FLOOD PROTECTION PLANNING STUDY

for

CITY OF EAGLE PASS

MAVERICK COUNTY, TEXAS

funded in part by a
Flood Protection Planning Grant

from

Texas Water Development Board

by

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TABLE OF CONTENTS

Figures

Tables

Sheets

Appendices

- Tributary 2
- Unnamed Creek

B. Hydrologic models - HEC-HMS models
- Main Arroyo and tributaries
- Unnamed Creek
- Seco Creek Tributary

C. Hydraulic models - HEC-RAS models
- Rio Grande extended
- Main Arroyo & Tributary 3
- Tributary 1
- Tributary 2
- Unnamed Creek
- Seco Creek Tributary

D. Alternatives for Flood Damage Reduction
- Existing Structure Information
- Costs for each Alternative
- Value of Structures Protected

E. Draft Drainage Ordinance

EAGLE PASS FLOOD STUDY
Executive Summary

Project Background – This Flood Study is co-sponsored by the City of Eagle Pass and the Texas Water Development Board under contract No. 98-483-242. The study presents data collected, the hydrologic analysis, hydraulic analysis, flood reduction alternatives considered and an economic analysis of the flood reduction alternatives. Conclusions reached as a result of the flood study are described below:

1. **Data Collection and Aerial Mapping along Rio Grande River and for the City of Eagle Pass** - The International Boundary and Waterway Commission is the governing authority to regulate the use of water and the quality of water entering the Rio Grande River. *The City of Eagle Pass may want to combine its dollars with the IBWC to map new areas as they develop.*
2. **Flood Insurance Study Validation** – An effort to validate the existing HEC-2 models from the 1979 Flood Insurance Study for Eagle Pass was conducted. This work then served as a basis for modeling the existing and future condition streams. The hydrology and hydraulics of the existing FIS were analyzed and new flows and flood plains determined for planning purposes. Although only the 100-year event was depicted in this study, a full range of flows was determined in the stream models. The models created by this Flood Protection Study could serve as a basis to revise the existing FIS study. *The City of Eagle Pass may chose to apply for updating its existing flood insurance study with the Federal Emergency Management Administration to redefine new flood plains, to redefine more streams studied and to identify improvements which have occurred on existing streams since 1979 when the older study was completed.*
3. **Flood Damage Reduction Alternatives** - A list of suggested alternatives for flood damage reduction is summarized in the study. These alternatives will provide a 25- to 100-year level of protection to the City of Eagle Pass. These alternatives could be phased in over a period of years in a Capital Improvement Program. Recent development along Loop 431 and Highway 277 will add significant areas of impervious cover in the upper watersheds of Tributary 2 and 3 and the Unnamed Tributary. This fact will increase future flood levels in these watersheds. *The City of Eagle Pass should phase these drainage improvements in over time and finance them through a drainage fee, a bond program or some other type of public funding.*
4. **Flooded properties along the Rio Grande River** - The flood-prone properties along the Rio Grande River could be purchased to alleviate future flood damages. This would be a one-time compensation to property owners along the river. This alternative appears to be less expensive in the long run for the City of Eagle Pass than flood proofing. *The City of Eagle Pass would have to borrow or obtain a grant from FEMA to assist with this option.*
5. **Proposed Storm water and Drainage Ordinance** - Appendix E contains a draft Drainage Ordinance modified to fit flooding issues in Eagle Pass. *The City of Eagle Pass may want to consider adoption of this ordinance to allow for orderly development of the upper watersheds along Loop 431 and US Highway 277, and to assure the City that as development occurs, property owners will bear their proportionate share of the cost of drainage improvements.*
6. **Storm Water Regulations as Proposed by the Environmental Protection Agency** - As the Environmental Protection Agency expands the storm water program for Phase II, this is scheduled to go into effect by the year 2000. The State of Texas, TNRCC, will take over the monitoring and compliance part of the NPDES program. *The City of Eagle Pass may choose to participate and use this planning study to identify all existing storm water discharges into waters of the United States and later to develop a sampling and testing program to periodically monitor storm water discharges associated with industrial activities.*
7. **Public Involvement and Eagle Pass Web Site** - Additions to the City of Eagle Pass web site may be made with links to FEMA, TNRCC, TWDB and others to provide information on flooding. The City could expand this site to include information on activities by the Public Works department, such as water rates, wastewater rates, street closures and repair, flooding, solid waste collection, and complaints. The posting of flooded area maps could aid homeowners or insurance agents, regarding which properties might be in the 100-year flood plain. *The City of Eagle Pass may want to allocate part of its existing WEB site to be dedicated to Public Works updates.*

Eagle Pass Flood Protection Planning Study

I. Introduction

The first section of the report covers the project background, purpose, and previous studies. The second section describes the data collection effort. The third section describes the hydrologic methods and assumptions used in determining the peak discharges used for different storm events. The fourth section describes the hydraulic methods and assumptions used in modeling the streams in Eagle Pass. The fifth section describes the flood reduction alternatives considered and the economic analysis of these flood reduction alternatives.

A. Project Background

Eagle Pass is located in Maverick County in South Central Texas along the border with Mexico. Eagle Pass is situated about 60 miles south of Del Rio and 70 miles north of Laredo, Texas on the Rio Grande, River. Figure 1 shows the location of Eagle Pass, Texas.

Major flooding events have occurred in Eagle Pass in 1954, 1963, 1964, 1967, 1969, 1970, 1983, and 1998. Streams generally flow from east to west towards the Rio Grande through Eagle Pass. Streams located along the south City limit of Eagle Pass generally flow south to agricultural areas. A major irrigation ditch identified as the Maverick County Canal and owned by the Maverick County Irrigation and Drainage District No. 1 carries irrigation water to large parts of the county located to the south of Eagle Pass. Topography in the Eagle Pass area is hilly with stream slopes varying in grade from 0.4 % to 2.0 %.

An excerpt on flooding along the Rio Grande in Eagle Pass as reported in the Flood Insurance Study states:

> "Damaging floods have occurred in Eagle Pass in 1954, 1963, 1964, 1967, 1969, 1970, and 1983. Flooding on the Rio Grande is fed by a drainage basin of approximately 127,000 square miles, which is enhanced by tropical storms that occasionally move inland along the Rio Grande or through northern Mexico. In June of 1954, Hurricane Alice moved inland up the Rio Grande from the Gulf of Mexico south of Brownsville. Rainfalls of as much as 27.1 inches in 48 hours resulted in the greatest flood on the middle Rio Grande since June, 1865. Rises of 50 to 60 feet, or 30 to 40 feet above flood stage, occurred at Eagle Pass within 48 hours. The construction of Amistad Dam (completed in 1969) on the Rio Grande 73 miles upstream of Eagle Pass has reduced but not eliminated flood damages from the Rio Grande.
>
> Flooding potential from the Main Arroyo and its tributaries has increased in recent years due to a combination of urbanization and inadequate bridge and culvert openings. The most recent floods in Eagle Pass, according to local residents, were those of 1954, 1963, 1964, 1967, 1969, 1970, and 1983. There are no stream gauging records and no adequate high water marks to estimate flows for the Main Arroyo for any of these periods."

The climate of Eagle Pass is dry to semi-arid with an average annual rainfall of about 19 inches per year. Tropical storms have triggered significant amounts of rainfall in recent years as evidenced most recently by Hurricane Charley in August, 1998. Rainfall approaching 20

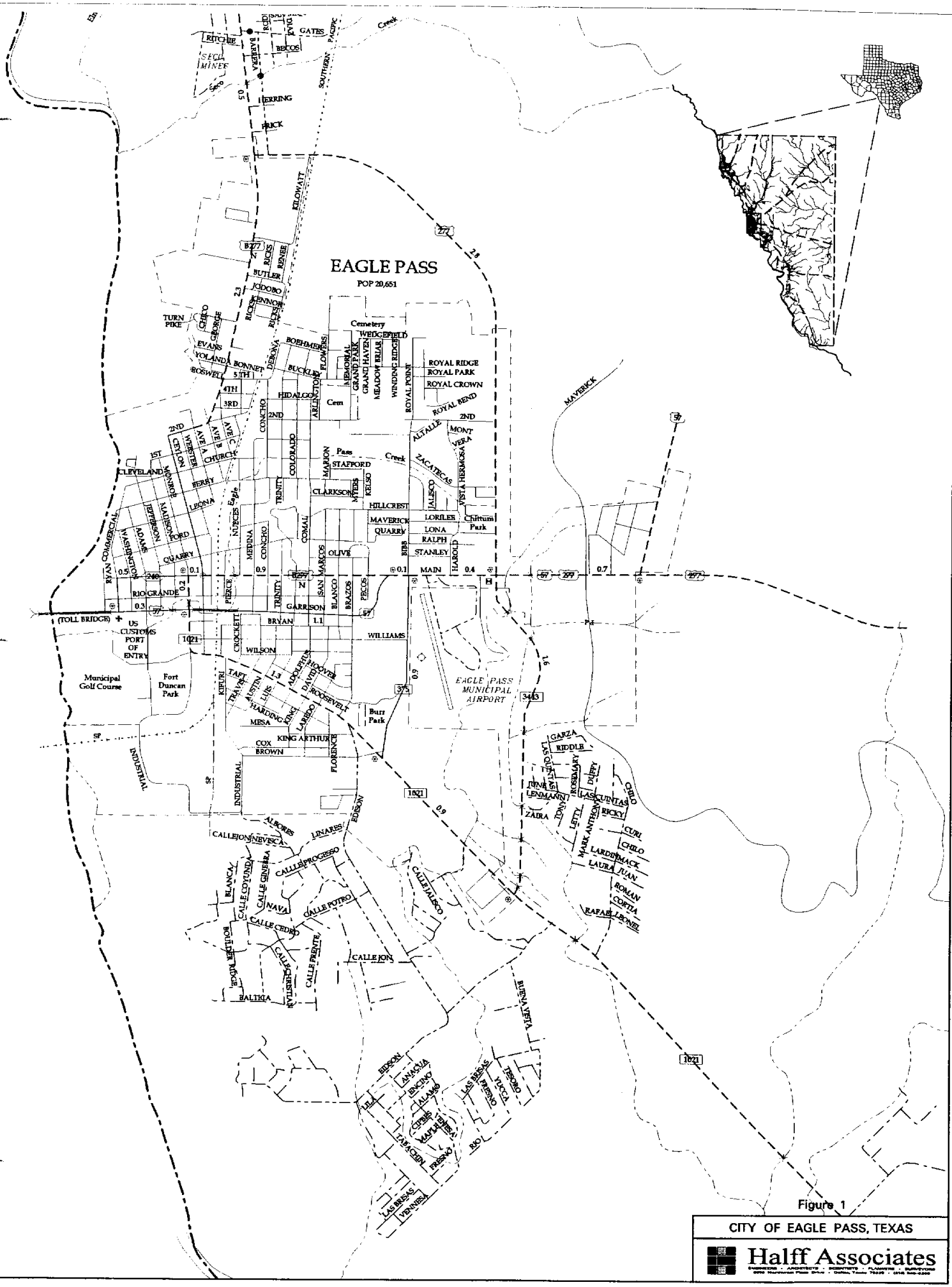

Figure 1

CITY OF EAGLE PASS, TEXAS

Halff Associates

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inches in a 24-hour period was recorded in nearby Del Rio, Texas resulting from Hurricane Charley.

The City of Eagle Pass, Texas and the Texas Water Development Board under Contract No. 98-483-242 provided funding for this study.

B. Purpose of Study

The purpose of the Eagle Pass Flood Protection Planning Study is to provide the City and the Texas Water Development Board with technical data for decision-making in two areas: 1) solving the existing flooding problems; and 2) prevention of flooding problems from future development with prudent flood plain management. To accomplish these goals an information base comprised of field surveys, engineering plans, previous studies, photos, personal communication and other sources was developed. This report documents the results of the investigation, and presents the methods, analysis, and flood protection alternatives considered. An economic analysis is also presented.

The City of Eagle Pass needs to update its comprehensive drainage plan since development is occurring in the north and west parts of the City. Previous flooding in 1983 caused damage to some downtown businesses and homes. During storm events in 1990, culverts were damaged near Loop 431. Also, due to the recent rains and flooding along the Rio Grande during August 23-24, 1998, some homes along Ryan Street were damaged as a result of high river levels. As a result of the 1998 flood event, the scope of this study was expanded to include mapping and analysis of the Rio Grande River. Seventeen homes and one business were condemned, and the City is presently considering a buyout of these properties.

Four public meetings were held during the course of the study, March 16, 1998, May 21, 1998, July 16, 1998, and March 16, 1999.

C. Previous Studies

Previous studies by various consultants have been completed over the past 36 years in Eagle Pass. Turner and Collie Consulting Engineers completed the first comprehensive drainage study in 1964. This study proposed drainage improvements to the Main Arroyo and provided aerial mapping with 5' contours for a large part of the downtown area. Hunter and Associates in 1965 completed a comprehensive plan, which included an inventory of existing drainage structures in Eagle Pass. This study recommended drainage improvements and associated costs. Southwest Planning Associates in 1972 completed a plan for the Central Business District, including a storm drainage system map showing existing storm sewers and manholes.

URS/Forrest & Cotton, Inc. in 1981 completed a flood insurance study for Eagle Pass which delineated the 10, 50, 100, and 500-year flood plain limits for the Rio Grande River, Main Arroyo, and a major tributary. Flood Insurance Rate Maps were prepared and flood insurance hazard factors were determined for insurance purposes.

In 1993 the Governor's Working Group addressed border issues. One of the issues presented was the joint cooperation with Mexico in solving storm drainage problems. Several common flooding problems were identified.

In 1996 a flood study was performed for the proposed Second International Bridge built in Eagle Pass. Grove & Associates, Inc. performed this study for the bridge design. The flood study consisted of four cross-sections supplemented by information from the International Boundary and Waterway Commission.

II. Data Collection

Data collection efforts conducted during the course of this study included:

1. Meetings with City Staff to obtain available plans, flood photos, maps, previous studies, other pertinent data, and to confirm limits of detailed study.
2. Contacts with other agencies such as Soil Conservation Service (County soil survey maps, flood control studies, aerial photos, computer models), Texas Department of Transportation (TxDOT) (Highway plans, topographic, drainage calculations, digital topographic maps), Corps of Engineers, International Water and Boundary Commission (IBWC), Federal Emergency Management Agency (FEMA), (Flood data, topographic mapping, hydrologic/hydraulic computer models, and other related data).
3. Field trips to visit project sites for field (visual) inspection of existing drainage features and flooding problems. Flooding pictures taken in past storm events are shown at the end of this report. A collection of over 200 photos was taken of all drainage structures in Eagle Pass.
4. Field surveys, as needed to supplement the topographic maps, field surveys of existing drainage features such as culverts, and the dimensions and flow lines of affected underground storm sewers.
5. Aerial topographic mapping at 2-foot contour intervals of the stream flood plains were obtained under subcontract from Landata-Geosource for the purposes of this report. These maps were provided in hard copy and digital format to the City of Eagle Pass and were used to delineate the existing and fully developed 100-year flood plain in this report.
6. Several articles which document the history of Eagle Pass and its ties to water supply and the role irrigation played in developing large land tracts into productive agricultural areas.
7. A structure inventory of stream crossings and channel improvements was performed for each stream studied in detail.

From these resources the hydrologic and hydraulic analyses were performed and several flood reduction alternatives evaluated.

III. Hydrologic Analysis

The hydrologic method used to estimate storm water runoff in Eagle Pass was based on the Soil Conservation Service (SCS) method. This method is widely used by engineers for the analysis of urban watersheds. URS/Forrest & Cotton, Inc also used the SCS method in the original Eagle Pass Flood Insurance Study completed in 1979. For these reasons the SCS method was chosen for use in this study. The following discussion presents a brief explanation of the methodology, hydrologic parameters calculated, and peak discharges used in the study.

A. Methods

The Soil Conservation Service (SCS) method for computing runoff from storm rainfall is based on the theory of abstractions. The SCS method uses a 24-hour storm duration, which is considered acceptable for the Eagle Pass area. It should be noted that when using this method a Type I antecedent moisture condition (AMC) should be used for the Eagle Pass area. A more complete discussion of the SCS method is presented in Appendix B. Also, an excellent discussion of the SCS method is presented in NEH-4: "Hydrology" Section 4, National Engineering Handbook by the Soil Conservation Service.

The SCS developed an index, called the runoff curve number, to represent the combined hydrologic effect of soil type, land use, agricultural land treatment class, hydrologic condition, and antecedent soil moisture. These watershed factors were found to have the most significant impact on estimating the volume of runoff, and can be assessed from soil surveys, site investigations, and land use maps.

The curve number is an indication of the runoff producing potential of the drainage area for a given antecedent soil moisture condition, and can range in value from 0 to 100. The SCS runoff curve numbers are grouped into three (3) antecedent soil moisture conditions:

AMC I	Dry soil condition
AMC II	Average soil condition
AMC III	Wet soil condition

Values of runoff curve numbers for all three conditions may be computed following guidelines in the SCS "Hydrology" Section 4, National Engineering Handbook. Studies of hydrologic data indicate that Antecedent Moisture Condition (AMC) II is not the average throughout Texas. Instead, investigations have shown that the average condition ranges from AMC I in west Texas to between AMC II and AMC III in east Texas. Typical values are given in Appendix B for AMC II. Adjustments for the State of Texas were made to these curve numbers using Figure 2, which accounts for the variation in dry to wet conditions. Figure 2 was obtained from the National Resource Conservation Commission (formerly Soil Conservation Service) in Temple.

The SCS also classified surficial soils into four (4) hydrologic soil groups, and identified them by letters A, B, C, and D, to represent watershed characteristics.

Group A: (low runoff potential) Soils having a high infiltration rate even when thoroughly wetted and consisting chiefly of deep well-drained to excessively drained sands or gravels.

Group B: Soils having a moderate infiltration rate when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well to well-drained soils with moderately fine to moderately coarse texture.

Group C: Soils having a slow infiltration rate when thoroughly wetted and consisting chiefly of soils with a layer that impedes downward movement of water or soil with moderately fine to fine texture.

Group D: (High runoff potential) Soils having a very slow infiltration rate when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface and shallow soils over nearly impervious material.

A list of soils in Maverick County along with their hydrologic soil classification is given in the Soil Conservation Service publication Soil Survey of Maverick County, Texas. Typical values for curve numbers for the four (4) soil groups are listed in Appendix B. Typical curve numbers calculated for this flood study appear in the next section.

Flows for streams studied in detail were calculated using the SCS method in the U.S. Army Corps of Engineers - Hydrologic Engineering Center - Hydrologic Modeling System (HEC-HMS) program. HEC-HMS is a Windows driven program, which serves as a platform to organize and calculate runoff using various runoff methods. HEC-HMS models a watershed basin as separate hydrologic elements connected by reaches and junctions at which input and output information can be displayed. A basin schematic represents the hydrologic elements chosen, the connecting reaches, and type of output desired.

Figure 3 shows the major drainage areas used in this study. No areas were delineated for the Rio Grande River. Natural drainage boundaries were altered to some extent by construction of the Maverick County Irrigation Canal and the new Loop 431 in the northeast part of Eagle Pass. Flows for the Rio Grande River were obtained from the IBWC.

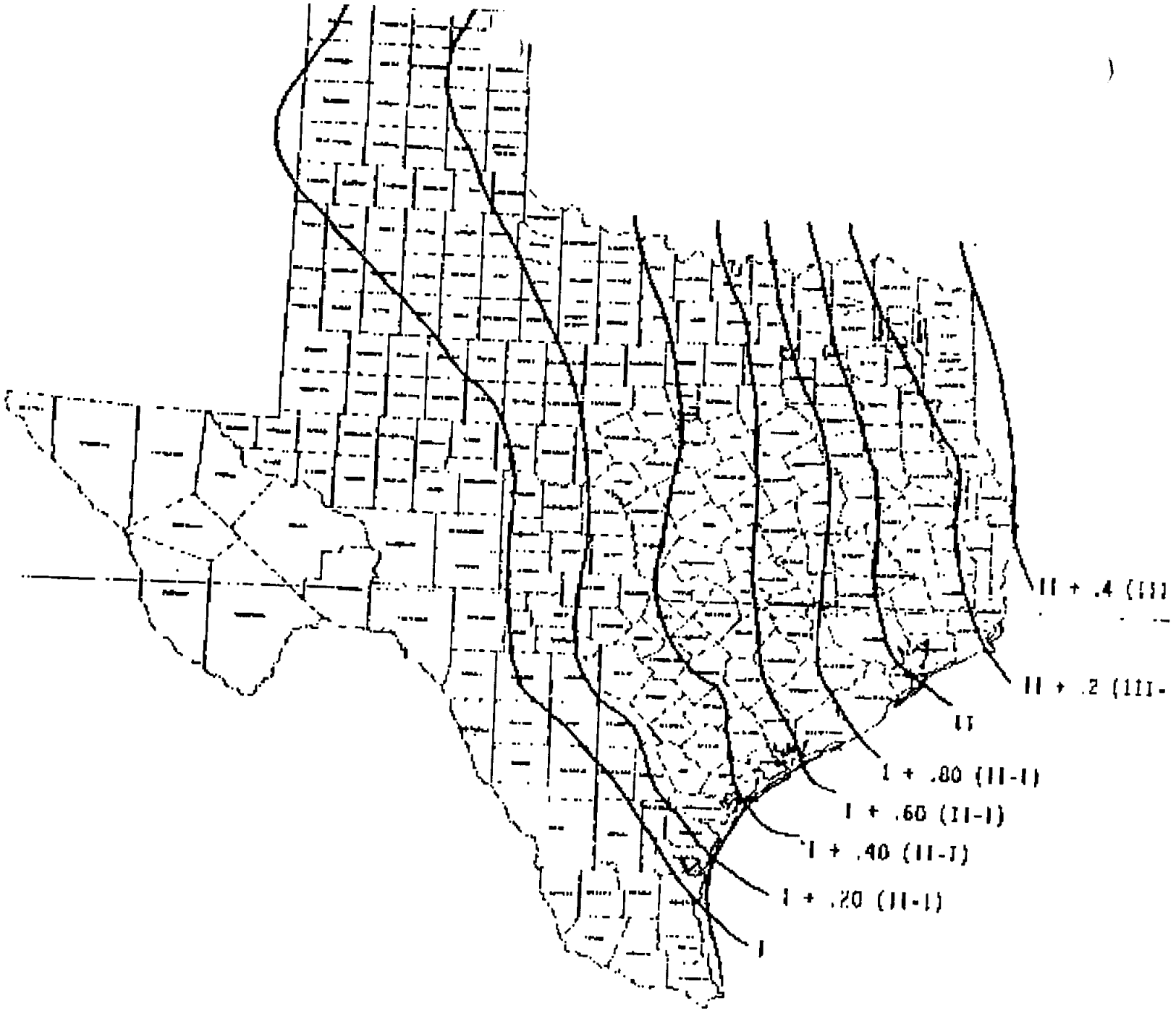
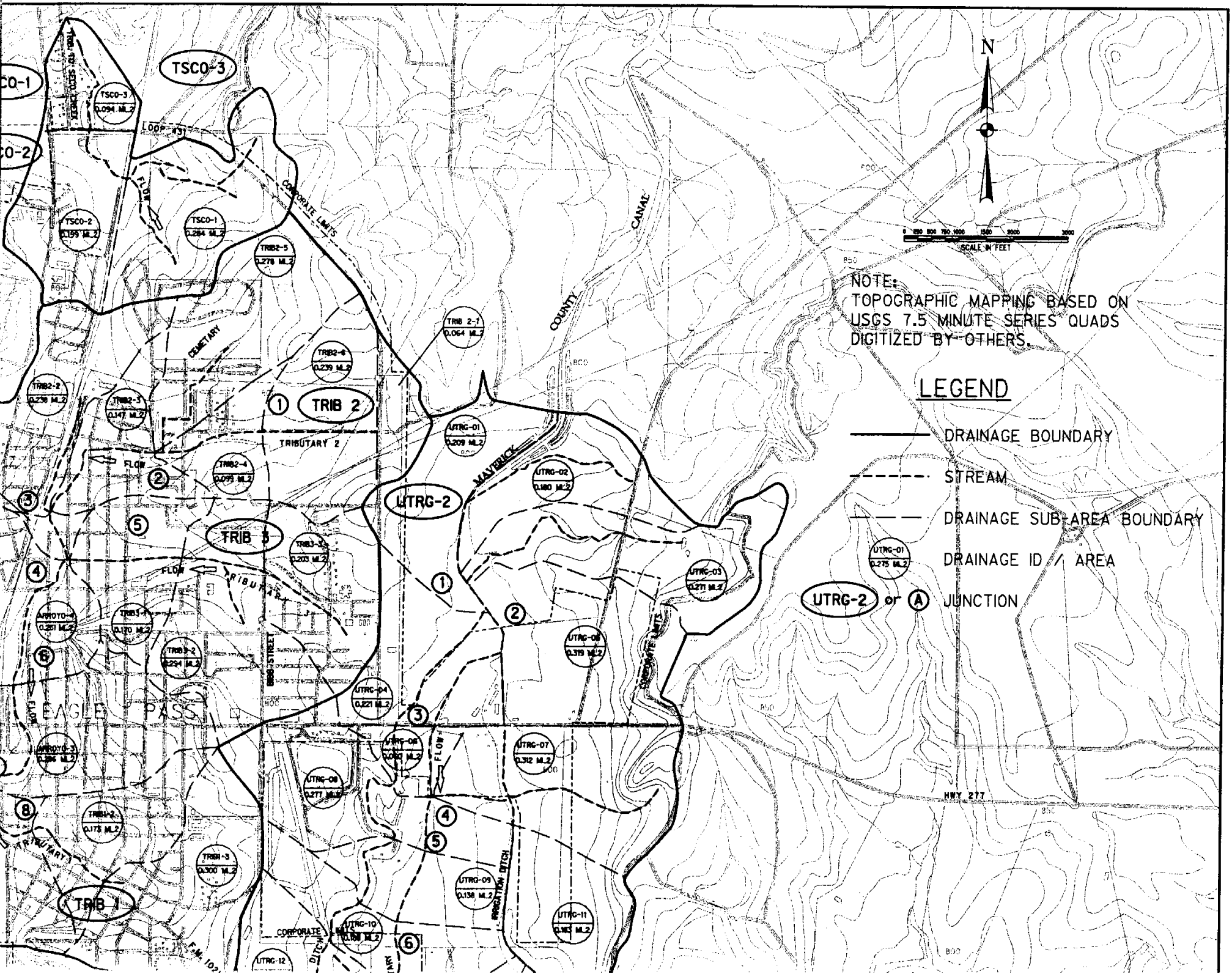


Figure 2 - Adjustments to Average Condition Runoff Curve Numbers for Antecedent Moisture Conditions I, II, & III for Texas.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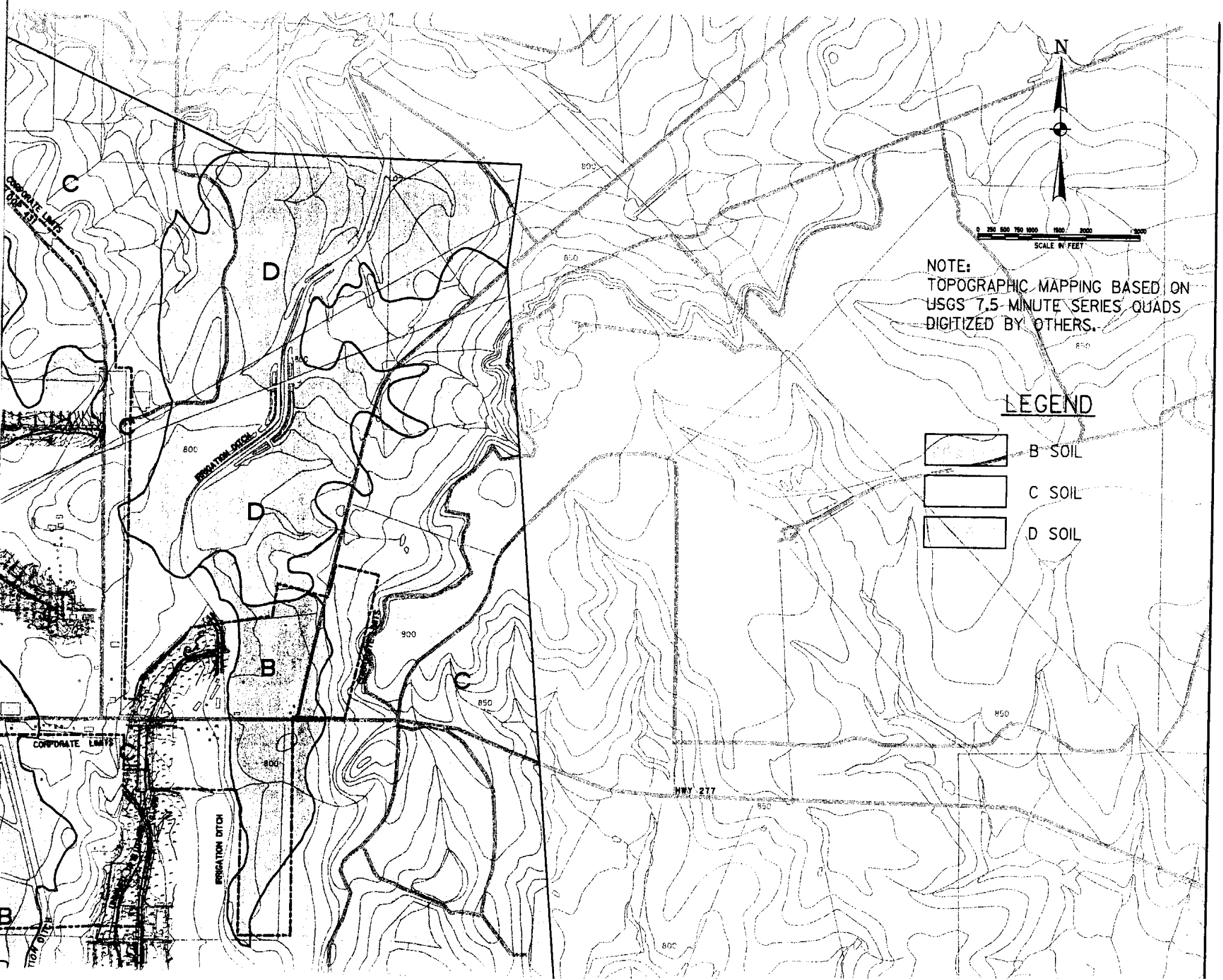
LEGEND
DRAINAGE BOUNDARY
STREAM
DRAINAGE SUB-AREA BOUNDARY
DRAINAGE ID / AREA
UTRG-2 or (A) JUNCTION
TSCO-3
TRIB 2
TRIB 3
UTRG-2
TRIB 1
EAGLE PASS
MAVERICK
COUNTY CANAL
CORPORATE LIMITS
CEMETERY
BIRD STREET
IRRIGATION DITCH
HWY 277
F.M. 1021
LOOP 431
TRIBUTARY 1
TRIBUTARY 2
TRIBUTARY 3
FLOW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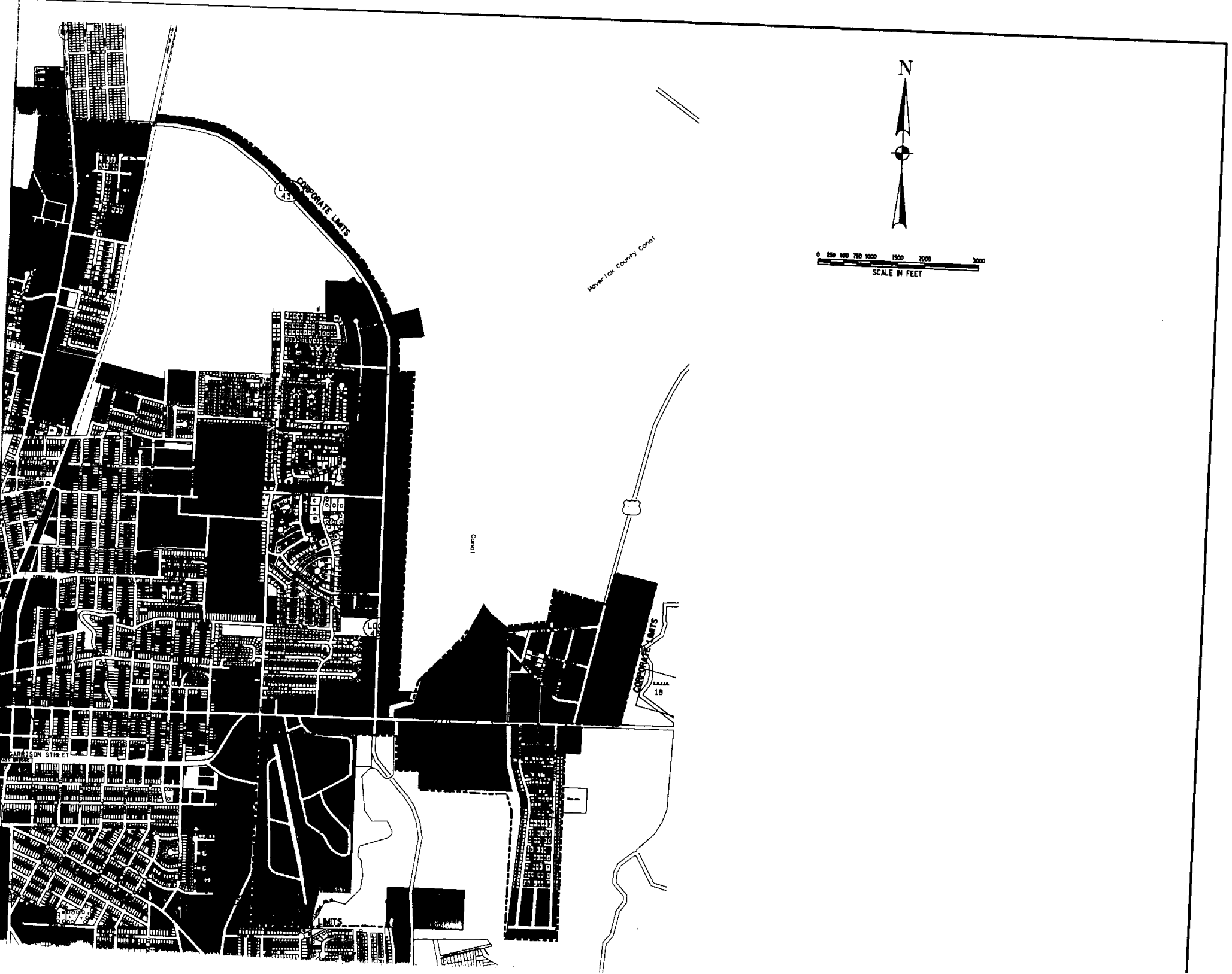
LEGEND
B SOIL
C SOIL
D SOIL
CORPORATE LIMITS
IRRIGATION DITCH
HWY 277
800
850
900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CORPORATE LIMITS
Haverlock County Canal
Canal
CORPORATE LIMITS
GARRISON STREET
LIMITS

B. Hydrologic Parameters

Figure 3 shows the drainage areas used for this study. The *drainage areas* for each stream were determined from digital U.S. Geological Survey quadrangle sheets obtained from Geographic Information Systems of McAllen, Texas. Figure 4 shows the *soils types* used for this study, compiled from the Soil Survey for Maverick County, Texas. Soil types in the Eagle Pass area consist of B, C, and D soils, with B and C being equally dominant within the study area. Figure 5 shows *existing land use* taken from a planning map developed by Hejl, Lee, and Associates. Sub-areas were broken up into the following: agricultural, commercial, industrial, residential, public (cemeteries), public (housing, schools, city offices, etc), roads, and open spaces (parks). A *future land use* map was used to determine new SCS curve numbers and recalculate flows for future conditions.

Table 1 shows the curve numbers used in the study based on land use and soil types. Composite curve numbers for each drainage area, taking into account land use and soil types, which are tabulated in Appendix B.

Table 1 - SCS Curve numbers used for the Eagle Pass Flood Study

Land use	Curve Numbers		
	Soil Type B	Soil Type C	Soil Type D
Agriculture (Brush-Poor Cond.)	67	77	83
Commercial	92	94	95
Industrial	88	91	93
Residential (1/4 acre lots)	75	83	87
Public (Cemeteries-Poor Cond)	79	86	89
Public (Housing, schools, etc)	92	94	95
Roads	98	98	98
Open Space (Parks-Poor Cond.)	79	86	89

Initial rainfall losses used in the study were calculated based on the curve number (CN) and the initial surface moisture storage capacity (IA) in units of depth. The curve number and initial surface moisture are related to a total runoff depth for a storm by the following relationship:

$$S = \frac{1000 - (10 * CN)}{CN}$$

(Use AMC II curve numbers in equation). S is the currently available soil moisture storage deficit in inches. The initial surface moisture IA is related to S by the relationship:

$$IA = 0.2 * S$$

This relation is based on empirical evidence established by the SCS. Initial rainfall losses were calculated for each subarea and are tabulated in Appendix B.

It should be noted, that the percentage imperviousness for a sub-area was not accounted for intentionally. The SCS curve numbers already generally account for the percentage of

imperviousness based on the soil type, land use and infiltration potential. Therefore, an over estimation of discharges could result if the impervious factor were applied.

Rainfall data was developed from two sources: 1) Rainfall data from the National Weather Service HYDRO-35, and 2) the U.S. Weather Bureau Technical Paper No. 40. These publications were used for determining runoff for storm return periods of 2 years through 100 years. Figure 6 is an intensity-duration-frequency curve for the Eagle Pass area. Log-normal graph paper was used to plot each duration storm and to estimate the 500-year storm event. Rainfall intensities were then input to HEC-HMS.

A *stream network or model* is constructed for each area studied in detail. This network is the model to which rainfall values are applied and peak discharges are determined as flows are routed and combined progressively downstream. Flood hydrographs were routed based on a Muskingum-Cunge method, which uses an eight-point cross-section taken from topography of the stream. Figure 7 shows a typical stream network used for the Main Arroyo. This figure was produced from HEC-HMS.

C. Peak Discharges

The original FIS flood study lists peak discharges in a Summary of Discharges table. A 6-hour storm duration was used in the FIS study with a 5-minute time step. For the purposes of this study a 24-hour storm duration was chosen with a 5 minute time step.

Table 2 presents a comparison of flows between the original Flood Insurance Study and the calculated Flood Study flows using the Soil Conservation Service method. The calculated Flood Study Flows are higher for a few reasons:

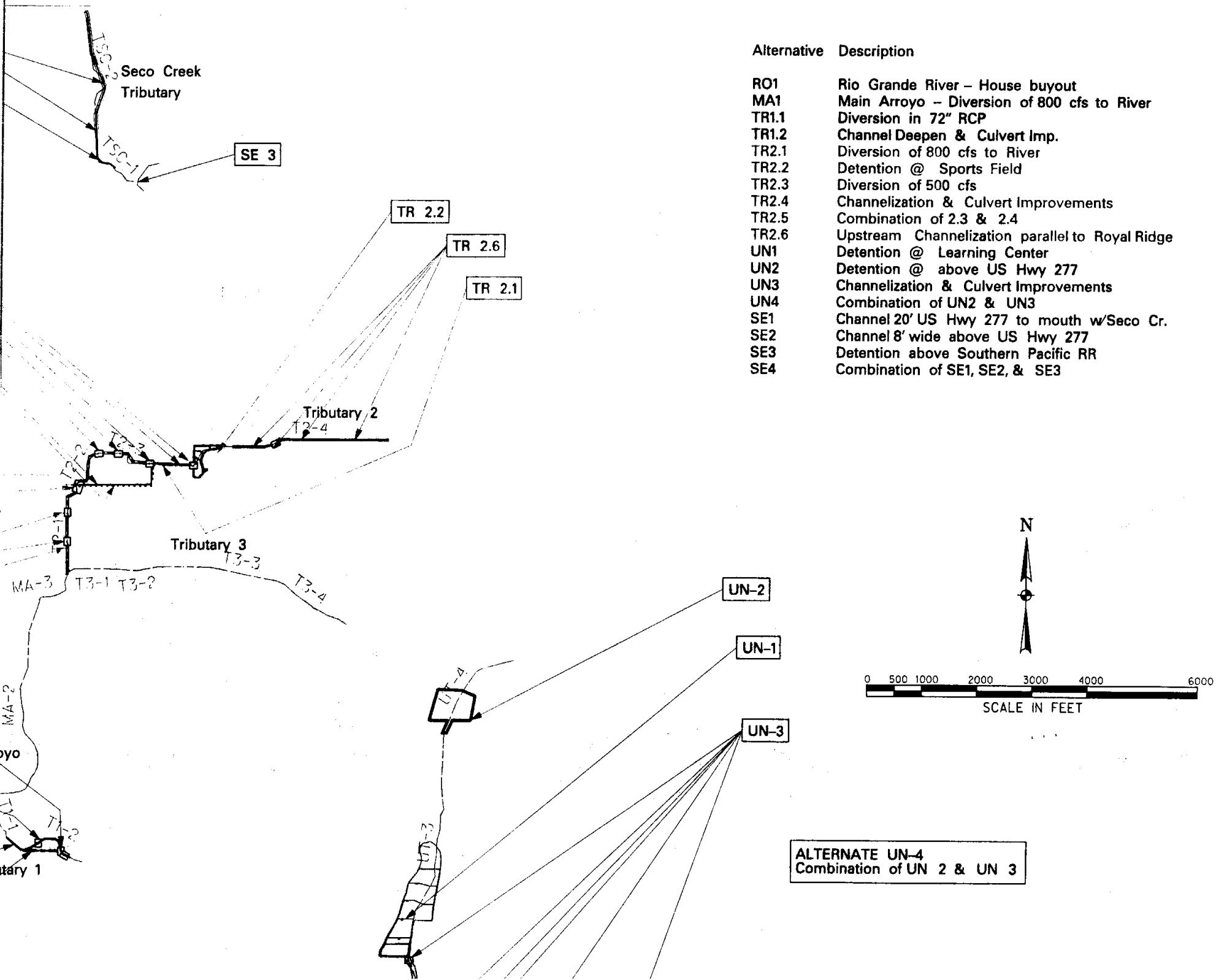
1. It was difficult to determine how the initial soil loss rates for the Original Flood Insurance Study were calculated. For the purposes of this study the SCS calculation of the initial soil loss rate was used. Generally, the calculated soil loss rates were lower than the Original FIS rates.
2. As development has occurred more impervious cover has been added to upstream areas of the Main Arroyo and Unnamed Tributary. Land use has become more intense increasing developed condition curve numbers.
3. Times of concentration have been reduced as new areas have developed with more efficient conveyance systems.
4. The SCS office in Temple uses an adjustment in calculating the antecedent moisture condition for Texas. (See Figure 1) This factor reduces the runoff for dryer regions of the state.

Table 3 shows existing and future peak flows for the full range of storm events at various locations in the study area.

Table 2 – Comparison of Original Flood Insurance Study and Calculated Flood Study Flows

LOCATION	Selected Points*	DRAINAGE AREA (sq. miles)	6 Hour FEMA Q's	DRAINAGE AREA (sq. miles)	24 Hour HEC-HMS Q's
Main Arroyo					
Above Limit of Study on Trib 2	I	0.61	1220	0.68	1382
Trib 2 @ Confluence with Arroyo	H	0.94	1670	1.09	1973
Above Limit of Study on Arroyo	O	0.41	920	0.20	840
Arroyo @ Confluence with Trib 2	E	0.69	1330	0.67	2230
Arroyo and Trib 2 Confluence	E	1.63	2480	1.76	3614
Arroyo Just Above Con. w/ Trib 1	C	2.20	2765	2.29	5080
Above Limit of Study on Trib 1		0.53	1110		
Trib 1 @ Confluence w/ Trib 1	C	0.74	1400	0.65	2076
Arroyo Just Below Con. w/ Trib 1	C	2.94	3050	2.94	7019
Arroyo @ Con. w/ Rio Grande R.	A	3.44	4220	3.26	7812
Unnamed Creek					
Unnamed Creek - Above Hwy 1021	A	3.21	3000	3.27	5732
Unnamed Creek - Above Hwy 277	H	1.31	1980	1.20	2851

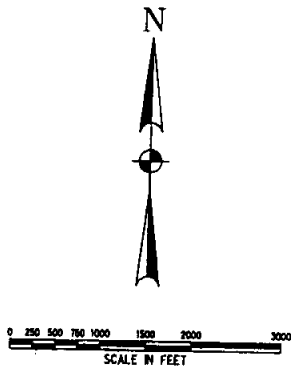
* For location of selected points see drainage area map.



Alternative	Description
RO1	Rio Grande River – House buyout
MA1	Main Arroyo – Diversion of 800 cfs to River
TR1.1	Diversion in 72" RCP
TR1.2	Channel Deepen & Culvert Imp.
TR2.1	Diversion of 800 cfs to River
TR2.2	Detention @ Sports Field
TR2.3	Diversion of 500 cfs
TR2.4	Channelization & Culvert Improvements
TR2.5	Combination of 2.3 & 2.4
TR2.6	Upstream Channelization parallel to Royal Ridge
UN1	Detention @ Learning Center
UN2	Detention @ above US Hwy 277
UN3	Channelization & Culvert Improvements
UN4	Combination of UN2 & UN3
SE1	Channel 20' US Hwy 277 to mouth w/Seco Cr.
SE2	Channel 8' wide above US Hwy 277
SE3	Detention above Southern Pacific RR
SE4	Combination of SE1, SE2, & SE3

ALTERNATE UN-4
Combination of UN 2 & UN 3


CORPORATE LIMITS
Maverick County Canal
Canal
CORPORATE LIMITS
18
LIMITS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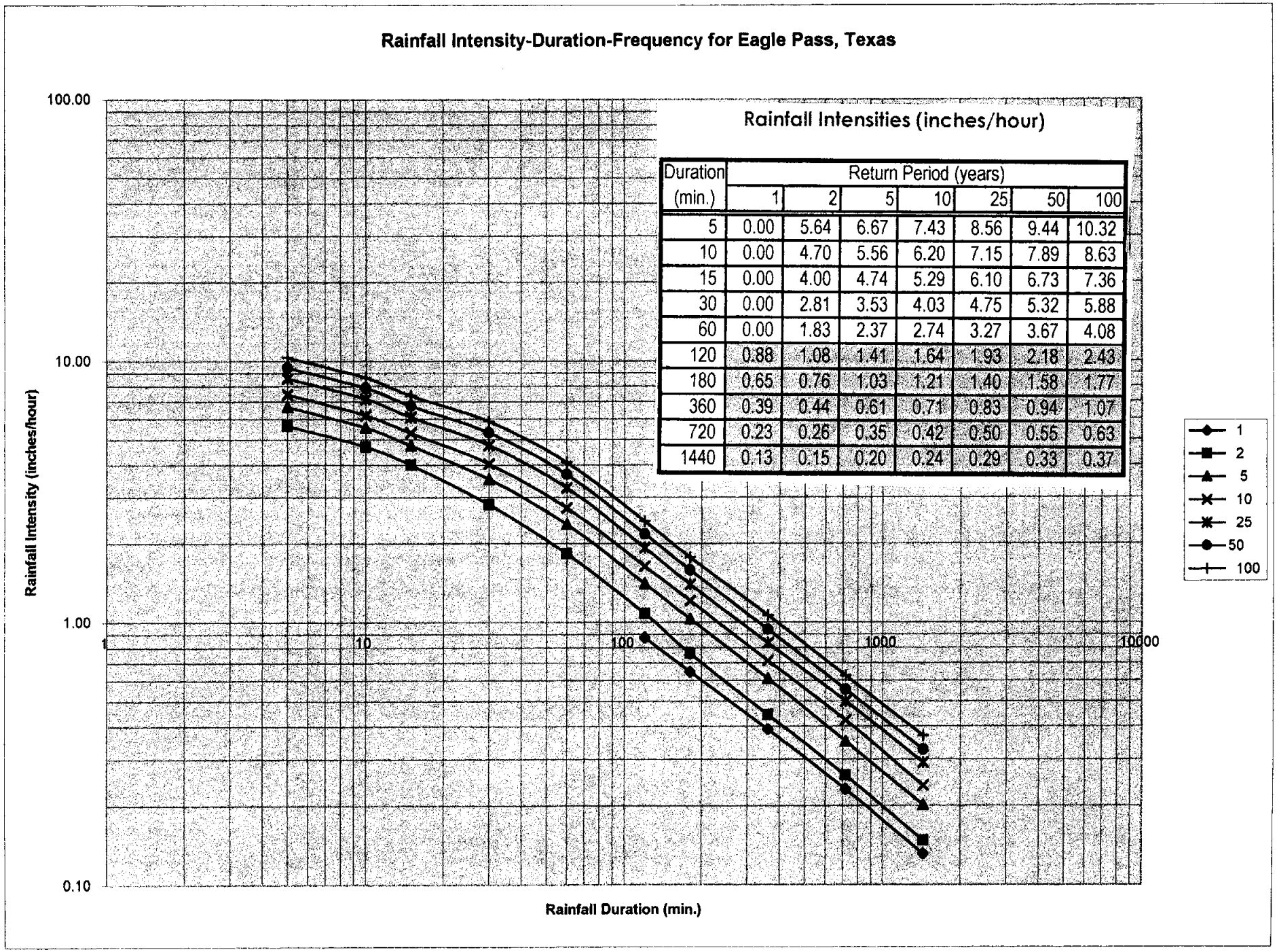


Figure 6 - Eagle Pass I-D-F Curves

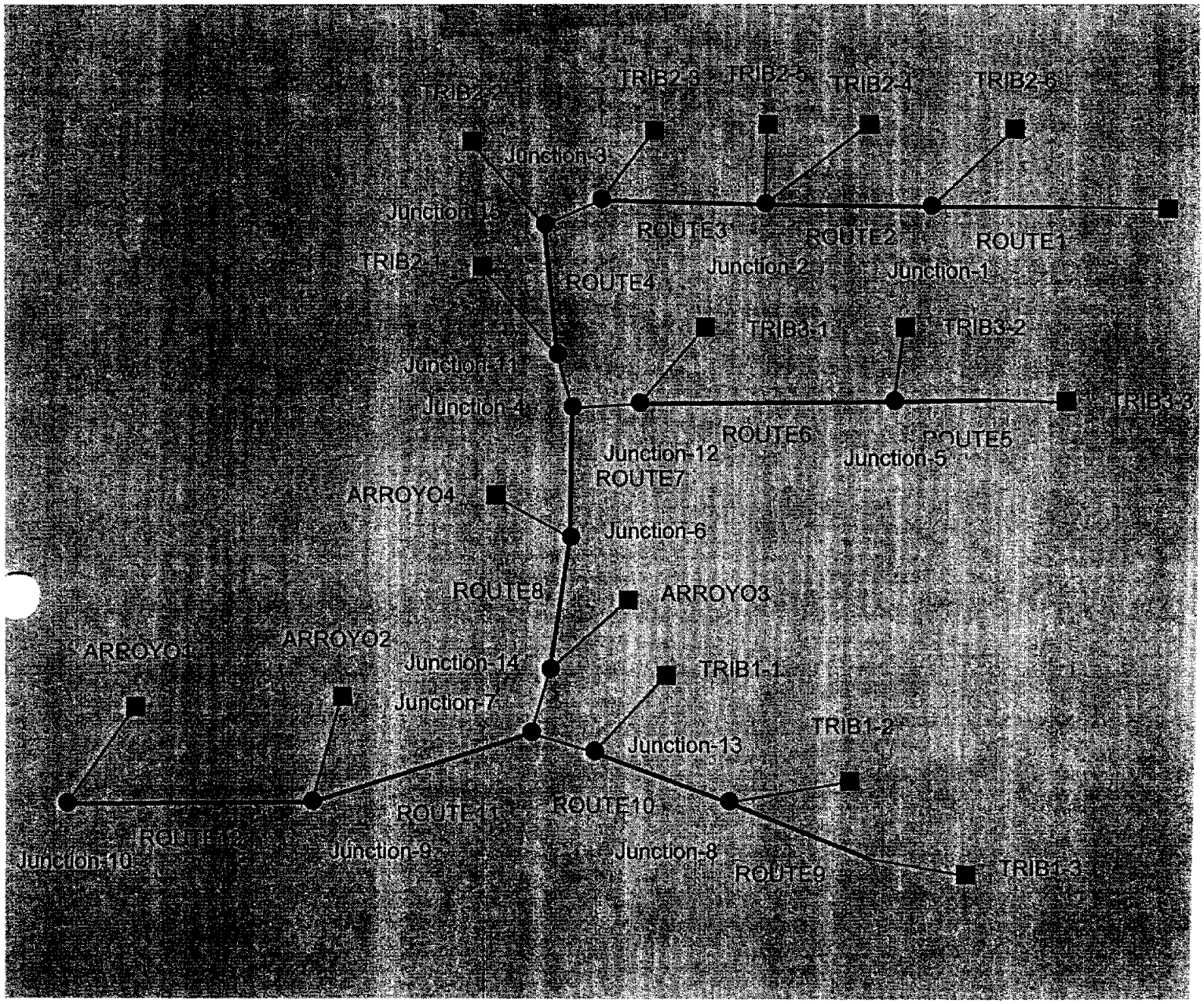


Figure 7 - Stream Network for Main Arroyo from HEC-HMS – Generated from HECHMS]

Table 3 – Summary of Peak Discharges

Discharge Point (1)	Description (2)	Stream Sta. (3)	Drainage Area	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
			sq mi	cfs	cfs	cfs	cfs	cfs	cfs	cfs
Rio Grande River										
Existing Conditions						90,000		180,000	230,000	350,000
Future Conditions						90,000		180,000	230,000	350,000
Main Arroyo										
Existing Conditions										
E	Junction 4	9551	1.76	286	791	1216	1706	2081	2489	3264
D	Junction 6	7149	2.01	322	942	1446	2028	2464	2965	3897
	Junction 14	5279	2.29	420	1166	1770	2471	2982	3572	4698
C	Junction 7	4658	2.94	696	1744	2569	3536	4233	5027	6596
B	Junction 9	3026	3.13	802	1949	2850	3898	4654	5510	7202
A	Junction 10	1623	3.26	854	2045	2967	4046	4826	5704	7451
Future Conditions										
E	Junction 4	9551	1.76	336	891	1322	1826	2197	2577	3349
D	Junction 6	7149	2.01	375	1043	1548	2134	2581	3059	3963
	Junction 14	5279	2.29	465	1265	1868	2568	3091	3672	4756
C	Junction 7	4658	2.94	728	1836	2664	3625	4332	5129	6652
B	Junction 9	3026	3.13	829	2043	2944	3985	4749	5611	7260
A	Junction 10	1623	3.26	882	2136	3061	4136	4927	5808	7510
Tributary 1										
Existing Conditions										
G	Trib. 1-3	2508	0.30	178	334	442	568	662	764	965
F	Junction 8	1588	0.47	223	451	616	809	955	1114	1434
	Junction 13	873	0.65	298	611	834	1105	1305	1524	1971
Future Conditions										
G	Trib. 1-3	2508	0.30	178	334	442	568	662	764	965
F	Junction 8	1588	0.47	223	451	616	809	955	1114	1434
	Junction 13	873	0.65	298	611	834	1105	1305	1524	1971
Tributary 2										
Existing Conditions										
M	Trib. 2-7	8155	0.07	35	67	88	114	133	153	193
L	Junction 1	6235	0.30	114	237	326	429	507	594	764
I	Junction 2	3984	0.68	149	353	516	716	870	1047	1406
H	Junction 3	638	1.07	187	483	728	1012	1232	1474	1942
	Junction 11	465	1.09	189	489	737	1025	1247	1491	1962
Future Conditions										
M	Trib. 2-7	8155	0.07	46	80	102	127	147	167	205
L	Junction 1	6235	0.30	124	250	339	443	521	608	776
I	Junction 2	3984	0.68	181	411	587	799	960	1145	1507
H	Junction 3	638	1.07	231	567	832	1126	1340	1614	2127
	Junction 11	465	1.09	233	573	842	1138	1354	1631	2145
Tributary 3										
Existing Conditions										
O	Trib 3-3	15040	0.20	73	174	249	339	407	428	644
N	Junction 5	11787	0.50	155	373	536	731	879	1044	1399

Discharge Point (1)	Description (2)	Stream Sta. (3)	Drainage Area	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
			Sq. mi.	cfs	cfs	cfs	cfs	cfs	cfs	cfs
	Junction 12	9933	0.67	184	462	676	937	1134	1356	1827
Tributary 3										
Future Conditions										
O	Trib 3-3	15040	0.20	73	174	249	339	407	428	644
N	Junction 5	11787	0.50	155	373	536	731	879	1044	1399
	Junction 12	9933	0.67	184	462	676	937	1134	1356	1827
Unnamed Tributary										
Existing Conditions										
J	Junction 2	13371	0.98	263	633	920	1264	1524	1817	2419
H	Junction 3	11519	1.20	333	755	1092	1534	1859	2221	2945
G	Junction 4	10339	1.57	376	874	1281	1809	2213	2669	3488
F	Junction 5	9195	1.85	430	1006	1487	2107	2586	3128	4100
E	Junction 6	7837	1.99	445	1043	1539	2199	2708	3290	4346
D	Junction 7	6342	2.39	514	1213	1786	2567	3173	3863	5127
C	Junction 8	3687	2.81	562	1339	1928	2696	3344	4139	5604
B	Junction 9	2368	3.07	595	1382	2009	2804	3465	4297	5853
A	Junction 10	1242	3.27	610	1428	2076	2893	3576	4439	6074
Future Conditions										
J	Junction 2	13371	0.98	484	950	1272	1645	1923	2225	2821
H	Junction 3	11519	1.20	550	1083	1499	1958	2295	2664	3370
G	Junction 4	10339	1.57	617	1265	1763	2338	2768	3156	4030
F	Junction 5	9195	1.85	686	1442	2023	2702	3208	3678	4712
E	Junction 6	7837	1.99	710	1488	2109	2834	3377	3906	4994
D	Junction 7	6342	2.39	784	1665	2384	3241	3878	4520	5799
C	Junction 8	3687	2.81	850	1787	2502	3410	4138	4901	6367
B	Junction 9	2368	3.07	859	1846	2587	3518	4278	5088	6640
A	Junction 10	1242	3.27	882	1901	2658	3617	4411	5262	6895
Tributary to Seco Creek										
Existing Conditions										
A	TSCO-1	4544	0.28	29	111	185	278	354	435	623
B	Junction 1	2590	0.48	150	317	453	618	751	874	1133
C	Junction 2	1760	0.60	188	384	545	724	876	1013	1285
Future Conditions										
A	TSCO-1	4544	0.28	105	254	363	495	603	704	941
B	Junction 1	2590	0.48	212	452	622	813	975	1097	1437
C	Junction 2	1760	0.60	246	517	694	901	1069	1190	1539

(1) Discharge Points shown on Drainage Area Map

(2) Description taken from HEC-HMS models

(3) Stream Stations taken from HEC-RAS models

IV. Hydraulic Analysis

A. Watershed Changes since FIS Study

The 1978 Flood Insurance Study completed for Eagle Pass by FEMA served as a starting point for defining the existing floodplains for Eagle Pass. Original data files used in this study were obtained from the Federal Emergency Management Agency. The Corps of Engineers HEC-2 Water Surface Profiles program was used to rerun the data files. Discrepancies between the published study and data files were resolved. These models served as a basis for developing existing and future condition models for this study. Stream stationing was preserved to the extent possible in modeling the existing streams and for comparison to the original FIS study. Several changes between the original model and current models for the Rio Grande River, Main Arroyo and its tributaries and the Unnamed Tributary have occurred in the last 20 years. New growth and increased impervious cover have changed runoff patterns and flows. As these areas have developed, new storm sewers and channels have been extended, and culverts and bridges built. A structure inventory and photo inventory for each stream was studied in detail. Table 4 summarizes the results of this structure inventory. Structure locations are tied to the hydraulic models by channel stations in column 2. Photos of typical structures appear at the end of this study.

Rio Grande River

A new International Bridge for Eagle Pass is presently under construction on the Rio Grande River. This structure has been added to the existing FIS model. The International Boundary and Water Commission (IBWC) was contacted regarding published flows for the Rio Grande River. These flows have remained unchanged since the original Flood Insurance Study was completed and the same flows were used for this study. Reasons for modeling the Rio Grande River were to use the flood elevations as a starting point for the Main Arroyo model and to account for construction of the new International Bridge in Eagle Pass. Elevations for the Mexico side of the Rio Grande were obtained photogrammetrically by Landata-Geoservices to maintain the accuracy of the hydraulic models. Stationing for the Rio Grande River starts at Sta. 21+90 downstream from the existing Southern Pacific Railroad Bridge and extends upstream to Sta. 205+00 just below the confluence with Seco Creek. The Rio Grande River is shown on Sheets 14-20.

Main Arroyo

Changes to the Main Arroyo, and accounted for since the original FIS in the updated stream model, include:

- Concrete lining of the Main Arroyo has been extended west across part of the Rio Grande flood plain. Historically, there have been limitations imposed due to 404 permit requirements and disturbances to wetland areas as to the length of main channel improvements allowed. The concrete channel extension occurs below station 0+00 and it appears on sheet 1.
- The City of Eagle Pass added a golf cart crossing for the municipal golf course near the downstream end of the watershed. This crossing occurs at station 14+58 and appears on sheet 1.

- The Main Arroyo drains most of the developed areas of old Eagle Pass. The channel for the most part is lined either with mortared rock or concrete. The FIS study included three channel dams, which were built with the main channel improvements in 1979-80. The three channel dams have been removed since that time for maintenance reasons and occurred at channel stations 15+80, 27+45 and 33+76. The previous location of these structures appears on Sheets 1 and 2.
- At Garrison street (US Highway 277) a new bridge structure was built, and bridge bents were added at station 35+80 to the model. This structure is shown on Sheet 2.
- A new culvert at Pierce Street was added since 1978 at station 50+44.5 and appears on sheet 3.

The Main Arroyo branches off into three tributaries as identified on Figure 3. For purposes of this study, two of the three tributaries were modeled separately, i.e., Tributary 1 and Tributary 2. Tributary 3 was included at the end of the Main Arroyo model. Starting water surfaces elevations for all storm events were taken from the Main Arroyo model. Photos of the Main Arroyo appear in Appendix 1.

Tributary 1

Tributary 1 drains areas from the original Eagle Pass Airport, and a shopping mall, on the east boundary, to FM 1021 along most of the south boundary, to the RR tracks on the west boundary. Most of this area is developed with residential, commercial and parkland use. The existing channel begins at the Main Arroyo and is concrete lined throughout most of its length. Photos of Tributary 1 appear in Appendix 1. A new hydraulic model was developed from the new topography, and construction plans were obtained from the City. Tributary 1 begins at station 0+00 at its confluence with the Main Arroyo and extends to Station 25+08 near the intersection of Austin and Roosevelt Streets. Tributary 1 appears on Sheet 4.

Tributary 2

Tributary 2 drains areas from Loop 431 on the east and RR tracks on the west, to the confluence with Tributary 3 forming the upper end of the Main Arroyo. Most of this area is undergoing rapid development as commercial sites are developed along Loop 431 and the new high school is completed. Photos of Tributary 2 appear in Appendix 1. A new hydraulic model was developed from the new topography, and construction plans obtained from the City. Stationing for Tributary 2 begins at the Main Arroyo near Sta. 0+00 and extends upstream to Sta. 81+55. Tributary 2 appears on Sheets 3, 5 and 6.

Tributary 3

Tributary 3 drains areas from Loop 431 on the east boundary and RR tracks to the west, to the confluence with Tributary 2 forming the upper end of the Main Arroyo. Most of this area is gradually being developed as residential subdivisions and as commercial sites along Loop 431 are completed. Photos of Tributary 3 appear in Appendix 1. The Tributary 3 hydraulic model was included in the Main Arroyo hydraulic model, and was developed from the new topography. Stationing for Tributary 3 begins at Sta. 95+51 in Main Arroyo model and extends upstream to Sta. 150+40. Tributary 3 appears on Sheets 3, 7, and 8.

Table 4 - Drainage Structure Inventory

Location	Channel Station	Structure Size	Stream Bed Elevation	Low Chord Elev.	Top of Bridge Elev.	Material	Channel U. S.	Channel D. S.	Comments
Rio Grande River									
RR Bridge	4215.00	Bridge	679.00	724.50	729.00	Concrete	Natural	Natural	Existing RR Bridge
New International bridge	4245.00	Bridge	678.00	725.00	729.50	Concrete	Natural	Natural	New International Bridge
Old International bridge	7643.00	Bridge	674.00	725.00	727.00	Concrete	Natural	Natural	Old International Bridge
Main Arroyo									
Golf Cart Crossing	1458.00	5-4'x5' RBC	689.79	693.79	698.50	Concrete	Concrete	Concrete	at Eagle Pass Golf Course
Former Dam No. 1	1580.00	Dam No. 1	692.75	0.00	0.00	Concrete	Concrete	Concrete	Dam No. 1 removed
Adam's Street	2547.00	Arch Bridge	695.90	618.50	618.50	Concrete	Concrete	Concrete	Adam's Street
Former Dam No. 2	2745.00	Dam No. 2	696.00	0.00	0.00	Concrete	Concrete	Concrete	Dam No. 2 removed
Former Dam No. 3	3376.00	Dam No. 3	700.46	0.00	0.00	Concrete	Concrete	Concrete	Dam No. 3 removed
Garrison St. (Hwy 277)	3580.00	Bridge	702.23	720.00	722.10	Concrete	Concrete	Concrete	Garrison St. (Hwy. 277)
Monroe St.	4093.50	Bridge	705.40	721.60	723.30	Concrete	Concrete	Concrete	Monroe St.
Ceylon St.	4591.00	Bridge	709.60	720.00	721.60	Concrete	Concrete	Concrete	Ceylon St.
Southern-Pacific RR	4920.50	Bridge	710.80	728.70	730.70	Concrete	Concrete	Concrete	RR Bridge
Pierce St.	5044.50	7- 6'x10' RBC	711.30	717.40	720.80	Concrete	Concrete	Concrete	Pierce St.
Rio Grande St.	5733.50	Bridge	714.20	723.70	725.70	Concrete	Concrete	Concrete	Rio Grande St.
Main St.	6291.00	2-12'x15' RBC	716.90	728.90	729.40	Concrete	Concrete	Concrete	Main St.
Quarry St.	6987.00	2-7.5 'x17' RBC	720.30	727.80	729.70	Concrete	Concrete	Concrete	Quarry St.
Ferry St.	8807.00	Bridge	726.50	737.20	739.90	Concrete	Concrete	Concrete	Ferry St;
Medina St.	9156.00	3-7'x10' RBC	728.05	735.05	735.90	Concrete	Concrete	Concrete	Medina St.
Concho St.	9860.00	1-5.5'x20' RBC	733.25	739.00	740.90	Concrete	Concrete	Concrete	Concho St.
Tributary #3									
Trinity St.	10218.50	1-6.4'x29' RBC	736.80	743.20	746.10	Concrete	Concrete	Concrete	Trinity St.
Colorado St.	10575.50	1-6'15' RBC	739.60	745.83	747.30	Concrete	Concrete	Concrete	Colorado St.
North Comal St.	10935.00	7-4' Dia. RCP	742.35	746.35	752.80	Concrete	Concrete	Concrete	North Comal St.
Kelso Dr.	12244.00	3-3'x5' RBC	757.20	760.20	761.80	Concrete	Concrete	Concrete	Kelso St.
Bibb St.	13434.00	1-5'x20.5'	765.66	750.50	772.80	Concrete	Concrete	Concrete	Bibb St.
Vista Hermosa Dr.	14873.00	4-18" RCP	782.15	783.65	787.60	Concrete	Concrete	Concrete	Vista Hermosa Dr.

Table 4 - Drainage Structure Inventory

Location	Channel Station	Structure Size	Stream Bed Elevation	Low Chord Elev.	Top of Bridge Elev.	Material	Channel U. S.	Channel D. S.	Comments
Tributary #1									
Williams St.	618.00	2-8'x11' RBC	716.49	724.49	730.20	Concrete	Concrete	Concrete	Williams St.
Private	709.00	Bridge	717.70	729.40	732.00	Concrete	Concrete	Concrete	Private
Pierce St.	917.00	1-6.5'x20' RBC	721.28	727.78	729.70	Concrete	Concrete	Concrete	Pierce St.
Crockett St.	1514.00	1-5.8'x16' RBC	726.54	732.30	733.00	Concrete	Concrete	Concrete	Crockett St.
Wilson St.	2102.50	1-5'x20' RBC	731.90	737.00	738.60	Concrete	Concrete	Concrete	Wilson St.
Travis St	2176.00	1-6'x18' RBC	731.40	737.40	738.10	Concrete	Concrete	Concrete	Travis St.
Tributary #2									
First St.	564.00	2-4'x10' RBC	739.83	743.83	745.00	Concrete	Concrete	Concrete	First St.
Second St.	1077.00	2-4'x10' RBC	742.40	746.40	747.10	Concrete	Concrete	Concrete	Second St.
Concho/Hidalgo St.	1662.00	2-4'x8' RBC	744.80	748.80	750.80	Concrete	Concrete	Concrete	Concho/Hidalgo St.
Trinity St.	2491.00	2-3.5'x8' RBC	749.80	753.30	753.90	Concrete	Concrete	Concrete	Trinity St.
Colorado St.	2853.00	2-4.5'x6' RBC	751.48	755.98	756.30	Concrete	Concrete	Concrete	Colorado St.
Arlington St.	3583.00	2-4.5'x6' RBC	754.76	759.26	759.70	Concrete	Concrete	Concrete	Arlington St.
Memorial Dr.	4354.00	2-4'x6' RBC	760.55	764.55	767.70	Concrete	Concrete	Concrete	Memorial Dr.
North Bibb St.	6042.00	3-2.5'x'5' RBC	775.32	777.82	778.60	Concrete	Natural	Natural	North Bibb St.
Royal Haven Dr.	6331.00	Concrete Dip	778.00	0.00	0.00	Concrete	Natural	Natural	Royal Haven Dr.
Unnamed Tributary									
El Indio Hwy. FM 1021	1208.50	5-7'x7' RBC	724.50	731.50	733.20	Concrete	Natural	Natural	El Indio Hwy. FM 1021
FM 3443	5258.50	6-8'x8' RBC	736.39	744.39	746.00	Concrete	Natural	Natural	FM 3443
Dell Crest Drive	6075.00	4-5'x8' RBC	739.70	744.70	746.70	Concrete	Natural	Natural	Dell Crest Drive
Cherry Leaf Drive	7536.50	8-4'x4' RBC	744.42	748.42	749.00	Concrete	Natural	Natural	Near Language Dev. Center
FM 3443	10050.00	16-3'x10' RBC	756.03	759.03	760.70	Concrete	Natural	Natural	FM 3443
FM 277 - Main Street	11742.00	9-5'x'5' RBC	763.20	768.30	770.90	Concrete	Natural	Natural	FM 277 - Main Street
Seco Creek Tributary									
Loop 431	3362.50	3-4'6' RBC	731.50	735.50	738.50	Concrete	Concrete	Natural	Loop 431
RR Tracks	4544.00	2-96" Steel Pipes	742.50	750.50	752.60	Steel	Natural	Natural	RR tracks

Unnamed Tributary

The unnamed tributary has undergone extensive development in the last 20 years. Much of the middle portion of the watershed is for residential use. Commercial sites have been developed along FM 3443 and US 277. The upper portion of the watershed is mostly undeveloped. The lower portion is developed partially with mobile home parks and residential structures. Channel changes since 1978 are:

- The southern extension of FM 3443 from US 57 to FM 1021 and two new culverts were added.
- Three new culverts have been added from the child development center downstream to the junior high school.
- The existing channel has been straightened out and deepened in places.

Stationing for the unnamed tributary begins at Sta. 0+00 South of the El Indio Highway FM 1021 and continues upstream to Sta. 133+71 and areas north of US 277.

These changes were modeled in the new hydraulic model along with the newer topography. Photos of the Unnamed Tributary appear in Appendix 1. The unnamed tributary is shown on Sheets 9-12.

Seco Creek Tributary

The Seco Creek Tributary starts in the northern part of Eagle Pass as shown on the drainage area map and flows north to Seco creek. New development has occurred. Within the watershed three primary businesses exist which affect stormwater runoff in the upper and middle part of the watershed. A recycling metal operation exists in the middle part of the basin. New developments along Loop 431 include a Freightliner distributorship and an old Grainary downstream of the railroad tracks. Both of these developments have added impervious cover to the watershed. Most of the upper parts of the watershed are residential in nature. Areas from the east side of US 277 (Del Rio highway) drain into the watershed above Loop 431. New roadway improvements on US 277 and Loop 431 have occurred in the last three years. A new hydraulic model was developed for the Seco Creek tributary. Photos of the Seco Creek tributary appear in Appendix 1. Stationing for the Seco Creek tributary begins at Sta. 10+00 near the confluence with Seco Creek and ends at Sta. 45+44 below an existing railroad embankment. The Seco Creek tributary is shown on Sheet 13.

B. Methods

The U.S. Army Corps of Engineers Hydrologic Engineering Center - River Analysis System (HECRAS) Version 2.2 was used to "model" reaches within selected watersheds for the purposes of this flood study. HECRAS is an integrated system of software, designed for interactive use in a multi-tasking, multi-used network environment. The system is comprised of a graphical user interface (GUI), separate hydraulic analysis components, data storage and management capabilities, graphics, and reporting facilities. HECRAS is designed to perform one-dimensional hydraulic calculations for a full network of natural and constructed channels.

Starting water surface elevations for the Rio Grande River, Seco Creek and the Unnamed tributary were computed using the slope area method. Starting water surface elevations for the

Main Arroyo were input from computations on the Rio Grande River. Starting water surface elevations for Tributaries 1, 2, and 3 were taken from backwater computations on the Main Arroyo. A more complete explanation of methods to begin backwater computations is presented in the HECRAS User's manual, 1998.

Bridges on the Rio Grande River were modeled using the normal bridge routine. Bridge structures on the Main Arroyo were also modeled using the normal bridge routine. Some stream crossings with culverts in the original FIS study had been modeled with the normal bridge routine. Some of the culverts were changed to the special culvert routine used in the 1990 version of HEC-2 and now used in Version 2.2 of HECRAS. A more complete explanation of bridge and culvert modeling techniques is presented in the HECRAS User's manual, 1998.

Stream roughness coefficients or Manning's "n" values for streams were selected based on a photo reconnaissance of all streams studied in detail. Over 200 photos were taken of all stream crossings and inventoried for use in Table 4 - Summary of Structures. From these observations stream "n" values were chosen. The n-values for channel varied from 0.035 to 0.060. N-values for overbank areas varied from 0.050 to 0.090. In a few instances, on the Rio Grande River and the Unnamed Tributary, n-values were varied horizontally for variations in stream overbank areas.

Two hydrologic data sets, existing and future condition, were applied to the stream models to determine water surface elevations. The next two sections present the results of this work effort.

C. Existing Conditions

As previously mentioned, the Federal Emergency Management Administration (FEMA) was contacted to obtain back-up information used in the preparation of the original Flood Insurance Study prepared by URS/Forrest & Cotton, Inc. in 1978. The original FIS study modeled the Main Arroyo, three tributaries and unnamed tributary and a portion of the Rio Grande River. For purposes of this flood protection study, these streams were re-run with HEC-2 to determine any known discrepancies between the existing stream models and the re-typed models. Appendix A summarizes the differences between the original model and the re-typed models, along with the output from the re-typed models.

Once these differences were resolved the original models were modified to include changes to the stream models identified in Section B and rerun using the HEC-RAS software. This flood study extended the area studied in detail on the Rio Grande River and added the Seco Creek Tributary to the study.

Existing and future peak discharges summarized in Table 2 were used to compute water surface elevations for the streams studied in detail. The 100-year flood plain was delineated for both conditions from the computed water surface elevations and is shown on sheets 1-20.

D. Future Conditions

Property addresses and finished floor elevations are shown for most permanent structures located in or near the future 100-year flood plain on sheets 1-20. A summary of all affected properties appears in Appendix D. The City of Eagle Pass was most helpful in providing property information for flood prone areas.

A summary by study reach of the number of residences and businesses located within the future 100-year floodplain is shown in Table 5.

Table 5 - Number of Residences and Businesses Located in Future 100-year Floodplain

Stream	Sections	No. of Residences	No. of Businesses	Other
Rio Grande	2190 to 20500	22	1	Sewage Lift Sta.
Main Arroyo	212 to 9551	23	6	Golf Course
Tributary 1	0 to 2508	12	-	-
Tributary 2	150 to 8155	113	-	Cemetery & Sports Field
Tributary 3	9791 to 15040	3	-	-
Unnamed Trib.	0 to 13371	257	19	Sports Field & Language Center
Seco Creek Trib.	1000 to 4544	2	2	Church
Totals		414	28	-

Table 5 shows approximately 414 residences and 28 businesses to be located in the future 100-year floodplain. Measures to protect these structures are presented in the next section as flood reduction alternatives.

V. Economic Considerations of Flood Reduction Alternatives

A. Alternatives Considered

Several alternatives were considered for flood damage reduction:

- Culvert or Bridge modifications
- Channel improvements - including deepening, widening, or realignment
- Detention ponds
- Regulatory measures, including floodplain zoning and floodway ordinances
- Flood Insurance
- Permanent evacuation or relocation
- Temporary evacuation

For the streams studied in detail, alternative flood damage reduction plans were formulated. Table 6 presents the alternative flood damage reduction plans considered. Appendix D includes more details on the alternative plans considered and sheets 21-25 show these plans. The costs and value of protected structures are calculated based on March 1999 price levels and subject to change.

Main Arroyo

Alternative MA1 & TR2.1

This alternative consists of two phases. Phase one is to divert approximately 800 cfs of flood flows away from the downtown area near the confluence of Tributary 2 and the Main Arroyo near

Hidalgo Street to the Rio Grande River. The second phase (identified as TR 2.1) is to extend this 800 cfs diversion to the Sports complex near the High School. Overall, the alternative would include:

- Phase one - A tunnel/conduit 96" in diameter and about 3000 feet long extending from the Rio Grande River to Hidalgo Street (near Trib 2 - Section 1568).
- Phase two – A 96" pipe about 2700 feet long extending from the intersection of Concho Street and Hildalgo Street along Hildalgo Street to the Sports Field near the High School.

This diversion could be constructed for the most part in public right-of-way and would alleviate severe flooding in the downtown area.

Flood reduction to properties downstream of this diversion would occur. From the routings for this alternative, the diversion would keep flood flows in the existing channel. Flood reduction improvements would occur for about 128 residences and businesses. The structures are identified on sheets 2, 3 and 5. The proposed alternative is shown on sheet 21 and 22 at the end of this study.

Improvements from Phase one would be to reduce the 100-year flood levels in Tributary 2 and the Main Arroyo to a 10-year level of flood protection for properties from Hidalgo Street (Section 1756) to Commerce Street (Main Arroyo - Section 4929) and a 25-year level of flood protection for properties from Commerce Street (Section 4929) to the Golf Course (Section 1473). Improvements from Phase two would be to reduce the 100-year flood levels in Tributary 2 from Church Street (Section 150) to Memorial Street (Section 4338).

Tributary 1

Alternative TR1.1

This alternative consists of diverting higher flood flows through a 72" diameter conduit from the Travis and Wilson Street intersection (Section 2725) down Wilson Street to Crockett Street (Section 1208). This diversion would take higher flood flows away from flooded homes and discharge it below the affected area.

Approximately 10 residences would be protected from flooding for the 100-yr event. Existing right-of-way constrictions limit channel widening. Sheet 21 shows the proposed alignment of the 72" RCP.

Alternative TR1.2

This alternative consists of channel widening and deepening in some areas and culvert replacement at three locations. The proposed improvements would consist of:

- Channel improvements are widening to 10' and deepening to 4' with a concrete lining from Pierce (Section 893) to Wilson Streets (Section 2427) for approximately 1,500 feet.
- Culvert replacement at Crockett Street (Section 1490 to 1538) from 1-5.8'x16' to 2-9'x10' box culverts.
- Culvert replacement at Wilson Street (Section 2080 to 2125) From 1-5'x20' to 2-9'x10' box culverts.
- Culvert replacement at Travis Streets (Section 2155 to 2197) From 1-6'x18' to 2-8'x8' box culverts.

About 12 residences would be protected from flooding for the 100-year event. Existing right-of-way constrictions limit channel widening. Sheet 21 shows the proposed channel widening and deepening.

Tributary 2

Alternative TR2.1

This alternative is Phase Two of MA1 above. Costs associated with it are included with MA1. Essentially, this alternative is to divert most of the excess flood flows away from an existing channel and restore the flood carrying capacity of the channel, thereby, adding additional flood protection to structures located in the area. Sheet 22 and 23 show the limits of Phase Two.

Alternative TR2.2

This alternative consists of providing a detention pond at a sports field complex behind the existing High School above Memorial Street. The outlet from the detention pond would discharge above Memorial Street and would provide limited flood protection from Memorial (Section 4338) to Trinity Streets (Section 2521). An 1100' long pilot channel would convey low flows to the outlet around the sports field. Sheet 23 shows the limits of this alternative.

Flood reduction improvements would be to reduce flooding in a cemetery immediately downstream of the detention pond west of Memorial and flooding to homes east of Colorado Street. Approximately, 15 homes would be protected for a 25-year flood event.

Alternative TR2.3

This alternative consists of diverting approximately 500 cfs in culvert from Arlington Street (Section 3562) to Hidalgo Street (Section 1756). This diversion would be a 72" concrete pipe approximately 1800' long. The culvert would extend from the intersection of Concho and Hidalgo to the intersection of Arlington and Hidalgo. It would then turn west along Arlington and continue north along the existing channel to the sports field. A new headwall would be constructed at the sports field to accept storm water runoff. Sheet 22 and 23 show the limits of the proposed culvert.

Flood reduction improvements would provide increased flood protection to residences from Memorial Street downstream to Hidalgo Street. Approximately 52 structures would receive increased flood protection from the 100-year storm event.

Alternative TR2.4

This alternative consists of channel widening and culvert improvements at seven locations along Tributary 2 from Church Street (Section 150) upstream to Memorial Street (Section 4338). The proposed improvements would consist of:

- Channel improvements are to increase the channel width 10' for approximately 4200 feet providing enough capacity to carry most of the 100-year flow.
- Culvert improvements at First Street (Section 540 to 564) are to add 1 - 4'x10' box culvert to the existing 2- 4'x10' box culverts.
- Culvert improvements at Second Street (Section 1051 to 1103) are to add 1 – 4'x10' box culvert to the existing 2-4'x10' box culverts.

- Culvert improvements at Hidalgo Street (Section 1568 to 1756) are to add 1 – 4'x8' box culvert to the existing 2-4'x8' box culverts.
- Culvert improvements at Trinity Street (Section 2461 to 2521) are to add 1 – 3.5x8' box culvert to the existing 2-3.5'x8' box culverts.
- Culvert improvements at Colorado Street (Section 2821 to 2845) are to add 1 – 4.5'x6' box culvert to the existing 2-4.5'x6' box culverts.
- Culvert improvements at Arlington Street (Section 3562 to 3604) are to add 1 – 4.5'x6' box culvert to the existing 2-4.5'x6' box culverts.
- Culvert improvements at Memorial Street (Section 4338 to 4370) are to add 1 – 4.5'x6' box culvert to the existing 2-4.5'x6' box culverts.

Flood reduction improvements would be to provide a 100-year level of protection to approximately 84 homes located between Church and Memorial Streets.

Alternative TR2.5

This alternative consists of a combination of TR2.3 and TR2.4.

Flood reduction improvements would to provide a higher level of flood protection to 52 homes located between Hidalgo and Memorial Streets. It would provide a 100-year level or protection to 32 homes located between Hidalgo and First Streets.

Alternative TR2.6

This alternative consists of channelizing approximately 2700 feet of the upper end of Tributary 2 from Bibb Street (Section 6076) to just below Loop 431 or US Highway 277 (Section 8155) and make culvert improvements at North Bibb Street and Royal Haven Drive. Proposed improvements would consist of:

- Construct a concrete channel 15' wide with 2:1 side slopes from the Sports Field (Section 5037) to North Bibb Street (Section 6008). The channel would be approximately 970' long.
- Construct a box culvert at North Bibb Street (Section 6008 to Section 6076) as a 5'x9' box culvert.
- Construct a concrete channel 15' wide with 2:1 side slopes approximately from North Bibb Street (Section 6076) to Royal Haven Drive (Section 6331). The channel would be approximately 250' long.
- Construct a new box culvert at Royal Haven Drive (Section 6331 to 6391) as a 4'x8' box culvert.
- Construct an earthen channel approximately 15' with 4:1 side slopes from Royal Haven (Section 6391) to US Highway 277 (Section 8155). The channel would be approximately 1760' long.

Flood reduction improvements would be to protect approximately 12 homes in the 100-year floodplain. This alternative is shown on sheet 23.

Unnamed Tributary

Alternative UN1

This alternative consists of providing upstream detention above Cherry Leaf Drive (Section 7554) adjacent to the Learning Center. The outlet from the detention pond would discharge below Cherry Leaf Drive. Some flood protection would be provided to residences downstream of Cherry Leaf Drive and above FM 3443 (Section 5290). Limited flood protection would be provided for storm occurrences between the 25-year and 100-year flood events.

Flood reduction improvements would be to protect approximately 41 homes and 3 businesses presently located in the 100-year floodplain.

Alternative UN2

This alternative consists of providing upstream detention above US Highway 277 (Section 11814). The outlet from the detention would discharge below US Highway 277. A higher level of flood protection would be provided to properties downstream of US Highway 277 (Section 11814) to FM 1021 El Indio Highway (Section 1242).

Flood reduction improvements would be to provide limited flood protection to approximately 46 homes and 5 businesses presently located in the 100-year floodplain.

Alternative UN3

This alternative consists of culvert and channel improvements along the lower portion of the Unnamed Tributary from El Indio Highway (Section 1242) to Cherry Leaf Drive (Section 7554). Culvert improvements are proposed at FM 1021, FM 3443, Dell Crest Drive and Cherry Leaf Drive. Proposed improvements would consist of:

- Construct culvert improvements at FM 1021 (Section 1242) by adding 2 –7'x6' concrete box culverts to the existing 5-7'x7' concrete box culverts
- Widen concrete channel from El Indio Highway (Section 1242) to FM 3443 (Section 5227) to a 70' wide channel with 2:1 side slopes. The channel would be approximately 4000' long.
- Construct culvert improvements at FM 3443 (Section 5227 to Section 5290) by adding 2-8'x8' box culverts to the existing 6-8'x8' concrete box culverts.
- Widen concrete channel from FM 3443 (Section 5290) to Dell Crest (Section 6048) to a 70' wide channel with 2:1 side slopes. The channel would be approximately 750' long.
- Construct culvert improvements at Dell Crest Drive (Section 6048 to Section 6102) by adding 2-5'x10' box culverts to the existing 1-4.5x8 concrete box culvert.
- Widen concrete channel from Dell Crest Drive (Section 6102) to Cherry Leaf Drive (Section 7507) to a 60' wide channel with 2:1 side slopes. The channel would be approximately 1400' long.
- Construct culvert improvements at Cherry Leaf Drive (Section 7507 to Section 7554) by adding 3-4'x8' box culverts to the existing 8-4'x4' concrete box culverts.

Flood reduction improvements would be to provide a 100-year level of protection to 213 residences and 15 businesses from FM 1021 to Cherry Leaf Drive.

Alternative UN4

This alternative consists of a combination of UN2 and UN3. As explained above a combination of upstream detention and downstream channel and culvert improvements would provide for a

higher level of flood protection along most of Unnamed Tributary from FM 1021 (Section 1226) to US Highway 277 (Section 11814).

Flood reduction improvements would be to provide a higher level of flood protection to the 213 residences and 15 businesses identified above and protect the Language Development Center and 6 businesses along US Highway 277.

Seco Creek Tributary

Alternative SE1

This alternative consists of constructing an earthen channel from Seco Creek (Section 1000) to US Highway 277 (Section 3311). The earthen channel would be approximately 20' wide with 4:1 side slopes. It would be approximately 2300' long. This alternative is shown on Sheet 25.

Flood reduction improvements would be to provide flood protection to 2 homes and one church downstream of Loop 431.

Alternative SE2

This alternative consists of constructing a concrete lined channel upstream of US Highway 277 approximately 850 feet. The concrete channel would have to be 8' wide with 2:1 side slopes. This alternative is shown on Sheet 25.

Flood reduction improvements would be to protect 2 businesses and 3 houses located adjacent to the channel.

Alternative SE3

This alternative consists of constructing upstream detention at the Southern Pacific Railroad embankment (Section 4544). Currently, 2-96" steel pipes discharge storm water at this location. Closing off one of the pipes would provide some detention upstream of the old railroad embankment. Land above the railroad embankment is undeveloped and could easily be used as a detention area.

Flood reduction improvements would be to provide increased flood protection to 2 businesses and 2 homes.

Alternative SE4

This alternative consists of combining SE1 and SE2, essentially channelizing the Seco Creek Tributary from above US Highway 277 (Section 4044) to its confluence with the main channel of Seco Creek (Section 1000).

Flood reduction improvements would be to provide a 100-year level of flood protection to 2 businesses, 3 homes, a church, and a recycling yard downstream of US Highway 277.

Rio Grande River

Alternative RO1

This alternative consists of a buyout of approximately 24 houses and businesses along Ryan Street. Many of these residences were flooded by the storm of August 23-25,1998 from rainfall resulting from Hurricane Charley. A buyout would involve a displacement and demolition of structures in the flood plain. Sheet 16 shows the structures affected which fall between station 80+00 and 96+00 in the model study. These structures are also located upstream of the International Bridge (US Hwy 57) Structures and land values were estimated at $40,000 per property in March, 1999 price levels.

B. Flood Reduction Alternative Costs

For the alternatives formulated (Table 6) to reduce flooding in Eagle Pass, costs for each alternative were computed based on personal communication with local city officials, consultants and Texas Department of Transportation average unit prices for the Laredo District. These cost estimates are summarized in Appendix D and the flood reduction alternatives are shown on sheets 21-25 in this report. March, 1999 price levels were used in the cost estimates.

C. Value of Protected Structures

The value of protecting existing structures from a 100-year flood is presented. The methods used for determining these values for residences and businesses included:

- Flood protection from the occurrence of a 100-year flood event.
- Costs and structure values attributable to a given flood reduction alternative were determined in present dollars. The average project life for most drainage structures in Eagle Pass is considered to be about 50 years or greater.
- The value of structures was determined from an average of the appraised value of existing structures protected in a stream reach. Only 50% of the value of the structures was considered salvageable. Contents were assigned a value of 25% of the average structure value.
- A property buyout alternative was considered for the Rio Grande River.

D. Recommended Flood Reduction Plan and Implementation Plan

A flood reduction plan is discussed, and a plan for implementation is proposed. Available funding sources and additional funding options are discussed. The Federal government uses a tangible value analysis based on existing land use to evaluate flood control projects. This analysis consists of identifying costs and benefits with the objective of maximizing national economic development. Benefits divided by cost are expressed as a ratio. A ratio of 1.0 represents benefits equal to project costs and is the dividing point between an economically feasible and an infeasible project. Projects with benefit-cost ratios that are less than one are deemed economically not feasible. This method of rating alternatives does not take into account intangible factors such as citizen desires, environmental quality, ecological enhancement, neighborhood enhancement and aesthetics. Preservation of the flood plain to minimize future flooding resulting from urban development of the watershed is also not taken into consideration. Previous flood protection studies have indicated that benefit-cost ratios on municipal flood plain management projects rarely exceed 1.0. In fact, the requirement of a benefit-cost ratio exceeding 1.0 would exclude consideration of most alternatives. In light of this, and because the flood reduction alternatives presented herein provide significant non-quantifiable benefits to both the residents of the City of

Eagle Pass and the environment, benefit-cost ratios were not calculated. Instead, flood reduction costs were determined and the value of structures protected was calculated for the six streams studied in detail. Table 7 presents the recommended flood reduction alternatives chosen for each stream with a proposed plan for implementation. Figure 8 shows the Recommended Implementation Plan.

Rio Grande River - Alternative RO1 consists of a buyout of flooded structures along the Rio Grande River. After the August, 1998 storm event several of these structures were purchased, and families relocated to non-flood prone areas.

Main Arroyo - Alternative MA1 in combination with Alternative 2.1 provides a diversion of floodwaters away from the downtown area. This alternative is expensive costing over $3,181,000 and would require some additional ROW. This alternative would have a significant impact on flood reduction for any historic structures located in downtown Eagle Pass. About 70 structures would be protected by this upstream diversion. Alternatives MA1 and 2.1 together would reduce 100-yr water surface elevations about 0.5 feet to 2.0 feet throughout much of the lower reaches of the Main Arroyo from Station 10+92 to Station 92+31 and on Tributary 2 from Sta. 1+50 to Sta. 43+07.

Tributary 1 – Alternative TR1.2 consists of channel widening and culvert improvements at three road crossings in the upper part of the watershed. This alternative would cost about $636,000 and may require some additional ROW for the culvert improvements. Alternative TR1.2 would reduce 100-yr water surface elevations about 1.20 feet to almost 4.0 feet from Sta. 8+93 to Sta. 24+27.

Tributary 2 – Alternative TR2.6 is a channelization project in the upstream reaches of Tributary 2. The land and right-of-way for the channel improvement already exist, and there are no known utilities to be relocated. Alternative TR2.6 is relatively low in cost at about $137,000 making it an attractive alternative for consideration. Alternative TR2.6 would reduce the 100-yr water surface elevations about 0.45 feet to as much as 2.87 feet from Sta. 52+71 to Sta. 80+91.

Unnamed Tributary - Alternative UN4 is a combination of UN2 & UN3. Consisting of channel and culvert improvements in the lower part of the Unnamed Tributary and a dry detention pond in the upper part of the watershed. This is an expensive alternative at over $2,000,000, and would require Federal funding and support. Alternative UN4 would have the greatest impact from a flood protection standpoint, since 276 structures would be protected. Alternative UN4 would reduce the 100-yr water surface elevations about 0.50 feet to as much as 5.13 feet from Sta. 0+00 to Sta. 133+71, or basically the entire length of the Unnamed Tributary.

Seco Creek Tributary – Alternative SE4 would widen and deepen the existing channel below US 277, widen and line the existing channel above US 277 and call for the construction of a detention pond above an existing Railroad embankment. The cost of this combination of improvements would be in excess of $400,000. Three businesses, one house and a church would be protected by these improvements. Alternative SE4 would reduce the 100-yr water surface elevations about 0.49 feet to as much as 3.45 feet from Sta. 16+00 to Sta. 45+44.

A more complete comparison of 100-yr water surface elevations appears in Appendix D. Table 8 is an example of the information collected for a particular watershed to determine the average value of structures. Based on the number of structures protected for a flood event a value was computed.

Should the City of Eagle Pass plan to use federal funds for construction of flood control facilities, the use of these funds will undoubtedly require preparation of environmental assessments to address impacts of the alternative or other mitigative measures, which might be determined necessary, as an additional cost of the alternative. Furthermore, federal permitting required for implementation of the flood management alternatives involving earthmoving (channelization, new or enlarged culverts, detention ponds, diversion structures, etc.) would require surveys for particular impacts to cultural resources and federally protected species. The City of Eagle Pass should budget additional funds if federal money is sought for these flood reduction alternatives.

Table 6 - Alternative Improvement Plans Considered

Stream	Problem		Alternative	Description	Cost
Rio Grande River	• Periodic Flooding from rise in river levels...usually during storms induced by tropical disturbances. • Minor flooding along Ryan Street. • Lift station closed during high flooding	RO1	Existing House Buyout	• Do nothing • Buyout of existing homes and businesses along Ryan Street. • Shut down lift station periodically	$ 940,000
Main Arroyo	• Disruption of traffic at low water crossings. • Minor flooding of properties adjacent to creek during heavy storm events.	MA1	Existing MA1 - Diversion of 800 cfs to River Regular Maintenance	• Do nothing • Diversion of flood flows away from Downtown area near confluence of Tributary 2 and Main Arroyo down Church St. or 1st Street. Conduit 8' diameter. About 4000' long. • Routine channel clean up and mowing	$ 3,181,000
Tributary 1	• Disruption of traffic at low water crossings. • Minor flooding of structures adjacent to creek. • Minor flooding of structures adjacent to creek and traffic disruption during heavy storm events.	TR1.1 TR1.2	Existing Diversion in 72" RCP Channel widening & culvert improvement	• Do nothing • Diversion thru 72" diameter conduit, from Travis & Wilson intersection to Crockett St., • Channel widening and deepening in same area. • Routine channel clean up and mowing.	$ 388,000 $ 636,200
Tributary 2	• Significant flooding of homes in lower watershed • Disruption of traffic at low water crossings. • Minor flooding of structures adjacent to creek in upper watershed.	TR2.1 TR2.2 TR2.3 TR2.4 TR2.5 TR2.6	Existing Diversion of 800 cfs to River away from Downtown area Detention Diversion of 500 cfs Channelization and culvert improvements Combination of 2.3 & 2.4 Upstream Channelization	• Do nothing • Diversion of flood flows away from Downtown area. Conduit 8' diameter. About 4000' long. • Construct dry detention pond at Sports Field to reduce flows below Memorial Drive • Diversion of 500 cfs down Hildalgo Street • Channel widening and Culvert improvements • Combination • Widening and deepening channel parallel to Royal Crown Drive w/ culvert improvement • Routine channel clean up and mowing.	see MA1 $ 167,860 $ 964,100 $ 1,163,150 $ 2,127,250 $ 137,000
Tributary 3	• Disruption of traffic at low water crossings		Existing	• Do nothing	
Unnamed Tributary	• Significant flooding of homes in lower portion of watershed • Disruption of traffic at low water crossings. • Minor flooding of structures adjacent to creek in upper watershed.	UN1 UN2 UN3 UN4	Existing Detention Pond @ Learning Center Detention Pond above US 277 Channelization and Culvert Improvement Combination of UN2 & UN3	• Do nothing • Dry Detention at Learning Center above Cherry Leaf Drive • Dry Detention above US Hwy 277 • Widen and deepen channel between FM 1021 and FM 3443 to Cherry Leaf, add culvert capacity @ 4 locations. • Combine pond and culvert improvements	$ 707,950 $ 410,800 $ 1,507,000 $ 1,917,800
Seco Creek	• Minor flooding in lower reaches	SE1 SE2 SE3 SE4	Existing Channel 20' wide below US 277 Channel 8' wide above US 277 Detention above RR tracks Combination of projects	• Do Nothing • Widen and deepen existing channel below US 277. • Widen channel upstream of US Hwy 277 • Construct Detention Pond upstream of Railroad embankment • Combination of SE1, SE2, SE3, SE4	$ 120,933 $ 106,200 $ 235,831 $ 342,031

Table 7 – Recommended Implementation Plan

Stream		Alternative	Description	Cost
Rio Grande River	RO1	Existing House Buyout	• Buyout of existing homes and businesses along Ryan Street.	$ 940,000
Main Arroyo	MA1	MA1 - Diversion of 800 cfs to River	• Diversion of flood flows away from Downtown area near confluence of Tributary 2 and Main Arroyo down Church St. or 1st Street. Conduit 8' diameter. About 4000' long.	$ 3,181,000
Tributary 1	TR1.2	Channel widening & culvert improvement	• Channel widening and deepening in same area.	$ 636,200
Tributary 2	TR2.1	Diversion of 800 cfs to River away from Downtown area	• Diversion of flood flows away from Downtown area. Conduit 8' diameter. About 4000' long.	see MA1
	TR2.4	Channelization and culvert improvements	• Channel widening and Culvert improvements	$ 1,163,150
	TR2.6	Upstream Channelization	• Widening and deepening channel parallel to Royal Crown Drive w/ culvert improvement	$ 137,000
Tributary 3		Existing	• Do nothing	
Unnamed Tributary	UN4	Combination of UN2 & UN3	• Dry Detention above US Hwy 277 Widen and deepen channel between FM 1021 and FM 3443 to Cherry Leaf, add culvert capacity @ 4 locations.	$ 1,917,800
Seco Creek Tributary	SE4	Combination of projects SE1, SE2, and SE3	• Widen and deepen existing channel below US 277, Widen channel upstream of US Hwy 277 Construct Detention Pond upstream of Railroad embankment	$ 342,031

bldg-data

AVO: 16739

State	Zip	Station	LEFT (assumed) or Right	Year Built (assume missing)	1st Floor Stage (Flr Elev)	Stage (Grnd Elev)	Found Grnd Elev.	SID Reach Name	Struct Value (1k) Average all bldgs	Content Value (1k) (=20% Struct)	Other Value (1k)	No. of Struct.	Res1-2Gen. Data Estimate	No. of Struct. Estimated for test Taxs/SF	Tax Esti $/SF. for Main Area	Living Area SF (partial)	All Tax Appr. Value (1998)	Notes
ate	Zip	Station	Bank	ear	1F Stage	Grnd Stage		SID Rch	Struct Val	Cont Val	Other Val							Notes
X	78852	4307	Right	1996	720.16	719.16		MA-1	5.1	1.0	1.0	1		0			5,100	
X	78852	4307	Right	1996	720.36	719.36		MA-1	25.0	5.0	1.0	1		1	24.77	1392	24,980	
X	78852	4267	Right	1996	719.99	718.99		MA-1	45.7	9.1	1.0	1		0			45,740	
X	78852	3735	Left	1996	720.84	719.84		MA-1	11.2	2.2	1.0	1		0			11,170	
X	78852	3735	Left	1996	719.20	718.20		MA-1	17.9	3.6	1.0	1		1	22.03	1458	17,920	
X	78852	3735	Left	1996	719.31	718.31		MA-1	13.1	2.6	1.0	1		0			13,130	
X	78852	3735	Left	1996	720.33	719.33		MA-1	15.2	13.0	1.0	1		0			15,220	
X	78852	4049	Right	1996	720.87	719.87		MA-1	16.2	3.2	1.0	1		0			16,240	
X	78852	4049	Right	1996	724.09	723.09		MA-1	8.3	1.7	1.0	1		0			8,300	
X	78852	9369	Right	1996	722.89	721.89		MA-3	15.4	3.1	1.0	1		1	9.64	826	15,400	
X	78852	9369	Right	1996	723.89	722.89	722.89	MA-3	14.0	2.8	1.0	1		1	10.42	1100	14,030	
X	78852	9369	Right	1996	723.89	722.89	722.89	MA-3	21.1	4.2	1.0	1	21,098	0				
X	78852	9369	Right	1996	723.89	722.89	722.89	MA-3	21.1	4.2	1.0	1	21,098	0				
X	78852	9551	Left	1996	742.23	741.23		MA-3	21.1	4.2	1.0	1	21,098	0				
X	78852	9551	Left	1996	741.92	740.92		MA-3	25.0	5.0	1.0	1		0			24,960	
X	78852	9551	Left	1996	742.11	741.11		MA-3	21.6	4.3	1.0	1		0			21,630	
X	78852	9791	Left	1996	741.40	740.40		MA-3	24.4	4.9	1.0	1		0			24,360	
X	78852	9837	Left	1996	740.55	739.55		MA-3	24.7	4.9	1.0	1		0			24,740	
X	78852	9837	Left	1996	742.09	741.09		MA-3	33.6	6.7	1.0	1		0			33,630	
X	78852	9883	Left	1996	743.82	742.82		MA-3	33.6	6.7	1.0	1		1	29.69	925	33,630	
X	78852	9837	Left	1996	742.26	741.26		MA-3	20.7	4.1	1.0	1		1	22.09	782	20,710	
X	78852	9837	Left	1996	742.46	741.46		MA-3	23.0	4.6	1.0	1		0			23,010	
X	78852	9933	Left	1996	742.79	741.79		MA-3	34.9	7.0	1.0	1		0			34,930	
X	78852	9933	Right	1996	738.71	737.71		MA-3	34.2	6.8	1.0	1		0			34,230	
X	78852	9933	Right	1996	738.31	737.31		MA-3	31.3	6.3	1.0	1		1	26.17	999	31,250	
X	78852	9933	Right	1996	729.63	728.63		MA-3	24.1	4.8	1.0	1		1	25.67	648	24,110	
	78852	9933	Right	1996	729.89	728.89		MA-3	43.4	8.7	1.0	1		1	28.91	1270	43,360	
	78852	1538	Left	1996	735.23	734.23		MA-3	29.4	5.9	1.0	1		1	25.96	939	29,350	
	78852	1538	Left	1996	734.33	733.33		T1-2	26.3	5.3	1.0	1		0			26,330	
	78852	1670	Left	1996	736.03	735.03		T1-2	22.6	4.5	1.0	1		0			22,630	
	78852	1670	Left	1996	738.84	737.84		T1-2	33.0	6.6	1.0	1		0			33,020	
	78852	1819	Left	1996	737.74	736.74		T1-2	22.1	4.4	1.0	1		0			22,120	
	78852	1819	Left	1996	737.95	736.95		T1-2	39.4	7.9	1.0	1		0			39,380	
	78852	1955	Left	1996	738.14	737.14		T1-2	49.2	9.8	1.0	1		0			49,150	
	78852	2227	Right	1996	739.59	738.59		T1-2	24.5	4.9	1.0	1		0			24,490	
	78852	2227	Right	1996	739.68	738.68		T1-2	26.6	5.3	1.0	1		0			26,630	
	78852	564	Left	1996	745.61	744.61		T1-2	21.1	4.2	1.0	1	21,098	0				
	78852	465	Left	1996	745.37	744.37		T2-1	23.7	4.7	1.0	1		1	24.92	680	23,650	
	78852	430	Left	1996	744.00	743.00		T2-1	29.5	5.9	1.0	1		0			29,460	
	78852	540	Left	1996	745.50	744.50		T2-1	19.4	3.9	1.0	1		0			19,360	
	78852	465	Left	1996	745.10	744.10		T2-1	32.9	6.6	1.0	1		1	30.36	736	32,940	

VI. Conclusions and Recommendations

The following conclusions and recommendations are made to improve flood protection planning for the City of Eagle Pass. These measures could be adopted by the City Council in the form of a Capital Improvement Program. Funding for these measures could be by means of a bond program, a drainage fee assessment, for application of a low interest loan through the Texas Water Development Board.

- **Alternatives for Flood Damage Reduction** – A recommended plan for flood damage reduction is presented in Table 7. This plan will provide a 25- to 100-year level of protection to the City of Eagle Pass. These alternatives could be phased in over a period of years in a Capital Improvement Program. Recent development along Loop 431 and Highway 277 will add significant areas of impervious cover in the upper watersheds of Tributary 2 and 3 and the Unnamed Tributary. This development will increase future flood levels in these watersheds. *The City of Eagle Pass should phase these drainage improvements in over time and finance them through a drainage fee, a bond program or some other type of public funding.*

- **Buy Out of Properties** - The flooded properties along the Rio Grande River could be purchased to alleviate claims from future flood damages. This would be a one-time compensation to property owners along the river. This alternative appears to be less expensive in the long run for the City of Eagle Pass than flood proofing. *The City of Eagle Pass could borrow or seek a grant from FEMA to assist with this option.*

- **FIS Study Update** - A major part of this work effort involved reconstruction and validation of the existing HEC-2 models from the 1979 Flood Insurance Study for Eagle Pass. This work served as a basis for modeling the existing and future condition streams. The hydrology and hydraulics of the existing FIS were analyzed and new flows and flood plains determined for planning purposes. Although only the 100-year event was depicted in this study, a full range of flows was determined in the stream models. The models created by this Flood Protection Study would well serve as a basis to revise the existing FIS study. *The City of Eagle Pass may chose to apply for updating their existing flood insurance study with the Federal Emergency Management Administration to redefine new flood plains, including more streams studied and improvements which have occurred on existing streams since 1979.*

- **Draft Drainage Ordinance** - Appendix E contains a draft Drainage Ordinance modified to fit flooding issues in Eagle Pass. *The City of Eagle Pass may want to consider adoption of this ordinance to allow for orderly development of the upper watersheds along Loop 431 and US Highway 277, and to assure the City that property owners will bear their proportionate share of drainage improvements as development occurs.*

- **NPDES - Phase II Storm Water Regulations** - As the Environmental Protection Agency expands the storm water program; Phase II is scheduled to go into effect by the year 2000. The State of Texas, TNRCC, has taken over the monitoring and compliance part of the NPDES program. *The City of Eagle Pass may choose to participate and use this planning study to identify all existing storm water discharges into waters of the United States and later to develop a sampling and testing program periodically to monitor storm water discharges associated with industrial activities.*

- **Create WEB site for Public Works Department** - The site could be a part of the City of Eagle Pass current web site or a stand alone site. It could provide information concerning various activities of the Public Works department such as water rates, wastewater rates, street closures and repair, flooding, solid waste collection, and complaints. The posting of flooded area maps could aid homeowners or insurance agents regarding which properties might be in the 100-year flood plain. *The City of Eagle Pass may want to allocate part of its existing WEB site to be dedicated to Public Works updates.*

- **Aerial Mapping along Rio Grande River and City of Eagle Pass** - The International Boundary and Waterway Commission is the governing authority to regulate the use of water and the quality of water entering the Rio Grande River. *The City of Eagle Pass may want to combine its dollars with the IBWC to map new areas as they develop.*

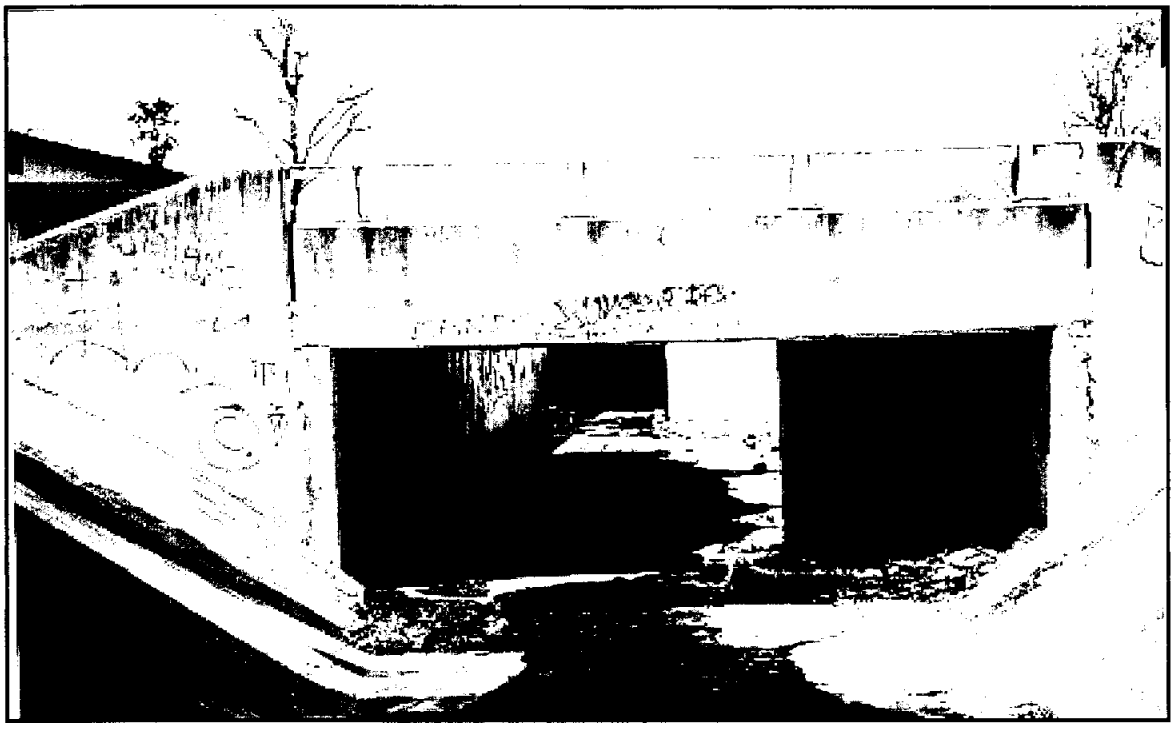
VII. References

1. *City of Eagle Pass, Texas - Flood Insurance Study*, Federal Insurance Administration now Federal Emergency Management Agency, August 1979.
2. *Personal Communication with Federal Emergency Management Agency*, Concerning backup material used in the preparation of the Flood Insurance Study by URS/Forrest & Cotton, Inc. 1978 and 1979.
3. *HEC-HMS, Hydrologic Modeling System User's Manual Version 1.0*, March, 1998, U. S. Army Corps of Engineers Hydrologic Engineering Center, CPD-74.
4. *HEC-RAS, River Analysis System, User's Manual Version 2.2*, September, 1998, U.S. Army Corps of Engineers Hydrologic Engineering Center, CPD-68.
5. *HEC-FDA, Flood Damage Reduction Analysis, User's Manual Version 1.0*, January, 1998, U.S. Army Corps of Engineers Hydrologic Engineering Center, CPD-72.
6. *EM 1110-2-1619 Risk-Based Analysis for Flood Damage Reduction Studies*, U.S. Army Corps of Engineers, 1 August 1996.
7. *EM 1110-2-1419 Hydrologic Engineering Requirements for Flood Damage Reduction Studies*, U.S. Army Corps of Engineers, 31 January 1995.
8. *Personal Communication with the International Boundary and Water Commission.* Fall, 1997 concerning flows for Rio Grande River.
9. *Technical Paper No. 40 Precipitation-Frequency Values for durations from 5 minutes to 24 hours over the Eastern United States*, U.S. Weather Bureau, Hershfield, 1961.
10. *Hydro-35, 5 to 60 minute Precipitation Frequency for the Eastern and Central United States* NOAA Technical Memorandum NWS HYDRO-35, Office of Hydrology, June, 1977.
11. *U. S. Geological Survey 7.5 degree Quadrangle Sheets* covering Eagle Pass, Texas. These included:
    - Quemado SE
    - Deadmans Hill
    - Indian Tank
    - Eagle Pass West
    - Eagle Pass NE
    - Eagle Pass SW
    - Indio Creek
12. *Texas Department of Transportation* plans for:
    - US 277 from US 277 Business to 0.8 miles east of US 57
    - US 277 to Main Street - Length 3.576 km
13. *Construction Plans for New International Bridge* from Groves and Associates Fall, 1997. Also, personal communication regarding modeling used to set low chord elevation of bridge.
14. *City of Eagle Pass Plans* for various subdivisions and Street and Drainage Improvements by various developers
15. *Construction plans for Main Arroyo extension* beyond 21" sanitary sewer line to Rio Grande River by Richard Lane and Associates, 1985.
16. *Planning Studies for Eagle Pass, Texas* by Hejl, Lee & Associates for Land Use, Storm Drainage and Street Layout. Personal communication regarding electronic information on plans prepared.
17. *Soil Survey of Maverick County*, US Department of Agriculture Soil Conservation Service, November, 1977.

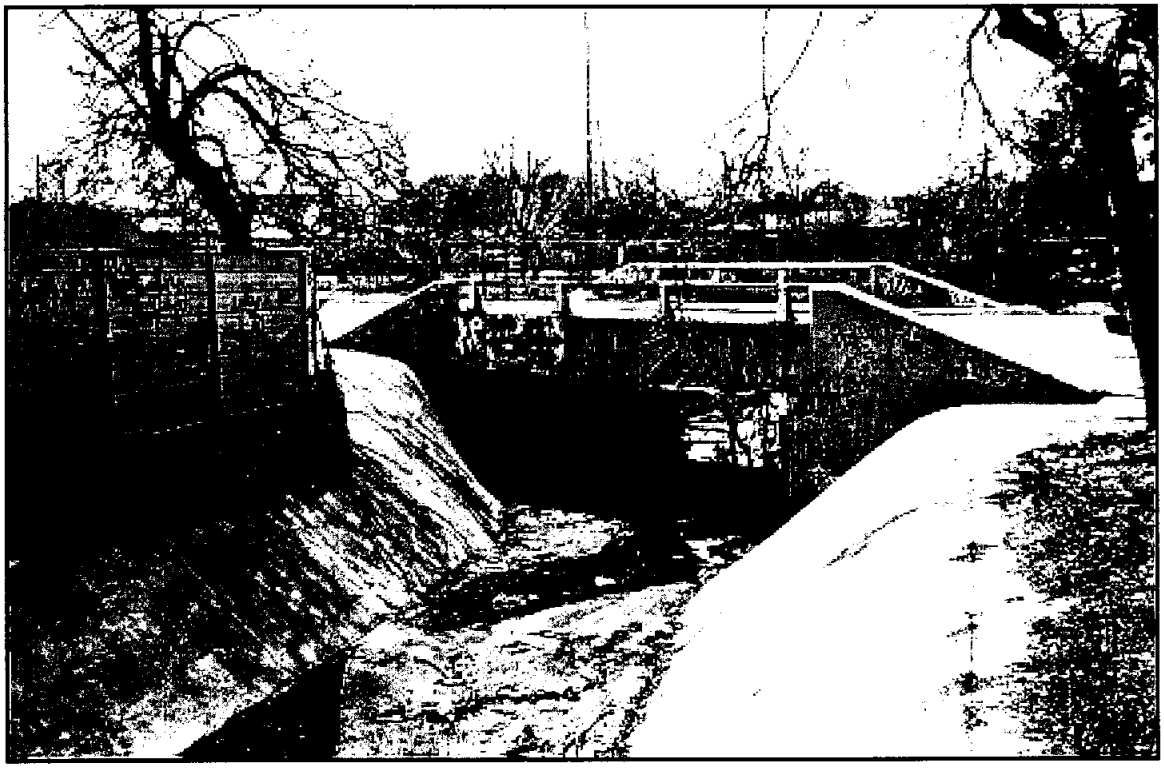
18. *Aerial mapping of Eagle Pass and Rio Grande River* performed under this contract by Landata - Geosource, Inc. 1997 and 1998. The flood plains of streams studied in detail were flown and mapped to an accuracy of 2 feet. Additional point elevations were obtained photogrammetrically for the Mexico side of the Rio Grande River to maintain the accuracy of flood prediction models.
19. *Photographic file of most drainage structures* taken during the course of this drainage study were compiled by stream with descriptions of their condition, type and size.
20. *City of Eagle Pass, Public Works Department Construction Specifications Manual*, Fall, 1997. Storm Drainage Requirements pp. 118-124.
21. *Storm water and Drainage ordinances*, City of Coppell, City of Allen, City of Plano, and others.
22. *Personal Correspondence* with various local, regional, state, and federal agencies regarding plans and studies for City of Eagle Pass and Maverick County.
23. *Study procedures* published by the Texas Water Development Board concerning Flood Protection Studies, 1997.
24. *Maverick County Water Control and Improvement District Number 1*, plans for irrigation canal layout.
25. *History of Eagle Pass and Piedras Negras* from the Lower Rio Grande Valley Planning Authority obtained from the Internet.
26. *Maverick County Appraisal District property values* for structures identified to be in the future 100-year flood plain.

Attachment 1 - Selected Photos of Existing Streams in Eagle Pass, Texas

The following pages contain photos of typical stream reaches in Eagle Pass. Some of the photos show past flooding events.



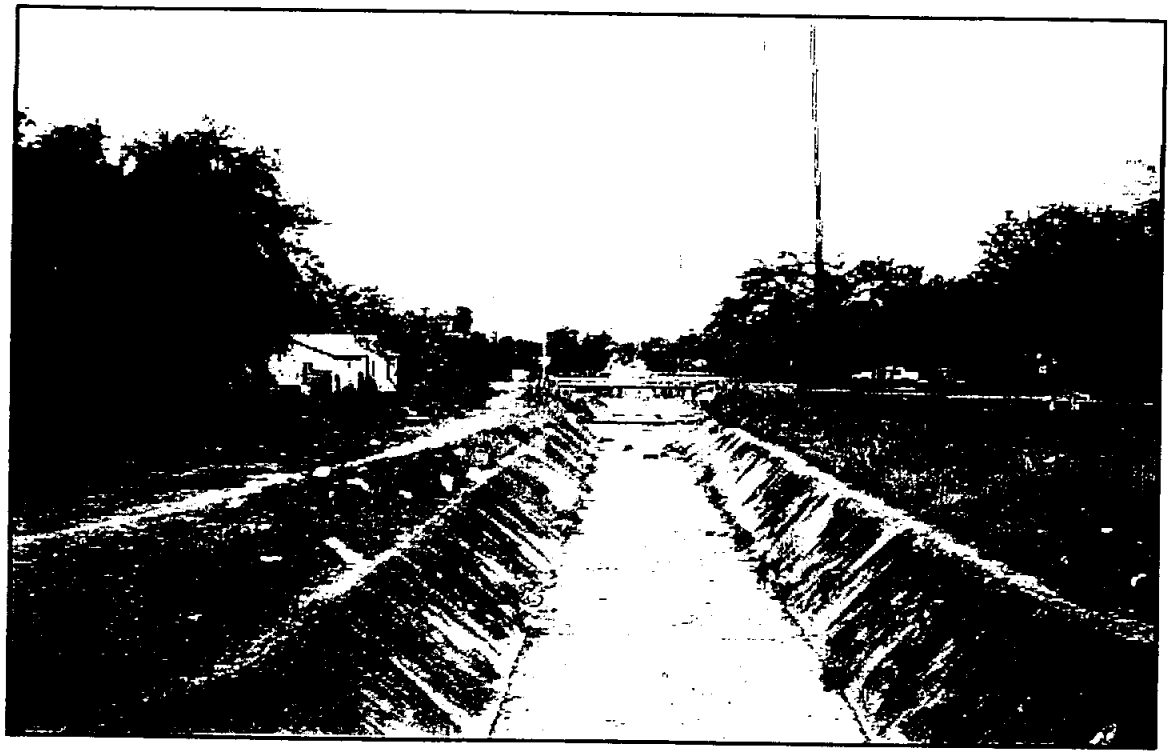
Tributary 1 Looking Downstream at Bridge at Travis Street



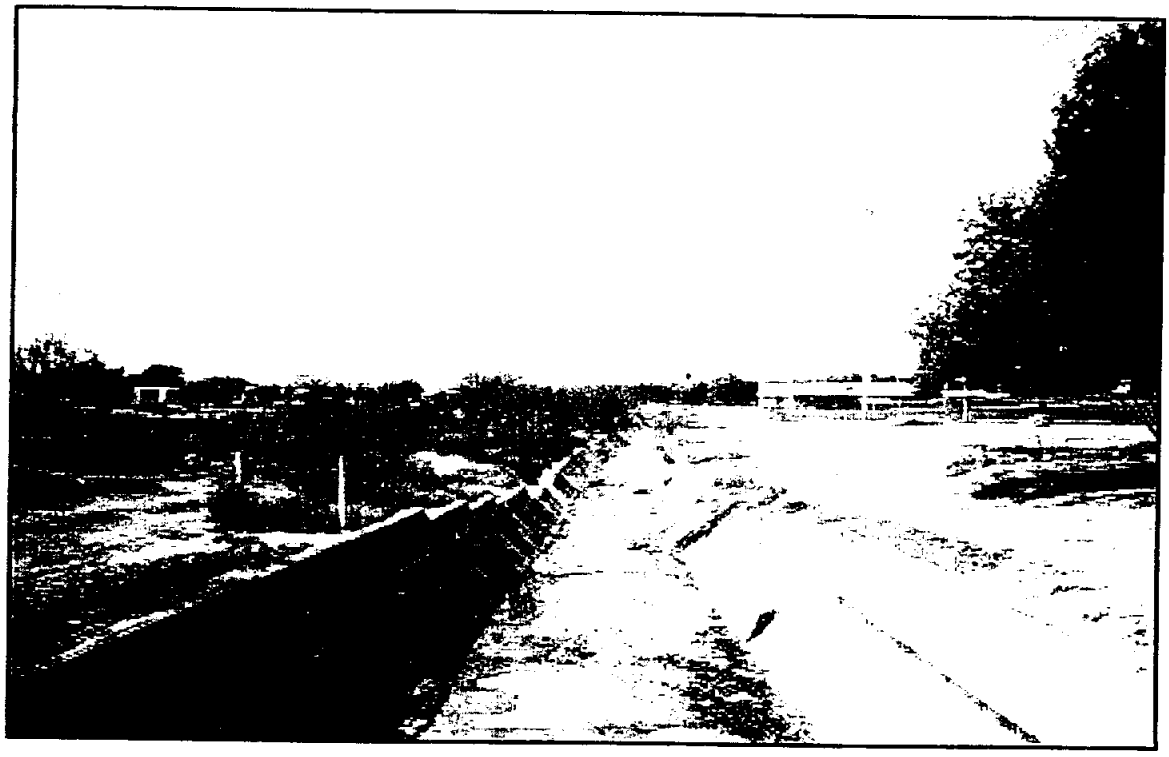
Tributary 1 Looking Downstream at Bridge at Crockett Street

Tributary 2 Flooding at Eagle Pass High School

Tributary 2 Flooding at Loop 431 and Royal Ridge



Tributary 3 Looking Downstream from Bridge at Colorado Street



Tributary 3 Looking Downstream from Bridge at Bibb Street

Unnamed Tributary Flooding at Katy Street and Cherry Leaf

Unnamed Tributary Flooding at Katy Street and Cherry Leaf

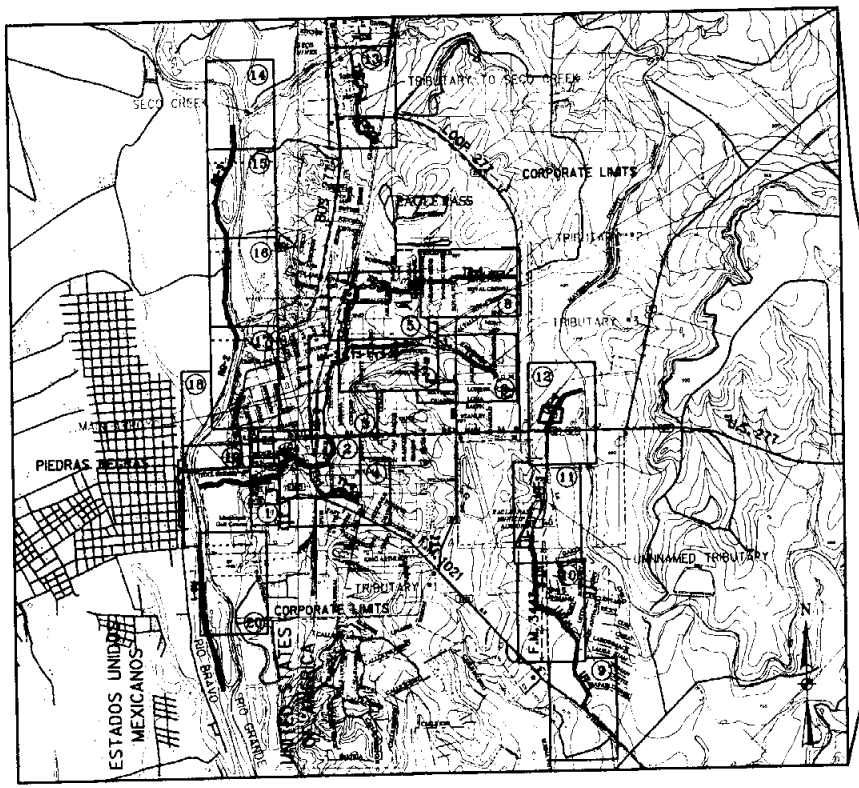
Seco Tributary Looking Upstream at Loop 431

Seco Creek Tributary Looking Upstream from End of Diaz Street

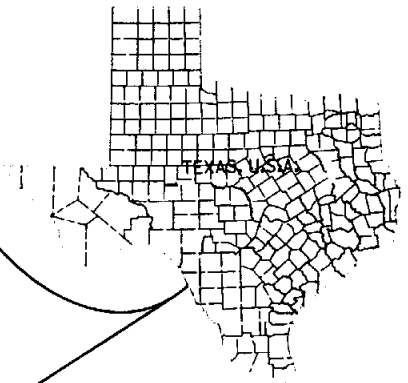
THE CITY OF EAGLE PASS, TEXAS

EAGLE PASS FLOOD STUDY

SHEET INDEX



SITE LOCATION MAP



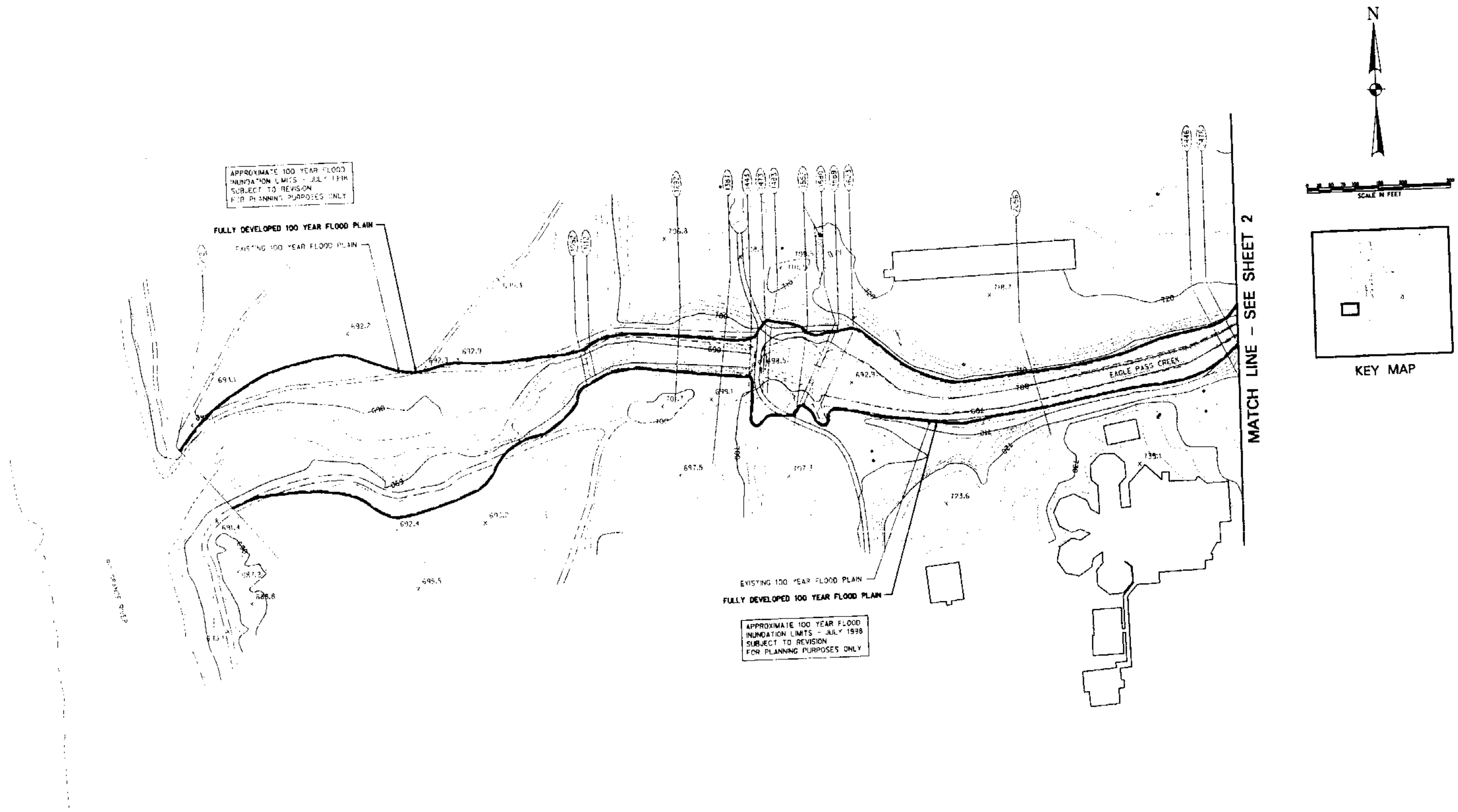
REGION LOCATION MAP

Halff Associates

ENGINEERS · ARCHITECTS · SCIENTISTS · PLANNERS · SURVEYORS

8616 NORTHWEST PLAZA DRIVE DALLAS, TEXAS (214) 346-6200

AVO 16739 NOVEMBER, 2000



LEGEND

- EXISTING 100 YEAR FLOOD PLAIN
- FULLY DEVELOPED 100 YEAR FLOOD PLAIN
- CENTER LINE OF TRIBUTARY
- STRUCTURES AFFECTED BY FUTURE 100 YEAR FLOOD PLAIN
- HIGHWAY
- SOUTHERN PACIFIC RAILROAD
- LIMITS OF HECRAS CROSS-SECTIONS USED IN HYDRAULIC MODEL

GENERAL NOTES:

1. TOPO BASIS: LANDATA AERIAL TOPO FLOWN 1998
2. FLOWS DEVELOPED BY HALFF ASSOCIATES, INC. IN 1998 FLOOD STUDY REPORT.
3. 11"X17" SUBMITTALS ARE NOT TO SCALE.

EAGLE PASS FLOOD STUDY

MAIN ARROYO

EAGLE PASS, TEXAS

FLOODED AREA MAP

Halff Associates

DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO.
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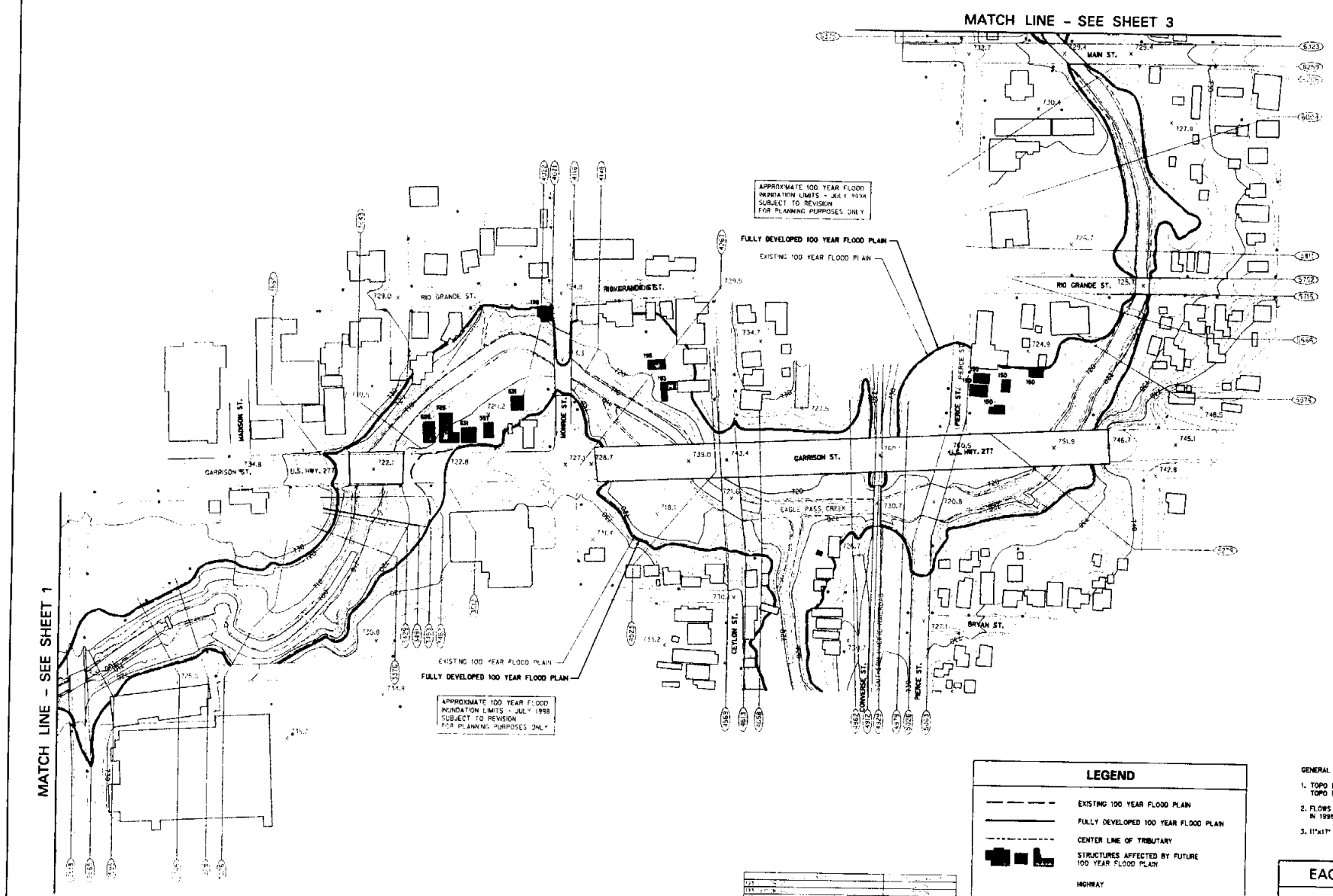

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EAGLE PASS FLOOD STUDY

MAIN ARROYO

EAGLE PASS, TEXAS

FLOODED AREA MAP

Halff Associates

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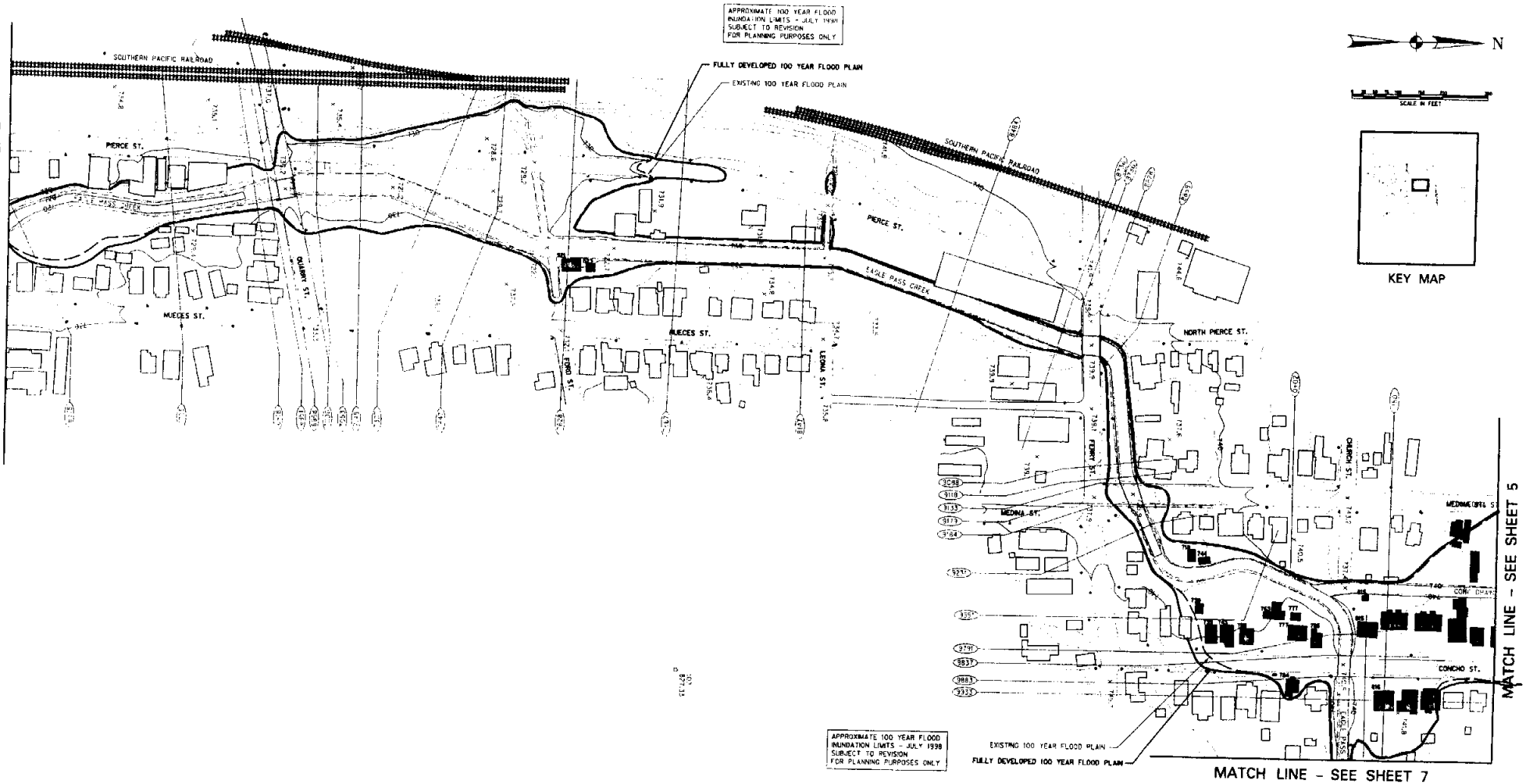

APPROXIMATE 100 YEAR FLOOD INUNDATION LIMITS - JULY 1998 SUBJECT TO REVISION FOR PLANNING PURPOSES ONLY

LEGEND

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EAGLE PASS FLOOD STUDY
MAIN ARROYO
EAGLE PASS, TEXAS
FLOODED AREA MAP

Halff Associates

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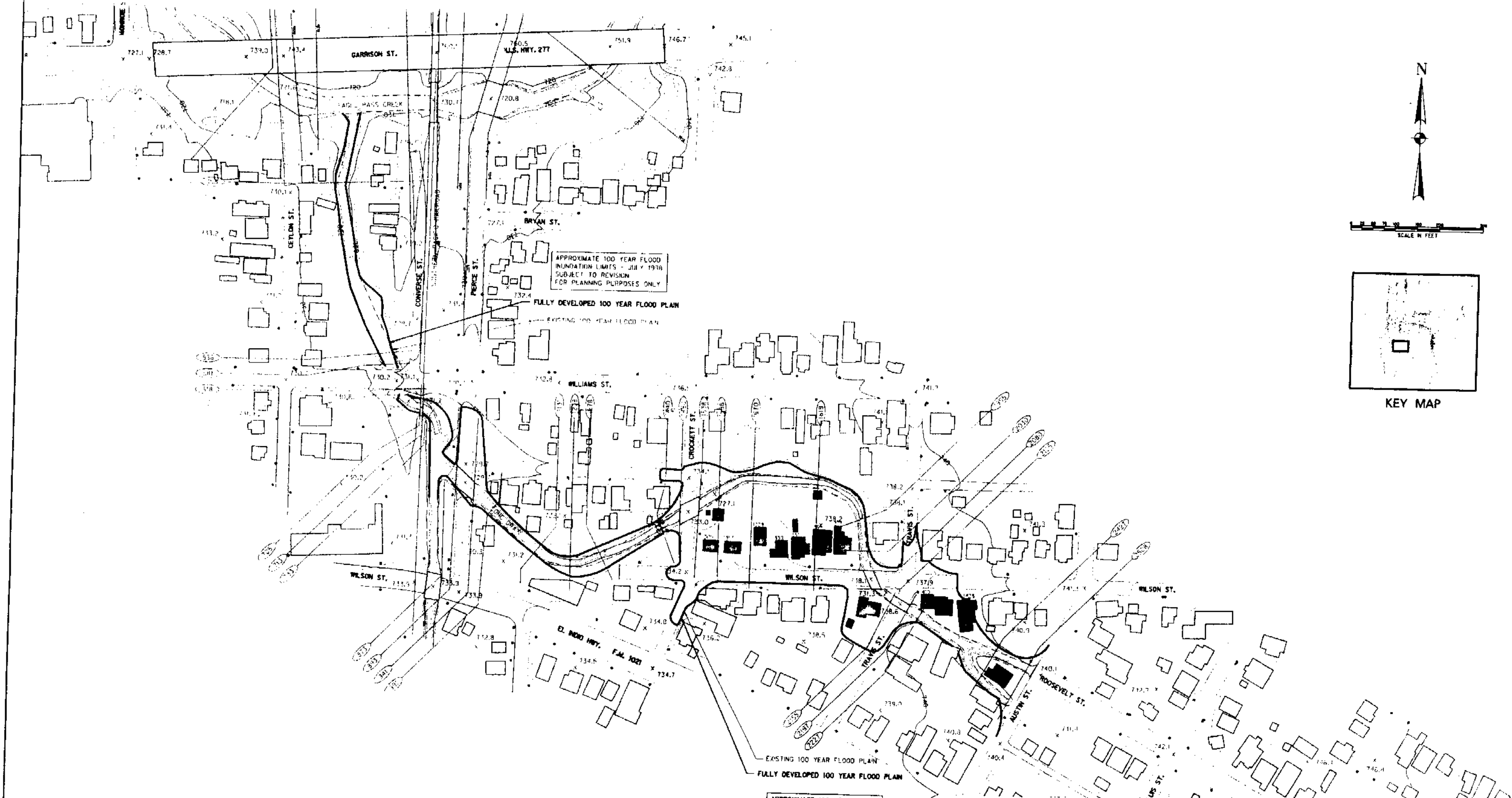

APPROXIMATE 100 YEAR FLOOD INUNDATION LIMITS - JULY 1998 SUBJECT TO REVISION FOR PLANNING PURPOSES ONLY

[illegible]	[illegible]
[illegible] Wilson St.	735.21
[illegible] Wilson St.	734.33
[illegible] Wilson St.	736.03
[illegible] Wilson St.	738.84
1351 Wilson St.	732.24
1361 Wilson St.	737.35
[illegible] Wilson St.	738.14
[illegible] Wilson St.	739.57
[illegible] Wilson St.	[illegible]

LEGEND

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EAGLE PASS FLOOD STUDY

TRIBUTARY #1 TO MAIN ARROYO

EAGLE PASS, TEXAS

FLOODED AREA MAP

Halff Associates

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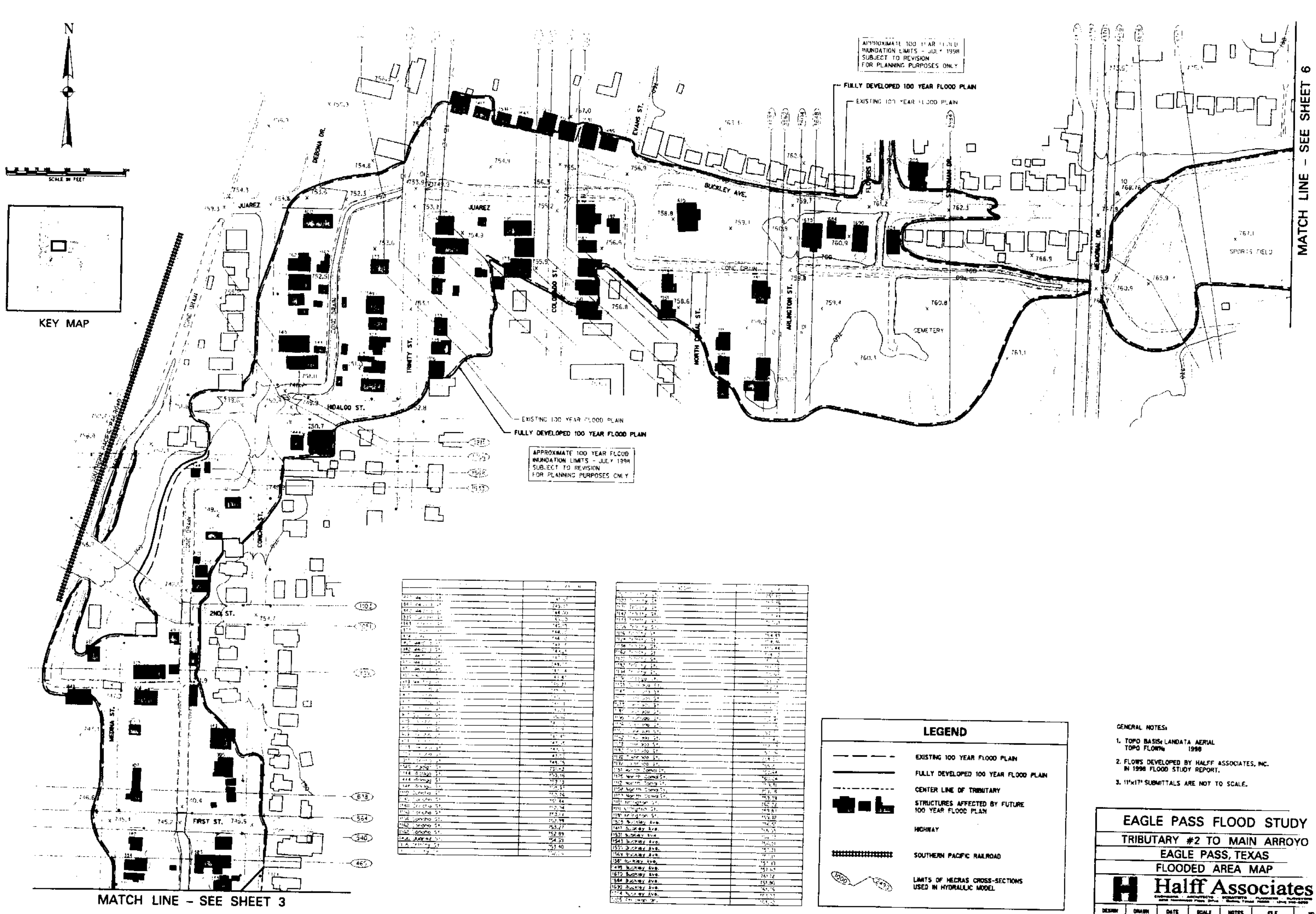
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MATCH LINE - SEE SHEET 3
KEY MAP
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SCALE IN FEET
APPROXIMATE 100 YEAR FLOOD INUNDATION LIMITS - JULY 1998 SUBJECT TO REVISION FOR PLANNING PURPOSES ONLY
FULLY DEVELOPED 100 YEAR FLOOD PLAIN
EXISTING 100 YEAR FLOOD PLAIN
DEBONA DR.
JUAREZ
TRINITY ST.
COLORADO ST.
HIDALGO ST.
EVANS ST.
BUCKLEY AVE.
NORTH CANAL ST.
ARLINGTON ST.
FLOWERS DR.
STROHMAN DR.
MEMORIAL DR.
CONC. DRAIN
CEMETERY
SPORTS FIELD
CONCHO ST.
2ND ST.
FIRST ST.
MEDINA ST.
SOUTHERN PACIFIC RAILROAD
LEGEND
EXISTING 100 YEAR FLOOD PLAIN
FULLY DEVELOPED 100 YEAR FLOOD PLAIN
CENTER LINE OF TRIBUTARY
STRUCTURES AFFECTED BY FUTURE 100 YEAR FLOOD PLAIN
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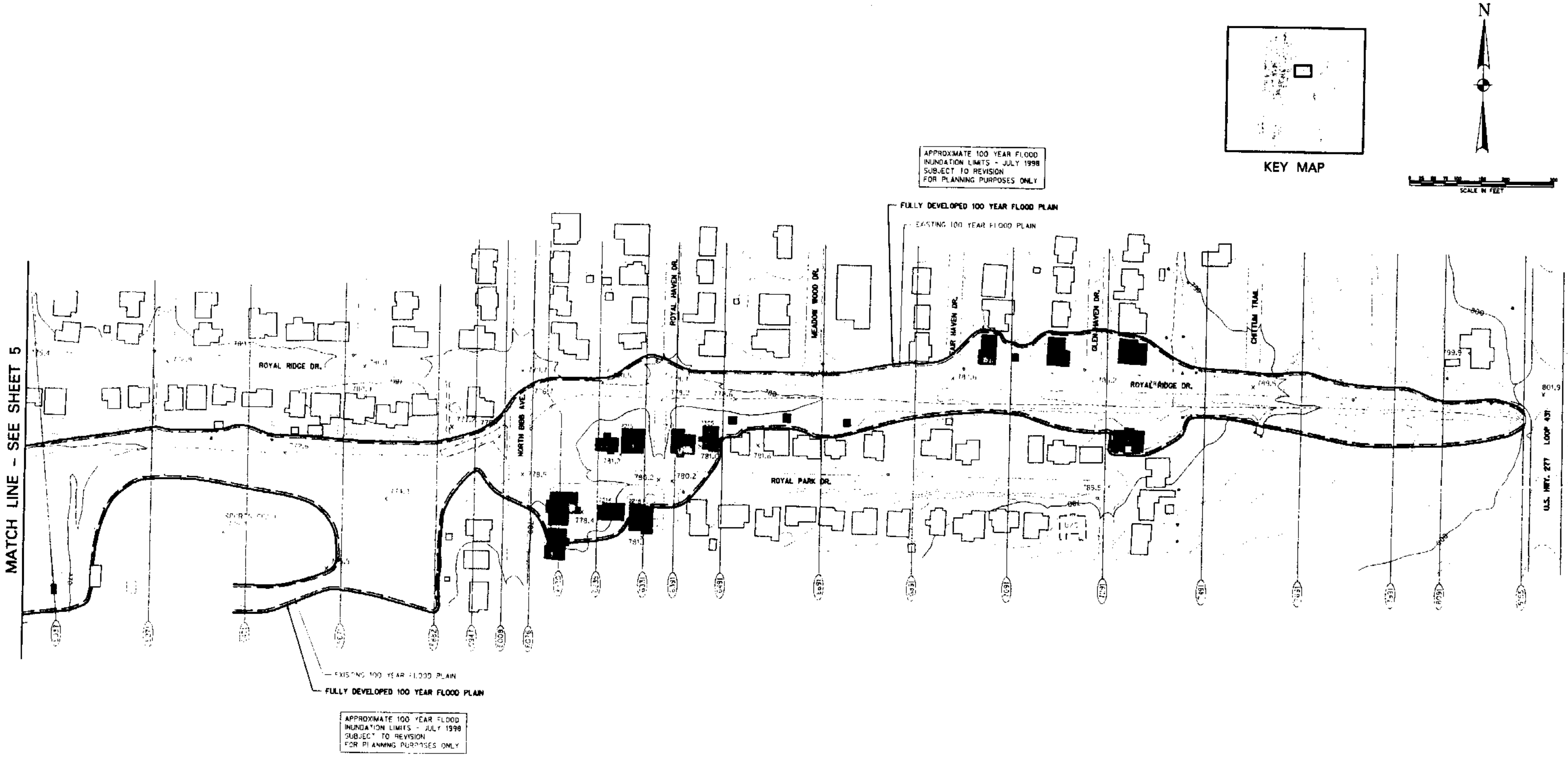
EAGLE PASS FLOOD STUDY
TRIBUTARY #2 TO MAIN ARROYO
EAGLE PASS, TEXAS
FLOODED AREA MAP
Halff Associates
DESIGN J.M.P.
DRAWN U.L.L.
DATE MAY 1999
SCALE 1"= 100'
NOTES AVO 16739
SHEET 5



LEGEND

— — —	EXISTING 100 YEAR FLOOD PLAIN
———	FULLY DEVELOPED 100 YEAR FLOOD PLAIN
- - - -	CENTER LINE OF TRIBUTARY
■	STRUCTURES AFFECTED BY FUTURE 100 YEAR FLOOD PLAIN
	HIGHWAY
++++++	SOUTHERN PACIFIC RAILROAD
	LIMITS OF HECRAS CROSS-SECTIONS USED IN HYDRAULIC MODEL

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EAGLE PASS FLOOD STUDY

TRIBUTARY #2 TO MAIN ARROYO

EAGLE PASS, TEXAS

FLOODED AREA MAP

Halff Associates

DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO.
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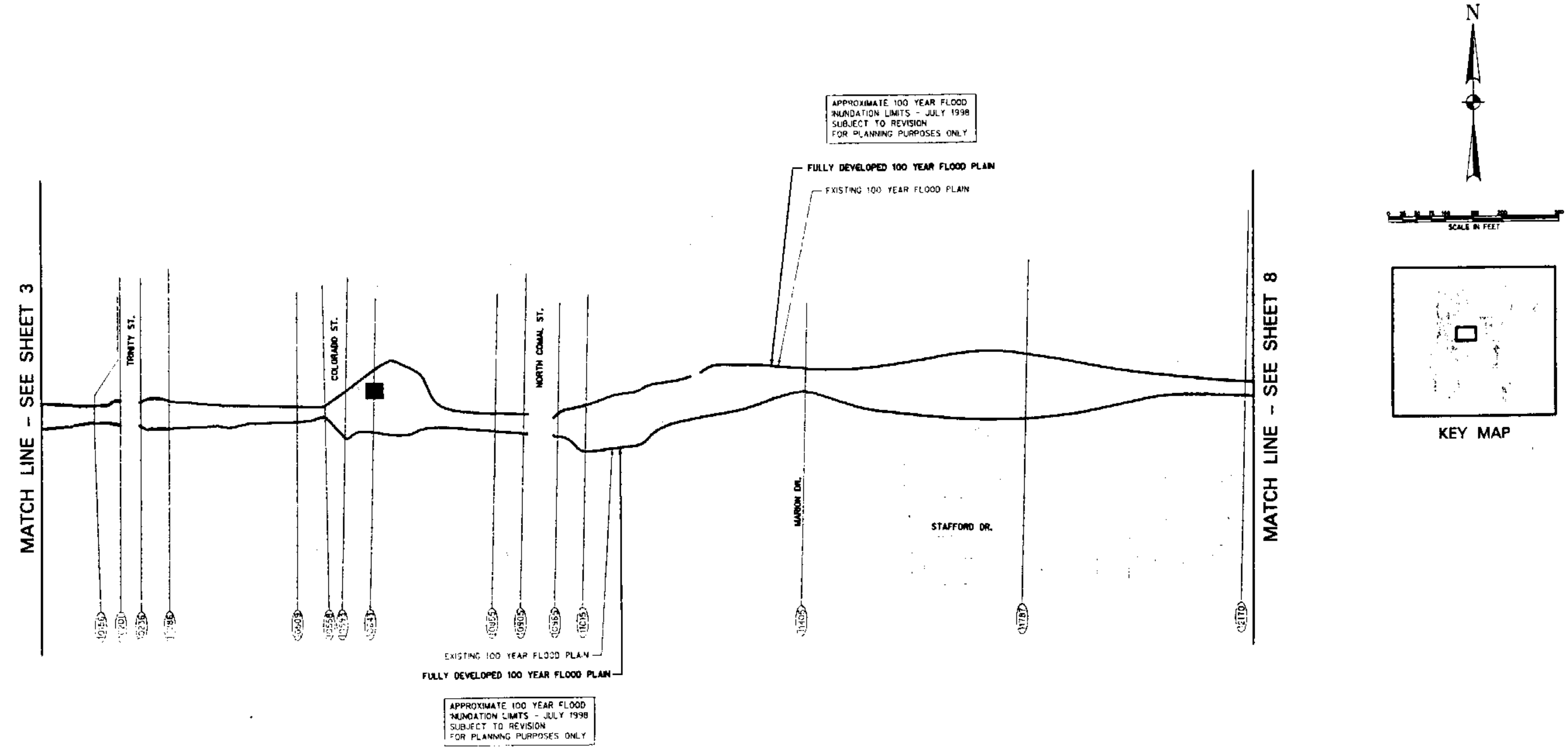

LEGEND

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- STRUCTURES AFFECTED BY FUTURE 100 YEAR FLOOD PLAIN
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EAGLE PASS FLOOD STUDY

TRIBUTARY #3 TO MAIN ARROYO

EAGLE PASS, TEXAS

FLOODED AREA MAP

Halff Associates

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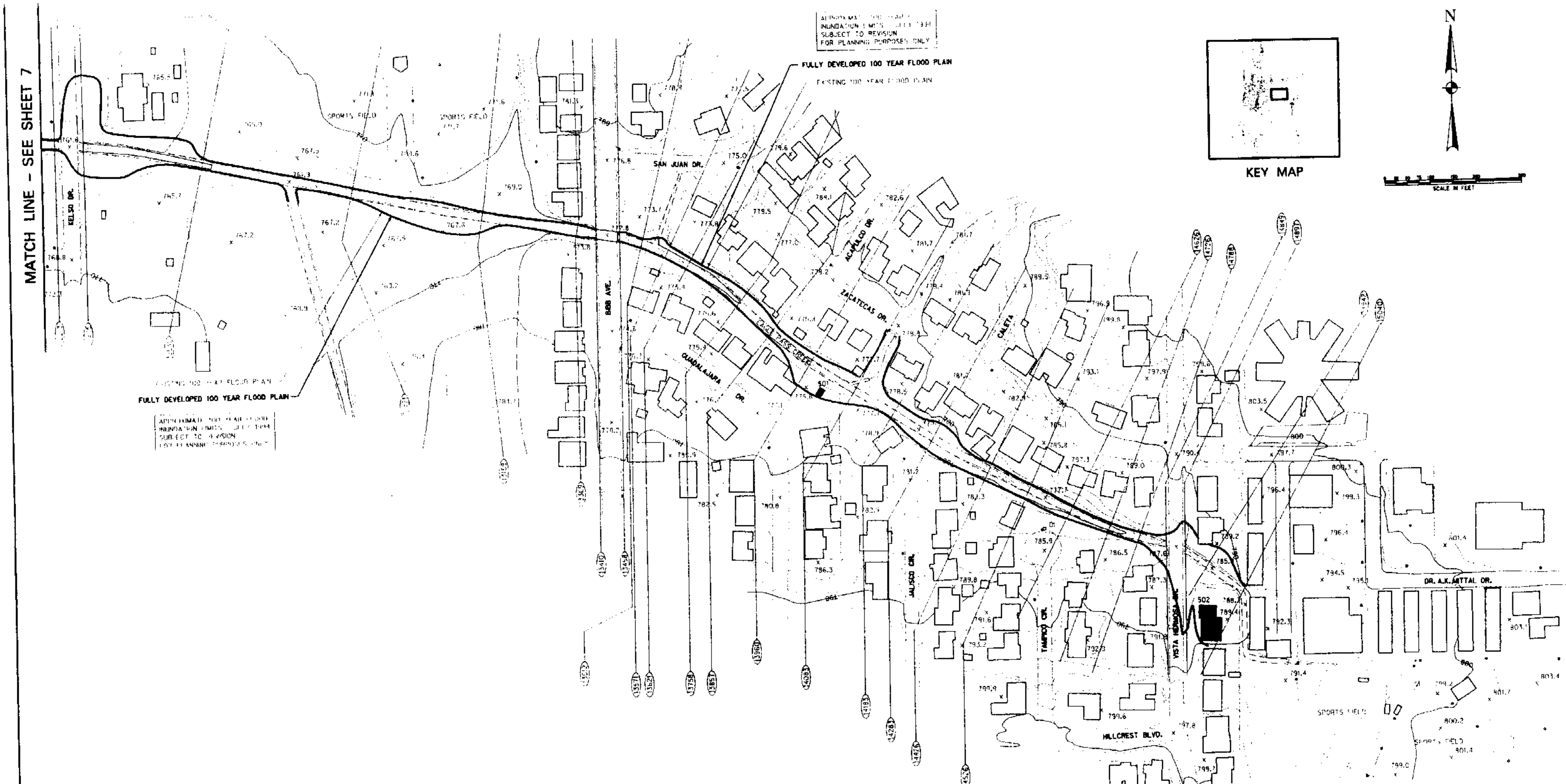

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EAGLE PASS FLOOD STUDY

TRIBUTARY #3 TO MAIN ARROYO

EAGLE PASS, TEXAS

FLOODED AREA MAP

Halff Associates

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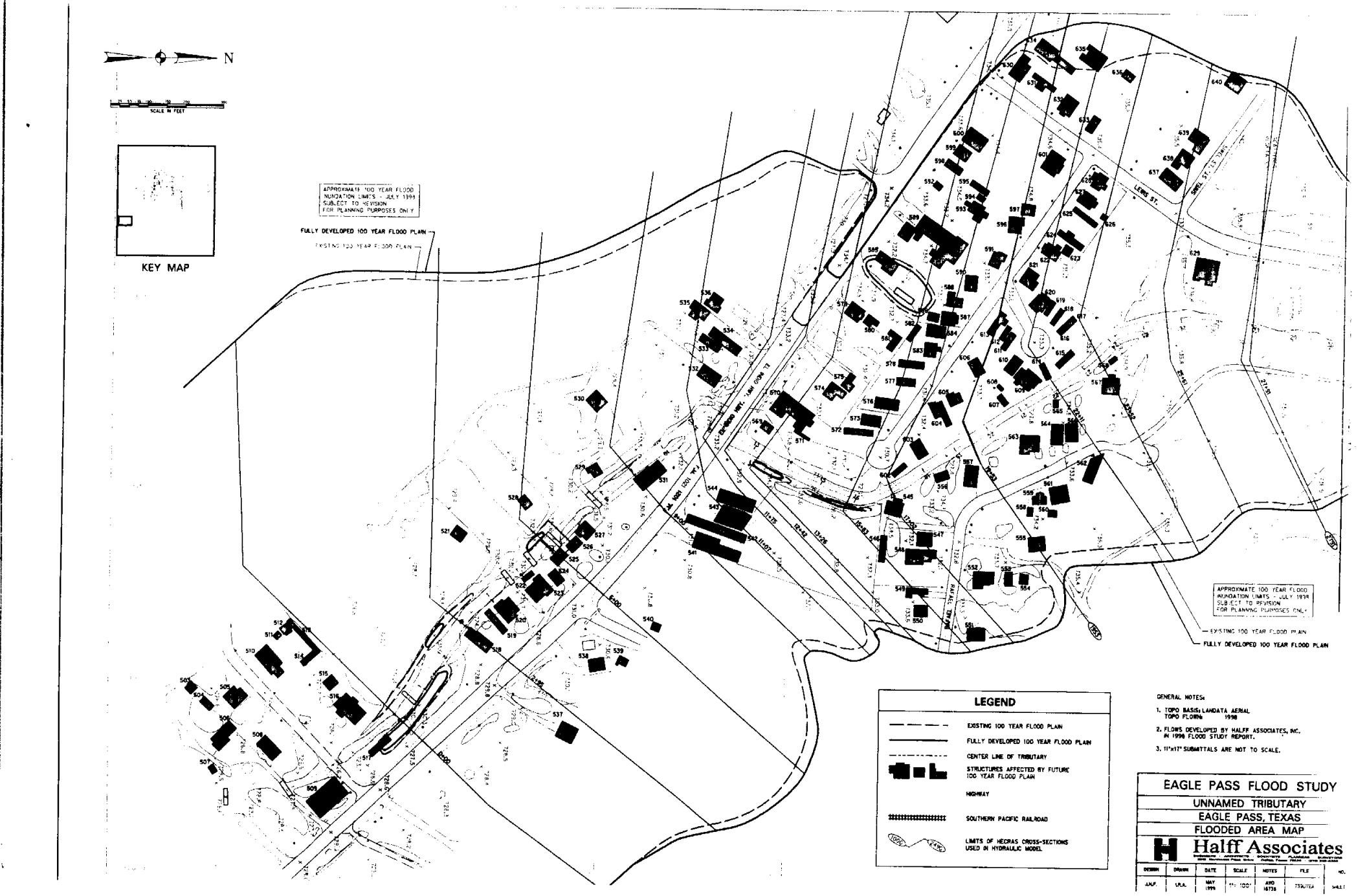
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APPROXIMATE 100 YEAR FLOOD INUNDATION LIMITS - JULY 1998 SUBJECT TO REVISION FOR PLANNING PURPOSES ONLY
FULLY DEVELOPED 100 YEAR FLOOD PLAIN
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EAGLE PASS FLOOD STUDY
UNNAMED TRIBUTARY
EAGLE PASS, TEXAS
FLOODED AREA MAP
Halff Associates
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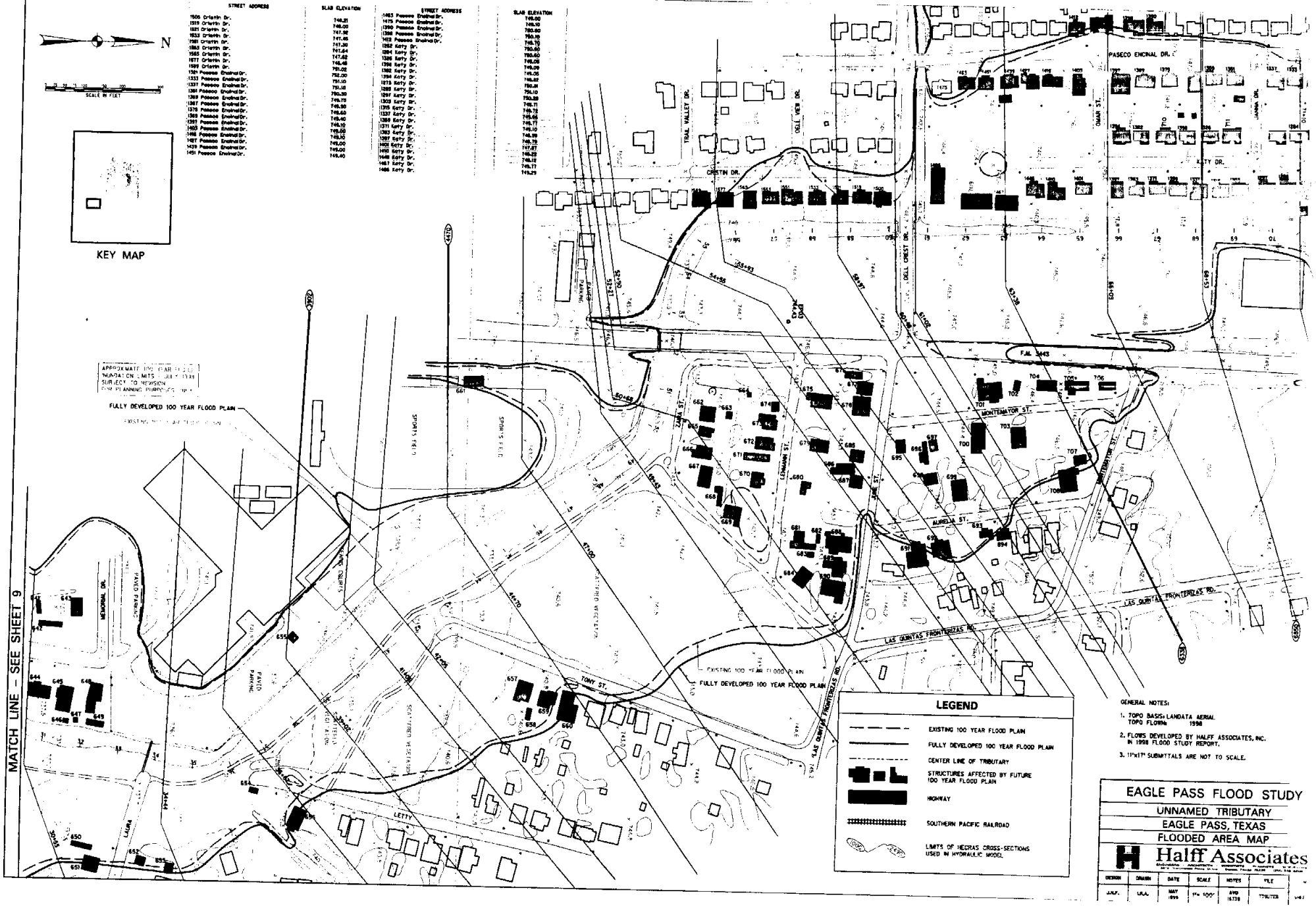
N
SCALE IN FEET
KEY MAP
STREET ADDRESS
SLAB ELEVATION
MATCH LINE - SEE SHEET 9
FULLY DEVELOPED 100 YEAR FLOOD PLAIN
EXISTING 100 YEAR FLOOD PLAIN
PASEO ENCINAL DR.
TRAIL VALLEY DR.
DELL VIEW DR.
DELL CREST DR.
CRISTIN DR.
OMAR ST.
JANNA DR.
KITTY DR.
F.M. 3443
MONTEMAYOR ST.
LERMAN ST.
JANE ST.
AURELIA ST.
LAS QUINTAS FRONTERIZAS RD.
TONY ST.
LETTY
LAURA
MEMORIAL DR.
PAVED PARKING
SPORTS FIELD
SOUTHERN PACIFIC RAILROAD
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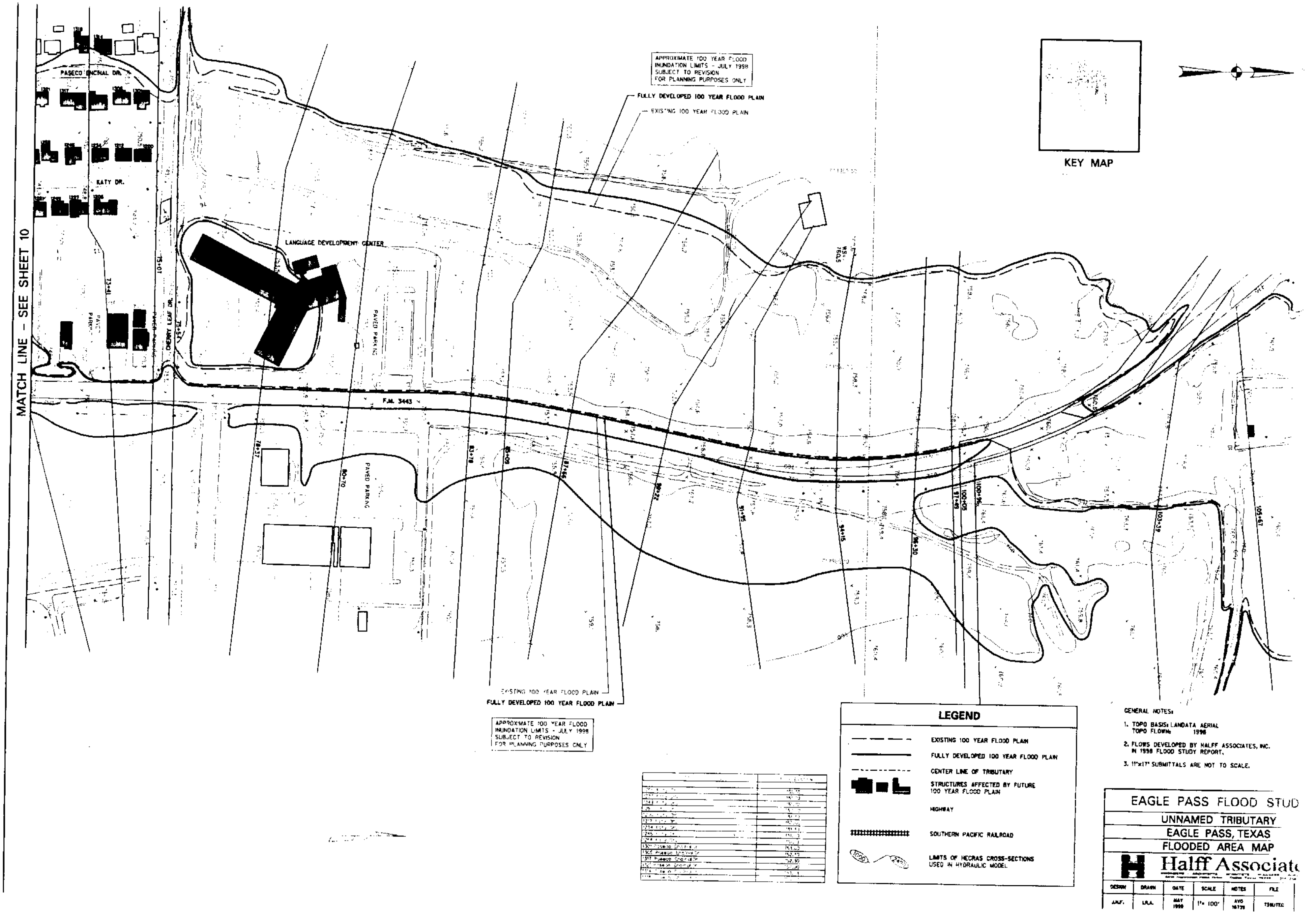
EAGLE PASS FLOOD STUDY
UNNAMED TRIBUTARY
EAGLE PASS, TEXAS
FLOODED AREA MAP
Halff Associates


MATCH LINE - SEE SHEET 10
KEY MAP
APPROXIMATE 100 YEAR FLOOD INUNDATION LIMITS - JULY 1998 SUBJECT TO REVISION FOR PLANNING PURPOSES ONLY
FULLY DEVELOPED 100 YEAR FLOOD PLAIN
EXISTING 100 YEAR FLOOD PLAIN
PASECO ENCINAL DR.
KATY DR.
CHERRY LEAF DR.
PAVED PARKING
LANGUAGE DEVELOPMENT CENTER
F.M. 3443
75+01
75+54
73+41
78+37
80+70
83+78
85+09
87+56
89+22
91+95
94+15
96+30
97+49
100+05
100+96
103+39
105+67
EXISTING 100 YEAR FLOOD PLAIN
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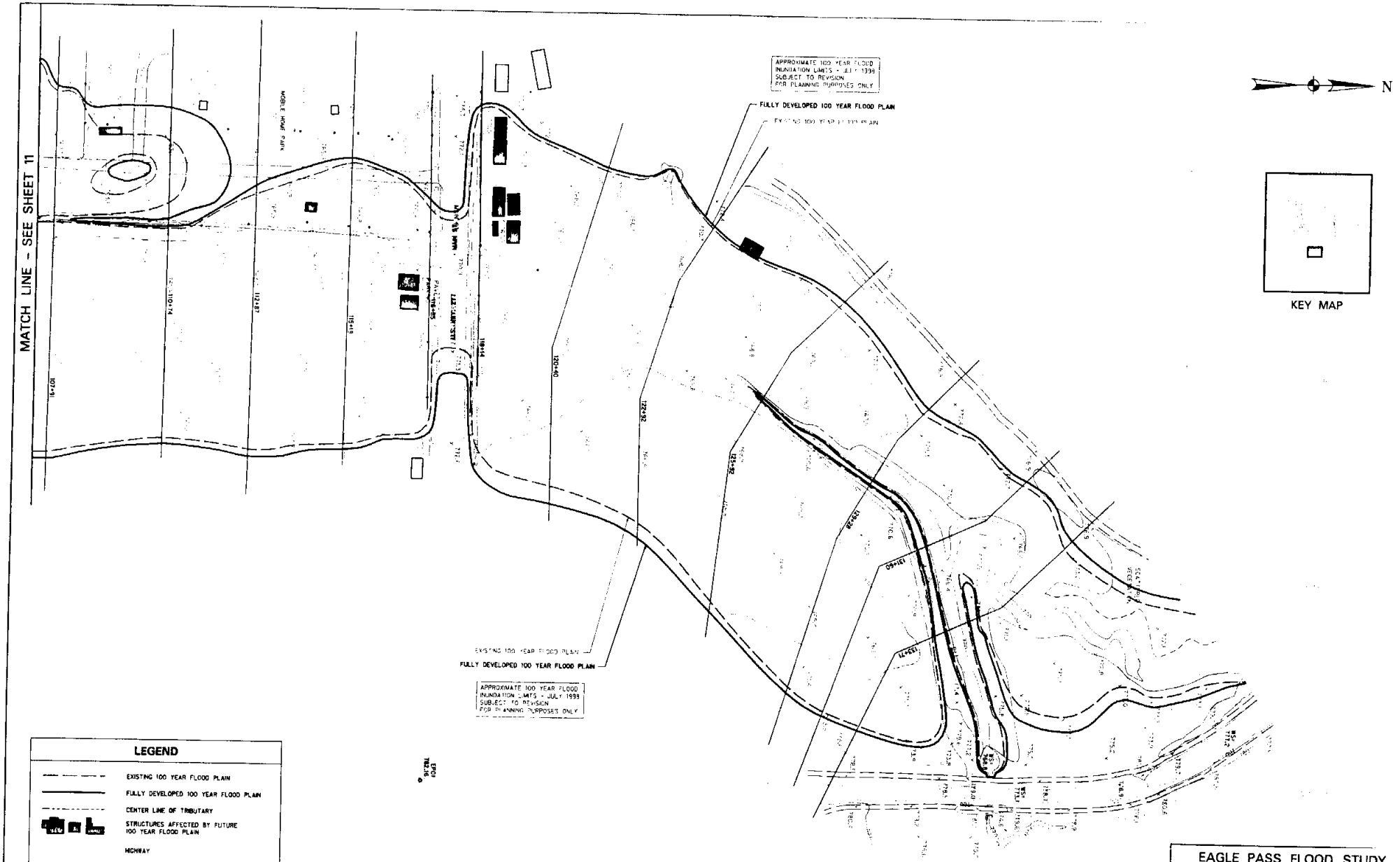
EAGLE PASS FLOOD STUD
UNNAMED TRIBUTARY
EAGLE PASS, TEXAS
FLOODED AREA MAP
Halff Associat
DESIGN DRAWN DATE SCALE NOTES FILE
MAY 1999
1"= 100'



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- LIMITS OF HECRAS CROSS-SECTIONS USED IN HYDRAULIC MODEL

GENERAL NOTES:

1. TOPO BASIS: LANDATA AERIAL
   TOPO FLOWN 1998
2. FLOWS DEVELOPED BY HALFF ASSOCIATES, INC. IN 1998 FLOOD STUDY REPORT.

