890 cfs.

To be conservative, the Gowan Outfall Channel (a tributary to the Unnamed Tributary) was modeled using the flow rate of 4,890 cfs. A HEC-RAS model was prepared using the channel geometry from the as-built plans (see Appendix D). The model demonstrates that the entire 4,890 cfs would be contained within the Gowan Outfall Channel. Figure 3 in Appendix B is a work map showing the HEC-RAS cross section locations, study limits, and the existing and proposed limits of Flood Zone 'A'.



APPENDICES

A. FEMA Forms

FEMA 'Overview and Concurrence Form' – MT-2 Form 1
FEMA 'Riverine Hydrology & Hydraulics Form' – MT-2 Form 2
FEMA 'Hydraulic Structures Form' – MT-2 Form 3
Statement of Explanations

B. Figures

Figure 1 - Existing FEMA Flood Zone Map
Figure 2 - Annotated FEMA Flood Zone Map
Photographs
Figure 3 - Work Map

C. FIS Excerpt

D. Hydraulic Model

Post-Project Conditions HEC-RAS Output File

E. As-Built Plans

As-built plans - Gowan Detention Basin Outfall Structure

F. Data CD

Hydraulic Model electronic files
Check-RAS Output files

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
320007	City of North Las Vegas	NV	32003C	2160E	9/27/02

2. Flooding Source: Gowan Watershed

3. Project Name/Identifier: Gowan Detention Basin Outfall

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 ExplanationPlease see the FEMA Web site at http://www.fema.gov/fhm/fm_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 89119Daytime Telephone No.:
(702)-736-6632Fax No.:
(702)-736-0704

E-Mail Address: sdudley@louisberger.com

Signature of Requester (required):

Syndi J. Flippin-Dudley

Date:

10/20/03

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: Stephen E. Casmus, P.E., Senior Engineer, Development & Flood Control Division

Telephone No.:
(702)-633-1912

Community Name: City of North Las Vegas

Community Official's Signature (required):

Stephen E. Casmus

Date:

10-16-03

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, Ph.D., P.E.

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:

10/20/03

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)

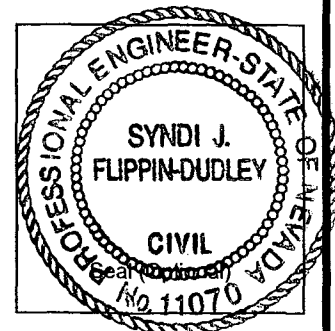
New or revised coastal elevations

☐ 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: Gowan Watershed
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.shtml.

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	Station 258+95 of the Gowan Outfall	80	N/A	2027.77
Upstream Limit	Station 228+00 of the Gowan Outfall	220	N/A	2057.19

2. Hydraulic Method Used

Hydraulic Analysis HEC-RAS [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/fhm_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:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: N/A	Floodway File Name:
Revised or Post-Project Conditions Model	Natural File Name: 879_Gowan.prj	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: Gowan Watershed

Note: Fill out one form for each flooding source studied

A. GENERAL

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

Channelizationcomplete Section B
Bridge/Culvertcomplete Section C
Damcomplete Section D
Levee/Floodwallcomplete Section E
Sediment Transport.....complete Section F (if required)

Description Of Structure

1. Name of Structure: Gowan Detention Basin Outfall

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

Location of Structure: 1,600 feet east of Camino Al Norte to the Western Tributary of Las Vegas Wash

Downstream Limit/Cross Section: 80

Upstream Limit/Cross Section: 220

2. Name of Structure:

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

Location of Structure:

Downstream Limit/Cross Section:

Upstream Limit/Cross Section:

3. Name of Structure:

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

Location of Structure:

Downstream Limit/Cross Section:

Upstream Limit/Cross Section:

NOTE: For more structures, attach additional pages as needed.

B. CHANNELIZATION

Flooding Source: Gowan Watershed

Name of Structure: Gowan Detention Basin Outfall

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 4,890 (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):

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:

Name of Structure:

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):

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) | ☐ Erosion Protection |
| ☐ Shape (culverts only) | ☐ Low Chord Elevations – Upstream and Downstream |
| ☐ Material | ☐ Top of Road Elevations – Upstream and Downstream |
| ☐ Beveling or Rounding | ☐ Structure Invert Elevations – Upstream and Downstream |
| ☐ Wing Wall Angle | ☐ Stream Invert Elevations – Upstream and Downstream |
| ☐ Skew Angle | ☐ Cross-Section Locations |
| ☐ Distances Between Cross Sections | |

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.
- ☐ structural floodwall
- ☐ Other (describe):

Station to
Station to
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

3.5 feet or more at the upstream end

4.0 feet within 100 feet upstream of all structures and/or constrictions

☐ Yes ☐ No
☐ Yes ☐ No
☐ 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)

E. LEVEE/FLOODWALL (CONTINUED)

4. Embankment Protection (continued)

- f. Is a bedding/filter analysis and design attached? ☐ Yes ☐ No
- g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

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

☐ Overall height: Sta. ; height ft.

☐ Limiting foundation soil strength:

Sta. , depth to

strength ϕ = degrees, c = psf

slope: SS = (h) to (v)

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

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

- c. Summary of stability analysis results:

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

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

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

If Yes, describe methodology used:

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

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

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

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

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability

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

☐ UBC (1988) or ☐ Other (specify):

b. Stability analysis submitted provides for:

☐ Overturning ☐ Sliding If not, explain:

c. Loading included in the analyses were:

☐ Lateral earth @ $P_A =$ psf; $P_p =$ psf

☐ Surcharge-Slope @ , ☐ surface psf

☐ Wind @ $P_w =$ psf

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

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

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

d. Summary of Stability Analysis Results: Factors of Safety.

Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

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

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)

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

e. Foundation bearing strength for each soil type:

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

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

Attach engineering analysis to support construction plans.

E. LEVEE/FLOODWALL (CONTINUED)

7. Settlement

- a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☐ Yes ☐ No
- b. The computed range of settlement is ft. to ft.
- c. Settlement of the levee crest is determined to be primarily from :
- ☐ Foundation consolidation
- ☐ Embankment compression
- ☐ Other (Describe):
- d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.
- Attach engineering analysis to support construction plans.

8. Interior Drainage

- a. Specify size of each interior watershed:
- Draining to pressure conduit: acres
- Draining to ponding area: acres
- b. Relationships Established
- Ponding elevation vs. storage ☐ Yes ☐ No
- Ponding elevation vs. gravity flow ☐ Yes ☐ No
- Differential head vs. gravity flow ☐ Yes ☐ No
- c. The river flow duration curve is enclosed: ☐ Yes ☐ No
- d. Specify the discharge capacity of the head pressure conduit: cfs
- e. Which flooding conditions were analyzed?
- Gravity flow (Interior Watershed) ☐ Yes ☐ No
 - Common storm (River Watershed) ☐ Yes ☐ No
 - Historical ponding probability ☐ Yes ☐ No
 - Coastal wave overtopping ☐ Yes ☐ No
- If No for any of the above, attach explanation.
- f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☐ Yes ☐ No
- If No, attach explanation.
- g. The rate of seepage through the levee system for the base flood is cfs
- h. The length of levee system used to drive this seepage rate in item g: ft.

E. LEVEE/FLOODWALL (CONTINUED)

8. Interior Drainage (continued)

- i. Will pumping plants be used for interior drainage?

☐ Yes ☐ No

If Yes, include the number of pumping plants:

For each pumping plant, list:

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

Will the operation be automatic?

☐ Yes ☐ No

If the pumps are electric, are there backup power sources?

☐ Yes ☐ No

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

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

9. Other Design Criteria

- a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem

Hydrocompaction ☐ is ☐ is not a problem

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

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

Attach supporting documentation

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

Attach supporting documentation

- d. Sediment Transport Considerations:

Was sediment transport considered? ☐ Yes ☐ No If Yes, then fill out Section F (Sediment Transport).

If No, then attach your explanation for why sediment transport was not considered.

E. LEVEE/FLOODWALL (CONTINUED)

10. Operational Plan And Criteria

- a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No
- b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations?
☐ Yes ☐ No
- c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations?
☐ Yes ☐ No

If the answer is No to any of the above, please attach supporting documentation.

11. Maintenance Plan

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

12. Operations and Maintenance Plan

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

F. SEDIMENT TRANSPORT

Flooding Source:

Name of Structure:

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

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

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

Sediment transport rate (percent concentration by volume)

Method used to estimate sediment transport:

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

Method used to estimate scour and/or deposition:

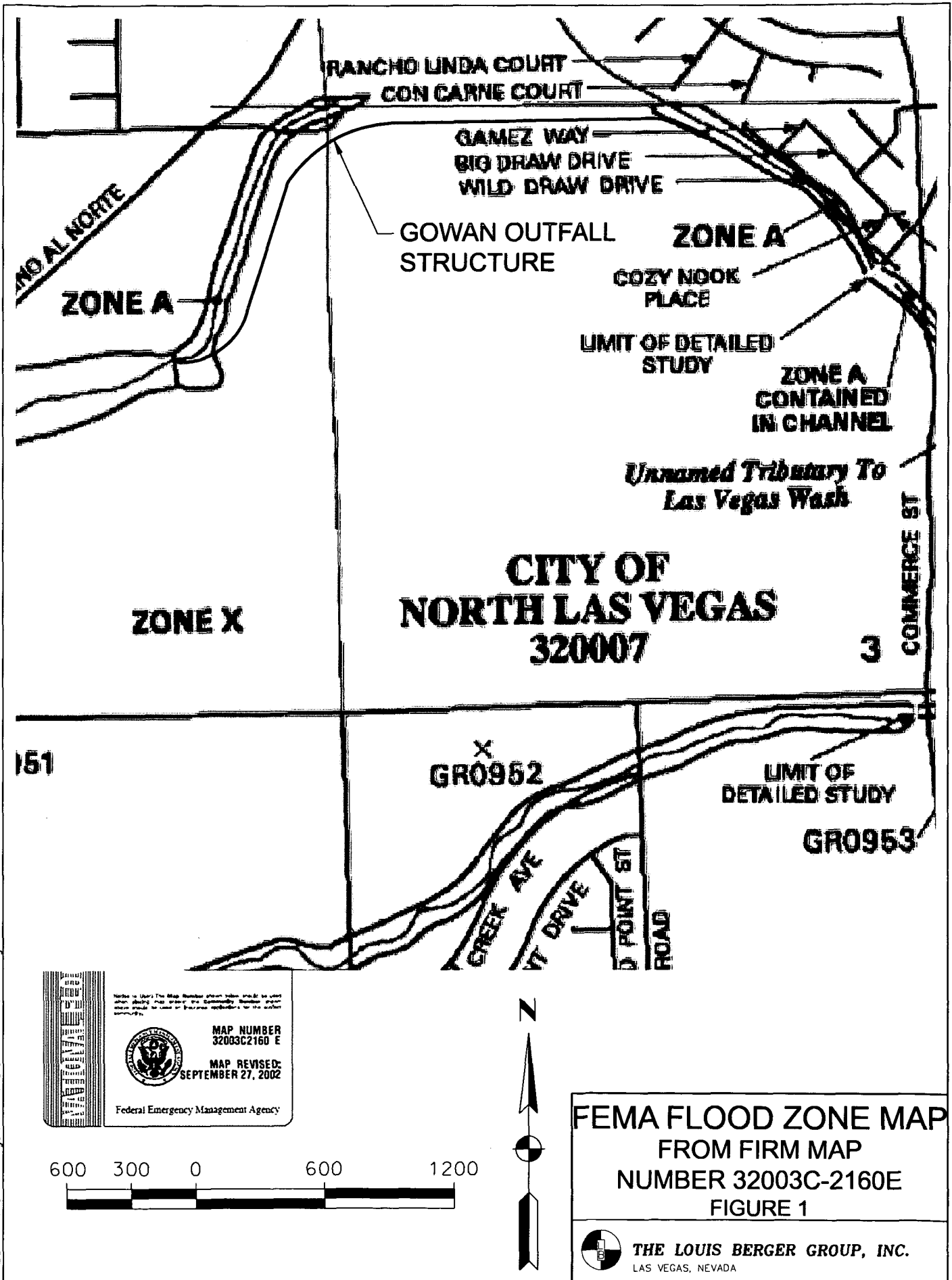
Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport:

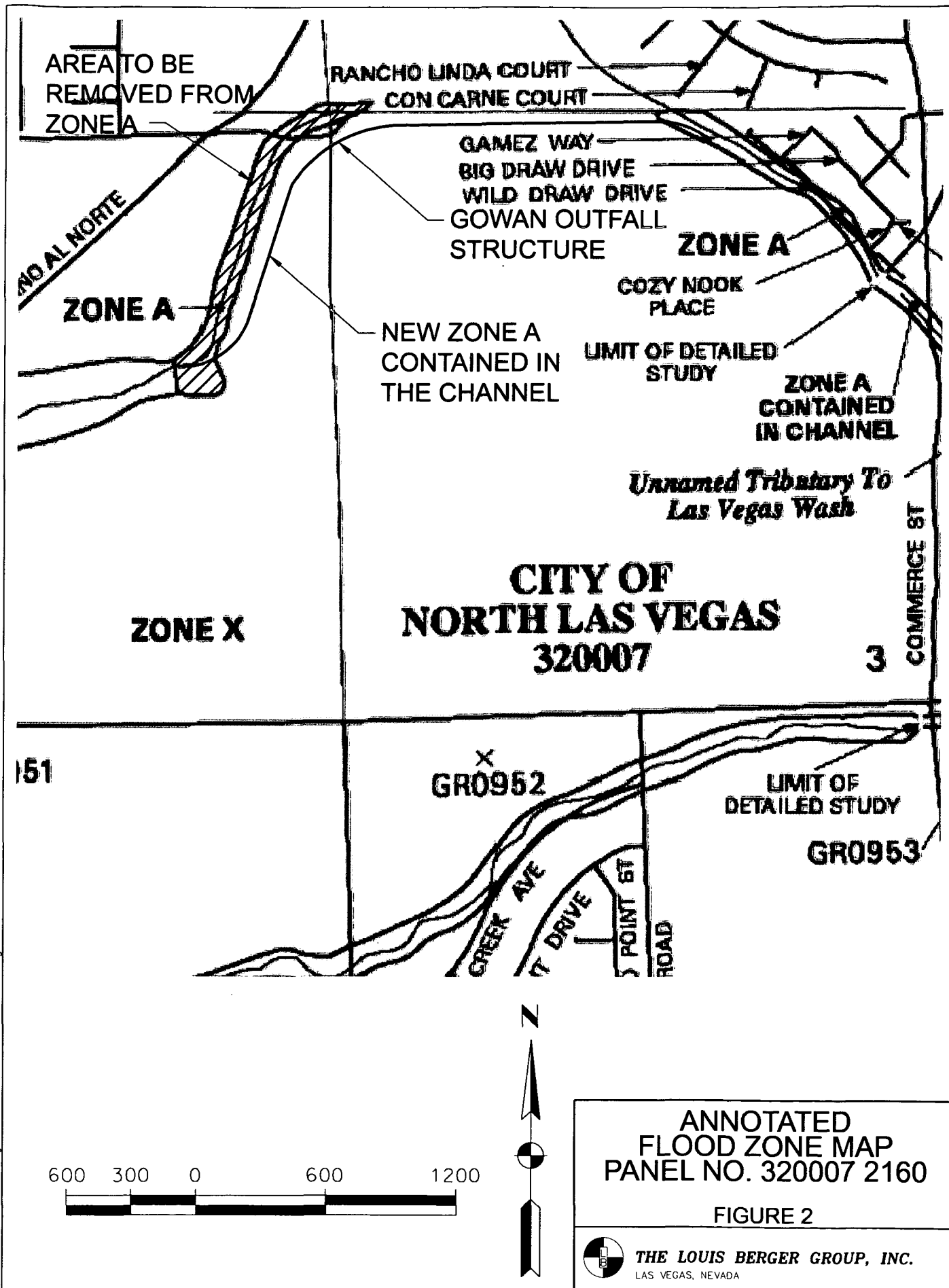
Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

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

APPENDIX B

Figures





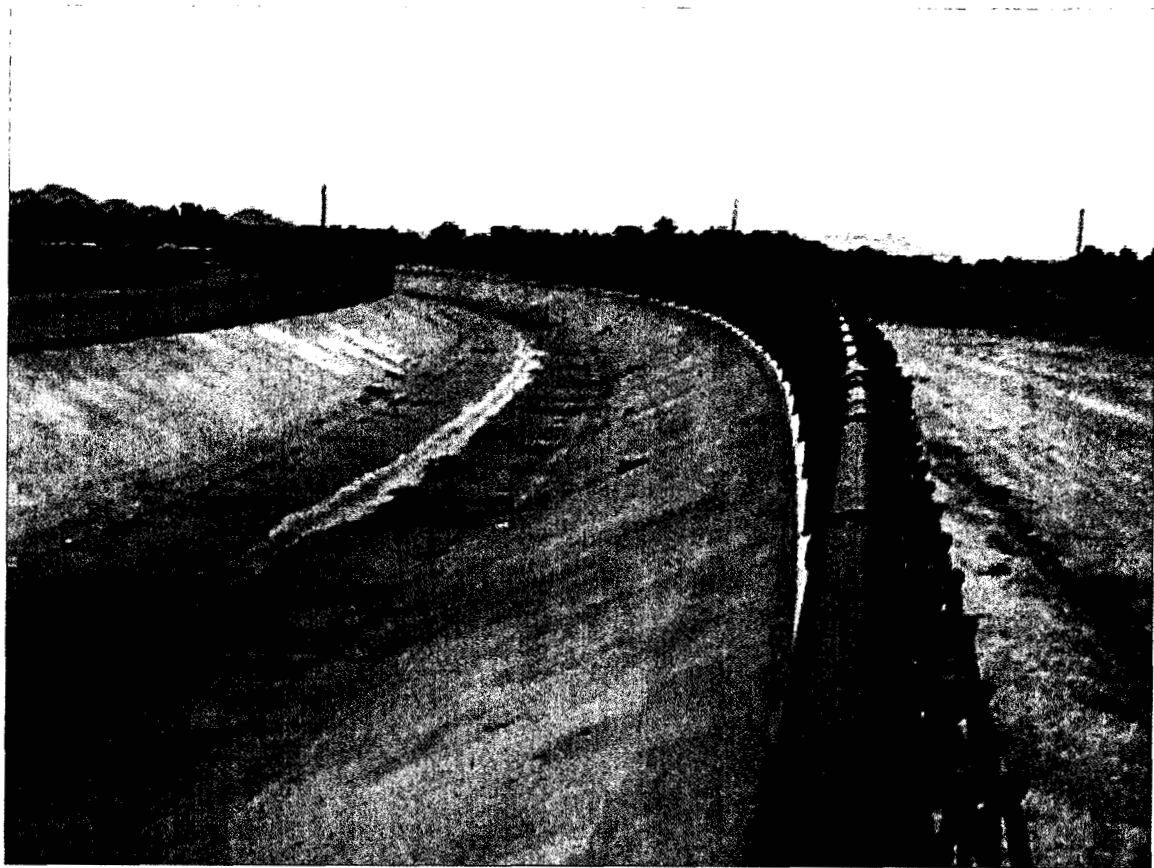


Photo 1: Gowan Outfall at the upstream limit of the study looking downstream.



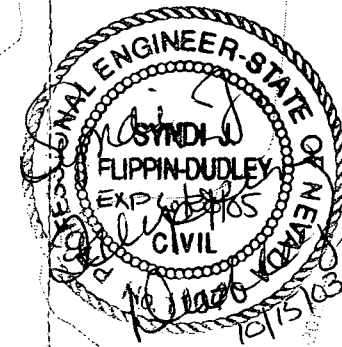
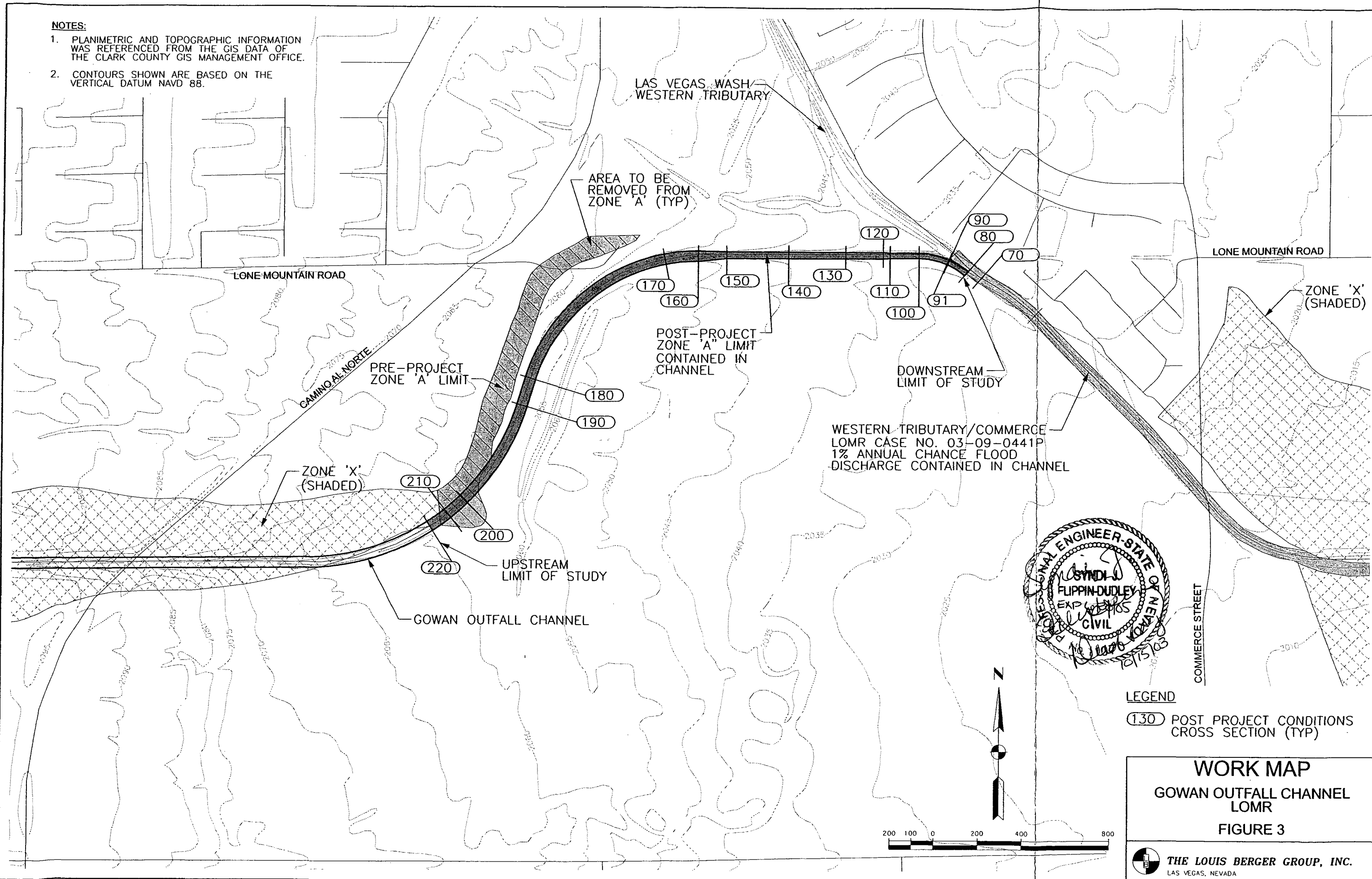
Photo 2: Gowan Outfall looking downstream at the transition to a rectangular channel.



Photo 3: Gowanus Outfall looking downstream at the transition from a 30' wide channel to a 25' wide channel.

NOTES:

1. PLANIMETRIC AND TOPOGRAPHIC INFORMATION WAS REFERENCED FROM THE GIS DATA OF THE CLARK COUNTY GIS MANAGEMENT OFFICE.
2. CONTOURS SHOWN ARE BASED ON THE VERTICAL DATUM NAVD 88.



LEGEND

(130) POST PROJECT CONDITIONS CROSS SECTION (TYP)

WORK MAP
GOWAN OUTFALL CHANNEL LOMR
FIGURE 3

 **THE LOUIS BERGER GROUP, INC.**
 LAS VEGAS, NEVADA

APPENDIX C

FIS Excerpt

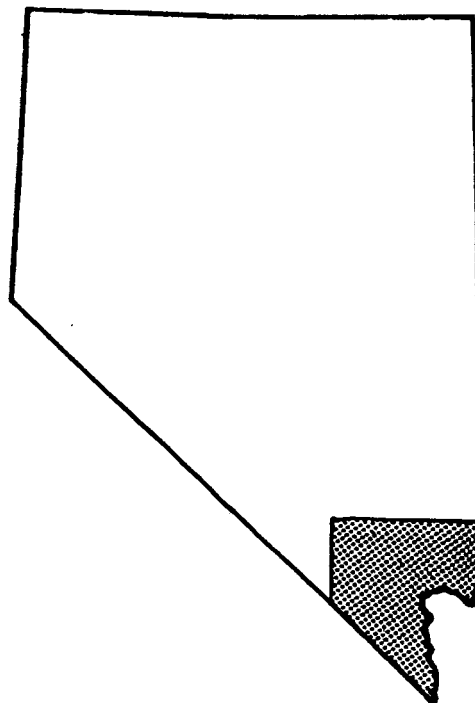
FLOOD INSURANCE STUDY



CLARK COUNTY, NEVADA AND INCORPORATED AREAS

32003CV000

COMMUNITY NAME	COMMUNITY NUMBER
BOULDER CITY, CITY OF	320004
HENDERSON, CITY OF	320005
LAS VEGAS, CITY OF	325276
MESQUITE, CITY OF	320035
NORTH LAS VEGAS, CITY OF	320007
CLARK COUNTY, UNINCORPORATED AREAS	320003



REVISED: SEPTEMBER 27, 2002



Federal Emergency Management Agency

Table 3. Summary of Discharges (Cont'd)

<u>Flooding Source and Location</u>	<u>Drainage Area (Square Miles)</u>	<u>Peak Discharges (Cubic Feet per Second)</u>			
		<u>10-Year</u>	<u>50-Year</u>	<u>100-Year</u>	<u>500-Year</u>
Union Pacific Railroad Overflow					
At Las Vegas Wash	-- ¹	1,860	4,970	6,380	11,100
At Middle Tributary to Las Vegas Wash	-- ¹	1,240	4,260	5,300	8,600
Unnamed Fan					
(Just West of Blue Diamond Fan)					
At Apex	1.3	140	660	1,140	3,460
Unnamed Tributary to Las Vegas Wash					
At Lone Mountain Road	126	2,120	4,060	4,890	7,850
At Craig Road	-- ²	1,560	3,500	4,330	6,550
Below Intestate 15	177	3,000	5,720	6,870	9,100
Below Civic Center Drive	-- ²	3,000	5,720	5,970	7,100
Wash B					
At Cross Section A	0.41	140	255	315	460
Wash C					
At Cross Section A	1.04	120	265	335	490
At Cross Section C	0.81	90	195	250	390
At Cross Section D	0.60	70	150	195	300
Wash D					
At Cross Section D	1.38	205	400	490	740
West Branch Muddy River					
Downstream of Cooper Avenue	-- ³	100	2,450	9,000	20,900
Virgin River					
At Bunkerville Bridge	-- ¹	-- ¹	-- ¹	34,400	-- ¹

¹Discharge Not Available²Flow affected by upstream overflows, diversions, or obstructions; drainage area does not apply³Flow due to overflows from Muddy River

APPENDIX D
Hydraulic Models

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

```

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

```

PROJECT DATA

Project Title: Gowan Outfall Letter of Map Revision
 Project File : 879_Gowan.prj
 Run Date and Time: 9/5/2003 2:35:08 PM

Project in English units

Project Description:

LETTER OF MAP REVISION
 GOWAN OUTFALL STRUCTURE
 LONE MOUNTAIN ROAD TO WESTERN TRIBUTARY
 DATUM = NAVD88
 SUPER CRITICAL STARTING WSE = NORMAL DEPTH
 SUPERCRITICAL RUN

PLAN DATA

Plan Title: Gowan Outfall Letter of Map Revision
 Plan File : E:\879-Gowan\HEC-Ras\879_Gowan.p01

Geometry Title: Gowan Outfall
 Geometry File : E:\879-Gowan\HEC-Ras\879_Gowan.g01

Flow Title : FIS 100-Year Flow
 Flow File : E:\879-Gowan\HEC-Ras\879_Gowan.f01

Plan Summary Information:

Number of:	Cross Sections =	76	Multiple Openings =	0
	Culverts =	0	Inline Weirs =	0
	Bridges =	0		

Computational Information

Water surface calculation tolerance = 0.01
 Critical depth calculation tolerance = 0.01

Maximum number of iterations = 20
 Maximum difference tolerance = 0.3
 Flow tolerance factor = 0.001

Computation Options

Critical depth computed at all cross sections
 Conveyance Calculation Method: At breaks in n values only
 Friction Slope Method: Average Conveyance
 Computational Flow Regime: Supercritical Flow

FLOW DATA

Flow Title: FIS 100-Year Flow
 Flow File : E:\879-Gowan\HEC-Ras\879_Gowan.f01

Flow Data (cfs)

River	Reach	RS	PF 1
Gowan Outfall	1	220	4890

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Gowan Outfall	1	PF 1	Normal S = .006	Normal S = .01

GEOMETRY DATA

Geometry Title: Gowan Outfall
 Geometry File : E:\879-Gowan\HEC-Ras\879_Gowan.g01

CROSS SECTION RIVER: Gowan Outfall
 REACH: 1 RS: 220

INPUT

Description: Station 228+00 (Begin Study)

Station Elevation Data		num=						
Sta	Elev	7	Sta	Elev	Sta	Elev	Sta	Elev
56	2058.62		76	2057.62	90	2050.62	100	2050.42
124	2057.62		124	2058.62			110	2050.62

Manning's n Values		num=				
Sta	n Val	3	Sta	n Val	Sta	n Val
56	.025		76	.014	124	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	76	124		97.57	100 102.44	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			879_Gowan.rep		
		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2064.88	Wt. n-Val.		0.014	
Vel Head (ft)	7.69	Reach Len. (ft)	97.57	100.00	102.44
W.S. Elev (ft)	2057.19	Flow Area (sq ft)		219.80	
Crit W.S. (ft)	2059.71	Area (sq ft)		219.80	
E.G. Slope (ft/ft)	0.006002	Flow (cfs)		4890.00	
Q Total (cfs)	4890.00	Top Width (ft)		46.29	
Top Width (ft)	46.29	Avg. Vel. (ft/s)		22.25	
Vel Total (ft/s)	22.25	Hydr. Depth (ft)		4.75	
Max Chl Dpth (ft)	6.77	Conv. (cfs)		63117.0	
Conv. Total (cfs)	63117.0	Wetted Per. (ft)		49.39	
Length Wtd. (ft)	100.00	Shear (lb/sq ft)		1.67	
Min Ch El (ft)	2050.42	Stream Power (lb/ft s)		37.10	
Alpha	1.00	Cum Volume (acre-ft)		14.78	
Frctn Loss (ft)		Cum SA (acres)		2.85	
C & E Loss (ft)					

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.

CROSS SECTION RIVER: Gownan Outfall
REACH: 1 RS: 210

INPUT

Description: Station 229+00

Station Elevation Data		num=	7			
Sta	Elev	Sta	Elev	Sta	Elev	Sta Elev
56	2058.02	76	2057.02	90	2050.02	100 2049.82
124	2057.02	124	2058.02			110 2050.02

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
56	.025	76	.014	124	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	76	124		97.57	100 102.44	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2064.28	Wt. n-Val.		0.014	
Vel Head (ft)	7.69	Reach Len. (ft)	97.57	100.00	102.44
W.S. Elev (ft)	2056.59	Flow Area (sq ft)		219.79	
Crit W.S. (ft)	2059.11	Area (sq ft)		219.79	
E.G. Slope (ft/ft)	0.006003	Flow (cfs)		4890.00	
Q Total (cfs)	4890.00	Top Width (ft)		46.29	
Top Width (ft)	46.29	Avg. Vel. (ft/s)		22.25	
Vel Total (ft/s)	22.25	Hydr. Depth (ft)		4.75	
Max Chl Dpth (ft)	6.77	Conv. (cfs)		63111.4	
Conv. Total (cfs)	63111.4	Wetted Per. (ft)		49.39	
Length Wtd. (ft)	100.00	Shear (lb/sq ft)		1.67	
Min Ch El (ft)	2049.82	Stream Power (lb/ft s)		37.11	
Alpha	1.00	Cum Volume (acre-ft)		14.27	
Frctn Loss (ft)	0.60	Cum SA (acres)		2.74	
C & E Loss (ft)	0.00				

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 200

INPUT

Description: Station 230+00

Station Elevation Data		num=	7						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
56	2057.42	76	2056.42	90	2049.42	100	2049.22	110	2049.42
124	2056.42	124	2057.42						

Manning's n Values		num=	3			
Sta	n Val	Sta	n Val	Sta	n Val	
56	.025	76	.014	124	.025	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	76	124		97.57	100 102.44	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2063.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.69	Wt. n-Val.		0.014	
W.S. Elev (ft)	2055.99	Reach Len. (ft)	97.57	100.00	102.44
Crit W.S. (ft)	2058.51	Flow Area (sq ft)		219.79	
E.G. Slope (ft/ft)	0.006003	Area (sq ft)		219.79	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	46.29	Top Width (ft)		46.29	
Vel Total (ft/s)	22.25	Avg. Vel. (ft/s)		22.25	
Max Chl Dpth (ft)	6.77	Hydr. Depth (ft)		4.75	
Conv. Total (cfs)	63111.4	Conv. (cfs)		63111.4	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		49.39	
Min Ch El (ft)	2049.22	Shear (lb/sq ft)		1.67	
Alpha	1.00	Stream Power (lb/ft s)		37.11	
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)		13.77	
C & E Loss (ft)	0.00	Cum SA (acres)		2.64	

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 198

INPUT

Description: Station 231+00

Station Elevation Data		num=	7						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
56	2056.82	76	2055.82	90	2048.82	100	2048.62	110	2048.82
124	2055.82	124	2056.82						

Manning's n Values		num=	3			
Sta	n Val	Sta	n Val	Sta	n Val	
56	.025	76	.014	124	.025	

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
76	124	97.57	100	102.44	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2063.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.69	Wt. n-Val.		0.014	
W.S. Elev (ft)	2055.39	Reach Len. (ft)	97.57	100.00	102.44
Crit W.S. (ft)	2057.91	Flow Area (sq ft)		219.79	
E.G. Slope (ft/ft)	0.006003	Area (sq ft)		219.79	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	46.29	Top Width (ft)		46.29	
Vel Total (ft/s)	22.25	Avg. Vel. (ft/s)		22.25	
Max Chl Dpth (ft)	6.77	Hydr. Depth (ft)		4.75	
Conv. Total (cfs)	63111.4	Conv. (cfs)		63111.4	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		49.39	
Min Ch El (ft)	2048.62	Shear (lb/sq ft)		1.67	
Alpha	1.00	Stream Power (lb/ft s)		37.11	
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)		13.26	
C & E Loss (ft)	0.00	Cum SA (acres)		2.53	

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 196

INPUT

Description: Station 232+00

Station Elevation Data	num=	7
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
56 2056.22 76 2055.22 90 2048.22 100 2048.02 110 2048.22		
124 2055.22 124 2056.22		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
56 .025 76 .014 124 .025		

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
76	124	97.57	100	102.44	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2062.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.69	Wt. n-Val.		0.014	
W.S. Elev (ft)	2054.79	Reach Len. (ft)	97.57	100.00	102.44
Crit W.S. (ft)	2057.31	Flow Area (sq ft)		219.79	
E.G. Slope (ft/ft)	0.006003	Area (sq ft)		219.79	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	46.29	Top Width (ft)		46.29	
Vel Total (ft/s)	22.25	Avg. Vel. (ft/s)		22.25	
Max Chl Dpth (ft)	6.77	Hydr. Depth (ft)		4.75	
Conv. Total (cfs)	63111.4	Conv. (cfs)		63111.4	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		49.39	

Min Ch El (ft)	2048.02	Shear (lb/sq ft)	1.67
Alpha	1.00	Stream Power (lb/ft s)	37.11
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)	12.76
C & E Loss (ft)	0.00	Cum SA (acres)	2.43

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.

CROSS SECTION RIVER: Gownan Outfall
REACH: 1 RS: 194

INPUT

Description: Station 233+00

Station Elevation Data		num=	7				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
56	2055.62	76	2054.62	90	2047.62	100	2047.42
124	2054.62	124	2055.62				

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
56	.025	76	.014
		124	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	76	124		97.56	100 102.44	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2061.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.69	Wt. n-Val.		0.014	
W.S. Elev (ft)	2054.19	Reach Len. (ft)	97.56	100.00	102.44
Crit W.S. (ft)	2056.69	Flow Area (sq ft)		219.79	
E.G. Slope (ft/ft)	0.006003	Area (sq ft)		219.79	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	46.29	Top Width (ft)		46.29	
Vel Total (ft/s)	22.25	Avg. Vel. (ft/s)		22.25	
Max Chl Dpth (ft)	6.77	Hydr. Depth (ft)		4.75	
Conv. Total (cfs)	63113.3	Conv. (cfs)		63113.3	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		49.39	
Min Ch El (ft)	2047.42	Shear (lb/sq ft)		1.67	
Alpha	1.00	Stream Power (lb/ft s)		37.10	
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)		12.26	
C & E Loss (ft)	0.00	Cum SA (acres)		2.32	

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.

CROSS SECTION RIVER: Gownan Outfall
REACH: 1 RS: 192

INPUT

Description: Station 234+00

Station Elevation Data		num=	7				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

56 2055.02 76 2054.02 90 2047.02 100 2046.82 110 2047.02
 124 2054.02 124 2055.02

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 56 .025 76 .014 124 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 76 124 97.56 100 102.44 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2061.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.69	Wt. n-Val.		0.014	
W.S. Elev (ft)	2053.59	Reach Len. (ft)	97.56	100.00	102.44
Crit W.S. (ft)	2056.11	Flow Area (sq ft)		219.79	
E.G. Slope (ft/ft)	0.006003	Area (sq ft)		219.79	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	46.29	Top Width (ft)		46.29	
Vel Total (ft/s)	22.25	Avg. Vel. (ft/s)		22.25	
Max Chl Dpth (ft)	6.77	Hydr. Depth (ft)		4.75	
Conv. Total (cfs)	63112.0	Conv. (cfs)		63112.0	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		49.39	
Min Ch El (ft)	2046.82	Shear (lb/sq ft)		1.67	
Alpha	1.00	Stream Power (lb/ft s)		37.11	
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)		11.75	
C & E Loss (ft)	0.00	Cum SA (acres)		2.21	

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.

CROSS SECTION RIVER: Gowan Outfall
 REACH: 1 RS: 191

INPUT

Description: Station 235+00

Station Elevation Data num= 7
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev
 56 2054.42 76 2053.42 90 2046.42 100 2046.22 110 2046.42
 124 2053.42 124 2054.42

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 56 .025 76 .014 124 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 76 124 9.27 9.5 9.73 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2060.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.69	Wt. n-Val.		0.014	
W.S. Elev (ft)	2052.99	Reach Len. (ft)	9.27	9.50	9.73
Crit W.S. (ft)	2055.51	Flow Area (sq ft)		219.79	
E.G. Slope (ft/ft)	0.006004	Area (sq ft)		219.79	

Q Total (cfs)	4890.00	Flow (cfs)	4890.00
Top Width (ft)	46.29	Top Width (ft)	46.29
Vel Total (ft/s)	22.25	Avg. Vel. (ft/s)	22.25
Max Chl Dpth (ft)	6.77	Hydr. Depth (ft)	4.75
Conv. Total (cfs)	63110.1	Conv. (cfs)	63110.1
Length Wtd. (ft)	9.50	Wetted Per. (ft)	49.39
Min Ch El (ft)	2046.22	Shear (lb/sq ft)	1.67
Alpha	1.00	Stream Power (lb/ft s)	37.11
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)	11.25
C & E Loss (ft)	0.00	Cum SA (acres)	2.11

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 190

INPUT

Description: Station 235+09.55 (PT)

Station Elevation Data		num=	7						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
56	2054.36	76	2053.36	90	2046.36	100	2046.16	110	2046.36
124	2053.36	124	2054.36						

Manning's n Values		num=	3			
Sta	n Val	Sta	n Val	Sta	n Val	
56	.025	76	.014	124	.025	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	76	124		90.45	90.45	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2060.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.68	Wt. n-Val.		0.014	
W.S. Elev (ft)	2052.93	Reach Len. (ft)	90.45	90.45	90.45
Crit W.S. (ft)	2055.43	Flow Area (sq ft)		219.92	
E.G. Slope (ft/ft)	0.005994	Area (sq ft)		219.92	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	46.30	Top Width (ft)		46.30	
Vel Total (ft/s)	22.24	Avg. Vel. (ft/s)		22.24	
Max Chl Dpth (ft)	6.77	Hydr. Depth (ft)		4.75	
Conv. Total (cfs)	63162.5	Conv. (cfs)		63162.5	
Length Wtd. (ft)	90.45	Wetted Per. (ft)		49.40	
Min Ch El (ft)	2046.16	Shear (lb/sq ft)		1.67	
Alpha	1.00	Stream Power (lb/ft s)		37.04	
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)		11.20	
C & E Loss (ft)	0.00	Cum SA (acres)		2.10	

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.

CROSS SECTION RIVER: Gownan Outfall

REACH: 1

RS: 185

INPUT

Description: Station 236+00.00

Station Elevation Data		num=	7
Sta	Elev	Sta	Elev
76	2054.32	76	2052.82
124	2052.82	124	2053.82

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
76	.025	76	.014
		124	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	76	124		38.83	38.83	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2060.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.68	Wt. n-Val.		0.014	
W.S. Elev (ft)	2052.39	Reach Len. (ft)	38.83	38.83	38.83
Crit W.S. (ft)	2054.69	Flow Area (sq ft)		219.92	
E.G. Slope (ft/ft)	0.005994	Area (sq ft)		219.92	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	46.30	Top Width (ft)		46.30	
Vel Total (ft/s)	22.24	Avg. Vel. (ft/s)		22.24	
Max Chl Dpth (ft)	6.77	Hydr. Depth (ft)		4.75	
Conv. Total (cfs)	63162.5	Conv. (cfs)		63162.5	
Length Wtd. (ft)	38.83	Wetted Per. (ft)		49.40	
Min Ch El (ft)	2045.62	Shear (lb/sq ft)		1.67	
Alpha	1.00	Stream Power (lb/ft s)		37.04	
Frctn Loss (ft)	0.54	Cum Volume (acre-ft)		10.74	
C & E Loss (ft)	0.00	Cum SA (acres)		2.00	

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.

CROSS SECTION

RIVER: Gownan Outfall

REACH: 1

RS: 180

INPUT

Description: Station 236+38.83 (PC)

Station Elevation Data		num=	7
Sta	Elev	Sta	Elev
76	2054.09	76	2052.59
124	2052.59	154	2054.09

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
76	.025	76	.014
		124	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	76	124		59.26	61.17	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

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E.G. Elev (ft)	2059.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.68	Wt. n-Val.		0.014	
W.S. Elev (ft)	2052.16	Reach Len. (ft)	59.26	61.17	63.08
Crit W.S. (ft)	2054.79	Flow Area (sq ft)		219.92	
E.G. Slope (ft/ft)	0.005994	Area (sq ft)		219.92	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	46.30	Top Width (ft)		46.30	
Vel Total (ft/s)	22.24	Avg. Vel. (ft/s)		22.24	
Max Chl Dpth (ft)	6.77	Hydr. Depth (ft)		4.75	
Conv. Total (cfs)	63162.5	Conv. (cfs)		63162.5	
Length Wtd. (ft)	61.17	Wetted Per. (ft)		49.40	
Min Ch El (ft)	2045.39	Shear (lb/sq ft)		1.67	
Alpha	1.00	Stream Power (lb/ft s)		37.04	
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)		10.55	
C & E Loss (ft)	0.00	Cum SA (acres)		1.96	

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.

CROSS SECTION RIVER: Gownan Outfall
REACH: 1 RS: 179

INPUT

Description: Station 237+00

Station Elevation Data		num=	7					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
76	2053.72	76	2052.22	90	2045.22	100	2045.02	110
124	2052.22	154	2053.72					

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
76	.025	76	.014	124	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	76	124		96.88	100 103.12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2059.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.67	Wt. n-Val.		0.014	
W.S. Elev (ft)	2051.80	Reach Len. (ft)	96.88	100.00	103.12
Crit W.S. (ft)	2054.41	Flow Area (sq ft)		220.07	
E.G. Slope (ft/ft)	0.005982	Area (sq ft)		220.07	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	46.31	Top Width (ft)		46.31	
Vel Total (ft/s)	22.22	Avg. Vel. (ft/s)		22.22	
Max Chl Dpth (ft)	6.78	Hydr. Depth (ft)		4.75	
Conv. Total (cfs)	63223.4	Conv. (cfs)		63223.4	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		49.42	
Min Ch El (ft)	2045.02	Shear (lb/sq ft)		1.66	
Alpha	1.00	Stream Power (lb/ft s)		36.95	
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)		10.24	
C & E Loss (ft)	0.00	Cum SA (acres)		1.89	

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 177.875*

INPUT

Description: Station 238+00

Station Elevation Data		num=	7						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
76	2053.12	76	2051.62	90	2044.62	100	2044.42	110	2044.62
124	2051.62	154	2053.12						

Manning's n Values		num=	3				
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
76	.025	76	.014	124	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	76	124		96.88	100 103.12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

	E.G. Elev (ft)	2058.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.66		Wt. n-Val.		0.014	
W.S. Elev (ft)	2051.20		Reach Len. (ft)	96.88	100.00	103.12
Crit W.S. (ft)	2053.82		Flow Area (sq ft)		220.12	
E.G. Slope (ft/ft)	0.005978		Area (sq ft)		220.12	
Q Total (cfs)	4890.00		Flow (cfs)		4890.00	
Top Width (ft)	46.31		Top Width (ft)		46.31	
Vel Total (ft/s)	22.22		Avg. Vel. (ft/s)		22.22	
Max Chl Dpth (ft)	6.78		Hydr. Depth (ft)		4.75	
Conv. Total (cfs)	63243.2		Conv. (cfs)		63243.2	
Length Wtd. (ft)	100.00		Wetted Per. (ft)		49.42	
Min Ch El (ft)	2044.42		Shear (lb/sq ft)		1.66	
Alpha	1.00		Stream Power (lb/ft s)		36.93	
Frctn Loss (ft)	0.60		Cum Volume (acre-ft)		9.73	
C & E Loss (ft)	0.00		Cum SA (acres)		1.79	

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 176.75*

INPUT

Description: Station 239+00

Station Elevation Data		num=	7						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
76	2052.52	76	2051.02	90	2044.02	100	2043.82	110	2044.02
124	2051.02	154	2052.52						

Manning's n Values		num=	3				
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

76 .025 76 .014 124 .025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
76	124	96.88	100 103.12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2058.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.66	Wt. n-Val.		0.014	
W.S. Elev (ft)	2050.60	Reach Len. (ft)	96.88	100.00	103.12
Crit W.S. (ft)	2053.22	Flow Area (sq ft)		220.21	
E.G. Slope (ft/ft)	0.005972	Area (sq ft)		220.21	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	46.32	Top Width (ft)		46.32	
Vel Total (ft/s)	22.21	Avg. Vel. (ft/s)		22.21	
Max Chl Dpth (ft)	6.78	Hydr. Depth (ft)		4.75	
Conv. Total (cfs)	63277.8	Conv. (cfs)		63277.8	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		49.43	
Min Ch El (ft)	2043.82	Shear (lb/sq ft)		1.66	
Alpha	1.00	Stream Power (lb/ft s)		36.88	
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)		9.23	
C & E Loss (ft)	0.00	Cum SA (acres)		1.68	

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.

