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FLOOD PROTECTION PLANNING STUDY
ALPINE CREEK
BREWSTER COUNTY, TEXAS
CITY OF ALPINE

TWDB Contract No. 2001-483-375

Prepared for:

City of Alpine, Texas
Through a grant from the
Texas Water Development Board
Austin, Texas

Prepared by:

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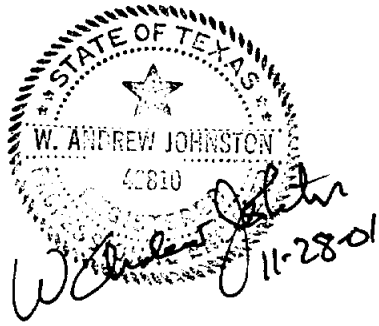

November 2001

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TEXAS WATER DEVELOPMENT BOARD

October 2, 2001

cc Paul M_
DKA_
SUM_
CJ_

The Honorable Paul R. Weyerts
Mayor, City of Alpine
309 West Sul Ross Avenue
Alpine, TX 79830

Re: Flood Protection Planning Grant Contract between the City of Alpine (City) and the Texas Water Development Board (Board), Draft Final Report, Contract 2001-483-375

Dear Mayor Weyerts:

Staff members of the Texas Water Development Board have completed a review of the draft report under TWDB Contract No. 2001-483-375. As stated in the above referenced contract, the City will consider incorporating comments from the EXECUTIVE ADMINISTRATOR shown in Attachment 1 and other commentors on the draft final report into a final report. The City must include a copy of the EXECUTIVE ADMINISTRATOR's comments in the final report.

The Board looks forward to receiving one (1) electronic copy, one (1) unbound single-sided camera-ready original, and nine (9) bound double-sided copies of the final report on this planning project. Please contact Mr. Gilbert Ward at (512) 463-6418 if you have any questions about the Board's comments.

Sincerely,

Tommy Knowles, Ph.D., P.E.
Deputy Executive Administrator
Office of Planning

Cc: Gilbert Ward, TWDB
Andy Johnston, PBS&J CJ 10/8/01

ATTACHMENT 1
TEXAS WATER DEVELOPMENT BOARD
Review of the Draft Final Report: Contract No. 2001-483-375
Flood Protection Planning Study, Alpine Creek, Brewster County, City of Alpine

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 Alpine, needs to be permitted by the City. The City of Alpine 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 Alpine's Flood Insurance Rate Map.

2. The technical content of the referenced report is based on acceptable hydrological and hydraulic methods and is complete. Therefore, the merits of the proposed project can be evaluated from the report. The study also appears to include a fairly good assessment of permitting requirements for SW3P, 404, etc.

3. The report describes the results of hydrologic and hydraulic analyzes completed in an effort to develop means of reducing existing flooding problems on Alpine Creek in the City of Alpine, Brewster County. Measures considered in the study include detention, channel improvements to the main channel, removal/modification of flow constrictions and floodplain storage preservation.

4. Recommendations include improvements to the main channel and associated bridges that would allow passage of the 4 percent annual chance exceedence flood (25-year flood).

5. It appears that current, acceptable methodologies have been employed in the accumulation and presentation of data in this report. Construction of main channel improvements and modification of bridges for flood control purposes are eligible for Board financing. Estimations of project costs appear to be based on reasonable assumptions. The report would be appropriate for use in support of an application to the Board for financing the proposed improvements. All additional information required by Board rules, 31 TAC 363.401-404, and required to make legal findings required by Texas Water Code Chapter 17.771-776 would be required at the time of application. Flood control work is not eligible for the Board's pre-design funding option.

6. Although detention facilities and non-structural alternatives are not recommended at this time, those activities are also eligible for TWDB financing. The purchase of floodplain property for use as public open space, removal of buildings from the floodplain, relocation of floodplain residents and installation of flood warning systems are examples of eligible non-structural activities.

7. As noted by Table 2.1 (page 8), simulated discharges increase from upstream to downstream sections for the 2-year event, however, for the 25-year, 100 year and 500 year events, sometimes the flows increase from upstream to downstream, but some sections reflect a decrease in discharge. Please explain.

EXECUTIVE SUMMARY

The City of Alpine, Brewster County, Texas, is located in southwestern Texas, approximately 210 miles east southeast of El Paso, Texas, and 85 miles north of Big Bend National Park. Covering approximately 150 square miles, Alpine is located in the southwest portion of a broad flat arid plain. Alpine generally has three major waterways affecting its corporate boundaries. Alpine Creek flows north through the center of the city where Toronto (Paisano) and Moss Creeks are located to the west and east of the city respectively. The total drainage area of these principal alluvial streams is approximately 71 square miles. All of these streams have their headwaters in the mountains with peak elevations ranging from 5,000 to 6,000 feet (ft) above sea level and are 1,000 to 1,500 ft higher than the City of Alpine.

The City of Alpine is a participant of the Federal Emergency Management Agency (FEMA) Flood Insurance Program and a majority of the city is within the FEMA floodplain. The principal purpose of this study is to present several flood protection planning options (alternatives) and recommend the most feasible one. In presenting the flood protection options, this study presents the methodology and findings in the hydraulic analysis, flood damages, approximate construction cost, a recommended option, and possible financial and plan implementations.

Alpine, like most other cities, tends to experience sporadic localized flooding. One of the areas of the most documented damage is within the Flood Insurance Study (FIS) flood plain along the north-south axis of Alpine Creek. This flooding is caused by the inability of drainage systems to carry the runoff from the high desert area's erratic, and sometimes intense rainfall patterns. Residential and commercial areas within the City of Alpine have historically suffered significant flooding damages including the loss of life. The level of flood protection currently provided by Alpine Creek has been achieved only through periodic attempts to define the natural channel with rock retaining walls and stone gabions.

This study has attempted to continue the effort that was established during the River Network report, Alpine Creek Opportunities (PBS&J, 2000). The report identifies potential creek improvements that are acceptable and realistic to the community. Several of the possible opportunities for the creek include channel improvement for flood protection, walking trails along the creek, and the use of treated effluent water to put flow back in the creek. It's the focus of this study to present several channel improvements for flood protection and present the most economically attainable option.

Option A focused upon improvements downstream of 2nd Street. The cost to complete Option A is included in each of the following Option summary sheets as Reach 1 (Hendryx Street to Kokernot Lodge) and Reach 2 (Golf Course to 2nd Street). The work included the "benched channel" and the estimated construction cost is $1.2 million dollars. Including the final design and construction

management services, the total project should be around $1.3 million. The construction is estimated to be from $350 to $450 per linear foot over the project length of 3,176 ft.

Table 5.1 presents the estimated construction cost for Option B to be $4.8 million dollars. Including the final design and construction management services, the total project should be around $5.2 million. The project length ends downstream of the Union Pacific Railroad (UPRR) trestle. The construction is estimated to be near $710 per linear foot over the project length of 6,785 ft.

Table 5.2 presents the estimated construction cost for Option C to be $6.4 million dollars. Option C is equivalent to Option B below the UPRR tracks, but Option C extends further upstream and, therefore, has a larger total cost. Including the final design and construction management services, the total project should be around $6.9 million. The construction is estimated to be near $710 per linear foot over the project length of 8,985 ft due to the cost of low water crossing (LWC) replacement in the upper reaches.

Table 5.3 presents the estimated construction cost for Option D to be $7.5 million dollars. Option D is a deeper channel section than either Option B or Option C. The overall length of Option D is equivalent to Option C. Including the final design and construction management services, the total project should be around $8.1 million. The construction is estimated to be near $830 per linear foot over the project length of 8,985 ft.

Table 5.4 presents the estimated construction cost for Option E to be $5.6 million dollars. The depth of cut is less than the other Options, yet its length is equivalent to Option C and Option D. Including the final design and construction management services, the total project should be around $6.1 million. The construction is estimated to be near $620 per linear foot over the project length of 8,985 ft.

Initially the focus of the flood protection planning was upon the 100-year event and reducing the floodplain width to within the existing channel banks. As discussed in previous sections, this goal requires structural improvements. There are basically two ways to achieve this goal. In order to create a larger channel (but keeping the top width the same as the current channel) stormwater detention must be used in the upper basin to reduce the peak flow through the City. This reduction in peak flow would then allow the modified channel to convey the 100-year event within the banks. However, if detention is not employed, then the top of the channel will need to be widened impacting existing structures along the route. These two basic scenarios and their large construction cost estimates (Option B, Option C, and Option D) were discussed at the second Public Meeting.

One of the outcomes of the second Public Meeting was to shift the protection focus from the 100-year event to something more "achievable." The focus shifted to examining the existing conveyance capacity of the Holland Street structure. It was determined that an event just smaller than the

25-year event would begin to overtop that structure. Therefore, providing flooding protection for the 25-year event became the final focus. This yielded Option E which aims to provide additional channel capacity to safely convey the 25-year event through the City. The total length of Option E is larger than the length of Option B, hence the total project cost is larger for Option E and Option B. However, comparing both options for the same length shows that Option E is more than $500,000 which is less than Option B.

When looking at the damage assessment comparisons presented in Table 6.2 and Table 6.4 for Option B and Option E respectively, it appears that each alternative generates a similar level of damage removal. They should be used simply as "relative" numbers and should not be used as exact dollars of benefits derived from the given alternative. Therefore, if the benefits are generally equivalent, and the cost of Option E is less for the same length, then Option E appears to be the most "achievable" of the alternatives presented.

As far as an "implementation plan" for Option E, the entire project does not have to be constructed all at one time. Portions of the entire Option can be built as funding allows. For example, Phase 1 could entail construction from 2nd Street to Brown Street at a project cost of approximately $566,000. The floodplain reduction in this reach alone would be 30%. The "project cost" includes construction cost, final design cost, and construction management cost and should be used to estimate the amount of funding needed. The cost estimate information presented in Table 5.4 can be used to examine the various "reaches" along the entire project length. A criss-cross comparison with the "benefits" presented on a reach by reach basis in Table 6.5 could guide the City to select specific reaches for construction. Generally the project should proceed from a downstream to upstream direction starting no further upstream than 2nd Street. It is the depth of cut at this section that allows the "pilot channel" to be created and extended along the project length.

TABLE OF CONTENTS

Section		Page
	Executive Summary	ii
	List of Figures	vii
	List of Tables	vii
1.0	INTRODUCTION	1-1
1.1	GENERAL	1-1
1.2	HISTORY OF FLOODING	1-1
1.3	LEGAL AUTHORITY	1-3
1.4	EXISTING DATA	1-4
2.0	HYDROLOGY	2-1
3.0	HYDRAULIC ANALYSIS	3-1
3.1	EXISTING CONDITIONS MODEL	3-1
3.2	OPTIONS MODELS	3-3
4.0	FLOOD PROTECTION MEASURES (OPTIONS/ALTERNATIVES)	4-1
4.1	DESCRIPTION OF OPTIONS	4-6
4.1.1	Option A	4-7
4.1.2	Option B	4-7
4.1.3	Option C	4-7
4.1.4	Option D	4-11
4.1.5	Option E	4-13
5.0	PROBABLE COST OF CONSTRUCTION	5-1
5.1	METHODOLOGY AND INDIVIDUAL CONSTRUCTION LINE ITEMS	5-1
5.2	PROBABLE COST	5-9
6.0	FLOOD DAMAGES	6-1
6.1	AVAILABLE DATA	6-1
6.2	METHODOLOGY	6-2
6.3	RELATIVE FLOOD DAMAGE BENEFITS OF EACH OPTION	6-7
7.0	RECOMMENDATIONS/PRIORITIZATION/IMPLEMENTATION	7-1
7.1	RIGHT-OF-WAY	7-1
7.2	PRIORITIZATION	7-1
7.3	IMPLEMENTATION PLAN AND POTENTIAL PERMITTING REQUIREMENTS	7-2
7.3.1	Procedures for Cultural Resources Management	7-4
7.3.2	Coordination with State and Federal Agencies	7-5
7.3.3	Development of Research Design/Determination of Level of Investigation	7-5
7.3.4	Survey	7-6
7.3.5	Field Time	7-7

7.3.6	Testing	7-7
7.3.7	Field Work	7-7
7.3.8	Data Recovery	7-7
7.3.9	Fieldwork	7-8
7.4	OTHER CONSIDERATIONS	7-8
7.4.1	Technical Reports	7-8
7.4.2	Curation	7-8
7.4.3	Structure Analyses	7-9
7.4.4	Cemeteries	7-9
8.0	PUBLIC INVOLVEMENT	8-1
9.0	REFERENCES	9-1

APPENDICES

A Photos
B.1 Hydraulic model (HEC-RAS) input – Revised FIS
B.2 Hydraulic model (HEC-RAS) input - Option A
B.3 Hydraulic model (HEC-RAS) input - Option B
B.4 Hydraulic model (HEC-RAS) input - Option C
B.5 Hydraulic model (HEC-RAS) input - Option D
B.6 Hydraulic model (HEC-RAS) input – Option E
C.1 Hydraulic model (HEC-RAS) output – Revised FIS
C.2 Hydraulic model (HEC-RAS) output – Option A
C.3 Hydraulic model (HEC-RAS) output – Option B
C.4 Hydraulic model (HEC-RAS) output – Option C
C.5 Hydraulic model (HEC-RAS) output – Option D
C.6 Hydraulic model (HEC-RAS) output – Option E
D Hydrologic model (HEC-HMS) input/output and Watershed Boundary Map
E Public Notices for Public Meetings
F FIS Floodplain Boundary Map
G Floodplain Boundary Map – Option E

LIST OF FIGURES

Figure		Page
1.1	Location Map	1-2
3.1	Cross Section Location Map	3-2
3.2	FIS and Revised FIS 100-Year Water Surface Elevation	3-4
3.3	Typical Cross Section Between Hendryx Street and 2nd Street	3-6
3.4	Typical Cross Section Between 2nd Street and End of Project Reach	3-7
4.1	Water Surface Profile (25-yr and 100-yr) – Option A	4-8
4.2	Water Surface Profile (25-yr and 100-yr) – Option B	4-9
4.3	Water Surface Profile (25-yr and 100-yr) – Option C	4-10
4.4	Water Surface Profile (25-yr and 100-yr) – Option D	4-12
4.5	Water Surface Profile (25-yr and 100-yr) – Option E	4-14

LIST OF TABLES

Table		Page
2.1	Flow Discharges Used in the Analysis	2-2
3.1	Reach Lengths	3-5
4.1	Structural and Non-Structural Alternatives	4-3
5.1	Probable Cost of Construction – Option B	5-2
5.2	Probable Cost of Construction – Option C	5-10
5.3	Probable Cost of Construction – Option D	5-11
5.4	Probable Cost of Construction – Option E	5-12
6.1	Relative Damages – FIS	6-3
6.2	Relative Damages – Option B	6-5
6.3	Relative Damages – Option C	6-8
6.4	Relative Damages – Option D	6-9
6.5	Relative Damages – Option E	6-10

1.0 INTRODUCTION

1.1 GENERAL

The City of Alpine, Brewster County, Texas, is located in southwestern Texas, approximately 210 miles east southeast of El Paso, Texas, and 85 miles north of Big Bend National Park. Covering approximately 150 square miles, Alpine is located in the southwest portion of a broad flat arid plain. Created under the Texas Constitution, Article III, Section 52, the City of Alpine functions under a "Council-Manager" government. Currently, the population of Alpine is estimated at 6,479 while the current population of Brewster County is estimated at 10,330. Over 60% of the population in Brewster County resides in the City of Alpine. The population growth of Alpine has been steady over the last ten years, but has increased greatly in the last two years.

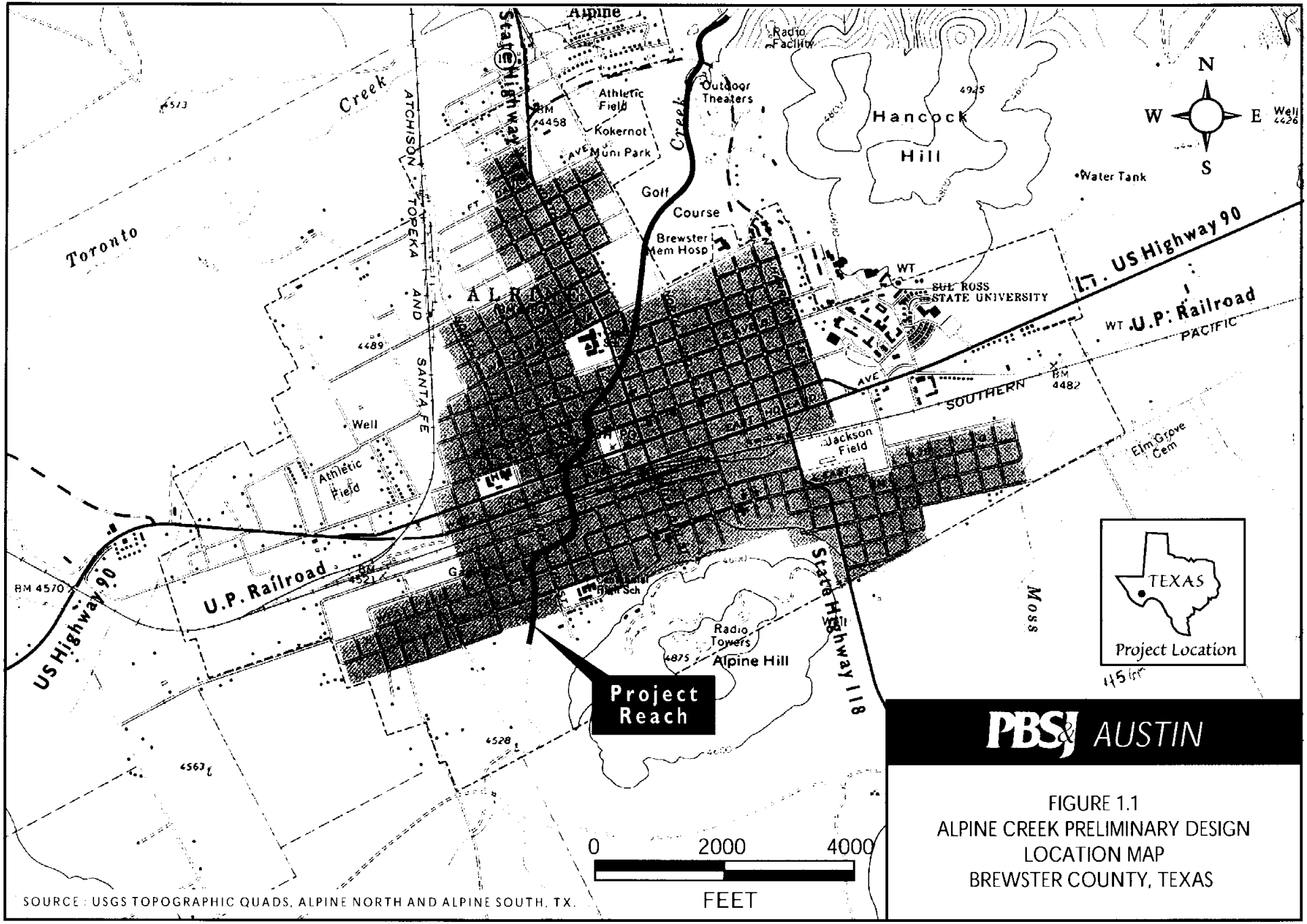
Alpine generally has three major waterways affecting its corporate boundaries. Alpine Creek flows north through the center of the City where Toronto (Paisano) and Moss Creeks are located on the west and east of the City respectively as shown in Figure 1.1. Approximately a mile north of Alpine, Toronto Creek and Moss Creek flow into Alpine Creek. The total drainage area of these principal alluvial streams is approximately 71 square miles. All of these streams have their headwaters in the mountains with peak elevations ranging from 5,000 to 6,000 feet (ft) above sea level and are 1,000 to 1,500 ft higher than the City of Alpine.

The City of Alpine is a participant of the Federal Emergency Management Agency (FEMA) Flood Insurance Program and a majority of the city is within the FEMA floodplain. Approximately 1,233 people reside in the 100-year floodplain with 125 National Flood Insurance Program policies estimated at a value of $10,800,000. The estimated value of property in the 100-year floodplain is $45,832,000 (U.S. Army Corps of Engineers [USACE], 1997).

The principal purpose of this study is to present several flood protection planning options (alternatives) and recommend the most feasible one. In presenting the flood protection options, this study presents the methodology and findings in the hydrologic and hydraulic analysis, flood damages, approximate construction cost, a recommended option, and plan implementation discussions including permitting.

1.2 HISTORY OF FLOODING

Alpine, like most other cities, tends to experience sporadic localized flooding. One of the areas of the most documented damage is within the Flood Insurance Study (FIS) flood plain along the north-south axis of Alpine Creek. This flooding is caused by the inability of drainage systems to carry the runoff from the high desert area's erratic, and sometimes intense, rainfall patterns. Residential and



SOURCE : USGS TOPOGRAPHIC QUADS, ALPINE NORTH AND ALPINE SOUTH, TX.

PBS&J AUSTIN

FIGURE 1.1
ALPINE CREEK PRELIMINARY DESIGN
LOCATION MAP
BREWSTER COUNTY, TEXAS

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commercial areas within the City of Alpine have historically suffered significant flooding damages including the loss of life. According to research published in the USACE "Reconnaissance Report, Pecos River and Tributaries, Alpine, Texas" (USACE, 1997) revealed that while significant problem areas are located along Alpine Creek, Moss Creek, and Toronto Creek, the most significant problem areas were located along Alpine Creek. The level of flood protection currently provided by Alpine Creek has been achieved only through periodic attempts to define the natural channel with rock retaining walls and stone gabions.

The main flood season for the Alpine area is during the June–September period, when most of the average annual precipitation occurs. Summer rainfall usually results from intense thunderstorm activity with maximum rainfall occurring in July. Since the City is nestled so close to the large mountains in the area, these storms often produce high runoff for relatively short periods of time, which can cause serious local flash flooding. While there are no reliable records of historic flood discharges, accurate documentation of repeated flooding have been obtained from newspaper accounts and interviews with residents of the area and recorded at the Archives of the Big Bend at Sul Ross State University in Alpine. These sources reveal that since 1931, flooding has occurred on one or more of the streams, generally during the summer months. Of these, at least eight were large magnitude floods. In addition, it is understood that a major flood occurred in 1904.

Newspaper and other accounts indicate that floods have occurred in June 1904, September 1932, June 1935, September 1935, August 1945, August 1953, October 1954, September 1956, June 1958, August 1958, August 1962, September 1974, May 1977, June 1978, September 1981, October 1983, September 1986, August 1990, June 1991, July 1991 and 1994. The Alpine Avalanche describe the floods of September 1932, October 1945, August 1953, September 1956, June 1958, and September 1974 as "destructive in nature." Descriptions of damage occurring during these accounts are included in a Hydrology Design Memorandum prepared by Espey, Huston & Associates, Inc. (EH&A) for the USACE, Albuquerque District (USACE, 1977). EH&A was acquired by PBS&J several years ago, so the work PBS&J has performed in this preliminary engineering report continues our long involvement with the City of Alpine and Alpine Creek.

1.3 LEGAL AUTHORITY

The legal authority for the City of Alpine to plan and implement flood protection measures for all study watersheds lying within the corporate boundaries of the City is stated in:

Texas Constitution Title 8, Subtitle B, Chapter 261, Section 261.001 Right of Eminent Domain
Texas Constitution Title 8, Subtitle B, Chapter 273, Section 273.001 Exercise of Police Power
Texas Constitution Title 12, Subtitle C, Chapter 391, Regional Planning Commissions

This study was prepared under the Research and Planning Fund Grant for Flood Protection through the Texas Water Development Board (TWDB) for the City of Alpine under TWDB Contract No. 2001-483-375.

1.4 EXISTING DATA

This study has attempted to continue the effort that was established during the River Network report, Alpine Creek Opportunities (PBS&J, 2000). The report identifies potential creek improvements that are acceptable and realistic to the community. Several of the possible opportunities for the creek include channel improvement for flood protection, walking trails along the creek, and the use of treated effluent water to put low flows back in the creek. It's the focus of this study however, to present several channel improvements for flood protection purposes and present the most economically attainable option.

To prepare the hydrology and hydraulic models, data was taken from available reports and models. Data for the hydrology model was taken from the previously mentioned Hydrology Design Memorandum, prepared by EH&A for the USACE. Likewise, data for the hydraulics model was taken from the effective FIS for the City of Alpine in 1990. Flood damage Information was also taken from a Reconnaissance Report, Pecos River and Tributaries, Alpine, Texas (USACE, 1997) and High Flood Hazard Area Studies, Alpine, Texas (USACE, 1986) both produced by the USACE, Albuquerque District.

To update the hydraulic model, several surveyed channel cross sections were taken. Thomas Greenwood Architects (TGA), a local architectural firm on the PBS&J design team, assisted in gathering the channel survey and bridge data. TGA also prepared the cross section sketches included in this report. Also, bridge plans provided by the Texas Department of Transportation (TxDOT) were used in the hydraulic model. Because this is a preliminary design, our intention is to focus on the options for flood protection measures while utilizing readily available data.

2.0 HYDROLOGY

The headwaters of Alpine Creek, Paisano Creek, and Moss Creek begin in the high elevations of the mountain ranges south of the city. Once out of the steep mountain slopes, the rainfall runoff slows down and spreads out in the flatter slopes of the plains. Evidence of alluvial fans exists in the watershed. Channel slopes in the mountains are estimated at about 13 percent grade, while the slopes on the plains are generally 1 to 2 percent grade. When the runoff is in the plains, some overflow discharge from Paisano and Moss Creeks will leave those basins and flow into Alpine Creek. This is due to physical features of the area such as low topographic relief, railroad berms, roads, etc. On the southwestern part of the city, Union Pacific Railroad (UPRR) (originally Southern Pacific Railroad) diverges some high flow from Toronto Creek east into Alpine Creek. Likewise, between Hancock Hill and Alpine Hill, some high flow from Moss Creek overtops the watershed divide and flows into Alpine Creek. The Alpine Creek watershed boundary map is shown in Appendix D.

A series of flows were evaluated for the preliminary design of the optional flood protection measures. In 1977, the USACE contracted a hydrologic analysis for the City of Alpine that used the Synder's unit hydrograph method. The watersheds modeled were for Alpine Creek, Paisano (Toronto) Creek, and Moss Creek. The 1977 model was able to recreate actual observed flood events at historic U.S. Geological Survey (USGS) gauges, which indicate the model was properly representing the watershed characteristics. Also, to route the rainfall runoff through the sub watersheds, the Muskingum method was used. In this current study, the 1977 hydrologic model was recreated using the Hydrologic Modeling System (HEC-HMS) and updated with new rainfall data for Texas and the flows were compared (see Appendix D). The Corps' original 1977 model shows a 100-year discharge of 14,730 cubic feet per second (cfs) at W. Main Avenue as compared with our updated model of 12,049 cfs for the 100-year discharge.

During the FEMA study, the Corps' hydrologic model was reviewed and FEMA opted to use two different hydrologic methods to generate their flows. One method was a computation of regional regression equations for Texas and the other was the TR-20 hydrologic model using the SCS unit hydrograph method. The published effective 100-year FEMA discharge at W. Main Avenue is 11,182 cfs as compared to our updated discharge of 12,049 cfs. The 1977 model gives slightly higher discharges than were ultimately accepted by FEMA in the FIS. In this preliminary study, it was decided to use the effective FEMA discharges for analysis since they are the "officially" accepted flows. Although the flows of the 2-, 25-, 100-, and 500-year discharges are summarized in Table 2.1, the 5-, 10-, and 50-year discharges were also included in the hydraulic analysis model to determine water surface elevations. As seen in Table 2.1, the effective FEMA discharges reflect an increase from upstream to downstream for the 2-year event. However, for the 25-, 100-, and 500-year events, the flows show an occasional decrease from upstream to downstream. The decrease in flow of the higher storm events is caused by the overbank

Table 2.1
Summary of Discharges

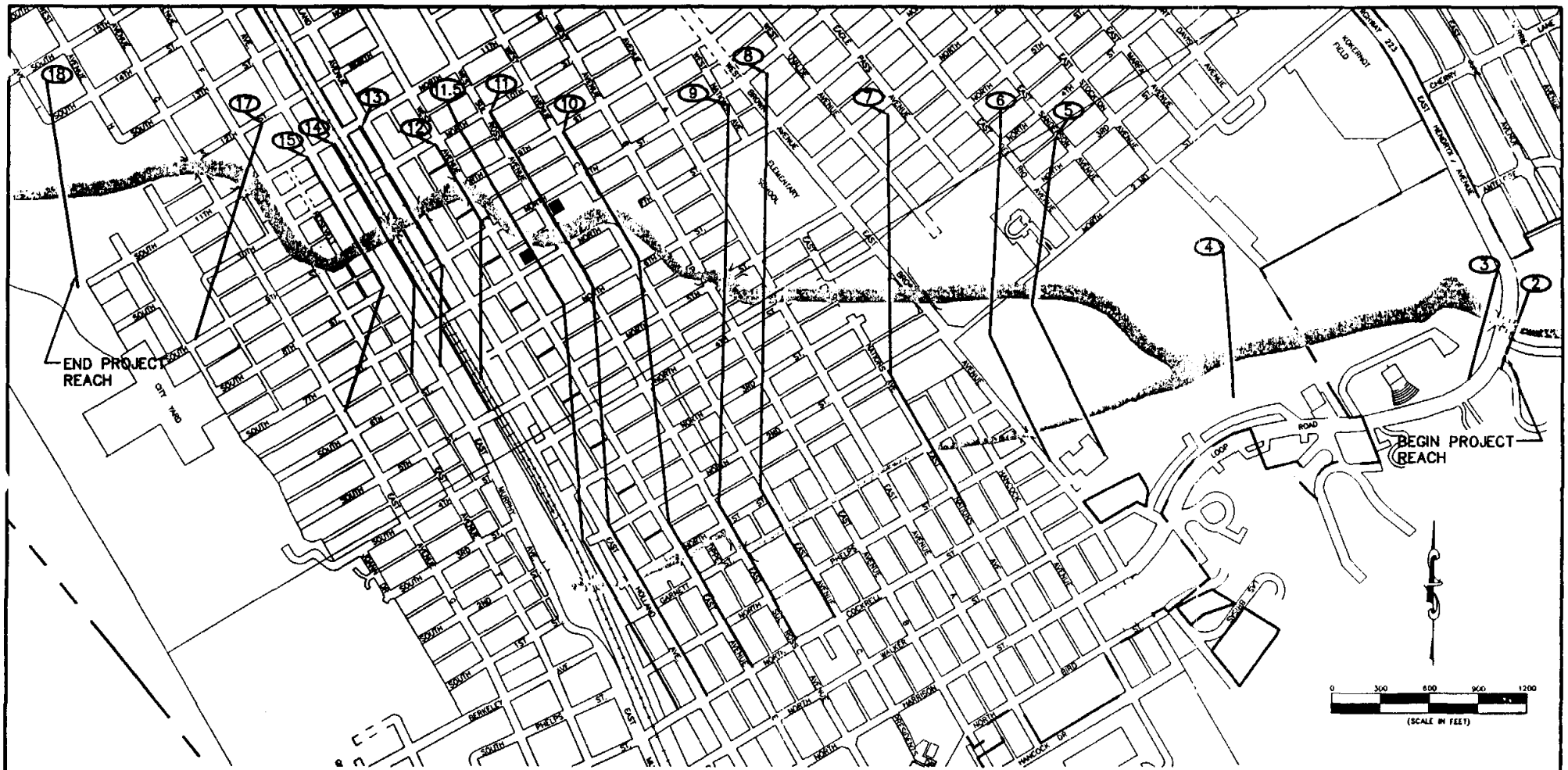
Stream Location	HEC-RAS River Station	Discharges (cubic feet/second) [1]			
		2-yr	25-yr	100-yr	500-yr
Upstream of S. 11th St.	17	426	5831	10758	16969
Upstream of Union Pacific RR	14	427	5796	10704	16916
Upstream of Holland Ave.	13	427	5790	10695	16906
Downstream of Sul Ross Ave.	11	428	5765	10656	16867
Upstream of N. 5th St.	9	428	5736	10612	16824
Upstream of N. 2nd St.	6	430	5676	10519	16732
Confluence with W. Moss Creek	4	445	6062	11340	18295
Downstream of Hendryx St.	2	448	6032	11182	18075

[1] Effective FIS flows were used in the hydraulic models.

flow being detained and the water is causing a storage effect. Because the 2-year event is contained entirely within the banks of the channel, the flows do not show a decrease from upstream to downstream.

The initial focus of the preliminary design was upon containing the 100-year flow within the existing top of banks with a lowered channel. A second option was to reduce these peak flows so that the channel would not need to be so large. Therefore, detention north of Alpine is also a possibility that could be a considered in the final design of the Alpine Creek. This alteration would reduce the discharges to an acceptable level by constructing a lateral weir parallel to the channel. It would allow low flows to move downstream unchanged, but would "shave" higher flows into an off channel detention basin which would capture the high peak and reduce the flows through the city. Once the lower peak has passed the city, the detention basin would slowly release the captured water volume and allow a continued base flow for several days after the storm. A quick analysis of the size of a detention basin required to reduce the peak 100-year flows to a 50-year flow showed a size comparable to that of the Corps' estimation in the Reconnaissance Report (USACE, 1997). It should be noted that as a detention basin that releases all the captured water, no state water rights permit would be needed. However, if a fixed volume of water was retained after the event, then a water rights permit would be needed.

In the Alpine Opportunities (PBS&J, 2000) report, one concern of the community was to bring habitat back to Alpine Creek. One way is with the use of detention in the floodplain. By using detention, water could be pooled after the storm event passes on constructed "flood benches" paralleling the channel and the captured water could either be slowly drained back into the creek or allowed to infiltrate into the ground. These "benches" are flat areas graded away from the main channel at a gentle slope.



PBSJ
208 WILD BASIN ROAD STE. 300
AUSTIN, TEXAS 78746 - (512) 327-6940

ALPINE CREEK
FLOOD PLANNING STUDY

FIGURE 3-1
HYDRAULIC MODEL
CROSS-SECTION LOCATIONS

DATE: 11, 2001
CAD FILE: newmost.dwg
PROJ. NO.: 440798

survey along the creek and information at the bridges to reflect any changes in the study reach since 1990. This data was blended back into the cross section data used in the FIS. The cross sections in the FIS ran well into the neighborhood areas (overbanks). Because this information will not have changed much if at all, it was not recreated with current grant funds. Also, TxDOT bridge plans were acquired by TGA, which allowed verification of bridge data in the model. The FIS model also did not include three bridges that were constructed after the FIS was published. The updated model does include these recent bridges. These new bridges are the Brown Street bridge, the 11th Street bridge and W. Avenue G bridge near Medina Park. The UPRR bridge has also been reconstructed since the FIS in 1990 and updated in the HEC-RAS model.

The study reach for the project includes over 8,000 ft of channel, beginning upstream of Hendryx Avenue (Loop Road) bridge and ending approximately 800 ft upstream of S. 11th Street. Differences in water surface elevation between the FIS model and the revised baseline model are not extensive, and some differences are to be expected because of newer channel and bridge data. A comparison of the Revised (updated) FIS and the effective FIS water surface profile is shown in Figure 3.2. The majority of the differences in the models are due to the bridges at the UPRR crossing, S. 11th Street, and W. Avenue G. The impact of the bridges in south Alpine increases the water surface elevation about 1.5 ft as compared to the effective FIS. The revised FIS model also shows to lower the water surface elevation 0.6 ft through the Holland Avenue bridge. The bridge routines in HEC-RAS are more sophisticated than previous models and result in a better estimation of losses through the bridge, which explains the differences in water surface elevations upstream of each of the structures.

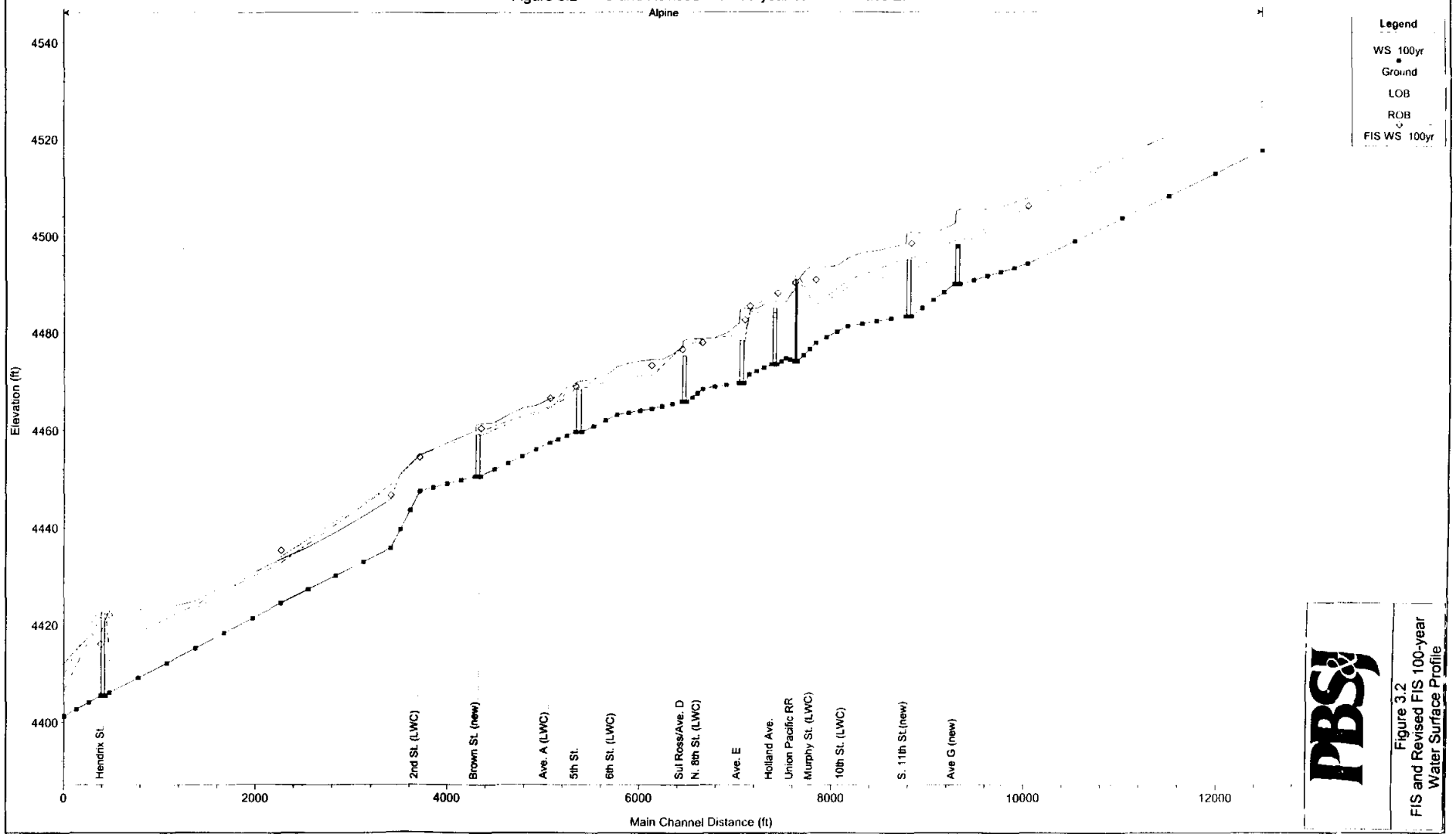
3.2 OPTIONS MODELS

The existing conditions (revised FIS) model was used as the baseline model to make comparisons to possible flood protection options. Flood channel modifications were made using the channel modification option in the HEC-RAS program. The study reach of Alpine Creek was primarily broken up into 15 reaches as shown in Table 3.1. Reach 1 and 2, spanning from Hendryx Avenue (Loop Road) to 2nd Street, will have a flood bench cut horizontally beginning about 4 ft above the natural channel bottom. Leaving the natural channel bottom alone will help minimize habitat damages. A typical cross section through this reach is shown in Figure 3.3. From reach 3 to 15, spanning from 2nd Street to the end of the study, will consist of a channel-lowering cut. A typical cross section for this channel modification can be seen in Figure 3.4. Further details about the channel modifications will be discussed in Section 4.

Along the study reach exists several low water crossings that will need to be modified for any of the alternatives presented. A total of five low water crossing will either need to be retrofitted with a new bridge constructed to span from bank to bank or single Crownspan culvert at the existing location. The streets with low water crossings across Alpine Creek are 2nd Street, Avenue A, 6th Street, 8th Street,

Alpine Creek -- Flood Planning Study

Figure 3.2 - FIS and Revised FIS 100-year Water Surface Elevation



1 in Horiz. = 1000 ft 1 in Vert. = 20 ft

PBS&J

Figure 3.2
FIS and Revised FIS 100-year
Water Surface Profile

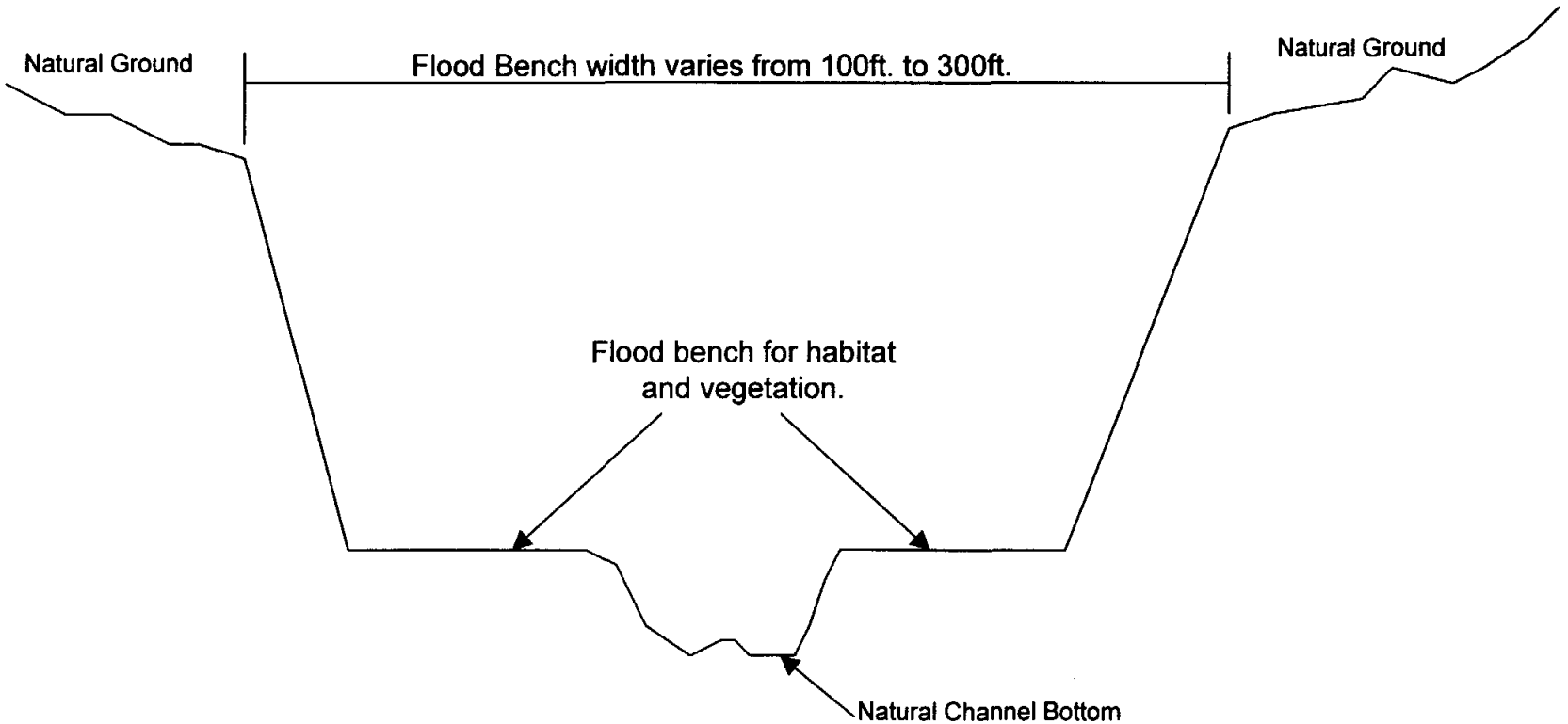
TABLE 3.1

STUDY REACH LENGTH LOCATION

No.	Location	RAS River Station		Reach Length (ft.)
		From	To	
1	Hendryx Avenue Kokernot Lodge Area	2.5	3.83	1,838
2	Golf Course to Second Street	3.83	5.66	1,338
3	Second Street to Brown Street	5.66	6.5	595
4	Brown Street to W. Avenue A	6.5	7.9	665
5	W. Avenue A To 5th Street	7.9	9.0	272
6	5th Street to 6th Street	9.0	9.7	372
7	6th Street to W. Ave D (Sul Ross)	9.7	11.0	632
8	W. Avenue D (Sul Ross) to W. Avenue E.	11.0	11.7	550
9	W. Ave E. to Holland Avenue	11.7	12.7	285
10	Holland Avenue to UP RR Trestle	12.7	14.0	240
11	UP RR Trestle to Murphy Street	14.0	15.0	200
12	Murphy Street to 10th Street	15.0	15.5	280
13	S. 10th Street to S. 11th Street	15.5	16.5	550
14	S. 11th Street to W. Avenue G	16.5	17.2	460
15	W. Avenue G to End of Study	17.2	18.0	710

Alpine Creek – Flood Planning Study

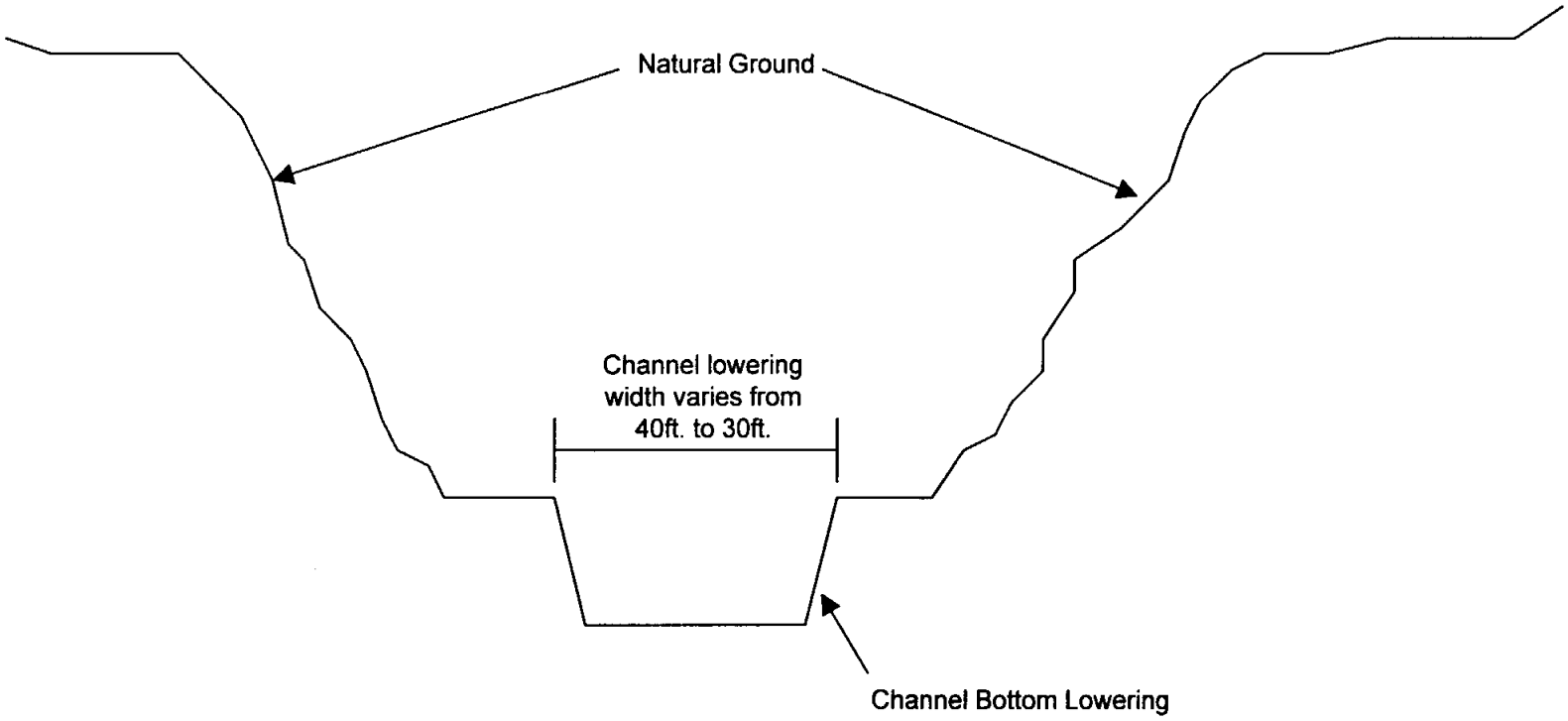
Figure 3.3 – Typical Cross Section Between Hendryx St. and 2nd St.



Not Drawn To Scale

Alpine Creek – Flood Planning Study

Figure 3.4 – Typical Cross Section Between 2nd St. and End of Project Reach



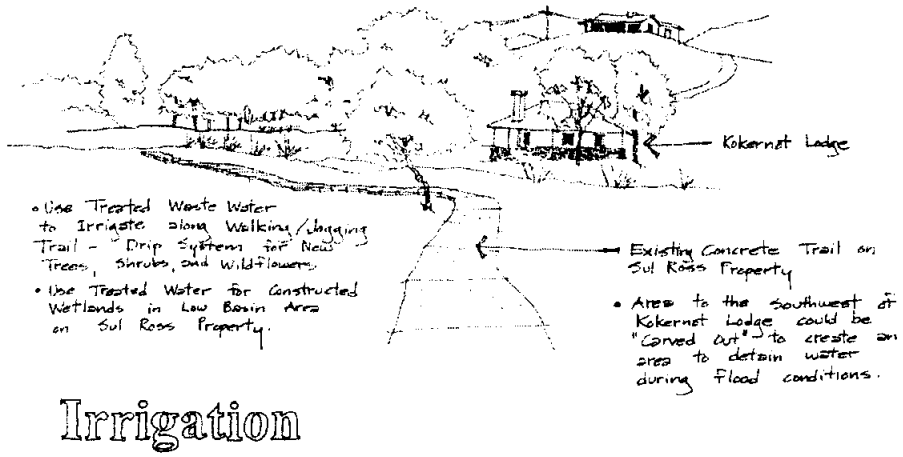
Not Drawn To Scale

Murphy Street, and S. 10th Street. The study team decided to keep the existing elevation of the low water crossings and retrofit them with a single bridge or Crownspan structure across the channel. In the hydraulic model, the low water crossings were coded as a single span at existing road elevation and treated as a bridge to allow stream flow underneath the roadway. Cross section were added where necessary to properly describe the channel through the single spans. This was done for each of the five low water crossings when needed by the channel improvements.

In the alternative models, the 2-year flow was used to represent nature's most significant "channel-forming" storm event. The water surface elevation for the 2-year flow was estimated to be less than 3 ft at a discharge of approximately 427 cfs. To keep the "channel-forming" flow at bank level, the natural low flow channel through the Alpine Golf Course and Kokernot Lodge area was left untouched and the "flood bench" was placed 4 ft above the channel bottom (Figure 3.2). The channel bottom from 2nd Street to the study end will be a natural channel bottom. Manning's n-value in the channel for the alternative models ranged from 0.040 to 0.050 for the natural bottom to 0.035 for the concrete masonry retaining walls further discussed in Section 4. The Manning's n-value for the overbanks was not changed from the existing model. The output for all the alternative models can be seen in Appendix C.

4.0 FLOOD PROTECTION MEASURES (OPTIONS/ALTERNATIVES)

The overall objective of this preliminary engineering study is to achieve as many of the "targets" as possible that were quantified in the River Network grant process. The design concepts would primarily focus upon reducing/eliminating the flooding problems, with awareness that other goals are of interest (hike and bike trail, water features, the environment) should not be "blocked" by the presented options. Several conceptual drawings are shown in this section of how these options might appear after construction. Some of these same views were presented in the River Network report (previously discussed) and are presented again in this report for continuity with that previous report. A key point is that this is just a preliminary engineering study, and as such does not represent the "final decision" of how the job will be bid and/or built.



The options presented herein could continue to be refined and revised through the Public Meeting process. Nevertheless, as much thought and agreement must be achieved in this process as possible before the final design is funded. Another key is that the alternatives must be economically feasible and they must be "achievable." It would be considered a benefit if the overall project was tied to the overall ecology of the creek. The issue of right-of-way (ROW) ownership (public or private) could hinge upon just what type of measure is selected.

General nonstructural and/or structural control measures were evaluated and then refined in this preliminary design phase to provide recommended solutions to the identified problem areas. This section presents a general discussion of the process used to develop the recommended solutions and the "performance" results of the specific recommendations. The specifics of the recommendations are presented in following sections of this report. The flood control measures that best solved the individual problems while providing a pattern of continuity and consistency from reach to reach and throughout the watershed were advanced. Multi-objective solutions received consideration when evaluating the various plans of improvement.

Interaction with the city staff and the public was most critical during this evaluation stage of control measures to be considered. Control measures are usually grouped into "structural" items (typically construction projects) and "nonstructural" items (typically ordinances and criteria). Table 4.1 presents the general categories of alternative solutions to drainage problems that were considered. The table breaks the "alternative solutions" into the two main categories, and also includes a general grouping of the "means of protection" that a particular solution provides.

As mentioned above, this preliminary design study reviewed these options and recommended that "structural solutions" be used for the study reach of the Alpine Creek watershed. The structural aspects or improvements were analyzed hydrologically and hydraulically to determine the benefits provided and also to determine the costs associated with the improvements. General cost estimates and construction quantities for the controls were developed. The possibility of using the proposed improvements as multi-use facilities also was explored.

Discussions with city staff included the factors of each measure's ability to correct existing flood problems, prevent new flood problems, provide considerable benefits for the costs involved, utilize stream corridors as open space and parks, as well as be funded and implemented. City staff input and recommendations were received throughout the process and were acted upon by the Design Team.

Each problem area or reach was examined for non-structural and structural control measures. The Design Team formulated lists of structural and non-structural improvements that were compatible with the environmental setting of the given area. The broad list presented in Table 4.1 was reduced to include only the measures that would be used in the Alpine Creek improvements. These measures included the following:

- Regional Detention Basin on the main channel,
- Channel improvements to the main channel ("benched" channel design),
- Removal/modification of flow constrictions (undersized bridges), and

TABLE 4.1

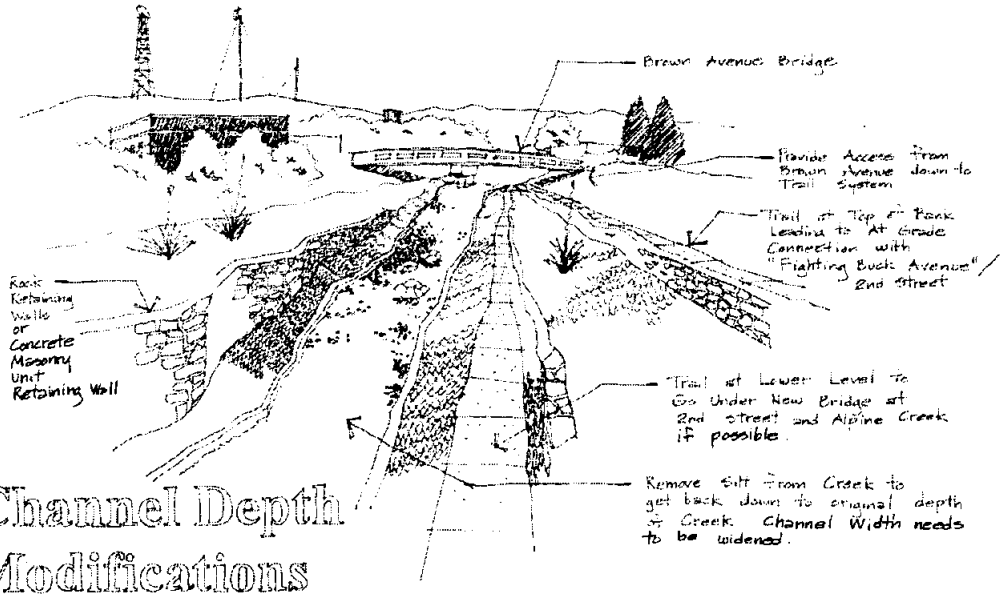
STRUCTURAL AND NON-STRUCTURAL ALTERNATIVES

Alternative Solutions	Means of Protection
STRUCTURAL	
Onsite Detention/Retention	Decrease Peak Flows
Offsite or Regional Detention/Retention	
Floodplain Storage Preservation	
Flow Diversion	
Channel Improvements (excavation)	Decrease Peak Stage for Given Flow
Removal/Modification of Flow Constrictions (bridges)	
Closed System Improvements (pipes, box culverts, inlets)	
Levees/Dikes/Pump Stations	
NONSTRUCTURAL	
Mechanical Flood-proofing of Existing Structures	Keep Water Out of Structures
Mechanical Flood-proofing of New Structures	
Elevate Foundations of Existing Structures	
Elevate Foundations of New Structures	
Relocation/Acquisition of Structures	Keep Structures Away from Water
Subdivision and/or Zoning Regulations	
Public Acquisition of Open Space	
Flood Early Warning System/Evacuation Plan	Decrease Damages Under Existing Conditions
Flood Insurance	
Street Sweeping	Water Quality
Less Fertilizer on Yards	
Public Information Programs	
Erosion and Sediment Controls	
No Action	

- Floodplain storage preservation.

For the purposes of the preliminary design, only these four items were considered. These four items may be added to or modified during "final design."

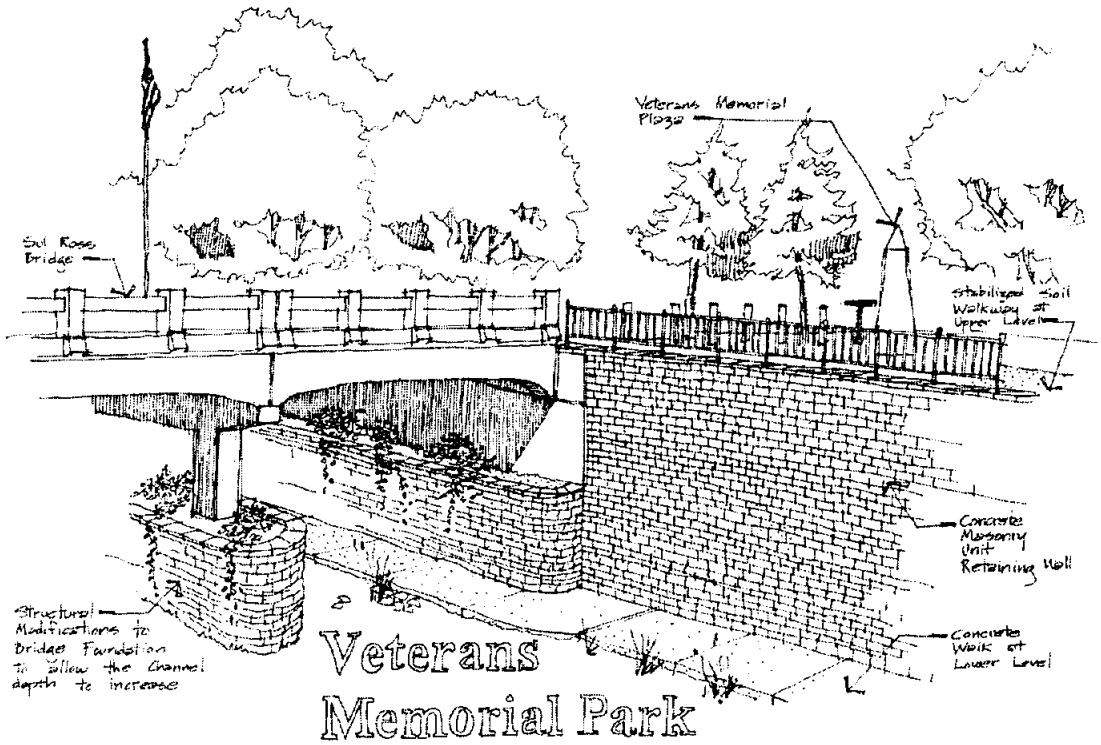
The entire reach from upstream of 2nd Street to the end of the study posed some limiting flood control measures based on physical constraints. Due to the close proximity of existing structures to the existing banks of Alpine Creek, the horizontal widening of a proposed channel was limited. The entire 100-year flood event could not be safely conveyed through the city simply by using channel improvements. Certainly there was some increased conveyance in the future channel, but not enough to carry the 100-year capacity. If this is the case, then consideration may need to be given to constructing a detention basin in the upper watershed. There are some technical considerations that will make this option somewhat more difficult to attain, however, it may end up being a future Phase of construction to the initial main channel construction phases.



As mentioned before, several streets crossing Alpine Creek are low water crossings and will need to be modified to effectively channel water through the city by lowering the channel bottom. Some of the low water crossings may need to have box culverts installed underneath or a Crownspan. For all options presented, the existing elevation and street grade back into the neighborhoods would be

maintained and not converted to flat grade bridge structures at the "top of bank" elevation. For example, the 2nd Street low water crossing could be replaced with a short bridge or Crownspan culvert and the flow line of the creek could be lowered considerably. This additional depth in the channel itself is then passed upstream under all the bridges and low water crossings, and eventually up to Medina Park. In this study, any necessary work needed to support or modify any pier depths of existing bridges and trestles is neglected. Ultimately, the final engineering design will fully analyze any necessary modifications to existing bridges. Armoring or encasement as shown in the sketch below could be an option.

The channel through the golf course is fairly deep (incised) downstream of 2nd Street. As briefly discussed in Section 3, one option to lower the water surface elevation through this area, and downstream through the Kokernot Lodge area, would be to make "flood bench" areas through this reach of the creek. By providing more area for the water to flow, the floodplain water surface elevations could be lowered which would be immediately beneficial at 2nd Street. There was positive discussion about the public reaction to shaping the overbank in this area. It is conceivable that some additional "golfing challenges" could be made while making these flood channel improvements.

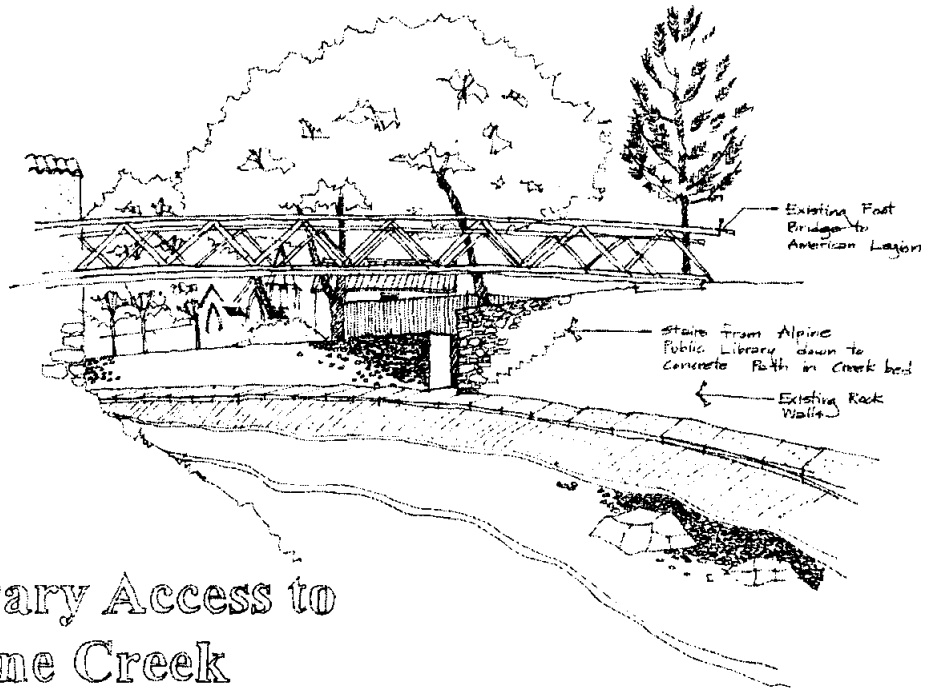


Since the reach downstream of the golf course (through the Kokernot Lodge) is part of a natural riparian area reach, the disturbance of the "bed and banks" through this most downstream area will be minimized. However, there may need to be some shaping of the wider overbank area (as mentioned above) to help reduce the water surface elevations.

Through out the channel study area, past attempts to tame Alpine Creek are seen with existing gabions and rock walls. Removal of the existing gabions was discussed. It could be that in order to widen the existing channel in certain areas, the existing gabions may need to be removed. Everything possible will be done to not have to remove these walls that are constructed of native rock. Any flood protection improvements in the channel bottom will need to be aware of the structural stability of these walls.

4.1 DESCRIPTION OF OPTIONS

Several combinations of options varying in width and depth and channel slope were run hydraulically during this preliminary study. Ultimately, four options were decided by the study team to have the best impacts along the creek. Options B through E include the Option A flood bench channel improvement in the golf course and Kokernot Lodge area.



Library Access to Alpine Creek

Differences between Option B through E are based on the lowering of the channel bottom from 2nd Street to the end of the study reach by the specified channel slope.

4.1.1 Option A

Option A consists of a high flow bench of varying width that is 4 ft above the channels natural invert. The flood bench will extend from Hendryx Street bridge through the Kokernot Lodge area and the gold course, to just downstream of 2nd Street. The channel reach from Hendryx Street to just past Kokernot Lodge has a left bench only that varies from 120 ft to 300 ft. Once in the golf course and through to 2nd Street, the high flow bench extends on both the right and left side of the channel with a bottom width that varies from 250 ft to 390 ft. The water surface profile for Option A can be seen in Figure 4.1. This option is an element of each of the following Options to be discussed below.

4.1.2 Option B

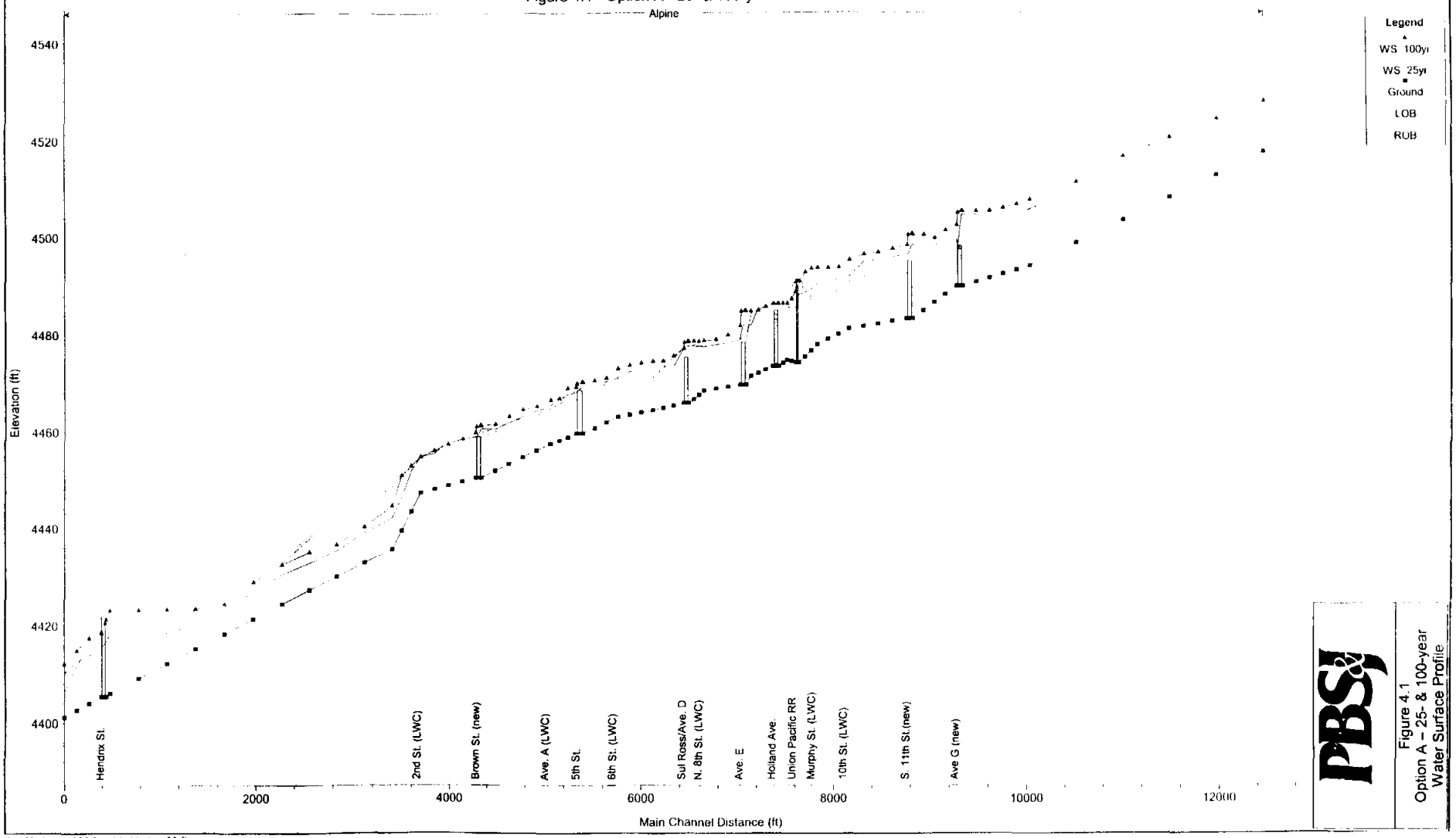
Option B is proposed to have a constant channel slope of 0.00917 ft per foot beginning with an elevation of 4435 ft at 2nd Street and continuing upstream to just downstream of the UPRR. This option consists of a center channel cut that has a bottom width of varying width and side slope of 0.5 horizontal to vertical (H:V) making it nearly a vertical face. From 2nd Street to Brown Street, the bottom width is 50 ft. Through the Brown Street bridge, the bottom width is 50 ft. Once passed the bridge, a 40 ft bottom width follows through to 5th Street. A 40 ft bottom width carries through to just downstream of the UPRR. The water surface profile is shown in Figure 4.2.

4.1.3 Option C

Option C is proposed to have a constant channel slope of 0.00917 ft per foot (the same as Option B) beginning with an elevation of 4435 ft at 2nd Street and continuing upstream to just downstream of the UPRR. At that point the proposed slope is 0.00835 ft per foot beginning at an elevation of 4474 ft from upstream of UPRR to about 350 ft upstream of S. Avenue G. This option consists of a center channel cut that has a bottom varying width and side slope of 0.5 H:V. From 2nd Street to Brown Street, the bottom width is 50 ft. Through the Brown Street bridge, the bottom width is 50 ft. Once passed the bridge, a 40 ft bottom width follows through to 5th Street. A 40 ft bottom width carries through to just downstream of a point about 350 ft upstream of S. Avenue G. The water surface profile is shown in Figure 4.3.

