Upper East Fork Cave Creek Channel
GREENWAY PARKWAY CHANNEL
City of Phoenix, Maricopa County, Arizona
CONDITIONAL LETTER OF MAP REVISION
TECHNICAL DATA NOTEBOOK
Project: ST83130010

Submitted to:

FEDERAL EMERGENCY MANAGEMENT AGENCY
Mitigation Directorate
Hazard Identification & Risk Assessment Division
500 C. Street, SW
Washington, DC 20472
(202) 646-3680

Prepared for:

CITY OF PHOENIX
215 West Washington Street
Phoenix, Arizona 85003
(602) 262-4026

City of Phoenix

Prepared By:

Wood, Patel & Associates, Inc.
1550 East Missouri Avenue, Suite 203
Phoenix, Arizona 85014
(602) 234-1344

Federal Emergency Management Agency

Washington, D.C. 20472

FEB 28 2000

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WOOD / PATEL

The Honorable Skip Rimsza
Mayor of the City of Phoenix
200 West Washington, 11th Floor
Phoenix, Arizona 85003

IN REPLY REFER TO:
Case Number: 99-09-1210R
Community Name: City of Phoenix, Maricopa County, Arizona
Community Number: 040051

(104)

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Dear Mayor Rimsza:

This is in reference to an August 30, 1999, letter from Mr. Ashok C. Patel, P.E., of Wood, Patel & Associates, Inc., requesting a conditional Letter of Map Revision (LOMR) for a proposed project to channelize and realign a portion of East Fork Cave Creek. The proposed project, which will be located adjacent to Greenway Parkway from a point approximately 300 feet downstream of 9th Street to Cave Creek Road, will consist of redirecting the watercourse from East Fork Cave Creek into the Greenway Parkway Channel. The flow will be carried to the Greenway Parkway Channel by two storm drains at 18th and 20th Streets from Detention Basin numbers 3A and 3B. The area of the proposed project is shown on the Maricopa County and incorporated areas Flood Insurance Rate Map (FIRM) number 04013C1220 G, dated September 30, 1995.

We received the following technical data, prepared by Wood, Patel & Associates, Inc., in support of this request:

- a certified engineering report, titled Upper East Fork Cave Creek Channel, Greenway Parkway Channel, City of Phoenix, Maricopa County, Arizona, Conditional Letter of Map Revision, Technical Data Notebook, dated August 30, 1999, containing the following:
  - a TR-20 hydrologic model, dated February 12, 1993, of the 1% annual chance (100-year) flood discharge for the East Fork Cave Creek watershed, reflecting existing conditions;
  - a TR-20 hydrologic model, dated November 4, 1998, of the 1% annual chance flood discharge for the East Fork Cave Creek watershed, reflecting proposed conditions;
  - a HEC-2 hydraulic model, dated February 25, 1993, of the 1% annual chance flood for East Fork Cave Creek from Central Avenue to 7th Street, duplicating the model used to prepare a LOMR (Case No. 92-09-161P), effective on October 1, 1992, and incorporated into Maricopa County FIRM number 04013C1215 H, dated September 30, 1995;
  - a HEC-RAS hydraulic model, dated July 8, 1999, of the 1% annual chance flood for Greenway Parkway Channel from 9th Avenue to Cave Creek Road, reflecting proposed conditions;
  - a topographic map, titled Upper East Fork Cave Creek, Drainage Channel, FEMA LOMR Submittal, dated September 1992, at a scale of 1"=200',

with a contour interval of 2 feet, reflecting the existing conditions 1% annual chance floodplain for East Fork Cave Creek from Central Avenue to 7th Street;

- a topographic map, titled Proposed Floodway Work Map, Upper East Fork Cave Creek, Greenway Parkway Channel, FEMA CLOMR Submittal, dated January 5, 1999, at a scale of 1"=200', with a contour interval of 2 feet, reflecting the proposed conditions 1% annual chance (Zone A) floodplain for Greenway Parkway Channel; and

- an annotated copy of Maricopa County FIRM number 04013C1220 G, dated September 30, 1995, reflecting the proposed conditions 1% annual chance (Zone A) floodplain for Greenway Parkway Channel;

- a set of certified plans, titled City of Phoenix, Street Transportation Department, Design & Construction Management Division, Greenway Parkway Channel, 9th Street to Cave Creek Road, dated September 2, 1999, reflecting the proposed conditions for Greenway Parkway Channel;

- a letter, dated December 10, 1999, from the City of Phoenix, approving the proposed revision to the 1% annual chance (Zone A) floodplain and certifying that no structures would be impacted by the proposed project; and

- completed application/certificationforms, including community concurrence with this request.

We received all data necessary to process this request by December 13, 1999.

We have reviewed the submitted data and determined that the proposed project meets the minimum floodplain management criteria of the National Flood Insurance Program (NFIP). If the project is built as proposed, a revision to the FIRM for your community will be warranted. This revision will show the removal of the 1% annual chance (Zone A) floodplain of East Fork Cave Creek from Beardsley Road to a point approximately 300 feet west of 9th Street and the addition of a 1% annual chance (Zone A) floodplain for the proposed Greenway Parkway Channel from 9th Street to Cave Creek Road, as shown by the aforementioned data. The addition of the 1% annual chance (Zone A) floodplain will be contained within the channel right of way. Future revisions to the FIRM or restudies of the flood hazards in this area could modify this determination.

We based this determination on the 1% annual chance flood discharges computed in the aforementioned proposed conditions TR-20 hydrologic model. Future development of projects upstream could cause increased flood discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on flood discharges and could, therefore, establish greater flood hazards in the area.

Your community must approve all proposed floodplain development, including this proposed project, and ensure that permits required by other Federal agencies and/or State and local agencies have been obtained. State and/or community officials may set standards for construction that are more restrictive than the minimum NFIP standards or may limit

development in floodplains, based on knowledge of local conditions and in the interest of safety. If the State of Arizona and/or the City of Phoenix have adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

NFIP regulations Section 65.3 states that when a community's base (1% annual chance) flood elevations increase or decrease because of physical changes that affect flooding conditions, the community must submit technical or scientific data to Federal Emergency Management Agency (FEMA) that substantiate these changes. The community must submit such data as soon as possible, but no later than 6 months after such data become available, so that FEMA can base risk premium data and floodplain management requirements on current information.

Channel modifications and culverts will fail to function as designed without proper maintenance, such as regular clearing of the channelized area or culvert. To avoid such failures, we require participating communities to ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained according to NFIP regulations Subparagraph 60.3(b)(7). Therefore, upon completion of the project, your community must submit documentation ensuring that the modified channel and culverts will be maintained to preserve their design function. We may request that your community submit a description and schedule of its channel and culvert maintenance, as outlined in Subparagraph 65.6(a)(12) of the NFIP regulations.

Upon completion of the proposed project, your community should request a revision to the FIRM. The revision request should be submitted to our Regional Office in San Francisco, California, and include the data listed below.

1. Evidence of compliance with NFIP regulations Paragraph 65.4(b) which states that "all requests for changes to effective maps...must be made in writing by the community's Chief Executive Officer (CEO) or an official designated by the CEO. Should the CEO refuse to submit such a request on behalf of another party, we will agree to review the request only if written evidence is provided indicating the CEO or designee has been requested to do so."

2. As-built plans of the project, certified by a registered professional engineer.

3. A TR-20 hydrologic model of the 1% annual chance flood discharge for Greenway Parkway Channel, representing as-built conditions.

4. A HEC-RAS hydraulic model of the 1% annual chance flood for Greenway Parkway Channel, representing as-built conditions.

5. Delineation of the 1% annual chance (Zone A) floodplain for Greenway Parkway Channel along with the locations and alignments of cross sections used in the aforementioned HEC-RAS hydraulic model. The revised floodplain boundaries must tie-in with effective information at both the upstream and downstream limits of the area of revision.

    a. Please show this information on a certified map of suitable scale and topographic definition to provide reasonable accuracy.

b. Label all items for easy cross-referencing to the summary data.

6. An annotated copy of Maricopa County FIRM number 04013C1220 G, dated September 30, 1995, reflecting the as-built 1% annual chance (Zone A) floodplain. The as-built floodplain boundaries must tie-in with the effective boundaries at both the upstream and downstream limits of the area of revision.

7. Evidence of compliance with Subparagraphs 65.6(a)(12) of the NFIP regulations regarding channel and culvert maintenance, as previously discussed.

8. If structures are constructed on filled areas within the 1% annual chance (Zone A) floodplain, evidence of compliance with Subparagraph 65.5(a)(4), as discussed previously, certified by a registered professional engineer or licensed land surveyor.

If the project is built as proposed, you do not have to resubmit items 3 and 4; otherwise, please resubmit them. We have enclosed a copy of our application/certificationforms for your reference. Typically, we do not require these forms if the project is completed as proposed. The enclosed document, titled Requirements for Submitting Application/CertificationForms to Support Requests for NFIP Map Revisions, describes in detail the circumstances under which the forms are required.

The NFIP is not funded by taxes; rather, its expenses are primarily borne by policyholders. To minimize the financial burden on our policyholders, FEMA has established a flat processing fee for review of proposed projects and requests for revisions to published flood information and maps. Currently the fee for an as-built LOMR request in follow-up to this conditional LOMR is $3,400, which must be received before we can begin processing. This fee represents the new fee schedule effective September 23, 1999. Please note that the fees are subject to change, and the fee for the follow-up LOMR may change between the date of this letter and the date that the follow-up LOMR is submitted. If items 3 and 4 listed above must be resubmitted, the review and processing fee could be higher. Your payment must be a check or money order made payable to the National Flood Insurance Program and should be forwarded to:

Federal Emergency Management Agency
Fee Charge System Administrator
P.O. Box 3173
Merrifield, Virginia 22216

Once we receive the items listed above, including the processing fee, complete our review, and verify that the completed project meets all applicable NFIP standards, we will revise your community's FIRM to incorporate the effects of the completed project, as appropriate.

Part 65 of the enclosed NFIP regulations further describes the nature and extent of the material needed to support a request to revise a FIRM. Your compliance with the criteria outlined in this document will streamline our review, allowing us to expeditiously revise your community's FIRM.

If you have any questions, please do not hesitate to contact the Director, Mitigation Division of FEMA in Denton, Texas, at (940) 898-5399, or the FEMA Map Assistance Center toll free at 1-877-FEMA MAP (336-2627).

Sincerely,

Max H. Yuan, P.E.
Project Engineer
Hazards Study Branch
Mitigation Directorate

For: Matthew B. Miller, P.E., Chief
Hazards Study Branch
Mitigation Directorate

Enclosures

cc: Ms. Cindy D. White, P.E., City of Phoenix Floodplain Manager
Mr. Ashok C. Patel, P.E.
State Coordinator

WOOD/PATEL fax transmittal

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

PAGE:	6
DATE:	5/22/2000
TIME:	8 45
FAX NO.:	506- 7346

TO: Mike Duncan

FROM: Ash Patel

PROJECT: Greenway channel JOB NO.

COMMENTS:

Here is a copy of CLOMR, you requested.

Ap

☐ copy to: ☐ hard copy to follow in mail

Wood, Patel & Associates, Inc. • 2051 West Northern, Suite 100, Phoenix, Arizona 85021 • (602) 335-8500 • Fax (602) 335-8580
E-Mail: woodpatel@woodpatel.com

City of Phoenix

STREET TRANSPORTATION DEPARTMENT

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REMARKS CLER

September 1, 1999

Mr. Matthew Miller, P.E.
Chief, Hazard Studies Branch
Mitigation Directorate
Federal Emergency Management Agency
500 "C" Street, S.W.
Washington, D.C. 20472

Attn: Mr. Mike Grimm
Project Officer, Western Studies Team

Dear Mr. Miller:

RE: REQUEST FOR CONDITIONAL LETTER OF MAP REVISION
UPPER EAST FORK CAVE CREEK WASH
COMMUNITY NUMBER 040051, MAP NUMBER 04013C
PANELS 1215H AND 1220G

The City of Phoenix staff has reviewed the request for a Conditional Letter of Map Revision for the Upper East fork of the Cave creek Wash and fully supports the request which is being delivered under separate cover.

The intent of the Technical Data Notebook which is being submitted by Wood, Patel & Associates is to provide adequate documentation for the CLOMR request to achieve the following objectives:

1. Eliminate Zone "A" for Upper East Fork Cave Creek Wash from Greenway Parkway channel to an existing basin located at 20th Street and Grovers Avenue, approximately 1.50 miles northeast of the Greenway Parkway Channel.

2. Redefine Zone "AE" along the Greenway Parkway Channel from approximately 1,000 feet east of 7th Street to Cave Creek Road.

As required, I have signed the Community Official Form which is included in the submittal from Wood, Patel & Associates.

200 West Washington Street, Fifth Floor, Phoenix, Arizona 85003-1611 602-262-6284 FAX 602-495-5018

Recycled Paper

If there is anything I can do to assist your staff, please contact me at (602) 262-4026.

Sincerely,

Thomas E. Callow, P.E.
Interim Street Transportation Director

Cindy D. White

Cindy D. White, P.E.
Floodplain Manager

TEC/CDW/aff/990901a.wpd

c: Mr. Patel, P.E., Wood, Patel & Associates
Mr. Goodall, P.E., City of Phoenix (DCM)
Mr. Rerick, P.E., Flood Control District of Maricopa County

WOOD/PATEL

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

Darrel E. Wood, P.E., R.L.S.
Ashok C. Patel, P.E., R.L.S.
James S. Campbell, P.E.
Gordon W. R. Wark, P.E.
Thomas R. Gettings, R.L.S.
Bruce Friedhoff, P.E.
Scott A. Nelson, R.L.S.
Richard L. Hiner, P.E.
Timothy A. Huval, P.E.
Michael J. Sexton, R.L.S.
Jack K. Moody, P.E.
Leslie J. Kland, P.E.
Curtis L. Brown, P.E.
R. Scott Rasmussen, P.E.
Paul M. Haas, P.E.
Shimin Zou, Ph.D., P.E.
Michael T. Young, P.E.
Shawn D. Gustafson, P.E.
John Bulka, P.E.
Robert J. Hedrick, P.E.

August 30, 1999

Mr. Matt Miller
Chief, Hazard Studies Branch
Mitigation Directorate
Federal Emergency Management Agency
500 C Street SW
Washington, D.C. 20472

Attention: Mr. Mike Grimm,
Project Officer, Western Studies Team

Subject: Request for Conditional Letter of Map Revision
Upper East Fork Cave Creek Channel
City of Phoenix, AZ
Community Number 040051, Map Number 04013C, Panel 1220G
WP #96559.04

Gentlemen:

We are respectfully requesting a Conditional Letter of Map Revision (CLOMR) for the Upper East Fork Cave Creek Channel within the City of Phoenix, Arizona.

All appropriate hydrologic and hydraulic (scientific) data including detailed topographical information have been included in the enclosed Technical Data Notebook (TDN).

The study area is very unique in which regulatory Zone"A" is eliminated along the subject watercourse from Greenway Parkway Channel to Detention Basin No. 3, primarily because the construction of a 100-year Flood Control Facility upstream. However, a new Zone "AE" is created along a separate corridor of Greenway Parkway Channel as presented in this TDN.

It is my understanding that because of the unique nature of this study, you may direct your review staff as to how this submittal request will be handled.

Please note that the Greenway Parkway Channel has been reviewed for Value Engineering by Baker Engineers, Phoenix office. The TDN has been reviewed by Cindy White, P.E., Floodplain Administrator, of the City of Phoenix for its completeness and adequacy.

It is hoped that the TDN is complete and addresses all issues in conjunction with the CLOMR request.

15 Year Anniversary

Wood, Patel & Associates, Inc. • 1550 East Missouri, Suite 203, Phoenix, Arizona 85014 • (602) 234-1344 • Fax (602) 234-1322

Should you have any questions or need any clarification on this TDN, please do not hesitate to contact us. My email address is: apatel@woodpatel.com.

Very truly yours,

WOOD, PATEL & ASSOCIATES, INC.

Ashok C. Patel, P.E., R.L.S.
Project Manager

ACP/tjd

CC: Cindy White, P.E., Floodplain Administrator, City of Phoenix
Ralph Goodall, P.E., Street Transportation, City of Phoenix
Don Rerick, Flood Control District of Maricopa County

Y:\WP\General Correspondence\96559.04 Request for CLOMR.wpd

UPPER EAST FORK
CAVE CREEK CHANNEL
GREENWAY PARKWAY CHANNEL
FEMA CLOMR SUBMITTAL

Prepared For:

City of Phoenix
215 West Washington Street
Phoenix, Arizona 85003
(602) 262-4026

Submitted To:

Federal Emergency Management Agency
Mitigation Directorate
Hazard Identification & Risk Assessment Division
500 C Street SW
Washington, DC 20472
(202) 646-3680

Prepared By:

Wood, Patel & Associates, Inc.
1550 East Missouri Avenue
Suite 203
Phoenix, Arizona 85014
(602) 234-1344

August 30, 1999
WP #96559.04

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1.0 INTRODUCTION

1.1 Project Location and Scope of Work

The Upper East Fork Cave Creek Wash is located in northeast Phoenix, Arizona and extends from the confluence with Cave Creek Wash at 19th Avenue and Greenway Road to the headwaters at Beardsley Road and 26th Street. The channel is within the East Fork Cave Creek watershed and drains an area of about 15 square miles. The vicinity of the project location is shown on Figure 1.

The hydrology for the East Fork Cave Creek watershed was originally prepared as part of the Drainage Master Plan for the Upper East Fork Cave Creek watershed adopted by the City of Phoenix and the Flood Control District of Maricopa County and presented in the *Upper East Fork Cave Creek Area Drainage Master Study*, October 1987 (reference 1).

This report is intended to meet the requirements for a Conditional Letter of Map Revision (CLOMR) for the East Fork Cave Creek Channel from approximately 1,000 feet upstream of 7th Street to Detention Basin #3 at Cave Creek Road and Grovers Avenue. ***Due to the construction of Detention Basin #3, the stormdrain system in 18th Street, 20th Street and Bell Road, and the Greenway Parkway Channel the existing Zone A in this reach is replaced by Zone X along the East Fork Cave Creek Channel, and new Zone AE is created within the new Greenway Parkway Channel.*** The Federal Emergency Management Agency (FEMA) may wish to designate Greenway Parkway Channel as a Zone A. However, this channel was studied in detail and base flood elevations are shown on Exhibit C with hydraulic calculations provided in Appendix E. Please refer to Figure 1 and Exhibit D for a graphical representation of CLOMR request. Also sections 1.3 and 1.4 cover the changed physical conditions of the study area in detail.

1.2 Previous Submittals to FEMA

Upon completion of the *Upper East Fork Cave Creek Area Drainage Master Study* in October 1987, the City of Phoenix submitted the hydrology from the study to FEMA for review with a request that the floodway designation for East Fork Cave Creek, east of 7th Street, be eliminated, and that the entire area be designated as Zone B. In a letter dated June 1, 1988 from John L. Matticks, Chief, Risk Studies

Division, Federal Insurance Administration, the hydrology was accepted as representative of existing flow conditions and the floodplain was redesignated as Zone "A". The letter is enclosed in Appendix B.

On March 18, 1992, a request for a CLOMR entitled *Upper East Fork Cave Creek Drainage Channel, Union Hills Drive to Beardsley Road, FEMA CLOMR Submittal* (reference 3) was submitted. The CLOMR was issued in a letter dated April 29, 1992 from William Locke, Chief, Risk Studies Division, Federal Insurance Administration. The letter is enclosed in Appendix B (reference 3).

The regulatory floodplain currently in effect is the Zone A designation referred to in the June 1, 1988 letter from the headwaters at Beardsley Road to approximately 1,000 feet east of 7th Street. The floodplain delineation from the confluence with Cave Creek Wash to Central Avenue was updated in a detailed study as part of the *Cave Creek Floodplain Delineation - Cave Buttes Dam to the Arizona Canal Diversion Channel*, January, 1990 prepared by Burgess & Niple, Inc. for the Flood Control District of Maricopa County (reference 2).

Two Letters of Map Revision (LOMR) have been submitted and approved modifying the above mentioned regulatory floodplain. On July 13, 1992, a request for a LOMR entitled *Upper East Fork Cave Creek Channel, Central Avenue to 7th Street, FEMA LOMR* (reference 4) was submitted revising the flood plain from Central Avenue to about 1,000 feet east of 7th Street based on channel improvements. The LOMR was issued in a letter dated October 1, 1992, from William Locke, Chief, Risk Studies Division, Federal Insurance Administration. The letter is enclosed in Appendix B.

On April 6, 1992, a request for a LOMR for Coral Manor Units I and II, was submitted revising the flood plain on the northwest corner of 7th Avenue and the Greenway Road alignment. The LOMR was issued in a letter dated May 19,1992, from Fay L. Davis, Acting Chief, Technical Operations Division, Federal Insurance Administration. The letter is enclosed in Appendix B, and the HEC-2 modeling area (Figure 3) of the FEMA LOMR submittal is included in Exhibit E. The areas affected by these submittals are shown on Figure 1.

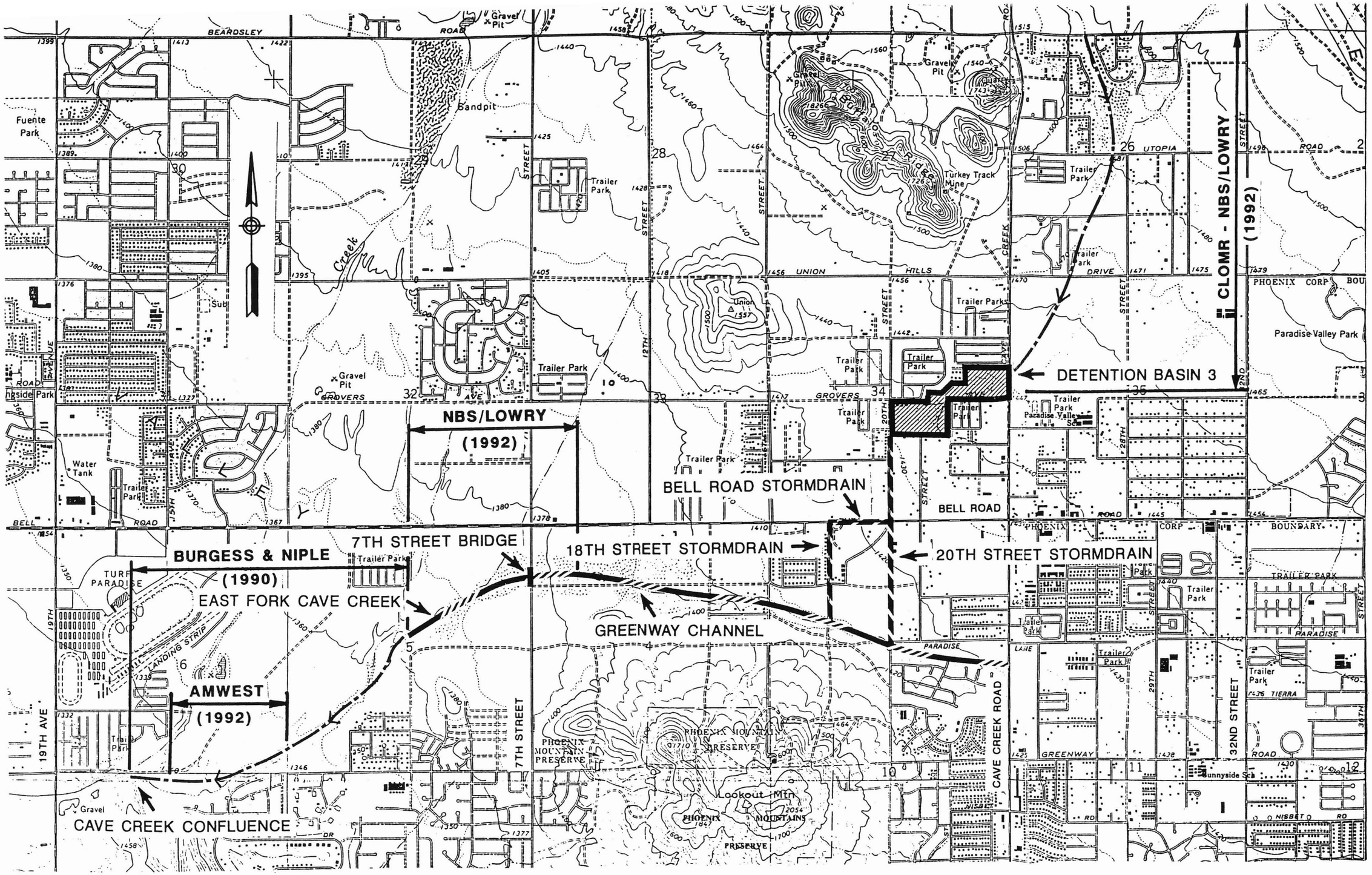
1.3 General Description of Changed Physical Conditions

As part of the Upper East Fork Cave Creek Area Drainage Master Study, (Upper EFCC ADMS) drainage improvements were recommended throughout the watershed to safely convey runoff away from the area and thus, remove a significant number of structures from the regulatory floodplain. Since completion of the master plan in October 1987, the City of Phoenix and the Flood Control District of Maricopa County have worked to implement the recommendations contained in the master plan. The improvements include channels, detention basins, and stormdrains. Construction of the following projects constitutes the changed physical conditions that affect the hydrology for the Upper East Fork Cave Creek watershed. The projects are shown on Figure 2.

Description		Project No.
1.	Moonlight Cove II	Clouse Engineer
2.	East Fork Cave Creek - Central Avenue to 7th Street	PRC Engineer
3.	7th Street - Bridge over Greenway Channel	BR-860395
4.	7th Street - Greenway Parkway to Bell Road	"Bell Town Center"
5.	Union Hills Drive - 7th Street to 12th Street	ST-883223
6.	Detention Basin #2	ST-896803
7.	Rosemont Lateral	ST-896803
8.	Detention Basin #5	ST-896837
9.	9th Street Greenway Road to Bell Road	P-861013
10.	9th Street Bell Road Crossing	ST-880807
11.	9th Street Bell Road to Union Hills	ST-887299
12.	Greenway Channel - 7th Street to Cave Creek Road	P-861013
13.	16th Street - Greenway Parkway to Bell Road	P-861013
14.	16th Street - Bell Road Crossing	ST-880807
15.	16th Street - Bell Road to Grovers Avenue	ST-885152
16.	18th Street - Greenway Parkway to Bell Road	ST-880781
17.	20th Street - Greenway Parkway to Bell Road	ST-880781
18.	Bell Road - 18th Street to 20th Street	ST-880807
19.	20th Street - Bell Road to Detention Basin #3	ST-887422
20.	Detention Basin #3	ST-896829
21.	Grovers Avenue Lateral	FCD 86-4
22.	East Fork Channel - Union Hills Drive to Beardsley Road	FCD 90-54

23.	Detention Basin #1	ST-896811
24.	Greenway Parkway - Cave Creek Road to 32nd Street	P-861005
25.	Cave Creek Road Cactus Road to Greenway Road	P-855932
26.	Cave Creek Road Greenway Road to Bell Road	P-855999
27.	32nd Street - Thunderbird Road to Greenway Road	ST-783746
28.	32nd Street - Greenway Road to Bell Road	ST-791871
29.	32nd Street - Bell Road to Union Hills Drive	ST-894436
30.	Detention Basin #4	FCD 90-55
31.	Greenway Parkway Channel - 9th Street to Cave Creek Road (Wood/Patel Update)	ST83130010

The effect of these projects is reflected in the new hydrologic analysis.



STUDY AREA VICINITY MAP

FIGURE 1

The changed physical conditions affecting the hydraulics are the Greenway Parkway Channel from 7th Street to Cave Creek Road, the stormdrain system in 18th and 20th Streets that conveys the discharge from Detention Basin #3 to the Greenway Parkway Channel.

1.3.1 Greenway Parkway Channel

The Greenway Parkway Channel is constructed adjacent to the Greenway Parkway from 7th Street to Cave Creek Road. Stormdrain laterals enter the channel from the north at the side streets. The lateral inverts are typically lower than the channel invert to allow for adequate cover over the pipes, therefore, a 36-inch low flow pipe has been constructed to drain the laterals following storm events. The Greenway Parkway Channel is earth lined with native grass and ground cover from 7th Street to 12th Street with a grade control structure at 9th Street. From 12th Street to Cave Creek Road, gabion baskets are used for bank protection. Each layer is offset about one foot to provide a shelf for establishment of vegetation. The channel bottom is concrete lined in this reach.

1.3.2 18th and 20th Street Stormdrain

The 18th and 20th Street laterals discharge into the Greenway Parkway Channel. The 18th Street lateral is an 84-inch concrete pipe and extends from the Greenway Parkway Channel to Bell Road and in Bell Road to 20th Street where it ties in with the 20th Street lateral. The 20th Street lateral is a 96-inch concrete pipe from the Greenway Parkway Channel to Aire Libre Drive and a 78-inch concrete pipe from Aire Libre to Bell Road. North of Bell Road, a 108-inch pipe connects the system to Detention Basin #3. Flow is metered out of basin #3 into the 108-inch pipe which conveys it to Bell Road where a splitter stricture splits the flow between the 18th and 20th Street laterals.

1.3.3 Detention Basin #3

Detention Basin #3 is actually two detention basins in a series covering a 35- acre parcel divided by Grovers Avenue. The flow from the Pepperidge Channel east of Cave Creek Road enters the basin through a double barrel 10'x 10' box culvert at John Cabot Road. Low flows, up to about the 2-year flow is conveyed under the basin in concrete pipes to the 20th Street

lateral. When the capacity of the low flow pipe is exceeded, the flow backs up into basin #3A north of Grovers. The basin #3A outfall discharges under Grovers Avenue into basin #3B. Basin #3B outlets into the 20th Street lateral. The basins reduce the 100- year peak discharge from 1300 cfs at Cave Creek Road and John Cabot to 500 cfs at 20th Street, including side inflows from Grovers Avenue east. Detention Basin #3 is a City of Phoenix park including softball fields, a soccer field, basketball and volleyball courts, ramadas, and pedestrian and equestrian trails.

1.4 Construction Plans

The following projects represent improvements to the East Fork Cave Creek Wash and constitute the changed physical conditions affecting the hydraulics.

	Description	Project No.
12.	Greenway Channel - 7th St. to Cave Creek Road	P-861013
16.	18th Street - Greenway Parkway to Bell Road	ST-880781
17.	20th Street - Greenway Parkway to Bell Road	ST-880781
18.	Bell Road - 18th Street to 20th Street	ST-880807
19.	20th Street - Bell Road to Detention Basin #3	ST-887422
20.	Detention Basin #3	ST-896829
31.	Greenway Parkway Channel - 9th Street to Cave Creek Road (Wood/Patel Update)	ST83130010

Construction plans or as-built plans, depending on the current level of completion, are included under separate cover with the exception of number 12.

2.0 FEMA FORMS

The appropriate FEMA forms from the current FEMA MT-2 packet (expires April 30, 2001) follow:

Form 1	Revision Requestor and Community Official Form
Form 3	Hydrologic Analysis Form
Form 4	Riverine Hydraulic Analysis Form
Form 5	Riverine Costal Mapping Form
Form 6	Channelization Form
Form 7	Bridge/Culvert Form
Form 8	Levee/Floodwall Form

2.1 Supplemental Information to FEMA Forms

Responses to questions in the following section require further explanation:

2.1.1 Revision Requestor and Community Official Form

To clarify item 1 of FEMA Form 1: The existing floodway extends from the confluence at Cave Creek Wash to 7th Street. East of Central Avenue, the floodplain is designated as Zone A on the current FIRM. Due to the changed physical conditions (detention basin and stormdrain) the regulatory Zone A from 1,000 feet east of 7th Street to Detention Basin 3, is replaced with the floodplain contained in the Greenway Parkway Channel.

2.1.2 Hydrologic Analysis Form

To clarify item 1 of FEMA Form 3: Just west of Cave Creek Road, the Upper East Fork of Cave Creek Wash enters Grovers Park (Detention Basin #3). This basin is large enough to significantly attenuate the 100-year flood

peak flow. The basin releases storm water through a storm drain system in 18th Street, 20th Street and Bell Road. The storm drain conveys the stormwater flow due south from Basin #3 to the Greenway Parkway Channel, which parallels Greenway Parkway (see Figure 2). The channel outfalls to the existing upper East Fork of Cave Creek Wash near 12th Street. Furthermore, subbasin curve numbers were revised to reflect updated conditions since 1993.

To clarify item 3 of FEMA Form 3: The City of Phoenix has approved the hydrology as documented within this report. A letter documenting this approval is provided in Appendix B.

To clarify item 4 of FEMA Form 3: Due to the changed physical conditions as listed in section 1.4, and above in Section 2.1.1, the Upper East Fork of Cave Creek Wash is cutoff along the regulartory flood hazzard area. Detention Basin No. 3 significantly attenuates the peak discharge. The new stormdrain system drains the detention basin into the Greenway Parkway Channel. Thus east of 7th Street the runoff is cut off and redirected from the historic flood path. Therefore the duplicate effective FIS discharges do not correspond to the revised discharges and are not listed for comparison.

2.1.3 Riverine Hydraulic Analysis Form

To clarify item 3 of FEMA Form 4: Please refer to Section 5.3.1 of text.

To clarify item 4 of FEMA Form 4: Please refer to Sections 5.5 and 5.6 of text.

To clarify item 5 of FEMA Form 4: Due to the changed physical conditions (detention basin, storm drain and channel) the existing Zone A is replaced with the new floodplain contained in the new Greenway Parkway Channel. This channel alignment does not follow the effective floodplain alignment thus, the upstream revised floodplain is a new floodplain.

2.1.4 Riverine Costal Mapping Form

To clarify item 1 of FEMA Form 5:

b. The revised floodplain was studied using detailed methods for the 100-year storm only.

f. The study area floodplain does not cross any community boundaries.

g. The effective and revised floodplain are shown on the annotated FIRM Panel, Exhibit D.

i. The channel contains the revised floodplain.

k. ERM 971 of FIRM Panel 04013C 1220 G applies to this study.

l. Vertical datum used is NGVD 29, which matches effective FIRM.

m, n & o. This study area is not a costal area.

2.1.5 Channelization Form

To clarify item 2 of FEMA Form 6: Refer to the construction plans for channel inlet and outlet details. Table E1.2 provides a description of channelization materials used. Cross sections are provided in Appendix E2. Typical cross sections and planametric information are provided in the construction plans.

To clarify item 5 of FEMA Form 6: Please refer to sections 5.5 and 5.6 of text.

To clarify item 6 of FEMA Form 6: There is no evidence of sediment loading for this study reach (see section 6.0 of text).

2.1.6 Bridge/Culvert Form

To clarify item 2 of FEMA Form 7: There are two concrete box culvert crossings in this study reach. One at 16th Street and one at 20th Street. The HEC-RAS cross sections correspond to the construction plan stationing. The channel bottom is lined by concrete in these areas, thus no erosion protection calculations were performed. There is a gabion bank stability analysis provided in Appendix E5.

2.1.7 Levee/Floodwall Form

The flood wall was designed by Cannon & Associates, Inc., in February 199, and the geotechnical analysis was conducted by Speedie & Associates, in October 1998. Both reports are included in Appendix G.

3.0 SURVEY AND MAPPING INFORMATION

3.1 Field Survey Information

Wood, Patel & Associates Inc., has performed a field survey for the Greenway Parkway Channel reach from 12th Street to Cave Creek Road. Information surveyed includes left and right top of channel bank and top and toe of existing gabion lining. The survey datum used is the City of Phoenix datum which is NGVD 29 and is consistent with the previous CLOMR/LOMR studies in the subject area. Survey points are incorporated into the electronic topography files (the layer is turned off for exhibit purposes). A hard copy of survey points is included in Appendix C.

3.2 Mapping

The mapping for this project was developed for the Flood Control District of Maricopa County for the Upper EFCC ADMS (reference 1). It meets FEMA standards for 200 scale 2 ft. CI mapping. The Field Survey information, which is accurate to 0.1 ft., was used to supplement the existing topography map in the channel vicinity.

FEDERAL EMERGENCY MANAGEMENT AGENCY **REVISION REQUESTER AND COMMUNITY OFFICIAL**	O.M.B No. 3067-0148 Expires April 30, 2001

Public reporting burden for this form is estimated to average 2.13 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the 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, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

1. REQUESTED RESPONSE FROM FEMA

This request is for a:

☒ 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, floodway or flood elevations. LOMRs typically decrease flood hazards. (See 44 CFR Ch. 1 Parts 60 & 65.)

☐ Other Describe:

2. OVERVIEW

1. The basis for this revision request is (are): (check all that apply)

☒ Physical Change ☐ Improved Methodology/Data ☒ Floodway Revision

☐ Other Describe:

Note: A photograph is not required, but is very helpful during review.

2. Flooding Source: East Fork Cave Creek

3. Project Name/Identifier: Upper East Fork Cave Creek Channel, Greenway Parkway Channel

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

5. 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 480287	Katy, City Harris County	TX TX	480301 48201C	0005D 0220G	02/08/83 09/28/90
040051	Phoenix, City of	AZ	04013C	1220G	09/30/95

6. The area of revision encompasses the following types of flooding and structures. Check all that apply.

Types of Flooding	Structures
☒ Riverine	☒ Channelization
☐ Coastal	☐ Levee/Floodwall
☐ Alluvial fan	☒ Bridge/Culvert
☒ Shallow Flooding (e.g. Zones AO and AH)	☐ Dam
☐ Lakes	☐ Fill
☐ Other (describe)	☒ Other - Detention Basin & Storm Drain

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

4. ENCROACHMENT INFORMATION

1. Does the State have jurisdiction over the floodway or its adoption by communities participating in the NFIP?
   ☐ Yes ☒ No

If Yes, attach a copy of a letter notifying the appropriate State agency of the floodway revision and documentation of the approval of the revised floodway by the appropriate State agency.

2. Does the development in the floodway cause the 1% annual chance (base) elevation to increase at any location by more than 0.000 feet? ☐ Yes ☐ No ☒ N/A

3. Does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the base flood elevation to increase at any location by more than one foot (or other increase limit if community or state has adopted more stringent criteria - even if a floodway has not been delineated by FEMA)? ☐ Yes ☒ No

If the answer to either items is Yes, please attach documentation that all requirements of Section 65.12 of the NFIP regulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and certification that no insurable structures are impacted.

5. MAINTENANCE RESPONSIBILITY

The community is willing to assume responsibility for ☒ performing ☐ overseeing compliance with the maintenance and operation plans of the Grovers Park (Detention Basin No 3)
(Name)
flood control structure. If not performed promptly by an owner other than the community, the community will provide the necessary services without cost to the Federal government.

Operation and maintenance plans are attached. ☐ **Yes** ☒ **No** ☐ **N/A**

6. REVIEW FEE

The review fee for the appropriate request category has been included. ☒ Yes Fee amount: $4,000

OR

This request is based on a federally sponsored flood-control project where 50 percent or more of the project's cost is federally sponsored, or the request is based on detailed hydrologic and hydraulic studies conducted by Federal, State, or local agencies to replace approximate studies conducted by FEMA and shown on the effective FIRM; thus the project is fee exempt.
☐ Yes

Please see Instructions for Fee Amounts

7. SIGNATURE

Note: **I understand that my signature indicates that all information submitted in support of this request is correct**

Signature of Revision Requester

Ashok Patel, P.E., R.L.S. - Project Manager
Printed Name and Title of Revision Requester

Wood, Patel & Associates, Inc.
Company Name

Telephone No.: (602) 234-1344 Date: 3-May-99

Note: **Signature indicates that the community understands, from the revision requester, the impacts of the revision on flooding conditions in the community.**

Signature of Community Official

Cindy White, P.E. - Floodplain Management Engineer
Printed Name and Title of Community Official

City of Phoenix, Arizona
Community Name

Telephone No.: (602) 262-4960 Date:

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is in accordance with 44 CFR Ch. 1, Sect 65.2

Signature

Ashok Patel, P.E., R.L.S. - Project Manager
Printed Name and Title of Revision Requester

Registr No. 10512 Expires (Date) 30-SEP-2001 State AZ

Type of License/Expertise: Civil

Registered Professional Engineer (Civil) CERTIFICATE NO. 10512 ASHOK C. PATEL Date Signed 8/30/99 ARIZONA, U.S.A.

Check which forms have been included with this request

Form Name and (Number)	Required if .....
☒ **Hydrologic** (3)	new or revised discharges
☒ **Hydraulic** (4)	new or revised water-surface elevations
☒ **Mapping** (5)	floodplain/floodway changes
☒ **Channelization** (6)	channel is modified
☒ **Bridge/Culvert** (7)	addition/revision of bridge/culvert
☒ **Levee/Floodwall** (8)	addition/revision of levee/floodwall
☐ **Coastal** (9)	new or revised coastal elevations
☐ **Coastal Structures** (10)	addition/revision of coastal structure
☐ **Dam** (11)	addition/revision of dam
☐ **Alluvial Fan** (12)	structures proposed on alluvial fan

FEDERAL EMERGENCY MANAGEMENT AGENCY **HYDROLOGIC ANALYSIS**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average **3.67** hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the 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, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: City of Phoenix, Arizona

Flooding Source: East Fork Cave Creek

Project Name/Identifier: Upper East Fork Cave Creek Channel, Greenway Parkway Channel

1. REASON FOR NEW HYDROLOGIC ANALYSIS

☐ No existing analysis ☐ Improved data ☒ Changed physical condition of watershed

☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Other

For the reason stated above, please attach a detailed explanation. If a computer program/model was used in revising the hydrologic analysis, **please provide a diskette with the input files** for the same flood recurrence intervals contained in the FIS for that stream; and at least for the 1% annual chance (base) flood where no detailed study exists.

Explanation provided: ☒ Yes ☐ No **Diskettes provided:** ☒ Yes ☐ No

2. METHODOLOGY FOR NEW ANALYSIS

Indicate Method	Required Data	Data Included
☐ Statistical Analysis of Gage Records	Form 3 - Attachment A	☐ Yes ☐ No
☐ Regional Regression Equations	Form 3 - Attachment C	☐ Yes ☐ No
☒ Precipitation/Runoff Model	Form 3 - Attachment D	☒ Yes ☐ No
☐ Other	Back-up computations and supporting data	☐ Yes ☐ No

3. APPROVAL OF ANALYSIS

The hydrologic analysis has already been approved by a local, state, or Federal Agency. ☒ Yes ☐ No ☐ Not Required

If Yes, attach evidence of approval. ☒ **Approval attached.** If No, attach explanation. ☐ **Explanation attached.**

4. COMPARISON OF BASE FLOOD DISCHARGES

Location:	Drainage Area (SqMi)	FIS(cfs)	Revised (cfs)
At 7th Street	14	8,100	8,100
East of (upstream) 7th Street	13.7	n/a	6,970

Note: When revised discharges are not significantly different than the FIS discharges, FEMA may require a confidence limits analysis (see attachment B) at a later date to complete the review.

If only a portion of a detailed study area was revised please attach an explanation describing the transition from the proposed discharges to the effective discharges. ☐ **Explanation Included** ☒ **Explanation Not Required**

5. HISTORICAL FLOODING INFORMATION

If historical data are available for the flooding source please provide: Location, peak discharges/water-surface elevations and dates, and source of information. ☐ **Data Attached** ☒ **Data Not Available**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

ATTACHMENT A: STATISTICAL ANALYSIS OF GAGE RECORDS

Gaging Station:

Gage Location (latitude and longitude):

		FIS:		Revised:	
1.	Number of years of data				
	Systematic				
	Historical				
2.	Homogeneous data	☐ Yes	☐ No	☐ Yes	☐ No
3.	Data adjustments	☐ Yes	☐ No	☐ Yes	☐ No
4.	Number of high outliers				
	Low outliers				
	Zero events				
5.	Generalized skew				
6.	Station skew				
7.	Adopted skew				
8.	Probability distribution used (justify if log-Pearson III was not used)				
9.	Transfer equations to ungaged sites			☐ Yes	☐ No
	If Yes, specify method				
10.	Expected probability*			☐ Yes	☐ No
11.	Comparison of results with other analyses			☐ Yes	☐ No
	If Yes, describe comparison				

12. **Attach analysis including plot of flood-frequency curve. Analysis Attached?** ☐ Yes ☐ No

*FEMA does not accept expected probability analyses for the purpose of reflecting flood hazard information in a FIS.

If any data are not available, indicate by N/A.

N/A

ATTACHMENT B: CONFIDENCE LIMITS EVALUATION

Stream

Select one location for Confidence Limits Evaluation (*describe location*):

1. Discharge for selected location:

Exceedence Probability		FIS:	Revised:
10%	(10-year)	___ cfs	___ cfs
2%	(50-year)	___ cfs	___ cfs
1%	(100-year)	___ cfs	___ cfs
0.2%	(500-year)	___ cfs	___ cfs

2. 1% Annual Chance (Base) Flood Confidence Intervals

90% Confidence Interval:	5% limit	___ cfs
	95% limit	___ cfs
50% Confidence Interval:	25% limit	___ cfs
	75% limit	___ cfs

3. If the discharge of the base flood in the FIS is beyond the 50% confidence interval but within the 90% confidence interval, does the base flood elevation change by 1.0 foot or more? ☐ Yes ☐ No

An example of confidence limits analysis can be found in Appendix 9 of Bulletin 17B.

4. **Confidence Limits Analysis Attached?** ☐ Yes ☐

N/A

ATTACHMENT C: REGIONAL REGRESSION EQUATIONS

1. Bibliographical Reference:

(Attach a copy of the page, table of contents, and pertinent pages including equations.)

2. Gaged or ungaged stream

3. Hydrologic region(s):
Attach backup map.

4. Provide parameters, values, and source of data used to define parameters.

		FIS:		Revised:	
5.	Urbanized conditions calculations	☐ Yes	☐ No	☐ Yes	☐ No
6.	Percent of watershed urbanization				
7.	Is the watershed controlled?	☐ Yes	☐ No	☐ Yes	☐ No
8.	Comparison with other analyses	☐ Yes	☐ No	☐ Yes	☐ No

If the answer to 5, 7, or 8 is Yes, explain methodology below. If data are not available, indicate with N/A.

Comments

9. **Attach computation and supporting maps, delineating the watershed boundary and drainage area divides.**

Computation and Supporting Maps provided? ☐ Yes ☐ No

N/A

ATTACHMENT D: PRECIPITATION/RUNOFF MODEL

		FIS:		Revised:	
1.	Method or model used:	SCS TR 20		SCS TR 20	
	Version:	PC (.2)		PC (.2)	
	Date:	09/83		09/83	
2.	Source of rainfall depth:	NOAA Atlas 2, Volume VIII		NOAA Atlas 2, Volume VIII	
3.	Source of rainfall distribution:	City of Phoenix		City of Phoenix	
4.	Rainfall duration:	24 hour		24 hour	
5.	Areal adjustment to precipitation (%):	1.0		1.0	
6.	Maximum overland flow length	N/A		N/A	
7.	Hydrograph development method:	SCS UH		SCS UH	
8.	Loss rate method:	SCS CN		SCS CN	
	Source of soils information:	SCS - detailed soils survey		SCS - detailed soils survey	
	Source of land use information:	City of Phoenix		City of Phoenix	
9.	Channel routing method:	Modified Att-kin		Modified Att-kin	
10.	Reservoir routing:	☒ Yes	☐ No	☒ Yes	☐ No
11.	Baseflow considerations: **If Yes, explain below how baseflow was determined:**	☐ Yes	☒ No	☐ Yes	☒ No
12.	Snowmelt considerations:	☐ Yes	☒ No	☐ Yes	☒ No
13.	Model calibration: **If Yes, explain below how calibration was performed**	☐ Yes	☒ No	☐ Yes	☒ No
14.	Future land use condition: **If Yes, explain why below**	☒ Yes	☐ No	☒ Yes	☐ No

Hydrology used the higher curve number of either full build out with an adjustment for on site retention or natural conditions.

15. **Attach precipitation/runoff model, hydrologic model schematic, curve number calculations, time of concentration calculations, and supporting maps, delineating the watershed boundary and drainage area divides.**

Information and Maps provided? ☒ Yes ☐ No

NOTE: FEMA policy is to base flooding on existing conditions.

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the 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, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: City of Phoenix, Arizona

Flooding Source: East Fork Cave Creek

Project Name/Identifier: Upper East Fork Cave Creek Channel, Greenway Parkway Channel

1. REACH TO BE REVISED

Describe the limits of the revision OR submit a copy of the FIRM with the revision area clearly highlighted.
Copy of FIRM(s) attached depicting area of the revision (highlighted, or circled)? ☒ Yes

Downstream Limit: 1000 feet east of 7th Street = approximately 200 ft west of 9th Street

Upstream Limit: Effective U/S limit = Detention Basin #3, revised U/S limit = Cave Creek Road

2. MODELS SUBMITTED

Requirements: for areas which have detailed flooding:
Full input and output listings along with files on diskette for each of the models listed below (items 1-4) and a summary of the source of input parameters used in the models must be provided. The summary must include a description of any changes made from model to model (e.g., Duplicate Effective model to Corrected Effective model). At a minimum, the Duplicate Effective (item 1) and the Revised or Post-Project Conditions (item 4) models must be submitted. See instructions for directions on when other models may be required.

for areas which do not have detailed flooding:
Only the 100-year (Base) flood profile is required. A hydraulic model is not required for areas which do not have detailed flooding; however, BFEs may not be added to the revised FIRM. If a hydraulic model is developed for the area, items 3 and 4 described below must be submitted.

If hydraulic models are not developed, hydraulic analyses (including all calculations) for existing or pre-project conditions and revised or post-project conditions must be submitted.

1. Duplicate Effective Model ☒ **Natural** **File Name** EFCC.DAT ☒ **Floodway** **File Name** EFCCFW.DAT
Copies of the hydraulic analysis used in the effective FIS, referred to as the effective models (10-, 50-, 100-, and 500-year multi-profile runs and the floodway run) must be obtained and then reproduced on the requester's equipment to produce the Duplicate Effective model. This is required to assure that the effective models input data has been transferred correctly to the requester's equipment and to assure that the revised data will be integrated into the effective data to provide a continuous FIS model upstream and downstream of the revised reach.

2. Corrected Effective Model ☐ **Natural** **File Name** N/A ☐ **Floodway** **File Name**
The Corrected Effective model is the model that corrects any errors that occur in the Duplicate Effective model, adds any additional cross sections to the Duplicate Effective model, or incorporates more detailed topographic information than that used in the currently effective model. The Correctly Effective model must not reflect any man-made physical changes since the date of the effective model. An error could be a technical error in the modeling procedures, or any construction in the floodplain that occurred prior to the date of the effective model but was not incorporated into the effective model.

3. Existing or Pre-Project Conditions Model ☐ **Natural** **File Name** N/A ☐ **Floodway** **File Name**
The Duplicate Effective model or Corrective Effective model is modified to produce the Existing or Pre-Project Conditions model to reflect any modifications that have occurred within the floodplain since the date of the Effective model but prior to the construction of the project for which the revision is being requested. If no modification has occurred since the date of the effective model, then this model would be identical to the Corrected Effective model or Duplicate Effective model.

4. Revised or Post-Project Conditions Model ☒ **Natural** **File Name** GWCLOMR.* (HEC-RAS)
☒ **Floodway** **File Name** GWCLOMR.* (HEC-RAS
The Existing or Pre-Project Conditions model (or Duplicate Effective model or Corrected Effective model, as appropriate) is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for the proposed project this model must reflect proposed conditions.

5. Other – Please attach a sheet describing all other models submitted along with the file names. ☐ **Natural** ☐ **Floodway**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

3. STARTING WATER-SURFACE ELEVATIONS

Explain how they were determined. Explanation Attached? ☒ Yes ☐ No

NOTE: If the effective study is an approximate study, the slope/area method is recommended.
For detailed analysis studies, using a known water-surface elevation is recommended.

4. RESULTS (from the model used to revise the 100-year water surface elevations)

If the results indicate any of the following, attach an explanation - to this form, or to the hydraulic model printout- as to the reasonableness of the situation.

☒ Supercritical depth ☒ Critical Depth ☒ Drawdowns ☐ Negative Floodway Surcharges

☐ Floodway Surcharges Greater Than Maximum Allowed by Community/State

☐ Water surface elevations higher than the end points of cross sections.

☐ Floodway discharge is different than the Natural 100-year (base) flood discharge.

☐ Project causes 100-year floodplain or floodway elevations to increase (state if increases are located off the requester's property)

Explanation attached with Form ☒ **Explanation provided on attached printout** ☐

If Hydraulic model used is HEC-2, has it been checked with FEMA'S CHECK-2 computer program? ☐ **Yes** ☐ **No**
(see instructions for information on how to obtain CHECK-2)

5. REVISED FIRM/FBFM AND FLOOD PROFILES

1. Profile Transition

a. 100-Year Water-Surface Elevations - indicate the difference in water surface elevations where the project 100-year elevations tie into the existing 100-year water surface elevations at each end of the project.

Downstream End 141+80 within 0 (feet) Upstream End N/A within ___ (feet)
Cross-Section # *Cross-Section #*

b. Floodway Elevations - indicate the difference in water surface elevations where the project floodway elevations tie into the existing floodway water surface elevations at each end of the project.

Downstream End 141+80 within 0.0 (feet) Upstream End N/A within ___ (feet)
Cross-Section # *Cross-Section #*

c. Floodway widths - indicate the difference in floodway widths where the project floodway widths tie into the existing floodway width at each end of the project.

Downstream End 141+80 within 0.0 (feet) Upstream End N/A within ___ (feet)
Cross-Section # *Cross-Section #*

2. Profile Checklist (check box if information has been provided on profile)

The following information (unless in parentheses) must be included at the same scale as the existing profiles for this project:

☒ Stream Name ☒ Community Name ☒ Corporate Limits labeled ☒ Study limits labeled

☒ Confluences labeled ☒ Channel Stationing ☒ Streambed profiled ☒ Cross Sections labeled

☒ Horizontal/Vertical Scales indicated ☒ 100-year elevs profiled*

☒ Road Crossings ☒ Labeled ☒ Low Chord Elevations ☒ Top of Road Elevations

*All recurrence intervals in the effective study must also be profiled.

Floodway Data Table

Attach a Floodway Data Table for each cross section listed in the published Floodway Data table in the FIS report.

Floodway Data Table Attached ☒ **Yes** ☐ **Not Required**

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE / COASTAL MAPPING**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the 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, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: City of Phoenix, Arizona

Flooding Source: East Fork Cave Creek

Project Name/Identifier: Upper East Fork Cave Creek Channel, Greenway Parkway Channel

This is a ☒ Manual ☐ Digital submission. *Digital map submissions may be used to update digital FIRMs (DFIRMs). For updating DFIRMs, these submissions must be coordinated with FEMA Headquarters as far in advance as possible .*

1. MAPPING CHANGES

1. A topographic workmap must be submitted showing the following information (check N/A when not applicable):

a. Revised approximate 100-year floodplain boundaries (Zone A)	☒ Yes	☐ No	☐ N/A
b. Revised detailed 100- and 500-year floodplain boundaries.	☒ Yes	☒ No	☐ N/A
c. Revised floodway boundaries	☒ Yes	☐ No	☐ N/A
d. Location and alignment of all cross sections with stationing control indicated.	☒ Yes	☐ No	☐ N/A
e. Stream alignments, road alignments and dam alignments.	☒ Yes	☐ No	☐ N/A
f. Current community boundaries.	☐ Yes	☒ No	☐ N/A
g. Effective 100- year floodplain and floodway boundaries from FIRM/FBFM reduced or enlarged to the scale of the topographic workmap	☐ Yes	☒ No	☐ N/A
h. Tie-ins between the effective and revised 100-, 500-year and floodway boundaries	☒ Yes	☐ No	☐ N/A
i. The requester's property boundaries and community easements	☐ Yes	☐ No	☒ N/A
j. The signed certification of a registered professional engineer	☒ Yes	☐ No	☐ N/A
k. Location and description of reference marks	☐ Yes	☒ No	☐ N/A
l. Vertical datum (example: NGVD, NAVD)	☐ Yes	☒ No	☐ N/A
m. Coastal zone designations tie into adjacent areas not being revised	☐ Yes	☐ No	☒ N/A
n. Location and alignment of all coastal transects used to revise the coastal analyze	☐ Yes	☐ No	☒ N/A
o. V-zone has been delineated to extend landward to the heel of the primary frontal dune	☐ Yes	☐ No	☒ N/A

If any items are marked No or N/A please attach an explanation.

2. What is the source and date of the updated topographic information (example: orthophoto maps, July 1985; filed survey, May 1979, beach profile, June 1987 etc.)? Upper EFCC ADMS (oct 87, ref 1) supplemented with field survey within vicinity of channel, 1998.

3. What is the scale and contour interval of the following workmaps?

Effective FIS	Scale 200	Contour Interval 2
Revision Request	Scale 200	Contour Interval 2

NOTE: Revised topographic information must be of equal or greater detail than effective.

4. Attach an annotated FIRM/FBFM at the scale of the effective FIRM/FBFM showing the revised 100- and 500-year floodplain and the floodway boundaries and how they tie into those shown on the effective FIRM/FBFM downstream and upstream of the revisions or adjacent to the area of revision for coastal studies. **FIRM/FBFM attached?** ☒ **Yes** ☐ **No**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

2. EARTH FILL PLACEMENT

1. The fill is: ☐ Existing ☐ Proposed

2. Has fill been/will be placed in the regulatory floodway? ☐ Yes ☒ No
If Yes, please attach completed Riverine Hydraulic Analysis Form (Form 4).

3. Has fill been/will be placed in floodway fringe (*area between the floodway and 100-year floodplain boundaries*)? ☐ Yes ☒ No

If Yes, then complete A, B, C, and D below.

a. Are fill slopes for granular materials steeper than one vertical on one-and-one-half horizontal? ☐ Yes ☐ No

If Yes, justify steeper slopes

b. Is adequate erosion protection provided for fill slopes exposed to moving flood waters? (*Slopes exposed to flows with velocities of up to 5 feet per second (fps) during the 100-year flood must, at a minimum, be protected by a cover of grass, vines, weeds, or similar vegetation; slopes exposed to flows with velocities greater than 5 fps during the 100-year flood must, at a minimum, be protected by stone or rock riprap.)*

☐ Yes ☐ No

If No, describe erosion protection provided

c. Has all fill placed in revised 100-year floodplain been compacted to 95 percent of the maximum density obtainable with the Standard Proctor Test Method or acceptable equivalent method? ☐ Yes ☐ No

d. Can structures conceivably be constructed on the fill at any time in the future? ☐ Yes ☐ No

If Yes, attach certification of fill compaction (Item 3c. above) by the community's NFIP permit official, a registered professional engineer, or an accredited soil engineer in accordance with Subparagraph 65.5(a)(6) of the NFIP regulations.

Fill certification attached ☐ **Yes** ☐ **No**

4. Has fill been/will be placed in a V zone? ☐ Yes ☐ No

If Yes, is the fill protected from erosion by a flood control structure such as a revetment or seawall?

☐ Yes ☐ No

If Yes, attach the Coastal Structures Form (Form 10).

N/A No FILL USED

FEDERAL EMERGENCY MANAGEMENT AGENCY **CHANNELIZATION**	O.M.B. Burden No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.75 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the 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, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Community Name: City of Phoenix, Arizona

Flooding Source: East Fork Cave Creek

Project Name/Identifier: Upper East Fork Cave Creek Channel, Greenway Parkway Channel

1. REACH TO BE REVISED

Describe the limits of the revision **OR** submit a copy of the FIRM with the revision area clearly highlighted.
Copy of FIRM(s) attached depicting area of the revision (highlighted, or circled)? ☒ Yes

Downstream Limit: 1000 feet east of 7th Street = 200 feet west of 9th street (Effective FIS Station 51+12 (P))

Upstream Limit: Effective U/S Limit = Detention Basin #3, revised U/S limit = Cave Creek Road

2. CHANNEL DESCRIPTION

Attach the following information about the channel (check box if information has been provided):

☒ Description of the inlet and outlet

☒ Description of the shape of the channel *(both cross sectional and planimetric configuration)* and its lining *(channel bottom and sides)*:

3. ACCESSORY STRUCTURES

The channelization includes:

- ☐ Levees *(Attach Levee/Floodwall System Analysis Form - Form 8)*
- ☐ Drop structures
- ☐ Superelevated sections
- ☒ Transitions in cross sectional geometry
- ☐ Debris basin/detention basin
- ☐ Energy dissipater
- ☐ Other (Describe):

4. DRAWING CHECKLIST

Attach the plans of the channelization certified by a registered professional engineer. The plan detail and information should include (check box if information has been provided):

☒ Channel alignment and locations of inlet, outlet, and accessory structures

☒ Channel lining

☒ Typical cross sections and profiles of channel banks and invert

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

5. HYDRAULIC CONSIDERATIONS

1. The channel was designed to carry See Table 4.1 of text (cfs) and/or the 100-year flood.

2. The design elevation in the channel based on:

   ☒ Subcritical flow

   ☐ Critical flow

   ☐ Supercritical flow

   ☐ Energy grade line

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

Inlet to channel?	☐ Yes
Outlet of channel?	☐ Yes
At Drop Structures?	☐ Yes
At Transitions?	☒ Yes
Other locations?	☐ Yes

Explanation Attached? ☒ **Yes** ☐ **No** ☐ **N/A**

6. SEDIMENT TRANSPORT CONSIDERATIONS

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the 100-year (base flood) water-surface elevations; and/or based on the stream geomorphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including sewer and deposition) to affect the base flood water-surface elevations, then provide the following information **(Check the box if provided):**

☐ Estimated sediment load

☐ Method used to estimate sediment transport

☐ Method used to estimate scour and/or deposition

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

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT**	O.M.B. Burden No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the 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, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Community Name: City of Phoenix, Arizona

Flooding Source: East Fork Cave Creek

Project Name/Identifier: Upper East Fork Cave Creek Channel, Greenway Parkway Channel

1. IDENTIFIER

1. Name of structure (roadway, railroad, etc.): 16th Street Box Culvert

2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier):

   Station 184+40.5 @ CL of 16th Street U/S STA 184+91, D/S STA 183+90

3. This revision reflects (check one of the following):

   ☒ 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

4. Hydraulic model used to analyze the structure *(e.g., HEC-2 with special bridge routine, WSPRO, HY8)*

   HEC-RAS

   If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structure(s). *(Attach justification)*

   Justification attached ☐ **Yes** ☐ **No** ☒ **N/A**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

2. DRAWING CHECKLIST

Attach plans of the structure(s) certified by a registered professional engineer. The plan detail and information should include the following (check the boxes if the information has been provided):

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

3. SEDIMENT TRANSPORT CONSIDERATIONS

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the 100-year (base flood) water-surface elevations; and/or based on the stream geomorphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including sewer and deposition) to affect the base flood elevations, then provide the following information **(Check the box if provided):**

- ☐ Estimated sediment load
- ☐ Method used to estimate sediment transport
- ☐ Method used to estimate scour and/or deposition
- ☐ Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT**	O.M.B. Burden No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the 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, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Community Name: City of Phoenix, Arizona

Flooding Source: East Fork Cave Creek

Project Name/Identifier: Upper East Fork Cave Creek Channel, Greenway Parkway Channel

1. IDENTIFIER

1. Name of structure (roadway, railroad, etc.): 20th Street Box Culvert

2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier):

   Station 214+35 @ CL of 20th Street U/S STA 214+62, D/S STA 213+92

3. This revision reflects (check one of the following):

   ☒ 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

4. Hydraulic model used to analyze the structure *(e.g., HEC-2 with special bridge routine, WSPRO, HY8)*

   HEC-RAS

   If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structure(s). *(Attach justification)*

   Justification attached ☐ **Yes** ☐ **No** ☒ **N/A**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

2. DRAWING CHECKLIST

Attach plans of the structure(s) certified by a registered professional engineer. The plan detail and information should include the following (check the boxes if the information has been provided):

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

3. SEDIMENT TRANSPORT CONSIDERATIONS

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the 100-year (base flood) water-surface elevations; and/or based on the stream geomorphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including sewer and deposition) to affect the base flood elevations, then provide the following information **(Check the box if provided):**

- ☐ Estimated sediment load
- ☐ Method used to estimate sediment transport
- ☐ Method used to estimate scour and/or deposition
- ☐ Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport

FEDERAL EMERGENCY MANAGEMENT AGENCY **LEVEE/FLOODWALL SYSTEM ANALYSES**	O.M.B. Burden No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.0 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the 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, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Community Name: City of Phoenix, Arizona

Flooding Source: East Fork Cave Creek

Project Name/Identifier: Upper East Fork Cave Creek Channel, Greenway Parkway Channel

1. REACH TO BE REVISED

Describe the limits of the revision **OR** submit a copy of the FIRM with the revision area clearly highlighted.
Copy of FIRM(s) attached depicting area of the revision (highlighted, or circled)? ☒ Yes

Downstream Limit: 1000 feet east of 7th Street = approximately 200 ft west of 9th Street

Upstream Limit: Effective U/S limi = Detention Basin #3, revised U/S limit = Cave Creek Road

2. LEVEE/FLOODWALL SYSTEM ELEMENTS

1. This Levee/Floodwall analysis is based on:

   ☐ upgrading of an existing levee/floodwall system
   ☒ a newly constructed levee/floodwall system
   ☐ reanalysis of an existing levee/floodwall system

2. Levee elements and locations are:

   ☐ earthen embankment, dike, berm, etc. — Station _____ to
   ☒ structural floodwall — Station 220+18 to 221+20
   ☐ other (describe): _____ — Station _____ to

3. Structural Type:

   ☐ monolithic cast-in place reinforced concrete
   ☒ reinforced concrete masonry block
   ☐ sheet piling
   ☐ other (describe):

4. Has this levee/floodwall system been certified by a Federal agency to provide protection against the 1% annual chance (100-year) flood event? ☐ Yes ☒ No

   If Yes, by which agency?

   If Yes, complete only the interior drainage section on pages 7 and 8 of this form and the operation and maintenance section of Revision Requestor and Community Official Form.

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

2. LEVEE/FLOODWALL SYSTEM ELEMENTS (Cont'd)

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

   a. Plan of the levee embankment and floodwall structures. Sheet Numbers Exhibit B

   b. A profile of the levee/floodwall system showing the 100-year water-surface (base flood) elevation, levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers Exhibit B

   c. A profile of the base flood elevation, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure device. Sheet Numbers Exhibit B

   d. A layout detail for the embankment protection measures. Sheet Numbers Exhibit B

   e. Location, layout, and size and shape of the levee embankment features, foundation treatment, floodwall structure, closure structures, and pump stations. Sheet Numbers Exhibit B

3. FREEBOARD

1. The minimum freeboard provided above the base flood elevation is:

   Riverine

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

   Coastal

   1.0 foot above the height of the one percent wave for the 100-year stillwater surge elevation or maximum wave runup (whichever is greater). ☐ Yes ☐ No

   2.0 feet above 100-year stillwater surge elevation ☐ Yes ☐ No

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Part 65.10(b)(1)(ii) of the National Flood Insurance Program regulations.

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

2. Is there an indication from historical records that ice-jamming can effect the base flood elevation? ☐ Yes ☒ No
   If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Tabulate the elevations at critical locations (tabulate values at each levee crest grade change, and where sediment may accumulate such as along bends in the channel.)

Station	Location	100-year Water Surface Elevation	Levee Crest	Freeboard (ft.)
	Upper end			
220+18		1412.3	1416.0	3.7
221+00		1412.3	1416.0	3.7
221+20		1412.3	1416.0	3.7
	Lower end			

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

4. SEDIMENT TRANSPORT CONSIDERATIONS

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the 100-year water-surface (base flood) elevations; and/or based on the stream geomorphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including sewer and deposition) to affect the base flood elevations, then provide the following information:

- ☐ Estimated sediment load N/A channel is protected.
- ☐ Method used to estimate sediment transport
- ☐ Method used to estimate scour and/or deposition
- ☐ Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport

5. CLOSURES

1. Openings through the levee system:

☒ exist ☐ do not exist

If openings exist, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device
220+51	Left (North)	circular pipe	1403.45	flapgate
220+57.25	Left(North)	circular pipe	1403.40	flapgate

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

Note:
Geotechnical and geologic data

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

6. EMBANKMENT PROTECTION

1. The maximum levee slope landside is: N/A
2. The maximum levee slope floodside is: N/A
3. The range of 100-year (base) riverine flood velocities along the levee? 3.63 ft/s (min.) to 17.63 ft/s (max.)
4. Embankment material is protected by (describe the kind): Gabion Baskets
5. Riprap Design Parameters: (Include references) ☐ Velocity ☐ Tractive stress

N/A

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)

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

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

See attachment

Note: Attach engineering analysis to support construction plans.

7. EMBANKMENT AND FOUNDATION STABILITY

1. 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 Ø = _____ degrees, c = _____ psf

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

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

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

3. 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: U.S. Army Corps of Engineers (USACE) EM-1110-2-1913 Table 6-1)

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

   If Yes, describe methodology used:

5. Was a seepage analysis for the foundation performed: ☐ Yes ☐ No

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

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

8. The duration of 100-year (base) flood hydrograph against the embankment is _____ Hours

Note: Attach engineering analysis to support construction plans.

N/A

8. FLOODWALL AND FOUNDATION STABILITY

1. Describe analysis submittal based on Code:

   ☐ UBC (1988) or ☒ Other (specify):

2. Stability analysis submitted provides for:

   ☒ Overturning ☒ Sliding; If not, explain:

3. Loading included in the analyses were:

   ☐ Lateral earth @ P_A = 35 psf; P_p = 400 psf

   ☐ Surcharge-Slope @ _____, ☐ surface _____ psf

   ☐ Wind @ P_w = 80 mph, exposure C psf

   ☐ Seepage (Uplift); N/A ☐ Earthquake @ P_{eq} = N/A %g

   ☐ 100-year significant wave height N/A ft.

   ☐ 100-year significant wave period N/A sec.

4. 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	6.72	4.51		
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5	4.81	3.38		
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)

5. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum	10222 psi	
Maximum allowable	24000 psi	

6. Foundation scour protection ☒ is, ☐ is not provided. Describe if provided:

   Gabion Baskets

Note: Attach engineering analysis to support construction plans.

9. SETTLEMENT

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

2. The computed range of settlement is N/A ft. to _____ ft.

3. Settlement of the levee crest is determined to be primarily from:

   ☐ Foundation consolidation
   ☐ Embankment compression
   ☐ Other (describe):

4. Differential settlement of floodwalls

   ☒ has ☐ has not been accommodated in the structural design and construction.

Note: Attach engineering analysis to support construction plans.

10. INTERIOR DRAINAGE

1. Specify size of each interior watershed

   Draining to pressure conduit: 0.4 acre

   Draining to ponding area:

2. Relationships Established

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

3. The river flow duration curve is enclosed ☐ Yes ☒ No

4. Specify the discharge capacity of the head pressure conduit: 3.9 cfs

5. 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, explain why not:

6. 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, explain why not: Interior drainage area is very small

7. The rate of seepage through the levee system for the 100-year (base) flood is N/A cfs

10. INTERIOR DRAINAGE (Cont'd)

8. The length of levee system used to drive this seepage rate in item 7: N/A ft.

9. Will a pumping plant(s) 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 operations be automatic? ☐ Yes ☐ No

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

(Reference: U.S. Army Corps of Engineers EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Note: 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.

11. OTHER DESIGN CRITERIA

1. 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

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

   N/A

3. 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

Note: Attach supporting documentation

12. OPERATIONAL PLAN AND CRITERIA

1. Are the planned/installed works in full compliance with NFIP regulations, Section 44 CFR Ch. 1 1.65.10

   ☒ Yes ☐ No

2. Does the operation plan incorporate all the provisions for closure devices as required in Section 65.10(c)(1), of the NFIP regulations?

   ☒ Yes ☐ No

3. Does the operation plan incorporate all the provisions for interior drainage as required in Section 65.10(c)(2), of the NFIP regulations?

   ☒ Yes ☐ No

If the answer is No to any of the above, please explain below.

4.0 HYDROLOGY

4.1 Methodology

As described in Section 1, the hydrology was originally developed and approved by FEMA as part of the Upper EFCC ADMS (reference 1). The previously approved hydrology forms the basis for the revised discharges except that it has been updated for current existing conditions and to include the improvements listed in Section 1.3. Changes in subarea boundaries were made where necessary based on more detailed field investigations made during project investigation.

The rainfall runoff relationship for the study area was modeled using the U.S. Soil Conservation Service TR-20 Computer program. The development of the TR-20 model is described in detail in the Upper EFCC ADMS. Parameters used in preparing the TR-20 model for this report are identical to those used in preparing the Area Drainage Master Study, and may be summarized as follows:

1. Rainfall Depth for a 100-year, 24-hour storm of 4.04 inches was used to be consistent with the previous studies, LOMRs, and City of Phoenix criteria.
2. 24-hour rainfall distribution was based on the City of Phoenix S-curve.
3. Curve numbers were developed based on a weighted average of computed soil and development types in each drainage subarea at build-out.
4. Time of concentration for overland flow was estimated using the Upland method. A minimum time of concentration of 10 minutes was used.
5. Time of concentration for flow in gutters was estimated using figures contained in the *City of Phoenix Storm Drain Design Manual.*

The only exception to the above is that the SCS curve numbers for new residential development since 1993 have been adjusted for the ADMS modeling. The reasoning for this adjustment follows: the updated ADMS (reference 3 and 4) hydrology modeled each sub-basin as ultimate, full build out or natural condition of the sub-area, whichever produced a higher curve number. The duplicate effective hydrology used a curve number of 77 for all improved commercial or industrial areas, to account for on-site detention. Curve numbers for residential areas were not adjusted to account for on-site detention in the duplicate effective

hydrology. Thus, this submittal has adjusted curve numbers to account for on-site detention for residential development since 1993.

Curve numbers for sub-basins, below the regional retention basins, were adjusted to account for the local 100-year, 2-hour on-site detention requirement.

4.2 Parameter Estimation

The drainage subareas used in the analysis are shown on Exhibit A. The input parameters of area, curve number, and time of concentration for each subarea are provided in Appendix D, along with the routing parameters X and M.

The TR-20 input file as approved by FEMA (reference 3 and 4), is included on diskette. The updated hydrologic analysis TR-20 input and output listings for the 10, 50, and 100-year storms is provided in Appendix D.

The design 100- year discharge values from the TR-20 model used for the new hydraulic analysis are provided in Table 4.1 below.

TABLE 4.1

Summary of Discharges

Location	100-year 24-Hour Discharge	Drainage Area Square Mile
HEC-2 MODEL		
7th Street to 9th Street	6970	13.70
9th Street to 12th Street	6120	10.56
12th Street to 14th Street	5920	10.25
14th Street to 16th Street	5860	10.18
16th Street to 18th Street	5130	9.68
Just Upstream of 18th Street	5100	9.66
Just Upstream of 18th Street to 20th Street	4320	7.53
20th Street to 22nd Street	3790	4.99
22nd Street to C.C. Road	2000	3.49
STORMPLUS:		
18TH Street:		
GW Channel to 20th Street	315	N/A
20th Street:		
GW Channel to Bell Road	200	N/A
Bell Road to Basin #3	515	N/A

East of 7th Street the runoff is redirected through stormdrains to a man made channel from the historic flood path. Therefore the FIS discharges do not

correspond to the revised discharges and are not listed for comparison.

4.3 Problems Encountered During the Study

There were no unique problems encountered during this study. However, the new hydrologic analysis is provided to account for the hydrologic effects of the physical changes to the watershed resulting from implementation of the drainage master plan. Specifically, the detention basins, channels, and storm-drain pipes as described in Section 1.3.

4.4 Summary of Results

The following is a detailed example of how the TR-20 results were used and reported in Table 4.1 for this project. It is also intended to help the reader/reviewer understand how the flowrates were used in the hydraulic modeling of this study reach. Three pieces of this TDN are needed to follow this example:

1. Table 4.1,
2. Exhibit A for future conditions,
3. TR-20 output in Appendix D2.

Please note: for hydraulic modeling purposes, each reach (7th Street to 9th Street) uses the downstream concentration point for the flowrate within that reach. Thus, at 7th Street the flow reported in Table 4.1 is 6970 cfs. From inspection of Exhibit A, the reader should see that sub basins 113 and 120 are added at 7th Street. From Appendix D2, page 39 of 63 (page 45 of TR-20 output), the 5th line from the bottom is the concentration point reporting 6966.26 cfs. (Note: total combined drainage area is 13.70 sm). Since the stormdrain laterals enter the channel on the downstream side of the roadway alignment, the next upstream concentration point is the upstream side of 9th Street where sub-basins 112 and 121 are added. The concentration point is the 11th line from the bottom of page 39 of 63 (Appendix D2). TR-20 reports the 100-year flow as 6119.18 cfs. This value is reported in Table 4.1 as 6120 cfs and has a corresponding drainage area of 10.56 sm. The above should be sufficient documentation as to how TR-20 results are used and applied in hydraulic modeling.

5.0 HYDRAULICS

5.1 General

Improvements to the floodplain include channels, pipes, and detention basins, specifically as described previously in Section 1.0. The U.S. Army Corps of Engineers HEC-RAS version 2.2 Water Surface Profile computer program was used for the water surface profile analysis for channels. The Los Angeles County Flood Control District F0515P computer program as enhanced by CivilSoft and renamed Storm Plus was used for hydraulic grade line calculations for pipes. The water surface elevation and outlet discharge from the detention basins are computed as part of the revised hydrologic analysis.

The area modeled by HEC-RAS is shown on Exhibits B & C. The cross-section stationing corresponds to the construction stationing shown on the channel plans.

5.2 Work Study Map

5.2.1 Existing Models

The original HEC-2 model developed by Burgess & Niple (B&N) is used from the confluence with Cave Creek Wash to Central Avenue, except that the model was modified by Clouse Engineering, Inc. to reflect the changes in grading associated with Moonlight Cove II. The B&N model was extended from Central Avenue to 1,000 feet east of 7th Street by NBS/Lowry as part of the LOMR request for the channel improvements in that reach. This defines the location of the starting point for this study, which is at the bottom of the concrete transition structure at Station 142+25.

The distance above the confluence of Cave Creek Wash at Station 142+25 is 2.210 miles, thus this cross section corresponds to the regulatory FEMA cross section P. The model documented in this report reflects the construction plans shown on Exhibit B.

5.3 Modeling Considerations

5.3.1 Downstream Conditions

The model starting conditions are taken from the effective HEC-2 run for the Upper East Fork of Cave Creek Wash (see LOMR dated October 1, 1992 in Appendix A2). This location is approximately 1,000 feet upstream of 7th Street. The starting WSEL is taken from the previous LOMR (reference 2 and 4 also, Appendix B) tributary backwater analysis at Greenway Parkway Station 141+80 = LOMR HEC-2 Station 51+12 (effective FEMA section P). The effective floodway water surface is the same as the effective floodplain which is 1376.86 feet, for a 100-year discharge of 8,100 cfs.

5.3.2 Floodplain Analysis

A new floodplain is developed east of 7th Street as part of this submittal. The floodplain east of 7th Street is contained in the channel. Since the entire flow is contained within the channel right-of-way, there is no need to develop a floodway condition.

5.3.3 Results

The HEC-RAS output listings are contained in Appendix E for the 100-year water surface profile (floodplain) and the floodplain encroachment limit runs. The computed water surface profile is shown on Figure 7.1, located in Section 7. Cross section designations in the output listing correspond to the channel stationing on the plans which correspond to roadway stationing. Refer to Table 7.2 for a listing of HEC-RAS cross section stationing, proposed FEMA cross section identifiers and rivermile stationing. The new 100-year floodplain and boundaries are shown on Exhibit C. The 100-year profile ties into the existing downstream "A" Zone, thus multiple storm events were not analyzed.

5.4 Hydraulic Grade Line Analysis

The effective FIRM shows the floodplain extending from 12th Street and Aire Libre Avenue northeasterly to Cave Creek Road and John Cabot Road. With the improvements reported in this submittal the flow is diverted from Cave Creek Road

and John Cabot Road. Detention Basin 3 collects the runoff in the Upper East Fork Cave Creek Channel and significantly attenuates peak discharge. Detention Basin 3 discharges into a stormdrain system flowing south in 20th Street to Bell Road. The storm drain flow is split at Bell Road. A portion is diverted west along Bell Road to 18th Street and down 18th Street to the Greenway Parkway Channel. The remainder of the flow continues south in 20th Street to the Greenway Parkway Channel. Because the flow conveyed in the stormdrain system is the flow which makes up the effective FIS, hydraulic calculations are included to substantiate the elimination of the Zone A designation and to show that the flow can be conveyed and discharged into the Greenway Parkway Channel.

5.5 Hydraulic Jumps

When flow transitions from a steep slope to a mild slope or when certain obstructions are met in the passage of a supercritical flow, a hydraulic jump occurs. Four hydraulic jumps exist for the proposed channel: the first one occurs between Station 141+80 and Station 142+25; the second occurs between Station 153+00 and Station 154+30; the third occurs between Station 184+91 and Station 186+00; the fourth occurs between Station 233+51.6 and Station 234+49.3.

The first jump is classified as a weak jump with Froude number between 1.7 and 2.5, and the rest of them are classified as undular jumps with Froude numbers between 1 and 1.7 (reference 7). The first hydraulic jump forms because the channel bottom slopes change significantly from Station 147+00 to Station 141+80. The flow first changes from subcritical flow at Station 147+00 to supercritical flow at Station 142+25 through critical flow at Station 143+40. Then it comes back to subcritical flow through the jump. The flow depth increases from 2.92 ft at Station 142+25 to 8.16 ft at Station 141+80. The maximum water surface elevations difference is 3.89 ft, and flow is contained within the channel banks.

The second hydraulic jump forms because the channel bottom width increases from approximately 110 ft to more than 220 ft. Before the jump the flow first changes from subcritical flow to supercritical flow due to the bottom drop, and then converts back to subcritical flow through the jump. The flow depth increases from 4.45 ft at Station 154+30 to 7.02 ft at Station 153+00. The maximum water surface elevations

difference is 2.45 ft, and the flow is contained within the channel banks.

The third hydraulic jump occurs between Station 184+91 and Station 186+00. The jump is caused by the box culvert at 16th Street. The maximum water surface elevations difference is 5.21 ft.

The fourth hydraulic jump forms because the channel width increases from approximately 34 ft to 38 ft. The flow depth increases from 4.30 ft at Station 234+49.3 to 6.46 ft at Station 233+51.6. The maximum water surface elevations difference is 1.71 ft, and the flow is contained within the channel banks.

These hydraulic jumps are verified hydraulically by momentum equation in Appendix E.

5.6 Flow Regimes

Per FEMA 37 (reference 8) requirements, this channel is analyzed using the subcritical routine of HEC-RAS. The portions of the channel that flow within the supercritical regime are reported to be flowing at critical depth by HEC-RAS. As flow transitions from subcritical to near critical or critical depth and then back to subcritical, the hydraulic gradeline (HGL) appears as a drawdown.

To satisfy FEMA 37 criteria, the 100-year profile (figure 7.1) was adjusted to eliminate the drawdown areas shown below.

Downstream		100-year HGL	Approximate distance HGL is projected horizontally upstream
Station	Cross Section ID		
153+00	F	1382.13	190
184+91	Y	1401.04	290
193+11.9	AD	1404.60	530
198+43.3	AF	1404.68	220
204+60	Near AG	1408.79	850
214+62	AL	1412.69	1450
231+54	AV	1414.69	570

5.7 Storm Drain Analysis

5.7.1 Storm CAD Model

The storm drain system was originally analyzed by using Storm Plus model. The total designed flow was 515 cfs, the split flow to 18th Street was 315 cfs, and the remaining flow along 20th Street was 200 cfs.

A new Storm CAD model was developed for this study. The 18th and 20th Street storm drains were input based on the storm drain construction plans and analyzed for the 100 year peak discharge only. The storm drain was sized to convey the Detention Basin 3 outlet discharge to the Greenway Parkway Channel. The design discharge for the hydraulic grade line analysis is from the hydrologic analysis discussed in Section 4.2.

5.7.2 Downstream Conditions

The starting hydraulic grade line elevation for the storm drain analysis is taken as the 100 year water surface elevation from the HEC-RAS run for the Greenway Parkway Channel. The 100-year peak discharge was used for the starting hydraulic grade line elevation regardless of hydrograph timing.

5.7.3 Results

The Storm Plus model was developed by others for the City of Phoenix (reference 6). The Storm Plus input and output listings are contained in Appendix E for the 100-year peak discharges. The Detention basin discharge is conveyed to the Greenway Parkway Channel within the storm drain system.

The new Storm CAD model results show that 322.5 cfs is flowing to 18th Street and 192.5 cfs flows to 20th Street, which are close to the results of the Storm Plus model. The hydraulic grade line at Detention Basin #3 is 1417.0 ft which is below the designed water surface elevation of Detention Basin #3. The modeling results are included in Appendix E, and the electronic Storm CAD files are included in the floppy disk pocket.

5.8 Results of Hydraulic Analysis

The revised floodplain delineation resulting from the discharges generated in the new hydrologic analysis and from the new hydraulic analysis are shown on Exhibit D.

The entire 100-year floodplain and floodway is contained within the Greenway Parkway Channel right-of-way. Thus, Wood, Patel and Associates, Inc., recommends that the entire channel (bank to bank) be designated as a floodway. The duplicate effective HEC-2 model is included on diskette. The new HEC-RAS model for existing condition is included in Appendix E and on diskette.

6.0 EROSION AND SEDIMENT TRANSPORT

6.1 General

Sediment transport analysis examines the potential for sediment deposition impacts to the design water surface profile and potential undercutting of the natural bank or bank-lining by scour processes. In order to estimate the long-term aggradation/degradation trend of the channel, the potential of watershed sediment load into the subject channel should be evaluated first. The main source of sediment yield is soil erosion from natural and disturbed lands of the watershed. The factors affecting the amount and rate of sediment yield to the channel are soil types, land uses, vegetation, land slopes, climatic conditions, and man's activities. The contributing area to the Greenway Parkway Channel is an urbanized watershed. The majority of the watershed is urbanized and primarily zoned residential and commercial. Several detention basins have been built to intercept peak flows before they reach the channel through a storm drain pipe system. Flows contribute directly to the upstream end of the channel via roadway sheet flow and 2-72-inch storm drains. Therefore, sediment yield from the watershed to the channel is negligible.

6.2 Bank Protection Stability Analysis

The hydraulics of the channel were modeled with the Army Corps of Engineers HEC-RAS Hydraulic Modeling Software. The profile summary tables and the graphical profiles and cross sections for the 100-year flow are shown in Appendix E. Most of the channel banks will be protected using 3' x 3' gabion baskets. Using the method provided by MacCaferri Gabions, Inc., the bank protection stability analysis results show that the shear stresses are within acceptable ranges for gabion structures with D_{50} of 6-inch rocks. An exception to this statement is the reach between Station 156+00 to Station 157+50. The gabion baskets within this reach will be grouted to satisfy the stability requirements. See Appendix E for detailed calculations.

6.3 Scour Analysis

The design of an erosion resistant bank protection system must consider the potential for scour of the channel bed, if the bed is to be left as natural earth. Failure to do so could lead to the toe of the bank protection material being undercut by scour processes that will be induced by flowing water. Should this situation occur, the bank lining material may collapse into the scour hole, thus exposing the bank to erosive velocities an possible lateral movement. In order to prevent the channel from scouring, the entire channel is lined and protected either by gabion baskets or reinforced concrete. The two box culverts and culvert transition areas will also be fully lined using concrete. Therefore, no detailed scour analysis is necessary.

7.0 DRAFT FIS REPORT DATA

7.1 Summary of Discharges

Table 7.1 provides a summary of discharges in FEMA format for the study area.

TABLE 7.1
Summary of Discharges

Flooding Source and Locations	Drainage Area (sq. mi)	Peak Discharge (cfs)			
		10-year	50-year	100-year	500-year
East Fork Cave Creek (Greenway Parkway Channel)					
Above 7th Street -2-	13.7	-1-	-1-	8100	N/A
Below 9th Street	13.4	-1-	-1-	6970	N/A
Above 9th Street	10.6	-1-	-1-	6120	N/A
Above 12th Street	10.3	-1-	-1-	5920	N/A
Above 14th Street	10.2	-1-	-1-	5860	N/A
Below 18th Street	9.7	-1-	-1-	5130	N/A
Above 18th Street	9.7	-1-	-1-	5100	N/A
Below 20th Street	7.5	-1-	-1-	4320	N/A
Above 20th Street	5.0	-1-	-1-	3790	N/A
Below Cave Creek Road	3.5	-1-	-1-	2000	N/A

Notes: -1- Not Reported
-2- 100-year discharge is duplicate effective discharge

7.2 Floodway Data

Table 7.2 provides a summary of floodway data results in FEMA format for this study area. Please note, the floodplain is contained within the man made channel right-of way, thus a method 4 analysis with zero foot rise was used.

TABLE 7.2
Floodway Data in FEMA Format for Greenway Parkway Channel, 9th Street to Cave Creek Road

TABLE 7.2
Floodway Data in FEMA Format for Greenway Parkway Channel, 9th Street to Cave Creek Road

FLOODING SOURCE				FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
	Cross Section ID			Width	Section Area	Mean Velocity	Regulatory	Without	With	Increase
Reach	Sta, in feet (1)	Sta, in miles (2)	FEMA ID	(ft)	(sq. ft.)	(fps)		Floodway	Floodway	(ft)
9th St to Cave C	14180 (3)	2.202	P	221.31	1287.18	6.29	1376.86	1376.86	1376.86	0
9th St to Cave C	14225	2.210	A	200.72	1060.34	6.57	1376.86	1376.86	1376.86	0
9th St to Cave C	14340	2.232	B	181.57	642.67	10.92	1379.28	1379.28	1379.28	0
9th St to Cave C	14700	2.300	C	244.78	1666.8	4.18	1381.71	1381.71	1381.71	0
9th St to Cave C	14900	2.338	D	248.5	1561.76	3.92	1381.89	1381.89	1381.89	0
9th St to Cave C	15061	2.368	E	246.65	1685.84	3.63	1382.04	1382.04	1382.04	0
9th St to Cave C	15300	2.414	F	218.21	1294.53	4.73	1382.13	1382.13	1382.13	0
9th St to Cave C	15430	2.438	G	125.49	545.87	12.81	1381.07	1381.07	1381.07	0
9th St to Cave C	15475	2.447	H	103.62	516.67	13.95	1382.1	1382.1	1382.1	0
9th St to Cave C	15670	2.484	I	117.87	697.39	10.33	1384	1384	1384	0
9th St to Cave C	15700	2.489	J	66.93	424.27	15.15	1384.26	1384.26	1384.26	0
9th St to Cave C	15800	2.508	K	47.06	379.14	16.7	1386.42	1386.42	1386.42	0
9th St to Cave C	15900	2.527	L	47.07	377.58	16.74	1387.29	1387.29	1387.29	0
9th St to Cave C	16100	2.565	M	52.18	444.21	14.46	1389.41	1389.41	1389.41	0
9th St to Cave C	16400	2.622	N	47.03	399.65	15.66	1390.03	1390.03	1390.03	0
9th St to Cave C	16600	2.660	O	47.05	388.77	16	1390.67	1390.67	1390.67	0
9th St to Cave C	16900	2.717	P	46.98	387.68	15.92	1391.89	1391.89	1391.89	0
9th St to Cave C	17000	2.736	Q	46.96	385.23	16.01	1392.26	1392.26	1392.26	0
9th St to Cave C	17200	2.773	R	46.95	378.33	16.27	1392.99	1392.99	1392.99	0
9th St to Cave C	17400	2.811	S	47	425.59	14.43	1394.61	1394.61	1394.61	0
9th St to Cave C	17900	2.906	T	47.01	440.63	13.92	1396.23	1396.23	1396.23	0
9th St to Cave C	18200	2.963	U	47.03	470.19	13.08	1397.33	1397.33	1397.33	0
9th St to Cave C	18300	2.982	V	58.94	647.98	9.5	1398.83	1398.83	1398.83	0
9th St to Cave C	18379	2.997	W	76.07	902.42	5.94	1399.8	1399.8	1399.8	0
9th St to Cave C	18390	2.999	X	64.08	608.54	8.44	1399.41	1399.41	1399.41	0
9th St to Cave C	18440.5	3.008	Culvert							
9th St to Cave C	18491	3.018	Y	74.07	762.73	7.14	1401.04	1401.04	1401.04	0
9th St to Cave C	18600	3.039	Z	48.86	429.06	12.85	1399.94	1399.94	1399.94	0
9th St to Cave C	18700	3.058	AA	40.82	329	17.43	1400.12	1400.12	1400.12	0
9th St to Cave C	18880	3.092	AB	47.7	411.16	14.19	1402.37	1402.37	1402.37	0

TABLE 7.2
Floodway Data in FEMA Format for Greenway Parkway Channel, 9th Street to Cave Creek Road

9th St to Cave C	18925	3.100	AC	50.61	435.12	13.42	1402.82	1402.82	1402.82	0
9th St to Cave C	19311.9	3.173	AD	55.62	562	10.23	1404.6	1404.6	1404.6	0
9th St to Cave C	19360	3.183	AE	40.98	368.33	15.81	1403.17	1403.17	1403.17	0
9th St to Cave C	19843.3	3.274	AF	40.04	356.66	16.18	1404.68	1404.68	1404.68	0
9th St to Cave C	20360	3.372	AG	39.93	318.46	17.6	1405.72	1405.72	1405.72	0
9th St to Cave C	20860	3.467	AH	40.03	376.8	13	1408.68	1408.68	1408.68	0
9th St to Cave C	21300	3.550	AI	35.94	300.76	15.11	1408.46	1408.46	1408.46	0
9th St to Cave C	21380	3.565	AJ	78.57	898.74	4.52	1412.01	1412.01	1412.01	0
9th St to Cave C	21392	3.567	AK	53.07	539.46	7.04	1411.69	1411.69	1411.69	0
9th St to Cave C	21435	3.576	Culvert							
9th St to Cave C	21462	3.581	AL	67.05	626.39	6.63	1412.69	1412.69	1412.69	0
9th St to Cave C	21550	3.597	AM	49.68	436.26	9.7	1412.18	1412.18	1412.18	0
9th St to Cave C	21650	3.616	AN	49.43	412.16	10.08	1412.14	1412.14	1412.14	0
9th St to Cave C	21850	3.654	AO	49.01	401.26	10.35	1412.19	1412.19	1412.19	0
9th St to Cave C	21900	3.664	AP	49.02	399.22	10.41	1412.2	1412.2	1412.2	0
9th St to Cave C	22200	3.720	AQ	48.68	414.55	10.37	1412.4	1412.4	1412.4	0
9th St to Cave C	22300	3.739	AR	51.07	405.31	10.81	1412.38	1412.38	1412.38	0
9th St to Cave C	22400	3.758	AS	45.04	348.82	11.71	1412.2	1412.2	1412.2	0
9th St to Cave C	22900	3.853	AT	44.97	291.36	13.81	1412.17	1412.17	1412.17	0
9th St to Cave C	23000	3.872	AU	55.36	327.97	6.87	1414.68	1414.68	1414.68	0
9th St to Cave C	23154	3.901	AV	45.1	306.23	7.19	1414.69	1414.69	1414.69	0
9th St to Cave C	23254	3.920	AW	38.05	233.54	9.55	1414.32	1414.32	1414.32	0
9th St to Cave C	23840	4.031	AX	37.93	170.38	12.76	1415.32	1415.32	1415.32	0
9th St to Cave C	23887	4.040	AY	45.03	272.09	8.04	1417.02	1417.02	1417.02	0
9th St to Cave C	24022	4.065	AZ	44.96	240.7	8.92	1416.94	1416.94	1416.94	0

Notes: * Denotes HEC-RAS Interpolated Cross Section
1) Stationing in feet, based on Greenway Parkway Stationing
2) Stationing in miles above confluence with Cave Creek Wash. Greenway Parkway Channel follow: a new alignment, thus section stationing does not correspond to duplicate effective model
3) Station 141+80 is approximately RM 2.202 (FEMA Section P, STA 51+12) of previous study.

7.3 Annotated Flood Insurance Rate Map

The 100-year surface water runoff from the study watershed will be contained within the proposed Greenway Parkway Channel Improvements as documented within this report. Exhibit D contains the revisions to the effective FIRM Panel 04013C 1220 G, dated September 30, 1995. Refer to Exhibit C for the proposed Floodway Work Map.

7.4 Flood Profiles

Figure 7.1 contains the proposed Greenway Parkway Channel Flood profile for the 100-year storm.

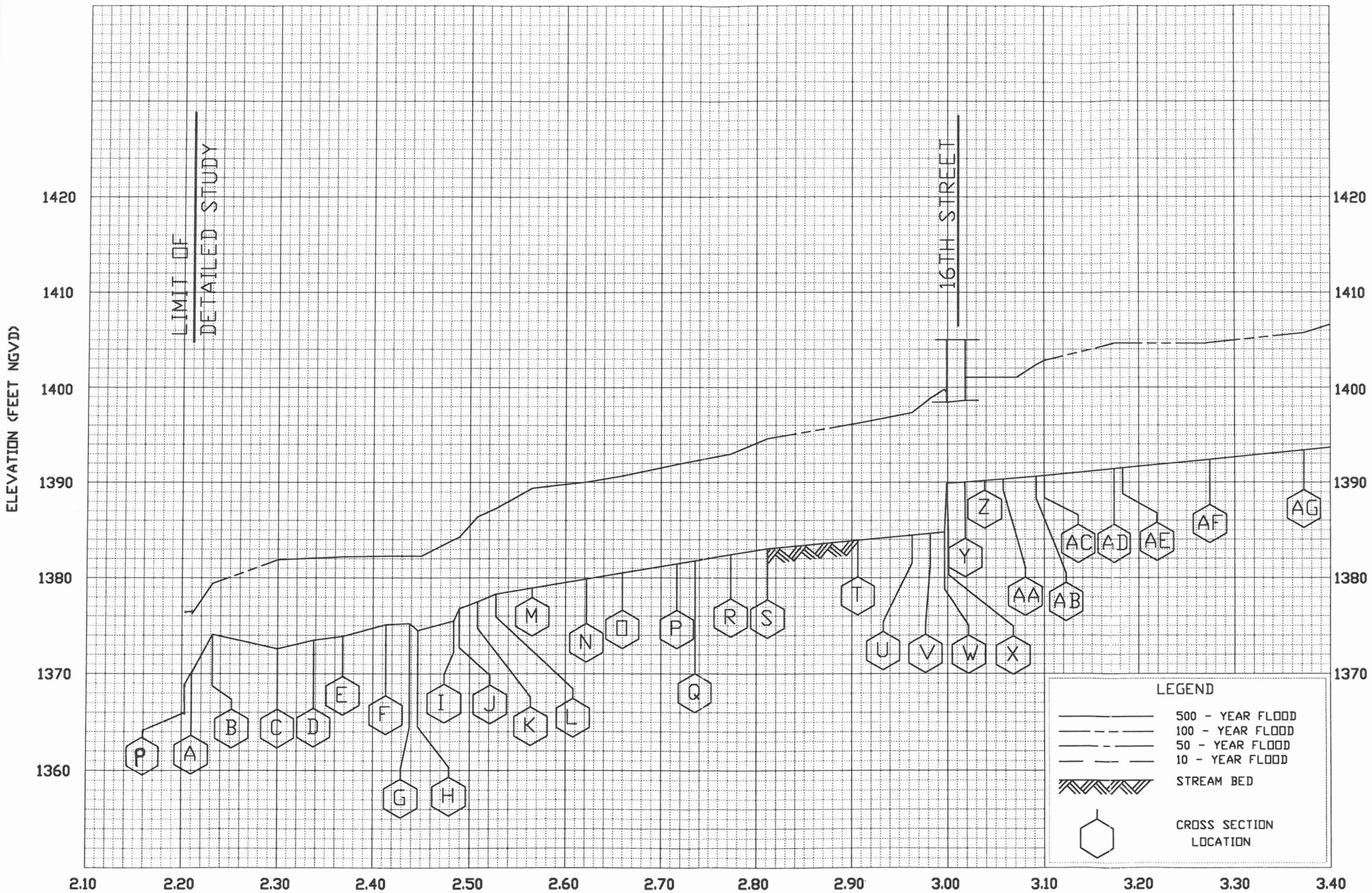


FIGURE 7.1

FLOOD PROFILES

EAST FORK CAVE CREEK
GREENWAY PARKWAY CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

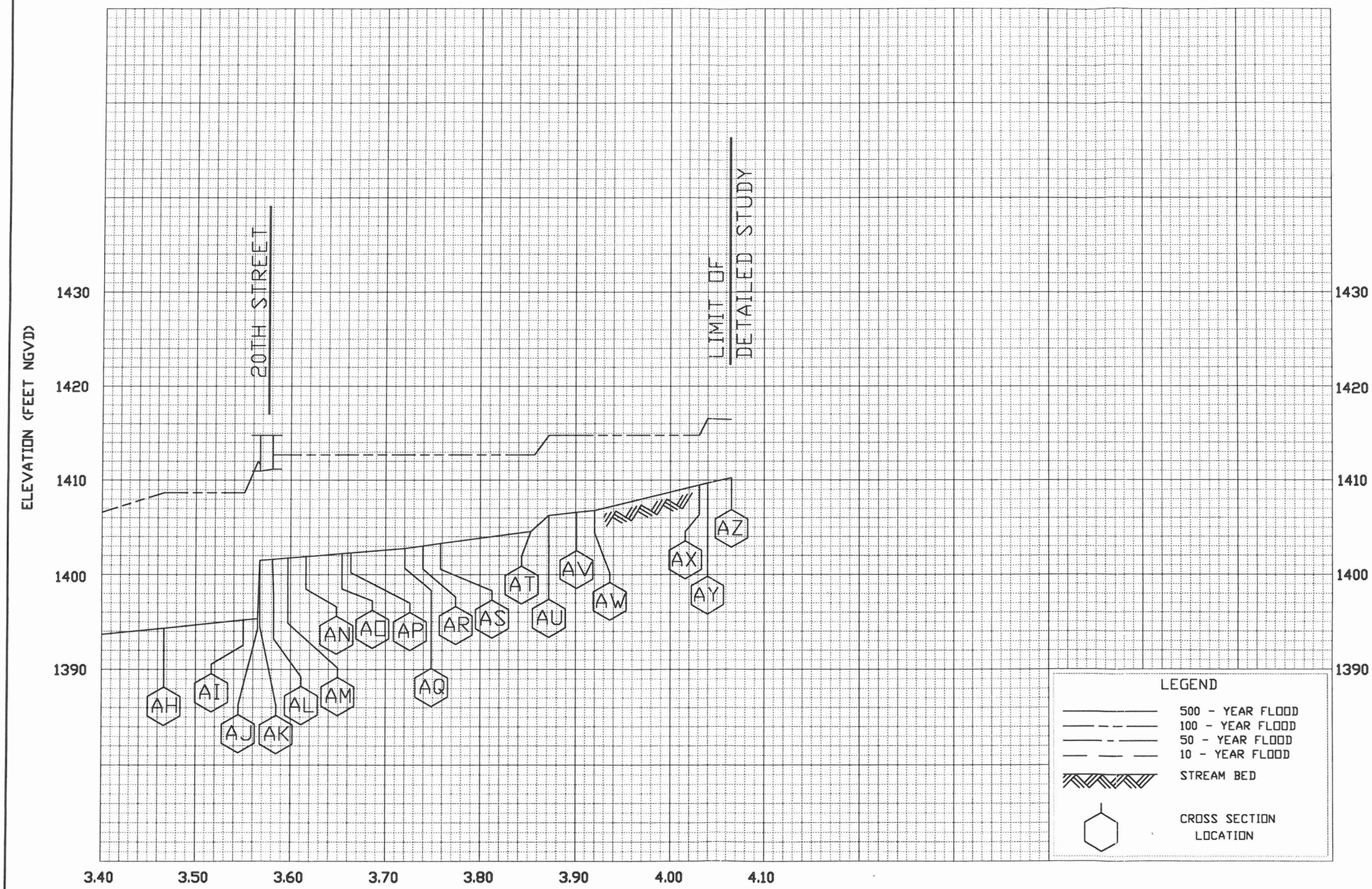


FIGURE 7.1

FLOOD PROFILES

EAST FORK CAVE CREEK
GREENWAY PARKWAY CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY
MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

8.0 SUMMARY

As described earlier, this CLOMR is based on the fact that the contributing watershed physical conditions have changed. The annotated FIRM panel shows the flood hazard areas Wood, Patel and Associates, Inc. is recommending be revised to reflect the changed physical conditions. The key elements of this revision are Grovers Park (Detention Basin 3) acting as a detention basin for the East Fork of Cave Creek Channel. The peak flow released from the surge basin is conveyed through the 18th/20th Street stormdrain system to the Greenway Parkway Channel.

As a result of the hydrologic analysis, it has been determined that 2000 cfs is concentrated near the intersection of Greenway Parkway Channel and Cave Creek Road. A portion of inflow is conveyed below surface by two (2) 72-inch incoming storm drains at the upstream limit of this study. Therefore, the remainder sheet flow entering the channel is estimated to be 1400 cfs. Please note that the sheet flow condition has not changed since the previous regulatory FIRMs were prepared. In other words, that condition existed prior to the channelization of Greenway Parkway Channel and therefore is conssitent with the regulatory FIRMs. Initial estimates by Wood, Patel and Associates Inc., show that this area is a very shallow sheet flow area. A flood hazard designation of Zone X may be appropriate for this area.

Appendix A
References

Appendix A1	**Data Collection Summary**
Appendix A2	**List of References**

Appendix A1

Data Collection Summary

The following is a list of data collected for this study area:

- Electronic copies of the Upper East Fork Cave Creek Area Drainage Master Study TR-20 input files, electronic copies of HEC-2 input files.

- A 24" x 36" copy of the Upper East Fork Cave Creek ADMS Drainage Area Map.

- FEMA FIRM panel 04013C 1220G, dated September 30, 1995.

- A 24" x 36" copy of the construction plans for the Detention Basin #3, by NBS/ Lowery Engineers & Planners, March 1992, included in Exhibit E.

- FEMA acceptance response to Letter of Map Revision for *Upper East Fork Cave Creek Area Drainage Master Study*, dated June 1, 1988. The letter is enclosed in Appendix B.

- FEMA acceptance response to Conditional Letter of Map Revision for *Upper East Fork Cave Creek Drainage Channel, Union Hills Drive to Beardsley Road*, dated April 29, 1992. The letter is enclosed in Appendix B.

- FEMA acceptance response to Letter of Map Revision for *Upper East Fork Cave Creek Channel, Central Avenue to 7th Street*, dated October 1, 1992. The letter is enclosed in Appendix B.

- FEMA acceptance response to Letter of Map Revision for *Coral Mannor Units I and II*, dated May 19, 1992. The letter is enclosed in Appendix B.

Appendix A2

List of References

LIST OF REFERENCES

1) Flood Control District of Maricopa County, *Upper East Fork Cave Creek Area Drainage Master Study*, October 1987.

2) Flood Control District of Maricopa County, *Cave Creek Floodplain Delineation - Cave Buttes Dam to the Arizona Canal Diversion Channel*, January 1990.

3) NBS / Lowery, *Upper East Fork Cave Creek Drainage Channel, Union Hills Drive to Beardsley Road, FEMA CLOMR Submittal,* March 1992.

4) NBS / Lowery, *Upper East Fork Cave Creek Channel, Central Avenue to 7th Street, FEMA LOMR Submittal*, July 1992.

5) City of Phoenix, *Storm Drain Design Manuel, Subdivision Drainage Design*, July 1988.

6) City of Phoenix, Storm Plus Hydraulic Grade Line Calculations, NBS / Lowery Engineers and Planners, February, 1993.

7) Chow, Ven Te, Ph.D., *Open Channel Hydraulics*, McGraw Hill, 1959.

8) Federal Emergency Management Agency, *Guidelines and Specifications for Study Contractors, FEMA 37, January 1995.*

9) City of Phoenix, *FEMA LOMR for Detention Basin Number 3*, October 4, 1995.

Appendix B

General Documentation & Correspondence

City of Phoenix
STREET TRANSPORTATION DEPARTMENT

September 1, 1999

Mr. Matthew Miller, P.E.
Chief, Hazard Studies Branch
Mitigation Directorate
Federal Emergency Management Agency
500 "C" Street, S.W.
Washington, D.C. 20472

Attn: Mr. Mike Grimm
Project Officer, Western Studies Team

Dear Mr. Miller:

RE: REQUEST FOR CONDITIONAL LETTER OF MAP REVISION
UPPER EAST FORK CAVE CREEK WASH
COMMUNITY NUMBER 040051, MAP NUMBER 04013C
PANELS 1215H AND 1220G

The City of Phoenix staff has reviewed the request for a Conditional Letter of Map Revision for the Upper East fork of the Cave creek Wash and fully supports the request which is being delivered under separate cover.

The intent of the Technical Data Notebook which is being submitted by Wood, Patel & Associates is to provide adequate documentation for the CLOMR request to achieve the following objectives:

1. Eliminate Zone "A" for Upper East Fork Cave Creek Wash from Greenway Parkway channel to an existing basin located at 20th Street and Grovers Avenue, approximately 1.50 miles northeast of the Greenway Parkway Channel.

2. Redefine Zone "AE" along the Greenway Parkway Channel from approximately 1,000 feet east of 7th Street to Cave Creek Road.

As required, I have signed the Community Official Form which is included in the submittal from Wood, Patel & Associates.

200 West Washington Street, Fifth Floor, Phoenix, Arizona 85003-1611 602-262-6284 FAX 602-495-2016

Recycled Paper

If there is anything I can do to assist your staff, please contact me at (602) 262-4026.

Sincerely,

Thomas E. Callow, P.E.
Interim Street Transportation Director

Cindy D White

Cindy D. White, P.E.
Floodplain Manager

TEC/CDW/aff/990901a.wpd

c: Mr. Patel, P.E., Wood, Patel & Associates
Mr. Goodall, P.E., City of Phoenix (DCM)
Mr. Rerick, P.E., Flood Control District of Maricopa County

WOOD/PATEL

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

Darrel E. Wood, P.E., R.L.S.
Ashok C. Patel, P.E., R.L.S.
James S. Campbell, P.E.
Gordon W. R. Wark, P.E.
Thomas R. Gettings, R.L.S.
Bruce Friedhoff, P.E.
Scott A. Nelson, R.L.S.
Richard L. Hiner, P.E.
Timothy A. Huval, P.E.
Michael J. Sexton, R.L.S.
Jack K. Moody, P.E.
Leslie J. Kland, P.E.
Carl Sitterley, R.L.S.
Curtis L. Brown, P.E.
Jim Lynck, P.E., R.L.S.
R. Scott Rasmussen, P.E.
Paul M. Haas, P.E.
Shimin Zou, Ph.D., P.E.
David T. Phelps, P.E.
Michael T. Young, P.E.

January 8, 1999

Mr. Thomas E. Robinson
Michael Baker Jr., Inc.
3601 Eisenhower Avenue
Suite 600
Alexandria, Virginia 22304

Phone: 703-960-8800
Fax: 703-329-3023

Re: **City of Phoenix, Maricopa County, Arizona**
WP #96559.04

Dear Mr. Robinson:

Wood/Patel has been contracted by the City of Phoenix to perform Flood Insurance Restudies in Maricopa County for the study area listed below:

1. **East Fork - Cave Creek Wash (FEMA Map Nos. 04013 C 1215 H & 1220 G) (7th Street to 24th Place).**

We are respectfully requesting the following information for the study areas:

1. Hydrology and flood history (hard copy and electronic files).
2. HEC-2 and hydraulic data (hard copy and electronic files).
3. Aerial photos.
4. Topographic data.
5. Any other information, which would help in the study.

Should you have any questions, please contact us.

Sincerely,

WOOD, PATEL & ASSOCIATES, INC.

Ashok C. Patel, P.E., R.L.S.
Project Manager

ACP/djp

cc: Ray Acuña, P.E., Floodplain Manager, City of Phoenix

GENCOR\96559-04Letter.wpd

RECEIVED

FEB 16 1999

WOOD, PATEL & ASSOCIATES

TEC@Baker

SUPPORTING FEMA FOR A SAFER TOMORROW

Michael Baker Jr., Inc.
A Unit of Michael Baker Corporation

3601 Eisenhower Avenue,
Suite 600
Alexandria, Virginia 22304

(703) 960-8800
FAX (703) 960-9125
www.mbakercorp.com

The enclosed data are provided in response to your request.

If you have any questions regarding the enclosed, or if we may be of further assistance, please contact me at the phone or facsimile number or by e-mail as shown on the attached business card.

TEC@Baker

Diana H. Bradley
Library Manager

Baker Civil
A Unit of Michael Baker Corporation

3601 Eisenhower Avenue, Suite 600
Alexandria, Virginia 22304-1550
(703) 317-6270
FAX (703) 329-3023
e-mail dbradley@mbakercorp.com

d Emergency Management Agency

Washington, D.C. 20472

JUN 1 1988

FLD 0803

IED MAIL
RN RECEIPT REQUESTED

The Honorable Terry Goddard
Mayor, City of Phoenix
City Hall
251 West Washington Street
Phoenix, Arizona 85003

Dear Mayor Goddard:

This is in response to a letter dated October 13, 1987, from Mr. J.E. Attebery, P.E., City Engineer, concerning the then-effective Flood Insurance Rate Map (FIRM) and Flood Boundary and Floodway Map (FBFM) for the City of Phoenix, dated June 1, 1984, and the FIRM and FBFM for Maricopa County and Incorporated Areas, which became effective on April 15, 1988. Mr. Attebery requested that the floodway designation for East Fork Cave Creek, east of 7th Street, be eliminated, and that a restudy be initiated to redelineate the flooding in this area. He also requested that, if we are unable to restudy the stream, the entire area be designated as Zone B.

Mr. Attebery's requests were based on a hydrologic analysis of the 100-year flood for East Fork Cave Creek, performed by NBS/Lowry Engineers and Planners (NBS/Lowry) and presented in a report entitled "Upper East Fork Cave Creek, Area Drainage Master Study, Technical Submittals," submittal number 4 (90 percent completion), dated June 30, 1987. A copy of this report was submitted with Mr. Attebery's letter along with two undated reports, also prepared by NBS/Lowry, entitled "Upper East Fork Cave Creek, Area Drainage Master Study, Technical Submittals (Executive Summary)," and "Upper East Fork Cave Creek, Area Drainage Master Study, Technical Submittals."

We have completed our review of the hydrology reports submitted by Mr. Attebery and have determined that the NBS/Lowry hydrologic analysis is more detailed than the analysis used in the preparation of the effective FIRM and FBFM for Maricopa County, Arizona and Incorporated Areas. The routing used in the NBS/Lowry analysis represents the existing flow conditions in the Upper East Fork Cave Creek drainage basin more accurately than does the routing used in the preparation of the effective FIRM and FBFM. Therefore, we agree that the effective FIRM, FBFM, and Flood Insurance Study report should be revised.

As Mr. Attebery requested, we will remove the floodway shown for the reach of East Fork Cave Creek east of 7th Street. We will also eliminate the base (100-year) flood elevations shown for that reach and designate the 100-year floodplain as Zone A. In addition, the area between Cave Creek and East Fork Cave Creek, which is designated as Zone C on the effective FIRM, will be designated as Zone B. All of these changes will be made as part of the ongoing revision to the FIRM and FBFM for Maricopa County and Incorporated Areas. Preliminary copies of the revised FIRM and FBFM are scheduled to be sent to the affected communities by November 1988.

The previously described changes are those warranted by the data submitted by Mr. Attebery. If the City wishes, it may provide revised delineations of the 100-year floodplain boundaries for the reach of East Fork Cave Creek east of 7th Street. Such delineations, if based on revised hydrologic and hydraulic computations, must be accompanied by all appropriate technical supporting data as required by Sections 65.6(c), (d), and (e) of the National Flood Insurance Program regulations (copy enclosed). The revised delineations should be submitted on a topographic map whose scale and contour interval are sufficient to provide reasonable accuracy. All data submitted must be certified by a registered professional engineer. If the required data are submitted by June 30, 1988, we will review them and include all warranted revisions to the East Fork Cave Creek floodplain boundary delineations in the revised FIRM and FBFM now being processed.

Should the City wish to request a restudy of the flood hazards associated with East Fork Cave Creek, the City should call our Regional Office staff in San Francisco, California, at (415) 923-7175. The Regional Office can provide information about the restudy process, including the earliest date by which a restudy could be initiated.

If you have any questions concerning this matter, please call our Regional Office staff at the telephone number shown previously or Mr. William Judkins of my staff in Washington, D.C., at (202) 646-3458.

Sincerely,

John L. Matticks
Chief, Risk Studies Division
Federal Insurance Administration

Enclosure

cc: Mr. Paul Kienow, P.E.
Floodplain Management Engineer, City of Phoenix

Mr. William H. Leimkuehler, P.E., R.L.S.
Amwest Engineering Company, Inc.

Mr. J.E. Attebery, P.E.
City Engineer

Mr. D.E. Sagramoso, P.E.
Flood Control District of Maricopa County

Mr. Greg Rodzenko
Flood Control District of Maricopa County

Federal Emergency Management Agency

Washington, D.C. 20472

APR 29 1992

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable Paul Johnson
Mayor, City of Phoenix
251 West Washington Street
Phoenix, Arizona 85003

Case No.: 92-09-036R
Re: East Fork Cave Creek
Community: City of Phoenix, Arizona

Dear Mayor Johnson:

This is in response to a letter dated March 18, 1992, from Mr. Paul E. Kienow, P.E., City of Phoenix, regarding a request for a conditional Letter of Map Revision (LOMR) for an area shown on the effective Flood Insurance Rate Map (FIRM) for Maricopa County, Arizona and Incorporated Areas. The request is based on the proposed detention basin, channelization of East Fork Cave Creek (EFCC) from Beardsley Road to Union Hill Drive, and the existing EFCC channel from Union Hill Drive to Cave Creek Road. All data required to evaluate this request were submitted by Mr. Kienow with his March 18 letter. In addition, Mr. Kienow's letter indicated that this proposed project is for public benefit and primarily intended for flood loss reduction to existing development in identified flood hazard areas. Therefore, in accordance with Section 72.5 of the National Flood Insurance Program (NFIP) regulations, the fees associated with our review for a conditional LOMR have been waived.

We have reviewed the data submitted with respect to the data used to prepare the effective FIRM for Maricopa County, Arizona and Incorporated Areas. The U.S. Soil Conservation Service TR-20 computer model was utilized to determine the 100-year peak discharge. This is a part of the upper EFCC master drainage study approved in our previous letter dated June 1, 1988. In addition, the U.S. Army Corps of Engineers HEC-2 computer model was used for the hydraulic analysis of the EFCC. We believe that if the proposed project is constructed in accordance with the plans listed below, the 100-year flow will be contained within the EFCC channel from Beardsley Road to Cave Creek Road:

- Sheets CD-1, CD-2, C-0 through C-20, L-0 through L-8, I-0 through I-9, and E-0 through E-7 of 8 plans entitled "Detention Basin No. 1," prepared by the City of Phoenix, dated March 1992.

- Sheets C-1 through C-11, D-1 through D-8, E-1, E-2, G-1 through G-4, P-1 through P-18, SS-1A through SS-4A, SS-5, SS-6, W-1, W-2, W-3A through W-5A, and W-6 of construction plans entitled "Upper East Fork Drainage Channel," prepared by NBS/Lowry Engineers and Planners, dated June 26, 1991.

Upon completion of the project and receipt of "as-built" plans, certified by a registered professional engineer, for proposed Detention Basin No. 1 and the channelization of EFCC between Beardsley Road and Union Hill Drive,

including all hydraulic structures, we will make a final determination on revising the FIRM.

The basis of this conditional LOMR is the proposed construction of a detention basin, as well as a channel modification project. The NFIP regulations, as cited in Paragraph 60.3(b)(7), require that communities ensure the flood-carrying capacity of an altered or relocated watercourse. This provision is incorporated into your community's floodplain management regulations. Consequently, upon completion of the proposed project, the ultimate responsibility for maintenance of the channel modification will rest with your community.

Should you have any questions regarding this matter, please contact the Chief, Natural and Technological Hazards Division, Federal Emergency Management Agency, in San Francisco, California, at (415) 923-7177, or Mr. Karl Mohr of my staff in Washington, D.C., at (202) 646-2770.

Sincerely,

William R. Locke
Chief, Risk Studies Division
Federal Insurance Administration

cc: Mr. Paul E. Kienow, P.E.
City of Phoenix

Mr. James H. Matteson, P.E.
City of Phoenix

Mr. Ron Nevitt
Flood Control District of
Maricopa County

RECEIVED OCT 0 5 1992

Federal Emergency Management Agency

Washington, D.C. 20472

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
102

The Honorable Paul Johnson
Mayor, City of Phoenix
251 West Washington
Phoenix, Arizona 85003

Case No.: 92-09-161P
Community: Maricopa County, Arizona and Incorporated Areas
Map Panel Numbers: 04013C1220 E
04013C1215 F
Effective Date of This Revision: OCT 1 1992

Dear Mayor Johnson:

This is in response to a letter dated July 13, 1992, from Mr. Paul E. Kienow, P.E., Floodplain Management Engineer, regarding the effective Flood Insurance Rate Map (FIRM) for Maricopa County, Arizona and Incorporated Areas. Mr. Kienow requested that we revise the effective FIRM to show the effects of channel improvements along East Fork Cave Creek from Central Avenue to Seventh Street; construction of a six-barrel 12' X 12' reinforced concrete box culvert at Seventh Street; and the Greenway Channel improvements approximately 1,000 feet upstream of Seventh Street.

All data required to evaluate this request were submitted with Mr. Kienow's letters dated June 16 and July 13, 1992, and with a letter of transmittal dated August 17, 1992, from Mr. Brian Fry, NBS/Lowry, Engineers & Planners.

We have completed our review of the submitted data with regard to the data used to produce the effective FIRM, and have revised the FIRM to modify the floodplain boundary delineations, floodway boundary delineations, and zone designations of a flood having a 1-percent probability of being equaled or exceeded in any given year (base flood) along a reach of East Fork Cave Creek from a point located approximately 1,000 feet downstream of Central Avenue to Seventh Street and approximately 1,000 feet along Greenway Channel, just upstream of Seventh Street along Greenway Parkway. As a result of this project, the 100-year flood and floodway are now contained in the channel from Central Avenue to a point approximately 1,000 feet upstream of Seventh Street.

The modifications are shown on the enclosed annotated copies of FIRM Panels 04013C1215 F and 04013C1220 E, Flood Profile Panel 133 P, and the Floodway Data Table for East Fork Cave Creek. This Letter of Map Revision (LOMR) hereby revises these panels of the effective FIRM dated September 4, 1991, and September 29, 1989, respectively, and the Floodway Data Table for East Fork Cave Creek. The Flood Profiles from Central Avenue to Seventh Street and the Floodway Data information for Cross Sections M and N have been deleted. Downstream of Central Avenue between Cross Sections J and M, Flood Profiles and the Floodway Data Table were revised to match the previously approved analysis, performed by Burgess and Niple, in our February 4, 1991,

letter. The following table is a partial listing of former and modified base (100-year) flood elevations (BFEs).

Location	Existing BFE *(feet)	Modified BFE *(feet)
Approximately 1,400 feet downstream of Central Avenue	*1,355	*1,355
At Central Avenue	*1,361	*1,359

New detailed flood hazard information for East Fork Cave Creek were incorporated into FIRM Panels 04013C1215 F as a physical map revision. A preliminary copy of this panel was issued on September 4, 1992, for review by your community. We will incorporate the modifications described in this LOMR into the revised map before it becomes effective.

The floodway is provided to your community as a tool to regulate floodplain development. Therefore, the floodway modifications described in this letter, while acceptable to the Federal Emergency Management Agency (FEMA), must also be acceptable to your community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the National Flood Insurance Program (NFIP) regulations.

These modifications have been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR, Part 65. Public notification of modifications to the BFEs along East Fork Cave Creek will be given in the Arizona Republic on or about October 22, 1992, and October 29, 1992. In addition, a Notice of Changes will be published in the Federal Register.

As required by the legislation, a community must adopt and enforce floodplain management measures to ensure continued eligibility to participate in the NFIP. Therefore, your community must enforce these regulations using, at a minimum, the BFEs, zone designations, and floodways in the Special Flood Hazard Areas shown on the FIRM and Flood Boundary and Floodway Map for your community, including the previously described modifications.

This response to your request is based on minimum floodplain management criteria established under the NFIP. Your community is responsible for approving all proposed floodplain developments, including this request, and for ensuring that necessary permits required by Federal or State law have been received. With knowledge of local conditions and in the interest of safety, State and community officials may set higher standards for construction, or may limit development in floodplain areas. If the State of Arizona or the City of Phoenix has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP requirements.

The basis of this LOMR is a channel-modification project. NFIP regulations, as cited in Section 60.3(b)(7), require that communities assure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management regulations. Consequently, the

ultimate responsibility for maintenance of the channel modification rests with your community.

The community number and suffix code listed above will be used for all flood insurance policies and renewals issued for your community on and after the effective date listed above.

The modifications described herein are effective as of the date of this letter. However, within 90 days of the second publication in the Arizona Republic, your community may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. All interested parties are hereby notified that, until the 90-day period elapses, the determination may be modified.

Please note that FEMA is currently developing detailed application and certification forms for use in requesting revisions or amendments to NFIP maps. These forms are mandatory for all requests received by FEMA on or after October 1, 1992. The forms will facilitate an efficient review by highlighting relevant technical considerations; therefore, use of these forms prior to that date, while voluntary, is strongly recommended. Application forms are presently available for Letter of Map Amendment and LOMR Based on Fill requests, and should be available October 1 for all other revision requests.

If you have any questions regarding the modifications described herein, please call the Chief, Natural and Technological Hazards Division, FEMA, in San Francisco, California, at (415) 923-7175, or Mr. Karl F. Mohr of my staff in Washington, D.C., at (202) 646-2770.

Sincerely,

William R. Locke

William R. Locke
Chief, Risk Studies Division
Federal Insurance Administration

Enclosures

cc: The Honorable Betsey Bayless
Chairperson, Maricopa County
Board of Supervisors

Mr. Stanley L. Smith, Jr., P.E.
Acting Floodplain Administrator
Maricopa County Flood Control District

Mr. Brian Fry
NBS/Lowry, Engineers and Planners

Mr. Paul E. Kienow, P.E.
Floodplain Management Engineer

Federal Emergency Management Agency

Washington, D.C. 20472

MAY 19 1992

The Honorable Paul Johnson
Mayor, City of Phoenix
251 West Washington Street
Phoenix, Arizona 85003

IN REPLY REFER TO:
Case No.: 92-09-107G

T-218-65-R (REI)

Dear Mayor Johnson:

This is in reference to a letter dated April 6, 1992, from Mr. Paul Kienow, Floodplain Management Engineer for the City of Phoenix, requesting that the Federal Emergency Management Agency (FEMA) reissue two Letters of Map Revision (LOMRs) dated May 10, 1991, and July 16, 1991, for the following property:

Property Description: Portions of Coral Manor Units I and II, as described in the Special Warranty Deed, recorded as Instrument No. 87 105633, in the Office of the Recorder, Maricopa County, Arizona

Community: City of Phoenix

State: Arizona

The portion of Coral Manor Unit 1 mentioned above is contained in the following:

That part of the Southeast quarter of Section Six (6), Township Three (3) North, Range Three (3) East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona, described as follows:

Beginning at the Southeast corner of Section 6, thence N89°59'38"W along the South line of said Section 6 a distance of 2,633.00 feet to the South quarter corner Section 6;

Thence N00°16'18"E along the midsection line a distance of 297.33 feet to the monument line of Greenway Parkway as recorded in Document Nos. 87-557692, 87-557694 and 87-557695;

Thence continuing N79°22'05"E along said monument line a distance of 150.79 feet to a point of curvature of a circular curve having a radius of 1,300.00 feet and a radius point which bears N10°37'55"W from the point of curvature;

Thence continuing northwesterly along said monument line 1,341.42 feet along the arc of said curve through 59°07'17" of central angle to a point of intersection with Tierra Buena Lane and Greenway Parkway (public streets) as shown and delineated on Tierra Buena Map of Dedication recorded in Book 319 of Maps, Page 36, MCR;

Thence S69°45'12"E along the southerly line of an easement for waterline recorded in No. 89-536044 and No. 89-536046 a distance of 200.00 feet to a point of curvature of a circular curve having a radius of 700.00 feet and a radius point which bears N20°14'48"E from the point of curvature;

Thence continuing easterly along said southerly line 589.31 feet along the arc of said curve through 48°14'08" of central angle to a point of tangency;

Thence continuing along said southerly line N62°00'40"E a distance of 248.38 feet to a point of curvature of a circular curve having a radius of 700.00 feet and a radius point which bears S27°59'20"E from the point of curvature;

Thence continuing easterly along said southerly line 344.97 feet along the arc of said curve through 28°14'09" of central angle to a point of tangency;

Thence continuing S89°45'11"E along said southerly line a distance of 200.00 feet to the Northeast corner of the Southeast quarter Southeast quarter, Section 6;

Thence S00°14'49"W along the east line of the Southeast quarter, Section 6 a distance of 1,320.22 to the True Point of Beginning.

EXCEPT:

Beginning at the Southeast Corner, Section 6;

Thence N89°59'38"W along the South line of Section 6, a distance of 1,207.73 feet;

Thence N58°50'34"E a distance of 368.64 feet;

Thence N69°21'27"E a distance of 432.09 feet;

Thence N62°23'26"E a distance of 195.75 feet;

Thence N58°18'59"E a distance of 372.71 feet to the East line of Section 6;

Thence S00°14'49"W along said East line a distance of 245.08 feet;

Thence S58°18'59"W a distance of 250.49 feet;

Thence S62°23'26"W a distance of 217.66 feet;

Thence S00°00'22"W a distance of 112.10 feet;

Thence S89°59'38"E a distance of 404.56 feet to the East line of Section 6;

Thence S00°14'49"W along said East line a distance of 40.00 feet to the Point of Beginning.

The portion of Coral Manor Unit II mentioned above is as follows:

That part of the Southeast quarter of Section Six (6), Township Three (3) North, Range Three (3) East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona, described as follows:

Beginning at the Southeast corner of Section 6, thence N89°59'38"W along the South line of said Section 6 a distance of 2,633.00 feet to the South quarter corner Section 65;

Thence N00°16'18"E along the midsection line a distance of 297.33 feet to the monument line of Greenway Parkway as recorded in Document Nos. 87-557692, 87-557694 and 87-557695;

Thence continuing N79°22'05"E along said monument line a distance of 150.79 feet to a point of curvature of a circular curve having a radius of 1,300.00 feet and a radius point which bears N10°37'55"W from the point of curvature;

Thence continuing northwesterly along said monument line 1,341.42 feet along the arc of said curve through 59°07'17" of central angle to a point of intersection with Tierra Buena Lane and Greenway Parkway (public streets) as shown and delineated on Tierra Buena Map of Dedication recorded in Book 319 of Maps, Page 36, MCR;

Thence S69°45'12"E along the southerly line of an easement for waterline recorded in No. 89-536044 and 89-536046 a distance of 200.00 feet to a point of curvature of a circular curve having a radius of 700.00 feet and a radius point which bears N20°14'48"E from the point of curvature;

Thence continuing easterly along said southerly line 589.31 feet along the arc of said curve through 48°14'08" of central angle to a point of tangency;

Thence continuing along said southerly line N62°00'40"E a distance of 248.38 feet to a point of curvature of a circular curve having a radius of 700.00 feet and a radius point which bears S27°59'20"E from the point of curvature;

Thence continuing easterly along said southerly line 344.97 feet along the arc of said curve through 28°14'09" of central angle to a point of tangency;

Thence continuing S89°45'11"E along said southerly line a distance of 200.00 feet to the Northeast corner of the Southeast quarter Southeast quarter, Section 6;

Thence S00°14'49"W along the east line of the Southeast quarter, Section 6 a distance of 1,320.22 feet to the True Point of Beginning.

EXCEPT:

Beginning at the Southeast Corner, Section 6;

Thence N89°59'38"W along the South line of Section 6, a distance of 1,316.50 feet to the southwest corner of the southeast quarter of the southeast quarter, Section 6;

Thence N00°14'28"E along the west line of the Southeast quarter of the Southeast quarter a distance of 160.00 feet;

Thence S89°59'38"E a distance of 160.00 feet;

Thence S00°14'28"W a distance of 128.94 feet;

Thence N58°50'34"E a distance of 308.62 feet;

Thence N69°21'27"E a distance of 432.09 feet;

Thence N62°23'26"E a distance of 195.75 feet;

Thence N58°18'59"E a distance of 372.71 feet to the East line of Section 6;

Thence S00°14'49"W along said East line a distance of 245.08 feet;

Thence S58°18'59"W a distance of 250.49 feet;

Thence S62°23'26"W a distance of 217.66 feet;

Thence S00°00'22"W a distance of 112.10 feet;

Thence S89°59'38"E a distance of 404.56 feet to the East line of Section 6;

Thence S00°14'49"W along said East line a distance of 40.00 feet to the Point of Beginning.

The May 10 and July 16, 1991, LOMRs that revised the Maricopa County, Arizona, National Flood Insurance Program (NFIP) map have since been superseded by a new NFIP map dated September 4, 1991, for Maricopa County, Arizona. Therefore, this letter issues a new determination for the property based on the new September 4, 1991, NFIP map.

On April 21, 1992, we received all of the information necessary to process this request. After comparing this information to the NFIP map for your community, we determined that the above-mentioned portions of Coral Manor Units I and II would not be inundated by a 100-year flood. Therefore, this letter revises the map for Maricopa County, Arizona, NFIP Map Number 04013 C, dated September 4, 1991, to remove this property from the Special Flood Hazard Area (SFHA).