CROSS SECTION RIVER: Gowan Outfall
 REACH: 1 RS: 175.625*

INPUT

Description: Station 240+00

Station Elevation Data	num=	7			
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev					
76 2051.92 76 2050.42 90 2043.42 100 2043.22 110 2043.42					
124 2050.42 154 2051.92					

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
76 .025 76 .014 124 .025		

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
76	124	96.88	100 103.12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2057.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.65	Wt. n-Val.		0.014	
W.S. Elev (ft)	2050.00	Reach Len. (ft)	96.88	100.00	103.12
Crit W.S. (ft)	2052.63	Flow Area (sq ft)		220.33	
E.G. Slope (ft/ft)	0.005963	Area (sq ft)		220.33	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	46.33	Top Width (ft)		46.33	
Vel Total (ft/s)	22.19	Avg. Vel. (ft/s)		22.19	
Max Chl Dpth (ft)	6.78	Hydr. Depth (ft)		4.76	
Conv. Total (cfs)	63325.2	Conv. (cfs)		63325.2	

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Length Wtd. (ft)	100.00	Wetted Per. (ft)	49.44
Min Ch El (ft)	2043.22	Shear (lb/sq ft)	1.66
Alpha	1.00	Stream Power (lb/ft s)	36.82
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)	8.72
C & E Loss (ft)	0.00	Cum SA (acres)	1.58

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 174.5*

INPUT

Description: Station 241+00

Station Elevation Data		num=	7				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
76	2051.32	76	2049.82	90	2042.82	100	2042.62
124	2049.82	154	2051.32			110	2042.82

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
76	.025	76	.014
		124	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	76	124		96.88	100	103.12	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2057.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.64	Wt. n-Val.		0.014	
W.S. Elev (ft)	2049.41	Reach Len. (ft)	96.88	100.00	103.12
Crit W.S. (ft)	2052.02	Flow Area (sq ft)		220.48	
E.G. Slope (ft/ft)	0.005951	Area (sq ft)		220.48	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	46.34	Top Width (ft)		46.34	
Vel Total (ft/s)	22.18	Avg. Vel. (ft/s)		22.18	
Max Chl Dpth (ft)	6.79	Hydr. Depth (ft)		4.76	
Conv. Total (cfs)	63386.7	Conv. (cfs)		63386.7	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		49.46	
Min Ch El (ft)	2042.62	Shear (lb/sq ft)		1.66	
Alpha	1.00	Stream Power (lb/ft s)		36.74	
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)		8.21	
C & E Loss (ft)	0.00	Cum SA (acres)		1.47	

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 173.375*

INPUT

Description: Station 242+00

Station Elevation Data	num=	7

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Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
76	2050.72	76	2049.22	90	2042.22	100	2042.02	110	2042.22
124	2049.22	154	2050.72						

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
76	.025	76	.014
		124	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	76	124		96.88	100 103.12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2056.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.65	Wt. n-Val.		0.014	
W.S. Elev (ft)	2048.80	Reach Len. (ft)	96.88	100.00	103.12
Crit W.S. (ft)	2051.41	Flow Area (sq ft)		220.32	
E.G. Slope (ft/ft)	0.005964	Area (sq ft)		220.32	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	46.33	Top Width (ft)		46.33	
Vel Total (ft/s)	22.19	Avg. Vel. (ft/s)		22.19	
Max Chl Dpth (ft)	6.78	Hydr. Depth (ft)		4.76	
Conv. Total (cfs)	63322.0	Conv. (cfs)		63322.0	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		49.44	
Min Ch El (ft)	2042.02	Shear (lb/sq ft)		1.66	
Alpha	1.00	Stream Power (lb/ft s)		36.82	
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)		7.71	
C & E Loss (ft)	0.00	Cum SA (acres)		1.36	

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.

CROSS SECTION RIVER: Gownan Outfall
REACH: 1 RS: 172.25*

INPUT

Description: Station 243+00

Station Elevation Data		num=	7
Sta	Elev	Sta	Elev
76	2050.12	76	2048.62
124	2048.62	154	2050.12

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
76	.025	76	.014
		124	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	76	124		96.88	100 103.12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2055.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.64	Wt. n-Val.		0.014	
W.S. Elev (ft)	2048.21	Reach Len. (ft)	96.88	100.00	103.12
Crit W.S. (ft)	2050.82	Flow Area (sq ft)		220.52	

E.G. Slope (ft/ft)	0.005949	Area (sq ft)	220.52
Q Total (cfs)	4890.00	Flow (cfs)	4890.00
Top Width (ft)	46.35	Top Width (ft)	46.35
Vel Total (ft/s)	22.18	Avg. Vel. (ft/s)	22.18
Max Chl Dpth (ft)	6.79	Hydr. Depth (ft)	4.76
Conv. Total (cfs)	63400.2	Conv. (cfs)	63400.2
Length Wtd. (ft)	100.00	Wetted Per. (ft)	49.46
Min Ch El (ft)	2041.42	Shear (lb/sq ft)	1.66
Alpha	1.00	Stream Power (lb/ft s)	36.72
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)	7.20
C & E Loss (ft)	0.00	Cum SA (acres)	1.26

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.

CROSS SECTION RIVER: Gowan Outfall
 REACH: 1 RS: 171.125*

INPUT

Description: Station 244+00

Station Elevation Data		num=	7						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
76	2049.52	76	2048.02	90	2041.02	100	2040.82	110	2041.02
124	2048.02	154	2049.52						

Manning's n Values		num=	3				
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
76	.025	76	.014	124	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	76	124		96.88	100 103.12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2055.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.65	Wt. n-Val.		0.014	
W.S. Elev (ft)	2047.60	Reach Len. (ft)	96.88	100.00	103.12
Crit W.S. (ft)	2050.22	Flow Area (sq ft)		220.34	
E.G. Slope (ft/ft)	0.005962	Area (sq ft)		220.34	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	46.33	Top Width (ft)		46.33	
Vel Total (ft/s)	22.19	Avg. Vel. (ft/s)		22.19	
Max Chl Dpth (ft)	6.78	Hydr. Depth (ft)		4.76	
Conv. Total (cfs)	63331.6	Conv. (cfs)		63331.6	
Length Wtd. (ft)	100.00	Wetted Per. (ft)		49.45	
Min Ch El (ft)	2040.82	Shear (lb/sq ft)		1.66	
Alpha	1.00	Stream Power (lb/ft s)		36.81	
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)		6.70	
C & E Loss (ft)	0.00	Cum SA (acres)		1.15	

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 170

INPUT

Description: Station 245+00 (Grade Break)

Station Elevation Data		num=	7				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
76	2048.92	76	2047.42	90	2040.42	100	2040.22
124	2047.42	154	2048.92			110	2040.42

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
76	.025	76	.014
		124	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	76	124		48.43	50	51.56	
						.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2054.66	Element			
Vel Head (ft)	7.66	Wt. n-Val.		0.014	
W.S. Elev (ft)	2047.00	Reach Len. (ft)	48.43	50.00	51.56
Crit W.S. (ft)	2049.63	Flow Area (sq ft)		220.21	
E.G. Slope (ft/ft)	0.005972	Area (sq ft)		220.21	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	46.32	Top Width (ft)		46.32	
Vel Total (ft/s)	22.21	Avg. Vel. (ft/s)		22.21	
Max Chl Dpth (ft)	6.78	Hydr. Depth (ft)		4.75	
Conv. Total (cfs)	63280.0	Conv. (cfs)		63280.0	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		49.43	
Min Ch El (ft)	2040.22	Shear (lb/sq ft)		1.66	
Alpha	1.00	Stream Power (lb/ft s)		36.88	
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)		6.19	
C & E Loss (ft)	0.00	Cum SA (acres)		1.04	

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 166.812*

INPUT

Description: Station 245+50

Station Elevation Data		num=	7				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
76	2048.29	76	2046.79	90	2039.79	100	2039.59
124	2046.79	154	2048.29			110	2039.79

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
76	.025	76	.014
		124	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	76	124		48.43	50	51.56	
						.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2054.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.05	Wt. n-Val.		0.014	
W.S. Elev (ft)	2046.25	Reach Len. (ft)	48.43	50.00	51.56
Crit W.S. (ft)	2048.99	Flow Area (sq ft)		214.71	
E.G. Slope (ft/ft)	0.006404	Area (sq ft)		214.71	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	45.84	Top Width (ft)		45.84	
Vel Total (ft/s)	22.77	Avg. Vel. (ft/s)		22.77	
Max Chl Dpth (ft)	6.66	Hydr. Depth (ft)		4.68	
Conv. Total (cfs)	61107.9	Conv. (cfs)		61107.9	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		48.90	
Min Ch El (ft)	2039.59	Shear (lb/sq ft)		1.76	
Alpha	1.00	Stream Power (lb/ft s)		39.98	
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)		5.94	
C & E Loss (ft)	0.04	Cum SA (acres)		0.99	

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 163.625*

INPUT

Description: Station 246+00

Station Elevation Data		num=	7						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
76	2047.65	76	2046.15	90	2039.15	100	2038.95	110	2039.15
124	2046.15	154	2047.65						

Manning's n Values		num=	3				
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
76	.025	76	.014	124	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	76	124		48.43	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2053.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.43	Wt. n-Val.		0.014	
W.S. Elev (ft)	2045.51	Reach Len. (ft)	48.43	50.00	51.56
Crit W.S. (ft)	2048.36	Flow Area (sq ft)		209.87	
E.G. Slope (ft/ft)	0.006820	Area (sq ft)		209.87	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	45.42	Top Width (ft)		45.42	
Vel Total (ft/s)	23.30	Avg. Vel. (ft/s)		23.30	
Max Chl Dpth (ft)	6.56	Hydr. Depth (ft)		4.62	
Conv. Total (cfs)	59212.7	Conv. (cfs)		59212.7	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		48.42	
Min Ch El (ft)	2038.95	Shear (lb/sq ft)		1.85	
Alpha	1.00	Stream Power (lb/ft s)		43.00	
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)		5.70	
C & E Loss (ft)	0.04	Cum SA (acres)		0.94	

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 160.438*

INPUT

Description: Station 246+50

Station Elevation Data		num=	7
Sta	Elev	Sta	Elev
76	2047.02	76	2045.52
124	2045.52	154	2047.02

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
76	.025	76	.014
		124	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	76	124		6.65	6.87	7.08	
						.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2053.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.77	Wt. n-Val.		0.014	
W.S. Elev (ft)	2044.79	Reach Len. (ft)	6.65	6.87	7.08
Crit W.S. (ft)	2047.72	Flow Area (sq ft)		205.82	
E.G. Slope (ft/ft)	0.007198	Area (sq ft)		205.82	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	45.06	Top Width (ft)		45.06	
Vel Total (ft/s)	23.76	Avg. Vel. (ft/s)		23.76	
Max Chl Dpth (ft)	6.47	Hydr. Depth (ft)		4.57	
Conv. Total (cfs)	57637.3	Conv. (cfs)		57637.3	
Length Wtd. (ft)	6.87	Wetted Per. (ft)		48.02	
Min Ch El (ft)	2038.32	Shear (lb/sq ft)		1.93	
Alpha	1.00	Stream Power (lb/ft s)		45.76	
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)		5.46	
C & E Loss (ft)	0.03	Cum SA (acres)		0.89	

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 160

INPUT

Description: Station 246+56.87 (PT/Transition)

Station Elevation Data		num=	8
Sta	Elev	Sta	Elev
71	2047.03	75.9999	2046.93
110	2038.43	124	2045.43
		154	2046.93

Manning's n Values		num=	3
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Sta	n Val	Sta	n Val	Sta	n Val
71	.025	76	.014	124	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	76	124		43.13	43.13	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2053.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.81	Wt. n-Val.		0.014	
W.S. Elev (ft)	2044.68	Reach Len. (ft)	43.13	43.13	43.13
Crit W.S. (ft)	2047.65	Flow Area (sq ft)		205.26	
E.G. Slope (ft/ft)	0.007253	Area (sq ft)		205.26	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	45.01	Top Width (ft)		45.01	
Vel Total (ft/s)	23.82	Avg. Vel. (ft/s)		23.82	
Max Chl Dpth (ft)	6.45	Hydr. Depth (ft)		4.56	
Conv. Total (cfs)	57420.2	Conv. (cfs)		57420.2	
Length Wtd. (ft)	43.13	Wetted Per. (ft)		47.97	
Min Ch El (ft)	2038.23	Shear (lb/sq ft)		1.94	
Alpha	1.00	Stream Power (lb/ft s)		46.16	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		5.43	
C & E Loss (ft)	0.00	Cum SA (acres)		0.88	

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.

CROSS SECTION RIVER: Gowan Outfall
 REACH: 1 RS: 156

INPUT

Description: Station 247+00

Station Elevation Data	num=	9
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
74 2046.35 77.33 2046.28 77.33 2044.95 79 2044.92 88.33 2037.92		
100 2037.68 111.67 2037.92 121 2044.92 147.66 2046.25		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
74 .025 79 .014 121 .025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	79	121		50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2053.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.93	Wt. n-Val.		0.014	
W.S. Elev (ft)	2044.25	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2047.28	Flow Area (sq ft)		203.90	
E.G. Slope (ft/ft)	0.006696	Area (sq ft)		203.90	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	40.21	Top Width (ft)		40.21	
Vel Total (ft/s)	23.98	Avg. Vel. (ft/s)		23.98	
Max Chl Dpth (ft)	6.57	Hydr. Depth (ft)		5.07	

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Conv. Total (cfs)	59760.6	Conv. (cfs)	59760.6
Length Wtd. (ft)	50.00	Wetted Per. (ft)	44.44
Min Ch El (ft)	2037.68	Shear (lb/sq ft)	1.92
Alpha	1.00	Stream Power (lb/ft s)	46.00
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	5.22
C & E Loss (ft)	0.01	Cum SA (acres)	0.84

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 152.517*

INPUT

Description: Station 247+50

Station Elevation Data		num=	9						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
77.48	2045.56	78.88	2045.53	78.88	2044.39	82.48	2044.32	86.4	2037.32
100	2037.05	113.6	2037.32	117.52	2044.32	140.31	2045.46		

Manning's n Values		num=	3			
Sta	n Val	Sta	n Val	Sta	n Val	
77.48	.025	82.48	.014	117.52	.025	

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
82.48	117.52	36.15	36.15	36.15	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2052.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.07	Wt. n-Val.		0.014	
W.S. Elev (ft)	2043.77	Reach Len. (ft)	36.15	36.15	36.15
Crit W.S. (ft)	2046.89	Flow Area (sq ft)		202.35	
E.G. Slope (ft/ft)	0.006368	Area (sq ft)		202.35	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	34.42	Top Width (ft)		34.42	
Vel Total (ft/s)	24.17	Avg. Vel. (ft/s)		24.17	
Max Chl Dpth (ft)	6.72	Hydr. Depth (ft)		5.88	
Conv. Total (cfs)	61276.2	Conv. (cfs)		61276.2	
Length Wtd. (ft)	36.15	Wetted Per. (ft)		41.99	
Min Ch El (ft)	2037.05	Shear (lb/sq ft)		1.92	
Alpha	1.00	Stream Power (lb/ft s)		46.31	
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)		4.99	
C & E Loss (ft)	0.01	Cum SA (acres)		0.79	

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 150

INPUT

Description: Station 247+86.15 (Transition)

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Station Elevation Data		num=	8						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
80	2044.99	80	2043.99	85	2043.89	85	2036.89	100	2036.59
115	2036.89	115	2043.89	135	2044.89				

Manning's n Values		num=	3			
Sta	n Val	Sta	n Val	Sta	n Val	
80	.025	85	.014	115	.025	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	85	115		13.85	13.85	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2052.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.13	Wt. n-Val.		0.014	
W.S. Elev (ft)	2043.46	Reach Len. (ft)	13.85	13.85	13.85
Crit W.S. (ft)	2046.59	Flow Area (sq ft)		201.63	
E.G. Slope (ft/ft)	0.006683	Area (sq ft)		201.63	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	30.00	Top Width (ft)		30.00	
Vel Total (ft/s)	24.25	Avg. Vel. (ft/s)		24.25	
Max Chl Dpth (ft)	6.87	Hydr. Depth (ft)		6.72	
Conv. Total (cfs)	59817.1	Conv. (cfs)		59817.1	
Length Wtd. (ft)	13.85	Wetted Per. (ft)		43.15	
Min Ch El (ft)	2036.59	Shear (lb/sq ft)		1.95	
Alpha	1.00	Stream Power (lb/ft s)		47.28	
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)		4.82	
C & E Loss (ft)	0.01	Cum SA (acres)		0.77	

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 149

INPUT

Description: Station 248+00

Station Elevation Data		num=	8						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
80	2044.81	80	2043.81	85	2043.71	85	2036.71	100	2036.41
115	2036.71	115	2043.71	135	2044.71				

Manning's n Values		num=	3			
Sta	n Val	Sta	n Val	Sta	n Val	
80	.025	85	.014	115	.025	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	85	115		50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2052.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.24	Wt. n-Val.		0.014	
W.S. Elev (ft)	2043.24	Reach Len. (ft)	50.00	50.00	50.00

Crit W.S. (ft)	2046.23	Flow Area (sq ft)	200.43
E.G. Slope (ft/ft)	0.006800	Area (sq ft)	200.43
Q Total (cfs)	4890.00	Flow (cfs)	4890.00
Top Width (ft)	30.00	Top Width (ft)	30.00
Vel Total (ft/s)	24.40	Avg. Vel. (ft/s)	24.40
Max Chl Dpth (ft)	6.83	Hydr. Depth (ft)	6.68
Conv. Total (cfs)	59298.5	Conv. (cfs)	59298.5
Length Wtd. (ft)	50.00	Wetted Per. (ft)	43.07
Min Ch El (ft)	2036.41	Shear (lb/sq ft)	1.98
Alpha	1.00	Stream Power (lb/ft s)	48.20
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	4.76
C & E Loss (ft)	0.01	Cum SA (acres)	0.76

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.

CROSS SECTION RIVER: Gowan Outfall
 REACH: 1 RS: 147.302*

INPUT

Description: Station 248+50

Station	Elevation	Data	num=	8	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
80	2044.17	80	2043.17	85	2043.07	85	2036.07	100	2035.77			
115	2036.07	115	2043.07	135	2044.07							

Manning's n	Values	num=	3	Sta	n Val	Sta	n Val	Sta	n Val
80	.025	85	.014	115	.025				

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	85	115		50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2052.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.62	Wt. n-Val.		0.014	
W.S. Elev (ft)	2042.47	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2045.77	Flow Area (sq ft)		196.46	
E.G. Slope (ft/ft)	0.007210	Area (sq ft)		196.46	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	30.00	Top Width (ft)		30.00	
Vel Total (ft/s)	24.89	Avg. Vel. (ft/s)		24.89	
Max Chl Dpth (ft)	6.70	Hydr. Depth (ft)		6.55	
Conv. Total (cfs)	57588.6	Conv. (cfs)		57588.6	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		42.80	
Min Ch El (ft)	2035.77	Shear (lb/sq ft)		2.07	
Alpha	1.00	Stream Power (lb/ft s)		51.42	
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)		4.53	
C & E Loss (ft)	0.04	Cum SA (acres)		0.72	

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 145.604*

INPUT

Description: Station 249+00

Station Elevation Data		num=	8				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
80	2043.52	80	2042.52	85	2042.42	85	2035.42
115	2035.42	115	2042.42	135	2043.42	100	2035.12

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
80	.025	85	.014
		115	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	85	115		50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2051.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.98	Wt. n-Val.		0.014	
W.S. Elev (ft)	2041.70	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2045.12	Flow Area (sq ft)		192.92	
E.G. Slope (ft/ft)	0.007604	Area (sq ft)		192.92	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	30.00	Top Width (ft)		30.00	
Vel Total (ft/s)	25.35	Avg. Vel. (ft/s)		25.35	
Max Chl Dpth (ft)	6.58	Hydr. Depth (ft)		6.43	
Conv. Total (cfs)	56076.2	Conv. (cfs)		56076.2	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		42.57	
Min Ch El (ft)	2035.12	Shear (lb/sq ft)		2.15	
Alpha	1.00	Stream Power (lb/ft s)		54.54	
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)		4.31	
C & E Loss (ft)	0.04	Cum SA (acres)		0.69	

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 143.906*

INPUT

Description: Station 249+50

Station Elevation Data		num=	8				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
80	2042.88	80	2041.88	85	2041.78	85	2034.78
115	2034.78	115	2041.78	135	2042.78	100	2034.48

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
80	.025	85	.014
		115	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	85	115		50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2051.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.29	Wt. n-Val.		0.014	
W.S. Elev (ft)	2040.96	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2044.52	Flow Area (sq ft)		189.93	
E.G. Slope (ft/ft)	0.007961	Area (sq ft)		189.93	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	30.00	Top Width (ft)		30.00	
Vel Total (ft/s)	25.75	Avg. Vel. (ft/s)		25.75	
Max Chl Dpth (ft)	6.48	Hydr. Depth (ft)		6.33	
Conv. Total (cfs)	54805.6	Conv. (cfs)		54805.6	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		42.37	
Min Ch El (ft)	2034.48	Shear (lb/sq ft)		2.23	
Alpha	1.00	Stream Power (lb/ft s)		57.36	
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)		4.09	
C & E Loss (ft)	0.03	Cum SA (acres)		0.65	

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 142.208*

INPUT

Description: Station 250+00

Station Elevation Data		num=	8				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
80	2042.24	80	2041.24	85	2041.14	85	2034.14
115	2034.14	115	2041.14	135	2042.14		

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
80	.025	85	.014	115	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	85	115		50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2050.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.58	Wt. n-Val.		0.014	
W.S. Elev (ft)	2040.23	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2043.87	Flow Area (sq ft)		187.30	
E.G. Slope (ft/ft)	0.008294	Area (sq ft)		187.30	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	30.00	Top Width (ft)		30.00	
Vel Total (ft/s)	26.11	Avg. Vel. (ft/s)		26.11	
Max Chl Dpth (ft)	6.39	Hydr. Depth (ft)		6.24	
Conv. Total (cfs)	53695.1	Conv. (cfs)		53695.1	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		42.19	
Min Ch El (ft)	2033.84	Shear (lb/sq ft)		2.30	
Alpha	1.00	Stream Power (lb/ft s)		60.01	
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)		3.87	

C & E Loss (ft) 0.03 Cum SA (acres) 879_Gowan.rep 0.62

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.

CROSS SECTION RIVER: Gownan Outfall
REACH: 1 RS: 140.510*

INPUT

Description: Station 250+50

Station Elevation Data		num=	8				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
80	2041.59	80	2040.59	85	2040.49	85	2033.49
115	2033.49	115	2040.49	135	2041.49	100	2033.19

Manning's n Values		num=	3				
Sta	n Val	Sta	n Val	Sta	n Val		
80	.025	85	.014	115	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	85	115		15	15	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2050.37	Wt. n-Val.		0.014	
Vel Head (ft)	10.86	Reach Len. (ft)	15.00	15.00	15.00
W.S. Elev (ft)	2039.50	Flow Area (sq ft)		184.87	
Crit W.S. (ft)	2043.22	Area (sq ft)		184.87	
E.G. Slope (ft/ft)	0.008618	Flow (cfs)		4890.00	
Q Total (cfs)	4890.00	Top Width (ft)		30.00	
Top Width (ft)	30.00	Avg. Vel. (ft/s)		26.45	
Vel Total (ft/s)	26.45	Hydr. Depth (ft)		6.16	
Max Chl Dpth (ft)	6.31	Conv. (cfs)		52676.3	
Conv. Total (cfs)	52676.3	Wetted Per. (ft)		42.03	
Length Wtd. (ft)	15.00	Shear (lb/sq ft)		2.37	
Min Ch El (ft)	2033.19	Stream Power (lb/ft s)		62.59	
Alpha	1.00	Cum Volume (acre-ft)		3.66	
Frctn Loss (ft)	0.42	Cum SA (acres)		0.59	
C & E Loss (ft)	0.03				

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.

CROSS SECTION RIVER: Gownan Outfall
REACH: 1 RS: 140

INPUT

Description: Station 250+65.00 (Grade Break)

Station Elevation Data		num=	8				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
80	2041.4	80	2040.4	85	2040.3	85	2033.3
115	2033.3	115	2040.3	135	2041.3	100	2033

Manning's n Values			num=	3
Sta	n Val	Sta	n Val	Sta n Val
80	.025	85	.014	115 .025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	85	115		35 35	35	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2050.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.94	Wt. n-Val.		0.014	
W.S. Elev (ft)	2039.29	Reach Len. (ft)	35.00	35.00	35.00
Crit W.S. (ft)	2043.03	Flow Area (sq ft)		184.26	
E.G. Slope (ft/ft)	0.008703	Area (sq ft)		184.26	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	30.00	Top Width (ft)		30.00	
Vel Total (ft/s)	26.54	Avg. Vel. (ft/s)		26.54	
Max Chl Dpth (ft)	6.29	Hydr. Depth (ft)		6.14	
Conv. Total (cfs)	52418.6	Conv. (cfs)		52418.6	
Length Wtd. (ft)	35.00	Wetted Per. (ft)		41.99	
Min Ch El (ft)	2033.00	Shear (lb/sq ft)		2.38	
Alpha	1.00	Stream Power (lb/ft s)		63.27	
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)		3.59	
C & E Loss (ft)	0.01	Cum SA (acres)		0.58	

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.

CROSS SECTION RIVER: Gowan Outfall
 REACH: 1 RS: 138

INPUT

Description: Station 251+00

Station Elevation Data		num=	8
Sta	Elev	Sta	Elev
80	2040.83	80	2039.83
115	2032.73	115	2039.73
		135	2040.73

Manning's n Values			num=	3
Sta	n Val	Sta	n Val	Sta n Val
80	.025	85	.014	115 .025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	85	115		50 50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2049.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.25	Wt. n-Val.		0.014	
W.S. Elev (ft)	2038.64	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2042.44	Flow Area (sq ft)		181.69	
E.G. Slope (ft/ft)	0.009070	Area (sq ft)		181.69	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	30.00	Top Width (ft)		30.00	
Vel Total (ft/s)	26.91	Avg. Vel. (ft/s)		26.91	

Max Chl Dpth (ft)	6.21	Hydr. Depth (ft)	6.06
Conv. Total (cfs)	51345.8	Conv. (cfs)	51345.8
Length Wtd. (ft)	50.00	Wetted Per. (ft)	41.82
Min Ch El (ft)	2032.43	Shear (lb/sq ft)	2.46
Alpha	1.00	Stream Power (lb/ft s)	66.21
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	3.45
C & E Loss (ft)	0.03	Cum SA (acres)	0.55

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 136.224*

INPUT

Description: Station 251+50

Station Elevation Data		num=	8						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
80	2040.01	80	2039.01	85	2038.91	85	2031.91	100	2031.61
115	2031.91	115	2038.91	135	2039.91				

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
80	.025	85	.014	115	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	85	115		50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2049.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.67	Wt. n-Val.		0.014	
W.S. Elev (ft)	2037.71	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2041.64	Flow Area (sq ft)		178.39	
E.G. Slope (ft/ft)	0.009574	Area (sq ft)		178.39	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	30.00	Top Width (ft)		30.00	
Vel Total (ft/s)	27.41	Avg. Vel. (ft/s)		27.41	
Max Chl Dpth (ft)	6.10	Hydr. Depth (ft)		5.95	
Conv. Total (cfs)	49975.9	Conv. (cfs)		49975.9	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		41.60	
Min Ch El (ft)	2031.61	Shear (lb/sq ft)		2.56	
Alpha	1.00	Stream Power (lb/ft s)		70.26	
Frctn Loss (ft)	0.47	Cum Volume (acre-ft)		3.24	
C & E Loss (ft)	0.04	Cum SA (acres)		0.52	

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 134.449*

INPUT

Description: Station 252+00

Station Elevation Data				num=	8
Sta	Elev	Sta	Elev	Sta	Elev
80	2039.2	80	2038.2	85	2038.1
115	2031.1	115	2038.1	135	2039.1

Manning's n Values				num=	3
Sta	n Val	Sta	n Val	Sta	n Val
80	.025	85	.014	115	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	85	115		50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2048.85	Wt. n-Val.		0.014	
Vel Head (ft)	12.04	Reach Len. (ft)	50.00	50.00	50.00
W.S. Elev (ft)	2036.80	Flow Area (sq ft)		175.59	
Crit W.S. (ft)	2040.81	Area (sq ft)		175.59	
E.G. Slope (ft/ft)	0.010032	Flow (cfs)		4890.00	
Q Total (cfs)	4890.00	Top Width (ft)		30.00	
Top Width (ft)	30.00	Avg. Vel. (ft/s)		27.85	
Vel Total (ft/s)	27.85	Hydr. Depth (ft)		5.85	
Max Chl Dpth (ft)	6.00	Conv. (cfs)		48821.6	
Conv. Total (cfs)	48821.6	Wetted Per. (ft)		41.41	
Length Wtd. (ft)	50.00	Shear (lb/sq ft)		2.66	
Min Ch El (ft)	2030.80	Stream Power (lb/ft s)		73.96	
Alpha	1.00	Cum Volume (acre-ft)		3.04	
Frctn Loss (ft)	0.49	Cum SA (acres)		0.48	
C & E Loss (ft)	0.04				

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.

CROSS SECTION RIVER: Gowan Outfall
 REACH: 1 RS: 132.673*

INPUT

Description: Station 252+50

Station Elevation Data				num=	8
Sta	Elev	Sta	Elev	Sta	Elev
80	2038.38	80	2037.38	85	2037.28
115	2030.28	115	2037.28	135	2038.28

Manning's n Values				num=	3
Sta	n Val	Sta	n Val	Sta	n Val
80	.025	85	.014	115	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	85	115		50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2048.30	Wt. n-Val.		0.014	
Vel Head (ft)	12.40				

W.S. Elev (ft)	2035.90	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2040.01	Flow Area (sq ft)		173.05	
E.G. Slope (ft/ft)	0.010474	Area (sq ft)		173.05	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	30.00	Top Width (ft)		30.00	
Vel Total (ft/s)	28.26	Avg. Vel. (ft/s)		28.26	
Max Chl Dpth (ft)	5.92	Hydr. Depth (ft)		5.77	
Conv. Total (cfs)	47780.8	Conv. (cfs)		47780.8	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		41.24	
Min Ch El (ft)	2029.98	Shear (lb/sq ft)		2.74	
Alpha	1.00	Stream Power (lb/ft s)		77.53	
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)		2.84	
C & E Loss (ft)	0.04	Cum SA (acres)		0.45	

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.

CROSS SECTION RIVER: Gownan Outfall
REACH: 1 RS: 130.898*

INPUT

Description: Station 253+00

Station Elevation Data		num=	8			
Sta	Elev	Sta	Elev	Sta	Elev	Sta Elev
80	2037.57	80	2036.57	85	2036.47	85 2029.47
115	2029.47	115	2036.47	135	2037.47	100 2029.17

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
80	.025	85	.014
		115	.025

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
85	115	25.3	25.3	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2047.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.71	Wt. n-Val.		0.014	
W.S. Elev (ft)	2035.02	Reach Len. (ft)	25.30	25.30	25.30
Crit W.S. (ft)	2039.18	Flow Area (sq ft)		170.91	
E.G. Slope (ft/ft)	0.010867	Area (sq ft)		170.91	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	30.00	Top Width (ft)		30.00	
Vel Total (ft/s)	28.61	Avg. Vel. (ft/s)		28.61	
Max Chl Dpth (ft)	5.85	Hydr. Depth (ft)		5.70	
Conv. Total (cfs)	46909.5	Conv. (cfs)		46909.5	
Length Wtd. (ft)	25.30	Wetted Per. (ft)		41.10	
Min Ch El (ft)	2029.17	Shear (lb/sq ft)		2.82	
Alpha	1.00	Stream Power (lb/ft s)		80.72	
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)		2.64	
C & E Loss (ft)	0.03	Cum SA (acres)		0.41	

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.

CROSS SECTION RIVER: Gowan Outfall
 REACH: 1 RS: 130

INPUT

Description: Station 253+25.30 (Grade Break)

Station Elevation Data		num= 8							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
80	2037.14	80	2036.14	85	2036.04	85	2029.04	100	2028.74
115	2029.04	115	2036.04	135	2037.04				

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
80	.025	85	.014	115	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	85	115		24.7	24.7	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2047.43	Element			
Vel Head (ft)	12.88	Wt. n-Val.		0.014	
W.S. Elev (ft)	2034.55	Reach Len. (ft)	24.70	24.70	24.70
Crit W.S. (ft)	2038.77	Flow Area (sq ft)		169.76	
E.G. Slope (ft/ft)	0.011087	Area (sq ft)		169.76	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	30.00	Top Width (ft)		30.00	
Vel Total (ft/s)	28.81	Avg. Vel. (ft/s)		28.81	
Max Chl Dpth (ft)	5.81	Hydr. Depth (ft)		5.66	
Conv. Total (cfs)	46440.3	Conv. (cfs)		46440.3	
Length Wtd. (ft)	24.70	Wetted Per. (ft)		41.02	
Min Ch El (ft)	2028.74	Shear (lb/sq ft)		2.86	
Alpha	1.00	Stream Power (lb/ft s)		82.51	
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)		2.54	
C & E Loss (ft)	0.02	Cum SA (acres)		0.40	

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.

CROSS SECTION RIVER: Gowan Outfall
 REACH: 1 RS: 128

INPUT

Description: Station 253+50

Station Elevation Data		num= 8							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
80	2036.83	80	2035.83	85	2035.73	85	2028.73	100	2028.43
115	2028.73	115	2035.73	135	2036.73				

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
80	.025	85	.014	115	.025

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

85 115 50 50 50 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2047.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.93	Wt. n-Val.		0.014	
W.S. Elev (ft)	2034.23	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2038.44	Flow Area (sq ft)		169.49	
E.G. Slope (ft/ft)	0.011139	Area (sq ft)		169.49	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	30.00	Top Width (ft)		30.00	
Vel Total (ft/s)	28.85	Avg. Vel. (ft/s)		28.85	
Max Chl Dpth (ft)	5.80	Hydr. Depth (ft)		5.65	
Conv. Total (cfs)	46332.5	Conv. (cfs)		46332.5	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		41.01	
Min Ch El (ft)	2028.43	Shear (lb/sq ft)		2.87	
Alpha	1.00	Stream Power (lb/ft s)		82.93	
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)		2.44	
C & E Loss (ft)	0.00	Cum SA (acres)		0.38	

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.

CROSS SECTION RIVER: Gowan Outfall
 REACH: 1 RS: 125.315*

INPUT

Description: Station 254+00

Station Elevation Data		num=	8				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
80	2036.21	80	2035.21	85	2035.11	85	2028.11
115	2028.11	115	2035.11	135	2036.11		

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
80	.025	85	.014
		115	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	85	115		50 50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2046.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.99	Wt. n-Val.		0.014	
W.S. Elev (ft)	2033.60	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2037.82	Flow Area (sq ft)		169.04	
E.G. Slope (ft/ft)	0.011227	Area (sq ft)		169.04	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	30.00	Top Width (ft)		30.00	
Vel Total (ft/s)	28.93	Avg. Vel. (ft/s)		28.93	
Max Chl Dpth (ft)	5.78	Hydr. Depth (ft)		5.63	
Conv. Total (cfs)	46151.5	Conv. (cfs)		46151.5	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		40.98	
Min Ch El (ft)	2027.81	Shear (lb/sq ft)		2.89	
Alpha	1.00	Stream Power (lb/ft s)		83.64	

Frctn Loss (ft)	0.56	Cum Volume (acre-ft)	2.25
C & E Loss (ft)	0.01	Cum SA (acres)	0.35

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 122.630*

INPUT

Description: Station 254+50

Station Elevation Data		num=	8						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
80	2035.58	80	2034.58	85	2034.48	85	2027.48	100	2027.18
115	2027.48	115	2034.48	135	2035.48				

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
80	.025	85	.014
		115	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	85	115		48.99	48.99	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2046.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	13.07	Wt. n-Val.		0.014	
W.S. Elev (ft)	2032.95	Reach Len. (ft)	48.99	48.99	48.99
Crit W.S. (ft)	2037.19	Flow Area (sq ft)		168.57	
E.G. Slope (ft/ft)	0.011322	Area (sq ft)		168.57	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	30.00	Top Width (ft)		30.00	
Vel Total (ft/s)	29.01	Avg. Vel. (ft/s)		29.01	
Max Chl Dpth (ft)	5.77	Hydr. Depth (ft)		5.62	
Conv. Total (cfs)	45957.3	Conv. (cfs)		45957.3	
Length Wtd. (ft)	48.99	Wetted Per. (ft)		40.94	
Min Ch El (ft)	2027.18	Shear (lb/sq ft)		2.91	
Alpha	1.00	Stream Power (lb/ft s)		84.42	
Frctn Loss (ft)	0.56	Cum Volume (acre-ft)		2.06	
C & E Loss (ft)	0.01	Cum SA (acres)		0.31	

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 120

INPUT

Description: Station 255+00.00 (Transition)

Station Elevation Data		num=	8						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
80	2034.97	80	2033.97	85	2033.87	85	2026.87	100	2026.57
115	2026.87	115	2033.87	135	2034.87				

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 80 .025 85 .014 115 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 85 115 3 3 3 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2045.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	13.13	Wt. n-Val.		0.014	
W.S. Elev (ft)	2032.33	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2036.60	Flow Area (sq ft)		168.18	
E.G. Slope (ft/ft)	0.011399	Area (sq ft)		168.18	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	30.00	Top Width (ft)		30.00	
Vel Total (ft/s)	29.08	Avg. Vel. (ft/s)		29.08	
Max Chl Dpth (ft)	5.76	Hydr. Depth (ft)		5.61	
Conv. Total (cfs)	45801.2	Conv. (cfs)		45801.2	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		40.92	
Min Ch El (ft)	2026.57	Shear (lb/sq ft)		2.92	
Alpha	1.00	Stream Power (lb/ft s)		85.05	
Frctn Loss (ft)	0.56	Cum Volume (acre-ft)		1.87	
C & E Loss (ft)	0.01	Cum SA (acres)		0.28	

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.

CROSS SECTION RIVER: Gowan Outfall
 REACH: 1 RS: 119.*

INPUT

Description:

Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
79.75	2035.64	80.25	2034.34	80.25	2034.24	85.25	2034.13	85.25	2026.83
100	2026.53	114.75	2026.83	114.75	2034.13	136.75	2035.63		

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val
 79.75 .025 85.25 .014 114.75 .025

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 85.25 114.75 3 3 3 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2045.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.94	Wt. n-Val.		0.014	
W.S. Elev (ft)	2032.42	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2036.82	Flow Area (sq ft)		169.37	
E.G. Slope (ft/ft)	0.011051	Area (sq ft)		169.37	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	29.50	Top Width (ft)		29.50	

Vel Total (ft/s)	28.87	Avg. Vel. (ft/s)	28.87
Max Chl Dpth (ft)	5.89	Hydr. Depth (ft)	5.74
Conv. Total (cfs)	46515.9	Conv. (cfs)	46515.9
Length Wtd. (ft)	3.00	Wetted Per. (ft)	40.69
Min Ch El (ft)	2026.53	Shear (lb/sq ft)	2.87
Alpha	1.00	Stream Power (lb/ft s)	82.92
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	1.86
C & E Loss (ft)	0.06	Cum SA (acres)	0.27

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 118.*

INPUT

Description:

Station		Elevation Data		num=	9	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
79.5	2036.32	80.5	2034.72			80.5	2034.52	85.5	2034.4	85.5	2026.8		
100	2026.5	114.5	2026.8			114.5	2034.4	138.5	2036.4				

Manning's n Values		num=	3	Sta	n Val	Sta	n Val	Sta	n Val
79.5	.025			85.5	.014	114.5	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	85.5	114.5		3	3	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2045.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.73	Wt. n-Val.		0.014	
W.S. Elev (ft)	2032.54	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2037.01	Flow Area (sq ft)		170.79	
E.G. Slope (ft/ft)	0.010677	Area (sq ft)		170.79	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	29.00	Top Width (ft)		29.00	
Vel Total (ft/s)	28.63	Avg. Vel. (ft/s)		28.63	
Max Chl Dpth (ft)	6.04	Hydr. Depth (ft)		5.89	
Conv. Total (cfs)	47325.3	Conv. (cfs)		47325.3	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		40.48	
Min Ch El (ft)	2026.50	Shear (lb/sq ft)		2.81	
Alpha	1.00	Stream Power (lb/ft s)		80.51	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		1.84	
C & E Loss (ft)	0.06	Cum SA (acres)		0.27	

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.