Alpine Creek -- Flood Planning Study

Figure 4.1 - Option A - 25- & 100-year Water Surface Elevation



1 in Horiz. = 1000 ft 1 in Vert. = 20 ft

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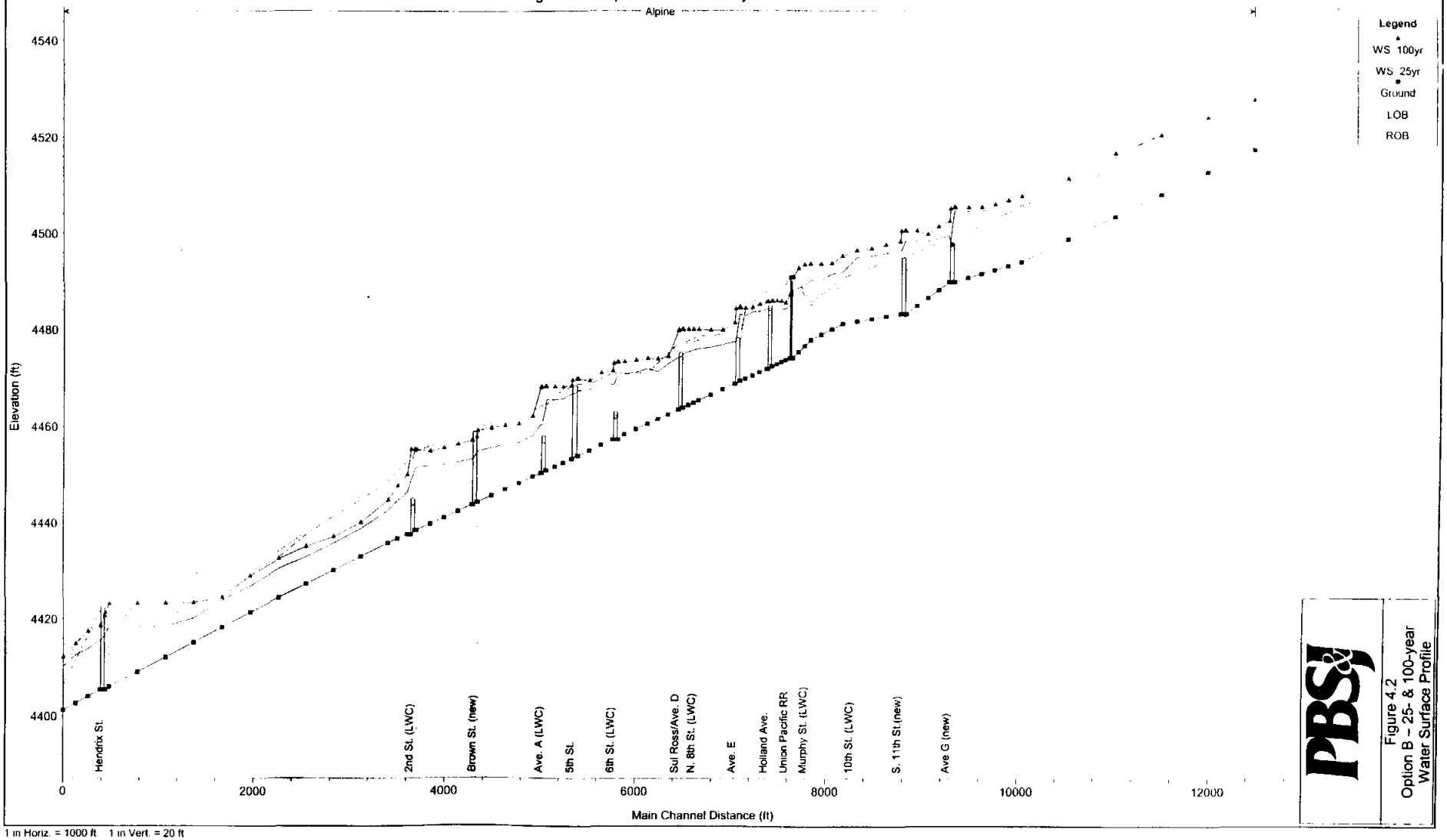
Figure 4.1
Option A – 25- & 100-year
Water Surface Profile

Alpine Creek -- Flood Planning Study

Figure 4.2 - Option B - 25- & 100-year Water Surface Elevation



1 in Horiz. = 1000 ft 1 in Vert. = 20 ft

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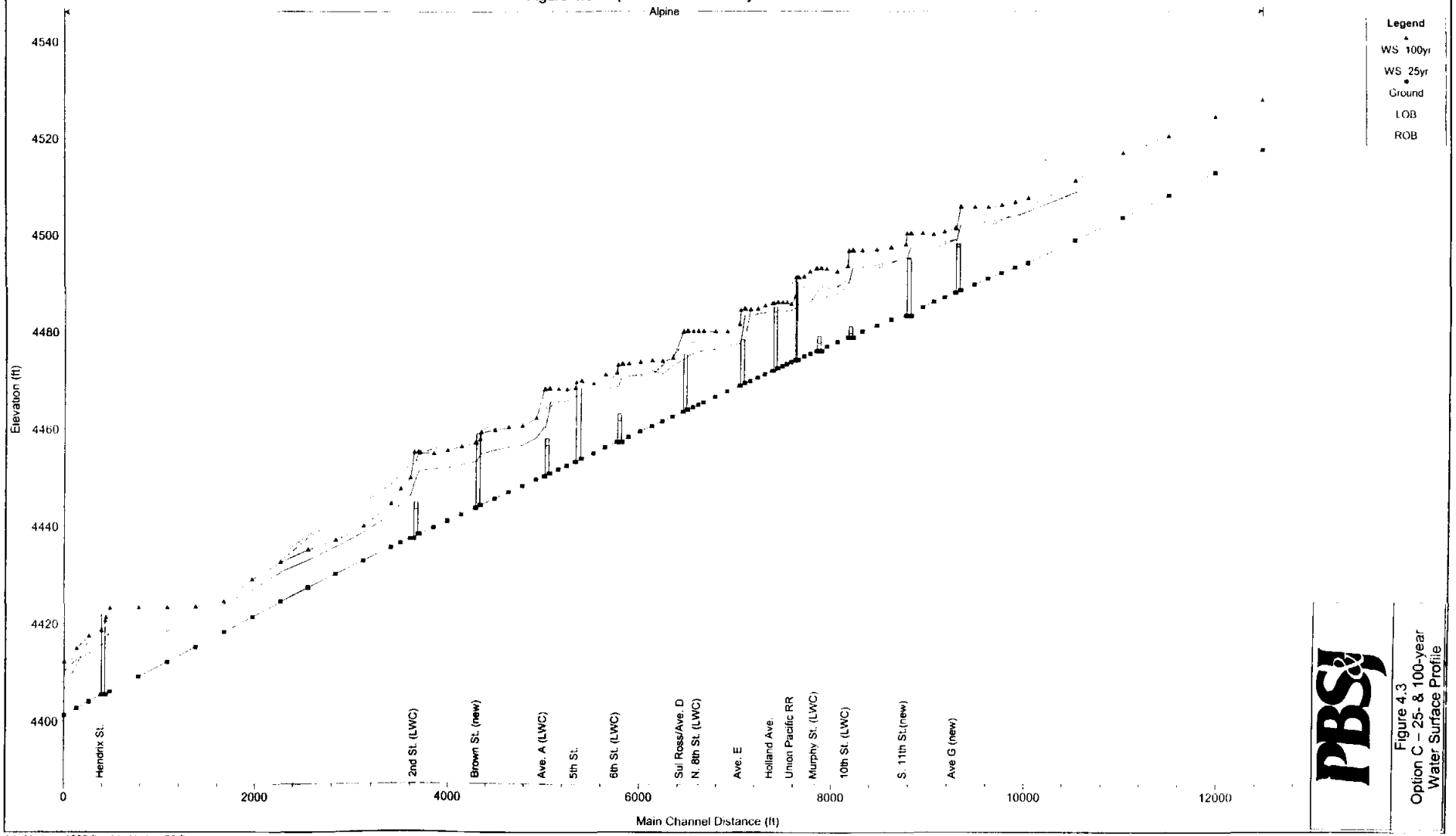
Figure 4.2
Option B – 25- & 100-year
Water Surface Profile

Alpine Creek -- Flood Planning Study

Figure 4.3 - Option C - 25- & 100-year Water Surface Elevation



1 in Horiz. = 1000 ft 1 in Vert. = 20 ft

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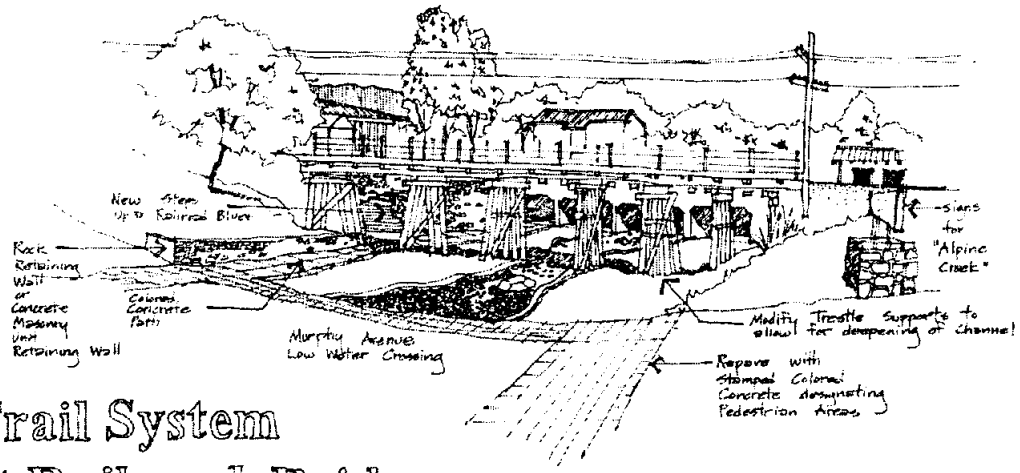
Figure 4.3
Option C – 25- & 100-year
Water Surface Profile



Trail System at Railroad Bridge

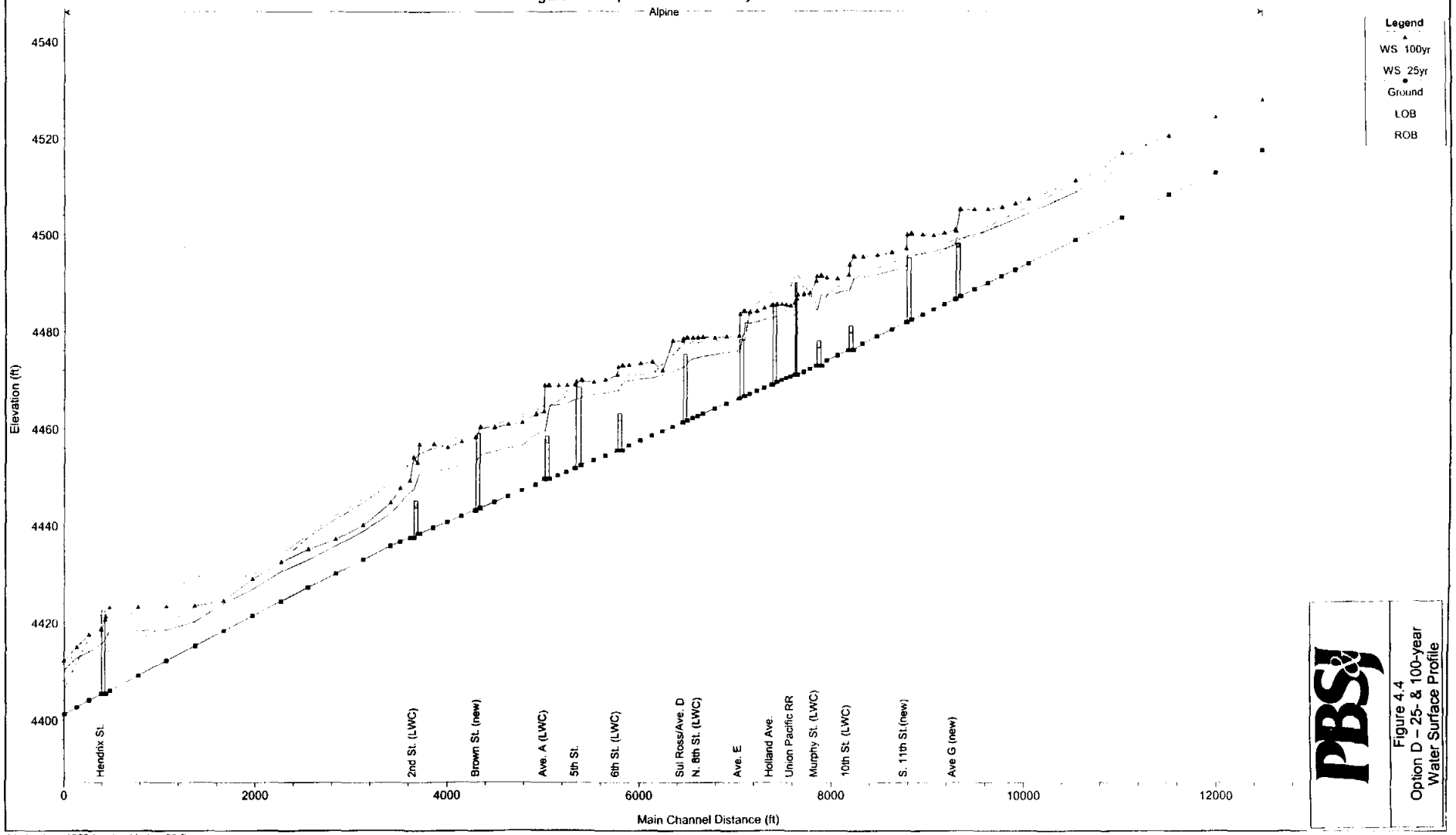
4.1.4 Option D

Option D has a flatter initial slope than Option B or Option C and, therefore, results in a deeper pilot channel. The initial channel slope is 0.00842 ft per foot beginning at an elevation of 4,435 ft and extending from 2nd Street to just downstream of the UPRR. At that point the slope changes to 0.00963 ft per foot beginning at an elevation of 4,471 ft from just upstream of UPRR and extending to about 350 ft upstream of S. Avenue G. This option consists of a center channel cut that has a bottom width of varying width and side slope of 0.5 H:V. From 2nd Street to Brown Street, the bottom width is 60 ft. Through the Brown Street bridge, the bottom width is 50 ft. Once passed the bridge, a 40 ft bottom width follows through to 5th Street. A 40 ft bottom width carries through to just downstream of a point about 350 ft upstream of S. Avenue G. The water surface profile is shown in Figure 4.4.

All of these Options focused upon controlling the 100-year flood event. However, after the second Public Meeting, an option that contained a flow capacity through the Holland Street bridge was desired. The 25-year flow was the determined to be the capacity to be contained under the Holland

Alpine Creek -- Flood Planning Study

Figure 4.4 - Option D - 25- & 100-year Water Surface Elevation



1 in Horiz. = 1000 ft 1 in Vert. = 20 ft

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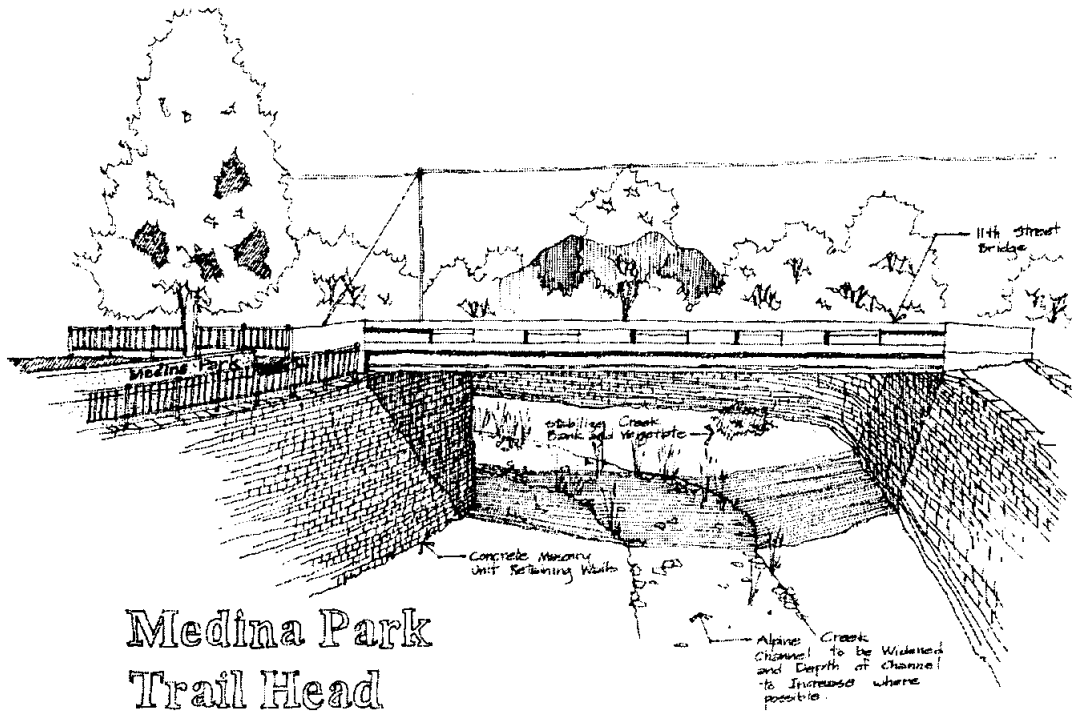
Figure 4.4
Option D – 25- & 100-year
Water Surface Profile

Avenue bridge. The decision was made to examine a new option that would focus on providing a 25-year flood protection. The 100-year flow was used to show the flood impact reduction and the damage reduction of the proposed flood option.

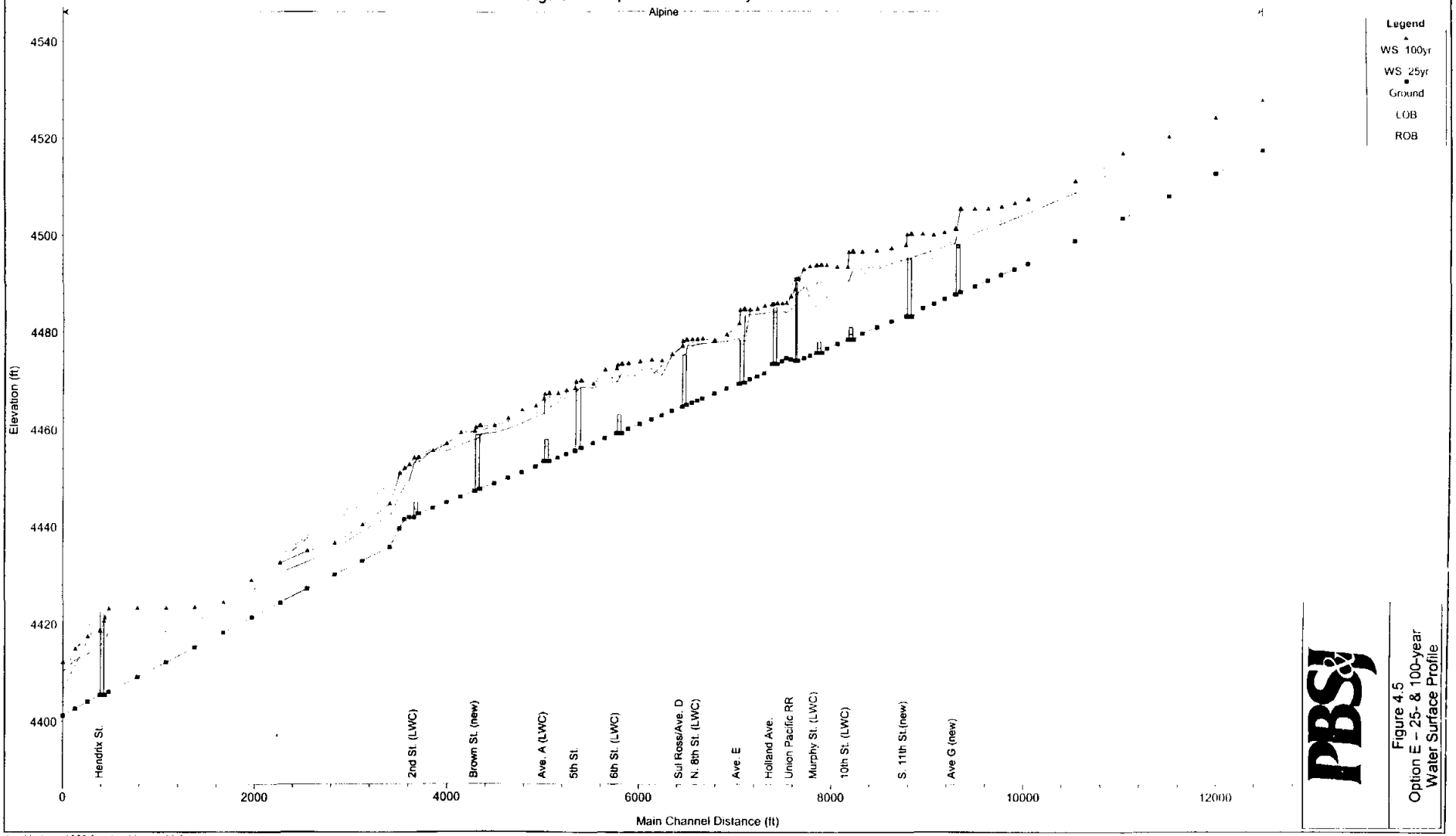
4.1.5 Option E

This option focuses upon the 25-year flood event. The initial depth of cut at 2nd Street is less than any of the previous Options presented. Option E begins with a channel slope of 0.00805 ft per foot at an elevation of 4,442 ft extending from 2nd Street to just downstream of Holland Avenue. There are no improvements from Holland Street to upstream of the UPRR. Above that point the proposed channel slope is 0.00835 ft per foot starting at an elevation of 4,472 ft and extending from upstream of UPRR to about 350 ft upstream of S. Avenue G. This option is half the cut of Option D at 2nd Street as compared to Option D or C. This option consists of a center channel cut that has a bottom width of 50 ft and side slopes of 0.5 H:V. The water surface profile is shown in Figure 4.5.



Alpine Creek -- Flood Planning Study

Figure 4.5 - Option E - 25- & 100-year Water Surface Elevation



1 in Horiz. = 1000 ft 1 in Vert. = 20 ft

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Figure 4.5
Option E – 25- & 100-year
Water Surface Profile

Option E is considered to be the most feasible of the option attainable by the City of Alpine. This option does not fully contain the 100-year storm event, but with an area acquired in the upper watershed for detention, there is still possibility to make Alpine protected from the 100-year event using this Option.

5.0 PROBABLE COST OF CONSTRUCTION

The Section 4 discussed the "structural" solutions for reducing the flooding problems along Alpine Creek. This Section presents a summary of the estimated construction costs for the proposed improvements. Each table breaks out the costs by reach and structure. The probable construction cost for each Option is estimated along with estimates for final design and construction management. If the city decides not to use a certain item, then that item can be subtracted from the cost. Please note that any cost for the acquisition of ROW or project final design itself would need to be added to the totals.

At this preliminary design stage, even though the quantities and design have advanced beyond the "conceptual" stage, there still are some uncertainties associated with the design. Therefore, there is a "contingency" factor applied to the quantities. Also, in order to perform the final design, a consultant engineering company will have to conduct a detailed field survey of the area, finalize the design itself, and prepare construction plans and specifications for bidding purposes. This activity is estimated to be about seven percent of the construction cost. After the job is bid and awarded, there will be a cost associated with the construction inspection and material testing. This activity is estimated to be about one and a half percent of the construction cost. The total project cost does not include any bond issue "issuance" costs that may be applicable should that be the funding route that is followed.

5.1 METHODOLOGY AND INDIVIDUAL CONSTRUCTION LINE ITEMS

Table 5.1 presents the cost estimate for Option B including the individual construction items and their unit prices that were used for this project. The first column is simply a sequential numbering of the line items. The second and third columns present the TxDOT specification number and unique "descriptor code" that provides additional specific information to the contractor about the particular bid item. The next column provides the "item" description for the type of work that is to be performed. To the right of the description column are the "units of measurement" for that particular item such as Lump Sum (LS), Square Yard (SY), Cubic Yards (CY), Linear Feet (LF), Square Feet (SF), and Each (EA). The final column is the estimated unit price in 2001 dollars. Local unit prices have been incorporated into the cost estimate. It should be noted that due to the intense construction in Texas as a whole the unit prices have been changing over the last six months. If this trend continues, adjustments to the overall Project cost will need to be made in the final design process. This is another reason for the additional "contingency" factor of ten percent to be included in all the quantities at this point in the project development.

As mentioned above, each table presents the list of construction items and unit prices that were used for the project. The actual construction cost estimates should be viewed as "preliminary" and not "refined" for preparation of an actual bid (a product of the final design process). The intent of

CITY OF ALPINE
Alpine Creek - Preliminary Design
Option B 5
Engineer's Estimate of Probable Cost (August 2001)

Item No	TxDOT Spec	TxDOT Descriptor Code	Item	Units	Unit $	Reach 1 Hendrix Street Kokernot Lodge Area Quantity	Reach 1 Sheet $	Reach 2 Golf Course to Second Street Quantity	Reach 2 Sheet $	Reach 3 Second Street to Brown Ave Quantity	Reach 3 Sheet $	Reach 4 Brown Ave to West Ave A Quantity	Reach 4 Sheet $	Reach 5 Avenue A to 5th Street Quantity	Reach 5 Sheet $
1	100	none	Preparing Right of Way - General	LS	1.80%										
2	100	none	Relocation of utilities: gas, telephone, power, others	LS	2.50%										
3	500	501	Mobilization	LS	1.00%										
4	502	none	Barricades, Signs and Traffic Handling	LS	1.50%										
5	100	??	Preparing Right of Way - Culvert Removal	LF	$85.00									55	$4,675
6	100	??	Preparing Right of Way - Headwall Removal	LF	$20.00									55	$1,100
7	104	520	Removing concrete (unusual items not a part of general ROW prep)	SY	$8.00					1,222	$9,776			466	$3,812
8	110	502	Excavation (easy)	CY	$2.80	108,315	$303,282	41,887	$117,284						
9	110		Excavation (hard)	CY	$5.00					15,839	$79,195	11,447	$57,235	5,247	$26,235
10	132	518	Embankment - berms, dikes, detention basin dams	CY	$6.00										
11	158	504	Specialized Excavation Work (hard to reach areas, more difficult)	CY	$7.00										
12	160	508	Furnishing and Placing Topsoil (6 inches)	SY	$0.50	78,626	$39,313	38,160	$19,080						
13	162	509	Block sod (St. Augustine)	SY	$2.00										
14	164	611	Seeding for Erosion Control (to include fertilizer & watering, subsidiary)	SY	$0.75	78,626	$58,970	38,160	$28,620	727	$545	813	$610	332	$249
15	169	501	Soil Retention Blanket - Temporary (ECRM) - (if shear under 3 psf) 1/2	SY	$2.00	19,656	$39,312	9,780	$19,560	727	$1,454	813	$1,626	332	$664
16	169	513	Soil Retention Blanket - Permanent (TRM) - (if shear over 3 psf) 1/3	SY	$5.00	26,283	$131,415	76,362	$381,810	1,691	$8,455	2,113	$10,565	864	$4,320
17	247	505	Flexible Base - assume 12" Thickness (maintenance access)	SY	$7.00					61	$427				
18	340	none	HMAC - Type D - assume 2" Thickness (maintenance access)	SY	$6.00					833	$4,998				
19	400	501	Excavation and Backfill for Structures (headwalls, junction boxes)	CY	$4.50										
20	402	501	Trench Safety Protection	LF	$1.25					655	$819	732	$915	299	$374
21	423	508	Retaining walls (cast in place) (pedestrian safety wall)	SF	$18.00					3,927	$70,686	4,389	$79,002	1,795	$32,310
22	423		Retaining walls (modular block wall) (2 ft embedded toe) (normal soils)	SF	$25.00					17,017	$425,425	13,107	$328,175	4,787	$119,675
23	423		Retaining walls (modular block wall) (2 ft embedded toe) (difficult soils)	SF	$35.00										
24	432	507	Riprap - Stone (Channel) (assume 18" thick, large random boulders)	SY	$6.00			1,305	$7,830	582	$3,492	650	$3,900	266	$1,596
25	441	none	Steel Structures (pedestrian hand rails, others)	EA	$1,500.00			4	$6,000						
26	441	none	Steel Structures (park benches, trash cans, accessories)	EA	$2,000.00	2	$4,000			1	$2,000	1	$2,000	1	$2,000
27	462	509	Concrete Box Culverts 5 x 5	LF	$185.00										
28	462	516	Concrete Box Culverts 6 x 6	LF	$245.00										
29	462	523	Concrete Box Culverts 8 x 5	LF	$305.00										
30	462	532	Concrete Box Culverts 8 x 7	LF	$420.00										
31	462	??	Concrete Box Culverts 12 x 6	LF	$686.00										
32	462	??	Concrete Box Culverts 12 x 8	LF	$760.00			13	$9,880						
33	Special 4308	none	Precast CROWNSPAN culvert structures (assume 24 x 6)	LF	$750.00										
34	422	501	Bridge 1 - Crownspan - Large Span (span > 25 LF)	SF	$35.00					4,400	$154,000			4,400	$154,000
35	422	501	Bridge 2 - Crownspan - Small Span (span <= 25 LF)	SF	$30.00										
36	422	501	Bridge 3 - Modifications to existing structures (nothing major)	SF	$40.00							1,320	$52,800		
37	464	505	RCP - Class III - 24"	LF	$40.00										
38	464	508	RCP - Class III - 30"	LF	$50.00										
39	464	510	RCP - Class III - 42"	LF	$70.00										
40	464	511	RCP - Class III - 48"	LF	$80.00										
41	464	512	RCP - Class III - 54"	LF	$120.00										
42	464	513	RCP - Class III - 60"	LF	$150.00										
43	464	514	RCP - Class III - 66"	LF	$175.00										
44	464	515	RCP - Class III - 72"	LF	$200.00										
45	464	516	RCP - Class III - 78"	LF	$225.00										
46	464	517	RCP - Class III - 84"	LF	$275.00										
47	464	518	RCP - Class III - 96"	LF	$325.00										
48	465	547	Inlet - Single	EA	$7,000.00										
49	465	548	Inlet - Double	EA	$10,000.00										
50	465	549	Inlet - Triple	EA	$13,000.00										
51	465	538	Drainage MH or JB	EA	$5,000.00										
52	466	501	Headwall - small	EA	$2,500.00										
53	466	501	Headwall - large	EA	$5,000.00			2	$10,000						
54	529	511	Concrete Curb and Gutter	LF	$8.50										
55	529	521	Concrete Valley Gutter	LF	$10.00										
56	530	604	Remove & Replace Driveway	EA	$3,000.00										
57	531	502	Sidewalk (concrete) (pedestrian access points)	SY	$27.00	550	$14,850	198	$5,292						
58	531		Sidewalk - soil amendment (hike and bike trail) (4" on top of TRM)	SY	$5.00	2,022	$10,110			1,454	$7,270	1,626	$8,130	865	$4,325
59	550	501	Chain Link Fence - 6ft (assume 10% of total project L)	LF	$10.00	330	$3,300			65	$650	73	$730	30	$300
60	560	501	Mailbox Assembly	EA	$400.00										
61	580	none	Project Maintenance (subsidiary)												
62	COA 594	none	Gabions	CY	$130.00	165	$21,450								
63	COA 594 B	none	Reno Revetment Mattress	CY	$150.00										
64	639	none	Rock Berm (construction ESC) (assume 10% of total project L)	LF	$10.00	202	$2,020	147	$1,470	65	$650	73	$730	30	$300
65	642	none	Silt Fence (construction) (assume 33% of total project L)	LF	$2.50	674	$1,685	490	$1,225	218	$545	244	$610	100	$250
66	1610	none	Preservation of Trees (Type L)	EA	$100.00	33	$3,300	17	$1,700						
67	802 A	none	Capital Improvement Project Sign	LS	$600.00										
68	Special	none	Conlock II pavers	SY	$27.00										
69	420	none	Concrete Structures (drop, energy dissipation, special)	EA	$20,000.00										
70	Special	none	Geogrid Basket	SY	$5.00										
			TOTAL ESTIMATED CONSTRUCTION (subject to revision)				$635,807		$611,021		$771,387		$546,028		$355,285
			FINAL DESIGN		7.0%		$ 44,506		$ 42,771		$ 53,997		$ 38,362		$ 24,870
			CONSTRUCTION MANAGEMENT		1.5%		$ 9,537		$ 9,165		$ 11,571		$ 8,220		$ 5,329
			TOTAL ESTIMATED PROJECT COST (subject to revision)				$ 689,850		$ 662,957		$ 836,955		$ 594,610		$ 385,484
			Construction Cost Per Linear Foot				$ 348		$ 458		$ 1,298		$ 824		$ 1,308
			Total Project Cost Per Linear Foot				$ 375		$ 497		$ 1,407		$ 894		$ 1,417

Item No	Reach 6 5th Street to 6th Street Quantity	Reach 6 Sheet $	Reach 7 6th Street to W Ave D (Sul Ross) Quantity	Reach 7 Sheet $	Reach 8 W Ave D (Sul Ross) to West Ave E Quantity	Reach 8 Sheet $	Reach 9 W Ave E to Holland Avenue Quantity	Reach 9 Sheet $	Reach 10 Holland Ave to UP RR Trestle Quantity	Reach 10 Sheet $
1										
2										
3										
4										
5										
6	66	$1,320								
7			466	$3,812	466	$3,812				
8										
9	5,058	$25,290	6,262	$31,310	3,202	$16,010	1,510	$7,550	1,138	$5,680
10										
11										
12										
13										
14	455	$341	774	$581	672	$504	348	$261	293	$220
15	455	$910	774	$1,548	672	$1,344	348	$696	293	$586
16	1,182	$5,910	2,012	$10,060	1,748	$8,740	906	$4,530	763	$3,815
17	61	$427					61	$427		
18	833	$4,998					833	$4,998		
19										
20	409	$511	696	$870	605	$756	314	$393	264	$330
21	2,455	$44,190	4,178	$75,204	3,630	$65,340	1,881	$33,858	1,584	$28,512
22	6,547	$163,675							2,112	$52,800
23			9,748	$341,180	4,840	$169,400	1,881	$65,835		
24	364	$2,184	619	$3,714	538	$3,228	279	$1,674	235	$1,410
25	1	$1,500					1	$1,500		
26	1	$2,000	1	$2,000	1	$2,000	1	$2,000	1	$2,000
27										
28										
29										
30										
31										
32										
33										
34			4,400	$154,000						
35					770	$23,100				
36	1,210	$48,400			770	$30,800	660	$26,400	770	$30,800
37										
38										
39										
40										
41										
42										
43										
44										
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46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										
57	49	$1,323					49	$1,323		
58	909	$4,545	1,547	$7,735	1,344	$6,720	697	$3,485	587	$2,935
59	41	$410	70	$700	61	$610	31	$310	26	$260
60										
61										
62										
63										
64	41	$410	70	$700	61	$610	31	$310	26	$260
65	138	$330	232	$580	202	$505	105	$263	98	$245
66										
67										
68										
69										
70										
TOTAL ESTIMATED CONSTRUCTION (subject to revision)		$308,680		$634,064		$333,579		$155,812		$129,828
FINAL DESIGN 7.0%		$ 21,608		$ 44,387		$ 23,351		$ 10,907		$ 9,088
CONSTRUCTION MANAGEMENT 1.5%		$ 4,630		$ 9,511		$ 5,004		$ 2,337		$ 1,947
TOTAL ESTIMATED PROJECT COST (subject to revision)		$ 334,920		$ 687,961		$ 361,933		$ 169,056		$ 140,863
Construction Cost Per Linear Foot		$ 830		$ 1,002		$ 607		$ 547		$ 541
Total Project Cost Per Linear Foot		$ 900		$ 1,087		$ 658		$ 593		$ 587

Item No	Reach 11 UP RR Trestle to Murphy Street Quantity	Reach 11 Sheet $	Reach 12 Murphy Street to 10th Street Quantity	Reach 12 Sheet $	Reach 13 10th Street to 11th Street Quantity	Reach 13 Sheet $	Reach 14 11th Street to W Ave G Quantity	Reach 14 Sheet $	Reach 15 W Ave G to End of Study Quantity	Reach 15 Sheet $	Lump Sum Items Quantity	Lump Sum Items Sheet $	Alpine Creek Overall Project Quantity	Alpine Creek Overall Project Total $
1											1	$40,714	1	$40,714
2											1	$112,103	1	$112,103
3											1	$44,841	1	$44,841
4											1	$67,262	1	$67,262
5													55	$4,675
6													121	$2,420
7													2,689	$21,512
8													151,202	$423,366
9													49,702	$248,510
10														
11														
12													117,786	$58,893
13														
14													122,200	$91,650
15													33,860	$67,720
16													114,124	$570,620
17													183	$1,281
18													2,499	$14,994
19														
20													3,974	$4,968
21													23,839	$429,102
22													43,630	$1,090,750
23													16,469	$576,415
24													4,838	$29,028
25													6	$9,000
26													10	$20,000
27														
28														
29														
30														
31														
32													13	$9,880
33														
34													13,200	$462,000
35													770	$23,100
36													4,730	$189,200
37														—
38														
39														
40														
41														
42														
43														
44														
45														
46														
47														
48														
49														
50														
51														
52														
53													2	$10,000
54														
55														
56														
57													844	$22,788
58													14,851	$74,255
59													727	$7,270
60														
61														
62													165	$21,450
63														
64													748	$7,480
65													2,489	$6,223
66													50	$5,000
67											1	$600	1	$600
68														—
69														
70														
TOTAL ESTIMATED CONSTRUCTION (subject to revision)												$305,521		$4,789,049 $4,789,000
FINAL DESIGN 7.0%		$		$		$		$		$		$ 21,386		$335,233
CONSTRUCTION MANAGEMENT 1.5%		$		$		$		$		$		$ 4,583		$71,836
TOTAL ESTIMATED PROJECT COST (subject to revision)		$		$		$		$		$		$ 331,490		$5,196,118
Construction Cost Per Linear Foot														$ 708
Total Project Cost Per Linear Foot														$ 768

TABLE 5 1
Probable Cost of Construction

these cost estimates is to reflect the amount of funding that this phase could require so as to assist the city in the short term and long term financial planning processes. With that in mind, the following paragraphs discuss the various "assumptions" that were made in the estimation of each of the specific line items in the cost estimation spreadsheet. The "final design" engineer can refer to these assumptions and modify them as needed once the actual design is underway.

General bid items were calculated as a percentage of the total material cost. For example, "Preparing Right of Way - General" was assumed to be one point eight (1.8) percent of the total bid amount since the Alpine Creek channel is relatively clear of major obstructions. Similarly, "Relocation of utilities - gas, telephone, power, others" was assumed to be two and one-half (2.5) percent of the total bid amount. There are several concrete encasements running across the channel that will need to be evaluated as to the nature of the utility and then relocated or armored in place to accommodate the channel expansion. "Mobilization" was assumed to be one (1.0) percent of the total bid amount since there will not be a large number or unique or specialized pieces of equipment required. "Barricades, Signs and Traffic Handling" was assumed to be one and one-half (1.5) percent of the total construction amount.

The line items for "Preparing Right of Way - Culvert Removal," "Preparing Right of Way - Headwall Removal," and "Removing concrete (unusual items not a part of general ROW preparation)" were for larger existing items that are not typically considered as "general" ROW preparation mentioned above. The "Excavation - easy" line item is for the quantity of dirt (CY) that would need to be cut from the existing channel in order to create the proposed trapezoidal channel previously discussed. It considers access to the channel and removal of the excavation to be easier than in other parts of the job. The downstream areas along Kokernut Lodge and through the Golf Course were evaluated as easier than in the confines of the channel through the city. The "Excavation - hard" line item is for the quantity of dirt (CY) that would need to be cut from the existing channel with more difficult access and removal issues.

"Embankment - berms, dikes, detention basin dams" represents the quantity of fill material (CY), which could be needed in final design. This is assumed to be an "in place" quantity with no shrinkage factor applied at this time. At this point in the design the fill was assumed to be zero. "Specialized Excavation Work (hard to reach areas, more difficult)" is a line item reserved for any excavation (CY) that could not be handled by the large moving equipment and would most likely require more specialized (smaller) equipment and more time to complete thereby making it more costly. This item also can represent areas that are difficult to access due to building encroachments or other constraints as discussed in previous sections. At this point in the design the quantity was assumed to be zero.

The next few items deal with the erosion and sediment control aspect for the project. "Furnishing and Placing Topsoil" was used only in those situations where a "cut section" could end up exposing buried soil that is low in nutrient sources and, therefore, would need assistance before planting

could take place successfully. The quantities were assumed to cover a depth of six inches over the face of the earthen channel sections. The channel invert and side slopes were to be lined with other materials. "Block sod (St. Augustine)" was used primarily in the neighborhood settings where yards could be disturbed by the installation of a wider channel, new pipe or box culverts around bridges. At this point in the design the quantity was assumed to be zero but can be added during the final design period. The majority of the revegetation effort (both urban and open channel) would be handled with "Seeding for Erosion Control (to include fertilizer & watering, subsidiary)." The area covered would be approximately the same quantity as the "topsoil" line item discussed above.

Continuing with the erosion and sediment control line items, in some places there appears to be the need for "Soil Retention Blanket - Temporary (ECRM)." Note that this is the temporary biodegradable material. The "shear" is a better indicator or erosion potential than simply looking at the "velocity" of the stormwater. The hydraulic models compute this parameter and it was used as the "indicator" for when the additional matting was needed. If the shear stress in the open channel or adjoining slopes was less than 3 pounds per square foot (psf) then a SY quantity of this temporary matting was estimated. This will provide the project with temporary, biodegradable matting to assist in the growth of grasses. This product should be installed as the project progresses (not waiting until the end of the job) so as to protect all the slopes that have been final graded, covered with topsoil and seeded. In some channels, the velocity was a little higher than unprotected grass could take on its own. Again this quantity can be refined during final design.

On the other hand, if the shear stress in the channel was over 3 psf, then a "Soil Retention Blanket - Permanent (TRM)" was recommended. This quantity should provide the design engineer with enough material to protect those areas in need of "soft armor" (instead of more expensive hard armor rock riprap). The use of Conlock concrete pavers may be required at some flow concentration points. Since these pavers are a "hard armor" it has been specified as it own unique bid item discussed below. The control of sediment during construction and the establishment of healthy vegetative cover along the channel should help make these projects significant contributors to the overall water quality in the watersheds. This Erosion and Sediment Control (ESC) aspect of the project should not be discounted or reduced since it will be a major contributor to satisfying regulatory requirements.

In the urban areas, as the pipes and boxes are installed at bridges, there will most likely be a need for "Flexible Base - assume 12" Thickness" to repair the streets or to create maintenance access points. This can be bid as an individual line item, or can be lumped into a large item for "bridge rehabilitation" if that is the decision made in final design. Similarly, after the base was installed, "HMAC - Type D - assume 2 inch Thickness" was estimated to be needed to repave the street or provide maintenance access. Certainly, as the urban projects are actually designed, these quantities may slightly increase or decrease depending upon the final footprint of the work at the bridges.

The line item for "Excavation and Backfill for Structures (headwalls, junction boxes)" would be for the excavation work around the drainage structures. At this point in the design the quantity was assumed to be zero. Another separate line item is used for the concrete work to actually install the new structures. "Trench Safety Protection" is a critical item. Typically this item is used with the installation of water, wastewater, or storm drainage pipes. It is intended for use when "narrow" trenches are created over 5 ft deep. However, in this project there will not be many of these traditional "narrow" trench situations since the majority of the work will be along an open channel where the width is greater than the height. Nevertheless, it is recommended to consider some type of safety precautions as the channel walls are created (some could be over 11 ft tall). As the individual project is designed this item may be modified somewhat since the requirement is only for those regions where the project depth exceeds the Federal depth requirements.

In some locations there was an estimate for "Retaining Walls (cast in place)" for the creation of a short wall between the pedestrian walking trail and the steep walls of the deepened channel. One of the major cost items for this preliminary design concept involves the construction of the walls for the deepened pilot channel section. "Retaining Walls (modular block wall) – normal" reflect the quantity of the exposed face (SF) of the wall plus an additional 2 ft of depth below the flowline of the channel. This additional depth is highly recommended as a safety factor for the toe of the slope as the channel invert adjusts through time. These modular block walls were recommended since information gathered during the Public Meetings indicated that the use of poured concrete walls was not esthetically pleasing. Although these modular blocks are made of concrete, the resulting walls do present a more natural appearance of individual rocks. The color of the blocks can be made to approximate the brown, tan and rust colors of the native rocks in the Alpine area. These walls are able to "articulate" and settle some without cracking as poured concrete walls typically can do. These walls also allow hydrostatic pressures to be relieved without the use of weeps holes. These walls need to have a geogrid material that extends back from the wall face into the slope. These geogrid strips serve as the "anchor" to hold the wall up. These "tails" can be easy to install if the overall width behind the wall is large, or can be difficult if the horizontal working room is more confined. The unit price for the normal or difficult installation situations are different so there are two unique line items.

Although the pilot channel will have stabilized walls, the invert of the channel will remain natural. This will help the stormwater in the pilot channel to infiltrate and naturally reenter the groundwater layers. Natural rock will be placed (or left) in the invert with sizes ranging from gravel to twelve inch diameter rocks. In some open channel sections, however, there may be a need for "Riprap - Stone (Channel) (assume 18" thick)" for in-line energy dissipation or for use just downstream of a bridge or headwall structure that has high exit velocities. The need for this item can best be evaluated during final design and is included here primarily as a reminder. Many times there are needs for "Steel Structures (pedestrian hand rails, others)" to provide safety to the general public along the pedestrian

trails and to the maintenance staff. Along the pedestrian trail there will be opportunities for "Steel Structures (park benches, trash cans, and accessories)."

A limited number of "Concrete Box Culvert" sizes were evaluated for use at bridge crossings and for large storm sewers. At this point in the design the quantity was assumed to be zero since the majority of the work involves the larger bridges and major crossings. During the actual "final design" of this particular project, a wider variety of box sizes and requirements (utility conflicts and other similar items) can be evaluated that could make one of the "basic sizes" used in this study. Again, these "basic sizes" were selected based upon the best cost for the open area provided. They are listed here as a reminder that there may be refinements to this overall preliminary design before the project is actually ready for construction.

One additional precast product was added to the choices called "Precast CROWNSPAN culvert structures." This product is basically a very wide box culvert without a concrete bottom. The height of the Crownspan units varies from 2 to 12 ft (in 2-ft increments) and the width ranges from 16 ft to 40 ft (in increments of 2 to 4 ft). This product is used in situations where multiple boxes would normally be used. However, since multiple box structures many times prove to be maintenance problems with trees and trash collecting on the repeated vertical upstream members (where the multiple boxes are placed side by side), the Crownspan product provides an unobstructed open area for the stormwater to pass (minimal vertical members out in the channel). The hydraulic efficiency of this section allows it to be narrower than a multiple box section of the same conveyance capacity. The cost-effective use of these structures proves out when multiple boxes can be replaced with a single unit. A product size other than the proposed dimensions could be evaluated during detailed design. The costs estimated for Crownspan structures were based on a square yard of bridge deck basis.

In most cases a traditional bridge section was estimated. Where improved open channels met an existing bridge structure or low water crossing, an evaluation was performed to determine the size required for a new bridge to provide the necessary conveyance. The proposed construction was divided into three categories depending on the type of work. "Bridge 1 - Large span over 25 feet" is assumed to be "poured in place" and the unit price includes all piling, deck, and subsidiary items required. Different unit costs were used based on the level of difficulty of the specific bridge application. "Bridge 2 - Small span under 25 feet" are for the more minor structures. "Bridge 3 – Modifications to existing structures" is an estimate of the minor modifications that could be needed to transition from the channel to the existing structure. The existing structure will not need to be removed or replaced. It should be noted that in the design Options where existing Low Water Crossings (LWC) are being replaced, the proposed design is to leave the roadway surface at the same existing elevation. There would be a deeper "pilot channel" created underneath thereby converting the LWC to a "bridge" structure, but in the high flow conditions, there would still be stormwater overtopping the driving surface. One of two things are suggested at this point. Either plan to construct some warning lights, horns, or gates to close off access to these LWC, or

plan to raise the driving surface of the LWC up to an elevation that would match the top of bank elevation. There still may be some water crossing over these "raised" bridges depending upon the 100-year floodplain elevation for that Option. The "probable cost" estimates presented herein would need to be increased for either of these scenarios.

There were several "basic sizes" of circular concrete pipe. Again, as with the concrete box culverts, during actual "final design" there may be a situation where some pipes could be required due to utility conflicts (for example) or to where one of the larger diameter structures could be replaced with a box culvert. The recommendations presented herein will provide the final design team with an initial estimate of the conveyance required for a particular reach.

Where the concrete box culverts and the concrete pipe bid items reflect the proposed systems "conveyance" the next bid items reflect the proposed systems "collection" requirements. Certainly the two need to be balanced and compatible for the entire system to function properly. The collection system was analyzed using the following three basic sizes: "Inlet-Single," "Inlet-Double," and "Inlet-Triple." The single inlet has a throat width of 5 ft and the "double" and "triple" are multiples of this base dimension. At this point in the design the quantity was assumed to be zero. As mentioned in the discussion about the boxes and the pipes, the intent is to simply provide an idea about the general "collection" capacity requirements for a particular watershed and an estimate of the construction funding required to provide that capacity.

Within the closed system design there may be needs for "drainage manholes (MH) or junction boxes (JB)." At this point in the design the quantity was assumed to be zero. Final design may reveal that an existing structure can simply be modified to accommodate a parallel pipe or another larger pipe without the need to totally build a new MH of JB structure in which case the cost estimate could be reduced. Similarly, at some point there will be a need for either a "Headwall - small" or a "Headwall - large" to allow the flow from the closed system to exit into the open channel system. Refinements and unique design structures can be evaluated during the final design phase.

For the closed system portion of the project around the bridge transitions some of the area could require new "Concrete Curb and Gutter." Some portions of the existing system will most likely be able to be reused and the new pipes may be placed toward the centerline of the street. However, in other sections the new structures may need to be placed under/near the existing curb dictating removal and replacement. In some situations stormwater may be able to be passed across a street section with the use of a "Concrete Valley Gutter" which is included as a reminder for the final design phase.

In closed system work around the bridges there was an estimate made for the number of "Remove & Replace Driveway" efforts that may be needed. Again, final design may reveal that there may be slightly more or less than this. Similarly, there was an assumption that the major sidewalks

around the bridges would not be damaged and that only the individual sidewalk segments extending perpendicular to the street could possibly be impacted. The pedestrian access points will most likely require new concrete sidewalks to be installed. One down along the channel, the pedestrian walkway will be more natural looking as a gravel train. "Sidewalk – soil amendment – hike and bike trail" will make use of existing granular base material and a non-toxic binding agent. The material is blended to a thickness of about four inches and then compacted in place. This method will make this shoulder area strong enough to resist erosion, yet natural in appearance. Again assuming that the majority of the work would take place out in the street ROW the need for "Chain Link Fence - 6 feet" would be minimal but could be needed in final design on a site by site basis. This quantity could be increased to address concerns of access from the public hike and bike trail up into nonpublic areas. Certainly, if a closed system project went down one side of a street, there would be a need for some work on a "Mailbox Assembly."

For final design, the contractor needs to be reminded about their responsibility to perform routine "Project Maintenance" as a subsidiary item to all others in the bid package. It is important to the safety of the citizens and the workers that this type of effort be monitored.

As discussed in Section 4, in the open channel design there may be a use for "Gabions" or "Reno Revetment Mattress" in the final design. These structures were included in areas where the existing gabion channel liner might be widened. Gabions also are used in areas that require steeper banks side slopes in order to provide the required conveyance. These design elements provide environmentally sensitive structures that allow for the exchange of stormwater and groundwater as well as providing a very "flexible" structure that can move and shift as needed to offset poor geotechnical conditions at a particular project site.

For the management of construction erosion and sedimentation there is a need to include the use of "Rock Berms" and "Silt Fence" in the project. The use of round flexible excelsior "logs" (approximately ten to twelve inches in diameter) in lieu of the standard vertical silt fence should be considered. The round products can be more easily moved along with the project as grading proceeds and seem to actually collect the sediment. Another environmental concern is the "Preservation of Trees (Type C)" along the creek corridors and along the urban streets. This will particularly be needed in the lower portions of the project through the Kokernut Lodge area and through the Golf Course. Once in the more urban section, the work will be down in the existing channel and the trees up along the street should not be impacted. This line item would provide for orange fencing along the circumference of the "drip line" of the tree to keep truck traffic away from the trunk and root zone. An allowance has been made for a "Capital Improvement Project Sign" for each project to inform the public of the contractors name and that the project is a part of the Alpine Creek improvements.

As discussed in previous sections, the proposed open channels designs included a "benched channel" concept with a "pilot channel." The original concept was either to preserve the low flow section of the existing channel (approximately 1 to 3 ft deep) or to armor it to maintain its shape and environmental importance. Although this shape cannot be achieved, the need for infiltration and exfiltration along these reaches still exists. This can be achieved by including a quantity for "Conlock II pavers" to serve as that armoring agent along the flow line of the trapezoidal channels. These square pavers are individual concrete sections varying in thickness of four, six, or eight inches. They are about 18 inches on a side with "dog ears" and "slot" sections (like a jig-saw puzzle piece) allowing for the individual pieces to articulate as needed. This system provides a combination of the necessary armoring yet still allows for the exchange of stormwater and groundwater in this "low flow" area, which is of interest to the permitting agencies. At this point in the design the quantity was assumed to be zero

The final item on the cost estimate is "Concrete Structures (drop, energy dissipation, special)" which could be needed at major bridge crossings, outlet works for detention basins, and in-line drop structures along the reach of a channel. At this point in the design the quantity was assumed to be zero

5.2 PROBABLE COST

Table 5.1 presents the "probable cost of construction" for Option B to be $4.8 million dollars. The project length ends downstream of the UPRR trestle. Including the final design and construction management services, the total project should be around $5.2 million. The construction is estimated to be near $710 per linear foot over the project length.

Table 5.2 presents the estimated construction cost for Option C to be $6.4 million dollars. Option C is equivalent to Option B below the UPRR tracks, but Option C extends further upstream and, therefore, has a larger total cost. Including the final design and construction management services, the total project should be around $6.9 million. The construction is estimated to be near $710 per linear foot over the project length due to the cost of LWC replacement in the upper reaches.

Table 5.3 presents the estimated construction cost for Option D to be $7.5 million dollars. Option D is a deeper channel section than either Option B or Option C. The overall length of Option D is equivalent to Option C. Including the final design and construction management services, the total project should be around $8.1 million. The construction is estimated to be near $830 per linear foot over the project length.

Table 5.4 presents the estimated construction cost for Option E to be $5.6 million dollars. The depth of cut is less than the other Options, yet its length is equivalent to Option C and Option D. Including the final design and construction management services, the total project should be around $6.1 million. The construction is estimated to be near $620 per linear foot over the project length.

CITY OF ALPINE
Alpine Creek Preliminary Design
Option C 5
Engineer's Estimate of Probable Cost (August 2001)

Item No	TxDOT Spec	TxDOT Descriptive Code	Item	Units	Unit $
1	100	none	Preparing Right of Way - General	LS	1.60%
2	100	none	Relocation of utilities gas telephone power others	LS	2.50%
3	500	501	Mobilization	LS	1.00%
4	502	none	Barricades Signs and Traffic Handling	LS	1.50%
5	100	??	Preparing Right of Way - Culvert Removal	LF	$85.00
6	100	??	Preparing Right of Way - Headwall Removal	LF	$20.00
7	104	520	Removing concrete (assume items not a part of general ROW prep)	SY	$8.00
8	110	502	Excavation (easy)	CY	$2.80
9	110		Excavation (hard)	CY	$5.00
10	132	516	Embankment - berms dikes detention basin dams	CY	$6.00
11	158	504	Specialized Excavation Work (hard to reach areas or as difficult)	CY	$7.00
12	160	506	Furnishing and Placing Topsoil (6 inches)	SY	$0.50
13	162	509	Block sod (St. Augustine)	SY	$2.00
14	164	511	Seeding for Erosion Control (to include fertilizer & watering subsidiary)	SY	$0.75
15	168	501	Soil Retention Blanket - Temporary (ECRM) (if shear under 3 psf) L/2	SY	$2.00
16	168	513	Soil Retention Blanket - Permanent (TRM) - (if shear over 3 psf) L/3	SY	$5.00
17	247	505	Flexible Base - assume 12" Thickness (maintenance access)	SY	$7.00
18	340	none	HMAC Type D - assume 2" Thickness (maintenance access)	SY	$6.00
19	400	501	Excavation and Backfill for Structures (headwalls, junction boxes)	CY	$4.50
20	402	501	Trench Safety Protection	LF	$1.25
21	423	506	Retaining walls (cast in place) (pedestrian safety wall)	SF	$18.00
22	423		Retaining walls (modular block wall) (2 ft extended toe) (normal falls)	SF	$25.00
23	423		Retaining walls (modular block wall) (2 ft extended toe) (difficult falls)	SF	$35.00
24	432	507	Riprap - Stone (Channel) (assume 18" thick, large random boulders)	SY	$6.00
25	441	none	Steel Structures (pedestrian hand rails others)	EA	$1,500.00
26	441	none	Steel Structures (park benches, trash cans, accessories)	EA	$2,000.00
27	462	508	Concrete Box Culverts - 5 x 5	LF	$185.00
28	462	518	Concrete Box Culverts - 6 x 6	LF	$245.00
29	462	523	Concrete Box Culverts - 8 x 5	LF	$308.00
30	462	532	Concrete Box Culverts - 8 x 7	LF	$420.00
31	462	??	Concrete Box Culverts - 12 x 6	LF	$665.00
32	462	??	Concrete Box Culverts - 12 x 8	LF	$760.00
33	Special 4308	none	Precast CROWNSPAN culvert structures (assume 24 x 6)	LF	$750.00
34	422	501	Bridge 1 - Crownspan - Large Span (span > 25 LF)	SF	$35.00
35	422	501	Bridge 2 - Crownspan - Small Span (span <= 25 LF)	SF	$30.00
36	422	501	Bridge 3 - Modifications to existing structures (nothing major)	SF	$40.00
37	464	505	RCP - Class III - 24"	LF	$40.00
38	464	508	RCP - Class III - 36"	LF	$50.00
39	464	510	RCP - Class III - 42"	LF	$70.00
40	464	511	RCP - Class III - 48"	LF	$80.00
41	464	512	RCP - Class III - 54"	LF	$120.00
42	464	513	RCP - Class III - 60"	LF	$150.00
43	464	514	RCP - Class III - 66"	LF	$175.00
44	464	515	RCP - Class III - 72"	LF	$200.00
45	464	516	RCP - Class III - 78"	LF	$225.00
46	464	517	RCP - Class III - 84"	LF	$275.00
47	464	518	RCP - Class III - 96"	LF	$325.00
48	465	547	Inlet - Single	EA	$7,000.00
49	465	548	Inlet - Double	EA	$10,000.00
50	465	549	Inlet - Triple	EA	$13,000.00
51	465	538	Drainage Manhole	EA	$5,000.00
52	466	501	Headwall - small	EA	$2,500.00
53	466	501	Headwall - large	EA	$5,000.00
54	529	511	Concrete Curb and Gutter	LF	$6.50
55	529	521	Concrete Valley Gutter	LF	$10.00
56	530	604	Remove & Replace Driveway	EA	$3,000.00
57	531	502	Sidewalk (concrete) (pedestrian access points)	SY	$27.00
58	531		Sidewalk - soil amendment (hike and bike trail) (4" on top of TRM)	SY	$5.00
59	550	501	Chain Link Fence - 6ft (assume 10% of total project)	LF	$10.00
60	580	501	Mailbox Assembly	EA	$400.00
61	580	none	Project Maintenance (subsidiary)		
62	LGA 5xx	none	Gabions	CY	$130.00
63	LGA 584 m	none	Reno Revetment Mattress	CY	$150.00
64	639	none	Rock Berm (construction ESC) (assume 10% of total project)	LF	$10.00
65	642	none	Silt Fence (construction) (assume 33% of total project)	LF	$2.50
66	1610	none	Preservation of Trees (Type C)	EA	$100.00
67	802 A	none	Capital Improvement Project Sign	LS	$800.00
68	Special	none	Contech Flexamat	SY	$27.00
69	420	none	Concrete Structures (drop energy dissipation special)	EA	$20,000.00
70	Special	none	Geogrid Gravel	SY	$5.00
			TOTAL ESTIMATED CONSTRUCTION (subject to revision)		
			FINAL DESIGN		7.0%
			CONSTRUCTION MANAGEMENT		1.5%
			TOTAL ESTIMATED PROJECT COST (subject to revision)		
			Construction Cost Per Linear Foot		
			Total Project Cost Per Linear Foot		

Item No	Reach 1 Hendrix Street Kokernot Lodge Area Quantity	Reach 1 Sheet $	Reach 2 Golf Course to Second Street Quantity	Reach 2 Sheet $	Reach 3 Second Street to Brown Ave Quantity	Reach 3 Sheet $	Reach 4 Brown Ave to West Ave A Quantity	Reach 4 Sheet $
7					1,222	$9,776		
8	109,315	$306,082	41,867	$117,294				
9					15,838	$79,190	11,447	$57,235
12	78,626	$39,313	39,160	$19,580				
14	78,626	$58,970	39,160	$29,370	727	$545	813	$610
15	19,656	$39,312	9,790	$19,580	727	$1,454	813	$1,626
16	26,283	$131,415	76,362	$381,810	1,691	$8,455	2,113	$10,565
17					61	$427		
18					833	$4,998		
20					655	$819	732	$915
21					3,927	$70,686	4,389	$79,002
22					17,017	$425,425	13,167	$329,175
24			1,305	$7,830	582	$3,492	650	$3,900
25			4	$6,000				
26	2	$4,000			1	$2,000	1	$2,000
32			13	$9,880				
34					4,400	$154,000		
36							1,320	$52,800
53			2	$10,000				
57	550	$14,850	196	$5,292				
58	2,022	$10,110			1,454	$7,270	1,626	$8,130
59	330	$3,300			65	$650	73	$730
62	165	$21,450						
64	202	$2,020	147	$1,470	65	$650	73	$730
65	674	$1,685	490	$1,225	218	$545	244	$610
66	33	$3,300	17	$1,700				
TOTAL ESTIMATED CONSTRUCTION		$635,807		$611,021		$771,387		$548,028
FINAL DESIGN		$ 44,506		$ 42,771		$ 53,997		$ 38,362
CONSTRUCTION MANAGEMENT		$ 9,537		$ 9,165		$ 11,571		$ 8,220
TOTAL ESTIMATED PROJECT COST		$ 689,850		$ 662,957		$ 836,955		$ 594,610
Construction Cost Per Linear Foot		$ 346		$ 458		$ 1,296		$ 824
Total Project Cost Per Linear Foot		$ 375		$ 497		$ 1,407		$ 894

Item No	Reach 5 Avenue A to 5th Street Quantity	Reach 5 Sheet $	Reach 6 5th Street to 6th Street Quantity	Reach 6 Sheet $	Reach 7 6th Street to W Ave D (Sul Ross) Quantity	Reach 7 Sheet $	Reach 8 W Ave D (Sul Ross) to West Ave E Quantity	Reach 8 Sheet $
5	55	$4,675						
6	55	$1,100	66	$1,320				
7	489	$3,912			489	$3,912	489	$3,912
9	5,247	$26,235	5,059	$25,295	6,262	$31,310	3,202	$16,010
14	332	$249	455	$341	774	$581	672	$504
15	332	$664	455	$910	774	$1,548	672	$1,344
16	864	$4,320	1,162	$5,810	2,012	$10,060	1,748	$8,740
17			61	$427				
18			833	$4,998				
20	299	$374	409	$511	696	$870	605	$756
21	1,795	$32,310	2,455	$44,190	4,178	$75,204	3,630	$65,340
22	4,787	$119,675	6,547	$163,675				
23					9,748	$341,180	4,840	$169,400
24	266	$1,596	364	$2,184	619	$3,714	538	$3,228
25			1	$1,500				
26	1	$2,000	1	$2,000	1	$2,000	1	$2,000
34	4,400	$154,000			4,400	$154,000		
35							770	$23,100
36			1,210	$48,400			770	$30,800
57			49	$1,323				
58	665	$3,325	909	$4,545	1,547	$7,735	1,344	$6,720
59	30	$300	41	$410	70	$700	61	$610
64	30	$300	41	$410	70	$700	61	$610
65	100	$250	136	$340	232	$580	202	$505
TOTAL ESTIMATED CONSTRUCTION		$355,285		$308,890		$634,094		$333,579
FINAL DESIGN		$ 24,870		$ 21,606		$ 44,387		$ 23,351
CONSTRUCTION MANAGEMENT		$ 5,329		$ 4,630		$ 9,511		$ 5,004
TOTAL ESTIMATED PROJECT COST		$ 385,484		$ 334,926		$ 687,991		$ 361,935
Construction Cost Per Linear Foot		$ 1,306		$ 530		$ 1,002		$ 607
Total Project Cost Per Linear Foot		$ 1,417		$ 600		$ 1,087		$ 656

Item No	Reach 9 W Ave E to Holland Avenue Quantity	Reach 9 Sheet $	Reach 10 Holland Ave to UP RR Trestle Quantity	Reach 10 Sheet $	Reach 11 UP RR Trestle to Murphy Street Quantity	Reach 11 Sheet $	Reach 12 Murphy Street to 10th Street Quantity	Reach 12 Sheet $
7							444	$3,552
9	1,510	$7,550	1,136	$5,680	1,804	$9,020	2,798	$13,990
14	348	$261	293	$220	244	$183	342	$257
15	348	$696	293	$586	244	$488	342	$684
16	906	$4,530	763	$3,815	636	$3,180	890	$4,450
17	61	$427					61	$427
18	833	$4,998					833	$4,998
20	314	$393	264	$330	220	$275	308	$385
21	1,881	$33,858	1,584	$28,512	1,320	$23,760	1,848	$33,264
22			2,112	$52,800	1,320	$33,000	3,080	$77,000
23	1,881	$65,835						
24	279	$1,674	235	$1,410	196	$1,176	274	$1,644
25	1	$1,500					1	$1,500
26	1	$2,000	1	$2,000	1	$2,000	1	$2,000
34			4,400	$154,000			4,400	$154,000
36	660	$26,400	770	$30,800	660	$26,400		
57	49	$1,323					49	$1,323
58	697	$3,485	583	$2,915	489	$2,445	684	$3,420
59	31	$310	26	$260	22	$220	31	$310
64	31	$310	26	$260	22	$220	31	$310
65	105	$263	88	$220	73	$183	103	$258
TOTAL ESTIMATED CONSTRUCTION		$155,812		$283,828		$102,550		$303,775
FINAL DESIGN		$ 10,907		$ 19,868		$ 7,178		$ 21,264
CONSTRUCTION MANAGEMENT		$ 2,337		$ 4,257		$ 1,538		$ 4,557
TOTAL ESTIMATED PROJECT COST		$ 169,056		$ 307,953		$ 111,266		$ 329,595
Construction Cost Per Linear Foot		$ 547		$ 1,183		$ 513		$ 1,065
Total Project Cost Per Linear Foot		$ 593		$ 1,283		$ 556		$ 1,177

Item No	Reach 13 10th Street to 11th Street Quantity	Reach 13 Sheet $	Reach 14 11th Street to W Ave G Quantity	Reach 14 Sheet $	Reach 15 W Ave G to End of Study Quantity	Reach 15 Sheet $	Lump Sum Items Quantity	Lump Sum Sheet $	Alpine Creek Overall Project Quantity	Overall Total $
1							1	$107,137	1	$107,137
2							1	$148,801	1	$148,801
3							1	$59,520	1	$59,520
4							1	$89,281	1	$89,281
5									55	$4,675
6									121	$2,420
7									3,133	$25,064
8									151,202	$423,366
9	3,875	$19,375	[illegible]	[illegible]	2,727	$13,635			62,846	$314,230
12									117,786	$58,893
14	672	$504	562	[illegible]	868	$651			[illegible]	[illegible]
15	672	$1,344	562	$1,124	868	$1,736			36,544	$73,088
16	1,748	$8,740	1,462	$7,310	2,256	$11,280			121,118	$608,580
17	61	$427			61	$427			366	$2,562
18	833	$4,998			833	$4,998			4,998	$29,988
20	605	$756	[illegible]	$633					5,613	$7,016
21	3,630	$65,340	[illegible]	$54,648	4,686	$84,348			50,359	$890,462
22	6,050	$151,250	5,060	$126,500	3,124	$78,100			62,264	$1,556,600
23									16,469	$576,415
24	538	$3,228	450	$2,700	694	$4,164			6,990	$41,940
25	1	$1,500			1	$1,500			9	$13,500
26	1	$2,000	1	$2,000	1	$2,000			15	$30,000
32									13	$9,880
34	4,400	$154,000							26,400	$924,000
35									770	$23,100
36			880	$35,200	550	$22,000			6,820	$272,800
53									2	$10,000
57	49	$1,323			49	[illegible]			991	$26,757
58	1,344	$6,720	[illegible]	[illegible]	1,736	$8,680			16,228	$81,140
59	61	$610	[illegible]	[illegible]	78	$780			970	$9,700
62									165	$21,450
64	61	$610	[illegible]	[illegible]	78	$780			988	$9,880
65	202	$505	165	[illegible]	260	$650			3,296	$8,240
66									50	$5,000
67							1	$800	1	$800
TOTAL ESTIMATED CONSTRUCTION		$423,230		$247,299		$237,05[illegible]		$405,338		$6,356,772 / $6,356,772
FINAL DESIGN		$ 29,626		$ 17,311		$ 16,594		$ 28,374		$444,974
CONSTRUCTION MANAGEMENT		$ 6,348		$ 3,709		$ 558		$ 6,080		$95,352
TOTAL ESTIMATED PROJECT COST		$ 459,205		$ 268,319		$ [illegible]7,201		$ 439,792		$6,887,097
Construction Cost Per Linear Foot		$ 770		$ 538		$ 334				$ 707
Total Project Cost Per Linear Foot		$ 835		$ 583		$ 367				$ 766

CITY OF ALPINE
Alpine Creek - Preliminary Design
Option D 6
Engineer's Estimate of Probable Cost (August 2001)

Item No.	TxDOT Spec	TxDOT Code	Item	Units	Unit $
1	100	none	Preparing Right of Way - General	LS	1.80%
2	100	none	Relocation of utilities - gas, telephone, power, others	LS	2.50%
3	500	501	Mobilization	LS	1.00%
4	502	none	Barricades, Signs and Traffic Handling	LS	1.50%
5	100	77	Preparing Right of Way - Culvert Removal	LF	$85.00
6	100	77	Preparing Right of Way - Headwall Removal	LF	$20.00
7	104	520	Removing concrete (unusual items not a part of general ROW prep)	SY	$8.00
8	110	502	Excavation (easy)	CY	$2.80
9	110		Excavation (hard)	CY	$5.00
10	132	518	Embankment - berms, dikes, detention basin dams	CY	$4.00
11	158	504	Specialized Excavation Work (hard to reach areas, more difficult)	CY	$7.00
12	160	508	Furnishing and Placing Topsoil (6 inches)	SY	$0.50
13	162	509	Block sod (St. Augustine)	SY	$2.00
14	164	511	Seeding for Erosion Control (to include fertilizer & watering, subsidiary)	SY	$0.75
15	169	501	Soil Retention Blanket - Temporary (ECRM) - (if shear under 3 psf) L/2	SY	$2.00
16	169	513	Soil Retention Blanket - Permanent (TRM) - (if shear over 3 psf) L/3	SY	$5.00
17	247	505	Flexible Base - assume 12" Thickness (maintenance access)	SY	$7.00
18	340	none	HMAC - Type D - assume 2" Thickness (maintenance access)	SY	$6.00
19	400	501	Excavation and Backfill for Structures (headwalls, junction boxes)	CY	$4.50
20	402	501	Trench Safety Protection	LF	$1.25
21	423	508	Retaining walls (cast in place) (pedestrian safety wall)	SF	$18.00
22	423		Retaining walls (modular block wall) (2 ft extended toe) (normal falls)	SF	$25.00
23	423		Retaining walls (modular block wall) (2 ft extended toe) (difficult falls)	SF	$35.00
24	432	507	Riprap - Stone (Channel) (assume 18" thick, large random boulders)	SY	$6.00
25	441	none	Steel Structures (pedestrian hand rails, others)	EA	$1,500.00
26	441	none	Steel Structures (park benches, trash cans, accessories)	EA	$2,000.00
27	462	509	Concrete Box Culverts - 5 x 5	LF	$185.00
28	462	516	Concrete Box Culverts - 6 x 6	LF	$249.00
29	462	523	Concrete Box Culverts - 8 x 5	LF	$305.00
30	462	532	Concrete Box Culverts - 9 x 7	LF	$430.00
31	462	77	Concrete Box Culverts - 12 x 6	LF	$665.00
32	462	77	Concrete Box Culverts - 12 x 8	LF	$760.00
33	Special 4306	none	Precast CROWNSPAN culvert structures (assume 24 x 8)	LF	$730.00
34	422	501	Bridge 1 - Crownspan - Large Span (span > 25 LF)	SF	$35.00
35	422	501	Bridge 2 - Crownspan - Small Span (span <= 25 LF)	SF	$30.00
36	422	501	Bridge 3 - Modifications to existing structures (nothing major)	SF	$40.00
37	464	505	RCP - Class III - 24"	LF	$40.00
38	464	508	RCP - Class III - 30"	LF	$50.00
39	464	510	RCP - Class III - 42"	LF	$70.00
40	464	511	RCP - Class III - 48"	LF	$80.00
41	464	512	RCP - Class III - 54"	LF	$120.00
42	464	513	RCP - Class III - 60"	LF	$150.00
43	464	514	RCP - Class III - 66"	LF	$175.00
44	464	515	RCP - Class III - 72"	LF	$200.00
45	464	516	RCP - Class III - 78"	LF	$225.00
46	464	517	RCP - Class III - 84"	LF	$275.00
47	464	518	RCP - Class III - 90"	LF	$325.00
48	465	547	Inlet - Single	EA	$7,000.00
49	465	548	Inlet - Double	EA	$10,000.00
50	465	549	Inlet - Triple	EA	$13,000.00
51	465	538	Drainage Manhole	EA	$5,000.00
52	466	501	Headwall - small	EA	$2,500.00
53	466	501	Headwall - large	EA	$5,000.00
54	529	511	Concrete Curb and Gutter	LF	$8.50
55	529	521	Concrete Valley Gutter	LF	$10.00
56	530	604	Remove & Replace Driveway	EA	$2,000.00
57	531	502	Sidewalk (concrete) (pedestrian access points)	SY	$27.00
58	531		Sidewalk - soil amendment (hike and bike trail) (4" ontop of TRM)	SY	$5.00
59	550	501	Chain Link Fence - 6ft (assume 10% of total project L)	LF	$10.00
60	560	501	Mailbox Assembly	EA	$400.00
61	560	none	Project Maintenance (subsidiary)		
62	COA 564	none	Gabions	CY	$130.00
63	COA 564 B	none	Reno Revetment Mattress	CY	$150.00
64	538	none	Rock Berm (construction ESC) (assume 10% of total project L)	LF	$10.00
65	542	none	Silt Fence (coir logs) (assume 33% of total project L)	LF	$2.50
66	1610	none	Preservation of Trees (Type C)	EA	$100.00
67	802 A	none	Capital Improvement Project Sign	LS	$600.00
68	Special	none	Conlock II pavers	SY	$27.00
69	420	none	Concrete Structures (drop, energy dissipation, special)	EA	$20,000.00
70	Special	none	Geogrid Base	SY	$5.00
			TOTAL ESTIMATED CONSTRUCTION (subject to revision)		
			FINAL DESIGN		7.0%
			CONSTRUCTION MANAGEMENT		1.5%
			TOTAL ESTIMATED PROJECT COST (subject to revision)		
			Construction Cost Per Linear Foot		
			Total Project Cost Per Linear Foot		

Item No.	Reach 1 Hendrix Street Kokernot Lodge Area Quantity	Reach 1 Sheet $	Reach 2 Golf Course to Second Street Quantity	Reach 2 Sheet $	Reach 3 Second Street to Brown Ave Quantity	Reach 3 Sheet $	Reach 4 Brown Ave to West Ave A Quantity	Reach 4 Sheet $	Reach 5 Avenue A to 5th Street Quantity	Reach 5 Sheet $
5									55	$4,675
6									55	$1,100
7					1,222	$9,776			489	$3,912
8	109,315	$306,082	42,081	$117,827						
9					14,046	$70,230	11,089	$55,445	6,304	$31,520
12	78,626	$39,313	39,160	$19,580						
14	78,626	$58,970	39,160	$29,370	727	$545	813	$610	332	$249
15	19,656	$39,312	9,790	$19,580	727	$1,454	813	$1,626	332	$664
16	26,283	$131,415	76,382	$381,910	1,891	$9,455	2,113	$10,565	864	$4,320
17					61	$427				
18					833	$4,998				
20					655	$819	732	$915	299	$374
21					3,927	$70,686	4,389	$79,002	1,795	$32,310
22					17,017	$425,425	13,167	$329,175	5,386	$134,650
24			1,306	$7,836	582	$3,492	650	$3,900	260	$1,560
25			4	$6,000						
26	2	$4,000			1	$2,000	1	$2,000	1	$2,000
32			13	$9,880						
34					4,400	$154,000			4,400	$154,000
36							1,320	$52,800		
53			2	$10,000						
57	550	$14,850	196	$5,292						
58	2,022	$10,110			1,454	$7,270	1,626	$8,130	665	$3,325
59	330	$3,300			65	$650	73	$730	30	$300
62	165	$21,450								
64	202	$2,020	147	$1,470	65	$650	73	$730	30	$300
65	674	$1,685	490	$1,225	218	$545	244	$610	100	$250
66	33	$3,300	17	$1,700						
TOTAL ESTIMATED CONSTRUCTION		$835,807		$811,584		$762,422		$548,238		$375,545
FINAL DESIGN		$ 44,508		$ 42,808		$ 53,370		$ 38,237		$ 26,288
CONSTRUCTION MANAGEMENT		$ 8,537		$ 8,173		$ 11,436		$ 8,104		$ 5,633
TOTAL ESTIMATED PROJECT COST		$ 889,850		$ 863,547		$ 827,228		$ 562,668		$ 407,466
Construction Cost Per Linear Foot		$ 346		$ 458		$ 1,281		$ 821		$ 1,381
Total Project Cost Per Linear Foot		$ 375		$ 497		$ 1,390		$ 881		$ 1,488