Please note that this property could be inundated by a flood greater than the 100-year flood or by local flooding conditions not shown on the NFIP map.

Flood insurance is obtainable, at reduced costs, for properties located outside the SFHA. Also, although we have based our determination on the flood information presently available, flood conditions may change or new information may be generated which would supersede this determination.

Although the criteria for removal of a parcel of land based on fill have been met for this request, we encourage you to require that the lowest adjacent grades and lowest floors (including basements) of any structures placed on the above parcels be elevated to a level at or above the base flood elevation.

This LOMR will not be printed and distributed to primary map users such as local insurance agents and mortgage lenders; therefore, the community will serve as a repository for these new data.

A copy of this LOMR is being sent to your community's official NFIP map repository where, in accordance with regulations adopted by your community when it made application to join the NFIP, it should be attached to the community's official record copy of the NFIP map which is available for public inspection.

We encourage you to disseminate the information reflected by this LOMR widely throughout the community in order that interested persons such as property owners, insurance agents, and mortgage lenders may benefit from this information. We also encourage you to consider preparing an article for publication in the community's local newspaper that would describe the changes that have been made and the assistance the community will provide in serving as a clearinghouse for these data and interpreting NFIP maps.

In order to ensure continued eli ibility to participate in the NFIP, your community must enforce its floodplain management regulations using, at a minimum, the flood elevations and zone designations shown on your community's NFIP map, including the revision effected by this letter. This response to your request is based on the minimum criteria established by the NFIP. State and community officials, based on knowledge of local conditions and in the interest of public safety, may set higher standards for construction in the floodplain. If the State of Arizona or your community have adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum Federal criteria.

This revision has been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and is in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448) 42 U.S.C. 4001-4128, and 44 CFR Part 65.

This revision is effective as of the date of this letter. However, a request for reconsideration may be made within 30 days. Any requests for reconsideration must be based on scientific or technical data.

Please note that FEMA is currently developing detailed application and certification forms for use in requesting revisions or amendments to NFIP maps. These forms will be available this summer and will be mandatory for all requests received by FEMA on or after October 1, 1992. These forms will

highlight technical considerations in a fashion that facilitates an efficient review; therefore, use of these forms prior to October 1, while voluntary, is strongly recommended. Application forms should be available after July 1 for Letter of Map Amendment and LOMR Based on Fill requests, and after August 1 for all other revision requests.

If you have any questions or if we can be of further assistance, please call Ms. Cecelia Lynch at (202) 646-2747.

Sincerely,

Arch Flowers for

Fay L. Davis, Acting Chief
Technical Operations Division
Federal Insurance Administration

cc: Mr. Paul Kienow
City of Phoenix Street
Transportation Department

Federal Emergency Management Agency

Washington, D.C. 20472

RECEIVED
FEB 5 1999
WOOD, PATEL & ASSOCIATES

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 95-09-932P

The Honorable Skip Rimsza
Mayor, City of Phoenix
200 West Washington Street, 11th Floor
Phoenix, Arizona 85003-1611

Community: City of Phoenix, Arizona
Community No.: 040051
Panel Affected: 04013C1220 G
Effective Date of
This Revision: OCT 04 1995

102-D

Dear Mayor Rimsza:

This is in response to a request for a revision to the effective Flood Insurance Study and National Flood Insurance Program (NFIP) map for your community. Specifically, this responds to a facsimile dated September 20, 1995, from Mr. Brian Fry, P.E., Dibble & Associates Consulting Engineers, regarding the effective Flood Insurance Rate Map (FIRM) for Maricopa County, Arizona and Incorporated Areas. With his letter, Mr. Fry submitted additional data to support an August 31, 1995, request from Mr. Raymond U. Acuña, P.E., Floodplain Manager, City of Phoenix Street Transportation Department, for a Letter of Map Revision (LOMR). Mr. Acuña requested that the Federal Emergency Management Agency (FEMA) revise the effective FIRM to show the effects of the construction of a double-barrel 10-foot by 10-foot concrete box culvert and two detention basins along East Fork Cave Creek Wash from just upstream of Cave Creek Road to approximately 1,400 feet downstream of 20th Street.

All data required to complete our review of this request were submitted with Mr. Fry's September 20 facsimile and with letters dated August 31 and September 5, 1995, from Mr. Acuña. Because this LOMR shows the effects of a publicly sponsored flood-control project that reduces flooding to existing development, fees were not assessed for the review.

We have completed our review of the submitted data and the flood data shown on the effective FIRM, and have revised the FIRM to modify the floodplain boundary delineations of a flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) along East Fork Cave Creek Wash from just upstream of Cave Creek Road to approximately 1,400 feet downstream of 20th Street.

The width of the Special Flood Hazard Area (SFHA) decreased along East Fork Cave Creek Wash from just upstream of Cave Creek Road to just downstream of Cave Creek Road, and the base flood is now contained in the double-barrel concrete box culvert at John Cabot Road. The SFHA width decreased from just downstream of Cave Creek Road to approximately 1,400 feet downstream of 20th Street. The maximum decrease in SFHA width, 2,350 feet, occurs just upstream of 20th Street. The decrease in SFHA width from just downstream of Cave Creek Road to just upstream of 20th Street is due to the construction of the two detention basins along the above-referenced reach of East Fork Cave Creek Wash.

The modifications are shown on the enclosed annotated copy of FIRM Panel 04013C1220 G for Maricopa County, Arizona and Incorporated Areas. This LOMR hereby revises this panel of the effective FIRM dated September 30, 1995.

The revisions are effective as of the date of this letter; however, a review of the determination made by this LOMR and any requests to alter this determination should be made within 30 days. Any request to alter the determination must be based on scientific or technical data.

Due to present funding constraints, we must limit the number of physical map revisions processed. Consequently, we will not republish the FIRM for your community to reflect the modifications described in this LOMR at this time. The projected date for the next preliminary FIRM for Maricopa County, Arizona and Incorporated Areas is fall 1996. The determination of this LOMR will be incorporated at that time into FIRM Panel 04013C1220 G.

This response to Mr. Acuña's request is based on minimum floodplain management criteria established under the NFIP. Your community is responsible for approving all floodplain development, including this request, and for ensuring that necessary permits required by Federal or State law have been received. With knowledge of local conditions and in the interest of safety, State and community officials may set higher standards for construction, or may limit development in floodplain areas. If the State of Arizona or your community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence.

The basis of this LOMR is, in whole or in part, a channel-modification/culvert project. NFIP regulations, as cited in Paragraph 60.3(b)(7), require that communities assure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management regulations. Consequently, the ultimate responsibility for maintenance of the channel modification/culvert rests with your community.

Because this LOMR will not be printed and distributed to primary users, such as local insurance agents and mortgage lenders, your community will serve as a repository for these new data. We encourage you to disseminate the information reflected by this LOMR throughout the community, so that interested persons, such as property owners, local insurance agents, and mortgage lenders, may benefit from the information. We also encourage you to prepare an article for publication in your community's local newspaper. This article should describe the changes that have been made and the assistance that officials of your community will give to interested persons by providing these data and interpreting the NFIP maps.

The map panel as listed above and as revised by this letter will be used for all flood insurance policies and renewals issued for your community.

This determination has been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and is in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria are the minimum requirements and do not supersede any State or local requirements of a more stringent nature. This includes adoption of the effective FIRM to which the regulations apply and the modifications described in this LOMR.

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please contact the Consultation Coordination Officer (CCO) for your community. Information on the CCO for your community may be obtained by contacting the Director, Mitigation Division of FEMA in San Francisco, California, at (415) 923-7177. If you have any technical questions regarding this LOMR, please contact Mr. John Magnotti of our staff in Washington, DC, either by telephone at (202) 646-3932 or by facsimile at (202) 646-4596.

Sincerely,

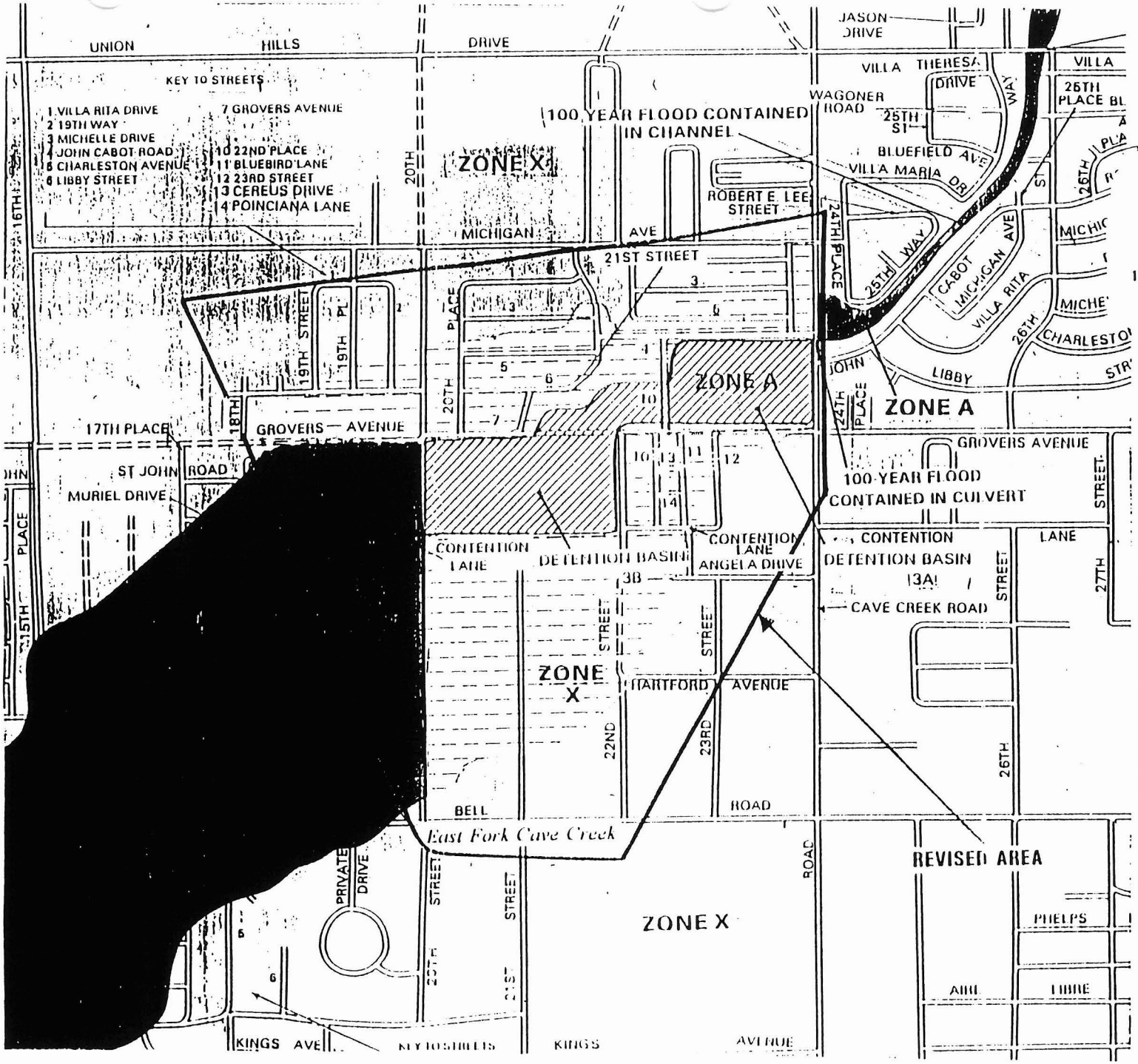
Michael K. Buckley, P.E., Chief
Hazard Identification Branch
Mitigation Directorate

Enclosure

cc: Mr. Brian Fry, P.E.
Dibble & Associates Consulting Engineers

Mr. Raymond U. Acuña, P.E.
Floodplain Manager
City of Phoenix Street Transportation Department

Mr. Ron Nevitt
Program Manager
NFIP Program
Flood Control District of Maricopa County



MAP LEGEND

Revised 100-Year Floodplain

Revised 500-Year Floodplain

APPROXIMATE SCALE IN FEET

1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 1220 OF 4350

REVISED TO REFLECT LOMR DATED OCT 04 1995

MAP NUMBER 04013C1220G

MAP REVISED: SEPTEMBER 30, 1995

Federal Emergency Management Agency

Upper East Fork Cave Creek Channel
Central Avenue to 7th Street
FEMA LOMR Submittal

NBS LOWRY

ENGINEERS & PLANNERS

ALEXANDRIA, VIRGINIA

Upper East Fork Cave Creek Channel
Central Avenue to 7th Street
FEMA LOMR Submittal

Prepared For:

Fleet Engineering, Inc.

Registered Professional Engineer (Civil)
CERTIFICATE NO.
21684
BRIAN J.
FOY
Date Signed 6-10-92
ARIZONA, U.S.A.

Prepared By:

NBS/Lowry, Engineers & Planners
2600 North 44th Street
Phoenix, Arizona 85008

June 10, 1992

Upper East Fork Cave Creek Channel
Central Avenue to 7th Street
FEMA LOMR Submittal

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- A. General
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V. Revised Floodplain Delineation

VI. Appendix A - Existing HEC-2 Input and Output Listings

- A. 1980 HEC-2 model
- B. Burgess & Niple HEC-2 model

VII. Appendix B - Revised HEC-2 Input and Output Listing

THIS RUN EXECUTED 06JUN92 11:30:40

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

EAST FORK OF CAVE CREEK

SUMMARY PRINTOUT

	SECNO	Q	CWSEL	DEPTH	VCH	SSTA	ENDST	10*KS	EG
	1.204	5500.00	1353.42	9.12	10.85	953.48	1052.91	88.09	1355.25
	1.204	8200.00	1354.97	10.67	11.74	950.30	1170.26	78.03	1356.97
	1.204	9400.00	1355.42	11.12	12.18	930.00	1173.35	78.38	1357.51
	693.000	5300.00	1357.24	8.44	4.57	908.21	1222.42	14.11	1357.54
*	693.000	7900.00	1358.80	10.00	5.09	905.54	1233.99	13.79	1359.16
	693.000	9100.00	1359.33	10.53	5.34	904.63	1236.67	13.96	1359.72
	1100.000	5300.00	1357.54	5.34	9.72	898.18	1059.27	76.01	1359.01
*	1100.000	7900.00	1359.00	6.80	9.91	887.51	1075.48	58.56	1360.52
	1100.000	9100.00	1359.49	7.29	10.19	883.79	1082.17	57.21	1361.11
*	1600.000	5300.00	1360.03	6.93	5.03	881.81	1105.11	13.06	1360.42
	1600.000	7900.00	1361.33	8.23	5.84	874.03	1109.65	13.63	1361.86
	1600.000	9100.00	1361.86	8.76	6.16	870.85	1111.51	13.82	1362.45
	2075.000	5300.00	1360.69	6.69	6.28	902.96	1099.63	23.14	1361.30
	2075.000	7900.00	1361.99	7.99	7.07	889.48	1108.51	23.30	1362.77
	2075.000	9100.00	1362.52	8.52	7.37	884.13	1112.04	23.42	1363.37
	2600.000	5300.00	1361.78	7.08	5.78	911.30	1092.47	15.81	1362.30
	2600.000	7900.00	1363.11	8.41	6.77	903.31	1098.79	17.39	1363.83
	2600.000	9100.00	1363.65	8.95	7.14	900.09	1101.35	17.93	1364.44
	3100.000	5300.00	1362.56	7.16	6.01	902.11	1069.58	16.24	1363.12
	3100.000	7900.00	1363.96	8.56	7.01	892.28	1074.85	17.86	1364.72
	3100.000	9100.00	1364.53	9.13	7.38	888.30	1078.96	18.61	1365.37
	3650.000	5300.00	1363.50	7.00	6.42	917.78	1087.51	20.58	1364.14
	3650.000	7900.00	1364.98	8.48	7.25	907.15	1094.90	20.76	1365.80
	3650.000	9100.00	1365.58	9.08	7.56	902.83	1097.89	20.76	1366.47

SECNO	Q	CWSEL	DEPTH	VCH	SSTA	ENDST	10*KS	EG	
* 3882.000	4800.00	1364.17	7.57	3.80	909.60	1096.21	4.70	1364.39	
3882.000	7100.00	1365.75	9.15	4.54	904.69	1099.61	5.34	1366.07	1.947
3882.000	8100.00	1366.39	9.79	4.79	902.71	1100.99	5.50	1366.75	
3974.000	4800.00	1363.57	6.72	10.21	961.28	1038.92	47.16	1365.19	
3974.000	7100.00	1364.81	7.96	12.53	961.18	1039.00	57.46	1367.25	1.964
* 3974.000	8100.00	1365.30	8.45	13.39	961.13	1039.03	61.00	1368.08	
3975.000	4800.00	1366.09	5.19	12.90	961.50	1038.50	27.82	1368.68	
3975.000	7100.00	1367.61	6.71	14.75	961.50	1038.50	30.58	1370.99	1.965
* 3975.000	8100.00	1368.23	7.33	15.40	961.50	1038.50	31.57	1371.91	40968
4082.600	4800.00	1367.56	6.56	10.22	961.50	1038.50	14.90	1369.18	
4082.600	7100.00	1369.50	8.50	11.65	961.50	1038.50	16.59	1371.61	1.985
4082.600	8100.00	1370.27	9.27	12.18	961.50	1038.50	17.31	1372.57	
4083.600	4800.00	1368.13	7.09	8.73	960.91	1039.09	28.29	1369.31	
4083.600	7100.00	1370.26	9.22	9.90	960.73	1039.27	27.20	1371.78	1.985
4083.600	8100.00	1371.11	10.07	10.34	960.66	1039.34	26.96	1372.77	
4098.600	4800.00	1368.60	6.06	7.40	946.50	1053.50	23.32	1369.45	
4098.600	7100.00	1371.04	8.50	7.80	946.50	1053.50	17.40	1371.99	1.985
4098.600	8100.00	1372.01	9.47	8.00	946.50	1053.50	16.18	1373.00	
* 4099.000	4800.00	1371.09	8.55	11.45	946.50	1053.50	92.25	1373.13	
4099.000	7100.00	1372.33	9.79	12.86	946.50	1053.50	80.57	1374.90	1.988
4099.000	8100.00	1372.74	10.20	13.60	946.50	1053.50	81.50	1375.61	
4169.000	4800.00	1373.50	5.43	4.39	873.29	1096.71	9.49	1373.80	
4169.000	7100.00	1375.36	7.29	4.66	865.85	1104.15	7.52	1375.69	2.001
* 4169.000	8100.00	1376.14	8.07	4.73	860.32	1107.47	6.84	1376.48	
4370.000	4800.00	1373.69	5.69	4.66	875.09	1115.30	12.75	1374.03	
4370.000	7100.00	1375.51	7.51	4.78	865.76	1125.30	9.16	1375.87	2.045
4370.000	8100.00	1376.28	8.28	4.80	861.81	1129.54	8.11	1376.64	
4730.000	4800.00	1374.13	6.13	4.76	903.31	1118.15	11.82	1374.48	
4730.000	7100.00	1375.82	7.82	5.13	894.04	1126.78	9.99	1376.23	2.108
4730.000	8100.00	1376.55	8.55	5.19	889.98	1130.56	9.16	1376.97	
5112.000	4800.00	1374.60	5.90	5.94	907.02	1109.08	22.79	1375.15	
5112.000	7100.00	1376.17	7.47	6.23	899.08	1114.64	17.30	1376.78	2.150
5112.000	8100.00	1376.86	8.16	6.29	895.67	1117.03	15.49	1377.47	
* 5932.000	2200.00	1386.72	2.42	1.77	626.01	2115.81	140.80	1386.96	
5932.000	5900.00	1387.41	3.11	2.92	598.67	2310.59	98.38	1387.65	2.335
5932.000	8400.00	1387.71	3.41	3.50	468.32	2313.29	94.06	1387.99	

Appendix C
Survey Field Notes

There are no hydrologic survey field notes for this study area.

An ASCII Text File listing of the surveyed points along the channel for this project is provided herein. Electronic copies of the surveyed point files are also included on the diskette (see readme file). The surveyed points were incorporated into the topography shown on the channel improvement plans. However the point listing layer may be turned off.

T:/ 970206/ CHANNEL.DWG
12-15-98 MJS

96559 GREENWAY CHANNEL TOPO

Project: channel
Point statistics:
Starting point number: 1
Current point number: 1

Tue Dec 15 15:08:57 1998

('L' indicates locked point)

Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
3	5456.04900000	3321.47900000	1386.373	bcf
4	5171.66300000	3918.52200000	1391.545	REBAR
5	5284.20700000	3272.47000000	1374.820	REBAR
6	5172.73500000	3975.86900000	1382.339	GAB
7	5173.87400000	3976.83800000	1380.203	GAB
8	4931.16600000	6565.90000000	1400.200	P K NAIL
10	4257.89700000	7746.53700000	1407.220	REBAR
11	3925.97800000	8318.19900000	1409.208	rb
15	3677.32200000	10480.36500000	1414.452	bcf
17	3668.87500000	10156.19900000	1411.962	bcf
18	3747.36900000	9268.03700000	1413.225	bcf
19	3979.81200000	11905.53400000	1422.302	bcf
20	3896.74100000	8735.83900000	1411.932	bcf
22	4287.76200000	7941.81500000	1409.370	REBAR
23	4455.60400000	7701.15900000	1407.960	BRASS CAP FLUSH
24	4696.52800000	7382.14300000	1406.644	bcf
25	5012.60400000	6612.74100000	1402.456	bcf
26	5026.80100000	6363.73900000	1402.013	bcf
28	5127.32400000	4380.81300000	1392.606	bcf
29	5315.01800000	3966.58500000	1389.370	BRASS CAP FLUSH
30	5328.59100000	3936.64100000	1389.131	bcf
31	3576.78600000	9576.81000000	1402.964	pkn
32	3905.51900000	9265.70800000	1412.820	bcf
33	3910.51600000	9265.60400000	1412.800	bcf
34	5018.58100000	5947.35800000	1400.739	bcf
100	5517.95400000	3860.52100000	1390.272	REBAR
1000	5284.20500000	3272.48000000	1374.824	CHECK SHOT
1001	5314.91500000	3966.55000000	1389.351	CHECK SHOT
1002	5286.09300000	3662.97600000	1376.833	EDGE OF CONCRETE
1003	5268.25800000	3656.31700000	1375.688	EDGE OF CONCRETE
1004	5261.56000000	3673.71200000	1375.620	EDGE OF CONCRETE
1005	5254.71800000	3693.84400000	1375.457	EDGE OF CONCRETE
1006	5249.91300000	3711.97000000	1375.283	EDGE OF CONCRETE
1007	5248.58700000	3719.08200000	1375.333	EDGE OF CONCRETE
1008	5247.31000000	3718.91400000	1375.356	EDGE OF CONCRETE
1009	5247.34800000	3718.92900000	1375.351	EDGE OF CONCRETE
1010	5241.79800000	3715.72900000	1374.270	CONCRETE ELEVATION
1011	5224.67500000	3705.11000000	1374.284	CONCRETE ELEVATION
1012	5220.35900000	3701.92400000	1375.604	EDGE OF CONCRETE
1013	5220.03600000	3702.77700000	1375.601	EDGE OF CONCRETE
1014	5247.18600000	3720.05400000	1375.266	EDGE OF CONCRETE
1015	5247.68100000	3734.91000000	1375.503	EDGE OF CONCRETE
1016	5248.91800000	3749.57700000	1375.395	EDGE OF CONCRETE
1017	5250.05300000	3762.27300000	1375.248	EDGE OF CONCRETE
1018	5251.19900000	3779.76900000	1375.195	EDGE OF CONCRETE

96559 GREENWAY CHANNEL TOPO

ject: channel

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1019	5251.05500000	3795.99600000	1375.635	EDGE OF CONCRETE
1020	5250.70000000	3803.31300000	1376.111	EDGE OF CONCRETE
1021	5250.25200000	3810.43000000	1377.619	EDGE OF CONCRETE
1022	5249.38400000	3816.51900000	1378.830	CONCRETE ELEVATION
1023	5248.46700000	3822.95900000	1377.858	EDGE OF CONCRETE
1024	5246.90800000	3828.72900000	1376.943	EDGE OF CONCRETE
1025	5242.58300000	3841.86100000	1376.919	EDGE OF CONCRETE
1026	5236.46500000	3857.34000000	1376.723	EDGE OF CONCRETE
1027	5230.57200000	3871.18100000	1376.612	EDGE OF CONCRETE
1028	5221.62600000	3891.48500000	1376.705	EDGE OF CONCRETE
1029	5216.73400000	3903.01600000	1376.772	EDGE OF CONCRETE
1030	5211.83600000	3914.87200000	1376.695	EDGE OF CONCRETE
1031	5212.73300000	3915.33700000	1376.700	EDGE OF CONCRETE
1032	5230.71400000	3921.87100000	1378.226	EDGE OF CONCRETE
1033	5230.71400000	3921.85800000	1378.226	EDGE OF CONCRETE
1034	5234.07100000	3910.77800000	1377.994	EDGE OF CONCRETE
1035	5238.50900000	3898.35900000	1377.929	EDGE OF CONCRETE
1036	5219.20700000	3917.80500000	1377.760	GRADE BREAK LINE
1037	5223.17400000	3905.39700000	1377.757	GRADE BREAK LINE
1038	5237.25700000	3875.06500000	1377.985	GRADE BREAK LINE
1039	5251.07800000	3846.75800000	1378.248	GRADE BREAK LINE
1040	5256.30300000	3833.96400000	1378.382	GRADE BREAK LINE
1041	5259.20200000	3820.44200000	1378.930	GRADE BREAK LINE
1042	5262.56200000	3781.85900000	1377.050	GRADE BREAK LINE
1043	5262.55000000	3770.88300000	1377.109	GRADE BREAK LINE
1044	5259.43300000	3751.11700000	1377.036	GRADE BREAK LINE
1045	5257.60700000	3740.54000000	1377.062	GRADE BREAK LINE
1046	5256.64600000	3729.25300000	1377.069	GRADE BREAK LINE
1047	5257.98500000	3710.39200000	1377.173	GRADE BREAK LINE
1048	5265.44100000	3688.75800000	1377.168	GRADE BREAK LINE
1049	5277.57100000	3659.54000000	1376.926	GRADE BREAK LINE
1050	5266.32900000	3711.51500000	1377.183	CONCRETE ELEVATION
1051	5269.12600000	3752.70400000	1377.183	CONCRETE ELEVATION
1052	5273.69800000	3775.24700000	1377.272	CONCRETE ELEVATION
1053	5290.38600000	3796.30600000	1377.413	CONCRETE ELEVATION
1054	5309.26500000	3824.42200000	1377.726	CONCRETE ELEVATION
1055	5306.61600000	3829.85100000	1377.681	GRADE BREAK LINE
1056	5284.86600000	3806.52000000	1377.433	CONCRETE ELEVATION
1057	5262.52200000	3782.07000000	1377.092	GRADE BREAK LINE
1058	5249.45100000	3816.44100000	1378.857	GRADE BREAK LINE
1059	5275.85800000	3827.25300000	1379.144	CONCRETE ELEVATION
1060	5303.61300000	3838.36500000	1379.299	GRADE BREAK LINE
1061	5300.25100000	3847.44800000	1378.849	BOTTOM OF BANK
1062	5282.60000000	3852.00700000	1378.882	BOTTOM OF BANK
1063	5282.51400000	3852.05800000	1378.892	VOID SHOT
1064	5265.69600000	3860.34500000	1378.339	BOTTOM OF BANK
1065	5254.72900000	3868.92500000	1378.257	BOTTOM OF BANK
1066	5247.12200000	3879.03800000	1377.922	BOTTOM OF BANK
1067	5238.58400000	3898.32100000	1377.831	BOTTOM OF BANK

96559 GREENWAY CHANNEL TOPO

ject: channel

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1068	5239.08900000	3900.11500000	1377.785	BOTTOM OF BANK
1069	5240.10500000	3901.80200000	1378.043	BOTTOM OF BANK
1070	5253.46200000	3900.32300000	1387.770	TOP OF BANK
1071	5249.42300000	3906.74100000	1386.971	FENCE
1072	5253.90700000	3900.21200000	1386.972	FENCE
1073	5263.60600000	3887.62200000	1387.397	TOP OF BANK
1074	5264.28800000	3888.48100000	1386.942	FENCE
1075	5274.60000000	3875.41500000	1387.116	TOP OF BANK
1076	5275.43700000	3877.22800000	1386.874	FENCE
1077	5281.25600000	3870.39500000	1386.867	TOP OF BANK
1078	5281.88200000	3871.86900000	1386.661	FENCE
1079	5289.66700000	3865.94900000	1386.435	TOP OF BANK
1080	5294.31200000	3863.60900000	1386.217	TOP OF BANK
1081	5295.06800000	3863.43800000	1387.884	FENCE
1082	5295.34100000	3864.16300000	1386.606	HEADWALL
1083	5319.34800000	3798.99400000	1386.665	HEADWALL
1084	5318.81200000	3799.34500000	1384.058	FENCE
1085	5318.41900000	3798.67000000	1381.329	VOID SHOT
1086	5318.99600000	3794.12600000	1382.753	VOID SHOT
1087	5318.53100000	3798.65000000	1385.062	TOP OF BANK
1088	5318.99700000	3794.27800000	1386.580	TOP OF BANK
1089	5320.51300000	3789.11000000	1387.045	TOP OF BANK
1090	5318.63900000	3780.75000000	1387.484	TOP OF BANK
1091	5316.75900000	3768.13900000	1388.283	TOP OF BANK
1092	5312.65300000	3753.47600000	1388.128	TOP OF BANK
1093	5312.54200000	3738.65400000	1388.297	TOP OF BANK
1094	5313.77700000	3716.17800000	1387.655	TOP OF BANK
1095	5318.02100000	3693.59100000	1386.976	TOP OF BANK
1096	5325.68800000	3667.80400000	1386.468	TOP OF BANK
1097	5327.57000000	3666.18300000	1384.863	MULTI-PURPOSE CIRCLE
1098	5322.39900000	3681.58500000	1385.216	MULTI-PURPOSE CIRCLE
1099	5318.15200000	3696.69900000	1385.662	MULTI-PURPOSE CIRCLE
1100	5314.92800000	3712.26300000	1386.072	MULTI-PURPOSE CIRCLE
1101	5313.55900000	3727.88400000	1386.966	MULTI-PURPOSE CIRCLE
1102	5313.57100000	3744.23300000	1387.341	MULTI-PURPOSE CIRCLE
1103	5315.40300000	3760.60700000	1386.734	MULTI-PURPOSE CIRCLE
1104	5318.30600000	3775.10600000	1385.991	MULTI-PURPOSE CIRCLE
1105	5321.63700000	3789.89000000	1385.028	MULTI-PURPOSE CIRCLE
1106	5313.19400000	3812.50900000	1377.703	BOTTOM OF BANK
1107	5297.01100000	3790.99800000	1377.392	BOTTOM OF BANK
1108	5285.64300000	3770.36800000	1377.205	BOTTOM OF BANK
1109	5279.10600000	3753.45000000	1377.262	BOTTOM OF BANK
1110	5273.73500000	3728.85300000	1377.050	BOTTOM OF BANK
1111	5275.01700000	3708.10600000	1377.006	BOTTOM OF BANK
1112	5279.48400000	3683.93700000	1377.089	BOTTOM OF BANK
1113	5286.25400000	3663.04900000	1376.820	BOTTOM OF BANK
1114	5284.20500000	3272.48100000	1374.792	CHECK SHOT
1115	5202.01800000	3911.10700000	1377.297	VOID SHOT
1116	5202.05100000	3911.21200000	1377.033	BOTTOM OF BANK

96559 GREENWAY CHANNEL TOPO

ject: channel

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1117	5206.14800000	3890.09900000	1376.997	BOTTOM OF BANK
1118	5209.62600000	3872.46900000	1376.629	BOTTOM OF BANK
1119	5213.05700000	3852.22800000	1376.783	BOTTOM OF BANK
1120	5215.75500000	3824.73800000	1375.611	BOTTOM OF BANK
1121	5217.41300000	3800.17900000	1375.557	BOTTOM OF BANK
1122	5217.71800000	3774.57300000	1375.068	BOTTOM OF BANK
1123	5219.35900000	3747.10000000	1375.236	BOTTOM OF BANK
1124	5220.70700000	3716.74200000	1374.525	BOTTOM OF BANK
1125	5220.34000000	3681.64600000	1374.664	BOTTOM OF BANK
1126	5208.87100000	3643.62200000	1375.366	BOTTOM OF BANK
1127	5159.12900000	3666.13300000	1388.082	TOP OF BANK
1128	5171.78100000	3697.52400000	1389.116	TOP OF BANK
1129	5178.50500000	3725.14600000	1389.171	TOP OF BANK
1130	5171.88400000	3766.32400000	1388.948	TOP OF BANK
1131	5173.02800000	3799.43300000	1388.945	TOP OF BANK
1132	5177.98500000	3833.77400000	1389.798	TOP OF BANK
1133	5183.70900000	3867.37000000	1390.391	TOP OF BANK
1134	5178.39100000	3900.59900000	1391.268	TOP OF BANK
1135	5108.24500000	3896.04600000	1390.373	WALL
1136	5106.79000000	3815.34000000	1389.712	WALL
1137	5105.70000000	3742.48700000	1389.701	WALL
1138	5104.51600000	3678.14000000	1389.062	WALL
1139	5121.89200000	3671.62700000	1387.473	NATURAL GROUND
1140	5146.28800000	3669.91400000	1388.555	NATURAL GROUND
1141	5152.35600000	3697.16900000	1389.822	NATURAL GROUND
1142	5127.18400000	3702.55500000	1388.162	NATURAL GROUND
1143	5131.04400000	3737.83500000	1389.234	NATURAL GROUND
1144	5158.74000000	3737.19100000	1389.936	NATURAL GROUND
1145	5159.57300000	3762.09300000	1389.338	NATURAL GROUND
1146	5132.08600000	3763.08400000	1389.035	NATURAL GROUND
1147	5133.07700000	3788.43100000	1389.520	NATURAL GROUND
1148	5158.37600000	3788.00100000	1389.152	NATURAL GROUND
1149	5158.44300000	3820.01200000	1389.279	NATURAL GROUND
1150	5127.93900000	3820.42600000	1388.599	NATURAL GROUND
1151	5128.55800000	3849.35700000	1388.706	NATURAL GROUND
1152	5161.67200000	3853.91400000	1389.913	NATURAL GROUND
1153	5284.20500000	3272.48100000	1374.808	CHECK SHOT
1154	5163.52600000	3899.06100000	1391.358	NATURAL GROUND
1155	5130.95800000	3896.34700000	1389.788	NATURAL GROUND
1156	5206.84500000	3913.09300000	1376.695	NATURAL GROUND
1157	5215.95700000	3883.15400000	1376.615	NATURAL GROUND
1158	5227.06200000	3843.24700000	1376.011	NATURAL GROUND
1159	5242.80100000	3840.76000000	1376.552	MULTI-PURPOSE LINE
1160	5215.80100000	3828.14200000	1375.539	MULTI-PURPOSE LINE
1161	5228.69700000	3831.04000000	1374.914	NATURAL GROUND
1162	5249.21400000	3816.62500000	1374.688	INVERT ELEVATION
1163	5249.21400000	3816.62500000	1374.688	REINFOR. CONC. PIPE
1164	5232.31300000	3804.98800000	1375.151	NATURAL GROUND
1165	5234.86400000	3767.39300000	1374.798	NATURAL GROUND

96559 GREENWAY CHANNEL TOPO

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1166	5234.50600000	3716.16800000	1374.486	NATURAL GROUND
1167	5240.83200000	3645.58400000	1374.524	NATURAL GROUND
1168	5284.20500000	3272.48100000	1374.808	CHECK SHOT
1169	5517.97400000	3860.51800000	1390.265	CHECK SHOT
1170	5171.64000000	3918.51700000	1391.534	CHECK SHOT
1171	5465.04100000	3703.70700000	1389.738	BACK OF WALK
1172	5468.79100000	3729.71500000	1389.604	BACK OF WALK
1173	5481.81900000	3780.84200000	1386.748	BACK OF WALK
1174	5486.01700000	3812.48800000	1384.696	BACK OF WALK
1175	5486.12100000	3828.89900000	1383.494	BACK OF WALK
1176	5481.29000000	3845.11400000	1382.610	BACK OF WALK
1177	5467.63800000	3859.80500000	1381.427	BACK OF WALK
1178	5450.02800000	3868.70100000	1380.026	BACK OF WALK
1179	5419.61900000	3871.61800000	1378.440	BACK OF WALK
1180	5423.61200000	3860.81400000	1378.565	BACK OF WALK
1181	5447.72600000	3861.27700000	1380.011	BACK OF WALK
1182	5421.25900000	3865.96500000	1378.469	CONCRETE ELEVATION
1183	5462.94200000	3853.44800000	1381.304	BACK OF WALK
1184	5474.40100000	3841.40500000	1382.555	BACK OF WALK
1185	5478.19800000	3828.40000000	1383.400	BACK OF WALK
1186	5478.25900000	3812.91300000	1384.557	BACK OF WALK
1187	5474.14300000	3782.30800000	1386.661	BACK OF WALK
1188	5469.31200000	3760.64900000	1388.039	BACK OF WALK
1189	5461.63200000	3738.38100000	1389.504	BACK OF WALK
1190	5457.34100000	3733.54600000	1389.934	BACK OF WALK
1191	5457.33200000	3733.55100000	1389.917	TOP OF BANK
1192	5447.25700000	3768.30300000	1390.167	TOP OF BANK
1193	5434.92400000	3812.93500000	1390.010	STREET LIGHT MAST
1194	5433.46100000	3814.32600000	1390.481	STREET LIGHT J-BOX
1195	5425.11100000	3836.91600000	1390.554	TOP OF BANK
1196	5413.68600000	3868.79800000	1390.610	TOP OF BANK
1197	5399.91300000	3904.00400000	1390.820	TOP OF BANK
1198	5397.57400000	3913.68100000	1390.816	TRAFFIC SIGNAL J-BOX
1199	5392.42700000	3921.82000000	1390.911	TOP OF BANK
1200	5373.68900000	3964.61000000	1390.930	TOP OF BANK
1201	5403.98300000	3895.43800000	1390.014	SIGN
1202	5404.48600000	3894.32600000	1390.534	MULTI-PURPOSE LINE
1203	5423.16300000	3844.11700000	1389.967	MULTI-PURPOSE LINE
1204	5437.62400000	3853.11600000	1387.543	HEADWALL
1205	5423.18300000	3859.63000000	1387.567	HEADWALL
1206	5413.50000000	3885.44800000	1387.610	HEADWALL
1207	5419.67600000	3898.29600000	1387.555	HEADWALL
1208	5392.26700000	3922.40400000	1390.850	MULTI-PURPOSE LINE
1209	5405.40600000	3929.45300000	1387.431	MULTI-PURPOSE LINE
1210	5420.56600000	3898.25500000	1383.992	CONCRETE HEADER
1211	5407.50300000	3927.50800000	1387.286	CONCRETE HEADER
1212	5390.91300000	3964.22600000	1388.367	CONCRETE HEADER
1213	5401.39800000	3963.87300000	1387.162	VOID SHOT
1214	5401.44400000	3964.37800000	1387.240	CONCRETE ELEVATION

96559 GREENWAY CHANNEL TOPO

ject: channel Tue Dec 15 15:09:04 1998

Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1215	5415.70300000	3963.45800000	1388.087	CONCRETE ELEVATION
1216	5450.12100000	3961.92300000	1390.258	CONCRETE HEADER
1217	5472.15800000	3961.56800000	1386.096	CONCRETE ELEVATION
1218	5483.03200000	3961.04800000	1385.600	CONCRETE HEADER
1219	5491.55400000	3961.15100000	1386.056	CONCRETE ELEVATION
1220	5511.87000000	3960.23500000	1390.100	CONCRETE HEADER
1221	5512.52800000	3949.45400000	1390.191	CONCRETE HEADER
1222	5512.64700000	3950.06300000	1390.194	VOID SHOT
1223	5513.88900000	3933.10600000	1390.062	VOID SHOT
1224	5514.15000000	3933.72100000	1390.017	CONCRETE ELEVATION
1225	5515.44700000	3911.35500000	1390.381	CONCRETE HEADER
1226	5516.58600000	3898.08100000	1387.049	CONCRETE ELEVATION
1227	5516.94200000	3886.10000000	1389.510	CONCRETE HEADER
1228	5490.79700000	3882.62100000	1387.257	CONCRETE HEADER
1229	5460.20500000	3878.18600000	1382.673	CONCRETE HEADER
1230	5436.00500000	3874.75800000	1379.518	CONCRETE HEADER
1231	5419.23700000	3872.70500000	1378.473	CONCRETE HEADER
1232	5419.19600000	3872.90500000	1378.169	HEADWALL
1233	5417.69500000	3877.21600000	1378.114	HW E
1234	5417.11200000	3879.47900000	1376.166	INV.
1235	5416.46800000	3879.67300000	1382.333	REINFOR. CONC. PIPE
1236	5416.34900000	3882.38500000	1377.906	HEADWALL
1237	5415.22300000	3885.57500000	1377.908	HEADWALL
1238	5417.08900000	3889.47500000	1377.921	HEADWALL
1239	5514.85100000	3884.82100000	1389.362	CONCRETE HEADER
1240	5511.48300000	3882.07000000	1389.556	CONCRETE HEADER
1241	5503.95600000	3876.01800000	1388.885	CONCRETE HEADER
1242	5495.55200000	3868.91000000	1387.779	CONCRETE HEADER
1243	5475.83700000	3852.80700000	1382.047	CONCRETE HEADER
1244	5520.74300000	3887.07100000	1390.159	TOP OF BANK
1245	5510.83000000	3875.95100000	1390.094	TOP OF BANK
1246	5504.07700000	3868.68200000	1389.494	TOP OF BANK
1247	5511.08200000	3846.40500000	1389.734	TOP OF BANK
1248	5513.70700000	3805.58500000	1389.780	TOP OF BANK
1249	5507.15600000	3760.60500000	1390.375	TOP OF BANK
1250	5497.81700000	3732.29300000	1390.216	TOP OF BANK
1251	5484.35700000	3717.82300000	1389.808	TOP OF BANK
1252	5465.78700000	3712.01700000	1389.734	TOP OF BANK
1253	5433.34900000	3813.48900000	1390.220	MULTI-PURPOSE LINE
1254	5454.78400000	3823.77300000	1385.556	MULTI-PURPOSE LINE
1255	5472.16500000	3844.81400000	1382.127	MULTI-PURPOSE LINE
1256	5471.63200000	3840.68800000	1382.530	SIGN
1257	5417.31800000	3879.72100000	1376.507	BOTTOM OF BANK
1258	5420.22000000	3886.32500000	1376.843	BOTTOM OF BANK
1259	5427.10600000	3886.78400000	1377.153	BOTTOM OF BANK
1260	5432.00500000	3896.30500000	1378.289	BOTTOM OF BANK
1261	5446.30200000	3897.30300000	1379.403	BOTTOM OF BANK
1262	5450.17200000	3888.48900000	1379.754	BOTTOM OF BANK
1263	5473.36700000	3890.22500000	1382.966	BOTTOM OF BANK

96559 GREENWAY CHANNEL TOPO

ɔject: channel Tue Dec 15 15:09:04 1998

Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1264	5503.72700000	3897.30800000	1386.187	BOTTOM OF BANK
1265	5467.48100000	3916.76000000	1382.623	VOID SHOT
1266	5520.04300000	3899.93600000	1387.489	DIRT DITCH
1267	5550.98200000	3905.94800000	1383.974	VOID SHOT
1268	5550.99100000	3905.69000000	1387.639	DIRT DITCH
1269	5576.04100000	3910.42000000	1387.841	DIRT DITCH
1270	5611.84300000	3917.23600000	1388.159	DIRT DITCH
1271	5641.44100000	3922.99600000	1388.176	DIRT DITCH
1272	5671.87400000	3928.07800000	1388.263	DIRT DITCH
1273	5696.27400000	3931.95400000	1388.428	DIRT DITCH
1274	5723.14000000	3937.35000000	1388.761	DIRT DITCH
1275	5726.13700000	3925.54000000	1389.796	NATURAL GROUND
1276	5691.02900000	3944.32800000	1390.440	NATURAL GROUND
1277	5696.81900000	3918.08200000	1390.396	NATURAL GROUND
1278	5663.16000000	3938.45700000	1390.102	NATURAL GROUND
1279	5671.24000000	3912.91900000	1391.014	NATURAL GROUND
1280	5637.55900000	3934.81200000	1390.135	NATURAL GROUND
1281	5643.77700000	3906.87000000	1391.530	NATURAL GROUND
1282	5611.05900000	3930.71200000	1390.217	NATURAL GROUND
1283	5618.41100000	3902.00000000	1391.627	NATURAL GROUND
1284	5585.37300000	3926.01900000	1390.561	NATURAL GROUND
1285	5593.85500000	3896.69900000	1391.428	NATURAL GROUND
1286	5558.08500000	3921.25800000	1390.350	NATURAL GROUND
1287	5567.02300000	3891.79300000	1390.966	NATURAL GROUND
1288	5535.33200000	3917.41600000	1390.795	NATURAL GROUND
1289	5542.91600000	3889.28700000	1390.742	NATURAL GROUND
1290	5516.72100000	3912.40100000	1390.448	NATURAL GROUND
1291	5525.55700000	3886.61400000	1390.810	NATURAL GROUND
1292	5515.07300000	3912.43600000	1390.446	GRADE BREAK LINE
1293	5496.36400000	3905.13800000	1387.888	GRADE BREAK LINE
1294	5465.10400000	3895.04600000	1381.988	GRADE BREAK LINE
1295	5444.52900000	3890.72600000	1379.117	BOTTOM OF BANK
1296	5461.87800000	3908.44200000	1381.680	BOTTOM OF BANK
1297	5473.39800000	3926.42600000	1383.448	BOTTOM OF BANK
1298	5484.13500000	3961.42600000	1385.637	BOTTOM OF BANK
1299	5440.36200000	3888.97500000	1378.522	BOTTOM OF BANK
1300	5437.89500000	3917.72000000	1381.950	BOTTOM OF BANK
1301	5416.84400000	3942.14300000	1385.907	BOTTOM OF BANK
1302	5401.80500000	3964.03100000	1387.195	BOTTOM OF BANK
1303	4455.63200000	7701.15300000	1407.949	CHECK SHOT
1304	4287.75400000	7941.77300000	1409.312	CHECK SHOT
1305	4274.66900000	7791.25200000	1399.201	HEADWALL
1306	4278.35900000	7812.53000000	1407.740	HEADWALL
1307	4270.13300000	7814.84200000	1407.760	HEADWALL
1308	4292.73300000	7794.61200000	1408.606	FENCE
1309	4284.57000000	7806.21800000	1408.682	FENCE
1310	4270.09200000	7827.30400000	1408.379	FENCE
1311	4291.28200000	7789.85300000	1407.801	TOP OF CURB ELEV.
1312	4277.40400000	7803.27700000	1406.924	TOP OF BANK

96559 GREENWAY CHANNEL TOPO

ject: channel

Tue Dec 15 15:09:05 1998

Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1313	4271.25400000	7816.36800000	1407.374	TOP OF BANK
1314	4262.65900000	7824.69000000	1407.259	TOP OF CURB ELEV.
1315	4267.63400000	7801.29800000	1396.756	CONCRETE ELEVATION
1316	4274.10400000	7812.86500000	1396.739	CONCRETE ELEVATION
1317	4274.49200000	7813.71000000	1396.767	INVERT ELEVATION
1318	4274.35000000	7813.74300000	1396.755	REINFOR. CONC. PIPE
1319	5026.82400000	6363.59200000	1402.013	CHECK SHOT
1320	5012.61200000	6612.60900000	1402.450	CHECK SHOT
1321	4966.33300000	6522.21800000	1401.261	BW PCN B
1322	4964.69000000	6542.01100000	1401.403	BACK OF WALK
1323	4964.82300000	6546.52400000	1401.278	BACK OF WALK
1324	4965.02000000	6551.81200000	1401.224	BW PTN E
1325	4974.26500000	6523.04800000	1401.163	VOID SHOT
1326	4972.44100000	6542.99900000	1401.254	VOID SHOT
1327	4967.72700000	6557.65600000	1400.953	VOID SHOT
1328	4967.53500000	6557.70800000	1400.914	PR B
1329	4962.40700000	6559.05300000	1400.742	PEDESTRIAN RAMP
1330	4965.02600000	6561.18700000	1400.667	PR E
1331	4962.04200000	6565.03600000	1400.553	CONCRETE ELEVATION
1332	4955.46400000	6568.88000000	1400.678	PR B
1333	4957.18900000	6564.12700000	1400.622	PEDESTRIAN RAMP
1334	4959.14300000	6566.74100000	1400.464	PR E
1335	4951.28600000	6571.03100000	1400.916	VOID SHOT
1336	4940.65500000	6573.94500000	1400.913	VOID SHOT
1337	4943.61400000	6573.43100000	1400.911	EC B
1338	4940.77100000	6569.38600000	1400.990	EDGE OF CONCRETE
1339	4917.87600000	6570.58900000	1400.169	CONCRETE ELEVATION
1340	4877.70200000	6572.72900000	1400.152	EDGE OF CONCRETE
1341	4866.05300000	6577.79500000	1400.802	EC E
1342	4900.60200000	6576.02200000	1400.183	CONCRETE ELEVATION
1343	4865.37000000	6577.94600000	1400.913	VOID SHOT
1344	4834.82500000	6579.43500000	1401.311	VOID SHOT
1345	4829.69100000	6572.44800000	1401.411	POWER POLE
1346	4835.08700000	6571.91200000	1402.242	REBAR
1347	4836.55700000	6573.06000000	1401.664	SIGN
1348	4839.92900000	6573.99400000	1398.701	FIRE HYDRANT
1349	4855.56000000	6572.46300000	1400.909	DOWN GUY
1350	4829.07900000	6574.93700000	1401.392	EP PCN B
1351	4855.91000000	6572.96200000	1401.142	EDGE OF PAVEMENT
1352	4871.47600000	6555.44100000	1399.973	EDGE OF PAVEMENT
1353	4884.30800000	6562.24900000	1399.582	EDGE OF PAVEMENT
1354	4906.79800000	6561.86900000	1399.489	EDGE OF PAVEMENT
1355	4950.65900000	6561.00300000	1399.513	EP PTN E
1356	4951.09400000	6564.61700000	1400.795	GBL B
1357	4915.65900000	6563.44500000	1399.804	GBL E
1358	4943.62200000	6573.41800000	1400.912	VOID SHOT
1359	4940.78200000	6569.35800000	1400.987	VOID SHOT
1360	4940.53500000	6573.92700000	1400.938	DR B
1361	4940.34000000	6569.39200000	1400.986	DRIVEWAY RAMP

96559 GREENWAY CHANNEL TOPO

ject: channel Tue Dec 15 15:09:06 1998

Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1362	4934.84100000	6574.08400000	1400.408	DR E
1363	4866.24300000	6577.72800000	1400.773	DR B
1364	4877.80300000	6572.73300000	1400.162	DRIVEWAY RAMP
1365	4878.54700000	6577.09900000	1400.262	DR E
1366	4876.91500000	6574.93400000	1400.251	MPL B
1367	4942.52800000	6571.66400000	1400.931	MPL E
1368	4943.30900000	6570.89900000	1401.034	SIGN
1369	4951.83900000	6563.86100000	1400.751	TRAFFIC SIGNAL MAST
1370	4957.72900000	6560.61800000	1400.662	TRAFFIC SIGNAL J-BOX
1371	4959.67900000	6553.24300000	1400.989	IRRIGATION VALVE
1372	4963.57100000	6541.29000000	1398.816	FIRE HYDRANT
1373	4963.30800000	6543.72600000	1401.199	MPL B
1374	4951.83500000	6562.96500000	1400.689	MULTI-PURPOSE LINE
1375	4935.06300000	6563.49200000	1400.120	MPL E
1376	4964.12900000	6550.09800000	1400.981	TRAFFIC SIGNAL
1377	4964.37700000	6551.71000000	1401.231	TC B
1378	4952.32100000	6564.38000000	1400.987	TC E
1379	4951.56900000	6563.18400000	1401.028	TC B
1380	4951.28300000	6560.76500000	1401.134	TOP OF CURB ELEV.
1381	4963.00200000	6539.51400000	1401.346	TOP OF CURB ELEV.
1382	4964.68200000	6539.51500000	1401.381	TC E
1383	4974.36000000	6523.00300000	1401.182	VL B
1384	4974.94800000	6522.97000000	1400.691	GUTTER ELEVATION
1385	4972.54800000	6542.77900000	1401.265	VL PCN
1386	4973.09200000	6542.82500000	1400.786	GUTTER ELEVATION
1387	4969.71700000	6553.59500000	1401.148	TOP OF CURB ELEV.
1388	4970.26400000	6553.80300000	1400.686	GUTTER ELEVATION
1389	4961.90000000	6564.70000000	1400.552	CONCRETE ELEVATION
1390	4951.24700000	6570.97300000	1400.917	TOP OF CURB ELEV.
1391	4951.43200000	6571.48100000	1400.464	GUTTER ELEVATION
1392	4940.64100000	6573.96200000	1397.160	VL PTN
1393	4940.80000000	6574.59500000	1400.455	GUTTER ELEVATION
1394	4829.90700000	6579.64400000	1401.352	VL E
1395	4829.99000000	6580.29000000	1400.832	GUTTER ELEVATION
1396	4839.46700000	6580.75500000	1400.754	WATER VALVE
1397	4839.19800000	6591.60200000	1400.962	WATER VALVE
1398	4873.61000000	6600.76300000	1400.765	SEWER MANHOLE
1399	4957.80200000	6547.45600000	1399.567	HWR W 2 B
1400	4950.71200000	6560.83000000	1399.487	HWR W 2
1401	4884.55000000	6562.24700000	1399.588	HWR W 2
1402	4876.76000000	6548.94700000	1399.562	HWR W 2 E
1403	4964.37700000	6551.70400000	1401.220	SL B
1404	4952.43200000	6564.38500000	1400.955	SL E
1405	4951.75000000	6563.23100000	1401.036	SL B
1406	4951.36900000	6560.74200000	1401.122	SINGLE CURB
1407	4962.79000000	6539.89200000	1401.353	SL PCN
1408	4964.68600000	6539.51800000	1401.370	SL PTN E
1409	4865.32900000	6668.06600000	1399.705	HWR W 2 B
1410	4872.51500000	6654.35900000	1399.618	HWR W 2

96559 GREENWAY CHANNEL TOPO

Project: channel Tue Dec 15 15:09:07 1998

Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1411	4938.78400000	6653.39000000	1399.667	HWR W 2
1412	4946.56900000	6666.86900000	1399.517	HWR W 2 E
1413	4937.05700000	6676.44200000	1396.272	HWR B
1414	4928.87700000	6690.17800000	1396.297	HWR E
1415	4932.13200000	6654.63200000	1390.019	CONCRETE ELEVATION
1416	4918.83700000	6654.73700000	1389.962	CONCRETE ELEVATION
1417	4905.69300000	6654.81100000	1390.000	CONCRETE ELEVATION
1418	4892.39700000	6655.02200000	1389.960	CONCRETE ELEVATION
1419	4879.45100000	6654.96500000	1389.916	CONCRETE ELEVATION
1420	4932.43400000	6683.04300000	1406.564	RCP S 4 NJ
1421	4932.09500000	6682.67900000	1390.510	INVERT ELEVATION
1422	4943.76400000	6560.15800000	1389.823	CONCRETE ELEVATION
1423	4930.71900000	6560.41400000	1389.860	CONCRETE ELEVATION
1424	4917.59000000	6560.61900000	1389.868	CONCRETE ELEVATION
1425	4904.21000000	6560.57300000	1389.886	CONCRETE ELEVATION
1426	4890.56600000	6561.15000000	1389.904	CONCRETE ELEVATION
1427	4952.60400000	6553.83600000	1389.515	INVERT ELEVATION
1428	4952.80300000	6553.98800000	1389.520	RCP S 7 NJ
1429	4455.55400000	7701.17100000	1407.944	BRASS CAP FLUSH
1430	4455.55400000	7701.17100000	1407.944	BRASS CAP FLUSH
1431	4455.55400000	7701.17100000	1407.949	CHECK SHOT
1433	4455.60400000	7701.16400000	1407.939	BRASS CAP FLUSH
1441	3896.80000000	8735.61100000	1411.945	CHECK SHOT
1442	3910.56000000	9265.37000000	1412.800	CHECK SHOT
1443	3709.88800000	9215.11800000	1414.548	VL B
1444	3710.47400000	9215.30800000	1414.037	GUTTER ELEVATION
1445	3708.39600000	9224.77100000	1414.098	GUTTER ELEVATION
1446	3707.80500000	9224.64200000	1414.521	VL PCN
1447	3701.50300000	9237.73700000	1414.410	VERTICAL CURB
1448	3701.86500000	9238.08600000	1413.955	GUTTER ELEVATION
1449	3695.56400000	9240.75700000	1414.390	TRAFFIC SIGNAL J-BOX
1450	3690.67100000	9246.02400000	1414.372	VERTICAL CURB
1451	3690.90300000	9246.52600000	1413.954	GUTTER ELEVATION
1452	3680.74900000	9247.85900000	1413.937	VL PTN
1453	3680.74500000	9247.87600000	1413.936	PR B
1454	3680.70900000	9242.96200000	1414.348	PEDESTRIAN RAMP
1455	3685.84300000	9247.34700000	1414.317	PR E
1456	3676.85100000	9248.01800000	1413.873	PR B
1457	3676.85100000	9243.04200000	1414.290	PEDESTRIAN RAMP
1458	3671.67400000	9248.01700000	1414.211	PR E
1459	3667.92800000	9248.13900000	1414.185	EC B
1460	3670.56700000	9235.70300000	1414.340	EC E
1461	3649.09700000	9249.07800000	1413.543	GUTTER ELEVATION
1462	3649.12300000	9248.42500000	1414.041	VERTICAL CURB
1463	3620.03100000	9248.85600000	1413.692	VL E
1464	3620.03900000	9249.49100000	1413.215	GUTTER ELEVATION
1465	3624.33200000	9236.16000000	1413.911	SL B
1466	3619.24100000	9240.81300000	1413.950	SL E
1467	3619.95100000	9240.83700000	1413.859	EC B

96559 GREENWAY CHANNEL TOPO

ject: channel Tue Dec 15 15:09:08 1998

Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1468	3619.93000000	9248.85300000	1413.671	EC E
1469	3649.41300000	9241.83500000	1414.117	CONCRETE ELEVATION
1470	3669.36700000	9241.43500000	1414.323	CONCRETE ELEVATION
1471	3692.69500000	9232.75900000	1414.528	CONCRETE ELEVATION
1472	3704.59200000	9213.84700000	1414.484	CONCRETE ELEVATION
1473	3699.46900000	9214.37600000	1414.314	SIGN
1474	3699.46600000	9214.37300000	1413.879	HWR W 2.7 B
1475	3678.95800000	9235.53800000	1412.410	HWR W 2.7
1476	3624.66700000	9236.47700000	1412.506	HWR W 2.7
1477	3617.70000000	9222.23600000	1413.893	HWR W 2.7 E
1478	3617.65600000	9222.68300000	1414.802	F B
1479	3613.83400000	9222.10400000	1414.702	F E
1480	3609.68100000	9221.59600000	1415.037	GATE
1481	3613.81900000	9222.15000000	1414.729	GATE
1482	3723.44900000	9254.75600000	1413.620	STORM DRAIN MANHOLE
1483	3724.56700000	9209.63300000	1413.728	SEWER MANHOLE
1484	3672.16200000	9335.88700000	1412.279	HWL W 2.7 B
1485	3672.52900000	9316.96000000	1412.268	HWL W 2.7
1486	3665.36300000	9301.96000000	1412.275	HWL W 2.7
1487	3612.05200000	9303.06400000	1412.354	HWL W 2.7 E
1488	3612.02900000	9302.97600000	1412.256	HWL W 2 B
1489	3601.56100000	9314.88400000	1415.999	VOID SHOT
1490	3601.34600000	9315.19200000	1412.269	HWL W 2 E
1491	3896.78400000	8735.66900000	1411.932	CHECK SHOT
1492	3672.02600000	9234.09300000	1401.423	CONCRETE ELEVATION
1493	3658.67500000	9234.50200000	1401.436	CONCRETE ELEVATION
1494	3645.26400000	9234.69300000	1401.507	CONCRETE ELEVATION
1495	3632.12300000	9234.94300000	1401.505	CONCRETE ELEVATION
1496	3683.94700000	9228.67200000	1417.705	RCP S 8.0 NJ
1497	3683.47100000	9228.05900000	1402.324	INVERT ELEVATION
1498	3658.77100000	9303.55900000	1401.693	CONCRETE ELEVATION
1499	3645.06000000	9303.74800000	1401.635	CONCRETE ELEVATION
1500	3631.57700000	9304.07300000	1401.620	CONCRETE ELEVATION
1501	3618.50900000	9304.33600000	1401.498	CONCRETE ELEVATION
1502	3628.96600000	9366.35600000	1402.024	STORM DRAIN MANHOLE
1503	3609.38400000	9314.08700000	1401.771	CONCRETE ELEVATION
1507	3663.03800000	9314.59900000	1401.823	CONCRETE ELEVATION
1511	3896.78400000	8735.66900000	1411.919	CHECK SHOT
1512	3625.83100000	9196.03900000	1412.395	SEWER MANHOLE

12-15-98 MJS

GREENWAY CHANNEL TOPO

ject: channel1 Tue Dec 15 15:09:44 1998
int statistics:
Starting point number: 1
Current point number: 6 ('L' indicates locked point)

Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
3	5456.04330000	3321.47761000	1386.370	BCF-L
4	5171.66287000	3918.52203000	1391.540	RB-GPS
5	5284.20763000	3272.47094000	1374.830	RB-L
8	4931.16563000	6565.89956000	1400.200	PKN-L
9	4743.55941000	7126.03099000	1392.450	N-GPS
10	4257.89713000	7746.53724000	1407.070	RB-GPS
11	3926.03216000	8318.00084000	1409.210	RB-GPS
14	3346.78651000	11844.16258000	1419.440	N-L
15	3677.38556000	10480.08207000	1414.450	BCF-L
16	3579.95748000	10941.87920000	1415.690	RB-GPS
17	3591.06511000	10240.51712000	1412.060	RB-L
18	3747.42987000	9267.80137000	1413.210	BCF-L
19	3979.86409000	11905.19435000	1422.300	BCF-L
20	3896.79664000	8735.62415000	1411.990	BCF-L/1411.93 GPS
22	4287.76202000	7941.81512000	1409.370	BCF-L
23	4455.60426000	7701.15967000	1407.960	BCF-L
24	4696.55211000	7381.98178000	1406.560	BCF-L/1406.64 GPS
25	5012.61535000	6612.60964000	1402.460	BCF-L
26	5026.81238000	6363.61731000	1402.030	BCF-L
27	5000.00021000	5000.00017000	1396.580	BCF-L
28	5127.33103000	4380.76934000	1392.610	BCF-L
29	5315.01812000	3966.58559000	1389.370	BCF-L
30	5328.58982000	3936.61533000	1389.130	BCF-GPS
31	3576.89077000	9576.56336000	1402.870	PKN-GPS
32	3905.57406000	9265.47307000	1412.800	BCF-L
33	3910.57044000	9265.36876000	1412.830	BCF-L
34	5018.59214000	5947.25356000	1400.740	BCF-GPS
1000	5183.45800000	3871.82500000	1390.322	NATURAL GROUND
1001	5153.20300000	3869.43600000	1391.278	NATURAL GROUND
1002	5108.72800000	3856.92500000	1388.719	NATURAL GROUND
1006	5126.99700000	4067.66700000	1387.967	NATURAL GROUND
1007	5103.54500000	4058.72800000	1389.746	NATURAL GROUND
1008	5040.23000000	4035.46600000	1390.072	NATURAL GROUND
1009	5021.36000000	4022.85700000	1391.087	NATURAL GROUND
1012	5047.17300000	4241.91000000	1388.590	NATURAL GROUND
1013	5021.24700000	4236.35700000	1392.551	NATURAL GROUND
1014	5000.99300000	4230.47300000	1393.066	NATURAL GROUND
1015	4951.43700000	4433.09400000	1392.778	NATURAL GROUND
1016	4966.27000000	4428.26400000	1390.652	NATURAL GROUND
1021	4909.66600000	4622.01300000	1391.481	NATURAL GROUND
1022	4897.79500000	4621.91900000	1394.483	NATURAL GROUND
1023	4862.65200000	4829.25500000	1394.593	NATURAL GROUND
1024	4875.92300000	4830.58300000	1393.340	NATURAL GROUND
1027	4857.12800000	5045.71500000	1396.340	NATURAL GROUND
1028	4870.97300000	5044.81800000	1394.129	NATURAL GROUND

GREENWAY CHANNEL TOPO

ject: channel1 Tue Dec 15 15:09:46 1998

Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1033	4874.39600000	5256.06900000	1395.476	NATURAL GROUND
1034	4866.44600000	5255.05500000	1396.824	NATURAL GROUND
1035	4875.69000000	5292.60200000	1396.011	NATURAL GROUND
1036	4862.50900000	5290.11400000	1398.082	NATURAL GROUND
1037	4833.25900000	5295.04100000	1398.919	NATURAL GROUND
1038	4784.12100000	5298.79700000	1399.540	NATURAL GROUND
1039	4751.16100000	5299.31900000	1398.366	NATURAL GROUND
1040	4735.13500000	5299.14100000	1396.188	NATURAL GROUND
1041	4733.98000000	5300.31400000	1396.125	CONCRETE ELEVATION
1042	4726.66200000	5308.34700000	1395.677	CONCRETE ELEVATION
1043	4714.91900000	5317.10000000	1396.336	CONCRETE ELEVATION
1044	4744.23700000	5317.86400000	1396.449	CONCRETE ELEVATION
1045	4746.02500000	5310.60900000	1395.575	CONCRETE ELEVATION
1046	4746.57700000	5302.51900000	1396.289	CONCRETE ELEVATION
1047	4717.63000000	5326.93800000	1397.313	NATURAL GROUND
1048	4790.69600000	5322.80500000	1397.500	NATURAL GROUND
1049	4831.87900000	5324.59800000	1397.487	NATURAL GROUND
1050	4834.23800000	5374.71800000	1397.972	NATURAL GROUND
1051	4827.26100000	5374.87100000	1397.170	NATURAL GROUND
1052	4828.66700000	5428.26600000	1397.436	NATURAL GROUND
1053	4836.42500000	5427.62400000	1397.538	NATURAL GROUND
1054	4854.47400000	5428.20100000	1397.759	NATURAL GROUND
1055	4854.58600000	5361.49900000	1397.373	NATURAL GROUND
1056	4853.44900000	5324.02500000	1396.211	NATURAL GROUND
1059	4838.55700000	5424.92100000	1396.100	NATURAL GROUND
1060	4851.55200000	5424.87900000	1396.130	NATURAL GROUND
1061	4850.82700000	5410.90500000	1394.578	NATURAL GROUND
1062	4839.46400000	5410.77500000	1394.581	NATURAL GROUND
1063	4838.89100000	5397.44000000	1393.831	NATURAL GROUND
1064	4850.50000000	5396.71200000	1393.428	NATURAL GROUND
1065	4850.01400000	5382.71500000	1392.723	NATURAL GROUND
1066	4838.66600000	5382.84200000	1392.867	NATURAL GROUND
1067	4838.49100000	5367.74300000	1392.030	NATURAL GROUND
1068	4849.23500000	5367.32900000	1391.743	NATURAL GROUND
1069	4848.91300000	5351.41900000	1390.582	NATURAL GROUND
1070	4838.74800000	5351.98200000	1390.773	NATURAL GROUND
1071	4838.25200000	5337.22300000	1390.035	NATURAL GROUND
1072	4848.77000000	5336.93700000	1389.826	NATURAL GROUND
1090	4869.46600000	5477.60300000	1397.019	NATURAL GROUND
1091	4877.76500000	5478.56600000	1396.806	NATURAL GROUND
1096	4884.92000000	5626.05900000	1393.267	CONCRETE ELEVATION
1097	4877.81300000	5635.53800000	1396.613	CONCRETE ELEVATION
1098	4870.87900000	5636.86600000	1396.897	CONCRETE ELEVATION
1099	4872.64600000	5678.22200000	1397.677	NATURAL GROUND
1100	4881.72700000	5678.62500000	1397.288	NATURAL GROUND
1105	4876.96500000	5891.67300000	1398.940	NATURAL GROUND
1106	4884.27800000	5891.52800000	1398.575	NATURAL GROUND
1110	4843.20500000	6673.65800000	1402.313	NATURAL GROUND
1111	4861.02000000	6676.74600000	1399.700	NATURAL GROUND

GREENWAY CHANNEL TOPO

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1115	4824.48800000	6724.38000000	1402.623	NATURAL GROUND
1116	4819.21800000	6739.35900000	1400.157	NATURAL GROUND
1117	4819.20300000	6758.02300000	1402.863	NATURAL GROUND
1118	4849.81800000	6745.86600000	1399.638	NATURAL GROUND
1119	4798.33500000	6860.31800000	1403.889	NATURAL GROUND
1120	4819.08500000	6868.62600000	1399.727	NATURAL GROUND
1123	4725.69400000	7037.16700000	1404.032	NATURAL GROUND
1124	4740.13200000	7045.02200000	1400.498	NATURAL GROUND
1128	4639.78200000	7215.31700000	1406.247	NATURAL GROUND
1129	4648.59500000	7221.31200000	1401.869	NATURAL GROUND
1137	4509.40300000	7391.24900000	1406.688	NATURAL GROUND
1143	4403.90400000	7541.12800000	1406.642	NATURAL GROUND
1149	4274.59200000	7713.34700000	1407.701	NATURAL GROUND
1155	4159.58800000	7888.71900000	1408.358	NATURAL GROUND
1162	4125.42700000	7928.49200000	1408.060	CONCRETE ELEVATION
1163	4123.04900000	7932.14900000	1405.472	CONCRETE ELEVATION
1164	4117.39900000	7941.54000000	1405.810	CONCRETE ELEVATION
1165	4127.92700000	7935.93500000	1406.557	SEWER MANHOLE
1166	4136.96100000	7932.49200000	1404.529	CONCRETE ELEVATION
1167	4128.15000000	7945.77800000	1404.652	CONCRETE ELEVATION
1168	4119.67900000	7945.37700000	1408.208	CONCRETE ELEVATION
1170	4048.30500000	8062.88700000	1409.943	NATURAL GROUND
1176	3959.02600000	8232.61400000	1410.313	NATURAL GROUND
1182	3874.80200000	8401.75800000	1410.835	NATURAL GROUND
1183	3890.67800000	8408.72100000	1407.771	NATURAL GROUND
1191	3814.68100000	8583.89800000	1409.483	NATURAL GROUND
1192	3802.31200000	8578.29000000	1411.665	NATURAL GROUND
1193	3732.39600000	8769.64500000	1412.761	NATURAL GROUND
1194	3744.28900000	8778.96600000	1410.570	NATURAL GROUND
1199	3556.71200000	8876.20400000	1410.510	CONCRETE ELEVATION
1200	3560.92300000	8867.46300000	1410.351	CONCRETE ELEVATION
1201	3554.75800000	8853.99700000	1410.811	GUTTER ELEVATION
1202	3549.28600000	8867.85100000	1410.498	GUTTER ELEVATION
1203	3538.66900000	8894.18400000	1410.909	GUTTER ELEVATION
1204	3627.68900000	8894.55600000	1410.027	CONCRETE ELEVATION
1205	3624.15600000	8903.57500000	1410.054	CONCRETE ELEVATION
1206	3684.65000000	8918.53200000	1409.711	CONCRETE ELEVATION
1207	3682.66700000	8927.24100000	1409.754	CONCRETE ELEVATION
1208	3690.42900000	8930.33200000	1409.003	CONCRETE ELEVATION
1209	3692.16000000	8922.34500000	1408.951	CONCRETE ELEVATION
1218	3643.10200000	9135.01700000	1410.957	NATURAL GROUND
1219	3628.47400000	9134.99300000	1413.773	NATURAL GROUND
1220	3568.50300000	9609.44400000	1403.205	CONCRETE ELEVATION
1221	3553.67000000	9867.48200000	1403.433	SEWER MANHOLE
1222	3544.80000000	9908.90900000	1403.864	CONCRETE ELEVATION
1223	3588.90400000	9903.49700000	1407.636	HEADWALL
1224	3588.22300000	9912.89500000	1407.555	HEADWALL
1225	3587.07400000	9904.98500000	1403.453	INVERT ELEVATION
1226	3586.79500000	9911.09500000	1403.398	INVERT ELEVATION

GREENWAY CHANNEL TOPO

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1227	3586.85400000	9911.18200000	1403.422	REINFOR. CONC. PIPE
1228	3587.03400000	9904.97500000	1403.537	REINFOR. CONC. PIPE
1229	3546.31300000	10272.87900000	1404.232	CONCRETE ELEVATION
1230	3571.34500000	10273.56000000	1404.196	CONCRETE ELEVATION
1231	3587.82900000	10466.38300000	1404.860	CONCRETE ELEVATION
1232	3575.89000000	10466.74400000	1404.636	CONCRETE ELEVATION
1235	3548.00500000	10540.92900000	1412.504	SEWER MANHOLE
1236	3389.44700000	11592.68500000	1409.266	CONCRETE ELEVATION
1237	3408.38300000	11600.27400000	1408.788	CONCRETE ELEVATION
1238	3416.02800000	11600.88700000	1409.137	CONCRETE ELEVATION
1239	3376.15100000	11786.40600000	1410.075	CONCRETE ELEVATION
1240	3362.79000000	11784.44300000	1409.719	CONCRETE ELEVATION
1241	3342.48800000	11780.02200000	1410.198	CONCRETE ELEVATION
1242	3333.48400000	11825.77800000	1410.151	CONCRETE ELEVATION
1243	3364.04700000	11832.50000000	1410.142	CONCRETE ELEVATION
1303	4455.63200000	7701.15300000	1407.949	CHECK SHOT
3000	5240.29800000	3893.61000000	1377.913	CONCRETE ELEVATION
3001	5230.72100000	3889.31100000	1377.741	CONCRETE ELEVATION
3002	5224.91500000	3886.45000000	1376.754	CONCRETE ELEVATION
3003	5224.02500000	3886.04000000	1376.715	CONCRETE ELEVATION
3004	5210.46300000	3882.56300000	1376.178	NATURAL GROUND
3005	5207.43700000	3882.31300000	1377.528	NATURAL GROUND
3006	5204.82200000	3880.95200000	1377.717	NATURAL GROUND
3007	5201.38100000	3988.83300000	1378.456	CONCRETE ELEVATION
3008	5196.06600000	3986.54900000	1378.581	CONCRETE ELEVATION
3009	5185.86400000	3981.58000000	1376.875	CONCRETE ELEVATION
3010	5177.44300000	3978.99600000	1377.095	NATURAL GROUND
3012	5053.88100000	4245.54100000	1379.876	NATURAL GROUND
3013	5068.17300000	4250.23500000	1379.627	CONCRETE ELEVATION
3014	5069.82200000	4250.86800000	1380.014	CONCRETE ELEVATION
3015	5081.69900000	4256.13500000	1380.254	CONCRETE ELEVATION
3016	5035.62900000	4307.55700000	1380.258	SEWER MANHOLE
3017	5036.30900000	4339.97600000	1379.468	STORM DRAIN MANHOLE
3018	5064.81100000	4292.78500000	1380.615	CONCRETE ELEVATION
3019	5057.01500000	4288.96000000	1380.226	CONCRETE ELEVATION
3020	5054.73200000	4283.09200000	1380.054	CONCRETE ELEVATION
3021	5053.66500000	4280.20900000	1379.624	CONCRETE ELEVATION
3022	5040.01900000	4274.30400000	1380.246	NATURAL GROUND
3023	5029.97300000	4292.86400000	1380.625	CONCRETE ELEVATION
3024	5040.25000000	4297.44600000	1380.000	CONCRETE ELEVATION
3025	5041.83100000	4306.53400000	1378.997	CONCRETE ELEVATION
3026	5054.34500000	4314.89100000	1380.520	NATURAL GROUND
3027	4973.63100000	4429.38900000	1381.527	CONCRETE ELEVATION
3028	4984.74800000	4433.96200000	1381.370	CONCRETE ELEVATION
3029	4992.25400000	4436.76700000	1379.469	CONCRETE ELEVATION
3030	4993.19400000	4436.87400000	1379.449	CONCRETE ELEVATION
3031	4997.79400000	4438.75700000	1379.333	NATURAL GROUND
3032	4938.87900000	4630.67600000	1381.296	NATURAL GROUND
3033	4933.46800000	4630.24100000	1380.809	CONCRETE ELEVATION

GREENWAY CHANNEL TOPO

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
3034	4932.63900000	4630.00100000	1380.846	CONCRETE ELEVATION
3035	4925.09100000	4628.59000000	1382.839	CONCRETE ELEVATION
3036	4914.30100000	4626.49100000	1383.011	CONCRETE ELEVATION
3037	4929.87800000	4665.73900000	1382.164	STORM DRAIN MANHOLE
3038	4882.14000000	4830.92800000	1384.232	CONCRETE ELEVATION
3039	4893.92000000	4832.13600000	1383.929	CONCRETE ELEVATION
3040	4900.01800000	4832.85400000	1382.425	CONCRETE ELEVATION
3041	4909.45900000	4833.03200000	1382.758	NATURAL GROUND
3042	4900.91400000	5003.95500000	1384.212	STORM DRAIN MANHOLE
3043	4877.72000000	5045.61500000	1385.087	CONCRETE ELEVATION
3044	4889.08500000	5045.48700000	1384.711	CONCRETE ELEVATION
3045	4896.47600000	5044.88300000	1383.120	CONCRETE ELEVATION
3046	4905.52600000	5045.06400000	1384.106	CONCRETE ELEVATION
3047	4886.65500000	5066.77000000	1384.993	SEWER MANHOLE
3048	4881.27000000	5256.75500000	1386.270	CONCRETE ELEVATION
3049	4892.83400000	5256.97200000	1385.914	CONCRETE ELEVATION
3050	4898.99100000	5256.54800000	1384.520	CONCRETE ELEVATION
3051	4914.14300000	5255.62200000	1386.501	NATURAL GROUND
3052	4899.46900000	5285.49300000	1384.497	CONCRETE ELEVATION
3053	4894.95000000	5295.55400000	1385.417	CONCRETE ELEVATION
3054	4894.73700000	5295.66700000	1387.007	CONCRETE ELEVATION
3055	4882.43000000	5320.33900000	1388.567	CONCRETE ELEVATION
3056	4882.43700000	5318.89500000	1387.041	CONCRETE ELEVATION
3057	4880.74200000	5318.27700000	1387.096	CONCRETE ELEVATION
3058	4904.98100000	5307.64400000	1386.201	STORM DRAIN MANHOLE
3060	4873.71800000	5312.14800000	1387.183	CATCH BASIN GRATE
3061	4873.76900000	5307.80100000	1387.097	CATCH BASIN GRATE
3062	4880.91800000	5299.35000000	1386.664	NATURAL GROUND
3063	4880.73200000	5307.88400000	1387.005	NATURAL GROUND
3064	4880.68600000	5318.10100000	1387.066	NATURAL GROUND
3065	4866.76100000	5317.95000000	1387.431	NATURAL GROUND
3066	4867.39300000	5310.04700000	1386.836	NATURAL GROUND
3067	4866.43100000	5300.35700000	1387.203	NATURAL GROUND
3068	4863.52800000	5301.13700000	1387.858	NATURAL GROUND
3069	4864.00500000	5309.54000000	1387.908	NATURAL GROUND
3070	4863.50800000	5318.26100000	1387.831	NATURAL GROUND
3071	4853.12900000	5318.70800000	1388.289	NATURAL GROUND
3072	4853.07100000	5310.52800000	1387.878	NATURAL GROUND
3073	4852.12500000	5301.10100000	1388.473	NATURAL GROUND
3074	4848.99600000	5302.11900000	1388.854	NATURAL GROUND
3075	4849.93700000	5308.27400000	1388.834	NATURAL GROUND
3076	4850.47100000	5319.70400000	1388.697	NATURAL GROUND
3077	4836.63200000	5319.83000000	1389.138	NATURAL GROUND
3078	4836.98200000	5302.06900000	1389.187	NATURAL GROUND
3079	4833.98500000	5302.15900000	1390.254	NATURAL GROUND
3080	4834.14300000	5319.00700000	1390.025	NATURAL GROUND
3081	4824.35600000	5318.09800000	1390.564	NATURAL GROUND
3082	4824.06800000	5302.23200000	1390.479	NATURAL GROUND
3083	4821.92500000	5302.27900000	1391.021	NATURAL GROUND

GREENWAY CHANNEL TOPO

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
3084	4822.41100000	5318.35900000	1390.934	NATURAL GROUND
3085	4809.36700000	5318.20900000	1391.320	NATURAL GROUND
3086	4809.61900000	5302.01500000	1391.518	NATURAL GROUND
3087	4808.13800000	5302.85800000	1392.117	NATURAL GROUND
3088	4807.70300000	5318.54400000	1392.007	NATURAL GROUND
3089	4794.66800000	5317.13000000	1392.298	NATURAL GROUND
3090	4794.56300000	5302.87000000	1392.454	NATURAL GROUND
3091	4792.72500000	5303.23700000	1393.105	NATURAL GROUND
3092	4792.83600000	5317.80700000	1392.961	NATURAL GROUND
3093	4779.49000000	5316.82600000	1393.087	NATURAL GROUND
3094	4779.22600000	5303.85100000	1393.094	NATURAL GROUND
3095	4777.03000000	5304.04900000	1393.515	NATURAL GROUND
3096	4776.85500000	5317.39800000	1393.705	NATURAL GROUND
3097	4763.84600000	5316.65200000	1394.317	NATURAL GROUND
3098	4764.28300000	5304.60300000	1393.975	NATURAL GROUND
3099	4761.41500000	5304.44100000	1394.510	NATURAL GROUND
3100	4761.24900000	5317.44700000	1394.661	NATURAL GROUND
3101	4747.84300000	5315.58300000	1395.028	NATURAL GROUND
3102	4748.05900000	5303.81900000	1395.107	NATURAL GROUND
3103	4882.74700000	5336.52000000	1386.835	CONCRETE ELEVATION
3104	4896.90700000	5337.64600000	1386.578	CONCRETE ELEVATION
3105	4906.88400000	5337.64900000	1386.320	CONCRETE ELEVATION
3106	4918.60500000	5337.67200000	1386.709	CONCRETE ELEVATION
3107	4923.76500000	5468.71100000	1387.083	CONCRETE ELEVATION
3108	4909.28200000	5469.92100000	1386.596	CONCRETE ELEVATION
3109	4886.00200000	5470.43100000	1387.162	CONCRETE ELEVATION
3110	4913.23100000	5658.37600000	1387.100	STORM DRAIN MANHOLE
3111	4927.50100000	5680.71200000	1387.874	CONCRETE ELEVATION
3112	4913.00100000	5680.70900000	1387.213	CONCRETE ELEVATION
3113	4889.62100000	5680.95500000	1387.981	CONCRETE ELEVATION
3114	4898.17400000	5788.20700000	1387.886	SEWER MANHOLE
3115	4894.11900000	5894.39600000	1388.689	CONCRETE ELEVATION
3116	4915.45000000	5894.14500000	1387.933	CONCRETE ELEVATION
3117	4932.08400000	5894.19400000	1388.715	CONCRETE ELEVATION
3118	4918.45000000	6011.02500000	1388.267	STORM DRAIN MANHOLE
3119	4935.84400000	6106.45500000	1389.408	CONCRETE ELEVATION
3120	4918.01200000	6107.27500000	1388.512	CONCRETE ELEVATION
3121	4898.18000000	6108.17800000	1389.326	CONCRETE ELEVATION
3122	4902.34100000	6316.47400000	1389.591	CONCRETE ELEVATION
3123	4920.05500000	6315.59800000	1389.154	CONCRETE ELEVATION
3124	4939.98700000	6314.57800000	1389.738	CONCRETE ELEVATION
3125	4927.46100000	6368.32100000	1389.350	STORM DRAIN MANHOLE
3126	4922.31100000	6522.26200000	1389.716	STORM DRAIN MANHOLE
3127	4908.37400000	6516.97200000	1389.670	SEWER MANHOLE
3128	4884.21700000	6522.52900000	1400.014	SEWER MANHOLE
3129	4874.57400000	6529.03100000	1399.268	NATURAL GROUND
3130	4883.41000000	6463.43100000	1399.338	NATURAL GROUND
3131	4897.02800000	6472.57900000	1399.054	NATURAL GROUND
3132	4884.22800000	6316.94000000	1400.140	NATURAL GROUND

GREENWAY CHANNEL TOPO

ject: channel1 Tue Dec 15 15:09:52 1998

Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
3133	4880.41100000	6107.12400000	1399.681	NATURAL GROUND
3134	4881.99900000	6187.29700000	1400.024	CONCRETE ELEVATION
3135	4891.19700000	6186.91000000	1399.376	CONCRETE ELEVATION
3136	4892.30000000	6186.44700000	1399.019	CONCRETE ELEVATION
3137	4893.09800000	6210.62400000	1399.048	CONCRETE ELEVATION
3138	4891.29700000	6210.60000000	1399.586	CONCRETE ELEVATION
3139	4882.12300000	6210.63100000	1400.133	CONCRETE ELEVATION
3140	4900.08600000	6691.28600000	1390.075	CATCH BASIN GRATE
3141	4898.07800000	6700.95400000	1390.102	CATCH BASIN GRATE
3142	4891.74500000	6716.32300000	1390.206	SEWER MANHOLE
3143	4930.37600000	6686.38700000	1390.194	CONCRETE ELEVATION
3144	4893.95800000	6683.38300000	1390.121	CONCRETE ELEVATION
3145	4869.52100000	6677.99100000	1390.254	CONCRETE ELEVATION
3146	4825.25300000	6870.01000000	1391.505	CONCRETE ELEVATION
3147	4844.44300000	6877.12400000	1391.283	CONCRETE ELEVATION
3148	4854.37300000	6879.76800000	1391.562	CONCRETE ELEVATION
3149	4751.84300000	7051.53000000	1392.517	CONCRETE ELEVATION
3150	4775.48000000	7063.07100000	1392.205	CONCRETE ELEVATION
3151	4785.93900000	7067.41900000	1392.428	CONCRETE ELEVATION
3152	4766.91500000	7047.32000000	1392.388	SEWER MANHOLE
3153	4783.75500000	7047.60800000	1392.006	STORM DRAIN MANHOLE
3154	4653.79900000	7224.88300000	1393.393	CONCRETE ELEVATION
3155	4674.83900000	7239.37600000	1392.857	CONCRETE ELEVATION
3156	4684.40600000	7245.49800000	1393.581	CONCRETE ELEVATION
3157	4591.54200000	7353.58200000	1393.227	SEWER MANHOLE
3158	4532.58900000	7396.64900000	1394.298	CONCRETE ELEVATION
3159	4549.82200000	7410.93200000	1393.619	CONCRETE ELEVATION
3160	4553.90600000	7414.03800000	1393.906	CONCRETE ELEVATION
3161	4457.74400000	7503.86200000	1394.599	SEWER MANHOLE
3162	4432.51600000	7563.82100000	1394.637	STORM DRAIN MANHOLE
3163	4437.88900000	7567.31800000	1394.707	CONCRETE ELEVATION
3164	4433.11900000	7563.53600000	1394.676	CONCRETE ELEVATION
3165	4416.19300000	7550.97400000	1395.280	CONCRETE ELEVATION
3166	4311.58200000	7738.65500000	1396.139	CONCRETE ELEVATION
3167	4306.74600000	7734.28800000	1395.773	CONCRETE ELEVATION
3168	4290.20500000	7720.78000000	1396.094	CONCRETE ELEVATION
3169	4277.83600000	7773.96900000	1395.971	STORM DRAIN MANHOLE
3170	4254.49600000	7810.28600000	1396.249	STORM DRAIN MANHOLE
3171	4192.04100000	7910.79600000	1396.544	CATCH BASIN GRATE
3172	4186.63500000	7919.14000000	1396.611	CATCH BASIN GRATE
3173	4145.08600000	7950.32200000	1397.296	SEWER MANHOLE
3174	4170.07300000	7896.46200000	1397.454	CONCRETE ELEVATION
3175	4177.99400000	7901.57000000	1396.999	CONCRETE ELEVATION
3176	4191.02200000	7909.63600000	1396.573	CONCRETE ELEVATION
3177	4194.47900000	7912.31600000	1396.967	CONCRETE ELEVATION
3178	4117.56300000	8025.35300000	1397.227	STORM DRAIN MANHOLE
3179	4071.43100000	8064.35700000	1397.642	CONCRETE ELEVATION
3180	4079.44800000	8068.81800000	1397.673	CONCRETE ELEVATION
3181	4091.09000000	8075.41600000	1397.341	CONCRETE ELEVATION

GREENWAY CHANNEL TOPO

ject: channel1 Tue Dec 15 15:09:53 1998

Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
3182	4095.63900000	8077.94600000	1397.800	CONCRETE ELEVATION
3183	3975.54300000	8290.72300000	1398.210	STORM DRAIN MANHOLE
3184	3995.41700000	8253.48200000	1398.077	CONCRETE ELEVATION
3185	3977.17000000	8243.22400000	1398.279	CONCRETE ELEVATION
3186	3920.96500000	8423.29400000	1399.210	CONCRETE ELEVATION
3187	3915.70300000	8420.22600000	1398.562	CONCRETE ELEVATION
3188	3897.41600000	8412.79800000	1398.783	CONCRETE ELEVATION
3189	3842.23800000	8552.01500000	1399.481	SEWER MANHOLE
3190	3856.74100000	8566.19100000	1399.110	STORM DRAIN MANHOLE
3191	3848.86000000	8593.87000000	1399.849	CONCRETE ELEVATION
3192	3844.27600000	8592.38000000	1399.277	CONCRETE ELEVATION
3193	3823.49600000	8584.87500000	1399.548	CONCRETE ELEVATION
3194	3785.42200000	8768.72600000	1400.382	CONCRETE ELEVATION
3195	3780.71300000	8767.16900000	1399.945	CONCRETE ELEVATION
3196	3759.29200000	8760.19700000	1400.077	CONCRETE ELEVATION
3197	3731.32100000	8928.76100000	1400.591	CATCH BASIN GRATE
3198	3728.64000000	8938.13600000	1400.324	CATCH BASIN GRATE
3199	3719.28500000	8958.00900000	1400.502	STORM DRAIN MANHOLE
3200	3726.96000000	8948.65300000	1400.718	CONCRETE ELEVATION
3201	3723.53800000	8947.55000000	1400.453	CONCRETE ELEVATION
3202	3701.79900000	8940.49700000	1400.993	CONCRETE ELEVATION
3203	3680.01200000	9128.95100000	1401.885	CONCRETE ELEVATION
3204	3675.83900000	9128.38400000	1401.423	CONCRETE ELEVATION
3205	3653.06300000	9126.07300000	1401.686	CONCRETE ELEVATION
3207	3638.90100000	9316.25500000	1401.576	CATCH BASIN GRATE
3208	3637.14400000	9326.10500000	1401.681	CATCH BASIN GRATE
3209	3609.32200000	9314.13500000	1401.742	CONCRETE ELEVATION
3210	3635.52500000	9315.48300000	1401.638	CONCRETE ELEVATION
3211	3662.82000000	9315.75700000	1401.646	CONCRETE ELEVATION
3212	3600.16600000	9609.20400000	1403.245	CONCRETE ELEVATION
3213	3591.78600000	9608.67200000	1402.893	CONCRETE ELEVATION
3214	3592.23600000	9693.13100000	1403.291	CONCRETE ELEVATION
3215	3581.97100000	9693.49800000	1402.938	CONCRETE ELEVATION
3216	3559.81500000	9692.39600000	1403.140	CONCRETE ELEVATION
3217	3576.51600000	9782.71700000	1403.031	CONCRETE ELEVATION
3218	3569.58200000	9889.52900000	1403.300	CONCRETE ELEVATION
3219	3587.91100000	9890.32100000	1403.746	CONCRETE ELEVATION
3220	3584.24900000	10080.32700000	1403.996	CONCRETE ELEVATION
3221	3568.35900000	10081.29800000	1403.687	CONCRETE ELEVATION
3222	3542.15700000	10081.08900000	1404.055	CONCRETE ELEVATION
3223	3569.60700000	10201.52500000	1403.914	STORM DRAIN MANHOLE
3226	3578.25600000	10512.63700000	1404.723	CATCH BASIN GRATE
3227	3578.17300000	10522.72900000	1404.671	CATCH BASIN GRATE
3228	3576.05200000	10622.51200000	1404.979	STORM DRAIN MANHOLE
3229	3589.34900000	10656.45900000	1405.498	CONCRETE ELEVATION
3230	3572.97000000	10655.59100000	1405.128	CONCRETE ELEVATION
3231	3553.57200000	10655.12900000	1405.251	CONCRETE ELEVATION
3232	3574.55500000	10677.44100000	1405.068	CATCH BASIN GRATE
3233	3574.25200000	10687.34700000	1405.070	CATCH BASIN GRATE

GREENWAY CHANNEL TOPO

ject: channel1 Tue Dec 15 15:09:53 1998

Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
3234	3578.98100000	10843.83500000	1406.369	CONCRETE ELEVATION
3235	3562.23400000	10842.83400000	1405.742	CONCRETE ELEVATION
3236	3542.70100000	10840.87600000	1406.271	CONCRETE ELEVATION
3237	3563.07800000	10856.37500000	1405.793	CATCH BASIN GRATE
3238	3562.17600000	10866.48000000	1405.788	CATCH BASIN GRATE
3239	3553.69800000	11033.17500000	1406.614	CONCRETE ELEVATION
3240	3539.93800000	11031.18800000	1406.278	CONCRETE ELEVATION
3241	3519.86200000	11028.24800000	1406.649	CONCRETE ELEVATION
3242	3538.08500000	11041.62700000	1406.101	STORM DRAIN MANHOLE
3243	3527.56000000	11114.23400000	1406.529	CATCH BASIN GRATE
3244	3525.51100000	11123.87900000	1406.445	CATCH BASIN GRATE
3245	3511.42700000	11226.13000000	1407.467	CONCRETE ELEVATION
3246	3501.98000000	11224.87900000	1407.071	CONCRETE ELEVATION
3247	3483.20600000	11220.30700000	1407.177	CONCRETE ELEVATION
3248	3483.21500000	11249.17900000	1407.319	SEWER MANHOLE
5013	5080.68100000	4262.76800000	1383.076	VOID SHOT
5020	5003.83500000	4440.61500000	1390.162	NATURAL GROUND
5021	5009.88300000	4443.11000000	1391.636	NATURAL GROUND
5025	4945.18100000	4632.21700000	1391.257	NATURAL GROUND
5026	4953.65400000	4635.70000000	1392.699	NATURAL GROUND
5029	4916.26100000	4835.62900000	1392.084	NATURAL GROUND
5030	4925.07800000	4836.59100000	1393.872	NATURAL GROUND
5034	4913.10900000	5041.75100000	1393.615	NATURAL GROUND
5035	4921.51400000	5043.30300000	1395.373	NATURAL GROUND
5039	4918.01500000	5256.43500000	1394.169	NATURAL GROUND
5040	4929.36700000	5254.66000000	1396.907	NATURAL GROUND
5044	4929.87400000	5468.64300000	1396.387	NATURAL GROUND
5045	4929.81900000	5468.61600000	1396.377	NATURAL GROUND
5046	4935.05700000	5469.07600000	1397.778	NATURAL GROUND
5049	4930.68300000	5681.82100000	1393.356	VOID SHOT
5051	4933.39200000	5681.49000000	1397.036	NATURAL GROUND
5052	4939.54900000	5680.77800000	1398.009	NATURAL GROUND
5055	4936.54400000	5893.76400000	1396.805	NATURAL GROUND
5056	4943.68800000	5892.45600000	1398.855	NATURAL GROUND
5062	4942.37800000	6107.77200000	1398.645	NATURAL GROUND
5063	4947.65800000	6108.88400000	1399.430	NATURAL GROUND
5067	4946.30900000	6315.53700000	1398.857	NATURAL GROUND
5068	4951.93100000	6315.33200000	1399.944	NATURAL GROUND
5072	4957.28200000	6528.55900000	1399.564	NATURAL GROUND
5073	4960.95100000	6527.78400000	1400.592	NATURAL GROUND
5078	4936.44700000	6538.64400000	1389.851	VOID SHOT
5079	4952.23600000	6547.50800000	1389.666	VOID SHOT
5081	4951.72000000	6528.80700000	1389.666	CONCRETE ELEVATION
5082	4921.77800000	6529.17200000	1389.805	CONCRETE ELEVATION
5083	4892.61700000	6530.68900000	1389.834	CONCRETE ELEVATION
5088	4882.23000000	6529.20900000	1398.605	NATURAL GROUND
5098	4895.69500000	6317.14700000	1398.715	NATURAL GROUND
5103	4891.87100000	6108.79300000	1398.878	NATURAL GROUND
5107	4930.70800000	6691.40200000	1398.672	NATURAL GROUND

GREENWAY CHANNEL TOPO

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
5108	4939.40600000	6694.42400000	1401.256	NATURAL GROUND
5111	4858.14700000	6881.86700000	1399.687	NATURAL GROUND
5112	4865.52900000	6885.05000000	1400.780	NATURAL GROUND
5115	4790.58100000	7069.58900000	1400.763	NATURAL GROUND
5116	4795.53800000	7072.23800000	1401.816	NATURAL GROUND
5120	4687.62200000	7248.34600000	1401.682	NATURAL GROUND
5121	4690.76800000	7251.58200000	1402.581	NATURAL GROUND
5128	4610.68100000	7356.81400000	1403.294	NATURAL GROUND
5129	4611.17800000	7358.19700000	1405.201	NATURAL GROUND
5130	4614.10800000	7361.63000000	1404.166	NATURAL GROUND
5135	4561.88600000	7417.29800000	1404.446	NATURAL GROUND
5136	4566.04800000	7420.43500000	1405.083	NATURAL GROUND
5137	4558.25300000	7413.11300000	1397.703	NATURAL GROUND
5142	4444.97300000	7572.09200000	1404.987	NATURAL GROUND
5143	4444.89600000	7572.02800000	1404.990	NATURAL GROUND
5144	4449.24200000	7574.28500000	1405.712	NATURAL GROUND
5149	4318.64500000	7743.34500000	1406.125	NATURAL GROUND
5150	4325.37800000	7747.93800000	1407.742	NATURAL GROUND
5155	4277.48600000	7802.59100000	1406.866	NATURAL GROUND
5156	4286.68800000	7802.92100000	1408.690	NATURAL GROUND
5161	4267.52300000	7814.58600000	1406.361	NATURAL GROUND
5162	4275.21400000	7819.94100000	1408.477	NATURAL GROUND
5163	4275.86700000	7822.55800000	1408.833	STORM DRAIN MANHOLE
5168	4201.19500000	7916.14700000	1407.197	NATURAL GROUND
5169	4205.73700000	7918.78300000	1408.652	NATURAL GROUND
5170	4200.37500000	7915.64000000	1405.090	NATURAL GROUND
5175	4102.47200000	8080.96200000	1407.997	NATURAL GROUND
5176	4107.05700000	8083.72900000	1409.103	NATURAL GROUND
5177	3999.72700000	8255.55700000	1398.487	CONCRETE ELEVATION
5182	4007.83700000	8257.90500000	1408.731	NATURAL GROUND
5183	4014.77900000	8260.87600000	1409.686	NATURAL GROUND
5188	3929.30100000	8424.45100000	1409.483	NATURAL GROUND
5189	3934.92600000	8425.12000000	1410.222	NATURAL GROUND
5192	3814.05800000	8637.16100000	1399.650	VOID SHOT
5195	3851.30300000	8609.01900000	1410.167	NATURAL GROUND
5196	3855.93900000	8608.98100000	1411.434	NATURAL GROUND
5200	3791.74100000	8771.08100000	1409.761	NATURAL GROUND
5201	3798.40500000	8774.93300000	1411.751	NATURAL GROUND
5206	3731.40800000	8952.62500000	1410.133	NATURAL GROUND
5207	3733.41300000	8952.97900000	1410.012	NATURAL GROUND
5208	3743.95000000	8953.61800000	1411.808	NATURAL GROUND
5212	3605.80700000	9611.67800000	1412.523	NATURAL GROUND
5213	3611.90300000	9612.55100000	1412.960	NATURAL GROUND
5217	3598.60600000	9690.99600000	1412.308	NATURAL GROUND
5218	3603.76200000	9690.91300000	1413.156	NATURAL GROUND
5221	3591.52800000	9890.11000000	1411.051	NATURAL GROUND
5222	3600.52400000	9890.97300000	1411.295	NATURAL GROUND
5223	3591.27900000	10560.81000000	1405.191	WALL
5224	3591.11400000	10570.05800000	1405.393	WALL

GREENWAY CHANNEL TOPO

ɔject: channel1 Tue Dec 15 15:09:55 1998

Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
5225	3590.91400000	10567.99400000	1405.015	REINFOR. CONC. PIPE
5226	3591.09800000	10562.52100000	1405.123	REINFOR. CONC. PIPE
5227	3573.14500000	10462.20800000	1391.587	CATCH BASIN GRATE
5228	3575.08200000	10513.32000000	1404.685	CATCH BASIN GRATE
5229	3575.18200000	10522.06900000	1404.742	CATCH BASIN GRATE
5230	3464.79100000	11414.68400000	1408.024	CONCRETE ELEVATION
5231	3435.50700000	11407.61800000	1408.107	CONCRETE ELEVATION
5232	3454.25700000	11425.67500000	1407.838	MULTI-PURPOSE LINE
5233	3452.10400000	11424.99500000	1407.916	MULTI-PURPOSE LINE
5234	3449.69300000	11433.74900000	1407.978	MULTI-PURPOSE LINE
5235	3447.68500000	11450.95100000	1408.004	SEWER MANHOLE
5236	3413.68600000	11590.54400000	1408.659	CATCH BASIN GRATE
5237	3410.33600000	11589.69100000	1408.725	CATCH BASIN GRATE
5238	3408.14600000	11599.20500000	1408.711	CATCH BASIN GRATE
5239	3380.05200000	11719.43800000	1409.512	CATCH BASIN GRATE
5240	3374.44200000	11724.64200000	1409.462	CATCH BASIN GRATE
5241	3382.38200000	11733.61600000	1409.548	CATCH BASIN GRATE
5242	3359.03300000	11814.48500000	1409.827	CATCH BASIN GRATE
5243	3351.82600000	11812.33700000	1409.784	CATCH BASIN GRATE
5244	3348.61700000	11823.93400000	1409.771	CATCH BASIN GRATE
)004	4329.26231932	7879.06733288	.	BRASS CAP FLUSH
20007	3747.41882390	9268.05468826	1411.070	P K NAIL
20008	3668.83869245	10156.16192309	.	.
20009	4923.26225111	6969.71940754	.	X-SECTION
20010	4792.14564852	6920.64358330	.	X-SECTION
20011	3713.06153743	9459.26324113	.	X-SECTION
20012	3584.57834866	9439.46247843	.	X-SECTION
20020	3896.79687213	8735.63959099	.	.
20022	4287.95255272	7941.97516669	.	BRASS CAP FLUSH
20023	4455.74824103	7701.37135786	.	BRASS CAP FLUSH
20024	4696.73540817	7382.07653145	.	BRASS CAP FLUSH
20025	5012.71838198	6612.67718931	1403.000	BRASS CAP FLUSH

1./ 970206, CHANNEL 3 DWG
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GREENWAY TOPO CONTINUED

ject: channel2 Tue Dec 15 15:16:36 1998
nt statistics:
Starting point number: 1
Current point number: 2 ('L' indicates locked point)

Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1	5212.76900000	3940.19200000	1377.731	GRADE BREAK LINE
3	5456.04300000	3321.47800000	1386.370	BRASS CAP FLUSH
4	5171.66300000	3918.52200000	1391.528	REBAR
5	5284.20800000	3272.47100000	1374.829	REBAR
8	4931.16600000	6565.90000000	1400.250	P K NAIL
9	4743.55900000	7126.03100000	1392.280	NAIL
10	4257.89700000	7746.53700000	1406.862	REBAR
11	3926.03200000	8318.00100000	1408.970	REBAR
14	3346.78700000	11844.16300000	1419.440	NAIL
15	3677.38600000	10480.08200000	1414.460	BRASS CAP FLUSH
16	3579.95700000	10941.87900000	1415.326	REBAR
17	3591.06500000	10240.51700000	1412.040	REBAR
18	3747.43000000	9267.80100000	1413.240	BRASS CAP FLUSH
19	3979.86400000	11905.19400000	1422.300	BRASS CAP FLUSH
20	3896.79700000	8735.62400000	1412.020	BRASS CAP FLUSH
22	4287.76200000	7941.81500000	1409.410	BRASS CAP FLUSH
23	4455.60400000	7701.16000000	1408.000	BRASS CAP FLUSH
24	4696.55200000	7381.98200000	1406.600	BRASS CAP FLUSH
25	5012.61500000	6612.61000000	1402.510	BRASS CAP FLUSH
26	5026.81200000	6363.61700000	1402.080	BRASS CAP FLUSH
27	5000.00000000	5000.00000000	1396.640	BRASS CAP FLUSH
28	5127.33100000	4380.76900000	1392.562	BRASS CAP FLUSH
29	5315.01800000	3966.58600000	1389.370	BRASS CAP FLUSH
30	5328.59000000	3936.61500000	1389.111	BRASS CAP FLUSH
31	3576.89100000	9576.56300000	1402.575	P K NAIL
32	3905.57400000	9265.47300000	1412.830	BRASS CAP FLUSH
33	3910.57000000	9265.36900000	1412.850	BRASS CAP FLUSH
34	5018.59200000	5947.25400000	1400.780	BRASS CAP FLUSH
44	3801.27400000	9314.86900000	0.000	EDGE OF CONCRETE
45	3797.74300000	9317.61700000	0.000	EDGE OF CONCRETE
46	3801.27400000	9314.86900000	0.000	EDGE OF CONCRETE
47	3797.74300000	9317.61700000	0.000	EDGE OF CONCRETE
53	3552.47000000	9567.13700000	0.000	TOP OF BANK
54	3551.11200000	9579.18600000	0.000	TOP OF BANK
55	3562.20100000	9580.31900000	0.000	TOP OF BANK
56	3353.56600000	11658.32100000	0.000	TOP OF BANK
57	3358.90100000	11681.50400000	0.000	TOP OF BANK
200	4837.40100000	7144.53100000	1405.361	REBAR
201	3673.85900000	9303.51400000	1414.276	P K NAIL
202	3673.14100000	9238.87300000	1414.322	P K NAIL
000	5026.82200000	6363.59800000	1402.018	CHECK SHOT
1001	5012.60500000	6612.60000000	1402.451	CHECK SHOT
1002	4840.51400000	6634.18700000	1401.600	VERTICAL CURB
1003	4861.07800000	6633.09500000	1401.421	TOP OF CURB ELEV.
1004	4840.40100000	6633.54400000	1401.078	GUTTER ELEVATION

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1005	4861.08100000	6632.52400000	1400.928	GUTTER ELEVATION
1006	4866.87600000	6632.26500000	1400.892	GUTTER ELEVATION
1007	4866.79300000	6632.74100000	1400.903	TOP OF CURB ELEV.
1008	4888.66600000	6631.66100000	1400.827	CONCRETE ELEVATION
1009	4914.70800000	6630.33000000	1400.889	TOP OF CURB ELEV.
1010	4919.78800000	6630.09300000	1401.352	VERTICAL CURB
1011	4914.70900000	6630.02000000	1400.876	GUTTER ELEVATION
1012	4919.82900000	6629.59700000	1400.910	GUTTER ELEVATION
1013	4935.63900000	6633.84600000	1401.428	VERTICAL CURB
1014	4947.89900000	6642.59200000	1401.226	VERTICAL CURB
1015	4955.47800000	6655.76000000	1401.748	VERTICAL CURB
1016	4955.44600000	6670.61300000	1401.838	VERTICAL CURB
1017	4956.10200000	6670.66900000	1401.342	GUTTER ELEVATION
1018	4953.14000000	6683.45400000	1401.961	VERTICAL CURB
1019	4954.04900000	6681.45200000	1401.351	CURB OPENING
1020	4954.87300000	6676.58600000	1401.270	GUTTER ELEVATION
1021	4955.65100000	6672.21300000	1401.273	CURB OPENING
1022	4953.10100000	6673.57900000	1401.908	MULTI-PURPOSE CIRCLE
1023	4949.38700000	6702.98500000	1402.069	VERTICAL CURB
1024	4946.68500000	6716.49200000	1402.183	VERTICAL CURB
1025	4947.24300000	6716.64000000	1401.700	GUTTER ELEVATION
1026	4938.90500000	6714.38700000	1402.315	BACK OF WALK
1027	4936.20500000	6711.71000000	1401.304	TREE
1028	4932.22400000	6712.29400000	1401.211	FENCE
1029	4943.16700000	6685.16800000	1403.104	FENCE
1030	4946.36000000	6667.16200000	1401.366	FENCE
1031	4947.67500000	6669.07700000	1401.959	BACK OF WALK
1032	4947.47200000	6664.55700000	1401.348	MULTI-PURPOSE LINE
1033	4949.64600000	6652.84800000	1401.738	BACK OF WALK
1034	4949.55700000	6652.86900000	1401.622	SINGLE CURB
1035	4932.96400000	6637.46800000	1401.634	SINGLE CURB
1036	4934.36300000	6640.92400000	1401.560	MULTI-PURPOSE LINE
1037	4919.93600000	6641.46700000	1401.113	MULTI-PURPOSE LINE
1038	4931.21400000	6639.09200000	1401.523	TRAFFIC SIGNAL
1039	4940.86600000	6646.91300000	1401.578	TRAFFIC SIGNAL J-BOX
1040	4942.05500000	6651.80600000	1401.502	IRRIGATION VALVE
1041	4943.15400000	6654.08200000	1401.496	IRR. VALVE BOX
1044	4947.42700000	6655.73400000	1401.465	TRAFFIC SIGNAL MAST
1045	4943.99300000	6652.04300000	1401.546	WATER METER
1047	4947.15600000	6666.83600000	1401.419	RETAINING WALL
1048	4939.34600000	6653.41000000	1401.635	RETAINING WALL
1049	4938.65500000	6649.35600000	1401.626	RETAINING WALL
1050	4939.77600000	6644.62200000	1401.588	RETAINING WALL
1051	4944.28900000	6639.33400000	1401.097	PEDESTRIAN RAMP
1052	4942.01200000	6642.22900000	1401.186	PEDESTRIAN RAMP
1053	4940.70800000	6636.75600000	1401.210	PEDESTRIAN RAMP
1054	4949.89300000	6645.11300000	1401.179	PEDESTRIAN RAMP
1055	4947.07800000	6647.25400000	1401.268	PEDESTRIAN RAMP
1056	4952.28700000	6648.74500000	1401.388	PEDESTRIAN RAMP

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1057	4947.55600000	6641.43900000	1401.188	GUTTER ELEVATION
1058	4932.59400000	6638.07900000	1401.458	BACK OF WALK
1059	4920.24000000	6638.78000000	1401.330	BACK OF WALK
1060	4911.96800000	6639.02100000	1400.786	BACK OF WALK
1061	4895.28400000	6640.07600000	1400.798	CONCRETE ELEVATION
1062	4896.81000000	6653.39200000	1399.646	CONCRETE ELEVATION
1063	4869.15000000	6641.39300000	1400.752	BACK OF WALK
1064	4861.61200000	6641.72700000	1401.458	BACK OF WALK
1065	4856.06900000	6641.97200000	1401.558	BACK OF WALK
1066	4840.71000000	6639.30700000	1401.649	BACK OF WALK
1067	4861.64800000	6641.76100000	1401.338	EDGE OF CONCRETE
1068	4872.27000000	6654.35000000	1399.456	EDGE OF CONCRETE
1069	4861.42300000	6636.29800000	1397.655	SIGN
1070	4839.54300000	6580.63300000	1400.743	WATER VALVE
1071	4839.28800000	6591.57900000	1400.973	WATER VALVE
1072	4959.68400000	6492.44100000	1400.688	FENCE
1073	4967.17700000	6492.45700000	1401.277	BACK OF WALK
1074	4976.39800000	6494.05500000	1401.139	VERTICAL CURB
1075	4977.02300000	6494.09300000	1400.641	GUTTER ELEVATION
1076	4975.44500000	6508.49600000	1401.146	VERTICAL CURB
1077	4974.28200000	6522.89500000	1401.149	VERTICAL CURB
1078	4974.93700000	6522.84100000	1400.672	GUTTER ELEVATION
1079	4966.76600000	6512.48200000	1401.383	BACK OF WALK
1080	4966.20300000	6504.03700000	1401.304	TRAFFIC SIGNAL J-BOX
1081	4966.28300000	6522.15600000	1401.201	BACK OF WALK
1082	4961.35000000	6540.89300000	1400.922	FENCE
1083	5025.20000000	6493.32200000	1402.372	VERTICAL CURB
1084	5024.63100000	6493.39200000	1401.851	GUTTER ELEVATION
1085	5024.53800000	6523.18300000	1402.539	VERTICAL CURB
1086	5024.53800000	6523.18300000	1402.539	SINGLE CURB
1087	5022.75800000	6523.12400000	1402.021	EDGE OF CONCRETE
1088	5022.61800000	6527.24200000	1402.066	EDGE OF CONCRETE
1089	5023.74900000	6532.31300000	1402.092	EDGE OF CONCRETE
1090	5024.27700000	6532.33100000	1402.584	SINGLE CURB
1091	5023.78200000	6532.43500000	1402.612	EDGE OF CONCRETE
1092	5023.41400000	6542.06800000	1402.584	EDGE OF CONCRETE
1093	5025.21200000	6544.38100000	1402.611	EDGE OF CONCRETE
1094	5025.24100000	6544.47500000	1402.232	PAVEMENT ELEVATION
1095	5027.43600000	6542.48500000	1402.601	EDGE OF CONCRETE
1096	5030.02300000	6532.71200000	1402.576	EDGE OF CONCRETE
1097	5029.64900000	6532.53800000	1402.502	SINGLE CURB
1098	5030.18700000	6532.55000000	1402.170	EDGE OF CONCRETE
1099	5032.51800000	6527.77200000	1402.199	EDGE OF CONCRETE
1100	5033.21100000	6524.86500000	1402.157	EDGE OF CONCRETE
1101	5031.43100000	6524.49000000	1402.545	SINGLE CURB
1102	5031.43100000	6524.49000000	1402.545	VERTICAL CURB
1103	5033.65600000	6511.61100000	1402.594	VERTICAL CURB
1104	5035.56000000	6493.78000000	1402.519	VERTICAL CURB
1105	5036.12300000	6493.87900000	1402.032	GUTTER ELEVATION

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1106	5024.89600000	6512.27900000	1402.357	SINGLE CURB
1107	5027.44600000	6512.32200000	1402.379	SINGLE CURB
1108	5026.34600000	6527.11000000	1402.478	SINGLE CURB
1109	5030.57600000	6527.56700000	1402.474	SINGLE CURB
1110	5028.06100000	6523.46500000	1402.537	TRAFFIC SIGNAL J-BOX
1111	5026.59800000	6530.23600000	1402.557	TRAFFIC SIGNAL
1112	5064.45300000	6557.19500000	1403.255	ELECTRIC MANHOLE
1113	5071.57700000	6495.94300000	1403.348	VERTICAL CURB
1114	5070.87500000	6495.86100000	1402.863	GUTTER ELEVATION
1115	5076.67900000	6493.63000000	1403.501	BACK OF WALK
1116	5074.99700000	6519.05700000	1403.638	BACK OF WALK
1117	5070.04300000	6518.73300000	1403.517	VERTICAL CURB
1118	5069.44000000	6518.79200000	1402.966	GUTTER ELEVATION
1119	5075.30600000	6525.60900000	1403.706	BACK OF WALK
1120	5077.23400000	6532.39200000	1403.859	BACK OF WALK
1121	5072.62900000	6534.23400000	1403.710	BACK OF WALK
1122	5072.62900000	6534.23400000	1403.710	VERTICAL CURB
1123	5074.58200000	6538.20500000	1403.639	PEDESTRIAN RAMP
1124	5079.77100000	6539.85900000	1403.520	PEDESTRIAN RAMP
1125	5077.19700000	6542.01800000	1403.397	PEDESTRIAN RAMP
1126	5078.96800000	6545.00600000	1403.375	GUTTER ELEVATION
1127	5082.85900000	6547.79200000	1403.499	PEDESTRIAN RAMP
1128	5082.95800000	6547.78000000	1403.501	VERTICAL CURB
1129	5085.05400000	6545.23600000	1403.571	PEDESTRIAN RAMP
1130	5086.45500000	6550.31600000	1409.019	PEDESTRIAN RAMP
1131	5097.64500000	6554.63800000	1404.125	VERTICAL CURB
1132	5105.70900000	6555.38000000	1404.215	VERTICAL CURB
1133	5105.70900000	6555.38000000	1404.215	EDGE OF CONCRETE
1134	5108.05400000	6555.90500000	1403.689	CURB OPENING
1135	5105.55500000	6556.00800000	1403.711	GUTTER ELEVATION
1136	5114.94700000	6555.55600000	1403.675	GUTTER ELEVATION
1137	5121.64100000	6555.25400000	1403.736	CURB OPENING
1138	5109.81600000	6553.79700000	1404.292	MULTI-PURPOSE CIRCLE
1139	5105.47800000	6550.49100000	1409.679	EDGE OF CONCRETE
1140	5105.48800000	6550.44400000	1409.616	EDGE OF PAVEMENT
1141	5123.58400000	6549.69300000	1409.845	EDGE OF CONCRETE
1142	5123.79200000	6554.52900000	1404.335	EDGE OF CONCRETE
1143	5130.89800000	6547.58900000	1403.981	TRAFFIC SIGNAL J-BOX
1144	5152.97600000	6553.38900000	1404.519	VERTICAL CURB
1145	5153.01800000	6553.99600000	1404.040	GUTTER ELEVATION
1146	5096.51700000	6549.50300000	1404.029	TRAFFIC SIGNAL
1147	5098.90300000	6549.45700000	1409.504	EDGE OF PAVEMENT
1148	5093.06500000	6547.44000000	1409.355	SINGLE CURB
1149	5093.02900000	6547.38300000	1409.349	SINGLE CURB
1150	5077.81100000	6532.22200000	1403.829	SINGLE CURB
1151	5077.81200000	6530.46200000	1403.600	TRAFFIC SIGNAL MAST
1152	5095.84900000	6503.01600000	1403.048	NATURAL GROUND
1153	5132.47700000	6539.21600000	1403.818	NATURAL GROUND
1154	5154.21600000	6618.48800000	1404.425	VERTICAL CURB

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1155	5154.38200000	6617.81400000	1403.919	GUTTER ELEVATION
1156	5149.04500000	6620.30600000	1404.182	SIGN
1157	5126.30700000	6619.47600000	1404.351	VERTICAL CURB
1158	5115.43400000	6624.51400000	1404.090	IRR. VALVE BOX
1159	5113.87400000	6624.46700000	1404.085	IRR. VALVE BOX
1160	5112.39800000	6624.48300000	1404.105	IRR. VALVE BOX
1161	5111.10900000	6624.56800000	1404.077	IRR. VALVE BOX
1164	5111.31800000	6636.44900000	1403.698	TREE
1165	5104.73800000	6625.92300000	1404.434	WATER METER
1166	5099.56800000	6620.30000000	1403.655	CURB OPENING
1167	5100.64700000	6620.83000000	1404.234	EDGE OF CONCRETE
1168	5100.89700000	6624.79300000	1404.330	EDGE OF CONCRETE
1169	5088.01200000	6625.40900000	1404.311	EDGE OF CONCRETE
1170	5087.79900000	6621.64700000	1404.196	EDGE OF CONCRETE
1171	5087.79900000	6621.64700000	1404.196	VERTICAL CURB
1172	5094.54000000	6620.54500000	1403.612	GUTTER ELEVATION
1173	5090.20100000	6620.87900000	1403.633	CURB OPENING
1174	5081.39100000	6628.80700000	1403.844	TRAFFIC SIGNAL MAST
1175	5092.04700000	6623.13300000	1404.239	MULTI-PURPOSE CIRCLE
1176	5073.25000000	6625.45500000	1403.954	VERTICAL CURB
1177	5073.15800000	6625.41600000	1403.951	PEDESTRIAN RAMP
1178	5071.36300000	6630.48900000	1403.957	PEDESTRIAN RAMP
1179	5069.41800000	6627.77400000	1403.631	PEDESTRIAN RAMP
1180	5065.78600000	6629.91700000	1403.635	GUTTER ELEVATION
1181	5063.33600000	6633.08100000	1403.701	PEDESTRIAN RAMP
1182	5066.01200000	6635.30800000	1403.918	PEDESTRIAN RAMP
1183	5060.74900000	6636.69600000	1403.845	PEDESTRIAN RAMP
1184	5060.74900000	6636.69600000	1403.845	VERTICAL CURB
1185	5069.09500000	6635.20200000	1403.949	TRAFFIC SIGNAL J-BOX
1186	5063.39100000	6643.19000000	1404.060	TRAFFIC SIGNAL
1187	5055.00700000	6650.46100000	1404.029	VERTICAL CURB
1188	5054.49500000	6650.34400000	1403.524	GUTTER ELEVATION
1189	5050.53200000	6678.15400000	1404.202	VERTICAL CURB
1190	5046.78100000	6699.73500000	1404.318	VERTICAL CURB
1191	5046.22200000	6699.57100000	1403.802	GUTTER ELEVATION
1192	5051.64700000	6700.64800000	1404.446	BACK OF WALK
1193	5053.56800000	6695.02700000	1405.739	TRAFFIC SIGNAL J-BOX
1194	5054.37800000	6689.63700000	1405.739	TRAFFIC SIGNAL J-BOX
1195	5055.11200000	6680.71900000	1404.322	BACK OF WALK
1196	5058.80300000	6659.46700000	1404.048	BACK OF WALK
1197	5070.10800000	6648.72400000	1404.261	BACK OF WALK
1198	5080.61400000	6646.83600000	1404.275	BACK OF WALK
1199	5087.65600000	6647.00500000	1404.275	BACK OF WALK
1200	5129.89900000	6649.45700000	1409.679	BACK OF WALK
1201	5137.70000000	6659.28400000	1404.442	BACK OF WALK
1202	5141.57100000	6660.18800000	1404.410	BACK OF WALK
1203	5141.57100000	6660.18800000	1404.410	VERTICAL CURB
1204	5142.16900000	6660.34000000	1403.927	GUTTER ELEVATION
1205	5141.44500000	6660.22400000	1404.430	PEDESTRIAN RAMP

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1206	5136.30000000	6651.90700000	1409.908	PEDESTRIAN RAMP
1207	5143.21700000	6654.49900000	1409.317	PEDESTRIAN RAMP
1208	5144.60600000	6650.71000000	1403.988	PEDESTRIAN RAMP
1209	5137.73800000	6647.93500000	1404.403	PEDESTRIAN RAMP
1210	5147.46800000	6645.44600000	1404.480	PEDESTRIAN RAMP
1211	5147.46800000	6645.44600000	1404.480	BACK OF WALK
1212	5149.01000000	6642.93900000	1404.491	VERTICAL CURB
1213	5157.01500000	6633.90100000	1404.540	VERTICAL CURB
1214	5157.31600000	6634.31400000	1404.071	GUTTER ELEVATION
1215	5153.63600000	6629.81900000	1404.150	SIGN
1216	5132.97900000	6631.68700000	1404.314	NATURAL GROUND
1217	5132.85600000	6639.97800000	1404.423	WATER VALVE
1218	5116.79800000	6663.36300000	1404.445	NATURAL GROUND
1219	5098.33500000	6642.68400000	1404.289	BACK OF WALK
1220	5084.93800000	6639.21700000	1404.309	BACK OF WALK
1221	5080.01800000	6632.70400000	1404.277	BACK OF WALK
1222	5078.79100000	6628.52300000	1404.115	BACK OF WALK
1223	5078.79100000	6628.52300000	1404.115	EDGE OF PAVEMENT
1224	5077.43100000	6623.66600000	1404.045	EDGE OF PAVEMENT
1225	5062.92300000	6642.80500000	1403.983	BACK OF WALK
1226	5058.41200000	6640.41700000	1403.891	BACK OF WALK
1227	5035.07200000	6641.62600000	1403.117	WATER VALVE
1228	5152.87400000	6588.56000000	1404.521	PAVEMENT ELEVATION
1229	5071.98800000	6589.35900000	1403.734	PAVEMENT ELEVATION
1230	4992.10900000	6725.86200000	1403.177	VERTICAL CURB
1231	4992.78200000	6726.04100000	1402.672	GUTTER ELEVATION
1232	4997.88200000	6691.90400000	1403.045	VERTICAL CURB
1233	5000.01400000	6679.91100000	1402.333	CURB OPENING
1234	5000.80900000	6673.87700000	1402.215	GUTTER ELEVATION
1235	5001.69600000	6666.89700000	1402.233	CURB OPENING
1236	5001.54800000	6664.41900000	1402.811	VERTICAL CURB
1237	5002.07400000	6664.41100000	1402.816	EDGE OF CONCRETE
1238	5003.22500000	6656.39000000	1402.791	EDGE OF CONCRETE
1239	5002.86200000	6653.98600000	1402.804	EDGE OF CONCRETE
1240	5001.57800000	6653.10500000	1402.401	PAVEMENT ELEVATION
1241	5000.52200000	6653.30000000	1402.779	EDGE OF CONCRETE
1242	4999.30800000	6654.50300000	1402.756	EDGE OF CONCRETE
1243	5000.54000000	6659.33900000	1402.785	TRAFFIC SIGNAL J-BOX
1244	4999.13500000	6662.69800000	1402.722	TRAFFIC SIGNAL
1245	4996.08000000	6663.45300000	1402.792	EDGE OF CONCRETE
1246	4996.53200000	6663.75200000	1402.817	VERTICAL CURB
1247	4988.50900000	6692.60500000	1402.975	VERTICAL CURB
1248	4982.10100000	6723.76500000	1403.102	VERTICAL CURB
1249	4981.50300000	6723.65000000	1402.551	GUTTER ELEVATION
1250	4994.35900000	6694.60000000	1403.004	TRAFFIC SIGNAL J-BOX
1251	4997.53400000	6693.66900000	1402.976	SINGLE CURB
1252	4994.08900000	6693.05900000	1403.087	SINGLE CURB
1253	4995.68400000	6681.60400000	1402.959	SINGLE CURB
1254	4999.09200000	6682.07600000	1402.953	BACK OF WALK

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1255	4995.15100000	6681.44200000	1402.990	BACK OF WALK
1256	4997.50400000	6664.42400000	1402.844	BACK OF WALK
1257	4996.56300000	6663.73200000	1402.774	BACK OF WALK
1258	4995.50100000	6678.72100000	1403.012	SINGLE CURB
1259	4992.14800000	6678.18700000	1402.834	SINGLE CURB
1260	4999.38100000	6668.10300000	1402.830	MULTI-PURPOSE CIRCLE
1261	4837.39400000	7144.53100000	1405.311	CHECK SHOT
1262	5026.82600000	6363.60000000	1402.018	CHECK SHOT
1263	4931.17900000	6565.82600000	1400.161	CHECK SHOT
1264	4946.65100000	6716.55000000	1402.117	VERTICAL CURB
1265	4939.03200000	6713.96600000	1402.272	BACK OF WALK
1266	4932.62500000	6711.07500000	1407.656	FENCE
1267	4932.60800000	6743.14100000	1402.371	BACK OF WALK
1268	4936.79100000	6761.57300000	1402.343	VERTICAL CURB
1269	4937.41600000	6761.80100000	1401.883	GUTTER ELEVATION
1270	4925.88400000	6743.40300000	1400.851	TREE
1271	4928.21600000	6758.99600000	1402.502	CONCRETE ELEVATION
1272	4923.06600000	6757.82700000	1401.571	NATURAL GROUND
1273	4915.49400000	6763.87500000	1402.176	TREE
1274	4909.84100000	6766.52700000	1405.979	FENCE
1275	4921.84800000	6775.79100000	1402.424	BACK OF WALK
1276	4933.37000000	6775.41800000	1402.333	BACK OF WALK
1277	4931.27300000	6775.60000000	1402.422	BACK OF WALK
1278	4929.70900000	6777.16400000	1402.466	BACK OF WALK
1279	4929.14400000	6778.77500000	1402.471	BACK OF WALK
1280	4911.19400000	6786.99300000	1401.289	TREE
1281	4925.58600000	6777.38700000	1402.448	SIDEWALK
1282	4922.95200000	6804.85900000	1401.899	SIGN
1283	4925.71500000	6807.94300000	1402.042	GUTTER ELEVATION
1284	4925.04700000	6807.86700000	1402.524	VERTICAL CURB
1285	4916.81600000	6797.72500000	1402.125	SIDEWALK
1286	4898.77300000	6799.37900000	1400.766	NATURAL GROUND
1287	4902.04000000	6804.75700000	1400.941	TREE
1288	4901.27600000	6828.31800000	1405.403	SIDEWALK
1289	4912.24100000	6855.27500000	1402.322	GUTTER ELEVATION
1290	4911.67800000	6855.02100000	1402.814	VERTICAL CURB
1291	4889.89200000	6849.69900000	1401.291	SIDEWALK
1292	4884.74300000	6834.26200000	1400.677	SIGN
1293	4898.50300000	6872.21400000	1403.077	STREET LIGHT MAST
1294	4878.68500000	6875.41100000	1401.490	SIDEWALK
1295	4897.22400000	6902.33000000	1402.492	GUTTER ELEVATION
1296	4896.57900000	6902.06300000	1402.993	VERTICAL CURB
1297	4871.01800000	6896.23100000	1401.512	SIDEWALK
1298	4880.43700000	6846.46500000	1400.601	NATURAL GROUND
1299	4863.00500000	6893.87900000	1400.964	NATURAL GROUND
1300	4857.06200000	6914.82400000	1400.748	TREE
1301	4880.93800000	6948.63200000	1402.742	GUTTER ELEVATION
1302	4880.33300000	6948.39000000	1403.227	VERTICAL CURB
1303	4854.96300000	6941.73000000	1401.629	SIDEWALK

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1304	4846.29500000	6938.57500000	1401.033	NATURAL GROUND
1305	4863.55300000	6993.40000000	1402.999	GUTTER ELEVATION
1306	4862.94400000	6993.18700000	1403.507	VERTICAL CURB
1307	4838.33000000	6983.78000000	1401.802	SIDEWALK
1308	4831.09500000	6980.85400000	1401.375	NATURAL GROUND
1309	4845.14300000	7036.93800000	1403.179	GUTTER ELEVATION
1310	4844.50500000	7036.68300000	1403.670	VERTICAL CURB
1311	4821.03800000	7027.12000000	1402.079	SIDEWALK
1312	4814.88100000	7024.83200000	1401.725	NATURAL GROUND
1313	4826.10600000	7078.22300000	1403.449	GUTTER ELEVATION
1314	4825.58200000	7077.99500000	1403.934	VERTICAL CURB
1315	4806.34400000	7073.48900000	1402.462	SIDEWALK
1316	4797.80200000	7069.52000000	1402.019	NATURAL GROUND
1317	4815.22200000	7086.87200000	1403.995	STREET LIGHT J-BOX
1318	4798.42700000	7066.38900000	1401.980	FENCE
1319	4813.37000000	7087.52800000	1403.490	STREET LIGHT MAST
1320	4788.66000000	7093.74500000	1401.750	TREE
1321	4800.39800000	7113.75900000	1401.576	TREE
1322	4805.31500000	7120.56600000	1403.616	GUTTER ELEVATION
1323	4804.72100000	7120.32300000	1404.096	VERTICAL CURB
1324	4792.42100000	7114.77900000	1402.903	SIDEWALK
1325	4777.23500000	7108.73600000	1402.092	NATURAL GROUND
1326	4762.19200000	7137.63300000	1402.305	FENCE
1327	4782.30100000	7162.25900000	1404.223	VERTICAL CURB
1328	4772.47400000	7156.66500000	1403.135	SIDEWALK
1329	4757.95700000	7148.41400000	1402.557	NATURAL GROUND
1330	4780.82800000	7166.44300000	1403.701	CURB OPENING
1331	4776.15900000	7174.70800000	1403.761	CURB OPENING
1332	4778.63000000	7170.29200000	1403.679	GUTTER ELEVATION
1333	4774.73800000	7176.14800000	1404.342	EDGE OF CONCRETE
1334	4771.22800000	7174.12400000	1404.382	EDGE OF CONCRETE
1335	4777.74800000	7162.44200000	1404.239	EDGE OF CONCRETE
1336	4781.23500000	7164.41700000	1404.227	EDGE OF CONCRETE
1337	4777.96500000	7166.84000000	1404.302	MULTI-PURPOSE CIRCLE
1338	4754.84700000	7162.71500000	1402.293	TREE
1339	4759.36500000	7203.95700000	1404.044	GUTTER ELEVATION
1340	4758.85100000	7203.62000000	1404.527	VERTICAL CURB
1341	4747.89600000	7196.44700000	1403.253	SIDEWALK
1342	4731.59700000	7187.10800000	1402.282	NATURAL GROUND
1343	4730.58300000	7201.55900000	1400.445	TREE
1344	4736.64000000	7225.64900000	1402.264	TREE
1345	4715.02700000	7222.39900000	1401.775	TREE
1346	4734.48300000	7244.66600000	1404.286	GUTTER ELEVATION
1347	4733.90100000	7244.35800000	1404.800	VERTICAL CURB
1348	4718.10000000	7234.09500000	1403.176	SIDEWALK
1349	4707.77000000	7227.79600000	1402.576	NATURAL GROUND
1350	4709.00300000	7283.62600000	1404.564	GUTTER ELEVATION
1351	4708.45200000	7283.25400000	1405.055	VERTICAL CURB
1352	4702.94900000	7251.44600000	1403.029	SIDEWALK