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 117.*

INPUT

Description:

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
79.25	2036.99	80.75	2035.09	80.75	2034.79	85.75	2034.66	85.75	2026.76
100	2026.46	114.25	2026.76	114.25	2034.66	140.25	2037.16		

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
79.25	.025	85.75	.014	114.25	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	85.75	114.25		3	3	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2045.18				
Vel Head (ft)	12.53	Wt. n-Val.		0.014	
W.S. Elev (ft)	2032.65	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2037.11	Flow Area (sq ft)		172.17	
E.G. Slope (ft/ft)	0.010326	Area (sq ft)		172.17	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	28.50	Top Width (ft)		28.50	
Vel Total (ft/s)	28.40	Avg. Vel. (ft/s)		28.40	
Max Chl Dpth (ft)	6.19	Hydr. Depth (ft)		6.04	
Conv. Total (cfs)	48121.5	Conv. (cfs)		48121.5	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		40.29	
Min Ch El (ft)	2026.46	Shear (lb/sq ft)		2.75	
Alpha	1.00	Stream Power (lb/ft s)		78.25	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		1.83	
C & E Loss (ft)	0.06	Cum SA (acres)		0.27	

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 116.*

INPUT

Description:

Station Elevation Data		num= 9		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
79	2037.66	81	2035.46	81	2035.06	86	2034.92	86	2026.72
100	2026.42	114	2026.72	114	2034.92	142	2037.92		

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
79	.025	86	.014	114	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	86	114		3	3	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2045.08				
Vel Head (ft)	12.31	Wt. n-Val.		0.014	
W.S. Elev (ft)	2032.77	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2036.97	Flow Area (sq ft)		173.68	
E.G. Slope (ft/ft)	0.009972	Area (sq ft)		173.68	

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Q Total (cfs)	4890.00	Flow (cfs)	4890.00
Top Width (ft)	28.00	Top Width (ft)	28.00
Vel Total (ft/s)	28.16	Avg. Vel. (ft/s)	28.16
Max Chl Dpth (ft)	6.35	Hydr. Depth (ft)	6.20
Conv. Total (cfs)	48969.8	Conv. (cfs)	48969.8
Length Wtd. (ft)	3.00	Wetted Per. (ft)	40.11
Min Ch El (ft)	2026.42	Shear (lb/sq ft)	2.70
Alpha	1.00	Stream Power (lb/ft s)	75.89
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	1.82
C & E Loss (ft)	0.07	Cum SA (acres)	0.27

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 115.*

INPUT

Description:

Station Elevation Data		num= 9	
Sta	Elev	Sta	Elev
78.75	2038.34	81.25	2035.84
100	2026.38	113.75	2026.68

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
78.75	.025	86.25	.014
		113.75	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	86.25	113.75		3	3	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2044.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.08	Wt. n-Val.		0.014	
W.S. Elev (ft)	2032.91	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2037.01	Flow Area (sq ft)		175.33	
E.G. Slope (ft/ft)	0.009613	Area (sq ft)		175.33	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	27.50	Top Width (ft)		27.50	
Vel Total (ft/s)	27.89	Avg. Vel. (ft/s)		27.89	
Max Chl Dpth (ft)	6.53	Hydr. Depth (ft)		6.38	
Conv. Total (cfs)	49874.5	Conv. (cfs)		49874.5	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		39.96	
Min Ch El (ft)	2026.38	Shear (lb/sq ft)		2.63	
Alpha	1.00	Stream Power (lb/ft s)		73.45	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		1.81	
C & E Loss (ft)	0.07	Cum SA (acres)		0.27	

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 114.*

INPUT

Description:

Station Elevation Data		num= 9	
Sta	Elev	Sta	Elev
78.5	2039.01	81.5	2036.21
100	2026.35	113.5	2026.65

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
78.5	.025	86.5	.014	113.5	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	86.5	113.5		3	3	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2044.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.81	Wt. n-Val.		0.014	
W.S. Elev (ft)	2033.07	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2037.04	Flow Area (sq ft)		177.32	
E.G. Slope (ft/ft)	0.009222	Area (sq ft)		177.32	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	27.00	Top Width (ft)		27.00	
Vel Total (ft/s)	27.58	Avg. Vel. (ft/s)		27.58	
Max Chl Dpth (ft)	6.72	Hydr. Depth (ft)		6.57	
Conv. Total (cfs)	50921.9	Conv. (cfs)		50921.9	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		39.84	
Min Ch El (ft)	2026.35	Shear (lb/sq ft)		2.56	
Alpha	1.00	Stream Power (lb/ft s)		70.66	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		1.80	
C & E Loss (ft)	0.08	Cum SA (acres)		0.27	

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 113.*

INPUT

Description:

Station Elevation Data		num=		9	
Sta	Elev	Sta	Elev	Sta	Elev
78.25	2039.68	81.75	2036.58	81.75	2035.88
100	2026.31	113.25	2026.61	113.25	2035.71
				147.25	2040.21

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
78.25	.025	86.75	.014	113.25	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	86.75	113.25		3	3	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2044.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.54	Wt. n-Val.		0.014	
W.S. Elev (ft)	2033.23	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2037.06	Flow Area (sq ft)		179.36	
E.G. Slope (ft/ft)	0.008847	Area (sq ft)		179.36	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	26.50	Top Width (ft)		26.50	
Vel Total (ft/s)	27.26	Avg. Vel. (ft/s)		27.26	
Max Chl Dpth (ft)	6.92	Hydr. Depth (ft)		6.77	
Conv. Total (cfs)	51988.3	Conv. (cfs)		51988.3	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		39.74	

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Min Ch El (ft)	2026.31	Shear (lb/sq ft)	2.49
Alpha	1.00	Stream Power (lb/ft s)	67.96
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	1.78
C & E Loss (ft)	0.08	Cum SA (acres)	0.26

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 112.*

INPUT

Description:

Station Elevation Data	num=	9			
Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	
78 2040.35	82 2036.95	82 2036.15	87 2035.97	87 2026.57	
100 2026.27	113 2026.57	113 2035.97	149 2040.97		

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
78 .025	87 .014	113 .025

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
87	113	3	3	3	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2044.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.25	Wt. n-Val.		0.014	
W.S. Elev (ft)	2033.41	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2037.10	Flow Area (sq ft)		181.67	
E.G. Slope (ft/ft)	0.008461	Area (sq ft)		181.67	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	26.00	Top Width (ft)		26.00	
Vel Total (ft/s)	26.92	Avg. Vel. (ft/s)		26.92	
Max Chl Dpth (ft)	7.14	Hydr. Depth (ft)		6.99	
Conv. Total (cfs)	53161.4	Conv. (cfs)		53161.4	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		39.68	
Min Ch El (ft)	2026.27	Shear (lb/sq ft)		2.42	
Alpha	1.00	Stream Power (lb/ft s)		65.09	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		1.77	
C & E Loss (ft)	0.09	Cum SA (acres)		0.26	

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 111.*

INPUT

Description:

Station Elevation Data	num=	9			
Sta Elev	Sta Elev	Sta Elev	Sta Elev	Sta Elev	
77.75 2041.03	82.25 2037.33	82.25 2036.43	87.25 2036.24	87.25 2026.54	
100 2026.24	112.75 2026.54	112.75 2036.24	150.75 2041.74		

Manning's n Values	num=	3
Sta n Val	Sta n Val	Sta n Val
77.75 .025	87.25 .014	112.75 .025

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

87.25 112.75 3 3 3 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2044.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.91	Wt. n-Val.		0.014	
W.S. Elev (ft)	2033.63	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2037.15	Flow Area (sq ft)		184.52	
E.G. Slope (ft/ft)	0.008032	Area (sq ft)		184.52	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	25.50	Top Width (ft)		25.50	
Vel Total (ft/s)	26.50	Avg. Vel. (ft/s)		26.50	
Max Chl Dpth (ft)	7.39	Hydr. Depth (ft)		7.24	
Conv. Total (cfs)	54564.3	Conv. (cfs)		54564.3	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		39.68	
Min Ch El (ft)	2026.24	Shear (lb/sq ft)		2.33	
Alpha	1.00	Stream Power (lb/ft s)		61.79	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)		1.76	
C & E Loss (ft)	0.10	Cum SA (acres)		0.26	

CROSS SECTION RIVER: Gowan Outfall
REACH: 1 RS: 110

INPUT

Description: Station 255+30.00 (Transition)

Station Elevation Data		num=	9						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
77.5	2041.7	82.5	2037.7	82.5	2036.7	87.5	2036.5	87.5	2026.5
100	2026.2	112.5	2026.5	112.5	2036.5	152.5	2042.5		

Manning's n Values		num=	3				
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
77.5	.025	87.5	.014	112.5	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	87.5	112.5		20	20	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2044.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.55	Wt. n-Val.		0.014	
W.S. Elev (ft)	2033.86	Reach Len. (ft)	20.00	20.00	20.00
Crit W.S. (ft)	2037.18	Flow Area (sq ft)		187.62	
E.G. Slope (ft/ft)	0.007608	Area (sq ft)		187.62	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	25.00	Top Width (ft)		25.00	
Vel Total (ft/s)	26.06	Avg. Vel. (ft/s)		26.06	
Max Chl Dpth (ft)	7.65	Hydr. Depth (ft)		7.50	
Conv. Total (cfs)	56063.5	Conv. (cfs)		56063.5	
Length Wtd. (ft)	20.00	Wetted Per. (ft)		39.72	
Min Ch El (ft)	2026.20	Shear (lb/sq ft)		2.24	
Alpha	1.00	Stream Power (lb/ft s)		58.48	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)		1.75	
C & E Loss (ft)	0.11	Cum SA (acres)		0.26	

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 108

INPUT

Description: Station 255+50

Station Elevation Data		num= 9							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
78.25	2042.13	82.5	2037.87	82.5	2036.87	87.5	2036.69	87.5	2026.24
100	2025.95	112.5	2026.24	112.5	2036.69	146.52	2041.79		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
78.25	.025	87.5	.014	112.5	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	87.5	112.5		25	25	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2044.23				
Vel Head (ft)	10.68	Wt. n-Val.		0.014	
W.S. Elev (ft)	2033.55	Reach Len. (ft)	25.00	25.00	25.00
Crit W.S. (ft)	2036.67	Flow Area (sq ft)		186.48	
E.G. Slope (ft/ft)	0.007742	Area (sq ft)		186.48	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	25.00	Top Width (ft)		25.00	
Vel Total (ft/s)	26.22	Avg. Vel. (ft/s)		26.22	
Max Chl Dpth (ft)	7.60	Hydr. Depth (ft)		7.46	
Conv. Total (cfs)	55575.1	Conv. (cfs)		55575.1	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		39.64	
Min Ch El (ft)	2025.95	Shear (lb/sq ft)		2.27	
Alpha	1.00	Stream Power (lb/ft s)		59.63	
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)		1.66	
C & E Loss (ft)	0.01	Cum SA (acres)		0.25	

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 106.241*

INPUT

Description: Station 255+75

Station Elevation Data		num= 9							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
79.18	2040.75	82.5	2037.43	82.5	2036.43	87.5	2036.27	87.5	2025.92
100	2025.64	112.5	2025.92	112.5	2036.27	139.04	2040.25		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
79.18	.025	87.5	.014	112.5	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	87.5	112.5		25	25	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2044.02				
Vel Head (ft)	10.84	Wt. n-Val.		0.014	

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W.S. Elev (ft)	2033.18	Reach Len. (ft)	25.00	25.00	25.00
Crit W.S. (ft)	2036.45	Flow Area (sq ft)		185.10	
E.G. Slope (ft/ft)	0.007910	Area (sq ft)		185.10	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	25.00	Top Width (ft)		25.00	
Vel Total (ft/s)	26.42	Avg. Vel. (ft/s)		26.42	
Max Chl Dpth (ft)	7.54	Hydr. Depth (ft)		7.40	
Conv. Total (cfs)	54982.3	Conv. (cfs)		54982.3	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		39.53	
Min Ch El (ft)	2025.64	Shear (lb/sq ft)		2.31	
Alpha	1.00	Stream Power (lb/ft s)		61.08	
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)		1.55	
C & E Loss (ft)	0.02	Cum SA (acres)		0.23	

CROSS SECTION RIVER: Gowan Outfall
 REACH: 1 RS: 104.483*

INPUT

Description: Station 256+00

Station Elevation Data		num=	9						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
80.12	2039.38	82.5	2036.99	82.5	2035.99	87.5	2035.85	87.5	2025.59
100	2025.32	112.5	2025.59	112.5	2035.85	131.57	2038.7		

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
80.12	.025	87.5	.014	112.5	.025

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
87.5	112.5	25	25	25	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2043.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.00	Wt. n-Val.		0.014	
W.S. Elev (ft)	2032.80	Reach Len. (ft)	25.00	25.00	25.00
Crit W.S. (ft)	2036.18	Flow Area (sq ft)		183.69	
E.G. Slope (ft/ft)	0.008085	Area (sq ft)		183.69	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	25.00	Top Width (ft)		25.00	
Vel Total (ft/s)	26.62	Avg. Vel. (ft/s)		26.62	
Max Chl Dpth (ft)	7.48	Hydr. Depth (ft)		7.35	
Conv. Total (cfs)	54382.1	Conv. (cfs)		54382.1	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		39.43	
Min Ch El (ft)	2025.32	Shear (lb/sq ft)		2.35	
Alpha	1.00	Stream Power (lb/ft s)		62.60	
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)		1.45	
C & E Loss (ft)	0.02	Cum SA (acres)		0.22	

CROSS SECTION RIVER: Gowan Outfall
 REACH: 1 RS: 102.725*

INPUT

Description: Station 256+25

Station Elevation Data	num=	9
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Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
81.05	2038	82.5	2036.55	82.5	2035.55	87.5	2035.42	87.5	2025.27
100	2025.01	112.5	2025.27	112.5	2035.42	124.09	2037.16		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
81.05	.025	87.5	.014	112.5	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	87.5	112.5		25	25	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2043.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.14	Wt. n-Val.		0.014	
W.S. Elev (ft)	2032.44	Reach Len. (ft)	25.00	25.00	25.00
Crit W.S. (ft)	2035.92	Flow Area (sq ft)		182.59	
E.G. Slope (ft/ft)	0.008227	Area (sq ft)		182.59	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	25.00	Top Width (ft)		25.00	
Vel Total (ft/s)	26.78	Avg. Vel. (ft/s)		26.78	
Max Chl Dpth (ft)	7.43	Hydr. Depth (ft)		7.30	
Conv. Total (cfs)	53912.5	Conv. (cfs)		53912.5	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		39.35	
Min Ch El (ft)	2025.01	Shear (lb/sq ft)		2.38	
Alpha	1.00	Stream Power (lb/ft s)		63.82	
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)		1.34	
C & E Loss (ft)	0.01	Cum SA (acres)		0.20	

CROSS SECTION RIVER: Gowan Outfall
 REACH: 1 RS: 100.967*

INPUT

Description: Station 256+50

Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
81.99	2036.63	82.5	2036.11	82.5	2035.11	87.5	2035	87.5	2024.95
100	2024.69	112.5	2024.95	112.5	2035	116.61	2035.62		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
81.99	.025	87.5	.014	112.5	.025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	87.5	112.5		13.75	13.75	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2043.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.27	Wt. n-Val.		0.014	
W.S. Elev (ft)	2032.08	Reach Len. (ft)	13.75	13.75	13.75
Crit W.S. (ft)	2035.67	Flow Area (sq ft)		181.51	
E.G. Slope (ft/ft)	0.008367	Area (sq ft)		181.51	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	25.00	Top Width (ft)		25.00	
Vel Total (ft/s)	26.94	Avg. Vel. (ft/s)		26.94	

Max Chl Dpth (ft)	7.39	Hydr. Depth (ft)	7.26
Conv. Total (cfs)	53458.9	Conv. (cfs)	53458.9
Length Wtd. (ft)	13.75	Wetted Per. (ft)	39.27
Min Ch El (ft)	2024.69	Shear (lb/sq ft)	2.41
Alpha	1.00	Stream Power (lb/ft s)	65.05
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	1.24
C & E Loss (ft)	0.01	Cum SA (acres)	0.19

CROSS SECTION RIVER: Gownan Outfall
REACH: 1 RS: 100

INPUT

Description: Station 256+63.74 (PC)

Station Elevation Data		num=	7						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
82.5	2035.87	82.5	2034.87	87.5	2034.77	87.5	2024.77	100	2024.52
112.5	2024.77	112.5	2034.77						

Manning's n Values		num=	3			
Sta	n Val	Sta	n Val	Sta	n Val	
82.5	.025	87.5	.014	112.5	.025	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	87.5	112.5		37.64 36.26	34.88	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2043.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.35	Wt. n-Val.		0.014	
W.S. Elev (ft)	2031.88	Reach Len. (ft)	37.64	36.26	34.88
Crit W.S. (ft)	2035.38	Flow Area (sq ft)		180.91	
E.G. Slope (ft/ft)	0.008450	Area (sq ft)		180.91	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	25.00	Top Width (ft)		25.00	
Vel Total (ft/s)	27.03	Avg. Vel. (ft/s)		27.03	
Max Chl Dpth (ft)	7.36	Hydr. Depth (ft)		7.24	
Conv. Total (cfs)	53197.6	Conv. (cfs)		53197.6	
Length Wtd. (ft)	36.26	Wetted Per. (ft)		39.23	
Min Ch El (ft)	2024.52	Shear (lb/sq ft)		2.43	
Alpha	1.00	Stream Power (lb/ft s)		65.76	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)		1.18	
C & E Loss (ft)	0.01	Cum SA (acres)		0.18	

CROSS SECTION RIVER: Gownan Outfall
REACH: 1 RS: 97

INPUT

Description: Station 257+00

Station Elevation Data		num=	7						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
83.87	2035.12	83.87	2034.39	87.5	2034.32	87.5	2024.32	100	2024.07
112.5	2024.32	112.5	2034.32						

Manning's n Values		num=	3			
Sta	n Val	Sta	n Val	Sta	n Val	

83.87 .025 87.5 .014 112.5 .025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	87.5	112.5		25.96	25	24.04	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2042.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.53	Wt. n-Val.		0.014	
W.S. Elev (ft)	2031.37	Reach Len. (ft)	25.96	25.00	24.04
Crit W.S. (ft)	2034.89	Flow Area (sq ft)		179.46	
E.G. Slope (ft/ft)	0.008644	Area (sq ft)		179.46	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	25.00	Top Width (ft)		25.00	
Vel Total (ft/s)	27.25	Avg. Vel. (ft/s)		27.25	
Max Chl Dpth (ft)	7.30	Hydr. Depth (ft)		7.18	
Conv. Total (cfs)	52596.6	Conv. (cfs)		52596.6	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		39.11	
Min Ch El (ft)	2024.07	Shear (lb/sq ft)		2.48	
Alpha	1.00	Stream Power (lb/ft s)		67.47	
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)		1.03	
C & E Loss (ft)	0.02	Cum SA (acres)		0.16	

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 95.4375*

INPUT

Description: Station 257+25

Station Elevation Data	num=	7
Sta Elev Sta Elev Sta Elev Sta Elev		
84.82 2034.6 84.82 2034.06 87.5 2034.01 87.5 2024.01 100 2023.76		
112.5 2024.01 112.5 2034.01		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
84.82 .025 87.5 .014 112.5 .025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	87.5	112.5		25.96	25	24.04	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2042.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.64	Wt. n-Val.		0.014	
W.S. Elev (ft)	2031.03	Reach Len. (ft)	25.96	25.00	24.04
Crit W.S. (ft)	2034.55	Flow Area (sq ft)		178.60	
E.G. Slope (ft/ft)	0.008764	Area (sq ft)		178.60	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	25.00	Top Width (ft)		25.00	
Vel Total (ft/s)	27.38	Avg. Vel. (ft/s)		27.38	
Max Chl Dpth (ft)	7.27	Hydr. Depth (ft)		7.14	
Conv. Total (cfs)	52235.7	Conv. (cfs)		52235.7	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		39.04	
Min Ch El (ft)	2023.76	Shear (lb/sq ft)		2.50	
Alpha	1.00	Stream Power (lb/ft s)		68.52	
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)		0.93	

C & E Loss (ft) 0.01 Cum SA (acres) 879_Gowan.rep 0.15

CROSS SECTION RIVER: Gownan Outfall
REACH: 1 RS: 93.875*

INPUT

Description: Station 257+50

Station Elevation Data		num=	7						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
85.76	2034.08	85.76	2033.73	87.5	2033.69	87.5	2023.69	100	2023.45
112.5	2023.69	112.5	2033.69						

Manning's n Values		num=	3				
Sta	n Val	Sta	n Val	Sta	n Val		
85.76	.025	87.5	.014	112.5	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	87.5	112.5		25.96	25	24.04	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2042.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.75	Wt. n-Val.		0.014	
W.S. Elev (ft)	2030.68	Reach Len. (ft)	25.96	25.00	24.04
Crit W.S. (ft)	2034.22	Flow Area (sq ft)		177.73	
E.G. Slope (ft/ft)	0.008889	Area (sq ft)		177.73	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	25.00	Top Width (ft)		25.00	
Vel Total (ft/s)	27.51	Avg. Vel. (ft/s)		27.51	
Max Chl Dpth (ft)	7.23	Hydr. Depth (ft)		7.11	
Conv. Total (cfs)	51866.8	Conv. (cfs)		51866.8	
Length Wtd. (ft)	25.00	Wetted Per. (ft)		38.98	
Min Ch El (ft)	2023.45	Shear (lb/sq ft)		2.53	
Alpha	1.00	Stream Power (lb/ft s)		69.61	
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)		0.83	
C & E Loss (ft)	0.01	Cum SA (acres)		0.13	

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.

CROSS SECTION RIVER: Gownan Outfall
REACH: 1 RS: 92.3125*

INPUT

Description: Station 257+75

Station Elevation Data		num=	7						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
86.71	2033.56	86.71	2033.4	87.5	2033.38	87.5	2023.38	100	2023.13
112.5	2023.38	112.5	2033.38						

Manning's n Values		num=	3				
Sta	n Val	Sta	n Val	Sta	n Val		
86.71	.025	87.5	.014	112.5	.025		

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
87.5	112.5	21.8	21	20.2	.1
					.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2042.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.86	Wt. n-Val.		0.014	
W.S. Elev (ft)	2030.33	Reach Len. (ft)	21.80	21.00	20.20
Crit W.S. (ft)	2033.89	Flow Area (sq ft)		176.90	
E.G. Slope (ft/ft)	0.009005	Area (sq ft)		176.90	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	25.00	Top Width (ft)		25.00	
Vel Total (ft/s)	27.64	Avg. Vel. (ft/s)		27.64	
Max Chl Dpth (ft)	7.20	Hydr. Depth (ft)		7.08	
Conv. Total (cfs)	51532.0	Conv. (cfs)		51532.0	
Length Wtd. (ft)	21.00	Wetted Per. (ft)		38.91	
Min Ch El (ft)	2023.13	Shear (lb/sq ft)		2.56	
Alpha	1.00	Stream Power (lb/ft s)		70.65	
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)		0.72	
C & E Loss (ft)	0.01	Cum SA (acres)		0.12	

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.

CROSS SECTION RIVER: Gowan Outfall
 REACH: 1 RS: 91

INPUT

Description: Station 257+96.00

Station Elevation Data	num=	5
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev		
87.5 2033.12 87.5 2023.12 100 2022.87 112.5 2023.12 112.5 2033.12		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
87.5 .025 87.5 .014 112.5 .025		

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
87.5	112.5	2.08	2	1.92	.1
					.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2042.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.95	Wt. n-Val.		0.014	
W.S. Elev (ft)	2030.05	Reach Len. (ft)	2.08	2.00	1.92
Crit W.S. (ft)	2033.57	Flow Area (sq ft)		176.27	
E.G. Slope (ft/ft)	0.009098	Area (sq ft)		176.27	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	25.00	Top Width (ft)		25.00	
Vel Total (ft/s)	27.74	Avg. Vel. (ft/s)		27.74	
Max Chl Dpth (ft)	7.18	Hydr. Depth (ft)		7.05	
Conv. Total (cfs)	51267.5	Conv. (cfs)		51267.5	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		38.86	
Min Ch El (ft)	2022.87	Shear (lb/sq ft)		2.58	
Alpha	1.00	Stream Power (lb/ft s)		71.48	

Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	0.64
C & E Loss (ft)	0.01	Cum SA (acres)	0.11

CROSS SECTION RIVER: Gowan Outfall
 REACH: 1 RS: 90.5*

INPUT

Description:

Station Elevation Data		num=	5						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
87.5	2034.6	87.5	2023.1	100	2022.85	112.5	2023.1	112.5	2034.6

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
87.5	.025	87.5	.014	112.5	.025

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
87.5	112.5	2.08	2	1.92	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2041.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.94	Wt. n-Val.		0.014	
W.S. Elev (ft)	2030.03	Reach Len. (ft)	2.08	2.00	1.92
Crit W.S. (ft)	2033.55	Flow Area (sq ft)		176.32	
E.G. Slope (ft/ft)	0.009091	Area (sq ft)		176.32	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	25.00	Top Width (ft)		25.00	
Vel Total (ft/s)	27.73	Avg. Vel. (ft/s)		27.73	
Max Chl Dpth (ft)	7.18	Hydr. Depth (ft)		7.05	
Conv. Total (cfs)	51287.7	Conv. (cfs)		51287.7	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		38.86	
Min Ch El (ft)	2022.85	Shear (lb/sq ft)		2.57	
Alpha	1.00	Stream Power (lb/ft s)		71.41	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)		0.63	
C & E Loss (ft)	0.00	Cum SA (acres)		0.10	

CROSS SECTION RIVER: Gowan Outfall
 REACH: 1 RS: 90

INPUT

Description: Station 258+00.00 (Begin 25'x13' Channel)

Station Elevation Data		num=	5						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
87.5	2036.07	87.5	2023.07	100	2022.82	112.5	2023.07	112.5	2036.07

Manning's n Values		num=	3		
Sta	n Val	Sta	n Val	Sta	n Val
87.5	.025	87.5	.014	112.5	.025

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
87.5	112.5	51.91	50	48.09	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		879_Gowan.rep		
		Left OB	Channel	Right OB
E.G. Elev (ft)	2041.95			
Vel Head (ft)	11.95		0.014	
W.S. Elev (ft)	2030.00	51.91	50.00	48.09
Crit W.S. (ft)	2033.52		176.28	
E.G. Slope (ft/ft)	0.009095		176.28	
Q Total (cfs)	4890.00		4890.00	
Top Width (ft)	25.00		25.00	
Vel Total (ft/s)	27.74		27.74	
Max Chl Dpth (ft)	7.18		7.05	
Conv. Total (cfs)	51273.8		51273.8	
Length Wtd. (ft)	50.00		38.86	
Min Ch El (ft)	2022.82		2.58	
Alpha	1.00		71.46	
Frctn Loss (ft)	0.02		0.62	
C & E Loss (ft)	0.00		0.10	

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 84.7329*

INPUT

Description: Station 258+50.00

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
101.19	2035.44	101.19	2022.44
114.48	2022.19	127.77	2022.44
127.77	2035.44		

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
101.19	.025	101.19	.014
127.77	.025		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
101.19	127.77	46.64	44.93	43.22	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

		Left OB	Channel	Right OB
E.G. Elev (ft)	2041.40			
Vel Head (ft)	12.63		0.014	
W.S. Elev (ft)	2028.77	46.64	44.93	43.22
Crit W.S. (ft)	2032.47		171.44	
E.G. Slope (ft/ft)	0.010109		171.44	
Q Total (cfs)	4890.00		4890.00	
Top Width (ft)	26.58		26.58	
Vel Total (ft/s)	28.52		28.52	
Max Chl Dpth (ft)	6.58		6.45	
Conv. Total (cfs)	48635.3		48635.3	
Length Wtd. (ft)	44.93		39.23	
Min Ch El (ft)	2022.19		2.76	
Alpha	1.00		78.66	
Frctn Loss (ft)	0.48		0.42	
C & E Loss (ft)	0.07		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: Gownan Outfall
 REACH: 1 RS: 80

INPUT

Description: Station 258+94.93= Station 58+65.82 (PT)

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
113.5	2034.88	113.5	2021.88
127.5	2021.63	141.5	2021.88
141.5	2034.88		

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
113.5	.025	113.5	.014
141.5	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	113.5	141.5		9.4	9.4	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
113.5	112.5	2034.88

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2040.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	13.10	Wt. n-Val.		0.014	
W.S. Elev (ft)	2027.77	Reach Len. (ft)	9.40	9.40	9.40
Crit W.S. (ft)	2031.56	Flow Area (sq ft)		168.33	
E.G. Slope (ft/ft)	0.010945	Area (sq ft)		168.33	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	28.00	Top Width (ft)		28.00	
Vel Total (ft/s)	29.05	Avg. Vel. (ft/s)		29.05	
Max Chl Dpth (ft)	6.14	Hydr. Depth (ft)		6.01	
Conv. Total (cfs)	46741.3	Conv. (cfs)		46741.3	
Length Wtd. (ft)	9.40	Wetted Per. (ft)		39.78	
Min Ch El (ft)	2021.63	Shear (lb/sq ft)		2.89	
Alpha	1.00	Stream Power (lb/ft s)		84.00	
Frctn Loss (ft)	0.47	Cum Volume (acre-ft)		0.25	
C & E Loss (ft)	0.05	Cum SA (acres)		0.05	

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 78.5714*

INPUT

Description:

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
113.5	2034.66	113.5	2021.66
127.5	2021.41	141.5	2021.66
141.5	2034.66		

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
113.5	.025	113.5	.014
141.5	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	113.5	141.5		9.4	9.4	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
113.5	112.5	2034.66

CROSS SECTION OUTPUT Profile #PF 1

		879_Gowan.rep			
		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2040.76	Wt. n-Val.		0.014	
Vel Head (ft)	13.24	Reach Len. (ft)	9.40	9.40	9.40
W.S. Elev (ft)	2027.52	Flow Area (sq ft)		167.45	
Crit W.S. (ft)	2031.34	Area (sq ft)		167.45	
E.G. Slope (ft/ft)	0.011114	Flow (cfs)		4890.00	
Q Total (cfs)	4890.00	Top Width (ft)		28.00	
Top Width (ft)	28.00	Avg. Vel. (ft/s)		29.20	
Vel Total (ft/s)	29.20	Hydr. Depth (ft)		5.98	
Max Chl Dpth (ft)	6.11	Conv. (cfs)		46385.6	
Conv. Total (cfs)	46385.6	Wetted Per. (ft)		39.72	
Length Wtd. (ft)	9.40	Shear (lb/sq ft)		2.93	
Min Ch El (ft)	2021.41	Stream Power (lb/ft s)		85.43	
Alpha	1.00	Cum Volume (acre-ft)		0.21	
Frctn Loss (ft)	0.10	Cum SA (acres)		0.04	
C & E Loss (ft)	0.01				

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 77.1428*

INPUT

Description:

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
113.5	2034.43	113.5	2021.43
127.5	2021.18	141.5	2021.43
141.5	2034.43		

Manning's n Values		num=	3
Sta	n Val	Sta	n Val
113.5	.025	113.5	.014
141.5	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	113.5	141.5		9.4	9.4	.1	.3

Blocked Obstructions		num=	1
Sta L	Sta R	Elev	
113.5	112.5	2034.43	

CROSS SECTION OUTPUT Profile #PF 1

		879_Gowan.rep			
		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2040.64	Wt. n-Val.		0.014	
Vel Head (ft)	13.39	Reach Len. (ft)	9.40	9.40	9.40
W.S. Elev (ft)	2027.25	Flow Area (sq ft)		166.53	
Crit W.S. (ft)	2031.11	Area (sq ft)		166.53	
E.G. Slope (ft/ft)	0.011295	Flow (cfs)		4890.00	
Q Total (cfs)	4890.00	Top Width (ft)		28.00	
Top Width (ft)	28.00	Avg. Vel. (ft/s)		29.36	
Vel Total (ft/s)	29.36	Hydr. Depth (ft)		5.95	
Max Chl Dpth (ft)	6.07	Conv. (cfs)		46011.3	
Conv. Total (cfs)	46011.3	Wetted Per. (ft)		39.65	
Length Wtd. (ft)	9.40	Shear (lb/sq ft)		2.96	
Min Ch El (ft)	2021.18	Stream Power (lb/ft s)		86.97	
Alpha	1.00	Cum Volume (acre-ft)		0.18	
Frctn Loss (ft)	0.11	Cum SA (acres)		0.03	
C & E Loss (ft)	0.01				

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 75.7142*

INPUT

Description:

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
113.5	2034.21	113.5	2021.21
127.5	2020.96	141.5	2021.21
141.5	2034.21		

Manning's n Values

num=		3
Sta	n Val	Sta
113.5	.025	113.5
141.5	.025	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	113.5	141.5		9.4	9.4	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2040.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	13.52	Wt. n-Val.		0.014	
W.S. Elev (ft)	2027.00	Reach Len. (ft)	9.40	9.40	9.40
Crit W.S. (ft)	2030.89	Flow Area (sq ft)		165.72	
E.G. Slope (ft/ft)	0.011459	Area (sq ft)		165.72	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	28.00	Top Width (ft)		28.00	
Vel Total (ft/s)	29.51	Avg. Vel. (ft/s)		29.51	
Max Chl Dpth (ft)	6.04	Hydr. Depth (ft)		5.92	
Conv. Total (cfs)	45681.9	Conv. (cfs)		45681.9	
Length Wtd. (ft)	9.40	Wetted Per. (ft)		39.59	
Min Ch El (ft)	2020.96	Shear (lb/sq ft)		2.99	
Alpha	1.00	Stream Power (lb/ft s)		88.35	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)		0.14	
C & E Loss (ft)	0.01	Cum SA (acres)		0.03	

CROSS SECTION

RIVER: Gownan Outfall

REACH: 1

RS: 74.2857*

INPUT

Description:

Station Elevation Data		num=	5
Sta	Elev	Sta	Elev
113.5	2033.99	113.5	2020.99
127.5	2020.74	141.5	2020.99
141.5	2033.99		

Manning's n Values

num=		3
Sta	n Val	Sta
113.5	.025	113.5
141.5	.025	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	113.5	141.5		9.4	9.4	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2040.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	13.65	Wt. n-Val.		0.014	
W.S. Elev (ft)	2026.76	Reach Len. (ft)	9.40	9.40	9.40
Crit W.S. (ft)	2030.67	Flow Area (sq ft)		164.93	
E.G. Slope (ft/ft)	0.011620	Area (sq ft)		164.93	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	

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Top Width (ft)	28.00	Top Width (ft)	28.00
Vel Total (ft/s)	29.65	Avg. Vel. (ft/s)	29.65
Max Chl Dpth (ft)	6.02	Hydr. Depth (ft)	5.89
Conv. Total (cfs)	45364.2	Conv. (cfs)	45364.2
Length Wtd. (ft)	9.40	Wetted Per. (ft)	39.54
Min Ch El (ft)	2020.74	Shear (lb/sq ft)	3.03
Alpha	1.00	Stream Power (lb/ft s)	89.72
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.10
C & E Loss (ft)	0.01	Cum SA (acres)	0.02

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 72.8571*

INPUT

Description:

Station Elevation Data		num=	5						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
113.5	2033.77	113.5	2020.77	127.5	2020.52	141.5	2020.77	141.5	2033.77

Manning's n Values		num=	3				
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
113.5	.025	113.5	.013	141.5	.025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	113.5	141.5		9.4	9.4	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2040.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	13.79	Wt. n-Val.		0.013	
W.S. Elev (ft)	2026.51	Reach Len. (ft)	9.40	9.40	9.40
Crit W.S. (ft)	2030.45	Flow Area (sq ft)		164.12	
E.G. Slope (ft/ft)	0.010165	Area (sq ft)		164.12	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	28.00	Top Width (ft)		28.00	
Vel Total (ft/s)	29.80	Avg. Vel. (ft/s)		29.80	
Max Chl Dpth (ft)	5.99	Hydr. Depth (ft)		5.86	
Conv. Total (cfs)	48500.4	Conv. (cfs)		48500.4	
Length Wtd. (ft)	9.40	Wetted Per. (ft)		39.48	
Min Ch El (ft)	2020.52	Shear (lb/sq ft)		2.64	
Alpha	1.00	Stream Power (lb/ft s)		78.61	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)		0.07	
C & E Loss (ft)	0.01	Cum SA (acres)		0.01	

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 71.4285*

INPUT

Description:

Station Elevation Data		num=	5						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
113.5	2033.54	113.5	2020.54	127.5	2020.29	141.5	2020.54	141.5	2033.54

Manning's n Values		num=	3				
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

113.5 .025 113.5 .013 141.5 .025

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	113.5	141.5		9.4	9.4	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2040.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	13.94	Wt. n-Val.		0.013	
W.S. Elev (ft)	2026.24	Reach Len. (ft)	9.40	9.40	9.40
Crit W.S. (ft)	2030.22	Flow Area (sq ft)		163.19	
E.G. Slope (ft/ft)	0.010335	Area (sq ft)		163.19	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	28.00	Top Width (ft)		28.00	
Vel Total (ft/s)	29.96	Avg. Vel. (ft/s)		29.96	
Max Chl Dpth (ft)	5.95	Hydr. Depth (ft)		5.83	
Conv. Total (cfs)	48100.2	Conv. (cfs)		48100.2	
Length Wtd. (ft)	9.40	Wetted Per. (ft)		39.41	
Min Ch El (ft)	2020.29	Shear (lb/sq ft)		2.67	
Alpha	1.00	Stream Power (lb/ft s)		80.06	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)		0.03	
C & E Loss (ft)	0.02	Cum SA (acres)		0.01	

CROSS SECTION RIVER: Gownan Outfall
 REACH: 1 RS: 70

INPUT

Description: Station 58+00.00 (Upstream X-Section of PBS&J LOMAR)

Station Elevation Data	num=	4
Sta Elev Sta Elev Sta Elev Sta Elev		
0 2034.07 0 2020.07 55 2020.07 55 2034.07		

Manning's n Values	num=	3
Sta n Val Sta n Val Sta n Val		
0 .025 0 .013 55 .025		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	0	55		50	50	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2039.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	16.98	Wt. n-Val.		0.013	
W.S. Elev (ft)	2022.76	Reach Len. (ft)			
Crit W.S. (ft)	2026.31	Flow Area (sq ft)		147.86	
E.G. Slope (ft/ft)	0.025362	Area (sq ft)		147.86	
Q Total (cfs)	4890.00	Flow (cfs)		4890.00	
Top Width (ft)	55.00	Top Width (ft)		55.00	
Vel Total (ft/s)	33.07	Avg. Vel. (ft/s)		33.07	
Max Chl Dpth (ft)	2.69	Hydr. Depth (ft)		2.69	
Conv. Total (cfs)	30705.8	Conv. (cfs)		30705.8	
Length Wtd. (ft)		Wetted Per. (ft)		60.38	
Min Ch El (ft)	2020.07	Shear (lb/sq ft)		3.88	
Alpha	1.00	Stream Power (lb/ft s)		128.24	
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)			
C & E Loss (ft)	0.30	Cum SA (acres)			

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

Warning: The 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.

SUMMARY OF MANNING'S N VALUES

River:Gowan Outfall

Reach	River Sta.	n1	n2	n3
1	220	.025	.014	.025
1	210	.025	.014	.025
1	200	.025	.014	.025
1	198	.025	.014	.025
1	196	.025	.014	.025
1	194	.025	.014	.025
1	192	.025	.014	.025
1	191	.025	.014	.025
1	190	.025	.014	.025
1	185	.025	.014	.025
1	180	.025	.014	.025
1	179	.025	.014	.025
1	177.875*	.025	.014	.025
1	176.75*	.025	.014	.025
1	175.625*	.025	.014	.025
1	174.5*	.025	.014	.025
1	173.375*	.025	.014	.025
1	172.25*	.025	.014	.025
1	171.125*	.025	.014	.025
1	170	.025	.014	.025
1	166.812*	.025	.014	.025
1	163.625*	.025	.014	.025
1	160.438*	.025	.014	.025
1	160	.025	.014	.025
1	156	.025	.014	.025
1	152.517*	.025	.014	.025
1	150	.025	.014	.025
1	149	.025	.014	.025
1	147.302*	.025	.014	.025
1	145.604*	.025	.014	.025
1	143.906*	.025	.014	.025
1	142.208*	.025	.014	.025
1	140.510*	.025	.014	.025
1	140	.025	.014	.025
1	138	.025	.014	.025
1	136.224*	.025	.014	.025
1	134.449*	.025	.014	.025
1	132.673*	.025	.014	.025
1	130.898*	.025	.014	.025
1	130	.025	.014	.025
1	128	.025	.014	.025
1	125.315*	.025	.014	.025

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1	122.630*	.025	.014	.025
1	120	.025	.014	.025
1	119.*	.025	.014	.025
1	118.*	.025	.014	.025
1	117.*	.025	.014	.025
1	116.*	.025	.014	.025
1	115.*	.025	.014	.025
1	114.*	.025	.014	.025
1	113.*	.025	.014	.025
1	112.*	.025	.014	.025
1	111.*	.025	.014	.025
1	110	.025	.014	.025
1	108	.025	.014	.025
1	106.241*	.025	.014	.025
1	104.483*	.025	.014	.025
1	102.725*	.025	.014	.025
1	100.967*	.025	.014	.025
1	100	.025	.014	.025
1	97	.025	.014	.025
1	95.4375*	.025	.014	.025
1	93.875*	.025	.014	.025
1	92.3125*	.025	.014	.025
1	91	.025	.014	.025
1	90.5*	.025	.014	.025
1	90	.025	.014	.025
1	84.7329*	.025	.014	.025
1	80	.025	.014	.025
1	78.5714*	.025	.014	.025
1	77.1428*	.025	.014	.025
1	75.7142*	.025	.014	.025
1	74.2857*	.025	.014	.025
1	72.8571*	.025	.013	.025
1	71.4285*	.025	.013	.025
1	70	.025	.013	.025

SUMMARY OF REACH LENGTHS

River: Gowan Outfall

	Reach	River Sta.	Left	Channel	Right
1		220	97.57	100	102.44
1		210	97.57	100	102.44
1		200	97.57	100	102.44
1		198	97.57	100	102.44
1		196	97.57	100	102.44
1		194	97.56	100	102.44
1		192	97.56	100	102.44
1		191	9.27	9.5	9.73
1		190	90.45	90.45	90.45
1		185	38.83	38.83	38.83
1		180	59.26	61.17	63.08
1		179	96.88	100	103.12
1		177.875*	96.88	100	103.12

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1	176.75*	96.88	100	103.12
1	175.625*	96.88	100	103.12
1	174.5*	96.88	100	103.12
1	173.375*	96.88	100	103.12
1	172.25*	96.88	100	103.12
1	171.125*	96.88	100	103.12
1	170	48.43	50	51.56
1	166.812*	48.43	50	51.56
1	163.625*	48.43	50	51.56
1	160.438*	6.65	6.87	7.08
1	160	43.13	43.13	43.13
1	156	50	50	50
1	152.517*	36.15	36.15	36.15
1	150	13.85	13.85	13.85
1	149	50	50	50
1	147.302*	50	50	50
1	145.604*	50	50	50
1	143.906*	50	50	50
1	142.208*	50	50	50
1	140.510*	15	15	15
1	140	35	35	35
1	138	50	50	50
1	136.224*	50	50	50
1	134.449*	50	50	50
1	132.673*	50	50	50
1	130.898*	25.3	25.3	25.3
1	130	24.7	24.7	24.7
1	128	50	50	50
1	125.315*	50	50	50
1	122.630*	48.99	48.99	48.99
1	120	3	3	3
1	119.*	3	3	3
1	118.*	3	3	3
1	117.*	3	3	3
1	116.*	3	3	3
1	115.*	3	3	3
1	114.*	3	3	3
1	113.*	3	3	3
1	112.*	3	3	3
1	111.*	3	3	3
1	110	20	20	20
1	108	25	25	25
1	106.241*	25	25	25
1	104.483*	25	25	25
1	102.725*	25	25	25
1	100.967*	13.75	13.75	13.75
1	100	37.64	36.26	34.88
1	97	25.96	25	24.04
1	95.4375*	25.96	25	24.04
1	93.875*	25.96	25	24.04
1	92.3125*	21.8	21	20.2
1	91	2.08	2	1.92
1	90.5*	2.08	2	1.92
1	90	51.91	50	48.09
1	84.7329*	46.64	44.93	43.22
1	80	9.4	9.4	9.4
1	78.5714*	9.4	9.4	9.4

1	77.1428*	9.4	9.4	879_Gowan.rep 9.4
1	75.7142*	9.4	9.4	9.4
1	74.2857*	9.4	9.4	9.4
1	72.8571*	9.4	9.4	9.4
1	71.4285*	9.4	9.4	9.4
1	70	50	50	50

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Gownan Outfall

Reach	River Sta.	Contr.	Expan.
1	220	.1	.3
1	210	.1	.3
1	200	.1	.3
1	198	.1	.3
1	196	.1	.3
1	194	.1	.3
1	192	.1	.3
1	191	.1	.3
1	190	.1	.3
1	185	.1	.3
1	180	.1	.3
1	179	.1	.3
1	177.875*	.1	.3
1	176.75*	.1	.3
1	175.625*	.1	.3
1	174.5*	.1	.3
1	173.375*	.1	.3
1	172.25*	.1	.3
1	171.125*	.1	.3
1	170	.1	.3
1	166.812*	.1	.3
1	163.625*	.1	.3
1	160.438*	.1	.3
1	160	.1	.3
1	156	.1	.3
1	152.517*	.1	.3
1	150	.1	.3
1	149	.1	.3
1	147.302*	.1	.3
1	145.604*	.1	.3
1	143.906*	.1	.3
1	142.208*	.1	.3
1	140.510*	.1	.3
1	140	.1	.3
1	138	.1	.3
1	136.224*	.1	.3
1	134.449*	.1	.3
1	132.673*	.1	.3
1	130.898*	.1	.3
1	130	.1	.3
1	128	.1	.3

1	125.315*	.1	.3
1	122.630*	.1	.3
1	120	.1	.3
1	119.*	.1	.3
1	118.*	.1	.3
1	117.*	.1	.3
1	116.*	.1	.3
1	115.*	.1	.3
1	114.*	.1	.3
1	113.*	.1	.3
1	112.*	.1	.3
1	111.*	.1	.3
1	110	.1	.3
1	108	.1	.3
1	106.241*	.1	.3
1	104.483*	.1	.3
1	102.725*	.1	.3
1	100.967*	.1	.3
1	100	.1	.3
1	97	.1	.3
1	95.4375*	.1	.3
1	93.875*	.1	.3
1	92.3125*	.1	.3
1	91	.1	.3
1	90.5*	.1	.3
1	90	.1	.3
1	84.7329*	.1	.3
1	80	.1	.3
1	78.5714*	.1	.3
1	77.1428*	.1	.3
1	75.7142*	.1	.3
1	74.2857*	.1	.3
1	72.8571*	.1	.3
1	71.4285*	.1	.3
1	70	.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
Right Sta Eff	Min Ch El	Left Stagn	Right Stagn								
(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
1	220		1.80	46.29	63117.0			76.86		100.00	
123.14	2050.42										
1	210		1.80	46.29	63111.4			76.86		100.00	
123.14	2049.82										
1	200		1.80	46.29	63111.4			76.86		100.00	
123.14	2049.22										
1	198		1.80	46.29	63111.4			76.86		100.00	
123.14	2048.62										
1	196		1.80	46.29	63111.4			76.86		100.00	
123.14	2048.02										
1	194		1.80	46.29	63113.3			76.86		100.00	

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1	123.14	2047.42					
		192	1.80	46.29	63112.0	76.86	100.00
1	123.14	2046.82					
		191	1.80	46.29	63110.1	76.86	100.00
1	123.14	2046.22					
		190	1.80	46.30	63162.5	76.85	100.00
1	123.15	2046.16					
		185	1.80	46.30	63162.5	76.85	100.00
1	123.15	2045.62					
		180	1.80	46.30	63162.5	76.85	100.00
1	123.15	2045.39					
		179	1.80	46.31	63223.4	76.85	100.00
1	123.15	2045.02					
		177.875*	1.80	46.31	63243.2	76.84	100.00
1	123.16	2044.42					
		176.75*	1.79	46.32	63277.8	76.84	100.00
1	123.16	2043.82					
		175.625*	1.79	46.33	63325.2	76.83	100.00
1	123.17	2043.22					
		174.5*	1.79	46.34	63386.7	76.83	100.00
1	123.17	2042.62					
		173.375*	1.79	46.33	63322.0	76.83	100.00
1	123.17	2042.02					
		172.25*	1.79	46.35	63400.2	76.83	100.00
1	123.17	2041.42					
		171.125*	1.79	46.33	63331.6	76.83	100.00
1	123.17	2040.82					
		170	1.79	46.32	63280.0	76.84	100.00
1	123.16	2040.22					
		166.812*	1.85	45.84	61107.9	77.08	100.00
1	122.92	2039.59					
		163.625*	1.91	45.42	59212.7	77.29	100.00
1	122.71	2038.95					
		160.438*	1.96	45.06	57637.3	77.47	100.00
1	122.53	2038.32					
		160	1.97	45.01	57420.2	77.49	100.00
1	122.51	2038.23					
		156	1.88	40.21	59760.6	79.89	100.00
1	120.11	2037.68					
		152.517*	1.76	34.42	61276.2	82.79	100.00
1	117.21	2037.05					
		150	1.65	30.00	59817.1	85.00	100.00
1	115.00	2036.59					
		149	1.66	30.00	59298.5	85.00	100.00
1	115.00	2036.41					
		147.302*	1.71	30.00	57588.6	85.00	100.00
1	115.00	2035.77					
		145.604*	1.76	30.00	56076.2	85.00	100.00
1	115.00	2035.12					
		143.906*	1.80	30.00	54805.6	85.00	100.00
1	115.00	2034.48					
		142.208*	1.84	30.00	53695.1	85.00	100.00
1	115.00	2033.84					
		140.510*	1.88	30.00	52676.3	85.00	100.00
1	115.00	2033.19					
		140	1.89	30.00	52418.6	85.00	100.00
1	115.00	2033.00					

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1		138	1.93	30.00	51345.8	85.00	100.00
	115.00	2032.43					
1		136.224*	1.98	30.00	49975.9	85.00	100.00
	115.00	2031.61					
1		134.449*	2.03	30.00	48821.6	85.00	100.00
	115.00	2030.80					
1		132.673*	2.07	30.00	47780.8	85.00	100.00
	115.00	2029.98					
1		130.898*	2.11	30.00	46909.5	85.00	100.00
	115.00	2029.17					
1		130	2.13	30.00	46440.3	85.00	100.00
	115.00	2028.74					
1		128	2.14	30.00	46332.5	85.00	100.00
	115.00	2028.43					
1		125.315*	2.15	30.00	46151.5	85.00	100.00
	115.00	2027.81					
1		122.630*	2.16	30.00	45957.3	85.00	100.00
	115.00	2027.18					
1		120	2.16	30.00	45801.2	85.00	100.00
	115.00	2026.57					
1		119.*	2.12	29.50	46515.9	85.25	100.00
	114.75	2026.53					
1		118.*	2.08	29.00	47325.3	85.50	100.00
	114.50	2026.50					
1		117.*	2.04	28.50	48121.5	85.75	100.00
	114.25	2026.46					
1		116.*	1.99	28.00	48969.8	86.00	100.00
	114.00	2026.42					
1		115.*	1.95	27.50	49874.5	86.25	100.00
	113.75	2026.38					
1		114.*	1.90	27.00	50921.9	86.50	100.00
	113.50	2026.35					
1		113.*	1.85	26.50	51988.3	86.75	100.00
	113.25	2026.31					
1		112.*	1.79	26.00	53161.4	87.00	100.00
	113.00	2026.27					
1		111.*	1.74	25.50	54564.3	87.25	100.00
	112.75	2026.24					
1		110	1.68	25.00	56063.5	87.50	100.00
	112.50	2026.20					
1		108	1.69	25.00	55575.1	87.50	100.00
	112.50	2025.95					
1		106.241*	1.71	25.00	54982.3	87.50	100.00
	112.50	2025.64					
1		104.483*	1.73	25.00	54382.1	87.50	100.00
	112.50	2025.32					
1		102.725*	1.75	25.00	53912.5	87.50	100.00
	112.50	2025.01					
1		100.967*	1.76	25.00	53458.9	87.50	100.00
	112.50	2024.69					
1		100	1.77	25.00	53197.6	87.50	100.00
	112.50	2024.52					
1		97	1.79	25.00	52596.6	87.50	100.00
	112.50	2024.07					
1		95.4375*	1.81	25.00	52235.7	87.50	100.00
	112.50	2023.76					
1		93.875*	1.82	25.00	51866.8	87.50	100.00