EAGLE PASS FLOOD STUDY

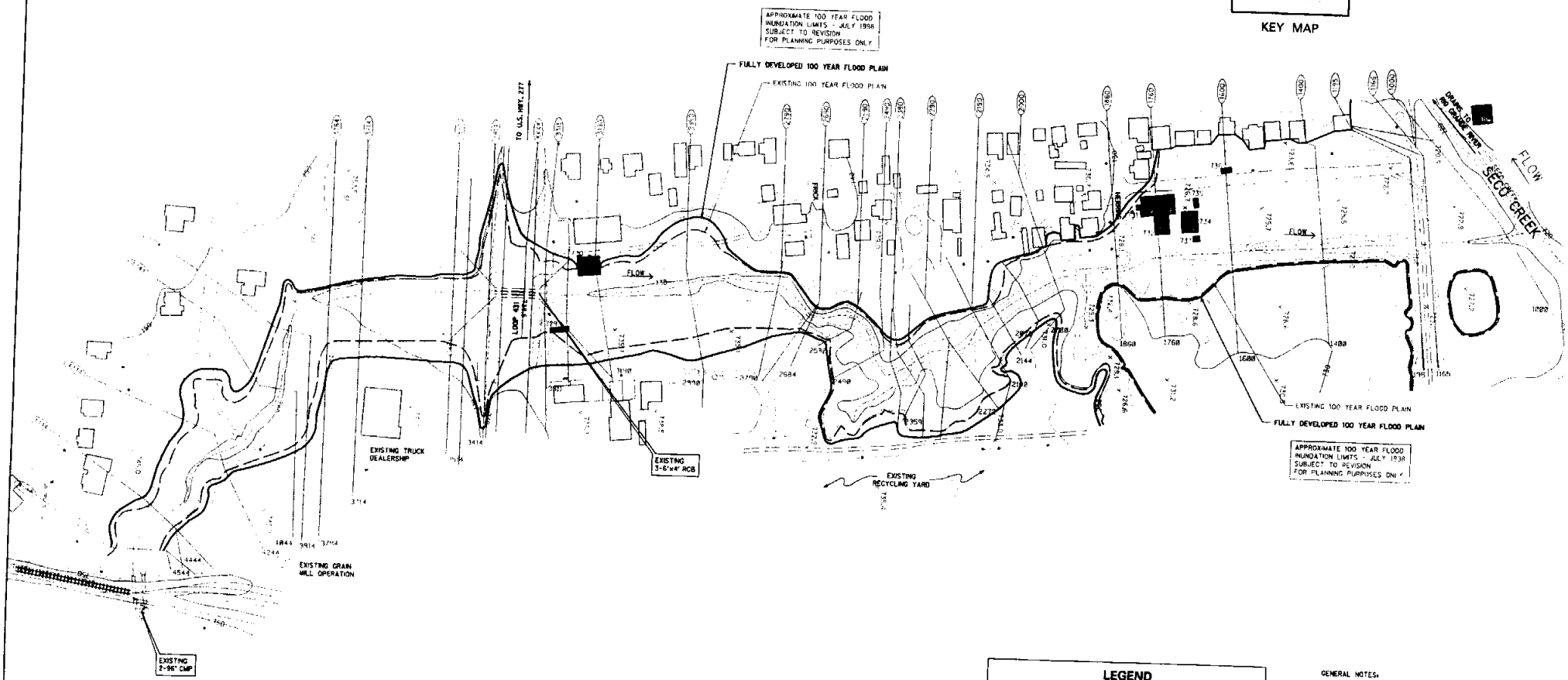
UNNAMED TRIBUTARY

EAGLE PASS, TEXAS

FLOODED AREA MAP

Halff Associates

DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO.
J.N.F.	L.R.A.	MAY 1998	1"= 100'	AVO 16798	T3RUTED	SHEET 12



KEY MAP

N

SCALE IN FEET

LEGEND

- EXISTING 100 YEAR FLOOD PLAIN
- FULLY DEVELOPED 100 YEAR FLOOD PLAIN
- CENTER LINE OF TRIBUTARY
- STRUCTURES AFFECTED BY FUTURE 100 YEAR FLOOD PLAIN
- HIGHWAY
- SOUTHERN PACIFIC RAILROAD
- LIMITS OF HECRAS CROSS-SECTIONS USED IN HYDRAULIC MODEL

GENERAL NOTES:

1. TOPO BASIS: LANDATA AERIAL TOPO FLOWN 1998
2. FLOWS DEVELOPED BY HALFF ASSOCIATES, INC. IN 1998 FLOOD STUDY REPORT.
3. "PRINT" SUBMITTALS ARE NOT TO SCALE.

EAGLE PASS FLOOD STUDY

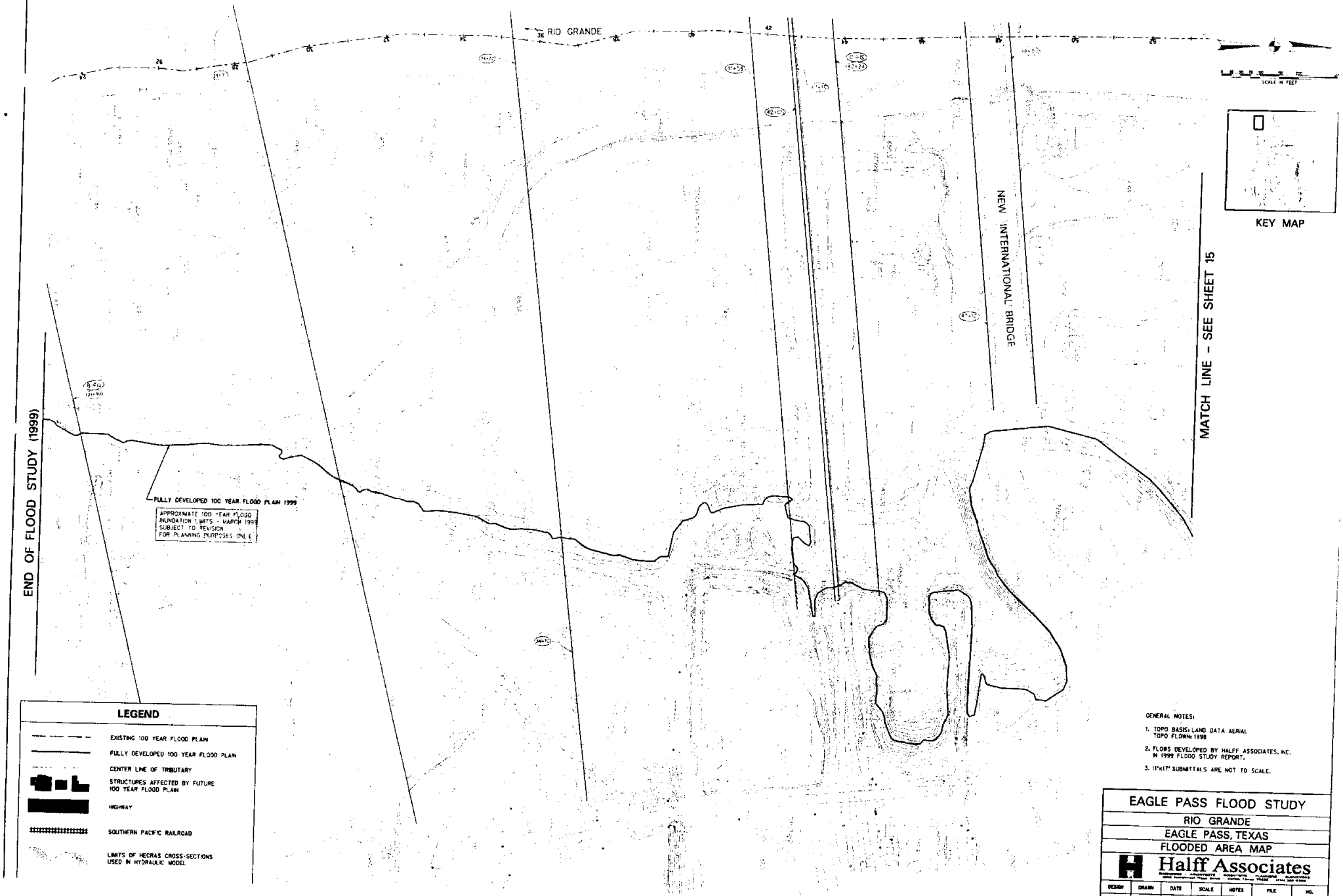
TRIBUTARY TO SECO CREEK

EAGLE PASS, TEXAS

FLOODED AREA MAP

Halff Associates

DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO.
JMLF.	LKA.	MAY 1998	1"= 100'	AVO 16739	7396E00E	SHEET 13



GENERAL NOTES:

1. TOPO BASIS: LAND DATA AERIAL TOPO FLOWN 1998
2. FLOWS DEVELOPED BY HALFF ASSOCIATES, INC. IN 1999 FLOOD STUDY REPORT.
3. 11"x17" SUBMITTALS ARE NOT TO SCALE.

EAGLE PASS FLOOD STUDY

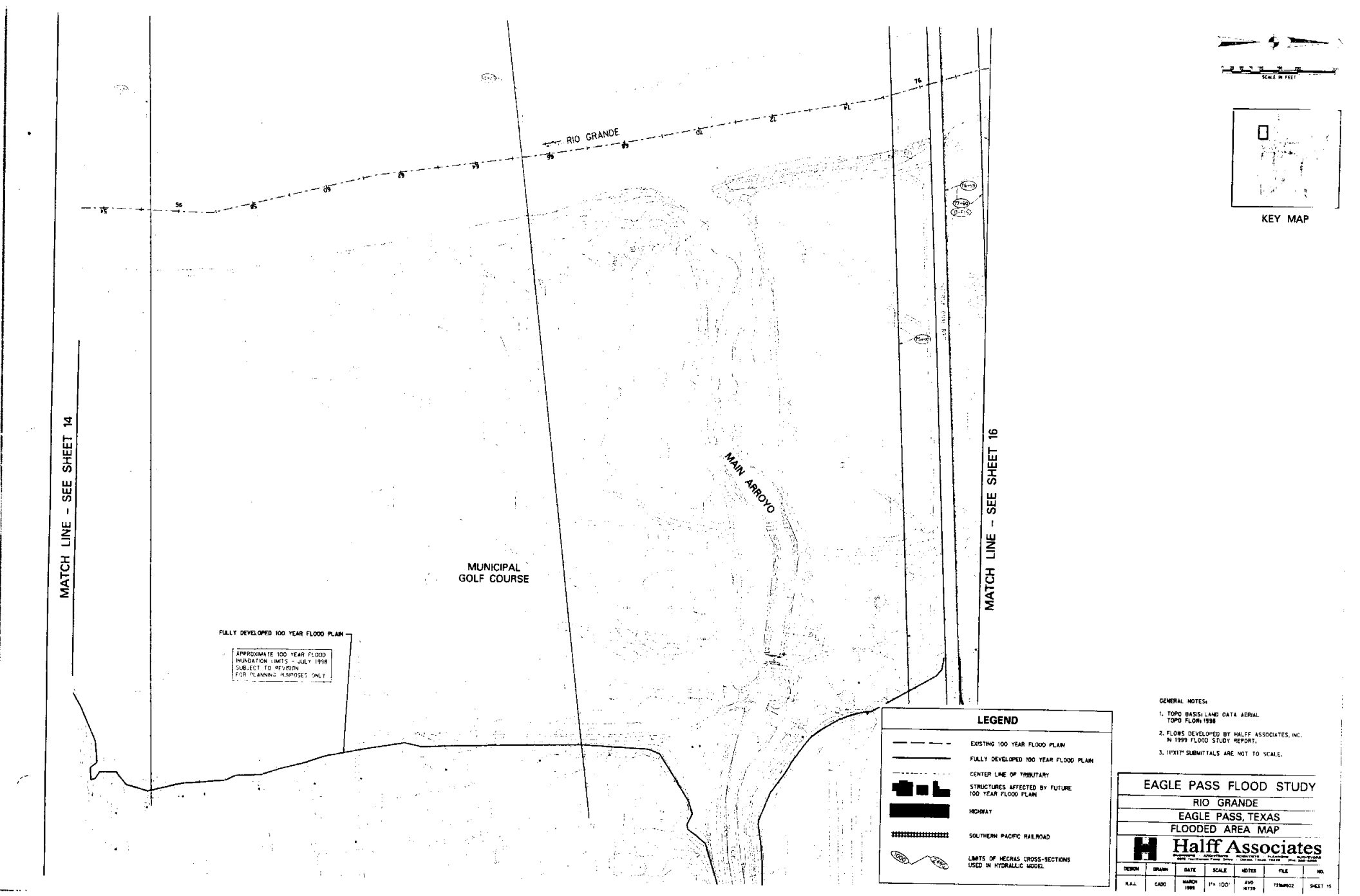
RIO GRANDE

EAGLE PASS, TEXAS

FLOODED AREA MAP

Halff Associates

DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO.
H.A.I.	CADD	MARCH 1999	1"= 100'	AVG 16736	7396PR01	SHEET 14



GENERAL NOTES:

1. TOPO BASIS: LAND DATA AERIAL TOPO FLOWN 1998
2. FLOWS DEVELOPED BY HALFF ASSOCIATES, INC. IN 1999 FLOOD STUDY REPORT.
3. 11"X17" SUBMITTALS ARE NOT TO SCALE.

EAGLE PASS FLOOD STUDY

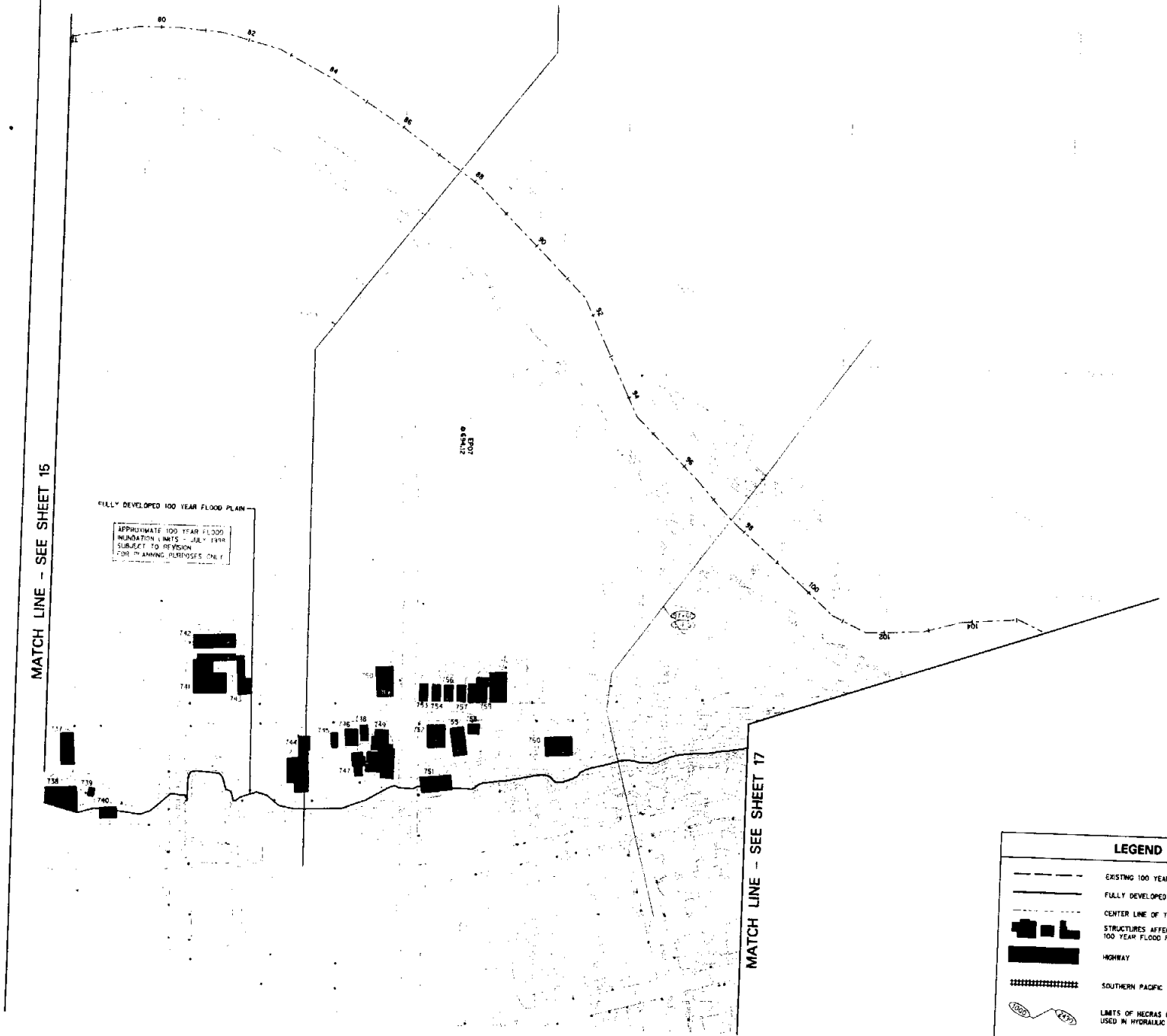
RIO GRANDE

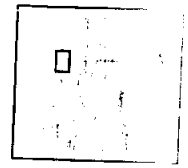
EAGLE PASS, TEXAS

FLOODED AREA MAP

Halff Associates

DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO.
R.A.J.	CADD	MARCH 1999	1"= 100'	AVO 16739	739MAP02	SHEET 15





LEGEND

- EXISTING 100 YEAR FLOOD PLAIN
- FULLY DEVELOPED 100 YEAR FLOOD PLAIN
- CENTER LINE OF TRIBUTARY
- STRUCTURES AFFECTED BY FUTURE 100 YEAR FLOOD PLAIN
- HIGHWAY
- SOUTHERN PACIFIC RAILROAD
- LIMITS OF HECRAS CROSS-SECTIONS USED IN HYDRAULIC MODEL

GENERAL NOTES:

1. TOPO BASIS: LAND DATA AERIAL TOPO FLOWN 1998
2. FLOWS DEVELOPED BY HALFF ASSOCIATES, INC. IN 1999 FLOOD STUDY REPORT.
3. 11"X17" SUBMITTALS ARE NOT TO SCALE.

EAGLE PASS FLOOD STUDY

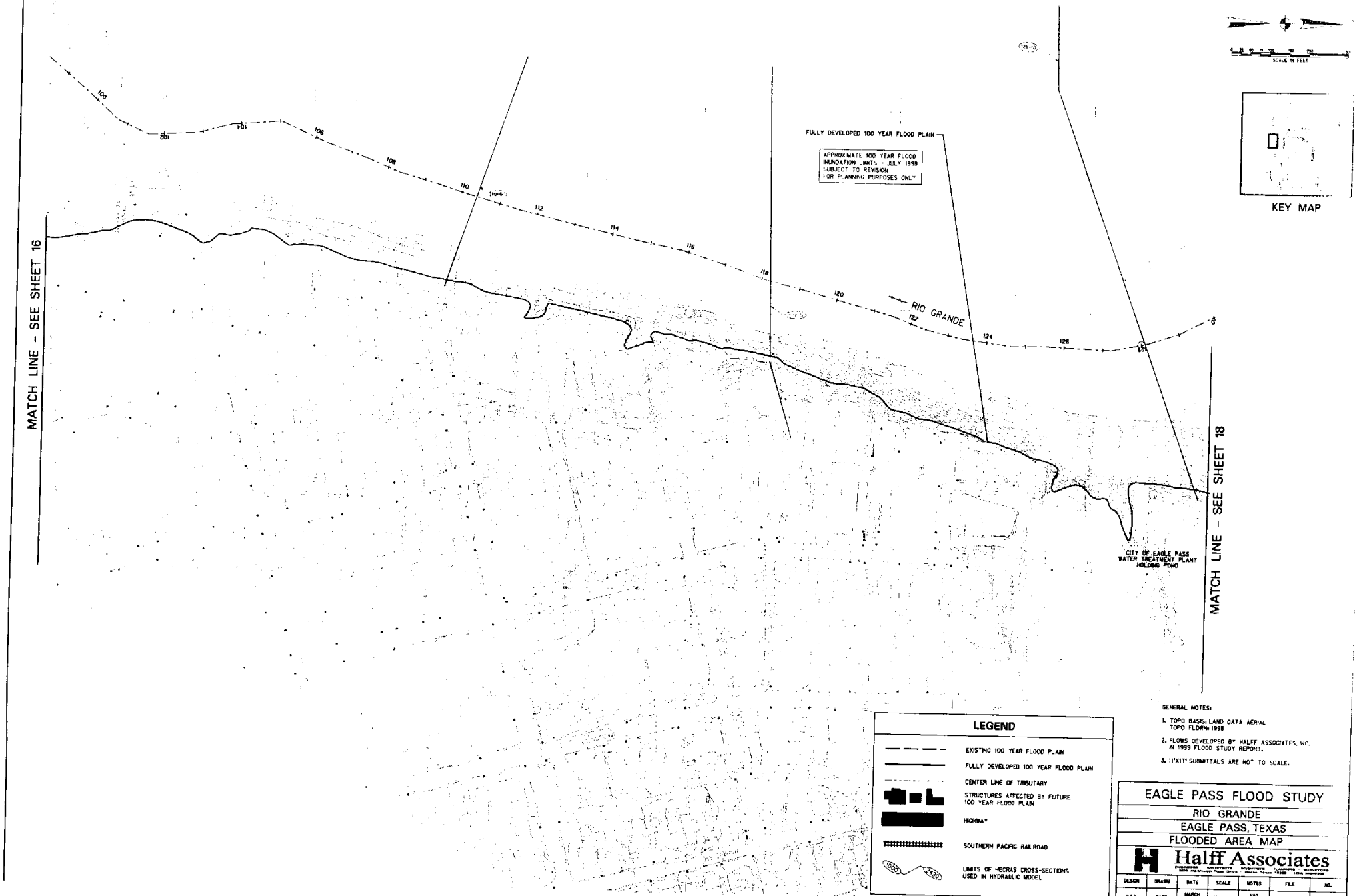
RIO GRANDE

EAGLE PASS, TEXAS

FLOODED AREA MAP

Halff Associates

DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO.
H.A.A.	CADD	MARCH 1999	1"= 100'	490 16739	7398R03	SHEET 16



GENERAL NOTES:

1. TOPO BASIS: LAND DATA AERIAL TOPO FLOWN: 1998
2. FLOWS DEVELOPED BY HALFF ASSOCIATES, INC. IN 1999 FLOOD STUDY REPORT.
3. 11"X17" SUBMITTALS ARE NOT TO SCALE.

EAGLE PASS FLOOD STUDY

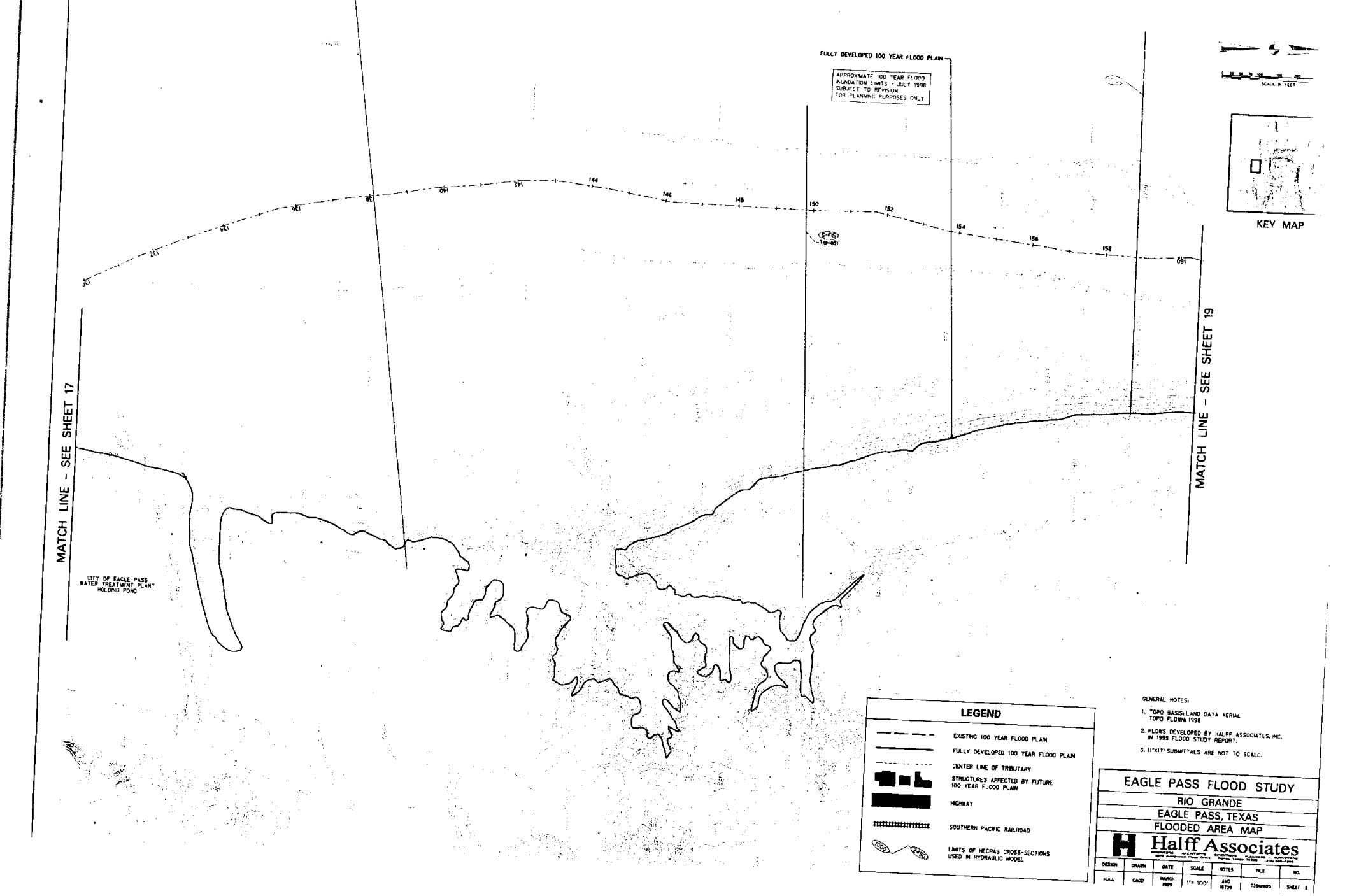
RIO GRANDE

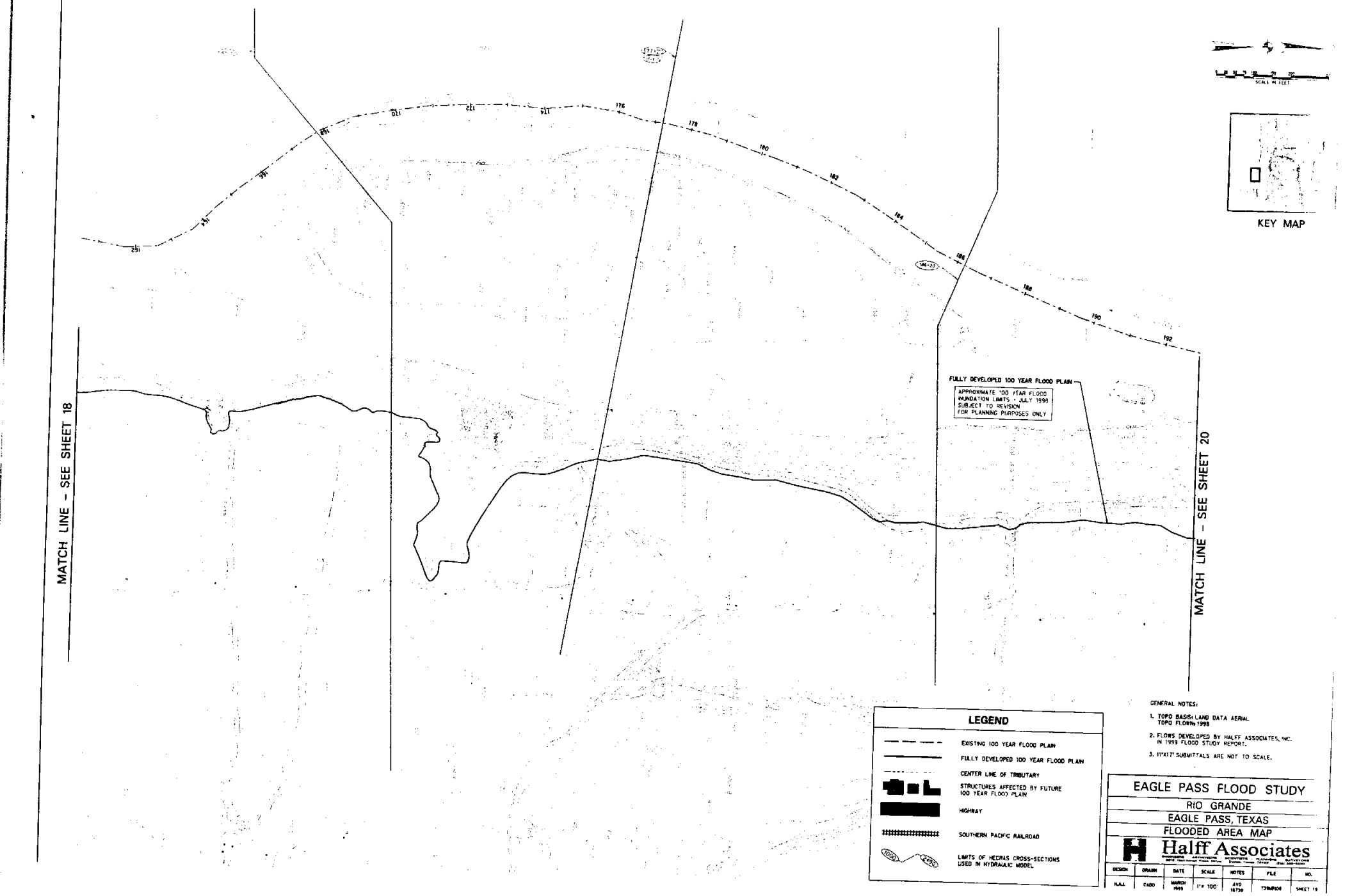
EAGLE PASS, TEXAS

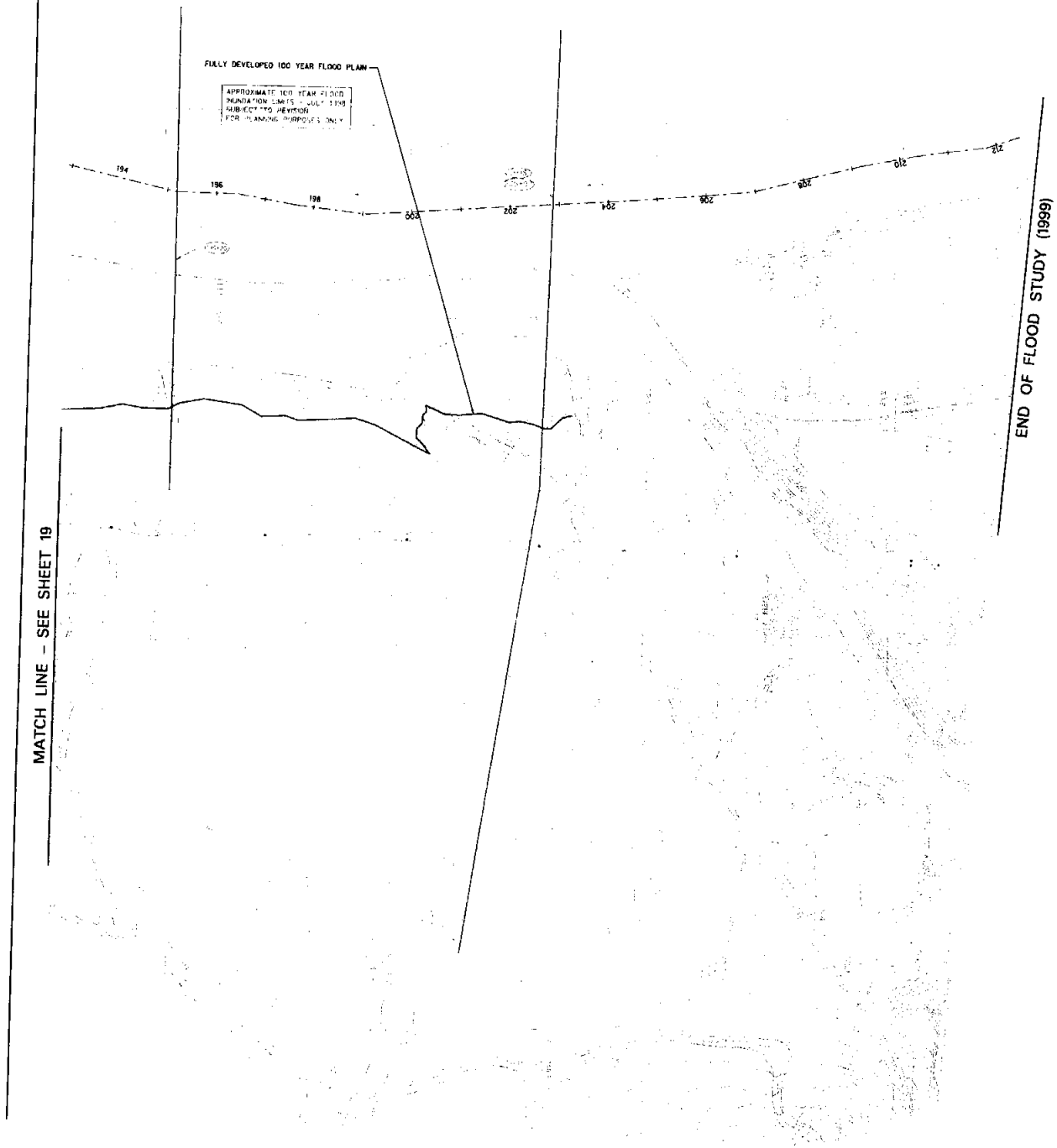
FLOODED AREA MAP

Halff Associates

DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO.
H.A.A.	CADD	MARCH 1999	1"= 100'	AVO 16739	7396R04	SHEET 17


FULLY DEVELOPED 100 YEAR FLOOD PLAIN
APPROXIMATE 100 YEAR FLOOD INUNDATION LIMITS - JULY 1998 SUBJECT TO REVISION FOR PLANNING PURPOSES ONLY
KEY MAP
MATCH LINE - SEE SHEET 17
MATCH LINE - SEE SHEET 19
CITY OF EAGLE PASS WATER TREATMENT PLANT HOLDING POND
LEGEND
EXISTING 100 YEAR FLOOD PLAIN
FULLY DEVELOPED 100 YEAR FLOOD PLAIN
CENTER LINE OF TRIBUTARY
STRUCTURES AFFECTED BY FUTURE 100 YEAR FLOOD PLAIN
HIGHWAY
SOUTHERN PACIFIC RAILROAD
LIMITS OF HECRAS CROSS-SECTIONS USED IN HYDRAULIC MODEL
GENERAL NOTES:
1. TOPO BASIS: LAND DATA AERIAL TOPO FLOWN 1998
2. FLOWS DEVELOPED BY HALFF ASSOCIATES, INC. IN 1999 FLOOD STUDY REPORT.
3. 11"X17" SUBMITTALS ARE NOT TO SCALE.
EAGLE PASS FLOOD STUDY
RIO GRANDE
EAGLE PASS, TEXAS
FLOODED AREA MAP
Halff Associates
DESIGN | DRAWN | DATE | SCALE | NOTES | FILE | NO.
H.A.I. | CADD | MARCH 1999 | 1"= 100' | AVO 16739 | 739MPROS | SHEET 18


MATCH LINE - SEE SHEET 18
MATCH LINE - SEE SHEET 20
FULLY DEVELOPED 100 YEAR FLOOD PLAIN
APPROXIMATE 100 YEAR FLOOD INUNDATION LIMITS - JULY 1998 SUBJECT TO REVISION FOR PLANNING PURPOSES ONLY
KEY MAP
LEGEND
EXISTING 100 YEAR FLOOD PLAIN
FULLY DEVELOPED 100 YEAR FLOOD PLAIN
CENTER LINE OF TRIBUTARY
STRUCTURES AFFECTED BY FUTURE 100 YEAR FLOOD PLAIN
HIGHWAY
SOUTHERN PACIFIC RAILROAD
LIMITS OF HECRAS CROSS-SECTIONS USED IN HYDRAULIC MODEL
GENERAL NOTES:
1. TOPO BASIS: LAND DATA AERIAL TOPO FLOWN 1998
2. FLOWS DEVELOPED BY HALFF ASSOCIATES, INC. IN 1999 FLOOD STUDY REPORT.
3. 11"X17" SUBMITTALS ARE NOT TO SCALE.
EAGLE PASS FLOOD STUDY
RIO GRANDE
EAGLE PASS, TEXAS
FLOODED AREA MAP
Halff Associates
DESIGN
DRAWN
DATE
SCALE
NOTES
FILE
NO.
MARCH 1999
1" = 100'
SHEET 19



SCALE IN FEET

KEY MAP

LEGEND

- EXISTING 100 YEAR FLOOD PLAIN
- FULLY DEVELOPED 100 YEAR FLOOD PLAIN
- CENTER LINE OF TRIBUTARY
- STRUCTURES AFFECTED BY FUTURE 100 YEAR FLOOD PLAIN
- HIGHWAY
- SOUTHERN PACIFIC RAILROAD
- LIMITS OF HECRAS CROSS-SECTIONS USED IN HYDRAULIC MODEL

GENERAL NOTES:

1. TOPO BASIS: LAND DATA AERIAL TOPO FLOWN: 1998
2. FLOWS DEVELOPED BY HALFF ASSOCIATES, INC. IN 1999 FLOOD STUDY REPORT.
3. 11"X17" SUBMITTALS ARE NOT TO SCALE.

EAGLE PASS FLOOD STUDY

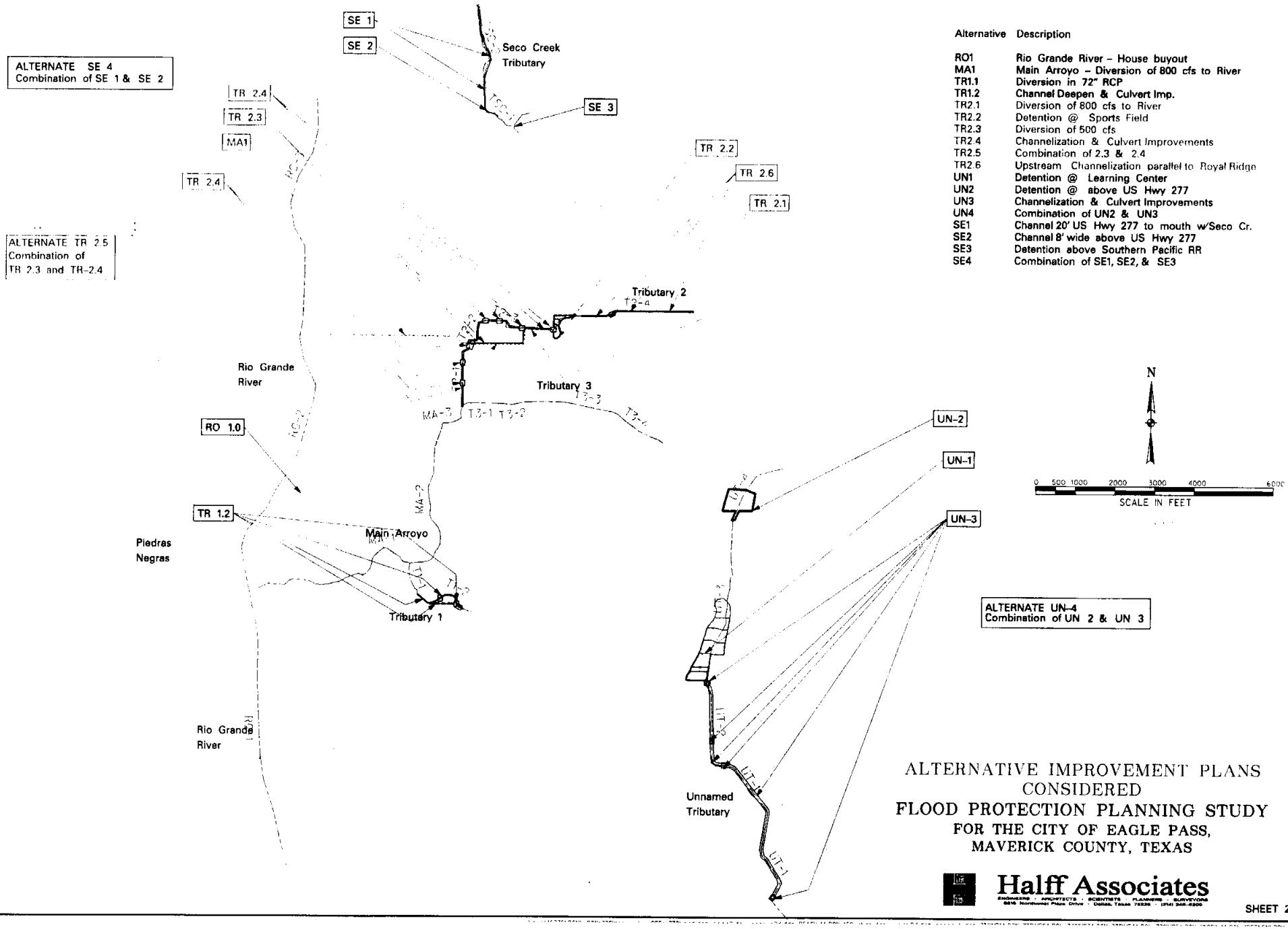
RIO GRANDE

EAGLE PASS, TEXAS

FLOODED AREA MAP

Halff Associates

DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO.
M.A.A.	CADD	MARCH 1999	1"= 100'	AVO 18739	739HP07	SHEET 20



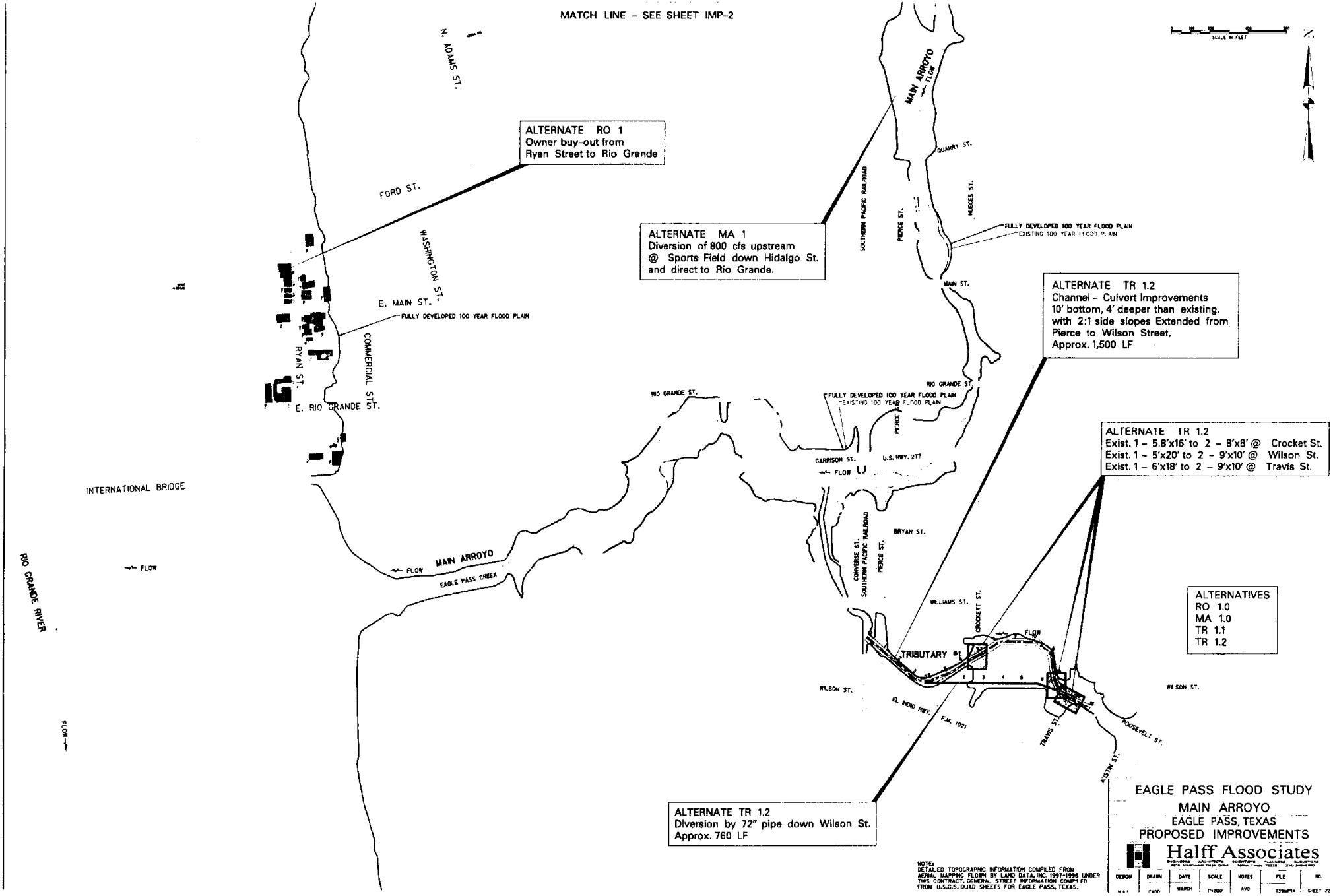
Alternative	Description
RO1	Rio Grande River – House buyout
MA1	Main Arroyo – Diversion of 800 cfs to River
TR1.1	Diversion in 72" RCP
TR1.2	Channel Deepen & Culvert Imp.
TR2.1	Diversion of 800 cfs to River
TR2.2	Detention @ Sports Field
TR2.3	Diversion of 500 cfs
TR2.4	Channelization & Culvert Improvements
TR2.5	Combination of 2.3 & 2.4
TR2.6	Upstream Channelization parallel to Royal Ridge
UN1	Detention @ Learning Center
UN2	Detention @ above US Hwy 277
UN3	Channelization & Culvert Improvements
UN4	Combination of UN2 & UN3
SE1	Channel 20' US Hwy 277 to mouth w/Seco Cr.
SE2	Channel 8' wide above US Hwy 277
SE3	Detention above Southern Pacific RR
SE4	Combination of SE1, SE2, & SE3

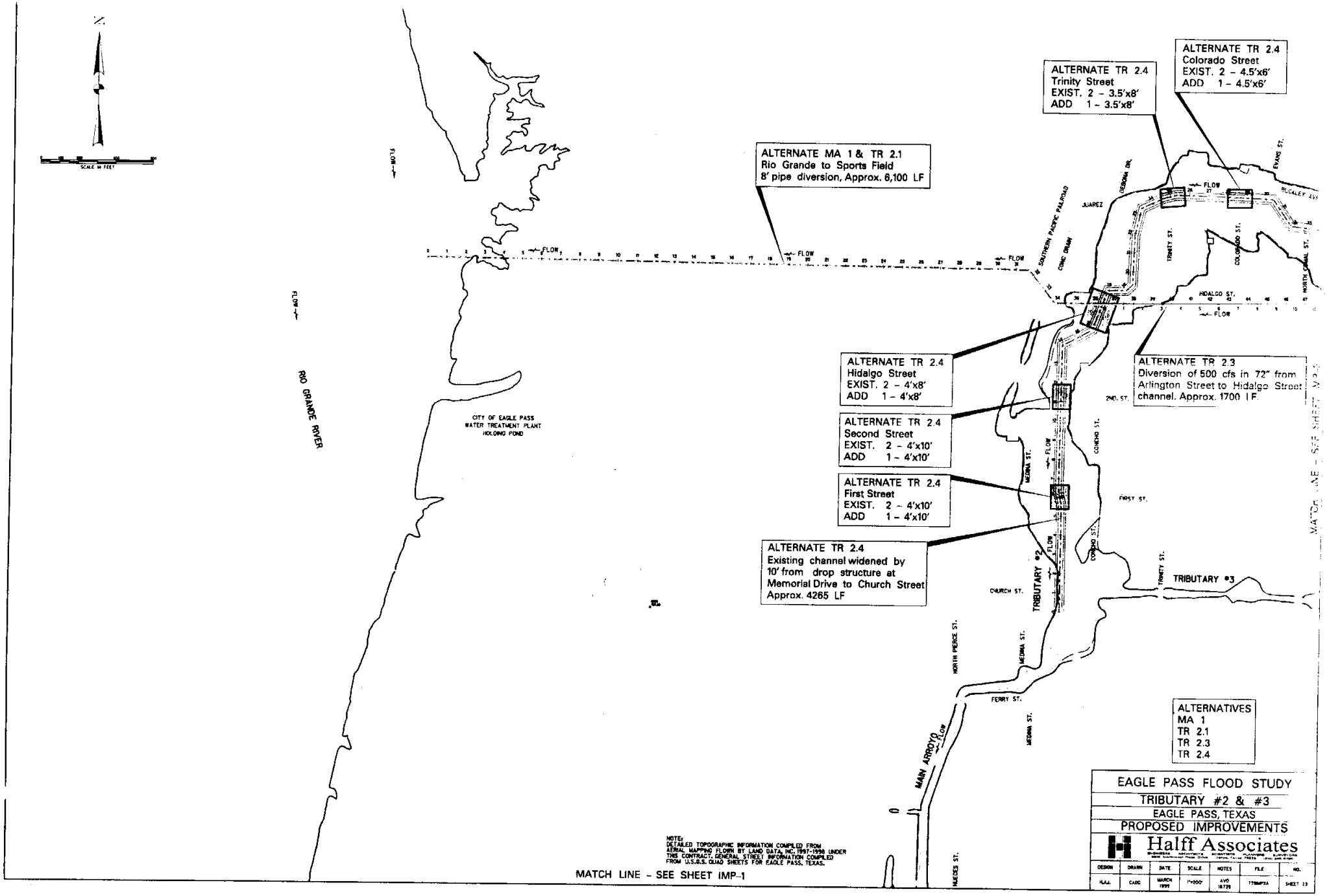
ALTERNATIVE IMPROVEMENT PLANS CONSIDERED

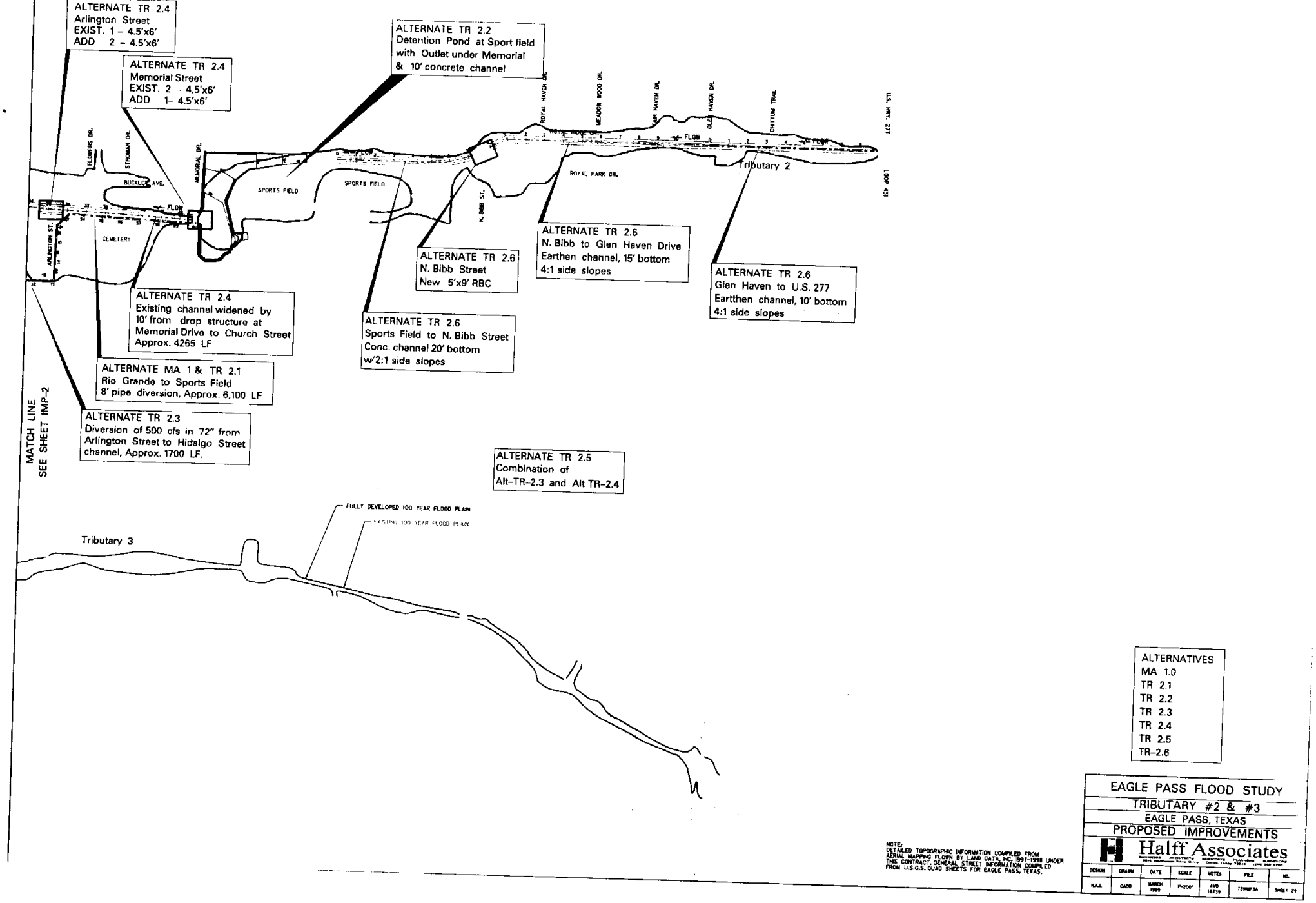
FLOOD PROTECTION PLANNING STUDY

FOR THE CITY OF EAGLE PASS,
MAVERICK COUNTY, TEXAS

Halff Associates
ENGINEERS · ARCHITECTS · SCIENTISTS · PLANNERS · SURVEYORS
8616 Northwest Plaza Drive · Dallas, Texas 75225 · (214) 346-6200


MATCH LINE – SEE SHEET IMP-2
N. ADAMS ST.
FORD ST.
WASHINGTON ST.
E. MAIN ST.
FULLY DEVELOPED 100 YEAR FLOOD PLAIN
RYAN ST.
COMMERCIAL ST.
E. RIO GRANDE ST.
INTERNATIONAL BRIDGE
RIO GRANDE RIVER
FLOW
MAIN ARROYO
EAGLE PASS CREEK
ALTERNATE RO 1
Owner buy-out from
Ryan Street to Rio Grande
ALTERNATE MA 1
Diversion of 800 cfs upstream
@ Sports Field down Hidalgo St.
and direct to Rio Grande.
MAIN ARROYO
QUARRY ST.
SOUTHERN PACIFIC RAILROAD
PIERCE ST.
NUECES ST.
FULLY DEVELOPED 100 YEAR FLOOD PLAIN
EXISTING 100 YEAR FLOOD PLAIN
MAIN ST.
ALTERNATE TR 1.2
Channel – Culvert Improvements
10' bottom, 4' deeper than existing.
with 2:1 side slopes Extended from
Pierce to Wilson Street,
Approx. 1,500 LF
RIO GRANDE ST.
GARRISON ST.
U.S. HWY. 277
BRYAN ST.
CONVERSE ST.
ALTERNATE TR 1.2
Exist. 1 – 5.8'x16' to 2 – 8'x8' @ Crocket St.
Exist. 1 – 5'x20' to 2 – 9'x10' @ Wilson St.
Exist. 1 – 6'x18' to 2 – 9'x10' @ Travis St.
WILLIAMS ST.
CROCKETT ST.
TRIBUTARY #1
WILSON ST.
EL INDIO HWY.
F.M. 1021
TRAVIS ST.
ROOSEVELT ST.
AUSTIN ST.
ALTERNATIVES
RO 1.0
MA 1.0
TR 1.1
TR 1.2
ALTERNATE TR 1.2
Diversion by 72" pipe down Wilson St.
Approx. 760 LF
EAGLE PASS FLOOD STUDY
MAIN ARROYO
EAGLE PASS, TEXAS
PROPOSED IMPROVEMENTS
Halff Associates
NOTES:
DETAILED TOPOGRAPHIC INFORMATION COMPILED FROM AERIAL MAPPING FLOWN BY LAND DATA, INC. 1997-1998 UNDER THIS CONTRACT. GENERAL STREET INFORMATION COMPILED FROM U.S.G.S. QUAD SHEETS FOR EAGLE PASS, TEXAS.
DESIGN
DRAWN
DATE
MARCH
SCALE
1"=200'
NOTES
AVO
FILE
NO.
SHEET 22


ALTERNATE MA 1 & TR 2.1
Rio Grande to Sports Field
8' pipe diversion, Approx. 6,100 LF
ALTERNATE TR 2.4
Trinity Street
EXIST. 2 - 3.5'x8'
ADD 1 - 3.5'x8'
ALTERNATE TR 2.4
Colorado Street
EXIST. 2 - 4.5'x6'
ADD 1 - 4.5'x6'
ALTERNATE TR 2.4
Hidalgo Street
EXIST. 2 - 4'x8'
ADD 1 - 4'x8'
ALTERNATE TR 2.3
Diversion of 500 cfs in 72" from Arlington Street to Hidalgo Street channel. Approx. 1700 LF
ALTERNATE TR 2.4
Second Street
EXIST. 2 - 4'x10'
ADD 1 - 4'x10'
ALTERNATE TR 2.4
First Street
EXIST. 2 - 4'x10'
ADD 1 - 4'x10'
ALTERNATE TR 2.4
Existing channel widened by 10' from drop structure at Memorial Drive to Church Street
Approx. 4265 LF
RIO GRANDE RIVER
CITY OF EAGLE PASS WATER TREATMENT PLANT HOLDING POND
SOUTHERN PACIFIC RAILROAD
CONC. DRAIN
OSBORN DR.
JUAREZ
EVANS ST.
BUCKLEY AVE.
TRINITY ST.
COLORADO ST.
NORTH CANAL ST.
HIDALGO ST.
2ND. ST.
CONCHO ST.
MEDINA ST.
FIRST ST.
TRIBUTARY #2
TRIBUTARY #3
CHURCH ST.
NORTH PIERCE ST.
FERRY ST.
MAIN ARROYO
NUECES ST.
FLOW
MATCH LINE - SEE SHEET IMP-1
NOTE:
DETAILED TOPOGRAPHIC INFORMATION COMPILED FROM AERIAL MAPPING FLOWN BY LAND DATA, INC. 1997-1998 UNDER THIS CONTRACT; GENERAL STREET INFORMATION COMPILED FROM U.S.G.S. QUAD SHEETS FOR EAGLE PASS, TEXAS.
ALTERNATIVES
MA 1
TR 2.1
TR 2.3
TR 2.4
EAGLE PASS FLOOD STUDY
TRIBUTARY #2 & #3
EAGLE PASS, TEXAS
PROPOSED IMPROVEMENTS
Halff Associates
DESIGN
DRAWN
DATE
SCALE
NOTES
FILE
NO.
HAA
CADD
MARCH 1999
1"=200'
AVO 16739
SHEET 23



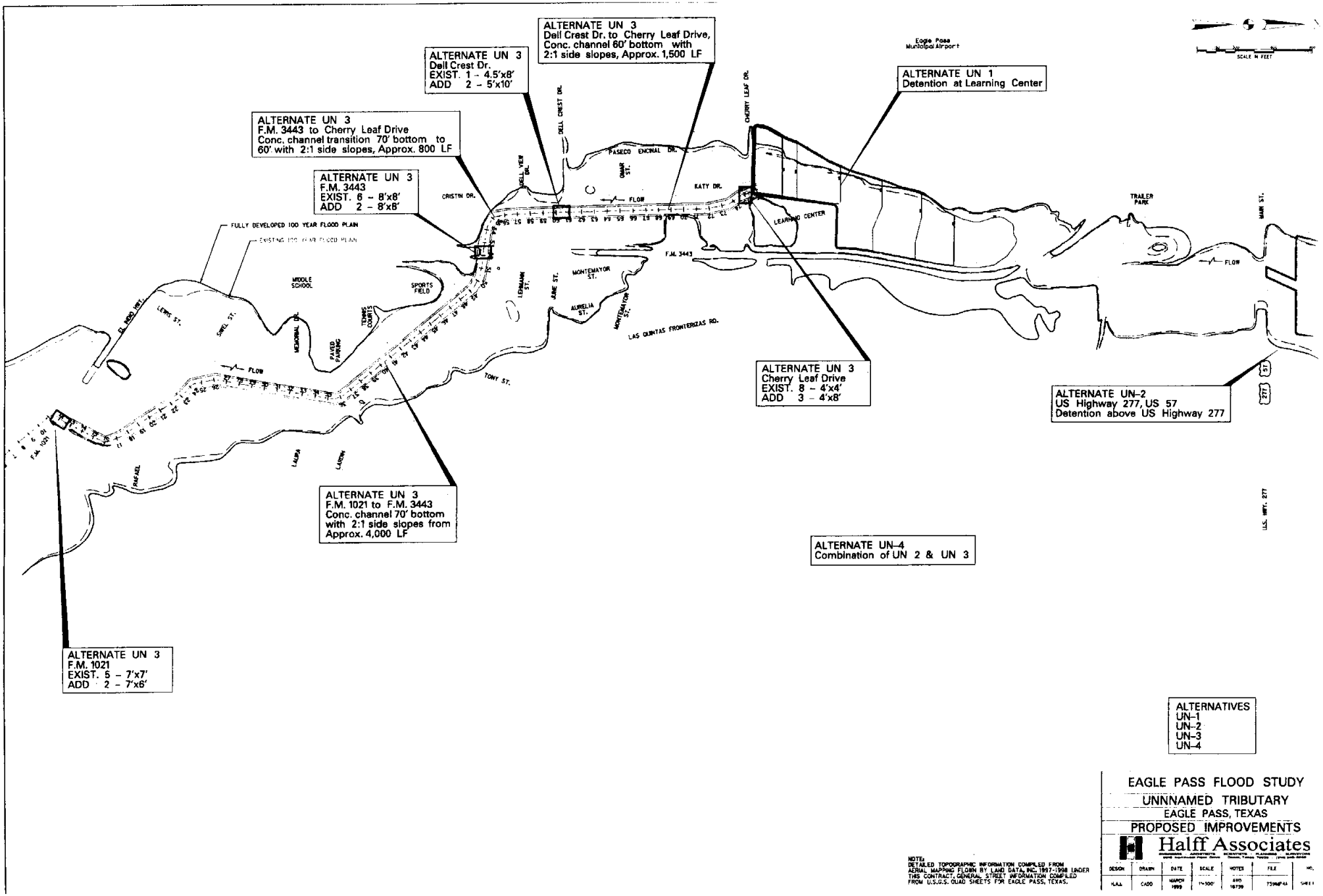
ALTERNATIVES
MA 1.0
TR 2.1
TR 2.2
TR 2.3
TR 2.4
TR 2.5
TR-2.6

NOTE:
DETAILED TOPOGRAPHIC INFORMATION COMPILED FROM AERIAL MAPPING FLOWN BY LAND DATA, INC. 1997-1998 UNDER THIS CONTRACT; GENERAL STREET INFORMATION COMPILED FROM U.S.G.S. QUAD SHEETS FOR EAGLE PASS, TEXAS.

EAGLE PASS FLOOD STUDY
TRIBUTARY #2 & #3
EAGLE PASS, TEXAS
PROPOSED IMPROVEMENTS

Halff Associates

DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO.
N.A.A.	CADD	MARCH 1999	1"=200'	AVO 16739	739MP3A	SHEET 24



SCALE IN FEET

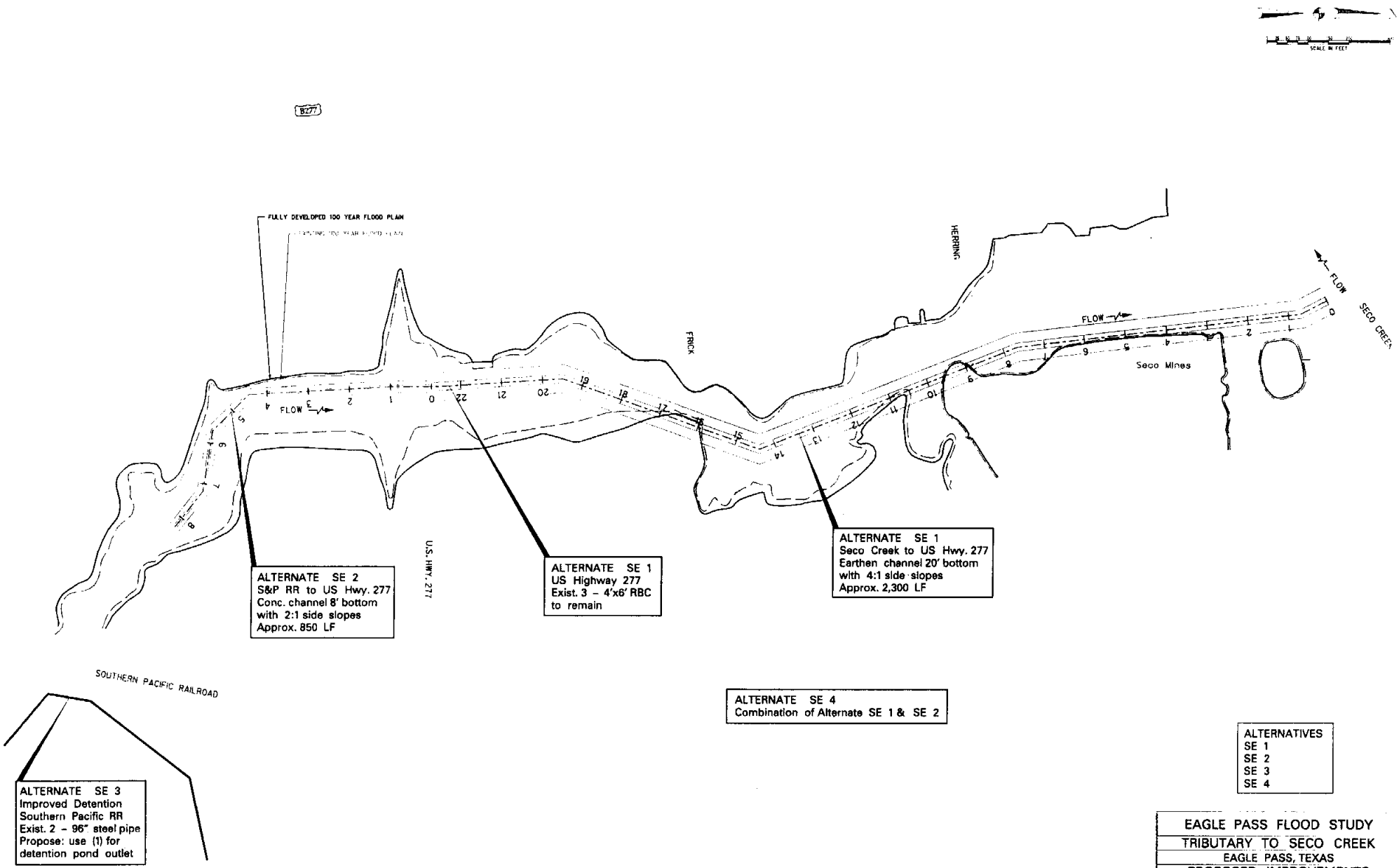
ALTERNATIVES
UN-1
UN-2
UN-3
UN-4

NOTE:
DETAILED TOPOGRAPHIC INFORMATION COMPILED FROM AERIAL MAPPING FLOWN BY LAND DATA, INC. 1997-1998 UNDER THIS CONTRACT, GENERAL STREET INFORMATION COMPILED FROM U.S.G.S. QUAD SHEETS FOR EAGLE PASS, TEXAS.

EAGLE PASS FLOOD STUDY
UNNAMED TRIBUTARY
EAGLE PASS, TEXAS
PROPOSED IMPROVEMENTS

Halff Associates

DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO.
K.A.A.	CADD	MARCH 1999	1"=500'	AMD 18739	739MP4A	SHEET


SCALE IN FEET
B277
FULLY DEVELOPED 100 YEAR FLOOD PLAIN
EXISTING 100 YEAR FLOOD PLAIN
FLOW
FRICK
HERRING
FLOW
FLOW
SECO CREEK
Seco Mines
U.S. HWY. 277
SOUTHERN PACIFIC RAILROAD
ALTERNATE SE 2
S&P RR to US Hwy. 277
Conc. channel 8' bottom
with 2:1 side slopes
Approx. 850 LF
ALTERNATE SE 1
US Highway 277
Exist. 3 – 4'x6' RBC
to remain
ALTERNATE SE 1
Seco Creek to US Hwy. 277
Earthen channel 20' bottom
with 4:1 side slopes
Approx. 2,300 LF
ALTERNATE SE 3
Improved Detention
Southern Pacific RR
Exist. 2 – 96" steel pipe
Propose: use (1) for
detention pond outlet
ALTERNATE SE 4
Combination of Alternate SE 1 & SE 2
ALTERNATIVES
SE 1
SE 2
SE 3
SE 4
EAGLE PASS FLOOD STUDY
TRIBUTARY TO SECO CREEK
EAGLE PASS, TEXAS
PROPOSED IMPROVEMENTS
Halff Associates
DESIGN
DRAWN
DATE
SCALE
NOTES
FILE
NO.
SHEET

Response to Comments Received from

Texas Water Development Board
Contract No. 98-483-242
City of Eagle Pass

1. Executive summary is not really a summary. It does not describe project background, tasks performed or overall project structure. The Executive summary must orient reader and give concise and thorough overview of project and conclusions. It appears that this Executive Summary is merely a reprint of your conclusion section.

   The Executive Summary has been rewritten to describe the project background, the tasks performed and the overall project structure used for the study. Specific recommendations regarding flooding issues are presented. The draft Executive Summary was a reprint of the conclusion section...

2. The report does not appear to have been edited even for draft-level review.

   The initial draft report has been extensively edited.

3. Table of Contents has numerous errors, some of which are:
   - Many figures are not listed in the Table of Contents properly,
   - Match titles of Figures and Tables to the Tale of Contents,
   - Some Figures and Tables are not included in the Table of Contents, please include,
   - Please provide page numbers,
   - Include drawings (over 20 listed in the Table of Contents). Better titles are needed for these.
   - References to Figures in text and Tables of Contents need to be consistent. (Sometimes they are referred to as Figures, Sheets, Drawings, or Sketches). Please correct.

   The Table of Contents has been corrected. Figures are now consecutive. The figures and table numbers have been corrected. Pages are numbered. The drawings have been included. The references are now consistent throughout the report.

4. Report does not include any Benefit-Cost analyses (5E of scope). Assumptions for estimating costs are detailed, some cost estimates are provided in the Appendix- but there is no discussion or summary of costs for alternative or alternative combinations. Economic analysis needs to be provided to compare alternatives. As stated in the Scope of Work, this analysis should be used to help determine the most feasible project.

A Benefit-Cost analysis has been developed to compare the alternatives for flood damage reduction. A discussion of cost development for the alternatives and combination of alternatives is presented. The Benefit-Cost analysis was used to help determine the most feasible project.

5. Cost descriptions are confusing or entirely missing from report. There is no comparison of any of the alternatives. While the report lists over $10,000,000 dollars worth of alternatives, none are compared in the body of the report. Compare alternatives and justify recommendations (Correct mathematical errors in cost estimates). Also, the report fails to include all required costs, e.g. grading the buyout areas for a future park (scope of work item 5D2). Summarize options regarding the benefits and costs of the various alternatives.

   Cost descriptions have been included in the report. A comparison of alternatives is included. These are now more completely described in the report with justification. Other required costs noted have been added to the cost estimates. A summary of the benefits and costs associated with the flood damage alternatives considered has been included.

6. Page 5,B. Purpose of Study, last sentence; refers to an economic analysis performed leading to the selection of the best alternative. This was not presented.

   The economic analysis has been included.

7. The report lacks any description of methodology employed in creating cost estimates. Explain in the text of the report, data sources used, cost estimating methodology and reliability of numbers. The report does not describe the types of costs (e.g. third party) that are NOT included in cost estimates. Explain what type shares of costs were included in "land acquisition" costs. Cost estimates did not address, in general terms, the existing gap between appraised and market property values.

   A methodology employed in creating the cost estimates is included. The data sources used, the cost estimating methodology used and the reliability is stated. Third party costs were not included in the cost estimates. No shared costs were included in the "land acquisition" costs, unless the land was publicly owned. The cost estimates were based on an average of the appraised property values.

8. Page 23 refers to appendix D "sketch[es] of each option considered." The sketches in Appendix D are not included.

   Proposed improvements for the flood reduction alternatives are presented on sheets 21-25 in the report.

9. Appendix D tables are not labeled with clear references. (e.g. "Table number....")

Appendix D tables are labeled.

10. The two table columns in tale D-2 are empty. (Why is B/C Ratio even listed? Benefit Cost comparisons were not performed in this study? Table D-2 has inappropriate headings. For example, "Actual cost less 15%". What does this mean if the Table title is "Estimate of Probable Construction Cost" Actual suggests that projects were actually completed as opposed to estimated. Explain why it is "less 15%"? Does this mean that an estimate was made then the authors subtracted 15% from the cost (suggesting that these estimates are, in effect, 30% lower than other estimates which added 15% to the initial estimates?).

The other columns in Table D-2 have been completed. Reference to "Actual cost less 15%" has been removed.

11. Row heading "...I All.." in D-2 is cut off and confusing. Explain what "(less Combos)' means and why "Total all " is blank.

Agree. This row has been removed.

12. Table 5 shows up twice. The version at the beginning of Appendix D has costs left out. Table 5 and conclusion- are all the alternatives considered "being recommended"?

Table 5 and Appendix Table D-1 have been completed. All alternatives are not recommended at the same time.

13. Include a list of the structures and the appraised values that are included in the "buyout" alternative. (Provide all data such as this if available; an appendix would suffice)

The buyout of structures along the Rio Grande River is recommended. The appraised value of all structures within the 100-year flood plain as identified by the flooded area maps is included in tabular form in Appendix D. The appraised value of these structures was used in determining project benefits for each of the flood damage alternatives considered.

14. Report contains mathematical errors, particularly in cost tables of Appendix D.

The mathematical errors have been corrected.

15. Rework entire cost estimate section to assure consistency and accuracy in terminology, cost adjustments and dollar totals.

The cost estimates have been reworked for consistency and accuracy.

16. Please include a section addressing social impacts of resident relocation. Please state what sort of relocations/buyouts was considered. What demographic group is impacted by relocations? These issues fall under the cost and benefits portion of report scope.

    A brief section addressing the social impacts of resident relocation has been added. The only relocation/buyouts considered were along Ryan Street for the Rio Grande River flood damage alternative RO-1. The demographic group affected would be the Mexican-American families living along Ryan Street.

17. Table 5, Page 27, the heading is missing over third column. Costs are confusing. For example, MA1 does not include cost of routine channel clean up and mowing. RO1 fails to include cost of shutting down lift station. Explain reference of table to "see MA1" instead of listing dollar amount. Alternatives cannot be compared until all costs are included and analyzed. Complete table.

    Table 5, Column 3 heading has been added. Costs for routine channel clean up and maintenance are annual incidental costs. Costs for shutting down the lift station are included. References to other alternatives are explained in further detail in the report.

18. The report should note the potential of several alternatives of disturbing partially developed and undeveloped landforms, which appear to have moderate to high probably for occurrence of buried archeological deposits. Sensitive habitat areas required prior to construction, to address these concerns should be given. (Are these associated costs in the 15%? If so, state.)

    A brief discussion addressing the disturbed area for the developed and undeveloped landforms is presented. Sensitive habitat areas have not been identified. These areas would have to be evaluated prior to any construction activities.

19. Any plans to use federal funds for such flood control facilities will undoubtedly require preparation of environmental assessment to address other impacts of the alternative, and other mitigative measures might be determined necessary at additional cost of the alternative. Furthermore, federal permitting required for implementation of the flood management alternatives involving earthmoving (channelization, new or enlarge culverts, detention ponds, diversion structures, etc.) would require surveys for particular impacts to cultural resources and federally protected species. Eagle Pass should be made aware of the potential added costs of such assessments, even if they do not lead to recommendations for

mitigative measures to be taken, in the city's consideration of the different alternatives.

The potential added costs for performing environmental assessments has been added to the discussion of the flood damage alternatives to keep the City of Eagle Pass aware of the added costs for these studies.

20. The report indicates that the Corps of Engineers has been consulted as part of the flood management study. Did the Corps provide comments on project alternatives?

The Corps of Engineers was contacted as part of the initial data collection effort to obtain past studies and any available flow information on the Rio Grande River. No, the Corps did not provide comments on the project alternatives.

21. The report effectively directs attention to the possibility that the City of Eagle Pass might participate in the NPDES program for monitoring and possible treatment of storm water discharges to area watercourses.

Agreed.

22. The report, although not specifically as part of the project, manages to incorporate into the Appendix E – "Proposed Drainage Ordinance" some Best Management Practices, which would be prudent, if not required by federal permits, for appropriate environmental management of construction in and along different streams and drainages.

The City Council of Eagle Pass is in the process of adopting the drainage ordinance.

REVIEW COMMENTS OFFERED BY THE DIVISION OF EMERGENCY MANAGEMENT

In Reference to Page 30, Paragraph "Buy Out of Properties," the following is offered:

The Hazard Mitigation Grant Program (HMGP) administered by this office is designed to procure and remove substantially damaged properties from floodplains and floodways after a disaster is declared by the President. Both Maverick County and the City of Eagle Pass are presently involved in acquisition grants generated by the FEMA 1179-DR Presidential Declared Disaster. These two jurisdictions are purchasing properties to be demolished and returned to green space. (Are any of the properties being acquired by HMGP on the proposed buyout list?)

Not to our knowledge.

Should there be another Presidential Declared Disaster, the Hazard Mitigation Grant Program at DEM will be prepared to assist in application of the procurement of qualified properties for removal from floodway/floodplain.

Many jurisdictions are becoming very aggressive in floodplain administration to prevent the loss of lives and property. Jurisdictions are beginning to extract flood management fees in the permitting process and requiring flood retention measures be addressed and accomplished by the developer. For example, some jurisdictions are requiring commercial parking lots to be constructed below grade for water retention.

Noted.

REVIEW COMMENTS OFFERED BY THE TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Our findings indicate the following:

1. An Application for Approval of Reclamation Project need not be filed with the Texas Natural Resource Conservation Commission for the referenced proposal. It was determined from our review that the proposed project, since it is in the City of Eagle Pass, needs to be permitted by the City. The City of Eagle Pass by virtue of its participation in the National Flood Insurance Program, and in accordance with Section 16.236 (d) (3&4) of the Texas Water Code, has approval authority for the project. If the City has not already done so, they should insure that the proposed construction is documented and permitted in accordance with their Flood Hazard Prevention Ordinance. This documentation should also be submitted by the City to the Federal Emergency Management Agency to obtain a Letter of Map Revision (LOMR) of Eagle Pass's Flood Insurance Rate Map.

   Noted.

2. The technical content of the referenced report is based on acceptable hydrological and hydrological and hydraulic methods and is complete. Therefore, the merits of the proposed project can be evaluated from the report.

   Noted.

REVIEW COMMENTS OFFERED BY THE TEXAS DEPARTMENT OF TRANSPORTATION

1. Task 5.A, Items 2 and 3 downstream impacts of detention ponds or improved flood plain delineation's were not included.

   Downstream impacts of the detention ponds would be to reduce the peak discharges. These impacts are addressed by showing the reduction in peak discharges for a given pond location, size, and outlet structure. The flood plain delineation was not included.

2. Task 5. B, Items 2 and 3 The HEC-RAS models with improved channel/ culvert conditions of flood plain delineations were not included.

   HEC-RAS models for the improved channel/culvert conditions are now included in Appendix D. The flood plain delineations were not included.

3. Task 5.C, Item 3 No flood profiles were included with improved diversion channel conditions. These analysis need to be included in the report.

   The flood profile for the improved diversion channel conditions has been included in Appendix D.

4. Appendix B: Given the limited output capability of HEC-HMS, it is recommended that drainage area maps be included.

   This map has been included in Appendix B.

5. Appendix C: The output for Tributary 3 is missing. Also, 3 out of 6 HEC-RAS outputs were not labeled which channel was analyzed. It was necessary to compare cross-section numbering with the maps to determine which channel the output was for. Additional labeling of the output should be added.

   Tributary 3 was added to the upstream end of the Main Arroyo. The HEC-RAS outputs have been labeled with the appropriate channel being analyzed. Additional labeling of the output has been added to the Appendix B.

Addendum to
Final Report

Flood Study for the City of Eagle Pass,
Maverick County, Texas
And
Flood Study,
Appendices A-E for the City of Eagle Pass,
Maverick County, Texas

p. 33, second paragraph – entitled Rio Grande River, replace discussion with the following:

As a result of flooding from the August 23-25, 1998 storm event on the Rio Grande River, the Federal Emergency Management Agency by Executive Order DR-1239-TX declared public assistance available to individuals affected by this storm event. Approximately, 14 properties and one business along Ryan Street were affected by this flood event in Eagle Pass, Texas. Flood disaster assistance was provided to purchase and remove these fourteen properties and one business from the flood plain of the Rio Grande River. The flood disaster assistance amounted to $500,221.00. The flood disaster assistance was split 75/25% between FEMA and TDHCA. This storm event and resulting flood disaster assistance occurred during the course of the Flood Protection Study for the City of Eagle Pass.

p. 35, Table 6 – Remove reference to Rio Grande River and Alternative RO-1.

p. 36, Table 7 – Remove reference to Rio Grande River and Alternative RO-1.

Figure 8 – Remove reference to Alternative RO-1.

This addendum was added at the request of the City of Eagle Pass, Texas in the final draft review of the Flood Protection Study.

Appendices
Table of Contents

Flood Protection Study for Eagle Pass, Texas
Appendix A

Duplicate Effective Models

Appendix A documents the results of models obtained via letter request from the Federal Emergency Management Agency in May, 1998. The HEC-2 data and back-up material were obtained, modeled and re-run to determine any elevation differences. A summary of differences is included. No printouts for the *Rio Grande River* or the *Unnamed Tributary* were obtained to compare against, other than a copy of the model furnished with the backup study data.

Summary of Elevation Differences – Differences between the FEMA Input/Output printouts and Re-typed HEC-2 models

Main Arroyo and Tributary 3

From the original data files, *"dpmain out"* was used for the "Main Arroyo" and "Tributary 3" on FEMA's input/output printouts. Differences in water surface elevation varied from -0.79' to +2.53' for the 100-year flood. There were no differences in input data at those cross-sections where the elevation differences occurred. The discrepancies may be explained in part by the fact that the earlier output (by FEMA) dated from March, 1979 was run on a previous version of HEC-2 dated August, 1977. The Halff Associates, Inc. version of HEC-2 is based on the May, 1991 version 4.6.2. To emulate the earlier version of HEC-2, a negative sign was inserted in front of the weir coefficients on the various Special Bridge records. Differences in water surface elevations still varied from –0.79' to +2.53'.

Tributary 1

From the original data files, *"dptrib1.out"* was used for *"Tributary 1"* on FEMA's input/output printouts. Differences in water surface elevation varied from 0.23' to +0.66'. Again, there were no differences in the input data at those cross-sections where the differences occur. To emulate the earlier version of HEC-2, a negative sign was inserted in front of the weir coefficient on the various Special Bridge records and differences in water surface elevations still varied from –0.23' to +0.66'.

Tributary 2

From the original data files, *"10trb2.out" called "Trib 2 Main Arroyo – 10-year only"* appears on the FEMA's input/output printouts. Differences in water surface elevations vary from –0.20' to +0.04' for the 100-year flood. There are no differences in input data at those cross-sections were the differences occurred. If only the 10-year event elevations were used, a question arose as to "Why were the other flows and elevations computed?" To emulate the earlier version of HEC-2, a negative sign was inserted in front of the weir

coefficients on the various Special Bridge records, and no differences in water surface elevation were found for the 100-year flood event.

From the original data files, *"Trib 2 Main Arroyo – 50, 100, 500-year only"* appears on FEMA's input/output printouts. Differences in water surface elevations vary from –0.10' to +0.02' for the 100-year flood. There were no differences in input data at those cross-sections where the water surface elevations differences occur. The discrepancies could be explained by the use of different versions of HEC-2 software. To emulate the earlier version of the HEC-2, a negative sign was inserted in front of the weir coefficients on the various Special Bridge records and the differences in water surface elevations varied a little less from –0.03' to +0.02' for the 100-year flood.

Appendix A
Flood Protection Study
for Eagle Pass, Texas

Elevation Differences between Currently Effective FIS
and Duplicate Effective model

MAIN ARROYO
MODEL = DPMAIN

Section Number	Storm Event	From Duplicate Run	From Currently Effective FIS	Elevation Differences	Comments
212	10-yr	687.96	687.96	0.00	
212	50-yr	688.89	688.89	0.00	
212	100-yr	689.37	689.37	0.00	
212	500-yr	690.16	690.16	0.00	
1280	10-yr	693.19	693.19	0.00	
1280	50-yr	694.18	694.18	0.00	
1280	100-yr	694.78	694.78	0.00	
1280	500-yr	696.54	696.54	0.00	
1375	10-yr	695.45	695.45	0.00	
1375	50-yr	697.68	697.68	0.00	
1375	100-yr	698.37	698.37	0.00	
1375	500-yr	698.89	698.89	0.00	
1540	10-yr	697.20	697.20	0.00	
1540	50-yr	698.34	698.34	0.00	
1540	100-yr	698.50	698.50	0.00	
1540	500-yr	698.88	698.88	0.00	
1567	10-yr	702.53	702.53	0.00	
1567	50-yr	703.04	703.04	0.00	
1567	100-yr	703.33	703.33	0.00	
1567	500-yr	703.85	703.85	0.00	
1575	10-yr	702.90	702.90	0.00	
1575	50-yr	703.44	703.44	0.00	
1575	100-yr	703.78	703.78	0.00	
1575	500-yr	704.34	704.34	0.00	
1608	10-yr	703.63	703.63	0.00	
1608	50-yr	704.33	704.33	0.00	
1608	100-yr	704.75	704.75	0.00	
1608	500-yr	705.39	705.39	0.00	
2058	10-yr	703.11	703.12	-0.01	
2058	50-yr	704.46	704.46	0.00	
2058	100-yr	705.05	705.05	0.00	
2058	500-yr	706.12	706.12	0.00	

2448	10-yr	706.99	706.99	0.00	
2448	50-yr	708.43	708.43	0.00	
2448	100-yr	709.11	709.11	0.00	
2448	500-yr	710.07	710.07	0.00	
2478	10-yr	706.91	706.91	0.00	
2478	50-yr	708.27	708.27	0.00	
2478	100-yr	708.88	708.88	0.00	
2478	500-yr	709.72	709.72	0.00	
2528	10-yr	709.33	709.33	0.00	
2528	50-yr	711.30	711.30	0.00	
2528	100-yr	712.50	712.50	0.00	
2528	500-yr	714.43	714.43	0.00	
2566	10-yr	712.99	713.08	-0.09	????
2566	50-yr	715.10	715.54	-0.44	????
2566	100-yr	716.07	716.74	-0.67	????
2566	500-yr	721.03	721.03	0.00	????
2596	10-yr	715.52	715.56	-0.04	
2596	50-yr	718.89	718.93	-0.04	
2596	100-yr	720.92	721.01	-0.09	
2596	500-yr	720.97	721.04	-0.07	
2745	10-yr	715.69	715.73	-0.04	
2745	50-yr	719.03	719.07	-0.04	
2745	100-yr	721.06	721.14	-0.08	
2745	500-yr	721.19	721.17	0.02	
2776	10-yr	715.66	715.70	-0.04	
2776	50-yr	719.00	719.05	-0.05	
2776	100-yr	721.04	721.12	-0.08	
2776	500-yr	721.15	721.13	0.02	
2784	10-yr	715.67	715.71	-0.04	
2784	50-yr	719.01	719.05	-0.04	
2784	100-yr	721.04	721.12	-0.08	
2784	500-yr	721.15	721.13	0.02	
2786	10-yr	715.73	715.77	-0.04	
2786	50-yr	719.07	719.11	-0.04	
2786	100-yr	721.09	721.17	-0.08	
2786	500-yr	721.23	721.21	0.02	
3430	10-yr	715.88	715.92	-0.04	
3430	50-yr	719.20	719.24	-0.04	
3430	100-yr	721.20	721.28	-0.08	
3430	500-yr	721.40	721.39	0.01	
3483	10-yr	715.65	715.65	0.00	
3483	50-yr	719.11	719.15	-0.04	
3483	100-yr	721.17	721.25	-0.08	
3483	500-yr	721.36	721.34	0.02	
3491	10-yr	716.33	716.32	0.01	
3491	50-yr	719.13	719.17	-0.04	

3491	100-yr	721.18	721.26	-0.08	
3491	500-yr	721.37	721.35	0.02	
3493	10-yr	717.15	717.14	0.01	
3493	50-yr	719.30	719.34	-0.04	
3493	100-yr	721.24	721.31	-0.07	
3493	500-yr	721.46	721.44	0.02	
3535	10-yr	717.41	717.41	0.00	
3535	50-yr	719.54	719.57	-0.03	
3535	100-yr	721.41	721.48	-0.07	
3535	500-yr	721.72	721.70	0.02	
3565	10-yr	717.41	717.41	0.00	
3565	50-yr	719.53	719.56	-0.03	
3565	100-yr	721.40	721.47	-0.07	
3565	500-yr	721.70	721.68	0.02	
3595	10-yr	717.42	717.42	0.00	
3595	50-yr	719.54	719.57	-0.03	
3595	100-yr	721.53	721.60	-0.07	
3595	500-yr	721.91	721.89	0.02	
3625	10-yr	717.45	717.45	0.00	
3625	50-yr	719.58	719.61	-0.03	
3625	100-yr	721.57	721.64	-0.07	
3625	500-yr	721.98	721.96	0.02	
4035	10-yr	717.46	717.46	0.00	
4035	50-yr	719.59	719.62	-0.03	
4035	100-yr	721.59	721.66	-0.07	
4035	500-yr	722.01	721.99	0.02	
4085	10-yr	717.64	717.64	0.00	
4085	50-yr	719.74	719.77	-0.03	
4085	100-yr	721.67	721.75	-0.08	
4085	500-yr	722.11	722.10	0.01	
4150	10-yr	717.64	717.67	-0.03	
4150	50-yr	719.74	719.79	-0.05	
4150	100-yr	721.88	721.94	-0.06	
4150	500-yr	722.46	722.44	0.02	
4180	10-yr	717.61	717.63	-0.02	
4180	50-yr	719.71	719.75	-0.04	
4180	100-yr	721.86	721.93	-0.07	
4180	500-yr	722.44	722.41	0.03	
4740	10-yr	718.13	718.15	-0.02	
4740	50-yr	720.06	720.10	-0.04	
4740	100-yr	722.07	722.13	-0.06	
4740	500-yr	722.69	722.67	0.02	
4790	10-yr	717.41	717.43	-0.02	
4790	50-yr	719.29	719.35	-0.06	
4790	100-yr	721.59	721.66	-0.07	
4790	500-yr	721.99	721.97	0.02	

4820	10-yr	718.45	718.44	0.01	
4820	50-yr	719.70	715.82	3.88	
4820	100-yr	723.45	723.52	-0.07	
4820	500-yr	724.77	724.75	0.02	
4870	10-yr	720.26	720.26	0.00	
4870	50-yr	722.05	722.08	-0.03	
4870	100-yr	724.15	724.19	-0.04	
4870	500-yr	725.25	725.23	0.02	
5140	10-yr	720.23	720.23	0.00	
5140	50-yr	722.00	722.02	-0.02	
5140	100-yr	724.09	724.10	-0.01	
5140	500-yr	725.14	725.09	0.05	
5190	10-yr	720.73	720.72	0.01	
5190	50-yr	722.41	722.44	-0.03	
5190	100-yr	724.31	724.35	-0.04	
5190	500-yr	725.36	725.39	-0.03	
5207	10-yr	720.76	720.76	0.00	
5207	50-yr	722.44	722.47	-0.03	
5207	100-yr	724.33	724.39	-0.06	
5207	500-yr	725.39	725.42	-0.03	
5257	10-yr	720.71	720.70	0.01	
5257	50-yr	722.39	722.42	-0.03	
5257	100-yr	724.29	724.35	-0.06	
5257	500-yr	725.34	725.37	-0.03	
6018	10-yr	723.06	723.06	0.00	
6018	50-yr	724.92	724.92	0.00	
6018	100-yr	725.40	725.38	0.02	
6018	500-yr	726.22	726.18	0.04	
6068	10-yr	724.81	724.82	-0.01	
6068	50-yr	725.32	725.33	-0.01	
6068	100-yr	725.43	725.43	0.00	
6068	500-yr	725.85	725.84	0.01	
6108	10-yr	724.87	724.88	-0.01	
6108	50-yr	726.11	726.12	-0.01	
6108	100-yr	726.50	726.50	0.00	
6108	500-yr	726.17	726.32	-0.15	726.90 Handwitten Value
6170	10-yr	724.86	724.87	-0.01	
6170	50-yr	726.81	726.83	-0.02	
6170	100-yr	727.64	727.65	-0.01	
6170	500-yr	728.87	728.94	-0.07	

6560	10-yr	726.12	726.35	-0.23	
6560	50-yr	727.76	727.77	-0.01	
6560	100-yr	728.52	728.52	0.00	
6560	500-yr	729.60	729.64	-0.04	
6610	10-yr	725.98	726.25	-0.27	
6610	50-yr	727.52	727.54	-0.02	
6610	100-yr	728.19	728.20	-0.01	
6610	500-yr	729.12	729.16	-0.04	
6685	10-yr	726.64	726.83	-0.19	
6685	50-yr	728.75	728.77	-0.02	
6685	100-yr	724.52	724.52	0.00	729.50 Handwritten Value
6685	500-yr	729.79	729.81	-0.02	
6735	10-yr	727.26	727.45	-0.19	
6735	50-yr	730.45	730.47	-0.02	
6735	100-yr	732.33	732.33	0.00	
6735	500-yr	733.30	733.31	-0.01	
7060	10-yr	727.37	727.51	-0.14	
7060	50-yr	729.85	729.87	-0.02	
7060	100-yr	732.08	732.08	0.00	
7060	500-yr	733.10	733.12	-0.02	
7270	10-yr	728.52	728.48	0.04	
7270	50-yr	730.17	730.18	-0.01	
7270	100-yr	732.10	732.10	0.00	
7270	500-yr	733.16	733.17	-0.01	
7303	10-yr	730.31	730.31	0.00	
7303	50-yr	732.02	732.02	0.00	
7303	100-yr	732.71	732.71	0.00	
7303	500-yr	733.42	733.43	-0.01	
7320	10-yr	729.17	729.18	-0.01	
7320	50-yr	733.21	733.21	0.00	
7320	100-yr	733.40	733.40	0.00	
7320	500-yr	733.76	733.76	0.00	
7355	10-yr	729.32	729.43	-0.11	
7355	50-yr	733.89	733.90	-0.01	
7355	100-yr	734.14	734.14	0.00	
7355	500-yr	734.42	734.42	0.00	
7405	10-yr	732.25	732.27	-0.02	
7405	50-yr	734.05	734.05	0.00	
7405	100-yr	734.26	734.26	0.00	
7405	500-yr	734.50	734.50	0.00	
8605	10-yr	733.33	733.34	-0.01	
8605	50-yr	734.56	734.57	-0.01	
8605	100-yr	734.87	734.86	0.01	
8605	500-yr	735.33	735.30	0.03	

9195	10-yr	734.02	734.02	0.00	
9195	50-yr	734.91	734.91	0.00	
9195	100-yr	735.16	735.16	0.00	
9195	500-yr	735.48	735.44	0.04	
9245	10-yr	733.83	733.83	0.00	
9245	50-yr	734.65	734.65	0.00	
9245	100-yr	734.80	734.80	0.00	
9245	500-yr	735.35	734.90	0.45	
9275	10-yr	733.98	733.98	0.00	
9275	50-yr	734.87	734.87	0.00	
9275	100-yr	735.23	735.24	-0.01	
9275	500-yr	737.02	736.49	0.53	
9305	10-yr	734.67	734.68	-0.01	
9305	50-yr	735.84	735.84	0.00	
9305	100-yr	736.48	736.48	0.00	
9305	500-yr	738.46	737.81	0.65	
9540	10-yr	734.58	734.58	0.00	
9540	50-yr	735.72	735.73	-0.01	
9540	100-yr	736.37	736.37	0.00	
9540	500-yr	738.63	737.80	0.83	
9570	10-yr	735.24	735.24	0.00	????
9570	50-yr	736.56	736.57	-0.01	????
9570	100-yr	737.31	737.32	-0.01	????
9570	500-yr	739.07	738.61	0.46	????
9590	10-yr	734.90	734.90	0.00	????
9590	50-yr	739.43	739.46	-0.03	????
9590	100-yr	739.77	739.81	-0.04	????
9590	500-yr	740.44	740.11	0.33	????
9622	10-yr	735.28	735.65	-0.37	????
9622	50-yr	740.40	740.43	-0.03	????
9622	100-yr	740.70	740.63	0.07	????
9622	500-yr	741.36	741.04	0.32	????
9627	10-yr	739.46	739.25	0.21	????
9627	50-yr	740.31	740.29	0.02	????
9627	100-yr	740.54	740.43	0.11	????
9627	500-yr	740.98	740.69	0.29	????
9675	10-yr	739.45	739.24	0.21	????
9675	50-yr	740.29	740.27	0.02	????
9675	100-yr	740.51	740.40	0.11	????
9675	500-yr	740.92	740.64	0.28	????
10235	10-yr	739.55	739.42	0.13	
10235	50-yr	740.43	740.48	-0.05	
10235	100-yr	740.71	740.71	0.00	
10235	500-yr	741.62	741.15	0.47	
10285	10-yr	739.47	739.34	0.13	
10285	50-yr	740.22	740.27	-0.05	

10285	100-yr	740.38	740.39	-0.01	
10285	500-yr	741.13	743.65	-2.52	
10330	10-yr	739.63	739.54	0.09	
10330	50-yr	740.50	740.56	-0.06	
10330	100-yr	740.93	740.99	-0.06	
10330	500-yr	741.48	744.27	-2.79	
10380	10-yr	739.50	739.50	0.00	
10380	50-yr	740.42	740.47	-0.05	
10380	100-yr	740.94	740.99	-0.05	
10380	500-yr	744.41	743.90	0.51	
10605	10-yr	741.55	742.18	-0.63	????
10605	50-yr	742.55	743.12	-0.57	????
10605	100-yr	742.91	743.65	-0.74	????
10605	500-yr	743.77	744.52	-0.75	????
10655	10-yr	743.60	744.26	-0.66	????
10655	50-yr	744.82	745.57	-0.75	????
10655	100-yr	745.57	746.30	-0.73	????
10655	500-yr	746.62	747.37	-0.75	????
10690	10-yr	743.62	744.27	-0.65	????
10690	50-yr	744.84	745.57	-0.73	????
10690	100-yr	745.90	746.69	-0.79	????
10690	500-yr	747.27	747.91	-0.64	????
10740	10-yr	744.42	743.95	0.47	????
10740	50-yr	746.23	745.24	0.99	????
10740	100-yr	747.35	746.37	0.98	????
10740	500-yr	748.35	747.67	0.68	????
10965	10-yr	747.08	744.42	2.66	????
10965	50-yr	748.62	745.65	2.97	????
10965	100-yr	749.16	746.63	2.53	????
10965	500-yr	749.91	747.73	2.18	????
11015	10-yr	747.05	744.47	2.58	????
11015	50-yr	748.57	745.63	2.94	????
11015	100-yr	749.10	746.57	2.53	????
11015	500-yr	749.87	747.59	2.28	????
11050	10-yr	747.67	744.69	2.98	????
11050	50-yr	749.15	746.57	2.58	????
11050	100-yr	749.86	748.11	1.75	????
11050	500-yr	750.94	750.87	0.07	????
11100	10-yr	747.96	744.81	3.15	????
11100	50-yr	749.40	747.41	1.99	????
11100	100-yr	749.86	749.05	0.81	????
11100	500-yr	750.82	750.74	0.08	????
11315	10-yr	747.76	747.04	0.72	????
11315	50-yr	749.29	747.91	1.38	????
11315	100-yr	749.73	748.77	0.96	????
11315	500-yr	750.63	750.56	0.07	????

11365	10-yr	749.07	749.06	0.01	????
11365	50-yr	749.96	749.92	0.04	????
11365	100-yr	749.92	750.20	-0.28	????
11365	500-yr	750.66	751.26	-0.60	????
11366	10-yr	754.49	754.66	-0.17	
11366	50-yr	754.63	754.61	0.02	754, 68 Handwritten Value
11366	100-yr	754.70	754.69	0.01	
11366	500-yr	754.77	754.77	0.00	
11424	10-yr	755.05	755.01	0.04	
11424	50-yr	755.25	755.28	-0.03	
11424	100-yr	755.37	755.39	-0.02	
11424	500-yr	755.58	755.60	-0.02	
11425	10-yr	755.04	755.01	0.03	
11425	50-yr	755.24	755.27	-0.03	
11425	100-yr	755.35	755.38	-0.03	
11425	500-yr	755.56	755.58	-0.02	
11475	10-yr	755.07	755.04	0.03	
11475	50-yr	755.28	755.31	-0.03	
11475	100-yr	755.40	755.42	-0.02	
11475	500-yr	755.61	755.62	-0.01	
12640	10-yr	759.42	759.42	0.00	
12640	50-yr	759.85	759.85	0.00	
12640	100-yr	759.94	759.94	0.00	
12640	500-yr	760.23	760.23	0.00	
12690	10-yr	760.59	760.88	-0.29	????
12690	50-yr	761.04	761.39	-0.35	????
12690	100-yr	761.12	761.49	-0.37	????
12690	500-yr	761.41	761.82	-0.41	????
12697	10-yr	760.87	760.87	0.00	
12697	50-yr	761.29	761.29	0.00	
12697	100-yr	761.38	761.38	0.00	
12697	500-yr	761.66	761.66	0.00	
12700	10-yr	760.98	760.98	0.00	
12700	50-yr	761.41	761.41	0.00	
12700	100-yr	761.49	761.49	0.00	
12700	500-yr	762.58	762.58	0.00	
12740	10-yr	762.81	762.61	0.20	????
12740	50-yr	763.36	763.29	0.07	????
12740	100-yr	763.46	763.34	0.12	????
12740	500-yr	763.82	763.58	0.24	????
13350	10-yr	765.55	766.25	-0.70	????
13350	50-yr	765.80	766.45	-0.65	????
13350	100-yr	766.06	766.71	-0.65	????
13350	500-yr	766.33	766.95	-0.62	????
13850	10-yr	769.19	768.54	0.65	????

13850	50-yr	769.93	769.16	0.77	????
13850	100-yr	770.08	769.55	0.53	????
13850	500-yr	770.22	770.05	0.17	????
13900	10-yr	769.53	769.68	-0.15	????
13900	50-yr	770.24	770.16	0.08	????
13900	100-yr	770.45	770.23	0.22	????
13900	500-yr	770.73	771.67	-0.94	????
					????
13955	10-yr	769.94	770.04	-0.10	????
13955	50-yr	770.78	770.30	0.48	????
13955	100-yr	771.32	770.30	1.02	????
13955	500-yr	771.69	773.31	-1.62	????
14005	10-yr	770.83	770.20	0.63	
14005	50-yr	772.00	770.58	1.42	
14005	100-yr	772.92	772.95	-0.03	
14005	500-yr	774.25	773.26	0.99	
			MAX =	3.88	
			MIN =	-2.79	

Appendix A
Flood Protection Study
for Eagle Pass, Texas

Elevation Differences between Currently Effective FIS
and Duplicate Effective model

TRIBUTARY 1
MODEL = DPTRIB1

Section Number	Storm Event	From Duplicate Run	From Currently Effective FIS	Elevation Differences	Comments
0	10-yr	715.22	715.22	0.00	
0	50-yr	716.17	716.16	0.01	
0	100-yr	716.71	716.73	-0.02	
0	500-yr	717.58	717.53	0.05	
158	10-yr	716.92	716.92	0.00	
158	50-yr	717.87	717.87	0.00	
158	100-yr	718.42	718.42	0.00	
158	500-yr	719.27	719.28	-0.01	
556	10-yr	721.07	721.07	0.00	
556	50-yr	722.00	722.00	0.00	
556	100-yr	722.54	722.54	0.00	
556	500-yr	723.38	723.37	0.01	
606	10-yr	721.85	721.85	0.00	
606	50-yr	722.79	722.79	0.00	
606	100-yr	723.35	723.35	0.00	
606	500-yr	724.11	724.11	0.00	
643	10-yr	723.17	723.17	0.00	
643	50-yr	724.24	724.24	0.00	
643	100-yr	724.84	724.84	0.00	
643	500-yr	725.85	725.85	0.00	
705	10-yr	723.89	723.89	0.00	
705	50-yr	725.08	725.08	0.00	
705	100-yr	725.77	725.77	0.00	
705	500-yr	726.85	726.85	0.00	
713	10-yr	723.91	723.91	0.00	
713	50-yr	725.10	725.10	0.00	
713	100-yr	725.79	725.79	0.00	
713	500-yr	726.87	726.86	0.01	
733	10-yr	725.33	725.32	0.01	
733	50-yr	726.22	726.22	0.00	
733	100-yr	726.72	726.71	0.01	
733	500-yr	727.47	727.47	0.00	

Section Number	Storm Event	From Duplicate Run	From Currently Effective FIS	Elevation Differences	Comments
873	10-yr	726.77	726.77	0.00	
873	50-yr	727.68	727.68	0.00	
873	100-yr	728.21	728.21	0.00	
873	500-yr	728.99	728.99	0.00	
893	10-yr	727.16	727.16	0.00	
893	50-yr	728.10	728.10	0.00	
893	100-yr	728.61	728.61	0.00	
893	500-yr	728.94	728.95	-0.01	
941	10-yr	728.39	728.40	-0.01	
941	50-yr	728.29	728.35	-0.06	
941	100-yr	730.68	730.69	-0.01	728.40 handwritten value
941	500-yr	730.74	730.76	-0.02	
991	10-yr	729.60	729.61	-0.01	
991	50-yr	731.09	731.07	0.02	
991	100-yr	730.87	730.88	-0.01	731.88 handwritten value
991	500-yr	731.09	731.10	-0.01	
1440	10-yr	730.86	730.78	0.08	
1440	50-yr	731.70	731.59	0.11	
1440	100-yr	732.21	732.09	0.12	
1440	500-yr	732.99	732.81	0.18	
1490	10-yr	731.09	731.10	-0.01	
1490	50-yr	732.04	732.02	0.02	
1490	100-yr	732.63	732.61	0.02	
1490	500-yr	733.73	736.71	-2.98	
1538	10-yr	732.28	732.28	0.00	
1538	50-yr	733.42	733.48	-0.06	
1538	100-yr	734.29	734.29	0.00	
1538	500-yr	734.65	735.14	-0.49	
1588	10-yr	732.53	738.54	-6.01	
1588	50-yr	734.52	734.53	-0.01	
1588	100-yr	734.31	734.31	0.00	734.73 handwritten value
1588	500-yr	734.66	735.09	-0.43	
2030	10-yr	734.83	735.05	-0.22	
2030	50-yr	735.69	735.93	-0.24	
2030	100-yr	736.23	736.46	-0.23	
2030	500-yr	737.00	737.23	-0.23	
2080	10-yr	735.01	735.76	-0.75	
2080	50-yr	735.86	735.08	0.78	
2080	100-yr	736.40	736.49	-0.09	
2080	500-yr	738.02	737.21	0.81	
2125	10-yr	736.06	736.08	-0.02	
2125	50-yr	737.10	736.99	0.11	
2125	100-yr	737.68	737.02	0.66	
2125	500-yr	738.00	737.34	0.66	

Section Number	Storm Event	From Duplicate Run	From Currently Effective FIS	Elevation Differences	Comments
2155	10-yr	735.99	735.99	0.00	
2155	50-yr	736.84	736.84	0.00	
2155	100-yr	737.42	737.39	0.03	
2155	500-yr	739.49	738.22	1.27	
2197	10-yr	736.69	736.69	0.00	
2197	50-yr	737.54	737.54	0.00	
2197	100-yr	738.09	738.09	0.00	
2197	500-yr	739.03	739.01	0.02	
2227	10-yr	737.73	737.73	0.00	
2227	50-yr	738.51	738.51	0.00	
2227	100-yr	739.34	739.36	-0.02	
2227	500-yr	741.04	741.05	-0.01	
2427	10-yr	739.34	738.92	0.42	
2427	50-yr	740.23	739.81	0.42	
2427	100-yr	740.66	740.27	0.39	
2427	500-yr	741.96	741.96	0.00	
2557	10-yr	742.71	742.72	-0.01	
2557	50-yr	742.83	742.87	-0.04	
2557	100-yr	742.95	742.92	0.03	
2557	500-yr	743.01	743.02	-0.01	
			MAX =	1.27	
			MIN =	-6.01	

Appendix A
Flood Protection Study
for Eagle Pass, Texas

Elevation Differences between Currently Effective FIS
and Duplicate Effective model

TRIBUTARY 2 (10-yr only applicable)
MODEL = 10TRB2

Section Number	Storm Event	From Duplicate Run	From Currently Effective FIS	Elevation Differences	Comments
2	10-yr	742.11	742.11	0.00	
2	50-yr	743.42	743.44	-0.02	N/A
2	100-yr	744.29	744.29	0.00	N/A
2	500-yr	744.89	744.87	0.02	N/A
150	10-yr	743.54	743.55	-0.01	
150	50-yr	744.93	744.92	0.01	N/A
150	100-yr	745.79	745.79	0.00	N/A
150	500-yr	746.39	746.39	0.00	N/A
465	10-yr	745.85	?	0.00	
465	50-yr	746.91	746.92	-0.01	N/A
465	100-yr	747.23	747.23	0.00	N/A
465	500-yr	747.61	747.62	-0.01	N/A
540	10-yr	746.91	746.90	0.01	
540	50-yr	747.77	747.75	0.02	N/A
540	100-yr	748.04	748.04	0.00	N/A
540	500-yr	748.40	748.41	-0.01	N/A
588	10-yr	748.41	748.41	0.00	
588	50-yr	749.50	749.49	0.01	N/A
588	100-yr	750.08	750.08	0.00	N/A
588	500-yr	750.89	750.89	0.00	N/A
638	10-yr	748.32	748.32	0.00	
638	50-yr	749.46	749.45	0.01	N/A
638	100-yr	750.05	750.05	0.00	N/A
638	500-yr	750.87	750.87	0.00	N/A
1543	10-yr	750.03	750.02	0.01	
1543	50-yr	751.46	751.46	0.00	N/A
1543	100-yr	751.76	751.76	0.00	N/A
1543	500-yr	751.99	751.99	0.00	N/A
1583	10-yr	752.56	752.56	0.00	
1583	50-yr	752.89	752.89	0.00	N/A
1583	100-yr	753.03	753.03	0.00	N/A
1583	500-yr	753.23	753.23	0.00	N/A

Section Number	Storm Event	From Duplicate Run	From Currently Effective FIS	Elevation Differences	Comments
1771	10-yr	754.18	754.18	0.00	
1771	50-yr	754.95	754.95	0.00	N/A
1771	100-yr	755.41	755.41	0.00	N/A
1771	500-yr	756.11	756.11	0.00	N/A
1821	10-yr	754.13	754.13	0.00	
1821	50-yr	754.92	754.92	0.00	N/A
1821	100-yr	755.39	755.39	0.00	N/A
1821	500-yr	756.09	756.09	0.00	N/A
2425	10-yr	755.41	755.41	0.00	
2425	50-yr	755.93	755.93	0.00	N/A
2425	100-yr	756.07	756.07	0.00	N/A
2425	500-yr	756.27	756.27	0.00	N/A
2475	10-yr	755.81	755.81	0.00	
2475	50-yr	756.11	756.11	0.00	N/A
2475	100-yr	756.56	756.56	0.00	N/A
2475	500-yr	756.89	756.89	0.00	N/A
2535	10-yr	756.72	756.72	0.00	
2535	50-yr	757.39	757.38	0.01	N/A
2535	100-yr	757.92	???	0.00	N/A
2535	500-yr	758.58	758.58	0.00	N/A
2575	10-yr	756.59	756.59	0.00	
2575	50-yr	757.35	757.35	0.00	N/A
2575	100-yr	757.89	757.89	0.00	N/A
2575	500-yr	758.57	758.57	0.00	N/A
2810	10-yr	757.23	757.23	0.00	
2810	50-yr	757.56	757.56	0.00	N/A
2810	100-yr	757.70	757.70	0.00	N/A
2810	500-yr	758.50	758.50	0.00	N/A
2840	10-yr	757.80	757.80	0.00	
2840	50-yr	758.26	758.26	0.00	N/A
2840	100-yr	758.52	758.52	0.00	N/A
2840	500-yr	758.83	758.82	0.01	N/A
2880	10-yr	758.04	758.04	0.00	
2880	50-yr	758.41	758.41	0.00	N/A
2880	100-yr	758.65	758.65	0.00	N/A
2880	500-yr	759.73	759.73	0.00	N/A
2910	10-yr	757.95	757.95	0.00	
2910	50-yr	758.32	758.32	0.00	N/A
2910	100-yr	758.56	758.56	0.00	N/A
2910	500-yr	759.70	759.70	0.00	N/A
3545	10-yr	759.86	759.86	0.00	
3545	50-yr	760.31	760.31	0.00	N/A
3545	100-yr	760.52	760.52	0.00	N/A
3545	500-yr	760.80	760.80	0.00	N/A

Section Number	Storm Event	From Duplicate Run	From Currently Effective FIS	Elevation Differences	Comments
3585	10-yr	760.47	760.48	-0.01	
3585	50-yr	760.78	760.78	0.00	N/A
3585	100-yr	761.00	761.00	0.00	N/A
3585	500-yr	761.20	761.20	0.00	N/A
3625	10-yr	760.60	760.59	0.01	
3625	50-yr	761.02	761.02	0.00	N/A
3625	100-yr	761.32	761.32	0.00	N/A
3625	500-yr	761.66	761.66	0.00	N/A
3665	10-yr	760.65	760.64	0.01	
3665	50-yr	761.04	761.04	0.00	N/A
3665	100-yr	761.33	761.33	0.00	N/A
3665	500-yr	761.66	761.66	0.00	N/A
4335	10-yr	764.74	764.75	-0.01	
4335	50-yr	765.12	765.12	0.00	N/A
4335	100-yr	765.31	765.31	0.00	N/A
4335	500-yr	765.51	765.51	0.00	N/A
4365	10-yr	765.45	765.45	0.00	
4365	50-yr	767.30	767.30	0.00	N/A
4365	100-yr	767.56	767.56	0.00	N/A
4365	500-yr	767.81	767.81	0.00	N/A
4381	10-yr	765.58	765.58	0.00	
4381	50-yr	767.85	767.85	0.00	N/A
4381	100-yr	768.10	768.10	0.00	N/A
4381	500-yr	768.46	768.46	0.00	N/A
4411	10-yr	767.93	767.93	0.00	
4411	50-yr	767.96	767.96	0.00	N/A
4411	100-yr	768.19	768.19	0.00	N/A
4411	500-yr	768.54	768.54	0.00	N/A
			MAX =	0.02	
			MIN =	-0.02	

Appendix A
Flood Protection Study
for Eagle Pass, Texas

Elevation Differences between Currently Effective FIS
and Duplicate Effective model

TRIBUTARY 2 (50yr, 100-yr, and 500-yr only applicable)
MODEL = 50TRB2

Section Number	Storm Event	From Duplicate Run	From Currently Effective FIS	Elevation Differences	Comments
2	10-yr	742.28	742.27	0.01	N/A
2	50-yr	742.55	742.57	-0.02	
2	100-yr	742.72	742.75	-0.03	
2	500-yr	742.94	743.01	-0.07	
150	10-yr	743.68	743.68	0.00	N/A
150	50-yr	744.06	744.04	0.02	
150	100-yr	744.24	744.22	0.02	
150	500-yr	744.48	744.44	0.04	
465	10-yr	744.92	744.92	0.00	N/A
465	50-yr	746.90	746.90	0.00	
465	100-yr	747.16	747.16	0.00	
465	500-yr	747.52	747.49	0.03	
540	10-yr	747.12	747.12	0.00	N/A
540	50-yr	747.77	747.77	0.00	
540	100-yr	748.09	748.09	0.00	
540	500-yr	748.49	748.53	-0.04	
588	10-yr	748.51	748.51	0.00	N/A
588	50-yr	749.50	749.50	0.00	
588	100-yr	750.10	750.09	0.01	
588	500-yr	750.92	750.93	-0.01	
638	10-yr	748.44	748.44	0.00	N/A
638	50-yr	749.46	749.46	0.00	
638	100-yr	750.07	750.07	0.00	
638	500-yr	750.90	750.94	-0.04	
1543	10-yr	750.01	750.01	0.00	N/A
1543	50-yr	751.46	751.46	0.00	
1543	100-yr	751.76	751.76	0.00	
1543	500-yr	751.99	751.99	0.00	
1583	10-yr	752.56	752.56	0.00	N/A
1583	50-yr	752.89	752.89	0.00	
1583	100-yr	753.03	753.03	0.00	
1583	500-yr	753.23	753.23	0.00	

Section Number	Storm Event	From Duplicate Run	From Currently Effective FIS	Elevation Differences	Comments
1771	10-yr	754.18	754.18	0.00	N/A
1771	50-yr	754.95	754.95	0.00	
1771	100-yr	755.41	755.41	0.00	
1771	500-yr	756.11	756.11	0.00	
1821	10-yr	754.13	754.13	0.00	N/A
1821	50-yr	754.92	754.92	0.00	
1821	100-yr	755.39	755.39	0.00	
1821	500-yr	756.09	756.09	0.00	
2425	10-yr	755.41	755.41	0.00	N/A
2425	50-yr	755.93	755.93	0.00	
2425	100-yr	756.07	756.07	0.00	
2425	500-yr	756.27	756.27	0.00	
2475	10-yr	755.81	755.81	0.00	N/A
2475	50-yr	756.11	756.11	0.00	
2475	100-yr	756.56	-	0.00	
2475	500-yr	756.89	756.89	0.00	
2535	10-yr	756.72	756.72	0.00	N/A
2535	50-yr	757.39	757.39	0.00	
2535	100-yr	757.92	757.92	0.00	
2535	500-yr	758.58	758.58	0.00	
2575	10-yr	756.59	756.59	0.00	N/A
2575	50-yr	757.35	757.35	0.00	
2575	100-yr	757.89	757.89	0.00	
2575	500-yr	758.57	758.57	0.00	
2810	10-yr	757.24	757.24	0.00	N/A
2810	50-yr	757.46	757.46	0.00	
2810	100-yr	757.87	757.87	0.00	
2810	500-yr	758.59	758.59	0.00	
2840	10-yr	757.38	757.38	0.00	N/A
2840	50-yr	758.18	758.18	0.00	
2840	100-yr	758.25	758.25	0.00	
2840	500-yr	758.72	758.72	0.00	
2880	10-yr	757.99	757.99	0.00	N/A
2880	50-yr	758.32	758.32	0.00	
2880	100-yr	758.41	758.41	0.00	
2880	500-yr	759.69	759.69	0.00	
2910	10-yr	757.92	757.92	0.00	N/A
2910	50-yr	758.24	758.24	0.00	
2910	100-yr	758.33	758.33	0.00	
2910	500-yr	759.69	759.69	0.00	
3545	10-yr	759.83	759.83	0.00	N/A
3545	50-yr	760.31	760.31	0.00	
3545	100-yr	760.54	760.54	0.00	
3545	500-yr	760.80	760.80	0.00	

Section Number	Storm Event	From Duplicate Run	From Currently Effective FIS	Elevation Differences	Comments
3585	10-yr	760.60	760.60	0.00	N/A
3585	50-yr	760.79	760.79	0.00	
3585	100-yr	761.00	761.00	0.00	
3585	500-yr	761.20	761.20	0.00	
3625	10-yr	760.71	760.71	0.00	N/A
3625	50-yr	761.02	761.02	0.00	
3625	100-yr	761.32	761.32	0.00	
3625	500-yr	761.66	761.66	0.00	
3665	10-yr	760.75	760.75	0.00	N/A
3665	50-yr	761.05	761.05	0.00	
3665	100-yr	761.34	761.34	0.00	
3665	500-yr	761.68	761.68	0.00	
4335	10-yr	764.84	764.84	0.00	N/A
4335	50-yr	765.13	765.13	0.00	
4335	100-yr	765.32	765.32	0.00	
4335	500-yr	765.51	765.51	0.00	
4365	10-yr	765.44	765.44	0.00	N/A
4365	50-yr	767.30	767.30	0.00	
4365	100-yr	767.56	767.56	0.00	
4365	500-yr	767.81	767.81	0.00	
4381	10-yr	765.58	765.58	0.00	N/A
4381	50-yr	767.85	767.85	0.00	
4381	100-yr	768.10	768.10	0.00	
4381	500-yr	768.46	768.46	0.00	
4411	10-yr	767.93	767.93	0.00	N/A
4411	50-yr	767.96	767.96	0.00	
4411	100-yr	768.19	768.19	0.00	
4411	500-yr	768.54	768.54	0.00	
			MAX =	0.04	
			MIN =	-0.07	

Flood Protection Study for Eagle Pass, Texas
Appendix B

Appendix B presents how the SCS method was applied, hydrologic parameters used, rainfall rates applied, flows determined, and a comparison to the Original Flood Insurance Study flows.

The Soil Conservation Service Method as applied in this Flood Protection Study.

The Soil Conservation Service (SCS) method for computing runoff from storm rainfall is based on the theory of abstractions. The SCS method uses a 24-hour storm duration, which is considered acceptable for the Eagle Pass area. It should be noted that when using this method a Type I antecedent moisture condition (AMC) should be used for the Eagle Pass area. A more complete discussion of the SCS method is presented in NEH-4: "Hydrology" Section 4, National Engineering Handbook by the Soil Conservation Service. The SCS method is described in Modern Sewer Design, by the American Iron and Steel Institute.

The SCS developed an index, called the runoff curve number, to represent the combined hydrologic effect of soil type, land use, agricultural land treatment class, hydrologic condition, and antecedent soil moisture. These watershed factors were found to have the most significant impact on estimating the volume of runoff, and can be assessed from soil surveys, site investigations, and land use maps.

The curve number is an indication of the runoff producing potential of the drainage area for a given antecedent soil moisture condition, and can range in value from 0 to 100. The SCS runoff curve numbers are grouped into three (3) antecedent soil moisture conditions:

AMC I	Dry soil condition
AMC II	Average soil condition
AMC III	Wet soil condition

Values of runoff curve numbers for all three conditions may be computed following guidelines in the SCS "Hydrology" Section 4, National Engineering Handbook. Studies of hydrologic data indicate that Antecedent Moisture Condition (AMC) II is not the average throughout Texas. Instead, investigations have shown that the average condition ranges from AMC I in west Texas to between AMC II and AMC III in east Texas. Typical values are given in Figure 1 for AMC II. Adjustments for the State of Texas were made to these curve numbers using Figure 1, which accounts for the variation in dry to wet conditions. Figure 1 was obtained from the Natural Resource Conservation Commission (formerly Soil Conservation Service) in Temple.

The SCS also classified surficial soils into four (4) hydrologic soil groups, and identified them by letters A, B, C, and D, to represent watershed characteristics.

Group A: (low runoff potential) Soils having a high infiltration rate even when thoroughly wetted and consisting chiefly of deep well-drained to excessively drained sands or gravels.

Group B: Soils having a moderate infiltration rate when thoroughly wetted and consisting chiefly of moderately deep to deep, moderately well to well-drained soils with moderately fine to moderately coarse texture.

Group C: Soils having a slow infiltration rate when thoroughly wetted and consisting chiefly of soils with a layer that impedes downward movement of water or soil with moderately fine to fine texture.

Group D: (High runoff potential) Soils having a very slow infiltration rate when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface and shallow soils over nearly impervious material.

A list of soils in Maverick County along with their hydrologic soil classification is given in the Soil Conservation Service publication Soil Survey of Maverick County, Texas. Typical values for curve numbers for the four (4) soil groups are listed in Appendix B. Typical curve numbers calculated for this flood study appear in the next section.

Flows for streams studied in detail were calculated using the SCS method in the U.S. Army Corps of Engineers - Hydrologic Engineering Center - Hydrologic Modeling System (HEC-HMS) program. HEC-HMS is a Windows driven program, which serves as a platform to organize and calculate runoff using various runoff methods. HEC-HMS models a watershed basin as separate hydrologic elements connected by reaches and junctions at which input and output information can be displayed. A basin schematic represents the hydrologic elements chosen, the connecting reaches, and type of output desired.

Figure 2 shows the major drainage areas used in this study. No areas were delineated for the Rio Grande River. Natural drainage boundaries were altered to some extent by construction of the Maverick County Irrigation Canal and the new Loop 431 in the northeast part of Eagle Pass. Flows for the Rio Grande River were obtained from the IBWC.

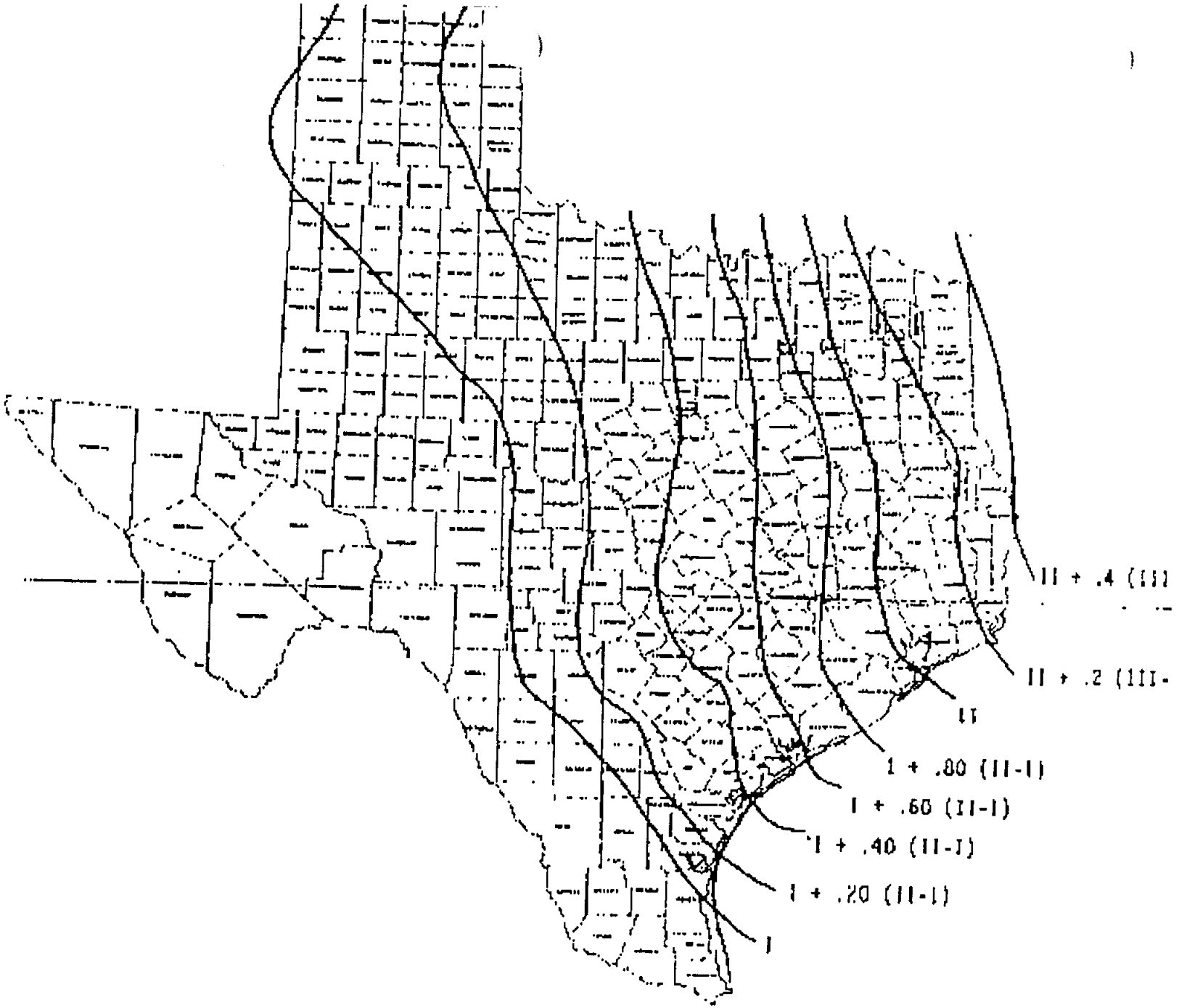


Figure 2 - Adjustments to Average Condition Runoff Curve Numbers for Antecedent Moisture Conditions I, II, & III for Texas.

Hydrologic Parameters

Figure 2 shows the drainage areas used for this study. The *drainage areas* for each stream were determined from digital U.S. Geological Survey quadrangle sheets obtained from Geographic Information Systems of McAllen, Texas. Figure 3 shows the *soils types* used for this study, compiled from the Soil Survey for Maverick County, Texas. Soil types in the Eagle Pass area consist of B, C, and D soils, with B and C being equally dominant within the study area. Figure 4 shows *existing land use* taken from a planning map developed by Hejl, Lee, and Associates. Sub-areas were broken up into the following: agricultural, commercial, industrial, residential, public (cemeteries), public (housing, schools, city offices, etc), roads, and open spaces (parks). A *future land use* map was used to determine new SCS curve numbers and recalculate flows for future conditions.

Table 1 shows the curve numbers used in the study based on land use and soil types. Composite curve numbers for each drainage area, taking into account land use and soil types, which are tabulated in the following spreadsheets for existing AMC 1, future AMC 1, existing AMC 2, and future AMC 2 conditions.

Table 1 - SCS Curve numbers used for the Eagle Pass Flood Study

Land use	Curve Numbers		
	Soil Type B	Soil Type C	Soil Type D
Agriculture (Brush-Poor Cond.)	67	77	83
Commercial	92	94	95
Industrial	88	91	93
Residential (1/4 acre lots)	75	83	87
Public (Cemeteries-Poor Cond)	79	86	89
Public (Housing, schools, etc)	92	94	95
Roads	98	98	98
Open Space (Parks-Poor Cond.)	79	86	89

Initial rainfall losses used in the study were calculated based on the curve number (CN) and the initial surface moisture storage capacity (IA) in units of depth. The curve number and initial surface moisture are related to a total runoff depth for a storm by the following relationship:

$$S = \frac{1000 - (10 * CN)}{CN}$$

(Use AMC II curve numbers in equation). S is the currently available soil moisture storage deficit in inches. The initial surface moisture IA is related to S by the relationship:

$$IA = 0.2 * S$$

This relation is based on empirical evidence established by the SCS. Initial rainfall losses were calculated for each subarea and are tabulated.

It should be noted, that the percentage imperviousness for a sub-area was not accounted for intentionally. The SCS curve numbers already generally account for the percentage of

imperviousness based on the soil type, land use and infiltration potential. Therefore, an over estimation of discharges could result if the impervious factor were applied.

Rainfall data was developed from two sources: 1) Rainfall data from the National Weather Service HYDRO-35, and 2) the U.S. Weather Bureau Technical Paper No. 40. These publications were used for determining runoff for storm return periods of 2 years through 100 years. Figure 5 is an intensity-duration-frequency curve for the Eagle Pass area. Log-normal graph paper was used to plot each duration storm and to estimate the 500-year storm event. Rainfall intensities were then input to HEC-HMS.

A *stream network or model* is constructed for each area studied in detail. This network is the model to which rainfall values are applied and peak discharges are determined as flows are routed and combined progressively downstream. Flood hydrographs were routed based on a Muskingum-Cunge method, which uses an eight-point cross-section taken from topography of the stream.

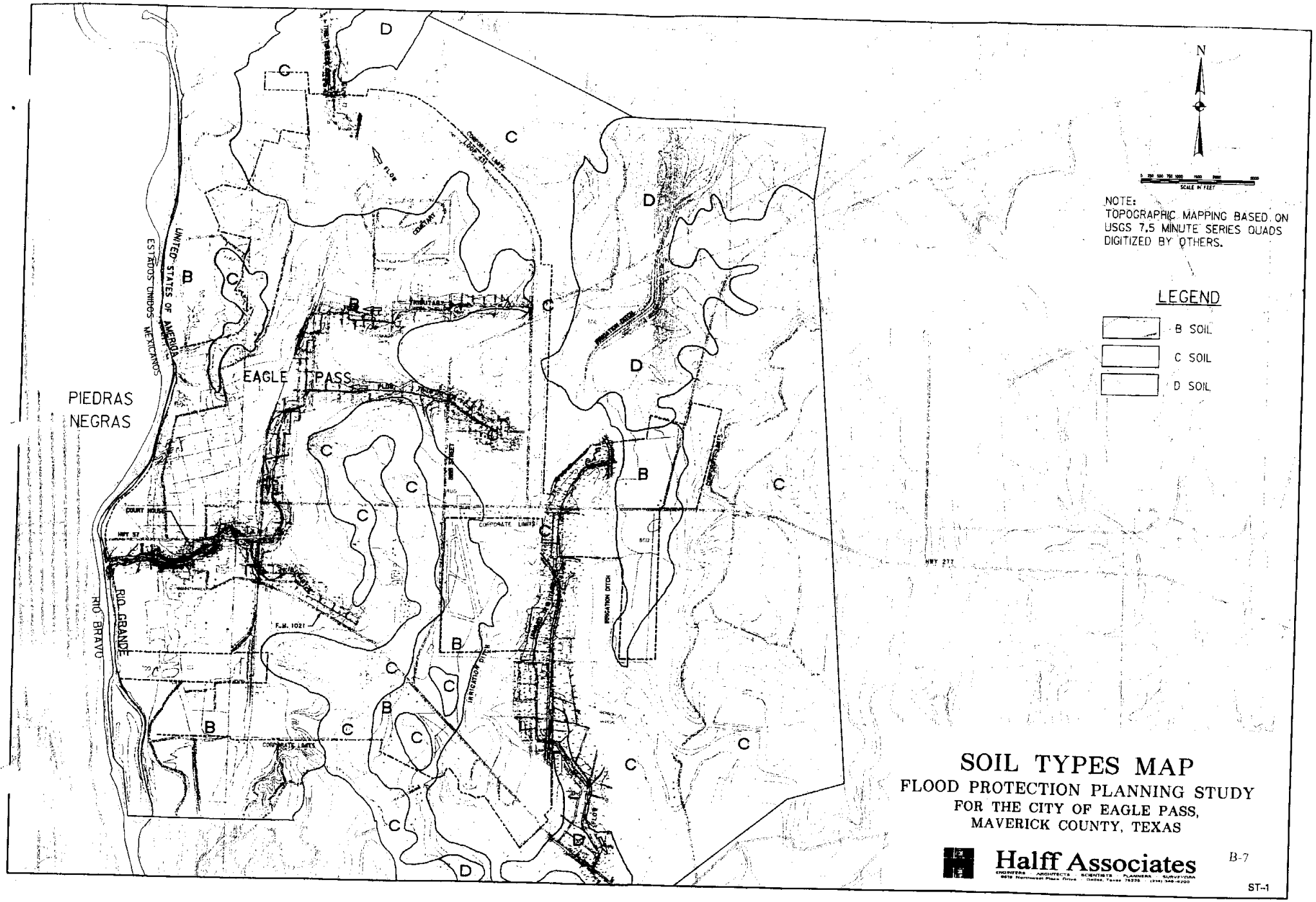
Peak Discharges Summary

The original FIS flood study lists peak discharges in a Table entitiled Summary of Discharges table. A 6-hour storm duration was used in the FIS study with a 5-minute time step. For the purposes of this study a 24-hour storm duration was chosen with a 5 minute time step. Table 2 shows existing and future peak flows for the full range of storm events at various locations in the study area. Summary tables from the HEC-HMS program are included in this Appendix.

Flow Comparison – Original Flood Insurance Study and Calculated Flood Study Flows

Table 3 presents a comparison of flows between the original Flood Insurance Study and the calculated Flood Study flows using the Soil Conservation Service method. The calculated Flood Study Flows are higher for a few reasons:

1. It was difficult to determine how the initial soil loss rates for the Original Flood Insurance Study were calculated. For the purposes of this study the SCS calculation of the initial soil loss rate was used. Generally, the calculated soil loss rates were lower than the Original FIS rates.
2. As development has occurred more impervious cover has been added to upstream areas of the Main Arroyo and Unnamed Tributary. Land use has become more intense increasing developed condition curve numbers.
3. Times of concentration have been reduced as new areas have developed with more efficient conveyance systems.
4. The SCS office in Temple uses an adjustment in calculating the antecedent moisture condition for Texas. (See Figure 1) This factor reduces the runoff for dryer regions of the state.