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1353	4689.81100000	7269.64000000	1402.992	SIDEWALK
1354	4682.62900000	7264.91400000	1402.681	NATURAL GROUND
1355	4694.54800000	7246.43600000	1402.721	FENCE
1356	4682.10600000	7264.56700000	1402.720	FENCE
1359	3772.79900000	9156.96800000	1413.288	VERTICAL CURB
1360	3772.19900000	9156.83500000	1412.772	GUTTER ELEVATION
1361	3770.01100000	9172.13100000	1413.362	VERTICAL CURB
1362	3767.74300000	9185.36700000	1413.452	VERTICAL CURB
1363	3767.74300000	9185.36700000	1413.449	SINGLE CURB
1364	3765.70900000	9184.99600000	1413.147	EDGE OF CONCRETE
1365	3765.15500000	9190.50900000	1413.120	EDGE OF CONCRETE
1366	3765.47100000	9194.80000000	1412.992	EDGE OF CONCRETE
1367	3766.11100000	9194.85600000	1413.464	SINGLE CURB
1368	3765.61100000	9194.83300000	1413.530	EDGE OF CONCRETE
1369	3763.36700000	9207.26400000	1413.599	EDGE OF CONCRETE
1370	3764.50400000	9209.65700000	1413.592	EDGE OF CONCRETE
1371	3766.65600000	9209.06800000	1413.580	EDGE OF CONCRETE
1372	3767.21500000	9208.30500000	1413.578	EDGE OF CONCRETE
1373	3767.56200000	9207.26100000	1413.578	EDGE OF CONCRETE
1374	3764.63700000	9209.90600000	1413.206	PAVEMENT ELEVATION
1375	3771.94400000	9196.18200000	1413.302	EDGE OF CONCRETE
1376	3772.10500000	9196.13300000	1412.919	EDGE OF CONCRETE
1377	3771.47500000	9195.91700000	1413.288	SINGLE CURB
1378	3775.03500000	9191.97400000	1412.839	EDGE OF CONCRETE
1379	3774.97000000	9186.75300000	1413.309	SINGLE CURB
1380	3774.97000000	9186.75300000	1413.309	VERTICAL CURB
1381	3776.72800000	9187.37600000	1412.811	EDGE OF CONCRETE
1382	3779.45300000	9172.85700000	1413.285	VERTICAL CURB
1383	3783.55300000	9159.89100000	1412.678	GUTTER ELEVATION
1384	3783.04600000	9159.71900000	1413.207	VERTICAL CURB
1385	3771.28600000	9165.24000000	1413.283	SINGLE CURB
1386	3775.20400000	9166.02300000	1413.362	SINGLE CURB
1387	3772.57500000	9180.76100000	1413.443	SINGLE CURB
1388	3776.66000000	9181.73000000	1413.284	SINGLE CURB
1389	3766.31900000	9194.49600000	1413.467	SINGLE CURB
1390	3771.59000000	9195.42800000	1413.334	SINGLE CURB
1391	3766.66300000	9201.84900000	1413.535	TRAFFIC SIGNAL J-BOX
1392	3725.48400000	9378.03800000	1413.613	VERTICAL CURB
1393	3726.06800000	9378.15100000	1413.065	GUTTER ELEVATION
1394	3725.45000000	9378.03100000	1413.583	SINGLE CURB
1395	3715.11200000	9376.29000000	1413.547	SINGLE CURB
1396	3715.15100000	9376.09300000	1413.544	VERTICAL CURB
1397	3714.55900000	9375.91400000	1413.092	GUTTER ELEVATION
1398	3717.49500000	9364.57700000	1413.644	VERTICAL CURB
1399	3719.73800000	9355.84900000	1413.704	VERTICAL CURB
1400	3722.77600000	9347.26500000	1413.695	VERTICAL CURB
1401	3722.77600000	9347.26500000	1413.689	SINGLE CURB
1402	3721.03900000	9346.38800000	1413.365	EDGE OF CONCRETE
1403	3722.96100000	9342.39000000	1413.309	EDGE OF CONCRETE

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1404	3726.08500000	9338.65600000	1413.278	EDGE OF CONCRETE
1405	3726.43800000	9338.97000000	1413.743	SINGLE CURB
1406	3726.63800000	9338.92500000	1413.723	SINGLE CURB
1407	3730.11800000	9340.26200000	1413.791	SINGLE CURB
1408	3730.65400000	9340.28500000	1413.790	EDGE OF CONCRETE
1409	3731.00500000	9336.05300000	1413.806	EDGE OF CONCRETE
1410	3730.00000000	9334.15000000	1413.795	EDGE OF CONCRETE
1411	3728.02500000	9335.26600000	1413.804	EDGE OF CONCRETE
1412	3726.18300000	9338.68600000	1413.764	EDGE OF CONCRETE
1413	3726.78800000	9338.96800000	1413.752	EDGE OF CONCRETE
1414	3730.17800000	9340.27600000	1413.798	EDGE OF CONCRETE
1415	3729.35100000	9336.15100000	1413.829	TRAFFIC SIGNAL J-BOX
1416	3730.12100000	9333.76800000	1413.319	PAVEMENT ELEVATION
1417	3729.48200000	9346.27500000	1413.799	VERTICAL CURB
1418	3729.48200000	9346.27500000	1413.799	SINGLE CURB
1419	3731.35300000	9346.47500000	1413.277	EDGE OF CONCRETE
1420	3731.35100000	9345.24900000	1413.315	EDGE OF CONCRETE
1421	3730.60700000	9341.91600000	1413.269	EDGE OF CONCRETE
1422	3730.21800000	9340.28600000	1413.796	SINGLE CURB
1427	3594.01900000	9290.76800000	1413.368	VERTICAL CURB
1428	3593.97300000	9294.78100000	1413.408	GRADE BREAK LINE
1429	3593.82300000	9295.01800000	1412.932	FENCE
1430	3610.03900000	9298.14200000	1413.603	GRADE BREAK LINE
1431	3609.97400000	9298.30700000	1413.460	FENCE
1432	3611.48700000	9303.56500000	1416.619	FENCE
1433	3612.36400000	9302.88300000	1413.724	MULTI-PURPOSE LINE
1434	3612.02500000	9303.16400000	1413.759	EDGE OF CONCRETE
1435	3611.50700000	9303.16200000	1413.745	EDGE OF CONCRETE
1436	3610.19800000	9298.16700000	1413.615	EDGE OF CONCRETE
1437	3611.27100000	9298.38000000	1413.629	MULTI-PURPOSE LINE
1438	3611.11500000	9290.55600000	1409.800	VOID SHOT
1439	3594.13800000	9297.71500000	1412.229	GRADE BREAK LINE
1440	3611.01400000	9290.55900000	1413.550	MULTI-PURPOSE LINE
1441	3611.05900000	9303.56400000	1412.139	GRADE BREAK LINE
1442	3601.37100000	9314.61500000	1412.562	SINGLE CURB
1443	3601.61200000	9315.03700000	1412.560	FENCE
1444	3594.52400000	9314.10500000	1422.085	FENCE
1445	3591.43500000	9313.56500000	1422.283	GATE
1446	3594.62500000	9314.07000000	1422.059	GATE
1447	3593.91300000	9298.72600000	1413.457	SINGLE CURB
1448	3629.63200000	9289.61700000	1413.414	GUTTER ELEVATION
1449	3629.65300000	9290.26600000	1413.908	TOP OF CURB ELEV.
1450	3630.15300000	9270.15700000	1413.933	PAVEMENT ELEVATION
1451	3594.24400000	9269.94200000	1413.497	PAVEMENT ELEVATION
1452	3606.73900000	9282.92100000	1413.335	SEWER MANHOLE
1453	3628.02100000	9301.72600000	1417.669	VOID SHOT
1454	3629.45800000	9301.65500000	1413.962	CONCRETE ELEVATION
1455	3658.07100000	9289.26400000	1413.861	GUTTER ELEVATION
1456	3658.12600000	9289.90500000	1414.293	VERTICAL CURB

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1457	3681.43100000	9299.91800000	1414.147	VERTICAL CURB
1458	3681.86500000	9299.66900000	1414.106	GUTTER ELEVATION
1459	3688.25700000	9324.85600000	1414.176	GUTTER ELEVATION
1460	3687.65100000	9324.65100000	1414.604	VERTICAL CURB
1461	3680.04500000	9298.62300000	1414.101	PEDESTRIAN RAMP
1462	3677.51800000	9300.77600000	1414.195	PEDESTRIAN RAMP
1463	3676.62800000	9295.69300000	1414.304	PEDESTRIAN RAMP
1464	3679.44200000	9301.98700000	1414.194	TRAFFIC SIGNAL J-BOX
1465	3682.72400000	9301.59500000	1414.130	PEDESTRIAN RAMP
1466	3680.01700000	9303.74800000	1414.261	PEDESTRIAN RAMP
1467	3685.20700000	9305.39200000	1414.415	PEDESTRIAN RAMP
1468	3675.85900000	9304.64700000	1414.262	CONCRETE ELEVATION
1469	3679.03400000	9313.02400000	1414.622	ELECTRIC J-BOX
1470	3672.75200000	9317.11800000	1414.813	BACK OF WALK
1471	3680.07700000	9320.46000000	1414.598	BACK OF WALK
1472	3679.99500000	9321.96700000	1414.629	BACK OF WALK
1473	3679.77400000	9323.75400000	1414.590	BACK OF WALK
1474	3678.32900000	9321.95900000	1414.612	ELECTRIC METER
1477	3676.65800000	9325.31900000	1414.356	IRR. VALVE BOX
1478	3675.36200000	9325.14400000	1414.337	IRR. VALVE BOX
1479	3673.93000000	9327.83000000	1414.310	IRR. VALVE BOX
1480	3673.88900000	9325.05200000	1414.323	IRR. VALVE BOX
1481	3675.27400000	9327.88700000	1414.328	IRR. VALVE BOX
1482	3676.87300000	9327.92100000	1414.427	IRR. VALVE BOX
1483	3678.04900000	9327.60400000	1414.399	IRRIGATION VALVE
1484	3676.82700000	9333.28500000	1414.584	BACK OF WALK
1485	3672.33500000	9335.93700000	1414.289	FENCE
1486	3669.70700000	9351.06100000	1414.203	BACK OF WALK
1487	3683.04200000	9349.59600000	1414.521	BACK OF WALK
1488	3679.41000000	9350.26400000	1414.545	BACK OF WALK
1489	3677.41100000	9353.15300000	1414.458	BACK OF WALK
1490	3675.12500000	9358.50800000	1414.298	BACK OF WALK
1491	3673.18300000	9363.09000000	1414.135	BACK OF WALK
1492	3665.88600000	9360.02000000	1414.005	BACK OF WALK
1493	3669.58300000	9361.60600000	1414.090	SIDEWALK
1494	3678.83400000	9376.46100000	1413.922	GUTTER ELEVATION
1495	3678.22500000	9376.42700000	1414.441	VERTICAL CURB
1496	3658.21300000	9365.07500000	1412.123	FENCE
1497	3648.94800000	9387.23500000	1413.132	FENCE
1498	3652.14900000	9405.56200000	1413.332	SIDEWALK
1499	3648.78100000	9395.03700000	1412.886	TREE
1500	3639.72800000	9417.72400000	1412.653	FENCE
1501	3639.72800000	9417.72400000	1412.653	SIGN
1502	3660.88300000	9420.59200000	1413.275	TREE
1503	3647.81200000	9422.26400000	1413.246	SIDEWALK
1504	3670.35800000	9426.91900000	1413.577	GUTTER ELEVATION
1505	3669.85800000	9426.89700000	1414.122	VERTICAL CURB
1506	3639.56600000	9420.92200000	1412.617	NATURAL GROUND
1507	3658.16600000	9453.23500000	1413.356	TREE

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1508	3636.47900000	9443.49800000	1412.320	TREE
1509	3659.75100000	9457.63100000	1413.914	STREET LIGHT J-BOX
1510	3660.40700000	9459.47100000	1413.651	STREET LIGHT MAST
1511	3662.48500000	9478.41700000	1413.389	GUTTER ELEVATION
1512	3661.94600000	9478.41400000	1413.934	VERTICAL CURB
1513	3638.46300000	9475.22100000	1413.234	SIDEWALK
1514	3630.42500000	9474.36400000	1412.855	NATURAL GROUND
1515	3629.76600000	9474.33500000	1412.796	FENCE
1516	3655.46100000	9528.24000000	1413.192	GUTTER ELEVATION
1517	3654.87700000	9528.24500000	1413.741	VERTICAL CURB
1518	3631.70900000	9524.74500000	1413.422	SIDEWALK
1519	3642.68300000	9529.19500000	1413.231	TREE
1520	3623.64600000	9523.51600000	1413.021	NATURAL GROUND
1521	3622.98900000	9523.30800000	1412.952	FENCE
1522	3639.60100000	9566.11100000	1413.182	TREE
1523	3625.38000000	9575.26300000	1413.484	SIDEWALK
1524	3648.96500000	9579.51900000	1412.931	GUTTER ELEVATION
1525	3648.33800000	9579.53100000	1413.461	VERTICAL CURB
1526	3617.17700000	9574.27000000	1413.111	NATURAL GROUND
1527	3616.62800000	9574.03600000	1413.087	FENCE
1528	3634.14200000	9590.28100000	1413.090	TREE
1529	3619.41800000	9627.50200000	1413.296	SIDEWALK
1530	3643.10200000	9630.28500000	1412.678	GUTTER ELEVATION
1531	3642.51100000	9630.22000000	1413.227	VERTICAL CURB
1532	3611.38000000	9626.25000000	1412.988	NATURAL GROUND
1533	3610.56200000	9626.04600000	1412.997	FENCE
1534	3610.95900000	9634.95800000	1412.623	TREE
1535	3621.70500000	9660.14900000	1412.581	TREE
1536	3614.16500000	9676.94500000	1413.130	SIDEWALK
1537	3638.09000000	9679.42600000	1412.546	GUTTER ELEVATION
1538	3637.51500000	9679.37700000	1413.073	VERTICAL CURB
1539	3606.43500000	9676.35600000	1413.096	NATURAL GROUND
1540	3605.36300000	9676.40800000	1412.980	FENCE
1541	3628.51300000	9693.08700000	1412.453	TREE
1542	3630.08500000	9697.77600000	1413.112	STREET LIGHT J-BOX
1543	3631.12100000	9700.75000000	1412.707	STREET LIGHT MAST
1544	3633.63500000	9729.89500000	1412.374	GUTTER ELEVATION
1545	3633.07300000	9729.86000000	1412.905	VERTICAL CURB
1546	3610.11800000	9727.84600000	1412.945	SIDEWALK
1547	3605.07900000	9727.67300000	1412.978	NATURAL GROUND
1548	3603.57400000	9695.02900000	1412.014	FENCE
1549	3609.75000000	9758.45000000	1412.805	SIDEWALK
1550	3619.42900000	9735.70800000	1412.421	TREE
1551	3618.92900000	9774.76700000	1412.111	TREE
1552	3629.67900000	9780.34700000	1412.052	GUTTER ELEVATION
1553	3629.20900000	9780.34300000	1412.625	VERTICAL CURB
1554	3611.26700000	9779.80400000	1412.695	SIDEWALK
1555	3604.51300000	9780.45300000	1412.820	NATURAL GROUND
1556	3606.38200000	9807.05800000	1411.945	TREE

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1557	3612.88200000	9804.08000000	1412.548	SIDEWALK
1558	3626.62200000	9830.47600000	1411.806	GUTTER ELEVATION
1559	3626.02000000	9830.55200000	1412.378	VERTICAL CURB
1560	3613.44400000	9829.74800000	1412.402	SIDEWALK
1561	3605.44200000	9841.38600000	1411.915	TREE
1562	3603.96700000	9807.04200000	1412.092	FENCE
1563	3623.89000000	9888.11600000	1411.611	GUTTER ELEVATION
1564	3623.25400000	9888.09200000	1412.133	VERTICAL CURB
1565	3613.13100000	9860.26900000	1412.118	SIDEWALK
1566	3611.71100000	9887.61300000	1411.528	SIDEWALK
1567	3601.76600000	9887.51000000	1411.753	NATURAL GROUND
1568	3601.18200000	9886.96100000	1411.816	FENCE
1571	3776.99200000	9361.87900000	1412.240	GUTTER ELEVATION
1572	3777.60400000	9361.97400000	1412.719	VERTICAL CURB
1573	3782.56800000	9362.71500000	1412.793	BACK OF WALK
1574	3791.64500000	9365.06800000	1414.577	WALL
1575	3795.84600000	9323.34300000	1413.063	IRR. VALVE BOX
1576	3796.13600000	9322.14500000	1413.074	IRR. VALVE BOX
1577	3796.31200000	9320.95000000	1413.074	IRR. VALVE BOX
1578	3799.12800000	9320.38500000	1414.507	WALL
1579	3792.20800000	9316.71500000	1412.800	ELECTRIC J-BOX
1580	3793.42800000	9313.40800000	1412.471	STREET LIGHT MAST
1581	3798.97200000	9319.19500000	1413.328	EDGE OF CONCRETE
1582	3802.50200000	9316.44800000	1413.347	EDGE OF CONCRETE
1583	3802.41900000	9300.88900000	1412.941	WATER METER
1584	3791.20500000	9315.76600000	1412.841	BACK OF WALK
1585	3786.38000000	9314.76300000	1412.744	VERTICAL CURB
1586	3785.77800000	9314.64900000	1412.261	GUTTER ELEVATION
1587	3793.87600000	9307.54400000	1412.859	BACK OF WALK
1588	3797.14200000	9302.97800000	1412.804	BACK OF WALK
1589	3797.14200000	9302.97800000	1412.804	SINGLE CURB
1590	3792.57100000	9299.48300000	1412.638	PEDESTRIAN RAMP
1591	3799.69300000	9300.13900000	1412.476	PEDESTRIAN RAMP
1592	3795.39200000	9295.86400000	1412.223	PEDESTRIAN RAMP
1593	3798.30200000	9293.16000000	1412.191	PEDESTRIAN RAMP
1594	3796.89700000	9294.43300000	1412.187	VERTICAL CURB
1595	3796.46400000	9294.00400000	1412.216	GUTTER ELEVATION
1596	3802.53900000	9298.46700000	1412.441	PEDESTRIAN RAMP
1597	3799.54300000	9296.56900000	1412.332	TRAFFIC SIGNAL J-BOX
1598	3801.99700000	9290.67300000	1412.523	PEDESTRIAN RAMP
1599	3800.88000000	9299.53400000	1412.756	SINGLE CURB
1600	3800.76900000	9299.34000000	1412.465	CONCRETE ELEVATION
1601	3805.50100000	9297.40100000	1412.732	SINGLE CURB
1602	3805.49000000	9297.20300000	1412.639	BACK OF WALK
1603	3809.83700000	9296.03600000	1412.660	BACK OF WALK
1604	3814.34900000	9287.68900000	1412.332	VERTICAL CURB
1605	3814.37400000	9287.08600000	1411.960	GUTTER ELEVATION
1606	3815.01900000	9295.56300000	1412.623	BACK OF WALK
1607	3816.37400000	9286.98800000	1411.847	CURB OPENING

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1608	3822.78700000	9286.72400000	1411.857	CURB OPENING
1609	3818.14000000	9289.28500000	1412.410	MULTI-PURPOSE CIRCLE
1610	3811.47300000	9303.49000000	1409.920	TREE
1611	3826.10400000	9297.06900000	1412.392	TREE
1612	3825.31600000	9301.64400000	1411.683	WALL
1613	3808.19200000	9311.38300000	1411.631	MULTI-PURPOSE CIRCLE
1614	3860.41200000	9285.92900000	1412.024	GUTTER ELEVATION
1615	3860.58200000	9286.62000000	1412.473	VERTICAL CURB
1616	3860.73100000	9294.51400000	1412.727	BACK OF WALK
1617	3840.93100000	9301.18400000	1412.834	WALL
1618	3861.03900000	9266.58700000	1412.603	PAVEMENT ELEVATION
1619	3860.31500000	9246.15600000	1411.939	GUTTER ELEVATION
1620	3860.35600000	9245.58900000	1412.433	VERTICAL CURB
1621	3850.48100000	9245.56600000	1412.461	EDGE OF CONCRETE
1622	3850.51300000	9241.61100000	1412.522	EDGE OF CONCRETE
1623	3837.34900000	9241.70300000	1412.460	EDGE OF CONCRETE
1624	3837.30600000	9245.66000000	1412.415	EDGE OF CONCRETE
1625	3837.30600000	9245.66000000	1412.415	VERTICAL CURB
1626	3840.85100000	9243.98600000	1412.435	MULTI-PURPOSE CIRCLE
1627	3848.38000000	9246.24600000	1411.860	CURB OPENING
1628	3839.19200000	9246.23000000	1411.851	CURB OPENING
1629	3843.55100000	9246.30900000	1411.773	GUTTER ELEVATION
1630	3828.48400000	9242.35700000	1412.226	SIGN
1631	3822.20400000	9241.24700000	1412.446	VERTICAL CURB
1632	3822.20400000	9241.24700000	1412.446	BACK OF WALK
1633	3824.88200000	9237.08700000	1412.634	BACK OF WALK
1634	3833.26500000	9229.41500000	1412.613	BACK OF WALK
1635	3844.43200000	9225.92800000	1412.724	BACK OF WALK
1636	3858.23100000	9225.51500000	1412.961	BACK OF WALK
1637	3858.29800000	9226.97900000	1412.554	TREE
1638	3858.17200000	9219.17600000	1413.017	BACK OF WALK
1639	3855.07800000	9218.21100000	1412.985	BACK OF WALK
1640	3852.53300000	9217.51700000	1412.974	BACK OF WALK
1641	3854.10600000	9210.79500000	1413.553	BACK OF WALK
1642	3845.20900000	9208.56900000	1413.594	BACK OF WALK
1643	3843.55900000	9215.44400000	1413.016	BACK OF WALK
1644	3838.39900000	9211.15100000	1412.938	BACK OF WALK
1645	3838.46000000	9205.07700000	1412.852	BACK OF WALK
1646	3824.84500000	9202.45200000	1412.650	BACK OF WALK
1647	3828.33500000	9211.72600000	1412.695	BACK OF WALK
1648	3830.74600000	9217.77300000	1412.706	BACK OF WALK
1649	3830.42700000	9221.63200000	1412.632	BACK OF WALK
1650	3828.09800000	9224.09300000	1412.586	BACK OF WALK
1651	3824.24900000	9225.35900000	1412.567	BACK OF WALK
1652	3815.90200000	9227.32800000	1412.539	BACK OF WALK
1653	3814.39000000	9224.16100000	1412.744	BACK OF WALK
1654	3809.77300000	9225.95800000	1412.563	BACK OF WALK
1655	3809.77300000	9225.95900000	1412.559	VERTICAL CURB
1656	3816.09500000	9236.16400000	1411.989	PEDESTRIAN RAMP

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1657	3819.24600000	9233.23900000	1412.281	PEDESTRIAN RAMP
1658	3819.36200000	9239.20800000	1412.268	PEDESTRIAN RAMP
1659	3816.02800000	9233.94600000	1412.131	TRAFFIC SIGNAL J-BOX
1660	3813.63900000	9233.18500000	1412.013	PEDESTRIAN RAMP
1661	3817.26800000	9230.60000000	1412.302	PEDESTRIAN RAMP
1662	3811.31200000	9229.14900000	1412.289	PEDESTRIAN RAMP
1663	3811.69700000	9222.90000000	1412.301	SIGN
1664	3807.81800000	9210.33700000	1412.064	GUTTER ELEVATION
1665	3808.45600000	9210.36700000	1412.552	VERTICAL CURB
1666	3810.87300000	9199.23100000	1412.507	VERTICAL CURB
1667	3810.21200000	9199.03700000	1412.025	GUTTER ELEVATION
1668	3856.36800000	9215.09300000	1414.506	WALL
1669	3858.12900000	9207.89900000	1414.504	WALL
1670	3804.23500000	9267.05000000	1412.410	PAVEMENT ELEVATION
1671	3802.05300000	9249.32200000	1412.289	ELECTRIC MANHOLE
1672	3670.44100000	9316.59000000	1411.368	TOP OF BANK
1673	3667.03800000	9334.16200000	1413.370	TOP OF BANK
1674	3666.76600000	9308.60800000	1413.067	VOID SHOT
1675	3666.82300000	9308.14200000	1401.837	BOTTOM OF BANK
1676	3667.59400000	9309.95200000	1404.114	GRADE BREAK LINE
1677	3668.84700000	9312.19300000	1407.323	GRADE BREAK LINE
1678	3648.43500000	9351.47300000	1402.567	BOTTOM OF BANK
1679	3649.92000000	9352.48300000	1405.133	GRADE BREAK LINE
1680	3651.80600000	9353.27900000	1408.071	GRADE BREAK LINE
1681	3636.12800000	9390.88600000	1408.425	GRADE BREAK LINE
1682	3634.21900000	9390.69300000	1405.772	GRADE BREAK LINE
1683	3633.99100000	9397.36900000	1408.395	GRADE BREAK LINE
1684	3631.69000000	9396.57200000	1405.568	GRADE BREAK LINE
1685	3631.07500000	9400.67300000	1405.372	GRADE BREAK LINE
1686	3633.05000000	9401.09800000	1408.440	GRADE BREAK LINE
1687	3632.28200000	9389.56800000	1402.861	BOTTOM OF BANK
1688	3630.37200000	9395.99300000	1402.873	BOTTOM OF BANK
1689	3629.35600000	9400.38300000	1402.822	BOTTOM OF BANK
1690	3637.61400000	9403.10600000	1412.718	VOID SHOT
1691	3655.62400000	9356.12900000	1412.036	TOP OF BANK
1692	3638.05200000	9402.52000000	1412.731	TOP OF BANK
1693	3611.30500000	9306.40800000	1401.537	BOTTOM OF BANK
1694	3609.53300000	9311.12300000	1401.766	BOTTOM OF BANK
1695	3607.60100000	9309.92300000	1404.121	GRADE BREAK LINE
1696	3605.86800000	9311.56500000	1406.507	GRADE BREAK LINE
1697	3604.18500000	9313.53700000	1409.702	GRADE BREAK LINE
1698	3601.82800000	9317.16800000	1411.225	TOP OF BANK
1699	3603.72300000	9358.99000000	1402.238	BOTTOM OF BANK
1700	3601.74900000	9358.79300000	1404.869	GRADE BREAK LINE
1701	3599.96700000	9358.91800000	1408.069	GRADE BREAK LINE
1702	3598.32500000	9358.65300000	1410.876	GRADE BREAK LINE
1703	3595.59400000	9358.33900000	1411.924	TOP OF BANK
1704	3598.13500000	9395.13000000	1402.433	BOTTOM OF BANK
1705	3595.91100000	9394.89700000	1405.119	GRADE BREAK LINE

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1706	3593.73300000	9394.75600000	1408.372	GRADE BREAK LINE
1707	3592.04200000	9394.07600000	1411.214	GRADE BREAK LINE
1708	3589.94800000	9393.94500000	1411.822	TOP OF BANK
1709	3575.43100000	9399.68300000	1419.748	WOOD FENCE
1710	3578.42200000	9386.33100000	1424.056	WOOD FENCE
1711	3621.99000000	9399.00600000	1402.170	GRADE BREAK LINE
1712	3627.81100000	9368.92000000	1402.033	GRADE BREAK LINE
1713	3632.73100000	9344.52700000	1401.877	GRADE BREAK LINE
1714	3636.07800000	9325.89800000	1401.778	GRADE BREAK LINE
1715	3593.35600000	9299.96200000	1413.063	WOOD FENCE
1717	3680.06500000	9145.01500000	1401.728	BOTTOM OF BANK
1718	3682.32600000	9144.90900000	1404.157	GRADE BREAK LINE
1719	3684.35100000	9145.39700000	1407.600	GRADE BREAK LINE
1720	3687.45100000	9146.05400000	1411.134	TOP OF BANK
1721	3693.36300000	9181.89800000	1412.233	TOP OF BANK
1722	3687.29200000	9182.95600000	1406.767	GRADE BREAK LINE
1723	3686.13100000	9183.06200000	1403.792	GRADE BREAK LINE
1724	3685.36000000	9183.43100000	1401.660	BOTTOM OF BANK
1725	3692.33400000	9219.46000000	1410.518	TOP OF BANK
1726	3689.99700000	9219.51300000	1409.537	VOID SHOT
1727	3688.62400000	9223.47000000	1401.694	BOTTOM OF BANK
1728	3624.88400000	9232.45900000	1401.681	BOTTOM OF BANK
1729	3623.80800000	9230.81700000	1404.502	GRADE BREAK LINE
1730	3622.47900000	9227.92100000	1407.496	GRADE BREAK LINE
1731	3620.88700000	9224.13900000	1410.769	TOP OF BANK
1732	3648.80000000	9141.89200000	1401.456	BOTTOM OF BANK
1733	3646.80800000	9141.40500000	1403.599	GRADE BREAK LINE
1734	3644.79300000	9140.73300000	1407.401	GRADE BREAK LINE
1735	3640.54600000	9140.01200000	1411.483	TOP OF BANK
1736	3628.48700000	9135.80900000	1413.697	WOOD FENCE
1737	3663.02300000	9143.44100000	1401.394	CONCRETE ELEVATION
1738	3660.97100000	9196.42700000	1401.352	STORM DRAIN MANHOLE
1739	3657.05300000	9213.72800000	1401.457	CONCRETE ELEVATION
1740	3608.19300000	9226.06900000	1410.990	WOOD FENCE
1741	3910.56000000	9265.36100000	1412.803	CHECK SHOT
1744	4864.60400000	6669.28700000	1398.932	TOP OF BANK
1745	4839.00300000	6667.64900000	1402.620	NATURAL GROUND
1746	4830.61200000	6716.26000000	1402.885	NATURAL GROUND
1747	4823.13700000	6739.51800000	1400.223	NATURAL GROUND
1748	4854.64100000	6748.40000000	1399.196	TOP OF BANK
1749	4855.25700000	6749.04400000	1396.175	GRADE BREAK LINE
1750	4857.17900000	6748.98200000	1393.185	GRADE BREAK LINE
1751	4859.24200000	6749.51600000	1390.525	BOTTOM OF BANK
1752	4871.74200000	6658.04800000	1389.911	BOTTOM OF BANK
1753	4868.75200000	6663.79400000	1392.692	GRADE BREAK LINE
1754	4866.14700000	6668.74200000	1395.925	GRADE BREAK LINE
1755	4904.98100000	6666.39200000	1390.034	CONCRETE ELEVATION
1756	4890.81900000	6707.42900000	1390.266	CONCRETE ELEVATION
1757	4879.92200000	6753.81900000	1390.577	CONCRETE ELEVATION

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
1758	4898.06300000	6759.26900000	1390.719	BOTTOM OF BANK
1759	4900.09000000	6759.72400000	1393.610	GRADE BREAK LINE
1760	4901.90200000	6760.28300000	1396.513	GRADE BREAK LINE
1761	4903.37200000	6761.04200000	1399.218	TOP OF BANK
1762	4910.53800000	6764.23000000	1400.453	NATURAL GROUND
1763	4924.79700000	6729.17500000	1400.570	NATURAL GROUND
1764	4926.86000000	6689.68700000	1390.263	BOTTOM OF BANK
1765	4928.77200000	6690.37500000	1392.801	GRADE BREAK LINE
1766	4930.18200000	6691.06600000	1396.042	GRADE BREAK LINE
1767	4932.75700000	6691.93900000	1399.482	TOP OF BANK
1768	4945.83700000	6667.74800000	1400.582	TOP OF BANK
1769	4944.61000000	6665.75800000	1396.164	GRADE BREAK LINE
1770	4953.19400000	6467.74200000	1400.030	VOID SHOT
1771	4953.28800000	6467.86900000	1399.568	TOP OF BANK
1772	4949.70800000	6468.77700000	1395.596	GRADE BREAK LINE
1773	4947.68400000	6468.69800000	1392.374	GRADE BREAK LINE
1774	4945.35500000	6469.22900000	1389.741	BOTTOM OF BANK
1775	4953.74300000	6534.34600000	1392.123	GRADE BREAK LINE
1776	4954.07700000	6550.89400000	1389.653	BOTTOM OF BANK
1777	4954.43100000	6520.57600000	1394.441	GRADE BREAK LINE
1778	4957.55300000	6520.27300000	1399.902	TOP OF BANK
1779	4958.29500000	6537.90600000	1399.813	TOP OF BANK
1780	4961.08000000	6538.31500000	1401.374	TOP OF BANK
1781	4957.56500000	6546.94500000	1400.789	TOP OF BANK
1782	4957.07200000	6546.82500000	1399.173	TOP OF BANK
1783	4884.17900000	6559.11400000	1389.856	BOTTOM OF BANK
1784	4894.48800000	6523.49200000	1389.807	BOTTOM OF BANK
1785	4903.20900000	6487.87300000	1389.527	BOTTOM OF BANK
1786	4904.83100000	6470.32500000	1389.548	BOTTOM OF BANK
1787	4897.19300000	6469.53800000	1399.039	TOP OF BANK
1788	4883.52400000	6465.26800000	1399.309	FENCE
1789	4877.70000000	6548.09300000	1399.082	TOP OF BANK
1790	4873.27300000	6541.45900000	1399.533	FENCE
1791	4876.94900000	6548.20200000	1399.572	FENCE
1792	4921.53600000	6537.96100000	1389.914	CONCRETE ELEVATION
1793	4923.97900000	6501.79800000	1389.734	CONCRETE ELEVATION
1794	4923.53900000	6470.12100000	1389.611	CONCRETE ELEVATION
6000	5328.58000000	3936.67900000	1389.196	CHECK SHOT
6001	5230.73700000	3921.94000000	1378.250	BOTTOM OF BANK
6002	5243.80000000	3900.18000000	1381.077	GRADE BREAK LINE
6003	5238.80200000	3909.32600000	1380.958	GRADE BREAK LINE
6004	5245.43400000	3901.97200000	1383.838	GRADE BREAK LINE
6005	5241.11300000	3909.47700000	1383.949	GRADE BREAK LINE
6006	5248.80600000	3901.14300000	1387.324	TOP OF BANK
6007	5240.55300000	3913.87600000	1387.239	TOP OF BANK
6008	5144.52800000	4114.63800000	1379.027	BOTTOM OF BANK
6009	5146.08800000	4115.27900000	1381.923	GRADE BREAK LINE
6010	5147.80700000	4116.82800000	1385.429	GRADE BREAK LINE
6011	5148.96500000	4116.64300000	1387.992	TOP OF BANK

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
6012	5060.38900000	4302.25400000	1381.056	BOTTOM OF BANK
6013	5062.60800000	4303.28600000	1383.769	GRADE BREAK LINE
6014	5064.56800000	4304.21200000	1386.176	GRADE BREAK LINE
6015	5065.49300000	4304.54500000	1388.888	TOP OF BANK
6016	5021.50100000	4381.33000000	1379.305	BOTTOM OF BANK
6017	5023.69800000	4381.82700000	1380.829	GRADE BREAK LINE
6018	5025.83200000	4383.16600000	1384.306	GRADE BREAK LINE
6019	5027.44500000	4383.49200000	1386.648	GRADE BREAK LINE
6020	5028.69200000	4384.28400000	1389.439	TOP OF BANK
6021	4969.21500000	4515.20600000	1379.491	BOTTOM OF BANK
6022	4971.51900000	4515.96300000	1382.220	GRADE BREAK LINE
6023	4973.27500000	4516.19600000	1385.151	GRADE BREAK LINE
6024	4974.88200000	4517.28500000	1388.149	GRADE BREAK LINE
6025	4975.81200000	4517.59100000	1390.881	TOP OF BANK
6026	4924.70800000	4702.06200000	1381.591	BOTTOM OF BANK
6027	4927.63000000	4702.42900000	1383.924	GRADE BREAK LINE
6028	4929.65500000	4702.90800000	1386.918	GRADE BREAK LINE
6029	4931.59600000	4703.43100000	1389.791	GRADE BREAK LINE
6030	4932.43400000	4703.57700000	1392.199	TOP OF BANK
6031	4907.25500000	4854.22800000	1383.039	BOTTOM OF BANK
6032	4910.76200000	4853.88100000	1383.884	GRADE BREAK LINE
6033	4912.96900000	4854.17300000	1386.373	GRADE BREAK LINE
6034	4914.82000000	4854.12100000	1389.291	GRADE BREAK LINE
6035	4915.40300000	4854.11700000	1392.071	TOP OF BANK
6036	4902.63100000	4990.40700000	1383.738	BOTTOM OF BANK
6037	4906.17400000	4990.87300000	1384.649	GRADE BREAK LINE
6038	4908.70200000	4991.06900000	1387.567	GRADE BREAK LINE
6039	4910.16100000	4991.36700000	1390.091	GRADE BREAK LINE
6040	4911.55800000	4991.60600000	1392.732	TOP OF BANK
6041	4901.46200000	5005.11700000	1384.234	STORM DRAIN MANHOLE
6042	4906.23200000	5102.02900000	1384.369	BOTTOM OF BANK
6043	4909.35800000	5102.79000000	1385.845	GRADE BREAK LINE
6044	4911.08800000	5102.61600000	1388.382	GRADE BREAK LINE
6045	4913.00700000	5102.76500000	1391.628	GRADE BREAK LINE
6046	4913.99000000	5102.64400000	1394.269	TOP OF BANK
6047	4909.96900000	5233.53900000	1385.309	BOTTOM OF BANK
6048	4913.15200000	5233.24500000	1386.297	GRADE BREAK LINE
6049	4915.26400000	5233.41400000	1389.227	GRADE BREAK LINE
6050	4917.10400000	5233.47100000	1392.319	GRADE BREAK LINE
6051	4918.07200000	5233.91700000	1394.992	TOP OF BANK
6052	4867.49200000	5300.13600000	1387.365	GRADE BREAK LINE
6053	4866.77000000	5318.43600000	1387.346	GRADE BREAK LINE
6054	4853.37500000	5318.83400000	1388.292	GRADE BREAK LINE
6055	4852.53600000	5301.28200000	1388.375	GRADE BREAK LINE
6056	4836.99500000	5301.57000000	1389.250	GRADE BREAK LINE
6057	4836.97000000	5301.52500000	1389.195	GRADE BREAK LINE
6058	4837.35800000	5320.03300000	1388.905	GRADE BREAK LINE
6059	4824.93400000	5318.32400000	1390.307	GRADE BREAK LINE
6060	4824.17400000	5301.54500000	1389.734	GRADE BREAK LINE

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
6061	4824.03900000	5301.45800000	1389.953	GRADE BREAK LINE
6062	4809.53000000	5301.75300000	1391.307	GRADE BREAK LINE
6063	4809.43900000	5317.81200000	1390.975	GRADE BREAK LINE
6064	4794.61600000	5317.59300000	1392.354	GRADE BREAK LINE
6065	4795.10200000	5302.42800000	1392.338	GRADE BREAK LINE
6066	4779.69500000	5303.28800000	1393.099	GRADE BREAK LINE
6067	4779.45700000	5317.24400000	1392.884	GRADE BREAK LINE
6068	4763.84100000	5316.99700000	1394.083	GRADE BREAK LINE
6069	4764.09200000	5304.18500000	1394.046	GRADE BREAK LINE
6070	4837.43000000	5320.32200000	1389.192	GRADE BREAK LINE
6071	4849.67000000	5320.93500000	1388.835	GRADE BREAK LINE
6072	4848.59100000	5336.85000000	1389.779	GRADE BREAK LINE
6073	4838.15100000	5337.15300000	1390.026	GRADE BREAK LINE
6074	4838.73400000	5351.71500000	1390.717	GRADE BREAK LINE
6075	4848.88200000	5351.59900000	1390.515	GRADE BREAK LINE
6076	4849.27600000	5367.35700000	1391.744	GRADE BREAK LINE
6077	4838.40100000	5367.74700000	1391.979	GRADE BREAK LINE
6078	4838.51800000	5382.65200000	1392.886	GRADE BREAK LINE
6079	4849.77900000	5382.69300000	1392.557	GRADE BREAK LINE
6080	4850.44900000	5396.87200000	1393.416	GRADE BREAK LINE
6081	4838.83700000	5397.36300000	1393.731	GRADE BREAK LINE
6082	4921.67300000	5396.17300000	1386.865	BOTTOM OF BANK
6083	4923.79200000	5395.95300000	1389.685	GRADE BREAK LINE
6084	4925.39900000	5395.42700000	1392.734	GRADE BREAK LINE
6085	4928.00300000	5395.65900000	1396.134	TOP OF BANK
6086	4925.57800000	5603.83900000	1387.557	BOTTOM OF BANK
6087	4927.44000000	5604.05500000	1390.107	GRADE BREAK LINE
6088	4929.65600000	5603.73400000	1393.461	GRADE BREAK LINE
6089	4933.28000000	5603.49200000	1396.865	TOP OF BANK
6090	4930.62600000	5786.75800000	1388.242	BOTTOM OF BANK
6091	4932.15900000	5786.34500000	1391.027	GRADE BREAK LINE
6092	4934.01800000	5785.89200000	1394.025	GRADE BREAK LINE
6093	4937.06800000	5785.99600000	1397.914	TOP OF BANK
6094	4932.30300000	5877.84900000	1388.541	BOTTOM OF BANK
6095	4934.01400000	5877.65700000	1391.436	GRADE BREAK LINE
6096	4935.61600000	5877.26100000	1394.009	GRADE BREAK LINE
6097	4938.92300000	5877.05300000	1398.262	TOP OF BANK
6098	4936.22000000	6130.18800000	1389.408	BOTTOM OF BANK
6099	4938.29100000	6130.15100000	1392.135	GRADE BREAK LINE
6100	4940.40200000	6129.69800000	1395.073	GRADE BREAK LINE
6101	4943.13800000	6129.09500000	1398.524	TOP OF BANK
6102	4943.35700000	6129.15600000	1398.517	TOP OF BANK
6103	4942.82600000	6420.20900000	1389.712	BOTTOM OF BANK
6104	4944.80500000	6419.92900000	1392.295	GRADE BREAK LINE
6105	4946.46800000	6419.73700000	1395.479	GRADE BREAK LINE
6106	4949.22700000	6419.24400000	1398.960	TOP OF BANK
6107	4945.26500000	6469.03800000	1389.761	BOTTOM OF BANK
6108	4946.00100000	6454.94000000	1393.002	GRADE BREAK LINE
6109	4947.67200000	6468.82300000	1392.391	GRADE BREAK LINE

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
6110	4949.57500000	6468.80900000	1395.589	GRADE BREAK LINE
6111	4952.79400000	6468.61600000	1399.441	TOP OF BANK
6112	4898.35200000	6759.53700000	1390.728	BOTTOM OF BANK
6113	4900.30800000	6760.20300000	1393.485	GRADE BREAK LINE
6114	4902.12300000	6760.78600000	1396.447	GRADE BREAK LINE
6115	4902.98300000	6761.22400000	1399.212	TOP OF BANK
6116	4870.62500000	6832.33200000	1391.582	BOTTOM OF BANK
6117	4872.35900000	6832.95400000	1394.339	GRADE BREAK LINE
6118	4874.34100000	6833.24300000	1397.175	GRADE BREAK LINE
6119	4875.10500000	6833.33000000	1399.592	TOP OF BANK
6120	4832.25200000	6945.27400000	1391.958	BOTTOM OF BANK
6121	4834.00200000	6945.83100000	1394.368	GRADE BREAK LINE
6122	4836.47500000	6946.02200000	1397.784	GRADE BREAK LINE
6123	4837.79100000	6946.17700000	1400.048	TOP OF BANK
6124	4757.17300000	7124.51500000	1392.812	BOTTOM OF BANK
6125	4759.66700000	7126.00100000	1395.735	GRADE BREAK LINE
6126	4761.11200000	7126.65500000	1398.574	GRADE BREAK LINE
6127	4762.34800000	7127.05100000	1400.933	TOP OF BANK
6128	4673.04200000	7262.73800000	1393.513	BOTTOM OF BANK
6129	4674.49800000	7264.12300000	1396.570	GRADE BREAK LINE
6130	4676.48100000	7264.91300000	1399.226	GRADE BREAK LINE
6131	4677.59000000	7264.94000000	1401.852	TOP OF BANK
6132	4606.19600000	7352.14000000	1393.703	BOTTOM OF BANK
6133	4607.38500000	7353.47200000	1396.601	GRADE BREAK LINE
6134	4608.57700000	7355.17700000	1398.176	GRADE BREAK LINE
6135	4609.66400000	7356.56200000	1400.405	GRADE BREAK LINE
6136	4610.56600000	7355.14800000	1402.259	TOP OF BANK
6137	4610.60000000	7357.58800000	1403.473	TOP OF BANK
6138	4610.02500000	7356.96700000	1402.479	GRADE BREAK LINE
6139	4487.78600000	7501.44100000	1394.519	BOTTOM OF BANK
6140	4489.21900000	7503.18900000	1397.450	GRADE BREAK LINE
6141	4490.28500000	7504.44600000	1398.443	GRADE BREAK LINE
6142	4492.36000000	7505.47900000	1401.689	GRADE BREAK LINE
6143	4493.79900000	7506.33900000	1404.379	GRADE BREAK LINE
6144	4494.61500000	7506.96400000	1405.220	TOP OF BANK
6145	4367.70600000	7661.15500000	1395.864	BOTTOM OF BANK
6146	4369.70200000	7662.21300000	1398.282	GRADE BREAK LINE
6147	4371.00700000	7663.44500000	1399.913	GRADE BREAK LINE
6148	4372.62200000	7664.35600000	1402.524	GRADE BREAK LINE
6149	4374.97100000	7664.17200000	1405.244	GRADE BREAK LINE
6150	4376.02500000	7665.26900000	1406.415	TOP OF BANK
6151	4274.95400000	7790.97400000	1396.750	BOTTOM OF BANK
6152	4275.68100000	7792.67300000	1398.821	GRADE BREAK LINE
6153	4276.30000000	7795.45400000	1399.944	GRADE BREAK LINE
6154	4276.73800000	7799.44100000	1403.218	GRADE BREAK LINE
6155	4277.28500000	7800.88700000	1405.913	GRADE BREAK LINE
6156	4277.22800000	7803.10700000	1406.800	TOP OF BANK
6157	4279.10700000	7812.92600000	1407.808	TOP OF BANK
6158	4270.03100000	7815.98500000	1406.969	TOP OF BANK

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
6159	4267.76900000	7814.92300000	1406.354	TOP OF BANK
6160	4266.60800000	7814.71400000	1405.180	GRADE BREAK LINE
6161	4266.34100000	7813.78700000	1402.743	GRADE BREAK LINE
6162	4264.91300000	7812.67000000	1399.970	GRADE BREAK LINE
6163	4263.38700000	7811.35900000	1399.168	GRADE BREAK LINE
6164	4261.70400000	7810.44000000	1396.690	BOTTOM OF BANK
6165	4157.92700000	7971.55600000	1397.391	BOTTOM OF BANK
6166	4159.19200000	7972.86800000	1400.109	GRADE BREAK LINE
6167	4160.83600000	7973.80900000	1401.325	GRADE BREAK LINE
6168	4163.46300000	7973.14700000	1403.833	GRADE BREAK LINE
6169	4164.54700000	7972.86200000	1406.324	GRADE BREAK LINE
6170	4166.82100000	7974.16000000	1407.662	TOP OF BANK
6171	4026.48800000	8203.90000000	1398.375	BOTTOM OF BANK
6172	4028.04700000	8205.01300000	1400.989	GRADE BREAK LINE
6173	4029.73000000	8206.38500000	1402.424	GRADE BREAK LINE
6174	4031.33200000	8207.55300000	1404.969	GRADE BREAK LINE
6175	4032.76400000	8208.55800000	1407.633	GRADE BREAK LINE
6176	4035.70000000	8210.23800000	1409.221	TOP OF BANK
6177	3951.42900000	8379.13200000	1409.505	TOP OF BANK
6178	3948.77600000	8378.46100000	1408.187	GRADE BREAK LINE
6179	3946.90500000	8377.62100000	1405.278	GRADE BREAK LINE
6180	3945.13900000	8378.28200000	1402.990	GRADE BREAK LINE
6181	3943.88700000	8376.96400000	1401.531	GRADE BREAK LINE
6182	3942.50600000	8375.08500000	1399.020	BOTTOM OF BANK
6183	3867.10300000	8544.99200000	1399.133	BOTTOM OF BANK
6184	3868.75800000	8545.94300000	1402.018	GRADE BREAK LINE
6185	3871.00500000	8546.79500000	1403.469	GRADE BREAK LINE
6186	3873.38700000	8546.25100000	1406.142	GRADE BREAK LINE
6187	3876.22100000	8545.88400000	1408.847	GRADE BREAK LINE
6188	3877.44700000	8546.25400000	1409.442	TOP OF BANK
6189	3864.62200000	8557.64200000	1402.431	GRADE BREAK LINE
6190	3798.15400000	8730.51900000	1400.381	BOTTOM OF BANK
6191	3799.97200000	8731.87300000	1402.908	GRADE BREAK LINE
6192	3801.99600000	8731.75700000	1404.674	GRADE BREAK LINE
6193	3804.04200000	8731.88700000	1407.129	GRADE BREAK LINE
6194	3805.65100000	8733.38800000	1410.195	GRADE BREAK LINE
6195	3806.86000000	8733.60600000	1410.996	TOP OF BANK
6196	3728.66400000	8945.89300000	1400.826	BOTTOM OF BANK
6197	3726.26000000	8949.92000000	1400.801	BOTTOM OF BANK
6198	3730.81100000	8951.03100000	1404.381	GRADE BREAK LINE
6199	3731.04800000	8947.08300000	1403.638	GRADE BREAK LINE
6200	3727.88600000	8950.72000000	1403.027	GRADE BREAK LINE
6201	3733.07700000	8952.37800000	1407.623	GRADE BREAK LINE
6202	3735.13300000	8953.49100000	1410.223	GRADE BREAK LINE
6203	3736.45900000	8953.66800000	1410.897	TOP OF BANK
6204	3731.75500000	8953.09600000	1410.179	TOP OF BANK
6205	3731.00100000	8952.49400000	1409.081	GRADE BREAK LINE
6206	3729.23400000	8951.94600000	1406.275	GRADE BREAK LINE
6207	3694.90800000	9065.71600000	1401.251	BOTTOM OF BANK

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
6208	3697.08100000	9066.43900000	1403.735	GRADE BREAK LINE
6209	3699.40700000	9063.44300000	1407.017	GRADE BREAK LINE
6210	3701.45000000	9063.28500000	1409.856	GRADE BREAK LINE
6211	3702.51300000	9063.51900000	1410.724	TOP OF BANK
6212	3679.95300000	9144.59200000	1401.637	BOTTOM OF BANK
6213	3682.30700000	9145.08500000	1404.028	GRADE BREAK LINE
6214	3681.60500000	9145.74300000	1404.063	GRADE BREAK LINE
6215	3629.34800000	9400.62000000	1402.712	BOTTOM OF BANK
6216	3631.00900000	9400.80500000	1405.238	GRADE BREAK LINE
6217	3633.13700000	9401.20300000	1408.339	GRADE BREAK LINE
6218	3635.16200000	9401.91000000	1411.429	GRADE BREAK LINE
6219	3635.87600000	9401.81800000	1412.121	TOP OF BANK
6220	3606.14200000	9560.49400000	1402.987	BOTTOM OF BANK
6221	3608.00100000	9560.31500000	1405.970	GRADE BREAK LINE
6222	3609.87100000	9560.60800000	1409.078	GRADE BREAK LINE
6223	3611.74400000	9560.91100000	1411.624	GRADE BREAK LINE
6224	3613.03100000	9561.21800000	1412.349	TOP OF BANK
6225	3593.26400000	9673.87400000	1403.090	BOTTOM OF BANK
6226	3595.46100000	9673.74400000	1405.856	GRADE BREAK LINE
6227	3597.43400000	9673.39100000	1408.990	GRADE BREAK LINE
6228	3599.54300000	9673.27300000	1411.850	GRADE BREAK LINE
6229	3600.66700000	9673.52300000	1412.453	TOP OF BANK
6230	3592.58600000	9740.00200000	1403.205	BOTTOM OF BANK
6231	3594.42300000	9739.71600000	1405.901	GRADE BREAK LINE
6232	3595.68800000	9739.37400000	1408.817	GRADE BREAK LINE
6233	3597.66200000	9739.39900000	1412.035	GRADE BREAK LINE
6234	3598.24200000	9739.35700000	1412.757	TOP OF BANK
6235	3592.79600000	9793.46900000	1403.431	BOTTOM OF BANK
6236	3594.84600000	9793.59500000	1406.177	GRADE BREAK LINE
6237	3596.63500000	9793.04100000	1409.123	GRADE BREAK LINE
6238	3598.91600000	9787.08400000	1412.737	GRADE BREAK LINE
6239	3599.14400000	9788.46800000	1412.314	TOP OF BANK
6240	3587.26700000	9902.77800000	1403.369	BOTTOM OF BANK
6241	3588.95100000	9903.01000000	1406.105	GRADE BREAK LINE
6242	3590.82300000	9902.92800000	1409.093	GRADE BREAK LINE
6243	3591.59400000	9902.83700000	1410.618	TOP OF BANK
6244	3588.23100000	9913.30000000	1405.731	GRADE BREAK LINE
6245	3584.24200000	10050.39100000	1403.959	BOTTOM OF BANK
6246	3586.41500000	10050.37900000	1406.849	GRADE BREAK LINE
6247	3588.01400000	10050.18600000	1409.944	GRADE BREAK LINE
6248	3589.39600000	10049.66400000	1412.483	TOP OF BANK
6249	3585.73800000	10215.36800000	1404.428	BOTTOM OF BANK
6250	3587.32600000	10215.41500000	1407.458	GRADE BREAK LINE
6251	3588.80700000	10215.15500000	1409.935	GRADE BREAK LINE
6252	3589.99400000	10215.54200000	1412.732	TOP OF BANK
6253	3585.60400000	10379.34500000	1404.877	BOTTOM OF BANK
6254	3587.13000000	10379.00700000	1407.435	GRADE BREAK LINE
6255	3589.16700000	10378.98700000	1410.561	GRADE BREAK LINE
6256	3590.52800000	10378.75800000	1413.165	TOP OF BANK

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
6257	3588.32300000	10477.97600000	1405.034	BOTTOM OF BANK
6258	3590.30800000	10477.56000000	1407.911	GRADE BREAK LINE
6259	3592.06600000	10477.03200000	1410.732	GRADE BREAK LINE
6260	3593.08200000	10477.06100000	1413.453	TOP OF BANK
6261	3587.68600000	10702.52500000	1405.726	BOTTOM OF BANK
6262	3590.10300000	10702.72700000	1408.844	GRADE BREAK LINE
6263	3591.47000000	10702.40600000	1411.189	GRADE BREAK LINE
6264	3592.08900000	10702.51000000	1413.862	TOP OF BANK
6265	3578.85400000	10844.84600000	1406.420	BOTTOM OF BANK
6266	3580.77200000	10844.36000000	1409.095	GRADE BREAK LINE
6267	3582.33900000	10845.08600000	1411.762	GRADE BREAK LINE
6268	3583.29400000	10845.25200000	1414.252	TOP OF BANK
6269	3561.71200000	10993.90200000	1406.504	BOTTOM OF BANK
6270	3563.76800000	10994.36500000	1409.377	GRADE BREAK LINE
6271	3565.19400000	10994.24600000	1412.210	GRADE BREAK LINE
6272	3566.26100000	10994.48300000	1414.717	TOP OF BANK
6273	3530.32300000	11136.45300000	1406.940	BOTTOM OF BANK
6274	3532.36800000	11136.95300000	1409.759	GRADE BREAK LINE
6275	3533.86100000	11136.68400000	1412.835	GRADE BREAK LINE
6276	3535.52900000	11137.74100000	1415.481	TOP OF BANK
6277	3504.86400000	11255.32300000	1407.511	BOTTOM OF BANK
6278	3507.00500000	11256.44500000	1410.730	GRADE BREAK LINE
6279	3508.39400000	11256.77400000	1413.314	GRADE BREAK LINE
6280	3509.39400000	11257.25800000	1415.904	TOP OF BANK
6281	3466.89200000	11405.15400000	1408.059	BOTTOM OF BANK
6282	3469.20000000	11404.95500000	1411.266	GRADE BREAK LINE
6283	3471.16200000	11405.63400000	1414.202	GRADE BREAK LINE
6284	3471.89900000	11406.11300000	1416.183	TOP OF BANK
6285	3432.53100000	11540.09000000	1408.816	BOTTOM OF BANK
6286	3434.90900000	11540.62600000	1411.836	GRADE BREAK LINE
6287	3436.48800000	11540.79300000	1414.472	GRADE BREAK LINE
6288	3437.68400000	11541.20700000	1417.137	TOP OF BANK
6289	3409.15400000	11630.90900000	1409.174	BOTTOM OF BANK
6290	3410.48100000	11631.17700000	1411.861	GRADE BREAK LINE
6291	3412.22100000	11631.19200000	1415.016	GRADE BREAK LINE
6292	3413.52400000	11632.00000000	1417.367	TOP OF BANK
6293	3397.51400000	11701.77700000	1409.529	BOTTOM OF BANK
6294	3399.67300000	11701.79900000	1412.183	GRADE BREAK LINE
6295	3401.35600000	11702.50500000	1415.204	GRADE BREAK LINE
6296	3402.69200000	11702.49700000	1418.112	TOP OF BANK
6297	3365.08000000	11833.62500000	1410.204	BOTTOM OF BANK
6298	3366.73800000	11834.50000000	1412.736	GRADE BREAK LINE
6299	3368.39800000	11836.76300000	1415.923	GRADE BREAK LINE
6300	3368.72300000	11837.65400000	1418.755	TOP OF BANK
6301	3324.43500000	11828.52400000	1418.844	TOP OF BANK
6302	3326.07600000	11827.53200000	1415.980	GRADE BREAK LINE
6303	3328.34000000	11826.12600000	1413.103	GRADE BREAK LINE
6304	3331.02600000	11825.31200000	1410.270	BOTTOM OF BANK
6305	3359.63000000	11813.97900000	1409.597	GRADE BREAK LINE

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
6306	3355.94100000	11813.11200000	1409.602	GRADE BREAK LINE
6307	3344.82600000	11810.76100000	1409.812	GRADE BREAK LINE
6308	3410.61500000	11615.99600000	1408.952	GRADE BREAK LINE
6309	3405.87600000	11614.45100000	1408.804	GRADE BREAK LINE
6310	3394.93300000	11611.69500000	1409.111	GRADE BREAK LINE
6311	3493.58300000	11259.24300000	1407.169	GRADE BREAK LINE
6312	3484.85300000	11254.12400000	1407.263	GRADE BREAK LINE
6314	3516.38600000	11106.42400000	1406.822	GRADE BREAK LINE
6315	3543.85800000	11028.36200000	1406.372	GRADE BREAK LINE
6316	3540.25100000	11027.88800000	1406.291	GRADE BREAK LINE
6317	3529.87900000	11026.09300000	1406.481	GRADE BREAK LINE
6318	3579.28200000	10677.68500000	1405.395	GRADE BREAK LINE
6319	3573.11100000	10677.45300000	1405.251	GRADE BREAK LINE
6320	3561.97000000	10676.91200000	1405.419	GRADE BREAK LINE
6321	3576.02000000	10458.32100000	1404.541	GRADE BREAK LINE
6322	3573.94100000	10458.62900000	1404.578	GRADE BREAK LINE
6323	3561.04100000	10458.61600000	1404.801	GRADE BREAK LINE
6324	3572.13400000	10256.60700000	1404.028	GRADE BREAK LINE
6325	3569.87400000	10256.71500000	1404.030	GRADE BREAK LINE
6326	3556.05800000	10256.97300000	1404.164	GRADE BREAK LINE
6327	3575.18600000	10206.62400000	1404.067	GRADE BREAK LINE
6328	3570.52500000	10206.33200000	1403.914	GRADE BREAK LINE
6329	3556.03600000	10206.77600000	1404.328	GRADE BREAK LINE
6330	3575.31600000	9957.27400000	1403.514	GRADE BREAK LINE
6331	3568.43100000	9957.26000000	1403.349	GRADE BREAK LINE
6332	3553.21000000	9956.70200000	1403.592	GRADE BREAK LINE
6333	3583.49500000	9778.80900000	1403.179	GRADE BREAK LINE
6334	3577.39500000	9778.35100000	1403.021	GRADE BREAK LINE
6335	3564.32500000	9778.17800000	1403.578	GRADE BREAK LINE
6336	3583.26100000	9762.72400000	1403.057	GRADE BREAK LINE
6337	3578.24600000	9762.34900000	1402.917	GRADE BREAK LINE
6339	3582.46600000	9728.05400000	1402.761	GRADE BREAK LINE
6340	3567.18800000	9727.49800000	1403.046	GRADE BREAK LINE
6341	3594.61600000	9592.11200000	1402.809	GRADE BREAK LINE
6342	3580.76100000	9589.97700000	1402.967	GRADE BREAK LINE
6343	3616.07400000	9430.78100000	1402.219	GRADE BREAK LINE
6344	3603.42800000	9428.75000000	1402.368	GRADE BREAK LINE
6345	3636.47300000	9325.90000000	1401.675	GRADE BREAK LINE
6346	3619.76600000	9324.58800000	1401.750	GRADE BREAK LINE
6347	3672.95200000	9148.99000000	1401.144	GRADE BREAK LINE
6348	3672.05000000	9149.28900000	1401.136	GRADE BREAK LINE
6349	3671.48400000	9133.18400000	1400.351	GRADE BREAK LINE
6350	3674.94600000	9132.78500000	1400.495	GRADE BREAK LINE
6351	3679.63300000	9113.82600000	1400.988	GRADE BREAK LINE
6352	3674.96300000	9112.49900000	1401.207	GRADE BREAK LINE
6353	3725.00400000	8943.26500000	1400.479	GRADE BREAK LINE
6354	3720.11600000	8942.04500000	1400.678	GRADE BREAK LINE
6355	3816.40700000	8668.33900000	1399.456	GRADE BREAK LINE
6356	3812.02100000	8668.08800000	1399.575	GRADE BREAK LINE

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
6357	3935.98100000	8377.30900000	1398.349	GRADE BREAK LINE
6358	3933.33300000	8376.95100000	1398.520	GRADE BREAK LINE
6359	4119.98700000	8024.95500000	1397.192	GRADE BREAK LINE
6360	4117.93600000	8023.80900000	1397.063	GRADE BREAK LINE
6361	4184.17200000	7917.08800000	1396.655	GRADE BREAK LINE
6362	4181.87600000	7915.77900000	1396.548	GRADE BREAK LINE
6363	4399.47700000	7608.84600000	1395.031	GRADE BREAK LINE
6364	4395.53300000	7607.68300000	1395.178	GRADE BREAK LINE
6365	4537.12900000	7427.30500000	1393.772	GRADE BREAK LINE
6366	4534.57300000	7425.66200000	1393.863	GRADE BREAK LINE
6367	4590.44100000	7352.68900000	1393.360	GRADE BREAK LINE
6368	4591.95200000	7355.29700000	1393.185	GRADE BREAK LINE
6369	4604.48100000	7337.97300000	1393.212	GRADE BREAK LINE
6370	4592.60200000	7328.67700000	1393.616	GRADE BREAK LINE
6371	4728.45400000	7152.80100000	1392.507	GRADE BREAK LINE
6372	4716.97600000	7145.32200000	1393.156	GRADE BREAK LINE
6373	4844.31700000	6872.86700000	1391.274	GRADE BREAK LINE
6374	4835.51300000	6870.48000000	1391.436	GRADE BREAK LINE
6375	4877.53300000	6774.42600000	1390.603	GRADE BREAK LINE
6376	4865.85300000	6770.11300000	1390.566	GRADE BREAK LINE
6377	4896.51200000	6700.78100000	1390.127	GRADE BREAK LINE
6378	4882.46100000	6697.51100000	1390.237	GRADE BREAK LINE
6379	4912.08500000	6510.77400000	1389.643	GRADE BREAK LINE
6380	4921.77500000	6510.29200000	1389.657	GRADE BREAK LINE
6381	4916.70200000	6011.01300000	1388.185	GRADE BREAK LINE
6382	4906.84100000	6010.73500000	1388.626	GRADE BREAK LINE
6383	4901.82900000	5591.42700000	1387.311	GRADE BREAK LINE
6384	4911.39600000	5590.82500000	1386.907	GRADE BREAK LINE
6385	4907.06000000	5337.90200000	1386.326	GRADE BREAK LINE
6386	4897.01000000	5337.82700000	1386.428	GRADE BREAK LINE
6387	4898.95300000	5285.27800000	1384.496	GRADE BREAK LINE
6388	4894.01100000	5295.26300000	1385.405	GRADE BREAK LINE
6389	4891.81900000	5197.21100000	1385.534	GRADE BREAK LINE
6390	4898.46200000	5196.47300000	1384.000	GRADE BREAK LINE
6391	4889.01700000	5049.66500000	1384.701	GRADE BREAK LINE
6392	4896.57700000	5049.73800000	1383.083	GRADE BREAK LINE
6393	4889.87100000	4881.23800000	1384.046	GRADE BREAK LINE
6394	4895.93100000	4877.42100000	1382.616	GRADE BREAK LINE
6395	4908.67600000	4718.01100000	1383.381	GRADE BREAK LINE
6396	4917.35000000	4718.93700000	1381.416	GRADE BREAK LINE
6397	4957.91100000	4511.20200000	1381.927	GRADE BREAK LINE
6398	4965.37400000	4513.90800000	1379.889	GRADE BREAK LINE
6399	5016.87400000	4349.89000000	1380.678	GRADE BREAK LINE
6400	5024.43000000	4352.47500000	1378.797	GRADE BREAK LINE
6401	5043.37700000	4310.61700000	1378.411	GRADE BREAK LINE
6402	5039.77300000	4298.35700000	1379.941	GRADE BREAK LINE
6403	5054.58900000	4283.16200000	1380.039	GRADE BREAK LINE
6404	5106.23400000	4173.16900000	1379.334	GRADE BREAK LINE
6405	5179.42000000	4011.89300000	1377.992	GRADE BREAK LINE

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
6406	5187.52100000	4004.72300000	1378.175	GRADE BREAK LINE
6407	5212.91100000	3940.20800000	1377.798	GRADE BREAK LINE
6408	5215.48300000	3929.37200000	1377.706	GRADE BREAK LINE
6409	5219.24100000	3917.91000000	1377.618	GRADE BREAK LINE
6410	5124.88400000	3978.40900000	1388.926	SEWER MANHOLE
7000	5328.57000000	3936.60400000	1389.079	CHECK SHOT
7001	5202.24900000	3912.65200000	1376.970	BOTTOM OF BANK
7002	5177.52900000	3905.73800000	1391.476	TOP OF BANK
7003	5108.08000000	3896.06200000	1388.697	WALL
7004	5108.99900000	3963.21600000	1389.637	WALL
7005	4984.18700000	3967.94000000	1390.408	WALL
7006	4985.67200000	3972.06800000	1391.399	WALL
7007	4989.99200000	3971.72300000	1391.594	WALL
7008	5172.11000000	3975.52100000	1385.414	TOP OF BANK
7009	5172.49300000	3975.70700000	1382.476	GRADE BREAK LINE
7010	5173.90700000	3975.96300000	1378.955	BOTTOM OF BANK
7011	5175.48400000	3977.17900000	1378.116	BOTTOM OF BANK
7012	5173.56500000	3976.30700000	1380.113	GRADE BREAK LINE
7013	5030.99700000	4278.44800000	1388.246	TOP OF BANK
7014	5031.33200000	4278.95000000	1385.865	GRADE BREAK LINE
7015	5033.55800000	4280.49500000	1382.988	GRADE BREAK LINE
7016	5035.19800000	4281.14700000	1380.779	BOTTOM OF BANK
7017	5012.41200000	4259.95000000	1392.973	NATURAL GROUND
7018	5008.65000000	4260.28100000	1393.201	NATURAL GROUND
7019	4994.70300000	4261.51100000	1393.201	WALL
7020	4985.42200000	4335.89500000	1392.074	WALL
7021	4985.31300000	4341.72500000	1392.542	WALL
7022	4948.92500000	4433.87800000	1392.600	WALL
7023	4898.49900000	4603.00800000	1394.172	WALL
7024	4914.52300000	4605.90900000	1391.143	TOP OF BANK
7025	4915.01600000	4605.83900000	1388.527	GRADE BREAK LINE
7026	4916.75800000	4606.21000000	1385.672	GRADE BREAK LINE
7027	4918.86400000	4606.98800000	1383.040	BOTTOM OF BANK
7028	4864.51900000	4797.35600000	1394.843	WALL
7029	4881.25800000	4799.98400000	1392.257	TOP OF BANK
7030	4882.08800000	4799.95500000	1389.669	GRADE BREAK LINE
7031	4883.62500000	4800.15000000	1386.649	GRADE BREAK LINE
7032	4885.59600000	4800.99300000	1383.986	BOTTOM OF BANK
7033	4855.60200000	4909.61900000	1395.455	WALL
7034	4872.08500000	4982.19800000	1392.949	TOP OF BANK
7035	4872.49700000	4982.37900000	1390.370	GRADE BREAK LINE
7036	4874.34600000	4982.26100000	1387.462	GRADE BREAK LINE
7037	4874.12900000	4982.22900000	1387.509	BOTTOM OF BANK
7038	4877.92400000	5294.10000000	1394.225	TOP OF BANK
7039	4879.08500000	5294.28500000	1392.106	GRADE BREAK LINE
7040	4880.23200000	5293.94800000	1389.041	GRADE BREAK LINE
7041	4881.03100000	5298.80700000	1386.485	BOTTOM OF BANK
7042	4860.32600000	5290.96800000	1398.115	WALL
7043	4748.19700000	5302.84800000	1395.360	BOTTOM OF BANK

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
7044	4748.00600000	5301.26500000	1397.764	TOP OF BANK
7045	4778.65100000	5295.06200000	1399.213	WALL
7046	4748.39200000	5317.65200000	1395.366	BOTTOM OF BANK
7047	4747.37900000	5319.42400000	1396.847	TOP OF BANK
7048	4833.17200000	5322.50800000	1397.168	TOP OF BANK
7049	4836.58100000	5320.39000000	1389.228	BOTTOM OF BANK
7050	4837.66000000	5428.38400000	1396.998	BOTTOM OF BANK
7051	4853.06200000	5428.66300000	1397.355	BOTTOM OF BANK
7052	4853.07500000	5323.25800000	1396.002	TOP OF BANK
7053	4849.55500000	5320.93900000	1388.850	BOTTOM OF BANK
7054	4851.58300000	5424.95000000	1396.065	GRADE BREAK LINE
7055	4838.03800000	5425.06600000	1395.991	GRADE BREAK LINE
7056	4838.84400000	5411.88900000	1394.614	GRADE BREAK LINE
7057	4851.06900000	5411.23900000	1394.261	GRADE BREAK LINE
7058	4855.36900000	5326.30700000	1396.962	BARBED WIRE FENCE
7059	4877.30500000	5323.59500000	1394.515	TOP OF BANK
7060	4881.98100000	5318.71200000	1387.076	BOTTOM OF BANK
7061	4879.46300000	5322.06700000	1391.809	GRADE BREAK LINE
7062	4880.56900000	5322.23900000	1391.704	VOID SHOT
7063	4881.06800000	5321.71900000	1388.992	GRADE BREAK LINE
064	4855.89500000	5375.80000000	1396.948	BARBED WIRE FENCE
7065	4867.93700000	5429.04700000	1396.552	BARBED WIRE FENCE
7066	4815.82300000	5480.93800000	1398.522	WALL
7067	4816.87400000	5481.22500000	1397.760	WALL
7068	4819.40600000	5637.27100000	1398.479	WALL
7069	4818.08200000	5637.33000000	1398.729	WALL
7070	4818.07600000	5638.31800000	1398.745	FENCE
7071	4819.59600000	5638.28100000	1398.481	FENCE
7072	4876.73100000	5912.02100000	1399.161	BARBED WIRE FENCE
7073	4824.59200000	5949.87300000	1399.537	FENCE
7074	4820.68800000	5949.96900000	1400.129	FENCE
7075	4810.99600000	6253.73900000	1401.099	FENCE
7076	4824.15800000	6253.96100000	1401.635	FENCE
7077	4823.57700000	6325.84300000	1402.309	FENCE
7078	4827.39500000	6324.63300000	1402.421	FENCE
7079	4824.90800000	6396.29400000	1401.569	FENCE
7080	4824.90100000	6396.32400000	1401.582	GATE
7081	4824.60100000	6407.48500000	1401.410	GATE
7082	4822.80700000	6415.40500000	1401.451	WALL
7083	4831.55800000	6415.44500000	1401.634	WALL
7084	4886.23800000	6439.50300000	1399.060	BARBED WIRE FENCE
7085	4833.53300000	6511.92200000	1401.778	WALL
7086	4832.76600000	6511.38300000	1401.744	GATE
7087	4821.36800000	6511.66500000	1402.471	GATE
7088	4821.36100000	6511.63900000	1402.458	WALL
7089	4822.83500000	6569.78800000	1402.568	WALL
7090	4817.45200000	6569.78200000	1402.626	WALL
7091	4817.45200000	6572.50900000	1402.496	PO
7092	4825.08400000	6572.24800000	1402.113	PO

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
7093	4826.55300000	6563.76600000	1402.318	PO
7094	4826.08000000	6558.59800000	1402.841	PO
7095	4826.42000000	6549.01300000	1402.446	PO
7096	4826.42200000	6542.18100000	1402.936	PO
7097	4826.07000000	6533.86000000	1402.845	PO
7098	4825.83500000	6526.27500000	1403.066	PO
7099	4825.30300000	6518.76100000	1403.055	PO
7100	4834.24500000	6530.13900000	1402.026	PO
7101	4834.73400000	6531.72100000	1402.276	PO
7102	4834.47700000	6539.61200000	1402.699	PO
7103	4834.29100000	6549.03100000	1401.942	PO
7104	4835.09300000	6553.83400000	1402.519	PO
7105	4834.43100000	6568.97100000	1402.525	PO
7106	4834.22200000	6569.18400000	1402.928	POWER POLE
7107	4826.56900000	6571.56200000	1402.575	TELEPHONE RISER
7108	4839.83400000	6574.19000000	1401.344	FIRE HYDRANT
7109	4855.44200000	6572.30700000	1400.866	DOWN GUY
7110	4873.09200000	6541.99400000	1399.773	BARBED WIRE FENCE
7111	4876.78200000	6548.53300000	1399.468	BARBED WIRE FENCE
7112	4897.06800000	6469.85900000	1398.842	TOP OF BANK
7113	4898.74600000	6469.93200000	1395.702	GRADE BREAK LINE
7114	4900.86200000	6470.37000000	1393.277	GRADE BREAK LINE
7115	4904.64900000	6469.98000000	1389.542	BOTTOM OF BANK
7116	4854.79000000	6748.72500000	1398.966	TOP OF BANK
7117	4855.02000000	6748.58200000	1396.227	GRADE BREAK LINE
7118	4857.03000000	6749.18700000	1393.123	GRADE BREAK LINE
7119	4859.13400000	6749.93300000	1390.475	BOTTOM OF BANK
7120	4843.83000000	6790.92200000	1398.651	TOP OF BANK
7121	4845.16500000	6791.45800000	1396.190	GRADE BREAK LINE
7122	4846.01100000	6791.87100000	1393.445	GRADE BREAK LINE
7123	4848.11300000	6792.36100000	1390.784	BOTTOM OF BANK
7124	4625.20800000	6751.05700000	1404.743	WALL
7125	4630.46400000	6750.92400000	1405.055	WALL
7126	4636.73200000	7215.52700000	1406.238	WALL
7127	4716.49900000	7111.24800000	1401.329	TOP OF BANK
7128	4716.03600000	7112.20400000	1398.745	GRADE BREAK LINE
7129	4718.43100000	7112.69300000	1395.879	GRADE BREAK LINE
7130	4720.40200000	7113.81700000	1392.920	BOTTOM OF BANK
7131	4592.65400000	7304.12800000	1401.884	TOP OF BANK
7132	4594.05500000	7303.95000000	1399.500	GRADE BREAK LINE
7133	4595.25400000	7304.71100000	1396.458	GRADE BREAK LINE
7134	4596.37100000	7305.74700000	1393.905	BOTTOM OF BANK
7135	4571.45100000	7327.79400000	1403.508	TOP OF BANK
7136	4572.67000000	7329.10600000	1403.892	TOP OF BANK
7137	4575.16100000	7330.23900000	1402.659	TOP OF BANK
7138	4575.08100000	7331.45100000	1399.880	GRADE BREAK LINE
7139	4576.05200000	7333.22700000	1397.653	GRADE BREAK LINE
7140	4576.91600000	7333.31300000	1396.727	GRADE BREAK LINE
7141	4578.55900000	7334.87700000	1393.694	BOTTOM OF BANK

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
7142	4390.74000000	7571.86500000	1405.452	TOP OF BANK
7143	4391.79800000	7573.10000000	1404.401	TOP OF BANK
7144	4392.48900000	7573.29400000	1402.009	GRADE BREAK LINE
7145	4394.16000000	7574.55100000	1399.278	GRADE BREAK LINE
7146	4395.18100000	7575.55600000	1398.193	GRADE BREAK LINE
7147	4396.54300000	7576.80700000	1395.251	BOTTOM OF BANK
7148	4250.71600000	7736.46800000	1408.183	WALL
7149	4180.03700000	7868.03900000	1407.074	TOP OF BANK
7150	4181.08600000	7868.47200000	1406.037	TOP OF BANK
7151	4141.57300000	7928.46900000	1406.764	TOP OF BANK
7152	4143.04700000	7929.52600000	1405.799	TOP OF BANK
7153	4141.76200000	7929.03900000	1405.945	TOP OF BANK
7154	4127.82900000	7928.96500000	1407.616	TOP OF BANK
7155	4124.63600000	7928.61200000	1407.661	WALL
7156	4122.66900000	7927.81900000	1408.852	WALL
7157	4114.62400000	7944.04800000	1408.134	WALL
7158	4120.03600000	7945.61000000	1408.193	TOP OF BANK
7159	4128.45400000	7950.77500000	1407.153	TOP OF BANK
7160	4128.88900000	7950.99100000	1406.142	TOP OF BANK
7161	4130.23400000	7952.04200000	1406.106	TOP OF BANK
7162	4130.49400000	7952.02500000	1403.712	GRADE BREAK LINE
7163	4133.08400000	7953.70000000	1400.666	GRADE BREAK LINE
7164	4133.74800000	7953.74500000	1399.670	GRADE BREAK LINE
7165	4135.31700000	7954.89800000	1397.323	BOTTOM OF BANK
7166	3935.33400000	8270.16100000	1409.895	WALL
7167	3949.96800000	8278.08100000	1408.282	TOP OF BANK
7168	3951.50100000	8278.94600000	1407.383	TOP OF BANK
7169	3952.13000000	8279.49900000	1405.145	GRADE BREAK LINE
7170	3954.57200000	8280.36500000	1401.688	GRADE BREAK LINE
7171	3955.71000000	8281.47500000	1400.704	GRADE BREAK LINE
7172	3957.59000000	8282.53900000	1398.282	BOTTOM OF BANK
7173	3728.64800000	8780.99400000	1412.660	WALL
7174	3742.45300000	8785.28600000	1410.516	TOP OF BANK
7175	3744.34600000	8785.35400000	1409.457	TOP OF BANK
7176	3744.77700000	8785.52800000	1407.177	GRADE BREAK LINE
7177	3746.70100000	8785.67400000	1404.210	GRADE BREAK LINE
7178	3748.35000000	8786.27700000	1402.957	GRADE BREAK LINE
7179	3750.00100000	8787.03600000	1400.289	BOTTOM OF BANK
7180	3686.70200000	8909.11100000	1413.227	WALL
7181	3674.31000000	8904.01800000	1413.794	WALL
7182	3663.05000000	8929.15300000	1413.027	WALL
7183	3679.63000000	8935.43300000	1412.813	WALL
7184	3704.00900000	8913.40300000	1409.279	TOP OF BANK
7185	3702.68100000	8913.03400000	1409.085	TOP OF BANK
7186	3702.67900000	8912.74900000	1410.319	TOP OF BANK
7187	3686.25200000	8917.94700000	1410.856	TOP OF BANK
7188	3683.66400000	8917.02200000	1410.273	TOP OF BANK
7189	3683.44000000	8928.35400000	1410.848	TOP OF BANK
7190	3694.63900000	8941.80500000	1409.850	TOP OF BANK

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
7191	3695.00400000	8941.81000000	1408.883	TOP OF BANK
7192	3696.50700000	8942.28900000	1408.698	TOP OF BANK
7193	3696.75400000	8942.60300000	1406.466	GRADE BREAK LINE
7194	3698.70800000	8943.54500000	1403.438	GRADE BREAK LINE
7195	3698.66300000	8941.95400000	1403.505	GRADE BREAK LINE
7196	3700.99700000	8943.07500000	1401.104	BOTTOM OF BANK
7197	3639.75200000	9087.61600000	1413.452	WALL
7198	3640.49100000	9088.32000000	1413.509	WOOD FENCE
7199	3627.78500000	9136.90100000	1413.553	WOOD FENCE
7200	3642.74800000	9140.89600000	1410.494	TOP OF BANK
7201	3644.53100000	9141.66900000	1409.302	TOP OF BANK
7202	3646.05600000	9142.18500000	1406.613	GRADE BREAK LINE
7203	3648.17800000	9142.17800000	1403.302	GRADE BREAK LINE
7204	3648.97900000	9142.60600000	1401.366	BOTTOM OF BANK
7205	3598.13400000	9395.22300000	1402.342	BOTTOM OF BANK
7206	3591.90900000	9394.88700000	1411.240	TOP OF BANK
7207	3590.24500000	9403.72000000	1411.238	TOP OF BANK
7208	3577.20400000	9400.95000000	1411.972	TOP OF BANK
7209	3593.30500000	9394.97800000	1410.459	TOP OF BANK
7210	3593.65100000	9395.56300000	1408.161	GRADE BREAK LINE
7211	3595.78500000	9395.19000000	1404.943	GRADE BREAK LINE
7212	3598.11300000	9395.50200000	1402.327	BOTTOM OF BANK
7213	3570.06600000	9420.61600000	1412.369	WOOD FENCE
7214	3572.32100000	9420.56000000	1412.313	WOOD FENCE
7215	3576.33900000	9419.34800000	1412.703	TOP OF BANK
7216	3587.35900000	9421.83100000	1411.561	TOP OF BANK
7217	3566.26600000	9568.96000000	1411.916	TOP OF BANK
7218	3551.51600000	9567.59500000	1413.578	WOOD FENCE
7219	3544.11100000	9566.89900000	1413.534	WOOD FENCE
7220	3552.20500000	9569.55800000	1414.182	TOP OF BANK
7221	3563.45800000	9570.77800000	1413.148	TOP OF BANK
7222	3563.72400000	9568.35700000	1412.840	TOP OF BANK
7223	3562.50600000	9577.33400000	1413.115	TOP OF BANK
7224	3551.41700000	9576.20100000	1414.149	TOP OF BANK
7225	3566.41600000	9571.08600000	1411.746	TOP OF BANK
7226	3563.97400000	9570.91200000	1411.522	TOP OF BANK
7227	3562.54000000	9576.25300000	1411.911	TOP OF BANK
7228	3565.04300000	9577.84100000	1411.949	TOP OF BANK
7229	3564.71300000	9581.21000000	1412.059	TOP OF BANK
7230	3547.31700000	9608.68700000	1413.033	WALL
7231	3534.38800000	9739.76200000	1413.397	WALL
7232	3549.20500000	9741.74200000	1412.323	TOP OF BANK
7233	3550.78400000	9741.97100000	1411.220	TOP OF BANK
7234	3551.37800000	9742.13800000	1408.878	GRADE BREAK LINE
7235	3553.30800000	9742.95500000	1405.456	GRADE BREAK LINE
7236	3555.46800000	9743.27000000	1403.174	BOTTOM OF BANK
7237	3524.15800000	9933.12800000	1413.820	WALL
7238	3543.80000000	9814.53100000	1412.291	TOP OF BANK
7239	3538.16800000	9956.05400000	1412.085	TOP OF BANK

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
7240	3538.91000000	9956.32800000	1409.800	GRADE BREAK LINE
7241	3540.38300000	9957.08000000	1406.466	GRADE BREAK LINE
7242	3542.75500000	9956.25900000	1403.916	BOTTOM OF BANK
7243	3522.95200000	10038.55400000	1413.841	WALL
7244	3524.13400000	10157.89000000	1414.199	WALL
7245	3538.18300000	10156.89800000	1412.475	TOP OF BANK
7246	3538.69500000	10156.89300000	1410.308	GRADE BREAK LINE
7247	3540.92500000	10156.44300000	1407.024	GRADE BREAK LINE
7248	3543.08300000	10156.34000000	1404.317	BOTTOM OF BANK
7249	3535.12200000	10524.84800000	1413.970	WALL
7251	3520.01300000	10572.83000000	1414.061	WALL
7252	3535.05500000	10579.12600000	1417.639	WALL
7253	3547.65900000	10530.57700000	1411.868	TOP OF BANK
7254	3548.21900000	10530.56100000	1410.429	GRADE BREAK LINE
7255	3549.88600000	10530.73800000	1407.458	GRADE BREAK LINE
7256	3551.40300000	10530.67700000	1405.036	BOTTOM OF BANK
7257	3549.13300000	10582.23100000	1413.122	TOP OF BANK
7258	3549.74100000	10582.63900000	1410.889	GRADE BREAK LINE
7259	3551.12500000	10582.39200000	1407.904	GRADE BREAK LINE
7260	3553.22500000	10581.81800000	1405.140	BOTTOM OF BANK
7261	3548.62600000	10668.56800000	1413.232	TOP OF BANK
7262	3540.32500000	10668.14900000	1414.202	TOP OF BANK
7263	3540.66400000	10668.26200000	1414.137	TOP OF BANK
7264	3542.54100000	10669.01800000	1412.370	TOP OF BANK
7265	3548.17900000	10669.29700000	1411.449	TOP OF BANK
7266	3544.83800000	10739.52000000	1411.985	TOP OF BANK
7267	3537.48000000	10739.27100000	1412.516	TOP OF BANK
7268	3534.83800000	10739.71000000	1414.190	TOP OF BANK
7269	3535.46500000	10653.24700000	1415.025	NATURAL GROUND
7270	3534.36400000	10660.39200000	1414.971	NATURAL GROUND
7271	3532.07800000	10675.21800000	1414.970	WALL
7272	3504.91300000	10680.99000000	1415.039	WALL
7273	3518.53200000	10741.39800000	1417.381	WALL
7274	3529.10500000	10738.81800000	1417.612	WALL
7275	3545.65300000	10740.94900000	1413.664	TOP OF BANK
7276	3546.50800000	10741.45700000	1411.301	GRADE BREAK LINE
7277	3547.93600000	10741.56300000	1408.257	GRADE BREAK LINE
7278	3549.74000000	10741.62500000	1405.778	BOTTOM OF BANK
7279	3518.76200000	10877.66900000	1417.446	WALL
7280	3522.78700000	10973.98700000	1414.640	TOP OF BANK
7281	3522.80400000	10973.99200000	1414.651	TOP OF BANK
7282	3523.54100000	10973.83100000	1412.140	GRADE BREAK LINE
7283	3525.49200000	10973.72900000	1409.462	GRADE BREAK LINE
7284	3527.47700000	10973.66100000	1406.555	BOTTOM OF BANK
7285	3488.78200000	11093.85500000	1416.839	WALL
7286	3479.26300000	11148.86600000	1416.815	WALL
7287	3485.08300000	11190.32500000	1415.545	TOP OF BANK
7288	3485.57400000	11190.94200000	1413.008	GRADE BREAK LINE
7289	3487.26400000	11190.83700000	1409.976	GRADE BREAK LINE

GREENWAY TOPO CONTINUED

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Current Coordinate Listing (All)

Point	Northing	Easting	Elevation	Description
7290	3488.90400000	11191.30200000	1407.159	BOTTOM OF BANK
7291	3460.00600000	11230.66600000	1417.536	WALL
7292	3365.77900000	11658.40900000	1419.238	TOP OF BANK
7293	3365.19800000	11660.33500000	1419.236	TOP OF BANK
7294	3352.98600000	11660.24600000	1423.153	TOP OF BANK
7295	3352.31600000	11660.25200000	1423.330	WALL
7296	3347.26800000	11660.38800000	1424.048	WALL
7297	3347.53200000	11680.58800000	1420.430	TOP OF BANK
7298	3347.44000000	11682.92400000	1420.344	TOP OF BANK
7299	3347.07500000	11680.78100000	1421.005	WALL
7300	3358.80900000	11683.84000000	1419.319	TOP OF BANK
7301	3301.72500000	11861.04700000	1422.930	WALL
7302	3300.33600000	11860.89100000	1422.799	WALL
7303	3325.63700000	11827.42100000	1417.714	TOP OF BANK
7304	3326.19100000	11827.13800000	1415.286	GRADE BREAK LINE
7305	3328.34100000	11825.85800000	1412.290	GRADE BREAK LINE
7306	3331.07700000	11825.02500000	1409.541	BOTTOM OF BANK
7307	4894.71500000	5295.40000000	1386.879	HEADWALL
7308	4882.45500000	5319.87100000	1388.506	HEADWALL
7309	4892.23500000	4849.95600000	1383.937	HEADWALL
7310	4909.92300000	4851.50600000	1383.593	HEADWALL
7311	5040.61100000	4297.31100000	1379.985	HEADWALL
7312	5044.93400000	4295.13500000	1379.892	HEADWALL
7313	5052.59900000	4291.62300000	1380.234	HEADWALL
7314	5057.04000000	4289.43000000	1380.187	HEADWALL
7315	5183.51500000	4007.86500000	1378.149	HEADWALL
7316	5166.91300000	4001.34900000	1377.771	HEADWALL
20004	4329.26200000	7879.06700000	-99999.000	BRASS CAP FLUSH
20007	3747.41900000	9268.05500000	1411.070	P K NAIL
20022	4287.95300000	7941.97500000	-99999.000	BRASS CAP FLUSH
20023	4455.74800000	7701.37100000	-99999.000	BRASS CAP FLUSH
20024	4696.73500000	7382.07700000	-99999.000	BRASS CAP FLUSH
20025	5012.71800000	6612.67700000	1403.000	BRASS CAP FLUSH

Appendix D

Hydrologic Analysis and Supporting Documentation

Appendix D1	TR 20 Input Summary
Appendix D2	Existing Condition TR 20 Computer Run

Appendix D1

TR-20 Input Summary

TABLE D1.1
Summary of Hydrologic Parameters

TR 20 Input for Upper East Fork Cave Creek Channel
Greenway Parkway Channel - 9th Street to Cave Creek Road

Sub Basin ID	Area sq. mi.	Curve Number	Tc hours	(a)
1	0.1480	95	0.30	
2	0.0970	95	0.19	
3	0.0470	77	0.36	
4	0.1950	95	0.22	
5	0.1250	77	0.56	
6	0.1090	81	0.82	
7	0.1170	77	0.69	
8	0.1310	78	0.75	
9	0.0660	79	0.93	
10	0.0950	77	0.56	
11	0.1250	79	0.73	
12	0.3780	80	0.64	
13	0.1250	82	0.61	
14	0.1770	83	0.39	
15	0.0730	82	0.89	
16	0.1190	86	0.54	
17	0.0590	95	0.17	
18	0.1840	78	0.72	
19	0.0220	95	0.17	
20	0.0640	95	0.17	
21	0.1890	87	0.58	
22	0.1530	87	0.47	
23	0.0910	95	0.23	
24	0.1980	86	0.46	
25	0.0890	83	0.43	
26	0.0670	85	0.31	
27	0.1880	82	1.20	
28	0.1560	82	0.93	
29	0.1250	81	0.73	
30	0.1520	79	0.97	
31	0.0840	83	0.58	
32	0.1800	80	0.93	
33	0.1540	61	0.81	
34	0.1250	84	0.73	
35	0.1250	83	0.49	
36	0.1250	83	0.48	
37	0.1250	83	0.25	
38	0.1250	85	0.44	
39	0.0625	85	0.53	
40	0.0940	82	0.51	
41	0.1720	84	0.38	
42	0.0780	87	0.22	
43	0.0470	90	0.17	
44	0.1250	87	0.30	
45	0.1160	90	0.51	

TABLE D1.1
Summary of Hydrologic Parameters

TR 20 Input for Upper East Fork Cave Creek Channel
Greenway Parkway Channel - 9th Street to Cave Creek Road

Sub Basin ID	Area sq. mi.	Curve Number	Tc hours	(a)
46	0.0530	82	0.17	
47	0.0730	82	0.18	
48	0.0920	82	0.60	
49	0.0860	95	0.19	
50	0.0920	95	0.48	
51	0.0310	82	0.17	
52	0.0550	82	0.19	
55	0.0170	82	0.17	
56	0.0670	82	0.25	
57	0.0500	82	0.25	
58	0.0320	84	0.17	
59	0.0530	82	0.25	
60	0.0630	81	0.49	
64	0.2500	82	0.33	
65	0.0630	82	0.49	
66	0.0630	84	0.46	
67	0.0630	88	0.25	
68	0.0630	85	0.25	
69	0.0630	81	0.62	
70	0.0630	86	0.25	
71	0.1250	83	0.49	
72	0.1250	83	0.49	
74	0.0630	90	0.24	
75	0.0630	95	0.52	
76	0.0630	83	0.25	(b)
77	0.0630	86	0.38	
78	0.0630	86	0.27	
79	0.0630	88	0.25	
80	0.0630	80	0.45	(b)
81	0.0630	84	0.52	
82	0.0630	84	0.27	
83	0.0630	83	0.52	(b)
84	0.0630	77	0.52	(b)
85	0.0630	77	0.52	(b)
86	0.0630	85	0.27	(b)
87	0.0630	85	0.52	(b)
88	0.0940	87	0.75	
89	0.0470	84	0.39	
90	0.1090	85	0.63	
91	0.1250	86	0.47	
92	0.1250	86	0.47	
93	0.1950	84	0.45	
94	0.1390	84	0.34	
95	0.1250	85	0.98	(b)
96	0.1250	82	0.51	

TABLE D1.1
Summary of Hydrologic Parameters

TR 20 Input for Upper East Fork Cave Creek Channel
Greenway Parkway Channel - 9th Street to Cave Creek Road

Sub Basin ID	Area sq. mi.	Curve Number	Tc hours	(a)
97	0.1880	87	0.53	
98	0.0940	86	0.37	
99	0.0940	86	0.49	
100	0.0780	86	0.39	
101	0.0470	89	0.52	
102	0.0630	77	0.63	(b)
103	0.0810	84	0.26	(b)
104	0.0690	73	0.67	(b)
105	0.0630	73	0.63	(b)
106	0.0630	79	0.56	
107	0.0590	81	0.42	(b)
108	0.0250	83	0.28	
109	0.0630	84	0.29	
110	0.0730	75	0.56	(b)
111	0.0700	72	0.56	(b)
112	0.0610	73	0.46	(b)
113	0.0530	91	0.52	
114	0.1280	85	1.19	
115	0.0940	82	0.45	
117	0.1730	80	1.90	
118	0.2310	81	1.59	
119	0.2310	84	1.05	
120	0.2310	87	0.30	
121	0.2500	94	0.17	(b)
122	0.3550	81	0.29	(b)
123	0.2130	94	0.25	(b)
124	0.2190	84	0.25	
125	0.1170	94	0.17	(b)
126	0.1580	91	0.28	(b)
127	0.1590	81	0.21	(b)
128	0.0360	80	0.17	
129	0.1080	81	0.17	(b)
130	0.0310	91	0.17	
131	0.1190	86	0.27	
132	0.1450	83	0.27	(b)
133	0.0800	88	0.17	(b)
134	0.1970	85	0.31	
135	0.0420	88	0.17	(b)
136	0.0660	88	0.17	(b)
137	0.0780	76	0.49	(b)
138	0.2030	83	0.24	(b)
139	0.1880	87	0.43	
140	0.1250	86	0.44	
141	0.1880	85	0.53	(b)
142	0.2500	82	1.39	(b)

TABLE D1.1
Summary of Hydrologic Parameters

TR 20 Input for Upper East Fork Cave Creek Channel
Greenway Parkway Channel - 9th Street to Cave Creek Road

Sub Basin ID	Area sq. mi.	Curve Number	Tc hours	(a)
143	0.0625	85	0.53	
144	0.1320	79	0.93	
145	0.1600	81	0.76	
146	0.0720	82	0.18	
147	0.0520	82	0.17	
148	0.0330	82	0.17	
149	0.0090	90	0.17	
150	0.0160	82	0.17	
TOTAL	15.41			

Notes:
(a) Minimum Tc is 10 minutes = 0.17 hrs
(b) CN updated to reflect on-site 100-yr 2-hr retention for residential areas developed since 1993.

*** M AND X FOR CIRCULAR PIPES ***

DRAINAGE AREA NO.	STREET	SLOPE [FT/FT]	ROUGHNESS n	DIAM. D [IN.]	X	M	FLOWING FULL CAP.
84,85	20th ST.	0.0011	0.012	108	3.21	1.25	449
105	20th ST.	0.0044	0.024	84	3.07	1.25	230
104	20th ST.	0.0015	0.024	102	1.85	1.25	225
83	BELL	0.00834	0.012	84	8.46	1.25	632
106	18th ST.	0.0035	0.012	84	5.48	1.25	409
107	18th ST.	0.0015	0.012	84	3.59	1.25	268
93	32nd ST.	0.0016	0.012	60	3.50	1.25	113
95,96	32nd ST.	0.003	0.012	54	4.72	1.25	117
142	32nd ST.	0.0042	0.012	60	5.68	1.25	183
140	GNWY PKWY	0.0026	0.012	42	4.21	1.25	56
139	GNWY PKWY	0.002	0.012	48	3.78	1.25	70
100	CAVE CRK	0.0058	0.012	36	6.13	1.25	55
139	CAVE CRK	0.0025	0.012	72	4.52	1.25	229
81	16th ST.	0.0042	0.012	60	5.68	1.25	183
80	16th ST.	0.0065	0.012	60	7.06	1.25	227
109	16th ST.	0.0019	0.012	84	4.04	1.25	302
45	ROSEMONT	0.0097	0.012	78	9.02	1.25	559
66	9th ST.	0.0039	0.012	72	5.64	1.25	287
67	9th ST.	0.006	0.012	84	7.18	1.25	536
69	9th ST.	0.001	0.012	108	3.06	1.25	428
75	9th ST.	0.0016	0.012	96	3.79	1.25	395
112	9th ST.	0.0016	0.012	96	3.79	1.25	395
113	7th ST.	0.0051	0.012	84	6.62	1.25	494
113	7th ST.	0.0028	0.012	36	4.26	1.25	38

Appendix D2

Existing Condition TR 20 Computer Run

The following TR 20 computer run has updated the Upper East Fork Cave Creek ADMS to reflect current land uses and physical changes as listed in Section 1.3 of this report. An electronic copy is included on diskette. Also included on diskette is the duplicate effective existing condition TR 20 input file.

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1

******************80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY******************

JOB TR-20                                                SUMMARY   NOPLOTS
TITLE 000 EAST FORK CAVE CREEK - GREENWAY CHANNEL 7th St to CAVE CREEK Rd.
TITLE 000 WOOD/PATEL JOB No: 96559.04      -- FEMA CLOMR --     FILENAME: GW1.IT2
 5 RAINFL 1            .0208
 8          0.         .004       .008       .0130      .018
 8          .022       .026       .031       .035       .04
 8          .044       .048       .053       .057       .062
 8          .066       .071       .075       .080       .093
 8          .107       .120       .140       .170       .500
 8          .830       .860       .880       .893       .907
 8          .920       .924       .928       .933       .937
 8          .942       .947       .951       .956       .960
 8          .964       .969       .973       .978       .982
 8          .987       .991       .995       1.00       1.00
 9 ENDTBL
 2 XSECTN   006        1.0
 8                     1502.      0.0        0.0
 8                     1502.4     3.7        2.1
 8                     1502.8     13.3       5.1
 8                     1503.2     29.5       9.1
 8                     1503.6     53.4       14.1
 8                     1504.0     85.8       20.0
 8                     1504.4     100.7      30.8
 8                     1504.8     169.0      50.3
 8                     1505.2     289.0      78.5
 8                     1505.6     469.8      115.4
 8                     1506.0     470.9      161.1
 8                     1506.4     952.6      295.5
 8                     1506.8     1764.7     462.7
 8                     1507.2     2878.8     662.8
 8                     1507.6     4328.4     895.6
 8                     1508.0     6145.9     1161.3
 8                     1508.4     8331.5     1460.9
 8                     1508.8     10956.2    1795.8
 9 ENDTBL
 2 XSECTN   008        1.0
 8                     1494.0     0.0        0.0
 8                     1494.3     7.4        5.7
 8                     1494.6     23.9       12.0
 8                     1494.9     47.8       18.8
 8                     1495.2     78.9       26.3
 8                     1495.5     117.0      34.3
 8                     1495.8     162.2      42.9
 8                     1496.1     165.4      53.5
 8                     1496.4     175.4      84.2
 8                     1496.7     302.7      140.5
1

**********************80-80 LIST OF INPUT DATA (CONTINUED)**********************

 8                     1497.0     527.8      222.4
 8                     1497.3     868.5      329.9
 8                     1497.6     1343.8     463.0
 8                     1497.9     1972.3     621.8
 8                     1498.2     2837.4     803.3
 8                     1498.5     3901.4     998.3
 8                     1498.8     5131.8     1206.2
 8                     1499.1     6532.4     1426.8
 8                     1499.4     8107.5     1660.4
 8                     1499.7     9861.7     1906.7
 9 ENDTBL
 2 XSECTN   037        1.0
 8                     1452.0     0.0        0.0
 8                     1452.2     8.1        6.5
 8                     1452.6     50.6       19.9
 8                     1453.0     119.3      34.0
 8                     1453.2     162.1      41.3
 8                     1453.4     210.4      48.7
 8                     1453.6     263.8      56.3
 8                     1453.8     322.2      64.1
 8                     1454.0     385.5      72.0
 8                     1454.2     420.0      86.0
 8                     1454.4     456.8      100.3
 8                     1454.6     566.6      114.7
 8                     1454.8     685.9      129.2
 8                     1455.0     814.4      143.9
 8                     1455.2     952.0      158.8
 8                     1455.4     1098.3     173.9
 8                     1455.6     1183.6     189.8
 8                     1455.8     1357.3     206.7
 8                     1456.0     1540.3     223.7
 8                     1456.2     1740.2     240.7
 9 ENDTBL
 2 XSECTN   083        1.
 8                     0.0        0.0        0.0
 8                     .2         9.5        5.8
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 8                        .4          26.9        11.6
 8                        .6          49.5        17.4
 8                        .8          76.2        23.2
 8                        1.0         106.4       29.
 8                        1.2         139.9       34.8
 8                        1.4         176.3       40.6
 8                        1.6         215.4       46.4
 8                        1.8         257.        52.2
 8                        2.0         301.        58.
 8                        2.2         347.3       63.8
1


**********************80-80 LIST OF INPUT DATA (CONTINUED)**********************

 8                        2.4         395.7       69.6
 9 ENDTBL
 2 XSECTN    084          1.
 8                        0.0         0.0         0.0
 8                        .2          5.3         3.2
 8                        .4          14.9        6.4
 8                        .6          27.3        9.6
 8                        .8          42.0        12.8
 8                        1.0         58.7        16.0
 8                        1.2         77.2        19.2
 8                        1.4         97.3        22.4
 8                        1.6         118.8       25.6
 8                        1.8         141.8       28.8
 8                        2.0         166.1       32.0
 8                        2.2         191.6       35.2
 8                        2.4         218.3       38.4
 9 ENDTBL
 2 XSECTN    087          1.0
 8                        1429.8      0.0         0.0
 8                        1429.9      32.7        48.5
 8                        1430.       115.8       116.0
 8                        1430.1      268.3       193.9
 8                        1430.2      469.2       273.6
 8                        1430.4      1000.2      438.7
 8                        1430.6      1689.0      611.1
 8                        1430.8      2526.0      791.0
 8                        1431.0      3505.8      978.2
 8                        1431.2      4625.3      1172.9
 8                        1431.4      5882.7      1374.9
 9 ENDTBL
 2 XSECTN    104          1.
 8                        0.          0.          0.
 8                        .5          52.         19.
 8                        1.          167.        38.
 8                        1.5         327.        57.
 8                        2.          529.        76.
 8                        2.5         767.        95.
 8                        3.          1039.       114.
 8                        3.5         1345.       135.
 8                        4.          1684.       156.
 8                        4.5         2053.       177.
 8                        5.          2451.       198.
 8                        5.5         2876.       219.
 8                        6.          3328.       240.
 8                        6.5         3802.       263.
 8                        7.          4312.       286.
1


**********************80-80 LIST OF INPUT DATA (CONTINUED)**********************

 8                        7.5         4846.       309.
 8                        8.          5406.       332.
 8                        8.5         5990.       355.
 8                        9.          6598.       378.
 8                        9.5         7215.       403.
 9 ENDTBL
 2 XSECTN    105          1.0
 8                        1417.1      0.0         0.0
 8                        1417.3      9.7         14.0
 8                        1417.5      61.9        56.0
 8                        1417.7      182.4       125.9
 8                        1417.9      392.9       223.9
 8                        1418.1      737.3       347.5
 8                        1418.3      1217.8      483.0
 8                        1418.5      1805.5      628.1
 8                        1418.7      2500.2      782.6
 8                        1418.9      3303.3      946.7
 9 ENDTBL
 2 XSECTN    107          1.
 8                        0.          0.          0.
 8                        .6          62.         17.
 8                        1.2         197.        34.
 8                        1.8         387.        50.
 8                        2.4         625.        67.
 8                        3.          906.        84.
 8                        3.6         1231.       103.
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  8                       4.2          1596.        123.
  8                       4.8          2005.        145.
  8                       5.4          2453.        166.
  8                       6.           2938.        188.
  8                       6.6          3457.        210.
  8                       7.2          3990.        232.
  8                       7.8          4583.        256.
  8                       8.4          5209.        280.
  8                       9.           5867.        304.
  8                       9.6          6557.        328.
  9 ENDTBL
  2 XSECTN    108         1.
  8                       0.           0.           0.
  8                       .6           83.          20.
  8                       1.2          263.         40.
  8                       1.8          517.         59.
  8                       2.4          835.         79.
  8                       3.           1211.        99.
  8                       3.6          1644.        121.
  8                       4.2          2131.        144.
1


**********************80-80 LIST OF INPUT DATA (CONTINUED)**********************

  8                       4.8          2675.        169.
  8                       5.4          3270.        193.
  8                       6.           3913.        218.
  8                       6.6          4602.        243.
  8                       7.2          5314.        268.
  8                       7.8          6099.        295.
  8                       8.4          6927.        322.
  8                       9.           7798.        349.
  8                       9.6          8709.        376.
  8                       10.2         9616.        404.
  9 ENDTBL
  2 XSECTN    110         1.
  8                       0.           0.           0.
  8                       .5           59.          20.
  8                       1.           187.         39.
  8                       1.5          368.         59.
  8                       2.           594.         78.
  8                       2.5          862.         98.
  8                       3.           1168.        117.
  8                       3.5          1513.        139.
  8                       4.           1893.        160.
  8                       4.5          2308.        182.
  8                       5.           2755.        203.
  8                       5.5          3233.        225.
  8                       6.           3741.        246.
  8                       6.5          4274.        270.
  8                       7.           4846.        293.
  8                       7.5          5447.        317.
  8                       8.           6076.        340.
  8                       8.5          6732.        364.
  8                       9.           7415.        387.
  8                       9.5          8109.        413.
  9 ENDTBL
  2 XSECTN    111         1.
  8                       0.           0.           0.
  8                       .5           70.          16.
  8                       1.           223.         32.
  8                       1.5          438.         48.
  8                       2.           707.         64.
  8                       2.5          1025.        80.
  8                       3.           1389.        96.
  8                       3.5          1799.        114.
  8                       4.           2253.        132.
  8                       4.5          2747.        150.
  8                       5.           3280.        168.
  8                       5.5          3850.        186.
1


**********************80-80 LIST OF INPUT DATA (CONTINUED)**********************

  8                       6.           4456.        204.
  8                       6.5          5091.        224.
  8                       7.           5775.        244.
  8                       7.5          6494.        264.
  8                       8.           7246.        284.
  8                       8.5          8032.        304.
  8                       9.           8849.        324.
  8                       9.5          9675.        346.
  9 ENDTBL
  2 XSECTN    124         1.
  8                       0.           0.           0.
  8                       .5           54.          16.
  8                       1.           171.         32.
  8                       1.5          335.         48.
  8                       2.           542.         64.
  8                       2.5          786.         80.
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  8                       3.          1065.       96.
  8                       3.5         1379.       114.
  8                       4.          1726.       132.
  8                       4.5         2105.       150.
  8                       5.          2514.       168.
  8                       5.5         2950.       186.
  8                       6.          3415.       204.
  8                       6.5         3902.       224.
  8                       7.          4426.       244.
  8                       7.5         4977.       264.
  8                       8.          5553.       284.
  8                       8.5         6155.       304.
  8                       9.          6781.       324.
  9 ENDTBL
  3 STRUCT      08
  8                       1487.84     0.0         0.000
  8                       1488.0      1.0         0.021
  8                       1489.0      7.00        1.189
  8                       1490.0      26.0        5.893
  8                       1491.0      80.0        14.491
  8                       1492.0      125.0       25.114
  8                       1493.0      162.0       36.539
  8                       1494.0      191.0       49.18
  8                       1495.0      216.0       61.83
  8                       1496.0      241.0       74.474
  8                       1497.0      265.0       90.000
  9 ENDTBL
  3 STRUCT      33
  8                       1462.       0.          0.
  8                       1464.       24.         0.86
1


**********************80-80 LIST OF INPUT DATA (CONTINUED)**********************

  8                       1465.       50.         3.82
  8                       1466.       73.         10.79
  8                       1467.       81.         22.49
  8                       1468.       87.         37.97
  8                       1469.       93.         55.54
  8                       1470.       99.         73.83
  9 ENDTBL
  3 STRUCT      43
  8                       1417.       0.          0.
  8                       1418.0      30.         .29
  8                       1418.3      80.         .77
  8                       1419.0      240.        2.11
  8                       1419.4      250.        6.7
  8                       1419.8      270.        10.6
  8                       1420.3      300.        22.1
  8                       1420.8      320.        38.8
  8                       1421.0      321.        48.9
  8                       1421.3      340.        59.8
  8                       1421.6      360.        71.0
  8                       1422.2      390.        92.9
  8                       1422.5      400.        103.1
  8                       1423.5      430.        128.7
  8                       1424.8      450.        149.7
  8                       1426.0      460.        160.2
  8                       1427.1      470.        165.5
  8                       1428.1      480.        168.6
  8                       1429.0      485.        170.6
  8                       1429.9      490.        172.3
  9 ENDTBL
  3 STRUCT      59
  8                       1389.0        0.0       0.00
  8                       1391.0       30.0       0.03
  8                       1393.0       90.0       0.12
  8                       1395.0      180.0       3.02
  8                       1397.0      225.0       10.16
  8                       1399.0      263.0       18.48
  8                       1401.0      296.0       27.69
  8                       1403.0      326.0       37.82
  8                       1405.0      353.0       48.87
  8                       1407.0      378.0       60.86
  8                       1407.5      385.0       63.02
  9 ENDTBL
  3 STRUCT      69
  8                       1372.0      0.          0.
  8                       1378.0      105.5       0.056
  8                       1379.0      129.        0.713
1


**********************80-80 LIST OF INPUT DATA (CONTINUED)**********************

  8                       1381.0      167.        9.251
  8                       1382.0      205.        18.292
  8                       1384.0      264.5       43.852
  8                       1386.0      312.8       74.997
  8                       1387.0      334.5       91.715
  8                       1388.0      354.7       109.506
```

```
  8                          1389.0       373.5        128.395
  9 ENDTBL
  6 RUNOFF 1 001        5 .148          95.          .3
  6 RUNOFF 1 002        6 .097          95.          .19
  6 REACH  3 003    5   7 1000.         .04          1.66
  6 REACH  3 003    6   5 1400.         .04          1.66
  6 ADDHYD 4 003    5 7 6
  6 RUNOFF 1 003        5 .047          77.          .36
  6 ADDHYD 4 003    5 6 7
  6 RUNOFF 1 006        5 .109          81.          .82
  6 REACH  3 006    7   6 1600.
  6 ADDHYD 4 006    5 6 7
  6 REACH  3 008    7   1 1600.
  6 RUNOFF 1 007        5 .117          77.          .69
  6 REACH  3 008    5   2 1400.
  6 RUNOFF 1 019        5 .022          95.          .167
  6 RUNOFF 1 004        6 .195          95.          .22
  6 REACH  3 004    5   7 1800.         .05          1.66
  6 ADDHYD 4 004    6 7 5
  6 RUNOFF 1 005        6 .125          77.          .56
  6 REACH  3 005    5   7 1400.         .05          1.66
  6 ADDHYD 4 005    6 7 5
  6 REACH  3 008    5   3 2100.
  6 ADDHYD 4 008    1 2 4
  6 ADDHYD 4 008    3 4 1
  6 RUNOFF 1 018        5 .184          78.          .72
  6 REACH  3 008    5   2 1900.         .04          1.66
  6 ADDHYD 4 008    1 2 3
  6 RUNOFF 1 008        5 .131          78.          .75
  6 ADDHYD 4 008    3 5 2
  6 RUNOFF 1 009        6 .066          79.          .93
  6 REACH  3 008    6   7 1095.         3.60         1.25
  6 ADDHYD 4 008    2 7 1
  6 DIVERT 6 014    1 3 4 150.                       8.0
  6 RESVOR 2     08 4   5 1487.84                                          BASIN #1
  6 ADDHYD 4 014    5 3 4
  6 REACH  3 014    4   5 2630.         .181         1.51
  6 RUNOFF 1 014        4 .177          83.          .39
  6 ADDHYD 4 014    5 4 3
  6 RUNOFF 1 016        5 .119          86.          .54
1
```

**********80-80 LIST OF INPUT DATA (CONTINUED)**********

```
  6 REACH  3 015    5   7 1300.         .54          1.54
  6 RUNOFF 1 015        6 .073          82.          .89
  6 ADDHYD 4 015    6 7 4
  6 ADDHYD 4 014    4 3 6
  6 RUNOFF 1 144        5 .132          79.          .93
  6 REACH  3 014    5   4 2640.         2.1          1.4
  6 REACH  3 014    4   7 1320.         1.64         1.67
  6 ADDHYD 4 014    6 7 5
  6 REACH  3 027    5   7 2743.         .068         1.61
  6 RUNOFF 1 027        5 .188          82.          1.2
  6 ADDHYD 4 027    5 7 6
  6 RUNOFF 1 017        5 .059          95.          .17
  6 REACH  3 025    5   7 2200.         .05          1.66
  6 RUNOFF 1 025        5 .089          83.          .43
  6 ADDHYD 4 025    5 7 4
  6 REACH  3 027    4   5 1343.         .068         1.61
  6 ADDHYD 4 027    5 6 7
  6 RUNOFF 1 026        6 .067          85.          .31
  6 ADDHYD 4 027    6 7 5
  6 REACH  3 037    5   4 3000.
  6 RUNOFF 1 037        5 .125          83.          .25
  6 ADDHYD 4 037    4 5 6
  6 RUNOFF 1 024        5 .198          86.          .46
  6 REACH  3 037    5   4 2100.         .41          1.66
  6 ADDHYD 4 037    4 6 5
  6 RUNOFF 1 143        4 .0625         85.          .53
  6 ADDHYD 4 143    5 4 1
  6 RUNOFF 1 034        5 .125          84.          .73
  6 REACH  3 035    5   6 1320.         .31          1.54
  6 RUNOFF 1 035        5 .125          83.          .49
  6 ADDHYD 4 035    5 6 7
  6 REACH  3 036    7   4 1320.         4.09         1.25
  6 RUNOFF 1 010        5 .095          77.          .56
  6 REACH  3 011    5   6 2700.         .44          1.66
  6 RUNOFF 1 011        7 .125          79.          .73
  6 ADDHYD 4 011    6 7 5
  6 REACH  3 028    5   3 3300.         .03          1.66
  6 RUNOFF 1 013        5 .125          82.          .61
  6 REACH  3 028    5   6 2800.         .03          1.66
  6 ADDHYD 4 028    3 6 7
  6 RUNOFF 1 028        5 .156          82.          .93
  6 ADDHYD 4 028    7 5 6
  6 REACH  3 036    6   7 3500.         .06          1.66
  6 RUNOFF 1 036        5 .125          83.          .48
  6 ADDHYD 4 036    5 7 6
  6 ADDHYD 4 036    6 4 7
1
```

```
**********************80-80 LIST OF INPUT DATA (CONTINUED)**********************

 6 DIVERT 6 036   7 5 3 466.                      90.
 6 REACH  3 037   5   6 1320.        3.00         1.25
 6 ADDHYD 4 143   1 6 7
 6 RESVOR 2    43 7   5 1417.0                                                 BASIN #3
 6 REACH  3 085   5   7 660.         3.21         1.25
 6 RUNOFF 1 085       6 .063         77.          .52
 6 ADDHYD 4 085   6 7 5
 6 REACH  3 084   5   6 1320.        3.21         1.25
 6 RUNOFF 1 084       5 .063         77.          .52
 6 ADDHYD 4 084   5 6 1
 6 RUNOFF 1 091       7 .125         86.          .47
 6 REACH  3 090   7   5 1320.        .22          1.54
 6 REACH  3 090   3   4 2600.        .22          1.54                        FROM 36
 6 ADDHYD 4 090   4 5 6
 6 RUNOFF 1 090       5 .109         85.          .63
 6 ADDHYD 4 090   5 6 7
 6 REACH  3 088   7   6 1320.        .22          1.54
 6 RUNOFF 1 088       5 .094         87.          .75
 6 ADDHYD 4 088   5 6 7
 6 RUNOFF 1 089       5 .047         84.          .39
 6 REACH  3 088   5   6 2000.        .22          1.54
 6 ADDHYD 4 088   6 7 5
 6 REACH  3 101   5   6 1050.        .22          1.54
 6 RUNOFF 1 101       5 .047         89.          .52
 6 ADDHYD 4 101   5 6 7
 6 REACH  3 102   7   6 1320.        .02          1.66
 6 RUNOFF 1 102       5 .063         77.          .63
 6 ADDHYD 4 102   5 6 7
 6 REACH  3 104   7   4 1900.        .02          1.66
 6 RUNOFF 1 086       5 .063         85.          .27
 6 REACH  3 087   5   6 1320.
 6 RUNOFF 1 087       5 .063         85.          .52
 6 ADDHYD 4 087   5 6 7
 6 REACH  3 105   7   6 2000.
 6 RUNOFF 1 105       5 .063         73.          .63
 6 ADDHYD 4 105   5 6 7
 6 REACH  3 104   7   6 1320.        .15          1.54
 6 RUNOFF 1 104       5 .069         73.          .67
 6 ADDHYD 4 104   5 6 7
 6 ADDHYD 4 104   4 7 2
 6 DIVERT 6 084   1 5 3              .35          83.
 6 REACH  3 105   5   7 1320.        3.07         1.25
 6 REACH  3 104   7   4 1320.        1.85         1.25
 6 ADDHYD 4 104   4 2 1
 6 REACH  3 083   3   5 1320.        8.46         1.25
 6 RUNOFF 1 083       6 .063         83.          .52
1
```

```
**********************80-80 LIST OF INPUT DATA (CONTINUED)**********************

 6 ADDHYD 4 083   5 6 7
 6 REACH  3 106   7   6 1320.        5.48         1.25
 6 RUNOFF 1 106       5 .063         79.          .56
 6 ADDHYD 4 106   5 6 7
 6 REACH  3 107   7   6 900.         3.59         1.25
 6 RUNOFF 1 107       5 .059         81.          .42
 6 ADDHYD 4 107   5 6 2
 6 RUNOFF 1 029       5 .125         81.          .73
 6 REACH  3 145   5   3 1500.        6.10         1.25
 6 RUNOFF 1 012       5 .378         80.          .64
 6 REACH  3 145   5   4 2350.        6.09         1.25
 6 RUNOFF 1 030       5 .152         79.          .97
 6 REACH  3 033   5   6 3500.        .145         1.66
 6 RUNOFF 1 033       5 .154         61.          .81
 6 ADDHYD 4 033   5 6 7
 6 ADDHYD 4 145   4 7 5
 6 RUNOFF 1 145       4 .160         81.          .76
 6 ADDHYD 4 145   5 4 6
 6 DIVERT 6 145   3 4 5 27.                       007.
 6 ADDHYD 4 145   5 6 7
 6 RESVOR 2    33 7   6 1462.                                                 BASIN #4
 6 ADDHYD 4 145   6 4 5
 6 REACH  3 093   5   6 2640.        3.50         1.25
 6 RUNOFF 1 093       5 .195         84.          .45
 6 ADDHYD 4 093   5 6 7
 6 DIVERT 6 093   7 5 4 265.                      92.
 6 REACH  3 092   4   6 1320.        .08          1.66
 6 RUNOFF 1 092       4 .125         86.          .47
 6 ADDHYD 4 092   4 6 7
 6 REACH  3 098   7   3 2500.        .08          1.66
 6 REACH  3 095   5   4 1320.        4.72         1.25
 6 RUNOFF 1 031       5 .084         83.          .58
 6 REACH  3 032   5   6 3400.        .03          1.66
 6 RUNOFF 1 032       5 .18          80.          .93
 6 ADDHYD 4 032   5 6 7
 6 REACH  3 094   7   6 3200.        .09          1.66
 6 RUNOFF 1 094       7 .139         84.          .34
 6 ADDHYD 4 094   6 7 5
```

```
  6 REACH  3 095   5   6 2400.       .09         1.66
  6 RUNOFF 1 095       5 .125        85.         .98
  6 ADDHYD 4 095   5 6 7
  6 ADDHYD 4 095   4 7 5
  6 DIVERT 6 095   5 7 4 265.                    98.
  6 REACH  3 098   4   5 3000.       .08         1.66
  6 ADDHYD 4 098   3 5 4
  6 REACH  3 096   7   6 1320.       4.72        1.25
1


**********************80-80 LIST OF INPUT DATA (CONTINUED)**********************

  6 RUNOFF 1 096       5 .125        82.         .51
  6 ADDHYD 4 096   5 6 7
  6 DIVERT 6 096   7 3 6 265.                    97.
  6 REACH  3 097   6   5 2100.       .08         1.66
  6 RUNOFF 1 097       6 .188        87.         .53
  6 ADDHYD 4 097   5 6 7
  6 REACH  3 098   7   5 1000.       .08         1.66
  6 ADDHYD 4 098   4 5 7
  6 RUNOFF 1 098       5 .094        86.         .37
  6 ADDHYD 4 098   5 7 6
  6 REACH  3 099   6   7 1250.       .08         1.66
  6 RUNOFF 1 099       6 .094        86.         .49
  6 ADDHYD 4 099   7 6 5
  6 REACH  3 139   5   6 1600.       .05         1.66
  6 RUNOFF 1 100       4 .078        86.         .39
  6 REACH  3 139   4   5 600.        6.13        1.25
  6 ADDHYD 4 139   5 6 7
  6 REACH  3 142   3   5 2640.       5.68        1.25
  6 RUNOFF 1 142       4 .25         82.         1.39
  6 ADDHYD 4 142   4 5 6
  6 DIVERT 6 142   6 5 4 265.                    141.
  6 REACH  3 141   4   5 2100.       4.34        1.25
  6 RUNOFF 1 141       6 .188        85.         .53
  6 ADDHYD 4 141   5 6 4
  6 REACH  3 140   4   5 1320.       4.21        1.25
  6 RUNOFF 1 140       6 .125        86.         .44
  6 ADDHYD 4 140   5 6 4
  6 RUNOFF 1 137       6 .078        76.         .49
  6 ADDHYD 4 140   4 6 5
  6 REACH  3 139   5   6 2800.       3.78        1.25
  6 ADDHYD 4 139   6 7 4
  6 RUNOFF 1 136       5 .066        88.         .167
  6 REACH  3 138   5   6 3000.       .17         1.66
  6 RUNOFF 1 138       5 .203        83.         .24
  6 ADDHYD 4 138   5 6 7
  6 REACH  3 139   7   6 2000.       4.52        1.25
  6 ADDHYD 4 139   4 6 7
  6 RUNOFF 1 139       5 .188        87.         .43
  6 ADDHYD 4 139   7 5 4
  6 RUNOFF 1 129       5 .108        81.         .167
  6 RUNOFF 1 130       6 .031        91.         .167
  6 ADDHYD 4 129   5 6 7
  6 REACH  3 127   7   6 2500.       .08         1.66
  6 RUNOFF 1 128       5 .036        80.         .167
  6 REACH  3 127   5   7 2300.       .08         1.66
  6 ADDHYD 4 127   7 6 5
1


**********************80-80 LIST OF INPUT DATA (CONTINUED)**********************

  6 RUNOFF 1 127       7 .159        81.         .21
  6 ADDHYD 4 127   5 7 6
  6 RUNOFF 1 132       7 .145        83.         .27
  6 RUNOFF 1 133       3 .08         88.         .167
  6 ADDHYD 4 133   3 7 5
  6 REACH  3 131   5   7 2000.       .17         1.66
  6 ADDHYD 4 131   6 7 5
  6 RUNOFF 1 131       6 .119        86.         .27
  6 ADDHYD 4 131   5 6 7
  6 REACH  3 126   7   6 1500.       .11         1.66
  6 RUNOFF 1 126       5 .158        91.         .28
  6 ADDHYD 4 126   5 6 7
  6 REACH  3 134   7   6 1500.       .13         1.66
  6 RUNOFF 1 135       7 .042        88.         .167
  6 REACH  3 134   7   5 3200.       .13         1.66
  6 ADDHYD 4 134   5 6 7
  6 RUNOFF 1 134       6 .197        85.         .31
  6 ADDHYD 4 134   6 7 5
  6 RUNOFF 1 125       7 .117        94.         .167
  6 ADDHYD 4 125   7 5 6
  6 REACH  3 124   6   7 2500.       .09         1.66
  6 RUNOFF 1 124       6 .219        84.         .25
  6 ADDHYD 4 124   6 7 5
  6 REACH  3 124   4   7 900.
  6 ADDHYD 4 124   5 7 6
  6 RUNOFF 1 103       5 .081        84.         .26
  6 ADDHYD 4 124   5 6 7
  6 REACH  3 104   7   6 1320.
```

```
  6 ADDHYD 4 104   1 6 4
  6 REACH  3 107   4   5 1000.
  6 ADDHYD 4 107   5 2 7
  6 RUNOFF 1 123       6 .213        94.         .25
  6 ADDHYD 4 107   6 7 5
  6 REACH  3 108   5   3 1700.
  6 RUNOFF 1 108       5 .025        83.         .28
  6 ADDHYD 4 108   5 3 1
  6 RUNOFF 1 148       6 .033        82.         0.17
  6 REACH  3  47   6   5 1101.       .04         1.66
  6 RUNOFF 1  47       6 .073        82.         0.18
  6 ADDHYD 4  47   5 6 7
  6 REACH  3  46   7   5 1285.       .04         1.66
  6 RUNOFF 1  46       6 .053        82.         0.17
  6 ADDHYD 4  46   5 6 7
  6 REACH  3 149   7   5 1331.       .04         1.66
  6 RUNOFF 1 149       6 .009        90.         0.17
  6 ADDHYD 4 149   5 6 4
1


**********************80-80 LIST OF INPUT DATA (CONTINUED)**********************

  6 RUNOFF 1 147       5 .052        82.         0.17
  6 REACH  3 146   5   6 1240.       .04         1.66
  6 RUNOFF 1 146       7 .072        82.         0.18
  6 ADDHYD 4 146   6 7 5
  6 REACH  3  45   5   6  413.       .04         1.66
  6 RUNOFF 1  43       5 .047        90.         0.17
  6 REACH  3  21   5   7 1377.       .04         1.66
  6 ADDHYD 4  21   6 7 5
  6 RUNOFF 1  21       6 .189        87.         0.58
  6 ADDHYD 4  21   5 6 7
  6 REACH  3  45   7   5 3213.       9.02        1.25
  6 RUNOFF 1  45       6 .116        90.         0.51
  6 ADDHYD 4  45   5 6 7
  6 ADDHYD 4  45   4 7 3
  6 RUNOFF 1 150       5 .016        82.         0.17
  6 REACH  3  57   5   6 1350.       .04         1.66
  6 RUNOFF 1  57       4 .050        82.         0.25
  6 ADDHYD 4  57   4 6 5
  6 REACH  3  59   5   7 1330.       .04         1.66
  6 RUNOFF 1  59       6 .053        82.         0.25
  6 ADDHYD 4  59   7 6 4
  6 ADDHYD 4  59   4 3 2
  6 RUNOFF 1  49       5 .086        95.         0.19
  6 REACH  3  50   5   4 1928.       .04         1.66
  6 RUNOFF 1  50       3 .092        95.         0.483
  6 ADDHYD 4  50   4 3 7
  6 RUNOFF 1  20       5 .064        95.         0.17
  6 REACH  3  48   5   3 2570.       .04         1.66
  6 RUNOFF 1  48       4 .092        82.         0.6
  6 ADDHYD 4  48   3 4 5
  6 REACH  3  50   5   4 1836.       .04         1.66
  6 ADDHYD 4  50   7 4 3
  6 REACH  3  52   3   4 550.        .04         1.66
  6 RUNOFF 1  52       3 .055        82.         0.190
  6 ADDHYD 4  52   4 3 5
  6 REACH  3  56   5   3 1377.       .04         1.66
  6 RUNOFF 1  56       4 .067        82.         0.25
  6 ADDHYD 4  56   3 4 5
  6 REACH  3  51   5   3 1377.       .04         1.66
  6 RUNOFF 1  51       4 .031        82.         0.17
  6 ADDHYD 4  51   3 4 5
  6 REACH  3  55   5   3 1331.       .04         1.66
  6 RUNOFF 1  55       4 .017        82.         0.17
  6 ADDHYD 4  55   3 4 5
  6 ADDHYD 4  55   5 2 6
  6 RESVOR 2    59 6   7                                                  BASIN #2
1


**********************80-80 LIST OF INPUT DATA (CONTINUED)**********************

  6 REACH  3 066   7   6 660.        5.64        1.25
  6 RUNOFF 1 066       5 .063        84.         .46
  6 ADDHYD 4 066   5 6 7
  6 REACH  3 067   7   6 1320.       7.18        1.25
  6 RUNOFF 1 067       5 .063        88.         .25
  6 ADDHYD 4 067   5 6 7
  6 RUNOFF 1 044       5 .125        87.         .3
  6 REACH  3 067   5   6 1320.       .25         1.54
  6 ADDHYD 4 067   6 7 4
  6 REACH  3 069   4   6 1320.       3.06        1.25
  6 RUNOFF 1 069       5 .063        81.         .62
  6 ADDHYD 4 069   5 6 4
  6 RUNOFF 1 023       6 .091        95.         .23
  6 REACH  3 040   6   5 2650.       .08         1.66
  6 RUNOFF 1 038       7 .125        85.         .44
  6 REACH  3 040   7   6 1800.       .08         1.66
  6 ADDHYD 4 040   5 6 7
  6 RUNOFF 1 040       5 .094        82.         .51
```

```
  6 ADDHYD 4 040   5 7 6
  6 REACH  3 082   6   5 1400.       .1          1.66
  6 RUNOFF 1 082       6 .063        84.         .27
  6 ADDHYD 4 082   5 6 7
  6 RUNOFF 1 039       5 .0625       85.         .53
  6 REACH  3 082   5   6 1867.       .1          1.66
  6 ADDHYD 4 082   6 7 5
  6 REACH  3 081   5   6 1320.       .22         1.54
  6 RUNOFF 1 081       5 .063        84.         .52
  6 ADDHYD 4 081   5 6 3
  6 RUNOFF 1 022       5 .153        87.         .47
  6 REACH  3 041   5   6 3100.       .24         1.66
  6 RUNOFF 1 041       5 .172        84.         .38
  6 ADDHYD 4 041   5 6 7
  6 RUNOFF 1 042       5 .078        87.         .22
  6 ADDHYD 4 042   5 7 6
  6 REACH  3 078   6   5 1600.       .09         1.66
  6 DIVERT 6 081   3 7 6 154.                    78.
  6 REACH  3 078   6   3 1320.       .09         1.66
  6 ADDHYD 4 078   5 3 6
  6 RUNOFF 1 078       3 .063        86.         .27
  6 ADDHYD 4 078   6 3 5
  6 SAVMOV 5 081   7   3
  6 REACH  3 077   5   6 1320.       .23         1.54
  6 RUNOFF 1 077       5 .063        86.         .38
  6 ADDHYD 4 077   5 6 7
  6 ADDHYD 4 069   4 7 2
  6 RESVOR 2    69 2   6 1372.0                                        BASIN #5
1


**********************80-80 LIST OF INPUT DATA (CONTINUED)**********************

  6 REACH  3 075   6   4 1320.       3.79        1.25
  6 REACH  3 080   3   6 1320.       7.06        1.25
  6 RUNOFF 1 080       5 .063        80.         .45
  6 ADDHYD 4 080   6 5 2
  6 DIVERT 6 080   2 3 5 166.                    79.
  6 REACH  3 079   5   6 1320.       .23         1.54
  6 RUNOFF 1 079       5 .063        88.         .25
  6 ADDHYD 4 079   5 6 7
  6 REACH  3 076   7   6 1320.       .23         1.54
  6 RUNOFF 1 076       5 .063        83.         .25
  6 ADDHYD 4 076   5 6 7
  6 REACH  3 075   7   6 1320.       .23         1.54
  6 ADDHYD 4 075   4 6 5
  6 RUNOFF 1 075       6 .063        95.         .52
  6 ADDHYD 4 075   5 6 7
  6 REACH  3 112   7   4 1320.       3.79        1.25
  6 REACH  3 109   3   7 2640.       4.04        1.25
  6 RUNOFF 1 109       5 .063        84.         .29
  6 ADDHYD 4 109   5 7 6
  6 ADDHYD 4 108   1 6 7
  6 REACH  3 110   7   6 1320.
  6 RUNOFF 1 110       5 .073        75.         .56
  6 ADDHYD 4 110   5 6 7
  6 RUNOFF 1 122       6 .355        81.         .29
  6 ADDHYD 4 110   6 7 5
  6 REACH  3 111   5   6 1320.
  6 RUNOFF 1 111       5 .07         72.         .56
  6 ADDHYD 4 111   5 6 7
  6 REACH  3 112   7   6 1320.       .06         1.63
  6 RUNOFF 1 112       5 .061        73.         .46
  6 ADDHYD 4 112   5 6 7
  6 RUNOFF 1 121       5 .25         94.         .17
  6 ADDHYD 4 112   5 7 1
  6 ADDHYD 4 112   1 4 3
  6 REACH  3 113   3   5 1320.       .06         1.63
  6 RUNOFF 1 113       6 .053        91.         .52
  6 ADDHYD 4 113   5 6 7
  6 RUNOFF 1 120       5 .231        87.         .30
  6 ADDHYD 4 113   5 7 1
  6 RUNOFF 1 058       5 .032        84.         .17
  6 REACH  3 060   5   6 1320.       .25         1.54
  6 RUNOFF 1 060       5 .063        81.         .49
  6 ADDHYD 4 060   5 6 7
  6 REACH  3 065   7   6 1320.       .28         1.54
  6 RUNOFF 1 065       5 .063        82.         .49
  6 ADDHYD 4 065   5 6 7
1


**********************80-80 LIST OF INPUT DATA (CONTINUED)**********************

  6 REACH  3 068   7   6 1320.       .25         1.54
  6 RUNOFF 1 068       5 .063        85.         .25
  6 ADDHYD 4 068   5 6 7
  6 REACH  3 070   7   6 1320.       .18         1.54
  6 RUNOFF 1 070       5 .063        86.         .25
  6 ADDHYD 4 070   5 6 7
  6 REACH  3 074   7   6 1320.       .09         1.66
  6 RUNOFF 1 074       5 .063        90.         .24
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  6 ADDHYD 4 074   5 6 7
  6 REACH  3 113   7   6 1320.       6.62        1.25
  6 ADDHYD 4 113   1 6 3
  6 REACH  3 114   3   1 3000.       .05         1.64
  6 RUNOFF 1 064       5 .25         82.         .33
  6 REACH  3 072   5   6 2650.       .18         1.54
  6 RUNOFF 1 072       5 .125        83.         .49
  6 ADDHYD 4 072   5 6 7
  6 REACH  3 114   7   6 2000.       .05         1.66
  6 RUNOFF 1 115       5 .094        82.         .45
  6 ADDHYD 4 114   5 6 7
  6 RUNOFF 1 071       5 .125        83.         .49
  6 REACH  3 114   5   6 2200.       .05         1.66
  6 ADDHYD 4 114   6 7 5
  6 RUNOFF 1 114       6 .128        85.         1.19
  6 ADDHYD 4 114   5 6 7
  6 ADDHYD 4 114   1 7 5
  6 RUNOFF 1 119       6 .231        84.         1.05
  6 ADDHYD 4 114   5 6 7
  6 REACH  3 118   7   6 4000.       .05         1.66
  6 RUNOFF 1 118       5 .231        81.         1.59
  6 ADDHYD 4 118   5 6 7
  6 REACH  3 117   7   6 3527.       .05         1.66
  6 RUNOFF 1 117       5 .173        80.         1.9
  6 ADDHYD 4 117   5 6 7
    ENDATA
  7 INCREM 6             .08
  7 COMPUT 7 001   117              2.53        24.         1 2  01  01
    ENDCMP 1
  7 COMPUT 7 001   117              3.57        24.         1 2  01  02
    ENDCMP 1
  7 COMPUT 7 001   117              4.04        24.         1 2  01  03
    ENDCMP 1
    ENDJOB 2
0*******************************END OF 80-80 LIST*********************************

 EXECUTIVE CONTROL OPERATION INCREM                                                                    RECORD ID
+                                        MAIN TIME INCREMENT =    .08 HOURS

 EXECUTIVE CONTROL OPERATION COMPUT                                                                    RECORD ID
+                                        FROM XSECTION    1
+                                                          TO XSECTION 117
        STARTING TIME =    .00    RAIN DEPTH =  2.53    RAIN DURATION= 24.00    RAIN TABLE NO.= 1    ANT. MOIST. COND= 2
        ALTERNATE NO.= 1          STORM NO.= 1    MAIN TIME INCREMENT =    .08 HOURS

      ***  WARNING  REACH   8 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  15 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  14 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  36 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  37 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  85 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH  85 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      40.15 CFS,  11.58 % OF PEAK.