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1	112.50	2023.45				
		92.3125*	1.83	25.00	51532.0	87.50 100.00
1	112.50	2023.13				
		91	1.84	25.00	51267.5	87.50 100.00
1	112.50	2022.87				
		90.5*	1.84	25.00	51287.7	87.50 100.00
1	112.50	2022.85				
		90	1.84	25.00	51273.8	87.50 100.00
1	112.50	2022.82				
		84.7329*	1.98	26.58	48635.3	101.19 114.48
1	127.77	2022.19				
		80	2.09	28.00	46741.3	113.50 127.50
1	141.50	2021.63				
		78.5714*	2.10	28.00	46385.6	113.50 127.50
1	141.50	2021.41				
		77.1428*	2.12	28.00	46011.3	113.50 127.50
1	141.50	2021.18				
		75.7142*	2.14	28.00	45681.9	113.50 127.50
1	141.50	2020.96				
		74.2857*	2.15	28.00	45364.2	113.50 127.50
1	141.50	2020.74				
		72.8571*	2.17	28.00	48500.4	113.50 127.50
1	141.50	2020.52				
		71.4285*	2.19	28.00	48100.2	113.50 127.50
1	141.50	2020.29				
		70	3.55	55.00	30705.8	0.00 27.50
1	55.00	2020.07				

HEC-RAS Plan: Gowan River: Gownan Outfall Reach: 1 Profile: PF 1

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	220	4890.00	2050.42	2057.19	2059.71	2064.88	0.006002	22.25	219.80	46.29	1.80
1	210	4890.00	2049.82	2056.59	2059.11	2064.28	0.006003	22.25	219.79	46.29	1.80
1	200	4890.00	2049.22	2055.99	2058.51	2063.68	0.006003	22.25	219.79	46.29	1.80
1	198	4890.00	2048.62	2055.39	2057.91	2063.08	0.006003	22.25	219.79	46.29	1.80
1	196	4890.00	2048.02	2054.79	2057.31	2062.48	0.006003	22.25	219.79	46.29	1.80
1	194	4890.00	2047.42	2054.19	2056.69	2061.88	0.006003	22.25	219.79	46.29	1.80
1	192	4890.00	2046.82	2053.59	2056.11	2061.28	0.006003	22.25	219.79	46.29	1.80
1	191	4890.00	2046.22	2052.99	2055.51	2060.68	0.006004	22.25	219.79	46.29	1.80
1	190	4890.00	2046.16	2052.93	2055.43	2060.61	0.005994	22.24	219.92	46.30	1.80
1	185	4890.00	2045.62	2052.39	2054.69	2060.07	0.005994	22.24	219.92	46.30	1.80
1	180	4890.00	2045.39	2052.16	2054.79	2059.84	0.005994	22.24	219.92	46.30	1.80
1	179	4890.00	2045.02	2051.80	2054.41	2059.46	0.005982	22.22	220.07	46.31	1.80
1	177.875*	4890.00	2044.42	2051.20	2053.82	2058.86	0.005978	22.22	220.12	46.31	1.80
1	176.75*	4890.00	2043.82	2050.60	2053.22	2058.26	0.005972	22.21	220.21	46.32	1.79
1	175.625*	4890.00	2043.22	2050.00	2052.63	2057.65	0.005963	22.19	220.33	46.33	1.79
1	174.5*	4890.00	2042.62	2049.41	2052.02	2057.04	0.005951	22.18	220.48	46.34	1.79
1	173.375*	4890.00	2042.02	2048.80	2051.41	2056.45	0.005964	22.19	220.32	46.33	1.79
1	172.25*	4890.00	2041.42	2048.21	2050.82	2055.84	0.005949	22.18	220.52	46.35	1.79
1	171.125*	4890.00	2040.82	2047.60	2050.22	2055.25	0.005962	22.19	220.34	46.33	1.79
1	170	4890.00	2040.22	2047.00	2049.63	2054.66	0.005972	22.21	220.21	46.32	1.79
1	166.812*	4890.00	2039.59	2046.25	2048.99	2054.31	0.006404	22.77	214.71	45.84	1.85
1	163.625*	4890.00	2038.95	2045.51	2048.36	2053.94	0.006820	23.30	209.87	45.42	1.91
1	160.438*	4890.00	2038.32	2044.79	2047.72	2053.55	0.007198	23.76	205.82	45.06	1.96
1	160	4890.00	2038.23	2044.68	2047.65	2053.50	0.007253	23.82	205.26	45.01	1.97
1	156	4890.00	2037.68	2044.25	2047.28	2053.18	0.006696	23.98	203.90	40.21	1.88
1	152.517*	4890.00	2037.05	2043.77	2046.89	2052.84	0.006368	24.17	202.35	34.42	1.76
1	150	4890.00	2036.59	2043.46	2046.59	2052.59	0.006683	24.25	201.63	30.00	1.65
1	149	4890.00	2036.41	2043.24	2046.23	2052.48	0.006800	24.40	200.43	30.00	1.66
1	147.302*	4890.00	2035.77	2042.47	2045.77	2052.09	0.007210	24.89	196.46	30.00	1.71
1	145.604*	4890.00	2035.12	2041.70	2045.12	2051.68	0.007604	25.35	192.92	30.00	1.76
1	143.906*	4890.00	2034.48	2040.96	2044.52	2051.25	0.007961	25.75	189.93	30.00	1.80
1	142.208*	4890.00	2033.84	2040.23	2043.87	2050.82	0.008294	26.11	187.30	30.00	1.84
1	140.510*	4890.00	2033.19	2039.50	2043.22	2050.37	0.008618	26.45	184.87	30.00	1.88
1	140	4890.00	2033.00	2039.29	2043.03	2050.23	0.008703	26.54	184.26	30.00	1.89
1	138	4890.00	2032.43	2038.64	2042.44	2049.88	0.009070	26.91	181.69	30.00	1.93
1	136.224*	4890.00	2031.61	2037.71	2041.64	2049.37	0.009574	27.41	178.39	30.00	1.98

HEC-RAS Plan: Gowan River: Gowan Outfall Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
1	134.449*	4890.00	2030.80	2036.80	2040.81	2048.85	0.010032	27.85	175.59	30.00	2.03
1	132.673*	4890.00	2029.98	2035.90	2040.01	2048.30	0.010474	28.26	173.05	30.00	2.07
1	130.898*	4890.00	2029.17	2035.02	2039.18	2047.73	0.010867	28.61	170.91	30.00	2.11
1	130	4890.00	2028.74	2034.55	2038.77	2047.43	0.011087	28.81	169.76	30.00	2.13
1	128	4890.00	2028.43	2034.23	2038.44	2047.16	0.011139	28.85	169.49	30.00	2.14
1	125.315*	4890.00	2027.81	2033.60	2037.82	2046.59	0.011227	28.93	169.04	30.00	2.15
1	122.630*	4890.00	2027.18	2032.95	2037.19	2046.02	0.011322	29.01	168.57	30.00	2.16
1	120	4890.00	2026.57	2032.33	2036.60	2045.45	0.011399	29.08	168.18	30.00	2.16
1	119*	4890.00	2026.53	2032.42	2036.82	2045.37	0.011051	28.87	169.37	29.50	2.12
1	118*	4890.00	2026.50	2032.54	2037.01	2045.27	0.010677	28.63	170.79	29.00	2.08
1	117*	4890.00	2026.46	2032.65	2037.11	2045.18	0.010326	28.40	172.17	28.50	2.04
1	116*	4890.00	2026.42	2032.77	2036.97	2045.08	0.009972	28.16	173.68	28.00	1.99
1	115*	4890.00	2026.38	2032.91	2037.01	2044.99	0.009613	27.89	175.33	27.50	1.95
1	114*	4890.00	2026.35	2033.07	2037.04	2044.88	0.009222	27.58	177.32	27.00	1.90
1	113*	4890.00	2026.31	2033.23	2037.06	2044.77	0.008847	27.26	179.36	26.50	1.85
1	112*	4890.00	2026.27	2033.41	2037.10	2044.66	0.008461	26.92	181.67	26.00	1.79
1	111*	4890.00	2026.24	2033.63	2037.15	2044.53	0.008032	26.50	184.52	25.50	1.74
1	110	4890.00	2026.20	2033.86	2037.18	2044.40	0.007608	26.06	187.62	25.00	1.68
1	108	4890.00	2025.95	2033.55	2036.67	2044.23	0.007742	26.22	186.48	25.00	1.69
1	106.241*	4890.00	2025.64	2033.18	2036.45	2044.02	0.007910	26.42	185.10	25.00	1.71
1	104.483*	4890.00	2025.32	2032.80	2036.18	2043.81	0.008085	26.62	183.69	25.00	1.73
1	102.725*	4890.00	2025.01	2032.44	2035.92	2043.58	0.008227	26.78	182.59	25.00	1.75
1	100.967*	4890.00	2024.69	2032.08	2035.67	2043.35	0.008367	26.94	181.51	25.00	1.76
1	100	4890.00	2024.52	2031.88	2035.38	2043.23	0.008450	27.03	180.91	25.00	1.77
1	97*	4890.00	2024.07	2031.37	2034.89	2042.90	0.008644	27.25	179.46	25.00	1.79
1	95.4375*	4890.00	2023.76	2031.03	2034.55	2042.67	0.008764	27.38	178.60	25.00	1.81
1	93.875*	4890.00	2023.45	2030.68	2034.22	2042.43	0.008889	27.51	177.73	25.00	1.82
1	92.3125*	4890.00	2023.13	2030.33	2033.89	2042.20	0.009005	27.64	176.90	25.00	1.83
1	91	4890.00	2022.87	2030.05	2033.57	2042.00	0.009098	27.74	176.27	25.00	1.84
1	90.5*	4890.00	2022.85	2030.03	2033.55	2041.97	0.009091	27.73	176.32	25.00	1.84
1	90	4890.00	2022.82	2030.00	2033.52	2041.95	0.009095	27.74	176.28	25.00	1.84
1	84.7329*	4890.00	2022.19	2028.77	2032.47	2041.40	0.010109	28.52	171.44	26.58	1.98
1	80	4890.00	2021.63	2027.77	2031.56	2040.87	0.010945	29.05	168.33	28.00	2.09
1	78.5714*	4890.00	2021.41	2027.52	2031.34	2040.76	0.011114	29.20	167.45	28.00	2.10
1	77.1428*	4890.00	2021.18	2027.25	2031.11	2040.64	0.011295	29.36	166.53	28.00	2.12
1	75.7142*	4890.00	2020.96	2027.00	2030.89	2040.52	0.011459	29.51	165.72	28.00	2.14

HEC-RAS Plan: Gowan River: Gowan Outfall Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	74.2857*	4890.00	2020.74	2026.76	2030.67	2040.41	0.011620	29.65	164.93	28.00	2.15
1	72.8571*	4890.00	2020.52	2026.51	2030.45	2040.29	0.010165	29.80	164.12	28.00	2.17
1	71.4285*	4890.00	2020.29	2026.24	2030.22	2040.19	0.010335	29.96	163.19	28.00	2.19
1	70	4890.00	2020.07	2022.76	2026.31	2039.74	0.025362	33.07	147.86	55.00	3.55

HEC-RAS Plan: Gowan River: Gowan Outfall Reach: 1 Profile: PF 1

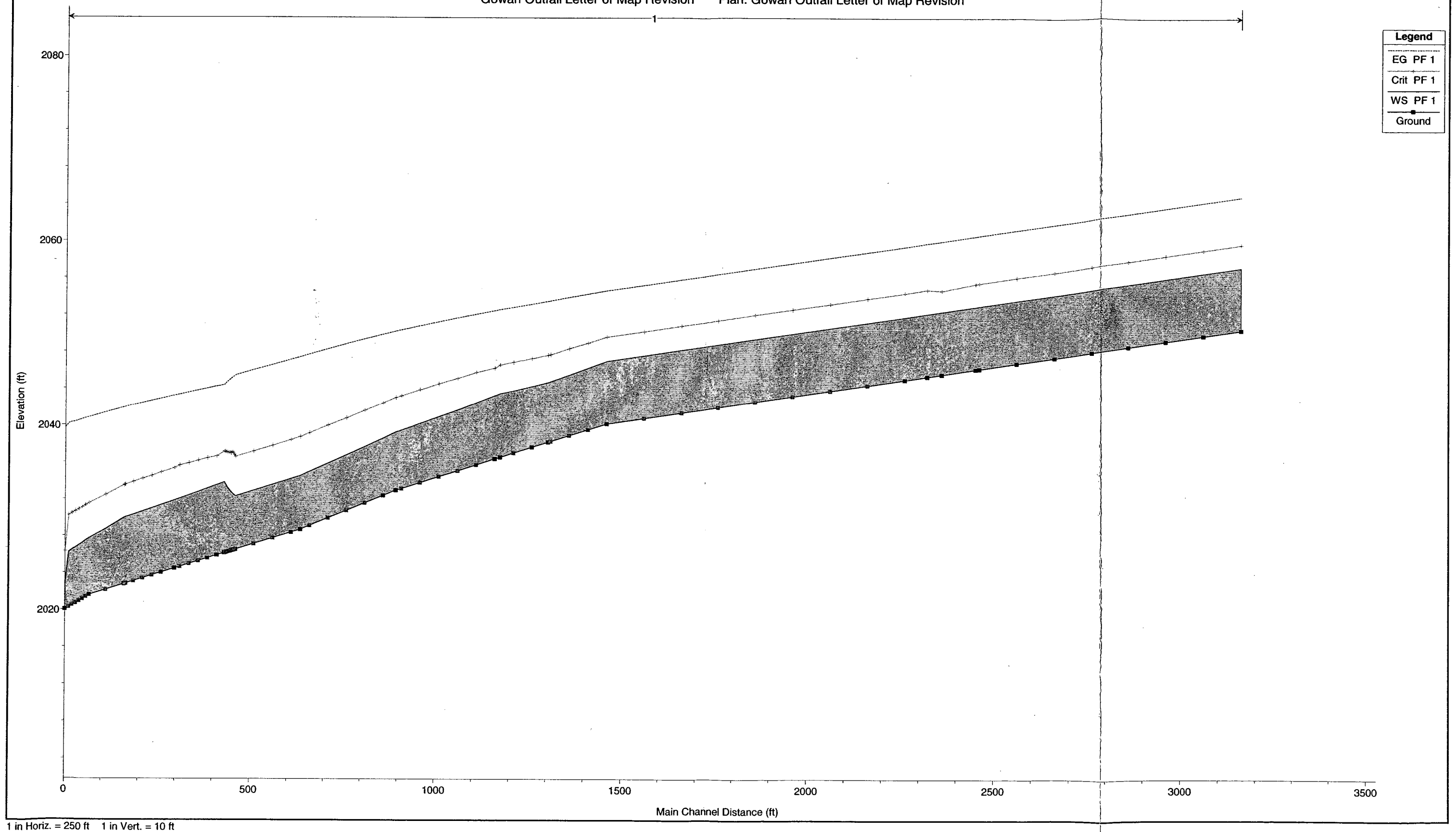
Reach	River Sta	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
1	220	2064.88	2057.19	7.69				4890.00		46.29
1	210	2064.28	2056.59	7.69	0.60	0.00		4890.00		46.29
1	200	2063.68	2055.99	7.69	0.60	0.00		4890.00		46.29
1	198	2063.08	2055.39	7.69	0.60	0.00		4890.00		46.29
1	196	2062.48	2054.79	7.69	0.60	0.00		4890.00		46.29
1	194	2061.88	2054.19	7.69	0.60	0.00		4890.00		46.29
1	192	2061.28	2053.59	7.69	0.60	0.00		4890.00		46.29
1	191	2060.68	2052.99	7.69	0.60	0.00		4890.00		46.29
1	190	2060.61	2052.93	7.68	0.06	0.00		4890.00		46.30
1	185	2060.07	2052.39	7.68	0.54	0.00		4890.00		46.30
1	180	2059.84	2052.16	7.68	0.23	0.00		4890.00		46.30
1	179	2059.46	2051.80	7.67	0.37	0.00		4890.00		46.31
1	177.875*	2058.86	2051.20	7.66	0.60	0.00		4890.00		46.31
1	176.75*	2058.26	2050.60	7.66	0.60	0.00		4890.00		46.32
1	175.625*	2057.65	2050.00	7.65	0.60	0.00		4890.00		46.33
1	174.5*	2057.04	2049.41	7.64	0.60	0.00		4890.00		46.34
1	173.375*	2056.45	2048.80	7.65	0.60	0.00		4890.00		46.33
1	172.25*	2055.84	2048.21	7.64	0.60	0.00		4890.00		46.35
1	171.125*	2055.25	2047.60	7.65	0.60	0.00		4890.00		46.33
1	170	2054.66	2047.00	7.66	0.60	0.00		4890.00		46.32
1	166.812*	2054.31	2046.25	8.05	0.31	0.04		4890.00		45.84
1	163.625*	2053.94	2045.51	8.43	0.33	0.04		4890.00		45.42
1	160.438*	2053.55	2044.79	8.77	0.35	0.03		4890.00		45.06
1	160	2053.50	2044.68	8.81	0.05	0.00		4890.00		45.01
1	156	2053.18	2044.25	8.93	0.30	0.01		4890.00		40.21
1	152.517*	2052.84	2043.77	9.07	0.33	0.01		4890.00		34.42
1	150	2052.59	2043.46	9.13	0.24	0.01		4890.00		30.00
1	149	2052.48	2043.24	9.24	0.09	0.01		4890.00		30.00
1	147.302*	2052.09	2042.47	9.62	0.35	0.04		4890.00		30.00
1	145.604*	2051.68	2041.70	9.98	0.37	0.04		4890.00		30.00
1	143.906*	2051.25	2040.96	10.29	0.39	0.03		4890.00		30.00
1	142.208*	2050.82	2040.23	10.58	0.41	0.03		4890.00		30.00
1	140.510*	2050.37	2039.50	10.86	0.42	0.03		4890.00		30.00
1	140	2050.23	2039.29	10.94	0.13	0.01		4890.00		30.00
1	138	2049.88	2038.64	11.25	0.31	0.03		4890.00		30.00
1	136.224*	2049.37	2037.71	11.67	0.47	0.04		4890.00		30.00

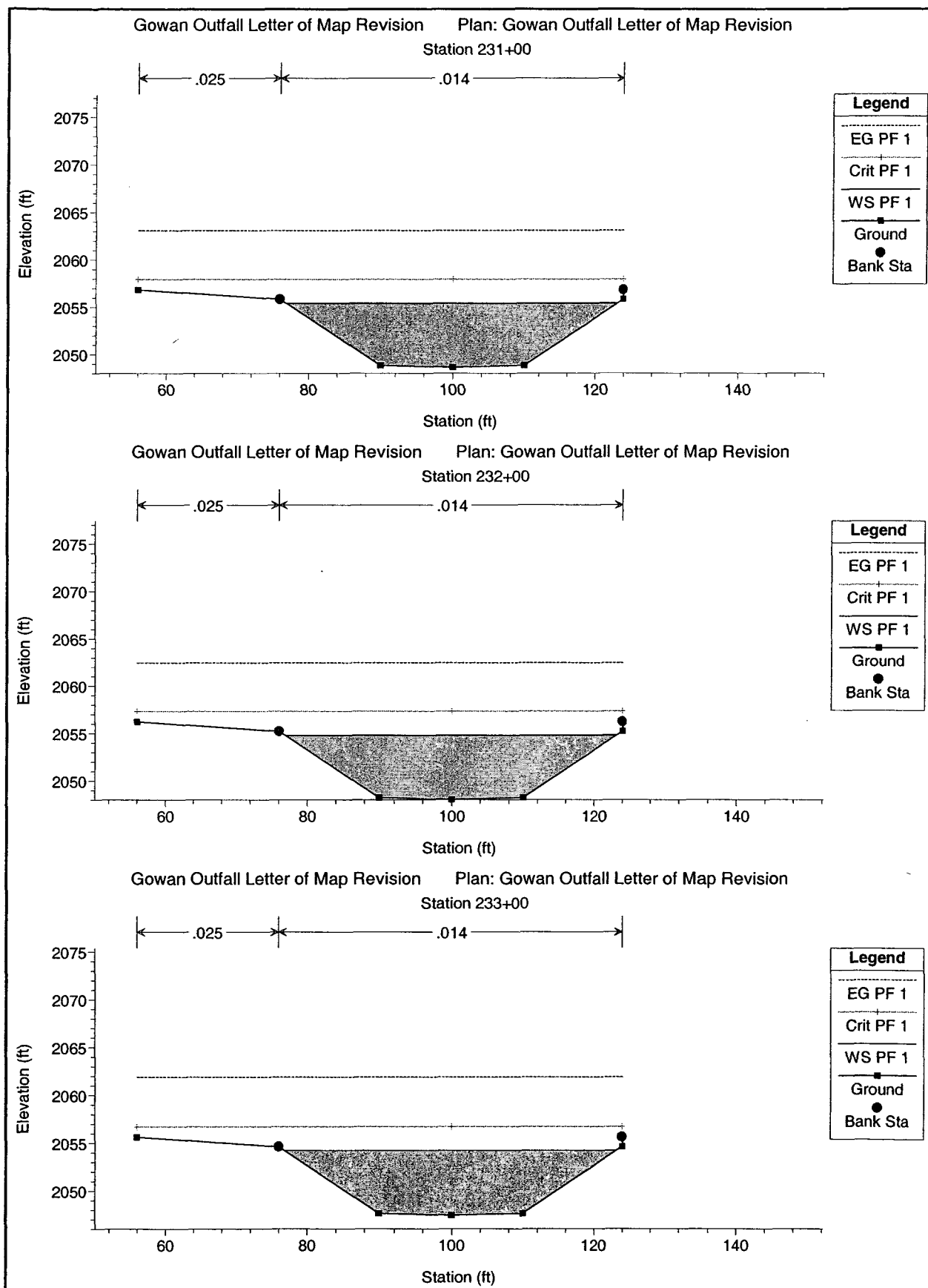
HEC-RAS Plan: Gowan River: Gowan Outfall Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
1	134.449*	2048.85	2036.80	12.04	0.49	0.04		4890.00		30.00
1	132.673*	2048.30	2035.90	12.40	0.51	0.04		4890.00		30.00
1	130.898*	2047.73	2035.02	12.71	0.53	0.03		4890.00		30.00
1	130	2047.43	2034.55	12.88	0.28	0.02		4890.00		30.00
1	128	2047.16	2034.23	12.93	0.27	0.00		4890.00		30.00
1	125.315*	2046.59	2033.60	12.99	0.56	0.01		4890.00		30.00
1	122.630*	2046.02	2032.95	13.07	0.56	0.01		4890.00		30.00
1	120	2045.45	2032.33	13.13	0.56	0.01		4890.00		30.00
1	119*	2045.37	2032.42	12.94	0.03	0.06		4890.00		29.50
1	118*	2045.27	2032.54	12.73	0.03	0.06		4890.00		29.00
1	117*	2045.18	2032.65	12.53	0.03	0.06		4890.00		28.50
1	116*	2045.08	2032.77	12.31	0.03	0.07		4890.00		28.00
1	115*	2044.99	2032.91	12.08	0.03	0.07		4890.00		27.50
1	114*	2044.88	2033.07	11.81	0.03	0.08		4890.00		27.00
1	113*	2044.77	2033.23	11.54	0.03	0.08		4890.00		26.50
1	112*	2044.66	2033.41	11.25	0.03	0.09		4890.00		26.00
1	111*	2044.53	2033.63	10.91	0.02	0.10		4890.00		25.50
1	110	2044.40	2033.86	10.55	0.02	0.11		4890.00		25.00
1	108	2044.23	2033.55	10.68	0.15	0.01		4890.00		25.00
1	106.241*	2044.02	2033.18	10.84	0.20	0.02		4890.00		25.00
1	104.483*	2043.81	2032.80	11.00	0.20	0.02		4890.00		25.00
1	102.725*	2043.58	2032.44	11.14	0.20	0.01		4890.00		25.00
1	100.967*	2043.35	2032.08	11.27	0.21	0.01		4890.00		25.00
1	100	2043.23	2031.88	11.35	0.12	0.01		4890.00		25.00
1	97	2042.90	2031.37	11.53	0.31	0.02		4890.00		25.00
1	95.4375*	2042.67	2031.03	11.64	0.22	0.01		4890.00		25.00
1	93.875*	2042.43	2030.68	11.75	0.22	0.01		4890.00		25.00
1	92.3125*	2042.20	2030.33	11.86	0.22	0.01		4890.00		25.00
1	91	2042.00	2030.05	11.95	0.19	0.01		4890.00		25.00
1	90.5*	2041.97	2030.03	11.94	0.02	0.00		4890.00		25.00
1	90	2041.95	2030.00	11.95	0.02	0.00		4890.00		25.00
1	84.7329*	2041.40	2028.77	12.63	0.48	0.07		4890.00		26.58
1	80	2040.87	2027.77	13.10	0.47	0.05		4890.00		28.00
1	78.5714*	2040.76	2027.52	13.24	0.10	0.01		4890.00		28.00
1	77.1428*	2040.64	2027.25	13.39	0.11	0.01		4890.00		28.00
1	75.7142*	2040.52	2027.00	13.52	0.11	0.01		4890.00		28.00

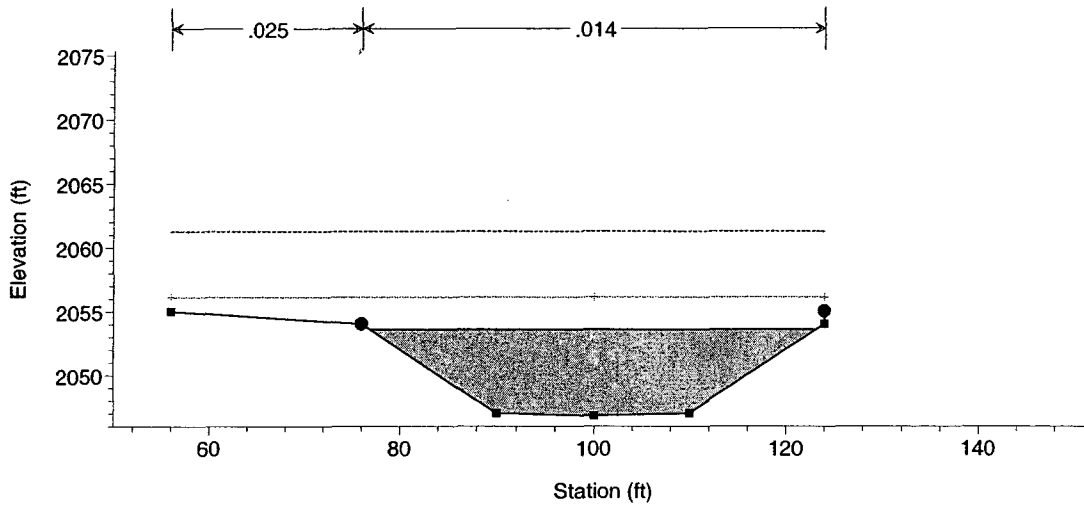
HEC-RAS Plan: Gowan River: Gownan Outfall Reach: 1 Profile: PF 1 (Continued)

Reach	River Sta	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
1	74.2857	2040.41	2026.76	13.65	0.11	0.01		4890.00		28.00
1	72.8571	2040.29	2026.51	13.79	0.10	0.01		4890.00		28.00
1	71.4285	2040.19	2026.24	13.94	0.10	0.02		4890.00		28.00
1	70	2039.74	2022.76	16.98	0.14	0.30		4890.00		55.00

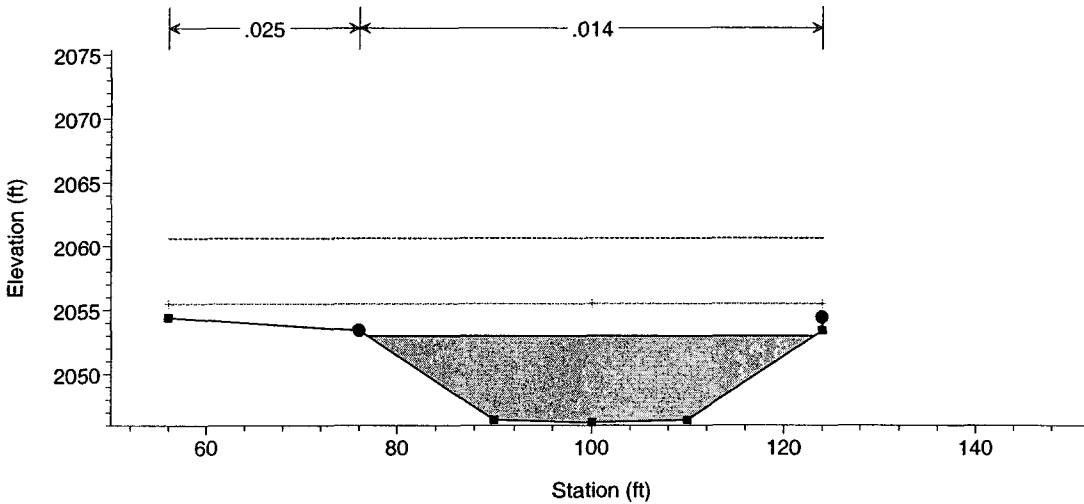




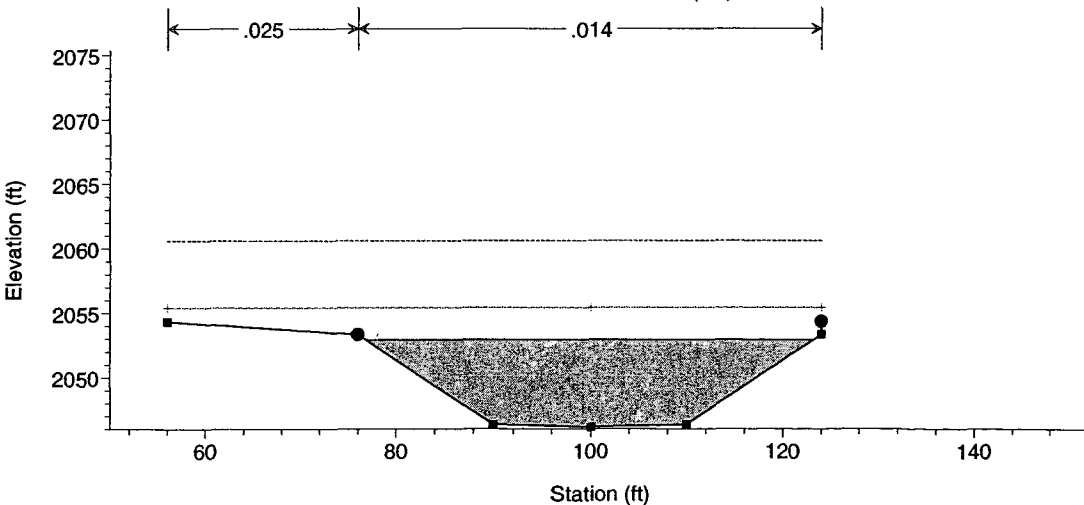
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Station 234+00



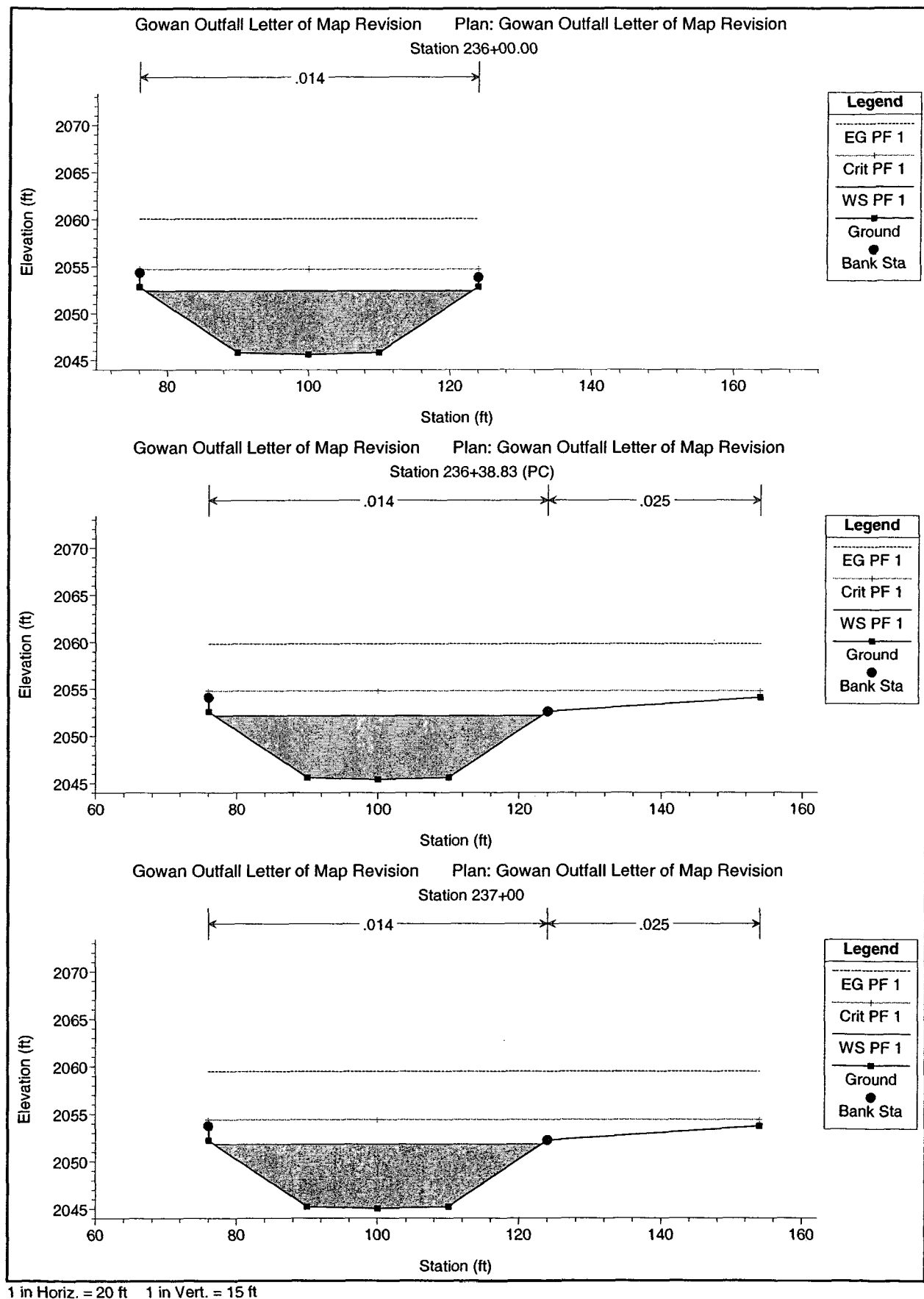
Gowan Outfall Letter of Map Revision Plan: Gowan Outfall Letter of Map Revision
Station 235+00

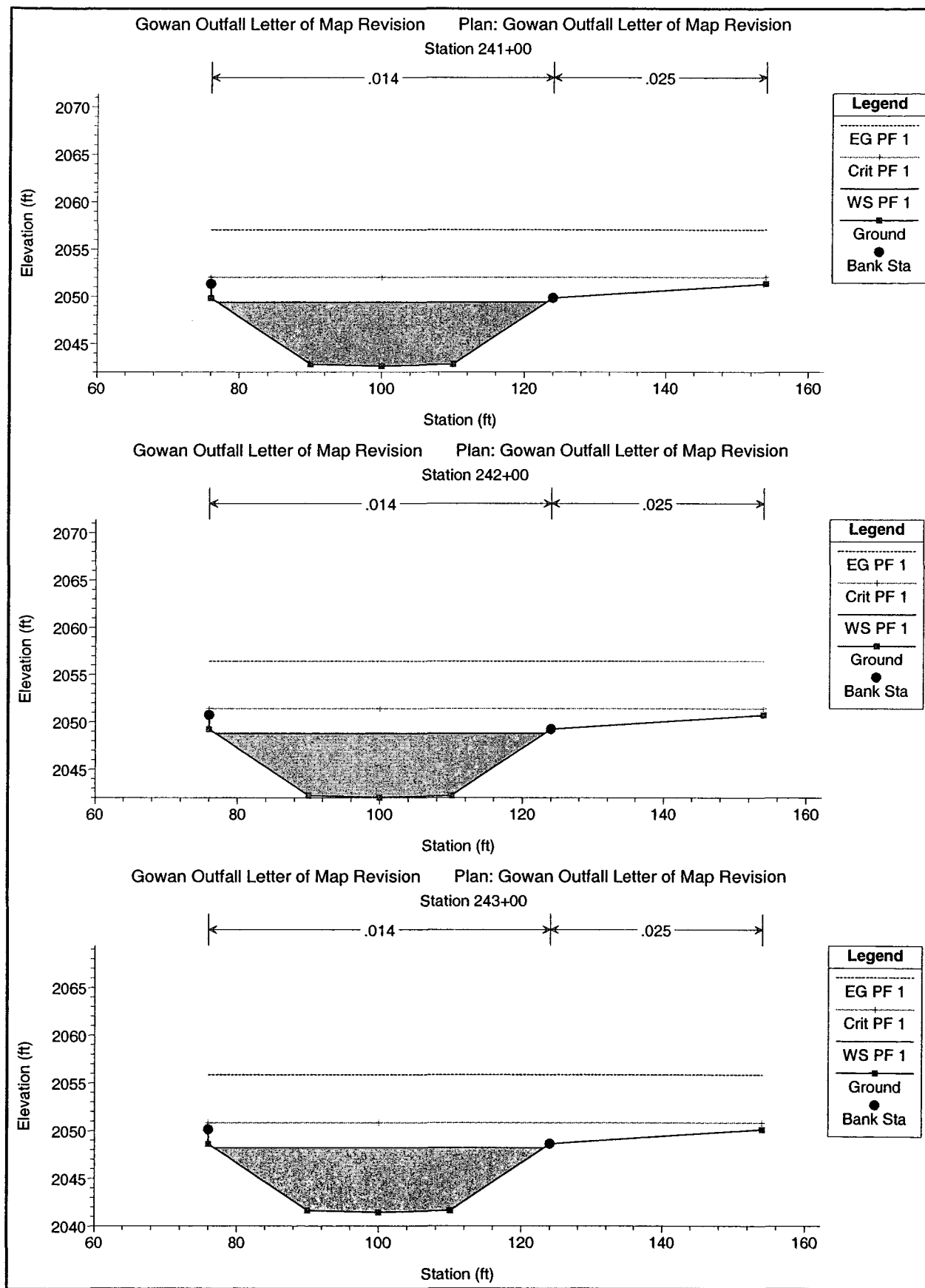


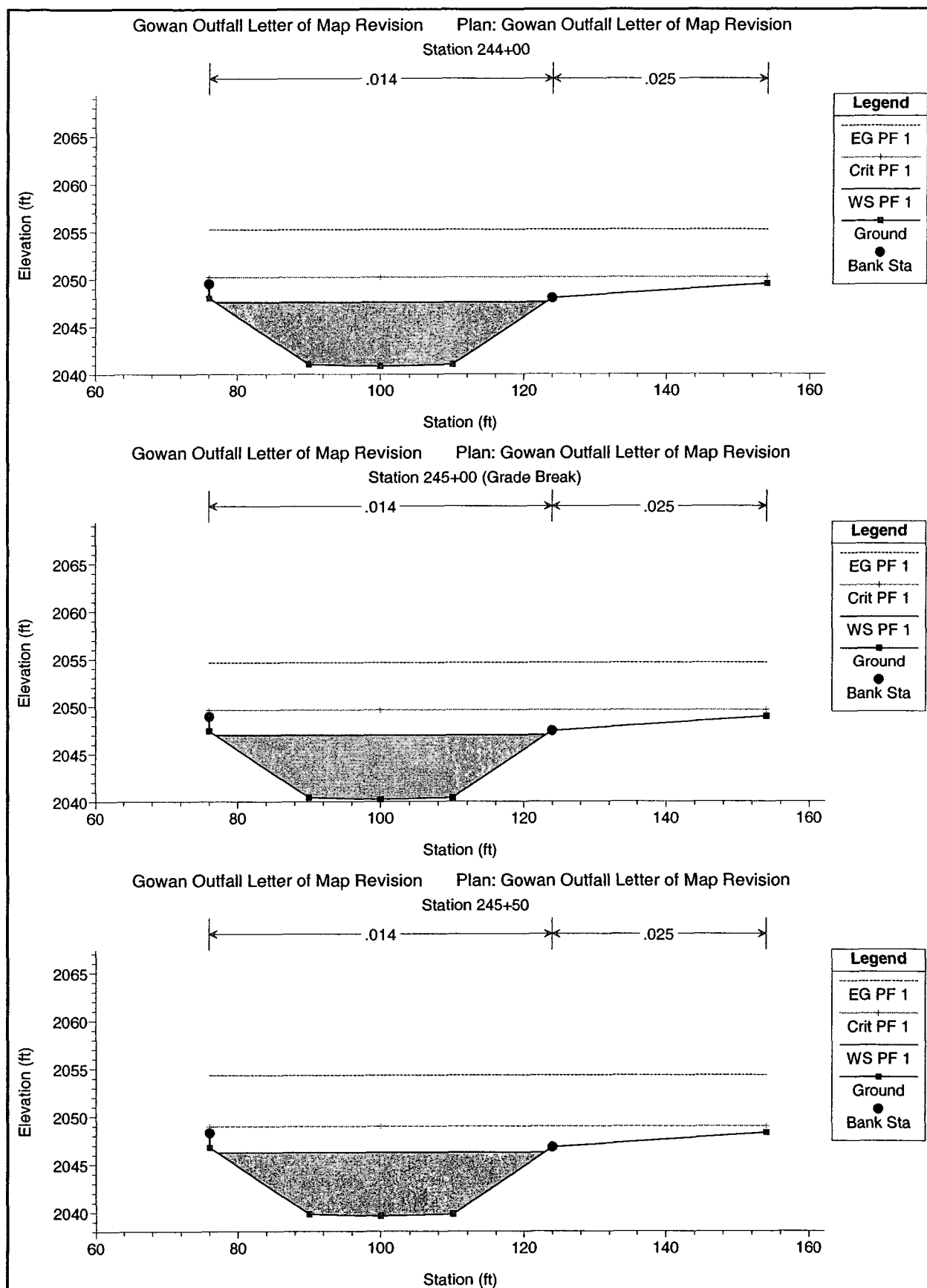
Gowan Outfall Letter of Map Revision Plan: Gowan Outfall Letter of Map Revision
Station 235+09.55 (PT)



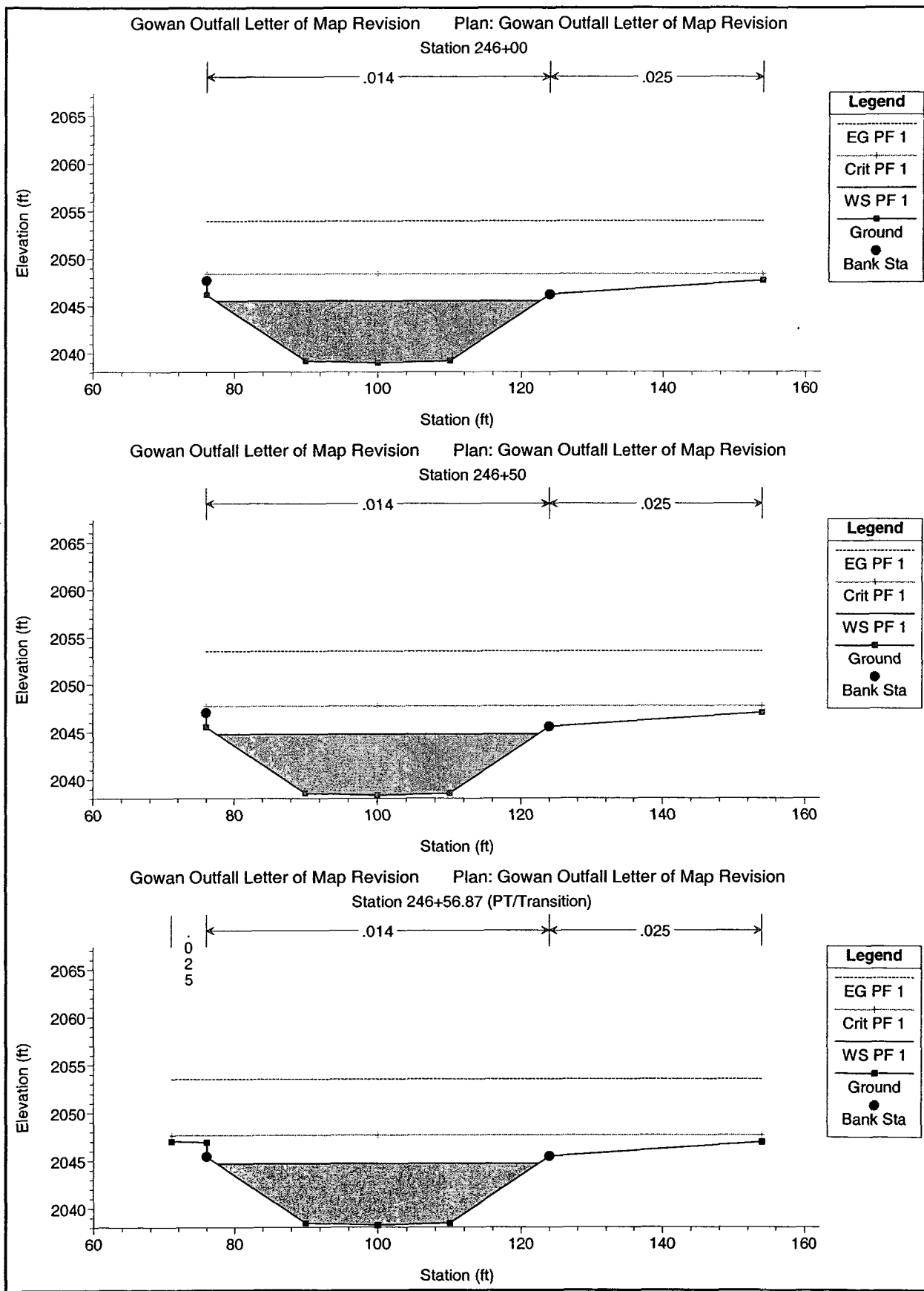
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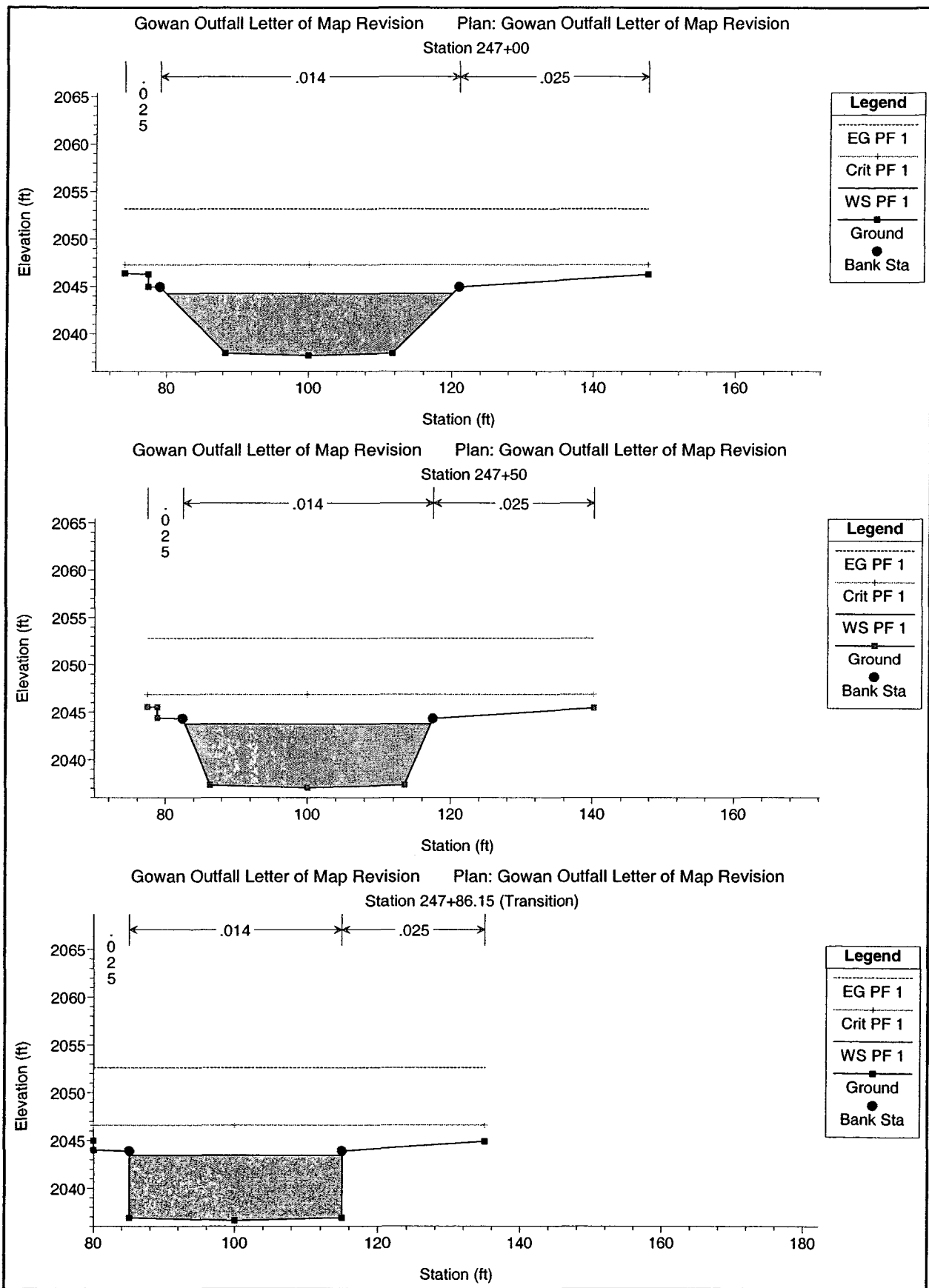