SOIL TYPES MAP

FLOOD PROTECTION PLANNING STUDY

FOR THE CITY OF EAGLE PASS,
MAVERICK COUNTY, TEXAS

Halff Associates

B-7

ST-1

EDUCATIONAL INSTITUTIONS

1. EAGLE PASS HIGH SCHOOL
2. EAGLE PASS JUNIOR HIGH
3. MEMORIAL JUNIOR HIGH
4. AUSTIN ELEMENTARY
5. BENAVIDES ELEMENTARY
6. RAY H. DARR ELEMENTARY
7. DAY CARE CENTER
8. RODOLFO DE LUNA CENTER
9. EARLY CHILDHOOD CENTER
10. GLASS ELEMENTARY
11. GRAVES ELEMENTARY
12. LANGUAGE DEVELOPMENT CENTER
13. ROBERT E. LEE ELEMENTARY
14. SAN LUIS ELEMENTARY
15. DISTRICT SERVICE CENTER
16. MULTIPLEX
17. EAGLE PASS REGIONAL TECHNICAL CENTER
18. SOUTHWEST TEXAS JUNIOR COLLEGE & SUL ROSS STATE UNIVERSITY

PARKS & RECREATIONAL

30. ELM CREEK PARK
33. SIESTA PARK
32. VALERIE PARK
33. AQUATICS PARK
34. KELSO PARK
35. SAN JUAN PLAZA
36. VEGA PARK
37. GOLF COURSE
38. ARROYO PARK WEST
39. ARCH M. MARCH MEMORIAL PARK
40. ARROYO PARK EAST
41. BLISS STREET PARK
42. R.E. LEE PARK
43. LITTLE DIPPER PARK
44. BURR PARK
45. CARTHAGE PARK
46. LAGO VISTA PARK
47. MAVERICK COUNTY LAKE PARK
48. CHITTIM PARK

VACANT DEVELOPED
VACANT UNDEVELOPED
RESIDENTIAL
COMMERCIAL
INDUSTRIAL
PUBLIC AND SEMI - PUBLIC
AGRICULTURE

LEGEND

CITY LIMITS
RAILROAD

ROADWAY SIGNS

U.S. NUMBERED HIGHWAY
STATE HIGHWAY
FARM OR RANCH TO MARKET
FARM OR RANCH TO MARKET

EXISTING LAND USE MAP

FLOOD PROTECTION PLANNING STUDY
FOR THE CITY OF EAGLE PASS, MAVERICK COUNTY, TEXAS

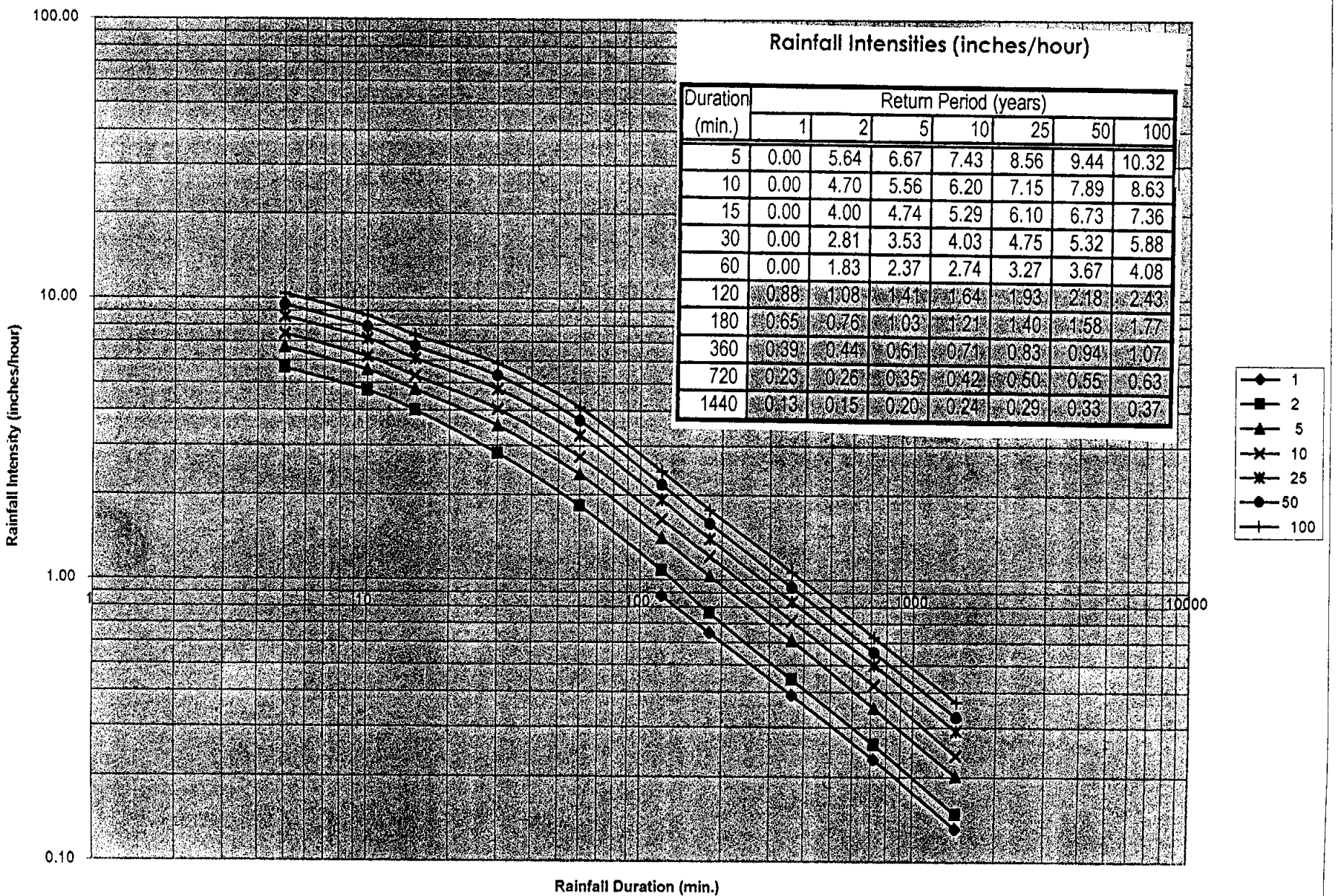
PREP. BY: HEA, LEE & ASSOC., INC. CONSULTING ENGINEERS
2207 HANCOCK DRIVE AUSTIN, TEXAS 78756

Halff Associates
ENGINEERS · ARCHITECTS · SCIENTISTS · PLANNERS · SURVEYORS

B-8

LU-1

Rainfall Intensity-Duration-Frequency for Eagle Pass, Texas



Rainfall Intensities (inches/hour)

Duration (min.)	Return Period (years)						
	1	2	5	10	25	50	100
5	0.00	5.64	6.67	7.43	8.56	9.44	10.32
10	0.00	4.70	5.56	6.20	7.15	7.89	8.63
15	0.00	4.00	4.74	5.29	6.10	6.73	7.36
30	0.00	2.81	3.53	4.03	4.75	5.32	5.88
60	0.00	1.83	2.37	2.74	3.27	3.67	4.08
120	0.88	1.08	1.41	1.64	1.93	2.18	2.43
180	0.65	0.76	1.03	1.21	1.40	1.58	1.77
360	0.39	0.44	0.61	0.71	0.83	0.94	1.07
720	0.23	0.26	0.35	0.42	0.50	0.55	0.63
1440	0.13	0.15	0.20	0.24	0.29	0.33	0.37

Figure 6 - Eagle Pass I-D-F Curves

Table 3 – Summary of Peak Discharges

Discharge Point (1)	Description (2)	Stream Sta. (3)	Drainage Area	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
			sq. mi.	cfs	cfs	cfs	cfs	cfs	cfs	cfs
Rio Grande River										
Existing Conditions						90,000		180,000	230,000	350,000
Future Conditions						90,000		180,000	230,000	350,000
Main Arroyo										
Existing Conditions										
E	Junction 4	9551	1.76	286	791	1216	1706	2081	2489	3264
D	Junction 6	7149	2.01	322	942	1446	2028	2464	2965	3897
	Junction 14	5279	2.29	420	1166	1770	2471	2982	3572	4698
C	Junction 7	4658	2.94	696	1744	2569	3536	4233	5027	6596
B	Junction 9	3026	3.13	802	1949	2850	3898	4654	5510	7202
A	Junction 10	1623	3.26	854	2045	2967	4046	4826	5704	7451
Future Conditions										
E	Junction 4	9551	1.76	336	891	1322	1826	2197	2577	3349
D	Junction 6	7149	2.01	375	1043	1548	2134	2581	3059	3963
	Junction 14	5279	2.29	465	1265	1868	2568	3091	3672	4756
C	Junction 7	4658	2.94	728	1836	2664	3625	4332	5129	6652
B	Junction 9	3026	3.13	829	2043	2944	3985	4749	5611	7260
A	Junction 10	1623	3.26	882	2136	3061	4136	4927	5808	7510
Tributary 1										
Existing Conditions										
G	Trib. 1-3	2508	0.30	178	334	442	568	662	764	965
F	Junction 8	1588	0.47	223	451	616	809	955	1114	1434
	Junction 13	873	0.65	298	611	834	1105	1305	1524	1971
Future Conditions										
G	Trib. 1-3	2508	0.30	178	334	442	568	662	764	965
F	Junction 8	1588	0.47	223	451	616	809	955	1114	1434
	Junction 13	873	0.65	298	611	834	1105	1305	1524	1971
Tributary 2										
Existing Conditions										
M	Trib. 2-7	8155	0.07	35	67	88	114	133	153	193
L	Junction 1	6235	0.30	114	237	326	429	507	594	764
I	Junction 2	3984	0.68	149	353	516	716	870	1047	1406
H	Junction 3	638	1.07	187	483	728	1012	1232	1474	1942
	Junction 11	465	1.09	189	489	737	1025	1247	1491	1962
Future Conditions										
M	Trib. 2-7	8155	0.07	46	80	102	127	147	167	205
L	Junction 1	6235	0.30	124	250	339	443	521	608	776
I	Junction 2	3984	0.68	181	411	587	799	960	1145	1507
H	Junction 3	638	1.07	231	567	832	1126	1340	1614	2127
	Junction 11	465	1.09	233	573	842	1138	1354	1631	2145
Tributary 3										
Existing Conditions										
O	Trib 3-3	15040	0.20	73	174	249	339	407	428	644
N	Junction 5	11787	0.50	155	373	536	731	879	1044	1399

Discharge Point (1)	Description (2)	Stream Sta. (3)	Drainage Area	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	500-Yr
			Sq.mi.	cfs	cfs	cfs	cfs	cfs	cfs	cfs
	Junction 12	9933	0.67	184	462	676	937	1134	1356	1827
Tributary 3										
Future Conditions										
O	Trib 3-3	15040	0.20	73	174	249	339	407	428	644
N	Junction 5	11787	0.50	155	373	536	731	879	1044	1399
	Junction 12	9933	0.67	184	462	676	937	1134	1356	1827
Unnamed Trib.										
Existing Conditions										
J	Junction 2	13371	0.98	263	633	920	1264	1524	1817	2419
H	Junction 3	11519	1.20	333	755	1092	1534	1859	2221	2945
G	Junction 4	10339	1.57	376	874	1281	1809	2213	2669	3488
F	Junction 5	9195	1.85	430	1006	1487	2107	2586	3128	4100
E	Junction 6	7837	1.99	445	1043	1539	2199	2708	3290	4346
D	Junction 7	6342	2.39	514	1213	1786	2567	3173	3863	5127
C	Junction 8	3687	2.81	562	1339	1928	2696	3344	4139	5604
B	Junction 9	2368	3.07	595	1382	2009	2804	3465	4297	5853
A	Junction 10	1242	3.27	610	1428	2076	2893	3576	4439	6074
Future Conditions										
J	Junction 2	13371	0.98	484	950	1272	1645	1923	2225	2821
H	Junction 3	11519	1.20	550	1083	1499	1958	2295	2664	3370
G	Junction 4	10339	1.57	617	1265	1763	2338	2768	3156	4030
F	Junction 5	9195	1.85	686	1442	2023	2702	3208	3678	4712
E	Junction 6	7837	1.99	710	1488	2109	2834	3377	3906	4994
D	Junction 7	6342	2.39	784	1665	2384	3241	3878	4520	5799
C	Junction 8	3687	2.81	850	1787	2502	3410	4138	4901	6367
B	Junction 9	2368	3.07	859	1846	2587	3518	4278	5088	6640
A	Junction 10	1242	3.27	882	1901	2658	3617	4411	5262	6895
Tributary to Seco Creek										
Existing Conditions										
A	TSCO-1	4544	0.28	29	111	185	278	354	435	623
B	Junction 1	2590	0.48	150	317	453	618	751	874	1133
C	Junction 2	1760	0.60	188	384	545	724	876	1013	1285
Future Conditions										
A	TSCO-1	4544	0.28	105	254	363	495	603	704	941
B	Junction 1	2590	0.48	212	452	622	813	975	1097	1437
C	Junction 2	1760	0.60	246	517	694	901	1069	1190	1539

(1) Discharge Points shown on Drainage Area Map

(2) Description taken from HEC-HMS models

(3) Stream Stations taken from HEC-RAS models

Table 3 - Comparison of Peak Discharges at Selected Points between Original FIS and Flood Study.
Eagle Pass Flood Study

LOCATION	Selected Points	Original FIS Study DRAINAGE AREA (sq. miles)	Original FIS Study 6 Hour FEMA Q's	Flood Study DRAINAGE AREA (sq. miles)	Flood Study 24 Hour HEC-HMS Q's
Main Arroyo					
Above Limit of Study on Trib 2	I	0.61	1220	0.68	1382
Trib 2 @ Confluence with Arroyo	H	0.94	1670	1.09	1973
Above Limit of Study on Arroyo	O	0.41	920	0.20	840
Arroyo @ Confluence with Trib 2	E	0.69	1330	0.67	2230
Arroyo and Trib 2 Confluence	E	1.63	2480	1.76	3614
Arroyo Just Above Con. w/ Trib 1	C	2.20	2765	2.29	5080
Above Limit of Study on Trib 1		0.53	1110		
Trib 1 @ Confluence w/ Trib 1	C	0.74	1400	0.65	2076
Arroyo Just Below Con. w/ Trib 1	C	2.94	3050	2.94	7019
Arroyo @ Con. w/ Rio Grande R.	A	3.44	4220	3.26	7812
Unnamed Creek					
Unnamed Creek - Above Hwy 1021	A	3.21	3000	3.27	5732
Unnamed Creek - Above Hwy 277	H	1.31	1980	1.20	2851

* For location of selected points see drainage area map.

Appendix B
Existing AMC 1
Sub-Watershed Work Sheets

EXISTING AMC1

use Table:
Curve Number LookUp Table

	Soil Type Curve Numbers			
AMC1	21	41	55	63
AMC1	21	41	55	63
AMCII	38	61	74	80
AMCIII	65	75	85	90

CN for Impervious Area 98

			Areas in each Soil Group					Soil Type Curve Numbers				
Area for Trib TSC03		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	0	36.21	4.87	38%	21	41	55	63	71.93	49.20
	Commercial	0	0	5.28	7.15	85%	21	41	55	63	92.24	19.09
	Roads	0	0	4.78	1.77	98%	94	94	94	94	97.92	10.68
	Total Area	60.06										78.97
			Areas in each Soil Group					Soil Type Curve Numbers				
Area for Trib TSC02		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industrial	0	0	6.08	0	72%	21	41	55	63	85.96	4.09
	Commercial	0	0	41.88	0	85%	21	41	55	63	91.55	30.04
	Public (other)	0	0	6.98	0	85%	21	41	55	63	91.55	5.01
	Residential	0	0.05	60.03	0	38%	21	41	55	63	71.33	33.58
	Roads	0	0.26	12.35	0	98%	94	94	94	94	97.92	9.67
	Total Area	127.63										82.40
			Areas in each Soil Group					Soil Type Curve Numbers				
Area for Trib TSC03		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	0	4.81	0	85%	21	41	55	63	91.55	2.42
	Agricultural	0	1.99	175.13	0	2%	28	46	59	67	59.64	58.06
	Total Area	181.93										60.48

EXISTING AMC1

Area for UTRG1			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	0	16.05	1.07	85%	21	41	55	63	91.63	11.70
	Industry	0	0	0.25	0	72%	21	41	55	63	85.96	0.16
	Agricultural	0	0	30.35	86.35	2%	28	46	59	67	65.58	57.08
	Total Area	134.07										68.94
Area for UTRG2			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Agricultural	0	0	21.34	94.14	2%	28	46	59	67	66.17	66.17
	Total Area	115.48										66.17
Area for UTRG3			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	0	4.27	0	72%	21	41	55	63	85.96	2.12
	Agricultural	0	2.31	116.29	50.5	2%	28	46	59	67	61.95	60.42
	Total Area	173.37										62.54
Area for UTRG4			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	0	42.98	0	85%	21	41	55	63	91.55	27.77
	Residential	0	0	0.93	0	38%	21	41	55	63	71.34	0.47
	Industry	0	0	52.36	0	72%	21	41	55	63	85.96	31.76
	Agricultural	0	0	45.43	0	2%	28	46	59	67	59.78	19.17
	Total Area	141.7										79.17
Area for UTRG5			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	48	17.28	18.3	85%	21	41	55	63	90.61	37.08
	Residential	0	28.19	2.89	2.43	38%	21	41	55	63	64.40	10.57
	Industry	0	1.81	24.19	0	72%	21	41	55	63	85.69	10.91
	Agricultural	0	12.61	45.51	0	2%	28	46	59	67	57.02	16.22
	Roads	0	3.04	0	0	98%	94	94	94	94	97.92	1.46
	Total Area	204.25										76.23

Area for UTRG6			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	0	22.9	0	72%	21	41	55	63	85.96	51.00
	Commercial	0	0	4.67	0	85%	21	41	55	63	91.55	11.08
	Agricultural	0	0	11.03	0	2%	28	46	59	67	59.78	17.08
	Total Area	38.6										79.16
Area for UTRG7			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	1.3	21.23	0	72%	21	41	55	63	85.73	9.67
	Commercial	0	9.07	11.59	0	85%	21	41	55	63	90.63	9.38
	Residential	0	33.71	0	0	38%	21	41	55	63	62.66	10.58
	Agricultural	0	24.01	96.45	0	2%	28	46	59	67	57.24	34.53
	Roads	0	2.32	0	0	98%	94	94	94	94	97.92	1.14
	Total Area	199.68										65.30
Area for UTRG8			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	16.12	18.41	0	85%	21	41	55	63	90.57	17.62
	Public (Airport)	0	19.79	0	0	20%	21	41	55	63	52.40	5.84
	Industry	0	0	0.55	0	72%	21	41	55	63	85.96	0.27
	Agricultural	0	0	65.87	0	2%	28	46	59	67	59.78	22.19
	Park	0	16.21	31.41	0	5%	46	60	70	76	68.17	18.29
	Roads	0	8.41	0.71	0	98%	94	94	94	94	97.92	5.03
	Total Area	177.48										69.24
Area for UTRG9			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	0	17.48	0	85%	21	41	55	63	91.55	18.11
	Agricultural	0	0	62.76	0	2%	28	46	59	67	59.78	42.46
	Park	0	4.03	4.1	0	5%	46	60	70	76	66.69	6.14
	Total Area	88.37										66.70
Area for UTRG10			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public (Airport)	0	23.53	7.1	0	20%	21	41	55	63	55.00	13.92
	Public (School)	0	0	7.35	0	20%	21	41	55	63	63.60	3.86
	Commercial	0	0	2.03	0	85%	21	41	55	63	91.55	1.54
	Residential	0	0	47.98	0	38%	21	41	55	63	71.34	28.28
	Agricultural	0	0	25.85	0	2%	28	46	59	67	59.78	12.77
	Roads	0	5.29	1.91	0	98%	94	94	94	94	97.92	5.82
	Total Area	121.04										66.19

Area for UTRG11			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	22.56	14.76	0	38%	21	41	55	63	66.09	21.05
	Agricultural	0	6.75	73.13	0	2%	28	46	59	67	58.70	40.01
	Total Area	117.2										61.06
Area for UTRG12			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	20.71	69.73	0	38%	21	41	55	63	69.35	46.00
	Commercial	0	15.62	4.41	0	85%	21	41	55	63	89.91	13.21
	Public (Airport)	0	19.45	0.72	0	20%	21	41	55	63	52.80	7.81
	Park	0	0	0.94	0	5%	46	60	70	76	71.40	0.49
	Agricultural	0	0	0.56	0	2%	28	46	59	67	59.78	0.25
	Roads	0	2.93	1.29	0	98%	94	94	94	94	97.92	3.03
	Total Area	136.36										70.78
Area for UTRG13			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	0	8.03	0.16	85%	21	41	55	63	91.57	4.89
	Residential	0	0	103.52	8.02	38%	21	41	55	63	71.70	52.18
	Public (School)	0	0	0.95	9.9	20%	21	41	55	63	69.44	4.92
	Agricultural	0	0	14.32	3.69	2%	28	46	59	67	61.39	7.21
	Roads	0	0	3.39	1.29	98%	94	94	94	94	97.92	2.99
	Total Area	153.27										72.19
Area for UTRG14			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	0	92.5	6.3	38%	21	41	55	63	71.66	43.11
	Commercial	0	0	20.68	0	85%	21	41	55	63	91.55	11.53
	Public (School)	0	0	0.6	2.81	20%	21	41	55	63	68.87	1.43
	Agricultural	0	0	26.47	6.96	2%	28	46	59	67	61.41	12.50
	Roads	0	0	5.98	1.93	98%	94	94	94	94	97.92	4.72
	Total Area	164.23										73.28
Area for UTRG15			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	0	69.98	5.99	38%	21	41	55	63	71.73	42.65
	Agricultural	0	0	26.6	25.19	2%	28	46	59	67	63.59	25.78
	Total Area	127.76										68.43

EXISTING AMC1

Area for ARROYO1			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public (Golf)	0	15.09	0	0	20%	21	41	55	63	52.40	10.17
	Public (School)	0	2.04	0	0	20%	21	41	55	63	52.40	1.37
	Public	0	31.24	0	0	85%	21	41	55	63	89.45	35.94
	Commercial	0	24.21	0	0	85%	21	41	55	63	89.45	27.85
	Industry	0	5.17	0	0	72%	21	41	55	63	82.04	5.46
	Total Area	77.75										80.79
Area for ARROYO2			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	19.19	0	0	85%	21	41	55	63	89.45	13.90
	Public (School)	0	4.65	0	0	20%	21	41	55	63	52.40	1.97
	Commercial	0	51.8	0	0	85%	21	41	55	63	89.45	37.51
	Industry	0	1.92	0	0	72%	21	41	55	63	82.04	1.28
	Residential	0	39.6	0	0	38%	21	41	55	63	62.66	20.09
	Roads	0	6.37	0	0	98%	94	94	94	94	97.92	5.05
	Total Area	123.53										79.79
Area for ARROYO3			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	19.14	0	0	72%	21	41	55	63	82.04	8.63
	Commercial	0	18.24	8.49	0	85%	21	41	55	63	90.12	13.24
	Residential	0	77.38	37.9	0	38%	21	41	55	63	65.51	41.50
	Public	0	5.11	2.75	0	85%	21	41	55	63	90.18	3.89
	Roads	0	11.44	1.55	0	98%	94	94	94	94	97.92	6.99
	Total Area	182										74.24
Area for ARROYO4			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	109.86	11.96	0	38%	21	41	55	63	63.51	48.21
	Industry	0	26.93	0	0	72%	21	41	55	63	82.04	13.77
	Commercial	0	7.21	0	0	85%	21	41	55	63	89.45	4.02
	Public	0	1.88	0	0	85%	21	41	55	63	89.45	1.05
	Roads	0	2.65	0	0	98%	94	94	94	94	97.92	1.62
	Total Area	160.49										68.66

Area for TRIB1-1			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	35.06	1.11	0	72%	21	41	55	63	82.16	26.89
	Public	0	11.75	1.52	0	85%	21	41	55	63	89.69	10.77
	Commercial	0	2.73	0	0	85%	21	41	55	63	89.45	2.21
	Residential	0	40.36	15.28	0	38%	21	41	55	63	65.04	32.75
	Roads	0	2.7	0	0	98%	94	94	94	94	97.92	2.39
	Total Area	110.51										75.01
Area for TRIB1-2			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	0.73	0.63	0	85%	21	41	55	63	90.42	1.11
	Residential	0	81.75	13.9	0	38%	21	41	55	63	63.92	55.30
	Commercial	0	9.16	1.26	0	85%	21	41	55	63	89.70	8.45
	Roads	0	3.14	0	0	98%	94	94	94	94	97.92	2.78
	Total Area	110.57										67.64
Area for TRIB1-3			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	14.76	18.71	0	85%	21	41	55	63	90.62	15.75
	Public (School)	0	4.88	2.25	0	20%	21	41	55	63	55.93	2.07
	Residential	0	48.8	36.76	0	38%	21	41	55	63	66.39	29.49
	Commercial	0	16.4	47.54	0	85%	21	41	55	63	91.01	30.21
	Industry	0	0	0.54	0	72%	21	41	55	63	85.96	0.24
	Roads	0	1.97	0	0	98%	94	94	94	94	97.92	1.00
	Total Area	192.61										78.76

Area for TRIB2-1			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	3.78	0	0	72%	21	41	55	63	82.04	19.44
	Residential	0	12.17	0	0	38%	21	41	55	63	62.66	47.81
	Total Area	15.95										67.25

Area for TRIB2-2			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	57.4	13.72	0	38%	21	41	55	63	64.33	30.02
	Industry	0	3.81	0	0	72%	21	41	55	63	82.04	2.05
	Public	0	7.53	0	0	85%	21	41	55	63	89.45	4.42
	Public (School)	0	30	0	0	20%	21	41	55	63	52.40	10.31
	Commercial	0	7.16	0	0	85%	21	41	55	63	89.45	4.20
	Agricultural	0	32.79	0	0	2%	28	46	59	67	47.04	10.12
	Total Area	152.41										61.13

Area for TRIB2-3			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	10.75	0	0	85%	21	41	55	63	89.45	10.23
	Public (School)	0	7.96	2.02	0	20%	21	41	55	63	54.67	5.81
	Residential	0	48.86	0	0	38%	21	41	55	63	62.66	32.58
	Commercial	0	0.44	0	0	85%	21	41	55	63	89.45	0.42
	Public (Cemetery)	0	15.35	0	0	20%	46	60	70	76	67.60	11.04
	Agricultural	0	8.6	0	0	2%	28	46	59	67	47.04	4.30
	Total Area	93.98										64.38

Area for TRIB2-4			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public (School)	0	16.76	15.34	0	20%	21	41	55	63	57.75	29.16
	Residential	0	25.98	4.06	0	38%	21	41	55	63	63.83	30.16
	Public (Cemetery)	0	1.44	0	0	20%	46	60	70	76	67.60	1.53
	Total Area	63.58										60.85

Area for TRIB2-5			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public (School)	0	0.48	0	0	20%	21	41	55	63	52.40	0.14
	Residential	0	30.56	10.1	0	38%	21	41	55	63	64.82	14.78
	Commercial	0	0	8.78	0	85%	21	41	55	63	91.55	4.51
	Public (Cemetery)	0	46.98	0	0	20%	46	60	70	76	67.60	17.81
	Agricultural	0	41.49	39.94	0	2%	28	46	59	67	53.29	24.33
	Total Area	178.33										61.57

Area for TRIB2-6			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	7.84	26.93	0	85%	21	41	55	63	91.08	20.70
	Residential	0	46.2	69.03	0	38%	21	41	55	63	67.86	51.12
	Public	0	1.73	1.23	0	85%	21	41	55	63	90.32	1.75
	Total Area	152.96										73.57
Area for TRIB2-7			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	1.43	23.79	0	85%	21	41	55	63	91.43	55.85
	Agricultural	0	0	16.07	0	2%	28	46	59	67	59.78	23.27
	Total Area	41.29										79.11

Area for TRIB3-1			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public (School)	0	26.96	3.42	0	20%	21	41	55	63	53.66	14.96
	Commercial	0	1.21	1.72	0	85%	21	41	55	63	90.68	2.44
	Residential	0	42.69	30.49	0	38%	21	41	55	63	66.28	44.52
	Public (Cemetery)	0	2.45	0	0	20%	46	60	70	76	67.60	1.52
	Total Area	108.94										63.44
Area for TRIB3-2			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	14.26	15.33	0	85%	21	41	55	63	90.54	14.17
	Public	0	3.82	0	0	85%	21	41	55	63	89.45	1.81
	Public (School)	0	16.84	32.23	0	20%	21	41	55	63	59.76	15.51
	Residential	0	41.24	65.32	0	38%	21	41	55	63	67.98	38.32
	Total Area	189.04										69.81
Area for TRIB3-3			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	0.22	0	0	85%	21	41	55	63	89.45	0.15
	Commercial	0	37.22	0	0	85%	21	41	55	63	89.45	25.64
	Residential	0	92.42	0	0	38%	21	41	55	63	62.66	44.59
	Total Area	129.86										70.38

Appendix B
Future AMC 1
Sub-watershed Work Sheets

FutAMC1

use Table:
Curve Number LookUp Table

	Soil Type Curve Numbers			
AMC1	21	41	55	63
AMC1	21	41	55	63
AMCII	38	61	74	80
AMCIII	65	75	85	90

CN for Impervious Area 98

		Areas in each Soil Group					Soil Type Curve Numbers					
Area for Trib TSC03		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	0	36.21	4.87	38.00%	21	41	55	63	71.93	49.20
	Commercial	0	0	5.28	7.15	85.00%	21	41	55	63	92.24	19.09
	Roads	0	0	4.78	1.77	98.00%	94	94	94	94	97.92	10.68
	Total Area	60.06										78.97
		Areas in each Soil Group					Soil Type Curve Numbers					
Area for Trib TSC02		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industrial	0	0	6.08	0	72.00%	21	41	55	63	85.96	4.09
	Commercial	0	0	41.88	0	85.00%	21	41	55	63	91.55	30.04
	Public (other)	0	0	6.98	0	85.00%	21	41	55	63	91.55	5.01
	Residential	0	0.05	60.03	0	38.00%	21	41	55	63	71.33	33.58
	Roads	0	0.26	12.35	0	98.00%	94	94	94	94	97.92	9.67
	Total Area	127.63										82.40
		Areas in each Soil Group					Soil Type Curve Numbers					
Area for Trib TSC03		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	0	4.81	0	85.00%	21	41	55	63	91.55	2.42
	Residential	0	1.99	144.92	0	38.00%	21	41	55	63	71.22	57.51
	Agricultural	0	0	30.21	0	2.00%	28	46	59	67	59.78	9.93
	Total Area	181.93										69.86

Area for UTRG1			Areas in each Soil Group					Soil Type Curve Numbers		
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D
	Commercial	0	0	16.05	1.07	85.00%	21	41	55	63
	Industry	0	0	0.25	0	72.00%	21	41	55	63
	Residential	0	0	30.35	86.35	38.00%	21	41	55	63
	Total Area	134.07								
Area for UTRG2			Areas in each Soil Group					Soil Type Curve Numbers		
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D
	Commercial	0	0	13.95	5.64	85.00%	21	41	55	63
	Residential	0	0	7.39	88.5	38.00%	21	41	55	63
	Total Area	115.48								
Area for UTRG3			Areas in each Soil Group					Soil Type Curve Numbers		
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D
	Commercial	0	0	23.45	0.52	85.00%	21	41	55	63
	Industry	0	0	4.27	0	72.00%	21	41	55	63
	Residential	0	2.31	92.84	49.98	38.00%	21	41	55	63
	Total Area	173.37								
Area for UTRG4			Areas in each Soil Group					Soil Type Curve Numbers		
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D
	Commercial	0	0	42.98	0	85.00%	21	41	55	63
	Residential	0	0	46.36	0	38.00%	21	41	55	63
	Industry	0	0	52.36	0	72.00%	21	41	55	63
	Total Area	141.7								
Area for UTRG5			Areas in each Soil Group					Soil Type Curve Numbers		
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D
	Commercial	0	48	20.06	18.3	85.00%	21	41	55	63
	Residential	0	40.8	45.62	2.43	38.00%	21	41	55	63
	Industry	0	1.81	24.19	0	72.00%	21	41	55	63
	Roads	0	3.04	0	0	98.00%	94	94	94	94
	Total Area	204.25								

Area for UTRG6			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	0	22.9	0	72.00%	21	41	55	63	85.96	51.00
	Commercial	0	0	4.67	0	85.00%	21	41	55	63	91.55	11.08
	Residential	0	0	11.03	0	38.00%	21	41	55	63	71.34	20.39
	Total Area	38.6										82.46
Area for UTRG7			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	1.3	21.23	0	72.00%	21	41	55	63	85.73	9.67
	Commercial	0	12.66	29.32	0	85.00%	21	41	55	63	90.92	19.11
	Residential	0	54.13	78.72	0	38.00%	21	41	55	63	67.80	45.11
	Roads	0	2.32	0	0	98.00%	94	94	94	94	97.92	1.14
	Total Area	199.68										75.04
Area for UTRG8			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	16.12	18.41	0	85.00%	21	41	55	63	90.57	17.62
	Public (Airport)	0	19.79	0	0	20.00%	21	41	55	63	52.40	5.84
	Industry	0	0	0.55	0	72.00%	21	41	55	63	85.96	0.27
	Residential	0	0	65.87	0	38.00%	21	41	55	63	71.34	26.48
	Park	0	16.21	31.41	0	5.00%	46	60	70	76	68.17	18.29
	Roads	0	8.41	0.71	0	98.00%	94	94	94	94	97.92	5.03
	Total Area	177.48										73.53
Area for UTRG9			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	0	17.48	0	85.00%	21	41	55	63	91.55	18.11
	Residential	0	0	62.76	0	38.00%	21	41	55	63	71.34	50.67
	Park	0	4.03	4.1	0	5.00%	46	60	70	76	66.69	6.14
	Total Area	88.37										74.91
Area for UTRG10			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public (Airport)	0	23.53	7.1	0	20.00%	21	41	55	63	55.00	13.92
	Public (School)	0	0	7.35	0	20.00%	21	41	55	63	63.60	3.86
	Commercial	0	0	2.03	0	85.00%	21	41	55	63	91.55	1.54
	Residential	0	0	73.83	0	38.00%	21	41	55	63	71.34	43.51
	Roads	0	5.29	1.91	0	98.00%	94	94	94	94	97.92	5.82
	Total Area	121.04										68.65

Area for UTRG11			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	29.31	87.89	0	38.00%	21	41	55	63	69.17	69.17
	Total Area	117.2										69.17
Area for UTRG12			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	20.71	70.29	0	38.00%	21	41	55	63	69.36	46.29
	Commercial	0	15.62	4.41	0	85.00%	21	41	55	63	89.91	13.21
	Public (Airport)	0	19.45	0.72	0	20.00%	21	41	55	63	52.80	7.81
	Park	0	0	0.94	0	5.00%	46	60	70	76	71.40	0.49
	Roads	0	2.93	1.29	0	98.00%	94	94	94	94	97.92	3.03
	Total Area	136.36										70.83
Area for UTRG13			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	0	8.03	0.16	85.00%	21	41	55	63	91.57	4.89
	Residential	0	0	117.84	11.71	38.00%	21	41	55	63	71.79	60.68
	Public (School)	0	0	0.95	9.9	20.00%	21	41	55	63	69.44	4.92
	Roads	0	0	3.39	1.29	98.00%	94	94	94	94	97.92	2.99
	Total Area	153.27										73.48
Area for UTRG14			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	0	118.97	13.26	38.00%	21	41	55	63	71.84	57.84
	Commercial	0	0	20.68	0	85.00%	21	41	55	63	91.55	11.53
	Public (School)	0	0	0.6	2.81	20.00%	21	41	55	63	68.87	1.43
	Roads	0	0	5.98	1.93	98.00%	94	94	94	94	97.92	4.72
	Total Area	164.23										75.51
Area for UTRG15			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	0	96.58	31.18	38.00%	21	41	55	63	72.55	72.55
	Total Area	127.76										72.55

Area for ARROYO1			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public (Golf)	0	15.09	0	0	20.00%	21	41	55	63	52.40	10.17
	Public (School)	0	2.04	0	0	20.00%	21	41	55	63	52.40	1.37
	Public	0	31.24	0	0	85.00%	21	41	55	63	89.45	35.94
	Commercial	0	24.21	0	0	85.00%	21	41	55	63	89.45	27.85
	Industry	0	5.17	0	0	72.00%	21	41	55	63	82.04	5.46
	Total Area	77.75										80.79
Area for ARROYO2			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	19.19	0	0	85.00%	21	41	55	63	89.45	13.90
	Public (School)	0	4.65	0	0	20.00%	21	41	55	63	52.40	1.97
	Commercial	0	51.8	0	0	85.00%	21	41	55	63	89.45	37.51
	Industry	0	1.92	0	0	72.00%	21	41	55	63	82.04	1.28
	Residential	0	39.6	0	0	38.00%	21	41	55	63	62.66	20.09
	Roads	0	6.37	0	0	98.00%	94	94	94	94	97.92	5.05
	Total Area	123.53										79.79
Area for ARROYO3			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	19.14	0	0	72.00%	21	41	55	63	82.04	8.63
	Commercial	0	18.24	8.49	0	85.00%	21	41	55	63	90.12	13.24
	Residential	0	77.38	37.9	0	38.00%	21	41	55	63	65.51	41.50
	Public	0	5.11	2.75	0	85.00%	21	41	55	63	90.18	3.89
	Roads	0	11.44	1.55	0	98.00%	94	94	94	94	97.92	6.99
	Total Area	182										74.24
Area for ARROYO4			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	109.86	11.96	0	38.00%	21	41	55	63	63.51	48.21
	Industry	0	26.93	0	0	72.00%	21	41	55	63	82.04	13.77
	Commercial	0	7.21	0	0	85.00%	21	41	55	63	89.45	4.02
	Public	0	1.88	0	0	85.00%	21	41	55	63	89.45	1.05
	Roads	0	2.65	0	0	98.00%	94	94	94	94	97.92	1.62
	Total Area	160.49										68.66

Area for TRIB1-1			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	35.06	1.11	0	72.00%	21	41	55	63	82.16	26.89
	Public	0	11.75	1.52	0	85.00%	21	41	55	63	89.69	10.77
	Commercial	0	2.73	0	0	85.00%	21	41	55	63	89.45	2.21
	Residential	0	40.36	15.28	0	38.00%	21	41	55	63	65.04	32.75
	Roads	0	2.7	0	0	98.00%	94	94	94	94	97.92	2.39
	Total Area	110.51										75.01
Area for TRIB1-2			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	0.73	0.63	0	85.00%	21	41	55	63	90.42	1.11
	Residential	0	81.75	13.9	0	38.00%	21	41	55	63	63.92	55.30
	Commercial	0	9.16	1.26	0	85.00%	21	41	55	63	89.70	8.45
	Roads	0	3.14	0	0	98.00%	94	94	94	94	97.92	2.78
	Total Area	110.57										67.64
Area for TRIB1-3			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	14.76	18.71	0	85.00%	21	41	55	63	90.62	15.75
	Public (School)	0	4.88	2.25	0	20.00%	21	41	55	63	55.93	2.07
	Residential	0	48.8	36.76	0	38.00%	21	41	55	63	66.39	29.49
	Commercial	0	16.4	47.54	0	85.00%	21	41	55	63	91.01	30.21
	Industry	0	0	0.54	0	72.00%	21	41	55	63	85.96	0.24
	Roads	0	1.97	0	0	98.00%	94	94	94	94	97.92	1.00
	Total Area	192.61										78.76

Area for TRIB2-1			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	3.78	0	0	72.00%	21	41	55	63	82.04	19.44
	Residential	0	12.17	0	0	38.00%	21	41	55	63	62.66	47.81
	Total Area	15.95										67.25
Area for TRIB2-2			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	90.19	13.72	0	38.00%	21	41	55	63	63.81	43.50
	Industry	0	3.81	0	0	72.00%	21	41	55	63	82.04	2.05
	Public	0	7.53	0	0	85.00%	21	41	55	63	89.45	4.42
	Public (School)	0	30	0	0	20.00%	21	41	55	63	52.40	10.31
	Commercial	0	7.16	0	0	85.00%	21	41	55	63	89.45	4.20
	Total Area	152.41										64.49
Area for TRIB2-3			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	10.75	0	0	85.00%	21	41	55	63	89.45	10.23
	Public (School)	0	7.96	2.02	0	20.00%	21	41	55	63	54.67	5.81
	Residential	0	57.46	0	0	38.00%	21	41	55	63	62.66	38.31
	Commercial	0	0.44	0	0	85.00%	21	41	55	63	89.45	0.42
	Public (Cemetery)	0	15.35	0	0	20.00%	46	60	70	76	67.60	11.04
	Total Area	93.98										65.81
Area for TRIB2-4			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public (School)	0	16.76	15.34	0	20.00%	21	41	55	63	57.75	29.16
	Residential	0	25.98	4.06	0	38.00%	21	41	55	63	63.83	30.16
	Public (Cemetery)	0	1.44	0	0	20.00%	46	60	70	76	67.60	1.53
	Total Area	63.58										60.85
Area for TRIB2-5			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public (School)	0	0.48	0	0	20.00%	21	41	55	63	52.40	0.14
	Residential	0	72.05	42.13	0	38.00%	21	41	55	63	65.86	42.17
	Commercial	0	0	16.69	0	85.00%	21	41	55	63	91.55	8.57
	Public (Cemetery)	0	46.98	0	0	20.00%	46	60	70	76	67.60	17.81
	Total Area	178.33										68.69

Area for TRIB2-6			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	7.84	26.93	0	85.00%	21	41	55	63	91.08	20.70
	Residential	0	46.2	69.03	0	38.00%	21	41	55	63	67.86	51.12
	Public	0	1.73	1.23	0	85.00%	21	41	55	63	90.32	1.75
	Total Area	152.96										73.57
Area for TRIB2-7			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	1.43	23.79	0	85.00%	21	41	55	63	91.43	55.85
	Residential	0	0	16.07	0	38.00%	21	41	55	63	71.34	27.77
	Total Area	41.29										83.61

Area for TRIB3-1			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public (School)	0	26.96	3.42	0	20.00%	21	41	55	63	53.66	14.96
	Commercial	0	1.21	1.72	0	85.00%	21	41	55	63	90.68	2.44
	Residential	0	42.69	30.49	0	38.00%	21	41	55	63	66.28	44.52
	Public (Cemetery)	0	2.45	0	0	20.00%	46	60	70	76	67.60	1.52
	Total Area	108.94										63.44
Area for TRIB3-2			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	14.26	15.33	0	85.00%	21	41	55	63	90.54	14.17
	Public	0	3.82	0	0	85.00%	21	41	55	63	89.45	1.81
	Public (School)	0	16.84	32.23	0	20.00%	21	41	55	63	59.76	15.51
	Residential	0	41.24	65.32	0	38.00%	21	41	55	63	67.98	38.32
	Total Area	189.04										69.81
Area for TRIB3-3			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	0.22	0	0	85.00%	21	41	55	63	89.45	0.15
	Commercial	0	37.22	0	0	85.00%	21	41	55	63	89.45	25.64
	Residential	0	92.42	0	0	38.00%	21	41	55	63	62.66	44.59
	Total Area	129.86										70.38

Appendix B
Existing AMC 2
Sub-watershed Work Sheets

use Table:
Curve Number LookUp Table

	Soil Type Curve Numbers			
AMCII	38	61	74	80
AMC1	21	41	55	63
AMCII	38	61	74	80
AMCIII	65	75	85	90

CN for Impervious Area 98

			Areas in each Soil Group				Soil Type Curve Numbers					
Area for Trib TSC03		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	0	36.21	4.87	38.00%	38	61	74	80	83.56	57.15
	Commercial	0	0	5.28	7.15	85.00%	38	61	74	80	94.92	19.64
	Roads	0	0	4.78	1.77	98.00%	98	98	98	98	98.00	10.69
	Total Area	60.06										87.49
			Areas in each Soil Group				Soil Type Curve Numbers					
Area for Trib TSC02		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industrial	0	0	6.08	0	72.00%	38	61	74	80	91.28	4.35
	Commercial	0	0	41.88	0	85.00%	38	61	74	80	94.40	30.98
	Public (other)	0	0	6.98	0	85.00%	38	61	74	80	94.40	5.16
	Residential	0	0.05	60.03	0	38.00%	38	61	74	80	83.11	39.12
	Roads	0	0.26	12.35	0	98.00%	98	98	98	98	98.00	9.68
	Total Area	127.63										89.29
Area for Trib TSC03			Areas in each Soil Group				Soil Type Curve Numbers					
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	0	4.81	0	85.00%	38	61	74	80	94.40	2.50
	Agricultural	0	1.99	175.13	0	2.00%	47	66	77	83	77.30	75.26
	Total Area	181.93										77.75

Area for UTRG1			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	0	16.05	1.07	85.00%	38	61	74	80	94.46	12.06
	Industry	0	0	0.25	0	72.00%	38	61	74	80	91.28	0.17
	Agricultural	0	0	30.35	86.35	2.00%	47	66	77	83	81.77	71.18
	Total Area	134.07										83.41
Area for UTRG2			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Agricultural	0	0	21.34	94.14	2.00%	47	66	77	83	82.21	82.21
	Total Area	115.48										82.21
Area for UTRG3			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	0	4.27	0	72.00%	38	61	74	80	91.28	2.25
	Agricultural	0	2.31	116.29	50.5	2.00%	47	66	77	83	79.03	77.08
	Total Area	173.37										79.33
Area for UTRG4			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	0	42.98	0	85.00%	38	61	74	80	94.40	28.63
	Residential	0	0	0.93	0	38.00%	38	61	74	80	83.12	0.55
	Industry	0	0	52.36	0	72.00%	38	61	74	80	91.28	33.73
	Agricultural	0	0	45.43	0	2.00%	47	66	77	83	77.42	24.82
	Total Area	141.7										87.73
Area for UTRG5			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	48	17.28	18.3	85.00%	38	61	74	80	93.48	38.25
	Residential	0	28.19	2.89	2.43	38.00%	38	61	74	80	76.61	12.57
	Industry	0	1.81	24.19	0	72.00%	38	61	74	80	91.03	11.59
	Agricultural	0	12.61	45.51	0	2.00%	47	66	77	83	75.08	21.36
	Roads	0	3.04	0	0	98.00%	98	98	98	98	98.00	1.46
	Total Area	204.25										85.23

Area for UTRG6			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	0	22.9	0	72.00%	38	61	74	80	91.28	54.15
	Commercial	0	0	4.67	0	85.00%	38	61	74	80	94.40	11.42
	Agricultural	0	0	11.03	0	2.00%	47	66	77	83	77.42	22.12
	Total Area	38.6										87.70
Area for UTRG7			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	1.3	21.23	0	72.00%	38	61	74	80	91.07	10.28
	Commercial	0	9.07	11.59	0	85.00%	38	61	74	80	93.54	9.68
	Residential	0	33.71	0	0	38.00%	38	61	74	80	75.06	12.67
	Agricultural	0	24.01	96.45	0	2.00%	47	66	77	83	75.27	45.41
	Roads	0	2.32	0	0	98.00%	98	98	98	98	98.00	1.14
	Total Area	199.68										79.17
Area for UTRG8			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	16.12	18.41	0	85.00%	38	61	74	80	93.49	18.19
	Public (Airport)	0	19.79	0	0	20.00%	38	61	74	80	68.40	7.63
	Industry	0	0	0.55	0	72.00%	38	61	74	80	91.28	0.28
	Agricultural	0	0	65.87	0	2.00%	47	66	77	83	77.42	28.73
	Park	0	16.21	31.41	0	5.00%	66	78	85	89	83.39	22.37
	Roads	0	8.41	0.71	0	98.00%	98	98	98	98	98.00	5.04
	Total Area	177.48										82.24
Area for UTRG9			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	0	17.48	0	85.00%	38	61	74	80	94.40	18.67
	Agricultural	0	0	62.76	0	2.00%	47	66	77	83	77.42	54.98
	Park	0	4.03	4.1	0	5.00%	66	78	85	89	82.35	7.58
	Total Area	88.37										81.23
Area for UTRG10			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public (Airport)	0	23.53	7.1	0	20.00%	38	61	74	80	70.81	17.92
	Public (School)	0	0	7.35	0	20.00%	38	61	74	80	78.80	4.79
	Commercial	0	0	2.03	0	85.00%	38	61	74	80	94.40	1.58
	Residential	0	0	47.98	0	38.00%	38	61	74	80	83.12	32.95
	Agricultural	0	0	25.85	0	2.00%	47	66	77	83	77.42	16.53
	Roads	0	5.29	1.91	0	98.00%	98	98	98	98	98.00	5.83
	Total Area	121.04										79.60

Area for UTRG11			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	22.56	14.76	0	38.00%	38	61	74	80	78.25	24.92
	Agricultural	0	6.75	73.13	0	2.00%	47	66	77	83	76.51	52.15
	Total Area	117.2										77.06
Area for UTRG12			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	20.71	69.73	0	38.00%	38	61	74	80	81.27	53.90
	Commercial	0	15.62	4.41	0	85.00%	38	61	74	80	92.88	13.64
	Public (Airport)	0	19.45	0.72	0	20.00%	38	61	74	80	68.77	10.17
	Park	0	0	0.94	0	5.00%	66	78	85	89	85.65	0.59
	Agricultural	0	0	0.56	0	2.00%	47	66	77	83	77.42	0.32
	Roads	0	2.93	1.29	0	98.00%	98	98	98	98	98.00	3.03
	Total Area	136.36										81.66
Area for UTRG13			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	0	8.03	0.16	85.00%	38	61	74	80	94.42	5.05
	Residential	0	0	103.52	8.02	38.00%	38	61	74	80	83.39	60.68
	Public (School)	0	0	0.95	9.9	20.00%	38	61	74	80	83.18	5.89
	Agricultural	0	0	14.32	3.69	2.00%	47	66	77	83	78.62	9.24
	Roads	0	0	3.39	1.29	98.00%	98	98	98	98	98.00	2.99
	Total Area	153.27										83.85
Area for UTRG14			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	0	92.5	6.3	38.00%	38	61	74	80	83.36	50.15
	Commercial	0	0	20.68	0	85.00%	38	61	74	80	94.40	11.89
	Public (School)	0	0	0.6	2.81	20.00%	38	61	74	80	82.76	1.72
	Agricultural	0	0	26.47	6.96	2.00%	47	66	77	83	78.64	16.01
	Roads	0	0	5.98	1.93	98.00%	98	98	98	98	98.00	4.72
	Total Area	164.23										84.48
Area for UTRG15			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	0	69.98	5.99	38.00%	38	61	74	80	83.41	49.60
	Agricultural	0	0	26.6	25.19	2.00%	47	66	77	83	80.28	32.54
	Total Area	127.76										82.14

Area for ARROYO1			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public (Golf)	0	15.09	0	0	20.00%	38	61	74	80	68.40	13.28
	Public (School)	0	2.04	0	0	20.00%	38	61	74	80	68.40	1.79
	Public	0	31.24	0	0	85.00%	38	61	74	80	92.45	37.15
	Commercial	0	24.21	0	0	85.00%	38	61	74	80	92.45	28.79
	Industry	0	5.17	0	0	72.00%	38	61	74	80	87.64	5.83
	Total Area	77.75										86.83
Area for ARROYO2			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	19.19	0	0	85.00%	38	61	74	80	92.45	14.36
	Public (School)	0	4.65	0	0	20.00%	38	61	74	80	68.40	2.57
	Commercial	0	51.8	0	0	85.00%	38	61	74	80	92.45	38.77
	Industry	0	1.92	0	0	72.00%	38	61	74	80	87.64	1.36
	Residential	0	39.6	0	0	38.00%	38	61	74	80	75.06	24.06
	Roads	0	6.37	0	0	98.00%	98	98	98	98	98.00	5.05
	Total Area	123.53										86.18
Area for ARROYO3			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	19.14	0	0	72.00%	38	61	74	80	87.64	9.22
	Commercial	0	18.24	8.49	0	85.00%	38	61	74	80	93.07	13.67
	Residential	0	77.38	37.9	0	38.00%	38	61	74	80	77.71	49.22
	Public	0	5.11	2.75	0	85.00%	38	61	74	80	93.13	4.02
	Roads	0	11.44	1.55	0	98.00%	98	98	98	98	98.00	6.99
	Total Area	182										83.12
Area for ARROYO4			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	109.86	11.96	0	38.00%	38	61	74	80	75.85	57.57
	Industry	0	26.93	0	0	72.00%	38	61	74	80	87.64	14.71
	Commercial	0	7.21	0	0	85.00%	38	61	74	80	92.45	4.15
	Public	0	1.88	0	0	85.00%	38	61	74	80	92.45	1.08
	Roads	0	2.65	0	0	98.00%	98	98	98	98	98.00	1.62
	Total Area	160.49										79.14

Area for TRIB1-1			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	35.06	1.11	0	72.00%	38	61	74	80	87.75	28.72
	Public	0	11.75	1.52	0	85.00%	38	61	74	80	92.67	11.13
	Commercial	0	2.73	0	0	85.00%	38	61	74	80	92.45	2.28
	Residential	0	40.36	15.28	0	38.00%	38	61	74	80	77.27	38.91
	Roads	0	2.7	0	0	98.00%	98	98	98	98	98.00	2.39
	Total Area	110.51										83.43
Area for TRIB1-2			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	0.73	0.63	0	85.00%	38	61	74	80	93.35	1.15
	Residential	0	81.75	13.9	0	38.00%	38	61	74	80	76.23	65.94
	Commercial	0	9.16	1.26	0	85.00%	38	61	74	80	92.69	8.73
	Roads	0	3.14	0	0	98.00%	98	98	98	98	98.00	2.78
	Total Area	110.57										78.61
Area for TRIB1-3			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	14.76	18.71	0	85.00%	38	61	74	80	93.54	16.25
	Public (School)	0	4.88	2.25	0	20.00%	38	61	74	80	71.68	2.65
	Residential	0	48.8	36.76	0	38.00%	38	61	74	80	78.52	34.88
	Commercial	0	16.4	47.54	0	85.00%	38	61	74	80	93.90	31.17
	Industry	0	0	0.54	0	72.00%	38	61	74	80	91.28	0.26
	Roads	0	1.97	0	0	98.00%	98	98	98	98	98.00	1.00
	Total Area	192.61										86.22

Area for TRIB2-1			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	3.78	0	0	72.00%	38	61	74	80	87.64	20.77
	Residential	0	12.17	0	0	38.00%	38	61	74	80	75.06	57.27
	Total Area	15.95										78.04
Area for TRIB2-2			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	57.4	13.72	0	38.00%	38	61	74	80	76.61	35.75
	Industry	0	3.81	0	0	72.00%	38	61	74	80	87.64	2.19
	Public	0	7.53	0	0	85.00%	38	61	74	80	92.45	4.57
	Public (School)	0	30	0	0	20.00%	38	61	74	80	68.40	13.46
	Commercial	0	7.16	0	0	85.00%	38	61	74	80	92.45	4.34
	Agricultural	0	32.79	0	0	2.00%	47	66	77	83	66.64	14.34
	Total Area	152.41										74.65
Area for TRIB2-3			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	10.75	0	0	85.00%	38	61	74	80	92.45	10.57
	Public (School)	0	7.96	2.02	0	20.00%	38	61	74	80	70.51	7.49
	Residential	0	48.86	0	0	38.00%	38	61	74	80	75.06	39.02
	Commercial	0	0.44	0	0	85.00%	38	61	74	80	92.45	0.43
	Public (Cemetery)	0	15.35	0	0	20.00%	66	78	85	89	82.00	13.39
	Agricultural	0	8.6	0	0	2.00%	47	66	77	83	66.64	6.10
	Total Area	93.98										77.01
Area for TRIB2-4			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public (School)	0	16.76	15.34	0	20.00%	38	61	74	80	73.37	37.04
	Residential	0	25.98	4.06	0	38.00%	38	61	74	80	76.15	35.98
	Public (Cemetery)	0	1.44	0	0	20.00%	66	78	85	89	82.00	1.86
	Total Area	63.58										74.88
Area for TRIB2-5			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public (School)	0	0.48	0	0	20.00%	38	61	74	80	68.40	0.18
	Residential	0	30.56	10.1	0	38.00%	38	61	74	80	77.06	17.57
	Commercial	0	0	8.78	0	85.00%	38	61	74	80	94.40	4.65
	Public (Cemetery)	0	46.98	0	0	20.00%	66	78	85	89	82.00	21.60
	Agricultural	0	41.49	39.94	0	2.00%	47	66	77	83	71.93	32.84
	Total Area	178.33										76.85

Area for TRIB2-6			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	7.84	26.93	0	85.00%	38	61	74	80	93.96	21.36
	Residential	0	46.2	69.03	0	38.00%	38	61	74	80	79.89	60.18
	Public	0	1.73	1.23	0	85.00%	38	61	74	80	93.26	1.80
	Total Area	152.96										83.35

Area for TRIB2-7			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	1.43	23.79	0	85.00%	38	61	74	80	94.29	57.59
	Agricultural	0	0	16.07	0	2.00%	47	66	77	83	77.42	30.13
	Total Area	41.29										87.72

Area for TRIB3-1			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public (School)	0	26.96	3.42	0	20.00%	38	61	74	80	69.57	19.40
	Commercial	0	1.21	1.72	0	85.00%	38	61	74	80	93.59	2.52
	Residential	0	42.69	30.49	0	38.00%	38	61	74	80	78.42	52.68
	Public (Cemetery)	0	2.45	0	0	20.00%	66	78	85	89	82.00	1.84
	Total Area	108.94										76.44

Area for TRIB3-2			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	14.26	15.33	0	85.00%	38	61	74	80	93.46	14.63
	Public	0	3.82	0	0	85.00%	38	61	74	80	92.45	1.87
	Public (School)	0	16.84	32.23	0	20.00%	38	61	74	80	75.23	19.53
	Residential	0	41.24	65.32	0	38.00%	38	61	74	80	80.00	45.10
	Total Area	189.04										81.12

Area for TRIB3-3			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	0.22	0	0	85.00%	38	61	74	80	92.45	0.16
	Commercial	0	37.22	0	0	85.00%	38	61	74	80	92.45	26.50
	Residential	0	92.42	0	0	38.00%	38	61	74	80	75.06	53.42
	Total Area	129.86										80.07

Appendix B
Future AMC 2
Sub-watershed Work Sheets

use Table:
Curve Number LookUp Table

	Soil Type Curve Numbers			
AMCII	38	61	74	80
AMC1	21	41	55	63
AMCII	38	61	74	80
AMCIII	65	75	85	90

CN for Impervious Area 98

			Areas in each Soil Group					Soil Type Curve Numbers				
Area for Trib TSC03		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	0	36.21	4.87	38.00%	38	61	74	80	83.56	57.15
	Commercial	0	0	5.28	7.15	85.00%	38	61	74	80	94.92	19.64
	Roads	0	0	4.78	1.77	98.00%	98	98	98	98	98.00	10.69
	Total Area	60.06										87.49
			Areas in each Soil Group					Soil Type Curve Numbers				
Area for Trib TSC02		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industrial	0	0	6.08	0	72.00%	38	61	74	80	91.28	4.35
	Commercial	0	0	41.88	0	85.00%	38	61	74	80	94.40	30.98
	Public (other)	0	0	6.98	0	85.00%	38	61	74	80	94.40	5.16
	Residential	0	0.05	60.03	0	38.00%	38	61	74	80	83.11	39.12
	Roads	0	0.26	12.35	0	98.00%	98	98	98	98	98.00	9.68
	Total Area	127.63										89.29
			Areas in each Soil Group					Soil Type Curve Numbers				
Area for Trib TSC03		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	0	4.81	0	85.00%	38	61	74	80	94.40	2.50
	Residential	0	1.99	144.92	0	38.00%	38	61	74	80	83.01	67.03
	Agricultural	0	0	30.21	0	2.00%	47	66	77	83	77.42	12.86
	Total Area	181.93										82.38

Area for UTRG1			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	0	16.05	1.07	85.00%	38	61	74	80	94.46	12.06
	Industry	0	0	0.25	0	72.00%	38	61	74	80	91.28	0.17
	Residential	0	0	30.35	86.35	38.00%	38	61	74	80	85.87	74.75
	Total Area	134.07										86.98
Area for UTRG2			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	0	13.95	5.64	85.00%	38	61	74	80	94.66	16.06
	Residential	0	0	7.39	88.5	38.00%	38	61	74	80	86.55	71.87
	Total Area	115.48										87.93
Area for UTRG3			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	0	23.45	0.52	85.00%	38	61	74	80	94.42	13.05
	Industry	0	0	4.27	0	72.00%	38	61	74	80	91.28	2.25
	Residential	0	2.31	92.84	49.98	38.00%	38	61	74	80	84.27	70.55
	Total Area	173.37										85.85
Area for UTRG4			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	0	42.98	0	85.00%	38	61	74	80	94.40	28.63
	Residential	0	0	46.36	0	38.00%	38	61	74	80	83.12	27.19
	Industry	0	0	52.36	0	72.00%	38	61	74	80	91.28	33.73
	Total Area	141.7										89.56
Area for UTRG5			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	48	20.06	18.3	85.00%	38	61	74	80	93.51	39.54
	Residential	0	40.8	45.62	2.43	38.00%	38	61	74	80	79.52	34.59
	Industry	0	1.81	24.19	0	72.00%	38	61	74	80	91.03	11.59
	Roads	0	3.04	0	0	98.00%	98	98	98	98	98.00	1.46
	Total Area	204.25										87.17

Area for UTRG6			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	0	22.9	0	72.00%	38	61	74	80	91.28	54.15
	Commercial	0	0	4.67	0	85.00%	38	61	74	80	94.40	11.42
	Residential	0	0	11.03	0	38.00%	38	61	74	80	83.12	23.75
	Total Area	38.6										89.33
Area for UTRG7			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	1.3	21.23	0	72.00%	38	61	74	80	91.07	10.28
	Commercial	0	12.66	29.32	0	85.00%	38	61	74	80	93.81	19.72
	Residential	0	54.13	78.72	0	38.00%	38	61	74	80	79.84	53.12
	Roads	0	2.32	0	0	98.00%	98	98	98	98	98.00	1.14
	Total Area	199.68										84.25
Area for UTRG8			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	16.12	18.41	0	85.00%	38	61	74	80	93.49	18.19
	Public (Airport)	0	19.79	0	0	20.00%	38	61	74	80	68.40	7.63
	Industry	0	0	0.55	0	72.00%	38	61	74	80	91.28	0.28
	Residential	0	0	65.87	0	38.00%	38	61	74	80	83.12	30.85
	Park	0	16.21	31.41	0	5.00%	66	78	85	89	83.39	22.37
	Roads	0	8.41	0.71	0	98.00%	98	98	98	98	98.00	5.04
	Total Area	177.48										84.36
Area for UTRG9			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	0	17.48	0	85.00%	38	61	74	80	94.40	18.67
	Residential	0	0	62.76	0	38.00%	38	61	74	80	83.12	59.03
	Park	0	4.03	4.1	0	5.00%	66	78	85	89	82.35	7.58
	Total Area	88.37										85.28
Area for UTRG10			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public (Airport)	0	23.53	7.1	0	20.00%	38	61	74	80	70.81	17.92
	Public (School)	0	0	7.35	0	20.00%	38	61	74	80	78.80	4.79
	Commercial	0	0	2.03	0	85.00%	38	61	74	80	94.40	1.58
	Residential	0	0	73.83	0	38.00%	38	61	74	80	83.12	50.70
	Roads	0	5.29	1.91	0	98.00%	98	98	98	98	98.00	5.83
	Total Area	121.04										80.82

Area for UTRG11			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	29.31	87.89	0	38.00%	38	61	74	80	81.10	81.10
	Total Area	117.2										81.10
Area for UTRG12			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	20.71	70.29	0	38.00%	38	61	74	80	81.29	54.25
	Commercial	0	15.62	4.41	0	85.00%	38	61	74	80	92.88	13.64
	Public (Airport)	0	19.45	0.72	0	20.00%	38	61	74	80	68.77	10.17
	Park	0	0	0.94	0	5.00%	66	78	85	89	85.65	0.59
	Roads	0	2.93	1.29	0	98.00%	98	98	98	98	98.00	3.03
	Total Area	136.36										81.68
Area for UTRG13			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	0	8.03	0.16	85.00%	38	61	74	80	94.42	5.05
	Residential	0	0	117.84	11.71	38.00%	38	61	74	80	83.46	70.54
	Public (School)	0	0	0.95	9.9	20.00%	38	61	74	80	83.18	5.89
	Roads	0	0	3.39	1.29	98.00%	98	98	98	98	98.00	2.99
	Total Area	153.27										84.47
Area for UTRG14			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	0	118.97	13.26	38.00%	38	61	74	80	83.49	67.22
	Commercial	0	0	20.68	0	85.00%	38	61	74	80	94.40	11.89
	Public (School)	0	0	0.6	2.81	20.00%	38	61	74	80	82.76	1.72
	Roads	0	0	5.98	1.93	98.00%	98	98	98	98	98.00	4.72
	Total Area	164.23										85.55
Area for UTRG15			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	0	96.58	31.18	38.00%	38	61	74	80	84.03	84.03
	Total Area	127.76										84.03

Area for ARROYO1			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public (Golf)	0	15.09	0	0	20.00%	38	61	74	80	68.40	13.28
	Public (School)	0	2.04	0	0	20.00%	38	61	74	80	68.40	1.79
	Public	0	31.24	0	0	85.00%	38	61	74	80	92.45	37.15
	Commercial	0	24.21	0	0	85.00%	38	61	74	80	92.45	28.79
	Industry	0	5.17	0	0	72.00%	38	61	74	80	87.64	5.83
	Total Area	77.75										86.83
Area for ARROYO2			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	19.19	0	0	85.00%	38	61	74	80	92.45	14.36
	Public (School)	0	4.65	0	0	20.00%	38	61	74	80	68.40	2.57
	Commercial	0	51.8	0	0	85.00%	38	61	74	80	92.45	38.77
	Industry	0	1.92	0	0	72.00%	38	61	74	80	87.64	1.36
	Residential	0	39.6	0	0	38.00%	38	61	74	80	75.06	24.06
	Roads	0	6.37	0	0	98.00%	98	98	98	98	98.00	5.05
	Total Area	123.53										86.18
Area for ARROYO3			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	19.14	0	0	72.00%	38	61	74	80	87.64	9.22
	Commercial	0	18.24	8.49	0	85.00%	38	61	74	80	93.07	13.67
	Residential	0	77.38	37.9	0	38.00%	38	61	74	80	77.71	49.22
	Public	0	5.11	2.75	0	85.00%	38	61	74	80	93.13	4.02
	Roads	0	11.44	1.55	0	98.00%	98	98	98	98	98.00	6.99
	Total Area	182										83.12
Area for ARROYO4			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	109.86	11.96	0	38.00%	38	61	74	80	75.85	57.57
	Industry	0	26.93	0	0	72.00%	38	61	74	80	87.64	14.71
	Commercial	0	7.21	0	0	85.00%	38	61	74	80	92.45	4.15
	Public	0	1.88	0	0	85.00%	38	61	74	80	92.45	1.08
	Roads	0	2.65	0	0	98.00%	98	98	98	98	98.00	1.62
	Total Area	160.49										79.14

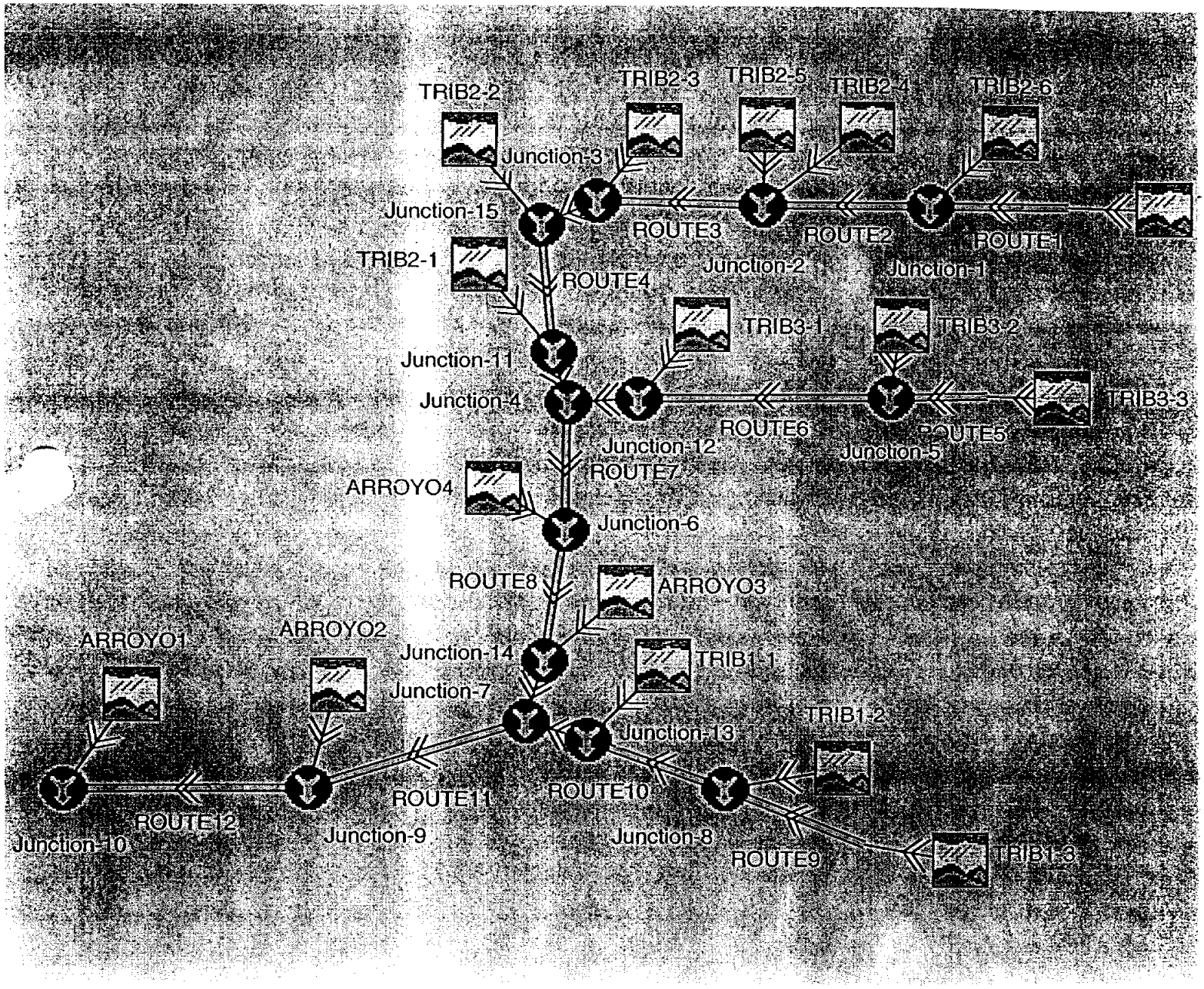
Area for TRIB1-1			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	35.06	1.11	0	72.00%	38	61	74	80	87.75	28.72
	Public	0	11.75	1.52	0	85.00%	38	61	74	80	92.67	11.13
	Commercial	0	2.73	0	0	85.00%	38	61	74	80	92.45	2.28
	Residential	0	40.36	15.28	0	38.00%	38	61	74	80	77.27	38.91
	Roads	0	2.7	0	0	98.00%	98	98	98	98	98.00	2.39
	Total Area	110.51										83.43
Area for TRIB1-2			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	0.73	0.63	0	85.00%	38	61	74	80	93.35	1.15
	Residential	0	81.75	13.9	0	38.00%	38	61	74	80	76.23	65.94
	Commercial	0	9.16	1.26	0	85.00%	38	61	74	80	92.69	8.73
	Roads	0	3.14	0	0	98.00%	98	98	98	98	98.00	2.78
	Total Area	110.57										78.61
Area for TRIB1-3			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	14.76	18.71	0	85.00%	38	61	74	80	93.54	16.25
	Public (School)	0	4.88	2.25	0	20.00%	38	61	74	80	71.68	2.65
	Residential	0	48.8	36.76	0	38.00%	38	61	74	80	78.52	34.88
	Commercial	0	16.4	47.54	0	85.00%	38	61	74	80	93.90	31.17
	Industry	0	0	0.54	0	72.00%	38	61	74	80	91.28	0.26
	Roads	0	1.97	0	0	98.00%	98	98	98	98	98.00	1.00
	Total Area	192.61										86.22

Area for TRIB2-1			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Industry	0	3.78	0	0	72.00%	38	61	74	80	87.64	20.77
	Residential	0	12.17	0	0	38.00%	38	61	74	80	75.06	57.27
	Total Area	15.95										78.04
Area for TRIB2-2			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Residential	0	90.19	13.72	0	38.00%	38	61	74	80	76.12	51.90
	Industry	0	3.81	0	0	72.00%	38	61	74	80	87.64	2.19
	Public	0	7.53	0	0	85.00%	38	61	74	80	92.45	4.57
	Public (School)	0	30	0	0	20.00%	38	61	74	80	68.40	13.46
	Commercial	0	7.16	0	0	85.00%	38	61	74	80	92.45	4.34
	Total Area	152.41										76.47
Area for TRIB2-3			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	10.75	0	0	85.00%	38	61	74	80	92.45	10.57
	Public (School)	0	7.96	2.02	0	20.00%	38	61	74	80	70.51	7.49
	Residential	0	57.46	0	0	38.00%	38	61	74	80	75.06	45.89
	Commercial	0	0.44	0	0	85.00%	38	61	74	80	92.45	0.43
	Public (Cemetery)	0	15.35	0	0	20.00%	66	78	85	89	82.00	13.39
	Total Area	93.98										77.78
Area for TRIB2-4			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public (School)	0	16.76	15.34	0	20.00%	38	61	74	80	73.37	37.04
	Residential	0	25.98	4.06	0	38.00%	38	61	74	80	76.15	35.98
	Public (Cemetery)	0	1.44	0	0	20.00%	66	78	85	89	82.00	1.86
	Total Area	63.58										74.88
Area for TRIB2-5			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public (School)	0	0.48	0	0	20.00%	38	61	74	80	68.40	0.18
	Residential	0	72.05	42.13	0	38.00%	38	61	74	80	78.03	49.96
	Commercial	0	0	16.69	0	85.00%	38	61	74	80	94.40	8.83
	Public (Cemetery)	0	46.98	0	0	20.00%	66	78	85	89	82.00	21.60
	Total Area	178.33										80.58

Area for TRIB2-6			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	7.84	26.93	0	85.00%	38	61	74	80	93.96	21.36
	Residential	0	46.2	69.03	0	38.00%	38	61	74	80	79.89	60.18
	Public	0	1.73	1.23	0	85.00%	38	61	74	80	93.26	1.80
	Total Area	152.96										83.35
Area for TRIB2-7			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	1.43	23.79	0	85.00%	38	61	74	80	94.29	57.59
	Residential	0	0	16.07	0	38.00%	38	61	74	80	83.12	32.35
	Total Area	41.29										89.94

Area for TRIB3-1			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public (School)	0	26.96	3.42	0	20.00%	38	61	74	80	69.57	19.40
	Commercial	0	1.21	1.72	0	85.00%	38	61	74	80	93.59	2.52
	Residential	0	42.69	30.49	0	38.00%	38	61	74	80	78.42	52.68
	Public (Cemetery)	0	2.45	0	0	20.00%	66	78	85	89	82.00	1.84
	Total Area	108.94										76.44
Area for TRIB3-2			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Commercial	0	14.26	15.33	0	85.00%	38	61	74	80	93.46	14.63
	Public	0	3.82	0	0	85.00%	38	61	74	80	92.45	1.87
	Public (School)	0	16.84	32.23	0	20.00%	38	61	74	80	75.23	19.53
	Residential	0	41.24	65.32	0	38.00%	38	61	74	80	80.00	45.10
	Total Area	189.04										81.12
Area for TRIB3-3			Areas in each Soil Group					Soil Type Curve Numbers				
		Area A	Area B	Area C	Area D	Per. Imp	A	B	C	D		
	Public	0	0.22	0	0	85.00%	38	61	74	80	92.45	0.16
	Commercial	0	37.22	0	0	85.00%	38	61	74	80	92.45	26.50
	Residential	0	92.42	0	0	38.00%	38	61	74	80	75.06	53.42
	Total Area	129.86										80.07

Appendix B
Main Arroyo, Tributary 1, Tributary 2, and Tributary 3
HEC-HMS Summary Printouts
Existing and Future Conditions
2, 5, 10, 25, 50, 100, and 500-year Storm Events


TRIB2-2
TRIB2-3
TRIB2-5
TRIB2-4
TRIB2-6
Junction-3
Junction-15
ROUTE3
ROUTE2
ROUTE1
TRIB2-1
ROUTE4
Junction-2
Junction-1
TRIB3-1
TRIB3-2
Junction-11
Junction-4
TRIB3-3
ROUTE6
ROUTE5
Junction-12
Junction-5
ROUTE7
ARROYO4
Junction-6
ROUTE8
ARROYO3
ARROYO1
ARROYO2
Junction-14
TRIB1-1
Junction-7
TRIB1-2
Junction-13
ROUTE11
ROUTE10
ROUTE12
Junction-10
Junction-9
Junction-8
ROUTE9
TRIB1-3

HMS * Summary of Results

Project : EPCREEK Run Name : EXISTING 2 YEAR

Start of Simulation : 10Jun98 1134 Basin Model : EPCREEK
End of Simulation : 11Jun98 1800 Precip Model : 2 YEAR STORM
Execution Time : 30Jun98 1906 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TRIB2-7	35.172	11 Jun 98 0006	3.9109	0.065
ROUTE1	34.990	11 Jun 98 0022	3.9106	0.065
TRIB2-6	79.643	11 Jun 98 0016	10.921	0.239
Junction-1	114.02	11 Jun 98 0018	14.832	0.304
ROUTE2	113.72	11 Jun 98 0036	14.837	0.304
TRIB2-5	33.933	11 Jun 98 0016	5.4125	0.279
TRIB2-4	13.224	10 Jun 98 2400	1.7601	0.099
Junction-2	148.82	11 Jun 98 0034	22.010	0.682
ROUTE3	148.38	11 Jun 98 0040	22.011	0.682
TRIB2-2	23.825	11 Jun 98 0024	4.2314	0.238
RIB2-3	23.102	11 Jun 98 0014	3.4075	0.147
Junction-3	186.56	11 Jun 98 0038	29.650	1.067
ROUTE4	186.35	11 Jun 98 0038	29.650	1.067
TRIB2-1	7.4900	10 Jun 98 2354	0.72823	0.025
Junction-11	188.82	11 Jun 98 0038	30.378	1.092
TRIB3-3	72.771	10 Jun 98 2356	7.2149	0.203
ROUTE5	72.694	10 Jun 98 2400	7.2184	0.203
TRIB3-2	86.395	11 Jun 98 0006	10.449	0.294
Junction-5	155.35	11 Jun 98 0002	17.668	0.497
ROUTE6	155.02	11 Jun 98 0004	17.669	0.497
TRIB3-1	30.719	10 Jun 98 2358	3.6276	0.170
Junction-12	183.57	11 Jun 98 0004	21.297	0.667
Junction-4	286.05	11 Jun 98 0034	51.675	1.759
ROUTE7	285.23	11 Jun 98 0038	51.677	1.759
ARROYO4	78.216	10 Jun 98 2400	8.3572	0.251
Junction-6	322.59	11 Jun 98 0012	60.034	2.010
ROUTE8	321.84	11 Jun 98 0016	60.031	2.010
ARROYO3	126.89	10 Jun 98 2400	12.978	0.284
nction-14	420.05	11 Jun 98 0012	73.008	2.294
TRIB1-3	177.62	10 Jun 98 2400	18.110	0.301

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
ROUTE9	177.37	11 Jun 98 0002	18.113	0.301
TRIB1-2	46.130	11 Jun 98 0004	5.3906	0.173
Junction-8	223.43	11 Jun 98 0002	23.504	0.474
ROUTE10	223.12	11 Jun 98 0004	23.502	0.474
TRIB1-1	98.392	10 Jun 98 2352	8.3393	0.173
Junction-13	298.11	11 Jun 98 0002	31.842	0.647
Junction-7	696.13	11 Jun 98 0008	104.85	2.941
ROUTE11	694.13	11 Jun 98 0010	104.85	2.941
ARROYO2	124.23	10 Jun 98 2400	12.217	0.193
Junction-9	802.36	11 Jun 98 0008	117.06	3.134
ROUTE12	798.90	11 Jun 98 0012	117.06	3.134
ARROYO1	57.625	11 Jun 98 0020	8.0540	0.121
Junction-10	854.11	11 Jun 98 0012	125.12	3.255

HMS * Summary of Results

Project : EPCREEK Run Name : EXISTING 5 YEAR

Start of Simulation : 10Jun98 1134 Basin Model : EPCREEK
End of Simulation : 11Jun98 1800 Precip Model : 5 YEAR STORM
Execution Time : 30Jun98 1906 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TRIB2-7	66.580	11 Jun 98 0004	7.8278	0.065
ROUTE1	66.312	11 Jun 98 0016	7.8279	0.065
TRIB2-6	170.95	11 Jun 98 0014	23.772	0.239
Junction-1	236.84	11 Jun 98 0014	31.600	0.304
ROUTE2	236.31	11 Jun 98 0028	31.603	0.304
TRIB2-5	114.04	11 Jun 98 0010	15.724	0.279
TRIB2-4	49.167	10 Jun 98 2356	5.2802	0.099
Junction-2	353.43	11 Jun 98 0024	52.607	0.682
ROUTE3	352.64	11 Jun 98 0028	52.607	0.682
RIB2-2	83.109	11 Jun 98 0016	12.694	0.238
IB2-3	69.774	11 Jun 98 0008	9.2716	0.147
Junction-3	483.20	11 Jun 98 0026	74.572	1.067
ROUTE4	482.39	11 Jun 98 0028	74.572	1.067
TRIB2-1	19.960	10 Jun 98 2352	1.8317	0.025
Junction-11	489.29	11 Jun 98 0028	76.404	1.092
TRIB3-3	173.51	10 Jun 98 2354	17.013	0.203
ROUTE5	172.94	10 Jun 98 2358	17.013	0.203
TRIB3-2	207.75	11 Jun 98 0004	24.639	0.294
Junction-5	372.52	10 Jun 98 2400	41.652	0.497
ROUTE6	371.91	11 Jun 98 0002	41.653	0.497
TRIB3-1	100.42	10 Jun 98 2354	10.167	0.170
Junction-12	461.78	10 Jun 98 2400	51.819	0.667
Junction-4	790.62	11 Jun 98 0008	128.22	1.759
ROUTE7	789.80	11 Jun 98 0012	128.22	1.759
ARROYO4	193.60	10 Jun 98 2358	20.125	0.251
Junction-6	942.08	11 Jun 98 0008	148.34	2.010
ROUTE8	940.64	11 Jun 98 0010	148.32	2.010
RROYO3	267.90	10 Jun 98 2358	28.248	0.284
nction-14	1166.2	11 Jun 98 0008	176.57	2.294
TRIB1-3	334.15	10 Jun 98 2400	36.249	0.301

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainag Area (sq mi)
ROUTE9	333.26	11 Jun 98 0002	36.249	0.301
TRIB1-2	118.73	10 Jun 98 2400	13.264	0.173
Junction-8	451.48	11 Jun 98 0002	49.513	0.474
ROUTE10	451.48	11 Jun 98 0002	49.513	0.474
TRIB1-1	200.49	10 Jun 98 2352	17.865	0.173
Junction-13	611.44	10 Jun 98 2400	67.379	0.647
Junction-7	1744.0	11 Jun 98 0004	243.95	2.941
ROUTE11	1741.5	11 Jun 98 0006	243.94	2.941
ARROYO2	228.47	10 Jun 98 2358	24.084	0.193
Junction-9	1949.0	11 Jun 98 0004	268.02	3.134
ROUTE12	1946.0	11 Jun 98 0008	267.99	3.134
ARROYO1	106.32	11 Jun 98 0018	15.641	0.121
Junction-10	2044.6	11 Jun 98 0008	283.63	3.255

HMS * Summary of Results

Project : EPCREEK Run Name : EXISTING 10 YEAR

Start of Simulation : 10Jun98 1134 Basin Model : EPCREEK
End of Simulation : 11Jun98 1800 Precip Model : 10 YEAR STORM
Execution Time : 30Jun98 1906 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TRIB2-7	88.424	11 Jun 98 0004	10.812	0.065
ROUTE1	88.080	11 Jun 98 0016	10.813	0.065
TRIB2-6	237.99	11 Jun 98 0014	33.911	0.239
Junction-1	325.78	11 Jun 98 0014	44.725	0.304
ROUTE2	324.91	11 Jun 98 0026	44.725	0.304
TRIB2-5	183.36	11 Jun 98 0008	24.789	0.279
TRIB2-4	80.112	10 Jun 98 2354	8.4092	0.099
Junction-2	516.05	11 Jun 98 0020	77.923	0.682
ROUTE3	514.45	11 Jun 98 0026	77.904	0.682
TRIB2-2	135.85	11 Jun 98 0014	20.216	0.238
TRIB2-3	108.58	11 Jun 98 0008	14.314	0.147
Junction-3	727.60	11 Jun 98 0022	112.43	1.067
ROUTE4	725.91	11 Jun 98 0024	112.42	1.067
TRIB2-1	29.415	10 Jun 98 2352	2.7535	0.025
Junction-11	736.82	11 Jun 98 0024	115.18	1.092
TRIB3-3	248.88	10 Jun 98 2354	24.993	0.203
ROUTE5	248.00	10 Jun 98 2356	24.993	0.203
TRIB3-2	299.28	11 Jun 98 0004	36.196	0.294
Junction-5	535.55	10 Jun 98 2400	61.189	0.497
ROUTE6	534.06	11 Jun 98 0002	61.189	0.497
TRIB3-1	157.54	10 Jun 98 2354	15.848	0.170
Junction-12	675.49	10 Jun 98 2400	77.037	0.667
Junction-4	1216.4	11 Jun 98 0006	192.22	1.759
ROUTE7	1213.9	11 Jun 98 0010	192.20	1.759
ARROYO4	281.22	10 Jun 98 2356	29.790	0.251
Junction-6	1446.1	11 Jun 98 0006	221.99	2.010
ROUTE8	1443.3	11 Jun 98 0008	221.96	2.010
ARROYO3	369.74	10 Jun 98 2358	40.296	0.284
Junction-14	1770.2	11 Jun 98 0006	262.25	2.294
TRIB1-3	442.41	10 Jun 98 2400	50.070	0.301

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
ROUTE9	441.61	10 Jun 98 2400	50.069	0.301
TRIB1-2	174.63	10 Jun 98 2400	19.785	0.173
Junction-8	616.24	10 Jun 98 2400	69.854	0.474
ROUTE10	615.45	11 Jun 98 0002	69.852	0.474
TRIB1-1	272.21	10 Jun 98 2352	25.328	0.173
Junction-13	838.63	10 Jun 98 2358	95.180	0.647
Junction-7	2568.9	11 Jun 98 0004	357.43	2.941
ROUTE11	2567.6	11 Jun 98 0004	357.42	2.941
ARROYO2	300.14	10 Jun 98 2358	33.070	0.193
Junction-9	2850.3	11 Jun 98 0004	390.49	3.134
ROUTE12	2839.9	11 Jun 98 0006	390.46	3.134
ARROYO1	140.16	11 Jun 98 0018	21.349	0.121
Junction-10	2967.1	11 Jun 98 0006	411.81	3.255

HMS * Summary of Results

Project : EPCREEK Run Name : EXISTING 25 YEAR

Start of Simulation : 10Jun98 1134 Basin Model : EPCREEK
End of Simulation : 11Jun98 1800 Precip Model : 25 YEAR STORM EVENT
Execution Time : 30Jun98 1907 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TRIB2-7	113.59	11 Jun 98 0002	14.394	0.065
ROUTE1	113.12	11 Jun 98 0014	14.395	0.065
TRIB2-6	316.83	11 Jun 98 0012	46.302	0.239
Junction-1	429.46	11 Jun 98 0014	60.697	0.304
ROUTE2	428.55	11 Jun 98 0024	60.695	0.304
TRIB2-5	270.44	11 Jun 98 0008	36.517	0.279
TRIB2-4	119.46	10 Jun 98 2354	12.480	0.099
Junction-2	715.78	11 Jun 98 0018	109.69	0.682
ROUTE3	708.42	11 Jun 98 0028	109.59	0.682
RIB2-2	202.72	11 Jun 98 0014	30.002	0.238
IB2-3	156.61	11 Jun 98 0006	20.763	0.147
Junction-3	1011.5	11 Jun 98 0022	160.36	1.067
ROUTE4	1010.6	11 Jun 98 0024	160.34	1.067
TRIB2-1	41.087	10 Jun 98 2350	3.9149	0.025
Junction-11	1025.2	11 Jun 98 0024	164.25	1.092
TRIB3-3	339.34	10 Jun 98 2354	34.911	0.203
ROUTE5	338.33	10 Jun 98 2356	34.915	0.203
TRIB3-2	409.52	11 Jun 98 0002	50.560	0.294
Junction-5	730.94	10 Jun 98 2358	85.475	0.497
ROUTE6	730.74	10 Jun 98 2400	85.473	0.497
TRIB3-1	228.67	10 Jun 98 2352	23.154	0.170
Junction-12	937.09	10 Jun 98 2358	108.63	0.667
Junction-4	1706.1	11 Jun 98 0006	272.88	1.759
ROUTE7	1704.5	11 Jun 98 0008	272.87	1.759
ARROYO4	386.99	10 Jun 98 2356	41.856	0.251
Junction-6	2027.7	11 Jun 98 0004	314.73	2.010
ROUTE8	2024.5	11 Jun 98 0006	314.70	2.010
RROYO3	489.69	10 Jun 98 2358	55.020	0.284
nction-14	2471.0	11 Jun 98 0004	369.72	2.294
TRIB1-3	567.52	10 Jun 98 2400	66.654	0.301

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
ROUTE9	567.48	10 Jun 98 2400	66.653	0.301
TRIB1-2	242.01	10 Jun 98 2358	27.962	0.173
Junction-8	809.43	10 Jun 98 2400	94.615	0.474
ROUTE10	806.96	11 Jun 98 0002	94.612	0.474
TRIB1-1	357.38	10 Jun 98 2350	34.415	0.173
Junction-13	1104.6	10 Jun 98 2358	129.03	0.647
Junction-7	3535.8	11 Jun 98 0002	498.75	2.941
ROUTE11	3527.2	11 Jun 98 0002	498.74	2.941
ARROYO2	382.91	10 Jun 98 2358	43.816	0.193
Junction-9	3898.1	11 Jun 98 0002	542.56	3.134
ROUTE12	3882.0	11 Jun 98 0006	542.54	3.134
ARROYO1	178.84	11 Jun 98 0016	28.155	0.121
Junction-10	4046.0	11 Jun 98 0006	570.70	3.255

HMS * Summary of Results

Project : EPCREEK Run Name : EXISTING 50 YEAR

Start of Simulation : 10Jun98 1134 Basin Model : EPCREEK
End of Simulation : 11Jun98 1800 Precip Model : 50 YEAR STORM EVENT
Execution Time : 30Jun98 1907 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TRIB2-7	132.68	11 Jun 98 0002	16.781	0.065
ROUTE1	132.17	11 Jun 98 0014	16.786	0.065
TRIB2-6	376.20	11 Jun 98 0012	54.655	0.239
Junction-1	507.47	11 Jun 98 0014	71.441	0.304
ROUTE2	506.21	11 Jun 98 0024	71.439	0.304
TRIB2-5	336.75	11 Jun 98 0006	44.709	0.279
TRIB2-4	149.14	10 Jun 98 2354	15.334	0.099
Junction-2	869.77	11 Jun 98 0016	131.48	0.682
ROUTE3	858.25	11 Jun 98 0026	131.31	0.682
RIB2-2	253.96	11 Jun 98 0012	36.862	0.238
IB2-3	193.06	11 Jun 98 0006	25.236	0.147
Junction-3	1232.3	11 Jun 98 0022	193.41	1.067
ROUTE4	1229.5	11 Jun 98 0026	193.38	1.067
TRIB2-1	49.844	10 Jun 98 2350	4.7128	0.025
Junction-11	1246.5	11 Jun 98 0024	198.10	1.092
TRIB3-3	407.10	10 Jun 98 2354	41.667	0.203
ROUTE5	406.29	10 Jun 98 2356	41.667	0.203
TRIB3-2	492.48	11 Jun 98 0002	60.346	0.294
Junction-5	879.08	10 Jun 98 2358	102.01	0.497
ROUTE6	878.12	10 Jun 98 2400	102.01	0.497
TRIB3-1	282.68	10 Jun 98 2352	28.239	0.170
Junction-12	1134.2	10 Jun 98 2358	130.25	0.667
Junction-4	2081.2	11 Jun 98 0006	328.35	1.759
ROUTE7	2078.7	11 Jun 98 0008	328.33	1.759
ARROYO4	466.31	10 Jun 98 2356	50.099	0.251
Junction-6	2463.5	11 Jun 98 0004	378.43	2.010
ROUTE8	2458.4	11 Jun 98 0006	378.40	2.010
ARROYO3	579.75	10 Jun 98 2358	64.946	0.284
nction-14	2982.3	11 Jun 98 0004	443.35	2.294
TRIB1-3	662.34	10 Jun 98 2358	77.709	0.301

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainag Area (sq mi)
ROUTE9	662.10	10 Jun 98 2400	77.707	0.301
TRIB1-2	293.14	10 Jun 98 2358	33.564	0.173
Junction-8	954.73	10 Jun 98 2400	111.27	0.474
ROUTE10	952.36	10 Jun 98 2400	111.27	0.474
TRIB1-1	421.38	10 Jun 98 2350	40.526	0.173
Junction-13	1305.3	10 Jun 98 2358	151.80	0.647
Junction-7	4233.2	11 Jun 98 0002	595.15	2.941
ROUTE11	4223.1	11 Jun 98 0002	595.12	2.941
ARROYO2	445.29	10 Jun 98 2358	50.965	0.193
Junction-9	4653.9	11 Jun 98 0002	646.09	3.134
ROUTE12	4634.7	11 Jun 98 0006	645.98	3.134
ARROYO1	208.07	11 Jun 98 0016	32.673	0.121
Junction-10	4826.3	11 Jun 98 0006	678.65	3.255

HMS * Summary of Results

Project : EPCREEK Run Name : EXISTING 100 YEAR

Start of Simulation : 10Jun98 1134 Basin Model : EPCREEK
End of Simulation : 11Jun98 1800 Precip Model : 100 YEAR STORM
Execution Time : 30Jun98 1907 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TRIB2-7	153.30	11 Jun 98 0002	19.845	0.065
ROUTE1	152.77	11 Jun 98 0014	19.843	0.065
TRIB2-6	442.54	11 Jun 98 0012	65.459	0.239
Junction-1	594.31	11 Jun 98 0012	85.302	0.304
ROUTE2	593.20	11 Jun 98 0022	85.300	0.304
TRIB2-5	415.06	11 Jun 98 0006	55.561	0.279
TRIB2-4	183.58	10 Jun 98 2354	19.123	0.099
Junction-2	1047.3	11 Jun 98 0016	159.98	0.682
ROUTE3	1030.9	11 Jun 98 0028	159.74	0.682
TRIB2-2	314.86	11 Jun 98 0012	45.972	0.238
TRIB2-3	235.38	11 Jun 98 0006	31.134	0.147
Junction-3	1473.9	11 Jun 98 0024	236.84	1.067
ROUTE4	1471.0	11 Jun 98 0026	236.81	1.067
TRIB2-1	59.663	10 Jun 98 2350	5.7581	0.025
Junction-11	1490.7	11 Jun 98 0026	242.57	1.092
TRIB3-3	482.23	10 Jun 98 2354	50.468	0.203
ROUTE5	480.67	10 Jun 98 2356	50.467	0.203
TRIB3-2	585.78	11 Jun 98 0002	73.091	0.294
Junction-5	1044.8	10 Jun 98 2358	123.56	0.497
ROUTE6	1042.6	10 Jun 98 2400	123.56	0.497
TRIB3-1	344.73	10 Jun 98 2352	34.958	0.170
Junction-12	1355.5	10 Jun 98 2358	158.51	0.667
Junction-4	2489.4	11 Jun 98 0004	401.08	1.759
ROUTE7	2484.9	11 Jun 98 0006	401.08	1.759
ARROYO4	555.04	10 Jun 98 2356	60.855	0.251
Junction-6	2964.6	11 Jun 98 0004	461.93	2.010
ROUTE8	2955.3	11 Jun 98 0006	461.87	2.010
ARROYO3	678.29	10 Jun 98 2358	77.784	0.284
Junction-14	3572.1	11 Jun 98 0004	539.66	2.294
TRIB1-3	764.20	10 Jun 98 2358	91.899	0.301

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainag Area (sq mi)
ROUTE9	763.79	10 Jun 98 2400	91.897	0.301
TRIB1-2	350.97	10 Jun 98 2358	40.889	0.173
Junction-8	1113.5	10 Jun 98 2400	132.79	0.474
ROUTE10	1111.5	10 Jun 98 2400	132.79	0.474
TRIB1-1	490.38	10 Jun 98 2350	48.418	0.173
Junction-13	1523.6	10 Jun 98 2358	181.20	0.647
Junction-7	5027.2	11 Jun 98 0002	720.86	2.941
ROUTE11	5015.3	11 Jun 98 0002	720.87	2.941
ARROYO2	511.71	10 Jun 98 2358	60.129	0.193
Junction-9	5509.9	11 Jun 98 0002	781.00	3.134
ROUTE12	5488.1	11 Jun 98 0004	780.87	3.134
ARROYO1	239.90	11 Jun 98 0016	38.457	0.121
Junction-10	5706.7	11 Jun 98 0006	819.33	3.255

HMS * Summary of Results

Project : EPCREEK Run Name : EXISTING 500 YEAR

Start of Simulation : 10Jun98 1134 Basin Model : EPCREEK
End of Simulation : 11Jun98 1800 Precip Model : 500 YEAR STORM
Execution Time : 30Jun98 1907 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TRIB2-7	193.21	11 Jun 98 0002	27.886	0.065
ROUTE1	192.12	11 Jun 98 0014	27.882	0.065
TRIB2-6	571.91	11 Jun 98 0012	94.100	0.239
Junction-1	763.89	11 Jun 98 0012	121.98	0.304
ROUTE2	761.82	11 Jun 98 0020	121.98	0.304
TRIB2-5	583.84	11 Jun 98 0004	85.324	0.279
TRIB2-4	262.64	10 Jun 98 2352	29.551	0.099
Junction-2	1406.2	11 Jun 98 0012	236.85	0.682
ROUTE3	1378.4	11 Jun 98 0032	236.60	0.682
TRIB2-2	446.52	11 Jun 98 0010	71.041	0.238
RIB2-3	325.98	11 Jun 98 0004	47.200	0.147
Junction-3	1941.5	11 Jun 98 0026	354.85	1.067
ROUTE4	1938.7	11 Jun 98 0028	354.82	1.067
TRIB2-1	81.651	10 Jun 98 2350	8.5799	0.025
Junction-11	1962.2	11 Jun 98 0028	363.40	1.092
TRIB3-3	643.88	10 Jun 98 2352	74.030	0.203
ROUTE5	641.74	10 Jun 98 2356	74.016	0.203
TRIB3-2	777.60	11 Jun 98 0002	107.22	0.294
Junction-5	1398.5	10 Jun 98 2358	181.23	0.497
ROUTE6	1393.5	10 Jun 98 2400	181.23	0.497
TRIB3-1	484.91	10 Jun 98 2352	53.322	0.170
Junction-12	1827.4	10 Jun 98 2356	234.55	0.667
Junction-4	3264.2	11 Jun 98 0002	597.95	1.759
ROUTE7	3254.0	11 Jun 98 0006	597.88	1.759
ARROYO4	744.37	10 Jun 98 2354	89.729	0.251
Junction-6	3897.3	11 Jun 98 0002	687.61	2.010
ROUTE8	3883.8	11 Jun 98 0004	687.52	2.010
ARROYO3	881.68	10 Jun 98 2356	111.82	0.284
unction-14	4698.0	11 Jun 98 0002	799.33	2.294
TRIB1-3	964.93	10 Jun 98 2358	129.13	0.301

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
ROUTE9	962.68	10 Jun 98 2400	129.13	0.301
TRIB1-2	473.58	10 Jun 98 2358	60.606	0.173
Junction-8	1433.6	10 Jun 98 2358	189.74	0.474
ROUTE10	1432.5	10 Jun 98 2400	189.73	0.474
TRIB1-1	638.04	10 Jun 98 2350	69.295	0.173
Junction-13	1971.2	10 Jun 98 2356	259.02	0.647
Junction-7	6596.0	10 Jun 98 2400	1058.4	2.941
ROUTE11	6581.7	11 Jun 98 0002	1058.3	2.941
ARROYO2	641.85	10 Jun 98 2356	84.130	0.193
Junction-9	7202.0	10 Jun 98 2400	1142.5	3.134
ROUTE12	7181.5	11 Jun 98 0004	1142.4	3.134
ARROYO1	298.47	11 Jun 98 0016	53.581	0.121
Junction-10	7451.8	11 Jun 98 0004	1195.9	3.255

HMS * Summary of Results

Project : EPCREEK Run Name : EPCRFUT 2 YR

Start of Simulation : 10Jun98 1134 Basin Model : EPCRFUT
End of Simulation : 11Jun98 1800 Precip Model : 2 YEAR STORM
Execution Time : 01Jul98 1848 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TRIB2-7	45.899	11 Jun 98 0004	5.0046	0.065
ROUTE1	45.612	11 Jun 98 0018	5.0038	0.065
TRIB2-6	78.642	11 Jun 98 0016	10.883	0.239
Junction-1	124.13	11 Jun 98 0018	15.887	0.304
ROUTE2	123.68	11 Jun 98 0034	15.890	0.304
TRIB2-5	69.682	11 Jun 98 0010	9.2524	0.279
TRIB2-4	12.940	10 Jun 98 2400	1.7509	0.099
Junction-2	181.09	11 Jun 98 0032	26.894	0.682
ROUTE3	180.78	11 Jun 98 0036	26.895	0.682
RIB2-2	33.680	11 Jun 98 0020	5.4912	0.238
RIB2-3	27.920	11 Jun 98 0012	3.9447	0.147
Junction-3	230.69	11 Jun 98 0034	36.330	1.067
ROUTE4	230.35	11 Jun 98 0036	36.331	1.067
TRIB2-1	7.3642	10 Jun 98 2354	0.72515	0.025
Junction-11	232.91	11 Jun 98 0036	37.056	1.092
TRIB3-3	71.663	10 Jun 98 2356	7.1869	0.203
ROUTE5	71.487	10 Jun 98 2400	7.1870	0.203
TRIB3-2	85.149	11 Jun 98 0006	10.409	0.294
Junction-5	153.01	11 Jun 98 0002	17.596	0.497
ROUTE6	152.68	11 Jun 98 0004	17.597	0.497
TRIB3-1	30.125	10 Jun 98 2358	3.6101	0.170
Junction-12	180.72	11 Jun 98 0004	21.207	0.667
Junction-4	336.11	11 Jun 98 0032	58.263	1.759
ROUTE7	335.27	11 Jun 98 0036	58.267	1.759
ARROYO4	77.019	10 Jun 98 2400	8.3238	0.251
Junction-6	374.90	11 Jun 98 0014	66.591	2.010
ROUTE8	374.16	11 Jun 98 0018	66.590	2.010
\RROYO3	125.15	10 Jun 98 2400	12.933	0.284
unction-14	465.84	11 Jun 98 0014	79.522	2.294
TRIB1-3	175.36	10 Jun 98 2400	18.055	0.301

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
ROUTE9	175.12	11 Jun 98 0002	18.058	0.301
TRIB1-2	45.419	11 Jun 98 0004	5.3684	0.173
Junction-8	220.46	11 Jun 98 0002	23.426	0.474
ROUTE10	220.16	11 Jun 98 0004	23.425	0.474
TRIB1-1	96.991	10 Jun 98 2352	8.3110	0.173
Junction-13	294.14	11 Jun 98 0002	31.736	0.647
Junction-7	728.29	11 Jun 98 0008	111.26	2.941
ROUTE11	727.61	11 Jun 98 0010	111.26	2.941
ARROYO2	122.65	10 Jun 98 2400	12.180	0.193
Junction-9	829.13	11 Jun 98 0010	123.44	3.134
ROUTE12	827.82	11 Jun 98 0012	123.44	3.134
ARROYO1	56.980	11 Jun 98 0020	8.0306	0.121
Junction-10	882.42	11 Jun 98 0012	131.47	3.255

HMS * Summary of Results

Project : EPCREEK Run Name : EPCRFUT 5 YR

Start of Simulation : 10Jun98 1134 Basin Model : EPCRFUT
End of Simulation : 11Jun98 1800 Precip Model : 5 YEAR STORM
Execution Time : 01Jul98 1848 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TRIB2-7	79.487	11 Jun 98 0004	9.3199	0.065
ROUTE1	79.185	11 Jun 98 0016	9.3225	0.065
TRIB2-6	170.95	11 Jun 98 0014	23.772	0.239
Junction-1	250.01	11 Jun 98 0014	33.095	0.304
ROUTE2	249.32	11 Jun 98 0028	33.095	0.304
TRIB2-5	176.00	11 Jun 98 0008	22.371	0.279
TRIB2-4	49.167	10 Jun 98 2356	5.2802	0.099
Junction-2	411.43	11 Jun 98 0022	60.746	0.682
ROUTE3	410.14	11 Jun 98 0026	60.743	0.682
TRIB2-2	102.75	11 Jun 98 0016	15.011	0.238
TRIB2-3	78.897	11 Jun 98 0008	10.237	0.147
Junction-3	566.86	11 Jun 98 0024	85.991	1.067
ROUTE4	565.93	11 Jun 98 0026	85.988	1.067
TRIB2-1	19.960	10 Jun 98 2352	1.8317	0.025
Junction-11	573.18	11 Jun 98 0026	87.820	1.092
TRIB3-3	173.51	10 Jun 98 2354	17.013	0.203
ROUTE5	172.94	10 Jun 98 2358	17.013	0.203
TRIB3-2	207.75	11 Jun 98 0004	24.639	0.294
Junction-5	372.52	10 Jun 98 2400	41.652	0.497
ROUTE6	371.91	11 Jun 98 0002	41.653	0.497
TRIB3-1	100.42	10 Jun 98 2354	10.167	0.170
Junction-12	461.78	10 Jun 98 2400	51.819	0.667
Junction-4	891.03	11 Jun 98 0008	139.64	1.759
ROUTE7	889.78	11 Jun 98 0012	139.63	1.759
ARROYO4	193.60	10 Jun 98 2358	20.125	0.251
Junction-6	1042.8	11 Jun 98 0008	159.76	2.010
ROUTE8	1040.5	11 Jun 98 0010	159.74	2.010
ARROYO3	267.90	10 Jun 98 2358	28.248	0.284
Junction-14	1264.7	11 Jun 98 0008	187.99	2.294
TRIB1-3	334.15	10 Jun 98 2400	36.249	0.301

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
ROUTE9	333.26	11 Jun 98 0002	36.249	0.301
TRIB1-2	118.73	10 Jun 98 2400	13.264	0.173
Junction-8	451.48	11 Jun 98 0002	49.513	0.474
ROUTE10	451.48	11 Jun 98 0002	49.513	0.474
TRIB1-1	200.49	10 Jun 98 2352	17.865	0.173
Junction-13	611.44	10 Jun 98 2400	67.379	0.647
Junction-7	1835.7	11 Jun 98 0006	255.37	2.941
ROUTE11	1835.4	11 Jun 98 0006	255.35	2.941
ARROYO2	228.47	10 Jun 98 2358	24.084	0.193
Junction-9	2042.6	11 Jun 98 0006	279.44	3.134
ROUTE12	2037.7	11 Jun 98 0008	279.41	3.134
ARROYO1	106.32	11 Jun 98 0018	15.641	0.121
Junction-10	2136.3	11 Jun 98 0008	295.05	3.255

HMS * Summary of Results

Project : EPCREEK Run Name : EPCRFUT 10 YR

Start of Simulation : 10Jun98 1134 Basin Model : EPCRFUT
End of Simulation : 11Jun98 1800 Precip Model : 10 YEAR STORM
Execution Time : 01Jul98 1848 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TRIB2-7	101.80	11 Jun 98 0002	12.500	0.065
ROUTE1	101.39	11 Jun 98 0014	12.500	0.065
TRIB2-6	237.99	11 Jun 98 0014	33.911	0.239
Junction-1	339.38	11 Jun 98 0014	46.411	0.304
ROUTE2	338.36	11 Jun 98 0026	46.410	0.304
TRIB2-5	256.93	11 Jun 98 0006	33.114	0.279
TRIB2-4	80.112	10 Jun 98 2354	8.4092	0.099
Junction-2	587.09	11 Jun 98 0018	87.933	0.682
ROUTE3	584.87	11 Jun 98 0024	87.908	0.682
RIB2-2	160.07	11 Jun 98 0014	23.175	0.238
RIB2-3	119.35	11 Jun 98 0006	15.530	0.147
Junction-3	832.23	11 Jun 98 0020	126.61	1.067
ROUTE4	830.51	11 Jun 98 0024	126.60	1.067
TRIB2-1	29.415	10 Jun 98 2352	2.7535	0.025
Junction-11	841.54	11 Jun 98 0022	129.35	1.092
TRIB3-3	248.88	10 Jun 98 2354	24.993	0.203
ROUTE5	248.00	10 Jun 98 2356	24.993	0.203
TRIB3-2	299.28	11 Jun 98 0004	36.196	0.294
Junction-5	535.55	10 Jun 98 2400	61.189	0.497
ROUTE6	534.06	11 Jun 98 0002	61.189	0.497
TRIB3-1	157.54	10 Jun 98 2354	15.848	0.170
Junction-12	675.49	10 Jun 98 2400	77.037	0.667
Junction-4	1322.4	11 Jun 98 0008	206.39	1.759
ROUTE7	1321.6	11 Jun 98 0010	206.37	1.759
ARROYO4	281.22	10 Jun 98 2356	29.790	0.251
Junction-6	1547.7	11 Jun 98 0006	236.16	2.010
ROUTE8	1544.4	11 Jun 98 0008	236.13	2.010
RROYO3	369.74	10 Jun 98 2358	40.296	0.284
unction-14	1868.0	11 Jun 98 0006	276.42	2.294
TRIB1-3	442.41	10 Jun 98 2400	50.070	0.301

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
ROUTE9	441.61	10 Jun 98 2400	50.069	0.301
TRIB1-2	174.63	10 Jun 98 2400	19.785	0.173
Junction-8	616.24	10 Jun 98 2400	69.854	0.474
ROUTE10	615.45	11 Jun 98 0002	69.852	0.474
TRIB1-1	272.21	10 Jun 98 2352	25.328	0.173
Junction-13	838.63	10 Jun 98 2358	95.180	0.647
Junction-7	2663.8	11 Jun 98 0004	371.60	2.941
ROUTE11	2661.4	11 Jun 98 0004	371.58	2.941
ARROYO2	300.14	10 Jun 98 2358	33.070	0.193
Junction-9	2944.1	11 Jun 98 0004	404.65	3.134
ROUTE12	2933.9	11 Jun 98 0006	404.65	3.134
ARROYO1	140.16	11 Jun 98 0018	21.349	0.121
Junction-10	3061.0	11 Jun 98 0006	426.00	3.255

HMS * Summary of Results

Project : EPCREEK Run Name : EPCRFUT 25 YR

Start of Simulation : 10Jun98 1134 Basin Model : EPCRFUT
End of Simulation : 11Jun98 1800 Precip Model : 25 YEAR STORM EVENT
Execution Time : 01Jul98 1848 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TRIB2-7	127.25	11 Jun 98 0002	16.256	0.065
ROUTE1	126.70	11 Jun 98 0014	16.257	0.065
TRIB2-6	316.83	11 Jun 98 0012	46.302	0.239
Junction-1	443.04	11 Jun 98 0014	62.559	0.304
ROUTE2	442.06	11 Jun 98 0024	62.555	0.304
TRIB2-5	354.65	11 Jun 98 0006	46.525	0.279
TRIB2-4	119.46	10 Jun 98 2354	12.480	0.099
Junction-2	798.69	11 Jun 98 0016	121.56	0.682
ROUTE3	788.95	11 Jun 98 0026	121.41	0.682
RIB2-2	231.07	11 Jun 98 0012	33.616	0.238
RIB2-3	169.11	11 Jun 98 0006	22.233	0.147
Junction-3	1125.6	11 Jun 98 0022	177.26	1.067
ROUTE4	1123.4	11 Jun 98 0024	177.24	1.067
TRIB2-1	41.087	10 Jun 98 2350	3.9149	0.025
Junction-11	1138.0	11 Jun 98 0024	181.15	1.092
TRIB3-3	339.34	10 Jun 98 2354	34.911	0.203
ROUTE5	338.33	10 Jun 98 2356	34.915	0.203
TRIB3-2	409.52	11 Jun 98 0002	50.560	0.294
Junction-5	730.94	10 Jun 98 2358	85.475	0.497
ROUTE6	730.74	10 Jun 98 2400	85.473	0.497
TRIB3-1	228.67	10 Jun 98 2352	23.154	0.170
Junction-12	937.09	10 Jun 98 2358	108.63	0.667
Junction-4	1825.5	11 Jun 98 0008	289.78	1.759
ROUTE7	1824.3	11 Jun 98 0010	289.78	1.759
ARROYO4	386.99	10 Jun 98 2356	41.856	0.251
Junction-6	2134.7	11 Jun 98 0006	331.64	2.010
ROUTE8	2131.6	11 Jun 98 0008	331.60	2.010
RROYO3	489.69	10 Jun 98 2358	55.020	0.284
unction-14	2568.2	11 Jun 98 0004	386.62	2.294
TRIB1-3	567.52	10 Jun 98 2400	66.654	0.301

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
ROUTE9	567.48	10 Jun 98 2400	66.653	0.301
TRIB1-2	242.01	10 Jun 98 2358	27.962	0.173
Junction-8	809.43	10 Jun 98 2400	94.615	0.474
ROUTE10	806.96	11 Jun 98 0002	94.612	0.474
TRIB1-1	357.38	10 Jun 98 2350	34.415	0.173
Junction-13	1104.6	10 Jun 98 2358	129.03	0.647
Junction-7	3625.1	11 Jun 98 0002	515.65	2.941
ROUTE11	3618.2	11 Jun 98 0004	515.66	2.941
ARROYO2	382.91	10 Jun 98 2358	43.816	0.193
Junction-9	3984.6	11 Jun 98 0002	559.47	3.134
ROUTE12	3972.4	11 Jun 98 0006	559.40	3.134
ARROYO1	178.84	11 Jun 98 0016	28.155	0.121
Junction-10	4136.4	11 Jun 98 0006	587.56	3.255

HMS * Summary of Results

Project : EPCREEK Run Name : EPCRFUT 50 YR

Start of Simulation : 10Jun98 1134 Basin Model : EPCRFUT
End of Simulation : 11Jun98 1800 Precip Model : 50 YEAR STORM EVENT
Execution Time : 01Jul98 1848 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TRIB2-7	146.57	11 Jun 98 0002	18.736	0.065
ROUTE1	145.97	11 Jun 98 0014	18.736	0.065
TRIB2-6	376.20	11 Jun 98 0012	54.655	0.239
Junction-1	521.47	11 Jun 98 0012	73.391	0.304
ROUTE2	520.08	11 Jun 98 0022	73.388	0.304
TRIB2-5	428.15	11 Jun 98 0006	55.687	0.279
TRIB2-4	149.14	10 Jun 98 2354	15.334	0.099
Junction-2	960.02	11 Jun 98 0016	144.41	0.682
ROUTE3	944.83	11 Jun 98 0028	144.16	0.682
RIB2-2	285.02	11 Jun 98 0012	40.859	0.238
RIB2-3	206.62	11 Jun 98 0006	26.852	0.147
Junction-3	1340.0	11 Jun 98 0024	211.87	1.067
ROUTE4	1337.8	11 Jun 98 0026	211.84	1.067
TRIB2-1	49.844	10 Jun 98 2350	4.7128	0.025
Junction-11	1354.3	11 Jun 98 0026	216.55	1.092
TRIB3-3	407.10	10 Jun 98 2354	41.667	0.203
ROUTE5	406.29	10 Jun 98 2356	41.667	0.203
TRIB3-2	492.48	11 Jun 98 0002	60.346	0.294
Junction-5	879.08	10 Jun 98 2358	102.01	0.497
ROUTE6	878.12	10 Jun 98 2400	102.01	0.497
TRIB3-1	282.68	10 Jun 98 2352	28.239	0.170
Junction-12	1134.2	10 Jun 98 2358	130.25	0.667
Junction-4	2196.6	11 Jun 98 0004	346.81	1.759
ROUTE7	2192.7	11 Jun 98 0008	346.80	1.759
ARROYO4	466.31	10 Jun 98 2356	50.099	0.251
Junction-6	2580.9	11 Jun 98 0004	396.90	2.010
ROUTE8	2573.2	11 Jun 98 0008	396.86	2.010
RROYO3	579.75	10 Jun 98 2358	64.946	0.284
Junction-14	3091.3	11 Jun 98 0004	461.81	2.294
TRIB1-3	662.34	10 Jun 98 2358	77.709	0.301

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
ROUTE9	662.10	10 Jun 98 2400	77.707	0.301
TRIB1-2	293.14	10 Jun 98 2358	33.564	0.173
Junction-8	954.73	10 Jun 98 2400	111.27	0.474
ROUTE10	952.36	10 Jun 98 2400	111.27	0.474
TRIB1-1	421.38	10 Jun 98 2350	40.526	0.173
Junction-13	1305.3	10 Jun 98 2358	151.80	0.647
Junction-7	4332.3	11 Jun 98 0002	613.60	2.941
ROUTE11	4324.9	11 Jun 98 0004	613.57	2.941
ARROYO2	445.29	10 Jun 98 2358	50.965	0.193
Junction-9	4749.4	11 Jun 98 0002	664.53	3.134
ROUTE12	4735.0	11 Jun 98 0006	664.42	3.134
ARROYO1	208.07	11 Jun 98 0016	32.673	0.121
Junction-10	4926.5	11 Jun 98 0006	697.09	3.255

HMS * Summary of Results

Project : EPCREEK Run Name : EPCRFUT 100 YR

Start of Simulation : 10Jun98 1134 Basin Model : EPCRFUT
End of Simulation : 11Jun98 1800 Precip Model : 100 YEAR STORM
Execution Time : 01Jul98 1849 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TRIB2-7	166.96	11 Jun 98 0002	21.900	0.065
ROUTE1	166.26	11 Jun 98 0014	21.899	0.065
TRIB2-6	442.54	11 Jun 98 0012	65.459	0.239
Junction-1	608.23	11 Jun 98 0012	87.358	0.304
ROUTE2	606.84	11 Jun 98 0022	87.355	0.304
TRIB2-5	511.48	11 Jun 98 0006	67.643	0.279
TRIB2-4	183.58	10 Jun 98 2354	19.123	0.099
Junction-2	1144.8	11 Jun 98 0014	174.12	0.682
ROUTE3	1125.9	11 Jun 98 0028	173.88	0.682
RIB2-2	348.02	11 Jun 98 0012	50.407	0.238
RIB2-3	249.74	11 Jun 98 0006	32.917	0.147
Junction-3	1614.4	11 Jun 98 0022	257.21	1.067
ROUTE4	1610.8	11 Jun 98 0026	257.18	1.067
TRIB2-1	59.663	10 Jun 98 2350	5.7581	0.025
Junction-11	1630.6	11 Jun 98 0024	262.94	1.092
TRIB3-3	482.23	10 Jun 98 2354	50.468	0.203
ROUTE5	480.67	10 Jun 98 2356	50.467	0.203
TRIB3-2	585.78	11 Jun 98 0002	73.091	0.294
Junction-5	1044.8	10 Jun 98 2358	123.56	0.497
ROUTE6	1042.6	10 Jun 98 2400	123.56	0.497
TRIB3-1	344.73	10 Jun 98 2352	34.958	0.170
Junction-12	1355.5	10 Jun 98 2358	158.51	0.667
Junction-4	2576.8	11 Jun 98 0004	421.45	1.759
ROUTE7	2574.9	11 Jun 98 0006	421.45	1.759
ARROYO4	555.04	10 Jun 98 2356	60.855	0.251
Junction-6	3058.8	11 Jun 98 0002	482.31	2.010
ROUTE8	3049.3	11 Jun 98 0006	482.27	2.010
RROYO3	678.29	10 Jun 98 2358	77.784	0.284
Junction-14	3671.8	11 Jun 98 0004	560.05	2.294
TRIB1-3	764.20	10 Jun 98 2358	91.899	0.301

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
ROUTE9	763.79	10 Jun 98 2400	91.897	0.301
TRIB1-2	350.97	10 Jun 98 2358	40.889	0.173
Junction-8	1113.5	10 Jun 98 2400	132.79	0.474
ROUTE10	1111.5	10 Jun 98 2400	132.79	0.474
TRIB1-1	490.38	10 Jun 98 2350	48.418	0.173
Junction-13	1523.6	10 Jun 98 2358	181.20	0.647
Junction-7	5129.0	11 Jun 98 0002	741.25	2.941
ROUTE11	5116.2	11 Jun 98 0002	741.25	2.941
ARROYO2	511.71	10 Jun 98 2358	60.129	0.193
Junction-9	5610.9	11 Jun 98 0002	801.38	3.134
ROUTE12	5585.7	11 Jun 98 0006	801.34	3.134
ARROYO1	239.90	11 Jun 98 0016	38.457	0.121
Junction-10	5807.6	11 Jun 98 0006	839.79	3.255

HMS * Summary of Results

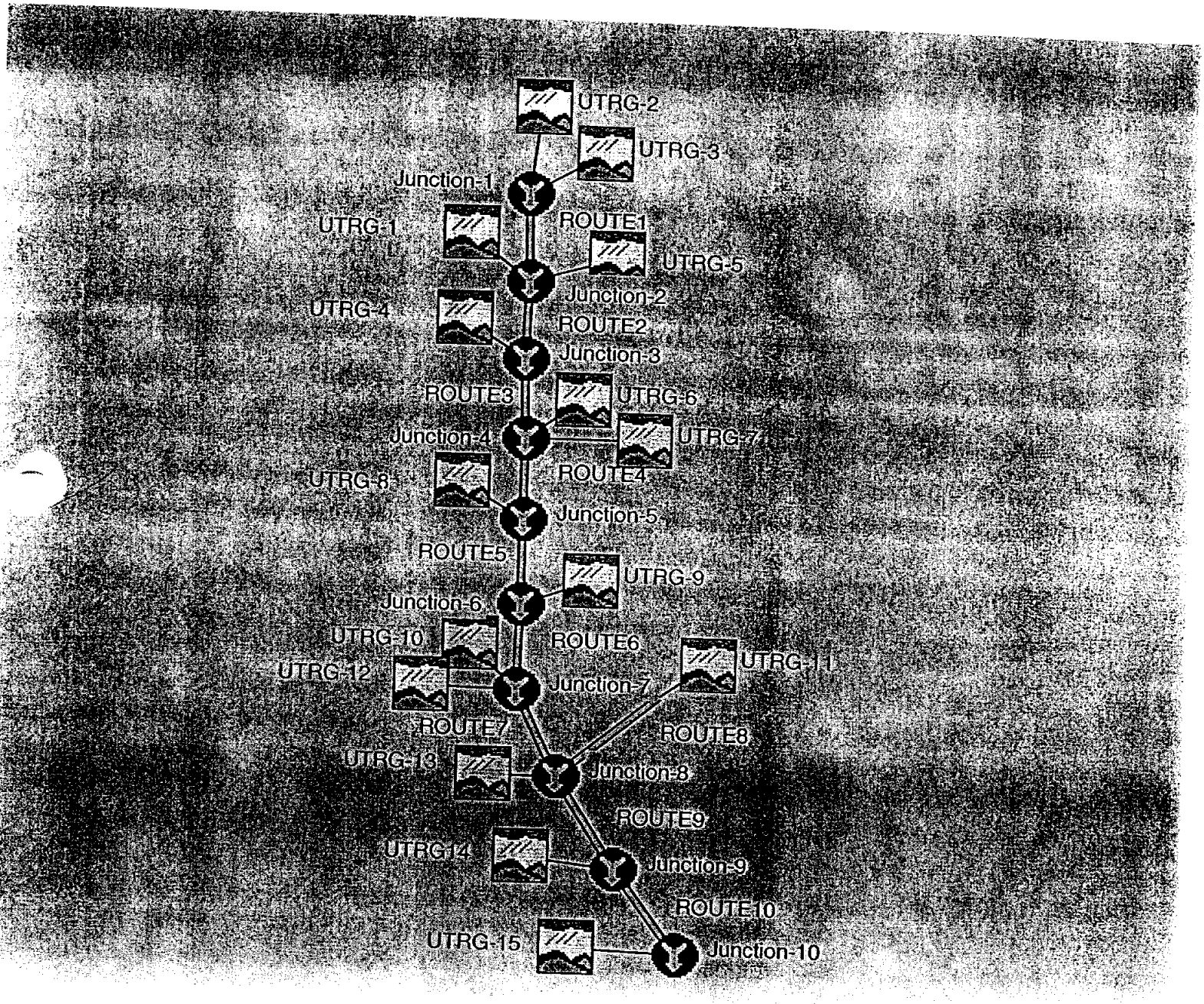
Project : EPCREEK Run Name : EPCRFUT 500 YR

Start of Simulation : 10Jun98 1134 Basin Model : EPCRFUT
End of Simulation : 11Jun98 1800 Precip Model : 500 YEAR STORM
Execution Time : 01Jul98 1849 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TRIB2-7	205.10	11 Jun 98 0002	30.134	0.065
ROUTE1	203.96	11 Jun 98 0012	30.129	0.065
TRIB2-6	571.91	11 Jun 98 0012	94.100	0.239
Junction-1	775.87	11 Jun 98 0012	124.23	0.304
ROUTE2	773.89	11 Jun 98 0020	124.22	0.304
TRIB2-5	683.85	11 Jun 98 0004	99.739	0.279
TRIB2-4	262.64	10 Jun 98 2352	29.551	0.099
Junction-2	1506.9	11 Jun 98 0012	253.51	0.682
ROUTE3	1486.1	11 Jun 98 0028	253.49	0.682
RIB2-2	481.61	11 Jun 98 0010	76.420	0.238
RIB2-3	341.00	11 Jun 98 0004	49.338	0.147
Junction-3	2127.2	11 Jun 98 0024	379.24	1.067
ROUTE4	2120.6	11 Jun 98 0026	379.21	1.067
TRIB2-1	81.651	10 Jun 98 2350	8.5799	0.025
Junction-11	2145.3	11 Jun 98 0026	387.79	1.092
TRIB3-3	643.88	10 Jun 98 2352	74.030	0.203
ROUTE5	641.74	10 Jun 98 2356	74.016	0.203
TRIB3-2	777.60	11 Jun 98 0002	107.22	0.294
Junction-5	1398.5	10 Jun 98 2358	181.23	0.497
ROUTE6	1393.5	10 Jun 98 2400	181.23	0.497
TRIB3-1	484.91	10 Jun 98 2352	53.322	0.170
Junction-12	1827.4	10 Jun 98 2356	234.55	0.667
Junction-4	3348.9	11 Jun 98 0002	622.34	1.759
ROUTE7	3338.4	11 Jun 98 0006	622.25	1.759
ARROYO4	744.37	10 Jun 98 2354	89.729	0.251
Junction-6	3963.3	11 Jun 98 0002	711.98	2.010
ROUTE8	3951.4	11 Jun 98 0006	711.88	2.010
ARROYO3	881.68	10 Jun 98 2356	111.82	0.284
unction-14	4756.1	11 Jun 98 0002	823.69	2.294
TRIB1-3	964.93	10 Jun 98 2358	129.13	0.301

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
ROUTE9	962.68	10 Jun 98 2400	129.13	0.301
TRIB1-2	473.58	10 Jun 98 2358	60.606	0.173
Junction-8	1433.6	10 Jun 98 2358	189.74	0.474
ROUTE10	1432.5	10 Jun 98 2400	189.73	0.474
TRIB1-1	638.04	10 Jun 98 2350	69.295	0.173
Junction-13	1971.2	10 Jun 98 2356	259.02	0.647
Junction-7	6651.9	10 Jun 98 2400	1082.7	2.941
ROUTE11	6638.9	11 Jun 98 0002	1082.7	2.941
ARROYO2	641.85	10 Jun 98 2356	84.130	0.193
Junction-9	7260.3	10 Jun 98 2400	1166.8	3.134
ROUTE12	7239.5	11 Jun 98 0004	1166.7	3.134
ARROYO1	298.47	11 Jun 98 0016	53.581	0.121
Junction-10	7509.8	11 Jun 98 0004	1220.3	3.255

Appendix B
Unnamed Tributary
HEC-HMS Summary Printouts
Existing and Future Conditions
2, 5, 10, 25, 50, 100, and 500-year Storm Events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UTRG-3
Junction-1
UTRG-1
ROUTE1
UTRG-5
Junction-2
UTRG-4
ROUTE2
Junction-3
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UTRG-6
UTRG-7
Junction-4
UTRG-8
ROUTE4
Junction-5
ROUTE5
UTRG-9
Junction-6
UTRG-10
ROUTE6
UTRG-11
UTRG-12
Junction-7
ROUTE7
ROUTE8
UTRG-13
Junction-8
ROUTE9
UTRG-14
Junction-9
ROUTE10
UTRG-15
Junction-10

HMS * Summary of Results

Project : UNMDTRIB Run Name : EXISTING 2 YEAR

Start of Simulation : 03Jun98 1100 Basin Model : UNMDTRIB
End of Simulation : 04Jun98 1200 Precip Model : 2 YEAR STORM
Execution Time : 01Jul98 1337 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG-2	36.550	03 Jun 98 2334	4.8500	0.180
UTRG-3	35.484	03 Jun 98 2346	5.7801	0.271
Junction-1	69.403	03 Jun 98 2340	10.630	0.451
ROUTE1	69.284	03 Jun 98 2344	10.631	0.451
UTRG-1	56.347	03 Jun 98 2334	6.9567	0.209
UTRG-5	157.12	03 Jun 98 2328	16.321	0.319
Junction-2	263.11	03 Jun 98 2332	33.908	0.979
ROUTE2	241.96	03 Jun 98 2348	33.641	0.979
UTRG-4	125.93	03 Jun 98 2328	13.293	0.221
unction-3	333.48	03 Jun 98 2342	46.934	1.200
OUTE3	324.76	03 Jun 98 2356	46.845	1.200
UTRG-6	42.703	03 Jun 98 2320	3.6091	0.06
UTRG-7	65.334	03 Jun 98 2326	7.7655	0.312
Junction-4	376.30	03 Jun 98 2354	58.220	1.572
ROUTE4	375.64	03 Jun 98 2358	58.212	1.572
UTRG-8	68.212	03 Jun 98 2338	9.2194	0.277
Junction-5	429.51	03 Jun 98 2356	67.431	1.849
ROUTE5	424.40	04 Jun 98 0004	67.283	1.849
UTRG-9	28.150	03 Jun 98 2340	4.0182	0.138
Junction-6	444.97	04 Jun 98 0004	71.301	1.987
ROUTE6	444.19	04 Jun 98 0008	71.267	1.987
UTRG-12	55.597	03 Jun 98 2346	8.0686	0.213
UTRG-10	30.813	03 Jun 98 2352	5.0908	0.189
Junction-7	513.97	04 Jun 98 0006	84.426	2.389
ROUTE7	510.47	04 Jun 98 0014	84.252	2.389
UTRG-11	22.109	03 Jun 98 2334	3.2526	0.183
ROUTE8	21.926	04 Jun 98 0008	3.2517	0.183
TRG-13	94.970	03 Jun 98 2324	9.6474	0.239
unction-8	561.86	04 Jun 98 0012	97.151	2.811
ROUTE9	558.40	04 Jun 98 0016	96.993	2.811

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG14	99.587	03 Jun 98 2330	11.041	0.257
Junction-9	594.78	04 Jun 98 0014	108.03	3.068
ROUTE10	588.55	04 Jun 98 0024	107.93	3.068
UTRG-15	46.818	03 Jun 98 2336	6.2297	0.20
Junction-10	609.61	04 Jun 98 0022	114.16	3.268

HMS * Summary of Results

Project : UNMDTRIB Run Name : EXISTING 5 YEAR

Start of Simulation : 03Jun98 1100 Basin Model : UNMDTRIB
End of Simulation : 04Jun98 1200 Precip Model : 5 YEAR STORM
Execution Time : 01Jul98 1337 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG-2	101.79	03 Jun 98 2330	12.531	0.180
UTRG-3	111.62	03 Jun 98 2340	16.199	0.271
Junction-1	208.22	03 Jun 98 2336	28.730	0.451
ROUTE1	207.66	03 Jun 98 2340	28.728	0.451
UTRG-1	140.20	03 Jun 98 2330	16.752	0.209
UTRG-5	316.57	03 Jun 98 2326	34.312	0.319
Junction-2	633.27	03 Jun 98 2330	79.792	0.979
ROUTE2	579.23	03 Jun 98 2346	79.413	0.979
UTRG-4	237.19	03 Jun 98 2328	26.606	0.221
Junction-3	755.40	03 Jun 98 2342	106.02	1.200
OUTE3	740.89	03 Jun 98 2352	105.98	1.200
UTRG-6	79.321	03 Jun 98 2318	7.2237	0.06
UTRG-7	192.51	03 Jun 98 2324	20.628	0.312
Junction-4	874.40	03 Jun 98 2348	133.83	1.572
ROUTE4	871.75	03 Jun 98 2354	133.81	1.572
UTRG-8	169.73	03 Jun 98 2336	22.201	0.277
Junction-5	1006.1	03 Jun 98 2352	156.01	1.849
ROUTE5	989.91	03 Jun 98 2400	155.70	1.849
UTRG-9	74.878	03 Jun 98 2336	10.107	0.138
Junction-6	1042.9	03 Jun 98 2400	165.81	1.987
ROUTE6	1039.7	04 Jun 98 0004	165.73	1.987
UTRG-12	130.19	03 Jun 98 2342	18.637	0.213
UTRG-10	85.084	03 Jun 98 2346	13.153	0.189
Junction-7	1213.3	04 Jun 98 0002	197.52	2.389
ROUTE7	1203.4	04 Jun 98 0008	197.21	2.389
UTRG-11	80.238	03 Jun 98 2328	9.7574	0.183
ROUTE8	79.471	03 Jun 98 2354	9.7554	0.183
UTRG-13	212.48	03 Jun 98 2324	21.839	0.239
unction-8	1338.9	04 Jun 98 0006	228.80	2.811
ROUTE9	1308.2	04 Jun 98 0016	228.31	2.811

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG14	217.59	03 Jun 98 2328	24.504	0.257
Junction-9	1382.3	04 Jun 98 0014	252.81	3.068
ROUTE10	1376.2	04 Jun 98 0020	252.71	3.068
UTRG-15	120.50	03 Jun 98 2334	15.328	0.20
Junction-10	1427.6	04 Jun 98 0018	268.04	3.268

HMS * Summary of Results

Project : UNMDTRIB Run Name : EXISTING 10 YEAR

Start of Simulation : 03Jun98 1100 Basin Model : UNMDTRIB
End of Simulation : 04Jun98 1200 Precip Model : 10 YEAR STORM
Execution Time : 01Jul98 1337 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG-2	154.15	03 Jun 98 2330	19.010	0.180
UTRG-3	176.36	03 Jun 98 2338	25.252	0.271
Junction-1	323.51	03 Jun 98 2334	44.262	0.451
ROUTE1	322.78	03 Jun 98 2338	44.260	0.451
UTRG-1	204.26	03 Jun 98 2330	24.797	0.209
UTRG-5	429.40	03 Jun 98 2326	48.303	0.319
Junction-2	919.85	03 Jun 98 2330	117.36	0.979
ROUTE2	847.90	03 Jun 98 2344	117.05	0.979
UTRG-4	314.33	03 Jun 98 2326	36.751	0.221
unction-3	1091.7	03 Jun 98 2340	153.81	1.200
OUTE3	1073.0	03 Jun 98 2348	153.87	1.200
UTRG-6	104.40	03 Jun 98 2318	9.9780	0.06
UTRG-7	294.00	03 Jun 98 2322	31.588	0.312
Junction-4	1280.8	03 Jun 98 2346	195.43	1.572
ROUTE4	1277.8	03 Jun 98 2350	195.33	1.572
UTRG-8	248.17	03 Jun 98 2334	32.863	0.277
Junction-5	1487.2	03 Jun 98 2348	228.19	1.849
ROUTE5	1458.8	03 Jun 98 2358	227.94	1.849
UTRG-9	112.07	03 Jun 98 2336	15.193	0.138
Junction-6	1539.1	03 Jun 98 2356	243.13	1.987
ROUTE6	1531.2	04 Jun 98 0002	242.97	1.987
UTRG-12	186.81	03 Jun 98 2340	27.174	0.213
UTRG-10	129.27	03 Jun 98 2344	19.954	0.189
Junction-7	1785.5	03 Jun 98 2400	290.10	2.389
ROUTE7	1747.0	04 Jun 98 0012	289.35	2.389
UTRG-11	130.99	03 Jun 98 2326	15.540	0.183
ROUTE8	129.90	03 Jun 98 2350	15.535	0.183
UTRG-13	299.10	03 Jun 98 2322	31.609	0.239
unction-8	1928.4	04 Jun 98 0010	336.49	2.811
ROUTE9	1907.8	04 Jun 98 0016	336.59	2.811

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG14	303.49	03 Jun 98 2326	35.208	0.257
Junction-9	2009.3	04 Jun 98 0014	371.80	3.068
ROUTE10	2001.9	04 Jun 98 0018	371.69	3.068
UTRG-15	177.94	03 Jun 98 2332	22.864	0.20
Junction-10	2076.0	04 Jun 98 0018	394.56	3.268

HMS * Summary of Results

Project : UNMDTRIB Run Name : EXISTING 25 YEAR

Start of Simulation : 03Jun98 1100 Basin Model : UNMDTRIB
End of Simulation : 04Jun98 1200 Precip Model : 25 YEAR STORM
Execution Time : 01Jul98 1338 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG-2	217.74	03 Jun 98 2330	27.214	0.180
UTRG-3	257.14	03 Jun 98 2338	36.892	0.271
Junction-1	465.71	03 Jun 98 2334	64.106	0.451
ROUTE1	465.05	03 Jun 98 2336	64.102	0.451
UTRG-1	281.54	03 Jun 98 2328	34.841	0.209
UTRG-5	561.52	03 Jun 98 2324	65.271	0.319
Junction-2	1264.3	03 Jun 98 2330	164.21	0.979
ROUTE2	1199.2	03 Jun 98 2340	164.52	0.979
UTRG-4	404.25	03 Jun 98 2326	48.924	0.221
Junction-3	1534.4	03 Jun 98 2338	213.45	1.200
ROUTE3	1500.7	03 Jun 98 2344	213.46	1.200
UTRG-6	133.67	03 Jun 98 2318	13.283	0.06
UTRG-7	419.64	03 Jun 98 2322	45.537	0.312
Junction-4	1809.2	03 Jun 98 2342	272.28	1.572
ROUTE4	1804.3	03 Jun 98 2346	272.17	1.572
UTRG-8	342.49	03 Jun 98 2334	46.172	0.277
Junction-5	2107.0	03 Jun 98 2344	318.35	1.849
ROUTE5	2074.6	03 Jun 98 2352	318.57	1.849
UTRG-9	157.10	03 Jun 98 2334	21.600	0.138
Junction-6	2199.1	03 Jun 98 2352	340.17	1.987
ROUTE6	2185.0	03 Jun 98 2356	339.97	1.987
UTRG-12	254.37	03 Jun 98 2340	37.738	0.213
UTRG-10	183.38	03 Jun 98 2344	28.564	0.189
Junction-7	2566.5	03 Jun 98 2356	406.27	2.389
ROUTE7	2450.3	04 Jun 98 0010	404.53	2.389
UTRG-11	195.35	03 Jun 98 2326	23.062	0.183
ROUTE8	193.61	03 Jun 98 2346	23.051	0.183
UTRG-13	402.23	03 Jun 98 2322	43.647	0.239
Junction-8	2696.4	04 Jun 98 0008	471.23	2.811
ROUTE9	2668.6	04 Jun 98 0014	471.38	2.811

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG14	405.98	03 Jun 98 2326	48.342	0.257
Junction-9	2804.3	04 Jun 98 0014	519.72	3.068
ROUTE10	2791.5	04 Jun 98 0018	519.79	3.068
UTRG-15	247.44	03 Jun 98 2332	32.314	0.20
Junction-10	2892.9	04 Jun 98 0016	552.11	3.268

HMS * Summary of Results

Project : UNMDTRIB Run Name : EXISTING 50 YEAR

Start of Simulation : 03Jun98 1100 Basin Model : UNMDTRIB
End of Simulation : 04Jun98 1200 Precip Model : 50 YEAR STORM
Execution Time : 01Jul98 1338 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG-2	266.06	03 Jun 98 2328	32.870	0.180
UTRG-3	318.53	03 Jun 98 2336	44.995	0.271
Junction-1	573.62	03 Jun 98 2332	77.864	0.451
ROUTE1	572.85	03 Jun 98 2336	77.859	0.451
UTRG-1	339.87	03 Jun 98 2328	41.702	0.209
UTRG-5	661.29	03 Jun 98 2324	76.656	0.319
Junction-2	1523.5	03 Jun 98 2330	196.22	0.979
ROUTE2	1453.9	03 Jun 98 2338	196.72	0.979
UTRG-4	471.89	03 Jun 98 2326	57.038	0.221
unction-3	1859.2	03 Jun 98 2336	253.76	1.200
OUTE3	1819.7	03 Jun 98 2342	253.74	1.200
UTRG-6	155.62	03 Jun 98 2318	15.486	0.06
UTRG-7	514.10	03 Jun 98 2322	55.183	0.312
Junction-4	2213.0	03 Jun 98 2340	324.41	1.572
ROUTE4	2207.1	03 Jun 98 2344	324.38	1.572
UTRG-8	413.47	03 Jun 98 2334	55.266	0.277
Junction-5	2585.7	03 Jun 98 2342	379.64	1.849
ROUTE5	2548.1	03 Jun 98 2350	379.50	1.849
UTRG-9	191.27	03 Jun 98 2334	26.004	0.138
Junction-6	2707.8	03 Jun 98 2348	405.50	1.987
ROUTE6	2692.3	03 Jun 98 2354	405.32	1.987
UTRG-12	305.15	03 Jun 98 2340	44.918	0.213
UTRG-10	224.24	03 Jun 98 2344	34.502	0.189
Junction-7	3173.3	03 Jun 98 2352	484.74	2.389
ROUTE7	3033.8	04 Jun 98 0008	483.50	2.389
UTRG-11	244.09	03 Jun 98 2326	28.335	0.183
ROUTE8	241.77	03 Jun 98 2344	28.323	0.183
TRG-13	479.48	03 Jun 98 2322	51.805	0.239
nction-8	3344.1	04 Jun 98 0006	563.63	2.811
ROUTE9	3297.1	04 Jun 98 0012	563.98	2.811

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG14	482.84	03 Jun 98 2326	57.220	0.257
Junction-9	3464.8	04 Jun 98 0010	621.20	3.068
ROUTE10	3447.3	04 Jun 98 0014	621.16	3.068
UTRG-15	299.77	03 Jun 98 2332	38.789	0.20
Junction-10	3575.8	04 Jun 98 0014	659.94	3.268

HMS * Summary of Results

Project : UNMDTRIB Run Name : EXISTING 100 YEAR

Start of Simulation : 03Jun98 1100 Basin Model : UNMDTRIB
End of Simulation : 04Jun98 1200 Precip Model : 100 YEAR STORM
Execution Time : 01Jul98 1338 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG-2	321.59	03 Jun 98 2328	40.293	0.180
UTRG-3	390.93	03 Jun 98 2336	55.701	0.271
Junction-1	699.76	03 Jun 98 2332	95.994	0.451
ROUTE1	698.28	03 Jun 98 2336	95.991	0.451
UTRG-1	405.79	03 Jun 98 2328	50.655	0.209
UTRG-5	769.90	03 Jun 98 2324	91.335	0.319
Junction-2	1816.7	03 Jun 98 2328	237.98	0.979
ROUTE2	1743.7	03 Jun 98 2338	238.56	0.979
UTRG-4	544.67	03 Jun 98 2326	67.454	0.221
unction-3	2220.9	03 Jun 98 2336	306.01	1.200
OUTE3	2179.9	03 Jun 98 2342	305.89	1.200
UTRG-6	178.83	03 Jun 98 2318	18.314	0.06
UTRG-7	621.88	03 Jun 98 2322	67.874	0.312
Junction-4	2669.3	03 Jun 98 2338	392.08	1.572
ROUTE4	2663.6	03 Jun 98 2342	392.03	1.572
UTRG-8	494.08	03 Jun 98 2334	67.132	0.277
Junction-5	3128.0	03 Jun 98 2340	459.16	1.849
ROUTE5	3086.5	03 Jun 98 2346	459.37	1.849
UTRG-9	230.52	03 Jun 98 2334	31.772	0.138
Junction-6	3290.4	03 Jun 98 2346	491.15	1.987
ROUTE6	3268.3	03 Jun 98 2352	490.96	1.987
UTRG-12	362.70	03 Jun 98 2340	54.250	0.213
UTRG-10	272.06	03 Jun 98 2342	42.294	0.189
Junction-7	3862.8	03 Jun 98 2350	587.51	2.389
ROUTE7	3727.6	04 Jun 98 0004	587.39	2.389
UTRG-11	301.21	03 Jun 98 2324	35.338	0.183
ROUTE8	299.10	03 Jun 98 2344	35.322	0.183
UTRG-13	564.70	03 Jun 98 2322	62.392	0.239
unction-8	4139.1	04 Jun 98 0002	685.10	2.811
ROUTE9	4071.6	04 Jun 98 0006	685.72	2.811

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG14	567.84	03 Jun 98 2326	68.720	0.257
Junction-9	4296.6	04 Jun 98 0006	754.44	3.068
ROUTE10	4271.8	04 Jun 98 0010	754.28	3.068
UTRG-15	359.34	03 Jun 98 2332	47.254	0.20
Junction-10	4438.8	04 Jun 98 0010	801.53	3.268

HMS * Summary of Results

Project : UNMDTRIB Run Name : EXISTING 500 YEAR

Start of Simulation : 03Jun98 1100 Basin Model : UNMDTRIB
End of Simulation : 04Jun98 1200 Precip Model : 500 YEAR STORM EVENT
Execution Time : 01Jul98 1338 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG-2	439.16	03 Jun 98 2328	60.390	0.180
UTRG-3	544.80	03 Jun 98 2334	84.945	0.271
Junction-1	967.34	03 Jun 98 2332	145.34	0.451
ROUTE1	965.33	03 Jun 98 2334	145.31	0.451
UTRG-1	542.31	03 Jun 98 2328	74.686	0.209
UTRG-5	988.14	03 Jun 98 2324	130.08	0.319
Junction-2	2419.2	03 Jun 98 2328	350.07	0.979
ROUTE2	2329.1	03 Jun 98 2336	350.52	0.979
UTRG-4	686.66	03 Jun 98 2326	94.778	0.221
unction-3	2944.9	03 Jun 98 2334	445.30	1.200
ROUTE3	2855.7	03 Jun 98 2342	444.51	1.200
UTRG-6	226.58	03 Jun 98 2318	25.734	0.06
UTRG-7	858.89	03 Jun 98 2320	102.34	0.312
Junction-4	3488.4	03 Jun 98 2338	572.59	1.572
ROUTE4	3480.5	03 Jun 98 2340	572.45	1.572
UTRG-8	660.84	03 Jun 98 2332	98.972	0.277
Junction-5	4100.6	03 Jun 98 2340	671.42	1.849
ROUTE5	4066.5	03 Jun 98 2344	671.39	1.849
UTRG-9	311.80	03 Jun 98 2332	47.334	0.138
Junction-6	4345.9	03 Jun 98 2344	718.72	1.987
ROUTE6	4321.3	03 Jun 98 2348	718.28	1.987
UTRG-12	478.22	03 Jun 98 2338	79.150	0.213
UTRG-10	370.65	03 Jun 98 2342	63.370	0.189
Junction-7	5126.7	03 Jun 98 2348	860.80	2.389
ROUTE7	5015.4	03 Jun 98 2358	860.77	2.389
UTRG-11	429.49	03 Jun 98 2324	54.607	0.183
ROUTE8	425.03	03 Jun 98 2342	54.572	0.183
UTRG-13	742.01	03 Jun 98 2322	90.591	0.239
Junction-8	5603.7	03 Jun 98 2356	1005.9	2.811
ROUTE9	5530.5	04 Jun 98 0002	1006.0	2.811

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG14	740.42	03 Jun 98 2326	99.277	0.257
Junction-9	5852.6	03 Jun 98 2400	1105.3	3.068
ROUTE10	5823.3	04 Jun 98 0004	1104.7	3.068
UTRG-15	484.00	03 Jun 98 2330	70.033	0.20
Junction-10	6073.5	04 Jun 98 0002	1174.8	3.268

HMS * Summary of Results

Project : UNMDTRIB Run Name : FUTURE 2 YR.

Start of Simulation : 03Jun98 1100 Basin Model : UNMDFUT
End of Simulation : 04Jun98 1200 Precip Model : 2 YEAR STORM
Execution Time : 01Jul98 1735 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG-2	99.534	03 Jun 98 2330	10.794	0.180
UTRG-3	107.89	03 Jun 98 2338	13.817	0.271
Junction-1	202.49	03 Jun 98 2334	24.611	0.451
ROUTE1	201.91	03 Jun 98 2338	24.609	0.451
UTRG-1	101.78	03 Jun 98 2330	11.230	0.209
UTRG-5	198.98	03 Jun 98 2326	20.126	0.319
Junction-2	483.55	03 Jun 98 2332	55.966	0.979
ROUTE2	440.19	03 Jun 98 2346	55.572	0.979
UTRG-4	155.62	03 Jun 98 2328	16.196	0.221
nction-3	549.57	03 Jun 98 2344	71.768	1.200
OUTE3	533.76	03 Jun 98 2356	71.605	1.200
UTRG-6	50.003	03 Jun 98 2318	4.1848	0.06
UTRG-7	155.62	03 Jun 98 2322	14.985	0.312
Junction-4	616.86	03 Jun 98 2352	90.774	1.572
ROUTE4	615.05	03 Jun 98 2358	90.727	1.572
UTRG-8	100.45	03 Jun 98 2336	12.609	0.277
Junction-5	686.18	03 Jun 98 2356	103.34	1.849
ROUTE5	677.41	04 Jun 98 0006	103.08	1.849
UTRG-9	52.578	03 Jun 98 2336	6.6269	0.138
Junction-6	710.31	04 Jun 98 0004	109.71	1.987
ROUTE6	708.88	04 Jun 98 0008	109.66	1.987
UTRG-12	54.855	03 Jun 98 2346	8.0377	0.213
UTRG-10	39.858	03 Jun 98 2350	6.2636	0.189
Junction-7	783.62	04 Jun 98 0006	123.97	2.389
ROUTE7	777.81	04 Jun 98 0014	123.72	2.389
UTRG-11	53.050	03 Jun 98 2328	6.0669	0.183
ROUTE8	52.504	03 Jun 98 2356	6.0661	0.183
TRG-13	101.44	03 Jun 98 2324	10.231	0.239
nction-8	849.56	04 Jun 98 0012	140.02	2.811
ROUTE9	823.18	04 Jun 98 0024	139.37	2.811

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG14	121.78	03 Jun 98 2328	13.105	0.257
Junction-9	858.85	04 Jun 98 0022	152.47	3.068
ROUTE10	856.15	04 Jun 98 0028	152.62	3.068
UTRG-15	69.799	03 Jun 98 2334	8.5609	0.20
Junction-10	881.49	04 Jun 98 0026	161.18	3.268

HMS * Summary of Results

Project : UNMDTRIB Run Name : FUTURE 5 YR.

Start of Simulation : 03Jun98 1100 Basin Model : UNMDFUT
End of Simulation : 04Jun98 1200 Precip Model : 5 YEAR STORM
Execution Time : 01Jul98 1735 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG-2	190.25	03 Jun 98 2328	21.670	0.180
UTRG-3	222.54	03 Jun 98 2336	29.145	0.271
Junction-1	404.64	03 Jun 98 2332	50.815	0.451
ROUTE1	403.54	03 Jun 98 2336	50.813	0.451
UTRG-1	203.66	03 Jun 98 2328	23.320	0.209
UTRG-5	370.38	03 Jun 98 2326	39.796	0.319
Junction-2	949.64	03 Jun 98 2330	113.93	0.979
ROUTE2	873.12	03 Jun 98 2344	113.63	0.979
UTRG-4	273.90	03 Jun 98 2326	30.612	0.221
Junction-3	1083.4	03 Jun 98 2340	144.24	1.200
ROUTE3	1064.0	03 Jun 98 2348	144.25	1.200
UTRG-6	88.479	03 Jun 98 2318	8.0290	0.06
UTRG-7	324.95	03 Jun 98 2322	32.210	0.312
Junction-4	1264.5	03 Jun 98 2346	184.49	1.572
ROUTE4	1261.0	03 Jun 98 2350	184.42	1.572
UTRG-8	217.38	03 Jun 98 2334	27.542	0.277
Junction-5	1441.8	03 Jun 98 2348	211.96	1.849
ROUTE5	1411.9	03 Jun 98 2358	211.83	1.849
UTRG-9	111.27	03 Jun 98 2334	14.245	0.138
Junction-6	1488.0	03 Jun 98 2358	226.08	1.987
ROUTE6	1479.2	04 Jun 98 0002	225.93	1.987
UTRG-12	130.19	03 Jun 98 2342	18.637	0.213
UTRG-10	100.57	03 Jun 98 2346	15.144	0.189
Junction-7	1665.7	04 Jun 98 0002	259.71	2.389
ROUTE7	1632.7	04 Jun 98 0012	259.09	2.389
UTRG-11	133.63	03 Jun 98 2326	14.669	0.183
ROUTE8	132.35	03 Jun 98 2348	14.664	0.183
UTRG-13	223.05	03 Jun 98 2322	22.788	0.239
Junction-8	1787.1	04 Jun 98 0010	296.54	2.811
ROUTE9	1766.4	04 Jun 98 0016	296.59	2.811

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG14	248.37	03 Jun 98 2328	27.643	0.257
Junction-9	1845.8	04 Jun 98 0016	324.24	3.068
ROUTE10	1840.2	04 Jun 98 0020	324.05	3.068
UTRG-15	155.25	03 Jun 98 2332	19.068	0.20
Junction-10	1901.0	04 Jun 98 0018	343.12	3.268

HMS * Summary of Results

Project : UNMDTRIB Run Name : FUTURE 10 YR.

Start of Simulation : 03Jun98 1100 Basin Model : UNMDFUT
End of Simulation : 04Jun98 1200 Precip Model : 10 YEAR STORM
Execution Time : 01Jul98 1736 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG-2	252.48	03 Jun 98 2328	29.933	0.180
UTRG-3	304.05	03 Jun 98 2336	41.029	0.271
Junction-1	546.40	03 Jun 98 2332	70.962	0.451
ROUTE1	545.23	03 Jun 98 2334	70.957	0.451
UTRG-1	274.96	03 Jun 98 2328	32.630	0.209
UTRG-5	486.78	03 Jun 98 2324	54.643	0.319
Junction-2	1272.0	03 Jun 98 2330	158.23	0.979
ROUTE2	1207.1	03 Jun 98 2340	158.58	0.979
UTRG-4	352.83	03 Jun 98 2326	41.296	0.221
unction-3	1498.5	03 Jun 98 2338	199.88	1.200
OUTE3	1464.6	03 Jun 98 2344	199.92	1.200
UTRG-6	113.80	03 Jun 98 2318	10.895	0.06
UTRG-7	443.31	03 Jun 98 2322	45.666	0.312
Junction-4	1763.0	03 Jun 98 2342	256.48	1.572
ROUTE4	1758.2	03 Jun 98 2346	256.43	1.572
UTRG-8	301.77	03 Jun 98 2334	39.288	0.277
Junction-5	2022.9	03 Jun 98 2344	295.72	1.849
ROUTE5	1990.0	03 Jun 98 2352	295.78	1.849
UTRG-9	153.44	03 Jun 98 2334	20.196	0.138
Junction-6	2108.6	03 Jun 98 2352	315.98	1.987
ROUTE6	2092.0	03 Jun 98 2358	315.76	1.987
UTRG-12	186.81	03 Jun 98 2340	27.174	0.213
UTRG-10	147.64	03 Jun 98 2344	22.417	0.189
Junction-7	2383.9	03 Jun 98 2356	365.35	2.389
ROUTE7	2285.2	04 Jun 98 0010	363.97	2.389
UTRG-11	193.96	03 Jun 98 2326	21.713	0.183
ROUTE8	192.49	03 Jun 98 2346	21.704	0.183
TRG-13	310.78	03 Jun 98 2322	32.743	0.239
nction-8	2501.7	04 Jun 98 0008	418.42	2.811
ROUTE9	2475.1	04 Jun 98 0014	418.78	2.811

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG14	337.83	03 Jun 98 2326	38.914	0.257
Junction-9	2586.9	04 Jun 98 0014	457.70	3.068
ROUTE10	2573.1	04 Jun 98 0018	457.74	3.068
UTRG-15	217.41	03 Jun 98 2332	27.398	0.20
Junction-10	2658.1	04 Jun 98 0018	485.14	3.268

HMS * Summary of Results

Project : UNMDTRIB Run Name : FUTURE 25 YR.

Start of Simulation : 03Jun98 1100 Basin Model : UNMDFUT
End of Simulation : 04Jun98 1200 Precip Model : 25 YEAR STORM
Execution Time : 01Jul98 1736 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG-2	324.31	03 Jun 98 2328	39.847	0.180
UTRG-3	398.69	03 Jun 98 2334	55.441	0.271
Junction-1	710.62	03 Jun 98 2332	95.288	0.451
ROUTE1	709.59	03 Jun 98 2334	95.278	0.451
UTRG-1	357.81	03 Jun 98 2328	43.881	0.209
UTRG-5	621.83	03 Jun 98 2324	72.400	0.319
Junction-2	1645.0	03 Jun 98 2328	211.56	0.979
ROUTE2	1575.3	03 Jun 98 2338	212.14	0.979
UTRG-4	443.08	03 Jun 98 2326	53.955	0.221
Junction-3	1958.2	03 Jun 98 2336	266.10	1.200
ROUTE3	1919.9	03 Jun 98 2342	266.03	1.200
UTRG-6	143.14	03 Jun 98 2318	14.301	0.06
UTRG-7	582.58	03 Jun 98 2320	62.050	0.312
Junction-4	2338.1	03 Jun 98 2340	342.38	1.572
ROUTE4	2331.7	03 Jun 98 2342	342.36	1.572
UTRG-8	400.87	03 Jun 98 2332	53.642	0.277
Junction-5	2702.1	03 Jun 98 2342	396.00	1.849
ROUTE5	2665.2	03 Jun 98 2348	395.85	1.849
UTRG-9	202.65	03 Jun 98 2334	27.441	0.138
Junction-6	2834.3	03 Jun 98 2348	423.29	1.987
ROUTE6	2816.6	03 Jun 98 2352	423.14	1.987
UTRG-12	254.37	03 Jun 98 2340	37.738	0.213
UTRG-10	204.09	03 Jun 98 2342	31.495	0.189
Junction-7	3240.6	03 Jun 98 2352	492.37	2.389
ROUTE7	3105.1	04 Jun 98 0006	491.40	2.389
UTRG-11	267.31	03 Jun 98 2324	30.508	0.183
ROUTE8	265.05	03 Jun 98 2344	30.492	0.183
UTRG-13	414.74	03 Jun 98 2322	44.958	0.239
Junction-8	3410.0	04 Jun 98 0004	566.84	2.811
ROUTE9	3360.8	04 Jun 98 0010	567.42	2.811

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG14	442.39	03 Jun 98 2326	52.585	0.257
Junction-9	3517.9	04 Jun 98 0010	620.00	3.068
ROUTE10	3496.2	04 Jun 98 0014	619.96	3.068
UTRG-15	290.63	03 Jun 98 2330	37.618	0.20
Junction-10	3616.9	04 Jun 98 0014	657.58	3.268

HMS * Summary of Results

Project : UNMDTRIB Run Name : FUTURE 50 YR.

Start of Simulation : 03Jun98 1100 Basin Model : UNMDFUT
End of Simulation : 04Jun98 1200 Precip Model : 50 YEAR STORM
Execution Time : 01Jul98 1736 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG-2	378.46	03 Jun 98 2328	46.456	0.180
UTRG-3	470.32	03 Jun 98 2334	65.113	0.271
Junction-1	834.27	03 Jun 98 2332	111.57	0.451
ROUTE1	833.16	03 Jun 98 2334	111.55	0.451
UTRG-1	420.12	03 Jun 98 2328	51.414	0.209
UTRG-5	723.48	03 Jun 98 2324	84.213	0.319
Junction-2	1922.5	03 Jun 98 2328	247.18	0.979
ROUTE2	1846.8	03 Jun 98 2338	247.79	0.979
UTRG-4	511.43	03 Jun 98 2326	62.328	0.221
nction-3	2295.4	03 Jun 98 2336	310.12	1.200
UTE3	2253.6	03 Jun 98 2342	310.00	1.200
UTRG-6	165.24	03 Jun 98 2318	16.558	0.06
UTRG-7	687.79	03 Jun 98 2320	73.068	0.312
Junction-4	2767.5	03 Jun 98 2338	399.63	1.572
ROUTE4	2757.5	03 Jun 98 2342	399.60	1.572
UTRG-8	475.73	03 Jun 98 2332	63.321	0.277
Junction-5	3208.1	03 Jun 98 2340	462.93	1.849
ROUTE5	3169.4	03 Jun 98 2346	463.39	1.849
UTRG-9	239.65	03 Jun 98 2334	32.315	0.138
Junction-6	3377.4	03 Jun 98 2346	495.70	1.987
ROUTE6	3356.5	03 Jun 98 2350	495.56	1.987
UTRG-12	305.15	03 Jun 98 2340	44.918	0.213
UTRG-10	246.79	03 Jun 98 2342	37.700	0.189
Junction-7	3877.8	03 Jun 98 2350	578.18	2.389
ROUTE7	3746.5	04 Jun 98 0002	578.08	2.389
UTRG-11	322.41	03 Jun 98 2324	36.516	0.183
ROUTE8	319.33	03 Jun 98 2342	36.498	0.183
TRG-13	492.63	03 Jun 98 2322	53.214	0.239
action-8	4138.2	03 Jun 98 2400	667.79	2.811
ROUTE9	4075.9	04 Jun 98 0006	668.31	2.811

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG14	520.91	03 Jun 98 2326	61.757	0.257
Junction-9	4277.7	04 Jun 98 0006	730.06	3.068
ROUTE10	4251.3	04 Jun 98 0010	729.97	3.068
UTRG-15	346.02	03 Jun 98 2330	44.527	0.20
Junction-10	4411.1	04 Jun 98 0008	774.50	3.268

HMS * Summary of Results

Project : UNMDTRIB Run Name : FUTURE 100 YR.