      ***  WARNING  REACH  84 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH  84 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      40.75 CFS,  11.70 % OF PEAK.

      ***  WARNING  REACH 101 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 105 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH 105 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      14.74 CFS,  11.85 % OF PEAK.

      ***  WARNING  REACH 104 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH 104 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      14.73 CFS,  11.84 % OF PEAK.

      ***  WARNING  REACH  83 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH  83 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      26.61 CFS,  11.80 % OF PEAK.

      ***  WARNING  REACH 106 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH 106 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      27.34 CFS,  10.73 % OF PEAK.
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      ***  WARNING  REACH 107 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 145 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 145 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  95 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  32 LENGTH FACTOR (K*) GREATER THAN 1.0, CONSIDER DIVIDING REACH LENGTH  ***
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*** WARNING REACH  98 LENGTH FACTOR (K*) GREATER THAN 1.0, CONSIDER DIVIDING REACH LENGTH  ***
*** WARNING REACH  96 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH 139 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH 142 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH 141 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH 140 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH 139 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH 139 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH 134 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH 124 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH 104 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH 107 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH 108 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH  45 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH  57 LENGTH FACTOR (K*) GREATER THAN 1.0, CONSIDER DIVIDING REACH LENGTH  ***
*** WARNING REACH  52 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH  66 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
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*** WARNING REACH  67 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH  69 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH  77 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH  75 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH  80 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH 112 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH 109 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH 110 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH 111 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH 112 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH 113 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH 113 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

EXECUTIVE CONTROL OPERATION ENDCMP                                                                    RECORD ID
+                                   COMPUTATIONS COMPLETED FOR PASS   1


EXECUTIVE CONTROL OPERATION COMPUT                                                                    RECORD ID
+                                   FROM XSECTION   1
+                                                      TO XSECTION 117
      STARTING TIME =   .00    RAIN DEPTH =  3.57    RAIN DURATION= 24.00    RAIN TABLE NO.= 1    ANT. MOIST. COND= 2
      ALTERNATE NO.= 1         STORM NO.= 2    MAIN TIME INCREMENT =   .08 HOURS
*** WARNING REACH   8 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH  15 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH  14 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH  37 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH  36 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
*** WARNING REACH  37 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
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      ***  WARNING  REACH  85 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH  85 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      65.92 CFS,  14.84 % OF PEAK.

      ***  WARNING  REACH  84 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH  84 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      66.93 CFS,  14.98 % OF PEAK.

      ***  WARNING  REACH 101 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 105 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH 105 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      24.16 CFS,  15.11 % OF PEAK.

      ***  WARNING  REACH 104 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH 104 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      24.19 CFS,  15.13 % OF PEAK.

      ***  WARNING  REACH  83 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH  83 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      43.78 CFS,  15.11 % OF PEAK.

      ***  WARNING  REACH 106 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH 106 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      44.92 CFS,  13.35 % OF PEAK.

      ***  WARNING  REACH 107 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH 107 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      45.97 CFS,  11.77 % OF PEAK.

      ***  WARNING  REACH 145 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 145 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH  93 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      22.71 CFS,  19.74 % OF PEAK.

      ***  WARNING  REACH  92 LENGTH FACTOR (K*) GREATER THAN 1.0, CONSIDER DIVIDING REACH LENGTH  ***

      ***  WARNING  REACH  95 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH  95 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      28.75 CFS,  10.85 % OF PEAK.

      ***  WARNING  REACH  32 LENGTH FACTOR (K*) GREATER THAN 1.0, CONSIDER DIVIDING REACH LENGTH  ***

      ***  WARNING  REACH  96 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
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0     *** WARNING - REACH  96 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      37.59 CFS,  14.18 % OF PEAK.

      ***  WARNING  REACH  98 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  99 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 139 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 142 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH 142 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      39.82 CFS,  15.03 % OF PEAK.

      ***  WARNING  REACH 141 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 140 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 139 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 139 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 126 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 134 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 124 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 104 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 107 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 108 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  45 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  45 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  52 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

          *** WARNING - STRUCTURE 59 DELTA T IS TOO LARGE.  O /2 >  S /DELTA T OCCURED  1 TIMES STARTING WITH POINT219

      ***  WARNING  REACH  66 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  67 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  69 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
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      ***  WARNING  REACH  81 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
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 TR20 XEQ 11-04-98  14:45        EAST FORK CAVE CREEK - GREENWAY CHANNEL 7th St to CAVE CREEK Rd.                JOB  1   PASS   2
      REV PC 09/83(.2)           WOOD/PATEL JOB No: 96559.04      -- FEMA CLOMR --     FILENAME: GW1.IT2                PAGE   5


      ***  WARNING  REACH  77 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

          *** WARNING - STRUCTURE 69 DELTA T IS TOO LARGE.  O /2 >  S /DELTA T OCCURED  1 TIMES STARTING WITH POINT289

      ***  WARNING  REACH  75 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH  75 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      39.75 CFS,  11.26 % OF PEAK.

      ***  WARNING  REACH  80 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 112 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 109 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 110 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 111 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 112 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 113 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 113 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

 EXECUTIVE CONTROL OPERATION ENDCMP                                                                            RECORD ID
+                                     COMPUTATIONS COMPLETED FOR PASS   2


 EXECUTIVE CONTROL OPERATION COMPUT                                                                            RECORD ID
+                                     FROM XSECTION   1
+                                                        TO XSECTION 117
         STARTING TIME =    .00    RAIN DEPTH =  4.04    RAIN DURATION= 24.00    RAIN TABLE NO.= 1    ANT. MOIST. COND= 2
         ALTERNATE NO.= 1          STORM NO.= 3    MAIN TIME INCREMENT =    .08 HOURS

      ***  WARNING  REACH   8 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH   8 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  15 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  14 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  14 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  37 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  36 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
1


 TR20 XEQ 11-04-98  14:45        EAST FORK CAVE CREEK - GREENWAY CHANNEL 7th St to CAVE CREEK Rd.                JOB  1   PASS   3
      REV PC 09/83(.2)           WOOD/PATEL JOB No: 96559.04      -- FEMA CLOMR --     FILENAME: GW1.IT2                PAGE   6


      ***  WARNING  REACH  37 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  85 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH  85 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT     279.60 CFS,  55.04 % OF PEAK.

      ***  WARNING  REACH  84 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH  84 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT     280.80 CFS,  54.92 % OF PEAK.

      ***  WARNING  REACH  90 LENGTH FACTOR (K*) GREATER THAN 1.0, CONSIDER DIVIDING REACH LENGTH  ***

      ***  WARNING  REACH 101 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 105 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH 105 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT     100.28 CFS,  54.82 % OF PEAK.

      ***  WARNING  REACH 104 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH 104 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT     101.53 CFS,  55.50 % OF PEAK.

      ***  WARNING  REACH  83 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH  83 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT     181.72 CFS,  54.81 % OF PEAK.

      ***  WARNING  REACH 106 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH 106 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT     183.05 CFS,  49.02 % OF PEAK.

      ***  WARNING  REACH 107 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
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0     *** WARNING - REACH 107 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT     184.28 CFS,  42.01 % OF PEAK.

      ***  WARNING  REACH 145 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 145 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
      *** WARNING - REACH  93 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      61.53 CFS,  51.48 % OF PEAK.

      ***  WARNING  REACH  95 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH  95 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      67.24 CFS,  25.37 % OF PEAK.

      ***  WARNING  REACH  96 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH  96 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      77.64 CFS,  29.30 % OF PEAK.
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      ***  WARNING  REACH  98 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  99 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 139 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 142 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH 142 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT      80.25 CFS,  30.28 % OF PEAK.

      ***  WARNING  REACH 141 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 140 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 139 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 139 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 126 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 134 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 124 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 104 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 107 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 108 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  45 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  45 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  52 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  66 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  67 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  69 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  81 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  77 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH  75 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
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0     *** WARNING - REACH  75 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT     149.49 CFS,  39.25 % OF PEAK.

      ***  WARNING  REACH  80 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 112 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
0     *** WARNING - REACH 112 INFLOW HYDROGRAPH VOLUME TRUNCATED ABOVE BASEFLOW AT     153.76 CFS,  26.17 % OF PEAK.

      ***  WARNING  REACH 109 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 110 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 111 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 112 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 113 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***

      ***  WARNING  REACH 113 ATT-KIN COEFF.(C) GREATER THAN 0.667, CONSIDER REDUCING MAIN TIME INCREMENT  ***
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EXECUTIVE CONTROL OPERATION ENDCMP RECORD ID
+ COMPUTATIONS COMPLETED FOR PASS 3

EXECUTIVE CONTROL OPERATION ENDJOB RECORD ID
1

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 1													
+													
XSECTION 1	RUNOFF	.15	1	2	.08	.0	2.53	24.00	1.98	---	12.45	149.82	1012.3
XSECTION 2	RUNOFF	.10	1	2	.08	.0	2.53	24.00	1.99	---	12.44	100.45	1035.5
XSECTION 3	REACH	.15	1	2	.08	.0	2.53	24.00	1.98	---	12.66	145.14	980.7
XSECTION 3	REACH	.10	1	2	.08	.0	2.53	24.00	1.97	---	12.72	92.53	954.0
XSECTION 3	ADDHYD	.25	1	2	.08	.0	2.53	24.00	1.98	---	12.68	238.07	971.7
XSECTION 3	RUNOFF	.05	1	2	.08	.0	2.53	24.00	.75	---	12.54	22.94	488.1
XSECTION 3	ADDHYD	.29	1	2	.08	.0	2.53	24.00	1.78	---	12.63	255.59	875.3
XSECTION 6	RUNOFF	.11	1	2	.08	.0	2.53	24.00	.95	---	12.74	48.43	444.3
XSECTION 6	REACH	.29	1	2	.08	.0	2.53	24.00	1.78	1505.08	12.76	252.12	863.4
XSECTION 6	ADDHYD	.40	1	2	.08	.0	2.53	24.00	1.55	1505.23	12.76	300.45	749.2
XSECTION 8	REACH	.40	1	2	.08	.0	2.53	24.00	1.55	1496.66	12.92	285.81	712.7
XSECTION 7	RUNOFF	.12	1	2	.08	.0	2.53	24.00	.75	---	12.69	44.80	382.9
XSECTION 8	REACH	.12	1	2	.08	.0	2.53	24.00	.75	1494.84	12.82	43.28	369.9
XSECTION 19	RUNOFF	.02	1	2	.08	.0	2.53	24.00	1.99	---	12.44	22.96	1043.8
XSECTION 4	RUNOFF	.19	1	2	.08	.0	2.53	24.00	1.99	---	12.44	200.22	1026.8
XSECTION 4	REACH	.02	1	2	.08	.0	2.53	24.00	1.96	---	13.00	17.70	804.5
XSECTION 4	ADDHYD	.22	1	2	.08	.0	2.53	24.00	1.98	---	12.45	210.49	970.0
XSECTION 5	RUNOFF	.13	1	2	.08	.0	2.53	24.00	.75	---	12.62	52.47	419.7
XSECTION 5	REACH	.22	1	2	.08	.0	2.53	24.00	1.98	---	12.64	201.41	928.2
XSECTION 5	ADDHYD	.34	1	2	.08	.0	2.53	24.00	1.53	---	12.63	253.80	742.1
XSECTION 8	REACH	.34	1	2	.08	.0	2.53	24.00	1.52	1496.54	12.87	234.64	686.1
XSECTION 8	ADDHYD	.52	1	2	.08	.0	2.53	24.00	1.37	1496.73	12.90	327.15	631.6
XSECTION 8	ADDHYD	.86	1	2	.08	.0	2.53	24.00	1.43	1497.03	12.88	561.34	652.7
XSECTION 18	RUNOFF	.18	1	2	.08	.0	2.53	24.00	.80	---	12.70	73.81	401.1
XSECTION 8	REACH	.18	1	2	.08	.0	2.53	24.00	.79	1494.97	13.16	55.14	299.7
XSECTION 8	ADDHYD	1.04	1	2	.08	.0	2.53	24.00	1.32	1497.07	12.90	606.28	580.7
XSECTION 8	RUNOFF	.13	1	2	.08	.0	2.53	24.00	.80	---	12.71	50.85	388.2
XSECTION 8	ADDHYD	1.18	1	2	.08	.0	2.53	24.00	1.26	1497.11	12.89	650.56	553.7
XSECTION 9	RUNOFF	.07	1	2	.08	.0	2.53	24.00	.84	---	12.81	24.37	369.2
XSECTION 8	REACH	.07	1	2	.08	.0	2.53	24.00	.84	1494.61	12.90	24.32	368.5
XSECTION 8	ADDHYD	1.24	1	2	.08	.0	2.53	24.00	1.24	1497.13	12.89	674.86	543.8
XSECTION 14	DIVERT	.00	1	2	.08	.0	2.53	24.00	1.24	---	12.16*	150.00	**********

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 1													
+													
XSECTION 8	DIVERT	1.24	1	2	.08	.0	2.53	24.00	.57	1497.00	12.89	524.86	422.9
STRUCTURE 8	RESVOR	1.24	1	2	.08	.0	2.53	24.00	.57	1492.28	13.48	135.41	109.1
XSECTION 14	ADDHYD	1.24	1	2	.08	.0	2.53	24.00	1.23	---	13.48	285.41	230.0
XSECTION 14	REACH	1.24	1	2	.08	.0	2.53	24.00	1.23	---	13.79	280.73	226.2
XSECTION 14	RUNOFF	.18	1	2	.08	.0	2.53	24.00	1.07	---	12.53	113.69	642.3

XSECTION	14	ADDHYD	1.42	1	2	.08	.0	2.53	24.00	1.21	---	13.74	287.60	202.8
XSECTION	16	RUNOFF	.12	1	2	.08	.0	2.53	24.00	1.26	---	12.57	79.99	672.2
XSECTION	15	REACH	.12	1	2	.08	.0	2.53	24.00	1.25	---	12.68	78.79	662.1
XSECTION	15	RUNOFF	.07	1	2	.08	.0	2.53	24.00	1.01	---	12.77	32.88	450.4
XSECTION	15	ADDHYD	.19	1	2	.08	.0	2.53	24.00	1.16	---	12.70	111.06	578.4
XSECTION	14	ADDHYD	1.61	1	2	.08	.0	2.53	24.00	1.20	---	12.63	366.62	227.7
XSECTION	144	RUNOFF	.13	1	2	.08	.0	2.53	24.00	.84	---	12.81	48.73	369.2
XSECTION	14	REACH	.13	1	2	.08	.0	2.53	24.00	.84	---	12.95	47.43	359.3
XSECTION	14	REACH	.13	1	2	.08	.0	2.53	24.00	.84	---	12.95	47.43	359.3
XSECTION	14	ADDHYD	1.74	1	2	.08	.0	2.53	24.00	1.17	---	12.66	401.52	230.5
XSECTION	27	REACH	1.74	1	2	.08	.0	2.53	24.00	1.17	---	13.04	360.97	207.2
XSECTION	27	RUNOFF	.19	1	2	.08	.0	2.53	24.00	1.00	---	12.96	71.15	378.4
XSECTION	27	ADDHYD	1.93	1	2	.08	.0	2.53	24.00	1.15	---	13.00	431.43	223.5
XSECTION	17	RUNOFF	.06	1	2	.08	.0	2.53	24.00	1.99	---	12.44	61.52	1042.6
XSECTION	25	REACH	.06	1	2	.08	.0	2.53	24.00	1.97	---	12.99	50.39	854.0
XSECTION	25	RUNOFF	.09	1	2	.08	.0	2.53	24.00	1.07	---	12.54	55.78	626.8
XSECTION	25	ADDHYD	.15	1	2	.08	.0	2.53	24.00	1.43	---	12.59	92.92	627.8
XSECTION	27	REACH	.15	1	2	.08	.0	2.53	24.00	1.42	---	12.81	81.78	552.6
XSECTION	27	ADDHYD	2.08	1	2	.08	.0	2.53	24.00	1.17	---	12.96	508.54	244.7
XSECTION	26	RUNOFF	.07	1	2	.08	.0	2.53	24.00	1.20	---	12.49	48.39	722.3
XSECTION	27	ADDHYD	2.14	1	2	.08	.0	2.53	24.00	1.17	---	12.93	516.89	241.0
XSECTION	37	REACH	2.14	1	2	.08	.0	2.53	24.00	1.17	1454.50	13.12	509.39	237.5
XSECTION	37	RUNOFF	.13	1	2	.08	.0	2.53	24.00	1.07	---	12.47	85.28	682.3
XSECTION	37	ADDHYD	2.27	1	2	.08	.0	2.53	24.00	1.16	1454.51	13.10	517.70	228.1
XSECTION	24	RUNOFF	.20	1	2	.08	.0	2.53	24.00	1.26	---	12.54	139.24	703.2
XSECTION	37	REACH	.20	1	2	.08	.0	2.53	24.00	1.26	1453.08	12.65	136.34	688.6
XSECTION	37	ADDHYD	2.47	1	2	.08	.0	2.53	24.00	1.17	1454.64	12.85	591.67	239.7
XSECTION	143	RUNOFF	.06	1	2	.08	.0	2.53	24.00	1.19	---	12.57	40.41	646.6
XSECTION	143	ADDHYD	2.53	1	2	.08	.0	2.53	24.00	1.17	---	12.80	619.95	245.0
XSECTION	34	RUNOFF	.13	1	2	.08	.0	2.53	24.00	1.13	---	12.67	68.82	550.6
XSECTION	35	REACH	.13	1	2	.08	.0	2.53	24.00	1.12	---	12.81	66.44	531.5

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 1													
+													
XSECTION 35	RUNOFF	.13	1	2	.08	.0	2.53	24.00	1.07	---	12.56	75.62	605.0
XSECTION 35	ADDHYD	.25	1	2	.08	.0	2.53	24.00	1.10	---	12.63	133.11	532.4
XSECTION 36	REACH	.25	1	2	.08	.0	2.53	24.00	1.10	---	12.63	133.11	532.4
XSECTION 10	RUNOFF	.09	1	2	.08	.0	2.53	24.00	.75	---	12.62	39.88	419.7
XSECTION 11	REACH	.09	1	2	.08	.0	2.53	24.00	.75	---	12.79	36.00	378.9
XSECTION 11	RUNOFF	.13	1	2	.08	.0	2.53	24.00	.85	---	12.70	52.45	419.6
XSECTION 11	ADDHYD	.22	1	2	.08	.0	2.53	24.00	.80	---	12.73	87.66	398.4
XSECTION 28	REACH	.22	1	2	.08	.0	2.53	24.00	.79	---	13.56	50.09	227.7
XSECTION 13	RUNOFF	.13	1	2	.08	.0	2.53	24.00	1.01	---	12.62	66.41	531.3
XSECTION 28	REACH	.13	1	2	.08	.0	2.53	24.00	.99	---	13.47	38.97	311.8
XSECTION 28	ADDHYD	.34	1	2	.08	.0	2.53	24.00	.86	---	13.52	88.75	257.3
XSECTION 28	RUNOFF	.16	1	2	.08	.0	2.53	24.00	1.01	---	12.80	68.66	440.1
XSECTION 28	ADDHYD	.50	1	2	.08	.0	2.53	24.00	.91	---	13.32	117.59	234.7
XSECTION 36	REACH	.50	1	2	.08	.0	2.53	24.00	.90	---	13.76	101.73	203.0
XSECTION 36	RUNOFF	.13	1	2	.08	.0	2.53	24.00	1.07	---	12.56	76.12	608.9
XSECTION 36	ADDHYD	.63	1	2	.08	.0	2.53	24.00	.93	---	13.71	107.47	171.7
XSECTION 36	ADDHYD	.88	1	2	.08	.0	2.53	24.00	.98	---	12.64	236.76	270.3
XSECTION 36	DIVERT	.00	1	2	.08	.0	2.53	24.00	.98	---	12.64	236.76	**********
XSECTION 90	DIVERT	.88	1	2	.08	.0	2.53	24.00	.00	---	.00	.00	.0
XSECTION 37	REACH	.00	1	2	.08	.0	2.53	24.00	.00	1453.50	12.72	236.68	**********
XSECTION 143	ADDHYD	2.53	1	2	.08	.0	2.53	24.00	1.51	---	12.75	854.04	337.5
STRUCTURE 43	RESVOR	2.53	1	2	.08	.0	2.53	24.00	1.51	1421.40	14.82	346.76	137.0
XSECTION 85	REACH	2.53	1	2	.08	.0	2.53	24.00	1.51	---	14.82	346.76	137.0
XSECTION 85	RUNOFF	.06	1	2	.08	.0	2.53	24.00	.75	---	12.60	27.34	433.9
XSECTION 85	ADDHYD	2.59	1	2	.08	.0	2.53	24.00	1.49	---	14.81	348.41	134.3
XSECTION 84	REACH	2.59	1	2	.08	.0	2.53	24.00	1.49	3.37	14.81	348.41	134.3
XSECTION 84	RUNOFF	.06	1	2	.08	.0	2.53	24.00	.75	---	12.60	27.34	433.9
XSECTION 84	ADDHYD	2.66	1	2	.08	.0	2.53	24.00	1.47	3.39	14.80	350.07	131.8
XSECTION 91	RUNOFF	.13	1	2	.08	.0	2.53	24.00	1.26	---	12.54	87.51	700.1
XSECTION 90	REACH	.13	1	2	.08	.0	2.53	24.00	1.26	---	12.68	83.43	667.4

XSECTION	90	REACH	.88	1	2	.08	.0	2.53	24.00	.00	---	.00	.00	.0
XSECTION	90	ADDHYD	1.00	1	2	.08	.0	2.53	24.00	.16	---	12.68	83.43	83.3
XSECTION	90	RUNOFF	.11	1	2	.08	.0	2.53	24.00	1.19	---	12.61	66.45	609.6
XSECTION	90	ADDHYD	1.11	1	2	.08	.0	2.53	24.00	.26	---	12.65	148.96	134.2
XSECTION	88	REACH	1.11	1	2	.08	.0	2.53	24.00	.26	---	12.78	144.37	130.1
XSECTION	88	RUNOFF	.09	1	2	.08	.0	2.53	24.00	1.32	---	12.66	59.09	628.7

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
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A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 1													
+													
XSECTION 88	ADDHYD	1.20	1	2	.08	.0	2.53	24.00	.34	---	12.75	201.27	167.2
XSECTION 89	RUNOFF	.05	1	2	.08	.0	2.53	24.00	1.13	---	12.53	31.57	671.6
XSECTION 88	REACH	.05	1	2	.08	.0	2.53	24.00	1.12	---	12.87	26.20	557.4
XSECTION 88	ADDHYD	1.25	1	2	.08	.0	2.53	24.00	.37	---	12.76	226.07	180.7
XSECTION 101	REACH	1.25	1	2	.08	.0	2.53	24.00	.37	---	12.87	223.21	178.4
XSECTION 101	RUNOFF	.05	1	2	.08	.0	2.53	24.00	1.47	---	12.55	36.53	777.3
XSECTION 101	ADDHYD	1.30	1	2	.08	.0	2.53	24.00	.41	---	12.82	244.90	188.7
XSECTION 102	REACH	1.30	1	2	.08	.0	2.53	24.00	.41	---	13.07	217.57	167.6
XSECTION 102	RUNOFF	.06	1	2	.08	.0	2.53	24.00	.75	---	12.65	24.94	395.9
XSECTION 102	ADDHYD	1.36	1	2	.08	.0	2.53	24.00	.42	---	13.03	229.77	168.8
XSECTION 104	REACH	1.36	1	2	.08	.0	2.53	24.00	.42	1.08	13.45	192.40	141.4
XSECTION 86	RUNOFF	.06	1	2	.08	.0	2.53	24.00	1.20	---	12.48	46.21	733.5
XSECTION 87	REACH	.06	1	2	.08	.0	2.53	24.00	1.19	1429.91	12.81	37.31	592.3
XSECTION 87	RUNOFF	.06	1	2	.08	.0	2.53	24.00	1.19	---	12.57	41.19	653.7
XSECTION 87	ADDHYD	.13	1	2	.08	.0	2.53	24.00	1.19	1429.95	12.65	72.68	576.9
XSECTION 105	REACH	.13	1	2	.08	.0	2.53	24.00	1.18	1417.49	13.01	58.37	463.2
XSECTION 105	RUNOFF	.06	1	2	.08	.0	2.53	24.00	.58	---	12.67	19.24	305.3
XSECTION 105	ADDHYD	.19	1	2	.08	.0	2.53	24.00	.98	1417.52	12.90	70.98	375.5
XSECTION 104	REACH	.19	1	2	.08	.0	2.53	24.00	.98	.56	13.12	66.78	353.3
XSECTION 104	RUNOFF	.07	1	2	.08	.0	2.53	24.00	.58	---	12.70	20.58	298.2
XSECTION 104	ADDHYD	.26	1	2	.08	.0	2.53	24.00	.87	.61	13.00	78.24	303.3
XSECTION 104	ADDHYD	1.62	1	2	.08	.0	2.53	24.00	.49	1.28	13.36	256.42	158.4
XSECTION 84	DIVERT	.93	1	2	.08	.0	2.53	24.00	1.49	1.65	14.80	124.45	133.8
XSECTION 83	DIVERT	1.73	1	2	.08	.0	2.53	24.00	1.46	1.65	14.80	225.62	130.7
XSECTION 105	REACH	.93	1	2	.08	.0	2.53	24.00	1.49	1417.60	14.89	124.45	133.8
XSECTION 104	REACH	.93	1	2	.08	.0	2.53	24.00	1.49	.81	15.00	124.43	133.8
XSECTION 104	ADDHYD	2.55	1	2	.08	.0	2.53	24.00	.86	1.62	13.35	374.48	146.9
XSECTION 83	REACH	1.73	1	2	.08	.0	2.53	24.00	1.46	1.65	14.80	225.62	130.7
XSECTION 83	RUNOFF	.06	1	2	.08	.0	2.53	24.00	1.07	---	12.57	37.47	594.8
XSECTION 83	ADDHYD	1.79	1	2	.08	.0	2.53	24.00	1.44	1.79	12.67	255.04	142.5
XSECTION 106	REACH	1.79	1	2	.08	.0	2.53	24.00	1.44	---	12.67	255.04	142.5
XSECTION 106	RUNOFF	.06	1	2	.08	.0	2.53	24.00	.85	---	12.61	29.64	470.5
XSECTION 106	ADDHYD	1.85	1	2	.08	.0	2.53	24.00	1.42	---	12.65	284.24	153.4
XSECTION 107	REACH	1.85	1	2	.08	.0	2.53	24.00	1.42	1.48	12.65	284.24	153.4
XSECTION 107	RUNOFF	.06	1	2	.08	.0	2.53	24.00	.96	---	12.54	33.78	572.6
XSECTION 107	ADDHYD	1.91	1	2	.08	.0	2.53	24.00	1.41	1.58	12.62	315.87	165.2

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 1													
XSECTION 29	RUNOFF	.13	1	2	.08	.0	2.53	24.00	.95	---	12.69	58.75	470.0
XSECTION 145	REACH	.13	1	2	.08	.0	2.53	24.00	.95	---	12.69	58.75	470.0

XSECTION 12	RUNOFF	.38	1	2	.08	.0	2.53	24.00	.90	---	12.64	178.05	471.0
XSECTION 145	REACH	.38	1	2	.08	.0	2.53	24.00	.90	---	12.73	177.78	470.3
XSECTION 30	RUNOFF	.15	1	2	.08	.0	2.53	24.00	.84	---	12.84	54.41	358.0
XSECTION 33	REACH	.15	1	2	.08	.0	2.53	24.00	.84	---	13.17	43.43	285.7
XSECTION 33	RUNOFF	.15	1	2	.08	.0	2.53	24.00	.20	---	12.87	12.51	81.2
XSECTION 33	ADDHYD	.31	1	2	.08	.0	2.53	24.00	.52	---	13.08	53.15	173.7
XSECTION 145	ADDHYD	.68	1	2	.08	.0	2.53	24.00	.73	---	12.77	218.34	319.2
XSECTION 145	RUNOFF	.16	1	2	.08	.0	2.53	24.00	.95	---	12.70	73.45	459.1
XSECTION 145	ADDHYD	.84	1	2	.08	.0	2.53	24.00	.77	---	12.75	290.84	344.6
XSECTION 145	DIVERT	.00	1	2	.08	.0	2.53	24.00	.77	---	12.24*	27.00	**********
XSECTION 7	DIVERT	.13	1	2	.08	.0	2.53	24.00	.22	---	12.69	31.75	254.0
XSECTION 145	ADDHYD	.97	1	2	.08	.0	2.53	24.00	.70	---	12.74	321.76	332.0
STRUCTURE 33	RESVOR	.97	1	2	.08	.0	2.53	24.00	.69	1466.54	13.64	77.35	79.8
XSECTION 145	ADDHYD	.97	1	2	.08	.0	2.53	24.00	.79	---	13.10	103.16	106.5
XSECTION 93	REACH	.97	1	2	.08	.0	2.53	24.00	.79	---	13.20	102.64	105.9
XSECTION 93	RUNOFF	.19	1	2	.08	.0	2.53	24.00	1.13	---	12.54	126.61	649.3
XSECTION 93	ADDHYD	1.16	1	2	.08	.0	2.53	24.00	.84	---	12.59	201.23	172.9
XSECTION 93	DIVERT	.00	1	2	.08	.0	2.53	24.00	.84	---	12.59	201.23	**********
XSECTION 92	DIVERT	1.16	1	2	.08	.0	2.53	24.00	.00	---	.00	.00	.0
XSECTION 92	REACH	1.16	1	2	.08	.0	2.53	24.00	.00	---	.00	.00	.0
XSECTION 92	RUNOFF	.13	1	2	.08	.0	2.53	24.00	1.26	---	12.54	87.51	700.1
XSECTION 92	ADDHYD	1.29	1	2	.08	.0	2.53	24.00	.12	---	12.54	87.51	67.9
XSECTION 98	REACH	1.29	1	2	.08	.0	2.53	24.00	.12	---	12.92	71.60	55.5
XSECTION 95	REACH	.00	1	2	.08	.0	2.53	24.00	.12	---	12.59	201.23	**********
XSECTION 31	RUNOFF	.08	1	2	.08	.0	2.53	24.00	1.07	---	12.60	47.88	570.0
XSECTION 32	REACH	.08	1	2	.08	.0	2.53	24.00	1.03	---	13.81	18.81	223.9
XSECTION 32	RUNOFF	.18	1	2	.08	.0	2.53	24.00	.90	---	12.81	70.58	392.1
XSECTION 32	ADDHYD	.26	1	2	.08	.0	2.53	24.00	.94	---	12.83	72.72	275.5
XSECTION 94	REACH	.26	1	2	.08	.0	2.53	24.00	.93	---	13.22	57.60	218.2
XSECTION 94	RUNOFF	.14	1	2	.08	.0	2.53	24.00	1.13	---	12.51	94.72	681.5
XSECTION 94	ADDHYD	.40	1	2	.08	.0	2.53	24.00	1.00	---	12.55	118.06	293.0
XSECTION 95	REACH	.40	1	2	.08	.0	2.53	24.00	.99	---	12.82	99.01	245.7
XSECTION 95	RUNOFF	.13	1	2	.08	.0	2.53	24.00	1.19	---	12.81	62.76	502.1
XSECTION 95	ADDHYD	.53	1	2	.08	.0	2.53	24.00	1.04	---	12.81	161.76	306.4

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 1													
+ XSECTION 95	ADDHYD	.53	1	2	.08	.0	2.53	24.00	2.90	---	12.67	344.66	652.8
XSECTION 95	DIVERT	.00	1	2	.08	.0	2.53	24.00	2.90	---	12.40*	265.00	**********
XSECTION 98	DIVERT	.53	1	2	.08	.0	2.53	24.00	.10	---	12.67	79.66	150.9
XSECTION 98	REACH	.53	1	2	.08	.0	2.53	24.00	.10	---	13.14	31.54	59.7
XSECTION 98	ADDHYD	1.82	1	2	.08	.0	2.53	24.00	.11	---	13.01	97.74	53.8
XSECTION 96	REACH	.00	1	2	.08	.0	2.53	24.00	.11	---	12.40*	265.00	**********
XSECTION 96	RUNOFF	.13	1	2	.08	.0	2.53	24.00	1.01	---	12.58	70.81	566.5
XSECTION 96	ADDHYD	.13	1	2	.08	.0	2.53	24.00	12.86	---	12.58	335.81	2686.5
XSECTION 96	DIVERT	.00	1	2	.08	.0	2.53	24.00	12.86	---	12.32*	265.00	**********
XSECTION 97	DIVERT	.13	1	2	.08	.0	2.53	24.00	.51	---	12.58	70.81	566.5
XSECTION 97	REACH	.13	1	2	.08	.0	2.53	24.00	.51	---	12.92	51.35	410.8
XSECTION 97	RUNOFF	.19	1	2	.08	.0	2.53	24.00	1.33	---	12.56	132.96	707.3
XSECTION 97	ADDHYD	.31	1	2	.08	.0	2.53	24.00	1.00	---	12.65	160.84	513.9
XSECTION 98	REACH	.31	1	2	.08	.0	2.53	24.00	1.00	---	12.78	155.05	495.4
XSECTION 98	ADDHYD	2.13	1	2	.08	.0	2.53	24.00	.24	---	12.87	238.91	112.2
XSECTION 98	RUNOFF	.09	1	2	.08	.0	2.53	24.00	1.26	---	12.51	68.89	732.8
XSECTION 98	ADDHYD	2.22	1	2	.08	.0	2.53	24.00	.29	---	12.77	265.64	119.4
XSECTION 99	REACH	2.22	1	2	.08	.0	2.53	24.00	.29	---	12.91	261.26	117.5
XSECTION 99	RUNOFF	.09	1	2	.08	.0	2.53	24.00	1.26	---	12.55	65.28	694.5
XSECTION 99	ADDHYD	2.32	1	2	.08	.0	2.53	24.00	.33	---	12.77	299.29	129.1
XSECTION 139	REACH	2.32	1	2	.08	.0	2.53	24.00	.32	---	12.99	286.16	123.5
XSECTION 100	RUNOFF	.08	1	2	.08	.0	2.53	24.00	1.26	---	12.52	57.05	731.4
XSECTION 139	REACH	.08	1	2	.08	.0	2.53	24.00	1.26	---	12.52	57.05	731.4
XSECTION 139	ADDHYD	2.40	1	2	.08	.0	2.53	24.00	.36	---	12.91	299.99	125.2
XSECTION 142	REACH	.00	1	2	.08	.0	2.53	24.00	.36	---	12.72*	265.00	**********
XSECTION 142	RUNOFF	.25	1	2	.08	.0	2.53	24.00	1.00	---	13.08	85.00	340.0
XSECTION 142	ADDHYD	.25	1	2	.08	.0	2.53	24.00	7.17	---	13.08	350.00	1400.0

XSECTION 142	DIVERT	.00	1	2	.08	.0	2.53	24.00	7.17	---	12.32*	265.00	**********
XSECTION 141	DIVERT	.25	1	2	.08	.0	2.53	24.00	.46	---	13.08	85.00	340.0
XSECTION 141	REACH	.25	1	2	.08	.0	2.53	24.00	.45	---	13.19	84.71	338.8
XSECTION 141	RUNOFF	.19	1	2	.08	.0	2.53	24.00	1.19	---	12.57	121.56	646.6
XSECTION 141	ADDHYD	.44	1	2	.08	.0	2.53	24.00	.77	---	12.66	165.18	377.1
XSECTION 140	REACH	.44	1	2	.08	.0	2.53	24.00	.77	---	12.66	165.18	377.1
XSECTION 140	RUNOFF	.13	1	2	.08	.0	2.53	24.00	1.26	---	12.53	89.04	712.3
XSECTION 140	ADDHYD	.56	1	2	.08	.0	2.53	24.00	.88	---	12.60	249.13	442.5
XSECTION 137	RUNOFF	.08	1	2	.08	.0	2.53	24.00	.71	---	12.59	32.50	416.6

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
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A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 1													
+													
XSECTION 140	ADDHYD	.64	1	2	.08	.0	2.53	24.00	.86	---	12.60	281.67	439.4
XSECTION 139	REACH	.64	1	2	.08	.0	2.53	24.00	.86	---	12.71	277.03	432.2
XSECTION 139	ADDHYD	3.04	1	2	.08	.0	2.53	24.00	.46	---	12.74	568.58	187.2
XSECTION 136	RUNOFF	.07	1	2	.08	.0	2.53	24.00	1.40	---	12.45	56.90	862.1
XSECTION 138	REACH	.07	1	2	.08	.0	2.53	24.00	1.39	---	12.82	48.06	728.2
XSECTION 138	RUNOFF	.20	1	2	.08	.0	2.53	24.00	1.07	---	12.47	139.73	688.3
XSECTION 138	ADDHYD	.27	1	2	.08	.0	2.53	24.00	1.15	---	12.49	175.57	652.7
XSECTION 139	REACH	.27	1	2	.08	.0	2.53	24.00	1.15	---	12.58	174.72	649.5
XSECTION 139	ADDHYD	3.31	1	2	.08	.0	2.53	24.00	.52	---	12.65	720.36	217.9
XSECTION 139	RUNOFF	.19	1	2	.08	.0	2.53	24.00	1.33	---	12.53	140.34	746.5
XSECTION 139	ADDHYD	3.49	1	2	.08	.0	2.53	24.00	.56	---	12.63	847.83	242.7
XSECTION 129	RUNOFF	.11	1	2	.08	.0	2.53	24.00	.96	---	12.46	71.41	661.2
XSECTION 130	RUNOFF	.03	1	2	.08	.0	2.53	24.00	1.63	---	12.45	29.32	945.9
XSECTION 129	ADDHYD	.14	1	2	.08	.0	2.53	24.00	1.11	---	12.45	100.69	724.4
XSECTION 127	REACH	.14	1	2	.08	.0	2.53	24.00	1.10	---	12.84	81.01	582.8
XSECTION 128	RUNOFF	.04	1	2	.08	.0	2.53	24.00	.91	---	12.46	22.79	633.1
XSECTION 127	REACH	.04	1	2	.08	.0	2.53	24.00	.89	---	13.03	14.55	404.3
XSECTION 127	ADDHYD	.17	1	2	.08	.0	2.53	24.00	1.06	---	12.85	93.32	533.2
XSECTION 127	RUNOFF	.16	1	2	.08	.0	2.53	24.00	.96	---	12.47	102.00	641.5
XSECTION 127	ADDHYD	.33	1	2	.08	.0	2.53	24.00	1.01	---	12.51	161.93	484.8
XSECTION 132	RUNOFF	.14	1	2	.08	.0	2.53	24.00	1.07	---	12.48	97.92	675.3
XSECTION 133	RUNOFF	.08	1	2	.08	.0	2.53	24.00	1.40	---	12.45	68.97	862.1
XSECTION 133	ADDHYD	.22	1	2	.08	.0	2.53	24.00	1.19	---	12.46	166.37	739.4
XSECTION 131	REACH	.22	1	2	.08	.0	2.53	24.00	1.19	---	12.65	157.31	699.2
XSECTION 131	ADDHYD	.56	1	2	.08	.0	2.53	24.00	1.08	---	12.54	309.27	553.3
XSECTION 131	RUNOFF	.12	1	2	.08	.0	2.53	24.00	1.26	---	12.47	90.78	762.9
XSECTION 131	ADDHYD	.68	1	2	.08	.0	2.53	24.00	1.11	---	12.52	399.22	588.8
XSECTION 126	REACH	.68	1	2	.08	.0	2.53	24.00	1.11	---	12.63	387.22	571.1
XSECTION 126	RUNOFF	.16	1	2	.08	.0	2.53	24.00	1.63	---	12.46	143.39	907.6
XSECTION 126	ADDHYD	.84	1	2	.08	.0	2.53	24.00	1.21	---	12.56	508.49	608.2
XSECTION 134	REACH	.84	1	2	.08	.0	2.53	24.00	1.21	---	12.66	499.40	597.4
XSECTION 135	RUNOFF	.04	1	2	.08	.0	2.53	24.00	1.40	---	12.45	36.21	862.1
XSECTION 134	REACH	.04	1	2	.08	.0	2.53	24.00	1.38	---	12.93	27.23	648.4
XSECTION 134	ADDHYD	.88	1	2	.08	.0	2.53	24.00	1.21	---	12.67	521.07	593.5
XSECTION 134	RUNOFF	.20	1	2	.08	.0	2.53	24.00	1.20	---	12.49	142.29	722.3
XSECTION 134	ADDHYD	1.08	1	2	.08	.0	2.53	24.00	1.21	---	12.60	635.72	591.4

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A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)

ALTERNATE 1 STORM 1

XSECTION 125	RUNOFF	.12	1	2	.08	.0	2.53	24.00	1.90	---	12.44	119.54	1021.7
XSECTION 125	ADDHYD	1.19	1	2	.08	.0	2.53	24.00	1.28	---	12.54	724.50	607.8
XSECTION 124	REACH	1.19	1	2	.08	.0	2.53	24.00	1.27	2.29	12.75	685.00	574.7
XSECTION 124	RUNOFF	.22	1	2	.08	.0	2.53	24.00	1.13	---	12.47	155.75	711.2
XSECTION 124	ADDHYD	1.41	1	2	.08	.0	2.53	24.00	1.25	2.42	12.64	748.83	530.7
XSECTION 124	REACH	3.49	1	2	.08	.0	2.53	24.00	.56	2.61	12.63	847.83	242.7
XSECTION 124	ADDHYD	4.91	1	2	.08	.0	2.53	24.00	.76	3.81	12.64	1596.51	325.5
XSECTION 103	RUNOFF	.08	1	2	.08	.0	2.53	24.00	1.13	---	12.48	57.51	710.1
XSECTION 124	ADDHYD	4.99	1	2	.08	.0	2.53	24.00	.77	3.87	12.62	1637.80	328.5
XSECTION 104	REACH	4.99	1	2	.08	.0	2.53	24.00	.77	3.93	12.62	1637.80	328.5
XSECTION 104	ADDHYD	7.53	1	2	.08	.0	2.53	24.00	.80	4.24	12.65	1863.26	247.3
XSECTION 107	REACH	7.53	1	2	.08	.0	2.53	24.00	.80	4.59	12.65	1863.26	247.3
XSECTION 107	ADDHYD	9.45	1	2	.08	.0	2.53	24.00	.92	5.03	12.64	2178.58	230.6
XSECTION 123	RUNOFF	.21	1	2	.08	.0	2.53	24.00	1.89	---	12.45	212.19	996.2
XSECTION 107	ADDHYD	9.66	1	2	.08	.0	2.53	24.00	.94	5.24	12.60	2330.96	241.3
XSECTION 108	REACH	9.66	1	2	.08	.0	2.53	24.00	.94	4.42	12.60	2330.96	241.3
XSECTION 108	RUNOFF	.03	1	2	.08	.0	2.53	24.00	1.07	---	12.48	16.80	671.9
XSECTION 108	ADDHYD	9.68	1	2	.08	.0	2.53	24.00	.94	4.44	12.60	2345.72	242.2
XSECTION 148	RUNOFF	.03	1	2	.08	.0	2.53	24.00	1.02	---	12.45	22.70	688.0
XSECTION 47	REACH	.03	1	2	.08	.0	2.53	24.00	1.00	---	12.85	16.99	515.0
XSECTION 47	RUNOFF	.07	1	2	.08	.0	2.53	24.00	1.02	---	12.46	50.00	684.9
XSECTION 47	ADDHYD	.11	1	2	.08	.0	2.53	24.00	1.01	---	12.47	59.93	565.3
XSECTION 46	REACH	.11	1	2	.08	.0	2.53	24.00	1.00	---	12.79	47.41	447.3
XSECTION 46	RUNOFF	.05	1	2	.08	.0	2.53	24.00	1.02	---	12.45	36.46	688.0
XSECTION 46	ADDHYD	.16	1	2	.08	.0	2.53	24.00	1.01	---	12.50	67.75	426.1
XSECTION 149	REACH	.16	1	2	.08	.0	2.53	24.00	1.00	---	12.82	52.88	332.6
XSECTION 149	RUNOFF	.01	1	2	.08	.0	2.53	24.00	1.55	---	12.45	8.25	917.1
XSECTION 149	ADDHYD	.17	1	2	.08	.0	2.53	24.00	1.03	---	12.77	53.87	320.6
XSECTION 147	RUNOFF	.05	1	2	.08	.0	2.53	24.00	1.02	---	12.45	35.77	688.0
XSECTION 146	REACH	.05	1	2	.08	.0	2.53	24.00	1.00	---	12.85	27.36	526.2
XSECTION 146	RUNOFF	.07	1	2	.08	.0	2.53	24.00	1.02	---	12.46	49.31	684.9
XSECTION 146	ADDHYD	.12	1	2	.08	.0	2.53	24.00	1.01	---	12.48	65.66	529.5
XSECTION 45	REACH	.12	1	2	.08	.0	2.53	24.00	1.01	---	12.59	62.62	505.0
XSECTION 43	RUNOFF	.05	1	2	.08	.0	2.53	24.00	1.55	---	12.45	43.11	917.1
XSECTION 21	REACH	.05	1	2	.08	.0	2.53	24.00	1.54	---	12.91	35.24	749.8
XSECTION 21	ADDHYD	.17	1	2	.08	.0	2.53	24.00	1.15	---	12.61	90.80	531.0

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CF$)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 1													
XSECTION 21	RUNOFF	.19	1	2	.08	.0	2.53	24.00	1.32	---	12.58	129.93	687.4
XSECTION 21	ADDHYD	.36	1	2	.08	.0	2.53	24.00	1.24	---	12.60	219.92	610.9
XSECTION 45	REACH	.36	1	2	.08	.0	2.53	24.00	1.24	---	12.68	220.48	612.4
XSECTION 45	RUNOFF	.12	1	2	.08	.0	2.53	24.00	1.55	---	12.54	93.77	808.3
XSECTION 45	ADDHYD	.48	1	2	.08	.0	2.53	24.00	1.32	---	12.64	307.75	646.5
XSECTION 45	ADDHYD	.64	1	2	.08	.0	2.53	24.00	1.24	---	12.65	358.93	557.4
XSECTION 150	RUNOFF	.02	1	2	.08	.0	2.53	24.00	1.02	---	12.45	11.01	688.0
XSECTION 57	REACH	.02	1	2	.08	.0	2.53	24.00	.99	---	13.12	6.45	403.3
XSECTION 57	RUNOFF	.05	1	2	.08	.0	2.53	24.00	1.02	---	12.48	32.68	653.7
XSECTION 57	ADDHYD	.07	1	2	.08	.0	2.53	24.00	1.01	---	12.49	34.29	519.6
XSECTION 59	REACH	.07	1	2	.08	.0	2.53	24.00	1.00	---	12.91	25.59	387.8
XSECTION 59	RUNOFF	.05	1	2	.08	.0	2.53	24.00	1.02	---	12.48	34.64	653.7
XSECTION 59	ADDHYD	.12	1	2	.08	.0	2.53	24.00	1.01	---	12.53	49.29	414.2
XSECTION 59	ADDHYD	.76	1	2	.08	.0	2.53	24.00	1.20	---	12.62	400.97	525.5
XSECTION 49	RUNOFF	.09	1	2	.08	.0	2.53	24.00	1.99	---	12.44	89.06	1035.5
XSECTION 50	REACH	.09	1	2	.08	.0	2.53	24.00	1.97	---	12.91	76.14	885.3
XSECTION 50	RUNOFF	.09	1	2	.08	.0	2.53	24.00	1.98	---	12.50	89.09	968.3
XSECTION 50	ADDHYD	.18	1	2	.08	.0	2.53	24.00	1.97	---	12.58	150.39	844.9
XSECTION 20	RUNOFF	.06	1	2	.08	.0	2.53	24.00	1.99	---	12.44	66.73	1042.6
XSECTION 48	REACH	.06	1	2	.08	.0	2.53	24.00	1.96	---	13.01	50.19	784.2
XSECTION 48	RUNOFF	.09	1	2	.08	.0	2.53	24.00	1.01	---	12.62	49.99	543.4
XSECTION 48	ADDHYD	.16	1	2	.08	.0	2.53	24.00	1.40	---	12.69	88.78	569.1
XSECTION 50	REACH	.16	1	2	.08	.0	2.53	24.00	1.39	---	13.14	72.89	467.2
XSECTION 50	ADDHYD	.33	1	2	.08	.0	2.53	24.00	1.70	---	12.67	193.94	580.7

XSECTION	52	REACH	.33	1	2	.08	.0	2.53	24.00	1.70	---	12.80	191.62	573.7
XSECTION	52	RUNOFF	.05	1	2	.08	.0	2.53	24.00	1.02	---	12.46	37.31	678.3
XSECTION	52	ADDHYD	.39	1	2	.08	.0	2.53	24.00	1.60	---	12.59	199.93	514.0
XSECTION	56	REACH	.39	1	2	.08	.0	2.53	24.00	1.60	---	12.97	190.76	490.4
XSECTION	56	RUNOFF	.07	1	2	.08	.0	2.53	24.00	1.02	---	12.48	43.80	653.7
XSECTION	56	ADDHYD	.46	1	2	.08	.0	2.53	24.00	1.51	---	12.64	198.29	434.8
XSECTION	51	REACH	.46	1	2	.08	.0	2.53	24.00	1.51	---	13.14	192.74	422.7
XSECTION	51	RUNOFF	.03	1	2	.08	.0	2.53	24.00	1.02	---	12.45	21.33	688.0
XSECTION	51	ADDHYD	.49	1	2	.08	.0	2.53	24.00	1.48	---	13.13	194.37	399.1
XSECTION	55	REACH	.49	1	2	.08	.0	2.53	24.00	1.47	---	13.35	190.31	390.8
XSECTION	55	RUNOFF	.02	1	2	.08	.0	2.53	24.00	1.02	---	12.45	11.70	688.0
XSECTION	55	ADDHYD	.50	1	2	.08	.0	2.53	24.00	1.46	---	13.35	191.08	379.1

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

ALTERNATE 1 STORM 1

SECTION/ STRUCTURE ID		STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
XSECTION	55	ADDHYD	1.27	1	2	.08	.0	2.53	24.00	1.31	---	12.67	532.92	420.6
STRUCTURE	59	RESVOR	1.27	1	2	.08	.0	2.53	24.00	1.30	1399.76	13.62	275.56	217.5
XSECTION	66	REACH	1.27	1	2	.08	.0	2.53	24.00	1.30	---	13.62	275.56	217.5
XSECTION	66	RUNOFF	.06	1	2	.08	.0	2.53	24.00	1.13	---	12.55	40.53	643.3
XSECTION	66	ADDHYD	1.33	1	2	.08	.0	2.53	24.00	1.30	---	13.55	279.01	209.8
XSECTION	67	REACH	1.33	1	2	.08	.0	2.53	24.00	1.30	---	13.55	279.01	209.8
XSECTION	67	RUNOFF	.06	1	2	.08	.0	2.53	24.00	1.40	---	12.46	52.20	828.6
XSECTION	67	ADDHYD	1.39	1	2	.08	.0	2.53	24.00	1.30	---	12.57	305.37	219.2
XSECTION	44	RUNOFF	.13	1	2	.08	.0	2.53	24.00	1.33	---	12.49	98.18	785.4
XSECTION	67	REACH	.13	1	2	.08	.0	2.53	24.00	1.33	---	12.61	95.63	765.1
XSECTION	67	ADDHYD	1.52	1	2	.08	.0	2.53	24.00	1.30	---	12.58	399.67	263.3
XSECTION	69	REACH	1.52	1	2	.08	.0	2.53	24.00	1.30	---	12.58	399.67	263.3
XSECTION	69	RUNOFF	.06	1	2	.08	.0	2.53	24.00	.95	---	12.63	31.97	507.4
XSECTION	69	ADDHYD	1.58	1	2	.08	.0	2.53	24.00	1.29	---	12.58	431.19	272.7
XSECTION	23	RUNOFF	.09	1	2	.08	.0	2.53	24.00	1.99	---	12.45	93.41	1026.5
XSECTION	40	REACH	.09	1	2	.08	.0	2.53	24.00	1.97	---	12.76	82.68	908.6
XSECTION	38	RUNOFF	.13	1	2	.08	.0	2.53	24.00	1.19	---	12.54	85.27	682.1
XSECTION	40	REACH	.13	1	2	.08	.0	2.53	24.00	1.19	---	12.79	74.57	596.5
XSECTION	40	ADDHYD	.22	1	2	.08	.0	2.53	24.00	1.52	---	12.78	157.04	727.0
XSECTION	40	RUNOFF	.09	1	2	.08	.0	2.53	24.00	1.01	---	12.58	53.25	566.5
XSECTION	40	ADDHYD	.31	1	2	.08	.0	2.53	24.00	1.36	---	12.70	201.34	649.5
XSECTION	82	REACH	.31	1	2	.08	.0	2.53	24.00	1.36	---	12.84	195.78	631.6
XSECTION	82	RUNOFF	.06	1	2	.08	.0	2.53	24.00	1.13	---	12.48	44.37	704.3
XSECTION	82	ADDHYD	.37	1	2	.08	.0	2.53	24.00	1.32	---	12.67	207.20	555.5
XSECTION	39	RUNOFF	.06	1	2	.08	.0	2.53	24.00	1.19	---	12.57	40.41	646.6
XSECTION	82	REACH	.06	1	2	.08	.0	2.53	24.00	1.19	---	12.87	34.08	545.3
XSECTION	82	ADDHYD	.44	1	2	.08	.0	2.53	24.00	1.30	---	12.79	239.53	550.0
XSECTION	81	REACH	.44	1	2	.08	.0	2.53	24.00	1.30	---	12.91	237.40	545.1
XSECTION	81	RUNOFF	.06	1	2	.08	.0	2.53	24.00	1.13	---	12.57	39.31	624.0
XSECTION	81	ADDHYD	.50	1	2	.08	.0	2.53	24.00	1.28	---	12.78	261.74	525.1
XSECTION	22	RUNOFF	.15	1	2	.08	.0	2.53	24.00	1.33	---	12.54	111.80	730.7
XSECTION	41	REACH	.15	1	2	.08	.0	2.53	24.00	1.32	---	12.70	102.80	671.9
XSECTION	41	RUNOFF	.17	1	2	.08	.0	2.53	24.00	1.13	---	12.53	116.10	675.0
XSECTION	41	ADDHYD	.32	1	2	.08	.0	2.53	24.00	1.22	---	12.56	210.27	647.0
XSECTION	42	RUNOFF	.08	1	2	.08	.0	2.53	24.00	1.33	---	12.46	63.18	810.0
XSECTION	42	ADDHYD	.40	1	2	.08	.0	2.53	24.00	1.24	---	12.53	269.56	668.9

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE | STANDARD CONTROL | DRAINAGE | RAIN TABLE | ANTEC MOIST | MAIN TIME | PRECIPITATION | RUNOFF | PEAK DISCHARGE

ID	OPERATION	AREA (SQ MI)	#	COND	INCREM (HR)	BEGIN (HR)	AMOUNT (IN)	DURATION (HR)	AMOUNT (IN)	ELEVATION (FT)	TIME (HR)	RATE (CFS)	RATE (CSM)
ALTERNATE 1 STORM 1													
XSECTION 78	REACH	.40	1	2	.08	.0	2.53	24.00	1.24	---	12.72	255.26	633.4
XSECTION 81	DIVERT	.00	1	2	.08	.0	2.53	24.00	1.24	---	12.40*	154.00	**********
XSECTION 78	DIVERT	.50	1	2	.08	.0	2.53	24.00	.22	---	12.78	107.74	216.1
XSECTION 78	REACH	.50	1	2	.08	.0	2.53	24.00	.22	---	13.00	99.75	200.1
XSECTION 78	ADDHYD	.90	1	2	.08	.0	2.53	24.00	.68	---	12.79	331.96	368.2
XSECTION 78	RUNOFF	.06	1	2	.08	.0	2.53	24.00	1.26	---	12.47	48.06	762.9
XSECTION 78	ADDHYD	.96	1	2	.08	.0	2.53	24.00	.71	---	12.76	346.46	359.2
XSECTION 77	REACH	.96	1	2	.08	.0	2.53	24.00	.71	---	12.88	340.26	352.8
XSECTION 77	RUNOFF	.06	1	2	.08	.0	2.53	24.00	1.26	---	12.52	46.27	734.4
XSECTION 77	ADDHYD	1.03	1	2	.08	.0	2.53	24.00	.75	---	12.84	356.40	346.9
XSECTION 69	ADDHYD	2.61	1	2	.08	.0	2.53	24.00	1.08	---	12.68	748.57	287.0
STRUCTURE 69	RESVOR	2.61	1	2	.08	.0	2.53	24.00	1.07	1384.51	14.65	276.79	106.1
XSECTION 75	REACH	2.61	1	2	.08	.0	2.53	24.00	1.07	---	14.65	276.79	106.1
XSECTION 80	REACH	.00	1	2	.08	.0	2.53	24.00	1.07	---	12.40*	154.00	**********
XSECTION 80	RUNOFF	.06	1	2	.08	.0	2.53	24.00	.90	---	12.56	33.70	535.0
XSECTION 80	ADDHYD	.06	1	2	.08	.0	2.53	24.00	9.27	---	12.56	187.70	2979.4
XSECTION 80	DIVERT	.00	1	2	.08	.0	2.53	24.00	9.27	---	12.32*	166.00	**********
XSECTION 79	DIVERT	.06	1	2	.08	.0	2.53	24.00	.22	---	12.56	21.70	344.5
XSECTION 79	REACH	.06	1	2	.08	.0	2.53	24.00	.22	---	12.83	16.35	259.5
XSECTION 79	RUNOFF	.06	1	2	.08	.0	2.53	24.00	1.40	---	12.46	52.20	828.6
XSECTION 79	ADDHYD	.13	1	2	.08	.0	2.53	24.00	.81	---	12.53	55.62	441.4
XSECTION 76	REACH	.13	1	2	.08	.0	2.53	24.00	.81	---	12.71	51.86	411.6
XSECTION 76	RUNOFF	.06	1	2	.08	.0	2.53	24.00	1.07	---	12.47	42.98	682.3
XSECTION 76	ADDHYD	.19	1	2	.08	.0	2.53	24.00	.90	---	12.52	88.24	466.9
XSECTION 75	REACH	.19	1	2	.08	.0	2.53	24.00	.89	---	12.64	84.20	445.5
XSECTION 75	ADDHYD	2.80	1	2	.08	.0	2.53	24.00	1.06	---	12.82	303.47	108.5
XSECTION 75	RUNOFF	.06	1	2	.08	.0	2.53	24.00	1.98	---	12.52	60.48	960.1
XSECTION 75	ADDHYD	2.86	1	2	.08	.0	2.53	24.00	1.08	---	12.66	354.27	123.9
XSECTION 112	REACH	2.86	1	2	.08	.0	2.53	24.00	1.08	---	12.66	354.27	123.9
XSECTION 109	REACH	.00	1	2	.08	.0	2.53	24.00	1.08	---	12.92	166.08	**********
XSECTION 109	RUNOFF	.06	1	2	.08	.0	2.53	24.00	1.13	---	12.49	43.97	697.9
XSECTION 109	ADDHYD	.06	1	2	.08	.0	2.53	24.00	10.17	---	12.53	208.73	3313.2
XSECTION 108	ADDHYD	9.75	1	2	.08	.0	2.53	24.00	1.00	4.66	12.59	2550.91	261.7
XSECTION 110	REACH	9.75	1	2	.08	.0	2.53	24.00	1.00	4.77	12.59	2550.91	261.7
XSECTION 110	RUNOFF	.07	1	2	.08	.0	2.53	24.00	.66	---	12.62	27.12	371.6
XSECTION 110	ADDHYD	9.82	1	2	.08	.0	2.53	24.00	1.00	4.80	12.59	2577.76	262.5

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 1													
XSECTION 122	RUNOFF	.35	1	2	.08	.0	2.53	24.00	.96	---	12.50	217.31	612.2
XSECTION 110	ADDHYD	10.18	1	2	.08	.0	2.53	24.00	1.00	5.03	12.58	2780.53	273.3
XSECTION 111	REACH	10.18	1	2	.08	.0	2.53	24.00	1.00	4.53	12.58	2780.53	273.3
XSECTION 111	RUNOFF	.07	1	2	.08	.0	2.53	24.00	.54	---	12.64	21.28	304.0
XSECTION 111	ADDHYD	10.25	1	2	.08	.0	2.53	24.00	.99	4.55	12.58	2801.19	273.4
XSECTION 112	REACH	10.25	1	2	.08	.0	2.53	24.00	.99	---	12.67	2773.40	270.7
XSECTION 112	RUNOFF	.06	1	2	.08	.0	2.53	24.00	.58	---	12.59	21.54	353.1
XSECTION 112	ADDHYD	10.31	1	2	.08	.0	2.53	24.00	.99	---	12.67	2793.77	271.1
XSECTION 121	RUNOFF	.25	1	2	.08	.0	2.53	24.00	1.89	---	12.44	255.13	1020.5
XSECTION 112	ADDHYD	10.56	1	2	.08	.0	2.53	24.00	1.01	---	12.63	2872.09	272.1
XSECTION 112	ADDHYD	13.42	1	2	.08	.0	2.53	24.00	1.03	---	12.64	3225.65	240.4
XSECTION 113	REACH	13.42	1	2	.08	.0	2.53	24.00	1.03	---	12.73	3210.51	239.3
XSECTION 113	RUNOFF	.05	1	2	.08	.0	2.53	24.00	1.63	---	12.54	44.56	840.7
XSECTION 113	ADDHYD	13.47	1	2	.08	.0	2.53	24.00	1.03	---	12.73	3247.28	241.1
XSECTION 120	RUNOFF	.23	1	2	.08	.0	2.53	24.00	1.33	---	12.49	181.43	785.4
XSECTION 113	ADDHYD	13.70	1	2	.08	.0	2.53	24.00	1.03	---	12.70	3338.95	243.7
XSECTION 58	RUNOFF	.03	1	2	.08	.0	2.53	24.00	1.14	---	12.45	23.85	745.3
XSECTION 60	REACH	.03	1	2	.08	.0	2.53	24.00	1.13	---	12.65	21.27	664.7
XSECTION 60	RUNOFF	.06	1	2	.08	.0	2.53	24.00	.96	---	12.57	34.53	548.1
XSECTION 60	ADDHYD	.09	1	2	.08	.0	2.53	24.00	1.01	---	12.60	55.33	582.4

XSECTION	65	REACH	.09	1	2	.08	.0	2.53	24.00	1.01	---	12.82	52.21	549.6
XSECTION	65	RUNOFF	.06	1	2	.08	.0	2.53	24.00	1.01	---	12.57	36.30	576.2
XSECTION	65	ADDHYD	.16	1	2	.08	.0	2.53	24.00	1.01	---	12.67	81.41	515.3
XSECTION	68	REACH	.16	1	2	.08	.0	2.53	24.00	1.01	---	12.83	77.89	493.0
XSECTION	68	RUNOFF	.06	1	2	.08	.0	2.53	24.00	1.20	---	12.47	46.64	740.3
XSECTION	68	ADDHYD	.22	1	2	.08	.0	2.53	24.00	1.06	---	12.56	104.62	473.4
XSECTION	70	REACH	.22	1	2	.08	.0	2.53	24.00	1.06	---	12.72	96.15	435.1
XSECTION	70	RUNOFF	.06	1	2	.08	.0	2.53	24.00	1.26	---	12.47	48.49	769.7
XSECTION	70	ADDHYD	.28	1	2	.08	.0	2.53	24.00	1.10	---	12.57	130.46	459.4
XSECTION	74	REACH	.28	1	2	.08	.0	2.53	24.00	1.10	---	12.72	121.52	427.9
XSECTION	74	RUNOFF	.06	1	2	.08	.0	2.53	24.00	1.55	---	12.46	56.24	892.6
XSECTION	74	ADDHYD	.35	1	2	.08	.0	2.53	24.00	1.18	---	12.56	159.74	460.4
XSECTION	113	REACH	.35	1	2	.08	.0	2.53	24.00	1.18	---	12.56	159.74	460.4
XSECTION	113	ADDHYD	14.05	1	2	.08	.0	2.53	24.00	1.04	---	12.69	3482.47	247.9
XSECTION	114	REACH	14.05	1	2	.08	.0	2.53	24.00	1.03	---	12.86	3351.45	238.6
XSECTION	64	RUNOFF	.25	1	2	.08	.0	2.53	24.00	1.01	---	12.51	156.50	626.0

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 1													
+													
XSECTION 72	REACH	.25	1	2	.08	.0	2.53	24.00	1.01	---	12.75	133.87	535.5
XSECTION 72	RUNOFF	.13	1	2	.08	.0	2.53	24.00	1.07	---	12.56	75.62	605.0
XSECTION 72	ADDHYD	.38	1	2	.08	.0	2.53	24.00	1.03	---	12.67	198.79	530.1
XSECTION 114	REACH	.38	1	2	.08	.0	2.53	24.00	1.02	---	12.88	172.33	459.5
XSECTION 115	RUNOFF	.09	1	2	.08	.0	2.53	24.00	1.01	---	12.55	55.56	591.0
XSECTION 114	ADDHYD	.47	1	2	.08	.0	2.53	24.00	1.02	---	12.77	202.52	431.8
XSECTION 71	RUNOFF	.13	1	2	.08	.0	2.53	24.00	1.07	---	12.56	75.62	605.0
XSECTION 114	REACH	.13	1	2	.08	.0	2.53	24.00	1.06	---	12.97	56.66	453.3
XSECTION 114	ADDHYD	.59	1	2	.08	.0	2.53	24.00	1.03	---	12.83	253.59	426.9
XSECTION 114	RUNOFF	.13	1	2	.08	.0	2.53	24.00	1.18	---	12.93	57.41	448.6
XSECTION 114	ADDHYD	.72	1	2	.08	.0	2.53	24.00	1.06	---	12.85	309.93	429.3
XSECTION 114	ADDHYD	14.77	1	2	.08	.0	2.53	24.00	1.04	---	12.86	3661.27	247.9
XSECTION 119	RUNOFF	.23	1	2	.08	.0	2.53	24.00	1.12	---	12.86	105.55	456.9
XSECTION 114	ADDHYD	15.00	1	2	.08	.0	2.53	24.00	1.04	---	12.86	3766.81	251.1
XSECTION 118	REACH	15.00	1	2	.08	.0	2.53	24.00	1.03	---	13.05	3597.78	239.8
XSECTION 118	RUNOFF	.23	1	2	.08	.0	2.53	24.00	.94	---	13.22	66.98	290.0
XSECTION 118	ADDHYD	15.23	1	2	.08	.0	2.53	24.00	1.03	---	13.05	3661.90	240.4
XSECTION 117	REACH	15.23	1	2	.08	.0	2.53	24.00	1.03	---	13.23	3549.65	233.0
XSECTION 117	RUNOFF	.17	1	2	.08	.0	2.53	24.00	.88	---	13.45	40.91	236.5
XSECTION 117	ADDHYD	15.41	1	2	.08	.0	2.53	24.00	1.03	---	13.24	3588.63	233.0
ALTERNATE 1 STORM 2													
+													
XSECTION 1	RUNOFF	.15	1	2	.08	.0	3.57	24.00	3.00	---	12.45	217.93	1472.5
XSECTION 2	RUNOFF	.10	1	2	.08	.0	3.57	24.00	3.00	---	12.44	145.51	1500.1
XSECTION 3	REACH	.15	1	2	.08	.0	3.57	24.00	2.99	---	12.63	213.83	1444.8
XSECTION 3	REACH	.10	1	2	.08	.0	3.57	24.00	2.98	---	12.70	138.09	1423.6
XSECTION 3	ADDHYD	.25	1	2	.08	.0	3.57	24.00	2.99	---	12.66	349.90	1428.2
XSECTION 3	RUNOFF	.05	1	2	.08	.0	3.57	24.00	1.47	---	12.52	42.49	903.9
XSECTION 3	ADDHYD	.29	1	2	.08	.0	3.57	24.00	2.74	---	12.60	387.57	1327.3
XSECTION 6	RUNOFF	.11	1	2	.08	.0	3.57	24.00	1.75	---	12.71	87.96	807.0
XSECTION 6	REACH	.29	1	2	.08	.0	3.57	24.00	2.74	1505.41	12.72	383.09	1312.0
XSECTION 6	ADDHYD	.40	1	2	.08	.0	3.57	24.00	2.47	1506.00	12.72	471.05	1174.7
XSECTION 8	REACH	.40	1	2	.08	.0	3.57	24.00	2.46	1496.90	12.88	453.71	1131.4
XSECTION 7	RUNOFF	.12	1	2	.08	.0	3.57	24.00	1.47	---	12.66	86.33	737.8
XSECTION 8	REACH	.12	1	2	.08	.0	3.57	24.00	1.46	1495.25	12.78	84.82	724.9
XSECTION 19	RUNOFF	.02	1	2	.08	.0	3.57	24.00	3.00	---	12.44	33.24	1510.9
XSECTION 4	RUNOFF	.19	1	2	.08	.0	3.57	24.00	3.00	---	12.44	290.36	1489.0

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
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A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 2													
+													
XSECTION 4	REACH	.02	1	2	.08	.0	3.57	24.00	2.97	---	12.98	27.33	1242.2
XSECTION 4	ADDHYD	.22	1	2	.08	.0	3.57	24.00	3.00	---	12.45	307.71	1418.0
XSECTION 5	RUNOFF	.13	1	2	.08	.0	3.57	24.00	1.47	---	12.60	99.67	797.4
XSECTION 5	REACH	.22	1	2	.08	.0	3.57	24.00	2.99	---	12.62	298.64	1376.2
XSECTION 5	ADDHYD	.34	1	2	.08	.0	3.57	24.00	2.43	---	12.62	398.25	1164.5
XSECTION 8	REACH	.34	1	2	.08	.0	3.57	24.00	2.42	1496.79	12.85	371.68	1086.8
XSECTION 8	ADDHYD	.52	1	2	.08	.0	3.57	24.00	2.24	1497.01	12.86	535.72	1034.2
XSECTION 8	ADDHYD	.86	1	2	.08	.0	3.57	24.00	2.31	1497.32	12.85	907.39	1055.1
XSECTION 18	RUNOFF	.18	1	2	.08	.0	3.57	24.00	1.53	---	12.67	139.85	760.1
XSECTION 8	REACH	.18	1	2	.08	.0	3.57	24.00	1.53	1495.49	12.93	115.81	629.4
XSECTION 8	ADDHYD	1.04	1	2	.08	.0	3.57	24.00	2.17	1497.40	12.86	1021.80	978.7
XSECTION 8	RUNOFF	.13	1	2	.08	.0	3.57	24.00	1.53	---	12.69	96.88	739.6
XSECTION 8	ADDHYD	1.18	1	2	.08	.0	3.57	24.00	2.10	1497.45	12.85	1108.39	943.3
XSECTION 9	RUNOFF	.07	1	2	.08	.0	3.57	24.00	1.60	---	12.79	46.12	698.8
XSECTION 8	REACH	.07	1	2	.08	.0	3.57	24.00	1.60	1494.88	12.87	46.11	698.7
XSECTION 8	ADDHYD	1.24	1	2	.08	.0	3.57	24.00	2.07	1497.48	12.85	1154.46	930.3
XSECTION 14	DIVERT	.00	1	2	.08	.0	3.57	24.00	2.07	---	12.00*	150.00**********	
XSECTION 8	DIVERT	1.24	1	2	.08	.0	3.57	24.00	1.22	1497.39	12.85	1004.46	809.4
STRUCTURE 8	RESVOR	1.24	1	2	.08	.0	3.57	24.00	1.20	1494.96	13.54	215.01	173.3
XSECTION 14	ADDHYD	1.24	1	2	.08	.0	3.57	24.00	2.06	---	13.54	365.01	294.1
XSECTION 14	REACH	1.24	1	2	.08	.0	3.57	24.00	2.05	---	13.84	361.54	291.3
XSECTION 14	RUNOFF	.18	1	2	.08	.0	3.57	24.00	1.91	---	12.52	191.46	1081.7
XSECTION 14	ADDHYD	1.42	1	2	.08	.0	3.57	24.00	2.03	---	12.60	375.99	265.2
XSECTION 16	RUNOFF	.12	1	2	.08	.0	3.57	24.00	2.14	---	12.55	132.00	1109.3
XSECTION 15	REACH	.12	1	2	.08	.0	3.57	24.00	2.14	---	12.65	130.95	1100.4
XSECTION 15	RUNOFF	.07	1	2	.08	.0	3.57	24.00	1.82	---	12.75	58.92	807.2
XSECTION 15	ADDHYD	.19	1	2	.08	.0	3.57	24.00	2.02	---	12.67	188.55	982.0
XSECTION 14	ADDHYD	1.61	1	2	.08	.0	3.57	24.00	2.03	---	12.62	562.35	349.3
XSECTION 144	RUNOFF	.13	1	2	.08	.0	3.57	24.00	1.60	---	12.79	92.24	698.8
XSECTION 14	REACH	.13	1	2	.08	.0	3.57	24.00	1.60	---	12.91	90.79	687.8
XSECTION 14	REACH	.13	1	2	.08	.0	3.57	24.00	1.60	---	12.91	90.79	687.8
XSECTION 14	ADDHYD	1.74	1	2	.08	.0	3.57	24.00	2.00	---	12.65	635.99	365.1
XSECTION 27	REACH	1.74	1	2	.08	.0	3.57	24.00	1.99	---	12.90	582.57	334.4
XSECTION 27	RUNOFF	.19	1	2	.08	.0	3.57	24.00	1.81	---	12.92	129.26	687.6
XSECTION 27	ADDHYD	1.93	1	2	.08	.0	3.57	24.00	1.97	---	12.90	711.71	368.8
XSECTION 17	RUNOFF	.06	1	2	.08	.0	3.57	24.00	3.00	---	12.44	89.05	1509.4

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TR20 XEQ 11-04-98 14:45 EAST FORK CAVE CREEK - GREENWAY CHANNEL 7th St to CAVE CREEK Rd. JOB 1 SUMMARY
REV PC 09/83(.2) WOOD/PATEL JOB No: 96559.04 -- FEMA CLOMR -- FILENAME: GW1.IT2 PAGE 23

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 2													
+													
XSECTION 25	REACH	.06	1	2	.08	.0	3.57	24.00	2.97	---	12.89	77.24	1309.2
XSECTION 25	RUNOFF	.09	1	2	.08	.0	3.57	24.00	1.90	---	12.53	95.00	1067.4
XSECTION 25	ADDHYD	.15	1	2	.08	.0	3.57	24.00	2.33	---	12.57	159.28	1076.2
XSECTION 27	REACH	.15	1	2	.08	.0	3.57	24.00	2.32	---	12.74	146.91	992.6
XSECTION 27	ADDHYD	2.08	1	2	.08	.0	3.57	24.00	2.00	---	12.87	850.50	409.3
XSECTION 26	RUNOFF	.07	1	2	.08	.0	3.57	24.00	2.07	---	12.48	79.23	1182.6
XSECTION 27	ADDHYD	2.14	1	2	.08	.0	3.57	24.00	2.00	---	12.83	870.82	406.0
XSECTION 37	REACH	2.14	1	2	.08	.0	3.57	24.00	2.00	1455.07	12.97	860.99	401.4
XSECTION 37	RUNOFF	.13	1	2	.08	.0	3.57	24.00	1.91	---	12.46	142.64	1141.2
XSECTION 37	ADDHYD	2.27	1	2	.08	.0	3.57	24.00	1.99	1455.09	12.95	878.40	387.0
XSECTION 24	RUNOFF	.20	1	2	.08	.0	3.57	24.00	2.15	---	12.53	228.04	1151.7
XSECTION 37	REACH	.20	1	2	.08	.0	3.57	24.00	2.14	1453.46	12.62	225.67	1139.7
XSECTION 37	ADDHYD	2.47	1	2	.08	.0	3.57	24.00	2.00	1455.33	12.74	1049.09	425.1
XSECTION 143	RUNOFF	.06	1	2	.08	.0	3.57	24.00	2.06	---	12.55	67.55	1080.8
XSECTION 143	ADDHYD	2.53	1	2	.08	.0	3.57	24.00	2.00	---	12.71	1107.05	437.5
XSECTION 34	RUNOFF	.13	1	2	.08	.0	3.57	24.00	1.98	---	12.65	118.43	947.4
XSECTION 35	REACH	.13	1	2	.08	.0	3.57	24.00	1.97	---	12.78	116.06	928.5

XSECTION	35	RUNOFF	.13	1	2	.08	.0	3.57	24.00	1.90	---	12.54	129.69	1037.5
XSECTION	35	ADDHYD	.25	1	2	.08	.0	3.57	24.00	1.94	---	12.61	234.08	936.3
XSECTION	36	REACH	.25	1	2	.08	.0	3.57	24.00	1.94	---	12.61	234.08	936.3
XSECTION	10	RUNOFF	.09	1	2	.08	.0	3.57	24.00	1.47	---	12.60	75.75	797.4
XSECTION	11	REACH	.09	1	2	.08	.0	3.57	24.00	1.47	---	12.74	71.85	756.3
XSECTION	11	RUNOFF	.13	1	2	.08	.0	3.57	24.00	1.60	---	12.67	97.84	782.7
XSECTION	11	ADDHYD	.22	1	2	.08	.0	3.57	24.00	1.54	---	12.70	169.07	768.5
XSECTION	28	REACH	.22	1	2	.08	.0	3.57	24.00	1.52	---	13.38	112.49	511.3
XSECTION	13	RUNOFF	.13	1	2	.08	.0	3.57	24.00	1.82	---	12.60	116.76	934.0
XSECTION	28	REACH	.13	1	2	.08	.0	3.57	24.00	1.80	---	13.17	79.01	632.1
XSECTION	28	ADDHYD	.34	1	2	.08	.0	3.57	24.00	1.62	---	13.30	187.28	542.8
XSECTION	28	RUNOFF	.16	1	2	.08	.0	3.57	24.00	1.82	---	12.77	123.38	790.9
XSECTION	28	ADDHYD	.50	1	2	.08	.0	3.57	24.00	1.68	---	13.11	264.65	528.2
XSECTION	36	REACH	.50	1	2	.08	.0	3.57	24.00	1.67	---	13.45	234.58	468.2
XSECTION	36	RUNOFF	.13	1	2	.08	.0	3.57	24.00	1.90	---	12.54	130.39	1043.1
XSECTION	36	ADDHYD	.63	1	2	.08	.0	3.57	24.00	1.72	---	13.40	248.11	396.3
XSECTION	36	ADDHYD	.88	1	2	.08	.0	3.57	24.00	1.78	---	12.65	451.65	515.6
XSECTION	36	DIVERT	.00	1	2	.08	.0	3.57	24.00	1.78	---	12.65	451.65	**********
XSECTION	90	DIVERT	.88	1	2	.08	.0	3.57	24.00	.00	---	.00	.00	.0

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A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 2													
+													
XSECTION 37	REACH	.00	1	2	.08	.0	3.57	24.00	.00	1454.37	12.65	451.65	**********
XSECTION 143	ADDHYD	2.53	1	2	.08	.0	3.57	24.00	2.62	---	12.68	1557.16	615.4
STRUCTURE 43	RESVOR	2.53	1	2	.08	.0	3.57	24.00	2.62	1424.42	15.08	444.11	175.5
XSECTION 85	REACH	2.53	1	2	.08	.0	3.57	24.00	2.62	---	15.08	444.11	175.5
XSECTION 85	RUNOFF	.06	1	2	.08	.0	3.57	24.00	1.47	---	12.58	51.67	820.2
XSECTION 85	ADDHYD	2.59	1	2	.08	.0	3.57	24.00	2.59	---	15.03	446.83	172.3
XSECTION 84	REACH	2.59	1	2	.08	.0	3.57	24.00	2.59	4.11	15.03	446.83	172.3
XSECTION 84	RUNOFF	.06	1	2	.08	.0	3.57	24.00	1.47	---	12.58	51.67	820.2
XSECTION 84	ADDHYD	2.66	1	2	.08	.0	3.57	24.00	2.56	4.13	15.01	449.58	169.2
XSECTION 91	RUNOFF	.13	1	2	.08	.0	3.57	24.00	2.15	---	12.53	143.49	1147.9
XSECTION 90	REACH	.13	1	2	.08	.0	3.57	24.00	2.14	---	12.65	139.22	1113.8
XSECTION 90	REACH	.88	1	2	.08	.0	3.57	24.00	.00	---	.00	.00	.0
XSECTION 90	ADDHYD	1.00	1	2	.08	.0	3.57	24.00	.27	---	12.65	139.22	139.1
XSECTION 90	RUNOFF	.11	1	2	.08	.0	3.57	24.00	2.06	---	12.59	111.80	1025.7
XSECTION 90	ADDHYD	1.11	1	2	.08	.0	3.57	24.00	.44	---	12.62	250.46	225.6
XSECTION 88	REACH	1.11	1	2	.08	.0	3.57	24.00	.44	---	12.74	245.63	221.3
XSECTION 88	RUNOFF	.09	1	2	.08	.0	3.57	24.00	2.22	---	12.64	97.37	1035.8
XSECTION 88	ADDHYD	1.20	1	2	.08	.0	3.57	24.00	.58	---	12.71	341.03	283.2
XSECTION 89	RUNOFF	.05	1	2	.08	.0	3.57	24.00	1.98	---	12.51	52.42	1115.3
XSECTION 88	REACH	.05	1	2	.08	.0	3.57	24.00	1.98	---	12.68	46.80	995.6
XSECTION 88	ADDHYD	1.25	1	2	.08	.0	3.57	24.00	.63	---	12.71	387.63	309.9
XSECTION 101	REACH	1.25	1	2	.08	.0	3.57	24.00	.63	---	12.80	384.92	307.7
XSECTION 101	RUNOFF	.05	1	2	.08	.0	3.57	24.00	2.41	---	12.53	57.73	1228.4
XSECTION 101	ADDHYD	1.30	1	2	.08	.0	3.57	24.00	.70	---	12.76	426.06	328.2
XSECTION 102	REACH	1.30	1	2	.08	.0	3.57	24.00	.69	---	12.97	393.09	302.8
XSECTION 102	RUNOFF	.06	1	2	.08	.0	3.57	24.00	1.47	---	12.62	47.91	760.5
XSECTION 102	ADDHYD	1.36	1	2	.08	.0	3.57	24.00	.73	---	12.93	422.89	310.7
XSECTION 104	REACH	1.36	1	2	.08	.0	3.57	24.00	.73	1.61	13.29	370.96	272.6
XSECTION 86	RUNOFF	.06	1	2	.08	.0	3.57	24.00	2.07	---	12.47	75.40	1196.9
XSECTION 87	REACH	.06	1	2	.08	.0	3.57	24.00	2.05	1429.94	12.79	65.50	1039.7
XSECTION 87	RUNOFF	.06	1	2	.08	.0	3.57	24.00	2.06	---	12.55	68.78	1091.7
XSECTION 87	ADDHYD	.13	1	2	.08	.0	3.57	24.00	2.06	1430.01	12.62	126.21	1001.6
XSECTION 105	REACH	.13	1	2	.08	.0	3.57	24.00	2.05	1417.57	12.96	106.86	848.1
XSECTION 105	RUNOFF	.06	1	2	.08	.0	3.57	24.00	1.21	---	12.64	40.10	636.5
XSECTION 105	ADDHYD	.19	1	2	.08	.0	3.57	24.00	1.77	1417.62	12.84	135.52	717.0
XSECTION 104	REACH	.19	1	2	.08	.0	3.57	24.00	1.76	.84	13.03	130.19	688.8

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 2													
+													
XSECTION 104	RUNOFF	.07	1	2	.08	.0	3.57	24.00	1.21	---	12.67	42.97	622.8
XSECTION 104	ADDHYD	.26	1	2	.08	.0	3.57	24.00	1.62	.97	12.90	159.41	617.9
XSECTION 104	ADDHYD	1.62	1	2	.08	.0	3.57	24.00	.87	1.94	13.20	503.99	311.3
XSECTION 84	DIVERT	.93	1	2	.08	.0	3.57	24.00	2.60	1.95	15.01	159.87	171.9
XSECTION 83	DIVERT	1.73	1	2	.08	.0	3.57	24.00	2.54	1.95	15.01	289.71	167.8
XSECTION 105	REACH	.93	1	2	.08	.0	3.57	24.00	2.60	1417.66	15.09	159.86	171.9
XSECTION 104	REACH	.93	1	2	.08	.0	3.57	24.00	2.60	.97	15.19	159.85	171.9
XSECTION 104	ADDHYD	2.55	1	2	.08	.0	3.57	24.00	1.50	2.25	13.20	649.95	255.0
XSECTION 83	REACH	1.73	1	2	.08	.0	3.57	24.00	2.54	1.95	15.01	289.71	167.8
XSECTION 83	RUNOFF	.06	1	2	.08	.0	3.57	24.00	1.90	---	12.56	64.43	1022.8
XSECTION 83	ADDHYD	1.79	1	2	.08	.0	3.57	24.00	2.52	2.16	12.59	337.09	188.3
XSECTION 106	REACH	1.79	1	2	.08	.0	3.57	24.00	2.52	---	12.59	337.09	188.3
XSECTION 106	RUNOFF	.06	1	2	.08	.0	3.57	24.00	1.61	---	12.59	54.38	863.2
XSECTION 106	ADDHYD	1.85	1	2	.08	.0	3.57	24.00	2.49	---	12.59	391.47	211.3
XSECTION 107	REACH	1.85	1	2	.08	.0	3.57	24.00	2.49	1.81	12.59	391.47	211.3
XSECTION 107	RUNOFF	.06	1	2	.08	.0	3.57	24.00	1.75	---	12.53	59.22	1003.8
XSECTION 107	ADDHYD	1.91	1	2	.08	.0	3.57	24.00	2.46	1.96	12.57	449.66	235.2
XSECTION 29	RUNOFF	.13	1	2	.08	.0	3.57	24.00	1.75	---	12.66	105.95	847.6
XSECTION 145	REACH	.13	1	2	.08	.0	3.57	24.00	1.75	---	12.66	105.95	847.6
XSECTION 12	RUNOFF	.38	1	2	.08	.0	3.57	24.00	1.68	---	12.62	324.42	858.3
XSECTION 145	REACH	.38	1	2	.08	.0	3.57	24.00	1.68	---	12.62	324.42	858.3
XSECTION 30	RUNOFF	.15	1	2	.08	.0	3.57	24.00	1.60	---	12.81	103.27	679.4
XSECTION 33	REACH	.15	1	2	.08	.0	3.57	24.00	1.59	---	13.09	89.06	585.9
XSECTION 33	RUNOFF	.15	1	2	.08	.0	3.57	24.00	.59	---	12.80	41.95	272.4
XSECTION 33	ADDHYD	.31	1	2	.08	.0	3.57	24.00	1.09	---	12.96	123.94	405.0
XSECTION 145	ADDHYD	.68	1	2	.08	.0	3.57	24.00	1.41	---	12.68	419.76	613.7
XSECTION 145	RUNOFF	.16	1	2	.08	.0	3.57	24.00	1.75	---	12.68	132.86	830.4
XSECTION 145	ADDHYD	.84	1	2	.08	.0	3.57	24.00	1.48	---	12.68	552.62	654.8
XSECTION 145	DIVERT	.00	1	2	.08	.0	3.57	24.00	1.48	---	12.00*	27.00**********	
XSECTION 7	DIVERT	.13	1	2	.08	.0	3.57	24.00	.75	---	12.66	78.95	631.6
XSECTION 145	ADDHYD	.97	1	2	.08	.0	3.57	24.00	1.38	---	12.67	631.52	651.7
STRUCTURE 33	RESVOR	.97	1	2	.08	.0	3.57	24.00	1.37	1468.30	13.91	88.79	91.6
XSECTION 145	ADDHYD	.97	1	2	.08	.0	3.57	24.00	1.50	---	13.33	115.18	118.9
XSECTION 93	REACH	.97	1	2	.08	.0	3.57	24.00	1.49	---	13.42	114.88	118.6
XSECTION 93	RUNOFF	.19	1	2	.08	.0	3.57	24.00	1.98	---	12.53	213.06	1092.6
XSECTION 93	ADDHYD	1.16	1	2	.08	.0	3.57	24.00	1.57	---	12.55	311.28	267.4
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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 2													
+													
XSECTION 93	DIVERT	.00	1	2	.08	.0	3.57	24.00	1.57	---	12.32*	265.00**********	
XSECTION 92	DIVERT	1.16	1	2	.08	.0	3.57	24.00	.02	---	12.55	46.28	39.8
XSECTION 92	REACH	1.16	1	2	.08	.0	3.57	24.00	.02	---	12.80	23.25	20.0
XSECTION 92	RUNOFF	.13	1	2	.08	.0	3.57	24.00	2.15	---	12.53	143.49	1147.9
XSECTION 92	ADDHYD	1.29	1	2	.08	.0	3.57	24.00	.22	---	12.59	148.13	114.9
XSECTION 98	REACH	1.29	1	2	.08	.0	3.57	24.00	.22	---	12.77	131.84	102.3
XSECTION 95	REACH	.00	1	2	.08	.0	3.57	24.00	.22	---	12.32*	265.00**********	
XSECTION 31	RUNOFF	.08	1	2	.08	.0	3.57	24.00	1.90	---	12.58	82.67	984.1
XSECTION 32	REACH	.08	1	2	.08	.0	3.57	24.00	1.86	---	13.45	45.66	543.6
XSECTION 32	RUNOFF	.18	1	2	.08	.0	3.57	24.00	1.67	---	12.78	131.23	729.1
XSECTION 32	ADDHYD	.26	1	2	.08	.0	3.57	24.00	1.73	---	12.85	150.43	569.8
XSECTION 94	REACH	.26	1	2	.08	.0	3.57	24.00	1.72	---	13.18	131.04	496.4
XSECTION 94	RUNOFF	.14	1	2	.08	.0	3.57	24.00	1.99	---	12.49	157.60	1133.8
XSECTION 94	ADDHYD	.40	1	2	.08	.0	3.57	24.00	1.81	---	12.56	219.89	545.6

XSECTION	95	REACH	.40	1	2	.08	.0	3.57	24.00	1.80	---	12.81	196.46	487.5
XSECTION	95	RUNOFF	.13	1	2	.08	.0	3.57	24.00	2.05	---	12.78	107.66	861.3
XSECTION	95	ADDHYD	.53	1	2	.08	.0	3.57	24.00	1.86	---	12.80	304.00	575.8
XSECTION	95	ADDHYD	.53	1	2	.08	.0	3.57	24.00	5.30	---	12.71	562.48	1065.3
XSECTION	95	DIVERT	.00	1	2	.08	.0	3.57	24.00	5.30	---	12.08*	265.00	**********
XSECTION	98	DIVERT	.53	1	2	.08	.0	3.57	24.00	.73	---	12.71	297.48	563.4
XSECTION	98	REACH	.53	1	2	.08	.0	3.57	24.00	.73	---	12.98	245.61	465.2
XSECTION	98	ADDHYD	1.82	1	2	.08	.0	3.57	24.00	.37	---	12.92	363.28	199.9
XSECTION	96	REACH	.00	1	2	.08	.0	3.57	24.00	.37	---	12.08*	265.00	**********
XSECTION	96	RUNOFF	.13	1	2	.08	.0	3.57	24.00	1.83	---	12.56	123.52	988.2
XSECTION	96	ADDHYD	.13	1	2	.08	.0	3.57	24.00	21.12	---	12.56	388.52	3108.2
XSECTION	96	DIVERT	.00	1	2	.08	.0	3.57	24.00	21.12	---	12.00*	265.00	**********
XSECTION	97	DIVERT	.13	1	2	.08	.0	3.57	24.00	1.34	---	12.56	123.52	988.2
XSECTION	97	REACH	.13	1	2	.08	.0	3.57	24.00	1.33	---	12.83	107.60	860.8
XSECTION	97	RUNOFF	.19	1	2	.08	.0	3.57	24.00	2.23	---	12.54	216.11	1149.5
XSECTION	97	ADDHYD	.31	1	2	.08	.0	3.57	24.00	1.87	---	12.61	302.31	965.9
XSECTION	98	REACH	.31	1	2	.08	.0	3.57	24.00	1.87	---	12.72	297.45	950.3
XSECTION	98	ADDHYD	2.13	1	2	.08	.0	3.57	24.00	.59	---	12.84	634.13	297.7
XSECTION	98	RUNOFF	.09	1	2	.08	.0	3.57	24.00	2.15	---	12.49	111.92	1190.6
XSECTION	98	ADDHYD	2.22	1	2	.08	.0	3.57	24.00	.66	---	12.76	682.91	307.1
XSECTION	99	REACH	2.22	1	2	.08	.0	3.57	24.00	.66	---	12.88	677.18	304.5
XSECTION	99	RUNOFF	.09	1	2	.08	.0	3.57	24.00	2.14	---	12.53	107.22	1140.6

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 2													
+													
XSECTION 99	ADDHYD	2.32	1	2	.08	.0	3.57	24.00	.72	---	12.80	738.98	318.8
XSECTION 139	REACH	2.32	1	2	.08	.0	3.57	24.00	.72	---	12.97	719.33	310.3
XSECTION 100	RUNOFF	.08	1	2	.08	.0	3.57	24.00	2.15	---	12.50	92.22	1182.3
XSECTION 139	REACH	.08	1	2	.08	.0	3.57	24.00	2.15	---	12.50	92.22	1182.3
XSECTION 139	ADDHYD	2.40	1	2	.08	.0	3.57	24.00	.76	---	12.93	741.69	309.6
XSECTION 142	REACH	.00	1	2	.08	.0	3.57	24.00	.76	---	12.40*	265.00	**********
XSECTION 142	RUNOFF	.25	1	2	.08	.0	3.57	24.00	1.81	---	13.05	155.34	621.4
XSECTION 142	ADDHYD	.25	1	2	.08	.0	3.57	24.00	11.68	---	13.05	420.34	1681.4
XSECTION 142	DIVERT	.00	1	2	.08	.0	3.57	24.00	11.68	---	12.08*	265.00	**********
XSECTION 141	DIVERT	.25	1	2	.08	.0	3.57	24.00	1.29	---	13.05	155.34	621.4
XSECTION 141	REACH	.25	1	2	.08	.0	3.57	24.00	1.29	---	13.14	155.02	620.1
XSECTION 141	RUNOFF	.19	1	2	.08	.0	3.57	24.00	2.06	---	12.55	203.20	1080.8
XSECTION 141	ADDHYD	.44	1	2	.08	.0	3.57	24.00	1.62	---	12.65	292.88	668.7
XSECTION 140	REACH	.44	1	2	.08	.0	3.57	24.00	1.62	---	12.65	292.88	668.7
XSECTION 140	RUNOFF	.13	1	2	.08	.0	3.57	24.00	2.15	---	12.52	145.51	1164.0
XSECTION 140	ADDHYD	.56	1	2	.08	.0	3.57	24.00	1.74	---	12.59	430.00	763.8
XSECTION 137	RUNOFF	.08	1	2	.08	.0	3.57	24.00	1.40	---	12.57	62.53	801.6
XSECTION 140	ADDHYD	.64	1	2	.08	.0	3.57	24.00	1.70	---	12.59	492.37	768.1
XSECTION 139	REACH	.64	1	2	.08	.0	3.57	24.00	1.70	---	12.68	488.63	762.3
XSECTION 139	ADDHYD	3.04	1	2	.08	.0	3.57	24.00	.96	---	12.77	1180.88	388.8
XSECTION 136	RUNOFF	.07	1	2	.08	.0	3.57	24.00	2.33	---	12.44	88.56	1341.9
XSECTION 138	REACH	.07	1	2	.08	.0	3.57	24.00	2.31	---	12.72	79.64	1206.6
XSECTION 138	RUNOFF	.20	1	2	.08	.0	3.57	24.00	1.91	---	12.46	233.36	1149.5
XSECTION 138	ADDHYD	.27	1	2	.08	.0	3.57	24.00	2.01	---	12.48	302.48	1124.5
XSECTION 139	REACH	.27	1	2	.08	.0	3.57	24.00	2.00	---	12.56	302.09	1123.0
XSECTION 139	ADDHYD	3.31	1	2	.08	.0	3.57	24.00	1.04	---	12.67	1414.77	427.9
XSECTION 139	RUNOFF	.19	1	2	.08	.0	3.57	24.00	2.23	---	12.52	224.54	1194.4
XSECTION 139	ADDHYD	3.49	1	2	.08	.0	3.57	24.00	1.11	---	12.64	1613.75	461.9
XSECTION 129	RUNOFF	.11	1	2	.08	.0	3.57	24.00	1.76	---	12.45	121.49	1124.9
XSECTION 130	RUNOFF	.03	1	2	.08	.0	3.57	24.00	2.60	---	12.44	44.13	1423.4
XSECTION 129	ADDHYD	.14	1	2	.08	.0	3.57	24.00	1.95	---	12.45	165.58	1191.3
XSECTION 127	REACH	.14	1	2	.08	.0	3.57	24.00	1.93	---	12.73	144.39	1038.8
XSECTION 128	RUNOFF	.04	1	2	.08	.0	3.57	24.00	1.69	---	12.45	39.33	1092.4
XSECTION 127	REACH	.04	1	2	.08	.0	3.57	24.00	1.67	---	12.85	29.29	813.5
XSECTION 127	ADDHYD	.17	1	2	.08	.0	3.57	24.00	1.88	---	12.75	171.41	979.5
XSECTION 127	RUNOFF	.16	1	2	.08	.0	3.57	24.00	1.76	---	12.46	174.54	1097.7

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
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A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

ALTERNATE 1 STORM 2

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
XSECTION 127	ADDHYD	.33	1	2	.08	.0	3.57	24.00	1.82	---	12.50	313.23	937.8
XSECTION 132	RUNOFF	.14	1	2	.08	.0	3.57	24.00	1.91	---	12.47	164.11	1131.8
XSECTION 133	RUNOFF	.08	1	2	.08	.0	3.57	24.00	2.33	---	12.44	107.35	1341.9
XSECTION 133	ADDHYD	.22	1	2	.08	.0	3.57	24.00	2.06	---	12.45	271.04	1204.6
XSECTION 131	REACH	.22	1	2	.08	.0	3.57	24.00	2.05	---	12.55	262.53	1166.8
XSECTION 131	ADDHYD	.56	1	2	.08	.0	3.57	24.00	1.91	---	12.52	575.12	1028.8
XSECTION 131	RUNOFF	.12	1	2	.08	.0	3.57	24.00	2.15	---	12.46	146.24	1228.9
XSECTION 131	ADDHYD	.68	1	2	.08	.0	3.57	24.00	1.96	---	12.50	714.61	1054.0
XSECTION 126	REACH	.68	1	2	.08	.0	3.57	24.00	1.95	---	12.60	711.29	1049.1
XSECTION 126	RUNOFF	.16	1	2	.08	.0	3.57	24.00	2.60	---	12.45	217.54	1376.9
XSECTION 126	ADDHYD	.84	1	2	.08	.0	3.57	24.00	2.07	---	12.54	903.88	1081.2
XSECTION 134	REACH	.84	1	2	.08	.0	3.57	24.00	2.07	---	12.63	897.33	1073.4
XSECTION 135	RUNOFF	.04	1	2	.08	.0	3.57	24.00	2.33	---	12.44	56.36	1341.9
XSECTION 134	REACH	.04	1	2	.08	.0	3.57	24.00	2.30	---	12.90	46.30	1102.3
XSECTION 134	ADDHYD	.88	1	2	.08	.0	3.57	24.00	2.08	---	12.64	935.78	1065.8
XSECTION 134	RUNOFF	.20	1	2	.08	.0	3.57	24.00	2.07	---	12.48	232.96	1182.6
XSECTION 134	ADDHYD	1.08	1	2	.08	.0	3.57	24.00	2.08	---	12.58	1134.16	1055.0
XSECTION 125	RUNOFF	.12	1	2	.08	.0	3.57	24.00	2.90	---	12.44	174.57	1492.0
XSECTION 125	ADDHYD	1.19	1	2	.08	.0	3.57	24.00	2.16	---	12.52	1276.33	1070.7
XSECTION 124	REACH	1.19	1	2	.08	.0	3.57	24.00	2.16	3.28	12.64	1238.63	1039.1
XSECTION 124	RUNOFF	.22	1	2	.08	.0	3.57	24.00	1.99	---	12.46	257.03	1173.7
XSECTION 124	ADDHYD	1.41	1	2	.08	.0	3.57	24.00	2.13	3.59	12.57	1442.11	1022.1
XSECTION 124	REACH	3.49	1	2	.08	.0	3.57	24.00	1.11	3.84	12.64	1613.75	461.9
XSECTION 124	ADDHYD	4.91	1	2	.08	.0	3.57	24.00	1.40	5.59	12.61	3031.59	618.1
XSECTION 103	RUNOFF	.08	1	2	.08	.0	3.57	24.00	1.99	---	12.47	94.97	1172.5
XSECTION 124	ADDHYD	4.99	1	2	.08	.0	3.57	24.00	1.41	5.67	12.60	3106.65	623.1
XSECTION 104	REACH	4.99	1	2	.08	.0	3.57	24.00	1.41	5.76	12.60	3106.65	623.1
XSECTION 104	ADDHYD	7.53	1	2	.08	.0	3.57	24.00	1.44	6.21	12.62	3528.88	468.3
XSECTION 107	REACH	7.53	1	2	.08	.0	3.57	24.00	1.44	6.68	12.62	3528.88	468.3
XSECTION 107	ADDHYD	9.45	1	2	.08	.0	3.57	24.00	1.65	7.18	12.62	3974.42	420.7
XSECTION 123	RUNOFF	.21	1	2	.08	.0	3.57	24.00	2.89	---	12.44	311.05	1460.3
XSECTION 107	ADDHYD	9.66	1	2	.08	.0	3.57	24.00	1.68	7.43	12.58	4219.41	436.8
XSECTION 108	REACH	9.66	1	2	.08	.0	3.57	24.00	1.68	6.27	12.58	4219.41	436.8
XSECTION 108	RUNOFF	.03	1	2	.08	.0	3.57	24.00	1.91	---	12.47	28.19	1127.6
XSECTION 108	ADDHYD	9.68	1	2	.08	.0	3.57	24.00	1.68	6.29	12.58	4244.76	438.3
XSECTION 148	RUNOFF	.03	1	2	.08	.0	3.57	24.00	1.84	---	12.45	38.12	1155.1

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

ALTERNATE 1 STORM 2

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
XSECTION 47	REACH	.03	1	2	.08	.0	3.57	24.00	1.82	---	12.83	31.57	956.8
XSECTION 47	RUNOFF	.07	1	2	.08	.0	3.57	24.00	1.84	---	12.45	84.03	1151.1
XSECTION 47	ADDHYD	.11	1	2	.08	.0	3.57	24.00	1.83	---	12.47	105.86	998.7
XSECTION 46	REACH	.11	1	2	.08	.0	3.57	24.00	1.82	---	12.69	91.34	861.7
XSECTION 46	RUNOFF	.05	1	2	.08	.0	3.57	24.00	1.84	---	12.45	61.22	1155.1
XSECTION 46	ADDHYD	.16	1	2	.08	.0	3.57	24.00	1.82	---	12.49	135.93	854.9
XSECTION 149	REACH	.16	1	2	.08	.0	3.57	24.00	1.81	---	12.74	118.28	743.9
XSECTION 149	RUNOFF	.01	1	2	.08	.0	3.57	24.00	2.51	---	12.44	12.56	1395.6
XSECTION 149	ADDHYD	.17	1	2	.08	.0	3.57	24.00	1.85	---	12.73	120.23	715.7
XSECTION 147	RUNOFF	.05	1	2	.08	.0	3.57	24.00	1.84	---	12.45	60.06	1155.1

XSECTION 146	REACH	.05	1	2	.08	.0	3.57	24.00	1.82	---	12.82	50.52	971.6
XSECTION 146	RUNOFF	.07	1	2	.08	.0	3.57	24.00	1.84	---	12.45	82.88	1151.1
XSECTION 146	ADDHYD	.12	1	2	.08	.0	3.57	24.00	1.83	---	12.47	118.44	955.1
XSECTION 45	REACH	.12	1	2	.08	.0	3.57	24.00	1.82	---	12.57	115.49	931.4
XSECTION 43	RUNOFF	.05	1	2	.08	.0	3.57	24.00	2.51	---	12.44	65.59	1395.6
XSECTION 21	REACH	.05	1	2	.08	.0	3.57	24.00	2.49	---	12.81	57.45	1222.3
XSECTION 21	ADDHYD	.17	1	2	.08	.0	3.57	24.00	2.01	---	12.59	166.23	972.1
XSECTION 21	RUNOFF	.19	1	2	.08	.0	3.57	24.00	2.23	---	12.56	212.04	1121.9
XSECTION 21	ADDHYD	.36	1	2	.08	.0	3.57	24.00	2.12	---	12.58	377.96	1049.9
XSECTION 45	REACH	.36	1	2	.08	.0	3.57	24.00	2.12	---	12.58	377.96	1049.9
XSECTION 45	RUNOFF	.12	1	2	.08	.0	3.57	24.00	2.50	---	12.53	146.17	1260.1
XSECTION 45	ADDHYD	.48	1	2	.08	.0	3.57	24.00	2.21	---	12.56	523.05	1098.8
XSECTION 45	ADDHYD	.64	1	2	.08	.0	3.57	24.00	2.12	---	12.58	635.43	986.7
XSECTION 150	RUNOFF	.02	1	2	.08	.0	3.57	24.00	1.84	---	12.45	18.48	1155.1
XSECTION 57	REACH	.02	1	2	.08	.0	3.57	24.00	1.81	---	13.02	13.07	816.6
XSECTION 57	RUNOFF	.05	1	2	.08	.0	3.57	24.00	1.83	---	12.47	55.42	1108.4
XSECTION 57	ADDHYD	.07	1	2	.08	.0	3.57	24.00	1.83	---	12.48	61.31	928.9
XSECTION 59	REACH	.07	1	2	.08	.0	3.57	24.00	1.81	---	12.81	50.85	770.4
XSECTION 59	RUNOFF	.05	1	2	.08	.0	3.57	24.00	1.83	---	12.47	58.75	1108.4
XSECTION 59	ADDHYD	.12	1	2	.08	.0	3.57	24.00	1.82	---	12.52	96.25	808.8
XSECTION 59	ADDHYD	.76	1	2	.08	.0	3.57	24.00	2.07	---	12.56	729.39	955.9
XSECTION 49	RUNOFF	.09	1	2	.08	.0	3.57	24.00	3.00	---	12.44	129.01	1500.1
XSECTION 50	REACH	.09	1	2	.08	.0	3.57	24.00	2.98	---	12.81	115.77	1346.2
XSECTION 50	RUNOFF	.09	1	2	.08	.0	3.57	24.00	2.99	---	12.49	130.50	1418.4
XSECTION 50	ADDHYD	.18	1	2	.08	.0	3.57	24.00	2.98	---	12.56	233.60	1312.4
XSECTION 20	RUNOFF	.06	1	2	.08	.0	3.57	24.00	3.00	---	12.44	96.60	1509.4

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 2													
+													
XSECTION 48	REACH	.06	1	2	.08	.0	3.57	24.00	2.97	---	12.99	77.79	1215.4
XSECTION 48	RUNOFF	.09	1	2	.08	.0	3.57	24.00	1.82	---	12.60	87.74	953.7
XSECTION 48	ADDHYD	.16	1	2	.08	.0	3.57	24.00	2.29	---	12.66	149.93	961.1
XSECTION 50	REACH	.16	1	2	.08	.0	3.57	24.00	2.28	---	12.96	129.04	827.2
XSECTION 50	ADDHYD	.33	1	2	.08	.0	3.57	24.00	2.66	---	12.66	333.88	999.6
XSECTION 52	REACH	.33	1	2	.08	.0	3.57	24.00	2.65	---	12.76	331.82	993.5
XSECTION 52	RUNOFF	.05	1	2	.08	.0	3.57	24.00	1.83	---	12.45	62.80	1141.8
XSECTION 52	ADDHYD	.39	1	2	.08	.0	3.57	24.00	2.54	---	12.58	354.42	911.1
XSECTION 56	REACH	.39	1	2	.08	.0	3.57	24.00	2.53	---	12.86	338.08	869.1
XSECTION 56	RUNOFF	.07	1	2	.08	.0	3.57	24.00	1.83	---	12.47	74.26	1108.4
XSECTION 56	ADDHYD	.46	1	2	.08	.0	3.57	24.00	2.43	---	12.61	369.51	810.3
XSECTION 51	REACH	.46	1	2	.08	.0	3.57	24.00	2.42	---	12.89	351.07	769.9
XSECTION 51	RUNOFF	.03	1	2	.08	.0	3.57	24.00	1.84	---	12.45	35.81	1155.1
XSECTION 51	ADDHYD	.49	1	2	.08	.0	3.57	24.00	2.39	---	12.88	354.69	728.3
XSECTION 55	REACH	.49	1	2	.08	.0	3.57	24.00	2.38	---	13.11	349.14	716.9
XSECTION 55	RUNOFF	.02	1	2	.08	.0	3.57	24.00	1.84	---	12.45	19.64	1155.1
XSECTION 55	ADDHYD	.50	1	2	.08	.0	3.57	24.00	2.36	---	13.10	350.67	695.8
XSECTION 55	ADDHYD	1.27	1	2	.08	.0	3.57	24.00	2.19	---	12.60	999.11	788.6
STRUCTURE 59	RESVOR	1.27	1	2	.08	.0	3.57	24.00	2.19	1406.35	13.70	369.87	291.9
XSECTION 66	REACH	1.27	1	2	.08	.0	3.57	24.00	2.19	---	13.70	369.87	291.9
XSECTION 66	RUNOFF	.06	1	2	.08	.0	3.57	24.00	1.98	---	12.53	68.27	1083.7
XSECTION 66	ADDHYD	1.33	1	2	.08	.0	3.57	24.00	2.18	---	13.62	374.91	281.9
XSECTION 67	REACH	1.33	1	2	.08	.0	3.57	24.00	2.18	---	13.62	374.91	281.9
XSECTION 67	RUNOFF	.06	1	2	.08	.0	3.57	24.00	2.32	---	12.45	81.87	1299.5
XSECTION 67	ADDHYD	1.39	1	2	.08	.0	3.57	24.00	2.19	---	12.56	432.81	310.7
XSECTION 44	RUNOFF	.13	1	2	.08	.0	3.57	24.00	2.24	---	12.47	156.47	1251.8
XSECTION 67	REACH	.13	1	2	.08	.0	3.57	24.00	2.23	---	12.58	153.12	1225.0
XSECTION 67	ADDHYD	1.52	1	2	.08	.0	3.57	24.00	2.19	---	12.56	585.69	385.8
XSECTION 69	REACH	1.52	1	2	.08	.0	3.57	24.00	2.19	---	12.56	585.69	385.8
XSECTION 69	RUNOFF	.06	1	2	.08	.0	3.57	24.00	1.75	---	12.61	57.16	907.3
XSECTION 69	ADDHYD	1.58	1	2	.08	.0	3.57	24.00	2.17	---	12.57	642.23	406.2
XSECTION 23	RUNOFF	.09	1	2	.08	.0	3.57	24.00	3.00	---	12.44	135.51	1489.1
XSECTION 40	REACH	.09	1	2	.08	.0	3.57	24.00	2.98	---	12.82	124.25	1365.4
XSECTION 38	RUNOFF	.13	1	2	.08	.0	3.57	24.00	2.06	---	12.53	141.28	1130.3
XSECTION 40	REACH	.13	1	2	.08	.0	3.57	24.00	2.06	---	12.68	130.15	1041.2

XSECTION	40	ADDHYD	.22	1	2	.08	.0	3.57	24.00	2.45	---	12.72	250.22	1158.4

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
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A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 2													
+													
XSECTION 40	RUNOFF	.09	1	2	.08	.0	3.57	24.00	1.83	---	12.56	92.89	988.2
XSECTION 40	ADDHYD	.31	1	2	.08	.0	3.57	24.00	2.26	---	12.64	336.12	1084.3
XSECTION 82	REACH	.31	1	2	.08	.0	3.57	24.00	2.25	---	12.77	329.94	1064.3
XSECTION 82	RUNOFF	.06	1	2	.08	.0	3.57	24.00	1.99	---	12.47	73.36	1164.5
XSECTION 82	ADDHYD	.37	1	2	.08	.0	3.57	24.00	2.21	---	12.62	366.29	982.0
XSECTION 39	RUNOFF	.06	1	2	.08	.0	3.57	24.00	2.06	---	12.55	67.55	1080.8
XSECTION 82	REACH	.06	1	2	.08	.0	3.57	24.00	2.05	---	12.82	60.55	968.7
XSECTION 82	ADDHYD	.44	1	2	.08	.0	3.57	24.00	2.19	---	12.65	420.57	965.7
XSECTION 81	REACH	.44	1	2	.08	.0	3.57	24.00	2.18	---	12.78	416.01	955.2
XSECTION 81	RUNOFF	.06	1	2	.08	.0	3.57	24.00	1.98	---	12.55	66.60	1057.2
XSECTION 81	ADDHYD	.50	1	2	.08	.0	3.57	24.00	2.16	---	12.72	471.00	944.8
XSECTION 22	RUNOFF	.15	1	2	.08	.0	3.57	24.00	2.23	---	12.52	180.83	1181.9
XSECTION 41	REACH	.15	1	2	.08	.0	3.57	24.00	2.22	---	12.75	171.52	1121.1
XSECTION 41	RUNOFF	.17	1	2	.08	.0	3.57	24.00	1.98	---	12.51	191.99	1116.2
XSECTION 41	ADDHYD	.32	1	2	.08	.0	3.57	24.00	2.10	---	12.55	346.09	1064.9
XSECTION 42	RUNOFF	.08	1	2	.08	.0	3.57	24.00	2.24	---	12.45	100.02	1282.3
XSECTION 42	ADDHYD	.40	1	2	.08	.0	3.57	24.00	2.12	---	12.52	437.49	1085.6
XSECTION 78	REACH	.40	1	2	.08	.0	3.57	24.00	2.12	---	12.63	426.42	1058.1
XSECTION 81	DIVERT	.00	1	2	.08	.0	3.57	24.00	2.12	---	12.16*	154.00**********	
XSECTION 78	DIVERT	.50	1	2	.08	.0	3.57	24.00	.81	---	12.72	317.00	635.9
XSECTION 78	REACH	.50	1	2	.08	.0	3.57	24.00	.81	---	12.86	307.18	616.2
XSECTION 78	ADDHYD	.90	1	2	.08	.0	3.57	24.00	1.40	---	12.71	690.47	765.9
XSECTION 78	RUNOFF	.06	1	2	.08	.0	3.57	24.00	2.15	---	12.46	77.42	1228.9
XSECTION 78	ADDHYD	.96	1	2	.08	.0	3.57	24.00	1.45	---	12.66	732.59	759.6
XSECTION 77	REACH	.96	1	2	.08	.0	3.57	24.00	1.44	---	12.77	724.18	750.8
XSECTION 77	RUNOFF	.06	1	2	.08	.0	3.57	24.00	2.15	---	12.50	74.51	1182.7
XSECTION 77	ADDHYD	1.03	1	2	.08	.0	3.57	24.00	1.49	---	12.73	769.21	748.6
XSECTION 69	ADDHYD	2.61	1	2	.08	.0	3.57	24.00	1.90	---	12.66	1371.45	525.8
STRUCTURE 69	RESVOR	2.61	1	2	.08	.0	3.57	24.00	1.90	1387.91	15.25	352.86	135.3
XSECTION 75	REACH	2.61	1	2	.08	.0	3.57	24.00	1.90	---	15.25	352.86	135.3
XSECTION 80	REACH	.00	1	2	.08	.0	3.57	24.00	1.90	---	12.16*	154.00**********	
XSECTION 80	RUNOFF	.06	1	2	.08	.0	3.57	24.00	1.68	---	12.54	60.24	956.2
XSECTION 80	ADDHYD	.06	1	2	.08	.0	3.57	24.00	12.33	---	12.54	214.24	3400.6
XSECTION 80	DIVERT	.00	1	2	.08	.0	3.57	24.00	12.33	---	12.08*	166.00**********	
XSECTION 79	DIVERT	.06	1	2	.08	.0	3.57	24.00	.76	---	12.54	48.24	765.7
XSECTION 79	REACH	.06	1	2	.08	.0	3.57	24.00	.76	---	12.69	43.92	697.1

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
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A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 2													
+													
XSECTION 79	RUNOFF	.06	1	2	.08	.0	3.57	24.00	2.32	---	12.45	81.87	1299.5
XSECTION 79	ADDHYD	.13	1	2	.08	.0	3.57	24.00	1.54	---	12.50	116.84	927.3
XSECTION 76	REACH	.13	1	2	.08	.0	3.57	24.00	1.54	---	12.62	112.18	890.3
XSECTION 76	RUNOFF	.06	1	2	.08	.0	3.57	24.00	1.91	---	12.46	71.89	1141.2
XSECTION 76	ADDHYD	.19	1	2	.08	.0	3.57	24.00	1.66	---	12.53	176.75	935.2
XSECTION 75	REACH	.19	1	2	.08	.0	3.57	24.00	1.66	---	12.64	170.27	900.9
XSECTION 75	ADDHYD	2.80	1	2	.08	.0	3.57	24.00	1.89	---	12.71	445.31	159.2

XSECTION 75	RUNOFF	.06	1	2	.08	.0	3.57	24.00	2.99	---	12.50	88.70	1407.9
XSECTION 75	ADDHYD	2.86	1	2	.08	.0	3.57	24.00	1.91	---	12.66	524.56	183.4
XSECTION 112	REACH	2.86	1	2	.08	.0	3.57	24.00	1.91	---	12.66	524.56	183.4
XSECTION 109	REACH	.00	1	2	.08	.0	3.57	24.00	1.91	---	12.80*	166.00	**********
XSECTION 109	RUNOFF	.06	1	2	.08	.0	3.57	24.00	1.99	---	12.47	72.84	1156.2
XSECTION 109	ADDHYD	.06	1	2	.08	.0	3.57	24.00	13.52	---	12.47	238.78	3790.2
XSECTION 108	ADDHYD	9.75	1	2	.08	.0	3.57	24.00	1.75	6.49	12.58	4477.50	459.3
XSECTION 110	REACH	9.75	1	2	.08	.0	3.57	24.00	1.75	6.68	12.58	4477.50	459.3
XSECTION 110	RUNOFF	.07	1	2	.08	.0	3.57	24.00	1.34	---	12.60	53.66	735.0
XSECTION 110	ADDHYD	9.82	1	2	.08	.0	3.57	24.00	1.75	6.72	12.58	4530.88	461.4
XSECTION 122	RUNOFF	.35	1	2	.08	.0	3.57	24.00	1.76	---	12.48	375.29	1057.1
XSECTION 110	ADDHYD	10.18	1	2	.08	.0	3.57	24.00	1.75	7.03	12.56	4884.95	480.1
XSECTION 111	REACH	10.18	1	2	.08	.0	3.57	24.00	1.75	6.34	12.56	4884.95	480.1
XSECTION 111	RUNOFF	.07	1	2	.08	.0	3.57	24.00	1.16	---	12.61	44.93	641.9
XSECTION 111	ADDHYD	10.25	1	2	.08	.0	3.57	24.00	1.75	6.37	12.56	4929.22	481.1
XSECTION 112	REACH	10.25	1	2	.08	.0	3.57	24.00	1.74	---	12.65	4912.57	479.5
XSECTION 112	RUNOFF	.06	1	2	.08	.0	3.57	24.00	1.22	---	12.57	43.79	717.9
XSECTION 112	ADDHYD	10.31	1	2	.08	.0	3.57	24.00	1.74	---	12.65	4954.28	480.7
XSECTION 121	RUNOFF	.25	1	2	.08	.0	3.57	24.00	2.90	---	12.44	372.61	1490.4
XSECTION 112	ADDHYD	10.56	1	2	.08	.0	3.57	24.00	1.77	---	12.62	5095.44	482.7
XSECTION 112	ADDHYD	13.42	1	2	.08	.0	3.57	24.00	1.80	---	12.62	5617.34	418.7
XSECTION 113	REACH	13.42	1	2	.08	.0	3.57	24.00	1.80	---	12.70	5609.30	418.1
XSECTION 113	RUNOFF	.05	1	2	.08	.0	3.57	24.00	2.59	---	12.53	68.59	1294.1
XSECTION 113	ADDHYD	13.47	1	2	.08	.0	3.57	24.00	1.80	---	12.70	5668.31	420.8
XSECTION 120	RUNOFF	.23	1	2	.08	.0	3.57	24.00	2.24	---	12.47	289.16	1251.8
XSECTION 113	ADDHYD	13.70	1	2	.08	.0	3.57	24.00	1.81	---	12.68	5832.89	425.7
XSECTION 58	RUNOFF	.03	1	2	.08	.0	3.57	24.00	1.99	---	12.45	39.00	1218.8
XSECTION 60	REACH	.03	1	2	.08	.0	3.57	24.00	1.98	---	12.63	36.37	1136.5
XSECTION 60	RUNOFF	.06	1	2	.08	.0	3.57	24.00	1.75	---	12.55	61.05	969.0

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 2													
+													
XSECTION 60	ADDHYD	.09	1	2	.08	.0	3.57	24.00	1.83	---	12.58	96.16	1012.2
XSECTION 65	REACH	.09	1	2	.08	.0	3.57	24.00	1.82	---	12.70	93.68	986.1
XSECTION 65	RUNOFF	.06	1	2	.08	.0	3.57	24.00	1.83	---	12.55	63.20	1003.2
XSECTION 65	ADDHYD	.16	1	2	.08	.0	3.57	24.00	1.82	---	12.62	152.65	966.2
XSECTION 68	REACH	.16	1	2	.08	.0	3.57	24.00	1.82	---	12.74	148.66	940.9
XSECTION 68	RUNOFF	.06	1	2	.08	.0	3.57	24.00	2.07	---	12.46	75.97	1205.8
XSECTION 68	ADDHYD	.22	1	2	.08	.0	3.57	24.00	1.89	---	12.55	203.71	921.7
XSECTION 70	REACH	.22	1	2	.08	.0	3.57	24.00	1.89	---	12.67	194.34	879.4
XSECTION 70	RUNOFF	.06	1	2	.08	.0	3.57	24.00	2.15	---	12.46	77.97	1237.6
XSECTION 70	ADDHYD	.28	1	2	.08	.0	3.57	24.00	1.95	---	12.56	253.58	892.9
XSECTION 74	REACH	.28	1	2	.08	.0	3.57	24.00	1.94	---	12.69	243.32	856.8
XSECTION 74	RUNOFF	.06	1	2	.08	.0	3.57	24.00	2.50	---	12.45	86.02	1365.4
XSECTION 74	ADDHYD	.35	1	2	.08	.0	3.57	24.00	2.04	---	12.56	303.55	874.8
XSECTION 113	REACH	.35	1	2	.08	.0	3.57	24.00	2.04	---	12.56	303.55	874.8
XSECTION 113	ADDHYD	14.05	1	2	.08	.0	3.57	24.00	1.81	---	12.67	6117.58	435.5
XSECTION 114	REACH	14.05	1	2	.08	.0	3.57	24.00	1.81	---	12.80	5972.88	425.2
XSECTION 64	RUNOFF	.25	1	2	.08	.0	3.57	24.00	1.83	---	12.49	267.71	1070.8
XSECTION 72	REACH	.25	1	2	.08	.0	3.57	24.00	1.82	---	12.72	244.17	976.7
XSECTION 72	RUNOFF	.13	1	2	.08	.0	3.57	24.00	1.90	---	12.54	129.69	1037.5
XSECTION 72	ADDHYD	.38	1	2	.08	.0	3.57	24.00	1.85	---	12.64	359.31	958.2
XSECTION 114	REACH	.38	1	2	.08	.0	3.57	24.00	1.84	---	12.82	329.76	879.4
XSECTION 115	RUNOFF	.09	1	2	.08	.0	3.57	24.00	1.83	---	12.53	96.28	1024.2
XSECTION 114	ADDHYD	.47	1	2	.08	.0	3.57	24.00	1.84	---	12.72	392.93	837.8
XSECTION 71	RUNOFF	.13	1	2	.08	.0	3.57	24.00	1.90	---	12.54	129.69	1037.5
XSECTION 114	REACH	.13	1	2	.08	.0	3.57	24.00	1.89	---	12.84	107.00	856.0
XSECTION 114	ADDHYD	.59	1	2	.08	.0	3.57	24.00	1.85	---	12.75	495.69	834.5
XSECTION 114	RUNOFF	.13	1	2	.08	.0	3.57	24.00	2.05	---	12.90	99.23	775.2
XSECTION 114	ADDHYD	.72	1	2	.08	.0	3.57	24.00	1.89	---	12.77	590.82	818.3
XSECTION 114	ADDHYD	14.77	1	2	.08	.0	3.57	24.00	1.81	---	12.80	6562.40	444.3
XSECTION 119	RUNOFF	.23	1	2	.08	.0	3.57	24.00	1.97	---	12.83	184.55	798.9
XSECTION 114	ADDHYD	15.00	1	2	.08	.0	3.57	24.00	1.82	---	12.80	6746.64	449.7
XSECTION 118	REACH	15.00	1	2	.08	.0	3.57	24.00	1.81	---	12.95	6544.25	436.3

XSECTION 118	RUNOFF	.23	1	2	.08	.0	3.57	24.00	1.73	---	13.18	125.08	541.5
XSECTION 118	ADDHYD	15.23	1	2	.08	.0	3.57	24.00	1.81	---	12.96	6659.83	437.2
XSECTION 117	REACH	15.23	1	2	.08	.0	3.57	24.00	1.81	---	13.10	6512.39	427.5
XSECTION 117	RUNOFF	.17	1	2	.08	.0	3.57	24.00	1.65	---	13.40	78.06	451.2

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 2													
+ XSECTION 117	ADDHYD	15.41	1	2	.08	.0	3.57	24.00	1.80	---	13.10	6582.92	427.3
ALTERNATE 1 STORM 3													
+ XSECTION 1	RUNOFF	.15	1	2	.08	.0	4.04	24.00	3.46	---	12.45	248.49	1679.0
XSECTION 2	RUNOFF	.10	1	2	.08	.0	4.04	24.00	3.46	---	12.44	165.73	1708.6
XSECTION 3	REACH	.15	1	2	.08	.0	4.04	24.00	3.45	---	12.63	244.59	1652.7
XSECTION 3	REACH	.10	1	2	.08	.0	4.04	24.00	3.44	---	12.70	158.51	1634.1
XSECTION 3	ADDHYD	.25	1	2	.08	.0	4.04	24.00	3.45	---	12.65	400.78	1635.9
XSECTION 3	RUNOFF	.05	1	2	.08	.0	4.04	24.00	1.83	---	12.52	51.36	1092.7
XSECTION 3	ADDHYD	.29	1	2	.08	.0	4.04	24.00	3.19	---	12.59	446.92	1530.5
XSECTION 6	RUNOFF	.11	1	2	.08	.0	4.04	24.00	2.13	---	12.71	106.85	980.3
XSECTION 6	REACH	.29	1	2	.08	.0	4.04	24.00	3.18	1505.54	12.71	443.03	1517.2
XSECTION 6	ADDHYD	.40	1	2	.08	.0	4.04	24.00	2.90	1506.07	12.71	549.88	1371.3
XSECTION 8	REACH	.40	1	2	.08	.0	4.04	24.00	2.89	1497.00	12.86	531.54	1325.5
XSECTION 7	RUNOFF	.12	1	2	.08	.0	4.04	24.00	1.83	---	12.65	106.65	911.5
XSECTION 8	REACH	.12	1	2	.08	.0	4.04	24.00	1.82	1495.41	12.77	105.14	898.7
XSECTION 19	RUNOFF	.02	1	2	.08	.0	4.04	24.00	3.47	---	12.44	37.85	1720.5
XSECTION 4	RUNOFF	.19	1	2	.08	.0	4.04	24.00	3.46	---	12.44	330.80	1696.4
XSECTION 4	REACH	.02	1	2	.08	.0	4.04	24.00	3.43	---	12.97	31.76	1443.6
XSECTION 4	ADDHYD	.22	1	2	.08	.0	4.04	24.00	3.46	---	12.45	351.51	1619.9
XSECTION 5	RUNOFF	.13	1	2	.08	.0	4.04	24.00	1.83	---	12.59	122.65	981.2
XSECTION 5	REACH	.22	1	2	.08	.0	4.04	24.00	3.45	---	12.62	342.38	1577.8
XSECTION 5	ADDHYD	.34	1	2	.08	.0	4.04	24.00	2.85	---	12.61	464.83	1359.2
XSECTION 8	REACH	.34	1	2	.08	.0	4.04	24.00	2.84	1496.88	12.85	436.28	1275.7
XSECTION 8	ADDHYD	.52	1	2	.08	.0	4.04	24.00	2.65	1497.09	12.84	633.31	1222.6
XSECTION 8	ADDHYD	.86	1	2	.08	.0	4.04	24.00	2.73	1497.43	12.85	1069.56	1243.7
XSECTION 18	RUNOFF	.18	1	2	.08	.0	4.04	24.00	1.90	---	12.67	171.98	934.7
XSECTION 8	REACH	.18	1	2	.08	.0	4.04	24.00	1.89	1495.70	12.98	146.42	795.7
XSECTION 8	ADDHYD	1.04	1	2	.08	.0	4.04	24.00	2.58	1497.51	12.86	1208.88	1157.9
XSECTION 8	RUNOFF	.13	1	2	.08	.0	4.04	24.00	1.90	---	12.68	119.20	909.9
XSECTION 8	ADDHYD	1.18	1	2	.08	.0	4.04	24.00	2.50	1497.58	12.84	1315.07	1119.2
XSECTION 9	RUNOFF	.07	1	2	.08	.0	4.04	24.00	1.97	---	12.78	56.70	859.0
XSECTION 8	REACH	.07	1	2	.08	.0	4.04	24.00	1.97	1494.99	12.78	56.70	859.0
XSECTION 8	ADDHYD	1.24	1	2	.08	.0	4.04	24.00	2.47	1497.61	12.84	1370.97	1104.7
XSECTION 14	DIVERT	.00	1	2	.08	.0	4.04	24.00	2.47	---	12.00*	150.00	**********
XSECTION 8	DIVERT	1.24	1	2	.08	.0	4.04	24.00	1.53	1497.52	12.84	1220.97	983.9
STRUCTURE 8	RESVOR	1.24	1	2	.08	.0	4.04	24.00	1.51	1496.21	13.57	246.05	198.3