Item No.	Reach 6 5th Street to 6th Street Quantity	Reach 6 Sheet $	Reach 7 6th Street to W Ave D (Sul Ross) Quantity	Reach 7 Sheet $	Reach 8 W Ave D (Sul Ross) to West Ave E Quantity	Reach 8 Sheet $	Reach 9 W Ave E to Holland Avenue Quantity	Reach 9 Sheet $	Reach 10 Holland Ave to UP RR Trestle Quantity	Reach 10 Sheet $
6	66	$1,320								
7			489	$3,912	489	$3,912				
9	6,414	$32,070	8,842	$44,210	6,205	$31,025	3,289	$16,445	2,488	$12,440
14	455	$341	774	$581	672	$504	348	$261	293	$220
15	455	$910	774	$1,548	672	$1,344	348	$696	293	$586
16	1,162	$5,810	2,012	$10,060	1,748	$8,740	906	$4,530	763	$3,815
17	61	$427					61	$427		
18	833	$4,998					833	$4,998		
20	409	$511	696	$870	605	$756	314	$393	264	$330
21	2,455	$44,190	4,178	$75,204	3,630	$65,340	1,881	$33,858	1,584	$28,512
22	7,366	$184,150							3,696	$92,400
23			13,926	$487,410	8,470	$296,450	3,135	$109,725		
24	364	$2,184	619	$3,714	538	$3,228	279	$1,674	235	$1,410
25	1	$1,500					1	$1,500		
26	1	$2,000	1	$2,000	1	$2,000	1	$2,000	1	$2,000
34			4,400	$154,000	4,400	$154,000	2,200	$77,000	4,400	$154,000
36	1,320	$52,800			1,100	$44,000	880	$35,200	1,100	$44,000
57	49	$1,323					49	$1,323		
58	909	$4,545	1,547	$7,735	1,744	$8,720	697	$3,485	587	$2,935
59	41	$410	70	$700	61	$610	31	$310	26	$260
64	41	$410	70	$700	61	$610	31	$310	26	$260
65	136	$340	212	$530	202	$505	105	$263	88	$220
TOTAL ESTIMATED CONSTRUCTION		$340,340		$793,224		$619,744		$294,387		$343,388
FINAL DESIGN		$ 23,824		$ 55,526		$ 43,382		$ 20,608		$ 24,037
CONSTRUCTION MANAGEMENT		$ 5,105		$ 11,898		$ 9,296		$ 4,416		$ 5,151
TOTAL ESTIMATED PROJECT COST		$ 369,268		$ 860,647		$ 672,423		$ 319,421		$ 372,576
Construction Cost Per Linear Foot		$ 915		$ 1,253		$ 1,127		$ 1,033		$ 1,431
Total Project Cost Per Linear Foot		$ 993		$ 1,360		$ 1,223		$ 1,121		$ 1,552

Item No.	Reach 11 UP RR Trestle to Murphy Street Quantity	Reach 11 Sheet $	Reach 12 Murphy Street to 10th Street Quantity	Reach 12 Sheet $	Reach 13 10th Street to 11th Street Quantity	Reach 13 Sheet $	Reach 14 11th Street to W Ave G Quantity	Reach 14 Sheet $	Reach 15 W Ave G to end of Study Quantity	Reach 15 Sheet $
7			444	$3,552						
9	3,405	$17,025	4,766	$23,830	6,661	$33,305	3,476	$17,380	3,870	$19,350
14	244	$183	342	$257	672	$504	562	$422	868	$651
15	244	$488	342	$684	672	$1,344	562	$1,124	868	$1,736
16	636	$3,180	890	$4,450	1,748	$8,740	1,462	$7,310	2,256	$11,280
17			61	$427	61	$427			61	$427
18			833	$4,998	833	$4,998			833	$4,998
20	220	$275	308	$385	605	$756	506	$633	781	$976
21	1,320	$23,760	1,848	$33,264	3,630	$65,340	3,036	$54,648	4,686	$84,348
22	2,200	$55,000	4,312	$107,800	8,470	$211,750	4,048	$101,200	7,810	$195,250
24	196	$1,176	274	$1,644	538	$3,228	450	$2,700	694	$4,164
25			1	$1,500	1	$1,500			1	$1,500
26	1	$2,000	1	$2,000	1	$2,000	1	$2,000	1	$2,000
34	2,200	$77,000	4,400	$154,000	4,400	$154,000				
36	880	$35,200					770	$30,800	880	$35,200
57			49	$1,323	49	$1,323			49	$1,323
58	489	$2,445	694	$3,470	1,544	$7,720	1,124	$5,620	1,736	$8,680
59	22	$220	31	$310	61	$610	51	$510	76	$760
64	22	$220	31	$310	61	$610	51	$510	76	$760
65	73	$183	101	$253	202	$505	163	$413	260	$650
TOTAL ESTIMATED CONSTRUCTION		$218,355		$344,415		$497,660		$225,279		$374,083
FINAL DESIGN		$ 15,285		$ 24,109		$ 34,836		$ 15,769		$ 26,187
CONSTRUCTION MANAGEMENT		$ 3,275		$ 5,166		$ 7,465		$ 3,379		$ 5,611
TOTAL ESTIMATED PROJECT COST		$ 236,915		$ 373,690		$ 539,961		$ 244,427		$ 405,881
Construction Cost Per Linear Foot		$ 1,092		$ 1,210		$ 905		$ 490		$ 527
Total Project Cost Per Linear Foot		$ 1,185		$ 1,335		$ 982		$ 531		$ 572

Item No.	Lump Sum Items Quantity	Lump Sum Items Sheet $	Alpine Creek Overall Project Quantity	Alpine Creek Overall Project Total $
1	1	$125,695	1	$125,695
2	1	$174,577	1	$174,577
3	1	$69,831	1	$69,831
4	1	$104,746	1	$104,746
5			55	$4,675
6			121	$2,420
7			3,133	$25,064
8			151,396	$423,908
9			80,855	$404,275
12			117,786	$58,893
14			124,666	$93,500
15			36,540	$73,080
16			121,116	$605,580
17			366	$2,562
18			4,998	$29,988
20			6,394	$7,993
21			36,350	$660,462
22			73,477	$1,836,925
23			25,531	$893,585
24			6,880	$41,...
25			9	$13,500
26			15	$30,000
32			13	$9,880
34			35,200	$1,232,000
36			8,250	$330,000
53			2	$10,000
57			991	$26,757
58			16,228	$81,140
59			970	$9,700
62			165	$21,450
64			989	$9,890
65			3,296	$8,240
66			50	$5,000
67	1	$600	1	$600
TOTAL ESTIMATED CONSTRUCTION		$475,446		$7,457,818 / $7,457,818
FINAL DESIGN		$ 33,281		$522,054
CONSTRUCTION MANAGEMENT		$ 7,132		$111,868
TOTAL ESTIMATED PROJECT COST		$ 515,862		$8,091,838
Construction Cost Per Linear Foot				$ 830
Total Project Cost Per Linear Foot				$ 901

TABLE 5.3
Probable Cost of Construction
Option D

CITY OF ALPINE
Alpine Creek - Preliminary Design
Option E 5
Engineer's Estimate of Probable Cost (August 2001)

Item No.	TxDOT Spec	TxDOT Description Code	Item	Units	Unit $
1	100	none	Preparing Right of Way - General	LS	1.80%
2	100	none	Relocation of utilities - gas, telephone, power, others	LS	2.50%
3	500	501	Mobilization	LS	1.00%
4	502	none	Barricades, Signs and Traffic Handling	LS	1.50%
5	100	??	Preparing Right of Way - Culvert Removal	LF	$45.00
6	100	??	Preparing Right of Way - Headwall Removal	LF	$20.00
7	104	520	Removing concrete (unusual items not a part of general R-O-W prep)	SY	$8.00
8	110	502	Excavation (easy)	CY	$2.80
9	110		Excavation (hard)	CY	$5.00
10	132	518	Embankment - berms, dikes, detention basin dams	CY	$8.00
11	158	504	Specialized Excavation Work (hard to reach areas, more difficult)	CY	$7.00
12	160	506	Furnishing and Placing Topsoil (6 inches)	SY	$0.50
13	162	508	Block sod (St. Augustine)	SY	$2.00
14	164	511	Seeding for Erosion Control (to include fertilizer & watering, subsidiary)	SY	$0.75
15	169	501	Soil Retention Blanket - Temporary (ECRM) - (if shear under 3 psf) L/2	SY	$2.00
16	169	513	Soil Retention Blanket - Permanent (TRM) - (if shear over 3 psf) L/3	SY	$5.00
17	247	505	Flexible Base - assume 12" Thickness (maintenance access)	SY	$7.00
18	340	none	HMAC - Type D - assume 2" Thickness (maintenance access)	SY	$6.00
19	400	501	Excavation and backfill for Structures (headwalls, junction boxes)	CY	$4.50
20	402	501	Trench Safety Protection	LF	$1.25
21	423	506	Retaining walls (cast in place) (pedestrian safety wall)	SF	$18.00
22	423		Retaining walls (modular block wall) (2 ft extended toe) (normal tails)	SF	$25.00
23	423		Retaining walls (modular block wall) (2 ft extended toe) (difficult tails)	SF	$35.00
24	432	507	Riprap - Stone (Channel) (assume 18" thick, large random boulders)	SY	$6.00
25	441	none	Steel Structures (pedestrian hand rails, others)	EA	$1,500.00
26	441	none	Steel Structures (park benches, trash cans, accessories)	EA	$2,000.00
27	462	508	Concrete Box Culverts - 5 x 5	LF	$185.00
28	462	516	Concrete Box Culverts - 6 x 6	LF	$245.00
29	462	523	Concrete Box Culverts - 8 x 5	LF	$305.00
30	462	532	Concrete Box Culverts - 9 x 7	LF	$420.00
31	462	??	Concrete Box Culverts - 12 x 6	LF	$660.00
32	462	??	Concrete Box Culverts - 12 x 8	LF	$760.00
33	Special 4300	none	Precast CROWNSPAN culvert structures (assume 24 x 8)	LF	$750.00
34	422	501	Bridge 1 - Crownspan - Large Span (span > 25 LF)	SF	$35.00
35	422	501	Bridge 2 - Crownspan - Small Span (span <= 25 LF)	SF	$30.00
36	422	501	Bridge 3 - Modifications to existing structures (nothing major)	SF	$40.00
37	464	505	RCP - Class III - 24"	LF	$40.00
38	464	508	RCP - Class III - 30"	LF	$50.00
39	464	510	RCP - Class III - 42"	LF	$70.00
40	464	511	RCP - Class III - 48"	LF	$80.00
41	464	512	RCP - Class III - 54"	LF	$120.00
42	464	513	RCP - Class III - 60"	LF	$150.00
43	464	514	RCP - Class III - 66"	LF	$175.00
44	464	515	RCP - Class III - 72"	LF	$200.00
45	464	516	RCP - Class III - 78"	LF	$225.00
46	464	517	RCP - Class III - 84"	LF	$275.00
47	464	518	RCP - Class III - 90"	LF	$325.00
48	465	547	Inlet - Single	EA	$7,000.00
49	465	548	Inlet - Double	EA	$10,000.00
50	465	549	Inlet - Triple	EA	$13,000.00
51	465	538	Drainage MH or JB	EA	$5,000.00
52	466	501	Headwall - small	EA	$2,500.00
53	466	501	Headwall - large	EA	$5,000.00
54	529	511	Concrete Curb and Gutter	LF	$8.50
55	529	521	Concrete Valley Gutter	LF	$10.00
56	530	504	Remove & Replace Driveway	EA	$3,000.00
57	531	502	Sidewalk (concrete) (pedestrian access points)	SY	$27.00
58	531		Sidewalk - soil amendment (hike and bike trail) (4" on top of TRM)	SY	$5.00
59	550	501	Chain Link Fence - 6ft (assume 10% of total project L)	LF	$10.00
60	560	501	Mailbox Assembly	EA	$400.00
61	560	none	Project Maintenance (subsidiary)		
62	COA 594	none	Gabions	CY	$130.00
63	COA 594 B	none	Reno Revetment Mattress	CY	$150.00
64	638	none	Rock Berm (construction ESC) (assume 10% of total project L)	LF	$10.00
65	642	none	Silt Fence (curlex logs) (assume 33% of total project L)	LF	$2.50
66	1610	none	Preservation of Trees (Type C)	EA	$100.00
67	802 A	none	Capital Improvement Project Sign	LS	$600.00
68	Special	none	Conlock II pavers	SY	$27.00
69	420	none	Concrete Structures (drop, energy dissipation, special)	EA	$20,000.00
70	Special	none	Geogrid Based	SY	$5.00
			TOTAL ESTIMATED CONSTRUCTION (subject to revision)		
			FINAL DESIGN		7.0%
			CONSTRUCTION MANAGEMENT		1.5%
			TOTAL ESTIMATED PROJECT COST (subject to revision)		
			Construction Cost Per Linear Foot		
			Total Project Cost Per Linear Foot		

Item No.	Reach 1 Hendrix Street Rotational Lodge Area Quantity	Reach 1 Sheet $	Reach 2 Golf Course to Second Street Quantity	Reach 2 Sheet $	Reach 3 Second Street to Brown Ave Quantity	Reach 3 Sheet $	Reach 4 Brown Ave to West Ave A Quantity	Reach 4 Sheet $	Reach 5 Avenue A to 5th Street Quantity	Reach 5 Sheet $
1										
2										
3										
4										
5									55	$4,875
6									55	$1,100
7					1,222	$9,776			489	$3,912
8	108,315	$303,282	40,869	$114,433						
9					5,204	$26,020	4,276	$21,380	3,132	$15,660
10										
11										
12	78,626	$39,313	39,160	$19,580						
13										
14	78,626	$58,970	39,160	$29,370	727	$545	813	$610	332	$249
15	19,656	$39,312	9,790	$19,580	727	$1,454	813	$1,626	332	$664
16	26,283	$131,415	76,362	$381,810	1,891	$9,455	2,113	$10,565	864	$4,320
17					61	$427				
18					833	$4,998				
19										
20					735	$919	732	$915	299	$374
21					3,927	$70,686	4,389	$79,002	1,795	$32,310
22					9,163	$229,075	7,315	$182,875	2,992	$74,800
23										
24			1,305	$7,830	582	$3,492	650	$3,900	250	$1,500
25			4	$6,000						
26	2	$4,000			1	$2,000	1	$2,000	1	$2,000
27										
28										
29										
30										
31										
32			13	$9,880						
33										
34					4,400	$154,000			4,400	$154,000
35										
36							880	$35,200		
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										
53			2	$10,000						
54										
55										
56										
57	550	$14,850	196	$5,292						
58	2,022	$10,110			1,454	$7,270	1,626	$8,130	665	$3,325
59	330	$3,300			65	$650	73	$730	30	$300
60										
61										
62	165	$21,450								
63										
64	202	$2,020	147	$1,470	65	$650	73	$730	30	$300
65	674	$1,685	490	$1,225	218	$545	244	$610	100	$250
66	33	$3,300	17	$1,700						
67										
68										
69										
70										
TOTAL ESTIMATED CONSTRUCTION		$635,807		$608,170		$521,862		$348,273		$299,835
FINAL DESIGN		$ 44,506		$ 42,572		$ 36,530		$ 24,379		$ 20,988
CONSTRUCTION MANAGEMENT		$ 9,537		$ 9,123		$ 7,828		$ 5,224		$ 4,498
TOTAL ESTIMATED PROJECT COST		$ 689,850		$ 659,865		$ 566,220		$ 377,876		$ 325,321
Construction Cost Per Linear Foot		$ 346		$ 456		$ 877		$ 524		$ 1,102
Total Project Cost Per Linear Foot		$ 375		$ 494		$ 952		$ 568		$ 1,196

Item No.	Reach 6 5th Street to 6th Street Quantity	Reach 6 Sheet $	Reach 7 6th Street to W Ave D (Sul Ross) Quantity	Reach 7 Sheet $	Reach 8 W Ave D (Sul Ross) to West Ave E Quantity	Reach 8 Sheet $	Reach 9 W Ave E to Holland Avenue Quantity	Reach 9 Sheet $	Reach 10 Holland Ave to UP RR Trestle Quantity	Reach 10 Sheet $
1										
2										
3										
4										
5										
6	66	$1,320								
7			489	$3,912	489	$3,912				
8										
9	3,260	$16,300	4,169	$20,845	1,659	$8,295	1,202	$6,010		
10										
11										
12										
13										
14	455	$341	774	$581	672	$504	348	$261	293	$220
15	455	$910	774	$1,548	672	$1,344	348	$696	293	$586
16	1,162	$5,810	2,012	$10,060	1,748	$8,740	906	$4,530	763	$3,815
17	61	$427					61	$427		
18	833	$4,998					833	$4,998		
19										
20	409	$511	696	$870	606	$758	314	$393		
21	2,455	$44,190	4,178	$75,204	3,630	$65,340	1,881	$33,858	1,584	$28,512
22	4,910	$122,750							1,056	$26,400
23			6,356	$262,460	4,840	$169,400	1,881	$65,835		
24	364	$2,184	619	$3,714	538	$3,228	279	$1,674	235	$1,410
25	1	$1,500					1	$1,500		
26	1	$2,000	1	$2,000	1	$2,000	1	$2,000	1	$2,000
27										
28										
29										
30										
31										
32										
33										
34			4,400	$154,000	4,400	$154,000				
35										
36	990	$39,600			770	$30,800	660	$26,400	550	$22,000
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										
57	49	$1,323					49	$1,323		
58	909	$4,545	1,547	$7,735	1,344	$6,720	697	$3,485	587	$2,935
59	41	$410	70	$700	61	$610	31	$310	26	$260
60										
61										
62										
63										
64	41	$410	70	$700	61	$610	31	$310	26	$260
65	136	$340	232	$580	202	$505	105	$263	88	$220
66										
67										
68										
69										
70										
TOTAL ESTIMATED CONSTRUCTION		$249,970		$574,909		$456,764		$154,272		$88,618
FINAL DESIGN		$ 17,498		$ 40,244		$ 31,973		$ 10,799		$ 6,203
CONSTRUCTION MANAGEMENT		$ 3,750		$ 8,624		$ 6,851		$ 2,314		$ 1,329
TOTAL ESTIMATED PROJECT COST		$ 271,217		$ 623,776		$ 495,588		$ 167,385		$ 96,150
Construction Cost Per Linear Foot		$ 672		$ 908		$ 830		$ 541		$ 369
Total Project Cost Per Linear Foot		$ 728		$ 985		$ 901		$ 587		$ 401

Item No.	Reach 11 UP RR Trestle to Murphy Street Quantity	Reach 11 Sheet $	Reach 12 Murphy Street to 10th Street Quantity	Reach 12 Sheet $	Reach 13 10th Street to 11th Street Quantity	Reach 13 Sheet $	Reach 14 11th Street to W Ave G Quantity	Reach 14 Sheet $	Reach 15 W Ave G to End of Study Quantity	Reach 15 Sheet $
1										
2										
3										
4										
5										
6										
7			444	$3,552						
8										
9	1,901	$9,505	[illegible]	[illegible]	4,161	[illegible]	[illegible]	[illegible]	3,068	$15,340
10										
11										
12										
13										
14	244	$183	342	$257	672	$504	[illegible]	[illegible]	868	$651
15	244	$488	342	$684	672	$1,344	[illegible]	[illegible]	868	$1,736
16	636	$3,180	890	$4,450	1,748	$8,740	1,462	$7,310	2,256	$11,280
17			61	$427	61	$427			61	$427
18			833	$4,998	833	$4,998			833	$4,998
19										
20			308	$385	606	$758			781	$976
21	1,320	$23,760	1,848	$33,264	3,630	$65,340	3,036	$54,648	4,686	$84,348
22	880	$22,000	3,080	$77,000	6,050	$151,250	2,024	$50,600	6,248	$156,200
23										
24	196	$1,176	274	$1,644	538	$3,228	450	$2,700	694	$4,164
25			1	$1,500	1	$1,500			1	$1,500
26	1	$2,000	1	$2,000	1	$2,000	1	$2,000	1	$2,000
27										
28										
29										
30										
31										
32										
33										
34			4,400	$154,000	4,400	$154,000				
35										
36	550	$22,000					550	$22,000	770	$30,800
37										
38										
39										
40										
41										
42										
43										
44										
45										
46										
47										
48										
49										
50										
51										
52										
53										
54										
55										
56										
57			49	$1,323	49	$1,323			49	$1,323
58	489	$2,445	[illegible]	[illegible]	1,344	$6,720	[illegible]	[illegible]	1,736	$8,680
59	22	$220	31	$310	61	$610	[illegible]	[illegible]	78	$780
60										
61										
62										
63										
64	22	$220	[illegible]	[illegible]	61	$610	[illegible]	[illegible]	78	$780
65	73	$183	103	[illegible]	202	$505	[illegible]	[illegible]	260	$650
66										
67										
68										
69										
70										
TOTAL ESTIMATED CONSTRUCTION		$87,360		$304,590		$424,660		$158,691		$326,833
FINAL DESIGN		$ 6,115		$ 21,321		$ 29,726		$ 11,108		$ 22,884
CONSTRUCTION MANAGEMENT		$ 1,310		$ 4,569		$ 6,370		$ 2,360		$ 4,899
TOTAL ESTIMATED PROJECT COST		$ 94,785		$ 330,480		$ 460,756		$ 172,160		$ 354,397
Construction Cost Per Linear Foot		$ 437		$ 1,084		$ 772		$ 345		$ 460
Total Project Cost Per Linear Foot		$ 474		$ 1,180		$ 838		$ 374		$ 49[illegible]

Item No.	Entity Services Quantity	Entity Services Sheet $	Alpine Creek Overall Project Quantity	Alpine Creek Overall Project Total $
1	1	$84,338	1	$84,338
2	1	$131,025	1	$131,025
3	1	$52,410	1	$52,410
4	1	$78,615	1	$78,615
5			55	$4,875
6			121	$2,420
7			3,133	$25,088
8			150,184	$420,515
9			37,158	$185,790
10				
11				
12			117,786	$58,893
13				
14			124,888	$93,666
15			36,548	$73,096
16			121,118	$605,590
17			366	$2,562
18			4,998	$29,988
19				
20			5,404	$6,755
21			48,359	$870,462
22			43,718	$1,092,950
23			15,077	$527,695
24			6,990	$41,940
25			9	$13,500
26			15	$30,000
27				
28				
29				
30				
31				
32			13	$9,880
33				
34			26,400	$924,000
35				
36			5,720	$228,800
37				
38				
39				
40				
41				
42				
43				
44				
45				
46				
47				
48				
49				
50				
51				
52				
53			2	$10,000
54				
55				
56				
57			991	$26,757
58			16,228	$81,140
59			870	$8,700
60				
61				
62			165	$21,450
63				
64			988	$9,880
65			1,696	$4,240
66			50	$5,000
67	1	$600	1	$600
68				
69				
70				
TOTAL ESTIMATED CONSTRUCTION		$356,989		$5,507,481 $5,507,481
FINAL DESIGN		$ 24,989		$391,010
CONSTRUCTION MANAGEMENT		$ 5,355		$83,881
TOTAL ESTIMATED PROJECT COST		$ 387,333		$6,073,180
Construction Cost Per Linear Foot				$ 623
Total Project Cost Per Linear Foot				$ 676

TABLE 5.4
Probable Cost of Construction

Option A focused upon improvements downstream of 2nd Street. The cost to complete Option A is included in each of the other Option summary sheets as Reach 1 (Hendryx Street to Kokernot Lodge) and Reach 2 (Golf Course to 2nd Street). The work included the "benched channel" and the estimated construction cost is $1.2 million dollars. Including the final design and construction management services, the total project should be around $1.3 million. The construction is estimated to be from $350 to $450 per linear foot over the project length.

6.0 FLOOD DAMAGES

One of the main aspects of any flood protection planning study is the evaluation of the "benefits" of the proposed improvements related to the "cost" of those improvements. This Section will examine the benefits of reduced flood damages. Section 5 presents information about the construction costs associated with the various Alternatives.

The intent of this Section is to present our methodology for the computation of flood damages along Alpine Creek under existing conditions and for the various design options that could reduce these damages. It should be pointed out that this will be a "relative" comparison between the various options as opposed to an exacting evaluation of the precise damage amount that could be experienced. The traditional methodologies of a pure "benefit/cost" analysis will not be able to be performed due to the limited amount of existing data.

The TWDB does require that there be an estimation and assessment of the costs and benefits of the alternatives being considered, but does not specify the exact procedures or techniques that must be used (allowing for some flexibility). The goal of this analysis is to base this particular assessment upon as much real data as can be acquired under the scope of work with the key thought to make the method "repeatable" among all the options.

6.1 AVAILABLE DATA

As mentioned earlier, the USACE, Albuquerque District, prepared a study titled "Reconnaissance Report for the Pecos River and Tributaries, Alpine, Texas" dated February 1997. A very detailed flood damage assessment was prepared as a part of their analysis. PBS&J tried to obtain as much of the detailed backup information as possible for "reuse" in this TWDB grant study. However, it seems that all of the very detailed listings of structure, elevations, and valuation are no longer available.

Therefore, the best available data at this time is from the "summary table" information presented in the actual Reconnaissance report itself. The total number of impacted structures included within their 209 acre 100-year floodplain boundary was 307, with an estimated total damage of $4,084,000. It should be noted that the flood boundaries of the Reconnaissance study are not exactly the same as the current boundaries of the floodplain presented in the FEMA FIS. Therefore, there were several assumptions made in this flood damage analysis that blends the "best available data" from the USACE, FEMA, and "revised" hydraulic models discussed in Section 3.

It should be pointed out, however, that the methodology in this study made use of the USACE damage totals that were based upon very detailed and extensive data. This current analysis assumed a "uniform distribution" of structures throughout the floodplain area, and a uniform distribution of damage per structure. Both of these assumptions are known to not represent the actual distributions

within the floodplain, however, these assumptions will at least provide a common background in the evaluation of relative change or "benefit" derived from each of the individual flood reduction options. As mentioned above, this analysis strictly focuses upon the benefits of flood damage reduction. There are other benefits that as associated with each of the Alternatives related to improving the environment, wildlife habitat enhancements, ground water recharge, and overall stormwater quality. Since the main focus of this planning study was upon flood damages, these other benefits were not quantified.

Another piece of USACE information that is included in this analysis are the National Damage Curves. The assumption for this analysis is that although a uniform distribution of damage per structure was used, the relative changes in reduced floodplain water surface elevation would be evaluated based upon the same damage curves used in the Reconnaissance study. the National Damage Curves were used for one-story homes without basement. Table 6.1 lists the National Damage Curve relationships for this study with the upper value being the depth of floodwater above the finished floor of the structure, and the lower number being the percent of the total value that is damaged. Please note that even if the floodwater depth is reduced to 1 ft below the finished floor, statistically there have been damages reported to the structure and, therefore, are included into these national values.

The USACE used regression analysis to create the damage functions. While several independent variables, such as flood duration and flood warning lead-time, were examined in building the models, the models that were most efficient in explaining the percent damage to structure and contents were quadratic and cubic forms with depth as the only independent variable. Content damage was modeled with the dependent variable being content damage as a percentage of structure value. This differs from the previous technique of first developing content valuations and then content damage relationships as a function of content valuations. The generic content damage models are statistically significant and their use eliminates the need to establish content-to-structure ratios through surveys. Direct costs for cleanup expenses, unpaid hours for cleanup and repair, emergency damage prevention actions, and other flood-related costs are not included in these damage functions.

6.2 METHODOLOGY

The analysis for this planning study was conducted using a spreadsheet. The entire study area extends from Hendryx Street in the Kokernot Lodge area at the most downstream reach, up to Avenue G in the most upstream reach. On the left side of the spreadsheet are fifteen "subreaches" of the entire study area allowing the reader to evaluate the relative "benefits" in a more detailed manner. This will also provide feedback in the overall "prioritization" evaluation of the various options and perhaps in the "implementation" phase. Construction of smaller portions of the single most beneficial option could be based upon funding availability and prioritized or phased over time.

CITY OF ALPINE
Alpine Creek - Preliminary Design
Damage Assessment

Summary of Damages - USACE Recon Study - Existing Floodplain

Total Number of Structures	307	Assuming uniform distribution of impact	
Total Damages	$ 4,084,000	Number of Structures per Acre Innundated	1.47
Total Area Innundated (Acres)	209	Damages per Structure	$ 13,300

USACE National Damage Curve
Structural Depth-Damage - One Story

-6.0	-1.0	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.00	0.03	0.13	0.18	0.23	0.28	0.32	0.36	0.40	0.44	0.47	0.53	0.59

Comparison of damages per reach for various Options compared to US Army Corps of Engineers Recon evaluation of existing FIS

	Reach Location	FIS avg wsel (100 yr)	avg bank	avg depth above bank elev	damage %	flood area (acres)	structures	damages $
1	Hendrix Street Kokernot Lodge Area	4431.2	4426.8	4.4	47%	15.4	22.7	$ 302,090
2	Golf Course to Second Street	4444.0	4442.0	2.0	28%	16.4	24.1	$ 321,068
3	Second Street to Brown Street	4458.5	4456.8	1.7	28%	16.2	23.8	$ 316,372
4	Brown Street to West Avenue A	4466.5	4462.2	4.3	47%	35.1	51.6	$ 686,158
5	West Avenue A to 5th Street	4469.0	4466.1	2.9	36%	15.0	22.0	$ 292,698
6	5th Street to 6th Street	4471.2	4470.3	0.9	18%	22.6	33.2	$ 441,591
7	6th Street to W. Ave D (Sul Ross)	4474.2	4471.1	3.1	40%	19.7	29.0	$ 385,047
8	W. Ave D (Sul Ross) to W. Ave E	4479.9	4478.0	1.9	28%	10.7	15.8	$ 209,741
9	W. Ave E to Holland Ave	4487.5	4483.7	3.8	44%	7.7	11.3	$ 150,849
10	Holland Ave to UP RR Trestle	4488.1	4484.3	3.8	44%	4.4	6.5	$ 86,675
11	UP RR Trestle to Murphy Street	4490.4	4487.0	3.4	40%	5.0	7.4	$ 98,218
12	Murphy Street to 10th Street	4492.0	4487.9	4.1	47%	13.8	20.2	$ 269,220
13	10th Street to 11th Street	4495.0	4490.1	4.9	47%	9.8	14.4	$ 192,132
14	11th Street to W. Ave G	4500.5	4495.3	5.2	53%	8.0	11.7	$ 155,545
15	W. Ave G to End of Study	4505.0	4502.1	2.9	36%	9.0	13.2	$ 175,697
16	TOTAL					208.7	307.0	$ 4,083,100
							avg per str =	$ 13,300

TABLE 6.1
Relative Damages

Table 6.1 presents fifteen reaches along with data extracted from the FIS floodplain boundary. The FIS 100-year floodplain was used as the "benchmark" against which to compare the performance of all the Alternatives. The damages were uniformly distributed throughout this floodplain area and the totals at the bottom of Table 6.1 match the USACE damage numbers. The various columns under the FIS grouping include the "average water surface elevation (WSEL)" in the 100-year event for the particular reach as well as the "average bank" elevation of the reach. This yields the "average depth" of the floodplain assuming the WSEL elevation is higher than the bank elevation. The next column takes the "average depth" and extracts the "percent of damage" to a structure using the USACE National Damage Curve data presented immediately above the FIS work area. The next FIS column is an approximation of the floodplain area for the given reach determined by CAD area calculations. As mentioned above, this analysis makes us of generalizations assuming "uniform distribution" of structures and damages throughout the floodplain area. Therefore, knowing the approximate floodplain area, the total number of structures impacted is computed as well as the total damage amount. This last column represents the "baseline" damages against which each of the individual Options can be evaluated on a reach-by-reach basis.

Table 6.2 presents information about Option B. Across the top of the sheet are various columns of information about the particular "option" or scenario under review. The next groupings of columns are the same for reach of the Options. The individual Option under evaluation is clearly marked in the upper left and upper right of the table. There are several columns of information about the resulting floodplain width and elevation. The "key cross section" is listed as a criss-cross reference to the hydraulic model. This floodplain information is then used with the "uniform distribution" concept to determine how much of the baseline damages have been reduced. Again, it needs to be stated that this is NOT an exacting and rigorous Flood Damage Assessment (FDA) as the USACE software would conduct. However, some of the basic notions are reflected in this methodology.

The analysis is a combination of two damage components. First, due to overall FLOODPLAIN width reduction, it is assumed that a certain number of structures will be totally removed from receiving any flood damages. Second, due to the reduction in depth of the remaining floodplain, the REMAINING STRUCTURES within the floodplain should experience a reduction in flood damages (in keeping the USACE damage curves). The various columns are grouped to support these two basic "incremental" calculations, and then totaled to the right of the table.

The first column provides the "reach length" and the second column provides a general estimate of the 100-year "floodplain width" assuming this Option is fully implemented. The third column provides an estimate of the physical "top bank width" beyond which flooding would begin. A quick reference between the second and third columns gives the reader a general idea how close this particular Option came to containing the 100-year event within the existing top of bank.

CITY OF ALPINE
Alpine Creek - Preliminary Design
Damage Assessment

Comparison of damages per reach for various Options compared to US Army Corps of Engineers Recon evaluation of existing FIS

	Reach Location	OPTION B 5 Key Cross Section	reach length (feet)	flood width (feet)	top bank width (ft)	flood area (acres)	structures innundated	FLOODPLAIN flood area removed	structures removed	damages removed (incremental)	REMAINING STRUCTURES damages difference (before % adj)	avg wsel (100 yr)	avg bank	avg depth above bank elev	damage %	depth reduction	remaining damage % of original	damage $ reduction (incremental)	OPTION B 5 OPTION TOTALS damage $ removed	damage $ remaining	OPTION B 5 construction cost estimate	ratio of cost to damages removed
1	Hendrix Street Kokernot Lodge Area	3.68	1,838	358	157	15.1	22.2	0.3	0.5	$ 6,293	$ 295,798	4424.5	4426.8	-2.3	0%	6.74	0%	$ -	$ 6,293	$ 295,798	$ 635,807	101.0
2	Golf Course to Second Street	4.5	1,335	330	161	10.1	14.9	6.3	9.3	$ 123,203	$ 197,865	4437.0	4442.0	-5.0	0%	7.00	0%	$ -	$ 123,203	$ 197,865	$ 611,021	5.0
3	Second Street to Brown Street	6.25	595	422	122	5.8	8.5	10.4	15.3	$ 203,593	$ 112,779	4455.2	4456.8	-1.6	0%	3.34	0%	$ -	$ 203,593	$ 112,779	$ 771,387	3.8
4	Brown Street to West Avenue A	7.6	665	80	98	0.0	0.0	35.1	51.6	$ 686,158	$ -	4460.4	4462.2	-1.8	0%	6.06	0%	$ -	$ 686,158	$ -	$ 548,026	0.8
5	West Avenue A to 5th Street	8.33	272	2,257	66	14.1	20.7	0.9	1.3	$ 16,913	$ 275,785	4468.1	4466.1	2.0	32%	0.86	89%	$ 245,227	$ 262,140	$ 30,558	$ 355,285	1.4
6	5th Street to 6th Street	9.83	372	1,571	90	13.4	19.8	9.1	13.4	$ 178,724	$ 262,867	4471.0	4470.3	0.7	18%	0.19	100%	$ 262,867	$ 441,591	$ -	$ 308,690	0.7
7	6th Street to W Ave D (Sul Ross)	9.9	833	1,750	76	25.4	37.4	19.7	29.0	$ 385,047	$ -	4473.6	4471.1	2.5	36%	0.60	90%	$ -	$ 385,047	$ -	$ 611,094	1.6
8	W Ave D (Sul Ross) to W Ave E	11.63	550	578	84	7.3	10.7	3.4	5.0	$ 66,840	$ 142,901	4479.9	4478.0	1.9	28%	0.04	100%	$ 142,901	$ 209,741	$ -	$ 333,579	1.6
9	W Ave E to Holland Ave	12.63	285	623	87	4.1	6.0	3.6	5.3	$ 71,132	$ 79,717	4485.3	4483.7	1.6	28%	2.24	64%	$ 50,648	$ 121,778	$ 29,071	$ 155,812	1.3
10	Holland Ave to UP RR Trestle	13.5	240	501	113	2.8	4.1	1.7	2.5	$ 32,717	$ 53,957	4485.9	4484.3	1.6	28%	2.19	64%	$ 34,280	$ 88,998	$ 19,077	$ 129,870	1.9
11	UP RR Trestle to Murphy Street	14.83	200	1,289	79	5.9	8.7	5.0	7.4	$ 98,218	$ -	4493.5	4487.0	6.4	59%	3.05	146%	$ -	$ 98,218	$ -	$ -	0.0
12	Murphy Street to 10th Street	15.33	280	1,103	63	7.1	10.4	6.7	9.8	$ 130,530	$ 138,689	4493.7	4487.9	5.8	53%	-1.70	113%	$ 156,651	$ 287,182	$ (17,961)	$ -	0.0
13	10th Street to 11th Street	16	550	1,085	66	13.7	20.2	9.8	14.4	$ 192,132	$ -	4496.8	4490.1	6.7	59%	-1.80	124%	$ -	$ 192,132	$ -	$ -	0.0
14	11th Street to W Ave G	17.1	460	720	83	7.6	11.2	0.3	0.5	$ 6,814	$ 148,731	4499.7	4495.3	4.4	47%	0.81	89%	$ 131,677	$ 138,491	$ 17,054	$ -	0.0
15	W Ave G to End of Study	17.76	710	387	114	6.3	9.3	2.7	3.9	$ 52,361	$ 123,336	4505.9	4502.1	3.8	44%	-0.92	121%	$ 148,950	$ 201,321	$ (25,624)	$ -	0.0
16	TOTAL					138.7	204.0	115.0	169.2	$ 2,250,676	$ 1,832,424							$ 1,173,209	$ 3,423,885	$ 659,215	$ 4,483,529	1.3
									avg per str =	$ 13,300									avg per str =	$ 3,231		
																					lump sum items	$ 305,521
																					TOTAL CONSTRUCTION	$ 4,789,049

The fourth column calculated the "flood area" based upon the information in the first two columns, and then assuming "uniform distribution" of structures and damages throughout the floodplain computes the number of structures still receiving some amount of inundation. Note that if the floodplain width is less than the existing top bank width the assumption is that there will be NO structures inundated.

The next three columns compute the first of the two "incremental" damage components due to FLOODPLAIN width reduction. The sixth column is the difference between the FIS flooded area amount and the remaining flooded area for the given Option and is titled "flood area removed." Similarly the next column makes a calculation of the "structures removed" due to the benefits provided by the Option. The third column in this group presents the incremental "damages removed" based upon the uniform distribution concept. These are the structures and damages that are no longer in the floodplain. The more the particular Option reduced the 100-year floodplain, the larger the number in this incremental total.

The next eight columns compute the second of the two "incremental" damage components for the REMAINING STRUCTURES. The ninth column is the difference between the total damages for this reach under the baseline FIS scenario and the "damages removed" just computed. These are the remaining damages that will need to be adjusted downward due to the reduced depth of flooding experienced as a result of this Option. Although the damages were not totally removed, the magnitude of the impacts were reduced due to a lower floodplain water elevation. The average 100-year WSEL for this Option as represented by the "key cross section" is presented along with the "average bank" elevation which was previously presented in the FIS portion of Table 6.1. The "average depth" is simply the difference between the two. Note that if the WSEL is less than the bank elevation the depth will be reported as a negative number indicating it is less than the bank elevation by a certain amount.

Assuming the elevation is positive, there will be a "damage percent" associated with that depth based upon the USACE damage curves. That percentage is listed in the next column followed by a column presenting the "depth reduction" in the 100-year WSEL between the Option and the FIS (a positive number indicating the WSEL was reduced). The next column is very important in this second "incremental" damage evaluation. Assuming that the "damage difference before any adjustment" is a result of the water being a certain depth, then reducing that depth will yield a benefit. If the average depth of the FIS yielded 70% from the damage curve, and a certain Option creates a lower depth which yielded 35% from the damage curve, then in this general analysis method the damages will be HALF those experienced during the FIS evaluation. The "damage reduction percentage" represents this ratio between the FIS damage percentage and the Option damage percentage. This percentage is then multiplied by the "damage difference" computed at the beginning of this section yielding the second the incremental

"damages removed" based upon the uniform distribution concept. These are the structures and damages that are still in the floodplain, but damaged to a lesser degree.

The "option totals" are presented to the right of the table. The first column is the total of the two "incremental" damage reduction summed into one value labeled "damages removed." The next column simply is the difference between that value and the total damages for that reach under the baseline FIS scenario. Again, it cannot be stressed enough that these are NOT exact damages, but are simply relative comparisons based upon our "uniform distribution" assumptions. These totals can be compared against the construction cost for each reach to get some feel of the relation of cost to reduced damages for each Option.

6.3 RELATIVE FLOOD DAMAGE BENEFITS OF EACH OPTION

As mentioned above, due to several assumptions that were required, the results from this analysis are more "relative" between the various alternatives than they are "specific" as to exact benefits derived for a particular alternative. Please recall that Option B (Table 6.2), C (Table 6.3), and D (Table 6.4) were primarily focused upon reducing the limits of the 100-year event. Therefore, the FLOODPLAIN increment of damage reduction is larger than the value for Option E (Table 6.5) which primarily focused upon the 25-year event. In this first "increment" of damage reduction listed on the tables, Option B had less benefit than Option C since it did not extend as far upstream as did Option C. Option D had more benefit than did Option C because of the depth of cut and overall capacity of the Option D channel. Again, the reader must recall that this "modified" flood damage assessment method should only be used to determine these "relative" benefits of one Option compared to another and should NOT be used to determine that the benefits were exactly a certain dollar amount.

The second increment of damage reduction is for the REMAINING STRUCTURES. For this value, Option B had a larger value than Option C, and Option C had a larger value than Option D. Since so much was removed from the floodplain in Option C and Option D, it only make sense that the most benefits to the "remaining structures" would be larger under Option B (since more were left in the floodplain). Option E had more benefits in this increment than did Option B, again since it's goal was to address the 25-year event, leaving the 100-year floodplain just slightly reduced. It should also be noted that Option B ends at the UPRR trestle, whereas Option E extends a great distance upstream of that point.

CITY OF ALPINE
Alpine Creek - Preliminary Design
Damage Assessment

Comparison of damages per reach for various Options compared to US Army Corps of Engineers Recon evaluation of existing FIS

	Reach Location	OPTION C.5 Key Cross Section	reach length (feet)	flood width (feet)	top bank width (ft)	flood area (acres)	structures inundated	FLOODPLAIN flood area removed	structures removed	damages removed (incremental)	REMAINING STRUCTURES damages difference (before % adj)	avg wsel (100 yr)	avg bank	avg depth	damage %	depth reduction	damage % reduction	damage $ reduction (incremental)	OPTION C.5 OPTION TOTALS damage $ removed	damage $ remaining	OPTION C.5 construction cost estimate	ratio of cost to damages removed
1	Hendrix Street Kokernot Lodge Area	3.66	1,838	358.3	158.66	15.1	22.2	0.3	0.5	$ 6,293	$ 295,796	4424.5	4426.8	-2.3	0%	6.74	0%	$ -	$ 6,293	$ 295,796	$ 635,807	101.0
2	Golf Course to Second Street	4.5	1,335	330	161	10.1	14.9	6.3	9.3	$ 123,203	$ 197,865	4437.0	4442.0	-5.0	0%	7.00	0%	$ -	$ 123,203	$ 197,865	$ 611,021	5.0
3	Second Street to Brown Street	6.25	595	422	122	5.8	8.5	10.4	15.3	$ 203,593	$ 112,779	4455.2	4456.8	-1.6	0%	3.34	0%	$ -	$ 203,593	$ 112,779	$ 771,387	3.8
4	Brown Street to West Avenue A	7.6	665	80	98	0.0	0.0	35.1	51.6	$ 686,158	$ -	4460.4	4462.2	-1.8	0%	6.06	0%	$ -	$ 686,158	$ -	$ 548,028	0.8
5	West Avenue A to 5th Street	8.33	272	2,257	66	14.1	20.7	0.9	1.3	$ 16,913	$ 275,785	4468.1	4466.1	2.0	32%	0.86	89%	$ 245,227	$ 262,140	$ 30,558	$ 355,285	1.4
6	5th Street to 6th Street	9.63	372	1,571	90	13.4	19.8	9.1	13.4	$ 178,724	$ 262,867	4471.0	4470.3	0.7	18%	0.19	100%	$ 262,867	$ 441,591	$ -	$ 308,690	0.7
7	6th Street to W Ave D (Sul Ross)	9.9	633	1,750	76	25.4	37.4	19.7	29.0	$ 385,047	$ -	4473.6	4471.1	2.5	36%	0.60	99%	$ -	$ 385,047	$ -	$ 634,094	1.6
8	W Ave D (Sul Ross) to W Ave E	11.63	550	578	64	7.3	10.7	3.4	5.0	$ 66,840	$ 142,901	4479.9	4478.0	1.9	28%	0.04	100%	$ 142,901	$ 209,741	$ -	$ 333,579	1.6
9	W Ave E to Holland Ave	12.63	285	623	87	4.1	6.0	3.8	5.3	$ 71,132	$ 79,717	4485.3	4483.7	1.6	28%	2.24	64%	$ 50,646	$ 121,778	$ 29,071	$ 155,812	1.3
10	Holland Ave to UP RR Trestle	13.5	240	501	113	2.8	4.1	1.7	2.5	$ 32,717	$ 53,957	4485.9	4484.3	1.6	28%	2.19	64%	$ 34,280	$ 88,998	$ 19,677	$ 283,828	4.2
11	UP RR Trestle to Murphy Street	14.83	200	1,129	79	5.2	7.6	5.0	7.4	$ 98,218	$ -	4492.3	4487.0	5.3	53%	-1.90	100%	$ -	$ 98,218	$ -	$ 102,550	1.0
12	Murphy Street to 10th Street	15.33	280	772	63	5.0	7.3	8.8	12.9	$ 172,152	$ 97,068	4492.3	4487.9	4.4	47%	0.27	100%	$ 97,068	$ 269,220	$ -	$ 303,775	1.1
13	10th Street to 11th Street	16	550	1,082	66	13.7	20.1	9.8	14.4	$ 192,132	$ -	4496.8	4490.1	6.7	59%	-1.78	124%	$ -	$ 192,132	$ -	$ 423,230	2.2
14	11th Street to W Ave G	17.1	460	771	83	8.1	12.0	8.0	11.7	$ 155,545	$ -	4499.9	4495.3	4.6	47%	0.58	89%	$ -	$ 155,545	$ -	$ 247,299	1.6
15	W Ave G to End of Study	17.76	710	387	114	6.3	9.3	2.7	3.9	$ 52,132	$ 123,565	4505.9	4502.1	3.8	44%	-0.92	121%	$ 149,237	$ 201,369	$ (25,671)	$ 237,052	1.2
16	TOTAL					136.3	200.8	124.8	183.5	$ 2,440,799	$ 1,642,301							$ 982,226	$ 3,423,024	$ 660,078	$ 5,951,433	1.7
									avg per str =	$ 13,300									avg per str =	$ 3,291	lump sum items	$ 405,338
																					TOTAL CONSTRUCTION	$ 6,356,772

CITY OF ALPINE
Alpine Creek - Preliminary Design
Damage Assessment

Comparison of damages per reach for various Options compared to US Army Corps of Engineers Recon evaluation of existing FIS

	Reach Location	OPTION D 5 Key Cross Section	reach length (feet)	flood width (feet)	top bank width (ft)	flood area (acres)	structures inundated	FLOODPLAIN flood area removed	structures removed	damages removed (incremental)	REMAINING STRUCTURES damages difference (before % adj)	avg wsel (100 yr)	avg bank	avg depth	damage %	depth reduction	damage % reduction	damage $ reduction (incremental)	OPTION D 5 OPTION TOTALS damage $ removed	damage $ remaining	OPTION D 5 construction cost estimate	ratio of cost to damages removed
1	Hendrix Street Kokernot Lodge Area	3.66	1,838	358	157	15.1	22.2	0.3	0.5	$ 6,293	$ 295,796	4424.5	4426.8	-2.3	0%	6.70	0%	$ -	$ 6,293	$ 295,796	$ 635,807	101.0
2	Golf Course to Second Street	4.5	1,335	330	161	10.1	14.9	6.3	9.3	$ 123,203	$ 197,865	4437.0	4442.0	-5.0	0%	7.00	0%	$ -	$ 123,203	$ 197,865	$ 611,564	5.0
3	Second Street to Brown Street	6.25	595	1,224	122	16.7	24.6	16.2	23.8	$ 316,372	$ -	4456.1	4456.8	-0.7	3%	2.43	9%	$ -	$ 316,372	$ -	$ 762,422	2.4
4	Brown Street to West Avenue A	7.6	665	212	98	3.2	4.8	31.8	46.8	$ 622,773	$ 63,385	4461.1	4462.2	-1.1	0%	5.36	0%	$ -	$ 622,773	$ 63,385	$ 946,238	0.9
5	West Avenue A to 5th Street	8.33	272	2,302	66	14.4	21.1	0.6	0.9	$ 11,419	$ 281,279	4468.8	4466.1	2.7	36%	0.23	100%	$ 281,279	$ 292,698	$ -	$ 375,545	1.3
6	5th Street to 6th Street	9.63	372	1,055	90	9.0	13.3	13.6	19.9	$ 265,113	$ 176,478	4469.9	4470.3	-0.4	3%	1.26	14%	$ 24,109	$ 289,222	$ 152,369	$ 340,340	1.2
7	6th Street to W. Ave D (Sul Ross)	9.9	633	1,867	76	24.2	35.6	19.7	29.0	$ 385,047	$ -	4473.2	4471.1	2.1	32%	1.00	68%	$ -	$ 385,047	$ -	$ 793,224	2.1
8	W. Ave D (Sul Ross) to W. Ave E	11.63	550	392	84	4.9	7.3	5.8	8.5	$ 112,852	$ 96,789	4478.8	4478.0	0.8	18%	1.14	66%	$ 63,944	$ 176,895	$ 32,845	$ 619,744	3.5
9	W. Ave E to Holland Ave	12.63	285	595	87	3.9	5.7	3.8	5.6	$ 74,741	$ 76,109	4484.7	4483.7	1.0	23%	2.79	53%	$ 40,673	$ 115,413	$ 35,436	$ 294,397	2.6
10	Holland Ave to UP RR Trestle	13.5	240	485	113	2.7	3.9	1.8	2.6	$ 34,392	$ 52,282	4485.3	4484.3	1.0	23%	2.76	53%	$ 27,940	$ 62,332	$ 24,342	$ 343,388	5.5
11	UP RR Trestle to Murphy Street	14.83	200	161	79	0.7	1.1	4.3	6.3	$ 83,766	$ 14,452	4487.8	4487.0	0.8	18%	2.57	46%	$ 6,595	$ 90,361	$ 7,857	$ 218,355	2.4
12	Murphy Street to 10th Street	15.33	280	439	63	2.8	4.1	10.9	16.1	$ 214,052	$ 55,168	4490.7	4487.9	2.8	36%	1.26	77%	$ 42,284	$ 256,335	$ 10,891	$ 344,315	1.3
13	10th Street to 11th Street	16	550	781	66	9.9	14.5	9.8	14.4	$ 192,132	$ -	4495.5	4490.1	5.4	53%	-0.54	113%	$ -	$ 192,132	$ -	$ 497,660	2.6
14	11th Street to W. Ave G	17.1	460	716	83	7.6	11.1	0.4	0.6	$ 7,657	$ 147,888	4499.7	4495.3	4.4	47%	0.83	89%	$ 130,931	$ 138,588	$ 16,957	$ 325,279	1.6
15	W. Ave G to End of Study	17.76	710	294	114	4.8	7.0	4.2	6.2	$ 81,940	$ 93,758	4505.5	4502.1	3.4	40%	-0.53	111%	$ 104,146	$ 186,086	$ (10,389)	$ 374,093	2.0
16	TOTAL					130.1	191.4	129.4	190.4	$ 2,531,852	$ 1,551,248							$ 721,900	$ 3,253,752	$ 829,348	$ 6,982,468	2.1
									avg per str =	$ 13,300									avg per str =	$ 4,334		
																					lump sum items	$ 475,449
																					TOTAL CONSTRUCTION	$ 7,457,916

CITY OF ALPINE
Alpine Creek - Preliminary Design
Damage Assessment

Comparison of damages per reach for various Options compared to US Army Corps of Engineers Recon evaluation of existing FIS

	Reach Location	OPTION 5 Key Cross Section	reach length (feet)	flood width (feet)	top bank width (ft)	flood area (acres)	structures innundated	FLOODPLAIN flood area removed	structures removed	damages removed (incremental)	REMAINING STRUCTURES damages difference (before % adj)	avg wsel (100 yr)	avg bank	avg depth	damage %	depth reduction	damage % reduction	damage $ reduction (incremental)	OPTION 5 OPTION TOTALS damage $ removed	damage $ remaining	OPTION 5 construction cost estimate	ratio of cost to damages removed
1	Hendrix Street Kokernot Lodge Area	3.66	1,838	358	157	15.1	22.2	0.3	0.5	$ 6,293	$ 295,796	4424.5	4426.8	-2.3	0%	6.74	0%	$ -	$ 6,293	$ 295,796	$ 635,807	101.0
2	Golf Course to Second Street	4.5	1,335	325	161	10.0	14.7	6.4	9.5	$ 126,081	$ 194,987	4436.5	4442.0	-5.5	0%	7.48	0%	$ -	$ 126,081	$ 194,987	$ 608,170	4.8
3	Second Street to Brown Street	6.25	595	1,389	122	19.0	27.9	16.2	23.6	$ 316,372	$ -	4457.1	4456.8	0.3	13%	1.40	48%	$ -	$ 316,372	$ -	$ 521,862	1.6
4	Brown Street to West Avenue A	7.6	865	1,786	98	27.3	40.1	7.8	11.5	$ 152,738	$ 533,420	4464.0	4462.2	1.8	28%	2.47	59%	$ 313,710	$ 466,448	$ 219,710	$ 348,273	0.7
5	West Avenue A to 5th Street	8.33	272	2,160	66	13.5	19.8	1.5	2.2	$ 28,835	$ 263,863	4467.4	4466.1	1.3	23%	1.61	65%	$ 170,305	$ 199,140	$ 93,558	$ 299,835	1.5
6	5th Street to 6th Street	9.63	372	1,836	90	15.7	23.1	6.9	10.1	$ 134,398	$ 307,193	4472.2	4470.3	1.9	28%	-0.96	151%	$ 464,986	$ 599,384	$ (157,793)	$ 249,970	0.4
7	6th Street to W Ave D (Sul Ross)	9.9	633	1,794	76	26.1	38.3	19.7	29.0	$ 385,047	$ -	4473.8	4471.1	2.7	36%	0.39	80%	$ -	$ 385,047	$ -	$ 574,809	1.5
8	W Ave D (Sul Ross) to W Ave E	11.63	550	492	84	8.2	9.9	4.5	6.6	$ 88,245	$ 121,496	4479.4	4478.0	1.4	23%	0.55	84%	$ 102,197	$ 190,442	$ 19,299	$ 456,764	2.4
9	W Ave E to Holland Ave	12.63	285	625	87	4.1	6.0	3.6	5.3	$ 70,846	$ 80,003	4485.3	4480.7	1.6	28%	2.20	64%	$ 50,827	$ 121,674	$ 29,175	$ 154,272	1.3
10	Holland Ave to UP RR Trestle	13.5	240	500	113	2.8	4.1	1.7	2.5	$ 32,754	$ 53,921	4485.9	4484.3	1.6	28%	2.20	64%	$ 34,267	$ 67,011	$ 19,664	$ 80,618	1.3
11	UP RR Trestle to Murphy Street	14.83	200	1,287	79	5.9	8.7	5.0	7.4	$ 98,218	$ -	4493.4	4487.0	6.4	59%	3.02	146%	$ -	$ 98,218	$ -	$ 87,300	0.9
12	Murphy Street to 10th Street	15.33	280	1,057	63	6.8	10.0	7.0	10.3	$ 136,346	$ 132,874	4493.4	4487.9	5.5	53%	1.36	113%	$ 150,083	$ 286,428	$ (17,434)	$ 304,590	1.1
13	10th Street to 11th Street	16	550	1,068	66	13.5	19.8	9.8	14.4	$ 192,132	$ -	4496.7	4490.1	6.6	59%	1.69	124%	$ -	$ 192,132	$ -	$ 424,660	2.2
14	11th Street to W Ave G	17.1	460	774	83	8.2	12.0	8.0	11.7	$ 155,545	$	4499.9	4495.3	4.6	47%	0.57	89%	$ -	$ 155,545	$ -	$ 158,691	1.0
15	W Ave G to End of Study	17.76	710	336	114	5.5	8.1	3.5	5.1	$ 68,424	$ 107,273	4505.8	4502.1	3.8	44%	-0.75	121%	$ 129,559	$ 197,984	$ (22,237)	$ 326,633	1.8
16	TOTAL					179.5	264.0	101.8	149.8	$ 1,992,274	$ 2,090,828							$ 1,415,924	$ 3,408,199	$ 674,901	$ 5,240,412	1.5
									avg per str =	$ 13,300									avg per str =	$ 2,556	lump sum items	$ 356,989
																					TOTAL CONSTRUCTION	$ 5,597,401

TABLE 6.5

7.0 RECOMMENDATIONS/PRIORITIZATION/IMPLEMENTATION

The Section 4 discussed the "structural" solutions to the flooding problems along Alpine Creek. This Section presents a discussion of other items that may need to be addressed before one of the Options is selected for final design and construction. This Section will discuss an implementation plan and a general prioritization plan.

7.1 RIGHT-OF-WAY

Certainly no project can be constructed and maintained without proper ROW, easement, and access points along the reach. The "final" design should provide a more exact determination of the amounts of property required. As discussed in the Public Meetings, there is a mixture of public and private ownership along the Alpine Creek corridor. It will be up to the city to determine whether there will need to be either 1) a "fee simple" ROW purchase of the surface making it a public drainage way or public park corridor, or 2) a "drainage easement" dedication from the private owner to the city for general drainage maintenance. Ingress and egress maintenance access agreements may also be needed along corridors perpendicular to the channel itself. Consideration should be given to obtaining legal access to the open channel corridors themselves as well as a 10 to 15 ft wide strip outside the top bank of the open channel. This should provide adequate space to access the channel and for maintenance purposes. As the specific parcels of land are identified in the final design, there may need to be additional edge or remnant areas included (i.e., taking a small sliver off a larger piece could impact the larger piece where it may be necessary to acquire the entire larger piece at this time).

7.2 PRIORITIZATION

It is highly recommended to the City of Alpine to utilize this flood planning study to submit a request to FEMA for restudy of Alpine Creek and its tributaries. Since the FIS for the City of Alpine in 1990, several bridges have been constructed or replaced by TxDOT and the railroad trestle has been replaced. Also, newer hydrology and hydraulic models have been developed to better represent the flow of water through structures along the creek. With these changes since the FIS, it should be a high priority for the City of Alpine to update the effective FIS and Flood Insurance Rate Maps (FIRM).

One of the more critical features of any watershed planning is the prioritization of the individual projects or phases of projects. A key element to the plan is that adverse downstream impacts due to the construction of an individual upstream project must be avoided or at least minimized to the greatest degree possible. Hydrologic modeling was used to set this hydrologically based prioritization process.

Initially the focus of the flood protection planning was upon the 100-year event and reducing the floodplain width to within the existing channel banks. As discussed in previous sections,

this goal is not achievable without major structural improvements. There are basically two ways to achieve this goal. In order to create a larger channel (but keeping the top width the same as the current channel) stormwater detention must be used in the upper basin to reduce the peak flow through the city. This reduction in peak flow would then allow the modified channel to convey the 100-year event within the banks. However, if detention is not employed, then the top of the channel will need to be widened impacting existing structures along the route. These two basic scenarios and their large construction cost estimates (Option B, Option C, and Option D) were discussed at the second Public Meeting.

One of the outcomes of the second Public Meeting was to shift the protection focus from the 100-year event to something more "achievable." The focus shifted to examining the existing conveyance capacity of the Holland Street structure. It was determined that an event just smaller than the 25-year event would begin to overtop that structure. Therefore, providing flooding protection for the 25-year event became the final focus. This yielded Option E which aims to provide additional channel capacity to safely convey the 25-year event through the city. The total length of Option E is larger than the length of Option B, hence the total project cost is larger for Option E and Option B. However, comparing both options for the same length shows that Option E is more than $500,000 less than Option B.

When looking at the damage assessment comparisons presented in Table 6.1 and Table 6.4 for Option B and Option E, respectively, it appears that each alternative generates a similar level of damage removal. Please keep in mind all the caveats and discussion in Section 6 about the flood damage numbers. They should be used simply as "relative numbers" and should not be used as exact dollars of benefits derived from the given alternative. Therefore, if the benefits are generally equivalent, and the cost of Option E is less for the same length, then Option E appears to be the most "achievable" of the alternatives presented.

7.3 IMPLEMENTATION PLAN AND POTENTIAL PERMITTING REQUIREMENTS

As far as an "implementation plan" for Option E, the entire project does not have to be constructed all at one time. Portions of the entire Option can be built as funding allows. The cost estimate information presented in Table 6.4 can be used to examine the various "reaches" along the entire project length. A criss-cross comparison with the "benefits" presented on a reach-by-reach basis in Table 6.5 could guide the City to select specific reaches for construction. Generally the project should proceed from a downstream to upstream direction starting no further upstream than 2nd Street. It is the depth of cut at this section that allows the "pilot channel" to be created and extended along the project length.

One major item that needs to be addressed very early in the implementation of this project is the issue of "permitting" requirements from the various State and Federal Agencies. This section is included as a "worst case" scenario where all the many requirements of the law are assumed to

have to take place. It is included here as a reminder to the city that some action will need to be taken with the permitting agencies. It could be very simple, or it could get more involved depending upon what some of the initial field surveys discover. This permit process, however, cannot be ignored. The intent of this section is simply to provide the city with an awareness of what could be (but may not necessarily be) required as a part of the implementation plan.

One very critical part of the implementation of the project is the coordination of the Clean Water Act Section 404 permitting through USACE. This is a task that cannot be avoided or eliminated. Concerns typically voiced by the Agencies include but were not limited to the following:

- Respecting the "low flow channel" and including it in the design template of the channel improvements, and
- Including erosion and sediment controls during construction.

Some parts of this permit process that are clear at this point in time, while some parts cannot be estimated until the "kickoff" meeting with the Agencies takes place. For example, they will most likely want to know the magnitude and type of impacts to various habitats along the creek corridors. They will want to discuss these impacts (minimal, moderate, and major) and be reassured that their environmental concerns are being addressed. This could necessitate interpretation of aerial photography and field investigations to identify and delineate sensitive areas that may be impacted by various portions of the project addressed in this report. Therefore, following the permit "kickoff" meeting, there will most likely be a requirement to officially identify sensitive areas along the project route. The USACE has indicated that they could need to field verify (in detail) these sensitive locations. There will likely need to be an "iterative review" of the project with the Agencies and then a response to a variety of questions.

Nationwide Permit (NWP) 43 for Stormwater Management Facilities allows for discharges of dredged or fill material into non-tidal waters of the U.S., excluding non-tidal wetlands adjacent to tidal waters, for the construction and maintenance of stormwater management facilities. The criteria in this NWP include: 1) the discharge for the construction of the new stormwater management facility does not cause the loss of greater than 2 acre of non-tidal waters of the U.S., excluding non-tidal wetlands adjacent to tidal waters; 2) the discharge does not cause the loss of greater than 300 linear feet of stream bed; 3) the discharge of dredged or fill material for the construction of new stormwater management facilities in perennial streams is not authorized; and 4) a loss of greater than 1/10 acre of non-tidal waters, excluding non-tidal wetlands adjacent to tidal waters, requires notification to the USACE. This notification requires specific information such as wetland delineation of the affected areas, a maintenance plan, and a compensatory mitigation proposal that offsets the loss of the waters (wetlands). It also should address other general conditions, including specific activities in the 100-yr floodplain.

Based on the conditions stipulated in this nationwide permit, the extent of stream bed potentially impacted by this project exceeds the criteria limit of 300 ft, thus an individual permit would be required for the Section 404 permitting of this facility. The individual permit requires a public comment period, thus the authorization of this type of permit may take significantly longer to obtain, than a nationwide permit. Mitigative measures and compensation would be required.

The cultural resources evaluation for the project is a second item that could occur concurrently with the environmental permitting. This possibility must be explored before the construction phase can begin. Once the environmental and cultural resources concerns are addressed, the actual construction phases of the project can begin. The following section outlines the lengthy and various steps that may be encountered while obtaining Cultural Resource Management (CRM) clearance for the Alpine Creek Project. Since Federal funding or permitting will be required for development on city owned property. It is important to note that if the initial field studies do not uncover or discover certain artifacts, then the remainder of the "to do" list presented below will not have to be completed. The CRM process can be a very short, concise task or a long and involved task.

7.3.1 Procedures for Cultural Resources Management

Procedural steps are outlined below.

1. The City will first select a CRM consultant. The consultant will coordinate with the City to determine which regulatory agencies will be involved and begin coordination with those agencies. Because the City owns the property a Texas Antiquities Permit Application will need to be filed with the State prior to project initiation. Coordination with the Federal government will also be required.

2. Coordination with both regulatory agencies will determine the level of effort necessary to comply with agency standards. Upon determining the level of effort, and in agreement with the City, the consulting archaeologist will develop a Research Design that is appropriate for the project.

3. When the Research Design has been approved by all parties fieldwork will commence. This work may be conducted in phases, with each succeeding phase subsequent to the previous phase. The first phase will consist of a pedestrian survey and subsurface testing to identify cultural resource sites. If one or more cultural resource properties are identified a testing phase may be required. Data gathered during this second phase will be used to ascertain whether a site is worthy of State Archaeological Landmark (SAL) status and/or for listing on the National Register of Historic Places (NRHP). Should a site be determined significant a third phase, the data recovery phase, may be implemented in an effort to mitigate impacts to a SAL designated or NRHP-eligible site. During the course of the work it may become necessary to conduct archival and/or ethnographic research for encountered historic properties.

4. At each of these phases, a draft report will be written upon completion of the field effort.

5. Upon completion of the draft report and review by the City, it will be submitted to the regulating agencies for their respective reviews.

6. By law, review of the draft report can take up to 30 working days. Upon completion of the review, the regulatory agencies will either notify the City and consultant of their concurrence, or notify the City and consultant of comments that they would like addressed. In the event that one or both agencies have comments, the consultant and City will address the comments and resubmit a draft for a second review. Upon re-submittal, regulatory agencies can again take up to 30 days for document review. At that time they may either concur or make additional comments. With each resubmitted draft, the review agency may take 30 days to review and comment.

7. Upon final concurrence with the draft report, the consultant will prepare a final report and submit copies to the City and agencies, including 20 copies to the Texas Historical Commission (THC) required by law under the Antiquities Permit.

7.3.2 Coordination with State and Federal Agencies

Upon approval of the project by the City, coordination will be required between the City and its consultant archaeologist, the USACE, Albuquerque District, and the THC prior to project initiation. A letter addressing the requirements of each regulatory agency and project maps will be sent to each agency for their review. The letter will address the following questions: (1) will CRM work be required and, (2) if CRM work is necessary, what level of investigation will be necessary. The agencies may require up to 30 days to review the submitted letter and maps.

Two different results can be reached based upon the agency's review of the project. If both the USACE and the THC find that the project will have no affect on cultural resources, they will send a letter permitting the project to proceed. If either the USACE or the THC determines that the project is likely to impact cultural resources, some level of investigation of the project area will be required.

7.3.3 Development of Research Design/Determination of Level of Investigation

If field investigations are required by one or both agencies, a Research Design will be developed for that phase of work by the consultant and the City for approval by the USACE and the THC. This agency coordination will finalize the level of effort required at the project location and the techniques utilized for the required investigation.

An Antiquities Permit issued by the THC will be required because the project is located on City-owned property. Fieldwork cannot proceed until the permit has been granted. In order to apply for the permit the consultant will, in the City's behalf, submit an Antiquities Permit Application to the THC. The application will require the following information: (1) proposed date of fieldwork; (2) the desired duration of the permit (usually one year); (3) the research design; (4) the designated curation facility; (5) signatures of a City representative responsible for the project, (6) the signature of the consultant's Principal Investigator (PI) (their individual responsible for project completion); and, (7) the location of the project on USGS 7.5-minute quadrangle maps which show the boundaries of the project. Typically it takes approximately one week to get the permit, however, they can take up to 30 days to review the application.

7.3.4 Survey

Following agency coordination and approvals, fieldwork can proceed. Four possibilities exist for the extent of the survey, the USACE and/or THC may: (1) only require pedestrian survey of certain areas (defined as high probability areas for site occurrence) located within the project corridor; (2) require pedestrian survey of the entire project corridor; (3) require pedestrian survey in conjunction with judgmentally placed backhoe trenches to locate deeply buried sites; or (4) require a series of backhoe trenches covering most of the project corridor.

Once fieldwork has been conducted and completed, a draft report of the survey results will be written and submitted to the Client for review and comment. Upon acceptance of the draft report by the City it will be submitted to the USACE and the THC for their respective reviews and comment. Both review agencies have up to 30 calendar days to comment on the draft report's findings. If no sites were found during survey and the level of effort is considered appropriate by the review agencies, both agencies will issue letters stating that no cultural resources will be adversely impacted and that the project can proceed.

If archaeological sites are found, the PI will have made a recommendation in the draft report on each site's SAL status as defined in the Antiquities Code of Texas found as Title 9, Chapter 191, of the Texas Natural Resource Code. The PI will also have made recommendations for each site's NRHP eligibility status as listed under 36 CFR 60.4. of the National Historic Preservation Act. The USACE and the THC may agree or disagree with the consultant's recommendations. If cultural resource clearance is recommended because the sites were not recommended for SAL designation or were recommended as ineligible for the NRHP and both regulatory agencies concur with these findings, the project may proceed with no further archaeological considerations. If however, the PI and the USACE and/or the THC agree that some sites are potentially eligible for the NRHP or have potential to be a designated a SAL, a second phase of fieldwork may be necessary to assess their significance. This second phase, and any additional phases, would be required only if impacts to designated SALs or NRHP listed

or eligible properties could not be avoided. It is important to note that even if sites are determined to have designated SAL status or are eligible for the NRHP, it is not a fatal flaw for the project.

7.3.5 Field Time

Typically the time line for a survey on a project this size is one to two months from the time the survey is first undertaken, to the time that a draft report is submitted to the review agency. The review agencies then have 30 working days to comment. If comments require changes to the draft report, the agency will have an additional 30 days to comment.

7.3.6 Testing

Testing will be comprised of fieldwork to assess a site's SAL status and NRHP eligibility. A new Antiquities Permit with a new Research Design must be prepared specifically detailing the work to be conducted. If comments are made by either regulatory agency, they must be addressed and resubmitted for approval. Special analyses such as radiocarbon dating, soil sampling, macrobotanical analysis, DNA analysis, and other artifact specific types of analyses are sometimes required at this level of investigation.

At the end of the testing field effort, a draft report is written detailing the results of the investigations and after City approval it is submitted to the review agencies for a 30-day review period. By the end of the testing phase, the PI and review agencies must concur on the status of the site(s). If testing shows a site to be ineligible for NRHP or an SAL designation, no further consideration will be given and the review agencies will issue a statement of no adverse impacts to that cultural resource. If testing determines that a site is eligible for NRHP or SAL designation, the site will either need to be avoided or data recovery will be required.

7.3.7 Field Work

If required, the length of time to complete this task will depend on the number of sites located and determined potentially eligible, the size of the sites, and the amount of work required at each of the sites by the review agencies. Two to four weeks of field time can be expected for each tested site. Report documentation and agency approvals can be expected to take up to at least three times the length of the field effort.

7.3.8 Data Recovery

When a site is designated as a SAL or is determined to be eligible for the NRHP and avoidance is not feasible, a data recovery plan to mitigate project impacts will be developed. During this phase a new Research Design will be developed with a new Antiquities Permit. It will be submitted to the

USACE and the THC for review and comment. During the mitigation phase, a more intense level of effort is expected by the review agencies because the site will likely be destroyed. Special analyses such as radiocarbon dating, soil sampling, macrobotanical analysis, DNA analysis, and other artifact specific types of analyses are usually required at this level of investigation. The compilation of all the data recovered in the field and in the special analysis is presented in detail in a draft report describing the data recovery efforts. This draft report is again submitted to the City for comment and then the review agencies for their respective comments. Upon concurrence of the findings, the City may proceed with the proposed work. Coordination with the agencies during data recovery can sometimes yield a concurrence decision upon completion of fieldwork prior to completion of the draft report. This can speed the permitting process and allow construction to begin prior to the submission of the draft report.

7.3.9 Fieldwork

If required, the amount of fieldwork will depend on the number of sites, the size of the sites, and the amount of work necessary at each of the sites. One to three months of fieldwork can be expected per site. Report documentation and agency approvals can be expected to take up to four or more times the length of the field effort.

7.4 OTHER CONSIDERATIONS

7.4.1 Technical Reports

Each phase of work requires its own scientific draft and final reports detailing the results of various investigations. All investigations will be described in standard reporting formats and, where appropriate, will be accompanied by detailed maps and illustrations. Archaeological site locations will be shown only to the City and review agencies as per Texas regulations. All reports will first be submitted to the City prior to agency review. All reports will meet the professional standards specified by the Council of Texas Archeologists guidelines and will be modeled after the Society for American Archaeology Style Guide.

7.4.2 Curation

It is a prerequisite for all of the phases of cultural resources work that an agreement be in place with a repository for the curation of all of the field documents and artifacts generated by each of the different phases of work. After the fieldwork, all of the project documentation and artifacts must be processed and analyzed in preparation for curation at a federally approved repository. One such facility is the Texas Archeological Research Laboratory, at the University of Texas, J.J. Pickle Research Campus, located in Austin. All artifacts must be curated according to the standards of the curation facility and a storage fee will be assessed for each storage drawer.

7.4.3 Structure Analyses

The project may at some point encounter intact historic (defined as 50 or more years old) properties such as buildings or bridges. Once identified, these cultural resources will be subjected to the same review processes and phases outlined above. Data recovery however, if conducted, will likely require photographic analyses and measured drawings conducted under the Historic American Buildings Survey and the Historic American Engineering Record programs administered by the U.S. Department of the Interior. As above, all work would be permitted through the THC with the approval of the USACE. The THC's Architecture Division would also be involved.

7.4.4 Cemeteries

The possibility for locating human burials, prehistoric or historic, cannot be discounted. Numerous Federal and state laws are in place to protect such resources. Texas Preservation Guidelines are published by the THC. In the event that human burials are encountered, work should immediately cease at the location and the USACE and the THC should be notified immediately. The remains should be guarded against looters.