Start of Simulation : 03Jun98 1100 Basin Model : UNMDFUT
End of Simulation : 04Jun98 1200 Precip Model : 100 YEAR STORM
Execution Time : 01Jul98 1736 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG-2	436.73	03 Jun 98 2328	54.939	0.180
UTRG-3	549.37	03 Jun 98 2334	77.581	0.271
Junction-1	970.05	03 Jun 98 2330	132.52	0.451
ROUTE1	968.37	03 Jun 98 2334	132.50	0.451
UTRG-1	487.83	03 Jun 98 2328	61.111	0.209
UTRG-5	831.98	03 Jun 98 2324	99.356	0.319
Junction-2	2224.8	03 Jun 98 2328	292.97	0.979
ROUTE2	2144.4	03 Jun 98 2336	293.44	0.979
UTRG-4	583.59	03 Jun 98 2326	73.023	0.221
Junction-3	2664.4	03 Jun 98 2334	366.46	1.200
ROUTE3	2584.2	03 Jun 98 2342	365.90	1.200
UTRG-6	188.27	03 Jun 98 2318	19.444	0.06
UTRG-7	802.12	03 Jun 98 2320	87.297	0.312
Junction-4	3156.0	03 Jun 98 2338	472.64	1.572
ROUTE4	3151.3	03 Jun 98 2342	472.60	1.572
UTRG-8	558.86	03 Jun 98 2332	75.837	0.277
Junction-5	3678.4	03 Jun 98 2340	548.43	1.849
ROUTE5	3653.5	03 Jun 98 2344	548.85	1.849
UTRG-9	280.54	03 Jun 98 2334	38.607	0.138
Junction-6	3906.1	03 Jun 98 2344	587.46	1.987
ROUTE6	3887.2	03 Jun 98 2348	587.35	1.987
UTRG-12	362.70	03 Jun 98 2340	54.250	0.213
UTRG-10	295.78	03 Jun 98 2342	45.794	0.189
Junction-7	4520.2	03 Jun 98 2348	687.39	2.389
ROUTE7	4407.6	03 Jun 98 2400	687.79	2.389
UTRG-11	384.33	03 Jun 98 2324	44.355	0.183
ROUTE8	381.03	03 Jun 98 2342	44.336	0.183
UTRG-13	578.10	03 Jun 98 2322	63.909	0.239
Junction-8	4900.9	03 Jun 98 2358	796.03	2.811
ROUTE9	4830.8	04 Jun 98 0004	796.79	2.811

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
JTRG14	606.45	03 Jun 98 2326	73.583	0.257
Junction-9	5088.0	04 Jun 98 0002	870.37	3.068
ROUTE10	5062.0	04 Jun 98 0006	870.15	3.068
UTRG-15	407.67	03 Jun 98 2330	53.476	0.20
Junction-10	5262.1	04 Jun 98 0006	923.63	3.268

HMS * Summary of Results

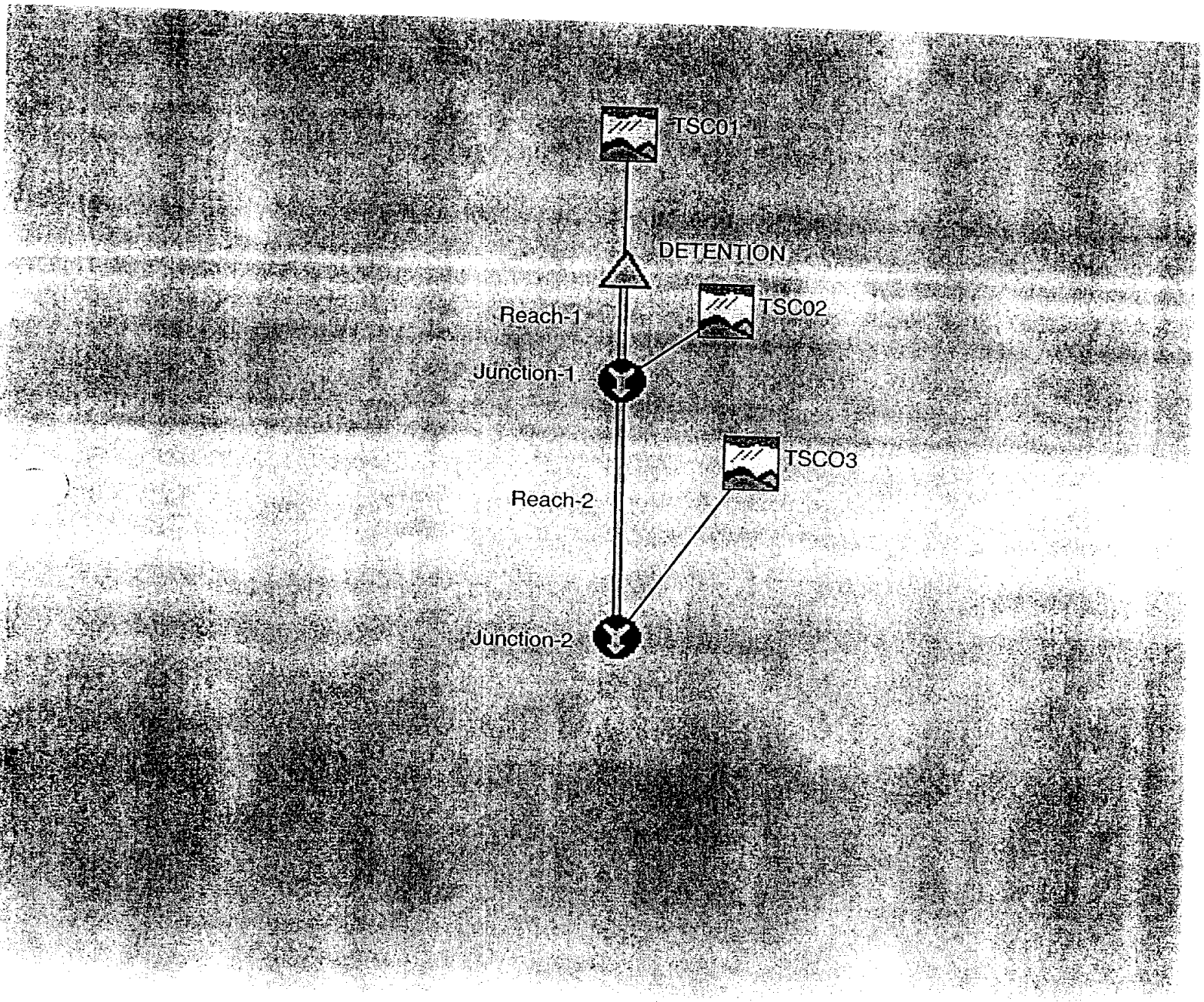
Project : UNMDTRIB Run Name : FUTURE 500 YR.

Start of Simulation : 03Jun98 1100 Basin Model : UNMDFUT
End of Simulation : 04Jun98 1200 Precip Model : 500 YEAR STORM EVENT
Execution Time : 01Jul98 1736 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG-2	550.77	03 Jun 98 2326	77.194	0.180
UTRG-3	702.75	03 Jun 98 2334	110.47	0.271
Junction-1	1234.3	03 Jun 98 2330	187.67	0.451
ROUTE1	1230.3	03 Jun 98 2334	187.63	0.451
UTRG-1	621.65	03 Jun 98 2326	86.650	0.209
UTRG-5	1044.4	03 Jun 98 2324	139.01	0.319
Junction-2	2820.6	03 Jun 98 2328	413.29	0.979
ROUTE2	2717.0	03 Jun 98 2336	413.55	0.979
UTRG-4	720.78	03 Jun 98 2326	100.89	0.221
unction-3	3369.9	03 Jun 98 2334	514.44	1.200
JTE3	3282.6	03 Jun 98 2340	514.18	1.200
UTRG-6	234.95	03 Jun 98 2318	26.977	0.06
UTRG-7	1039.0	03 Jun 98 2320	124.94	0.312
Junction-4	4030.3	03 Jun 98 2338	666.09	1.572
ROUTE4	4023.3	03 Jun 98 2340	665.99	1.572
UTRG-8	723.27	03 Jun 98 2332	109.01	0.277
Junction-5	4711.5	03 Jun 98 2338	774.99	1.849
ROUTE5	4664.3	03 Jun 98 2344	775.07	1.849
UTRG-9	361.34	03 Jun 98 2332	55.246	0.138
Junction-6	4994.4	03 Jun 98 2342	830.32	1.987
ROUTE6	4963.5	03 Jun 98 2348	829.87	1.987
UTRG-12	478.22	03 Jun 98 2338	79.150	0.213
UTRG-10	394.75	03 Jun 98 2340	67.499	0.189
Junction-7	5798.7	03 Jun 98 2346	976.52	2.389
ROUTE7	5692.1	03 Jun 98 2356	976.88	2.389
UTRG-11	514.49	03 Jun 98 2324	65.400	0.183
ROUTE8	510.51	03 Jun 98 2340	65.364	0.183
TRG-13	754.92	03 Jun 98 2320	92.329	0.239
ction-8	6367.2	03 Jun 98 2354	1134.6	2.811
ROUTE9	6286.4	03 Jun 98 2358	1134.3	2.811

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
UTRG14	776.58	03 Jun 98 2326	104.79	0.257
Junction-9	6639.5	03 Jun 98 2358	1239.1	3.068
ROUTE10	6607.1	03 Jun 98 2400	1238.5	3.068
UTRG-15	531.23	03 Jun 98 2330	77.251	0.20
Junction-10	6895.0	03 Jun 98 2400	1315.7	3.268

Appendix B
Seco Creek Tributary
HEC-HMS Summary Printouts
Existing and Future Conditions
2, 5, 10, 25, 50, 100, and 500-year Storm Events


TSC01
DETENTION
Reach-1
TSC02
Junction-1
TSCO3
Reach-2
Junction-2

HMS * Summary of Results

Project : TRBSECO Run Name : 2 YEAR STORM

Start of Simulation : 14May98 1700 Basin Model : TRIBSECO
End of Simulation : 15May98 1700 Precip Model : 2-YEAR STORM
Execution Time : 26Jun98 1114 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TSC01	29.067	15 May 98 0538	4.6167	0.284
DETENTION	28.171	15 May 98 0544	4.6164	0.284
Reach-1	28.069	15 May 98 0552	4.6119	0.284
TSC02	147.13	15 May 98 0524	13.923	0.199
Junction-1	150.25	15 May 98 0526	18.535	0.483
Reach-2	145.70	15 May 98 0540	18.464	0.483
TSC03	61.689	15 May 98 0522	5.6566	0.094
Junction-2	188.09	15 May 98 0536	24.120	0.577

HMS * Summary of Results

Project : TRBSECO Run Name : 5 YEAR STORM

Start of Simulation : 14May98 1700 Basin Model : TRIBSECO
End of Simulation : 15May98 1700 Precip Model : 5-YEAR STORM
Execution Time : 26Jun98 1114 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TSC01	111.32	15 May 98 0532	14.360	0.284
DETENTION	106.87	15 May 98 0538	14.359	0.284
Reach-1	106.50	15 May 98 0544	14.346	0.284
TSC02	261.74	15 May 98 0524	26.683	0.199
Junction-1	316.64	15 May 98 0530	41.029	0.483
Reach-2	309.03	15 May 98 0540	40.917	0.483
TSC03	116.31	15 May 98 0522	11.343	0.094
Junction-2	384.32	15 May 98 0538	52.259	0.577

HMS * Summary of Results

Project : TRBSECO Run Name : 10 YEAR STORM

Start of Simulation : 14May98 1700 Basin Model : TRIBSECO
End of Simulation : 15May98 1700 Precip Model : 10-YEAR STORM
Execution Time : 26Jun98 1114 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TSC01	184.81	15 May 98 0530	23.093	0.284
DETENTION	176.67	15 May 98 0536	23.092	0.284
Reach-1	175.86	15 May 98 0542	23.073	0.284
TSC02	338.08	15 May 98 0524	36.198	0.199
Junction-1	452.46	15 May 98 0530	59.271	0.483
Reach-2	442.88	15 May 98 0540	59.150	0.483
TSC03	153.40	15 May 98 0522	15.663	0.094
Junction-2	544.46	15 May 98 0536	74.813	0.577

HMS * Summary of Results

Project : TRBSECO Run Name : 25 YEAR STORM

Start of Simulation : 14May98 1700 Basin Model : TRIBSECO
End of Simulation : 15May98 1700 Precip Model : 25-YEAR STORM
Execution Time : 26Jun98 1115 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TSC01	278.31	15 May 98 0528	34.507	0.284
DETENTION	264.88	15 May 98 0534	34.504	0.284
Reach-1	264.20	15 May 98 0540	34.470	0.284
TSC02	426.53	15 May 98 0522	47.495	0.199
Junction-1	617.97	15 May 98 0530	81.965	0.483
Reach-2	600.49	15 May 98 0540	81.754	0.483
TSC03	196.44	15 May 98 0522	20.843	0.094
Junction-2	724.06	15 May 98 0538	102.60	0.577

HMS * Summary of Results

Project : TRBSECO Run Name : 50 YEAR STORM

Start of Simulation : 14May98 1700 Basin Model : TRIBSECO
End of Simulation : 15May98 1700 Precip Model : 50-YEAR STORM
Execution Time : 26Jun98 1115 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TSC01	353.51	15 May 98 0528	41.014	0.284
DETENTION	333.37	15 May 98 0536	41.013	0.284
Reach-1	332.20	15 May 98 0540	40.994	0.284
TSC02	504.86	15 May 98 0522	53.575	0.199
Junction-1	751.37	15 May 98 0528	94.569	0.483
Reach-2	729.49	15 May 98 0542	94.366	0.483
TSC03	233.96	15 May 98 0522	23.643	0.094
Junction-2	875.50	15 May 98 0538	118.01	0.577

HMS * Summary of Results

Project : TRBSECO Run Name : 100 YEAR STORM

Start of Simulation : 14May98 1700 Basin Model : TRIBSECO
End of Simulation : 15May98 1700 Precip Model : 100-YEAR STORM
Execution Time : 26Jun98 1115 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TSC01	434.95	15 May 98 0528	53.253	0.284
DETENTION	408.18	15 May 98 0534	53.246	0.284
Reach-1	406.95	15 May 98 0540	53.209	0.284
TSC02	563.77	15 May 98 0522	64.579	0.199
Junction-1	874.03	15 May 98 0530	117.79	0.483
Reach-2	849.44	15 May 98 0542	117.48	0.483
TSC03	263.75	15 May 98 0520	28.737	0.094
Junction-2	1012.6	15 May 98 0538	146.21	0.577

HMS * Summary of Results

Project : TRBSECO Run Name : 500 YEAR STORM

Start of Simulation : 14May98 1700 Basin Model : TRIBSECO
End of Simulation : 15May98 1700 Precip Model : 500-YEAR STORM
Execution Time : 26Jun98 1115 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TSC01	622.97	15 May 98 0526	82.601	0.284
DETENTION	537.36	15 May 98 0538	82.559	0.284
Reach-1	536.25	15 May 98 0540	82.461	0.284
TSC02	701.77	15 May 98 0522	89.447	0.199
Junction-1	1133.3	15 May 98 0526	171.91	0.483
Reach-2	1089.8	15 May 98 0542	171.28	0.483
TSC03	334.02	15 May 98 0520	40.316	0.094
Junction-2	1285.4	15 May 98 0538	211.59	0.577

HMS * Summary of Results

Project : TRBSECO Run Name : FUTURE 2 YR.

Start of Simulation : 14May98 1700 Basin Model : TRBSCFUT
End of Simulation : 15May98 1700 Precip Model : 2-YEAR STORM
Execution Time : 01Jul98 1504 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TSC01	105.23	15 May 98 0522	10.092	0.284
DETENTION	97.681	15 May 98 0526	10.091	0.284
Reach-1	96.822	15 May 98 0534	10.084	0.284
TSC02	195.90	15 May 98 0514	13.923	0.199
Junction-1	212.08	15 May 98 0516	24.008	0.483
Reach-2	207.74	15 May 98 0532	23.905	0.483
TSC03	81.826	15 May 98 0512	5.6566	0.094
Junction-2	245.77	15 May 98 0530	29.562	0.577

HMS * Summary of Results

Project : TRBSECO Run Name : FUTURE 10 YR.

Start of Simulation : 14May98 1700 Basin Model : TRBSCFUT
End of Simulation : 15May98 1700 Precip Model : 10-YEAR STORM
Execution Time : 01Jul98 1504 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TSC01	363.05	15 May 98 0520	35.046	0.284
DETENTION	329.70	15 May 98 0526	35.044	0.284
Reach-1	328.17	15 May 98 0530	35.016	0.284
TSC02	436.50	15 May 98 0514	36.221	0.199
Junction-1	621.68	15 May 98 0520	71.237	0.483
Reach-2	602.01	15 May 98 0532	71.046	0.483
TSC03	198.25	15 May 98 0512	15.673	0.094
Junction-2	694.18	15 May 98 0530	86.719	0.577

HMS * Summary of Results

Project : TRBSECO Run Name : FUTURE 25 YR.

Start of Simulation : 14May98 1700 Basin Model : TRBSCFUT
End of Simulation : 15May98 1700 Precip Model : 25-YEAR STORM
Execution Time : 01Jul98 1504 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TSC01	494.85	15 May 98 0518	48.931	0.284
DETENTION	442.36	15 May 98 0526	48.926	0.284
Reach-1	441.13	15 May 98 0530	48.891	0.284
TSC02	547.47	15 May 98 0514	47.531	0.199
Junction-1	813.20	15 May 98 0518	96.422	0.483
Reach-2	785.52	15 May 98 0532	96.102	0.483
TSC03	253.19	15 May 98 0512	20.858	0.094
Junction-2	900.77	15 May 98 0530	116.96	0.577

HMS * Summary of Results

Project : TRBSECO Run Name : FUTURE 50 YR.

Start of Simulation : 14May98 1700 Basin Model : TRBSCFUT
End of Simulation : 15May98 1700 Precip Model : 50-YEAR STORM
Execution Time : 01Jul98 1506 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TSC01	603.48	15 May 98 0518	56.609	0.284
DETENTION	504.60	15 May 98 0528	56.608	0.284
Reach-1	503.40	15 May 98 0532	56.593	0.284
TSC02	644.54	15 May 98 0514	53.611	0.199
Junction-1	975.32	15 May 98 0518	110.20	0.483
Reach-2	928.87	15 May 98 0532	109.93	0.483
TSC03	299.33	15 May 98 0512	23.659	0.094
Junction-2	1069.3	15 May 98 0528	133.59	0.577

HMS * Summary of Results

Project : TRBSECO Run Name : FUTURE 500 YR

Start of Simulation : 14May98 1700 Basin Model : TRBSCFUT
End of Simulation : 15May98 1700 Precip Model : 500-YEAR STORM
Execution Time : 01Jul98 1507 Control Specs : HYPO 1

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Total Volume (ac ft)	Drainage Area (sq mi)
TSC01	941.37	15 May 98 0518	103.59	0.284
DETENTION	883.15	15 May 98 0522	103.54	0.284
Reach-1	869.92	15 May 98 0528	103.45	0.284
TSC02	900.41	15 May 98 0512	89.568	0.199
Junction-1	1436.6	15 May 98 0524	193.01	0.483
Reach-2	1375.3	15 May 98 0534	192.26	0.483
TSC03	430.82	15 May 98 0512	40.368	0.094
Junction-2	1538.5	15 May 98 0532	232.63	0.577

Flood Protection Study for Eagle Pass, Texas
Appendix C

Appendix C presents a compilation of structures and watersheds modeled with HECRAS. Existing and future condition flows determined in Appendix B were applied to all stream models for the 2, 5, 10, 25, 50, 100, and 500-year storm events except for the Rio Grande River. The Rio Grande River flows remained unchanged for existing and future conditions and only the 10, 50, 100, and 500-year flows were applied. Plotted water surface profiles are shown for all streams studied in detail. Appendix C has been organized as follows:

Structure Inventory

Rio Grande River –	**Existing Conditions**
Main Arroyo & Tributary 3 -	**Existing and Future Conditions**
Tributary 1 -	**Existing and Future Conditions**
Tributary 2 -	**Existing and Future Conditions**
Unnamed Tributary -	**Existing and Future Conditions**
Seco Creek Tributary -	**Existing and Future Conditions**

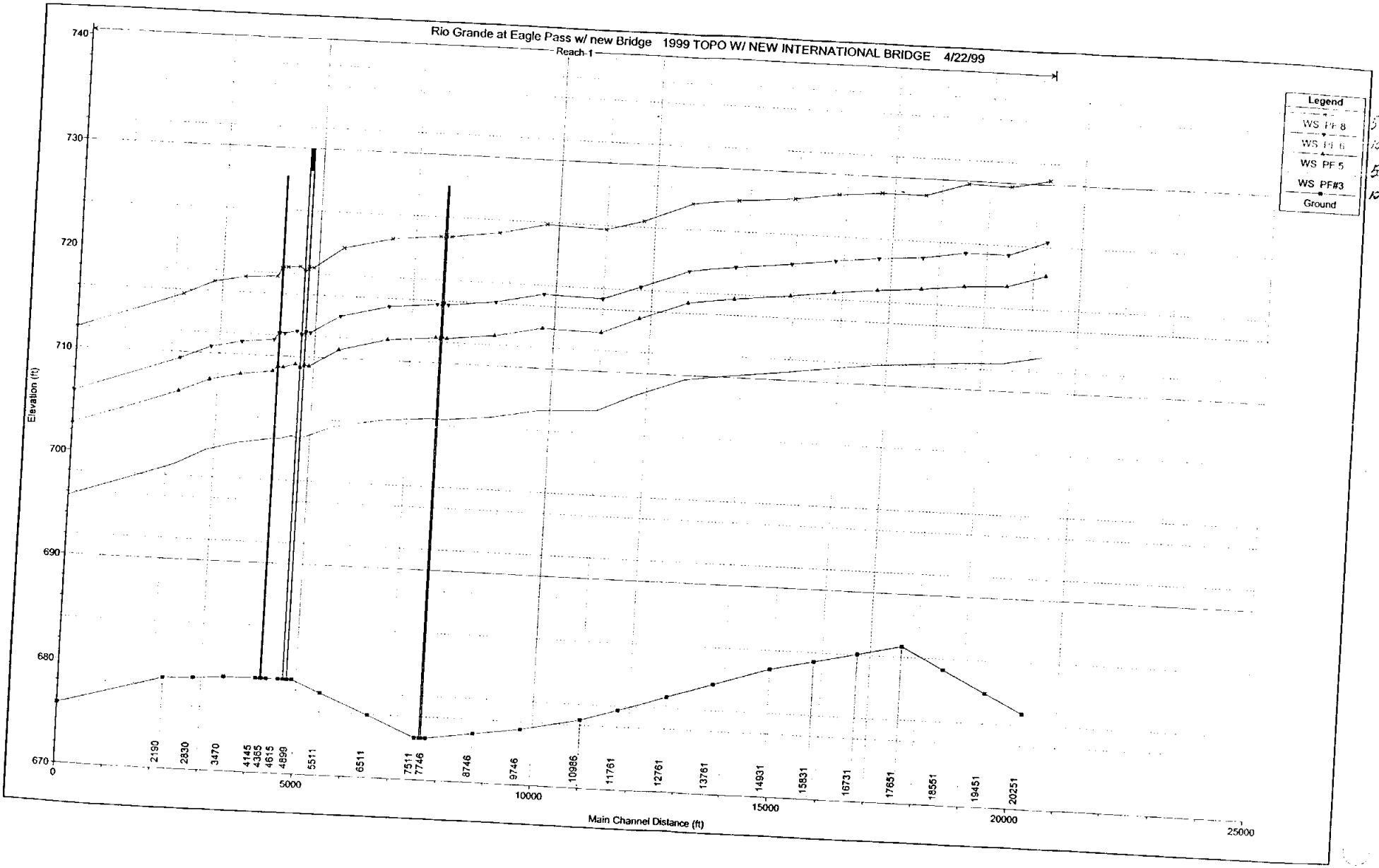
Table 4 - Drainag ucture Inventory

Location	Channel Station	Structure Size	Stream Bed Elevation	Low Chord Elev.	Top of Bridge Elev.	Material	Channel U. S.	Channel D. S.	Comments
Rio Grande River									
RR Bridge	4215.00	Bridge	679.00	724.50	729.00	Concrete	Natural	Natural	Existing RR Bridge
New International bridge	4245.00	Bridge	678.00	725.00	729.50	Concrete	Natural	Natural	New International Bridge
Old International bridge	7643.00	Bridge	674.00	725.00	727.00	Concrete	Natural	Natural	Old International Bridge
Main Arroyo									
Golf Cart Crossing	1458.00	5-4'x5' RBC	689.79	693.79	698.50	Concrete	Concrete	Concrete	at Eagle Pass Golf Course
Former Dam No. 1	1580.00	Dam No. 1	692.75	0.00	0.00	Concrete	Concrete	Concrete	Dam No. 1 removed
Adam's Street	2547.00	Arch Bridge	695.90	618.50	618.50	Concrete	Concrete	Concrete	Adam's Street
Former Dam No. 2	2745.00	Dam No. 2	696.00	0.00	0.00	Concrete	Concrete	Concrete	Dam No. 2 removed
Former Dam No. 3	3376.00	Dam No. 3	700.46	0.00	0.00	Concrete	Concrete	Concrete	Dam No. 3 removed
Garrison St. (Hwy 277)	3580.00	Bridge	702.23	720.00	722.10	Concrete	Concrete	Concrete	Garrison St. (Hwy. 277)
Monroe St.	4093.50	Bridge	705.40	721.60	723.30	Concrete	Concrete	Concrete	Monroe St.
Ceylon St.	4591.00	Bridge	709.60	720.00	721.60	Concrete	Concrete	Concrete	Ceylon St.
Southern-Pacific RR	4920.50	Bridge	710.80	728.70	730.70	Concrete	Concrete	Concrete	RR Bridge
Pierce St.	5044.50	7- 6'x10' RBC	711.30	717.40	720.80	Concrete	Concrete	Concrete	Pierce St.
Rio Grande St.	5733.50	Bridge	714.20	723.70	725.70	Concrete	Concrete	Concrete	Rio Grande St.
Main St.	6291.00	2-12'x15' RBC	716.90	728.90	729.40	Concrete	Concrete	Concrete	Main St.
Quarry St.	6987.00	2-7.5 'x17' RBC	720.30	727.80	729.70	Concrete	Concrete	Concrete	Quarry St.
Ferry St.	8807.00	Bridge	726.50	737.20	739.90	Concrete	Concrete	Concrete	Ferry St;
Medina St.	9156.00	3-7'x10' RBC	728.05	735.05	735.90	Concrete	Concrete	Concrete	Medina St.
Concho St.	9860.00	1-5.5'x20' RBC	733.25	739.00	740.90	Concrete	Concrete	Concrete	Concho St.
Tributary #3									
Trinity St.	10218.50	1-6.4'x29' RBC	736.80	743.20	746.10	Concrete	Concrete	Concrete	Trinity St.
Colorado St.	10575.50	1-6'15' RBC	739.60	745.83	747.30	Concrete	Concrete	Concrete	Colorado St.
North Comal St.	10935.00	7-4' Dia. RCP	742.35	746.35	752.80	Concrete	Concrete	Concrete	North Comal St.
Kelso Dr.	12244.00	3-3'x5' RBC	757.20	760.20	761.80	Concrete	Concrete	Concrete	Kelso St.
Bibb St.	13434.00	1-5'x20.5'	765.66	750.50	772.80	Concrete	Concrete	Concrete	Bibb St.
Vista Hermosa Dr.	14873.00	4-18" RCP	782.15	783.65	787.60	Concrete	Concrete	Concrete	Vista Hermosa Dr.

Table 4 - Drainag .ucture Inventory

Location	Channel Station	Structure Size	Stream Bed Elevation	Low Chord Elev.	Top of Bridge Elev.	Material	Channel U. S.	Channel D. S.	Comments
Tributary #1									
Williams St.	618.00	2-8'x11' RBC	716.49	724.49	730.20	Concrete	Concrete	Concrete	Williams St.
Private	709.00	Bridge	717.70	729.40	732.00	Concrete	Concrete	Concrete	Private
Pierce St.	917.00	1-6.5'x20' RBC	721.28	727.78	729.70	Concrete	Concrete	Concrete	Pierce St.
Crockett St.	1514.00	1-5.8'x16' RBC	726.54	732.30	733.00	Concrete	Concrete	Concrete	Crockett St.
Wilson St.	2102.50	1-5'x20' RBC	731.90	737.00	738.60	Concrete	Concrete	Concrete	Wilson St.
Travis St	2176.00	1-6'x18' RBC	731.40	737.40	738.10	Concrete	Concrete	Concrete	Travis St.
Tributary #2									
First St.	564.00	2-4'x10' RBC	739.83	743.83	745.00	Concrete	Concrete	Concrete	First St.
Second St.	1077.00	2-4'x10' RBC	742.40	746.40	747.10	Concrete	Concrete	Concrete	Second St.
Concho/Hidalgo St.	1662.00	2-4'x8' RBC	744.80	748.80	750.80	Concrete	Concrete	Concrete	Concho/Hidalgo St.
Trinity St.	2491.00	2-3.5'x8' RBC	749.80	753.30	753.90	Concrete	Concrete	Concrete	Trinity St.
Colorado St.	2853.00	2-4.5'x6' RBC	751.48	755.98	756.30	Concrete	Concrete	Concrete	Colorado St.
Arlington St.	3583.00	2-4.5'x6' RBC	754.76	759.26	759.70	Concrete	Concrete	Concrete	Arlington St.
Memorial Dr.	4354.00	2-4'x6' RBC	760.55	764.55	767.70	Concrete	Concrete	Concrete	Memorial Dr.
North Bibb St.	6042.00	3-2.5'x'5' RBC	775.32	777.82	778.60	Concrete	Natural	Natural	North Bibb St.
Royal Haven Dr.	6331.00	Concrete Dip	778.00	0.00	0.00	Concrete	Natural	Natural	Royal Haven Dr.
Unnamed Tributary									
El Indio Hwy. FM 1021	1208.50	5-7'x7' RBC	724.50	731.50	733.20	Concrete	Natural	Natural	El Indio Hwy. FM 1021
FM 3443	5258.50	6-8'x8' RBC	736.39	744.39	746.00	Concrete	Natural	Natural	FM 3443
Dell Crest Drive	6075.00	4-5'x8' RBC	739.70	744.70	746.70	Concrete	Natural	Natural	Dell Crest Drive
Cherry Leaf Drive	7536.50	8-4'x4' RBC	744.42	748.42	749.00	Concrete	Natural	Natural	Near Language Dev. Center
FM 3443	10050.00	16-3'x10' RBC	756.03	759.03	760.70	Concrete	Natural	Natural	FM 3443
FM 277 - Main Street	11742.00	9-5'x'5' RBC	763.20	768.30	770.90	Concrete	Natural	Natural	FM 277 - Main Street
Seco Creek Tributary									
Loop 431	3362.50	3-4'6' RBC	731.50	735.50	738.50	Concrete	Concrete	Natural	Loop 431
RR Tracks	4544.00	2-96" Steel Pipes	742.50	750.50	752.60	Steel	Natural	Natural	RR tracks

Rio Grande River
Existing and Future Conditions
Water Surface Profile and HECRAS Summary Printouts
10, 50, 100, & 500-year Storm Events


Rio Grande at Eagle Pass w/ new Bridge 1999 TOPO W/ NEW INTERNATIONAL BRIDGE 4/22/99
Reach 1
Legend
WS PF 8
WS PF 6
WS PF 5
WS PF#3
Ground
Elevation (ft)
740
730
720
710
700
690
680
670
0
2190
2830
3470
4145
4365
4615
4899
5111
6511
7511
7746
8746
9746
10986
11761
12761
13761
14931
15831
16731
17651
18561
19451
20251
5000
10000
15000
20000
25000
Main Channel Distance (ft)

HEC-RAS Plan: 1999 TOPO River: RIVER-1 Reach: Reach-1

Reach	River Sta	Profile	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(CFS)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	0[illegible]	90000.00	675.80	695.65	688.84	696.84	0.000950	8.74	10403.05	858.93	0.42
		180000.00	675.80	702.70	693.93	704.61	0.000951	11.19	17134.05	1012.92	0.44
		230000.00	675.80	705.83	696.44	708.09	0.000951	12.25	20598.66	1313.02	0.45
		350000.00	675.80	711.96	701.19	714.80	0.000951	13.98	30685.85	1837.32	0.47
Reach-1	2190	90000.00	678.67	699.13		700.02	0.002444	7.58	11866.96	1137.12	0.41
Reach-1	2190	180000.00	678.67	706.19		707.43	0.001734	8.96	20341.62	1268.96	0.38
Reach-1	2190	230000.00	678.67	709.41		710.82	0.001579	9.58	24472.22	1291.71	0.37
Reach-1	2190	350000.00	678.67	715.61		717.46	0.001469	11.01	32899.12	1443.37	0.37
Reach-1	2830	90000.00	678.78	700.63		701.26	0.001497	6.34	14198.31	1218.92	0.33
Reach-1	2830	180000.00	678.78	707.44		708.40	0.001266	7.89	23485.83	1508.62	0.32
Reach-1	2830	230000.00	678.78	710.63		711.72	0.001175	8.46	28404.55	1559.21	0.32
Reach-1	2830	350000.00	678.78	716.92		718.31	0.001093	9.68	38378.82	1694.58	0.32
Reach-1	3470	90000.00	679.00	701.43		702.18	0.001287	6.94	12967.28	886.21	0.32
Reach-1	3470	180000.00	679.00	708.10		709.34	0.001421	9.07	21614.49	1558.67	0.35
Reach-1	3470	230000.00	679.00	711.24		712.60	0.001338	9.68	26626.74	1628.27	0.35
Reach-1	3470	350000.00	679.00	717.48		719.12	0.001233	10.87	37072.84	1712.17	0.35
Reach-1	4145	90000.00	679.00	701.93	691.62	702.95	0.000837	8.38	12586.94	971.37	0.33
Reach-1	4145	180000.00	679.00	708.51	698.33	710.37	0.001124	11.71	20161.96	1368.07	0.40
Reach-1	4145	230000.00	679.00	711.54	701.35	713.67	0.001160	12.78	24619.66	1536.75	0.41
Reach-1	4145	350000.00	679.00	717.68	706.83	720.18	0.001160	14.47	35124.66	1741.76	0.42
Reach-1	4245	90000.00	679.00	702.00	691.91	703.05	0.000881	8.55	12963.57	1225.90	0.33
Reach-1	4245	180000.00	679.00	708.97	698.99	710.51	0.000986	11.01	23293.83	1692.07	0.37
Reach-1	4245	230000.00	679.00	712.21	701.79	713.82	0.000944	11.61	28833.06	1722.48	0.37
Reach-1	4245	350000.00	679.00	718.50	707.53	720.35	0.000912	12.93	39791.29	1760.71	0.38
Reach-1	4246	90000.00	679.00	701.99	691.91	703.06	0.000737	8.61	12953.92	1224.88	0.34
Reach-1	4246	180000.00	679.00	708.93	699.00	710.56	0.000848	11.24	23236.52	1691.52	0.38
Reach-1	4246	230000.00	679.00	712.16	701.71	713.89	0.000822	11.93	28756.22	1722.21	0.38
Reach-1	4246	350000.00	679.00	718.43	707.66	720.45	0.000808	13.40	39681.25	1760.33	0.39
Reach-1	4255	Bridge									
Reach-1	4264	90000.00	679.00	702.00	692.05	703.09	0.000755	8.71	12937.07	1236.33	0.34
Reach-1	4264	180000.00	679.00	708.97	699.09	710.59	0.000853	11.27	23359.90	1689.09	0.38
Reach-1	4264	230000.00	679.00	712.25	702.54	713.95	0.000819	11.92	28958.57	1717.83	0.38
Reach-1	4264	350000.00	679.00	718.62	708.11	720.59	0.000796	13.33	40015.35	1753.98	0.39
Reach-1	4265	90000.00	679.00	702.00	692.05	703.09	0.000754	8.70	12937.97	1236.36	0.34
Reach-1	4265	180000.00	679.00	708.97	699.09	710.59	0.000853	11.27	23361.34	1689.10	0.38
Reach-1	4265	230000.00	679.00	712.25	702.54	713.95	0.000819	11.92	28959.93	1717.84	0.38
Reach-1	4265	350000.00	679.00	718.62	708.11	720.59	0.000796	13.33	40016.74	1753.99	0.39
Reach-1	4365	90000.00	679.00	702.00	692.52	703.22	0.001008	9.14	11400.25	889.05	0.36
Reach-1	4365	180000.00	679.00	708.92	699.44	710.75	0.001143	11.86	21374.01	1716.64	0.40
Reach-1	4365	230000.00	679.00	712.21	701.49	714.10	0.001079	12.44	26669.49	1732.55	0.40
Reach-1	4365	350000.00	679.00	718.59	709.04	720.73	0.001026	13.78	37032.86	1759.82	0.40
Reach-1	4615	90000.00	679.00	702.33	692.61	703.46	0.000819	8.79	11978.11	1040.79	0.35
Reach-1	4615	180000.00	679.00	709.29	699.45	711.02	0.000934	11.45	20468.04	1309.94	0.39
Reach-1	4615	230000.00	679.00	712.45	701.55	714.36	0.000927	12.29	24619.46	1337.99	0.39
Reach-1	4615	350000.00	679.00	718.70	708.42	721.03	0.000933	13.98	32859.13	1406.68	0.41
Reach-1	4715	90000.00	679.00	702.16	693.53	703.64	0.000768	10.34	11603.71	1017.76	0.39
Reach-1	4715	180000.00	679.00	709.02	701.57	711.27	0.000916	13.57	19640.00	1292.53	0.45
Reach-1	4715	230000.00	679.00	712.18	703.97	714.61	0.000907	14.49	23730.64	1297.26	0.45
Reach-1	4715	350000.00	679.00	718.40	709.84	721.29	0.000910	16.35	31838.02	1306.61	0.47
Reach-1	4757	Bridge									
Reach-1	4799	90000.00	679.00	702.33	693.53	703.76	0.000744	10.23	11768.14	1022.44	0.39
Reach-1	4799	180000.00	679.00	709.27	701.57	711.44	0.000878	13.37	19967.28	1292.91	0.44
Reach-1	4799	230000.00	679.00	712.45	703.97	714.80	0.000871	14.27	24088.59	1297.68	0.45
Reach-1	4799	350000.00	679.00	718.71	709.84	721.51	0.000877	16.14	32233.32	1307.06	0.46
Reach-1	4899	90000.00	679.00	702.29	694.00	703.89	0.000868	10.81	10609.80	960.29	0.41
Reach-1	4899	180000.00	679.00	709.13	702.22	711.64	0.001051	14.29	17989.00	1299.69	0.47

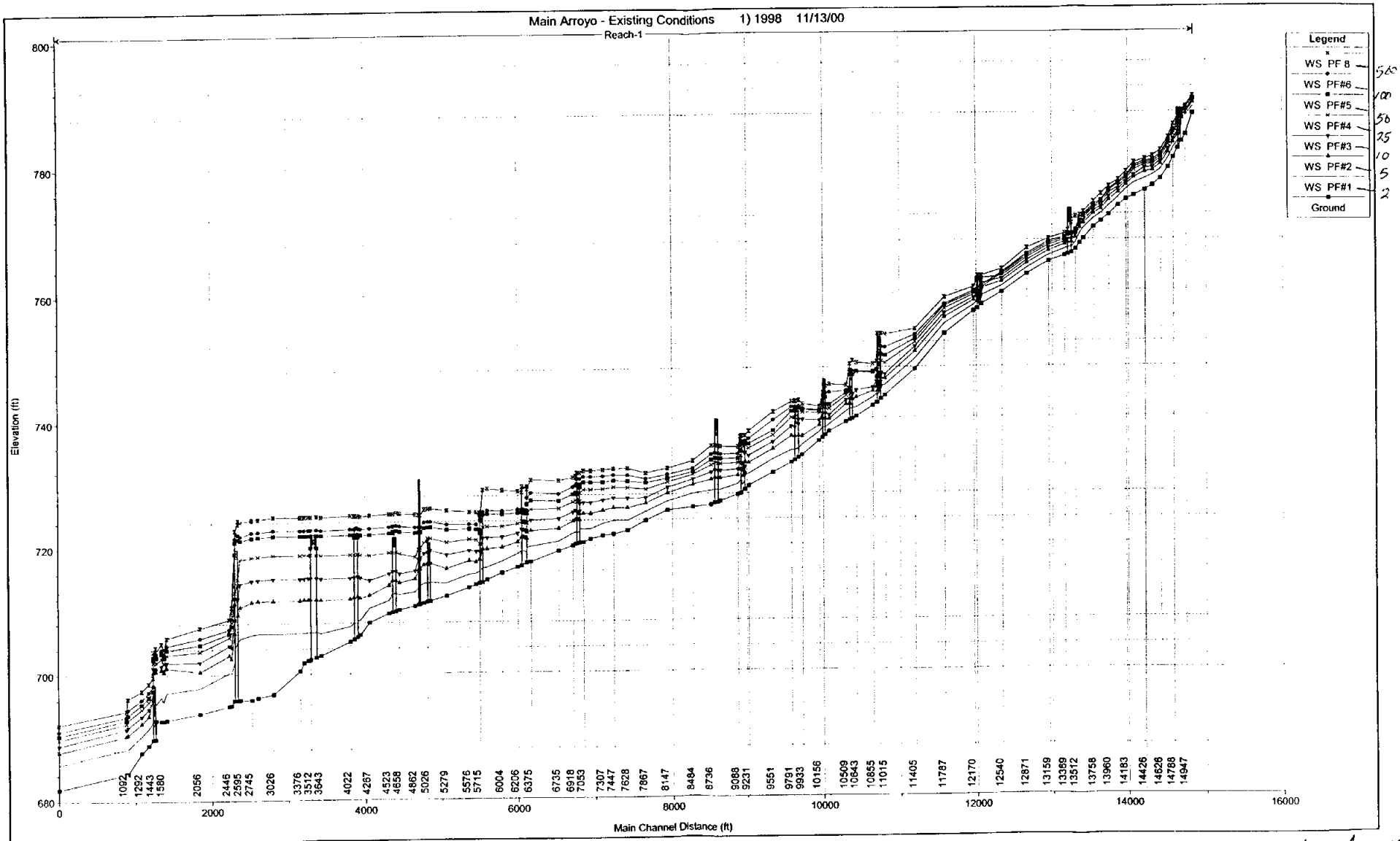
HEC-RAS Plan: 1999 TOPO River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	4899	230000.00	679.00	712.33	704.92	714.99	0.001020	15.12	22162.25	1304.50	0.47
Reach-1	4899	350000.00	679.00	718.63	710.87	721.68	0.000993	16.83	30401.85	1313.94	0.48
Reach-1	5511	90000.00	677.83	703.42	692.48	704.37	0.000523	8.34	13768.82	1117.96	0.31
Reach-1	5511	180000.00	677.83	710.80	700.19	712.22	0.000608	10.86	24043.32	1728.09	0.35
Reach-1	5511	230000.00	677.83	714.08	702.96	715.56	0.000588	11.44	29914.27	1951.55	0.35
Reach-1	5511	350000.00	677.83	720.65	707.77	722.25	0.000545	12.42	41852.78	1990.50	0.35
Reach-1	6511	90000.00	675.92	704.27		704.80	0.000297	6.72	19438.43	1429.67	0.24
Reach-1	6511	180000.00	675.92	711.98		712.74	0.000333	8.56	32635.93	1892.17	0.27
Reach-1	6511	230000.00	675.92	715.23		716.08	0.000338	9.19	38822.77	1910.57	0.27
Reach-1	6511	350000.00	675.92	721.72		722.76	0.000349	10.46	51327.97	1943.63	0.29
Reach-1	7511	90000.00	674.00	704.62	691.67	705.07	0.000253	6.40	20563.13	1476.64	0.22
Reach-1	7511	180000.00	674.00	712.39	699.69	713.05	0.000287	8.14	33843.68	1822.82	0.25
Reach-1	7511	230000.00	674.00	715.65	701.45	716.39	0.000291	8.74	39798.23	1829.65	0.26
Reach-1	7511	350000.00	674.00	722.14	704.99	723.08	0.000306	9.99	51719.44	1845.23	0.27
Reach-1	7612	90000.00	674.00	704.57	692.28	705.14	0.000326	7.08	20010.89	1500.86	0.25
Reach-1	7612	180000.00	674.00	712.31	700.26	713.13	0.000368	9.01	32990.41	1741.00	0.28
Reach-1	7612	230000.00	674.00	715.55	702.14	716.48	0.000382	9.78	38631.23	1741.00	0.29
Reach-1	7612	350000.00	674.00	722.00	705.76	723.19	0.000415	11.38	49854.01	1741.00	0.31
Reach-1	7612	90000.00	674.00	704.57	692.28	705.14	0.000326	7.08	20011.34	1500.87	0.25
Reach-1	7612	180000.00	674.00	712.31	700.26	713.13	0.000368	9.01	32991.04	1741.00	0.28
Reach-1	7612	230000.00	674.00	715.55	702.14	716.48	0.000382	9.78	38631.87	1741.00	0.29
Reach-1	7612	350000.00	674.00	722.00	705.76	723.19	0.000415	11.38	49854.75	1741.00	0.31
Reach-1	7628.5	Bridge									
Reach-1	7645	90000.00	674.00	704.63	692.28	705.20	0.000322	7.05	20107.42	1503.11	0.25
Reach-1	7645	180000.00	674.00	712.43	700.26	713.23	0.000362	8.96	33188.48	1741.00	0.28
Reach-1	7645	230000.00	674.00	715.68	702.14	716.59	0.000376	9.72	38847.37	1741.00	0.29
Reach-1	7645	350000.00	674.00	722.15	705.76	723.33	0.000408	11.31	50111.90	1741.00	0.31
Reach-1	7646	90000.00	674.00	704.63	692.28	705.20	0.000322	7.05	20107.88	1503.12	0.25
Reach-1	7646	180000.00	674.00	712.43	700.26	713.23	0.000362	8.96	33189.12	1741.00	0.28
Reach-1	7646	230000.00	674.00	715.68	702.14	716.59	0.000376	9.72	38848.00	1741.00	0.29
Reach-1	7646	350000.00	674.00	722.15	705.76	723.33	0.000408	11.31	50112.65	1741.00	0.31
Reach-1	7746	90000.00	674.00	704.56	693.82	705.28	0.000426	8.05	18509.47	1556.93	0.29
Reach-1	7746	180000.00	674.00	712.38	701.96	713.31	0.000443	9.87	32113.89	1899.87	0.31
Reach-1	7746	230000.00	674.00	715.66	703.81	716.66	0.000440	10.49	38292.17	1946.81	0.31
Reach-1	7746	350000.00	674.00	722.18	706.99	723.38	0.000447	11.83	50643.71	2040.15	0.32
Reach-1	8746	90000.00	674.65	705.02		705.77	0.000746	7.97	17721.18	1709.24	0.29
Reach-1	8746	180000.00	674.65	712.89		713.78	0.000709	9.44	32424.99	2071.67	0.30
Reach-1	8746	230000.00	674.65	716.18		717.11	0.000688	9.94	39399.98	2141.58	0.30
Reach-1	8746	350000.00	674.65	722.76		723.82	0.000664	10.97	53804.88	2243.51	0.30
Reach-1	9746	90000.00	675.30	705.91		706.38	0.000502	6.13	21447.14	2554.41	0.23
Reach-1	9746	180000.00	675.30	713.87		714.27	0.000351	6.30	42298.12	2677.86	0.20
Reach-1	9746	230000.00	675.30	717.16		717.58	0.000329	6.54	51173.19	2714.68	0.20
Reach-1	9746	350000.00	675.30	723.78		724.27	0.000306	7.12	69343.08	2778.87	0.20
Reach-1	10986	90000.00	676.50	706.20		707.66	0.001467	9.73	9467.20	565.14	0.37
Reach-1	10986	180000.00	676.50	713.72		715.41	0.001378	11.56	24093.93	2114.95	0.38
Reach-1	10986	230000.00	676.50	717.01		718.64	0.001255	11.86	31079.97	2128.06	0.37
Reach-1	10986	350000.00	676.50	723.61		725.24	0.001094	12.55	45217.20	2154.34	0.36
Reach-1	11761	90000.00	677.60	707.83		709.03	0.002051	8.87	11244.49	1373.07	0.37
Reach-1	11761	180000.00	677.60	715.27		716.62	0.001721	10.25	23461.37	1704.12	0.36
Reach-1	11761	230000.00	677.60	718.31		719.75	0.001663	10.86	28704.38	1745.95	0.36
Reach-1	11761	350000.00	677.60	724.57		726.23	0.001562	12.02	39927.71	1841.70	0.36
Reach-1	12761	90000.00	679.05	709.57		709.97	0.000474	5.10	19510.38	2351.86	0.20
Reach-1	12761	180000.00	679.05	717.00		717.49	0.000463	6.16	40966.26	3211.79	0.20
Reach-1	12761	230000.00	679.05	720.09		720.60	0.000451	6.52	51273.45	3463.50	0.21
Reach-1	12761	350000.00	679.05	726.49		727.01	0.000402	6.97	74248.50	3618.40	0.20
Reach-1	13761	90000.00	680.50	710.15		710.48	0.000547	4.66	20463.60	1900.15	0.19

HEC-RAS Plan: 1999 TOPO River: RIVER-1 Reach: Reach-1 (Continued)

River	Reach	RS	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
			180000.00	680.50	717.56		717.99	0.000528	5.71	41218.63	3307.42	0.20
			230000.00	680.50	720.64		721.09	0.000509	6.03	51957.52	3669.03	0.20
			350000.00	680.50	726.99		727.45	0.000436	6.36	76095.95	3827.84	0.19
			90000.00	682.20	710.78	697.48	711.26	0.000712	5.73	18594.52	2158.59	0.23
			180000.00	682.20	718.15	703.30	718.72	0.000655	6.79	35398.70	2442.59	0.23
			230000.00	682.20	721.19	705.55	721.82	0.000652	7.27	42852.31	2559.08	0.23
			350000.00	682.20	727.40	712.16	726.15	0.000638	8.15	58991.21	2941.35	0.24
			90000.00	683.13	711.34		711.76	0.000446	5.29	19286.37	1917.49	0.21
			180000.00	683.13	718.67		719.24	0.000501	6.59	37131.07	2993.11	0.22
			230000.00	683.13	721.71		722.34	0.000522	7.14	47169.32	3477.53	0.23
			350000.00	683.13	728.03		728.65	0.000463	7.49	69224.14	3495.05	0.22
			90000.00	684.05	711.84		712.14	0.000385	4.49	21201.19	1392.12	0.18
			180000.00	684.05	719.10		719.68	0.000507	6.29	34493.02	2854.44	0.21
			230000.00	684.05	722.15		722.80	0.000519	6.84	44536.86	3746.67	0.22
			350000.00	684.05	728.40		729.03	0.000451	7.24	70903.25	4305.30	0.21
			90000.00	685.00	712.16		712.60	0.000547	5.34	16959.36	970.56	0.22
			180000.00	685.00	719.45		720.31	0.000699	7.51	25921.09	1561.74	0.26
			230000.00	685.00	722.44		723.50	0.000757	8.41	30845.71	1733.25	0.28
			350000.00	685.00	728.41		729.84	0.000841	10.04	42414.66	2173.57	0.30
			90000.00	682.96	712.49		713.01	0.000338	6.01	17501.73	1216.33	0.22
			180000.00	682.96	719.88		720.85	0.000464	8.47	32350.20	3772.56	0.27
			230000.00	682.96	723.09		724.01	0.000430	8.72	46235.59	4908.71	0.26
			350000.00	682.96	729.70		730.34	0.000302	8.23	85841.42	6585.37	0.23
			90000.00	680.91	712.66		713.39	0.000387	7.53	16980.30	1396.30	0.27
			180000.00	680.91	720.11		721.36	0.000514	10.36	29084.90	2525.26	0.32
			230000.00	680.91	723.10		724.62	0.000580	11.68	38121.21	3501.02	0.35
			350000.00	680.91	729.63		730.80	0.000443	11.44	65588.38	4454.60	0.31
			90000.00	679.10	713.38		713.66	0.000217	4.56	24122.11	1626.04	0.16
			180000.00	679.10	721.26		721.73	0.000273	6.14	38941.45	2122.93	0.19
			230000.00	679.10	724.48		725.04	0.000295	6.80	46075.79	2308.10	0.20
			350000.00	679.10	730.38		731.16	0.000352	8.22	60885.64	2923.46	0.22

Main Arroyo & Tributary 3
Existing and Future Conditions
Water Surface Profile and HECRAS Summary Printouts
2, 5, 10, 25, 50, 100, & 500-year Storm Events



Main Arroyo
+
Trib. 3

Main Arroyo Existing Q's

HEC-RAS Plan: 1998 River: RIVER-1 Reach: Reach-1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2120	850.00	681.80	685.70	684.15	685.87	0.002846	3.28	259.53	101.13	0.36
Reach-1	2120	2044.00	681.80	687.67	685.43	687.94	0.002845	4.20	486.36	129.94	0.38
Reach-1	2120	2970.00	681.80	688.73	686.18	689.07	0.002843	4.70	631.80	142.35	0.39
Reach-1	2120	4050.00	681.80	689.70	686.90	690.12	0.002845	5.25	772.09	147.27	0.40
Reach-1	2120	4830.00	681.80	690.33	687.38	690.81	0.002844	5.58	866.20	150.48	0.41
Reach-1	2120	5710.00	681.80	690.99	687.84	691.53	0.002843	5.90	973.29	222.48	0.42
Reach-1	2120	7450.00	681.80	692.08	688.67	692.71	0.002844	6.42	1308.82	392.26	0.42
Reach-1	1092	850.00	684.30	688.26		688.75	0.003538	5.60	151.76	42.79	0.52
Reach-1	1092	2044.00	684.30	690.35		691.41	0.004939	8.25	247.70	49.40	0.65
Reach-1	1092	2970.00	684.30	691.43		692.92	0.005964	9.80	303.09	53.70	0.73
Reach-1	1092	4050.00	684.30	692.35		694.38	0.007184	11.44	354.10	57.04	0.81
Reach-1	1092	4830.00	684.30	692.89		695.33	0.008009	12.52	385.77	58.68	0.86
Reach-1	1092	5710.00	684.30	693.43		696.33	0.008944	13.67	417.58	60.28	0.92
Reach-1	1092	7450.00	684.30	694.34	694.34	698.18	0.010485	15.72	474.12	64.05	1.00
Reach-1	1112	850.00	684.36	688.27		688.79	0.000737	5.74	148.15	45.70	0.56
Reach-1	1112	2044.00	684.36	690.48		691.45	0.000853	7.89	258.93	54.56	0.64
Reach-1	1112	2970.00	684.36	691.71		692.98	0.000915	9.02	329.12	59.50	0.68
Reach-1	1112	4050.00	684.36	692.88		694.46	0.000979	10.10	401.03	64.16	0.71
Reach-1	1112	4830.00	684.36	693.68		695.44	0.000989	10.65	453.49	67.36	0.72
Reach-1	1112	5710.00	684.36	694.55		696.47	0.000970	11.11	514.28	72.03	0.72
Reach-1	1112	7450.00	684.36	696.32		698.40	0.000840	11.58	656.50	87.05	0.69
Reach-1	1292	850.00	687.67	690.40	690.40	691.60	0.002597	8.78	96.81	40.92	1.01
Reach-1	1292	2044.00	687.67	692.36	692.36	694.26	0.002237	11.06	184.87	48.77	1.00
Reach-1	1292	2970.00	687.67	693.51	693.51	695.82	0.002139	12.19	243.64	53.38	1.01
Reach-1	1292	4050.00	687.67	694.67	694.67	697.35	0.002043	13.14	308.27	58.02	1.00
Reach-1	1292	4830.00	687.67	695.41	695.41	698.33	0.001999	13.71	352.19	60.97	1.01
Reach-1	1292	5710.00	687.67	696.18	696.18	699.34	0.001955	14.27	400.18	64.04	1.01
Reach-1	1292	7450.00	687.67	697.53	697.53	701.12	0.001892	15.19	490.51	69.46	1.01
Reach-1	1387	850.00	688.84	691.57	691.57	692.77	0.002589	8.77	96.92	40.93	1.00
Reach-1	1387	2044.00	688.84	693.52	693.52	695.43	0.002261	11.10	184.18	48.72	1.01
Reach-1	1387	2970.00	688.84	694.69	694.69	696.99	0.002136	12.18	243.75	53.39	1.00
Reach-1	1387	4050.00	688.84	695.84	695.84	698.52	0.002047	13.15	308.04	58.00	1.01
Reach-1	1387	4830.00	688.84	696.58	696.58	699.50	0.001998	13.71	352.24	60.97	1.01
Reach-1	1387	5710.00	688.84	697.37	697.37	700.51	0.001936	14.22	401.57	64.13	1.00
Reach-1	1387	7450.00	688.84	698.70	698.70	702.29	0.001892	15.19	490.51	69.46	1.01
Reach-1	1443	850.00	689.79	692.71	692.71	694.17	0.002299	9.70	87.60	41.68	1.00
Reach-1	1443	2044.00	689.79	696.15	696.15	697.03	0.000743	7.52	271.71	55.44	0.60
Reach-1	1443	2970.00	689.79	696.16	696.16	698.01	0.001563	10.91	272.12	55.47	0.87
Reach-1	1443	4050.00	689.79	696.81	696.81	699.47	0.002025	13.10	309.21	58.08	1.00
Reach-1	1443	4830.00	689.79	697.56	697.56	700.45	0.001975	13.66	353.69	61.07	1.00
Reach-1	1443	5710.00	689.79	698.33	698.33	701.46	0.001931	14.20	401.98	64.16	1.00
Reach-1	1443	7450.00	689.79	699.71	699.71	703.24	0.001853	15.08	494.17	69.67	1.00
Reach-1	1158	Culvert									
Reach-1	1073	850.00	689.84	695.82	692.75	696.17	0.000210	4.73	179.54	55.27	0.34
Reach-1	1073	2044.00	689.84	700.68	695.07	700.88	0.000091	3.54	602.60	123.92	0.23
Reach-1	1073	2970.00	689.84	701.18	696.57	701.54	0.000154	4.80	669.01	141.43	0.30
Reach-1	1073	4050.00	689.84	702.24	697.92	702.73	0.000184	5.69	837.87	177.22	0.33
Reach-1	1073	4830.00	689.84	703.06	698.51	703.62	0.000190	6.11	993.27	201.82	0.34
Reach-1	1073	5710.00	689.84	703.52	698.51	704.21	0.000222	6.82	1090.12	215.73	0.37
Reach-1	1073	7450.00	689.84	704.33	699.67	705.26	0.000282	8.07	1271.11	230.98	0.42
Reach-1	1483	850.00	692.84	695.50	695.50	696.62	0.002618	8.50	100.05	45.20	1.01
Reach-1	1483	2044.00	692.84	700.54		700.94	0.000273	5.11	414.12	106.16	0.38
Reach-1	1483	2970.00	692.84	700.92		701.66	0.000462	6.93	457.04	120.37	0.50
Reach-1	1483	4050.00	692.84	701.92		702.88	0.000498	7.97	595.93	157.81	0.53
Reach-1	1483	4830.00	692.84	702.74		703.76	0.000467	8.30	734.05	176.15	0.52
Reach-1	1483	5710.00	692.84	703.14		704.38	0.000540	9.23	805.76	184.31	0.56
Reach-1	1483	7450.00	692.84	703.79		705.50	0.000686	10.93	929.69	197.61	0.64
Reach-1	1553	850.00	692.75	696.58		696.77	0.000436	3.55	239.16	79.92	0.36
Reach-1	1553	2044.00	692.75	700.83		700.98	0.000135	3.15	653.68	118.98	0.23
Reach-1	1553	2970.00	692.75	701.46		701.73	0.000203	4.13	732.16	128.18	0.28
Reach-1	1553	4050.00	692.75	702.61		702.96	0.000220	4.78	887.82	142.07	0.30
Reach-1	1553	4830.00	692.75	703.44		703.84	0.000221	5.12	1009.93	150.42	0.31
Reach-1	1553	5710.00	692.75	704.00		704.48	0.000248	5.66	1094.59	155.95	0.33
Reach-1	1553	7450.00	692.75	704.97		705.63	0.000298	6.62	1258.09	180.20	0.37

HEC-RAS Plan: 1998 River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
Reach-1	1580	850.00	692.75	695.80	695.76	697.15	0.003809	9.34	91.00	32.65	0.99
Reach-1	1580	2044.00	692.75	700.46		701.15	0.000680	6.87	383.79	122.33	0.47
Reach-1	1580	2970.00	692.75	700.80		702.03	0.001168	9.30	425.66	128.32	0.62
Reach-1	1580	4050.00	692.75	701.89		703.29	0.001161	10.23	576.27	147.90	0.64
Reach-1	1580	4830.00	692.75	702.79		704.14	0.001021	10.30	712.95	152.32	0.61
Reach-1	1580	5710.00	692.75	703.26		704.82	0.001137	11.25	783.54	153.73	0.65
Reach-1	1580	7450.00	692.75	703.99		706.02	0.001386	13.05	896.85	155.96	0.72
Reach-1	1589	850.00	692.75	696.09		697.20	0.002821	8.43	100.86	33.49	0.86
Reach-1	1589	2044.00	692.75	700.47		701.15	0.000677	6.86	384.54	122.43	0.47
Reach-1	1589	2970.00	692.75	700.81		702.03	0.001157	9.27	427.60	128.59	0.62
Reach-1	1589	4050.00	692.75	701.90		703.29	0.001152	10.20	578.53	148.17	0.64
Reach-1	1589	4830.00	692.75	702.80		704.14	0.001016	10.28	714.36	152.35	0.61
Reach-1	1589	5710.00	692.75	703.27		704.82	0.001129	11.22	785.85	153.78	0.65
Reach-1	1589	7450.00	692.75	704.01		706.10	0.001408	13.18	900.26	169.25	0.73
Reach-1	1623	850.00	692.90	697.23		697.31	0.000116	2.23	381.44	92.47	0.19
Reach-1	1623	2044.00	692.90	701.10		701.21	0.000077	2.71	766.81	123.83	0.17
Reach-1	1623	2970.00	692.90	701.95		702.15	0.000113	3.53	881.17	143.91	0.21
Reach-1	1623	4050.00	692.90	703.15		703.41	0.000132	4.15	1089.54	181.83	0.23
Reach-1	1623	4830.00	692.90	703.95		704.26	0.000140	4.51	1238.47	191.41	0.24
Reach-1	1623	5710.00	692.90	704.59		704.96	0.000157	4.96	1362.65	196.33	0.26
Reach-1	1623	7450.00	692.90	705.80		706.28	0.000180	5.70	1606.15	205.23	0.29
Reach-1	2056	800.00	693.86	697.91	697.91	699.48	0.006574	10.04	79.71	25.74	1.01
Reach-1	2056	1950.00	693.86	700.48	700.48	702.93	0.005797	12.56	155.78	34.10	1.00
Reach-1	2056	2850.00	693.86	701.97	701.97	704.98	0.005018	13.97	211.45	40.63	0.98
Reach-1	2056	3900.00	693.86	703.65	703.65	706.99	0.004136	14.83	296.68	61.03	0.92
Reach-1	2056	4650.00	693.86	704.71	704.71	708.18	0.003716	15.27	367.08	70.09	0.89
Reach-1	2056	5510.00	693.86	705.70	705.70	709.39	0.003522	15.93	439.76	76.69	0.88
Reach-1	2056	7200.00	693.86	707.34	707.34	711.43	0.003338	17.14	571.53	84.12	0.88
Reach-1	2448	800.00	695.02	700.28		701.07	0.002573	7.16	111.85	29.30	0.64
Reach-1	2448	1950.00	695.02	703.00		704.53	0.002775	9.98	202.26	37.13	0.71
Reach-1	2448	2850.00	695.02	704.52		706.54	0.002893	11.54	262.62	44.40	0.74
Reach-1	2448	3900.00	695.02	705.83		708.44	0.003074	13.23	327.96	55.51	0.78
Reach-1	2448	4650.00	695.02	706.45		709.59	0.003401	14.56	363.95	58.81	0.83
Reach-1	2448	5510.00	695.02	707.09	706.95	710.82	0.003748	15.97	402.20	61.35	0.88
Reach-1	2448	7200.00	695.02	708.68	708.68	713.00	0.003676	17.43	505.04	67.73	0.90
Reach-1	2478	800.00	695.12	700.15		701.39	0.004066	8.95	89.37	20.80	0.76
Reach-1	2478	1950.00	695.12	702.47	702.47	705.48	0.006258	13.95	143.19	25.51	0.98
Reach-1	2478	2850.00	695.12	704.37	704.37	707.97	0.005748	15.37	195.61	31.17	0.96
Reach-1	2478	3900.00	695.12	706.46	706.46	710.32	0.004633	16.13	275.46	43.86	0.90
Reach-1	2478	4650.00	695.12	707.61	707.61	711.71	0.004365	16.83	327.67	47.46	0.89
Reach-1	2478	5510.00	695.12	708.79	708.79	713.14	0.004147	17.54	385.98	51.19	0.88
Reach-1	2478	7200.00	695.12	710.63	710.63	715.64	0.004104	19.15	485.93	58.30	0.90
Reach-1	2510	800.00	695.90	701.82	701.82	704.77	0.035702	13.79	58.00	9.80	1.00
Reach-1	2510	1950.00	695.90	706.50	706.50	710.08	0.023501	15.17	128.53	44.58	1.00
Reach-1	2510	2850.00	695.90	708.57	708.57	713.16	0.021476	17.19	165.82	49.57	1.00
Reach-1	2510	3900.00	695.90	710.71	710.71	716.37	0.020055	19.09	204.31	64.72	1.00
Reach-1	2510	4650.00	695.90	712.11	712.11	718.49	0.019353	20.26	229.49	79.06	1.00
Reach-1	2510	5510.00	695.90	719.11	719.11	719.48	0.001003	6.17	1208.86	152.59	0.24
Reach-1	2510	7200.00	695.90	719.11	719.11	719.75	0.001713	8.07	1208.86	152.59	0.32
Reach-1	2525	Bridge									
Reach-1	2565	800.00	695.90	705.22	701.80	706.12	0.007644	7.58	105.48	42.81	0.55
Reach-1	2565	1950.00	695.90	709.42	706.49	711.22	0.007504	10.77	181.03	53.98	0.60
Reach-1	2565	2850.00	695.90	712.13	708.53	714.52	0.007241	12.40	229.76	79.13	0.61
Reach-1	2565	3900.00	695.90	715.08	710.67	718.03	0.006781	13.79	282.85	93.61	0.61
Reach-1	2565	4650.00	695.90	721.41	712.07	721.57	0.000445	4.43	1680.59	273.23	0.17
Reach-1	2565	5510.00	695.90	722.15	713.61	722.33	0.000504	4.82	1902.52	321.90	0.18
Reach-1	2565	7200.00	695.90	724.36	716.36	724.51	0.000392	4.52	2755.18	446.47	0.16
Reach-1	2585	800.00	696.00	705.67		706.28	0.001230	6.27	133.76	24.78	0.41
Reach-1	2585	1950.00	696.00	710.63		711.55	0.001054	8.17	308.31	49.03	0.41
Reach-1	2585	2850.00	696.00	714.34		715.06	0.000672	7.77	545.05	69.51	0.34
Reach-1	2585	3900.00	696.00	718.18		718.77	0.000457	7.39	843.59	85.98	0.29
Reach-1	2585	4650.00	696.00	721.18		721.83	0.000421	7.79	1153.16	189.36	0.29
Reach-1	2585	5510.00	696.00	721.84		722.68	0.000536	8.96	1291.83	237.14	0.33
Reach-1	2585	7200.00	696.00	724.10		724.80	0.000470	8.92	2013.90	386.06	0.31

HEC-RAS Plan: 1998 River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	4022		420.00	705.03	707.45	708.12	0.004275	6.59	63.71	28.53	0.78
Reach-1	4022		1170.00	705.03	711.81	712.30	0.001070	5.63	207.68	39.33	0.43
Reach-1	4022		1770.00	705.03	715.17	715.53	0.000431	4.93	413.37	80.17	0.30
Reach-1	4022		2470.00	705.03	718.85	719.10	0.000204	4.31	759.68	110.58	0.22
Reach-1	4022		2980.00	705.03	721.97	722.14	0.000113	3.73	1225.03	202.45	0.17
Reach-1	4022		3570.00	705.03	722.87	723.06	0.000123	4.04	1411.51	212.01	0.18
Reach-1	4022		4700.00	705.03	724.98	725.17	0.000115	4.24	1967.00	379.47	0.17
Reach-1	4074		420.00	705.40	707.98	707.19	708.37	0.000875	5.03	83.48	34.80	0.57
Reach-1	4074		1170.00	705.40	712.05	708.88	712.41	0.000287	4.81	243.45	45.67	0.36
Reach-1	4074		1770.00	705.40	715.29	709.92	715.58	0.000131	4.43	459.66	82.13	0.27
Reach-1	4074		2470.00	705.40	718.86	711.02	719.11	0.000072	4.13	796.53	105.98	0.21
Reach-1	4074		2980.00	705.40	721.97	711.74	722.16	0.000044	3.77	1152.06	144.49	0.17
Reach-1	4074		3570.00	705.40	722.86	712.46	723.11	0.000052	4.24	1310.30	155.77	0.19
Reach-1	4074		4700.00	705.40	724.96	713.76	725.25	0.000055	4.76	1750.65	337.51	0.20
Reach-1	4093.5		Bridge									
Reach-1	4116		420.00	705.76	708.33	707.45	708.66	0.000746	4.65	90.24	37.85	0.53
Reach-1	4116		1170.00	705.76	712.23	709.05	712.55	0.000257	4.53	258.25	50.20	0.35
Reach-1	4116		1770.00	705.76	715.40	710.06	715.68	0.000120	4.24	448.87	73.87	0.26
Reach-1	4116		2470.00	705.76	718.93	711.10	719.17	0.000067	4.01	762.24	101.33	0.20
Reach-1	4116		2980.00	705.76	722.01	711.79	722.21	0.000042	3.69	1099.81	117.47	0.17
Reach-1	4116		3570.00	705.76	722.97	712.44	723.21	0.000048	4.09	1210.07	157.19	0.18
Reach-1	4116		4700.00	705.76	724.93	713.57	725.26	0.000057	4.84	1652.83	310.48	0.20
Reach-1	4148		420.00	706.08	708.38	708.38	709.45	0.002935	8.31	50.56	23.86	1.01
Reach-1	4148		1170.00	706.08	711.93		712.88	0.000971	7.83	149.36	31.84	0.64
Reach-1	4148		1770.00	706.08	715.18		715.91	0.000375	6.90	283.66	56.18	0.43
Reach-1	4148		2470.00	706.08	718.77		719.34	0.000187	6.25	551.36	92.97	0.32
Reach-1	4148		2980.00	706.08	721.90		722.32	0.000108	5.56	961.50	184.85	0.26
Reach-1	4148		3570.00	706.08	722.85		723.32	0.000115	6.01	1139.46	189.26	0.27
Reach-1	4148		4700.00	706.08	724.84		725.35	0.000114	6.47	1527.90	210.79	0.27
Reach-1	4267		420.00	708.00	710.29	710.29	711.32	0.002824	8.15	51.54	24.97	1.00
Reach-1	4267		1170.00	708.00	712.37	712.37	714.19	0.002446	10.83	108.06	29.47	1.00
Reach-1	4267		1770.00	708.00	714.77	713.61	716.19	0.001166	9.57	186.57	44.97	0.72
Reach-1	4267		2470.00	708.00	718.70	714.83	719.41	0.000321	7.06	548.21	140.21	0.41
Reach-1	4267		2980.00	708.00	721.98	715.65	722.34	0.000125	5.41	1161.49	245.92	0.27
Reach-1	4267		3570.00	708.00	722.96	716.76	723.35	0.000126	5.71	1408.02	251.89	0.27
Reach-1	4267		4700.00	708.00	724.99	718.11	725.37	0.000113	5.94	1925.46	257.49	0.27
Reach-1	4523		420.00	709.47	711.54	711.54	712.42	0.002881	7.50	56.01	32.45	1.01
Reach-1	4523		1170.00	709.47	713.97		714.91	0.001312	7.75	151.04	45.76	0.75
Reach-1	4523		1770.00	709.47	715.80		716.62	0.000796	7.26	243.88	55.77	0.61
Reach-1	4523		2470.00	709.47	719.12		719.56	0.000263	5.37	497.14	142.29	0.37
Reach-1	4523		2980.00	709.47	722.18		722.41	0.000089	3.98	1180.62	283.23	0.23
Reach-1	4523		3570.00	709.47	723.18		723.42	0.000084	4.14	1471.85	300.80	0.23
Reach-1	4523		4700.00	709.47	725.21		725.44	0.000069	4.24	2133.11	359.22	0.21
Reach-1	4569		420.00	709.60	712.61	711.35	712.84	0.000454	3.89	108.09	41.86	0.43
Reach-1	4569		1170.00	709.60	714.68	712.93	715.19	0.000556	5.76	203.05	50.01	0.50
Reach-1	4569		1770.00	709.60	716.16	713.91	716.77	0.000501	6.29	281.62	55.86	0.49
Reach-1	4569		2470.00	709.60	719.15	714.87	719.58	0.000238	5.30	465.94	67.63	0.36
Reach-1	4569		2980.00	709.60	722.18	715.48	722.47	0.000103	4.34	779.31	164.41	0.25
Reach-1	4569		3570.00	709.60	723.17	716.14	723.50	0.000104	4.64	971.96	223.08	0.25
Reach-1	4569		4700.00	709.60	725.19	717.26	725.54	0.000091	4.90	1539.29	334.94	0.24
Reach-1	4591		Bridge									
Reach-1	4613		420.00	709.80	712.62	711.54	712.89	0.000555	4.12	101.93	42.18	0.47
Reach-1	4613		1170.00	709.80	714.70	713.13	715.24	0.000612	5.89	198.61	51.12	0.53
Reach-1	4613		1770.00	709.80	716.18	714.06	716.80	0.000531	6.34	279.23	57.52	0.51
Reach-1	4613		2470.00	709.80	719.17	715.00	719.60	0.000241	5.25	470.39	70.41	0.36
Reach-1	4613		2980.00	709.80	722.51	715.60	722.77	0.000089	4.08	874.07	208.01	0.23
Reach-1	4613		3570.00	709.80	723.38	716.24	723.67	0.000092	4.39	1081.42	268.11	0.24
Reach-1	4613		4700.00	709.80	725.36	717.34	725.65	0.000078	4.52	1729.20	376.03	0.23
Reach-1	4658		420.00	710.00	712.49		713.10	0.001465	6.25	67.20	29.92	0.74
Reach-1	4658		1170.00	710.00	714.35		715.67	0.001709	9.23	126.82	34.33	0.85
Reach-1	4658		1770.00	710.00	715.76		717.30	0.001475	9.97	177.60	37.68	0.81
Reach-1	4658		2470.00	710.00	718.90		719.90	0.000568	8.03	321.63	76.27	0.53
Reach-1	4658		2980.00	710.00	722.39		722.89	0.000182	5.93	828.43	215.01	0.32
Reach-1	4658		3570.00	710.00	723.26		723.80	0.000186	6.32	1029.09	250.71	0.33

HEC-RAS Plan: 1998 River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta									
Reach-1	4655	4700.00	710.00	725.24		725.78	0.000163	6.57	1618.63	347.70	0.32
Reach-1	4662	420.00	710.60	712.89	712.89	713.93	0.002862	8.20	51.24	24.81	1.01
Reach-1	4662	1170.00	710.60	714.95	714.95	716.81	0.002502	10.93	107.00	29.16	1.01
Reach-1	4662	1770.00	710.60	716.22	716.22	718.51	0.002364	12.16	145.62	31.83	1.00
Reach-1	4662	2470.00	710.60	718.41		720.36	0.001410	11.21	220.94	42.77	0.80
Reach-1	4662	2980.00	710.60	722.23		723.03	0.000335	7.55	662.74	198.85	0.42
Reach-1	4662	3570.00	710.60	723.09		723.95	0.000334	7.97	839.20	211.53	0.43
Reach-1	4662	4700.00	710.60	725.10		725.90	0.000272	8.06	1306.05	261.82	0.40
Reach-1	4912	420.00	710.80	713.54	713.04	714.15	0.001393	6.26	67.09	28.90	0.72
Reach-1	4912	1170.00	710.80	716.39	714.99	717.19	0.000853	7.21	162.35	38.12	0.62
Reach-1	4912	1770.00	710.80	718.09	716.15	718.99	0.000723	7.64	231.77	43.63	0.58
Reach-1	4912	2470.00	710.80	719.63	717.29	720.68	0.000601	8.21	313.46	63.09	0.55
Reach-1	4912	2980.00	710.80	722.35	718.00	723.07	0.000271	6.90	513.27	80.29	0.39
Reach-1	4912	3570.00	710.80	723.10	718.72	723.96	0.000297	7.60	573.84	81.97	0.42
Reach-1	4912	4700.00	710.80	725.01	720.02	726.02	0.000280	8.27	734.60	85.86	0.42
Reach-1	4920.5	Bridge									
Reach-1	4929	420.00	710.90	713.87	712.95	714.30	0.000840	5.25	80.01	29.88	0.57
Reach-1	4929	1170.00	710.90	716.55	714.85	717.31	0.000749	7.00	167.17	35.68	0.57
Reach-1	4929	1770.00	710.90	718.22	716.03	719.14	0.000663	7.67	234.36	46.58	0.56
Reach-1	4929	2470.00	710.90	719.80	717.21	720.87	0.000575	8.36	321.89	64.67	0.54
Reach-1	4929	2980.00	710.90	722.38	718.00	723.15	0.000288	7.21	511.62	79.86	0.40
Reach-1	4929	3570.00	710.90	723.11	718.76	724.03	0.000319	7.95	570.46	81.12	0.43
Reach-1	4929	4700.00	710.90	725.00	720.22	726.06	0.000305	8.65	726.40	84.37	0.43
Reach-1	4979	420.00	711.10	714.23		714.35	0.000189	2.70	155.52	53.27	0.28
Reach-1	4979	1170.00	711.10	717.17		717.38	0.000158	3.63	322.02	60.08	0.28
Reach-1	4979	1770.00	711.10	718.96		719.21	0.000143	4.09	441.62	82.53	0.27
Reach-1	4979	2470.00	711.10	720.64		720.96	0.000132	4.55	625.00	159.60	0.27
Reach-1	4979	2980.00	711.10	722.98		723.21	0.000075	4.03	1206.37	299.34	0.21
Reach-1	4979	3570.00	711.10	723.85		724.11	0.000078	4.32	1474.24	314.82	0.22
Reach-1	4979	4700.00	711.10	725.88		726.15	0.000069	4.52	2204.11	407.38	0.21
Reach-1	5028	420.00	711.30	714.32	712.30	714.37	0.000092	1.88	223.12	74.00	0.19
Reach-1	5028	1170.00	711.30	717.30	713.27	717.41	0.000079	2.63	444.22	74.00	0.19
Reach-1	5028	1770.00	711.30	719.11	713.90	719.25	0.000080	3.06	577.83	74.00	0.19
Reach-1	5028	2470.00	711.30	720.81	714.55	721.00	0.000082	3.50	732.74	145.36	0.20
Reach-1	5028	2980.00	711.30	723.07	714.98	723.23	0.000054	3.28	1290.74	351.93	0.17
Reach-1	5028	3570.00	711.30	723.95	715.45	724.13	0.000058	3.55	1636.56	435.39	0.18
Reach-1	5028	4700.00	711.30	726.00	716.30	726.17	0.000050	3.67	2773.19	677.54	0.17
Reach-1	5044.5	Culvert									
Reach-1	5063	420.00	711.40	714.36	712.41	714.42	0.000096	1.95	215.82	73.00	0.20
Reach-1	5063	1170.00	711.40	717.38	713.39	717.50	0.000075	2.68	436.79	73.00	0.19
Reach-1	5063	1770.00	711.40	719.41	714.03	719.55	0.000067	3.03	584.51	73.01	0.19
Reach-1	5063	2470.00	711.40	721.32	714.68	721.50	0.000073	3.39	804.23	193.49	0.19
Reach-1	5063	2980.00	711.40	723.11	715.12	723.27	0.000056	3.33	1288.72	347.31	0.17
Reach-1	5063	3570.00	711.40	723.94	715.59	724.13	0.000061	3.62	1609.17	417.30	0.18
Reach-1	5063	4700.00	711.40	725.99	716.43	726.17	0.000053	3.75	2747.40	700.92	0.17
Reach-1	5270	420.00	712.20	714.25	714.25	715.21	0.002896	7.87	53.40	28.10	1.01
Reach-1	5270	1170.00	712.20	716.51		717.94	0.001877	9.59	122.00	32.97	0.88
Reach-1	5270	1770.00	712.20	718.71		719.90	0.001056	8.74	202.44	39.94	0.68
Reach-1	5270	2470.00	712.20	720.68		721.83	0.000742	8.60	300.47	84.43	0.59
Reach-1	5270	2980.00	712.20	722.66		723.50	0.000399	7.53	598.15	225.15	0.46
Reach-1	5270	3570.00	712.20	723.49		724.36	0.000386	7.88	813.54	296.21	0.45
Reach-1	5270	4700.00	712.20	725.69		726.33	0.000245	7.23	1630.31	434.67	0.38
Reach-1	5570	320.00	713.50	715.60		716.12	0.002894	5.75	55.69	35.99	0.81
Reach-1	5570	940.00	713.50	717.73		718.52	0.001582	7.10	132.56	37.30	0.65
Reach-1	5570	1450.00	713.50	719.37		720.25	0.001094	7.54	200.59	45.71	0.58
Reach-1	5570	2030.00	713.50	721.14		722.08	0.000805	7.84	289.32	54.65	0.52
Reach-1	5570	2460.00	713.50	722.77		723.65	0.000575	7.61	387.97	69.45	0.45
Reach-1	5570	2960.00	713.50	723.51		724.56	0.000626	8.38	442.64	79.37	0.48
Reach-1	5570	3900.00	713.50	725.43		726.59	0.000555	8.92	630.97	120.97	0.47
Reach-1	5600	320.00	714.00	715.75		716.48	0.003768	6.82	46.94	28.51	0.94
Reach-1	5600	940.00	714.00	717.53		718.88	0.003134	9.32	100.86	32.07	0.93
Reach-1	5600	1450.00	714.00	719.19		720.52	0.002041	9.26	156.55	35.37	0.78
Reach-1	5600	2030.00	714.00	721.00		722.27	0.001438	9.05	224.42	39.67	0.67

HEC-RAS Plan: 1998 River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	5666	2460.00	714.00	722.70		723.78	0.000976	8.33	295.36	43.50	0.56
Reach-1	5666	2960.00	714.00	723.43		724.70	0.001052	9.04	327.59	44.72	0.59
Reach-1	5666	3900.00	714.00	725.35		726.71	0.000927	9.36	416.58	47.92	0.56
Reach-1	5715	320.00	714.20	716.05	716.05	716.95	0.004484	7.62	42.02	23.41	1.00
Reach-1	5715	940.00	714.20	717.96	717.96	719.73	0.003975	10.66	88.21	24.88	1.00
Reach-1	5715	1450.00	714.20	719.19	719.19	721.48	0.003879	12.17	119.19	25.81	1.00
Reach-1	5715	2030.00	714.20	720.39	720.39	723.20	0.003836	13.45	150.88	26.73	1.00
Reach-1	5715	2460.00	714.20	722.11	721.19	724.51	0.002598	12.42	198.05	28.05	0.82
Reach-1	5715	2960.00	714.20	722.65	722.04	725.64	0.003059	13.88	213.19	28.46	0.89
Reach-1	5715	3900.00	714.20	724.42	723.55	727.79	0.002869	14.73	264.78	35.30	0.87
Reach-1	5733.5	Bridge									
Reach-1	5752	320.00	714.30	716.60	715.99	717.02	0.002842	5.23	61.16	28.28	0.63
Reach-1	5752	940.00	714.30	719.57	717.70	720.16	0.001587	6.21	151.45	32.52	0.51
Reach-1	5752	1450.00	714.30	721.29	718.80	722.03	0.001471	6.92	209.67	34.99	0.50
Reach-1	5752	2030.00	714.30	723.00	719.87	723.86	0.001383	7.48	271.42	37.42	0.49
Reach-1	5752	2460.00	714.30	724.94	720.59	725.73	0.000951	7.11	345.76	68.83	0.42
Reach-1	5752	2960.00	714.30	725.41	721.36	726.44	0.001163	8.14	363.72	87.36	0.47
Reach-1	5752	3900.00	714.30	728.90	722.66	729.36	0.000439	6.10	1109.33	297.31	0.30
Reach-1	5811	320.00	714.70	716.69		717.29	0.004721	6.17	51.83	27.99	0.80
Reach-1	5811	940.00	714.70	719.61		720.29	0.001964	6.62	141.99	33.82	0.57
Reach-1	5811	1450.00	714.70	721.35		722.14	0.001646	7.11	203.91	37.30	0.54
Reach-1	5811	2030.00	714.70	723.08		723.95	0.001399	7.49	272.17	45.67	0.51
Reach-1	5811	2460.00	714.70	725.07		725.79	0.000836	6.87	392.34	74.73	0.41
Reach-1	5811	2960.00	714.70	725.62		726.51	0.000963	7.69	436.14	82.65	0.44
Reach-1	5811	3900.00	714.70	729.09		729.39	0.000298	5.28	1572.96	497.59	0.26
Reach-1	6004	320.00	715.80	717.65		718.36	0.006204	6.78	47.21	27.08	0.90
Reach-1	6004	940.00	715.80	719.82		720.96	0.004056	8.55	109.99	30.70	0.80
Reach-1	6004	1450.00	715.80	721.46		722.70	0.003066	8.92	162.57	33.43	0.71
Reach-1	6004	2030.00	715.80	723.12		724.44	0.002494	9.22	220.20	36.81	0.66
Reach-1	6004	2460.00	715.80	725.01		726.11	0.001467	8.46	303.39	52.07	0.53
Reach-1	6004	2960.00	715.80	725.52		726.91	0.001709	9.52	331.10	56.65	0.57
Reach-1	6004	3900.00	715.80	728.82		729.63	0.000738	7.79	760.27	189.91	0.40
Reach-1	6208	320.00	716.70	718.83		719.35	0.003841	5.80	55.18	27.79	0.73
Reach-1	6208	940.00	716.70	720.64		721.81	0.004283	8.68	108.30	31.01	0.82
Reach-1	6208	1450.00	716.70	722.03		723.42	0.003683	9.47	153.12	33.49	0.78
Reach-1	6208	2030.00	716.70	723.54		725.05	0.003082	9.87	205.77	36.18	0.73
Reach-1	6208	2460.00	716.70	725.22		726.50	0.001920	9.11	280.58	50.73	0.60
Reach-1	6208	2960.00	716.70	725.78		727.35	0.002145	10.11	309.64	53.79	0.64
Reach-1	6208	3900.00	716.70	728.66		729.98	0.001223	9.42	515.61	146.67	0.51
Reach-1	6259	320.00	716.90	719.27	718.39	719.56	0.001905	4.36	73.33	31.00	0.50
Reach-1	6259	940.00	716.90	721.40	719.95	722.11	0.002239	6.74	139.52	31.00	0.56
Reach-1	6259	1450.00	716.90	722.67	720.98	723.69	0.002525	8.11	178.90	31.00	0.59
Reach-1	6259	2030.00	716.90	723.89	722.01	725.25	0.002817	9.37	216.60	31.00	0.62
Reach-1	6259	2460.00	716.90	725.28	722.69	726.67	0.002445	9.47	259.79	31.00	0.58
Reach-1	6259	2960.00	716.90	725.80	723.46	727.59	0.002979	10.73	275.96	31.00	0.63
Reach-1	6259	3900.00	716.90	728.49	724.79	730.32	0.002406	10.85	359.39	117.09	0.56
Reach-1	629[illegible]	Culvert									
Reach-1	632[illegible]	320.00	717.40	719.77	718.89	720.07	0.001891	4.35	73.49	31.00	0.50
Reach-1	632[illegible]	940.00	717.40	722.15	720.45	722.78	0.001903	6.38	147.22	31.00	0.52
Reach-1	632[illegible]	1450.00	717.40	723.74	721.47	724.58	0.001914	7.38	196.44	31.00	0.52
Reach-1	632[illegible]	2030.00	717.40	725.32	722.49	726.38	0.001961	8.27	245.41	31.00	0.52
Reach-1	632[illegible]	2460.00	717.40	726.59	723.19	727.75	0.001878	8.63	284.98	31.00	0.50
Reach-1	632[illegible]	2960.00	717.40	727.61	723.95	728.97	0.002021	9.35	316.58	31.00	0.52
Reach-1	632[illegible]	3900.00	717.40	729.01	725.28	730.83	0.002456	10.84	359.88	31.00	0.56
Reach-1	637[illegible]	320.00	717.50	719.94		720.15	0.001334	3.75	85.26	35.00	0.42
Reach-1	637[illegible]	940.00	717.50	722.42		722.88	0.001295	5.46	172.09	35.00	0.43
Reach-1	637[illegible]	1450.00	717.50	724.07		724.69	0.001285	6.31	229.96	36.14	0.43
Reach-1	637[illegible]	2030.00	717.50	725.75		726.49	0.001143	6.93	314.29	63.95	0.42
Reach-1	637[illegible]	2460.00	717.50	727.16		727.86	0.000922	6.91	420.28	87.10	0.39
Reach-1	637[illegible]	2960.00	717.50	728.37		729.10	0.000837	7.12	543.27	133.72	0.38
Reach-1	637[illegible]	3900.00	717.50	730.49		731.02	0.000567	6.60	977.92	289.44	0.32
Reach-1	[illegible]	320.00	719.20	720.71	720.71	721.47	0.008315	7.00	45.68	30.43	1.01
Reach-1	[illegible]	940.00	719.20	722.72	722.30	723.91	0.004857	8.76	107.32	30.99	0.83

HEC-RAS Plan: 1998 River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
Reach-1	6735	1450.00	719.20	724.30	723.33	725.63	0.003656	9.26	156.66	31.44	0.73
Reach-1	6735	2030.00	719.20	725.86	724.36	727.36	0.003185	9.86	205.91	31.87	0.68
Reach-1	6735	2460.00	719.20	727.09	725.08	728.64	0.002670	10.01	249.79	43.16	0.64
Reach-1	6735	2960.00	719.20	728.19	725.84	729.86	0.002430	10.44	306.79	71.66	0.62
Reach-1	6735	3900.00	719.20	730.31	727.37	731.55	0.001543	9.61	632.54	232.75	0.51
Reach-1	6718	320.00	720.00	721.98		722.35	0.002923	4.92	64.98	34.71	0.63
Reach-1	6718	940.00	720.00	723.83		724.61	0.002788	7.09	132.58	38.19	0.67
Reach-1	6718	1450.00	720.00	725.29		726.19	0.002254	7.63	190.14	40.92	0.62
Reach-1	6718	2030.00	720.00	726.89		727.85	0.001804	7.87	258.07	43.92	0.57
Reach-1	6718	2460.00	720.00	728.10		729.06	0.001512	7.87	312.92	50.33	0.53
Reach-1	6718	2960.00	720.00	729.26		730.24	0.001268	8.00	399.51	99.37	0.50
Reach-1	6718	3900.00	720.00	730.78		731.80	0.001098	8.37	608.78	185.03	0.48
Reach-1	6695	320.00	720.20	722.12		722.45	0.002655	4.63	69.18	38.11	0.61
Reach-1	6695	940.00	720.20	724.09		724.71	0.002162	6.34	148.29	42.33	0.60
Reach-1	6695	1450.00	720.20	725.55		726.27	0.001745	6.82	212.69	45.47	0.56
Reach-1	6695	2030.00	720.20	727.15		727.92	0.001403	7.05	288.07	48.89	0.51
Reach-1	6695	2460.00	720.20	728.35		729.12	0.001102	7.06	358.92	69.60	0.47
Reach-1	6695	2960.00	720.20	729.51		730.30	0.000933	7.18	451.48	90.28	0.44
Reach-1	6695	3900.00	720.20	731.06		731.86	0.000801	7.47	670.47	189.65	0.42
Reach-1	6668	320.00	720.30	722.12	721.71	722.54	0.003180	5.21	61.41	35.56	0.68
Reach-1	6668	940.00	720.30	724.00	723.18	724.88	0.002605	7.55	124.46	37.17	0.69
Reach-1	6668	1450.00	720.30	725.39	724.15	726.50	0.002129	8.46	171.48	38.36	0.66
Reach-1	6668	2030.00	720.30	726.92	725.13	728.21	0.001741	9.11	222.93	39.67	0.62
Reach-1	6668	2460.00	720.30	728.08	725.78	729.45	0.001494	9.39	261.90	63.00	0.59
Reach-1	6668	2960.00	720.30	729.40	726.49	730.45	0.001372	8.36	408.04	102.14	0.50
Reach-1	6668	3900.00	720.30	730.98	727.76	731.97	0.001120	8.46	646.79	209.72	0.47
Reach-1	6652	Culvert									
Reach-1	7006	320.00	720.40	722.62	721.80	722.90	0.000934	4.29	74.62	36.33	0.51
Reach-1	7006	940.00	720.40	725.03	723.28	725.59	0.000692	6.03	155.89	38.87	0.49
Reach-1	7006	1450.00	720.40	726.62	724.25	727.37	0.000613	6.92	209.60	40.55	0.49
Reach-1	7006	2030.00	720.40	728.29	725.22	729.20	0.000544	7.63	265.90	56.70	0.48
Reach-1	7006	2460.00	720.40	729.18	725.88	730.26	0.000560	8.32	295.84	101.04	0.49
Reach-1	7006	2960.00	720.40	730.53	726.61	731.19	0.000451	6.85	602.98	217.83	0.39
Reach-1	7006	3900.00	720.40	731.53	727.84	732.22	0.000453	7.34	852.69	280.47	0.40
Reach-1	7053	320.00	720.50	722.57		723.01	0.001864	5.27	60.68	32.52	0.68
Reach-1	7053	940.00	720.50	725.04		725.65	0.001077	6.25	150.40	40.27	0.57
Reach-1	7053	1450.00	720.50	726.76		727.41	0.000813	6.46	224.36	45.68	0.51
Reach-1	7053	2030.00	720.50	728.80		729.27	0.000423	5.72	433.23	139.06	0.39
Reach-1	7053	2460.00	720.50	729.97		730.35	0.000299	5.35	605.17	156.51	0.34
Reach-1	7053	2960.00	720.50	730.87		731.24	0.000263	5.39	760.10	187.05	0.32
Reach-1	7053	3900.00	720.50	731.84		732.27	0.000280	5.96	956.93	220.39	0.34
Reach-1	7010	320.00	721.00	722.62	722.61	723.36	0.004338	6.94	46.14	31.08	1.00
Reach-1	7010	940.00	721.00	725.02		725.83	0.001647	7.23	129.99	38.64	0.69
Reach-1	7010	1450.00	721.00	726.74		727.55	0.001111	7.21	201.07	44.04	0.59
Reach-1	7010	2030.00	721.00	728.76		729.35	0.000590	6.38	370.80	133.69	0.45
Reach-1	7010	2460.00	721.00	729.94		730.40	0.000395	5.87	548.97	168.74	0.38
Reach-1	7010	2960.00	721.00	730.85		731.29	0.000333	5.82	715.61	196.33	0.36
Reach-1	7010	3900.00	721.00	731.82		732.32	0.000344	6.37	920.06	225.64	0.37
Reach-1	7040	290.00	721.53	723.43		723.86	0.002064	5.27	55.06	31.97	0.71
Reach-1	7040	790.00	721.53	725.49		726.08	0.001233	6.20	127.43	38.43	0.60
Reach-1	7040	1220.00	721.53	727.11		727.72	0.000871	6.29	194.06	43.54	0.52
Reach-1	7040	1710.00	721.53	728.85		729.45	0.000621	6.23	279.10	73.07	0.46
Reach-1	7040	2080.00	721.53	729.97		730.49	0.000452	5.98	446.42	220.19	0.40
Reach-1	7040	2490.00	721.53	730.91		731.35	0.000346	5.70	668.26	246.37	0.36
Reach-1	7040	3260.00	721.53	731.96		732.38	0.000311	5.89	939.90	271.05	0.35
Reach-1	7027	290.00	721.75	723.87	722.93	724.04	0.000698	3.38	85.92	41.74	0.41
Reach-1	7027	790.00	721.75	725.90	724.03	726.22	0.000577	4.57	173.04	43.89	0.41
Reach-1	7027	1220.00	721.75	727.45	724.79	727.84	0.000501	4.99	244.47	48.35	0.39
Reach-1	7027	1710.00	721.75	729.12	725.54	729.54	0.000385	5.19	350.27	130.28	0.36
Reach-1	7027	2080.00	721.75	730.19	726.08	730.56	0.000297	5.04	613.98	292.91	0.32
Reach-1	7027	2490.00	721.75	731.09	726.64	731.40	0.000237	4.86	881.66	301.91	0.29
Reach-1	7027	3260.00	721.75	732.13	727.61	732.43	0.000219	5.04	1201.30	315.85	0.29
Reach-1	7028	290.00	722.29	723.88	723.64	724.35	0.002659	5.49	52.84	34.77	0.78
Reach-1	7028	790.00	722.29	725.84	724.89	726.47	0.001357	6.33	124.90	38.69	0.62

HEC-RAS Plan: 1998 River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
Reach-1	7628	1220.00	722.29	727.38	725.74	728.04	0.000967	6.53	186.74	41.76	0.54
Reach-1	7628	1710.00	722.29	729.05	726.57	729.72	0.000944	6.60	259.25	45.61	0.49
Reach-1	7628	2080.00	722.29	730.07	727.13	730.74	0.000980	6.63	341.14	308.38	0.46
Reach-1	7628	2490.00	722.29	731.04	727.72	731.52	0.000676	6.00	652.96	345.15	0.39
Reach-1	7628	3260.00	722.29	732.15	728.72	732.50	0.000502	5.62	1067.01	455.16	0.34
Reach-1	7867	290.00	723.86	725.27	725.27	725.95	0.004523	6.62	43.84	32.54	1.00
Reach-1	7867	790.00	723.86	726.56	726.56	727.82	0.003825	9.01	87.65	35.13	1.01
Reach-1	7867	1220.00	723.86	727.43	727.43	729.07	0.003586	10.25	118.98	36.87	1.01
Reach-1	7867	1710.00	723.86	728.75		730.34	0.002444	10.09	169.42	39.51	0.86
Reach-1	7867	2080.00	723.86	729.81		731.30	0.001866	9.80	212.18	41.62	0.77
Reach-1	7867	2490.00	723.86	730.44	729.47	732.13	0.001829	10.42	242.07	56.85	0.77
Reach-1	7867	3260.00	723.86	731.38	731.38	733.24	0.001718	11.18	348.30	160.76	0.77
Reach-1	8147	290.00	725.43	726.85	726.85	727.53	0.004492	6.62	43.84	32.37	1.00
Reach-1	8147	790.00	725.43	728.15	728.15	729.41	0.003817	9.00	87.76	35.22	1.00
Reach-1	8147	1220.00	725.43	729.02	729.02	730.65	0.003577	10.22	119.33	37.13	1.01
Reach-1	8147	1710.00	725.43	729.88	729.88	731.85	0.003412	11.25	151.94	39.00	1.00
Reach-1	8147	2080.00	725.43	730.47	730.47	732.66	0.003184	11.88	176.72	46.52	0.99
Reach-1	8147	2490.00	725.43	731.09	731.09	733.48	0.002931	12.44	208.66	56.15	0.97
Reach-1	8147	3260.00	725.43	732.12	732.12	734.85	0.002654	13.38	269.29	61.44	0.95
Reach-1	8484	290.00	725.88	728.02		728.41	0.001591	5.00	58.04	29.28	0.63
Reach-1	8484	790.00	725.88	729.45		730.38	0.002121	7.74	102.02	32.14	0.77
Reach-1	8484	1220.00	725.88	730.30		731.67	0.002468	9.39	129.92	33.83	0.84
Reach-1	8484	1710.00	725.88	731.03		732.91	0.002877	11.02	155.24	35.30	0.93
Reach-1	8484	2080.00	725.88	731.47	731.41	733.77	0.003211	12.16	171.06	36.18	0.99
Reach-1	8484	2490.00	725.88	732.05	732.05	734.65	0.003281	12.95	192.34	37.34	1.01
Reach-1	8484	3260.00	725.88	733.24	733.24	736.15	0.002967	13.69	243.35	69.05	0.98
Reach-1	8736	290.00	726.20	728.46		728.74	0.001054	4.24	68.41	32.50	0.51
Reach-1	8736	790.00	726.20	730.22		730.80	0.001158	6.14	128.57	36.43	0.58
Reach-1	8736	1220.00	726.20	731.38		732.15	0.001204	7.02	173.84	41.37	0.60
Reach-1	8736	1710.00	726.20	732.56		733.45	0.001164	7.59	225.40	46.37	0.61
Reach-1	8736	2080.00	726.20	733.39		734.34	0.001104	7.83	265.55	49.91	0.60
Reach-1	8736	2490.00	726.20	734.24		735.24	0.001047	8.05	309.25	53.50	0.59
Reach-1	8736	3260.00	726.20	735.62		736.72	0.000975	8.41	387.61	59.40	0.58
Reach-1	8786	290.00	726.50	728.59	727.76	728.81	0.000852	3.70	78.33	39.12	0.46
Reach-1	8786	790.00	726.50	730.51	728.92	730.91	0.000739	5.07	155.70	41.74	0.46
Reach-1	8786	1220.00	726.50	731.72	729.71	732.26	0.000736	5.88	207.45	43.40	0.47
Reach-1	8786	1710.00	726.50	732.88	730.51	733.56	0.000749	6.62	258.48	44.99	0.49
Reach-1	8786	2080.00	726.50	733.67	731.05	734.44	0.000753	7.06	294.53	46.07	0.49
Reach-1	8786	2490.00	726.50	734.44	731.61	735.33	0.000769	7.53	330.59	47.13	0.50
Reach-1	8786	3260.00	726.50	735.69	732.58	736.77	0.000814	8.35	390.30	48.83	0.52
Reach-1	8807	Bridge									
Reach-1	8826	290.00	726.60	728.59	727.98	728.90	0.001378	4.52	64.22	33.94	0.58
Reach-1	8826	790.00	726.60	730.46	729.26	731.03	0.001134	6.05	130.66	36.94	0.57
Reach-1	8826	1220.00	726.60	731.66	730.13	732.40	0.001106	6.94	175.92	38.85	0.57
Reach-1	8826	1710.00	726.60	732.79	730.99	733.72	0.001106	7.74	221.05	40.67	0.58
Reach-1	8826	2080.00	726.60	733.57	731.57	734.62	0.001100	8.21	253.26	41.92	0.59
Reach-1	8826	2490.00	726.60	734.33	732.18	735.51	0.001113	8.72	285.64	43.13	0.60
Reach-1	8826	3260.00	726.60	735.56	733.21	736.99	0.001162	9.60	339.54	45.09	0.62
Reach-1	8858	290.00	726.80	728.59		729.00	0.003620	5.15	56.34	32.93	0.69
Reach-1	8858	790.00	726.80	730.44		731.11	0.002559	6.58	120.01	35.80	0.63
Reach-1	8858	1220.00	726.80	731.62		732.49	0.002403	7.48	163.45	37.63	0.63
Reach-1	8858	1710.00	726.80	732.75		733.81	0.002353	8.27	206.75	39.39	0.64
Reach-1	8858	2080.00	726.80	733.52		734.71	0.002315	8.75	237.69	40.59	0.64
Reach-1	8858	2490.00	726.80	734.27		735.61	0.002324	9.27	268.73	41.77	0.64
Reach-1	8858	3260.00	726.80	735.48		737.09	0.002411	10.17	320.41	43.85	0.66
Reach-1	9088	290.00	727.81	729.50	729.43	730.19	0.006783	6.66	43.52	28.00	0.94
Reach-1	9088	790.00	727.81	730.87	730.87	732.24	0.006687	9.40	84.04	31.00	1.01
Reach-1	9088	1220.00	727.81	731.85	731.84	733.59	0.006147	10.57	115.46	32.88	0.99
Reach-1	9088	1710.00	727.81	732.88	732.77	734.89	0.005569	11.39	150.17	34.85	0.97
Reach-1	9088	2080.00	727.81	733.60	733.41	735.77	0.005206	11.83	175.87	36.23	0.95
Reach-1	9088	2490.00	727.81	734.30	734.03	736.67	0.004902	12.35	202.15	40.46	0.93
Reach-1	9088	3260.00	727.81	735.43	735.18	738.16	0.004431	13.31	255.14	53.44	0.91
Reach-1	9148	290.00	727.90	730.01		730.34	0.002368	4.58	63.38	32.08	0.57
Reach-1	9148	790.00	727.90	731.79		732.42	0.002293	6.40	123.38	35.57	0.61

HEC-RAS Plan: 1998 River: RIVER-1 Reach: Reach-1 (Continued)

Reach	RS	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	9118	1220.00	727.90	732.94		733.78	0.002281	7.37	165.60	37.84	0.62
Reach-1	9118	1710.00	727.90	734.05		735.09	0.002321	8.17	209.35	41.08	0.64
Reach-1	9118	2080.00	727.90	734.83		735.97	0.002333	8.57	242.70	44.41	0.65
Reach-1	9118	2490.00	727.90	735.65		736.88	0.002285	8.88	280.54	47.91	0.65
Reach-1	9118	3260.00	727.90	737.04		738.38	0.001989	9.32	355.67	65.75	0.62
Reach-1	9133	290.00	728.05	730.04	729.44	730.38	0.002266	4.67	62.15	34.04	0.58
Reach-1	9133	790.00	728.05	731.79	730.75	732.50	0.002063	6.77	116.61	35.79	0.62
Reach-1	9133	1220.00	728.05	732.90	731.66	733.91	0.002063	8.06	151.36	36.90	0.64
Reach-1	9133	1710.00	728.05	733.97	732.57	735.30	0.002091	9.26	184.61	37.97	0.67
Reach-1	9133	2080.00	728.05	734.70	733.20	736.26	0.002099	10.03	207.38	49.18	0.69
Reach-1	9133	2490.00	728.05	735.67	733.86	736.94	0.001962	9.08	293.23	64.69	0.60
Reach-1	9133	3260.00	728.05	737.06	735.48	738.43	0.001735	9.62	428.15	143.35	0.58
Reach-1	9130	Culvert									
Reach-1	9129	290.00	728.60	730.82	729.99	731.10	0.001599	4.21	68.83	33.20	0.50
Reach-1	9129	790.00	728.60	732.93	731.32	733.47	0.001280	5.88	134.25	35.31	0.50
Reach-1	9129	1220.00	728.60	734.39	732.23	735.10	0.001162	6.80	179.36	39.20	0.50
Reach-1	9129	1710.00	728.60	735.38	733.14	736.41	0.001344	8.13	210.29	46.49	0.55
Reach-1	9129	2080.00	728.60	735.98	733.79	736.98	0.001724	8.06	268.24	50.85	0.55
Reach-1	9129	2490.00	728.60	736.37	734.45	737.64	0.002041	9.10	299.84	104.15	0.60
Reach-1	9129	3260.00	728.60	737.22	735.91	738.73	0.002179	10.15	425.63	189.39	0.63
Reach-1	9184	290.00	728.60	730.86		731.11	0.001650	4.00	72.54	33.24	0.48
Reach-1	9184	790.00	728.60	733.04		733.48	0.001372	5.36	147.35	35.42	0.46
Reach-1	9184	1220.00	728.60	734.56		735.13	0.001242	6.02	203.53	40.49	0.45
Reach-1	9184	1710.00	728.60	735.70		736.45	0.001335	6.94	254.45	48.83	0.48
Reach-1	9184	2080.00	728.60	735.99		736.99	0.001723	8.07	268.58	50.90	0.55
Reach-1	9184	2490.00	728.60	736.37		737.65	0.002040	9.11	300.53	104.80	0.60
Reach-1	9184	3260.00	728.60	737.21		738.76	0.002219	10.23	423.90	188.48	0.64
Reach-1	923	290.00	729.19	731.15	731.15	732.05	0.007791	7.63	38.02	21.29	1.01
Reach-1	923	790.00	729.19	732.89	732.89	734.48	0.006803	10.12	78.06	24.77	1.00
Reach-1	923	1220.00	729.19	734.02	734.02	736.02	0.006468	11.35	107.46	27.07	1.00
Reach-1	923	1710.00	729.19	735.17	735.17	737.46	0.006215	12.14	140.89	31.10	1.00
Reach-1	923	2080.00	729.19	735.90	735.90	738.38	0.006113	12.65	164.42	33.64	1.01
Reach-1	923	2490.00	729.19	736.73	736.73	739.30	0.005190	12.87	199.55	51.93	0.95
Reach-1	923	3260.00	729.19	737.93	737.93	740.73	0.004484	13.59	267.30	67.28	0.91
Reach-1	955	290.00	731.28	733.43		734.17	0.005629	6.88	42.13	21.39	0.86
Reach-1	955	790.00	731.28	735.04	734.98	736.61	0.006508	10.05	78.63	24.07	0.98
Reach-1	955	1220.00	731.28	736.13	736.13	738.19	0.006580	11.53	105.79	25.88	1.01
Reach-1	955	1710.00	731.28	737.24	737.24	739.71	0.006385	12.61	135.59	27.73	1.01
Reach-1	955	2080.00	731.28	737.95	737.95	740.72	0.006387	13.35	155.86	28.92	1.01
Reach-1	955	2490.00	731.28	739.63	739.63	741.56	0.003302	11.48	291.04	135.07	0.76
Reach-1	955	3260.00	731.28	740.98	740.98	742.45	0.002308	10.78	560.13	253.41	0.66
Reach-1	979	180.00	732.86	734.85		735.12	0.002242	4.18	43.10	23.69	0.55
Reach-1	979	460.00	732.86	737.10		737.42	0.001139	4.53	101.49	28.19	0.42
Reach-1	979	680.00	732.86	738.61		738.94	0.000821	4.66	147.41	34.84	0.37
Reach-1	979	940.00	732.86	740.04		740.41	0.000648	4.91	205.96	55.20	0.34
Reach-1	979	1130.00	732.86	741.06		741.38	0.000501	4.77	371.57	271.59	0.31
Reach-1	979	1360.00	732.86	741.74		742.02	0.000425	4.66	607.27	417.62	0.29
Reach-1	979	1830.00	732.86	742.57		742.79	0.000370	4.65	1025.19	596.56	0.28
Reach-1	963	180.00	733.25	734.87	734.63	735.37	0.004433	5.69	31.63	22.31	0.79
Reach-1	963	460.00	733.25	737.02	735.83	737.63	0.001747	6.26	73.44	25.52	0.57
Reach-1	963	680.00	733.25	738.47	736.60	739.17	0.001282	6.67	101.88	27.71	0.51
Reach-1	963	940.00	733.25	740.03	737.40	740.51	0.001052	5.56	169.03	35.81	0.41
Reach-1	963	1130.00	733.25	741.05	737.96	741.45	0.000763	5.29	323.96	268.11	0.36
Reach-1	963	1360.00	733.25	741.74	738.56	742.06	0.000601	5.02	575.91	481.32	0.33
Reach-1	963	1830.00	733.25	742.61	739.96	742.82	0.000445	4.65	1064.62	656.10	0.29
Reach-1	963	Bridge									
Reach-1	963	180.00	733.64	735.11	735.01	735.71	0.005990	6.20	29.03	22.67	0.90
Reach-1	963	460.00	733.64	737.11	736.20	737.81	0.002250	6.73	68.38	25.66	0.64
Reach-1	963	680.00	733.64	739.73	736.96	740.23	0.000751	5.66	120.13	29.60	0.40
Reach-1	963	940.00	733.64	741.04	737.76	741.34	0.000604	4.62	286.24	212.65	0.32
Reach-1	963	1130.00	733.64	741.52	738.30	741.82	0.000575	4.73	401.82	269.43	0.32
Reach-1	963	1360.00	733.64	741.82	738.93	742.15	0.000635	5.11	489.85	321.84	0.34
Reach-1	963	1830.00	733.64	742.76	740.06	743.00	0.000472	4.79	901.81	563.23	0.30

HEC-RAS Plan: 1998 River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta									
Reach-1	9933	180.00	734.08	735.72	735.72	736.47	0.004634	6.96	25.88	17.44	1.01
Reach-1	9933	460.00	734.08	737.05	737.05	738.31	0.004072	8.99	51.19	20.63	1.01
Reach-1	9933	680.00	734.08	739.74		740.28	0.000744	5.95	129.26	43.00	0.48
Reach-1	9933	940.00	734.08	740.88		741.46	0.000641	6.36	209.60	91.91	0.46
Reach-1	9933	1130.00	734.08	741.29		741.96	0.000692	6.91	249.93	101.27	0.48
Reach-1	9933	1360.00	734.08	741.47		742.35	0.000887	7.97	268.14	101.99	0.55
Reach-1	9933	1830.00	734.08	742.21		743.28	0.000998	9.07	360.72	168.10	0.59
Reach-1	10158	160.00	736.30	737.73	737.73	738.40	0.004727	6.56	24.40	18.47	1.01
Reach-1	10158	370.00	736.30	738.75	738.75	739.84	0.004177	8.37	44.23	20.50	1.00
Reach-1	10158	540.00	736.30	739.57		740.76	0.003358	8.77	61.61	22.13	0.93
Reach-1	10158	730.00	736.30	740.78		741.81	0.001888	8.16	90.32	25.35	0.73
Reach-1	10158	880.00	736.30	741.11		742.38	0.002096	9.07	98.71	26.32	0.78
Reach-1	10158	1040.00	736.30	741.19		742.90	0.002740	10.50	100.92	26.57	0.89
Reach-1	10158	1400.00	736.30	741.79	741.79	744.15	0.003191	12.37	117.41	28.37	0.99
Reach-1	10210	160.00	736.80	738.44	737.79	738.62	0.000901	3.45	46.42	32.11	0.47
Reach-1	10210	370.00	736.80	739.85	738.54	740.13	0.000610	4.29	86.29	36.29	0.43
Reach-1	10210	540.00	736.80	740.68	739.04	741.06	0.000582	4.92	109.81	37.77	0.44
Reach-1	10210	730.00	736.80	741.58	739.54	742.03	0.000531	5.40	135.22	39.13	0.44
Reach-1	10210	880.00	736.80	742.12	739.90	742.65	0.000541	5.85	150.43	39.87	0.45
Reach-1	10210	1040.00	736.80	742.67	740.26	743.28	0.000544	6.26	166.03	40.38	0.46
Reach-1	10210	1400.00	736.80	743.94	741.03	744.69	0.000512	6.93	202.09	41.55	0.46
Reach-1	10210.01	Bridge									
Reach-1	10236	160.00	737.20	738.41	738.20	738.76	0.002576	4.75	33.68	30.31	0.76
Reach-1	10236	370.00	737.20	739.82	738.96	740.22	0.001040	5.06	73.12	32.76	0.55
Reach-1	10236	540.00	737.20	740.65	739.46	741.14	0.000887	5.61	96.22	34.19	0.53
Reach-1	10236	730.00	737.20	741.54	739.96	742.11	0.000751	6.02	121.22	35.74	0.51
Reach-1	10236	880.00	737.20	742.08	740.33	742.73	0.000741	6.46	136.12	36.67	0.52
Reach-1	10236	1040.00	737.20	743.86	740.70	744.34	0.000367	5.60	185.75	39.75	0.38
Reach-1	10236	1400.00	737.20	744.99	741.46	745.64	0.000394	6.44	217.43	109.02	0.41
Reach-1	10286	160.00	737.80	738.96	738.96	739.49	0.004844	5.86	27.31	25.90	1.01
Reach-1	10286	370.00	737.80	739.77	739.77	740.63	0.004159	7.43	49.79	29.16	1.00
Reach-1	10286	540.00	737.80	740.40		741.35	0.003370	7.83	68.96	31.67	0.94
Reach-1	10286	730.00	737.80	741.47		742.22	0.001820	6.96	104.92	35.91	0.72
Reach-1	10286	880.00	737.80	742.06		742.81	0.001531	6.93	127.04	38.28	0.67
Reach-1	10286	1040.00	737.80	743.99		744.38	0.000534	5.00	208.17	45.96	0.41
Reach-1	10286	1400.00	737.80	745.28		745.68	0.000401	5.12	319.63	115.48	0.37
Reach-1	10509	160.00	739.30	741.01	741.01	741.73	0.004653	6.81	23.49	16.53	1.01
Reach-1	10509	370.00	739.30	742.13	742.13	743.22	0.004119	8.36	44.23	20.58	1.01
Reach-1	10509	540.00	739.30	742.82	742.82	744.10	0.003931	9.06	59.58	23.70	1.01
Reach-1	10509	730.00	739.30	743.46	743.46	744.91	0.003776	9.65	75.68	26.58	1.01
Reach-1	10509	880.00	739.30	743.91	743.91	745.46	0.003673	10.01	87.90	28.58	1.01
Reach-1	10509	1040.00	739.30	744.29	744.29	746.00	0.003532	10.51	99.37	32.42	1.00
Reach-1	10509	1400.00	739.30	745.11	745.11	747.09	0.003076	11.33	130.10	42.29	0.97
Reach-1	10558	160.00	739.60	741.45	741.05	741.90	0.001890	5.37	29.82	16.34	0.70
Reach-1	10558	370.00	739.60	742.25	742.13	743.41	0.003057	8.67	42.69	16.44	0.94
Reach-1	10558	540.00	739.60	742.87	742.87	744.50	0.003226	10.25	52.71	16.51	1.00
Reach-1	10558	730.00	739.60	743.60	743.60	745.59	0.003007	11.32	64.51	16.60	1.00
Reach-1	10558	880.00	739.60	744.13	744.13	746.38	0.002890	12.05	73.02	16.66	1.00
Reach-1	10558	1040.00	739.60	744.66	744.66	747.18	0.002783	12.74	81.64	16.73	1.00
Reach-1	10558	1400.00	739.60	747.47	747.47	748.79	0.001864	9.69	252.80	194.87	0.61
Reach-1	10570	Bridge									
Reach-1	10593	160.00	739.83	741.45	741.29	742.05	0.002981	6.22	25.73	18.27	0.86
Reach-1	10593	370.00	739.83	742.68	742.39	743.79	0.001948	7.65	48.34	20.38	0.77
Reach-1	10593	540.00	739.83	743.68	743.12	744.89	0.001907	8.85	61.03	21.56	0.80
Reach-1	10593	730.00	739.83	746.76	743.85	747.44	0.000490	6.64	109.92	125.63	0.44
Reach-1	10593	880.00	739.83	746.73	744.39	747.73	0.000723	8.04	109.43	121.45	0.54
Reach-1	10593	1040.00	739.83	747.36	744.94	747.87	0.000592	5.96	282.82	205.71	0.42
Reach-1	10593	1400.00	739.83	748.98	746.04	749.20	0.000265	4.63	769.15	379.74	0.29
Reach-1	10743	160.00	740.18	741.65	741.65	742.33	0.004720	6.62	24.16	17.93	1.01
Reach-1	10743	370.00	740.18	743.19		743.91	0.002240	6.82	54.24	21.02	0.75
Reach-1	10743	540.00	740.18	744.29		745.03	0.001608	6.87	78.68	23.94	0.65
Reach-1	10743	730.00	740.18	747.13		747.49	0.000370	4.93	194.01	80.69	0.35
Reach-1	10743	880.00	740.18	747.32		747.81	0.000481	5.73	210.53	92.96	0.40
Reach-1	10743	1040.00	740.18	747.25		747.96	0.000699	6.86	204.55	88.72	0.48

HEC-RAS Plan: 1998 River: RIVER-1 Reach: Reach-1 (Continued)

Reach-1	1400.00	740.18	748.66		749.36	0.000567	7.06	387.75	155.00	0.45
Reach-1	160.00	741.89	743.20	743.20	743.82	0.004771	6.32	25.32	20.62	1.00
Reach-1	370.00	741.89	744.14	744.14	745.16	0.004199	8.12	45.57	22.50	1.01
Reach-1	540.00	741.89	744.75	744.75	746.02	0.003994	9.05	59.64	23.72	1.01
Reach-1	730.00	741.89	747.09		747.67	0.000842	6.11	122.26	31.12	0.50
Reach-1	880.00	741.89	747.26		748.04	0.001081	7.09	127.68	31.88	0.57
Reach-1	1040.00	741.89	747.17		748.30	0.001617	8.55	124.66	31.46	0.70
Reach-1	1400.00	741.89	748.47		749.69	0.001270	8.93	171.95	48.68	0.64
Reach-1	160.00	742.35	743.72	743.35	743.99	0.001686	4.18	38.30	29.61	0.63
Reach-1	370.00	742.35	744.91	744.10	745.32	0.001120	5.17	71.62	31.01	0.57
Reach-1	540.00	742.35	745.66	744.60	746.19	0.001012	5.83	92.63	31.89	0.56
Reach-1	730.00	742.35	747.28	745.10	747.72	0.000488	5.29	138.12	33.80	0.42
Reach-1	880.00	742.35	747.53	745.47	748.10	0.000602	6.07	145.09	34.10	0.47
Reach-1	1040.00	742.35	747.63	745.84	748.39	0.000792	7.04	147.70	34.21	0.54
Reach-1	1400.00	742.35	748.85	746.60	749.77	0.000714	7.69	182.12	35.65	0.53
Reach-1	Culvert									
Reach-1	160.00	742.98	745.03	744.01	745.16	0.000469	2.89	55.41	30.51	0.36
Reach-1	370.00	742.98	746.20	744.77	746.49	0.000556	4.25	87.07	32.51	0.42
Reach-1	540.00	742.98	747.02	745.29	747.40	0.000559	4.95	109.08	33.91	0.43
Reach-1	730.00	742.98	748.88	745.80	749.20	0.000290	4.59	159.20	37.08	0.33
Reach-1	880.00	742.98	749.98	746.18	750.31	0.000238	4.66	188.87	38.96	0.31
Reach-1	1040.00	742.98	751.17	746.55	751.51	0.000197	4.70	221.13	48.36	0.29
Reach-1	1400.00	742.98	753.27	747.34	753.45	0.000148	3.45	506.57	230.12	0.23
Reach-1	160.00	743.50	745.11	745.11	745.79	0.004600	6.62	24.17	17.99	1.01
Reach-1	370.00	743.50	746.16	746.16	747.21	0.004073	8.20	45.12	21.89	1.01
Reach-1	540.00	743.50	746.82	746.82	748.06	0.003845	8.96	60.24	24.32	1.00
Reach-1	730.00	743.50	748.61		749.35	0.001131	6.91	111.77	39.74	0.59
Reach-1	880.00	743.50	749.81		750.41	0.000673	6.30	173.61	63.34	0.48
Reach-1	1040.00	743.50	751.10		751.56	0.000411	5.68	265.77	78.03	0.39
Reach-1	1400.00	743.50	753.13		753.52	0.000270	5.48	541.72	272.06	0.33
Reach-1	160.00	747.60	749.28	749.28	750.04	0.004712	7.00	22.85	15.18	1.01
Reach-1	370.00	747.60	750.44	750.44	751.66	0.004259	8.85	41.79	17.38	1.01
Reach-1	540.00	747.60	751.19	751.19	752.67	0.004075	9.77	55.26	18.79	1.00
Reach-1	730.00	747.60	751.88	751.88	753.64	0.003716	10.66	69.61	23.15	0.99
Reach-1	880.00	747.60	752.43	752.43	754.33	0.003319	11.08	84.90	33.56	0.96
Reach-1	1040.00	747.60	753.05	753.05	754.96	0.002824	11.21	109.87	47.17	0.90
Reach-1	1400.00	747.60	753.98	753.98	756.11	0.002591	12.10	163.33	67.65	0.89
Reach-1	160.00	753.20	754.80	754.80	755.47	0.004590	6.56	24.37	18.41	1.01
Reach-1	370.00	753.20	755.84	755.84	756.86	0.004059	8.11	45.61	22.56	1.01
Reach-1	540.00	753.20	756.49	756.49	757.70	0.003569	8.84	63.07	38.38	0.98
Reach-1	730.00	753.20	757.21	757.21	758.43	0.002665	9.02	103.44	73.92	0.88
Reach-1	880.00	753.20	757.69	757.69	758.88	0.002268	9.11	144.20	97.45	0.83
Reach-1	1040.00	753.20	757.93	757.93	759.30	0.002444	9.86	169.34	109.46	0.87
Reach-1	1400.00	753.20	759.01	759.01	759.99	0.001464	8.97	396.67	319.46	0.70
Reach-1	70.00	756.80	757.78	757.78	758.22	0.005273	5.37	13.02	14.71	1.01
Reach-1	170.00	756.80	758.51	758.51	759.25	0.004576	6.91	24.59	16.76	1.01
Reach-1	250.00	756.80	758.97	758.97	759.88	0.004338	7.67	32.58	18.03	1.01
Reach-1	340.00	756.80	759.41	759.41	760.49	0.004168	8.32	40.87	19.27	1.01
Reach-1	410.00	756.80	759.72	759.72	760.91	0.004067	8.73	46.98	20.13	1.01
Reach-1	480.00	756.80	760.01	760.01	761.29	0.003983	9.08	52.88	20.93	1.01
Reach-1	640.00	756.80	760.60	760.60	762.08	0.003736	9.77	65.75	23.82	1.00
Reach-1	70.00	757.20	758.24	758.00	758.48	0.002194	3.96	17.65	18.08	0.69
Reach-1	170.00	757.20	759.15	758.66	759.56	0.001575	5.12	33.20	19.03	0.65
Reach-1	250.00	757.20	759.61	759.08	760.19	0.001681	6.09	41.05	19.52	0.69
Reach-1	340.00	757.20	759.81	759.51	760.72	0.002390	7.66	44.41	19.72	0.83
Reach-1	410.00	757.20	759.86	759.82	761.14	0.003264	9.06	45.26	19.77	0.98
Reach-1	480.00	757.20	760.13	760.10	761.57	0.003235	9.62	49.88	20.06	0.99
Reach-1	640.00	757.20	761.77	761.00	762.58	0.001598	7.23	88.53	21.76	0.63
Reach-1	Culvert									
Reach-1	70.00	757.90	759.29	758.70	759.43	0.000827	2.96	23.66	19.78	0.44
Reach-1	170.00	757.90	760.43	759.35	760.68	0.000662	3.95	43.07	22.07	0.44
Reach-1	250.00	757.90	761.18	759.78	761.49	0.000608	4.49	55.69	26.26	0.44
Reach-1	340.00	757.90	761.96	760.21	762.21	0.000473	3.99	91.19	35.58	0.37

HEC-RAS Plan: 1998 River: RIVER-1 Reach: Reach-1 (Continued)

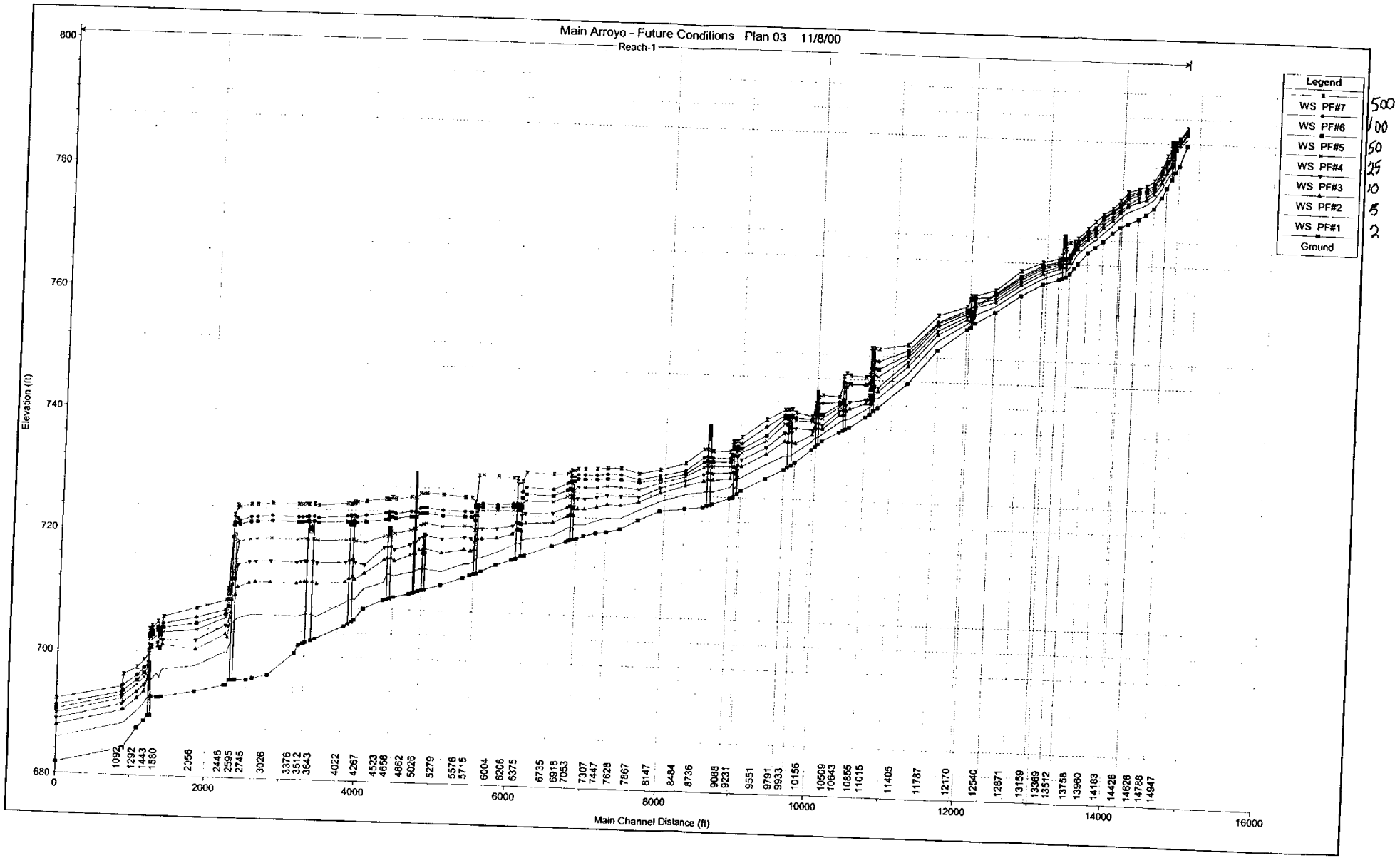
Reach	RM St									
Reach-1	12275	410.00	757.90	760.52	760.52	761.84	0.003461	9.22	44.47	22.23	1.00
Reach-1	12275	480.00	757.90	760.80	760.80	762.27	0.003345	9.72	49.38	22.81	1.00
Reach-1	12275	640.00	757.90	762.39	761.80	763.04	0.001112	6.58	132.93	127.98	0.57
Reach-1	12540	70.00	759.80	760.76	760.76	761.19	0.005246	5.25	13.32	15.70	1.01
Reach-1	12540	170.00	759.80	761.47	761.47	762.16	0.004547	6.70	25.39	18.43	1.01
Reach-1	12540	250.00	759.80	761.91	761.91	762.75	0.004278	7.39	33.84	20.12	1.00
Reach-1	12540	340.00	759.80	762.32	762.32	763.32	0.004094	7.99	42.58	21.81	1.00
Reach-1	12540	410.00	759.80	762.60	762.60	763.70	0.003936	8.45	48.74	23.76	1.00
Reach-1	12540	480.00	759.80	762.85	762.85	764.07	0.003751	8.87	54.97	25.60	1.00
Reach-1	12540	640.00	759.80	763.39	763.39	764.82	0.003387	9.63	69.97	29.56	0.98
Reach-1	12871	70.00	762.60	763.57	763.57	764.02	0.005272	5.37	13.04	14.77	1.01
Reach-1	12871	170.00	762.60	764.31	764.31	765.05	0.004577	6.90	24.65	16.86	1.01
Reach-1	12871	250.00	762.60	764.77	764.77	765.68	0.004338	7.65	32.66	18.16	1.01
Reach-1	12871	340.00	762.60	765.21	765.21	766.28	0.004168	8.29	41.03	19.49	1.01
Reach-1	12871	410.00	762.60	765.52	765.52	766.69	0.004063	8.67	47.28	20.49	1.01
Reach-1	12871	480.00	762.60	765.82	765.82	767.07	0.003939	8.97	53.49	21.43	1.00
Reach-1	12871	640.00	762.60	766.68	766.68	767.80	0.002509	8.59	97.26	95.15	0.84
Reach-1	13159	70.00	764.60	765.56	765.56	765.99	0.005275	5.24	13.37	15.87	1.01
Reach-1	13159	170.00	764.60	766.26	766.26	766.95	0.004407	6.69	25.90	22.10	0.99
Reach-1	13159	250.00	764.60	766.71	766.71	767.53	0.003829	7.34	37.59	29.83	0.96
Reach-1	13159	340.00	764.60	767.14	767.14	768.07	0.003459	7.87	51.99	37.21	0.94
Reach-1	13159	410.00	764.60	767.43	767.43	768.42	0.003296	8.23	63.43	42.16	0.93
Reach-1	13159	480.00	764.60	767.69	767.69	768.74	0.003155	8.52	75.28	46.74	0.92
Reach-1	13159	640.00	764.60	768.14	768.14	769.40	0.003231	9.44	98.91	66.18	0.95
Reach-1	13369	70.00	765.48	766.52		766.78	0.002771	4.12	17.00	17.72	0.74
Reach-1	13369	170.00	765.48	767.21		767.71	0.002895	5.68	29.94	19.54	0.81
Reach-1	13369	250.00	765.48	767.59		768.28	0.003207	6.67	37.45	20.52	0.87
Reach-1	13369	340.00	765.48	767.89	767.81	768.83	0.003763	7.78	43.69	21.30	0.96
Reach-1	13369	410.00	765.48	768.11	768.10	769.22	0.004023	8.45	48.53	21.88	1.00
Reach-1	13369	480.00	765.48	768.37	768.37	769.58	0.003994	8.85	54.21	22.55	1.01
Reach-1	13369	640.00	765.48	768.92	768.92	770.33	0.003839	9.54	67.09	24.00	1.01
Reach-1	13410	70.00	765.66	766.71	766.37	766.87	0.001472	3.26	21.45	23.77	0.56
Reach-1	13410	170.00	765.66	767.49	766.94	767.81	0.001338	4.52	37.58	26.24	0.59
Reach-1	13410	250.00	765.66	767.95	767.32	768.39	0.001378	5.32	46.96	27.67	0.62
Reach-1	13410	340.00	765.66	768.37	767.70	768.95	0.001449	6.11	55.62	28.99	0.65
Reach-1	13410	410.00	765.66	768.67	767.97	769.35	0.001494	6.65	61.66	29.91	0.68
Reach-1	13410	480.00	765.66	768.92	768.22	769.72	0.001568	7.19	66.80	30.70	0.70
Reach-1	13410	640.00	765.66	769.36	768.76	770.47	0.001819	8.43	75.93	32.09	0.77
Reach-1	13434	Bridge									
Reach-1	13456	70.00	765.89	766.75	766.60	767.00	0.002798	3.96	17.69	23.47	0.75
Reach-1	13456	170.00	765.89	767.52	767.17	767.92	0.001988	5.09	33.37	25.93	0.70
Reach-1	13456	250.00	765.89	767.97	767.55	768.50	0.001897	5.86	42.66	27.39	0.72
Reach-1	13456	340.00	765.89	768.39	767.93	769.07	0.001907	6.64	51.22	28.73	0.74
Reach-1	13456	410.00	765.89	768.68	768.20	769.48	0.001915	7.16	57.24	29.68	0.76
Reach-1	13456	480.00	765.89	768.93	768.46	769.85	0.001975	7.70	62.33	30.47	0.78
Reach-1	13456	640.00	765.89	771.38	769.00	771.89	0.000489	5.68	112.62	38.36	0.43
Reach-1	13512	70.00	766.40	767.52	767.52	767.94	0.005274	5.19	13.48	16.37	1.01
Reach-1	13512	170.00	766.40	768.22	768.22	768.85	0.004606	6.39	26.62	21.28	1.01
Reach-1	13512	250.00	766.40	768.61	768.61	769.39	0.004348	7.08	35.33	23.07	1.01
Reach-1	13512	340.00	766.40	768.98	768.98	769.90	0.004156	7.69	44.23	24.53	1.01
Reach-1	13512	410.00	766.40	769.24	769.24	770.26	0.004042	8.07	50.79	25.55	1.01
Reach-1	13512	480.00	766.40	769.49	769.49	770.58	0.003948	8.40	57.11	26.50	1.01
Reach-1	13512	640.00	766.40	771.46		771.93	0.000921	5.46	117.12	34.23	0.52
Reach-1	13574	70.00	767.31	768.93	768.93	769.42	0.005174	5.60	12.50	13.10	1.01
Reach-1	13574	170.00	767.31	769.74	769.74	770.45	0.004556	6.72	25.30	18.28	1.01
Reach-1	13574	250.00	767.31	770.21	770.21	771.02	0.004353	7.25	34.48	21.46	1.01
Reach-1	13574	340.00	767.31	770.64	770.64	771.55	0.004185	7.63	44.56	24.94	1.01
Reach-1	13574	410.00	767.31	770.94	770.94	771.89	0.004148	7.83	52.37	28.07	1.01
Reach-1	13574	480.00	767.31	771.21	771.21	772.19	0.004005	7.96	60.31	30.75	1.00
Reach-1	13574	640.00	767.31	771.69	771.69	772.78	0.003947	8.40	76.21	35.51	1.01
Reach-1	13621	70.00	768.07	769.71	769.71	770.15	0.005275	5.31	13.17	15.38	1.01
Reach-1	13621	170.00	768.07	770.43	770.43	771.08	0.004647	6.46	26.31	20.75	1.01
Reach-1	13621	250.00	768.07	770.85	770.85	771.62	0.004408	7.05	35.48	23.56	1.01
Reach-1	13621	340.00	768.07	771.25	771.25	772.12	0.004130	7.47	45.49	26.29	1.00

HEC-RAS Plan: 1998 River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
Reach-1	13621		410.00	768.07	771.50	771.50	772.46	0.004106	7.84	52.30	27.99	1.01
Reach-1	13621		480.00	768.07	771.76	771.76	772.76	0.003928	8.04	59.70	29.73	1.00
Reach-1	13621		640.00	768.07	772.23	772.23	773.38	0.003633	8.62	75.40	41.80	0.99
Reach-1	13759											
Reach-1	13759		70.00	769.89	771.24	771.24	771.69	0.005177	5.39	12.99	14.66	1.01
Reach-1	13759		170.00	769.89	771.99	771.99	772.65	0.004583	6.52	26.09	20.13	1.01
Reach-1	13759		250.00	769.89	772.39	772.39	773.21	0.004035	7.30	35.31	26.13	0.99
Reach-1	13759		340.00	769.89	772.80	772.80	773.75	0.003505	7.88	47.51	32.50	0.96
Reach-1	13759		410.00	769.89	773.08	773.08	774.13	0.003309	8.31	57.06	36.66	0.95
Reach-1	13759		480.00	769.89	773.34	773.34	774.46	0.003142	8.67	67.01	40.41	0.94
Reach-1	13759		640.00	769.89	773.87	773.87	775.15	0.002859	9.35	90.65	48.15	0.92
Reach-1	13857											
Reach-1	13857		70.00	770.86	772.03	772.03	772.44	0.005245	5.16	13.56	16.61	1.00
Reach-1	13857		170.00	770.86	772.71	772.71	773.43	0.004147	6.85	25.82	20.40	0.99
Reach-1	13857		250.00	770.86	773.15	773.15	774.05	0.003717	7.70	35.49	23.52	0.98
Reach-1	13857		340.00	770.86	773.58	773.58	774.66	0.003408	8.44	46.37	26.46	0.97
Reach-1	13857		410.00	770.86	773.87	773.87	775.08	0.003317	8.99	54.25	28.34	0.97
Reach-1	13857		480.00	770.86	774.09	774.09	775.48	0.003470	9.69	60.84	35.81	1.01
Reach-1	13857		640.00	770.86	775.08	775.08	776.12	0.001910	8.76	127.88	83.00	0.78
Reach-1	13960											
Reach-1	13960		70.00	771.83	773.22	773.22	773.75	0.005153	5.84	11.99	11.47	1.01
Reach-1	13960		170.00	771.83	774.09	774.09	774.91	0.004507	7.25	23.62	18.20	1.00
Reach-1	13960		250.00	771.83	774.67	774.67	775.56	0.003346	7.65	39.85	36.92	0.90
Reach-1	13960		340.00	771.83	775.21	775.21	776.11	0.002697	7.93	65.87	62.68	0.84
Reach-1	13960		410.00	771.83	775.62	775.62	776.42	0.002133	7.74	95.58	77.10	0.77
Reach-1	13960		480.00	771.83	775.82	775.82	776.68	0.002210	8.20	110.70	78.39	0.79
Reach-1	13960		640.00	771.83	776.33	776.33	777.19	0.001994	8.57	168.46	141.65	0.77
Reach-1	14083											
Reach-1	14083		70.00	773.24	774.55	774.55	775.00	0.004424	5.45	14.74	20.75	0.96
Reach-1	14083		170.00	773.24	775.30	775.30	775.99	0.003445	7.00	34.68	32.12	0.93
Reach-1	14083		250.00	773.24	775.83	775.83	776.57	0.002738	7.45	54.59	41.94	0.87
Reach-1	14083		340.00	773.24	776.17	776.17	777.09	0.002955	8.48	69.17	46.96	0.92
Reach-1	14083		410.00	773.24	776.70	776.70	777.42	0.001969	7.83	112.84	134.00	0.78
Reach-1	14083		480.00	773.24	776.94	776.94	777.65	0.001862	7.99	145.75	142.70	0.76
Reach-1	14083		640.00	773.24	777.29	777.29	778.06	0.001952	8.74	197.85	154.27	0.80
Reach-1	14183											
Reach-1	14183		70.00	774.20	775.82	775.82	776.24	0.005382	5.22	13.41	16.37	1.02
Reach-1	14183		170.00	774.20	776.49	776.49	777.18	0.004258	6.69	26.61	23.32	0.99
Reach-1	14183		250.00	774.20	776.91	776.91	777.76	0.003734	7.46	37.55	28.12	0.97
Reach-1	14183		340.00	774.20	777.33	777.33	778.32	0.003403	8.15	50.08	32.76	0.96
Reach-1	14183		410.00	774.20	777.62	777.62	778.70	0.003203	8.57	60.13	36.04	0.95
Reach-1	14183		480.00	774.20	777.87	777.87	779.05	0.003121	9.01	69.59	38.87	0.95
Reach-1	14183		640.00	774.20	778.58	778.58	779.78	0.002423	9.23	107.30	66.08	0.87
Reach-1	14283											
Reach-1	14283		70.00	774.79	776.77	776.77	777.30	0.004386	5.92	14.15	16.51	0.96
Reach-1	14283		170.00	774.79	777.65	777.65	778.47	0.003538	7.69	31.71	23.80	0.95
Reach-1	14283		250.00	774.79	778.00	778.00	779.18	0.004206	9.34	40.78	26.70	1.06
Reach-1	14283		340.00	774.79	778.81	778.81	779.84	0.002660	9.00	71.09	48.68	0.88
Reach-1	14283		410.00	774.79	779.19	779.19	780.23	0.002403	9.22	91.86	59.20	0.86
Reach-1	14283		480.00	774.79	779.48	779.48	780.56	0.002369	9.63	109.80	67.59	0.88
Reach-1	14283		640.00	774.79	780.00	780.00	781.19	0.002358	10.46	149.17	82.49	0.88
Reach-1	14426											
Reach-1	14426		70.00	775.62	777.47		777.66	0.001466	3.55	19.73	15.97	0.56
Reach-1	14426		170.00	775.62	778.48		778.79	0.001208	4.47	38.82	22.26	0.55
Reach-1	14426		250.00	775.62	779.15		779.52	0.000990	4.89	55.35	27.19	0.52
Reach-1	14426		340.00	775.62	779.65		780.12	0.001015	5.55	69.78	30.56	0.55
Reach-1	14426		410.00	775.62	779.94		780.50	0.001089	6.09	78.90	32.50	0.57
Reach-1	14426		480.00	775.62	780.18		780.84	0.001186	6.64	87.04	36.32	0.61
Reach-1	14426		640.00	775.62	780.53		781.48	0.001528	8.01	101.09	43.11	0.70
Reach-1	14526											
Reach-1	14526		70.00	776.37	778.00	778.00	778.46	0.005199	5.44	12.87	14.29	1.01
Reach-1	14526		170.00	776.37	778.75	778.75	779.53	0.004006	7.14	25.57	19.73	0.98
Reach-1	14526		250.00	776.37	779.23	779.23	780.19	0.003575	8.00	35.94	23.49	0.97
Reach-1	14526		340.00	776.37	779.70	779.70	780.83	0.003251	8.72	47.96	27.23	0.95
Reach-1	14526		410.00	776.37	780.02	780.02	781.26	0.003108	9.22	57.17	29.85	0.95
Reach-1	14526		480.00	776.37	780.33	780.33	781.67	0.002969	9.63	66.93	33.35	0.94
Reach-1	14526		640.00	776.37	780.98	780.98	782.49	0.002692	10.36	91.13	41.53	0.93
Reach-1	14626											
Reach-1	14626		70.00	777.42	778.88	778.88	779.37	0.005014	5.64	12.41	12.59	1.00
Reach-1	14626		170.00	777.42	779.70	779.70	780.48	0.004487	7.10	23.94	15.53	1.01
Reach-1	14626		250.00	777.42	780.18	780.18	781.14	0.004126	7.85	31.98	17.99	1.00
Reach-1	14626		340.00	777.42	780.65	780.65	781.78	0.003662	8.55	41.22	21.57	0.98
Reach-1	14626		410.00	777.42	780.97	780.97	782.23	0.003442	9.03	48.64	24.07	0.97
Reach-1	14626		480.00	777.42	781.28	781.28	782.64	0.003259	9.43	56.36	26.41	0.96

HEC-RAS Plan: 1998 River: RIVER-1 Reach: Reach-1 (Continued)

640.00	777.42	781.91	781.91	783.48	0.002973	10.22	74.53	31.37	0.94
70.00	779.14	780.61	780.61	781.18	0.004508	6.09	12.31	12.59	0.99
170.00	779.14	781.55	781.55	782.48	0.003553	7.96	26.05	16.84	0.96
250.00	779.14	782.09	782.09	783.29	0.003427	9.11	35.91	19.76	0.98
340.00	779.14	782.74	782.74	784.06	0.002907	9.70	50.66	25.94	0.94
410.00	779.14	783.16	783.16	784.57	0.002702	10.13	62.43	29.96	0.92
480.00	779.14	783.54	783.54	785.02	0.002555	10.51	74.47	33.52	0.91
640.00	779.14	783.99	783.99	785.95	0.003007	12.23	90.72	37.73	1.01
70.00	780.72	782.26	782.26	782.81	0.004851	5.93	11.94	11.96	1.00
170.00	780.72	783.15	783.15	784.07	0.003781	7.79	24.30	15.86	0.98
250.00	780.72	783.73	783.73	784.86	0.003364	8.71	34.16	18.39	0.96
340.00	780.72	784.37	784.37	785.65	0.002852	9.32	49.08	32.74	0.92
410.00	780.72	784.92	784.92	786.11	0.002245	9.18	72.26	52.11	0.84
480.00	780.72	785.22	785.22	786.48	0.002220	9.61	89.55	62.79	0.84
640.00	780.72	785.99	785.99	787.09	0.001729	9.53	146.29	77.75	0.77
70.00	782.15	783.30	783.30	783.88	0.005934	6.08	11.51	10.00	1.00
170.00	782.15	784.23	784.23	785.27	0.005591	8.16	20.83	13.96	1.00
250.00	782.15	784.84	784.84	786.18	0.005165	9.30	26.88	24.25	1.00
340.00	782.15	785.64	785.64	786.72	0.003260	8.79	57.67	37.84	0.83
410.00	782.15	786.00	786.00	787.14	0.003140	9.21	72.37	43.95	0.83
480.00	782.15	786.48	786.48	787.58	0.002678	9.20	102.48	80.39	0.78
640.00	782.15	787.24	787.24	788.12	0.002028	8.92	185.08	137.61	0.70
Culvert									
70.00	783.29	787.29	784.44	787.34	0.000071	1.75	40.01	37.72	0.15
170.00	783.29	787.76	785.36	787.84	0.000141	2.38	109.73	101.77	0.21
250.00	783.29	788.16	785.97	788.29	0.000203	3.04	174.19	201.65	0.25
340.00	783.29	788.20	786.58	788.42	0.000356	4.05	182.27	203.67	0.34
410.00	783.29	787.01	787.01	788.90	0.003080	11.01	37.25	34.35	1.01
480.00	783.29	788.21	787.60	788.65	0.000699	5.69	184.69	203.94	0.47
640.00	783.29	788.22	788.22	788.99	0.001231	7.56	186.19	204.11	0.62
70.00	784.39	787.29		787.35	0.000207	2.07	53.86	42.24	0.24
170.00	784.39	787.67		787.90	0.000682	4.16	71.81	52.84	0.44
250.00	784.39	787.99		788.33	0.000925	5.21	92.39	107.83	0.53
340.00	784.39	787.91		788.60	0.001944	7.41	84.81	66.71	0.76
410.00	784.39	788.75		789.12	0.000862	5.84	186.43	135.80	0.53
480.00	784.39	788.52	788.52	789.22	0.001672	7.80	155.96	128.36	0.73
640.00	784.39	788.87	788.87	789.63	0.001787	8.57	201.89	139.43	0.76
70.00	787.67	788.76	788.76	789.09	0.003876	5.06	24.82	48.97	0.90
170.00	787.67	789.37	789.37	789.76	0.002933	6.09	65.86	83.63	0.85
250.00	787.67	789.61	789.61	790.09	0.003277	7.06	85.47	83.68	0.92
340.00	787.67	789.84	789.84	790.40	0.003467	7.86	105.14	84.13	0.96
410.00	787.67	789.99	789.99	790.62	0.003716	8.52	117.45	89.24	1.01
480.00	787.67	790.14	790.14	790.82	0.003804	9.00	131.39	94.66	1.03
640.00	787.67	790.45	790.45	791.23	0.003896	9.90	162.20	101.37	1.07


Main Arroyo - Future Conditions Plan 03 11/8/00
Reach-1
Legend
WS PF#7
WS PF#6
WS PF#5
WS PF#4
WS PF#3
WS PF#2
WS PF#1
Ground
500
100
50
25
10
5
2
Elevation (ft)
800
780
760
740
720
700
680
0
2000
4000
6000
8000
10000
12000
14000
16000
Main Channel Distance (ft)
1092
1292
1443
1550
2056
2446
2595
2745
3026
3376
3512
3643
4022
4267
4523
4658
4862
5026
5279
5576
5715
6004
6206
6375
6735
6918
7053
7307
7447
7628
7867
8147
8484
8736
9088
9231
9551
9791
9933
10156
10509
10643
10855
11015
11405
11787
12170
12540
12871
13159
13369
13512
13758
13960
14183
14426
14626
14788
14947

HEC-RAS Plan: 1998 Future River: RIVER-1 Reach: Reach-1

Future Q's
2
5
10
25
50
100
500

Reach	River Sta	Profile	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
Reach-1	212		880.00	681.80	685.77	684.19	685.94	0.002845	3.31	266.00	102.07	0.36
Reach-1	212		2140.00	681.80	687.79	685.52	688.06	0.002841	4.25	503.05	131.81	0.38
Reach-1	212		3060.00	681.80	688.81	686.23	689.16	0.002843	4.75	644.11	142.79	0.39
Reach-1	212		4140.00	681.80	689.77	686.95	690.21	0.002844	5.29	783.33	147.66	0.40
Reach-1	212		4930.00	681.80	690.41	687.44	690.89	0.002844	5.62	877.87	150.87	0.41
Reach-1	212		5810.00	681.80	691.06	687.90	691.61	0.002843	5.94	989.51	233.82	0.42
Reach-1	212		7510.00	681.80	692.11	688.71	692.74	0.002844	6.44	1321.20	392.38	0.42
Reach-1	1092		880.00	684.30	688.33		688.84	0.003579	5.69	154.77	43.00	0.53
Reach-1	1092		2140.00	684.30	690.48		691.58	0.005042	8.42	254.14	49.92	0.66
Reach-1	1092		3060.00	684.30	691.51		693.05	0.006073	9.94	307.70	54.04	0.73
Reach-1	1092		4140.00	684.30	692.41		694.49	0.007281	11.57	357.92	57.24	0.82
Reach-1	1092		4930.00	684.30	692.96		695.44	0.008114	12.65	389.59	58.87	0.87
Reach-1	1092		5810.00	684.30	693.48		696.44	0.009057	13.81	420.86	60.44	0.92
Reach-1	1092		7510.00	684.30	694.38	694.38	698.24	0.010467	15.76	476.85	64.30	1.00
Reach-1	1112		880.00	684.36	688.35		688.87	0.000741	5.81	151.43	45.99	0.56
Reach-1	1112		2140.00	684.36	690.63		691.63	0.000859	8.02	266.82	55.14	0.64
Reach-1	1112		3060.00	684.36	691.82		693.11	0.000921	9.12	335.35	59.92	0.68
Reach-1	1112		4140.00	684.36	692.97		694.58	0.000982	10.17	406.94	64.53	0.71
Reach-1	1112		4930.00	684.36	693.78		695.56	0.000989	10.71	460.30	67.77	0.72
Reach-1	1112		5810.00	684.36	694.67		696.59	0.000958	11.13	522.40	73.14	0.72
Reach-1	1112		7510.00	684.36	696.38		698.46	0.000837	11.60	661.57	87.16	0.69
Reach-1	1292		880.00	687.67	690.46	690.46	691.68	0.002582	8.86	99.27	41.16	1.01
Reach-1	1292		2140.00	687.67	692.49	692.49	694.44	0.002223	11.19	191.25	49.29	1.00
Reach-1	1292		3060.00	687.67	693.62	693.62	695.96	0.002129	12.28	249.20	53.79	1.01
Reach-1	1292		4140.00	687.67	694.76	694.76	697.47	0.002037	13.21	313.44	58.37	1.00
Reach-1	1292		4930.00	687.67	695.50	695.50	698.45	0.001994	13.78	357.69	61.33	1.01
Reach-1	1292		5810.00	687.67	696.26	696.26	699.45	0.001951	14.33	405.53	64.38	1.01
Reach-1	1292		7510.00	687.67	697.56	697.56	701.17	0.001901	15.25	492.46	69.57	1.01
Reach-1	1387		880.00	688.84	691.63	691.63	692.85	0.002573	8.85	99.39	41.17	1.00
Reach-1	1387		2140.00	688.84	693.65	693.65	695.61	0.002246	11.23	190.57	49.24	1.01
Reach-1	1387		3060.00	688.84	694.79	694.79	697.13	0.002128	12.28	249.27	53.80	1.01
Reach-1	1387		4140.00	688.84	695.93	695.93	698.64	0.002040	13.22	313.24	58.36	1.01
Reach-1	1387		4930.00	688.84	696.67	696.67	699.62	0.001992	13.78	357.81	61.34	1.01
Reach-1	1387		5810.00	688.84	697.45	697.45	700.62	0.001935	14.28	406.72	64.45	1.00
Reach-1	1387		7510.00	688.84	698.73	698.73	702.34	0.001899	15.24	492.64	69.58	1.01
Reach-1	1443		880.00	689.79	692.78	692.78	694.27	0.002266	9.80	89.83	41.98	1.00
Reach-1	1443		2140.00	689.79	696.15	696.15	697.11	0.000815	7.88	271.71	55.44	0.63
Reach-1	1443		3060.00	689.79	696.16	696.16	698.12	0.001659	11.25	272.12	55.47	0.89
Reach-1	1443		4140.00	689.79	696.90	696.90	699.59	0.002020	13.17	314.35	58.44	1.00
Reach-1	1443		4930.00	689.79	697.64	697.64	700.57	0.001977	13.74	358.74	61.40	1.00
Reach-1	1443		5810.00	689.79	698.42	698.42	701.57	0.001918	14.24	408.00	64.53	1.00
Reach-1	1443		7510.00	689.79	699.75	699.75	703.29	0.001849	15.10	497.43	69.85	1.00
Reach-1	1458		Culvert									
Reach-1	1473		880.00	689.84	696.05	692.82	696.39	0.000200	4.73	186.16	56.20	0.33
Reach-1	1473		2140.00	689.84	700.90	695.23	701.10	0.000090	3.59	630.60	131.59	0.23
Reach-1	1473		3060.00	689.84	702.86	696.70	703.09	0.000082	3.97	953.13	195.76	0.22
Reach-1	1473		4140.00	689.84	702.63	698.51	703.09	0.000165	5.54	908.54	188.80	0.31
Reach-1	1473		4930.00	689.84	703.13	698.51	703.70	0.000192	6.19	1007.48	203.92	0.34
Reach-1	1473		5810.00	689.84	703.58	698.51	704.28	0.000225	6.89	1102.80	217.49	0.37
Reach-1	1473		7510.00	689.84	704.35	699.73	705.29	0.000284	8.11	1277.18	231.06	0.42
Reach-1	1483		880.00	692.84	695.56	695.56	696.70	0.002603	8.57	102.63	45.53	1.01
Reach-1	1483		2140.00	692.84	700.76		701.17	0.000263	5.14	438.45	114.43	0.37
Reach-1	1483		3060.00	692.84	702.74		703.15	0.000188	5.26	733.90	176.13	0.33
Reach-1	1483		4140.00	692.84	702.35		703.21	0.000416	7.58	667.18	168.19	0.49
Reach-1	1483		4930.00	692.84	702.80		703.84	0.000472	8.39	745.60	177.49	0.52
Reach-1	1483		5810.00	692.84	703.19		704.45	0.000546	9.31	815.53	185.39	0.57
Reach-1	1483		7510.00	692.84	703.81		705.53	0.000690	10.99	933.80	198.04	0.65
Reach-1	1552		880.00	692.75	696.65		696.85	0.000435	3.59	245.20	80.56	0.36
Reach-1	1552		2140.00	692.75	701.05		701.20	0.000131	3.18	680.32	122.18	0.22
Reach-1	1552		3060.00	692.75	703.00		703.18	0.000106	3.43	944.31	146.00	0.21
Reach-1	1552		4140.00	692.75	702.95		703.28	0.000199	4.67	936.53	145.46	0.29
Reach-1	1552		4930.00	692.75	703.52		703.93	0.000223	5.17	1021.54	151.19	0.31
Reach-1	1552		5810.00	692.75	704.06		704.56	0.000251	5.71	1104.73	157.49	0.33
Reach-1	1552		7510.00	692.75	705.00		705.67	0.000300	6.66	1263.91	181.01	0.37