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A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 3													
+ XSECTION 14	ADDHYD	1.24	1	2	.08	.0	4.04	24.00	2.45	---	13.57	396.05	319.1
XSECTION 14	REACH	1.24	1	2	.08	.0	4.04	24.00	2.44	---	13.88	393.02	316.7
XSECTION 14	RUNOFF	.18	1	2	.08	.0	4.04	24.00	2.31	---	12.51	227.94	1287.8

XSECTION 14	ADDHYD	1.42	1	2	.08	.0	4.04	24.00	2.42	---	12.59	430.00	303.2
XSECTION 16	RUNOFF	.12	1	2	.08	.0	4.04	24.00	2.56	---	12.54	155.97	1310.7
XSECTION 15	REACH	.12	1	2	.08	.0	4.04	24.00	2.56	---	12.64	155.01	1302.6
XSECTION 15	RUNOFF	.07	1	2	.08	.0	4.04	24.00	2.21	---	12.74	71.32	977.0
XSECTION 15	ADDHYD	.19	1	2	.08	.0	4.04	24.00	2.43	---	12.66	224.76	1170.6
XSECTION 14	ADDHYD	1.61	1	2	.08	.0	4.04	24.00	2.42	---	12.61	652.42	405.2
XSECTION 144	RUNOFF	.13	1	2	.08	.0	4.04	24.00	1.97	---	12.78	113.39	859.0
XSECTION 14	REACH	.13	1	2	.08	.0	4.04	24.00	1.97	---	12.89	111.92	847.9
XSECTION 14	REACH	.13	1	2	.08	.0	4.04	24.00	1.97	---	12.89	111.92	847.9
XSECTION 14	ADDHYD	1.74	1	2	.08	.0	4.04	24.00	2.39	---	12.64	744.85	427.6
XSECTION 27	REACH	1.74	1	2	.08	.0	4.04	24.00	2.38	---	12.86	686.27	394.0
XSECTION 27	RUNOFF	.19	1	2	.08	.0	4.04	24.00	2.20	---	12.91	157.15	835.9
XSECTION 27	ADDHYD	1.93	1	2	.08	.0	4.04	24.00	2.36	---	12.88	842.74	436.7
XSECTION 17	RUNOFF	.06	1	2	.08	.0	4.04	24.00	3.47	---	12.44	101.41	1718.8
XSECTION 25	REACH	.06	1	2	.08	.0	4.04	24.00	3.43	---	12.88	89.43	1515.7
XSECTION 25	RUNOFF	.09	1	2	.08	.0	4.04	24.00	2.31	---	12.52	113.22	1272.2
XSECTION 25	ADDHYD	.15	1	2	.08	.0	4.04	24.00	2.76	---	12.56	188.52	1273.8
XSECTION 27	REACH	.15	1	2	.08	.0	4.04	24.00	2.75	---	12.73	175.74	1187.4
XSECTION 27	ADDHYD	2.08	1	2	.08	.0	4.04	24.00	2.39	---	12.84	1010.56	486.3
XSECTION 26	RUNOFF	.07	1	2	.08	.0	4.04	24.00	2.48	---	12.47	93.38	1393.7
XSECTION 27	ADDHYD	2.14	1	2	.08	.0	4.04	24.00	2.39	---	12.80	1036.76	483.3
XSECTION 37	REACH	2.14	1	2	.08	.0	4.04	24.00	2.39	1455.30	12.93	1026.06	478.3
XSECTION 37	RUNOFF	.13	1	2	.08	.0	4.04	24.00	2.31	---	12.46	169.10	1352.8
XSECTION 37	ADDHYD	2.27	1	2	.08	.0	4.04	24.00	2.38	1455.33	12.91	1048.62	461.9
XSECTION 24	RUNOFF	.20	1	2	.08	.0	4.04	24.00	2.57	---	12.52	268.81	1357.6
XSECTION 37	REACH	.20	1	2	.08	.0	4.04	24.00	2.56	1453.61	12.61	266.68	1346.9
XSECTION 37	ADDHYD	2.47	1	2	.08	.0	4.04	24.00	2.40	1455.69	12.72	1265.08	512.6
XSECTION 143	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.48	---	12.55	80.11	1281.8
XSECTION 143	ADDHYD	2.53	1	2	.08	.0	4.04	24.00	2.40	---	12.69	1336.20	528.0
XSECTION 34	RUNOFF	.13	1	2	.08	.0	4.04	24.00	2.38	---	12.64	141.66	1133.3
XSECTION 35	REACH	.13	1	2	.08	.0	4.04	24.00	2.38	---	12.76	139.31	1114.5
XSECTION 35	RUNOFF	.13	1	2	.08	.0	4.04	24.00	2.30	---	12.54	154.91	1239.3
XSECTION 35	ADDHYD	.25	1	2	.08	.0	4.04	24.00	2.34	---	12.61	281.50	1126.0

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A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

ALTERNATE 1 STORM 3

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
XSECTION 36	REACH	.25	1	2	.08	.0	4.04	24.00	2.34	---	12.61	281.50	1126.0
XSECTION 10	RUNOFF	.09	1	2	.08	.0	4.04	24.00	1.83	---	12.59	93.22	981.2
XSECTION 11	REACH	.09	1	2	.08	.0	4.04	24.00	1.82	---	12.72	89.38	940.9
XSECTION 11	RUNOFF	.13	1	2	.08	.0	4.04	24.00	1.97	---	12.66	119.79	958.3
XSECTION 11	ADDHYD	.22	1	2	.08	.0	4.04	24.00	1.91	---	12.69	208.58	948.1
XSECTION 28	REACH	.22	1	2	.08	.0	4.04	24.00	1.89	---	13.27	144.98	659.0
XSECTION 13	RUNOFF	.13	1	2	.08	.0	4.04	24.00	2.22	---	12.59	140.57	1124.5
XSECTION 28	REACH	.13	1	2	.08	.0	4.04	24.00	2.19	---	13.15	99.15	793.2
XSECTION 28	ADDHYD	.34	1	2	.08	.0	4.04	24.00	2.00	---	13.22	242.20	702.0
XSECTION 28	RUNOFF	.16	1	2	.08	.0	4.04	24.00	2.21	---	12.76	149.43	957.9
XSECTION 28	ADDHYD	.50	1	2	.08	.0	4.04	24.00	2.06	---	13.06	346.06	690.7
XSECTION 36	REACH	.50	1	2	.08	.0	4.04	24.00	2.05	---	13.37	309.28	617.3
XSECTION 36	RUNOFF	.13	1	2	.08	.0	4.04	24.00	2.30	---	12.54	155.70	1245.6
XSECTION 36	ADDHYD	.63	1	2	.08	.0	4.04	24.00	2.10	---	13.32	327.91	523.8
XSECTION 36	ADDHYD	.88	1	2	.08	.0	4.04	24.00	2.17	---	12.66	564.23	644.1
XSECTION 36	DIVERT	.00	1	2	.08	.0	4.04	24.00	2.17	---	12.48*	466.00	**********
XSECTION 90	DIVERT	.88	1	2	.08	.0	4.04	24.00	.06	---	12.66	98.23	112.1
XSECTION 37	REACH	.00	1	2	.08	.0	4.04	24.00	.06	1454.42	12.48*	466.00	**********
XSECTION 143	ADDHYD	2.53	1	2	.08	.0	4.04	24.00	3.13	---	12.69	1802.20	712.2
STRUCTURE 43	RESVOR	2.53	1	2	.08	.0	4.04	24.00	3.03	1433.14	15.05	508.00	200.8
XSECTION 85	REACH	2.53	1	2	.08	.0	4.04	24.00	3.03	---	15.05	508.00	200.8
XSECTION 85	RUNOFF	.06	1	2	.08	.0	4.04	24.00	1.83	---	12.57	63.49	1007.8
XSECTION 85	ADDHYD	2.59	1	2	.08	.0	4.04	24.00	3.00	---	15.03	511.25	197.1
XSECTION 84	REACH	2.59	1	2	.08	.0	4.04	24.00	3.00	4.59	15.03	511.25	197.1
XSECTION 84	RUNOFF	.06	1	2	.08	.0	4.04	24.00	1.83	---	12.57	63.49	1007.8
XSECTION 84	ADDHYD	2.66	1	2	.08	.0	4.04	24.00	2.97	4.62	15.02	514.52	193.7
XSECTION 91	RUNOFF	.13	1	2	.08	.0	4.04	24.00	2.57	---	12.52	169.21	1353.7
XSECTION 90	REACH	.13	1	2	.08	.0	4.04	24.00	2.56	---	12.64	165.02	1320.2

XSECTION	90	REACH	.88	1	2	.08	.0	4.04	24.00	.06	---	12.86	58.16	66.4
XSECTION	90	ADDHYD	1.00	1	2	.08	.0	4.04	24.00	.37	---	12.74	206.21	206.0
XSECTION	90	RUNOFF	.11	1	2	.08	.0	4.04	24.00	2.47	---	12.58	132.92	1219.5
XSECTION	90	ADDHYD	1.11	1	2	.08	.0	4.04	24.00	.58	---	12.70	330.07	297.4
XSECTION	88	REACH	1.11	1	2	.08	.0	4.04	24.00	.58	---	12.81	323.59	291.5
XSECTION	88	RUNOFF	.09	1	2	.08	.0	4.04	24.00	2.65	---	12.64	115.03	1223.7
XSECTION	88	ADDHYD	1.20	1	2	.08	.0	4.04	24.00	.74	---	12.77	430.34	357.4
XSECTION	89	RUNOFF	.05	1	2	.08	.0	4.04	24.00	2.39	---	12.50	62.16	1322.6

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 3													
+													
XSECTION 88	REACH	.05	1	2	.08	.0	4.04	24.00	2.38	---	12.75	56.34	1198.7
XSECTION 88	ADDHYD	1.25	1	2	.08	.0	4.04	24.00	.80	---	12.77	486.69	389.0
XSECTION 101	REACH	1.25	1	2	.08	.0	4.04	24.00	.80	---	12.86	484.03	386.9
XSECTION 101	RUNOFF	.05	1	2	.08	.0	4.04	24.00	2.84	---	12.53	67.37	1433.4
XSECTION 101	ADDHYD	1.30	1	2	.08	.0	4.04	24.00	.87	---	12.82	523.21	403.1
XSECTION 102	REACH	1.30	1	2	.08	.0	4.04	24.00	.87	---	13.00	493.39	380.1
XSECTION 102	RUNOFF	.06	1	2	.08	.0	4.04	24.00	1.82	---	12.62	59.11	938.2
XSECTION 102	ADDHYD	1.36	1	2	.08	.0	4.04	24.00	.91	---	12.96	526.07	386.5
XSECTION 104	REACH	1.36	1	2	.08	.0	4.04	24.00	.91	1.87	13.30	474.77	348.8
XSECTION 86	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.48	---	12.46	88.77	1409.0
XSECTION 87	REACH	.06	1	2	.08	.0	4.04	24.00	2.47	1429.96	12.78	78.65	1248.5
XSECTION 87	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.48	---	12.54	81.54	1294.3
XSECTION 87	ADDHYD	.13	1	2	.08	.0	4.04	24.00	2.47	1430.02	12.62	151.29	1200.7
XSECTION 105	REACH	.13	1	2	.08	.0	4.04	24.00	2.46	1417.61	12.95	130.05	1032.1
XSECTION 105	RUNOFF	.06	1	2	.08	.0	4.04	24.00	1.54	---	12.63	50.54	802.3
XSECTION 105	ADDHYD	.19	1	2	.08	.0	4.04	24.00	2.15	1417.67	12.82	167.14	884.4
XSECTION 104	REACH	.19	1	2	.08	.0	4.04	24.00	2.15	.98	13.00	161.45	854.2
XSECTION 104	RUNOFF	.07	1	2	.08	.0	4.04	24.00	1.54	---	12.66	54.22	785.8
XSECTION 104	ADDHYD	.26	1	2	.08	.0	4.04	24.00	1.98	1.10	12.87	200.16 *	775.8
XSECTION 104	ADDHYD	1.62	1	2	.08	.0	4.04	24.00	1.08	2.22	13.20	634.92	392.2
XSECTION 84	DIVERT	.93	1	2	.08	.0	4.04	24.00	3.02	2.13	15.02	182.94	196.8
XSECTION 83	DIVERT	1.73	1	2	.08	.0	4.04	24.00	2.94	2.13	15.02	331.58	192.0
XSECTION 105	REACH	.93	1	2	.08	.0	4.04	24.00	3.00	1417.70	15.10	182.94	196.8
XSECTION 104	REACH	.93	1	2	.08	.0	4.04	24.00	2.98	1.05	15.20	182.91	196.7
XSECTION 104	ADDHYD	2.55	1	2	.08	.0	4.04	24.00	1.78	2.55	13.19	793.05	311.1
XSECTION 83	REACH	1.73	1	2	.08	.0	4.04	24.00	2.94	2.13	15.02	331.58	192.0
XSECTION 83	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.30	---	12.55	77.03	1222.7
XSECTION 83	ADDHYD	1.79	1	2	.08	.0	4.04	24.00	2.92	2.31	12.64	373.42	208.6
XSECTION 106	REACH	1.79	1	2	.08	.0	4.04	24.00	2.92	---	12.64	373.42	208.6
XSECTION 106	RUNOFF	.06	1	2	.08	.0	4.04	24.00	1.98	---	12.58	66.28	1052.0
XSECTION 106	ADDHYD	1.85	1	2	.08	.0	4.04	24.00	2.89	---	12.62	439.00	237.0
XSECTION 107	REACH	1.85	1	2	.08	.0	4.04	24.00	2.89	1.93	12.62	439.00	237.0
XSECTION 107	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.14	---	12.52	71.17	1206.3
XSECTION 107	ADDHYD	1.91	1	2	.08	.0	4.04	24.00	2.87	2.10	12.59	505.14	264.2
XSECTION 29	RUNOFF	.13	1	2	.08	.0	4.04	24.00	2.13	---	12.66	128.47	1027.8
XSECTION 145	REACH	.13	1	2	.08	.0	4.04	24.00	2.13	---	12.66	128.47	1027.8

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 3													

XSECTION 12	RUNOFF	.38	1	2	.08	.0	4.04	24.00	2.06	---	12.61	394.33	1043.2
XSECTION 145	REACH	.38	1	2	.08	.0	4.04	24.00	2.06	---	12.61	394.33	1043.2
XSECTION 30	RUNOFF	.15	1	2	.08	.0	4.04	24.00	1.97	---	12.80	127.06	835.9
XSECTION 33	REACH	.15	1	2	.08	.0	4.04	24.00	1.96	---	13.14	111.86	735.9
XSECTION 33	RUNOFF	.15	1	2	.08	.0	4.04	24.00	.82	---	12.79	58.69	381.1
XSECTION 33	ADDHYD	.31	1	2	.08	.0	4.04	24.00	1.39	---	12.99	156.44	511.3
XSECTION 145	ADDHYD	.68	1	2	.08	.0	4.04	24.00	1.76	---	12.67	512.36	749.1
XSECTION 145	RUNOFF	.16	1	2	.08	.0	4.04	24.00	2.13	---	12.67	161.24	1007.8
XSECTION 145	ADDHYD	.84	1	2	.08	.0	4.04	24.00	1.83	---	12.67	673.60	798.1
XSECTION 145	DIVERT	.00	1	2	.08	.0	4.04	24.00	1.83	---	11.92*	27.00**********	
XSECTION 7	DIVERT	.13	1	2	.08	.0	4.04	24.00	1.04	---	12.66	101.47	811.8
XSECTION 145	ADDHYD	.97	1	2	.08	.0	4.04	24.00	1.73	---	12.67	774.98	799.8
STRUCTURE 33	RESVOR	.97	1	2	.08	.0	4.04	24.00	1.60	1469.07	14.04	93.45	96.4
XSECTION 145	ADDHYD	.97	1	2	.08	.0	4.04	24.00	1.74	---	13.42	119.61	123.4
XSECTION 93	REACH	.97	1	2	.08	.0	4.04	24.00	1.73	---	13.51	119.33	123.1
XSECTION 93	RUNOFF	.19	1	2	.08	.0	4.04	24.00	2.39	---	12.52	253.10	1297.9
XSECTION 93	ADDHYD	1.16	1	2	.08	.0	4.04	24.00	1.84	---	12.54	355.09	305.1
XSECTION 93	DIVERT	.00	1	2	.08	.0	4.04	24.00	1.84	---	12.24*	265.00**********	
XSECTION 92	DIVERT	1.16	1	2	.08	.0	4.04	24.00	.05	---	12.54	90.09	77.4
XSECTION 92	REACH	1.16	1	2	.08	.0	4.04	24.00	.05	---	12.69	72.95	62.7
XSECTION 92	RUNOFF	.13	1	2	.08	.0	4.04	24.00	2.57	---	12.52	169.21	1353.7
XSECTION 92	ADDHYD	1.29	1	2	.08	.0	4.04	24.00	.29	---	12.60	229.82	178.3
XSECTION 98	REACH	1.29	1	2	.08	.0	4.04	24.00	.29	---	12.86	200.37	155.4
XSECTION 95	REACH	.00	1	2	.08	.0	4.04	24.00	.29	---	12.24*	265.00**********	
XSECTION 31	RUNOFF	.08	1	2	.08	.0	4.04	24.00	2.30	---	12.57	99.02	1178.8
XSECTION 32	REACH	.08	1	2	.08	.0	4.04	24.00	2.26	---	13.34	60.30	717.9
XSECTION 32	RUNOFF	.18	1	2	.08	.0	4.04	24.00	2.05	---	12.77	160.51	891.7
XSECTION 32	ADDHYD	.26	1	2	.08	.0	4.04	24.00	2.12	---	12.85	193.67	733.6
XSECTION 94	REACH	.26	1	2	.08	.0	4.04	24.00	2.11	---	13.23	172.54	653.6
XSECTION 94	RUNOFF	.14	1	2	.08	.0	4.04	24.00	2.39	---	12.49	186.62	1342.6
XSECTION 94	ADDHYD	.40	1	2	.08	.0	4.04	24.00	2.21	---	12.56	256.69	637.0
XSECTION 95	REACH	.40	1	2	.08	.0	4.04	24.00	2.20	---	12.72	232.30	576.4
XSECTION 95	RUNOFF	.13	1	2	.08	.0	4.04	24.00	2.46	---	12.77	128.67	1029.4
XSECTION 95	ADDHYD	.53	1	2	.08	.0	4.04	24.00	2.26	---	12.73	360.28	682.3
XSECTION 95	ADDHYD	.53	1	2	.08	.0	4.04	24.00	6.21	---	12.72	625.04	1183.8
XSECTION 95	DIVERT	.00	1	2	.08	.0	4.04	24.00	6.21	---	12.00*	265.00**********	

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A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 3													
XSECTION 98	DIVERT	.53	1	2	.08	.0	4.04	24.00	1.09	---	12.72	360.04	681.9
XSECTION 98	REACH	.53	1	2	.08	.0	4.04	24.00	1.09	---	12.97	319.39	604.9
XSECTION 98	ADDHYD	1.82	1	2	.08	.0	4.04	24.00	.52	---	12.92	510.95	281.2
XSECTION 96	REACH	.00	1	2	.08	.0	4.04	24.00	.52	---	12.00*	265.00**********	
XSECTION 96	RUNOFF	.13	1	2	.08	.0	4.04	24.00	2.22	---	12.55	148.27	1186.2
XSECTION 96	ADDHYD	.13	1	2	.08	.0	4.04	24.00	23.86	---	12.55	413.27	3306.2
XSECTION 96	DIVERT	.00	1	2	.08	.0	4.04	24.00	23.86	---	11.92*	265.00**********	
XSECTION 97	DIVERT	.13	1	2	.08	.0	4.04	24.00	1.71	---	12.55	148.27	1186.2
XSECTION 97	REACH	.13	1	2	.08	.0	4.04	24.00	1.71	---	12.81	132.83	1062.6
XSECTION 97	RUNOFF	.19	1	2	.08	.0	4.04	24.00	2.66	---	12.54	254.23	1352.3
XSECTION 97	ADDHYD	.31	1	2	.08	.0	4.04	24.00	2.28	---	12.61	365.07	1166.3
XSECTION 98	REACH	.31	1	2	.08	.0	4.04	24.00	2.28	---	12.71	360.65	1152.2
XSECTION 98	ADDHYD	2.13	1	2	.08	.0	4.04	24.00	.78	---	12.84	833.25	391.2
XSECTION 98	RUNOFF	.09	1	2	.08	.0	4.04	24.00	2.57	---	12.49	131.63	1400.3
XSECTION 98	ADDHYD	2.22	1	2	.08	.0	4.04	24.00	.85	---	12.78	887.32	399.0
XSECTION 99	REACH	2.22	1	2	.08	.0	4.04	24.00	.85	---	12.88	882.44	396.8
XSECTION 99	RUNOFF	.09	1	2	.08	.0	4.04	24.00	2.56	---	12.53	126.50	1345.7
XSECTION 99	ADDHYD	2.32	1	2	.08	.0	4.04	24.00	.92	---	12.81	951.42	410.5
XSECTION 139	REACH	2.32	1	2	.08	.0	4.04	24.00	.92	---	12.97	933.43	402.7
XSECTION 100	RUNOFF	.08	1	2	.08	.0	4.04	24.00	2.57	---	12.50	108.52	1391.3
XSECTION 139	REACH	.08	1	2	.08	.0	4.04	24.00	2.57	---	12.50	108.52	1391.3
XSECTION 139	ADDHYD	2.40	1	2	.08	.0	4.04	24.00	.98	---	12.93	959.82	400.6
XSECTION 142	REACH	.00	1	2	.08	.0	4.04	24.00	.98	---	12.32*	265.00**********	
XSECTION 142	RUNOFF	.25	1	2	.08	.0	4.04	24.00	2.20	---	13.04	189.10	756.4
XSECTION 142	ADDHYD	.25	1	2	.08	.0	4.04	24.00	13.23	---	13.04	454.10	1816.4

XSECTION 142	DIVERT	.00	1	2	.08	.0	4.04	24.00	13.23	---	12.00*	265.00	**********
XSECTION 141	DIVERT	.25	1	2	.08	.0	4.04	24.00	1.67	---	13.04	189.10	756.4
XSECTION 141	REACH	.25	1	2	.08	.0	4.04	24.00	1.67	---	13.13	188.79	755.1
XSECTION 141	RUNOFF	.19	1	2	.08	.0	4.04	24.00	2.48	---	12.55	240.98	1281.8
XSECTION 141	ADDHYD	.44	1	2	.08	.0	4.04	24.00	2.02	---	12.65	353.56	807.2
XSECTION 140	REACH	.44	1	2	.08	.0	4.04	24.00	2.02	---	12.65	353.56	807.2
XSECTION 140	RUNOFF	.13	1	2	.08	.0	4.04	24.00	2.57	---	12.52	170.38	1363.0
XSECTION 140	ADDHYD	.56	1	2	.08	.0	4.04	24.00	2.14	---	12.59	514.99	914.7
XSECTION 137	RUNOFF	.08	1	2	.08	.0	4.04	24.00	1.75	---	12.56	77.13	988.9
XSECTION 140	ADDHYD	.64	1	2	.08	.0	4.04	24.00	2.09	---	12.58	591.86	923.3
XSECTION 139	REACH	.64	1	2	.08	.0	4.04	24.00	2.09	---	12.68	587.18	916.0

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A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

ALTERNATE 1 STORM 3

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
XSECTION 139	ADDHYD	3.04	1	2	.08	.0	4.04	24.00	1.21	---	12.77	1487.78	489.9
XSECTION 136	RUNOFF	.07	1	2	.08	.0	4.04	24.00	2.76	---	12.44	102.84	1558.3
XSECTION 138	REACH	.07	1	2	.08	.0	4.04	24.00	2.74	---	12.71	94.03	1424.7
XSECTION 138	RUNOFF	.20	1	2	.08	.0	4.04	24.00	2.31	---	12.46	276.50	1362.1
XSECTION 138	ADDHYD	.27	1	2	.08	.0	4.04	24.00	2.42	---	12.47	359.49	1336.4
XSECTION 139	REACH	.27	1	2	.08	.0	4.04	24.00	2.41	---	12.55	359.32	1335.8
XSECTION 139	ADDHYD	3.31	1	2	.08	.0	4.04	24.00	1.31	---	12.66	1767.04	534.5
XSECTION 139	RUNOFF	.19	1	2	.08	.0	4.04	24.00	2.66	---	12.51	263.45	1401.3
XSECTION 139	ADDHYD	3.49	1	2	.08	.0	4.04	24.00	1.38	---	12.64	2000.01	572.4
XSECTION 129	RUNOFF	.11	1	2	.08	.0	4.04	24.00	2.15	---	12.45	144.68	1339.6
XSECTION 130	RUNOFF	.03	1	2	.08	.0	4.04	24.00	3.05	---	12.44	50.77	1637.7
XSECTION 129	ADDHYD	.14	1	2	.08	.0	4.04	24.00	2.35	---	12.45	195.42	1405.9
XSECTION 127	REACH	.14	1	2	.08	.0	4.04	24.00	2.33	---	12.72	174.09	1252.4
XSECTION 128	RUNOFF	.04	1	2	.08	.0	4.04	24.00	2.07	---	12.45	47.02	1306.1
XSECTION 127	REACH	.04	1	2	.08	.0	4.04	24.00	2.05	---	12.84	36.51	1014.1
XSECTION 127	ADDHYD	.17	1	2	.08	.0	4.04	24.00	2.27	---	12.74	207.93	1188.2
XSECTION 127	RUNOFF	.16	1	2	.08	.0	4.04	24.00	2.15	---	12.46	208.22	1309.6
XSECTION 127	ADDHYD	.33	1	2	.08	.0	4.04	24.00	2.21	---	12.49	380.51	1139.3
XSECTION 132	RUNOFF	.14	1	2	.08	.0	4.04	24.00	2.31	---	12.47	194.67	1342.6
XSECTION 133	RUNOFF	.08	1	2	.08	.0	4.04	24.00	2.76	---	12.44	124.66	1558.3
XSECTION 133	ADDHYD	.22	1	2	.08	.0	4.04	24.00	2.47	---	12.45	318.96	1417.6
XSECTION 131	REACH	.22	1	2	.08	.0	4.04	24.00	2.46	---	12.55	310.76	1381.2
XSECTION 131	ADDHYD	.56	1	2	.08	.0	4.04	24.00	2.31	---	12.51	685.14	1225.7
XSECTION 131	RUNOFF	.12	1	2	.08	.0	4.04	24.00	2.57	---	12.46	171.53	1441.4
XSECTION 131	ADDHYD	.68	1	2	.08	.0	4.04	24.00	2.36	---	12.50	854.51	1260.3
XSECTION 126	REACH	.68	1	2	.08	.0	4.04	24.00	2.36	---	12.60	846.01	1247.8
XSECTION 126	RUNOFF	.16	1	2	.08	.0	4.04	24.00	3.04	---	12.45	250.87	1587.8
XSECTION 126	ADDHYD	.84	1	2	.08	.0	4.04	24.00	2.49	---	12.54	1077.69	1289.1
XSECTION 134	REACH	.84	1	2	.08	.0	4.04	24.00	2.48	---	12.63	1072.15	1282.5
XSECTION 135	RUNOFF	.04	1	2	.08	.0	4.04	24.00	2.76	---	12.44	65.45	1558.3
XSECTION 134	REACH	.04	1	2	.08	.0	4.04	24.00	2.73	---	12.90	55.20	1314.2
XSECTION 134	ADDHYD	.88	1	2	.08	.0	4.04	24.00	2.49	---	12.63	1118.69	1274.1
XSECTION 134	RUNOFF	.20	1	2	.08	.0	4.04	24.00	2.48	---	12.47	274.55	1393.7
XSECTION 134	ADDHYD	1.08	1	2	.08	.0	4.04	24.00	2.49	---	12.57	1355.89	1261.3
XSECTION 125	RUNOFF	.12	1	2	.08	.0	4.04	24.00	3.36	---	12.44	199.24	1702.9
XSECTION 125	ADDHYD	1.19	1	2	.08	.0	4.04	24.00	2.58	---	12.52	1516.42	1272.2

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM	PRECIPITATION BEGIN	PRECIPITATION AMOUNT	PRECIPITATION DURATION	RUNOFF AMOUNT	PEAK DISCHARGE ELEVATION	PEAK DISCHARGE TIME	PEAK DISCHARGE RATE	PEAK DISCHARGE RATE

		(SQ MI)			(HR)	(HR)	(IN)	(HR)	(IN)	(FT)	(HR)	(CFS)	(CSM)
ALTERNATE 1 STORM 3													
XSECTION 124	REACH	1.19	1	2	.08	.0	4.04	24.00	2.57	3.65	12.63	1485.11	1245.9
XSECTION 124	RUNOFF	.22	1	2	.08	.0	4.04	24.00	2.40	---	12.46	303.53	1386.0
XSECTION 124	ADDHYD	1.41	1	2	.08	.0	4.04	24.00	2.54	4.01	12.56	1732.10	1227.6
XSECTION 124	REACH	3.49	1	2	.08	.0	4.04	24.00	1.38	4.36	12.64	2000.01	572.4
XSECTION 124	ADDHYD	4.91	1	2	.08	.0	4.04	24.00	1.72	6.29	12.60	3699.04	754.1
XSECTION 103	RUNOFF	.08	1	2	.08	.0	4.04	24.00	2.40	---	12.46	112.17	1384.9
XSECTION 124	ADDHYD	4.99	1	2	.08	.0	4.04	24.00	1.73	6.38	12.59	3788.85	759.9
XSECTION 104	REACH	4.99	1	2	.08	.0	4.04	24.00	1.73	6.49	12.59	3788.85	759.9
XSECTION 104	ADDHYD	7.53	1	2	.08	.0	4.04	24.00	1.74	7.00	12.62	4312.53	572.4
XSECTION 107	REACH	7.53	1	2	.08	.0	4.04	24.00	1.74	7.53	12.62	4312.53	572.4
XSECTION 107	ADDHYD	9.45	1	2	.08	.0	4.04	24.00	1.97	8.03	12.62	4818.46	510.1
XSECTION 123	RUNOFF	.21	1	2	.08	.0	4.04	24.00	3.35	---	12.44	355.37	1668.4
XSECTION 107	ADDHYD	9.66	1	2	.08	.0	4.04	24.00	2.00	8.29	12.59	5094.64	527.4
XSECTION 108	REACH	9.66	1	2	.08	.0	4.04	24.00	2.00	7.02	12.59	5094.64	527.4
XSECTION 108	RUNOFF	.03	1	2	.08	.0	4.04	24.00	2.31	---	12.47	33.45	1338.1
XSECTION 108	ADDHYD	9.68	1	2	.08	.0	4.04	24.00	2.00	7.04	12.58	5124.50	529.1
XSECTION 148	RUNOFF	.03	1	2	.08	.0	4.04	24.00	2.23	---	12.45	45.22	1370.4
XSECTION 47	REACH	.03	1	2	.08	.0	4.04	24.00	2.21	---	12.82	38.55	1168.1
XSECTION 47	RUNOFF	.07	1	2	.08	.0	4.04	24.00	2.23	---	12.45	99.73	1366.1
XSECTION 47	ADDHYD	.11	1	2	.08	.0	4.04	24.00	2.22	---	12.46	127.59	1203.6
XSECTION 46	REACH	.11	1	2	.08	.0	4.04	24.00	2.21	---	12.68	112.52	1061.5
XSECTION 46	RUNOFF	.05	1	2	.08	.0	4.04	24.00	2.23	---	12.45	72.63	1370.4
XSECTION 46	ADDHYD	.16	1	2	.08	.0	4.04	24.00	2.22	---	12.49	166.54	1047.4
XSECTION 149	REACH	.16	1	2	.08	.0	4.04	24.00	2.21	---	12.73	148.06	931.2
XSECTION 149	RUNOFF	.01	1	2	.08	.0	4.04	24.00	2.95	---	12.44	14.49	1610.6
XSECTION 149	ADDHYD	.17	1	2	.08	.0	4.04	24.00	2.25	---	12.72	150.51	895.9
XSECTION 147	RUNOFF	.05	1	2	.08	.0	4.04	24.00	2.23	---	12.45	71.26	1370.4
XSECTION 146	REACH	.05	1	2	.08	.0	4.04	24.00	2.21	---	12.74	61.57	1184.1
XSECTION 146	RUNOFF	.07	1	2	.08	.0	4.04	24.00	2.23	---	12.45	98.36	1366.1
XSECTION 146	ADDHYD	.12	1	2	.08	.0	4.04	24.00	2.22	---	12.47	148.20	1195.2
XSECTION 45	REACH	.12	1	2	.08	.0	4.04	24.00	2.22	---	12.56	145.58	1174.0
XSECTION 43	RUNOFF	.05	1	2	.08	.0	4.04	24.00	2.95	---	12.44	75.70	1610.6
XSECTION 21	REACH	.05	1	2	.08	.0	4.04	24.00	2.93	---	12.80	67.57	1437.6
XSECTION 21	ADDHYD	.17	1	2	.08	.0	4.04	24.00	2.41	---	12.58	205.80	1203.5
XSECTION 21	RUNOFF	.19	1	2	.08	.0	4.04	24.00	2.65	---	12.55	249.78	1321.6
XSECTION 21	ADDHYD	.36	1	2	.08	.0	4.04	24.00	2.54	---	12.57	455.32	1264.8

SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 3													
XSECTION 45	REACH	.36	1	2	.08	.0	4.04	24.00	2.54	---	12.57	455.32	1264.8
XSECTION 45	RUNOFF	.12	1	2	.08	.0	4.04	24.00	2.94	---	12.52	169.91	1464.8
XSECTION 45	ADDHYD	.48	1	2	.08	.0	4.04	24.00	2.64	---	12.56	624.18	1311.3
XSECTION 45	ADDHYD	.64	1	2	.08	.0	4.04	24.00	2.53	---	12.57	765.61	1188.8
XSECTION 150	RUNOFF	.02	1	2	.08	.0	4.04	24.00	2.23	---	12.45	21.93	1370.4
XSECTION 57	REACH	.02	1	2	.08	.0	4.04	24.00	2.20	---	12.93	16.21	1012.9
XSECTION 57	RUNOFF	.05	1	2	.08	.0	4.04	24.00	2.23	---	12.46	65.96	1319.1
XSECTION 57	ADDHYD	.07	1	2	.08	.0	4.04	24.00	2.22	---	12.48	75.32	1141.2
XSECTION 59	REACH	.07	1	2	.08	.0	4.04	24.00	2.20	---	12.80	64.33	974.7
XSECTION 59	RUNOFF	.05	1	2	.08	.0	4.04	24.00	2.23	---	12.46	69.91	1319.1
XSECTION 59	ADDHYD	.12	1	2	.08	.0	4.04	24.00	2.21	---	12.52	118.64	997.0
XSECTION 59	ADDHYD	.76	1	2	.08	.0	4.04	24.00	2.48	---	12.56	882.06	1156.0
XSECTION 49	RUNOFF	.09	1	2	.08	.0	4.04	24.00	3.46	---	12.44	146.94	1708.6
XSECTION 50	REACH	.09	1	2	.08	.0	4.04	24.00	3.44	---	12.80	133.69	1554.5
XSECTION 50	RUNOFF	.09	1	2	.08	.0	4.04	24.00	3.45	---	12.48	149.09	1620.6
XSECTION 50	ADDHYD	.18	1	2	.08	.0	4.04	24.00	3.44	---	12.55	269.33	1513.1
XSECTION 20	RUNOFF	.06	1	2	.08	.0	4.04	24.00	3.47	---	12.44	110.00	1718.8
XSECTION 48	REACH	.06	1	2	.08	.0	4.04	24.00	3.43	---	12.98	90.52	1414.4
XSECTION 48	RUNOFF	.09	1	2	.08	.0	4.04	24.00	2.22	---	12.59	105.20	1143.5
XSECTION 48	ADDHYD	.16	1	2	.08	.0	4.04	24.00	2.71	---	12.66	178.58	1144.7
XSECTION 50	REACH	.16	1	2	.08	.0	4.04	24.00	2.70	---	12.93	156.04	1000.2

XSECTION	50	ADDHYD	.33	1	2	.08	.0	4.04	24.00	3.10	---	12.65	394.21	1180.3
XSECTION	52	REACH	.33	1	2	.08	.0	4.04	24.00	3.10	---	12.75	392.30	1174.5
XSECTION	52	RUNOFF	.05	1	2	.08	.0	4.04	24.00	2.23	---	12.45	74.56	1355.7
XSECTION	52	ADDHYD	.39	1	2	.08	.0	4.04	24.00	2.97	---	12.57	421.29	1083.0
XSECTION	56	REACH	.39	1	2	.08	.0	4.04	24.00	2.97	---	12.83	402.41	1034.5
XSECTION	56	RUNOFF	.07	1	2	.08	.0	4.04	24.00	2.23	---	12.46	88.38	1319.1
XSECTION	56	ADDHYD	.46	1	2	.08	.0	4.04	24.00	2.86	---	12.60	445.07	976.0
XSECTION	51	REACH	.46	1	2	.08	.0	4.04	24.00	2.85	---	12.83	423.88	929.6
XSECTION	51	RUNOFF	.03	1	2	.08	.0	4.04	24.00	2.23	---	12.45	42.48	1370.4
XSECTION	51	ADDHYD	.49	1	2	.08	.0	4.04	24.00	2.81	---	12.81	428.63	880.1
XSECTION	55	REACH	.49	1	2	.08	.0	4.04	24.00	2.81	---	13.04	420.89	864.3
XSECTION	55	RUNOFF	.02	1	2	.08	.0	4.04	24.00	2.23	---	12.45	23.30	1370.4
XSECTION	55	ADDHYD	.50	1	2	.08	.0	4.04	24.00	2.79	---	13.04	422.99	839.3
XSECTION	55	ADDHYD	1.27	1	2	.08	.0	4.04	24.00	2.60	---	12.60	1221.81	964.3
STRUCTURE	59	RESVOR	1.27	1	2	.08	.0	4.04	24.00	2.60	1410.06	13.69	420.79	332.1

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
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A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID		STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE	1	STORM	3											
+														
XSECTION	66	REACH	1.27	1	2	.08	.0	4.04	24.00	2.60	---	13.69	420.79	332.1
XSECTION	66	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.39	---	12.53	81.13	1287.7
XSECTION	66	ADDHYD	1.33	1	2	.08	.0	4.04	24.00	2.59	---	13.64	426.63	320.8
XSECTION	67	REACH	1.33	1	2	.08	.0	4.04	24.00	2.59	---	13.64	426.63	320.8
XSECTION	67	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.76	---	12.45	95.29	1512.5
XSECTION	67	ADDHYD	1.39	1	2	.08	.0	4.04	24.00	2.60	---	12.55	484.87	348.1
XSECTION	44	RUNOFF	.13	1	2	.08	.0	4.04	24.00	2.66	---	12.47	182.98	1463.9
XSECTION	67	REACH	.13	1	2	.08	.0	4.04	24.00	2.66	---	12.57	179.72	1437.8
XSECTION	67	ADDHYD	1.52	1	2	.08	.0	4.04	24.00	2.61	---	12.56	664.38	437.7
XSECTION	69	REACH	1.52	1	2	.08	.0	4.04	24.00	2.61	---	12.56	664.38	437.7
XSECTION	69	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.14	---	12.60	69.10	1096.8
XSECTION	69	ADDHYD	1.58	1	2	.08	.0	4.04	24.00	2.59	---	12.56	732.80	463.5
XSECTION	23	RUNOFF	.09	1	2	.08	.0	4.04	24.00	3.46	---	12.44	154.39	1696.6
XSECTION	40	REACH	.09	1	2	.08	.0	4.04	24.00	3.44	---	12.73	143.22	1573.8
XSECTION	38	RUNOFF	.13	1	2	.08	.0	4.04	24.00	2.48	---	12.52	167.08	1336.7
XSECTION	40	REACH	.13	1	2	.08	.0	4.04	24.00	2.47	---	12.75	155.72	1245.8
XSECTION	40	ADDHYD	.22	1	2	.08	.0	4.04	24.00	2.88	---	12.74	298.88	1383.7
XSECTION	40	RUNOFF	.09	1	2	.08	.0	4.04	24.00	2.22	---	12.55	111.50	1186.2
XSECTION	40	ADDHYD	.31	1	2	.08	.0	4.04	24.00	2.68	---	12.66	397.19	1281.3
XSECTION	82	REACH	.31	1	2	.08	.0	4.04	24.00	2.67	---	12.77	392.44	1265.9
XSECTION	82	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.40	---	12.46	86.69	1376.0
XSECTION	82	ADDHYD	.37	1	2	.08	.0	4.04	24.00	2.63	---	12.60	438.07	1174.5
XSECTION	39	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.48	---	12.55	80.11	1281.8
XSECTION	82	REACH	.06	1	2	.08	.0	4.04	24.00	2.47	---	12.81	72.97	1167.5
XSECTION	82	ADDHYD	.44	1	2	.08	.0	4.04	24.00	2.60	---	12.63	502.11	1153.0
XSECTION	81	REACH	.44	1	2	.08	.0	4.04	24.00	2.60	---	12.75	498.26	1144.1
XSECTION	81	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.39	---	12.55	79.29	1258.6
XSECTION	81	ADDHYD	.50	1	2	.08	.0	4.04	24.00	2.57	---	12.70	564.94	1133.3
XSECTION	22	RUNOFF	.15	1	2	.08	.0	4.04	24.00	2.66	---	12.52	212.40	1388.2
XSECTION	41	REACH	.15	1	2	.08	.0	4.04	24.00	2.65	---	12.74	203.21	1328.1
XSECTION	41	RUNOFF	.17	1	2	.08	.0	4.04	24.00	2.39	---	12.50	227.58	1323.2
XSECTION	41	ADDHYD	.32	1	2	.08	.0	4.04	24.00	2.51	---	12.55	412.55	1269.4
XSECTION	42	RUNOFF	.08	1	2	.08	.0	4.04	24.00	2.66	---	12.45	116.72	1496.4
XSECTION	42	ADDHYD	.40	1	2	.08	.0	4.04	24.00	2.54	---	12.51	519.87	1290.0
XSECTION	78	REACH	.40	1	2	.08	.0	4.04	24.00	2.54	---	12.62	509.79	1265.0
XSECTION	81	DIVERT	.00	1	2	.08	.0	4.04	24.00	2.54	---	12.08*	154.00**********	

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 3													
+													
XSECTION 78	DIVERT	.50	1	2	.08	.0	4.04	24.00	1.12	---	12.70	410.94	824.4
XSECTION 78	REACH	.50	1	2	.08	.0	4.04	24.00	1.12	---	12.83	402.38	807.2
XSECTION 78	ADDHYD	.90	1	2	.08	.0	4.04	24.00	1.75	---	12.69	866.54	961.2
XSECTION 78	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.57	---	12.46	90.81	1441.4
XSECTION 78	ADDHYD	.96	1	2	.08	.0	4.04	24.00	1.81	---	12.65	920.08	953.9
XSECTION 77	REACH	.96	1	2	.08	.0	4.04	24.00	1.80	---	12.75	913.56	947.2
XSECTION 77	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.57	---	12.49	87.65	1391.3
XSECTION 77	ADDHYD	1.03	1	2	.08	.0	4.04	24.00	1.85	---	12.72	968.33	942.4
XSECTION 69	ADDHYD	2.61	1	2	.08	.0	4.04	24.00	2.30	---	12.65	1658.27	635.7
STRUCTURE 69	RESVOR	2.61	1	2	.08	.0	4.04	24.00	2.26	1389.39	15.37	380.84	146.0
XSECTION 75	REACH	2.61	1	2	.08	.0	4.04	24.00	2.26	---	15.37	380.84	146.0
XSECTION 80	REACH	.00	1	2	.08	.0	4.04	24.00	2.26	---	12.08*	154.00**********	
XSECTION 80	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.06	---	12.53	72.79	1155.4
XSECTION 80	ADDHYD	.06	1	2	.08	.0	4.04	24.00	13.59	---	12.53	226.79	3599.9
XSECTION 80	DIVERT	.00	1	2	.08	.0	4.04	24.00	13.59	---	12.00*	166.00**********	
XSECTION 79	DIVERT	.06	1	2	.08	.0	4.04	24.00	1.04	---	12.53	60.79	965.0
XSECTION 79	REACH	.06	1	2	.08	.0	4.04	24.00	1.04	---	12.76	56.46	896.1
XSECTION 79	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.76	---	12.45	95.29	1512.5
XSECTION 79	ADDHYD	.13	1	2	.08	.0	4.04	24.00	1.90	---	12.51	137.02	1087.4
XSECTION 76	REACH	.13	1	2	.08	.0	4.04	24.00	1.89	---	12.62	132.10	1048.4
XSECTION 76	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.31	---	12.46	85.23	1352.8
XSECTION 76	ADDHYD	.19	1	2	.08	.0	4.04	24.00	2.03	---	12.53	208.64	1103.9
XSECTION 75	REACH	.19	1	2	.08	.0	4.04	24.00	2.03	---	12.64	201.94	1068.5
XSECTION 75	ADDHYD	2.80	1	2	.08	.0	4.04	24.00	2.24	---	12.70	497.49	177.8
XSECTION 75	RUNOFF	.06	1	2	.08	.0	4.04	24.00	3.45	---	12.50	101.37	1609.0
XSECTION 75	ADDHYD	2.86	1	2	.08	.0	4.04	24.00	2.27	---	12.65	587.85	205.5
XSECTION 112	REACH	2.86	1	2	.08	.0	4.04	24.00	2.27	---	12.65	587.85	205.5
XSECTION 109	REACH	.00	1	2	.08	.0	4.04	24.00	2.27	---	12.72*	166.00**********	
XSECTION 109	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.39	---	12.47	86.13	1367.2
XSECTION 109	ADDHYD	.06	1	2	.08	.0	4.04	24.00	14.91	---	12.47	252.11	4001.8
XSECTION 108	ADDHYD	9.75	1	2	.08	.0	4.04	24.00	2.09	7.24	12.58	5368.90	550.8
XSECTION 110	REACH	9.75	1	2	.08	.0	4.04	24.00	2.09	7.44	12.58	5368.90	550.8
XSECTION 110	RUNOFF	.07	1	2	.08	.0	4.04	24.00	1.68	---	12.59	66.54	911.5
XSECTION 110	ADDHYD	9.82	1	2	.08	.0	4.04	24.00	2.08	7.49	12.58	5435.38	553.5
XSECTION 122	RUNOFF	.35	1	2	.08	.0	4.04	24.00	2.14	---	12.48	449.04	1264.9
XSECTION 110	ADDHYD	10.18	1	2	.08	.0	4.04	24.00	2.08	7.83	12.56	5856.90	575.6
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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 3													
+													
XSECTION 111	REACH	10.18	1	2	.08	.0	4.04	24.00	2.08	7.06	12.56	5856.90	575.6
XSECTION 111	RUNOFF	.07	1	2	.08	.0	4.04	24.00	1.47	---	12.60	56.78	811.2
XSECTION 111	ADDHYD	10.25	1	2	.08	.0	4.04	24.00	2.08	7.10	12.56	5913.10	577.1
XSECTION 112	REACH	10.25	1	2	.08	.0	4.04	24.00	2.08	---	12.65	5902.49	576.1
XSECTION 112	RUNOFF	.06	1	2	.08	.0	4.04	24.00	1.54	---	12.56	54.80	898.3
XSECTION 112	ADDHYD	10.31	1	2	.08	.0	4.04	24.00	2.07	---	12.65	5954.51	577.7
XSECTION 121	RUNOFF	.25	1	2	.08	.0	4.04	24.00	3.36	---	12.44	425.28	1701.1
XSECTION 112	ADDHYD	10.56	1	2	.08	.0	4.04	24.00	2.10	---	12.61	6119.18	579.7
XSECTION 112	ADDHYD	13.42	1	2	.08	.0	4.04	24.00	2.14	---	12.62	6704.36	499.7
XSECTION 113	REACH	13.42	1	2	.08	.0	4.04	24.00	2.13	---	12.70	6700.63	499.4
XSECTION 113	RUNOFF	.05	1	2	.08	.0	4.04	24.00	3.04	---	12.52	79.44	1498.9
XSECTION 113	ADDHYD	13.47	1	2	.08	.0	4.04	24.00	2.14	---	12.70	6769.30	502.5
XSECTION 120	RUNOFF	.23	1	2	.08	.0	4.04	24.00	2.66	---	12.47	338.15	1463.9
XSECTION 113	ADDHYD	13.70	1	2	.08	.0	4.04	24.00	2.15	---	12.67	6966.26	508.4
XSECTION 58	RUNOFF	.03	1	2	.08	.0	4.04	24.00	2.40	---	12.45	45.93	1435.2
XSECTION 60	REACH	.03	1	2	.08	.0	4.04	24.00	2.39	---	12.62	43.31	1353.6
XSECTION 60	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.14	---	12.54	73.55	1167.5
XSECTION 60	ADDHYD	.09	1	2	.08	.0	4.04	24.00	2.22	---	12.57	115.42	1215.0

XSECTION 65	REACH	.09	1	2	.08	.0	4.04	24.00	2.22	---	12.69	113.10	1190.5
XSECTION 65	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.22	---	12.54	75.82	1203.4
XSECTION 65	ADDHYD	.16	1	2	.08	.0	4.04	24.00	2.22	---	12.61	184.44	1167.3
XSECTION 68	REACH	.16	1	2	.08	.0	4.04	24.00	2.21	---	12.73	180.50	1142.4
XSECTION 68	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.48	---	12.46	89.38	1418.7
XSECTION 68	ADDHYD	.22	1	2	.08	.0	4.04	24.00	2.29	---	12.54	247.97	1122.0
XSECTION 70	REACH	.22	1	2	.08	.0	4.04	24.00	2.29	---	12.66	238.49	1079.1
XSECTION 70	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.57	---	12.46	91.40	1450.7
XSECTION 70	ADDHYD	.28	1	2	.08	.0	4.04	24.00	2.35	---	12.56	309.71	1090.5
XSECTION 74	REACH	.28	1	2	.08	.0	4.04	24.00	2.35	---	12.67	299.54	1054.7
XSECTION 74	RUNOFF	.06	1	2	.08	.0	4.04	24.00	2.95	---	12.45	99.42	1578.1
XSECTION 74	ADDHYD	.35	1	2	.08	.0	4.04	24.00	2.45	---	12.56	370.62	1068.1
XSECTION 113	REACH	.35	1	2	.08	.0	4.04	24.00	2.45	---	12.56	370.62	1068.1
XSECTION 113	ADDHYD	14.05	1	2	.08	.0	4.04	24.00	2.15	---	12.66	7314.83	520.7
XSECTION 114	REACH	14.05	1	2	.08	.0	4.04	24.00	2.14	---	12.79	7165.20	510.1
XSECTION 64	RUNOFF	.25	1	2	.08	.0	4.04	24.00	2.22	---	12.48	319.51	1278.1
XSECTION 72	REACH	.25	1	2	.08	.0	4.04	24.00	2.22	---	12.63	296.13	1184.5
XSECTION 72	RUNOFF	.13	1	2	.08	.0	4.04	24.00	2.30	---	12.54	154.91	1239.3

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SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
(A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/ STRUCTURE ID	STANDARD CONTROL OPERATION	DRAINAGE AREA (SQ MI)	RAIN TABLE #	ANTEC MOIST COND	MAIN TIME INCREM (HR)	PRECIPITATION BEGIN (HR)	PRECIPITATION AMOUNT (IN)	PRECIPITATION DURATION (HR)	RUNOFF AMOUNT (IN)	PEAK DISCHARGE ELEVATION (FT)	PEAK DISCHARGE TIME (HR)	PEAK DISCHARGE RATE (CFS)	PEAK DISCHARGE RATE (CSM)
ALTERNATE 1 STORM 3													
XSECTION 72	ADDHYD	.38	1	2	.08	.0	4.04	24.00	2.25	---	12.60	446.87	1191.7
XSECTION 114	REACH	.38	1	2	.08	.0	4.04	24.00	2.24	---	12.84	413.53	1102.8
XSECTION 115	RUNOFF	.09	1	2	.08	.0	4.04	24.00	2.22	---	12.53	115.33	1226.9
XSECTION 114	ADDHYD	.47	1	2	.08	.0	4.04	24.00	2.23	---	12.74	483.50	1030.9
XSECTION 71	RUNOFF	.13	1	2	.08	.0	4.04	24.00	2.30	---	12.54	154.91	1239.3
XSECTION 114	REACH	.13	1	2	.08	.0	4.04	24.00	2.29	---	12.91	131.16	1049.3
XSECTION 114	ADDHYD	.59	1	2	.08	.0	4.04	24.00	2.25	---	12.78	606.03	1020.3
XSECTION 114	RUNOFF	.13	1	2	.08	.0	4.04	24.00	2.46	---	12.90	118.86	928.6
XSECTION 114	ADDHYD	.72	1	2	.08	.0	4.04	24.00	2.28	---	12.80	722.11	1000.1
XSECTION 114	ADDHYD	14.77	1	2	.08	.0	4.04	24.00	2.15	---	12.79	7887.28	534.0
XSECTION 119	RUNOFF	.23	1	2	.08	.0	4.04	24.00	2.38	---	12.82	221.79	960.2
XSECTION 114	ADDHYD	15.00	1	2	.08	.0	4.04	24.00	2.15	---	12.79	8108.75	540.5
XSECTION 118	REACH	15.00	1	2	.08	.0	4.04	24.00	2.14	---	12.94	7899.43	526.6
XSECTION 118	RUNOFF	.23	1	2	.08	.0	4.04	24.00	2.11	---	13.17	153.26	663.5
XSECTION 118	ADDHYD	15.23	1	2	.08	.0	4.04	24.00	2.14	---	12.94	8040.75	527.9
XSECTION 117	REACH	15.23	1	2	.08	.0	4.04	24.00	2.14	---	13.07	7889.65	518.0
XSECTION 117	RUNOFF	.17	1	2	.08	.0	4.04	24.00	2.03	---	13.39	96.28	556.5
XSECTION 117	ADDHYD	15.41	1	2	.08	.0	4.04	24.00	2.13	---	13.08	7975.86	517.7

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SUMMARY TABLE 2 - SELECTED MODIFIED ATT-KIN REACH ROUTINGS IN ORDER OF STANDARD EXECUTIVE CONTROL INSTRUCTIONS
(A STAR(*) AFTER VOLUME ABOVE BASE(IN) INDICATES A HYDROGRAPH TRUNCATED AT A VALUE EXCEEDING BASE + 10% OF PEAK
A QUESTION MARK(?) AFTER COEFF.(C) INDICATES PARAMETERS OUTSIDE ACCEPTABLE LIMITS, SEE PREVIOUS WARNINGS)

		HYDROGRAPH INFORMATION							ROUTING PARAMETERS									PEAK TRAVEL TIME	
		INFLOW		OUTFLOW		OUTFLOW+ INTERV.AREA		BASE-	VOLUME ABOVE	MAIN	ITER-	Q AND A			PEAK	S/Q	ATT-		
XSEC ID	REACH LENGTH (FT)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	FLOW (CFS)	BASE (IN)	TIME INCR (HR)	ATION #	EQUATION COEFF (X)	POWER (M)	LENGTH FACTOR (K*)	RATIO O/I (Q*)	@PEAK (K) (SEC)	KIN COEFF (C)	STOR- AGE (HR)	KINE- MATIC (HR)
ALTERNATE 1 STORM 1																			
3	1000	149	12.5	145	12.6	---	---	0	1.98	.08	1	.040	1.66	.074	.971	572	.40	.08	.16
3	1400	99	12.5	93	12.7			0	1.99	.08	1	.040	1.66	.171	.939	945	.26	.08	.27

+							---	---												
+	6	1600	256	12.6	251	12.8			0	1.78	.08	1	1.73	1.17	.063	.982	379	.55	.16	.11
+							---	---												
	8	1600	299	12.8	284	13.0			0	1.55	.08	1	.594	1.26	.094	.952	589	.39	.16	.16
+							---	---												
+	8	1400	45	12.7	43	12.8			0	.75	.08	1	.491	1.56	.038	.969	361	.57	.08	.10
+							---	---												
+	4	1800	22	12.5	18	13.0			0	1.99	.08	1	.050	1.66	.553	.783	1915	.14	.16	.56
+							209	12.5												
+	5	1400	209	12.5	201	12.6			0	1.98	.08	1	.050	1.66	.076	.966	613	.38	.08	.17
+							---	---												
+	8	2100	254	12.6	235	12.9			0	1.53	.08	2	.486	1.31	.125	.924	746	.32	.16	.21
+							---	---												
+	8	1900	74	12.7	55	13.1			0	.80	.08	1	.040	1.66	.334	.746	1440	.18	.24	.42
+							---	---												
+	8	1095	24	12.8	24	12.9			0	.84	.08	1	3.60	1.25	.017	.997	166	.93?	.08	.05
+							---	---												
+	14	2630	285	13.4	281	13.8			0	1.23	.08	1	.181	1.51	.030	.984	800	.30	.32	.22
+							288	13.8												
+	15	1300	80	12.6	78	12.6			0	1.26	.08	1	.540	1.54	.027	.981	271	.69?	.08	.08
+							111	12.7												
+	14	2640	49	12.8	47	13.0			0	.84	.08	1	2.10	1.40	.038	.974	366	.56	.16	.10
+							---	---												
+	14	1320	47	13.0	47	13.0			0	.84	.08	0	1.64	1.67	.004	1.000	125	1.00?	.00	.00
+							---	---												
+	27	2743	401	12.6	361	13.0			0	1.17	.08	1	.068	1.61	.036	.900	934	.27	.40	.26
+							431	13.0												
+	25	2200	60	12.5	50	13.0			0	1.99	.08	1	.050	1.66	.403	.837	1581	.17	.08	.45
+							92	12.6												
+	27	1343	92	12.6	82	12.8			0	1.43	.08	1	.068	1.61	.102	.885	797	.31	.24	.23
+							---	---												
+	37	3000	517	13.0	509	13.1			0	1.17	.08	1	.630	1.43	.016	.986	439	.49	.16	.12
+							517	13.1												
+	37	2100	139	12.6	136	12.6			0	1.26	.08	1	.410	1.66	.030	.981	304	.64	.08	.08
+							---	---												
+	35	1320	69	12.6	66	12.8			0	1.13	.08	1	.310	1.54	.045	.969	416	.51	.16	.12
+							133	12.6												
+	36	1320	133	12.6	133	12.6			0	1.10	.08	0	4.09	1.25	.014	1.000	129	1.00?	.00	.00
+							---	---												
+	11	2700	40	12.6	36	12.8			0	.75	.08	1	.440	1.66	.097	.905	617	.38	.16	.17
+							88	12.7												
+	28	3300	88	12.7	50	13.6			0	.80	.08	1	.030	1.66	.971	.571	2777	.10	.48	.86
+							---	---												
+	28	2800	66	12.6	39	13.4			0	1.01	.08	1	.030	1.66	.979	.587	2632	.10	.32	.81
+							89	13.5												
+	36	3500	117	13.3	102	13.8			0	.91	.08	1	.060	1.66	.150	.867	1726	.15	.48	.49
+							107	13.7												
+	37	1320	237	12.6	237	12.7			0	.00	.08	1	3.00	1.25	.008	1.000	147	.99?	.08	.04
+							---	---												
+	85	660	347	14.8	347	14.8			0	1.51*	.08	0	3.21	1.25	.001	1.000	64	1.00?	.00	.00
+							348	14.8												
+	84	1320	348	14.8	348	14.8			0	1.49*	.08	0	3.21	1.25	.002	1.000	129	1.00?	.00	.00
+							350	14.8												
+	90	1320	87	12.6	83	12.7			0	1.26	.08	1	.220	1.54	.069	.948	478	.46	.16	.13
+							---	---												
+	90	2600	0	.0	0	.0			0	.00	.08	0	.000	.00	.000	.000	0	.00	.00	.00
+							---	---												
	88	1320	149	12.6	144	12.8			0	.26	.08	1	.220	1.54	.047	.968	396	.53	.16	.11
+							201	12.7												

+ 88	2000	31	12.6	26	12.9	---	---	0	1.13	.08	1	.220 1.54	.248	.837	1038	.24	.16	.30
+ 1																		

SUMMARY TABLE 2 - SELECTED MODIFIED ATT-KIN REACH ROUTINGS IN ORDER OF STANDARD EXECUTIVE CONTROL INSTRUCTIONS
(A STAR(*) AFTER VOLUME ABOVE BASE(IN) INDICATES A HYDROGRAPH TRUNCATED AT A VALUE EXCEEDING BASE + 10% OF PEAK
A QUESTION MARK(?) AFTER COEFF.(C) INDICATES PARAMETERS OUTSIDE ACCEPTABLE LIMITS, SEE PREVIOUS WARNINGS)

XSEC ID	REACH LENGTH (FT)	HYDROGRAPH INFORMATION: INFLOW PEAK (CFS)	INFLOW TIME (HR)	OUTFLOW PEAK (CFS)	OUTFLOW TIME (HR)	OUTFLOW+ INTERV. PEAK (CFS)	OUTFLOW+ INTERV. TIME (HR)	BASE-FLOW (CFS)	ROUTING PARAMETERS: VOLUME ABOVE BASE (IN)	MAIN TIME INCR (HR)	ITER-ATION #	Q AND A EQUATION COEFF (X)	POWER (M)	LENGTH FACTOR (K*)	PEAK RATIO O/I (Q*)	S/Q @PEAK (SEC)	ATT-KIN COEFF (C)	PEAK TRAVEL TIME STOR-AGE (HR)	KINE-MATIC (HR)
ALTERNATE	1	STORM	1																
+101	1050	225	12.8	223	12.9	245	12.8	0	.37	.08	1	.220	1.54	.024	.992	273	.69?	.08	.08
+102	1320	245	12.8	217	13.0	230	13.0	0	.41	.08	1	.020	1.66	.143	.888	943	.27	.24	.27
+104	1900	230	13.0	192	13.4	---	---	0	.42	.08	1	.020	1.66	.215	.837	1391	.19	.32	.40
+ 87	1320	46	12.5	37	12.8	73	12.6	0	1.20	.08	1	.118	1.45	.328	.807	1213	.21	.16	.35
+105	2000	73	12.6	58	13.0	71	12.9	0	1.19	.08	1	.285	1.34	.258	.801	1300	.20	.32	.37
+104	1320	71	12.9	67	13.1	78	13.0	0	.98	.08	1	.150	1.54	.064	.942	659	.36	.24	.19
105	1320	124	14.8	124	14.9	---	---	0	1.49*	.08	1	3.07	1.25	.002	1.000	164	.93?	.08	.05
+104	1320	124	14.9	124	15.0	---	---	0	1.49*	.08	1	1.85	1.25	.004	1.000	246	.74?	.08	.07
+ 83	1320	226	14.8	226	14.8	255	12.6	0	1.46*	.08	0	8.46	1.25	.001	1.000	65	1.00?	.00	.00
+106	1320	255	12.6	255	12.6	284	12.6	0	1.44*	.08	0	5.48	1.25	.001	1.000	89	1.00?	.00	.00
+107	900	284	12.6	284	12.6	316	12.6	0	1.42	.08	0	3.59	1.25	.001	1.000	84	1.00?	.00	.00
+145	1500	58	12.7	58	12.7	---	---	0	.95	.08	0	6.10	1.25	.014	1.000	125	1.00?	.00	.00
+145	2350	178	12.6	178	12.7	---	---	0	.90	.08	1	6.09	1.25	.020	.998	157	.96?	.08	.04
+ 33	3500	54	12.8	43	13.2	53	13.0	0	.84	.08	1	.145	1.66	.233	.801	1380	.19	.40	.40
+ 93	2640	103	13.1	103	13.2	200	12.6	0	.79	.08	1	3.50	1.25	.009	.996	307	.64	.08	.09
+ 92	1320	0	.0	0	.0	87	12.6	0	.00	.08	0	.000	.00	.000	.000	0	.00	.00	.00
+ 98	2500	87	12.6	71	12.9	---	---	0	.12	.08	1	.080	1.66	.278	.815	1166	.22	.16	.34
+ 95	1320	200	12.6	200	12.6	---	---	0	.00	.08	0	4.72	1.25	.004	1.000	106	1.00?	.00	.00
+ 32	3400	47	12.6	19	13.8	72	12.8	0	1.07	.08	1	.030	1.66	1.709	.396	5215	.05?	.48	1.19
+ 94	3200	72	12.8	58	13.2	118	12.6	0	.94	.08	1	.090	1.66	.145	.795	1498	.18	.40	.43
+ 95	2400	118	12.6	99	12.8			0	1.00	.08	1	.090	1.66	.065	.839	926	.27	.16	.27

+						162	12.8													
+ 98	3000	79	12.6	31	13.1			0	.10	.08	1	.080	1.66	2.236	.401	2449	.11?	.32	.48
+						---	---													
96	1320	265	12.4	265	12.4			0	.00	.08	0	4.72	1.25	.003	1.000	100	1.00?	.00	.00
+						336	12.6													
+ 97	2100	71	12.6	51	12.9			0	.51	.08	1	.080	1.66	.757	.720	1065	.24	.24	.32
+						161	12.6													
+ 98	1000	161	12.6	155	12.8			0	1.00	.08	1	.080	1.66	.036	.964	366	.56	.16	.10
+						---	---													
+ 99	1250	265	12.8	261	12.9			0	.29	.08	1	.080	1.66	.026	.984	375	.55	.08	.10
+						299	12.8													
+139	1600	299	12.8	286	13.0			0	.33	.08	1	.050	1.66	.054	.956	608	.38	.16	.17
+						---	---													
+139	600	56	12.6	56	12.6			0	1.26	.08	0	6.13	1.25	.005	1.000	50	1.00?	.00	.00
+						300	12.9													
+142	2640	265	12.3	265	12.7			0	.00	.08	1	5.68	1.25	.006	1.000	172	.91?	.40	.05
+						350	13.1													
+141	2100	85	13.1	85	13.2			0	.46	.08	1	4.34	1.25	.046	.998	214	.81?	.08	.06
+						165	12.6													
+140	1320	165	12.6	165	12.6			0	.77	.08	0	4.21	1.25	.013	1.000	120	1.00?	.00	.00
+						247	12.6													
+139	2800	279	12.6	277	12.7			0	.86	.08	1	3.78	1.25	.035	.991	251	.73?	.08	.07
+						---	---													
1																				

SUMMARY TABLE 2 - SELECTED MODIFIED ATT-KIN REACH ROUTINGS IN ORDER OF STANDARD EXECUTIVE CONTROL INSTRUCTIONS
(A STAR(*) AFTER VOLUME ABOVE BASE(IN) INDICATES A HYDROGRAPH TRUNCATED AT A VALUE EXCEEDING BASE + 10% OF PEAK
A QUESTION MARK(?) AFTER COEFF.(C) INDICATES PARAMETERS OUTSIDE ACCEPTABLE LIMITS, SEE PREVIOUS WARNINGS)

		HYDROGRAPH INFORMATION							ROUTING PARAMETERS									PEAK	
+						OUTFLOW+			VOLUME	MAIN	ITER-	Q AND A			PEAK	S/Q	ATT-	TRAVEL TIME	
+ XSEC	REACH	INFLOW		OUTFLOW		INTERV.AREA		BASE-	ABOVE	TIME	ATION	EQUATION		LENGTH	RATIO	@PEAK	KIN	STOR-	KINE-
+ ID	LENGTH (FT)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	FLOW (CFS)	BASE (IN)	INCR (HR)	#	COEFF (X)	POWER (M)	FACTOR (K*)	O/I (Q*)	(K) (SEC)	COEFF (C)	AGE (HR)	MATIC (HR)
ALTERNATE	1	STORM	1																
+																			
+138	3000	56	12.5	48	12.8			0	1.40	.08	1	.170	1.66	.273	.858	1061	.24	.08	.30
+						175	12.5												
+139	2000	175	12.5	174	12.6			0	1.15	.08	1	4.52	1.25	.025	.994	170	.92?	.08	.05
+						---	---												
+127	2500	99	12.5	80	12.8			0	1.11	.08	1	.080	1.66	.326	.809	1108	.23	.08	.32
+						---	---												
+127	2300	23	12.5	15	13.0			0	.91	.08	1	.080	1.66	.851	.645	1838	.15	.16	.55
+						93	12.9												
+131	2000	166	12.5	157	12.6			0	1.19	.08	1	.170	1.66	.071	.949	459	.48	.08	.13
+						---	---												
+126	1500	395	12.6	387	12.6			0	1.11	.08	1	.110	1.66	.029	.980	317	.62	.08	.09
+						508	12.6												
+134	1500	508	12.6	498	12.6			0	1.21	.08	1	.130	1.66	.019	.980	259	.71?	.08	.07
+						---	---												
+134	3200	36	12.5	27	13.0			0	1.40	.08	1	.130	1.66	.535	.760	1593	.17	.16	.47
+						519	12.6												
+124	2500	722	12.6	682	12.7			0	1.28	.08	1	.090	1.66	.047	.945	469	.47	.08	.13
+						749	12.6												
+124	900	848	12.6	848	12.6			0	.56	.08	0	.532	1.67	.001	1.000	53	1.00?	.00	.00
						---	---												
												.468							

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+104   1320    1635  12.6    1635  12.6                    0     .77    .08    0        1.62   .002  1.000     76 1.00?   .00   .00
+                                          ---   ---
                                                                                   .858
+107   1000    1863  12.6    1863  12.6                    0     .80    .08    0        1.56   .001  1.000     47 1.00?   .00   .00
                                          ---   ---
                                                                                   .799
+108   1700    2314  12.6    2314  12.6                    0     .94    .08    0        1.59   .001  1.000     71 1.00?   .00   .00
+                                         2331  12.6
                                                                                   .040
+ 47   1101      22  12.5      17  12.9                    0    1.02    .08    1        1.66   .476   .752   1338  .19    .16   .39
+                                           60  12.5
                                                                                   .040
+ 46   1285      60  12.5      47  12.8                    0    1.01    .08    1        1.66   .238   .791   1058  .24    .16   .31
+                                           67  12.5

                                                                                   .040
+149   1331      67  12.5      53  12.8                    0    1.01    .08    1        1.66   .146   .784   1045  .24    .24   .30
+                                           54  12.8
                                                                                   .040
+146   1240      35  12.5      27  12.9                    0    1.02    .08    1        1.66   .430   .767   1258  .21    .16   .37
+                                           66  12.5
                                                                                   .040
+ 45    413      66  12.5      62  12.6                    0    1.01    .08    1        1.66   .031   .949    328  .61    .08   .09
+                                          ---   ---
                                                                                   .040
+ 21   1377      42  12.5      35  12.9                    0    1.55    .08    1        1.66   .358   .830   1301  .20    .08   .37
+                                           90  12.6
                                                                                   9.02
+ 45   3213     218  12.6     218  12.7                    0    1.24    .08    1        1.25   .018   .999    151  .98?   .16   .04
+                                          308  12.6

                                                                                   .040
+ 57   1350      11  12.5       6  13.1                    0    1.02    .08    1        1.66  1.077   .593   2308  .12?   .16   .67
+                                           34  12.5
                                                                                   .040
+ 59   1330      34  12.5      25  12.9                    0    1.01    .08    1        1.66   .319   .742   1367  .19    .16   .40
+                                           49  12.6
                                                                                   .040
+ 50   1928      87  12.5      76  12.9                    0    1.99    .08    1        1.66   .315   .869   1365  .19    .08   .39
+                                          150  12.6
                                                                                   .040
+ 48   2570      65  12.5      50  13.0                    0    1.99    .08    1        1.66   .617   .765   2046  .13    .16   .60
+                                           89  12.7
                                                                                   .040
+ 50   1836      89  12.7      73  13.1                    0    1.40    .08    1        1.66   .196   .823   1293  .20    .32   .37
+                                          ---   ---

                                                                                   .040
  52    550     193  12.6     192  12.8                    0    1.70    .08    1        1.66   .012   .991    284  .67?   .16   .08
                                          199  12.6
                                                                                   .040
+ 56   1377     199  12.6     191  13.0                    0    1.60    .08    1        1.66   .048   .957    703  .34    .40   .20
+                                          198  12.6
                                                                                   .040
+ 51   1377     198  12.6     193  13.1                    0    1.51    .08    1        1.66   .040   .972    704  .34    .48   .20
+                                          194  13.1
                                                                                   .040
+ 55   1331     194  13.1     190  13.4                    0    1.48    .08    1        1.66   .035   .979    686  .35    .24   .19
+                                          191  13.4
                                                                                   5.64
+ 66    660     276  13.6     276  13.6                    0    1.30    .08    0        1.25   .001  1.000     43 1.00?   .00   .00
+                                          279  13.5

                                                                                   7.18
+ 67   1320     279  13.5     279  13.5                    0    1.30    .08    0        1.25   .002  1.000     71 1.00?   .00   .00
+                                          305  12.6
                                                                                   .250
+ 67   1320      98  12.5      95  12.6                    0    1.33    .08    1        1.54   .063   .964    422  .51    .16   .12
+                                          ---   ---
1
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SUMMARY TABLE 2 - SELECTED MODIFIED ATT-KIN REACH ROUTINGS IN ORDER OF STANDARD EXECUTIVE CONTROL INSTRUCTIONS
(A STAR(*) AFTER VOLUME ABOVE BASE(IN) INDICATES A HYDROGRAPH TRUNCATED AT A VALUE EXCEEDING BASE + 10% OF PEAK
A QUESTION MARK(?) AFTER COEFF.(C) INDICATES PARAMETERS OUTSIDE ACCEPTABLE LIMITS, SEE PREVIOUS WARNINGS)

	HYDROGRAPH INFORMATION								ROUTING PARAMETERS									PEAK	
						OUTFLOW+			VOLUME	MAIN	ITER-	Q AND A			PEAK	S/Q	ATT-	TRAVEL TIME	
XSEC	REACH	INFLOW		OUTFLOW		INTERV.AREA		BASE-	ABOVE	TIME	ATION	EQUATION		LENGTH	RATIO	@PEAK	KIN	STOR-	KINE-
ID	LENGTH (FT)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	FLOW (CFS)	BASE (IN)	INCR (HR)	#	COEFF (X)	POWER (M)	FACTOR (K*)	O/I (Q*)	(K) (SEC)	COEFF (C)	AGE (HR)	MATIC (HR)

ALTERNATE 1 STORM 1

+ 69	1320	399	12.6	399	12.6			0	1.30	.08	0	3.06	1.25	.005	1.000	130	1.00?	.00	.00
+						430	12.6												
40	2650	92	12.5	82	12.8			0	1.99	.08	1	.080	1.66	.258	.887	1209	.21	.16	.34
						---	---												
+ 40	1800	85	12.6	75	12.8			0	1.19	.08	1	.080	1.66	.171	.877	849	.29	.16	.24
+						157	12.8												
+ 82	1400	201	12.7	195	12.9			0	1.36	.08	1	.100	1.66	.038	.968	410	.52	.16	.11
+						207	12.6												
+ 82	1867	40	12.6	34	12.9			0	1.19	.08	1	.100	1.66	.219	.843	1035	.24	.24	.30
+						---	---												
+ 81	1320	239	12.8	237	12.9			0	1.30	.08	1	.220	1.54	.026	.990	336	.60	.08	.09
+						262	12.8												
+ 41	3100	112	12.6	103	12.7			0	1.33	.08	1	.240	1.66	.111	.920	677	.35	.16	.19
+						210	12.6												
+ 78	1600	267	12.6	255	12.7			0	1.24	.08	1	.090	1.66	.053	.957	446	.49	.08	.12
+						---	---												
+ 78	1320	108	12.8	99	13.0			0	.22	.08	1	.090	1.66	.190	.921	528	.43	.24	.15
+						---	---												
+ 77	1320	344	12.7	340	12.9			0	.71	.08	1	.230	1.54	.027	.988	287	.67?	.16	.08
+						355	12.9												
+ 75	1320	277	14.6	277	14.6			0	1.07	.08	0	3.79	1.25	.002	1.000	118	1.00?	.00	.00
+						---	---												
+ 80	1320	154	12.4	154	12.4			0	.00	.08	0	7.06	1.25	.004	1.000	81	1.00?	.00	.00
+						188	12.6												
+ 79	1320	22	12.6	16	12.8			0	.22	.08	1	.230	1.54	.682	.747	757	.32	.16	.22
+						55	12.6												
+ 76	1320	55	12.6	52	12.7			0	.81	.08	1	.230	1.54	.080	.947	547	.42	.08	.15
+						88	12.5												
+ 75	1320	88	12.5	84	12.6			0	.90	.08	1	.230	1.54	.059	.960	464	.47	.16	.13
+						---	---												
112	1320	354	12.6	354	12.6			0	1.08	.08	0	3.79	1.25	.002	1.000	112	1.00?	.00	.00
+						---	---												
+109	2640	166	12.3	166	13.0			0	.00	.08	1	4.04	1.25	.017	1.000	249	.73?	.64	.07
+						208	12.6												
+110	1320	2538	12.6	2538	12.6			0	1.00	.08	0	.512	1.62	.001	1.000	62	1.00?	.00	.00
+						2565	12.6												
+111	1320	2777	12.6	2777	12.6			0	1.00	.08	0	.908	1.60	.000	1.000	45	1.00?	.00	.00
+						2797	12.6												
+112	1320	2797	12.6	2760	12.6			0	.99	.08	1	.060	1.63	.005	.987	212	.81?	.08	.06
+						2781	12.6												
+113	1320	3226	12.6	3209	12.7			0	1.03	.08	1	.060	1.63	.004	.995	200	.84?	.08	.06
+						3247	12.7												
+ 60	1320	24	12.5	21	12.6			0	1.14	.08	1	.250	1.54	.156	.903	697	.34	.08	.20
+						55	12.6												
+ 65	1320	55	12.6	52	12.8			0	1.01	.08	1	.280	1.54	.072	.952	481	.46	.08	.13
+						81	12.6												
+ 68	1320	81	12.6	78	12.8			0	1.01	.08	1	.250	1.54	.055	.958	452	.48	.16	.13
+						105	12.6												
+ 70	1320	105	12.6	96	12.7			0	1.06	.08	1	.180	1.54	.054	.919	511	.44	.16	.14
+						130	12.6												
+ 74	1320	130	12.6	122	12.7			0	1.10	.08	1	.090	1.66	.041	.932	489	.45	.16	.14
+						160	12.6												
+113	1320	160	12.6	160	12.6			0	1.18	.08	0	6.62	1.25	.006	1.000	84	1.00?	.00	.00
+						---	---												
+114	3000	3475	12.7	3348	12.9			0	1.04	.08	1	.050	1.64	.016	.963	472	.47	.16	.13
+						---	---												
+ 72	2650	156	12.5	133	12.7			0	1.01	.08	1	.180	1.54	.211	.855	892	.28	.16	.25
						198	12.6												
+114	2000	198	12.6	172	12.9			0	1.03	.08	1	.050	1.66	.157	.871	895	.28	.24	.26

+						202	12.8												
+114	2200	76	12.6	57	13.0	---	---	0	1.07	.08	1	.050 1.66	.409	.749	1443	.18	.24	.42
+118	4000	3763	12.9	3597	13.0	3661	13.0	0	1.04	.08	1	.050 1.66	.020	.956	555	.41	.16	.16
+ 1																			

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(A STAR(*) AFTER VOLUME ABOVE BASE(IN) INDICATES A HYDROGRAPH TRUNCATED AT A VALUE EXCEEDING BASE + 10% OF PEAK
A QUESTION MARK(?) AFTER COEFF.(C) INDICATES PARAMETERS OUTSIDE ACCEPTABLE LIMITS, SEE PREVIOUS WARNINGS)

	HYDROGRAPH INFORMATION									ROUTING PARAMETERS										PEAK
						OUTFLOW+				VOLUME	MAIN	ITER-	Q AND A			PEAK	S/Q	ATT-	TRAVEL TIME	
XSEC	REACH	INFLOW		OUTFLOW		INTERV.AREA		BASE-		ABOVE	TIME	ATION	EQUATION		LENGTH	RATIO	@PEAK	KIN	STOR-	KINE-
ID	LENGTH (FT)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	FLOW (CFS)		BASE (IN)	INCR (HR)	#	COEFF (X)	POWER (M)	FACTOR (K*)	O/I (Q*)	(K) (SEC)	COEFF (C)	AGE (HR)	MATIC (HR)
ALTERNATE	1	STORM	1																	
+117	3527	3661	13.0	3543	13.2	3581	13.2	0		1.03	.08	1	.050	1.66	.016	.968	495	.45	.16	.14
ALTERNATE	1	STORM	2																	
+ 3	1000	217	12.5	214	12.6	---	---	0		3.00	.08	1	.040	1.66	.054	.985	493	.45	.08	.14
+ 3	1400	143	12.5	138	12.7	---	---	0		3.00	.08	1	.040	1.66	.125	.967	816	.30	.08	.23
+ 6	1600	386	12.6	383	12.7	---	---	0		2.74	.08	1	1.59	1.20	.052	.992	342	.59	.08	.10
+ 8	1600	471	12.7	454	12.9	---	---	0		2.47	.08	1	.644	1.24	.088	.963	554	.41	.16	.15
+ 8	1400	86	12.6	85	12.8	---	---	0		1.47	.08	1	.530	1.53	.029	.983	296	.65	.16	.08
+ 4	1800	32	12.5	27	13.0	305	12.5	0		3.00	.08	1	.050	1.66	.403	.843	1654	.16	.08	.47
+ 5	1400	305	12.5	298	12.6	---	---	0		3.00	.08	1	.050	1.66	.056	.979	528	.43	.08	.15
+ 8	2100	397	12.6	371	12.9	---	---	0		2.43	.08	1	.627	1.25	.127	.933	745	.32	.16	.21
+ 8	1900	139	12.6	115	13.0	---	---	0		1.53	.08	1	.040	1.66	.213	.829	1118	.23	.32	.32
+ 8	1095	46	12.8	46	12.9	---	---	0		1.60	.08	1	3.60	1.25	.015	1.000	146	.99?	.08	.04
+ 14	2630	365	13.5	362	13.8	374	12.6	0		2.06	.08	1	.181	1.51	.017	.991	737	.33	.32	.20
+ 15	1300	132	12.6	131	12.6	188	12.6	0		2.14	.08	1	.540	1.54	.020	.992	227	.78?	.08	.06
+ 14	2640	92	12.8	91	12.9	---	---	0		1.60	.08	1	2.10	1.40	.029	.983	305	.64	.08	.08
+ 14	1320	91	12.9	91	12.9	---	---	0		1.60	.08	0	1.64	1.67	.003	1.000	96	1.00?	.00	.00
+ 27	2743	636	12.6	582	12.9	711	12.9	0		2.00	.08	1	.068	1.61	.024	.916	784	.31	.24	.22
+ 25	2200	87	12.5	77	12.9	159	12.6	0		3.00	.08	1	.050	1.66	.294	.890	1366	.19	.08	.39
27	1343	159	12.6	147	12.7	---	---	0		2.33	.08	1	.068	1.61	.080	.921	649	.36	.16	.18
													.474							

+ 37	3000	870	12.8	861	13.0	878	13.0	0	2.00	.08	1	.410 1.50	.010	.990	345	.59	.16	.10
+ 37	2100	227	12.6	225	12.6	---	---	0	2.15	.08	1	.310 1.66	.020	.994	251	.73?	.08	.07
+	1320	118	12.6	116	12.8	233	12.6	0	1.98	.08	1	4.09 1.54	.033	.978	344	.59	.16	.10
+ 36	1320	233	12.6	233	12.6	---	---	0	1.94	.08	0	1.25	.012	1.000	115	1.00?	.00	.00
+ 11	2700	75	12.6	72	12.7	169	12.7	0	1.47	.08	1	.440 1.66	.060	.952	478	.46	.16	.13
+ 28	3300	169	12.7	112	13.4	---	---	0	1.54	.08	1	.030 1.66	.634	.666	2139	.13	.32	.64
+ 28	2800	116	12.6	79	13.2	187	13.3	0	1.82	.08	1	.030 1.66	.644	.678	2105	.13	.40	.63
+ 36	3500	265	13.1	235	13.4	248	13.4	0	1.68	.08	1	.060 1.66	.121	.886	1250	.21	.32	.36
+ 37	1320	452	12.6	452	12.6	---	---	0	.00	.08	0	3.00 1.25	.008	1.000	129	1.00?	.00	.00
+ 85	660	444	15.0	444	15.0	447	15.0	0	2.62*	.08	0	3.21 1.25	.000	1.000	61	1.00?	.00	.00
+ 84	1320	447	15.0	447	15.0	450	15.0	0	2.59*	.08	0	3.21 1.25	.001	1.000	123	1.00?	.00	.00
+ 90	1320	143	12.6	139	12.6	---	---	0	2.15	.08	1	.220 1.54	.049	.975	402	.53	.08	.11
+ 90	2600	0	.0	0	.0	---	---	0	.00	.08	0	.000 .00	.000	.000	0	.00	.00	.00

1

ARY TABLE 2 - SELECTED MODIFIED ATT-KIN REACH ROUTINGS IN ORDER OF STANDARD EXECUTIVE CONTROL INSTRUCTIONS
(A STAR(*) AFTER VOLUME ABOVE BASE(IN) INDICATES A HYDROGRAPH TRUNCATED AT A VALUE EXCEEDING BASE + 10% OF PEAK
A QUESTION MARK(?) AFTER COEFF.(C) INDICATES PARAMETERS OUTSIDE ACCEPTABLE LIMITS, SEE PREVIOUS WARNINGS)

		HYDROGRAPH INFORMATION							ROUTING PARAMETERS								PEAK	
		INFLOW		OUTFLOW		OUTFLOW+ INTERV. PEAK	OUTFLOW+ INTERV. TIME	BASE-	VOLUME ABOVE	MAIN TIME	ITER- ATION	Q AND A EQUATION		LENGTH	PEAK RATIO	S/Q @PEAK	ATT- KIN	TRAVEL TIME STOR-	TRAVEL TIME KINE-
XSEC ID	REACH LENGTH (FT)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	FLOW (CFS)	BASE (IN)	INCR (HR)	#	COEFF (X)	POWER (M)	FACTOR (K*)	O/I (Q*)	(K) (SEC)	COEFF (C)	AGE (HR)	MATIC (HR)
ALTERNATE	1	STORM	2																
+ 88	1320	250	12.6	245	12.7	341	12.7	0	.44	.08	1	.220	1.54	.034	.981	330	.61	.08	.09
+ 88	2000	52	12.5	46	12.7	---	---	0	1.98	.08	1	.220	1.54	.175	.889	867	.28	.24	.25
+101	1050	387	12.7	385	12.8	424	12.7	0	.63	.08	1	.220	1.54	.018	.994	225	.78?	.08	.06
+102	1320	424	12.7	393	13.0	422	13.0	0	.70	.08	1	.020	1.66	.103	.926	757	.32	.24	.21
+104	1900	422	13.0	371	13.3	---	---	0	.73	.08	1	.020	1.66	.160	.879	1092	.23	.24	.31
+ 87	1320	75	12.5	65	12.8	126	12.6	0	2.07	.08	1	.118	1.45	.242	.869	1042	.24	.16	.30
+105	2000	126	12.6	107	13.0	135	12.8	0	2.06	.08	1	.286	1.34	.216	.847	1134	.23	.24	.32
+104	1320	135	12.8	130	13.0	159	12.9	0	1.77	.08	1	.150	1.54	.049	.964	526	.43	.24	.15
	1320	160	15.0	160	15.1	---	---	0	2.60*	.08	1	3.07	1.25	.002	1.000	156	.96?	.08	.04
												1.85							

+104	1320	160	15.1	160	15.2			0	2.60*	.08	1		1.25	.003	1.000	234	.76?	.08	.06
+						---	---												
												8.46							
- 83	1320	290	15.0	290	15.0			0	2.54*	.08	0		1.25	.000	1.000	62	1.00?	.00	.00
						336	12.6												
												5.48							
+106	1320	336	12.6	336	12.6			0	2.52*	.08	0		1.25	.001	1.000	85	1.00?	.00	.00
+						391	12.6												
												3.59							
+107	900	391	12.6	391	12.6			0	2.49*	.08	0		1.25	.001	1.000	79	1.00?	.00	.00
+						449	12.6												
												6.10							
+145	1500	106	12.6	106	12.6			0	1.75	.08	0		1.25	.012	1.000	111	1.00?	.00	.00
+						---	---												
												6.09							
+145	2350	324	12.6	324	12.6			0	1.68	.08	0		1.25	.017	1.000	139	1.00?	.00	.00
+						---	---												
												.145							
+ 33	3500	103	12.8	89	13.1			0	1.60	.08	1		1.66	.154	.861	1068	.24	.32	.31
+						124	13.0												
												3.50							
+ 93	2640	115	13.4	115	13.4			0	1.50*	.08	1		1.25	.004	.998	300	.65	.08	.08
+						311	12.6												
												.080							
+ 92	1320	46	12.6	23	12.8			0	.02	.08	1		1.66	1.799	.504	1171	.22?	.16	.25
+						148	12.6												
												.080							
+ 98	2500	148	12.6	131	12.8			0	.22	.08	1		1.66	.174	.890	946	.26	.24	.27
+						---	---												
												4.72							
+ 95	1320	265	12.3	265	12.3			0	.00*	.08	0		1.25	.002	1.000	100	1.00?	.00	.00
+						---	---												
												.030							
+ 32	3400	83	12.6	46	13.4			0	1.90	.08	1		1.66	1.141	.553	3216	.09?	.40	.91
+						150	12.9												
												.090							
+ 94	3200	150	12.9	131	13.2			0	1.73	.08	1		1.66	.109	.872	1121	.23	.32	.32
+						220	12.6												
												.090							
+ 95	2400	220	12.6	196	12.8			0	1.81	.08	1		1.66	.045	.893	723	.33	.16	.21
+						304	12.8												
												.080							
+ 98	3000	297	12.7	245	13.0			0	.73	.08	1		1.66	.288	.825	860	.29	.16	.25
+						---	---												
												4.72							
96	1320	265	12.1	265	12.1			0	.00*	.08	0		1.25	.002	1.000	100	1.00?	.00	.00
						389	12.6												
												.080							
+ 97	2100	124	12.6	107	12.8			0	1.34	.08	1		1.66	.265	.867	854	.29	.16	.24
+						301	12.6												
												.080							
+ 98	1000	301	12.6	297	12.7			0	1.87	.08	1		1.66	.024	.987	285	.67?	.08	.08
+						---	---												
												.080							
+ 99	1250	681	12.7	677	12.9			0	.66	.08	1		1.66	.017	.995	258	.72?	.16	.07
+						739	12.8												
												.050							
+139	1600	739	12.8	719	13.0			0	.72	.08	1		1.66	.036	.973	424	.51	.16	.12
+						---	---												
												6.13							
+139	600	92	12.5	92	12.5			0	2.15	.08	0		1.25	.005	1.000	46	1.00?	.00	.00
+						741	13.0												
												5.68							
+142	2640	265	12.0	265	12.4			0	.00*	.08	1		1.25	.003	1.000	172	.91?	.40	.05
+						420	13.0												
												4.34							
+141	2100	155	13.0	155	13.1			0	1.29	.08	1		1.25	.023	.997	189	.86?	.08	.05
+						293	12.6												
1																			

TR20 XEQ 11-04-98 14:45 EAST FORK CAVE CREEK - GREENWAY CHANNEL 7th St to CAVE CREEK Rd. JOB 1 SUMMARY
REV PC 09/83(.2) WOOD/PATEL JOB No: 96559.04 -- FEMA CLOMR -- FILENAME: GW1.IT2 PAGE 53

SUMMARY TABLE 2 - SELECTED MODIFIED ATT-KIN REACH ROUTINGS IN ORDER OF STANDARD EXECUTIVE CONTROL INSTRUCTIONS
(A STAR(*) AFTER VOLUME ABOVE BASE(IN) INDICATES A HYDROGRAPH TRUNCATED AT A VALUE EXCEEDING BASE + 10% OF PEAK
A QUESTION MARK(?) AFTER COEFF.(C) INDICATES PARAMETERS OUTSIDE ACCEPTABLE LIMITS, SEE PREVIOUS WARNINGS)

		HYDROGRAPH INFORMATION								ROUTING PARAMETERS									PEAK	
						OUTFLOW+			VOLUME	MAIN	ITER-	Q AND A			PEAK	S/Q	ATT-	TRAVEL TIME	
XSEC	REACH	INFLOW		OUTFLOW		INTERV.AREA		BASE-	ABOVE	TIME	ATION	EQUATION		LENGTH	RATIO	@PEAK	KIN	STOR-	KINE-
ID	LENGTH (FT)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	FLOW (CFS)	BASE (IN)	INCR (HR)	#	COEFF (X)	POWER (M)	FACTOR (K*)	O/I (Q*)	(K) (SEC)	COEFF (C)	AGE (HR)	MATIC (HR)

ALTERNATE 1 STORM 2

+																			
140	1320	293	12.6	293	12.6			0	1.62	.08	0	4.21	1.25	.009	1.000	107	1.00?	.00	.00
+						428	12.6												
+139	2800	491	12.6	486	12.7			0	1.70	.08	1	3.78	1.25	.026	.989	224	.78?	.16	.06
+						---	---												
+138	3000	87	12.5	80	12.7			0	2.33	.08	1	.170	1.66	.183	.919	891	.28	.08	.25
+						302	12.5												
+139	2000	302	12.5	302	12.6			0	2.01	.08	1	4.52	1.25	.021	.999	153	.97?	.08	.04
+						---	---												
+127	2500	163	12.5	144	12.7			0	1.95	.08	1	.080	1.66	.210	.887	911	.27	.08	.26
+						---	---												
+127	2300	39	12.5	29	12.9			0	1.69	.08	1	.080	1.66	.521	.751	1482	.18	.16	.44
+						171	12.7												
+131	2000	269	12.5	262	12.6			0	2.06	.08	1	.170	1.66	.046	.975	379	.55	.08	.11
+						---	---												
+126	1500	713	12.5	703	12.6			0	1.96	.08	1	.110	1.66	.021	.986	251	.73?	.16	.07
+						903	12.6												
+134	1500	903	12.6	897	12.6			0	2.07	.08	1	.130	1.66	.014	.994	206	.82?	.08	.06
+						---	---												
+134	3200	55	12.5	46	12.9			0	2.33	.08	1	.130	1.66	.359	.837	1338	.19	.08	.38
+						936	12.6												
+124	2500	1266	12.6	1239	12.6			0	2.16	.08	1	.090	1.66	.035	.978	375	.55	.08	.10
+						1442	12.6												
+124	900	1614	12.6	1614	12.6			0	1.11	.08	0	.652	1.61	.001	1.000	44	1.00?	.00	.00
+						---	---												
+104	1320	3089	12.6	3089	12.6			0	1.41	.08	0	.512	1.60	.002	1.000	61	1.00?	.00	.00
+						---	---												
+107	1000	3524	12.6	3524	12.6			0	1.44	.08	0	1.06	1.51	.001	1.000	40	1.00?	.00	.00
+						---	---												
+108	1700	4207	12.6	4207	12.6			0	1.68	.08	0	.993	1.54	.001	1.000	60	1.00?	.00	.00
+						4234	12.6												
+ 47	1101	38	12.5	31	12.8			0	1.84	.08	1	.040	1.66	.299	.838	1091	.23	.08	.31
+						106	12.5												
+ 46	1285	106	12.5	91	12.7			0	1.83	.08	1	.040	1.66	.157	.859	844	.29	.16	.24
+						136	12.5												
+149	1331	136	12.5	118	12.7			0	1.82	.08	1	.040	1.66	.110	.870	791	.31	.16	.23
+						120	12.7												
+146	1240	59	12.5	50	12.8			0	1.84	.08	1	.040	1.66	.269	.852	1026	.25	.08	.29
+						118	12.5												
+ 45	413	118	12.5	115	12.6			0	1.83	.08	1	.040	1.66	.021	.975	259	.71?	.08	.07
+						---	---												
+ 21	1377	64	12.5	57	12.8			0	2.51	.08	1	.040	1.66	.245	.895	1102	.23	.08	.31
+						166	12.6												
+ 45	3213	378	12.6	378	12.6			0	2.12	.08	0	9.02	1.25	.016	1.000	135	1.00?	.00	.00
+						523	12.6												
+ 57	1350	18	12.5	13	13.0			0	1.84	.08	1	.040	1.66	.675	.716	1784	.15	.16	.53
+						61	12.5												
+ 59	1330	61	12.5	51	12.8			0	1.83	.08	1	.040	1.66	.213	.829	1084	.23	.16	.31
+						95	12.6												
+ 50	1928	126	12.5	116	12.8			0	3.00	.08	1	.040	1.66	.230	.915	1179	.22	.08	.33
+						234	12.6												
+ 48	2570	94	12.5	78	13.0			0	3.00	.08	1	.040	1.66	.450	.824	1767	.15	.08	.51
+						150	12.6												
+ 50	1836	150	12.6	129	13.0			0	2.29	.08	1	.040	1.66	.146	.862	1050	.24	.32	.30
+						---	---												
52	550	334	12.6	331	12.7			0	2.66	.08	1	.040	1.66	.010	.991	229	.77?	.08	.06
						354	12.6												
												.040							

+ 56	1377	354	12.6	338	12.9			0	2.54	.08	1		1.66	.040	.954	559	.41	.32	.16
+						369	12.6					.040							
+ 51	1377	369	12.6	351	12.9			0	2.43	.08	1		1.66	.034	.952	550	.41	.24	.15
						355	12.9												
+ 55	1331	355	12.9	349	13.1			0	2.39	.08	1	.040	1.66	.029	.984	540	.42	.24	.15
+						351	13.1												
+ 66	660	370	13.7	370	13.7			0	2.19	.08	0	5.64	1.25	.001	1.000	41	1.00?	.00	.00
+						375	13.6												
1																			

SUMMARY TABLE 2 - SELECTED MODIFIED ATT-KIN REACH ROUTINGS IN ORDER OF STANDARD EXECUTIVE CONTROL INSTRUCTIONS
(A STAR(*) AFTER VOLUME ABOVE BASE(IN) INDICATES A HYDROGRAPH TRUNCATED AT A VALUE EXCEEDING BASE + 10% OF PEAK
A QUESTION MARK(?) AFTER COEFF.(C) INDICATES PARAMETERS OUTSIDE ACCEPTABLE LIMITS, SEE PREVIOUS WARNINGS)

		HYDROGRAPH INFORMATION							ROUTING PARAMETERS									PEAK	
						OUTFLOW+			VOLUME	MAIN	ITER-	Q AND A			PEAK	S/Q	ATT-	TRAVEL TIME	
XSEC	REACH	INFLOW		OUTFLOW		INTERV.AREA		BASE-	ABOVE	TIME	ATION	EQUATION		LENGTH	RATIO	@PEAK	KIN	STOR-	KINE-
ID	LENGTH (FT)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	FLOW (CFS)	BASE (IN)	INCR (HR)	#	COEFF (X)	POWER (M)	FACTOR (K*)	O/I (Q*)	(K) (SEC)	COEFF (C)	AGE (HR)	MATIC (HR)
ALTERNATE	1	STORM	2																
+ 67	1320	375	13.6	375	13.6			0	2.18	.08	0	7.18	1.25	.001	1.000	67	1.00?	.00	.00
+						433	12.6												
+ 67	1320	156	12.5	153	12.6			0	2.24	.08	1	.250	1.54	.045	.977	359	.57	.08	.10
+						---	---												
+ 69	1320	586	12.6	586	12.6			0	2.19	.08	0	3.06	1.25	.004	1.000	121	1.00?	.00	.00
+						642	12.6												
+ 40	2650	134	12.5	124	12.8			0	3.00	.08	1	.080	1.66	.188	.927	1043	.24	.08	.29
						---	---												
+ 40	1800	140	12.6	129	12.7			0	2.06	.08	1	.080	1.66	.114	.922	696	.34	.16	.20
+						250	12.7												
+ 82	1400	336	12.6	329	12.8			0	2.26	.08	1	.100	1.66	.027	.979	334	.60	.16	.09
+						366	12.6												
+ 82	1867	68	12.6	60	12.8			0	2.06	.08	1	.100	1.66	.147	.895	843	.29	.16	.24
+						---	---												
+ 81	1320	420	12.6	416	12.8			0	2.19	.08	1	.220	1.54	.021	.989	275	.69?	.16	.08
+						471	12.7												
+ 41	3100	180	12.6	171	12.7			0	2.23	.08	1	.240	1.66	.075	.952	560	.41	.08	.16
+						346	12.6												
+ 78	1600	435	12.5	426	12.6			0	2.12	.08	1	.090	1.66	.035	.979	367	.56	.16	.10
+						---	---												
+ 78	1320	317	12.7	307	12.9			0	.81	.08	1	.090	1.66	.065	.968	344	.59	.16	.10
+						---	---												
+ 77	1320	731	12.6	721	12.8			0	1.45	.08	1	.230	1.54	.019	.987	220	.79?	.16	.06
+						769	12.7												
+ 75	1320	353	15.3	353	15.3			0	1.90*	.08	0	3.79	1.25	.001	1.000	113	1.00?	.00	.00
+						---	---												
+ 80	1320	154	12.2	154	12.2			0	.00	.08	0	7.06	1.25	.003	1.000	81	1.00?	.00	.00
+						214	12.6												
+ 79	1320	48	12.6	44	12.7			0	.76	.08	1	.230	1.54	.226	.908	572	.40	.16	.16
+						116	12.5												
+ 76	1320	116	12.5	112	12.6			0	1.54	.08	1	.230	1.54	.064	.960	420	.51	.16	.12
+						175	12.6												
+ 75	1320	175	12.6	170	12.6			0	1.66	.08	1	.230	1.54	.046	.970	364	.57	.08	.10
+						---	---												
112	1320	524	12.6	524	12.6			0	1.91	.08	0	3.79	1.25	.001	1.000	104	1.00?	.00	.00
+						---	---												

+109	2640	166	12.1	166	12.8			0	.00	.08	1	4.04	1.25	.013	1.000	249	.73?	.72	.07
+						239	12.5												
+110	1320	4470	12.6	4470	12.6			0	1.75	.08	0	.592	1.59	.001	1.000	52	1.00?	.00	.00
						4523	12.6												
+111	1320	4884	12.6	4884	12.6			0	1.75	.08	0	1.01	1.58	.000	1.000	37	1.00?	.00	.00
+						4929	12.6												
+112	1320	4929	12.6	4910	12.6			0	1.75	.08	1	.060	1.63	.004	.996	170	.92?	.08	.05
+						4952	12.6												
+113	1320	5608	12.6	5603	12.7			0	1.80	.08	1	.060	1.63	.003	.999	162	.94?	.08	.04
+						5660	12.7												
+ 60	1320	38	12.5	36	12.6			0	1.99	.08	1	.250	1.54	.107	.948	587	.39	.08	.16
+						96	12.6												
+ 65	1320	96	12.6	93	12.7			0	1.83	.08	1	.280	1.54	.051	.973	395	.53	.16	.11
+						152	12.6												
+ 68	1320	152	12.6	148	12.7			0	1.82	.08	1	.250	1.54	.042	.974	362	.57	.08	.10
+						204	12.6												
+ 70	1320	204	12.6	193	12.6			0	1.89	.08	1	.180	1.54	.043	.949	405	.52	.08	.11
+						254	12.6												
+ 74	1320	254	12.6	242	12.7			0	1.95	.08	1	.090	1.66	.031	.955	375	.55	.16	.11
+						304	12.6												
+113	1320	304	12.6	304	12.6			0	2.04	.08	0	6.62	1.25	.006	1.000	74	1.00?	.00	.00
+						---	---												
+114	3000	6102	12.6	5973	12.8			0	1.81	.08	1	.050	1.64	.011	.979	379	.55	.16	.11
+						---	---												
+ 72	2650	268	12.5	244	12.7			0	1.83	.08	1	.180	1.54	.146	.913	738	.33	.16	.21
+						359	12.6												
+114	2000	359	12.6	329	12.8			0	1.85	.08	1	.050	1.66	.108	.916	706	.34	.16	.20
+						393	12.7												
1																			

SUMMARY TABLE 2 - SELECTED MODIFIED ATT-KIN REACH ROUTINGS IN ORDER OF STANDARD EXECUTIVE CONTROL INSTRUCTIONS
(A STAR(*) AFTER VOLUME ABOVE BASE(IN) INDICATES A HYDROGRAPH TRUNCATED AT A VALUE EXCEEDING BASE + 10% OF PEAK
A QUESTION MARK(?) AFTER COEFF.(C) INDICATES PARAMETERS OUTSIDE ACCEPTABLE LIMITS, SEE PREVIOUS WARNINGS)

		HYDROGRAPH INFORMATION							ROUTING PARAMETERS									PEAK	
						OUTFLOW+			VOLUME	MAIN	ITER-	Q AND A			PEAK	S/Q	ATT-	TRAVEL TIME	
XSEC	REACH	INFLOW		OUTFLOW		INTERV.AREA		BASE-	ABOVE	TIME	ATION	EQUATION		LENGTH	RATIO	@PEAK	KIN	STOR-	KINE-
ID	LENGTH (FT)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	FLOW (CFS)	BASE (IN)	INCR (HR)	#	COEFF (X)	POWER (M)	FACTOR (K*)	O/I (Q*)	(K) (SEC)	COEFF (C)	AGE (HR)	MATIC (HR)
ALTERNATE		1	STORM	2															
+114	2200	130	12.6	107	12.9			0	1.90	.08	1	.050	1.66	.269	.822	1165	.22	.24	.34
+						---	---												
+118	4000	6747	12.8	6543	13.0			0	1.82	.08	1	.050	1.66	.014	.970	440	.49	.16	.12
+						6659	13.0												
+117	3527	6659	13.0	6507	13.1			0	1.81	.08	1	.050	1.66	.011	.977	390	.54	.16	.11
+						6578	13.1												
ALTERNATE		1	STORM	3															
+ 3	1000	247	12.5	244	12.6			0	3.46	.08	1	.040	1.66	.049	.989	468	.47	.08	.13
+						---	---												
+ 3	1400	162	12.5	158	12.7			0	3.46	.08	1	.040	1.66	.112	.974	775	.31	.08	.22
+						---	---												
+ 6	1600	446	12.6	443	12.7			0	3.19	.08	1	1.53	1.21	.049	.992	329	.61	.16	.09
+						---	---												
8	1600	550	12.7	531	12.9			0	2.90	.08	1	.655	1.24	.085	.967	540	.42	.16	.15
+						---	---												

+	8	1400	107	12.6	105	12.8	---	---	0	1.83	.08	1	.542 1.52	.026	.982	278	.68?	.16	.08
+																			
	4	1800	37	12.5	32	13.0	348	12.5	0	3.47	.08	1	.050 1.66	.362	.861	1571	.17	.08	.45
+																			
+	5	1400	348	12.5	342	12.6	---	---	0	3.46	.08	1	.050 1.66	.051	.983	500	.45	.08	.14
+																			
+	8	2100	463	12.6	434	12.9	---	---	0	2.85	.08	1	.643 1.24	.123	.938	729	.33	.16	.20
+																			
+	8	1900	172	12.6	146	13.0	---	---	0	1.90	.08	1	.040 1.66	.184	.852	1029	.25	.24	.29
+																			
+	8	1095	57	12.8	57	12.8	---	---	0	1.97	.08	0	3.60 1.25	.014	1.000	140	1.00?	.00	.00
+																			
+	14	2630	396	13.6	393	13.8	428	12.6	0	2.45	.08	1	.181 1.51	.015	.992	717	.33	.24	.20
+																			
+	15	1300	156	12.6	155	12.6	224	12.6	0	2.56	.08	1	.540 1.54	.018	.995	214	.80?	.08	.06
+																			
+	14	2640	113	12.8	112	12.9	---	---	0	1.97	.08	1	2.10 1.40	.027	.988	287	.67?	.08	.08
+																			
+	14	1320	112	12.9	112	12.9	---	---	0	1.97	.08	0	1.64 1.67	.002	1.000	89	1.00?	.00	.00
+																			
+	27	2743	745	12.6	686	12.9	843	12.9	0	2.39	.08	1	.068 1.61	.021	.921	739	.33	.24	.21
+																			
+	25	2200	99	12.5	89	12.9	189	12.6	0	3.47	.08	1	.050 1.66	.264	.905	1297	.20	.08	.37
+																			
+	27	1343	189	12.6	176	12.7	---	---	0	2.76	.08	1	.068 1.61	.072	.932	609	.38	.16	.17
+																			
+	37	3000	1037	12.8	1025	13.0	1048	12.9	0	2.39	.08	1	.448 1.51	.008	.989	321	.62	.16	.09
+																			
+	37	2100	267	12.6	266	12.6	---	---	0	2.57	.08	1	.410 1.66	.018	.997	235	.76?	.08	.07
+																			
+	35	1320	142	12.6	139	12.8	280	12.6	0	2.38	.08	1	.310 1.54	.030	.979	323	.62	.16	.09
+																			
+	36	1320	280	12.6	280	12.6	---	---	0	2.34	.08	0	4.09 1.25	.012	1.000	111	1.00?	.00	.00
+																			
+	11	2700	93	12.6	89	12.7	208	12.7	0	1.83	.08	1	.440 1.66	.052	.962	440	.49	.16	.12
+																			
+	28	3300	208	12.7	145	13.3	---	---	0	1.91	.08	1	.030 1.66	.548	.697	1969	.14	.32	.59
+																			
+	28	2800	140	12.6	99	13.1	242	13.2	0	2.22	.08	1	.030 1.66	.561	.706	1954	.14	.32	.58
+																			
+	36	3500	346	13.0	309	13.4	327	13.3	0	2.06	.08	1	.060 1.66	.113	.894	1124	.23	.32	.32
+																			
+	37	1320	466	12.5	466	12.5	---	---	0	.00	.08	0	3.00 1.25	.006	1.000	128	1.00?	.00	.00
+																			
+	85	660	508	15.0	508	15.0	511	15.0	0	3.03*	.08	0	3.21 1.25	.000	1.000	60	1.00?	.00	.00
+																			
+	84	1320	511	15.0	511	15.0	515	15.0	0	3.00*	.08	0	3.21 1.25	.001	1.000	119	1.00?	.00	.00
+																			
1																			

TR20 XEQ 11-04-98 14:45 EAST FORK CAVE CREEK - GREENWAY CHANNEL 7th St to CAVE CREEK Rd. JOB 1 SUMMARY
REV PC 09/83(.2) WOOD/PATEL JOB No: 96559.04 -- FEMA CLOMR -- FILENAME: GW1.IT2 PAGE 56

SUMMARY TABLE 2 - SELECTED MODIFIED ATT-KIN REACH ROUTINGS IN ORDER OF STANDARD EXECUTIVE CONTROL INSTRUCTIONS
(A STAR(*) AFTER VOLUME ABOVE BASE(IN) INDICATES A HYDROGRAPH TRUNCATED AT A VALUE EXCEEDING BASE + 10% OF PEAK
A QUESTION MARK(?) AFTER COEFF.(C) INDICATES PARAMETERS OUTSIDE ACCEPTABLE LIMITS, SEE PREVIOUS WARNINGS)

	HYDROGRAPH INFORMATION								ROUTING PARAMETERS								PEAK
							OUTFLOW+		VOLUME	MAIN	ITER-	Q AND A		PEAK	S/Q	ATT-	TRAVEL TIME
+																	

XSEC ID	REACH LENGTH (FT)	INFLOW PEAK (CFS)	INFLOW TIME (HR)	OUTFLOW PEAK (CFS)	OUTFLOW TIME (HR)	INTERV.AREA PEAK (CFS)	INTERV.AREA TIME (HR)	BASE-FLOW (CFS)	ABOVE BASE (IN)	TIME INCR (HR)	ATION #	EQUATION COEFF (X)	EQUATION POWER (M)	LENGTH FACTOR (K*)	RATIO O/I (Q*)	@PEAK (K) (SEC)	KIN COEFF (C)	STOR-AGE (HR)	KINE-MATIC (HR)
ALTERNATE		1	STORM	3															
90	1320	168	12.6	165	12.6	---	---	0	2.57	.08	1	.220	1.54	.044	.982	380	.55	.08	.11
90	2600	98	12.6	58	12.9	---	---	0	.06	.08	1	.220	1.54	1.223	.593	1021	.25?	.24	.27
88	1320	329	12.7	324	12.8	429	12.8	0	.58	.08	1	.220	1.54	.030	.983	300	.65	.08	.08
88	2000	62	12.5	56	12.7	---	---	0	2.39	.08	1	.220	1.54	.156	.906	816	.30	.16	.23
101	1050	485	12.8	483	12.9	523	12.8	0	.80	.08	1	.220	1.54	.016	.997	208	.82?	.08	.06
102	1320	523	12.8	492	13.0	526	13.0	0	.87	.08	1	.020	1.66	.087	.940	697	.34	.24	.20
104	1900	526	13.0	475	13.3	---	---	0	.91	.08	1	.020	1.66	.137	.902	1001	.25	.24	.28
87	1320	89	12.5	78	12.8	151	12.6	0	2.48	.08	1	.118	1.45	.218	.886	991	.25	.16	.28
105	2000	151	12.6	130	13.0	167	12.8	0	2.47	.08	1	.286	1.34	.202	.861	1084	.23	.24	.31
104	1320	167	12.8	161	13.0	200	12.9	0	2.15	.08	1	.150	1.54	.045	.964	488	.46	.16	.14
105	1320	183	15.0	183	15.1	---	---	0	3.02*	.08	1	3.07	1.25	.001	1.000	152	.97?	.08	.04
104	1320	183	15.1	183	15.2	---	---	0	3.00*	.08	1	1.85	1.25	.002	1.000	228	.77?	.08	.06
83	1320	332	15.0	332	15.0	373	12.6	0	2.94*	.08	0	8.46	1.25	.000	1.000	60	1.00?	.00	.00
106	1320	373	12.6	373	12.6	439	12.6	0	2.92*	.08	0	5.48	1.25	.001	1.000	83	1.00?	.00	.00
107	900	439	12.6	439	12.6	504	12.6	0	2.89*	.08	0	3.59	1.25	.001	1.000	77	1.00?	.00	.00
145	1500	128	12.6	128	12.6	---	---	0	2.13	.08	0	6.10	1.25	.011	1.000	107	1.00?	.00	.00
145	2350	393	12.6	393	12.6	---	---	0	2.06	.08	0	6.09	1.25	.016	1.000	134	1.00?	.00	.00
33	3500	127	12.8	112	13.1	156	13.0	0	1.97	.08	1	.145	1.66	.134	.880	983	.26	.24	.28
93	2640	120	13.4	119	13.5	354	12.6	0	1.74*	.08	1	3.50	1.25	.004	.998	298	.65	.08	.08
92	1320	89	12.6	72	12.7	228	12.6	0	.05	.08	1	.080	1.66	.582	.804	610	.38	.16	.18
98	2500	228	12.6	200	12.9	---	---	0	.29	.08	1	.080	1.66	.172	.878	797	.31	.16	.23
95	1320	265	12.2	265	12.2	---	---	0	.00*	.08	0	4.72	1.25	.002	1.000	100	1.00?	.00	.00
32	3400	99	12.6	60	13.4	193	12.9	0	2.30	.08	1	.030	1.66	.996	.609	2725	.10	.40	.83
94	3200	193	12.9	172	13.2	257	12.6	0	2.12	.08	1	.090	1.66	.100	.891	1014	.25	.24	.29
95	2400	257	12.6	232	12.7	360	12.7	0	2.21	.08	1	.090	1.66	.038	.905	679	.35	.16	.19
98	3000	360	12.7	319	13.0	---	---	0	1.09	.08	1	.080	1.66	.181	.887	797	.31	.16	.23
96	1320	265	12.0	265	12.0	413	12.6	0	.00*	.08	0	4.72	1.25	.001	1.000	100	1.00?	.00	.00

+ 97	2100	148	12.6	133	12.8			0	1.71	.08	1	.080	1.66	.213	.896	794	.31	.16	.23
+						363	12.6												
+ 98	1000	363	12.6	361	12.7			0	2.28	.08	1	.080	1.66	.021	.992	265	.70?	.08	.07
						---	---												
+ 99	1250	886	12.8	882	12.9			0	.85	.08	1	.080	1.66	.014	.996	232	.77?	.08	.06
+						951	12.8												
+139	1600	951	12.8	933	13.0			0	.92	.08	1	.050	1.66	.030	.981	383	.55	.16	.11
+						---	---												
+139	600	108	12.5	108	12.5			0	2.57	.08	0	6.13	1.25	.004	1.000	44	1.00?	.00	.00
+						959	13.0												
1																			

SUMMARY TABLE 2 - SELECTED MODIFIED ATT-KIN REACH ROUTINGS IN ORDER OF STANDARD EXECUTIVE CONTROL INSTRUCTIONS
(A STAR(*) AFTER VOLUME ABOVE BASE(IN) INDICATES A HYDROGRAPH TRUNCATED AT A VALUE EXCEEDING BASE + 10% OF PEAK
A QUESTION MARK(?) AFTER COEFF.(C) INDICATES PARAMETERS OUTSIDE ACCEPTABLE LIMITS, SEE PREVIOUS WARNINGS)

		HYDROGRAPH INFORMATION							ROUTING PARAMETERS									PEAK	
		INFLOW		OUTFLOW		OUTFLOW+ INTERV.AREA		BASE-	VOLUME ABOVE	MAIN TIME	ITER- ATION	Q AND A EQUATION			PEAK RATIO	S/Q @PEAK	ATT- KIN	TRAVEL TIME STOR-	TRAVEL TIME KINE-
XSEC ID	REACH LENGTH (FT)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	PEAK (CFS)	TIME (HR)	FLOW (CFS)	BASE (IN)	INCR (HR)	#	COEFF (X)	POWER (M)	LENGTH FACTOR (K*)	O/I (Q*)	(K) (SEC)	COEFF (C)	AGE (HR)	MATIC (HR)
ALTERNATE		1	STORM	3															
+142	2640	265	11.9	265	12.3			0	.00*	.08	1	5.68	1.25	.003	1.000	172	.91?	.40	.05
+						454	13.0												
+141	2100	189	13.0	189	13.1			0	1.67	.08	1	4.34	1.25	.020	.998	182	.88?	.08	.05
+						354	12.6												
+140	1320	354	12.6	354	12.6			0	2.02	.08	0	4.21	1.25	.009	1.000	103	1.00?	.00	.00
+						514	12.6												
+139	2800	591	12.6	584	12.6			0	2.09	.08	1	3.78	1.25	.024	.988	216	.80?	.08	.06
+						---	---												
+138	3000	101	12.5	94	12.7			0	2.76	.08	1	.170	1.66	.160	.935	840	.29	.08	.24
+						359	12.5												
+139	2000	359	12.5	359	12.6			0	2.42	.08	1	4.52	1.25	.020	1.000	148	.99?	.08	.04
+						---	---												
+127	2500	192	12.5	174	12.7			0	2.35	.08	1	.080	1.66	.181	.908	853	.29	.08	.24
+						---	---												
+127	2300	46	12.5	36	12.9			0	2.07	.08	1	.080	1.66	.443	.781	1382	.19	.16	.40
+						208	12.7												
+131	2000	316	12.5	310	12.6			0	2.47	.08	1	.170	1.66	.040	.981	355	.58	.08	.10
+						---	---												
+126	1500	853	12.5	842	12.6			0	2.36	.08	1	.110	1.66	.018	.987	233	.76?	.08	.06
+						1075	12.6												
+134	1500	1075	12.6	1071	12.6			0	2.49	.08	1	.130	1.66	.012	.996	193	.86?	.08	.05
+						---	---												
+134	3200	64	12.5	55	12.9			0	2.76	.08	1	.130	1.66	.313	.861	1261	.20	.08	.36
+						1118	12.6												
+124	2500	1508	12.5	1485	12.6			0	2.58	.08	1	.090	1.66	.031	.984	350	.58	.16	.10
+						1732	12.6												
+124	900	2000	12.6	2000	12.6			0	1.38	.08	0	.690	1.60	.001	1.000	41	1.00?	.00	.00
+						---	---												
+104	1320	3771	12.6	3771	12.6			0	1.73	.08	0	.557	1.58	.002	1.000	58	1.00?	.00	.00
+						---	---												
+107	1000	4304	12.6	4304	12.6			0	1.74	.08	0	1.14	1.50	.001	1.000	38	1.00?	.00	.00
						---	---												
+108	1700	5079	12.6	5079	12.6			0	2.00	.08	0	1.04	1.53	.001	1.000	57	1.00?	.00	.00

```
+                                                  5111  12.6
                                                                                                   .040
+ 47   1101     44  12.5     38  12.8                        0    2.23    .08    1      1.66   .256   .865   1020  .25    .08   .29
+                                                   127  12.5
                                                                                                   .040
  46   1285    127  12.5    111  12.7                        0    2.22    .08    1      1.66   .137   .875    784  .31    .16   .22
+                                                   166  12.5
                                                                                                   .040
+149   1331    166  12.5    148  12.7                        0    2.22    .08    1      1.66   .097   .889    730  .33    .16   .21
+                                                   150  12.7
                                                                                                   .040
+146   1240     70  12.5     61  12.7                        0    2.23    .08    1      1.66   .231   .878    959  .26    .08   .27
+                                                   148  12.5
                                                                                                   .040
+ 45    413    148  12.5    146  12.6                        0    2.22    .08    1      1.66   .019   .984    237  .76?   .08   .07
+                                                   ---  ---
                                                                                                   .040
+ 21   1377     74  12.5     68  12.8                        0    2.95    .08    1      1.66   .216   .913   1042  .24    .08   .29
+                                                   205  12.6
                                                                                                  9.02
+ 45   3213    455  12.6    455  12.6                        0    2.54    .08    0      1.25   .015  1.000    130 1.00?   .00   .00
+                                                   624  12.6
                                                                                                   .040
+ 57   1350     22  12.5     16  13.0                        0    2.23    .08    1      1.66   .579   .747   1668  .16    .16   .49
+                                                    75  12.5
                                                                                                   .040
+ 59   1330     75  12.5     64  12.8                        0    2.22    .08    1      1.66   .189   .854    999  .25    .16   .29
+                                                   117  12.6
                                                                                                   .040
+ 50   1928    144  12.5    134  12.8                        0    3.46    .08    1      1.66   .206   .929   1119  .23    .08   .32
+                                                   269  12.6
                                                                                                   .040
+ 48   2570    107  12.5     90  13.0                        0    3.47    .08    1      1.66   .404   .843   1678  .16    .08   .48
+                                                   178  12.6
                                                                                                   .040
+ 50   1836    178  12.6    156  13.0                        0    2.71    .08    1      1.66   .132   .873    979  .26    .32   .28
+                                                   ---  ---
                                                                                                   .040
+ 52    550    394  12.6    391  12.7                        0    3.10    .08    1      1.66   .009   .993    214  .80?   .08   .06
+                                                   421  12.6
                                                                                                   .040
+ 56   1377    421  12.6    402  12.8                        0    2.97    .08    1      1.66   .036   .955    522  .43    .24   .15
+                                                   444  12.6
                                                                                                   .040
+ 51   1377    444  12.6    424  12.8                        0    2.86    .08    1      1.66   .031   .955    511  .44    .16   .14
                                                   429  12.8
-
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TR20 XEQ 11-04-98  14:45        EAST FORK CAVE CREEK - GREENWAY CHANNEL 7th St to CAVE CREEK Rd.                JOB  1   SUMMARY
     REV PC 09/83(.2)          WOOD/PATEL JOB No: 96559.04      -- FEMA CLOMR --      FILENAME: GW1.IT2                PAGE  58
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SUMMARY TABLE 2 - SELECTED MODIFIED ATT-KIN REACH ROUTINGS IN ORDER OF STANDARD EXECUTIVE CONTROL INSTRUCTIONS
(A STAR(*) AFTER VOLUME ABOVE BASE(IN) INDICATES A HYDROGRAPH TRUNCATED AT A VALUE EXCEEDING BASE + 10% OF PEAK
A QUESTION MARK(?) AFTER COEFF.(C) INDICATES PARAMETERS OUTSIDE ACCEPTABLE LIMITS, SEE PREVIOUS WARNINGS)

XSEC ID	REACH LENGTH (FT)	HYDROGRAPH INFORMATION: INFLOW PEAK (CFS)	INFLOW TIME (HR)	OUTFLOW PEAK (CFS)	OUTFLOW TIME (HR)	OUTFLOW+ INTERV.AREA PEAK (CFS)	INTERV.AREA TIME (HR)	BASE-FLOW (CFS)	ROUTING PARAMETERS: VOLUME ABOVE BASE (IN)	MAIN TIME INCR (HR)	ITER-ATION #	Q AND A EQUATION COEFF (X)	POWER (M)	LENGTH FACTOR (K*)	PEAK RATIO O/I (Q*)	S/Q @PEAK (K) (SEC)	ATT-KIN COEFF (C)	PEAK TRAVEL TIME STOR-AGE (HR)	KINE-MATIC (HR)
ALTERNATE 1 STORM 3																			
55	1331	429	12.8	421	13.0	423	13.0	0	2.81	.08	1	.040	1.66	.026	.982	501	.45	.24	.14
66	660	421	13.7	421	13.7	427	13.7	0	2.60	.08	0	5.64	1.25	.001	1.000	40	1.00?	.00	.00
67	1320	427	13.7	427	13.7	485	12.6	0	2.59	.08	0	7.18	1.25	.001	1.000	65	1.00?	.00	.00
67	1320	183	12.5	180	12.6	---	---	0	2.66	.08	1	.250	1.54	.040	.982	339	.60	.08	.09
69	1320	664	12.6	664	12.6	733	12.6	0	2.61	.08	0	3.06	1.25	.003	1.000	118	1.00?	.00	.00
40	2650	153	12.5	143	12.7	---	---	0	3.46	.08	1	.080	1.66	.169	.939	991	.25	.08	.28
												.080							

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+ 40   1800    166  12.6    155  12.7                    0    2.48   .08   1        1.66   .099   .938    651  .36    .08   .18
+                                          299  12.7
                                                                                  .100
+ 82   1400    397  12.6    392  12.8                    0    2.68   .08   1        1.66   .024   .987    313  .63    .16   .09
                                          435  12.6
                                                                                  .100
+ 82   1867     80  12.6     73  12.8                    0    2.48   .08   1        1.66   .129   .911    788  .31    .16   .22
+                                          ---  ---
                                                                                  .220
+ 81   1320    502  12.6    497  12.7                    0    2.60   .08   1        1.54   .019   .990    259  .71?   .08   .07
+                                          564  12.7
                                                                                  .240
+ 41   3100    211  12.6    203  12.7                    0    2.66   .08   1        1.66   .066   .964    526  .43    .08   .15
+                                          412  12.6
                                                                                  .090
+ 78   1600    518  12.5    508  12.6                    0    2.54   .08   1        1.66   .031   .982    343  .59    .16   .10
+                                          ---  ---
                                                                                  .090
+ 78   1320    410  12.7    401  12.8                    0    1.12   .08   1        1.66   .049   .978    310  .63    .08   .09
+                                          ---  ---
                                                                                  .230
+ 77   1320    919  12.6    911  12.7                    0    1.81   .08   1        1.54   .017   .990    203  .83?   .08   .06
+                                          968  12.7
                                                                                  3.79
+ 75   1320    381  15.4    381  15.4                    0    2.26*  .08   0        1.25   .001  1.000    111 1.00?   .00   .00
+                                          ---  ---
                                                                                  7.06
+ 80   1320    154  12.1    154  12.1                    0     .00   .08   0        1.25   .003  1.000     81 1.00?   .00   .00
+                                          227  12.6
                                                                                  .230
+ 79   1320     61  12.6     56  12.7                    0    1.04   .08   1        1.54   .176   .926    528  .43    .08   .15
+                                          137  12.5
                                                                                  .230
+ 76   1320    137  12.5    132  12.6                    0    1.90   .08   1        1.54   .054   .965    397  .53    .16   .11
+                                          207  12.6
                                                                                  .230
+ 75   1320    207  12.6    202  12.6                    0    2.03   .08   1        1.54   .039   .975    343  .59    .08   .10
+                                          ---  ---
                                                                                  3.79
+112   1320    588  12.6    588  12.6                    0    2.27*  .08   0        1.25   .001  1.000    102 1.00?   .00   .00
+                                          ---  ---
                                                                                  4.04
+109   2640    166  12.0    166  12.7                    0     .00   .08   1        1.25   .012  1.000    249  .73?   .72   .07
+                                          252  12.5
                                                                                  .632
110    1320   5359  12.6   5359  12.6                    0    2.09   .08   0        1.57   .001  1.000     49 1.00?   .00   .00
                                         5425  12.6
                                                                                  1.11
+111   1320   5856  12.6   5856  12.6                    0    2.08   .08   0        1.56   .000  1.000     36 1.00?   .00   .00
+                                         5912  12.6
                                                                                  .060
+112   1320   5912  12.6   5901  12.6                    0    2.08   .08   1        1.63   .003   .998    159  .95?   .08   .04
+                                         5953  12.6
                                                                                  .060
+113   1320   6691  12.6   6689  12.7                    0    2.14   .08   1        1.63   .002  1.000    151  .98?   .08   .04
+                                         6755  12.7
                                                                                  .250
+ 60   1320     45  12.5     43  12.6                    0    2.40   .08   1        1.54   .094   .959    555  .41    .08   .16
+                                          115  12.6
                                                                                  .280
+ 65   1320    115  12.6    113  12.7                    0    2.22   .08   1        1.54   .045   .976    371  .56    .16   .10
+                                          184  12.6
                                                                                  .250
+ 68   1320    184  12.6    180  12.7                    0    2.22   .08   1        1.54   .037   .982    339  .60    .08   .09
+                                          248  12.6
                                                                                  .180
+ 70   1320    248  12.6    238  12.6                    0    2.29   .08   1        1.54   .039   .961    378  .55    .08   .11
+                                          310  12.6
                                                                                  .090
+ 74   1320    310  12.6    298  12.6                    0    2.35   .08   1        1.66   .028   .962    347  .59    .08   .10
+                                          371  12.6
                                                                                  6.62
+113   1320    371  12.6    371  12.6                    0    2.45   .08   0        1.25   .006  1.000     71 1.00?   .00   .00
+                                          ---  ---
                                                                                  .050
+114   3000   7301  12.6   7164  12.8                    0    2.15   .08   1        1.64   .010   .981    353  .58    .16   .10
+                                          ---  ---
1
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SUMMARY TABLE 2 - SELECTED MODIFIED ATT-KIN REACH ROUTINGS IN ORDER OF STANDARD EXECUTIVE CONTROL INSTRUCTIONS
(A STAR(*) AFTER VOLUME ABOVE BASE(IN) INDICATES A HYDROGRAPH TRUNCATED AT A VALUE EXCEEDING BASE + 10% OF PEAK
A QUESTION MARK(?) AFTER COEFF.(C) INDICATES PARAMETERS OUTSIDE ACCEPTABLE LIMITS, SEE PREVIOUS WARNINGS)

XSEC ID	REACH LENGTH (FT)	HYDROGRAPH INFORMATION INFLOW PEAK (CFS)	INFLOW TIME (HR)	OUTFLOW PEAK (CFS)	OUTFLOW TIME (HR)	OUTFLOW+ INTERV.AREA PEAK (CFS)	INTERV.AREA TIME (HR)	BASE-FLOW (CFS)	ROUTING PARAMETERS VOLUME ABOVE BASE (IN)	MAIN TIME INCR (HR)	ITER-ATION #	Q AND A EQUATION COEFF (X)	POWER (M)	LENGTH FACTOR (K*)	PEAK RATIO O/I (Q*)	S/Q @PEAK (K) (SEC)	ATT-KIN COEFF (C)	TRAVEL TIME STOR-AGE (HR)	KINE-MATIC (HR)
ALTERNATE	1	STORM	3																
72	2650	319	12.5	296	12.6	443	12.6	0	2.22	.08	1	.180 1.54		.129	.926	694	.34	.16	.20
114	2000	443	12.6	411	12.8	483	12.7	0	2.25	.08	1	.050 1.66		.096	.929	649	.36	.08	.18
114	2200	155	12.6	131	12.9	---	---	0	2.30	.08	1	.050 1.66		.234	.846	1086	.23	.16	.31
118	4000	8108	12.8	7889	13.0	8032	13.0	0	2.15	.08	1	.050 1.66		.013	.973	409	.52	.16	.11
117	3527	8032	13.0	7869	13.0	7953	13.0	0	2.14	.08	1	.050 1.66		.010	.980	362	.57	.08	.10

SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1	2	3
STRUCTURE 69	2.61			
ALTERNATE 1		276.79	352.86	380.84
STRUCTURE 59	1.27			
ALTERNATE 1		275.56	369.87	420.79
STRUCTURE 43	2.53			
ALTERNATE 1		346.76	444.11	508.00
STRUCTURE 33	.97			
ALTERNATE 1		77.35	88.79	93.45
STRUCTURE 8	1.24			
ALTERNATE 1		135.41	215.01	246.05
XSECTION 1	.15			
ALTERNATE 1		149.82	217.93	248.49
XSECTION 2	.10			
ALTERNATE 1		100.45	145.51	165.73
XSECTION 3	.29			
ALTERNATE 1		255.59	387.57	446.92
XSECTION 4	.22			
ALTERNATE 1		210.49	307.71	351.51
XSECTION 5	.34			
ALTERNATE 1		253.80	398.25	464.83
XSECTION 6	.40			
ALTERNATE 1		300.45	471.05	549.88
XSECTION 7	.13			
ALTERNATE 1		31.75	78.95	101.47
XSECTION 8	1.24			
ALTERNATE 1		524.86	1004.46	1220.97
XSECTION 9	.07			
ALTERNATE 1		24.37	46.12	56.70

SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1	2	3
0 XSECTION 10	.09			
ALTERNATE 1		39.88	75.75	93.22
0 XSECTION 11	.22			
ALTERNATE 1		87.66	169.07	208.58
0 XSECTION 12	.38			
ALTERNATE 1		178.05	324.42	394.33
0 XSECTION 13	.13			
ALTERNATE 1		66.41	116.76	140.57
0 XSECTION 14	1.74			
ALTERNATE 1		401.52	635.99	744.85
0 XSECTION 15	.19			
ALTERNATE 1		111.06	188.55	224.76
0 XSECTION 16	.12			
ALTERNATE 1		79.99	132.00	155.97
0 XSECTION 17	.06			
ALTERNATE 1		61.52	89.05	101.41
0 XSECTION 18	.18			
ALTERNATE 1		73.81	139.85	171.98
0 XSECTION 19	.02			
ALTERNATE 1		22.96	33.24	37.85
0 XSECTION 20	.06			
ALTERNATE 1		66.73	96.60	110.00
0 XSECTION 21	.36			
ALTERNATE 1		219.92	377.96	455.32
0 XSECTION 22	.15			
ALTERNATE 1		111.80	180.83	212.40
0 XSECTION 23	.09			
ALTERNATE 1		93.41	135.51	154.39

SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1	2	3
0 XSECTION 24	.20			
ALTERNATE 1		139.24	228.04	268.81
0 XSECTION 25	.15			
ALTERNATE 1		92.92	159.28	188.52
0 XSECTION 26	.07			
ALTERNATE 1		48.39	79.23	93.38
0 XSECTION 27	2.14			
ALTERNATE 1		516.89	870.82	1036.76
0 XSECTION 28	.50			
ALTERNATE 1		117.59	264.65	346.06
0 XSECTION 29	.13			
ALTERNATE 1		58.75	105.95	128.47
0 XSECTION 30	.15			
ALTERNATE 1		54.41	103.27	127.06
0 XSECTION 31	.08			
ALTERNATE 1		47.88	82.67	99.02
0 XSECTION 32	.26			
ALTERNATE 1		72.72	150.43	193.67
0 XSECTION 33	.31			
ALTERNATE 1		53.15	123.94	156.44
0 XSECTION 34	.13			

ALTERNATE 1		68.82	118.43	141.66
0 XSECTION 35	.25			
ALTERNATE 1		133.11	234.08	281.50
XSECTION 36	.00			
ALTERNATE 1		236.76	451.65	466.00
0 XSECTION 37	.00			
ALTERNATE 1		236.68	451.65	466.00
1				

SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1	2	3
0 XSECTION 38	.13			
ALTERNATE 1		85.27	141.28	167.08
0 XSECTION 39	.06			
ALTERNATE 1		40.41	67.55	80.11
0 XSECTION 40	.31			
ALTERNATE 1		201.34	336.12	397.19
0 XSECTION 41	.32			
ALTERNATE 1		210.27	346.09	412.55
0 XSECTION 42	.40			
ALTERNATE 1		269.56	437.49	519.87
0 XSECTION 43	.05			
ALTERNATE 1		43.11	65.59	75.70
0 XSECTION 44	.13			
ALTERNATE 1		98.18	156.47	182.98
0 XSECTION 45	.64			
ALTERNATE 1		358.93	635.43	765.61
0 XSECTION 46	.16			
ALTERNATE 1		67.75	135.93	166.54
0 XSECTION 47	.11			
ALTERNATE 1		59.93	105.86	127.59
0 XSECTION 48	.16			
ALTERNATE 1		88.78	149.93	178.58
0 XSECTION 49	.09			
ALTERNATE 1		89.06	129.01	146.94
0 XSECTION 50	.33			
ALTERNATE 1		193.94	333.88	394.21
0 XSECTION 51	.49			
ALTERNATE 1		194.37	354.69	428.63
1				

SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1	2	3
0 XSECTION 52	.39			
ALTERNATE 1		199.93	354.42	421.29
0 XSECTION 55	1.27			
ALTERNATE 1		532.92	999.11	1221.81
0 XSECTION 56	.46			
ALTERNATE 1		198.29	369.51	445.07
XSECTION 57	.07			

ALTERNATE 1		34.29	61.31	75.32
0 XSECTION 58	.03			
+				
ALTERNATE 1		23.85	39.00	45.93
XSECTION 59	.76			
ALTERNATE 1		400.97	729.39	882.06
0 XSECTION 60	.09			
+				
ALTERNATE 1		55.33	96.16	115.42
0 XSECTION 64	.25			
+				
ALTERNATE 1		156.50	267.71	319.51
0 XSECTION 65	.16			
+				
ALTERNATE 1		81.41	152.65	184.44
0 XSECTION 66	1.33			
+				
ALTERNATE 1		279.01	374.91	426.63
0 XSECTION 67	1.52			
+				
ALTERNATE 1		399.67	585.69	664.38
0 XSECTION 68	.22			
+				
ALTERNATE 1		104.62	203.71	247.97
0 XSECTION 69	2.61			
+				
ALTERNATE 1		748.57	1371.45	1658.27
0 XSECTION 70	.28			
+				
ALTERNATE 1		130.46	253.58	309.71
1				

SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1	2	3
0 XSECTION 71	.13			
+				
ALTERNATE 1		75.62	129.69	154.91
XSECTION 72	.38			
+				
ALTERNATE 1		198.79	359.31	446.87
0 XSECTION 74	.35			
+				
ALTERNATE 1		159.74	303.55	370.62
0 XSECTION 75	2.86			
+				
ALTERNATE 1		354.27	524.56	587.85
0 XSECTION 76	.19			
+				
ALTERNATE 1		88.24	176.75	208.64
0 XSECTION 77	1.03			
+				
ALTERNATE 1		356.40	769.21	968.33
0 XSECTION 78	.96			
+				
ALTERNATE 1		346.46	732.59	920.08
0 XSECTION 79	.13			
+				
ALTERNATE 1		55.62	116.84	137.02
0 XSECTION 80	.00			
+				
ALTERNATE 1		166.00	166.00	166.00
0 XSECTION 81	.00			
+				
ALTERNATE 1		154.00	154.00	154.00
0 XSECTION 82	.44			
+				
ALTERNATE 1		239.53	420.57	502.11
0 XSECTION 83	1.79			
+				
ALTERNATE 1		255.04	337.09	373.42
0 XSECTION 84	.93			
+				
ALTERNATE 1		124.45	159.87	182.94
0 XSECTION 85	2.59			
+				
ALTERNATE 1		348.41	446.83	511.25
1				

SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1	2	3
0 XSECTION 86	.06			
ALTERNATE 1		46.21	75.40	88.77
0 XSECTION 87	.13			
ALTERNATE 1		72.68	126.21	151.29
0 XSECTION 88	1.25			
ALTERNATE 1		226.07	387.63	486.69
0 XSECTION 89	.05			
ALTERNATE 1		31.57	52.42	62.16
0 XSECTION 90	1.11			
ALTERNATE 1		148.96	250.46	330.07
0 XSECTION 91	.13			
ALTERNATE 1		87.51	143.49	169.21
0 XSECTION 92	1.29			
ALTERNATE 1		87.51	148.13	229.82
0 XSECTION 93	.00			
ALTERNATE 1		201.23	265.00	265.00
0 XSECTION 94	.40			
ALTERNATE 1		118.06	219.89	256.69
0 XSECTION 95	.00			
ALTERNATE 1		265.00	265.00	265.00
0 XSECTION 96	.00			
ALTERNATE 1		265.00	265.00	265.00
0 XSECTION 97	.31			
ALTERNATE 1		160.84	302.31	365.07
0 XSECTION 98	2.22			
ALTERNATE 1		265.64	682.91	887.32
XSECTION 99	2.32			
ALTERNATE 1		299.29	738.98	951.42

1

SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/ STRUCTURE ID	DRAINAGE AREA (SQ MI)	STORM NUMBERS..... 1	2	3
0 XSECTION 100	.08			
ALTERNATE 1		57.05	92.22	108.52
0 XSECTION 101	1.30			
ALTERNATE 1		244.90	426.06	523.21
0 XSECTION 102	1.36			
ALTERNATE 1		229.77	422.89	526.07
0 XSECTION 103	.08			
ALTERNATE 1		57.51	94.97	112.17
0 XSECTION 104	7.53			
ALTERNATE 1		1863.26	3528.88	4312.53
0 XSECTION 105	.93			
ALTERNATE 1		124.45	159.86	182.94
0 XSECTION 106	1.85			
ALTERNATE 1		284.24	391.47	439.00
0 XSECTION 107	9.66			
ALTERNATE 1		2330.96	4219.41	5094.64
0 XSECTION 108	9.75			
ALTERNATE 1		2550.91	4477.50	5368.90
0 XSECTION 109	.06			