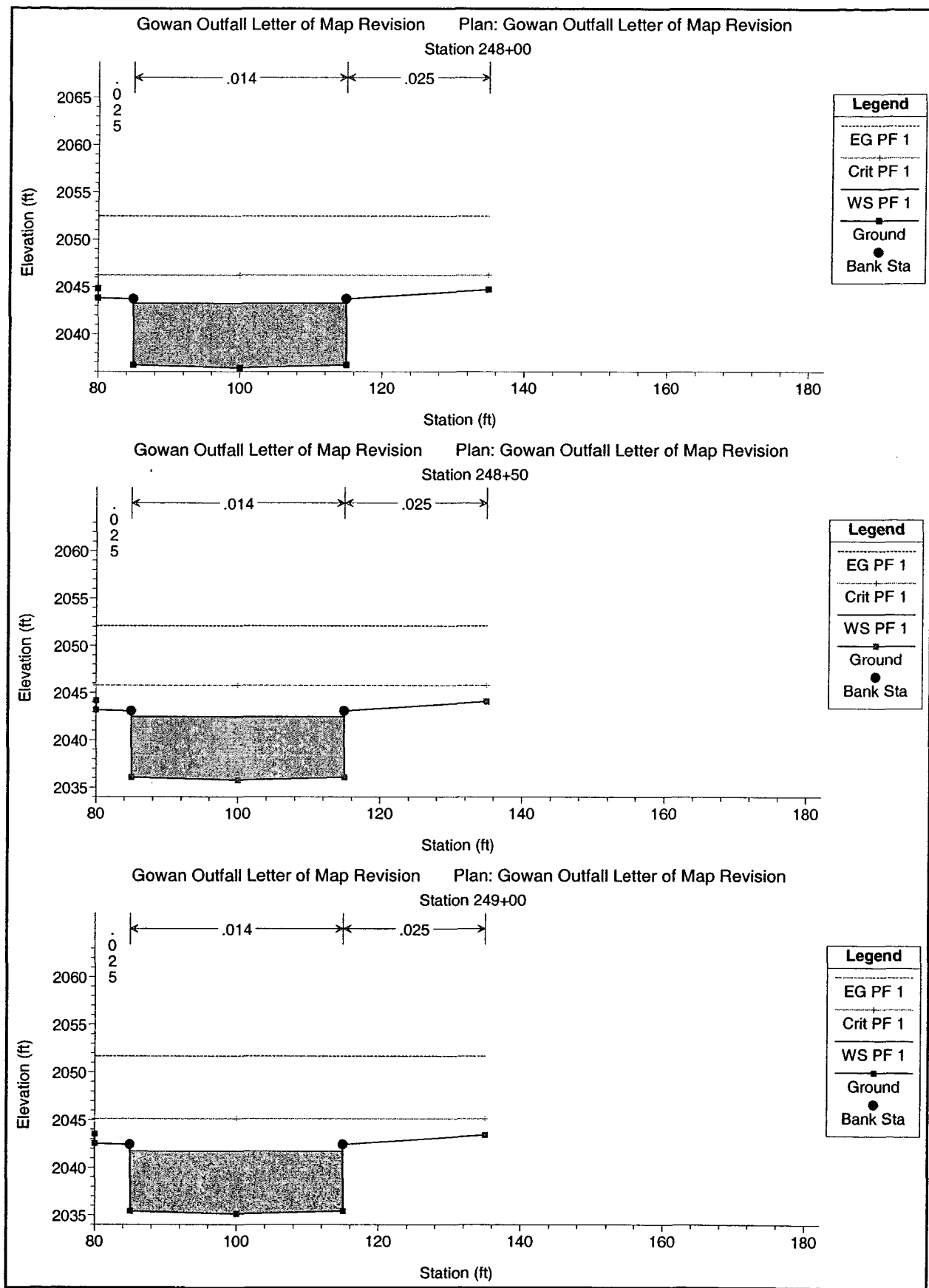


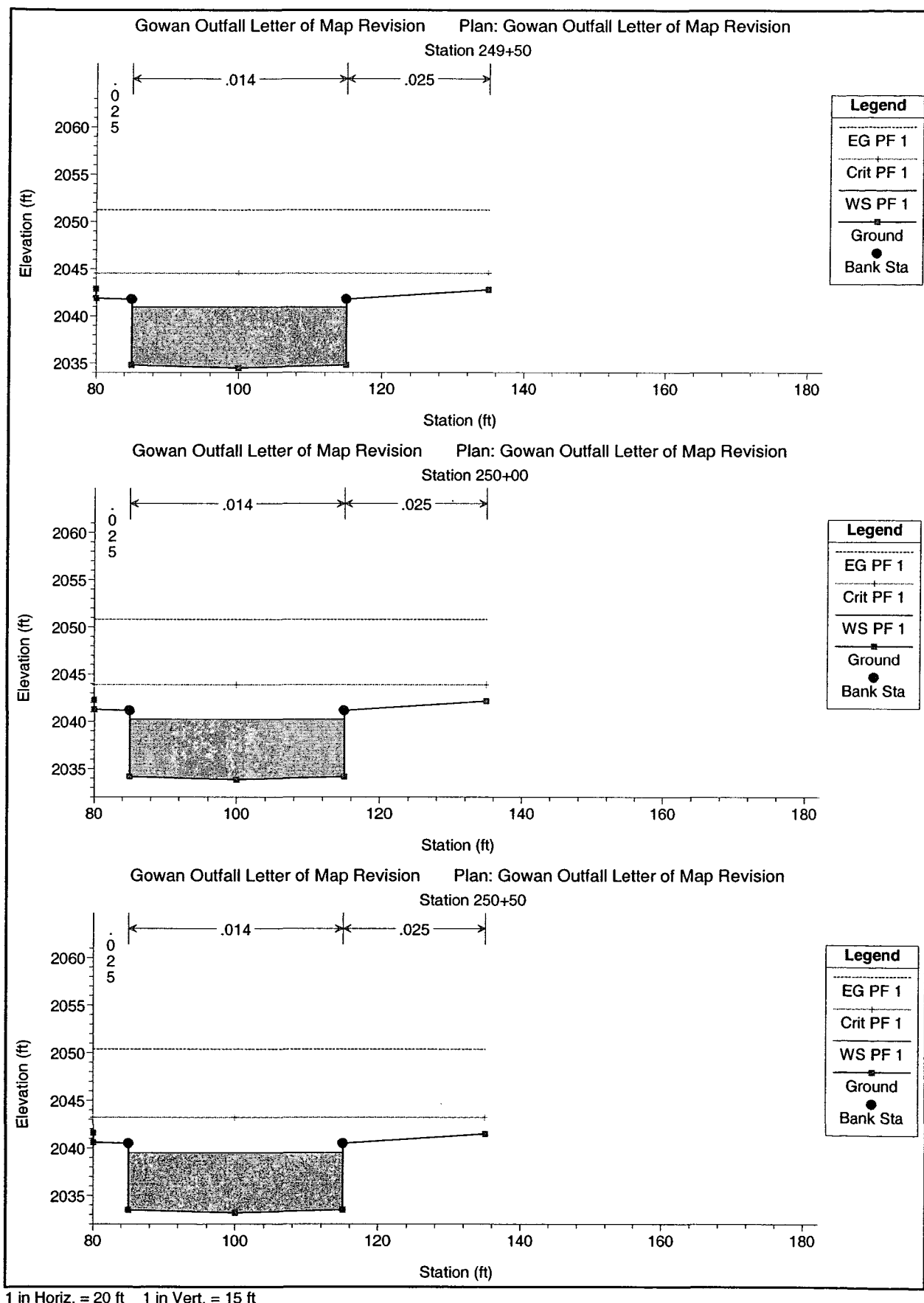


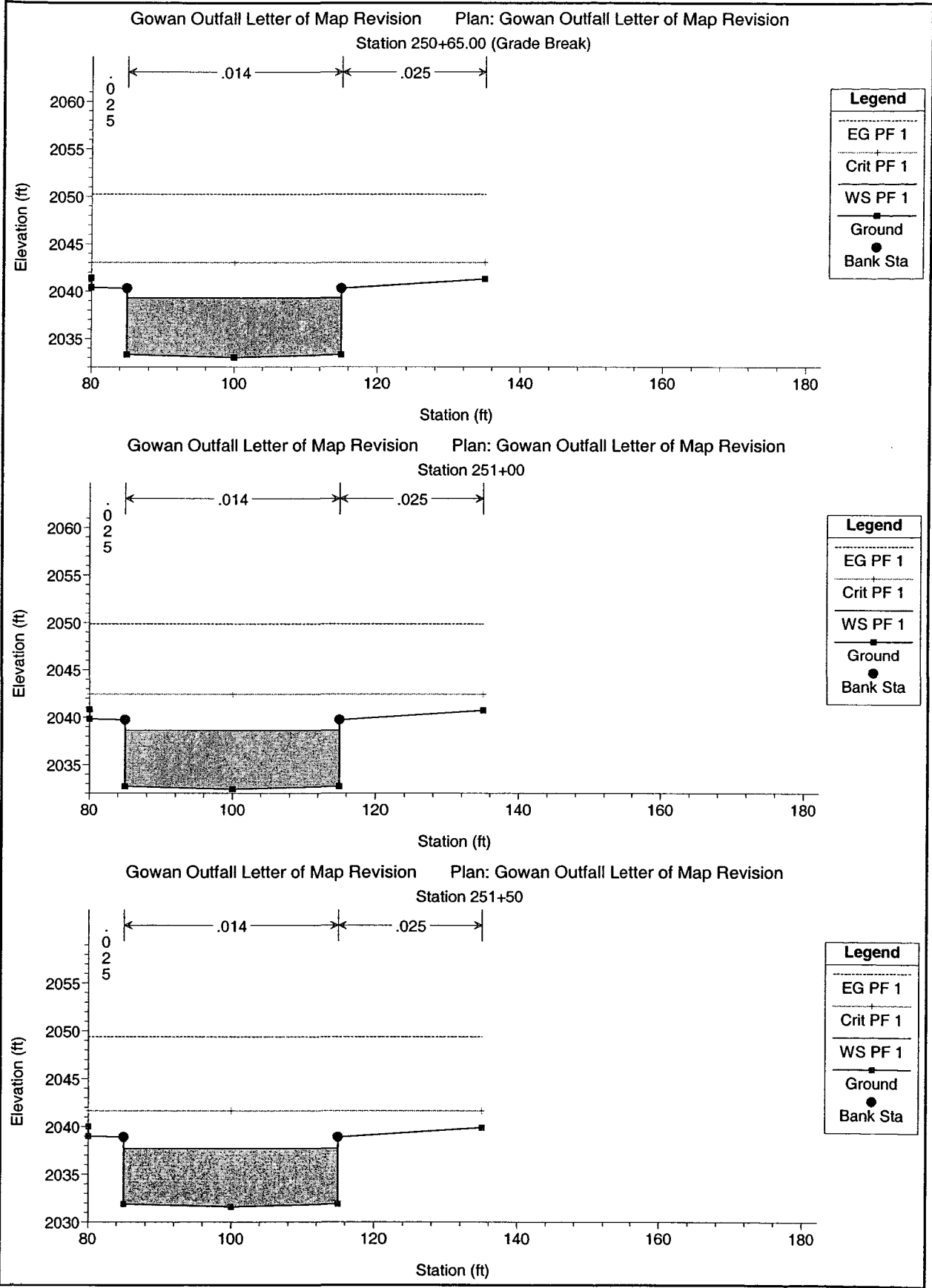
1 in Horiz. = 20 ft 1 in Vert. = 15 ft



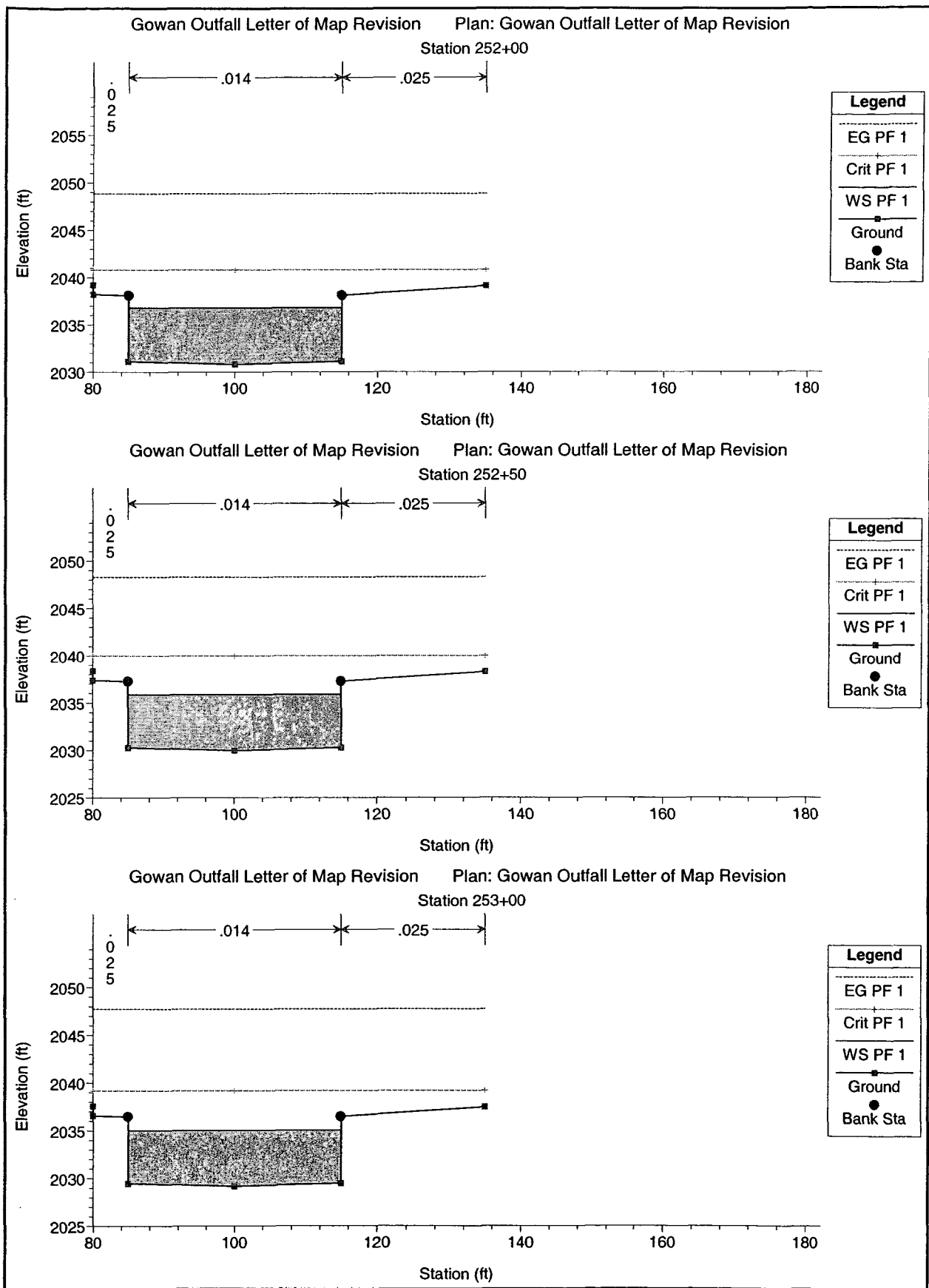




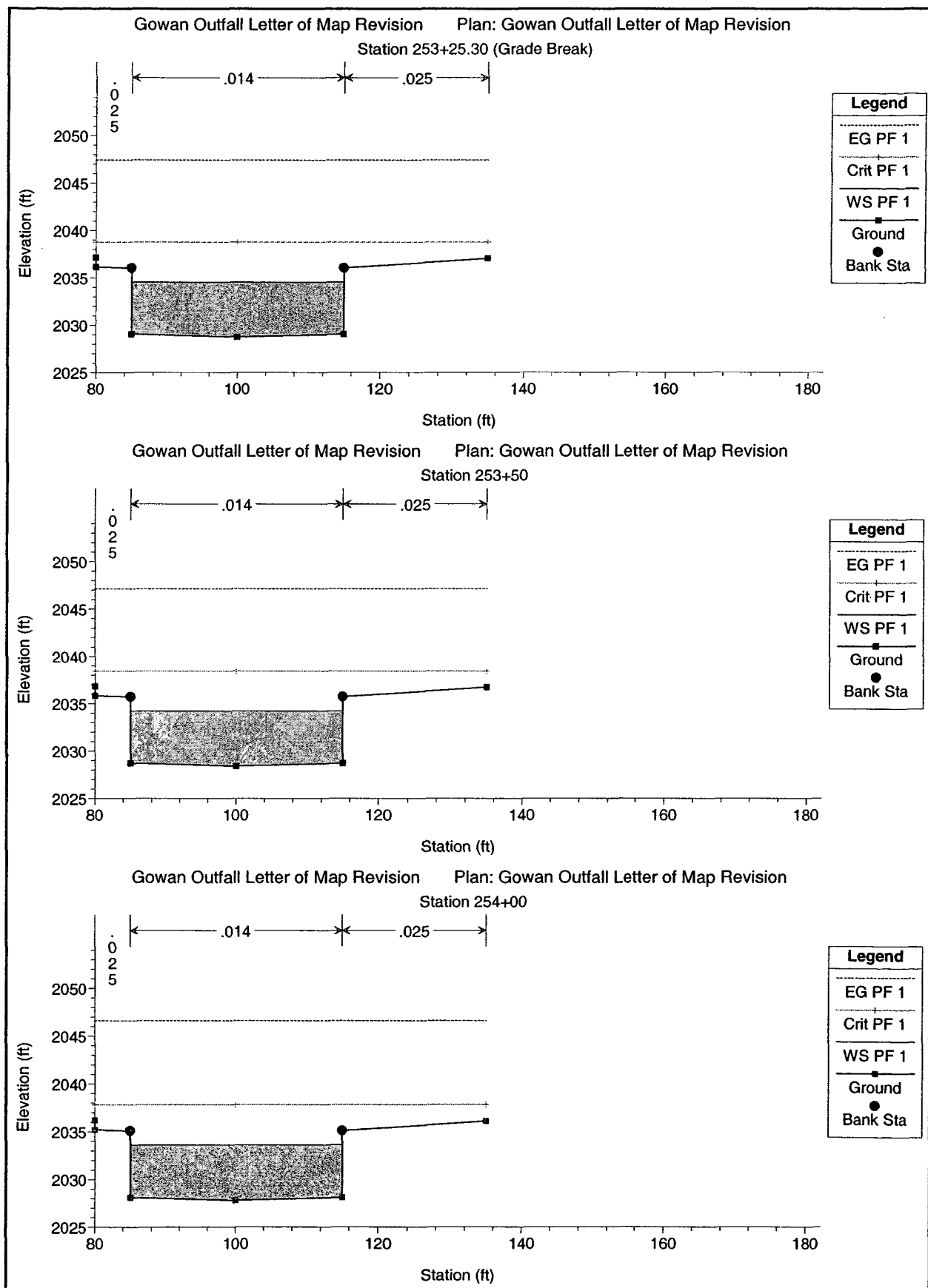


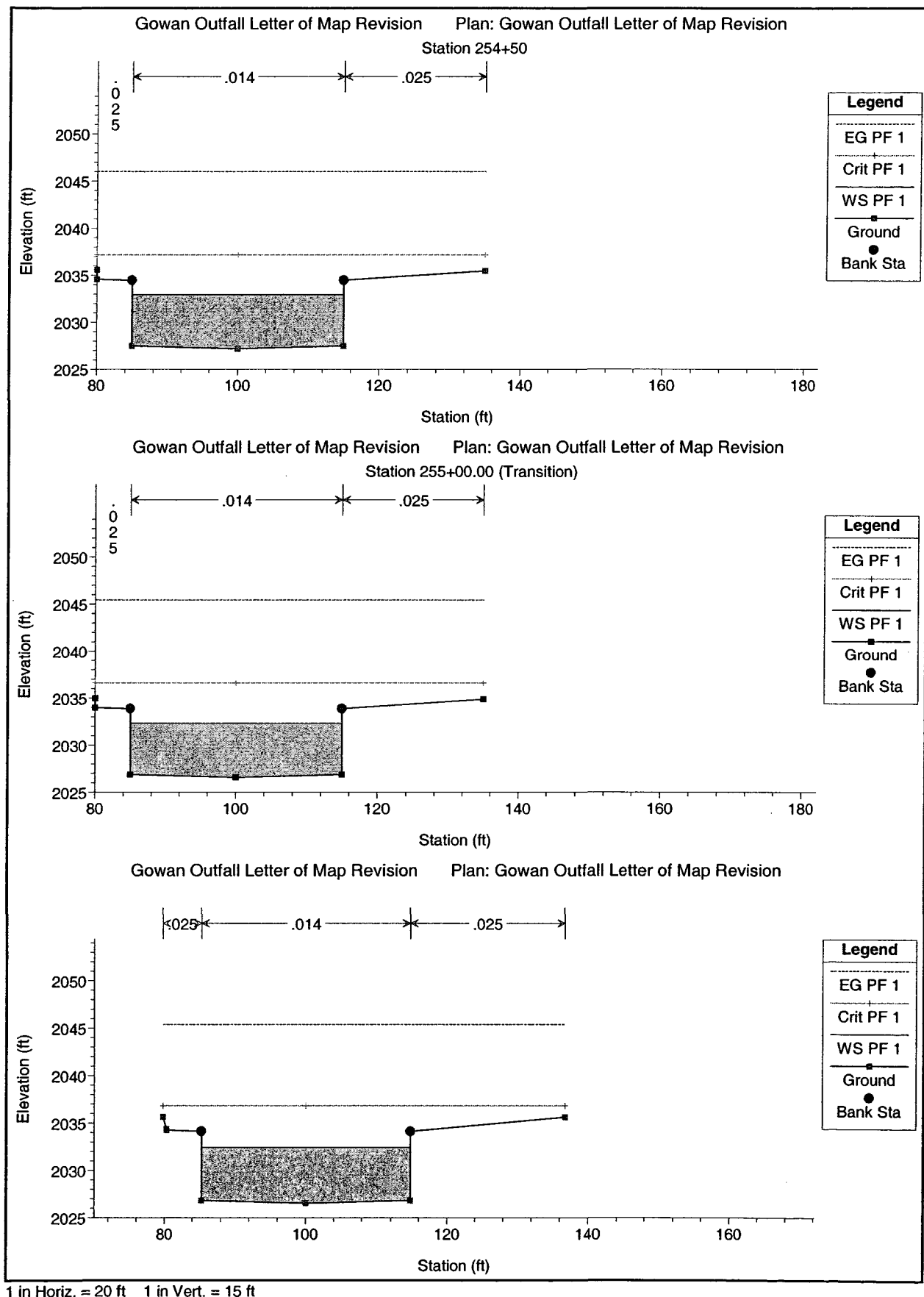


1 in Horiz. = 20 ft 1 in Vert. = 15 ft



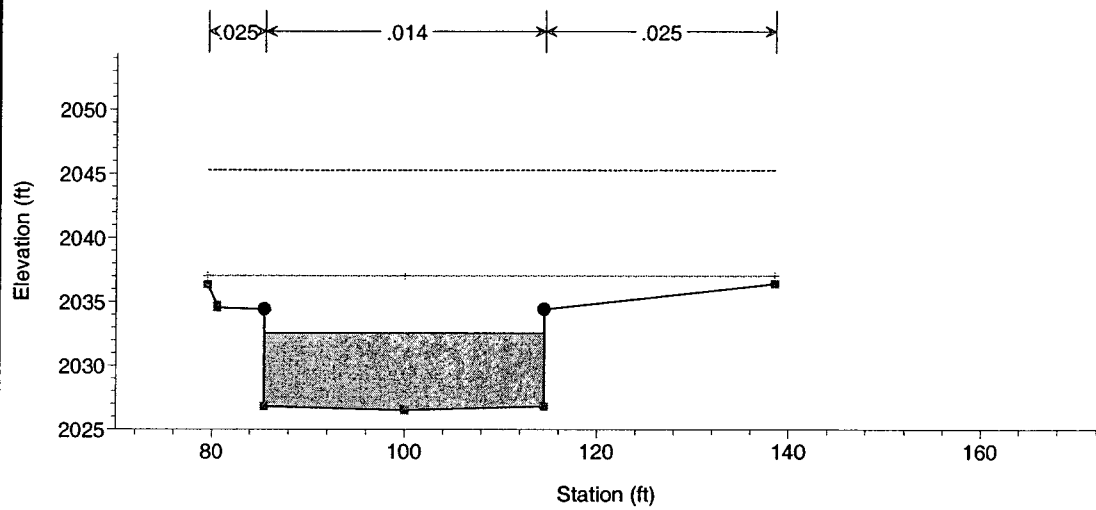
1 in Horiz. = 20 ft 1 in Vert. = 15 ft





Gowan Outfall Letter of Map Revision

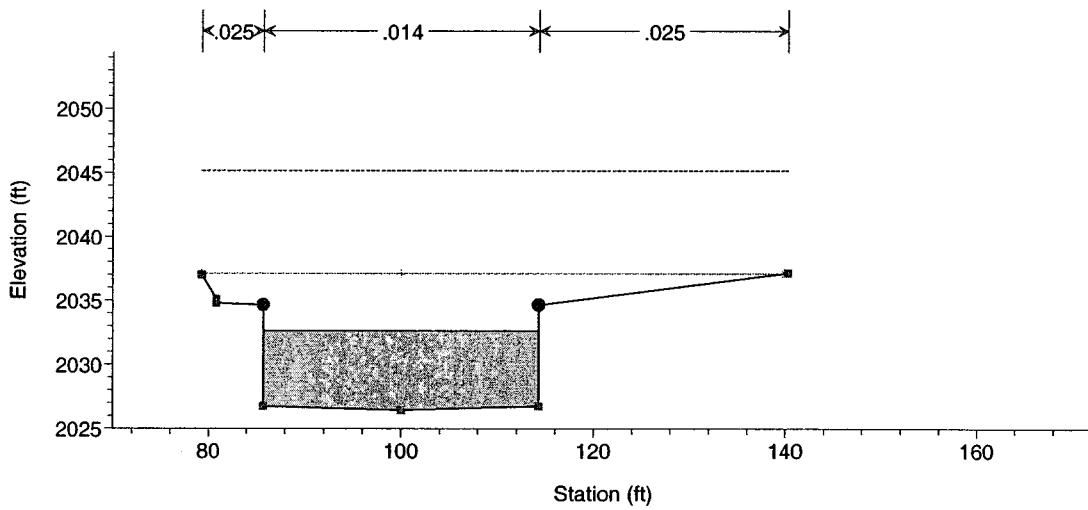
Plan: Gowan Outfall Letter of Map Revision



Legend	
EG PF 1	
Crit PF 1	
WS PF 1	
Ground	■
Bank Sta	●

Gowan Outfall Letter of Map Revision

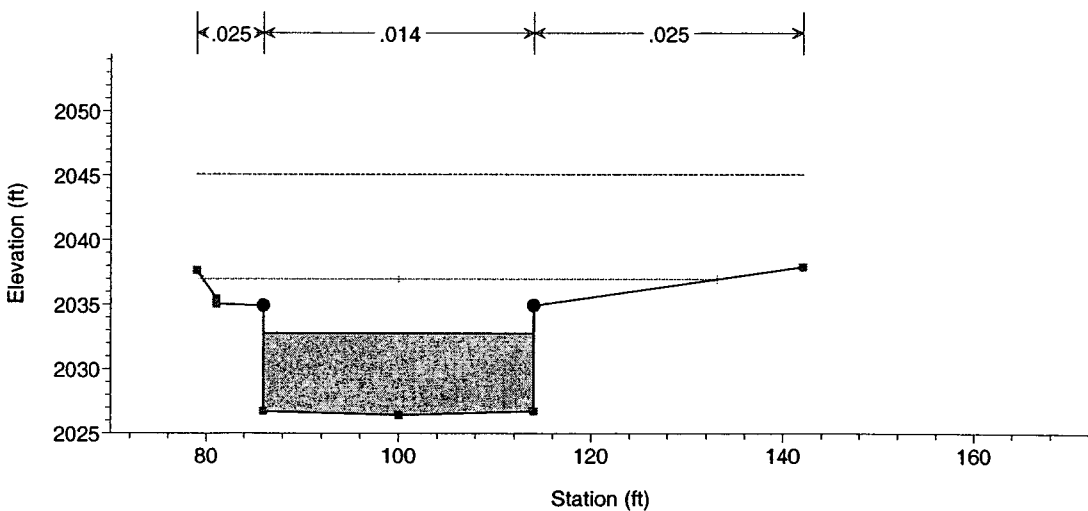
Plan: Gowan Outfall Letter of Map Revision



Legend	
EG PF 1	
Crit PF 1	
WS PF 1	
Ground	■
Bank Sta	●

Gowan Outfall Letter of Map Revision

Plan: Gowan Outfall Letter of Map Revision

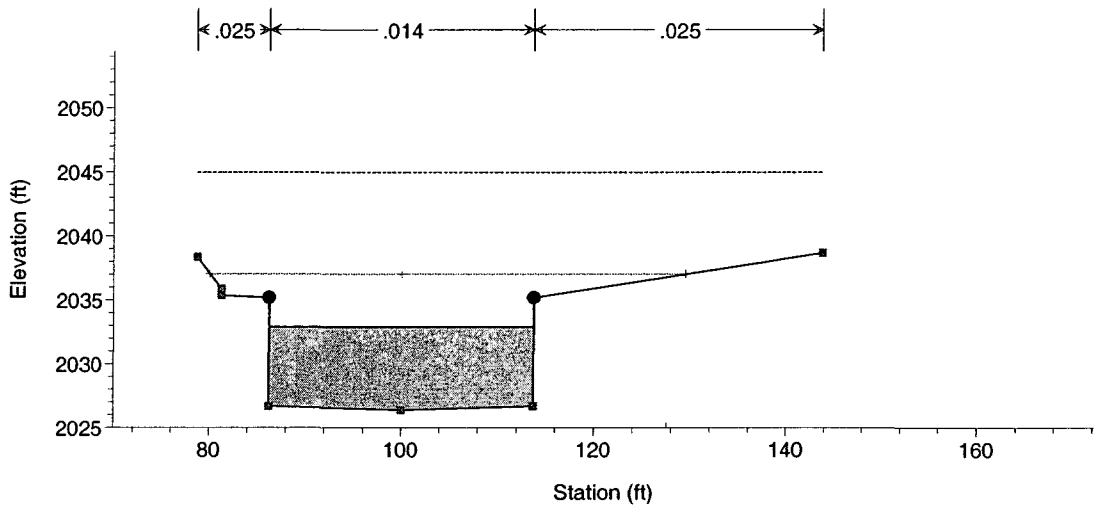


Legend	
EG PF 1	
Crit PF 1	
WS PF 1	
Ground	■
Bank Sta	●

1 in Horiz. = 20 ft 1 in Vert. = 15 ft

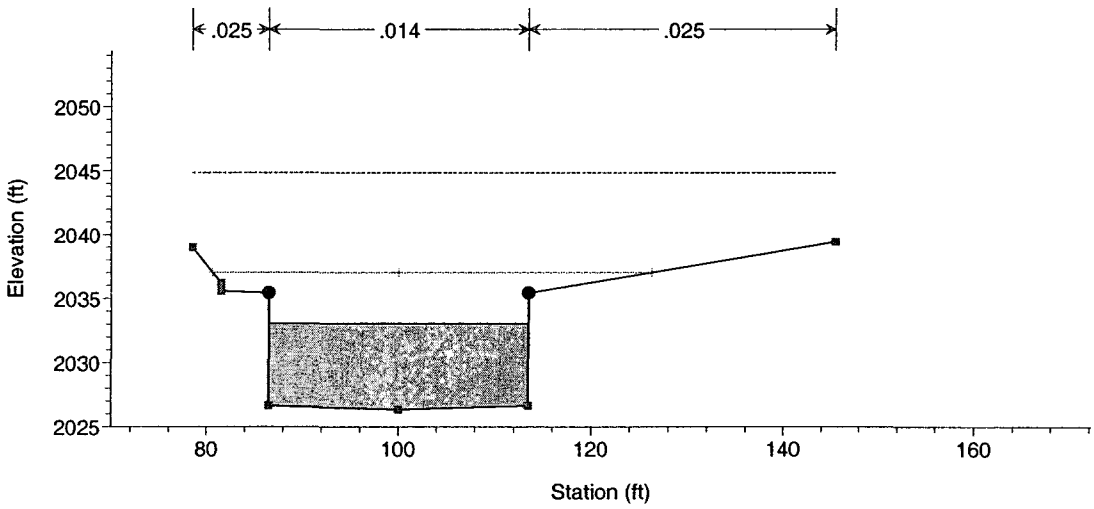
Gowan Outfall Letter of Map Revision

Plan: Gowan Outfall Letter of Map Revision



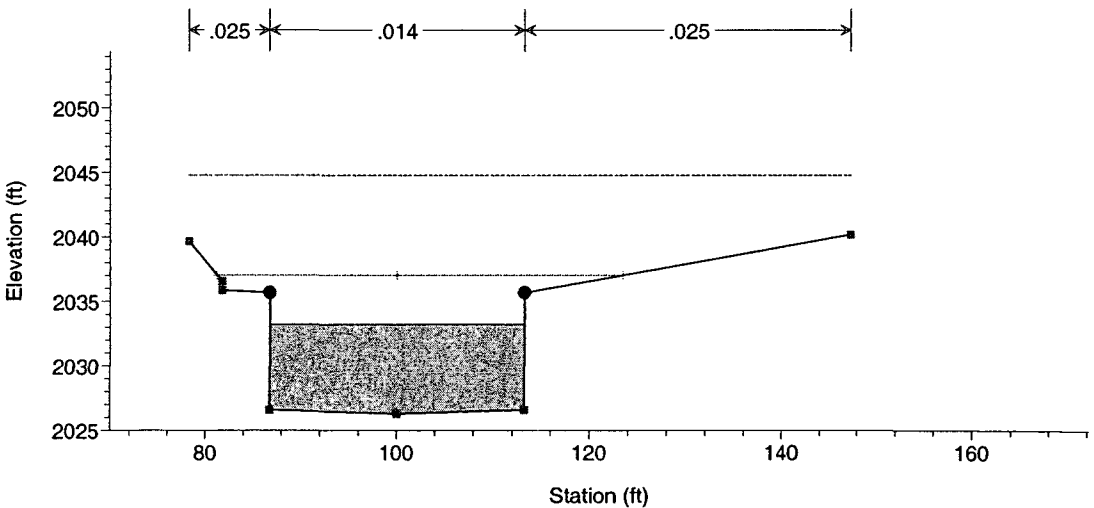
Gowan Outfall Letter of Map Revision

Plan: Gowan Outfall Letter of Map Revision



Gowan Outfall Letter of Map Revision

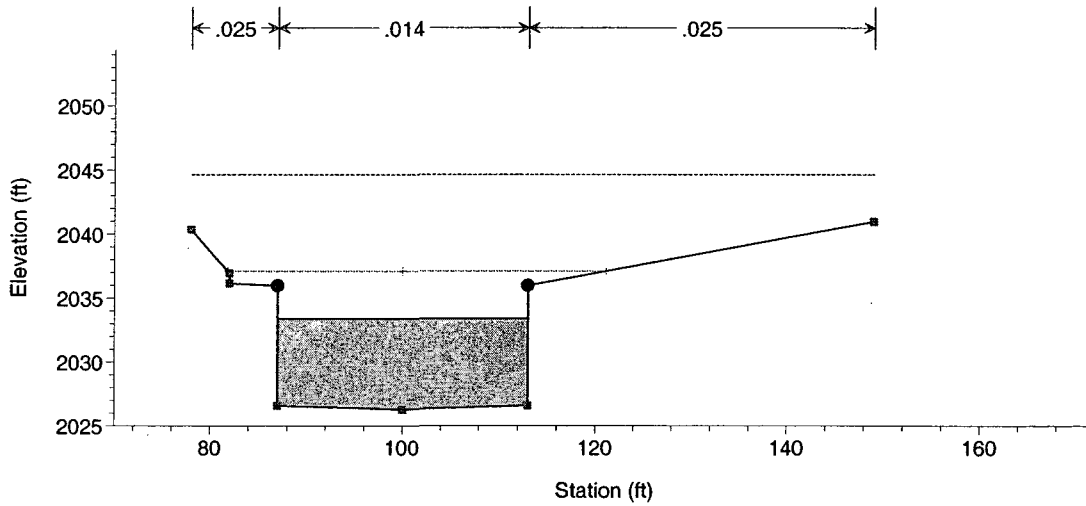
Plan: Gowan Outfall Letter of Map Revision



1 in Horiz. = 20 ft 1 in Vert. = 15 ft

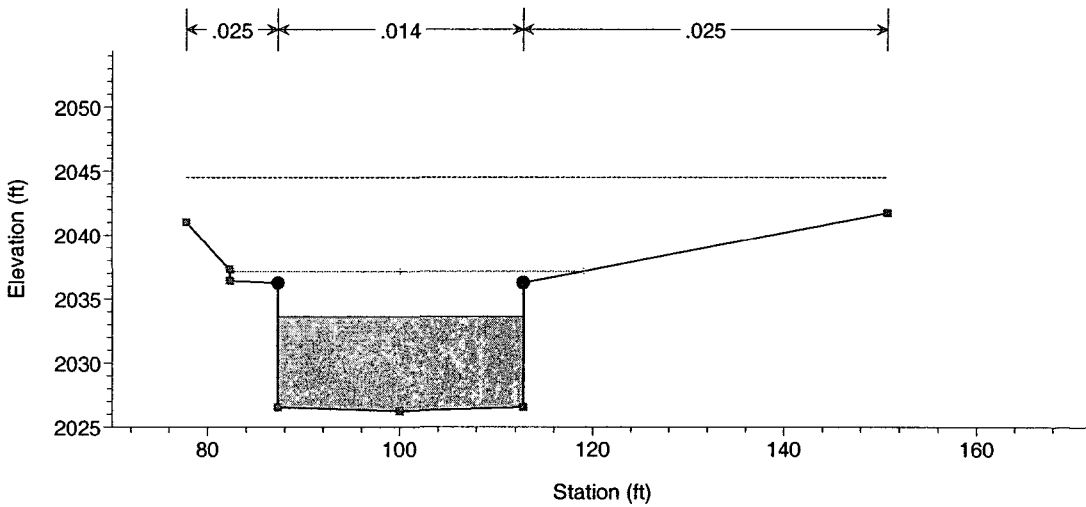
Gowan Outfall Letter of Map Revision

Plan: Gowan Outfall Letter of Map Revision



Gowan Outfall Letter of Map Revision

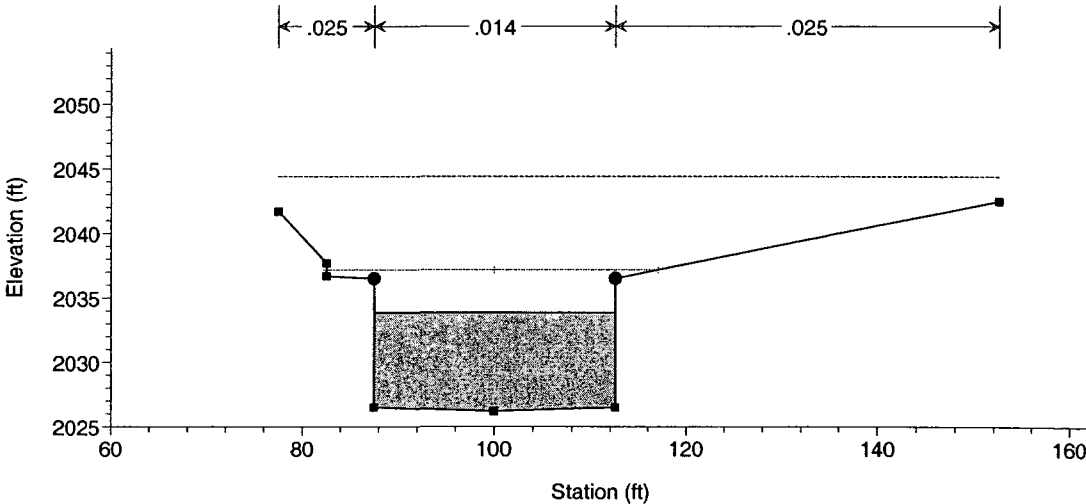
Plan: Gowan Outfall Letter of Map Revision



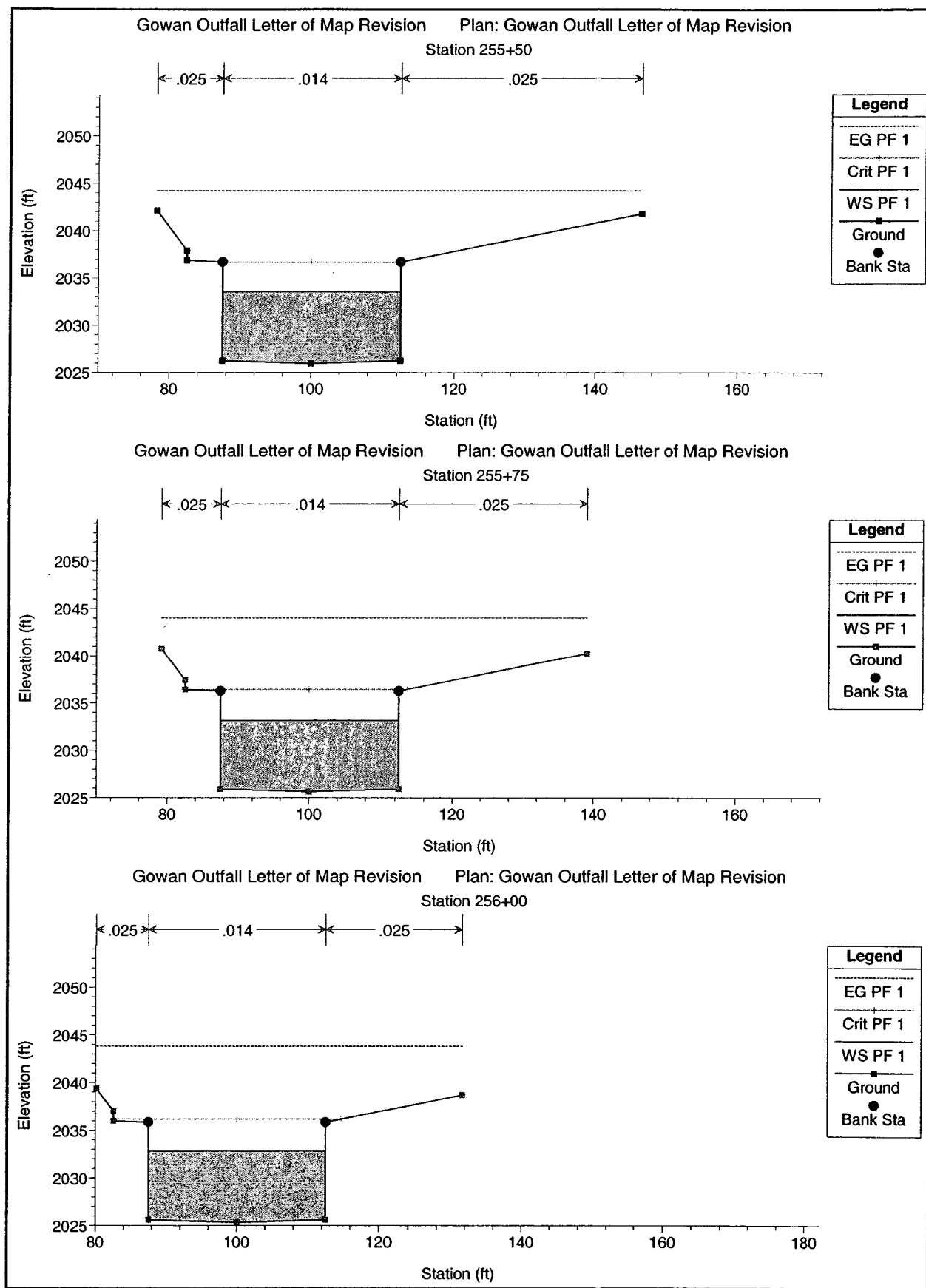
Gowan Outfall Letter of Map Revision

Plan: Gowan Outfall Letter of Map Revision

Station 255+30.00 (Transition)