HEC-RAS Plan: 1998 Future River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Q Total (cfs)	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	1550	880.00	692.75	695.83	695.82	697.25	0.003926	9.55	92.19	32.72	1.00
Reach-1	1580	2140.00	692.75	700.70		701.37	0.000646	6.85	412.61	126.48	0.46
Reach-1	1580	3060.00	692.75	702.75		703.30	0.000420	6.58	705.66	152.18	0.39
Reach-1	1580	4140.00	692.75	702.36		703.55	0.000938	9.55	647.50	151.01	0.58
Reach-1	1580	4930.00	692.75	702.87		704.23	0.001026	10.38	723.95	152.54	0.61
Reach-1	1580	5810.00	692.75	703.31		704.90	0.001145	11.33	792.55	153.91	0.65
Reach-1	1580	7510.00	692.75	703.99		706.06	0.001404	13.14	898.00	155.98	0.73
Reach-1	1589	880.00	692.75	696.19		697.30	0.002776	8.46	104.06	33.92	0.85
Reach-1	1589	2140.00	692.75	700.70		701.37	0.000643	6.84	413.34	126.59	0.46
Reach-1	1589	3060.00	692.75	702.75		703.30	0.000419	6.58	706.24	152.19	0.39
Reach-1	1589	4140.00	692.75	702.37		703.55	0.000934	9.54	648.77	151.03	0.58
Reach-1	1589	4930.00	692.75	702.88		704.23	0.001021	10.36	725.36	152.57	0.61
Reach-1	1589	5810.00	692.75	703.33		704.90	0.001137	11.30	794.87	153.95	0.65
Reach-1	1589	7510.00	692.75	704.01		706.13	0.001430	13.28	900.66	169.31	0.74
Reach-1	1623	880.00	692.90	697.34		697.41	0.000115	2.25	390.83	92.67	0.19
Reach-1	1623	2140.00	692.90	701.31		701.43	0.000077	2.76	793.71	128.84	0.17
Reach-1	1623	3060.00	692.90	703.20		703.34	0.000074	3.12	1097.56	182.36	0.18
Reach-1	1623	4140.00	692.90	703.40		703.65	0.000126	4.12	1134.02	184.75	0.23
Reach-1	1623	4930.00	692.90	704.03		704.34	0.000141	4.56	1254.30	192.24	0.25
Reach-1	1623	5810.00	692.90	704.66		705.04	0.000158	5.01	1376.97	196.87	0.26
Reach-1	1623	7510.00	692.90	705.84		706.31	0.000181	5.73	1613.02	205.47	0.29
Reach-1	2056	830.00	693.86	698.00	698.00	699.59	0.006547	10.13	81.95	26.00	1.01
Reach-1	2056	2040.00	693.86	700.63	700.63	703.15	0.005713	12.73	161.10	34.78	1.00
Reach-1	2056	2940.00	693.86	702.11	702.11	705.17	0.004964	14.09	217.11	42.08	0.98
Reach-1	2056	3980.00	693.86	703.76	703.76	707.12	0.004096	14.90	303.62	62.42	0.92
Reach-1	2056	4750.00	693.86	704.84	704.84	708.32	0.003687	15.35	375.70	70.90	0.89
Reach-1	2056	5610.00	693.86	705.83	705.83	709.52	0.003475	15.96	449.82	77.56	0.88
Reach-1	2056	7260.00	693.86	707.39	707.39	711.50	0.003336	17.19	575.85	84.33	0.88
Reach-1	2446	830.00	695.02	700.37		701.19	0.002573	7.25	114.57	29.57	0.64
Reach-1	2446	2040.00	695.02	703.17		704.75	0.002794	10.15	208.53	37.61	0.71
Reach-1	2446	2940.00	695.02	704.65		706.72	0.002893	11.67	268.73	45.55	0.74
Reach-1	2446	3980.00	695.02	705.91		708.58	0.003089	13.35	332.91	56.27	0.79
Reach-1	2446	4750.00	695.02	706.52		709.74	0.003457	14.75	367.92	59.08	0.84
Reach-1	2446	5610.00	695.02	707.18	707.07	710.96	0.003759	16.08	407.73	61.71	0.89
Reach-1	2446	7260.00	695.02	708.74	708.74	713.07	0.003666	17.47	509.00	67.96	0.90
Reach-1	2476	830.00	695.12	700.23		701.52	0.004136	9.12	91.05	20.97	0.77
Reach-1	2476	2040.00	695.12	702.68	702.68	705.75	0.006216	14.12	148.39	25.92	0.98
Reach-1	2476	2940.00	695.12	704.56	704.56	708.20	0.005643	15.46	201.52	32.45	0.96
Reach-1	2476	3980.00	695.12	706.59	706.59	710.48	0.004596	16.21	281.19	44.27	0.90
Reach-1	2476	4750.00	695.12	707.75	707.75	711.89	0.004337	16.92	334.50	47.91	0.89
Reach-1	2476	5610.00	695.12	708.89	708.89	713.30	0.004164	17.68	391.15	51.50	0.88
Reach-1	2476	7260.00	695.12	710.71	710.71	715.72	0.004081	19.17	490.59	58.72	0.90
Reach-1	2518	830.00	695.90	701.97	701.97	704.99	0.036278	13.95	59.49	9.80	1.00
Reach-1	2518	2040.00	695.90	706.73	706.73	710.40	0.023171	15.38	132.62	44.89	1.00
Reach-1	2518	2940.00	695.90	708.76	708.76	713.45	0.021404	17.38	169.11	50.74	1.00
Reach-1	2518	3980.00	695.90	710.87	710.87	716.60	0.019956	19.22	207.12	66.44	1.00
Reach-1	2518	4750.00	695.90	712.31	712.31	718.76	0.019184	20.38	233.05	80.03	1.00
Reach-1	2518	5610.00	695.90	719.11	719.11	719.50	0.001040	6.29	1208.86	152.59	0.25
Reach-1	2518	7260.00	695.90	719.11	719.11	719.76	0.001741	8.14	1208.86	152.59	0.32
Reach-1	2547	Bridge									
Reach-1	2565	830.00	695.90	705.42	701.94	706.32	0.007359	7.61	109.07	43.08	0.54
Reach-1	2565	2040.00	695.90	709.68	706.71	711.56	0.007535	10.98	185.77	55.28	0.60
Reach-1	2565	2940.00	695.90	712.39	708.73	714.83	0.007203	12.54	234.46	80.41	0.61
Reach-1	2565	3980.00	695.90	715.31	710.84	718.30	0.006719	13.86	287.12	94.77	0.61
Reach-1	2565	4750.00	695.90	721.48	712.26	721.64	0.000457	4.49	1698.85	277.69	0.17
Reach-1	2565	5610.00	695.90	722.19	713.80	722.38	0.000518	4.89	1912.61	323.93	0.18
Reach-1	2565	7260.00	695.90	724.38	716.45	724.53	0.000396	4.54	2765.11	447.70	0.16
Reach-1	2585	830.00	696.00	705.87		706.48	0.001207	6.32	138.64	25.25	0.40
Reach-1	2585	2040.00	696.00	710.98		711.90	0.001029	8.22	325.93	51.83	0.41
Reach-1	2585	2940.00	696.00	714.68		715.40	0.000646	7.73	569.45	70.80	0.34
Reach-1	2585	3980.00	696.00	718.48		719.05	0.000444	7.36	868.77	87.13	0.29
Reach-1	2585	4750.00	696.00	721.24		721.91	0.000436	7.94	1163.91	192.19	0.29
Reach-1	2585	5610.00	696.00	721.86		722.73	0.000554	9.11	1296.61	239.00	0.33
Reach-1	2585	7260.00	696.00	724.12		724.82	0.000475	8.97	2021.56	387.02	0.31

HEC-RAS Plan: 1998 Future River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2745	830.00	696.00	706.40	706.62	0.000414	3.79	218.75	34.86	0.27
Reach-1	2745	2040.00	696.00	711.70	712.04	0.000305	4.72	481.26	71.25	0.25
Reach-1	2745	2940.00	696.00	715.16	715.49	0.000220	4.81	759.67	84.44	0.22
Reach-1	2745	3980.00	696.00	718.80	719.12	0.000169	4.90	1126.54	118.42	0.20
Reach-1	2745	4750.00	696.00	721.71	721.98	0.000126	4.67	1499.02	135.27	0.18
Reach-1	2745	5610.00	696.00	722.49	722.82	0.000149	5.21	1606.47	138.94	0.20
Reach-1	2745	7260.00	696.00	724.48	724.89	0.000171	5.91	1897.33	154.56	0.21
Reach-1	2828	830.00	696.32	706.56	706.65	0.000094	2.45	387.61	49.00	0.14
Reach-1	2828	2040.00	696.32	711.87	712.07	0.000118	3.71	681.38	61.87	0.17
Reach-1	2828	2940.00	696.32	715.26	715.51	0.000116	4.23	914.05	92.96	0.18
Reach-1	2828	3980.00	696.32	718.88	719.13	0.000100	4.43	1326.51	123.96	0.17
Reach-1	2828	4750.00	696.32	721.75	721.99	0.000084	4.41	1705.95	142.57	0.16
Reach-1	2828	5610.00	696.32	722.54	722.84	0.000102	4.97	1820.41	148.40	0.17
Reach-1	2828	7260.00	696.32	724.53	724.91	0.000122	5.71	2130.16	162.44	0.19
Reach-1	3026	830.00	696.86	706.55	706.69	0.000194	3.16	320.40	60.01	0.19
Reach-1	3026	2040.00	696.86	711.92	712.10	0.000152	3.88	864.02	162.03	0.18
Reach-1	3026	2940.00	696.86	715.41	715.54	0.000098	3.63	1511.27	204.83	0.15
Reach-1	3026	3980.00	696.86	719.07	719.17	0.000063	3.30	2309.15	229.92	0.13
Reach-1	3026	4750.00	696.86	721.95	722.02	0.000045	3.05	2996.67	248.75	0.11
Reach-1	3026	5610.00	696.86	722.78	722.87	0.000053	3.36	3206.79	252.16	0.12
Reach-1	3026	7260.00	696.86	724.85	724.95	0.000058	3.73	3735.78	260.19	0.13
Reach-1	3376	730.00	700.46	706.46	706.92	0.001239	5.42	134.75	29.22	0.44
Reach-1	3376	1840.00	700.46	711.78	712.28	0.000597	5.77	347.73	55.56	0.34
Reach-1	3376	2660.00	700.46	715.25	715.68	0.000357	5.54	620.85	96.56	0.28
Reach-1	3376	3630.00	700.46	718.93	719.27	0.000221	5.17	1029.32	129.79	0.23
Reach-1	3376	4330.00	700.46	721.84	722.10	0.000150	4.74	1462.02	168.42	0.19
Reach-1	3376	5130.00	700.46	722.65	722.96	0.000172	5.23	1603.86	177.99	0.21
Reach-1	3376	6650.00	700.46	724.71	725.05	0.000181	5.72	1993.63	203.99	0.21
Reach-1	3429	730.00	701.75	706.53	706.96	0.000527	5.24	139.24	36.67	0.47
Reach-1	3429	1840.00	701.75	712.00	712.32	0.000160	4.54	414.18	63.98	0.29
Reach-1	3429	2660.00	701.75	715.40	715.70	0.000093	4.44	667.28	92.39	0.24
Reach-1	3429	3630.00	701.75	719.00	719.28	0.000062	4.38	1082.15	140.15	0.20
Reach-1	3429	4330.00	701.75	721.86	722.10	0.000044	4.18	1551.81	190.17	0.18
Reach-1	3429	5130.00	701.75	722.67	722.97	0.000052	4.66	1712.17	205.10	0.19
Reach-1	3429	6650.00	701.75	724.70	725.06	0.000056	5.21	2165.36	237.59	0.20
Reach-1	3482	730.00	702.09	706.78	707.01	0.000671	3.83	190.80	49.28	0.34
Reach-1	3482	1840.00	702.09	712.12	712.34	0.000238	3.72	500.66	67.23	0.23
Reach-1	3482	2660.00	702.09	715.51	715.72	0.000151	3.72	786.15	101.84	0.19
Reach-1	3482	3630.00	702.09	719.10	719.29	0.000103	3.68	1204.15	131.44	0.17
Reach-1	3482	4330.00	702.09	721.94	722.11	0.000076	3.55	1642.07	185.73	0.15
Reach-1	3482	5130.00	702.09	722.76	722.98	0.000090	3.98	1810.07	222.05	0.16
Reach-1	3482	6650.00	702.09	724.83	725.08	0.000095	4.38	2354.43	289.66	0.17
Reach-1	3512	730.00	702.23	706.83	704.42	707.04	0.000584	3.65	200.09	49.08	0.32
Reach-1	3512	1840.00	702.23	712.13	706.22	712.35	0.000238	3.75	495.65	63.51	0.23
Reach-1	3512	2660.00	702.23	715.51	707.27	715.73	0.000158	3.81	756.58	88.39	0.19
Reach-1	3512	3630.00	702.23	719.09	708.35	719.31	0.000113	3.84	1118.35	112.77	0.17
Reach-1	3512	4330.00	702.23	721.93	709.06	722.13	0.000084	3.72	1463.42	131.12	0.15
Reach-1	3512	5130.00	702.23	722.74	709.82	723.01	0.000108	4.32	1608.47	234.59	0.17
Reach-1	3512	6650.00	702.23	724.81	711.06	725.10	0.000112	4.71	2358.22	444.97	0.18
Reach-1	3580	Bridge								
Reach-1	3590	730.00	702.57	706.81	705.23	707.19	0.001315	4.91	148.64	43.72	0.47
Reach-1	3590	1840.00	702.57	712.13	707.24	712.41	0.000347	4.25	445.22	70.88	0.27
Reach-1	3590	2660.00	702.57	715.52	708.37	715.77	0.000197	4.11	723.16	93.01	0.22
Reach-1	3590	3630.00	702.57	719.11	709.52	719.34	0.000129	4.01	1098.57	117.40	0.19
Reach-1	3590	4330.00	702.57	722.06	710.19	722.25	0.000089	3.77	1442.45	213.96	0.16
Reach-1	3590	5130.00	702.57	722.86	710.92	723.11	0.000108	4.28	1750.58	277.48	0.18
Reach-1	3590	6650.00	702.57	724.91	712.18	725.18	0.000109	4.62	2477.72	428.57	0.18
Reach-1	3626	730.00	702.85	706.43	706.43	707.82	0.006705	9.49	76.91	27.49	1.00
Reach-1	3626	1840.00	702.85	711.86		712.57	0.001073	6.75	277.29	45.64	0.46
Reach-1	3626	2660.00	702.85	715.28		715.90	0.000555	6.36	451.08	55.98	0.35
Reach-1	3626	3630.00	702.85	718.87		719.46	0.000359	6.26	677.30	79.85	0.30
Reach-1	3626	4330.00	702.85	721.86		722.34	0.000240	5.82	978.70	114.73	0.25
Reach-1	3626	5130.00	702.85	722.62		723.23	0.000289	6.59	1081.25	165.23	0.28
Reach-1	3626	6650.00	702.85	724.64		725.30	0.000291	7.11	1565.81	285.80	0.28

HEC-RAS Plan: 1998 Future River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	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
Reach-1	4022									
		730.00	705.03	708.85		709.59	0.002813	6.93	105.37	30.98	0.66
		1840.00	705.03	712.25		713.28	0.002069	8.17	225.59	43.70	0.61
		2660.00	705.03	715.48		716.22	0.000852	7.10	438.27	82.82	0.42
		3630.00	705.03	719.12		719.62	0.000404	6.15	790.01	113.96	0.31
		4330.00	705.03	722.12		722.47	0.000228	5.33	1256.30	204.86	0.24
		5130.00	705.03	723.01		723.40	0.000243	5.71	1442.14	215.31	0.25
		6650.00	705.03	725.11		725.48	0.000222	5.91	2019.28	398.95	0.24
Reach-1	4071										
		730.00	705.40	709.35	707.96	709.82	0.000641	5.50	132.74	37.41	0.51
		1840.00	705.40	712.89	710.04	713.55	0.000438	6.53	286.83	57.58	0.46
		2660.00	705.40	715.73	711.29	716.33	0.000246	6.29	497.08	85.18	0.37
		3630.00	705.40	719.14	712.53	719.64	0.000142	5.91	826.17	107.71	0.29
		4330.00	705.40	722.12	713.34	722.52	0.000090	5.41	1170.93	149.07	0.24
		5130.00	705.40	723.00	714.26	723.49	0.000103	6.02	1331.55	157.00	0.26
		6650.00	705.40	725.06	715.68	725.66	0.000108	6.67	1791.30	356.14	0.27
Reach-1	4083.5										
		Bridge									
Reach-1	4116										
		730.00	705.76	709.63	708.19	710.04	0.000569	5.16	141.40	40.56	0.49
		1840.00	705.76	713.28	710.17	713.83	0.000346	5.94	313.96	55.73	0.42
		2660.00	705.76	715.99	711.36	716.53	0.000214	5.92	494.13	79.91	0.35
		3630.00	705.76	719.30	712.51	719.78	0.000131	5.69	799.86	103.63	0.29
		4330.00	705.76	722.22	713.22	722.62	0.000084	5.27	1123.81	126.12	0.24
		5130.00	705.76	723.21	713.99	723.68	0.000093	5.77	1238.28	167.36	0.25
		6650.00	705.76	725.43	715.40	726.03	0.000102	6.59	1823.10	370.03	0.27
Reach-1	4148										
		730.00	706.08	709.37	709.37	710.83	0.002713	9.69	75.30	26.09	1.01
		1840.00	706.08	712.71		714.44	0.001442	10.54	175.69	35.56	0.80
		2660.00	706.08	715.52		717.02	0.000730	9.90	303.56	60.28	0.61
		3630.00	706.08	718.96		720.13	0.000380	9.00	569.05	95.27	0.46
		4330.00	706.08	721.99		722.86	0.000221	8.00	977.50	184.98	0.37
		5130.00	706.08	722.98		723.92	0.000229	8.52	1163.29	189.89	0.38
		6650.00	706.08	725.28		726.19	0.000203	8.78	1623.36	229.23	0.36
Reach-1	4267										
		730.00	708.00	711.25	711.25	712.67	0.002610	9.54	76.55	27.05	1.00
		1840.00	708.00	713.75	713.75	716.06	0.002327	12.20	150.81	32.46	1.00
		2660.00	708.00	715.13	715.13	717.95	0.002159	13.48	200.89	50.57	0.99
		3630.00	708.00	718.80	716.84	720.29	0.000663	10.22	562.74	143.03	0.59
		4330.00	708.00	722.18	717.68	722.90	0.000246	7.65	1211.72	249.54	0.38
		5130.00	708.00	723.24	718.69	723.97	0.000237	7.92	1478.34	252.73	0.38
		6650.00	708.00	725.59	720.13	726.24	0.000191	7.90	2078.10	258.96	0.35
Reach-1	4523										
		730.00	709.47	712.37	712.37	713.52	0.002640	8.64	84.52	36.95	1.01
		1840.00	709.47	716.02		716.82	0.000750	7.18	256.40	56.99	0.60
		2660.00	709.47	718.07		718.81	0.000517	6.92	384.45	72.37	0.51
		3630.00	709.47	719.91		720.64	0.000389	6.92	631.40	195.27	0.46
		4330.00	709.47	722.63		723.04	0.000155	5.42	1307.77	290.11	0.31
		5130.00	709.47	723.70		724.11	0.000142	5.56	1629.07	310.70	0.30
		6650.00	709.47	725.98		726.36	0.000107	5.51	2421.08	386.45	0.27
Reach-1	4569										
		730.00	709.60	713.72	712.09	714.06	0.000454	4.64	157.28	46.26	0.44
		1840.00	709.60	716.35	714.01	716.96	0.000488	6.30	292.15	56.60	0.49
		2660.00	709.60	718.20	715.10	718.87	0.000411	6.59	403.87	63.91	0.46
		3630.00	709.60	719.93	716.20	720.68	0.000380	6.98	520.02	70.71	0.45
		4330.00	709.60	722.61	716.91	723.16	0.000186	6.00	856.11	189.98	0.33
		5130.00	709.60	723.67	717.63	724.27	0.000180	6.31	1090.79	252.56	0.33
		6650.00	709.60	725.95	718.92	726.53	0.000144	6.40	1808.53	374.95	0.31
Reach-1	4501										
		Bridge									
Reach-1	4613										
		730.00	709.80	713.74	712.27	714.10	0.000519	4.81	151.73	47.00	0.47
		1840.00	709.80	716.37	714.17	716.99	0.000515	6.34	290.07	58.33	0.50
		2660.00	709.80	718.23	715.23	718.90	0.000419	6.55	406.40	66.38	0.47
		3630.00	709.80	720.80	716.31	721.39	0.000263	6.16	589.60	113.60	0.38
		4330.00	709.80	723.09	717.00	723.55	0.000150	5.51	1007.97	248.49	0.30
		5130.00	709.80	723.89	717.72	724.41	0.000157	5.92	1227.52	303.39	0.31
		6650.00	709.80	726.27	718.97	726.71	0.000114	5.75	2089.18	424.22	0.28
Reach-1	4658										
		730.00	710.00	713.54		714.37	0.001341	7.30	99.97	32.42	0.73
		1840.00	710.00	715.95		717.49	0.001425	9.96	184.68	38.12	0.80
		2660.00	710.00	717.77		719.42	0.001150	10.29	258.38	42.47	0.74
		3630.00	710.00	720.43		721.60	0.000613	9.50	482.40	136.23	0.57
		4330.00	710.00	722.88		723.78	0.000316	8.05	938.69	234.02	0.43
		5130.00	710.00	723.66		724.65	0.000329	8.60	1134.78	268.92	0.44

HEC-RAS Plan: 1998 Future River: RIVER-1 Reach: Reach-1 (Continued)

River Sta	Profile	Q Total	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	4658	6650.00	710.00	726.06		726.93	0.000247	8.43	1923.32	387.31	0.39
Reach-1	4882	470.00	710.60	714.14		714.63	0.000816	5.59	84.08	27.46	0.56
Reach-1	4882	1260.00	710.60	716.91		717.78	0.000798	7.50	168.06	33.28	0.59
Reach-1	4882	1870.00	710.60	718.63		719.67	0.000715	8.18	231.44	50.18	0.57
Reach-1	4882	2570.00	710.60	721.05		721.95	0.000421	7.78	456.44	144.89	0.46
Reach-1	4882	3090.00	710.60	723.26		723.87	0.000233	6.73	875.78	214.07	0.36
Reach-1	4882	3670.00	710.60	724.09		724.74	0.000238	7.14	1058.10	227.90	0.37
Reach-1	4882	4760.00	710.60	726.43		727.00	0.000179	6.99	1686.43	318.38	0.33
Reach-1	4912	470.00	710.80	714.24	713.20	714.68	0.000792	5.35	87.92	31.15	0.56
Reach-1	4912	1260.00	710.80	717.25	715.19	717.89	0.000581	6.42	196.29	40.91	0.52
Reach-1	4912	1870.00	710.80	719.09	716.32	719.80	0.000456	6.77	281.17	55.85	0.48
Reach-1	4912	2570.00	710.80	721.33	717.44	722.03	0.000300	6.74	433.31	75.66	0.41
Reach-1	4912	3090.00	710.80	723.26	718.14	723.89	0.000211	6.46	587.14	82.34	0.35
Reach-1	4912	3670.00	710.80	724.06	718.84	724.80	0.000229	7.07	653.35	84.10	0.37
Reach-1	4912	4760.00	710.80	726.32	720.09	727.13	0.000200	7.47	848.32	88.25	0.36
Reach-1	4920.5	Bridge									
Reach-1	4929	470.00	710.90	714.39	713.11	714.76	0.000613	4.91	95.74	30.91	0.49
Reach-1	4929	1260.00	710.90	717.32	715.04	717.96	0.000556	6.44	195.80	39.22	0.50
Reach-1	4929	1870.00	710.90	719.17	716.20	719.92	0.000446	6.95	283.72	57.49	0.47
Reach-1	4929	2570.00	710.90	721.38	717.38	722.12	0.000314	7.02	433.55	75.42	0.41
Reach-1	4929	3090.00	710.90	723.26	718.14	723.93	0.000227	6.77	582.69	81.38	0.36
Reach-1	4929	3670.00	710.90	724.04	718.91	724.83	0.000248	7.41	646.70	82.72	0.38
Reach-1	4929	4760.00	710.90	726.33	720.29	727.18	0.000216	7.79	840.44	86.67	0.37
Reach-1	4979	470.00	711.10	714.70		714.80	0.000149	2.60	180.44	54.34	0.25
Reach-1	4979	1260.00	711.10	717.83		718.02	0.000129	3.48	362.19	61.61	0.25
Reach-1	4979	1870.00	711.10	719.75		719.98	0.000110	3.87	513.77	99.57	0.24
Reach-1	4979	2570.00	711.10	721.94		722.18	0.000084	3.98	906.65	276.67	0.22
Reach-1	4979	3090.00	711.10	723.78		723.98	0.000060	3.77	1453.81	313.67	0.19
Reach-1	4979	3670.00	711.10	724.68		724.89	0.000062	4.03	1747.43	349.78	0.20
Reach-1	4979	4760.00	711.10	727.04		727.25	0.000050	4.06	2713.19	471.84	0.18
Reach-1	5026	470.00	711.30	714.77	712.37	714.82	0.000073	1.83	256.83	74.00	0.17
Reach-1	5026	1260.00	711.30	717.95	713.37	718.05	0.000067	2.56	491.93	74.00	0.18
Reach-1	5026	1870.00	711.30	719.88	714.00	720.01	0.000067	2.95	634.69	74.00	0.18
Reach-1	5026	2570.00	711.30	722.05	714.64	722.21	0.000057	3.18	981.15	255.02	0.17
Reach-1	5026	3090.00	711.30	723.86	715.07	724.00	0.000045	3.10	1597.65	426.81	0.15
Reach-1	5026	3670.00	711.30	724.76	715.53	724.92	0.000046	3.32	2027.77	530.71	0.16
Reach-1	5026	4760.00	711.30	727.15	716.34	727.27	0.000035	3.19	3589.04	741.04	0.14
Reach-1	5044.5	Culvert									
Reach-1	5063	470.00	711.40	714.81	712.49	714.86	0.000075	1.89	248.86	73.00	0.18
Reach-1	5063	1260.00	711.40	718.07	713.49	718.17	0.000061	2.59	486.66	73.01	0.18
Reach-1	5063	1870.00	711.40	720.24	714.12	720.37	0.000054	2.90	645.25	94.82	0.17
Reach-1	5063	2570.00	711.40	722.23	714.77	722.38	0.000057	3.18	1016.11	274.04	0.17
Reach-1	5063	3090.00	711.40	723.86	715.21	724.00	0.000047	3.16	1573.09	410.01	0.16
Reach-1	5063	3670.00	711.40	724.75	715.67	724.92	0.000049	3.39	1990.89	527.92	0.16
Reach-1	5063	4760.00	711.40	727.14	716.48	727.27	0.000036	3.23	3561.56	703.00	0.14
Reach-1	5279	470.00	712.20	714.40	714.40	715.43	0.002844	8.13	57.78	28.41	1.01
Reach-1	5279	1260.00	712.20	717.45		718.49	0.001125	8.15	154.62	35.96	0.69
Reach-1	5279	1870.00	712.20	719.72		720.63	0.000705	7.65	244.34	43.13	0.57
Reach-1	5279	2570.00	712.20	721.76		722.62	0.000461	7.51	429.70	151.92	0.48
Reach-1	5279	3090.00	712.20	723.53		724.17	0.000284	6.78	824.03	299.24	0.39
Reach-1	5279	3670.00	712.20	724.44		725.08	0.000261	6.92	1131.64	364.81	0.38
Reach-1	5279	4760.00	712.20	726.96		727.37	0.000147	6.01	2214.08	473.71	0.30
Reach-1	5576	370.00	713.50	715.76		716.32	0.002848	6.04	61.26	35.99	0.82
Reach-1	5576	1040.00	713.50	718.08		718.88	0.001432	7.17	145.86	39.19	0.63
Reach-1	5576	1550.00	713.50	720.10		720.87	0.000807	7.06	235.34	49.40	0.51
Reach-1	5576	2130.00	713.50	721.97		722.78	0.000605	7.32	336.20	58.82	0.46
Reach-1	5576	2580.00	713.50	723.53		724.32	0.000472	7.29	444.07	79.61	0.42
Reach-1	5576	3060.00	713.50	724.35		725.26	0.000493	7.87	514.55	94.50	0.43
Reach-1	5576	3960.00	713.50	726.68		727.58	0.000385	7.96	807.40	156.47	0.40
Reach-1	5660	370.00	714.00	715.87	715.84	716.71	0.004083	7.37	50.21	28.74	0.98
Reach-1	5660	1040.00	714.00	717.88		719.22	0.002798	9.27	112.14	32.77	0.88
Reach-1	5660	1550.00	714.00	719.97		721.06	0.001441	8.38	184.91	36.94	0.66
Reach-1	5660	2130.00	714.00	721.88		722.92	0.001051	8.19	260.19	42.01	0.58

HEC-RAS Plan: 1998 Future River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	5666	2580.00	714.00	723.47		724.42	0.000786	7.83	329.42	44.79	0.51
Reach-1	5666	3060.00	714.00	724.29		725.37	0.000817	8.35	366.62	46.15	0.52
Reach-1	5666	3960.00	714.00	726.61		727.68	0.000627	8.28	487.67	80.79	0.47
Reach-1	5715	370.00	714.20	716.24	716.24	717.22	0.004408	7.98	46.36	23.56	1.00
Reach-1	5715	1040.00	714.20	718.21	718.21	720.10	0.003971	11.01	94.42	25.07	1.00
Reach-1	5715	1550.00	714.20	719.45	719.38	721.80	0.003763	12.30	126.06	26.01	0.98
Reach-1	5715	2130.00	714.20	721.35	720.56	723.60	0.002683	12.04	176.84	27.47	0.84
Reach-1	5715	2580.00	714.20	722.96	721.39	725.06	0.002074	11.62	222.08	28.70	0.74
Reach-1	5715	3060.00	714.20	723.65	722.21	726.13	0.002294	12.64	242.13	29.23	0.77
Reach-1	5715	3960.00	714.20	725.95	723.64	728.43	0.001804	12.68	336.06	56.34	0.69
Reach-1	5733.5	Bridge									
Reach-1	5752	370.00	714.30	717.16	716.16	717.51	0.001844	4.78	77.33	29.09	0.52
Reach-1	5752	1040.00	714.30	719.93	717.93	720.56	0.001556	6.37	163.39	33.04	0.50
Reach-1	5752	1550.00	714.30	721.58	719.00	722.35	0.001466	7.05	219.90	35.40	0.50
Reach-1	5752	2130.00	714.30	724.57	720.05	725.21	0.000819	6.42	331.67	54.30	0.39
Reach-1	5752	2580.00	714.30	725.07	720.78	725.91	0.000996	7.35	350.86	74.09	0.43
Reach-1	5752	3060.00	714.30	725.47	721.51	726.56	0.001216	8.36	366.11	89.83	0.48
Reach-1	5752	3960.00	714.30	730.29	722.72	730.54	0.000237	4.80	1537.35	316.49	0.22
Reach-1	5811	370.00	714.70	717.21		717.69	0.002933	5.56	66.49	29.02	0.65
Reach-1	5811	1040.00	714.70	719.98		720.68	0.001881	6.73	154.51	34.56	0.56
Reach-1	5811	1550.00	714.70	721.65		722.45	0.001618	7.21	214.99	37.89	0.53
Reach-1	5811	2130.00	714.70	724.66		725.26	0.000745	6.29	363.00	68.91	0.38
Reach-1	5811	2580.00	714.70	725.22		725.98	0.000864	7.06	403.82	76.88	0.42
Reach-1	5811	3060.00	714.70	725.71		726.64	0.000996	7.86	443.12	83.84	0.45
Reach-1	5811	3960.00	714.70	730.42		730.56	0.000145	3.93	2246.70	513.82	0.18
Reach-1	6004	370.00	715.80	717.78		718.60	0.006566	7.27	50.89	27.31	0.94
Reach-1	6004	1040.00	715.80	720.16		721.32	0.003789	8.63	120.49	31.27	0.77
Reach-1	6004	1550.00	715.80	721.74		723.00	0.002971	9.01	172.10	33.91	0.70
Reach-1	6004	2130.00	715.80	724.62		725.55	0.001304	7.72	284.07	48.61	0.49
Reach-1	6004	2580.00	715.80	725.15		726.32	0.001518	8.71	310.82	53.34	0.54
Reach-1	6004	3060.00	715.80	725.59		727.04	0.001771	9.75	335.27	57.31	0.59
Reach-1	6004	3960.00	715.80	730.23		730.71	0.000414	6.28	1042.40	211.04	0.30
Reach-1	6206	370.00	716.70	719.04		719.61	0.003748	6.05	61.12	28.17	0.72
Reach-1	6206	1040.00	716.70	720.91		722.14	0.004181	8.90	116.89	31.50	0.81
Reach-1	6206	1550.00	716.70	722.28		723.71	0.003585	9.58	161.81	33.95	0.77
Reach-1	6206	2130.00	716.70	724.81		725.90	0.001765	8.40	260.06	48.45	0.57
Reach-1	6206	2580.00	716.70	725.37		726.72	0.001966	9.34	288.27	51.55	0.61
Reach-1	6206	3060.00	716.70	725.87		727.50	0.002205	10.33	314.29	54.26	0.65
Reach-1	6206	3960.00	716.70	730.12		730.91	0.000678	7.64	827.17	302.71	0.39
Reach-1	6259	370.00	716.90	719.49	718.54	719.82	0.001903	4.60	80.43	31.00	0.50
Reach-1	6259	1040.00	716.90	721.67	720.16	722.44	0.002295	7.03	147.93	31.00	0.57
Reach-1	6259	1550.00	716.90	722.89	721.17	723.97	0.002582	8.35	185.72	31.00	0.60
Reach-1	6259	2130.00	716.90	724.88	722.17	726.03	0.002109	8.61	247.42	31.00	0.54
Reach-1	6259	2580.00	716.90	725.42	722.89	726.90	0.002563	9.76	264.21	31.00	0.59
Reach-1	6259	3060.00	716.90	725.88	723.59	727.76	0.003105	10.99	278.41	31.00	0.65
Reach-1	6259	3960.00	716.90	730.07	724.87	731.05	0.001231	8.45	783.54	385.27	0.41
Reach-1	6323	Culvert									
Reach-1	6323	370.00	717.40	719.94	719.04	720.28	0.002033	4.70	78.77	31.00	0.52
Reach-1	6323	1040.00	717.40	722.48	720.66	723.16	0.001900	6.60	157.52	31.00	0.52
Reach-1	6323	1550.00	717.40	724.02	721.65	724.91	0.001922	7.55	205.28	31.00	0.52
Reach-1	6323	2130.00	717.40	725.92	722.66	726.93	0.001751	8.07	263.98	31.00	0.49
Reach-1	6323	2580.00	717.40	726.84	723.37	728.05	0.001916	8.82	292.68	31.00	0.51
Reach-1	6323	3060.00	717.40	727.81	724.10	729.21	0.002045	9.48	322.86	31.00	0.52
Reach-1	6323	3960.00	717.40	729.63	725.36	731.29	0.002150	10.39	397.89	153.67	0.52
Reach-1	6375	370.00	717.50	720.13		720.38	0.001402	4.02	92.00	35.00	0.44
Reach-1	6375	1040.00	717.50	722.76		723.26	0.001291	5.65	184.17	35.00	0.43
Reach-1	6375	1550.00	717.50	724.37		725.01	0.001266	6.45	241.43	41.04	0.43
Reach-1	6375	2130.00	717.50	726.35		727.03	0.000971	6.69	355.36	73.79	0.40
Reach-1	6375	2580.00	717.50	727.46		728.16	0.000897	6.95	447.18	92.06	0.39
Reach-1	6375	3060.00	717.50	728.62		729.34	0.000816	7.14	578.62	155.18	0.38
Reach-1	6375	3960.00	717.50	731.06		731.47	0.000437	5.96	1154.90	321.53	0.29
Reach-1	6735	370.00	719.20	720.88	720.88	721.70	0.007974	7.30	50.67	30.47	1.00
Reach-1	6735	1040.00	719.20	723.05	722.51	724.26	0.004506	8.85	117.45	31.08	0.80

HEC-RAS Plan: 1998 Future River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	6735	1550.00	719.20	724.58	723.52	725.94	0.003548	9.37	165.44	31.52	0.72
Reach-1	6735	2130.00	719.20	726.38	724.53	727.80	0.002775	9.56	222.75	33.15	0.64
Reach-1	6735	2580.00	719.20	727.35	725.26	728.94	0.002615	10.13	261.65	46.87	0.63
Reach-1	6735	3060.00	719.20	728.41	725.98	730.09	0.002370	10.48	324.94	90.48	0.62
Reach-1	6735	3960.00	719.20	730.98	727.47	731.83	0.001073	8.34	809.42	290.88	0.43
Reach-1	6918	370.00	720.00	722.16		722.58	0.002929	5.19	71.23	35.04	0.64
Reach-1	6918	1040.00	720.00	724.11		724.93	0.002691	7.25	143.42	38.71	0.66
Reach-1	6918	1550.00	720.00	725.57		726.49	0.002162	7.68	201.73	41.44	0.61
Reach-1	6918	2130.00	720.00	727.31		728.23	0.001620	7.69	276.89	44.71	0.54
Reach-1	6918	2580.00	720.00	728.38		729.35	0.001454	7.92	328.45	62.05	0.53
Reach-1	6918	3060.00	720.00	729.49		730.47	0.001218	7.99	423.59	109.16	0.49
Reach-1	6918	3960.00	720.00	731.11		732.04	0.000972	8.06	673.30	207.65	0.45
Reach-1	6951	370.00	720.20	722.31		722.67	0.002590	4.84	76.47	38.52	0.61
Reach-1	6951	1040.00	720.20	724.37		725.03	0.002080	6.48	160.59	42.94	0.59
Reach-1	6951	1550.00	720.20	725.83		726.57	0.001675	6.87	225.56	46.07	0.55
Reach-1	6951	2130.00	720.20	727.55		728.30	0.001241	6.92	308.99	55.33	0.49
Reach-1	6951	2580.00	720.20	728.64		729.41	0.001058	7.10	379.26	74.64	0.46
Reach-1	6951	3060.00	720.20	729.73		730.52	0.000904	7.20	471.97	94.25	0.44
Reach-1	6951	3960.00	720.20	731.38		732.09	0.000700	7.13	734.28	207.84	0.40
Reach-1	6968	370.00	720.30	722.31	721.85	722.77	0.003092	5.48	67.56	35.72	0.68
Reach-1	6968	1040.00	720.30	724.27	723.38	725.21	0.002513	7.78	133.67	37.40	0.69
Reach-1	6968	1550.00	720.30	725.66	724.32	726.80	0.002050	8.59	180.52	38.59	0.65
Reach-1	6968	2130.00	720.30	727.32	725.29	728.58	0.001575	9.01	236.42	40.58	0.60
Reach-1	6968	2580.00	720.30	728.51	725.97	729.58	0.001567	8.31	329.43	75.99	0.53
Reach-1	6968	3060.00	720.30	729.62	726.63	730.67	0.001323	8.36	432.14	112.25	0.50
Reach-1	6968	3960.00	720.30	731.32	727.84	732.18	0.000966	8.03	721.93	235.86	0.44
Reach-1	6887	Culvert									
Reach-1	7006	370.00	720.40	722.85	721.95	723.16	0.000897	4.49	82.42	36.58	0.51
Reach-1	7006	1040.00	720.40	725.36	723.48	725.96	0.000673	6.23	167.03	39.22	0.49
Reach-1	7006	1550.00	720.40	726.91	724.43	727.69	0.000602	7.07	219.37	40.86	0.49
Reach-1	7006	2130.00	720.40	728.35	725.37	729.33	0.000586	7.96	267.61	59.23	0.50
Reach-1	7006	2580.00	720.40	729.92	726.05	730.59	0.000474	6.72	482.23	182.35	0.40
Reach-1	7006	3060.00	720.40	730.65	726.75	731.32	0.000450	6.90	631.36	225.82	0.39
Reach-1	7006	3960.00	720.40	731.72	727.92	732.37	0.000420	7.15	906.32	292.60	0.39
Reach-1	7053	370.00	720.50	722.80		723.26	0.001742	5.42	68.26	33.24	0.67
Reach-1	7053	1040.00	720.50	725.38		726.01	0.001017	6.32	164.49	41.35	0.56
Reach-1	7053	1550.00	720.50	727.08		727.73	0.000775	6.48	239.38	52.33	0.50
Reach-1	7053	2130.00	720.50	728.92		729.40	0.000430	5.83	449.90	140.85	0.39
Reach-1	7053	2580.00	720.50	730.28		730.64	0.000276	5.27	655.40	166.63	0.32
Reach-1	7053	3060.00	720.50	731.00		731.37	0.000263	5.44	783.68	191.35	0.32
Reach-1	7053	3960.00	720.50	731.99		732.41	0.000268	5.89	991.69	225.76	0.33
Reach-1	7749	370.00	721.00	722.83	722.78	723.59	0.003806	7.00	52.87	31.75	0.96
Reach-1	7749	1040.00	721.00	725.37		726.18	0.001507	7.24	143.60	39.73	0.67
Reach-1	7749	1550.00	721.00	727.06		727.87	0.001045	7.20	215.30	45.05	0.58
Reach-1	7749	2130.00	721.00	728.88		729.49	0.000598	6.50	386.73	137.19	0.46
Reach-1	7749	2580.00	721.00	730.26		730.69	0.000358	5.74	603.83	178.28	0.37
Reach-1	7749	3060.00	721.00	730.98		731.42	0.000331	5.87	740.43	200.12	0.36
Reach-1	7749	3960.00	721.00	731.98		732.46	0.000327	6.29	955.80	230.38	0.36
Reach-1	7507	340.00	721.53	723.57		724.08	0.002229	5.71	59.56	32.41	0.74
Reach-1	7507	890.00	721.53	725.78		726.42	0.001218	6.41	138.84	39.35	0.60
Reach-1	7507	1320.00	721.53	727.40		728.03	0.000850	6.38	206.76	44.45	0.52
Reach-1	7507	1830.00	721.53	728.94		729.61	0.000674	6.56	286.00	79.01	0.48
Reach-1	7507	2200.00	721.53	730.28		730.77	0.000409	5.86	518.24	231.62	0.39
Reach-1	7507	2580.00	721.53	731.04		731.47	0.000341	5.73	700.70	249.45	0.36
Reach-1	7507	3350.00	721.53	732.10		732.52	0.000303	5.87	979.51	277.88	0.35
Reach-1	7477	340.00	721.75	724.07		724.27	0.000712	3.60	94.37	41.95	0.42
Reach-1	7477	890.00	721.75	726.21		726.56	0.000585	4.77	186.59	44.62	0.41
Reach-1	7477	1320.00	721.75	727.74		728.15	0.000499	5.11	258.57	49.22	0.39
Reach-1	7477	1830.00	721.75	729.25		729.70	0.000410	5.43	379.93	181.52	0.37
Reach-1	7477	2200.00	721.75	730.49		730.83	0.000272	4.95	702.90	295.93	0.31
Reach-1	7477	2580.00	721.75	731.22		731.53	0.000235	4.88	920.99	303.21	0.29
Reach-1	7477	3350.00	721.75	732.27		732.57	0.000214	5.03	1246.20	321.07	0.28
Reach-1	7628	340.00	722.29	724.07	723.79	724.58	0.002511	5.72	59.48	35.15	0.77
Reach-1	7628	890.00	722.29	726.14	725.10	726.80	0.001313	6.52	136.59	39.29	0.62

HEC-RAS Plan: 1998 Future River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Q Total	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	7628	1320.00	722.29	727.67	725.91	728.35	0.000942	6.64	198.66	42.33	0.54
Reach-1	7628	1830.00	722.29	729.16	726.77	729.90	0.001045	6.92	264.41	45.90	0.51
Reach-1	7628	2200.00	722.29	730.38	727.31	731.00	0.000875	6.45	438.60	311.69	0.44
Reach-1	7628	2580.00	722.29	731.18	727.85	731.64	0.000649	5.95	702.72	352.46	0.38
Reach-1	7628	3350.00	722.29	732.29	728.85	732.63	0.000477	5.54	1126.98	464.97	0.33
Reach-1	7867	340.00	723.86	725.43	725.43	726.17	0.004375	6.94	48.97	32.85	1.00
Reach-1	7867	890.00	723.86	726.78	726.78	728.13	0.003757	9.34	95.27	35.56	1.01
Reach-1	7867	1320.00	723.86	727.62	727.62	729.33	0.003547	10.49	125.80	37.24	1.01
Reach-1	7867	1830.00	723.86	728.83		730.58	0.002651	10.60	172.58	39.67	0.90
Reach-1	7867	2200.00	723.86	730.03		731.56	0.001833	9.93	221.66	43.16	0.76
Reach-1	7867	2580.00	723.86	730.51	729.62	732.28	0.001884	10.66	246.60	94.20	0.78
Reach-1	7867	3350.00	723.86	731.51	731.51	733.34	0.001664	11.15	370.31	177.84	0.76
Reach-1	8147	340.00	725.43	727.01	727.01	727.76	0.004377	6.96	48.87	32.71	1.00
Reach-1	8147	890.00	725.43	728.37	728.37	729.72	0.003749	9.33	95.43	35.69	1.01
Reach-1	8147	1320.00	725.43	729.22	729.22	730.91	0.003501	10.42	126.65	37.56	1.00
Reach-1	8147	1830.00	725.43	730.07	730.07	732.12	0.003381	11.49	159.26	40.31	1.01
Reach-1	8147	2200.00	725.43	730.66	730.66	732.91	0.003105	12.05	185.61	49.39	0.99
Reach-1	8147	2580.00	725.43	731.24	731.24	733.65	0.002853	12.50	217.12	58.21	0.96
Reach-1	8147	3350.00	725.43	732.23	732.23	735.00	0.002631	13.48	276.19	62.56	0.95
Reach-1	8484	340.00	725.88	728.20		728.65	0.001665	5.36	63.40	29.64	0.65
Reach-1	8484	890.00	725.88	729.67		730.70	0.002202	8.16	109.12	32.58	0.79
Reach-1	8484	1320.00	725.88	730.45		731.93	0.002569	9.76	135.20	34.14	0.86
Reach-1	8484	1830.00	725.88	731.18	730.98	733.20	0.002980	11.39	160.68	35.61	0.94
Reach-1	8484	2200.00	725.88	731.62	731.60	734.03	0.003292	12.48	176.30	36.47	1.00
Reach-1	8484	2580.00	725.88	732.19	732.19	734.84	0.003261	13.06	197.57	37.62	1.00
Reach-1	8484	3350.00	725.88	733.44	733.44	736.30	0.002795	13.58	259.36	86.35	0.95
Reach-1	8736	340.00	726.20	728.68		728.99	0.001068	4.50	75.49	32.92	0.52
Reach-1	8736	890.00	726.20	730.50		731.14	0.001180	6.39	139.19	37.64	0.59
Reach-1	8736	1320.00	726.20	731.63		732.43	0.001203	7.16	184.23	42.43	0.61
Reach-1	8736	1830.00	726.20	732.83		733.75	0.001147	7.68	238.25	47.53	0.60
Reach-1	8736	2200.00	726.20	733.65		734.62	0.001083	7.89	278.72	51.02	0.60
Reach-1	8736	2580.00	726.20	734.41		735.43	0.001037	8.10	318.58	54.24	0.59
Reach-1	8736	3350.00	726.20	735.75		736.87	0.000978	8.48	395.03	59.93	0.58
Reach-1	8786	340.00	726.50	728.83	727.90	729.06	0.000823	3.88	87.55	39.44	0.46
Reach-1	8786	890.00	726.50	730.81	729.12	731.24	0.000738	5.29	168.37	42.15	0.47
Reach-1	8786	1320.00	726.50	731.97	729.88	732.54	0.000738	6.04	218.38	43.75	0.48
Reach-1	8786	1830.00	726.50	733.14	730.69	733.85	0.000752	6.77	270.25	45.34	0.49
Reach-1	8786	2200.00	726.50	733.91	731.22	734.71	0.000757	7.20	305.50	46.40	0.49
Reach-1	8786	2580.00	726.50	734.60	731.73	735.51	0.000774	7.63	338.04	47.35	0.50
Reach-1	8786	3350.00	726.50	735.80	732.68	736.91	0.000826	8.47	395.69	48.99	0.52
Reach-1	8807	Bridge									
Reach-1	8828	340.00	726.60	728.82	728.14	729.16	0.001320	4.72	72.03	34.31	0.57
Reach-1	8828	890.00	726.60	730.76	729.48	731.37	0.001126	6.28	141.68	37.41	0.57
Reach-1	8828	1320.00	726.60	731.90	730.32	732.69	0.001105	7.11	185.54	39.24	0.58
Reach-1	8828	1830.00	726.60	733.05	731.18	734.02	0.001106	7.90	231.53	41.08	0.59
Reach-1	8828	2200.00	726.60	733.81	731.76	734.89	0.001102	8.36	263.10	42.29	0.59
Reach-1	8828	2580.00	726.60	734.49	732.30	735.70	0.001118	8.83	292.35	43.38	0.60
Reach-1	8828	3350.00	726.60	735.66	733.32	737.13	0.001179	9.73	344.35	45.26	0.62
Reach-1	8858	340.00	726.80	728.81		729.25	0.003360	5.33	63.80	33.28	0.68
Reach-1	8858	890.00	726.80	730.73		731.45	0.002513	6.82	130.58	36.25	0.63
Reach-1	8858	1320.00	726.80	731.87		732.77	0.002389	7.64	172.68	38.02	0.63
Reach-1	8858	1830.00	726.80	733.00		734.11	0.002344	8.44	216.81	39.78	0.64
Reach-1	8858	2200.00	726.80	733.75		734.98	0.002313	8.90	247.12	40.95	0.64
Reach-1	8858	2580.00	726.80	734.43		735.79	0.002330	9.38	275.15	42.01	0.65
Reach-1	8858	3350.00	726.80	735.59		737.24	0.002446	10.31	324.99	44.04	0.67
Reach-1	9088	340.00	727.81	729.65	729.61	730.44	0.007036	7.13	47.67	28.39	0.97
Reach-1	9088	890.00	727.81	731.11	731.11	732.58	0.006579	9.73	91.42	31.45	1.01
Reach-1	9088	1320.00	727.81	732.07	732.04	733.87	0.006008	10.76	122.71	33.30	0.99
Reach-1	9088	1830.00	727.81	733.11	732.98	735.18	0.005454	11.55	158.45	35.30	0.96
Reach-1	9088	2200.00	727.81	733.82	733.60	736.04	0.005123	11.97	183.86	36.65	0.94
Reach-1	9088	2580.00	727.81	734.44	734.16	736.85	0.004833	12.47	207.93	42.07	0.93
Reach-1	9088	3350.00	727.81	735.53	735.34	738.32	0.004442	13.46	260.52	54.58	0.92
Reach-1	9178	340.00	727.90	730.23		730.59	0.002351	4.83	70.39	32.51	0.58
Reach-1	9178	890.00	727.90	732.07		732.76	0.002287	6.66	133.73	35.14	0.61

HEC-RAS Plan: 1998 Future River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	E.G. Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	9118	1320.00	727.90	733.18		734.06	0.002281	7.55	174.74	38.31	0.62
Reach-1	9118	1830.00	727.90	734.31		735.39	0.002333	8.31	220.09	42.18	0.64
Reach-1	9118	2200.00	727.90	735.06		736.25	0.002323	8.67	253.69	45.46	0.65
Reach-1	9118	2580.00	727.90	735.83		737.07	0.002270	8.93	288.95	48.65	0.65
Reach-1	9118	3350.00	727.90	737.19		738.55	0.001956	9.37	365.61	68.71	0.62
Reach-1	9133	340.00	728.05	730.26	729.59	730.64	0.002213	4.94	68.85	34.26	0.59
Reach-1	9133	890.00	728.05	732.07	730.98	732.85	0.002057	7.10	125.37	36.07	0.62
Reach-1	9133	1320.00	728.05	733.13	731.85	734.21	0.002069	8.33	158.54	37.13	0.65
Reach-1	9133	1830.00	728.05	734.21	732.78	735.62	0.002094	9.52	192.17	41.38	0.68
Reach-1	9133	2200.00	728.05	734.93	733.40	736.56	0.002100	10.26	214.45	52.81	0.69
Reach-1	9133	2580.00	728.05	735.84	734.00	737.13	0.001936	9.17	304.49	67.42	0.60
Reach-1	9133	3350.00	728.05	737.21	735.49	738.58	0.001697	9.63	451.52	154.26	0.58
Reach-1	9156	Culvert									
Reach-1	9179	340.00	728.60	731.07	730.15	731.38	0.001544	4.44	76.53	33.45	0.50
Reach-1	9179	890.00	728.60	733.29	731.54	733.87	0.001247	6.12	145.35	35.67	0.50
Reach-1	9179	1320.00	728.60	734.70	732.42	735.45	0.001142	6.98	189.03	41.48	0.50
Reach-1	9179	1830.00	728.60	735.44	733.35	736.60	0.001496	8.63	212.09	46.92	0.58
Reach-1	9179	2200.00	728.60	736.19	733.97	737.25	0.001744	8.28	283.38	87.01	0.55
Reach-1	9179	2580.00	728.60	736.48	734.59	737.79	0.002066	9.25	312.06	115.23	0.61
Reach-1	9179	3350.00	728.60	737.33	735.91	738.84	0.002163	10.20	446.37	199.99	0.63
Reach-1	9184	340.00	728.60	731.11		731.39	0.001603	4.20	81.02	33.50	0.48
Reach-1	9184	890.00	728.60	733.41		733.89	0.001342	5.54	160.65	35.79	0.46
Reach-1	9184	1320.00	728.60	734.89		735.48	0.001209	6.14	217.32	42.91	0.45
Reach-1	9184	1830.00	728.60	735.82		736.64	0.001443	7.28	260.31	49.70	0.50
Reach-1	9184	2200.00	728.60	736.20		737.26	0.001741	8.28	283.97	87.69	0.55
Reach-1	9184	2580.00	728.60	736.48		737.80	0.002067	9.26	312.70	115.77	0.61
Reach-1	9184	3350.00	728.60	737.31		738.87	0.002216	10.31	443.08	198.35	0.64
Reach-1	9231	340.00	729.19	731.36	731.36	732.35	0.007602	7.99	42.57	21.72	1.01
Reach-1	9231	890.00	729.19	733.17	733.17	734.87	0.006711	10.45	85.14	25.34	1.00
Reach-1	9231	1320.00	729.19	734.28	734.28	736.34	0.006410	11.53	114.47	27.96	1.00
Reach-1	9231	1830.00	729.19	735.42	735.42	737.77	0.006172	12.31	148.70	31.96	1.01
Reach-1	9231	2200.00	729.19	736.10	736.10	738.66	0.006044	12.84	171.50	36.55	1.01
Reach-1	9231	2580.00	729.19	736.89	736.89	739.48	0.005077	12.96	207.54	52.54	0.95
Reach-1	9231	3350.00	729.19	737.99	737.99	740.88	0.004586	13.83	271.36	68.78	0.93
Reach-1	9551	340.00	731.28	733.64		734.47	0.005733	7.31	46.52	21.73	0.88
Reach-1	9551	890.00	731.28	735.29	735.27	737.00	0.006626	10.49	84.81	24.49	0.99
Reach-1	9551	1320.00	731.28	736.37	736.37	738.52	0.006523	11.77	112.13	26.28	1.00
Reach-1	9551	1830.00	731.28	737.50	737.50	740.05	0.006294	12.80	143.01	28.17	1.00
Reach-1	9551	2200.00	731.28	738.40	738.40	741.02	0.005495	13.02	173.77	54.76	0.95
Reach-1	9551	2580.00	731.28	739.86	739.86	741.69	0.003066	11.29	323.55	149.90	0.74
Reach-1	9551	3350.00	731.28	741.06	741.06	742.53	0.002313	10.86	579.34	262.66	0.66
Reach-1	9791	180.00	732.86	735.10		735.30	0.001507	3.67	49.10	24.19	0.45
Reach-1	9791	460.00	732.86	737.50		737.76	0.000835	4.07	113.00	29.00	0.36
Reach-1	9791	680.00	732.86	738.94		739.23	0.000657	4.35	159.42	37.50	0.34
Reach-1	9791	940.00	732.86	740.40		740.72	0.000535	4.63	238.61	130.34	0.32
Reach-1	9791	1130.00	732.86	741.35		741.62	0.000402	4.39	460.57	334.31	0.28
Reach-1	9791	1360.00	732.86	741.87		742.12	0.000379	4.46	664.89	446.10	0.28
Reach-1	9791	1830.00	732.86	742.66		742.87	0.000340	4.48	1082.31	617.12	0.26
Reach-1	9837	180.00	733.25	735.10	734.63	735.49	0.002853	4.99	36.10	22.65	0.65
Reach-1	9837	460.00	733.25	737.43	735.83	737.92	0.001237	5.65	81.44	26.14	0.49
Reach-1	9837	680.00	733.25	738.82	736.59	739.43	0.001037	6.26	108.56	28.23	0.47
Reach-1	9837	940.00	733.25	740.38	737.40	740.80	0.000849	5.21	196.02	116.55	0.37
Reach-1	9837	1130.00	733.25	741.34	737.96	741.67	0.000596	4.82	415.24	345.53	0.32
Reach-1	9837	1360.00	733.25	741.88	738.56	742.16	0.000527	4.76	641.49	500.95	0.31
Reach-1	9837	1830.00	733.25	742.70	739.96	742.89	0.000404	4.46	1127.00	674.71	0.27
Reach-1	9860	Bridge									
Reach-1	9883	180.00	733.64	735.25	735.01	735.75	0.004481	5.68	31.67	22.87	0.79
Reach-1	9883	460.00	733.64	737.49	736.20	738.06	0.001586	6.06	75.94	26.24	0.54
Reach-1	9883	680.00	733.64	739.73	736.97	740.23	0.000752	5.66	120.09	29.59	0.40
Reach-1	9883	940.00	733.64	741.17	737.76	741.45	0.000541	4.43	315.34	228.73	0.31
Reach-1	9883	1130.00	733.64	741.63	738.30	741.91	0.000520	4.55	432.66	288.87	0.30
Reach-1	9883	1360.00	733.64	741.88	738.93	742.19	0.000601	5.00	509.50	332.41	0.33
Reach-1	9883	1830.00	733.64	742.84	740.06	743.05	0.000439	4.64	944.29	583.53	0.29

HEC-RAS Plan: 1998 Future River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	9933	180.00	734.08	735.72	736.47	0.004634	6.96	25.88	17.44	1.01
Reach-1	9933	460.00	734.08	737.25	738.32	0.003251	8.31	55.38	21.13	0.90
Reach-1	9933	680.00	734.08	739.74	740.28	0.000745	5.95	129.18	42.98	0.48
Reach-1	9933	940.00	734.08	741.02	741.56	0.000581	6.15	222.30	94.22	0.44
Reach-1	9933	1130.00	734.08	741.41	742.04	0.000639	6.72	261.87	101.74	0.46
Reach-1	9933	1360.00	734.08	741.54	742.39	0.000848	7.84	275.07	102.26	0.54
Reach-1	9933	1830.00	734.08	742.31	743.32	0.000931	8.84	378.59	175.70	0.57
Reach-1	10156	150.00	736.30	737.67	738.32	0.004781	6.43	23.32	18.35	1.01
Reach-1	10156	370.00	736.30	738.75	739.84	0.004191	8.37	44.18	20.50	1.01
Reach-1	10156	540.00	736.30	739.56	740.76	0.003367	8.77	61.55	22.13	0.93
Reach-1	10156	730.00	736.30	740.92	741.88	0.001686	7.88	93.72	25.75	0.69
Reach-1	10156	880.00	736.30	741.22	742.43	0.001911	8.82	101.80	26.67	0.75
Reach-1	10156	1040.00	736.30	741.26	742.91	0.002594	10.33	102.79	26.78	0.87
Reach-1	10156	1400.00	736.30	741.79	741.79	744.15	0.003191	12.37	117.41	28.37	0.99
Reach-1	10201	150.00	736.80	738.36	737.75	738.54	0.000942	3.40	44.07	31.86	0.48
Reach-1	10201	370.00	736.80	739.85	738.54	740.14	0.000610	4.29	86.32	36.29	0.43
Reach-1	10201	540.00	736.80	740.68	739.04	741.06	0.000582	4.92	109.83	37.77	0.44
Reach-1	10201	730.00	736.80	741.63	739.54	742.07	0.000512	5.34	136.76	39.21	0.43
Reach-1	10201	880.00	736.80	742.15	739.90	742.68	0.000529	5.81	151.43	39.91	0.44
Reach-1	10201	1040.00	736.80	742.66	740.26	743.27	0.000545	6.27	165.91	40.37	0.46
Reach-1	10201	1400.00	736.80	743.94	741.03	744.69	0.000512	6.93	202.09	41.55	0.46
Reach-1	10218.5	Bridge								
Reach-1	10236	150.00	737.20	738.32	738.16	738.68	0.002883	4.79	31.33	30.16	0.80
Reach-1	10236	370.00	737.20	739.82	738.96	740.22	0.001038	5.06	73.15	32.76	0.55
Reach-1	10236	540.00	737.20	740.65	739.46	741.14	0.000887	5.61	96.23	34.19	0.53
Reach-1	10236	730.00	737.20	741.60	739.96	742.15	0.000719	5.95	122.78	35.84	0.50
Reach-1	10236	880.00	737.20	742.12	740.33	742.75	0.000723	6.42	137.13	36.73	0.51
Reach-1	10236	1040.00	737.20	743.86	740.70	744.34	0.000367	5.60	185.76	39.75	0.38
Reach-1	10236	1400.00	737.20	744.99	741.46	745.64	0.000394	6.44	217.43	109.02	0.41
Reach-1	10286	150.00	737.80	738.91	738.91	739.42	0.004905	5.75	26.09	25.72	1.01
Reach-1	10286	370.00	737.80	739.77	739.77	740.63	0.004159	7.43	49.79	29.16	1.00
Reach-1	10286	540.00	737.80	740.40		741.35	0.003367	7.83	68.98	31.67	0.93
Reach-1	10286	730.00	737.80	741.53		742.25	0.001708	6.81	107.27	36.17	0.70
Reach-1	10286	880.00	737.80	742.10		742.83	0.001483	6.85	128.47	38.43	0.66
Reach-1	10286	1040.00	737.80	743.99		744.38	0.000533	5.00	206.18	45.96	0.41
Reach-1	10286	1400.00	737.80	745.28		745.68	0.000401	5.12	319.63	115.48	0.37
Reach-1	10509	150.00	739.30	740.94	740.94	741.64	0.004692	6.70	22.40	16.30	1.01
Reach-1	10509	370.00	739.30	742.13	742.13	743.22	0.004119	8.36	44.23	20.58	1.01
Reach-1	10509	540.00	739.30	742.82	742.82	744.10	0.003931	9.06	59.58	23.70	1.01
Reach-1	10509	730.00	739.30	743.46	743.46	744.91	0.003776	9.65	75.68	26.58	1.01
Reach-1	10509	880.00	739.30	743.91	743.91	745.46	0.003673	10.01	87.90	28.58	1.01
Reach-1	10509	1040.00	739.30	744.29	744.29	746.00	0.003532	10.51	99.37	32.42	1.00
Reach-1	10509	1400.00	739.30	745.11	745.11	747.09	0.003076	11.33	130.10	42.29	0.97
Reach-1	10558	150.00	739.60	741.38	740.99	741.81	0.001877	5.22	28.75	16.33	0.69
Reach-1	10558	370.00	739.60	742.25	742.13	743.41	0.003057	8.67	42.69	16.44	0.94
Reach-1	10558	540.00	739.60	742.87	742.87	744.50	0.003226	10.25	52.71	16.51	1.00
Reach-1	10558	730.00	739.60	743.60	743.60	745.59	0.003007	11.32	64.51	16.60	1.00
Reach-1	10558	880.00	739.60	744.13	744.13	746.38	0.002890	12.05	73.02	16.66	1.00
Reach-1	10558	1040.00	739.60	744.66	744.66	747.18	0.002783	12.74	81.64	16.73	1.00
Reach-1	10558	1400.00	739.60	747.47	747.47	748.79	0.001864	9.69	252.80	194.87	0.61
Reach-1	10574.5	Bridge								
Reach-1	10593	150.00	739.83	741.39	741.23	741.96	0.003005	6.08	24.69	18.17	0.86
Reach-1	10593	370.00	739.83	742.88	742.39	743.79	0.001948	7.65	48.34	20.38	0.77
Reach-1	10593	540.00	739.83	743.68	743.12	744.89	0.001907	8.85	61.03	21.56	0.80
Reach-1	10593	730.00	739.83	746.77	743.85	747.45	0.000488	6.63	110.07	126.88	0.44
Reach-1	10593	880.00	739.83	746.73	744.39	747.74	0.000720	8.03	109.56	122.55	0.54
Reach-1	10593	1040.00	739.83	746.50	744.94	748.00	0.001129	9.83	105.82	91.20	0.67
Reach-1	10593	1400.00	739.83	748.97	746.04	749.20	0.000265	4.63	768.82	379.67	0.29
Reach-1	10643	150.00	740.18	741.59	741.59	742.24	0.004770	6.50	23.09	17.81	1.01
Reach-1	10643	370.00	740.18	743.19		743.91	0.002240	6.82	54.25	21.02	0.75
Reach-1	10643	540.00	740.18	744.29		745.03	0.001608	6.87	78.68	23.94	0.65
Reach-1	10643	730.00	740.18	747.14		747.50	0.000369	4.92	194.72	81.26	0.35
Reach-1	10643	880.00	740.18	747.32		747.82	0.000480	5.73	211.19	93.42	0.40
Reach-1	10643	1040.00	740.18	747.48		748.12	0.000612	6.57	226.52	103.47	0.45

HEC-RAS Plan: 1998 Future River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	10643	1400.00	740.18	748.66		749.36	0.000567	7.06	387.61	155.00	0.45
Reach-1	10855	150.00	741.89	743.15	743.15	743.74	0.004832	6.20	24.20	20.51	1.01
Reach-1	10855	370.00	741.89	744.14	744.14	745.16	0.004199	8.12	45.57	22.50	1.01
Reach-1	10855	540.00	741.89	744.75	744.75	746.02	0.003994	9.05	59.64	23.72	1.01
Reach-1	10855	730.00	741.89	747.10		747.68	0.000837	6.09	122.54	31.16	0.50
Reach-1	10855	880.00	741.89	747.27		748.05	0.001076	7.08	127.90	31.91	0.57
Reach-1	10855	1040.00	741.89	747.40		748.43	0.001373	8.14	132.03	32.47	0.65
Reach-1	10855	1400.00	741.89	748.47		749.69	0.001271	8.93	171.91	48.65	0.64
Reach-1	10905	150.00	742.35	743.65	743.31	743.91	0.001758	4.12	36.39	29.53	0.64
Reach-1	10905	370.00	742.35	744.91	744.10	745.32	0.001120	5.17	71.62	31.01	0.57
Reach-1	10905	540.00	742.35	745.66	744.60	746.19	0.001012	5.83	92.63	31.89	0.56
Reach-1	10905	730.00	742.35	747.29	745.10	747.72	0.000486	5.28	138.33	33.81	0.42
Reach-1	10905	880.00	742.35	747.54	745.47	748.11	0.000600	6.06	145.25	34.10	0.47
Reach-1	10905	1040.00	742.35	747.78	745.84	748.50	0.000721	6.85	151.92	34.38	0.52
Reach-1	10905	1400.00	742.35	748.85	746.60	749.77	0.000714	7.69	182.10	35.65	0.53
Reach-1	10935	Culvert									
Reach-1	10965	150.00	742.98	744.97	743.96	745.09	0.000460	2.80	53.60	30.39	0.35
Reach-1	10965	370.00	742.98	746.20	744.77	746.49	0.000556	4.25	87.07	32.51	0.42
Reach-1	10965	540.00	742.98	747.02	745.29	747.40	0.000559	4.95	109.08	33.91	0.43
Reach-1	10965	730.00	742.98	748.88	745.80	749.21	0.000288	4.58	159.42	37.09	0.33
Reach-1	10965	880.00	742.98	749.98	746.18	750.32	0.000237	4.66	189.03	38.97	0.31
Reach-1	10965	1040.00	742.98	751.34	746.55	751.67	0.000184	4.61	225.59	49.68	0.28
Reach-1	10965	1400.00	742.98	753.26	747.34	753.44	0.000149	3.45	505.37	229.40	0.23
Reach-1	11015	150.00	743.50	745.05	745.05	745.71	0.004652	6.51	23.04	17.75	1.01
Reach-1	11015	370.00	743.50	746.16	746.16	747.21	0.004073	8.20	45.12	21.89	1.01
Reach-1	11015	540.00	743.50	746.82	746.82	748.06	0.003845	8.96	60.24	24.32	1.00
Reach-1	11015	730.00	743.50	748.62		749.36	0.001122	6.89	112.19	39.95	0.59
Reach-1	11015	880.00	743.50	749.82		750.42	0.000669	6.29	174.06	63.48	0.48
Reach-1	11015	1040.00	743.50	751.28		751.71	0.000370	5.49	279.84	79.82	0.37
Reach-1	11015	1400.00	743.50	753.12		753.52	0.000270	5.49	540.20	271.14	0.33
Reach-1	11405	150.00	747.60	749.21	749.21	749.95	0.004750	6.87	21.83	15.05	1.01
Reach-1	11405	370.00	747.60	750.44	750.44	751.66	0.004259	8.85	41.79	17.38	1.01
Reach-1	11405	540.00	747.60	751.19	751.19	752.67	0.004075	9.77	55.26	18.79	1.00
Reach-1	11405	730.00	747.60	751.88	751.88	753.64	0.003716	10.66	69.61	23.15	0.99
Reach-1	11405	880.00	747.60	752.43	752.43	754.33	0.003319	11.08	84.90	33.56	0.96
Reach-1	11405	1040.00	747.60	753.05	753.05	754.96	0.002824	11.21	109.87	47.17	0.90
Reach-1	11405	1400.00	747.60	753.98	753.98	756.11	0.002591	12.10	163.33	67.65	0.89
Reach-1	11787	150.00	753.20	754.74	754.74	755.39	0.004631	6.45	23.25	18.17	1.00
Reach-1	11787	370.00	753.20	755.84	755.84	756.86	0.004059	8.11	45.61	22.56	1.01
Reach-1	11787	540.00	753.20	756.49	756.49	757.70	0.003569	8.84	63.07	38.38	0.98
Reach-1	11787	730.00	753.20	757.21	757.21	758.43	0.002665	9.02	103.44	73.92	0.88
Reach-1	11787	880.00	753.20	757.69	757.69	758.88	0.002268	9.11	144.20	97.45	0.83
Reach-1	11787	1040.00	753.20	757.93	757.93	759.30	0.002444	9.86	169.34	109.46	0.87
Reach-1	11787	1400.00	753.20	759.02	759.02	759.99	0.001463	8.96	396.82	319.56	0.70
Reach-1	12170	70.00	756.80	757.78	757.78	758.22	0.005274	5.38	13.02	14.71	1.01
Reach-1	12170	170.00	756.80	758.51	758.51	759.25	0.004576	6.91	24.59	16.76	1.01
Reach-1	12170	250.00	756.80	758.97	758.97	759.88	0.004338	7.67	32.58	18.03	1.01
Reach-1	12170	340.00	756.80	759.41	759.41	760.49	0.004168	8.32	40.87	19.27	1.01
Reach-1	12170	410.00	756.80	759.72	759.72	760.91	0.004067	8.73	46.98	20.13	1.01
Reach-1	12170	480.00	756.80	760.01	760.01	761.29	0.003983	9.08	52.88	20.93	1.01
Reach-1	12170	640.00	756.80	760.60	760.60	762.08	0.003736	9.77	65.75	23.82	1.00
Reach-1	12213	70.00	757.20	758.24	758.00	758.48	0.002193	3.96	17.66	18.08	0.69
Reach-1	12213	170.00	757.20	759.15	758.66	759.56	0.001575	5.12	33.20	19.03	0.65
Reach-1	12213	250.00	757.20	759.61	759.08	760.19	0.001681	6.09	41.05	19.52	0.69
Reach-1	12213	340.00	757.20	759.81	759.51	760.72	0.002390	7.66	44.41	19.72	0.83
Reach-1	12213	410.00	757.20	759.86	759.82	761.14	0.003264	9.06	45.26	19.77	0.98
Reach-1	12213	480.00	757.20	760.13	760.10	761.57	0.003235	9.62	49.88	20.06	0.99
Reach-1	12213	640.00	757.20	761.77	761.00	762.58	0.001598	7.23	88.53	21.76	0.63
Reach-1	12234	Culvert									
Reach-1	12275	70.00	757.90	759.29	758.70	759.43	0.000827	2.96	23.66	19.78	0.44
Reach-1	12275	170.00	757.90	760.43	759.35	760.68	0.000662	3.95	43.07	22.07	0.44
Reach-1	12275	250.00	757.90	761.18	759.78	761.49	0.000608	4.49	55.69	26.26	0.44
Reach-1	12275	340.00	757.90	761.95	760.21	762.20	0.000478	4.00	90.78	35.45	0.37

HEC-RAS Plan: 1998 Future River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	12275	410.00	757.90	762.80	760.52	762.99	0.000297	3.63	196.49	178.30	0.30
Reach-1	12275	480.00	757.90	763.11	760.80	763.30	0.000293	3.77	257.46	215.82	0.30
Reach-1	12275	640.00	757.90	762.37	761.80	763.03	0.001137	6.63	130.20	125.36	0.58
Reach-1	12540	70.00	759.80	760.76	760.76	761.19	0.005246	5.25	13.32	15.70	1.01
Reach-1	12540	170.00	759.80	761.47	761.47	762.16	0.004547	6.70	25.39	18.43	1.01
Reach-1	12540	250.00	759.80	761.91	761.91	762.75	0.004278	7.39	33.84	20.12	1.00
Reach-1	12540	340.00	759.80	762.32	762.32	763.32	0.004094	7.99	42.58	21.81	1.00
Reach-1	12540	410.00	759.80	762.59	762.59	763.70	0.003952	8.46	48.68	23.74	1.00
Reach-1	12540	480.00	759.80	762.85	762.85	764.07	0.003751	8.87	54.97	25.60	1.00
Reach-1	12540	640.00	759.80	763.39	763.39	764.82	0.003386	9.63	69.98	29.57	0.98
Reach-1	12871	70.00	762.60	763.57	763.57	764.02	0.005272	5.37	13.04	14.77	1.01
Reach-1	12871	170.00	762.60	764.31	764.31	765.05	0.004577	6.90	24.65	16.86	1.01
Reach-1	12871	250.00	762.60	764.77	764.77	765.68	0.004338	7.65	32.66	18.16	1.01
Reach-1	12871	340.00	762.60	765.21	765.21	766.28	0.004168	8.29	41.03	19.49	1.01
Reach-1	12871	410.00	762.60	765.52	765.52	766.69	0.004063	8.67	47.28	20.49	1.01
Reach-1	12871	480.00	762.60	765.82	765.82	767.07	0.003939	8.97	53.49	21.43	1.00
Reach-1	12871	640.00	762.60	766.68	766.68	767.80	0.002509	8.59	97.26	95.15	0.84
Reach-1	13159	70.00	764.60	765.56	765.56	765.99	0.005289	5.24	13.36	15.87	1.01
Reach-1	13159	170.00	764.60	766.26	766.26	766.95	0.004407	6.69	25.90	22.10	0.99
Reach-1	13159	250.00	764.60	766.71	766.71	767.53	0.003829	7.34	37.59	29.83	0.96
Reach-1	13159	340.00	764.60	767.14	767.14	768.07	0.003459	7.87	51.99	37.21	0.94
Reach-1	13159	410.00	764.60	767.43	767.43	768.42	0.003296	8.23	63.43	42.16	0.93
Reach-1	13159	480.00	764.60	767.69	767.69	768.74	0.003152	8.52	75.31	46.75	0.92
Reach-1	13159	640.00	764.60	768.14	768.14	769.40	0.003231	9.44	98.91	66.18	0.95
Reach-1	13369	70.00	765.48	766.52		766.78	0.002766	4.12	17.01	17.72	0.74
Reach-1	13369	170.00	765.48	767.21		767.71	0.002895	5.68	29.94	19.54	0.81
Reach-1	13369	250.00	765.48	767.59		768.28	0.003207	6.67	37.45	20.52	0.87
Reach-1	13369	340.00	765.48	767.89	767.81	768.83	0.003763	7.78	43.69	21.30	0.96
Reach-1	13369	410.00	765.48	768.11	768.10	769.22	0.004023	8.45	48.53	21.88	1.00
Reach-1	13369	480.00	765.48	768.37	768.37	769.58	0.003992	8.85	54.22	22.55	1.01
Reach-1	13369	640.00	765.48	768.92	768.92	770.33	0.003839	9.54	67.09	24.00	1.01
Reach-1	13410	70.00	765.66	766.71	766.37	766.87	0.001471	3.26	21.45	23.78	0.56
Reach-1	13410	170.00	765.66	767.49	766.94	767.81	0.001338	4.52	37.58	26.24	0.59
Reach-1	13410	250.00	765.66	767.95	767.32	768.39	0.001378	5.32	46.96	27.67	0.62
Reach-1	13410	340.00	765.66	768.37	767.70	768.95	0.001449	6.11	55.62	28.99	0.65
Reach-1	13410	410.00	765.66	768.67	767.97	769.35	0.001494	6.65	61.66	29.91	0.68
Reach-1	13410	480.00	765.66	768.92	768.22	769.72	0.001568	7.19	66.80	30.70	0.70
Reach-1	13410	640.00	765.66	769.36	768.76	770.47	0.001819	8.43	75.93	32.09	0.77
Reach-1	13434	Bridge									
Reach-1	13458	70.00	765.89	766.75	766.60	767.00	0.002796	3.96	17.69	23.47	0.75
Reach-1	13458	170.00	765.89	767.52	767.17	767.92	0.001988	5.09	33.37	25.93	0.70
Reach-1	13458	250.00	765.89	767.97	767.55	768.50	0.001897	5.86	42.66	27.39	0.72
Reach-1	13458	340.00	765.89	768.39	767.93	769.07	0.001907	6.64	51.22	28.73	0.74
Reach-1	13458	410.00	765.89	768.68	768.20	769.48	0.001915	7.16	57.24	29.68	0.76
Reach-1	13458	480.00	765.89	768.93	768.46	769.85	0.001975	7.70	62.33	30.47	0.78
Reach-1	13458	640.00	765.89	771.38	769.00	771.89	0.000489	5.68	112.62	38.36	0.43
Reach-1	13512	70.00	766.40	767.52	767.52	767.94	0.005274	5.19	13.48	16.37	1.01
Reach-1	13512	170.00	766.40	768.22	768.22	768.85	0.004606	6.39	26.62	21.28	1.01
Reach-1	13512	250.00	766.40	768.61	768.61	769.39	0.004348	7.08	35.33	23.07	1.01
Reach-1	13512	340.00	766.40	768.98	768.98	769.90	0.004156	7.69	44.23	24.53	1.01
Reach-1	13512	410.00	766.40	769.24	769.24	770.26	0.004042	8.07	50.79	25.55	1.01
Reach-1	13512	480.00	766.40	769.49	769.49	770.58	0.003948	8.40	57.11	26.50	1.01
Reach-1	13512	640.00	766.40	771.46		771.93	0.000921	5.46	117.12	34.23	0.52
Reach-1	13571	70.00	767.31	768.93	768.93	769.42	0.005174	5.60	12.50	13.10	1.01
Reach-1	13571	170.00	767.31	769.74	769.74	770.45	0.004556	6.72	25.30	18.28	1.01
Reach-1	13571	250.00	767.31	770.21	770.21	771.02	0.004353	7.25	34.48	21.46	1.01
Reach-1	13571	340.00	767.31	770.64	770.64	771.55	0.004185	7.63	44.56	24.94	1.01
Reach-1	13571	410.00	767.31	770.94	770.94	771.89	0.004148	7.83	52.37	28.07	1.01
Reach-1	13571	480.00	767.31	771.21	771.21	772.19	0.004005	7.96	60.31	30.75	1.00
Reach-1	13571	640.00	767.31	771.69	771.69	772.78	0.003947	8.40	76.21	35.51	1.01
Reach-1	13621	70.00	768.07	769.71	769.71	770.15	0.005275	5.31	13.17	15.38	1.01
Reach-1	13621	170.00	768.07	770.43	770.43	771.08	0.004647	6.46	26.31	20.75	1.01
Reach-1	13621	250.00	768.07	770.85	770.85	771.62	0.004408	7.05	35.48	23.56	1.01
Reach-1	13621	340.00	768.07	771.25	771.25	772.12	0.004130	7.47	45.49	26.29	1.00

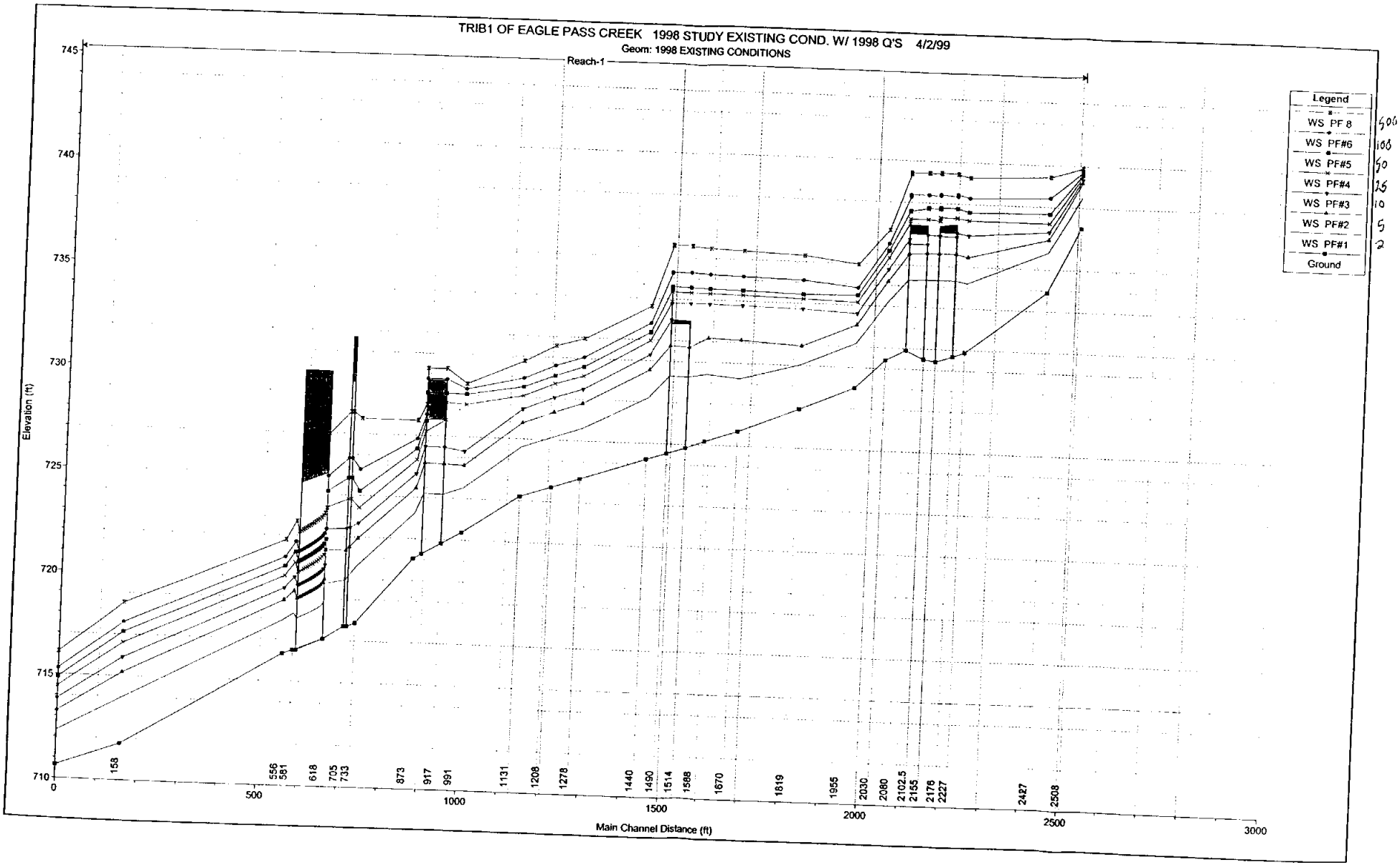
HEC-RAS Plan: 1998 Future River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Profile	E.G. Elev (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	13621		410.00	768.07	771.50	771.50	772.46	0.004106	7.84	52.30	27.99	1.01
Reach-1	13621		480.00	768.07	771.76	771.76	772.76	0.003928	8.04	59.70	29.73	1.00
Reach-1	13621		640.00	768.07	772.23	772.23	773.38	0.003633	8.62	75.40	41.80	0.99
Reach-1	13758		70.00	769.89	771.24	771.24	771.69	0.005177	5.39	12.99	14.66	1.01
Reach-1	13758		170.00	769.89	771.99	771.99	772.65	0.004583	6.52	26.09	20.13	1.01
Reach-1	13758		250.00	769.89	772.39	772.39	773.21	0.004035	7.30	35.31	26.13	0.99
Reach-1	13758		340.00	769.89	772.80	772.80	773.75	0.003505	7.88	47.51	32.50	0.96
Reach-1	13758		410.00	769.89	773.08	773.08	774.13	0.003308	8.31	57.07	36.66	0.95
Reach-1	13758		480.00	769.89	773.34	773.34	774.46	0.003142	8.67	67.01	40.41	0.94
Reach-1	13758		640.00	769.89	773.87	773.87	775.15	0.002859	9.35	90.65	48.15	0.92
Reach-1	13857		70.00	770.86	772.03	772.03	772.44	0.005239	5.16	13.56	16.61	1.00
Reach-1	13857		170.00	770.86	772.71	772.71	773.43	0.004147	6.85	25.82	20.40	0.99
Reach-1	13857		250.00	770.86	773.15	773.15	774.05	0.003717	7.70	35.49	23.52	0.98
Reach-1	13857		340.00	770.86	773.58	773.58	774.66	0.003408	8.44	46.37	26.46	0.97
Reach-1	13857		410.00	770.86	773.87	773.87	775.08	0.003317	8.99	54.25	28.34	0.97
Reach-1	13857		480.00	770.86	774.09	774.09	775.48	0.003464	9.68	60.89	35.92	1.01
Reach-1	13857		640.00	770.86	775.08	775.08	776.12	0.001910	8.76	127.88	83.00	0.78
Reach-1	13960		70.00	771.83	773.22	773.22	773.75	0.005159	5.84	11.98	11.47	1.01
Reach-1	13960		170.00	771.83	774.09	774.09	774.91	0.004507	7.25	23.62	18.20	1.00
Reach-1	13960		250.00	771.83	774.67	774.67	775.56	0.003346	7.65	39.85	36.92	0.90
Reach-1	13960		340.00	771.83	775.21	775.21	776.11	0.002697	7.93	65.87	62.68	0.84
Reach-1	13960		410.00	771.83	775.62	775.62	776.42	0.002133	7.74	95.58	77.10	0.77
Reach-1	13960		480.00	771.83	775.82	775.82	776.68	0.002210	8.20	110.70	78.39	0.79
Reach-1	13960		640.00	771.83	776.33	776.33	777.19	0.001994	8.57	168.46	141.65	0.77
Reach-1	14083		70.00	773.24	774.55	774.55	775.00	0.004424	5.45	14.74	20.75	0.96
Reach-1	14083		170.00	773.24	775.30	775.30	775.99	0.003445	7.00	34.68	32.12	0.93
Reach-1	14083		250.00	773.24	775.83	775.83	776.57	0.002738	7.45	54.59	41.94	0.87
Reach-1	14083		340.00	773.24	776.17	776.17	777.09	0.002958	8.49	69.14	46.94	0.92
Reach-1	14083		410.00	773.24	776.70	776.70	777.42	0.001969	7.83	112.84	134.00	0.78
Reach-1	14083		480.00	773.24	776.94	776.94	777.65	0.001862	7.99	145.75	142.70	0.76
Reach-1	14083		640.00	773.24	777.29	777.29	778.06	0.001952	8.74	197.85	154.27	0.80
Reach-1	14183		70.00	774.20	775.82	775.82	776.24	0.005382	5.22	13.41	16.37	1.02
Reach-1	14183		170.00	774.20	776.49	776.49	777.18	0.004258	6.69	26.61	23.32	0.99
Reach-1	14183		250.00	774.20	776.91	776.91	777.76	0.003734	7.46	37.55	28.12	0.97
Reach-1	14183		340.00	774.20	777.33	777.33	778.32	0.003403	8.15	50.08	32.76	0.96
Reach-1	14183		410.00	774.20	777.62	777.62	778.70	0.003203	8.57	60.14	36.04	0.95
Reach-1	14183		480.00	774.20	777.87	777.87	779.05	0.003121	9.01	69.58	38.87	0.95
Reach-1	14183		640.00	774.20	778.58	778.58	779.78	0.002423	9.23	107.30	66.08	0.87
Reach-1	14283		70.00	774.79	776.77	776.77	777.30	0.004386	5.92	14.15	16.51	0.96
Reach-1	14283		170.00	774.79	777.65	777.65	778.47	0.003538	7.69	31.71	23.80	0.95
Reach-1	14283		250.00	774.79	778.00	778.00	779.18	0.004206	9.34	40.78	26.70	1.06
Reach-1	14283		340.00	774.79	778.81	778.81	779.84	0.002660	9.00	71.09	48.68	0.88
Reach-1	14283		410.00	774.79	779.19	779.19	780.23	0.002403	9.22	91.86	59.20	0.86
Reach-1	14283		480.00	774.79	779.48	779.48	780.56	0.002369	9.63	109.80	67.59	0.86
Reach-1	14283		640.00	774.79	780.00	780.00	781.19	0.002358	10.46	149.17	82.49	0.88
Reach-1	14426		70.00	775.62	777.47		777.66	0.001466	3.55	19.73	15.97	0.56
Reach-1	14426		170.00	775.62	778.48		778.79	0.001208	4.47	38.82	22.26	0.55
Reach-1	14426		250.00	775.62	779.15		779.52	0.000990	4.89	55.35	27.19	0.52
Reach-1	14426		340.00	775.62	779.65		780.12	0.001015	5.55	69.78	30.56	0.55
Reach-1	14426		410.00	775.62	779.94		780.50	0.001089	6.09	78.90	32.50	0.57
Reach-1	14426		480.00	775.62	780.18		780.84	0.001186	6.64	87.04	36.32	0.61
Reach-1	14426		640.00	775.62	780.53		781.48	0.001528	8.01	101.09	43.11	0.70
Reach-1	14526		70.00	776.37	778.00	778.00	778.46	0.005199	5.44	12.87	14.29	1.01
Reach-1	14526		170.00	776.37	778.75	778.75	779.53	0.004006	7.14	25.57	19.73	0.98
Reach-1	14526		250.00	776.37	779.23	779.23	780.19	0.003575	8.00	35.94	23.49	0.97
Reach-1	14526		340.00	776.37	779.70	779.70	780.83	0.003251	8.72	47.96	27.23	0.95
Reach-1	14526		410.00	776.37	780.02	780.02	781.26	0.003108	9.22	57.17	29.85	0.95
Reach-1	14526		480.00	776.37	780.33	780.33	781.67	0.002969	9.63	66.93	33.35	0.94
Reach-1	14526		640.00	776.37	780.98	780.98	782.49	0.002692	10.36	91.13	41.53	0.93
Reach-1	14626		70.00	777.42	778.88	778.88	779.37	0.005014	5.64	12.41	12.59	1.00
Reach-1	14626		170.00	777.42	779.70	779.70	780.48	0.004487	7.10	23.94	15.53	1.01
Reach-1	14626		250.00	777.42	780.18	780.18	781.14	0.004126	7.85	31.98	17.99	1.00
Reach-1	14626		340.00	777.42	780.65	780.65	781.78	0.003662	8.55	41.22	21.57	0.98
Reach-1	14626		410.00	777.42	780.97	780.97	782.23	0.003442	9.03	48.64	24.07	0.97
Reach-1	14626		480.00	777.42	781.28	781.28	782.64	0.003259	9.43	56.36	26.41	0.96

HEC-RAS Plan: 1998 Future River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	1728	640.00	777.42	781.91	781.91	783.48	0.002973	10.22	74.53	31.37	0.94
Reach-1	1720	70.00	779.14	780.61	780.61	781.18	0.004508	6.09	12.31	12.59	0.99
Reach-1	1720	170.00	779.14	781.55	781.55	782.48	0.003553	7.96	26.05	16.84	0.96
Reach-1	1720	250.00	779.14	782.09	782.09	783.29	0.003427	9.11	35.91	19.76	0.98
Reach-1	1720	340.00	779.14	782.74	782.74	784.06	0.002907	9.70	50.66	25.94	0.94
Reach-1	1720	410.00	779.14	783.16	783.16	784.57	0.002702	10.13	62.43	29.96	0.92
Reach-1	1720	480.00	779.14	783.54	783.54	785.02	0.002555	10.51	74.47	33.52	0.91
Reach-1	1720	640.00	779.14	783.99	783.99	785.95	0.003007	12.23	90.72	37.73	1.01
Reach-1	1708	70.00	780.72	782.26	782.26	782.81	0.004851	5.93	11.94	11.96	1.00
Reach-1	1708	170.00	780.72	783.15	783.15	784.07	0.003781	7.79	24.30	15.86	0.98
Reach-1	1708	250.00	780.72	783.73	783.73	784.86	0.003364	8.71	34.16	18.39	0.96
Reach-1	1708	340.00	780.72	784.37	784.37	785.65	0.002852	9.32	49.08	32.74	0.92
Reach-1	1708	410.00	780.72	784.92	784.92	786.11	0.002245	9.18	72.26	52.11	0.84
Reach-1	1708	480.00	780.72	785.22	785.22	786.48	0.002220	9.61	89.55	62.79	0.84
Reach-1	1708	640.00	780.72	785.99	785.99	787.09	0.001729	9.53	146.31	77.75	0.76
Reach-1	1696	70.00	782.15	783.30	783.30	783.88	0.005934	6.08	11.51	10.00	1.00
Reach-1	1696	170.00	782.15	784.23	784.23	785.27	0.005591	8.16	20.83	13.96	1.00
Reach-1	1696	250.00	782.15	784.84	784.84	786.18	0.005165	9.30	26.88	24.25	1.00
Reach-1	1696	340.00	782.15	785.64	785.64	786.72	0.003260	8.79	57.67	37.84	0.83
Reach-1	1696	410.00	782.15	786.00	786.00	787.14	0.003140	9.21	72.37	43.95	0.83
Reach-1	1696	480.00	782.15	786.48	786.48	787.58	0.002678	9.20	102.48	80.39	0.78
Reach-1	1696	640.00	782.15	787.24	787.24	788.12	0.002028	8.92	185.08	137.61	0.70
Reach-1	1695	Culvert									
Reach-1	1687	70.00	783.29	787.29	784.44	787.34	0.000071	1.75	40.01	37.72	0.15
Reach-1	1687	170.00	783.29	787.99	785.36	788.07	0.000117	2.25	140.99	168.14	0.19
Reach-1	1687	250.00	783.29	788.13	785.97	788.26	0.000212	3.09	167.74	200.30	0.26
Reach-1	1687	340.00	783.29	788.19	786.58	788.42	0.000363	4.08	179.56	202.77	0.34
Reach-1	1687	410.00	783.29	787.01	787.01	788.90	0.003080	11.01	37.25	34.35	1.01
Reach-1	1687	480.00	783.29	788.16	787.60	788.63	0.000752	5.85	173.67	201.54	0.49
Reach-1	1687	640.00	783.29	788.22	788.22	788.99	0.001231	7.56	186.19	204.11	0.62
Reach-1	1647	70.00	784.39	787.29		787.35	0.000207	2.07	53.86	42.24	0.24
Reach-1	1647	170.00	784.39	787.94		788.11	0.000463	3.64	87.30	82.48	0.37
Reach-1	1647	250.00	784.39	788.01		788.40	0.001019	5.49	93.98	111.71	0.55
Reach-1	1647	340.00	784.39	787.88		788.60	0.002015	7.51	83.35	57.18	0.77
Reach-1	1647	410.00	784.39	788.75		789.12	0.000862	5.84	186.43	135.80	0.53
Reach-1	1647	480.00	784.39	788.52	788.52	789.22	0.001672	7.80	155.96	128.36	0.73
Reach-1	1647	640.00	784.39	788.87	788.87	789.63	0.001787	8.57	201.89	139.43	0.76
Reach-1	1640	70.00	787.67	788.76	788.76	789.09	0.003876	5.06	24.82	48.97	0.90
Reach-1	1640	170.00	787.67	789.37	789.37	789.76	0.002933	6.09	65.86	83.63	0.85
Reach-1	1640	250.00	787.67	789.61	789.61	790.09	0.003277	7.06	85.47	83.88	0.92
Reach-1	1640	340.00	787.67	789.84	789.84	790.40	0.003467	7.86	105.14	84.13	0.96
Reach-1	1640	410.00	787.67	789.99	789.99	790.62	0.003716	8.52	117.45	89.24	1.01
Reach-1	1640	480.00	787.67	790.14	790.14	790.82	0.003804	9.00	131.39	94.66	1.03
Reach-1	1640	640.00	787.67	790.45	790.45	791.23	0.003896	9.90	162.20	101.37	1.07

Tributary 1
Existing and Future Conditions
Water Surface Profile and HECRAS Summary Printouts
2, 5, 10, 25, 50, 100, & 500-year Storm Events


TRIB1 OF EAGLE PASS CREEK 1998 STUDY EXISTING COND. W/ 1998 Q'S 4/2/99
Geom: 1998 EXISTING CONDITIONS
Reach-1
Legend
WS PF 8
WS PF#6
WS PF#5
WS PF#4
WS PF#3
WS PF#2
WS PF#1
Ground
500
100
50
25
10
5
2
Elevation (ft)
745
740
735
730
725
720
715
710
0
500
1000
1500
2000
2500
3000
Main Channel Distance (ft)
158
556
581
618
705
733
873
917
991
1131
1208
1278
1440
1490
1514
1588
1670
1819
1955
2030
2080
2102.5
2155
2176
2227
2487
2508

HEC-RAS Plan: 1998 River: RIVER-1 Reach: Reach-1

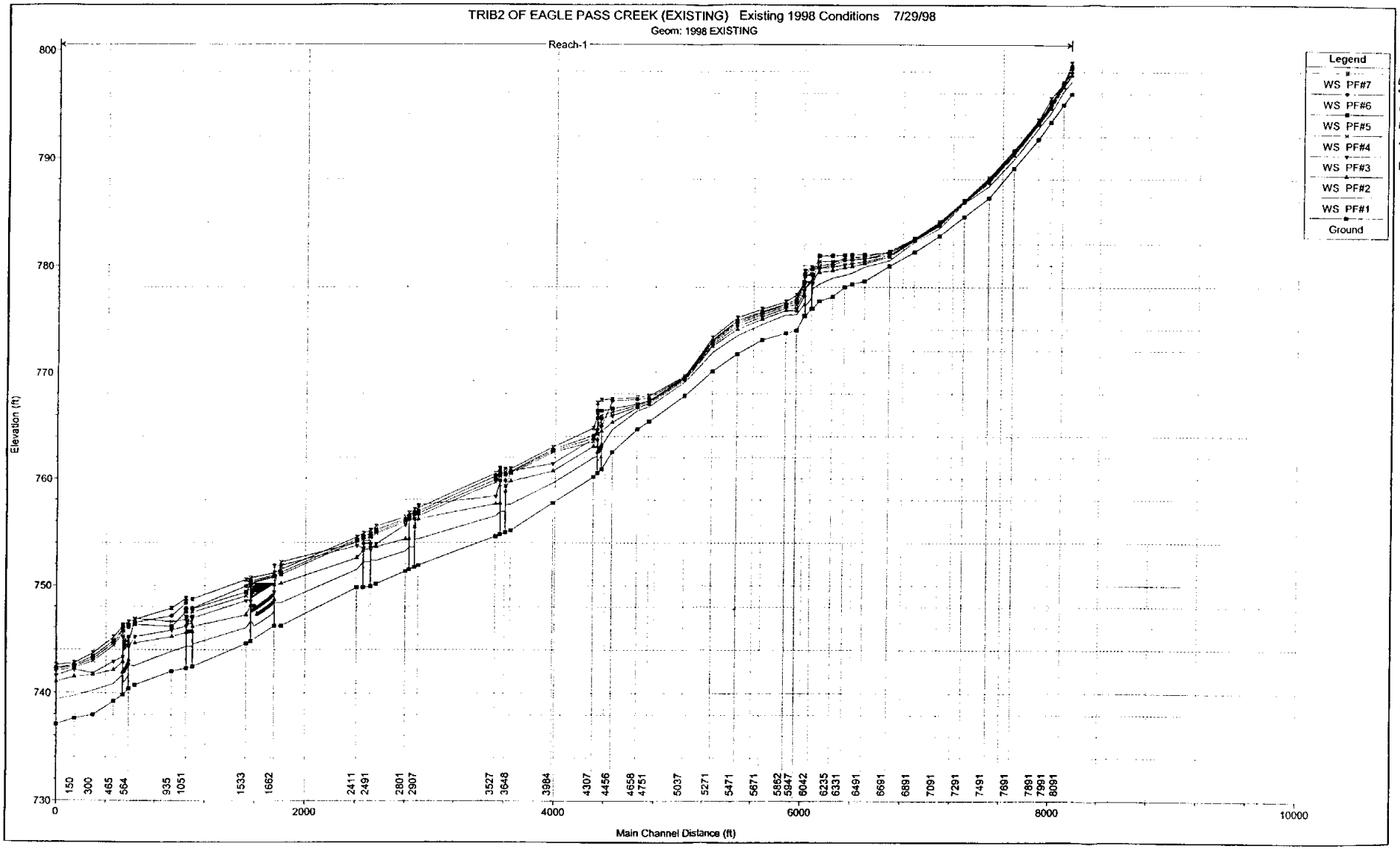
Reach	River Sta	Profile	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	1040	300.00	710.65	712.31	712.31	713.09	0.003042	7.07	42.41	27.62	1.01
Reach-1	1040	610.00	710.65	713.26	713.26	714.45	0.002712	8.76	69.66	29.53	1.00
Reach-1	1040	840.00	710.65	713.85	713.85	715.29	0.002593	9.62	87.32	30.70	1.01
Reach-1	1040	1100.00	710.65	714.45	714.45	716.12	0.002474	10.36	106.23	31.91	1.00
Reach-1	1040	1310.00	710.65	714.88	714.88	716.73	0.002446	10.92	119.97	32.76	1.01
Reach-1	1040	1520.00	710.65	715.29	715.29	717.30	0.002397	11.37	133.67	33.58	1.00
Reach-1	1040	1970.00	710.65	716.10	716.10	718.41	0.002299	12.20	161.62	37.63	1.00
Reach-1	954										
Reach-1	954	300.00	711.76	713.97	713.97	714.93	0.004269	7.85	38.20	20.17	1.01
Reach-1	954	610.00	711.76	715.17	715.17	716.57	0.003889	9.48	64.34	23.33	1.01
Reach-1	954	840.00	711.76	715.89	715.89	717.53	0.003742	10.28	81.69	25.20	1.01
Reach-1	954	1100.00	711.76	716.61	716.61	718.47	0.003578	10.94	100.58	27.10	1.00
Reach-1	954	1310.00	711.76	717.12	717.12	719.14	0.003506	11.41	114.86	28.45	1.00
Reach-1	954	1520.00	711.76	717.60	717.60	719.77	0.003446	11.81	128.65	29.70	1.00
Reach-1	954	1970.00	711.76	718.53	718.53	720.96	0.003342	12.51	157.46	32.40	1.00
Reach-1	559										
Reach-1	559	300.00	716.32	717.94	717.94	718.71	0.004409	7.04	42.59	27.88	1.00
Reach-1	559	610.00	716.32	718.89	718.89	720.07	0.003943	8.74	69.81	29.77	1.01
Reach-1	559	840.00	716.32	719.47	719.47	720.90	0.003762	9.60	87.53	30.94	1.01
Reach-1	559	1100.00	716.32	720.06	720.06	721.73	0.003765	10.35	106.26	32.25	1.01
Reach-1	559	1310.00	716.32	720.53	720.53	722.33	0.004658	10.77	121.62	34.11	1.01
Reach-1	559	1520.00	716.32	720.97	720.97	722.88	0.005369	11.09	137.02	35.87	1.00
Reach-1	559	1970.00	716.32	721.78	721.78	723.93	0.006584	11.75	167.67	39.14	1.00
Reach-1	581										
Reach-1	581	300.00	716.49	718.26	718.26	719.15	0.003947	7.54	39.80	25.53	1.00
Reach-1	581	610.00	716.49	719.33	719.33	720.75	0.003382	9.56	63.81	27.66	1.00
Reach-1	581	840.00	716.49	720.01	720.01	721.76	0.003139	10.62	79.07	29.02	1.00
Reach-1	581	1100.00	716.49	720.71	720.71	722.80	0.002946	11.61	94.74	30.38	1.00
Reach-1	581	1310.00	716.49	721.22	721.22	723.58	0.002853	12.33	106.23	31.37	1.00
Reach-1	581	1520.00	716.49	721.71	721.71	724.32	0.002766	12.97	117.21	32.32	1.00
Reach-1	581	1970.00	716.49	722.70	722.70	725.79	0.002594	14.11	139.61	33.62	1.00
Reach-1	616	Culvert									
Reach-1	656										
Reach-1	656	300.00	717.07	719.73	718.83	720.12	0.001002	5.01	59.82	22.54	0.54
Reach-1	656	610.00	717.07	721.34	719.90	721.96	0.000856	6.35	96.01	22.57	0.54
Reach-1	656	840.00	717.07	722.35	720.57	723.13	0.000797	7.07	118.84	22.58	0.54
Reach-1	656	1100.00	717.07	723.39	721.26	724.32	0.000751	7.73	142.24	22.60	0.54
Reach-1	656	1310.00	717.07	724.17	721.78	725.22	0.000722	8.20	159.81	22.61	0.54
Reach-1	656	1520.00	717.07	724.91	722.27	726.07	0.000699	8.61	176.47	22.62	0.54
Reach-1	656	1970.00	717.07	726.97	723.25	728.18	0.000540	8.85	222.68	22.65	0.50
Reach-1	705										
Reach-1	705	300.00	717.70	719.92	719.92	720.73	0.005645	7.22	41.57	25.63	1.00
Reach-1	705	610.00	717.70	721.34	720.94	722.22	0.003685	7.52	81.11	30.12	0.81
Reach-1	705	840.00	717.70	722.40	721.54	723.23	0.002748	7.31	114.94	33.49	0.70
Reach-1	705	1100.00	717.70	723.81	722.17	724.50	0.001812	6.66	165.14	37.94	0.56
Reach-1	705	1310.00	717.70	724.85	722.61	725.47	0.001436	6.35	206.30	41.24	0.50
Reach-1	705	1520.00	717.70	725.61	723.02	726.39	0.001198	6.15	247.08	44.32	0.45
Reach-1	705	1970.00	717.70	728.06	723.81	728.57	0.000820	5.71	344.85	48.10	0.36
Reach-1	705	Bridge									
Reach-1	743										
Reach-1	743	300.00	717.70	720.13	719.91	720.76	0.003984	6.38	47.05	26.30	0.84
Reach-1	743	610.00	717.70	721.52	720.93	722.29	0.003081	7.04	86.68	30.70	0.74
Reach-1	743	840.00	717.70	722.46	721.54	723.26	0.002636	7.20	116.74	33.66	0.68
Reach-1	743	1100.00	717.70	723.83	722.15	724.51	0.001791	6.63	165.87	38.00	0.56
Reach-1	743	1310.00	717.70	724.86	722.60	725.49	0.001425	6.33	206.89	41.28	0.50
Reach-1	743	1520.00	717.70	725.82	723.01	726.40	0.001193	6.14	247.50	44.33	0.45
Reach-1	743	1970.00	717.70	728.07	723.81	728.58	0.000818	5.71	345.13	48.11	0.36
Reach-1	783										
Reach-1	783	300.00	717.87	720.62	720.62	721.66	0.004261	8.19	36.63	17.86	1.01
Reach-1	783	610.00	717.87	721.94	721.94	723.40	0.003893	9.70	62.88	21.83	1.01
Reach-1	783	840.00	717.87	722.67	722.67	724.42	0.003487	10.63	80.30	26.03	0.99
Reach-1	783	1100.00	717.87	723.42	723.42	725.44	0.003152	11.45	101.32	30.49	0.97
Reach-1	783	1310.00	717.87	724.23	723.95	726.20	0.002467	11.36	128.12	36.16	0.88
Reach-1	783	1520.00	717.87	725.28		726.99	0.001713	10.72	171.38	46.14	0.76
Reach-1	783	1970.00	717.87	727.75		728.93	0.000804	9.19	306.99	60.89	0.55
Reach-1	875										
Reach-1	875	300.00	721.06	723.24	723.24	724.18	0.004290	7.78	38.54	20.73	1.01
Reach-1	875	610.00	721.06	724.43	724.43	725.78	0.003893	9.33	65.39	24.52	1.01
Reach-1	875	840.00	721.06	725.15	725.15	726.71	0.003681	10.00	83.96	27.04	1.00
Reach-1	875	1100.00	721.06	725.82	725.82	727.60	0.003600	10.69	102.89	29.39	1.01
Reach-1	875	1310.00	721.06	726.36	726.36	728.23	0.003509	10.98	119.27	32.16	1.01
Reach-1	875	1520.00	721.06	726.84	726.84	728.80	0.003448	11.22	135.50	35.05	1.01

Reach	River Sta	Profile	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
Reach-1	975	1970.00	721.06	727.74	727.74	729.84	0.003314	11.64	169.26	40.42	1.00
Reach-1	893	220.00	721.28	724.20	722.86	724.42	0.000526	3.81	57.74	29.00	0.40
Reach-1	893	450.00	721.28	725.68	723.81	726.09	0.000554	5.15	87.34	36.40	0.43
Reach-1	893	620.00	721.28	726.47	724.40	727.03	0.000603	6.01	103.23	40.96	0.47
Reach-1	893	810.00	721.28	727.21	725.01	727.94	0.000660	6.87	117.93	45.56	0.50
Reach-1	893	950.00	721.28	727.71	725.43	728.57	0.000690	7.42	128.02	48.71	0.52
Reach-1	893	1110.00	721.28	728.04	725.88	729.10	0.000798	8.25	134.60	53.53	0.56
Reach-1	893	1430.00	721.28	728.52	726.73	730.05	0.001053	9.92	144.16	87.82	0.65
Reach-1	91	Bridge									
Reach-1	91	220.00	721.81	724.18	723.41	724.53	0.001082	4.74	46.46	29.10	0.55
Reach-1	91	450.00	721.81	725.66	724.36	726.21	0.000875	5.92	76.05	37.98	0.53
Reach-1	91	620.00	721.81	726.46	724.95	727.16	0.000883	6.74	91.93	40.94	0.55
Reach-1	91	810.00	721.81	728.62	725.56	729.18	0.000416	5.99	135.26	53.03	0.41
Reach-1	91	950.00	721.81	729.08	725.97	729.75	0.000461	6.58	144.36	59.55	0.43
Reach-1	91	1110.00	721.81	729.76	726.42	729.98	0.000240	3.87	303.14	98.35	0.28
Reach-1	91	1430.00	721.81	730.27	727.26	730.57	0.000291	4.47	378.58	244.46	0.32
Reach-1	991	220.00	722.37	724.52	724.52	725.39	0.004371	7.46	29.49	17.31	1.01
Reach-1	99	450.00	722.37	725.62	725.62	726.88	0.003996	9.02	49.91	20.04	1.01
Reach-1	99	620.00	722.37	726.29	726.29	727.75	0.003794	9.69	63.98	21.94	1.00
Reach-1	99	810.00	722.37	728.57		729.25	0.001121	6.62	122.44	29.35	0.57
Reach-1	99	950.00	722.37	729.06		729.81	0.001131	6.91	137.39	30.96	0.58
Reach-1	99	1110.00	722.37	729.31		730.22	0.001334	7.65	145.11	31.76	0.63
Reach-1	99	1430.00	722.37	729.57		730.92	0.001902	9.31	153.57	32.62	0.76
Reach-1	1131	220.00	724.21	726.61	726.61	727.51	0.004357	7.64	28.80	16.01	1.00
Reach-1	1131	450.00	724.21	727.78	727.78	729.05	0.003998	9.03	49.84	19.92	1.01
Reach-1	1131	620.00	724.21	728.45	728.45	729.91	0.003852	9.70	63.89	22.16	1.01
Reach-1	1131	810.00	724.21	729.09	729.09	730.73	0.003732	10.29	78.71	24.29	1.01
Reach-1	1131	950.00	724.21	729.52	729.52	731.27	0.003623	10.61	89.53	25.73	1.00
Reach-1	1131	1110.00	724.21	729.94	729.94	731.83	0.003603	11.03	100.67	27.14	1.01
Reach-1	1131	1430.00	724.21	730.77	730.77	732.83	0.003033	11.53	136.83	61.99	0.96
Reach-1	1208	220.00	724.71	727.14	727.14	728.08	0.004404	7.77	28.32	15.30	1.01
Reach-1	1208	450.00	724.71	728.35	728.35	729.66	0.004043	9.19	48.95	18.92	1.01
Reach-1	1208	620.00	724.71	729.05	729.05	730.55	0.003839	9.83	63.07	21.04	1.00
Reach-1	1208	810.00	724.71	729.72	729.72	731.41	0.003711	10.42	77.74	23.04	1.00
Reach-1	1208	950.00	724.71	730.11	730.11	731.96	0.003687	10.92	87.25	27.74	1.01
Reach-1	1208	1110.00	724.71	730.61	730.61	732.55	0.003283	11.21	105.02	44.50	0.97
Reach-1	1208	1430.00	724.71	731.57	731.57	733.57	0.002605	11.48	163.66	76.39	0.90
Reach-1	1278	220.00	725.17	727.60	727.60	728.54	0.004390	7.76	28.35	15.30	1.00
Reach-1	1278	450.00	725.17	728.81	728.81	730.12	0.004028	9.18	49.02	18.93	1.01
Reach-1	1278	620.00	725.17	729.50	729.50	731.01	0.003894	9.88	62.74	20.99	1.01
Reach-1	1278	810.00	725.17	730.14	730.14	731.87	0.003743	10.55	77.01	26.06	1.01
Reach-1	1278	950.00	725.17	730.59	730.59	732.43	0.003380	10.90	91.51	37.76	0.98
Reach-1	1278	1110.00	725.17	731.06	731.06	733.02	0.003115	11.29	111.96	49.79	0.96
Reach-1	1278	1430.00	725.17	731.95	731.95	734.05	0.002646	11.79	166.75	72.81	0.91
Reach-1	1440	220.00	726.23	729.20	729.20	730.22	0.004504	8.09	27.19	13.61	1.01
Reach-1	1440	450.00	726.23	730.55	730.55	731.90	0.004073	9.33	48.25	17.91	1.00
Reach-1	1440	620.00	726.23	731.28	731.28	732.82	0.003924	9.93	62.45	20.50	1.00
Reach-1	1440	810.00	726.23	731.96	731.96	733.67	0.003844	10.51	77.08	22.86	1.01
Reach-1	1440	950.00	726.23	732.37	732.37	734.24	0.003618	10.97	87.53	28.21	1.00
Reach-1	1440	1110.00	726.23	732.82	732.82	734.84	0.003379	11.43	101.61	34.50	0.98
Reach-1	1440	1430.00	726.23	733.64	733.64	735.93	0.003049	12.22	134.55	45.96	0.96
Reach-1	1490	220.00	726.54	730.28	728.42	730.50	0.000383	3.76	58.51	26.28	0.35
Reach-1	1490	450.00	726.54	731.75	729.52	732.22	0.000521	5.49	81.95	32.87	0.43
Reach-1	1490	620.00	726.54	733.01	730.21	733.24	0.000315	3.89	172.10	60.24	0.32
Reach-1	1490	810.00	726.54	733.87	730.91	734.14	0.000299	4.24	233.48	82.59	0.32
Reach-1	1490	950.00	726.54	734.45	731.40	734.75	0.000285	4.42	313.25	282.36	0.32
Reach-1	1490	1110.00	726.54	735.24	731.92	735.42	0.000177	3.78	598.62	387.36	0.25
Reach-1	1490	1430.00	726.54	736.53	732.69	736.61	0.000086	2.95	1129.00	424.00	0.18
Reach-1	550	Bridge									
Reach-1	550	220.00	726.83	730.27	728.81	730.59	0.000609	4.59	47.91	24.06	0.44
Reach-1	550	450.00	726.83	731.70	730.01	732.38	0.000794	6.62	67.98	29.80	0.53
Reach-1	550	620.00	726.83	733.82	730.76	734.00	0.000216	3.53	223.25	91.18	0.27
Reach-1	550	810.00	726.83	734.33	731.53	734.58	0.000263	4.14	285.52	182.69	0.30

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	1540	950.00	726.83	734.58	732.06	734.88	0.000300	4.55	335.66	222.57	0.32
Reach 1	1539	1110.00	726.83	735.31	732.64	735.53	0.000219	4.18	530.17	309.02	0.28
Reach 1	1538	1430.00	726.83	736.55	733.01	736.67	0.000123	3.50	961.56	361.00	0.22
Reach 1	1588	220.00	727.17	730.41		730.64	0.000717	3.82	57.60	23.64	0.43
Reach 1	1587	450.00	727.17	732.17		732.45	0.000558	4.27	105.71	34.73	0.40
Reach 1	1586	620.00	727.17	733.80		734.04	0.000281	3.91	189.58	58.22	0.30
Reach 1	1585	810.00	727.17	734.30		734.62	0.000345	4.61	224.76	96.62	0.34
Reach 1	1584	950.00	727.17	734.53		734.92	0.000409	5.16	249.56	117.50	0.38
Reach 1	1583	1110.00	727.17	735.22		735.58	0.000346	5.11	365.06	204.35	0.35
Reach 1	1582	1430.00	727.17	736.46		736.73	0.000234	4.71	644.48	235.00	0.30
Reach 1	1670	180.00	727.71	730.25		730.84	0.002626	6.16	29.24	14.99	0.78
Reach 1	1670	330.00	727.71	732.12		732.56	0.001107	5.32	62.04	20.13	0.53
Reach 1	1670	440.00	727.71	733.78		734.09	0.000550	4.43	99.30	24.70	0.39
Reach 1	1670	570.00	727.71	734.28		734.68	0.000643	5.10	113.23	35.71	0.43
Reach 1	1670	660.00	727.71	734.51		734.99	0.000727	5.60	122.33	44.22	0.46
Reach 1	1670	760.00	727.71	735.18		735.65	0.000600	5.57	160.37	69.26	0.43
Reach 1	1670	960.00	727.71	736.40		736.78	0.000404	5.25	352.50	311.26	0.36
Reach 1	1619	180.00	728.88	731.04	731.04	731.89	0.004516	7.40	24.33	14.49	1.01
Reach 1	1619	330.00	728.88	731.94	731.94	733.08	0.004200	8.56	38.54	17.18	1.01
Reach 1	1619	440.00	728.88	733.73		734.28	0.001246	5.94	74.12	22.56	0.58
Reach 1	1619	570.00	728.88	734.22		734.91	0.001454	6.67	85.42	24.33	0.63
Reach 1	1619	660.00	728.88	734.43		735.25	0.001685	7.27	90.76	25.31	0.68
Reach 1	1619	760.00	728.88	735.11		735.87	0.001428	6.96	109.12	28.40	0.63
Reach 1	1619	960.00	728.88	736.29		736.96	0.001057	6.60	148.30	50.21	0.55
Reach 1	1955	180.00	730.00	732.17	732.17	733.01	0.004503	7.39	24.36	14.50	1.00
Reach 1	1955	330.00	730.00	733.06	733.06	734.20	0.004180	8.55	38.61	17.19	1.01
Reach 1	1955	440.00	730.00	733.61	733.61	734.89	0.003995	9.10	48.36	18.82	1.00
Reach 1	1955	570.00	730.00	734.14	734.14	735.60	0.003928	9.69	58.79	20.42	1.01
Reach 1	1955	660.00	730.00	734.48	734.48	736.04	0.003856	10.01	65.92	21.44	1.01
Reach 1	1955	760.00	730.00	734.83	734.83	736.48	0.003771	10.31	73.73	22.50	1.00
Reach 1	1955	960.00	730.00	735.96		737.40	0.002286	9.65	99.98	24.05	0.82
Reach 1	2030	180.00	731.40	734.17	734.17	735.11	0.004625	7.78	23.14	12.51	1.01
Reach 1	2030	330.00	731.40	735.19	735.19	736.39	0.004237	8.80	37.48	15.57	1.00
Reach 1	2030	440.00	731.40	735.76	735.76	737.13	0.004141	9.39	46.84	17.28	1.01
Reach 1	2030	570.00	731.40	736.31	736.31	737.88	0.003907	10.06	56.86	19.55	1.00
Reach 1	2030	660.00	731.40	736.65	736.65	738.36	0.003720	10.51	63.77	21.24	0.99
Reach 1	2030	760.00	731.40	736.99	736.99	738.87	0.003610	11.02	71.25	22.93	0.99
Reach 1	2030	960.00	731.40	737.64	737.64	739.80	0.003374	11.83	87.28	26.20	0.99
Reach 1	2080	180.00	731.90	735.28	733.26	735.39	0.000206	2.67	67.52	20.69	0.26
Reach 1	2080	330.00	731.90	736.53	733.93	736.73	0.000241	3.56	92.62	23.39	0.29
Reach 1	2080	440.00	731.90	737.23	734.36	737.50	0.000268	4.13	106.65	26.55	0.31
Reach 1	2080	570.00	731.90	737.99	734.82	738.31	0.000415	4.52	134.03	64.89	0.33
Reach 1	2080	660.00	731.90	738.58	735.12	738.84	0.000329	4.29	290.87	318.13	0.30
Reach 1	2080	760.00	731.90	739.26	735.44	739.41	0.000210	3.66	520.99	362.42	0.24
Reach 1	2080	960.00	731.90	740.37	736.04	740.44	0.000110	2.92	958.12	411.00	0.18
Reach 1	2022	Bridge									
Reach 1	2125	180.00	731.50	735.32	732.86	735.40	0.000174	2.37	76.05	23.12	0.21
Reach 1	2125	330.00	731.50	736.59	733.54	736.75	0.000240	3.25	101.41	23.16	0.25
Reach 1	2125	440.00	731.50	737.45	733.97	737.67	0.000265	3.71	118.62	23.18	0.27
Reach 1	2125	570.00	731.50	738.20	734.44	738.40	0.000281	3.66	179.20	196.71	0.25
Reach 1	2125	660.00	731.50	738.75	734.74	738.92	0.000224	3.45	318.02	262.18	0.23
Reach 1	2125	760.00	731.50	739.36	735.05	739.48	0.000165	3.12	502.02	341.07	0.20
Reach 1	2125	960.00	731.50	740.42	735.65	740.48	0.000097	2.61	921.17	423.20	0.15
Reach 1	2155	180.00	731.40	735.32	732.86	735.42	0.000248	2.55	70.71	18.12	0.23
Reach 1	2155	330.00	731.40	736.58	733.58	736.77	0.000371	3.52	93.66	18.16	0.27
Reach 1	2155	440.00	731.40	737.44	734.04	737.69	0.000426	4.03	109.24	18.18	0.29
Reach 1	2155	570.00	731.40	738.15	734.53	738.49	0.000516	4.66	125.72	109.70	0.32
Reach 1	2155	660.00	731.40	738.72	734.85	738.97	0.000404	4.35	252.33	310.77	0.28
Reach 1	2155	760.00	731.40	739.35	735.19	739.50	0.000257	3.67	482.89	402.55	0.23
Reach 1	2155	960.00	731.40	740.42	735.83	740.48	0.000124	2.77	975.14	486.10	0.16
Reach 1	2075	Bridge									
Reach 1	2207	180.00	731.66	735.32	733.11	735.44	0.000194	2.73	65.87	20.40	0.25
Reach 1	2207	330.00	731.66	736.59	733.84	736.80	0.000242	3.72	88.68	21.16	0.30

440.00	731.66	737.59	734.30	737.86	0.000233	4.12	106.71	21.76	0.30
570.00	731.66	738.31	734.80	738.67	0.000265	4.76	119.79	102.08	0.33
660.00	731.66	738.78	735.12	739.07	0.000373	4.42	214.92	162.92	0.30
760.00	731.66	739.44	735.46	739.70	0.000311	4.30	351.35	249.30	0.28
960.00	731.66	740.39	736.10	740.59	0.000234	4.05	637.58	322.00	0.25
180.00	731.88	735.20		735.50	0.000982	4.39	41.00	15.94	0.48
330.00	731.88	736.45		736.88	0.001029	5.28	62.53	18.64	0.51
440.00	731.88	737.48		737.92	0.000848	5.31	82.91	20.87	0.47
570.00	731.88	738.21		738.73	0.000857	5.76	102.61	52.74	0.48
660.00	731.88	738.61		739.17	0.000848	6.06	130.58	89.02	0.48
760.00	731.88	739.29		739.79	0.000660	5.84	212.58	151.67	0.44
960.00	731.88	740.27		740.66	0.000476	5.52	401.50	217.00	0.38
180.00	734.90	736.81	736.81	737.40	0.003294	6.15	29.26	25.27	1.01
330.00	734.90	737.42	737.42	738.22	0.003370	7.18	45.94	29.25	1.01
440.00	734.90	737.79	737.79	738.71	0.003336	7.69	57.19	31.65	1.01
570.00	734.90	738.21	738.21	739.21	0.003070	8.01	71.12	36.14	1.01
660.00	734.90	738.67		739.52	0.002258	7.37	89.52	43.10	0.90
760.00	734.90	739.43		739.99	0.001322	6.02	126.30	54.42	0.70
960.00	734.90	740.44		740.79	0.000835	4.73	203.00	98.00	0.58
180.00	738.00	739.47	739.47	739.96	0.007609	5.57	32.32	34.22	1.01
330.00	738.00	740.18	740.18	740.52	0.008139	4.63	71.31	106.00	0.99
440.00	738.00	740.33	740.33	740.73	0.007699	5.10	86.26	106.00	1.00
570.00	738.00	740.47	740.47	740.96	0.007578	5.62	101.34	106.00	1.01
660.00	738.00	740.57	740.57	741.11	0.007214	5.87	112.40	106.00	1.00
760.00	738.00	740.68	740.68	741.26	0.006893	6.12	124.11	106.00	1.00
960.00	738.00	740.87	740.87	741.56	0.006658	6.64	144.48	106.00	1.00

Tributary 2
Existing and Future Conditions
Water Surface Profile and HECRAS Summary Printouts
2, 5, 10, 25, 50, 100, & 500-year Storm Events


TRIB2 OF EAGLE PASS CREEK (EXISTING) Existing 1998 Conditions 7/29/98
Geom: 1998 EXISTING
Reach-1
Legend
WS PF#7
WS PF#6
WS PF#5
WS PF#4
WS PF#3
WS PF#2
WS PF#1
Ground
500
100
50
25
10
5
2
Elevation (ft)
800
790
780
770
760
750
740
730
150
300
465
564
935
1051
1533
1662
2411
2491
2801
2907
3527
3648
3984
4307
4456
4658
4751
5037
5271
5471
5671
5862
5947
6042
6235
6331
6491
6691
6891
7091
7291
7491
7891
7991
8091
0
2000
4000
6000
8000
10000
Main Channel Distance (ft)

HEC-RAS Plan: 1998 River: RIVER-1 Reach: Reach-1

Existing

Reach	River Sta	Profile	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2									
Reach-1	2		190.00	737.06	739.38	738.67	739.68	0.002283	4.43	42.86	21.96	0.56
Reach-1	2		490.00	737.06	741.02	739.95	741.56	0.002283	5.92	82.80	26.87	0.59
Reach-1	2		740.00	737.06	741.58	740.77	742.17	0.002282	6.60	211.89	336.92	0.61
Reach-1	2		1030.00	737.06	742.01	742.01	742.47	0.001883	6.46	416.84	648.67	0.56
Reach-1	2		1250.00	737.06	742.20	742.20	742.63	0.001856	6.61	540.97	656.27	0.56
Reach-1	2		1490.00	737.06	742.30	742.30	742.78	0.002159	7.24	605.53	660.19	0.61
Reach-1	2		1960.00	737.06	742.56	742.51	743.03	0.002282	7.74	776.37	670.45	0.63
Reach-1	150											
Reach-1	150		190.00	737.63	739.72		740.11	0.003270	5.01	37.93	21.27	0.66
Reach-1	150		490.00	737.63	741.46		741.88	0.001986	5.43	99.61	73.37	0.55
Reach-1	150		740.00	737.63	742.14		742.45	0.001472	5.29	249.75	417.73	0.49
Reach-1	150		1030.00	737.63	742.28		742.75	0.002197	6.63	310.47	430.79	0.60
Reach-1	150		1250.00	737.63	742.42		742.95	0.002525	7.28	371.22	443.47	0.65
Reach-1	150		1490.00	737.63	742.55		743.14	0.002874	7.94	429.00	455.20	0.70
Reach-1	150		1960.00	737.63	742.75		743.48	0.003557	9.13	523.23	473.71	0.78
Reach-1	300											
Reach-1	300		190.00	737.97	740.22		740.55	0.002539	4.60	41.33	21.75	0.59
Reach-1	300		490.00	737.97	741.66		742.31	0.002935	6.47	75.77	26.07	0.67
Reach-1	300		740.00	737.97	741.82	741.68	743.15	0.005762	9.26	79.88	26.54	0.94
Reach-1	300		1030.00	737.97	742.94	742.94	743.58	0.002379	7.28	265.29	282.57	0.64
Reach-1	300		1250.00	737.97	743.16	743.16	743.83	0.002480	7.70	332.71	315.48	0.65
Reach-1	300		1490.00	737.97	743.37	743.37	744.07	0.002602	8.14	400.65	345.48	0.68
Reach-1	300		1960.00	737.97	743.69	743.69	744.46	0.002856	8.93	520.79	392.98	0.72
Reach-1	465											
Reach-1	465		190.00	739.24	740.85	740.85	741.55	0.008063	6.76	28.10	20.02	1.01
Reach-1	465		490.00	739.24	742.12	742.12	743.30	0.007025	8.74	56.09	23.99	1.01
Reach-1	465		740.00	739.24	742.92	742.92	744.38	0.006658	9.70	76.25	26.49	1.01
Reach-1	465		1030.00	739.24	744.40	744.40	745.04	0.002129	7.10	319.26	335.40	0.61
Reach-1	465		1250.00	739.24	744.64	744.64	745.28	0.002197	7.47	401.71	376.51	0.62
Reach-1	465		1490.00	739.24	744.84	744.84	745.51	0.002312	7.90	480.82	412.12	0.64
Reach-1	465		1960.00	739.24	745.16	745.16	745.88	0.002514	8.61	624.08	469.79	0.68
Reach-1	540											
Reach-1	540		180.00	739.83	741.66	741.16	742.01	0.003030	4.81	37.43	20.54	0.63
Reach-1	540		480.00	739.83	742.86	742.39	743.79	0.004253	7.72	62.19	20.57	0.78
Reach-1	540		730.00	739.83	743.33	743.22	744.94	0.006288	10.18	71.68	20.58	0.96
Reach-1	540		1010.00	739.83	745.51	745.51	746.03	0.001763	6.61	373.91	386.65	0.49
Reach-1	540		1230.00	739.83	745.73	745.73	746.24	0.001803	6.86	462.47	411.52	0.50
Reach-1	540		1470.00	739.83	745.90	745.90	746.42	0.001966	7.29	530.28	428.85	0.52
Reach-1	540		1940.00	739.83	746.16	746.16	746.72	0.002260	8.04	644.84	454.30	0.56
Reach-1	564											
Reach-1	564		Culvert									
Reach-1	588											
Reach-1	588		180.00	740.40	742.51	741.73	742.78	0.001899	4.16	43.28	20.56	0.50
Reach-1	588		480.00	740.40	744.46	742.97	744.98	0.001663	5.77	83.22	87.25	0.50
Reach-1	588		730.00	740.40	744.28	743.79	745.59	0.004469	9.18	79.55	61.29	0.82
Reach-1	588		1010.00	740.40	744.61	744.61	746.74	0.006524	11.70	86.29	108.96	1.01
Reach-1	588		1230.00	740.40	746.11	746.11	746.67	0.001998	7.25	474.94	404.92	0.53
Reach-1	588		1470.00	740.40	746.29	746.29	746.87	0.002116	7.62	553.01	423.43	0.55
Reach-1	588		1940.00	740.40	746.56	746.56	747.18	0.002416	8.39	671.06	447.60	0.60
Reach-1	638											
Reach-1	638		180.00	740.72	742.52		742.98	0.004703	5.47	32.90	21.58	0.78
Reach-1	638		480.00	740.72	744.61		745.07	0.001858	5.52	108.37	103.18	0.55
Reach-1	638		730.00	740.72	745.17		745.81	0.002170	6.66	187.25	174.52	0.61
Reach-1	638		1010.00	740.72	746.87	745.37	746.99	0.000418	3.75	729.21	425.06	0.28
Reach-1	638		1230.00	740.72	746.33		746.78	0.001420	6.45	506.75	394.55	0.51
Reach-1	638		1470.00	740.72	746.50		746.98	0.001541	6.87	576.97	406.95	0.54
Reach-1	638		1940.00	740.72	746.78		747.30	0.001747	7.59	693.15	420.84	0.58
Reach-1	835											
Reach-1	835		160.00	742.00	743.84	743.43	744.20	0.003453	4.76	33.60	21.45	0.67
Reach-1	835		410.00	742.00	745.20	744.56	745.80	0.003105	6.23	66.28	30.62	0.68
Reach-1	835		600.00	742.00	745.80	745.20	746.63	0.003227	7.32	89.68	46.42	0.72
Reach-1	835		820.00	742.00	746.59	745.93	747.44	0.002613	7.62	168.49	184.67	0.67
Reach-1	835		1000.00	742.00	746.15	746.15	747.95	0.006250	10.89	107.09	63.19	1.02
Reach-1	835		1190.00	742.00	747.13	747.13	748.20	0.003040	8.95	253.93	224.63	0.74
Reach-1	835		1580.00	742.00	747.85	747.85	748.82	0.002531	9.02	389.64	315.07	0.69
Reach-1	105											
Reach-1	105		160.00	742.28	744.29	743.51	744.53	0.001950	3.87	41.33	20.55	0.48
Reach-1	105		410.00	742.28	745.59	744.59	746.15	0.002795	6.04	67.91	20.58	0.59
Reach-1	105		600.00	742.28	746.18	745.25	747.05	0.003653	7.49	80.11	20.60	0.67
Reach-1	105		820.00	742.28	746.80	745.94	747.99	0.004150	8.77	103.69	62.03	0.73
Reach-1	105		1000.00	742.28	747.53	746.59	748.67	0.003437	8.81	169.73	119.87	0.68
Reach-1	105		1190.00	742.28	748.34	748.34	749.11	0.002212	7.79	318.33	238.21	0.56
Reach-1	105		1580.00	742.28	748.80	748.80	749.52	0.002195	8.14	432.11	261.50	0.56

Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Crit W.S.	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
Reach-1	1077									
		Culvert								
Reach-1	1103									
Reach-1	1103	160.00	742.43	744.52	743.66	744.74	0.001739	3.73	42.88	20.55	0.46
Reach-1	1103	410.00	742.43	746.14	744.74	746.59	0.001984	5.38	76.14	20.59	0.49
Reach-1	1103	600.00	742.43	746.94	745.41	747.58	0.002244	6.44	102.37	59.09	0.53
Reach-1	1103	820.00	742.43	747.48	746.09	748.35	0.002687	7.60	146.08	100.70	0.60
Reach-1	1103	1000.00	742.43	747.80	746.77	748.84	0.003080	8.47	181.42	124.56	0.65
Reach-1	1103	1190.00	742.43	747.86	747.86	749.27	0.004130	9.89	189.71	129.52	0.75
Reach-1	1103	1580.00	742.43	748.74	748.74	750.01	0.003445	9.98	328.86	186.18	0.70
Reach-1	1533										
Reach-1	1533	160.00	744.57	746.04	746.04	746.72	0.008722	6.62	24.18	17.97	1.01
Reach-1	1533	410.00	744.57	747.24	747.24	748.41	0.007803	8.68	47.24	20.40	1.01
Reach-1	1533	600.00	744.57	748.58	748.58	749.29	0.003411	7.07	94.83	70.41	0.69
Reach-1	1533	820.00	744.57	749.03	749.03	749.75	0.003119	7.36	141.02	143.92	0.67
Reach-1	1533	1000.00	744.57	749.40		750.03	0.002613	7.17	209.85	227.69	0.62
Reach-1	1533	1190.00	744.57	749.95		750.35	0.001635	6.17	370.92	353.12	0.50
Reach-1	1533	1580.00	744.57	750.55		750.85	0.001253	5.85	601.30	405.02	0.45
Reach-1	1568										
Reach-1	1568	150.00	744.80	746.61	746.16	747.00	0.003866	5.01	29.91	16.55	0.66
Reach-1	1568	350.00	744.80	748.11	747.20	748.75	0.003375	6.39	54.77	16.58	0.62
Reach-1	1568	520.00	744.80	748.53	747.93	749.63	0.005240	8.42	61.74	16.59	0.77
Reach-1	1568	720.00	744.80	750.05	750.05	750.57	0.002047	6.51	246.00	315.08	0.50
Reach-1	1568	870.00	744.80	750.23	750.23	750.77	0.002179	6.88	306.84	335.65	0.52
Reach-1	1568	1050.00	744.80	750.42	750.42	750.96	0.002342	7.29	369.80	355.68	0.54
Reach-1	1568	1410.00	744.80	750.72	750.72	751.29	0.002593	7.95	483.61	389.29	0.58
Reach-1	1662										
		Culvert									
Reach-1	1756										
Reach-1	1756	150.00	746.20	748.37	747.57	748.65	0.001075	4.18	35.87	16.55	0.50
Reach-1	1756	350.00	746.20	750.02	748.60	750.50	0.000997	5.55	63.10	96.59	0.50
Reach-1	1756	520.00	746.20	751.90	749.33	751.91	0.000066	1.63	537.95	350.41	0.12
Reach-1	1756	720.00	746.20	750.09	750.09	752.04	0.004009	11.22	64.15	96.61	1.00
Reach-1	1756	870.00	746.20	750.86	750.86	751.26	0.001331	6.36	223.21	255.24	0.52
Reach-1	1756	1050.00	746.20	750.98	750.98	751.41	0.001478	6.82	254.41	266.20	0.55
Reach-1	1756	1410.00	746.20	751.19	751.19	751.68	0.001679	7.49	314.54	286.13	0.59
Reach-1	1811										
Reach-1	1811	150.00	746.20	748.39		748.74	0.001789	4.76	31.51	18.76	0.65
Reach-1	1811	350.00	746.20	750.20	748.96	750.57	0.000977	4.86	72.17	108.27	0.51
Reach-1	1811	520.00	746.20	751.89		751.92	0.000094	2.06	543.94	417.52	0.17
Reach-1	1811	720.00	746.20	752.21	750.82	752.25	0.000108	2.32	681.45	435.28	0.19
Reach-1	1811	870.00	746.20	751.04	751.04	751.56	0.001287	6.65	225.52	312.58	0.62
Reach-1	1811	1050.00	746.20	751.24	751.24	751.75	0.001262	6.83	291.39	347.03	0.62
Reach-1	1811	1410.00	746.20	751.51	751.51	752.04	0.001362	7.42	389.51	392.13	0.65
Reach-1	2411										
Reach-1	2411	150.00	749.80	751.49	751.49	752.17	0.004612	6.64	22.61	16.76	1.01
Reach-1	2411	350.00	749.80	752.57	752.57	753.60	0.004078	8.15	42.97	21.07	1.01
Reach-1	2411	520.00	749.80	753.71	753.71	754.16	0.001502	5.95	115.58	226.65	0.64
Reach-1	2411	720.00	749.80	753.99	753.99	754.44	0.001566	6.43	209.85	377.19	0.66
Reach-1	2411	870.00	749.80	754.15	754.15	754.61	0.001599	6.73	285.49	483.36	0.67
Reach-1	2411	1050.00	749.80	754.30	754.30	754.78	0.001709	7.17	356.79	505.45	0.70
Reach-1	2411	1410.00	749.80	754.52	754.52	755.06	0.001952	8.01	475.31	540.17	0.76
Reach-1	2461										
Reach-1	2461	150.00	749.80	752.16	751.16	752.39	0.000828	3.85	38.94	16.57	0.44
Reach-1	2461	350.00	749.80	753.25	752.20	753.84	0.001367	6.14	56.97	16.60	0.58
Reach-1	2461	520.00	749.80	753.45	752.93	754.61	0.002509	8.63	60.27	112.19	0.80
Reach-1	2461	720.00	749.80	754.30	754.30	754.74	0.001307	6.45	326.67	502.73	0.54
Reach-1	2461	870.00	749.80	754.47	754.47	754.90	0.001361	6.74	414.07	534.10	0.55
Reach-1	2461	1050.00	749.80	754.61	754.61	755.07	0.001510	7.24	491.08	560.28	0.58
Reach-1	2461	1410.00	749.80	754.87	754.87	755.35	0.001695	7.95	644.66	645.34	0.62
Reach-1	2461										
		Culvert									
Reach-1	2521										
Reach-1	2521	150.00	749.90	752.39	751.26	752.59	0.000818	3.64	41.19	16.64	0.41
Reach-1	2521	350.00	749.90	753.63	752.30	754.13	0.001287	5.65	61.94	93.13	0.52
Reach-1	2521	520.00	749.90	753.29	753.02	754.62	0.003851	9.23	56.33	16.69	0.89
Reach-1	2521	720.00	749.90	754.41	754.41	754.77	0.001124	6.00	301.02	478.69	0.50
Reach-1	2521	870.00	749.90	754.54	754.54	754.91	0.001200	6.32	366.44	502.80	0.52
Reach-1	2521	1050.00	749.90	754.79	754.67	755.07	0.001002	5.97	494.55	546.95	0.48
Reach-1	2521	1410.00	749.90	755.12	754.85	755.35	0.000893	5.90	685.61	606.84	0.46
Reach-1	2561										
Reach-1	2561	150.00	750.13	752.31		752.79	0.002610	5.57	26.92	16.70	0.77
Reach-1	2561	350.00	750.13	753.60		754.31	0.002335	6.76	51.79	21.85	0.77
Reach-1	2561	520.00	750.13	753.87	753.87	755.13	0.003732	9.01	58.08	25.82	0.99
Reach-1	2561	720.00	750.13	754.85	754.85	755.35	0.001311	6.59	230.77	281.10	0.62

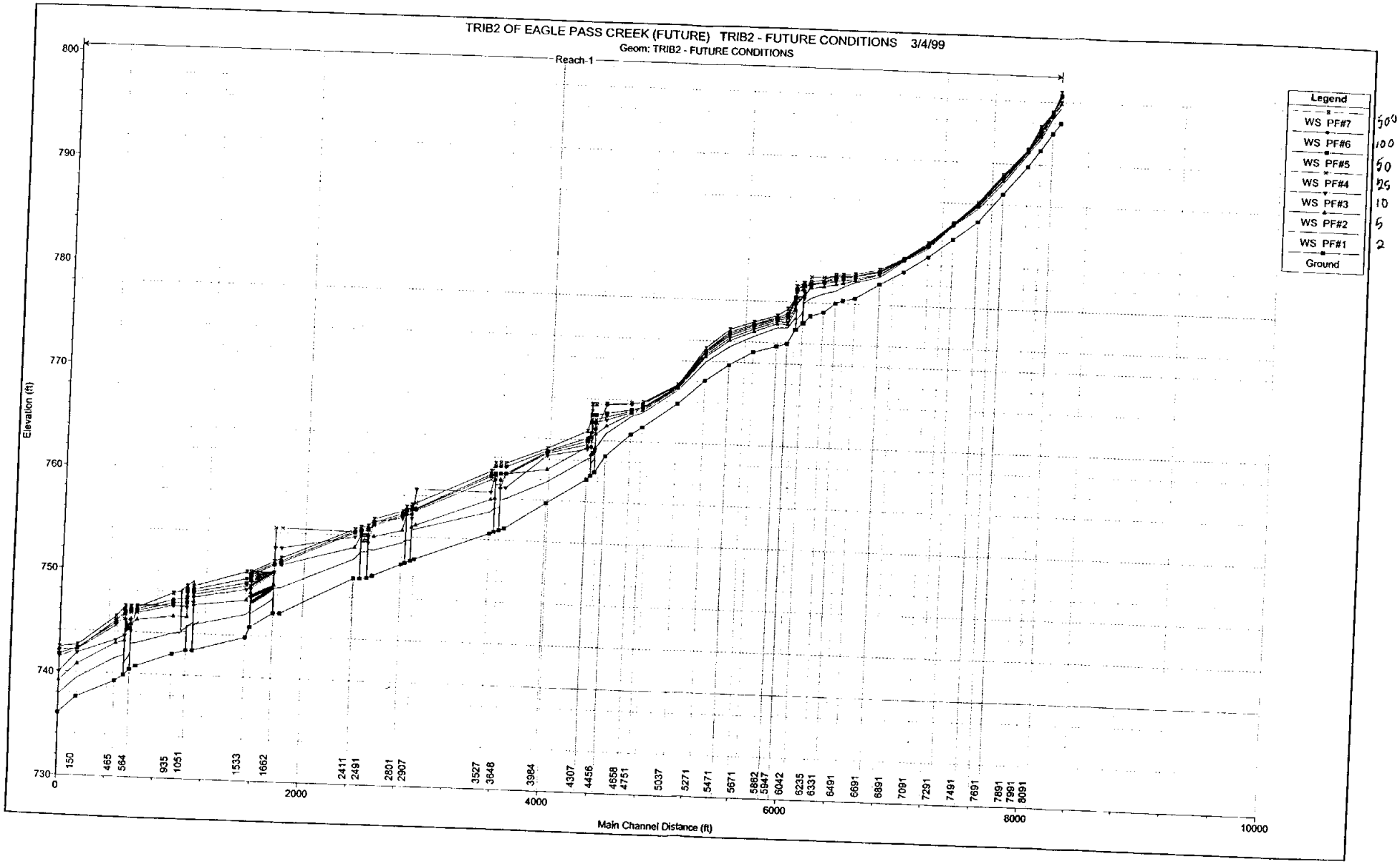
Reach	River Sta										
Reach 1	2560										
Reach 1	2560	870.00	750.13	754.99	754.99	755.54	0.001453	7.12	273.33	318.41	0.66
Reach 1	2560	1050.00	750.13	755.19	755.19	755.73	0.001473	7.42	341.74	391.01	0.67
Reach 1	2560	1410.00	750.13	755.52	755.52	756.04	0.001448	7.78	503.08	591.18	0.67
Reach 1	2560										
Reach 1	2801	150.00	751.32	753.20	753.20	753.91	0.004568	6.80	22.06	15.51	
Reach 1	2801	350.00	751.32	754.34	754.34	755.40	0.004071	8.27	42.30	20.06	1.00
Reach 1	2801	520.00	751.32	755.65	755.65	756.05	0.001199	5.65	137.80	242.63	1.00
Reach 1	2801	720.00	751.32	755.90	755.90	756.30	0.001261	6.11	217.26	401.93	0.58
Reach 1	2801	870.00	751.32	756.03	756.03	756.45	0.001344	6.48	272.12	439.69	0.60
Reach 1	2801	1050.00	751.32	756.16	756.16	756.60	0.001447	6.89	331.87	479.10	0.62
Reach 1	2801	1410.00	751.32	756.38	756.38	756.85	0.001634	7.62	440.93	543.72	0.65
Reach 1	2831										0.70
Reach 1	2831	150.00	751.48	753.57	753.12	754.08	0.002631	5.72	26.20	12.60	
Reach 1	2831	350.00	751.48	754.37	754.37	755.81	0.005466	9.64	36.29	12.64	0.70
Reach 1	2831	520.00	751.48	756.14	756.14	756.27	0.000574	3.99	266.71	381.78	1.00
Reach 1	2831	720.00	751.48	756.15	756.15	756.39	0.001081	5.48	269.56	383.90	0.33
Reach 1	2831	870.00	751.48	756.28	756.15	756.53	0.001159	5.78	321.05	420.26	0.45
Reach 1	2831	1050.00	751.48	756.47	756.26	756.69	0.001094	5.77	407.13	474.88	0.47
Reach 1	2831	1410.00	751.48	756.74	756.46	756.96	0.001125	6.06	547.80	552.64	0.46
Reach 1	2853										0.47
Reach 1	2853	Culvert									
Reach 1	2875										
Reach 1	2875	150.00	751.71	754.29	753.35	754.62	0.001400	4.63	32.40	12.61	0.51
Reach 1	2875	350.00	751.71	755.42	754.60	756.30	0.002641	7.49	46.74	56.66	0.69
Reach 1	2875	520.00	751.71	755.46	755.46	757.35	0.005666	11.02	47.21	56.67	1.01
Reach 1	2875	720.00	751.71	756.45	756.45	756.93	0.001777	6.89	212.67	333.47	0.56
Reach 1	2875	870.00	751.71	756.63	756.63	757.12	0.001868	7.23	274.22	365.10	0.58
Reach 1	2875	1050.00	751.71	756.80	756.80	757.31	0.002010	7.68	338.00	395.21	0.60
Reach 1	2875	1410.00	751.71	757.04	757.04	757.62	0.002376	8.62	441.09	441.59	0.66
Reach 1	2907										
Reach 1	2907	150.00	751.87	754.33		754.67	0.001650	4.72	31.76	17.83	0.62
Reach 1	2907	350.00	751.87	756.17		756.40	0.000643	4.11	115.53	182.57	0.42
Reach 1	2907	520.00	751.87	757.48	755.98	757.54	0.000160	2.62	598.32	503.44	0.22
Reach 1	2907	720.00	751.87	756.44	756.44	757.05	0.001698	7.07	177.30	280.26	0.69
Reach 1	2907	870.00	751.87	756.68	756.68	757.27	0.001615	7.24	256.02	353.82	0.68
Reach 1	2907	1050.00	751.87	756.87	756.87	757.49	0.001690	7.68	327.20	387.09	0.71
Reach 1	2907	1410.00	751.87	757.19	757.19	757.86	0.001836	8.45	457.44	445.50	0.75
Reach 1	3527										
Reach 1	3527	150.00	754.58	756.46	756.46	757.17	0.004580	6.81	22.04	15.50	
Reach 1	3527	350.00	754.58	757.59	757.59	758.66	0.004106	8.30	42.17	20.03	1.01
Reach 1	3527	520.00	754.58	758.31	758.31	759.57	0.003841	9.01	57.71	22.93	1.01
Reach 1	3527	720.00	754.58	759.62	759.62	760.28	0.001375	6.97	235.74	291.62	1.00
Reach 1	3527	870.00	754.58	759.88	759.88	760.52	0.001334	7.19	319.67	359.02	0.64
Reach 1	3527	1050.00	754.58	760.21	760.21	760.76	0.001164	7.08	475.62	581.40	0.64
Reach 1	3527	1410.00	754.58	760.49	760.49	761.07	0.001311	7.83	636.45	592.31	0.60
Reach 1	3562										0.65
Reach 1	3562	150.00	754.76	756.84	756.40	757.35	0.002649	5.74	26.15	12.60	
Reach 1	3562	350.00	754.76	757.64	757.64	759.09	0.005487	9.66	36.25	12.64	0.70
Reach 1	3562	520.00	754.76	759.74	759.74	760.23	0.001337	6.37	229.44	332.83	1.01
Reach 1	3562	720.00	754.76	760.15	760.15	760.54	0.001204	6.37	406.72	550.15	0.50
Reach 1	3562	870.00	754.76	760.27	760.27	760.69	0.001348	6.85	477.01	554.62	0.49
Reach 1	3562	1050.00	754.76	760.60	760.42	760.88	0.001032	6.23	661.99	566.21	0.52
Reach 1	3562	1410.00	754.76	760.98	760.64	761.22	0.000976	6.32	878.10	579.45	0.46
Reach 1	3563										0.45
Reach 1	3563	Culvert									
Reach 1	3604										
Reach 1	3604	150.00	754.94	757.51	756.58	757.85	0.001411	4.64	32.32	12.63	0.51
Reach 1	3604	350.00	754.94	759.21	757.82	759.87	0.001707	6.50	53.88	109.77	0.56
Reach 1	3604	520.00	754.94	758.69	758.69	760.57	0.005654	11.01	47.24	12.69	1.01
Reach 1	3604	720.00	754.94	760.24	760.24	760.63	0.001222	6.35	392.02	545.28	0.49
Reach 1	3604	870.00	754.94	760.38	760.38	760.77	0.001325	6.73	468.44	550.57	0.51
Reach 1	3604	1050.00	754.94	760.49	760.49	760.93	0.001540	7.36	529.02	554.74	0.55
Reach 1	3604	1410.00	754.94	760.88	760.72	761.21	0.001352	7.21	744.89	569.34	0.52
Reach 1	3648										
Reach 1	3648	150.00	755.12	757.57		757.92	0.001679	4.75	31.56	17.79	0.63
Reach 1	3648	350.00	755.12	759.72		759.95	0.000552	4.06	147.01	242.12	0.40
Reach 1	3648	520.00	755.12	760.71		760.78	0.000190	2.84	591.41	528.44	0.24
Reach 1	3648	720.00	755.12	760.43		760.67	0.000609	4.86	448.52	517.42	0.43
Reach 1	3648	870.00	755.12	760.56		760.83	0.000696	5.31	514.76	522.56	0.46
Reach 1	3648	1050.00	755.12	760.68		760.99	0.000819	5.87	575.44	527.22	0.50
Reach 1	3648	1410.00	755.12	760.91		761.27	0.000983	6.67	700.08	536.66	0.56
Reach 1	3664										
Reach 1	3664	150.00	757.70	759.58	759.58	760.29	0.008142	6.81	22.04	15.50	
Reach 1	3664	350.00	757.70	760.71	760.71	761.78	0.007299	8.30	42.17	20.03	1.01
											1.01

Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Crit W.S.	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
Reach-1	396									
Reach-1	394	520.00	757.70	761.41	761.41	762.69	0.006960	9.07	57.31	22.86	1.01
Reach-1	394	720.00	757.70	762.48	762.48	762.90	0.002063	6.11	302.38	401.24	0.58
Reach-1	394	870.00	757.70	762.63	762.63	763.04	0.002176	6.44	360.58	424.75	0.60
Reach-1	394	1050.00	757.70	762.76	762.76	763.19	0.002310	6.81	421.31	447.96	0.62
Reach-1	394	1410.00	757.70	762.98	762.98	763.44	0.002578	7.47	522.45	485.58	0.66
Reach-1	393										
Reach-1	392	110.00	760.15	761.98		762.39	0.004803	5.16	21.33	15.32	0.77
Reach-1	392	240.00	760.15	763.06		763.61	0.003901	5.96	40.25	19.65	0.73
Reach-1	391	330.00	760.15	763.78		764.33	0.003063	5.95	55.47	22.53	0.67
Reach-1	390	430.00	760.15	763.51	763.51	764.68	0.007107	8.69	49.48	21.44	1.01
Reach-1	389	510.00	760.15	763.83	763.83	765.09	0.006943	9.02	56.55	22.72	1.01
Reach-1	387	590.00	760.15	764.11	764.11	765.47	0.006880	9.34	63.14	23.86	1.01
Reach-1	386	760.00	760.15	764.82	764.82	766.16	0.005088	9.37	92.20	60.71	0.90
Reach-1	385										
Reach-1	384	110.00	760.55	762.11	761.88	762.60	0.006151	5.63	19.52	12.58	0.80
Reach-1	384	240.00	760.55	763.04	762.79	763.95	0.007069	7.67	31.28	12.62	0.86
Reach-1	383	330.00	760.55	763.64	763.32	764.76	0.007113	8.50	38.81	12.65	0.86
Reach-1	382	430.00	760.55	763.86	763.86	765.52	0.009854	10.33	41.64	12.67	1.00
Reach-1	381	510.00	760.55	764.27	764.27	766.11	0.009907	10.89	46.83	12.69	1.00
Reach-1	380	590.00	760.55	764.65	764.65	766.67	0.009897	11.41	51.70	16.82	1.00
Reach-1	379	760.00	760.55	765.99	765.99	767.50	0.005439	10.23	110.70	70.78	0.77
Reach-1	378	Culvert									
Reach-1	377										
Reach-1	376	110.00	760.90	763.05	762.24	763.31	0.004907	4.10	26.86	18.58	0.49
Reach-1	376	240.00	760.90	764.51	763.15	764.95	0.004125	5.31	45.18	34.12	0.49
Reach-1	375	330.00	760.90	765.74	763.68	765.87	0.001624	3.08	128.83	74.53	0.30
Reach-1	374	430.00	760.90	766.01	764.21	766.18	0.002060	3.57	151.58	252.81	0.34
Reach-1	373	510.00	760.90	766.43	764.61	766.55	0.001443	3.24	267.12	296.48	0.29
Reach-1	372	590.00	760.90	764.99	764.99	767.06	0.016488	11.54	51.15	46.24	1.00
Reach-1	371	760.00	760.90	767.45	765.71	767.50	0.000573	2.39	667.68	493.88	0.19
Reach-1	370										
Reach-1	369	110.00	762.50	764.67	764.67	764.97	0.029080	4.40	25.02	42.48	1.01
Reach-1	368	240.00	762.50	765.34		765.55	0.012772	3.67	65.43	79.28	0.71
Reach-1	367	330.00	762.50	765.97		766.08	0.004245	2.64	127.78	170.55	0.43
Reach-1	366	430.00	762.50	766.30		766.39	0.002662	2.42	214.79	286.41	0.36
Reach-1	365	510.00	762.50	766.63		766.69	0.001515	2.10	311.75	309.51	0.28
Reach-1	364	590.00	762.50	767.36		767.38	0.000438	1.42	560.23	372.94	0.16
Reach-1	363	760.00	762.50	767.52		767.55	0.000548	1.66	622.03	383.56	0.18
Reach-1	362										
Reach-1	361	110.00	764.70	766.43		766.48	0.003493	2.54	88.02	236.96	0.40
Reach-1	360	240.00	764.70	766.72		766.78	0.003736	3.02	169.17	320.70	0.42
Reach-1	359	330.00	764.70	766.83		766.90	0.004159	3.33	205.57	331.97	0.45
Reach-1	358	430.00	764.70	766.95		767.02	0.004220	3.51	246.03	339.26	0.46
Reach-1	357	510.00	764.70	767.06		767.14	0.003911	3.52	284.28	347.75	0.45
Reach-1	356	590.00	764.70	767.49		767.53	0.001464	2.47	441.89	387.89	0.28
Reach-1	355	760.00	764.70	767.68		767.72	0.001543	2.67	516.84	405.20	0.30
Reach-1	354										
Reach-1	353	110.00	765.43	766.81		766.85	0.006296	2.15	84.81	284.46	0.48
Reach-1	352	240.00	765.43	767.06		767.10	0.005122	2.29	167.06	352.71	0.45
Reach-1	351	330.00	765.43	767.18		767.23	0.004841	2.43	210.97	365.28	0.45
Reach-1	350	430.00	765.43	767.29		767.35	0.004696	2.58	252.24	368.80	0.45
Reach-1	349	510.00	765.43	767.38		767.44	0.004568	2.69	285.06	377.04	0.45
Reach-1	348	590.00	765.43	767.62		767.66	0.002575	2.30	376.12	388.22	0.35
Reach-1	347	760.00	765.43	767.81		767.86	0.002441	2.44	450.22	397.13	0.35
Reach-1	346										
Reach-1	345	110.00	767.82	769.11	768.91	769.25	0.011107	3.06	45.25	260.66	0.65
Reach-1	344	240.00	767.82	769.28		769.48	0.015303	4.11	93.30	299.41	0.79
Reach-1	343	330.00	767.82	769.39	769.39	769.58	0.013913	4.22	128.23	316.76	0.76
Reach-1	342	430.00	767.82	769.47	769.47	769.68	0.014725	4.56	154.98	328.87	0.80
Reach-1	341	510.00	767.82	769.52	769.52	769.75	0.016452	4.94	169.41	334.82	0.85
Reach-1	340	590.00	767.82	769.57	769.57	769.81	0.016410	5.08	188.37	336.30	0.85
Reach-1	339	760.00	767.82	769.67	769.67	769.94	0.017673	5.53	220.01	342.77	0.89
Reach-1	338										
Reach-1	337	110.00	770.10	771.85	771.63	772.06	0.012740	3.64	30.25	37.27	0.71
Reach-1	336	240.00	770.10	772.42	772.18	772.70	0.012594	4.18	57.41	59.29	0.73
Reach-1	335	330.00	770.10	772.58	772.43	772.96	0.014805	4.95	67.33	65.71	0.81
Reach-1	334	430.00	770.10	772.76	772.64	773.24	0.015353	5.55	79.85	75.75	0.85
Reach-1	333	510.00	770.10	772.91	772.81	773.44	0.014749	5.85	92.07	83.97	0.85
Reach-1	332	590.00	770.10	773.02	772.96	773.61	0.015527	6.27	100.89	88.71	0.88
Reach-1	331	760.00	770.10	773.24	773.24	773.95	0.015940	6.94	122.13	106.40	0.91
Reach-1	330										
Reach-1	329	110.00	771.71	773.41		773.50	0.004648	2.39	46.03	50.08	0.44
Reach-1	328	240.00	771.71	774.03		774.16	0.004702	2.91	82.47	68.98	0.46