```
+_____________________________
   ALTERNATE    1                208.73    238.78    252.11
0 XSECTION  110        10.18
+_____________________________
   ALTERNATE    1               2780.53   4884.95   5856.90
 XSECTION  111        10.25
+_____________________________
   ALTERNATE    1               2801.19   4929.22   5913.10
0 XSECTION  112        13.42
+_____________________________
   ALTERNATE    1               3225.65   5617.34   6704.36
0 XSECTION  113        14.05
+_____________________________
   ALTERNATE    1               3482.47   6117.58   7314.83
1
```


SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

```
 XSECTION/          DRAINAGE
 STRUCTURE            AREA       STORM NUMBERS..........
   ID               (SQ MI)          1         2         3

0 XSECTION  114        15.00
+_____________________________
   ALTERNATE    1               3766.81   6746.64   8108.75
0 XSECTION  115          .09
+_____________________________
   ALTERNATE    1                 55.56     96.28    115.33
0 XSECTION  117        15.41
+_____________________________
   ALTERNATE    1               3588.63   6582.92   7975.86
0 XSECTION  118        15.23
+_____________________________
   ALTERNATE    1               3661.90   6659.83   8040.75
0 XSECTION  119          .23
+_____________________________
   ALTERNATE    1                105.55    184.55    221.79
0 XSECTION  120          .23
+_____________________________
   ALTERNATE    1                181.43    289.16    338.15
0 XSECTION  121          .25
+_____________________________
   ALTERNATE    1                255.13    372.61    425.28
0 XSECTION  122          .35
+_____________________________
   ALTERNATE    1                217.31    375.29    449.04
0 XSECTION  123          .21
+_____________________________
   ALTERNATE    1                212.19    311.05    355.37
0 XSECTION  124        4.99
+_____________________________
   ALTERNATE    1               1637.80   3106.65   3788.85
0 XSECTION  125        1.19
+_____________________________
   ALTERNATE    1                724.50   1276.33   1516.42
0 XSECTION  126          .84
+_____________________________
   ALTERNATE    1                508.49    903.88   1077.69
0 XSECTION  127          .33
+_____________________________
   ALTERNATE    1                161.93    313.23    380.51
0 XSECTION  128          .04
+_____________________________
   ALTERNATE    1                 22.79     39.33     47.02
1
```


SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

```
 XSECTION/          DRAINAGE
 STRUCTURE            AREA       STORM NUMBERS..........
   ID               (SQ MI)          1         2         3

0 XSECTION  129          .14
+_____________________________
   ALTERNATE    1                100.69    165.58    195.42
0 XSECTION  130          .03
+_____________________________
   ALTERNATE    1                 29.32     44.13     50.77
 XSECTION  131          .68
+_____________________________
```

```
    ALTERNATE    1                    399.22    714.61    854.51
0 XSECTION  132          .14
+_____________________________
    ALTERNATE    1                     97.92    164.11    194.67
  XSECTION  133          .22
_____________________________
    ALTERNATE    1                    166.37    271.04    318.96
0 XSECTION  134         1.08
+_____________________________
    ALTERNATE    1                    635.72   1134.16   1355.89
0 XSECTION  135          .04
+_____________________________
    ALTERNATE    1                     36.21     56.36     65.45
0 XSECTION  136          .07
+_____________________________
    ALTERNATE    1                     56.90     88.56    102.84
0 XSECTION  137          .08
+_____________________________
    ALTERNATE    1                     32.50     62.53     77.13
0 XSECTION  138          .27
+_____________________________
    ALTERNATE    1                    175.57    302.48    359.49
0 XSECTION  139         3.49
+_____________________________
    ALTERNATE    1                    847.83   1613.75   2000.01
0 XSECTION  140          .64
+_____________________________
    ALTERNATE    1                    281.67    492.37    591.86
0 XSECTION  141          .44
+_____________________________
    ALTERNATE    1                    165.18    292.88    353.56
0 XSECTION  142          .00
+_____________________________
    ALTERNATE    1                    265.00    265.00    265.00
1
```


SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

```
XSECTION/          DRAINAGE
STRUCTURE            AREA       STORM NUMBERS..........
  ID               (SQ MI)          1         2         3