8.0 PUBLIC INVOLVEMENT

In order to keep the community and City agencies of Alpine involved through out the flood protection planning process, the TWDB requires that three public meetings be held. Newspaper advertisements of all the public meeting announcements can be seen in Appendix E. All three public meetings were held at the Kokernot Lodge in Alpine, Texas and provided positive constructive insight and information to the Design Team.

The first Pubic Meeting was held on March 15, 2001, and began with a discussion of generic options for flood protection measures such as structural and nonstructural methods (Table 4.1) that covered channel improvements, bridge improvements, detention, flood proofing, flood warning, and city ordinances. One possibility would be to open up the channel through the Alpine Golf Course with a flood bench to contain more of the floodwaters and possibly retain some floodwaters for habitat. Another possibility discussed is to lower the channel bottom from 2nd Street to a point south of Medina Park in south Alpine. This would increase the capacity of the channel and reduce some of the flooding on the overbanks. An issue about lowering the channel is the attainment by the City of an easement through private property. City records show that within the corporate limits of Alpine, the City owns half of the property that Alpine Creek flows through. The other half is privately owned. The use of detention in the upper watershed south of the City was also discussed to lower flows to an acceptable level that the natural channel would be able to contain. If detention is needed, there is a private landowner that the City would be able to negotiate the use of their land. Other topics of discussion focused on the implementation of a hike and bike trail for pedestrian traffic, the use of treated effluent water from the City water treatment plant to revive the creek with a base flow, and the construction of wetlands for habitat. The other discussions and goals identified in the River Networks report would be considered and any recommendations from this flood reduction study would not block achieving these other long-term goals.

The second Public Meeting was held on May 10, 2001. Before the public meeting was held in the evening, a 2:00 p.m. "channel walk" was conducted to discuss the possible options for flood protection and gather input from the community as well as identify any physical constraints in the channel downstream of City Hall. A second "channel walk" was conducted on the following day focusing upon the channel reaches upstream of City Hall. The evening meeting brought the participation of several city, state, and local agencies in the area including TxDOT, the local Soil Conservation authority, the City's Park Board, members of the City Council, and several local newspapers, developers and property owners. A number of items were listed on the agenda. The need for acquiring easements on privately owned land to construct any type of flood control measure would be a priority for the City. Pedestrian safety along the stream corridor was a concern as well as access to a future implementation of a hike and bike trail. In order to keep debris from building up in the channel and backing water up, the discussion of maintenance access will also be required in the final design of any flood protection measure.

In the second half of the meeting, the possible options for flood protection were discussed. The difference between retention and detention was discussed and the need for a State water rights permit if "retention" was selected for flood bench through golf course and Kokernot Lodge area. A side channel "detention" could be a real possibility to allow the lower flow through the City and allow higher flows to be captured temporarily and slowly drained back into the creek allowing a base flow for period after a major rainstorm. No State permit would be required for the detention alternative. Finally, the options that had been investigated were presented describing differences in each of the options and how each one performs. An estimated cost of each of the options was discussed and where possible funds could be acquired to construct any or part of the flood protection measures.

The third Public Meeting was held on August 6, 2001, to submit the draft report for the Flood Protection Planning Study to the City of Alpine and the TWDB. The Design Team presented the most attainable option of conveying the 25-year storm event safely through the City and what the possible steps would be to actually constructing the improvements. How this study can be used to make improvements in phases along Alpine Creek so funding would be easier to acquire were discussed. Possible State agencies that the City could acquire funding to construct phases of the study would be from TxDOT, Texas Water Development Board, and Texas Parks and Wildlife. It was also recommended by the Design Team to utilize this study to update the Flood Insurance Rate Maps for the City of Alpine. The meeting had a sense of how could the City of Alpine to accomplish the next step.

9.0 REFERENCES

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———. 1972. 7.5 Minute Series Topographic Map. Paisano, Texas.

———. 1972. 7.5 Minute Series Topographic Map. Bird Mountain, Texas.

Appendix A
Project Photos

Location	Orientation	Figure	File
Golf Course	D/S	A.1	Photo-C2.JPG

Location	Orientation	Figure	File
D/S of N. 2nd St.	U/S @ N. 2nd St.	A.2	Photo-C4.JPG

Location	Orientation	Figure	File
N. 2nd St.	D/S	A.3	Photo-23.JPG

Location	Orientation	Figure	File
N. 2nd St.	U/S @ LWC	A.4	Photo-24.JPG

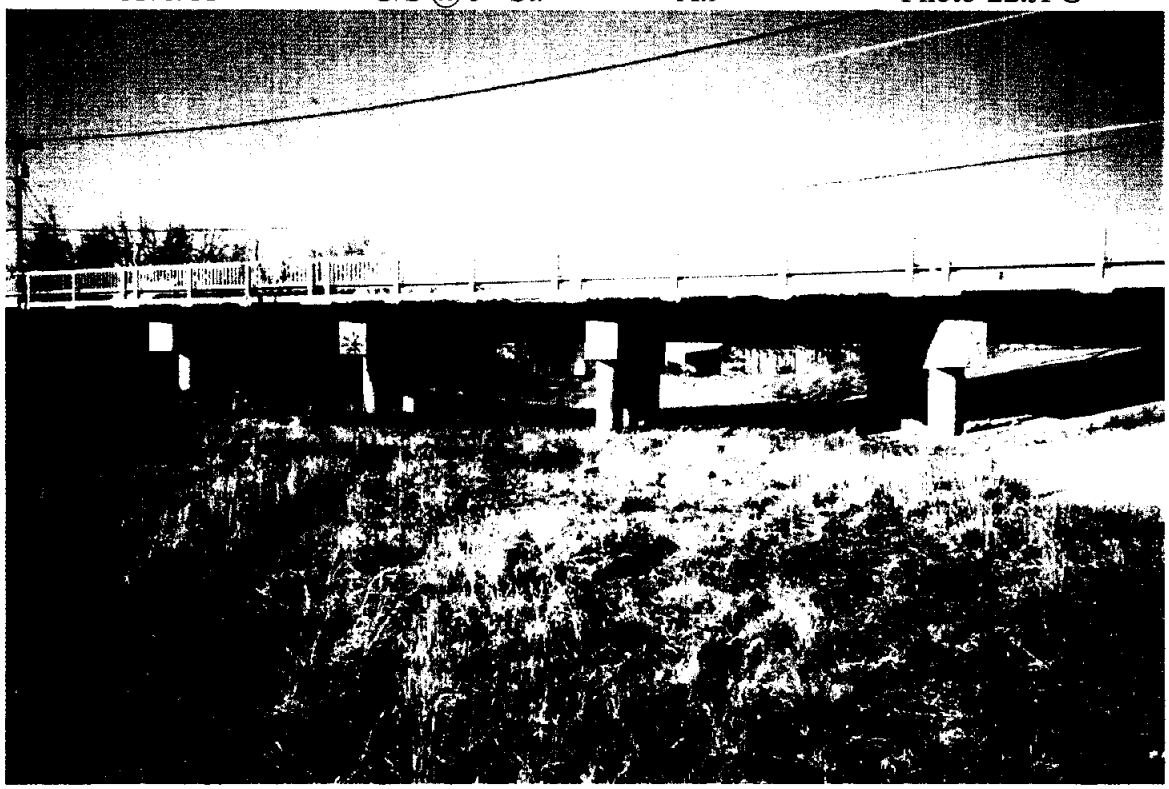
Location	Orientation	Figure	File
D/S of Brown St.	U/S	A.5	Photo-B4.JPG

Location	Orientation	Figure	File
U/S of Brown St.	U/S @ ROB	A.6	Photo-B7.JPG

Location	Orientation	Figure	File
D/S of Ave. A	U/S on ROB	A.7	Photo-B8.JPG

Location	Orientation	Figure	File
Ave. A	U/S @ LWC	A.8	Photo-B9.JPG

Location	Orientation	Figure	File
Ave. A	U/S @ 5th St.	A.9	Photo-22.JPG

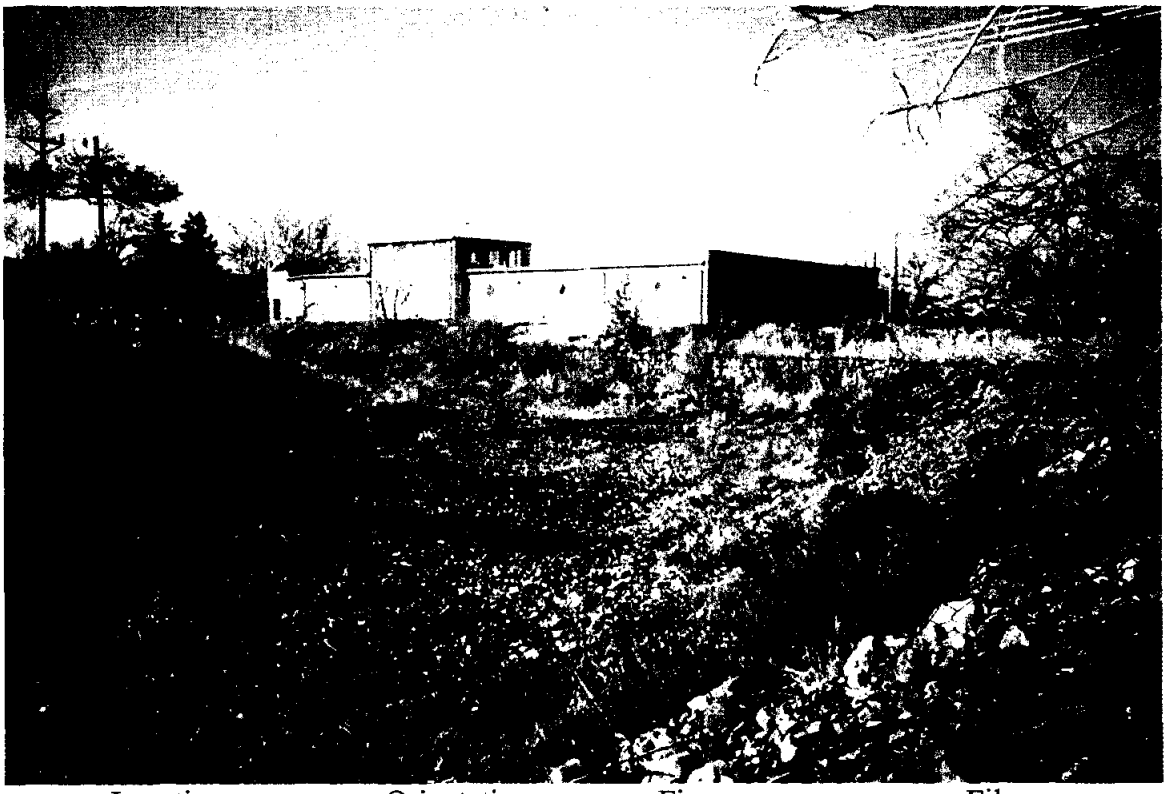


Location	Orientation	Figure	File
D/S of 5th St.	U/S	A.10	Photo-B10.JPG

Location	Orientation	Figure	File
U/s of 5th St.	U/S	A.11	Photo-B11.JPG

Location	Orientation	Figure	File
D/S of 6th St.	U/S	A.12	Photo-B12.JPG

Location	Orientation	Figure	File
U/S of 6th St.	U/S	A.13	Photo-B14.JPG



Location	Orientation	Figure	File
U/S of 6th St.	U/S @ bend	A.14	Photo-B15.JPG

Location	Orientation	Figure	File
D/S of Sul Ross Ave.	U/S	A.15	Photo-B18.JPG

Location	Orientation	Figure	File
U/S of Sul Ross Ave.	U/S	A.16	Photo-B20.JPG

Location	Orientation	Figure	File
D/S of 8th St.	U/S @ 8th St.	A.17	Photo-B21.JPG

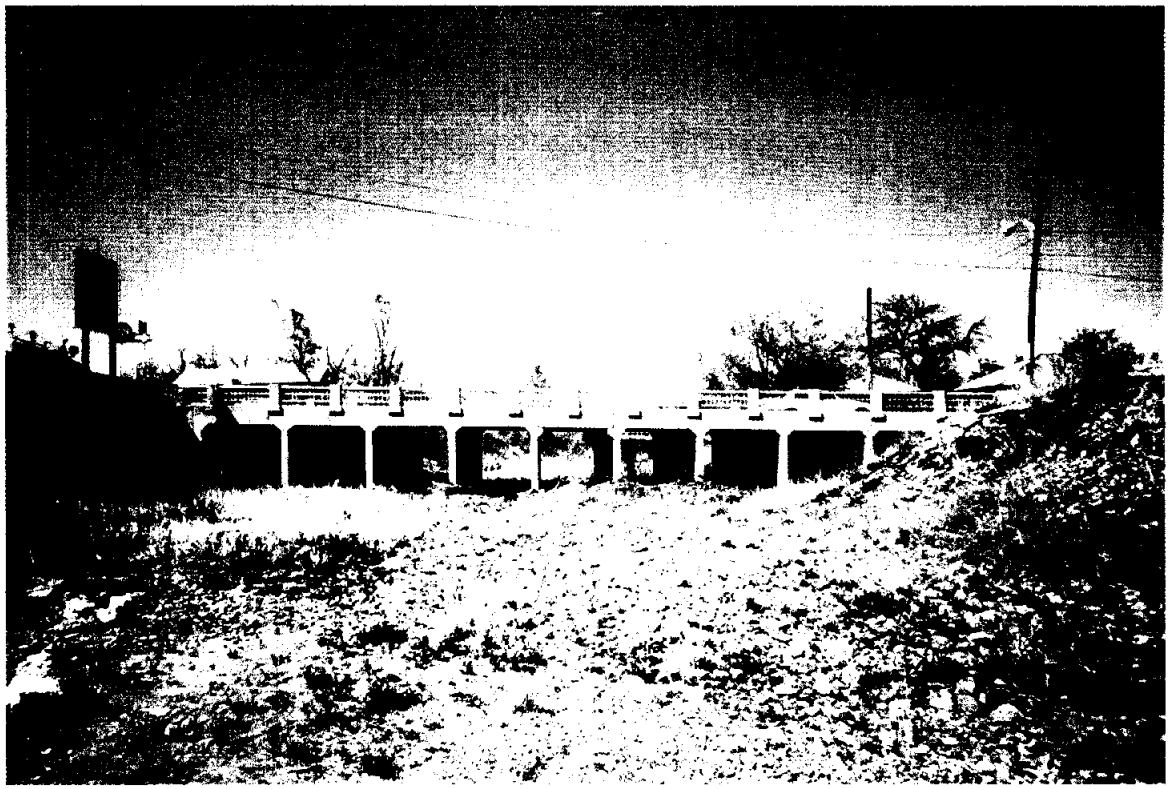
Location	Orientation	Figure	File
D/S of 8th St.	U/S @ 8th St.	A.18	Photo-B22.JPG

Location	Orientation	Figure	File
8th St.	D/S	A.19	Photo-B23.JPG

Location	Orientation	Figure	File
Ave. E	D/S	A.20	Photo-21.JPG

Location	Orientation	Figure	File
U/S of Ave. E	D/S @ Ave. E	A.21	Photo-20.JPG

Location	Orientation	Figure	File
Holland Ave.	D/S @ ROB	A.22	Photo-18.JPG



Location	Orientation	Figure	File
U/S of Holland Ave.	D/S	A.23	Photo-17.JPG

Location	Orientation	Figure	File
D/S of U.P. Railroad	U/S	A.24	Photo-1.JPG

Location	Orientation	Figure	File
Murphy Ave.	D/S	A.25	Photo-C1.JPG

Location	Orientation	Figure	File
U/S of Murphy Ave.	U/S @ S. 10th St.	A.26	Photo-6.JPG

Location	Orientation	Figure	File
S. 10th St.	U/S @ S. 11th St.	A.27	Photo-9.JPG

Location	Orientation	Figure	File
D/S of S. 11th St.	U/S @ ROB	A.28	Photo-B12.JPG

Location	Orientation	Figure	File
U/S of 11th St.	U/S @ Ave. G	A.29	Photo-12.JPG

Location	Orientation	Figure	File
Ave. G	D/S	A.30	Photo-13.JPG

Location	Orientation	Figure	File
Ave. G	U/S	A.31	Photo-14.JPG

Appendix B
Hydraulic Model Input

HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

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

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

PROJECT DATA
Project Title: Alpine Creek -- Preliminary Design
Project File : alpcrk.prj
Run Date and Time: 7/25/01 5:00:45 PM

Project in English units

Project Description:
Alpine Creek, Texas Preliminary Design.  Study done under a grant from the
Texas Water Development Board.


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

PLAN DATA

Plan Title: Revised FIS
Plan File : d:\Projects\Alpine\ras\model\alpcrk.p01

          Geometry Title: Revised FIS geometry
          Geometry File : d:\Projects\Alpine\ras\model\alpcrk.g01

          Flow Title    : Effective FIS flows
          Flow File     : d:\Projects\Alpine\ras\model\alpcrk.f01

Plan Description:
Effective FIS model including updated channel survey and new bridges data.


Plan Summary Information:
Number of:  Cross Sections =   86    Mulitple Openings =    0
            Culverts       =    1    Inline Weirs      =    0
            Bridges        =    8

Computational Information
    Water surface calculation tolerance =  0.01
    Critical depth calculaton tolerance =  0.01
    Maximum number of interations       =  40
    Maximum difference tolerance        =  0.3
    Flow tolerance factor               =  0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method:         Average Conveyance
    Computational Flow Regime:     Subcritical Flow
```

FLOW DATA

Flow Title: Effective FIS flows
Flow File : d:\Projects\Alpine\ras\model\alpcrk.f01

Flow Data (cfs)

River	Reach	RS	2yr	5yr	10yr	25yr	50yr	100yr	500yr
Alpine Creek	Alpine	19	419	1699	3811	6145	8007	11240	17447
Alpine Creek	Alpine	15	427	1691	3681	5806	7570	10719	16930
Alpine Creek	Alpine	14	427	1691	3678	5796	7558	10704	16916
Alpine Creek	Alpine	13	427	1691	3675	5790	7550	10695	16906
Alpine Creek	Alpine	12	427	1691	3670	5777	7534	10675	16887
Alpine Creek	Alpine	11	428	1690	3666	5765	7517	10656	16867
Alpine Creek	Alpine	9	428	1690	3655	5736	7481	10612	16824
Alpine Creek	Alpine	5	430	1688	3624	5657	7379	10490	16703
Alpine Creek	Alpine	4	445	1687	3895	5635	7910	11340	18295
Alpine Creek	Alpine	1	448	1720	3881	6035	7845	11182	18015

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Alpine Creek	Alpine	2yr	Normal S = .00969	Normal S = .010433
Alpine Creek	Alpine	5yr	Normal S = .00969	Normal S = .010433
Alpine Creek	Alpine	10yr	Normal S = .00969	Normal S = .010433
Alpine Creek	Alpine	25yr	Normal S = .00969	Normal S = .010433
Alpine Creek	Alpine	50yr	Normal S = .00969	Normal S = .010433
Alpine Creek	Alpine	100yr	Normal S = .00969	Normal S = .010433
Alpine Creek	Alpine	500yr	Normal S = .00969	Normal S = .010433

Observed Water Surface Marks

River	Reach	RS	2yr	5yr	10yr	25yr	50yr	100yr	500yr
Alpine Creek	Alpine	19						4527	
Alpine Creek	Alpine	18						4506	
Alpine Creek	Alpine	17						4498.3	
Alpine Creek	Alpine	15						4490.8	
Alpine Creek	Alpine	14						4490.3	
Alpine Creek	Alpine	13						4488.1	
Alpine Creek	Alpine	12.5						4485.4	
Alpine Creek	Alpine	12						4482.5	
Alpine Creek	Alpine	11.5						4477.8	
Alpine Creek	Alpine	11						4476.5	
Alpine Creek	Alpine	10						4473.2	
Alpine Creek	Alpine	9						4469	
Alpine Creek	Alpine	8						4466.5	
Alpine Creek	Alpine	7						4460.3	
Alpine Creek	Alpine	6						4454.4	
Alpine Creek	Alpine	5						4446.5	
Alpine Creek	Alpine	4						4435.2	
Alpine Creek	Alpine	3						4422	
Alpine Creek	Alpine	2						4416	

GEOMETRY DATA

Geometry Title: Revised FIS geometry
Geometry File : d:\Projects\Alpine\ras\model\alpcrk.g01

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 19

INPUT
Description: XS U
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4536.8	591	4532.9	600	4532.7	642	4530.8	655	4517.4
673	4518.9	689	4519.3	694	4520.7	700	4520.3	707	4523.5
800	4522.8	900	4522.9	1000	4523.2	1100	4524.4	1200	4525.5
1300	4527.2	1400	4527.6	1500	4532.2	1580	4537.5		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	642	.055	707	.085

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
642	707	403.99	486	403.99	.1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev
707	1580	4523.5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 18.8*

INPUT
Description:
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4532.68	84.2	4532.02	252.6	4530.95	355.32	4530.11	421	4529.6
505.2	4528.84	589.4	4528.05	616.34	4527.8	620.09	4527.76	629.53	4527.55
673.6	4525.78	686.2	4519.29	694.84	4513.93	697	4512.74	703.57	4513.35
712.6	4514.12	716.04	4514.45	725.73	4514.94	732.96	4515.44	738.25	4516.83
744.6	4516.83	752	4519.76	818.19	4519.93	838.71	4519.92	847.76	4519.99
931.96	4520.17	988.6	4520.39	1005.49	4520.39	1025.2	4520.45	1118.44	4521.45
1129.43	4521.56	1211.68	4522.43	1270.26	4523.35	1304.92	4523.9	1398.16	4524.34
1411.09	4524.87	1491.41	4528.29	1543.47	4531.42	1566	4533.14		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	673.6	.045	752	.085

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
673.6	752	403.99	486	403.99	.1 .3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 18.6*

INPUT
Description:
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4528.56	88.15	4527.76	264.45	4526.69	371.99	4525.66	440.75	4525.05
528.9	4524.05	617.05	4523.02	645.26	4522.67	649.18	4522.62	659.07	4522.39
705.2	4520.76	723.4	4514.99	735.88	4509.22	739	4508.08	745.93	4508.79
755.45	4509.62	759.08	4510	769.3	4510.76	776.92	4511.59	782.5	4512.96
789.19	4513.36	797	4516.02	858.39	4516.9	877.43	4517.05	885.82	4517.17
963.91	4517.44	1016.45	4517.69	1032.12	4517.64	1050.4	4517.7	1136.88	4518.51
1147.07	4518.6	1223.36	4519.37	1277.69	4520.14	1309.85	4520.61	1396.33	4521.09
1408.31	4521.5	1482.81	4524.39	1531.1	4526.94	1552	4528.78		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	705.2	.045	797	.085

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
705.2	797	403.99	486	403.99	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 18.4*

INPUT
Description:
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4524.44	92.1	4523.51	276.3	4522.42	388.66	4521.21	460.5	4520.5
552.6	4519.27	644.7	4517.98	674.17	4517.55	678.27	4517.48	688.6	4517.24
736.8	4515.74	760.6	4510.69	776.92	4504.51	781	4503.42	788.28	4504.23
798.3	4505.11	802.12	4505.55	812.87	4506.57	820.88	4507.73	826.75	4509.09
833.79	4509.88	842	4512.28	898.6	4513.87	916.14	4514.17	923.88	4514.34
995.87	4514.7	1044.3	4514.99	1058.75	4514.89	1075.59	4514.95	1155.32	4515.56
1164.71	4515.63	1235.04	4516.3	1285.13	4516.93	1314.77	4517.31	1394.49	4517.83
1405.54	4518.14	1474.22	4520.48	1518.73	4522.46	1538	4524.42		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	736.8	.045	842	.085

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
736.8	842	403.99	486	403.99	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 18.2*

INPUT
Description:
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4520.32	96.05	4519.25	288.15	4518.16	405.33	4516.75	480.25	4515.95
576.3	4514.48	672.35	4512.94	703.09	4512.42	707.36	4512.34	718.13	4512.08
768.4	4510.72	797.8	4506.4	817.96	4499.81	823	4498.76	830.64	4499.66
841.15	4500.61	845.15	4501.1	856.43	4502.39	864.85	4503.87	871	4505.22
878.38	4506.41	887	4508.54	938.8	4510.83	954.86	4511.3	961.94	4511.52
1027.83	4511.97	1072.15	4512.3	1085.37	4512.15	1100.79	4512.2	1173.76	4512.62
1182.36	4512.67	1246.73	4513.23	1292.56	4513.71	1319.69	4514.02	1392.66	4514.57
1402.77	4514.77	1465.63	4516.58	1506.37	4517.98	1524	4520.06		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	768.4	.045	887	.085

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
768.4	887	403.99	486	403.99	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 18

INPUT
Description: XS T
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
	4516.2	100	4515	300	4513.9	422	4512.3	500	4511

600	4509.7	700	4507.9	732	4507.3	800	4505.7	835	4502.1
859	4495.1	865	4494.1	873	4495.1	884	4496.1	900	4498.2
932	4504.8	979	4507.8	1000	4508.7	1100	4509.6	1112	4509.4
1200	4509.7	1300	4510,5	1400	4511.4	1494	4513.5	1510	4515.7

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	800	.045	932	.085

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
800	932	130.74	140	130.74 .1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 17.8842*

INPUT
Description:
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4514.3	55.14	4513.66	92.91	4513.25	136.67	4513.04	278.74	4512.3
287.74	4512.19	392.09	4510.76	464.56	4509.88	479.54	4509.62	557.48	4508.26
650.39	4506.56	680.12	4505.99	719.33	4505.07	731.32	4504.75	743.31	4504.32
754.43	4502.49	775.25	4500.38	797.16	4494.16	802.64	4493.27	810.26	4494.17
820.75	4495.07	836	4496.96	836.18	4497	866.51	4503.47	887.25	4504.55
917.8	4506.3	926.91	4506.67	940.72	4507.16	948.25	4507.22	1009.26	4507.6
1049.85	4507.98	1062.94	4507.82	1070.26	4507.86	1131.26	4508.05	1158.98	4508.16
1192.26	4508.41	1211.78	4508.53	1253.27	4508.84	1268.1	4508.95	1314.27	4509.32
1375.27	4509.81	1377.23	4509.83	1436.27	4510.98	1454.58	4511.36	1479.81	4511.87
1497.27	4513.85								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	743.31	.045	866.51	.085

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
743.31	866.51	130.74	140	130.74 .1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 17.7685*

INPUT
Description:
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4512.4	50.94	4511.83	85.83	4511.49	126.24	4511.33	257.48	4510.7
265.79	4510.61	362.19	4509.22	429.13	4508.36	442.97	4508.11	514.96	4506.83
600.78	4505.22	628.24	4504.69	664.47	4503.83	675.54	4503.5	686.61	4502.95
696.67	4500.52	715.51	4498.66	735.32	4493.22	740.27	4492.43	747.53	4493.24
757.5	4494.05	772.01	4495.72	772.17	4495.75	801.02	4502.14	823.5	4503.1
856.6	4504.81	866.47	4505.18	881.44	4505.62	889.6	4505.67	955.71	4505.94
999.69	4506.35	1013.88	4506.25	1021.82	4506.29	1087.92	4506.49	1117.95	4506.62
1154.02	4506.88	1175.17	4506.96	1220.13	4507.29	1236.21	4507.4	1286.24	4507.76
1352.34	4508.24	1354.46	4508.26	1418.44	4509.35	1438.28	4509.75	1465.62	4510.24
1484.54	4512								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	686.61	.045	801.02	.085

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
686.61	801.02	130.74	140	130.74 .1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 17.6528*

INPUT
Description:
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4510.51	46.73	4510.01	78.74	4509.74	115.82	4509.62	236.22	4509.11
243.84	4509.02	332.28	4507.69	393.7	4506.84	406.39	4506.6	472.44	4505.39
551.17	4503.88	576.37	4503.38	609.6	4502.59	619.76	4502.25	629.92	4501.57
638.91	4498.56	655.76	4496.94	673.48	4492.28	677.91	4491.6	684.79	4492.3
694.25	4493.02	708.01	4494.49	708.17	4494.51	735.54	4500.81	759.75	4501.64
795.41	4503.31	806.03	4503.69	822.16	4504.07	830.95	4504.12	902.17	4504.28
949.54	4504.73	964.83	4504.67	973.37	4504.73	1044.58	4504.93	1076.93	4505.07
1115.78	4505.35	1138.57	4505.4	1187	4505.74	1204.31	4505.85	1258.2	4506.2
1329.41	4506.67	1331.69	4506.68	1400.61	4507.71	1421.98	4508.13	1451.43	4508.61
1471.82	4510.14								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	629.92	.045	735.54	.085

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
629.92	735.54	130.74	140	130.74	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 17.5371*

INPUT
Description:
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4508.61	42.53	4508.18	71.65	4507.98	105.39	4507.92	214.96	4507.51
221.9	4507.44	302.38	4506.15	358.26	4505.32	369.82	4505.1	429.92	4503.96
501.57	4502.54	524.49	4502.08	554.74	4501.35	563.98	4501	573.22	4500.2
581.16	4496.6	596.01	4495.22	611.64	4491.34	615.54	4490.76	622.05	4491.37
631	4492	644.02	4493.25	644.16	4493.27	670.05	4499.48	695.99	4500.18
734.21	4501.82	745.6	4502.21	762.88	4502.53	772.3	4502.58	848.62	4502.61
899.39	4503.1	915.77	4503.1	924.93	4503.16	1001.23	4503.36	1035.9	4503.53
1077.54	4503.81	1101.96	4503.84	1153.86	4504.19	1172.41	4504.3	1230.17	4504.64
1306.47	4505.1	1308.92	4505.11	1382.78	4506.08	1405.68	4506.51	1437.25	4506.98
1459.09	4508.29								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	573.22	.045	670.05	.085

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
573.22	670.05	130.74	140	130.74	.3	.5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 17.4214

INPUT
Description: S. Ave G
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4506.71	38.32	4506.35	64.57	4506.23	94.97	4506.21	193.7	4505.91
199.95	4505.86	272.47	4504.61	322.83	4503.8	333.24	4503.59	387.4	4502.52
451.96	4501.2	472.62	4500.77	499.87	4500.11	508.2	4499.75	516.53	4498.82
523.4	4494.64	536.27	4493.5	549.8	4490.4	553.18	4489.93	559.32	4490.44
567	4490.97	580.02	4492.01	580.16	4492.03	604.56	4498.15	632.24	4498

```
  673.01 4500.32  685.16 4500.72   703.6 4500.99  713.65 4501.03  795.07 4500.95
  849.24 4501.48  866.71 4501.52  876.48  4501.6  957.89  4501.8  994.88 4501.99
  1039.3 4502.28 1065.35 4502.28 1120.72 4502.64 1140.52 4502.75 1202.13 4503.08
 1283.54 4503.53 1286.16 4503.54 1364.95 4504.45 1389.38 4504.89 1423.06 4505.35
 1461.86    4507

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0    .085  516.53    .045  604.56    .085

Bank Sta: Left   Right     Lengths: Left Channel   Right     Coeff Contr.   Expan.
        516.53  604.56                  60      60      60             .3      .5

BRIDGE                  RIVER: Alpine Creek
REACH: Alpine             RS: 17.3

INPUT
Description: W. Ave G (new)
Distance from Upstream XS =       10
Deck/Roadway Width        =       40
Weir Coefficient          =      2.6
Bridge Deck/Roadway Skew  =
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************
     500     4499  4497.5     618     4498  4496.5

Upstream Bridge Cross Section Data
Station Elevation Data    num=      46
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*********************************************************************************
       0 4506.71   38.32 4506.35   64.57 4506.23   94.97 4506.21   193.7 4505.91
  199.95 4505.86  272.47 4504.61  322.83  4503.8  333.24 4503.59   387.4 4502.52
  451.96  4501.2  472.62 4500.77  499.87 4500.11   508.2 4499.75  516.53 4498.82
   523.4 4494.64  536.27  4493.5   549.8  4490.4  553.18 4489.93  559.32 4490.44
  567.75 4490.97  580.02 4492.01  580.16 4492.03  604.56 4498.15  632.24 4498.72
  673.01 4500.32  685.16 4500.72   703.6 4500.99  713.65 4501.03  795.07 4500.95
  849.24 4501.48  866.71 4501.52  876.48  4501.6  957.89  4501.8  994.88 4501.99
  1039.3 4502.28 1065.35 4502.28 1120.72 4502.64 1140.52 4502.75 1202.13 4503.08
 1283.54 4503.53 1286.16 4503.54 1364.95 4504.45 1389.38 4504.89 1423.06 4505.35
 1461.86    4507

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0    .085  516.53    .045  604.56    .085

Bank Sta: Left   Right     Coeff Contr.   Expan.
        516.53  604.56             .3       .5

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************
     500     4499  4497.5     618     4498  4496.5

Downstream Bridge Cross Section Data
Station Elevation Data    num=      46
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*********************************************************************************
       0 4506.71   38.32 4506.35   64.57 4506.23   94.97 4506.21   193.7 4505.91
  199.95 4505.86  272.47 4504.61  322.83  4503.8  333.24 4503.59   387.4 4502.52
  451.96  4501.2  472.62 4500.77  499.87 4500.11   508.2 4499.75  516.53 4498.82
   523.4 4494.64  536.27  4493.5   549.8  4490.4  553.18 4489.93  559.32 4490.44
  567.75 4490.97  580.02 4492.01  580.16 4492.03  604.56 4498.15  632.24 4498.72
```

```
  673.01 4500.32  685.16 4500.72   703.6 4500.99  713.65 4501.03  795.07 4500.95
  849.24 4501.48  866.71 4501.52  876.48  4501.6  957.89  4501.8  994.88 4501.99
  1039.3 4502.28 1065.35 4502.28 1120.72 4502.64 1140.52 4502.75 1202.13 4503.08
 1283.54 4503.53 1286.16 4503.54 1364.95 4504.45 1389.38 4504.89 1423.06 4505.35
 1461.86  4506.8

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0     .11  516.53     .04  604.56     .11

Bank Sta: Left   Right    Coeff Contr.   Expan.
        516.53  604.56             .3       .5

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

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .8
           Max Low Cord                =

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

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 17.2

INPUT
Description: Additional XS for bridge interpolated from sta. 18 and 17.2
Station Elevation Data    num=      46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0 4506.71   38.32 4506.35   64.57 4506.23   94.97 4506.21   193.7 4505.91
  199.95 4505.86  272.47 4504.61  322.83  4503.8  333.24 4503.59   387.4 4502.52
  451.96  4501.2  472.62 4500.77  499.87 4500.11   508.2 4499.75  516.53 4498.82
   523.4 4494.64  536.27  4493.5   549.8  4490.4  553.18 4489.93  559.32 4490.44
  567.75 4490.97  580.02 4492.01  580.16 4492.03  604.56 4498.15  632.24 4498.72
  673.01 4500.32  685.16 4500.72   703.6 4500.99  713.65 4501.03  795.07 4500.95
  849.24 4501.48  866.71 4501.52  876.48  4501.6  957.89  4501.8  994.88 4501.99
  1039.3 4502.28 1065.35 4502.28 1120.72 4502.64 1140.52 4502.75 1202.13 4503.08
 1283.54 4503.53 1286.16 4503.54 1364.95 4504.45 1389.38 4504.89 1423.06 4505.35
 1461.86  4506.8

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0     .11  516.53     .04  604.56     .11

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.   Expan
        516.53  604.56            104.07   112.5  104.07              .3       .
```

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 17.15*

INPUT
Description:
Station Elevation Data num= 67

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4504.98	34.4	4504.69	34.96	4504.69	57.96	4504.63	85.25	4504.66
86.65	4504.65	173.87	4504.46	179.48	4504.42	182.42	4504.38	244.57	4503.23
289.78	4502.43	299.12	4502.24	304.03	4502.14	347.74	4501.24	405.69	4500.01
424.23	4499.61	448.69	4499.01	456.05	4498.72	456.17	4498.71	463.65	4497.92
468.61	4494.97	470.53	4493.95	483.43	4492.12	487.73	4491.06	497	4488.85
500.39	4488.28	505.93	4488.79	513.53	4489.36	519.25	4489.9	524.61	4490.63
524.73	4490.66	546.75	4496.73	569.82	4497.3	575.95	4497.44	618.96	4499
626.04	4499.23	631.78	4499.37	651.23	4499.59	656.32	4499.61	661.83	4499.61
742.81	4499.44	747.72	4499.45	804.87	4500.01	823.3	4500.1	829.31	4500.15
833.6	4500.18	91[illegible].8	4500.37	919.48	4500.38	958.5	4500.59	1002.3	4500.87
1005.36	4500.88	1029.97	4500.86	1032.84	4500.86	1088.79	4501.22	1091.25	4501.23
1112.14	4501.34	1175.29	4501.65	1177.13	4501.66	1261.78	4502.09	1263.01	4502.1
1265.77	4502.11	1348.28	4502.96	1348.89	4502.97	1374.22	4503.41	1374.66	4503.42
1410.19	4503.87	1434.77	4504.75						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.112	463.65	.04	546.75	.117	1434.77	.117

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
463.65	546.75	104.07	112.5	104.07	.3	.5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 17.1*

INPUT
Description:
Station Elevation Data num= 67

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4503.25	30.47	4503.03	30.98	4503.02	51.35	4503.03	75.52	4503.1
76.77	4503.1	154.04	4503	159.01	4502.98	161.61	4502.95	216.68	4501.84
256.73	4501.07	265.01	4500.89	269.35	4500.79	308.08	4499.95	359.42	4498.81
375.85	4498.45	397.52	4497.92	404.03	4497.68	404.14	4497.67	410.77	4497.01
415.74	4494.13	417.67	4493.26	430.6	4490.74	434.9	4489.6	444.19	4487.31
447.59	4486.62	452.53	4487.13	459.32	4487.75	464.42	4488.28	469.19	4489.25
469.31	4489.28	488.95	4495.3	513.21	4496	519.66	4496.16	564.91	4497.69
572.36	4497.92	57[illegible].4	4498.02	598.86	4498.19	604.21	4498.2	610.01	4498.2
695.21	4497.93	700.87	4497.95	760.49	4498.55	779.88	4498.68	786.2	4498.73
790.72	4498.75	877.2	4498.95	881.07	4498.96	922.12	4499.19	968.2	4499.48
971.42	4499.48	997.32	4499.44	1000.33	4499.45	1059.19	4499.81	1061.78	4499.83
1083.76	4499.93	1150.19	4500.24	1152.13	4500.24	1241.19	4500.66	1242.48	4500.67
1245.39	4500.69	1332.18	4501.47	1332.83	4501.48	1359.48	4501.94	1359.94	4501.95
1397.32	4502.38	1423.18	4503.07						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.115	410.77	.04	488.95	.125	1423.18	.125

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
410.77	488.95	104.07	112.5	104.07	.3	.5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 17.05*

INPUT

Description:
Station Elevation Data num= 67

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4501.53	26.55	4501.36	26.99	4501.36	44.74	4501.43	65.8	4501.55
66.88	4501.55	134.21	4501.55	138.54	4501.54	140.81	4501.53	188.78	4500.46
223.68	4499.7	230.89	4499.53	234.68	4499.45	268.41	4498.67	313.14	4497.62
327.46	4497.29	346.34	4496.82	352.02	4496.64	352.11	4496.63	357.88	4496.1
362.87	4493.3	364.8	4492.57	377.76	4489.36	382.08	4488.14	391.39	4485.76
394.79	4484.96	399.14	4485.48	405.1	4486.14	409.58	4486.67	413.78	4487.88
413.88	4487.91	431.14	4493.88	456.61	4494.7	463.38	4494.89	510.86	4496.38
518.68	4496.61	525.01	4496.67	546.49	4496.79	552.11	4496.8	558.2	4496.78
647.6	4496.41	653.03	4496.46	716.12	4497.08	736.47	4497.25	743.1	4497.32
747.85	4497.33	838.6	4497.52	842.66	4497.54	885.75	4497.79	934.1	4498.09
937.48	4498.09	964.66	4498.02	967.82	4498.03	1029.6	4498.41	1032.31	4498.42
1055.38	4498.52	1125.1	4498.82	1127.13	4498.83	1220.59	4499.23	1221.95	4499.24
1225	4499.26	1316.09	4499.99	1316.77	4500	1344.74	4500.47	1345.22	4500.48
1384.45	4500.9	1411.59	4501.39						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.117	357.88	.04	431.14	.132	1411.59	.132

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
357.88	431.14	104.07	112.5	104.07	.3	.5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 17

INPUT
Description: XS S -- S. 11th St.
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4499.8	23	4499.7	57	4500	120	4500.1	200	4498.1
300	4495.6	305	4495.2	310	4492.46	329.25	4486.68	342	4483.31
354.75	4485.06	373.33	4492.46	400	4493.4	465	4495.3	500	4495.4
600	4494.9	700	4495.9	800	4496.1	900	4496.7	932	4496.6
1000	4497	1100	4497.4	1200	4497.8	1300	4498.5	1330	4499
1401.8	4500.54								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.12	305	.04	373.33	.14

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
305	373.33	60	60	60	.3	.5

BRIDGE RIVER: Alpine Creek
REACH: Alpine RS: 16.7

INPUT
Description: S. 11th St. Bridge (new)
Distance from Upstream XS = 10
Deck/Roadway Width = 40
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
305	4496.5	4495	373.8	4493.9	4492.4

Upstream Bridge Cross Section Data
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4499.8	23	4499.7	57	4500	120	4500.1	200	4498.1
300	4495.6	305	4495,2	310	4492.46	329.25	4486.68	342	4483.31
354.75	4485.06	373.33	4492.46	400	4493.4	465	4495.3	500	4495.4
600	4494.9	700	4495.9	800	4496.1	900	4496.7	932	4496.6
1000	4497	1100	4497.4	1200	4497.8	1300	4498.5	1330	4499
1401.8	4500.54								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.12	305	.04	373.33	.14

Bank Sta: Left	Right	Coeff Contr.	Expan.
305	373.33	.3	.5

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
305 4496.5	4495	373.8 4493.9	4492.4

Downstream Bridge Cross Section Data
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4499.8	23	4499.7	57	4500	120	4500.1	200	4498.1
300	4495.6	305	4495.2	310	4492.46	329.25	4486.68	342	4483.31
354.75	4485.06	373.33	4492.46	400	4493.4	465	4495.3	500	4495.4
600	4494.9	700	4495.9	800	4496.1	900	4496.7	932	4496.6
1000	4497	1100	4497.4	1200	4497.8	1300	4498.5	1330	4499
1400	4500.48								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.12	305	.04	373.33	.14

Bank Sta: Left	Right	Coeff Contr.	Expan.
305	373.33	.3	.5

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

Number of Bridge Coefficient Sets = 1

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

High Flow Method
Pressure and Weir flow
Submerged Inlet Cd =
Submerged Inlet + Outlet Cd = .5
Max Low Cord =

Additional Bridge Parameters
Add Friction component to Momentum
Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth
inside the bridge at the upstream end

Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 16.5

INPUT
Description: Additional XS for bridge copied from sta. 17
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4499.8	23	4499.7	57	4500	120	4500.1	200	4498.1
300	4495.6	305	4495.2	310	4492.46	329.25	4486.68	342	4483.31
354.75	4485.06	373.33	4492.46	400	4493.4	465	4495.3	500	4495.4
600	4494.9	700	4495.9	800	4496.1	900	4496.7	932	4496.6
1000	4497	1100	4497.4	1200	4497.8	1300	4498.5	1330	4499
1400	4500.48								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.12	305	.04	373.33	.14

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
305	373.33	129.04	150	129.04	.3	.5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 16.25*

INPUT
Description:
Station Elevation Data num= 60

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4499.47	24.81	4499.38	25.22	4499.38	56.5	4499.6	61.5	4499.61
62.5	4499.62	112.99	4499.49	129.46	4499.48	131.59	4499.47	169.49	4498.62
215.77	4497.59	219.31	4497.51	225.98	4497.36	282.47	4496.02	323.66	4494.84
328.97	4494.64	329.06	4494.64	334.45	4494.09	338.72	4491.7	339.35	4491.4
349.38	4488.46	358.21	4485.97	370.7	4482.78	383.32	4484.93	391.37	4487.9
401.7	4491.67	428.82	4492.52	465.17	4493.5	475.83	4493.73	494.9	4494.23
530.48	4494.47	538.86	4494.48	558.09	4494.42	572.8	4494.39	632.15	4494.17
651.01	4494.31	669.76	4494.44	720.7	4494.9	733.82	4495.03	766.73	4495.14
808.98	4495.24	835.49	4495.31	863.7	4495.46	937.16	4495.91	960.67	4495.9
969.69	4495.88	991.69	4495.98	1038.83	4496.26	1045.93	4496.29	1057.64	4496.34
1140.49	4496.66	1154.6	4496.71	1208.55	4496.92	1242.16	4497.1	1251.57	4497.17
1343.83	4497.91	1348.53	4497.99	1374.33	4498.42	1377.62	4498.45	1445.5	4499.18

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.12	334.45	.04	401.7	.14

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
334.45	401.7	129.04	150	129.04	.3	.5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 16.*

INPUT
Description:
Station Elevation Data num= 60

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4499.14	27	4499.05	27.44	4499.05	61.47	4499.25	66.91	4499.24
68.01	4499.23	122.94	4498.9	140.86	4498.86	143.17	4498.84	184.41	4498.01
234.77	4497	238.62	4496.92	245.88	4496.77	307.34	4495.38	352.16	4493.96
357.93	4493.69	358.03	4493.68	363.9	4492.98	368.09	4490.6	368.7	4490.35
378	4487.54	387.17	4485.26	399.4	4482.25	411.88	4484.81	419.85	4487

430.07	4490.88	457.63	4491.64	494.58	4492.55	505.42	4492.72	524.8	4493.17
560.97	4493.55	569.48	4493.6	589.03	4493.58	603.97	4493.58	664.3	4493.45
683.47	4493.54	702.53	4493.61	754.31	4494.04	767.64	4494.15	801.09	4494.32
844.03	4494.44	870.98	4494.52	899.66	4494.66	974.32	4495.12	998.21	4495.16
1007.38	4495.15	1029.74	4495.22	1077.65	4495.52	1084.87	4495.55	1096.77	4495.6
1180.99	4495.92	1195.83	4495.97	1250.16	4496.18	1284.33	4496.41	1293.89	4496.48
1387.66	4497.33	1392.44	4497.39	1418.66	4497.83	1422.01	4497.88	1491	4498.66

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.12	363.9	.04	430.07	.14

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
363.9	430.07	129.04	129.04	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 15.75*

INPUT
Description:
Station Elevation Data num= 60

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4498.81	29.18	4498.73	29.66	4498.73	66.45	4498.89	72.33	4498.86
73.51	4498.85	132.89	4498.32	152.26	4498.24	154.76	4498.21	199.34	4497.39
253.77	4496.4	257.93	4496.33	265.78	4496.19	332.22	4494.73	380.66	4493.07
386.9	4492.73	387.01	4492.73	393.35	4491.87	397.45	4489.5	398.05	4489.29
407.67	4486.61	416.13	4484.54	428.11	4481.73	440.45	4484.68	448.33	4487.09
458.44	4490.08	486.44	4490.76	523.99	4491.61	535	4491.7	554.7	4492.1
591.45	4492.62	600.1	4492.73	619.96	4492.73	635.15	4492.78	696.46	4492.72
715.93	4492.77	735.3	4492.78	787.91	4493.17	801.46	4493.28	835.45	4493.5
879.09	4493.63	906.47	4493.73	935.61	4493.86	1011.47	4494.33	1035.76	4494.43
1045.07	4494.43	1067.8	4494.47	1116.48	4494.77	1123.82	4494.82	1135.91	4494.87
1221.48	4495.18	1236.05	4495.23	1291.77	4495.43	1326.49	4495.71	1336.2	4495.79
1431.49	4496.74	1436.35	4496.8	1463	4497.25	1466.39	4497.3	1536.5	4498.14

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.12	393.35	.045	458.44	.14

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
393.35	458.44	129.04	129.04	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 15.5

INPUT
Description: 10th. St. (LW Xing) -- Interpolated XS
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4498.48	31.37	4498.4	71.42	4498.54	77.74	4498.48	142.84	4497.73
163.66	4497.62	214.26	4496.78	272.77	4495.81	285.68	4495.6	357.09	4494.09
409.16	4492.19	415.98	4491.77	422.8	4490.76	426.81	4488.39	436.81	4485.69
456.81	4481.2	476.81	4486.69	486.81	4489.29	553.4	4490.66	564.59	4490.68
630.72	4491.85	650.9	4491.89	666.33	4491.97	748.39	4492	768.07	4491.95
821.52	4492.3	869.81	4492.68	914.14	4492.83	971.56	4493.06	1073.3	4493.7
1105.85	4493.72	1162.76	4494.08	1175.04	4494.13	1276.78	4494.49	1333.38	4494.69
1378.52	4495.1	1480.26	4496.21	1510.78	4496.72	1582	4497.62		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.12	422.8	.045	486.81	.14

```
Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.    Expan.
          422.8  486.81             94.63     110   94.63              .1       .3

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 15.3333*

INPUT
Description:
Station Elevation Data    num=      54
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
**********************************************************************************
       0 4497.82    35.75 4497.75    80.31 4497.82     81.4 4497.82     88.6 4497.71
  160.62 4496.57    162.8 4496.54   186.52 4496.37   240.93 4495.62   244.19 4495.57
  310.88 4494.65   321.24 4494.51   325.59 4494.43   401.56 4492.93   406.98 4492.76
  466.32 4490.37   474.09 4489.94   475.44  4489.8   481.87 4489.06   485.72  4487.1
  492.76 4485.07   495.33 4484.41   514.54 4480.08   534.54 4485.19   544.54 4487.88
  613.15 4489.12   624.68 4489.18   654.08 4489.66   676.74 4489.92   692.82 4490.11
  713.61 4490.14   729.51  4490.2   771.18 4490.22   814.07 4490.35   834.34 4490.38
  865.61  4490.6   889.42 4490.71   936.43 4490.97   939.17 4490.99   984.85 4491.18
 1026.14 4491.36 1044.02 4491.45 1148.85 4492.12 1182.39 4492.21 1241.02 4492.59
 1253.68 4492.66 1266.94 4492.72 1358.51 4493.02 1416.83 4493.21  1432.2 4493.32
 1463.34 4493.68 1568.17 4495.03 1599.62 4495.55    1673 4496.58

Manning's n Values        num=      3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
       0     .12   481.87    .045   544.54     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.    Expan.
          481.87 544.54             94.63     110   94.63              .1       .3

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 15.1666*

INPUT
Description:
Station Elevation Data    num=      54
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
**********************************************************************************
       0 4497.16    40.14  4497.1    90.16 4497.11    91.38 4497.09    99.46 4496.94
  180.31 4495.38   182.75 4495.36   209.39 4495.12   270.47 4494.41   274.13 4494.37
  348.98 4493.49   360.62 4493.35    365.5 4493.27   450.78 4491.66   456.86 4491.42
  523.48 4488.54   532.21 4488.11   533.72    4488   540.93 4487.36   544.63  4485.8
  551.38 4483.74   553.84 4483.14   572.27 4478.96   592.27  4483.7   602.27 4486.48
  672.91 4487.57   684.78 4487.69   715.04 4488.13   738.37 4488.26   754.92 4488.36
  776.33 4488.39    792.7 4488.43   835.59 4488.46   879.74 4488.71   900.62 4488.81
   932.8 4489.05   957.32 4489.12 1005.72 4489.29 1008.54  4489.3 1055.56 4489.52
 1098.07 4489.73 1116.47 4489.84 1224.39 4490.54 1258.92 4490.71 1319.29  4491.1
 1332.31 4491.18 1345.97 4491.26 1440.24 4491.55 1500.27 4491.73  1516.1 4491.81
 1548.16 4492.26 1656.08 4493.85 1688.45 4494.39    1764 4495.54

Manning's n Values        num=      3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
       0     .12   540.93    .045   602.27    .095

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.    Expan.
          540.93 602.27             94.63     110   94.63              .1       .3

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 15

INPUT
Description: XS R -- Murphy St. (LW Xing)
Station Elevation Data    num=      21
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Ele
**********************************************************************************
```

0	4496.5	100	4496.4	200	4494.2	300	4493.2	400	4492.2
500	4490.4	592	4486.2	600	4485.66	610	4482.4	630	4477.84
650	4482.2	660	4485.07	776	4486.6	800	4486.6	900	4486.7
1000	4487.5	1075	4487.6	1170	4488.1	1425	4489.8	1600	4490.3
1855	4494.5								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.13	600	.045	660	.095

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
600	660	63.33	63.33	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 14.8333*

INPUT
Description:
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4497	14.03	4496.76	99.89	4496.39	199.78	4494.57	200.45	4494.56
299.67	4493.6	300.67	4493.59	399.56	4492.57	400.89	4492.55	499.44	4491.1
501.11	4491.05	591.34	4488.02	599.33	4487.64	600.99	4485.27	610.48	4482.04
614.95	4480.79	632.78	4476.61	645.55	4480.48	653.97	4482.41	663.15	4483.97
678.33	4487.01	768.16	4487.96	786.74	4487.94	864.18	4487.95	882.06	4488.06
941.62	4488.43	999.69	4488.47	1073.26	4488.76	1121.73	4489.01	1270.72	4489.76
1361.41	4489.92	1406.23	4490.1	1603.7	4493.18				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.13	599.33	.045	678.33	.095

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
599.33	678.33	63.33	63.33	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 14.6666*

INPUT
Description:
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4497.5	14.02	4497.03	99.78	4496.39	199.56	4494.94	200.22	4494.93
299.33	4494.01	300.33	4494	399.11	4492.94	400.45	4492.93	498.89	4491.81
500.56	4491.77	590.68	4489.85	598.67	4489.62	600.5	4485.36	610.96	4481.69
615.89	4480.09	635.55	4475.38	652.69	4481.28	663.99	4483.93	676.3	4485.74
696.67	4488.96	760.32	4489.32	773.49	4489.29	828.36	4489.2	841.03	4489.23
883.23	4489.37	924.39	4489.34	976.52	4489.42	1010.87	4489.51	1116.44	4489.73
1180.7	4489.71	1212.47	4489.9	1352.39	4491.86				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	598.67	.045	696.67	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
598.67	696.67	63.33	63.33	.3	.5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 14.5

INPUT
Description: Additional XS for bridge copied from sta. 14

Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4498	14	4497.3	200	4495.3	300	4494.4	400	4493.3
500	4492.5	598	4491.6	600	4485.45	616.83	4479.39	638.33	4474.15
659.83	4482.09	674	4485.45	715	4490.9	800	4490.4	900	4490
1000	4489.5	1118.04	4491.41						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	598	.045	715	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
598	715	30	30	.3	.5

BRIDGE RIVER: Alpine Creek
REACH: Alpine RS: 14.3

INPUT
Description: Southern Pacific RR Bridge
Distance from Upstream XS = 10
Deck/Roadway Width = 15
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
598	4491.6	4490.1	715	4490.9	4489.4

Upstream Bridge Cross Section Data
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4498	14	4497.3	200	4495.3	300	4494.4	400	4493.3
500	4492.5	598	4491.6	600	4485.45	616.83	4479.39	638.33	4474.15
659.83	4482.09	674	4485.45	715	4490.9	800	4490.4	900	4490
1000	4489.5	1118.04	4491.41						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	598	.045	715	.15

Bank Sta: Left	Right	Coeff Contr.	Expan.
598	715	.3	.5

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
598	4491.6	4490.1	715	4490.9	4489.4

Downstream Bridge Cross Section Data
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4498	14	4497.3	200	4495.3	300	4494.4	400	4493.3
500	4492.5	598	4491.6	600	4485.45	616.83	4479.39	638.33	4474.15
659.83	4482.09	674	4485.45	715	4490.9	800	4490.4	900	4490
1000	4489.5	1121.13	4491.41						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
	.15	598	.045	715	.15

```
Bank Sta: Left    Right     Coeff Contr.    Expan.
           598      715             .3        .5

Upstream Embankment side slope                =       0 horiz. to 1.0 vertical
Downstream Embankment side slope              =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =      .95
Elevation at which weir flow begins           =  4490.9
Energy head used in spillway design           =
Spillway height used in design                =
Weir crest shape                              = Broad Crested

Number of Piers =  7

Pier Data
Pier Station     Upstream=      603    Downstream=      603
Upstream      num=         2
    Width   Elev    Width   Elev
*********************************
       1    4400        1    4490
Downstream      num=         2
    Width   Elev    Width   Elev
*********************************
       1    4400        1    4490

Pier Data
Pier Station     Upstream=      616    Downstream=      616
Upstream      num=         2
    Width   Elev    Width   Elev
*********************************
       1    4400        1    4490
Downstream      num=         2
    Width   Elev    Width   Elev
*********************************
       1    4400        1    4490

Pier Data
Pier Station     Upstream=      631    Downstream=      631
Upstream      num=         2
    Width   Elev    Width   Elev
*********************************
       1    4400        1    4490
Downstream      num=         2
    Width   Elev    Width   Elev
*********************************
       1    4400        1    4490

Pier Data
Pier Station     Upstream=      646    Downstream=      646
Upstream      num=         2
    Width   Elev    Width   Elev
*********************************
       1    4400        1  4490.5
Downstream      num=         2
    Width   Elev    Width   Elev
*********************************
       1    4400        1  4490.5

Pier Data
Pier Station     Upstream=      661    Downstream=      661
Upstream      num=         2
    Width   Elev    Width   Elev
*********************************
       1    4400        1  4490.5
Downstream      num=         2
    Width   Elev    Width   Elev
*********************************
```

```
       1    4400       1  4490.5

Pier Data
Pier Station     Upstream=     676    Downstream=     676
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
       1    4400       1  4490.5
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
       1    4400       1  4490.5

Pier Data
Pier Station     Upstream=     691    Downstream=     691
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
       1    4400       1  4490.5
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
       1    4400       1  4490.5

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.2
       Yarnell                KVal =      .9
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .5
           Max Low Cord                =

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

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 14

INPUT
Description: XS Q -- SPRR
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0    4498      14  4497.3     200  4495.3     300  4494.4     400  4493.3
     500  4492.5     598  4491.6     600 4485.45  616.83 4479.39  638.33 4474.15
  659.83 4482.09     674 4485.45     715  4490.9     800  4490.4     900    4490
    1000  4489.5 1121.13 4491.41

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .15     598    .045     715     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           598     715               45      45      45             .3       .5

CROSS     TION          RIVER: Alpine Creek
```

REACH: Alpine RS: 13.75*

INPUT
Description:
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4496.1	14.12	4495.71	99.18	4495	198.36	4494.07	201.67	4494.04
297.53	4493.32	302.51	4493.28	330.26	4493	396.71	4492.44	403.34	4492.34
495.89	4491.18	504.18	4491.03	570.27	4489.8	603	4489.25	605.17	4485.87
623.39	4480.3	646.67	4474.42	666.67	4479.03	679.85	4481.14	692.06	4482.4
718	4487.6	784.6	4487.04	822.45	4486.97	868.9	4486.92	945.33	4486.8
961.63	4486.77	1012.21	4486.91	1068.21	4488.22	1071.23	4488.31	1096.52	4489.52
1132.14	4490.02	1192.44	4490.35						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.15	603	.045	718	.15	1192.44	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
603	718	45	45	.3	.5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 13.5

INPUT
Description: XS P
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4494.2	100	4493.6	200	4492.8	300	4492.2	333	4491.9
400	4491.5	500	4489.8	575	4487.7	608	4486.9	655	4474.7
697	4477.6	721	4484.3	800	4483.5	900	4483.6	1010	4483.6
1070	4484.1	1140	4487.1	1170	4489.3	1212.26	4490	1283.78	4490.16

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.15	608	.045	721	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
608	721	45	45	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 13.25*

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4494.2	100	4493.6	200	4492.8	300	4492.2	333	4491.9
400	4491.5	500	4489.8	575	4487.7	608	4487.48	608.99	4480.75
655.25	4474.08	691.36	4476.01	710.81	4479.42	712	4483.79	792.26	4483.48
807.5	4483.51	893.86	4483.59	905.95	4483.6	1005.62	4483.6	1014.24	4483.64
1066.58	4484.07	1073.31	4484.24	1137.7	4487	1142.23	4487.26	1168.18	4489.17
1171.76	4489.33	1211.12	4489.98	1213.37	4490	1283.78	4490.16		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.125	608	.045	712	.145	1283.78	.145

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
608	712	45	45	.3	.5

```
CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 13

INPUT
Description: XS 0 -- Holland Ave
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0  4494.2     100  4493.6     200  4492.8     300  4492.2     333  4491.9
     400  4491.5     500  4489.8     575  4487.7     608 4488.07     609 4474.86
   655.5 4473.45     702 4474.93     703 4483.29     800  4483.5     900  4483.6
    1010  4483.6    1070  4484.1    1140  4487.1    1170  4489.3 1212.26    4490
 1283.78 4490.16

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
       0      .1     608    .045     703     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           608     703                60      60      60             .3      .5

CULVERT                RIVER: Alpine Creek
REACH: Alpine             RS: 12.9

INPUT
Description: Holland Ave. Bridge
Distance from Upstream XS =      10
Deck/Roadway Width        =      35
Weir Coefficient          =     2.6
Bridge Deck/Roadway Skew  =
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
**************************************************
     608    4488    4400     705  4483.5    4400

Upstream Bridge Cross Section Data
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0  4494.2     100  4493.6     200  4492.8     300  4492.2     333  4491.9
     400  4491.5     500  4489.8     575  4487.7     608 4488.07     609 4474.86
   655.5 4473.45     702 4474.93     703 4483.29     800  4483.5     900  4483.6
    1010  4483.6    1070  4484.1    1140  4487.1    1170  4489.3 1212.26    4490
 1283.78 4490.16

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
       0      .1     608    .045     703     .14

Bank Sta: Left   Right    Coeff Contr.   Expan.
           608     703             .3      .5

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
**************************************************
     608    4488    4400     705  4483.5    4400

Downstream Bridge Cross Section Data
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0  4494.2     100  4493.6     200  4492.8     300  4492.2     333  4491.9
         4491.5     500  4489.8     575  4487.7     608 4488.07     609 4474.
```

```
   655.5 4473.45      702 4474.93      703 4483.29      800  4483.5      900  4483.6
    1010  4483.6     1070  4484.1     1140  4487.1     1170  4489.3 1212.26     4490
 1283.78 4490.16

Manning's n Values          num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
       0      .1      608    .045      703     .14

Bank Sta: Left   Right     Coeff Contr.    Expan.
            608     703              .3       .5

Upstream Embankment side slope                  =       0 horiz. to 1.0 vertical
Downstream Embankment side slope                =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =      .95
Elevation at which weir flow begins         =  4484.3
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  7

Culvert Name      Shape      Rise    Span
Culvert #1            Box      11       9
FHWA Chart # 10 - 90 degree headwall; Chamfered or beveled inlet
FHWA Scale # 2 - Inlet edges beveled 1/2 inch at 45 degrees (1:1)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                10       35        .02                   .2                1
Upstream   Elevation =  4474
           Centerline Station =  615
Downstream Elevation =  4474
           Centerline Station =  615

Culvert Name      Shape      Rise    Span
Culvert #5            Box      11       9
FHWA Chart # 10 - 90 degree headwall; Chamfered or beveled inlet
FHWA Scale # 2 - Inlet edges beveled 1/2 inch at 45 degrees (1:1)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                10       35        .02                   .2                1
Upstream   Elevation =  4474
           Centerline Station =  625
Downstream Elevation =  4474
           Centerline Station =  625

Culvert Name      Shape      Rise    Span
Culvert #2            Box      10       9
FHWA Chart # 10 - 90 degree headwall; Chamfered or beveled inlet
FHWA Scale # 2 - Inlet edges beveled 1/2 inch at 45 degrees (1:1)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                10       35        .02                   .2                1
Number of Barrels =  2
Upstream   Elevation =  4474
Centerline Stations
    Sta.    Sta.
     635     645
Downstream Elevation =  4474
Centerline Stations
    Sta.    Sta.
     635     645

Culvert Name      Shape      Rise    Span
Culvert #6            Box      10       9
FHWA Chart # 10 - 90 degree headwall; Chamfered or beveled inlet
FHWA Scale # 2 - Inlet edges beveled 1/2 inch at 45 degrees (1:1)
```

```
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                 10      35        .02                  .2                1
Number of Barrels =  2
Upstream   Elevation =  4474
Centerline Stations
    Sta.    Sta.
     655     665
Downstream Elevation =  4474
Centerline Stations
    Sta.    Sta.
     655     665

Culvert Name     Shape      Rise    Span
Culvert #4           Box       9       9
FHWA Chart # 10- 90 degree headwall; Chamfered or beveled inlet
FHWA Scale # 2 - Inlet edges beveled 1/2 inch at 45 degrees (1:1)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                 10      35        .02                  .2                1
Upstream   Elevation =  4474
           Centerline Station =  675
Downstream Elevation =  4474
           Centerline Station =  675

Culvert Name     Shape      Rise    Span
Culvert #3           Box       9       9
FHWA Chart # 10- 90 degree headwall; Chamfered or beveled inlet
FHWA Scale # 2 - Inlet edges beveled 1/2 inch at 45 degrees (1:1)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                 10      35        .02                  .2                1
Upstream   Elevation =  4474
           Centerline Station =  685
Downstream Elevation =  4474
           Centerline Station =  685

Culvert Name     Shape      Rise    Span
Culvert #7           Box       9       9
FHWA Chart # 10- 90 degree headwall; Chamfered or beveled inlet
FHWA Scale # 2 - Inlet edges beveled 1/2 inch at 45 degrees (1:1)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                 10      35        .02                  .2                1
Upstream   Elevation =  4474
           Centerline Station =  695
Downstream Elevation =  4474
           Centerline Station =  695

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 12.7

INPUT
Description: Addtional XS for bridge copied from sta. 13
Station Elevation Data    num=      21
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
**********************************************************************************
       0  4494.2      100  4493.6      200  4492.8      300  4492.2      333  4491.9
     400  4491.5      500  4489.8      575  4487.7      608 4488.07      609 4474.86
   655.5 4473.45      702 4474.93      703 4483.29      800  4483.5      900  4483.6
    1010  4483.6     1070  4484.1     1140  4487.1     1170  4489.3 1212.26     4490
 1283.78 4490.16

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
***********************************************
              .1      608    .045      703     .14
```

```
Bank Sta: Left   Right     Lengths: Left Channel   Right      Coeff Contr.    Expan.
           608     703                75      75      75              .3       .5

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 12.6333*

INPUT
Description:
Station Elevation Data    num=      43
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*********************************************************************************
       0 4492.33    41.7  4492.5   84.16  4492.3   160.4 4491.82  168.31 4491.74
  252.47  4491.1  280.24 4490.82  320.79 4490.51  336.62 4490.35   364.1 4489.83
  365.71 4489.14  420.78 4488.16  481.19 4486.56   483.9 4486.51  511.67 4486.88
  512.66 4478.02  527.78  4476.9  546.91 4473.25     559 4472.77   568.6 4473.21
   584.6 4474.65   597.4 4476.57  598.16  4477.3     599 4483.66  605.32 4483.57
  636.93  4483.6  675.57 4482.51   714.2 4482.19  722.07  4482.2  770.39 4482.19
  848.94 4482.67  921.42 4483.07   988.5 4483.31 1033.81 4483.67 1064.62 4483.79
 1111.07 4484.81 1153.44 4485.62 1177.81 4486.47  1191.5 4487.07 1245.11 4487.82
 1248.05 4487.84 1328.83 4488.13 1335.85 4489.24

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
*************************************************
       0      .1  511.67    .045      599     .14

Bank Sta: Left   Right     Lengths: Left Channel   Right      Coeff Contr.    Expan.
       511.67     599                75      75      75              .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
************************
   654.9 1335.85 4483.15

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 12.5666*

INPUT
Description:
Station Elevation Data    num=      43
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*********************************************************************************
       0 4490.47   33.85  4491.1   68.31    4491   130.2 4490.76  136.62 4490.69
  204.93    4490  227.48 4489.74   260.4  4489.4  273.25  4489.2  295.55 4488.71
  296.85 4487.37  341.56 4486.52   390.6 4485.33  392.79 4485.32  415.33 4485.69
  416.33 4481.18  431.39  4479.4  450.46 4472.67   462.5 4472.08   470.3  4472.6
   483.3 4474.87   493.7 4478.23  494.32 4479.66     495 4484.03  502.66 4483.83
  540.97 4483.85  587.78 4481.61   634.6  4480.9  644.13 4480.89   702.7 4480.85
  797.88 4481.73  885.71 4482.53     967 4483.01  1021.9 4483.43 1059.25 4483.47
 1115.54 4483.96 1166.87 4484.14  1196.4 4484.44 1212.99 4484.84 1277.97 4485.64
 1281.52 4485.67 1379.41 4486.12 1387.93 4488.32

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
*************************************************
       0      .1  415.33    .045      495     .14

Bank Sta: Left   Right     Lengths: Left Channel   Right      Coeff Contr.    Expan.
       415.33     495                75      75      75              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
************************
  561.08 1387.93 4482.99

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 12.5
```

INPUT
Description: XS N
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4488.6	26	4489.7	100	4489.7	200	4488.3	227	4487.6
228	4485.6	300	4484.1	319	4484.5	335	4481.9	354	4472.1
366	4471.4	372	4472	382	4475.1	390	4479.9	391	4484.4
400	4484.1	445	4484.1	500	4480.7	555	4479.6	635	4479.5
850	4482	1010	4483.2	1120	4483.1	1215	4482.4	1315	4483.5
1430	4484.1	1440	4487.4						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	319	.045	391	.14

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
319	391	50	50	.3	.5

Ineffective Flow num= 1

Sta L	Sta R	Elev
463.92	1440	4483.17

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 12

INPUT
Description: XS M -- Ave E
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4488.2	158	4486.3	230	4485.2	315	4479.22	315	4471.86
342	4469.56	369	4470.31	375	4478.03	418	4479.1	420	4480.1
515	4478.4	635	4479.1	850	4481.6	1010	4482.8	1120	4482.7
1215	4482	1315	4483.1	1430	4483.8	1440	4487		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.135	315	.045	375	.15

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
315	375	60	60	.3	.5

BRIDGE RIVER: Alpine Creek
REACH: Alpine RS: 11.9

INPUT
Description: Ave E Bridge
Distance from Upstream XS = 10
Deck/Roadway Width = 40
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
315	4479.3	4478.3	420	4477.3	4476.3

Upstream Bridge Cross Section Data
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4488.2	158	4486.3	230	4485.2	315	4479.22	315	4471.86
342	4469.56	369	4470.31	375	4478.03	418	4479.1	420	4480.1
	4478.4	635	4479.1	850	4481.6	1010	4482.8	1120	4482

```
    1215    4482    1315  4483.1    1430  4483.8    1440    4487

Manning's n Values          num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
       0    .135      315    .045      375     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
           315     375              .3       .5

Downstream  Deck/Roadway Coordinates
    num=        2
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
*********************************************
      315  4479.3  4478.3      420  4477.3  4476.3

Downstream Bridge Cross Section Data
Station Elevation Data     num=       19
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
*************************************************************************************
       0  4488.2      158  4486.3      230  4485.2      315 4479.22      315 4471.86
     342 4469.56      369 4470.31      375 4478.03      418  4479.1      420  4480.1
     515  4478.4      625  4479.1      850  4481.6     1010  4482.8     1120  4482.7
    1215    4482     1315  4483.1    1430  4483.8    1440    4487

Manning's n Values          num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
       0    .135      315    .045      375     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
           315     375              .3       .5

Upstream Embankment side slope                =       0 horiz. to 1.0 vertical
Downstream Embankment side slope              =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =      .95
Elevation at which weir flow begins           =  4480.1
Energy head used in spillway design           =
Spillway height used in design                =
Weir crest shape                              = Broad Crested

Number of Piers -  3

Pier Data
Pier Station     Upstream=    330.7    Downstream=    330.7
Upstream      num=        2
    Width   Elev    Width   Elev
*********************************
       6    4400        6    4481
Downstream    num=        2
    Width   Elev    Width   Elev
*********************************
       6    4400        6    4481

Pier Data
Pier Station     Upstream=    356.2    Downstream=    356.2
Upstream      num=        2
    Width   Elev    Width   Elev
*********************************
       6    4400        6    4481
Downstream    num=        2
    Width   Elev    Width   Elev
*********************************
       6    4400        6    4481

Pier Data
Pier Station     Upstream=    381.7    Downstream=    381.7
```

```
Upstream      num=        2
    Width   Elev    Width   Elev
*********************************
       6    4400        6    4481
Downstream      num=        2
    Width   Elev    Width   Elev
*********************************
       6    4400        6    4481

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum                Cd   =     1.2
       Yarnell                 KVal =      .9
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

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

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 11.7

INPUT
Description: Additional XS for bridge copied from sta. 12
Station Elevation Data    num=       19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0  4488.2     158  4486.3     230  4485.2     315 4479.22     315 4471.86
     342 4469.56     369 4470.31     375 4478.03     418  4479.1     420  4480.1
     515  4478.4     635  4479.1     850  4481.6    1010  4482.8    1120  4482.7
    1215    4482    1315  4483.1    1430  4483.8    1440    4487

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
*************************************************
       0    .135      315    .045      375     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
           315     375                80  126.67      80              .3       .5

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 11.6333*

INPUT
Description:
Station Elevation Data    num=       34
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0 4487.67  114.39 4486.73  171.59 4486.24  193.33    4486  252.47  4485.1
  367.51  4483.2  400.38  4481.9  457.58 4480.32  503.33 4479.01  503.33 4474.11
  520.08 4470.46  532.92 4470.02  546.33  4469.4     548 4469.17  564.82  4469.5
  579.91 4471.83     587 4477.95  627.89 4478.47  629.79 4479.13  686.25 4478.16
  720.13 4477.71  797.77 4477.98  834.23 4478.07  853.52 4478.19  1020.8 4479.69
 1038.68 4479.81 1190.82  4480.4 1295.42  4480.2 1316.31 4480.06 1385.76 4479.98
 1387.39    4480 1480.85 4481.33  1590.2  4482.5 1599.71  4484.7