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	542		330.00	771.71	774.31		774.47	0.004429	3.24	105.95	110.55	0.47
Reach-1	547		430.00	771.71	774.55		774.74	0.004274	3.52	138.46	153.85	0.47
Reach-1	5473		510.00	771.71	774.71		774.91	0.004245	3.72	165.33	188.90	0.47
Reach-1	547		590.00	771.71	774.87		775.07	0.004022	3.81	197.62	217.72	0.47
Reach-1	5471		760.00	771.71	775.15		775.36	0.003703	3.99	268.23	278.61	0.46
Reach-1	561		110.00	773.02	774.52		774.65	0.007163	3.17	45.76	99.02	0.55
Reach-1	561		240.00	773.02	775.00		775.13	0.005050	3.46	112.23	174.19	0.50
Reach-1	562		330.00	773.02	775.24		775.36	0.004444	3.57	157.15	210.28	0.48
Reach-1	562		430.00	773.02	775.45		775.57	0.003988	3.66	205.48	239.95	0.46
Reach-1	562		510.00	773.02	775.61		775.73	0.003815	3.77	245.10	275.43	0.46
Reach-1	562		590.00	773.02	775.72		775.84	0.003656	3.82	276.72	278.89	0.45
Reach-1	562		760.00	773.02	775.95		776.07	0.003328	3.89	341.99	285.67	0.44
Reach-1	562		110.00	773.66	775.42		775.48	0.002763	1.92	57.29	61.08	0.34
Reach-1	5624		240.00	773.66	775.84		775.97	0.003859	2.86	87.96	84.80	0.43
Reach-1	562		330.00	773.66	776.05		776.22	0.004440	3.37	114.14	213.88	0.47
Reach-1	562		430.00	773.66	776.22		776.42	0.004690	3.71	151.99	232.97	0.49
Reach-1	562		510.00	773.66	776.35		776.55	0.004627	3.86	184.45	270.46	0.49
Reach-1	562		590.00	773.66	776.45		776.66	0.004760	4.05	212.06	295.30	0.51
Reach-1	562		760.00	773.66	776.64		776.87	0.004928	4.38	273.42	341.10	0.52
Reach-1	594		110.00	773.93	775.46		775.65	0.001014	3.54	31.04	25.57	0.57
Reach-1	594		240.00	773.93	775.80		776.35	0.002344	5.93	40.47	28.83	0.88
Reach-1	5947		330.00	773.93	776.02	776.02	776.79	0.002946	7.03	47.00	33.59	1.00
Reach-1	5947		430.00	773.93	776.36	776.36	777.21	0.002619	7.43	61.36	51.35	0.97
Reach-1	5947		510.00	773.93	776.62	776.62	777.51	0.002382	7.62	76.25	63.12	0.94
Reach-1	5947		590.00	773.93	776.84	776.84	777.77	0.002269	7.85	90.90	71.59	0.93
Reach-1	5947		760.00	773.93	777.26	777.26	778.26	0.002064	8.22	126.03	93.53	0.91
Reach-1	6008		110.00	775.32	776.46	776.46	777.02	0.003145	6.05	18.18	50.44	1.00
Reach-1	6008		240.00	775.32	777.23	777.23	778.19	0.002645	7.85	30.58	60.64	1.00
Reach-1	6008		330.00	775.32	777.69	777.69	778.87	0.002454	8.71	37.87	65.98	1.00
Reach-1	6008		430.00	775.32	778.14	778.14	779.55	0.002331	9.54	45.07	134.60	1.00
Reach-1	6008		510.00	775.32	778.47	778.47	778.60	0.000285	2.98	209.16	170.60	0.34
Reach-1	6008		590.00	775.32	778.47	778.47	778.65	0.000381	3.45	209.16	170.60	0.39
Reach-1	6008		760.00	775.32	778.47	778.47	778.77	0.000633	4.44	209.16	170.60	0.50
Reach-1	6042		Culvert									
Reach-1	6076											
Reach-1	6076		110.00	776.00	777.87	777.13	778.08	0.004288	3.69	29.84	54.13	0.48
Reach-1	6076		240.00	776.00	778.76	777.90	779.22	0.005513	5.43	44.20	176.80	0.58
Reach-1	6076		330.00	776.00	778.36	778.36	779.55	0.017713	8.75	37.70	110.27	1.01
Reach-1	6076		430.00	776.00	778.82	778.82	780.23	0.016443	9.52	45.18	195.55	1.00
Reach-1	6076		510.00	776.00	779.17	779.17	780.74	0.015771	10.06	50.68	221.85	1.00
Reach-1	6076		590.00	776.00	779.69	779.22	779.76	0.001081	2.51	360.62	253.28	0.26
Reach-1	6076		760.00	776.00	779.84	779.32	779.94	0.001416	2.98	402.22	278.72	0.30
Reach-1	6130		110.00	776.70	778.30		778.43	0.010658	2.90	37.98	57.73	0.63
Reach-1	6130		240.00	776.70	779.38		779.41	0.001638	1.46	181.24	250.66	0.26
Reach-1	6130		330.00	776.70	779.77		779.79	0.000917	1.29	302.53	340.27	0.21
Reach-1	6130		430.00	776.70	780.41		780.42	0.000303	0.97	540.66	402.87	0.13
Reach-1	6130		510.00	776.70	780.92		780.93	0.000163	0.83	754.66	439.35	0.10
Reach-1	6130		590.00	776.70	779.77		779.85	0.002922	2.31	302.95	340.33	0.37
Reach-1	6130		760.00	776.70	779.96		780.04	0.002814	2.45	369.00	356.41	0.37
Reach-1	6235		110.00	777.10	778.85		778.91	0.002499	1.93	56.93	53.46	0.33
Reach-1	6235		240.00	777.10	779.55		779.63	0.002338	2.34	115.73	138.97	0.34
Reach-1	6235		330.00	777.10	779.87		779.95	0.002159	2.44	165.08	168.64	0.33
Reach-1	6235		430.00	777.10	780.43		780.49	0.001114	2.09	293.41	319.51	0.25
Reach-1	6235		510.00	777.10	780.93		780.96	0.000548	1.68	483.08	418.61	0.18
Reach-1	6235		590.00	777.10	780.06		780.25	0.004528	3.72	200.19	199.29	0.49
Reach-1	6235		760.00	777.10	780.24		780.47	0.005196	4.23	239.07	251.65	0.53
Reach-1	633		30.00	778.00	779.12		779.14	0.002028	1.30	23.15	33.84	0.28
Reach-1	633		70.00	778.00	779.80		779.83	0.001298	1.34	52.19	51.88	0.24
Reach-1	633		90.00	778.00	780.10		780.13	0.000953	1.27	76.44	157.92	0.21
Reach-1	633		110.00	778.00	780.56		780.57	0.000297	0.89	188.80	313.45	0.12
Reach-1	633		130.00	778.00	780.99		781.00	0.000111	0.63	339.08	377.55	0.08
Reach-1	633		150.00	778.00	780.50		780.52	0.000682	1.31	169.65	303.48	0.18
Reach-1	633		190.00	778.00	780.72		780.74	0.000519	1.25	242.20	337.79	0.16
Reach-1	639		30.00	778.28	779.31	779.31	779.52	0.032929	3.69	8.14	19.93	1.02
Reach-1	639		70.00	778.28	779.92		779.97	0.004861	2.00	41.69	95.89	0.43

Reach										
Reach-	639									
Reach-	639	90.00	778.28	780.18		780.21	0.002150	1.65	72.03	133.48	0.30
Reach-	639	110.00	778.28	780.58		780.59	0.000528	1.04	174.31	302.72	0.16
Reach-	639	130.00	778.28	781.00		781.00	0.000166	0.70	311.82	351.75	0.09
Reach-	639	150.00	778.28	780.55		780.57	0.001129	1.49	164.28	298.61	0.23
Reach-	639	190.00	778.28	780.76		780.78	0.000783	1.37	230.58	323.60	0.20
Reach-	649										
Reach-	649	30.00	778.54	779.87		779.89	0.001248	1.02	29.28	42.32	0.22
Reach-	649	70.00	778.54	780.21		780.25	0.001787	1.54	48.87	80.53	0.28
Reach-	649	90.00	778.54	780.36		780.40	0.001704	1.66	62.46	100.55	0.28
Reach-	649	110.00	778.54	780.64		780.67	0.001036	1.50	93.47	126.71	0.22
Reach-	649	130.00	778.54	781.02		781.04	0.000501	1.22	148.48	162.73	0.16
Reach-	649	150.00	778.54	780.66		780.72	0.001776	1.99	96.92	129.56	0.29
Reach-	649	190.00	778.54	780.84		780.90	0.001707	2.10	121.53	147.62	0.29
Reach-	669										
Reach-	669	30.00	779.97	780.49		780.56	0.022143	2.06	14.54	63.73	0.76
Reach-	669	70.00	779.97	780.81		780.86	0.006330	1.75	40.07	88.62	0.46
Reach-	669	90.00	779.97	780.92		780.97	0.005426	1.81	50.18	100.06	0.43
Reach-	669	110.00	779.97	781.01		781.06	0.004899	1.86	60.12	110.47	0.42
Reach-	669	130.00	779.97	781.20		781.24	0.002880	1.63	83.18	130.78	0.33
Reach-	669	150.00	779.97	781.18		781.24	0.004106	1.93	81.07	129.46	0.40
Reach-	669	190.00	779.97	781.33		781.39	0.003733	2.00	101.04	149.88	0.39
Reach-	689										
Reach-	689	30.00	781.25	782.18	781.88	782.19	0.004119	1.03	29.06	101.92	0.34
Reach-	689	70.00	781.25	782.27		782.32	0.008642	1.79	39.20	105.36	0.52
Reach-	689	90.00	781.25	782.34		782.39	0.009341	1.96	45.96	114.01	0.54
Reach-	689	110.00	781.25	782.38		782.45	0.009906	2.13	51.54	117.42	0.57
Reach-	689	130.00	781.25	782.34		782.46	0.018488	2.78	46.77	114.51	0.77
Reach-	689	150.00	781.25	782.45		782.55	0.011796	2.50	59.88	122.34	0.63
Reach-	689	190.00	781.25	782.52		782.64	0.012631	2.77	68.70	127.34	0.66
Reach-	709										
Reach-	709	30.00	782.72	783.40	783.30	783.44	0.010035	1.59	18.96	111.95	0.53
Reach-	709	70.00	782.72	783.64		783.68	0.005134	1.71	47.39	121.23	0.42
Reach-	709	90.00	782.72	783.72		783.76	0.005116	1.86	56.32	123.02	0.43
Reach-	709	110.00	782.72	783.79		783.84	0.004904	1.96	65.37	124.49	0.43
Reach-	709	130.00	782.72	783.89		783.94	0.004081	1.95	78.55	132.56	0.40
Reach-	709	150.00	782.72	783.92		783.98	0.004772	2.15	82.18	133.99	0.43
Reach-	709	190.00	782.72	784.02		784.10	0.004837	2.34	96.82	142.31	0.44
Reach-	729										
Reach-	729	30.00	784.47	785.77	785.73	785.81	0.014114	1.72	21.67	151.57	0.61
Reach-	729	70.00	784.47	785.85	785.85	785.93	0.027510	2.63	33.19	166.19	0.87
Reach-	729	90.00	784.47	785.88	785.88	785.98	0.028490	2.83	39.52	173.17	0.90
Reach-	729	110.00	784.47	785.92	785.92	786.03	0.030900	3.09	45.47	197.07	0.95
Reach-	729	130.00	784.47	785.94	785.94	786.07	0.033241	3.32	49.98	201.58	0.99
Reach-	729	150.00	784.47	785.97	785.97	786.11	0.032531	3.43	55.84	207.29	0.99
Reach-	729	190.00	784.47	786.02	786.02	786.17	0.031651	3.65	67.14	223.17	1.00
Reach-	749										
Reach-	749	30.00	786.25	787.34		787.37	0.004956	1.41	21.32	53.85	0.39
Reach-	749	70.00	786.25	787.66		787.71	0.004306	1.74	40.34	66.95	0.39
Reach-	749	90.00	786.25	787.77		787.82	0.004535	1.87	48.02	73.84	0.41
Reach-	749	110.00	786.25	787.87		787.93	0.004512	1.97	55.78	79.18	0.41
Reach-	749	130.00	786.25	787.96		788.02	0.004527	2.07	62.76	82.97	0.42
Reach-	749	150.00	786.25	788.02		788.09	0.004732	2.20	68.17	88.87	0.43
Reach-	749	190.00	786.25	788.13		788.22	0.004906	2.45	78.50	96.70	0.45
Reach-	769										
Reach-	769	30.00	789.02	789.84	789.84	790.08	0.031479	3.90	7.70	16.80	1.02
Reach-	769	70.00	789.02	790.25	790.25	790.52	0.024402	4.25	17.37	38.26	0.94
Reach-	769	90.00	789.02	790.38	790.38	790.66	0.020030	4.37	23.12	48.87	0.88
Reach-	769	110.00	789.02	790.43	790.43	790.78	0.023073	4.91	25.88	53.98	0.96
Reach-	769	130.00	789.02	790.61	790.61	790.88	0.014759	4.46	37.76	84.21	0.79
Reach-	769	150.00	789.02	790.68	790.68	790.96	0.014068	4.58	44.38	92.55	0.78
Reach-	769	190.00	789.02	790.72	790.72	791.11	0.019082	5.47	48.53	109.02	0.92
Reach-	789										
Reach-	789	30.00	791.76	792.80		792.89	0.007806	2.34	13.53	36.46	0.53
Reach-	789	70.00	791.76	793.13		793.24	0.008516	2.88	30.65	73.45	0.58
Reach-	789	90.00	791.76	793.20		793.34	0.009710	3.21	36.84	88.43	0.62
Reach-	789	110.00	791.76	793.31		793.44	0.008458	3.18	47.43	103.17	0.59
Reach-	789	130.00	791.76	793.32		793.49	0.011638	3.74	47.73	103.37	0.69
Reach-	789	150.00	791.76	793.37		793.55	0.012062	3.95	53.02	106.78	0.71
Reach-	789	190.00	791.76	793.53		793.70	0.009255	3.85	71.54	118.62	0.64
Reach-	789										
Reach-	789	30.00	793.37	794.25	794.25	794.50	0.030233	4.03	7.45	15.03	1.01
Reach-	789	70.00	793.37	794.65	794.65	795.03	0.026816	4.96	14.12	18.99	1.01
Reach-	789	90.00	793.37	794.80	794.80	795.23	0.025691	5.25	17.15	20.51	1.01
Reach-	789	110.00	793.37	794.94	794.94	795.40	0.024708	5.47	20.09	21.87	1.01

130.00	793.37	795.06	795.06	795.58	0.024470	5.72	22.74	23.03	1.01
150.00	793.37	795.22	795.22	795.70	0.020849	5.58	27.92	39.84	0.95
190.00	793.37	795.56	795.56	795.88	0.012066	4.75	52.69	108.47	0.74
30.00	795.00	796.24		796.35	0.012040	2.61	11.49	22.22	0.64
70.00	795.00	796.63		796.78	0.011989	3.05	22.92	34.98	0.67
90.00	795.00	796.78		796.93	0.011916	3.19	28.26	40.34	0.67
110.00	795.00	796.89		797.06	0.011582	3.31	33.22	43.79	0.67
130.00	795.00	796.99		797.17	0.011056	3.47	38.04	53.71	0.67
150.00	795.00	797.05		797.26	0.011773	3.73	41.29	60.72	0.69
190.00	795.00	797.04	796.98	797.39	0.019283	4.76	40.97	60.14	0.89
30.00	796.00	797.15	797.13	797.51	0.025550	4.78	6.28	8.23	0.96
70.00	796.00	797.73	797.73	798.27	0.025057	5.94	11.79	10.91	1.01
90.00	796.00	797.95	797.95	798.56	0.024295	6.27	14.37	11.95	1.01
110.00	796.00	798.17	798.17	798.81	0.023774	6.43	17.10	13.47	1.01
130.00	796.00	798.40	798.40	799.03	0.021771	6.38	20.36	15.23	0.97
150.00	796.00	798.58	798.58	799.20	0.023665	6.34	23.67	19.28	1.01
190.00	796.00	798.84	798.84	799.50	0.023311	6.51	29.17	22.67	1.01


TRIB2 OF EAGLE PASS CREEK (FUTURE) TRIB2 - FUTURE CONDITIONS 3/4/99
Geom: TRIB2 - FUTURE CONDITIONS
Reach 1
Legend
WS PF#7
WS PF#6
WS PF#5
WS PF#4
WS PF#3
WS PF#2
WS PF#1
Ground
500
100
50
25
10
5
2
Elevation (ft)
800
790
780
770
760
750
740
730
0
2000
4000
6000
8000
10000
Main Channel Distance (ft)
150
465
564
935
1051
1533
1662
2411
2491
2801
2907
3527
3648
3984
4307
4456
4658
4751
5037
5271
5471
5671
5862
5947
6042
6235
6331
6491
6691
6891
7091
7291
7491
7691
7891
7981
8091

HEC-RAS Plan: FUTURE River: RIVER-1 Reach: Reach-1

Future

Reach	River Sta	Profile	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	2									
Reach-1	2	230.00	736.00	737.82	737.82	738.61	0.007770	7.14	32.23	20.45	1.00
Reach-1	2	570.00	736.00	739.16	739.16	740.46	0.006888	9.12	62.48	24.49	1.01
Reach-1	2	840.00	736.00	739.98	739.98	741.55	0.006530	10.05	83.59	26.95	1.01
Reach-1	2	1140.00	736.00	741.38	741.38	742.19	0.002433	7.85	322.49	279.05	0.65
Reach-1	2	1350.00	736.00	741.69	741.69	742.45	0.002291	7.96	414.49	352.81	0.64
Reach-1	2	1630.00	736.00	742.08	742.08	742.71	0.001948	7.74	601.53	569.83	0.60
Reach-1	2	2150.00	736.00	742.39	742.39	743.04	0.002131	8.41	780.89	579.66	0.63
Reach-1	1										
Reach-1	1	230.00	737.60	739.41	739.41	740.21	0.007825	7.15	32.15	20.44	1.01
Reach-1	1	570.00	737.60	740.75	740.75	742.06	0.006988	9.17	62.16	24.45	1.01
Reach-1	1	840.00	737.60	741.86	741.86	742.39	0.002662	6.78	231.26	303.23	0.64
Reach-1	1	1140.00	737.60	742.16	742.16	742.72	0.002866	7.39	327.94	338.04	0.67
Reach-1	1	1350.00	737.60	742.31	742.31	742.91	0.003123	7.89	378.60	349.27	0.70
Reach-1	1	1630.00	737.60	742.20		743.26	0.005422	10.23	343.08	341.44	0.93
Reach-1	1	2150.00	737.60	742.61		743.54	0.004884	10.30	488.23	372.40	0.89
Reach-1	1										
Reach-1	1	230.00	739.24	741.44		741.94	0.003951	5.66	40.64	21.89	0.73
Reach-1	1	570.00	739.24	742.87		743.76	0.004150	7.61	74.94	26.33	0.79
Reach-1	1	840.00	739.24	743.20	743.20	744.76	0.006556	10.02	83.86	27.37	1.01
Reach-1	1	1140.00	739.24	744.59	744.59	745.34	0.002336	7.65	279.06	251.71	0.64
Reach-1	1	1350.00	739.24	744.81	744.81	745.60	0.002410	8.04	338.49	271.37	0.66
Reach-1	1	1630.00	739.24	745.07	745.07	745.89	0.002530	8.53	409.65	293.17	0.68
Reach-1	1	2150.00	739.24	745.46	745.46	746.36	0.002717	9.30	532.49	338.70	0.71
Reach-1	5										
Reach-1	5	230.00	739.83	741.75	741.40	742.28	0.004674	5.84	39.41	20.50	0.74
Reach-1	5	570.00	739.83	743.14	742.70	744.24	0.005411	8.40	67.89	20.50	0.81
Reach-1	5	830.00	739.83	743.65	743.53	745.39	0.007497	10.60	78.28	20.50	0.96
Reach-1	5	1130.00	739.83	745.57	745.57	746.03	0.001702	6.52	397.14	393.61	0.48
Reach-1	5	1340.00	739.83	745.73	745.73	746.19	0.001785	6.80	460.74	411.13	0.49
Reach-1	5	1610.00	739.83	745.88	745.88	746.36	0.001962	7.25	523.16	427.12	0.52
Reach-1	5	2130.00	739.83	746.46	746.12	746.75	0.001313	6.31	789.19	482.69	0.43
Reach-1	5										
Reach-1	5	Culvert									
Reach-1	5										
Reach-1	5	230.00	740.40	742.89	741.97	743.20	0.002108	4.51	50.96	20.50	0.50
Reach-1	5	570.00	740.40	744.75	743.28	745.39	0.002235	6.39	89.26	129.92	0.54
Reach-1	5	830.00	740.40	744.09	744.09	745.96	0.008196	10.96	75.73	34.18	1.00
Reach-1	5	1130.00	740.40	745.81	745.81	746.39	0.002131	7.21	362.84	351.96	0.55
Reach-1	5	1340.00	740.40	746.05	746.05	746.57	0.002023	7.23	453.35	399.23	0.54
Reach-1	5	1610.00	740.40	746.25	746.25	746.76	0.002068	7.48	535.19	419.70	0.55
Reach-1	5	2130.00	740.40	746.47	746.47	747.05	0.002484	8.40	629.64	439.31	0.60
Reach-1	4										
Reach-1	4	230.00	740.72	742.97		743.41	0.003508	5.35	42.98	23.23	0.69
Reach-1	4	570.00	740.72	745.20		745.57	0.001289	5.15	191.13	177.32	0.47
Reach-1	4	830.00	740.72	746.58	744.89	746.71	0.000436	3.69	559.15	357.65	0.29
Reach-1	4	1130.00	740.72	745.86		746.58	0.002242	7.58	328.42	250.70	0.64
Reach-1	4	1340.00	740.72	746.06		746.83	0.002412	8.09	385.43	306.81	0.66
Reach-1	4	1610.00	740.72	746.23		747.09	0.002732	8.82	438.40	327.78	0.71
Reach-1	4	2130.00	740.72	746.38		747.57	0.003809	10.64	490.72	347.14	0.84
Reach-1	3										
Reach-1	3	230.00	742.00	744.02		744.29	0.002435	4.20	54.62	41.11	0.57
Reach-1	3	570.00	742.00	745.63		745.93	0.001098	4.05	130.69	53.21	0.41
Reach-1	3	830.00	742.00	746.66		746.91	0.000750	3.97	208.40	117.21	0.35
Reach-1	3	1130.00	742.00	746.64		747.13	0.001415	5.44	206.34	115.74	0.48
Reach-1	3	1340.00	742.00	746.92		747.42	0.001511	5.84	241.51	138.61	0.50
Reach-1	3	1610.00	742.00	747.22		747.74	0.001630	6.30	287.73	163.88	0.52
Reach-1	3	2130.00	742.00	747.87		748.34	0.001578	6.67	420.23	253.22	0.51
Reach-1	2										
Reach-1	2	230.00	742.40	744.20	743.97	744.80	0.005738	6.23	36.92	36.50	0.82
Reach-1	2	570.00	742.40	745.59	745.20	746.25	0.003496	6.62	87.66	36.50	0.65
Reach-1	2	830.00	742.40	746.53	745.72	747.18	0.002607	6.66	131.82	73.56	0.58
Reach-1	2	1130.00	742.40	746.65	746.65	747.72	0.004298	8.71	140.97	81.78	0.74
Reach-1	2	1340.00	742.40	746.97	746.97	748.10	0.004432	9.29	171.11	104.38	0.77
Reach-1	2	1610.00	742.40	747.33	747.33	748.52	0.004597	9.95	213.34	127.02	0.79
Reach-1	2	2130.00	742.40	748.30	748.30	749.21	0.003338	9.55	370.02	245.70	0.69
Reach-1	1										
Reach-1	1	Culvert									
Reach-1	1										
Reach-1	1	230.00	742.40	744.87	743.97	745.19	0.002158	4.55	50.57	20.50	0.51
Reach-1	1	570.00	742.40	746.77	745.61	747.13	0.001479	5.11	121.23	63.91	0.43
Reach-1	1	830.00	742.40	747.51	746.21	747.91	0.001514	5.74	189.15	119.29	0.45
Reach-1	1	1130.00	742.40	747.79	747.11	748.38	0.002155	7.09	225.33	140.13	0.54
Reach-1	1	1340.00	742.40	748.04	747.41	748.71	0.002385	7.69	263.81	158.78	0.57
Reach-1	1	1610.00	742.40	748.28	747.82	749.06	0.002767	8.52	302.86	173.46	0.62

Reach	River Sta	Q Total	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	1533	2130.00	742.40	748.61	748.42	749.65	0.003606	10.08	362.78	193.85	0.71
Reach-1	1533	230.00	743.80	746.01		746.58	0.004718	6.10	37.71	19.20	0.77
Reach-1	1533	570.00	743.80	747.36	747.36	748.35	0.005106	8.15	74.38	38.42	0.83
Reach-1	1533	830.00	743.80	748.41	748.41	749.05	0.002762	7.01	143.35	137.15	0.63
Reach-1	1533	1130.00	743.80	748.77	748.77	749.44	0.002910	7.63	199.00	176.07	0.65
Reach-1	1533	1340.00	743.80	749.03		749.66	0.002707	7.66	249.11	203.82	0.64
Reach-1	1533	1610.00	743.80	749.48		749.96	0.002037	7.08	352.71	266.39	0.56
Reach-1	1533	2130.00	743.80	750.14		750.50	0.001498	6.60	553.50	328.56	0.49
Reach-1	1568	180.00	744.80	746.35	746.35	747.12	0.009104	7.05	25.54	16.50	1.00
Reach-1	1568	411.00	744.80	748.13	747.74	748.63	0.002951	5.98	74.47	40.53	0.58
Reach-1	1568	590.00	744.80	748.50	748.26	749.18	0.003595	6.94	89.97	43.49	0.64
Reach-1	1568	800.00	744.80	748.72	748.67	749.73	0.004934	8.35	99.91	45.28	0.74
Reach-1	1568	960.00	744.80	749.32	749.32	750.01	0.003329	7.50	151.96	141.20	0.62
Reach-1	1568	1140.00	744.80	749.63	749.63	750.24	0.003135	7.61	208.58	230.99	0.61
Reach-1	1568	1510.00	744.80	750.16	750.01	750.60	0.002466	7.24	365.82	344.12	0.55
Reach-1	1642	Culvert									
Reach-1	1756	180.00	746.20	748.65	747.74	748.96	0.001239	4.44	40.50	16.50	0.50
Reach-1	1756	411.00	746.20	750.92	748.87	751.00	0.000258	2.82	239.62	261.08	0.23
Reach-1	1756	590.00	746.20	752.56	749.60	752.57	0.000034	1.26	781.21	375.37	0.09
Reach-1	1756	800.00	746.20	754.47	750.81	754.48	0.000010	0.82	1586.14	452.21	0.05
Reach-1	1756	960.00	746.20	750.92	750.92	751.34	0.001407	6.59	239.66	261.10	0.53
Reach-1	1756	1140.00	746.20	751.04	751.04	751.48	0.001510	6.94	272.53	272.39	0.56
Reach-1	1756	1510.00	746.20	751.25	751.25	751.74	0.001742	7.66	329.57	290.95	0.60
Reach-1	1811	180.00	746.20	748.71		749.06	0.001563	4.78	37.64	20.03	0.61
Reach-1	1811	411.00	746.20	750.90		751.05	0.000377	3.51	180.73	187.47	0.33
Reach-1	1811	590.00	746.20	752.56		752.58	0.000047	1.61	720.54	372.38	0.13
Reach-1	1811	800.00	746.20	754.47		754.48	0.000013	1.04	1519.73	455.02	0.07
Reach-1	1811	960.00	746.20	751.15	751.15	751.67	0.001280	6.76	240.69	274.77	0.62
Reach-1	1811	1140.00	746.20	751.31	751.31	751.84	0.001320	7.07	285.67	291.16	0.63
Reach-1	1811	1510.00	746.20	751.59	751.59	752.13	0.001368	7.54	374.35	330.26	0.65
Reach-1	2411	180.00	749.80	751.68	751.68	752.43	0.004493	6.95	25.91	17.53	1.01
Reach-1	2411	411.00	749.80	752.82	752.82	753.94	0.004041	8.49	48.38	22.07	1.01
Reach-1	2411	590.00	749.80	753.82	753.82	754.27	0.001523	6.10	143.90	311.36	0.64
Reach-1	2411	800.00	749.80	754.31		754.58	0.000935	5.32	332.36	439.77	0.52
Reach-1	2411	960.00	749.80	754.22	754.22	754.69	0.001635	6.91	293.02	425.85	0.68
Reach-1	2411	1140.00	749.80	754.38	754.38	754.84	0.001659	7.18	360.99	449.63	0.69
Reach-1	2411	1510.00	749.80	754.58	754.58	755.12	0.001965	8.12	453.02	479.96	0.76
Reach-1	2461	180.00	749.80	752.39	751.34	752.67	0.001049	4.21	42.79	16.50	0.46
Reach-1	2461	411.00	749.80	754.06	752.47	754.27	0.000640	4.33	205.17	444.36	0.37
Reach-1	2461	590.00	749.80	754.13	754.13	754.50	0.001111	5.77	238.95	458.28	0.49
Reach-1	2461	800.00	749.80	754.35	754.35	754.73	0.001253	6.33	341.94	498.34	0.52
Reach-1	2461	960.00	749.80	754.46	754.46	754.87	0.001390	6.79	402.76	520.55	0.55
Reach-1	2461	1140.00	749.80	754.59	754.59	755.01	0.001492	7.16	471.69	541.36	0.58
Reach-1	2461	1510.00	749.80	754.80	754.80	755.25	0.001744	7.96	583.66	557.79	0.63
Reach-1	2511	Culvert									
Reach-1	2521	180.00	749.90	752.66	751.44	752.90	0.000855	3.93	45.78	16.66	0.42
Reach-1	2521	411.00	749.90	754.08	752.57	754.37	0.000785	4.77	149.30	370.49	0.41
Reach-1	2521	590.00	749.90	753.29	753.29	755.00	0.004958	10.47	56.33	16.69	1.00
Reach-1	2521	800.00	749.90	754.49	754.49	754.86	0.001184	6.23	313.87	440.77	0.51
Reach-1	2521	960.00	749.90	754.57	754.57	755.00	0.001406	6.87	351.77	456.06	0.56
Reach-1	2521	1140.00	749.90	754.71	754.71	755.14	0.001457	7.13	416.11	480.90	0.57
Reach-1	2521	1510.00	749.90	754.91	754.91	755.37	0.001655	7.81	516.33	517.22	0.62
Reach-1	2586	180.00	750.13	752.59		753.09	0.002358	5.65	31.83	17.83	0.75
Reach-1	2586	411.00	750.13	753.90	753.43	754.66	0.002229	7.01	59.49	28.80	0.77
Reach-1	2586	590.00	750.13	755.39	754.66	755.51	0.000326	3.61	404.28	445.66	0.32
Reach-1	2586	800.00	750.13	754.95	754.95	755.46	0.001335	6.77	249.78	266.60	0.63
Reach-1	2586	960.00	750.13	755.09	755.09	755.64	0.001483	7.32	290.03	310.86	0.66
Reach-1	2586	1140.00	750.13	755.27	755.27	755.83	0.001504	7.61	354.08	390.50	0.68
Reach-1	2586	1510.00	750.13	755.61	755.61	756.12	0.001434	7.85	522.61	588.45	0.67
Reach-1	2611	180.00	751.32	753.40	753.40	754.19	0.004459	7.10	25.33	16.33	1.01
Reach-1	2611	411.00	751.32	754.60	754.60	755.75	0.004015	8.60	47.80	21.13	1.01
Reach-1	2611	590.00	751.32	755.75	755.75	756.15	0.001217	5.82	162.87	270.40	0.58
Reach-1	2611	800.00	751.32	755.97	755.97	756.39	0.001309	6.32	236.32	377.92	0.61

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
Reach-1	2801	960.00	751.32	756.10	756.10	756.53	0.001408	6.72	286.07	412.00	0.64
Reach-1	2801	1140.00	751.32	756.22	756.22	756.68	0.001520	7.14	336.64	434.51	0.67
Reach-1	2801	1510.00	751.32	756.46	756.46	756.93	0.001620	7.70	442.19	457.85	0.70
Reach-1	2831	180.00	751.48	753.69	753.33	754.34	0.003193	6.49	27.75	12.61	0.77
Reach-1	2831	411.00	751.48	756.14	756.14	756.22	0.000351	3.12	266.74	381.80	0.26
Reach-1	2831	590.00	751.48	756.14	756.14	756.30	0.000724	4.48	266.71	381.78	0.37
Reach-1	2831	800.00	751.48	756.33	756.15	756.51	0.000838	4.95	342.52	404.09	0.40
Reach-1	2831	960.00	751.48	756.50	756.20	756.67	0.000818	5.01	413.32	423.50	0.40
Reach-1	2831	1140.00	751.48	756.66	756.31	756.83	0.000834	5.16	481.51	450.80	0.40
Reach-1	2831	1510.00	751.48	756.90	756.49	757.08	0.000923	5.60	596.35	507.91	0.43
Reach-1	2853	Culvert									
Reach-1	2875	180.00	751.71	754.66	753.56	755.03	0.001354	4.85	37.13	12.63	0.50
Reach-1	2875	411.00	751.71	754.92	754.92	756.53	0.005537	10.18	40.37	12.64	1.00
Reach-1	2875	590.00	751.71	755.79	755.79	757.84	0.005739	11.48	51.40	67.93	1.00
Reach-1	2875	800.00	751.71	756.55	756.55	757.03	0.001811	7.05	241.77	316.00	0.57
Reach-1	2875	960.00	751.71	756.70	756.70	757.21	0.001976	7.51	288.92	316.00	0.59
Reach-1	2875	1140.00	751.71	756.82	756.82	757.40	0.002225	8.10	328.74	316.82	0.63
Reach-1	2875	1510.00	751.71	757.11	757.11	757.72	0.002426	8.78	424.89	366.22	0.67
Reach-1	2907	180.00	751.87	754.78		755.09	0.001233	4.47	40.27	19.65	0.55
Reach-1	2907	411.00	751.87	755.15	755.15	756.30	0.004016	8.60	47.79	21.13	1.01
Reach-1	2907	590.00	751.87	758.63		758.65	0.000055	1.81	1036.07	639.22	0.14
Reach-1	2907	800.00	751.87	756.54		757.19	0.001781	7.39	177.99	214.54	0.71
Reach-1	2907	960.00	751.87	756.66		757.44	0.002093	8.21	206.50	245.96	0.78
Reach-1	2907	1140.00	751.87	756.75		757.71	0.002568	9.24	227.69	253.26	0.87
Reach-1	2907	1510.00	751.87	757.30	757.30	758.05	0.001936	8.84	391.51	348.21	0.77
Reach-1	3527	180.00	754.58	756.66	756.66	757.45	0.004442	7.10	25.37	16.34	1.00
Reach-1	3527	411.00	754.58	757.86	757.86	759.01	0.004019	8.60	47.78	21.12	1.01
Reach-1	3527	590.00	754.58	758.57	758.57	759.90	0.003752	9.24	63.87	23.98	1.00
Reach-1	3527	800.00	754.58	759.82	759.82	760.50	0.001372	7.21	237.64	276.93	0.64
Reach-1	3527	960.00	754.58	760.14	760.14	760.75	0.001214	7.15	351.44	451.05	0.61
Reach-1	3527	1140.00	754.58	760.33	760.33	760.95	0.001260	7.50	440.56	478.91	0.63
Reach-1	3527	1510.00	754.58	760.65	760.65	761.29	0.001351	8.13	593.93	491.49	0.66
Reach-1	3562	180.00	754.76	757.02	756.61	757.64	0.002999	6.35	28.34	12.61	0.75
Reach-1	3562	411.00	754.76	757.98	757.98	759.58	0.005498	10.16	40.47	12.66	1.00
Reach-1	3562	590.00	754.76	760.38	759.87	760.53	0.000499	4.22	536.86	558.40	0.31
Reach-1	3562	800.00	754.76	760.17	760.17	760.62	0.001423	6.94	418.07	550.88	0.53
Reach-1	3562	960.00	754.76	760.35	760.35	760.77	0.001412	7.07	518.27	557.23	0.53
Reach-1	3562	1140.00	754.76	761.09	760.48	761.22	0.000537	4.74	942.22	583.32	0.33
Reach-1	3562	1510.00	754.76	761.45	760.69	761.58	0.000565	5.04	1152.30	595.83	0.34
Reach-1	3583	Culvert									
Reach-1	3604	180.00	754.94	757.85	756.79	758.22	0.001418	4.93	36.54	12.65	0.51
Reach-1	3604	411.00	754.94	759.05	758.15	760.03	0.002678	7.93	51.84	37.09	0.69
Reach-1	3604	590.00	754.94	759.02	759.02	761.06	0.005666	11.47	51.43	30.21	1.00
Reach-1	3604	800.00	754.94	760.28	760.28	760.62	0.001211	6.35	409.38	546.48	0.49
Reach-1	3604	960.00	754.94	760.43	760.39	760.76	0.001230	6.52	493.51	552.30	0.49
Reach-1	3604	1140.00	754.94	761.11	760.50	761.21	0.000466	4.34	880.54	578.32	0.31
Reach-1	3604	1510.00	754.94	761.48	760.64	761.57	0.000468	4.52	1092.24	592.07	0.31
Reach-1	3648	180.00	755.12	757.99		758.31	0.001306	4.57	39.43	19.48	0.57
Reach-1	3648	411.00	755.12	760.41		760.50	0.000212	2.86	410.25	448.53	0.25
Reach-1	3648	590.00	755.12	759.08	759.08	760.44	0.003902	9.37	62.95	23.82	1.02
Reach-1	3648	800.00	755.12	760.31		760.71	0.000982	6.05	363.12	444.28	0.54
Reach-1	3648	960.00	755.12	760.45		760.88	0.001087	6.51	424.76	449.83	0.57
Reach-1	3648	1140.00	755.12	761.11		761.30	0.000506	4.92	731.63	476.53	0.40
Reach-1	3648	1510.00	755.12	761.47		761.67	0.000539	5.34	904.74	490.96	0.42
Reach-1	3964	180.00	757.70	759.78	759.78	760.57	0.007900	7.10	25.37	16.34	1.00
Reach-1	3964	411.00	757.70	760.98	760.98	762.13	0.007144	8.60	47.78	21.12	1.01
Reach-1	3964	590.00	757.70	762.33	762.33	762.74	0.001970	5.79	243.49	375.97	0.56
Reach-1	3964	800.00	757.70	762.56	762.56	762.98	0.002118	6.28	334.89	414.54	0.59
Reach-1	3964	960.00	757.70	762.70	762.70	763.12	0.002245	6.63	391.82	436.84	0.61
Reach-1	3964	1140.00	757.70	762.81	762.81	763.26	0.002485	7.11	439.63	454.77	0.65
Reach-1	3964	1510.00	757.70	763.07	763.07	763.49	0.002444	7.38	568.14	501.07	0.65
Reach-1	4007	120.00	760.15	762.14		762.53	0.004179	5.03	23.84	15.96	0.73
Reach-1	4007	250.00	760.15	763.33		763.79	0.003011	5.49	45.56	20.70	0.65

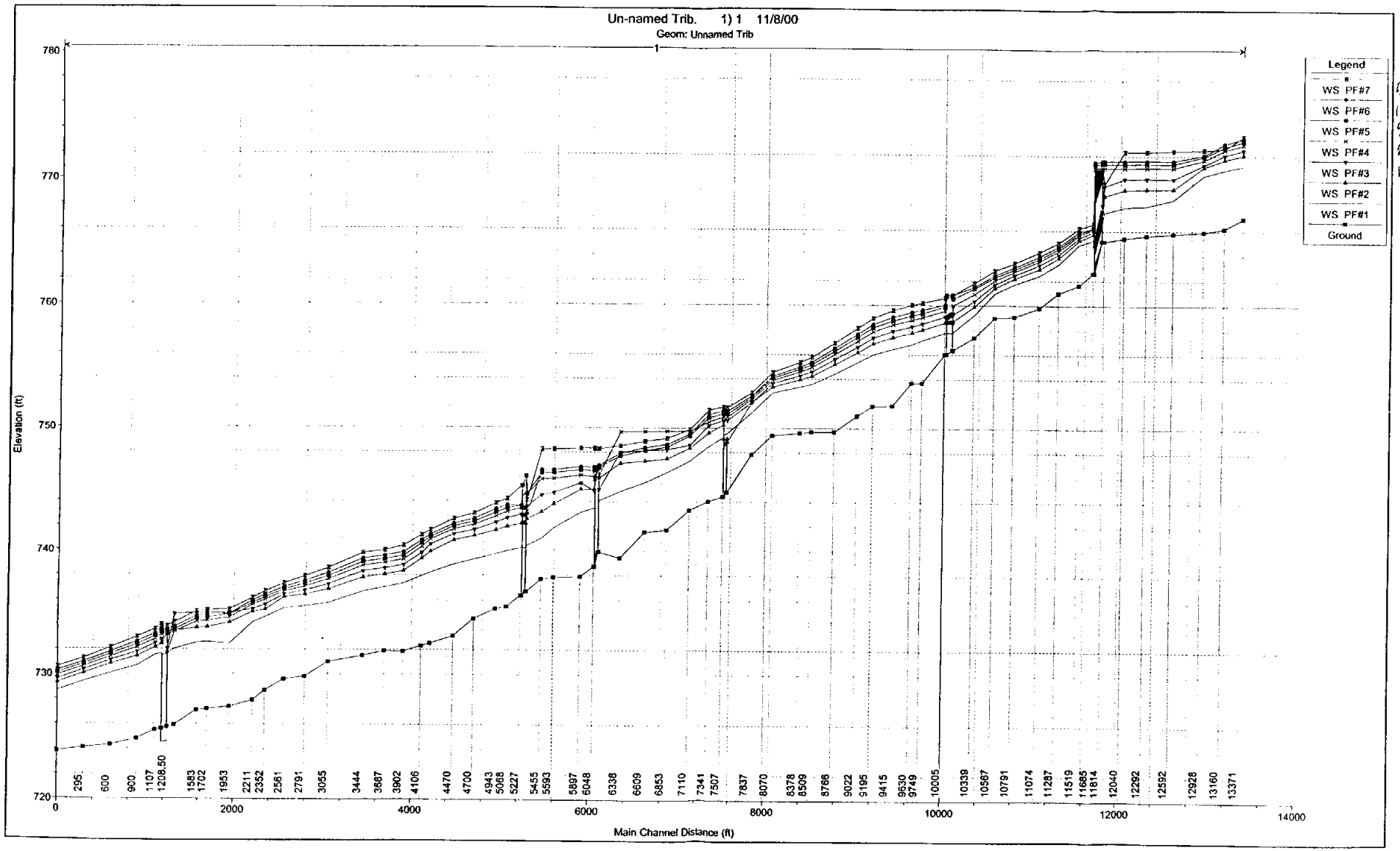
Reach	River Sta	Profile	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
Reach-1	4307									
		340.00	760.15	763.11	763.11	764.17	0.007325	8.25	41.24	19.85	1.01
		440.00	760.15	763.55	763.55	764.74	0.007080	8.73	50.39	21.61	1.01
		520.00	760.15	763.88	763.88	765.14	0.006820	9.01	57.74	22.93	1.00
		610.00	760.15	764.19	764.19	765.56	0.006753	9.39	64.98	26.16	1.01
		780.00	760.15	764.90	764.90	766.23	0.004895	9.34	97.42	65.27	0.89
Reach-1	4338									
		120.00	760.55	762.25	761.97	762.74	0.005593	5.63	21.32	12.58	0.76
		250.00	760.55	763.32	762.85	764.12	0.005617	7.19	34.77	12.64	0.76
		340.00	760.55	763.38	763.38	764.80	0.009679	9.54	35.63	12.64	1.00
		440.00	760.55	763.93	763.93	765.59	0.009733	10.35	42.49	12.67	1.00
		520.00	760.55	764.31	764.31	766.18	0.009950	10.97	47.41	12.69	1.00
		610.00	760.55	764.74	764.74	766.81	0.009839	11.54	52.84	20.43	1.00
		780.00	760.55	766.80	766.80	767.54	0.002604	7.76	245.75	265.19	0.55
Reach-1	4354									
		Culvert									
Reach-1	4370									
		120.00	760.90	763.18	762.32	763.45	0.004812	4.22	28.46	19.03	0.49
		250.00	760.90	764.61	763.21	765.06	0.004088	5.38	46.43	36.42	0.49
		340.00	760.90	765.81	763.73	765.95	0.001595	3.08	134.54	78.88	0.30
		440.00	760.90	766.04	764.26	766.22	0.002057	3.59	160.07	255.56	0.34
		520.00	760.90	766.47	764.66	766.59	0.001383	3.19	280.50	300.69	0.29
		610.00	760.90	765.08	765.08	767.20	0.016368	11.66	52.29	48.11	1.01
		780.00	760.90	767.49	765.71	767.54	0.000563	2.39	688.11	499.35	0.19
Reach-1	4456									
		120.00	762.50	764.72	764.72	765.02	0.028452	4.42	27.12	44.92	1.00
		250.00	762.50	765.44		765.62	0.010285	3.41	73.34	84.38	0.64
		340.00	762.50	766.04		766.14	0.003721	2.54	144.02	260.08	0.41
		440.00	762.50	766.34		766.42	0.002524	2.39	224.25	287.90	0.35
		520.00	762.50	766.67		766.72	0.001442	2.07	322.71	311.41	0.27
		610.00	762.50	767.49		767.51	0.000374	1.36	608.89	381.32	0.15
		780.00	762.50	767.56		767.59	0.000541	1.66	637.14	386.11	0.18
Reach-1	4658									
		120.00	764.70	766.46		766.51	0.003406	2.55	95.57	239.10	0.39
		250.00	764.70	766.72		766.79	0.003879	3.08	171.99	321.61	0.43
		340.00	764.70	766.84		766.91	0.004178	3.35	209.54	332.39	0.46
		440.00	764.70	766.96		767.04	0.004239	3.54	249.51	339.61	0.46
		520.00	764.70	767.08		767.15	0.003820	3.50	290.47	349.27	0.44
		610.00	764.70	767.60		767.63	0.001200	2.30	484.51	398.21	0.26
		780.00	764.70	767.71		767.76	0.001497	2.65	531.64	408.74	0.29
Reach-1	4751									
		120.00	765.43	766.83		766.87	0.006237	2.16	91.40	292.80	0.48
		250.00	765.43	767.07		767.12	0.005072	2.30	172.30	354.24	0.45
		340.00	765.43	767.19		767.24	0.004853	2.45	215.05	366.43	0.45
		440.00	765.43	767.30		767.36	0.004708	2.60	256.72	373.17	0.45
		520.00	765.43	767.39		767.45	0.004535	2.70	289.32	377.62	0.45
		610.00	765.43	767.70		767.74	0.002120	2.17	408.83	391.73	0.32
		780.00	765.43	767.84		767.89	0.002359	2.43	462.94	398.84	0.34
Reach-1	5037									
		120.00	767.82	769.13	769.01	769.27	0.011490	3.17	50.30	262.60	0.66
		250.00	767.82	769.29		769.49	0.015362	4.15	96.59	299.61	0.79
		340.00	767.82	769.40	769.40	769.59	0.014343	4.30	129.74	317.12	0.78
		440.00	767.82	769.48	769.48	769.69	0.014890	4.60	157.01	329.06	0.80
		520.00	767.82	769.53	769.53	769.76	0.016157	4.92	172.97	335.10	0.84
		610.00	767.82	769.59	769.59	769.83	0.016464	5.12	192.67	336.64	0.85
		780.00	767.82	769.68	769.68	769.96	0.017829	5.58	223.30	342.90	0.90
Reach-1	5271									
		120.00	770.10	771.91	771.69	772.12	0.012611	3.69	32.51	38.87	0.71
		250.00	770.10	772.45	772.21	772.73	0.012729	4.26	58.83	60.14	0.74
		340.00	770.10	772.61	772.46	772.99	0.014564	4.98	69.06	66.86	0.81
		440.00	770.10	772.78	772.66	773.26	0.015319	5.60	81.28	77.21	0.85
		520.00	770.10	772.92	772.83	773.46	0.015074	5.93	92.66	84.30	0.86
		610.00	770.10	773.04	772.99	773.66	0.015664	6.37	103.17	89.93	0.88
		780.00	770.10	773.28	773.28	773.99	0.015468	6.94	126.54	112.42	0.90
Reach-1	5413									
		120.00	771.71	773.47		773.56	0.004665	2.45	49.06	51.69	0.44
		250.00	771.71	774.06		774.20	0.004639	2.95	84.95	71.09	0.46
		340.00	771.71	774.33		774.50	0.004452	3.28	108.56	114.89	0.47
		440.00	771.71	774.57		774.76	0.004265	3.54	141.79	157.83	0.47
		520.00	771.71	774.73		774.93	0.004186	3.72	169.85	192.52	0.47
		610.00	771.71	774.91		775.11	0.003984	3.84	205.72	226.05	0.47
		780.00	771.71	775.18		775.39	0.003723	4.03	274.68	283.48	0.46
Reach-1	5671									
		120.00	773.02	774.56		774.70	0.006929	3.22	50.63	106.36	0.55
		250.00	773.02	775.03		775.16	0.004989	3.48	117.03	178.40	0.50

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach-1	567A	340.00	773.02	775.26		775.38	0.004381	3.58	162.26	214.00	0.48
Reach-1	567	440.00	773.02	775.47		775.59	0.003953	3.67	210.18	242.52	0.46
Reach-1	567	520.00	773.02	775.62		775.74	0.003796	3.78	249.07	275.87	0.46
Reach-1	567	610.00	773.02	775.75		775.87	0.003597	3.82	285.04	279.79	0.45
Reach-1	567	780.00	773.02	775.98		776.10	0.003304	3.91	349.06	286.31	0.44
Reach-1	566	120.00	773.66	775.46		775.53	0.002846	2.00	60.07	63.30	0.35
Reach-1	566	250.00	773.66	775.87		776.00	0.003922	2.92	90.17	86.05	0.43
Reach-1	566	340.00	773.66	776.07		776.25	0.004475	3.41	118.15	215.99	0.47
Reach-1	566	440.00	773.66	776.24		776.43	0.004704	3.73	155.60	234.75	0.49
Reach-1	566	520.00	773.66	776.37		776.57	0.004647	3.89	187.92	272.93	0.50
Reach-1	566	610.00	773.66	776.47		776.69	0.004789	4.09	218.91	302.12	0.51
Reach-1	566	780.00	773.66	776.66		776.89	0.004920	4.40	280.11	341.68	0.52
Reach-1	564	120.00	773.93	775.50		775.71	0.001100	3.74	32.11	25.96	0.59
Reach-1	564	250.00	773.93	775.82		776.40	0.002471	6.11	40.90	28.97	0.91
Reach-1	564	340.00	773.93	776.05	776.05	776.83	0.002929	7.09	48.10	34.92	1.00
Reach-1	564	440.00	773.93	776.39	776.39	777.25	0.002631	7.49	62.58	52.39	0.98
Reach-1	564	520.00	773.93	776.65	776.65	777.54	0.002362	7.64	78.13	64.18	0.94
Reach-1	564	610.00	773.93	776.88	776.88	777.84	0.002287	7.96	93.79	73.62	0.94
Reach-1	564	780.00	773.93	777.34	777.34	778.31	0.001969	8.15	133.15	97.35	0.89
Reach-1	600	120.00	775.32	776.53	776.53	777.13	0.003055	6.21	19.32	53.74	1.00
Reach-1	600	250.00	775.32	777.27	777.27	778.27	0.002678	8.01	31.23	60.99	1.01
Reach-1	600	340.00	775.32	777.74	777.74	778.94	0.002430	8.79	38.67	67.77	1.00
Reach-1	600	440.00	775.32	778.19	778.19	779.62	0.002302	9.59	45.87	140.03	1.00
Reach-1	600	520.00	775.32	778.47	778.47	778.61	0.000296	3.04	209.16	170.60	0.34
Reach-1	600	610.00	775.32	778.47	778.47	778.66	0.000408	3.56	209.16	170.60	0.40
Reach-1	600	780.00	775.32	778.47	778.47	778.78	0.000666	4.56	209.16	170.60	0.52
Reach-1	6042	Culvert									
Reach-1	6026	120.00	776.00	777.98	777.20	778.20	0.004206	3.79	31.63	61.43	0.48
Reach-1	6026	250.00	776.00	778.72	777.96	779.23	0.006267	5.74	43.58	168.68	0.61
Reach-1	6026	340.00	776.00	778.40	778.40	779.62	0.017581	8.84	38.46	115.82	1.00
Reach-1	6026	440.00	776.00	778.87	778.87	780.30	0.016324	9.58	45.91	200.49	1.00
Reach-1	6026	520.00	776.00	779.62	779.22	779.68	0.000940	2.31	344.31	249.32	0.24
Reach-1	6026	610.00	776.00	779.71	779.22	779.78	0.001120	2.57	365.35	254.67	0.26
Reach-1	6026	780.00	776.00	779.88	779.32	779.97	0.001417	3.00	411.21	281.83	0.30
Reach-1	6130	120.00	776.70	778.41		778.52	0.008452	2.68	44.74	64.16	0.57
Reach-1	6130	250.00	776.70	779.41		779.44	0.001681	1.49	188.28	272.67	0.27
Reach-1	6130	340.00	776.70	779.83		779.85	0.000811	1.25	323.37	343.27	0.19
Reach-1	6130	440.00	776.70	780.47		780.48	0.000277	0.94	566.63	407.47	0.12
Reach-1	6130	520.00	776.70	779.70		779.76	0.002854	2.21	277.17	329.97	0.36
Reach-1	6130	610.00	776.70	779.79		779.87	0.002924	2.33	310.34	341.39	0.37
Reach-1	6130	780.00	776.70	780.00		780.07	0.002720	2.44	380.61	358.43	0.36
Reach-1	625	120.00	777.10	778.91		778.97	0.002545	2.00	60.11	54.49	0.33
Reach-1	625	250.00	777.10	779.58		779.66	0.002363	2.38	120.06	141.39	0.34
Reach-1	625	340.00	777.10	779.92		780.00	0.002061	2.41	173.48	172.44	0.32
Reach-1	625	440.00	777.10	780.49		780.54	0.001012	2.02	313.61	333.96	0.24
Reach-1	625	520.00	777.10	779.98		780.15	0.004204	3.49	184.67	176.61	0.48
Reach-1	625	610.00	777.10	780.09		780.28	0.004612	3.78	204.53	203.88	0.49
Reach-1	625	780.00	777.10	780.26		780.50	0.005192	4.26	244.78	254.85	0.53
Reach-1	633	50.00	778.00	779.19		779.25	0.004190	1.93	25.88	35.82	0.40
Reach-1	633	80.00	778.00	779.84		779.87	0.001561	1.48	54.29	59.76	0.26
Reach-1	633	100.00	778.00	780.14		780.17	0.001032	1.35	82.88	168.73	0.22
Reach-1	633	130.00	778.00	780.61		780.62	0.000349	0.98	205.28	321.16	0.13
Reach-1	633	150.00	778.00	780.39		780.42	0.000970	1.49	140.27	272.30	0.22
Reach-1	633	170.00	778.00	780.53		780.55	0.000786	1.42	179.61	309.07	0.20
Reach-1	633	210.00	778.00	780.75		780.77	0.000585	1.34	251.08	341.67	0.17
Reach-1	639	50.00	778.28	779.61		779.73	0.018518	2.87	18.44	54.52	0.77
Reach-1	639	80.00	778.28	779.97		780.03	0.004720	2.07	47.01	101.87	0.43
Reach-1	639	100.00	778.28	780.22		780.26	0.002257	1.75	78.92	178.42	0.31
Reach-1	639	130.00	778.28	780.64		780.65	0.000587	1.12	191.31	309.29	0.17
Reach-1	639	150.00	778.28	780.47		780.50	0.001620	1.71	140.60	290.81	0.27
Reach-1	639	170.00	778.28	780.59		780.61	0.001227	1.59	176.26	303.51	0.24
Reach-1	639	210.00	778.28	780.79		780.81	0.000857	1.46	240.61	327.16	0.21
Reach-1	640	50.00	778.54	780.08		780.11	0.001494	1.29	39.70	64.84	0.25
Reach-1	640	80.00	778.54	780.27		780.31	0.001876	1.64	53.64	83.43	0.28

Reach-1	649									
		100.00	778.54	780.41		780.46	0.001765	1.74	67.61	104.88	0.28
		130.00	778.54	780.70		780.74	0.001203	1.66	101.48	133.23	0.24
		150.00	778.54	780.63		780.68	0.001994	2.07	92.04	125.51	0.31
		170.00	778.54	780.71		780.78	0.001968	2.14	103.46	134.40	0.31
		210.00	778.54	780.88		780.94	0.001875	2.24	127.19	150.50	0.31
Reach-1	6691										
		50.00	779.97	780.67		780.72	0.009071	1.75	28.58	82.16	0.52
		80.00	779.97	780.87		780.92	0.005711	1.77	45.41	94.84	0.44
		100.00	779.97	780.97		781.02	0.005076	1.83	55.39	105.48	0.42
		130.00	779.97	781.10		781.16	0.004416	1.89	70.82	122.81	0.41
		150.00	779.97	781.18		781.24	0.004169	1.94	80.60	129.16	0.40
		170.00	779.97	781.26		781.31	0.003917	1.97	90.96	139.40	0.39
		210.00	779.97	781.39		781.45	0.003557	2.05	110.10	153.94	0.38
Reach-1	6891										
		50.00	781.25	782.22		782.26	0.007033	1.47	33.96	104.49	0.46
		80.00	781.25	782.30		782.36	0.009366	1.88	42.45	111.81	0.54
		100.00	781.25	782.35		782.42	0.010294	2.10	47.73	115.10	0.57
		130.00	781.25	782.41		782.50	0.011569	2.38	54.73	119.33	0.62
		150.00	781.25	782.46		782.55	0.011603	2.49	60.22	122.54	0.63
		170.00	781.25	782.49		782.60	0.012203	2.64	64.44	124.95	0.65
		210.00	781.25	782.55		782.68	0.013119	2.89	72.61	129.49	0.68
Reach-1	7091										
		50.00	782.72	783.55		783.58	0.005768	1.59	35.90	120.18	0.43
		80.00	782.72	783.69		783.73	0.004936	1.76	52.58	121.66	0.42
		100.00	782.72	783.76		783.80	0.004944	1.90	61.16	123.81	0.42
		130.00	782.72	783.85		783.91	0.004916	2.08	73.66	130.78	0.43
		150.00	782.72	783.92		783.98	0.004821	2.16	81.89	133.87	0.43
		170.00	782.72	783.97		784.04	0.004822	2.25	89.36	136.91	0.44
		210.00	782.72	784.09		784.16	0.004595	2.38	105.68	146.09	0.44
Reach-1	7291										
		50.00	784.47	785.79	785.78	785.88	0.032212	2.65	23.53	153.04	0.93
		80.00	784.47	785.85	785.85	785.96	0.036429	3.03	33.02	166.00	1.00
		100.00	784.47	785.88	785.88	786.01	0.035817	3.17	39.25	172.88	1.01
		130.00	784.47	785.94	785.94	786.07	0.033241	3.32	49.96	201.58	0.99
		150.00	784.47	785.97	785.97	786.11	0.032531	3.43	55.84	207.29	0.99
		170.00	784.47	786.00	786.00	786.14	0.030307	3.46	62.67	213.74	0.97
		210.00	784.47	786.04	786.04	786.20	0.030579	3.72	72.65	225.60	0.99
Reach-1	7491										
		50.00	786.25	787.54		787.58	0.003904	1.52	32.84	61.60	0.37
		80.00	786.25	787.74		787.78	0.004068	1.75	45.62	71.43	0.39
		100.00	786.25	787.84		787.89	0.004205	1.87	53.45	77.87	0.40
		130.00	786.25	787.96		788.02	0.004527	2.07	62.76	82.97	0.42
		150.00	786.25	788.02		788.09	0.004732	2.20	68.17	88.87	0.43
		170.00	786.25	788.07		788.16	0.004964	2.35	72.71	92.39	0.45
		210.00	786.25	788.17		788.28	0.005113	2.58	82.79	99.77	0.46
Reach-1	7691										
		50.00	789.02	790.06	790.06	790.35	0.028631	4.28	11.73	22.25	1.00
		80.00	789.02	790.32	790.32	790.60	0.021641	4.30	20.28	44.04	0.90
		100.00	789.02	790.41	790.41	790.72	0.020896	4.60	24.85	51.95	0.91
		130.00	789.02	790.61	790.61	790.88	0.014759	4.46	37.76	84.21	0.79
		150.00	789.02	790.68	790.68	790.96	0.014068	4.58	44.38	92.55	0.78
		170.00	789.02	790.75	790.75	791.03	0.013621	4.69	51.39	111.91	0.78
		210.00	789.02	790.90	790.90	791.15	0.011306	4.65	71.12	143.52	0.72
Reach-1	7891										
		50.00	791.76	793.00		793.10	0.008008	2.63	22.80	55.15	0.55
		80.00	791.76	793.17		793.29	0.009171	3.06	33.71	81.03	0.60
		100.00	791.76	793.26		793.39	0.009184	3.21	41.80	94.92	0.61
		130.00	791.76	793.32		793.49	0.011638	3.74	47.73	103.37	0.69
		150.00	791.76	793.37		793.55	0.012062	3.95	53.02	106.78	0.71
		170.00	791.76	793.41		793.61	0.012535	4.15	57.85	109.80	0.73
		210.00	791.76	793.47		793.72	0.014816	4.68	64.16	113.63	0.80
Reach-1	7991										
		50.00	793.37	794.47	794.47	794.79	0.028174	4.59	10.89	17.09	1.01
		80.00	793.37	794.73	794.73	795.13	0.026198	5.11	15.66	19.78	1.01
		100.00	793.37	794.87	794.87	795.32	0.025247	5.37	18.62	21.20	1.01
		130.00	793.37	795.06	795.06	795.56	0.024470	5.72	22.74	23.03	1.01
		150.00	793.37	795.22	795.22	795.70	0.020863	5.58	27.91	39.81	0.95
		170.00	793.37	795.46	795.46	795.80	0.013488	4.85	42.57	90.15	0.78
		210.00	793.37	795.62	795.62	795.94	0.011987	4.85	59.34	116.14	0.74
Reach-1	8091										
		50.00	795.00	796.47		796.60	0.012418	2.85	17.57	30.61	0.66
		80.00	795.00	796.71		796.86	0.012300	3.13	25.55	38.32	0.68
		100.00	795.00	796.84		797.00	0.011766	3.25	30.74	42.10	0.67
		130.00	795.00	796.99		797.17	0.011056	3.47	38.04	53.71	0.67

	150.00	795.00	797.05		797.26	0.011765	3.73	41.31	60.74	0.69
	170.00	795.00	797.01		797.31	0.017183	4.40	39.38	57.12	0.83
	210.00	795.00	797.09	797.06	797.47	0.019675	4.98	43.93	65.35	0.90
	50.00	796.00	797.46	797.46	797.93	0.026196	5.52	9.05	9.68	1.01
	80.00	796.00	797.84	797.84	798.42	0.024581	6.10	13.11	11.45	1.01
	100.00	796.00	798.06	798.06	798.69	0.023978	6.36	15.72	12.65	1.01
	130.00	796.00	798.40	798.40	799.03	0.021771	6.38	20.36	15.23	0.97
	150.00	796.00	798.58	798.58	799.20	0.023665	6.34	23.67	19.28	1.01
	170.00	796.00	798.72	798.72	799.36	0.023570	6.42	26.49	21.19	1.01
	210.00	796.00	798.95	798.95	799.63	0.023158	6.62	31.74	24.01	1.01

Unnamed Tributary
Existing and Future Conditions
Water Surface Profile and HECRAS Summary Printouts
2, 5, 10, 25, 50, 100, & 500-year Storm Events



500
100
50
25
10
5
2

Exist.

HEC-RAS Plan: [redacted] River: Unnamed Trib Reach: 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
[redacted]	0000	610.00	723.80	728.37	726.64	728.44	0.002372	2.66	498.20	770.49	0.25
[redacted]	0000	1430.00	723.80	729.03	728.43	729.09	0.002371	2.88	1167.73	1255.85	0.26
[redacted]	0000	2080.00	723.80	729.36	728.63	729.40	0.002373	2.98	1618.04	1522.44	0.26
[redacted]	0000	2890.00	723.80	729.66	728.86	729.70	0.002374	3.07	2106.45	1735.06	0.26
[redacted]	0000	3580.00	723.80	729.87	728.96	729.92	0.002370	3.13	2493.04	1886.43	0.26
[redacted]	0000	4440.00	723.80	730.09	729.16	730.14	0.002371	3.21	2916.06	1993.61	0.26
[redacted]	0000	6070.00	723.80	730.41	729.37	730.47	0.002371	3.36	3575.04	2030.00	0.27
[redacted]	[redacted]										
[redacted]	295	610.00	724.10	729.10		729.18	0.002718	2.78	435.17	575.42	0.27
[redacted]	295	1430.00	724.10	729.79		729.87	0.003139	3.25	942.15	889.47	0.30
[redacted]	295	2080.00	724.10	730.12		730.19	0.003159	3.41	1342.90	1606.81	0.30
[redacted]	295	2890.00	724.10	730.39		730.45	0.002898	3.41	1786.85	1641.15	0.29
[redacted]	295	3580.00	724.10	730.58		730.65	0.002759	3.42	2105.31	1665.34	0.29
[redacted]	295	4440.00	724.10	730.79		730.85	0.002673	3.47	2451.75	1691.26	0.28
[redacted]	295	6070.00	724.10	731.11		731.19	0.002646	3.61	3005.74	1731.92	0.28
[redacted]	[redacted]										
[redacted]	600	610.00	724.30	729.72		729.75	0.001349	2.06	568.93	494.93	0.19
[redacted]	600	1430.00	724.30	730.52		730.56	0.001644	2.55	1115.00	985.12	0.22
[redacted]	600	2080.00	724.30	730.87		730.92	0.001829	2.83	1510.17	1182.66	0.23
[redacted]	600	2890.00	724.30	731.16		731.22	0.002145	3.19	1865.13	1257.83	0.25
[redacted]	600	3580.00	724.30	731.36		731.43	0.002384	3.45	2124.76	1310.07	0.27
[redacted]	600	4440.00	724.30	731.59		731.67	0.002606	3.72	2430.29	1369.01	0.28
[redacted]	600	6070.00	724.30	731.96		732.05	0.002943	4.12	2948.88	1463.62	0.30
[redacted]	[redacted]										
[redacted]	900	610.00	724.80	730.29		730.48	0.004151	3.84	239.89	430.75	0.33
[redacted]	900	1430.00	724.80	731.13		731.23	0.002664	3.48	717.55	716.49	0.28
[redacted]	900	2080.00	724.80	731.52		731.61	0.002497	3.55	1017.82	836.85	0.27
[redacted]	900	2890.00	724.80	731.87		731.97	0.002517	3.72	1332.86	942.42	0.28
[redacted]	900	3580.00	724.80	732.12		732.23	0.002548	3.85	1582.45	1068.85	0.28
[redacted]	900	4440.00	724.80	732.38		732.50	0.002556	3.97	1872.98	1128.72	0.28
[redacted]	900	6070.00	724.80	732.80		732.93	0.002577	4.16	2365.57	1223.55	0.29
[redacted]	[redacted]										
[redacted]	1107	610.00	725.50	731.31		731.39	0.004358	2.49	311.34	398.31	0.32
[redacted]	1107	1430.00	725.50	731.90		732.00	0.005024	3.03	589.24	549.77	0.35
[redacted]	1107	2080.00	725.50	732.23		732.35	0.004821	3.23	810.01	765.02	0.35
[redacted]	1107	2890.00	725.50	732.56		732.69	0.004527	3.39	1093.86	939.76	0.35
[redacted]	1107	3580.00	725.50	732.80		732.93	0.004322	3.49	1333.47	1039.86	0.34
[redacted]	1107	4440.00	725.50	733.06		733.19	0.004221	3.63	1609.19	1167.40	0.35
[redacted]	1107	6070.00	725.50	733.45		733.60	0.003967	3.78	2089.30	1260.02	0.34
[redacted]	[redacted]										
[redacted]	1175	610.00	725.60	731.41	727.97	731.52	0.000744	2.70	226.26	398.09	0.21
[redacted]	1175	1430.00	725.60	731.97	729.39	732.47	0.002918	5.71	250.37	537.22	0.42
[redacted]	1175	2080.00	725.60	732.54	730.30	732.60	0.001084	2.73	1405.18	1094.54	0.24
[redacted]	1175	2890.00	725.60	732.89	731.32	732.96	0.001090	2.89	1812.77	1199.60	0.24
[redacted]	1175	3580.00	725.60	733.15	732.39	733.22	0.001105	3.02	2130.86	1318.08	0.25
[redacted]	1175	4440.00	725.60	733.41	732.39	733.49	0.001118	3.16	2492.53	1385.79	0.25
[redacted]	1175	6070.00	725.60	733.83	732.56	733.91	0.001169	3.41	3086.12	1490.25	0.26
[redacted]	[redacted]										
[redacted]	1208.50	Culvert									
[redacted]	[redacted]										
[redacted]	1242	610.00	725.75	731.48	728.53	731.65	0.001451	3.29	185.19	145.73	0.28
[redacted]	1242	1430.00	725.75	732.09	730.36	732.80	0.005182	6.78	210.76	371.59	0.53
[redacted]	1242	2080.00	725.75	731.31	731.31	733.43	0.019299	11.69	177.88	137.93	1.00
[redacted]	1242	2890.00	725.75	732.34	732.34	734.99	0.017961	13.05	221.40	586.74	1.00
[redacted]	1242	3580.00	725.75	733.21	733.21	733.40	0.003307	4.51	1388.83	1127.17	0.41
[redacted]	1242	4440.00	725.75	733.35	733.21	733.59	0.004063	5.13	1557.77	1196.76	0.46
[redacted]	1242	6070.00	725.75	733.72	733.21	733.98	0.004410	5.67	2023.68	1365.95	0.49
[redacted]	[redacted]										
[redacted]	1326	590.00	725.90	731.68	728.52	731.79	0.001887	2.73	216.02	79.58	0.29
[redacted]	1326	1380.00	725.90	732.97	730.58	733.09	0.001706	3.22	744.07	848.90	0.29
[redacted]	1326	2010.00	725.90	733.77	731.64	733.84	0.000920	2.69	1486.91	1117.83	0.22
[redacted]	1326	2800.00	725.90	735.29	732.88	735.30	0.000186	1.47	3976.20	1858.79	0.11
[redacted]	1326	3460.00	725.90	733.40	733.14	733.76	0.004927	5.88	1125.31	982.23	0.51
[redacted]	1326	4300.00	725.90	733.60	733.34	734.00	0.005471	6.40	1317.68	1056.09	0.54
[redacted]	1326	5850.00	725.90	733.99	733.67	734.40	0.005652	6.88	1715.40	1193.87	0.56
[redacted]	[redacted]										
[redacted]	1563	590.00	727.10	732.04		732.09	0.000742	2.14	390.35	221.45	0.19
[redacted]	1563	1380.00	727.10	733.30		733.35	0.000658	2.44	918.20	664.74	0.19
[redacted]	1563	2010.00	727.10	733.96		734.01	0.000567	2.46	1454.46	946.78	0.18
[redacted]	1563	2800.00	727.10	735.33		735.34	0.000206	1.71	3381.80	1751.91	0.11
[redacted]	1563	3460.00	727.10	734.21		734.30	0.001218	3.70	1733.92	1269.47	0.27
[redacted]	1563	4300.00	727.10	734.48		734.58	0.001291	3.92	2087.81	1341.14	0.28
[redacted]	1563	5850.00	727.10	734.89		735.00	0.001382	4.24	2658.38	1415.21	0.29
[redacted]	[redacted]										

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
	1702	590.00	727.20	732.11		732.17	0.000931	2.17	280.66	412.75	0.21
	1702	1380.00	727.20	733.35		733.39	0.000281	1.48	967.64	710.63	0.12
	1702	2010.00	727.20	734.01		734.04	0.000211	1.40	1481.41	980.51	0.11
	1702	2800.00	727.20	735.34		735.36	0.000077	0.98	3253.19	1487.84	0.07
	1702	3460.00	727.20	734.30		734.37	0.000419	2.05	1786.45	1130.40	0.15
	1702	4300.00	727.20	734.57		734.64	0.000450	2.19	2151.50	1386.07	0.16
		5850.00	727.20	734.99		735.07	0.000497	2.41	2741.04	1430.79	0.17
	1953	590.00	727.40	732.33	730.78	732.68	0.004865	4.72	125.12	41.16	0.48
	1953	1380.00	727.40	732.61	732.61	734.19	0.021027	10.10	136.59	42.93	1.00
	1953	2010.00	727.40	734.23	734.23	734.56	0.004563	5.60	563.86	768.54	0.49
	1953	2800.00	727.40	735.35	734.42	735.40	0.000747	2.66	1719.52	1295.29	0.20
	1953	3460.00	727.40	734.54	734.54	734.97	0.006217	6.86	809.26	792.29	0.57
	1953	4300.00	727.40	734.81	734.81	735.17	0.005303	6.58	1059.51	1122.86	0.53
		5850.00	727.40	735.00	734.95	735.44	0.006445	7.46	1285.66	1182.28	0.59
	2211	590.00	727.90	733.42		733.70	0.003243	4.24	139.17	38.81	0.39
	2211	1380.00	727.90	735.01		735.11	0.001330	3.34	886.45	865.47	0.27
	2211	2010.00	727.90	735.09		735.26	0.002461	4.58	950.43	900.63	0.36
	2211	2800.00	727.90	735.51		735.65	0.002211	4.59	1370.36	1098.89	0.35
	2211	3460.00	727.90	735.60		735.79	0.002868	5.28	1474.65	1140.40	0.40
	2211	4300.00	727.90	735.75		735.97	0.003396	5.85	1654.04	1200.49	0.44
		5850.00	727.90	736.08		736.31	0.003564	6.23	2076.70	1351.25	0.45
	2352	590.00	728.70	733.90		734.26	0.004561	4.86	121.38	39.31	0.46
	2352	1380.00	728.70	735.05		735.57	0.005611	6.51	370.19	461.77	0.54
	2352	2010.00	728.70	735.31		735.94	0.007274	7.69	507.11	699.25	0.62
	2352	2800.00	728.70	735.79		736.14	0.004873	6.71	1005.60	1164.92	0.52
	2352	3460.00	728.70	736.00		736.32	0.004711	6.77	1260.40	1293.72	0.51
	2352	4300.00	728.70	736.23		736.51	0.004375	6.71	1561.69	1321.77	0.50
		5850.00	728.70	736.58		736.83	0.004124	6.78	2029.92	1361.47	0.49
	2561	590.00	729.60	734.63		734.70	0.001109	1.55	307.36	262.35	0.15
	2561	1380.00	729.60	735.86		735.93	0.000739	1.45	827.74	786.56	0.13
	2561	2010.00	729.60	736.29		736.36	0.000812	1.61	1219.33	1014.12	0.13
	2561	2800.00	729.60	736.48		736.58	0.001168	1.99	1423.65	1067.72	0.16
	2561	3460.00	729.60	736.67		736.78	0.001345	2.19	1623.03	1090.61	0.18
	2561	4300.00	729.60	736.86		736.99	0.001568	2.43	1837.99	1114.76	0.19
		5850.00	729.60	737.19		737.35	0.001878	2.77	2209.25	1155.29	0.21
	2791	590.00	729.80	734.88		734.94	0.000911	1.60	336.78	135.77	0.14
	2791	1380.00	729.80	736.05		736.18	0.001391	2.19	522.24	355.44	0.18
	2791	2010.00	729.80	736.52		736.63	0.001670	2.56	803.94	847.80	0.20
	2791	2800.00	729.80	736.81		736.95	0.002113	2.98	1078.21	1001.95	0.22
	2791	3460.00	729.80	737.05		737.19	0.002306	3.20	1322.09	1064.04	0.23
	2791	4300.00	729.80	737.30		737.45	0.002471	3.41	1594.01	1105.95	0.24
		5850.00	729.80	737.70		737.67	0.002663	3.70	2049.65	1172.84	0.26
	3055	590.00	731.00	735.20		735.30	0.002168	2.14	245.00	118.66	0.21
	3055	1380.00	731.00	736.43		736.64	0.002059	2.50	429.47	246.18	0.21
	3055	2010.00	731.00	736.96		737.15	0.002263	2.83	595.47	381.47	0.23
	3055	2800.00	731.00	737.36		737.58	0.002683	3.25	790.40	672.01	0.25
	3055	3460.00	731.00	737.64		737.87	0.002845	3.47	981.95	718.14	0.26
	3055	4300.00	731.00	737.92		738.17	0.003024	3.70	1195.97	766.41	0.27
		5850.00	731.00	738.37		738.64	0.003254	4.03	1552.06	839.21	0.28
	3444	590.00	731.50	736.16		736.27	0.002872	2.65	237.13	209.98	0.24
	3444	1380.00	731.50	737.38		737.50	0.002343	2.90	530.25	269.80	0.23
	3444	2010.00	731.50	737.93		738.08	0.002474	3.19	685.12	344.71	0.24
	3444	2800.00	731.50	738.42		738.60	0.002595	3.46	883.92	428.83	0.25
	3444	3460.00	731.50	738.72		738.94	0.002749	3.69	1019.66	453.17	0.26
	3444	4300.00	731.50	739.06		739.32	0.002935	3.95	1175.10	479.64	0.27
		5850.00	731.50	739.57		739.90	0.003255	4.37	1431.93	528.94	0.29
	3687	560.00	731.90	736.60		736.65	0.001042	1.67	330.75	226.10	0.15
	3687	1340.00	731.90	737.64		737.76	0.000820	1.74	581.86	257.27	0.14
	3687	1930.00	731.90	738.17		738.34	0.000826	1.86	721.88	281.66	0.14
	3687	2700.00	731.90	738.65		738.90	0.000926	2.09	866.50	320.79	0.15
	3687	3340.00	731.90	738.95		739.28	0.001022	2.27	968.85	345.62	0.16
	3687	4140.00	731.90	739.29		739.69	0.001128	2.47	1088.25	372.90	0.17
	3687	5600.00	731.90	739.78		740.36	0.001343	2.82	1297.27	485.02	0.19
	3902	510.00	731.85	736.87		736.94	0.001753	2.04	249.65	70.12	0.19
	3902	1210.00	731.85	737.92		738.11	0.004328	3.59	346.85	205.06	0.31

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
	3902		1790.00	731.85	738.45		738.67	0.003707	3.58	480.99	276.19	0.29
	3902		2570.00	731.85	738.92		739.25	0.003209	3.55	621.48	314.41	0.27
	3902		3170.00	731.85	739.23		739.64	0.002924	3.52	719.11	331.87	0.26
	3902		3860.00	731.85	739.56		740.07	0.002641	3.47	857.75	526.16	0.25
	3902		5130.00	731.85	740.12		740.71	0.002098	3.29	1180.27	616.49	0.23
	4106		510.00	732.30	737.26		737.34	0.002152	2.17	234.68	70.47	0.21
	4106		1210.00	732.30	738.88		739.04	0.004791	3.27	370.36	110.23	0.31
	4106		1790.00	732.30	739.41		739.67	0.006597	4.10	455.49	231.09	0.37
	4106		2570.00	732.30	739.90		740.25	0.008150	4.90	600.04	366.81	0.42
	4106		3170.00	732.30	740.23		740.55	0.007479	4.94	781.16	635.74	0.41
	4106		3860.00	732.30	740.57		740.85	0.005613	4.49	1009.72	685.39	0.36
	4106		5130.00	732.30	741.03		741.33	0.004242	4.15	1337.63	750.91	0.32
	4205		510.00	732.50	737.47		737.54	0.001981	2.22	230.04	62.13	0.20
	4205		1210.00	732.50	739.29		739.47	0.003832	3.35	360.82	86.00	0.29
	4205		1790.00	732.50	740.00		740.26	0.005404	4.16	464.64	406.36	0.35
	4205		2570.00	732.50	740.61		740.82	0.004178	3.98	807.61	621.79	0.31
	4205		3170.00	732.50	740.87		741.09	0.003977	4.02	976.25	657.38	0.31
	4205		3860.00	732.50	741.08		741.33	0.004132	4.20	1115.45	681.17	0.31
	4205		5130.00	732.50	741.45		741.74	0.004011	4.32	1375.57	711.85	0.31
	4470		510.00	733.10	737.97	735.10	738.04	0.001772	2.11	241.71	64.86	0.19
	4470		1210.00	733.10	740.08	736.25	740.21	0.002129	3.01	450.86	257.49	0.22
	4470		1790.00	733.10	740.94	737.00	741.06	0.001873	3.10	793.10	547.77	0.22
	4470		2570.00	733.10	741.42	737.88	741.54	0.001927	3.30	1062.56	572.77	0.22
	4470		3170.00	733.10	741.69	738.59	741.82	0.002027	3.48	1217.33	586.64	0.23
	4470		3860.00	733.10	741.94	739.40	742.09	0.002146	3.66	1370.52	600.06	0.24
	4470		5130.00	733.10	742.35	741.20	742.52	0.002323	3.95	1623.75	714.00	0.25
	4700		510.00	734.50	738.36	736.63	738.47	0.001874	2.76	184.88	68.02	0.29
	4700		1210.00	734.50	740.47	737.69	740.66	0.001646	3.47	361.79	144.61	0.30
	4700		1790.00	734.50	741.28	738.42	741.52	0.001830	4.11	532.84	337.45	0.32
	4700		2570.00	734.50	741.76	739.23	742.10	0.002336	4.93	742.77	495.17	0.37
	4700		3170.00	734.50	742.05	739.80	742.43	0.002617	5.40	893.72	554.90	0.39
	4700		3860.00	734.50	742.34	740.69	742.74	0.002831	5.80	1054.98	598.41	0.41
	4700		5130.00	734.50	742.78	742.11	743.23	0.003119	6.38	1322.91	666.54	0.44
	4943		510.00	735.30	738.82	737.11	738.95	0.001992	2.89	176.19	62.68	0.30
	4943		1210.00	735.30	740.91	738.21	741.13	0.002203	3.76	322.16	83.01	0.34
	4943		1790.00	735.30	741.78	738.95	742.09	0.002874	4.46	401.12	97.44	0.39
	4943		2570.00	735.30	742.38	739.79	742.86	0.003856	5.54	481.37	208.65	0.46
	4943		3170.00	735.30	742.73	740.45	743.26	0.004123	6.02	682.04	670.81	0.48
	4943		3860.00	735.30	743.07	741.13	743.59	0.003993	6.19	927.03	768.16	0.48
	4943		5130.00	735.30	743.60	743.19	744.05	0.003582	6.25	1355.74	890.84	0.46
	5068		510.00	735.50	739.06	737.17	739.17	0.001606	2.71	188.35	62.70	0.28
	5068		1210.00	735.50	741.16	738.25	741.37	0.001701	3.68	328.56	71.22	0.30
	5068		1790.00	735.50	742.09	738.97	742.40	0.002138	4.51	396.85	95.14	0.35
	5068		2570.00	735.50	742.78	739.81	743.28	0.002866	5.67	470.60	151.66	0.41
	5068		3170.00	735.50	743.13	740.40	743.78	0.003500	6.51	530.39	351.53	0.46
	5068		3860.00	735.50	743.43	741.03	744.20	0.004117	7.28	702.05	763.61	0.50
	5068		5130.00	735.50	743.95	742.02	744.70	0.004153	7.69	1138.80	946.17	0.51
	5227		510.00	736.39	739.33	737.84	739.51	0.002527	3.40	149.79	58.34	0.35
	5227		1210.00	736.39	741.38	738.98	741.73	0.002429	4.75	254.55	74.90	0.37
	5227		1790.00	736.39	742.33	739.75	742.87	0.002981	5.91	302.77	109.99	0.43
	5227		2570.00	736.39	743.05	740.67	743.94	0.004188	7.57	339.70	249.20	0.52
	5227		3170.00	736.39	743.41	741.32	744.63	0.005345	8.85	358.08	533.97	0.59
	5227		3860.00	736.39	743.63	742.00	745.33	0.007150	10.45	369.30	612.43	0.68
	5227		5130.00	736.39	743.35	743.19	746.59	0.014396	14.45	355.08	512.97	0.96
	5256.5		Culvert									
	5290		510.00	736.71	739.47	738.17	739.67	0.003158	3.65	139.78	57.36	0.39
	5290		1210.00	736.71	741.64	739.31	742.01	0.002555	4.84	250.15	104.49	0.38
	5290		1790.00	736.71	742.75	740.08	743.28	0.002850	5.85	306.20	205.25	0.42
	5290		2570.00	736.71	743.81	741.00	744.60	0.003431	7.14	359.82	598.95	0.47
	5290		3170.00	736.71	744.53	741.66	745.53	0.003772	7.99	396.64	828.44	0.50
	5290		3860.00	736.71	744.66	742.34	746.09	0.005295	9.57	403.21	844.59	0.60
	5290		5130.00	736.71	743.53	743.53	746.95	0.015574	14.83	346.00	504.90	1.00
	5455		510.00	737.70	740.17		740.51	0.008161	4.68	109.05	54.91	0.58
	5455		1210.00	737.70	742.17		742.60	0.004918	5.26	229.89	65.67	0.50

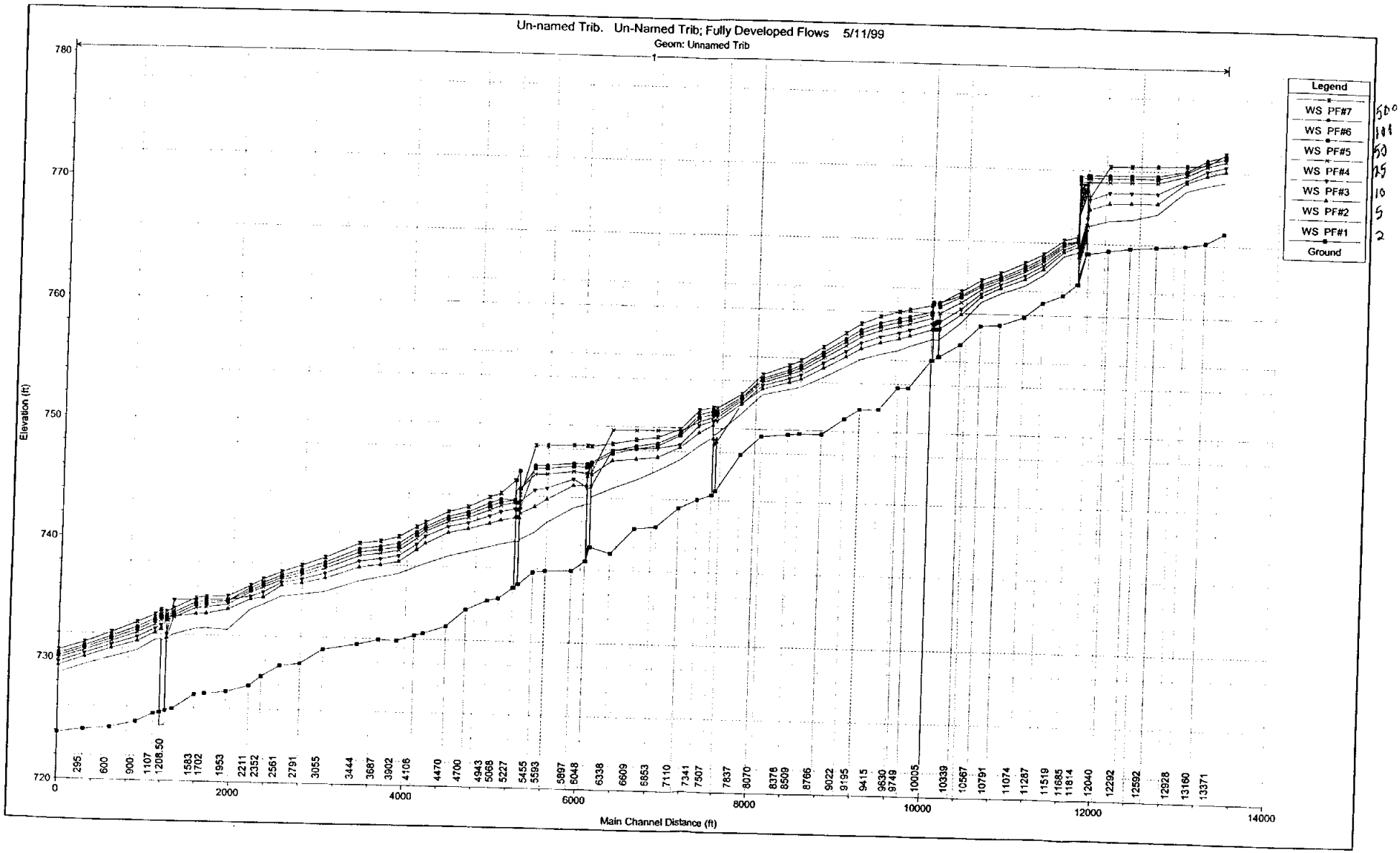
Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
	5455	1790.00	737.70	743.34		743.86	0.004414	5.78	311.40	139.54	0.49
	5455	2570.00	737.70	744.84		744.97	0.001266	3.68	1245.90	949.62	0.27
	5455	3170.00	737.70	745.73		745.79	0.000528	2.62	2106.85	964.20	0.18
	5455	3860.00	737.70	746.33		746.37	0.000398	2.41	2711.24	1088.16	0.16
	5455	5130.00	737.70	747.37		747.40	0.000250	2.09	3877.63	1149.16	0.13
	5593	510.00	737.85	741.14		741.39	0.005098	4.07	125.38	54.24	0.47
	5593	1210.00	737.85	742.86		743.30	0.005201	5.29	228.90	67.62	0.51
	5593	1790.00	737.85	744.03		744.47	0.004461	5.45	369.31	288.12	0.48
	5593	2570.00	737.85	744.95		745.19	0.002416	4.61	887.10	823.02	0.37
	5593	3170.00	737.85	745.77		745.87	0.001047	3.37	1606.27	930.77	0.25
	5593	3860.00	737.85	746.35		746.43	0.000731	3.00	2179.42	1050.19	0.21
	5593	5130.00	737.85	747.39		747.43	0.000431	2.55	3338.48	1221.87	0.17
	5897	510.00	737.90	742.28		742.46	0.002532	3.42	149.15	49.25	0.35
	5897	1210.00	737.90	744.15		744.51	0.003152	4.84	255.36	130.03	0.41
	5897	1790.00	737.90	745.12		745.33	0.001891	4.28	748.46	739.41	0.33
	5897	2570.00	737.90	745.62		745.79	0.001652	4.25	1137.81	809.14	0.31
	5897	3170.00	737.90	746.09		746.21	0.001234	3.87	1534.54	875.44	0.27
	5897	3860.00	737.90	746.58		746.67	0.000933	3.54	1984.53	980.87	0.24
	5897	5130.00	737.90	747.52		747.58	0.000536	2.92	2927.93	1021.83	0.19
	6048	510.00	738.71	742.60	740.55	742.80	0.001991	3.64	139.99	46.36	0.33
	6048	1210.00	738.71	744.50	741.97	745.02	0.002970	5.80	208.50	121.98	0.42
	6048	1790.00	738.71	745.02	742.95	745.98	0.004889	7.88	227.08	250.96	0.55
	6048	2570.00	738.71	744.73	744.10	746.91	0.011804	11.87	216.57	210.29	0.85
	6048	3170.00	738.71	745.94	744.91	746.72	0.004621	8.39	689.72	464.26	0.55
	6048	3860.00	738.71	746.53	746.30	747.02	0.003236	7.40	1081.58	791.06	0.47
	6048	5130.00	738.71	747.55	746.74	747.72	0.001304	5.10	2034.15	975.19	0.30
	6075	Culvert									
	6102	510.00	739.90	743.05	741.72	743.35	0.002367	4.44	114.93	43.87	0.44
	6102	1210.00	739.90	745.41	743.13	745.98	0.002058	6.01	201.28	326.46	0.45
	6102	1790.00	739.90	745.71	744.10	746.82	0.003784	8.44	212.08	431.29	0.62
	6102	2570.00	739.90	745.26	745.26	747.94	0.010235	13.15	195.48	273.19	1.00
	6102	3170.00	739.90	746.05	746.05	749.15	0.009846	14.13	224.29	581.29	1.00
	6102	3860.00	739.90	746.83	746.83	747.37	0.002683	7.99	1242.32	999.57	0.54
	6102	5130.00	739.90	747.36	747.10	747.77	0.002268	7.72	1806.54	1113.24	0.50
	6338	510.00	739.40	743.79	742.05	743.98	0.002895	3.51	145.41	51.44	0.37
	6338	1210.00	739.40	746.25	743.50	746.35	0.000979	2.87	603.16	362.25	0.23
	6338	1790.00	739.40	747.16	744.87	747.23	0.000660	2.65	937.59	489.49	0.20
	6338	2570.00	739.40	748.39	745.69	748.43	0.000332	2.15	1687.27	1034.35	0.14
	6338	3170.00	739.40	749.53	746.17	749.55	0.000123	1.45	3295.09	1344.73	0.09
	6338	3860.00	739.40	747.70	746.42	747.90	0.001673	4.49	1209.52	819.32	0.32
	6339	5130.00	739.40	748.04	746.72	748.29	0.001989	5.07	1435.75	969.86	0.35
	6600	510.00	741.50	744.71	743.51	744.96	0.004401	3.98	128.21	51.27	0.44
	6600	1210.00	741.50	746.57	745.21	746.71	0.001769	3.41	448.72	503.78	0.30
	6600	1790.00	741.50	747.36	745.86	747.43	0.000815	2.61	939.39	691.02	0.21
	6600	2570.00	741.50	748.48	746.68	748.52	0.000295	1.81	1790.51	867.76	0.13
	6600	3170.00	741.50	749.56	746.86	749.59	0.000136	1.38	2703.32	1053.98	0.09
	6600	3860.00	741.50	748.15	747.04	748.26	0.001049	3.29	1527.87	827.84	0.25
	6600	5130.00	741.50	748.55	747.30	748.69	0.001073	3.48	1847.87	876.38	0.25
	6855	510.00	741.70	745.67	744.14	745.85	0.003051	3.44	148.40	56.49	0.37
	6855	1210.00	741.70	747.03	745.42	747.36	0.003590	4.83	303.52	285.98	0.43
	6855	1790.00	741.70	747.56	746.43	747.84	0.003134	4.91	529.04	491.45	0.41
	6855	2570.00	741.70	748.55	747.58	748.66	0.001119	3.36	1088.98	614.24	0.26
	6855	3170.00	741.70	749.60	747.79	749.65	0.000448	2.39	1853.08	833.40	0.17
	6855	3860.00	741.70	748.43	747.96	748.72	0.003067	5.48	1014.20	602.44	0.42
	6855	5130.00	741.70	748.84	748.28	749.15	0.002940	5.64	1265.88	641.27	0.42
	7210	510.00	743.30	746.57	745.41	746.80	0.004415	3.90	130.76	54.39	0.44
	7210	1210.00	743.30	748.02	748.64	748.37	0.004181	4.79	255.05	123.46	0.46
	7210	1790.00	743.30	748.43	747.76	748.92	0.005168	5.75	320.05	178.03	0.52
	7210	2570.00	743.30	748.69	748.50	749.46	0.007424	7.20	368.20	198.20	0.63
	7210	3170.00	743.30	749.62	749.11	749.99	0.003131	5.36	677.09	441.69	0.42
	7210	3860.00	743.30	749.35	749.35	750.11	0.006818	7.62	567.81	387.44	0.62
	7210	5130.00	743.30	749.72	749.72	750.57	0.007092	8.17	722.10	450.62	0.64
	7574	510.00	744.02	747.80	747.02	748.20	0.008113	5.06	100.79	44.63	0.59
	7574	1210.00	744.02	749.11	749.09	749.70	0.007552	6.53	229.22	227.22	0.62

Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Crit W.S.	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
	7511	1790.00	744.02	749.71	749.63	750.12	0.005332	6.10	426.35	424.19	0.53
	7511	2570.00	744.02	750.31	749.99	750.55	0.003133	5.12	756.77	690.06	0.42
	7511	3170.00	744.02	750.46	750.20	750.73	0.003479	5.51	855.25	713.06	0.44
	7511	3860.00	744.02	750.83	750.31	751.05	0.002551	4.95	1107.96	776.71	0.38
	7511	5130.00	744.02	751.26	750.56	751.48	0.002323	4.98	1457.38	968.48	0.37
	7507	510.00	744.42	748.42	746.28	748.62	0.001143	3.62	141.01	177.48	0.32
	7507	1210.00	744.42	749.90	747.73	750.00	0.000639	2.98	609.88	370.09	0.24
	7507	1790.00	744.42	750.30	748.97	750.41	0.000766	3.44	838.19	694.64	0.26
	7507	2570.00	744.42	750.68	749.42	750.80	0.000842	3.77	1093.97	747.31	0.28
	7507	3170.00	744.42	750.87	749.69	751.01	0.000943	4.08	1231.29	774.49	0.30
	7507	3860.00	744.42	751.14	750.25	751.28	0.000937	4.19	1429.52	812.52	0.30
	7507	5130.00	744.42	751.54	750.52	751.71	0.000961	4.43	1739.25	867.64	0.31
	7536.5	Culvert									
	7554	510.00	744.78	748.60	746.63	748.82	0.000240	3.76	135.75	201.65	0.34
	7554	1210.00	744.78	750.01	748.07	750.07	0.000073	2.56	814.11	497.12	0.20
	7554	1790.00	744.78	750.36	749.10	750.44	0.000113	3.32	1006.81	655.10	0.25
	7554	2570.00	744.78	750.69	749.11	750.82	0.000164	4.15	1238.11	762.83	0.30
	7554	3170.00	744.78	750.86	749.11	751.02	0.000207	4.75	1362.93	781.09	0.34
	7554	3860.00	744.78	751.12	749.36	751.29	0.000234	5.19	1553.61	807.31	0.36
	7554	5130.00	744.78	751.49	749.99	751.71	0.000285	5.95	1840.49	845.72	0.40
	7837	440.00	747.85	750.86	750.86	751.26	0.035051	5.70	120.59	185.12	0.69
	7837	1040.00	747.85	751.52	751.52	751.94	0.034990	6.81	276.76	308.31	0.72
	7837	1540.00	747.85	751.79	751.79	752.29	0.040164	7.77	361.85	349.68	0.78
	7837	2200.00	747.85	752.12	752.12	752.66	0.040884	8.39	476.49	402.50	0.80
	7837	2710.00	747.85	752.32	752.32	752.88	0.041100	8.74	553.03	428.12	0.81
	7837	3290.00	747.85	752.48	752.48	753.12	0.044003	9.31	617.14	441.87	0.85
	7837	4350.00	747.85	752.75	752.75	753.51	0.046995	10.09	729.28	465.18	0.89
	8070	430.00	749.40	752.53	751.05	752.56	0.002058	1.31	336.98	388.15	0.17
	8070	1010.00	749.40	753.13	751.73	753.18	0.001891	1.50	622.92	680.82	0.17
	8070	1490.00	749.40	753.39	752.24	753.47	0.001742	1.54	784.64	716.53	0.16
	8070	2110.00	749.40	753.67	752.59	753.79	0.001653	1.60	961.87	755.80	0.16
	8070	2590.00	749.40	753.85	752.88	754.01	0.001621	1.64	1083.84	778.85	0.16
	8070	3130.00	749.40	754.05	753.00	754.24	0.001576	1.68	1214.97	799.95	0.16
	8070	4100.00	749.40	754.37	753.11	754.61	0.001515	1.75	1432.82	897.43	0.16
	8378	430.00	749.60	753.01	751.41	753.02	0.001170	1.17	485.05	500.82	0.13
	8378	1010.00	749.60	753.66	752.54	753.69	0.001502	1.55	809.11	574.24	0.15
	8378	1490.00	749.60	753.98	752.72	754.03	0.001873	1.84	981.65	609.20	0.17
	8378	2110.00	749.60	754.32	752.91	754.38	0.002241	2.14	1171.94	656.72	0.19
	8378	2590.00	749.60	754.55	753.05	754.62	0.002479	2.34	1302.00	691.27	0.21
	8378	3130.00	749.60	754.78	753.18	754.87	0.002709	2.54	1436.84	727.74	0.22
	8378	4100.00	749.60	755.15	753.41	755.26	0.003045	2.85	1658.29	785.17	0.23
	8509	430.00	749.70	753.19	751.44	753.24	0.002575	1.97	327.42	317.17	0.20
	8509	1010.00	749.70	753.90	752.84	753.97	0.003545	2.66	588.59	464.00	0.24
	8509	1490.00	749.70	754.27	753.21	754.35	0.003960	2.99	761.03	538.74	0.26
	8509	2110.00	749.70	754.65	753.51	754.75	0.004240	3.28	953.32	585.06	0.27
	8509	2590.00	749.70	754.90	753.71	755.01	0.004370	3.45	1085.75	607.38	0.28
	8509	3130.00	749.70	755.15	753.91	755.28	0.004493	3.62	1221.88	633.26	0.28
	8509	4100.00	749.70	755.56	754.20	755.71	0.004686	3.89	1443.35	712.40	0.29
	8766	430.00	749.70	753.97	752.73	754.02	0.003835	2.02	257.06	287.18	0.23
	8766	1010.00	749.70	754.81	753.52	754.87	0.003619	2.39	580.59	458.99	0.23
	8766	1490.00	749.70	755.23	754.00	755.31	0.003694	2.62	762.88	482.95	0.24
	8766	2110.00	749.70	755.67	754.43	755.77	0.003888	2.90	955.68	507.31	0.25
	8766	2590.00	749.70	755.96	754.60	756.07	0.004036	3.09	1086.69	552.47	0.26
	8766	3130.00	749.70	756.26	754.72	756.39	0.004398	3.37	1238.58	666.33	0.28
	8766	4100.00	749.70	756.71	755.01	756.87	0.004574	3.66	1489.30	743.92	0.29
	9022	430.00	751.00	754.91	753.47	754.96	0.003484	1.89	263.10	223.85	0.22
	9022	1010.00	751.00	755.75	754.53	755.84	0.003883	2.46	479.64	310.86	0.25
	9022	1490.00	751.00	756.21	754.90	756.33	0.004168	2.79	631.13	374.73	0.26
	9022	2110.00	751.00	756.70	755.20	756.84	0.004419	3.13	804.80	425.79	0.27
	9022	2590.00	751.00	757.02	755.44	757.20	0.004618	3.37	933.54	529.33	0.28
	9022	3130.00	751.00	757.39	755.67	757.58	0.004671	3.57	1093.96	671.69	0.29
	9022	4100.00	751.00	757.89	756.10	758.11	0.004978	3.94	1345.19	865.55	0.30
	9185	430.00	751.80	755.54	754.59	755.59	0.003411	2.22	273.07	236.84	0.23
	9185	1010.00	751.80	756.44	755.23	756.53	0.003612	2.72	538.54	411.63	0.24

	9195	1490.00	751.80	756.94	755.58	757.04	0.003606	2.95	747.40	478.24	0.25
	9195	2110.00	751.80	757.44	755.90	757.56	0.003603	3.17	981.53	518.10	0.25
	9195	2590.00	751.80	757.79	756.02	757.92	0.003575	3.31	1151.47	659.26	0.25
	9195	3130.00	751.80	758.16	756.43	758.29	0.003503	3.42	1335.53	787.32	0.26
	9195	4100.00	751.80	758.69	756.88	758.85	0.003518	3.65	1613.28	857.22	0.26
	9415	380.00	751.85	755.97	754.56	755.99	0.001066	1.33	336.96	323.19	0.13
	9415	870.00	751.85	756.93	755.12	756.97	0.001140	1.63	676.98	378.47	0.14
	9415	1280.00	751.85	757.45	755.38	757.50	0.001261	1.85	880.98	413.96	0.15
	9415	1810.00	751.85	757.99	755.75	758.05	0.001396	2.09	1104.71	455.87	0.16
	9415	2210.00	751.85	758.35	756.05	758.43	0.001472	2.25	1265.20	582.66	0.17
	9415	2670.00	751.85	758.72	756.27	758.81	0.001543	2.40	1432.16	644.77	0.17
	9415	3490.00	751.85	759.28	756.63	759.38	0.001675	2.65	1691.80	738.74	0.18
	9630	380.00	753.70	756.35	755.24	756.39	0.003785	1.81	271.16	340.01	0.23
	9630	870.00	753.70	757.27	756.18	757.31	0.002386	1.85	600.79	387.29	0.19
	9630	1280.00	753.70	757.80	756.42	757.85	0.002213	1.99	822.44	446.09	0.19
	9630	1810.00	753.70	758.36	756.64	758.41	0.002041	2.11	1073.53	493.33	0.19
	9630	2210.00	753.70	758.73	756.78	758.79	0.001942	2.19	1244.88	511.11	0.18
	9630	2670.00	753.70	759.11	756.95	759.17	0.001887	2.28	1421.53	529.24	0.18
	9630	3490.00	753.70	759.69	757.16	759.76	0.001866	2.45	1696.42	794.50	0.19
	9745	380.00	753.70	756.77	755.88	756.83	0.004394	2.26	216.32	220.04	0.25
	9745	870.00	753.70	757.55	756.58	757.63	0.004207	2.64	454.72	365.22	0.26
	9745	1280.00	753.70	758.05	756.88	758.13	0.003683	2.72	646.68	420.33	0.25
	9745	1810.00	753.70	758.58	757.28	758.66	0.003391	2.84	867.79	454.11	0.24
	9745	2210.00	753.70	758.93	757.46	759.02	0.003132	2.88	1021.30	470.02	0.23
	9745	2670.00	753.70	759.30	757.63	759.40	0.002948	2.94	1184.70	513.61	0.23
	9745	3490.00	753.70	759.87	757.93	759.98	0.002779	3.06	1447.78	693.47	0.23
	10005	380.00	756.03	757.35	756.55	757.39	0.001702	1.64	231.47	229.19	0.25
	10005	870.00	756.03	758.13	756.94	758.22	0.001899	2.36	368.15	532.33	0.29
	10005	1280.00	756.03	758.62	757.21	758.75	0.002051	2.82	453.56	562.60	0.31
	10005	1810.00	756.03	759.14	757.52	759.31	0.002228	3.32	544.67	594.89	0.33
	10005	2210.00	756.03	759.48	757.73	759.68	0.002367	3.67	602.94	672.74	0.35
	10005	2670.00	756.03	759.82	757.96	760.07	0.002511	4.02	663.53	806.51	0.36
	10005	3490.00	756.03	760.27	758.33	760.36	0.001049	2.80	1715.46	933.02	0.24
	10050	Culvert									
	10090	380.00	756.37	757.40	756.90	757.47	0.003960	2.12	179.28	188.10	0.37
	10090	870.00	756.37	758.21	757.29	758.32	0.002996	2.71	320.89	219.35	0.35
	10090	1280.00	756.37	758.72	757.55	758.87	0.002847	3.12	410.79	230.16	0.36
	10090	1810.00	756.37	759.32	757.86	759.51	0.002679	3.51	515.03	242.69	0.36
	10090	2210.00	756.37	759.82	758.07	760.03	0.002370	3.67	602.32	424.68	0.35
	10090	2670.00	756.37	760.41	758.30	760.63	0.002043	3.79	705.40	710.85	0.33
	10090	3490.00	756.37	760.80	758.68	761.01	0.001874	3.85	1011.70	811.47	0.32
	10330	380.00	757.40	758.95		759.01	0.012194	2.11	193.14	241.24	0.36
	10330	870.00	757.40	759.50		759.61	0.012436	2.83	353.99	340.18	0.39
	10330	1280.00	757.40	759.91		760.02	0.010021	2.96	497.89	355.41	0.37
	10330	1810.00	757.40	760.40		760.52	0.007881	3.04	675.17	364.84	0.34
	10330	2210.00	757.40	760.78		760.90	0.006553	3.04	814.52	372.22	0.32
	10330	2670.00	757.40	761.25		761.36	0.005202	3.00	989.77	381.29	0.29
	10330	3490.00	757.40	761.59		761.74	0.006030	3.44	1120.42	387.91	0.32
	10560	330.00	759.00	760.67		760.69	0.004801	1.43	268.17	437.32	0.23
	10560	760.00	759.00	761.15		761.19	0.004231	1.69	526.63	601.84	0.23
	10560	1090.00	759.00	761.41		761.45	0.004146	1.84	685.04	653.22	0.23
	10560	1530.00	759.00	761.71		761.76	0.003891	1.96	889.55	714.10	0.23
	10560	1860.00	759.00	761.93		761.98	0.003556	2.00	1053.96	759.52	0.23
	10560	2220.00	759.00	762.19		762.25	0.002962	1.96	1259.10	785.45	0.21
	10560	2940.00	759.00	762.57		762.63	0.002677	2.03	1559.59	807.81	0.20
	10790	330.00	759.10	761.38	760.68	761.41	0.002389	1.90	248.61	281.27	0.25
	10790	760.00	759.10	761.91	761.10	761.97	0.002928	2.47	437.11	467.04	0.29
	10790	1090.00	759.10	762.18	761.33	762.24	0.003131	2.75	571.52	799.31	0.31
	10790	1530.00	759.10	762.47	761.62	762.54	0.003306	3.04	723.04	824.29	0.32
	10790	1860.00	759.10	762.66	761.79	762.75	0.003380	3.21	826.29	840.94	0.33
	10790	2220.00	759.10	762.85	761.91	762.95	0.003431	3.38	932.21	857.72	0.34
	10790	2940.00	759.10	763.19	762.13	763.31	0.003526	3.67	1124.04	887.41	0.35
	11070	330.00	759.80	762.06	761.10	762.10	0.002448	1.70	255.34	352.95	0.25
	11070	760.00	759.80	762.66	761.87	762.71	0.002345	2.08	506.67	455.56	0.26

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
	1074	1090.00	759.80	762.96	762.06	763.02	0.002411	2.31	646.59	470.68	0.27
	1074	1530.00	759.80	763.29	762.30	763.36	0.002521	2.57	803.94	487.12	0.28
	1074	1860.00	759.80	763.50	762.47	763.58	0.002596	2.74	909.26	497.83	0.29
	1074	2220.00	759.80	763.72	762.59	763.80	0.002669	2.91	1015.88	517.50	0.29
	1074	2940.00	759.80	764.09	762.79	764.19	0.002749	3.18	1267.71	834.66	0.30
	1287	330.00	761.00	763.02		763.25	0.016812	3.79	87.32	91.15	0.63
	1287	760.00	761.00	763.56		763.79	0.015174	4.40	259.53	489.95	0.63
	1287	1090.00	761.00	763.83		764.02	0.011171	4.18	396.66	503.09	0.55
	1287	1530.00	761.00	764.14		764.30	0.008855	4.12	552.76	536.30	0.50
	1287	1860.00	761.00	764.34		764.50	0.007847	4.13	664.21	573.71	0.48
	1287	2220.00	761.00	764.54		764.70	0.007081	4.15	783.02	611.07	0.46
	1287	2940.00	761.00	764.89		765.05	0.006168	4.23	1008.66	676.38	0.44
	1516	330.00	761.65	764.56	763.30	764.64	0.002939	2.47	164.70	427.90	0.29
	1516	760.00	761.65	765.05	764.69	765.13	0.002953	2.83	402.86	510.62	0.30
	1516	1090.00	761.65	765.24	764.84	765.34	0.003419	3.19	506.31	529.20	0.33
	1516	1530.00	761.65	765.47	765.01	765.59	0.003781	3.53	629.20	550.44	0.35
	1516	1860.00	761.65	765.62	765.12	765.75	0.003958	3.73	713.80	624.76	0.36
	1516	2220.00	761.65	765.78	765.22	765.92	0.004069	3.90	802.95	677.11	0.37
	1516	2940.00	761.65	766.06	765.41	766.22	0.004138	4.14	1014.98	719.64	0.38
	1685	260.00	762.59	764.85	763.39	764.90	0.000806	1.81	143.29	81.04	0.21
	1685	630.00	762.59	765.42	764.04	765.61	0.002218	3.50	179.90	85.51	0.37
	1685	920.00	762.59	765.69	764.45	766.03	0.003507	4.67	196.79	87.58	0.47
	1685	1260.00	762.59	765.94	764.88	766.48	0.005071	5.92	212.76	89.53	0.57
	1685	1520.00	762.59	766.07	765.19	766.81	0.006471	6.87	221.32	524.24	0.65
	1685	1820.00	762.59	766.17	765.52	767.16	0.008481	8.00	227.36	529.65	0.75
	1685	2420.00	762.59	766.14	766.14	767.93	0.015384	10.73	225.62	528.09	1.00
	1742	Culvert									
	1814	260.00	765.15	766.69	766.09	766.87	0.004635	3.38	76.98	83.18	0.48
	1814	630.00	765.15	767.93	766.85	768.25	0.003808	4.54	138.87	254.85	0.48
	1814	920.00	765.15	768.73	767.34	769.14	0.003500	5.15	178.75	344.83	0.48
	1814	1260.00	765.15	769.57	767.85	770.08	0.003264	5.72	220.45	589.60	0.48
	1814	1520.00	765.15	770.16	768.21	770.73	0.003131	6.08	249.82	772.65	0.48
	1814	1820.00	765.15	771.27	768.60	771.29	0.000127	1.37	2225.76	903.86	0.10
	1814	2420.00	765.15	771.73	769.32	771.74	0.000144	1.53	2649.33	957.46	0.11
	1204	260.00	765.43	767.19		767.20	0.000704	1.27	299.51	411.23	0.19
	1204	630.00	765.43	768.38		768.39	0.000180	0.96	902.96	599.10	0.10
	1204	920.00	765.43	769.24		769.24	0.000092	0.82	1443.89	662.65	0.08
	1204	1260.00	765.43	770.16		770.17	0.000057	0.76	2086.76	730.59	0.06
	1204	1520.00	765.43	770.81		770.82	0.000044	0.73	2581.15	777.39	0.06
	1204	1820.00	765.43	771.30		771.30	0.000042	0.76	2962.65	811.66	0.06
	1204	2420.00	765.43	771.75		771.76	0.000053	0.89	3342.35	844.39	0.06
	1292	260.00	765.64	767.41		767.44	0.001310	1.51	232.49	309.43	0.24
	1292	630.00	765.64	768.45		768.46	0.000568	1.34	618.30	431.85	0.17
	1292	920.00	765.64	769.27		769.28	0.000280	1.17	1043.30	573.44	0.13
	1292	1260.00	765.64	770.18		770.19	0.000156	1.07	1600.65	676.87	0.10
	1292	1520.00	765.64	770.83		770.84	0.000111	1.01	2067.61	738.68	0.09
	1292	1820.00	765.64	771.31		771.32	0.000099	1.03	2428.39	766.95	0.08
	1292	2420.00	765.64	771.77		771.78	0.000117	1.19	2788.41	794.15	0.09
	1592	260.00	765.77	768.02	767.63	768.40	0.010691	4.94	52.67	61.53	0.71
	1592	630.00	765.77	768.83	768.83	769.44	0.022269	6.26	100.59	421.60	1.00
	1592	920.00	765.77	769.33	769.33	769.82	0.012705	5.86	177.57	580.65	0.80
	1592	1260.00	765.77	770.15	769.57	770.39	0.004097	4.30	343.27	708.38	0.48
	1592	1520.00	765.77	770.81	769.75	770.97	0.002083	3.59	503.04	767.92	0.36
	1592	1820.00	765.77	771.29	769.92	771.43	0.001580	3.44	634.42	811.07	0.32
	1592	2420.00	765.77	771.75	770.23	771.92	0.001636	3.79	771.51	852.09	0.33
	2328	260.00	765.91	769.47	767.74	769.58	0.001676	2.73	95.29	70.86	0.31
	2328	630.00	765.91	770.76	768.93	770.92	0.001743	3.53	230.64	544.01	0.33
	2328	920.00	765.91	771.10	769.61	771.31	0.002194	4.21	292.00	596.78	0.38
	2328	1260.00	765.91	771.29	770.74	771.61	0.003094	5.16	329.49	627.02	0.45
	2328	1520.00	765.91	771.54	770.95	771.88	0.003168	5.43	380.70	666.29	0.46
	2328	1820.00	765.91	771.87	771.17	772.20	0.002972	5.52	451.14	717.06	0.45
	2328	2420.00	765.91	772.22	771.54	772.28	0.000782	2.98	1532.91	772.07	0.23
	3160	260.00	766.20	769.95	768.81	770.05	0.002300	2.76	132.87	310.44	0.35
	3160	630.00	766.20	771.22	770.03	771.30	0.001289	2.87	370.27	586.99	0.28

	920.00	766.20	771.67	770.37	771.78	0.001474	3.35	475.44	651.78	0.31
	1260.00	766.20	772.07	770.66	772.20	0.001703	3.85	576.58	704.84	0.34
	1520.00	766.20	772.35	770.89	772.50	0.001797	4.14	655.42	729.98	0.35
	1820.00	766.20	772.66	771.11	772.82	0.001865	4.42	745.39	756.93	0.36
	2420.00	766.20	772.36	771.47	772.74	0.004501	6.57	658.53	730.94	0.55
	260.00	767.00	770.44	769.28	770.58	0.002750	3.16	104.89	228.51	0.38
	630.00	767.00	771.54	770.56	771.70	0.002917	3.75	258.64	396.93	0.41
	920.00	767.00	772.03	771.07	772.22	0.003164	4.16	368.05	502.24	0.43
	1260.00	767.00	772.46	771.49	772.66	0.003006	4.45	486.56	557.81	0.43
	1520.00	767.00	772.76	771.61	772.96	0.002880	4.61	576.65	596.14	0.43
	1820.00	767.00	773.07	772.01	773.28	0.002756	4.76	678.82	636.35	0.42
	2420.00	767.00	773.27	772.37	773.56	0.003855	5.82	745.59	660.87	0.51



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Unnamed Trib. - Fully Dev. -

HEC-RAS Plan: Adjusted River: Unnamed Trib Reach: 1

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl	
	0000	880.00	723.80	728.65	727.26	728.71	0.002372	2.75	737.88	972.49	0.25	2
	0000	1900.00	723.80	729.28	728.58	729.33	0.002374	2.95	1501.53	1467.18	0.26	5
	0000	2660.00	723.80	729.58	728.77	729.63	0.002371	3.04	1973.57	1679.88	0.26	10
	0000	3620.00	723.80	729.88	728.98	729.93	0.002370	3.13	2514.73	1894.57	0.26	25
	0000	4410.00	723.80	730.08	729.09	730.13	0.002371	3.20	2901.86	1989.91	0.26	50
	0000	5320.00	723.80	730.27	729.26	730.32	0.002373	3.29	3280.64	2015.69	0.26	100
	0000	6900.00	723.80	730.56	729.41	730.62	0.002371	3.42	3872.05	2030.00	0.27	500
	295	880.00	724.10	729.39		729.47	0.002914	2.99	623.48	724.46	0.28	
	295	1900.00	724.10	730.05		730.12	0.003242	3.41	1258.80	1674.92	0.30	
	295	2660.00	724.10	730.32		730.38	0.002943	3.40	1723.86	1710.76	0.29	
	295	3620.00	724.10	730.59		730.65	0.002734	3.41	2191.83	1746.09	0.28	
	295	4410.00	724.10	730.78		730.84	0.002647	3.45	2523.25	1770.69	0.28	
	295	5320.00	724.10	730.97		731.03	0.002619	3.53	2857.33	1795.14	0.28	
	295	6900.00	724.10	731.26		731.33	0.002600	3.65	3383.14	1832.85	0.28	
	600	880.00	724.30	730.06		730.10	0.001507	2.27	767.55	625.83	0.20	
	600	1900.00	724.30	730.79		730.84	0.001725	2.72	1456.44	1209.20	0.22	
	600	2660.00	724.30	731.08		731.13	0.002020	3.06	1814.11	1283.35	0.24	
	600	3620.00	724.30	731.37		731.43	0.002334	3.42	2193.96	1357.68	0.26	
	600	4410.00	724.30	731.57		731.64	0.002546	3.66	2474.39	1410.04	0.28	
	600	5320.00	724.30	731.78		731.86	0.002745	3.90	2777.39	1464.51	0.29	
	600	6900.00	724.30	732.10		732.20	0.003017	4.25	3269.23	1604.17	0.31	
	900	880.00	724.80	730.67		730.79	0.003156	3.55	430.95	581.66	0.30	
	900	1900.00	724.80	731.41		731.51	0.002499	3.50	971.83	857.68	0.27	
	900	2660.00	724.80	731.76		731.86	0.002489	3.65	1291.02	969.56	0.27	
	900	3620.00	724.80	732.11		732.22	0.002533	3.83	1658.00	1155.07	0.28	
	900	4410.00	724.80	732.35		732.46	0.002537	3.94	1939.14	1208.93	0.28	
	900	5320.00	724.80	732.59		732.71	0.002540	4.04	2237.80	1263.62	0.28	
	900	6900.00	724.80	732.95		733.08	0.002556	4.21	2712.04	1345.92	0.29	
	1107	880.00	725.50	731.54		731.64	0.004955	2.80	420.38	487.70	0.34	
	1107	1900.00	725.50	732.16		732.28	0.005387	3.35	798.90	873.06	0.37	
	1107	2660.00	725.50	732.49		732.61	0.005021	3.50	1117.38	1042.54	0.37	
	1107	3620.00	725.50	732.82		732.95	0.004645	3.63	1480.26	1136.44	0.36	
	1107	4410.00	725.50	733.05		733.18	0.004564	3.76	1747.79	1258.45	0.36	
	1107	5320.00	725.50	733.27		733.41	0.004391	3.85	2040.74	1313.11	0.36	
	1107	6900.00	725.50	733.62		733.76	0.004170	3.99	2507.66	1395.81	0.35	
	1175	880.00	725.60	731.70	728.13	731.80	0.001012	2.53	347.70	205.48	0.23	
	1175	1900.00	725.60	732.44	729.54	732.59	0.001591	3.47	797.97	829.00	0.29	
	1175	2660.00	725.60	732.81	730.48	732.95	0.001596	3.66	1132.52	998.97	0.30	
	1175	3620.00	725.60	733.16	731.49	733.31	0.001596	3.84	1516.55	1157.60	0.30	
	1175	4410.00	725.60	733.41	732.65	733.55	0.001599	3.97	1810.42	1264.03	0.30	
	1175	5320.00	725.60	733.64	732.81	733.80	0.001617	4.11	2125.93	1375.38	0.31	
	1175	6900.00	725.60	734.00	733.09	734.16	0.001638	4.31	2646.42	1541.38	0.31	
	1200.60	Culvert										
	1232	880.00	725.75	732.10	728.19	732.16	0.000668	2.14	537.39	504.31	0.19	
	1232	1900.00	725.75	732.62	729.60	732.79	0.001607	3.60	875.95	790.93	0.30	
	1232	2660.00	725.75	732.95	730.53	733.16	0.002042	4.25	1157.78	917.45	0.34	
	1232	3620.00	725.75	733.25	732.36	733.50	0.002468	4.86	1455.36	1020.05	0.38	
	1232	4410.00	725.75	733.44	732.70	733.73	0.002855	5.35	1650.45	1082.04	0.41	
	1232	5320.00	725.75	733.63	733.07	733.95	0.003265	5.85	1856.27	1143.81	0.44	
	1232	6900.00	725.75	733.92	733.39	734.30	0.003806	6.54	2206.23	1241.81	0.48	
	1326	860.00	725.90	732.15		732.27	0.001981	2.96	420.48	477.83	0.30	
	1326	1850.00	725.90	732.75		732.98	0.003475	4.44	858.33	857.14	0.42	
	1326	2590.00	725.90	733.13		733.37	0.003560	4.81	1198.08	937.61	0.43	
	1326	3520.00	725.90	733.48		733.73	0.003641	5.29	1536.40	1011.39	0.45	
	1326	4280.00	725.90	733.71		733.98	0.004115	5.66	1770.48	1059.44	0.47	
	1326	5140.00	725.90	733.94		734.23	0.004364	6.03	2020.39	1148.10	0.49	
	1326	6640.00	725.90	734.30		734.60	0.004512	6.44	2478.08	1322.83	0.50	
	1583	860.00	727.10	732.50		732.55	0.000745	2.31	571.66	571.00	0.20	
	1583	1850.00	727.10	733.28		733.33	0.000786	2.66	1155.34	866.96	0.21	
	1583	2590.00	727.10	733.65		733.71	0.000808	2.82	1497.29	959.15	0.21	
	1583	3520.00	727.10	734.02		734.09	0.000853	3.03	1867.39	1103.92	0.22	
	1583	4280.00	727.10	734.27		734.35	0.000888	3.18	2155.19	1180.15	0.23	
	1583	5140.00	727.10	734.52		734.61	0.000921	3.33	2461.19	1241.22	0.23	
	1583	6640.00	727.10	734.89		734.99	0.000984	3.58	2939.73	1331.13	0.24	

HEC-RAS Plan: Adjusted River: Unnamed Trib Reach: 1 (Continued)

Reach	River Sta	Profile	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
	702		727.20	732.57	732.62	0.000594	1.89	501.79	545.62	0.17
	1702		727.20	733.33	733.40	0.000604	2.16	1006.16	815.85	0.18
	702		727.20	733.71	733.78	0.000651	2.37	1361.00	1045.05	0.19
	702		727.20	734.06	734.16	0.000714	2.60	1795.76	1312.39	0.20
	702		727.20	734.34	734.42	0.000740	2.73	2143.59	1386.38	0.20
	702		727.20	734.60	734.69	0.000765	2.86	2506.87	1430.23	0.21
	702		727.20	734.98	735.08	0.000812	3.08	3058.56	1471.05	0.22
	953		727.40	732.48	733.15	0.009086	6.55	131.27	42.12	0.65
	953		727.40	734.19	734.58	0.005267	5.97	674.13	1149.73	0.52
	953		727.40	734.46	734.79	0.005141	6.15	1004.02	1318.25	0.52
	953		727.40	734.62	735.01	0.006366	7.02	1227.04	1420.89	0.58
	953		727.40	734.75	735.16	0.006918	7.46	1420.12	1504.11	0.61
	953		727.40	734.82	735.32	0.008440	8.32	1532.77	1538.67	0.67
	953		727.40	735.15	735.54	0.007017	7.94	2046.20	1584.41	0.62
	221		727.90	734.18	734.49	0.003298	4.64	304.94	640.80	0.41
	221		727.90	735.14	735.30	0.002216	4.38	1141.18	1084.43	0.34
	221		727.90	735.38	735.57	0.002849	5.12	1414.96	1212.17	0.39
	221		727.90	735.68	735.88	0.003140	5.58	1801.94	1346.96	0.42
	221		727.90	735.87	736.09	0.003443	5.98	2074.60	1474.62	0.44
	221		727.90	736.10	736.31	0.003453	6.15	2427.72	1570.54	0.44
	221		727.90	736.29	736.54	0.004319	7.01	2716.40	1588.99	0.50
	2352		728.70	734.62	735.07	0.004609	5.53	214.80	291.02	0.48
	2352		728.70	735.35	735.89	0.006154	7.12	584.05	900.65	0.57
	2352		728.70	735.74	736.17	0.005546	7.12	1025.36	1217.54	0.55
	2352		728.70	736.12	736.43	0.004708	6.87	1518.82	1388.18	0.51
	2352		728.70	736.35	736.63	0.004379	6.81	1853.00	1415.30	0.50
	2352		728.70	736.58	736.84	0.004214	6.86	2181.67	1441.47	0.49
	2352		728.70	736.87	737.13	0.004464	7.28	2600.22	1474.13	0.51
	2561		729.60	735.36	735.40	0.000679	1.32	561.54	429.42	0.12
	2561		729.60	736.24	736.29	0.000836	1.62	1264.73	1069.90	0.14
	2561		729.60	736.54	736.60	0.001040	1.89	1595.78	1147.66	0.15
	2561		729.60	736.81	736.88	0.001294	2.19	1907.31	1180.81	0.17
	2561		729.60	737.01	737.09	0.001456	2.38	2145.89	1205.58	0.18
	2561		729.60	737.22	737.32	0.001600	2.57	2403.77	1231.80	0.19
	2561		729.60	737.54	737.66	0.001826	2.85	2804.61	1271.48	0.21
	2791		729.80	735.52	735.60	0.000923	1.71	428.84	153.58	0.14
	2791		729.80	736.46	736.57	0.001583	2.47	759.17	798.00	0.19
	2791		729.80	736.82	736.94	0.001939	2.86	1087.83	1005.79	0.21
	2791		729.80	737.16	737.29	0.002279	3.23	1444.30	1083.08	0.23
	2791		729.80	737.40	737.54	0.002456	3.44	1711.30	1123.55	0.24
	2791		729.80	737.65	737.79	0.002604	3.64	1995.36	1165.07	0.25
	2791		729.80	738.03	738.19	0.002814	3.93	2445.06	1227.20	0.27
	3055		731.00	735.79	735.95	0.001849	2.15	319.50	132.22	0.20
	3055		731.00	736.88	737.07	0.002168	2.74	568.01	362.60	0.22
	3055		731.00	737.33	737.53	0.002525	3.14	770.71	667.08	0.24
	3055		731.00	737.75	737.96	0.002821	3.50	1061.94	736.56	0.26
	3055		731.00	738.03	738.25	0.003006	3.73	1276.39	783.68	0.27
	3055		731.00	738.31	738.55	0.003175	3.95	1503.52	829.70	0.28
	3055		731.00	738.73	739.00	0.003416	4.29	1869.30	898.89	0.29
	3441		731.50	736.70	736.80	0.002652	2.79	356.62	236.20	0.24
	3441		731.50	737.82	737.96	0.002453	3.14	652.49	291.14	0.24
	3441		731.50	738.34	738.52	0.002626	3.45	851.80	422.87	0.25
	3441		731.50	738.82	739.06	0.002843	3.79	1066.01	461.19	0.27
	3441		731.50	739.15	739.43	0.003016	4.04	1222.85	489.18	0.28
	3441		731.50	739.48	739.80	0.003204	4.30	1388.01	520.84	0.29
	3441		731.50	739.97	740.36	0.003506	4.70	1653.66	568.08	0.30
	3887		731.90	737.05	737.13	0.000984	1.75	434.28	239.44	0.15
	3887		731.90	738.07	738.24	0.000877	1.90	694.48	273.62	0.14
	3887		731.90	738.58	738.82	0.000941	2.09	845.36	315.38	0.15
	3887		731.90	739.07	739.40	0.001061	2.34	1007.44	354.80	0.16
	3887		731.90	739.40	739.80	0.001146	2.51	1129.32	381.77	0.17
	3887		731.90	739.72	740.21	0.001253	2.71	1266.60	467.76	0.18
	3887		731.90	740.22	740.82	0.001393	2.99	1530.27	583.56	0.19
	3902		731.85	737.35	737.47	0.002851	2.75	283.79	73.45	0.25
	3902		731.85	738.37	738.58	0.003754	3.56	459.48	269.67	0.29

HEC-RAS Plan: Adjusted River: Unnamed Trib Reach: 1 (Continued)

Reach	River Sta										
	3902	2380.00	731.85	738.87		739.16	0.003063	3.44	603.81	310.84	0.27
	3902	3240.00	731.85	739.35		739.75	0.002616	3.37	762.58	350.58	0.25
	3902	3880.00	731.85	739.69		740.14	0.002308	3.30	935.96	567.45	0.24
	3902	4570.00	731.85	740.05		740.53	0.001948	3.15	1155.17	644.39	0.22
		5800.00	731.85	740.65		741.13	0.001448	2.89	1569.39	732.78	0.19
	4106	780.00	732.30	737.94							
	4106	1670.00	732.30	739.32		738.06	0.002928	2.75	284.04	75.54	0.25
	4106	2380.00	732.30	739.79		739.56	0.006302	3.95	435.88	205.81	0.36
	4106	3240.00	732.30	740.25		740.14	0.008188	4.84	562.23	336.75	0.42
	4106	3880.00	732.30	740.56		740.62	0.008321	5.22	794.50	638.74	0.43
	4106	4570.00	732.30	740.83		740.90	0.006652	4.88	1001.74	683.72	0.39
	4106	5800.00	732.30	741.23		741.17	0.005673	4.67	1187.49	721.65	0.37
						741.63	0.004587	4.43	1493.36	780.11	0.33
	4205	780.00	732.50	738.22							
	4205	1670.00	732.50	739.88		738.34	0.002771	2.80	278.08	67.70	0.24
	4205	2380.00	732.50	740.51		740.13	0.005227	4.03	424.30	295.88	0.34
	4205	3240.00	732.50	740.95		740.75	0.004681	4.16	747.81	603.26	0.33
	4205	3880.00	732.50	741.14		741.21	0.004242	4.19	1030.95	668.52	0.32
	4205	4570.00	732.50	741.35		741.44	0.004516	4.43	1162.23	694.53	0.33
	4205	5800.00	732.50	741.70		741.68	0.004621	4.59	1307.86	722.28	0.33
						742.08	0.004589	4.75	1568.39	769.44	0.34
	4470	780.00	733.10	738.87							
	4470	1670.00	733.10	740.83		738.97	0.002053	2.58	311.20	90.22	0.21
	4470	2380.00	733.10	741.41		740.97	0.002106	3.26	736.10	541.76	0.23
	4470	3240.00	733.10	741.84		741.54	0.002050	3.40	1055.51	572.13	0.23
	4470	3880.00	733.10	742.11		741.98	0.002190	3.67	1311.11	594.89	0.24
	4470	4570.00	733.10	742.37		742.26	0.002293	3.84	1476.16	664.12	0.25
	4470	5800.00	733.10	742.77		742.52	0.002372	3.99	1654.03	718.33	0.25
						742.94	0.002473	4.22	1961.96	803.58	0.26
	4700	780.00	734.50	739.28							
	4700	1670.00	734.50	741.21		739.43	0.001821	3.10	251.55	75.90	0.30
	4700	2380.00	734.50	741.77		741.44	0.001713	3.94	510.92	307.23	0.31
	4700	3240.00	734.50	742.23		742.07	0.002077	4.65	744.65	496.01	0.35
	4700	3880.00	734.50	742.52		742.58	0.002400	5.28	996.47	582.43	0.38
	4700	4570.00	734.50	742.79		742.90	0.002567	5.63	1169.82	626.18	0.40
	4700	5800.00	734.50	743.22		743.19	0.002712	5.96	1347.44	668.04	0.41
						743.64	0.002865	6.39	1705.48	984.71	0.43
	4943	780.00	735.30	739.73							
	4943	1670.00	735.30	741.68		739.90	0.001956	3.32	235.01	66.76	0.31
	4943	2380.00	735.30	742.33		741.97	0.002653	4.27	391.46	95.80	0.37
	4943	3240.00	735.30	742.86		742.75	0.003463	5.21	470.46	192.63	0.43
	4943	3880.00	735.30	743.19		743.35	0.003775	5.85	771.47	708.59	0.46
	4943	4570.00	735.30	743.51		743.66	0.003614	5.98	1022.88	795.44	0.45
	4943	5800.00	735.30	743.98		743.94	0.003401	6.02	1284.31	869.16	0.45
						744.37	0.003097	6.06	1727.01	995.43	0.43
	5068	780.00	735.50	739.97							
	5068	1670.00	735.50	741.97		740.12	0.001643	3.16	246.81	65.88	0.29
	5068	2380.00	735.50	742.69		742.26	0.002001	4.31	389.76	86.80	0.33
	5068	3240.00	735.50	743.22	740.48	743.12	0.002573	5.32	472.22	143.92	0.39
	5068	3880.00	735.50	743.52		743.84	0.003369	6.45	604.25	626.99	0.45
	5068	4570.00	735.50	743.82		744.22	0.003759	7.02	831.16	900.19	0.48
	5068	5800.00	735.50	744.32		744.52	0.003789	7.26	1116.69	958.02	0.48
						744.93	0.003528	7.33	1641.32	1112.88	0.47
	5227	780.00	736.39	740.24							
	5227	1670.00	736.39	742.26		740.45	0.002187	3.79	214.94	62.14	0.34
	5227	2380.00	736.39	743.07		742.64	0.002246	5.09	372.95	107.81	0.37
	5227	3240.00	736.39	743.90		743.59	0.002760	6.15	475.87	269.91	0.42
	5227	3880.00	736.39	744.46		744.35	0.002395	6.20	959.87	770.33	0.40
	5227	4570.00	736.39	744.80		744.75	0.001757	5.57	1492.75	1044.84	0.35
	5227	5800.00	736.39	745.20		745.05	0.001593	5.45	1857.97	1103.74	0.33
						745.44	0.001580	5.60	2318.34	1157.36	0.33
	5255	Culvert									
	5260	780.00	736.71	740.45	738.61	740.68	0.002400	3.90	210.01	67.40	0.36
	5260	1670.00	736.71	742.73	739.85	743.00	0.001702	4.51	495.67	205.08	0.32
	5260	2380.00	736.71	743.57	740.74	743.84	0.001614	4.79	763.32	580.14	0.32
	5260	3240.00	736.71	744.26	741.89	744.47	0.001336	4.65	1272.11	874.81	0.30
	5260	3880.00	736.71	744.64	741.78	744.82	0.001194	4.54	1618.07	949.85	0.28
	5260	4570.00	736.71	744.93	743.70	745.10	0.001174	4.61	1899.12	1005.90	0.28
	5260	5800.00	736.71	745.31	744.18	745.49	0.001231	4.86	2292.67	1064.72	0.29
	5455	780.00	737.70	740.96		741.35	0.006701	5.06	154.16	59.26	0.55
	5455	1670.00	737.70	743.00		743.53	0.004872	5.84	285.97	69.00	0.51

HEC-RAS Plan: Adjusted River: Unnamed Trib Reach: 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
	5455		2380.00	737.70	743.72	742.10	744.44	0.005836	6.91	418.00	409.86	0.56
	5455		3240.00	737.70	744.36		744.97	0.004971	6.88	819.38	825.93	0.53
	5455		3880.00	737.70	744.76		745.22	0.003982	6.47	1174.10	946.21	0.48
	5455		4570.00	737.70	745.07		745.46	0.003508	6.29	1467.95	960.06	0.45
	5455		5800.00	737.70	745.47		745.82	0.003258	6.33	1860.38	978.31	0.44
	5593		780.00	737.85	741.83							
	5593		1670.00	737.85	743.72		742.18	0.005307	4.74	164.46	58.07	0.50
	5593		2380.00	737.85	744.70		744.23	0.005243	5.74	300.36	259.57	0.52
	5593		3240.00	737.85	745.15		745.01	0.003085	5.04	783.96	765.16	0.41
	5593		3880.00	737.85	745.32		745.43	0.002812	5.11	1197.76	951.06	0.40
	5593		4570.00	737.85	745.51		745.62	0.003115	5.50	1358.95	973.07	0.42
	5593		5800.00	737.85	745.83		745.82	0.003285	5.78	1541.95	997.48	0.44
	5897						746.15	0.003380	6.09	1872.76	1040.14	0.45
	5897		780.00	737.90	743.09							
	5897		1670.00	737.90	744.98		743.35	0.002889	4.09	190.80	52.92	0.38
	5897		2380.00	737.90	745.54		745.27	0.002365	4.71	652.31	721.15	0.36
	5897		3240.00	737.90	745.93		745.77	0.002076	4.72	1074.93	798.29	0.35
	5897		3880.00	737.90	746.18		746.17	0.002221	5.10	1400.15	852.91	0.36
	5897		4570.00	737.90	746.40		746.42	0.002331	5.36	1610.73	893.25	0.37
	5897		5800.00	737.90	746.76		746.66	0.002439	5.62	1819.77	984.70	0.38
	6048						747.02	0.002554	5.95	2174.81	1029.58	0.40
	6048		780.00	738.71	743.46							
	6048		1670.00	738.71	745.26		743.72	0.002041	4.21	199.66	50.06	0.34
	6048		2380.00	738.71	745.73		745.74	0.002679	5.99	448.46	344.63	0.41
	6048		3240.00	738.71	746.10		746.37	0.003597	7.26	635.65	460.58	0.48
	6048		3880.00	738.71	746.36		746.91	0.004623	8.52	836.49	686.32	0.55
	6048		4570.00	738.71	746.62		747.18	0.004914	8.99	1022.65	752.05	0.57
	6048		5800.00	738.71	747.03		747.42	0.005009	9.27	1233.05	891.66	0.58
							747.70	0.004616	9.21	1633.57	993.37	0.56
	6075		Culvert									
	6102		780.00	738.86	743.84	741.24	744.08	0.001058	4.03	205.71	46.07	0.32
	6102		1670.00	738.86	745.71	742.78	746.15	0.001382	5.69	522.10	432.90	0.38
	6102		2380.00	738.86	745.93	743.79	746.67	0.002373	7.62	621.67	506.57	0.50
	6102		3240.00	738.86	746.25	746.25	747.29	0.003324	9.28	811.38	676.04	0.60
	6102		3880.00	738.86	746.79	746.79	747.63	0.002819	8.96	1245.40	931.31	0.56
	6102		4570.00	738.86	747.11	747.11	747.88	0.002730	9.06	1579.59	1069.31	0.56
			5800.00	738.86	747.47	747.47	748.24	0.002889	9.59	1980.91	1133.79	0.58
	6338											
	6338		780.00	739.40	744.23							
	6338		1670.00	739.40	746.36		744.56	0.004388	4.62	171.48	80.04	0.46
	6338		2380.00	739.40	747.02		746.55	0.001841	4.00	644.25	373.76	0.32
	6338		3240.00	739.40	747.71		747.20	0.001661	4.14	926.40	497.91	0.31
	6338		3880.00	739.40	748.00		747.87	0.001432	4.16	1392.13	915.31	0.29
	6338		4570.00	739.40	748.25		748.16	0.001466	4.34	1672.66	1046.21	0.30
	6338		5800.00	739.40	748.62		748.41	0.001525	4.54	1944.93	1130.43	0.31
							748.79	0.001585	4.79	2376.68	1196.91	0.32
	6609		780.00	741.50	745.44							
	6609		1670.00	741.50	746.92		745.73	0.004208	4.39	182.36	97.24	0.45
	6609		2380.00	741.50	747.52		747.09	0.002173	4.00	650.06	622.03	0.34
	6609		3240.00	741.50	748.13		747.65	0.001652	3.80	1054.34	713.83	0.30
	6609		3880.00	741.50	748.43		748.24	0.001288	3.63	1523.51	836.94	0.27
	6609		4570.00	741.50	748.69		748.54	0.001267	3.73	1778.47	885.25	0.27
	6609		5800.00	741.50	749.07		748.80	0.001298	3.89	2011.32	927.18	0.28
							749.20	0.001384	4.18	2373.19	975.49	0.29
	6853		780.00	741.70	746.38							
	6853		1670.00	741.70	747.47		746.64	0.003285	4.08	197.92	100.64	0.40
	6853		2380.00	741.70	747.96		747.82	0.003667	5.24	520.45	574.86	0.44
	6853		3240.00	741.70	748.48		748.26	0.003350	5.38	826.51	679.39	0.43
	6853		3880.00	741.70	748.78		748.72	0.002668	5.14	1196.68	726.53	0.39
	6853		4570.00	741.70	749.04		749.00	0.002524	5.18	1412.77	754.53	0.39
	6853		5800.00	741.70	749.44		749.26	0.002473	5.29	1615.82	779.92	0.38
							749.67	0.002468	5.52	1936.18	818.38	0.39
	7010		780.00	743.30	747.32							
	7010		1670.00	743.30	748.47		747.62	0.004342	4.42	180.15	93.89	0.45
	7010		2380.00	743.30	748.89		748.88	0.004486	5.39	335.31	227.45	0.48
	7010		3240.00	743.30	749.23		749.40	0.005432	6.35	449.67	322.06	0.54
	7010		3880.00	743.30	749.48		749.85	0.006528	7.33	606.76	520.47	0.60
	7010		4570.00	743.30	749.72		750.12	0.006679	7.68	736.09	534.30	0.61
	7010		5800.00	743.30	750.12		750.37	0.006710	7.95	876.66	616.97	0.62
							750.76	0.006528	8.24	1158.97	826.38	0.62
	7341		780.00	744.02	748.48							
	7341		1670.00	744.02	749.62		749.01	0.007912	5.85	141.47	86.29	0.61
							750.17	0.006848	6.81	389.41	394.59	0.60

HEC-RAS Plan: Adjusted River: Unnamed Trib Reach: 1 (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
	7341	2380.00	744.02	750.21		750.60	0.004996	6.37	708.94	764.34	0.52
	7341	3240.00	744.02	750.72		750.99	0.003846	5.99	1131.54	900.06	0.47
	7341	3880.00	744.02	750.98		751.23	0.003611	6.00	1369.28	929.97	0.46
	7341	4570.00	744.02	751.22		751.47	0.003465	6.06	1601.85	963.24	0.45
	7341	5800.00	744.02	751.59		751.83	0.003381	6.24	1964.68	1011.70	0.45
	7507	780.00	744.42	749.31	746.89	749.40	0.000669	2.80	413.15	292.94	0.24
	7507	1670.00	744.42	750.46	748.89	750.56	0.000673	3.29	961.49	717.68	0.25
	7507	2380.00	744.42	750.82	749.37	750.95	0.000863	3.89	1229.22	768.27	0.28
	7507	3240.00	744.42	751.17	749.84	751.32	0.001064	4.49	1502.46	816.68	0.32
	7507	3880.00	744.42	751.39	750.25	751.56	0.001193	4.86	1686.95	847.80	0.34
	7507	4570.00	744.42	751.61	750.47	751.80	0.001306	5.20	1877.88	874.50	0.36
	7507	5800.00	744.42	751.96	750.79	752.18	0.001472	5.72	2188.81	909.84	0.38
	7536.5	Culvert									
	7554	780.00	744.78	749.60	747.24	749.63	0.000048	1.96	631.55	394.25	0.16
	7554	1670.00	744.78	750.49	749.10	750.57	0.000099	3.14	1104.08	716.11	0.23
	7554	2380.00	744.78	750.83	749.11	750.95	0.000149	4.01	1361.48	777.89	0.29
	7554	3240.00	744.78	751.15	749.11	751.32	0.000212	4.95	1611.02	810.16	0.35
	7554	3880.00	744.78	751.36	749.35	751.56	0.000257	5.57	1783.48	831.72	0.38
	7554	4570.00	744.78	751.55	749.67	751.80	0.000305	6.19	1949.40	851.96	0.42
	7554	5800.00	744.78	751.85	750.19	752.18	0.000391	7.22	2209.92	882.79	0.48
	7837	710.00	747.85	751.30	751.30	751.71	0.018716	6.30	225.37	276.16	0.69
	7837	1490.00	747.85	751.87	751.87	752.37	0.022048	7.82	407.82	361.88	0.78
	7837	2110.00	747.85	752.18	752.18	752.72	0.023091	8.52	528.47	414.24	0.81
	7837	2830.00	747.85	752.44	752.44	753.04	0.025249	9.35	640.98	460.65	0.86
	7837	3380.00	747.85	752.61	752.61	753.25	0.026515	9.87	722.19	491.42	0.88
	7837	3950.00	747.85	752.77	752.77	753.45	0.027789	10.37	800.79	519.48	0.91
	7837	4990.00	747.85	753.04	753.04	753.78	0.028867	11.03	947.09	568.02	0.94
	8070	690.00	749.40	752.71		752.76	0.001848	1.76	437.91	464.76	0.21
	8070	1440.00	749.40	753.27		753.33	0.001576	1.89	785.35	700.54	0.20
	8070	2020.00	749.40	753.56		753.64	0.001431	1.93	989.57	739.98	0.20
	8070	2700.00	749.40	753.84		753.94	0.001341	1.99	1202.65	777.60	0.19
	8070	3210.00	749.40	754.02		754.14	0.001307	2.03	1346.14	794.68	0.19
	8070	3720.00	749.40	754.20		754.33	0.001257	2.06	1492.21	828.99	0.19
	8070	4710.00	749.40	754.49		754.65	0.001227	2.15	1748.01	916.45	0.19
	8378	690.00	749.60	753.22		753.25	0.001400	1.55	622.51	525.13	0.16
	8378	1440.00	749.60	753.81		753.86	0.001860	2.03	952.36	590.48	0.20
	8378	2020.00	749.60	754.11		754.17	0.002219	2.35	1136.21	627.22	0.22
	8378	2700.00	749.60	754.41		754.49	0.002540	2.65	1329.73	669.75	0.24
	8378	3210.00	749.60	754.61		754.70	0.002742	2.85	1464.93	701.01	0.25
	8378	3720.00	749.60	754.79		754.89	0.002909	3.02	1595.99	730.04	0.26
	8378	4710.00	749.60	755.10		755.22	0.003216	3.32	1829.45	778.36	0.27
	8509	690.00	749.70	753.44		753.52	0.003623	2.82	411.59	363.48	0.27
	8509	1440.00	749.70	754.10		754.22	0.004812	3.66	699.80	518.15	0.32
	8509	2020.00	749.70	754.45		754.58	0.005177	4.02	888.26	560.70	0.34
	8509	2700.00	749.70	754.79		754.93	0.005431	4.33	1084.33	598.24	0.35
	8509	3210.00	749.70	755.01		755.17	0.005545	4.51	1218.21	616.01	0.36
	8509	3720.00	749.70	755.21		755.38	0.005625	4.67	1344.36	643.31	0.36
	8509	4710.00	749.70	755.55		755.74	0.005780	4.94	1575.73	711.41	0.37
	8766	690.00	749.70	754.41		754.47	0.003870	2.58	435.82	436.81	0.27
	8766	1440.00	749.70	755.18		755.25	0.003539	2.90	790.33	480.03	0.27
	8766	2020.00	749.70	755.59		755.67	0.003685	3.18	990.14	502.76	0.28
	8766	2700.00	749.70	755.98		756.08	0.003871	3.47	1192.57	557.33	0.29
	8766	3210.00	749.70	756.25		756.36	0.004154	3.74	1358.14	664.07	0.31
	8766	3720.00	749.70	756.47		756.59	0.004255	3.91	1508.43	703.88	0.31
	8766	4710.00	749.70	756.85		756.99	0.004374	4.16	1791.09	767.17	0.32
	9022	690.00	751.00	755.31		755.38	0.003275	2.33	356.67	253.06	0.25
	9022	1440.00	751.00	756.10		756.22	0.003919	3.03	599.82	362.97	0.29
	9022	2020.00	751.00	756.55		756.70	0.004152	3.38	772.22	410.17	0.30
	9022	2700.00	751.00	756.98		757.16	0.004360	3.72	966.68	514.29	0.31
	9022	3210.00	751.00	757.30		757.48	0.004327	3.88	1148.53	638.50	0.32
	9022	3720.00	751.00	757.55		757.73	0.004417	4.06	1318.25	734.33	0.32
	9022	4710.00	751.00	757.96		758.15	0.004504	4.33	1654.83	894.51	0.33
	9195	690.00	751.80	755.94		756.02	0.003719	2.88	376.98	286.31	0.28
	9195	1440.00	751.80	756.83		756.93	0.003802	3.40	722.93	469.83	0.29

HEC-RAS Plan: Adjusted River: Unnamed Trib Reach: 1 (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
	9195	2020.00	751.80	757.30		757.41	0.003753	3.62	952.38	506.44	0.29
	9195	2700.00	751.80	757.76		757.88	0.003721	3.84	1201.88	635.54	0.30
	9195	3210.00	751.80	758.07		758.19	0.003611	3.93	1423.67	775.68	0.30
	9195	3720.00	751.80	758.32		758.44	0.003553	4.02	1625.86	808.95	0.30
	9195	4710.00	751.80	758.74		758.86	0.003524	4.19	1976.37	863.61	0.30
	9415	620.00	751.85	756.43		756.47	0.001208	1.77	495.52	354.71	0.16
	9415	1270.00	751.85	757.37		757.42	0.001365	2.18	849.27	407.60	0.18
	9415	1760.00	751.85	757.86		757.93	0.001499	2.44	1059.77	446.06	0.19
	9415	2340.00	751.85	758.35		758.42	0.001621	2.69	1314.52	582.01	0.20
	9415	2770.00	751.85	758.65		758.73	0.001685	2.84	1499.90	633.14	0.20
	9415	3190.00	751.85	758.91		758.99	0.001752	2.98	1668.66	676.34	0.21
	9415	4030.00	751.85	759.34		759.43	0.001886	3.23	1978.57	750.44	0.22
	9630	620.00	753.70	756.79		756.83	0.002537	1.94	424.71	357.61	0.22
	9630	1270.00	753.70	757.72		757.77	0.001982	2.12	786.79	433.22	0.20
	9630	1760.00	753.70	758.23		758.28	0.001833	2.24	1023.66	487.34	0.20
	9630	2340.00	753.70	758.72		758.78	0.001729	2.35	1269.52	510.75	0.20
	9630	2770.00	753.70	759.03		759.09	0.001709	2.45	1429.54	525.54	0.20
	9630	3190.00	753.70	759.29		759.36	0.001721	2.55	1571.47	583.18	0.20
	9630	4030.00	753.70	759.75		759.82	0.001754	2.73	1890.31	806.01	0.21
	9749	620.00	753.70	757.12		757.21	0.005165	3.04	306.01	303.73	0.32
	9749	1270.00	753.70	757.96		758.05	0.004044	3.20	612.22	409.79	0.29
	9749	1760.00	753.70	758.44		758.53	0.003676	3.31	820.78	447.89	0.29
	9749	2340.00	753.70	758.91		759.01	0.003306	3.37	1037.07	469.12	0.28
	9749	2770.00	753.70	759.22		759.31	0.003172	3.44	1180.72	486.88	0.27
	9749	3190.00	753.70	759.48		759.58	0.003108	3.53	1318.58	569.13	0.27
	9749	4030.00	753.70	759.93		760.04	0.003036	3.68	1607.77	711.41	0.27
	10005	620.00	756.03	757.78	756.76	757.85	0.001770	2.02	307.06	252.16	0.27
	10005	1270.00	756.03	758.59	757.20	758.71	0.002057	2.80	463.85	560.50	0.31
	10005	1760.00	756.03	759.06	757.49	759.22	0.002195	3.24	560.74	589.91	0.33
	10005	2340.00	756.03	759.51	757.80	759.72	0.002392	3.71	662.99	687.40	0.35
	10005	2770.00	756.03	759.81	758.03	760.04	0.002506	4.01	759.36	799.74	0.36
	10005	3190.00	756.03	759.92	758.24	760.01	0.001136	2.75	1629.89	845.43	0.25
	10005	4030.00	756.03	760.36	758.60	760.45	0.001100	2.91	2024.80	952.63	0.25
	10050	Culvert									
	10096	620.00	756.37	757.84	757.10	757.93	0.003198	2.41	256.79	206.83	0.35
	10096	1270.00	756.37	758.69	757.55	758.84	0.002935	3.13	405.17	229.48	0.36
	10096	1760.00	756.37	759.21	757.83	759.41	0.002857	3.54	496.78	240.50	0.37
	10096	2340.00	756.37	759.84	758.14	760.07	0.002565	3.83	646.08	434.39	0.36
	10096	2770.00	756.37	760.19	758.35	760.44	0.002488	4.03	790.75	655.41	0.36
	10096	3190.00	756.37	760.39	758.54	760.67	0.002690	4.33	877.83	707.02	0.38
	10096	4030.00	756.37	760.80	758.91	760.99	0.001947	3.93	1417.68	811.71	0.33
	10339	620.00	757.40	759.17		759.28	0.012079	2.74	251.85	281.42	0.43
	10339	1270.00	757.40	759.84		759.97	0.008977	3.13	474.72	354.27	0.40
	10339	1760.00	757.40	760.29		760.42	0.007173	3.22	635.45	362.71	0.37
	10339	2340.00	757.40	760.80		760.94	0.005714	3.27	823.73	372.70	0.34
	10339	2770.00	757.40	761.13		761.27	0.005208	3.35	946.67	379.08	0.33
	10339	3190.00	757.40	761.39		761.54	0.005085	3.48	1045.05	384.10	0.33
	10339	4030.00	757.40	761.59		761.81	0.006488	4.08	1123.43	388.06	0.37
	10567	550.00	759.00	760.90		760.94	0.004713	1.82	398.03	556.98	0.27
	10567	1080.00	759.00	761.34		761.38	0.004424	2.12	667.87	665.93	0.28
	10567	1500.00	759.00	761.61		761.66	0.004231	2.27	855.72	721.06	0.28
	10567	1960.00	759.00	761.92		761.97	0.003666	2.31	1087.64	783.80	0.26
	10567	2300.00	759.00	762.14		762.20	0.003205	2.30	1267.70	809.33	0.25
	10567	2700.00	759.00	762.35		762.41	0.002975	2.33	1442.14	822.00	0.24
	10567	3370.00	759.00	762.68		762.74	0.002740	2.40	1711.05	841.18	0.24
	10791	550.00	759.10	761.68		761.73	0.002858	2.29	342.26	355.81	0.28
	10791	1080.00	759.10	762.15		762.22	0.003217	2.76	589.40	797.01	0.31
	10791	1500.00	759.10	762.41		762.48	0.003276	2.98	796.86	819.26	0.32
	10791	1960.00	759.10	762.65		762.73	0.003237	3.14	999.51	840.41	0.32
	10791	2300.00	759.10	762.82		762.90	0.003193	3.23	1138.55	854.63	0.32
	10791	2700.00	759.10	763.00		763.08	0.003120	3.32	1296.70	870.51	0.32
	10791	3370.00	759.10	763.28		763.38	0.002998	3.44	1548.90	895.26	0.32
	11074	550.00	759.80	762.44		762.48	0.002478	1.99	406.18	444.38	0.26
	11074	1080.00	759.80	762.98		763.04	0.002636	2.43	653.78	471.44	0.28

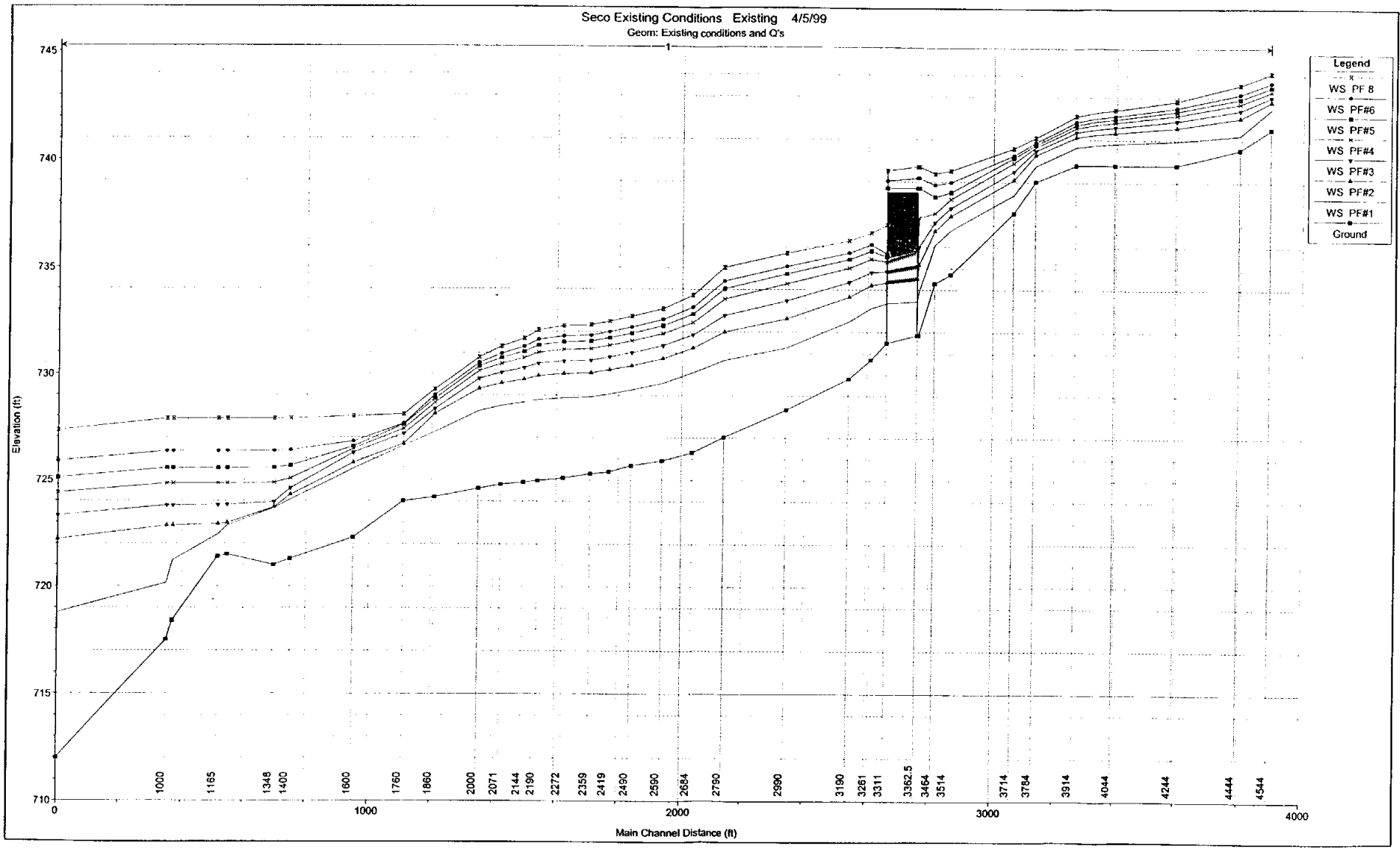
HEC-RAS Plan: Adjusted River: Unnamed Trib Reach: 1 (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
	11074	1500.00	759.80	763.27		763.35	0.002900	2.75	796.78	486.39	0.30
	11074	1960.00	759.80	763.55		763.64	0.003166	3.06	930.91	500.00	0.32
	11074	2300.00	759.80	763.72		763.83	0.003345	3.27	1020.55	523.18	0.33
	11074	2700.00	759.80	763.91		764.03	0.003528	3.49	1132.20	685.57	0.34
	11074	3370.00	759.80	764.20		764.33	0.003712	3.78	1359.73	842.27	0.36
	11287	550.00	761.00	763.39		763.65	0.016854	4.30	176.79	481.84	0.65
	11287	1080.00	761.00	763.89		764.06	0.010325	4.10	425.39	505.80	0.53
	11287	1500.00	761.00	764.20		764.36	0.008437	4.10	586.41	547.86	0.49
	11287	1960.00	761.00	764.48		764.64	0.007364	4.17	751.60	601.42	0.47
	11287	2300.00	761.00	764.67		764.83	0.006858	4.23	868.69	636.66	0.46
	11287	2700.00	761.00	764.88		765.04	0.006437	4.31	1001.57	674.42	0.45
	11287	3370.00	761.00	765.16		765.33	0.005992	4.44	1236.21	863.36	0.44
	11519	550.00	761.65	764.89		764.96	0.002714	2.60	324.52	496.10	0.29
	11519	1080.00	761.65	765.27	764.86	765.37	0.003486	3.24	519.39	531.50	0.33
	11519	1500.00	761.65	765.50		765.62	0.003814	3.57	646.39	584.19	0.35
	11519	1960.00	761.65	765.74		765.86	0.003932	3.80	792.29	662.78	0.36
	11519	2300.00	761.65	765.89		766.02	0.003978	3.94	896.93	693.82	0.37
	11519	2700.00	761.65	766.06		766.20	0.003979	4.06	1016.21	720.05	0.37
	11519	3370.00	761.65	766.31		766.46	0.004039	4.27	1201.23	778.03	0.38
	11685	480.00	762.24	765.16		765.24	0.000963	2.36	215.57	84.09	0.24
	11685	950.00	762.24	765.69		765.91	0.002093	3.88	261.17	87.83	0.37
	11685	1270.00	762.24	765.99	764.47	766.31	0.002787	4.73	287.71	89.93	0.43
	11685	1650.00	762.24	766.26		766.67	0.003386	5.47	427.32	534.99	0.48
	11685	1920.00	762.24	766.43		766.88	0.003639	5.83	519.91	544.76	0.50
	11685	2250.00	762.24	766.62		767.10	0.003896	6.20	620.24	555.16	0.52
	11685	2820.00	762.24	766.89		767.41	0.004240	6.74	773.86	570.72	0.55
	11742	Culvert									
	11814	480.00	765.20	767.66	766.66	767.78	0.002137	3.06	206.29	192.22	0.34
	11814	950.00	765.20	769.24	767.42	769.28	0.000471	2.00	707.51	465.15	0.18
	11814	1270.00	765.20	770.13	767.83	770.15	0.000251	1.67	1268.46	769.46	0.13
	11814	1650.00	765.20	771.06	768.21	771.07	0.000141	1.40	2034.50	878.92	0.10
	11814	1920.00	765.20	771.38	768.34	771.40	0.000137	1.43	2325.42	917.07	0.10
	11814	2250.00	765.20	771.63	768.49	771.64	0.000149	1.53	2549.89	945.46	0.11
	11814	2820.00	765.20	771.96	768.70	771.98	0.000174	1.71	2869.10	984.42	0.12
	12040	480.00	765.43	767.92		767.93	0.000287	1.06	638.66	531.85	0.13
	12040	950.00	765.43	769.31		769.32	0.000088	0.82	1495.60	668.40	0.08
	12040	1270.00	765.43	770.17		770.18	0.000058	0.76	2095.59	731.45	0.06
	12040	1650.00	765.43	771.08		771.09	0.000042	0.74	2793.27	796.63	0.06
	12040	1920.00	765.43	771.41		771.41	0.000044	0.79	3054.90	819.74	0.06
	12040	2250.00	765.43	771.65		771.66	0.000050	0.86	3256.45	837.10	0.06
	12040	2820.00	765.43	771.99		772.00	0.000062	1.00	3541.22	861.04	0.07
	12292	480.00	765.64	768.02		768.04	0.000865	1.48	441.11	403.90	0.21
	12292	950.00	765.64	769.34		769.36	0.000272	1.18	1087.25	579.58	0.13
	12292	1270.00	765.64	770.19		770.20	0.000166	1.11	1608.89	679.91	0.10
	12292	1650.00	765.64	771.10		771.11	0.000110	1.05	2268.11	754.52	0.09
	12292	1920.00	765.64	771.42		771.43	0.000112	1.11	2515.74	773.63	0.09
	12292	2250.00	765.64	771.67		771.68	0.000125	1.22	2707.05	788.08	0.10
	12292	2820.00	765.64	772.00		772.02	0.000151	1.39	2977.20	808.57	0.11
	12592	480.00	765.77	768.59	768.59	768.90	0.013617	4.85	131.33	215.44	0.78
	12592	950.00	765.77	769.49		769.56	0.002693	2.86	550.22	607.46	0.37
	12592	1270.00	765.77	770.27		770.30	0.000768	1.92	1074.30	718.96	0.21
	12592	1650.00	765.77	771.14		771.16	0.000318	1.50	1738.32	797.73	0.14
	12592	1920.00	765.77	771.47		771.48	0.000286	1.51	2000.77	826.80	0.14
	12592	2250.00	765.77	771.72		771.74	0.000295	1.60	2209.56	849.21	0.14
	12592	2820.00	765.77	772.06		772.09	0.000323	1.77	2509.82	882.84	0.15
	12928	480.00	765.91	770.11		770.25	0.001929	3.25	247.29	443.58	0.34
	12928	950.00	765.91	770.38	770.23	770.64	0.003938	4.92	370.06	484.87	0.49
	12928	1270.00	765.91	770.56		770.86	0.004548	5.49	462.53	513.78	0.53
	12928	1650.00	765.91	771.27		771.39	0.001860	3.99	863.67	623.88	0.35
	12928	1920.00	765.91	771.58		771.68	0.001499	3.76	1065.89	672.59	0.32
	12928	2250.00	765.91	771.83		771.93	0.001404	3.78	1241.04	712.09	0.31
	12928	2820.00	765.91	772.19		772.29	0.001346	3.89	1507.88	769.61	0.31
	13160	480.00	766.20	770.54		770.59	0.001219	2.38	412.82	489.36	0.26
	13160	950.00	766.20	771.06		771.11	0.001356	2.84	683.15	563.20	0.29