 XSECTION  143        2.53
+_____________________________
    ALTERNATE    1                    854.04   1557.16   1802.20
0 XSECTION  144          .13
+_____________________________
    ALTERNATE    1                     48.73     92.24    113.39
0 XSECTION  145          .97
+_____________________________
    ALTERNATE    1                    103.16    115.18    119.61
0 XSECTION  146          .12
+_____________________________
    ALTERNATE    1                     65.66    118.44    148.20
0 XSECTION  147          .05
+_____________________________
    ALTERNATE    1                     35.77     60.06     71.26
0 XSECTION  148          .03
+_____________________________
    ALTERNATE    1                     22.70     38.12     45.22
0 XSECTION  149          .17
+_____________________________
    ALTERNATE    1                     53.87    120.23    150.51
0 XSECTION  150          .02
+_____________________________
    ALTERNATE    1                     11.01     18.48     21.93
1END OF  1 JOBS IN THIS RUN
```

Appendix E

Hydraulic Analysis and Supporting Documentation

Appendix E1	Roughness Coefficient Estimations
Appendix E2	Cross Section Plots
Appendix E3	Expansion and Contraction Coefficients
Appendix E4	Analysis of Structures
Appendix E5	Hydraulic Calculations for Greenway Channel
Appendix E6	Hydraulic Calculations for Storm Drain Systems

Appendix E1

Roughness Coefficient Estimations

TABLE E1.1
Manning's n-values used for each channel material

Channel Material	Manning's n-value
Concrete - troweled or float finish	0.015
Grouted rip rap (d50 < 12 inches)	0.025
Grouted rip rap (d50 > 12 inches)	0.035
Vegetated earth, grass with weeds	0.035
Gabion basket or mattress	0.035

References: Flood Control District of Maricopa County, Drainage Design Manual - Volume II, Hydraulics, January 1996
Chow, Ven Te, Open-Channel Hydraulics, 1959

TABLE E1.2
Summary of Manning's n-values used for Greenway Parkway Channel

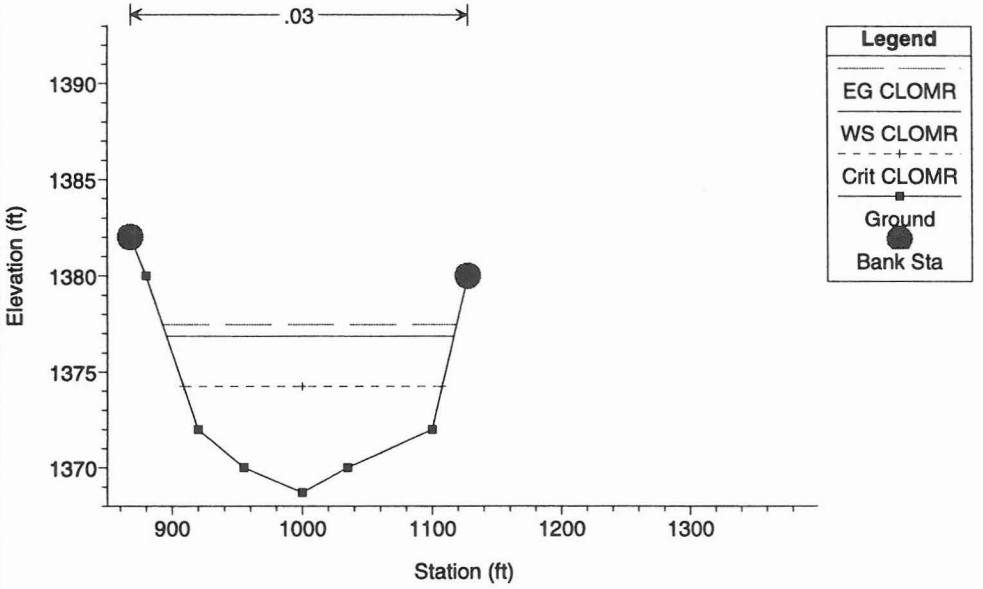
From Station	To Station	Channel Description	Assigned Manning's n-values		
			Left Side	Channel	Right Side
142+25.00	143+40.00	Existing concrete and gabion mattress lined transition.	0.017	0.017	0.017
143+40.00	154+30.00	Generally trapezoidal in shape. Sloping grass lined bottom and sides.	0.035	0.035	0.035
154+30.00	156+70.00	Generally trapezoidal in shape. Sloping bottom is partially gabion mattress and partially grouted rip rap. Sides are lined by gabion mattress.	0.035	0.025	0.035
156+70.00	157+00.00	Transition from gabion mattress side slopes to stepped gabion side slopes. Bottom is partially gabion mattress, partially grouted rip rap and partially of concrete with exposed large aggregate.	0.035	0.030	0.035
157+00.00	161+00.00	Trapezoidal bottom with stepped gabion sides. Bottom material will consist partially of gabion mattress and partially of new concrete with exposed large aggregate.	0.035	0.030	0.035
161+00.00	198+43.30	Trapezoidal bottom with stepped gabion sides. Bottom material will consist of concrete with exposed large aggregate.	0.035	0.025	0.035
198+43.30	240+22.00	Trapezoidal concrete bottom with stepped gabion sides.	0.035	0.015	0.035

Appendix E2

Cross Section Plots

New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
Match EFFECTIVE FLOODPLAIN @ FEMA Sectio RS = 14180



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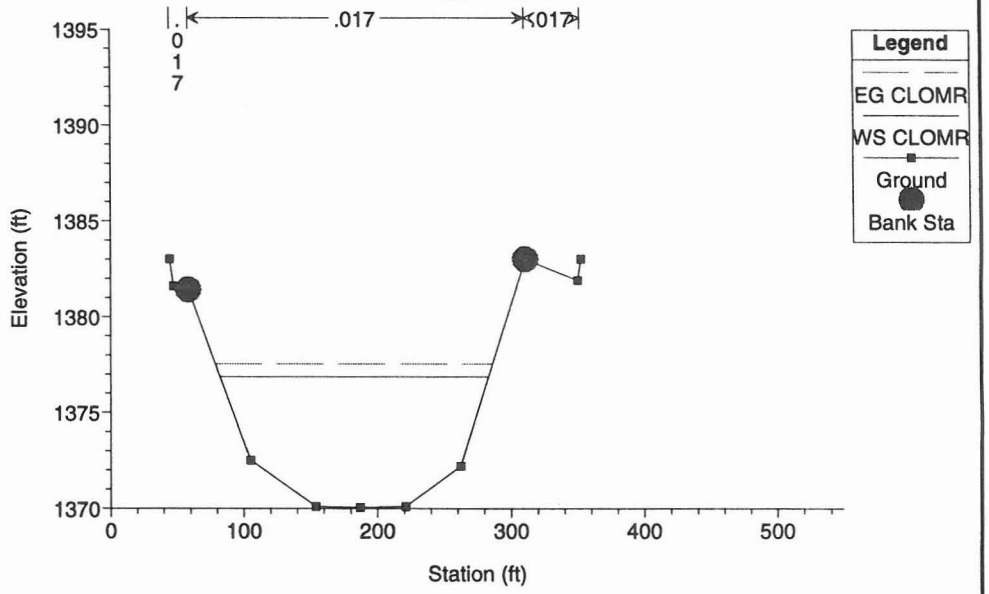
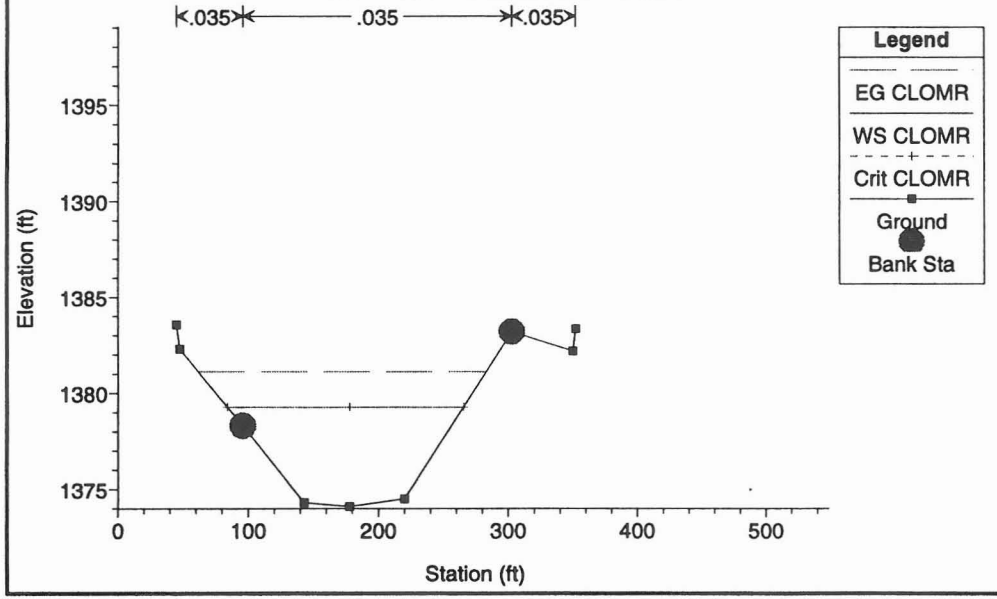
Flow: Greenway Parkway Channel
RS = 14225



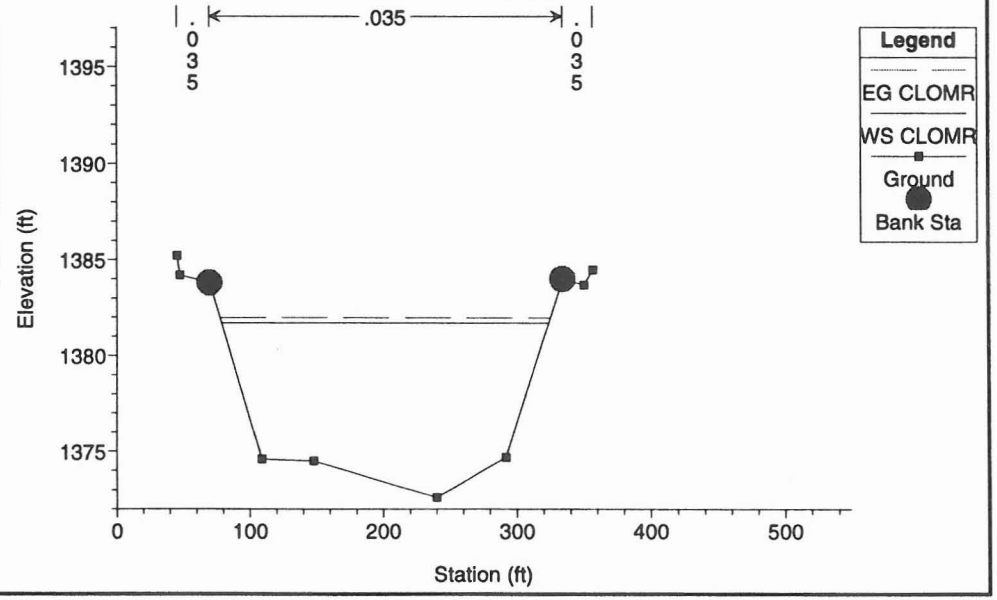
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
100 ft D/S of 9th Street RS = 14340



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 14700

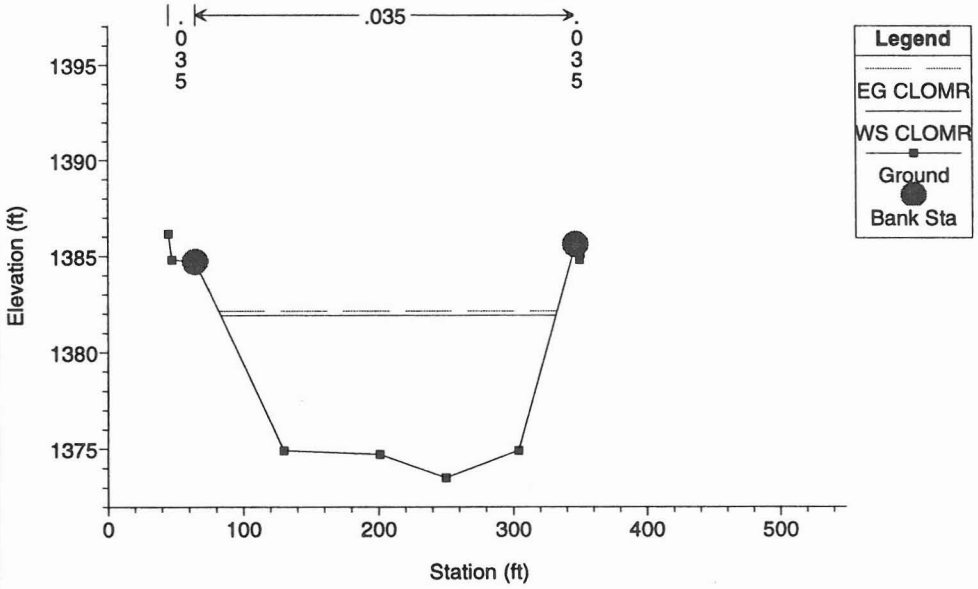


1 in Horiz. = 150 ft 1 in Vert. = 10 ft

New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

RS = 14900



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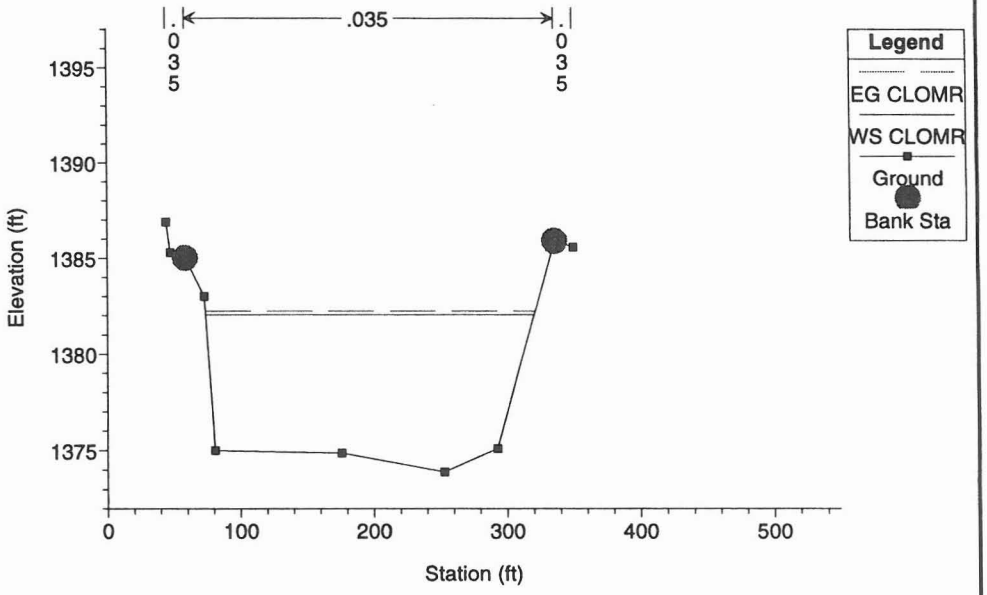
Flow: Greenway Parkway Channel

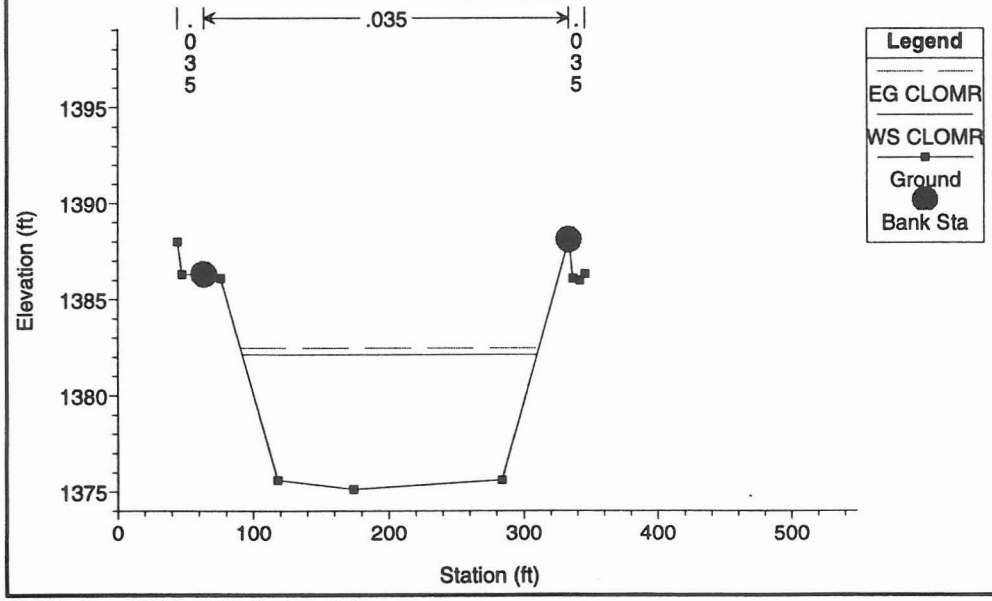
RS = 15061



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

RS = 15300



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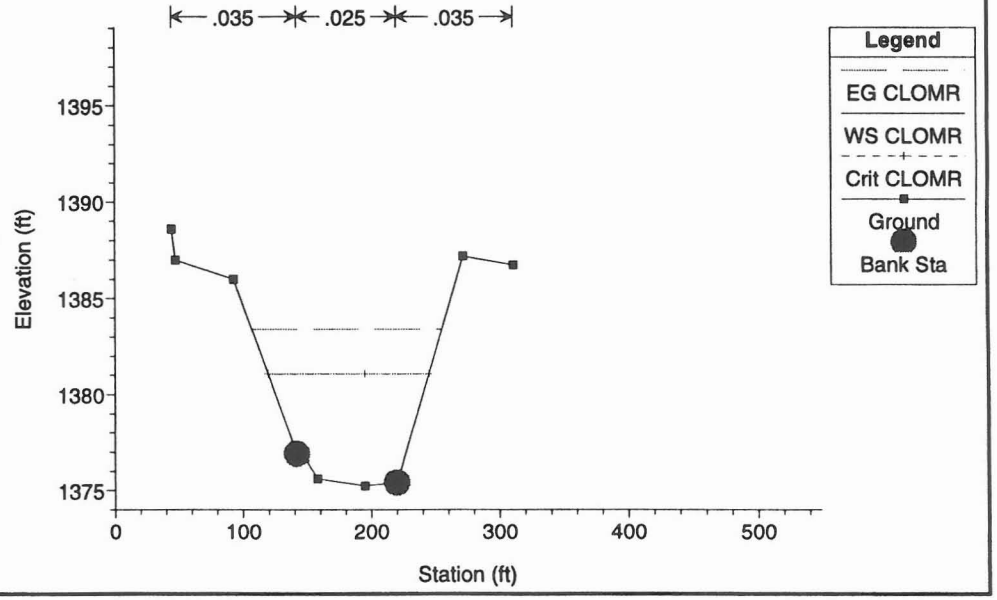
Flow: Greenway Parkway Channel

RS = 15430

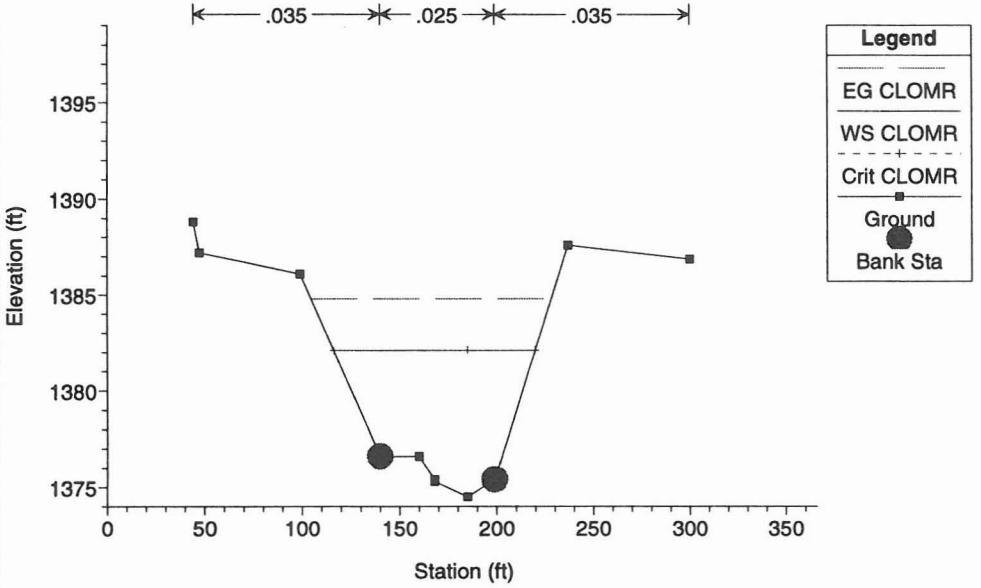


1 in Horiz. = 150 ft 1 in Vert. = 10 ft

New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

RS = 15475



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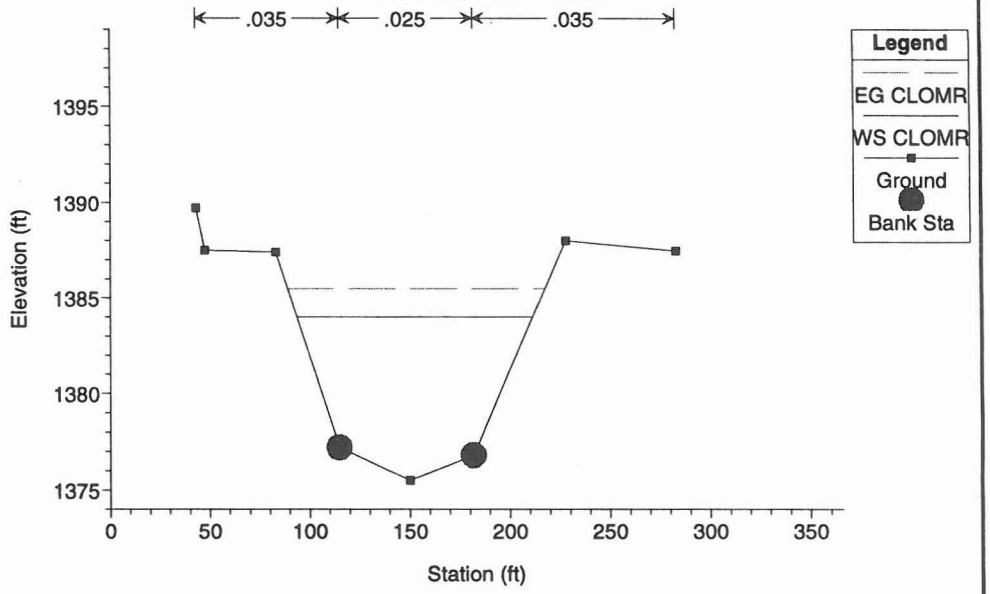
Flow: Greenway Parkway Channel

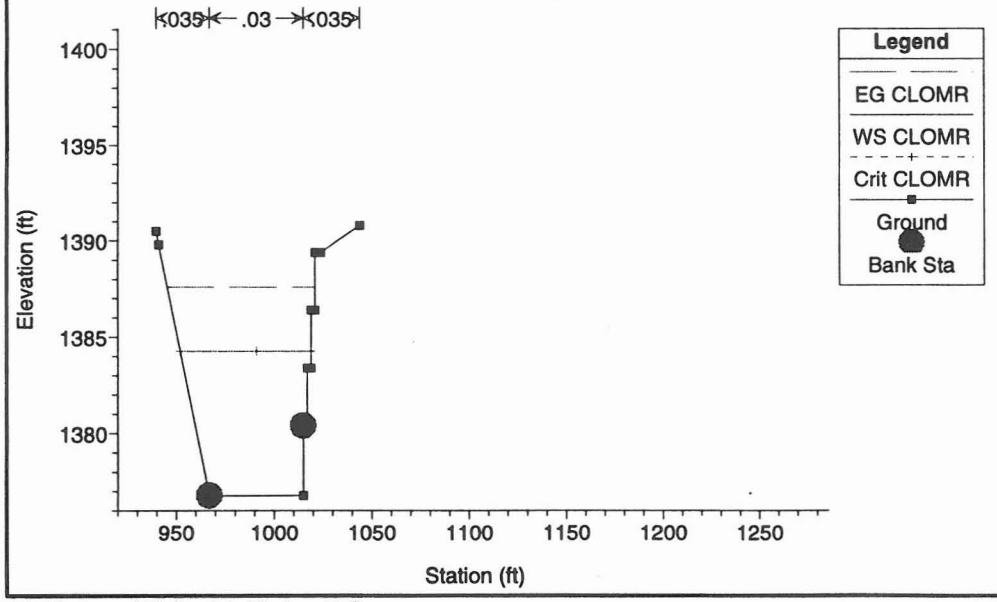
12th Street RS = 15670



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

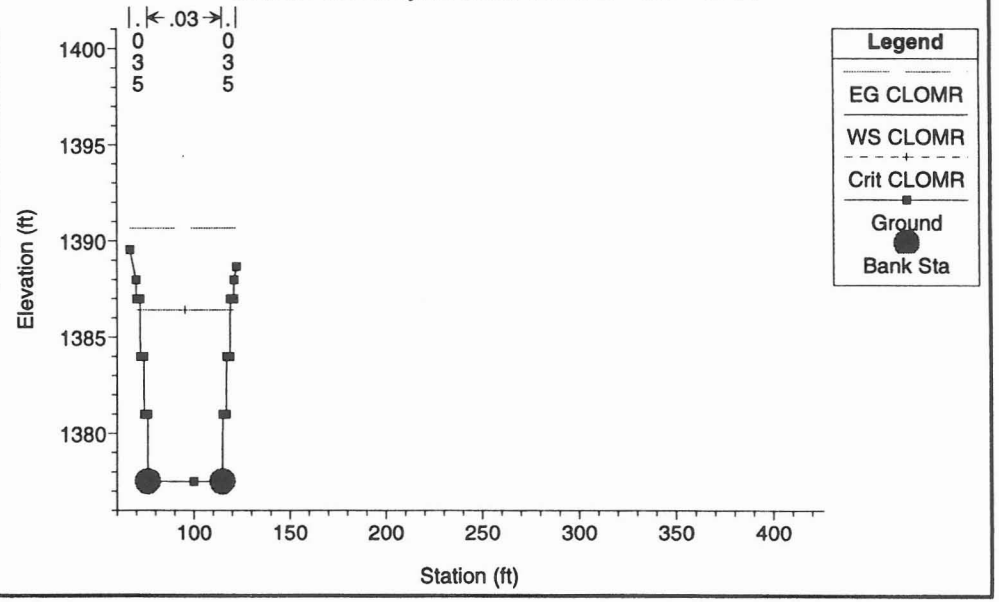
RS = 15700



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

Start WP Geometry, based on "As-Builts" RS = 15800

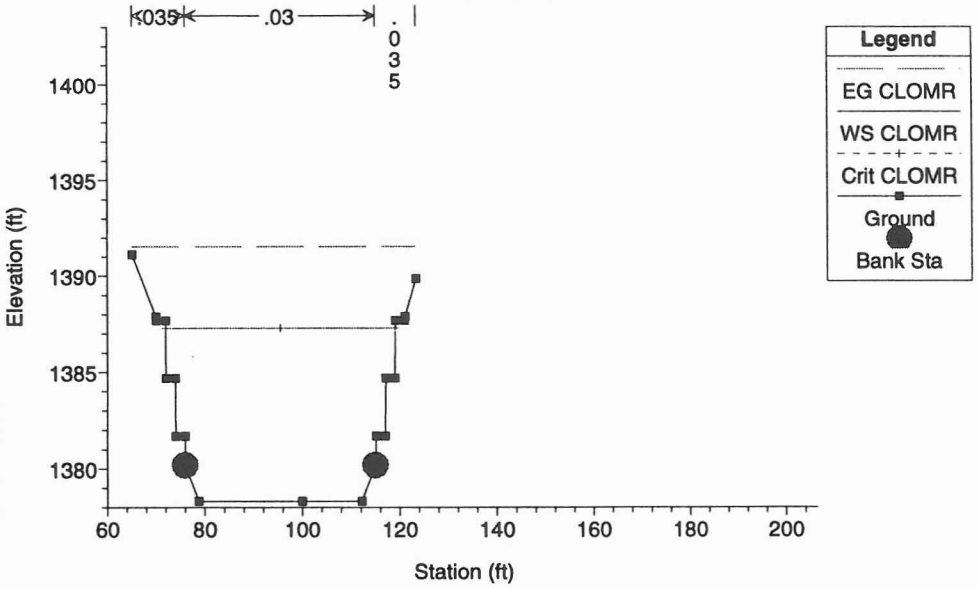


1 in Horiz. = 100 ft 1 in Vert. = 10 ft

New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

RS = 15900



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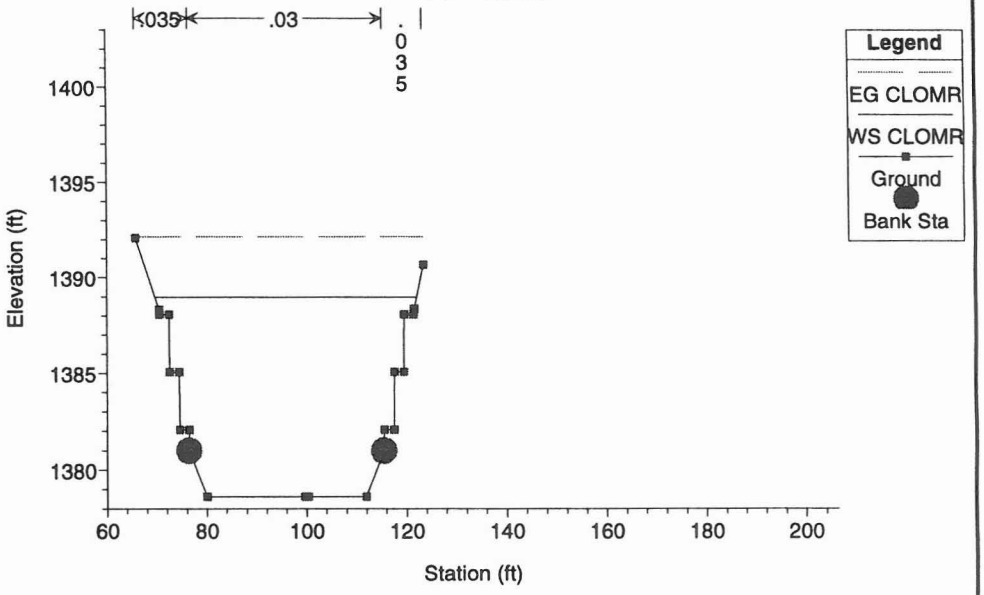
Flow: Greenway Parkway Channel

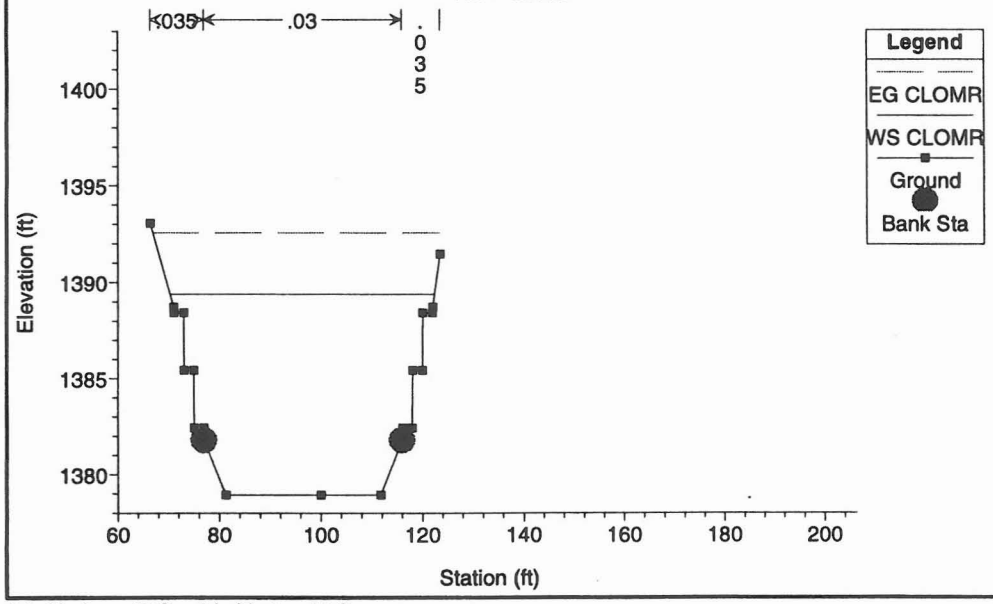
RS = 16000.*



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

RS = 16100



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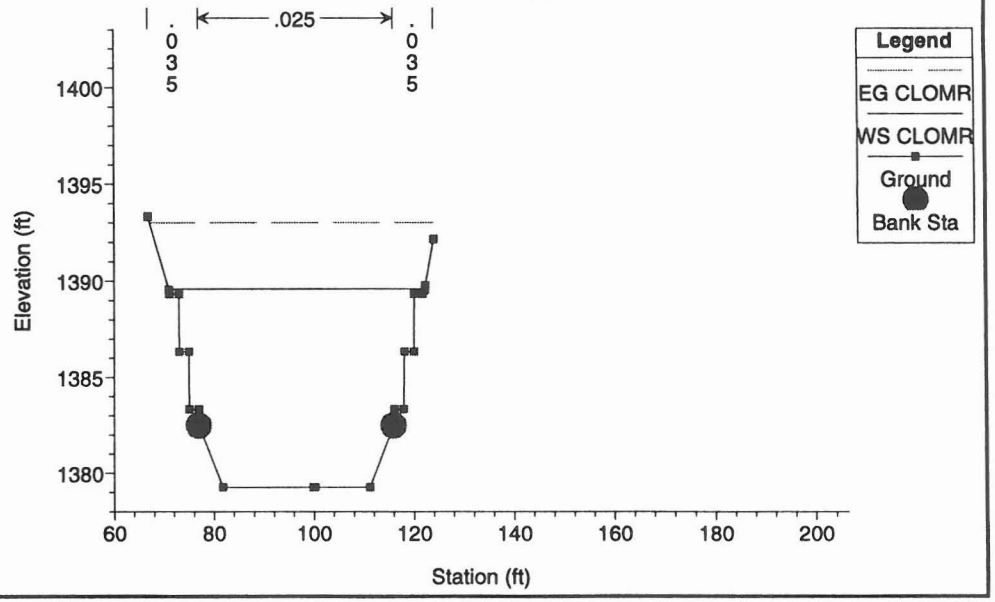
Flow: Greenway Parkway Channel

RS = 16200.*

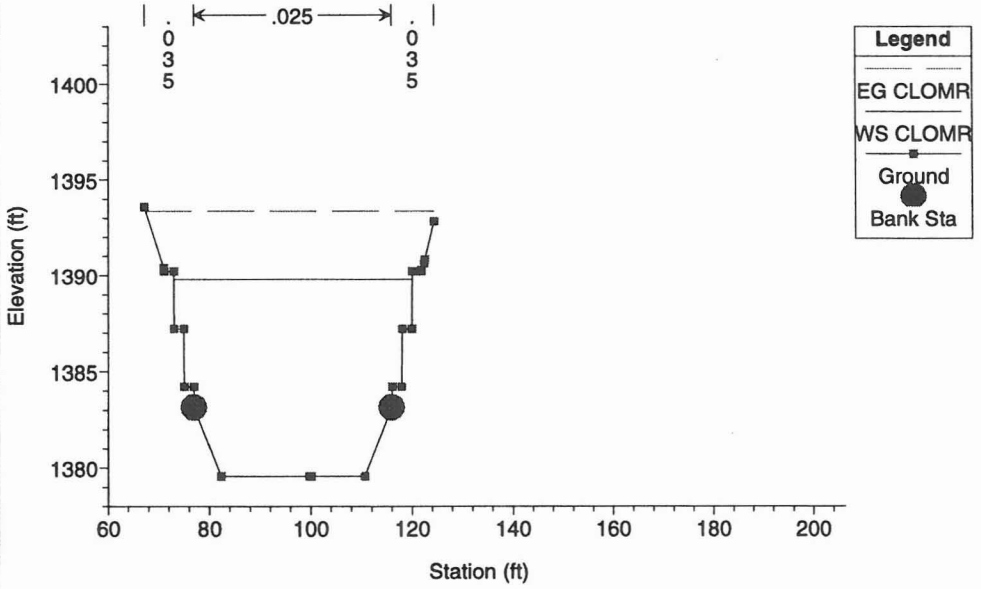


1 in Horiz. = 40 ft 1 in Vert. = 10 ft

New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

RS = 16300.*



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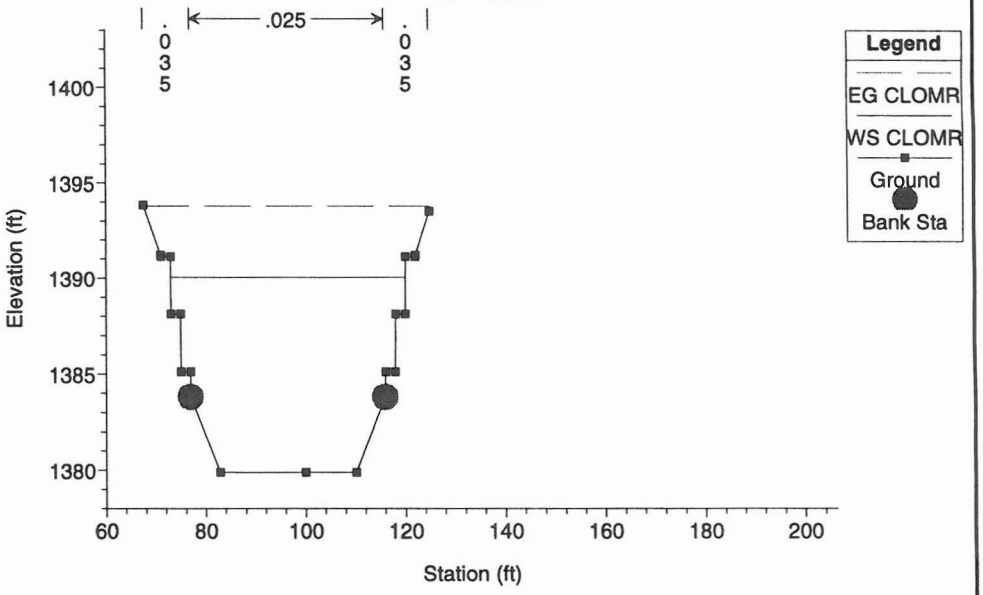
Flow: Greenway Parkway Channel

RS = 16400



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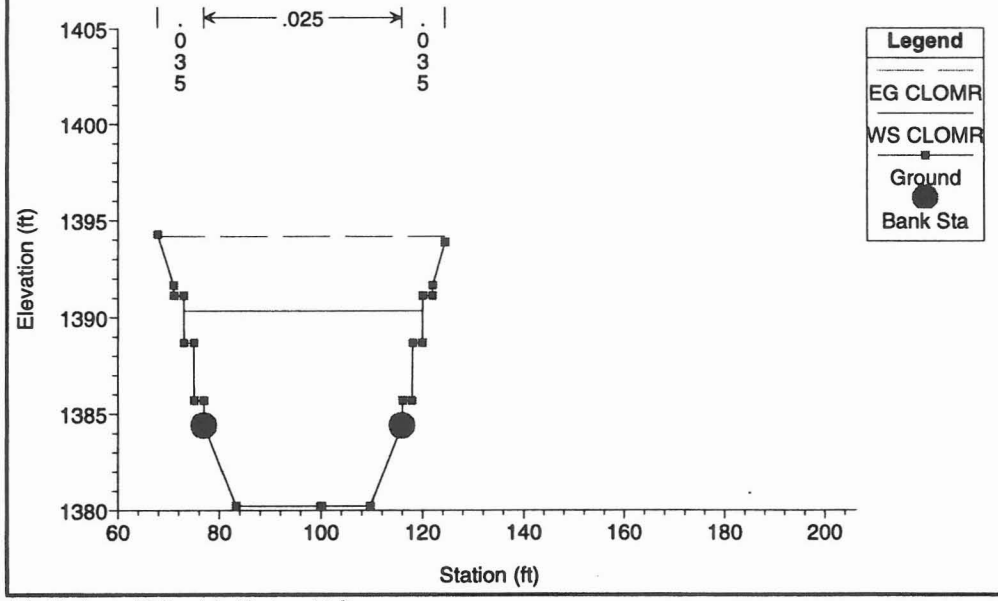
Flow: Greenway Parkway Channel

RS = 16500.*



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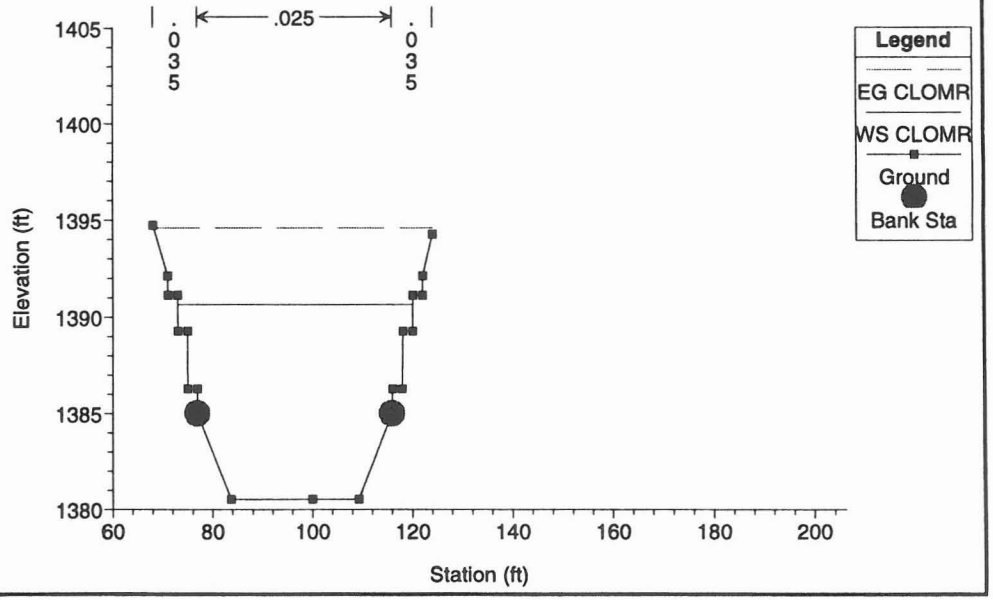
Flow: Greenway Parkway Channel

RS = 16600

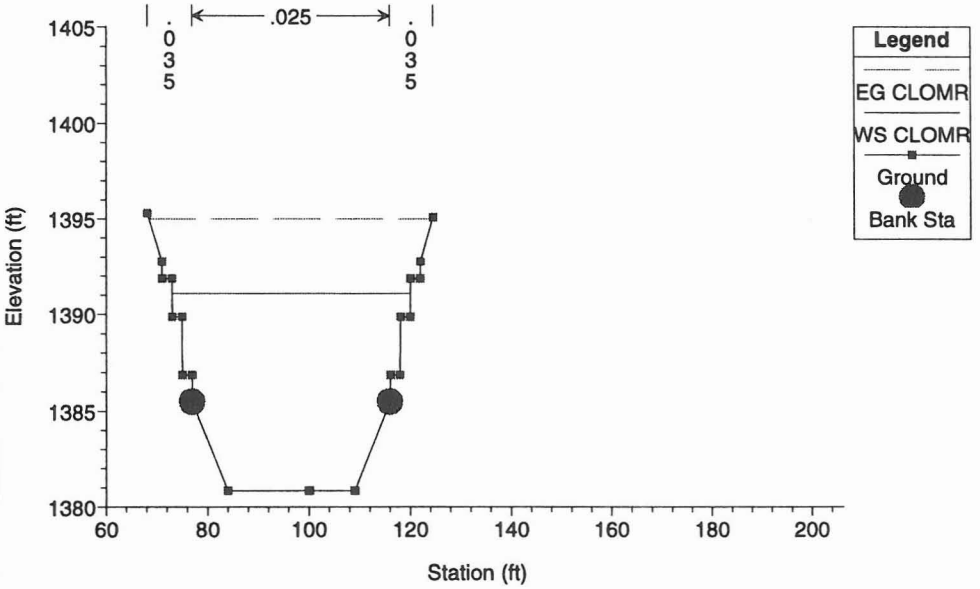


1 in Horiz. = 40 ft 1 in Vert. = 10 ft

New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

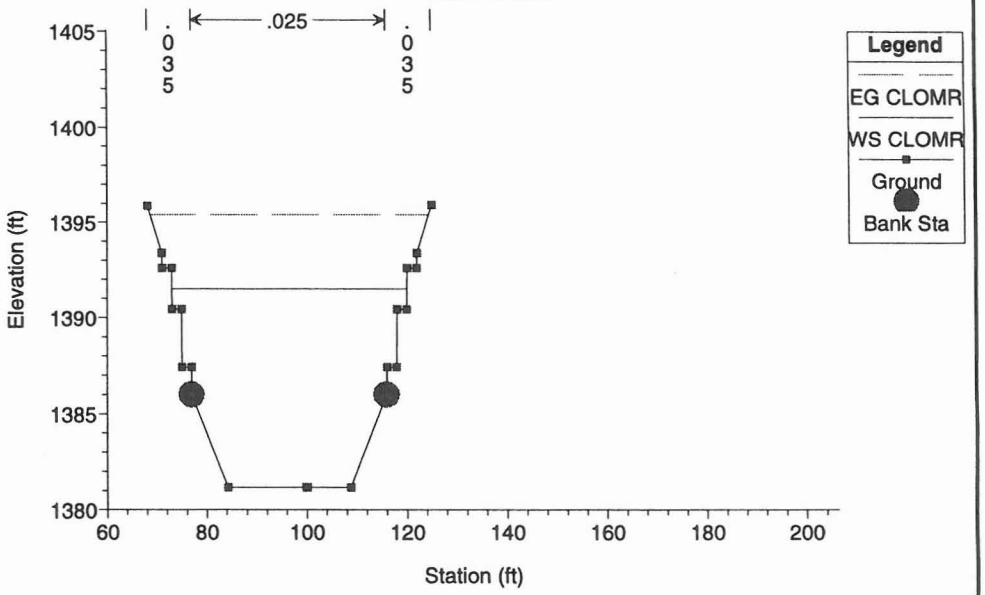
RS = 16700.*



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

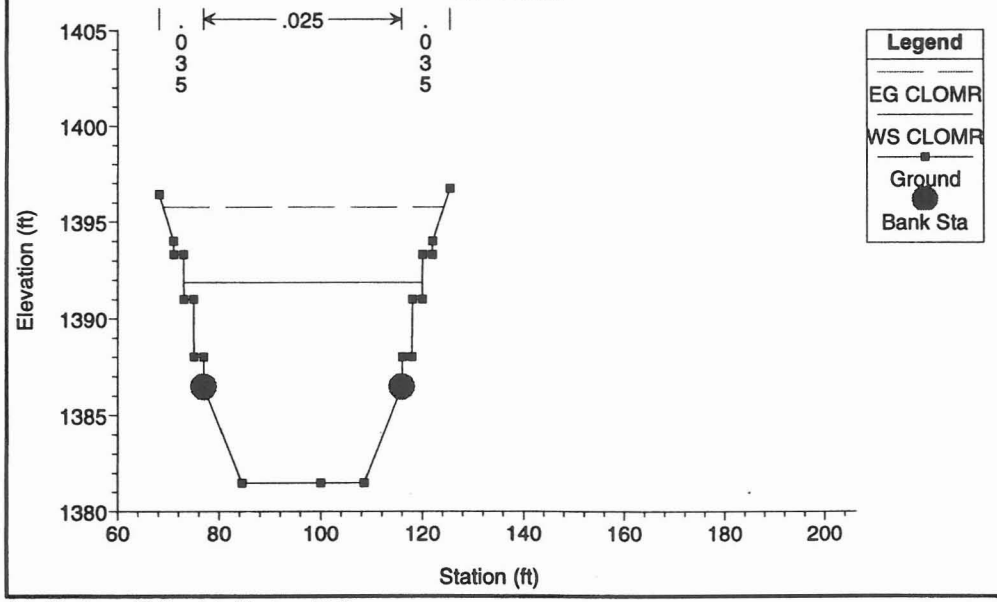
RS = 16800.*



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

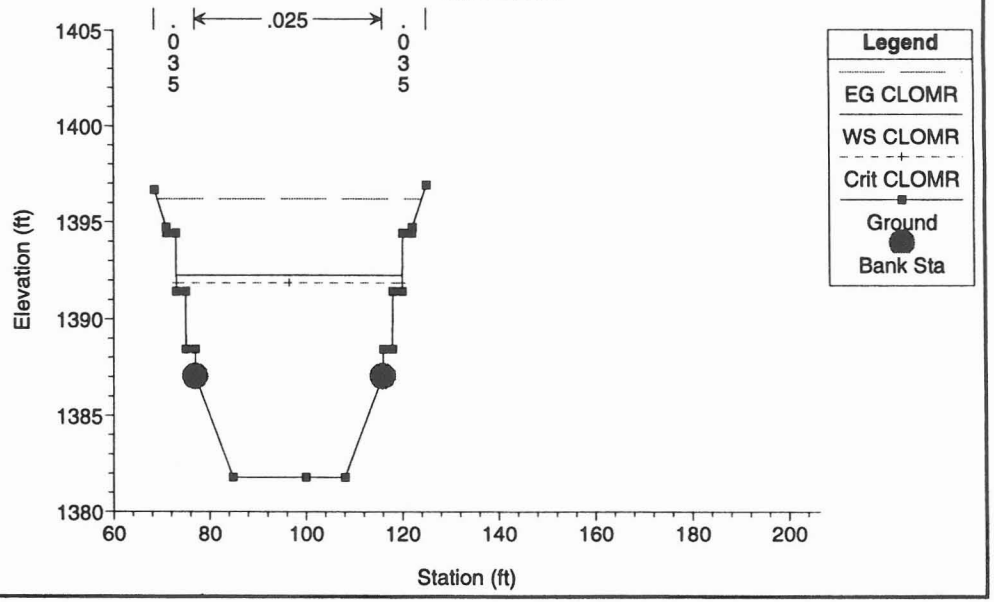
RS = 16900



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

RS = 17000

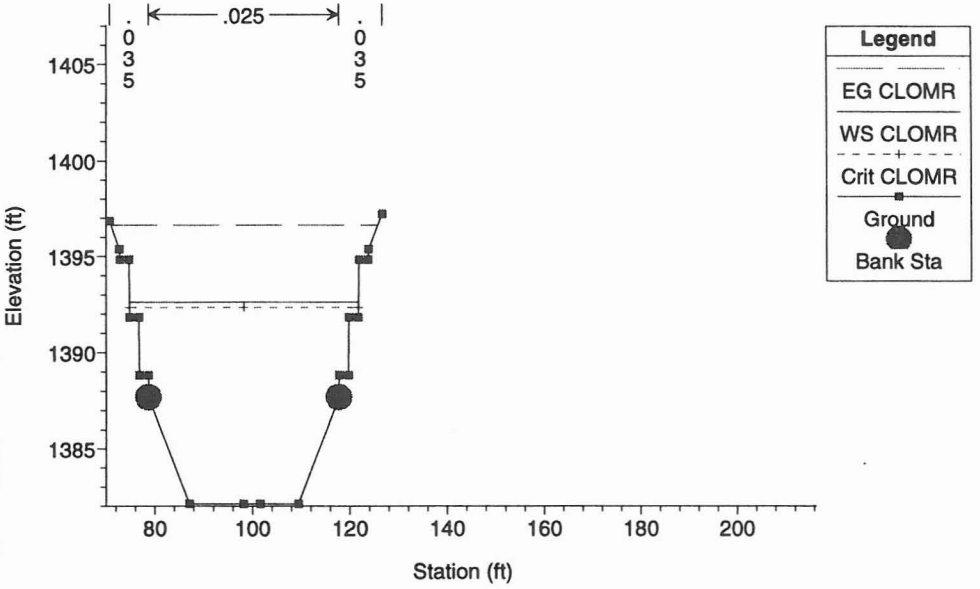


1 in Horiz. = 40 ft 1 in Vert. = 10 ft

New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

RS = 17100.*



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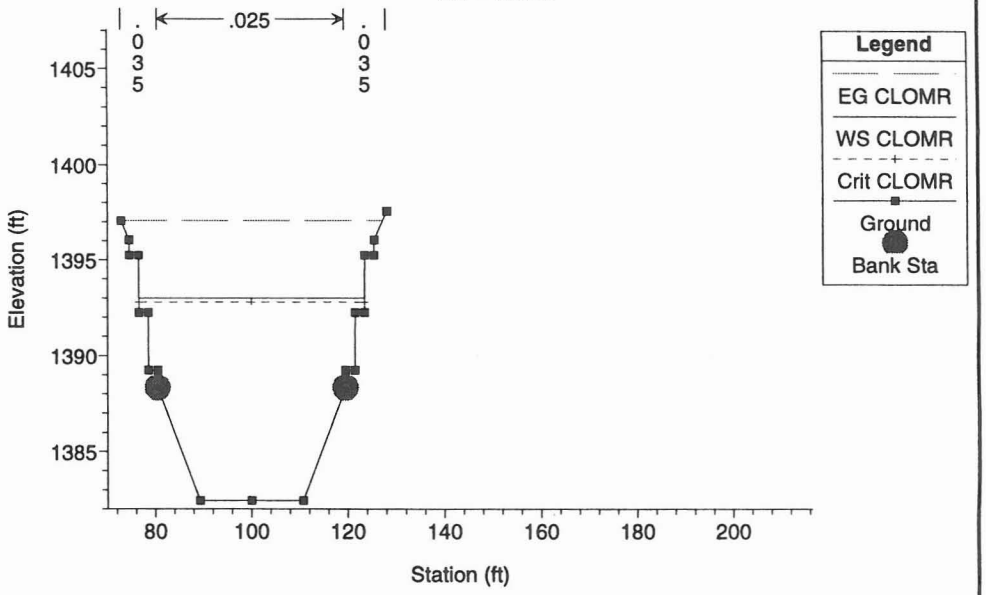
Flow: Greenway Parkway Channel

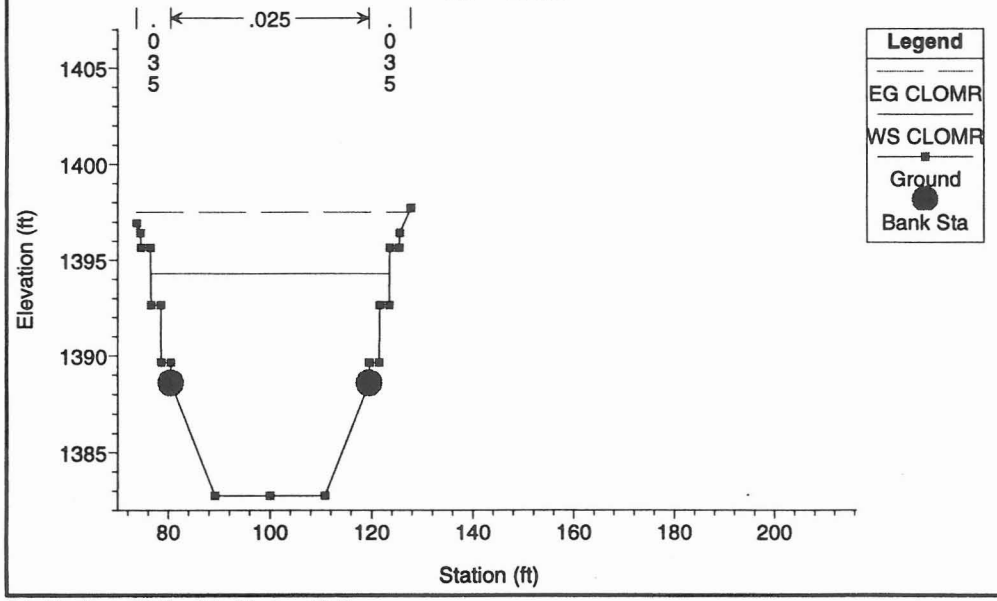
RS = 17200



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

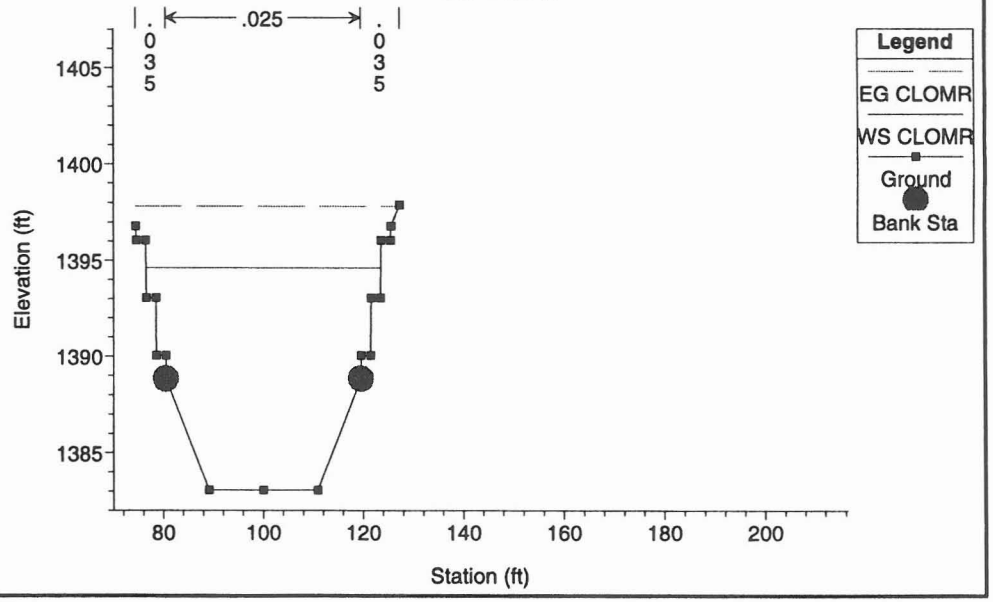
RS = 17300.*



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

RS = 17400

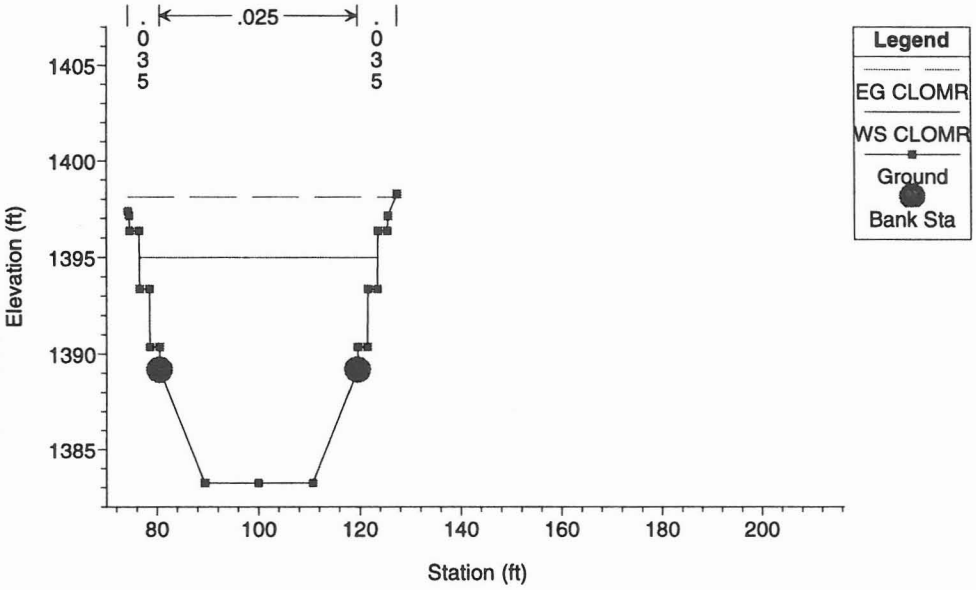


1 in Horiz. = 40 ft 1 in Vert. = 10 ft

New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

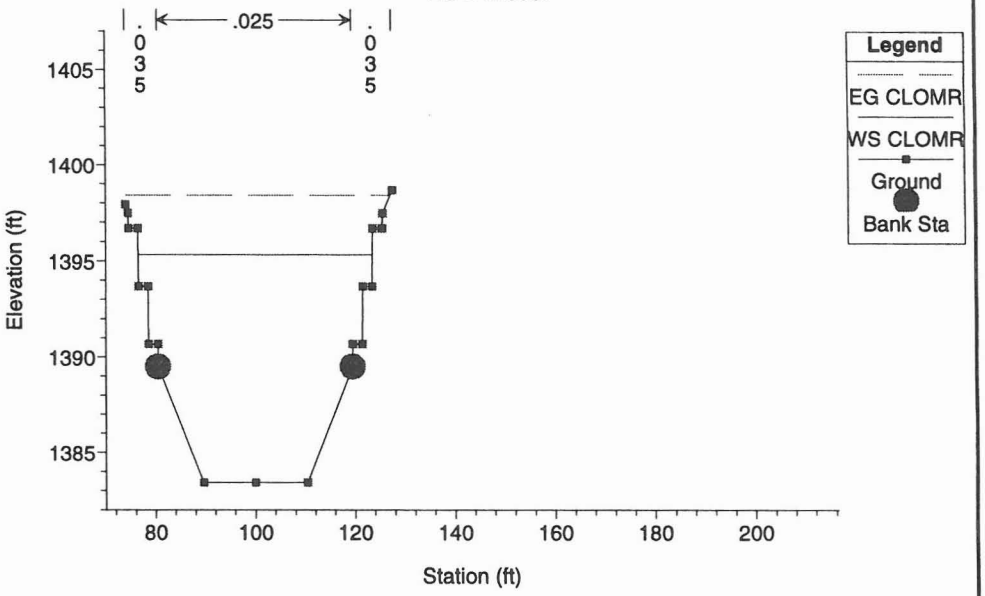
RS = 17500.*



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

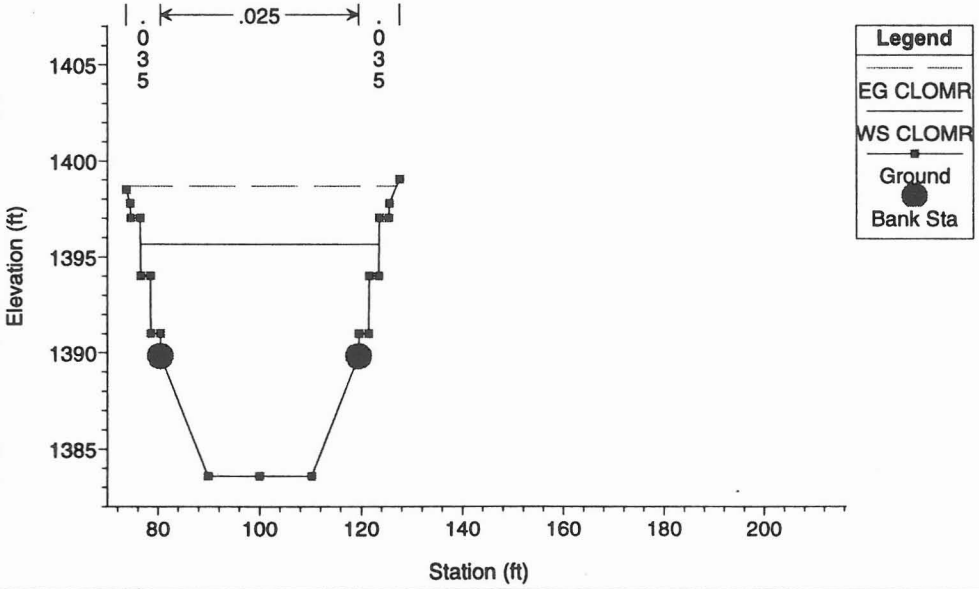
RS = 17600.*



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

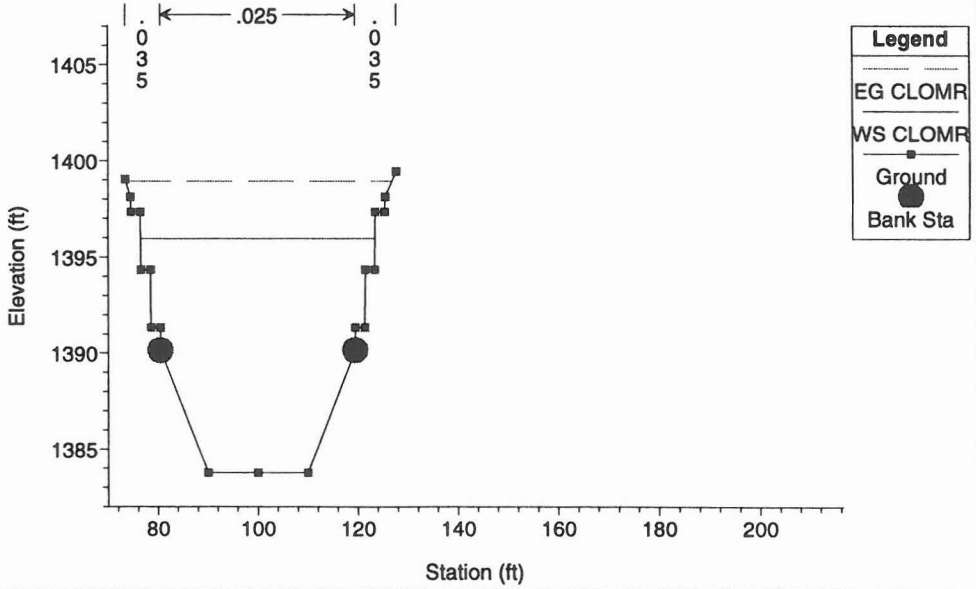
RS = 17700.*



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

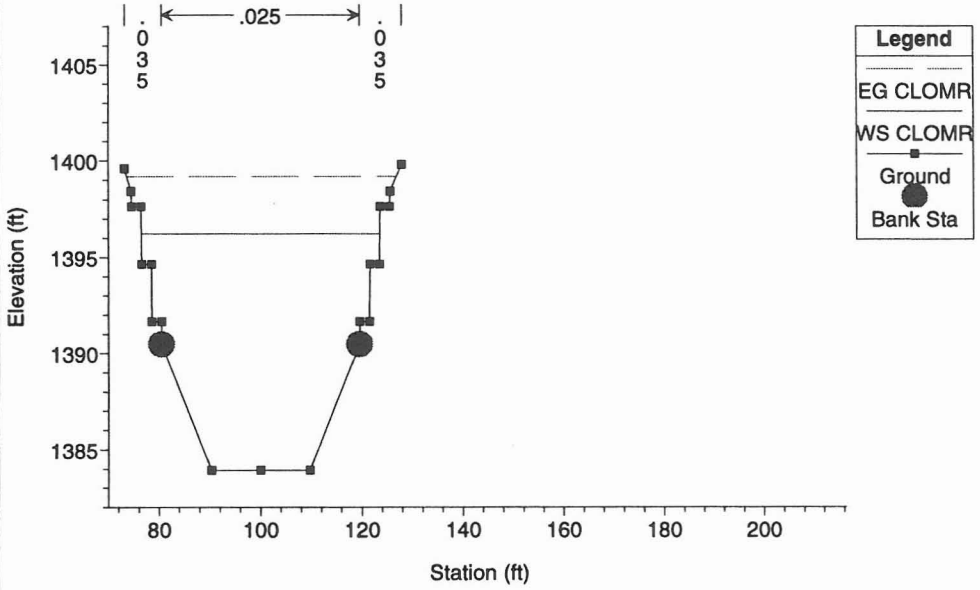
RS = 17800.*



1 in Horiz. = 40 ft 1 in Vert. = 10 ft

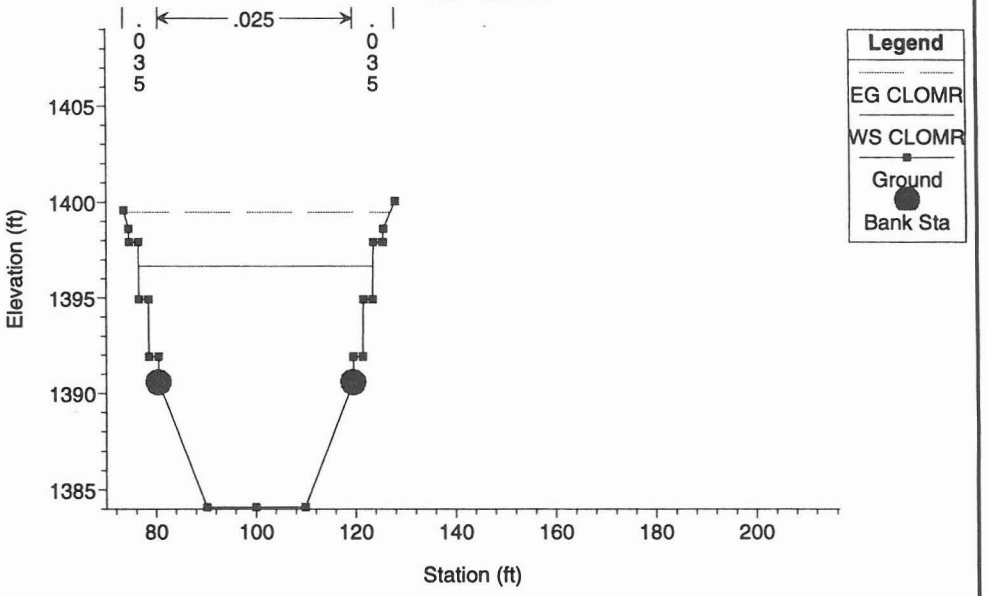
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 17900



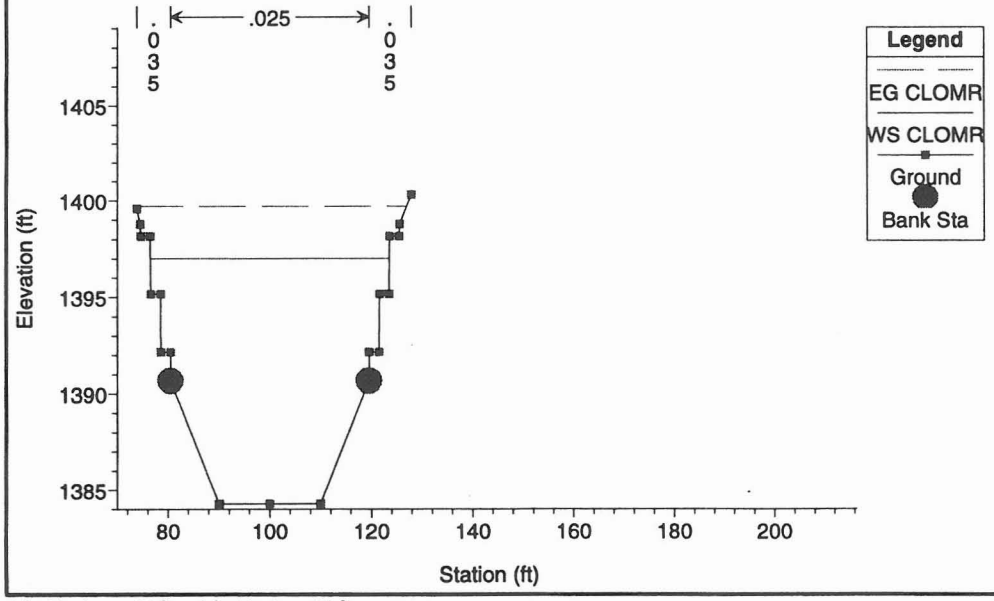
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 18000.*



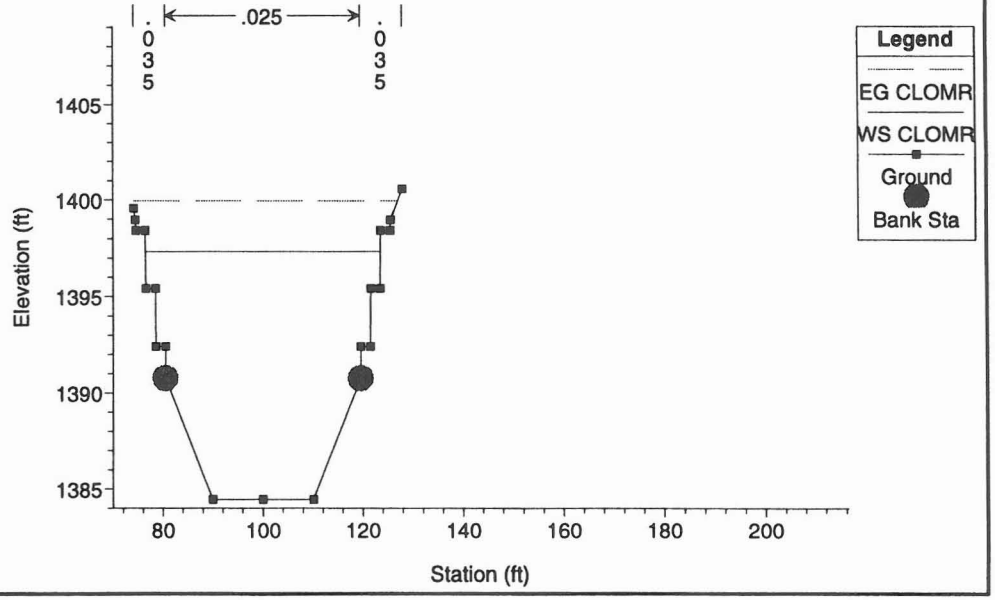
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 18100.*



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

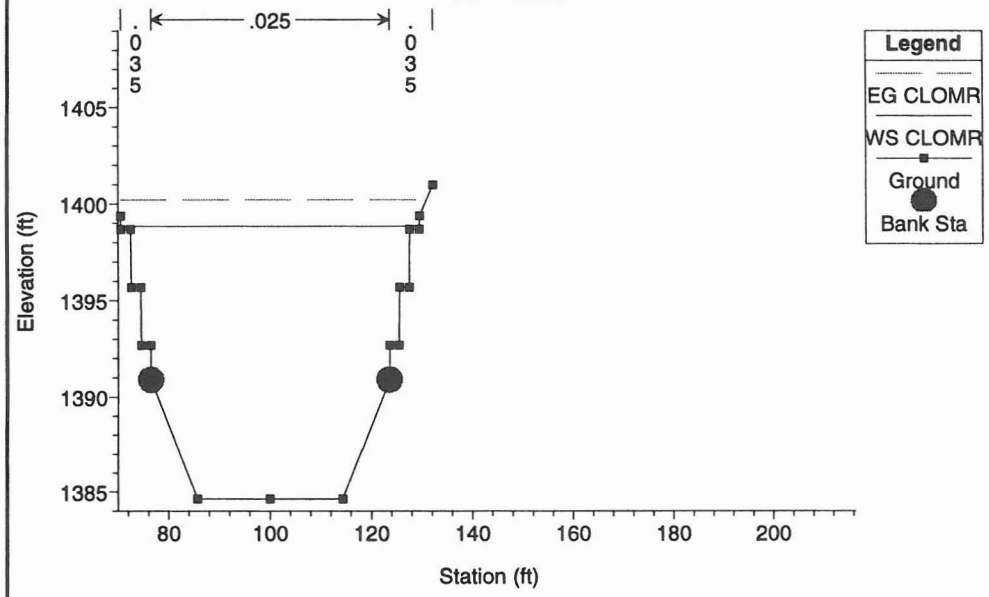
Flow: Greenway Parkway Channel
RS = 18200



1 in Horiz. = 40 ft 1 in Vert. = 10 ft

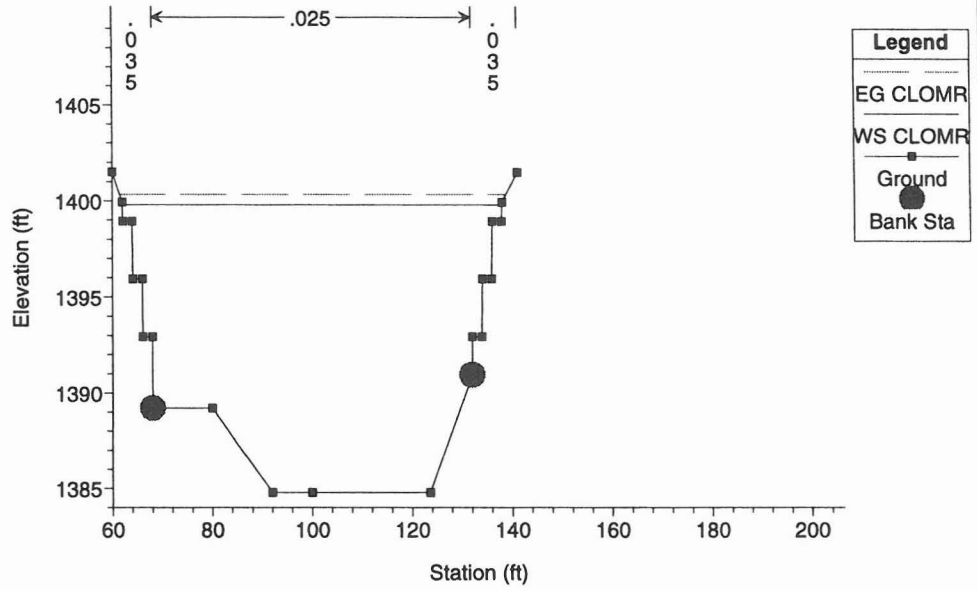
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 18300



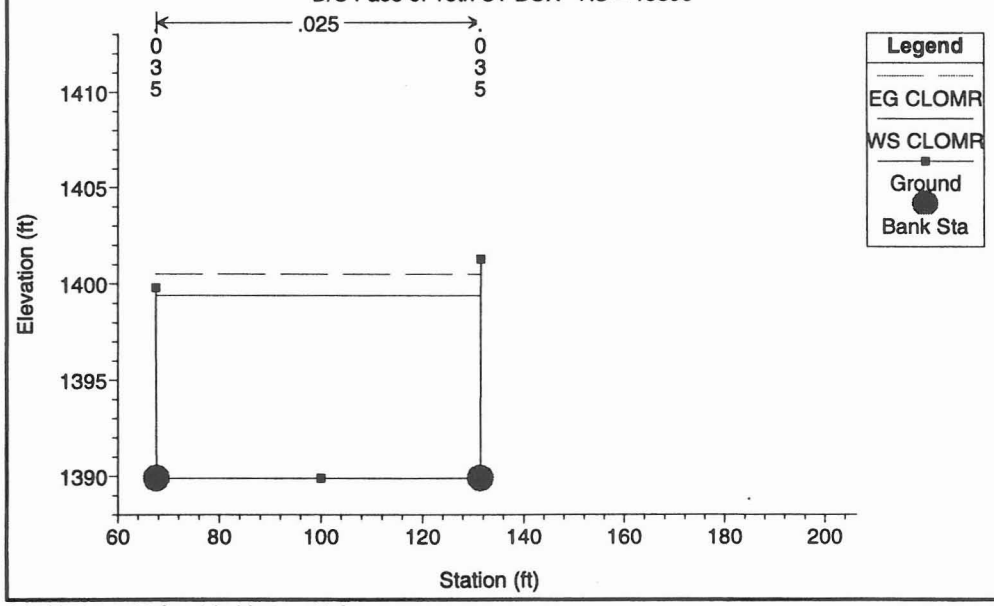
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 18379



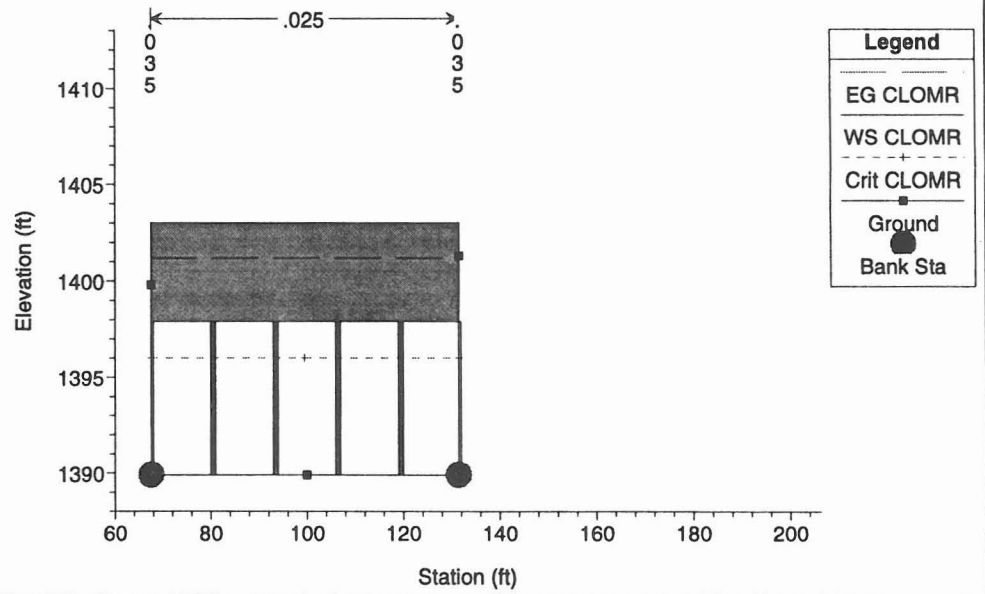
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
D/S Face of 16th ST BOX RS = 18390



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

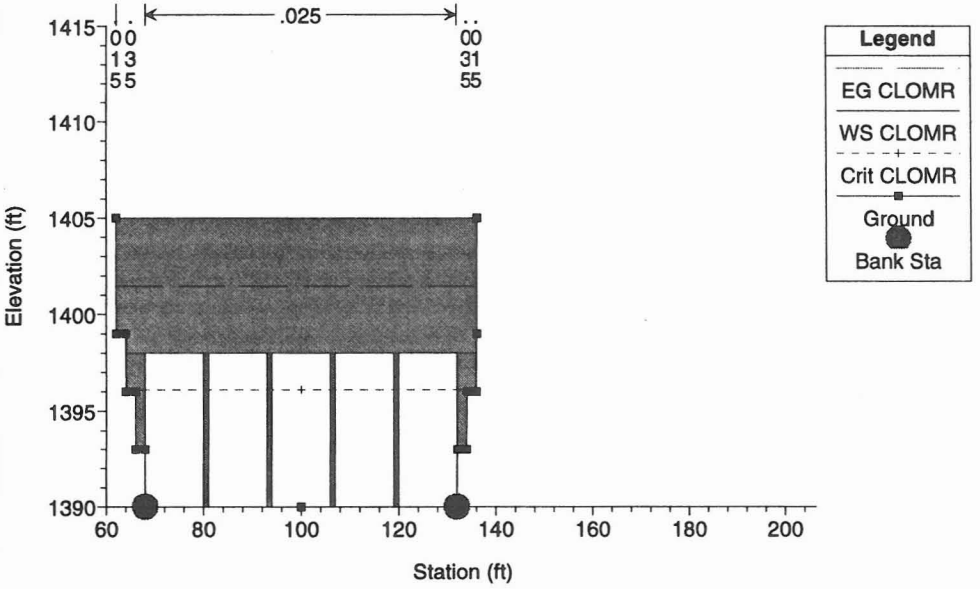
Flow: Greenway Parkway Channel
16th Street RS = 18440.5



1 in Horiz. = 40 ft 1 in Vert. = 10 ft

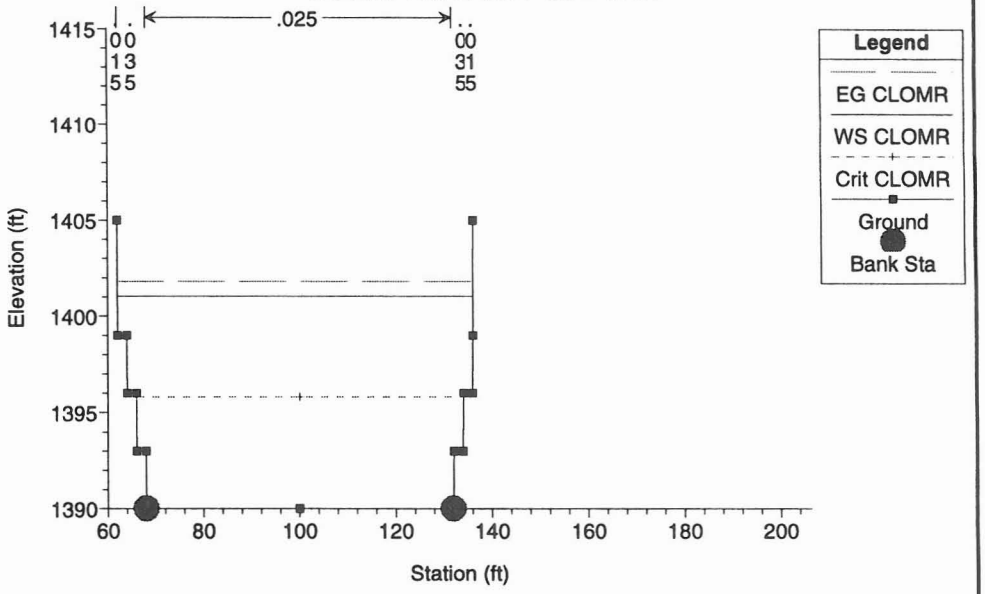
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
16th Street RS = 18440.5



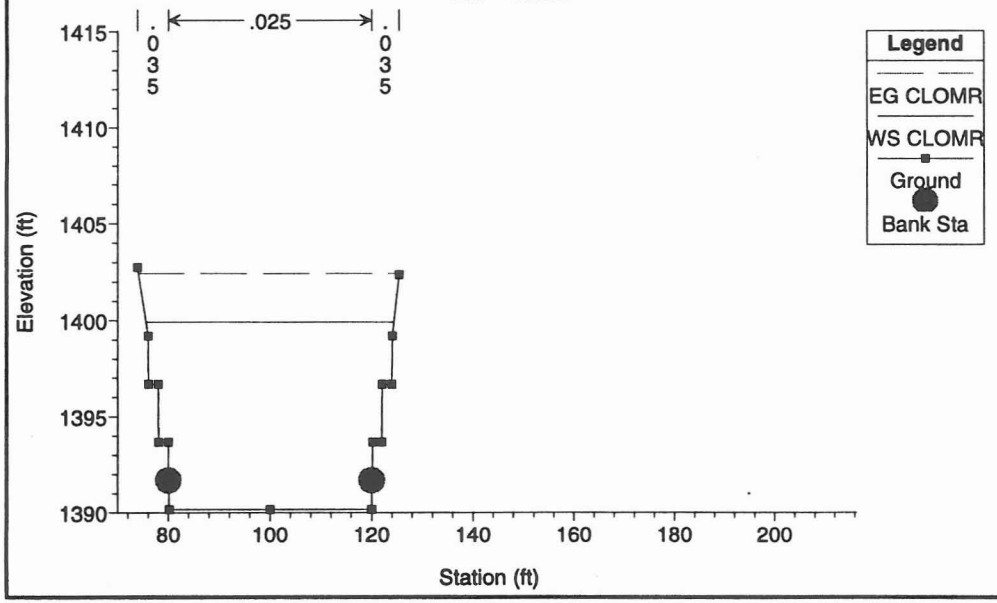
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
U/S Face 16th ST BOX RS = 18491



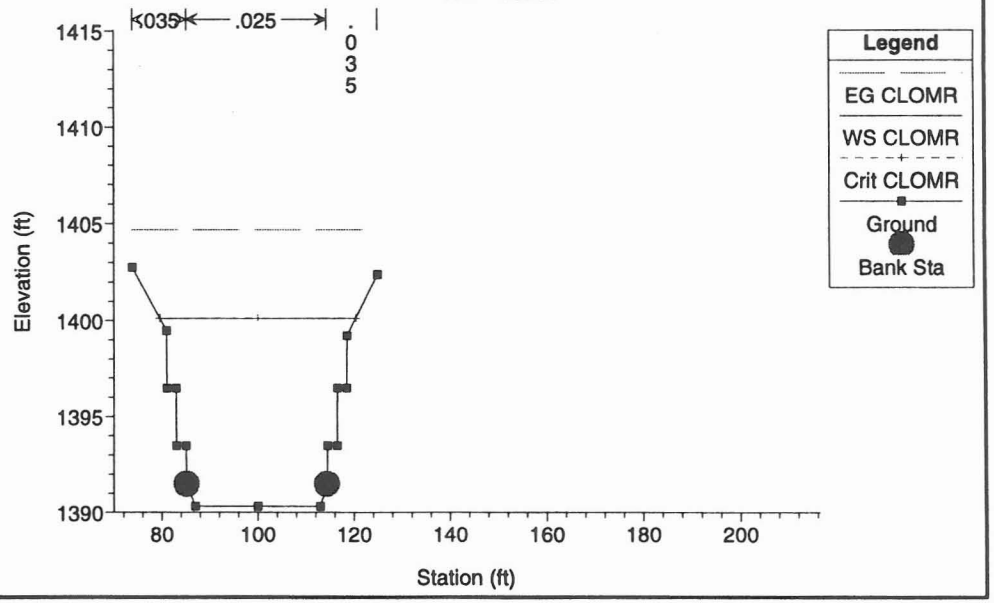
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 18600



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 18700

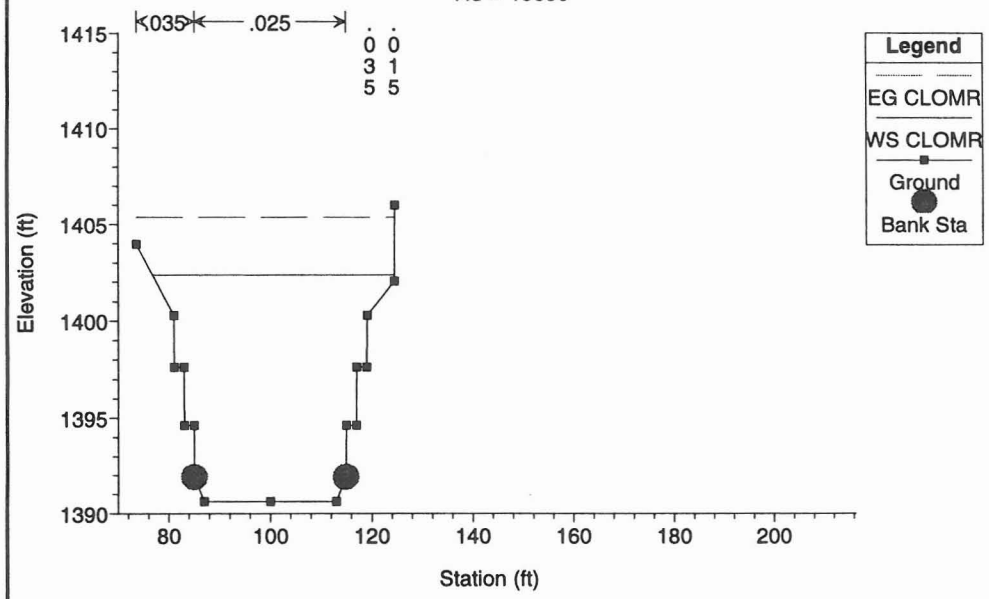


1 in Horiz. = 40 ft 1 in Vert. = 10 ft

New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

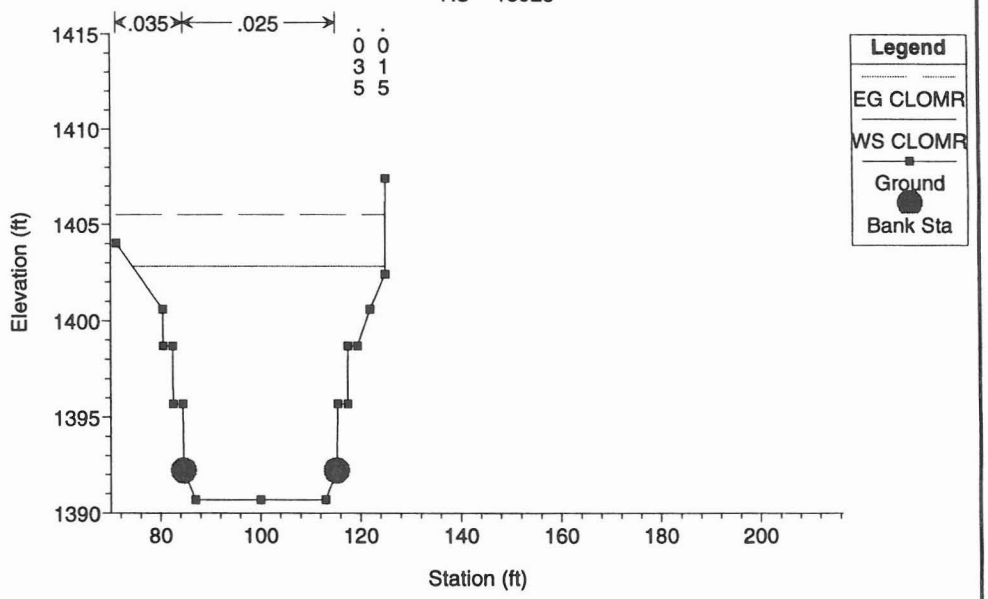
RS = 18880



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

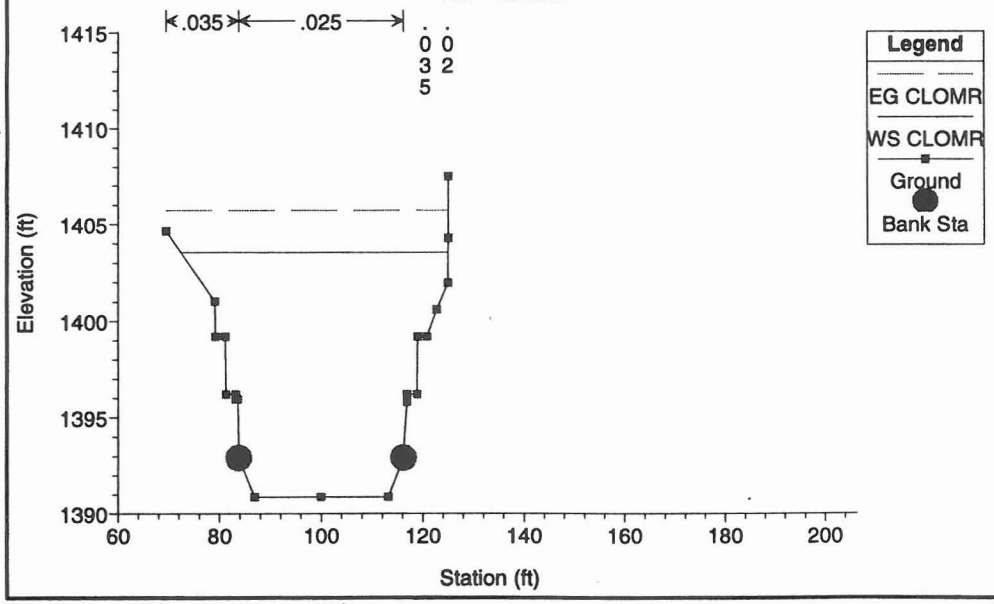
RS = 18925



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

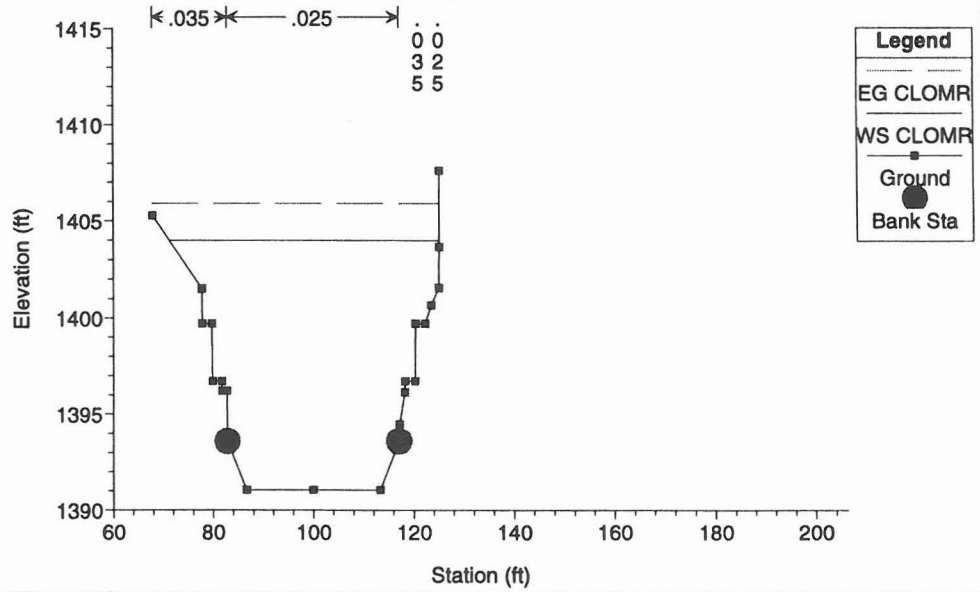
RS = 19021.7*



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

RS = 19118.4*

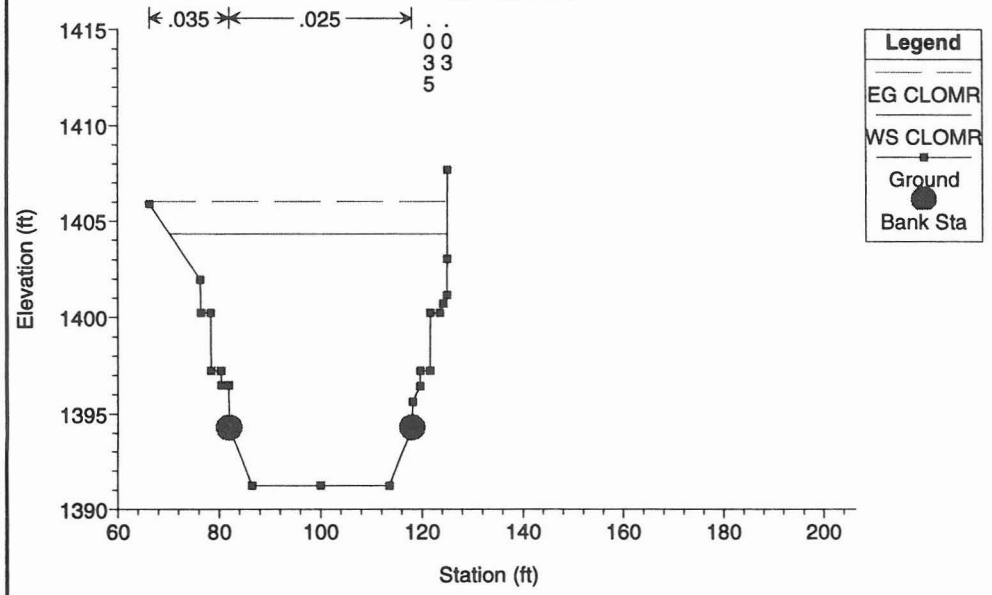


1 in Horiz. = 40 ft 1 in Vert. = 10 ft

New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

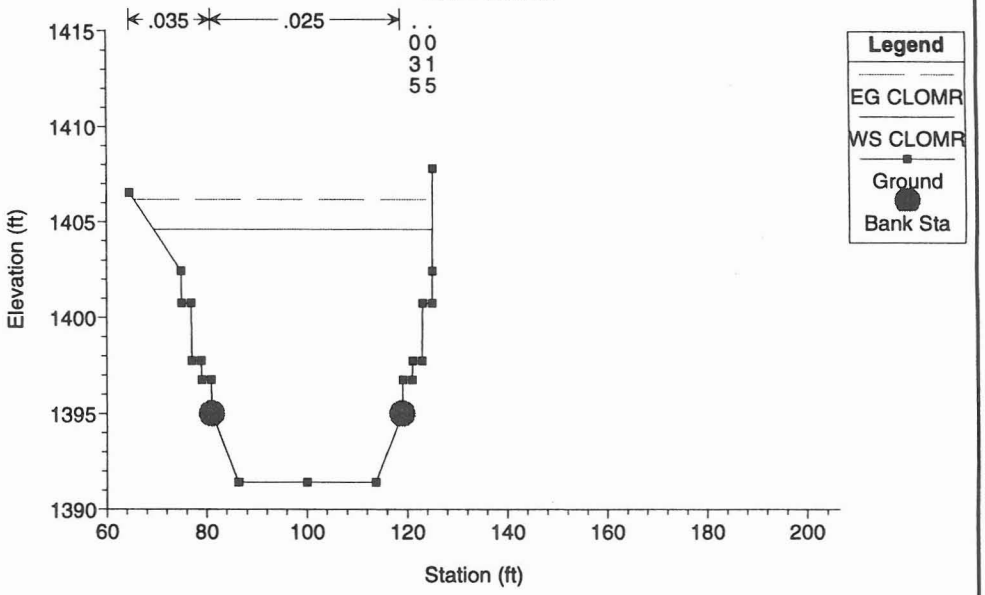
RS = 19215.1*



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

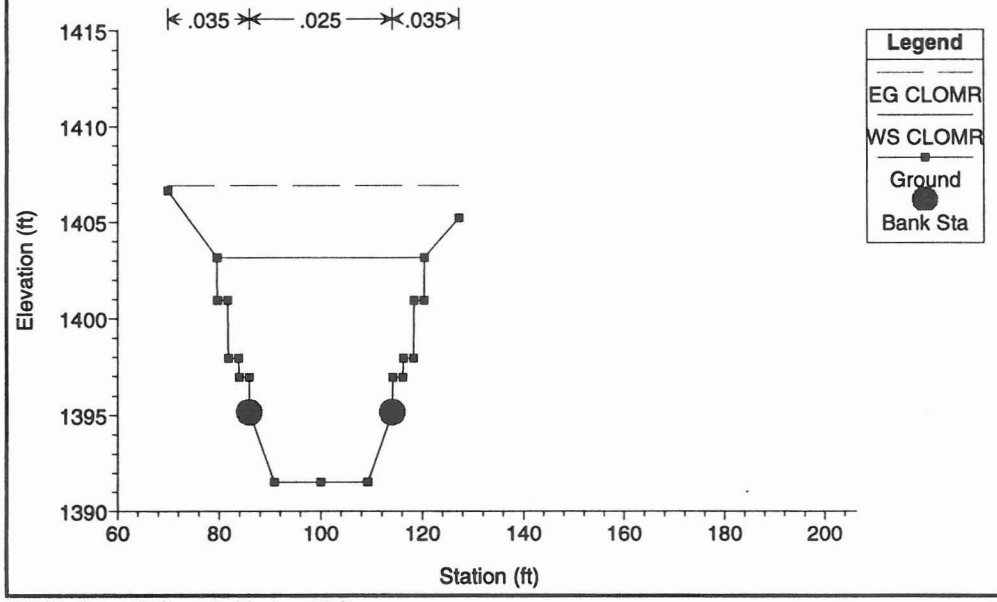
RS = 19311.9



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

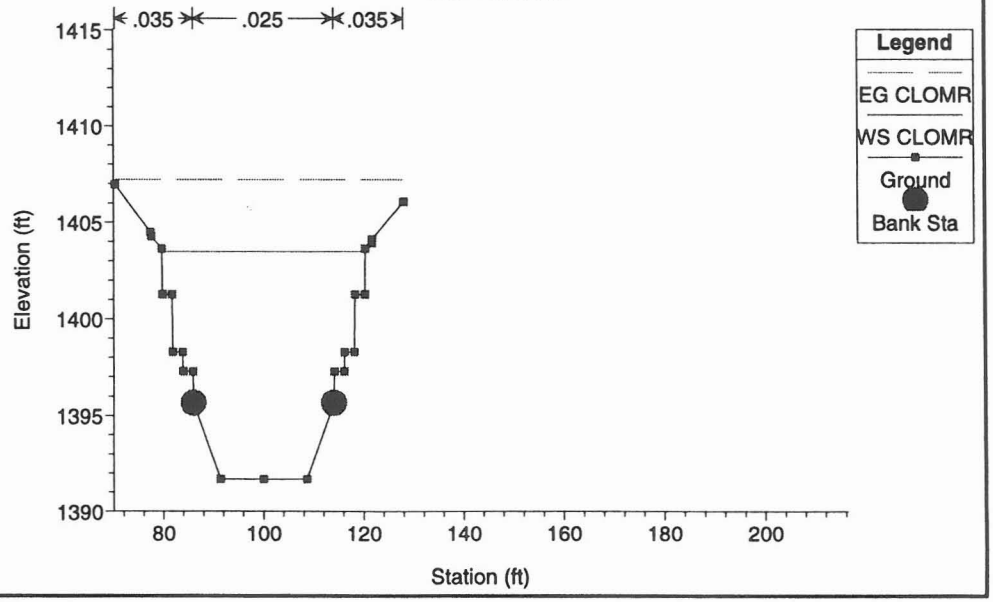
RS = 19360



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

RS = 19456.6*

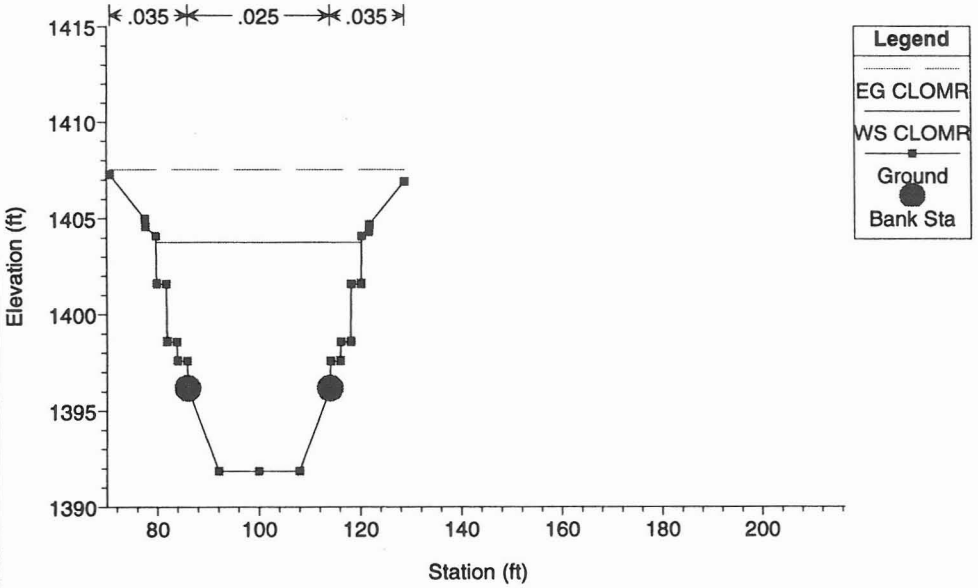


1 in Horiz. = 40 ft 1 in Vert. = 10 ft

New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

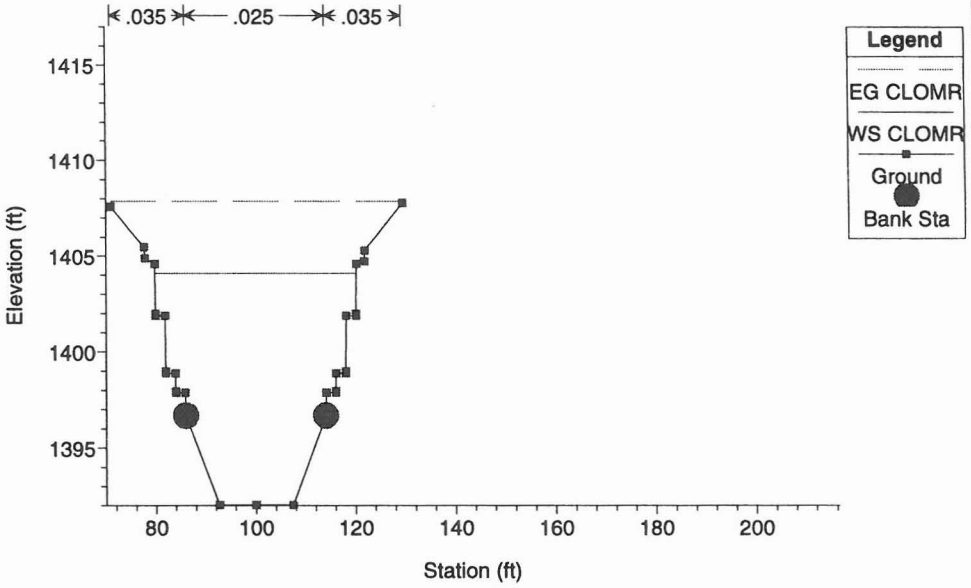
RS = 19553.3*



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

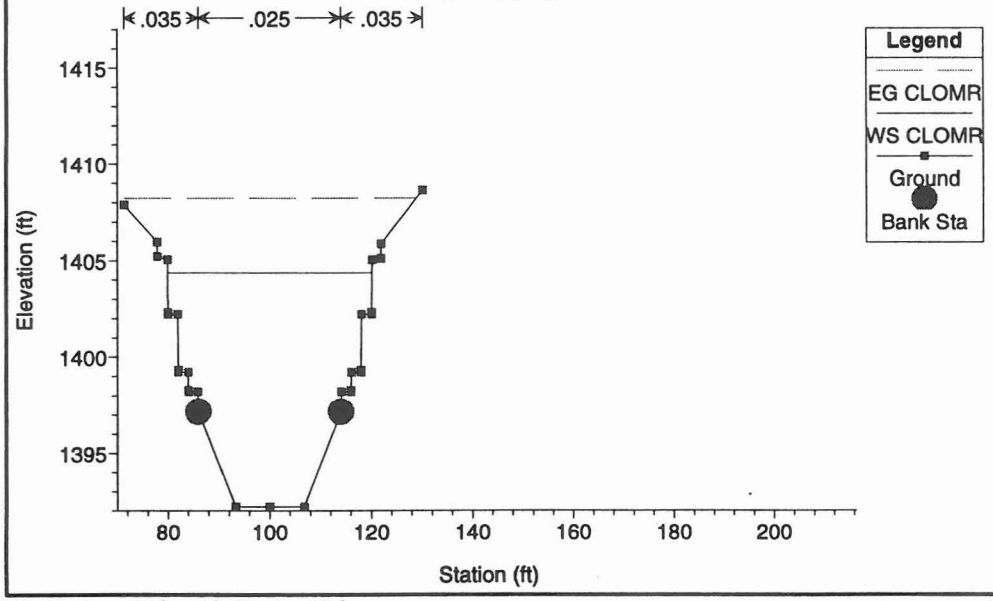
RS = 19649.9*



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

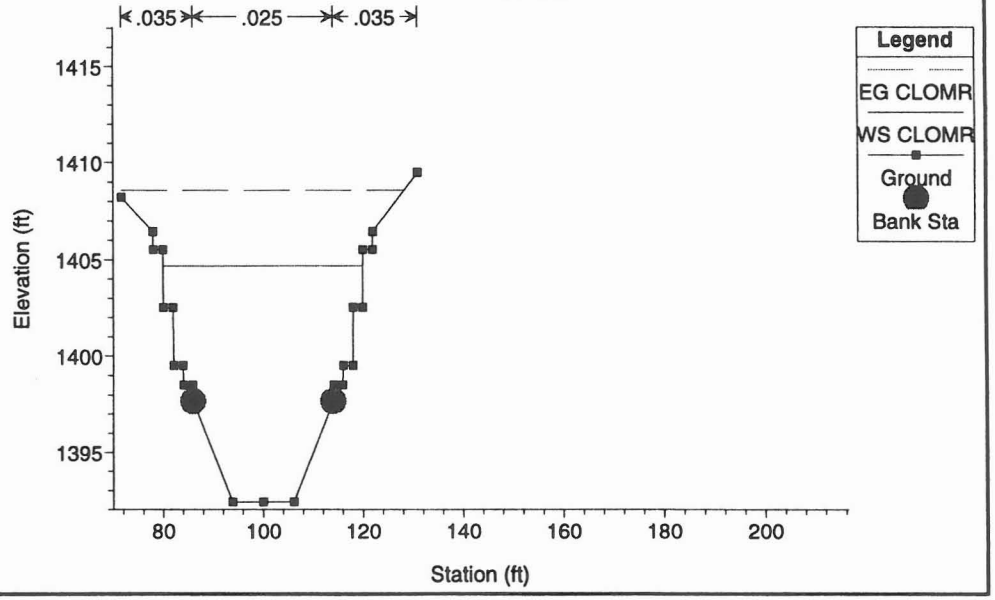
RS = 19746.6*



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

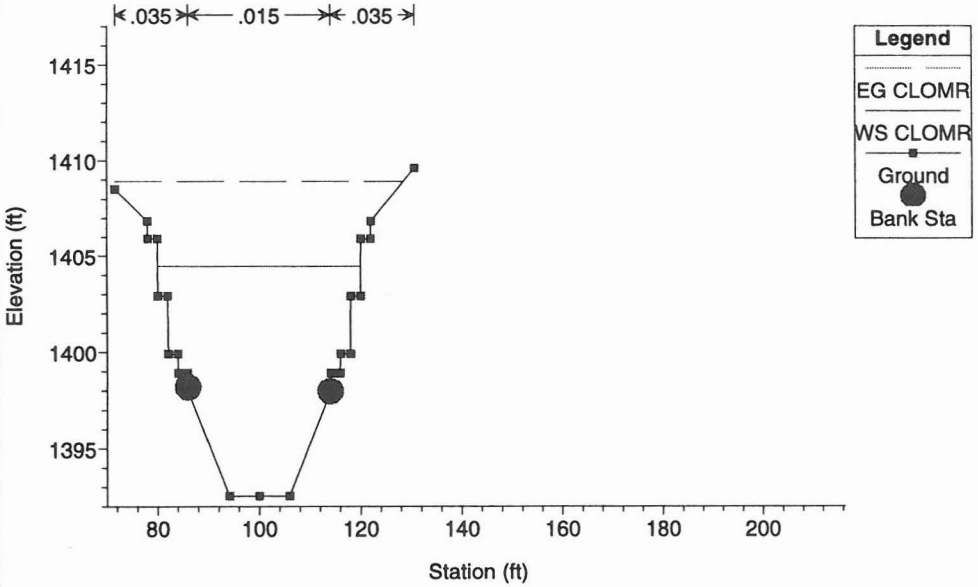
RS = 19843.3



1 in Horiz. = 40 ft 1 in Vert. = 10 ft

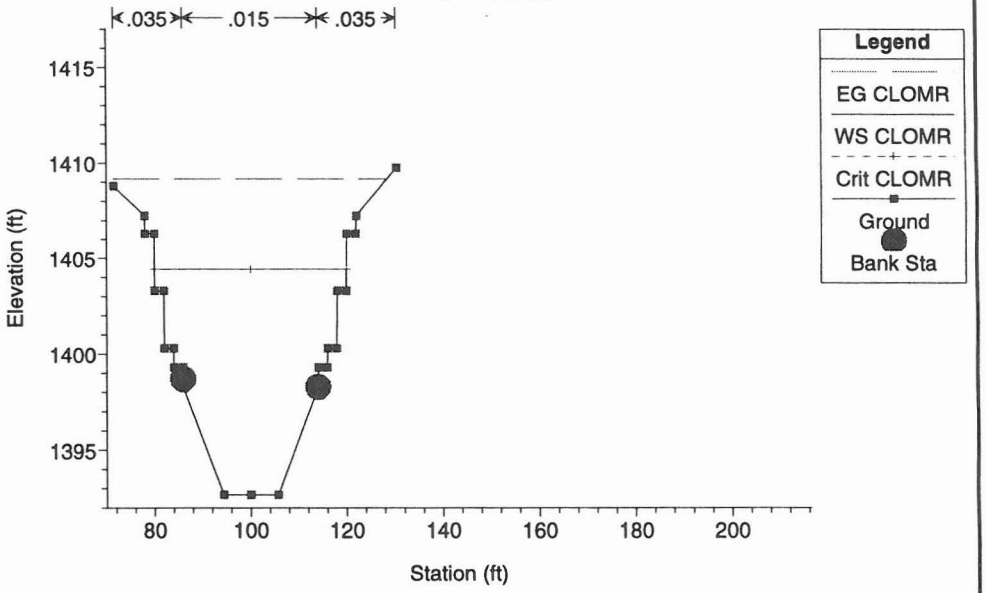
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 19917.1*



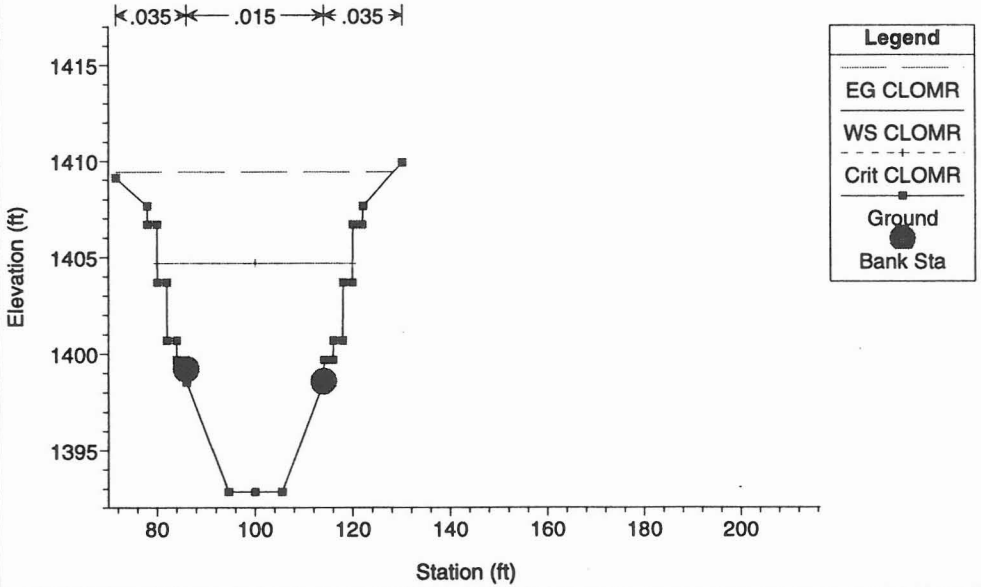
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 19990.9*



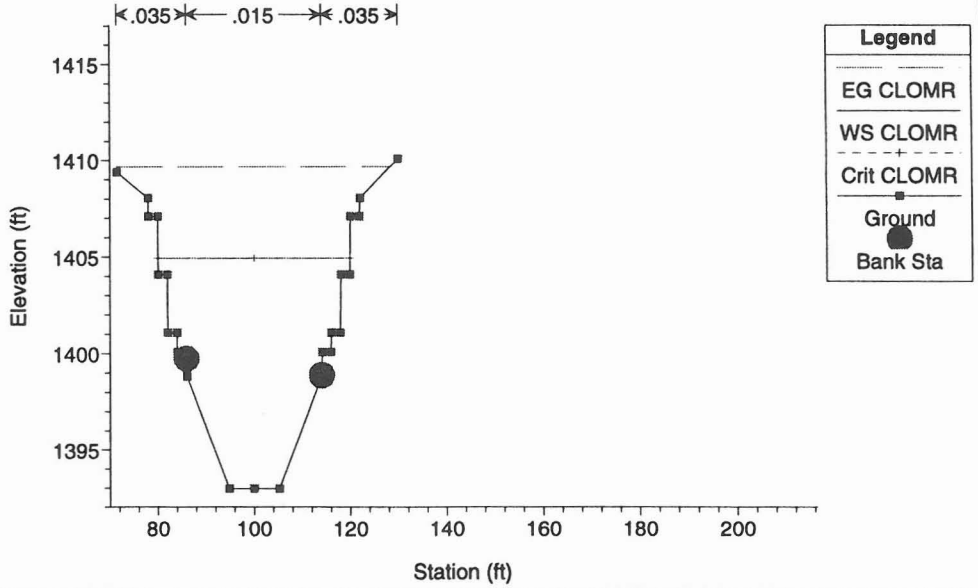
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 20064.7*



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

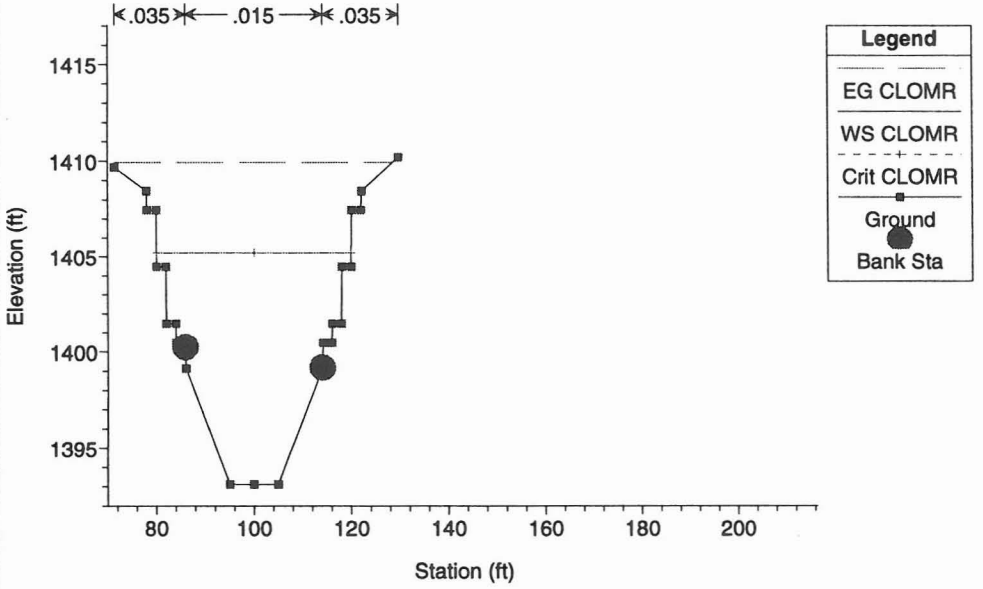
Flow: Greenway Parkway Channel
RS = 20138.5*



1 in Horiz. = 40 ft 1 in Vert. = 10 ft

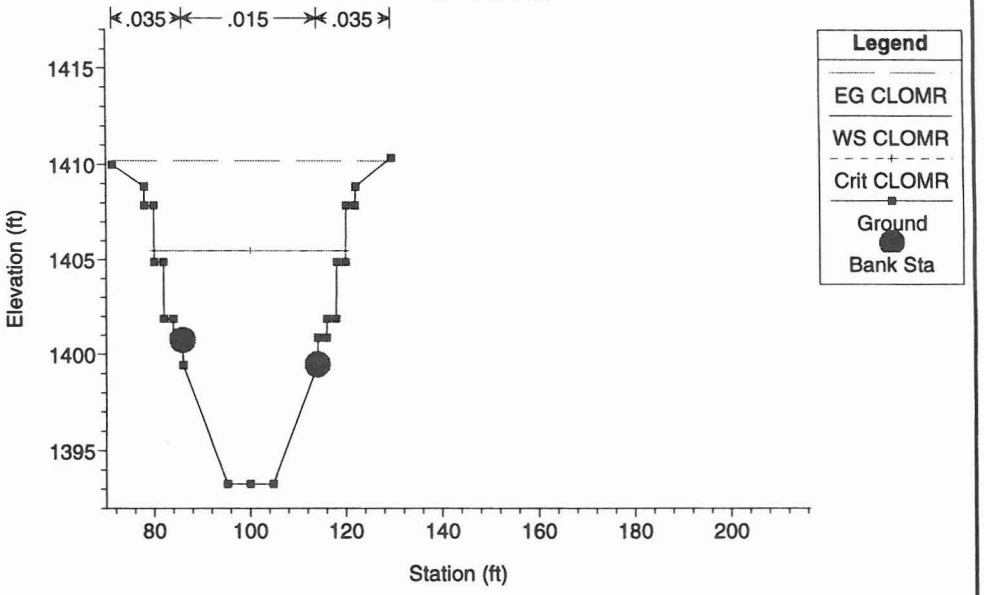
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 20212.3*



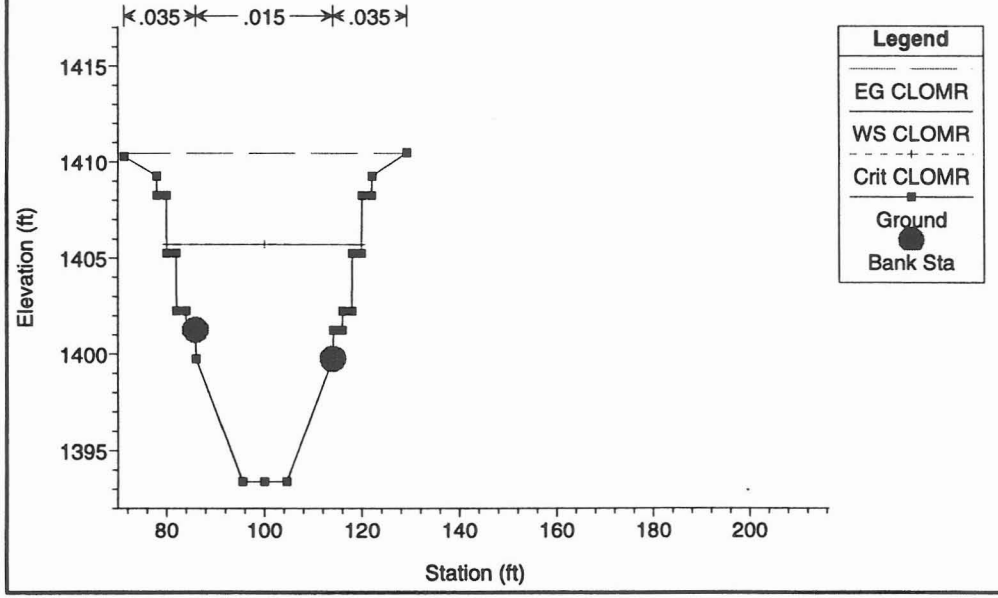
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 20286.1*



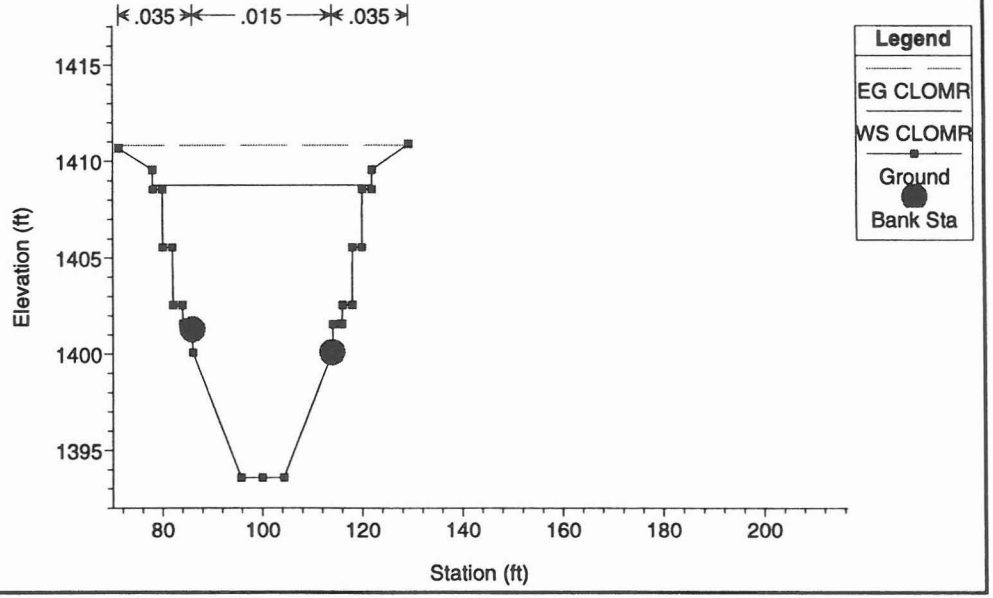
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 20360



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

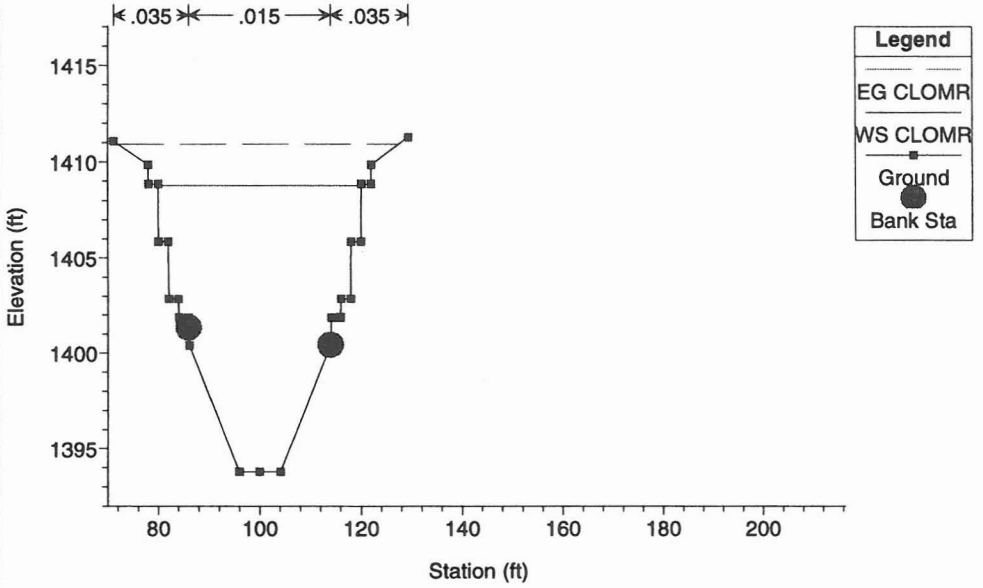
Flow: Greenway Parkway Channel
RS = 20460.*



1 in Horiz. = 40 ft 1 in Vert. = 10 ft

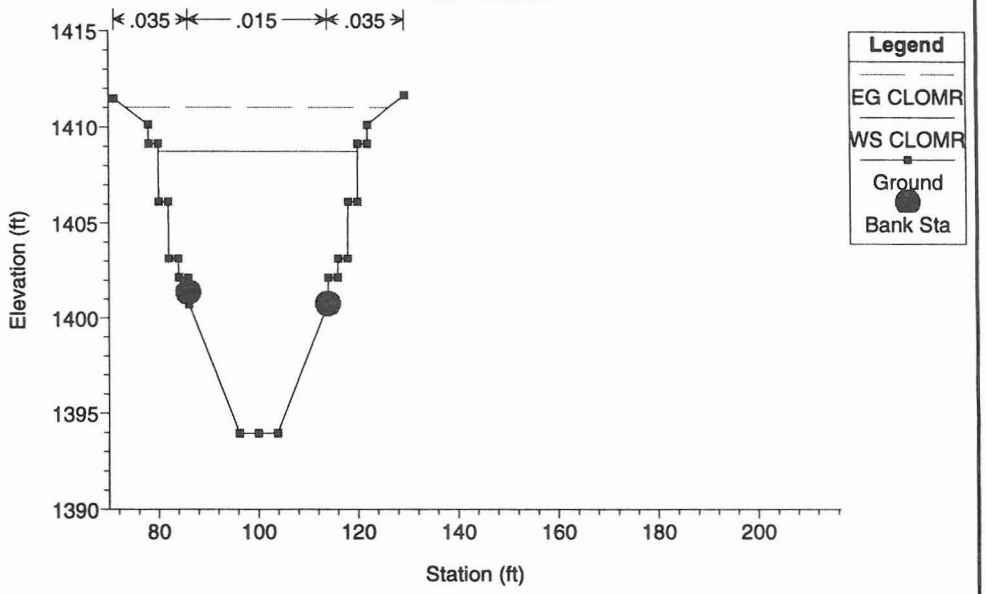
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 20560.*



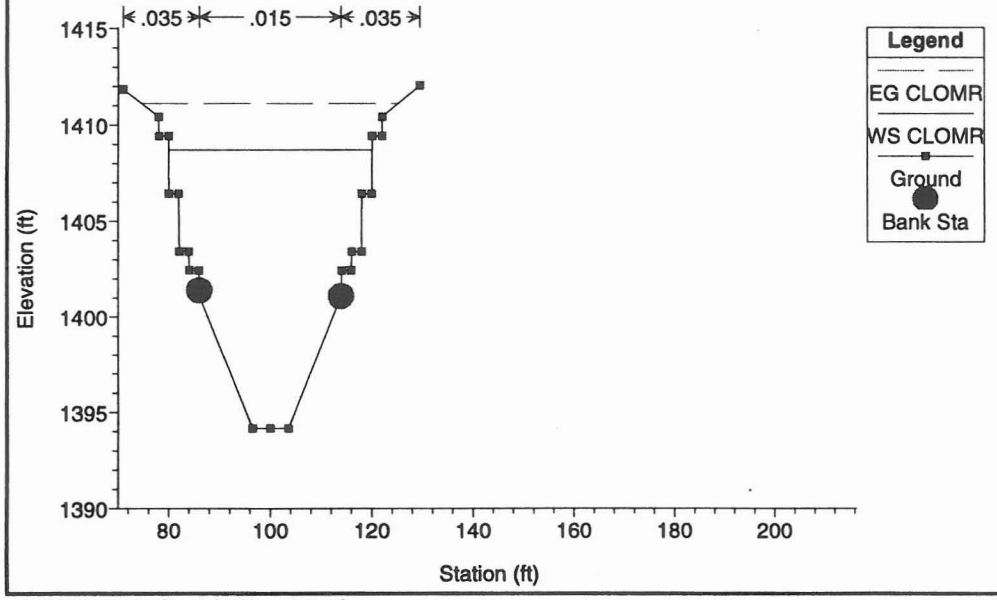
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 20660.*



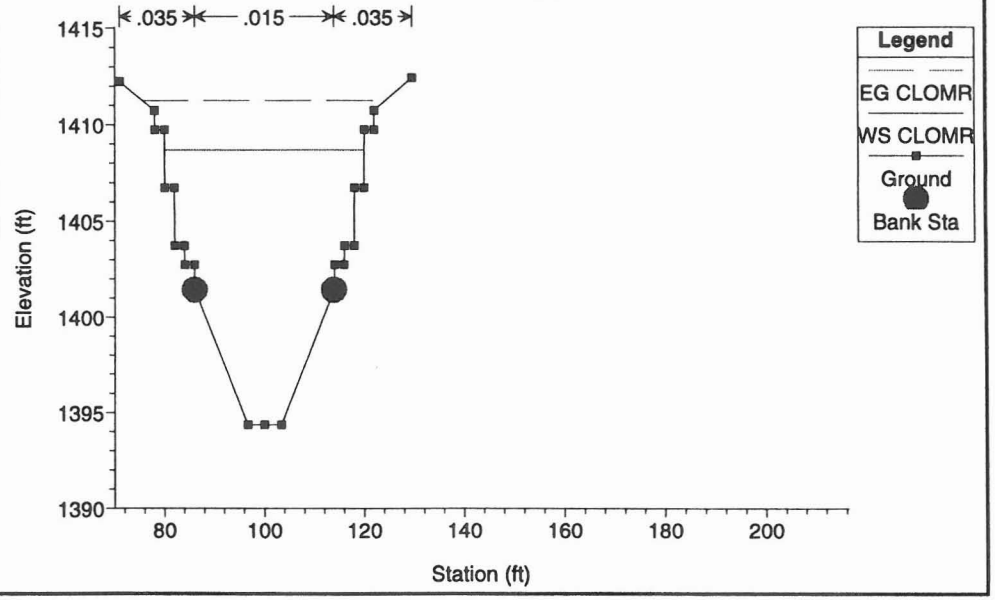
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 20760.*



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

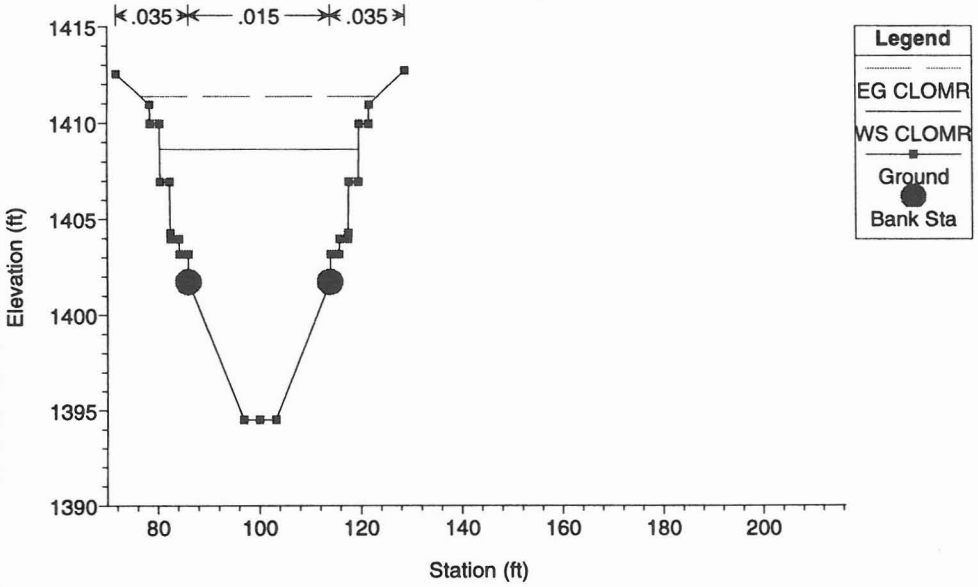
Flow: Greenway Parkway Channel
RS = 20860



1 in Horiz. = 40 ft 1 in Vert. = 10 ft

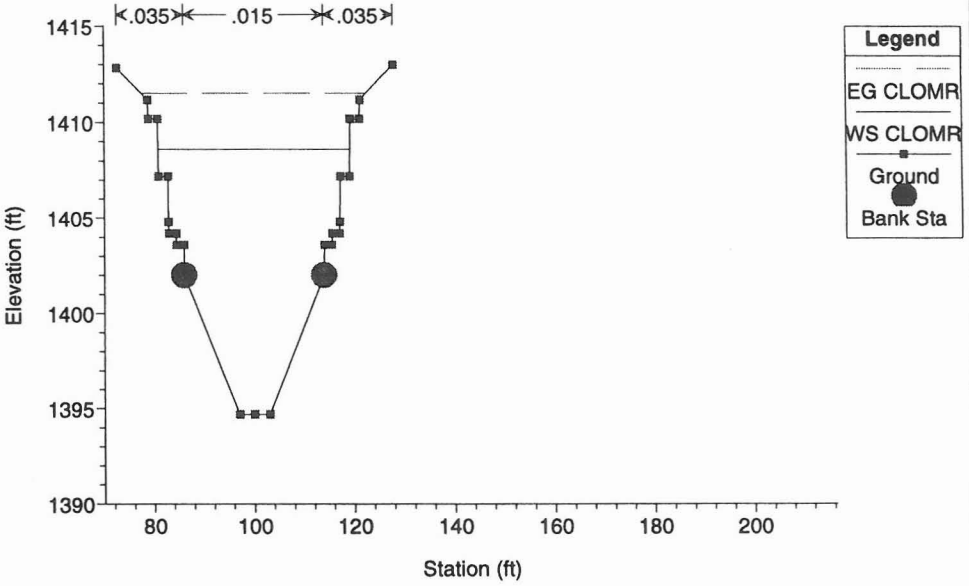
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 20948.*



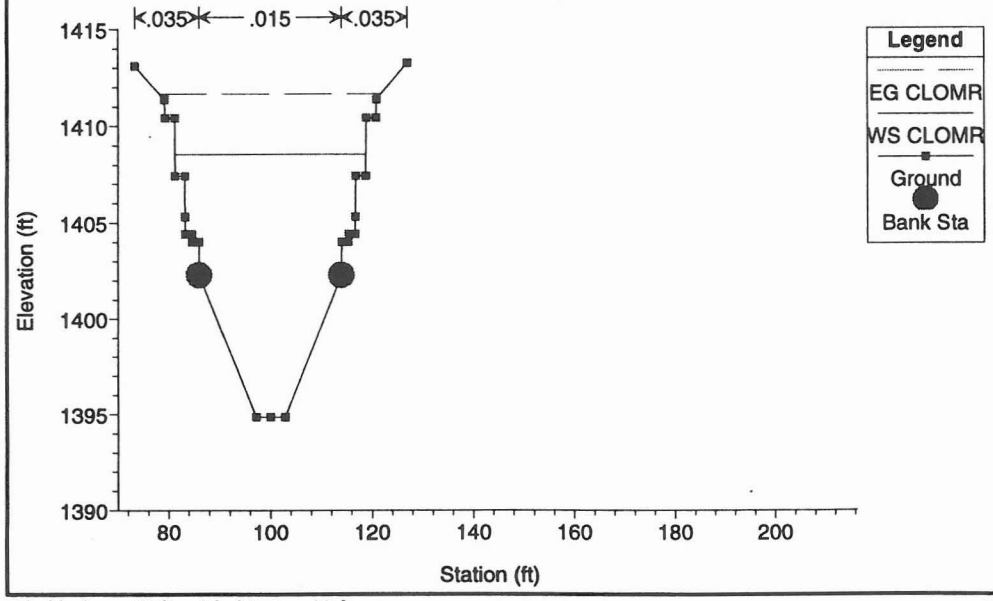
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 21036.*



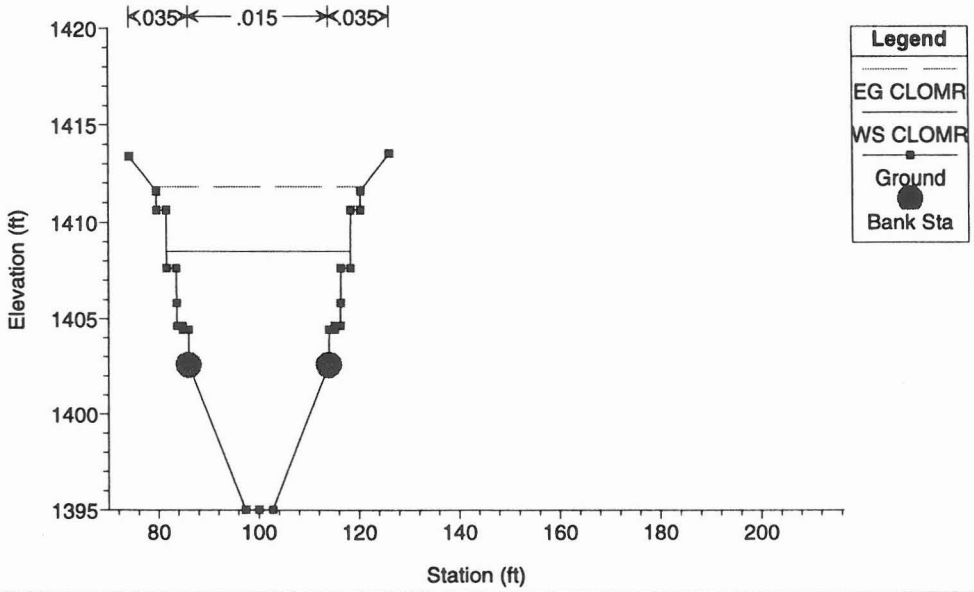
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 21124.*



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

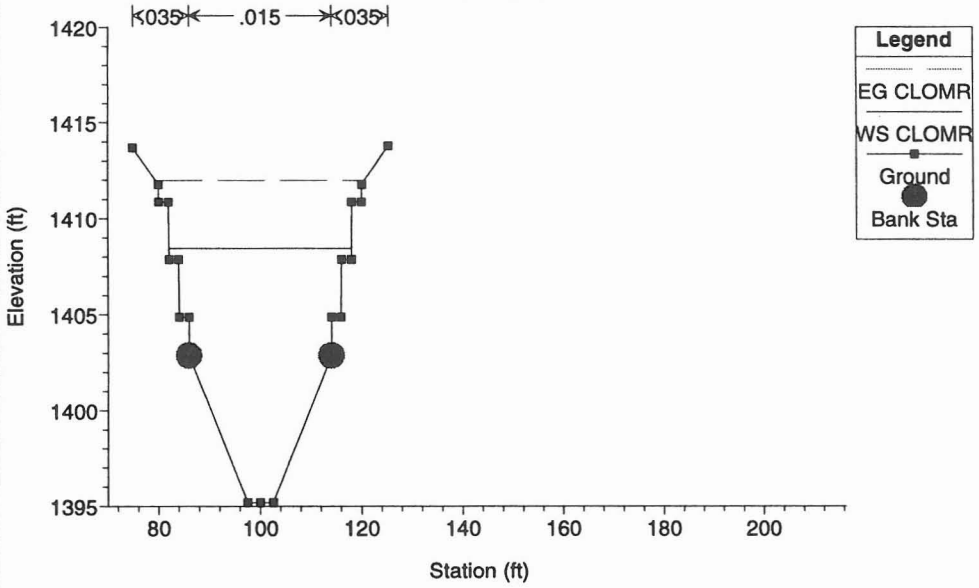
Flow: Greenway Parkway Channel
RS = 21212.*



1 in Horiz. = 40 ft 1 in Vert. = 10 ft

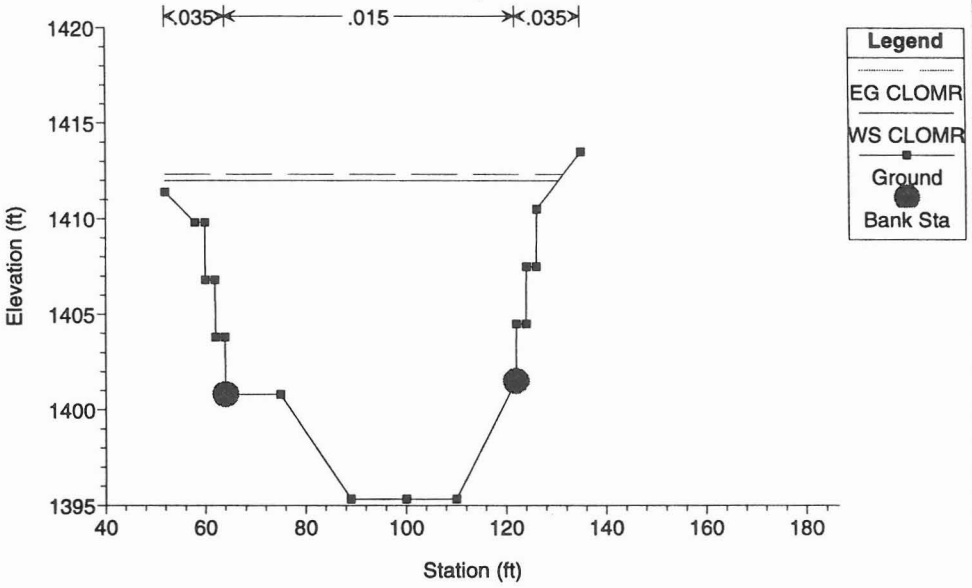
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 21300



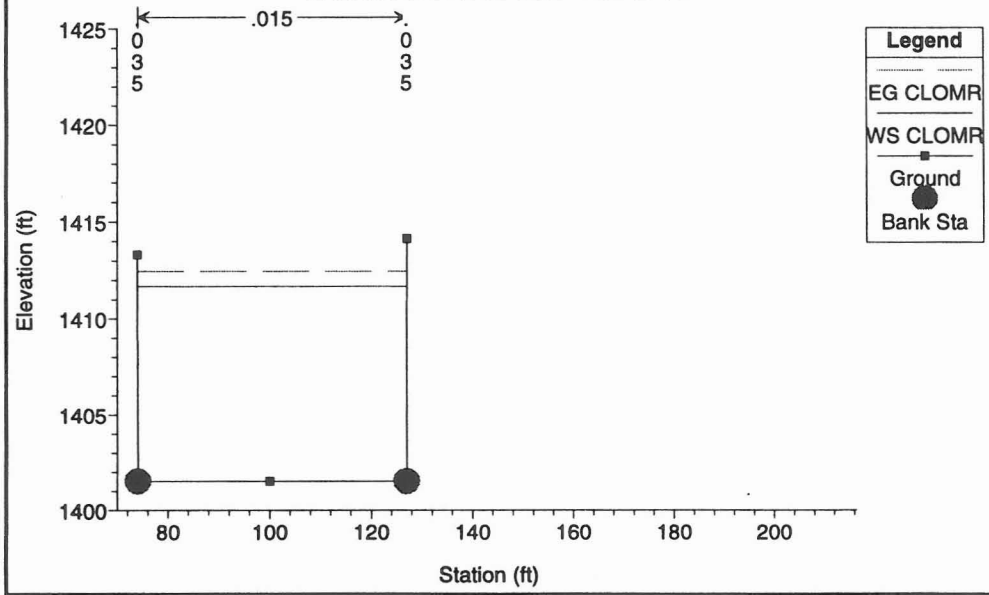
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
Bottom of Drop RS = 21380



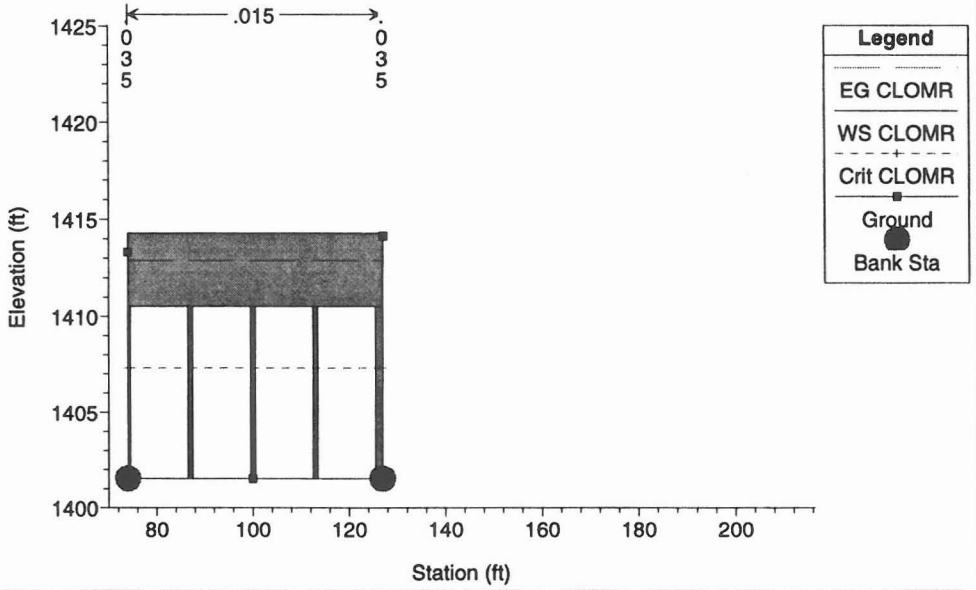
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
D/S Face of 20 th ST BOX RS = 21392



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

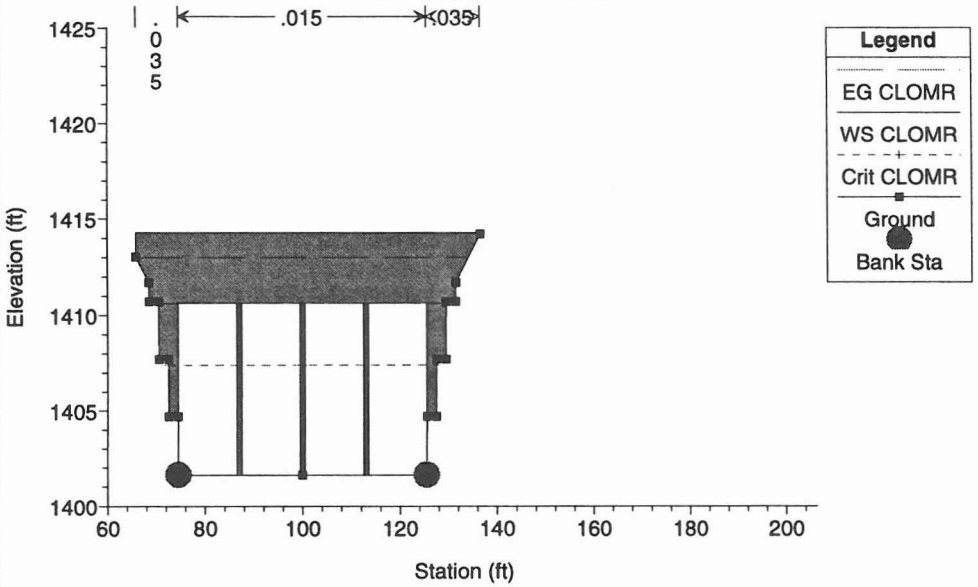
Flow: Greenway Parkway Channel
20th Street RS = 21435



1 in Horiz. = 40 ft 1 in Vert. = 10 ft

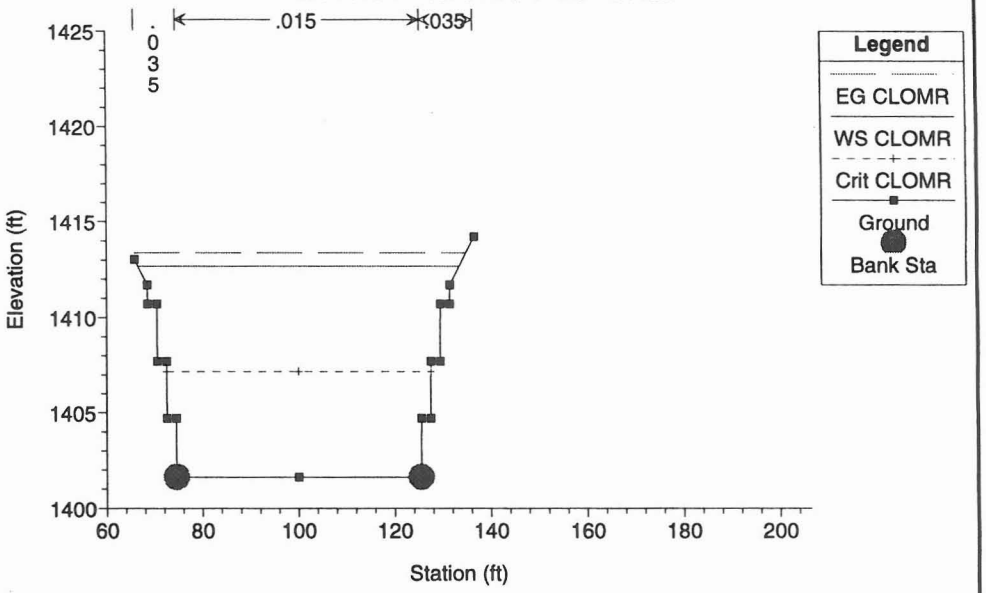
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
20th Street RS = 21435



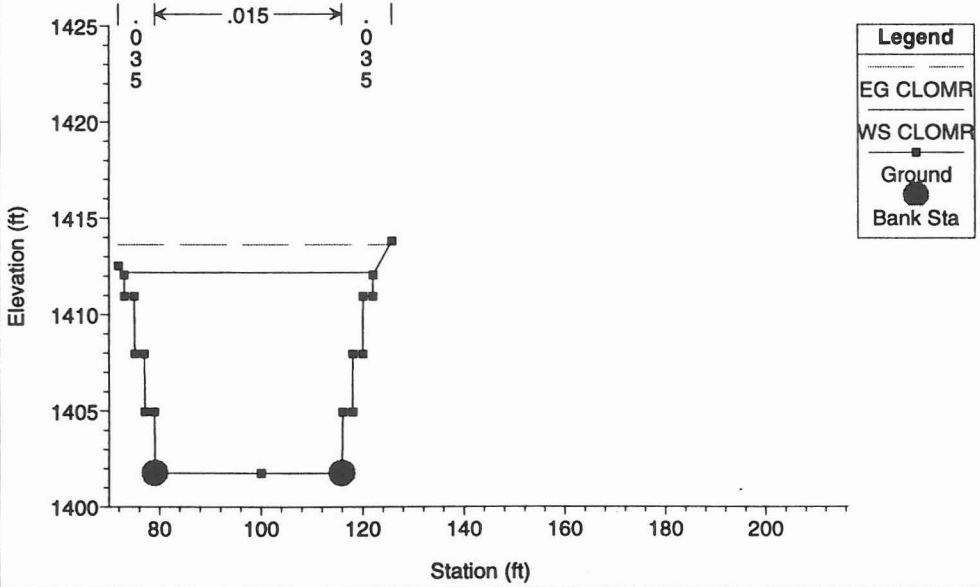
New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
U/S Face of 20th ST BOX RS = 21462



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 21550



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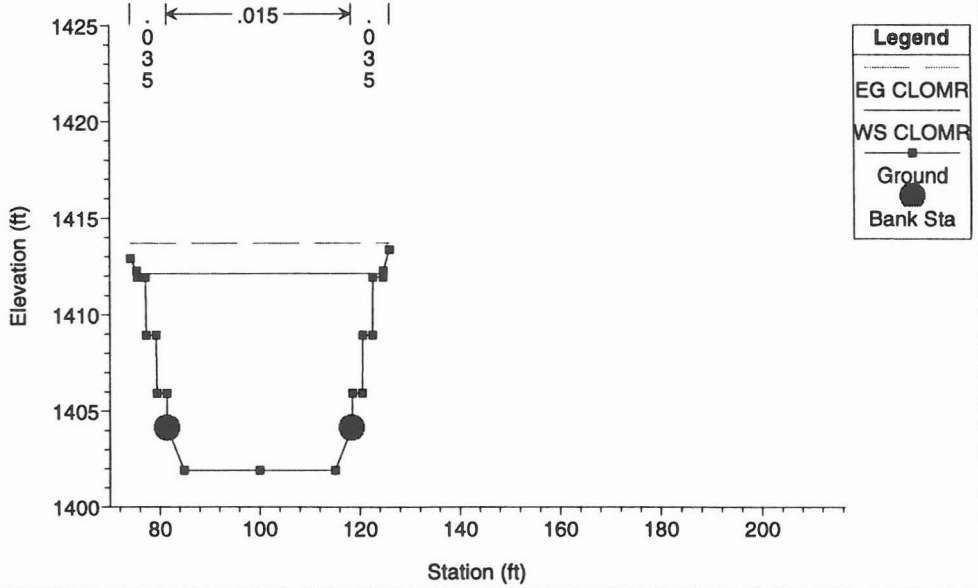
Flow: Greenway Parkway Channel
RS = 21650

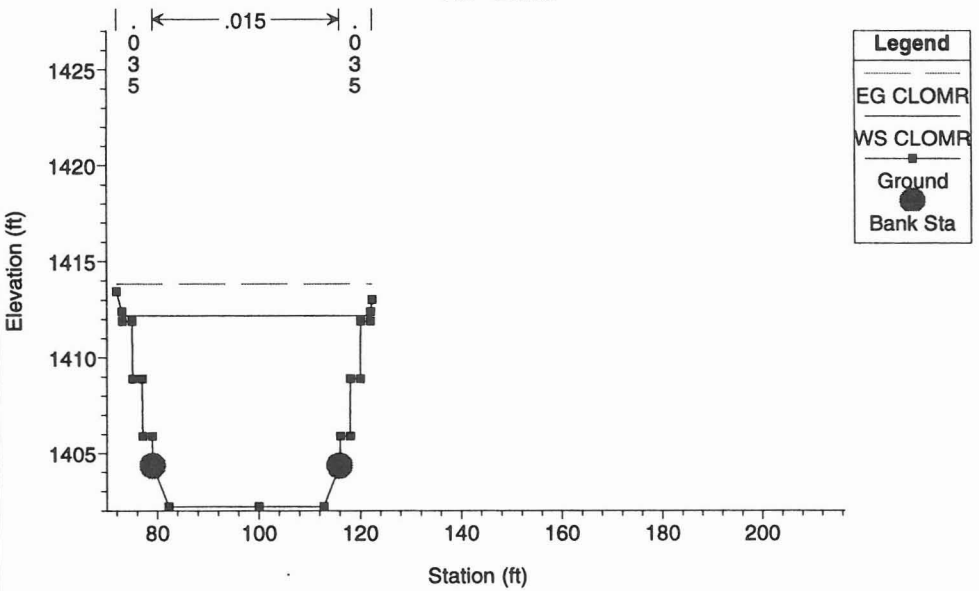


1 in Horiz. = 40 ft 1 in Vert. = 10 ft

New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

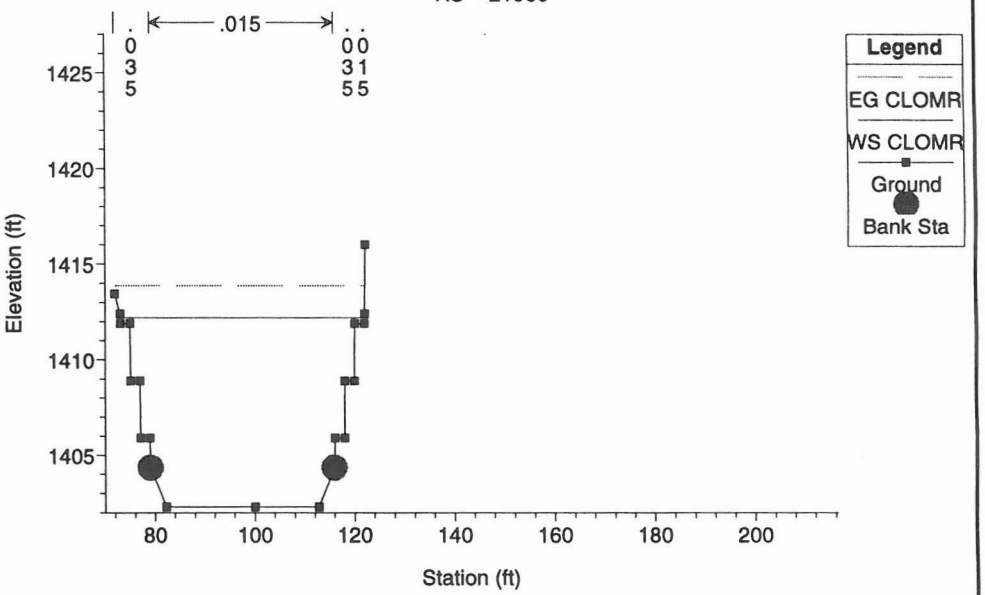
RS = 21850



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

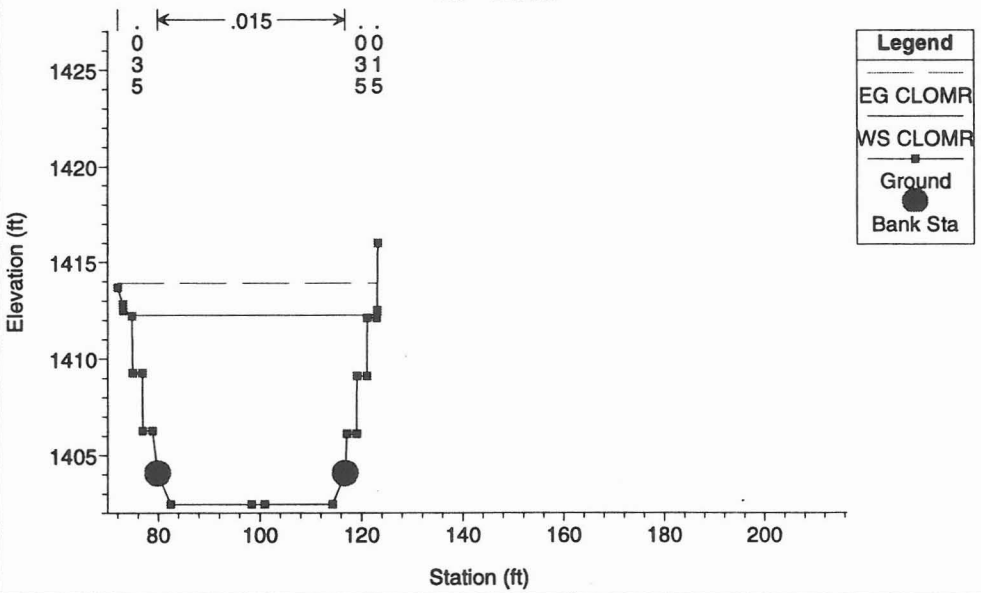
RS = 21900



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

RS = 22000.*



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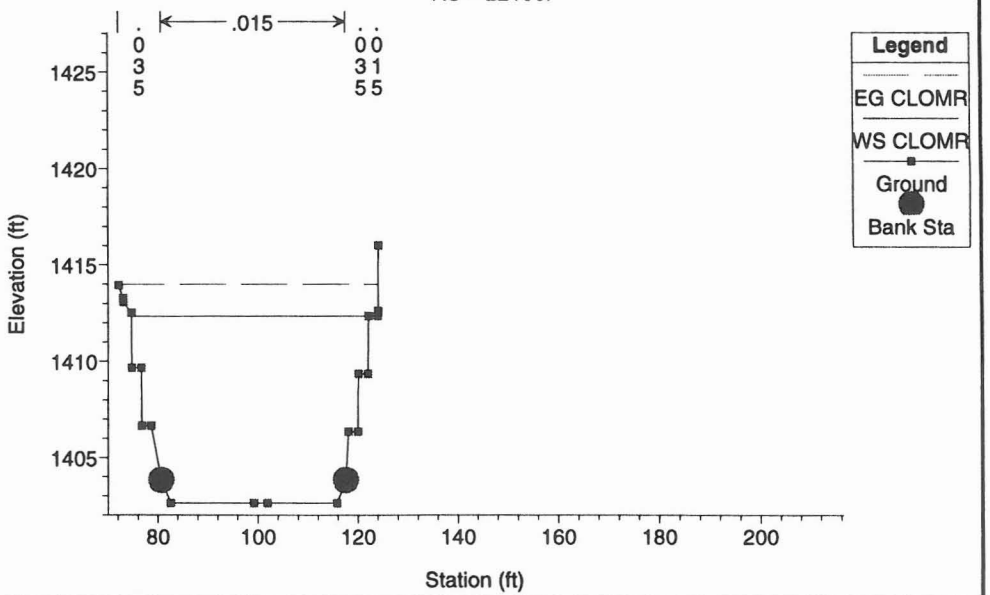
Flow: Greenway Parkway Channel

RS = 22100.*

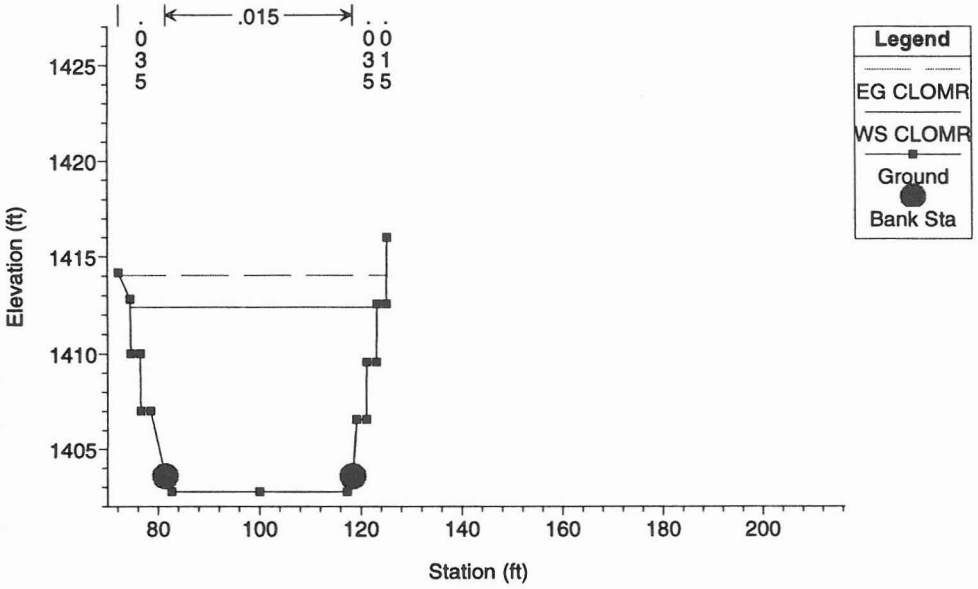


1 in Horiz. = 40 ft 1 in Vert. = 10 ft

New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

RS = 22200



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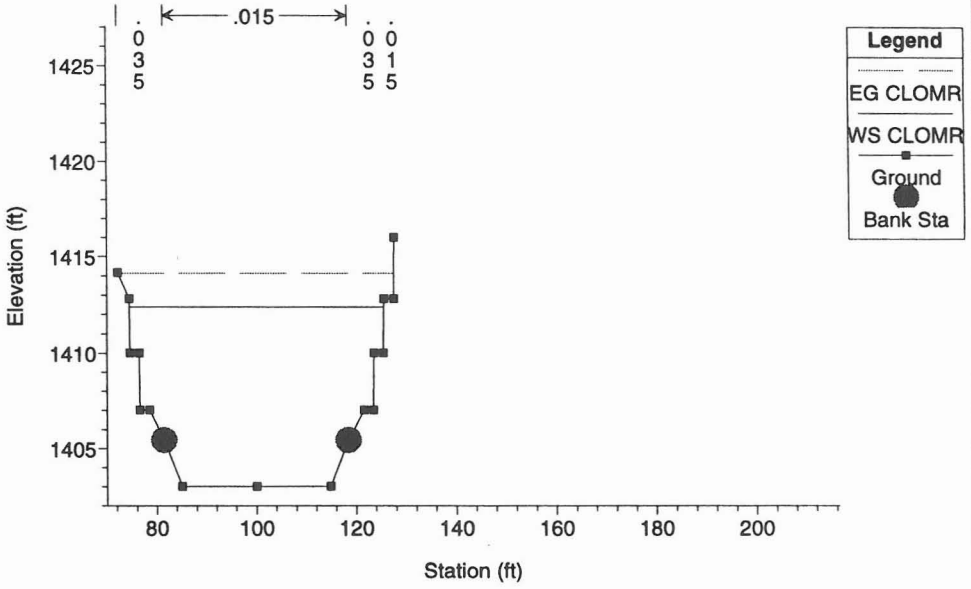
Flow: Greenway Parkway Channel

RS = 22300



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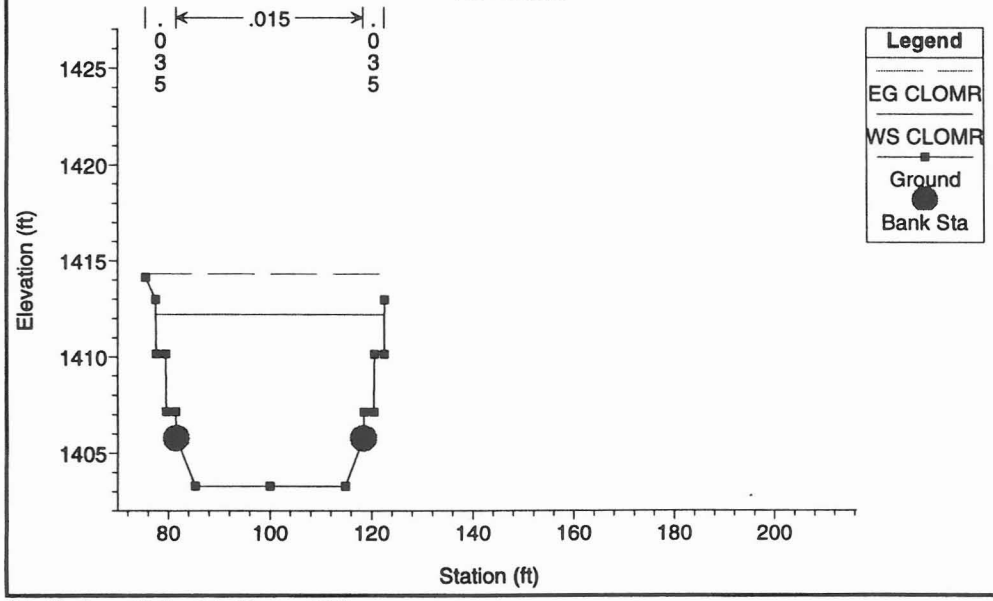
Flow: Greenway Parkway Channel

RS = 22400



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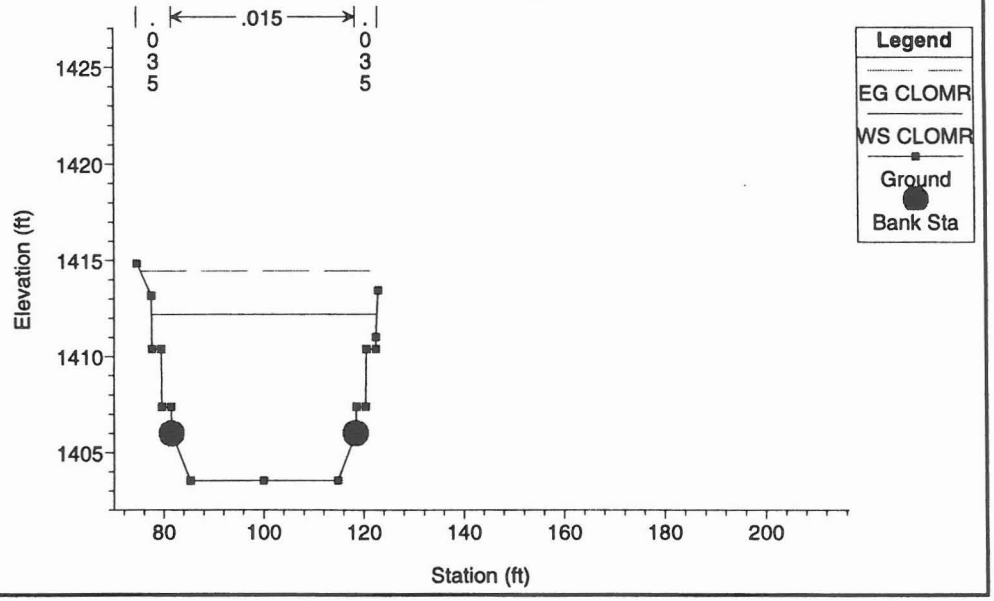
Flow: Greenway Parkway Channel

RS = 22500.*



1 in Horiz. = 40 ft 1 in Vert. = 10 ft

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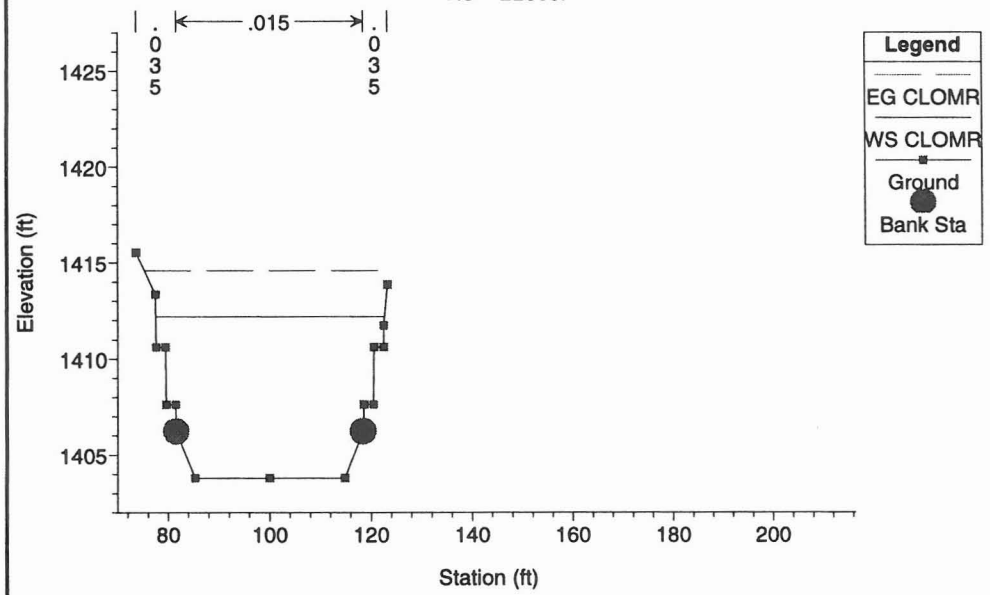
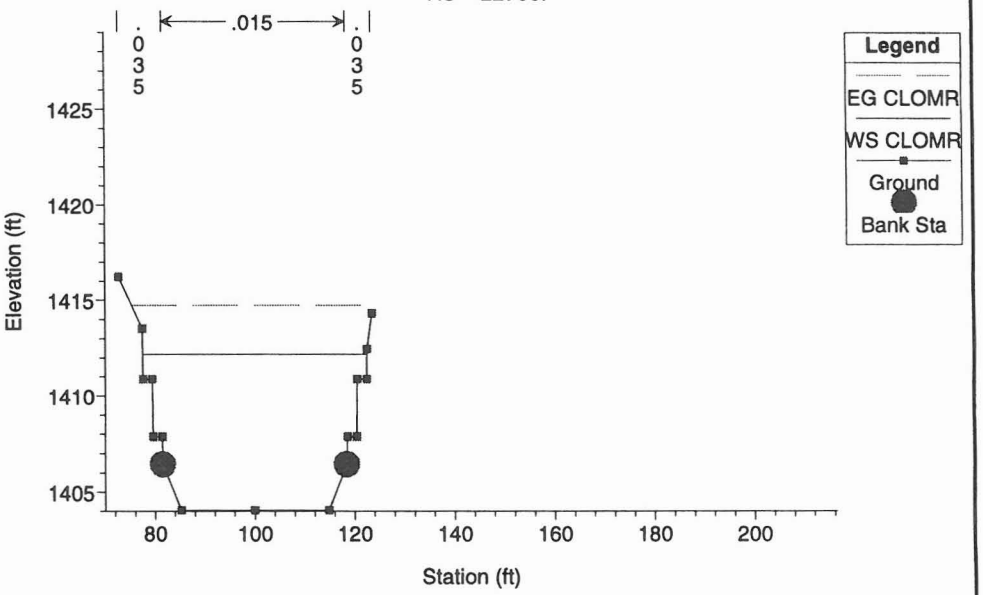
Flow: Greenway Parkway Channel
RS = 22600.*



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 22700.*



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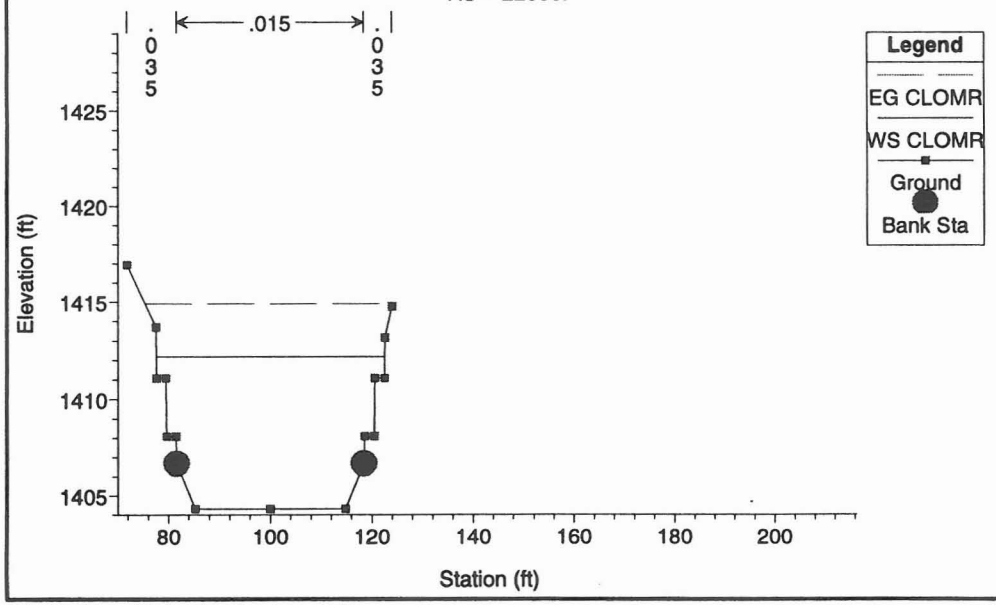
Flow: Greenway Parkway Channel
RS = 22800.*



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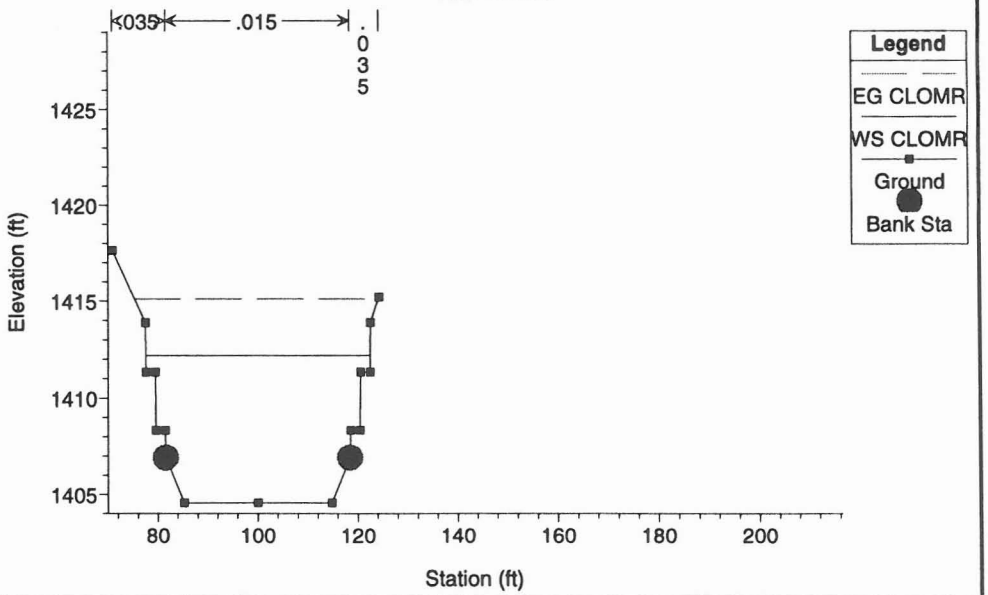
Flow: Greenway Parkway Channel
RS = 22900

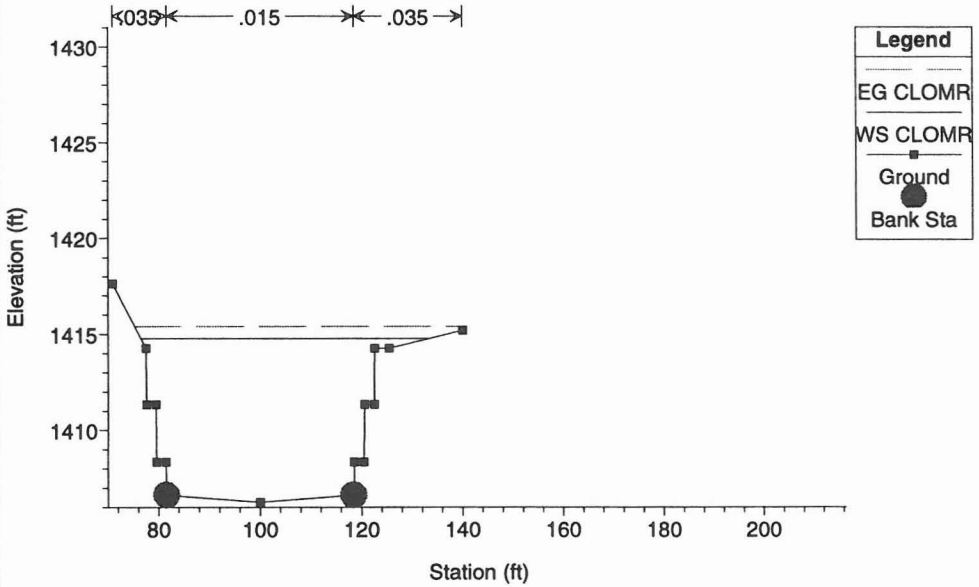


1 in Horiz. = 40 ft 1 in Vert. = 10 ft

New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

RS = 23000



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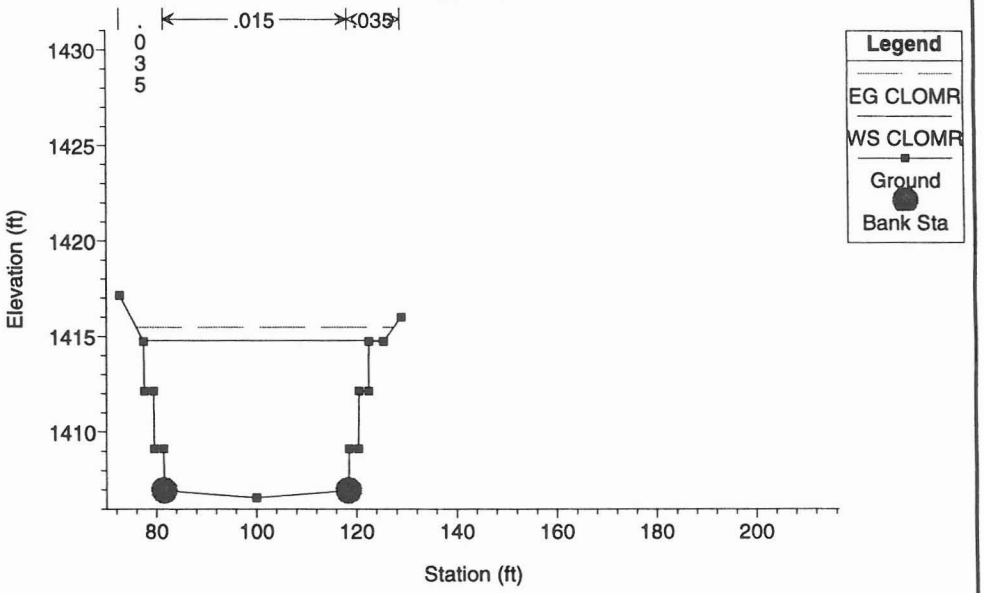
Flow: Greenway Parkway Channel

RS = 23154



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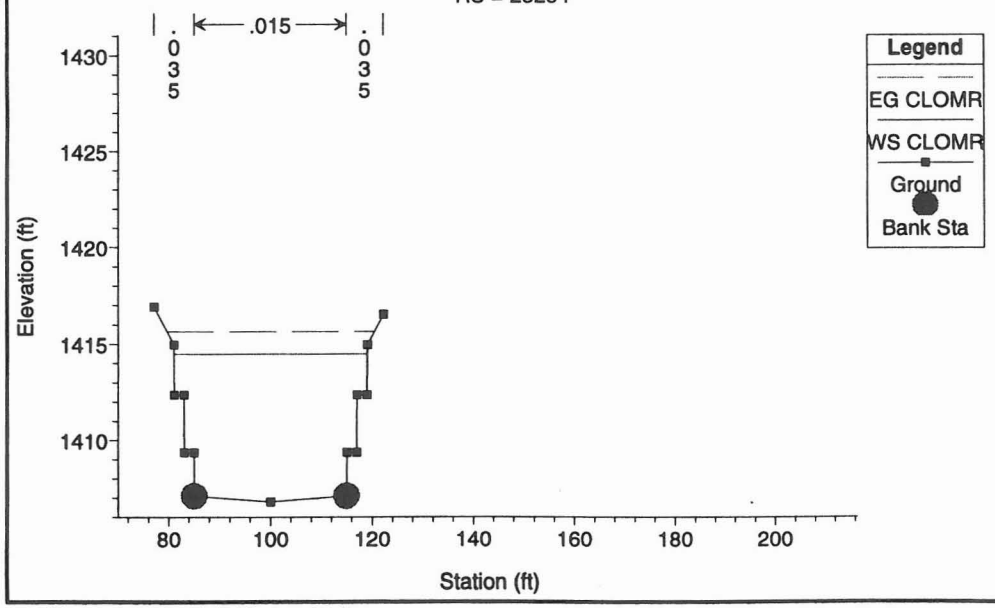
Flow: Greenway Parkway Channel

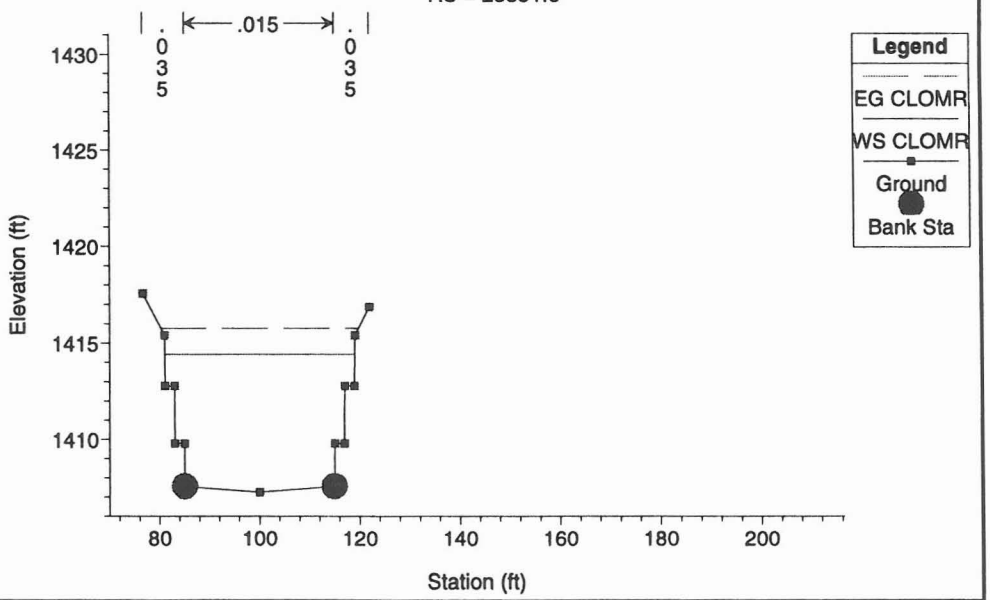
RS = 23254



New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel

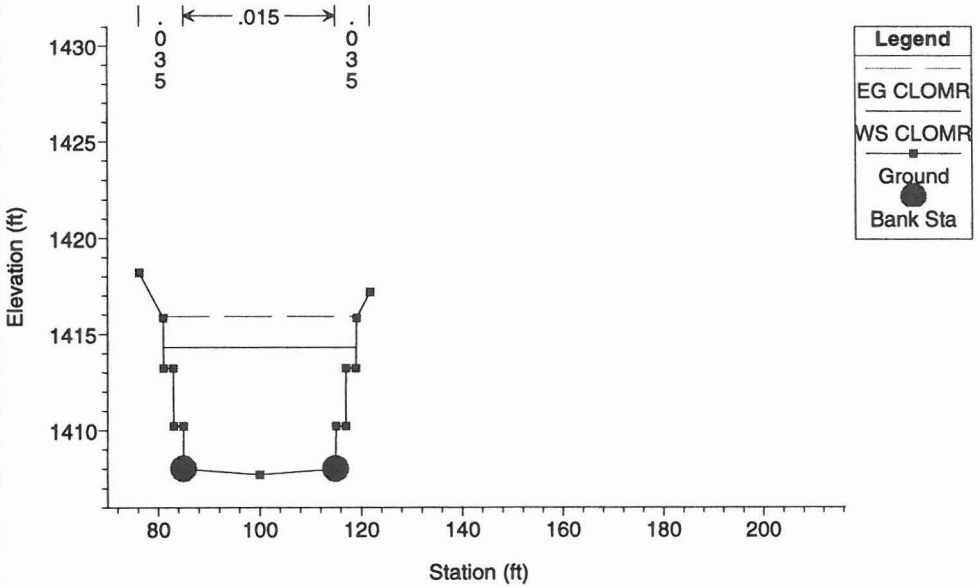
RS = 23351.6*



1 in Horiz. = 40 ft 1 in Vert. = 10 ft

New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 23449.3*



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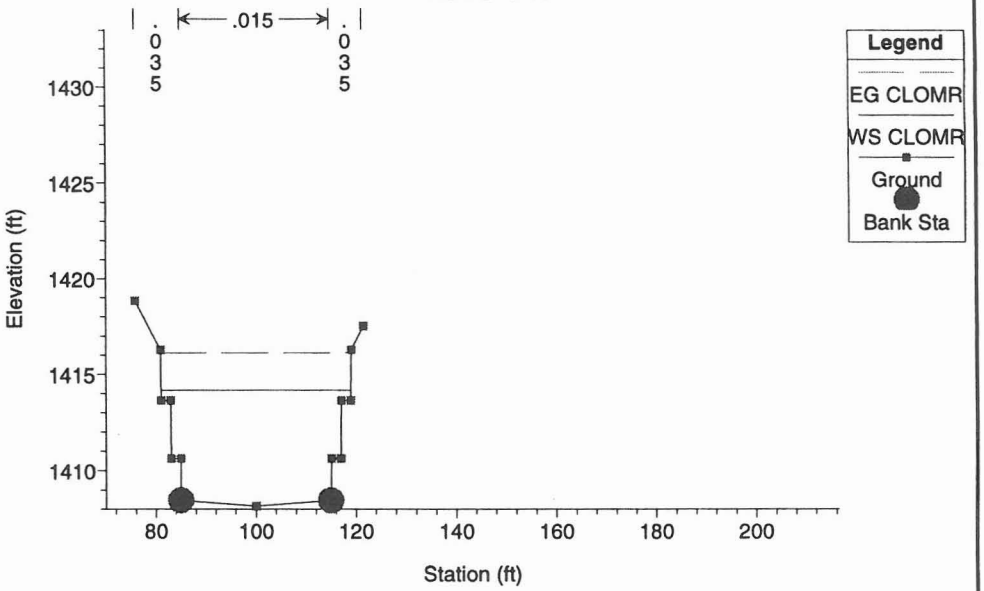
Flow: Greenway Parkway Channel
RS = 23547.*



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Flow: Greenway Parkway Channel
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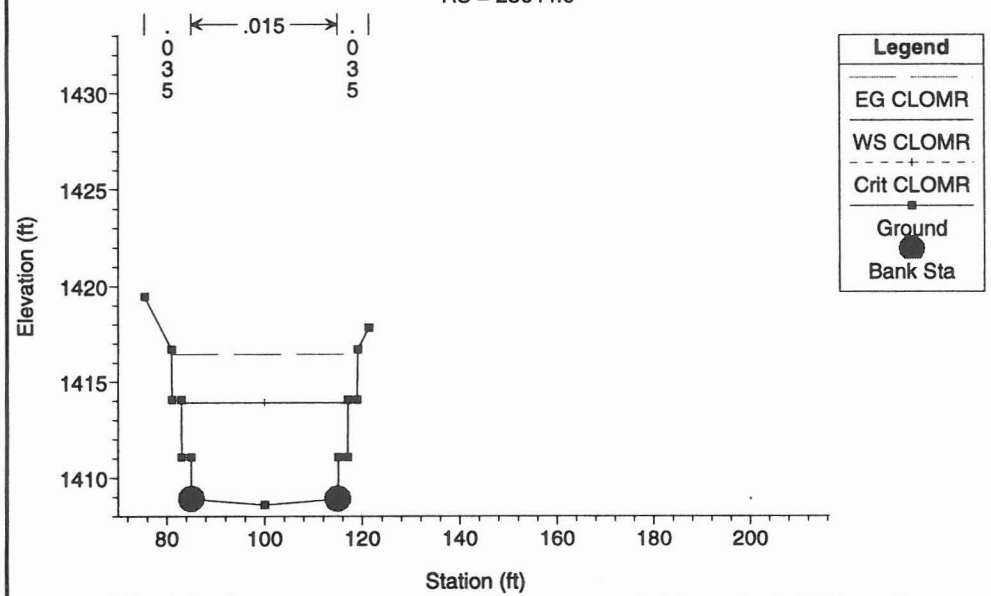

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Flow: Greenway Parkway Channel
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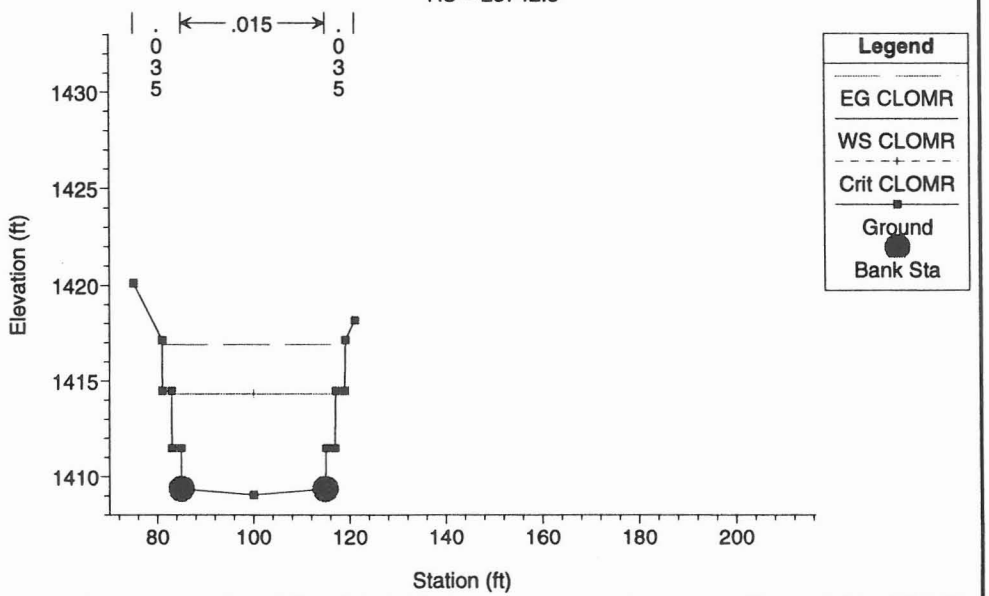
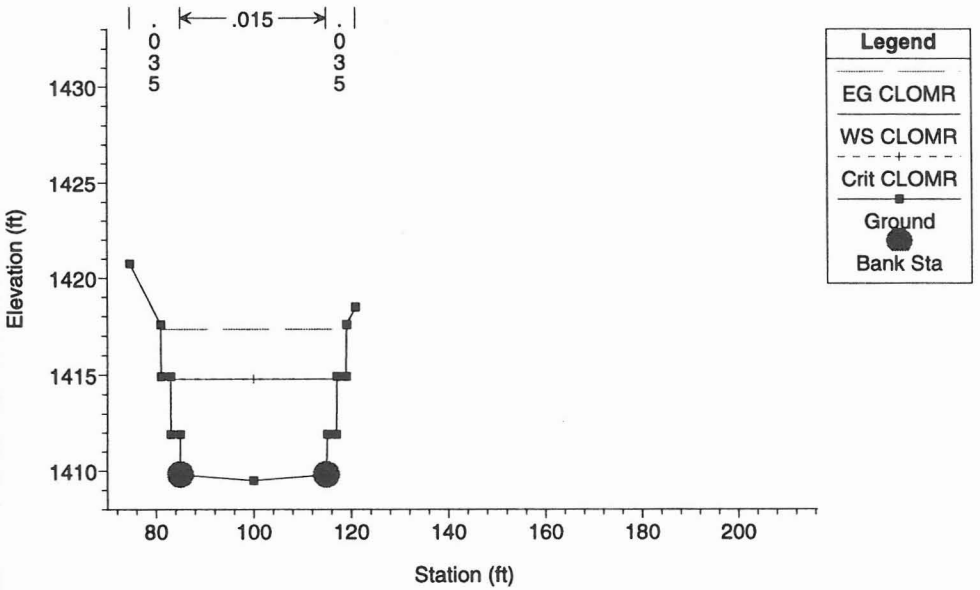


1 in Horiz. = 40 ft 1 in Vert. = 10 ft

New Design-Greenway Pkwy Ch+9th-12th st Greenway - Trap Bottom, Minimal, n=.015 3/18/99 9:07:36 AM

Flow: Greenway Parkway Channel
RS = 23840



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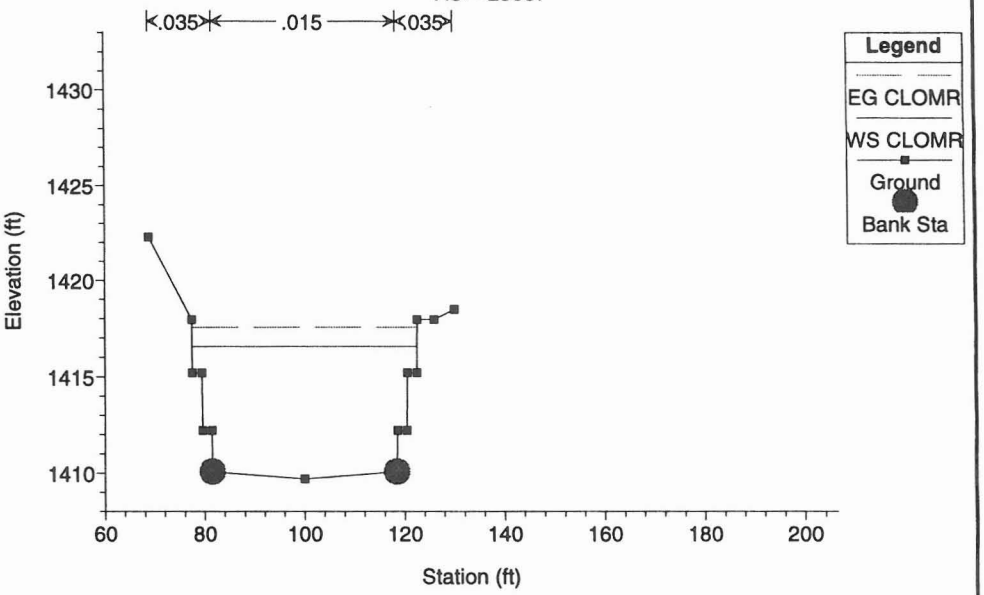
Flow: Greenway Parkway Channel
RS = 23887



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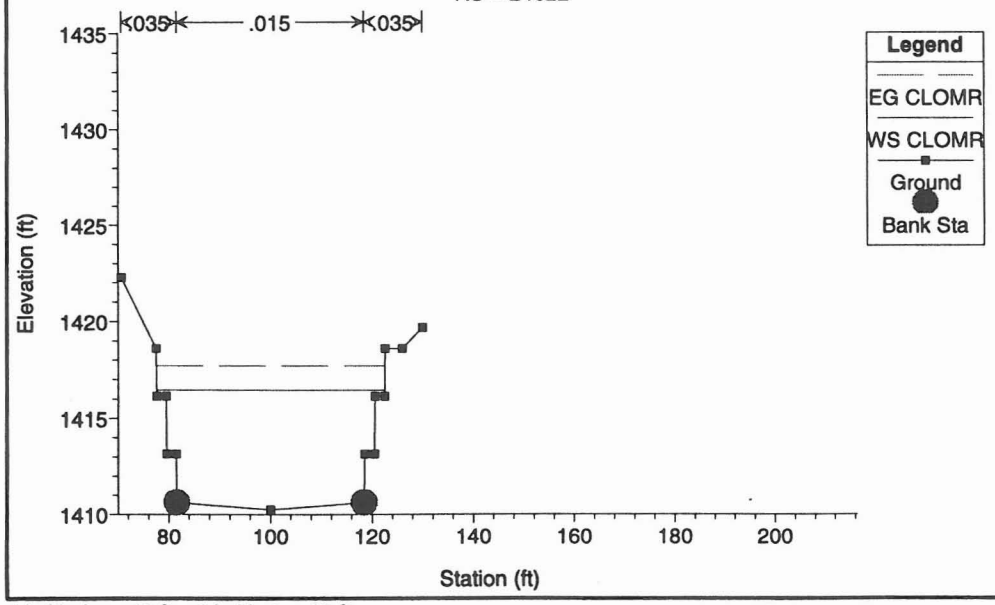
Flow: Greenway Parkway Channel
RS = 24022



1 in Horiz. = 40 ft 1 in Vert. = 10 ft

Appendix E3

Expansion and Contraction Coefficients

TABLE E3

Summary of expansion and contraction coefficients

From Station	To Station	Channel Description	Assigned coefficients	
			Contraction	Expansion
142+25.00	240+22.00	Gradual transitions, manmade channel, entire study reach.	0.1	0.3

References: Flood Control District of Maricopa County, Drainage Design Manual - Volume II, Hydraulics, January 1996
US Army Corps of Engineers, HEC-2 Water Surface Profiles User's Manual, September 1990

Note: There are two culvert crossings within this study reach. Each crossing is a gradual transition (man made channel to culvert opening), thus the contraction and expansion coefficents were not adjusted at the culvert crossings.

Appendix E4

Analysis of Structures

There are not any separate hydraulic modeling of structures within this study reach. Refer to Appendix E5 for HEC-RAS analysis of structures.

Appendix E5

Hydraulic Calculations for Greenway Channel

This appendix contains HEC-RAS output tables and water surface profile plots for the subcritical flow analysis of this study reach. Refer to the diskette holder for an electronic copy of the HEC-RAS model.

Also Included are:

- Hydraulic Jump Calculations
- Gabion Bank Stability Calculations

TABLE E5.1

HEC-RAS Output for Greenway Parkway Channel, 9th Street to Cave Creek Road
Final Hydraulic Profile (100-yr Q) for sub-critical flow conditions

Profile Output Table - Standard Table 1
HEC-RAS Plan: MinTrap .015 River: Greenway Channel Reach: 9th St to Cave C

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	
9th St to Cave C	14180	8100.00	1368.70	1376.86	1374.24	1377.47	0.001555	6.29	1287.18	221.31	0.46	a
9th St to Cave C	14225	6970.00	1370.05	1376.86		1377.53	0.000619	6.57	1060.34	200.72	0.50	
9th St to Cave C	14340	6970.00	1374.10	1379.28	1379.28	1381.13	0.011377	10.92	642.67	181.57	0.99	b
9th St to Cave C	14700	6970.00	1372.60	1381.71		1381.98	0.000758	4.18	1666.80	244.78	0.28	
9th St to Cave C	14900	6120.00	1373.50	1381.89		1382.13	0.000740	3.92	1561.76	248.50	0.28	
9th St to Cave C	15061	6120.00	1373.90	1382.04		1382.24	0.000575	3.63	1685.84	246.65	0.24	
9th St to Cave C	15300	6120.00	1375.11	1382.13		1382.47	0.001166	4.73	1294.53	218.21	0.34	
9th St to Cave C	15430	6120.00	1375.23	1381.07	1381.07	1383.41	0.004816	12.81	545.87	125.49	0.96	b
9th St to Cave C	15475	6120.00	1374.50	1382.10	1382.10	1384.80	0.004599	13.95	516.67	103.62	0.97	b
9th St to Cave C	15670	6120.00	1375.50	1384.00		1385.48	0.001976	10.33	697.39	117.87	0.65	
9th St to Cave C	15700	5920.00	1376.78	1384.26	1384.26	1387.61	0.007044	15.15	424.27	66.93	0.98	b
9th St to Cave C	15800	5920.00	1377.50	1386.42	1386.42	1390.66	0.006151	16.70	379.14	47.06	0.99	b
9th St to Cave C	15900	5920.00	1378.31	1387.29	1387.29	1391.54	0.006494	16.74	377.58	47.07	0.99	b
9th St to Cave C	16000.*	5920.00	1378.62	1388.98		1392.15	0.004096	14.50	443.16	52.46	0.80	
9th St to Cave C	16100	5920.00	1378.94	1389.41		1392.56	0.004108	14.46	444.21	52.18	0.80	
9th St to Cave C	16200.*	5920.00	1379.26	1389.59		1392.99	0.003168	14.97	426.44	51.31	0.84	
9th St to Cave C	16300.*	5920.00	1379.57	1389.81		1393.37	0.003410	15.28	412.97	47.07	0.86	
9th St to Cave C	16400	5920.00	1379.89	1390.03		1393.78	0.003709	15.66	399.65	47.03	0.89	
9th St to Cave C	16500.*	5920.00	1380.21	1390.34		1394.19	0.003858	15.83	394.11	47.04	0.91	
9th St to Cave C	16600	5920.00	1380.53	1390.67		1394.60	0.004008	16.00	388.77	47.05	0.92	
9th St to Cave C	16700.*	5920.00	1380.85	1391.08		1395.00	0.003987	15.97	388.58	47.02	0.92	
9th St to Cave C	16800.*	5920.00	1381.16	1391.50		1395.39	0.003948	15.91	389.02	47.00	0.91	
9th St to Cave C	16900	5920.00	1381.48	1391.89		1395.79	0.003963	15.92	387.68	46.98	0.91	
9th St to Cave C	17000	5920.00	1381.80	1392.26	1391.87	1396.20	0.004058	16.01	385.23	46.96	0.92	
9th St to Cave C	17100.*	5920.00	1382.11	1392.62	1392.33	1396.63	0.004197	16.13	381.92	46.95	0.93	
9th St to Cave C	17200	5920.00	1382.43	1392.99	1392.79	1397.07	0.004350	16.27	378.33	46.95	0.94	
9th St to Cave C	17300.*	5860.00	1382.75	1394.31		1397.52	0.002980	14.45	425.48	47.01	0.80	
9th St to Cave C	17400	5860.00	1383.06	1394.61		1397.82	0.002961	14.43	425.59	47.00	0.79	
9th St to Cave C	17500.*	5860.00	1383.23	1395.01		1398.11	0.002828	14.22	432.08	47.01	0.78	
9th St to Cave C	17600.*	5860.00	1383.41	1395.34		1398.40	0.002760	14.11	435.49	47.01	0.77	
9th St to Cave C	17700.*	5860.00	1383.58	1395.66		1398.67	0.002704	14.01	438.43	47.01	0.76	
9th St to Cave C	17800.*	5860.00	1383.76	1395.94		1398.94	0.002683	13.97	439.48	47.01	0.76	
9th St to Cave C	17900	5860.00	1383.93	1396.23		1399.21	0.002661	13.92	440.63	47.01	0.75	
9th St to Cave C	18000.*	5860.00	1384.10	1396.66		1399.48	0.002419	13.53	453.91	47.02	0.72	
9th St to Cave C	18100.*	5860.00	1384.28	1397.01		1399.72	0.002268	13.28	462.85	47.02	0.70	

TABLE E5.1
HEC-RAS Output for Greenway Parkway Channel, 9th Street to Cave Creek Road
Final Hydraulic Profile (100-yr Q) for sub-critical flow conditions

Profile Output Table - Standard Table 1
HEC-RAS Plan: MinTrap .015 River: Greenway Channel Reach: 9th St to Cave C

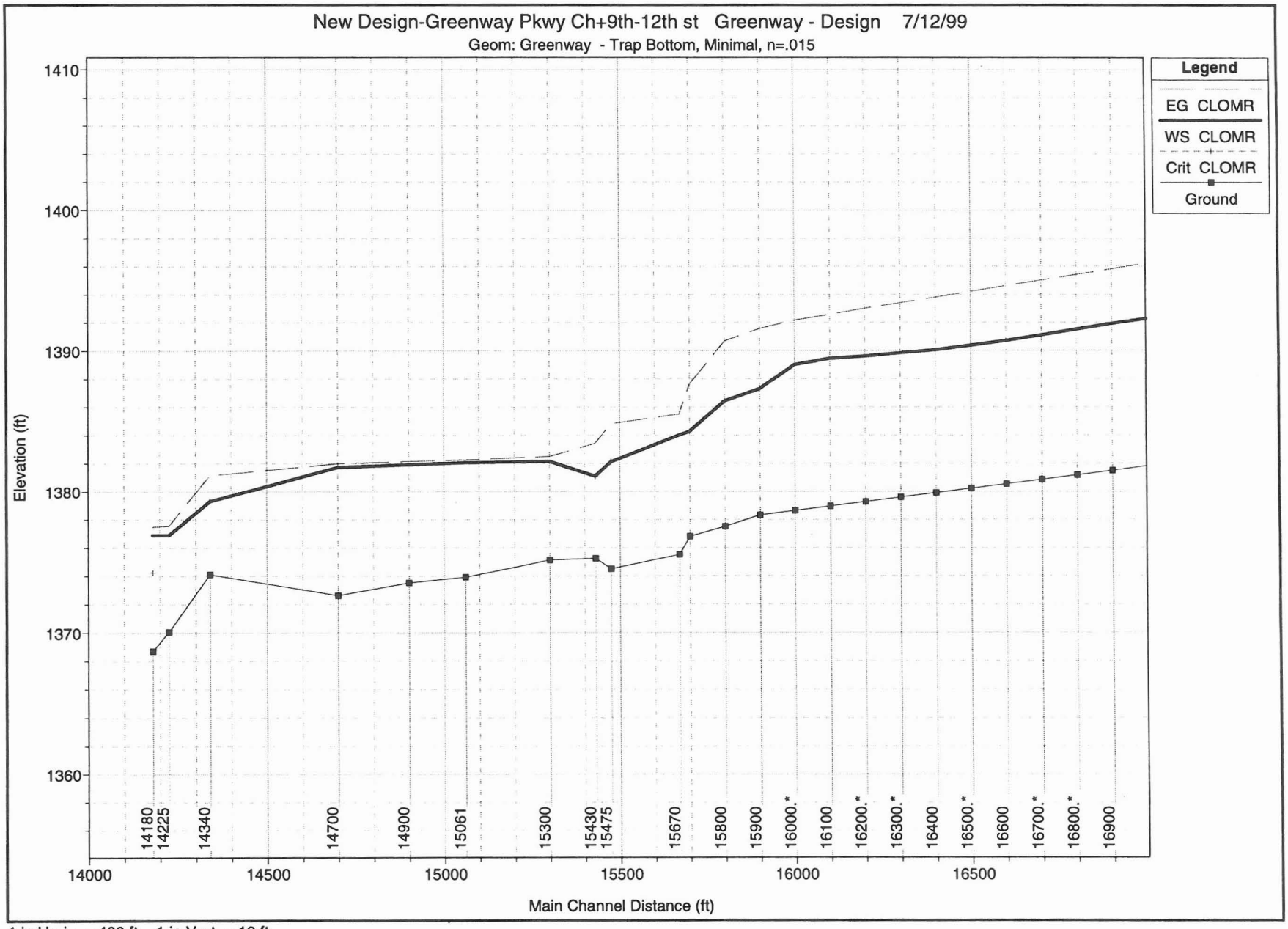
Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl	
9th St to Cave C	18200	5860.00	1384.45	1397.33		1399.95	0.002150	13.08	470.19	47.03	0.68	
9th St to Cave C	18300	5860.00	1384.63	1398.83		1400.21	0.000930	9.50	647.98	58.94	0.46	
9th St to Cave C	18379	5130.00	1384.78	1399.80		1400.34	0.000333	5.94	902.42	76.07	0.29	
9th St to Cave C	18390	5130.00	1389.90	1399.41		1400.52	0.001001	8.44	608.54	64.08	0.48	
9th St to Cave C	18440.5	Culvert										
9th St to Cave C	18491	5130.00	1390.00	1401.04	1395.79	1401.81	0.000587	7.14	762.73	74.07	0.38	
9th St to Cave C	18600	5130.00	1390.17	1399.94		1402.45	0.002456	12.85	429.06	48.86	0.72	
9th St to Cave C	18700	5130.00	1390.32	1400.12	1400.12	1404.69	0.004282	17.43	329.00	40.82	0.98	b
9th St to Cave C	18880	5130.00	1390.61	1402.37		1405.39	0.002226	14.19	411.16	47.70	0.73	
9th St to Cave C	18925	5130.00	1390.69	1402.82		1405.52	0.001926	13.42	435.12	50.61	0.68	
9th St to Cave C	19021.7*	5130.00	1390.87	1403.55		1405.74	0.001504	12.11	483.51	52.61	0.60	
9th St to Cave C	19118.4*	5130.00	1391.05	1404.01		1405.90	0.001293	11.28	516.48	53.86	0.56	
9th St to Cave C	19215.1*	5130.00	1391.24	1404.33		1406.04	0.001167	10.70	541.54	54.82	0.53	
9th St to Cave C	19311.9	5130.00	1391.42	1404.60		1406.16	0.001080	10.23	562.00	55.62	0.51	
9th St to Cave C	19360	5130.00	1391.51	1403.17		1406.89	0.003216	15.81	368.33	40.98	0.84	
9th St to Cave C	19456.6*	5130.00	1391.69	1403.48		1407.21	0.003256	15.84	366.86	40.73	0.84	
9th St to Cave C	19553.3*	5130.00	1391.87	1403.77		1407.54	0.003326	15.91	364.43	40.55	0.85	
9th St to Cave C	19649.9*	5130.00	1392.04	1404.08		1407.87	0.003385	15.97	362.58	40.38	0.85	
9th St to Cave C	19746.6*	5130.00	1392.22	1404.37		1408.22	0.003486	16.07	359.42	40.21	0.86	
9th St to Cave C	19843.3	5130.00	1392.40	1404.68		1408.58	0.003583	16.18	356.66	40.04	0.87	
9th St to Cave C	19917.1*	5100.00	1392.54	1404.46		1408.92	0.001549	17.13	336.79	40.00	0.94	
9th St to Cave C	19990.9*	5100.00	1392.69	1404.43	1404.43	1409.16	0.001719	17.63	324.32	39.98	0.98	b
9th St to Cave C	20064.7*	5100.00	1392.83	1404.68	1404.68	1409.41	0.001736	17.62	323.12	39.97	0.98	b
9th St to Cave C	20138.5*	5100.00	1392.97	1404.94	1404.94	1409.67	0.001753	17.61	321.99	39.96	0.98	b
9th St to Cave C	20212.3*	5100.00	1393.11	1405.20	1405.20	1409.93	0.001771	17.61	320.79	39.95	0.98	b
9th St to Cave C	20286.1*	5100.00	1393.26	1405.46	1405.46	1410.19	0.001787	17.60	319.64	39.94	0.97	b
9th St to Cave C	20360	5100.00	1393.40	1405.72	1405.72	1410.46	0.001806	17.60	318.46	39.93	0.97	b
9th St to Cave C	20460.*	4320.00	1393.59	1408.79		1410.82	0.000562	11.59	430.36	43.95	0.57	
9th St to Cave C	20560.*	4320.00	1393.78	1408.77		1410.91	0.000606	11.88	416.78	40.09	0.59	
9th St to Cave C	20660.*	4320.00	1393.97	1408.75		1411.01	0.000658	12.23	403.74	40.07	0.61	
9th St to Cave C	20760.*	4320.00	1394.16	1408.72		1411.12	0.000719	12.60	390.39	40.05	0.64	
9th St to Cave C	20860	4320.00	1394.35	1408.68		1411.25	0.000789	13.00	376.80	40.03	0.67	
9th St to Cave C	20948.*	4320.00	1394.52	1408.64		1411.37	0.000868	13.38	360.61	39.21	0.70	
9th St to Cave C	21036.*	4320.00	1394.69	1408.60		1411.50	0.000957	13.78	344.76	38.39	0.73	
9th St to Cave C	21124.*	4320.00	1394.85	1408.55		1411.65	0.001057	14.20	329.69	37.58	0.76	

TABLE E5.1
HEC-RAS Output for Greenway Parkway Channel, 9th Street to Cave Creek Road
Final Hydraulic Profile (100-yr Q) for sub-critical flow conditions

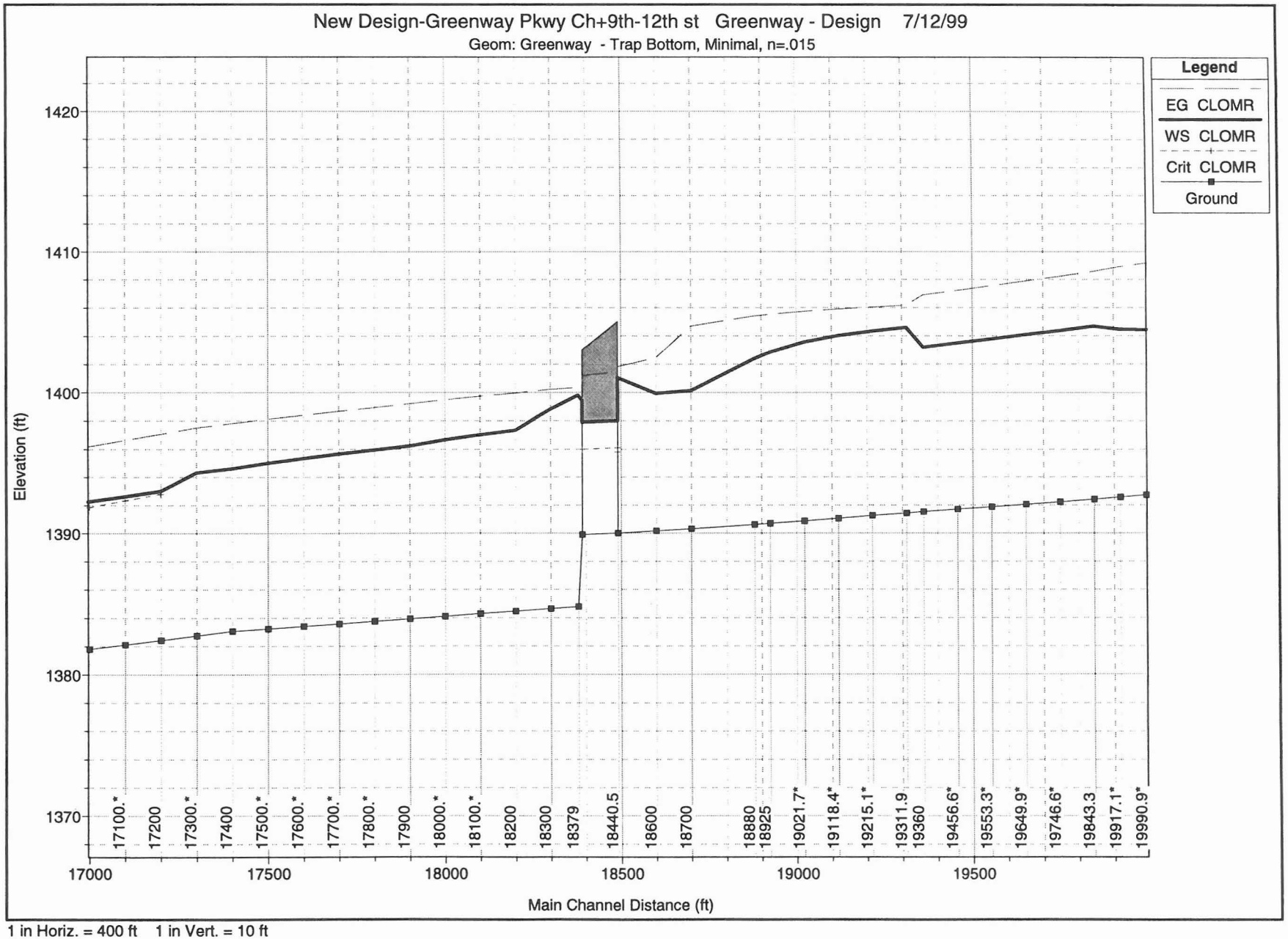
Profile Output Table - Standard Table 1
HEC-RAS Plan: MinTrap .015 River: Greenway Channel Reach: 9th St to Cave C

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	
9th St to Cave C	21212.*	4320.00	1395.02	1408.51		1411.81	0.001173	14.65	314.89	36.76	0.80	
9th St to Cave C	21300	4320.00	1395.19	1408.46		1411.99	0.001303	15.11	300.76	35.94	0.84	
9th St to Cave C	21380	3790.00	1395.34	1412.01		1412.32	0.000063	4.52	898.74	78.57	0.21	
9th St to Cave C	21392	3790.00	1401.51	1411.69		1412.46	0.000229	7.04	539.46	53.07	0.39	
9th St to Cave C	21435	Culvert										
9th St to Cave C	21462	3790.00	1401.62	1412.69	1407.17	1413.36	0.000182	6.63	626.39	67.05	0.35	
9th St to Cave C	21550	3790.00	1401.76	1412.18		1413.62	0.000421	9.70	436.26	49.68	0.53	
9th St to Cave C	21650	3790.00	1401.91	1412.14		1413.70	0.000502	10.08	412.16	49.43	0.56	
9th St to Cave C	21850	3790.00	1402.22	1412.19		1413.83	0.000546	10.35	401.26	49.01	0.58	
9th St to Cave C	21900	3790.00	1402.30	1412.20		1413.86	0.000556	10.41	399.22	49.02	0.59	
9th St to Cave C	22000.*	3790.00	1402.45	1412.27		1413.92	0.000549	10.38	404.51	49.37	0.59	
9th St to Cave C	22100.*	3790.00	1402.61	1412.34		1413.97	0.000546	10.37	409.26	48.01	0.59	
9th St to Cave C	22200	3790.00	1402.76	1412.40		1414.03	0.000545	10.37	414.55	48.68	0.59	
9th St to Cave C	22300	3790.00	1403.02	1412.38		1414.12	0.000657	10.81	405.31	51.07	0.63	
9th St to Cave C	22400	3790.00	1403.29	1412.20		1414.31	0.000828	11.71	348.82	45.04	0.70	
9th St to Cave C	22500.*	3790.00	1403.54	1412.20		1414.43	0.000915	12.07	337.42	45.95	0.73	
9th St to Cave C	22600.*	3790.00	1403.80	1412.18		1414.58	0.001024	12.50	324.17	46.38	0.77	
9th St to Cave C	22700.*	3790.00	1404.05	1412.18		1414.73	0.001132	12.89	313.47	43.88	0.81	
9th St to Cave C	22800.*	3790.00	1404.31	1412.17		1414.91	0.001269	13.34	302.36	44.42	0.85	
9th St to Cave C	22900	3790.00	1404.56	1412.17		1415.11	0.001420	13.81	291.36	44.97	0.90	
9th St to Cave C	23000	2000.00	1406.76	1414.68		1415.40	0.000314	6.87	327.97	55.36	0.43	
9th St to Cave C	23154	2000.00	1407.10	1414.69		1415.48	0.000366	7.19	306.23	45.10	0.47	
9th St to Cave C	23254	2000.00	1407.30	1414.32		1415.71	0.000712	9.55	233.54	38.05	0.64	
9th St to Cave C	23351.6*	2000.00	1407.75	1414.21		1415.87	0.000947	10.41	212.40	38.10	0.73	
9th St to Cave C	23449.3*	2000.00	1408.20	1414.05		1416.09	0.001340	11.56	188.94	37.16	0.85	
9th St to Cave C	23547.*	2000.00	1408.65	1413.97	1413.97	1416.47	0.001865	12.78	169.43	37.11	0.99	
9th St to Cave C	23644.6*	2000.00	1409.10	1414.41	1414.41	1416.92	0.001867	12.79	169.55	37.16	0.99	
9th St to Cave C	23742.3*	2000.00	1409.55	1414.87	1414.87	1417.37	0.001857	12.76	169.98	37.24	0.99	b
9th St to Cave C	23840	2000.00	1410.00	1415.32	1415.32	1417.82	0.001856	12.76	170.38	37.93	0.99	b
9th St to Cave C	23887	2000.00	1410.20	1417.02		1418.01	0.000528	8.04	272.09	45.03	0.55	
9th St to Cave C	24022	2000.00	1410.75	1416.94		1418.16	0.000742	8.92	240.70	44.96	0.64	

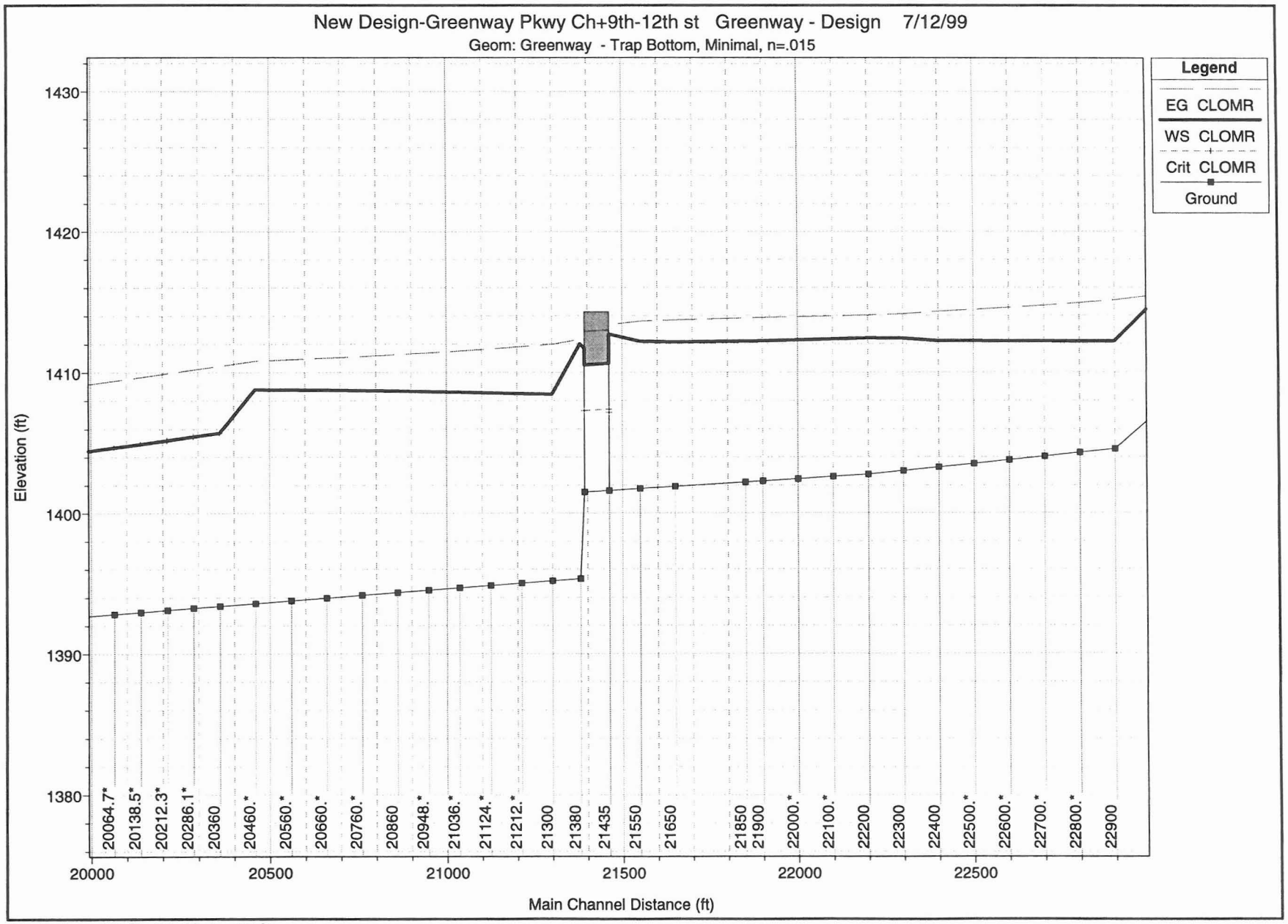
Notes: * Denotes HEC-RAS Interpolated Cross Section
a) Station 141+80 starting WSEL per duplicate effective model - WSEL = 1376.86
b) Critical depth reported by HEC-RAS



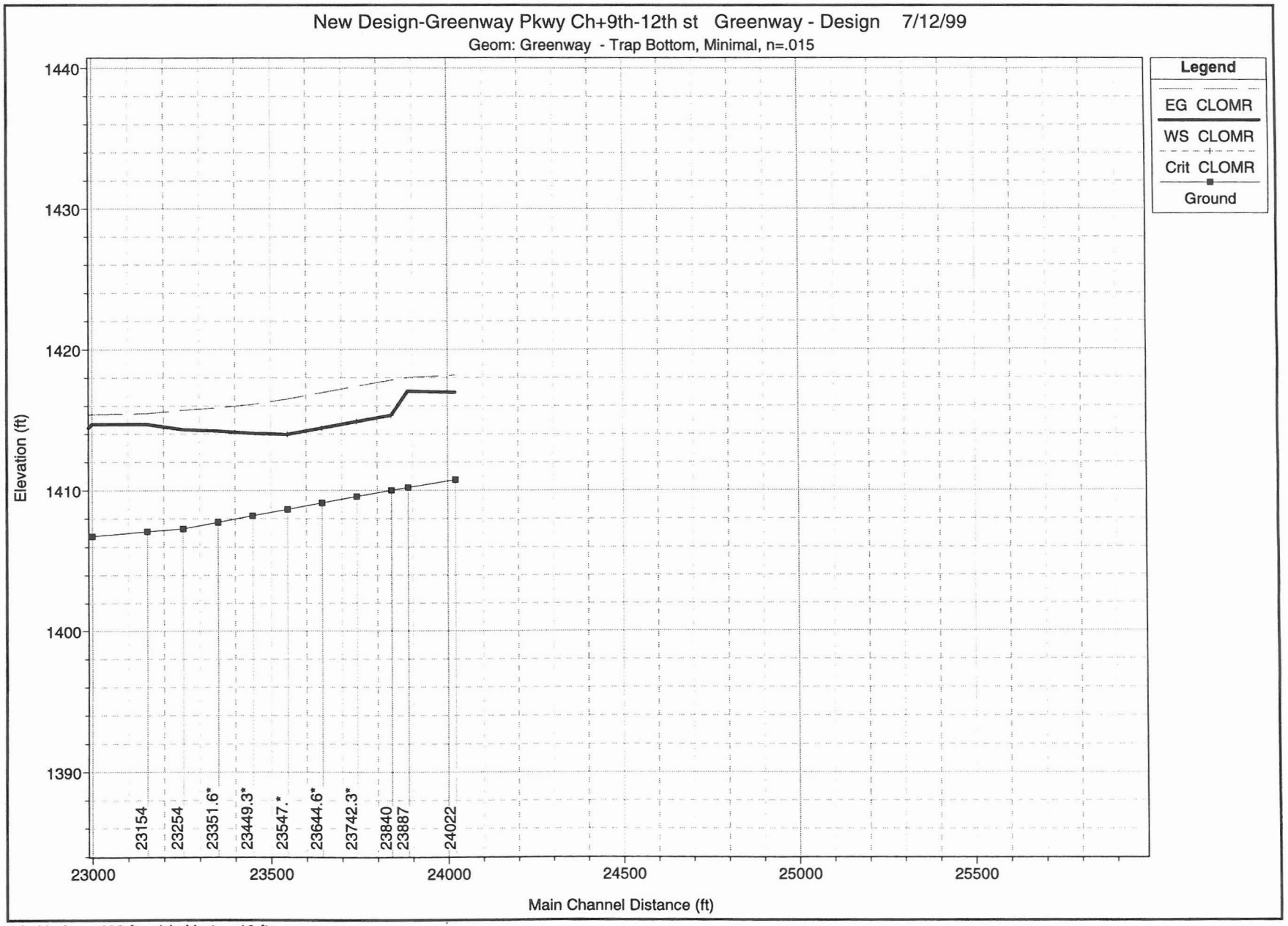
1 in Horiz. = 400 ft 1 in Vert. = 10 ft



1 in Horiz. = 400 ft 1 in Vert. = 10 ft



1 in Horiz. = 400 ft 1 in Vert. = 10 ft



1 in Horiz. = 400 ft 1 in Vert. = 10 ft

TABLE E5.2
HEC-RAS Output for Greenway Parkway Channel, 9th Street to Cave Creek Road
Floodway Enchroachment Run

Profile Output Table - Encroachment 1 HEC-RAS Plan: MinTrap .015 River: Greenway Channel Reach: 9th St to Cave C

Reach	River Sta	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Wdth Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
9th St to Cave C	14180	1376.86	0.00	1377.47	221.31		8100.00		868.00	868.00	1128.00	1128.00
9th St to Cave C	14225	1376.86	0.00	1377.53	200.72		6970.00		44.80	59.00	311.00	352.24
9th St to Cave C	14340	1379.28	0.00	1381.13	181.57	16.53	6953.47		45.00	96.00	303.00	352.34
9th St to Cave C	14700	1381.71	0.00	1381.98	244.78		6970.00		45.54	70.00	334.00	356.56
9th St to Cave C	14900	1381.89	0.00	1382.13	248.50		6120.00		44.88	65.00	347.00	350.60
9th St to Cave C	15061	1382.04	0.00	1382.24	246.65		6120.00		44.40	59.00	336.00	350.00
9th St to Cave C	15300	1382.13	0.00	1382.47	218.21		6120.00		44.18	64.00	334.00	346.00
9th St to Cave C	15430	1381.07	0.00	1383.41	125.49	223.26	5484.69	412.04	44.38	142.00	220.00	311.00
9th St to Cave C	15475	1382.10	0.00	1384.80	103.62	362.84	5320.71	436.45	44.36	140.00	199.00	300.00
9th St to Cave C	15670	1384.00	0.00	1385.48	117.87	299.15	5358.69	462.15	43.16	115.00	182.00	283.00
9th St to Cave C	15700	1384.26	0.00	1387.61	66.93	444.96	5437.07	37.98	939.60	967.00	1015.00	1044.00
9th St to Cave C	15800	1386.42	0.00	1390.66	47.06	62.92	5794.16	62.92	66.88	76.10	115.00	122.44
9th St to Cave C	15900	1387.29	0.00	1391.54	47.07	71.76	5772.70	75.54	65.16	76.01	115.01	123.43
9th St to Cave C	16000.*	1388.98	0.00	1392.15	52.46	90.03	5735.78	94.20	65.78	76.51	115.51	123.49
9th St to Cave C	16100	1389.41	0.00	1392.56	52.18	94.22	5727.47	98.31	66.40	77.01	116.01	123.54
9th St to Cave C	16200.*	1389.59	0.00	1392.99	51.31	60.37	5796.67	62.96	66.79	77.01	116.01	123.99
9th St to Cave C	16300.*	1389.81	0.00	1393.37	47.07	53.20	5810.90	55.91	67.17	77.01	116.01	124.43
9th St to Cave C	16400	1390.03	0.00	1393.78	47.03	42.03	5833.59	44.38	67.56	77.01	116.01	124.88
9th St to Cave C	16500.*	1390.34	0.00	1394.19	47.04	38.25	5841.30	40.45	67.83	77.01	116.01	124.48
9th St to Cave C	16600	1390.67	0.00	1394.60	47.05	34.59	5848.77	36.64	68.10	77.01	116.01	124.08
9th St to Cave C	16700.*	1391.08	0.00	1395.00	47.02	31.32	5855.43	33.25	68.13	77.01	116.01	124.57
9th St to Cave C	16800.*	1391.50	0.00	1395.39	47.00	28.25	5861.70	30.06	68.15	77.01	116.01	125.05
9th St to Cave C	16900	1391.89	0.00	1395.79	46.98	25.03	5868.26	26.71	68.18	77.01	116.01	125.54
9th St to Cave C	17000	1392.26	0.00	1396.20	46.96	24.88	5868.57	26.54	68.54	77.01	116.01	125.06
9th St to Cave C	17100.*	1392.62	0.00	1396.63	46.95	25.16	5868.87	25.98	70.71	78.76	117.80	126.64
9th St to Cave C	17200	1392.99	0.00	1397.07	46.95	25.43	5869.13	25.43	72.88	80.51	119.59	128.22
9th St to Cave C	17300.*	1394.31	0.00	1397.52	47.01	34.31	5791.39	34.31	73.69	80.51	119.59	127.75
9th St to Cave C	17400	1394.61	0.00	1397.82	47.00	32.42	5795.17	32.42	74.50	80.51	119.59	127.28
9th St to Cave C	17500.*	1395.01	0.00	1398.11	47.01	32.80	5794.40	32.80	74.24	80.51	119.59	127.41
9th St to Cave C	17600.*	1395.34	0.00	1398.40	47.01	32.59	5794.82	32.59	73.98	80.51	119.59	127.54
9th St to Cave C	17700.*	1395.66	0.00	1398.67	47.01	32.26	5795.48	32.26	73.72	80.51	119.59	127.66
9th St to Cave C	17800.*	1395.94	0.00	1398.94	47.01	31.62	5796.77	31.62	73.46	80.51	119.59	127.79
9th St to Cave C	17900	1396.23	0.00	1399.21	47.01	30.98	5798.04	30.98	73.20	80.51	119.59	127.92
9th St to Cave C	18000.*	1396.66	0.00	1399.48	47.02	31.72	5796.55	31.72	73.53	80.51	119.59	127.91
9th St to Cave C	18100.*	1397.01	0.00	1399.72	47.02	31.79	5796.42	31.79	73.87	80.51	119.59	127.89
9th St to Cave C	18200	1397.33	0.00	1399.95	47.03	31.34	5797.33	31.34	74.20	80.51	119.59	127.88

TABLE E5.2
HEC-RAS Output for Greenway Parkway Channel, 9th Street to Cave Creek Road
Floodway Enchroachment Run

Profile Output Table - Encroachment 1 HEC-RAS Plan: MinTrap .015 River: Greenway Channel Reach: 9th St to Cave C

Reach	River Sta	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Wdth Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
9th St to Cave C	18300	1398.83	0.00	1400.21	58.94	29.69	5800.62	29.69	70.50	76.51	123.59	132.20
9th St to Cave C	18379	1399.80	0.00	1400.34	76.07	23.51	5082.55	23.95	60.00	68.10	132.09	141.20
9th St to Cave C	18390	1399.41	0.00	1400.52	64.08	0.08	5129.85	0.06	67.50	67.60	131.50	131.60
9th St to Cave C												
9th St to Cave C	18491	1401.04	0.00	1401.81	74.07	51.49	5033.41	45.10		68.10	132.00	
9th St to Cave C	18600	1399.94	0.00	1402.45	48.86	56.63	5019.46	53.91	73.88	80.10	120.10	125.50
9th St to Cave C	18700	1400.12	0.00	1404.69	40.82	85.57	4957.24	87.19	73.88	85.20	114.40	125.00
9th St to Cave C	18880	1402.37	0.00	1405.39	47.70	88.39	4944.56	97.04	73.60	85.10	114.94	124.60
9th St to Cave C	18925	1402.82	0.00	1405.52	50.61	80.51	4936.89	112.60	71.14	84.70	115.30	125.10
9th St to Cave C	19021.7*	1403.55	0.00	1405.74	52.61	93.25	4904.79	131.96	69.51	83.80	116.23	125.12
9th St to Cave C	19118.4*	1404.01	0.00	1405.90	53.86	98.81	4898.68	132.51	67.89	82.90	117.15	125.15
9th St to Cave C	19215.1*	1404.33	0.00	1406.04	54.82	102.63	4904.47	122.90	66.26	82.00	118.07	125.17
9th St to Cave C	19311.9	1404.60	0.00	1406.16	55.62	105.71	4918.26	106.03	64.64	81.10	119.00	125.20
9th St to Cave C	19360	1403.17	0.00	1406.89	40.98	113.83	4902.37	113.80	69.94	86.00	114.10	127.34
9th St to Cave C	19456.6*	1403.48	0.00	1407.21	40.73	113.15	4903.70	113.15	70.29	86.00	114.10	128.06
9th St to Cave C	19553.3*	1403.77	0.00	1407.54	40.55	112.14	4905.73	112.14	70.64	86.00	114.10	128.79
9th St to Cave C	19649.9*	1404.08	0.00	1407.87	40.38	111.73	4906.55	111.73	70.98	86.00	114.10	129.51
9th St to Cave C	19746.6*	1404.37	0.00	1408.22	40.21	111.22	4907.56	111.22	71.33	86.00	114.10	130.24
9th St to Cave C	19843.3	1404.68	0.00	1408.58	40.04	111.51	4906.99	111.51	71.68	86.00	114.10	130.96
9th St to Cave C	19917.1*	1404.46	0.00	1408.92	40.00	59.77	4981.11	59.12	71.62	86.00	114.10	130.72
9th St to Cave C	19990.9*	1404.43	0.00	1409.16	39.98	53.64	4993.94	52.43	71.56	86.00	114.10	130.47
9th St to Cave C	20064.7*	1404.68	0.00	1409.41	39.97	51.12	4999.49	49.39	71.50	86.00	114.10	130.23
9th St to Cave C	20138.5*	1404.94	0.00	1409.67	39.96	48.70	5004.82	46.48	71.44	86.00	114.10	129.99
9th St to Cave C	20212.3*	1405.20	0.00	1409.93	39.95	46.26	5010.10	43.64	71.38	86.00	114.10	129.75
9th St to Cave C	20286.1*	1405.46	0.00	1410.19	39.94	43.89	5015.20	40.91	71.32	86.00	114.10	129.50
9th St to Cave C	20360	1405.72	0.00	1410.46	39.93	41.37	5020.38	38.24	71.26	86.00	114.10	129.26
9th St to Cave C	20460.*	1408.79	0.00	1410.82	43.95	58.06	4206.57	55.37	71.20	86.02	114.08	129.32
9th St to Cave C	20560.*	1408.77	0.00	1410.91	40.09	59.03	4204.35	56.62	71.13	86.04	114.06	129.38
9th St to Cave C	20660.*	1408.75	0.00	1411.01	40.07	56.01	4209.54	54.45	71.07	86.06	114.04	129.44
9th St to Cave C	20760.*	1408.72	0.00	1411.12	40.05	52.70	4215.35	51.95	71.00	86.08	114.02	129.50
9th St to Cave C	20860	1408.68	0.00	1411.25	40.03	49.22	4221.57	49.22	70.94	86.10	114.00	129.56
9th St to Cave C	20948.*	1408.64	0.00	1411.37	39.21	40.27	4239.46	40.27	71.74	86.08	114.02	128.72
9th St to Cave C	21036.*	1408.60	0.00	1411.50	38.39	31.70	4256.60	31.70	72.55	86.06	114.04	127.88
9th St to Cave C	21124.*	1408.55	0.00	1411.65	37.58	24.23	4271.55	24.23	73.35	86.05	114.05	127.04
9th St to Cave C	21212.*	1408.51	0.00	1411.81	36.76	17.36	4285.27	17.36	74.16	86.03	114.07	126.20
9th St to Cave C	21300	1408.46	0.00	1411.99	35.94	11.56	4296.89	11.56	74.96	86.01	114.09	125.36

TABLE E5.2
HEC-RAS Output for Greenway Parkway Channel, 9th Street to Cave Creek Road
Floodway Enchroachment Run

Profile Output Table - Encroachment 1 HEC-RAS Plan: MinTrap .015 River: Greenway Channel Reach: 9th St to Cave C

Reach	River Sta	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Wdth Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
9th St to Cave C	21380	1412.01	0.00	1412.32	78.57	20.68	3756.39	12.93	52.00	64.10	122.00	135.00
9th St to Cave C	21392	1411.69	0.00	1412.46	53.07	0.03	3789.93	0.03	74.00	74.10	127.00	127.10
9th St to Cave C												
9th St to Cave C	21462	1412.66	-0.03	1413.36	53.10	1.63	3780.74	7.63	74.00	74.60	125.50	127.10
9th St to Cave C	21550	1412.17	-0.01	1413.61	49.64	30.68	3728.61	30.72	71.86	79.10	116.00	125.80
9th St to Cave C	21650	1412.13	-0.01	1413.69	49.42	25.43	3739.40	25.18	74.20	81.50	118.50	126.10
9th St to Cave C	21850	1412.18	-0.01	1413.82	49.01	25.85	3738.30	25.85	71.90	79.10	116.00	122.38
9th St to Cave C	21900	1412.19	-0.01	1413.85	49.02	26.23	3737.54	26.23	71.90	79.10	116.00	122.20
9th St to Cave C	22000.*	1412.26	-0.01	1413.91	49.33	38.40	3724.02	27.58	72.00	79.90	116.83	123.20
9th St to Cave C	22100.*	1412.33	-0.01	1413.97	48.01	53.05	3706.14	30.82	72.10	80.70	117.67	124.20
9th St to Cave C	22200	1412.39	-0.01	1414.02	48.68	69.49	3688.64	31.87	72.20	81.50	118.50	125.20
9th St to Cave C	22300	1412.37	-0.01	1414.12	51.07	70.42	3647.33	72.25	72.20	81.50	118.50	127.60
9th St to Cave C	22400	1412.19	-0.01	1414.30	45.04	22.29	3745.42	22.29	75.52	81.60	118.50	122.60
9th St to Cave C	22500.*	1412.19	-0.01	1414.43	45.95	21.08	3747.95	20.97	74.60	81.60	118.50	122.95
9th St to Cave C	22600.*	1412.17	-0.01	1414.58	46.35	18.20	3753.26	18.54	73.67	81.60	118.50	123.30
9th St to Cave C	22700.*	1412.17	-0.01	1414.73	43.88	18.71	3752.99	18.30	72.75	81.60	118.50	123.64
9th St to Cave C	22800.*	1412.16	-0.01	1414.91	44.42	17.92	3754.64	17.44	71.82	81.60	118.50	123.99
9th St to Cave C	22900	1412.16	-0.01	1415.10	44.97	15.88	3758.25	15.88	70.90	81.60	118.50	124.34
9th St to Cave C	23000	1414.68	0.00	1415.40	55.35	21.28	1960.74	17.97	70.90	81.60	118.50	140.00
9th St to Cave C	23154	1414.68	0.00	1415.47	45.10	17.67	1964.65	17.67	72.68	81.60	118.50	129.00
9th St to Cave C	23254	1414.32	0.00	1415.71	38.05	19.42	1961.16	19.42	77.10	85.10	115.00	122.24
9th St to Cave C	23351.6*	1414.21	0.00	1415.87	38.10	17.39	1964.98	17.63	76.69	85.10	115.00	122.02
9th St to Cave C	23449.3*	1414.05	0.00	1416.09	37.16	14.83	1970.11	15.06	76.28	85.10	115.00	121.81
9th St to Cave C	23547.*	1413.97	0.00	1416.47	37.11	12.91	1974.35	12.75	75.87	85.10	115.00	121.59
9th St to Cave C	23644.6*	1414.41	0.00	1416.92	37.16	13.18	1973.79	13.03	75.46	85.10	115.00	121.37
9th St to Cave C	23742.3*	1414.87	0.00	1417.37	37.24	13.35	1973.42	13.23	75.05	85.10	115.00	121.16
9th St to Cave C	23840	1415.32	0.00	1417.82	37.93	13.36	1973.28	13.36	74.64	85.10	115.00	120.94
9th St to Cave C	23887	1417.02	0.00	1418.01	45.03	15.97	1968.06	15.97	68.82	81.60	118.50	130.00
9th St to Cave C	24022	1416.94	0.00	1418.16	44.96	10.75	1978.50	10.75	70.66	81.60	118.50	130.00

Notes: * Denotes HEC-RAS Interpolated Cross Section

TABLE E5.3
HEC-RAS Output for Culvert Crossings
Greenway Parkway Channel from 9th Street to Cave Creek Road

Profile Output Table - Four XS Culvert
HEC-RAS Plan: MinTrap .015 River: Greenway Channel Reach: 9th St to Cave C

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)
9th St to Cave C	18379	1400.34	1399.80	0.54	0.04	0.08	23.51	5082.55	23.95	76.07
9th St to Cave C	18390	1400.52	1399.41	1.11	0.01	0.17	0.08	5129.85	0.06	64.08
9th St to Cave C	18440.5	Culvert								
9th St to Cave C	18491	1401.81	1401.04	0.78			51.49	5033.41	45.10	74.07
9th St to Cave C	18600	1402.45	1399.94	2.51	0.12	0.52	56.63	5019.46	53.91	48.86
9th St to Cave C	21380	1412.32	1412.01	0.31	0.01	0.32	20.68	3756.39	12.93	78.57
9th St to Cave C	21392	1412.46	1411.69	0.77	0.00	0.14	0.03	3789.93	0.03	53.07
9th St to Cave C	21435	Culvert								
9th St to Cave C	21462	1413.36	1412.69	0.67			26.20	3737.60	26.20	67.05
9th St to Cave C	21550	1413.62	1412.18	1.44	0.02	0.23	30.72	3728.52	30.76	49.68

Profile Output Table - Culvert Only
HEC-RAS Plan: MinTrap .015 River: Greenway Channel Reach: 9th St to Cave C

Reach	River Sta	E.G. US. (ft)	W.S. US (ft)	E.G. IC (ft)	E.G. OC (ft)	Min Top Rd (ft)	Culv Q (cfs)	Q Weir (cfs)	Delta WS (ft)	Culv Vel In (ft/s)	Culv Vel Out (ft/s)
9th St to Cave C	18440.5C#1	1401.81	1401.04	1400.34	1401.81	1405.00	5130.00		1.63	10.69	10.69
9th St to Cave C	21435 C#1	1413.36	1412.69	1411.10	1413.36	1414.29	3790.00		1.00	8.77	8.77

TABLE 5.4

Summary of Errors, Warnings and Notes for Greenway Parkway Channel

Errors Warnings and Notes for Plan : Design

Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 23887 Profile: CLOMR
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.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 23840 Profile: CLOMR
Warning:	The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 23742.3* Profile: CLOMR
Warning:	The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 23644.6* Profile: CLOMR
Warning:	The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 23547.* Profile: CLOMR
Warning:	The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 23254 Profile: CLOMR
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 23000 Profile: CLOMR
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 21550 Profile: CLOMR
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.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 21392 Profile: CLOMR
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.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 21380 Profile: CLOMR
Warning:	The cross-section end points had to be extended vertically for the computed water surface.
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.

TABLE 5.4

Summary of Errors, Warnings and Notes for Greenway Parkway Channel

Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 20460.* Profile: CLOMR
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.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 20360 Profile: CLOMR
Warning:	The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 20286.1* Profile: CLOMR
Warning:	The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 20212.3* Profile: CLOMR
Warning:	The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 20138.5* Profile: CLOMR
Warning:	The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 20064.7* Profile: CLOMR
Warning:	The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 19990.9* Profile: CLOMR
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 19917.1* Profile: CLOMR
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.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 19360 Profile: CLOMR
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.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 19021.7* Profile: CLOMR
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for

TABLE 5.4
Summary of Errors, Warnings and Notes for Greenway Parkway Channel

	additional cross sections.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 18880 Profile: CLOMR
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 18700 Profile: CLOMR
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 18600 Profile: CLOMR
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.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 18390 Profile: CLOMR
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.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 18379 Profile: CLOMR
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.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 18300 Profile: CLOMR
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.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 17300.* Profile: CLOMR
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 16000.* Profile: CLOMR
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 15900 Profile: CLOMR
Warning:	The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 15800 Profile: CLOMR
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth,

TABLE 5.4
Summary of Errors, Warnings and Notes for Greenway Parkway Channel

	the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 15700 Profile: CLOMR
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 15670 Profile: CLOMR
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.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 15475 Profile: CLOMR
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 15430 Profile: CLOMR
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 14700 Profile: CLOMR
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.
Location:	River: Greenway Channel Reach: 9th St to Cave C RS: 14340 Profile: CLOMR
Warning:	The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

HYDRAULIC JUMP CALCULATIONS

GABION BANK STABILITY CALCULATIONS

VERIFICATION OF THE HYDRAULIC JUMPS BY MOMENTUM EQUATION FOR THE GREENWAY PARKWAY FLOOD CONTROL CHANNEL

Equations

When mixed flow regime exists the specific force equation is used in the HEC-RAS software to determine the surface water profile and locate any hydraulic jumps. The equation for specific force is derived from the momentum equation. When the external force of friction and the force due to the weight of water are ignored, the momentum equation reduces to the following equation:

$$\beta_1 Q_1^2/(gA_1)+A_1 Y_{c1}= \beta_2 Q_2^2/(gA_2)+A_2 Y_{c2} \qquad (1)$$

where: A = the flow area;

Y_c = the depth from the water surface to centroid of the area;

Q = discharge at each section;

β = momentum coefficient ;

g = gravitational acceleration.

For trapezoidal channel,

$$A = (b+my)y \qquad (2)$$

where: b = the bottom width of the channel;

m = the side slope;

y = the flow depth;

and

$$Y_c = (3b+2my)y/[6(b+my)] \qquad (3)$$

For known hydraulic properties of Section 1, the specific force of Section 1 on the left-

hand side of the specific force equation (Eq. 1) can be computed directly. Let

$$SF_1 = \beta_1 Q_1^2/(gA_1)+A_1 Y_{c1} \quad (4)$$

and substituting Equations 2 to 4 into Equation 1 yields

$$y_2 = \{(3b_2+2m_2y_2)y_2^3/6 + \beta_2 Q_2^2/[g(b_2+m_2y_2)]\}/SF_1 \quad (5)$$

By trial-and-error method, the conjugate depth (after the hydraulic jump), y_2, can be determined from Equation 5.

For rectangular channels, Equation 5 reduces to:

$$y_2 = y_1((1+8Fr_1^2)^{1/2}-1)/2 \quad (6)$$

where: Fr_1 = Froude number before the hydraulic jump.

Conjugate Depths for the Hydraulic Jumps

Modeling results from the HEC-RAS run of the Greenway Parkway flood control channel are verified by using the above equations. The second hydraulic jump was used as an example.

Hydraulic Jump near Station 154+30

For Station 154+30, the following values are obtained from the profile table: Q=6,120 cfs, y_1=4.45ft, $WSEL_1$=1379.68 ft, b_1=66 ft, m_1=4, and β_1 = 1.3. The downstream section, Station 153+00, Q=6,120 cfs, $WSEL_2$=1382.13 ft, b_2=160 ft, m_2=4, y_2=7.02 ft, and β_2 =1.0. Substituting required values into Equation 5 yields y_2=6.6 ft by trial-and-error method, and Equation 6 gives y_2=7.3 ft, both of which are in reasonable limit.

The momentum equation results for the second hydraulic jump show that surface water profile in the mixed regime computed by the HEC-RAS model is acceptable.

WOOD/PATEL

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS

PROJECT Greenway Channel

PROJECT NO. 96559 SHEET NO. 1 OF 2

CALCULATED BY SZ DATE 12-27-98 CHECKED BY _____ DATE _____

Gabion Baskets Bank protection stability Analysis

1. Bank protection Design parameters

Gabion Basket size = 3'×3'

Side slope = 1:1 (H:V)

Median diameter of rocks in baskets, D_{50} = 6 in = 0.50 ft.

Density of the aggregates (rocks) $\gamma_s = 165.4$ lb/ft³

2. Hydraulic Parameters for typical cross section (per HEC-RAS model)

Typical cross section Sta. 154+30 (Highest total shear stress other than stations 156+70 and 157+00)

Flow depth = 4.45 ft.

velocity = 17.74 ft/s.

Energy grade line slope = 0.013635 ft/ft

Hydraulic radius $R = \frac{380.63}{112.75} = 3.38$

3. Bank protection stability Analysis

The shear stress exerted on the revetment:

$$\tau_b = \gamma_w y i$$

where γ_w = water density (62.4 lb/ft³)

y = flow depth for shallow water and hydraulic radius otherwise.

i = energy grade line slope or channel bed slope.

$\tau_b = 62.4 \times 3.38 \times 0.013635 = 2.87$ lb/ft²

PROJECT Greenway channel

PROJECT NO. 96559 SHEET NO. 2 OF 2

CALCULATED BY SZ DATE 12-27-96 CHECKED BY _____ DATE _____

The tractive shear stress in the critical situation when rocks movement starts:

$$\tau_c = C_* (\gamma_s - \gamma_w) d_m$$

Where C_* = Shields coefficient = 0.1 for rocks contained in wire mesh (Reno mattress and gabions)

γ_s = rock density = 165.4 lb/ft^3

$d_m = d_{50}$ = mediam diameter of rocks (ft)

$$\tau_c = 0.1 \times (165.4 - 62.4) \times 0.5 = 5.15 \text{ lb/ft}^2$$

$$\tau_b = 2.87 < \tau_c = 5.15$$

The gabion baskets are stable.

Mixed Flow Regime For Shear Stress Calculations

HEC-RAS Plan: Design River: Greenway Channel Reach: 9th St to Cave Creek Road

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	Fr # Chl	Shear LOB	Shear ROB	Shear Total
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(lb/sq ft)	(lb/sq ft)	(lb/sq ft)
9th St to Cave Creek Rd.	24022	2000.00	1410.75	1416.94	1415.40	1418.16	0.000742	8.92	240.70	44.96	0.64	0.05	0.05	0.20
9th St to Cave Creek Rd.	23887	2000.00	1410.20	1417.02		1418.01	0.000528	8.04	272.09	45.03	0.55	0.04	0.04	0.16
9th St to Cave Creek Rd.	23840	2000.00	1410.00	1415.32	1415.32	1417.82	0.001856	12.76	170.38	37.93	0.99	0.10	0.10	0.42
9th St to Cave Creek Rd.	23742.3*	2000.00	1409.55	1414.20	1414.87	1417.51	0.002964	14.69	145.68	34.63	1.22	0.15	0.17	0.63
9th St to Cave Creek Rd.	23644.6*	2000.00	1409.10	1413.57	1414.41	1417.17	0.003388	15.30	139.57	34.60	1.30	0.17	0.18	0.70
9th St to Cave Creek Rd.	23547.*	2000.00	1408.65	1413.01	1413.97	1416.80	0.003696	15.71	135.66	34.56	1.35	0.18	0.18	0.74
9th St to Cave Creek Rd.	23449.3*	2000.00	1408.20	1412.50	1413.52	1416.41	0.003894	15.96	133.30	34.50	1.38	0.19	0.18	0.77
9th St to Cave Creek Rd.	23351.6*	2000.00	1407.75	1414.21	1413.07	1415.87	0.000947	10.41	212.40	38.10	0.73	0.07	0.07	0.25
9th St to Cave Creek Rd.	23254	2000.00	1407.30	1414.32		1415.71	0.000712	9.55	233.54	38.05	0.64	0.06	0.06	0.20
9th St to Cave Creek Rd.	23154	2000.00	1407.10	1414.69		1415.48	0.000366	7.19	306.23	45.10	0.47	0.03	0.03	0.12
9th St to Cave Creek Rd.	23000	2000.00	1406.76	1414.68		1415.40	0.000314	6.87	327.97	55.36	0.43	0.03	0.02	0.09
9th St to Cave Creek Rd.	22900	3790.00	1404.56	1412.17		1415.11	0.001420	13.81	291.36	44.97	0.90	0.09	0.09	0.46
9th St to Cave Creek Rd.	22800.*	3790.00	1404.31	1412.17		1414.91	0.001269	13.34	302.36	44.42	0.85	0.09	0.09	0.43
9th St to Cave Creek Rd.	22700.*	3790.00	1404.05	1412.18		1414.73	0.001132	12.89	313.47	43.88	0.81	0.09	0.09	0.40
9th St to Cave Creek Rd.	22600.*	3790.00	1403.80	1412.18		1414.58	0.001024	12.50	324.17	46.38	0.77	0.08	0.08	0.36
9th St to Cave Creek Rd.	22500.*	3790.00	1403.54	1412.20		1414.43	0.000915	12.07	337.42	45.95	0.73	0.08	0.08	0.33
9th St to Cave Creek Rd.	22400	3790.00	1403.29	1412.20		1414.31	0.000828	11.71	348.82	45.04	0.70	0.07	0.07	0.31
9th St to Cave Creek Rd.	22300	3790.00	1403.02	1412.38		1414.12	0.000657	10.81	405.31	51.07	0.63	0.11	0.11	0.26
9th St to Cave Creek Rd.	22200	3790.00	1402.76	1412.40		1414.03	0.000545	10.37	414.55	48.68	0.59	0.09	0.06	0.22
9th St to Cave Creek Rd.	22100.*	3790.00	1402.61	1412.34		1413.97	0.000546	10.37	409.26	48.01	0.59	0.08	0.06	0.22
9th St to Cave Creek Rd.	22000.*	3790.00	1402.45	1412.27		1413.92	0.000549	10.38	404.51	49.37	0.59	0.07	0.05	0.21
9th St to Cave Creek Rd.	21900	3790.00	1402.30	1412.20		1413.86	0.000556	10.41	399.22	49.02	0.59	0.05	0.05	0.21
9th St to Cave Creek Rd.	21850	3790.00	1402.22	1412.19		1413.83	0.000546	10.35	401.26	49.01	0.58	0.05	0.05	0.21
9th St to Cave Creek Rd.	21650	3790.00	1401.91	1412.14		1413.70	0.000502	10.08	412.16	49.43	0.56	0.05	0.05	0.20
9th St to Cave Creek Rd.	21550	3790.00	1401.76	1412.18		1413.62	0.000421	9.70	436.26	49.68	0.53	0.04	0.04	0.17
9th St to Cave Creek Rd.	21462	3790.00	1401.62	1412.69	1407.17	1413.36	0.000182	6.63	626.39	67.05	0.35	0.02	0.02	0.08
9th St to Cave Creek Rd.	21435	Culvert												
9th St to Cave Creek Rd.	21392	3790.00	1401.51	1411.69		1412.46	0.000229	7.04	539.46	53.07	0.39	0.00	0.00	0.11
9th St to Cave Creek Rd.	21380	3790.00	1395.34	1412.01		1412.32	0.000063	4.52	898.74	78.57	0.21	0.01	0.01	0.04
9th St to Cave Creek Rd.	21300	4320.00	1395.19	1408.46		1411.99	0.001303	15.11	300.76	35.94	0.84	0.07	0.07	0.48
9th St to Cave Creek Rd.	21212.*	4320.00	1395.02	1408.51		1411.81	0.001173	14.65	314.89	36.76	0.80	0.08	0.08	0.44
9th St to Cave Creek Rd.	21124.*	4320.00	1394.85	1408.55		1411.65	0.001057	14.20	329.69	37.58	0.76	0.09	0.09	0.40
9th St to Cave Creek Rd.	21036.*	4320.00	1394.69	1408.60		1411.50	0.000957	13.78	344.76	38.39	0.73	0.09	0.09	0.37
9th St to Cave Creek Rd.	20948.*	4320.00	1394.52	1408.64		1411.37	0.000868	13.38	360.61	39.21	0.70	0.10	0.10	0.34
9th St to Cave Creek Rd.	20860	4320.00	1394.35	1408.68		1411.25	0.000789	13.00	376.80	40.03	0.67	0.10	0.10	0.32
9th St to Cave Creek Rd.	20760.*	4320.00	1394.16	1408.72		1411.12	0.000719	12.60	390.39	40.05	0.64	0.10	0.09	0.30
9th St to Cave Creek Rd.	20660.*	4320.00	1393.97	1408.75		1411.01	0.000658	12.23	403.74	40.07	0.61	0.09	0.09	0.28
9th St to Cave Creek Rd.	20560.*	4320.00	1393.78	1408.77		1410.91	0.000606	11.88	416.78	40.09	0.59	0.09	0.09	0.26
9th St to Cave Creek Rd.	20460.*	4320.00	1393.59	1408.79		1410.82	0.000562	11.59	430.36	43.95	0.57	0.08	0.07	0.23
9th St to Cave Creek Rd.	20360	5100.00	1393.40	1405.72	1405.72	1410.46	0.001806	17.60	318.46	39.93	0.97	0.18	0.16	0.65
9th St to Cave Creek Rd.	20286.1*	5100.00	1393.26	1404.82	1405.46	1410.24	0.002231	18.83	294.17	36.10	1.08	0.24	0.21	0.82
9th St to Cave Creek Rd.	20212.3*	5100.00	1393.11	1404.99	1405.20	1409.94	0.001900	18.00	312.59	39.93	1.01	0.19	0.18	0.68
9th St to Cave Creek Rd.	20138.5*	5100.00	1392.97	1404.34	1404.94	1409.74	0.002162	18.78	298.20	39.92	1.07	0.20	0.19	0.75
9th St to Cave Creek Rd.	20064.7*	5100.00	1392.83	1404.59	1404.68	1409.42	0.001791	17.79	319.52	39.96	0.99	0.19	0.18	0.65

Mixed Flow Regime For Shear Stress Calculations

HEC-RAS Plan: Design River: Greenway Channel Reach: 9th St to Cave Creek Road

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	Fr # Chl	Shear LOB	Shear ROB	Shear Total
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(lb/sq ft)	(lb/sq ft)	(lb/sq ft)
9th St to Cave Creek Rd.	19990.9*	5100.00	1392.69	1403.87	1404.43	1409.22	0.002094	18.73	301.94	39.94	1.07	0.21	0.20	0.73
9th St to Cave Creek Rd.	19917.1*	5100.00	1392.54	1404.46	1404.18	1408.92	0.001549	17.13	336.79	40.00	0.94	0.19	0.18	0.59
9th St to Cave Creek Rd.	19843.3	5130.00	1392.40	1404.68		1408.58	0.003583	16.18	356.66	40.04	0.87	0.47	0.47	1.41
9th St to Cave Creek Rd.	19746.6*	5130.00	1392.22	1404.37		1408.22	0.003486	16.07	359.42	40.21	0.86	0.46	0.46	1.37
9th St to Cave Creek Rd.	19649.9*	5130.00	1392.04	1404.08		1407.87	0.003385	15.97	362.58	40.38	0.85	0.44	0.44	1.34
9th St to Cave Creek Rd.	19553.3*	5130.00	1391.87	1403.77		1407.54	0.003326	15.91	364.43	40.55	0.85	0.43	0.43	1.31
9th St to Cave Creek Rd.	19456.6*	5130.00	1391.69	1403.48		1407.21	0.003256	15.84	366.86	40.73	0.84	0.42	0.42	1.28
9th St to Cave Creek Rd.	19360	5130.00	1391.51	1403.17		1406.89	0.003216	15.81	368.33	40.98	0.84	0.42	0.42	1.26
9th St to Cave Creek Rd.	19311.9	5130.00	1391.42	1404.60		1406.16	0.001080	10.23	562.00	55.62	0.51	0.15	0.17	0.51
9th St to Cave Creek Rd.	19215.1*	5130.00	1391.24	1404.33		1406.04	0.001167	10.70	541.54	54.82	0.53	0.16	0.19	0.54
9th St to Cave Creek Rd.	19118.4*	5130.00	1391.05	1404.01		1405.90	0.001293	11.28	516.48	53.86	0.56	0.16	0.21	0.58
9th St to Cave Creek Rd.	19021.7*	5130.00	1390.87	1403.55		1405.74	0.001504	12.11	483.51	52.61	0.60	0.18	0.23	0.65
9th St to Cave Creek Rd.	18925	5130.00	1390.69	1402.82		1405.52	0.001926	13.42	435.12	50.61	0.68	0.20	0.25	0.77
9th St to Cave Creek Rd.	18880	5130.00	1390.61	1402.37		1405.39	0.002226	14.19	411.16	47.70	0.73	0.25	0.25	0.87
9th St to Cave Creek Rd.	18700	5130.00	1390.32	1400.12	1400.12	1404.69	0.004282	17.43	329.00	40.82	0.98	0.44	0.44	1.54
9th St to Cave Creek Rd.	18600	5130.00	1390.17	1395.83	1398.15	1403.64	0.015593	22.51	234.97	44.04	1.67	0.72	0.69	4.17
9th St to Cave Creek Rd.	18491	5130.00	1390.00	1401.04	1395.79	1401.81	0.000587	7.14	762.73	74.07	0.38	0.07	0.07	0.29
9th St to Cave Creek Rd.	18440.5	Culvert												
9th St to Cave Creek Rd.	18390	5130.00	1389.90	1399.41		1400.52	0.001001	8.44	608.54	64.08	0.48	0.00	0.00	0.46
9th St to Cave Creek Rd.	18379	5130.00	1384.78	1399.80		1400.34	0.000333	5.94	902.42	76.07	0.29	0.03	0.03	0.19
9th St to Cave Creek Rd.	18300	5860.00	1384.63	1398.83		1400.21	0.000930	9.50	647.98	58.94	0.46	0.08	0.08	0.48
9th St to Cave Creek Rd.	18200	5860.00	1384.45	1397.33		1399.95	0.002150	13.08	470.19	47.03	0.68	0.17	0.17	0.99
9th St to Cave Creek Rd.	18100.*	5860.00	1384.28	1397.01		1399.72	0.002268	13.28	462.85	47.02	0.70	0.18	0.18	1.04
9th St to Cave Creek Rd.	18000.*	5860.00	1384.10	1396.66		1399.48	0.002419	13.53	453.91	47.02	0.72	0.20	0.20	1.09
9th St to Cave Creek Rd.	17900	5860.00	1383.93	1396.23		1399.21	0.002661	13.92	440.63	47.01	0.75	0.21	0.21	1.18
9th St to Cave Creek Rd.	17800.*	5860.00	1383.76	1395.94		1398.94	0.002683	13.97	439.48	47.01	0.76	0.21	0.21	1.18
9th St to Cave Creek Rd.	17700.*	5860.00	1383.58	1395.66		1398.67	0.002704	14.01	438.43	47.01	0.76	0.22	0.22	1.19
9th St to Cave Creek Rd.	17600.*	5860.00	1383.41	1395.34		1398.40	0.002760	14.11	435.49	47.01	0.77	0.22	0.22	1.21
9th St to Cave Creek Rd.	17500.*	5860.00	1383.23	1395.01		1398.11	0.002828	14.22	432.08	47.01	0.78	0.23	0.23	1.23
9th St to Cave Creek Rd.	17400	5860.00	1383.06	1394.61		1397.82	0.002961	14.43	425.59	47.00	0.79	0.23	0.23	1.27
9th St to Cave Creek Rd.	17300.*	5860.00	1382.75	1394.31		1397.52	0.002980	14.45	425.48	47.01	0.80	0.24	0.24	1.28
9th St to Cave Creek Rd.	17200	5920.00	1382.43	1392.99	1392.79	1397.07	0.004350	16.27	378.33	46.95	0.94	0.28	0.28	1.72
9th St to Cave Creek Rd.	17100.*	5920.00	1382.11	1392.62	1392.33	1396.63	0.004197	16.13	381.92	46.95	0.93	0.27	0.27	1.67
9th St to Cave Creek Rd.	17000	5920.00	1381.80	1392.26	1391.87	1396.20	0.004058	16.01	385.23	46.96	0.92	0.26	0.27	1.62
9th St to Cave Creek Rd.	16900	5920.00	1381.48	1391.89		1395.79	0.003963	15.92	387.68	46.98	0.91	0.25	0.26	1.59
9th St to Cave Creek Rd.	16800.*	5920.00	1381.16	1391.50		1395.39	0.003948	15.91	389.02	47.00	0.91	0.27	0.28	1.58
9th St to Cave Creek Rd.	16700.*	5920.00	1380.85	1391.08		1395.00	0.003987	15.97	388.58	47.02	0.92	0.28	0.29	1.60
9th St to Cave Creek Rd.	16600	5920.00	1380.53	1390.67		1394.60	0.004008	16.00	388.77	47.05	0.92	0.30	0.31	1.60
9th St to Cave Creek Rd.	16500.*	5920.00	1380.21	1390.34		1394.19	0.003858	15.83	394.11	47.04	0.91	0.31	0.32	1.56
9th St to Cave Creek Rd.	16400	5920.00	1379.89	1390.03		1393.78	0.003709	15.66	399.65	47.03	0.89	0.31	0.32	1.51
9th St to Cave Creek Rd.	16300.*	5920.00	1379.57	1389.81		1393.37	0.003410	15.28	412.97	47.07	0.86	0.33	0.34	1.42
9th St to Cave Creek Rd.	16200.*	5920.00	1379.26	1389.59		1392.99	0.003168	14.97	426.44	51.31	0.84	0.30	0.30	1.26
9th St to Cave Creek Rd.	16100	5920.00	1378.94	1389.41		1392.56	0.004108	14.46	444.21	52.18	0.80	0.45	0.46	1.68
9th St to Cave Creek Rd.	16000.*	5920.00	1378.62	1388.98		1392.15	0.004096	14.50	443.16	52.46	0.80	0.43	0.44	1.66

Mixed Flow Regime For Shear Stress Calculations

HEC-RAS Plan: Design River: Greenway Channel Reach: 9th St to Cave Creek Road

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	Fr # Chl	Shear LOB	Shear ROB	Shear Total	
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	
9th St to Cave Creek Rd.	15900	5920.00	1378.31	1387.29	1387.29	1391.54	0.006494	16.74	377.58	47.07	0.99	0.60	0.62	2.47	
9th St to Cave Creek Rd.	15800	5920.00	1377.50	1385.75	1386.42	1390.75	0.008000	18.09	347.98	47.02	1.11	0.56	0.56	2.76	
9th St to Cave Creek Rd.	15700	5920.00	1376.78	1382.06	1384.26	1389.27	0.023710	22.02	284.39	60.54	1.69	3.49	1.34	6.28	(a)
9th St to Cave Creek Rd.	15670	6120.00	1375.50	1379.91	1382.36	1388.38	0.028602	23.83	276.18	88.26	2.20	2.30	2.70	5.53	(a)
9th St to Cave Creek Rd.	15475	6120.00	1374.50	1382.06	1382.10	1384.80	0.004714	14.06	512.14	103.29	0.98	0.78	0.93	1.43	
9th St to Cave Creek Rd.	15430	6120.00	1375.23	1379.68	1381.07	1384.27	0.013635	17.74	380.63	111.85	1.54	1.16	1.78	2.87	(b)
9th St to Cave Creek Rd.	15300	6120.00	1375.11	1382.13	1378.75	1382.47	0.001166	4.73	1294.53	218.21	0.34			0.43	
9th St to Cave Creek Rd.	15061	6120.00	1373.90	1382.04		1382.24	0.000575	3.63	1685.84	246.65	0.24			0.24	
9th St to Cave Creek Rd.	14900	6120.00	1373.50	1381.89		1382.13	0.000740	3.92	1561.76	248.50	0.28			0.29	
9th St to Cave Creek Rd.	14700	6970.00	1372.60	1381.71		1381.98	0.000758	4.18	1666.80	244.78	0.28			0.32	
9th St to Cave Creek Rd.	14340	6970.00	1374.10	1379.28	1379.28	1381.13	0.011377	10.92	642.67	181.57	0.99	0.35		2.51	
9th St to Cave Creek Rd.	14225	6970.00	1370.05	1372.97	1374.67	1379.07	0.018472	19.82	351.61	162.88	2.38			2.49	
9th St to Cave Creek Rd.	14180	8100.00	1368.70	1376.86	1374.24	1377.47	0.001555	6.29	1287.18	221.31	0.46			0.56	

Notes:

(a) - Cross section in this reach exceed critical tractive shear stress and will be grouted.

(b) - Total shear stress is verified for this cross section.

Appendix E6

Hydraulic Calculations for Storm Drain Systems

Please Note: Storm CAD input files are included in the floppy disk;
Storm Plus modeling was performed by NBS Lowry Engineers and Planners.

Greenway Channel

20th Street and 18th Street Storm Drains

4/30/99

Hydraulic Summary Table: For Storm Drains from Basin No. 3 to Greenway Channel

Note: *Based on Storm CAD file: w:\1996projects\96559-Greenway\stormcad\18st.stm, 20st.stm, 20stb.stm*

W/P # 96559

U/S Node	D/S Node	Pipe	Discharge (cfs)	Length (ft)	Slope (ft/ft)	Pipe Size	Manning's n Value	Velocity (fps)	U/S Invert El (ft)*	D/S Invert El (ft)*	U/S NG Elev (ft)*	D/S NG Elev (ft)*	U/S Cover (ft)	D/S Cover (ft)	U/S HGL (ft)*	D/S HGL (ft)*	U/S EGL (ft)*	D/S EGL (ft)*
Basin No. 3 to Bell Road																		
I-5	7714	P-32	515	2081.5	0.00234	108 inch	0.012	10.26	411.78	406.91	430.30	427.40	9.52	11.49	417.80	414.37	419.81	415.67
18th Street Outlet																		
7714	J-28	P-32	322.5	1320	0.006773	84 inch	0.012	8.38	406.91	397.97	426.20	414.20	12.29	9.23	414.34	411.48	415.43	412.57
J-28	J-27	P-33	322.5	490	0.005898	84 inch	0.012	8.38	397.97	395.08	414.20	411.50	9.23	9.42	410.60	409.54	411.69	410.63
J-27	J-26	P-34	322.5	1055	0.003517	84 inch	0.012	8.38	395.08	391.37	411.50	409.30	9.42	10.93	408.99	406.70	410.08	407.79
J-26	Outlet	P-35	322.5	680	0.0015	84 inch	0.012	8.38	391.37	390.35	409.30	404.50	10.93	7.15	406.16	404.68	407.25	405.77
20th Street Outlet																		
7714	6463.25	P-28	192.5	1250.7	0.00443	78 inch	0.012	5.8	406.91	401.37	427.40	415.80	13.99	7.93	414.39	412.96	414.92	413.48
6463.25	6456.75	P-34	192.5	6.5	0.076923	78 inch	0.012	5.8	401.37	400.87	415.80	415.80	7.93	8.43	412.70	412.69	413.22	413.21
6456.75	5830.75	P-35	192.5	626	0.005016	84 inch	0.012	5	400.87	397.73	415.80	412.00	7.93	7.27	412.49	412.01	412.88	412.40
5830.75	5824.25	P-32	192.5	6.5	0.153846	84 inch	0.012	5	397.73	396.73	412.00	412.00	7.27	8.27	412.02	412.01	412.40	412.40
5824.25	Outlet	P-36	192.5	850.4	0.001505	96 inch	0.012	3.83	396.73	395.45	412.00	411.80	7.27	8.35	412.33	412.01	412.56	412.24

***Note: All elevations are +1000**

INPUT FILE LISTING