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

```
       0    .135  503.33    .045     587     .15

Bank Sta: Left   Right     Lengths: Left Channel   Right     Coeff Contr.   Expan.
        503.33     587              .      80  126.67      80             .3      .5

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 11.5666*

INPUT
Description:
Station Elevation Data    num=      34
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0 4487.13   157.2 4486.11   235.8 4485.57  265.66 4485.25  346.93  4483.9
  505.03  4481.2  550.19 4480.05  628.79 4479.41  691.67 4478.81  691.67 4476.35
  715.04 4469.93  732.96 4469.71  751.66 4469.15     754 4468.79  773.41 4469.05
  790.82 4473.34     799 4477.88  837.78 4477.85  839.58 4478.16  893.12 4477.28
  925.25 4477.03  998.88 4477.09 1033.47 4477.04 1051.76 4477.05  1210.4 4477.99
 1227.36 4478.02 1371.64 4478.01 1470.84 4477.69 1490.66 4477.58 1556.51 4477.96
 1558.07 4477.98 1646.69 4479.55  1750.4 4481.21 1759.42  4482.4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0    .135  691.67    .045     799     .15

Bank Sta: Left   Right     Lengths: Left Channel   Right     Coeff Contr.   Expan.
        691.67     799              .      80  126.67      80             .3      .5

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 11.5

INPUT
Description: XS L
Station Elevation Data    num=      20
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0  4486.6     200  4485.5     300  4484.9     338  4484.5     700  4478.2
     800  4478.5     880  4478.6     910  4469.4     933  4469.4     957  4468.9
     960  4468.4     982  4468.6    1011  4477.8    1100  4476.4    1200  4476.2
    1250  4475.9    1400  4476.3    1665  4475.1 1728.74 4475.96 1919.13  4480.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
       0    .135     880    .045    1011     .15

Bank Sta: Left   Right     Lengths: Left Channel   Right     Coeff Contr.   Expan.
           880    1011            53.33   53.33   53.33             .1      .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
************************
 1036.33 1919.13  4477.4

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 11.4666*

INPUT
Description:
Station Elevation Data    num=      36
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0 4486.17  197.04 4485.08  201.52 4485.06  295.56 4484.49  302.27 4484.44
  332.99 4484.12  340.56 4484.02  689.63 4477.95   705.3 4477.78  788.15 4478.03
  806.06 4478.07  886.67 4478.17  901.21 4473.91  912.61 4468.43  913.21 4468.29
  932.51 4468.25  953.27 4467.87  955.86 4467.53  978.06  4468.3  984.67 4469.87
  992.28 4474.08 1007.33 4477.53 1016.19 4477.28 1087.88 4476.16 1108.56 4475.95
```

```
 1168.43 4475.83  1208.7 4475.68 1222.29 4475.68 1279.16 4475.54 1329.53 4475.68
 1449.75 4475.64 1542.98 4475.22 1712.13 4475.14 1751.15 4475.24 1823.64  4476.2
 2040.18  4480.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
       0     .13  886.67    .045 1007.33     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        886.67 1007.33            53.33   53.33   53.33             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
************************
 1015.77 2040.18 4477.28

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 11.4333*

INPUT
Description:
Station Elevation Data    num=      36
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
**********************************************************************************
       0 4485.73  198.52 4484.64  203.03 4484.62  297.78 4484.05  304.55 4483.99
   335.5 4483.66  343.12 4483.54  694.81 4477.42  710.61 4477.37  794.07 4477.62
  812.12 4477.65  893.33 4477.73   905.6 4474.37  915.23 4467.47  915.73 4467.18
  932.01  4467.1  949.53 4466.84  951.72 4466.67  974.13    4468   980.8 4469.07
  988.48 4475.09 1003.67 4477.27  1013.6 4476.89 1093.94 4475.63 1117.11  4475.5
 1184.21 4475.36 1229.35 4475.14 1244.58 4475.16 1308.31 4475.19 1364.76 4475.34
 1499.51 4474.98 1603.99 4474.51 1793.56 4475.02 1837.29 4475.38 1918.54 4476.43
 2161.22  4480.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
       0     .13  893.33    .045 1003.67     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        893.33 1003.67            53.33   53.33   53.33             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
************************
 1013.69 2161.22 4476.89

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 11.4

INPUT
Description: Additional XS for bridge copied from sta. 11
Station Elevation Data    num=      21
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
**********************************************************************************
       0  4485.3      200  4484.2      300  4483.6      338  4483.2      700  4476.9
     800  4477.2      900  4477.3      910 4474.84  918.25 4466.07  947.58  4465.8
  976.92 4468.26  984.67  4476.1     1000    4477     1011  4476.5     1100  4475.1
    1200  4474.9     1250  4474.6     1400     4475    1665  4473.8     1875  4474.9
 2282.27  4480.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
       0     .13      900    .045     1000     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           900    1000              50      50      50             .3       .5
Ineff      ve Flow     num=       1
```

Sta L	Sta R	Elev
1011.18	2282.27	4476.52

BRIDGE RIVER: Alpine Creek
REACH: Alpine RS: 11.3

INPUT
Description: Sul Ross Ave D Bridge
Distance from Upstream XS = 10
Deck/Roadway Width = 35
Weir Coefficient = 2.6
Bridge Deck/Roadway Flow =
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
895	4477.2	4475.2	997	4477.2	4475.2

Upstream Bridge Cross Section Data
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4485.3	200	4484.2	300	4483.6	338	4483.2	700	4476.9
800	4477.2	900	4477.3	910	4474.84	918.25	4466.07	947.58	4465.8
976.92	4468.26	984.67	4476.1	1000	4477	1011	4476.5	1100	4475.1
1200	4474.9	1250	4474.6	1400	4475	1665	4473.8	1875	4474.9
2282.27	4480.1								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.13	900	.045	1000	.13

Bank Sta: Left	Right	Coeff Contr.	Expan.
900	1000	.3	.5

Ineffective Flow num= 1

Sta L	Sta R	Elev
1011.18	2282.27	4476.52

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
895	4477.2	4475.2	997	4477.2	4475.2

Downstream Bridge Cross Section Data
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4485.3	200	4484.2	300	4483.6	338	4483.2	700	4476.9
800	4477.2	900	4477.3	910	4474.84	918.25	4466.07	947.58	4465.8
976.92	4468.26	984.67	4476.1	1000	4477	1011	4476.5	1100	4475.1
1200	4474.9	1250	4474.6	1400	4475	1665	4473.8	1875	4474.9
2278.38	4480.1								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.13	900	.045	1000	.13

Bank Sta: Left	Right	Coeff Contr.	Expan.
900	1000	.3	.5

Ineffective Flow num= 1

Sta L	Sta R	Elev

```
 1011.16 2278.38 4476.52

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =  4477.2
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  2

Pier Data
Pier Station     Upstream=     933    Downstream=     933
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
       2    4400        2  4475.5
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
       2    4400        2  4475.5

Pier Data
Pier Station     Upstream=     957    Downstream=     957
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
       2    4400        2  4475.5
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
       2    4400        2  4475.5

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =       2
       Yarnell                KVal =    1.05
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

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

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 11

INPUT
Description: XS K --  Sul Ross/Ave. D
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0  4485.3     200  4484.2     300  4483.6     338  4483.2     700  4476.9
     800  4477.2     900  4477.3     910 4474.84  918.25 4466.07  947.58  4465.8
  976.92 4468.26  984.67  4476.1    1000    4477    1011  4476.5    1100  4475.1
    1200  4474.9    1250  4474.6    1400    4475    1665  4473.8    1875  4474.9
 2278.38  4480.1

Manni     n Values        num=       3
```

Sta	n Val	Sta	n Val	Sta	n Val
0	.13	900	.045	1000	.13

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
900 1000 106.67 106.67 106.67 .3 .5

Ineffective Flow num= 1

Sta L	Sta R	Elev
1011.16	2278.38	4476.52

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 10.6666*

INPUT
Description:
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4483.7	177.78	4482.5	266.67	4481.87	300.44	4481.45	533.33	4477.36
622.22	4475.78	666.67	4475.67	711.11	4475.54	800	4475.17	804.52	4472.93
808.56	4471.96	815.62	4465.76	816.59	4465.71	840.72	4465.3	852.22	4466.21
867.18	4468.02	874.17	4473.66	888	4475.07	899.91	4474.68	919.24	4474.41
996.25	4473.43	1006	4473.39	1092.77	4472.81	1104.51	4472.8	1150.04	4472.63
1158.64	4472.62	1314.03	4473.16	1321.02	4473.19	1504.92	4473.19	1607.89	4472.87
1835.22	4473.54	1860.67	4473.74	2271.9	4478.03				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.13	800	.045	888	.13

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
800 888 106.67 106.67 106.67 .3 .5

Ineffective Flow num= 1

Sta L	Sta R	Elev
888	2271.9	4475.07

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 10.3333*

INPUT
Description:
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4482.1	155.56	4480.8	233.33	4480.13	262.89	4479.7	466.67	4476.08
544.44	4474.66	583.33	4474.28	622.22	4473.89	700	4473.03	703.76	4469.87
707.12	4469.08	712.99	4465.45	713.79	4465.35	733.86	4464.8	744.11	4465.56
757.45	4467.78	763.68	4471.21	776	4473.13	788.82	4472.86	809.62	4472.61
892.51	4471.76	903	4471.69	996.39	4470.71	1009.02	4470.7	1058.02	4470.62
1067.27	4470.63	1234.52	4471.33	1242.03	4471.37	1439.96	4472.14	1550.78	4471.94
1795.45	4472.18	1822.84	4472.27	2380.8	4476.46				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.13	700	.045	776	.13

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
700 776 106.67 106.67 106.67 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev
776	2380.8	4473.13

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 10

INPUT
Description: XS J
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4480.5	200	4478.4	400	4474.8	500	4472.9	600	4470.9
603	4466.8	611	4465	627	4464.3	636	4464.9	664	4471.2
700	4470.8	800	4470	900	4468.6	966	4468.6	1155	4469.5
1375	4471.1	1785	4470.8	2406.57	4474.34				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.13	600	.045	664	.13

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
600	664	109.17	120.83	109.17	.1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev
664	2406.57	4471.2

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 9.9*

INPUT
Description:
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4480.5	200	4478.4	400	4474.8	500	4472.9	600	4470.9
601.77	4468.15	603.24	4466.76	611.89	4464.67	612.65	4464.57	629.18	4463.89
640.57	4464.61	642.57	4464.9	652.08	4466.76	676	4471.07	711.85	4470.71
776.87	4470.19	811.42	4469.84	877.73	4468.91	910.99	4468.6	944.3	4468.6
976.71	4468.65	1134.94	4469.4	1164.9	4469.57	1356.84	4470.97	1383.96	4471.09
1770.39	4470.81	1792.21	4470.85	2264.12	4473.93				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.13	600	.045	676	.13

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
600	676	109.17	120.83	109.17	.1 .3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 9.8*

INPUT
Description:
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4480.5	200	4478.4	400	4474.8	500	4472.9	600	4470.9
601.91	4467.65	603.48	4466.73	612.78	4464.34	613.59	4464.17	631.36	4463.48
645.14	4464.32	647.55	4464.55	659.06	4466.58	688	4470.93	723.69	4470.61
788.43	4470.09	822.84	4469.68	888.87	4468.76	921.98	4468.6	955.15	4468.6
987.42	4468.7	1144.97	4469.45	1174.8	4469.64	1365.92	4471.03	1392.92	4471.09
1777.7	4470.81	1799.42	4470.89	2269.31	4473.95				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
	.1	600	.045	688	.13

```
Bank Sta: Left   Right     Lengths: Left Channel   Right      Coeff Contr.    Expan.
           600     688              109.17  120.83  109.17              .1       .3

CROSS SECTION           RIVER: Alpine Creek
REACH: Alpine             RS: 9.7

INPUT
Description: 6th St. (LW Xing) -- Interpolated x section
Station Elevation Data    num=      18
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*********************************************************************************
       0  4480.5      200  4478.4      400  4474.8      500  4472.9      600  4470.9
  602.04 4467.15   614.54 4463.77   633.54 4463.07   652.54  4464.2   666.04  4466.4
     700  4470.8      800    4470      900  4468.6      966  4468.6     1155  4469.5
    1375  4471.1     1785  4470.8  2274.49 4473.98

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
***********************************************
       0      .1      600    .045      700     .13

Bank Sta: Left   Right     Lengths: Left Channel   Right      Coeff Contr.    Expan.
           600     700              109.17  120.83  109.17              .1       .3

CROSS SECTION           RIVER: Alpine Creek
REACH: Alpine             RS: 9.63333*

INPUT
Description:
Station Elevation Data    num=      28
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*********************************************************************************
    -100 4477.33   -99.31 4477.33   -98.61 4477.33    108.5 4475.19   156.22 4474.89
  413.44 4472.27   490.75 4471.43   540.56 4470.98   668.67 4469.76   670.74 4466.38
  674.56 4464.08   683.44 4462.45   702.75 4461.87   718.72 4462.73   730.08 4464.27
  749.52 4466.39   758.64 4470.28   857.71 4469.19   885.09 4468.78   956.79  4468.1
 1022.18  4468.1 1209.43  4468.7 1420.08 4469.73 1427.39 4469.78 1583.13 4469.99
  1833.6 4469.84 2133.41 4471.11 2318.56 4472.67

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
***********************************************
    -100      .1   668.67    .045   758.64     .13

Bank Sta: Left   Right     Lengths: Left Channel   Right      Coeff Contr.    Expan.
        668.67  758.64              109.17  120.83  109.17              .1       .3

CROSS SECTION           RIVER: Alpine Creek
REACH: Alpine             RS: 9.56666*

INPUT
Description:
Station Elevation Data    num=      28
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*********************************************************************************
    -200 4474.17 -199.15 4474.16  -198.3 4474.16    54.25   4471.6   112.44 4471.38
  424.89 4469.74   520.37 4469.21   581.11 4469.06   737.33 4468.63   739.44 4465.61
  743.32 4462.02   752.34 4461.13   771.95 4460.67   784.91 4461.25   794.12 4462.13
  809.88 4463.38   817.27 4469.77   915.42 4468.38   942.54 4467.94 1013.57   4467.6
 1078.35  4467.6 1263.85  4467.9 1472.54 4468.42 1479.78 4468.46 1634.06     4469
 1882.19 4468.87  2179.2 4469.46 2362.62 4471.36

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
***********************************************
    -200      .1   737.33     .05   817.27     .13
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
        737.33  817.27            109.17  120.83  109.17             .3       .5

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 9.5

INPUT
Description: Additional XS for bridge copied from sta. 9
Station Elevation Data    num=      20
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
**********************************************************************************
    -300    4471     -299    4471     -298    4471        0    4468      550    4467
     806  4468.7      806  4466.5      830  4461.8      858    4460      866  4459.6
     882    4460      907  4461.9      930  4466.9      933    4468      933  4469.4
    1000  4467.1     1525  4467.1     1685    4468     2225  4467.8  2488.4 4469.94

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
***********************************************
    -300      .1      806     .05      933     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
           806     933                70      70      70             .3       .5

BRIDGE                 RIVER: Alpine Creek
REACH: Alpine             RS: 9.3

INPUT
Description: 5th St. Bridge
Distance from Upstream XS =      10
Deck/Roadway Width        =      50
Weir Coefficient          =     2.6
Bridge Deck/Roadway Skew  =
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
***************************************************
     806  4468.7  4467.7     933  4469.4  4468.4

Upstream Bridge Cross Section Data
Station Elevation Data    num=      20
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
**********************************************************************************
    -300    4471     -299    4471     -298    4471        0    4468      550    4467
     806  4468.7      806  4466.5      830  4461.8      858    4460      866  4459.6
     882    4460      907  4461.9      930  4466.9      933    4468      933  4469.4
    1000  4467.1     1525  4467.1     1685    4468     2225  4467.8  2488.4 4469.94

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
***********************************************
    -300      .1      806     .05      933     .13

Bank Sta: Left   Right    Coeff Contr.    Expan.
           806     933             .3       .5

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
***************************************************
     806  4468.7  4467.7     933  4469.4  4468.4

Downstream Bridge Cross Section Data
Station Elevation Data    num=      20
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*****  **********************************************************************
```

300	4471	299	4471	-298	4471	0	4468	550	4467		
806	4468.7	806	4466.5	830	4461.8	858	4460	866	4459.6		
882	4460	907	4461.9	930	4466.9	933	4468	933	4469.4		
1000	4467.1	1525	4467.1	1685	4468	2225	4467.8	2488.4	4469.89		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-300	.1	806	.05	933	.13

Bank Sta: Left	Right	Coeff Contr.	Expan.
806	933	.3	.5

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 4468.7
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Piers = 4

Pier Data
Pier Station Upstream= 830 Downstream= 830
Upstream num= 2

Width	Elev	Width	Elev
2.33	4400	2.33	4468.5

Downstream num= 2

Width	Elev	Width	Elev
2.33	4400	2.33	4468.5

Pier Data
Pier Station Upstream= 855 Downstream= 855
Upstream num= 2

Width	Elev	Width	Elev
2.33	4400	2.33	4469

Downstream num= 2

Width	Elev	Width	Elev
2.33	4400	2.33	4469

Pier Data
Pier Station Upstream= 880 Downstream= 880
Upstream num= 2

Width	Elev	Width	Elev
2.33	4400	2.33	4468.5

Downstream num= 2

Width	Elev	Width	Elev
2.33	4400	2.33	4468.5

Pier Data
Pier Station Upstream= 905 Downstream= 905
Upstream num= 2

Width	Elev	Width	Elev
2.33	4400	2.33	4468.5

Downstream num= 2

Width	Elev	Width	Elev
2.33	4400	2.33	4468.5

```
Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =      1.2
       Yarnell                KVal =       .9
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

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

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 9

INPUT
Description: XS I -- 5th St.
Station Elevation Data    num=      20
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
    -300    4471    -299    4471    -298    4471       0    4468     550    4467
     806  4468.7     806  4466.5     830  4461.8     858    4460     866  4459.6
     882    4460     907  4461.9     930  4466.9     933    4468     933  4469.4
    1000  4467.1    1525  4467.1    1685    4468    2225  4467.8  2488.4 4469.89

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
    -300      .1     806     .05     933     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           806     933             83.33   87.33   83.33             .3       .5

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 8.66666*

INPUT
Description:
Station Elevation Data    num=      39
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
    -300 4470.33 -298.91 4470.33 -297.82 4470.32    -214 4469.28    -128 4468.29
     -42 4467.36   26.58  4466.9   37.12 4466.89   104.2 4467.05     130 4466.92
     302 4466.73     388  4466.8  478.07 4466.63  538.47 4466.22  625.32 4465.98
     732 4465.92  768.12    4466  803.38 4465.78  854.98 4465.67   899.7 4466.16
     904 4466.57  909.93 4460.77  920.87 4459.21  938.27 4458.76  955.91  4459.6
  966.45 4461.09  971.94 4467.66  1034.2 4466.46 1074.42 4465.97 1207.13  4466.2
 1380.07  4466.2 1507.99 4466.15 1640.13  4466.7 1725.94 4466.64 1834.89 4466.88
 1936.92 4466.88  2054.6 4467.07 2086.08 4467.13 2236.13 4468.95

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
    -300      .1     904     .05  971.94     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           904  971.94             83.33   87.33   83.33             .3       .5

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 8.33333*
```

```
INPUT
Description:
Station Elevation Data    num=      39
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
    -300 4469.67 -298.82 4469.65 -297.65 4469.64    -207 4468.34     114 4467.14
     -21 4466.08   53.16 4465.81   64.56 4465.79   137.1 4466.22     165 4466.01
     351 4465.91     444  4466.2   541.4 4466.02  606.72  4465.3  700.63 4464.96
     816 4464.66  855.06 4464.75  893.19 4464.24  948.99 4463.93  997.35 4464.83
    1002 4465.64 1007.77 4461.58 1018.44 4458.66 1035.39 4458.05 1052.45 4459.17
 1062.65  4461.8 1067.97 4466.08  1117.1 4464.98 1148.84 4464.84 1253.57  4465.3
 1390.03  4465.3 1490.98  4465.2 1595.25  4465.4 1662.97 4465.32 1748.94 4465.84
 1829.46 4465.89 1922.33 4466.32 1947.17 4466.46 2065.58 4467.85

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
    -300      .1    1002     .05 1067.97     .13

Bank Sta: Left   Right     Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1002 1067.97              83.33   87.33   83.33             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************
    -300 1000.06 4465.29 1094.14 2065.58  4465.5

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 8

INPUT
Description: XS H -- Ave. A (LW Xing)
Station Elevation Data    num=      29
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
     300    4469     200  4467.4    -100    4466       0  4464.8      92  4464.7
     170  4465.4     200  4465.1     400  4465.1     500  4465.6  604.73 4465.41
  674.97 4464.38     900  4463.4     942  4463.5     983  4462.7    1043  4462.2
    1095  4463.5    1100 4464.72    1116  4458.1 1132.5 4457.34    1149 4458.74
    1164 4464.49    1200  4463.5    1300  4464.4    1400  4464.4    1600    4464
    1663  4464.8    1700  4464.9 1790.05 4465.58 1895.02 4466.75

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
    -300      .1    1100     .05    1164     .13

Bank Sta: Left   Right     Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1100    1164              143     143     143             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
************************
    -300    1100 4464.72

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 7.8*

INPUT
Description:
Station Elevation Data    num=      48
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
    -270 4467.86 -177.86 4466.16  -85.71 4464.62  -42.35 4463.97    6.43 4463.42
   88.16 4463.28    91.2 4463.28  163.07 4463.96  165.56 4463.94  190.71 4463.75
  261.18 4463.82     375 4463.96  467.14 4464.47   529.8 4464.44  563.64 4464.04
  564.71 4464.01  628.37 4463.15  640.59  4463.1  806.01 4462.57  835.71 4462.49
  874.41  4462.6  912.19    4462  967.48 4461.65  982.06 4461.98 1015.39 4462.75
    1020 4463.74 1040.76  4458.3 1042.22 4457.78 1051.92 4456.39 1065.13 4455.95
```

```
 1083.92 4457.22 1083.96 4457.23    1101 4463.37 1102.26 4463.28 1135.23 4462.32
 1165.33 4462.37  1230.3  4462.8 1291.47 4462.74 1325.38 4462.84 1384.81 4462.92
  1417.6 4462.88 1515.53 4462.81 1543.74 4463.14 1575.42 4463.48 1631.52 4463.57
 1669.88  4463.9 1696.22 4464.23 1796.02 4465.57

Manning's n Values         num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
**********************************************
    -270      .1    1020     .05    1101      .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1020    1101              143     143     143              .1       .3
Ineffective Flow      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************
    -270 1017.93 4463.35 1102.72 1796.02 4463.27

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 7.6*

INPUT
Description:
Station Elevation Data  ·  num=       48
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
**************************************************************************************
    -240 4466.72 -155.71 4464.92  -71.43 4463.24  -31.76  4462.5   12.86 4462.04
   87.62 4461.86    90.4 4461.87  156.14 4462.51  158.42  4462.5  181.43 4462.39
  245.88 4462.54     350 4462.81  434.29 4463.33   491.6 4463.41  522.56 4462.67
  523.53 4462.64  581.76 4461.93  592.94 4461.87  744.26  4461.6  771.43 4461.57
  806.83  4461.7  841.39 4461.29  891.96 4461.09  905.29 4461.36  935.79 4462.01
     940 4462.75  966.57 4458.07  968.44 4457.46  980.86    4455  997.77 4454.57
 1018.84  4455.7 1018.89 4455.71    1038 4462.24  1039.2 4462.11 1070.45 4461.14
    1099 4460.95  1160.6  4461.2  1218.6 4461.08 1250.75 4461.28 1307.11 4461.56
  1338.2 4461.56 1431.05 4461.63 1457.81 4461.91 1487.85 4462.17 1541.04 4462.25
 1577.41  4462.5 1602.38 4462.88 1697.01 4464.39

Manning's n Values         num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
**********************************************
    -240      .1     940     .05    1038      .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           940    1038              143     143     143              .1       .3
Ineffective Flow      num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************
    -240  935.59 4462.01 1039.22 1697.01 4462.11

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 7.4*

INPUT
Description:
Station Elevation Data    num=       48
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
**************************************************************************************
    -210 4465.58 -133.57 4463.68  -57.14 4461.85  -21.18 4461.03   19.29 4460.67
   87.08 4460.44    89.6 4460.45  149.21 4461.07  151.28 4461.07  172.14 4461.04
  230.59 4461.26     325 4461.67  401.43  4462.2   453.4 4462.37  481.47  4461.3
  482.35 4461.26  535.16  4460.7  545.29 4460.65  682.51 4460.64  707.14 4460.66
  739.24 4460.81  770.58 4460.59  816.44 4460.54  828.53 4460.74  856.18 4461.26
     860 4461.77  892.38 4457.83  894.66 4457.14   909.8 4453.61   930.4 4453.18
  953.76 4454.17  953.82 4454.18     975 4461.12  976.13 4460.94 1005.68 4459.96
 1032.67 4459.53 1090.91 4459.59 1145.73 4459.42 1176.13 4459.73  1229.4 4460.21
  1258.8 4460.24 1346.58 4460.44 1371.87 4460.67 1400.27 4460.85 1450.55 4460.92
 1484.94  4461.1 1508.55 4461.53 1598.01 4463.21
```

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-210	.12	860	.05	975	.95

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
860	975	143	143	143	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
-210	855.83	4461.26	976.38	1598.01	4460.94

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 7.2*

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-180	4464.44	-111.43	4462.44	-42.86	4460.47	-10.59	4459.57	25.71	4459.29
86.54	4459.02	88.8	4459.04	142.29	4459.62	144.14	4459.63	162.86	4459.69
215.29	4459.98	300	4460.52	368.57	4461.06	415.2	4461.33	440.39	4459.93
441.18	4459.88	488.55	4459.47	497.65	4459.42	620.75	4459.67	642.86	4459.75
671.66	4459.91	699.77	4459.89	740.91	4459.99	751.76	4460.12	776.57	4460.51
780	4460.78	818.19	4457.6	820.88	4456.82	838.73	4452.22	863.04	4451.8
888.68	4452.65	888.74	4452.65	912	4459.99	913.07	4459.77	940.91	4458.79
966.33	4458.12	1021.21	4457.99	1072.87	4457.76	1101.51	4458.17	1151.7	4458.85
1179.4	4458.92	1262.1	4459.25	1285.94	4459.44	1312.69	4459.54	1360.07	4459.6
1392.47	4459.7	1414.71	4460.18	1499	4462.03				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-180	.12	780	.05	912	.95

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
780	912	143	143	143	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
-180	776.99	4460.51	913.77	1499	4459.78

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 7

INPUT
Description: XS G -- Brown St. (new)
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-150	4463.3	0	4458.1	86	4457.6	137	4458.2	200	4458.7
377	4460.3	400	4458.5	450	4458.2	559	4458.7	675	4459.5
700	4459.8	744	4457.36	767.67	4450.83	795.67	4450.41	823.67	4451.13
849	4458.87	850	4458.6	900	4456.7	1000	4456.1	1074	4457.5
1100	4457.6	1200	4458.2	1300	4458.3	1400	4460.85		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-150	.12	700	.05	849	.095

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
700	849	60	60	60	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev

```
    -150  675.12  4459.5  850.36    1400 4458.61

BRIDGE                  RIVER: Alpine Creek
REACH: Alpine             RS: 6.7

INPUT
Description: Brown St. Bridge (new)
Distance from Upstream XS =      10
Deck/Roadway Width        =      40
Weir Coefficient          =     2.6
Bridge Deck/Roadway Skew  =
Upstream  Deck/Roadway Coordinates
    num=        3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
**********************************************************************
     700  4459.8  4458.8  769.61  4460.1 4459.01     849 4458.87 4457.87

Upstream Bridge Cross Section Data
Station Elevation Data    num=      24
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
    -150  4463.3       0  4458.1      86  4457.6     137  4458.2     200  4458.7
     377  4460.3     400  4458.5     450  4458.2     559  4458.7     675  4459.5
     700  4459.8     744 4457.36  767.67 4450.83  795.67 4450.41  823.67 4451.13
     849 4458.87     850  4458.6     900  4456.7    1000  4456.1    1074  4457.5
    1100  4457.6    1200  4458.2    1300  4458.3    1400 4460.85

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
    -150     .12     700     .05     849    .095

Bank Sta: Left   Right    Coeff Contr.   Expan.
           700     849             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************
    -150  675.12  4459.5  850.36    1400 4458.61

Downstream  Deck/Roadway Coordinates
    num=        3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
**********************************************************************
     700  4459.8  4458.8  769.61  4460.1 4459.01     849 4458.87 4457.87

Downstream Bridge Cross Section Data
Station Elevation Data    num=      24
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
    -150  4463.3       0  4458.1      86  4457.6     137  4458.2     200  4458.7
     377  4460.3     400  4458.5     450  4458.2     559  4458.7     675  4459.5
     700  4459.8     744 4457.36  767.67 4450.83  795.67 4450.41  823.67 4451.13
     849 4458.87     850  4458.6     900  4456.7    1000  4456.1    1074  4457.5
    1100  4457.6    1200  4458.2    1300  4458.3    1400 4460.85

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
    -150     .12     700     .05     849    .095

Bank Sta: Left   Right    Coeff Contr.   Expan.
           700     849             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************
    -150  674.52  4459.5  849.44    1400 4458.59
```

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

Number of Piers =  1

Pier Data
Pier Station     Upstream=     784    Downstream=     784
Upstream      num=        2
    Width   Elev    Width   Elev
*********************************
       2    4400        2    4460
Downstream      num=        2
    Width   Elev    Width   Elev
*********************************
       2    4400        2    4460

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.2
       Yarnell                KVal =      .9
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

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

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 6.5

INPUT
Description: additional XS for bridge copied from sta 7
Station Elevation Data     num=       24
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
*********************************************************************************************
    -150  4463.3        0  4458.1       86  4457.6      137  4458.2      200  4458.7
     377  4460.3      400  4458.5      450  4458.2      559  4458.7      675  4459.5
     700  4459.8      744 4457.36   767.67 4450.83   795.67 4450.41   823.67 4451.13
     849 4458.87      850  4458.6      900  4456.7     1000  4456.1     1074  4457.5
    1100  4457.6     1200  4458.2     1300  4458.3     1400 4460.85

Manning's n Values         num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
*************************************************
    -150     .12      700     .05      849    .095

Bank Sta: Left   Right     Lengths: Left Channel   Right      Coeff Contr.    Expan.
          700     849           141.25  143.75  141.25              .3         .5
Ineffective Flow      num=        2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*************************************************
    -150  674.52  4459.5  849.44    1400 4458.59

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 6.375*
```

INPUT
Description:
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-137.5	4461.55	-115.56	4460.83	-71.69	4459.29	-49.75	4458.55	19.82	4457.03
59.93	4456.98	60.81	4456.88	110.02	4456.45	125.74	4456.51	163.51	4456.79
213.48	4457.03	229.59	4457.11	301.23	4457.51	388.98	4458.03	415.23	4458.18
439.35	4456.81	457.42	4456.72	491.79	4456.58	564.47	4456.81	606.12	4456.97
652.21	4457.23	727.78	4457.73	738.21	4457.84	745.23	4458.47	754	4458.55
792.86	4455.32	802.05	4452.84	813.77	4450.06	838.5	4449.66	856.21	4450.32
865.15	4450.92	889.25	4457.85	890.17	4457.65	905.13	4457.26	913.07	4456.39
936.41	4455.67	1000.41	4455.34	1028.88	4455.22	1097.31	4456.31	1121.35	4456.4
1213.82	4456.91	1237.4	4456.94	1306.29	4457.22	1398.76	4459.43		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-137.5	.09	754	.05	889.25	.09

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

	754	889.25		141.25	143.75	141.25	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
-137.5	737.41	4457.85	890.86	1398.76	4457.66

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 6.25*

INPUT
Description:
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-125	4459.8	-102.04	4459.09	-56.13	4457.46	-33.17	4456.7	39.65	4455.96
81.62	4456.09	82.54	4455.89	134.04	4455.3	150.49	4455.24	190.02	4455.39
242.32	4455.49	259.18	4455.52	334.15	4455.71	425.98	4455.99	453.46	4456.06
478.71	4455.13	497.61	4455.05	533.59	4454.95	609.65	4455.11	653.23	4455.25
701.48	4455.45	780.56	4455.96	791.47	4456.06	798.82	4457.25	808	4457.3
841.73	4453.29	849.7	4451.2	859.87	4449.28	881.33	4448.91	898.14	4449.74
906.62	4450.7	929.5	4456.83	930.35	4456.71	944.09	4456.54	951.38	4455.13
972.82	4454.64	1031.61	4454.39	1057.76	4454.34	1120.61	4455.12	1142.7	4455.2
1227.63	4455.62	1249.3	4455.66	1312.57	4456.14	1397.51	4458.02		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-125	.09	808	.05	929.5	.09

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

	808	929.5		141.25	143.75	141.25	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
-125	794.79	4456.57	944.22	1397.51	4456.55

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 6.125*

INPUT
Description:
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-11	4458.05	-88.52	4457.34	-40.56	4455.63	-16.58	4454.85	59.47	4454.

```
  103.31 4455.19  104.27 4454.89  158.07 4454.14  175.25 4453.97  216.54 4453.98
  271.16 4453.94  288.76 4453.93  367.08  4453.9  462.99 4453.94  491.69 4453.94
  518.06 4453.44  537.81 4453.37  575.38 4453.33  654.82  4453.4  700.35 4453.52
  750.74 4453.68  833.34  4454.2  844.74 4454.28  852.41 4456.02     862 4456.05
  890.59 4451.25  897.35 4449.55  905.97 4448.51  924.17 4448.15  940.07 4449.17
   948.1 4450.49  969.75 4455.82  970.52 4455.76  983.04 4455.82  989.69 4453.86
 1009.23  4453.6  1062.8 4453.45 1086.64 4453.45 1143.92 4453.93 1164.04     4454
 1241.45 4454.33 1261.19 4454.38 1318.86 4455.07 1396.27  4456.6

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************
  -112.5     .09     862     .05  969.75    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           862  969.75           141.25  143.75  141.25             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*****************************************
  -112.5  847.91 4455.02  985.65 1396.27 4455.01

CROSS SECTION           RIVER: Alpine Creek
REACH: Alpine           RS: 6

INPUT
Description: XS F
Station Elevation Data     num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
    -100  4456.3     -75  4455.6     -25  4453.8       0    4453     125  4454.3
     126  4453.9     200  4452.7     300  4452.4     400  4452.1     500  4451.9
     578  4451.7     700  4451.7     800  4451.9     898  4452.5     906  4454.8
     916  4454.8     945  4447.9     967  4447.4     982  4448.6    1010  4454.8
    1022  4455.1    1028  4452.6    1094  4452.5 1273.09  4453.1 1395.02 4455.18

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************
    -100     .09     916     .05    1010    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           916    1010                    110     100     110             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*****************************************
    -100  903.08 4454.02 1024.18 1395.02    4454

CROSS SECTION           RIVER: Alpine Creek
REACH: Alpine           RS: 5.66666*

INPUT
Description:
Station Elevation Data     num=      43
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
  -66.67 4454.57   -42.4 4453.99    6.12 4452.58   30.38 4451.94   39.81 4451.97
  146.29 4452.59  151.69 4452.63  152.66 4452.36  214.44 4451.65  224.48 4451.58
  250.64 4451.65  252.77 4451.44  321.52 4451.21  359.25 4451.09  418.57 4450.97
  465.73  4450.9   466.8  4450.9  515.62 4450.56  526.42 4450.48  572.21 4450.63
  591.31  4450.6  678.69  4450.6  709.71 4450.66  734.06 4450.73  768.13 4450.45
  785.17  4450.5  806.76 4450.75  808.59 4450.77  901.86 4451.19  909.63 4452.73
  919.33 4452.73  949.09 4444.03  949.47 4443.96  972.33  4443.5  991.29 4444.33
   993.5 4444.59 1026.67 4452.77 1036.12 4452.97 1040.85 4451.31 1092.85 4451.28
 1113.34 4451.36 1233.95 4451.98 1330.01 4453.59

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

```
**********************************************
  -66.67     .085  919.33      .05 1026.67      .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        919.33 1026.67               110     100     110             .1      .3

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 5.33333*

INPUT
Description:
Station Elevation Data    num=       43
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
**********************************************************************************************
  -33.33 4452.83    -9.81 4452.39    37.24 4451.36    60.76 4450.88    69.91 4450.83
  173.15 4450.95   178.38 4450.96   179.32 4450.83   239.22 4450.42   248.95 4450.46
  274.32 4450.67   276.39 4450.27   343.04 4450.03   379.63 4449.89   437.14 4449.83
  482.87  4449.8    483.9  4449.8   531.23 4449.22   541.71 4449.09   586.11 4449.52
  604.63  4449.5   689.34  4449.5   719.42 4449.61   743.03 4449.72   776.07 4449.07
  792.58 4449.15   813.52  4449.6    815.3 4449.64   905.73 4449.89   913.26 4450.66
  922.67 4450.67   953.54 4440.06   953.94 4440.03   977.67  4439.6 1000.57 4440.06
 1003.25  4440.2 1043.33 4450.73 1050.24 4450.85   1053.7 4450.02   1091.7 4450.07
 1106.67 4450.13 1194.81 4450.86 1265.01 4452.01

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
**********************************************
  -33.33     .085  922.67      .05 1043.33      .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        922.67 1043.33               110     100     110             .1      .3

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 5

INPUT
Description: XS E
Station Elevation Data    num=       23
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
**********************************************************************************************
       0  4451.1      100  4449.7      200  4449.3      264  4449.2      298  4449.7
     300  4449.1      400  4448.7      500  4448.7      501  4448.7      557  4447.7
     600  4448.4      700  4448.4      752  4448.7      784  4447.7      800  4447.8
     822  4448.5      926  4448.6      958  4436.1      983  4435.7     1013  4435.8
    1060  4448.7     1100  4448.9     1200 4450.42

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
**********************************************
       0     .085      926      .05     1060      .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          926    1060              276.25  283.75  276.25             .1      .3

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 4.75*

INPUT
Description:
Station Elevation Data    num=       42
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
**********************************************************************************************
       0  4448.2    90.09 4447.13   149.24 4446.93   180.18 4446.82   237.84 4446.74
  268.47  4447.1   270.28 4446.65   298.47 4446.56   360.37 4446.25   447.71  4446.1
  450.46  4446.1   451.36 4446.09   501.81 4445.25   540.55  4445.7   596.95  4445.6
  629.78 4445.58   630.64 4445.57   677.49  4445.5   704.48 4444.62   706.32 4444.56
  720    4444.51   740.56 4444.88   778.63 4444.59   834.25 4444.62   871.44 4433.
```

871.87	4433.45	894.34	4433.02	901.25	4432.88	922.32	4433.4	932.71	4433.25
939.87	4434.53	960.06	4438.42	961.81	4439.99	968.83	4441.24	982	4445
1016.67	4445.18	1030	4445.25	1083.33	4445.83	1112	4446.13	1140	4446.75
1147.33	4447.61	1150	4447.87						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	834.25	.05	982	.08

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
834.25	982	276.25	283.75 276.25	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 4.5*

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4445.3	80.18	4444.57	132.82	4444.42	160.37	4444.34	211.69	4444.27
238.95	4444.51	240.55	4444.21	265.65	4444.14	320.74	4443.79	398.47	4443.5
400.92	4443.49	401.72	4443.49	446.63	4442.8	481.1	4443.01	531.3	4442.8
560.52	4442.75	561.29	4442.74	602.98	4442.29	627	4441.48	628.64	4441.42
641.47	4441.23	659.11	4441.25	693	4440.65	742.51	4440.63	785.24	4430.89
785.73	4430.81	811.56	4430.25	819.5	4430.05	841.54	4431.03	852.42	4430.69
859.91	4431.39	881.04	4433.88	882.88	4436.56	890.22	4437.23	904	4441.3
944.44	4441.52	960	4441.59	1022.22	4442.09	1055.67	4442.32	1088.33	4443.2
1096.89	4444.84	1100	4445.31						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	742.51	.05	904	.08

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
742.51	904	276.25	283.75 276.25	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 4.25*

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4442.4	70.28	4442	116.41	4441.91	140.55	4441.86	185.53	4441.81
209.42	4441.92	210.93	4441.76	232.82	4441.72	281.1	4441.34	349.24	4440.9
351.38	4440.88	352.08	4440.88	391.44	4440.35	421.66	4440.31	465.65	4440
491.26	4439.92	491.93	4439.91	528.48	4439.08	549.53	4438.33	550.97	4438.27
562.21	4437.94	577.67	4437.63	607.37	4436.7	650.76	4436.65	699.04	4428.21
699.6	4428.16	728.78	4427.47	737.75	4427.23	760.77	4428.67	772.13	4428.14
779.96	4428.24	802.02	4429.34	803.94	4433.13	811.61	4433.21	826	4437.6
872.22	4437.86	890	4437.94	961.11	4438.34	999.33	4438.51	1036.67	4439.65
1046.44	4442.07	1050	4442.75						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.08	650.76	.05	826	.08

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
650.76	826	276.25	283.75 276.25	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 4

INPUT
Description: XS D
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4439.5	100	4439.4	200	4439.3	300	4438.3	400	4437.2
422	4437.1	472.05	4435.19	521.74	4432.75	559.01	4432.66	612.84	4425.53
646	4424.7	656	4424.4	680	4426.3	700	4425.1	723	4424.8
725	4429.7	733	4429.2	748	4433.9	800	4434.2	900	4434.6
943	4434.7	985	4436.1	996	4439.3	1000	4440.2		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.075	559.01	.05	748	.08

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
559.01	748	281.65	298	281.65	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 3.83333*

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4436.7	1.68	4436.58	75.56	4436.08	92.52	4435.99	142.73	4435.72
167.91	4435.6	185.03	4435.58	277.55	4434.71	335.83	4434.11	364.37	4433.94
370.06	4433.85	390.42	4433.63	436.72	4431.73	455.05	4430.8	482.69	4429.85
485.27	4429.87	503.74	4429.81	517.17	4429.8	530.94	4427.73	537.82	4426.03
565.55	4422.48	595.35	4421.63	604.33	4421.33	626.68	4423.15	628.13	4423.09
645.3	4422.45	645.58	4422.45	666.72	4422.42	668.58	4426.53	669.38	4426.49
676.03	4426.22	690	4430.35	740.21	4430.58	777.6	4430.7	794.63	4431.46
811.67	4431.76	836.77	4432.21	878.29	4432.88	918.85	4434.63	929.47	4437.44
933.33	4438.25								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.075	517.17	.05	690	.08

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
517.17	690	281.65	298	281.65	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 3.66666*

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4433.9	1.54	4433.67	69.45	4432.75	85.03	4432.58	131.18	4432.1
154.33	4431.88	170.06	4431.85	255.1	4431.11	308.66	4430.6	334.9	4430.61
340.13	4430.49	358.84	4430.16	401.4	4428.27	418.24	4427.38	443.65	4426.95
446.02	4427	462.99	4426.93	475.34	4426.94	487.55	4424.82	493.65	4422.44
518.26	4419.43	544.69	4418.56	552.67	4418.27	573.36	4420	574.7	4419.97
590.61	4419.79	590.86	4419.8	610.44	4420.04	612.17	4423.35	612.9	4423.33
619.07	4423.24	632	4426.8	680.42	4426.96	716.48	4427.04	732.91	4428.48
749.33	4429.03	773.54	4429.82	813.59	4431.07	852.7	4433.15	862.94	4435.59
866.67	4436.3								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

```
       0    .075  475.34     .05     632     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        475.34     632          ,  281.65     298  281.65             .1      .3

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 3.5*

INPUT
Description:
Station Elevation Data    num=      41
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0  4431.1    1.41 4430.75   63.34 4429.41   77.55 4429.17  119.64 4428.47
  140.75 4428.16   155.1 4428.13  232.65 4427.52   281.5  4427.1  305.42 4427.28
  310.19 4427.14  327.26 4426.68  366.07 4424.81  381.43 4423.96   404.6 4424.05
  406.76 4424.12  422.25 4424.05  433.51 4424.08  444.16 4421.92  449.49 4418.86
  470.97 4416.38  494.04 4415.49     501  4415.2  520.04 4416.85  521.28 4416.85
  535.91 4417.14  536.15 4417.15  554.16 4417.67  555.75 4420.18  556.43 4420.17
   562.1 4420.26     574 4423.25  620.63 4423.34  655.36 4423.38  671.18 4425.51
     687  4426.3  710.32 4427.42  748.88 4429.25  786.55 4431.68  796.41 4433.73
     800 4434.35

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0    .075  433.51    .045     574     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        433.51     574           281.65     298  281.65             .1      .3

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 3.33333*

INPUT
Description:
Station Elevation Data    num=      41
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0  4428.3    1.27 4427.83   57.22 4426.07   70.06 4425.76  108.09 4424.85
  127.17 4424.44  140.13 4424.41  210.19 4423.93  254.33  4423.6  275.95 4423.96
  280.26 4423.78  295.67 4423.21  330.74 4421.35  344.62 4420.54  365.56 4421.15
  367.51 4421.25   381.5 4421.17  391.67 4421.22  400.77 4419.01  405.33 4415.27
  423.67 4413.33  443.39 4412.42  449.33 4412.13  466.72 4413.71  467.85 4413.74
  481.22 4414.48  481.43  4414.5  497.88 4415.29  499.33    4417  499.95 4417.02
  505.13 4417.28     516  4419.7  560.85 4419.72  594.24 4419.72  609.45 4422.54
  624.67 4423.57  647.09 4425.03  684.17 4427.43   720.4 4430.21  729.88 4431.88
  733.33  4432.4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0    .075  391.67    .045     516     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        391.67     516           281.65     298  281.65             .1      .3

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 3.16666*

INPUT
Description:
Station Elevation Data    num=      41
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0  4425.5    1.14 4424.92   51.11 4422.74   62.58 4422.35   96.55 4421.22
  113.58 4420.72  125.16 4420.68  187.74 4420.33  227.17  4420.1  246.47 4420.63
```

```
  250.32 4420.43  264.09 4419.74  295.41 4417.89  307.81 4417.12  326.51 4418.25
  328.25 4418.37  340.75 4418.28  349.83 4418.36  357.39 4416.11  361.16 4411.69
  376.38 4410.28  392.74 4409.35  397.67 4409.07  413.41 4410.56  414.43 4410.62
  426.52 4411.83  426.72 4411.85  441.61 4412.91  442.92 4413.83  443.48 4413.86
  448.16 4414.29     458 4416.15  501.06  4416.1  533.12 4416.06  547.73 4419.57
  562.33 4420.83  583.86 4422.64  619.47 4425.61  654.25 4428.73  663.35 4430.02
  666.67 4430.45

Manning's n Values          num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
**********************************************
       0    .075  349.83    .045     458     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        349.83     458           281.65     298  281.65             .1       .3

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 3

INPUT
Description: XS C
Station Elevation Data    num=      22
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
**************************************************************************************
       0  4422.7        1    4422       45  4419.4       85  4417.6      100    4417
     200  4416.6      217  4417.3      271  4413.7      289  4415.5      300  4415.4
     308  4415.5      314  4413.2      317  4408.1      346    4406      361  4407.5
     372  4409.2      387  4410.7      400  4412.6      472  4412.4      486  4416.6
     500  4418.1      600  4428.5

Manning's n Values          num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
**********************************************
       0    .075      308    .045      400     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           308      400                  35      40      35             .3       .5

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 2.5

INPUT
Description: Additional XS for bridge copied from sta. 2
Station Elevation Data    num=      27
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
**************************************************************************************
    -450  4429.3        0  4422.9       70  4421.2       71  4420.6      100    4420
     200  4420.3      294  4421.7      294  4418.9      306  4415.5      313  4414.2
     314  4410.1      320  4408.1      328  4406.2      335  4405.5      346  4406.6
     351  4406.3      358  4405.4      366  4406.4      372  4409.1      376  4411.5
     380  4412.6      386  4413.8      400  4419.1      400  4423.8      500  4426.3
     582  4432.4      600  4433.3

Manning's n Values          num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
**********************************************
    -450     .09      294    .045      400    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           294      400                  50      50      50             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
************************
    -450      294  4421.7

BRIDGE                 RIVER: Alpine Creek
REACH      ine            RS: 2.3
```

```
INPUT
Description: Hendrix St. Bridge
Distance from Upstream XS =        10
Deck/Roadway Width        =        35
Weir Coefficient          =       2.6
Bridge Deck/Roadway Skew  =
Upstream  Deck/Roadway Coordinates
    num=        2
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
*****************************************************
     294  4421.7  4420.3      400  4423.8  4422.6

Upstream Bridge Cross Section Data
Station Elevation Data    num=       27
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*************************************************************************************
     -450  4429.3        0  4422.9       70  4421.2       71  4420.6      100    4420
     200  4420.3      294  4421.7      294  4418.9      306  4415.5      313  4414.2
     314  4410.1      320  4408.1      328  4406.2      335  4405.5      346  4406.6
     351  4406.3      358  4405.4      366  4406.4      372  4409.1      376  4411.5
     380  4412.6      386  4413.8      400  4419.1      400  4423.8      500  4426.3
     582  4432.4      600  4433.3

Manning's n Values        num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
*************************************************
    -450     .09      294    .045      400    .075

Bank Sta: Left   Right     Coeff Contr.    Expan.
          294     400              .3        .5
Ineffective Flow      num=        1
   Sta L   Sta R     Elev
************************
    -450      294  4421.7

Downstream  Deck/Roadway Coordinates
    num=        2
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
*****************************************************
     294  4421.7  4420.3      400  4423.8  4422.6

Downstream Bridge Cross Section Data
Station Elevation Data    num=       27
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*************************************************************************************
     -450  4429.3        0  4422.9       70  4421.2       71  4420.6      100    4420
     200  4420.3      294  4421.7      294  4418.9      306  4415.5      313  4414.2
     314  4410.1      320  4408.1      328  4406.2      335  4405.5      346  4406.6
     351  4406.3      358  4405.4      366  4406.4      372  4409.1      376  4411.5
     380  4412.6      386  4413.8      400  4419.1      400  4423.8      500  4426.3
     582  4432.4      600  4433.3

Manning's n Values        num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
*************************************************
    -450     .09      294    .045      400    .075

Bank Sta: Left   Right     Coeff Contr.    Expan.
          294     400              .3        .5
Ineffective Flow      num=        1
   Sta L   Sta R     Elev
************************
    -450      294  4421.7

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
```

```
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =  4421.7
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  3

Pier Data
Pier Station     Upstream=     320    Downstream=     320
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
       2    4400        2  4421.5
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
       2    4400        2  4421.5

Pier Data
Pier Station     Upstream=     351    Downstream=     351
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
       2    4400        2    4422
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
       2    4400        2    4422

Pier Data
Pier Station     Upstream=     380    Downstream=     380
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
       2    4400        2    4423
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
       2    4400        2    4423

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.2
       Yarnell                KVal =      .9
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

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

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 2

INPUT
Description: XS B -- Hendrix
Station Elevation Data    num=      27
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****    ***************************************************************
```

-450	4429.3	0	4422.9	70	4421.2	71	4420.6	100	4420
200	4420.3	294	4421.7	294	4418.9	306	4415.5	313	4414.2
314	4410.1	320	4408.1	328	4406.2	335	4405.5	346	4406.6
351	4406.3	358	4405.4	366	4406.4	372	4409.1	376	4411.5
380	4412.6	386	4413.8	400	4419.1	400	4423.8	500	4426.3
582	4432.4	600	4433.3						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-450	.09	294	.045	400	.075

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
294	400	109.33	128.33	109.33	.3	.5

Ineffective Flow num= 1

Sta L	Sta R	Elev
-450	294	4421.7

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 1.66666*

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-300	4426.07	-244.5	4425.32	-153.94	4423.53	-7.88	4420.93	88.52	4420.07
88.71	4420.06	98.75	4419.65	113.35	4417.4	138.18	4416.74	149.18	4416.5
150.04	4416.1	175.09	4415.62	261.47	4415.54	284.24	4415.73	342.67	4416.63
342.67	4414.77	351.67	4411.82	356.92	4410.55	357.67	4407.76	360.67	4406.64
362.17	4406.18	368.17	4404.83	373.42	4404.3	381.67	4404.92	385.42	4404.67
390.67	4404	397.97	4404.8	403.44	4406.7	407.1	4408.36	409.22	4408.83
410.75	4409.33	416.22	4410.83	429	4416	429	4419.13	439.68	4419.39
521.86	4420.58	537.47	4420.78	541.17	4420.84	570.34	4422.22	587.59	4424.12
604.03	4425.01	633.14	4426.71	653.33	4427.6				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-300	.09	342.67	.045	429	.075

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
342.67	429	109.33	128.33	109.33	.3	.5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 1.33333*

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-150	4422.83	-103.35	4422.26	-26.97	4420.17	96.06	4417.36	177.26	4417.23
177.42	4417.22	185.87	4416.67	198.18	4412.6	219.09	4411.97	228.35	4411.8
229.08	4411.59	250.18	4411.23	322.94	4410.78	342.12	4410.76	391.33	4411.57
391.33	4410.63	397.33	4408.13	400.83	4406.9	401.33	4405.42	403.33	4404.52
404.33	4404.26	408.33	4403.47	411.83	4403.09	417.33	4403.24	419.83	4403.04
423.33	4402.6	429.94	4403.2	434.89	4404.29	438.19	4405.22	440.11	4405.51
441.49	4406.06	446.44	4407.86	458	4412.9	458	4414.47	469.84	4414.75
560.93	4415.29	578.23	4415.34	582.33	4415.39	614.67	4416.21	633.8	4418.86
652.01	4419.56	684.29	4421.03	706.67	4421.9				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-150	.09	391.33	.045	458	.075

```
Bank Sta: Left   Right     Lengths: Left Channel   Right      Coeff Contr.    Expan.
        391.33     458             109.33  128.33  109.33              .1       .3

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 1

INPUT
Description: XS A
Station Elevation Data    num=      21
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*********************************************************************************
       0  4419.6       38  4419.2      100  4416.8      200  4413.8      266  4414.4
     273  4413.7      283  4407.8      300  4407.2      400  4405.8      440  4406.5
     446  4402.4      456  4401.2      471  4402.2      487  4409.8      500  4410.1
     600    4410      619  4409.9      659  4410.2      680  4413.6      700  4414.1
     760  4416.2

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
***********************************************
       0     .09      440    .045      487    .075

Bank Sta: Left   Right     Coeff Contr.    Expan.
          440     487              .1       .3

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

SUMMARY OF MANNING'S N VALUES

River:Alpine Creek
*********************************************************************
*     Reach      *   River Sta.   *   n1    *   n2    *   n3    *   n4    *
*********************************************************************
*Alpine          *    19          *     .085*     .055*     .085*         *
*Alpine          *    18.8*       *     .085*     .045*     .085*         *
*Alpine          *    18.6*       *     .085*     .045*     .085*         *
*Alpine          *    18.4*       *     .085*     .045*     .085*         *
*Alpine          *    18.2*       *     .085*     .045*     .085*         *
*Alpine          *    18          *     .085*     .045*     .085*         *
*Alpine          *    17.8842*    *     .085*     .045*     .085*         *
*Alpine          *    17.7685*    *     .085*     .045*     .085*         *
*Alpine          *    17.6528*    *     .085*     .045*     .085*         *
*Alpine          *    17.5371*    *     .085*     .045*     .085*         *
*Alpine          *    17.4214     *     .085*     .045*     .085*         *
*Alpine          *    17.3        *Bridge   *         *         *        *
*Alpine          *    17.2        *      .11*      .04*      .11*         *
*Alpine          *    17.15*      *     .112*      .04*     .117*     .117*
*Alpine          *    17.1*       *     .115*      .04*     .125*     .125*
*Alpine          *    17.05*      *     .117*      .04*     .132*     .132*
*Alpine          *    17          *      .12*      .04*      .14*         *
*Alpine          *    16.7        *Bridge   *         *         *        *
*Alpine          *    16.5        *      .12*      .04*      .14*         *
*Alpine          *    16.25*      *      .12*      .04*      .14*         *
*Alpine          *    16.*        *      .12*      .04*      .14*         *
*Alpine          *    15.75*      *      .12*     .045*      .14*         *
*Alpine          *    15.5        *      .12*     .045*      .14*         *
*Alpine          *    15.3333*    *      .12*     .045*      .14*         *
*Alpine          *    15.1666*    *      .12*     .045*     .095*         *
*Alpine          *    15          *      .13*     .045*     .095*         *
*Alpine          *    14.8333*    *      .13*     .045*     .095*         *
*Alpine          *    14.6666*    *      .15*     .045*      .15*         *
*Alpine          *    14.5        *      .15*     .045*      .15*         *
*Alpine          *    14.3        *Bridge   *         *         *        *
*Alpine          *    14          *      .15*     .045*      .15*         *
*Alpine          *    13.75*      *      .15*     .045*      .15*      .15*
*Alpi            *    13.5        *      .15*     .045*      .15*         *
```

*Alpine	*	13.25*	*	.125*	.045*	.145*	.145*
*Alpine	*	13	*	.1*	.045*	.14*	*
*Alpine	*	12.9	*Culvert	*	*	*	*
*Alpine	*	12.7	*	.1*	.045*	.14*	*
*Alpine	*	12.6333*	*	.1*	.045*	.14*	*
*Alpine	*	12.5666*	*	.1*	.045*	.14*	*
*Alpine	*	12.5	*	.1*	.045*	.14*	*
*Alpine	*	12	*	.135*	.045*	.15*	*
*Alpine	*	11.9	*Bridge	*	*	*	*
*Alpine	*	11.7	*	.135*	.045*	.15*	*
*Alpine	*	11.6333*	*	.135*	.045*	.15*	*
*Alpine	*	11.5666*	*	.135*	.045*	.15*	*
*Alpine	*	11.5	*	.135*	.045*	.15*	*
*Alpine	*	11.4666*	*	.13*	.045*	.13*	*
*Alpine	*	11.4333*	*	.13*	.045*	.13*	*
*Alpine	*	11.4	*	.13*	.045*	.13*	*
*Alpine	*	11.3	*Bridge	*	*	*	*
*Alpine	*	11	*	.13*	.045*	.13*	*
*Alpine	*	10.6666*	*	.13*	.045*	.13*	*
*Alpine	*	10.3333*	*	.13*	.045*	.13*	*
*Alpine	*	10	*	.13*	.045*	.13*	*
*Alpine	*	9.9*	*	.13*	.045*	.13*	*
*Alpine	*	9.8*	*	.1*	.045*	.13*	*
*Alpine	*	9.7	*	.1*	.045*	.13*	*
*Alpine	*	9.63333*	*	.1*	.045*	.13*	*
*Alpine	*	9.56666*	*	.1*	.05*	.13*	*
*Alpine	*	9.5	*	.1*	.05*	.13*	*
*Alpine	*	9.3	*Bridge	*	*	*	*
*Alpine	*	9	*	.1*	.05*	.13*	*
*Alpine	*	8.66666*	*	.1*	.05*	.13*	*
*Alpine	*	8.33333*	*	.1*	.05*	.13*	*
*Alpine	*	8	*	.1*	.05*	.13*	*
*Alpine	*	7.8*	*	.1*	.05*	.13*	*
*Alpine	*	7.6*	*	.1*	.05*	.13*	*
*Alpine	*	7.4*	*	.12*	.05*	.95*	*
*Alpine	*	7.2*	*	.12*	.05*	.95*	*
*Alpine	*	7	*	.12*	.05*	.095*	*
*Alpine	*	6.7	*Bridge	*	*	*	*
*Alpine	*	6.5	*	.12*	.05*	.095*	*
*Alpine	*	6.375*	*	.09*	.05*	.09*	*
*Alpine	*	6.25*	*	.09*	.05*	.09*	*
*Alpine	*	6.125*	*	.09*	.05*	.085*	*
*Alpine	*	6	*	.09*	.05*	.085*	*
*Alpine	*	5.66666*	*	.085*	.05*	.08*	*
*Alpine	*	5.33333*	*	.085*	.05*	.08*	*
*Alpine	*	5	*	.085*	.05*	.08*	*
*Alpine	*	4.75*	*	.08*	.05*	.08*	*
*Alpine	*	4.5*	*	.08*	.05*	.08*	*
*Alpine	*	4.25*	*	.08*	.05*	.08*	*
*Alpine	*	4	*	.075*	.05*	.08*	*
*Alpine	*	3.83333*	*	.075*	.05*	.08*	*
*Alpine	*	3.66666*	*	.075*	.05*	.08*	*
*Alpine	*	3.5*	*	.075*	.045*	.08*	*
*Alpine	*	3.33333*	*	.075*	.045*	.08*	*
*Alpine	*	3.16666*	*	.075*	.045*	.08*	*
*Alpine	*	3	*	.075*	.045*	.08*	*
*Alpine	*	2.5	*	.09*	.045*	.075*	*
*Alpine	*	2.3	*Bridge	*	*	*	*
*Alpine	*	2	*	.09*	.045*	.075*	*
*Alpine	*	1.66666*	*	.09*	.045*	.075*	*
*Alpine	*	1.33333*	*	.09*	.045*	.075*	*
*Alpine	*	1	*	.09*	.045*	.075*	*

****

****

SUMMARY OF REACH LENGTHS

River: Alpine Creek

Reach	River Sta.	Left	Channel	Right
Alpine	19	403.99	486	403.99
Alpine	18.8	403.99	486	403.99
Alpine	18.6	403.99	486	403.99
Alpine	18.4	403.99	486	403.99
Alpine	18.2	403.99	486	403.99
Alpine	18	130.74	140	130.74
Alpine	17.8842	130.74	140	130.74
Alpine	17.7685	130.74	140	130.74
Alpine	17.6528	130.74	140	130.74
Alpine	17.5371	130.74	140	130.74
Alpine	17.4214	60	60	60
Alpine	17.3	Bridge		
Alpine	17.2	104.07	112.5	104.07
Alpine	17.15	104.07	112.5	104.07
Alpine	17.1	104.07	112.5	104.07
Alpine	17.05	104.07	112.5	104.07
Alpine	17	60	60	60
Alpine	16.7	Bridge		
Alpine	16.5	129.04	150	129.04
Alpine	16.25	129.04	150	129.04
Alpine	16.	129.04	150	129.04
Alpine	15.75	129.04	150	129.04
Alpine	15.5	94.63	110	94.63
Alpine	15.3333	94.63	110	94.63
Alpine	15.1666	94.63	110	94.63
Alpine	15	63.33	63.33	63.33
Alpine	14.8333	63.33	63.33	63.33
Alpine	14.6666	63.33	63.33	63.33
Alpine	14.5	30	30	30
Alpine	14.3	Bridge		
Alpine	14	45	45	45
Alpine	13.75	45	45	45
Alpine	13.5	45	45	45
Alpine	13.25	45	45	45
Alpine	13	60	60	60
Alpine	12.9	Culvert		
Alpine	12.7	75	75	75
Alpine	12.6333	75	75	75
Alpine	12.5666	75	75	75
Alpine	12.5	50	50	50
Alpine	12	60	60	60
Alpine	11.9	Bridge		
Alpine	11.7	80	126.67	80
Alpine	11.6333	80	126.67	80
Alpine	11.5666	80	126.67	80
Alpine	11.5	53.33	53.33	53.33
Alpine	11.4666	53.33	53.33	53.33
Alpine	11.4333	53.33	53.33	53.33
Alpine	11.4	50	50	50
Alpine	11.3	Bridge		
Alpine	11	106.67	106.67	106.67
Alpine	10.6666	106.67	106.67	106.67
Alpine	10.3333	106.67	106.67	106.67
Alpine	10	109.17	120.83	109.17
Alpine	9.9	109.17	120.83	109.17
Alpine	9.8	109.17	120.83	109.17
Alpine	9.7	109.17	120.83	109.17
Alpine	9.63333	109.17	120.83	109.17
Alpine	9.56666	109.17	120.83	109.17
Alpine	9.5	70	70	70
Alpine	9.3	Bridge		
Alpi	9	83.33	87.33	83.33

*Alpine	*	8.66666*	* 83.33*	87.33*	83.33*
*Alpine	*	8.33333*	* 83.33*	87.33*	83.33*
*Alpine	*	8	* 143*	143*	143*
*Alpine	*	7.8*	* 143*	143*	143*
*Alpine	*	7.6*	* 143*	143*	143*
*Alpine	*	7.4*	* 143*	143*	143*
*Alpine	*	7.2*	* 143*	143*	143*
*Alpine	*	7	* 60*	60*	60*
*Alpine	*	6.7	*Bridge *	*	*
*Alpine	*	6.5	* 141.25*	143.75*	141.25*
*Alpine	*	6.375*	* 141.25*	143.75*	141.25*
*Alpine	*	6.25*	* 141.25*	143.75*	141.25*
*Alpine	*	6.125*	* 141.25*	143.75*	141.25*
*Alpine	*	6	* 110*	100*	110*
*Alpine	*	5.66666*	* 110*	100*	110*
*Alpine	*	5.33333*	* 110*	100*	110*
*Alpine	*	5	* 276.25*	283.75*	276.25*
*Alpine	*	4.75*	* 276.25*	283.75*	276.25*
*Alpine	*	4.5*	* 276.25*	283.75*	276.25*
*Alpine	*	4.25*	* 276.25*	283.75*	276.25*
*Alpine	*	4	* 281.65*	298*	281.65*
*Alpine	*	3.83333*	* 281.65*	298*	281.65*
*Alpine	*	3.66666*	* 281.65*	298*	281.65*
*Alpine	*	3.5*	* 281.65*	298*	281.65*
*Alpine	*	3.33333*	* 281.65*	298*	281.65*
*Alpine	*	3.16666*	* 281.65*	298*	281.65*
*Alpine	*	3	* 35*	40*	35*
*Alpine	*	2.5	* 50*	50*	50*
*Alpine	*	2.3	*Bridge *	*	*
*Alpine	*	2	* 109.33*	128.33*	109.33*
*Alpine	*	1.66666*	* 109.33*	128.33*	109.33*
*Alpine	*	1.33333*	* 109.33*	128.33*	109.33*
*Alpine	*	1	* *	*	*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Alpine Creek

Reach	River Sta.	Contr.	Expan.
*Alpine	* 19	* .1*	.3*
*Alpine	* 18.8*	* .1*	.3*
*Alpine	* 18.6*	* .1*	.3*
*Alpine	* 18.4*	* .1*	.3*
*Alpine	* 18.2*	* .1*	.3*
*Alpine	* 18	* .1*	.3*
*Alpine	* 17.8842**	.1*	.3*
*Alpine	* 17.7685**	.1*	.3*
*Alpine	* 17.6528**	.1*	.3*
*Alpine	* 17.5371**	.3*	.5*
*Alpine	* 17.4214 *	.3*	.5*
*Alpine	* 17.3	*Bridge *	*
*Alpine	* 17.2	* .3*	.5*
*Alpine	* 17.15*	* .3*	.5*
*Alpine	* 17.1*	* .3*	.5*
*Alpine	* 17.05*	* .3*	.5*
*Alpine	* 17	* .3*	.5*
*Alpine	* 16.7	*Bridge *	*
*Alpine	* 16.5	* .3*	.5*
*Alpine	* 16.25*	* .3*	.5*
*Alpine	* 16.*	* .1*	.3*
*Alpine	* 15.75*	* .1*	.3*
*Alpine	* 15.5	* .1*	.3*
*Alpine	* 15.3333**	.1*	.3*

*Alpine	*	15.1666**		.1*	.3*
*Alpine	*	15	*	.1*	.3*
*Alpine	*	14.8333**		.1*	.3*
*Alpine	*	14.6666**		.3*	.5*
*Alpine	*	14.5	*	.3*	.5*
*Alpine	*	14.3	*Bridge	*	*
*Alpine	*	14	*	.3*	.5*
*Alpine	*	13.75*	*	.3*	.5*
*Alpine	*	13.5	*	.1*	.3*
*Alpine	*	13.25*	*	.3*	.5*
*Alpine	*	13	*	.3*	.5*
*Alpine	*	12.9	*Culvert	*	*
*Alpine	*	12.7	*	.3*	.5*
*Alpine	*	12.6333**		.3*	.5*
*Alpine	*	12.5666**		.1*	.3*
*Alpine	*	12.5	*	.3*	.5*
*Alpine	*	12	*	.3*	.5*
*Alpine	*	11.9	*Bridge	*	*
*Alpine	*	11.7	*	.3*	.5*
*Alpine	*	11.6333**		.3*	.5*
*Alpine	*	11.5666**		.3*	.5*
*Alpine	*	11.5	*	.1*	.3*
*Alpine	*	11.4666**		.1*	.3*
*Alpine	*	11.4333**		.3*	.5*
*Alpine	*	11.4	*	.3*	.5*
*Alpine	*	11.3	*Bridge	*	*
*Alpine	*	11	*	.3*	.5*
*Alpine	*	10.6666**		.3*	.5*
*Alpine	*	10.3333**		.1*	.3*
*Alpine	*	10	*	.1*	.3*
*Alpine	*	9.9*	*	.1*	.3*
*Alpine	*	9.8*	*	.1*	.3*
*Alpine	*	9.7	*	.1*	.3*
*Alpine	*	9.63333**		.1*	.3*
*Alpine	*	9.56666**		.3*	.5*
*Alpine	*	9.5	*	.3*	.5*
*Alpine	*	9.3	*Bridge	*	*
*Alpine	*	9	*	.3*	.5*
*Alpine	*	8.66666**		.3*	.5*
*Alpine	*	8.33333**		.1*	.3*
*Alpine	*	8	*	.1*	.3*
*Alpine	*	7.8*	*	.1*	.3*
*Alpine	*	7.6*	*	.1*	.3*
*Alpine	*	7.4*	*	.1*	.3*
*Alpine	*	7.2*	*	.3*	.5*
*Alpine	*	7	*	.3*	.5*
*Alpine	*	6.7	*Bridge	*	*
*Alpine	*	6.5	*	.3*	.5*
*Alpine	*	6.375*	*	.3*	.5*
*Alpine	*	6.25*	*	.1*	.3*
*Alpine	*	6.125*	*	.1*	.3*
*Alpine	*	6	*	.1*	.3*
*Alpine	*	5.66666**		.1*	.3*
*Alpine	*	5.33333**		.1*	.3*
*Alpine	*	5	*	.1*	.3*
*Alpine	*	4.75*	*	.1*	.3*
*Alpine	*	4.5*	*	.1*	.3*
*Alpine	*	4.25*	*	.1*	.3*
*Alpine	*	4	*	.1*	.3*
*Alpine	*	3.83333**		.1*	.3*
*Alpine	*	3.66666**		.1*	.3*
*Alpine	*	3.5*	*	.1*	.3*
*Alpine	*	3.33333**		.1*	.3*
*Alpine	*	3.16666**		.1*	.3*
*Alpine	*	3	*	.3*	.5*
*Alpine	*	2.5	*	.3*	.5*
*Alpi	*	2.3	*Bridge	*	*

```
*Alpine          *    2        *        .3*        .5*
*Alpine          *    1.66666**        .3*        .5*
*Alpine          *    1.33333**        .1*        .3*
*Alpine          *    1        *        .1*        .3*
*****************************************************
```

HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

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

****

PROJECT DATA
Project Title: Alpine Creek -- Preliminary Design
Project File : alpcrk.prj
Run Date and Time: 7/18/01 4:38:31 PM

Project in English units

Project Description:
Alpine Creek, Texas Preliminary Design. Study done under a grant from the
Texas Water Development Board.

****

PLAN DATA

Plan Title: Opt. E
Plan File : D:\Projects\Alpine\ras\model\alpcrk.p06

Geometry Title: Opt. E
Geometry File : D:\Projects\Alpine\ras\model\alpcrk.g11

Flow Title : Effective FIS flows
Flow File : D:\Projects\Alpine\ras\model\alpcrk.f01

Plan Description:
Channel cut beginning from 2nd St. to UPRR at a slope of 0.00805 and from UPRR
to Medina Park at a slope of 0.00835.