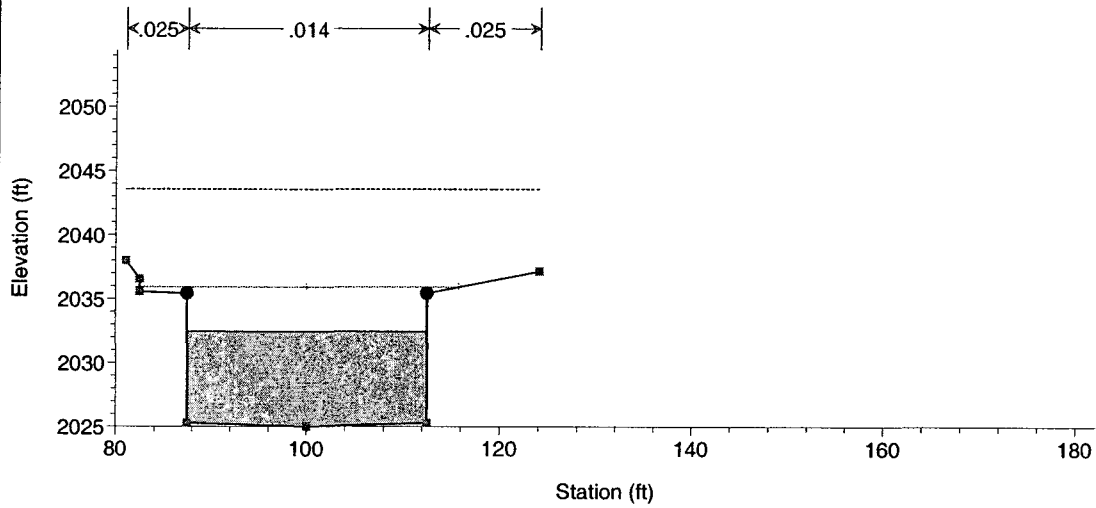
1 in Horiz. = 20 ft 1 in Vert. = 15 ft



Gowan Outfall Letter of Map Revision

Plan: Gowan Outfall Letter of Map Revision

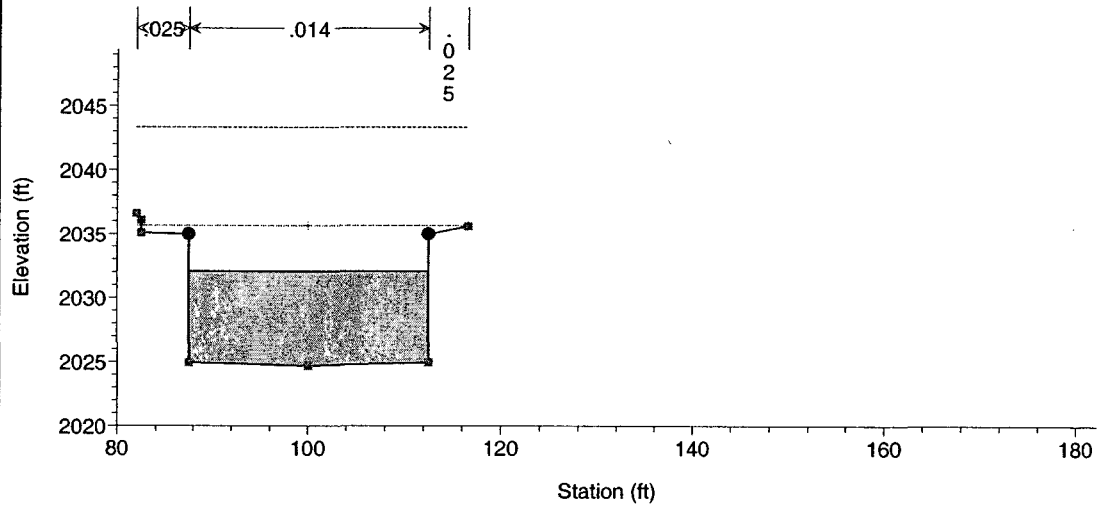
Station 256+25



Gowan Outfall Letter of Map Revision

Plan: Gowan Outfall Letter of Map Revision

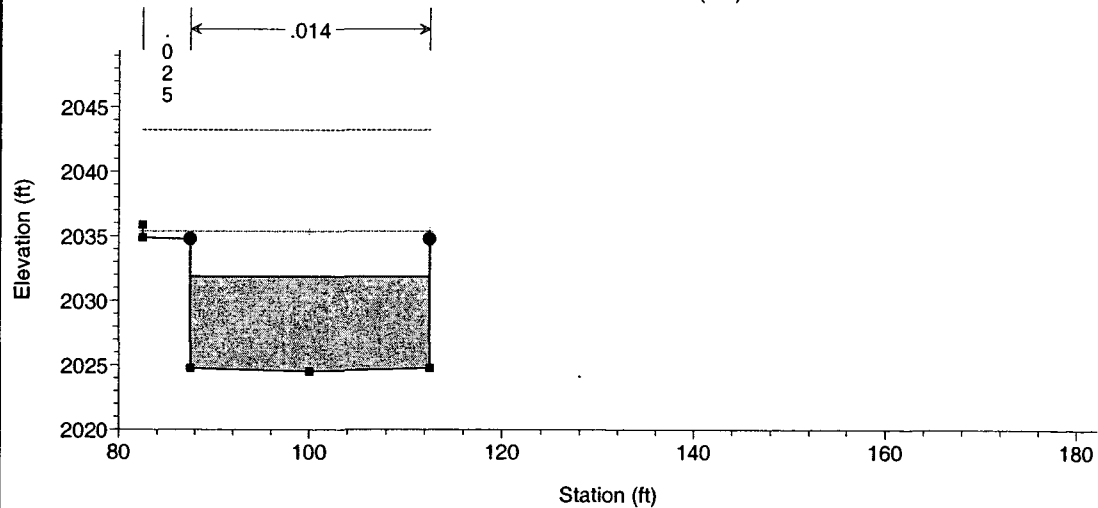
Station 256+50



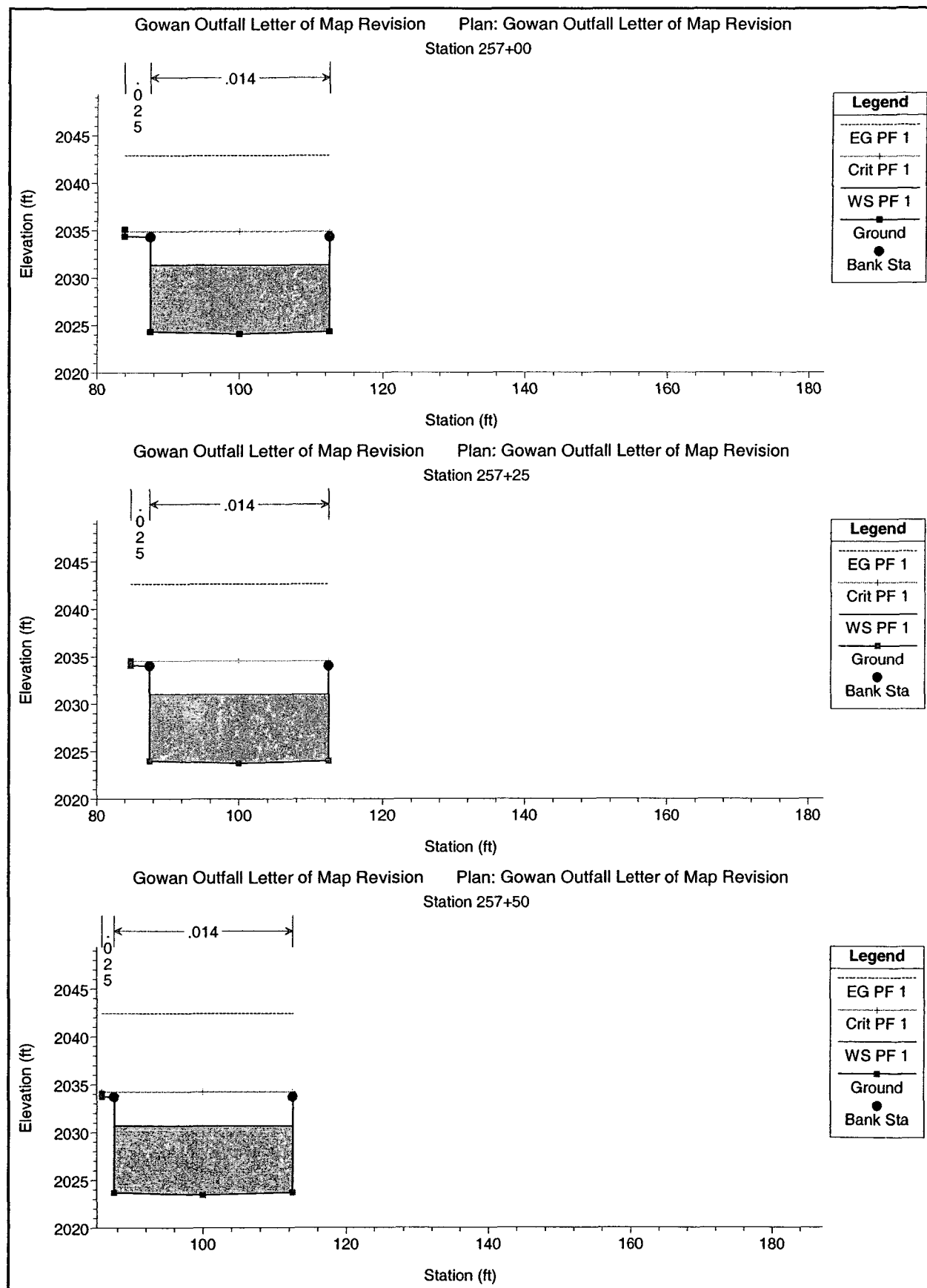
Gowan Outfall Letter of Map Revision

Plan: Gowan Outfall Letter of Map Revision

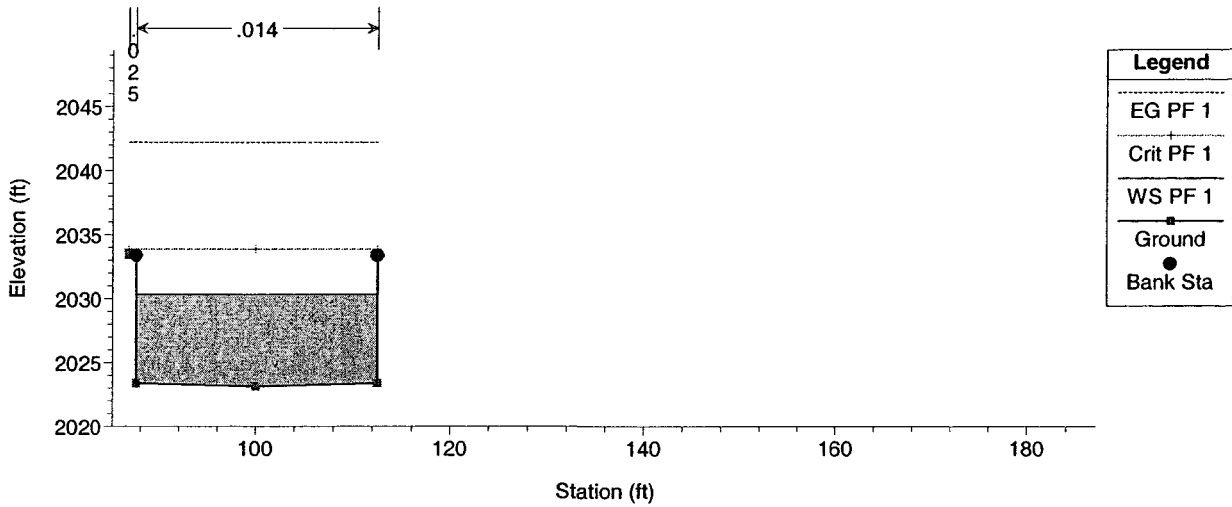
Station 256+63.74 (PC)



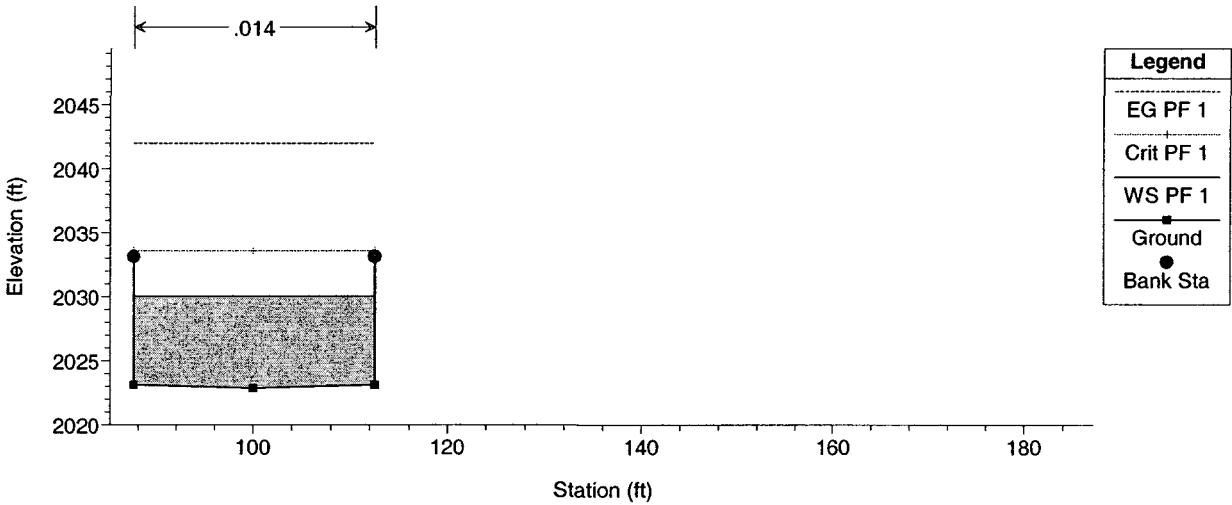
1 in Horiz. = 20 ft 1 in Vert. = 15 ft



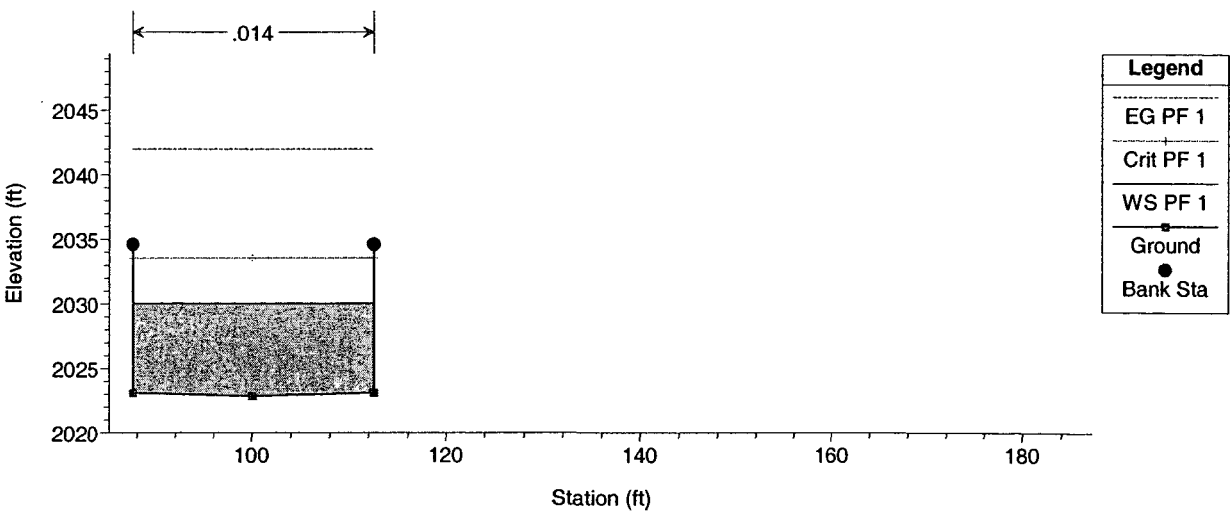
Gowan Outfall Letter of Map Revision Plan: Gowan Outfall Letter of Map Revision
Station 257+75



Gowan Outfall Letter of Map Revision Plan: Gowan Outfall Letter of Map Revision
Station 257+96.00



Gowan Outfall Letter of Map Revision Plan: Gowan Outfall Letter of Map Revision

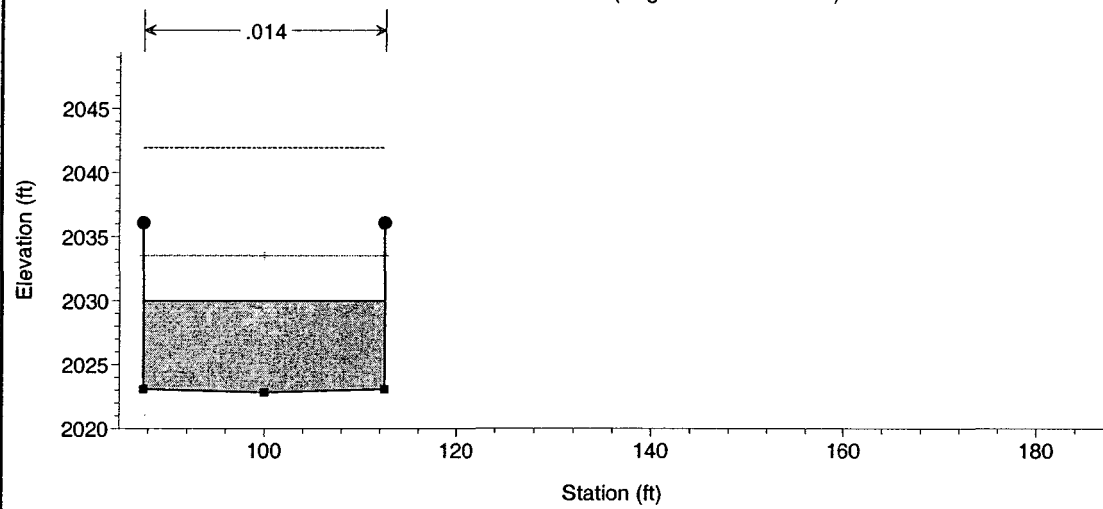


1 in Horiz. = 20 ft 1 in Vert. = 15 ft

Gowan Outfall Letter of Map Revision

Plan: Gowan Outfall Letter of Map Revision

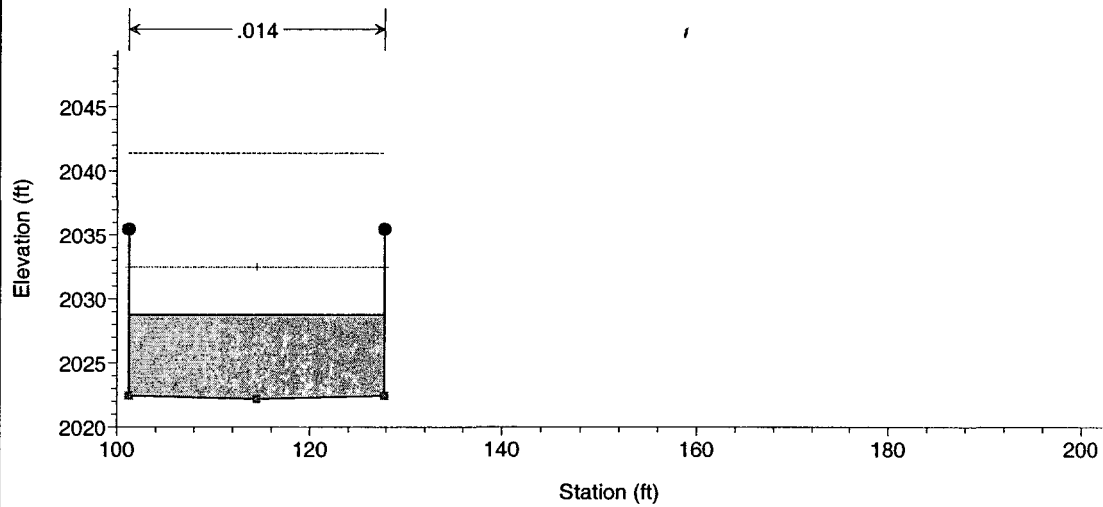
Station 258+00.00 (Begin 25'x13' Channel)



Gowan Outfall Letter of Map Revision

Plan: Gowan Outfall Letter of Map Revision

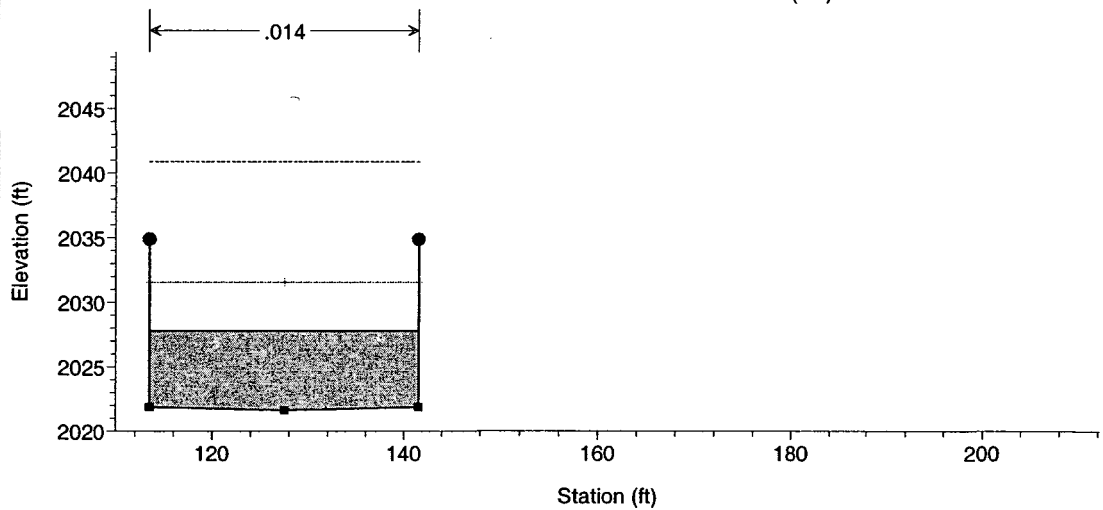
Station 258+50.00



Gowan Outfall Letter of Map Revision

Plan: Gowan Outfall Letter of Map Revision

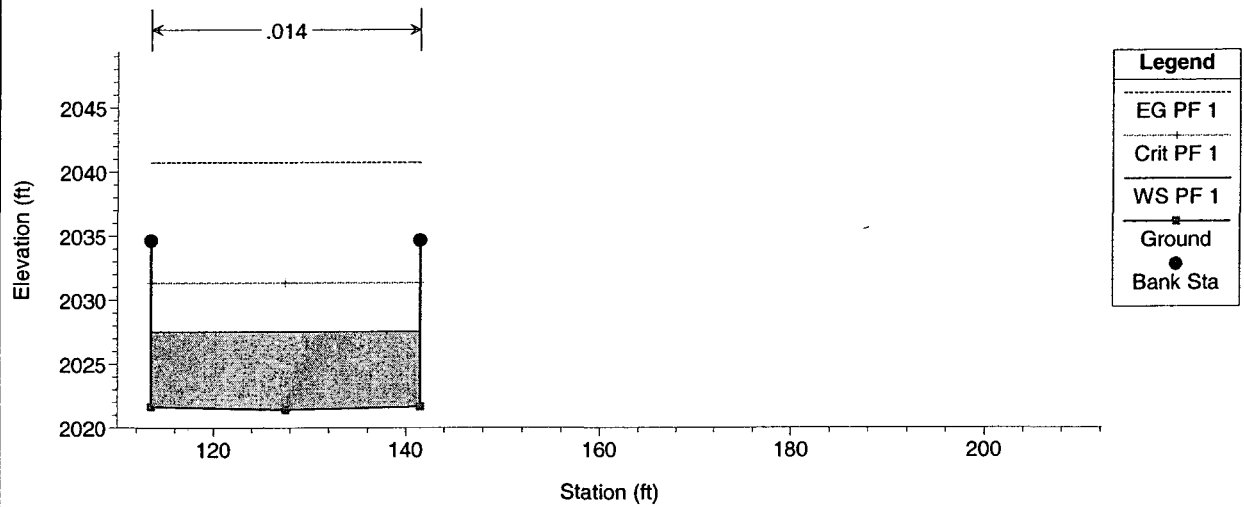
Station 258+94.93= Station 58+65.82 (PT)



1 in Horiz. = 20 ft 1 in Vert. = 15 ft

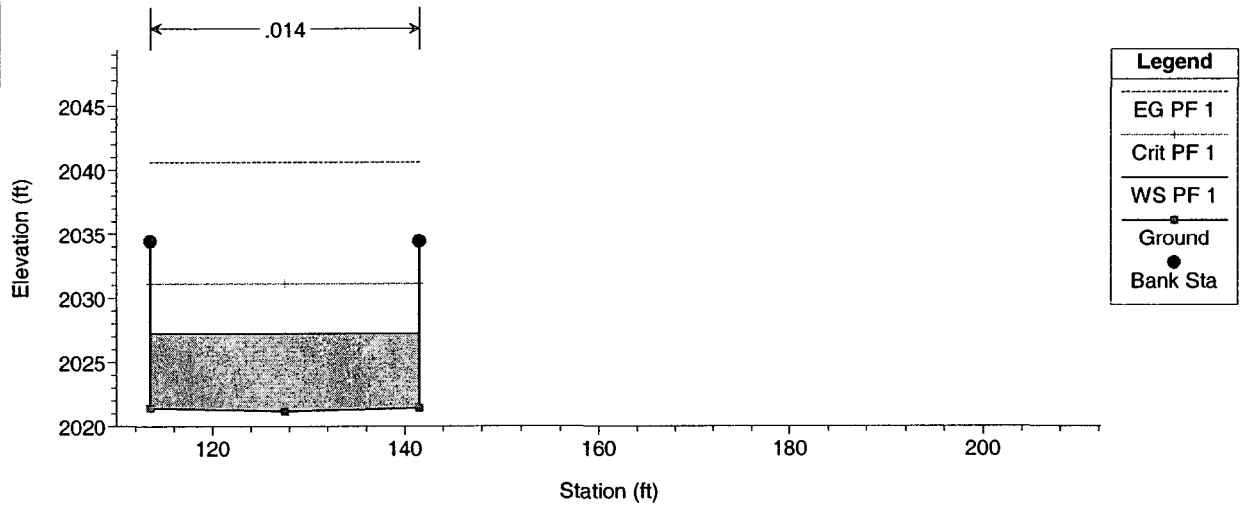
Gowan Outfall Letter of Map Revision

Plan: Gowan Outfall Letter of Map Revision



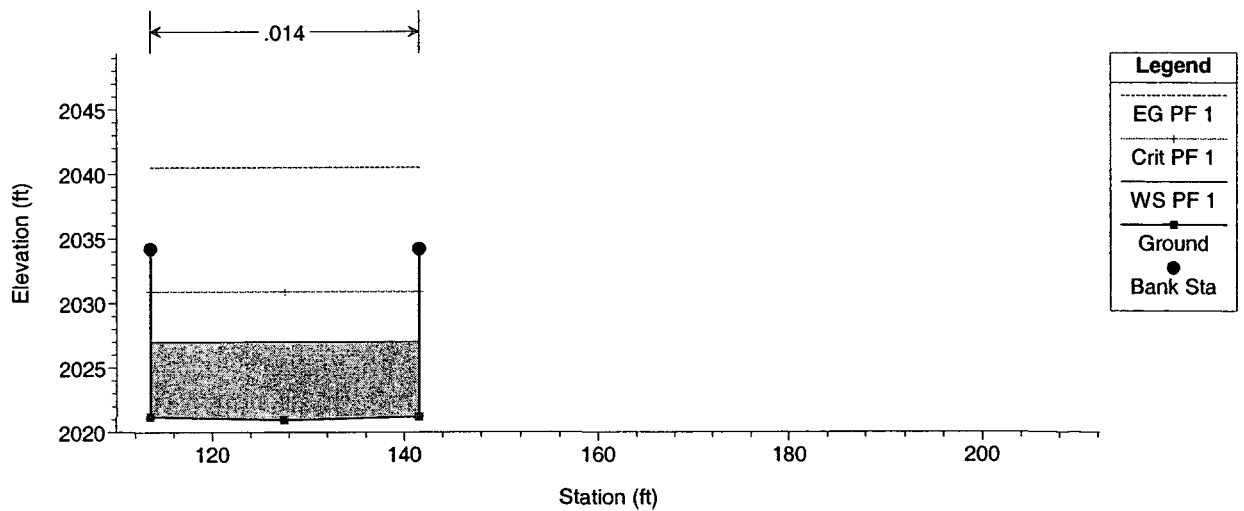
Gowan Outfall Letter of Map Revision

Plan: Gowan Outfall Letter of Map Revision



Gowan Outfall Letter of Map Revision

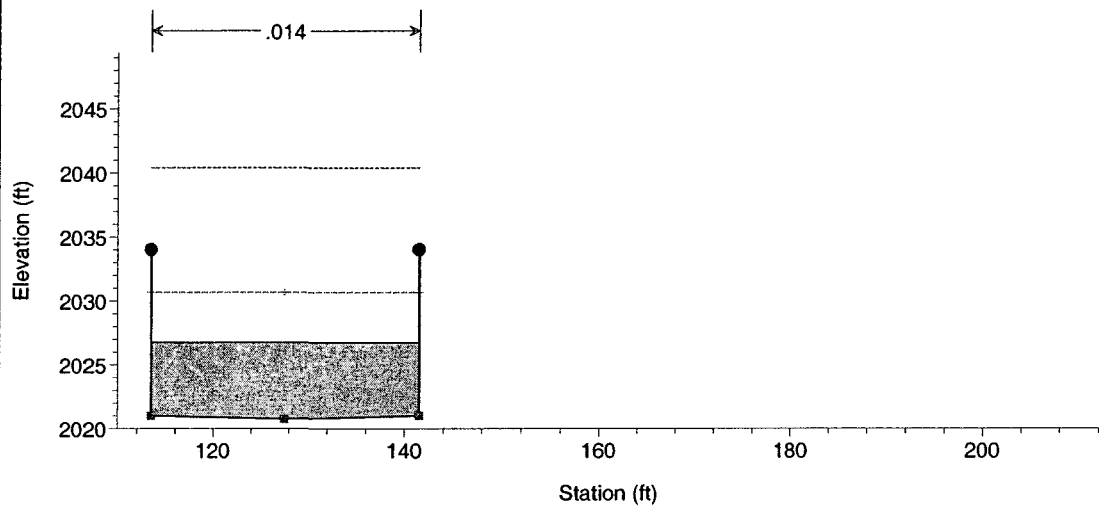
Plan: Gowan Outfall Letter of Map Revision



1 in Horiz. = 20 ft 1 in Vert. = 15 ft

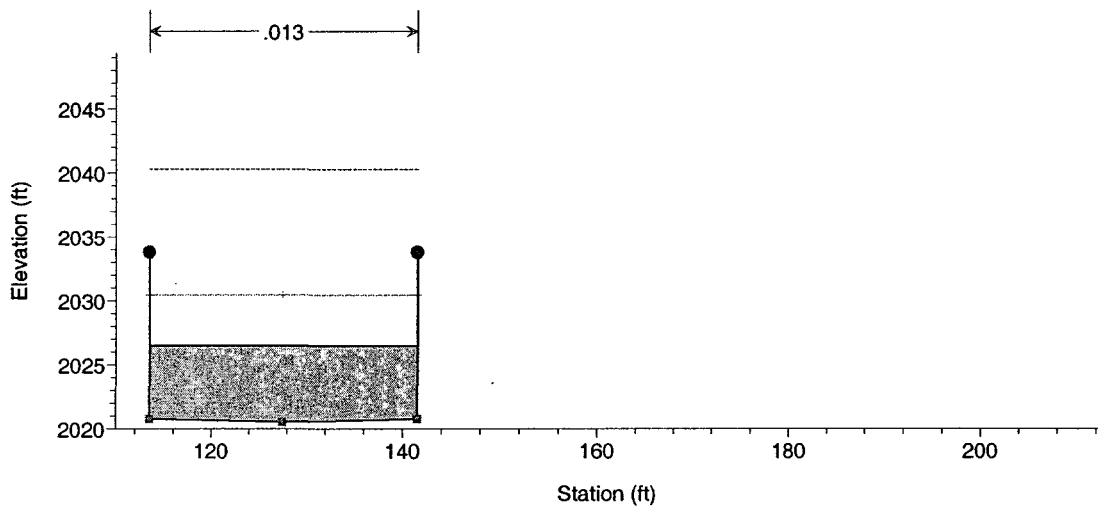
Gowan Outfall Letter of Map Revision

Plan: Gowan Outfall Letter of Map Revision



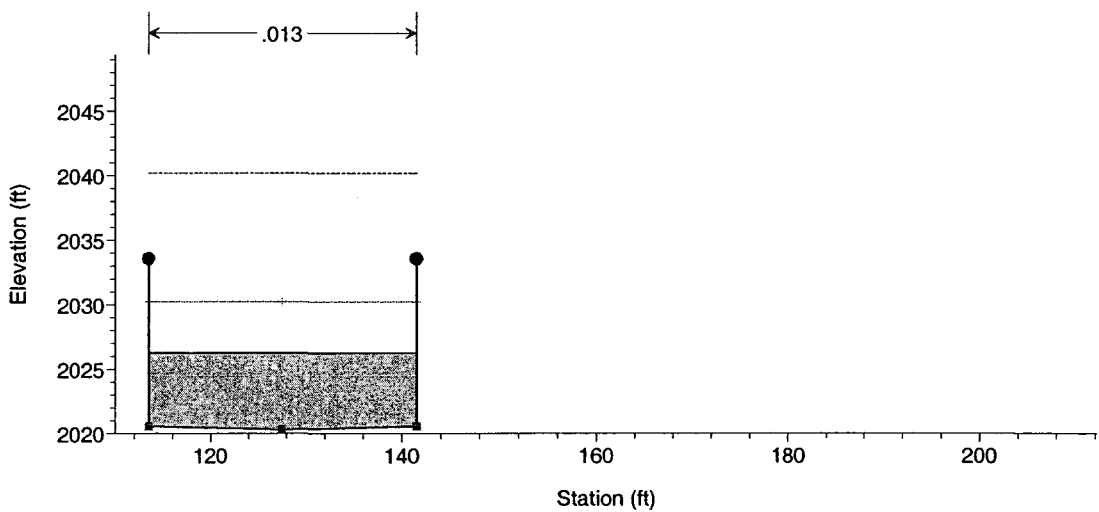
Gowan Outfall Letter of Map Revision

Plan: Gowan Outfall Letter of Map Revision



Gowan Outfall Letter of Map Revision

Plan: Gowan Outfall Letter of Map Revision

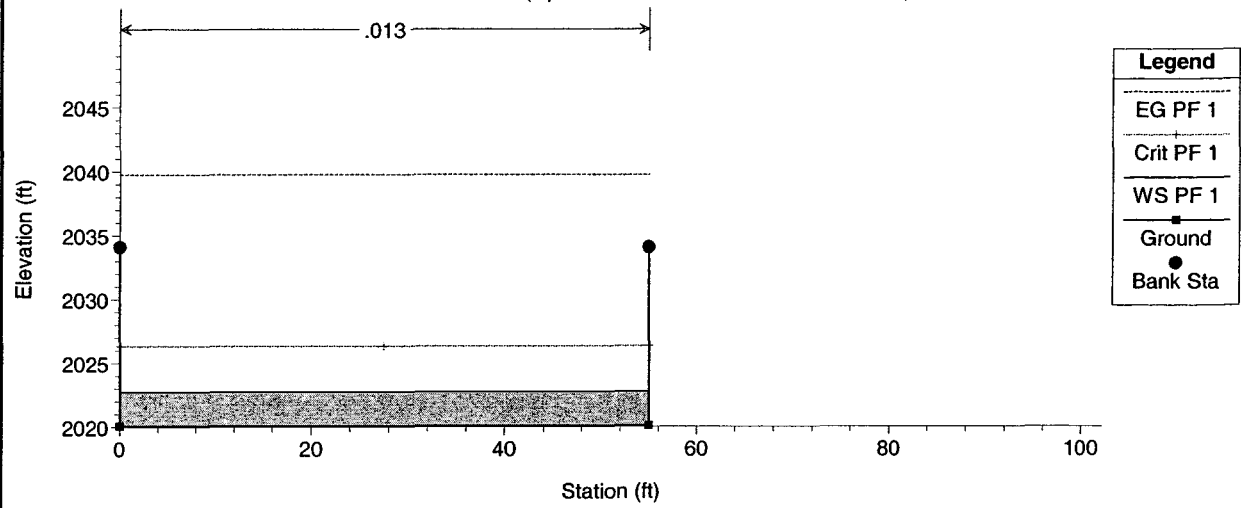


1 in Horiz. = 20 ft 1 in Vert. = 15 ft

Gowan Outfall Letter of Map Revision

Plan: Gowan Outfall Letter of Map Revision

Station 58+00.00 (Upstream X-Section of PBS&J LOMAR)



1 in Horiz. = 20 ft 1 in Vert. = 15 ft

CHECK-RAS Output Files

CHECK-RAS Program: NT Check

Manning's n Value and Transition Loss Coefficient Review

Project File: E:\879-Gowan\HEC-Ras\879_Gowan.prj
 Plan File: E:\879-Gowan\HEC-Ras\879_Gowan.p01
 Geometry File: E:\879-Gowan\HEC-Ras\879_Gowan.g01
 Flow File: E:\879-Gowan\HEC-Ras\879_Gowan.f01
 Report File: E:\879-Gowan\HEC-Ras\879_Gowan.nt
 Selected profiles: PF 1
 Date: 9/5/2003
 Time: 12:56:14 PM

SECNO	STRUCTURE	NLOB	NCHL	NROB	CNTR	EXP

Gowan Outfall,1						
220		0.025	0.014	0.025	0.1	0.3
210		0.025	0.014	0.025	0.1	0.3
200		0.025	0.014	0.025	0.1	0.3
198		0.025	0.014	0.025	0.1	0.3
196		0.025	0.014	0.025	0.1	0.3
194		0.025	0.014	0.025	0.1	0.3
192		0.025	0.014	0.025	0.1	0.3
191		0.025	0.014	0.025	0.1	0.3
190		0.025	0.014	0.025	0.1	0.3
185		-----	0.025	0.025	0.1	0.3
		-----	0.014	-----		
180		-----	0.025	0.025	0.1	0.3
		-----	0.014	-----		
179		-----	0.025	0.025	0.1	0.3
		-----	0.014	-----		
177.875		-----	0.025	0.025	0.1	0.3
		-----	0.014	-----		
176.75		-----	0.025	0.025	0.1	0.3
		-----	0.014	-----		
175.625		-----	0.025	0.025	0.1	0.3
		-----	0.014	-----		
174.5		-----	0.025	0.025	0.1	0.3
		-----	0.014	-----		
173.375		-----	0.025	0.025	0.1	0.3
		-----	0.014	-----		
172.25		-----	0.025	0.025	0.1	0.3
		-----	0.014	-----		
171.125		-----	0.025	0.025	0.1	0.3
		-----	0.014	-----		
170		-----	0.014	0.025	0.1	0.3
		-----	0.025	-----		
166.812		-----	0.025	0.025	0.1	0.3
		-----	0.014	-----		
163.625		-----	0.025	0.025	0.1	0.3
		-----	0.014	-----		
160.438		-----	0.025	0.025	0.1	0.3
		-----	0.014	-----		
160		0.025	0.014	0.025	0.1	0.3
156		0.025	0.014	0.025	0.1	0.3
152.517		0.025	0.014	0.025	0.1	0.3
150		0.025	0.014	0.025	0.1	0.3
149		0.025	0.014	0.025	0.1	0.3
147.302		0.025	0.014	0.025	0.1	0.3
145.604		0.025	0.014	0.025	0.1	0.3
143.906		0.025	0.014	0.025	0.1	0.3
142.208		0.025	0.014	0.025	0.1	0.3
140.51		0.025	0.014	0.025	0.1	0.3
140		0.025	0.014	0.025	0.1	0.3
138		0.025	0.014	0.025	0.1	0.3
136.224		0.025	0.014	0.025	0.1	0.3
134.449		0.025	0.014	0.025	0.1	0.3
132.673		0.025	0.014	0.025	0.1	0.3
130.898		0.025	0.014	0.025	0.1	0.3
130		0.025	0.014	0.025	0.1	0.3
128		0.025	0.014	0.025	0.1	0.3
125.315		0.025	0.014	0.025	0.1	0.3
122.63		0.025	0.014	0.025	0.1	0.3
120		0.025	0.014	0.025	0.1	0.3

879_Gowan.nt.txt

119	0.025	0.014	0.025	0.1	0.3
118	0.025	0.014	0.025	0.1	0.3
117	0.025	0.014	0.025	0.1	0.3
116	0.025	0.014	0.025	0.1	0.3
115	0.025	0.014	0.025	0.1	0.3
114	0.025	0.014	0.025	0.1	0.3
113	0.025	0.014	0.025	0.1	0.3
112	0.025	0.014	0.025	0.1	0.3
111	0.025	0.014	0.025	0.1	0.3
110	0.025	0.014	0.025	0.1	0.3
108	0.025	0.014	0.025	0.1	0.3
106.241	0.025	0.014	0.025	0.1	0.3
104.483	0.025	0.014	0.025	0.1	0.3
102.725	0.025	0.014	0.025	0.1	0.3
100.967	0.025	0.014	0.025	0.1	0.3
100	0.025	0.014	0.025	0.1	0.3
97	0.025	0.014	0.025	0.1	0.3
95.4375	0.025	0.014	0.025	0.1	0.3
93.875	0.025	0.014	0.025	0.1	0.3
92.3125	0.025	0.014	0.025	0.1	0.3
91	-----	0.025	0.025	0.1	0.3
	-----	0.014	-----		
90.5	-----	0.025	0.025	0.1	0.3
	-----	0.014	-----		
90	-----	0.025	0.025	0.1	0.3
	-----	0.014	-----		
84.7329	-----	0.025	0.025	0.1	0.3
	-----	0.014	-----		
80	-----	0.025	0.025	0.1	0.3
	-----	0.014	-----		
78.5714	-----	0.025	0.025	0.1	0.3
	-----	0.014	-----		
77.1428	-----	0.025	0.025	0.1	0.3
	-----	0.014	-----		
75.7142	-----	0.025	0.025	0.1	0.3
	-----	0.014	-----		
74.2857	-----	0.025	0.025	0.1	0.3
	-----	0.014	-----		
72.8571	-----	0.025	0.025	0.1	0.3
	-----	0.013	-----		
71.4285	-----	0.025	0.025	0.1	0.3
	-----	0.013	-----		
70	-----	0.025	0.025	0.1	0.3
	-----	0.013	-----		

---Summary of Statistics---

	Minimum	Maximum
Left Overbank n Value:	0.025	0.025
Right Overbank n Value:	0.025	0.025
Channel n Value:	0.013	0.025
Contraction Coefficient:	0.1	0.1
Expansion Coefficient:	0.3	0.3

ROUGHNESS COEFFICIENT CHECK

RS: 220

NT RC 01 Left overbank n value is less than 0.035

The n value for overbank is usually larger than 0.035.

The n value should be reevaluated.

RS: 220

NT RC 01 Right overbank n value is less than 0.035

The n value for overbank is usually larger than 0.035.

The n value should be reevaluated.

RS: 220

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 if it is not representing a concrete lined channel.

RS: 210
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: 210
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: 210
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: 200
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: 200
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: 200
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: 198
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: 198
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: 198
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: 196
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: 196
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: 196
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: 194
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: 194
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: 194
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: 192
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: 192
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: 192
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: 191
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: 191
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: 191
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: 190
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: 190
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: 190
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: 185
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: 185
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: 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: 179

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: 179

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: 177.875

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: 177.875

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: 176.75

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: 176.75

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: 175.625

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: 175.625

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: 174.5

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: 174.5

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: 173.375

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: 173.375

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: 172.25

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: 172.25
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: 171.125
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: 171.125
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 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: 166.812
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: 166.812
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: 163.625
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: 163.625
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: 160.438
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: 160.438
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: 156

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: 156

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: 156

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: 152.517

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: 152.517

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: 152.517

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: 149

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: 149

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: 149

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: 147.302

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: 147.302

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: 147.302

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: 145.604

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: 145.604

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: 145.604

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: 143.906

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: 143.906

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: 143.906

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: 142.208

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: 142.208

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: 142.208

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: 140.51

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: 140.51

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: 140.51

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: 138

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: 138

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: 138

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: 136.224

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: 136.224

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: 136.224

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: 134.449

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: 134.449

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: 134.449

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: 132.673

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: 132.673

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: 132.673

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: 130.898

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: 130.898

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: 130.898

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: 128

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: 128

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: 128

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: 125.315

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: 125.315

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: 125.315

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: 122.63

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: 122.63
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 122.63
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 than 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 than 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: 119
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 119
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 119
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: 118
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 118
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 118
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: 117
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 117
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 117
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: 116
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 116
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 116
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: 115
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 115
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 115
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: 114
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 114
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 114
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: 113
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 113
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 113
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: 112
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 112
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger than 0.035.
The n value should be reevaluated.