```
 T1 EAST FORK CAVE CREEK - FEMA CLOMR          BY: NBS/LOWRY
 T2 CAVE CREEK WASH TO DETENTION BASIN #3      FILENAME: 18TH.SP
 T3 18TH STREET STORMDRAIN; 18th - 20th St.    JOB NO: P79-086-016
 SO   1920.10 390.35  2                          406.30
 R    1977.00 390.49  2      .012                            45.00       1
 R    2074.90 390.58  2      .012
 R    2141.60 390.68  2      .012                            34.736      2
 R    2580.00 391.34  2      .012                                        1
 R    4143.00 396.80  2      .012                                        2
 R    4155.71 396.91  2      .012
 R    4226.33 397.49  2      .012                            89.912
 R    5399.47 407.30  2      .012                                        2
 R    5434.50 407.60  2      .012                            44.607
 R    5491.76 408.08  2      .012
 SH   5498.93 408.57  7                          420.32
1                                                  SP
                                WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING                                  PAGE    1
0 CARD  SECT  CHN   NO OF  AVE PIER  HEIGHT 1  BASE    ZL    ZR    INV   Y(1)  Y(2)  Y(3)  Y(4)  Y(5)  Y(6)  Y(7)  Y(8)  Y(9)  Y(10)

  CODE   NO   TYPE  PIERS   WIDTH    DIAMETER  WIDTH              DROP

  CD      1    4                      6.50
  CD      2    4                      7.00
  CD      3    4                      7.50
  CD      4    4                      8.00
  CD      5    4                      8.50
  CD      6    4                      9.00
  CD      7    3      0        .00    10.50    5.17    .00   .00   .00
1                                                                                                                  PAGE NO   1
0                              WATER SURFACE PROFILE - TITLE CARD LISTING
0HEADING LINE NO 1 IS -
0                                EAST FORK CAVE CREEK - FEMA CLOMR          BY: NBS/LOWRY
0HEADING LINE NO 2 IS -
0                                CAVE CREEK WASH TO DETENTION BASIN #3      FILENAME: 18TH.SP
0HEADING LINE NO 3 IS -
0                                18TH STREET STORMDRAIN; 18th - 20th St.    JOB NO: P79-086-016
1                                                                                                                  PAGE NO   2
0                              WATER SURFACE PROFILE - ELEMENT CARD LISTING
0 ELEMENT NO   1 IS A SYSTEM OUTLET     *         *     *
                      U/S DATA   STATION    INVERT  SECT                                    W S ELEV
                                   1920.10  390.35    2                                      406.30
0 ELEMENT NO   2 IS A REACH             *         *     *
                      U/S DATA   STATION    INVERT  SECT              N                     RADIUS  ANGLE  ANG PT  MAN H
                                   1977.00  390.49    2              .012                       .00  45.00     .00      1
0 ELEMENT NO   3 IS A REACH             *         *     *
                      U/S DATA   STATION    INVERT  SECT              N                     RADIUS  ANGLE  ANG PT  MAN H
                                   2074.90  390.58    2              .012                       .00    .00     .00      0
0 ELEMENT NO   4 IS A REACH             *         *     *
                      U/S DATA   STATION    INVERT  SECT              N                     RADIUS  ANGLE  ANG PT  MAN H
                                   2141.60  390.68    2              .012                       .00  34.74     .00      2
0 ELEMENT NO   5 IS A REACH             *         *     *
                      U/S DATA   STATION    INVERT  SECT              N                     RADIUS  ANGLE  ANG PT  MAN H
                                   2580.00  391.34    2              .012                       .00    .00     .00      1
0 ELEMENT NO   6 IS A REACH             *         *     *
                      U/S DATA   STATION    INVERT  SECT              N                     RADIUS  ANGLE  ANG PT  MAN H
                                   4143.00  396.80    2              .012                       .00    .00     .00      2
0 ELEMENT NO   7 IS A REACH             *         *     *
                      U/S DATA   STATION    INVERT  SECT              N                     RADIUS  ANGLE  ANG PT  MAN H
                                   4155.71  396.91    2              .012                       .00    .00     .00      0
0 ELEMENT NO   8 IS A REACH             *         *     *
                      U/S DATA   STATION    INVERT  SECT              N                     RADIUS  ANGLE  ANG PT  MAN H
                                   4226.33  397.49    2              .012                       .00  89.91     .00      0
0 ELEMENT NO   9 IS A REACH             *         *     *
                      U/S DATA   STATION    INVERT  SECT              N                     RADIUS  ANGLE  ANG PT  MAN H
                                   5399.47  407.30    2              .012                       .00    .00     .00      2
0 ELEMENT NO  10 IS A REACH             *         *     *
                      U/S DATA   STATION    INVERT  SECT              N                     RADIUS  ANGLE  ANG PT  MAN H
                                   5434.50  407.60    2              .012                       .00  44.61     .00      0
0 ELEMENT NO  11 IS A REACH             *         *     *
                      U/S DATA   STATION    INVERT  SECT              N                     RADIUS  ANGLE  ANG PT  MAN H
                                   5491.76  408.08    2              .012                       .00    .00     .00      0
 WARNING - ADJACENT SECTIONS ARE NOT IDENTICAL - SEE SECTION NUMBERS AND CHANNEL DEFINITIONS
0 ELEMENT NO  12 IS A SYSTEM HEADWORKS                *                         *
                      U/S DATA   STATION    INVERT  SECT                                    W S ELEV
                                   5498.93  408.57    7                                      420.32
 NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING

1                                                                                                                  PAGE    1
                                          WATER SURFACE PROFILE LISTING
                              EAST FORK CAVE CREEK - FEMA CLOMR          BY: NBS/LOWRY
                              CAVE CREEK WASH TO DETENTION BASIN #3      FILENAME: 18TH.SP
                              18TH STREET STORMDRAIN; 18th - 20th St.    JOB NO: P79-086-016
0 STATION    INVERT   DEPTH    W.S.       Q       VEL     VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL   NO  AVBPR
              ELEV   OF FLOW    ELEV                     HEAD    GRD.EL.   ELEV    DEPTH             DIA    ID NO.        PIER
0 L/ELEM      SO                                        SF AVE     HF                     NORM DEPTH                    ZR
*****************************************************************************************************************************
0  1920.10   390.35    15.95   406.30     316.0    8.21     1.05    407.35    .00     4.68              7.00     .00   .00   0    .00
     56.90   .00246                                        .00208      .12                     5.29                     .00
   1977.00   390.49    16.13   406.62     316.0    8.21     1.05    407.67    .00     4.68              7.00     .00   .00   0    .00
0    97.90   .00092                                        .00208      .20                     7.00                     .00
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0  2074.90   390.58   16.24   406.82   316.0   8.21   1.05   407.87   .00   4.68          7.00   .00   .00   0   .00
0    66.70   .00150                                    .00208     .14                7.00                .00
0  2141.60   390.68   16.52   407.20   316.0   8.21   1.05   408.25   .00   4.68          7.00   .00   .00   0   .00
0   438.40   .00151                                    .00208     .91                7.00                .00
0  2580.00   391.34   16.82   408.16   316.0   8.21   1.05   409.21   .00   4.68          7.00   .00   .00   0   .00
0  1563.00   .00349                                    .00208    3.26                4.62                .00
0  4143.00   396.80   14.73   411.53   316.0   8.21   1.05   412.58   .00   4.68          7.00   .00   .00   0   .00
0    12.71   .00866                                    .00208     .03                3.46                .00
0  4155.71   396.91   14.64   411.55   316.0   8.21   1.05   412.60   .00   4.68          7.00   .00   .00   0   .00
0    70.62   .00821                                    .00208     .15                3.52                .00
0  4226.33   397.49   14.42   411.91   316.0   8.21   1.05   412.96   .00   4.68          7.00   .00   .00   0   .00
0  1173.14   .00836                                    .00208    2.45                3.50                .00
0  5399.47   407.30    7.16   414.46   316.0   8.21   1.05   415.51   .00   4.68          7.00   .00   .00   0   .00
0    35.03   .00857                                    .00208     .07                3.47                .00
0  5434.50   407.60    7.08   414.68   316.0   8.21   1.05   415.73   .00   4.68          7.00   .00   .00   0   .00
0    12.96   .00838                                    .00207     .03                3.49                .00
0  5447.46   407.71    7.00   414.71   316.0   8.21   1.05   415.76   .00   4.68          7.00   .00   .00   0   .00
0    44.30   .00838                                    .00194     .09                3.49                .00
1                                                                                                          PAGE    2
```

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                                WATER SURFACE PROFILE LISTING
                    EAST FORK CAVE CREEK - FEMA CLOMR          BY: NBS/LOWRY
                    CAVE CREEK WASH TO DETENTION BASIN #3      FILENAME: 18TH.SP
                    18TH STREET STORMDRAIN; 18th - 20th St.    JOB NO: P79-086-016
0 STATION    INVERT   DEPTH    W.S.      Q      VEL    VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL   NO  AVBPR
              ELEV   OF FLOW   ELEV                     HEAD   GRD.EL.   ELEV   DEPTH                DIA    ID NO.        PIER
0 L/ELEM      SO                                      SF AVE    HF                     NORM DEPTH                ZR
*****************************************************************************************************************************
0  5491.76   408.08    6.68   414.76   316.0   8.35   1.08   415.84   .00   4.68          7.00   .00   .00   0   .00
0     7.17   .00838                                    .00090     .01                3.49                .00
0  5498.93   408.57    6.68   415.25   316.0   9.15   1.30   416.55   .00   4.88         10.50  5.17   .00   0   .00
1
```

INPUT FILE LISTING

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T1 EAST FORK CAVE CREEK - FEMA CLOMR          BY: NBS/LOWRY
T2 CAVE CREEK WASH TO DETENTION BASIN #3      FILENAME: 20TH.SP
T3 20TH STREET STORMDRAIN; GW Ch - DB3        JOB NO: P79-086-016
SO   4973.85 395.45  4                           414.00
R    5070.80 395.60  4      .012                            34.995      1
R    5145.00 395.71  4      .012
TS   5151.00 395.72  7      .012
R    5187.00 395.77  7      .012                                        1
TS   5192.00 395.78  4      .012
R    5217.10 395.82  4      .012
WE                   5
R    5824.25 396.73  5      .012
TS   5830.75 397.73  3      .012
R    6456.75 400.87  3      .012
JX   6463.25 401.37  2 1    .012    1.00         401.37        0.1
R    7714.00 406.91  2      .012                                        1
WX                   1
R    7764.56 407.14  1      .012
TS   7778.82 407.99  1      .012
R    7838.82 408.16  1      .012
WE                   8
TS   7850.82 408.57  9      .012
JX   7865.82 408.67  6 10   .012 -316.00         408.57        0.1
R    8184.00 409.72  6      .012
R    8284.00 409.83  6      .012
R    8484.00 410.05  6      .012                                     3.15
R    9702.50 411.40  6      .012                                     3.15 2
R    9795.48 411.48  6      .012                            59.194
WE                  11
SH                  11                            427.20
1                                                                   SP
                                   WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING                                  PAGE    1
0 CARD  SECT  CHN   NO OF  AVE PIER  HEIGHT 1  BASE    ZL    ZR   INV   Y(1)  Y(2)  Y(3)  Y(4)  Y(5)  Y(6)  Y(7)  Y(8)  Y(9)  Y(10)

  CODE   NO   TYPE  PIERS   WIDTH    DIAMETER  WIDTH              DROP

  CD      1    4                       6.50
  CD      2    4                       7.00
  CD      3    4                       7.50
  CD      4    4                       8.00
  CD      5    4                       8.50
  CD      6    4                       9.00
  CD      7    4                      10.00
  CD      8    3      0        .00    10.50    6.50    .00   .00   .00
  CD      9    3      0        .00    10.50    2.83    .00   .00   .00
  CD     10    3      0        .00    10.50    5.17    .00   .00   .00
  CD     11    3      0        .00    10.80   12.60    .00   .00   .00
1                                                                                                                PAGE NO    1
0                                WATER SURFACE PROFILE - TITLE CARD LISTING
0HEADING LINE NO 1 IS -
0                                  EAST FORK CAVE CREEK - FEMA CLOMR          BY: NBS/LOWRY
0HEADING LINE NO 2 IS -
0                                  CAVE CREEK WASH TO DETENTION BASIN #3      FILENAME: 20TH.SP
0HEADING LINE NO 3 IS -
0                                  20TH STREET STORMDRAIN; GW Ch - DB3        JOB NO: P79-086-016
1                                                                                                                PAGE NO    2
0                                WATER SURFACE PROFILE - ELEMENT CARD LISTING
0 ELEMENT NO    1 IS A SYSTEM OUTLET     *          *      *
                       U/S DATA   STATION    INVERT  SECT                                        W S ELEV
                                   4973.85  395.45    4                                           414.00
0 ELEMENT NO    2 IS A REACH             *          *      *
                       U/S DATA   STATION    INVERT  SECT                N                   RADIUS  ANGLE  ANG PT  MAN H
                                   5070.80  395.60    4                .012                      .00  34.99     .00      1
0 ELEMENT NO    3 IS A REACH             *          *      *
                       U/S DATA   STATION    INVERT  SECT                N                   RADIUS  ANGLE  ANG PT  MAN H
                                   5145.00  395.71    4                .012                      .00    .00     .00      0
0 ELEMENT NO    4 IS A TRANSITION        *          *      *
                       U/S DATA   STATION    INVERT  SECT                N
                                   5151.00  395.72    7                .012
0 ELEMENT NO    5 IS A REACH             *          *      *
                       U/S DATA   STATION    INVERT  SECT                N                   RADIUS  ANGLE  ANG PT  MAN H
                                   5187.00  395.77    7                .012                      .00    .00     .00      1
0 ELEMENT NO    6 IS A TRANSITION        *          *      *
                       U/S DATA   STATION    INVERT  SECT                N
                                   5192.00  395.78    4                .012
0 ELEMENT NO    7 IS A REACH             *          *      *
                       U/S DATA   STATION    INVERT  SECT                N                   RADIUS  ANGLE  ANG PT  MAN H
                                   5217.10  395.82    4                .012                      .00    .00     .00      0
0 ELEMENT NO    8 IS A  WALL  ENTRANCE                 *
                       U/S DATA   STATION    INVERT  SECT               FP
                                   5217.10  395.82    5                .500
0 ELEMENT NO    9 IS A REACH             *          *      *
                       U/S DATA   STATION    INVERT  SECT                N                   RADIUS  ANGLE  ANG PT  MAN H
                                   5824.25  396.73    5                .012                      .00    .00     .00      0
0 ELEMENT NO   10 IS A TRANSITION        *          *      *
                       U/S DATA   STATION    INVERT  SECT                N
                                   5830.75  397.73    3                .012
  ELEMENT NO   11 IS A REACH             *          *      *
                       U/S DATA   STATION    INVERT  SECT                N                   RADIUS  ANGLE  ANG PT  MAN H
                                   6456.75  400.87    3                .012                      .00    .00     .00      0
```

```
0 ELEMENT NO  12 IS A JUNCTION          *          *     *     *                    *                    *                *
                  U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3       Q4    INVERT-3 INVERT-4  PHI 3   PHI 4
                              6463.25  401.37    2     1     0   .012     1.0       .0   401.37      .00     .10     .00
1                                                                                                                PAGE NO   3
0                          WATER SURFACE PROFILE - ELEMENT CARD LISTING
0 ELEMENT NO  13 IS A REACH             *          *     *
                  U/S DATA   STATION    INVERT  SECT              N                                RADIUS  ANGLE  ANG PT  MAN H
                              7714.00  406.91    2              .012                                   .00    .00     .00      1
0 ELEMENT NO  14 IS A  WALL  EXIT                   *
                  U/S DATA   STATION    INVERT  SECT
                              7714.00  406.91    1
0 ELEMENT NO  15 IS A REACH             *          *     *
                  U/S DATA   STATION    INVERT  SECT              N                                RADIUS  ANGLE  ANG PT  MAN H
                              7764.56  407.14    1              .012                                   .00    .00     .00      0
0 ELEMENT NO  16 IS A TRANSITION        *          *     *
                  U/S DATA   STATION    INVERT  SECT              N
                              7778.82  407.99    1              .012
0 ELEMENT NO  17 IS A REACH             *          *     *
                  U/S DATA   STATION    INVERT  SECT              N                                RADIUS  ANGLE  ANG PT  MAN H
                              7838.82  408.16    1              .012                                   .00    .00     .00      0
0 ELEMENT NO  18 IS A  WALL  ENTRANCE               *
                  U/S DATA   STATION    INVERT  SECT             FP
                              7838.82  408.16    8             .500
0 ELEMENT NO  19 IS A TRANSITION        *          *     *
                  U/S DATA   STATION    INVERT  SECT              N
                              7850.82  408.57    9              .012
0 ELEMENT NO  20 IS A JUNCTION          *          *     *     *                    *                    *                *
                  U/S DATA   STATION    INVERT  SECT LAT-1 LAT-2   N      Q3       Q4    INVERT-3 INVERT-4  PHI 3   PHI 4
                              7865.82  408.67    6    10     0   .012  -316.0       .0   408.57      .00     .10     .00
0 ELEMENT NO  21 IS A REACH             *          *     *
                  U/S DATA   STATION    INVERT  SECT              N                                RADIUS  ANGLE  ANG PT  MAN H
                              8184.00  409.72    6              .012                                   .00    .00     .00      0
0 ELEMENT NO  22 IS A REACH             *          *     *
                  U/S DATA   STATION    INVERT  SECT              N                                RADIUS  ANGLE  ANG PT  MAN H
                              8284.00  409.83    6              .012                                   .00    .00     .00      0
0 ELEMENT NO  23 IS A REACH             *          *     *
                  U/S DATA   STATION    INVERT  SECT              N                                RADIUS  ANGLE  ANG PT  MAN H
                              8484.00  410.05    6              .012                                   .00    .00    3.15      0
0 ELEMENT NO  24 IS A REACH             *          *     *
                  U/S DATA   STATION    INVERT  SECT              N                                RADIUS  ANGLE  ANG PT  MAN H
                              9702.50  411.40    6              .012                                   .00    .00    3.15      2
1                                                                                                                PAGE NO   4
0                          WATER SURFACE PROFILE - ELEMENT CARD LISTING
0 ELEMENT NO  25 IS A REACH             *          *     *
                  U/S DATA   STATION    INVERT  SECT              N                                RADIUS  ANGLE  ANG PT  MAN H
                              9795.48  411.48    6              .012                                   .00  59.19     .00      0
0 ELEMENT NO  26 IS A  WALL  ENTRANCE               *
                  U/S DATA   STATION    INVERT  SECT             FP
                              9795.48  411.48   11             .500
0 ELEMENT NO  27 IS A SYSTEM HEADWORKS              *                    *
                  U/S DATA   STATION    INVERT  SECT                                   W S ELEV
                              9795.48  411.48   11                                      427.20
 NO EDIT ERRORS ENCOUNTERED-COMPUTATION IS NOW BEGINNING
```

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1                                                                                                                          PAGE     1
                                          WATER SURFACE PROFILE LISTING
                        EAST FORK CAVE CREEK - FEMA CLOMR          BY: NBS/LOWRY
                        CAVE CREEK WASH TO DETENTION BASIN #3      FILENAME: 20TH.SP
                        20TH STREET STORMDRAIN; GW Ch - DB3        JOB NO: P79-086-016
0 STATION    INVERT   DEPTH     W.S.       Q       VEL     VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL   NO  AVBPR
              ELEV   OF FLOW    ELEV                       HEAD    GRD.EL.   ELEV    DEPTH            DIA    ID NO.        PIER
0 L/ELEM      SO                                          SF AVE    HF                       NORM DEPTH                  ZR
*****************************************************************************************************************************
0  4973.85   395.45    18.55    414.00     200.0    3.98     .25    414.25    .00     3.54            8.00      .00   .00   0     .00
0    96.95    .00155                                       .00041      .04                     4.07                     .00
0  5070.80   395.60    18.48    414.08     200.0    3.98     .25    414.33    .00     3.54            8.00      .00   .00   0     .00
0    74.20    .00148                                       .00041      .03                     4.12                     .00
0  5145.00   395.71    18.40    414.11     200.0    3.98     .25    414.36    .00     3.54            8.00      .00   .00   0     .00
0TRANS STR    .00167                                       .00027      .00                                              .00
0  5151.00   395.72    18.55    414.27     200.0    2.55     .10    414.38    .00     3.31           10.00      .00   .00   0     .00
0    36.00    .00139                                       .00012      .00                     3.75                     .00
0  5187.00   395.77    18.51    414.28     200.0    2.55     .10    414.38    .00     3.31           10.00      .00   .00   0     .00
0TRANS STR    .00200                                       .00027      .00                                              .00
0  5192.00   395.78    18.39    414.17     200.0    3.98     .25    414.42    .00     3.54            8.00      .00   .00   0     .00
0    25.10    .00159                                       .00041      .01                     4.03                     .00
0  5217.10   395.82    18.36    414.18     200.0    3.98     .25    414.43    .00     3.54            8.00      .00   .00   0     .00
0  WALL ENTRANCE                                                                                                          .00
0  5217.10   395.82    18.44    414.26     200.0    3.52     .19    414.45    .00     3.47            8.50      .00   .00   0     .00
0   607.15   .00150                                       .00030      .18                     3.97                     .00
0  5824.25   396.73    17.71    414.44     200.0    3.52     .19    414.63    .00     3.47            8.50      .00   .00   0     .00
0TRANS STR    .15385                                       .00044      .00                                              .00
0  5830.75   397.73    16.61    414.34     200.0    4.53     .32    414.66    .00     3.61            7.50      .00   .00   0     .00
0   626.00   .00502                                       .00058      .36                     3.01                     .00
0  6456.75   400.87    13.83    414.70     200.0    4.53     .32    415.02    .00     3.61            7.50      .00   .00   0     .00
0JUNCT STR    .07692                                       .00070      .00                                              .00
1                                                                                                                          PAGE     2
                                          WATER SURFACE PROFILE LISTING
                        EAST FORK CAVE CREEK - FEMA CLOMR          BY: NBS/LOWRY
                        CAVE CREEK WASH TO DETENTION BASIN #3      FILENAME: 20TH.SP
                        20TH STREET STORMDRAIN; GW Ch - DB3        JOB NO: P79-086-016
0 STATION    INVERT   DEPTH     W.S.       Q       VEL     VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL   NO  AVBPR
              ELEV   OF FLOW    ELEV                       HEAD    GRD.EL.   ELEV    DEPTH            DIA    ID NO.        PIER
 L/ELEM       SO                                          SF AVE    HF                       NORM DEPTH                  ZR
*****************************************************************************************************************************
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0  6463.25   401.37    13.24    414.61    199.0    5.17     .42    415.03    .00     3.68            7.00     .00    .00   0    .00
0  1250.75    .00443                                        .00083     1.03                   3.22                     .00
0  7714.00   406.91     8.76    415.67    199.0    5.17     .42    416.09    .00     3.68            7.00     .00    .00   0    .00
0  WALL EXIT                                                                                                                .00
0  7714.00   406.91     8.76    415.67    199.0    6.00     .56    416.23    .00     3.76            6.50     .00    .00   0    .00
0    50.56    .00455                                        .00123      .06                   3.32                     .00
0  7764.56   407.14     8.59    415.73    199.0    6.00     .56    416.29    .00     3.76            6.50     .00    .00   0    .00
0TRANS STR    .05961                                        .00123      .02                                            .00
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0    60.00    .00283                                        .00123      .07                   3.85                     .00
0  7838.82   408.16     7.66    415.82    199.0    6.00     .56    416.38    .00     3.76            6.50     .00    .00   0    .00
0  WALL ENTRANCE                                                                                                            .00
0  7838.82   408.16     8.30    416.46    199.0    3.69     .21    416.67    .00     3.08           10.50    6.50    .00   0    .00
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0JUNCT STR    .00667                                                                                                       .00
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0    22.89    .00330                                        .00330      .08                   5.35                     .00
0  7888.71   408.75     5.35    414.10    515.0   13.06    2.65    416.75    .00     5.60            9.00     .00    .00   0    .00
0   218.87    .00330                                        .00328      .72                   5.35                     .00
0  8107.58   409.47     5.38    414.84    515.0   12.99    2.62    417.47    .00     5.60            9.00     .00    .00   0    .00
0    76.42    .00330                                        .00307      .23                   5.35                     .00
1                                                                                                                        PAGE    3
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WATER SURFACE PROFILE LISTING

EAST FORK CAVE CREEK - FEMA CLOMR BY: NBS/LOWRY
CAVE CREEK WASH TO DETENTION BASIN #3 FILENAME: 20TH.SP
20TH STREET STORMDRAIN; GW Ch - DB3 JOB NO: P79-086-016

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0 STATION    INVERT   DEPTH     W.S.      Q       VEL     VEL     ENERGY   SUPER  CRITICAL          HGT/   BASE/    ZL   NO  AVBPR
           ELEV    OF FLOW    ELEV                        HEAD    GRD.EL.   ELEV    DEPTH              DIA    ID NO.        PIER
0 L/ELEM     SO                                          SF AVE     HF                     NORM DEPTH                ZR
*****************************************************************************************************************************
0  8184.00   409.72     5.60    415.32    515.0   12.38    2.38    417.70    .00     5.60            9.00     .00    .00   0    .00
0    10.73    .00110                                        .00272      .03                   9.00                     .00
0  8194.73   409.73     5.83    415.56    515.0   11.81    2.17    417.73    .00     5.60            9.00     .00    .00   0    .00
0    40.29    .00110                                        .00241      .10                   9.00                     .00
0  8235.02   409.78     6.08    415.86    515.0   11.26    1.97    417.83    .00     5.60            9.00     .00    .00   0    .00
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0   126.29    .00110                                        .00200      .25                   9.00                     .00
0  8410.29   409.97     6.53    416.50    515.0   10.41    1.68    418.19    .00     5.60            9.00     .00    .00   0    .00
0    73.71    .00110                                        .00184      .14                   9.00                     .00
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0   282.31    .00111                                        .00171      .48                   9.00                     .00
0  8766.31   410.36     6.97    417.33    515.0    9.74    1.48    418.81    .00     5.60            9.00     .00    .00   0    .00
0   502.52    .00111                                        .00155      .78                   9.00                     .00
0  9268.83   410.92     7.32    418.24    515.0    9.29    1.34    419.58    .00     5.60            9.00     .00    .00   0    .00
0   433.67    .00111                                        .00143      .62                   9.00                     .00
0  9702.50   411.40     7.53    418.93    515.0    9.06    1.28    420.21    .00     5.60            9.00     .00    .00   0    .00
     92.98    .00086                                        .00139      .13                   9.00                     .00
0  9795.48   411.48     7.60    419.08    515.0    8.99    1.26    420.34    .00     5.60            9.00     .00    .00   0    .00
0  WALL ENTRANCE                                                                                                            .00
0  9795.48   411.48     9.32    420.80    515.0    4.39     .30    421.10    .00     3.73           10.80   12.60    .00   0    .00
1
```

Appendix F

Erosion and Sedimentation Analysis

The sediment yield for this channel is negligible. The entire channel is lined with either gabions or concrete or a mixture of the two, thus detailed calculations are not necessary for this study. Refer to Section 6.0 for further details.

Appendix G

Soil Report and Flood Wall Design Report

SPEEDIE AND ASSOCIATES
GEOTECHNICAL / ENVIRONMENTAL / MATERIALS ENGINEERS
11029 N. 24th AVE., SUITE 805 • PHOENIX, ARIZONA 85029 • (602) 997-6391 • FAX (602) 943-5508

HENRIETTA SPEEDIE, C.E.O.
JAMES A. SPEEDIE, P.E.
GREGG A. CREASER, P.E.
BRETT P. CREASER, P.E.
DONALD L. CORNELISON, P.E.
STEVEN A. GRIESS, P.E.
PRABHAKAR (PETER) RUPAL, P.E.

REPORT ON GEOTECHNICAL INVESTIGATION

DESIGNATION: Greenway Drainage Channel Improvements

LOCATION: 9th Street to 21st Street Phoenix, Arizona

CLIENT: Wood Patel & Associates

PROJECT NO: 980823SA

DATE: October 19, 1998

Registered Professional Engineer (Civil)
CERTIFICATE NO.
14388
GREGG ALAN
CREASER
Date Signed 10-19-98
ARIZONA, U.S.A.

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Site Conditions	2
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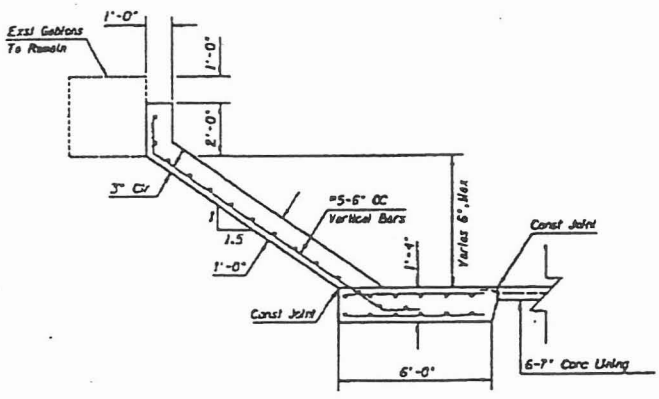
SPEEDIE
AND ASSOCIATES
GEOTECHNICAL / ENVIRONMENTAL / MATERIAL ENGINEERS
11029 N. 24th AVE., SUITE 805 • PHOENIX, ARIZONA 85029

INTRODUCTION

This report presents the results of a subsoil investigation carried out at the site of the proposed Greenway Drainage Channel improvements between 9th Street and 21st Street in Phoenix, Arizona.

Preliminary information calls for the lowering of the existing channel bottom by as much as 6 feet, tapering back to the original flow line at each end. Several alternative designs are being considered. The existing gabion wall may be left in-place, supported by a sloped retaining wall. In shallower cut areas, the channel may simply be re-lined with concrete including slope paving. The following sketch provided by the Client depicts what is being considered:



SECTION - ALT 1 CANTILEVER RETAINING WALL

The original scope of work for this investigation was to classify soils and provide comments with respect to excavatability of the subsoils in order to lower and re-cast the channel bottom. Due to the alternative designs being considered, it appears that significant structural components may be involved. Although this is beyond the scope of the investigation, additional analysis and engineering recommendations are provided based on very limited investigation. The limited number of borings did not allow for bracketing the various soil conditions encountered. Accordingly, general recommendations are made to address each of the expected conditions. Either additional investigation should be conducted once final designs are determined, or increased field inspection during construction should be provided to ensure that the soil conditions are in fact as assumed for the foundation alternative selected.

GENERAL SITE AND SOIL CONDITIONS

Site Conditions - The Greenway Drainage Channel is situated on the south side of Greenway Parkway and drains to the west. The channel has a concrete-lined invert and gabion walls. The existing concrete channel bottom is undergoing distress in the form of differential movement between adjacent slabs. Relatively large storm sewer pipe is located under the channel bottom. Reports are that this is a cast in place pipe. It is likely that there are fills associated with this pipe and possible loss of ground to due piping and/or erosion during heavy flows.

General Subsurface Conditions - Subsoil conditions are variable along the alignment in terms of relative density and potential fill. Under 4.5 to 5.5 of concrete and up to 12 inches of aggregate base consist of clayey sand and sandy clay, with subordinate amounts of gravel and varying degrees of calcareous cementation to depths of 5.5 to 10.5 feet below grade. In borings B-1, B-2 and B-3, the upper 3 to 7 feet is classified as fill or possible fill material. There are no obvious tell-tales to establish its exact vertical extent. Standard Penetration Test values generally range from 4 to 50+ blows per foot. No groundwater was encountered during this investigation. Some of the near-surface samples are described as being in a "moist" state. No gap was noted between the underside of slab and top of subgrade or aggregate base where present.

Laboratory testing indicates in-situ dry densities of the upper soils on the order of 85 to 120 pcf at about 10 to 20 percent moisture at the time of investigation. Liquid limits are in the 39 to 48 percent range with plasticity indices ranging from 18 to 25 percent. The upper clayey soils exhibit volume increase due to wetting of 6 percent when recompacted to moistures and densities normally expected during construction. Attempts to run shear tests were not successful due to presence of fine and coarse gravels in the samples.

ANALYSIS AND RECOMMENDATIONS

Analysis - The presence of loose fill material is of concern, particularly with respect to foundation support. Accordingly, it is recommended that the retaining wall be supported on spread footings bearing in dense native soil. This may require deepening the foundations to remove the loose soils if present. Another option would be to remove the loose soil by over-excavation and recompaction to create engineered fill. A third option would be to drill short caissons bearing in the native soil. The depth to native soil appears to range anywhere from near the surface to as deep as 7 feet below existing grade. It is assumed that most of this loose soil would be removed when the channel is lowered. It is also assumed that due to the concrete lining, scour is not a factor in design.

Mixing of foundation types or bearing media is not recommended to limit the detrimental affects of differential settlement.

Regional ground water is not expected to be a factor in the design or construction of shallow foundations and underground utilities. However, time of year of construction and flow in the channel will have an impact on construction. Provision should be made to re-route channel flow as required. Nuisance water should be controllable using sumps.

Subsurface flows could be a factor immediately after large flows. Large flows above and over the gabion baskets, and leakage through the lining, will have the potential of creating a temporary water under the lining. The channel will drain quickly, resulting in a phreatic water surface under the lining. This water pressure could cause uplift and damage. Accordingly, consideration should be given to installing a toe drain and weep holes under any sloped channel lining to relieve this pressure.

Excavation operations should be relatively straightforward using conventional equipment although cemented soils, gravels and cobbles may impede progress and possibly require heavier equipment. Care will have to be exercised with respect to the existing underground utilities. Depending on their location relative to the new invert, they may have to be re-routed.

Preliminary information indicates that the steepest slope proposed for excavating the channel deeper is 1½ to 1. This slope should be suitable for temporary support of the gabion baskets assuming they are not undermined or non-cohesive soils ("flowing sands") are not encountered. The gabions may have to be braced or supported in some form, or removed altogether, to prevent them from falling into the excavation for steeper slopes. If they are removed, they can be re-constructed once the channel walls are constructed, or they can be deleted entirely, replacing them with a concrete-lined bank extending from invert up to top-of-bank level.

The swell potential of the upper clayey soils is a concern. The potential is usually strong enough to cause differential movements of slabs-on-grade but not enough to cause damage to structures. Typical recommendations to reduce the swell potential include reducing the compaction requirements and requiring higher moisture contents during pad preparation and/or requiring at least one or more feet of non-expansive material to be placed directly beneath slabs. While removing additional soil and replacement with non-expansive fill would be the best solution, this could add significant cost to the project. Accordingly, recommendations are made to process the bottom soils to a depth of 16 inches below grade, increasing the

moisture content to above optimum and reducing compaction. This will reduce but not eliminate swell potential.

Frequent jointing is recommended to control cracking and reduce impedance of flow should differential movement occur. Joint design and spacing should be in accordance with ACI recommendations. Construction joints should contain dowels or be tongue and grooved to provide load transfer. Tie bars are recommended on the joints adjacent to un-supported edges. Joint sealing with a quality silicone sealer is recommended to prevent water from entering the subgrade and/or allowing pumping and loss of support.

Site Preparation - The entire area to be occupied by the proposed construction should be stripped of all vegetation, debris, rubble and obviously loose surface soils.

In proposed spread foundation areas, any loose soils and/or fill encountered should be over-excavated full depth until dense native soil is encountered. This excavation should extend a distance beyond the footing edges equal to the depth, and then be re-placed as engineered fill.

If structural fill is required below footing bottom elevation, the exposed grade should first be scarified to a depth of 8 inches, moisture-conditioned to optimum (± 2 percent) and compacted to at least 95 percent of maximum dry density as determined by ASTM D-698 prior to placing any fill.

The exposed channel bottom that is to receive only concrete channel lining should be scarified **16 inches**, moisture conditioned to at least optimum to 3 percent above optimum, and uniformly compacted to at least 90 but not more than 95 percent of maximum dry density as determined by ASTM D-698. The contractor must demonstrate that they can do this in-place. Otherwise, partial to full over-excavation should be provided, depending on the equipment and processes used.

Care should be taken during excavation not to affect the gabion walls that are to remain in-place. Depending on proximity and slope, gabions may require shoring, bracing or underpinning to provide structural stability and protect personnel working in the excavation.

Excavation And Temporary Cut Slopes - All excavations must comply with current governmental regulations including the current OSHA Excavation and Trench Safety Standards. Side slopes for open-cut excavation in fill material should be cut back at 1.5:1 (horizontal to vertical). Excavation in the native, dense clayey soils maybe cut back at 1:1. The slopes should be protected from erosion due to run-off or long term surcharge at the slope crest. Construction equipment, building materials, excavated soil and vehicular traffic

should not be allowed within 10 feet or ⅓ the slope height, whichever is greater, from the top of slope. All cut slopes should be observed by the Soils Engineer during excavation. Adjustments to the recommended slopes may be necessary due to wet zones, loose strata and conditions not observed in the borings. Localized shoring may also be required. Shotcrete or soil stabilizer on the slope face may be useful in preventing erosion due to run-off and/or drying of the slope.

Foundation Design - If site preparation is carried out as set forth herein, the following bearing capacities can be utilized for design:

Alternate No.	Foundation Type	Bearing Stratum	Bearing Capacity
1	Spread Footing	Dense Native Soil	2,000 psf
2	Spread Footing	Engineered Fill	2,000 psf
3	Caissons	Native Soil	8,000 psf

Caissons should consist of drilled shaft foundations bearing in the dense native soils underlying the fill soils. The depth to the contact zone is variable, on the order of 0 to 7 feet below existing grade. A minimum caisson length of 10 feet is recommended. The fill soils may not be suitable for under-reaming by belling. Sloughing could occur, resulting in concrete quantities higher than neat dimension calculations. Accordingly, design and construction should assume straight shaft caissons. A minimum shaft diameter of 30 inches is recommended to allow access for cleaning and inspection. Full length casing must be provided to protect personnel entering the caissons. All caissons should be examined by a representative of the geotechnical engineer to verify cleaning, depth, dimensions and proper bearing strata. Straight shaft caissons may be "machine cleaned" provided the contractor can show the ability to adequately remove loose material. The minimum allowable caisson spacing is 3 diameters, center-to-center. Adjacent caisson base (tip) elevations should not vary by more than 45 degrees.

These bearing capacities refer to the total of all loads, dead and live, and are net pressures. They may be increased one-third for wind, seismic or other loads of short duration. These values may be increased by one-third as the allowable toe pressure for retaining walls. All footing excavations should be level and cleaned of all loose or disturbed materials.

Estimated settlements under design loads are on the order of ½ to 1-inch, virtually all of which will occur during construction. Post-construction differential settlements will be negligible, under existing and compacted moisture contents. Additional localized settlements of the same magnitude could occur if native

GENERAL SITE AND SOIL CONDITIONS

Site Conditions - The Greenway Drainage Channel is situated on the south side of Greenway Parkway and drains to the west. The channel has a concrete-lined invert and gabion walls. The existing concrete channel bottom is undergoing distress in the form of differential movement between adjacent slabs. Relatively large storm sewer pipe is located under the channel bottom. Reports are that this is a cast in place pipe. It is likely that there are fills associated with this pipe and possible loss of ground to due piping and/or erosion during heavy flows.

General Subsurface Conditions - Subsoil conditions are variable along the alignment in terms of relative density and potential fill. Under 4.5 to 5.5 of concrete and up to 12 inches of aggregate base consist of clayey sand and sandy clay, with subordinate amounts of gravel and varying degrees of calcareous cementation to depths of 5.5 to 10.5 feet below grade. In borings B-1, B-2 and B-3, the upper 3 to 7 feet is classified as fill or possible fill material. There are no obvious tell-tales to establish its exact vertical extent. Standard Penetration Test values generally range from 4 to 50+ blows per foot. No groundwater was encountered during this investigation. Some of the near-surface samples are described as being in a "moist" state. No gap was noted between the underside of slab and top of subgrade or aggregate base where present.

Laboratory testing indicates in-situ dry densities of the upper soils on the order of 85 to 120 pcf at about 10 to 20 percent moisture at the time of investigation. Liquid limits are in the 39 to 48 percent range with plasticity indices ranging from 18 to 25 percent. The upper clayey soils exhibit volume increase due to wetting of 6 percent when recompacted to moistures and densities normally expected during construction. Attempts to run shear tests were not successful due to presence of fine and coarse gravels in the samples.

ANALYSIS AND RECOMMENDATIONS

Analysis - The presence of loose fill material is of concern, particularly with respect to foundation support. Accordingly, it is recommended that the retaining wall be supported on spread footings bearing in dense native soil. This may require deepening the foundations to remove the loose soils if present. Another option would be to remove the loose soil by over-excavation and recompaction to create engineered fill. A third option would be to drill short caissons bearing in the native soil. The depth to native soil appears to range anywhere from near the surface to as deep as 7 feet below existing grade. It is assumed that most of this loose soil would be removed when the channel is lowered. It is also assumed that due to the concrete lining, scour is not a factor in design.

supporting soils were to experience a significant increase in moisture content. Care should be taken in design and construction to insure that channel flows will not result in loss of materials due to scour or piping of fines through joints.

Continuous footings and stem walls should be reinforced to distribute stresses arising from small differential movements, and long walls should be provided with control joints to accommodate these movements. Reinforcement and frequent control joints are suggested to allow slight movement and prevent minor slab cracking especially.

Lateral Pressures - The following lateral pressure values may be utilized for the proposed construction:

Active Pressure	
Unrestrained Walls	35 pcf
Restrained Walls	60 pcf
Passive Pressure	
Continuous Footings	350 pcf
Spread Footings or Drilled Piers	400 pcf
Coefficient of Friction (With Passive Pressure)	0.35
Coefficient of Friction (Without Passive Pressure)	0.45

All backfill must be compacted to not less than 95 percent (ASTM D-698) to mobilize these passive values at low strain. Expansive native soils should not be used as retaining wall backfill, except as a surface seal to limit infiltration of storm/irrigation water. The expansive pressures could greatly increase active pressures.

Fill And Backfill - Native soils are considered suitable for use in general grading fills but should **not** be used in the top foot of fill for any slabs-on-grade adjacent to the channel or as retaining wall backfill. While removing additional soil and replacement with non-expansive fill would be the best solution, this could add significant cost to the project. Accordingly, recommendations are made to process the bottom soils to a depth of 16 inches below grade, increasing the moisture content to above optimum and reducing compaction.

If imported common fill for use in site grading is required, it should be examined by a Soils Engineer to ensure that it is of low swell potential and free of organic or otherwise deleterious material. In general, the fill should have 100 percent passing the 3-inch sieve and no more than 60 percent passing the 200 sieve. For the fine fraction (passing the 40 sieve), the liquid limit and plasticity index should not exceed 30 percent and 10 percent, respectively. It should exhibit less than 1.5 percent swell potential when compacted to 95 percent of maximum dry density (ASTM D-698) at a moisture content of 2 percent below optimum, confined under a 100 psf surcharge, and inundated.

Fill should be placed on subgrade which has been properly prepared and approved by a Soils Engineer. Fill must be wetted and thoroughly mixed to achieve optimum moisture content, ± 2 percent (optimum to $+3$ percent for underslab fill). Fill should be placed in horizontal lifts of 8-inch thickness (or as dictated by compaction equipment) and compacted to the percent of maximum dry density per ASTM D-698 set forth as follows:

A.	Channel Area		
	1.	Below slabs-on-grade (non-expansive soils)	95
	2.	Below slabs-on-grade (expansive native soils)	90 - 95 (max)
	3.	Below footing level	95
B.	Utility Trench Backfill		
	1.	More than 2.0' below finish S/G	90
	2.	Within 2.0' of finish S/G	95
C.	Aggregate Base Course		
	1.	Below slabs-on-grade	95
D.	Landscape Areas		
	1.	Miscellaneous fill	90
	2.	Utility trench - more than 1.0' below F/G	85
	3.	Utility trench - within 1.0' of F/G	90

Utilities Installation - Trench excavations for utilities can be accomplished by conventional trenching equipment although cemented soils, gravels and cobbles may impede progress and could require the use of heavier equipment. Trench walls will stand near-vertical for the short periods of time required to install utilities although some sloughing may occur in looser sandy soils necessitating laying back of side slopes and/or shoring. Adequate precautions must be taken to protect workmen in accordance with all current governmental regulations.

Backfill of trenches may be carried out with native excavated material. This material should be moisture-conditioned, placed in 8-inch lifts and mechanically compacted. Water settling is not recommended. Compaction requirements are summarized in the "Fill And Backfill" section of this report.

GENERAL

The scope of this investigation and report does not include regional considerations such as seismic activity and ground fissures resulting from subsidence due to groundwater withdrawal, nor any considerations of hazardous releases or toxic contamination of any type.

Our analysis of data and the recommendations presented herein are based on the assumption that soil conditions do not vary significantly from those found at specific sample locations. Our work has been performed in accordance with generally accepted engineering principles and practice; this warranty is in lieu of all other warranties expressed or implied.

We recommend that a representative of the Soils Engineer observe and test the earthwork and foundation portions of this project to ensure compliance to project specifications and the field applicability of subsurface conditions which are the basis of the recommendations presented in this report. If any significant changes are made in the scope of work or type of construction that was assumed in this report, we must review such revised conditions to confirm our findings if the conclusions and recommendations presented herein are to apply.

Respectfully submitted,

SPEEDIE & ASSOCIATES, INC.

Registered Professional Engineer (Civil) CERTIFICATE NO. 30524 PRABHAKAR RUPAL Date Signed 10-19-98 ARIZONA, U.S.A.

Prabhakar (Peter) Rupal, P.E.

Registered Professional Engineer (Civil) CERTIFICATE NO. 14388 GREGG ALAN CREASER Date Signed 10-19-98 ARIZONA, U.S.A.

Gregg A. Creaser, P.E.

APPENDIX

FIELD AND LABORATORY INVESTIGATION

SOIL BORING LOCATION PLAN

SOIL LEGEND

LOG OF TEST BORINGS

TABULATION OF TEST DATA

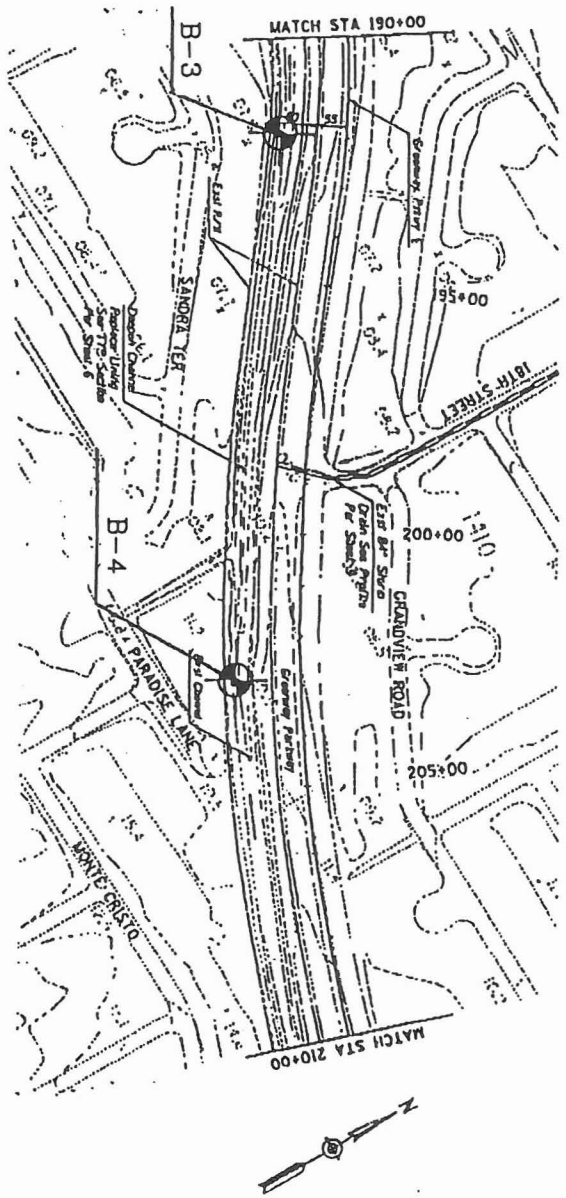
MOISTURE-DENSITY RELATIONS

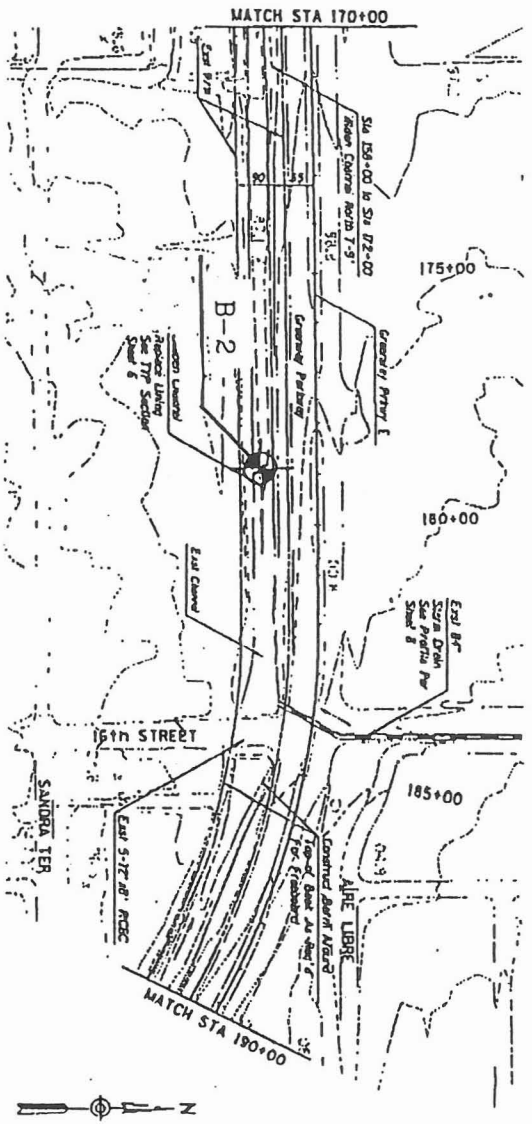
SWELL TEST DATA

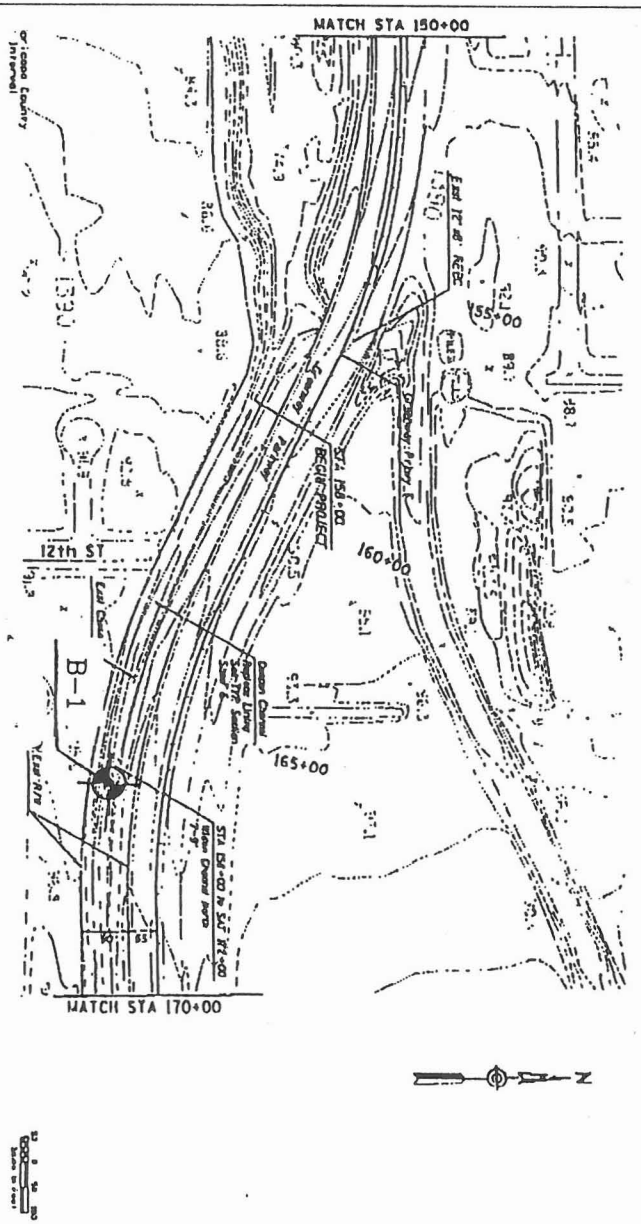
FIELD AND LABORATORY INVESTIGATION

On September 24, 1998, a total of 4 soil test borings were drilled at the approximate locations and depths specified by the Client and as shown on the attached Soil Boring Location Plan. All exploration work was carried out under the full-time supervision of our staff geologist, who recorded subsurface conditions and obtained samples for laboratory testing. The soil borings were advanced with a truck-mounted CME-LC60 drill rig utilizing 7-inch diameter hollow stem flight augers. Detailed information regarding the borings and samples obtained can be found on an individual Log of Test Boring prepared for each drilling location.

Laboratory testing consisted of moisture content, dry density, grain-size distribution and plasticity (Atterberg Limits) tests for classification and pavement design parameters. Remolded swell tests were performed on samples compacted to densities and moisture contents expected during construction. All field and laboratory data is presented in this appendix.







- Approximate Soil Boring Locations

SOIL BORING LOCATION PLAN

Greenway Drainage Channel
9th St. to 21st St.
Phoenix, Arizona

DR:	BP	CHK:	PR	REV:	GAC	DATE:	9/24/98

SPEEDIE AND ASSOCIATES
GEOTECHNICAL/ENVIRONMENTAL/MATERIALS ENGINEERS
11020 N. 24th AVE., SUITE 805 PHOENIX, ARIZONA 85029 (602) 997-6391

Project No. 980823SA

SOIL LEGEND

SAMPLE DESIGNATION	DESCRIPTION	
AS	Auger Sample–	A grab sample taken directly from auger flights.
BS	Large Bulk Sample–	A grab sample taken directly from auger flights.
S	Spoon Sample–	Standard Penetration Test (ASTM D–1586) Driving a 2.0 inch outside diameter split spoon sampler into undisturbed soil for three successive 6–inch increments by means of a 140 lb. weight free falling through a distance of 30 inches. The cumulative number of blows for the final 12 inches of penetration is the Standard Penetration Resistance (N).
RS	Ring Sample–	Driving a 3.0 inch outside diameter spoon equipped with a series of 2.42 inside diameter, 1 inch long brass rings, into undisturbed soil for one 12 inch increment by the same means of the Spoon Sample. The blows required for the 12 inches of penetration are recorded.
LS	Liner Sample–	Standard Penetration Test driving a 2.0 inch outside diameter split spoon equipped with two 3 inch long, ⅜ inch inside diameter brass liners, separated by a 1 inch long spacer, into undisturbed soil by the same means of the spoon sample.
ST	Shelby Tube–	A 2.0 inch outside diameter thin–walled tube continuously pushed into undisturbed soil by a rapid motion, without impact or twisting (ASTM D–1587).
–	Continuous Penetration Resistance–	Driving a 2.0 inch outside diameter "Bullnose Penetrometer" continuously into undisturbed soil by the same means of the spoon sample. The blows for each successive 12 inch increment are recorded.

CONSISTENCY			RELATIVE DENSITY	
Clays & Silts	Blows/Foot *	Strength †	Sands & Gravels	Blows/Foot *
Very Soft	0–2	0–0.25	Very Loose	0–4
Soft	2–4	0.25–0.5	Loose	5–10
Firm	5–8	0.5–1.0	Medium Dense	11–30
Stiff	9–15	1–2	Dense	31–50
Very Stiff	16–30	2–4	Very Dense	> 50
Hard	> 30	> 4		

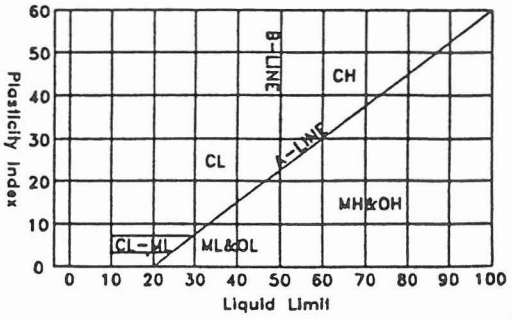
* Number of blows of a 140 lb hammer free falling 30 inches to drive a 2 inch O.D. split spoon sampler (ASTM D–1588)

† Unconfined compressive strength in tons/sq ft. Read from a pocket penetrometer.

MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
Coarse Grained Soils More than 50% of material is larger than #200 sieve size	Gravel and Gravelly Soils 50% Coarse Fraction is > #4 Sieve Size	Clean Gravels		GW	Well Graded Gravels
				GP	Poorly Graded Gravels
		Gravels w/ Fines		GM	Silty Gravels
				GC	Clayey Gravels
	Sand and Sandy Soils 50% Coarse Fraction is < #4 Sieve Size	Clean Sands		SW	Well Graded Sands
				SP	Poorly Graded Sands
		Sands w/ Fines		SM	Silty Sand
				SC	Clayey Sand
Fine Grained Soils More than 50% of material is smaller than #200 sieve size	Silts and Clays Liquid Limit is less than 50%			ML	Inorganic Silts, Low P.I.
				CL	Inorganic Clays, Low P.I.
				OL	Organic Silts, High P.I.
	Silts and Clays Liquid Limit is greater than 50%			MH	Inorganic Silts, High P.I.
				CH	Inorganic Clays, High P.I.
				OH	Organic Clays, High P.I.
Highly Organic Soils				PT	Peat and Humus, Highly Organic

MATERIAL SIZE	PARTICLE SIZE			
	Lower Limit		Upper Limit	
	mm	Sieve Size †	mm	Sieve Size †
Sands				
Fine	.075	#200	0.42	#40
Medium	0.42	#40	2.00	#10
Coarse	2.00	#10	4.76	#4
Gravels				
Fine	4.76	#4	191	¾" ∘
Coarse	191	¾" ∘	762	3" ∘
Cobbles	762	3" ∘	304.8	12" ∘
Boulders	304.8	12" ∘	914.4	36" ∘

† U.S. Standard ∘ Clear Square Openings



Rig Type: CME-LC60
Boring Type: Hollow Stem Auger
Surface Elevation: N/A

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 – 25 – 50)
0	5" Concrete; ~12"ABC POSSIBLE FILL: Medium Dense Brown CLAYEY SAND (SC-Dry to Moist) with Little to Some Gravel	RS-1	2.0	--	--	
5		RS-2	5.5	11.0	98.2	
5.5	End of Boring					
10						
15						

Boring Date: 9-24-98
Field Engineer/Technician: B. Payton
Driller: B. Freeman
Contractor: Heber Mining

Water Level

Depth	Hour	Date
Dry		

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: B- 1

Greenway Drainage Channel Improvements

9th St. to 21st St.

Phoenix, Arizona

Project No.: 980823SA

Rig Type: CME-LC60
Boring Type: Hollow Stem Auger
Surface Elevation: N/A

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0–25–50)
0	4.5" Concrete FILL: Very Loose Brown CLAYEY SAND (SC-Dry to Moist) with Trace to Little Gravel	RS-1	2.0	14.2	93.9	
3.0	Dense Brown CLAYEY SAND (SC-Dry) with Trace Gravel	RS-2	5.5	9.8	112.9	
8.0	Dense Brown CLAYEY SAND (SC-Dry) with Little to Some Gravel and Possible Cobbles	RS-3	10.5	11.2	115.1	
10.5	End of Boring					

Boring Date: 9-24-98
Field Engineer/Technician: B. Payton
Driller: B. Freeman
Contractor: Heber Mining

Water Level

Depth	Hour	Date
Dry		

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: B- 2

Greenway Drainage Channel Improvements

9th St. to 21st St.

Phoenix, Arizona

Project No.: 980823SA

Rig Type: CME-LC60
Boring Type: Hollow Stem Auger
Surface Elevation: N/A

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 – 25 – 50)
0	5" Concrete POSSIBLE FILL: Medium Dense to Loose Brown CLAYEY SAND (SC-Dry) with Trace to Little Gravel	RS-1	2.0	12.6	106.7	
5		RS-2	5.5	12.3	103.9	
7.0	Very Dense Brown CLAYEY SAND/CLAYEY GRAVEL (SC/GC-Dry)					
10		RS-3	10.5	13.6	101.9	53/12"
10.5	End of Boring					
15						

Boring Date: 9-24-98
Field Engineer/Technician: B. Payton
Driller: B. Freeman
Contractor: Heber Mining

Water Level

Depth	Hour	Date
Dry		

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: B- 3

Greenway Drainage Channel Improvements

9th St. to 21st St.

Phoenix, Arizona

Project No.: 980823SA

Rig Type: CME-LC60
Boring Type: Hollow Stem Auger
Surface Elevation: N/A

Depth (feet)	Visual Classification	Sample Number	Depth of Sample	Natural Water Content (%)	In-place Dry Density (P.C.F.)	Penetration Resistance Blows per Foot (0 – 25 – 50)
0	5.5" Concrete; 7" ABC					
	Very Dense Brown CLAYEY SAND (SC-Dry) with Little Gravel and Moderate to Strong Calcareous Cementation	RS-1	2.0	17.7	105.0	65/12"
5		RS-2	5.5	7.5	120.4	83/12"
5.5		BS-3	6.0	--	--	
	Hard Brown SANDY CLAY (CL-Dry) with Trace Weak Calcareous Cementation					
10		RS-4	10.5	23.3	84.3	
10.5	End of Boring					
15						

Boring Date: 9-24-98
Field Engineer/Technician: B. Payton
Driller: B. Freeman
Contractor: Heber Mining

Water Level

Depth	Hour	Date
Dry		

SPEEDIE AND ASSOCIATES

Log of Test Boring Number: B- 4

Greenway Drainage Channel Improvements

9th St. to 21st St.

Phoenix, Arizona

Project No.: 980823SA

TABULATION OF TEST DATA

SOIL BORING or TEST PIT NUMBER	SAMPLE NUMBER	SAMPLE TYPE	DEPTH OF SAMPLE TIP	NATURAL WATER CONTENT (Percent of Dry Weight)	IN-PLACE DRY DENSITY (Pounds Per Cubic Foot)	PARTICLE SIZE DISTRIBUTION (Percent Finer)					ATTERBERG LIMITS			UNIFIED SOIL CLASSIFICATION	SPECIMEN DESCRIPTION
						#200 SIEVE	#40 SIEVE	#10 SIEVE	#4 SIEVE	3" SIEVE	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX		
B- 1	RS-1	RS	2.0	--	--	28.6	39	58	75	100	39	21	18	SC	CLAYEY SAND with GRAVEL
B- 1	RS-2	RS	5.5	11.0	98.2										
B- 2	RS-1	RS	2.0	14.2	93.9	26.7	38	58	77	100	48	23	25	SC	CLAYEY SAND with GRAVEL
B- 2	RS-2	RS	5.5	9.8	112.9										
B- 2	RS-3	RS	10.5	11.2	115.1										
B- 3	RS-1	RS	2.0	12.6	106.7										
B- 3	RS-2	RS	5.5	12.3	103.9										
B- 3	RS-3	RS	10.5	13.6	101.9										
B- 4	RS-1	RS	2.0	17.7	105.0										
B- 4			4.5			36.7	51	66	78	100	46	25	21	SC	CLAYEY SAND with GRAVEL
B- 4	RS-2	RS	5.5	7.5	120.4										
B- 4	RS-4	RS	10.5	23.3	84.3										

Sieve analysis results do not include material greater than 3". Refer to the actual boring logs for the possibility of cobble and boulder sized materials.

Sheet 1 of 1

Greenway Drainage Channel Improvements
9th St. to 21st St.
Phoenix, Arizona
Project No. 980823SA

SPEEDIE AND ASSOCIATES

MOISTURE-DENSITY RELATIONS

PROJECT: Greenway Drainage Channel Improvements

PROJECT NO.: 980823SA

LOCATION: 9th St. to 21st St.

DATE: 9/24/98

BORING NO.: B- 4

SAMPLE NO.:

SAMPLE DEPTH: 4.50

METHOD OF COMPACTION: ASTM D698A

LIQUID LIMIT: 46

PLASTIC LIMIT: 25

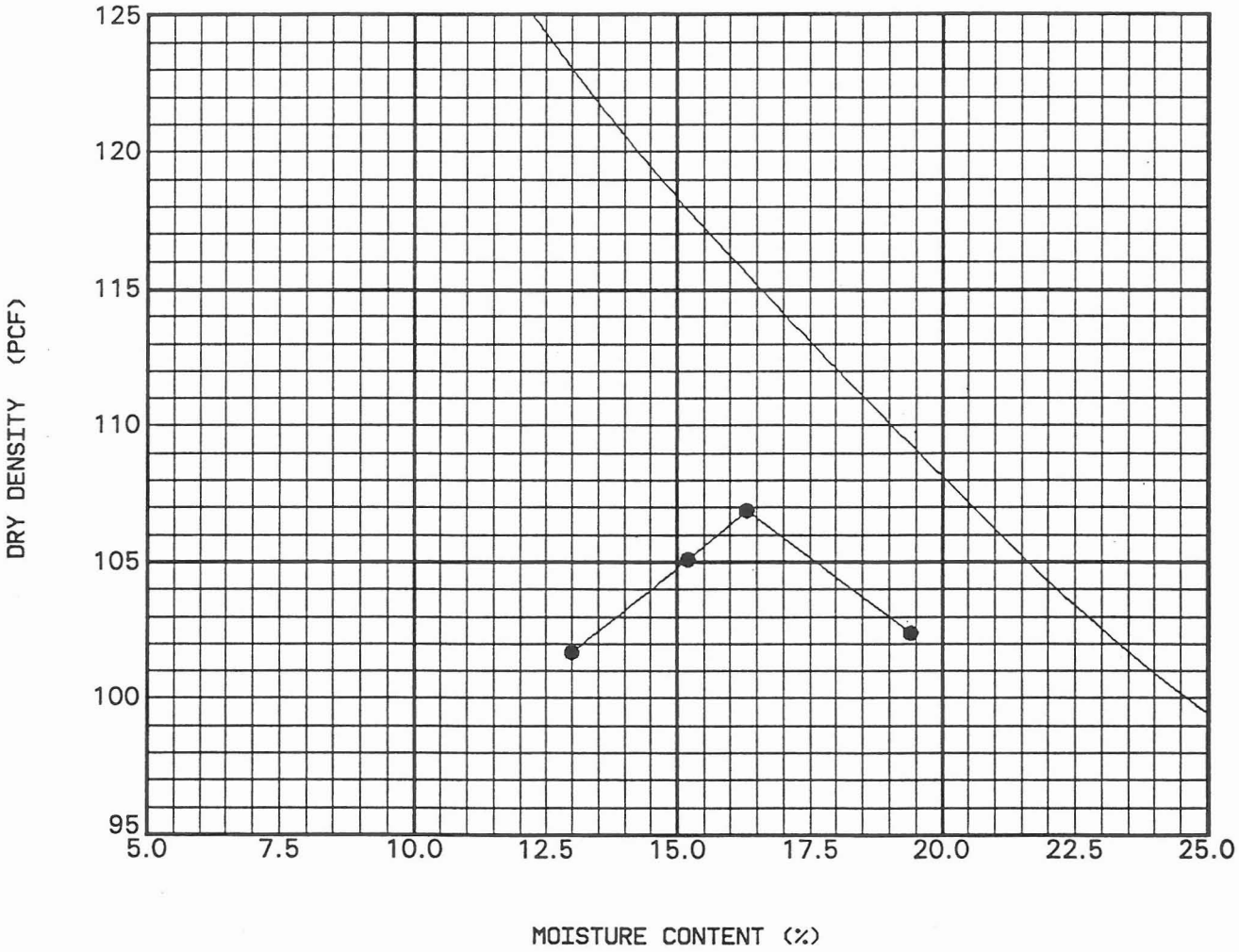
PLASTICITY INDEX: 22

CLASSIFICATION: SC

ASTM SOIL DESCRIPTION: CLAYEY SAND with GRAVEL

MAXIMUM DRY DENSITY: 106.9 PCF

OPTIMUM MOISTURE CONTENT: 16.3 %



SPEEDIE AND ASSOCIATES

SWELL TEST DATA

BORING or TEST PIT No.	SAMPLE DEPTH, ft	REMOLDED DRY DENSITY (pcf)	INITIAL MOISTURE (%)	PERCENT COMPACTION	INITIAL DEGREE of SATURATION (%)	FINAL DEGREE of SATURATION (%)	TOTAL SWELL (%)
B- 4	4.5	102.1	14.3	95.4	61.0	94.2	5.8

PERCENT COMPACTION BASED ON A MAXIMUM DRY DENSITY OF 106.9 pcf @ 16.3 % MOISTURE

Greenway Drainage Channel Improvements
9th St. to 21st St.
Phoenix, Arizona
Project No. 980823SA

SPEEDIE AND ASSOCIATES

Copy

Cannon & Associates, Inc.

Consulting Engineers

406 South 4th Avenue
Tucson, Arizona 85701

(520) 792-2200
(520) 792-3668 FAX

RECEIVED
FEB 18 1999
WOOD, PATEL & ASSOCIATES

February 17, 1999

R. Scott Rasmussen, P.E.
Wood/Patel & Associates, Inc.
1550 East Missouri, Suite 203
Phoenix, Arizona 85014

Re: Greenway Parkway Channel
Structural Calculations
CA 99001-1

Dear Scott:

Enclosed is a revised set of structural calculations on the floodway design. If you need additional work, please let me know.

Sincerely,

Jerry A. Cannon, P.E.
Project Manager

JAC/jh

STRUCTURAL CALCULATIONS

for

THE FLOODWALL

GREENWAY DRAINAGE CHANNEL IMPROVEMENTS

PREPARED BY:

CANNON & ASSOCIATES, INC.
3410 E. University Drive
Suite 390
Phoenix, Arizona 85034

Registered Professional Engineer (Structural)
CERTIFICATE NO. 161
JERRY A. CANNON
Date Signed 2/17/99
ARIZONA, U.S.A.

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WALL DESIGN	6
FOOTING DESIGN	8
WALL SECTION	9
APPENDIX: Draft Geotechnical Report dated October 19, 1998	10

Basis of Design

Design Specification

1994 Uniform Building Code with City of Phoenix Modifications.

Hydraulic Data

Per the phone conversation with Scott Rasmussen of Wood, Patel & Associates, Inc. on 1/29/99, use 2.5 ft. as the maximum water depth (100 Year Hydraulic Grade Line) above the existing gabion.

Design Loading

Wind Load:		80 mph, exposure C
Water:		62.5 pcf
Earth:	Active:	35 pcf
	Passive:	400 pcf

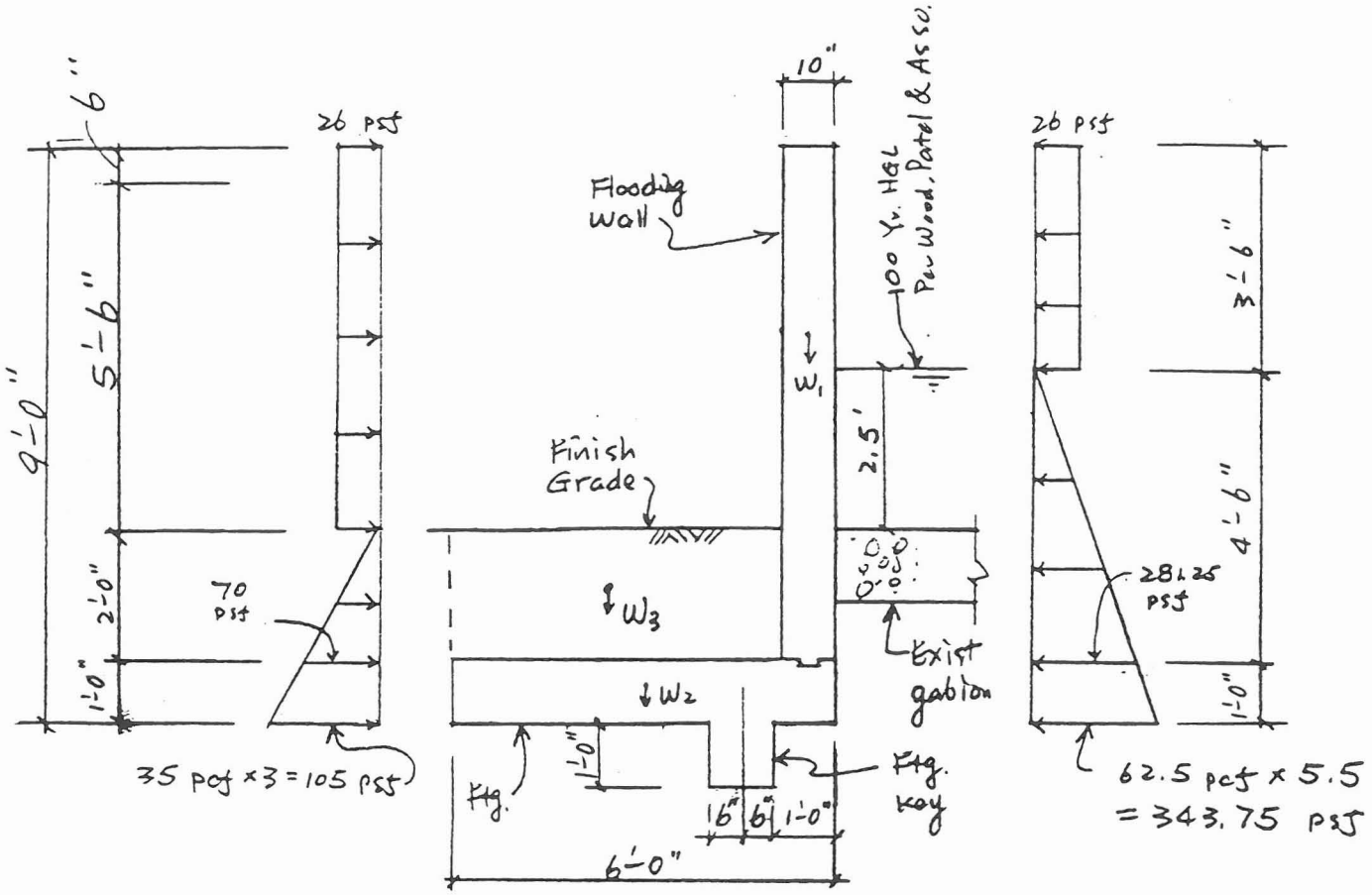
Materials of Construction

Concrete:	f'_c = 3,000 psi at 28 days
Reinforcing Steel:	ASTM A615, Grade 60

Foundations

Draft Geotechnical Report prepared by Speedie & Associates, Report No. 980823SA dated October 19, 1998, and Facismile Transmittal, dated February 4, 1999.

Allowable Bearing Pressure:	2000 psf on engineered fill (Dry and submerged conditions)
Friction Coefficient:	0.35 with Passive Pressure
	0.45 without Passive Pressure



Typical Wall Section
1" = 30'-0"

Check Overturning

Wind Load: $P_w = C_e C_g q_s I_w = (1.06)(1.3)(16.4)(1.15) = 26$ psf

Case 1: Wind Load + Active Soil Pressure from Inside (Left):

Item		WT		Arm		Moments (1-#/1)
W_1	0.83' x 8' x 150 =	1000#	x	0.417'	=	417
W_2	6' x 1' x 150 =	900#	x	3'	=	2700
W_3	5.17' x 2' x 120 =	1240#	x	3.415'	=	4234
		3140#				7351 1-#/1

$M_{OT.} = 26\text{ psf} \times 6' \times (\frac{6'}{2} + 3') + 105\text{ psf} \times 3 \times \frac{1}{2} \times \frac{3}{3} = 1093.5$ 1-#/1

$S.F._{OT} = \frac{7351}{1093.5} = 6.72 > 1.5$ O.K.

Cannon & Associates, Inc.
Consulting Engineers

project no.: CA 99001-1
project: Greenway Flood Wall
designed by: HM
checked by: AL
date: 2/99 sht. 3 of

Check Overturning (cont.)

Case II : Wind Load + Water Pressure from Channel side

$W_1 = 1000^{\#} \times 5.59' = 5590^{'-\#/'}$
$W_2 = 900^{\#} \times 3' = 2700^{'-\#/'}$
$W_3 = 1240^{\#} \times 2.59' = 3211^{'-\#/'}$
$3140^{\#}$ $\quad$ $11501^{'-\#/'}$

$$M_{OT} = 26(3.5')\left(\frac{3.5'}{2} + 5.5'\right) + 343.75 \times 5.5 \times \frac{1}{2} \times \left(\frac{5.5}{3}\right) = 2393^{'-\#/'}$$

$$SF_{OT} = \frac{11501}{2393} = 4.81 > 1.5 \quad \underline{o.k.}$$

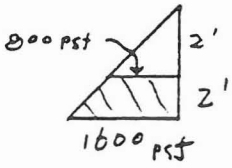
Check Sliding

Case I :

Active Force : $26 \times 6 + 105 \times 3 \times \frac{1}{2} = 313.5^{\#/'}$
Friction Force : $3140 \times 0.45 = 1413^{\#/'}$
$$S.F._{slide} = \frac{1413}{313.5} = 4.51 > 1.5 \quad \underline{o.k.}$$

Case II :

Active Force : $26 \times 3.5 + 343.75 \times 5.5 \times \frac{1}{2} = 1036.3^{\#/'}$
Friction Force : $3140 \times 0.35 = 1099^{\#/'}$
Passive Force : $1200 \times 2' = 2400^{\#/'}$
$$S.F._{slide} = \frac{1099 + 2400}{1036.3} = 3.38 > 1.5 \quad \underline{o.k.}$$



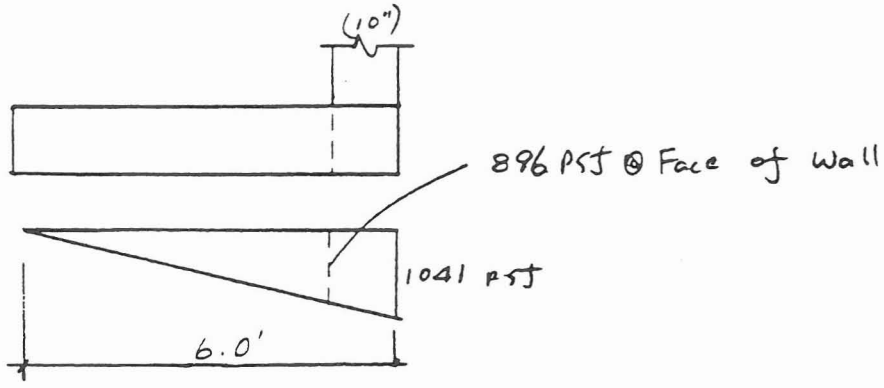
Check soil Pressure

Case I

$$\bar{x} = \frac{7351 - 1036.3}{3140} = 2.01' \approx \frac{6'}{3} = 2'$$

$$q_{max.} = \frac{2 \times 3140}{3 \times 2.01} = 1041 \text{ psf} < 2000 \text{ psf} \quad \underline{\text{o.k.}}$$

$$q_{min.} = 0$$

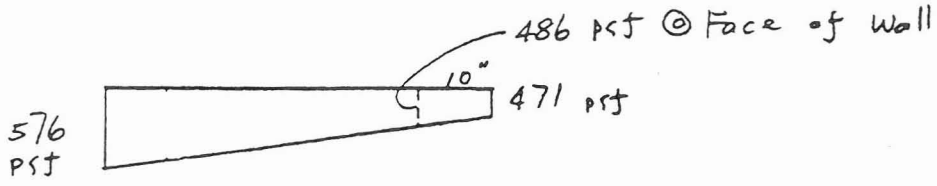


Case II

$$\bar{x} = \frac{11501 - 2393}{3140} = 2.90' > 2', \text{ inside the kern.}$$

$$q_{max} = (4 \times 6 - 6 \times 2.90)\left(\frac{3140}{6^2}\right) = 576 \text{ psf} < 2000 \text{ psf} \quad \underline{\text{o.k.}}$$

$$q_{min.} = (6 \times 2.90 - 2 \times 6)\left(\frac{3140}{6^2}\right) = 471 \text{ psf}$$



Wall Design (cont).

Shear Friction:

$V = 26(3.5) + 28.125(4.5)(\frac{1}{2}) = 724^{\#}$ ← case II controls

$A_{vf.\ req'd} = \frac{724}{24000(1 \times 1)} = 0.0302\ in^2$

Provide: #4 @ 18" o.c.

Horizontal Rebar: (per UBC)

$[0.002(12")(12")](\frac{1}{2}) = 0.144\ in^2$

Use #4 @ 1'-4", $A_s = 0.15\ in^2 > 0.144\ in^2$ O.K.

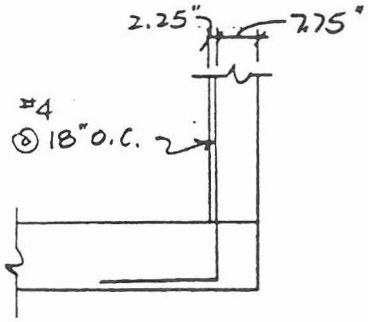
Wall Design

Case I:

Moment at Bott. of Wall:

$$M = 26(6)\left(\frac{6}{2} + 2\right) + 70(2)\left(\frac{1}{2}\right)\left(\frac{2}{3}\right) = 827^{1-\#/}$$

Use #4 @ 18" o.c., $A_s = 0.133\ in^2$, $d = 7.75"$, use $d = 7.5"$



$$\rho = \frac{0.133}{7.5(12)} = 0.00148,\ n = 9,\ n\rho = 0.0133,$$

$$k = 0.15,\ j = 0.95,\ \frac{M}{bd^2} = 14.7$$

$$f_c = \frac{M}{bd^2} \cdot \frac{2}{kj} = 206 \text{ psi} < 1200 \text{ psi} \quad \underline{o.k.}$$

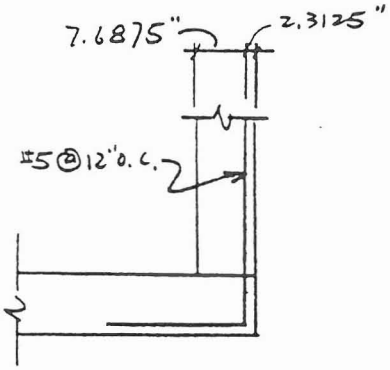
$$f_s = \frac{M}{bd^2} \cdot \frac{1}{\rho j} = 10455 \text{ psi} < 24000 \text{ psi} \quad \underline{o.k.}$$

Case II:

Moment at Bott. of Wall:

$$M = 26(3.5)\left(\frac{3.5}{2} + 4.5\right) + (281.25)(4.5)\left(\frac{1}{2}\right)\left(\frac{4.5}{3}\right) = 1518^{1-\#/}$$

Use #5 @ 12" o.c., $A_s = 0.31\ in^2$, $d = 7.6875"$, use $d = 7.5"$



$$\rho = \frac{0.31}{7.5(12)} = 0.00344,\ n\rho = 0.031,$$

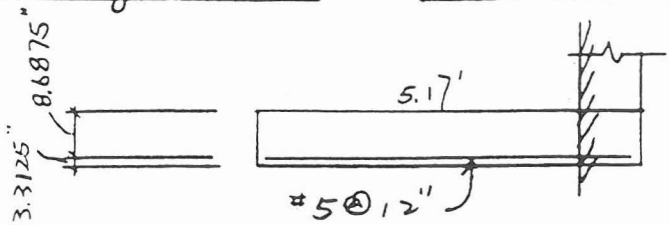
$$k = 0.22,\ j = 0.92,\ \frac{M}{bd^2} = 27$$

$$f_c = 267 \text{ psi} < 1200 \text{ psi} \quad \underline{o.k.}$$

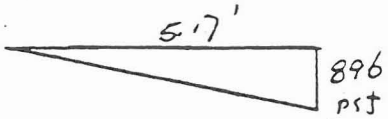
$$f_s = 8531 \text{ psi} < 24000 \text{ psi} \quad \underline{o.k.}$$

Footing Design

Use: #5 @ 12" o.c.



Case I:



$$M_I = 896(5.17)\left(\tfrac{1}{2}\right)\left(\tfrac{5.17}{3}\right) - [(1)(150)+(2\times120)](5.17)\left(\tfrac{5.17}{2}\right)$$

$$M_I = -1221\ ^{\prime-\#}$$

Case II:

$$M_{II} = 486(5.17)\left(\tfrac{5.17}{2}\right) + 90(5.17)\left(\tfrac{1}{2}\right)\left(\tfrac{5.17\times2}{3}\right) - [(1)(150)+(2\times120)](5.17)\left(\tfrac{5.17}{2}\right)$$

$$M_{II} = 2084\ ^{\prime-\#} \leftarrow \text{controls.}$$

Try #5 @ 12" o.c., $A_s = 0.31\ in^2$, Use $d = 8.5"$, $f'_c = 3000$ psi

$$\rho = \frac{0.31}{12(8.5)} = 0.00304,\quad n\rho = 0.0274,\quad k = 0.208,\quad j = 0.93$$

$$\frac{M}{bd^2} = 28.9$$

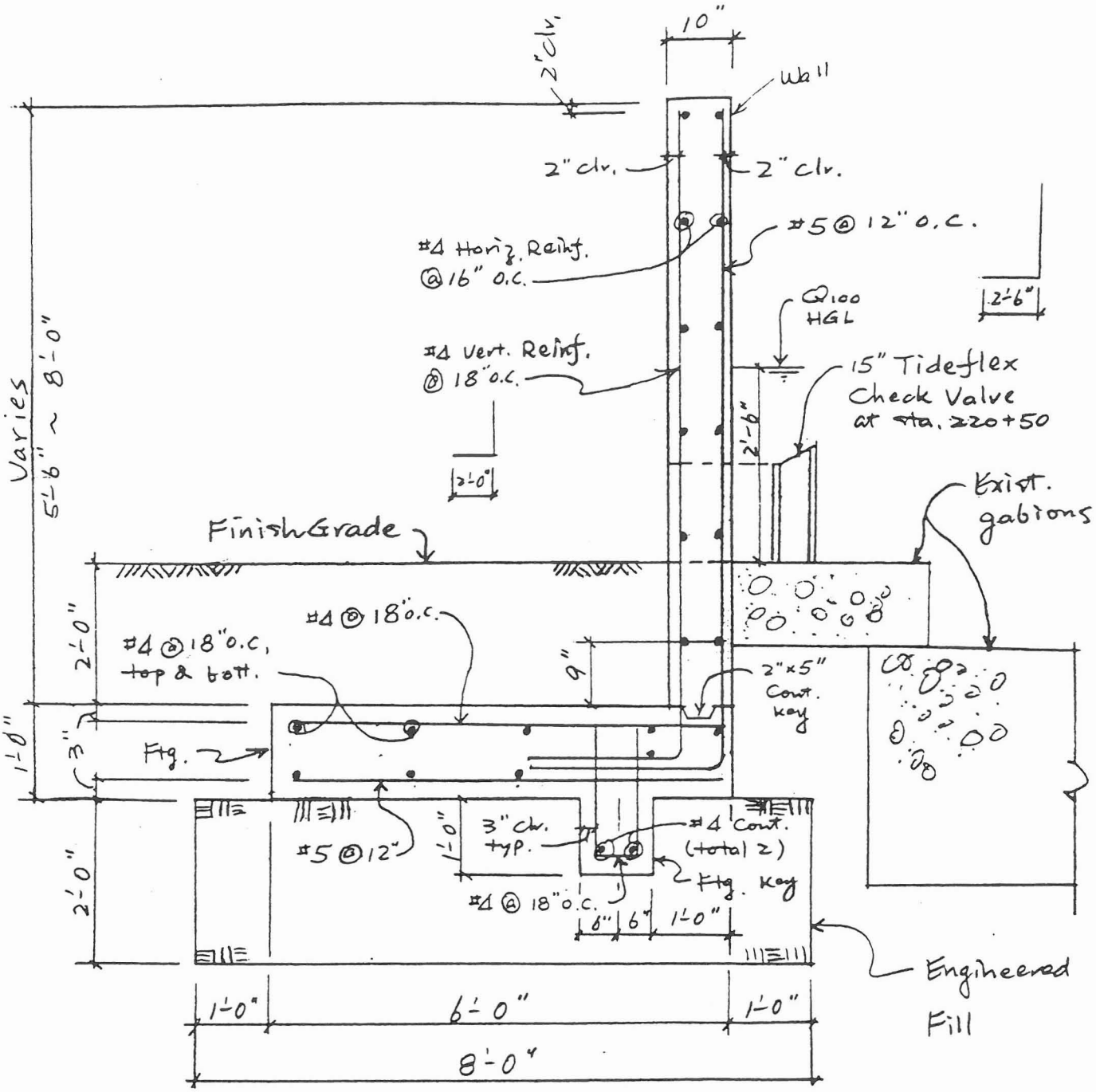
$f_c = 298$ psi < 1200 psi <u>o.k.</u>

$f_s = 10222$ psi < 24000 psi <u>o.k.</u>

Shear:

$$V = 486(5.17) + 90(5.17)\left(\tfrac{1}{2}\right) = 2745^{\#}$$

$$v = \frac{2745}{12(8.5)} = 27 \text{ psi} < 0.95\sqrt{f'_c} = 52 \text{ psi}$$ <u>o.k.</u>



Note: Ftg. to be supported on dense native soil or engineered fill with at least 2000 psf bearing capacity.

Cannon & Associates, Inc.
Consulting Engineers

project no. : CA 99001-1
project : Greenway Flood Wall
designed by : HM
checked by : AC
date : 2/99 sht. 9 of 32

Exhibit A

Hydrology Map

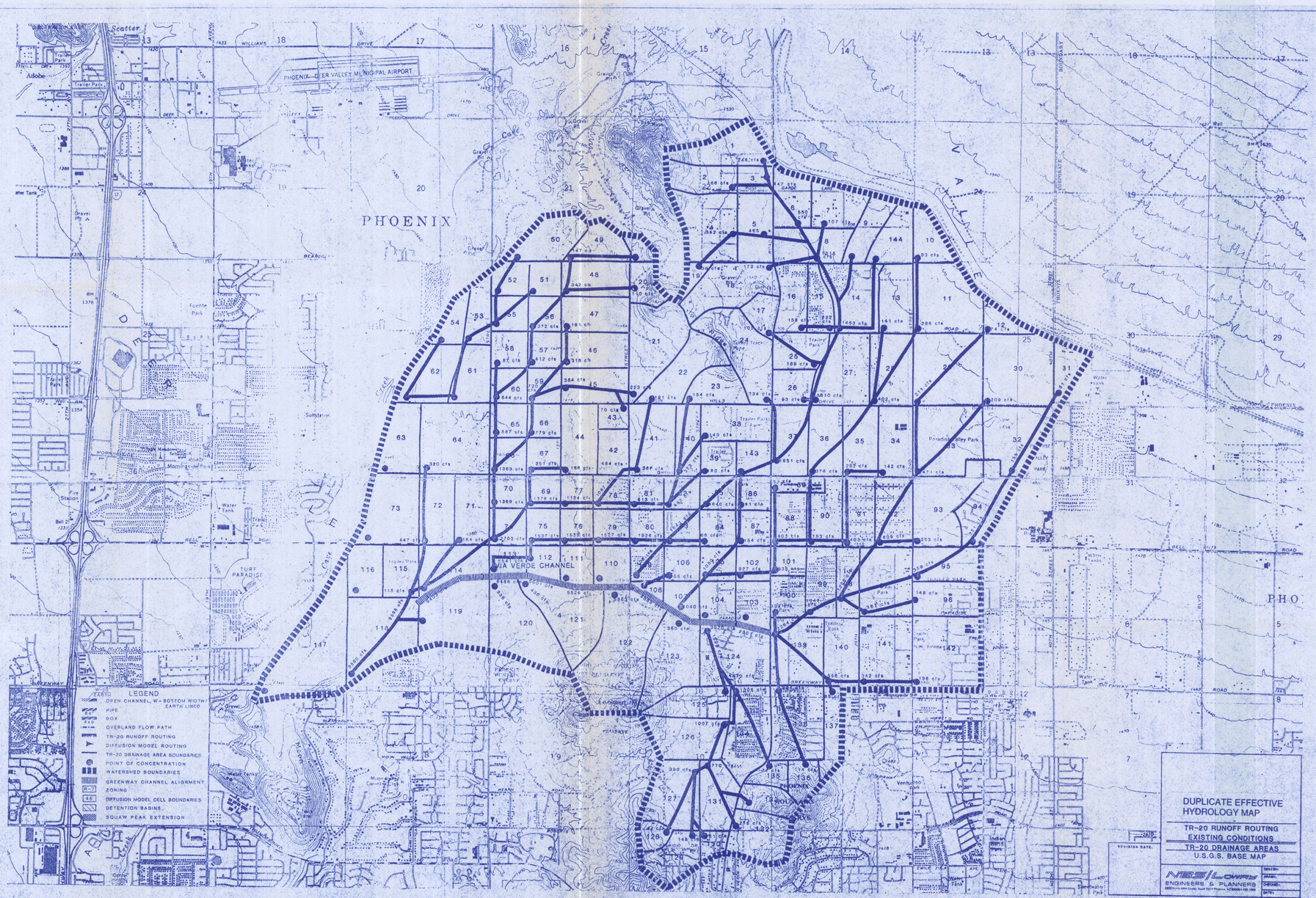

PHOENIX
PHOENIX—DEER VALLEY MUNICIPAL AIRPORT
MIA VERDE CHANNEL
LEGEND
OPEN CHANNEL, W = BOTTOM WIDTH/ EARTH LINED
PIPE
BOX
OVERLAND FLOW PATH
TR-20 RUNOFF ROUTING
DIFFUSION MODEL ROUTING
TR-20 DRAINAGE AREA BOUNDARIES
POINT OF CONCENTRATION
WATERSHED BOUNDARIES
GREENWAY CHANNEL ALIGNMENT
ZONING
DIFFUSION MODEL CELL BOUNDARIES
DETENTION BASINS
SQUAW PEAK EXTENSION
DUPLICATE EFFECTIVE
HYDROLOGY MAP
TR-20 RUNOFF ROUTING
EXISTING CONDITIONS
TR-20 DRAINAGE AREAS
U.S.G.S. BASE MAP
REVISION DATE
NBS/LOWRY
ENGINEERS & PLANNERS

EXHIBIT A

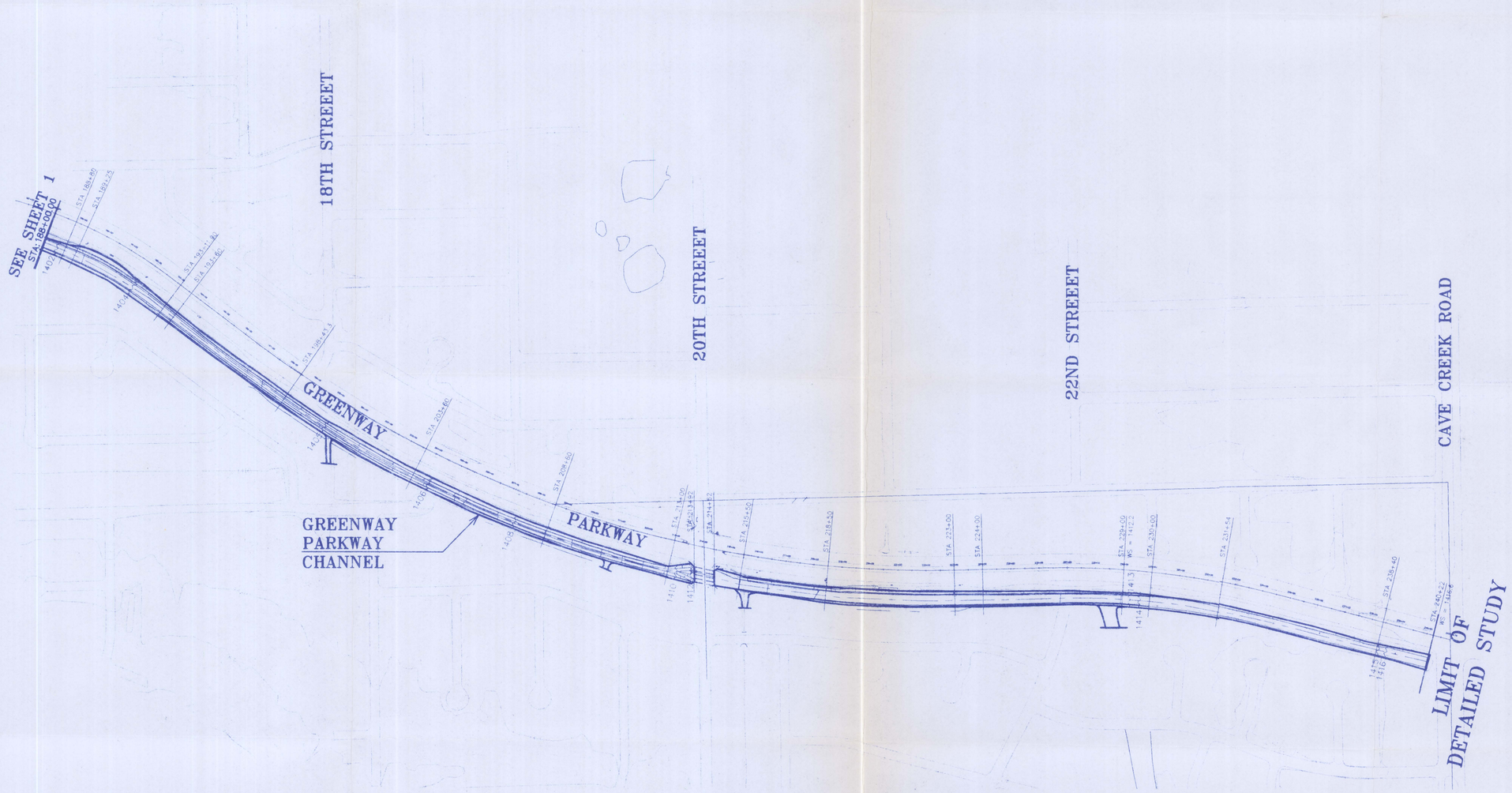
Exhibit B

Proposed Construction Plans Under Separate Cover

Please refer to the full size (24x36) plan set titled *City of Phoenix, Street Transportation Department, Design & Construction Management Division, Greenway Parkway Channel, 9th Street to Cave Creek Road, ST 83130010* marked Preliminary, 70% submittal as submitted with this CLOMR Submittal.

Exhibit C

Proposed Floodway Work Map



LEGEND

———	100 YEAR FLOODPLAIN LIMIT (FLOODWAY = FLOODPLAIN)
1382	BASE FLOOD ELEVATION
STA 161+00	CROSS SECTION
— · —	CHANNEL THALWEG

V:\980903\40SUB\FEMA2.DWG

N

200 0 100 200

1 inch = 200 ft.

PREPARED FOR
CITY OF PHOENIX
ARIZONA
STREET TRANSPORTATION DEPARTMENT

WOOD, PATEL & ASSOCIATES, INC.
1550 EAST MISSOURI, SUITE 203
PHOENIX, AZ 85014
(602) 234-1344

EXHIBIT C
PROPOSED FLOODWAY WORK MAP

UPPER EAST FORK CAVE CREEK
GREENWAY PARKWAY CHANNEL
FEMA CLOMR SUBMITTAL

DR. CW 1-5-99	DES. DTP 1-5-99	CK. DTP 3-15-99	SHEET NO.	TOTAL SHEETS	AS BUILT
SCALE:	HORIZONTAL 1"=200' VERTICAL N/A		2	2	N/A

Exhibit D

Annotated FIRM Panel

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

- **ZONE A** No base flood elevations determined.
- **ZONE AE** Base flood elevations determined.
- **ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- **ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE A99** To be protected from 100-year flood by Federal flood protection system under construction; no base elevations determined.
- **ZONE V** Coastal flood with velocity hazard (wave action); no base flood elevations determined.
- **ZONE VE** Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

- **ZONE X** Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside 500-year flood plain.
- **ZONE D** Areas in which flood hazards are undetermined.

Flood Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

513 — Base Flood Elevation Line; Elevation in Feet*

(D)—(D) Cross Section Line

(EL 987) Base Flood Elevation in Feet Where Uniform Within Zone*

$RM7_X$ Elevation Reference Mark

*Referenced to the National Geodetic Vertical Datum of 1929

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas.

Areas of special flood hazard (100-year flood) include Zones A, A1-30, AE, AH, AO, A99, V, V1-30 AND VE.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.

Coastal base flood elevations apply only landward of the shoreline.

Corporate limits shown are current as of the date of this map. The user should contact appropriate community officials to determine if corporate limits have changed subsequent to the issuance of the map.

For community map revision history prior to countywide mapping, see Section 6.0 of the Flood Insurance Study Report.

For adjoining map panels see separately printed Map Index.

MAP REPOSITORY
Refer to Repository Listing on Index Map

EFFECTIVE DATE OF
COUNTYWIDE FLOOD INSURANCE RATE MAP
APRIL 15, 1988

EFFECTIVE DATE (S) OF REVISION (S) TO THIS PANEL
SEPTEMBER 29, 1989
DECEMBER 3, 1993

Map revised SEPTEMBER 30, 1995 to update corporate limits, to change base flood elevations, to add base flood elevations, to add special flood hazard areas, to change special flood hazard areas, to change zone designations, to add and update roads and road names, to reflect updated topographic information, to incorporate previously issued letters of map revision, and to incorporate previously issued letters of map amendment.

To determine if flood insurance is available, contact an insurance agent or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE IN FEET
1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 1220 OF 4350

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
PHOENIX, CITY OF	040051	1220	G

EXHIBIT D
ANNOTATED FIRM PANEL

MAP NUMBER
04013C1220 G

MAP REVISED:
SEPTEMBER 30, 1995

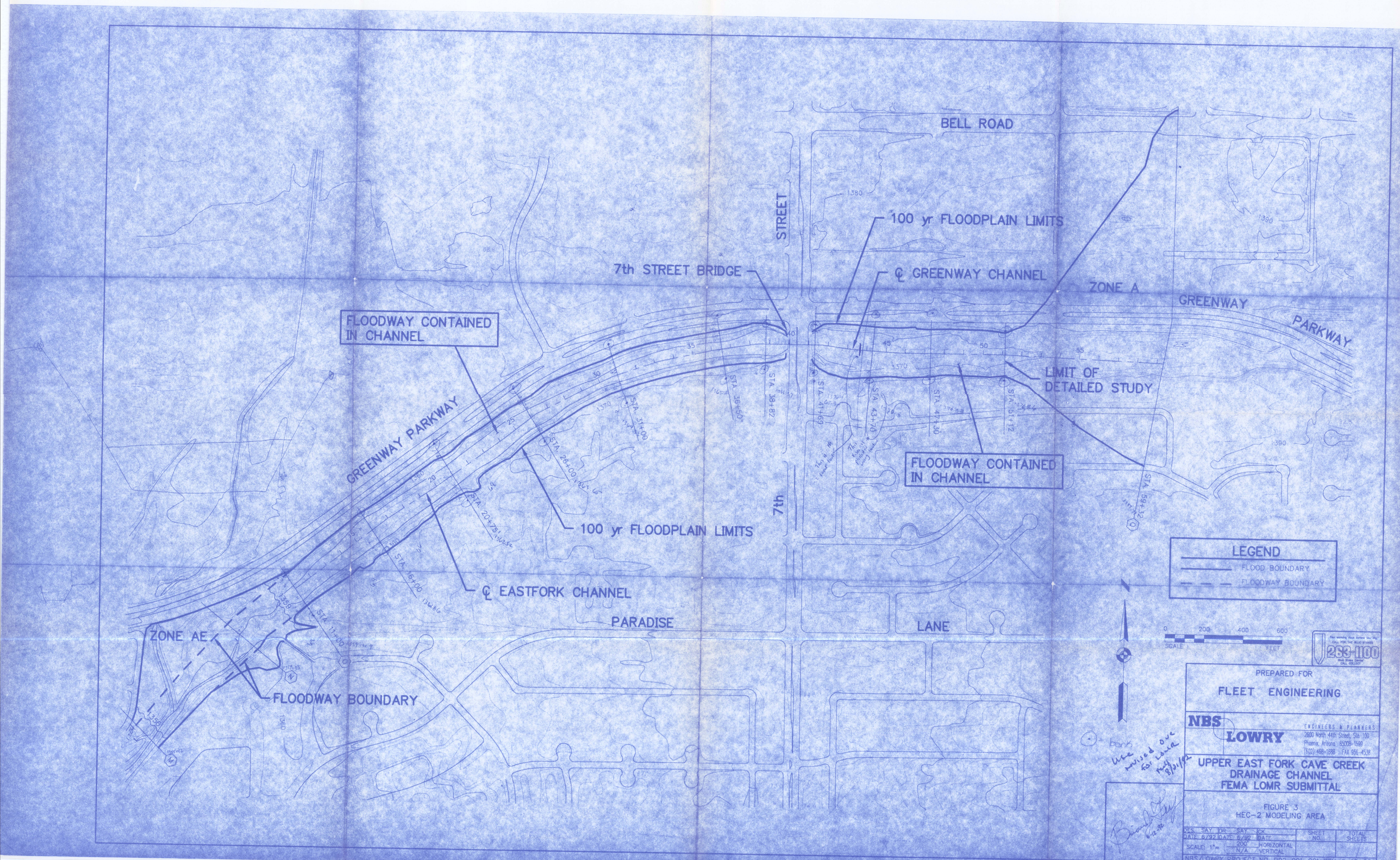
Federal Emergency Management Agency

Exhibit E

Figure 3-HEC-2 Modeling Area,

FEMA LOMR Submittal by NBS/Lowry

(This map was approved by FEMA and subsequently, LOMR was issued)


BELL ROAD
STREET
100 yr FLOODPLAIN LIMITS
7th STREET BRIDGE
℄ GREENWAY CHANNEL
ZONE A
GREENWAY
PARKWAY
FLOODWAY CONTAINED IN CHANNEL
LIMIT OF DETAILED STUDY
GREENWAY PARKWAY
FLOODWAY CONTAINED IN CHANNEL
7th
100 yr FLOODPLAIN LIMITS
℄ EASTFORK CHANNEL
PARADISE
LANE
ZONE AE
FLOODWAY BOUNDARY
STA 11+00
STA 20+75
STA 26+00
STA 31+00
STA 36+50
STA 38+82
STA 43+70
STA 47+30
STA 51+12
STA 56+32
LEGEND
FLOOD BOUNDARY
FLOODWAY BOUNDARY
N
0 200 400 600
SCALE FEET
263-1100
Blue Stakes Center
CALL 602.263.1100
PREPARED FOR
FLEET ENGINEERING
NBS
LOWRY
ENGINEERS & PLANNERS
2600 North 44th Street, Ste. 100
Phoenix, Arizona 85008-1589
(602) 468-1888 FAX 956-4538
UPPER EAST FORK CAVE CREEK
DRAINAGE CHANNEL
FEMA LOMR SUBMITTAL
FIGURE 3
HEC-2 MODELING AREA
DES. SAY DR. SAY CK.
DATE 6/92 DATE 6/92 DATE
SHEET NO.
TOTAL SHEETS
SCALE 1"= 200 HORIZONTAL
N/A VERTICAL
NBS/LOWRY PROJECT NO. F92-201-001