HEC-RAS Plan: Adjusted River: Unnamed Trib Reach: 1 (Continued)

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
	5150	1270.00	766.20	771.31		771.37	0.001458	3.11	829.21	599.32	0.30
	5150	1650.00	766.20	771.64		771.71	0.001351	3.19	1039.33	647.76	0.29
	5150	1920.00	766.20	771.89		771.95	0.001238	3.19	1202.71	683.06	0.29
	5150	2250.00	766.20	772.12		772.18	0.001199	3.26	1364.21	709.59	0.28
	5150	2820.00	766.20	772.46		772.53	0.001166	3.39	1612.41	739.68	0.28
	5371	480.00	767.00	770.82		770.93	0.002749	3.33	254.55	286.13	0.39
	5371	950.00	767.00	771.35		771.48	0.003400	3.96	428.43	367.65	0.44
	5371	1270.00	767.00	771.61		771.76	0.003655	4.24	531.88	409.64	0.46
	5371	1650.00	767.00	771.92		772.08	0.003657	4.40	669.89	480.79	0.46
	5371	1920.00	767.00	772.14		772.29	0.003393	4.41	778.16	516.20	0.45
	5371	2250.00	767.00	772.36		772.51	0.003237	4.51	892.90	544.12	0.44
	5371	2820.00	767.00	772.68		772.84	0.003089	4.70	1077.78	586.32	0.44

Seco Creek Tributary
Existing and Future Conditions
Water Surface Profile and HECRAS Summary Printouts
2, 5, 10, 25, 50, 100, & 500-year Storm Events



50
100
50
25
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5
2

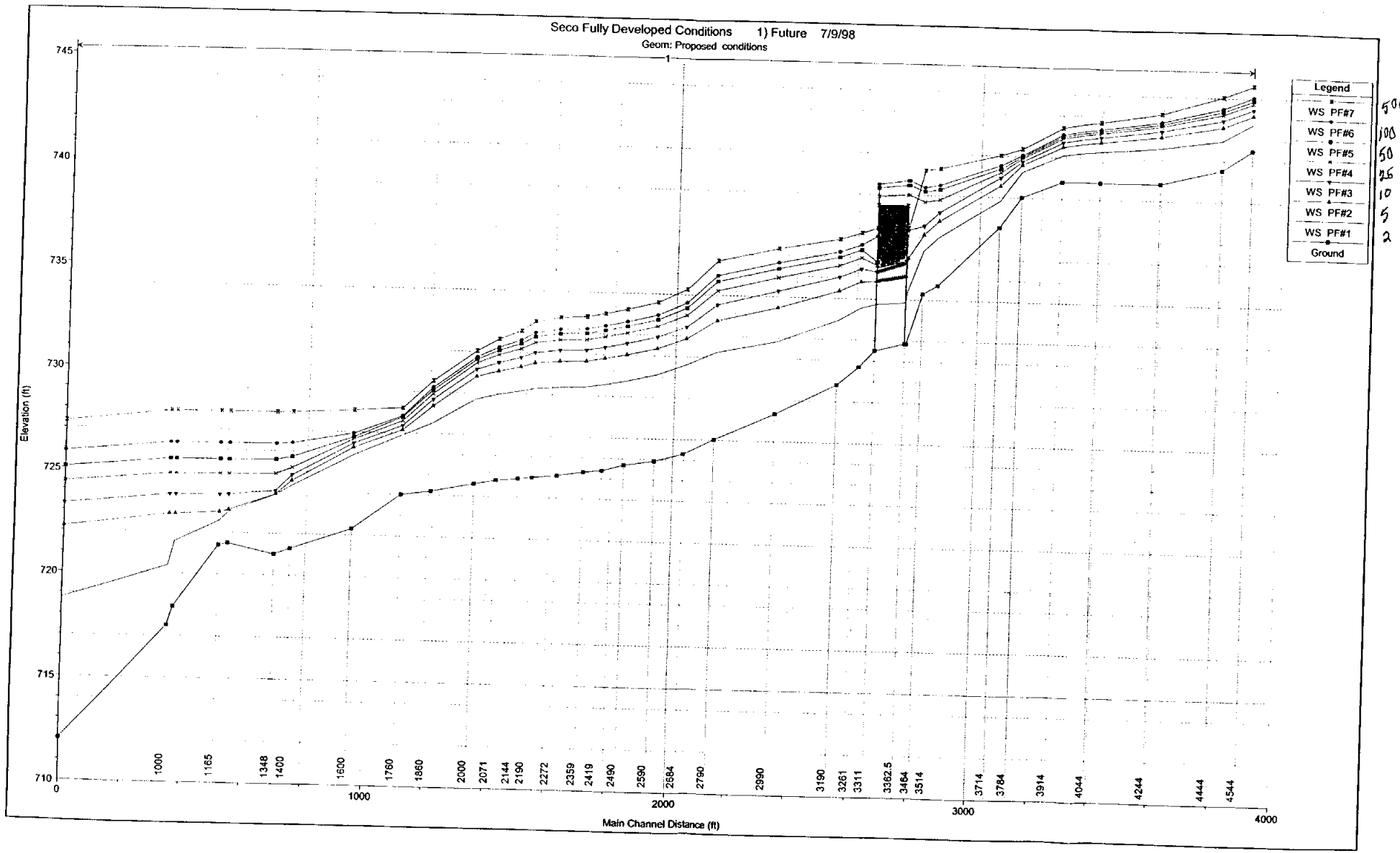
HEC-RAS Plan: Existing River: Seco Creek Trib. Reach: 1

Reach	River Sta	Q (cfs)	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
	650	480.00	712.00	718.76	715.33	718.88	0.002944	2.83	169.34	41.11	0.25
	650	1820.00	712.00	722.20	718.53	722.40	0.002943	4.02	593.53	290.00	0.27
	650	3070.00	712.00	723.30	721.30	723.52	0.002941	4.43	912.63	290.00	0.27
	650	4690.00	712.00	724.37	722.43	724.63	0.002942	4.81	1223.02	290.00	0.28
	650	5950.00	712.00	725.08	722.86	725.37	0.002940	5.06	1428.91	290.00	0.28
	650	7480.00	712.00	725.86	723.27	726.19	0.002941	5.32	1653.36	290.00	0.29
	650	10800.00	712.00	727.33	724.02	727.75	0.002946	5.80	2079.69	290.00	0.29
	1000	190.00	717.50	720.15	720.07	720.71	0.060236	5.99	31.71	41.70	0.94
	1000	380.00	717.50	722.84	720.89	722.85	0.000326	0.76	661.16	490.03	0.08
	1000	540.00	717.50	723.79	721.37	723.79	0.000120	0.56	1131.35	504.69	0.05
	1000	720.00	717.50	724.82	721.80	724.82	0.000060	0.47	1749.15	621.00	0.04
	1000	880.00	717.50	725.54	722.00	725.54	0.000045	0.44	2194.55	621.00	0.03
	1000	1010.00	717.50	726.34	722.00	726.34	0.000032	0.40	2690.24	621.00	0.03
	1000	1290.00	717.50	727.88	722.01	727.89	0.000020	0.37	3651.11	621.00	0.02
	1020	190.00	718.40	721.22	720.78	721.55	0.029427	4.63	41.01	65.21	0.67
	1020	380.00	718.40	722.84	721.59	722.85	0.000679	1.06	515.75	469.28	0.11
	1020	540.00	718.40	723.79	722.01	723.79	0.000187	0.68	963.23	479.66	0.06
	1020	720.00	718.40	724.82	722.17	724.82	0.000085	0.54	1461.22	482.00	0.04
	1020	880.00	718.40	725.54	722.27	725.54	0.000063	0.51	1806.84	482.00	0.04
	1020	1010.00	718.40	726.34	722.33	726.34	0.000044	0.47	2191.46	482.00	0.03
	1020	1290.00	718.40	727.88	722.40	727.89	0.000027	0.43	2937.20	482.00	0.03
	1165	190.00	721.40	722.43	722.43	722.74	0.035299	4.54	47.04	322.52	0.93
	1165	380.00	721.40	722.91	722.90	722.93	0.001362	1.25	373.36	389.99	0.20
	1165	540.00	721.40	723.80	722.90	723.81	0.000346	0.91	774.09	495.00	0.11
	1165	720.00	721.40	724.83	722.90	724.83	0.000126	0.71	1280.75	495.00	0.07
	1165	880.00	721.40	725.54	722.90	725.55	0.000086	0.67	1634.72	495.00	0.06
	1165	1010.00	721.40	726.34	722.90	726.34	0.000056	0.62	2028.90	495.00	0.05
	1165	1290.00	721.40	727.88	722.91	727.89	0.000032	0.57	2794.12	495.00	0.04
	1195	190.00	721.50	722.85	722.46	722.93	0.012534	2.53	87.01	315.06	0.43
	1195	380.00	721.50	722.96	722.85	722.99	0.002725	1.26	286.22	325.46	0.20
	1195	540.00	721.50	723.81	722.85	723.83	0.000589	0.84	621.41	458.00	0.10
	1195	720.00	721.50	724.83	722.85	724.84	0.000186	0.61	1086.98	458.00	0.06
	1195	880.00	721.50	725.54	722.85	725.55	0.000119	0.56	1413.91	458.00	0.05
	1195	1010.00	721.50	726.34	722.86	726.35	0.000075	0.51	1778.26	458.00	0.04
	1195	1290.00	721.50	727.89	722.88	727.89	0.000041	0.45	2485.97	458.00	0.03
	1348	190.00	721.00	723.66	722.66	723.76	0.007680	2.51	75.60	114.21	0.35
	1348	380.00	721.00	723.70	723.27	723.82	0.010274	2.93	135.01	116.14	0.41
	1348	540.00	721.00	723.95	723.68	724.11	0.011960	3.35	165.86	129.33	0.45
	1348	720.00	721.00	724.86	723.69	724.94	0.003677	2.44	321.34	215.52	0.27
	1348	880.00	721.00	725.56	723.77	725.61	0.001891	2.05	496.94	278.46	0.20
	1348	1010.00	721.00	726.35	723.90	726.38	0.000764	1.50	718.46	286.45	0.13
	1348	1290.00	721.00	727.89	724.17	727.91	0.000261	1.08	1181.25	314.92	0.08
	1400	190.00	721.30	724.07	723.04	724.19	0.008530	2.78	68.52	79.42	0.38
	1400	380.00	721.30	724.29	723.73	724.57	0.018404	4.43	97.59	108.41	0.56
	1400	540.00	721.30	724.60	724.35	724.90	0.017589	4.79	137.70	149.16	0.56
	1400	720.00	721.30	725.07	724.63	725.28	0.010477	4.20	222.65	210.90	0.45
	1400	880.00	721.30	725.67	724.83	725.77	0.004341	3.08	369.84	267.67	0.30
	1400	1010.00	721.30	726.39	724.96	726.44	0.001542	2.10	563.84	269.97	0.18
	1400	1290.00	721.30	727.90	725.17	727.93	0.000427	1.36	974.42	273.75	0.10
	1600	190.00	722.30	725.53	724.28	725.62	0.006100	2.50	75.86	129.50	0.32
	1600	380.00	722.30	725.80	724.95	725.85	0.003205	1.92	203.05	142.40	0.24
	1600	540.00	722.30	726.27	725.39	726.33	0.003691	2.32	297.43	285.64	0.26
	1600	720.00	722.30	726.45	725.60	726.52	0.004062	2.55	347.80	286.70	0.28
	1600	880.00	722.30	726.57	725.61	726.66	0.004526	2.77	381.98	287.41	0.29
	1600	1010.00	722.30	726.81	725.61	726.89	0.003470	2.57	452.96	288.89	0.26
	1600	1290.00	722.30	728.01	725.74	728.05	0.000889	1.62	802.28	296.82	0.14
	1760	190.00	724.00	726.60	725.73	726.70	0.007476	2.67	79.32	83.46	0.35
	1760	380.00	724.00	726.70	726.52	727.03	0.023162	4.86	88.24	87.52	0.63
	1760	540.00	724.00	727.18	726.81	727.46	0.015192	4.60	135.51	107.73	0.53
	1760	720.00	724.00	727.42	727.06	727.76	0.016499	5.12	163.10	117.94	0.56
	1760	880.00	724.00	727.62	727.25	728.00	0.017044	5.46	187.31	126.22	0.58
	1760	1010.00	724.00	727.66	727.40	728.14	0.021056	6.12	191.88	127.72	0.64
	1760	1290.00	724.00	728.10	727.68	728.55	0.017699	6.18	257.16	199.49	0.60
	1860	150.00	724.20	727.27		727.49	0.007588	3.74	40.10	22.08	0.49
	1860	310.00	724.20	728.13		728.52	0.009544	5.06	62.50	50.42	0.57

	1850	440.00	724.20	728.36	727.79	728.89	0.011924	6.00	75.96	68.75	0.65
	1850	600.00	724.20	728.64	728.64	729.23	0.010814	6.11	98.88	91.90	0.63
	1850	730.00	724.20	728.84	728.84	729.46	0.009568	6.00	118.24	107.64	0.60
	1850	850.00	724.20	729.01	729.01	729.65	0.008274	5.78	137.77	121.47	0.56
		1090.00	724.20	729.29	729.29	729.98	0.006673	5.48	175.05	144.24	0.51
	2000										
	2000	150.00	724.60	728.26		728.32	0.004619	1.92	78.56	46.81	0.25
	2000	310.00	724.60	729.31		729.39	0.004019	2.31	141.73	74.00	0.24
	2000	440.00	724.60	729.79		729.88	0.004297	2.61	180.12	86.44	0.26
	2000	600.00	724.60	730.16		730.28	0.005034	3.01	214.90	110.03	0.28
	2000	730.00	724.60	730.38		730.53	0.005654	3.33	242.25	135.83	0.30
	2000	850.00	724.60	730.53		730.71	0.006237	3.59	264.91	151.54	0.32
	2000	1090.00	724.60	730.79		731.02	0.007307	4.05	306.17	173.62	0.35
	2070										
	2070	150.00	724.80	728.51		728.54	0.002116	1.36	110.46	54.58	0.17
	2070	310.00	724.80	729.57		729.62	0.002555	1.78	174.42	66.23	0.19
	2070	440.00	724.80	730.08		730.14	0.003061	2.10	209.84	76.73	0.22
	2070	600.00	724.80	730.50		730.59	0.003598	2.49	248.60	108.17	0.24
	2070	730.00	724.80	730.76		730.88	0.004022	2.76	279.92	128.06	0.26
	2070	850.00	724.80	730.96		731.09	0.004431	3.01	306.78	142.93	0.27
	2070	1090.00	724.80	731.29		731.46	0.005162	3.43	358.50	167.89	0.30
	2170										
	2170	150.00	724.90	728.67		728.71	0.002539	1.60	93.96	41.34	0.19
	2170	310.00	724.90	729.76		729.83	0.003259	2.18	142.00	46.79	0.22
	2170	440.00	724.90	730.30		730.41	0.003965	2.61	169.51	57.86	0.25
	2170	600.00	724.90	730.76		730.91	0.004925	3.11	199.55	72.80	0.28
	2170	730.00	724.90	731.06		731.24	0.005674	3.47	222.51	82.42	0.30
	2170	850.00	724.90	731.29		731.50	0.006370	3.78	242.08	89.81	0.33
	2170	1090.00	724.90	731.67		731.95	0.007670	4.34	278.87	102.26	0.36
	2190										
	2190	150.00	724.98	728.79		728.82	0.002116	1.33	113.02	57.76	0.17
	2190	310.00	724.98	729.92		729.96	0.002421	1.62	191.50	80.47	0.18
	2190	440.00	724.98	730.50		730.56	0.002440	1.83	242.25	94.84	0.19
	2190	600.00	724.98	731.01		731.08	0.002642	2.10	294.04	107.87	0.20
	2190	730.00	724.98	731.35		731.43	0.002825	2.29	331.83	116.46	0.21
	2190	850.00	724.98	731.62		731.71	0.003007	2.46	363.66	123.24	0.22
	2190	1090.00	724.98	732.07		732.19	0.003444	2.81	426.11	194.35	0.24
	2272										
	2272	150.00	725.10	728.88		728.88	0.000429	0.73	214.97	108.96	0.08
	2272	310.00	725.10	730.03		730.04	0.000444	0.94	364.32	150.71	0.09
	2272	440.00	725.10	730.62		730.63	0.000480	1.08	458.69	167.61	0.09
	2272	600.00	725.10	731.15		731.17	0.000542	1.24	551.81	182.76	0.10
	2272	730.00	725.10	731.50		731.53	0.000591	1.36	618.15	192.83	0.10
	2272	850.00	725.10	731.78		731.81	0.000636	1.46	673.34	200.82	0.11
	2272	1090.00	725.10	732.27		732.31	0.000718	1.64	775.00	213.96	0.12
	2350										
	2350	150.00	725.30	728.93		728.96	0.001966	1.37	109.19	49.98	0.16
	2350	310.00	725.30	730.07		730.12	0.002300	1.81	171.34	62.55	0.19
	2350	440.00	725.30	730.66		730.73	0.002458	2.11	219.03	99.37	0.20
	2350	600.00	725.30	731.19		731.28	0.002657	2.41	280.72	132.61	0.21
	2350	730.00	725.30	731.55		731.65	0.002765	2.60	331.79	154.82	0.22
	2350	850.00	725.30	731.83		731.94	0.002848	2.75	378.15	172.52	0.22
	2350	1090.00	725.30	732.33		732.45	0.002884	2.96	470.46	195.71	0.23
	2410										
	2410	150.00	725.40	729.07		729.10	0.002659	1.45	103.72	54.45	0.18
	2410	310.00	725.40	730.22		730.27	0.002511	1.81	172.00	70.87	0.19
	2410	440.00	725.40	730.81		730.88	0.002567	2.08	222.46	98.05	0.20
	2410	600.00	725.40	731.36		731.44	0.002714	2.37	282.31	122.72	0.21
	2410	730.00	725.40	731.72		731.81	0.002818	2.55	329.43	139.10	0.22
	2410	850.00	725.40	732.00		732.11	0.002911	2.71	371.07	152.10	0.22
	2410	1090.00	725.40	732.50		732.62	0.003030	2.96	451.34	172.15	0.23
	2490										
	2490	150.00	725.69	729.26		729.30	0.003057	1.64	91.26	44.13	0.20
	2490	310.00	725.69	730.41		730.47	0.003237	2.07	152.56	71.55	0.22
	2490	440.00	725.69	731.01		731.09	0.003215	2.35	203.61	98.82	0.22
	2490	600.00	725.69	731.56		731.66	0.003272	2.62	265.12	123.95	0.23
	2490	730.00	725.69	731.93		732.04	0.003312	2.80	313.78	140.68	0.24
	2490	850.00	725.69	732.22		732.34	0.003338	2.94	356.81	151.62	0.24
	2490	1090.00	725.69	732.73		732.86	0.003367	3.16	438.01	169.09	0.25
	2590										
	2590	150.00	725.92	729.58		729.63	0.003436	1.74	86.08	41.39	0.21
	2590	310.00	725.92	730.74		730.82	0.003582	2.21	142.21	56.01	0.23
	2590	440.00	725.92	731.35		731.45	0.003877	2.55	178.52	64.17	0.24
	2590	600.00	725.92	731.91		732.04	0.004314	2.92	216.69	71.75	0.26

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1	2590	730.00	725.92	732.28		732.43	0.004731	3.20	245.12	81.17	0.28
	2590	850.00	725.92	732.58		732.75	0.005100	3.42	270.55	89.80	0.29
	2590	1090.00	725.92	733.09		733.30	0.005720	3.81	319.91	104.53	0.31
	2684	150.00	726.30	730.09		730.27	0.015679	3.36	44.70	24.54	0.44
	2684	320.00	726.30	731.24		731.51	0.016357	4.17	76.80	31.43	0.47
	2684	450.00	726.30	731.86		732.19	0.017024	4.62	97.37	35.13	0.49
	2684	620.00	726.30	732.44		732.86	0.018224	5.21	119.91	42.44	0.52
	2684	750.00	726.30	732.85		733.32	0.018497	5.54	138.16	48.27	0.53
	2684	870.00	726.30	733.17		733.69	0.018821	5.82	154.53	52.96	0.54
		1130.00	726.30	733.72		734.34	0.020213	6.42	185.89	60.95	0.57
	2790	150.00	727.04	730.67		730.71	0.001804	1.49	100.75	37.35	0.16
	2790	320.00	727.04	731.99		732.06	0.002411	2.09	153.19	41.98	0.19
	2790	450.00	727.04	732.78		732.86	0.003145	2.36	190.48	53.27	0.22
	2790	620.00	727.04	733.54		733.65	0.003768	2.63	235.51	64.37	0.24
	2790	750.00	727.04	734.03		734.15	0.004050	2.79	268.52	73.30	0.25
	2790	870.00	727.04	734.39		734.52	0.004010	2.95	299.87	101.93	0.26
		1130.00	727.04	735.03		735.19	0.003960	3.23	382.44	153.63	0.26
	2990	150.00	728.34	731.26		731.32	0.005991	2.00	75.01	45.18	0.27
	2990	320.00	728.34	732.63		732.70	0.004455	2.15	148.56	64.06	0.25
	2990	450.00	728.34	733.48		733.55	0.003725	2.15	208.94	78.85	0.23
	2990	620.00	728.34	734.27		734.35	0.003208	2.24	280.72	119.96	0.22
	2990	750.00	728.34	734.74		734.82	0.002822	2.31	350.71	175.81	0.21
	2990	870.00	728.34	735.09		735.17	0.002643	2.37	418.05	216.34	0.21
		1130.00	728.34	735.71		735.79	0.002336	2.46	575.78	289.87	0.20
	3190	150.00	729.81	732.50	731.25	732.57	0.006621	2.17	69.21	39.76	0.29
	3190	320.00	729.81	733.66	731.94	733.77	0.006282	2.66	120.12	48.42	0.30
	3190	450.00	729.81	734.35	732.31	734.48	0.005672	2.89	158.59	72.30	0.29
	3190	620.00	729.81	735.02	732.73	735.17	0.005085	3.13	221.29	113.75	0.29
	3190	750.00	729.81	735.42	733.03	735.57	0.004846	3.27	271.61	138.31	0.28
	3190	870.00	729.81	735.73	733.28	735.89	0.004724	3.39	316.94	157.18	0.28
		1130.00	729.81	736.28	733.75	736.45	0.004476	3.57	412.15	181.50	0.28
	3261	150.00	730.70	733.13	732.36	733.27	0.015012	3.01	49.88	32.23	0.43
	3261	320.00	730.70	734.20	733.02	734.41	0.012729	3.65	88.71	49.52	0.42
	3261	450.00	730.70	734.82	733.42	735.04	0.010596	3.89	130.72	87.29	0.40
	3261	620.00	730.70	735.44	733.88	735.65	0.008597	3.97	189.06	115.30	0.37
	3261	750.00	730.70	735.81	734.24	736.03	0.007912	4.07	226.39	138.39	0.36
	3261	870.00	730.70	736.10	734.64	736.33	0.007675	4.20	256.60	156.06	0.36
		1130.00	730.70	736.63	735.20	736.89	0.007558	4.51	317.59	186.72	0.36
	3311	150.00	731.50	733.36	732.73	733.63	0.003086	4.16	36.02	68.29	0.54
	3311	320.00	731.50	734.34	733.53	734.87	0.003435	5.82	54.95	89.51	0.61
	3311	450.00	731.50	734.86	734.05	735.60	0.003888	6.93	64.97	100.90	0.67
	3311	620.00	731.50	735.31	734.67	736.41	0.004850	8.41	73.69	110.82	0.76
	3311	750.00	731.50	735.54	735.09	736.97	0.005822	9.59	78.19	115.95	0.84
	3311	870.00	731.50	735.69	735.46	737.48	0.006968	10.74	80.99	119.13	0.93
		1130.00	731.50	737.00	737.00	737.11	0.000400	2.75	514.85	216.51	0.23
	3362.5	Culvert									
	3416	150.00	731.86	733.86	733.09	734.09	0.002441	3.88	38.64	44.23	0.48
	3416	320.00	731.86	735.17	733.89	735.56	0.002064	5.00	64.03	95.16	0.48
	3416	450.00	731.86	736.00	734.41	736.49	0.001940	5.62	80.03	129.91	0.49
	3416	620.00	731.86	737.33	735.02	737.87	0.001450	5.86	105.84	228.14	0.44
	3416	750.00	731.86	738.71	735.45	738.74	0.000099	1.66	884.76	359.11	0.12
	3416	870.00	731.86	739.18	735.82	739.20	0.000092	1.68	1067.30	420.03	0.11
		1130.00	731.86	739.70	736.58	739.73	0.000104	1.88	1305.29	488.16	0.12
	3464	150.00	734.29	736.08	736.08	736.55	0.014094	5.51	27.22	29.78	1.02
	3464	320.00	734.29	736.73	736.73	737.41	0.012168	6.62	48.34	35.89	1.01
	3464	450.00	734.29	737.12	737.12	737.91	0.011287	7.13	63.14	39.62	0.99
	3464	620.00	734.29	737.53	737.53	738.46	0.010659	7.71	80.46	43.57	1.00
	3464	750.00	734.29	738.30	737.81	738.94	0.005481	6.43	120.07	75.52	0.74
	3464	870.00	734.29	738.86	738.06	739.36	0.003501	5.76	173.39	128.34	0.61
		1130.00	734.29	739.38	738.69	739.89	0.003213	6.01	225.21	176.03	0.59
	3574	150.00	734.71	736.75	736.50	737.05	0.007035	4.42	33.93	30.63	0.74
	3574	320.00	734.71	737.41	737.17	737.91	0.007782	5.64	56.70	38.23	0.82
	3574	450.00	734.71	737.79	737.56	738.40	0.008036	6.25	71.95	42.57	0.85
	3574	620.00	734.71	738.21	737.98	738.93	0.007715	6.83	92.36	62.29	0.85

750.00	734.71	738.51	738.32	739.28	0.006973	7.06	115.29	87.67	0.83
870.00	734.71	738.98	738.60	739.60	0.004715	6.48	165.21	126.42	0.70
1130.00	734.71	739.51	739.14	740.08	0.003793	6.44	231.45	170.72	0.64
30.00	737.55	738.39	738.25	738.48	0.007261	2.36	12.71	30.35	0.64
110.00	737.55	739.10		739.20	0.003710	2.54	43.39	56.22	0.51
180.00	737.55	739.49		739.60	0.003013	2.65	67.89	70.35	0.48
260.00	737.55	739.88		739.99	0.002327	2.64	98.56	84.78	0.43
330.00	737.55	740.12		740.24	0.002131	2.76	120.30	104.26	0.42
410.00	737.55	740.24		740.39	0.002484	3.14	133.65	119.30	0.46
600.00	737.55	740.58		740.78	0.002604	3.64	180.87	161.66	0.49
30.00	739.03	739.76	739.76	739.94	0.018871	3.46	8.68	23.93	1.01
110.00	739.03	740.27	740.27	740.50	0.017768	3.89	28.29	62.54	1.02
180.00	739.03	740.48	740.48	740.74	0.017126	4.12	43.65	85.91	1.02
260.00	739.03	740.64	740.64	740.94	0.016758	4.39	59.22	104.40	1.03
330.00	739.03	740.76	740.76	741.08	0.016298	4.57	72.28	117.69	1.03
410.00	739.03	740.87	740.87	741.22	0.015946	4.75	86.38	130.53	1.03
600.00	739.03	741.09	741.09	741.49	0.015169	5.07	118.23	155.68	1.03
30.00	739.80	740.66		740.67	0.002508	0.95	31.72	87.46	0.28
110.00	739.80	741.14		741.17	0.002202	1.24	88.48	146.82	0.28
180.00	739.80	741.38		741.41	0.002277	1.42	126.47	175.68	0.30
260.00	739.80	741.58		741.62	0.002345	1.58	164.84	200.66	0.31
330.00	739.80	741.73		741.77	0.002409	1.69	195.13	218.37	0.32
410.00	739.80	741.87		741.92	0.002477	1.80	227.30	235.72	0.32
600.00	739.80	742.13		742.19	0.002505	2.05	294.83	279.03	0.34
30.00	739.80	740.83		740.83	0.000761	0.67	44.79	84.73	0.16
110.00	739.80	741.35		741.37	0.001188	1.10	100.33	126.54	0.22
180.00	739.80	741.61		741.64	0.001417	1.33	135.82	147.15	0.24
260.00	739.80	741.83		741.87	0.001612	1.52	170.51	164.83	0.26
330.00	739.80	741.99		742.04	0.001753	1.67	197.54	177.39	0.28
410.00	739.80	742.14		742.19	0.001798	1.83	224.53	191.92	0.29
600.00	739.80	742.41		742.48	0.001978	2.19	280.51	219.29	0.31
30.00	739.80	740.95		740.96	0.000550	0.77	38.75	46.17	0.15
110.00	739.80	741.59		741.62	0.001284	1.54	71.60	57.57	0.24
180.00	739.80	741.90		741.97	0.001771	1.98	90.76	63.28	0.29
260.00	739.80	742.17		742.26	0.002155	2.41	108.86	78.04	0.33
330.00	739.80	742.35		742.47	0.002418	2.74	124.52	92.37	0.36
410.00	739.80	742.51		742.66	0.002766	3.10	140.52	105.02	0.39
600.00	739.80	742.82		743.04	0.003469	3.82	176.85	129.22	0.44
30.00	740.52	741.20		741.34	0.025993	2.93	10.26	30.02	0.88
110.00	740.52	742.02		742.10	0.005202	2.23	49.41	65.15	0.45
180.00	740.52	742.39		742.48	0.003876	2.44	73.78	67.90	0.41
260.00	740.52	742.70		742.81	0.003625	2.73	95.18	70.22	0.41
330.00	740.52	742.92		743.06	0.003618	2.97	110.96	71.89	0.42
410.00	740.52	743.14		743.30	0.003696	3.23	126.77	73.52	0.43
600.00	740.52	743.56		743.78	0.003973	3.78	158.64	76.70	0.46
30.00	741.49	742.43		742.48	0.006358	1.76	17.06	37.24	0.46
110.00	741.49	742.78		742.96	0.015412	3.38	32.56	51.85	0.75
180.00	741.49	743.00		743.25	0.017824	4.03	44.66	60.87	0.83
260.00	741.49	743.25		743.53	0.016069	4.25	61.22	71.39	0.81
330.00	741.49	743.45		743.74	0.014203	4.30	76.71	79.99	0.77
410.00	741.49	743.67		743.96	0.012492	4.33	94.75	88.96	0.74
600.00	741.49	744.10		744.39	0.009572	4.39	137.44	117.82	0.67


Seco Fully Developed Conditions 1) Future 7/9/98
Geom: Proposed conditions
Legend
WS PF#7
WS PF#6
WS PF#5
WS PF#4
WS PF#3
WS PF#2
WS PF#1
Ground
500
100
50
25
10
5
2
Elevation (ft)
Main Channel Distance (ft)
745
740
735
730
725
720
715
710
0
1000
2000
3000
4000
1000
1165
1348
1400
1600
1760
1860
2000
2071
2144
2190
2272
2359
2419
2490
2590
2684
2790
2990
3190
3261
3311
3362.5
3464
3514
3714
3784
3914
4044
4244
4444
4544

HEC-RAS Plan: Future River: Seco Creek Trib. Reach: 1

Reach	RS	Q Total	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
	650	480.00	712.00	718.76	715.33	718.88	0.002944	2.83	169.34	41.11	0.25
	650	1820.00	712.00	722.20	718.53	722.40	0.002943	4.02	593.53	290.00	0.27
	650	3070.00	712.00	723.30	721.30	723.52	0.002941	4.43	912.63	290.00	0.27
	650	4690.00	712.00	724.37	722.43	724.63	0.002942	4.81	1223.02	290.00	0.28
	650	5950.00	712.00	725.08	722.86	725.37	0.002940	5.06	1428.91	290.00	0.28
	650	7480.00	712.00	725.86	723.27	726.19	0.002941	5.32	1653.36	290.00	0.29
	650	10800.00	712.00	727.33	724.02	727.75	0.002946	5.80	2079.69	290.00	0.29
	1000	250.00	717.50	720.39	720.39	721.06	0.066689	6.58	38.02	58.11	1.00
	1000	520.00	717.50	722.86	721.31	722.87	0.000579	1.02	672.53	490.39	0.11
	1000	690.00	717.50	723.80	721.74	723.80	0.000193	0.71	1136.25	504.84	0.06
	1000	900.00	717.50	724.83	722.00	724.83	0.000094	0.58	1752.56	621.00	0.05
	1000	1070.00	717.50	725.54	722.00	725.55	0.000067	0.54	2196.94	621.00	0.04
	1000	1190.00	717.50	726.34	722.01	726.34	0.000044	0.48	2691.79	621.00	0.03
	1000	1540.00	717.50	727.89	722.09	727.89	0.000028	0.44	3652.25	621.00	0.03
	1020	250.00	718.40	721.55	721.08	721.93	0.028604	4.92	50.79	124.63	0.68
	1020	520.00	718.40	722.87	722.01	722.89	0.001184	1.41	527.73	469.56	0.15
	1020	690.00	718.40	723.80	722.15	723.81	0.000300	0.86	968.12	479.77	0.08
	1020	900.00	718.40	724.83	722.27	724.83	0.000133	0.68	1463.90	482.00	0.05
	1020	1070.00	718.40	725.54	722.36	725.55	0.000093	0.62	1808.66	482.00	0.05
	1020	1190.00	718.40	726.34	722.34	726.34	0.000061	0.55	2192.64	482.00	0.04
	1020	1540.00	718.40	727.88	722.57	727.89	0.000039	0.51	2938.00	482.00	0.03
	1165	250.00	721.40	722.57	722.57	722.91	0.032318	4.87	60.01	341.81	0.92
	1165	520.00	721.40	722.99	722.90	723.02	0.002071	1.60	402.00	400.13	0.25
	1165	690.00	721.40	723.82	722.90	723.84	0.000543	1.14	784.12	495.00	0.14
	1165	900.00	721.40	724.84	722.90	724.85	0.000194	0.89	1285.34	495.00	0.09
	1165	1070.00	721.40	725.55	722.91	725.56	0.000126	0.82	1637.68	495.00	0.07
	1165	1190.00	721.40	726.34	722.91	726.35	0.000077	0.73	2030.74	495.00	0.06
	1165	1540.00	721.40	727.89	722.91	727.89	0.000046	0.68	2795.33	495.00	0.05
	1195	250.00	721.50	723.00	722.59	723.11	0.012646	2.77	106.23	329.23	0.44
	1195	520.00	721.50	723.10	723.10	723.14	0.003257	1.48	332.20	345.61	0.22
	1195	690.00	721.50	723.84	723.10	723.86	0.000909	1.05	633.37	458.00	0.13
	1195	900.00	721.50	724.84	723.10	724.85	0.000287	0.76	1092.02	458.00	0.08
	1195	1070.00	721.50	725.55	723.10	725.56	0.000175	0.68	1417.07	458.00	0.06
	1195	1190.00	721.50	726.34	723.10	726.35	0.000103	0.60	1780.13	458.00	0.05
	1195	1540.00	721.50	727.89	723.11	727.89	0.000058	0.54	2487.18	458.00	0.04
	1348	250.00	721.00	723.86	722.88	724.00	0.009428	2.92	85.58	124.90	0.39
	1348	520.00	721.00	723.89	723.61	724.06	0.012633	3.40	157.99	126.10	0.46
	1348	690.00	721.00	724.05	723.89	724.28	0.015594	3.95	179.89	137.35	0.51
	1348	900.00	721.00	724.88	723.89	725.00	0.005503	3.01	326.80	217.97	0.32
	1348	1070.00	721.00	725.57	723.95	725.65	0.002725	2.47	501.02	278.51	0.24
	1348	1190.00	721.00	726.36	724.07	726.40	0.001051	1.76	720.55	286.58	0.15
	1348	1540.00	721.00	727.89	724.39	727.92	0.000371	1.29	1182.38	314.99	0.10
	1400	250.00	721.30	724.33	723.28	724.48	0.008982	3.14	81.79	113.89	0.39
	1400	520.00	721.30	724.57	724.13	724.86	0.017666	4.75	132.79	144.79	0.56
	1400	690.00	721.30	724.83	724.61	725.14	0.016481	4.95	176.43	179.95	0.55
	1400	900.00	721.30	725.20	724.86	725.45	0.012248	4.68	251.71	228.22	0.49
	1400	1070.00	721.30	725.73	724.99	725.86	0.005631	3.56	386.25	267.91	0.34
	1400	1190.00	721.30	726.41	725.10	726.48	0.002068	2.44	569.91	270.03	0.21
	1400	1540.00	721.30	727.91	725.32	727.95	0.000604	1.62	976.71	273.77	0.12
	1600	250.00	722.30	725.88	724.52	726.00	0.006444	2.76	90.42	146.13	0.34
	1600	520.00	722.30	726.24	725.33	726.30	0.003769	2.32	288.03	285.44	0.26
	1600	690.00	722.30	726.45	725.77	726.52	0.003695	2.43	348.89	286.72	0.26
	1600	900.00	722.30	726.65	726.00	726.73	0.003906	2.62	405.95	287.91	0.27
	1600	1070.00	722.30	726.76	726.00	726.86	0.004366	2.84	437.03	288.56	0.29
	1600	1190.00	722.30	726.94	726.01	727.04	0.003755	2.74	489.51	289.65	0.27
	1600	1540.00	722.30	728.06	726.01	728.12	0.001193	1.90	817.71	301.48	0.16
	1760	250.00	724.00	726.90	725.98	727.00	0.006252	2.71	103.09	96.04	0.33
	1760	520.00	724.00	727.16	726.76	727.42	0.014728	4.50	133.26	106.85	0.52
	1760	690.00	724.00	727.36	727.03	727.70	0.017096	5.13	155.87	115.35	0.57
	1760	900.00	724.00	727.59	727.30	728.01	0.018739	5.69	183.84	125.07	0.60
	1760	1070.00	724.00	727.78	727.46	728.24	0.018994	5.99	208.28	132.97	0.61
	1760	1190.00	724.00	727.83	727.57	728.36	0.021619	6.46	214.88	135.03	0.66
	1760	1540.00	724.00	728.21	727.91	728.76	0.020770	6.85	279.63	206.85	0.66
	1860	210.00	724.20	727.51		727.84	0.010313	4.61	45.59	23.05	0.58
	1860	440.00	724.20	728.33	727.80	728.89	0.012767	6.16	73.97	66.36	0.67

Reach	River Sta	Profile	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
	1860	600.00	724.20	728.65	728.65	729.23	0.010731	6.09	99.15	92.14	0.63
	1860	790.00	724.20	728.92	728.92	729.56	0.008892	5.89	127.94	114.72	0.58
	1860	930.00	724.20	729.10	729.10	729.77	0.007764	5.71	149.55	129.10	0.55
	1860	1040.00	724.20	729.23	729.23	729.91	0.006970	5.55	167.16	139.73	0.52
	1860	1380.00	724.20	729.56	729.56	730.30	0.005587	5.27	217.61	166.47	0.47
	2000	210.00	724.60	728.71		728.78	0.004417	2.13	101.95	58.37	0.25
	2000	440.00	724.60	729.80		729.90	0.004204	2.59	181.62	86.89	0.25
	2000	600.00	724.60	730.15		730.28	0.005048	3.02	214.66	109.78	0.28
	2000	790.00	724.60	730.46		730.63	0.005947	3.46	254.22	145.28	0.31
	2000	930.00	724.60	730.63		730.82	0.006556	3.74	279.87	159.90	0.33
	2000	1040.00	724.60	730.74		730.96	0.007071	3.96	298.19	169.58	0.34
	2000	1380.00	724.60	731.03		731.32	0.008536	4.55	351.53	194.44	0.38
	2071	210.00	724.80	728.96		729.00	0.002306	1.54	136.47	59.59	0.18
	2071	440.00	724.80	730.09		730.16	0.003021	2.09	210.74	77.61	0.21
	2071	600.00	724.80	730.49		730.59	0.003603	2.49	248.45	108.07	0.24
	2071	790.00	724.80	730.87		730.99	0.004218	2.89	293.80	135.95	0.26
	2071	930.00	724.80	731.08		731.23	0.004681	3.15	324.51	151.95	0.28
	2071	1040.00	724.80	731.23		731.39	0.005018	3.35	347.96	163.11	0.29
	2071	1380.00	724.80	731.63		731.84	0.005855	3.85	419.66	193.29	0.32
	2144	210.00	724.90	729.14		729.19	0.002831	1.84	113.91	43.69	0.20
	2144	440.00	724.90	730.31		730.42	0.003934	2.61	170.03	58.15	0.25
	2144	600.00	724.90	730.76		730.91	0.004929	3.11	199.48	72.77	0.28
	2144	790.00	724.90	731.18		731.38	0.006017	3.63	232.57	86.29	0.32
	2144	930.00	724.90	731.42		731.66	0.006812	3.97	254.75	94.28	0.34
	2144	1040.00	724.90	731.60		731.86	0.007407	4.23	271.46	99.87	0.35
	2144	1380.00	724.90	732.05		732.40	0.009021	4.90	320.46	113.00	0.40
	2190	210.00	724.98	729.28		729.31	0.002297	1.46	143.59	67.52	0.18
	2190	440.00	724.98	730.51		730.56	0.002420	1.83	242.96	95.03	0.19
	2190	600.00	724.98	731.01		731.08	0.002644	2.10	293.95	107.85	0.20
	2190	790.00	724.98	731.49		731.58	0.002913	2.38	348.16	119.99	0.22
	2190	930.00	724.98	731.78		731.88	0.003122	2.56	383.99	127.37	0.23
	2190	1040.00	724.98	731.98		732.09	0.003277	2.70	410.70	132.61	0.24
	2190	1380.00	724.98	732.53		732.67	0.003568	3.06	535.63	280.59	0.25
	2272	210.00	725.10	729.37		729.38	0.000437	0.82	273.36	127.02	0.08
	2272	440.00	725.10	730.62		730.64	0.000477	1.08	459.81	167.80	0.09
	2272	600.00	725.10	731.15		731.17	0.000543	1.24	551.68	182.74	0.10
	2272	790.00	725.10	731.65		731.67	0.000613	1.41	646.48	196.97	0.11
	2272	930.00	725.10	731.96		731.99	0.000664	1.52	708.28	205.72	0.11
	2272	1040.00	725.10	732.18		732.21	0.000726	1.63	755.75	229.16	0.12
	2272	1380.00	725.10	732.76		732.80	0.000874	1.91	910.76	302.87	0.13
	2359	210.00	725.30	729.42		729.46	0.002109	1.56	134.73	53.67	0.17
	2359	440.00	725.30	730.67		730.74	0.002442	2.11	219.65	99.76	0.20
	2359	600.00	725.30	731.19		731.28	0.002659	2.41	280.64	132.57	0.21
	2359	790.00	725.30	731.70		731.80	0.002807	2.68	355.16	163.98	0.22
	2359	930.00	725.30	732.01		732.12	0.002887	2.84	409.11	183.53	0.23
	2359	1040.00	725.30	732.23		732.35	0.002925	2.95	452.83	202.44	0.23
	2359	1380.00	725.30	732.83		732.96	0.002966	3.19	589.05	252.45	0.24
	2419	210.00	725.40	729.56		729.60	0.002569	1.60	131.59	57.93	0.19
	2419	440.00	725.40	730.82		730.89	0.002552	2.08	222.98	98.29	0.20
	2419	600.00	725.40	731.36		731.44	0.002716	2.37	282.24	122.70	0.21
	2419	790.00	725.40	731.86		731.96	0.002864	2.63	350.52	145.83	0.22
	2419	930.00	725.40	732.18		732.29	0.002991	2.82	398.91	167.03	0.23
	2419	1040.00	725.40	732.40		732.52	0.003062	2.94	439.02	186.33	0.23
	2419	1380.00	725.40	733.00		733.14	0.003189	3.23	565.36	237.06	0.24
	2460	210.00	725.69	729.76		729.81	0.003309	1.83	114.71	50.10	0.21
	2460	440.00	725.69	731.01		731.09	0.003200	2.35	204.03	99.01	0.22
	2460	600.00	725.69	731.56		731.66	0.003274	2.62	265.07	123.93	0.23
	2460	790.00	725.69	732.08		732.19	0.003326	2.87	335.64	146.72	0.24
	2460	930.00	725.69	732.40		732.52	0.003343	3.01	384.79	157.86	0.24
	2460	1040.00	725.69	732.63		732.76	0.003344	3.11	422.48	165.89	0.24
	2460	1380.00	725.69	733.24		733.38	0.003403	3.39	529.45	186.82	0.25
	2590	210.00	725.92	730.10		730.16	0.003569	1.93	108.97	47.32	0.22
	2590	440.00	725.92	731.35		731.45	0.003866	2.55	178.70	64.20	0.24
	2590	600.00	725.92	731.91		732.04	0.004315	2.92	216.67	71.75	0.26
	2590	790.00	725.92	732.44		732.60	0.004918	3.31	257.97	85.64	0.29

	2590	930.00	725.92	732.76		732.95	0.005319	3.56	287.31	95.06	0.30
	2590	1040.00	725.92	732.99		733.19	0.005587	3.73	310.15	101.79	0.31
	2590	1380.00	725.92	733.60		733.85	0.006306	4.19	377.31	119.40	0.33
	2680	210.00	726.30	730.60		730.81	0.015051	3.62	58.07	27.62	0.44
	2680	450.00	726.30	731.86		732.19	0.017000	4.62	97.42	35.14	0.49
	2680	620.00	726.30	732.44		732.86	0.018227	5.21	119.90	42.43	0.52
	2680	810.00	726.30	733.01		733.51	0.018647	5.68	146.43	50.69	0.53
	2680	980.00	726.30	733.37		733.95	0.020215	6.17	165.37	55.85	0.56
	2680	1100.00	726.30	733.62		734.24	0.020790	6.44	179.72	59.46	0.57
	2680	1440.00	726.30	734.26		734.98	0.020992	7.01	220.57	67.83	0.59
	2790	210.00	727.04	731.23		731.28	0.002003	1.72	122.22	39.31	0.17
	2790	450.00	727.04	732.78		732.86	0.003144	2.36	190.52	53.28	0.22
	2790	620.00	727.04	733.54		733.65	0.003768	2.63	235.51	64.37	0.24
	2790	810.00	727.04	734.21		734.34	0.004027	2.88	283.37	88.04	0.25
	2790	980.00	727.04	734.66		734.81	0.004048	3.10	330.83	123.87	0.26
	2790	1100.00	727.04	734.95		735.11	0.004009	3.21	370.37	147.21	0.26
	2790	1440.00	727.04	735.66		735.83	0.003848	3.46	494.23	203.69	0.26
	2990	210.00	728.34	731.82		731.88	0.004953	2.06	102.12	51.10	0.26
	2990	450.00	728.34	733.48		733.55	0.003724	2.15	208.97	78.86	0.23
	2990	620.00	728.34	734.27		734.35	0.003208	2.24	280.71	119.95	0.22
	2990	810.00	728.34	734.92		735.00	0.002731	2.34	383.60	196.64	0.21
	2990	980.00	728.34	735.36		735.44	0.002523	2.42	481.35	248.47	0.21
	2990	1100.00	728.34	735.64		735.72	0.002382	2.46	555.28	281.40	0.20
	2990	1440.00	728.34	736.31		736.39	0.002055	2.50	766.16	339.62	0.19
	3190	210.00	729.81	732.94	731.53	733.03	0.006643	2.40	87.43	43.06	0.30
	3190	450.00	729.81	734.35	732.31	734.48	0.005671	2.89	156.60	72.31	0.29
	3190	620.00	729.81	735.02	732.73	735.17	0.005085	3.13	221.29	113.75	0.29
	3190	810.00	729.81	735.58	733.15	735.73	0.004784	3.34	294.23	148.02	0.28
	3190	980.00	729.81	735.97	733.47	736.14	0.004638	3.48	357.50	170.63	0.28
	3190	1100.00	729.81	736.22	733.70	736.39	0.004515	3.56	401.02	179.43	0.28
	3190	1440.00	729.81	736.82	734.31	736.99	0.004330	3.76	513.87	199.39	0.28
	3260	210.00	730.70	733.55	732.62	733.72	0.014223	3.29	63.88	34.54	0.43
	3260	450.00	730.70	734.82	733.42	735.04	0.010595	3.89	130.74	87.30	0.40
	3260	620.00	730.70	735.44	733.88	735.65	0.008597	3.97	189.06	115.30	0.37
	3260	810.00	730.70	735.96	734.47	736.18	0.007752	4.13	241.78	147.68	0.36
	3260	980.00	730.70	736.34	734.98	736.58	0.007617	4.34	282.73	169.78	0.36
	3260	1100.00	730.70	736.58	735.16	736.83	0.007580	4.48	310.50	183.39	0.36
	3260	1440.00	730.70	737.15	735.58	737.43	0.007572	4.83	385.68	216.46	0.37
	3310	210.00	731.50	733.75	733.04	734.11	0.003214	4.82	43.54	76.65	0.57
	3310	450.00	731.50	734.86	734.05	735.60	0.003887	6.93	64.97	100.90	0.67
	3310	620.00	731.50	735.31	734.67	736.41	0.004850	8.41	73.69	110.82	0.76
	3310	810.00	731.50	735.62	735.28	737.22	0.006369	10.16	79.71	117.68	0.88
	3310	980.00	731.50	735.79	735.79	737.96	0.008149	11.81	83.00	121.41	1.00
	3310	1100.00	731.50	737.00	737.00	737.10	0.000379	2.68	514.85	216.51	0.22
	3310	1440.00	731.50	737.39	737.00	737.53	0.000472	3.16	605.53	251.57	0.25
	3320	Culvert									
	3410	210.00	731.86	734.36	733.40	734.65	0.002258	4.34	48.40	61.23	0.48
	3410	450.00	731.86	736.00	734.41	736.49	0.001940	5.62	80.03	129.91	0.49
	3410	620.00	731.86	737.33	735.02	737.87	0.001450	5.86	105.84	228.14	0.44
	3410	810.00	731.86	739.01	735.64	739.03	0.000091	1.65	998.05	398.02	0.11
	3410	980.00	731.86	739.47	736.16	739.49	0.000094	1.75	1193.84	457.52	0.12
	3410	1100.00	731.86	739.68	736.49	739.71	0.000101	1.84	1293.53	485.02	0.12
	3410	1440.00	731.86	737.41	737.41	740.20	0.007484	13.43	107.26	232.41	1.00
	3480	210.00	734.29	736.35	736.35	736.89	0.012858	5.94	35.38	32.28	1.00
	3480	450.00	734.29	737.12	737.12	737.91	0.011287	7.13	63.14	39.62	0.99
	3480	620.00	734.29	737.53	737.53	738.46	0.010859	7.71	80.46	43.57	1.00
	3480	810.00	734.29	738.68	737.91	739.20	0.003845	5.83	155.07	111.22	0.63
	3480	980.00	734.29	739.17	738.32	739.64	0.003055	5.67	204.33	156.95	0.57
	3480	1100.00	734.29	739.37	738.64	739.86	0.003077	5.87	224.24	175.15	0.58
	3480	1440.00	734.29	740.18	739.11	740.63	0.002273	5.71	309.53	255.29	0.51
	3510	210.00	734.71	737.01	736.77	737.39	0.007533	4.97	42.22	33.60	0.78
	3510	450.00	734.71	737.79	737.56	738.40	0.008036	6.25	71.95	42.57	0.85
	3510	620.00	734.71	738.21	737.98	738.93	0.007715	6.83	92.36	62.29	0.85
	3510	810.00	734.71	738.81	738.46	739.46	0.005227	6.57	145.02	112.34	0.73

980.00	734.71	739.29	738.87	739.83	0.003854	6.23	203.28	151.94	0.64
1100.00	734.71	739.50	739.10	740.04	0.003684	6.33	229.08	169.14	0.63
1440.00	734.71	740.30	739.49	740.75	0.002443	5.92	331.58	244.79	0.53
100.00	737.55	738.82		739.00	0.009035	3.46	28.92	45.88	0.77
230.00	737.55	739.54		739.70	0.004225	3.20	71.88	72.39	0.57
330.00	737.55	739.94		740.09	0.003340	3.21	102.92	86.64	0.52
440.00	737.55	740.18		740.38	0.003256	3.51	127.17	112.26	0.53
500.00	737.55	740.37		740.56	0.002786	3.50	149.85	135.33	0.49
570.00	737.55	740.53		740.73	0.002570	3.57	173.79	156.04	0.48
880.00	737.55	741.02		741.26	0.002461	4.05	265.12	217.63	0.49
100.00	739.03	740.24	740.24	740.46	0.017266	3.80	26.30	58.83	1.00
230.00	739.03	740.58	740.58	740.87	0.016942	4.30	53.46	97.98	1.03
330.00	739.03	740.76	740.76	741.08	0.016298	4.57	72.28	117.69	1.03
440.00	739.03	740.91	740.91	741.27	0.015607	4.78	92.02	135.32	1.02
500.00	739.03	740.98	740.98	741.36	0.015516	4.91	101.83	143.28	1.03
570.00	739.03	741.06	741.06	741.46	0.015259	5.03	113.40	152.13	1.03
880.00	739.03	741.37	741.37	741.81	0.013785	5.35	164.49	186.26	1.00
100.00	739.80	741.10		741.12	0.002226	1.22	82.03	141.34	0.28
230.00	739.80	741.51		741.55	0.002317	1.52	151.02	192.04	0.30
330.00	739.80	741.73		741.77	0.002409	1.69	195.13	218.37	0.32
440.00	739.80	741.91		741.97	0.002514	1.85	238.33	241.39	0.33
500.00	739.80	742.01		742.06	0.002527	1.91	261.49	267.63	0.33
570.00	739.80	742.09		742.16	0.002509	2.01	285.04	275.73	0.33
880.00	739.80	742.41		742.50	0.002569	2.40	376.93	305.30	0.35
100.00	739.80	741.30		741.32	0.001156	1.06	94.36	122.73	0.21
230.00	739.80	741.76		741.79	0.001543	1.45	158.08	158.73	0.26
330.00	739.80	741.99		742.04	0.001753	1.67	197.54	177.39	0.28
440.00	739.80	742.19		742.24	0.001819	1.89	234.11	196.88	0.29
500.00	739.80	742.28		742.34	0.001853	2.00	253.25	206.42	0.30
570.00	739.80	742.37		742.44	0.001942	2.14	272.45	215.56	0.31
880.00	739.80	742.71		742.82	0.002277	2.65	350.72	249.40	0.35
100.00	739.80	741.53		741.56	0.001209	1.46	68.36	56.55	0.23
230.00	739.80	742.08		742.16	0.002034	2.26	102.17	71.05	0.32
330.00	739.80	742.35		742.47	0.002418	2.74	124.52	92.37	0.36
440.00	739.80	742.57		742.73	0.002888	3.22	146.42	109.31	0.40
500.00	739.80	742.67		742.85	0.003113	3.46	158.13	117.38	0.41
570.00	739.80	742.78		742.99	0.003367	3.71	171.29	125.81	0.43
880.00	739.80	743.17		743.49	0.004278	4.66	226.92	156.55	0.50
100.00	740.52	741.95		742.03	0.005601	2.22	44.99	62.86	0.46
230.00	740.52	742.59		742.70	0.003657	2.62	87.79	69.43	0.41
330.00	740.52	742.92		743.06	0.003618	2.97	110.96	71.89	0.42
440.00	740.52	743.21		743.38	0.003733	3.33	132.28	74.08	0.44
500.00	740.52	743.35		743.54	0.003816	3.50	142.70	75.13	0.45
570.00	740.52	743.50		743.71	0.003924	3.70	154.03	76.25	0.46
880.00	740.52	744.04		744.35	0.004431	4.48	196.71	85.24	0.50
100.00	741.49	742.75		742.91	0.014794	3.25	30.77	50.39	0.73
230.00	741.49	743.15		743.43	0.016917	4.20	54.76	67.48	0.82
330.00	741.49	743.45		743.74	0.014203	4.30	76.71	79.99	0.77
440.00	741.49	743.74		744.03	0.011964	4.33	101.55	92.11	0.73
500.00	741.49	743.88		744.18	0.011052	4.34	115.16	98.12	0.71
570.00	741.49	744.04		744.33	0.010040	4.36	130.84	108.83	0.68
880.00	741.49	744.59		744.90	0.006769	4.55	213.72	193.53	0.59

Flood Protection Study for Eagle Pass, Texas
Appendix D

Appendix D presents the Alternatives considered for flood damage reduction. Each of these alternatives are described below. Costs and the value of structures protected are presented in spreadsheets. Costs were computed using March, 1999 price levels. Hydraulic calculations, showing the differences in water surface elevations for the different alternatives for the 100-yr flood event are also included. Sheets showing each Alternative, appear at the end of this Appendix. Appendix D is organized as follows:

Alternatives Considered
Alternative Costs and Value of Structures Protected
Comparison of 100-yr Water Surface Elevations for Alternatives Considered
Value of Structures to be protected

Alternatives Considered

Rio Grande River

Alternative RO1

This alternative consists of a buyout of approximately 24 houses and businesses along Ryan Street. Many of these residences were flooded by the storm of August 23-25,1998 from rainfall resulting from Hurricane Charley. A buyout would involve a displacement and demolition of structures in the flood plain. Sheet 16 shows the structures affected which fall between station 80+00 and 96+00 in the model study. These structures are also located upstream of the International Bridge (US Hwy 57) Structures and land values were estimated at $40,000 per property in March, 1999 price levels.

Main Arroyo

Alternative MA1 & TR2.1

This alternative consists of two phases. Phase one is to divert approximately 800 cfs of flood flows away from the downtown area near the confluence of Tributary 2 and the Main Arroyo near Hidalgo Street to the Rio Grande River. The second phase (identified as TR 2.1) is to extend this 800 cfs diversion to the Sports complex near the High School. Overall, the alternative would include:

- Phase one - A tunnel/conduit 96" in diameter and about 3000 feet long extending from the Rio Grande River to Hidalgo Street (near Trib 2 - Section 1568).
- Phase two – A 96" pipe about 2700 feet long extending from the intersection of Concho Street and Hildalgo Street along Hildalgo Street to the Sports Field near the High School.

This diversion could be constructed for the most part in public right-of-way and would alleviate severe flooding in the downtown area.

Flood reduction to properties downstream of this diversion would occur. From the routings for this alternative, the diversion would keep flood flows in the existing channel. Flood reduction improvements would occur for about 128 residences and businesses. The structures are identified on sheets 2, 3 and 5. The proposed alternative is shown on sheet 21 and 22 at the end of this study.

Improvements from Phase one would be to reduce the 100-year flood levels in Tributary 2 and the Main Arroyo to a 10-year level of flood protection for properties from Hidalgo Street (Section 1756) to Commerce Street (Main Arroyo - Section 4929) and a 25-year level of flood protection for properties from Commerce Street (Section 4929) to the Golf Course (Section 1473). Improvements from Phase two would be to reduce the 100-year flood levels in Tributary 2 from Church Street (Section 150) to Memorial Street (Section 4338).

Tributary 1

Alternative TR1.1

This alternative consists of diverting higher flood flows through a 72" diameter conduit from the Travis and Wilson Street intersection (Section 2725) down Wilson Street to Crockett Street (Section 1208). This diversion would take higher flood flows away from flooded homes and discharge it below the affected area.

Approximately 10 residences would be protected from flooding for the 100-yr event. Existing right-of-way constrictions limit channel widening. Sheet 21 shows the proposed alignment of the 72" RCP.

Alternative TR1.2

This alternative consists of channel widening and deepening in some areas and culvert replacement at three locations. The proposed improvements would consist of:

- Channel improvements are widening to 10' and deepening to 4' with a concrete lining from Pierce (Section 893) to Wilson Streets (Section 2427) for approximately 1,500 feet.
- Culvert replacement at Crockett Street (Section 1490 to 1538) from 1-5.8'x16' to 2-9'x10' box culverts.
- Culvert replacement at Wilson Street (Section 2080 to 2125) From 1-5'x20' to 2-9'x10' box culverts.
- Culvert replacement at Travis Streets (Section 2155 to 2197) From 1-6'x18' to 2-8'x8' box culverts.

About 12 residences would be protected from flooding for the 100-year event. Existing right-of-way constrictions limit channel widening. Sheet 21 shows the proposed channel widening and deepening.

Tributary 2

Alternative TR2.1

This alternative is Phase Two of MA1 above. Costs associated with it are included with MA1. Essentially, this alternative is to divert most of the excess flood flows away from an existing channel and restore the flood carrying capacity of the channel, thereby, adding additional flood protection to structures located in the area. Sheet 22 and 23 show the limits of Phase Two.

Alternative TR2.2

This alternative consists of providing a detention pond at a sports field complex behind the existing High School above Memorial Street. The outlet from the detention pond would discharge above Memorial Street and would provide limited flood protection from Memorial (Section 4338) to Trinity Streets (Section 2521). An 1100' long pilot channel would convey low flows to the outlet around the sports field. Sheet 23 shows the limits of this alternative.

Flood reduction improvements would be to reduce flooding in a cemetery immediately downstream of the detention pond west of Memorial and flooding to homes east of Colorado Street. Approximately, 15 homes would be protected for a 25-year flood event.

Alternative TR2.3

This alternative consists of diverting approximately 500 cfs in culvert from Arlington Street (Section 3562) to Hidalgo Street (Section 1756). This diversion would be a 72" concrete pipe approximately 1800' long. The culvert would extend from the intersection of Concho and Hidalgo to the intersection of Arlington and Hidalgo. It would then turn west along Arlington and continue north along the existing channel to the sports field. A new headwall would be constructed at the sports field to accept storm water runoff. Sheet 22 and 23 show the limits of the proposed culvert.

Flood reduction improvements would provide increased flood protection to residences from Memorial Street downstream to Hidalgo Street. Approximately 52 structures would receive increased flood protection from the 100-year storm event.

Alternative TR2.4

This alternative consists of channel widening and culvert improvements at seven locations along Tributary 2 from Church Street (Section 150) upstream to Memorial Street (Section 4338). The proposed improvements would consist of:

- Channel improvements are to increase the channel width 10' for approximately 4200 feet providing enough capacity to carry most of the 100-year flow.
- Culvert improvements at First Street (Section 540 to 564) are to add 1 - 4'x10' box culvert to the existing 2- 4'x10' box culverts.
- Culvert improvements at Second Street (Section 1051 to 1103) are to add 1 – 4'x10' box culvert to the existing 2-4'x10' box culverts.
- Culvert improvements at Hidalgo Street (Section 1568 to 1756) are to add 1 – 4'x8' box culvert to the existing 2-4'x8' box culverts.
- Culvert improvements at Trinity Street (Section 2461 to 2521) are to add 1 – 3.5x8' box culvert to the existing 2-3.5'x8' box culverts.
- Culvert improvements at Colorado Street (Section 2821 to 2845) are to add 1 – 4.5'x6' box culvert to the existing 2-4.5'x6' box culverts.
- Culvert improvements at Arlington Street (Section 3562 to 3604) are to add 1 – 4.5'x6' box culvert to the existing 2-4.5'x6' box culverts.
- Culvert improvements at Memorial Street (Section 4338 to 4370) are to add 1 – 4.5'x6' box culvert to the existing 2-4.5'x6' box culverts.

Flood reduction improvements would be to provide a 100-year level of protection to approximately 84 homes located between Church and Memorial Streets.

Alternative TR2.5

This alternative consists of a combination of TR2.3 and TR2.4.

Flood reduction improvements would to provide a higher level of flood protection to 52 homes located between Hidalgo and Memorial Streets. It would provide a 100-year level or protection to 32 homes located between Hidalgo and First Streets.

Alternative TR2.6

This alternative consists of channelizing approximately 2700 feet of the upper end of Tributary 2 from Bibb Street (Section 6076) to just below Loop 431 or US Highway 277 (Section 8155) and make culvert improvements at North Bibb Street and Royal Haven Drive. Proposed improvements would consist of:

- Construct a concrete channel 15' wide with 2:1 side slopes from the Sports Field (Section 5037) to North Bibb Street (Section 6008). The channel would be approximately 970' long.
- Construct a box culvert at North Bibb Street (Section 6008 to Section 6076) as a 5'x9' box culvert.

- Construct a concrete channel 15' wide with 2:1 side slopes approximately from North Bibb Street (Section 6076) to Royal Haven Drive (Section 6331). The channel would be approximately 250' long.
- Construct a new box culvert at Royal Haven Drive (Section 6331 to 6391) as a 4'x8' box culvert.
- Construct an earthen channel approximately 15' with 4:1 side slopes from Royal Haven (Section 6391) to US Highway 277 (Section 8155). The channel would be approximately 1760' long.

Flood reduction improvements would be to protect approximately 12 homes in the 100-year floodplain. This alternative is shown on sheet 23.

Unnamed Tributary

Alternative UN1

This alternative consists of providing upstream detention above Cherry Leaf Drive (Section 7554) adjacent to the Learning Center. The outlet from the detention pond would discharge below Cherry Leaf Drive. Some flood protection would be provided to residences downstream of Cherry Leaf Drive and above FM 3443 (Section 5290). Limited flood protection would be provided for storm occurrences between the 25-year and 100-year flood events.

Flood reduction improvements would be to protect approximately 41 homes and 3 businesses presently located in the 100-year floodplain.

Alternative UN2

This alternative consists of providing upstream detention above US Highway 277 (Section 11814). The outlet from the detention would discharge below US Highway 277. A higher level of flood protection would be provided to properties downstream of US Highway 277 (Section 11814) to FM 1021 El Indio Highway (Section 1242).

Flood reduction improvements would be to provide limited flood protection to approximately 46 homes and 5 businesses presently located in the 100-year floodplain.

Alternative UN3

This alternative consists of culvert and channel improvements along the lower portion of the Unnamed Tributary from El Indio Highway (Section 1242) to Cherry Leaf Drive (Section 7554). Culvert improvements are proposed at FM 1021, FM 3443, Dell Crest Drive and Cherry Leaf Drive. Proposed improvements would consist of:

- Construct culvert improvements at FM 1021 (Section 1242) by adding 2 –7'x6' concrete box culverts to the existing 5-7'x7' concrete box culverts
- Widen concrete channel from El Indio Highway (Section 1242) to FM 3443 (Section 5227) to a 70' wide channel with 2:1 side slopes. The channel would be approximately 4000' long.
- Construct culvert improvements at FM 3443 (Section 5227 to Section 5290) by adding 2-8'x8' box culverts to the existing 6-8'x8' concrete box culverts.
- Widen concrete channel from FM 3443 (Section 5290) to Dell Crest (Section 6048) to a 70' wide channel with 2:1 side slopes. The channel would be approximately 750' long.

- Construct culvert improvements at Dell Crest Drive (Section 6048 to Section 6102) by adding 2-5'x10' box culverts to the existing 1-4.5x8 concrete box culvert.
- Widen concrete channel from Dell Crest Drive (Section 6102) to Cherry Leaf Drive (Section 7507) to a 60' wide channel with 2:1 side slopes. The channel would be approximately 1400' long.
- Construct culvert improvements at Cherry Leaf Drive (Section 7507 to Section 7554) by adding 3-4'x8' box culverts to the existing 8-4'x4' concrete box culverts.

Flood reduction improvements would be to provide a 100-year level of protection to 213 residences and 15 businesses from FM 1021 to Cherry Leaf Drive.

Alternative UN4

This alternative consists of a combination of UN2 and UN3. As explained above a combination of upstream detention and downstream channel and culvert improvements would provide for a higher level of flood protection along most of Unnamed Tributary from FM 1021 (Section 1226) to US Highway 277 (Section 11814).

Flood reduction improvements would be to provide a higher level of flood protection to the 213 residences and 15 businesses identified above and protect the Language Development Center and 6 businesses along US Highway 277.

Seco Creek Tributary

Alternative SE1

This alternative consists of constructing an earthen channel from Seco Creek (Section 1000) to US Highway 277 (Section 3311). The earthen channel would be approximately 20' wide with 4:1 side slopes. It would be approximately 2300' long. This alternative is shown on Sheet 25.

Flood reduction improvements would be to provide flood protection to 2 homes and one church downstream of Loop 431.

Alternative SE2

This alternative consists of constructing a concrete lined channel upstream of US Highway 277 approximately 850 feet. The concrete channel would have to be 8' wide with 2:1 side slopes. This alternative is shown on Sheet 25.

Flood reduction improvements would be to protect 2 businesses and 3 houses located adjacent to the channel.

Alternative SE3

This alternative consists of constructing upstream detention at the Southern Pacific Railroad embankment (Section 4544). Currently, 2-96" steel pipes discharge storm water at this location. Closing off one of the pipes would provide some detention upstream of the old railroad embankment. Land above the railroad embankment is undeveloped and could easily be used as a detention area.

Flood reduction improvements would be to provide increased flood protection to 2 businesses and 2 homes.

Alternative SE4

This alternative consists of combining SE1 and SE2, essentially channelizing the Seco Creek Tributary from above US Highway 277 (Section 4044) to its confluence with the main channel of Seco Creek (Section 1000).

Flood reduction improvements would be to provide a 100-year level of flood protection to 2 businesses, 3 homes, a church, and a recycling yard downstream of US Highway 277.

Table 7 – Recommended Implementation Plan

Stream		Alternative	Description	Cost
Rio Grande River	RO1	Existing House Buyout	• Buyout of existing homes and businesses along Ryan Street.	$ 940,000
Main Arroyo	MA1	MA1 - Diversion of 800 cfs to River	• Diversion of flood flows away from Downtown area near confluence of Tributary 2 and Main Arroyo down Church St. or 1st Street. Conduit 8' diameter. About 4000' long.	$ 3,181,000
Tributary 1	TR1.2	Channel widening & culvert improvement	• Channel widening and deepening in same area.	$ 636,200
Tributary 2	TR2.1 TR2.4 TR2.6	Diversion of 800 cfs to River away from Downtown area Channelization and culvert improvements Upstream Channelization	• Diversion of flood flows away from Downtown area. Conduit 8' diameter. About 4000' long. • Channel widening and Culvert improvements • Widening and deepening channel parallel to Royal Crown Drive w/ culvert improvement	see MA1 $ 1,163,150 $ 137,000
Tributary 3		Existing	• Do nothing	
Unnamed Tributary	UN4	Combination of UN2 & UN3	• Dry Detention above US Hwy 277 Widen and deepen channel between FM 1021 and FM 3443 to Cherry Leaf, add culvert capacity @ 4 locations.	$ 1,917,800
Seco Creek Tributary	SE4	Combination of projects SE1, SE2, and SE3	• Widen and deepen existing channel below US 277, Widen channel upstream of US Hwy 277 Construct Detention Pond upstream of Railroad embankment	$ 342,031

Alternative Costs and Value of Protected Structures

ALBERT H. HALFF ASSOCIATES, INC.
8616 Northwest Plaza Drive
Dallas, Texas 75225
(214) 346-6200

CLIENT: City of Eagle Pass

PROJECT: Flood Reduction Alternative

AVO: 16739

FILE: Summary

DATE: November, 2000

BY: Halff Associates

ESTIMATE OF PROBABLE COSTS AND VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Alternative	Description	Costs	Value of Protected Structures
RO1	Rio Grande River - House buyout	$ 940,000.00	$ 780,000.00
MA1	Main Arroyo - Diversion of 800 cfs to River	$ 3,181,000.00	$ 4,560,000.00
TR1.1	Diversion in 72" RCP	$ 388,000.00	$ 300,000.00
TR1.2	Channel Deepen & Culvert Imp.	$ 636,200.00	$ 360,000.00
TR2.1	Diversion of 800 cfs to River	see MA1 above	
TR2.2	Detention @ Sports Field	$ 167,860.00	$ 450,000.00
TR2.3	Diversion of 500 cfs	$ 964,100.00	$ 1,560,000.00
TR2.4	Channelization & Culvert Improvements	$ 1,163,150.00	$ 2,310,000.00
TR2.5	Combination of 2.3 & 2.4	$ 2,127,250.00	$ 2,520,000.00
TR2.6	Upstream Channelization parallel to Royal Ridge	$ 137,000.00	$ 360,000.00
UN1	Detention @ Learning Center	$ 707,950.00	$ 1,680,000.00
UN2	Detention @ above US Hwy 277	$ 410,800.00	$ 2,130,000.00
UN3	Channelization & Culvert Improvements	$ 1,507,000.00	$ 8,640,000.00
UN4	Combination of UN2 & UN3	$ 1,917,800.00	$ 9,660,000.00
SE1	Channel 20' US Hwy 277 to mouth w/ Seco Cr.	$ 120,933.00	$ 210,000.00
SE2	Channel 8' wide above US Hwy 277	$ 106,200.00	$ 390,000.00
SE3	Detention above Southern Pacific RR	$ 235,831.00	$ 360,000.00
SE4	Combination of SE1, SE2, & SE3	$ 342,031.00	$ 390,000.00
	Subtotals less all Combinations of Alternatives	$ 10,666,024.00	$ 24,090,000.00

Costs and Values are linked to other spreadsheets in file
This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that this is an estimate only, and that Engineer shall not be liable to Owner or to a third party for any failure to accurately estimate the cost of the project, or any part thereof.

Table 6 - Alternative Improvement Plans Considered

Stream	Problem		Alternative	Description	Cost
Rio Grande River	• Periodic Flooding from rise in river levels...usually during storms induced by tropical disturbances. • Minor flooding along Ryan Street. • Lift station closed during high flooding	RO1	Existing House Buyout	• Do nothing • Buyout of existing homes and businesses along Ryan Street. • Shut down lift station periodically	$ 940,000
Main Arroyo	• Disruption of traffic at low water crossings. • Minor flooding of properties adjacent to creek during heavy storm events.	MA1	Existing MA1 - Diversion of 800 cfs to River Regular Maintenance	• Do nothing • Diversion of flood flows away from Downtown area near confluence of Tributary 2 and Main Arroyo down Church St. or 1st Street. Conduit 8' diameter. About 4000' long. • Routine channel clean up and mowing	$ 3,181,000
Tributary 1	• Disruption of traffic at low water crossings. • Minor flooding of structures adjacent to creek. • Minor flooding of structures adjacent to creek and traffic disruption during heavy storm events.	TR1.1 TR1.2	Existing Diversion in 72" RCP Channel widening & culvert improvement	• Do nothing • Diversion thru 72" diameter conduit, from Travis & Wilson intersection to Crockett St., • Channel widening and deepening in same area. • Routine channel clean up and mowing.	$ 388,000 $ 636,200
Tributary 2	• Significant flooding of homes in lower watershed • Disruption of traffic at low water crossings. • Minor flooding of structures adjacent to creek in upper watershed.	TR2.1 TR2.2 TR2.3 TR2.4 TR2.5 TR2.6	Existing Diversion of 800 cfs to River away from Downtown area Detention Diversion of 500 cfs Channelization and culvert improvements Combination of 2.3 & 2.4 Upstream Channelization	• Do nothing • Diversion of flood flows away from Downtown area. Conduit 8' diameter. About 4000' long. • Construct dry detention pond at Sports Field to reduce flows below Memorial Drive • Diversion of 500 cfs down Hildalgo Street • Channel widening and Culvert improvements • Combination • Widening and deepening channel parallel to Royal Crown Drive w/ culvert improvement • Routine channel clean up and mowing.	see MA1 $ 167,860 $ 964,100 $ 1,163,150 $ 2,127,250 $ 137,000
Tributary 3	• Disruption of traffic at low water crossings		Existing	• Do nothing	
Unnamed Tributary	• Significant flooding of homes in lower portion of watershed • Disruption of traffic at low water crossings. • Minor flooding of structures adjacent to creek in upper watershed.	UN1 UN2 UN3 UN4	Existing Detention Pond @ Learning Center Detention Pond above US 277 Channelization and Culvert Improvement Combination of UN2 & UN3	• Do nothing • Dry Detention at Learning Center above Cherry Leaf Drive • Dry Detention above US Hwy 277 • Widen and deepen channel between FM 1021 and FM 3443 to Cherry Leaf, add culvert capacity @ 4 locations. • Combine pond and culvert improvements	$ 707,950 $ 410,800 $ 1,507,000 $ 1,917,800
Seco Creek	• Minor flooding in lower reaches	SE1 SE2 SE3 SE4	Existing Channel 20' wide below US 277 Channel 8' wide above US 277 Detention above RR tracks Combination of projects	• Do Nothing • Widen and deepen existing channel below US 277. • Widen channel upstream of US Hwy 277 • Construct Detention Pond upstream of Railroad embankment • Combination of SE1, SE2, SE3, SE4	$ 120,933 $ 106,200 $ 235,831 $ 342,031

ALBERT H. HALFF ASSOCIATES, INC.
8616 Northwest Plaza Drive
Dallas, Texas 75225
(214) 739-0094

CLIENT:	City of Eagle Pass	**FILE:**	Estimate
PROJECT:	**Rio Grande River - RO1 - House Buyout**		November, 2000
AVO:	16739	**BY:**	Halff Associates

ESTIMATE OF PROBABLE COSTS AND VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description		Quantity	Units	Unit Price	Amount
1	Residences		21	Each	$ 40,000.00	$ 840,000.00
2	Businesses		1	Each	$ 100,000.00	$ 100,000.00
3						
4						
			Subtotal			$ 940,000.00
			Total			$ 940,000.00

This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that this is an estimate only, and that Engineer shall not be liable to Owner or to a third party for any failure to accurately estimate the cost of the project, or any part thereof.

VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description		Quantity	Units	Unit Values	Amount
	Average residential structure value			Each	$ 40,000.00	$ -
	Average business structure value			Each	$ 100,000.00	$ -
1	Residences		21	Each	$ 20,000.00	$ 420,000.00
2	Residential contents		21	L.S.	$ 10,000.00	$ 210,000.00
3	Businesses		1	Each	$ 100,000.00	$ 100,000.00
4	Business contents		1	L.S.	$ 50,000.00	$ 50,000.00
5	Other		0	Each	$ -	$ -
			Total			$ 780,000.00

Values attributable to this alternative depend to a large extent on the level of protection afforded to flooded properties
Values for structures were computed at 50% of the structure value protected
Values for residential contents were computed at 25% of average structure value
Values for business contents were computed at 50% of average structure value

ALBERT H. HALFF ASSOCIATES, INC.
8616 Northwest Plaza Drive
Dallas, Texas 75225
(214) 739-0094

CLIENT:	City of Eagle Pass	**FILE:**	Estimate
PROJECT:	**MA1 - Diversion of 800 cfs to River**		November, 2000
AVO:	16739	**BY:**	Halff Associates

ESTIMATE OF PROBABLE COSTS AND VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description	TxDOT	Quantity	Units	Unit Price	Amount
1	Mobilization		1	L.S.	$ 20,000.00	$ 25,000.00
2	96" RCP	464	2700	L.F.	$ 280.00	$ 756,000.00
3	Street Repair		3200	S.Y.	$ 40.00	$ 128,000.00
4	Cement Stabilized Backfill	276	8000	C.Y.	$ 25.00	$ 200,000.00
5	Select Fill	134	5000	C.Y.	$ 3.00	$ 15,000.00
6	Tunnel and Liner for 96" diameter conduit		3000	L.F.	$ 500.00	$ 1,500,000.00
7	Utility Relocations		1	L.S.	$ 50,000.00	$ 50,000.00
8	Erosion Controls		1	L.S.	$ 15,000.00	$ 15,000.00
9	Traffic Control		1	L.S.	$ 20,000.00	$ 20,000.00
10	Jack & Bore under RR tracks	476	150	Ft	$ 1,200.00	$ 180,000.00
11	Manholes & Drop Structures		2	Each	$ 25,000.00	$ 50,000.00
12	Inlet Structure		1	Each	$ 25,000.00	$ 25,000.00
13	Outlet Structure		1	Each	$ 25,000.00	$ 25,000.00
14	Land Acquistion		3	Acre	$ 50,000.00	$ 150,000.00
15	Drainage Easements		5	Each	$ 5,000.00	$ 25,000.00
16	Seeding for Erosion Control		14,000	S.Y.	$ 0.50	$ 7,000.00
17	Lift Station restart		1	L.S.	$ 10,000.00	$ 10,000.00
			Subtotal			$ 3,181,000.00
			Total			$ 3,181,000.00

This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that this is an estimate only, and that Engineer shall not be liable to Owner or to a third party for any failure to accurately estimate the cost of the project, or any part thereof.

VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description		Quantity	Units	Unit Values	Amount
	Average residential structure value			Each	$ 40,000.00	$ -
	Average business structure value			Each	$ 100,000.00	$ -
1	Residences		122	Each	$ 20,000.00	$ 2,440,000.00
2	Residential contents		122	L.S.	$ 10,000.00	$ 1,220,000.00
3	Businesses		6	Each	$ 100,000.00	$ 600,000.00
4	Business contents		6	L.S.	$ 50,000.00	$ 300,000.00
5	Other		0	Each	$ -	$ -
			Total			$ 4,560,000.00

Values attributable to this alternative depend to a large extent on the level of protection afforded to flooded properties
Values for structures were computed at 50% of the structure value protected
Values for residential contents were computed at 25% of average structure value
Values for business contents were computed at 50% of average structure value

ALBERT H. HALFF ASSOCIATES, INC.
8616 Northwest Plaza Drive
Dallas, Texas 75225
(214) 739-0094

CLIENT:	City of Eagle Pass	**FILE:**	Estimate
PROJECT:	**TR1.1 - Diversion in 72" RCP from Travis to Crockett St.**		November, 2000
AVO:	16739	**BY:**	Halff Associates

ESTIMATE OF PROBABLE COSTS AND VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description	TxDOT	Quantity	Units	Unit Price	Amount
1	Mobilization		1	L.S.	$ 15,000.00	$ 15,000.00
2	72" RCP	464	760	L.F.	$ 240.00	$ 182,400.00
3	Street Repair		1300	S.Y.	$ 40.00	$ 52,000.00
4	Cement Stabilized Backfill	276	1450	CY	$ 30.00	$ 43,500.00
5	Utility Relocations		1	L.S.	$ 20,000.00	$ 20,000.00
6	Erosion Controls		1	L.S.	$ 5,000.00	$ 5,000.00
7	Traffic Control		1	L.S.	$ 20,000.00	$ 20,000.00
8	Manholes & Drop Structures		4	Each	$ 5,000.00	$ 20,000.00
9	Inlet Structure		1	Each	$ 7,500.00	$ 7,500.00
10	Outlet Structure		1	Each	$ 7,500.00	$ 7,500.00
11	Land Acquistion		1	Acre	$ 5,000.00	$ 5,000.00
12	Drainage Easements		4	Each	$ 2,500.00	$ 10,000.00
13	Seeding for Erosion Control		100	S.Y.	$ 1.00	$ 100.00
			Subtotal			$ 388,000.00
			Total			$ 388,000.00

This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that this is an estimate only, and that Engineer shall not be liable to Owner or to a third party for any failure to accurately estimate the cost of the project, or any part thereof.

VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description		Quantity	Units	Unit Values	Amount
	Average residential structure value			Each	$ 40,000.00	$ -
	Average business structure value			Each	$ 100,000.00	$ -
1	Residences		10	Each	$ 20,000.00	$ 200,000.00
2	Residential contents		10	L.S.	$ 10,000.00	$ 100,000.00
3	Businesses		0	Each	$ 100,000.00	$ -
4	Business contents		0	L.S.	$ 50,000.00	$ -
5	Other		0	Each	$ -	$ -
			Total			$ 300,000.00

Values attributable to this alternative depend to a large extent on the level of protection afforded to flooded properties
Values for structures were computed at 50% of the structure value protected
Values for residential contents were computed at 25% of average structure value
Values for business contents were computed at 50% of average structure value

ALBERT H. HALFF ASSOCIATES, INC.
8616 Northwest Plaza Drive
Dallas, Texas 75225
(214) 739-0094

CLIENT:	City of Eagle Pass	**FILE:**	Estimate
PROJECT:	**TR1.2 - Channel Widen and Culvert replacement**		November, 2000
AVO:	16739	**BY:**	Halff Associates

ESTIMATE OF PROBABLE COSTS AND VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description	TxDOT	Quantity	Units	Unit Price	Amount
1	Mobilization		1	L.S.	$ 12,000.00	$ 12,000.00
2	Select Fill	134	3000	C.Y.	$ 4.00	$ 12,000.00
3	Concrete Channel 10' wide rectangular 4' deep		1400	L.F.	$ 250.00	$ 350,000.00
4	Culvert Improvement - Crockett - 2 - 8'x8' RBC		1	L.S.	$ 50,000.00	$ 50,000.00
5	Culvert Improvement - Wilson - 2 - 9'x10' RBC		1	L.S.	$ 60,000.00	$ 60,000.00
6	Culvert Improvement - Travis - 2 - 9'x10' RBC		1	L.S.	$ 60,000.00	$ 60,000.00
7	Street Repair		600	S.Y.	$ 40.00	$ 24,000.00
8	Cement Stabilized Backfill		100	C.Y.	$ 30.00	$ 3,000.00
9	Utility Relocations		1	L.S.	$ 10,000.00	$ 10,000.00
10	Erosion Controls		1	L.S.	$ 5,000.00	$ 5,000.00
11	Traffic Control		1	L.S.	$ 5,000.00	$ 5,000.00
12	Land Acquistion		1	Acre	$ 5,000.00	$ 5,000.00
13	Drainage Easements		20	Each	$ 2,000.00	$ 40,000.00
14	Seeding for Erosion Control		200	S.Y.	$ 1.00	$ 200.00
						$ -
			Subtotal			$ 636,200.00
			Total			$ 636,200.00

This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that this is an estimate only, and that Engineer shall not be liable to Owner or to a third party for any failure to accurately estimate the cost of the project, or any part thereof.

VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description		Quantity	Units	Unit Values	Amount
	Average residential structure value			Each	$ 40,000.00	$ -
	Average business structure value			Each	$ 100,000.00	$ -
1	Residences		12	Each	$ 20,000.00	$ 240,000.00
2	Residential contents		12	L.S.	$ 10,000.00	$ 120,000.00
3	Businesses		0	Each	$ 100,000.00	$ -
4	Business contents		0	L.S.	$ 50,000.00	$ -
5	Other		0	Each	$ -	$ -
			Total			$ 360,000.00

Values attributable to this alternative depend to a large extent on the level of protection afforded to flooded properties
Values for structures were computed at 50% of the structure value protected
Values for residential contents were computed at 25% of average structure value
Values for business contents were computed at 50% of average structure value

ALBERT H. HALFF ASSOCIATES, INC.
8616 Northwest Plaza Drive
Dallas, Texas 75225
(214) 739-0094

CLIENT:	City of Eagle Pass	**FILE:**	Estimate
PROJECT:	**TR2.2 -Detention @ Sports Field near School**		November, 2000
AVO:	16739	**BY:**	Halff Associates

ESTIMATE OF PROBABLE COSTS AND VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description	TxDOT	Quantity	Units	Unit Price	Amount
1	Mobilization		1	L.S.	$ 10,000.00	$ 10,000.00
2	Unclassified Excavation	134	5000	C.Y.	$ 3.00	$ 15,000.00
3	Compacted Fill		1000	C.Y.	$ 4.00	$ 4,000.00
4	10' Low Flow Channel		1100	L.F.	$ 18.00	$ 19,800.00
5	Inlet Structure		1	L.S.	$ 25,000.00	$ 25,000.00
6	Outlet Structure		1	L.S.	$ 50,000.00	$ 50,000.00
7	Street Repair		170	S.Y.	$ 40.00	$ 6,800.00
8	Cement Stabilized Backfill		100	C.Y.	$ 30.00	$ 3,000.00
9	Utility Relocations		1	L.S.	$ 5,000.00	$ 5,000.00
10	Erosion Controls		1	L.S.	$ 8,000.00	$ 8,000.00
11	Traffic Control		1	L.S.	$ 5,000.00	$ 5,000.00
12	Land Acquistion		0.20	Acre	$ 5,000.00	$ 1,000.00
13	Drainage Easements		2	Each	$ 4,000.00	$ 8,000.00
14	Seeding for Erosion Control		14,520	S.Y.	$ 0.50	$ 7,260.00
						$ -
			Subtotal			$ 167,860.00
			Total			$ 167,860.00

This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that this is an estimate only, and that Engineer shall not be liable to Owner or to a third party for any failure to accurately estimate the cost of the project, or any part thereof.

VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description		Quantity	Units	Unit Values	Amount
	Average residential structure value			Each	$ 40,000.00	$ -
	Average business structure value			Each	$ 100,000.00	$ -
1	Residences		15	Each	$ 20,000.00	$ 300,000.00
2	Residential contents		15	L.S.	$ 10,000.00	$ 150,000.00
3	Businesses		0	Each	$ 100,000.00	$ -
4	Business contents		0	L.S.	$ 50,000.00	$ -
5	Other		0	Each	$ -	$ -
			Total			$ 450,000.00

Values attributable to this alternative depend to a large extent on the level of protection afforded to flooded properties
Values for structures were computed at 50% of the structure value protected
Values for residential contents were computed at 25% of average structure value
Values for business contents were computed at 50% of average structure value

ALBERT H. HALFF ASSOCIATES, INC.
8616 Northwest Plaza Drive
Dallas, Texas 75225
(214) 739-0094

CLIENT: City of Eagle Pass
PROJECT: TR2.3 - Diversion of 500 cfs
AVO: 16739

FILE: Estimate
November, 2000
BY: Halff Associates

ESTIMATE OF PROBABLE COSTS AND VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description	TxDOT	Quantity	Units	Unit Price	Amount
1	Mobilization		1	L.S.	$ 10,000.00	$ 15,000.00
2	72" RCP		2200	L.F.	$ 240.00	$ 528,000.00
3	Street Repair		5500	S.Y.	$ 40.00	$ 220,000.00
4	Cement Stabilized Backfill		4200	CY	$ 25.00	$ 105,000.00
5	Utility Relocations		1	L.S.	$ 20,000.00	$ 20,000.00
6	Erosion Controls		1	L.S.	$ 10,000.00	$ 10,000.00
7	Traffic Control		1	L.S.	$ 5,000.00	$ 5,000.00
8	Manholes & Drop Structures		4	Each	$ 3,000.00	$ 12,000.00
9	Inlet Structure		1	Each	$ 15,000.00	$ 15,000.00
10	Outlet Structure		1	Each	$ 15,000.00	$ 15,000.00
11	Land Acquistion		2	Acre	$ 5,000.00	$ 10,000.00
12	Drainage Easements		2	Each	$ 4,000.00	$ 8,000.00
13	Seeding for Erosion Control		2,200	S.Y.	$ 0.50	$ 1,100.00
						$ -
						$ -
			Subtotal			$ 964,100.00
			Total			$ 964,100.00

This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that this is an estimate only, and that Engineer shall not be liable to Owner or to a third party for any failure to accurately estimate the cost of the project, or any part thereof.

VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description		Quantity	Units	Unit Values	Amount
	Average residential structure value			Each	$ 40,000.00	$ -
	Average business structure value			Each	$ 100,000.00	$ -
1	Residences		52	Each	$ 20,000.00	$ 1,040,000.00
2	Residential contents		52	L.S.	$ 10,000.00	$ 520,000.00
3	Businesses		0	Each	$ 100,000.00	$ -
4	Business contents		0	L.S.	$ 50,000.00	$ -
5	Other		0	Each	$ -	$ -
			Total			$ 1,560,000.00

Values attributable to this alternative depend to a large extent on the level of protection afforded to flooded properties
Values benefits for structures were computed at 50% of the structure value protected
Values for residential contents were computed at 25% of average structure value
Values for business contents were computed at 50% of average structure value

ALBERT H. HALFF ASSOCIATES, INC.
8616 Northwest Plaza Drive
Dallas, Texas 75225
(214) 739-0094

:	City of Eagle Pass	FILE:	Estimate
CT:	**TR2.4 - Channelization & Culvert Improvements**		November, 2000
	16739	BY:	Halff Associates

ESTIMATE OF PROBABLE COSTS AND VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

No.	Description	TxDOT	Quantity	Units	Unit Price	Amount
	Mobilization		1	L.S.	$ 20,000.00	$ 20,000.00
	Concrete Channel - 10' Nominal width increase	134	4200	L.F.	$ 150.00	$ 630,000.00
	Culvert Improvement - First Street		1	L.S.	$ 20,000.00	$ 20,000.00
	Culvert Improvement - Second Street		1	L.S.	$ 20,000.00	$ 20,000.00
	Culvert Improvement - Hidalgo Street		1	L.S.	$ 20,000.00	$ 20,000.00
	Culvert Improvement - Trinity Street		1	L.S.	$ 20,000.00	$ 20,000.00
	Culvert Improvement - Colorado Street		1	L.S.	$ 20,000.00	$ 20,000.00
	Culvert Improvement - Arlington Street		1	L.S.	$ 25,000.00	$ 25,000.00
	Culvert Improvement - Memorial Street		1	L.S.	$ 25,000.00	$ 25,000.00
)	Street Repair		700	S.Y.	$ 40.00	$ 28,000.00
1	Cement Stabilized Backfill		400	CY	$ 30.00	$ 12,000.00
2	Utility Relocations		1	L.S.	$ 50,000.00	$ 50,000.00
3	Erosion Controls		1	L.S.	$ 15,000.00	$ 15,000.00
4	Traffic Control		1	L.S.	$ 20,000.00	$ 20,000.00
5	Transitions		3	Each	$ 20,000.00	$ 60,000.00
6	Land Acquistion		1.83	Acre	$ 5,000.00	$ 9,150.00
7	Drainage Easements		40	Each	$ 1,000.00	$ 40,000.00
8	eeding for Erosion Control		9,000	S.Y.	$ 1.00	$ 9,000.00
9	Fence Repair		6,000	L.F.	$ 20.00	$ 120,000.00
			Subtotal			$ 1,163,150.00
			Total			$ 1,163,150.00

atement was prepared utilizing standard cost estimate practices. It is understood and
l that this is an estimate only, and that Engineer shall not be liable to Owner or to a
arty for any failure to accurately estimate the cost of the project, or any part thereof.

VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

n No.	Description		Quantity	Units	Unit Values	Amount
	Average residential structure value			Each	$ 40,000.00	$ -
	Average business structure value			Each	$ 100,000.00	$ -
1	Residences		77	Each	$ 20,000.00	$ 1,540,000.00
2	Residential contents		77	L.S.	$ 10,000.00	$ 770,000.00
3	Businesses		0	Each	$ 100,000.00	$ -
4	Business contents		0	L.S.	$ 50,000.00	$ -
5	Other		0	Each	$ -	$ -
			Total			$ 2,310,000.00

s attributable to this alternative depend to a large extent on the level of protection afforded to flooded properties
s for structures were computed at 50% of the structure value protected
s for residential contents were computed at 25% of average structure value
s for business contents were computed at 50% of average structure value

ALBERT H. HALFF ASSOCIATES, INC.
8616 Northwest Plaza Drive
Dallas, Texas 75225
(214) 739-0094

CLIENT: City of Eagle Pass
PROJECT: TR2.5 - Combination of 2.3 & 2.4
AVO: 16739

FILE: Estimate
November, 2000
BY: Halff Associates

ESTIMATE OF PROBABLE COSTS AND VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description	TxDOT	Quantity	Units	Unit Price	Amount
1	Alternative 2.3		1	L.S.	$ 959,100.00	$ 964,100.00
2	Alternative 2.4		1	L.S.	$ 1,163,150.00	$ 1,163,150.00
3						
			Subtotal			$ 2,127,250.00
			Total			$ 2,127,250.00

This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that this is an estimate only, and that Engineer shall not be liable to Owner or to a third party for any failure to accurately estimate the cost of the project, or any part thereof.

VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description		Quantity	Units	Unit Values	Amount
	Average residential structure value			Each	$ 40,000.00	$ -
	Average business structure value			Each	$ 100,000.00	$ -
1	Residences		84	Each	$ 20,000.00	$ 1,680,000.00
2	Residential contents		84	L.S.	$ 10,000.00	$ 840,000.00
3	Businesses		0	Each	$ 100,000.00	$ -
4	Business contents		0	L.S.	$ 50,000.00	$ -
5	Other		0	Each	$ -	$ -
			Total			$ 2,520,000.00

Values attributable to this alternative depend to a large extent on the level of protection afforded to flooded properties
Values for structures were computed at 50% of the structure value protected
Values for residential contents were computed at 25% of average structure value
Values for business contents were computed at 50% of average structure value

ALBERT H. HALFF ASSOCIATES, INC.
8616 Northwest Plaza Drive
Dallas, Texas 75225
(214) 739-0094

CLIENT: City of Eagle Pass

PROJECT: **TR2.6 - Upstream Channel parallel to Royal Ridge**

AVO: 16739

FILE: Estimate

November, 2000

BY: Halff Associates

ESTIMATE OF PROBABLE COSTS AND VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description	TxDOT	Quantity	Units	Unit Price	Amount
1	Mobilization		1	L.S.	$ 10,000.00	$ 10,000.00
2	Unclassified Excavation	134	5800	L.F.	$ 5.00	$ 29,000.00
3	Culvert Improvement - North Bibb Ave.		1	L.S.	$ 20,000.00	$ 20,000.00
4	Culvert Improvement - Royal Haven Drive		1	L.S.	$ 25,000.00	$ 25,000.00
5	Street Repair		200	S.Y.	$ 40.00	$ 8,000.00
6	Cement Stabilized Backfill		100	CY	$ 30.00	$ 3,000.00
7	Utility Relocations		1	L.S.	$ 10,000.00	$ 10,000.00
8	Erosion Controls		1	L.S.	$ 5,000.00	$ 5,000.00
9	Traffic Control		1	L.S.	$ 5,000.00	$ 5,000.00
10	Drainage Easements		10	Each	$ 1,000.00	$ 10,000.00
11	Seeding for Erosion Control		12,000	S.Y.	$ 1.00	$ 12,000.00
						$ -
			Subtotal			$ 137,000.00
			Total			$ 137,000.00

This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that this is an estimate only, and that Engineer shall not be liable to Owner or to a third party for any failure to accurately estimate the cost of the project, or any part thereof.

VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description		Quantity	Units	Unit Values	Amount
	Average residential structure value			Each	$ 40,000.00	$ -
	Average business structure value			Each	$ 100,000.00	$ -
1	Residences		12	Each	$ 20,000.00	$ 240,000.00
2	Residential contents		12	L.S.	$ 10,000.00	$ 120,000.00
3	Businesses		0	Each	$ 100,000.00	$ -
4	Business contents		0	L.S.	$ 50,000.00	$ -
5	Other		0	Each	$ -	$ -
			Total			$ 360,000.00

Values attributable to this alternative depend to a large extent on the level of protection afforded to flooded properties
Values for structures were computed at 50% of the structure value protected
Values for residential contents were computed at 25% of average structure value
Values for business contents were computed at 50% of average structure value

ALBERT H. HALFF ASSOCIATES, INC.
8616 Northwest Plaza Drive
Dallas, Texas 75225
(214) 739-0094

CLIENT: City of Eagle Pass

PROJECT: **UN1 - Detention Pond @ Learning Center**

AVO: 16739

FILE: Estimate

November, 2000

BY: Halff Associates

ESTIMATE OF PROBABLE COSTS AND VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description	TxDOT	Quantity	Units	Unit Price	Amount
1	Mobilization		1	L.S.	$ 10,000.00	$ 10,000.00
2	Unclassified Excavation	134	134000	C.Y.	$ 3.00	$ 402,000.00
3	Compacted Fill		650	C.Y.	$ 3.00	$ 1,950.00
4	Inlet Structure		1	L.S.	$ 20,000.00	$ 20,000.00
5	Outlet Structure		1	L.S.	$ 25,000.00	$ 25,000.00
6	10' Concrete Channel		1800	L.F.	$ 25.00	$ 45,000.00
7	Street Repair		100	S.Y.	$ 40.00	$ 4,000.00
8	Utility Relocations		1	L.S.	$ 25,000.00	$ 25,000.00
9	Erosion Controls		1	L.S.	$ 10,000.00	$ 10,000.00
10	Traffic Control		1	L.S.	$ 5,000.00	$ 5,000.00
11	Land Acquistion		21	Acre	$ 5,000.00	$ 105,000.00
12	Drainage Easements		2	Each	$ 2,500.00	$ 5,000.00
13	Seeding for Erosion Control		100,000	S.Y.	$ 0.50	$ 50,000.00
						$ -
			Subtotal			$ 707,950.00
			Total			$ 707,950.00

This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that this is an estimate only, and that Engineer shall not be liable to Owner or to a third party for any failure to accurately estimate the cost of the project, or any part thereof.

VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description		Quantity	Units	Unit Values	Amount
	Average residential structure value			Each	$ 40,000.00	$ -
	Average business structure value			Each	$ 100,000.00	$ -
1	Residences		41	Each	$ 20,000.00	$ 820,000.00
2	Residential contents		41	L.S.	$ 10,000.00	$ 410,000.00
3	Businesses		3	Each	$ 100,000.00	$ 300,000.00
4	Business contents		3	L.S.	$ 50,000.00	$ 150,000.00
5	Other		0	Each	$ -	$ -
			Total			$ 1,680,000.00

Values attributable to this alternative depend to a large extent on the level of protection afforded to flooded properties
Values for structures were computed at 50% of the structure value protected
Values for residential contents were computed at 25% of average structure value
Values for business contents were computed at 50% of average structure value

ALBERT H. HALFF ASSOCIATES, INC.
8616 Northwest Plaza Drive
Dallas, Texas 75225
(214) 739-0094

CLIENT: City of Eagle Pass

PROJECT: **UN2 - Detention Pond above US 277**

AVO: 16739

FILE: Estimate

November, 2000

BY: Halff Associates

ESTIMATE OF PROBABLE COSTS AND VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description	TxDOT	Quantity	Units	Unit Price	Amount
1	Mobilization		1	L.S.	$ 15,000.00	$ 15,000.00
2	Unclassified Excavation		65000	C.Y.	$ 3.00	$ 195,000.00
3	Compacted Fill		100	C.Y.	$ 3.00	$ 300.00
4	Inlet Structure		1	L.S.	$ 20,000.00	$ 20,000.00
5	Outlet Structure		1	L.S.	$ 25,000.00	$ 25,000.00
6	10' Concrete Channel		740	L.F.	$ 25.00	$ 18,500.00
8	Utility Relocations		1	L.S.	$ 30,000.00	$ 30,000.00
9	Erosion Controls		1	L.S.	$ 5,000.00	$ 5,000.00
10	Traffic Control		1	L.S.	$ 5,000.00	$ 5,000.00
11	Land Acquistion		10	Acre	$ 5,000.00	$ 50,000.00
12	Drainage Easements		4	Each	$ 2,000.00	$ 8,000.00
13	Seeding for Erosion Control		39,000	S.Y.	$ 1.00	$ 39,000.00
						$ -
			Subtotal			$ 410,800.00
			Total			$ 410,800.00

This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that this is an estimate only, and that Engineer shall not be liable to Owner or to a third party for any failure to accurately estimate the cost of the project, or any part thereof.

VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description		Quantity	Units	Unit Values	Amount
	Average residential structure value			Each	$ 40,000.00	$ -
	Average business structure value			Each	$ 100,000.00	$ -
1	Residences		46	Each	$ 20,000.00	$ 920,000.00
2	Residential contents		46	L.S.	$ 10,000.00	$ 460,000.00
3	Businesses		5	Each	$ 100,000.00	$ 500,000.00
4	Business contents		5	L.S.	$ 50,000.00	$ 250,000.00
5	Other		0	Each	$ -	$ -
			Total			$ 2,130,000.00

Values attributable to this alternative depend to a large extent on the level of protection afforded to flooded properties
Values for structures were computed at 50% of the structure value protected
Values for residential contents were computed at 25% of average structure value
Values for business contents were computed at 50% of average structure value

ALBERT H. HALFF ASSOCIATES, INC.
8616 Northwest Plaza Drive
Dallas, Texas 75225
(214) 739-0094

CLIENT: City of Eagle Pass

PROJECT UN3 - Channel & Culvert Improvements

AVO: 16739

FILE: Estimate

November, 2000

BY: Halff Associates

ESTIMATE OF PROBABLE COSTS AND VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description	TxDOT	Quantity	Units	Unit Price	Amount
1	Mobilization		1	L.S.	$ 12,000.00	$ 12,000.00
2	Unclassified Excavation		22000	C.Y.	$ 3.00	$ 66,000.00
3	70' Concrete Channel		3900	L.F.	$ 200.00	$ 780,000.00
4	70' to 50' Concrete Channel Transition		700	L.F.	$ 100.00	$ 70,000.00
5	50' Concrete Channel - 20' Nominal width increase		1700	L.F.	$ 50.00	$ 85,000.00
6	Culvert Improvement - FM 1021		1	L.S.	$ 60,000.00	$ 60,000.00
7	Culvert Improvement - FM 3443		1	L.S.	$ 75,000.00	$ 75,000.00
8	Culvert Improvement - Del Robles		1	L.S.	$ 50,000.00	$ 50,000.00
9	Culvert Improvement - Cherry Leaf		1	L.S.	$ 50,000.00	$ 50,000.00
10	Street Repair		2000	S.Y.	$ 40.00	$ 80,000.00
11	Cement Stabilized Backfill		2000	CY	$ 30.00	$ 60,000.00
12	Utility Relocations		1	L.S.	$ 25,000.00	$ 25,000.00
13	Erosion Controls		1	L.S.	$ 10,000.00	$ 10,000.00
14	Traffic Control		1	L.S.	$ 10,000.00	$ 10,000.00
15	Land Acquistion		4	Acre	$ 5,000.00	$ 20,000.00
16	Drainage Easements		20	Each	$ 2,000.00	$ 40,000.00
17	Seeding for Erosion Control		14,000	S.Y.	$ 1.00	$ 14,000.00
						$ -
			Subtotal			$ 1,507,000.00
			Total			$ 1,507,000.00

This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that this is an estimate only, and that Engineer shall not be liable to Owner or to a third party for any failure to accurately estimate the cost of the project, or any part thereof.

VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description		Quantity	Units	Unit Values	Amount
	Average residential structure value			Each	$ 40,000.00	$ -
	Average business structure value			Each	$ 100,000.00	$ -
1	Residences		213	Each	$ 20,000.00	$ 4,260,000.00
2	Residential contents		213	L.S.	$ 10,000.00	$ 2,130,000.00
3	Businesses		15	Each	$ 100,000.00	$ 1,500,000.00
4	Business contents		15	L.S.	$ 50,000.00	$ 750,000.00
5	Other		0	Each	$ -	$ -
			Total			$ 8,640,000.00

Values attributable to this alternative depend to a large extent on the level of protection afforded to flooded properties
Values for structures were computed at 50% of the structure value protected
Values for residential contents were computed at 25% of average structure value
Values for business contents were computed at 50% of average structure value

ALBERT H. HALFF ASSOCIATES, INC.
8616 Northwest Plaza Drive
Dallas, Texas 75225
(214) 739-0094

CLIENT: City of Eagle Pass

PROJECT UN4 - Combination of UN2 & UN3

AVO: 16739

FILE: Estimate

November, 2000

BY: Halff Associates

ESTIMATE OF PROBABLE COSTS AND VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description		Quantity	Units	Unit Price	Amount
1	UN2					$ 410,800.00
2	UN3					$ 1,507,000.00
3						
4						
			Subtotal			$ 1,917,800.00
			Total			$ 1,917,800.00

This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that this is an estimate only, and that Engineer shall not be liable to Owner or to a third party for any failure to accurately estimate the cost of the project, or any part thereof.

VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description		Quantity	Units	Unit Values	Amount
	Average residential structure value			Each	$ 40,000.00	$ -
	Average business structure value			Each	$ 100,000.00	$ -
1	Residences		217	Each	$ 20,000.00	$ 4,340,000.00
2	Residential contents		217	L.S.	$ 10,000.00	$ 2,170,000.00
3	Businesses		21	Each	$ 100,000.00	$ 2,100,000.00
4	Business contents		21	L.S.	$ 50,000.00	$ 1,050,000.00
5	Other		0	Each	$ -	$ -
			Total			$ 9,660,000.00

Values attributable to this alternative depend to a large extent on the level of protection afforded to flooded properties
Values for structures were computed at 50% of the structure value protected
Values for residential contents were computed at 25% of average structure value
Values for business contents were computed at 50% of average structure value

ALBERT H. HALFF ASSOCIATES, INC.
8616 Northwest Plaza Drive
Dallas, Texas 75225
(214) 739-0094

CLIENT: City of Eagle Pass

FILE: Estimate

PROJECT SE1 - Channel 20' wide below US 277 to mouth

November, 2000

AVO: 16739

BY: Halff Associates

ESTIMATE OF PROBABLE COSTS AND VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description	TxDOT	Quantity	Units	Unit Price	Amount
1	Mobilization		1	L.S.	$ 10,000.00	$ 10,000.00
2	Demolition		1	L.S.	$ 25,000.00	$ 25,000.00
3	Unclassified Exc. - 20' Channel w/ 4:1 side slopes	134	8200	C.Y.	$ 3.00	$ 24,600.00
4	Utility Relocations		1	L.S.	$ 15,000.00	$ 15,000.00
5	Erosion Controls		1	L.S.	$ 5,000.00	$ 5,000.00
6	Land Acquistion		3.20	Acre	$ 5,000.00	$ 16,000.00
7	Drainage Easements		5	Each	$ 2,000.00	$ 10,000.00
8	Seeding for Erosion Control		15,333	S.Y.	$ 1.00	$ 15,333.00
						$ -
			Subtotal			$ 120,933.00
			Total			$ 120,933.00

This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that this is an estimate only, and that Engineer shall not be liable to Owner or to a third party for any failure to accurately estimate the cost of the project, or any part thereof.

VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description		Quantity	Units	Unit Values	Amount
	Average residential structure value			Each	$ 40,000.00	$ -
	Average business structure value			Each	$ 100,000.00	$ -
1	Residences		2	Each	$ 20,000.00	$ 40,000.00
2	Residential contents		2	L.S.	$ 10,000.00	$ 20,000.00
3	Businesses		1	Each	$ 100,000.00	$ 100,000.00
4	Business contents		1	L.S.	$ 50,000.00	$ 50,000.00
5	Other		0	Each	$ -	$ -
			Total			$ 210,000.00

Values attributable to this alternative depend to a large extent on the level of protection afforded to flooded properties
Values for structures were computed at 50% of the structure value protected
Values for residential contents were computed at 25% of average structure value
Values for business contents were computed at 50% of average structure value

ALBERT H. HALFF ASSOCIATES, INC.
8616 Northwest Plaza Drive
Dallas, Texas 75225
(214) 739-0094

CLIENT: City of Eagle Pass

PROJECT: **SE2 - Channel widening 8' above US 277**

AVO: 16739

FILE: Estimate

November, 2000

BY: Halff Associates

ESTIMATE OF PROBABLE COSTS AND VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description	TxDOT	Quantity	Units	Unit Price	Amount
1	Mobilization		1	L.S.	$ 7,500.00	$ 7,500.00
2	Unclassified Excavation	134	1000	C.Y.	$ 5.00	$ 5,000.00
3	Concrete Channel - 8' Nominal Width		820	L.F.	$ 40.00	$ 32,800.00
4	Concrete Transition		1	L.S.	$ 15,000.00	$ 15,000.00
5	Utility Relocations		1	L.S.	$ 20,000.00	$ 20,000.00
6	Erosion Controls		1	L.S.	$ 5,000.00	$ 5,000.00
7	Traffic Control		1	L.S.	$ 5,000.00	$ 5,000.00
8	Land Acquistion		0.38	Acre	$ 5,000.00	$ 1,900.00
9	Drainage Easements		6	Each	$ 2,000.00	$ 12,000.00
10	Seeding for Erosion Control		2,000	S.Y.	$ 1.00	$ 2,000.00
						$ -
			Subtotal			$ 106,200.00
			Total			$ 106,200.00

This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that this is an estimate only, and that Engineer shall not be liable to Owner or to a third party for any failure to accurately estimate the cost of the project, or any part thereof.

VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description		Quantity	Units	Unit Values	Amount
	Average residential structure value			Each	$ 40,000.00	$ -
	Average business structure value			Each	$ 100,000.00	$ -
1	Residences		3	Each	$ 20,000.00	$ 60,000.00
2	Residential contents		3	L.S.	$ 10,000.00	$ 30,000.00
3	Businesses		2	Each	$ 100,000.00	$ 200,000.00
4	Business contents		2	L.S.	$ 50,000.00	$ 100,000.00
5	Other		0	Each	$ -	$ -
			Total			$ 390,000.00

Values attributable to this alternative depend to a large extent on the level of protection afforded to flooded properties
Values for structures were computed at 50% of the structure value protected
Values for residential contents were computed at 25% of average structure value
Values for business contents were computed at 50% of average structure value

ALBERT H. HALFF ASSOCIATES, INC.
8616 Northwest Plaza Drive
Dallas, Texas 75225
(214) 739-0094

CLIENT: City of Eagle Pass

PROJECT SE3 - Detention Pond above RR tracks

AVO: 16739

FILE: Estimate

November, 2000

BY: Halff Associates

ESTIMATE OF PROBABLE COSTS AND VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description	TxDOT	Quantity	Units	Unit Price	Amount
1	Mobilization		1	L.S.	$ 10,000.00	$ 10,000.00
2	Unclassified Excavation	134	26,666	C.Y.	$ 3.00	$ 79,998.00
3	Compacted Fill		2700	C.Y.	$ 5.00	$ 13,500.00
4	Inlet Structure		1	L.S.	$ 20,000.00	$ 20,000.00
5	Outlet Structure		1	L.S.	$ 50,000.00	$ 50,000.00
6	Utility Relocations		1	L.S.	$ 10,000.00	$ 10,000.00
7	Erosion Controls		1	L.S.	$ 10,000.00	$ 10,000.00
8	Traffic Control		1	L.S.	$ 5,000.00	$ 5,000.00
9	Land Acquistion		4	Acre	$ 5,000.00	$ 20,000.00
10	Drainage Easements		2	Each	$ 2,000.00	$ 4,000.00
11	Seeding for Erosion Control		13,333	S.Y.	$ 1.00	$ 13,333.00
						$ -
			Subtotal			$ 235,831.00
			Total			$ 235,831.00

This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that this is an estimate only, and that Engineer shall not be liable to Owner or to a third party for any failure to accurately estimate the cost of the project, or any part thereof.

VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description		Quantity	Units	Unit Values	Amount
	Average residential structure value			Each	$ 40,000.00	$ -
	Average business structure value			Each	$ 100,000.00	$ -
1	Residences		2	Each	$ 20,000.00	$ 40,000.00
2	Residential contents		2	L.S.	$ 10,000.00	$ 20,000.00
3	Businesses		2	Each	$ 100,000.00	$ 200,000.00
4	Business contents		2	L.S.	$ 50,000.00	$ 100,000.00
5	Other		0	Each	$ -	$ -
			Total			$ 360,000.00

Values attributable to this alternative depend to a large extent on the level of protection afforded to flooded properties
Values for structures were computed at 50% of the structure value protected
Values for residential contents were computed at 25% of average structure value
Values for business contents were computed at 50% of average structure value

ALBERT H. HALFF ASSOCIATES, INC.
8616 Northwest Plaza Drive
Dallas, Texas 75225
(214) 739-0094

CLIENT: City of Eagle Pass FILE: Estimate

PROJECT SE4 - Combination of SE2 & SE3 November, 2000

AVO: 16739 BY: Halff Associates

ESTIMATE OF PROBABLE COSTS AND VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description		Quantity	Units	Unit Price	Amount
1	SE2					$ 106,200.00
2	SE3					$ 235,831.00
3						
4						
			Subtotal			$ 342,031.00
			Total			$ 342,031.00

This statement was prepared utilizing standard cost estimate practices. It is understood and agreed that this is an estimate only, and that Engineer shall not be liable to Owner or to a third party for any failure to accurately estimate the cost of the project, or any part thereof.

VALUE OF PROTECTED STRUCTURES
(Based on March 1999 Price Levels)

Item No.	Description		Quantity	Units	Unit Benefits	Amount
	Average residential structure value			Each	$ 40,000.00	$ -
	Average business structure value			Each	$ 100,000.00	$ -
1	Residences		3	Each	$ 20,000.00	$ 60,000.00
2	Residential contents		3	L.S.	$ 10,000.00	$ 30,000.00
3	Businesses		2	Each	$ 100,000.00	$ 200,000.00
4	Business contents		2	L.S.	$ 50,000.00	$ 100,000.00
5	Other		0	Each	$ -	$ -
			Total			$ 390,000.00

Values attributable to this alternative depend to a large extent on the level of protection afforded to flooded properties
Values for structures were computed at 50% of the structure value protected
Values for residential contents were computed at 25% of average structure value
Values for business contents were computed at 50% of average structure value

Comparison of 100-yr Water Surface Elevations
For Different Alternatives

Eagle Pass Flood Study Main Arroyo & Trib. 3 Comparison of 100 WSEL - Alt. MA 1 and Existing			
X-Section	Existing	Diversion of 800cfs Alt. MA 1&2	Difference
212	691.06	690.70	-0.36
1092	693.48	693.19	-0.29
1112	694.67	694.16	-0.51
1292	696.26	695.84	-0.42
1387	697.45	697.03	-0.42
1443	698.42	698.00	-0.42
1458			
1473	703.61	703.33	-0.28
1483	703.22	702.98	-0.24
1552	704.08	703.76	-0.32
1580	703.34	703.07	-0.27
1589	703.36	703.08	-0.28
1623	704.67	704.31	-0.36
2056	705.83	705.23	-0.60
2446	707.18	706.83	-0.35
2476	708.89	708.24	-0.65
2518	719.11	719.10	-0.01
2547			
2565	722.19	721.97	-0.22
2595	721.87	721.70	-0.17
2745	722.5	722.22	-0.28
2828	722.54	722.26	-0.28
3026	722.79	722.48	-0.31
3376	722.66	722.37	-0.29
3429	722.67	722.38	-0.29
3482	722.77	722.46	-0.31
3512	722.75	722.45	-0.30
3580			
3590	722.86	722.56	-0.30
3643	722.62	722.36	-0.26
4022	723.02	722.67	-0.35
4071	723	722.66	-0.34
4093.5			
4116	723.22	722.84	-0.38
4148	722.98	722.62	-0.36
4267	723.25	722.84	-0.41
4523	723.7	723.25	-0.45
4569	723.67	723.22	-0.45
4591			
4613	723.89	723.56	-0.33
4658	723.67	723.36	-0.31
4862	724.09	723.81	-0.28
4912	724.06	723.80	-0.26
4920.5			
4929	724.04	723.79	-0.25
4979	724.68	724.26	-0.42
5026	724.76	724.33	-0.43
5044.5			
5063	724.76	724.32	-0.44
5279	724.45	724.06	-0.39
5576	724.35	724.07	-0.28
5666	724.29	724.03	-0.26

Eagle Pass Flood Study Main Arroyo & Trib. 3 Comparison of 100 WSEL - Alt. MA 1 and Existing			
XSection	Existing	Diversion Of 800 cfs	Difference
5715	723.66	723.64	-0.02
5733.5			
5752	725.47	724.94	-0.53
5811	725.71	725.07	-0.64
6004	725.59	725.01	-0.58
6206	725.87	725.22	-0.65
6259	725.88	725.28	-0.60
6291			
6323	727.82	726.59	-1.23
6375	728.62	727.16	-1.46
6735	728.41	727.09	-1.32
6918	729.49	728.10	-1.39
6951	729.73	728.35	-1.38
6968	729.62	728.08	-1.54
6987			
7006	730.66	729.19	-1.47
7053	731	729.97	-1.03
7149	730.99	729.94	-1.05
7307	731.05	730.00	-1.05
7447	731.23	730.20	-1.03
7628	731.19	730.09	-1.10
7867	730.52	729.86	-0.66
8147	731.24	730.34	-0.90
8484	732.19	731.37	-0.82
8736	734.41	733.21	-1.20
8786	734.6	733.51	-1.09
8807			
8828	734.49	733.41	-1.08
8858	734.43	733.36	-1.07
9088	734.44	733.45	-0.99
9118	735.83	734.67	-1.16
9133	735.84	734.55	-1.29
9156			
9179	736.49	735.96	-0.53
9184	736.5	735.97	-0.53
9231	736.89	735.77	-1.12
9551	739.86	737.84	-2.02
9791	741.87	740.68	-1.19
9837	741.88	740.65	-1.23
9860			
9883	741.88	741.41	-0.47
9933	741.55	741.00	-0.55
10156	741.27	740.89	-0.38
10201	742.66	742.74	0.08
10218.5			
10236	743.86	743.86	0
10286	743.99	743.99	0
10509	744.29	744.29	0
10558	744.66	744.66	0
10575.5			
10593	747.36	747.36	0
10643	747.25	747.25	0
10855	747.17	747.17	0

Eagle Pass Flood Study Main Arroyo & Trib. 3 Comparison of 100 WSEL - Alt. MA 1 and Existing			
X-Section	Existing	Diversion of 800 cfs	Difference
10905	747.63	747.63	0
10935			
10965	751.17	751.17	0
11015	751.1	751.10	0
11405	753.05	753.05	0
11787	757.93	757.93	0
12170	760.01	760.01	0
12213	760.13	760.13	0
12244			
12275	760.8	760.80	0
12540	762.85	762.85	0
12871	765.82	765.82	0
13159	767.69	767.69	0
13369	768.37	768.37	0
13410	768.92	768.92	0
13434			
13458	768.93	768.93	0
13512	769.49	769.49	0
13571	771.21	771.21	0
13621	771.76	771.76	0
13758	773.34	773.34	0
13857	774.09	774.09	0
13960	775.82	775.82	0
14083	776.94	776.94	0
14183	777.87	777.87	0
14283	779.48	779.48	0
14426	780.18	780.18	0
14526	780.33	780.33	0
14626	781.28	781.28	0
14726	783.54	783.54	0
14788	785.22	785.22	0
14849	786.48	786.48	0
14873			
14897	788.21	788.21	0
14947	788.52	788.52	0
15040	790.14	790.14	0

Eagle Pass Flood Study Tributary 1 100 Year Water Surface Elevations					
XSections	Existing	500 cfs Diversion Alt 2&3	Difference	Channelization Alt 2&3	Difference
0	715.29	715.29	0.00	715.29	0.00
158	717.6	717.60	0.00	717.6	0.00
556	720.97	720.97	0.00	720.97	0.00
581	721.71	721.71	0.00	721.71	0.00
618			0.00		0.00
655	724.91	724.91	0.00	724.91	0.00
705	725.81	725.81	0.00	725.81	0.00
709			0.00		0.00
713	725.82	725.82	0.00	725.82	0.00
733	725.28	725.28	0.00	725.28	0.00
873	726.84	726.84	0.00	725.64	-1.20
893	728.04	728.04	0.00	727.55	-0.49
917			0.00		0.00
941	729.76	729.76	0.00	728.69	-1.07
991	729.31	729.31	0.00	728.69	-0.62
1131	729.94	729.82	-0.12	727.9	-2.04
1208	730.61	729.69	-0.92	728.36	-2.25
1278	731.06	729.60	-1.46	728.8	-2.26
1440	732.82	731.25	-1.57	730.12	-2.70
1490	735.24	732.96	-2.28	732.1	-3.14
1514			0.00		0.00
1538	735.31	733.78	-1.53	733.67	-1.64
1588	735.22	733.76	-1.46	733.64	-1.58
1670	735.18	733.92	-1.26	733.74	-1.44
1819	735.11	733.91	-1.20	733.73	-1.38
1955	734.83	733.85	-0.98	733.68	-1.15
2030	736.99	734.76	-2.23	733.04	-3.95
2080	739.26	736.00	-3.26	735.83	-3.43
2102.5			0.00		0.00
2125	739.36	737.69	-1.67	735.87	-3.49
2155	739.35	737.67	-1.68	735.87	-3.48
2176			0.00		0.00
2197	739.44	737.97	-1.47	735.76	-3.68
2227	739.29	737.64	-1.65	736.21	-3.08
2427	739.43	738.74	-0.69	738.74	-0.69
2508	740.68	740.68	0.00	740.68	0.00

Eagle Pass d Study

Tributary 2

100 - Year Water Surface Elevations

X-Sections	Existing	Detention Alt 2C	Difference	Diversion Alt 2C	Difference	Channelization Alt 2A	Difference	Diversion and Channelization Alt 2E	Difference	800 CFS Diversion Alt MA1 & 2H	Difference	U/S Channelization Alt 2G	Difference
2	742.08	741.90	-0.18	742.08	0.00	741.28	-0.80	741.28	-0.80	739.94	-2.14	742.08	0.00
150	742.20	742.40	0.20	742.21	0.01	742.25	0.05	742.25	0.05	741.85	-0.35	742.20	0.00
465	745.07	744.93	-0.14	745.07	0.00	744.52	-0.55	744.52	-0.55	743.17	-1.90	745.07	0.00
540	745.88	745.79	-0.09	745.88	0.00	745.54	-0.34	745.54	-0.34	743.64	-2.24	745.88	0.00
564			0.00		0.00		0.00		0.00		0.00		0.00
588	746.25	746.13	-0.12	746.25	0.00	745.47	-0.78	745.47	-0.78	744.04	-2.21	746.25	0.00
638	746.23	746.13	-0.10	746.23	0.00	745.60	-0.63	745.60	-0.63	746.45	0.22	746.23	0.00
935	747.22	747.05	-0.17	747.22	0.00	746.87	-0.35	746.87	-0.35	746.55	-0.67	747.22	0.00
1051	747.33	747.13	-0.20	747.33	0.00	746.65	-0.68	746.65	-0.68	746.42	-0.91	747.33	0.00
1077			0.00		0.00		0.00		0.00		0.00		0.00
1103	748.28	748.14	-0.14	748.28	0.00	747.91	-0.37	747.90	-0.38	747.43	-0.85	748.28	0.00
1533	749.48	749.23	-0.25	749.48	0.00	748.82	-0.66	748.82	-0.66	748.34	-1.14	749.48	0.00
1568	749.63	749.63	0.00	749.63	0.00	748.86	-0.77	748.86	-0.77	749.13	-0.50	749.63	0.00
1662			0.00		0.00		0.00		0.00		0.00		0.00
1756	751.04	751.04	0.00	753.26	2.22	753.98	2.94	750.16	-0.88	749.85	-1.19	751.04	0.00
1811	751.31	751.31	0.00	753.25	1.94	753.97	2.66	750.47	-0.84	750.06	-1.25	751.31	0.00
2411	754.38	754.38	0.00	753.91	-0.47	754.11	-0.27	752.66	-1.72	752.52	-1.86	754.38	0.00
2461	754.59	754.59	0.00	754.19	-0.40	754.40	-0.19	753.17	-1.42	753.24	-1.35	754.59	0.00
2491			0.00		0.00		0.00		0.00		0.00		0.00
2521	754.71	754.71	0.00	754.33	-0.38	754.54	-0.17	753.62	-1.09	753.64	-1.07	754.71	0.00
2566	755.27	755.27	0.00	754.73	-0.54	754.86	-0.41	753.67	-1.60	753.61	-1.66	755.27	0.00
2801	756.22	756.12	-0.10	755.81	-0.41	755.98	-0.24	754.33	-1.89	754.28	-1.94	756.22	0.00
2831	756.66	756.53	-0.13	756.15	-0.51	756.22	-0.44	756.14	-0.52	754.31	-2.35	756.66	0.00
2853			0.00		0.00		0.00		0.00		0.00		0.00
2875	756.82	756.72	-0.10	756.35	-0.47	756.65	-0.17	754.98	-1.84	755.51	-1.31	756.82	0.00
2907	756.75	756.68	-0.07	756.37	-0.38	756.84	0.09	757.12	0.37	756.44	-0.31	756.75	0.00
3527	760.33	760.19	-0.14	758.77	-1.56	758.86	-1.47	757.59	-2.74	757.54	-2.79	760.33	0.00
3562	761.09	760.90	-0.19	760.69	-0.40	760.99	-0.10	758.03	-3.06	757.60	-3.49	761.09	0.00
3583			0.00		0.00		0.00		0.00		0.00		0.00
3604	761.11	760.92	-0.19	759.24	-1.87	761.02	-0.09	759.08	-2.03	759.21	-1.90	761.11	0.00
3648	761.10	760.99	-0.11	762.43	1.33	761.02	-0.08	759.98	-1.12	760.51	-0.59	761.10	0.00
3984	762.82	762.38	-0.44	762.85	0.03	762.56	-0.26	762.56	-0.26	762.85	0.03	762.82	0.00
4307	764.19	764.31	0.12	764.19	0.00	763.07	-1.12	763.07	-1.12	764.19	0.00	764.19	0.00
4338	764.74	765.29	0.55	764.74	0.00	764.74	0.00	764.74	0.00	764.74	0.00	764.74	0.00
4354			0.00		0.00		0.00		0.00		0.00		0.00
4370	765.08	766.90	1.82	765.08	0.00	765.08	0.00	765.08	0.00	765.08	0.00	765.08	0.00
4456	767.49	767.04	-0.45	767.49	0.00	767.49	0.00	767.49	0.00	767.49	0.00	767.49	0.00
4658	767.60	767.30	-0.30	767.60	0.00	767.60	0.00	767.60	0.00	767.60	0.00	767.60	0.00
4751	767.70	767.53	-0.17	767.70	0.00	767.70	0.00	767.70	0.00	767.70	0.00	767.70	0.00
5037	769.59	769.59	0.00	769.59	0.00	769.59	0.00	769.59	0.00	769.59	0.00	769.59	0.00
5271	773.04	773.06	0.02	773.04	0.00	773.04	0.00	773.04	0.00	773.04	0.00	772.59	-0.45
5471	774.91	774.92	0.01	774.91	0.00	774.91	0.00	774.91	0.00	774.91	0.00	774.13	-0.78
5671	775.75	775.77	0.02	775.75	0.00	775.75	0.00	775.75	0.00	775.75	0.00	774.79	-0.96
5862	776.47	776.49	0.02	776.47	0.00	776.47	0.00	776.47	0.00	776.47	0.00	775.45	-1.02
5947	776.88	776.91	0.03	776.88	0.00	776.88	0.00	776.88	0.00	776.88	0.00	775.43	-1.45
6008	778.47	778.47	0.00	778.47	0.00	778.47	0.00	778.47	0.00	778.47	0.00	775.60	-2.87
6042			0.00		0.00		0.00		0.00		0.00		0.00
6076	779.71	779.73	0.02	779.71	0.00	779.71	0.00	779.71	0.00	779.71	0.00	777.96	-1.75
6130	779.80	779.82	0.02	779.79	-0.01	779.79	-0.01	779.79	-0.01	779.80	0.00	778.48	-1.32
6235	780.09	780.10	0.01	780.09	0.00	780.09	0.00	780.09	0.00	780.09	0.00	778.63	-1.46
6331	780.53	780.54	0.01	780.53	0.00	780.53	0.00	780.53	0.00	780.53	0.00	779.05	-1.48
6391	780.59	780.60	0.01	780.59	0.00	780.59	0.00	780.59	0.00	780.59	0.00	779.07	-1.52
6491	780.71	780.72	0.01	780.71	0.00	780.71	0.00	780.71	0.00	780.71	0.00	779.14	-1.57

Eagle Pa... ...d Study
Tributary 2
100 - Year Water Surface Elevations

X-Sections	Existing	Detention	Difference	Diversion	Difference	Channelization	Difference	Diversion and Channelization	Difference	800 CFS Diversion	Difference	U/S Channelization	Difference
6691	781.26	781.25	-0.01	781.26	0.00	781.26	0.00	781.26	0.00	781.26	0.00	779.94	-1.32
6891	782.49	782.49	0.00	782.49	0.00	782.49	0.00	782.49	0.00	782.49	0.00	782.14	-0.35
7091	783.97	783.97	0.00	783.97	0.00	783.97	0.00	783.97	0.00	783.97	0.00	783.76	-0.21
7291	786.00	786.00	0.00	786.00	0.00	786.00	0.00	786.00	0.00	786.00	0.00	786.03	0.03
7491	788.07	788.07	0.00	788.07	0.00	788.07	0.00	788.07	0.00	788.07	0.00	788.13	0.06
7691	790.75	790.75	0.00	790.75	0.00	790.75	0.00	790.75	0.00	790.75	0.00	790.60	-0.15
7891	793.41	793.41	0.00	793.41	0.00	793.41	0.00	793.41	0.00	793.41	0.00	792.94	-0.47
7991	795.46	795.46	0.00	795.46	0.00	795.46	0.00	795.46	0.00	795.46	0.00	794.09	-1.37
8091	797.01	797.01	0.00	797.01	0.00	797.01	0.00	797.01	0.00	797.01	0.00	795.19	-1.82
8155	798.72	798.72	0.00	798.72	0.00	798.72	0.00	798.72	0.00	798.72	0.00	798.72	0.00

Eagle Pass Flood Study
Unnamed Tributary to the Rio Grande
100-Year Water Surface Elevations

Xsection	Existing	Detention Alt UNS	Difference	Ult Detention Alt UNS	Difference	50% Channel	Difference	70% Channel Alt UNS	Difference	50% Chan & Ult Det	Difference	70% Chan & Ult Det Alt UNS	Difference
0	730.27	730.18	-0.09	729.81	-0.46	730.25	-0.02	730.25	-0.02	729.81	-0.46	729.81	-0.46
295	730.97	730.88	-0.09	730.52	-0.45	730.95	-0.02	730.95	-0.02	730.52	-0.45	730.52	-0.45
600	731.78	731.68	-0.10	731.30	-0.48	731.77	-0.01	731.77	-0.01	731.30	-0.48	731.30	-0.48
900	732.59	732.48	-0.11	732.03	-0.56	732.57	-0.02	732.57	-0.02	732.03	-0.56	732.03	-0.56
1107	733.27	733.17	-0.10	732.74	-0.53	733.26	-0.01	733.26	-0.01	732.74	-0.53	732.74	-0.53
1175	733.64	733.54	-0.10	733.08	-0.56	733.63	-0.01	733.47	-0.17	733.08	-0.56	732.91	-0.73
1208.5			0.00		0.00		0.00		0.00		0.00		0.00
1242	733.62	733.55	-0.07	731.73	-1.89	733.21	-0.41	732.95	-0.67	732.73	-0.89	732.93	-0.69
1326	733.93	733.83	-0.10	734.99	1.06	733.16	-0.77	732.96	-0.97	732.86	-1.07	732.96	-0.97
1583	734.52	734.41	-0.11	735.05	0.53	734.55	0.03	733.83	-0.69	733.43	-1.09	733.23	-1.29
1702	734.60	734.49	-0.11	735.07	0.47	734.49	-0.11	733.73	-0.87	733.36	-1.24	733.18	-1.42
1953	734.82	734.79	-0.03	735.09	0.27	734.83	0.01	732.60	-2.22	732.66	-2.16	732.92	-1.90
2211	736.10	736.01	-0.09	735.46	-0.64	735.28	-0.82	733.18	-2.92	732.69	-3.41	732.94	-3.16
2352	736.58	736.49	-0.09	735.95	-0.63	736.04	-0.54	733.88	-2.70	733.33	-3.25	732.78	-3.80
2561	737.22	737.13	-0.09	736.70	-0.52	736.86	-0.36	735.60	-1.62	734.56	-2.66	733.72	-3.50
2791	737.65	737.54	-0.11	737.03	-0.62	736.49	-1.16	735.55	-2.10	734.75	-2.90	734.37	-3.28
3055	738.31	738.19	-0.12	737.59	-0.72	737.37	-0.94	736.32	-1.99	735.77	-2.54	735.04	-3.27
3444	739.48	739.34	-0.14	738.63	-0.85	737.88	-1.60	737.06	-2.42	736.60	-2.88	735.66	-3.82
3687	739.72	739.58	-0.14	738.88	-0.84	739.32	-0.40	738.40	-1.32	737.91	-1.81	736.69	-3.03
3902	740.05	739.89	-0.16	739.15	-0.90	739.17	-0.88	738.26	-1.79	737.86	-2.19	737.06	-2.99
4106	740.83	740.77	-0.06	739.79	-1.04	738.51	-2.32	738.22	-2.61	737.89	-2.94	737.09	-3.74
4205	741.35	741.31	-0.04	740.51	-0.84	738.63	-2.72	738.27	-3.08	737.92	-3.43	737.12	-4.23
4470	742.37	742.32	-0.05	741.41	-0.96	738.97	-3.40	738.33	-4.04	737.96	-4.41	737.18	-5.19
4700	742.79	742.74	-0.05	741.77	-1.02	740.36	-2.43	739.31	-3.48	738.42	-4.37	737.69	-5.10
4943	743.51	743.45	-0.06	742.33	-1.18	741.11	-2.40	740.11	-3.40	739.21	-4.30	738.50	-5.01
5068	743.82	743.76	-0.06	742.69	-1.13	741.81	-2.01	740.77	-3.05	739.86	-3.96	739.12	-4.70
5227	743.97	743.95	-0.02	743.01	-0.96	745.27	1.30	741.40	-2.57	740.48	-3.49	739.67	-4.30
5258.5			0.00		0.00		0.00		0.00		0.00		0.00
5290	743.01	743.55	0.54	743.65	0.64	742.96	-0.05	744.57	1.56	743.14	0.13	742.30	-0.71
5455	746.67	746.51	-0.16	744.57	-2.10	746.11	-0.56	744.33	-2.34	743.18	-3.49	742.12	-4.55
5593	746.72	746.56	-0.16	744.82	-1.90	746.04	-0.68	744.28	-2.44	743.23	-3.49	742.19	-4.53
5897	746.95	746.82	-0.13	745.55	-1.40	745.84	-1.11	744.45	-2.50	743.48	-3.47	742.49	-4.46
6048	747.07	746.95	-0.12	745.42	-1.65	746.32	-0.75	745.76	-1.31	745.76	-1.31	742.46	-4.61
6075			0.00		0.00		0.00		0.00		0.00		0.00
6102	747.13	747.09	-0.04	745.44	-1.69	746.83	-0.30	744.59	-2.54	745.09	-2.04	745.66	-1.47
6338	748.24	748.19	-0.05	747.45	-0.79	746.98	-1.26	747.14	-1.10	746.61	-1.63	745.94	-2.30
6609	748.68	748.63	-0.05	747.77	-0.91	747.88	-0.80	747.25	-1.43	746.58	-2.10	745.49	-3.19
6853	749.04	748.99	-0.05	748.08	-0.96	748.66	-0.38	747.83	-1.21	746.50	-2.54	745.98	-3.06
7110	749.72	749.68	-0.04	748.86	-0.86	750.06	0.34	748.86	-0.86	748.10	-1.62	746.86	-2.86
7341	751.22	751.17	-0.05	750.22	-1.00	751.00	-0.22	750.09	-1.13	748.63	-2.59	747.60	-3.62
7507	751.61	751.57	-0.04	750.83	-0.78	751.94	0.33	751.41	-0.20	750.72	-0.89	749.10	-2.51
7536.5			0.00		0.00		0.00		0.00		0.00		0.00
7554	751.55	751.52	-0.03	750.84	-0.71	752.21	0.66	751.62	0.07	750.95	-0.60	750.00	-1.55
7837	752.77	752.74	-0.03	752.01	-0.76	752.75	-0.02	752.75	-0.02	752.01	-0.76	752.01	-0.76

Eagle Pass Flood Study
Unnamed Tributary to the Rio Grande
100-Year Water Surface Elevations

XSection	Existing	Detention	Differences	Ult Detention	Difference	50% Channel	Difference	70% Channel	Difference	50% Chan & Ult Det	Difference	70% Chan & Ult Det	Difference
8070	754.20	754.18	-0.02	753.38	-0.82	754.19	-0.01	754.19	-0.01	753.38	-0.82	753.38	-0.82
8378	754.79	754.79	0.00	753.87	-0.92	754.78	-0.01	754.78	-0.01	753.87	-0.92	753.87	-0.92
8509	755.21	755.21	0.00	754.16	-1.05	755.19	-0.02	755.19	-0.02	754.16	-1.05	754.16	-1.05
8766	756.47	756.47	0.00	755.25	-1.22	756.45	-0.02	756.45	-0.02	755.25	-1.22	755.25	-1.22
9022	757.55	757.55	0.00	756.18	-1.37	757.53	-0.02	757.53	-0.02	756.18	-1.37	756.18	-1.37
9195	758.32	758.32	0.00	756.91	-1.41	758.30	-0.02	758.30	-0.02	756.91	-1.41	756.91	-1.41
9415	758.91	758.91	0.00	757.38	-1.53	758.89	-0.02	758.89	-0.02	757.38	-1.53	757.38	-1.53
9630	759.29	759.29	0.00	757.61	-1.68	759.27	-0.02	759.27	-0.02	757.61	-1.68	757.61	-1.68
9749	759.48	759.48	0.00	757.79	-1.69	759.46	-0.02	759.46	-0.02	757.79	-1.69	757.79	-1.69
10005	759.92	759.92	0.00	758.34	-1.58	759.90	-0.02	759.90	-0.02	758.34	-1.58	758.34	-1.58
10050			0.00		0.00		0.00		0.00		0.00		0.00
10096	760.39	760.39	0.00	758.41	-1.98	760.37	-0.02	760.37	-0.02	758.41	-1.98	758.41	-1.98
10339	761.39	761.39	0.00	759.57	-1.82	761.37	-0.02	761.37	-0.02	759.57	-1.82	759.57	-1.82
10567	762.35	762.35	0.00	760.84	-1.51	762.34	-0.01	762.34	-0.01	760.84	-1.51	760.84	-1.51
10791	763.00	763.00	0.00	761.09	-1.91	762.98	-0.02	762.98	-0.02	761.09	-1.91	761.09	-1.91
11074	763.91	763.91	0.00	761.75	-2.16	763.90	-0.01	763.90	-0.01	761.75	-2.16	761.75	-2.16
11287	764.88	764.88	0.00	762.73	-2.15	764.86	-0.02	764.86	-0.02	762.73	-2.15	762.73	-2.15
11519	766.06	766.06	0.00	764.10	-1.96	766.04	-0.02	766.04	-0.02	764.10	-1.96	764.10	-1.96
11685	766.52	766.52	0.00	764.34	-2.18	766.50	-0.02	766.50	-0.02	764.34	-2.18	764.34	-2.18
11742			0.00		0.00		0.00		0.00		0.00		0.00
11814	771.63	771.63	0.00	766.50	-5.13	771.62	-0.01	771.62	-0.01	766.50	-5.13	766.50	-5.13
12040	771.66	771.66	0.00	767.01	-4.65	771.65	-0.01	771.65	-0.01	767.01	-4.65	767.01	-4.65
12292	771.67	771.67	0.00	767.27	-4.40	771.66	-0.01	771.66	-0.01	767.27	-4.40	767.27	-4.40
12592	771.72	771.72	0.00	767.88	-3.84	771.71	-0.01	771.71	-0.01	767.88	-3.84	767.88	-3.84
12928	771.84	771.84	0.00	769.08	-2.76	771.83	-0.01	771.83	-0.01	769.08	-2.76	769.08	-2.76
13160	772.12	772.12	0.00	769.56	-2.56	772.11	-0.01	772.11	-0.01	769.56	-2.56	769.56	-2.56
13371	772.36	772.36	0.00	770.14	-2.22	772.35	-0.01	772.35	-0.01	770.14	-2.22	770.14	-2.22

Eagle Pass Flood Study
Tributary to Seco Creek
100-Year Water Surface Elevations

X-Section	Existing	20% Channel Alt SE1	Difference	8% Channel Alt SE2	Difference	Detention Alt SE3	Difference	Combination Alt SE4	Difference
650	725.86	725.86	0.00	725.86	0.00	725.86	0.00	725.86	0.00
1000	726.34	726.32	-0.02	726.34	0.00	726.34	0.00	726.32	-0.02
1020	726.34	726.32	-0.02	726.34	0.00	726.34	0.00	726.32	-0.02
1165	726.34	726.32	-0.02	726.34	0.00	726.34	0.00	726.32	-0.02
1195	726.34	726.32	-0.02	726.34	0.00	726.35	-0.01	726.31	-0.05
1348	726.36	726.31	-0.05	726.36	0.00	726.39	-0.02	726.32	-0.09
1400	726.41	726.32	-0.09	726.41	0.00	726.85	-0.09	726.45	-0.49
1600	726.94	726.49	-0.45	726.94	0.00	727.71	-0.12	726.64	-1.19
1760	727.83	726.71	-1.12	727.83	0.00	729.02	-0.21	727.64	-1.59
1860	729.23	727.85	-1.38	729.23	0.00	730.55	-0.19	728.28	-2.46
2000	730.74	728.59	-2.15	730.74	0.00	730.97	-0.26	728.61	-2.62
2071	731.23	728.92	-2.31	731.23	0.00	731.30	-0.30	729.07	-2.53
2144	731.60	729.44	-2.16	731.60	0.00	731.64	-0.34	729.32	-2.66
2190	731.98	729.70	-2.28	731.98	0.00	731.81	-0.37	729.70	-2.48
2272	732.18	730.11	-2.07	732.18	0.00	731.85	-0.38	730.07	-2.16
2359	732.23	730.49	-1.74	732.23	0.00	732.02	-0.38	730.29	-2.11
2419	732.40	730.71	-1.69	732.40	0.00	732.24	-0.39	730.54	-2.09
2490	732.63	730.95	-1.68	732.63	0.00	732.60	-0.39	730.87	-2.12
2590	732.99	731.30	-1.69	732.99	0.00	733.20	-0.42	731.10	-2.52
2684	733.62	731.51	-2.11	733.62	0.00	734.52	-0.43	731.50	-3.45
2790	734.95	732.02	-2.93	734.95	0.00	735.23	-0.41	732.28	-3.36
2990	735.64	732.82	-2.82	735.64	0.00	735.86	-0.36	734.14	-2.08
3190	736.22	734.42	-1.80	736.22	0.00	736.23	-0.35	734.88	-1.70
3261	736.58	735.17	-1.41	736.58	0.00	735.73	-1.27	737.00	0.00
3311	737.00	737.00	0.00	737.00	0.00		0.00		0.00
3362.5			0.00		-0.02	739.35	-0.33	739.49	-0.19
3414	739.68	739.69	0.01	739.66	-0.37	739.06	-0.31	739.03	-0.34
3464	739.37	739.39	0.02	739.00	-0.56	739.17	-0.33	738.78	-0.72
3514	739.50	739.51	0.01	738.94	-0.77	740.31	-0.22	739.67	-0.86
3714	740.53	740.53	0.00	739.76	-0.39	741.03	-0.03	740.58	-0.48
3784	741.06	741.06	0.00	740.67	-0.40	742.06	-0.03	741.59	-0.50
3914	742.09	742.09	0.00	741.69	1.16	742.34	-0.03	743.44	1.07
4044	742.37	742.37	0.00	743.53	1.48	742.73	-0.05	744.20	1.42
4244	742.78	742.78	0.00	744.26	0.85	743.44	-0.06	744.28	0.78
4444	743.50	743.50	0.00	744.35	0.47	743.97	-0.07	744.44	0.40
4544	744.04	744.04	0.00	744.51					

Value of Structures to be Protected
From Maverick County Appraisal Records
And Information provided by the City of Eagle Pass

STRUCTURE DATA

EAGLE PASS, Tx

This table is for data entry only. DoNOT delete or move columns, they may be hidden or unhidden if required. Data below row 15 may be altered as required.

GREY cells are calculated and should not be changed. YELLOW cells are global changes to the column data

…nent data is linked to this table to file IMPORT2A.XLS which is renamed, edited, then exported to Tab delimited text. That is then imported to the HEC FDA

…rt area column 1, row 1, MUST begin @ **Struc_Name (below)**

…port requires RED columns only, or all if known.