RS: 112
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: 111
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: 111
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: 111
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: 108
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: 108
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: 108
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: 106.241
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: 106.241
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: 106.241
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: 104.483
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: 104.483

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: 104.483

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: 102.725

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: 102.725

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: 102.725

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: 100.967

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: 100.967

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: 100.967

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: 97

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: 97

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: 97

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: 95.4375

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: 95.4375

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: 95.4375

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: 93.875

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: 93.875

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: 93.875

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: 92.3125

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: 92.3125

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: 92.3125

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: 91

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: 91

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: 90.5

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: 90.5

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 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: 84.7329

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: 84.7329

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 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: 78.5714

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: 78.5714

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: 77.1428

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: 77.1428

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: 75.7142

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: 75.7142

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: 74.2857

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: 74.2857

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: 72.8571

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

RS: 72.8571

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: 71.4285

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

RS: 71.4285

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

ROUGHNESS COEFFICIENT AT STRUCTURES

---END---

879_Gowan.xls.txt
CHECK-RAS Program, XS Check
Cross Section Location and Alignment Review

Project File: E:\879-Gowan\HEC-Ras\879_Gowan.prj
Plan File: E:\879-Gowan\HEC-Ras\879_Gowan.p01
Geometry File: E:\879-Gowan\HEC-Ras\879_Gowan.g01
Flow File: E:\879-Gowan\HEC-Ras\879_Gowan.f01
Report File: E:\879-Gowan\HEC-Ras\879_Gowan.xls
Selected profiles: PF 1
Date: 9/5/2003
Time: 12:56:15 PM

SECNO	Len Lob	Len Chl	Len Rob	TopWdthAct	Q Total	Flow Code

Gowan Outfall,1						
220	97.57	100	102.44	46.29	4890	
210	97.57	100	102.44	46.29	4890	
200	97.57	100	102.44	46.29	4890	
198	97.57	100	102.44	46.29	4890	
196	97.57	100	102.44	46.29	4890	
194	97.56	100	102.44	46.29	4890	
192	97.56	100	102.44	46.29	4890	
191	9.27	9.5	9.73	46.29	4890	
190	90.45	90.45	90.45	46.3	4890	
185	38.83	38.83	38.83	46.3	4890	
180	59.26	61.17	63.08	46.3	4890	
179	96.88	100	103.12	46.31	4890	
177.875	96.88	100	103.12	46.32	4890	
176.75	96.88	100	103.12	46.32	4890	
175.625	96.88	100	103.12	46.33	4890	
174.5	96.88	100	103.12	46.35	4890	
173.375	96.88	100	103.12	46.33	4890	
172.25	96.88	100	103.12	46.32	4890	
171.125	96.88	100	103.12	46.34	4890	
170	48.43	50	51.56	46.35	4890	
166.812	48.43	50	51.56	45.87	4890	
163.625	48.43	50	51.56	45.44	4890	
160.438	6.65	6.87	7.08	45.08	4890	
160	43.13	43.13	43.13	45.03	4890	
156	50	50	50	40.22	4890	
152.517	36.15	36.15	36.15	34.43	4890	
150	13.85	13.85	13.85	30	4890	
149	50	50	50	30	4890	
147.302	50	50	50	30	4890	
145.604	50	50	50	30	4890	
143.906	50	50	50	30	4890	
142.208	50	50	50	30	4890	
140.51	15	15	15	30	4890	
140	35	35	35	30	4890	
138	50	50	50	30	4890	
136.224	50	50	50	30	4890	
134.449	50	50	50	30	4890	
132.673	50	50	50	30	4890	
130.898	25.3	25.3	25.3	30	4890	
130	24.7	24.7	24.7	30	4890	
128	50	50	50	30	4890	
125.315	50	50	50	30	4890	
122.63	48.99	48.99	48.99	30	4890	
120	3	3	3	30	4890	
119	3	3	3	29.5	4890	
118	3	3	3	29	4890	
117	3	3	3	28.5	4890	
116	3	3	3	28	4890	
115	3	3	3	27.5	4890	
114	3	3	3	27	4890	
113	3	3	3	26.5	4890	
112	3	3	3	26	4890	
111	3	3	3	25.5	4890	
110	20	20	20	25	4890	
108	25	25	25	25	4890	
106.241	25	25	25	25	4890	
104.483	25	25	25	25	4890	

879_Gowan.xls.txt

102.725	25	25	25	25	4890	
100.967	13.75	13.75	13.75	25	4890	
100	37.64	36.26	34.88	25	4890	
97	25.96	25	24.04	25	4890	
95.4375	25.96	25	24.04	25	4890	
93.875	25.96	25	24.04	25	4890	
92.3125	21.8	21	20.2	25	4890	
91	2.08	2	1.92	25	4890	
90.5	2.08	2	1.92	25	4890	
90	51.91	50	48.09	25	4890	
84.7329	46.64	44.93	43.22	26.58	4890	
80	9.4	9.4	9.4	28	4890	B
78.5714	9.4	9.4	9.4	28	4890	B
77.1428	9.4	9.4	9.4	28	4890	B
75.7142	9.4	9.4	9.4	28	4890	
74.2857	9.4	9.4	9.4	28	4890	
72.8571	9.4	9.4	9.4	28	4890	
71.4285	9.4	9.4	9.4	28	4890	
70	50	50	50	55	4890	

B=blocked obstruction XS SC 05
 C=critical 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

SPACING CHECK

INEFFECTIVE FLOW CHECK

DISCHARGE CHECK

XS DC 02 Constant discharge used for the Gowan Outfall,1

LOCATION CHECK

BOUNDARY CONDITION CHECK

XS BC 02 The name of the stream is Gowan Outfall,1
 Normal S = .01 is specified as the downstream boundary
 for profile PF 1

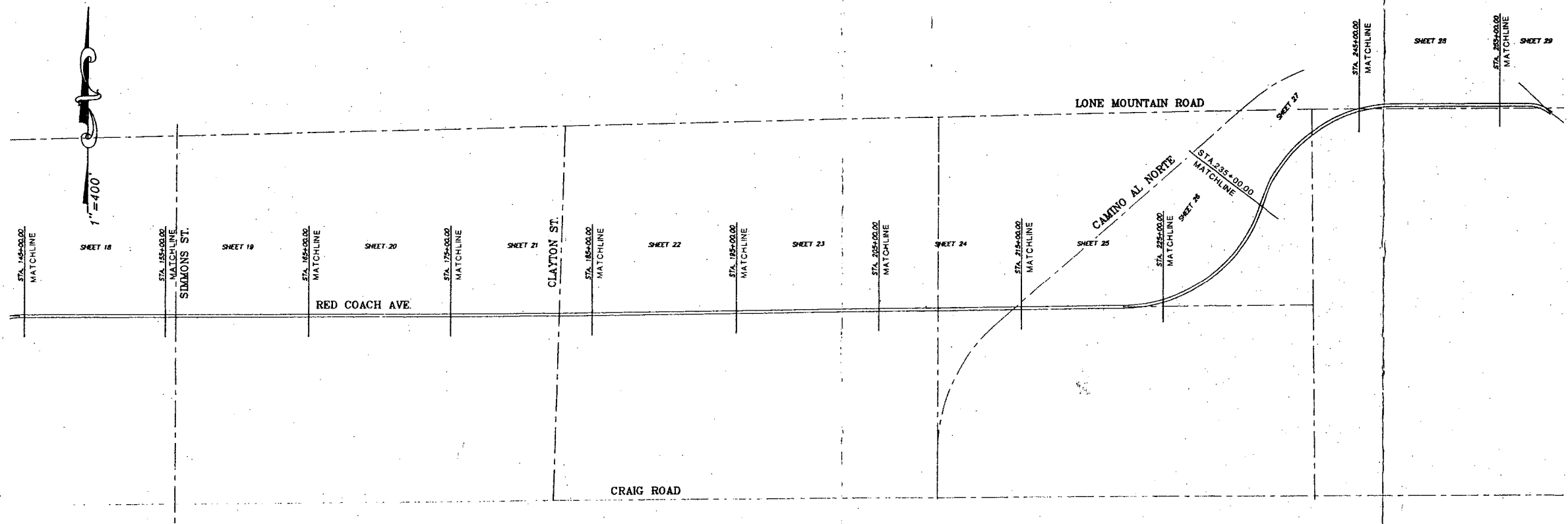
XS BC 02 The name of the stream is Gowan Outfall,1
 Normal S = .006 is specified as the upstream boundary
 for profile PF 1

XS FR 01 The profile is computed as supercritical flow regime.

---END---

APPENDIX E

As-Built Plans



AS-BUILT



WO NO.	3900
BY	KDG/TMM
DATE	NOV. 1990
SCALE	1"=400'
SHEET	2B
OF SHEETS	55

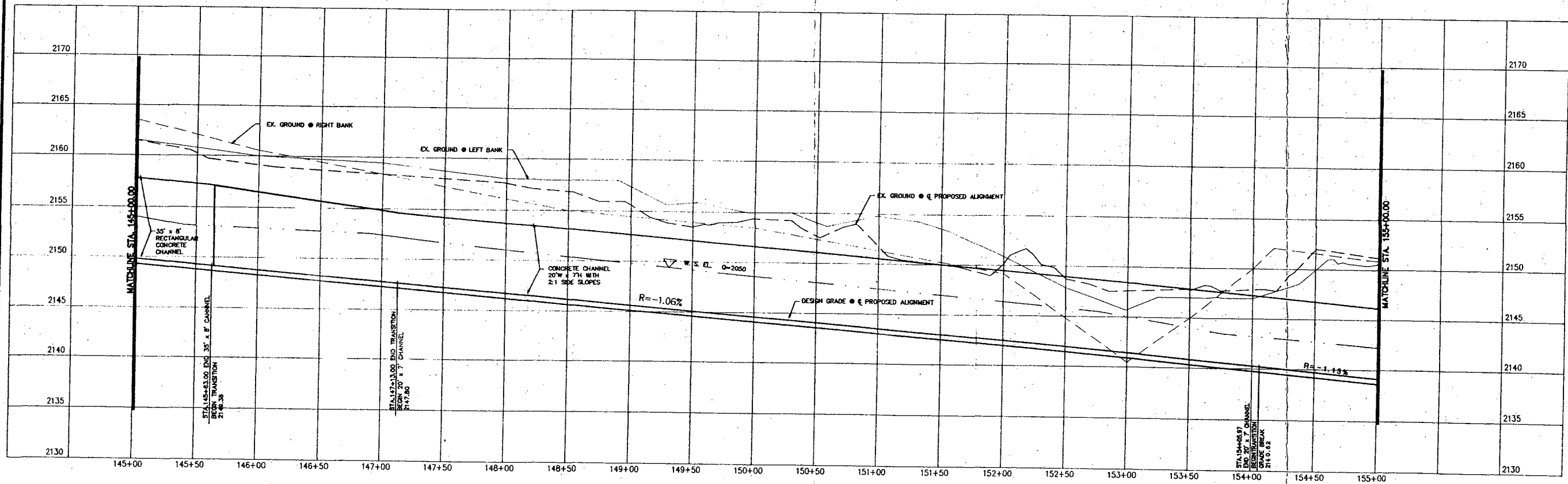
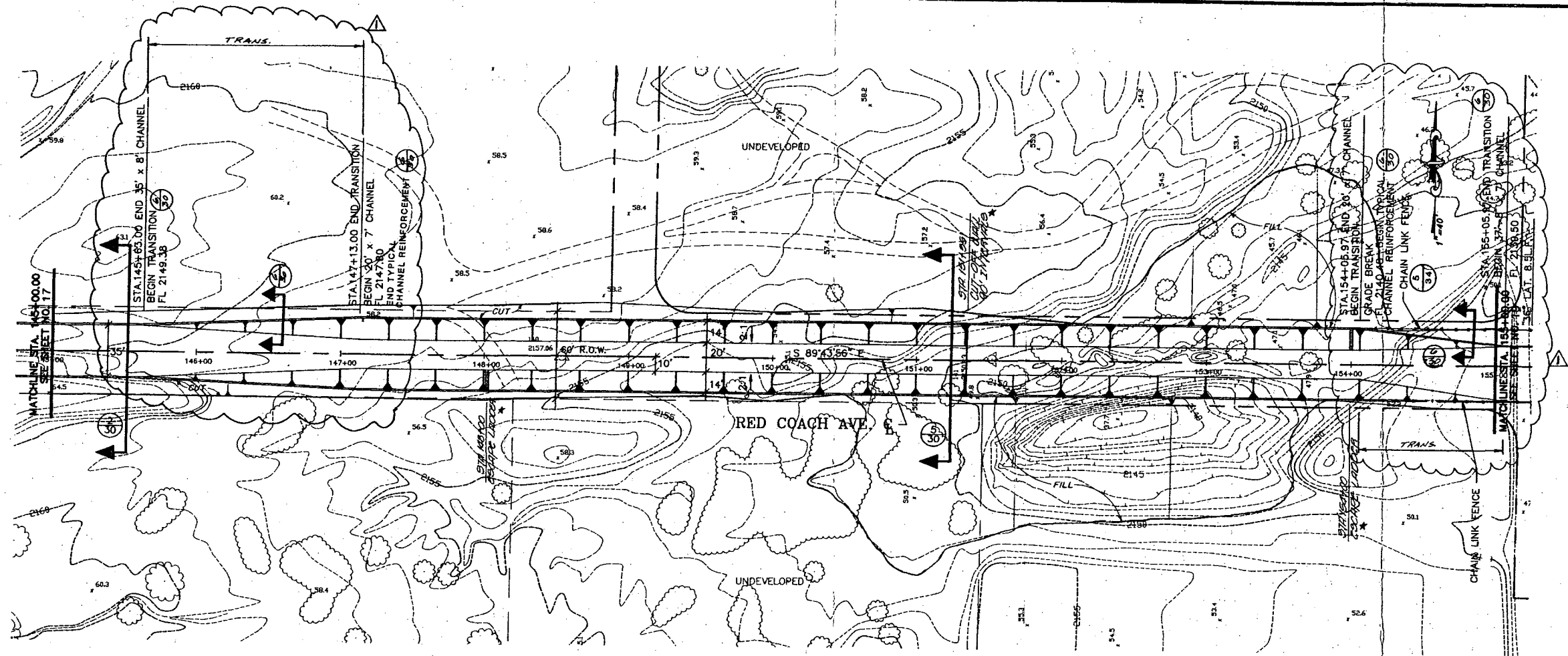
ROUTE MAP
STA. 145+00.00 TO STA. 258+07.05

PROJECT
GOWAN DETENTION BASIN
OUTFALL STRUCTURE

CITY OF NORTH LAS VEGAS
CLARK COUNTY, NEVADA



CONSULTING ENGINEERS • PLANNERS • LAND SUR
2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89102-5148 PHONE (702) 873-7550 FAX (702)



NOTE

CONTRACTOR MUST VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES BEFORE BEGINNING CONSTRUCTION.

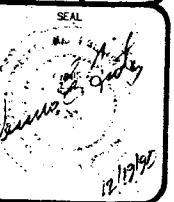
AS-BUILT

PLAN AND PROFILE
STA. 145+00.00 TO STA. 155+00.00

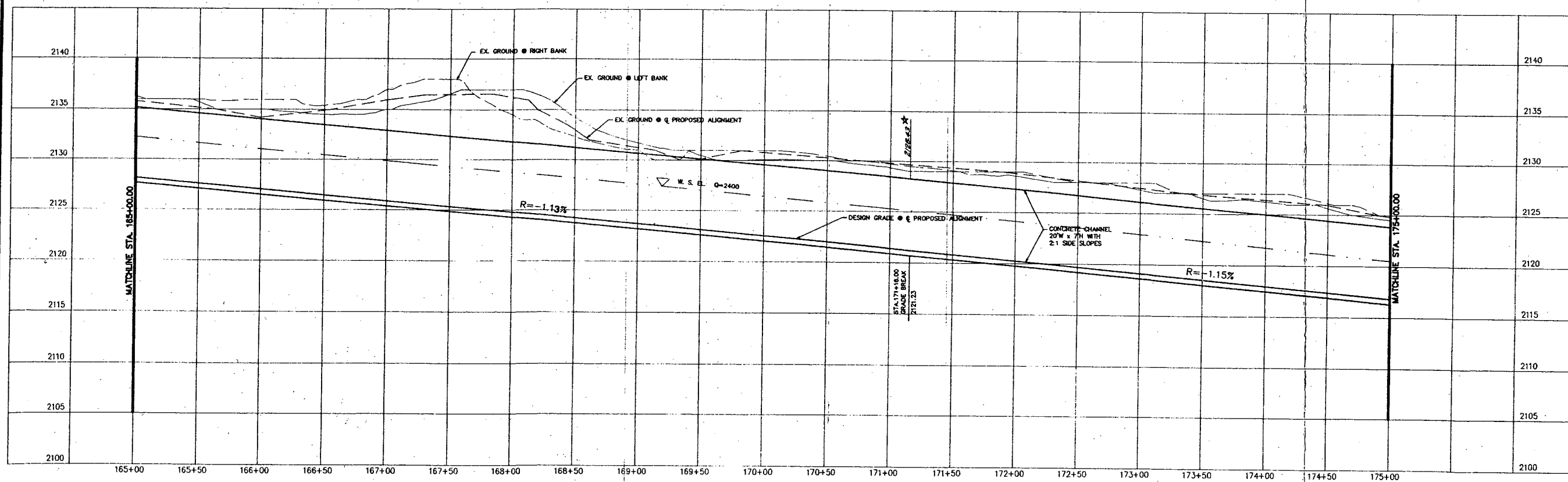
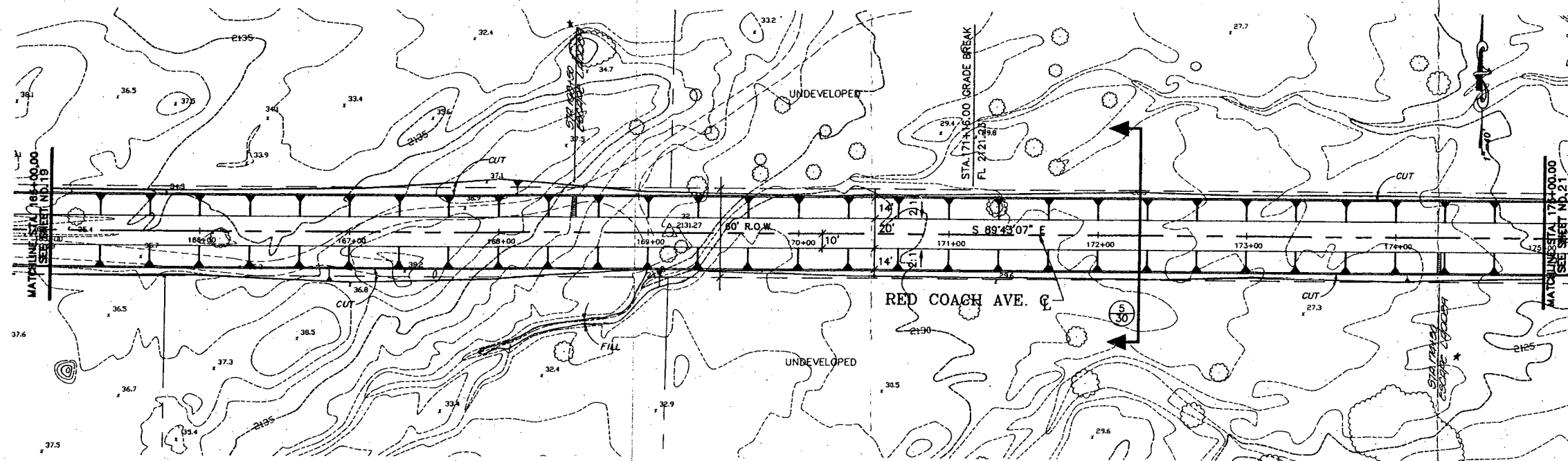
GOWAN DETENTION BASIN
OUTFALL STRUCTURE

CITY OF NORTH LAS VEGAS
CLARK COUNTY, NEVADA

vtm nevada
CONSULTING ENGINEERS • PLANNERS • LAND SURVEYORS
2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89102-5148 PHONE (702) 873-7550 FAX (702) 362-2597



WO NO.	3900
BY	KDG/TMM
DATE	NOV. 1990
SCALE	HORIZ. 1"=40' VERT. 1"=5'
SHEET	18
SHEETS	55



NOTE
CONTRACTOR MUST VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES BEFORE BEGINNING CONSTRUCTION.

AS-BUILT

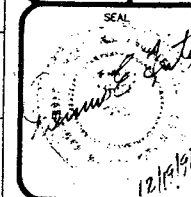
PLAN AND PROFILE
STA. 165+00.00 TO STA. 175+00.00

GOWAN DETENTION BASIN
OUTFALL STRUCTURE

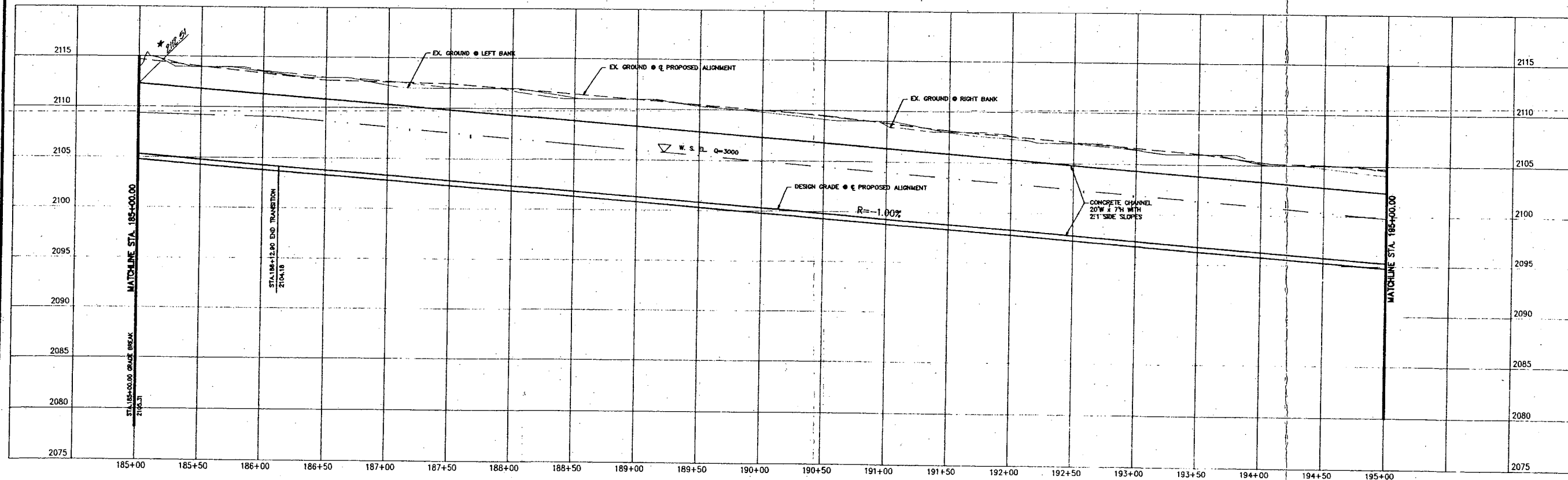
CITY OF NORTH LAS VEGAS
CLARK COUNTY, NEVADA

vtm nevada

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2727 SOUTH RAINBOW BOULEVARD
LAS VEGAS, NEVADA 89102-5148 PHONE (702) 873-7550 FAX (702) 362-2597



WD NO. 3900
BY KDG/TMM
DATE NOV. 1990
SCALE HORIZ. 1"=40' VERT. 1"=5'
SHEET 20 OF 55 SHEETS

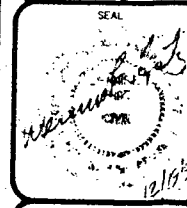


NOTE
CONTRACTOR MUST VERIFY HORIZONTAL AND
VERTICAL LOCATION OF ALL EXISTING UTILITIES
BEFORE BEGINNING CONSTRUCTION.

AS-BUILT

PLAN AND PROFILE
STA. 185+00.00 TO STA. 195+00.00

GOWAN DETENTION BASIN
OUTFALL STRUCTURE



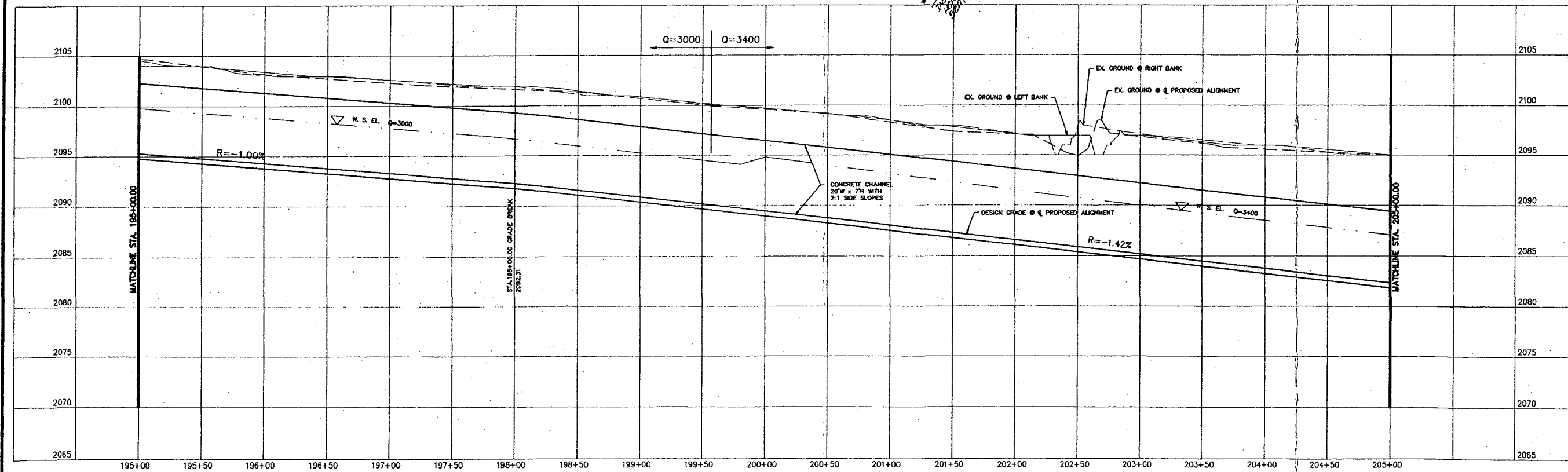
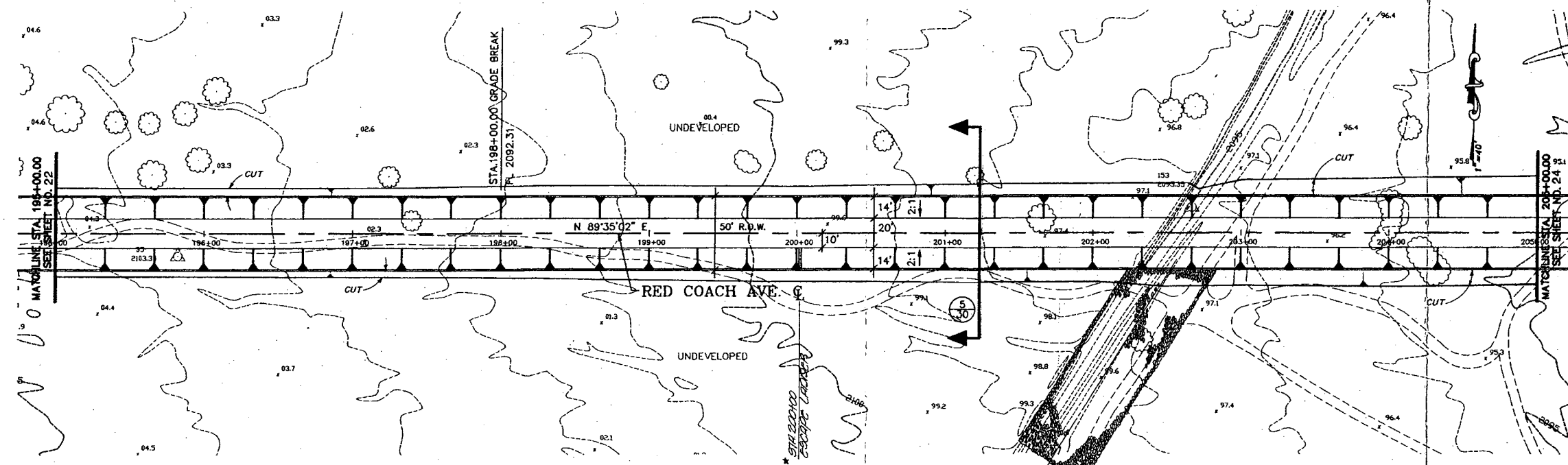
WD. NO. 3900
BY KDG/TMM
DATE NOV. 1990
SCALE HORZ. 1"=40'
VERT. 1"=5'
SHEET 22 OF 55 SHEETS

CITY OF NORTH LAS VEGAS
CLARK COUNTY, NEVADA

vtm nevada

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LAS VEGAS, NEVADA 89102-5148 PHONE (702) 873-7550 FAX (702) 362-2597

REV.	DATE	BY	REVISION
1	1-14-91	TMM	REVISION
2	9-18-92	DM	ADD CHAIRING REVISION



NOTE
CONTRACTOR MUST VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES BEFORE BEGINNING CONSTRUCTION.

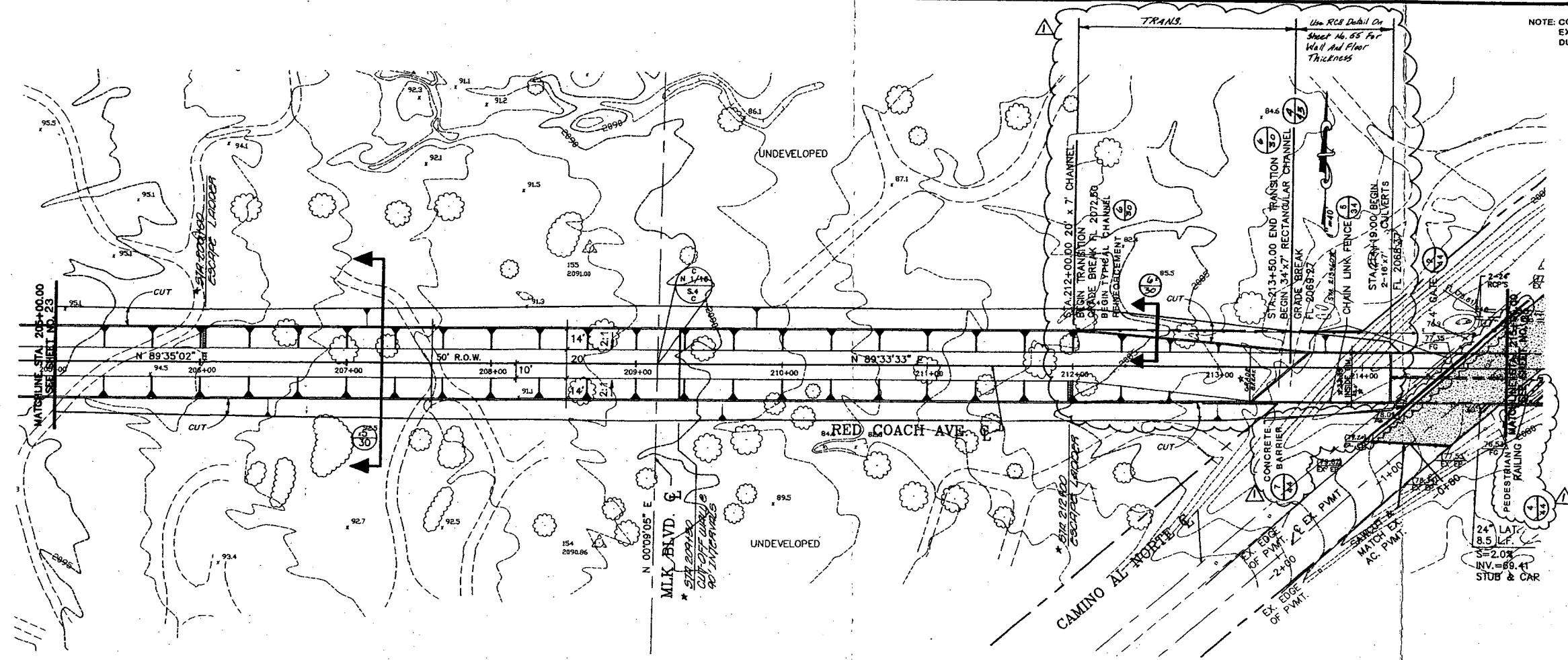
AS-BUILT

CITY OF NORTH LAS VEGAS CLARK COUNTY, NEVADA		vtn nevada	
CONSULTING ENGINEERS • PLANNERS • LAND SURVEYORS 2727 SOUTH RAINBOW BOULEVARD LAS VEGAS, NEVADA 89102-5148 PHONE (702) 873-7550 FAX (702) 362-2597		REVISION 9-18-92 DM BY DATE	

TITLE	PLAN AND PROFILE STA. 195+00.00 TO STA. 205+00.00
PROJECT	GOWAN DETENTION BASIN OUTFALL STRUCTURE

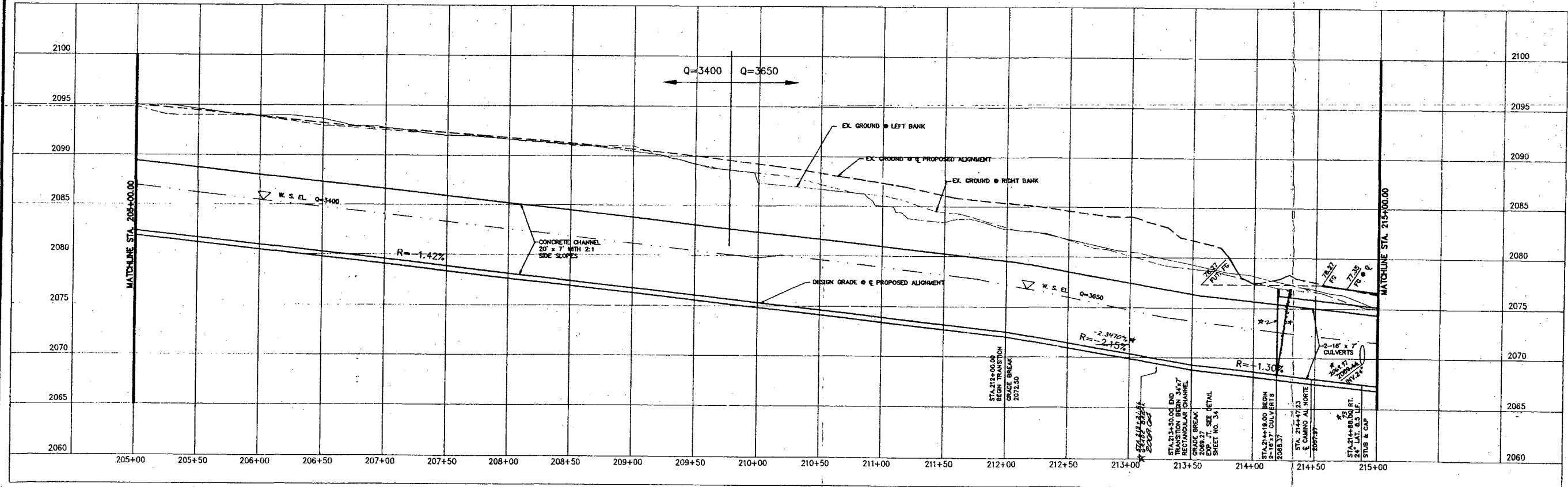
12/19/90

WO NO.	3900
BY	KDG/TMM
DATE	NOV. 1990
SCALE	HORIZ. 1"=40' VERT. 1"=5'
SHEET	23 OF 55



NOTE: CONTRACTOR SHALL REPLACE ALL EXISTING SIGNS THAT ARE DESTROYED DURING CONSTRUCTION

SEE SHEET 55 FOR DETAILS ON CAMINO AL NORTE BRIDGE RCB



NOTE
CONTRACTOR MUST VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES BEFORE BEGINNING CONSTRUCTION.

AS-BUILT

CITY OF NORTH LAS VEGAS
CLARK COUNTY, NEVADA

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LAS VEGAS, NEVADA 89102-5148 PHONE (702) 873-7550 FAX (702) 362-2597

vtm nevada

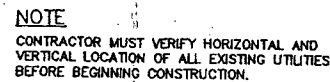
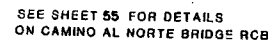
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PLAN AND PROFILE
STA.205+00.00 TO STA.215+00.00

GOWAN DETENTION BASIN
OUTFALL STRUCTURE

WD NO. 3900
BY KDG/TMM
DATE NOV. 1990
SCALE HORIZ. 1"=40'
VERT. 1"=5'
SHEET 24 OF 55 SHEETS

CURVE DATA				
NO.	DELTA	RADIUS	LENGTH	TANGENT
1	72° 29' 20"	1025.00'	12963.80'	751.41



CITY OF NORTH LAS VEGAS

CLARK COUNTY, NEVADA

newada

vtm

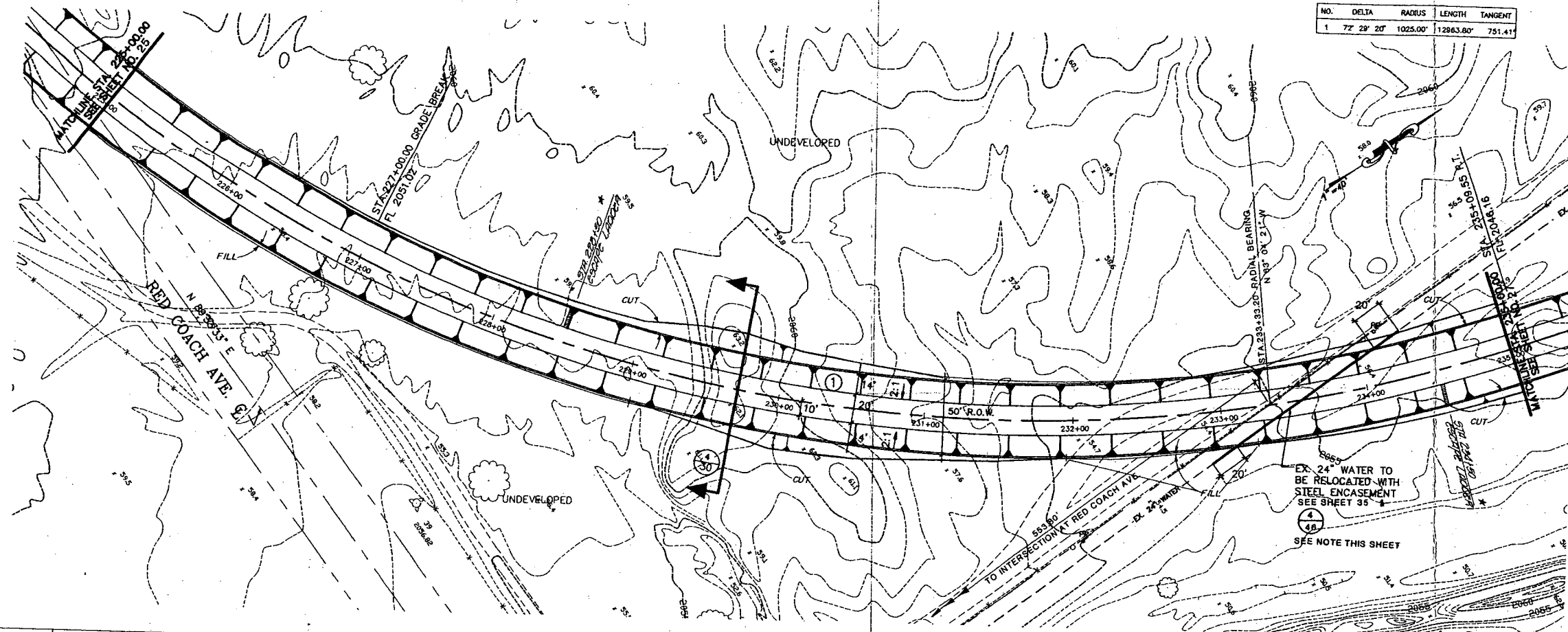
REV	DATE	BY	REVISION
1	1-14-91	T.M.M.	★ = Road Design Revised 12/14/91 to include Revised Road Right of Way Revised and Rechecked by: [Signature]
2	4-22-92	T.M.M.	
3			
4			

TITLE	PLAN AND PROFILE
	STA. 215+00.00 TO STA. 225+00.00

GOWAN DETENTION BASIN
OUTFALL STRUCTURE

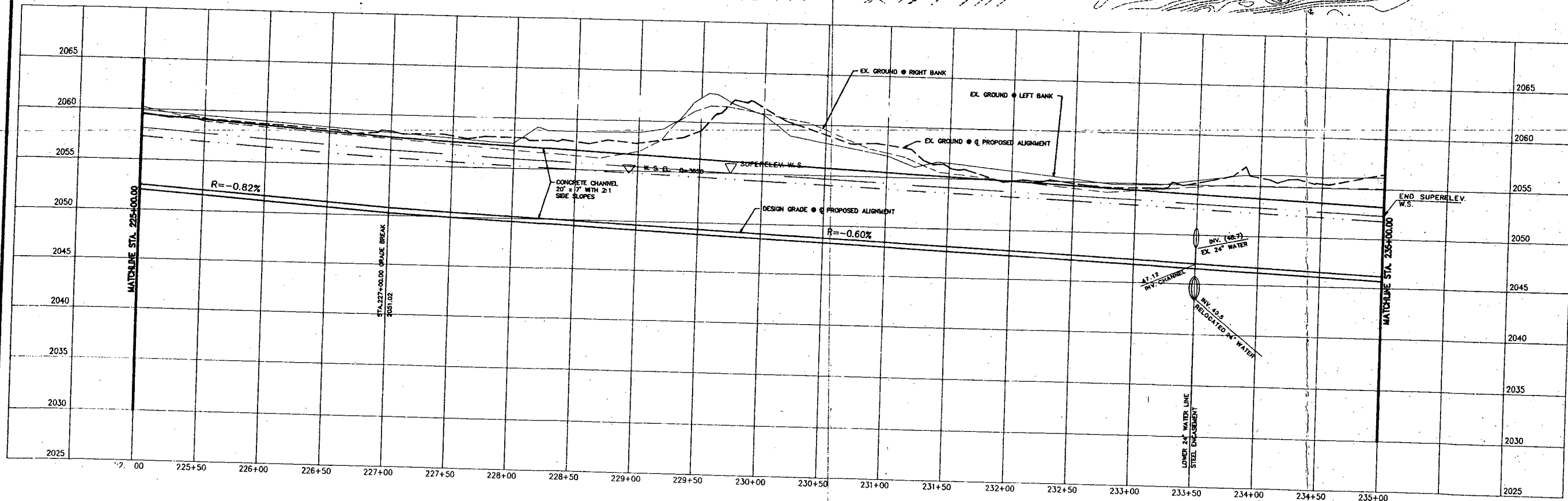
Seal of the Federal Bureau of Investigation (FBI). The seal features the words "DEPARTMENT OF JUSTICE" and "FEDERAL BUREAU OF INVESTIGATION" around the perimeter. In the center is a shield with a scale of justice and a sword. Handwritten signatures and dates are present: "L. J. [illegible]" and "2/13/72" are written across the seal.

WO NO.	3900
BY	KDG/TMM
DATE	NOV. 1990
SCALE	HORZ. 1"=40' VERT. 1"=5'
SHEET	25 of 55 SHEETS



NO.	DELTA	RADIUS	LENGTH	TANGENT
1	72° 29' 20"	1025.00'	12983.80'	751.41'

NOTE: ALL JOINTS TO BE WELDED.



NOTE
CONTRACTOR MUST VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES BEFORE BEGINNING CONSTRUCTION.

AS-BUILT

CITY OF NORTH LAS VEGAS
CLARK COUNTY, NEVADA

vtm nevada

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LAS VEGAS, NEVADA 89102-5148 PHONE (702) 873-7550 FAX (702) 362-2597

REVISION
DATE BY
11/19/90 KDG/TMM
11/19/90 KDG/TMM

PLAN AND PROFILE
STA. 225+00.00 TO STA. 235+00.00

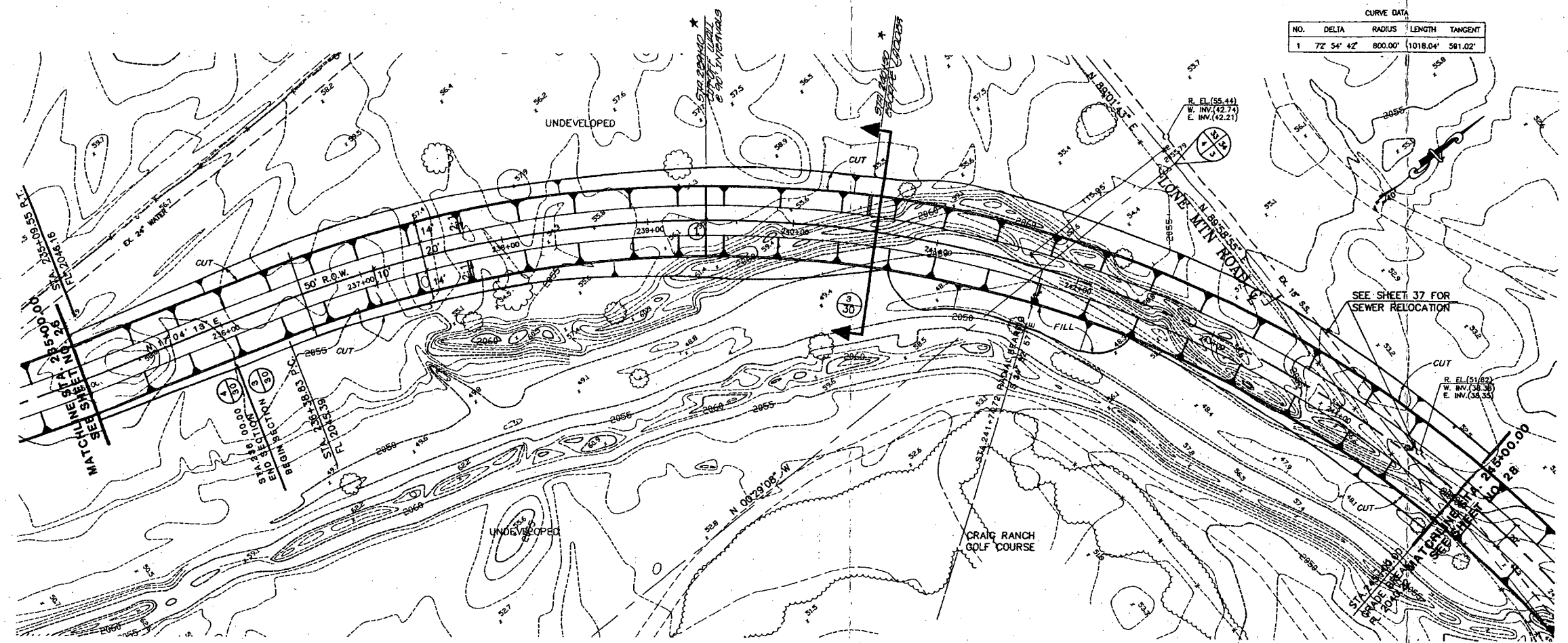
GOWAN DETENTION BASIN
OUTFALL STRUCTURE

PROJECT

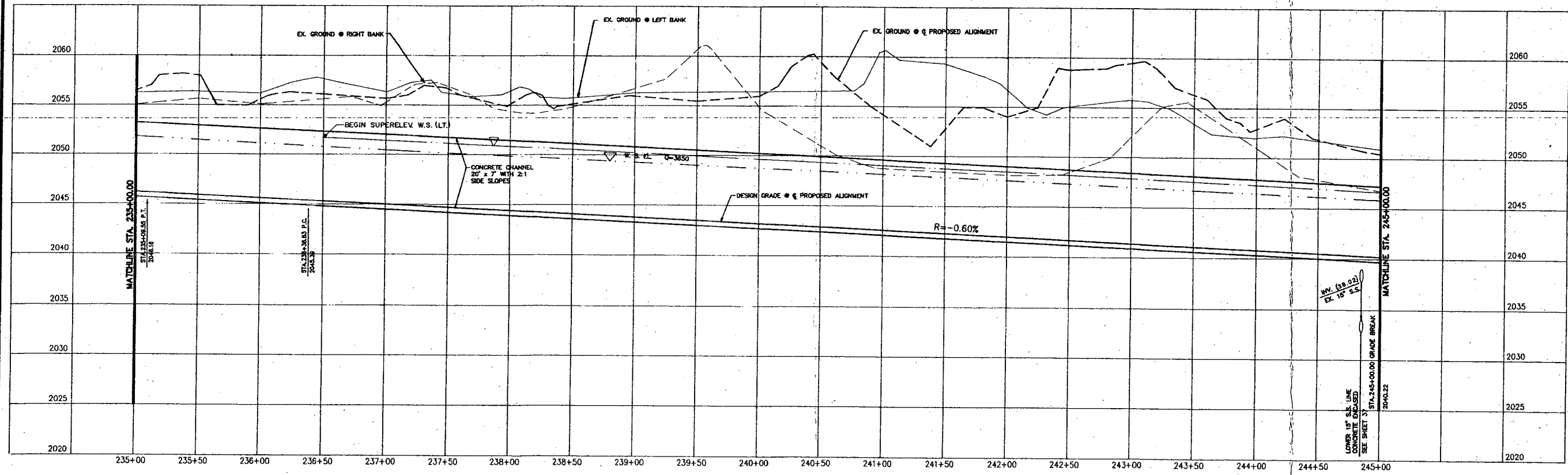
NOV. 1990

SCALE
HORIZ. 1"=40'
VERT. 1"=5'

SHEET
26 OF 55 SHEETS



CURVE DATA			
NO.	DELTA	RADIUS	TANGENT
1	72° 54' 42"	800.00'	1018.04' 581.02'



NOTE
CONTRACTOR MUST VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES BEFORE BEGINNING CONSTRUCTION.