Plan Summary Information:
Number of: Cross Sections = 91 Mulitple Openings = 0
Culverts = 1 Inline Weirs = 0
Bridges = 13

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculaton tolerance = 0.01
Maximum number of interations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Effective FIS flows
Flow File : D:\Projects\Alpine\ras\model\alpcrk.f01

Flow Data (cfs)

River	Reach	RS	2yr	5yr	10yr	25yr	50yr	100yr	500yr
Alpine Creek	Alpine	19	419	1699	3811	6145	8007	11240	17447
Alpine Creek	Alpine	15	427	1691	3681	5806	7570	10719	16930
Alpine Creek	Alpine	14	427	1691	3678	5796	7558	10704	16916
Alpine Creek	Alpine	13	427	1691	3675	5790	7550	10695	16906
Alpine Creek	Alpine	12	427	1691	3670	5777	7534	10675	16887
Alpine Creek	Alpine	11	428	1690	3666	5765	7517	10656	16867
Alpine Creek	Alpine	9	428	1690	3655	5736	7481	10612	16824
Alpine Creek	Alpine	5	430	1688	3624	5657	7379	10490	16703
Alpine Creek	Alpine	4	445	1687	3895	5635	7910	11340	18295
Alpine Creek	Alpine	1	448	1720	3881	6035	7845	11182	18075

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Alpine Creek	Alpine	2yr	Normal S = .00969	Normal S = .010433
Alpine Creek	Alpine	5yr	Normal S = .00969	Normal S = .010433
Alpine Creek	Alpine	10yr	Normal S = .00969	Normal S = .010433
Alpine Creek	Alpine	25yr	Normal S = .00969	Normal S = .010433
Alpine Creek	Alpine	50yr	Normal S = .00969	Normal S = .010433
Alpine Creek	Alpine	100yr	Normal S = .00969	Normal S = .010433
Alpine Creek	Alpine	500yr	Normal S = .00969	Normal S = .010433

Observed Water Surface Marks

River	Reach	RS	2yr	5yr	10yr	25yr	50yr	100yr	500yr
Alpine Creek	Alpine	19						4527	
Alpine Creek	Alpine	18						4506	
Alpine Creek	Alpine	17						4498.3	
Alpine Creek	Alpine	15						4490.8	
Alpine Creek	Alpine	14						4490.3	
Alpine Creek	Alpine	13						4488.1	
Alpine Creek	Alpine	12.5						4485.4	
Alpine Creek	Alpine	12						4482.5	
Alpine Creek	Alpine	11.5						4477.8	
Alpine Creek	Alpine	11						4476.5	
Alpine Creek	Alpine	10						4473.2	
Alpine Creek	Alpine	9						4469	
Alpine Creek	Alpine	8						4466.5	
Alpine Creek	Alpine	7						4460.3	
Alpine Creek	Alpine	6						4454.4	
Alpine Creek	Alpine	5						4446.5	
Alpine Creek	Alpine	4						4435.2	
Alpine Creek	Alpine	3						4422	
Alpine Creek	Alpine	2						4416	

GEOMETRY DATA

Geometry Title: Opt. E
Geometry File : D:\Projects\Alpine\ras\model\alpcrk.g11

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 19

INPUT
Description: XS U
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4536.8	591	4532.9	600	4532.7	642	4530.8	655	4517.4
673	4518.9	689	4519.3	694	4520.7	700	4520.3	707	4523.5
800	4522.8	900	4522.9	1000	4523.2	1100	4524.4	1200	4525.5
1300	4527.2	1400	4527.6	1500	4532.2	1580	4537.5		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	642	.055	707	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
642 707 403.99 486 403.99 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev
707	1580	4523.5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 18.8*

INPUT
Description:
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4532.68	84.2	4532.02	252.6	4530.95	355.32	4530.11	421	4529.6
505.2	4528.84	589.4	4528.05	616.34	4527.8	620.09	4527.76	629.53	4527.55
673.6	4525.78	686.2	4519.29	694.84	4513.93	697	4512.74	703.57	4513.35
712.6	4514.12	716.04	4514.45	725.73	4514.94	732.96	4515.44	738.25	4516.83
744.6	4516.83	752	4519.76	818.19	4519.93	838.71	4519.92	847.76	4519.99
931.96	4520.17	988.6	4520.39	1005.49	4520.39	1025.2	4520.45	1118.44	4521.45
1129.43	4521.56	1211.68	4522.43	1270.26	4523.35	1304.92	4523.9	1398.16	4524.34
1411.09	4524.87	1491.41	4528.29	1543.47	4531.42	1566	4533.14		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.085	673.6	.045	752	.085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
673.6 752 403.99 486 403.99 .1 .3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 18.6*

INPUT
Description:
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4528.56	88.15	4527.76	264.45	4526.69	371.99	4525.66	440.75	4525.05
528.9	4524.05	617.05	4523.02	645.26	4522.67	649.18	4522.62	659.07	4522.39
705.2	4520.76	723.4	4514.99	735.88	4509.22	739	4508.08	745.93	4508.79
755.45	4509.62	759.08	4510	769.3	4510.76	776.92	4511.59	782.5	4512.96
789.19	4513.36	797	4516.02	858.39	4516.9	877.43	4517.05	885.82	4517.17
963.91	4517.44	1016.45	4517.69	1032.12	4517.64	1050.4	4517.7	1136.88	4518.51
1147.07	4518.6	1223.36	4519.37	1277.69	4520.14	1309.85	4520.61	1396.33	4521.09
1408.31	4521.5	1482.81	4524.39	1531.1	4526.94	1552	4528.78		

```
Manning's n Values          num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
       0    .085   705.2    .045      797    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.    Expan.
         705.2     797             403.99     486  403.99              .1       .3

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 18.4*

INPUT
Description:
Station Elevation Data    num=      39
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*************************************************************************************
       0 4524.44     92.1 4523.51   276.3 4522.42  388.66 4521.21   460.5  4520.5
   552.6 4519.27    644.7 4517.98  674.17 4517.55  678.27 4517.48   688.6 4517.24
   736.8 4515.74    760.6 4510.69  776.92 4504.51     781 4503.42  788.28 4504.23
   798.3 4505.11   802.12 4505.55  812.87 4506.57  820.88 4507.73  826.75 4509.09
  833.79 4509.88      842 4512.28   898.6 4513.87  916.14 4514.17  923.88 4514.34
  995.87  4514.7   1044.3 4514.99 1058.75 4514.89 1075.59 4514.95 1155.32 4515.56
 1164.71 4515.63 1235.04  4516.3 1285.13 4516.93 1314.77 4517.31 1394.49 4517.83
 1405.54 4518.14 1474.22 4520.48 1518.73 4522.46    1538 4524.42

Manning's n Values          num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
       0    .085   736.8    .045      842    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.    Expan.
         736.8     842             403.99     486  403.99              .1       .3

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 18.2*

INPUT
Description:
Station Elevation Data    num=      39
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*************************************************************************************
       0 4520.32    96.05 4519.25  288.15 4518.16  405.33 4516.75  480.25 4515.95
   576.3 4514.48   672.35 4512.94  703.09 4512.42  707.36 4512.34  718.13 4512.08
   768.4 4510.72     797.8  4506.4  817.96 4499.81     823 4498.76  830.64 4499.66
  841.15 4500.61   845.15  4501.1  856.43 4502.39  864.85 4503.87     871 4505.22
  878.38 4506.41      887 4508.54   938.8 4510.83  954.86  4511.3  961.94 4511.52
 1027.83 4511.97 1072.15  4512.3 1085.37 4512.15 1100.79  4512.2 1173.76 4512.62
 1182.36 4512.67 1246.73 4513.23 1292.56 4513.71 1319.69 4514.02 1392.66 4514.57
 1402.77 4514.77 1465.63 4516.58 1506.37 4517.98    1524 4520.06

Manning's n Values          num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
       0    .085   768.4    .045      887    .085

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.    Expan.
         768.4     887             403.99     486  403.99              .1       .3

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 18

INPUT
Description: XS T
Station Elevation Data    num=      28
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*****     ***********************************************************************
```

0	4516.2	100	4515	300	4513.9	422	4512.3	500	4511.4
600	4509.7	700	4507.9	732	4507.3	800	4505.7	835	4502.1
843.2	4499.71	846	4494.11	864.94	4494.11	865	4494.1	865.08	4494.11
886	4494.11	887.21	4496.52	900	4498.2	932	4504.8	979	4507.8
1000	4508.7	1100	4509.6	1112	4509.4	1200	4509.7	1300	4510.5
1400	4511.4	1494	4513.5	1510	4515.7				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.085	800	.045	843.2	.025	846	.05	886	.025
887.21	.045	932	.085						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
800	932	130.74	140 130.74	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 17.8842*

INPUT
Description:
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4514.3	55.14	4513.66	92.91	4513.25	136.67	4513.04	278.74	4512.3
287.74	4512.19	392.09	4510.76	464.56	4509.88	479.54	4509.62	557.48	4508.26
650.39	4506.56	680.12	4505.99	719.33	4505.07	731.32	4504.75	743.31	4504.32
754.43	4502.49	775.25	4500.38	782.17	4498.41	784.91	4492.94	824.91	4492.94
826.32	4495.76	836	4496.96	836.18	4497	866.51	4503.47	887.25	4504.55
917.8	4506.3	926.91	4506.67	940.72	4507.16	948.25	4507.22	1009.26	4507.6
1049.85	4507.98	1062.94	4507.82	1070.26	4507.86	1131.26	4508.05	1158.98	4508.16
1192.26	4508.41	1211.78	4508.53	1253.27	4508.84	1268.1	4508.95	1314.27	4509.32
1375.27	4509.81	1377.23	4509.83	1436.27	4510.98	1454.58	4511.36	1479.81	4511.87
1497.27	4513.85								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.085	743.31	.045	782.17	.025	784.91	.05	824.91	.025
826.32	.045	866.51	.085						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
743.31	866.51	130.74	140 130.74	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 17.7685*

INPUT
Description:
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4512.4	50.94	4511.83	85.83	4511.49	126.24	4511.33	257.48	4510.7
265.79	4510.61	362.19	4509.22	429.13	4508.36	442.97	4508.11	514.96	4506.83
600.78	4505.22	628.24	4504.69	664.47	4503.83	675.54	4503.5	686.61	4502.95
696.67	4500.52	715.51	4498.66	721.15	4497.11	723.82	4491.77	763.82	4491.77
765.42	4494.96	772.01	4495.72	772.17	4495.75	801.02	4502.14	823.5	4503.1
856.6	4504.81	866.47	4505.18	881.44	4505.62	889.6	4505.67	955.71	4505.94
999.69	4506.35	1013.88	4506.25	1021.82	4506.29	1087.92	4506.49	1117.95	4506.62
1154.02	4506.88	1175.17	4506.96	1220.13	4507.29	1236.21	4507.4	1286.24	4507.76
1352.34	4508.24	1354.46	4508.26	1418.44	4509.35	1438.28	4509.75	1465.62	4510.24
1484.54	4512								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.085	686.61	.045	721.15	.025	723.82	.05	763.82	.025

765.42 .045 801.02 .085

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
686.61 801.02 130.74 140 130.74 .1 .3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 17.6528*

INPUT
Description:
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4510.51	46.73	4510.01	78.74	4509.74	115.82	4509.62	236.22	4509.11
243.84	4509.02	332.28	4507.69	393.7	4506.84	406.39	4506.6	472.44	4505.39
551.17	4503.88	576.37	4503.38	609.6	4502.59	619.76	4502.25	629.92	4501.57
638.91	4498.56	655.76	4496.94	660.14	4495.79	662.73	4490.6	702.73	4490.6
704.49	4494.11	708.01	4494.49	708.17	4494.51	735.54	4500.81	759.75	4501.64
795.41	4503.31	806.03	4503.69	822.16	4504.07	830.95	4504.12	902.17	4504.28
949.54	4504.73	964.83	4504.67	973.37	4504.73	1044.58	4504.93	1076.93	4505.07
1115.78	4505.35	1138.57	4505.4	1187	4505.74	1204.31	4505.85	1258.2	4506.2
1329.41	4506.67	1331.69	4506.68	1400.61	4507.71	1421.98	4508.13	1451.43	4508.61
1471.82	4510.14								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.085	629.92	.045	660.14	.025	662.73	.05	702.73	.025
704.49	.045	735.54	.085						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
629.92 735.54 130.74 140 130.74 .1 .3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 17.5371*

INPUT
Description:
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4508.61	42.53	4508.18	71.65	4507.98	105.39	4507.92	214.96	4507.51
221.9	4507.44	302.38	4506.15	358.26	4505.32	369.82	4505.1	429.92	4503.96
501.57	4502.54	524.49	4502.08	554.74	4501.35	563.98	4501	573.22	4500.2
581.16	4496.6	596.01	4495.22	599.13	4494.44	601.64	4489.43	641.64	4489.43
643.53	4493.2	644.02	4493.25	644.16	4493.27	670.05	4499.48	695.99	4500.18
734.21	4501.82	745.6	4502.21	762.88	4502.53	772.3	4502.58	848.62	4502.61
899.39	4503.1	915.77	4503.1	924.93	4503.16	1001.23	4503.36	1035.9	4503.53
1077.54	4503.81	1101.96	4503.84	1153.86	4504.19	1172.41	4504.3	1230.17	4504.64
1306.47	4505.1	1308.92	4505.11	1382.78	4506.08	1405.68	4506.51	1437.25	4506.98
1459.09	4508.29								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.085	573.22	.045	599.13	.025	601.64	.05	641.64	.025
643.53	.045	670.05	.085						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
573.22 670.05 130.74 140 130.74 .3 .5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 17.4214

INPUT
Description: S. Ave G
Stati evation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4506.71	38.32	4506.35	64.57	4506.23	94.97	4506.21	193.7	4505.91
199.95	4505.86	272.47	4504.61	322.83	4503.8	333.24	4503.59	387.4	4502.52
451.96	4501.2	472.62	4500.77	499.87	4500.11	508.2	4499.75	516.53	4498.82
523.4	4494.64	536.27	4493.5	538.14	4493.07	540.55	4488.26	580.55	4488.26
582.76	4492.68	604.56	4498.15	632.24	4498.72	673.01	4500.32	685.16	4500.72
703.6	4500.99	713.65	4501.03	795.07	4500.95	849.24	4501.48	866.71	4501.52
876.48	4501.6	957.89	4501.8	994.88	4501.99	1039.3	4502.28	1065.35	4502.28
1120.72	4502.64	1140.52	4502.75	1202.13	4503.08	1283.54	4503.53	1286.16	4503.54
1364.95	4504.45	1389.38	4504.89	1423.06	4505.35	1461.86	4507		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.085	516.53	.045	538.14	.025	540.55	.05	580.55	.025
582.76	.045	604.56	.085						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
516.53	604.56	60	60	.3	.5

BRIDGE RIVER: Alpine Creek
REACH: Alpine RS: 17.3

INPUT
Description: W. Ave G (new)
Distance from Upstream XS = 10
Deck/Roadway Width = 40
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
500	4499	4497.5	618	4498	4496.5

Upstream Bridge Cross Section Data
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4506.71	38.32	4506.35	64.57	4506.23	94.97	4506.21	193.7	4505.91
199.95	4505.86	272.47	4504.61	322.83	4503.8	333.24	4503.59	387.4	4502.52
451.96	4501.2	472.62	4500.77	499.87	4500.11	508.2	4499.75	516.53	4498.82
523.4	4494.64	536.27	4493.5	538.14	4493.07	540.55	4488.26	580.55	4488.26
582.76	4492.68	604.56	4498.15	632.24	4498.72	673.01	4500.32	685.16	4500.72
703.6	4500.99	713.65	4501.03	795.07	4500.95	849.24	4501.48	866.71	4501.52
876.48	4501.6	957.89	4501.8	994.88	4501.99	1039.3	4502.28	1065.35	4502.28
1120.72	4502.64	1140.52	4502.75	1202.13	4503.08	1283.54	4503.53	1286.16	4503.54
1364.95	4504.45	1389.38	4504.89	1423.06	4505.35	1461.86	4507		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.085	516.53	.045	538.14	.025	540.55	.05	580.55	.025
582.76	.045	604.56	.085						

Bank Sta: Left	Right	Coeff Contr.	Expan.
516.53	604.56	.3	.5

Downstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
500	4499	4497.5	618	4498	4496.5

Downstream Bridge Cross Section Data
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4506.71	38.32	4506.35	64.57	4506.23	94.97	4506.21	193.7	4505.91
199.95	4505.86	272.47	4504.61	322.83	4503.8	333.24	4503.59	387.4	4502.52
451.96	4501.2	472.62	4500.77	499.87	4500.11	508.2	4499.75	516.53	4498.82
523.4	4494.64	536.27	4493.5	537.86	4493.14	540.55	4487.76	580.55	4487.76
583.05	4492.75	604.56	4498.15	632.24	4498.72	673.01	4500.32	685.16	4500.72
703.6	4500.99	713.65	4501.03	795.07	4500.95	849.24	4501.48	866.71	4501.52
876.48	4501.6	957.89	4501.8	994.88	4501.99	1039.3	4502.28	1065.35	4502.28
1120.72	4502.64	1140.52	4502.75	1202.13	4503.08	1283.54	4503.53	1286.16	4503.54
1364.95	4504.45	1389.38	4504.89	1423.06	4505.35	1461.86	4506.8		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.11	516.53	.04	537.86	.025	540.55	.05	580.55	.025
583.05	.04	604.56	.11						

Bank Sta: Left Right Coeff Contr. Expan.
516.53 604.56 .3 .5

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

Number of Bridge Coefficient Sets = 1

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

High Flow Method
Pressure and Weir flow
Submerged Inlet Cd =
Submerged Inlet + Outlet Cd = .8
Max Low Cord =

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

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 17.2

INPUT
Description: Additional XS for bridge interpolated from sta. 18 and 17.2
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4506.71	38.32	4506.35	64.57	4506.23	94.97	4506.21	193.7	4505.91
199.95	4505.86	272.47	4504.61	322.83	4503.8	333.24	4503.59	387.4	4502.52
451.96	4501.2	472.62	4500.77	499.87	4500.11	508.2	4499.75	516.53	4498.82
523.4	4494.64	536.27	4493.5	537.86	4493.14	540.55	4487.76	580.55	4487.76
583.05	4492.75	604.56	4498.15	632.24	4498.72	673.01	4500.32	685.16	4500.72
703.6	4500.99	713.65	4501.03	795.07	4500.95	849.24	4501.48	866.71	4501.52
876.48	4501.6	957.89	4501.8	994.88	4501.99	1039.3	4502.28	1065.35	4502.28
1120.72	4502.64	1140.52	4502.75	1202.13	4503.08	1283.54	4503.53	1286.16	4503.54
1364.95	4504.45	1389.38	4504.89	1423.06	4505.35	1461.86	4506.8		

Manni n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.11	516.53	.04	537.86	.025	540.55	.05	580.55	.025
583.05	.04	604.56	.11						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
516.53	604.56	104.07	112.5	104.07	.3	.5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 17.15*

INPUT
Description:
Station Elevation Data num= 62

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4504.98	34.4	4504.69	34.96	4504.69	57.96	4504.63	85.25	4504.66
86.65	4504.65	173.87	4504.46	179.48	4504.42	182.42	4504.38	244.57	4503.23
289.78	4502.43	299.12	4502.24	304.03	4502.14	347.74	4501.24	405.69	4500.01
424.23	4499.61	448.69	4499.01	456.05	4498.72	456.17	4498.71	463.65	4497.92
468.61	4494.97	470.53	4493.95	482.48	4492.25	485.2	4486.82	525.2	4486.82
527.5	4491.42	546.75	4496.73	569.82	4497.3	575.95	4497.44	618.96	4499
626.04	4499.23	631.78	4499.37	651.23	4499.59	656.32	4499.61	661.83	4499.61
742.81	4499.44	747.72	4499.45	804.87	4500.01	823.3	4500.1	829.31	4500.15
833.6	4500.18	915.8	4500.37	919.48	4500.38	958.5	4500.59	1002.3	4500.87
1005.36	4500.88	1029.97	4500.86	1032.84	4500.86	1088.79	4501.22	1091.25	4501.23
1112.14	4501.34	1175.29	4501.65	1177.13	4501.66	1261.78	4502.09	1263.01	4502.1
1265.77	4502.11	1348.28	4502.96	1348.89	4502.97	1374.22	4503.41	1374.66	4503.42
1410.19	4503.87	1434.77	4504.75						

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.112	463.65	.04	482.48	.025	485.2	.05	525.2	.025
527.5	.04	546.75	.117	1434.77	.117				

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
463.65	546.75	104.07	112.5	104.07	.3	.5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 17.1*

INPUT
Description:
Station Elevation Data num= 62

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4503.25	30.47	4503.03	30.98	4503.02	51.35	4503.03	75.52	4503.1
76.77	4503.1	154.04	4503	159.01	4502.98	161.61	4502.95	216.68	4501.84
256.73	4501.07	265.01	4500.89	269.35	4500.79	308.08	4499.95	359.42	4498.81
375.85	4498.45	397.52	4497.92	404.03	4497.68	404.14	4497.67	410.77	4497.01
415.74	4494.13	417.67	4493.26	427.09	4491.42	429.86	4485.88	469.86	4485.88
471.97	4490.09	488.95	4495.3	513.21	4496	519.66	4496.16	564.91	4497.69
572.36	4497.92	578.4	4498.02	598.86	4498.19	604.21	4498.2	610.01	4498.2
695.21	4497.93	700.37	4497.95	760.49	4498.55	779.88	4498.68	786.2	4498.73
790.72	4498.75	877.2	4498.95	881.07	4498.96	922.12	4499.19	968.2	4499.48
971.42	4499.48	997.32	4499.44	1000.33	4499.45	1059.19	4499.81	1061.78	4499.83
1083.76	4499.93	1150.19	4500.24	1152.13	4500.24	1241.19	4500.66	1242.48	4500.67
1245.39	4500.69	1332.18	4501.47	1332.83	4501.48	1359.48	4501.94	1359.94	4501.95
1397.32	4502.38	1423.18	4503.07						

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.115	410.77	.04	427.09	.025	429.86	.05	469.86	.025
471.97	.04	488.95	.125	1423.18	.125				

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        410.77  488.95            104.07   112.5  104.07             .1       .3

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 17.05*

INPUT
Description:
Station Elevation Data    num=      62
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*********************************************************************************
       0 4501.53    26.55 4501.36    26.99 4501.36    44.74 4501.43    65.8 4501.55
   66.88 4501.55   134.21 4501.55   138.54 4501.54   140.81 4501.53  188.78 4500.46
  223.68  4499.7   230.89 4499.53   234.68 4499.45   268.41 4498.67  313.14 4497.62
  327.46 4497.29   346.34 4496.82   352.02 4496.64   352.11 4496.63  357.88  4496.1
  362.87  4493.3    364.8 4492.57   371.53  4490.9   374.51 4484.94  414.51 4484.94
  416.44 4488.79   431.14 4493.88   456.61  4494.7   463.38 4494.89  510.86 4496.38
  518.68 4496.61   525.01 4496.67   546.49 4496.79   552.11  4496.8   558.2 4496.78
   647.6 4496.41   653.03 4496.46   716.12 4497.08   736.47 4497.25   743.1 4497.32
  747.85 4497.33    838.6 4497.52   842.66 4497.54   885.75 4497.79   934.1 4498.09
  937.48 4498.09   964.66 4498.02   967.82 4498.03   1029.6 4498.41 1032.31 4498.42
 1055.38 4498.52  1125.1 4498.82  1127.13 4498.83  1220.59 4499.23 1221.95 4499.24
    1225 4499.26 1316.09 4499.99  1316.77    4500  1344.74 4500.47 1345.22 4500.48
 1384.45  4500.9 1411.59 4501.39

Manning's n Values        num=       8
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
*********************************************************************************
       0    .117   357.88     .04   371.53    .025   374.51     .05   414.51    .025
  416.44     .04   431.14    .132  1411.59    .132

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        357.88  431.14            104.07   112.5  104.07             .3       .5

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 17

INPUT
Description: XS S -- S. 11th St.
Station Elevation Data    num=      30
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*********************************************************************************
       0  4499.8       23  4499.7       57    4500      120  4500.1      200  4498.1
     300  4495.6      305  4495.2      310 4492.46    315.8 4490.72   319.16    4484
  339.39    4484      342 4483.31   347.03    4484   359.16    4484   360.92 4487.52
  373.33 4492.46      400  4493.4      465  4495.3      500  4495.4      600  4494.9
     700  4495.9      800  4496.1      900  4496.7      932  4496.6     1000    4497
    1100  4497.4     1200  4497.8     1300  4498.5     1330    4499   1401.8 4500.54

Manning's n Values        num=       9
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
*********************************************************************************
       0     .12      305     .04   315.8    .025   319.16     .05   339.39     .04
  347.03     .05   359.16    .025   360.92     .04   373.33     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           305  373.33                 60      60      60             .3       .5

BRIDGE                 RIVER: Alpine Creek
REACH: Alpine             RS: 16.7

INPUT
Description: S. 11th St. Bridge (new)
Distance from Upstream XS =       10
Deck/Roadway Width        =       40
Weir Coefficient          =      2.6
Bridge Deck/Roadway Skew  =
```

Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
305 4496.5	4495	373.8 4493.9	4492.4

Upstream Bridge Cross Section Data
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4499.8	23	4499.7	57	4500	120	4500.1	200	4498.1
300	4495.6	305	4495.2	310	4492.46	315.8	4490.72	319.16	4484
339.39	4484	342	4483.31	347.03	4484	359.16	4484	360.92	4487.52
373.33	4492.46	400	4493.4	465	4495.3	500	4495.4	600	4494.9
700	4495.9	800	4496.1	900	4496.7	932	4496.6	1000	4497
1100	4497.4	1200	4497.8	1300	4498.5	1330	4499	1401.8	4500.54

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.12	305	.04	315.8	.025	319.16	.05	339.39	.04
347.03	.05	359.16	.025	360.92	.04	373.33	.14		

Bank Sta: Left	Right	Coeff Contr.	Expan.
305	373.33	.3	.5

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
305 4496.5	4495	373.8 4493.9	4492.4

Downstream Bridge Cross Section Data
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4499.8	23	4499.7	57	4500	120	4500.1	200	4498.1
300	4495.6	305	4495.2	310	4492.46	315.51	4490.81	319.16	4483.5
341.28	4483.5	342	4483.31	343.38	4483.5	359.16	4483.5	361.23	4487.64
373.33	4492.46	400	4493.4	465	4495.3	500	4495.4	600	4494.9
700	4495.9	800	4496.1	900	4496.7	932	4496.6	1000	4497
1100	4497.4	1200	4497.8	1300	4498.5	1330	4499	1400	4500.48

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.12	305	.04	315.51	.025	319.16	.05	341.28	.04
343.38	.05	359.16	.025	361.23	.04	373.33	.14		

Bank Sta: Left	Right	Coeff Contr.	Expan.
305	373.33	.3	.5

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

Number of Bridge Coefficient Sets = 1

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

High Flow Method

```
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =       .5
           Max Low Cord                =

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

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 16.5

INPUT
Description: Additional XS for bridge copied from sta. 17
Station Elevation Data    num=      30
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0  4499.8      23  4499.7      57    4500     120  4500.1     200  4498.1
     300  4495.6     305  4495.2     310 4492.46  315.51 4490.81  319.16  4483.5
  341.28  4483.5     342 4483.31  343.38  4483.5  359.16  4483.5  361.23 4487.64
  373.33 4492.46     400  4493.4     465  4495.3     500  4495.4     600  4494.9
     700  4495.9     800  4496.1     900  4496.7     932  4496.6    1000    4497
    1100  4497.4    1200  4497.8    1300  4498.5    1330    4499    1400 4500.48

Manning's n Values        num=       9
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
       0     .12     305     .04  315.51    .025  319.16     .05  341.28     .04
  343.38     .05  359.16    .025  361.23     .04  373.33     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          305  373.33           129.04     150  129.04             .3       .5

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 16.25*

INPUT
Description:
Station Elevation Data    num=      60
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0 4499.47   24.81 4499.38   25.22 4499.38    56.5  4499.6    61.5 4499.61
    62.5 4499.62  112.99 4499.49  129.46 4499.48  131.59 4499.47  169.49 4498.62
  215.77 4497.59  219.31 4497.51  225.98 4497.36  282.47 4496.02  323.66 4494.84
  328.97 4494.64  329.06 4494.64  334.45 4494.09  338.72  4491.7  339.35  4491.4
  344.22 4489.97  348.08 4482.25  388.08 4482.25   390.8 4487.69  391.37  4487.9
   401.7 4491.67  428.82 4492.52  465.17  4493.5  475.83 4493.73   494.9 4494.23
  530.48 4494.47  538.86 4494.48  558.09 4494.42   572.8 4494.39  632.15 4494.17
  651.01 4494.31  669.76 4494.44   720.7  4494.9  733.82 4495.03  766.73 4495.14
  808.98 4495.24  835.49 4495.31   863.7 4495.46  937.16 4495.91  960.67  4495.9
  969.69 4495.88  991.69 4495.98 1038.83 4496.26 1045.93 4496.29 1057.64 4496.34
 1140.49 4496.66 1154.6 4496.71 1208.55 4496.92 1242.16  4497.1 1251.57 4497.17
 1343.83 4497.91 1348.53 4497.99 1374.33 4498.42 1377.62 4498.45  1445.5 4499.18

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
       0     .12  334.45     .04  344.22    .025  348.08     .05  388.08    .025
   390.8     .04   401.7     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        334.45   401.7           129.04     150  129.04             .3       .5

CROSS     TION          RIVER: Alpine Creek
```

REACH: Alpine RS: 16.*

INPUT
Description:
Station Elevation Data num= 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4499.14	27	4499.05	27.44	4499.05	61.47	4499.25	66.91	4499.24
68.01	4499.23	122.94	4498.9	140.86	4498.86	143.17	4498.84	184.41	4498.01
234.77	4497	238.62	4496.92	245.88	4496.77	307.34	4495.38	352.16	4493.96
357.93	4493.69	358.03	4493.68	363.9	4492.98	368.09	4490.6	368.7	4490.35
372.91	4489.15	376.98	4481	416.98	4481	420.31	4487.65	430.07	4490.88
457.63	4491.64	494.58	4492.55	505.42	4492.72	524.8	4493.17	560.97	4493.55
569.48	4493.6	589.03	4493.58	603.97	4493.58	664.3	4493.45	683.47	4493.54
702.53	4493.61	754.31	4494.04	767.64	4494.15	801.09	4494.32	844.03	4494.44
870.98	4494.52	899.66	4494.66	974.32	4495.12	998.21	4495.16	1007.38	4495.15
1029.74	4495.22	1077.65	4495.52	1084.87	4495.55	1096.77	4495.6	1180.99	4495.92
1195.33	4495.97	1250.16	4496.18	1284.33	4496.41	1293.89	4496.48	1387.66	4497.33
1392.44	4497.39	1418.66	4497.83	1422.01	4497.88	1491	4498.66		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.12	363.9	.04	372.91	.025	376.98	.05	416.98	.025
420.31	.04	430.07	.14						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
363.9	430.07	129.04	150 129.04	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 15.75*

INPUT
Description:
Station Elevation Data num= 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4498.81	29.18	4498.73	29.66	4498.73	66.45	4498.89	72.33	4498.86
73.51	4498.85	132.89	4498.32	152.26	4498.24	154.76	4498.21	199.34	4497.39
253.77	4496.4	257.93	4496.33	265.78	4496.19	332.22	4494.73	380.66	4493.07
386.9	4492.73	387.01	4492.73	393.35	4491.87	397.45	4489.5	398.05	4489.29
401.62	4488.29	405.9	4479.74	445.9	4479.74	449.79	4487.52	458.44	4490.08
486.44	4490.76	523.99	4491.61	535	4491.7	554.7	4492.1	591.45	4492.62
600.1	4492.73	619.96	4492.73	635.15	4492.78	696.46	4492.72	715.93	4492.77
735.3	4492.78	787.91	4493.17	801.46	4493.28	835.45	4493.5	879.09	4493.63
906.47	4493.73	935.61	4493.86	1011.47	4494.33	1035.76	4494.43	1045.07	4494.43
1067.8	4494.47	1116.48	4494.77	1123.82	4494.82	1135.91	4494.87	1221.48	4495.18
1236.05	4495.23	1291.77	4495.43	1326.49	4495.71	1336.2	4495.79	1431.49	4496.74
1436.35	4496.8	1463	4497.25	1466.39	4497.3	1536.5	4498.14		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.12	393.35	.045	401.62	.025	405.9	.05	445.9	.025
449.79	.045	458.44	.14						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
393.35	458.44	79.04	90 79.04	.3	.5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 15.6

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	4498.48	31.37	4498.4	71.42	4498.54	77.74	4498.48	142.84	4497.73
163.66	4497.62	214.26	4496.78	272.77	4495.81	285.68	4495.6	357.09	4494.09
409.16	4492.19	415.98	4491.77	422.8	4490.76	426.81	4488.39	430.32	4487.44
434.8	4478.49	474.8	4478.49	479.21	4487.31	486.81	4489.29	553.4	4490.66
564.59	4490.68	630.72	4491.85	650.9	4491.89	666.33	4491.97	748.39	4492
768.07	4491.95	821.52	4492.3	869.81	4492.68	914.14	4492.83	971.56	4493.06
1073.3	4493.7	1105.85	4493.72	1162.76	4494.08	1175.04	4494.13	1276.78	4494.49
1333.38	4494.69	1378.52	4495.1	1480.26	4496.21	1510.78	4496.72	1582	4497.62

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.12	422.8	.045	430.32	.025	434.8	.05	474.8	.025
479.21	.045	486.81	.14						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
422.8	486.81	50	60	50	.3	.5

BRIDGE RIVER: Alpine Creek
REACH: Alpine RS: 15.55

INPUT
Description: 10th St. (LW Xing)
Distance from Upstream XS = 10
Deck/Roadway Width = 40
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
430	4481	4479.5	481	4481	4479.5

Upstream Bridge Cross Section Data
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4498.48	31.37	4498.4	71.42	4498.54	77.74	4498.48	142.84	4497.73
163.66	4497.62	214.26	4496.78	272.77	4495.81	285.68	4495.6	357.09	4494.09
409.16	4492.19	415.98	4491.77	422.8	4490.76	426.81	4488.39	430.32	4487.44
434.8	4478.49	474.8	4478.49	479.21	4487.31	486.81	4489.29	553.4	4490.66
564.59	4490.68	630.72	4491.85	650.9	4491.89	666.33	4491.97	748.39	4492
768.07	4491.95	821.52	4492.3	869.81	4492.68	914.14	4492.83	971.56	4493.06
1073.3	4493.7	1105.85	4493.72	1162.76	4494.08	1175.04	4494.13	1276.78	4494.49
1333.38	4494.69	1378.52	4495.1	1480.26	4496.21	1510.78	4496.72	1582	4497.62

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.12	422.8	.045	430.32	.025	434.8	.05	474.8	.025
479.21	.045	486.81	.14						

Bank Sta: Left	Right	Coeff Contr.	Expan.
422.8	486.81	.3	.5

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
430	4481	4479.5	481	4481	4479.5

Downstream Bridge Cross Section Data
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4498.48	31.37	4498.4	71.42	4498.54	77.74	4498.48	142.84	4497.73
163	4497.62	214.26	4496.78	272.77	4495.81	285.68	4495.6	357.09	4494.0

```
  409.16 4492.19  415.98 4491.77   422.8 4490.76  426.81 4488.39  430.32 4487.44
   434.8 4478.49   474.8 4478.49  479.21 4487.31  486.81 4489.29   553.4 4490.66
  564.59 4490.68  630.72 4491.85   650.9 4491.89  666.33 4491.97  748.39    4492
  768.07 4491.95  821.52  4492.3  869.81 4492.68  914.14 4492.83  971.56 4493.06
  1073.3  4493.7 1105.85 4493.72 1162.76 4494.08 1175.04 4494.13 1276.78 4494.49
 1333.38 4494.69 1378.52  4495.1 1480.26 4496.21 1510.78 4496.72    1582 4497.62

Manning's n Values         num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
       0     .12   422.8    .045  430.32    .025   434.8     .05   474.8    .025
  479.21    .045  486.81     .14

Bank Sta: Left   Right    Coeff Contr.   Expan.
         422.8  486.81             .3       .5

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

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only

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

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 15.5

INPUT
Description: 10th. St. (LW Xing) -- Interpolated XS
Station Elevation Data    num=      40
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0 4498.48   31.37  4498.4   71.42 4498.54   77.74 4498.48  142.84 4497.73
  163.66 4497.62  214.26 4496.78  272.77 4495.81  285.68  4495.6  357.09 4494.09
  409.16 4492.19  415.98 4491.77   422.8 4490.76  426.81 4488.39  430.32 4487.44
   434.8 4478.49   474.8 4478.49  479.21 4487.31  486.81 4489.29   553.4 4490.66
  564.59 4490.68  630.72 4491.85   650.9 4491.89  666.33 4491.97  748.39    4492
  768.07 4491.95  821.52  4492.3  869.81 4492.68  914.14 4492.83  971.56 4493.06
  1073.3  4493.7 1105.85 4493.72 1162.76 4494.08 1175.04 4494.13 1276.78 4494.49
 1333.38 4494.69 1378.52  4495.1 1480.26 4496.21 1510.78 4496.72    1582 4497.62

Manning's n Values         num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
       0     .12   422.8    .045  430.32    .025   434.8     .05   474.8    .025
  479.21    .045  486.81     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.    Expan.
         422.8  486.81             94.63     110   94.63              .3       .5

CROSS SECTION          RIVER: Alpine Creek
```

REACH: Alpine RS: 15.3333*

INPUT
Description:
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4497.82	35.75	4497.75	80.31	4497.82	81.4	4497.82	88.6	4497.71
160.62	4496.57	162.8	4496.54	186.52	4496.37	240.93	4495.62	244.19	4495.57
310.88	4494.65	321.24	4494.51	325.59	4494.43	401.56	4492.93	406.98	4492.76
466.32	4490.37	474.09	4489.94	475.44	4489.8	481.87	4489.06	485.72	4487.1
488.89	4486.19	493.2	4477.57	533.2	4477.57	537.39	4485.96	544.54	4487.88
613.15	4489.12	624.68	4489.18	654.08	4489.66	676.74	4489.92	692.82	4490.11
713.61	4490.14	729.51	4490.2	771.18	4490.22	814.07	4490.35	834.34	4490.38
865.61	4490.6	889.42	4490.71	936.43	4490.97	939.17	4490.99	984.85	4491.18
1026.14	4491.36	1044.02	4491.45	1148.85	4492.12	1182.39	4492.21	1241.02	4492.59
1253.68	4492.66	1266.94	4492.72	1358.51	4493.02	1416.83	4493.21	1432.2	4493.32
1463.34	4493.68	1568.17	4495.03	1599.62	4495.55	1673	4496.58		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.12	481.87	.045	488.89	.025	493.2	.05	533.2	.025
537.39	.045	544.54	.14						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
481.87	544.54	94.63	110	94.63	.3	.5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 15.1666*

INPUT
Description:
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4497.16	40.14	4497.1	90.16	4497.11	91.38	4497.09	99.46	4496.94
180.31	4495.38	182.75	4495.36	209.39	4495.12	270.47	4494.41	274.13	4494.37
348.98	4493.49	360.62	4493.35	365.5	4493.27	450.78	4491.66	456.86	4491.42
523.48	4488.54	532.21	4488.11	533.72	4488	540.93	4487.36	544.63	4485.8
547.46	4484.94	551.6	4476.65	591.6	4476.65	595.59	4484.62	602.27	4486.48
672.91	4487.57	684.78	4487.69	715.04	4488.13	738.37	4488.26	754.92	4488.36
776.33	4488.39	792.7	4488.43	835.59	4488.46	879.74	4488.71	900.62	4488.81
932.8	4489.05	957.32	4489.12	1005.72	4489.29	1008.54	4489.3	1055.56	4489.52
1098.07	4489.73	1116.47	4489.84	1224.39	4490.54	1258.92	4490.71	1319.29	4491.1
1332.31	4491.18	1345.97	4491.26	1440.24	4491.55	1500.27	4491.73	1516.1	4491.81
1548.16	4492.26	1656.08	4493.85	1688.45	4494.39	1764	4495.54		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.12	540.93	.045	547.46	.025	551.6	.05	591.6	.025
595.59	.045	602.27	.095						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
540.93	602.27	54.63	50	54.63	.3	.5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 15.1

INPUT
Description:
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4496.5	100	4496.4	200	4494.2	300	4493.2	400	4492.2
	4490.4	592	4486.2	600	4485.66	606.02	4483.7	610	4475.7

650	4475.74	653.77	4483.28	660	4485.07	776	4486.6	800	4486.6
900	4486.7	1000	4487.5	1075	4487.6	1170	4488.1	1425	4489.8
1600	4490.3	1855	4494.5						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.13	600	.045	606.02	.025	610	.05	650	.025
653.77	.045	660	.095						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
600	660	40	60	40	.3	.5

BRIDGE RIVER: Alpine Creek
REACH: Alpine RS: 15.05

INPUT
Description: Murphy St. (LW Xing)
Distance from Upstream XS = 10
Deck/Roadway Width = 40
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
605	4478	4476.5	656	4478	4476.5

Upstream Bridge Cross Section Data
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4496.5	100	4496.4	200	4494.2	300	4493.2	400	4492.2
500	4490.4	592	4486.2	600	4485.66	606.02	4483.7	610	4475.74
650	4475.74	653.77	4483.28	660	4485.07	776	4486.6	800	4486.6
900	4486.7	1000	4487.5	1075	4487.6	1170	4488.1	1425	4489.8
1600	4490.3	1855	4494.5						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.13	600	.045	606.02	.025	610	.05	650	.025
653.77	.045	660	.095						

Bank Sta: Left	Right	Coeff Contr.	Expan.
600	660	.3	.5

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
605	4478	4476.5	656	4478	4476.5

Downstream Bridge Cross Section Data
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4496.5	100	4496.4	200	4494.2	300	4493.2	400	4492.2
500	4490.4	592	4486.2	600	4485.66	606.02	4483.7	610	4475.74
650	4475.74	653.77	4483.28	660	4485.07	776	4486.6	800	4486.6
900	4486.7	1000	4487.5	1075	4487.6	1170	4488.1	1425	4489.8
1600	4490.3	1855	4494.5						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.13	600	.045	606.02	.025	610	.05	650	.025

```
  653.77    .045     660    .095

Bank Sta: Left   Right    Coeff Contr.   Expan.
          600     660            .3       .5

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

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only

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

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 15

INPUT
Description: XS R -- Murphy St. (LW Xing)
Station Elevation Data    num=       22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0  4496.5     100  4496.4     200  4494.2     300  4493.2     400  4492.2
     500  4490.4     592  4486.2     600 4485.66  606.02  4483.7     610 4475.74
     650 4475.74  653.77 4483.28     660 4485.07     776  4486.6     800  4486.6
     900  4486.7    1000  4487.5    1075  4487.6    1170  4488.1    1425  4489.8
    1600  4490.3    1855  4494.5

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************************************************
       0     .13     600    .045  606.02    .025     610     .05     650    .025
  653.77    .045     660    .095

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          600     660             63.33   63.33   63.33             .3       .5

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 14.8333*

INPUT
Description:
Station Elevation Data    num=       33
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0    4497   14.03 4496.76   99.89 4496.39  199.78 4494.57  200.45 4494.56
  299.67  4493.6  300.67 4493.59  399.56 4492.57  400.89 4492.55  499.44  4491.1
  501.11 4491.05  591.34 4488.02  599.33 4487.64  600.99 4485.27  610.48 4482.04
  614.95 4480.79  616.18  4480.5  618.83 4475.21  658.83 4475.21  663.22 4483.98
  678.33 4487.01  768.16 4487.96  786.74 4487.94  864.18 4487.95  882.06 4488.06
  941.62 4488.43  999.69 4488.47 1073.26 4488.76 1121.73 4489.01 1270.72 4489.76
 1361     4489.92 1406.23  4490.1  1603.7 4493.18
```

```
Manning's n Values          num=        7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
       0     .13  599.33    .045  616.18    .025  618.83     .05  658.83    .025
  663.22    .045  678.33    .095

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        599.33  678.33             63.33   63.33   63.33             .3       .5

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 14.6666*

INPUT
Description:
Station Elevation Data     num=       34
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0  4497.5   14.02 4497.03   99.78 4496.39  199.56 4494.94  200.22 4494.93
  299.33 4494.01  300.33    4494  399.11 4492.94  400.45 4492.93  498.89 4491.81
  500.56 4491.77  590.68 4489.85  598.67 4489.62   600.5 4485.36  610.96 4481.69
  615.89 4480.09   626.2 4477.62  627.67 4474.68  667.67 4474.68  672.95 4485.25
   676.3 4485.74  696.67 4488.96  760.32 4489.32  773.49 4489.29  828.36  4489.2
  841.03 4489.23  883.23 4489.37  924.39 4489.34  976.52 4489.42 1010.87 4489.51
 1116.44 4489.73  1180.7 4489.71 1212.47  4489.9 1352.39 4491.86

Manning's n Values          num=        7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
       0     .15  598.67    .045   626.2    .025  627.67     .05  667.67    .025
  672.95    .045  696.67     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        598.67  696.67             63.33   63.33   63.33             .3       .5

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 14.5

INPUT
Description: Additional XS for bridge copied from sta. 14
Station Elevation Data     num=       17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0    4498      14  4497.3     200  4495.3     300  4494.4     400  4493.3
     500  4492.5     598  4491.6     600 4485.45  616.83 4479.39  638.33 4474.15
  659.83 4482.09     674 4485.45     715  4490.9     800  4490.4     900    4490
    1000  4489.5 1121.13 4491.41

Manning's n Values          num=        3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0     .15     598    .045     715     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           598     715              30      30      30             .3       .5
Ineffective Flow     num=        1
   Sta L   Sta R    Elev
************************
     715 1121.13  4490.9

BRIDGE                 RIVER: Alpine Creek
REACH: Alpine             RS: 14.3

INPUT
Description: Southern Pacific RR Bridge
Distance from Upstream XS =       10
Deck/Roadway Width        =       15
```

```
Weir Coefficient          =     2.6
Bridge Deck/Roadway Skew  =
Upstream  Deck/Roadway Coordinates
    num=        2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
**********************************************
     598  4491.6  4490.1     715  4490.9  4489.4

Upstream Bridge Cross Section Data
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0    4498      14  4497.3     200  4495.3     300  4494.4     400  4493.3
     500  4492.5     598  4491.6     600 4485.45  616.83 4479.39  638.33 4474.15
  659.83 4482.09     674 4485.45     715  4490.9     800  4490.4     900    4490
    1000  4489.5 1121.13 4491.41

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .15     598    .045     715     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
           598     715            .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
************************
     715 1121.13  4490.9

Downstream  Deck/Roadway Coordinates
    num=        2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
**********************************************
     598  4491.6  4490.1     715  4490.9  4489.4

Downstream Bridge Cross Section Data
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0    4498      14  4497.3     200  4495.3     300  4494.4     400  4493.3
     500  4492.5     598  4491.6     600 4485.45  616.83 4479.39  638.33 4474.15
  659.83 4482.09     674 4485.45     715  4490.9     800  4490.4     900    4490
    1000  4489.5 1121.13 4491.41

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .15     598    .045     715     .15

Bank Sta: Left   Right    Coeff Contr.   Expan.
           598     715            .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
************************
     715 1121.13  4490.9

Upstream Embankment side slope             =       0 horiz. to 1.0 vertical
Downstream Embankment side slope           =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins        =  4490.9
Energy head used in spillway design        =
Spillway height used in design             =
Weir crest shape                           = Broad Crested

Number of Piers =  7

Pier I
```

```
Pier Station     Upstream=     603    Downstream=     603
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
       1    4400        1    4490
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
       1    4400        1    4490

Pier Data
Pier Station     Upstream=     616    Downstream=     616
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
       1    4400        1    4490
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
       1    4400        1    4490

Pier Data
Pier Station     Upstream=     631    Downstream=     631
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
       1    4400        1    4490
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
       1    4400        1    4490

Pier Data
Pier Station     Upstream=     646    Downstream=     646
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
       1    4400        1  4490.5
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
       1    4400        1  4490.5

Pier Data
Pier Station     Upstream=     661    Downstream=     661
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
       1    4400        1  4490.5
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
       1    4400        1  4490.5

Pier Data
Pier Station     Upstream=     676    Downstream=     676
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
       1    4400        1  4490.5
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
       1    4400        1  4490.5

Pier Data
Pier Station     Upstream=     691    Downstream=     691
```

```
Upstream      num=        2
    Width   Elev    Width   Elev
*******************************
       1    4400        1  4490.5
Downstream      num=        2
    Width   Elev    Width   Elev
*******************************
       1    4400        1  4490.5

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum                Cd   =     1.2
       Yarnell                 KVal =      .9
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =       .5
           Max Low Cord                =

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

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 14

INPUT
Description: XS Q -- SPRR
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0    4498      14  4497.3     200  4495.3     300  4494.4     400  4493.3
     500  4492.5     598  4491.6     600 4485.45  616.83 4479.39  638.33 4474.15
  659.83 4482.09     674 4485.45     715  4490.9     800  4490.4     900    4490
    1000  4489.5 1121.13 4491.41

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
       0     .15     598    .045     715     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           598     715               45      45      45             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
************************
     715 1121.13  4490.9

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 13.75*

INPUT
Description:
Station Elevation Data    num=      32
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0  4496.1   14.12 4495.71   99.18    4495  198.36 4494.07  201.67 4494.04
  297.53 4493.32  302.51 4493.28  330.26    4493  396.71 4492.44  403.34 4492.34
  495.89 4491.18  504.18 4491.03  570.27  4489.8     603 4489.25  605.17 4485.87
  623,     4480.3  646.67 4474.42  666.67 4479.03  679.85 4481.14  692.06  4482
```

INPUT
Description: XS 0 -- Holland Ave
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4494.2	100	4493.6	200	4492.8	300	4492.2	333	4491.9
400	4491.5	500	4489.8	575	4487.7	608	4488.07	609	4474.86
655.5	4473.45	702	4474.93	703	4483.29	800	4483.5	900	4483.6
1010	4483.6	1070	4484.1	1140	4487.1	1170	4489.3	1212.26	4490
1283.78	4490.16								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	608	.045	703	.14

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
608	703	60	60	.3	.5

CULVERT RIVER: Alpine Creek
REACH: Alpine RS: 12.9

INPUT
Description: Holland Ave. Bridge
Distance from Upstream XS = 10
Deck/Roadway Width = 35
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
608	4488	4400	705	4483.5	4400

Upstream Bridge Cross Section Data
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4494.2	100	4493.6	200	4492.8	300	4492.2	333	4491.9
400	4491.5	500	4489.8	575	4487.7	608	4488.07	609	4474.86
655.5	4473.45	702	4474.93	703	4483.29	800	4483.5	900	4483.6
1010	4483.6	1070	4484.1	1140	4487.1	1170	4489.3	1212.26	4490
1283.78	4490.16								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.1	608	.045	703	.14

Bank Sta: Left	Right	Coeff Contr.	Expan.
608	703	.3	.5

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
608	4488	4400	705	4483.5	4400

Downstream Bridge Cross Section Data
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4494.2	100	4493.6	200	4492.8	300	4492.2	333	4491.9
400	4491.5	500	4489.8	575	4487.7	608	4488.07	609	4474.86
655.5	4473.45	702	4474.93	703	4483.29	800	4483.5	900	4483.6
1010	4483.6	1070	4484.1	1140	4487.1	1170	4489.3	1212.26	4490
1283	1490.16								

```
Manning's n Values          num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
*************************************************
       0      .1      608    .045      703     .14

Bank Sta: Left   Right    Coeff Contr.   Expan.
           608     703             .3       .5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =  4484.3
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  7

Culvert Name      Shape      Rise    Span
Culvert #1            Box      11       9
FHWA Chart # 10- 90 degree headwall; Chamfered or beveled inlet
FHWA Scale # 2 - Inlet edges beveled 1/2 inch at 45 degrees (1:1)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                10      35        .02                   .2                1
Upstream   Elevation =  4474
           Centerline Station =  615
Downstream Elevation =  4474
           Centerline Station =  615

Culvert Name      Shape      Rise    Span
Culvert #5            Box      11       9
FHWA Chart # 10- 90 degree headwall; Chamfered or beveled inlet
FHWA Scale # 2 - Inlet edges beveled 1/2 inch at 45 degrees (1:1)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                10      35        .02                   .2                1
Upstream   Elevation =  4474
           Centerline Station =  625
Downstream Elevation =  4474
           Centerline Station =  625

Culvert Name      Shape      Rise    Span
Culvert #2            Box      10       9
FHWA Chart # 10- 90 degree headwall; Chamfered or beveled inlet
FHWA Scale # 2 - Inlet edges beveled 1/2 inch at 45 degrees (1:1)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                10      35        .02                   .2                1
Number of Barrels =  2
Upstream   Elevation =  4474
Centerline Stations
    Sta.    Sta.
     635     645
Downstream Elevation =  4474
Centerline Stations
    Sta.    Sta.
     635     645

Culvert Name      Shape      Rise    Span
Culvert #6            Box      10       9
FHWA Chart # 10- 90 degree headwall; Chamfered or beveled inlet
FHWA Scale # 2 - Inlet edges beveled 1/2 inch at 45 degrees (1:1)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                10      35        .02                   .2                1
```

```
Number of Barrels =  2
Upstream   Elevation =  4474
Centerline Stations
    Sta.    Sta.
     655     665
Downstream Elevation =  4474
Centerline Stations
    Sta.    Sta.
     655     665

Culvert Name     Shape      Rise    Span
Culvert #4           Box       9       9
FHWA Chart # 10- 90 degree headwall; Chamfered or beveled inlet
FHWA Scale # 2 - Inlet edges beveled 1/2 inch at 45 degrees (1:1)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                10      35        .02                   .2                1
Upstream   Elevation =  4474
           Centerline Station =  675
Downstream Elevation =  4474
           Centerline Station =  675

Culvert Name     Shape      Rise    Span
Culvert #3           Box       9       9
FHWA Chart # 10- 90 degree headwall; Chamfered or beveled inlet
FHWA Scale # 2 - Inlet edges beveled 1/2 inch at 45 degrees (1:1)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                10      35        .02                   .2                1
Upstream   Elevation =  4474
           Centerline Station =  685
Downstream Elevation =  4474
           Centerline Station =  685

Culvert Name     Shape      Rise    Span
Culvert #7           Box       9       9
FHWA Chart # 10- 90 degree headwall; Chamfered or beveled inlet
FHWA Scale # 2 - Inlet edges beveled 1/2 inch at 45 degrees (1:1)
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                10      35        .02                   .2                1
Upstream   Elevation =  4474
           Centerline Station =  695
Downstream Elevation =  4474
           Centerline Station =  695

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 12.7

INPUT
Description: Addtional XS for bridge copied from sta. 13
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0  4494.2     100  4493.6     200  4492.8     300  4492.2     333  4491.9
     400  4491.5     500  4489.8     575  4487.7     608 4488.07     609 4474.86
   655.5 4473.45     702 4474.93     703 4483.29     800  4483.5     900  4483.6
    1010  4483.6    1070  4484.1    1140  4487.1    1170  4489.3 1212.26    4490
 1283.78 4490.16

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
       0      .1     608    .045     703     .14

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          608     703               75      75      75             .3       .1
```

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 12.6333*

INPUT
Description:
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4492.33	41.7	4492.5	84.16	4492.3	160.4	4491.82	168.31	4491.74
252.47	4491.1	280.24	4490.82	320.79	4490.51	336.62	4490.35	364.1	4489.83
365.71	4489.14	420.78	4488.16	481.19	4486.56	483.9	4486.51	511.67	4486.88
512.66	4478.02	527.78	4476.9	533.15	4475.88	535.34	4471.5	575.34	4471.5
576.55	4473.93	584.6	4474.65	597.4	4476.57	598.16	4477.3	599	4483.66
605.32	4483.57	636.93	4483.6	675.57	4482.51	714.2	4482.19	722.07	4482.2
770.39	4482.19	848.94	4482.67	921.42	4483.07	988.5	4483.31	1033.81	4483.67
1064.62	4483.79	1111.07	4484.81	1153.44	4485.62	1177.81	4486.47	1191.5	4487.07
1245.11	4487.82	1248.05	4487.84	1328.83	4488.13	1335.85	4489.24		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	511.67	.045	533.15	.025	535.34	.05	575.34	.025
576.55	.045	599	.14						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
511.67 599 75 75 75 .3 .5
Ineffective Flow num= 1

Sta L	Sta R	Elev
654.9	1335.85	4483.08

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 12.5666*

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4490.47	33.85	4491.1	68.31	4491	130.2	4490.76	136.62	4490.69
204.93	4490	227.48	4489.74	260.4	4489.4	273.25	4489.2	295.55	4488.71
296.85	4487.37	341.56	4486.52	390.6	4485.33	392.79	4485.32	415.33	4485.69
416.33	4481.18	430.88	4479.46	435.16	4470.9	475.16	4470.9	476.56	4473.69
483.3	4474.87	493.7	4478.23	494.32	4479.66	495	4484.03	502.66	4483.83
540.97	4483.85	587.78	4481.61	634.6	4480.9	644.13	4480.89	702.7	4480.85
797.88	4481.73	885.71	4482.53	967	4483.01	1021.9	4483.43	1059.25	4483.47
1115.54	4483.96	1166.87	4484.14	1196.4	4484.44	1212.99	4484.84	1277.97	4485.64
1281.52	4485.67	1379.41	4486.12	1387.93	4488.32				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	415.33	.045	430.88	.025	435.16	.05	475.16	.025
476.56	.045	495	.14						

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
415.33 495 75 75 75 .1 .3
Ineffective Flow num= 1

Sta L	Sta R	Elev
557.47	1387.93	4483.08

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 12.5

INPUT

Description: XS N
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4488.6	26	4489.7	100	4489.7	200	4488.3	227	4487.6
228	4485.6	300	4484.1	319	4484.5	328.68	4482.93	335	4470.29
375	4470.29	376.56	4473.41	382	4475.1	390	4479.9	391	4484.4
400	4484.1	445	4484.1	500	4480.7	555	4479.6	635	4479.5
850	4482	1010	4483.2	1120	4483.1	1215	4482.4	1315	4483.5
1430	4484.1	1440	4487.4						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	319	.045	328.68	.025	335	.05	375	.025
376.56	.045	391	.14						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
319	391	50	50	.3	.5

Ineffective Flow num= 1

Sta L	Sta R	Elev
468.04	1440	4482.99

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 12

INPUT
Description: XS M -- Ave E
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4488.2	158	4486.3	230	4485.2	315	4479.22	315	4471.86
324.42	4471.06	325	4469.89	338.12	4469.89	342	4469.56	353.88	4469.89
365	4469.89	365.16	4470.2	369	4470.31	375	4478.03	418	4479.1
420	4480.1	515	4478.4	635	4479.1	850	4481.6	1010	4482.8
1120	4482.7	1215	4482	1315	4483.1	1430	4483.8	1440	4487

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.135	315	.045	324.42	.025	325	.045	338.12	.045
353.88	.05	365	.025	365.16	.045	375	.15		

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
315	375	60	60	.3	.5

BRIDGE RIVER: Alpine Creek
REACH: Alpine RS: 11.9

INPUT
Description: Ave E Bridge
Distance from Upstream XS = 10
Deck/Roadway Width = 40
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
315	4479.3	4478.3	420	4477.3	4476.3

Upstream Bridge Cross Section Data
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
	4488.2	158	4486.3	230	4485.2	315	4479.22	315	4471.8

324.42	4471.06	325	4469.89	338.12	4469.89	342	4469.56	353.88	4469.89		
365	4469.89	365.16	4470.2	369	4470.31	375	4478.03	418	4479.1		
420	4480.1	515	4478.4	635	4479.1	850	4481.6	1010	4482.8		
1120	4482.7	1215	4482	1315	4483.1	1430	4483.8	1440	4487		

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.135	315	.045	324.42	.025	325	.045	338.12	.045
353.88	.05	365	.025	365.16	.045	375	.15		

Bank Sta: Left Right Coeff Contr. Expan.
315 375 .3 .5

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
315	4479.3	4478.3	420	4477.3	4476.3

Downstream Bridge Cross Section Data
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4488.2	158	4486.3	230	4485.2	315	4479.22	315	4471.86
324.17	4471.08	325	4469.41	365	4469.41	365.4	4470.21	369	4470.31
375	4478.03	418	4479.1	420	4480.1	515	4478.4	635	4479.1
850	4481.6	1010	4482.8	1120	4482.7	1215	4482	1315	4483.1
1430	4483.8	1440	4487						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.135	315	.045	324.17	.025	325	.05	365	.025
365.4	.045	375	.15						

Bank Sta: Left Right Coeff Contr. Expan.
315 375 .3 .5

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 4480.1
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Piers = 3

Pier Data
Pier Station Upstream= 330.7 Downstream= 330.7
Upstream num= 2

Width	Elev	Width	Elev
6	4400	6	4481

Downstream num= 2

Width	Elev	Width	Elev
6	4400	6	4481

Pier Data
Pier Station Upstream= 356.2 Downstream= 356.2
Upstream num= 2

Width	Elev	Width	Elev
6	4400	6	4481

Downstream num= 2

```
    Width   Elev    Width   Elev
*********************************
       6    4400       6    4481

Pier Data
Pier Station     Upstream=   381.7    Downstream=   381.7
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
       6    4400       6    4481
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
       6    4400       6    4481

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.2
       Yarnell                KVal =      .9
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

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

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 11.7

INPUT
Description: Additional XS for bridge copied from sta. 12
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*************************************************************************************
       0  4488.2     158  4486.3     230  4485.2     315 4479.22     315 4471.86
  324.17 4471.08     325 4469.41     365 4469.41   365.4 4470.21     369 4470.31
     375 4478.03     418  4479.1     420  4480.1     515  4478.4     635  4479.1
     850  4481.6    1010  4482.8    1120  4482.7    1215    4482    1315  4483.1
    1430  4483.8    1440    4487

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************************************************
       0    .135     315    .045  324.17    .025     325     .05     365    .025
   365.4    .045     375     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           315     375                80  126.67      80             .3       .5

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 11.6333*

INPUT
Description:
Station Elevation Data    num=      34
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*************************************************************************************
       0 4487.67  114.39 4486.73  171.59 4486.24  193.33    4486  252.47  4485.1
  367.51  4483.2  400.38  4481.9  457.58 4480.32  503.33 4479.01  503.33 4474.11
  520     4470.46   524.2 4470.32  525.16 4468.39  565.16 4468.39  565.79 4469.6
```

```
  579.91 4471.83     587 4477.95  627.89 4478.47  629.79 4479.13  686.25 4478.16
  720.13 4477.71  797.77 4477.98  834.23 4478.07  853.52 4478.19  1020.8 4479.69
 1038.68 4479.81 1190.82  4480.4 1295.42  4480.2 1316.31 4480.06 1385.76 4479.98
 1387.39    4480 1480.85 4481.33  1590.2  4482.5 1599.71  4484.7

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************************************************
       0    .135  503.33    .045   524.2    .025  525.16     .05  565.16    .025
  565.79    .045     587     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        503.33     587               80  126.67      80             .3       .5

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 11.5666*

INPUT
Description:
Station Elevation Data    num=      35
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
**********************************************************************************
       0 4487.13   157.2 4486.11   235.8 4485.57  265.66 4485.25  346.93  4483.9
  505.03  4481.2  550.19 4480.05  628.79 4479.41  691.67 4478.81  691.67 4476.35
  715.04 4469.93  724.11 4469.82  725.33 4467.37  765.33 4467.37  766.12 4468.95
  773.41 4469.05  790.82 4473.34     799 4477.88  837.78 4477.85  839.58 4478.16
  893.12 4477.28  925.25 4477.03  998.88 4477.09 1033.47 4477.04 1051.76 4477.05
  1210.4 4477.99 1227.36 4478.02 1371.64 4478.01 1470.84 4477.69 1490.66 4477.58
 1556.51 4477.96 1558.07 4477.98 1646.69 4479.55  1750.4 4481.21 1759.42  4482.4

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************************************************
       0    .135  691.67    .045   724.11    .025  725.33     .05  765.33    .025
  766.12    .045     799     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        691.67     799               80  126.67      80             .1       .3

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 11.5

INPUT
Description: XS L
Station Elevation Data    num=      21
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
**********************************************************************************
       0  4486.6     200  4485.5     300  4484.9     338  4484.5     700  4478.2
     800  4478.5     880  4478.6     910  4469.4  923.98  4469.4   925.5 4466.35
   965.5 4466.35  966.55 4468.46     982  4468.6    1011  4477.8    1100  4476.4
    1200  4476.2    1250  4475.9    1400  4476.3    1665  4475.1 1728.74 4475.96
 1919.13  4480.1

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************************************************
       0    .135     880    .045  923.98    .025   925.5     .05   965.5    .025
  966.55    .045    1011     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           880    1011             53.33   53.33   53.33             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
**********************
    1011 1919.13  4477.8

CROSS SECTION          RIVER: Alpine Creek
```

REACH: Alpine RS: 11.4666*

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4486.17	197.04	4485.08	201.52	4485.06	295.56	4484.49	302.27	4484.44
332.99	4484.12	340.56	4484.02	689.63	4477.95	705.3	4477.78	788.15	4478.03
806.06	4478.07	886.67	4478.17	901.21	4473.91	912.61	4468.43	913.21	4468.29
925.83	4468.26	927	4465.92	967	4465.92	968.02	4467.95	978.06	4468.3
984.67	4469.87	992.28	4474.08	1007.33	4477.53	1016.19	4477.28	1087.88	4476.16
1108.56	4475.95	1168.43	4475.83	1208.7	4475.68	1222.29	4475.68	1279.16	4475.54
1329.53	4475.68	1449.75	4475.64	1542.98	4475.22	1712.13	4475.14	1751.15	4475.24
1823.64	4476.2	2040.18	4480.1						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.13	886.67	.045	925.83	.025	927	.05	967	.025
968.02	.045	1007.33	.13						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
886.67	1007.33	53.33	53.33	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
1007.333	2040.18	4477.53

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 11.4333*

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4485.73	198.52	4484.64	203.03	4484.62	297.78	4484.05	304.55	4483.99
335.5	4483.66	343.12	4483.54	694.81	4477.42	710.61	4477.37	794.07	4477.62
812.12	4477.65	893.33	4477.73	905.6	4474.37	915.23	4467.47	915.73	4467.18
927.68	4467.12	928.5	4465.49	968.5	4465.49	969.62	4467.73	974.13	4468
980.8	4469.07	988.48	4475.09	1003.67	4477.27	1013.6	4476.89	1093.94	4475.63
1117.11	4475.5	1184.21	4475.36	1229.35	4475.14	1244.58	4475.16	1308.31	4475.19
1364.76	4475.34	1499.51	4474.98	1603.99	4474.51	1793.56	4475.02	1837.29	4475.38
1918.54	4476.43	2161.22	4480.1						

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.13	893.33	.045	927.68	.025	928.5	.05	968.5	.025
969.62	.045	1003.67	.13						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
893.33	1003.67	53.33	53.33	.3	.5

Ineffective Flow num= 1

Sta L	Sta R	Elev
1003.67	2161.22	4477.27

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 11.4

INPUT
Description: Additional XS for bridge copied from sta. 11
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	4485.3	200	4484.2	300	4483.6	338	4483.2	700	4476.9
800	4477.2	900	4477.3	910	4474.84	918.25	4466.07	929.55	4465.97
930	4465.06	970	4465.06	971.37	4467.79	976.92	4468.26	984.67	4476.1
1000	4477	1011	4476.5	1100	4475.1	1200	4474.9	1250	4474.6
1400	4475	1665	4473.8	1875	4474.9	2282.27	4480.1		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.13	900	.045	929.55	.025	930	.05	970	.025
971.37	.045	1000	.13						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
900	1000	50	50	.3	.5

Ineffective Flow num= 1

Sta L	Sta R	Elev
1000	2282.27	4477

BRIDGE RIVER: Alpine Creek
REACH: Alpine RS: 11.3

INPUT
Description: Sul Ross Ave D Bridge
Distance from Upstream XS = 10
Deck/Roadway Width = 35
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
895	4477.2	4475.2	997	4477.2	4475.2

Upstream Bridge Cross Section Data
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4485.3	200	4484.2	300	4483.6	338	4483.2	700	4476.9
800	4477.2	900	4477.3	910	4474.84	918.25	4466.07	929.55	4465.97
930	4465.06	970	4465.06	971.37	4467.79	976.92	4468.26	984.67	4476.1
1000	4477	1011	4476.5	1100	4475.1	1200	4474.9	1250	4474.6
1400	4475	1665	4473.8	1875	4474.9	2282.27	4480.1		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.13	900	.045	929.55	.025	930	.05	970	.025
971.37	.045	1000	.13						

Bank Sta: Left	Right	Coeff Contr.	Expan.
900	1000	.3	.5

Ineffective Flow num= 1

Sta L	Sta R	Elev
1000	2282.27	4477

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
895	4477.2	4475.2	997	4477.2	4475.2

Downstream Bridge Cross Section Data
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

```
      0  4485.3     200  4484.2     300  4483.6     338  4483.2     700  4476.9
    800  4477.2     900  4477.3     910 4474.84  918.25 4466.07  929.35 4465.97
    930 4464.66     970 4464.66  971.58 4467.81  976.92 4468.26  984.67  4476.1
   1000    4477    1011  4476.5    1100  4475.1    1200  4474.9    1250  4474.6
   1400    4475    1665  4473.8    1875  4474.9 2278.38  4480.1

Manning's n Values          num=       7
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
**********************************************************************************
       0     .13      900    .045  929.35    .025      930     .05      970    .025
  971.58    .045     1000     .13

Bank Sta: Left   Right    Coeff Contr.   Expan.
           900    1000             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
************************
    1000 2278.38    4477

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =  4477.2
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  2

Pier Data
Pier Station     Upstream=     933    Downstream=     933
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2    4400        2  4475.5
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2    4400        2  4475.5

Pier Data
Pier Station     Upstream=     957    Downstream=     957
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2    4400        2  4475.5
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
       2    4400        2  4475.5

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =       2
       Yarnell                KVal =    1.05
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =      .5
           Max Low Cord                =

Additional Bridge Parameters
         [1] Friction component to Momentum
```

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

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 11

INPUT
Description: XS K --  Sul Ross/Ave. D
Station Elevation Data    num=      24
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0  4485.3     200  4484.2     300  4483.6     338  4483.2     700  4476.9
     800  4477.2     900  4477.3     910 4474.84  918.25 4466.07  929.35 4465.97
     930 4464.66     970 4464.66  971.58 4467.81  976.92 4468.26  984.67  4476.1
    1000    4477    1011  4476.5    1100  4475.1    1200  4474.9    1250  4474.6
    1400    4475    1665  4473.8    1875  4474.9 2278.38  4480.1

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************************************************
       0     .13     900    .045  929.35    .025     930     .05     970    .025
  971.58    .045    1000     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           900    1000             106.67  106.67  106.67             .3      .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
**********************
    1000 2278.38    4477

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 10.6666*

INPUT
Description:
Station Elevation Data    num=      35
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0  4483.7  177.78  4482.5  266.67 4481.87  300.44 4481.45  533.33 4477.36
  622.22 4475.78  666.67 4475.67  711.11 4475.54     800 4475.17  804.52 4472.93
  808.56 4471.96  815.62 4465.76  816.59 4465.71   823.1  4465.6     824  4463.8
     864  4463.8  866.04 4467.88  867.18 4468.02  874.17 4473.66     888 4475.07
  899.91 4474.68  919.24 4474.41  996.25 4473.43    1006 4473.39 1092.77 4472.81
 1104.51  4472.8 1150.04 4472.63 1158.64 4472.62 1314.03 4473.16 1321.02 4473.19
 1504.92 4473.19 1607.89 4472.87 1835.22 4473.54 1860.67 4473.74  2271.9 4478.03

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************************************************
       0     .13     800    .045   823.1    .025     824     .05     864    .025
  866.04    .045     888     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           800     888             106.67  106.67  106.67             .3      .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
**********************
     888  2271.9 4475.07

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 10.3333*

INPUT
Description:
Station Elevation Data    num=      34
```

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4482.1	155.56	4480.8	233.33	4480.13	262.89	4479.7	466.67	4476.08
544.44	4474.66	583.33	4474.28	622.22	4473.89	700	4473.03	703.76	4469.87
707.12	4469.08	712.99	4465.45	713.79	4465.35	716.84	4465.27	718	4462.94
758	4462.94	761.55	4470.04	763.68	4471.21	776	4473.13	788.82	4472.86
809.62	4472.61	892.51	4471.76	903	4471.69	996.39	4470.71	1009.02	4470.7
1058.02	4470.62	1067.27	4470.63	1234.52	4471.33	1242.03	4471.37	1439.96	4472.14
1550.78	4471.94	1795.45	4472.18	1822.84	4472.27	2380.8	4476.46		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.13	700	.045	716.84	.025	718	.05	758	.025
761.55	.045	776	.13						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
700	776	106.67	106.67	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
776	2380.8	4473.13

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 10

INPUT
Description: XS J
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4480.5	200	4478.4	400	4474.8	500	4472.9	600	4470.9
603	4466.8	610.48	4465.12	612	4462.08	652	4462.08	655.62	4469.31
664	4471.2	700	4470.8	800	4470	900	4468.6	966	4468.6
1155	4469.5	1375	4471.1	1785	4470.8	2406.57	4474.34		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.13	600	.045	610.48	.025	612	.05	652	.025
655.62	.045	664	.13						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
600	664	109.17	120.83	109.17	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
664	2406.57	4471.2

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 9.9*

INPUT
Description:
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4480.5	200	4478.4	400	4474.8	500	4472.9	600	4470.9
601.77	4468.15	603.24	4466.76	611.89	4464.67	612.65	4464.57	616.35	4464.42
618	4461.11	658	4461.11	661.69	4468.49	676	4471.07	711.85	4470.71
776.87	4470.19	811.42	4469.84	877.73	4468.91	910.99	4468.6	944.3	4468.6
976.71	4468.65	1134.94	4469.4	1164.9	4469.57	1356.84	4470.97	1383.96	4471.09
1770.39	4470.81	1792.21	4470.85	2264.12	4473.93				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

```
       0     .13     600     .045  616.35    .025     618     .05     658    .025
  661.69    .045     676      .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           600     676             109.17  120.83  109.17             .1      .3

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 9.8*

INPUT
Description:
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0  4480.5     200  4478.4     400  4474.8     500  4472.9     600  4470.9
  601.91 4467.65  603.48 4466.73  612.78 4464.34  613.59 4464.17  622.15 4463.84
     624 4460.14     664 4460.14  667.88 4467.91     688 4470.93  723.69 4470.61
  788.43 4470.09  822.84 4469.68  888.87 4468.76  921.98  4468.6  955.15  4468.6
  987.42  4468.7 1144.97 4469.45  1174.8 4469.64 1365.92 4471.03 1392.92 4471.09
  1777.7 4470.81 1799.42 4470.89 2269.31 4473.95

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************************************************
       0      .1     600    .045  622.15    .025     624     .05     664    .025
  667.88    .045     688     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           600     688              69.17   60.83   69.17             .3      .5

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 9.75

INPUT
Description:
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0  4480.5     200  4478.4     400  4474.8     500  4472.9     600  4470.9
  602.04 4467.15  614.54 4463.77  627.95 4463.28     630 4459.17     670 4459.17
  674.14 4467.45     700  4470.8     800    4470     900  4468.6     966  4468.6
    1155  4469.5    1375  4471.1    1785  4470.8 2274.49 4473.98

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************************************************
       0      .1     600    .045  627.95    .025     630     .05     670    .025
  674.14    .045     700     .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           600     700                 40      60      40             .3      .5

BRIDGE                 RIVER: Alpine Creek
REACH: Alpine             RS: 9.73

INPUT
Description: 6th St. (LW Xing)
Distance from Upstream XS =      10
Deck/Roadway Width        =      40
Weir Coefficient          =     2.6
Bridge Deck/Roadway Skew  =
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************
     605     4463  4461.5     678     4463  4461.5
```

```
Upstream Bridge Cross Section Data
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0  4480.5     200  4478.4     400  4474.8     500  4472.9     600  4470.9
  602.04 4467.15  614.54 4463.77  627.95 4463.28     630 4459.17     670 4459.17
  674.14 4467.45     700  4470.8     800    4470     900  4468.6     966  4468.6
    1155  4469.5    1375  4471.1    1785  4470.8 2274.49 4473.98

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************************************************
       0      .1     600    .045  627.95    .025     630     .05     670    .025
  674.14    .045     700     .13

Bank Sta: Left   Right    Coeff Contr.   Expan.
           600     700             .3      .5

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
************************************************
     605    4463  4461.5     678    4463  4461.5

Downstream Bridge Cross Section Data
Station Elevation Data    num=      19
     Sta   Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
       0  4480.5     200  4478.4     400  4474.8     500  4472.9     600  4470.9
  602.04 4467.15  614.54 4463.77  627.95 4463.28     630 4459.17     670 4459.17
  674.14 4467.45     700  4470.8     800    4470     900  4468.6     966  4468.6
    1155  4469.5    1375  4471.1    1785  4470.8 2274.49 4473.98

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************************************************
       0      .1     600    .045  627.95    .025     630     .05     670    .025
  674.14    .045     700     .13

Bank Sta: Left   Right    Coeff Contr.   Expan.
           600     700             .3      .5

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

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only

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

CROSS     TION          RIVER: Alpine Creek
```

REACH: Alpine RS: 9.7

INPUT
Description: 6th St. (LW Xing) -- Interpolated x-section
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4480.5	200	4478.4	400	4474.8	500	4472.9	600	4470.9
602.04	4467.15	614.54	4463.77	627.95	4463.28	630	4459.17	670	4459.17
674.14	4467.45	700	4470.8	800	4470	900	4468.6	966	4468.6
1155	4469.5	1375	4471.1	1785	4470.8	2274.49	4473.98		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.1	600	.045	627.95	.025	630	.05	670	.025
674.14	.045	700	.13						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
600	700	109.17	120.83	109.17	.3	.5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 9.63333*

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-100	4477.33	-99.31	4477.33	-98.61	4477.33	108.5	4475.19	156.22	4474.89
412.44	4472.27	490.75	4471.43	540.56	4470.98	668.67	4469.76	670.74	4466.38
674.56	4464.08	683.44	4462.45	691.65	4462.2	693.66	4458.19	733.66	4458.19
737.08	4465.03	749.52	4466.39	758.64	4470.28	857.71	4469.19	885.09	4468.78
956.79	4468.1	1022.18	4468.1	1209.43	4468.7	1420.08	4469.73	1427.39	4469.78
1583.13	4469.99	1833.6	4469.84	2133.41	4471.11	2318.56	4472.67		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-100	.1	668.67	.045	691.65	.025	693.66	.05	733.66	.025
737.08	.045	758.64	.13						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
668.67	758.64	109.17	120.83	109.17	.3	.5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 9.56666*