Columns which are unused in IMPORT2A.xls should be deleted after SAVING it AS a new name (also use TOOLS / UNPROTECT)

Also See Import table IMPORT1a.xls for occupancy type and global value adjustments (linked to OCC_NAME.XLS)

BLUE is for hydraulogy data

GREEN is for Cost data and calculation

GRAND TOTAL 18,641,085

TOTAL	TOTAL	TOTAL
15,150,071	3,030,014	461,000

Tax Estl $/SF totals: $36.79 — All Tax Appr. Value total: $1,970,580

Unique Struct. Name	Drawing #	Stream Name	Street Address	Occupancy Code	Damage Category	City	State	Zip	Station	LEFT (assumed) or Right	Year Built (assume missing)	1st Floor Stage (Flr. Elev.)	Stage (Grnd. Elev.)	Found Grnd. Elev.	SID Reach Name	Struct Value (1k) Ave.$ per all bldgs	Content Value (1k) (=20% Struct)	Other Value (1k)	No. of Struct.	Resi-2 Gen Data Estimate	No. of Struct. Estimated for estl Tax $/SF	Tax Estl $/SF. for Main Area	Living Area SF (partial)	All Tax Appr. Value (1998)	Notes
[illegible] 46[illegible]						EP	TX	78852			1996					32.9	3.0	1.0	[illegible]61	[illegible]8,48[illegible]	[illegible]	$28.13	53556	16,668,555	
Struc_Name	[illegible]	Stream_Name	Street	Occ_Name	Cat_Name	City	State	Zip	Station	Bank	Year	IF_Stage	Grnd_Stage		SID_Rch	Struc_Val	Cont_Val	Other_Val	Num_Struc						Notes
1	EF-2	Main Arroyo	193 CEYLON ST. **	SF-1	Resi-1	EP	TX	78852	4307	Right	1996	720.16	719.16		MA-1	5.1	1.0	1.0	1		0			5,100	
2	EF-2	Main Arroyo	193 CEYLON ST.**	SF-1	Resi-1	EP	TX	78852	4307	Right	1996	720.36	719.36		MA-1	25.0	5.0	1.0	1		[illegible]	24.77	1392	24,980	
3	EF-2	Main Arroyo	195 CEYLON ST.	SF-1	Resi-1	EP	TX	78852	4267	Right	1996	719.99	718.99		MA-1	45.7	9.1	1.0	1		0			45,740	
4	EF-2	Main Arroyo	509 GARRISON ST.	SF-1	Resi-1	EP	TX	78852	3735	Left	1996	720.84	719.84		MA-1	11.2	2.2	1.0	1		0			11,170	
5	EF-2	Main Arroyo	525 GARRISON ST.	SF-1	Resi-1	EP	TX	78852	3735	Left	1996	719.20	718.20		MA-1	17.9	3.6	1.0	1		1	22.03	1458	17,920	
6	EF-2	Main Arroyo	531 GARRISON ST.	SF-1	Resi-1	EP	TX	78852	3735	Left	1996	719.31	718.31		MA-1	13.1	2.6	1.0	1		0			13,130	
7	EF-2	Main Arroyo	557 GARRISON ST.	SF-1	Resi-1	EP	TX	78852	3735	Left	1996	720.33	719.33		MA-1	15.2	3.0	1.0	1		0			15,220	
8	EF-2	Main Arroyo	131 MONROE ST.	SF-1	Resi-1	EP	TX	78852	4049	Right	1996	720.87	719.87		MA-1	16.2	3.2	1.0	1		0			16,240	
9	EF-2	Main Arroyo	199 MONROE ST.	SF-1	Resi-1	EP	TX	78852	4049	Right	1996	724.09	723.09		MA-1	8.3	1.7	1.0	1		0			8,300	
10	EF-2	Main Arroyo	150 PIERCE ST. **	SF-1	Resi-1	EP	TX	78852	9369	Right	1996	722.89	721.89		MA-3	15.4	3.1	1.0	1		1	9.64	826	15,400	
11	EF-2	Main Arroyo	150 PIERCE ST. **	SF-1	Resi-1	EP	TX	78852	9369	Right	1996	723.89	722.89	722.89	MA-3	14.0	2.8	1.0	1		1	10.42	1100	14,030	
12	EF-2	Main Arroyo	150 PIERCE ST. **	SF-1	Resi-1	EP	TX	78852	9369	Right	1996	723.89	722.89	722.89	MA-3	21.1	4.2	1.0	1	21,098	0				
13	EF-2	Main Arroyo	150 PIERCE ST. **	SF-1	Resi-1	EP	TX	78852	9369	Right	1996	723.89	722.89	722.89	MA-3	21.1	4.2	1.0	1	21,098	0				
14	EF-2	Main Arroyo	150 PIERCE ST. **	SF-1	Resi-1	EP	TX	78852	9369	Right	1996	723.89	722.89	722.89	MA-3	21.1	4.2	1.0	1	21,098	0				
15	EF-3	Main Arroyo	739 CONCHO ST.	SF-1	Resi-1	EP	TX	78852	9551	Left	1996	742.23	741.23		MA-3	25.0	5.0	1.0	1		0			24,960	
16	EF-3	Main Arroyo	743 CONCHO ST.	SF-1	Resi-1	EP	TX	78852	9551	Left	1996	741.92	740.92		MA-3	21.6	4.3	1.0	1		0			21,630	
17	EF-3	Main Arroyo	755 CONCHO ST.	SF-1	Resi-1	EP	TX	78852	9551	Left	1996	742.11	741.11		MA-3	24.4	4.9	1.0	1		0			24,360	
18	EF-3	Main Arroyo	763 CONCHO ST.	SF-1	Resi-1	EP	TX	78852	9791	Left	1996	741.40	740.40		MA-3	24.7	4.9	1.0	1		0			24,740	
19	EF-3	Main Arroyo	777 CONCHO ST. **	SF-1	Resi-1	EP	TX	78852	9837	Left	1996	740.55	739.55		MA-3	33.6	6.7	1.0	1		0			33,630	
20	EF-3	Main Arroyo	777 CONCHO ST. **	SF-1	Resi-1	EP	TX	78852	9837	Left	1996	742.09	741.09		MA-3	33.6	6.7	1.0	1		1	29.69	925	33,630	
21	EF-3	Main Arroyo	784 CONCHO ST.	SF-1	Resi-1	EP	TX	78852	9883	Left	1996	743.82	742.82		MA-3	20.7	4.1	1.0	1		1	22.09	782	20,710	
22	EF-3	Main Arroyo	785 CONCHO ST.	SF-1	Resi-1	EP	TX	78852	9837	Left	1996	742.26	741.26		MA-3	23.0	4.6	1.0	1		0			23,010	
23	EF-3	Main Arroyo	815 CONCHO ST.	SF-1	Resi-1	EP	TX	78852	9837	Left	1996	742.46	741.46		MA-3	34.9	7.0	1.0	1		0			34,930	
24	EF-3	Main Arroyo	816 CONCHO ST.	SF-1	Resi-1	EP	TX	78852	9933	Left	1996	742.79	741.79		MA-3	34.2	6.8	1.0	1		0			34,230	
25	EF-3	Main Arroyo	718 MEDINA ST.	SF-1	Resi-1	EP	TX	78852	9933	Right	1996	738.71	737.71		MA-3	31.3	6.3	1.0	1		[illegible]	26.17	999	31,250	
26	EF-3	Main Arroyo	744 MEDINA ST.	SF-1	Resi-1	EP	TX	78852	9933	Right	1996	738.31	737.31		MA-3	24.1	4.8	1.0	1		[illegible]	25.67	648	24,110	
27	EF-3	Main Arroyo	521 NEUCES ST.	SF-1	Resi-1	EP	TX	78852	9933	Right	1996	729.63	728.63		MA-3	43.4	8.7	1.0	1		[illegible]	28.91	1270	43,360	
28	EF-3	Main Arroyo	523 NEUCES ST.	SF-1	Resi-1	EP	TX	78852	9933	Right	1996	729.89	728.89		MA-3	29.4	5.9	1.0	1		[illegible]	25.96	939	29,350	
29	EF-4	Trib. #1	1305 Wilson St.	SF-1	Resi-1	EP	TX	78852	1538	Left	1996	735.23	734.23		T1-2	26.3	5.3	1.0	1		[illegible]			26,330	
30	EF-4	Trib. #1	1317 Wilson St.	SF-1	Resi-1	EP	TX	78852	1538	Left	1996	734.33	733.33		T1-2	22.6	4.5	1.0	1		[illegible]			22,630	
31	EF-4	Trib. #1	1329 Wilson St.	SF-1	Resi-1	EP	TX	78852	1670	Left	1996	736.03	735.03		T1-2	33.0	6.6	1.0	1		[illegible]			33,020	
32	EF-4	Trib. #1	1339 Wilson St.	SF-1	Resi-1	EP	TX	78852	1670	Left	1996	738.84	737.84		T1-2	22.1	4.4	1.0	1		[illegible]			22,120	
33	EF-4	Trib. #1	1351 Wilson St.	SF-1	Resi-1	EP	TX	78852	1819	Left	1996	737.74	736.74		T1-2	39.4	7.9	1.0	1		[illegible]			39,380	
34	EF-4	Trib. #1	1361 Wilson St.	SF-1	Resi-1	EP	TX	78852	1819	Left	1996	737.95	736.95		T1-2	49.2	9.8	1.0	1		[illegible]			49,150	
35	EF-4	Trib. #1	1371 Wilson St.	SF-1	Resi-1	EP	TX	78852	1955	Left	1996	738.14	737.14		T1-2	24.5	4.9	1.0	1		[illegible]			24,490	
36	EF-4	Trib. #1	1410 Wilson St.	SF-1	Resi-1	EP	TX	78852	2227	Right	1996	739.59	738.59		T1-2	26.6	5.3	1.0	1		[illegible]			26,630	
37	EF-4	Trib. #1	1428 Wilson St.	SF-1	Resi-1	EP	TX	78852	2227	Right	1996	739.68	738.68		T1-2	21.1	4.2	1.0	1	[illegible]	[illegible]				
38	EF-5	Trib. #2	882 Medina St.	SF-1	Resi-1	EP	TX	78852	564	Left	1996	745.61	744.61		T2-1	23.7	4.7	1.0	1		[illegible]	24.92	680	23,650	
39	EF-5	Trib. #2	884 Medina St.	SF-1	Resi-1	EP	TX	78852	465	Left	1996	745.37	744.37		T2-1	29.5	5.9	1.0	1		[illegible]			29,460	
40	EF-5	Trib. #2	840 Medina St.	SF-1	Resi-1	EP	TX	78852	430	Left	1996	744.00	743.00		T2-1	19.4	3.9	1.0	1		[illegible]			19,360	
41	EF-5	Trib. #2	895 Concho St.	SF-1	Resi-1	EP	TX	78852	540	Left	1996	745.50	744.50		T2-1	32.9	6.6	1.0	1		[illegible]	30.36	736	32,940	
42	EF-5	Trib. #2	883 Concho St.	SF-1	Resi-1	EP	TX	78852	465	Left	1996	745.10	744.10		T2-1	66.3	13.3	1.0	1		[illegible]			66,270	
43	EF-5	Trib. #2	873 Concho St.	SF-1	Resi-1	EP	TX	78852	430	Left	1996	744.20	743.20		T2-1	27.2	5.4	1.0	1		[illegible]			27,220	
44	EF-5	Trib. #2	874 Concho St.	SF-1	Resi-1	EP	TX	78852	430	Left	1996	744.50	743.50		T2-1	41.0	8.2	1.0	1		[illegible]			40,960	
45	EF-5	Trib. #2	907 Medina St.	SF-1	Resi-1	EP	TX	78852	638	Left	1996	748.17	747.17		T2-1	68.6	13.7	1.0	1		[illegible]			68,560	
46	EF-5	Trib. #2	942 Medina St.	SF-1	Resi-1	EP	TX	78852	910	Left	1996	749.21	748.21		T2-1	21.1	4.2	1.0	1		[illegible]				
47	EF-5	Trib. #2	923 Medina St.	SF-1	Resi-1	EP	TX	78852	910	Left	1996	747.01	746.01		T2-1	54.3	10.9	1.0	1		[illegible]	26.68	1620	54,300	

Eagle Pass

bldg data

461					EP	TX	78852			1996					32.9	3.0	1.0	461	8,481,516	47	$28.13	53556	6,668,555	AVO: 16739
Unique Struct. Name	Drawing #	Stream Name	Street Address	Occupancy Code	Damage Category	City	State	Zip	Station	LEFT (assumed) or Right	Year Built (assume missing)	1st Floor Stage (Flr. Elev.)	Stage (Grnd. Elev.)	Found Grnd. Elev.	SID Reach Name	Struct Value (1K) Ave. $ per all bldgs	Content Value (1K) (= 20% Struct)	Other Value (1K)	No. of Struct.	Resi-2 Gen Data Estimate	No. of Struct. Estimated for Est Tax $ / SF	Tax Estl $/SF. for Main Area	Living Area SF (partial)	All Tax Appr. Value (1998)	Notes
Struc_Name		Stream_Name	Street	Occ_Name	Cat_Name	City	State	Zip	Station	Bank	Year	IF_Stage	Grnd_Stage		SID_Rch	Struc_Val	Cont_Val	Other_Val	Num_Struct						Notes
48	EF-5	Trib. #2	935 Medina St.	SF-1	Resi-1	EP	TX	78852	935	Left	1996	748.77	747.77		T2-1	67.3	13.5	1.0	1		1	30.77	1770	67,330	
49	EF-5	Trib. #2	935 Medina St.	SF-1	Resi-1	EP	TX	78852	935	Left	1996	747.04	746.04		T2-1	21.1	4.2	1.0	1	21,098	0				
50	EF-5	Trib. #2	951 Medina St.	SF-1	Resi-1	EP	TX	78852	960	Left	1996	749.47	748.47		T2-1	93.3	18.7	1.0	1		0			93,330	
51	EF-5	Trib. #2	949 Medina St.	SF-1	Resi-1	EP	TX	78852	1020	Left	1996	746.97	745.97		T2-1	46.2	9.2	1.0	1		1	26.48	1279	46,160	
52	EF-5	Trib. #2	903 Concho St.	SF-1	Resi-1	EP	TX	78852	638	Left	1996	745.56	744.56		T2-1	21.1	4.2	1.0	1	21,098	0				
53	EF-5	Trib. #2	903 Concho St.	SF-1	Resi-1	EP	TX	78852	638	Left	1996	747.05	746.05		T2-1	21.1	4.2	1.0	1	21,098	0				
54	EF-5	Trib. #2	903 Concho St.	SF-1	Resi-1	EP	TX	78852	638	Left	1996	746.11	745.11		T2-1	21.1	4.2	1.0	1	21,098	0				
55	EF-5	Trib. #2	903 Concho St.	SF-1	Resi-1	EP	TX	78852	638	Left	1996	746.11	745.11		T2-1	21.1	4.2	1.0	1	21,098	0				
56	EF-5	Trib. #2	903 Concho St.	SF-1	Resi-1	EP	TX	78852	638	Left	1996	746.62	745.62		T2-1	21.1	4.2	1.0	1	21,098	0				
57	EF-5	Trib. #2	905 Concho St.	SF-1	Resi-1	EP	TX	78852	943	Left	1996	747.55	746.55		T2-1	28.9	5.8	1.0	1		0			28,920	
58	EF-5	Trib. #2	905 Concho St.	SF-1	Resi-1	EP	TX	78852	943	Left	1996	747.55	746.55		T2-1	20.1	4.0	1.0	1		0			20,070	
59	EF-5	Trib. #2	969 Concho St.	SF-1	Resi-1	EP	TX	78852	993	Left	1996	747.40	746.40		T2-1	21.1	4.2	1.0	1	21,098	0				
60	EF-5	Trib. #2	979 Concho St.	SF-1	Resi-1	EP	TX	78852	993	Left	1996	747.65	746.65		T2-1	39.1	7.8	1.0	1		0			39,050	
61	EF-5	Trib. #2	1013 Concho St.	SF-1	Resi-1	EP	TX	78852	1471	Left	1996	749.16	748.16		T2-2	32.5	6.5	1.0	1		0			32,450	
62	EF-5	Trib. #2	1015 Concho St.	SF-1	Resi-1	EP	TX	78852	1471	Left	1996	749.07	748.07		T2-2	39.6	7.9	1.0	1		0			39,640	
63	EF-5	Trib. #2	1017 Concho St.	SF-1	Resi-1	EP	TX	78852	1471	Left	1996	748.75	747.75		T2-2	37.4	7.5	1.0	1		1	24.98	780	37,360	
64	EF-5	Trib. #2	1346 Hidalgo St.	SF-1	Resi-1	EP	TX	78852	1533	Left	1996	751.83	750.83		T2-2	49.2	9.8	1.0	1		0			49,170	
65	EF-5	Trib. #2	1344 Hidalgo St.	SF-1	Resi-1	EP	TX	78852	1533	Left	1996	750.46	749.46		T2-2	36.6	7.3	1.0	1		0			36,610	
66	EF-5	Trib. #2	1444 Hidalgo St.	SF-1	Resi-1	EP	TX	78852	1756	Left	1996	752.19	751.19		T2-2	25.9	5.2	1.0	1		0			25,930	
67	EF-5	Trib. #2	1448 Hidalgo St.	SF-1	Resi-1	EP	TX	78852	1756	Left	1996	750.97	749.97		T2-2	38.2	7.6	1.0	1		0			38,190	
68	EF-5	Trib. #2	1110 Concho St.	SF-1	Resi-1	EP	TX	78852	1811	Left	1996	752.76	751.76		T2-2	21.1	4.2	1.0	1	21,098	0				
69	EF-5	Trib. #2	1140 Concho St.	SF-1	Resi-1	EP	TX	78852	1811	Left	1996	751.84	750.84		T2-2	54.9	11.0	1.0	1		1	29.02	1484	54,890	
70	EF-5	Trib. #2	1140 Concho St.	SF-1	Resi-1	EP	TX	78852	1811	Left	1996	752.04	751.04		T2-2	21.1	4.2	1.0	1	21,098	0				
71	EF-5	Trib. #2	1150 Concho St.	SF-1	Resi-1	EP	TX	78852	1850	Left	1996	753.19	752.19		T2-2	25.1	5.0	1.0	1		0			25,100	
72	EF-5	Trib. #2	1156 Concho St.	SF-1	Resi-1	EP	TX	78852	2024	Left	1996	752.99	751.99		T2-2	41.0	8.2	1.0	1		1	24.15	1462	40,950	
73	EF-5	Trib. #2	1162 Concho St.	SF-1	Resi-1	EP	TX	78852	2024	Left	1996	753.27	752.27		T2-2	66.1	13.2	1.0	1		1	30.77	1657	66,080	
74	EF-5	Trib. #2	1162 Concho St.	SF-1	Resi-1	EP	TX	78852	2024	Left	1996	752.89	751.89		T2-2	21.1	4.2	1.0	1	21,098	0				
75	EF-5	Trib. #2	1105 Trinity St.	SF-1	Resi-1	EP	TX	78852	2024	Left	1996	753.40	752.40		T2-2	37.7	7.5	1.0	1		0			37,710	
76	EF-5	Trib. #2	1115 Trinity St.	SF-1	Resi-1	EP	TX	78852	2024	Left	1996	752.56	751.56		T2-2	31.5	6.3	1.0	1		0			31,500	
77	EF-5	Trib. #2	1127 Trinity St.	SF-1	Resi-1	EP	TX	78852	2024	Left	1996	751.80	750.80		T2-2	28.4	5.7	1.0	1		0			28,380	
78	EF-5	Trib. #2	1127 Trinity St.	SF-1	Resi-1	EP	TX	78852	2024	Left	1996	752.36	751.36		T2-2	21.1	4.2	1.0	1	21,098	0				
79	EF-5	Trib. #2	1106 Trinity St.	SF-1	Resi-1	EP	TX	78852	2024	Left	1996	755.00	754.00	754.00	T2-2	21.1	4.2	1.0	1	21,098	0				
80	EF-5	Trib. #2	1116 Trinity St.	SF-1	Resi-1	EP	TX	78852	2024	Left	1996	754.89	753.89		T2-2	30.6	6.1	1.0	1		1	26.76	864	30,640	
81	EF-5	Trib. #2	1135 Trinity St.	SF-1	Resi-1	EP	TX	78852	2390	Left	1996	753.78	752.78		T2-2	31.2	6.2	1.0	1		1	24.88	1224	31,210	
82	EF-5	Trib. #2	1142 Trinity St.	SF-1	Resi-1	EP	TX	78852	2390	Left	1996	753.94	752.94		T2-2	21.1	4.2	1.0	1	21,098	0				
83	EF-5	Trib. #2	1173 Trinity St.	SF-1	Resi-1	EP	TX	78852	2411	Left	1996	754.91	753.91		T2-2	30.0	6.0	1.0	1		0			29,950	
84	EF-5	Trib. #2	1128 Trinity St.	SF-1	Resi-1	EP	TX	78852	2400	Left	1996	754.96	753.96		T2-2	28.6	5.7	1.0	1		0			28,580	
85	EF-5	Trib. #2	1138 Trinity St.	SF-1	Resi-1	EP	TX	78852	2411	Left	1996	755.44	754.44		T2-2	22.2	4.4	1.0	1		0			22,180	
86	EF-5	Trib. #2	1162 Trinity St.	SF-1	Resi-1	EP	TX	78852	2461	Left	1996	754.23	753.23		T2-2	28.1	5.6	1.0	1		1	25.37	888	28,090	
87	EF-5	Trib. #2	1172 Trinity St.	SF-1	Resi-1	EP	TX	78852	2491	Left	1996	755.56	754.56		T2-2	28.4	5.7	1.0	1		0			28,350	
88	EF-5	Trib. #2	1182 Trinity St.	SF-1	Resi-1	EP	TX	78852	2521	Left	1996	755.16	754.16		T2-3	78.4	15.7	1.0	1		1	29.12	1064	78,420	
89	EF-5	Trib. #2	1590 Hidalgo St.	SF-1	Resi-1	EP	TX	78852	2521	Left	1996	758.00	757.00		T2-3	39.8	8.0	1.0	1		0			39,820	
90	EF-5	Trib. #2	1133 Colorado St.	SF-1	Resi-1	EP	TX	78852	2521	Left	1996	756.55	755.55		T2-3	59.3	11.9	1.0	1		0			59,250	
91	EF-5	Trib. #2	1147 Colorado St.	SF-1	Resi-1	EP	TX	78852	2521	Left	1996	757.38	756.38		T2-3	42.2	8.4	1.0	1	42,197	0				
92	EF-5	Trib. #2	1194 Trinity St.	SF-1	Resi-1	EP	TX	78852	2566	Left	1996	755.69	754.69		T2-3	35.7	7.1	1.0	1		0			35,680	
93	EF-5	Trib. #2	1155 Colorado St.	SF-1	Resi-1	EP	TX	78852	2566	Left	1996	756.85	755.85		T2-3	47.4	9.5	1.0	1		0			47,420	
94	EF-5	Trib. #2	1173 Colorado St.	SF-1	Resi-1	EP	TX	78852	2566	Left	1996	756.85	755.85		T2-3	50.0	10.0	1.0	1		0			50,000	
95	EF-5	Trib. #2	1400 Juarez St.	SF-1	Resi-1	EP	TX	78852	2576	Left	1996	754.59	753.59		T2-3	44.5	8.9	1.0	1		0			44,450	
96	EF-5	Trib. #2	1505 Buckley Ave.	SF-1	Resi-1	EP	TX	78852	2580	Left	1996	756.51	755.51		T2-3	37.9	7.6	1.0	1		1	36.17	1400	37,910	
97	EF-5	Trib. #2	1417 Buckley Ave.	SF-1	Resi-1	EP	TX	78852	2739	Left	1996	756.55	755.55		T2-3	24.8	5.0	1.0	1		1	25.96	980	24,810	
98	EF-5	Trib. #2	1531 Buckley Ave.	SF-1	Resi-1	EP	TX	78852	2739	Left	1996	756.73	755.73		T2-3	30.2	6.0	1.0	1		1	26.46	875	30,170	
99	EF-5	Trib. #2	1543 Buckley Ave.	SF-1	Resi-1	EP	TX	78852	2739	Left	1996	756.51	755.51		T2-3	32.4	6.5	1.0	1		1	25.96	936	32,350	
100	EF-5	Trib. #2	1555 Buckley Ave.	SF-1	Resi-1	EP	TX	78852	2831	Left	1996	757.31	756.31		T2-3	43.6	8.7	1.0	1		0			43,570	
101	EF-5	Trib. #2	1569 Buckley Ave.	SF-1	Resi-1	EP	TX	78852	2845	Left	1996	757.11	756.11		T2-3	42.2	8.4	1.0	1	42,197	0				
102	EF-5	Trib. #2	1581 Buckley Ave.	SF-1	Resi-1	EP	TX	78852	2907	Left	1996	757.89	756.89		T2-3	57.5	11.5	1.0	1		0			57,525	
103	EF-5	Trib. #2	1185 Colorado St.	SF-1	Resi-1	EP	TX	78852	2801	Left	1996	757.60	756.10		T2-3	49.8	10.0	1.0	1		0			49,900	
104	EF-5	Trib. #2	1195 Colorado St.	SF-1	Resi-1	EP	TX	78852	2801	Left	1996	758.31	756.81		T2-3	50.0	10.0	1.0	1		0			49,990	
105	EF-5	Trib. #2	1136 Colorado St.	SF-1	Resi-1	EP	TX	78852	2801	Left	1996	756.75	755.75		T2-3	48.4	9.7	1.0	1		0			48,350	
106	EF-5	Trib. #2	1150 Colorado St.	SF-1	Resi-1	EP	TX	78852	2801	Left	1996	757.20	756.20		T2-3	52.8	10.6	1.0	1		0			52,840	

0BLDGS1X, bldg data, 5/10/99

Eagle Pass

bldg-data

AVO: 16739

461					EP	TX	78852		1996							32.9	3.0	1.0	461	8,481,516	47	$28.13	53556	6,668,555					
Unique Struct. Name	Drawing #	Stream Name	Street Address	Occupancy Code	Damage Category	City	State	Zip	Station	LEFT (assumed) or Right	Year Built (assume missing)	1st Floor Stage (Flr. Elev.)	Stage (Grnd. Elev.)	Found Grnd. Elev.	SID Reach Name	Struct Value (1k) Ave. $ per all bldgs	Content Value (1k) (= 20% Struct)	Other Value (1k)	No. of Struct.	Resi-2 Gen Data Estimate	No. of Struct. Estimated for test Tax $ / SF	Tax Esti $/SF. for Main Area	Living Area SF (partial)	All Tax Appr. Value (1998)	Notes				
Struc_Name		Stream_Name	Street	Occ_Name	Cat_Name	City	State	Zip	Station	Bank	Year	IF_Stage	Grnd_Stage		SID_Rch	Struc_Val	Cont_Val	Other_Val	Num_Struct										
107	EF-5	Trib. #2	1162 Colorado St.	SF-1	Resi-1	EP	TX	78852	2831	Left	1996	757.46	756.46		T2-3	33.4	6.7	1.0	1		0			33,400					
108	EF-5	Trib. #2	1172 Colorado St.	SF-1	Resi-1	EP	TX	78852	2845	Left	1996	758.54	757.54		T2-3	30.3	6.1	1.0	1		0			30,260					
109	EF-5	Trib. #2	1182 Colorado St.	SF-1	Resi-1	EP	TX	78852	2907	Left	1996	757.06	756.06		T2-3	40.6	8.1	1.0	1		1	30.78	1100	40,570					
110	EF-5	Trib. #2	1192 Colorado St.	SF-1	Resi-1	EP	TX	78852	2907	Left	1996	758.05	757.05		T2-3	68.0	13.6	1.0	1		0			68,000					
111	EF-5	Trib. #2	1192 Colorado St.	SF-1	Resi-1	EP	TX	78852	2907	Left	1996	756.86	755.86		T2-3	42.2	8.4	1.0	1	42,197	0								
112	EF-5	Trib. #2	1151 North Comal St.	SF-1	Resi-1	EP	TX	78852	2907	Left	1996	759.64	758.64		T2-3	55.6	11.1	1.0	1		0			55,580					
113	EF-5	Trib. #2	1175 North Comal St.	SF-1	Resi-1	EP	TX	78852	2907	Left	1996	760.04	759.04		T2-3	54.4	10.9	1.0	1		0			54,390					
114	EF-5	Trib. #2	1112 North Comal St.	SF-1	Resi-1	EP	TX	78852	2907	Left	1996	759.31	758.31		T2-3	29.0	5.8	1.0	1		0			28,970					
115	EF-5	Trib. #2	1108 North Comal St.	SF-1	Resi-1	EP	TX	78852	2907	Left	1996	759.06	758.06		T2-3	33.6	6.7	1.0	1		0			33,640					
116	EF-5	Trib. #2	1102 North Comal St.	SF-1	Resi-1	EP	TX	78852	2907	Left	1996	759.39	758.39		T2-3	31.9	6.4	1.0	1		0			31,920					
117	EF-5	Trib. #2	1101 Arlington St.	SF-1	Resi-1	EP	TX	78852	3527	Left	1996	760.32	759.32		T2-3	57.9	11.6	1.0	1		0			57,920					
118	EF-5	Trib. #2	1111 Arlington St.	SF-1	Resi-1	EP	TX	78852	3527	Left	1996	759.89	758.89		T2-3	35.9	7.2	1.0	1		0			35,920					
119	EF-5	Trib. #2	1181 Arlington St.	SF-1	Resi-1	EP	TX	78852	3527	Left	1996	759.92	758.92		T2-3	41.4	8.3	1.0	1		0			41,360					
120	EF-5	Trib. #2	1495 Buckley Ave.	SF-1	Resi-1	EP	TX	78852	3038	Left	1996	757.63	756.63		T2-3	41.1	8.2	1.0	1		1	29.12	1159	41,080					
121	EF-5	Trib. #2	1670 Buckley Ave.	SF-1	Resi-1	EP	TX	78852	3648	Left	1996	761.12	760.12		T2-3	50.1	10.0	1.0	1		0			50,090					
122	EF-5	Trib. #2	1684 Buckley Ave.	SF-1	Resi-1	EP	TX	78852	3908	Left	1996	761.80	760.80		T2-4	43.0	8.6	1.0	1		0			42,970					
123	EF-5	Trib. #2	1690 Buckley Ave.	SF-1	Resi-1	EP	TX	78852	3908	Left	1996	761.76	760.76		T2-4	42.2	8.4	1.0	1	42,197	0								
124	EF-5	Trib. #2	1704 Buckley Ave.	SF-1	Resi-1	EP	TX	78852	3908	Left	1996	763.23	762.23		T2-4	44.9	9.0	1.0	1		0			44,880					
125	EF-5	Trib. #2	1205 Stroman Dr.	SF-1	Resi-1	EP	TX	78852	3868	Left	1996	763.90	762.90		T2-4	64.9	13.0	1.0	1		0			64,900					
126	EF-6	Trib. #3	1160 North Bibb Ave.	SF-1	Resi-1	EP	TX	78852	6130	Left	1996	779.40	778.40	778.40	T3-1	42.2	8.4	1.0	1	42,197	0								
127	EF-6	Trib. #3	1170 North Bibb Ave.	SF-1	Resi-1	EP	TX	78852	6130	Left	1996	779.40	778.40	778.40	T3-1	42.2	8.4	1.0	1	42,197	0								
128	EF-6	Trib. #3	2211 Royal Park Dr.	SF-1	Resi-1	EP	TX	78852	6235	Left	1996	782.20	781.20	781.20	T3-1	42.2	8.4	1.0	1	42,197	0								
129	EF-6	Trib. #3	2214 Royal Park Dr.	SF-1	Resi-1	EP	TX	78852	6235	Left	1996	779.40	778.40	778.40	T3-1	42.2	8.4	1.0	1	42,197	0								
130	EF-6	Trib. #3	2215 Royal Park Dr.	SF-1	Resi-1	EP	TX	78852	6331	Left	1996	782.20	781.20	781.20	T3-1	42.2	8.4	1.0	1	42,197	0								
131	EF-6	Trib. #3	2218 Royal Park Dr.	SF-1	Resi-1	EP	TX	78852	6331	Left	1996	782.10	781.10	781.10	T3-1	42.2	8.4	1.0	1	42,197	0								
132	EF-6	Trib. #3	2301 Royal Park Dr.	SF-1	Resi-1	EP	TX	78852	6391	Left	1996	782.00	781.00	781.00	T3-1	42.2	8.4	1.0	1	42,197	0								
133	EF-6	Trib. #3	2305 Royal Park Dr.	SF-1	Resi-1	EP	TX	78852	6491	Left	1996	782.00	781.00	781.00	T3-1	42.2	8.4	1.0	1	42,197	0								
134	EF-6	Trib. #3	1204 Fair Haven Dr.	SF-1	Resi-1	EP	TX	78852	7091	Right	1996	783.60	782.60	782.60	T3-1	42.2	8.4	1.0	1	42,197	0								
135	EF-6	Trib. #3	1203 Glen Haven Dr.	SF-1	Resi-1	EP	TX	78852	7091	Right	1996	786.20	785.20	785.20	T3-1	42.2	8.4	1.0	1	42,197	0								
136	EF-6	Trib. #3	1204 Glen Haven Dr.	SF-1	Resi-1	EP	TX	78852	7291	Right	1996	786.20	785.20	785.20	T3-1	42.2	8.4	1.0	1	42,197	0								
137	EF-7	Trib. #3	824 Colorado St.	SF-1	Resi-1	EP	TX	78852	10643	Right	1996	747.30	746.30		T3-2	42.2	8.4	1.0	1	42,197	0								
138	EF-8	Trib. #3	501	SF-2	Resi-2	EP	TX	78852	13970	Left	1996	776.80	775.80	775.80	T3-3	42.2	8.4	1.0	1	42,197	0								
139	EF-8	Trib. #3	502	SF-2	Resi-2	EP	TX	78852	15040	Left	1996	790.40	789.40	789.40	T3-4	42.2	8.4	1.0	1	42,197	0								
140	EF-9	Unnamed	503	SF-2	Resi-2	EP	TX	78852	0	Right	1996	727.60	726.60	726.60	UT-1	21.1	4.2	1.0	1	21,098									
141	EF-9	Unnamed	504	SF-2	Resi-2	EP	TX	78852	0	Right	1996	727.60	726.60	726.60	UT-1	21.1	4.2	1.0	1	21,098									
142	EF-9	Unnamed	505	SF-2	Resi-2	EP	TX	78852	0	Right	1996	727.60	726.60	726.60	UT-1	21.1	4.2	1.0	1	21,098									
143	EF-9	Unnamed	506	SF-2	Resi-2	EP	TX	78852	0	Right	1996	727.80	726.80	726.80	UT-1	21.1	4.2	1.0	1	21,098									
144	EF-9	Unnamed	507	SF-2	Resi-2	EP	TX	78852	0	Right	1996	727.60	726.60	726.60	UT-1	21.1	4.2	1.0	1	21,098									
145	EF-9	Unnamed	508	SF-2	Resi-2	EP	TX	78852	0	Right	1996	727.80	726.80	726.80	UT-1	21.1	4.2	1.0	1	21,098									
146	EF-9	Unnamed	509	SF-2	Resi-2	EP	TX	78852	0	Right	1996	727.20	726.20	726.20	UT-1	21.1	4.2	1.0	1	21,098									
147	EF-9	Unnamed	510	SF-2	Resi-2	EP	TX	78852	0	Right	1996	727.90	726.90	726.90	UT-1	21.1	4.2	1.0	1	21,098									
148	EF-9	Unnamed	511	SF-2	Resi-2	EP	TX	78852	0	Right	1996	728.00	727.00	727.00	UT-1	21.1	4.2	1.0	1	21,098									
149	EF-9	Unnamed	512	SF-2	Resi-2	EP	TX	78852	0	Right	1996	728.00	727.00	727.00	UT-1	21.1	4.2	1.0	1	21,098									
150	EF-9	Unnamed	513	SF-2	Resi-2	EP	TX	78852	0	Right	1996	728.00	727.00	727.00	UT-1	21.1	4.2	1.0	1	21,098									
151	EF-9	Unnamed	514	SF-2	Resi-2	EP	TX	78852	0	Right	1996	728.00	727.00	727.00	UT-1	21.1	4.2	1.0	1	21,098									
152	EF-9	Unnamed	515	SF-2	Resi-2	EP	TX	78852	0	Right	1996	728.00	727.00	727.00	UT-1	21.1	4.2	1.0	1	21,098									
153	EF-9	Unnamed	516	SF-2	Resi-2	EP	TX	78852	0	Right	1996	728.00	727.00	727.00	UT-1	21.1	4.2	1.0	1	21,098									
154	EF-9	Unnamed	517	SF-2	Resi-2	EP	TX	78852	0	Right	1996	728.00	727.00	727.00	UT-1	21.1	4.2	1.0	1	21,098									
155	EF-9	Unnamed	518	SF-2	Resi-2	EP	TX	78852	253	Right	1996	729.00	728.00	728.00	UT-1	21.1	4.2	1.0	1	21,098									
156	EF-9	Unnamed	519	SF-2	Resi-2	EP	TX	78852	353	Right	1996	729.50	728.50	728.50	UT-1	21.1	4.2	1.0	1	21,098									
157	EF-9	Unnamed	520	SF-2	Resi-2	EP	TX	78852	353	Right	1996	725.00	724.00	724.00	UT-1	21.1	4.2	1.0	1	21,098									
158	EF-9	Unnamed	521	SF-2	Resi-2	EP	TX	78852	453	Right	1996	731.70	730.70	730.70	UT-1	21.1	4.2	1.0	1	21,098									
159	EF-9	Unnamed	522	SF-2	Resi-2	EP	TX	78852	453	Right	1996	730.00	729.00	729.00	UT-1	21.1	4.2	1.0	1	21,098									
160	EF-9	Unnamed	523	SF-2	Resi-2	EP	TX	78852	453	Right	1996	731.00	730.00	730.00	UT-1	21.1	4.2	1.0	1	21,098									
161	EF-9	Unnamed	524	SF-2	Resi-2	EP	TX	78852	553	Right	1996	731.00	730.00	730.00	UT-1	21.1	4.2	1.0	1	21,098									
162	EF-9	Unnamed	525	SF-2	Resi-2	EP	TX	78852	653	Right	1996	731.00	730.00	730.00	UT-1	21.1	4.2	1.0	1	21,098									
163	EF-9	Unnamed	526	SF-2	Resi-2	EP	TX	78852	653	Right	1996	732.00	731.00	731.00	UT-1	21.1	4.2	1.0	1	21,098									
164	EF-9	Unnamed	527	SF-2	Resi-2	EP	TX	78852	653	Right	1996	732.00	731.00	731.00	UT-1	21.1	4.2	1.0	1	21,098									

Unique Struct. Name	Drawing #	Stream Name	Street Address	Occupancy Code	Damage Category	City	State	Zip	Station	LEFT (assumed) or Right	Year Built (assume missing)	1st Floor Stage (Flr. Elev.)	Stage (Grnd. Elev.)	Found Grnd. Elev.
461						EP	TX	78852			1996			
Struc_Name		Stream_Name	Street	Occ_Name	Cat_Name	City	State	Zip	Station	Bank	Year	IF_Stage	Grnd_Stage	
165	EF-9	Unnamed	528	SF-2	Resi-2	EP	TX	78852	553	Right	1996	733.00	732.00	732.00
166	EF-9	Unnamed	529	SF-2	Resi-2	EP	TX	78852	753	Right	1996	731.00	730.00	730.00
167	EF-9	Unnamed	530	SF-2	Resi-2	EP	TX	78852	853	Right	1996	730.00	729.00	729.00
168	EF-9	Unnamed	531	SF-2	Resi-2	EP	TX	78852	853	Right	1996	733.00	732.00	732.00
169	EF-9	Unnamed	532	SF-2	Resi-2	EP	TX	78852	1053	Right	1996	732.00	731.00	731.00
170	EF-9	Unnamed	533	SF-2	Resi-2	EP	TX	78852	1053	Right	1996	732.00	731.00	731.00
171	EF-9	Unnamed	534	SF-2	Resi-2	EP	TX	78852	1053	Right	1996	732.00	731.00	731.00
172	EF-9	Unnamed	535	SF-2	Resi-2	EP	TX	78852	1053	Right	1996	732.00	731.00	731.00
173	EF-9	Unnamed	536	SF-2	Resi-2	EP	TX	78852	1053	Right	1996	732.00	731.00	731.00
174	EF-9	Unnamed	537	SF-2	Resi-2	EP	TX	78852	253	Left	1996	730.00	729.00	729.00
175	EF-9	Unnamed	538	SF-2	Resi-2	EP	TX	78852	453	Left	1996	731.00	730.00	730.00
176	EF-9	Unnamed	539	SF-2	Resi-2	EP	TX	78852	553	Left	1996	731.00	730.00	730.00
177	EF-9	Unnamed	540	SF-2	Resi-2	EP	TX	78852	653	Left	1996	731.00	730.00	730.00
178	EF-9	Unnamed	541	SF-2	Resi-2	EP	TX	78852	853	Left	1996	732.00	731.00	731.00
179	EF-9	Unnamed	542	SF-2	Resi-2	EP	TX	78852	953	Left	1996	732.00	731.00	731.00
180	EF-9	Unnamed	543	SF-2	Resi-2	EP	TX	78852	953	Left	1996	733.00	732.00	732.00
181	EF-9	Unnamed	544	SF-2	Resi-2	EP	TX	78852	953	Left	1996	733.00	732.00	732.00
182	EF-9	Unnamed	545	SF-2	Resi-2	EP	TX	78852	1653	Left	1996	735.00	734.00	734.00
183	EF-9	Unnamed	546	SF-2	Resi-2	EP	TX	78852	1653	Left	1996	735.00	734.00	734.00
184	EF-9	Unnamed	547	SF-2	Resi-2	EP	TX	78852	1653	Left	1996	733.00	732.00	732.00
185	EF-9	Unnamed	548	SF-2	Resi-2	EP	TX	78852	1653	Left	1996	733.00	732.00	732.00
186	EF-9	Unnamed	549	SF-2	Resi-2	EP	TX	78852	1653	Left	1996	734.00	733.00	733.00
187	EF-9	Unnamed	550	SF-2	Resi-2	EP	TX	78852	1653	Left	1996	734.00	733.00	733.00
188	EF-9	Unnamed	551	SF-2	Resi-2	EP	TX	78852	1753	Left	1996	734.00	733.00	733.00
189	EF-9	Unnamed	552	SF-2	Resi-2	EP	TX	78852	1753	Left	1996	734.00	733.00	733.00
190	EF-9	Unnamed	553	SF-2	Resi-2	EP	TX	78852	1853	Left	1996	734.00	733.00	733.00
191	EF-9	Unnamed	554	SF-2	Resi-2	EP	TX	78852	1853	Left	1996	734.00	733.00	733.00
192	EF-9	Unnamed	555	SF-2	Resi-2	EP	TX	78852	1953	Left	1996	735.00	734.00	734.00
193	EF-9	Unnamed	556	SF-2	Resi-2	EP	TX	78852	1753	Left	1996	735.00	734.00	734.00
194	EF-9	Unnamed	557	SF-2	Resi-2	EP	TX	78852	1853	Left	1996	735.00	734.00	734.00
195	EF-9	Unnamed	558	SF-2	Resi-2	EP	TX	78852	2053	Left	1996	735.00	734.00	734.00
196	EF-9	Unnamed	559	SF-2	Resi-2	EP	TX	78852	2053	Left	1996	735.00	734.00	734.00
197	EF-9	Unnamed	560	SF-2	Resi-2	EP	TX	78852	2053	Left	1996	735.00	734.00	734.00
198	EF-9	Unnamed	561	SF-2	Resi-2	EP	TX	78852	2153	Left	1996	735.00	734.00	734.00
199	EF-9	Unnamed	562	SF-2	Resi-2	EP	TX	78852	2253	Left	1996	734.00	733.00	733.00
200	EF-9	Unnamed	563	SF-2	Resi-2	EP	TX	78852	2153	Left	1996	728.00	727.00	727.00
201	EF-9	Unnamed	564	SF-2	Resi-2	EP	TX	78852	2153	Left	1996	735.00	734.00	734.00
202	EF-9	Unnamed	565	SF-2	Resi-2	EP	TX	78852	2253	Left	1996	735.00	734.00	734.00
203	EF-9	Unnamed	566	SF-2	Resi-2	EP	TX	78852	2253	Left	1996	735.00	734.00	734.00
204	EF-9	Unnamed	567	SF-2	Resi-2	EP	TX	78852	2453	Left	1996	735.00	734.00	734.00
205	EF-9	Unnamed	568	SF-2	Resi-2	EP	TX	78852	2453	Left	1996	735.00	734.00	734.00
206	EF-9	Unnamed	569	SF-2	Resi-2	EP	TX	78852	1453	Left	1996	732.00	731.00	731.00
207	EF-9	Unnamed	570	SF-2	Resi-2	EP	TX	78852	1453	Left	1996	733.00	732.00	732.00
208	EF-9	Unnamed	571	SF-2	Resi-2	EP	TX	78852	1453	Left	1996	732.00	731.00	731.00
209	EF-9	Unnamed	572	SF-2	Resi-2	EP	TX	78852	1653	Left	1996	731.00	730.00	730.00
210	EF-9	Unnamed	573	SF-2	Resi-2	EP	TX	78852	1653	Left	1996	731.00	730.00	730.00
211	EF-9	Unnamed	574	SF-2	Resi-2	EP	TX	78852	1553	Left	1996	732.00	731.00	731.00
212	EF-9	Unnamed	575	SF-2	Resi-2	EP	TX	78852	1653	Left	1996	733.00	732.00	732.00
213	EF-9	Unnamed	576	SF-2	Resi-2	EP	TX	78852	1653	Left	1996	732.00	731.00	731.00
214	EF-9	Unnamed	577	SF-2	Resi-2	EP	TX	78852	1753	Left	1996	732.00	731.00	731.00
215	EF-9	Unnamed	578	SF-2	Resi-2	EP	TX	78852	1753	Left	1996	732.00	731.00	731.00
216	EF-9	Unnamed	579	SF-2	Resi-2	EP	TX	78852	1653	Left	1996	735.00	734.00	734.00
217	EF-9	Unnamed	580	SF-2	Resi-2	EP	TX	78852	1653	Left	1996	735.00	734.00	734.00
218	EF-9	Unnamed	581	SF-2	Resi-2	EP	TX	78852	1653	Left	1996	733.00	732.00	732.00
219	EF-9	Unnamed	582	SF-2	Resi-2	EP	TX	78852	1753	Left	1996	733.00	732.00	732.00
220	EF-9	Unnamed	583	SF-2	Resi-2	EP	TX	78852	1853	Left	1996	732.00	731.00	731.00

Unique Struct. Name	SID Reach Name	Struct Value (1k) Ave. $ per all bldgs	Content Value (1k) (= 20% Sruct)	Other Value (1k)	No. of Struct.	Resi-2 Gen Data Estimate	No. of Struct. Estimated for test Tax $ / SF	Tax Estl $/SF. for Main Area	Living Area SF (partial)	All Tax Appr. Value (1998)	Notes
		32.9	3.0	1.0	461	8,481,516	47	$28.13	53558	6,668,555	AVO: 16739
Struc_Name	SID_Rch	Struc_Val	Cont_Val	Other_Val	Num_Struct						Notes
165	UT-1	21.1	4.2	1.0	1	21,098					
166	UT-1	21.1	4.2	1.0	1	21,098					
167	UT-1	21.1	4.2	1.0	1	21,098					
168	UT-1	21.1	4.2	1.0	1	21,098					
169	UT-1	21.1	4.2	1.0	1	21,098					
170	UT-1	21.1	4.2	1.0	1	21,098					
171	UT-1	21.1	4.2	1.0	1	21,098					
172	UT-1	21.1	4.2	1.0	1	21,098					
173	UT-1	21.1	4.2	1.0	1	21,098					
174	UT-1	21.1	4.2	1.0	1	21,098					
175	UT-1	21.1	4.2	1.0	1	21,098					
176	UT-1	21.1	4.2	1.0	1	21,098					
177	UT-1	21.1	4.2	1.0	1	21,098					
178	UT-1	21.1	4.2	1.0	1	21,098					
179	UT-1	21.1	4.2	1.0	1	21,098					
180	UT-1	21.1	4.2	1.0	1	21,098					
181	UT-1	21.1	4.2	1.0	1	21,098					
182	UT-1	21.1	4.2	1.0	1	21,098					
183	UT-1	21.1	4.2	1.0	1	21,098					
184	UT-1	21.1	4.2	1.0	1	21,098					
185	UT-1	21.1	4.2	1.0	1	21,098					
186	UT-1	21.1	4.2	1.0	1	21,098					
187	UT-1	21.1	4.2	1.0	1	21,098					
188	UT-1	21.1	4.2	1.0	1	21,098					
189	UT-1	21.1	4.2	1.0	1	21,098					
190	UT-1	21.1	4.2	1.0	1	21,098					
191	UT-1	21.1	4.2	1.0	1	21,098					
192	UT-1	21.1	4.2	1.0	1	21,098					
193	UT-1	21.1	4.2	1.0	1	21,098					
194	UT-1	21.1	4.2	1.0	1	21,098					
195	UT-1	21.1	4.2	1.0	1	21,098					
196	UT-1	21.1	4.2	1.0	1	21,098					
197	UT-1	21.1	4.2	1.0	1	21,098					
198	UT-1	21.1	4.2	1.0	1	21,098					
199	UT-1	21.1	4.2	1.0	1	21,098					
200	UT-1	21.1	4.2	1.0	1	21,098					
201	UT-1	21.1	4.2	1.0	1	21,098					
202	UT-1	21.1	4.2	1.0	1	21,098					
203	UT-1	21.1	4.2	1.0	1	21,098					
204	UT-1	21.1	4.2	1.0	1	21,098					
205	UT-1	21.1	4.2	1.0	1	21,098					
206	UT-1	21.1	4.2	1.0	1	21,098					
207	UT-1	21.1	4.2	1.0	1	21,098					
208	UT-1	21.1	4.2	1.0	1	21,098					
209	UT-1	21.1	4.2	1.0	1	21,098					
210	UT-1	21.1	4.2	1.0	1	21,098					
211	UT-1	21.1	4.2	1.0	1	21,098					
212	UT-1	21.1	4.2	1.0	1	21,098					
213	UT-1	21.1	4.2	1.0	1	21,098					
214	UT-1	21.1	4.2	1.0	1	21,098					
215	UT-1	21.1	4.2	1.0	1	21,098					
216	UT-1	21.1	4.2	1.0	1	21,098					
217	UT-1	21.1	4.2	1.0	1	21,098					
218	UT-1	21.1	4.2	1.0	1	21,098					
219	UT-1	21.1	4.2	1.0	1	21,098					
220	UT-1	21.1	4.2	1.0	1	21,098					

					EP	TX	78852			1996						32.9	3.0	1.0	461	8,481,516	47	$28.13	53556	6,668,555	
Unique Struct. Name	Drawing #	Stream Name	Street Address	Occupancy Code	Damage Category	City	State	Zip	Station	LEFT (assumed) or Right	Year Built (assume missing)	1st Floor Stage (Flr. Elev.)	Stage (Grnd. Elev.)	Found Grnd. Elev.	SID Reach Name	Struct Value (1k) Ave. $ per all bldgs	Content Value (1k) (= 20% Struct)	Other Value (1k)	No. of Struct.	Resi-2 Gen Data Estimate	No. of Struct. Estimated for test Tax $ / SF	Tax Estl $/SF. for Main Area	Living Area SF (partial)	All Tax Appr. Value (1998)	Notes
Struc_Name		Stream_Name	Street	Occ_Name	Cat_Name	City	State	Zip	Station	Bank	Year	IF_Stage	Grnd_Stage		SID_Rch	Struc_Val	Cont_Val	Other_Val	Num_Struct						Notes
221	EF-9	Unnamed	584	SF-2	Resi-2	EP	TX	78852	1853	Left	1996	732.00	731.00	731.00	UT-1	21.1	4.2	1.0	1	21,098					
222	EF-9	Unnamed	585	SF-2	Resi-2	EP	TX	78852	1553	Left	1996	733.00	732.00	732.00	UT-1	21.1	4.2	1.0	1	21,098					
223	EF-9	Unnamed	586	SF-2	Resi-2	EP	TX	78852	1753	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
224	EF-9	Unnamed	587	SF-2	Resi-2	EP	TX	78852	1853	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
225	EF-9	Unnamed	588	SF-2	Resi-2	EP	TX	78852	1853	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
226	EF-9	Unnamed	589	SF-2	Resi-2	EP	TX	78852	1753	Left	1996	735.00	734.00	734.00	UT-1	21.1	4.2	1.0	1	21,098					
227	EF-9	Unnamed	590	SF-2	Resi-2	EP	TX	78852	1853	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
228	EF-9	Unnamed	591	SF-2	Resi-2	EP	TX	78852	1953	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
229	EF-9	Unnamed	592	SF-2	Resi-2	EP	TX	78852	1753	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
230	EF-9	Unnamed	593	SF-2	Resi-2	EP	TX	78852	1853	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
231	EF-9	Unnamed	594	SF-2	Resi-2	EP	TX	78852	1853	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
232	EF-9	Unnamed	595	SF-2	Resi-2	EP	TX	78852	1853	Left	1996	735.00	734.00	734.00	UT-1	21.1	4.2	1.0	1	21,098					
233	EF-9	Unnamed	596	SF-2	Resi-2	EP	TX	78852	1853	Left	1996	735.00	734.00	734.00	UT-1	21.1	4.2	1.0	1	21,098					
234	EF-9	Unnamed	597	SF-2	Resi-2	EP	TX	78852	1953	Left	1996	735.00	734.00	734.00	UT-1	21.1	4.2	1.0	1	21,098					
235	EF-9	Unnamed	598	SF-2	Resi-2	EP	TX	78852	1953	Left	1996	735.00	734.00	734.00	UT-1	21.1	4.2	1.0	1	21,098					
236	EF-9	Unnamed	599	SF-2	Resi-2	EP	TX	78852	1753	Left	1996	735.00	734.00	734.00	UT-1	21.1	4.2	1.0	1	21,098					
237	EF-9	Unnamed	600	SF-2	Resi-2	EP	TX	78852	1753	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
238	EF-9	Unnamed	601	SF-2	Resi-2	EP	TX	78852	1753	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
239	EF-9	Unnamed	602	SF-2	Resi-2	EP	TX	78852	2053	Left	1996	735.00	734.00	734.00	UT-1	21.1	4.2	1.0	1	21,098					
240	EF-9	Unnamed	603	SF-2	Resi-2	EP	TX	78852	1753	Left	1996	731.00	730.00	730.00	UT-1	21.1	4.2	1.0	1	21,098					
241	EF-9	Unnamed	604	SF-2	Resi-2	EP	TX	78852	1853	Left	1996	731.00	730.00	730.00	UT-1	21.1	4.2	1.0	1	21,098					
242	EF-9	Unnamed	605	SF-2	Resi-2	EP	TX	78852	1853	Left	1996	733.00	732.00	732.00	UT-1	21.1	4.2	1.0	1	21,098					
243	EF-9	Unnamed	606	SF-2	Resi-2	EP	TX	78852	1853	Left	1996	732.00	731.00	731.00	UT-1	21.1	4.2	1.0	1	21,098					
244	EF-9	Unnamed	607	SF-2	Resi-2	EP	TX	78852	1953	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
245	EF-9	Unnamed	608	SF-2	Resi-2	EP	TX	78852	2053	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
246	EF-9	Unnamed	609	SF-2	Resi-2	EP	TX	78852	2053	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
247	EF-9	Unnamed	610	SF-2	Resi-2	EP	TX	78852	2153	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
248	EF-9	Unnamed	611	SF-2	Resi-2	EP	TX	78852	2053	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
249	EF-9	Unnamed	612	SF-2	Resi-2	EP	TX	78852	2053	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
250	EF-9	Unnamed	613	SF-2	Resi-2	EP	TX	78852	2053	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
251	EF-9	Unnamed	614	SF-2	Resi-2	EP	TX	78852	1953	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
252	EF-9	Unnamed	615	SF-2	Resi-2	EP	TX	78852	2253	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
253	EF-9	Unnamed	616	SF-2	Resi-2	EP	TX	78852	2253	Left	1996	736.00	735.00	735.00	UT-1	21.1	4.2	1.0	1	21,098					
254	EF-9	Unnamed	617	SF-2	Resi-2	EP	TX	78852	2253	Left	1996	736.00	735.00	735.00	UT-1	21.1	4.2	1.0	1	21,098					
255	EF-9	Unnamed	618	SF-2	Resi-2	EP	TX	78852	2253	Left	1996	736.00	735.00	735.00	UT-1	21.1	4.2	1.0	1	21,098					
256	EF-9	Unnamed	619	SF-2	Resi-2	EP	TX	78852	2253	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
257	EF-9	Unnamed	620	SF-2	Resi-2	EP	TX	78852	2253	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
258	EF-9	Unnamed	621	SF-2	Resi-2	EP	TX	78852	2153	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
259	EF-9	Unnamed	622	SF-2	Resi-2	EP	TX	78852	2053	Left	1996	734.00	733.00	733.00	UT-1	21.1	4.2	1.0	1	21,098					
260	EF-9	Unnamed	623	SF-2	Resi-2	EP	TX	78852	2153	Left	1996	736.00	735.00	735.00	UT-1	21.1	4.2	1.0	1	21,098					
261	EF-9	Unnamed	624	SF-2	Resi-2	EP	TX	78852	2253	Left	1996	736.00	735.00	735.00	UT-1	21.1	4.2	1.0	1	21,098					
262	EF-9	Unnamed	625	SF-2	Resi-2	EP	TX	78852	2153	Left	1996	736.00	735.00	735.00	UT-1	21.1	4.2	1.0	1	21,098					
263	EF-9	Unnamed	626	SF-2	Resi-2	EP	TX	78852	2253	Left	1996	736.00	735.00	735.00	UT-1	21.1	4.2	1.0	1	21,098					
264	EF-9	Unnamed	627	SF-2	Resi-2	EP	TX	78852	2353	Left	1996	736.00	735.00	735.00	UT-1	21.1	4.2	1.0	1	21,098					
265	EF-9	Unnamed	628	SF-2	Resi-2	EP	TX	78852	2253	Left	1996	736.00	735.00	735.00	UT-1	21.1	4.2	1.0	1	21,098					
266	EF-9	Unnamed	629	SF-2	Resi-2	EP	TX	78852	2253	Left	1996	736.00	735.00	735.00	UT-1	21.1	4.2	1.0	1	21,098					
267	EF-9	Unnamed	630	SF-2	Resi-2	EP	TX	78852	2653	Left	1996	736.00	735.00	735.00	UT-1	21.1	4.2	1.0	1	21,098					
268	EF-9	Unnamed	631	SF-2	Resi-2	EP	TX	78852	1853	Left	1996	736.00	735.00	735.00	UT-1	21.1	4.2	1.0	1	21,098					
269	EF-9	Unnamed	632	SF-2	Resi-2	EP	TX	78852	1953	Left	1996	736.00	735.00	735.00	UT-1	21.1	4.2	1.0	1	21,098					
270	EF-9	Unnamed	633	SF-2	Resi-2	EP	TX	78852	2053	Left	1996	736.00	735.00	735.00	UT-1	21.1	4.2	1.0	1	21,098					
271	EF-9	Unnamed	634	SF-2	Resi-2	EP	TX	78852	2153	Left	1996	736.00	735.00	735.00	UT-1	21.1	4.2	1.0	1	21,098					
272	EF-9	Unnamed	635	SF-2	Resi-2	EP	TX	78852	1953	Left	1996	736.00	735.00	735.00	UT-1	21.1	4.2	1.0	1	21,098					
273	EF-9	Unnamed	636	SF-2	Resi-2	EP	TX	78852	2153	Left	1996	736.00	735.00	735.00	UT-1	21.1	4.2	1.0	1	21,098					
274	EF-9	Unnamed	637	SF-2	Resi-2	EP	TX	78852	2453	Left	1996	736.00	735.00	735.00	UT-1	21.1	4.2	1.0	1	21,098					
275	EF-9	Unnamed	638	SF-2	Resi-2	EP	TX	78852	2553	Left	1996	736.00	735.00	735.00	UT-1	21.1	4.2	1.0	1	21,098					
276	EF-9	Unnamed	639	SF-2	Resi-2	EP	TX	78852	2653	Left	1996	736.00	735.00	735.00	UT-1	21.1	4.2	1.0	1	21,098					

Unique Struct. Name	Drawing #	Stream Name	Street Address	Occupancy Code	Damage Category	City	State	Zip	Station	LEFT (assumed) or Right	Year Built (assume missing)	1st Floor Stage (Flr. Elev.)	Stage (Grnd. Elev.)	Found Grnd. Elev.	SID Reach Name	Struct Value (1k) Ave. $ per all bldgs	Content Value (1k) (= 20% Struct)	Other Value (1k)	No. of Struct.	Resi-2 Gen Data Estimate	No. of Struct. Estimated for test Tax $ / SF	Tax Esti $/SF. for Main Area	Living Area SF (partial)	All Tax Appr. Value (1998)	Notes
461						EP	TX	78852			1996					32.9	3.0	1.0	461	8,481,516	47	$28.13	53556	6,668,555	AVO: 16739
Struc_Name		Stream_Name	Street	Occ_Name	Cat_Name	City	State	Zip	Station	Bank	Year	IF_Stage	Grnd_Stage		SID_Rch	Struc_Val	Cont_Val	Other_Val	Num_Struct						Notes
277	EF-9	Unnamed	640	SF-2	Resi-2	EP	TX	78852	2653	Left	1996	736.00	735.00	735.00	UT-1	21.1	4.2	1.0	1	21,098					
278	EF-10	Unnamed	641	SF-2	Resi-2	EP	TX	78852	3200	Right	1996	738.10	737.10	737.10	UT-1	28.1	5.6	1.0	1	28,131					
279	EF-10	Unnamed	642	SF-2	Resi-2	EP	TX	78852	3200	Right	1996	738.10	737.10	737.10	UT-1	28.1	5.6	1.0	1	28,131					
280	EF-10	Unnamed	643	SF-2	Resi-2	EP	TX	78852	3200	Right	1996	738.10	737.10	737.10	UT-1	28.1	5.6	1.0	1	28,131					
281	EF-10	Unnamed	644	SF-2	Resi-2	EP	TX	78852	3200	Right	1996	738.50	737.50	737.50	UT-1	28.1	5.6	1.0	1	28,131					
282	EF-10	Unnamed	645	SF-2	Resi-2	EP	TX	78852	3200	Right	1996	738.50	737.50	737.50	UT-1	28.1	5.6	1.0	1	28,131					
283	EF-10	Unnamed	646	SF-2	Resi-2	EP	TX	78852	3200	Right	1996	738.50	737.50	737.50	UT-1	28.1	5.6	1.0	1	28,131					
284	EF-10	Unnamed	647	SF-2	Resi-2	EP	TX	78852	3300	Right	1996	738.50	737.50	737.50	UT-1	28.1	5.6	1.0	1	28,131					
285	EF-10	Unnamed	648	SF-2	Resi-2	EP	TX	78852	3300	Right	1996	738.50	737.50	737.50	UT-1	28.1	5.6	1.0	1	28,131					
286	EF-10	Unnamed	649	SF-2	Resi-2	EP	TX	78852	3300	Right	1996	738.50	737.50	737.50	UT-1	28.1	5.6	1.0	1	28,131					
287	EF-10	Unnamed	650	SF-2	Resi-2	EP	TX	78852	3300	Left	1996	738.60	737.60	737.60	UT-1	28.1	5.6	1.0	1	28,131					
288	EF-10	Unnamed	651	SF-2	Resi-2	EP	TX	78852	3300	Left	1996	738.60	737.60	737.60	UT-1	28.1	5.6	1.0	1	28,131					
289	EF-10	Unnamed	652	SF-2	Resi-2	EP	TX	78852	3400	Left	1996	738.90	737.90	737.90	UT-1	28.1	5.6	1.0	1	28,131					
290	EF-10	Unnamed	653	SF-2	Resi-2	EP	TX	78852	3500	Left	1996	738.90	737.90	737.90	UT-1	28.1	5.6	1.0	1	28,131					
291	EF-10	Unnamed	654	SF-2	Resi-2	EP	TX	78852	3700	Left	1996	738.70	737.70	737.70	UT-1	28.1	5.6	1.0	1	28,131					
292	EF-10	Unnamed	655	SF-2	Resi-2	EP	TX	78852	3900	Left	1996	739.40	738.40	738.40	UT-1	28.1	5.6	1.0	1	28,131					
293	EF-10	Unnamed	656	SF-2	Resi-2	EP	TX	78852	3800	Left	1996	740.30	739.30	739.30	UT-1	28.1	5.6	1.0	1	28,131					
294	EF-10	Unnamed	657	SF-2	Resi-2	EP	TX	78852	4400	Left	1996	741.00	740.00	740.00	UT-1	42.2	8.4	1.0	1	42,197					
295	EF-10	Unnamed	658	SF-2	Resi-2	EP	TX	78852	4400	Left	1996	741.00	740.00	740.00	UT-1	42.2	8.4	1.0	1	42,197					
296	EF-10	Unnamed	659	SF-2	Resi-2	EP	TX	78852	4500	Left	1996	741.00	740.00	740.00	UT-1	42.2	8.4	1.0	1	42,197					
297	EF-10	Unnamed	660	SF-2	Resi-2	EP	TX	78852	4500	Left	1996	741.00	740.00	740.00	UT-1	42.2	8.4	1.0	1	42,197					
298	EF-10	Unnamed	661	SF-2	Resi-2	EP	TX	78852	4500	Left	1996	744.00	743.00	743.00	UT-1	42.2	8.4	1.0	1	42,197					
299	EF-10	Unnamed	662	SF-2	Resi-2	EP	TX	78852	5600	Left	1996	744.40	743.40	743.40	UT-2	42.2	8.4	1.0	1	42,197					
300	EF-10	Unnamed	663	SF-2	Resi-2	EP	TX	78852	5700	Left	1996	744.40	743.40	743.40	UT-2	42.2	8.4	1.0	1	42,197					
301	EF-10	Unnamed	664	SF-2	Resi-2	EP	TX	78852	5800	Left	1996	744.20	743.20	743.20	UT-2	42.2	8.4	1.0	1	42,197					
302	EF-10	Unnamed	665	SF-2	Resi-2	EP	TX	78852	5600	Left	1996	744.00	743.00	743.00	UT-2	42.2	8.4	1.0	1	42,197					
303	EF-10	Unnamed	666	SF-2	Resi-2	EP	TX	78852	5600	Left	1996	744.00	743.00	743.00	UT-2	42.2	8.4	1.0	1	42,197					
304	EF-10	Unnamed	667	SF-2	Resi-2	EP	TX	78852	5600	Left	1996	744.00	743.00	743.00	UT-2	42.2	8.4	1.0	1	42,197					
305	EF-10	Unnamed	668	SF-2	Resi-2	EP	TX	78852	5700	Left	1996	744.00	743.00	743.00	UT-2	42.2	8.4	1.0	1	42,197					
306	EF-10	Unnamed	669	SF-2	Resi-2	EP	TX	78852	5700	Left	1996	744.70	743.70	743.70	UT-2	42.2	8.4	1.0	1	42,197					
307	EF-10	Unnamed	670	SF-2	Resi-2	EP	TX	78852	5800	Left	1996	744.00	743.00	743.00	UT-2	42.2	8.4	1.0	1	42,197					
308	EF-10	Unnamed	671	SF-2	Resi-2	EP	TX	78852	5800	Left	1996	744.00	743.00	743.00	UT-2	42.2	8.4	1.0	1	42,197					
309	EF-10	Unnamed	672	SF-2	Resi-2	EP	TX	78852	5800	Left	1996	744.00	743.00	743.00	UT-2	42.2	8.4	1.0	1	42,197					
310	EF-10	Unnamed	673	SF-2	Resi-2	EP	TX	78852	5800	Left	1996	744.00	743.00	743.00	UT-2	42.2	8.4	1.0	1	42,197					
311	EF-10	Unnamed	674	SF-2	Resi-2	EP	TX	78852	5800	Left	1996	744.00	743.00	743.00	UT-2	42.2	8.4	1.0	1	42,197					
312	EF-10	Unnamed	675	SF-2	Resi-2	EP	TX	78852	5900	Left	1996	744.20	743.20	743.20	UT-2	42.2	8.4	1.0	1	42,197					
313	EF-10	Unnamed	676	SF-2	Resi-2	EP	TX	78852	6000	Left	1996	744.60	743.60	743.60	UT-2	42.2	8.4	1.0	1	42,197					
314	EF-10	Unnamed	677	SF-2	Resi-2	EP	TX	78852	6000	Left	1996	744.60	743.60	743.60	UT-2	42.2	8.4	1.0	1	42,197					
315	EF-10	Unnamed	678	SF-2	Resi-2	EP	TX	78852	6000	Left	1996	744.60	743.60	743.60	UT-2	42.2	8.4	1.0	1	42,197					
316	EF-10	Unnamed	679	SF-2	Resi-2	EP	TX	78852	5900	Left	1996	744.30	743.30	743.30	UT-2	42.2	8.4	1.0	1	42,197					
317	EF-10	Unnamed	680	SF-2	Resi-2	EP	TX	78852	5900	Left	1996	744.20	743.20	743.20	UT-2	42.2	8.4	1.0	1	42,197					
318	EF-10	Unnamed	681	SF-2	Resi-2	EP	TX	78852	5900	Left	1996	743.70	742.70	742.70	UT-2	42.2	8.4	1.0	1	42,197					
319	EF-10	Unnamed	682	SF-2	Resi-2	EP	TX	78852	5900	Left	1996	744.10	743.10	743.10	UT-2	42.2	8.4	1.0	1	42,197					
320	EF-10	Unnamed	683	SF-2	Resi-2	EP	TX	78852	5900	Left	1996	744.10	743.10	743.10	UT-2	42.2	8.4	1.0	1	42,197					
321	EF-10	Unnamed	684	SF-2	Resi-2	EP	TX	78852	5900	Left	1996	744.10	743.10	743.10	UT-2	42.2	8.4	1.0	1	42,197					
322	EF-10	Unnamed	685	SF-2	Resi-2	EP	TX	78852	6000	Left	1996	744.30	743.30	743.30	UT-2	42.2	8.4	1.0	1	42,197					
323	EF-10	Unnamed	686	SF-2	Resi-2	EP	TX	78852	6000	Left	1996	744.30	743.30	743.30	UT-2	42.2	8.4	1.0	1	42,197					
324	EF-10	Unnamed	687	SF-2	Resi-2	EP	TX	78852	6000	Left	1996	744.30	743.30	743.30	UT-2	42.2	8.4	1.0	1	42,197					
325	EF-10	Unnamed	688	SF-2	Resi-2	EP	TX	78852	6000	Left	1996	744.10	743.10	743.10	UT-2	42.2	8.4	1.0	1	42,197					
326	EF-10	Unnamed	689	SF-2	Resi-2	EP	TX	78852	6000	Left	1996	744.10	743.10	743.10	UT-2	42.2	8.4	1.0	1	42,197					
327	EF-10	Unnamed	690	SF-2	Resi-2	EP	TX	78852	6000	Left	1996	744.10	743.10	743.10	UT-2	42.2	8.4	1.0	1	42,197					
328	EF-10	Unnamed	691	SF-2	Resi-2	EP	TX	78852	6200	Left	1996	744.90	743.90	743.90	UT-2	42.2	8.4	1.0	1	42,197					
329	EF-10	Unnamed	692	SF-2	Resi-2	EP	TX	78852	6200	Left	1996	745.00	744.00	744.00	UT-2	42.2	8.4	1.0	1	42,197					
330	EF-10	Unnamed	693	SF-2	Resi-2	EP	TX	78852	6400	Left	1996	745.50	744.50	744.50	UT-2	42.2	8.4	1.0	1	42,197					
331	EF-10	Unnamed	694	SF-2	Resi-2	EP	TX	78852	6400	Left	1996	745.50	744.50	744.50	UT-2	42.2	8.4	1.0	1	42,197					
332	EF-10	Unnamed	695	SF-2	Resi-2	EP	TX	78852	6100	Left	1996	744.70	743.70	743.70	UT-2	42.2	8.4	1.0	1	42,197					

						EP	TX	78852		1996						32.9	3.0	1.0	461	8,481,516	47	$28.13	53556	6,668,555	
Unique Struct. Name	Drawing #	Stream Name	Street Address	Occupancy Code	Damage Category	City	State	Zip	Station	LEFT (assumed) or Right	Year Built (assume missing)	1st Floor Stage (Flr. Elev.)	Stage (Grnd. Elev.)	Found Grnd. Elev.	SID Reach Name	Struct Value (1k) Ave. $ per all bldgs	Content Value (1k) (= 20% Struct)	Other Value (1k)	No. of Struct.	Resi-2 Gen Data Estimate	No. of Struct. Estimated for test Tax $ / SF	Tax Esti $/SF. for Main Area	Living Area SF (partial)	All Tax Appr. Value (1998)	Notes
Struc_Name		Stream_Name	Street	Occ_Name	Cat_Name	City	State	Zip	Station	Bank	Year	IF_Stage	Grnd_Stage		SID_Rch	Struc_Val	Cont_Val	Other_Val	Num_Struct						Notes
333	EF-10	Unnamed	696	SF-2	Resi-2	EP	TX	78852	6200	Left	1996	744.70	743.70	743.70	UT-2	42.2	8.4	1.0	1	42,197					
334	EF-10	Unnamed	697	SF-2	Resi-2	EP	TX	78852	6200	Left	1996	745.00	744.00	744.00	UT-2	42.2	8.4	1.0	1	42,197					
335	EF-10	Unnamed	698	SF-2	Resi-2	EP	TX	78852	6200	Left	1996	745.50	744.50	744.50	UT-2	42.2	8.4	1.0	1	42,197					
336	EF-10	Unnamed	699	SF-2	Resi-2	EP	TX	78852	6300	Left	1996	745.50	744.50	744.50	UT-2	42.2	8.4	1.0	1	42,197					
337	EF-10	Unnamed	700	SF-2	Resi-2	EP	TX	78852	6300	Left	1996	745.40	744.40	744.40	UT-2	42.2	8.4	1.0	1	42,197					
338	EF-10	Unnamed	701	SF-2	Resi-2	EP	TX	78852	6400	Left	1996	746.00	745.00	745.00	UT-2	42.2	8.4	1.0	1	42,197					
339	EF-10	Unnamed	702	SF-2	Resi-2	EP	TX	78852	6400	Left	1996	747.40	746.40	746.40	UT-2	42.2	8.4	1.0	1	42,197					
340	EF-10	Unnamed	703	SF-2	Resi-2	EP	TX	78852	6400	Left	1996	747.40	746.40	746.40	UT-2	42.2	8.4	1.0	1	42,197					
341	EF-10	Unnamed	704	SF-2	Resi-2	EP	TX	78852	6500	Left	1996	747.40	746.40	746.40	UT-2	42.2	8.4	1.0	1	42,197					
342	EF-10	Unnamed	705	SF-2	Resi-2	EP	TX	78852	6600	Left	1996	749.60	748.60	748.60	UT-2	42.2	8.4	1.0	1	42,197					
343	EF-10	Unnamed	706	SF-2	Resi-2	EP	TX	78852	6600	Left	1996	749.60	748.60	748.60	UT-2	42.2	8.4	1.0	1	42,197					
344	EF-10	Unnamed	707	SF-2	Resi-2	EP	TX	78852	6600	Left	1996	747.30	746.30	746.30	UT-2	42.2	8.4	1.0	1	42,197					
345	EF-10	Unnamed	708	SF-2	Resi-2	EP	TX	78852	6600	Left	1996	747.30	746.30	746.30	UT-2	42.2	8.4	1.0	1	42,197					
346	EF-10	Unnamed	709	SF-2	Resi-2	EP	TX	78852	6300	Right	1996	748.40	747.40	747.40	UT-2	42.2	8.4	1.0	1	42,197					
347	EF-10	Unnamed	710	SF-2	Resi-2	EP	TX	78852	6800	Right	1996	747.80	746.80	746.80	UT-2	42.2	8.4	1.0	1	42,197					
348	EF-10	Unnamed	711	SF-2	Resi-2	EP	TX	78852	7000	Right	1996	748.70	747.70	747.70	UT-2	42.2	8.4	1.0	1	42,197					
349	EF-10	Unnamed	1505 Cristin Dr.	SF-1	Resi-1	EP	TX	78852	6100	Right	1996	748.21	747.21		UT-2	9.5	1.9	1.0	1		0				
350	EF-10	Unnamed	1519 Cristin Dr.	SF-1	Resi-1	EP	TX	78852	6000	Right	1996	748.00	747.00		UT-2	46.0	9.2	1.0	1		0			9,500	
351	EF-10	Unnamed	1521 Cristin Dr.	SF-1	Resi-1	EP	TX	78852	6000	Right	1996	747.92	746.92		UT-2	47.9	9.6	1.0	1		0			45,950	
352	EF-10	Unnamed	1533 Cristin Dr.	SF-1	Resi-1	EP	TX	78852	5900	Right	1996	747.45	746.45		UT-2	43.1	8.6	1.0	1		0			47,870	
353	EF-10	Unnamed	1551 Cristin Dr.	SF-1	Resi-1	EP	TX	78852	5800	Right	1996	747.30	746.30		UT-2	42.2	8.4	1.0	1	42,197	0			43,060	
354	EF-10	Unnamed	1553 Cristin Dr.	SF-1	Resi-1	EP	TX	78852	5800	Right	1996	747.64	746.64		UT-2	40.7	8.1	1.0	1		1	30.78	1100		
355	EF-10	Unnamed	1565 Cristin Dr.	SF-1	Resi-1	EP	TX	78852	5700	Right	1996	747.62	746.62		UT-2	46.1	9.2	1.0	1		1	31.35	1000	40,650	
356	EF-10	Unnamed	1577 Cristin Dr.	SF-1	Resi-1	EP	TX	78852	5700	Right	1996	748.45	747.45		UT-2	50.4	10.1	1.0	1		1	33.33	1078	46,070	
357	EF-10	Unnamed	1589 Cristin Dr.	SF-1	Resi-1	EP	TX	78852	5600	Right	1996	751.02	750.02		UT-2	56.0	11.2	1.0	1		0			50,400	
358	EF-10	Unnamed	1321 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	7200	Right	1996	752.00	751.00		UT-2	49.0	9.8	1.0	1		0			55,980	
359	EF-10	Unnamed	1333 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	7100	Right	1996	751.10	750.10		UT-2	47.2	9.4	1.0	1		0			48,950	
360	EF-10	Unnamed	1337 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	7100	Right	1996	751.10	750.10		UT-2	47.2	9.4	1.0	1		0			47,240	
361	EF-10	Unnamed	1351 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	7000	Right	1996	750.30	749.30		UT-2	43.2	8.6	1.0	1		0			47,170	
362	EF-10	Unnamed	1359 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	6900	Right	1996	749.70	748.70		UT-2	40.4	8.1	1.0	1		0			43,240	
363	EF-10	Unnamed	1367 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	6900	Right	1996	749.90	748.90		UT-2	46.6	9.3	1.0	1		0			40,430	
364	EF-10	Unnamed	1375 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	6800	Right	1996	749.60	748.60		UT-2	46.0	9.2	1.0	1		0			46,590	
365	EF-10	Unnamed	1389 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	6700	Right	1996	749.40	748.40		UT-2	48.0	9.6	1.0	1		0			46,040	
366	EF-10	Unnamed	1397 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	6700	Right	1996	749.10	748.10		UT-2	62.9	12.6	1.0	1		0			47,980	
367	EF-10	Unnamed	1403 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	6600	Right	1996	749.00	748.00		UT-2	50.8	10.2	1.0	1		0			62,940	
368	EF-10	Unnamed	1415 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	6500	Right	1996	749.10	748.10		UT-2	249.4	49.9	1.0	1		1	33.33	1116	50,800	
369	EF-10	Unnamed	1427 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	6500	Right	1996	749.00	748.00		UT-2	244.0	48.8	1.0	1		1	31.25	960	49,440	
370	EF-10	Unnamed	1439 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	6400	Right	1996	749.00	748.00		UT-2	52.9	10.6	1.0	1		1	29.83	1301	44,010	
371	EF-10	Unnamed	1451 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	6300	Right	1996	749.40	748.40		UT-2	46.9	9.4	1.0	1		1	33.33	1127	52,920	
372	EF-10	Unnamed	1463 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	6300	Right	1996	749.00	748.00		UT-2	41.1	8.2	1.0	1		1	31.35	1000	46,930	
373	EF-10	Unnamed	1475 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	6200	Right	1996	749.10	748.10		UT-2	48.0	9.6	1.0	1		1	30.78	1118	41,060	
374	EF-10	Unnamed	1390 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	6800	Right	1996	750.60	749.60		UT-2	47.2	9.4	1.0	1		0			47,950	
375	EF-10	Unnamed	1398 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	6700	Right	1996	750.10	749.10		UT-2	62.5	12.5	1.0	1		0			47,160	
376	EF-10	Unnamed	1412 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	6600	Right	1996	749.70	748.70		UT-2	45.7	9.1	1.0	1		0			62,280	
377	EF-10	Unnamed	1262 Katy Dr.	SF-1	Resi-1	EP	TX	78852	7200	Right	1996	750.60	749.60		UT-2	45.0	9.0	1.0	1		0			45,650	
378	EF-10	Unnamed	1284 Katy Dr.	SF-1	Resi-1	EP	TX	78852	7100	Right	1996	750.60	749.60		UT-2	54.0	10.8	1.0	1		0			44,990	
379	EF-10	Unnamed	1326 Katy Dr.	SF-1	Resi-1	EP	TX	78852	6900	Right	1996	749.15	748.05		UT-2	46.1	9.2	1.0	1		0			54,040	
380	EF-10	Unnamed	1398 Katy Dr.	SF-1	Resi-1	EP	TX	78852	6800	Right	1996	749.09	748.09		UT-2	42.2	8.4	1.0	1	42,197	0			46,110	
381	EF-10	Unnamed	1382 Katy Dr.	SF-1	Resi-1	EP	TX	78852	6700	Right	1996	749.05	748.05		UT-2	45.3	9.1	1.0	1		0				
382	EF-10	Unnamed	1394 Katy Dr.	SF-1	Resi-1	EP	TX	78852	6700	Right	1996	748.82	747.82		UT-2	61.6	12.3	1.0	1		0			45,310	
383	EF-10	Unnamed	1273 Katy Dr.	SF-1	Resi-1	EP	TX	78852	7200	Right	1996	750.81	749.81		UT-2	60.9	12.2	1.0	1		0			51,840	
384	EF-10	Unnamed	1285 Katy Dr.	SF-1	Resi-1	EP	TX	78852	7100	Right	1996	751.10	750.10		UT-2	42.2	8.4	1.0	1	42,197	0			60,910	
385	EF-10	Unnamed	1297 Katy Dr.	SF-1	Resi-1	EP	TX	78852	7100	Right	1996	750.28	749.28		UT-2	41.6	8.3	1.0	1		0				
386	EF-10	Unnamed	1303 Katy Dr.	SF-1	Resi-1	EP	TX	78852	7000	Right	1996	749.71	748.71		UT-2	47.3	9.5	1.0	1		0			41,570	
387	EF-10	Unnamed	1315 Katy Dr.	SF-1	Resi-1	EP	TX	78852	6900	Right	1996	749.72	748.72		UT-2	47.0	9.4	1.0	1		0			47,340	
388	EF-10	Unnamed	1337 Katy Dr.	SF-1	Resi-1	EP	TX	78852	6900	Right	1996	749.66	748.66		UT-2	56.8	11.4	1.0	1		0			47,130	
389	EF-10	Unnamed	1359 Katy Dr.	SF-1	Resi-1	EP	TX	78852	6800	Right	1996	749.77	748.77		UT-2	52.6	10.5	1.0	1		0			56,780	
390	EF-10	Unnamed	1371 Katy Dr.	SF-1	Resi-1	EP	TX	78852	6800	Right	1996	749.10	748.10		UT-2	44.6	8.9	1.0	1		0			52,640	
																								44,590	

						EP	TX	78852			1996					32.9	3.0	1.0	461	8,481,516	47	$28.13	53556	6,668,555	
Unique Struct. Name	Drawing #	Stream Name	Street Address	Occupancy Code	Damage Category	City	State	Zip	Station	LEFT (assumed) or Right	Year Built (assume missing)	1st Floor Stage (Flr. Elev.)	Stage (Grnd. Elev.)	Found Grnd. Elev.	SID Reach Name	Struct Value (1k) Ave. $ per all bldgs	Content Value (1k) (= 20% Struct)	Other Value (1k)	No. of Struct.	Resi-2 Gen Data Estimate	No. of Struct. Estimated for Test Tax $ / SF	Tax Estl $/SF. for Main Area	Living Area SF (partial)	All Tax Appr. Value (1998)	Notes
Struc_Name		Stream_Name	Street	Occ_Name	Cat_Name	City	State	Zip	Station	Bank	Year	1F_Stage	Grnd_Stage		SID_Rch	Struc_Val	Cont_Val	Other_Val	Num_Struct						Notes
391	EF-10	Unnamed	1383 Katy Dr.	SF-1	Resi-1	EP	TX	78852	6700	Right	1996	748.99	747.99		UT-2	46.6	9.3	1.0	1		0			46,620	
392	EF-10	Unnamed	1397 Katy Dr.	SF-1	Resi-1	EP	TX	78852	6700	Right	1996	748.79	747.79		UT-2	46.8	9.4	1.0	1		1	33.33	1075	46,840	
393	EF-10	Unnamed	1401 Katy Dr.	SF-1	Resi-1	EP	TX	78852	6600	Right	1996	747.87	746.87		UT-2	43.4	8.7	1.0	1		1	31.35	1000	43,350	
394	EF-10	Unnamed	1410 Katy Dr.	SF-1	Resi-1	EP	TX	78852	6500	Right	1996	748.22	747.22		UT-2	42.2	8.4	1.0	1	42,197	0				
395	EF-10	Unnamed	1445 Katy Dr.	SF-1	Resi-1	EP	TX	78852	6500	Right	1996	748.12	747.12		UT-2	29.5	5.9	1.0	1		1	28.91	1227	29,530	
396	EF-10	Unnamed	1467 Katy Dr.	SF-1	Resi-1	EP	TX	78852	6400	Right	1996	749.77	748.77		UT-2	101.0	20.2	1.0	1		1	27.83	2040	100,950	
397	EF-10	Unnamed	1486 Katy Dr.	SF-1	Resi-1	EP	TX	78852	6200	Right	1996	749.29	748.29		UT-2	42.2	8.4	1.0	1	42,197	0				
398	EF-11	Unnamed	1205 Katy Dr.	SF-1	Resi-1	EP	TX	78852	7300	Right	1996	751.30	750.30		UT-2	60.2	12.0	1.0	1		0			60,240	
399	EF-11	Unnamed	1227 Katy Dr.	SF-1	Resi-1	EP	TX	78852	7300	Right	1996	751.20	750.20		UT-2	52.0	10.4	1.0	1		0			52,010	
400	EF-11	Unnamed	1249 Katy Dr.	SF-1	Resi-1	EP	TX	78852	7200	Right	1996	751.20	750.20		UT-2	40.9	8.2	1.0	1		0			40,880	
401	EF-11	Unnamed	1251 Katy Dr.	SF-1	Resi-1	EP	TX	78852	7200	Right	1996	750.80	749.80		UT-2	54.2	10.8	1.0	1		0			54,240	
402	EF-11	Unnamed	1200 Katy Dr.	SF-1	Resi-1	EP	TX	78852	7500	Right	1996	751.70	750.70		UT-2	49.8	10.0	1.0	1		0			49,800	
403	EF-11	Unnamed	1212 Katy Dr.	SF-1	Resi-1	EP	TX	78852	7400	Right	1996	751.60	750.60		UT-2	44.4	8.9	1.0	1		0			44,360	
404	EF-11	Unnamed	1234 Katy Dr.	SF-1	Resi-1	EP	TX	78852	7300	Right	1996	751.40	750.40		UT-2	48.6	9.7	1.0	1		0			48,550	
405	EF-11	Unnamed	1246 Katy Dr.	SF-1	Resi-1	EP	TX	78852	7300	Right	1996	751.00	750.00		UT-2	52.4	10.5	1.0	1		0			52,350	
406	EF-11	Unnamed	1258 Katy Dr.	SF-1	Resi-1	EP	TX	78852	7200	Right	1996	751.10	750.10		UT-2	52.1	10.4	1.0	1		0			52,120	
407	EF-11	Unnamed	1301 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	7400	Right	1996	753.60	752.60		UT-2	55.3	11.1	1.0	1		1	29.83	1384	55,270	
408	EF-11	Unnamed	1305 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	7400	Right	1996	752.70	751.70		UT-2	52.6	10.5	1.0	1		1	36.17	1400	52,640	
409	EF-11	Unnamed	1317 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	7200	Right	1996	752.30	751.30		UT-2	68.4	13.7	1.0	1		0			68,420	
410	EF-11	Unnamed	1321 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	7200	Right	1996	752.00	751.00		UT-2	49.0	9.8	1.0	1		0			48,950	
411	EF-11	Unnamed	1314 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	7300	Right	1996	753.98	752.98		UT-2	49.8	10.0	1.0	1		1	32.32	1231	49,820	
412	EF-11	Unnamed	1318 Paseco Encinal Dr.	SF-1	Resi-1	EP	TX	78852	7300	Right	1996	753.22	752.22		UT-2	46.4	9.3	1.0	1		1	33.91	986	46,380	
413	EF-11	Unnamed	712	SF-2	Resi-2	EP	TX	78852	7300	Right	1996	751.00	750.00	750.00	UT-2	42.2	8.4	1.0	1	42,197	0				
414	EF-11	Unnamed	713	SF-2	Resi-2	EP	TX	78852	7200	Left	1996	751.20	750.20	750.20	UT-2	42.2	8.4	1.0	1	42,197	0				
415	EF-11	Unnamed	714	SF-2	Resi-2	EP	TX	78852	7400	Left	1996	751.00	750.00	750.00	UT-2	42.2	8.4	1.0	1	42,197	0				
416	EF-11	Unnamed	715	SF-2	Resi-2	EP	TX	78852	7400	Left	1996	751.00	750.00	750.00	UT-2	42.2	8.4	1.0	1	42,197	0				
417	EF-11	Unnamed	716	SF-2	Resi-2	EP	TX	78852	7400	Left	1996	750.90	749.90	749.90	UT-2	42.2	8.4	1.0	1	42,197	0				
418	EF-11	Unnamed	717	SF-2	Resi-2	EP	TX	78852	7387	Left	1996	754.20	753.20	753.20	UT-2	42.2	8.4	1.0	1	42,197	0				
419	EF-12	Unnamed	718	SF-2	Resi-2	EP	TX	78852	10999	Right	1996	764.50	763.50	763.50	UT-3	42.2	8.4	1.0	1	42,197	0				
420	EF-12	Unnamed	719	SF-2	Resi-2	EP	TX	78852	11499	Right	1996	765.90	764.90	764.90	UT-3	42.2	8.4	1.0	1	42,197	0				
421	EF-12	Unnamed	720	SF-2	Resi-2	EP	TX	78852	11742	Left	1996	766.90	765.90	765.90	UT-3	42.2	8.4	1.0	1	42,197	0				
422	EF-12	Unnamed	721	SF-2	Resi-2	EP	TX	78852	11742	Left	1996	766.90	765.90	765.90	UT-3	42.2	8.4	1.0	1	42,197	0				
423	EF-12	Unnamed	722	SF-2	Resi-2	EP	TX	78852	11999	Right	1996	768.90	767.90	767.90	UT-4	42.2	8.4	1.0	1	42,197	0				
424	EF-12	Unnamed	723	SF-2	Resi-2	EP	TX	78852	12000	Right	1996	768.90	767.90	767.90	UT-4	42.2	8.4	1.0	1	42,197	0				
425	EF-12	Unnamed	724	SF-2	Resi-2	EP	TX	78852	11999	Right	1996	768.90	767.90	767.90	UT-4	42.2	8.4	1.0	1	42,197	0				
426	EF-12	Unnamed	725	SF-2	Resi-2	EP	TX	78852	12000	Right	1996	768.90	767.90	767.90	UT-4	42.2	8.4	1.0	1	42,197	0				
427	EF-12	Unnamed	726	SF-2	Resi-2	EP	TX	78852	11999	Right	1996	772.00	771.00	771.00	UT-4	42.2	8.4	1.0	1	42,197	0				
428	EF-12	Unnamed	727	SF-2	Resi-2	EP	TX	78852	11999	Right	1996	772.00	771.00	771.00	UT-4	42.2	8.4	1.0	1	42,197	0				
429	EF-12	Unnamed	728	SF-2	Resi-2	EP	TX	78852	18000	Right	1996	773.60	772.60	772.60	UT-4	42.2	8.4	1.0	1	42,197	0				
430	EF-13	Trib to Secol	729	SF-2	Resi-2	EP	TX	78852	3311	Right	1996	736.00	735.00	735.00	TSC-2	28.1	5.6	1.0	1	28,131	0				
431	EF-13	Trib to Secol	730	SF-2	Resi-2	EP	TX	78852	3190	Left	1996	731.00	730.00	730.00	TSC-1	28.1	5.6	1.0	1	28,131	0				
432	EF-13	Trib to Secol	731	SF-2	Resi-2	EP	TX	78852	1760	Left	1996	727.70	726.70	726.70	TSC-1	28.1	5.6	1.0	1	28,131	0				
433	EF-13	Trib to Secol	732	SF-2	Resi-2	EP	TX	78852	1760	Left	1996	727.70	726.70	726.70	TSC-1	28.1	5.6	1.0	1	28,131	0				
434	EF-13	Trib to Secol	733	SF-2	Resi-2	EP	TX	78852	1700	Left	1996	727.70	726.70	726.70	TSC-1	28.1	5.6	1.0	1	28,131	0				
435	EF-13	Trib to Secol	734	SF-2	Resi-2	EP	TX	78852	1600	Left	1996	727.70	726.70	726.70	TSC-1	28.1	5.6	1.0	1	28,131	0				
436	EF-13	Trib to Secol	735	SF-2	Resi-2	EP	TX	78852	1600	Left	1996	727.70	726.70	726.70	TSC-1	28.1	5.6	1.0	1	28,131	0				
437	EF-13	Trib to Secol	736	SF-2	Resi-2	EP	TX	78852	1600	Left	1996	727.70	726.70	726.70	TSC-1	28.1	5.6	1.0	1	28,131	0				
438	EF-16	Rio Grande	737	SF-2	Resi-2	EP	TX	78852	8260	Left	1996	708.60	707.60	707.60	RG-2	21.1	4.2	1.0	1	21,098	0				
439	EF-16	Rio Grande	738	SF-2	Resi-2	EP	TX	78852	8260	Left	1996	708.60	707.60	707.60	RG-2	21.1	4.2	1.0	1	21,098	0				
440	EF-16	Rio Grande	739	SF-2	Resi-2	EP	TX	78852	8260	Left	1996	708.60	707.60	707.60	RG-2	21.1	4.2	1.0	1	21,098	0				
441	EF-16	Rio Grande	740	SF-2	Resi-2	EP	TX	78852	8360	Left	1996	708.60	707.60	707.60	RG-2	21.1	4.2	1.0	1	21,098	0				
442	EF-16	Rio Grande	741	SF-2	Resi-2	EP	TX	78852	8560	Left	1996	707.10	706.10	706.10	RG-2	21.1	4.2	1.0	1	21,098	0				
443	EF-16	Rio Grande	742	SF-2	Resi-2	EP	TX	78852	8560	Left	1996	709.10	708.10	708.10	RG-2	21.1	4.2	1.0	1	21,098	0				
444	EF-16	Rio Grande	743	SF-2	Resi-2	EP	TX	78852	8660	Left	1996	709.10	708.10	708.10	RG-2	21.1	4.2	1.0	1	21,098	0				
445	EF-16	Rio Grande	744	SF-2	Resi-2	EP	TX	78852	8760	Left	1996	711.30	710.30	710.30	RG-2	21.1	4.2	1.0	1	21,098	0				
446	EF-16	Rio Grande	745	SF-2	Resi-2	EP	TX	78852	8860	Left	1996	711.30	710.30	710.30	RG-2	21.1	4.2	1.0	1	21,098	0				
447	EF-16	Rio Grande	746	SF-2	Resi-2	EP	TX	78852	8860	Left	1996	711.30	710.30	710.30	RG-2	21.1	4.2	1.0	1	21,098	0				

Unique Struct. Name	Drawing #	Stream Name	Street Address	Occupancy Code	Damage Category	City	State	Zip	Station	LEFT (assumed) or Right	Year Built (assume missing)	1st Floor Stage (Flr. Elev.)	Stage (Grnd. Elev.)	Found Grnd. Elev.	SID Reach Name	Struct Value	Content Value	Other Value	No. of Struct.	Reg 2 Comp Estimate	No. of Struct. Estimated	Tax Estl $/SF for Main Area	Living Area SF (partial)	All Tax Appr. Value (1998)	Notes
461						EP	TX	78852			1996							1.0	461			$28.13	[illegible]	6,668,555	
Struc_Name		Stream_Name	Street	Occ_Name	Cat_Name	City	State	Zip	Station	Bank	Year	Flr_Stage	Grnd_Stage					Other_Val	Num_Struc						Notes
448	EF-16	Rio Grande	747	SF-2	Resi-2	EP	TX	78852	8860	Left	1996	711.30	710.30	710.30	[illegible]	[illegible]	[illegible]	1.0	1	[illegible]	[illegible]				
449	EF-16	Rio Grande	748	SF-2	Resi-2	EP	TX	78852	8860	Left	1996	711.30	710.30	710.30	[illegible]	[illegible]	[illegible]	1.0	1	[illegible]	[illegible]				
450	EF-16	Rio Grande	749	SF-2	Resi-2	EP	TX	78852	8960	Left	1996	711.30	710.30	710.30	[illegible]	[illegible]	[illegible]	1.0	1	[illegible]	[illegible]				
451	EF-16	Rio Grande	750	SF-2	Resi-2	EP	TX	78852	8960	Left	1996	709.80	708.80	708.80	[illegible]	[illegible]	[illegible]	1.0	1	[illegible]	[illegible]				
452	EF-16	Rio Grande	751	SF-2	Resi-2	EP	TX	78852	9060	Left	1996	709.60	708.60	708.60	[illegible]	[illegible]	[illegible]	1.0	1	[illegible]	[illegible]				
453	EF-16	Rio Grande	752	SF-2	Resi-2	EP	TX	78852	9060	Left	1996	709.60	708.60	708.60	[illegible]	[illegible]	[illegible]	1.0	1	[illegible]	[illegible]				
454	EF-16	Rio Grande	753	SF-2	Resi-2	EP	TX	78852	9060	Left	1996	709.50	708.50	708.50	[illegible]	[illegible]	[illegible]	1.0	1	[illegible]	[illegible]				
455	EF-16	Rio Grande	754	SF-2	Resi-2	EP	TX	78852	9060	Left	1996	709.50	708.50	708.50	[illegible]	[illegible]	[illegible]	1.0	1	[illegible]	[illegible]				
456	EF-16	Rio Grande	755	SF-2	Resi-2	EP	TX	78852	9060	Left	1996	713.90	712.90	712.90	[illegible]	[illegible]	[illegible]	1.0	1	[illegible]	[illegible]				
457	EF-16	Rio Grande	756	SF-2	Resi-2	EP	TX	78852	9060	Left	1996	709.50	708.50	708.50	[illegible]	[illegible]	[illegible]	1.0	1	[illegible]	[illegible]				
458	EF-16	Rio Grande	757	SF-2	Resi-2	EP	TX	78852	9160	Left	1996	709.50	708.50	708.50	[illegible]	[illegible]	[illegible]	1.0	1	[illegible]	[illegible]				
459	EF-16	Rio Grande	758	SF-2	Resi-2	EP	TX	78852	9160	Left	1996	713.90	712.90	712.90	[illegible]	[illegible]	[illegible]	1.0	1	[illegible]	[illegible]				
460	EF-16	Rio Grande	759	SF-2	Resi-2	EP	TX	78852	9160	Left	1996	[illegible]	[illegible]	710.40	[illegible]	[illegible]	[illegible]	1.0	1	[illegible]	[illegible]				
461	EF-16	Rio Grande	760	SF-2	Resi-2	EP	TX	78852	9360	Left	1996	715.60	714.60	714.60	[illegible]	[illegible]	[illegible]	1.0	1	[illegible]	[illegible]				
[illegible]			505 loop 3443		Commercial						[illegible]	0.00	1.00			[illegible]	[illegible]	1.0				35.17	1400	86,990	
[illegible]			505 loop 3443		Residential						[illegible]	0.00	1.00			[illegible]	[illegible]	1.0				24.92	336	8,373	
[illegible]			537 loop 3443		Commercial						[illegible]	0.00	1.00			173,150.0	[illegible]	1.0				[illegible]	[illegible]	173,150	
[illegible]			571 loop 3443		Commercial						[illegible]	0.00	1.00			78,470.0	[illegible]	1.0				[illegible]	[illegible]	78,470	
[illegible]			1593 loop 3443		Commercial						[illegible]	0.00	1.00			686,590.0	[illegible]	1.0				30.76	19235	686,590	

Appendix E

Appendix E is a proposed drainage and stormwater ordinance for the City of Eagle Pass. The City may want to consider implementing this proposed ordinance if one does not exist.

Organization: Proposed Drainage Ordinance
Tables and Figures

CITY OF EAGLE PASS, TEXAS
PROPOSED STORM DRAINAGE AND SEDIMENT CONTROL ORDINANCE

PERTAINING TO STORM DRAINAGE AND SEDIMENT CONTROL

WHEREAS, certain technological advances have occurred in the area of Storm Drainage And Sediment Control which are contained in a new code prepared for the City of Eagle Pass; and

WHEREAS, the new code has been drafted to coordinate with the drainage ordinances of Maverick County, Texas.

NOW THEREFORE, BE IT ORDAINED, that the entire Exhibit "A" attached hereto and shall become effective upon passage.

ADOPTED AND PASSED by at the CITY COUNCIL of the City of Eagle Pass, Texas, on this _____ day of _____, 1999.

_____

ATTEST:

_____

Presented by me to the Mayor of the City of Eagle Pass, Texas, this _____ day of _____, 1999.

_____

Approved and signed by the Mayor of the City of Eagle Pass, Texas, this _____ day of _____, 1999.

_____

ATTEST:

_____

Exhibit A

TABLE OF CONTENTS

B. Materials

15. Storm Water Detention
    A. Acceptable Detention Methods
    B. Time of Concentration
    C. Design Storm
    D. Allowable Release Rate
    E. Drainage System Overflow Design
    F. Determination of Storage Volume - Rational Method
    G. Determination of Storage Volume - Hydrographic Methods
    H. General Detention Basin Design Requirements
    I. Dry Bottom Basin Design Requirements
    J. Wet Bottom Basin Design Requirements
    K. Roof Top Storage
    L. Parking Lot Storage
    M. Facility Financial Responsibilities
    N. Facility Maintenance Responsibilities
    O. Inspections
    P. Corrective Measures
    Q. Joint Development of Control Systems
    R. Installation of Control Systems
    S. Detention Facilities in Flood Plains
    T. Off site Drainage Provision
    U. Erosion Control
16. Certifications Required
17. Changes in Plan
18. Determination of Impact Drainage Areas
19. Other Requirements
    A. Sump Pumps
    B. Down Spouts
    C. Footing Drains
    D. Basement Floor Drains
20. Regional Drainage Plans
21. Disclaimer of Liability
22. Corrective Action
23. Repealer
24. When Effective
25. Exempt Projects

Appendix - Tables and Figures

A. Table 1 - Urban Runoff Coefficients
B. Table 2 - Runoff Coefficients "C" by Land Use and Typical Inlet Times
C. Table 3 - Typical Values of Manning's n
D. Table 4 - Maximum Permissible Velocities in Vegetal - Lined Channels
E. Table 5 - Rainfall Depths for Various Return Periods and Storm Duration's
F. Table 5A - Rainfall Intensities for Various Return Periods and Storm Duration's
G. Table 6 - Street and Gutter Capacities, Maverick County, Texas
H. Figure 1 - Rainfall Intensity - Duration - Frequency Curves, Eagle Pass, Texas.
I. Figure 2 - Average Channel Velocities for used Calculate the Time of Concentration

EAGLE PASS, TEXAS

A General Ordinance Establishing

Storm Drainage and Sediment Control

1. Purpose

The purpose of this Ordinance is to reduce the hazard to public health and safety caused by excessive storm water runoff, to enhance economic objectives, and to protect, conserve and promote the orderly development of land and water resources within the regulatory area. This ordinance regulates:

a. Storm water drainage improvements related to development of lands located within Eagle Pass.

b. Drainage control systems installed during new construction and grading of lots and other parcels of land.

c. Erosion and sediment control systems installed during new construction of grading of lots and other parcels of land.

d. The design, construction and maintenance of storm water drainage facilities and systems.

e. Existing storm water drainage systems where the inclusion of improvements is feasible.

It is recognized that drainage systems serving the City of Eagle Pass may not have sufficient capacity to receive and convey storm water runoff resulting when land changes from open or agricultural use to a more urbanized use. It is further recognized that deposit of sediment from developments during and after construction can reduce capacities of storm sewer and drainage systems and result in damages to receiving lakes and streams. Therefore, it shall be the policy of the City of Eagle Pass that the storage and controlled release of storm water runoff shall be required of all new development, any redevelopment and other new construction in the City of Eagle Pass as stipulated elsewhere in this ordinance. The release rate of storm water from developed lands shall not exceed the release rate from the land area in its present land use.

Because topography and the availability and adequacy of outlets for storm runoff vary with almost every site, the requirements for storm drainage tend to be an individual matter for any project. It is recommended that each proposed project be discussed with the Engineer's office at the earliest practical time in the planning stage.

2. Conflicting Ordinances

The provisions of this Ordinance shall be deemed as additional requirements to minimum standards required by other ordinances of the City. In the case of conflicting requirements, the most restrictive shall apply.

3. Compliance with Other Ordinances

In addition to the requirements of this Ordinance, compliance with the requirements set forth in any other applicable ordinances with respect to submission and approval of preliminary and final subdivision plats, improvement plans, building and zoning permits, construction inspections, appeals, and similar matters, and compliance with applicable State of Texas statutes and regulations shall be required.

4. Definitions

For the purpose of this Ordinance, the following definitions shall apply:

City - The City of Eagle Pass, Maverick County, Texas, and any subordinate employee or agent to whom they shall specifically delegate a responsibility authorized by this Ordinance.

Capacity of a Storm Drainage Facility - The maximum flow that can be conveyed or stored by a storm drainage facility without causing damage to public or private property.

Channel - A natural or artificial watercourse which periodically or continuously contains moving water, or which forms a connecting link between two bodies of water. It has a defined bed and banks which serve to confine the water.

Compensatory storage - An artificial volume of storage within a flood plain used to balance the loss of natural flood storage capacity when artificial fill or structures are placed within the flood plain.

Contiguous - Adjoining or in actual contact with.

Critical Duration Storm - The storm duration which requires the greatest detention storage. In the Rational Method, the critical duration storm is equal to the time of concentration being analyzed. For computer modeling, the critical duration storm is equal to or greater than the time of concentration of the watershed being modeled.

Culvert - A closed conduit used for the passage of surface drainage water under a roadway, railroad, canal, or other impediment.

Detention Basin - A facility constructed or modified to restrict the flow of storm water to a prescribed maximum rate, and to detain concurrently the excess waters that accumulate behind the outlet.

Drainage Area - The area from which water is carried off by a drainage system; a watershed or catchment area.

Drop manhole - A manhole having a vertical drop greater than two feet between the inlet pipe and the outlet pipe. A vertical drop pipe shall be located immediately outside the manhole.

Dry Bottom Detention Basin - A basin designed to be completely dewatered after having provided its planned detention of runoff during a storm event.

Duration - The time period of a rainfall event.

Engineer - A subordinate or agent of the City to whom the City has delegated responsibility.

Erosion - Wearing away of the land by running water, waves, temperature changes, ice or wind.

FEMA - Federal Emergency Management Administration - delegated with administering the Flood Insurance program and response after natural disasters. Successor to the former Flood Insurance Administration.

Flood Elevation - The elevation at all locations delineating the maximum level of high waters for a flood of given return period and rainfall duration.

Flood or Flood Waters - The water of any watercourse which is above the banks of the watercourse. Is also means the water of any lake which is above and outside the banks thereof.

Flood Hazard Area - Those flood plains which have not been adequately protected from flooding caused by the regulatory flood, and are shown on the Flood Hazard or Floodway-Flood Boundary Maps of the Federal Insurance Administration or maps provided to the City by the Texas Natural Resources Conservation Commission.

Flood Plain - The area adjoining the river or stream which has been or may hereafter be covered by flood water from regulatory floodway and floodway fringe.

Floodway - see Regulatory Floodway.

Floodway Fringe - That portion of the flood plain lying outside the floodway which is inundated by the regulatory flood.

Footing Drain - A drain pipe installed around the exterior of a basement wall foundation to relieve water pressure caused by high groundwater elevation.

Grade - The inclination or slope of a channel, canal, conduit, etc., or natural ground surface usually expressed in terms of the percentage the vertical rise (or fall) bears to the corresponding horizontal distance.

IBWC - International Boundary and Waterway Commission - delegated with administering the use and care of water resources along the common border between the United States and Mexico.

Impact Areas - Areas defined and mapped by the City which are unlikely to be easily drained because of one or more factors including but not limited to any of the following: soil type, topography, land where there is not adequate outlet, a floodway or flood plain.

Impervious - A term applied to material through which water cannot pass, or through which water passes with difficulty.

Inlet - An opening into a storm sewer for the entrance of surface storm water runoff, more completely described as a storm sewer inlet.

Junction Chamber - A converging section of conduit, usually large enough for a person to enter, used to facilitate the flow from one or more conduits into a main conduit.

Lateral Storm Sewer - A sewer that has inlets connected to it but has no other storm sewer connected.

Manhole - Storm sewer structure through which a person may enter to gain access to an underground storm sewer or enclosed structure.

Major Drainage Area - Drainage system carrying runoff from an area of more than fifty square miles Rural classification or one square mile Urban classification. Designs shall be in accordance with the Texas Department of Transportation.

Maverick County Water County Water Control & Improvement District No. 1 - delegated with the development of water resources and irrigation for citizens in Maverick County, Texas. Responsible for care and maintenance of irrigation network in Maverick County, Texas.

Minor Drainage System - Drainage system carrying runoff from an area of less than fifty square miles Rural classification or one square mile Urban classification.

Off Site - Everything not on site.

On Site - Located within the controlled or Urbanized area where runoff originates.

Outfall - The point or location where storm runoff discharges from a sewer or drain. Also applies to the outfall sewer or channel which carries the storm runoff to the point of outfall.

Peak Flow - The maximum rate of flow of water at a given point in a channel or conduit resulting from a predetermined storm or flood.

Radius of Curvature - Length of radius of a circle used to define a curve.

Rainfall Intensity - The cumulative depth of rainfall occurring over a given duration, normally expressed in inches per hour.

Reach - Any length of river, channel or storm sewer.

Regulated Area - All of the land under the jurisdiction of the City of Eagle Pass.

Regulated Drain - An open drain, a tile drain or a combination of the two whose description and limits are established by law.

Regulatory Flood - That flood having a peak discharge which can be equaled or exceed on the average of once in a one hundred (100) year period, as calculated by a method and procedure which is acceptable to the City. If a permit from FEMA for construction in the floodway is required (see Section 6), then the regulatory flood peak discharge should be calculated by a

method acceptable to the City. This regulatory flood is equivalent to a flood having a probability of occurrence of one percent (1%) in any given year.

Regulatory Floodway - The channel of a river or stream and those portions of the flood plains adjoining the channel which are reasonably required to carry and discharge efficiently the peak flow of the regulatory flood of any river or stream.

Release Rate - The amount of storm water released from a storm water control facility per unit of time.

Return Period - The average interval of time within which a given rainfall event will be equaled or exceeded once. A flood having a return period of 100 years has a one percent probability of being equaled or exceeded in any one year.

Sediment - Material of soil or rock origin, transported, carried or deposited by water.

Siphon - A closed conduit or portion of which lies above the hydraulic grade line, resulting in a pressure less than atmospheric and requiring a vacuum within the conduit to start flow. A siphon utilizes atmospheric pressure to effect or increase the flow of water through a conduit. An inverted siphon is used to carry storm water flow under an obstruction such as a sanitary sewer.

Stilling Basin - A basin used to slow water down or dissipate its energy.

Storage Duration - The length of time that water may be stored in any storm water control facility, computed from the time water first begins to be stored.

Storm Sewer - A closed conduit for conveying collected storm water.

Storm Water Drainage System - All means, natural or man-made, used for conducting storm water to, through or from a drainage area to any of the following: conduits and appurtenant features, canals, channels, ditches, streams, culverts, street and pumping stations.

Storm Water Runoff - The water derived from rains falling within a tributary basin, flowing over the surface of the ground or collected in channels or conduits.

Tributary - Contributing storm water from upstream land areas.

Urbanization - The development, change or improvement of any parcel of land consisting of one or more lots for residential, commercial, industrial, institutional, recreational or public utility purposes.

Watercourse - Any river, stream, creek, brook, branch natural or man-made drainageway in or into which storm water runoff or floodwaters flow wither regularly or intermittently.

Watershed - see Drainage Area.

Wet Bottom Detention Basin (Retention Basin) - A basin designed to retain a permanent pool of water after having provided its planned detention of runoff during a storm event.

5. Storm Water Control Policy

It is recognized that the smaller streams and drainage channels serving the City of Eagle Pass may not have sufficient capacity to receive and convey storm water runoff resulting from continued urbanization. Accordingly, the storage and controlled release rate of excess storm water runoff shall be required for any development, redevelopment and new construction located within the City of Eagle Pass not exempt under this Ordinance. No improvement location permit shall be issued for the construction or extension of any proposed or existing building in Eagle Pass until the required drainage plans have been approved in writing by the City, except for the following exemptions:

(a) Construction or extension of a single family dwelling house or an extension of a single family dwelling house or an accessory use building thereto;

(b) Construction or extension of a duplex dwelling house or an accessory use building thereto;

(c) Construction or extension in that area of the City zoned Central Business District (CB); or

(d) Construction, extension or replacement of a building or buildings on a site of 30,000 square feet or less.

(e) Extension or replacement of any existing building that does not increase the existing rate of runoff.

The exceptions (a) through (e) above, however, shall not be applicable to a project if located in a previously designated Impact Area as established per Section 18 of this Ordinance.

The release rate of storm water from development, redevelopment, and new construction, as stipulated above, may not exceed the peak rate of runoff from the land area in its present state of development for a ten (10) year storm event. The developer must submit to the City, detailed computations of runoff before and after development, redevelopment or new construction. These computations must show the peak runoff rate after development, redevelopment or new construction, for the 100 year return period of critical duration must not exceed the 10 year return period predevelopment peak runoff rate. The computation method used in determining storm water runoff for land areas up to and including 5 acres may be the "Rational Method." Other proven hydrograph techniques and/or computer drainage modeling methods may be used for determining storm water runoff of both areas smaller and larger than 100 acres.

6. Permits for Construction in the Floodway

Permits for construction in a floodway require FEMA approval and of any works for flood control. This includes bridges, dams, levees, dikes, floodwalls, wharves, piers, dolphins, booms, weirs, bulkheads, jetties, groins, excavations, fills or deposits of any kind, utility lines, or other building, structure or obstruction. Also, any ditch work (new construction, deepening or modification) within one half mile of a public freshwater lake of 10 acres or more in area.

The approval of FEMA, in writing, must be obtained before beginning construction.

7. Information Requirements

The following information and data provided by a Texas licensed professional engineer or land surveyor engaged in storm drainage design shall be submitted to the City at the time of application for 1) each proposed major subdivision or planned development lying within the Regulated Area prior to Final Plat approval by the Planning Commission, or 2) a building permit for any development, redevelopment or new construction on real estate which lies within the Regulated Area which has not previously received drainage approval or is not exempt from the requirements of this Ordinance.

A. Topographic and Soils Maps

A topographic map of the land to be developed and such adjoining land whose topography may affect the layout or drainage of the development. The contour intervals shall be one foot when slopes are less than four percent and shall be two feet when the slope exceeds 10 percent and shall be five feet when the slope exceeds 10 percent. On this map, the following shall be shown:

(1) The locations of streams and other flood water runoff channels, the extent of the flood plains at the established 100 year flood elevation where available (regulatory floodway), and the limits of the floodway, all properly identified.

(2) The normal shoreline of lakes, ponds, swamps and detention basins, their flood plains, lines of inflow and outflow if any.

(3) The location of regulated drains, farm drains, inlets and outfall, if any of record.

(4) Storm sewers and outfall, if any of record.

(5) Septic tank systems and outlets, if any of record.

(6) Seeps, springs, flowing and other wells, that are visible or of record.

(7) Provide soils map of proposed development indicating soil name and their hydrologic classification when Soils Conservation Service (SCS) hydrologic methods are used.

B. Preliminary Drainage Plan

A comprehensive plan, in preliminary form (or in combined preliminary and final form), designed to handle safely the storm water runoff and to detain the increased storm water runoff must be submitted to the City. The plan shall provide or be accompanied by maps or other descriptive materials indicating the feasibility of the drainage plan and showing the following:

(1) The extent and area of each watershed affecting the design of detention facilities as shown on USGS Quadrangle Maps or other more detailed maps as required by the City.

(2) The preliminary layout and design of proposed storm sewers, the outfall and outlet locations and approximate elevations, the receiving stream of channel and its 100 year return period water elevation.

(3) The location and design of the proposed street system, especially including depressed pavements used to convey or temporarily store overflow from the heavier rainstorms, and the outlets for such overflow.

(4) The locations, cross sections and profiles of existing streams and flood plains to be maintained, and new channels to be constructed.

(5) The materials, elevations, waterway openings and the basis for design of proposed culverts and bridges.

(6) Existing detention ponds and basins to be maintained, enlarged or otherwise altered and new ponds or basins to be built and the basis of their design.

(7) The estimated depth and amount of storage required in the new ponds or basins.

(8) The estimated location and percentage of impervious surfaces existing and expected to be constructed when the development is completed.

(9) Any interim plan which is to be incorporated into the development pending completion of the development and the final drainage plan.

C. Valley Cross Section

One or more typical cross sections must be provided showing all existing and proposed channels or other open drainage facilities carried to a point above the 100 year high water elevation; showing the elevation of the existing land and the proposed changes thereto, together with the high water elevations expected from the 100 year storm under the controlled conditions called for by this Ordinance; and showing the relationship of structures, streets and other facilities.

D. Site Plan

A plan drawn to scale showing dimensions of the site with existing and proposed facilities must be provided. All plan views shall include, but may not be limited to, the following information when applicable:

1. A North arrow;
2. The scale used;
3. Site location map;
4. Property boundaries with bearing and distance;
5. Property owner/developer;
6. Building setback lines;
7. Location of all existing and proposed facilities/utilities;
8. Topography in the area affected by construction.

E. Final Drainage Plans

Upon approval of the preliminary drainage plans by the City, final drainage plans shall be submitted to the City. The final plans shall provide or be accompanied by calculations, maps and/or other descriptive material showing the following:

(1) The extent and area of each watershed tributary to the drainage channels in the development.

(2) The street storm sewers and other storm drains to be built, the basis of their design, outfall and outlet locations and elevations, the receiving stream or channel and its high water elevation, and the functioning of the drains during high water conditions,

(3) The parts of the proposed street system where pavements are planned to be depressed sufficiently to convey or temporarily store overflow from storm sewers and over the curb runoff resulting from the heavier rainstorms and the outlets for such overflow.

(4) Existing streams and flood plains to be maintained, and new channels to be constructed, their locations, cross sections and profiles.

(5) Proposed culverts and bridges to be built, their materials, elevations, waterway openings and basis of their design.

(6) Existing detention basins and ponds to be maintained, enlarged or otherwise altered and new basins or ponds to be built and the basis of their design.

(7) The estimated location and percentage of impervious surfaces existing and expected to be constructed when the development is completed.

(8) The slope, type and size of all sewers and other waterways.

(9) For all detention basins, a plot or tabulation of storage volumes with corresponding water surface elevations and a plot or tabulation of the basin outflow rates for those water surface elevations.

A written report must be included with each preliminary and final drainage plan. The report will contain a summary description of: (a) the significant drainage problems associated with the project; (b) the analysis procedure used to evaluate these problems and to propose solutions; (c) any assumptions or special conditions associated with the use of these procedures; (d) the proposed design of the drainage control system; and (e) the result of the analysis of the proposed drainage control system showing that is does solve the project's drainage problems.

The following additional documents should be submitted with all applications submitted for approval:

(1) A hydraulic report detailing existing and proposed drainage patterns on the subject site. The report should include a description of the present land use as well as proposed land use. Any off-site drainage entering the site should also be addressed. This report

should be comprehensive and detail all the design steps which the design engineer took during the design.

(2) All hydrologic and hydraulic computations should be included in the submittal. These calculations should include, but not be limited to: runoff curve members or runoff coefficients; runoff calculation; stage-discharge relationships; times of concentration; and storage volume.

(3) Copies of all computer runs. These computer runs should include both the input and outputs. A floppy diskette with input files will expedite the review process.

(4) A set of plan drawings stamped by a Registered Professional Engineer or Registered Land Surveyor showing all proposed detention areas, storm sewers, inlets, outfall structures, open ditches, culverts and bridges.

(5) A set of exhibits should be included showing the drainage subareas and a schematic detailing of how any computer model inputs were set up.

(6) A conclusion report summarizing the hydraulic design and detailing how this design satisfies the Eagle Pass Storm Water and Sediment Control Ordinance.

F. Submittal and Consideration of Plans

The City and/or its Engineer shall approve or disapprove any preliminary plans, final plans and/or construction plans within sixty (60) days of receipt of a complete submittal unless applicant consents to a time extension. All approvals and disapproval's shall be in writing.

The Engineer is authorized to review engineering summaries of projects and based upon the same grant exemption from any and all requirements of this Ordinance and/or waive any requirements of this Ordinance. Any applicant may appeal the decision of the Engineer to the City which shall also be authorized to grant exemptions from any and all requirements of this Ordinance and/or waive any requirements of this Ordinance at its discretion.

G. Engineering Review Fees

As a condition of and prior to approval of final drainage plans by the City, the applicant shall pay to the City of Eagle Pass the actual costs incurred by the City in respect to the review of all preliminary plans, final plans and/or construction plans by a licensed professional engineer in excess of the first ten (10) hours of such review and consultation.

The City shall furnish to the applicant in writing prior to the approval of the applicant's final drainage plan a written statement specifying the total cost of professional engineering fees incurred by the City in connection with the review of applicant's plans, including the total hours expended by such professional engineer, and the amount required to be paid by applicant prior to approval of final drainage plans by the City. As a condition of and prior to approval of final drainage plans, applicant shall pay to the City of Eagle Pass Clerk the sum set forth in said statement representing the cost of professional engineering services in excess of the following number of hours thereof incurred by the City in connection with the review of applicant's preliminary and final drainage plans and accompanying information and data:

a. Ten (10) hours of individual site plans, minor subdivisions, other projects that involve storm water drainage plans and/or calculations;
b. Fifteen (15) hours for major subdivisions.

8. Determination of Runoff Quantities

Runoff quantities shall be computed for the area of the parcel under development plus the area of the watershed flowing into the parcel under development. The quantity of runoff which is generated as the result of a given rainfall intensity may be calculated as follows:

A. Areas up to and Including 100 Acres

For areas up to and including one hundred (100) acres and for sites with no depression storage, the Rational Method may be used. In the Rational Method, the peak rate of runoff, Q, in cubic feet per second is computed as:

$$Q = CIA, \text{ where}$$

C = runoff coefficient, representing the characteristics of the drainage area and defined as the ratio of runoff to rainfall.

I = average intensity of rainfall in inches per hour for a duration equal to the time of concentration (t_c) for a selected rainfall frequency.

A = tributary drainage area in acres.

Guidance to the selection of the runoff coefficient "C" is provided by Table 1 which show values for different types of surface and local soil characteristics. The composite "C" value used for a given drainage area with various surface types shall be the weighted average value for the total area calculated from a breakdown of individual area having different surface types.

Table 2 provides runoff coefficients and inlet times for different land use classifications. In the instance of undeveloped land situated in an upstream area, a coefficient or coefficients shall be used for this area in its present or existing state of development.

Rainfall intensity shall be determined from the rainfall frequency curves shown in Figure 1 or from data shown in Table 5. The time of concentration (t_C) to be used shall be the sum of the inlet time and flow time in the drainage facility from the most remote part of the drainage area to the point under consideration. The flow time in the storm sewers may be estimated by the distance in feet divided by velocity of flow in feet per second. The velocity shall be determined by the Manning formula.

Inlet time is the combined time required for the runoff to reach the inlet of the storm sewer. It includes overland flow time and flow time through established surface drainage channels such as swales, ditches and sheet flow across such areas as lawns, fields and other graded surfaces. It may be computed by using Figure 2.

B. Areas in Excess of 100 acres

The runoff rate for area in excess of 100 acres shall be determined by methods described in Section 15, Subsection G.

9. Amount of Runoff to be Accommodated by Various Parts of Drainage Facility

Various parts of a drainage facility must accommodate runoff water as follow:

A. Minor Drainage System

The minor drainage system such as inlets, catch basins, street gutters, swales, sewers and small channels which collect storm water (runoff) must accommodate peak runoff from a 10-year return frequency storm.

Duration, for sizing these conveyance using the rational method shall be equal to the time of concentration. The Rational Method is acceptable for storm sewer design, as long as the TR-55 time of concentration methodology is used. Determination of hydraulic capacity for storm sewers sized by Rational Method analysis should be done using Manning's Equation.

These minimum requirements must be satisfied:

(1) The allowable spread of water on Collector Streets is limited to maintaining two clear 10 foot moving lanes of traffic. One lane is to be maintained on Local Roads, while Places can have a water spread equal to one-half of their width.

(2) Open channels carrying peak flows greater than 30 cubic feet per second shall be capable of accommodating peak runoff for a 50-year return period storm within the drainage easement.

(3) Culverts shall be capable of accommodating peak runoff from a 50-year return frequency storm when crossing under roads which are part of the functional classification and are classified as primary or secondary arterial streets.

B. Major Drainage Systems

Major drainage systems are defined in Section 4, and shall be designed in accordance with Texas Department of Transportation Hydraulic Manual as described in Section 6.

10. Level of Protection for Urban Areas

First floor elevations of all buildings shall be such that all floors including basements shall have one foot of free board above the 100 year flood elevation or at the flood protection grade.

11. Storm Sewer Design Standards

All storm sewers, whether private of public, and whether constructed on private or public property shall conform to the design standards and other requirements contained herein.

A. Manning Equation

The hydraulic capacity of storm sewers shall be determined using Manning's Equation:

$$V = (1.489/n)(R^{2/3})(s^{1/2}), \text{ where}$$

V = mean velocity of flow in feet per second

R = the hydraulic radius in feet, A/P, cross sectional area / wetted perimeter

s = the slope of the energy grade line in feet per foot

n = roughness coefficient

The hydraulic radius, R, is defined as the cross sectional area of flow divided by the wetted flow surface or wetted perimeter. Typical "n" values for storm sewer materials are listed in Table 3. Roughness coefficients (n) values for other sewer materials can be found in standard hydraulics texts and references.

B. Minimum Size

The minimum size of all storm sewers shall be 12 inches. Rate of release for detention storage shall be controlled by on orifice plate or other devices, subject to approval of the City, where the 12 inch pipe will not limit rate of release as required.

C. Grade

Sewer grade shall be such that, in general, a minimum to two feet of cover is maintained over the top of the pipe. Pipe cover less than the minimum may be used only upon approval of the City. Uniform slopes shall be maintained between inlets, manholes and inlets to manholes. A minimum drop of 0.1 foot through manholes and inlets should be provided. Final grade shall be set with full consideration of the capacity required, sedimentation problems and other design parameters. Minimum and maximum allowable slopes shall be those capable of producing velocities of two and one-half and 15 feet per second, respectively, when the sewer is flowing full.

D. Alignment

Storm sewers shall be straight between manholes insofar as possible. Where long radius curves are necessary to conform to street layout, the minimum radius of curvature shall be no less than 100 feet for sewers 42 inches and larger in diameter. Deflection of pipe sections shall not exceed the maximum deflection recommended by the pipe manufacturer. The deflection shall be uniform and finished installation shall follow a smooth curve.

E. Manholes

Manholes shall be installed to provide access to continuous underground storm sewers for the purpose of inspection and maintenance. Manholes may be used as inlet or drainage structures and shall be provided at the following locations:

(1) Where one or more storm sewers converge.

(2) At the point of beginning or at the end of a curve, and at the point of reverse curvature (PC, PT, PRC).

(3) Where the pipe size changes.

(4) Where an abrupt change in alignment occurs.

(5) Where a change in grade occurs.

(6) At suitable intervals in straight sections of sewer.

The maximum distance between storm sewer manholes, unless otherwise approved by the City, shall be as follows:

Size of Pipe Maximum Distance

(inches)	(feet)
12 through 24	400
48 and larger	600

F. Inlets

Inlets or drainage structures shall be utilized to collect surface water through grated openings and convey it to storm sewers, channels or culverts. Inlet design and spacing shall be in accordance with the Hydraulic Design Manual of the Texas Department of Transportation or other approved design procedure. The inlet grate opening provided must be adequate to pass the design 10 year flow with 50% of the sag inlet areas clogged. An overflow channel from sag inlets to the overflow channel or basin shall be provided at sag inlets, so that the maximum depth of water that might be ponded in the street sag shall not exceed 7 inches. Inlets may be used as manholes at locations where the pipe sizes do not exceed eighteen (18) inches in diameter.

Inlet design and spacing may be done using the Rational Method. Use of the HEC-12 computer program is also an acceptable method. Gutter spread on continuous grades may be determined using the modified Manning's equation, or by using Table 6 - Storm Drainage Street Velocities and Capacities flowing curb full for Maverick County, Texas.

12. Workmanship and Materials

A. Workmanship

The specifications for the construction of storm sewer shall not be less stringent than those set forth in the latest edition of the Texas Department of Transportation "Texas Standard Specifications".

B. Materials

Storm sewer manholes, inlets, pipe and fittings used in storm sewer construction shall conform to the materials shown in the most recent "City of Eagle Pass Typical Construction Guidelines and Details".

C. Special Hydraulic Structures

Special hydraulic structures required to control the flow of water in storm runoff drainage system include junction chambers, drop manholes, inverted siphons, stilling basins or other special structures. The use of these structures shall be limited to those locations justified by prudent planning and by careful and thorough hydraulic engineering analysis.

13. Open Channel Design Standards

All open channels, whether private or public, and whether constructed on private or public land, shall conform to the design standards and other design requirements contained herein.

A. Manning Equation

The waterway for channels shall be determined using Manning's Equation.

$$Q = AV = A\,(1.486/n)(R^{2/3})(s^{1/2}), \text{ where}$$

A = waterway area of channel in square feet

Q = discharge in cubic feet per second, cfs

V, R, s and n are explained above

B. Channel Cross Section and Grade

The required channel cross section and grade are determined by the design capacity, the material in which the channel is to be constructed, and the requirements for maintenance. A minimum depth may be required to provide adequate outlets for subsurface drains, tributary ditches or streams. The channel grade shall be such that the velocity in the channel is high enough to prevent siltation, but low enough to prevent erosion. Velocities less than 1.5 feet per second should be avoided because siltation will take place and ultimately reduce the channel cross section. The maximum permissible velocities in vegetal-lined channel are shown in Table 4. Developments through which the channel is to be constructed must be considered in the design of the channel section.

C. Side Slopes

Earthen channel side slopes shall be no steeper than 3 to 1. Flatter slopes may be required to prevent erosion and for ease of maintenance. Where channels will be lined, side slopes shall be no steeper that 1-1/2 to 1 with adequate provisions made for weep holes. Side slopes steeper than 1-1/2 to 1 may be used for lined channels providing that the side lining and

structural retaining wall are designed and constructed with provisions for live and dead load surcharge.

D. Channel Stability

(1) Characteristics of a stable channel are:

(a) It neither aggrades nor degrades beyond tolerable limits.

(b) The channel banks do not erode to the extent that the channel cross section is changed appreciably.

(c) Excessive sediment bars do not develop.

(d) Excessive erosion does not occur around culverts, bridges or elsewhere.

(e) Gullies do not form or enlarge due to the entry of uncontrolled surface flow to the channel.

(2) Channel stability shall be determined for an aged condition and the velocity shall be based on the design flow or the bank full flow, whichever is greater, using "n" values for various channel linings as shown in Table 3. In no case is it necessary to check channel stability for discharges greater than that from a 100-year return period storm.

(3) Channel stability must be checked for conditions immediately after construction. For this stability analysis, the velocity shall be calculated for the expected flow from a ten-year return period storm on the watershed, or the bank full flow, whichever is smaller. The "n" value for newly constructed channels in fine-grained soils and sands may be determined in accordance with the National Engineering Handbook 5, Supplement B, Soil Conservation Service and shall not exceed 0.025. The allowable velocity in the newly constructed channel may be increased by a maximum of 20 percent to reflect the effects of vegetation to be established under the following conditions:

(a) The soil and site in which the channel is to be constructed are suitable for rapid establishment and support of erosion controlling vegetation.

(b) Species of erosion controlling vegetation adapted to the area, and proven methods of establishment are shown.

(c) The channel design includes detailed plans for establishment of vegetation on the channel side slopes.

E. Appurtenant Structures

The design of channels will provide all structures required for the proper functioning of the channel and the laterals thereto and travelways for operation and maintenance. Recessed inlets and structures needed for entry of surface and subsurface flow into channels without significant erosion or degradation shall be included in the design of channel improvements.

The design is also to provide the necessary flood gates, water level control devices and any other appurtenance affecting the functioning of the channels and the attainment of the purpose for which they are built.

The effect of channel improvements on existing culverts, bridges, buried cables, pipelines and inlet structures for surface and subsurface drainage on the channel being improved and laterals thereto shall be evaluated to determine the need for modification or replacement. Culverts and bridges which are modified or added as part of channel improvement projects shall meet reasonable standards for the type of structure and shall have a minimum capacity equal to the design discharge or governmental agency design requirements, whichever is greater.

F. Disposition of Spoil

Spoil material resulting from clearing, grubbing and channel excavation shall be disposed in such a manner which will:

(1) Minimize overbank wash.

(2) Provide for the free flow of water between the channel and flood plain unless the valley routing and water surface profile are based on continuous dikes being installed.

(3) Not hinder the development of travelways for maintenance.

(4) Leave the right-of-way in the best condition feasible, consistent with the project purposes, for productive use by the owner,

(5) Improve the aesthetic appearance of the site to the extent feasible.

(6) Be approved by FEMA or US Army Corps of Engineers (whichever is applicable) if deposited in the floodway.

14. Construction and Materials

A. Construction

Specifications shall be in keeping with the proceeding standards and shall describe the requirements for proper installation of the project to achieve its intended purpose.

B. Materials

Materials acceptable for use as channel lining are:

(1) Grass

(2) Revetment riprap

(3) Concrete

(4) Hand-laid riprap

(5) Precast cement concrete riprap

(6) Grouted riprap

(7) Gabions

Other lining materials may be used with prior approval of the City. Materials shall comply with the latest edition of the Texas Department of Transportation "Texas Standard Specifications".

15. Storm Water Detention

The following shall govern the design of any improvement with respect to the detention of storm water runoff.

A. Acceptable Detention Methods

The increased storm water runoff (peak rate) resulting from a proposed development should be detained on-site by the provisions of appropriate wet or dry bottom reservoirs, by storage on flat roofs, parking lots, streets, lawns or other acceptable techniques. Measures which retard the rate of overland flow and the velocity in runoff channels shall also be used to control the runoff rate partially. Detention basins shall be sized to store excess flows from storms with a one hundred (100) year return period. Control devices shall limit the discharge to a rate no greater than that prescribed by this Ordinance (see Sections 15F and 15G).

B. Time of Concentration

All storm water management projects within the City of Eagle Pass must be done using the time-of-concentration methodology outlined in the SCS TR-55 manual. The TR-55 method examines the factors which affect time of concentration including surface roughness, channel shape and flow patterns along with watershed slope. Through the examination of sheet, shallow, concentrated and open channel flows, a more refined time of concentration may be determined. The methodology represents the best attempt of a Federal Agency to standardize times of concentration procedures.

C. Design Storm

Design of storm water detention facilities shall be based on a return period of once in 100 years. The storage volume and outflow rate shall be sufficient to handle storm water runoff from a critical duration storm, as defined in Sections 15F and 15G. Rainfall depth-duration-frequency relationships and intensity-duration-frequency relationships shall be those given in Tables 5 and 5A.

D. Allowable Release Rate

Design of storm water detention facilities shall be based on the allowable release rate of storm water originating from a proposed development and shall not exceed the amount specified in Section 5 - Storm Water Control Policy, and as described in Section 15F and 15G.

In the event the natural downstream channel or storm sewer system is inadequate to accommodate the release rate provided in Table 5A, then the allowable release rate shall be reduced to that rate permitted by the capacity of the receiving downstream channel or storm sewer system and additional detention as determined by the City shall be required to store that portion of the runoff exceeding the capacity of the receiving sewers or waterways. The area will be considered an impact drainage area subject to the provisions of Section 18 of this Ordinance.

If more than one detention basin is involved in the development of the area upstream of the limiting restriction, the allowable release rate from any one detention basin shall be in direct proportion to the ratio of its drainage area to the drainage area of the entire watershed upstream of the restriction.

E. Drainage System Overflow Design

Drainage systems shall have adequate capacity to convey the storm water runoff from all upstream tributary areas through the development under consideration for a storm of 100 year design return period calculated on the basis of upstream land in its present state of development. An allowance, equivalent to the reduction in flow rate provided, shall be made for upstream detention when such upstream detention and release rate have previously been approved by the City and evidence of its construction can be shown.

F. Determination of Storage Volume - Rational Method

The Rational Method may be used to determine the 10-year return period pre-development release rate for sites of less than five (5) acres of commonly owned contiguous property where no depression storage exists.

Step Procedure

1. Determine total drainage area in acres "A".

2. Determine composite runoff coefficient "C_u" based on existing land use (undeveloped).

3. Determine time of concentration "T_c" in minutes based on existing conditions.

4. Determine rainfall intensity "I_u" in inches per hour, based on time of concentration and using Figure 1 or from date given in Table 5A for the ten (10) year return period.

5. Compute runoff based on existing land use (undeveloped), and ten (10) year return period:
$Q_u = C_u I_u A$

6. Determine composite runoff coefficient "C_d" based on developed conditions and a one hundred (100) year return period.

7. Determine the one hundred (100) year return period rainfall intensity "I_d" for various storm duration's "t_d" up through the time of concentration for the developed area using Table 5A.

8. Determine developed inflow rates "Q_d" for various storm duration's "t_d" measured in hours.

$Q_d = C_d I_d A$

9. Compute a storage rate "S_{td}" for various storm duration's "t_d" up through the time of concentration of the developed area.

$S_{td} = Q_d - Q_u$

10. Compute required storage volume "S_R" in acre-feet for each storm duration "t_d". This assumes a triangular hydrograph of duration (2_{td}) hours with the peak flow of S_{td} and t_d hours.

$S_R = S_{td}\ (t_d/12)$

11. Select the largest storage volume computed in step 10 for detention basin design.

G. Determination of Storage Volume - Hydrographic Methods

Methods other than the rational method for determining runoff and routing of storm water may be used to determine the storage volume required to control storm water runoff. The SCS TR-20 computer model with the SCS TR-55 time of concentration and curve number calculation methodologies, may be used to determine the 10-year return period pre-development release rate for sites of five (5) acres or more and for sites with existing depression storage. The SCS TR-20 and SCS TR-55 models are accepted by the City for appropriate use in analysis of the runoff and routing of storm water. The use of these models or other approved procedures can be defined in an eight step procedure to determine the required storage volume of the detention basin.

Step Procedure

1. Calibrate the hydrologic/hydraulic model that is to be used for prediction of runoff and routing of storm water.

2. Determine the critical storm duration. The critical duration storm for computer modeling shall be equal to or greater than the time of concentration for the watershed being modeled.

3. Determine the ten (10) year, undeveloped peak flow. Denote this flow by $Q_u{}^{10}$.

4. Determine the one hundred (100) year runoff hydrograph ($H_d{}^{100}$) for developed conditions.

5. Determine the hydrograph that must be stored ($H_s{}^{100}$) by subtracting a flow up to $Q_u{}^{10}$ from the hydrograph ($H_d{}^{100}$) found in step 4.

6. Determine the volume of water (V_S) to be stored by calculating the area under the hydrograph $H_s{}^{100}$.

7. The detention basin must be designed to store the largest volume (V_S) found for any storm duration analyzed in step 6.

8. Approved routing techniques may be used to determine the final detention storage required.

H. General Detention Basin Design Requirements

Basins shall be constructed to detain temporarily the storm water runoff which exceeds the maximum peak flow rate authorized by this Ordinance. The volume of such storage provided in these basins, together with such storage as may be authorized in other on-site facilities shall be sufficient to control excess runoff from the one hundred (100) year storm.

The following design principles shall be observed:

(1) The maximum volume of water stored and subsequently released at the design release rate shall not result in a storage duration in excess of 48 hours unless additional storms occur within the period.

(2) The maximum planned depth of storm water stored (without a permanent pool) shall not exceed four feet.

(3) All storm water detention facilities shall be separated by not less than 25 feet from any building or structure to be occupied.

(4) All excavated excess spoil may be spread so as to provide for aesthetic and recreational features such as sliding hills, sports fields, etc. Detention pond side slopes no steeper that 6 horizontal to 1 vertical for safety, erosion control, stability and ease of maintenance shall be permitted.

(5) Safety screens having a maximum opening of 4 inches shall be provided for any pipe or opening to prevent children or large animals from crawling into the structures.

(6) Danger signs shall be mounted at appropriate locations to warn of deep water, possible flooding conditions during storm periods and other dangers that exist. Fencing shall be provided if deemed necessary by the City.

(7) Outlet control structures shall be designed to operate as simply as possible and shall require little or no maintenance and/or attention for proper operation. The shall limit discharges into existing or planned downstream channels or conduits so as not to exceed the predetermined maximum authorized peak flow rate.

(8) Emergency overflow facilities such as a weir or spillway shall be provided for the release of exceptional storm runoffs or in emergency conditions should the normal discharge devices become totally or partially inoperative. The overflow facility shall be of such design that its operation is automatic and does not require manual attention.

(9) Grass or other suitable vegetative cover shall be provided throughout the entire basin area. Grass should be cut regularly at approximately monthly intervals during the growing season or as required.

(10) Debris and trash removal and other necessary maintenance shall be performed on a regular basis to assure continued operation in conformance to design.

(11) Hydraulic calculations shall be submitted to substantiate all design features.

(12) No residential lot or any parts thereof shall be used for the storage of water, either temporary or permanent, without approval of the City.

I. Dry Bottom Design Requirements

Detention basins which will not contain a permanent pool of water shall comply with the following requirements:

(1) Provisions shall be incorporated to facilitate complete interior drainage of dry bottom basins, to include the provisions of natural grades to outlet structures, longitudinal and transverse grades to perimeter drainage facilities, paved gutters, or the installation of subsurface drains.

(2) The detention basin shall, whenever possible, be designed to serve a secondary or multipurpose function. Recreational facilities, aesthetic qualities (open spaces) or other types of use shall be considered in planning the detention facility.

J. Wet Bottom Basin Design Requirements

Where a part of a detention basin will contain a permanent pool of water, all the items required for detention storage shall apply except that the system of drains without a positive gravity outlet required to maintain a dry bottom basin will not be required. A controlled positive outlet will be required to maintain the design water level in the wet bottom basin and provide required detention storage above the design water level. However, the following additional conditions shall apply:

(1) Basins designed with permanent pools or containing permanent ponds shall have a water area of at least one-half acre. If fish are to be maintained in the pond, a minimum depth of approximately 10 feet shall be maintained over at least 25 percent of the pond area. The remaining pond area shall have no extensive shallow areas, except as required by subsection (3) below.

(2) In excavated lakes the underwater side slopes in the lake shall be stable. In the case of valley storage, natural slopes may be considered to be stable.

(3) A safety ledge four to six feet in width is required and must be installed in all ponds approximately 30 to 36 inches below the permanent water level. In addition, a similar maintenance ledge 12 to 18 inches above the permanent water line shall be provided.

(4) A safety ramp exit from the pond is required in all cases and shall have a minimum width of 20 feet and exit slope of 6 horizontal to 1 vertical. The ramp shall be of a material that will prevent its deterioration due to vehicle use and/or wave action.

(5) Periodic maintenance is required in ponds to control weed growth and larval growth. The pond shall also be designed to provide for the easy removal of sediment which will accumulate during periods of pond operation. A means of maintaining the designed water level of the pond during prolonged periods of dry weather is also required.

(6) For emergency use, basin cleaning, or shoreline maintenance, facilities shall be provided or plan prepared for auxiliary equipment to permit emptying and drainage.

(7) Aeration facilities to prevent pond stagnation shall be provided, if required. Design calculations to substantiate the effectiveness of these aeration facilities shall be submitted with final engineering plans. Agreements for the perpetual operation and maintenance of aeration facilities shall be prepared to the satisfaction of the City.

(8) The perimeter of wet bottom detention basins, defined by the high water contour which represents the high water elevation, shall be a minimum horizontal distance of 10 feet from high voltage electric lines.

K. Roof Top Storage

Detention storage requirements may be met in total or in part by detention on flat roofs. Details of such designs are to be included in the building permit application and shall include the depth and volume of storage, details of outlet devices and downdrains and elevations of emergency overflow provisions.

L. Parking Lot Storage

Paved parking lots may be designed to provide detention storage of storm waters on all or a portion of their surfaces. Depths of storage must be limited to a maximum depth of seven (7) inches so as to prevent damage to parked vehicles and so that access to parked vehicles is not impaired. Locate the deepest ponding zones at remote and least used portions of the parking lot.

M. Facility Financial Responsibilities

The construction cost of storm water detention systems and facilities as required by this Ordinance shall be part of the cost of land development. If general public use of the facility can be demonstrated, negotiations for public participation in the cost of such development may be considered.

N. Facility Maintenance Responsibility

Maintenance of detention/retention facilities during construction and thereafter shall be the responsibility of the land developer/owner. Assignment of responsibility for maintaining facilities serving more than one lot or holding shall be documented by appropriate covenants to property deeds, unless responsibility is formally accepted by a public body. This determination shall be made before the final drainage plans are approved.

Storm water detention and retention basins may be donated to the City of Eagle Pass or other unit of government approved by the City, for ownership and permanent maintenance providing:

(1) The City or other governmental unit is willing to accept responsibility.

(2) The facility has been designed and constructed according to all applicable provisions of this Ordinance.

(3) All improvements have been constructed, approved and accepted by the City for the land area served by the basin.

(4) Retention ponds containing a permanent pool of water have all slopes between the permanent pool and high water line sodded and the remaining land area hydroseeded using a method approved by the City; are equipped with electrically driven aeration devices, if required to maintain proper aerobic conditions and sustain aquatic life; provide suitable access acceptable to the responsible government agency; and have the high water line not closer than 25 feet to any property line.

(5) Dry detention ponds shall have all slopes, bottom of the basin and areas above the high water line hydroseeded; and shall have the high water line not closer than 25 feet to any development boundary.

All public and privately owned detention storage facilities will be inspected by representatives of the City not less often than once every 2 years. A certified inspection report covering physical conditions, available storage capacity and operational condition of key facility elements will be provided to the owner.

P. Corrective Measures

If deficiencies are found by the inspector, the owner of the detention/retention facility will be required to take the necessary measures to correct such deficiencies. If the owner fails to do so, the City will undertake the work and collect from the owner using lien rights, if necessary.

Q. Joint Development of Control Systems

Storm water control systems may be planned and constructed jointly by two or more developers as long as compliance with this Ordinance is maintained. Developers are encouraged to plan and construct these systems on a joint or regional basis.

R. Installation of Control Systems

Runoff and erosion control systems shall be installed as soon as possible during the course of site development. Detention/retention basins shall be designed with an additional 6 (six) percent of available capacity to allow for sediment accumulation resulting from development and to permit the pond to function for reasonable periods between cleanings. Basins should be designed to collect sediment and debris in specific locations so that removal cost are kept to a minimum. The City will require temporary and permanent erosion control plans to be submitted as a part of the construction plans.

S. Detention Facilities in Flood Plains

If detention storage is provided within a flood plain, only the net increase in storage volume above that which naturally existed on the flood plain shall be credited to the development. No credit will be granted for volumes below the elevation of the regulatory flood at the location unless compensatory storage is also provided.

T. Off site Drainage Provision

When the allowable runoff is released in an area that is susceptible to flooding, the developer may be required to construct appropriate storm drains through such area to avert increased flood hazard caused by the concentration of allowable runoff at one point instead of the natural overland distribution. The requirement of off-site drains shall be at the discretion of the City.

U. Erosion Control

Erosion control plans shall be submitted as part of the construction plans and specifications and shall include the following:

(1) A complete copy of the Erosion and Sediment Control Plan filed with the City. The Texas Department of Transportation Guidelines for Erosion Control may be used as a reference guide in developing the erosion control plan.

(2) Temporary erosion control measures necessary during the initial construction and establishment phases up to final site grading and seeding.

(3) A permanent erosion control plan of all the graded and non-hard surface areas within the proposed development, as planned for completion, up to and including seeding of the final lot on which business or residential dwellings are to be placed.

(4) Details concerning removal of temporary erosion control devices after the initial establishment of adequate vegetative cover.

(5) Maintenance procedures, as part of the continuing plan, to keep all of the land under adequate cover and erosion at an acceptable minimum.

16. Certifications Required

After completion of the project and before final approval and acceptance can be made, a professionally prepared and certified "As Built" set of plans shall be submitted to the City for review. These plans shall include all pertinent data relevant to the completed storm drainage system and shall include:

(1) Pipe size and pipe material.

(2) Invert elevations.

(3) Top rim elevations.

(4) Lengths of all pipe structures.

(5) Data and calculations showing detention basin storage volume.

(6) Certified statement on plans stating the completed storm drainage system substantially complies with construction plans as approved by the City.

All such submitted plans shall be reviewed for compliance within 30 days after submission to the City or Engineer. If notice of non-compliance is not given within 30 days of submission of the plans, the plans shall be construed as approved and accepted.

17. Changes in Plan

Any revision to, and/or significant change or deviation from the detailed plans and specifications after formal approval by the City shall be filed in duplicate with and approved by the City prior to implementation of the revision or change. Copies of the revisions or changes, if approved, shall be attached to the original plans and specifications.

18. Determination of Impact Drainage Areas

The City is authorized, but is not required to classify certain geographical areas as Impact Drainage Areas and to enact and promulgate regulations which are generally applied. In determining Impact Drainage Areas, the City shall consider such factors as topography, soil type, capacity of existing regulated drains and distance from adequate drainage facility. The following areas shall be designated as Impact Drainage Areas, unless good reason for not including them is presented to the City:

A. A floodway or flood plain as designated by FEMA.

B. Land within 75 feet of each bank of any regulated drain.

C. Land subject to flooding and/or areas that have previously exhibited drainage deficiencies.

Land where there is not adequate outlet, taking into consideration the capacity and depth of the outlet, may be designated as an Impact Drainage Area by resolution of the City. Special requirements for development within any Impact Drainage Area shall be included in the resolution.

19. Other Requirements

A. Sump Pumps

Sump pumps installed to receive and discharge groundwaters or other storm waters shall be connected to the storm sewer where possible or discharged into a designated storm drainage channel. Sump pumps installed to receive and discharge floor drain flow or other sanitary sewage shall be connected to the sanitary sewers. A sump pump shall be used for one function only, either the discharge of storm waters or the discharge of sanitary sewage.

B. Down Spouts

All down spouts or roof drains shall discharge onto the ground or be connected to the storm sewer. No down spouts or roof drains shall be connected to the sanitary sewer.

C. Footing Drains

Footing drains shall be connected to storm sewers where possible or designated storm drainage channels. No footing drains shall be connected to the sanitary sewer.

20. Regional Drainage Plans

The City may establish a regional drainage plan or Interim Regional Drainage Plan which controls drainage requirements within a specified drainage area.

A. Regional Drainage Plan or Interim Drainage Plan shall specify:

1. A description of the region;
2. The basis for the region having a Regional Drainage Plan;
3. Potential areas of ground water discharge and recharge;
4. What modifications or waivers of this Ordinance apply in the region; and
5. What additional drainage or drainage plan requirements, beyond those in this Ordinance, apply in the region.

B. A Regional Drainage Plan or Interim Drainage Plan may provide:

1. For regional detention and/or storage of storm water;
2. For design or performance standards to ensure water quality;
3. For design requirements to ensure compatibility with the plan for regional detention and storage; and
4. For a charge, in land or dollars, based upon the size and nature of the development, for the use of regional storm water detention and/or storage facilities for new development.

21. Disclaimer of Liability

The degree of protection required by this Ordinance is considered reasonable for regulatory purposes and is based on historical records engineering and specific methods of study. Larger storms may occur or storm water runoff depths may be increased by man-made or natural causes. This Ordinance does not imply that land uses permitted will be free from storm water damage. This Ordinance shall not create liability on the part of the City of Eagle Pass or any officer or employee thereof for any damage which may result from reliance on this Ordinance or on any administrative decision lawfully made thereunder.

22. Corrective Action

Nothing herein contained shall prevent the City of Eagle Pass from taking such lawful action as may be necessary to prevent or remedy any violation. All costs connected therewith shall accrue to the person or persons responsible.

23. Repealer

All ordinances or parts thereof in conflict with the provisions of this Ordinance are repealed.

24. When Effective

This Ordinance shall become effective after its final passage, approval and publication as required by law.

25. Exempt Projects

Any residential, commercial or industrial subdivision (major or minor) or construction project thereon, which has had its drainage plan approved by the City prior to the effective date of this Ordinance shall be exempt from all of the requirements of this Ordinance.

Appendix - Tables and Figures

Table 1 - Runoff Coefficients

Type of Drainage Area	Runoff Coefficient, C
Lawns:	
Sandy Soil, flat, less than 2%	0.05-0.10
Sandy Soil, average, 2-7%	0.10-0.15
Sandy Soil, steep, greater than 7%	0.15-0.20
Lawns:	
Clay Soil, flat, less than 2%	0.13-0.17
Clay Soil, average, 2-7%	0.18-0.22
Clay Soil, steep, greater than 7%	0.25-0.35
Business:	
Downtown areas	0.70-0.95
Neighborhood areas	0.50-0.70
Residential:	
Single-family areas	0.30-0.60
Multi-family, detached	0.40-0.80
Multi-family, attached	0.60-0.90
Industrial:	
Light areas	0.50-0.80
Heavy areas	0.60-0.90
Parks, cemeteries	0.10-0.40
Playgrounds	0.20-0.35
Railroad yard areas	0.20-0.40
Unimproved areas	0.10-0.30
Streets:	
Asphaltic	0.70-0.95
Concrete	0.80-0.95
Brick	0.70-0.85
Drives and walks	0.75-0.85
Roofs	0.75-0.95

Note:

1. These runoff coefficients were taken from, "Handbook of Applied Hydrology" by Ven Te Chow, 1964, McGraw-Hill, Chapter 14, Runoff, p. 14-8.
2. The coefficients of this tabulation are applicable to storms up to a 10-year frequency.
3. Coefficients for less frequent higher intensity storms shall be modified as follows:

Return Period (yrs)	Multiply "C" by
25	1.1
50	1.2
100	1.25

Appendix - Tables and Figures

Table 2 - Runoff Coefficients by Land Use and Maximum recommended Inlet Times

Zone Designation	Name	Runoff Coefficient	Max. Recommended Inlet Time (minutes)
AG	Agricultural, 1ac, 2000 SF home	Variable	15
SF or RE	Single Family Residential	0.60	15
D	Duplex	0.60	15
A-1	Multifamily, 12 units/acre	0.80	10
A-2	Multifamily, 18 units/acre	0.85	10
A-3	Multifamily, 24 units/acre	0.90	10
PD	Planned Development	Variable	10
O	Office	0.85	10
GR	General Retail	0.85	10
SS	Service Station	0.95	10
MU	Mixed Use	Variable	10
CBD	Central Business District	0.90	10
LC	Light Commercial	0.90	10
C	Commercial	0.90	10
I	Industrial	0.90	10
FP	Flood Plain	1.00	10
H	Historical Landmark	0.40	15
R/PC	Restaurant/Private Club	0.90	10
*	Parking Lots	1.00	10
*	Church	0.90 Varies	10
*	School	0.75 Varies	15
*	Park	0.40 Varies	15
*	Road & Interstate Hwy.	0.90	10

Note:

1. (*) = Indicates non-zoned useage
2. The coefficients of this tabulation are applicable to storms up to a 10-year frequency.
3. Coefficients for less frequent higher intensity storms shall be modified as follows:

Return Period (yrs)	Multiply "C" by
25	1.1
50	1.2
100	1.25

Table 3 - Typical Values of Manning's n

Boundary	Manning roughness, n, $ft^{1/6}$
Very smooth surfaces such as glass, plastic, or brass	0.010
Very smooth concrete and planed timber	0.011
Smooth concrete	0.012
Ordinary concrete lining	0.013
Good wood	0.014
Vitrified Clay	0.015
Shot concrete, untroweled, and earth channels in best condition	0.017
Straight unlined earth channels in good condition	0.020
Rivers and earth channels in fair condition - some growth	0.025
Winding natural streams and channels in poor condition - considerable moss growth	0.035
Mountain streams with rocky beds and rivers with variable sections and some vegetation along banks	0.040-0.050
Alluvial channels, sand beds, no vegetation	
1. Lower regime	
Ripples	0.017-0.028
Dunes	0.018-0.035
2. Washed-out dunes or transition	0.014-0.024
3. Upper regime	
Plane bed	0.011-0.015
Standing waves	0.012-0.016
Antidunes	0.012-0.020

Note:

1. Values taken from "Handbook of Applied Hydrology" by Ven Te Chow, 1964, McGraw-Hill publishers, Chapter 7, p. 7-25.

Table 4 - Maximum Permissible Velocities for Channels Lined With Grass

Cover	Slope, Range, *	Permissible Velocity, fps
Bermuda Grass	0-5	6
	5-10	5
	>10	4
Buffalo Grass, Kentucky bluegrass, smooth brome, blue grama	0-5	5
	5-10	4
	>10	3
Grass mixture	0-5	4
Do not use on slopes steeper than 10%.	5	3
	5-10	
Lespedeza sericea, weeping love grass, ischaemum (yellow blue stem), kudzu, alfalfa, crabgrass Do not use on slopes steeper than 5%, except for side slopes in a combination channel.	0-5	2.5
Annuals - used on mild slopes or as temporary protection until permanant covers are established, common lespedeza Sudan grass Use on slopes steeper than 5% is not recommended.	0-5	2.5

Remarks: The values apply to average, uniform stands of each type of cover. Use velocities exceeding 5 fps only where good covers and proper maintenance can be obtained. Based on past experience, all soils within the city of Eagle Pass have been found to be easily eroded soils.

* Longitudinal bed slopes of the channel bottom.

Table 5 - Rainfall Depths for Various Return Periods and Storm Durations

Duration (min.)	Return Period (years)						
	1	2	5	10	25	50	100
5		0.47	0.56	0.62	0.71	0.79	0.86
10		0.78	0.93	1.03	1.19	1.32	1.44
15		1.00	1.19	1.32	1.52	1.68	1.84
30		1.41	1.76	2.02	2.38	2.66	2.94
60		1.83	2.37	2.74	3.27	3.67	4.08
120	1.75	2.16	2.81	3.28	3.85	4.35	4.86
180	1.94	2.28	3.09	3.63	4.19	4.75	5.32
360	2.34	2.66	3.63	4.28	5.00	5.63	6.39
720	2.77	3.18	4.20	5.08	6.00	6.65	7.50
1440	3.14	3.54	4.83	5.71	7.00	7.85	8.83

Values taken from HYDRO-35 for shorter duration storms

Values taken from TP-40 for longer duration storms.

Table 5A - Rainfall Intensities for Various Return Periods and Storm Durations

Duration (min.)	Return Period (years)						
	1	2	5	10	25	50	100
5	0.00	5.64	6.67	7.43	8.56	9.44	10.32
10	0.00	4.70	5.56	6.20	7.15	7.89	8.63
15	0.00	4.00	4.74	5.29	6.10	6.73	7.36
30	0.00	2.81	3.53	4.03	4.75	5.32	5.88
60	0.00	1.83	2.37	2.74	3.27	3.67	4.08
120	0.88	1.08	1.41	1.64	1.93	2.18	2.43
180	0.65	0.76	1.03	1.21	1.40	1.58	1.77
360	0.39	0.44	0.61	0.71	0.83	0.94	1.07
720	0.23	0.26	0.35	0.42	0.50	0.55	0.63
1440	0.13	0.15	0.20	0.24	0.29	0.33	0.37

Values taken from HYDRO-35 for shorter duration storms

Values taken from TP-40 for longer duration storms.

TABLE 6 - STORM DRAINAGE

Street velocities and capacities
Flowing curb full
Manning's N=0.018

	CROWN-SECTION						CROSS-SLOPE	
	MINOR STREET		COLLECTOR STREET		MARGINAL ACCESS STREET		ARTERIAL STREET 1-SIDE	
	w = 30'		w = 42'		w = 24'		w = 24'	
Slope	c=4" wp=31.01 A=10 r2/3=.47		c=5" wp=43.01 A=12.25 r2/3=.43		c=3" wp=25.01 A=9.00 r2/3=.51		c=6" wp=24.51 A=6.00 r2/3=.39	
	V f/s	Q cfs	V f/s	Q cfs	V f/s	Q cfs	V f/S	Q cfs
.0010	1.22	12.28	1.13	13.84	1.32	11.89	1.02	6.13
.0015	1.50	15.04	1.38	16.96	1.61	14.56	1.25	7.51
.0020	1.73	17.36	1.59	19.58	1.86	16.81	1.44	8.67
.0025	1.94	19.42	1.78	21.89	2.08	18.80	1.61	9.69
.0030	2.12	21.27	1.95	23.98	2.28	20.59	1.77	10.62
.0035	2.29	22.97	2.11	25.90	2.47	22.24	1.91	11.47
.0040	2.45	24.56	2.26	27.69	2.64	23.78	2.04	12.26
.0045	2.60	26.05	2.39	29.37	2.80	25.22	2.16	13.00
.0050	2.74	27.46	2.52	30.96	2.95	26.59	2.28	13.71
.0055	2.87	28.80	2.65	32.47	3.09	27.89	2.39	14.38
.0060	3.00	30.08	2.76	33.92	3.23	29.13	2.50	15.02
.0065	3.13	31.31	2.88	35.30	3.36	30.32	2.60	15.63
.0070	3.24	32.49	2.99	36.64	3.49	31.46	2.70	16.22
.0075	3.36	33.63	3.09	37.92	3.61	32.57	2.79	16.79
.0080	3.47	34.73	3.19	39.17	3.73	33.63	2.89	17.34
.0085	3.58	35.80	3.29	40.37	3.85	34.67	2.97	17.87
.0090	3.68	36.84	3.39	41.54	3.96	35.67	3.06	18.39
.0095	3.78	37.85	3.48	42.68	4.07	36.65	3.14	18.90
.0100	3.88	38.84	3.57	43.79	4.17	37.60	3.23	19.39
.0150	4.75	47.56	4.37	53.63	5.11	46.06	3.95	23.75
.0200	5.49	54.92	5.05	61.93	5.90	53.18	4.57	27.42
.0250	6.13	61.41	5.65	69.24	6.60	59.46	5.10	30.66
.0300	6.72	67.27	6.19	75.85	7.23	65.14	5.59	33.59
.0350	7.26	72.66	6.68	81.93	7.81	70.35	6.04	36.28
.0400	7.76	77.68	7.14	87.58	8.35	75.21	6.46	38.78
.0450	8.23	82.39	7.58	92.90	8.86	79.77	6.85	41.13
.0500	8.68	86.84	7.99	97.92	9.34	84.09	7.22	43.36
.0550	9.10	91.08	8.38	102.70	9.79	88.20	7.57	45.48
.0600	9.51	95.13	8.75	107.27	10.23	92.21	7.91	47.50
.0650	9.89	99.02	9.11	111.65	10.65	95.88	8.23	49.44
.0700	10.27	102.76	9.45	115.86	11.05	99.50	8.54	51.30
.0750	10.63	106.36	9.78	119.93	11.44	102.99	8.84	53.11
.0800	10.98	109.85	10.10	123.86	11.81	106.37	9.14	54.85
.0850	11.32	113.23	10.42	127.68	12.18	109.64	9.42	56.54
.0900	11.64	116.52	10.72	131.38	12.53	112.82	9.69	58.17
.0950	11.96	119.71	11.01	134.98	12.87	115.91	9.96	59.77
.1000	12.27	122.82	11.30	138.48	13.21	118.92	10.21	61.32

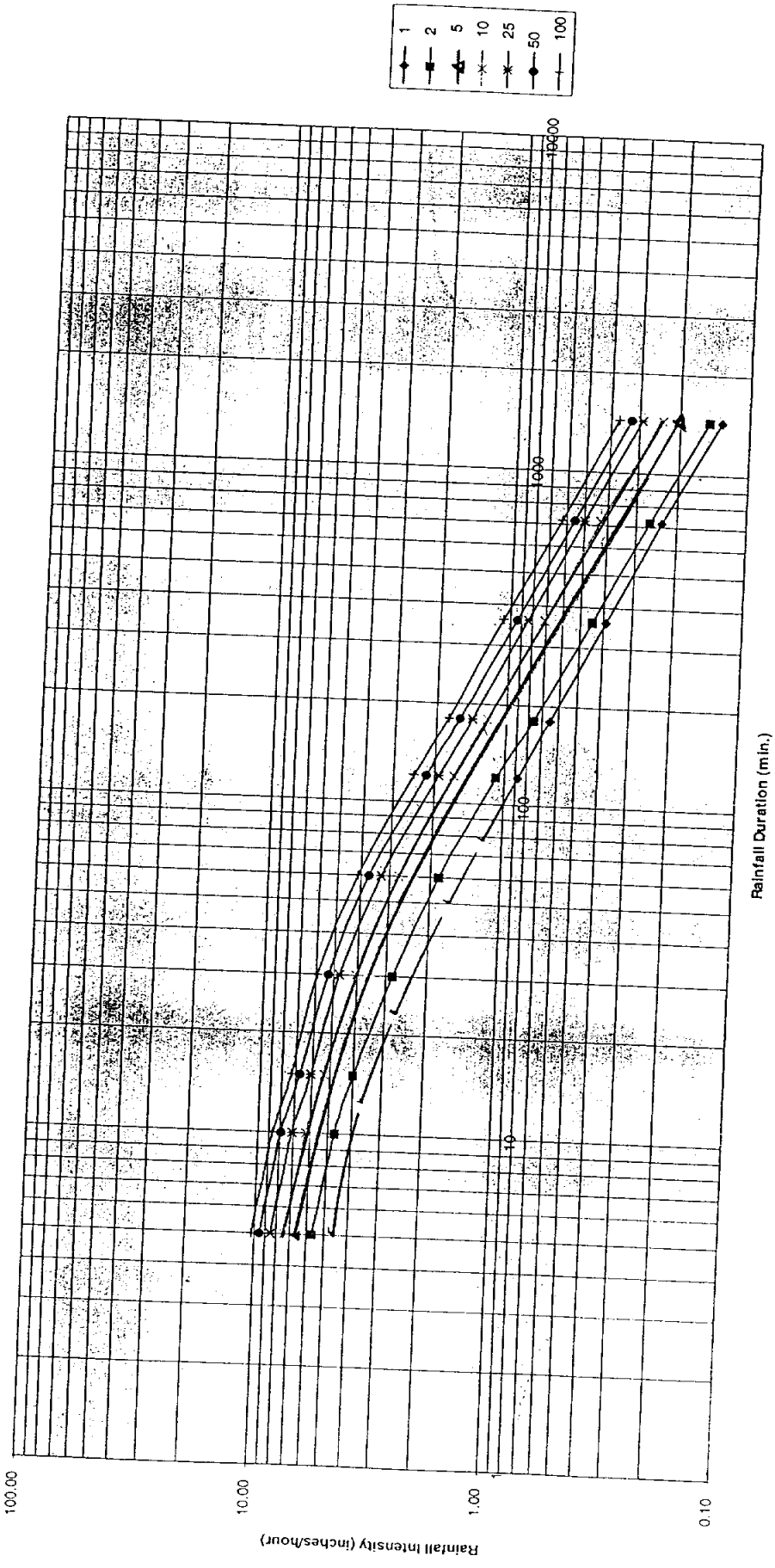


Figure 1 - Rainfall Intensity-Duration-Frequency for Eagle Pass, Texas

Appendix - Tables and Figures

Figure 2 - Average Channel Velocities used to Calculate Time of Concentration