AS-BUILT

CITY OF NORTH LAS VEGAS
CLARK COUNTY, NEVADA

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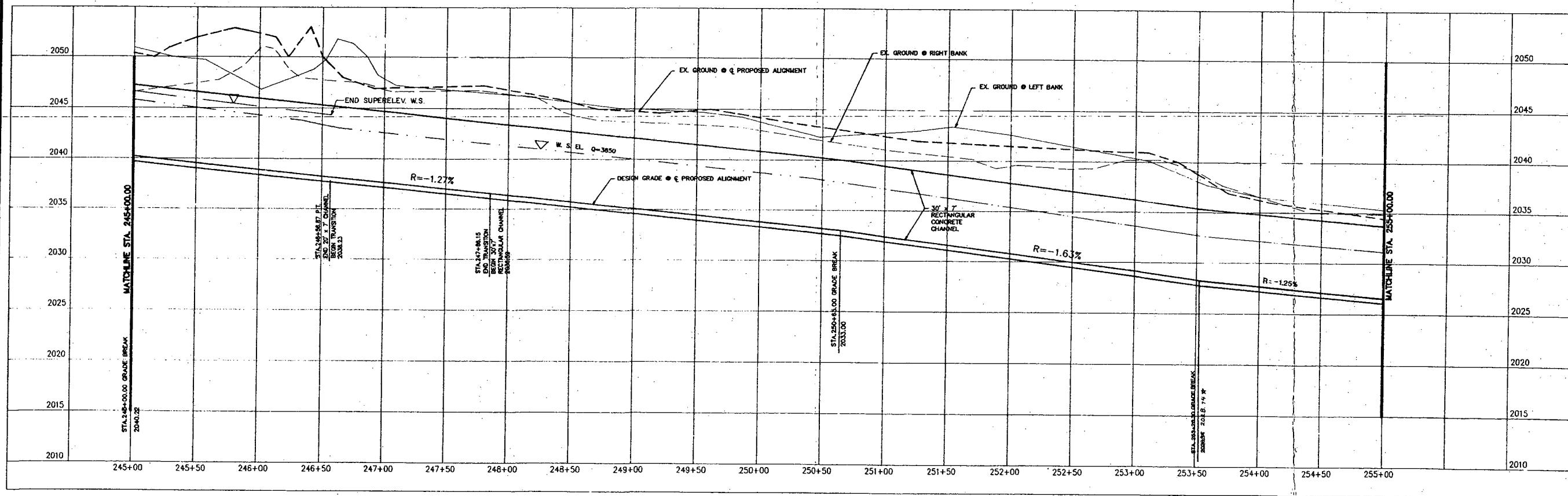
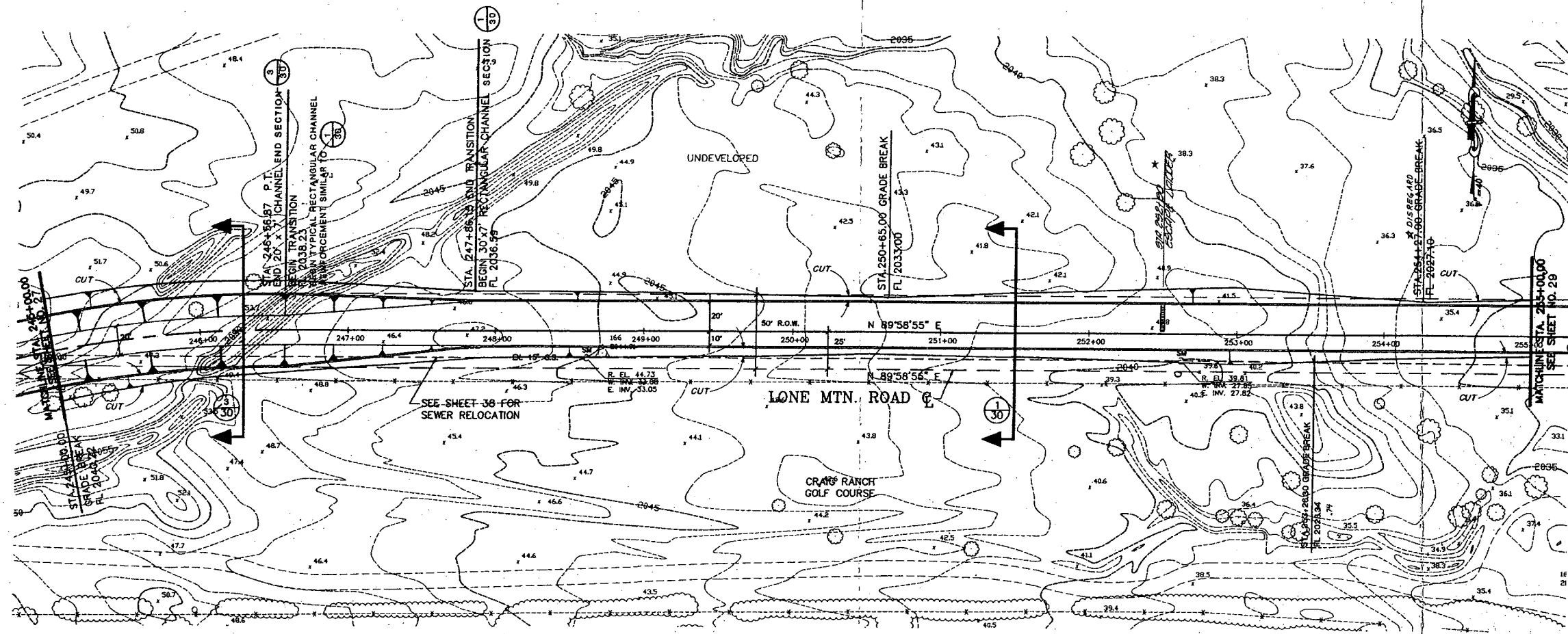
REV	DATE	BY	REVISION
1	9/28/99	DTM	RECORD DRAWING REVISION

PLAN AND PROFILE
STA. 235+00.00 TO STA. 245+00.00

PROJECT
GOWAN DETENTION BASIN
OUTFALL STRUCTURE

NO. 3900
BY KDG/TMM
DATE NOV. 1990
SCALE HORIZ. 1"=40' VERT. 1"=5'
SHEET 27 OF 28 SHEETS

12/10/90



NOTE
CONTRACTOR MUST VERIFY HORIZONTAL AND
VERTICAL LOCATION OF ALL EXISTING UTILITIES
BEFORE BEGINNING CONSTRUCTION.

AS-BUILT

CITY OF NORTH LAS VEGAS
CLARK COUNTY, NEVADA

vtm nevada

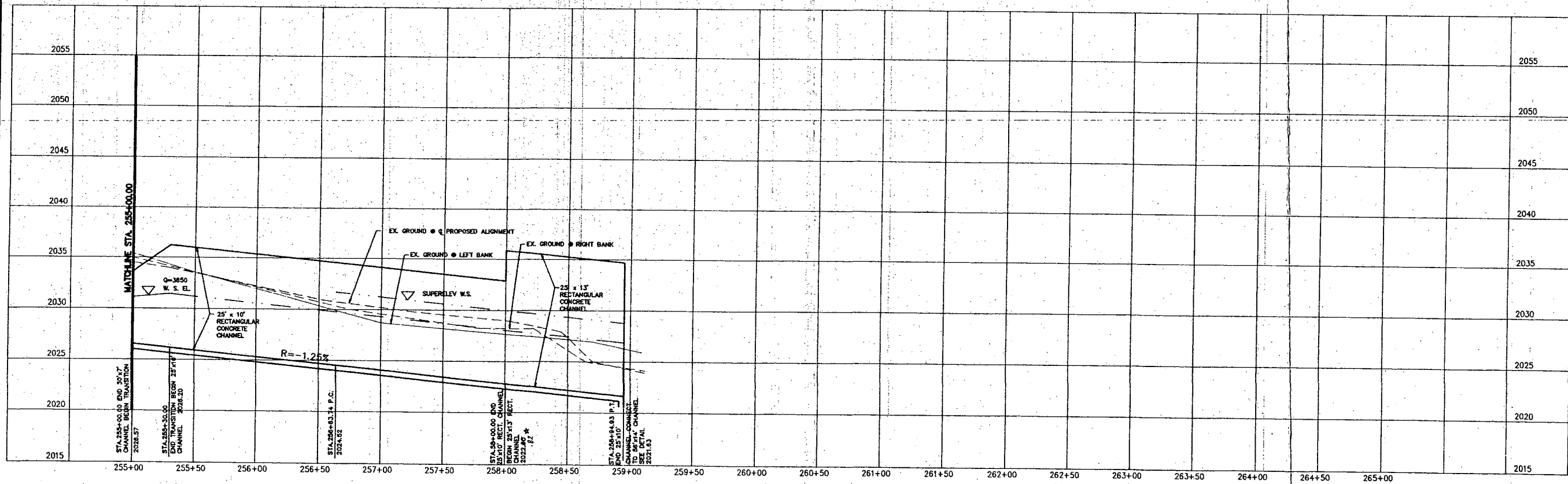
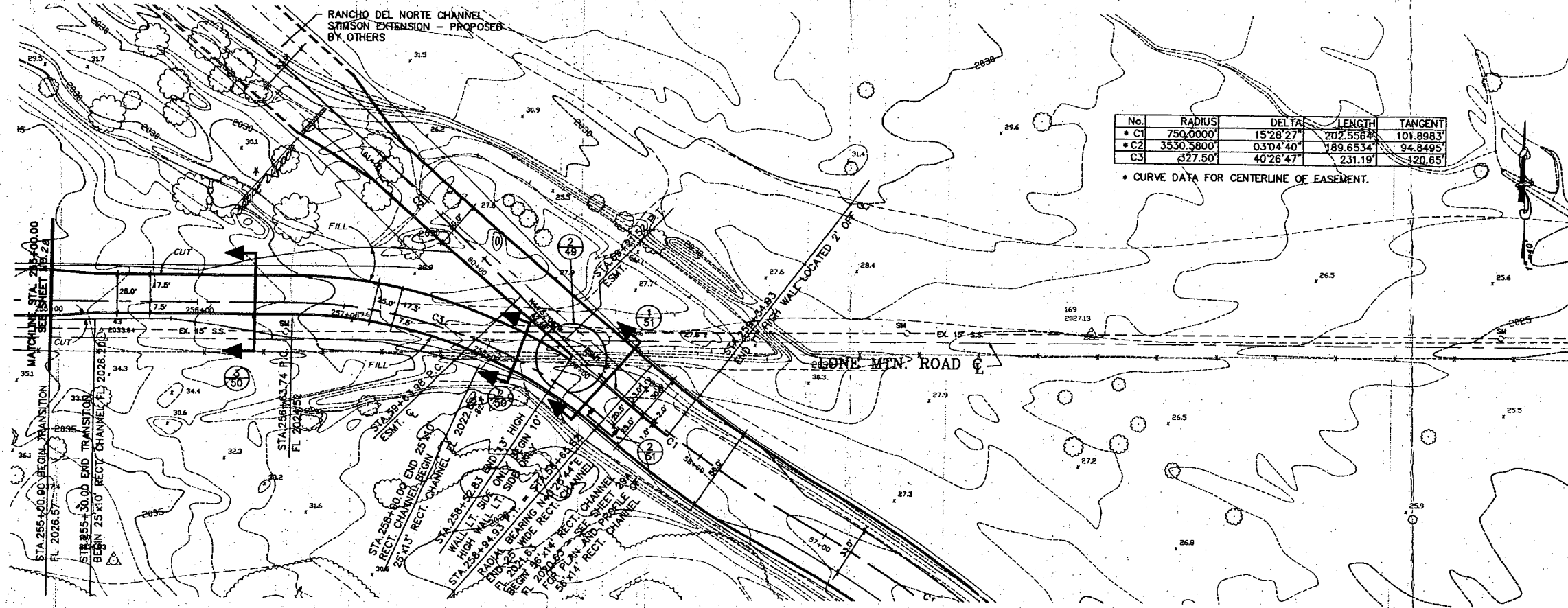
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LAS VEGAS, NEVADA 89102-5148 PHONE (702) 873-7550 FAX (702) 362-2597

PLAN AND PROFILE
STA. 245+00 TO STA. 255+00.00

GOWAN DETENTION BASIN
OUTFALL STRUCTURE



NO. 3900
BY KDG/TMM
DATE NOV. 1990
SCALE HORIZ. 1"=40'
VERT. 1"=5'
SHEET 28 OF 55 SHEETS

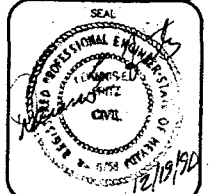


NOTE
CONTRACTOR MUST VERIFY HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES BEFORE BEGINNING CONSTRUCTION.

AS-BUILT

TITLE
PLAN AND PROFILE
STA.255+00.00 TO STA.258+94.93

PROJECT
GOWAN DETENTION BASIN
OUTFALL STRUCTURE

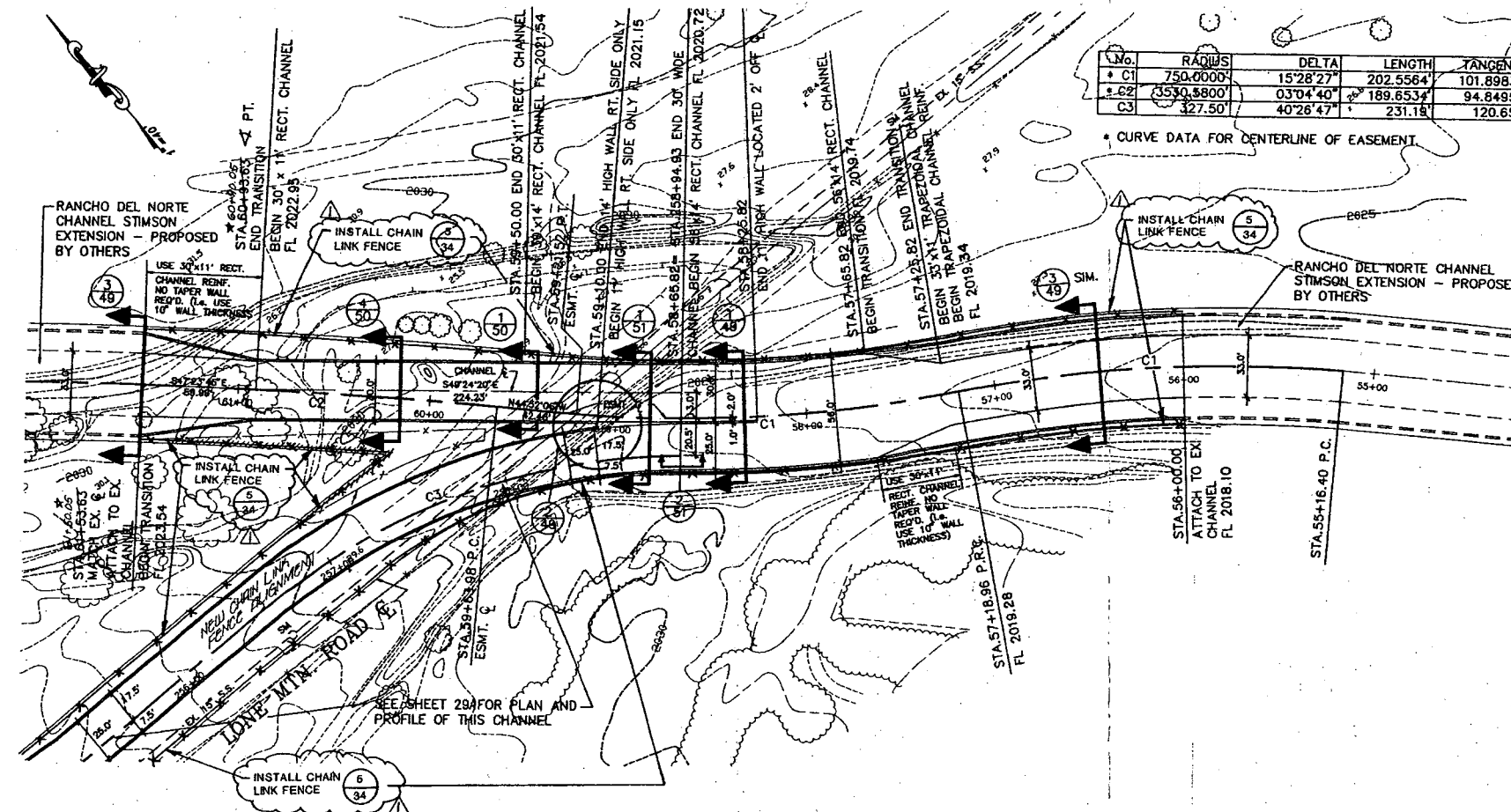


NO. 3900
BY KDG/TMM
DATE NOV. 1990
SCALE HORIZ. 1"=40'
VERT. 1"=5'
SHEET 55
29A OF SHEETS

CITY OF NORTH LAS VEGAS
CLARK COUNTY, NEVADA



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BENCHMARK

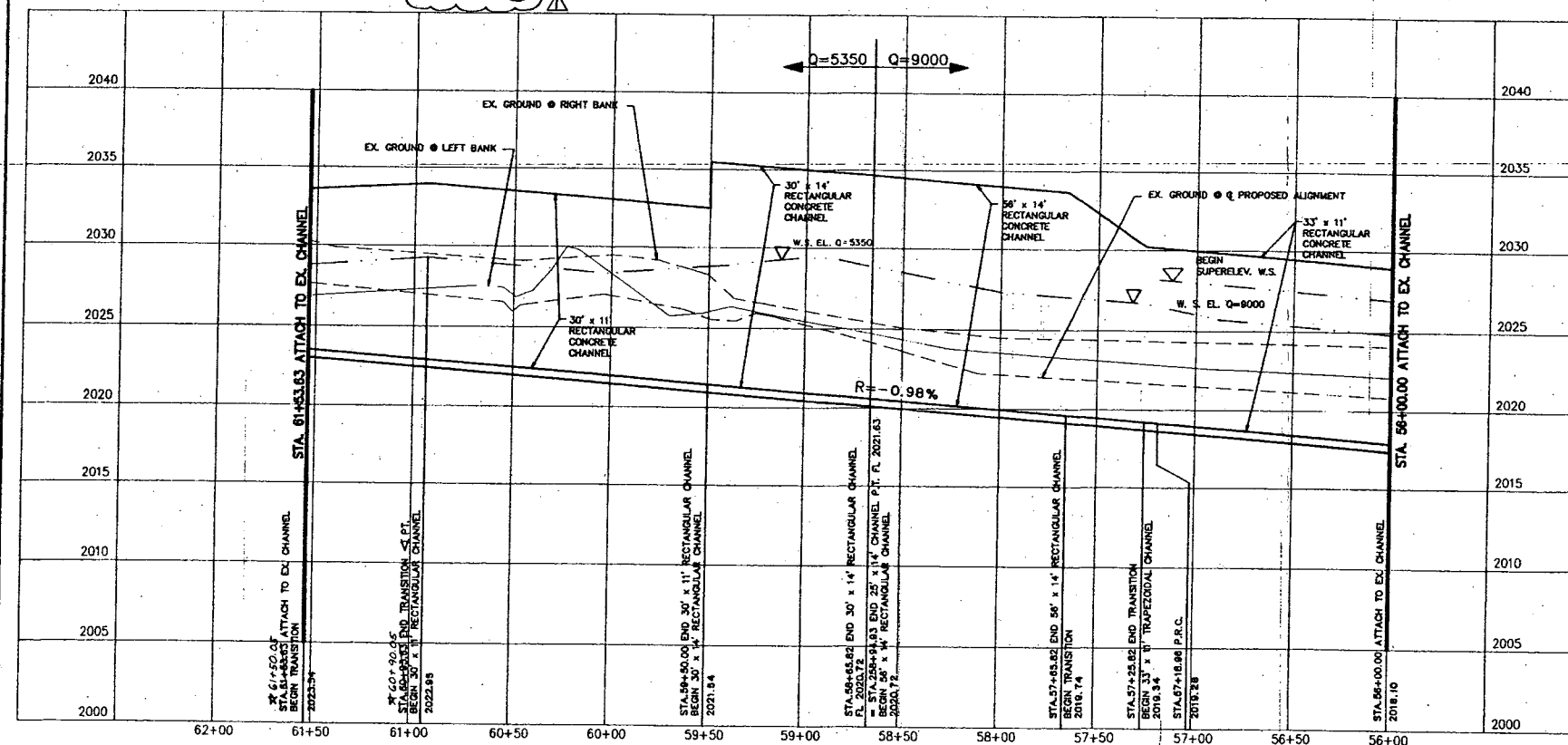
FOR RANCHO DEL NORTE CHANNEL
STIMSON EXTENSION

BY ALPHA ENGINEERING COMPANY

NORTH LAS VEGAS BENCHMARK #2292, AN 18" CONCRETE MONUMENT
WITH BRASS CAP LOCATED APPROXIMATELY 150' NORTH AND 50' EAST
OF THE INTERSECTION OF CRAIG ROAD AND 5TH STREET. ELEV. = 1971.06 FEET.

VTN ELEV. = 1970.50 FEET

ALPHA ENGINEERING CO. ELEV. = VTN ELEV. + 0.56 FEET



NOTE

CONTRACTOR MUST VERIFY HORIZONTAL AND
VERTICAL LOCATION OF ALL EXISTING UTILITIES
BEFORE BEGINNING CONSTRUCTION.

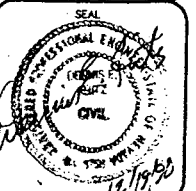
AS-BUILT

CITY OF NORTH LAS VEGAS
CLARK COUNTY, NEVADA

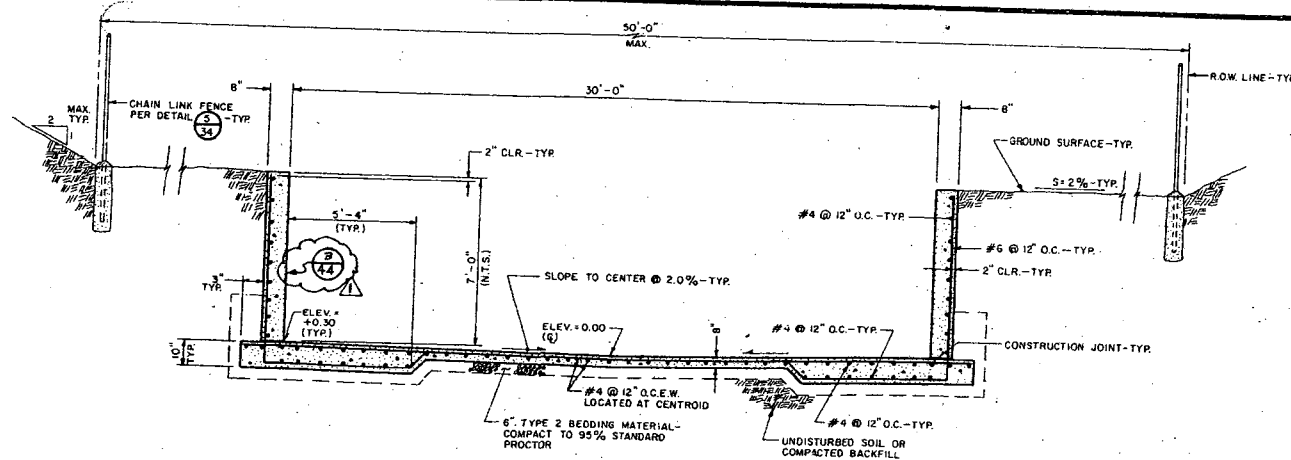
vtm nevada
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PLAN AND PROFILE
CONFLUENCE STRUCTURE

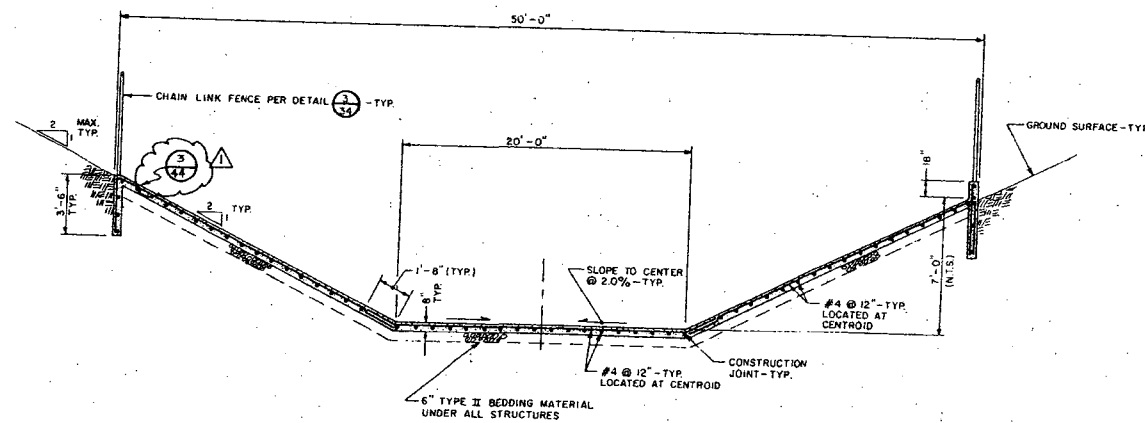
GOWAN DETENTION BASIN
OUTFALL STRUCTURE



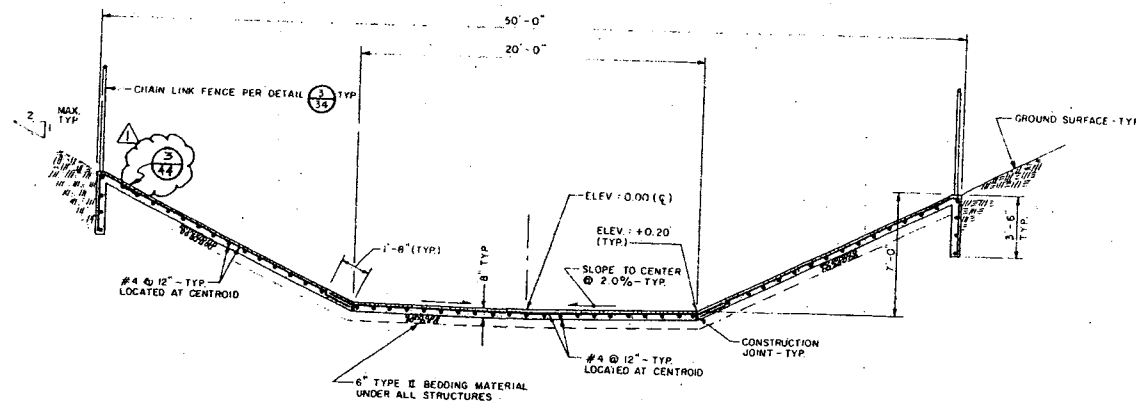
WO NO. 3900
BY KDG/TMM
DATE NOV. 1990
SCALE HORIZ. 1"=40'
VERT. 1"=5'
SHEET 55
29B OF SHEETS



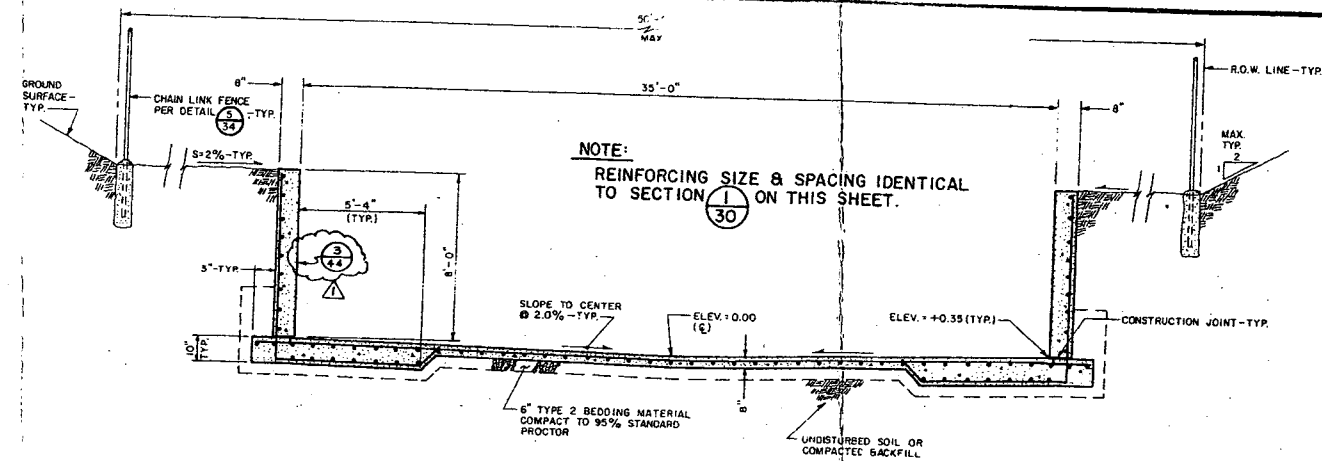
1
30 TYP. 30' x 7' RECTANGULAR CHANNEL SECTION
STA. 247+86.15 TO STA. 258+07.05



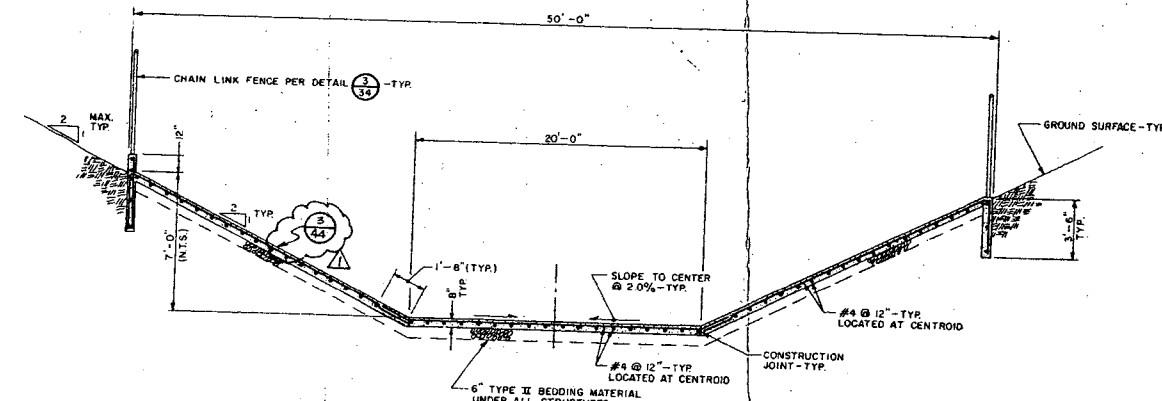
3
30 TYP. 50' TRAPEZOIDAL CHANNEL SECTION
STA. 236+00.00 TO STA. 246+56.87



5
30 TYP. 50' TRAPEZOIDAL CHANNEL SECTION
TYPICAL FOR CHANNEL SECTIONS NOT SPECIFIED BY THE OTHER CHANNEL SECTIONS ON THIS SHEET.



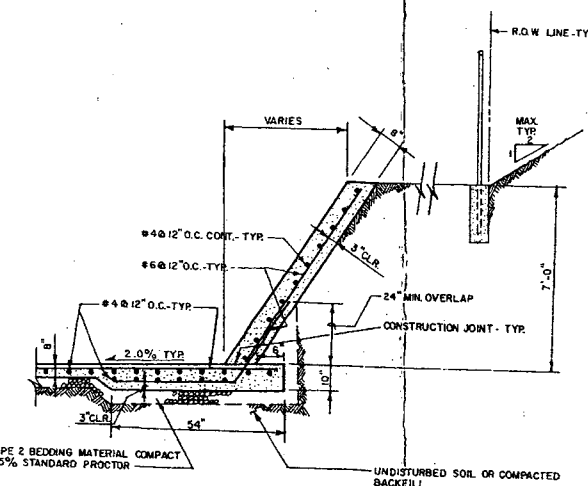
2
30 TYP. 35' x 8' RECTANGULAR CHANNEL SECTION
STA. 143+95.75 TO STA. 145+63.00



4
30 TYP. 50' TRAPEZOIDAL CHANNEL SECTION
STA. 221+00.00 TO STA. 236+00.00

NOTES:

- 1.) ALL SECTIONS ON THIS SHEET ARE CUT AS VIEWED LOOKING UPSTREAM.
- 2.) ALL FILL SLOPES SHALL BE A MIN. OF 2:1.



6
30 TYP. TRAPEZOIDAL TO RECTANGULAR WALL TRANSITION DETAIL

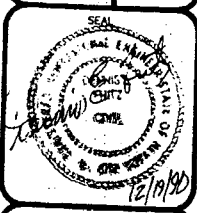
AS-BUILT

CITY OF NORTH LAS VEGAS
CLARK COUNTY, NEVADA

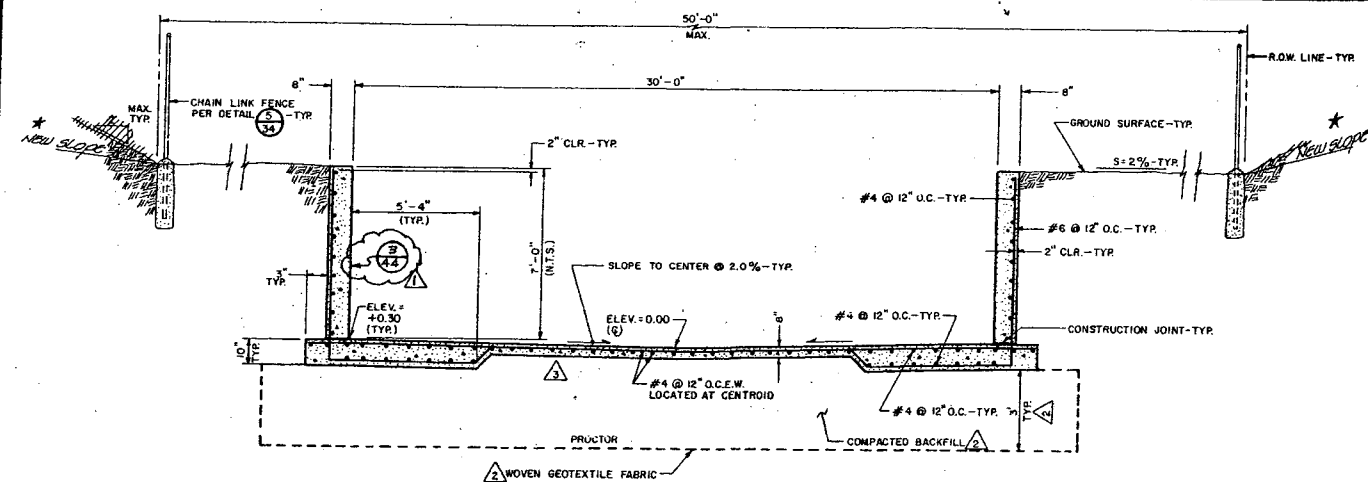
vtm nevada

CHANNEL SECTIONS
GOWAN DETENTION BASIN
OUTFALL STRUCTURE

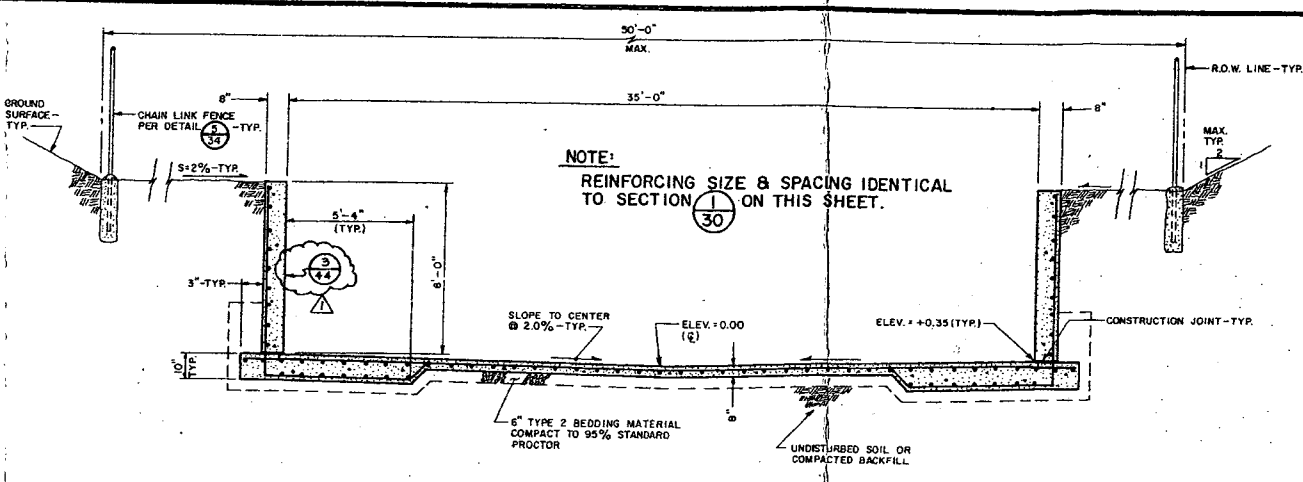
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LAS VEGAS, NEVADA 89102-5148 PHONE (702) 873-7550 FAX (702) 362-2597



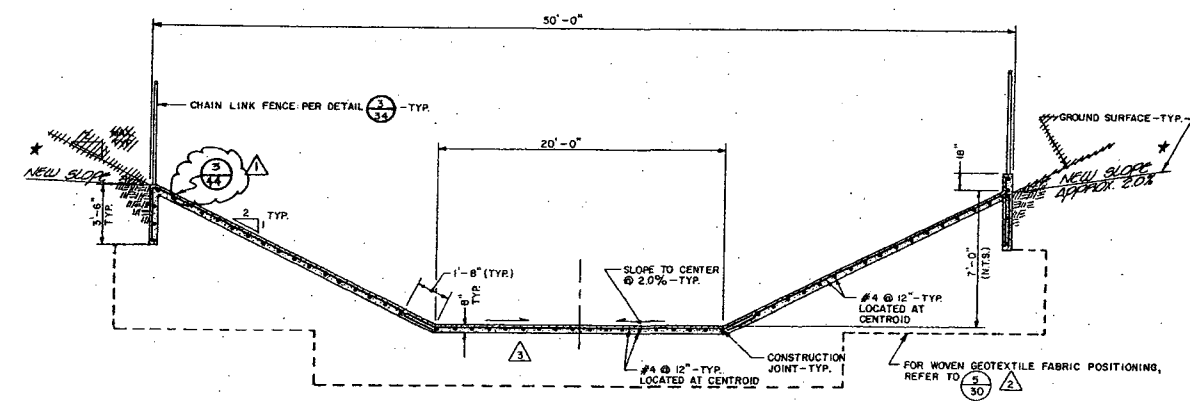
NO. NO.	3900
BY	DJB/KDG
DATE	DEC. 1990
SCALE	NONE
SHEET	30
SHEETS	55



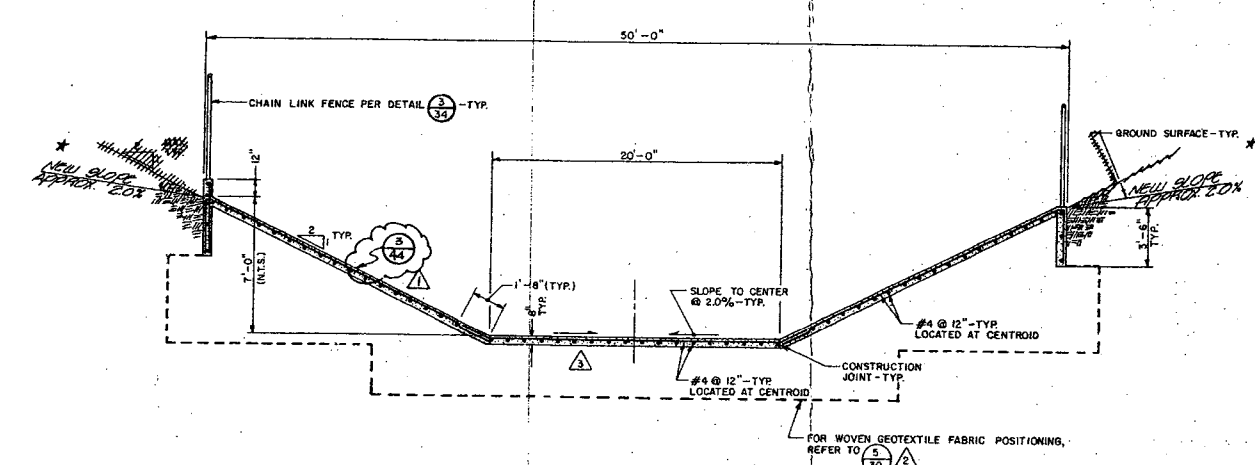
1
30 **TYP. 30' x 7' RECTANGULAR CHANNEL SECTION**
STA. 247+86.15 TO STA. 258+07.05



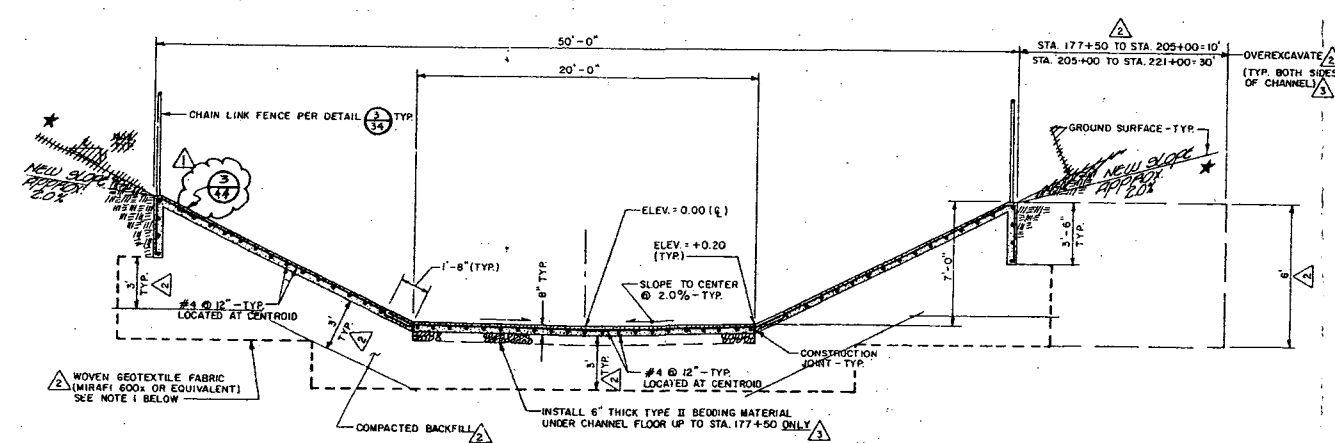
2
30 **TYP. 35' x 8' RECTANGULAR CHANNEL SECTION**
STA. 143+95.75 TO STA. 145+63.00



3
30 **TYP. 50' TRAPEZOIDAL CHANNEL SECTION**
STA. 236+00.00 TO STA. 246+56.87

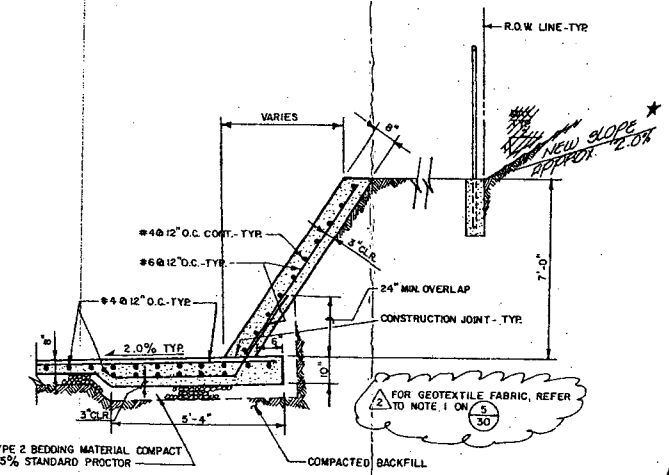


4
30 **TYP. 50' TRAPEZOIDAL CHANNEL SECTION**
STA. 221+00.00 TO STA. 236+00.00



5
30 **TYP. 50' TRAPEZOIDAL CHANNEL SECTION**
TYPICAL FOR CHANNEL SECTIONS NOT SPECIFIED BY THE OTHER CHANNEL SECTIONS ON THIS SHEET.

- NOTES:**
- 1.) ALL SECTIONS ON THIS SHEET ARE CUT AS VIEWED LOOKING UPSTREAM.
 - 2.) ALL FILL SLOPES SHALL BE A MIN. OF 2:1.



6
30 **TYP. TRAPEZOIDAL TO RECTANGULAR WALL TRANSITION DETAIL**

AS-BUILT

1.) THE FABRIC SHALL BE INSTALLED UNDER ALL CHANNEL AND CONFLUENCE STRUCTURES (INCLUDING TRANSITION SECTIONS) FROM STA. 177+50 TO THE END OF THE PROJECT.

CITY OF NORTH LAS VEGAS CLARK COUNTY, NEVADA		CONSULTING ENGINEERS • PLANNERS • LAND SURVEYORS 2727 SOUTH RAINBOW BOULEVARD LAS VEGAS, NEVADA 89102-5148 PHONE (702) 873-7550 FAX (702) 362-2597	
CHANNEL SECTIONS		GOWAN DETENTION BASIN OUTFALL STRUCTURE	
TITLE		PROJECT	
NO. NO.	3900	BY	DJB/KDG
DATE	DEC. 1990	SCALE	NONE
SHEET	30-R	SHEETS	55

APPENDIX F

Data CD