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-200	4474.17	-199.15	4474.16	-198.3	4474.16	54.25	4471.6	112.44	4471.38
424.89	4469.74	520.37	4469.21	581.11	4469.06	737.33	4468.63	739.44	4465.61
743.32	4462.02	752.34	4461.13	755.38	4461.06	757.3	4457.22	797.3	4457.22
799.99	4462.6	809.88	4463.38	817.27	4469.77	915.42	4468.38	942.54	4467.94
1013.57	4467.6	1078.35	4467.6	1263.85	4467.9	1472.54	4468.42	1479.78	4468.46
1634.06	4469	1882.19	4468.87	2179.2	4469.46	2362.62	4471.36		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-200	.1	737.33	.05	755.38	.025	757.3	.05	797.3	.025
799.99	.05	817.27	.13						

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

```
        737.33  817.27           109.17  120.83  109.17            .3       .5

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 9.5

INPUT
Description: Additional XS for bridge copied from sta. 9
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
    -300    4471    -299    4471    -298    4471       0    4468     550    4467
     806  4468.7     806  4466.5     830  4461.8  847.28 4460.69   849.5 4456.25
   889.5 4456.25  891.75 4460.74     907  4461.9     930  4466.9     933    4468
     933  4469.4    1000  4467.1    1525  4467.1    1685    4468    2225  4467.8
  2488.4 4469.94

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************************************************
    -300      .1     806      .05  847.28    .025   849.5     .05   889.5    .025
  891.75     .05     933      .13

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           806     933                 70      70      70            .3       .5

BRIDGE                 RIVER: Alpine Creek
REACH: Alpine             RS: 9.3

INPUT
Description: 5th St. Bridge
Distance from Upstream XS =      10
Deck/Roadway Width        =      50
Weir Coefficient          =     2.6
Bridge Deck/Roadway Skew  =
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************
     806  4468.7  4467.7     933  4469.4  4468.4

Upstream Bridge Cross Section Data
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
    -300    4471    -299    4471    -298    4471       0    4468     550    4467
     806  4468.7     806  4466.5     830  4461.8  847.28 4460.69   849.5 4456.25
   889.5 4456.25  891.75 4460.74     907  4461.9     930  4466.9     933    4468
     933  4469.4    1000  4467.1    1525  4467.1    1685    4468    2225  4467.8
  2488.4 4469.94

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************************************************
    -300      .1     806      .05  847.28    .025   849.5     .05   889.5    .025
  891.75     .05     933      .13

Bank Sta: Left   Right    Coeff Contr.   Expan.
           806     933             .3       .5

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************
     806  4468.7  4467.7     933  4469.4  4468.4

Downstream Bridge Cross Section Data
Static  levation Data    num=      21
```

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-300	4471	-299	4471	-298	4471	0	4468	550	4467
806	4468.7	806	4466.5	830	4461.8	846.99	4460.71	849.5	4455.68
889.5	4455.68	892.04	4460.71	907	4461.9	930	4466.9	933	4468
933	4469.4	1000	4467.1	1525	4467.1	1685	4468	2225	4467.8
2488.4	4469.89								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-300	.1	806	.05	846.99	.025	849.5	.05	889.5	.025
892.04	.05	933	.13						

Bank Sta: Left	Right	Coeff Contr.	Expan.
806	933	.3	.5

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 4468.7
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Piers - 4

Pier Data
Pier Station Upstream= 830 Downstream= 830
Upstream num= 2

Width	Elev	Width	Elev
2.33	4400	2.33	4468.5

Downstream num= 2

Width	Elev	Width	Elev
2.33	4400	2.33	4468.5

Pier Data
Pier Station Upstream= 855 Downstream= 855
Upstream num= 2

Width	Elev	Width	Elev
2.33	4400	2.33	4469

Downstream num= 2

Width	Elev	Width	Elev
2.33	4400	2.33	4469

Pier Data
Pier Station Upstream= 880 Downstream= 880
Upstream num= 2

Width	Elev	Width	Elev
2.33	4400	2.33	4468.5

Downstream num= 2

Width	Elev	Width	Elev
2.33	4400	2.33	4468.5

Pier Data
Pier Station Upstream= 905 Downstream= 905
Upstream num= 2

Width	Elev	Width	Elev
2.33	4400	2.33	4468.5

Downstream num= 2

Width	Elev	Width	Elev
2.33	4400	2.33	4468.5

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Momentum Cd = 1.2
Yarnell KVal = .9
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Energy Only

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

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 9

INPUT
Description: XS I -- 5th St.
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-300	4471	-299	4471	-298	4471	0	4468	550	4467
806	4468.7	806	4466.5	830	4461.8	846.99	4460.71	849.5	4455.68
889.5	4455.68	892.04	4460.76	907	4461.9	930	4466.9	933	4468
933	4469.4	1000	4467.1	1525	4467.1	1685	4468	2225	4467.8
2488.4	4469.89								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-300	.1	806	.05	846.99	.025	849.5	.05	889.5	.025
892.04	.05	933	.13						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
806	933	83.33	87.33	83.33	.3	.5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 8.66666*

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-300	4470.33	-298.91	4470.33	-297.82	4470.32	-214	4469.28	-128	4468.29
-42	4467.36	26.58	4466.9	37.12	4466.89	104.2	4467.05	130	4466.92
302	4466.73	388	4466.8	478.07	4466.63	538.47	4466.22	625.32	4465.98
732	4465.92	768.12	4466	803.38	4465.78	854.98	4465.67	899.7	4466.16
904	4466.57	909.93	4460.77	915.47	4459.98	917.97	4454.98	957.97	4454.98
960.61	4460.26	966.45	4461.09	971.94	4467.66	1034.2	4466.46	1074.42	4465.97
1207.13	4466.2	1380.07	4466.2	1507.99	4466.15	1640.13	4466.7	1725.94	4466.64
1834.89	4466.88	1936.92	4466.88	2054.6	4467.07	2086.08	4467.13	2236.13	4468.95

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-300	.1	904	.05	915.47	.025	917.97	.05	957.97	.025
960	.05	971.94	.13						

```
Bank Sta: Left   Right     Lengths: Left Channel   Right      Coeff Contr.    Expan.
           904  971.94              83.33   87.33   83.33              .3       .5

CROSS SECTION           RIVER: Alpine Creek
REACH: Alpine             RS: 8.33333*

INPUT
Description:
Station Elevation Data    num=       40
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
*********************************************************************************
    -300 4469.67  -298.82 4469.65  -297.65 4469.64     -207 4468.34     -114 4467.14
     -21 4466.08    53.16 4465.81    64.56 4465.79    137.1 4466.22      165 4466.01
     351 4465.91      444  4466.2    541.4 4466.02   606.72  4465.3   700.63 4464.96
     816 4464.66   855.06 4464.75   893.19 4464.24   948.99 4463.93   997.35 4464.83
    1002 4465.64 1007.77 4461.58  1011.89 4460.45  1014.98 4454.28  1054.98 4454.28
 1058.16 4460.64 1062.65  4461.8  1067.97 4466.08   1117.1 4464.98  1148.84 4464.84
 1253.57  4465.3 1390.03  4465.3  1490.98  4465.2  1595.25  4465.4  1662.97 4465.32
 1748.94 4465.84 1829.46 4465.89  1922.33 4466.32  1947.17 4466.46  2065.58 4467.85

Manning's n Values        num=       7
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
*********************************************************************************
    -300      .1     1002      .05 1011.89     .025 1014.98      .05 1054.98     .025
 1058.16      .05 1067.97      .13

Bank Sta: Left   Right     Lengths: Left Channel   Right      Coeff Contr.    Expan.
          1002 1067.97              83.33   87.33   83.33              .3       .5
Ineffective Flow     num=        2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************
    -300  999.02 4465.26 1094.44 2065.58 4465.51

CROSS SECTION           RIVER: Alpine Creek
REACH: Alpine             RS: 8

INPUT
Description: XS H -- Ave. A (LW Xing)
Station Elevation Data    num=       30
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
*********************************************************************************
    -300     4469     -200  4467.4     -100     4466        0  4464.8       92  4464.7
     170  4465.4      200  4465.1      400  4465.1      500  4465.6   604.73 4465.41
  674.97 4464.38      900  4463.4      942  4463.5      983  4462.7     1043  4462.2
    1095  4463.5     1100 4464.72  1108.11 4461.37     1112 4453.58     1152 4453.58
  1155.9 4461.39     1164 4464.49     1200  4463.5     1300  4464.4     1400  4464.4
    1600     4464     1663  4464.8     1722  4464.9  1790.05 4465.58  1895.02 4466.75

Manning's n Values        num=       7
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
*********************************************************************************
    -300      .1     1100      .05 1108.11     .025     1112      .05     1152     .025
  1155.9      .05    1164      .13

Bank Sta: Left   Right     Lengths: Left Channel   Right      Coeff Contr.    Expan.
          1100    1164                60      60      60              .3       .5
Ineffective Flow     num=        2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************
    -300 1097.32  4464.2 1175.37 1895.02  4464.2

BRIDGE                  RIVER: Alpine Creek
REACH: Alpine             RS: 7.95

INPUT
Description: Ave. A (LW Xing)
```

Distance from Upstream XS = 10
Deck/Roadway Width = 40
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
1100	4458	4456.5	1160	4458	4456.5

Upstream Bridge Cross Section Data
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-300	4469	-200	4467.4	-100	4466	0	4464.8	92	4464.7
170	4465.4	200	4465.1	400	4465.1	500	4465.6	604.73	4465.41
674.97	4464.38	900	4463.4	942	4463.5	983	4462.7	1043	4462.2
1095	4463.5	1100	4464.72	1108.11	4461.37	1112	4453.58	1152	4453.58
1155.9	4461.39	1164	4464.49	1200	4463.5	1300	4464.4	1400	4464.4
1600	4464	1663	4464.8	1722	4464.9	1790.05	4465.58	1895.02	4466.75

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-300	.1	1100	.05	1108.11	.025	1112	.05	1152	.025
1155.9	.05	1164	.13						

Bank Sta: Left Right Coeff Contr. Expan.
1100 1164 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
-300	1097.32	4464.2	1175.37	1895.02	4464.2

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
1100	4458	4456.5	1160	4458	4456.5

Downstream Bridge Cross Section Data
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-300	4469	-200	4467.4	-100	4466	0	4464.8	92	4464.7
170	4465.4	200	4465.1	400	4465.1	500	4465.6	604.73	4465.41
674.97	4464.38	900	4463.4	942	4463.5	983	4462.7	1043	4462.2
1095	4463.5	1100	4464.72	1108.11	4461.37	1112	4453.58	1152	4453.58
1155.9	4461.39	1164	4464.49	1200	4463.5	1300	4464.4	1400	4464.4
1600	4464	1663	4464.8	1722	4464.9	1790.05	4465.58	1895.02	4466.75

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-300	.1	1100	.05	1108.11	.025	1112	.05	1152	.025
1155.9	.05	1164	.13						

Bank Sta: Left Right Coeff Contr. Expan.
1100 1164 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
-300	1097.54	4464.19	1174.99	1895.02	4464.2

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95

```
Elevation at which weir flow begins          =
Energy head used in spillway design          =
Spillway height used in design               =
Weir crest shape                             = Broad Crested

Number of Bridge Coefficient Sets =  1

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

High Flow Method
       Energy Only

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

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 7.9

INPUT
Description:
Station Elevation Data    num=       30
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*********************************************************************************
     300    4469     -200  4467.4     -100    4466        0  4464.8       92  4464.7
     170  4465.4      200  4465.1      400  4465.1      500  4465.6   604.73 4465.41
  674.97 4464.38      900  4463.4      942  4463.5      983  4462.7     1043  4462.2
    1095  4463.5     1100 4464.72 1108.11 4461.37     1112 4453.58     1152 4453.58
  1155.9 4461.39     1164 4464.49     1200  4463.5     1300  4464.4     1400  4464.4
    1600    4464     1663  4464.8     1722  4464.9 1790.05 4465.58 1895.02 4466.75

Manning's n Values        num=       7
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
*********************************************************************************
    -300      .1     1100      .05 1108.11    .025     1112     .05     1152    .025
  1155.9     .05     1164      .13

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.    Expan.
          1100    1164                 83         83         83               .3        .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
*********************************************
    -300 1097.54 4464.19 1174.99 1895.02  4464.2

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 7.8*

INPUT
Description:
Station Elevation Data    num=       48
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*********************************************************************************
    -270 4467.86 -177.86 4466.16  -85.71 4464.62  -42.35 4463.97     6.43 4463.42
   88.16 4463.28     91.2 4463.28  163.07 4463.96  165.56 4463.94   190.71 4463.75
  261.18 4463.82      375 4463.96  467.14 4464.47   529.8 4464.44   563.64 4464.04
  564.71 4464.01   628.37 4463.15  640.59  4463.1  806.01 4462.57   835.71 4462.49
  874.41   4462.6   912.19     4462  967.48 4461.65  982.06 4461.98 1015.39 4462.75
    1020 4463.74 1037.08 4459.26  1040.5 4452.42  1080.5 4452.42 1082.86 4457.15
 1083.92 4457.22 1083.96 4457.23    1101 4463.37 1102.26 4463.28 1135.23 4462.32
 1165.33 4462.37   1230.3  4462.8 1291.47 4462.74 1325.38 4462.84 1384.81 4462.92
  1417.6 4462.88 1515.53 4462.81 1543.74 4463.14 1575.42 4463.48 1631.52 4463.57
 1669.88  4463.9 1696.22 4464.23 1796.02 4465.57
```

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-270	.1	1020	.05	1037.08	.025	1040.5	.05	1080.5	.025
1082.86	.05	1101	.13						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1020	1101	143	143	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
-270	1017.9	4463.31	1102.35	1796.02	4463.27

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 7.6*

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-240	4466.72	-155.71	4464.92	-71.43	4463.24	-31.76	4462.5	12.86	4462.04
87.62	4461.86	90.4	4461.87	156.14	4462.51	158.42	4462.5	181.43	4462.39
245.88	4462.54	350	4462.81	434.29	4463.33	491.6	4463.41	522.56	4462.67
523.53	4462.64	581.76	4461.93	592.94	4461.87	744.26	4461.6	771.43	4461.57
806.83	4461.7	841.39	4461.29	891.96	4461.09	905.29	4461.36	935.79	4462.01
940	4462.75	965.51	4458.26	969	4451.27	1009	4451.27	1011	4455.28
1018.84	4455.7	1018.89	4455.71	1038	4462.24	1039.2	4462.11	1070.45	4461.14
1099	4460.95	1160.6	4461.2	1218.6	4461.08	1250.75	4461.28	1307.11	4461.56
1338.2	4461.56	1431.05	4461.63	1457.81	4461.91	1487.85	4462.17	1541.04	4462.25
1577.41	4462.5	1602.38	4462.88	1697.01	4464.39				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-240	.1	940	.05	965.51	.025	969	.05	1009	.025
1011	.05	1038	.13						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
940	1038	143	143	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
-240	936.14	4462.01	1039.47	1697.01	4462.1

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 7.4*

INPUT
Description:
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-210	4465.58	-133.57	4463.68	-57.14	4461.85	-21.18	4461.03	19.29	4460.67
87.08	4460.44	89.6	4460.45	149.21	4461.07	151.28	4461.07	172.14	4461.04
230.59	4461.26	325	4461.67	401.43	4462.2	453.4	4462.37	481.47	4461.3
482.35	4461.26	535.16	4460.7	545.29	4460.65	682.51	4460.64	707.14	4460.66
739.24	4460.81	770.58	4460.59	816.44	4460.54	828.53	4460.74	856.18	4461.26
860	4461.77	892.38	4457.83	893.87	4457.38	897.5	4450.12	937.5	4450.12
939.22	4453.55	953.76	4454.17	953.82	4454.18	975	4461.12	976.13	4460.94
1005.68	4459.96	1032.67	4459.53	1090.91	4459.59	1145.73	4459.42	1176.13	4459.73
1229.4	4460.21	1258.8	4460.24	1346.58	4460.44	1371.87	4460.67	1400.27	4460.85
1450.55	4460.92	1484.94	4461.1	1508.55	4461.53	1598.01	4463.21		

Manning's n Values num= 7

n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n V

```
**********************************************************************************
    -210      .12      860      .05  893.87     .025   897.5      .05   937.5     .025
  939.22      .05      975      .95

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.    Expan.
           860     975               143      143     143              .1       .3
Ineffective Flow      num=        2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************
    -210  855.87 4461.26  976.07 1598.01 4460.94

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 7.2*

INPUT
Description:
Station Elevation Data    num=       50
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
**********************************************************************************
    -180 4464.44 -111.43 4462.44  -42.86 4460.47  -10.59 4459.57   25.71 4459.29
   86.54 4459.02     88.8 4459.04  142.29 4459.62  144.14 4459.63  162.86 4459.69
  215.29 4459.98      300 4460.52  368.57 4461.06   415.2 4461.33  440.39 4459.93
  441.18 4459.88  488.55 4459.47  497.65 4459.42  620.75 4459.67  642.86 4459.75
  671.66 4459.91  699.77 4459.89  740.91 4459.99  751.76 4460.12  776.57 4460.51
     780 4460.78  818.19  4457.6  820.88 4456.82  822.25 4456.47     826 4448.97
     866 4448.97  867.49 4451.95  888.68 4452.65  888.74 4452.65     912 4459.99
  913.07 4459.77  940.91 4458.79  966.33 4458.12 1021.21 4457.99 1072.87 4457.76
 1101.51 4458.17 1151.7 4458.85  1179.4 4458.92  1262.1 4459.25 1285.94 4459.44
 1312.69 4459.54 1360.07  4459.6 1392.47  4459.7 1414.71 4460.18    1499 4462.03

Manning's n Values        num=       7
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
**********************************************************************************
     180      .12      780      .05  822.25     .025     826      .05     866     .025
  867.49      .05      912      .95

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.    Expan.
           780     912               143      143     143              .3       .5
Ineffective Flow      num=        2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************
    -180  776.49 4460.52  913.44    1499 4459.76

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 7

INPUT
Description: XS G -- Brown St. (new)
Station Elevation Data    num=       26
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
**********************************************************************************
    -150   4463.3        0  4458.1       86  4457.6      137  4458.2      200  4458.7
     377   4460.3      400  4458.5      450  4458.2      559  4458.7      675  4459.5
     700   4459.8      744 4457.36  750.65 4455.53   754.5 4447.82   794.5 4447.82
   795.8 4450.41  823.67 4451.13      849 4458.87      850  4458.6      900  4456.7
    1000  4456.1     1074  4457.5     1100  4457.6     1200  4458.2     1300  4458.3
    1400 4460.85

Manning's n Values        num=       7
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
**********************************************************************************
    -150      .12      700      .05  750.65     .025   754.5      .05   794.5     .025
   795.8      .05      849     .095

Bank Sta: Left   Right    Lengths: Left Channel   Right      Coeff Contr.    Expan.
           700     849                60       60      60              .3       .5
Ineffective Flow      num=        2
```

Sta L	Sta R	Elev	Sta L	Sta R	Elev
-150	674.77	4459.5	850.13	1400	4458.59

BRIDGE RIVER: Alpine Creek
REACH: Alpine RS: 6.7

INPUT
Description: Brown St. Bridge (new)
Distance from Upstream XS = 10
Deck/Roadway Width = 40
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates
num= 3

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
700	4459.8	4458.8	769.61	4460.1	4459.01	849	4458.87	4457.87

Upstream Bridge Cross Section Data
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-150	4463.3	0	4458.1	86	4457.6	137	4458.2	200	4458.7
377	4460.3	400	4458.5	450	4458.2	559	4458.7	675	4459.5
700	4459.8	744	4457.36	750.65	4455.53	754.5	4447.82	794.5	4447.82
795.8	4450.41	823.67	4451.13	849	4458.87	850	4458.6	900	4456.7
1000	4456.1	1074	4457.5	1100	4457.6	1200	4458.2	1300	4458.3
1400	4460.85								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-150	.12	700	.05	750.65	.025	754.5	.05	794.5	.025
795.8	.05	849	.095						

Bank Sta: Left Right Coeff Contr. Expan.
700 849 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
-150	674.77	4459.5	850.13	1400	4458.59

Downstream Deck/Roadway Coordinates
num= 3

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
700	4459.8	4458.8	769.61	4460.1	4459.01	849	4458.87	4457.87

Downstream Bridge Cross Section Data
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-150	4463.3	0	4458.1	86	4457.6	137	4458.2	200	4458.7
377	4460.3	400	4458.5	450	4458.2	559	4458.7	675	4459.5
700	4459.8	744	4457.36	750.37	4455.6	754.5	4447.34	794.5	4447.34
796.04	4450.42	823.67	4451.13	849	4458.87	850	4458.6	900	4456.7
1000	4456.1	1074	4457.5	1100	4457.6	1200	4458.2	1300	4458.3
1400	4460.85								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-150	.12	700	.05	750.37	.025	754.5	.05	794.5	.025
796.04	.05	849	.095						

Bank S Left Right Coeff Contr. Expan.

```
          700     849              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************
    -150  674.46  4459.5  849.95    1400  4458.6

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

Number of Piers =  1

Pier Data
Pier Station     Upstream=     784    Downstream=     784
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
        2    4400       2    4460
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
        2    4400       2    4460

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.2
       Yarnell                KVal =      .9
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

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

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 6.5

INPUT
Description: addtional XS for bridge copied from sta 7
Station Elevation Data     num=       26
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
*********************************************************************************************
    -150  4463.3        0  4458.1       86  4457.6      137  4458.2      200  4458.7
     377  4460.3      400  4458.5      450  4458.2      559  4458.7      675  4459.5
     700  4459.8      744 4457.36   750.37  4455.6    754.5 4447.34    794.5 4447.34
  796.04 4450.42   823.67 4451.13      849 4458.87      850  4458.6      900  4456.7
    1000  4456.1     1074  4457.5     1100  4457.6     1200  4458.2     1300  4458.3
    1400 4460.85

Manning's n Values         num=       7
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
*********************************************************************************************
    -150     .12      700     .05   750.37    .025    754.5     .05    794.5    .025
  796.04     .05      849    .095

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

```
          700     849           141.25  143.75  141.25             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************
    -150  674.46  4459.5  849.95    1400  4458.6

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 6.375*

INPUT
Description:
Station Elevation Data    num=      45
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
  -137.5 4461.55 -115.56 4460.83  -71.69 4459.29  -49.75 4458.55   19.82 4457.03
   59.93 4456.98   60.81 4456.88  110.02 4456.45  125.74 4456.51  163.51 4456.79
  213.48 4457.03  229.59 4457.11  301.23 4457.51  388.98 4458.03  415.23 4458.18
  439.35 4456.81  457.42 4456.72  491.79 4456.58  564.47 4456.81  606.12 4456.97
  652.21 4457.23  727.78 4457.73  738.21 4457.84  745.23 4458.47     754 4458.55
  792.86 4455.32  797.72 4454.01  801.63 4446.18  841.63 4446.18  843.46 4449.85
  856.21 4450.32  865.15 4450.92  889.25 4457.85  890.17 4457.65  905.13 4457.26
  913.07 4456.39  936.41 4455.67 1000.41 4455.34 1028.88 4455.22 1097.31 4456.31
 1121.35  4456.4 1213.82 4456.91  1237.4 4456.94 1306.29 4457.22 1398.76 4459.43

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
  -137.5     .09     754     .05  797.72    .025  801.63     .05  841.63    .025
  843.46     .05  889.25     .09

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          754  889.25           141.25  143.75  141.25             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************
  -137.5  744.48 4458.48  890.48 1398.76 4457.64

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 6.25*

INPUT
Description:
Station Elevation Data    num=      45
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
    -125  4459.8 -102.04 4459.09  -56.13 4457.46  -33.17  4456.7   39.65 4455.96
   81.62 4456.09   82.54 4455.89  134.04  4455.3  150.49 4455.24  190.02 4455.39
  242.32 4455.49  259.18 4455.52  334.15 4455.71  425.98 4455.99  453.46 4456.06
  478.71 4455.13  497.61 4455.05  533.59 4454.95  609.65 4455.11  653.23 4455.25
  701.48 4455.45  780.56 4455.96  791.47 4456.06  798.82 4457.25     808  4457.3
  841.73 4453.29  845.05 4452.42  848.75 4445.02  888.75 4445.02  890.93 4449.38
  898.14 4449.74  906.62  4450.7   929.5 4456.83  930.35 4456.71  944.09 4456.54
  951.38 4455.13  972.82 4454.64 1031.61 4454.39 1057.76 4454.34 1120.61 4455.12
  1142.7  4455.2 1227.63 4455.62  1249.3 4455.66 1312.57 4456.14 1397.51 4458.02

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
    -125     .09     808     .05  845.05    .025  848.75     .05  888.75    .025
  890.93     .05   929.5     .09

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          808   929.5           141.25  143.75  141.25             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev   Sta L   Sta R    Elev
**********************************************
    -1     798.47 4457.26  944.71 1397.51 4456.54
```

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 6.125*

INPUT
Description:
Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-112.5	4458.05	-88.52	4457.34	-40.56	4455.63	-16.58	4454.85	59.47	4454.89
103.31	4455.19	104.27	4454.89	158.07	4454.14	175.25	4453.97	216.54	4453.98
271.16	4453.94	288.76	4453.93	367.08	4453.9	462.99	4453.94	491.69	4453.94
518.06	4453.44	537.81	4453.37	575.38	4453.33	654.82	4453.4	700.35	4453.52
750.74	4453.68	833.34	4454.2	844.74	4454.28	852.41	4456.02	862	4456.05
890.59	4451.25	892.41	4450.79	895.88	4443.86	935.88	4443.86	938.48	4449.07
940.07	4449.17	948.1	4450.49	969.75	4455.82	970.52	4455.76	983.04	4455.82
989.69	4453.86	1009.23	4453.6	1062.8	4453.45	1086.64	4453.45	1143.92	4453.93
1164.04	4454	1241.45	4454.33	1261.19	4454.38	1318.86	4455.07	1396.27	4456.6

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-112.5	.09	862	.05	892.41	.025	895.88	.05	935.88	.025
938.48	.05	969.75	.085						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
862	969.75	141.25	143.75	141.25	.3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
-112.5	847.4	4455.02	985.91	1396.27	4455

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 6

INPUT
Description: XS F
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-100	4456.3	-75	4455.6	-25	4453.8	0	4453	125	4454.3
126	4453.9	200	4452.7	300	4452.4	400	4452.1	500	4451.9
578	4451.7	700	4451.7	800	4451.9	898	4452.5	906	4454.8
916	4454.8	939.78	4449.14	943	4442.71	983	4442.71	986.44	4449.58
1010	4454.8	1022	4455.1	1028	4452.6	1094	4452.5	1273.09	4453.1
1395.02	4455.18								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-100	.09	916	.05	939.78	.025	943	.05	983	.025
986.44	.05	1010	.085						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
916	1010	110	100	110	.3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
-100	902.81	4454	1024.86	1395.02	4454.02

BRIDGE RIVER: Alpine Creek
REACH: Alpine RS: 5.75

INPUT
Description: 2nd St. (LW Xing)
Distance from Upstream XS = 10
Deck/Roadway Width = 40

Weir Coefficient = 2.6
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
940	4445	4443.5	995	4445	4443.5

Upstream Bridge Cross Section Data
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-100	4456.3	-75	4455.6	-25	4453.8	0	4453	125	4454.3
126	4453.9	200	4452.7	300	4452.4	400	4452.1	500	4451.9
578	4451.7	700	4451.7	800	4451.9	898	4452.5	906	4454.8
916	4454.8	939.78	4449.14	943	4442.71	983	4442.71	986.44	4449.58
1010	4454.8	1022	4455.1	1028	4452.6	1094	4452.5	1273.09	4453.1
1395.02	4455.18								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-100	.09	916	.05	939.78	.025	943	.05	983	.025
986.44	.05	1010	.085						

Bank Sta: Left Right Coeff Contr. Expan.
916 1010 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
-100	902.81	4454	1024.86	1395.02	4454.02

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
940	4445	4443.5	995	4445	4443.5

Downstream Bridge Cross Section Data
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-66.67	4454.57	-42.4	4453.99	6.12	4452.58	30.38	4451.94	39.81	4451.97
146.29	4452.59	151.69	4452.63	152.66	4452.36	214.44	4451.65	224.48	4451.58
250.64	4451.65	252.77	4451.44	321.52	4451.21	359.25	4451.09	418.57	4450.97
465.73	4450.9	466.8	4450.9	515.62	4450.56	526.42	4450.48	572.21	4450.63
591.31	4450.6	678.69	4450.6	709.71	4450.66	734.06	4450.73	768.13	4450.45
785.17	4450.5	806.76	4450.75	808.59	4450.77	901.86	4451.19	909.63	4452.73
919.33	4452.73	949.09	4444.03	949.47	4443.96	952	4443.91	953	4441.9
993	4441.9	994.46	4444.83	1026.67	4452.77	1036.12	4452.97	1040.85	4451.31
1092.85	4451.28	1113.34	4451.36	1233.95	4451.98	1330.01	4453.59		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-66.67	.085	919.33	.05	952	.025	953	.05	993	.025
994.46	.05	1026.67	.08						

Bank Sta: Left Right Coeff Contr. Expan.
919.33 1026.67 .3 .5

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins =
Energy head used in spillway design =
Spillv eight used in design =

Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

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

High Flow Method
Energy Only

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

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 5.66

INPUT
Description:
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-66.67	4454.57	-42.4	4453.99	6.12	4452.58	30.38	4451.94	39.81	4451.97
146.29	4452.59	151.69	4452.63	152.66	4452.36	214.44	4451.65	224.48	4451.58
250.64	4451.65	252.77	4451.44	321.52	4451.21	359.25	4451.09	418.57	4450.97
465.73	4450.9	466.8	4450.9	515.62	4450.56	526.42	4450.48	572.21	4450.63
591.31	4450.6	678.69	4450.6	709.71	4450.66	734.06	4450.73	768.13	4450.45
785.17	4450.5	806.76	4450.75	808.59	4450.77	901.86	4451.19	909.63	4452.73
919.33	4452.73	949.09	4444.03	949.47	4443.96	952	4443.91	953	4441.9
993	4441.9	994.46	4444.83	1026.67	4452.77	1036.12	4452.97	1040.85	4451.31
1092.85	4451.28	1113.34	4451.36	1233.95	4451.98	1330.01	4453.59		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-66.67	.085	919.33	.05	952	.025	953	.05	993	.025
994.46	.05	1026.67	.08						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
919.33	1026.67	55	50	55	.3	.5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 5.49

INPUT
Description:
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-50	4453.7	-26.11	4453.19	-26.1	4453.19	21.68	4451.97	45.57	4451.41
54.86	4451.4	159.72	4451.77	165.03	4451.79	165.99	4451.6	226.83	4451.04
236.71	4451.02	236.72	4451.02	262.48	4451.16	264.58	4450.85	332.28	4450.62
369.44	4450.49	427.85	4450.4	474.3	4450.35	475.35	4450.35	523.42	4449.89
523.43	4449.89	534.06	4449.79	579.16	4450.08	597.97	4450.05	684.01	4450.05
684.02	4450.05	714.56	4450.13	738.54	4450.23	772.1	4449.76	788.87	4449.83
788.88	4449.83	810.14	4450.17	811.94	4450.21	903.79	4450.54	911.44	4451.69
921	4451.7	951.31	4442.05	951.32	4442.04	951.7	4442	957.81	4441.88
958	4441.5	998	4441.5	998.46	4442.42	1035	4451.75	1043.18	4451.91
1047.27	4450.67	1092.27	4450.67	1110	4450.75	1214.38	4451.42	1297.51	4452.8

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

```
     -50     .085      921      .05  957.81     .025      958      .05      998     .025
  998.46      .05     1035      .08 1297.51      .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           921    1035               55      50      55             .3       .5

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 5.33

INPUT
Description:
Station Elevation Data    num=      43
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
**********************************************************************************
  -33.33 4452.83    -9.81 4452.39    37.24 4451.36    60.76 4450.88    69.91 4450.83
  173.15 4450.95   178.38 4450.96   179.32 4450.83   239.22 4450.42   248.95 4450.46
  274.32 4450.67   276.39 4450.27   343.04 4450.03   379.63 4449.89   437.14 4449.83
  482.87  4449.8    483.9  4449.8   531.23 4449.22   541.71 4449.09   586.11 4449.52
  604.63  4449.5   689.34  4449.5   719.42 4449.61   743.03 4449.72   776.07 4449.07
  792.58 4449.15   813.52  4449.6    815.3 4449.64   905.73 4449.89   913.26 4450.66
  922.67 4450.67   953.54 4440.06   953.94 4440.03   977.67  4439.6 1000.57 4440.06
 1003.25  4440.2 1043.33 4450.73 1050.24 4450.85   1053.7 4450.02   1091.7 4450.07
 1106.67 4450.13 1194.81 4450.86 1265.01 4452.01

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
**************************************************
  -33.33     .085  922.67      .05 1043.33      .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        922.67 1043.33              110     100     110             .1       .3

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 5

INPUT
Description: XS E
Station Elevation Data    num=      23
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
**********************************************************************************
       0  4451.1      100  4449.7      200  4449.3      264  4449.2      298  4449.7
     300  4449.1      400  4448.7      500  4448.7      501  4448.7      557  4447.7
     600  4448.4      700  4448.4      752  4448.7      784  4447.7      800  4447.8
     822  4448.5      926  4448.6      958  4436.1      983  4435.7     1013  4435.8
    1060  4448.7     1100  4448.9     1200 4450.42

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
**************************************************
       0     .085      926      .05     1060      .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           926    1060           276.25  283.75  276.25             .1       .3

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 4.75*

INPUT
Description:
Station Elevation Data    num=      40
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
**********************************************************************************
       0  4448.2    90.09 4447.13   149.24 4446.93   180.18 4446.82   237.84 4446.74
  268.47  4447.1   270.28 4446.65   298.47 4446.56   360.37 4446.25   447.71  4446.1
  450.46  4446.1   451.36 4446.09   501.81 4445.25   540.55  4445.7   596.95  4445.6
  629.78 4445.58   630.64 4445.57   677.49  4445.5   704.48 4444.62   706.32 4444.56
  720.7[illegible] 4444.51  740.56 4444.88   769.85 4444.66   808.13     4437   859.87     443[illegible]
```

```
  871.44 4433.56  871.87 4433.45  894.34 4433.02  901.25 4432.88  922.32  4433.4
  932.71 4433.25  939.87 4434.53  952.69    4437 1008.13    4437 1050.49 4445.47
 1083.33 4445.83    1112 4446.13    1140 4446.75 1147.33 4447.61    1150 4447.87

Manning's n Values          num= '      5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
**********************************************************************************
       0      .08  769.85      .04  859.87      .05  952.69      .04 1050.49      .08

Bank Sta: Left   Right     Lengths: Left Channel   Right      Coeff Contr.    Expan.
        769.85 1050.49            276.25  283.75  276.25              .1        .3

CROSS SECTION           RIVER: Alpine Creek
REACH: Alpine              RS: 4.5*

INPUT
Description:
Station Elevation Data     num=       39
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
**********************************************************************************
       0  4445.3    80.18 4444.57  132.82 4444.42  160.37 4444.34  211.69 4444.27
  238.95 4444.51  240.55 4444.21  265.65 4444.14  320.74 4443.79  398.47  4443.5
  400.92 4443.49  401.72 4443.49  446.63  4442.8   481.1 4443.01   531.3  4442.8
  560.52 4442.75  561.29 4442.74  602.98 4442.29     627 4441.48  628.64 4441.42
  636.76  4441.3  673.26    4434   771.6    4434  785.24 4430.89  785.73 4430.81
  811.56 4430.25   819.5 4430.05  841.54 4431.03  852.42 4430.69  859.91 4431.39
  881.04 4433.88  881.12    4434  973.26    4434 1013.35 4442.02 1022.22 4442.09
 1055.67 4442.32 1088.33  4443.2 1096.89 4444.84    1100 4445.31

Manning's n Values          num=       5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
**********************************************************************************
       0      .08  636.76      .04   771.6      .05  881.12      .04 1013.35      .08

Bank Sta: Left   Right     Lengths: Left Channel   Right      Coeff Contr.    Expan.
        636.76 1013.35            276.25  283.75  276.25              .1        .3

CROSS SECTION           RIVER: Alpine Creek
REACH: Alpine              RS: 4.25*

INPUT
Description:
Station Elevation Data     num=       40
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
**********************************************************************************
       0  4442.4    70.28    4442  116.41 4441.91  140.55 4441.86  185.53 4441.81
  209.42 4441.92  210.83 4441.76  232.82 4441.72   281.1 4441.34  349.24  4440.9
  351.38 4440.88  352.08 4440.88  391.44 4440.35  421.66 4440.31  465.65    4440
  491.26 4439.92  491.93 4439.91  528.48 4439.08  549.53 4438.33  550.97 4438.27
  562.21 4437.94  574.96 4437.68  613.38    4430   688.8    4430  699.04 4428.21
   699.6 4428.16  728.78 4427.47  737.75 4427.23  760.77 4428.67  772.13 4428.14
  779.96 4428.24  802.02 4429.34  802.35    4430  863.38    4430  903.46 4438.02
  961.11 4438.34  999.33 4438.51 1036.67 4439.65 1046.44 4442.07    1050 4442.75

Manning's n Values          num=       5
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
**********************************************************************************
       0      .08  574.96      .04   688.8      .05  802.35      .04  903.46      .08

Bank Sta: Left   Right     Lengths: Left Channel   Right      Coeff Contr.    Expan.
        574.96  903.46            276.25  283.75  276.25              .1        .3

CROSS SECTION           RIVER: Alpine Creek
REACH: Alpine              RS: 4

INPUT
Description: XS D
```

Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4439.5	100	4439.4	200	4439.3	300	4438.3	400	4437.2
422	4437.1	472.05	4435.19	521.74	4432.75	542.51	4432.7	566.01	4428
594.19	4428	612.84	4425.53	646	4424.7	656	4424.4	680	4426.3
700	4425.1	723	4424.8	724.31	4428	741.01	4428	771.18	4434.03
800	4434.2	900	4434.6	943	4434.7	985	4436.1	996	4439.3
1000	4440.2								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.075	542.51	.04	594.19	.05	724.31	.04	771.18	.08

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
542.51	771.18	281.65	298	281.65	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 3.83333*

INPUT
Description:
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4436.7	1.68	4436.58	75.56	4436.08	92.52	4435.99	142.73	4435.72
167.91	4435.6	185.03	4435.58	277.55	4434.71	335.83	4434.11	364.37	4433.94
370.06	4433.85	390.42	4433.63	436.72	4431.73	455.05	4430.8	482.69	4429.85
485.27	4429.87	491.84	4429.85	516.08	4425	545.86	4425	565.55	4422.48
595.35	4421.63	604.33	4421.33	626.68	4423.15	628.13	4423.09	645.3	4422.45
645.58	4422.45	666.72	4422.42	667.89	4425	691.08	4425	718.48	4430.48
740.21	4430.58	777.6	4430.7	794.63	4431.46	811.67	4431.76	836.77	4432.21
878.29	4432.88	918.85	4434.63	929.47	4437.44	933.33	4438.25		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.075	491.84	.04	545.86	.05	667.89	.04	718.48	.08

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
491.84	718.48	281.65	298	281.65	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 3.66666*

INPUT
Description:
Station Elevation Data num= 31

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4433.9	1.54	4433.67	69.45	4432.75	85.03	4432.58	131.18	4432.1
154.33	4431.88	170.06	4431.85	230.9	4431.32	277.5	4422	497.25	4422
518.26	4419.43	544.69	4418.56	552.67	4418.27	573.36	4420	574.7	4419.97
590.61	4419.79	590.86	4419.8	610.44	4420.04	612.17	4423.35	612.9	4423.33
619.07	4423.24	632	4426.8	680.42	4426.96	716.48	4427.04	732.91	4428.48
749.33	4429.03	773.54	4429.82	813.59	4431.07	852.7	4433.15	862.94	4435.59
866.67	4436.3								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.075	230.9	.04	497.25	.05	632	.08

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
230.9	632	281.65	298	281.65	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 3.5*

INPUT
Description:
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4431.1	1.41	4430.75	63.34	4429.41	73.84	4429.23	125	4419
449.25	4419	449.49	4418.86	470.97	4416.38	494.04	4415.49	501	4415.2
520.04	4416.85	521.28	4416.85	535.91	4417.14	536.15	4417.15	554.16	4417.67
555.75	4420.18	556.43	4420.17	562.1	4420.26	574	4423.25	620.63	4423.34
655.36	4423.38	671.18	4425.51	687	4426.3	710.32	4427.42	748.88	4429.25
786.55	4431.68	796.41	4433.73	800	4434.35				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.075	73.84	.04	449.25	.045	574	.08

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
73.84	574	281.65	298	281.65	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 3.33333*

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4428.3	1.27	4427.83	42.3	4426.54	95	4416	404.44	4416
405.33	4415.27	423.67	4413.33	443.39	4412.42	449.33	4412.13	466.72	4413.71
467.85	4413.74	481.22	4414.48	481.43	4414.5	497.88	4415.29	499.33	4417
499.95	4417.02	505.13	4417.28	516	4419.7	560.85	4419.72	594.24	4419.72
609.45	4422.54	624.67	4423.57	647.09	4425.03	684.17	4427.43	720.4	4430.21
729.88	4431.88	733.33	4432.4						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.075	42.3	.04	404.44	.045	516	.08

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
42.3	516	281.65	298	281.65	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 3.16666*

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4425.5	1.14	4424.92	38.56	4423.29	90	4413	360.04	4413
361.16	4411.69	376.38	4410.28	392.74	4409.35	397.67	4409.07	413.41	4410.56
414.43	4410.62	426.52	4411.83	426.72	4411.85	441.61	4412.91	442.92	4413.83
443.48	4413.86	448.16	4414.29	458	4416.15	501.06	4416.1	533.12	4416.06
547.73	4419.57	562.33	4420.83	583.86	4422.64	619.47	4425.61	654.25	4428.73
663.35	4430.02	666.67	4430.45						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.075	38.56	.04	360.04	.045	458	.08

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

```
        38.56     458          281.65     298  281.65            .1       .3

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 3

INPUT
Description: XS C
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0  4422.7       1    4422      45  4419.4      85  4417.6     100    4417
   105.1 4416.98     140    4410  315.88    4410     317  4408.1     346    4406
     361  4407.5     372  4409.2     387  4410.7     400  4412.6     472  4412.4
     486  4416.6     500  4418.1     600  4428.5

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************************
       0    .075   105.1     .04  315.88    .045     400     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         105.1     400               35      40      35             .3       .5

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 2.5

INPUT
Description: Additional XS for bridge copied from sta. 2
Station Elevation Data    num=      27
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
    -450  4429.3       0  4422.9      70  4421.2      71  4420.6     100    4420
     200  4420.3     294  4421.7     294  4418.9     306  4415.5     313  4414.2
     314  4410.1     320  4408.1     328  4406.2     335  4405.5     346  4406.6
     351  4406.3     358  4405.4     366  4406.4     372  4409.1     376  4411.5
     380  4412.6     386  4413.8     400  4419.1     400  4423.8     500  4426.3
     582  4432.4     600  4433.3

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
    -450     .09     294    .045     400    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          294     400               50      50      50             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev
************************
    -450     294  4421.7

BRIDGE                 RIVER: Alpine Creek
REACH: Alpine             RS: 2.3

INPUT
Description: Hendrix St. Bridge
Distance from Upstream XS =      10
Deck/Roadway Width        =      35
Weir Coefficient          =     2.6
Bridge Deck/Roadway Skew  =
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************
     294  4421.7  4420.3     400  4423.8  4422.6

Upstream Bridge Cross Section Data
Static  levation Data    num=      27
```

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
450	4429.3	0	4422.9	70	4421.2	71	4420.6	100	4420
200	4420.3	294	4421.7	294	4418.9	306	4415.5	313	4414.2
314	4410.1	320	4408.1	328	4406.2	335	4405.5	346	4406.6
351	4406.3	358	4405.4	366	4406.4	372	4409.1	376	4411.5
380	4412.6	386	4413.8	400	4419.1	400	4423.8	500	4426.3
582	4432.4	600	4433.3						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-450	.09	294	.045	400	.075

Bank Sta: Left Right Coeff Contr. Expan.
294 400 .3 .5

Ineffective Flow num= 1

Sta L	Sta R	Elev
-450	294	4421.7

Downstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
294	4421.7	4420.3	400	4423.8	4422.6

Downstream Bridge Cross Section Data
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-450	4429.3	0	4422.9	70	4421.2	71	4420.6	100	4420
200	4420.3	294	4421.7	294	4418.9	306	4415.5	313	4414.2
314	4410.1	320	4408.1	328	4406.2	335	4405.5	346	4406.6
351	4406.3	358	4405.4	366	4406.4	372	4409.1	376	4411.5
380	4412.6	386	4413.8	400	4419.1	400	4423.8	500	4426.3
582	4432.4	600	4433.3						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-450	.09	294	.045	400	.075

Bank Sta: Left Right Coeff Contr. Expan.
294 400 .3 .5

Ineffective Flow num= 1

Sta L	Sta R	Elev
-450	294	4421.7

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 4421.7
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Piers = 3

Pier Data
Pier Station Upstream= 320 Downstream= 320
Upstream num= 2

Width	Elev	Width	Elev
2	4400	2	4421.5

Downstream num= 2

```
    Width   Elev    Width   Elev
*********************************
       2    4400       2  4421.5

Pier Data
Pier Station     Upstream=     351    Downstream=     351
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
       2    4400       2    4422
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
       2    4400       2    4422

Pier Data
Pier Station     Upstream=     380    Downstream=     380
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
       2    4400       2    4423
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
       2    4400       2    4423

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =    1.2
       Yarnell                KVal =     .9
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

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

CROSS SECTION          RIVER: Alpine Creek
REACH: Alpine             RS: 2

INPUT
Description: XS B -- Hendrix
Station Elevation Data    num=      27
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
    -450  4429.3       0  4422.9      70  4421.2      71  4420.6     100    4420
     200  4420.3     294  4421.7     294  4418.9     306  4415.5     313  4414.2
     314  4410.1     320  4408.1     328  4406.2     335  4405.5     346  4406.6
     351  4406.3     358  4405.4     366  4406.4     372  4409.1     376  4411.5
     380  4412.6     386  4413.8     400  4419.1     400  4423.8     500  4426.3
     582  4432.4     600  4433.3

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
    -450     .09     294    .045     400    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          294     400           109.33  128.33  109.33             .3       .5
Ineffe    e Flow     num=       1
```

Sta L	Sta R	Elev
-450	294	4421.7

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 1.66666*

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-300	4426.07	-244.5	4425.32	-153.94	4423.53	-7.88	4420.93	88.52	4420.07
88.71	4420.06	98.75	4419.65	113.35	4417.4	138.18	4416.74	149.18	4416.5
150.04	4416.1	175.09	4415.62	261.47	4415.54	284.24	4415.73	342.67	4416.63
342.67	4414.77	351.67	4411.82	356.92	4410.55	357.67	4407.76	360.67	4406.64
362.17	4406.18	368.17	4404.83	373.42	4404.3	381.67	4404.92	385.42	4404.67
390.67	4404	397.97	4404.8	403.44	4406.7	407.1	4408.36	409.22	4408.83
410.75	4409.33	416.22	4410.83	429	4416	429	4419.13	439.68	4419.39
521.86	4420.58	537.47	4420.78	541.17	4420.84	570.34	4422.22	587.59	4424.12
604.03	4425.01	633.14	4426.71	653.33	4427.6				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-300	.09	342.67	.045	429	.075

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
342.67	429	109.33	128.33	109.33	.3	.5

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 1.33333*

INPUT
Description:
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-150	4422.83	-103.25	4422.26	-26.97	4420.17	96.06	4417.36	177.26	4417.23
177.42	4417.22	185.87	4416.67	198.18	4412.6	219.09	4411.97	228.35	4411.8
229.08	4411.59	250.18	4411.23	322.94	4410.78	342.12	4410.76	391.33	4411.57
391.33	4410.63	397.33	4408.13	400.83	4406.9	401.33	4405.42	403.33	4404.52
404.33	4404.26	408.33	4403.47	411.83	4403.09	417.33	4403.24	419.83	4403.04
423.33	4402.6	429.94	4403.2	434.89	4404.29	438.19	4405.22	440.11	4405.51
441.49	4406.06	446.44	4407.86	458	4412.9	458	4414.47	469.84	4414.75
560.93	4415.29	578.23	4415.34	582.33	4415.39	614.67	4416.21	633.8	4418.86
652.01	4419.56	684.29	4421.03	706.67	4421.9				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-150	.09	391.33	.045	458	.075

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
391.33	458	109.33	128.33	109.33	.1	.3

CROSS SECTION RIVER: Alpine Creek
REACH: Alpine RS: 1

INPUT
Description: XS A
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4419.6	38	4419.2	100	4416.8	200	4413.8	266	4414.4
273	4413.7	283	4407.8	300	4407.2	400	4405.8	440	4406.5
446	4402.4	456	4401.2	471	4402.2	487	4409.8	500	4410.1

*Alpine	*	11.5666*	* .135*	.045*	.025*	.05*	.025*	.045*	.15*	*	*
*Alpine	*	11.5	* .135*	.045*	.025*	.05*	.025*	.045*	.15*	*	*
*Alpine	*	11.4666*	* .13*	.045*	.025*	.05*	.025*	.045*	.13*	*	*
*Alpine	*	11.4333*	* .13*	.045*	.025*	.05*	.025*	.045*	.13*	*	*
*Alpine	*	11.4	* .13*	.045*	.025*	.05*	.025*	.045*	.13*	*	*
*Alpine	*	11.3	*Bridge *	*	*	*	*	*	*	*	*
*Alpine	*	11	* .13*	.045*	.025*	.05*	.025*	.045*	.13*	*	*
*Alpine	*	10.6666*	* .13*	.045*	.025*	.05*	.025*	.045*	.13*	*	*
*Alpine	*	10.3333*	* .13*	.045*	.025*	.05*	.025*	.045*	.13*	*	*
*Alpine	*	10	* .13*	.045*	.025*	.05*	.025*	.045*	.13*	*	*
*Alpine	*	9.9*	* .13*	.045*	.025*	.05*	.025*	.045*	.13*	*	*
*Alpine	*	9.8*	* .1*	.045*	.025*	.05*	.025*	.045*	.13*	*	*
*Alpine	*	9.75	* .1*	.045*	.025*	.05*	.025*	.045*	.13*	*	*
*Alpine	*	9.73	*Bridge *	*	*	*	*	*	*	*	*
*Alpine	*	9.7	* .1*	.045*	.025*	.05*	.025*	.045*	.13*	*	*
*Alpine	*	9.63333*	* .1*	.045*	.025*	.05*	.025*	.045*	.13*	*	*
*Alpine	*	9.56666*	* .1*	.05*	.025*	.05*	.025*	.05*	.13*	*	*
*Alpine	*	9.5	* .1*	.05*	.025*	.05*	.025*	.05*	.13*	*	*
*Alpine	*	9.3	*Bridge *	*	*	*	*	*	*	*	*
*Alpine	*	9	* .1*	.05*	.025*	.05*	.025*	.05*	.13*	*	*
*Alpine	*	8.66666*	* .1*	.05*	.025*	.05*	.025*	.05*	.13*	*	*
*Alpine	*	8.33333*	* .1*	.05*	.025*	.05*	.025*	.05*	.13*	*	*
*Alpine	*	8	* .1*	.05*	.025*	.05*	.025*	.05*	.13*	*	*
*Alpine	*	7.95	*Bridge *	*	*	*	*	*	*	*	*
*Alpine	*	7.9	* .1*	.05*	.025*	.05*	.025*	.05*	.13*	*	*
*Alpine	*	7.8*	* .1*	.05*	.025*	.05*	.025*	.05*	.13*	*	*
*Alpine	*	7.6*	* .1*	.05*	.025*	.05*	.025*	.05*	.13*	*	*
*Alpine	*	7.4*	* .12*	.05*	.025*	.05*	.025*	.05*	.95*	*	*
*Alpine	*	7.2*	* .12*	.05*	.025*	.05*	.025*	.05*	.95*	*	*
*Alpine	*	7	* .12*	.05*	.025*	.05*	.025*	.05*	.095*	*	*
*Alpine	*	6.7	*Bridge *	*	*	*	*	*	*	*	*
*Alpine	*	6.5	* .12*	.05*	.025*	.05*	.025*	.05*	.095*	*	*
*Alpine	*	6.375*	* .09*	.05*	.025*	.05*	.025*	.05*	.09*	*	*
*Alpine	*	6.25*	* .09*	.05*	.025*	.05*	.025*	.05*	.09*	*	*
*Alpine	*	6.125*	* .09*	.05*	.025*	.05*	.025*	.05*	.085*	*	*
*Alpine	*	6	* .09*	.05*	.025*	.05*	.025*	.05*	.085*	*	*
*Alpine	*	5.75	*Bridge *	*	*	*	*	*	*	*	*
*Alpine	*	5.66	* .085*	.05*	.025*	.05*	.025*	.05*	.08*	*	*
*Alpine	*	5.49	* .085*	.05*	.025*	.05*	.025*	.05*	.08*	.08*	*
*Alpine	*	5.33	* .085*	.05*	.08*	*	*	*	*	*	*
*Alpine	*	5	* .085*	.05*	.08*	*	*	*	*	*	*
*Alpine	*	4.75*	* .08*	.04*	.05*	.04*	.08*	*	*	*	*
*Alpine	*	4.5*	* .08*	.04*	.05*	.04*	.08*	*	*	*	*
*Alpine	*	4.25*	* .08*	.04*	.05*	.04*	.08*	*	*	*	*
*Alpine	*	4	* .075*	.04*	.05*	.04*	.08*	*	*	*	*
*Alpine	*	3.83333*	* .075*	.04*	.05*	.04*	.08*	*	*	*	*
*Alpine	*	3.66666*	* .075*	.04*	.05*	.08*	*	*	*	*	*
*Alpine	*	3.5*	* .075*	.04*	.045*	.08*	*	*	*	*	*
*Alpine	*	3.33333*	* .075*	.04*	.045*	.08*	*	*	*	*	*
*Alpine	*	3.16666*	* .075*	.04*	.045*	.08*	*	*	*	*	*
*Alpine	*	3	* .075*	.04*	.045*	.08*	*	*	*	*	*
*Alpine	*	2.5	* .09*	.045*	.075*	*	*	*	*	*	*
*Alpine	*	2.3	*Bridge *	*	*	*	*	*	*	*	*
*Alpine	*	2	* .09*	.045*	.075*	*	*	*	*	*	*
*Alpine	*	1.66666*	* .09*	.045*	.075*	*	*	*	*	*	*
*Alpine	*	1.33333*	* .09*	.045*	.075*	*	*	*	*	*	*
*Alpine	*	1	* .09*	.045*	.075*	*	*	*	*	*	*

SUMMARY OF REACH LENGTHS

River: Alpine Creek

Reach	River Sta.	Left	Channel	Right

*Alpine	*	19	*	403.99*	486*	403.99*
*Alpine	*	18.8*	*	403.99*	486*	403.99*
*Alpine	*	18.6*	*	403.99*	486*	403.99*
*Alpine	*	18.4*	*	403.99*	486*	403.99*
*Alpine	*	18.2*	*	403.99*	486*	403.99*
*Alpine	*	18	*	130.74*	140*	130.74*
*Alpine	*	17.8842*	*	130.74*	140*	130.74*
*Alpine	*	17.7685*	*	130.74*	140*	130.74*
*Alpine	*	17.6528*	*	130.74*	140*	130.74*
*Alpine	*	17.5371*	*	130.74*	140*	130.74*
*Alpine	*	17.4214	*	60*	60*	60*
*Alpine	*	17.3	*Bridge	*	*	*
*Alpine	*	17.2	*	104.07*	112.5*	104.07*
*Alpine	*	17.15*	*	104.07*	112.5*	104.07*
*Alpine	*	17.1*	*	104.07*	112.5*	104.07*
*Alpine	*	17.05*	*	104.07*	112.5*	104.07*
*Alpine	*	17	*	60*	60*	60*
*Alpine	*	16.7	*Bridge	*	*	*
*Alpine	*	16.5	*	129.04*	150*	129.04*
*Alpine	*	16.25*	*	129.04*	150*	129.04*
*Alpine	*	16.*	*	129.04*	150*	129.04*
*Alpine	*	15.75*	*	79.04*	90*	79.04*
*Alpine	*	15.6	*	50*	60*	50*
*Alpine	*	15.55	*Bridge	*	*	*
*Alpine	*	15.5	*	94.63*	110*	94.63*
*Alpine	*	15.3333*	*	94.63*	110*	94.63*
*Alpine	*	15.1666*	*	54.63*	50*	54.63*
*Alpine	*	15.1	*	40*	60*	40*
*Alpine	*	15.05	*Bridge	*	*	*
*Alpine	*	15	*	63.33*	63.33*	63.33*
*Alpine	*	14.8333*	*	63.33*	63.33*	63.33*
*Alpine	*	14.6666*	*	63.33*	63.33*	63.33*
*Alpine	*	14.5	*	30*	30*	30*
*Alpine	*	14.3	*Bridge	*	*	*
*Alpine	*	14	*	45*	45*	45*
*Alpine	*	13.75*	*	45*	45*	45*
*Alpine	*	13.5	*	45*	45*	45*
*Alpine	*	13.25*	*	45*	45*	45*
*Alpine	*	13	*	60*	60*	60*
*Alpine	*	12.9	*Culvert	*	*	*
*Alpine	*	12.7	*	75*	75*	75*
*Alpine	*	12.6333*	*	75*	75*	75*
*Alpine	*	12.5666*	*	75*	75*	75*
*Alpine	*	12.5	*	50*	50*	50*
*Alpine	*	12	*	60*	60*	60*
*Alpine	*	11.9	*Bridge	*	*	*
*Alpine	*	11.7	*	80*	126.67*	80*
*Alpine	*	11.6333*	*	80*	126.67*	80*
*Alpine	*	11.5666*	*	80*	126.67*	80*
*Alpine	*	11.5	*	53.33*	53.33*	53.33*
*Alpine	*	11.4666*	*	53.33*	53.33*	53.33*
*Alpine	*	11.4333*	*	53.33*	53.33*	53.33*
*Alpine	*	11.4	*	50*	50*	50*
*Alpine	*	11.3	*Bridge	*	*	*
*Alpine	*	11	*	106.67*	106.67*	106.67*
*Alpine	*	10.6666*	*	106.67*	106.67*	106.67*
*Alpine	*	10.3333*	*	106.67*	106.67*	106.67*
*Alpine	*	10	*	109.17*	120.83*	109.17*
*Alpine	*	9.9*	*	109.17*	120.83*	109.17*
*Alpine	*	9.8*	*	69.17*	60.83*	69.17*
*Alpine	*	9.75	*	40*	60*	40*
*Alpine	*	9.73	*Bridge	*	*	*
*Alpine	*	9.7	*	109.17*	120.83*	109.17*
*Alpine	*	9.63333*	*	109.17*	120.83*	109.17*
*Alpine	*	9.56666*	*	109.17*	120.83*	109.17*
*Alpine	*	9.5	*	70*	70*	70*
*Alpir	*	9.3	*Bridge	*	*	*

*Alpine	9	83.33*	87.33*	83.33*
*Alpine	8.66666*	83.33*	87.33*	83.33*
*Alpine	8.33333*	83.33*	87.33*	83.33*
*Alpine	8	60*	60*	60*
*Alpine	7.95	*Bridge	*	*
*Alpine	7.9	83*	83*	83*
*Alpine	7.8*	143*	143*	143*
*Alpine	7.6*	143*	143*	143*
*Alpine	7.4*	143*	143*	143*
*Alpine	7.2*	143*	143*	143*
*Alpine	7	60*	60*	60*
*Alpine	6.7	*Bridge	*	*
*Alpine	6.5	141.25*	143.75*	141.25*
*Alpine	6.375*	141.25*	143.75*	141.25*
*Alpine	6.25*	141.25*	143.75*	141.25*
*Alpine	6.125*	141.25*	143.75*	141.25*
*Alpine	6	110*	100*	110*
*Alpine	5.75	*Bridge	*	*
*Alpine	5.66	55*	50*	55*
*Alpine	5.49	55*	50*	55*
*Alpine	5.33	110*	100*	110*
*Alpine	5	276.25*	283.75*	276.25*
*Alpine	4.75*	276.25*	283.75*	276.25*
*Alpine	4.5*	276.25*	283.75*	276.25*
*Alpine	4.25*	276.25*	283.75*	276.25*
*Alpine	4	281.65*	298*	281.65*
*Alpine	3.83333*	281.65*	298*	281.65*
*Alpine	3.66666*	281.65*	298*	281.65*
*Alpine	3.5*	281.65*	298*	281.65*
*Alpine	3.33333*	281.65*	298*	281.65*
*Alpine	3.16666*	281.65*	298*	281.65*
*Alpine	3	35*	40*	35*
*Alpine	2.5	50*	50*	50*
*Alpine	2.3	*Bridge	*	*
*Alpine	2	109.33*	128.33*	109.33*
*Alpine	1.66666*	109.33*	128.33*	109.33*
*Alpine	1.33333*	109.33*	128.33*	109.33*
*Alpine	1	*	*	*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Alpine Creek

Reach	River Sta.	Contr.	Expan.
*Alpine	19	.1*	.3*
*Alpine	18.8*	.1*	.3*
*Alpine	18.6*	.1*	.3*
*Alpine	18.4*	.1*	.3*
*Alpine	18.2*	.1*	.3*
*Alpine	18	.1*	.3*
*Alpine	17.8842**	.1*	.3*
*Alpine	17.7685**	.1*	.3*
*Alpine	17.6528**	.1*	.3*
*Alpine	17.5371**	.3*	.5*
*Alpine	17.4214 *	.3*	.5*
*Alpine	17.3 *Bridge	*	*
*Alpine	17.2	.3*	.5*
*Alpine	17.15*	.3*	.5*
*Alpine	17.1*	.1*	.3*
*Alpine	17.05*	.3*	.5*
*Alpine	17	.3*	.5*
*Alpine	16.7 *Bridge	*	*
*Alpine	16.5	.3*	.5*

*Alpine	*	16.25*	*	.3*	.5*
*Alpine	*	16.*	*	.1*	.3*
*Alpine	*	15.75*	*	.3*	.5*
*Alpine	*	15.6	*	.3*	.5*
*Alpine	*	15.55	*Bridge	*	*
*Alpine	*	15.5	*	.3*	.5*
*Alpine	*	15.3333**		.3*	.5*
*Alpine	*	15.1666**		.3*	.5*
*Alpine	*	15.1	*	.3*	.5*
*Alpine	*	15.05	*Bridge	*	*
*Alpine	*	15	*	.3*	.5*
*Alpine	*	14.8333**		.3*	.5*
*Alpine	*	14.6666**		.3*	.5*
*Alpine	*	14.5	*	.3*	.5*
*Alpine	*	14.3	*Bridge	*	*
*Alpine	*	14	*	.3*	.5*
*Alpine	*	13.75*	*	.3*	.5*
*Alpine	*	13.5	*	.1*	.3*
*Alpine	*	13.25*	*	.3*	.5*
*Alpine	*	13	*	.3*	.5*
*Alpine	*	12.9	*Culvert	*	*
*Alpine	*	12.7	*	.3*	.5*
*Alpine	*	12.6333**		.3*	.5*
*Alpine	*	12.5666**		.1*	.3*
*Alpine	*	12.5	*	.3*	.5*
*Alpine	*	12	*	.3*	.5*
*Alpine	*	11.9	*Bridge	*	*
*Alpine	*	11.7	*	.3*	.5*
*Alpine	*	11.6333**		.3*	.5*
*Alpine	*	11.5666**		.1*	.3*
*Alpine	*	11.5	*	.1*	.3*
*Alpine	*	11.4666**		.1*	.3*
*Alpine	*	11.4333**		.3*	.5*
*Alpine	*	11.4	*	.3*	.5*
*Alpine	*	11.3	*Bridge	*	*
*Alpine	*	11	*	.3*	.5*
*Alpine	*	10.6666**		.3*	.5*
*Alpine	*	10.3333**		.1*	.3*
*Alpine	*	10	*	.1*	.3*
*Alpine	*	9.9*	*	.1*	.3*
*Alpine	*	9.8*	*	.3*	.5*
*Alpine	*	9.75	*	.3*	.5*
*Alpine	*	9.73	*Bridge	*	*
*Alpine	*	9.7	*	.3*	.5*
*Alpine	*	9.63333**		.3*	.5*
*Alpine	*	9.56666**		.3*	.5*
*Alpine	*	9.5	*	.3*	.5*
*Alpine	*	9.3	*Bridge	*	*
*Alpine	*	9	*	.3*	.5*
*Alpine	*	8.66666**		.3*	.5*
*Alpine	*	8.33333**		.3*	.5*
*Alpine	*	8	*	.3*	.5*
*Alpine	*	7.95	*Bridge	*	*
*Alpine	*	7.9	*	.3*	.5*
*Alpine	*	7.8*	*	.3*	.5*
*Alpine	*	7.6*	*	.1*	.3*
*Alpine	*	7.4*	*	.1*	.3*
*Alpine	*	7.2*	*	.3*	.5*
*Alpine	*	7	*	.3*	.5*
*Alpine	*	6.7	*Bridge	*	*
*Alpine	*	6.5	*	.3*	.5*
*Alpine	*	6.375*	*	.3*	.5*
*Alpine	*	6.25*	*	.1*	.3*
*Alpine	*	6.125*	*	.3*	.5*
*Alpine	*	6	*	.3*	.5*
*Alpine	*	5.75	*Bridge	*	*
*Alpir	*	5.66	*	.3*	.5*

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*Alpine          *    5.49     *        .3*        .5*
*Alpine          *    5.33     *        .1*        .3*
*Alpine          *    5        *        .1*        .3*
*Alpine          *    4.75*    *        .1*        .3*
*Alpine          *    4.5*     *        .1*        .3*
*Alpine          *    4.25*    *        .1*        .3*
*Alpine          *    4        *        .1*        .3*
*Alpine          *    3.83333**         .1*        .3*
*Alpine          *    3.66666**         .1*        .3*
*Alpine          *    3.5*     *        .1*        .3*
*Alpine          *    3.33333**         .1*        .3*
*Alpine          *    3.16666**         .1*        .3*
*Alpine          *    3        *        .3*        .5*
*Alpine          *    2.5      *        .3*        .5*
*Alpine          *    2.3      *Bridge   *          *
*Alpine          *    2        *        .3*        .5*
*Alpine          *    1.66666**         .3*        .5*
*Alpine          *    1.33333**         .1*        .3*
*Alpine          *    1        *        .1*        .3*
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Appendix C
Hydraulic Model Output

HEC-RAS Plan: Revised FIS River: Alpine Creek Reach: Alpine

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	1	2yr		448.00			5.81			1.47		4404.48	4403.86	4405.00	32.84	0.67
Alpine	1	5yr	167.82	1552.18		1.47	8.63		0.53	2.67		4407.22	4407.11	4408.26	181.99	0.73
Alpine	1	10yr	1214.13	2666.87		3.08	10.32		1.61	3.49		4409.02	4408.80	4410.20	204.43	0.76
Alpine	1	25yr	2369.28	3636.89	28.83	4.00	11.52	0.75	2.38	4.11	0.15	4410.26	4409.74	4411.59	380.51	0.78
Alpine	1	50yr	3195.85	4324.30	324.85	4.50	12.34	1.95	2.84	4.56	0.61	4410.99	4410.79	4412.42	386.29	0.80
Alpine	1	100yr	4596.94	5426.79	1158.27	5.17	13.51	3.19	3.50	5.22	1.29	4412.08	4411.77	4413.64	394.87	0.81
Alpine	1	500yr	7322.23	7477.60	3275.17	6.15	15.35	4.62	4.19	6.32	2.25	4413.90	4413.32	4415.71	434.96	0.84
Alpine	1.33333*	2yr		445.00			5.14			1.18		4405.84		4406.25	39.75	0.61
Alpine	1.33333*	5yr		1687.00			8.08			2.39		4408.55		4409.56	51.70	0.71
Alpine	1.33333*	10yr		3895.00			12.85			5.60		4410.24	4410.24	4412.81	59.65	1.01
Alpine	1.33333*	25yr	522.62	5112.38		2.01	11.31		0.83	3.95		4412.60	4412.60	4414.41	259.08	0.76
Alpine	1.33333*	50yr	1377.60	6532.40		2.97	12.53		1.52	4.65		4413.64	4413.64	4415.68	262.97	0.79
Alpine	1.33333*	100yr	2808.12	8530.18	1.70	4.01	14.20	0.52	2.43	5.72	0.09	4414.83	4414.83	4417.25	292.58	0.83
Alpine	1.33333*	500yr	5756.68	11878.42	659.90	5.33	16.37	2.77	3.75	7.14	1.07	4416.71	4416.71	4419.55	432.96	0.87
Alpine	1.66666*	2yr		445.00			4.87			1.08		4407.01		4407.38	44.46	0.60
Alpine	1.66666*	5yr		1687.00			7.08			1.80		4409.93		4410.71	55.86	0.60
Alpine	1.66666*	10yr		3895.00			8.30			2.19		4413.45		4414.51	75.98	0.59
Alpine	1.66666*	25yr		5635.00			11.30			4.02		4413.82		4415.81	78.06	0.79
Alpine	1.66666*	50yr		7910.00			13.88			5.92		4414.71		4417.70	82.97	0.93
Alpine	1.66666*	100yr	640.68	10699.32		2.02	13.42		0.84	5.08		4417.36	4417.36	4420.01	314.31	0.78
Alpine	1.66666*	500yr	3137.33	15154.26	3.40	3.72	15.31	0.67	2.09	6.18	0.12	4419.60	4419.60	4422.65	354.81	0.80
Alpine	2	2yr		445.00			4.73			1.04		4408.17	4407.57	4408.52	50.14	0.61
Alpine	2	5yr		1687.00			6.75			1.66		4410.92	4409.61	4411.62	61.23	0.59
Alpine	2	10yr		3895.00			8.26			2.16		4414.22	4411.88	4415.28	74.21	0.58
Alpine	2	25yr		5635.00			9.64			2.86		4415.64	4413.38	4417.08	85.36	0.65
Alpine	2	50yr		7910.00			10.21			3.06		4417.71	4415.09	4419.33	98.13	0.64
Alpine	2	100yr		11340.00			13.09			4.94		4418.62	4417.14	4421.28	103.75	0.80
Alpine	2	500yr		18295.00			17.65			8.59		4420.23	4420.15	4425.06	192.15	0.99
Alpine	2.3		Bridge													
Alpine	2.5	2yr		445.00			3.63			0.57		4408.72	4407.57	4408.93	53.03	0.42
Alpine	2.5	5yr		1687.00			5.71			1.14		4411.65	4409.59	4412.16	62.92	0.46
Alpine	2.5	10yr		3895.00			7.18			1.60		4415.14	4411.88	4415.94	81.58	0.49
Alpine	2.5	25yr		5635.00			8.02			1.92		4416.96	4413.38	4417.95	93.47	0.52
Alpine	2.5	50yr		7910.00			8.66			2.14		4419.07	4415.09	4420.23	105.92	0.52
Alpine	2.5	100yr		11340.00			9.93			2.65		4421.22	4417.14	4422.75	208.39	0.53
Alpine	2.5	500yr	3377.08	14822.47	95.45	1.84	9.00	1.00	0.51	1.94	0.16	4425.98	4420.15	4427.01	704.05	0.40
Alpine	3	2yr		445.00			4.84			1.12		4408.89		4409.25	53.46	0.65
Alpine	3	5yr		1687.00			5.82			1.27		4411.83		4412.36	79.95	0.54
Alpine	3	10yr	50.04	3388.72	456.24	0.83	5.33	1.79	0.11	0.87	0.40	4415.78		4416.17	243.53	0.36

HEC-RAS Plan: Revised FIS River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	3	25yr	383.09	4398.21	853.69	1.04	5.30	1.93	0.15	0.78	0.41	4417.89		4418.24	419.53	0.31
Alpine	3	50yr	1382.82	5232.22	1294.97	1.40	4.98	1.83	0.21	0.64	0.34	4420.30		4420.57	491.42	0.26
Alpine	3	100yr	2985.06	6410.41	1944.53	1.68	4.95	1.83	0.25	0.59	0.31	4422.96		4423.20	546.73	0.23
Alpine	3	500yr	6354.02	8613.20	3327.77	2.09	5.15	1.91	0.33	0.58	0.31	4427.06		4427.29	586.17	0.21
Alpine	3.16666*	2yr		445.00			4.25			0.89		4411.91		4412.20	66.65	0.60
Alpine	3.16666*	5yr		1687.00			6.54			1.70		4413.87		4414.54	84.31	0.66
Alpine	3.16666*	10yr		3876.71	18.29		7.76	0.73		2.05	0.14	4416.44		4417.37	178.39	0.62
Alpine	3.16666*	25yr	19.20	5268.24	347.56	0.92	7.64	2.03	0.16	1.82	0.59	4418.25		4419.10	229.17	0.53
Alpine	3.16666*	50yr	321.32	6717.99	870.69	1.57	7.25	2.36	0.21	1.49	0.66	4420.44		4421.14	379.13	0.44
Alpine	3.16666*	100yr	1537.81	8251.14	1551.05	1.71	6.82	2.32	0.33	1.20	0.56	4423.05		4423.60	544.84	0.36
Alpine	3.16666*	500yr	5003.17	10413.92	2877.91	2.18	6.30	2.20	0.41	0.92	0.45	4427.16		4427.54	636.75	0.28
Alpine	3.33333*	2yr		445.00			4.13			0.88		4414.81		4415.07	78.09	0.62
Alpine	3.33333*	5yr		1687.00			6.19			1.55		4416.60		4417.20	95.29	0.65
Alpine	3.33333*	10yr		3895.00			8.05			2.28		4418.65		4419.66	110.08	0.68
Alpine	3.33333*	25yr		5632.76	2.24		9.16	0.34		2.80	0.05	4419.80		4421.10	197.15	0.71
Alpine	3.33333*	50yr	11.47	7637.70	260.83	0.83	9.66	2.07	0.11	2.91	0.68	4421.25		4422.65	269.51	0.67
Alpine	3.33333*	100yr	376.53	10064.36	899.10	2.08	9.55	2.77	0.56	2.58	0.95	4423.37		4424.63	330.26	0.58
Alpine	3.33333*	500yr	2826.29	13149.14	2319.57	2.21	8.54	2.72	0.52	1.82	0.77	4427.27		4428.11	662.69	0.43
Alpine	3.5*	2yr		445.00			3.71			0.73		4417.77		4417.98	95.29	0.58
Alpine	3.5*	5yr		1687.00			6.02			1.51		4419.34		4419.90	106.56	0.65
Alpine	3.5*	10yr		3895.00			7.80			2.19		4421.27		4422.22	120.85	0.68
Alpine	3.5*	25yr		5635.00			8.66			2.52		4422.49		4423.65	129.63	0.68
Alpine	3.5*	50yr		7894.08	15.92		9.88	0.72		3.14	0.15	4423.59		4425.10	221.01	0.72
Alpine	3.5*	100yr	76.94	10961.44	301.63	1.52	11.21	2.25	0.41	3.79	0.81	4424.87		4426.76	301.62	0.75
Alpine	3.5*	500yr	756.19	16125.99	1412.82	2.20	11.85	3.20	0.65	3.80	1.26	4427.60		4429.53	491.07	0.67
Alpine	3.66666*	2yr		445.00			3.44			0.78		4420.67		4420.86	102.68	0.54
Alpine	3.66666*	5yr		1687.00			5.53			1.58		4422.28		4422.75	116.64	0.60
Alpine	3.66666*	10yr		3895.00			7.28			2.37		4424.13		4424.95	132.97	0.64
Alpine	3.66666*	25yr		5635.00			8.19			2.82		4425.25		4426.29	141.30	0.65
Alpine	3.66666*	50yr		7910.00			8.97			3.20		4426.56		4427.81	153.63	0.66
Alpine	3.66666*	100yr	79.51	11119.22	141.28	1.57	10.21	1.66	0.43	3.89	0.52	4427.89		4429.48	317.58	0.68
Alpine	3.66666*	500yr	642.48	16770.85	881.66	3.03	12.13	2.97	1.16	5.07	1.25	4429.76		4431.87	403.82	0.72
Alpine	3.83333*	2yr		445.00			3.27			0.71		4423.56		4423.72	110.10	0.52
Alpine	3.83333*	5yr		1687.00			5.30			1.45		4425.12		4425.56	123.05	0.58
Alpine	3.83333*	10yr		3895.00			6.88			2.14		4426.99		4427.73	144.71	0.61
Alpine	3.83333*	25yr		5635.00			7.73			2.53		4428.08		4429.01	153.74	0.63
Alpine	3.83333*	50yr		7910.00			8.52			2.91		4429.33		4430.46	166.24	0.64
Alpine	3.83333*	100yr	56.84	11276.63	6.53	1.42	9.71	0.50	0.37	3.56	0.08	4430.69		4432.15	315.66	0.66
Alpine	3.83333*	500yr	553.75	17193.28	547.97	2.83	11.49	2.20	1.03	4.58	0.78	4432.63		4434.56	448.13	0.69

HEC-RAS Plan: Revised EIS River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	4	2yr		445.00			3.24			0.71		4426.40		4426.56	117.40	0.53
Alpine	4	5yr		1687.00			5.24			1.44		4427.90		4428.32	129.30	0.59
Alpine	4	10yr		3895.00			6.78			2.11		4429.73		4430.44	153.52	0.62
Alpine	4	25yr		5635.00			7.61			2.50		4430.77		4431.67	164.77	0.63
Alpine	4	50yr		7910.00			8.38			2.87		4431.96		4433.05	177.51	0.64
Alpine	4	100yr	36.52	11303.48		1.27	9.40		0.31	3.39		4433.37		4434.74	237.19	0.65
Alpine	4	500yr	444.52	17557.90	292.58	2.76	11.23	1.59	0.99	4.44	0.48	4435.28		4437.16	490.80	0.69
Alpine	4.25*	2yr		430.00			3.41			0.78		4429.30		4429.48	108.45	0.56
Alpine	4.25*	5yr		1688.00			5.76			1.74		4430.77		4431.28	118.34	0.64
Alpine	4.25*	10yr		3624.00			7.32			2.43		4432.41		4433.24	128.54	0.66
Alpine	4.25*	25yr		5657.00			8.75			3.30		4433.53		4434.72	144.07	0.73
Alpine	4.25*	50yr		7379.00			9.21			3.48		4434.57		4435.89	153.40	0.71
Alpine	4.25*	100yr		10490.00			10.32			4.14		4435.92		4437.57	165.53	0.73
Alpine	4.25*	500yr	124.18	16577.11	1.71	1.80	12.36	0.45	0.62	5.52	0.08	4437.81	4436.69	4440.16	294.12	0.79
Alpine	4.5*	2yr		430.00			3.57			0.81		4432.13		4432.33	86.37	0.53
Alpine	4.5*	5yr		1688.00			5.84			1.74		4433.86		4434.39	108.68	0.63
Alpine	4.5*	10yr		3624.00			7.86			2.78		4435.38		4436.34	116.55	0.70
Alpine	4.5*	25yr		5657.00			9.04			3.41		4436.75		4438.02	125.50	0.71
Alpine	4.5*	50yr		7379.00			9.93			3.98		4437.65		4439.18	136.03	0.75
Alpine	4.5*	100yr		10490.00			11.20			4.81		4439.02		4440.96	146.68	0.78
Alpine	4.5*	500yr	30.22	16672.77		1.10	13.27		0.31	6.32		4441.09	4440.08	4443.82	234.90	0.84
Alpine	4.75*	2yr		430.00			3.87			0.93		4434.84		4435.07	74.34	0.56
Alpine	4.75*	5yr		1688.00			6.23			1.91		4436.77		4437.38	90.88	0.64
Alpine	4.75*	10yr		3624.00			8.15			2.92		4438.54		4439.57	105.51	0.70
Alpine	4.75*	25yr		5657.00			9.61			3.77		4439.87		4441.30	111.45	0.74
Alpine	4.75*	50yr		7379.00			10.41			4.27		4440.91		4442.59	120.21	0.76
Alpine	4.75*	100yr		10490.00			11.73			5.16		4442.38		4444.52	131.06	0.79
Alpine	4.75*	500yr	3.43	16699.57		0.42	13.75		0.07	6.66		4444.68	4443.63	4447.62	241.98	0.84
Alpine	5	2yr		430.00			4.03			0.98		4437.60		4437.85	65.40	0.56
Alpine	5	5yr		1688.00			6.61			2.09		4439.67		4440.35	78.24	0.64
Alpine	5	10yr		3624.00			8.62			3.17		4441.63		4442.78	90.37	0.70
Alpine	5	25yr		5657.00			10.10			4.09		4443.10		4444.68	99.50	0.75
Alpine	5	50yr		7379.00			11.01			4.68		4444.17		4446.05	106.14	0.77
Alpine	5	100yr		10490.00			12.38			5.63		4445.76		4448.14	116.04	0.81
Alpine	5	500yr	33.12	16669.88		0.93	14.41		0.26	7.18		4448.27	4447.20	4451.48	246.70	0.86
Alpine	5.33333*	2yr		428.00			6.17			2.52		4441.16	4441.16	4441.76	56.59	0.98
Alpine	5.33333*	5yr		1690.00			9.22			4.35		4442.98	4442.98	4444.30	68.81	0.99
Alpine	5.33333*	10yr		3655.00			11.30			5.73		4444.85	4444.85	4446.83	81.34	1.00
Alpine	5.33333*	25yr		5736.00			12.58			6.59		4446.38	4446.38	4448.84	91.63	0.99
Alpine	5.33333*	50yr		7481.00			13.38			7.16		4447.46	4447.46	4450.24	98.89	0.99

HEC-RAS Plan: Revised FIS River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	5.33333*	100yr	1058.54	9553.45	0.01	1.55	10.42	0.26	0.50	3.94	0.03	4450.72	4450.72	4452.24	848.42	0.67
Alpine	5.33333*	500yr	4588.16	11608.66	627.18	2.40	10.69	1.99	0.93	3.92	0.63	4452.12	4452.12	4453.37	1262.58	0.63
Alpine	5.66666*	2yr		428.00			6.36			2.62		4445.28	4445.28	4445.91	51.49	0.98
Alpine	5.66666*	5yr		1690.00			9.29			4.37		4447.23	4447.23	4448.57	66.07	0.99
Alpine	5.66666*	10yr		3655.00			11.33			5.74		4449.15	4449.15	4451.14	80.43	1.00
Alpine	5.66666*	25yr		5736.00			12.55			6.57		4450.71	4450.71	4453.16	92.08	0.99
Alpine	5.66666*	50yr		7481.00			13.34			7.13		4451.79	4451.79	4454.55	100.14	0.99
Alpine	5.66666*	100yr	3654.83	6377.71	579.46	2.33	9.39	1.94	0.93	3.40	0.63	4452.92	4452.92	4453.78	1293.51	0.66
Alpine	5.66666*	500yr	7057.49	8455.46	1311.05	3.21	11.26	2.68	1.60	4.72	1.11	4453.59	4453.59	4454.66	1358.70	0.75
Alpine	6	2yr		428.00			6.59			2.76		4449.38	4449.38	4450.06	46.78	0.99
Alpine	6	5yr		1690.00			9.38			4.44		4451.45	4451.45	4452.82	64.80	0.99
Alpine	6	10yr		3655.00			11.19			5.62		4453.44	4453.44	4455.39	82.16	0.99
Alpine	6	25yr	3650.33	2085.67	0.00	1.62	4.67	0.02	0.46	0.92		4454.81	4454.81	4454.96	1063.27	0.38
Alpine	6	50yr	4296.03	2132.50	1052.47	1.59	4.35	1.37	0.42	0.78	0.30	4455.27	4454.81	4455.38	1460.77	0.34
Alpine	6	100yr	6753.37	3858.63	0.00	3.00	8.64	0.04	1.56	3.15		4454.81	4454.81	4455.32	1063.27	0.70
Alpine	6	500yr	9702.47	4685.96	2435.57	3.47	9.37	3.00	1.94	3.58	1.44	4455.37	4454.83	4455.88	1463.69	0.72
Alpine	6.125*	2yr		428.00			3.24			0.57		4451.25	4450.06	4451.42	60.65	0.39
Alpine	6.125*	5yr		1690.00			5.13			1.20		4453.92	4452.01	4454.33	87.36	0.47
Alpine	6.125*	10yr		2668.04	986.96		5.08	1.48		1.08	0.38	4455.94	4453.97	4456.24	500.00	0.40
Alpine	6.125*	25yr		5736.00			12.10			6.25		4455.44	4455.44	4457.72	102.60	0.99
Alpine	6.125*	50yr	3161.54	3102.88	1216.59	1.75	5.78	1.72	0.56	1.39	0.50	4456.04	4456.04	4456.28	1415.61	0.46
Alpine	6.125*	100yr	4607.03	4218.28	1786.68	2.37	7.62	2.33	1.00	2.39	0.89	4456.19	4456.04	4456.60	1431.94	0.59
Alpine	6.125*	500yr	7891.46	5770.54	3162.00	3.15	9.33	3.09	1.63	3.45	1.46	4456.80	4456.28	4457.36	1469.62	0.69
Alpine	6.25*	2yr		428.00			3.14			0.54		4451.87	4450.71	4452.02	63.82	0.38
Alpine	6.25*	5yr		1690.00			4.85			1.07		4454.66	4452.56	4455.03	91.24	0.44
Alpine	6.25*	10yr		3655.00			7.09			2.14		4456.32	4454.48	4457.10	111.31	0.58
Alpine	6.25*	25yr	2162.73	2301.37	1271.90	0.96	3.08	1.00	0.15	0.37	0.16	4458.25	4455.95	4458.32	1475.88	0.22
Alpine	6.25*	50yr		5710.83	1770.17		9.72	2.59		3.93	1.31	4456.94	4456.94	4458.08	537.65	0.77
Alpine	6.25*	100yr	3145.94	5423.64	2042.42	2.25	8.65	2.48	0.99	3.07	1.14	4457.27	4457.27	4457.90	1407.49	0.67
Alpine	6.25*	500yr	6201.01	6964.58	3658.41	2.92	9.56	3.04	1.45	3.57	1.55	4458.11	4457.73	4458.77	1471.85	0.69
Alpine	6.375*	2yr		428.00			3.04			0.51		4452.46	4451.31	4452.60	66.84	0.37
Alpine	6.375*	5yr		1690.00			4.70			0.98		4455.29	4453.09	4455.64	87.41	0.41
Alpine	6.375*	10yr		3655.00			6.25			1.64		4457.46	4454.91	4458.07	120.76	0.50
Alpine	6.375*	25yr		4239.50	1496.49		6.10	1.72		1.52	0.55	4458.33	4456.48	4458.77	595.98	0.47
Alpine	6.375*	50yr	1716.35	3956.14	1808.51	1.26	5.12	1.58	0.31	1.04	0.43	4458.90	4457.84	4459.13	1436.80	0.38
Alpine	6.375*	100yr	2032.93	6133.05	2446.01	1.88	8.45	2.50	0.73	2.89	1.13	4458.56	4458.48	4459.23	1412.30	0.64
Alpine	6.375*	500yr	4609.39	7943.91	4270.70	2.60	9.45	3.07	1.20	3.45	1.54	4459.41	4459.04	4460.13	1472.73	0.67
Alpine	6.5	2yr		428.00			2.95			0.48		4453.02	4451.90	4453.16	70.15	0.36
Alpine	6.5	5yr		1690.00			4.55			0.92		4455.86	4453.60	4456.18	89.70	0.39

HEC-RAS Plan: Revised EIS River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	6.5	10yr		3655.00			5.97			1.47		4458.25	4455.37	4458.81	119.11	0.46
Alpine	6.5	25yr		4638.97	1097.03		6.57	1.52		1.76	0.51	4459.00	4456.81	4459.55	612.92	0.50
Alpine	6.5	50yr		5788.31	1692.69		7.76	1.97		2.45	0.82	4459.29	4457.95	4460.02	629.36	0.59
Alpine	6.5	100yr	0.00	7673.27	2938.73	0.04	9.44	2.69		3.58	1.43	4459.75	4459.48	4460.78	657.24	0.71
Alpine	6.5	500yr	2537.51	9415.94	4870.55	1.81	9.96	3.12	1.10	3.80	1.75	4460.64	4460.33	4461.56	1465.17	0.70
Alpine	6.7		Bridge													
Alpine	7	2yr		428.00			2.62			0.37		4453.28	4451.90	4453.39	71.94	0.31
Alpine	7	5yr		1690.00			4.24			0.78		4456.16	4453.60	4456.44	91.78	0.36
Alpine	7	10yr		2905.14	749.86		4.03	0.97		0.66	0.20	4459.11	4455.37	4459.31	619.27	0.31
Alpine	7	25yr	583.46	3637.49	1515.05	0.66	4.31	1.26	0.16	0.74	0.31	4459.96	4456.81	4460.15	1375.96	0.32
Alpine	7	50yr	1018.66	4340.93	2121.41	0.82	4.74	1.46	0.23	0.87	0.39	4460.44	4457.95	4460.65	1451.35	0.34
Alpine	7	100yr	1979.01	5381.33	3251.65	1.07	5.21	1.73	0.35	1.01	0.50	4461.23	4459.45	4461.46	1490.26	0.35
Alpine	7	500yr	3704.77	7697.24	5421.98	1.52	6.75	2.38	0.65	1.64	0.90	4461.95	4460.33	4462.31	1511.09	0.43
Alpine	7.2*	2yr		428.00			4.46			1.21		4453.89	4453.41	4454.19	60.39	0.62
Alpine	7.2*	5yr		1690.00			5.82			1.57		4456.65	4455.23	4457.18	79.90	0.54
Alpine	7.2*	10yr		3655.00			6.75			1.92		4459.33	4457.08	4460.04	112.57	0.54
Alpine	7.2*	25yr		5629.32	106.68		9.07	0.18		3.40	0.81	4460.01	4458.69	4461.26	617.62	0.71
Alpine	7.2*	50yr		7297.92	183.08		11.10	0.25		5.05	1.42	4460.30	4459.99	4462.17	634.68	0.86
Alpine	7.2*	100yr	2071.42	8156.65	383.93	1.65	10.13	0.29	0.97	3.99	1.58	4461.43	4461.43	4462.67	1548.23	0.72
Alpine	7.2*	500yr	5130.32	10980.88	712.80	2.39	11.68	0.37	1.73	5.04	2.35	4462.46	4462.46	4463.87	1610.95	0.77
Alpine	7.4*	2yr		428.00			4.39			1.14		4455.52	4454.95	4455.82	56.31	0.59
Alpine	7.4*	5yr		1690.00			7.02			2.34		4457.75	4456.86	4458.51	72.05	0.68
Alpine	7.4*	10yr		3655.00			8.00			2.74		4460.26	4458.84	4461.26	99.99	0.66
Alpine	7.4*	25yr		5597.77	138.23		9.44	0.20		3.65	0.92	4461.53	4460.32	4462.89	646.85	0.73
Alpine	7.4*	50yr	2030.93	5170.81	279.26	1.21	6.91	0.19	0.50	1.82	0.69	4462.89	4462.08	4463.41	1681.51	0.48
Alpine	7.4*	100yr	3168.61	7032.67	410.72	1.68	9.09	0.26	0.92	3.11	1.22	4463.11	4462.74	4463.97	1702.48	0.62
Alpine	7.4*	500yr	6911.13	9144.84	768.03	2.22	10.00	0.32	1.39	3.56	1.72	4464.34	4463.74	4465.21	1757.98	0.62
Alpine	7.6*	2yr		428.00			4.61			1.25		4457.07	4456.50	4457.40	52.42	0.61
Alpine	7.6*	5yr		1690.00			7.19			2.46		4459.39	4458.52	4460.20	70.60	0.70
Alpine	7.6*	10yr		3655.00			8.80			3.30		4461.64	4460.52	4462.84	89.96	0.72
Alpine	7.6*	25yr	1285.83	3388.71	1061.47	1.01	5.71	0.98	0.27	1.27	0.38	4463.50	4462.80	4463.81	1705.75	0.41
Alpine	7.6*	50yr	1858.24	4185.59	1437.16	1.29	6.86	1.22	0.42	1.82	0.57	4463.66	4463.15	4464.08	1744.27	0.48
Alpine	7.6*	100yr	3579.54	4733.80	2298.66	1.57	6.89	1.37	0.54	1.76	0.65	4464.45	4463.69	4464.80	1829.32	0.46
Alpine	7.6*	500yr	6965.79	5760.75	4097.46	1.93	7.15	1.65	0.71	1.80	0.84	4465.67	4464.37	4465.97	1887.79	0.44
Alpine	7.8*	2yr		428.00			4.70			1.27		4458.66	4458.06	4459.00	48.52	0.61
Alpine	7.8*	5yr		1690.00			7.43			2.58		4461.07	4460.17	4461.93	64.43	0.70
Alpine	7.8*	10yr		3471.79	183.21		8.96	0.78		3.37	0.36	4463.30	4462.27	4464.49	535.93	0.71
Alpine	7.8*	25yr	1229.46	3761.08	745.46	1.48	8.32	1.12	0.46	2.78	0.58	4464.11	4464.11	4464.82	1581.03	0.62
Alpine	7.8*	50yr	1975.31	4207.62	1298.07	1.48	8.53	1.34	0.58	2.84	0.74	4464.61	4464.61	4465.26	1809.34	0.61

HEC-RAS Plan: Revised FIS River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	7.8*	100yr	3478.54	5088.09	2045.37	1.92	9.65	1.65	0.90	3.56	1.06	4465.03	4465.02	4465.75	1865.95	0.67
Alpine	7.8*	500yr	7278.89	5688.73	3856.38	2.28	9.13	1.88	1.06	3.01	1.18	4466.21	4465.64	4466.70	1976.79	0.58
Alpine	8	2yr		428.00			5.02			1.41		4460.22	4459.59	4460.61	41.96	0.62
Alpine	8	5yr		1690.00			8.14			3.03		4462.75	4461.92	4463.78	54.68	0.74
Alpine	8	10yr	1086.39	2198.95	369.66	1.29	6.19	0.72	0.28	1.55	0.26	4465.19	4464.28	4465.55	1535.72	0.46
Alpine	8	25yr	1822.47	3233.88	679.65	1.83	8.84	1.10	0.58	3.13	0.58	4465.35	4465.21	4466.06	1645.47	0.65
Alpine	8	50yr	2488.96	3768.86	1223.18	1.69	9.59	1.39	0.76	3.60	0.83	4465.78	4465.57	4466.52	1889.28	0.68
Alpine	8	100yr	4503.87	4048.50	2059.63	1.99	9.31	1.56	0.92	3.28	0.94	4466.43	4466.26	4466.98	1997.45	0.63
Alpine	8	500yr	8161.31	4948.23	3714.46	2.51	10.20	1.96	1.31	3.79	1.34	4467.22	4466.85	4467.76	2082.15	0.65
Alpine	8.33333*	2yr		428.00			3.96			0.87		4461.12	4460.14	4461.36	50.54	0.48
Alpine	8.33333*	5yr		1690.00			6.23			1.69		4463.99	4462.27	4464.59	61.02	0.52
Alpine	8.33333*	10yr		3655.00			11.57			5.60		4464.71	4464.35	4466.79	62.94	0.91
Alpine	8.33333*	25yr	1390.27	3402.64	943.09	1.20	7.75	0.94	0.39	2.30	0.41	4466.60	4466.60	4467.16	2026.15	0.53
Alpine	8.33333*	50yr	2134.18	3917.28	1429.54	1.48	8.58	1.15	0.56	2.78	0.57	4466.87	4466.87	4467.48	2071.91	0.57
Alpine	8.33333*	100yr	3546.15	4718.61	2347.24	1.89	9.79	1.47	0.85	3.55	0.87	4467.25	4467.25	4467.94	2137.46	0.64
Alpine	8.33333*	500yr	6488.31	6087.31	4248.38	2.56	11.71	1.97	1.44	4.96	1.44	4467.83	4467.83	4468.65	2230.72	0.74
Alpine	8.66666*	2yr		428.00			3.43			0.65		4461.69	4460.66	4461.87	57.96	0.41
Alpine	8.66666*	5yr		1690.00			5.59			1.34		4464.61	4462.52	4465.10	63.39	0.45
Alpine	8.66666*	10yr	681.33	2973.67		0.81	6.15		0.19	1.42		4467.37	4464.52	4467.85	1015.06	0.41
Alpine	8.66666*	25yr		5736.00			14.03			7.78		4466.26	4466.26	4469.31	66.45	1.00
Alpine	8.66666*	50yr	1705.08	4293.25	1482.67	1.35	8.36	1.02	0.47	2.59	0.46	4467.81	4467.81	4468.44	2225.43	0.54
Alpine	8.66666*	100yr	2847.37	5253.49	2511.14	1.77	9.78	1.34	0.76	3.49	0.75	4468.16	4468.16	4468.91	2286.40	0.61
Alpine	8.66666*	500yr	5361.68	6680.18	4782.15	2.39	11.56	1.84	1.27	4.75	1.26	4468.76	4468.76	4469.62	2368.83	0.70
Alpine	9	2yr		428.00			3.38			0.70		4462.21	4461.48	4462.39	80.50	0.48
Alpine	9	5yr		1690.00			4.06			0.75		4465.25	4463.06	4465.51	110.02	0.37
Alpine	9	10yr		3655.00			5.10			1.04		4467.75	4464.62	4468.16	126.32	0.38
Alpine	9	25yr	1353.29	2611.00	1771.71	0.56	2.51	0.45	0.07	0.22	0.07	4470.29	4465.91	4470.34	2715.93	0.15
Alpine	9	50yr		7481.00			9.93			3.88		4468.04	4466.78	4469.57	127.00	0.72
Alpine	9	100yr	2001.51	8610.49	0.00	1.66	9.78	0.06	0.71	3.58		4469.04	4469.04	4470.25	1037.23	0.65
Alpine	9	500yr	3204.53	9416.44	4203.02	1.94	10.00	1.54	0.89	3.67	0.93	4469.52	4469.52	4470.41	2592.20	0.65
Alpine	9.3		Bridge													
Alpine	9.5	2yr		428.00			2.48			0.35		4462.76	4461.48	4462.86	85.87	0.31
Alpine	9.5	5yr		1690.00			3.62			0.58		4465.70	4463.04	4465.90	114.35	0.32
Alpine	9.5	10yr		3666.00			4.60			0.82		4468.38	4464.63	4468.71	127.00	0.32
Alpine	9.5	25yr	1383.97	2571.87	1809.16	0.55	2.45	0.45	0.06	0.21	0.07	4470.38	4465.91	4470.42	2724.51	0.15
Alpine	9.5	50yr	1888.10	3155.82	2473.08	0.68	2.91	0.55	0.09	0.30	0.10	4470.64	4466.80	4470.70	2750.60	0.18
Alpine	9.5	100yr	3486.99	2939.32	4229.69	0.64	2.11	0.51	0.07	0.14	0.07	4473.09	4468.10	4473.11	2788.40	0.11
Alpine	9.5	500yr	4369.63	6771.58	5725.78	1.45	6.10	1.20	0.42	1.29	0.47	4470.85	4469.52	4471.09	2771.12	0.36

HEC-RAS Plan: Revised FIS River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	10	100yr	252.61	3060.24	7343.15	0.78	5.98	1.22	0.24	1.04	0.47	4474.48	4472.62	4474.66	1989.76	0.37
Alpine	10	500yr	544.13	4028.27	12294.59	0.99	6.94	1.56	0.35	1.34	0.70	4475.55	4473.34	4475.76	2048.45	0.41
Alpine	10.3333*	2yr		428.00			3.52			0.53		4468.18	4466.87	4468.37	49.60	0.40
Alpine	10.3333*	5yr		1690.00			5.88			1.20		4471.15	4469.06	4471.69	61.35	0.48
Alpine	10.3333*	10yr		3666.00			12.35			5.27		4471.30	4471.30	4473.67	62.23	1.00
Alpine	10.3333*	25yr	0.15	3775.05	1989.80	0.17	8.86	1.24	0.03	2.57	0.66	4473.17	4473.17	4473.98	1255.13	0.66
Alpine	10.3333*	50yr	5.34	4426.05	3085.61	0.43	9.72	1.50	0.14	3.03	0.90	4473.55	4473.55	4474.43	1341.15	0.70
Alpine	10.3333*	100yr	74.16	5031.78	5550.06	0.75	9.55	1.70	0.30	2.78	1.02	4474.50	4474.08	4475.19	1558.29	0.64
Alpine	10.3333*	500yr	353.69	6479.67	10033.64	1.19	10.59	2.07	0.60	3.25	1.38	4475.62	4474.93	4476.32	1776.18	0.66
Alpine	10.6666*	2yr		428.00			3.16			0.43		4468.57	4467.19	4468.72	55.44	0.36
Alpine	10.6666*	5yr		1690.00			5.29			0.95		4471.68	4469.20	4472.11	62.83	0.41
Alpine	10.6666*	10yr		3666.00			7.51			1.78		4474.14	4471.28	4475.02	76.81	0.53
Alpine	10.6666*	25yr		5765.00			13.47			5.80		4473.31	4473.12	4476.13	70.00	0.96
Alpine	10.6666*	50yr		7517.00			14.23			6.37		4474.65	4474.65	4477.79	82.81	0.99
Alpine	10.6666*	100yr	4.01	6493.74	4158.25	0.32	10.79	1.75	0.09	3.58	1.15	4475.49	4475.49	4476.61	1306.35	0.73
Alpine	10.6666*	500yr	173.71	8657.66	8035.63	1.01	12.68	2.32	0.52	4.74	1.82	4476.42	4476.42	4477.74	1530.61	0.80
Alpine	11	2yr		428.00			2.95			0.38		4468.89	4467.54	4469.02	61.94	0.34
Alpine	11	5yr		1690.00			4.79			0.78		4472.08	4469.40	4472.44	68.10	0.37
Alpine	11	10yr		3666.00			6.75			1.38		4474.78	4471.34	4475.48	73.30	0.44
Alpine	11	25yr	0.43	3883.15	1881.42	0.09	5.32	0.85	0.01	0.85	0.27	4477.05	4472.98	4477.35	1201.36	0.35
Alpine	11	50yr	195.65	3863.12	3458.22	0.45	4.27	0.83	0.09	0.51	0.22	4478.81	4474.18	4478.96	1587.87	0.25
Alpine	11	100yr	0.02	7336.88	3319.10	0.07	10.21	1.58	0.01	3.14	0.94	4476.94	4476.94	4478.06	1144.82	0.66
Alpine	11	500yr	131.59	10001.82	6733.58	0.82	12.39	2.21	0.38	4.49	1.66	4477.83	4477.83	4479.27	1455.21	0.77
Alpine	11.3		Bridge													
Alpine	11.4	2yr		427.00			2.70			0.31		4469.10	4467.54	4469.21	62.34	0.30
Alpine	11.4	5yr		1691.00			4.55			0.69		4472.36	4469.39	4472.68	68.65	0.34
Alpine	11.4	10yr		3670.00			6.36			1.21		4475.23	4471.33	4475.86	75.42	0.40
Alpine	11.4	25yr	15.20	3623.50	2138.30	0.20	4.69	0.80	0.03	0.65	0.23	4477.48	4472.99	4477.69	1409.73	0.30
Alpine	11.4	50yr	222.22	3779.21	3532.57	0.45	4.09	0.80	0.08	0.47	0.20	4478.99	4474.20	4479.12	1615.32	0.24
Alpine	11.4	100yr	196.70	5794.55	4683.75	0.62	6.69	1.26	0.18	1.28	0.51	4478.41	4476.95	4478.80	1537.09	0.40
Alpine	11.4	500yr	708.33	7806.30	8372.38	0.99	7.89	1.61	0.37	1.70	0.77	4479.65	4477.83	4480.12	1704.95	0.44
Alpine	11.4333*	2yr		427.00			3.32			0.51		4469.22	4468.33	4469.39	68.20	0.43
Alpine	11.4333*	5yr		1691.00			4.63			0.74		4472.48	4470.01	4472.82	76.92	0.37
Alpine	11.4333*	10yr		3670.00			6.03			1.12		4475.46	4471.81	4476.03	89.48	0.41
Alpine	11.4333*	25yr	0.60	4115.61	1660.79	0.09	5.05	0.79	0.01	0.76	0.23	4477.53	4473.35	4477.81	1170.81	0.33
Alpine	11.4333*	50yr	152.41	4344.88	3036.71	0.42	4.44	0.83	0.08	0.55	0.22	4479.02	4474.50	4479.20	1486.57	0.26
Alpine	11.4333*	100yr	118.84	6592.07	3964.08	0.55	7.14	1.27	0.15	1.46	0.54	4478.50	4476.52	4479.00	1423.09	0.44
Alpine	11.4333*	500yr	569.31	8909.28	7408.41	0.97	8.40	1.65	0.37	1.93	0.83	4479.75	4478.19	4480.35	1577.46	0.48

HEC-RAS Plan: Revised FIS River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	11.4666*	2yr		427.00			4.35			0.98		4469.50	4469.15	4469.79	72.70	0.66
Alpine	11.4666*	5yr		1691.00			4.88			0.86		4472.62	4470.71	4472.99	85.73	0.43
Alpine	11.4666*	10yr		3670.00			5.82			1.07		4475.66	4472.39	4476.19	103.93	0.42
Alpine	11.4666*	25yr		4540.54	1236.46		5.38	0.76		0.87	0.23	4477.57	4473.82	4477.93	1011.23	0.36
Alpine	11.4666*	50yr	91.77	4877.42	2564.81	0.38	4.78	0.86	0.07	0.65	0.24	4479.04	4474.92	4479.27	1354.48	0.29
Alpine	11.4666*	100yr	56.45	7318.10	3300.45	0.44	7.58	1.29	0.12	1.66	0.57	4478.59	4476.58	4479.21	1303.20	0.47
Alpine	11.4666*	500yr	438.95	9962.52	6485.53	0.94	8.92	1.71	0.37	2.19	0.91	4479.84	4478.51	4480.59	1444.83	0.52
Alpine	11.5	2yr		427.00			4.67			1.20		4470.21	4470.01	4470.55	79.70	0.77
Alpine	11.5	5yr		1691.00			5.30			1.08		4472.80	4471.47	4473.23	96.31	0.51
Alpine	11.5	10yr		3670.00			5.71			1.06		4475.84	4473.04	4476.35	115.84	0.43
Alpine	11.5	25yr		5777.00			6.91			1.46		4477.45	4474.37	4478.19	126.12	0.47
Alpine	11.5	50yr	40.81	5587.74	1905.45	0.31	5.35	0.80	0.06	0.83	0.29	4479.05	4475.32	4479.38	1219.65	0.33
Alpine	11.5	100yr	10.16	8271.54	2393.30	0.25	8.36	1.18	0.06	2.05	0.67	4478.63	4476.77	4479.48	1176.72	0.54
Alpine	11.5	500yr	298.50	11563.87	5024.63	0.91	10.08	1.64	0.40	2.84	1.13	4479.84	4478.91	4480.93	1301.38	0.60
Alpine	11.5666*	2yr		427.00			3.20			0.48		4471.39		4471.55	73.20	0.42
Alpine	11.5666*	5yr		1691.00			5.60			1.20		4473.47		4473.96	88.89	0.54
Alpine	11.5666*	10yr		3670.00			6.47			1.37		4476.22		4476.87	103.88	0.49
Alpine	11.5666*	25yr		5688.31	88.69		7.67	0.43		1.79	0.12	4477.86		4478.76	579.56	0.51
Alpine	11.5666*	50yr	0.71	6702.57	830.72	0.17	7.68	0.73	0.03	1.71	0.30	4479.09		4479.90	957.98	0.47
Alpine	11.5666*	100yr	0.00	9770.14	904.86	0.02	11.58	0.99		3.93	0.59	4478.82		4480.72	914.13	0.73
Alpine	11.5666*	500yr	53.91	13678.98	3154.11	0.76	14.17	1.68	0.36	5.61	1.40	4479.96		4482.49	1110.18	0.83
Alpine	11.6333*	2yr		427.00			3.42			0.54		4471.95		4472.13	66.81	0.44
Alpine	11.6333*	5yr		1691.00			5.88			1.30		4474.17		4474.71	79.30	0.54
Alpine	11.6333*	10yr		3670.00			7.47			1.80		4476.69		4477.56	82.21	0.54
Alpine	11.6333*	25yr		5753.80	23.20		9.22	0.35		2.56	0.11	4478.29	4476.03	4479.61	297.12	0.59
Alpine	11.6333*	50yr	0.29	7250.20	283.52	0.23	10.26	0.76	0.05	3.05	0.38	4479.28		4480.85	480.87	0.62
Alpine	11.6333*	100yr	6.17	9984.49	684.34	0.58	13.33	1.17	0.24	5.04	0.80	4479.79	4479.79	4482.37	559.35	0.78
Alpine	11.6333*	500yr	241.21	12463.82	4181.97	1.28	13.01	1.58	0.71	4.43	1.14	4482.28	4482.28	4484.23	1179.25	0.68
Alpine	11.7	2yr		427.00			3.55			0.57		4472.51		4472.71	55.71	0.43
Alpine	11.7	5yr		1691.00			6.67			1.60		4474.87		4475.56	57.54	0.56
Alpine	11.7	10yr		3670.00			9.36			2.80		4477.24		4478.60	59.38	0.64
Alpine	11.7	25yr		5763.50	13.50		11.84	0.42		4.22	0.16	4478.82	4477.26	4480.99	186.78	0.73
Alpine	11.7	50yr	0.80	7322.18	211.02	0.46	13.55	0.92	0.17	5.35	0.56	4479.72	4479.61	4482.49	357.68	0.80
Alpine	11.7	100yr	58.15	8987.81	1629.03	1.20	13.47	1.51	0.68	4.93	1.12	4481.83	4481.83	4484.21	602.34	0.71
Alpine	11.7	500yr	314.10	10962.15	5610.75	1.64	13.33	1.68	1.01	4.50	1.23	4484.41	4484.41	4486.22	1190.68	0.63
Alpine	11.9		Bridge													
Alpine	12	2yr		427.00			2.79			0.32		4473.10	4471.51	4473.22	56.17	0.30
Alpine	12	5yr		1691.00			4.98			0.82		4476.35	4473.40	4476.74	58.70	0.36
Alpine	12	10yr	4.13	3410.66	255.22	0.35	5.80	0.51	0.07	0.95	0.15	4480.50	4475.49	4480.99	459.02	0.33

HEC-RAS Plan: Revised EIS River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	12	25yr	91.18	4093.14	1592.67	0.61	5.21	0.59	0.14	0.70	0.16	4483.81	4477.26	4484.11	1180.32	0.25
Alpine	12	50yr	111.56	5465.09	1957.35	0.81	7.05	0.78	0.26	1.28	0.29	4483.63	4479.61	4484.19	1148.88	0.35
Alpine	12	100yr	217.09	6577.69	3880.22	0.99	7.79	1.04	0.36	1.52	0.45	4484.79	4481.83	4485.37	1197.20	0.37
Alpine	12	500yr	407.75	8429.01	8050.24	0.94	8.86	1.43	0.34	1.89	0.75	4486.57	4484.41	4487.19	1303.27	0.39
Alpine	12.5	2yr		427.00			7.73			2.78		4474.16	4474.16	4475.08	28.95	0.99
Alpine	12.5	5yr		1691.00			11.08			4.60		4476.93	4476.93	4478.83	40.40	1.00
Alpine	12.5	10yr		3675.00			13.24			5.82		4479.68	4479.68	4482.40	50.33	0.99
Alpine	12.5	25yr		5790.00			12.96			5.13		4482.78	4481.69	4485.39	61.08	0.84
Alpine	12.5	50yr		7550.00			15.43			7.22		4483.46	4483.46	4487.15	65.36	0.99
Alpine	12.5	100yr	12.60	6085.34	4597.07	0.66	10.50	1.70	0.17	3.26	1.17	4484.76	4484.56	4485.75	1163.59	0.65
Alpine	12.5	500yr	288.01	7113.36	9504.63	1.60	9.88	2.01	0.58	2.69	1.35	4486.71	4485.45	4487.38	1210.45	0.55
Alpine	12.5666*	2yr		427.00			4.19			0.76		4475.61	4474.53	4475.88	43.47	0.48
Alpine	12.5666*	5yr		1691.00			5.93			1.23		4479.04	4476.95	4479.59	61.64	0.49
Alpine	12.5666*	10yr		3675.00			6.96			1.51		4482.39	4479.19	4483.14	78.68	0.47
Alpine	12.5666*	25yr	0.43	4117.66	1671.91	0.14	5.29	0.79	0.01	0.78	0.25	4485.55	4481.17	4485.86	880.62	0.30
Alpine	12.5666*	50yr	76.90	4331.49	3141.60	0.51	4.65	0.83	0.07	0.57	0.23	4487.48	4482.22	4487.68	1087.95	0.24
Alpine	12.5666*	100yr		8129.92	2565.08		11.12	1.53		3.51	0.99	4484.95	4484.69	4486.42	806.77	0.65
Alpine	12.5666*	500yr	47.68	11028.03	5830.29	1.01	13.02	2.05	0.33	4.60	1.57	4486.41	4486.41	4488.15	1034.58	0.70
Alpine	12.6333*	2yr		427.00			3.31			0.49		4476.08	4474.91	4476.25	62.06	0.40
Alpine	12.6333*	5yr		1691.00			4.14			0.59		4479.63	4476.89	4479.89	85.99	0.33
Alpine	12.6333*	10yr		3675.00			5.24			0.82		4483.01	4478.69	4483.43	338.86	0.33
Alpine	12.6333*	25yr		4861.60	928.40		5.23	0.69		0.75	0.20	4485.63	4480.08	4485.99	641.90	0.28
Alpine	12.6333*	50yr	14.45	5517.73	2017.82	0.34	5.05	0.83	0.04	0.66	0.24	4487.50	4481.08	4487.80	777.03	0.25
Alpine	12.6333*	100yr		8891.39	1803.61		9.46	1.27		2.43	0.66	4485.75	4482.56	4486.91	645.45	0.51
Alpine	12.6333*	500yr	3.64	12852.67	4049.70	0.41	12.36	1.95	0.08	4.03	1.39	4486.90	4486.17	4488.72	719.26	0.63
Alpine	12.7	2yr		427.00			2.08			0.19		4476.38		4476.45	93.29	0.25
Alpine	12.7	5yr		1691.00			3.17			0.33		4479.88		4480.03	93.97	0.23
Alpine	12.7	10yr		3675.00	0.00		4.30	0.01		0.53		4483.29		4483.58	96.22	0.25
Alpine	12.7	25yr		5329.64	460.36		4.91	0.56		0.65	0.14	4485.74		4486.08	499.99	0.26
Alpine	12.7	50yr		6322.64	1227.36		5.02	0.77		0.65	0.21	4487.56		4487.89	538.21	0.24
Alpine	12.7	100yr		9601.36	1093.64		8.48	1.07		1.91	0.47	4486.22		4487.23	511.38	0.43
Alpine	12.7	500yr		14216.01	2689.99		11.36	1.72		3.32	1.07	4487.48		4489.17	537.13	0.55
Alpine	12.9		Culvert													
Alpine	13	2yr		427.00			2.04			0.18		4476.42	4475.03	4476.49	93.30	0.24
Alpine	13	5yr		1691.00			3.12			0.32		4479.98	4476.34	4480.13	93.99	0.23
Alpine	13	10yr		3674.17	0.83		4.20	0.08		0.51	0.01	4483.51	4477.80	4483.78	200.44	0.24
Alpine	13	25yr		5325.14	464.86		4.89	0.56		0.64	0.14	4485.75	4479.09	4486.09	500.38	0.25
Alpine	13	50yr		6322.80	1227.20		5.02	0.77		0.65	0.21	4487.56	4480.04	4487.89	538.20	0.24
Alpine	13	100yr		9552.91	1142.09		8.37	1.07		1.85	0.47	4486.32	4481.57	4487.29	513.66	0.42

HEC-RAS Plan: Revised FIS River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	13	500yr		14198.21	2707.79		11.32	1.72		3.30	1.07	4487.50	4485.58	4489.18	537.46	0.55
Alpine	13.25*	2yr		427.00			6.37			2.17		4476.38	4476.38	4477.01	54.18	1.01
Alpine	13.25*	5yr		1691.00			4.98			0.94		4479.95		4480.33	96.38	0.47
Alpine	13.25*	10yr		3678.00	0.00		5.24	0.02		0.85	0.00	4483.50		4483.92	115.75	0.35
Alpine	13.25*	25yr		5261.86	534.14		5.62	0.67		0.89	0.21	4485.76		4486.21	500.53	0.33
Alpine	13.25*	50yr	0.04	6208.98	1348.98	0.06	5.52	0.87	0.00	0.81	0.29	4487.58		4487.97	553.02	0.30
Alpine	13.25*	100yr		9392.84	1311.16		9.40	1.26		2.45	0.70	4486.36		4487.57	514.69	0.53
Alpine	13.25*	500yr	0.29	13857.10	3058.60	0.17	12.26	1.94	0.03	4.00	1.46	4487.63		4489.55	561.96	0.66
Alpine	13.5	2yr		427.00			5.75			1.69		4477.55		4478.06	52.21	0.85
Alpine	13.5	5yr		1691.00			7.82			2.42		4479.86		4480.81	69.98	0.78
Alpine	13.5	10yr		3678.00			7.25			1.74		4483.37		4484.18	96.05	0.56
Alpine	13.5	25yr		5142.91	653.09		6.85	0.88		1.42	0.40	4485.73		4486.37	495.42	0.46
Alpine	13.5	50yr	2.19	5973.28	1582.53	0.22	6.23	1.06	0.05	1.10	0.47	4487.59		4488.07	567.08	0.38
Alpine	13.5	100yr		9131.26	1572.74		11.21	1.62		3.73	1.25	4486.31		4487.98	511.23	0.73
Alpine	13.5	500yr	8.28	13253.67	3654.05	0.56	13.57	2.33	0.26	5.17	2.24	4487.75		4490.01	575.62	0.81
Alpine	13.75*	2yr		427.00			6.88			2.20		4478.29	4478.07	4479.02	32.09	0.87
Alpine	13.75*	5yr		1691.00			9.95			3.94		4480.77	4480.77	4482.30	55.66	1.00
Alpine	13.75*	10yr		3678.00			10.61			4.03		4483.29		4485.04	82.88	0.91
Alpine	13.75*	25yr		5796.00			10.70			3.77		4485.42		4487.19	100.44	0.81
Alpine	13.75*	50yr		7533.84	24.16		10.35	0.37		3.31	0.14	4487.17	4485.64	4488.83	365.60	0.71
Alpine	13.75*	100yr		10400.43	303.57		12.72	0.99		4.87	0.64	4487.96	4487.96	4490.40	453.07	0.84
Alpine	13.75*	500yr	3.89	15042.96	1869.15	0.44	14.63	1.91	0.19	5.98	1.71	4489.79	4489.79	4492.76	545.54	0.86
Alpine	14	2yr		427.00			4.85			1.00		4479.24		4479.60	34.64	0.54
Alpine	14	5yr		1691.00			8.13			2.40		4482.05		4483.08	50.29	0.70
Alpine	14	10yr		3678.00			12.07			4.99		4483.77	4483.60	4486.03	62.26	0.96
Alpine	14	25yr		5796.00			13.60			6.02		4485.55	4485.55	4488.42	74.75	1.00
Alpine	14	50yr		7558.00			13.89			6.08		4487.01	4486.85	4490.01	86.26	0.97
Alpine	14	100yr		10704.00			15.30			7.13		4488.69	4488.69	4492.32	99.40	1.02
Alpine	14	500yr	18.74	15491.10	1406.16	0.53	13.89	1.61	0.24	5.33	1.28	4492.41	4492.41	4495.15	610.92	0.79
Alpine	14.3		Bridge													
Alpine	14.5	2yr		427.00			4.16			0.72		4479.64	4478.11	4479.91	37.07	0.44
Alpine	14.5	5yr		1691.00			6.43			1.45		4483.07	4480.99	4483.72	57.38	0.53
Alpine	14.5	10yr		3681.00			8.16			2.15		4485.87	4483.60	4486.91	77.33	0.60
Alpine	14.5	25yr		5806.00			8.93			2.45		4488.18	4485.53	4489.42	95.43	0.60
Alpine	14.5	50yr		7443.30	126.70		7.95	0.49		1.85	0.17	4490.88	4486.83	4491.84	482.31	0.49
Alpine	14.5	100yr		10544.18	174.82		11.29	0.69		3.72	0.34	4490.86	4488.70	4492.81	478.80	0.70
Alpine	14.5	500yr	642.98	13087.51	3199.52	0.81	8.92	1.54	0.33	2.01	0.88	4495.42	4492.40	4496.38	928.76	0.44
Alpine	14.6666*	2yr		427.00			5.84			1.50		4479.93		4480.46	32.19	0.68

HEC-RAS Plan: Revised FIS River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	14.6666*	5yr		1691.00			7.59			2.10		4483.37		4484.27	55.44	0.67
Alpine	14.6666*	10yr		3681.00			8.83			2.61		4486.24		4487.45	79.32	0.68
Alpine	14.6666*	25yr		5806.00			9.42			2.77		4488.53		4489.91	94.81	0.65
Alpine	14.6666*	50yr	29.82	6745.87	794.31	0.48	7.60	0.77	0.15	1.62	0.32	4491.31		4492.11	790.87	0.44
Alpine	14.6666*	100yr	128.35	8582.99	2007.66	0.65	8.53	1.11	0.25	1.96	0.56	4492.51		4493.42	915.21	0.47
Alpine	14.6666*	500yr	1128.28	10073.94	5727.78	0.81	7.41	1.37	0.29	1.33	0.65	4496.13		4496.64	1234.50	0.35
Alpine	14.8333*	2yr		427.00			6.89			2.18		4480.66		4481.39	30.81	0.86
Alpine	14.8333*	5yr		1691.00			8.26			2.59		4483.90		4484.96	57.74	0.77
Alpine	14.8333*	10yr		3681.00			9.31			2.91		4486.70		4488.05	76.82	0.72
Alpine	14.8333*	25yr	21.31	5282.39	502.29	0.68	8.93	1.10	0.24	2.37	0.31	4489.20		4490.32	602.59	0.57
Alpine	14.8333*	50yr	172.97	4501.45	2895.58	0.61	5.54	1.17	0.15	0.82	0.24	4491.99		4492.28	1088.61	0.30
Alpine	14.8333*	100yr	370.85	5292.45	5055.70	0.65	5.76	1.37	0.16	0.85	0.30	4493.34		4493.60	1278.46	0.30
Alpine	14.8333*	500yr	1270.89	5772.77	9886.34	0.67	4.91	1.48	0.14	0.57	0.29	4496.59		4496.74	1551.33	0.22
Alpine	15	2yr		427.00			5.96			1.63		4481.84		4482.39	35.86	0.74
Alpine	15	5yr		1691.00			8.41			2.66		4484.64		4485.74	55.39	0.78
Alpine	15	10yr	26.97	3228.30	425.73	0.83	8.65	1.20	0.34	2.35	0.37	4487.54		4488.57	470.36	0.61
Alpine	15	25yr	180.91	3212.11	2412.98	0.84	5.98	1.15	0.26	1.00	0.26	4490.27		4490.59	1088.00	0.35
Alpine	15	50yr	297.60	2921.71	4350.69	0.59	4.46	1.07	0.12	0.52	0.19	4492.23		4492.36	1320.71	0.24
Alpine	15	100yr	506.84	3459.86	6752.30	0.59	4.72	1.23	0.12	0.56	0.23	4493.55		4493.68	1532.74	0.24
Alpine	15	500yr	1310.14	3851.34	11768.52	0.58	4.17	1.27	0.10	0.41	0.21	4496.70		4496.78	1855.00	0.19
Alpine	15.1666*	2yr		419.00			5.36			1.29		4483.22		4483.66	36.71	0.65
Alpine	15.1666*	5yr		1699.00			8.16			2.49		4485.99		4487.02	56.32	0.75
Alpine	15.1666*	10yr	0.72	3724.98	85.31	0.57	11.69	1.42	0.21	4.57	0.59	4487.83	4487.83	4489.91	158.94	0.90
Alpine	15.1666*	25yr	74.94	4762.06	1308.00	1.18	10.42	1.67	0.53	3.22	0.63	4490.09	4490.09	4491.41	667.37	0.67
Alpine	15.1666*	50yr	224.38	4403.47	3379.15	1.01	7.58	1.48	0.33	1.57	0.42	4492.11		4492.62	1110.52	0.43
Alpine	15.1666*	100yr	416.84	4800.01	6023.15	0.96	7.20	1.65	0.29	1.36	0.46	4493.50		4493.87	1284.70	0.39
Alpine	15.1666*	500yr	1230.21	4831.69	11385.10	0.84	5.60	1.57	0.19	0.75	0.34	4496.71		4496.87	1652.42	0.26
Alpine	15.3333*	2yr		419.00			5.56			1.39		4484.33		4484.81	35.48	0.67
Alpine	15.3333*	5yr		1699.00			8.12			2.47		4487.22		4488.24	56.60	0.74
Alpine	15.3333*	10yr	0.77	3725.15	85.09	0.54	10.46	0.95	0.18	3.55	0.54	4489.63	4488.93	4491.29	175.27	0.77
Alpine	15.3333*	25yr	48.50	5323.20	773.29	1.10	11.16	1.14	0.49	3.67	0.66	4491.56	4491.56	4493.23	623.64	0.71
Alpine	15.3333*	50yr	130.00	6209.25	1667.75	1.35	11.61	1.36	0.66	3.82	0.84	4492.48	4492.48	4494.11	810.05	0.70
Alpine	15.3333*	100yr	304.42	7416.24	3519.34	1.47	12.13	1.58	0.73	3.99	1.03	4493.70	4493.70	4495.22	1102.84	0.68
Alpine	15.3333*	500yr	1022.68	7925.76	8498.56	1.33	10.11	1.69	0.53	2.55	0.95	4496.45		4497.20	1489.03	0.50
Alpine	15.5	2yr		419.00			5.58			1.39		4485.51		4485.99	34.87	0.67
Alpine	15.5	5yr		1699.00			8.11			2.47		4488.44		4489.46	56.79	0.74
Alpine	15.5	10yr		3766.09	44.91		10.70	0.85		3.76	0.46	4490.75	4490.11	4492.51	145.98	0.80
Alpine	15.5	25yr	4.14	5885.88	254.98	0.95	13.86	1.40	0.46	5.94	1.04	4491.89	4491.63	4494.75	236.36	0.95
Alpine	15.5	50yr	70.19	6686.05	1250.76	1.21	12.41	1.35	0.58	4.39	0.86	4493.67	4493.67	4495.68	700.62	0.75
Alpine	15.5	100yr	256.20	7752.65	3231.14	1.37	12.16	1.53	0.65	3.99	0.97	4495.22	4495.22	4496.81	1085.69	0.68

HEC-RAS Plan: Revised FIS River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	17.05*	5yr		1699.00			6.63			1.25		4492.38		4493.06	61.23	0.57
Alpine	17.05*	10yr		3776.88	34.12		7.79	0.64		1.48	0.21	4495.71		4496.65	130.97	0.53
Alpine	17.05*	25yr	34.65	5624.29	486.06	0.60	8.45	0.70	0.15	1.57	0.22	4498.18		4499.20	703.47	0.49
Alpine	17.05*	50yr	112.26	6759.17	1135.58	0.82	9.24	0.88	0.24	1.82	0.32	4499.08		4500.20	935.82	0.52
Alpine	17.05*	100yr	334.66	8104.96	2800.38	1.05	9.77	1.16	0.34	1.95	0.48	4500.42		4501.49	1150.92	0.51
Alpine	17.05*	500yr	747.07	10548.24	6151.69	1.10	11.23	1.59	0.38	2.47	0.79	4501.92		4503.12	1411.59	0.55
Alpine	17.1*	2yr		419.00			6.39			1.53		4489.75		4490.39	36.53	0.84
Alpine	17.1*	5yr		1699.00			7.64			1.74		4492.96		4493.87	62.12	0.71
Alpine	17.1*	10yr		3805.75	5.25		8.55	0.47		1.86	0.13	4496.10		4497.24	105.11	0.62
Alpine	17.1*	25yr	7.90	6001.92	135.18	0.52	9.64	0.67	0.13	2.13	0.22	4498.38		4499.79	365.14	0.60
Alpine	17.1*	50yr	44.69	7542.74	419.58	0.80	11.00	0.89	0.26	2.69	0.34	4499.19		4500.96	579.81	0.65
Alpine	17.1*	100yr	194.86	9677.29	1367.85	1.18	12.47	1.22	0.47	3.31	0.56	4500.34		4502.43	884.41	0.70
Alpine	17.1*	500yr	643.06	12729.17	4074.77	1.62	14.26	1.77	0.77	4.13	1.00	4501.84		4504.15	1136.52	0.74
Alpine	17.15*	2yr		419.00			5.87			1.30		4491.33		4491.87	40.55	0.78
Alpine	17.15*	5yr		1699.00			8.19			2.08		4493.93		4494.97	65.94	0.81
Alpine	17.15*	10yr		3811.00			9.26			2.28		4496.70		4498.04	80.96	0.72
Alpine	17.15*	25yr	2.28	6058.24	84.48	0.54	10.29	1.07	0.14	2.52	0.42	4498.85		4500.47	162.00	0.68
Alpine	17.15*	50yr	18.34	7856.65	132.01	0.77	12.01	0.84	0.25	3.31	0.31	4499.64	4498.54	4501.84	344.08	0.75
Alpine	17.15*	100yr	198.81	10038.33	1002.87	1.23	12.62	1.24	0.49	3.43	0.53	4501.34	4501.34	4503.55	769.61	0.72
Alpine	17.15*	500yr	798.64	12710.27	3938.09	1.61	13.25	1.76	0.70	3.55	0.86	4503.31	4503.31	4505.31	1128.21	0.69
Alpine	17.2	2yr		419.00			5.92			1.36		4492.76		4493.30	43.56	0.82
Alpine	17.2	5yr		1699.00			8.06			2.05		4495.21		4496.21	70.35	0.82
Alpine	17.2	10yr		3811.00			9.74			2.59		4497.55		4499.02	83.55	0.79
Alpine	17.2	25yr	1.14	6107.32	36.54	0.57	10.91	0.99	0.16	2.93	0.37	4499.49		4501.33	141.34	0.76
Alpine	17.2	50yr	12.46	7862.68	131.86	0.79	12.23	1.42	0.26	3.52	0.64	4500.43	4499.61	4502.71	189.75	0.80
Alpine	17.2	100yr	209.61	10323.87	706.53	1.28	12.66	1.21	0.51	3.49	0.47	4502.39	4502.39	4504.68	688.55	0.73
Alpine	17.2	500yr	875.48	13162.73	3408.79	1.66	13.20	1.79	0.72	3.54	0.81	4504.46	4504.46	4506.51	1083.30	0.69
Alpine	17.3		Bridge													
Alpine	17.4214	2yr		419.00			3.83			0.65		4493.58	4492.52	4493.81	50.97	0.46
Alpine	17.4214	5yr		1699.00			5.95			1.31		4496.23	4494.78	4496.78	76.11	0.54
Alpine	17.4214	10yr	0.01	3801.22	9.77	0.17	7.46	0.70	0.02	1.79	0.13	4498.92	4496.79	4499.79	121.65	0.55
Alpine	17.4214	25yr	15.06	5978.89	151.05	0.88	9.25	1.58	0.19	2.54	0.46	4500.47	4498.45	4501.77	192.89	0.60
Alpine	17.4214	50yr	1099.71	3355.52	3551.77	0.56	2.55	0.73	0.04	0.15	0.06	4508.06	4499.69	4508.10	1461.86	0.12
Alpine	17.4214	100yr	906.67	6799.30	3534.02	1.23	6.36	1.39	0.22	1.02	0.27	4505.27	4502.52	4505.66	1182.71	0.32
Alpine	17.4214	500yr	1829.73	8432.85	7184.43	1.27	6.90	1.80	0.24	1.15	0.40	4507.00	4504.26	4507.38	1461.86	0.33
Alpine	17.5371*	2yr		419.00			4.17			0.79		4494.33		4494.60	49.00	0.51
Alpine	17.5371*	5yr		1699.00			6.14			1.44		4497.08		4497.66	79.93	0.58
Alpine	17.5371*	10yr		3810.82	0.18		7.54	0.28		1.89	0.03	4499.67		4500.55	102.68	0.58
Alpine	17.5371*	25yr	6.23	6065.45	73.32	0.80	9.14	1.38	0.17	2.54	0.39	4501.31		4502.59	166.48	0.62

HEC-RAS Plan: Revised EIS River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	17.5371*	50yr	790.87	4437.72	2778.41	0.60	3.37	0.83	0.05	0.27	0.09	4508.06		4508.16	1395.17	0.16
Alpine	17.5371*	100yr	679.21	8688.58	1872.20	1.50	8.27	1.44	0.36	1.78	0.33	4505.31		4506.13	964.88	0.44
Alpine	17.5371*	500yr	1636.27	10814.99	4995.74	1.76	8.87	1.96	0.45	1.95	0.53	4507.05		4507.83	1192.14	0.44
Alpine	17.6528*	2yr		419.00			4.23			0.81		4495.22		4495.50	48.95	0.52
Alpine	17.6528*	5yr		1699.00			6.24			1.48		4498.03		4498.63	78.99	0.59
Alpine	17.6528*	10yr		3811.00			7.61			1.96		4500.52		4501.42	101.21	0.60
Alpine	17.6528*	25yr	2.00	6111.44	31.56	0.65	9.02	1.16	0.13	2.52	0.30	4502.21		4503.47	151.54	0.63
Alpine	17.6528*	50yr	733.01	5531.08	1742.91	0.84	4.27	0.88	0.10	0.46	0.11	4508.05		4508.25	1109.72	0.22
Alpine	17.6528*	100yr	395.79	10240.06	604.15	1.63	10.14	1.35	0.47	2.79	0.35	4505.35		4506.81	641.75	0.58
Alpine	17.6528*	500yr	1199.16	13755.46	2492.39	2.19	11.74	2.02	0.75	3.56	0.66	4506.89		4508.59	955.88	0.62
Alpine	17.7685*	2yr		419.00			4.23			0.81		4496.13		4496.41	49.20	0.52
Alpine	17.7685*	5yr		1699.00			6.25			1.46		4498.97		4499.58	74.33	0.58
Alpine	17.7685*	10yr		3811.00			7.65			2.01		4501.45		4502.35	105.04	0.62
Alpine	17.7685*	25yr	0.15	6133.48	11.37	0.32	8.90	0.93	0.05	2.51	0.22	4503.16		4504.39	142.41	0.64
Alpine	17.7685*	50yr	538.04	6685.42	783.54	1.00	5.36	0.85	0.16	0.75	0.12	4508.04		4508.42	877.90	0.29
Alpine	17.7685*	100yr	241.92	10758.45	239.64	1.57	10.72	1.45	0.47	3.21	0.41	4505.92		4507.63	386.75	0.64
Alpine	17.7685*	500yr	808.40	15712.63	925.98	2.37	13.76	1.85	0.94	5.06	0.65	4507.13		4509.78	699.37	0.77
Alpine	17.8842*	2yr		419.00			4.20			0.81		4497.05		4497.32	49.43	0.52
Alpine	17.8842*	5yr		1699.00			6.26			1.45		4499.87		4500.48	72.58	0.57
Alpine	17.8842*	10yr		3811.00			7.67			2.03		4502.42		4503.33	106.47	0.63
Alpine	17.8842*	25yr		6141.62	3.38		8.80	0.73		2.49	0.15	4504.17		4505.37	135.62	0.65
Alpine	17.8842*	50yr	319.43	7486.88	200.69	1.07	6.34	0.74	0.20	1.09	0.11	4508.09		4508.67	574.85	0.36
Alpine	17.8842*	100yr	168.79	10877.76	193.44	1.48	10.67	1.91	0.43	3.24	0.64	4506.77		4508.49	291.22	0.65
Alpine	17.8842*	500yr	873.80	15889.67	683.53	2.27	12.84	1.66	0.85	4.40	0.53	4508.55		4510.88	672.76	0.71
Alpine	18	2yr		419.00			4.20			0.80		4497.95		4498.23	48.88	0.52
Alpine	18	5yr		1699.00			6.26			1.46		4500.76		4501.37	72.80	0.57
Alpine	18	10yr		3811.00			7.67			2.00		4503.39		4504.30	102.70	0.61
Alpine	18	25yr		6144.39	0.61		8.71	0.50		2.47	0.09	4505.19		4506.37	133.23	0.65
Alpine	18	50yr	152.60	7733.26	121.15	1.02	6.94	1.25	0.20	1.36	0.27	4508.30		4509.02	312.80	0.42
Alpine	18	100yr	119.08	11000.34	120.58	1.40	10.64	1.84	0.41	3.28	0.61	4507.69		4509.41	266.05	0.67
Alpine	18	500yr	762.69	16281.63	402.68	2.22	12.74	1.81	0.83	4.38	0.48	4509.54		4511.90	534.40	0.72
Alpine	18.2*	2yr		419.00			5.50			1.44		4502.14		4502.61	43.46	0.73
Alpine	18.2*	5yr		1699.00			7.92			2.43		4504.66		4505.63	65.32	0.77
Alpine	18.2*	10yr		3811.00			9.35			3.04		4507.18		4508.54	89.04	0.77
Alpine	18.2*	25yr		6143.03	1.97		10.40	0.71		3.53	0.16	4509.04		4510.72	118.38	0.78
Alpine	18.2*	50yr		7989.28	17.72		12.20	1.33		4.75	0.45	4509.62	4509.14	4511.93	135.66	0.89
Alpine	18.2*	100yr	5.31	11039.31	195.38	0.83	12.98	2.22	0.21	5.04	0.92	4511.31	4510.79	4513.88	208.53	0.85
Alpine	18.2*	500yr	440.63	15217.98	1788.39	1.93	13.04	2.28	0.67	4.58	0.87	4513.98	4513.98	4516.29	708.12	0.73
Alpine	18.4*	2yr		419.00			4.53			0.94		4507.18		4507.50	47.23	0.57

HEC-RAS Plan: Revised FIS River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl*
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	18.4*	5yr		1699.00			6.92			1.82		4509.81		4510.56	70.27	0.65
Alpine	18.4*	10yr		3811.00			8.90			2.70		4512.14		4513.37	87.72	0.71
Alpine	18.4*	25yr		6084.48	60.52		10.42	1.42		3.43	0.45	4513.83		4515.50	151.27	0.75
Alpine	18.4*	50yr		7688.20	318.80		10.67	1.41		3.43	0.43	4515.20		4516.90	368.66	0.71
Alpine	18.4*	100yr	9.14	9743.78	1487.08	0.83	11.28	2.12	0.19	3.64	0.77	4516.57		4518.29	546.24	0.69
Alpine	18.4*	500yr	117.50	13506.43	3823.07	1.52	13.48	2.89	0.48	4.95	1.27	4517.88		4520.09	744.61	0.77
Alpine	18.6*	2yr		419.00			5.05			1.21		4511.61		4512.01	46.32	0.67
Alpine	18.6*	5yr		1699.00			7.40			2.09		4514.22		4515.07	66.65	0.70
Alpine	18.6*	10yr		3802.84	8.16		9.45	0.74		3.00	0.17	4516.58		4517.97	117.87	0.74
Alpine	18.6*	25yr		5668.36	476.64		10.48	1.59		3.42	0.52	4518.29		4519.86	399.93	0.73
Alpine	18.6*	50yr		6635.72	1371.28		10.65	2.10		3.41	0.78	4519.25		4520.72	501.20	0.70
Alpine	18.6*	100yr		8116.19	3123.81		11.24	2.69		3.66	1.11	4520.36		4521.81	586.34	0.70
Alpine	18.6*	500yr	33.18	10247.94	7165.88	1.11	11.49	3.19	0.28	3.58	1.36	4522.22		4523.49	762.79	0.65
Alpine	18.8*	2yr		419.00			4.68			1.01		4516.35		4516.69	45.47	0.59
Alpine	18.8*	5yr		1699.00			7.33			2.02		4518.87		4519.70	62.87	0.67
Alpine	18.8*	10yr		3382.77	428.23		8.87	1.44		2.59	0.44	4521.11		4522.20	403.95	0.67
Alpine	18.8*	25yr		4339.78	1805.22		9.04	2.10		2.52	0.73	4522.51		4523.43	536.83	0.62
Alpine	18.8*	50yr		5096.43	2910.57		9.67	2.49		2.82	0.95	4523.15		4524.11	578.97	0.64
Alpine	18.8*	100yr		6328.54	4911.46		10.57	2.90		3.26	1.21	4524.12		4525.16	675.19	0.66
Alpine	18.8*	500yr		8280.80	9166.20		11.93	3.66		4.00	1.76	4525.37		4526.53	748.36	0.70
Alpine	19	2yr		419.00			4.28			1.27		4521.03	4520.20	4521.31	50.11	0.54
Alpine	19	5yr		1506.26	192.74		6.37	1.11		2.22	0.31	4523.59	4522.38	4524.15	383.15	0.56
Alpine	19	10yr		2167.51	1643.49		6.56	2.04		2.12	0.71	4525.19	4524.51	4525.60	524.28	0.49
Alpine	19	25yr		2871.91	3273.09		7.49	2.63		2.66	1.06	4526.07	4525.22	4526.53	586.75	0.52
Alpine	19	50yr		3306.72	4700.28		7.81	2.93		2.81	1.24	4526.73	4525.72	4527.20	626.31	0.52
Alpine	19	100yr		4099.61	7140.39		8.42	3.18		3.14	1.40	4527.76	4526.35	4528.26	758.53	0.53
Alpine	19	500yr		5135.11	12311.89		8.97	3.83		3.40	1.82	4529.12	4527.20	4529.65	789.50	0.53

HEC-RAS Plan: Opt A River: Alpine Creek Reach: Alpine

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	1	2yr		448.00			5.81			1.47		4404.48	4403.86	4405.00	32.84	0.67
Alpine	1	5yr	167.82	1552.18		1.47	8.63		0.53	2.67		4407.22	4407.11	4408.26	181.99	0.73
Alpine	1	10yr	1214.13	2666.87		3.08	10.32		1.61	3.49		4409.02	4408.80	4410.20	204.43	0.76
Alpine	1	25yr	2369.28	3636.89	28.83	4.00	11.52	0.75	2.38	4.11	0.15	4410.26	4409.74	4411.59	380.51	0.78
Alpine	1	50yr	3195.85	4324.30	324.85	4.50	12.34	1.95	2.84	4.56	0.61	4410.99	4410.79	4412.42	386.29	0.80
Alpine	1	100yr	4596.94	5426.79	1158.27	5.17	13.51	3.19	3.50	5.22	1.29	4412.08	4411.77	4413.64	394.87	0.81
Alpine	1	500yr	7322.23	7477.60	3275.17	6.15	15.35	4.62	4.19	6.32	2.25	4413.90	4413.32	4415.71	434.96	0.84
Alpine	1.33333*	2yr		445.00			5.14			1.18		4405.84		4406.25	39.75	0.61
Alpine	1.33333*	5yr		1687.00			8.08			2.39		4408.55		4409.56	51.70	0.71
Alpine	1.33333*	10yr		3895.00			12.85			5.60		4410.24	4410.24	4412.81	59.65	1.01
Alpine	1.33333*	25yr	522.62	5112.38		2.01	11.31		0.83	3.95		4412.60	4412.60	4414.41	259.08	0.76
Alpine	1.33333*	50yr	1377.60	6532.40		2.97	12.53		1.52	4.65		4413.64	4413.64	4415.68	262.97	0.79
Alpine	1.33333*	100yr	2808.12	8530.18	1.70	4.01	14.20	0.52	2.43	5.72	0.09	4414.83	4414.83	4417.25	292.58	0.83
Alpine	1.33333*	500yr	5756.68	11878.42	659.90	5.33	16.37	2.77	3.75	7.14	1.07	4416.71	4416.71	4419.55	432.96	0.87
Alpine	1.66666*	2yr		445.00			4.87			1.08		4407.01		4407.38	44.46	0.60
Alpine	1.66666*	5yr		1687.00			7.08			1.80		4409.93		4410.71	55.86	0.60
Alpine	1.66666*	10yr		3895.00			8.30			2.19		4413.45		4414.51	75.98	0.59
Alpine	1.66666*	25yr		5635.00			11.30			4.02		4413.82		4415.81	78.06	0.79
Alpine	1.66666*	50yr		7910.00			13.88			5.92		4414.71		4417.70	82.97	0.93
Alpine	1.66666*	100yr	640.68	10699.32		2.02	13.42		0.84	5.08		4417.36	4417.36	4420.01	314.31	0.78
Alpine	1.66666*	500yr	3137.33	15154.26	3.40	3.72	15.31	0.67	2.09	6.18	0.12	4419.60	4419.60	4422.65	354.81	0.80
Alpine	2	2yr		445.00			4.73			1.04		4408.17	4407.57	4408.52	50.14	0.61
Alpine	2	5yr		1687.00			6.75			1.66		4410.92	4409.61	4411.62	61.23	0.59
Alpine	2	10yr		3895.00			8.26			2.16		4414.22	4411.88	4415.28	74.21	0.58
Alpine	2	25yr		5635.00			9.64			2.86		4415.64	4413.38	4417.08	85.36	0.65
Alpine	2	50yr		7910.00			10.21			3.06		4417.71	4415.09	4419.33	98.13	0.64
Alpine	2	100yr		11340.00			13.09			4.94		4418.62	4417.14	4421.28	103.75	0.80
Alpine	2	500yr		18295.00			17.65			8.59		4420.23	4420.15	4425.06	192.15	0.99
Alpine	2.3		Bridge													
Alpine	2.5	2yr		445.00			3.63			0.57		4408.72	4407.57	4408.93	53.03	0.42
Alpine	2.5	5yr		1687.00			5.71			1.14		4411.65	4409.59	4412.16	62.92	0.46
Alpine	2.5	10yr		3895.00			7.18			1.60		4415.14	4411.88	4415.94	81.58	0.49
Alpine	2.5	25yr		5635.00			8.02			1.92		4416.96	4413.38	4417.95	93.47	0.52
Alpine	2.5	50yr		7910.00			8.66			2.14		4419.07	4415.09	4420.23	105.92	0.52
Alpine	2.5	100yr		11340.00			9.93			2.65		4421.22	4417.14	4422.75	298.39	0.53
Alpine	2.5	500yr	3377.08	14822.47	95.45	1.84	9.00	1.00	0.51	1.94	0.16	4425.98	4420.15	4427.01	704.05	0.40
Alpine	3	2yr		445.00			4.84			1.12		4408.89		4409.25	53.46	0.65
Alpine	3	5yr		1687.00			2.29			0.18		4412.28		4412.36	269.17	0.24
Alpine	3	10yr		3697.13	197.87		2.03	0.70		0.11	0.06	4416.13		4416.19	375.04	0.14

HEC-RAS Plan: Opt A River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	3	25yr	5.44	5263.70	365.86	0.23	2.17	0.77	0.01	0.11	0.06	4418.19		4418.26	428.93	0.13
Alpine	3	50yr	66.38	7239.67	603.95	0.43	2.33	0.83	0.02	0.12	0.07	4420.50		4420.58	496.71	0.13
Alpine	3	100yr	261.65	10086.20	992.15	0.64	2.60	0.91	0.04	0.14	0.08	4423.11		4423.20	548.13	0.13
Alpine	3	500yr	827.98	15582.05	1884.97	0.99	3.07	1.07	0.08	0.18	0.10	4427.17		4427.30	587.22	0.13
Alpine	3.16666*	2yr		445.00			4.25			0.89		4411.91		4412.20	66.65	0.60
Alpine	3.16666*	5yr		1687.00			5.35			0.67		4413.37	4413.37	4413.81	354.09	1.00
Alpine	3.16666*	10yr		3893.55	1.45		2.84	0.15		0.25	0.01	4416.23		4416.35	459.97	0.26
Alpine	3.16666*	25yr		5517.82	117.18		2.55	0.68		0.18	0.07	4418.26		4418.36	478.61	0.19
Alpine	3.16666*	50yr		7607.21	302.79		2.47	0.80		0.15	0.07	4420.56		4420.65	507.03	0.16
Alpine	3.16666*	100yr		10749.21	590.79		2.59	0.86		0.15	0.08	4423.16		4423.26	550.94	0.14
Alpine	3.16666*	500yr	67.37	16946.45	1281.18	0.56	2.89	0.97	0.04	0.17	0.09	4427.23		4427.35	637.54	0.14
Alpine	3.33333*	2yr		445.00			4.13			0.88		4414.81		4415.07	78.09	0.62
Alpine	3.33333*	5yr		1687.00			4.38			0.47		4416.42		4416.72	405.93	0.79
Alpine	3.33333*	10yr		3895.00			6.82			1.45		4416.88	4416.88	4417.60	408.61	1.02
Alpine	3.33333*	25yr		5635.00			4.60			0.69		4418.44		4418.76	427.49	0.48
Alpine	3.33333*	50yr		7864.79	45.21		3.59	0.60		0.36	0.07	4420.65		4420.85	527.51	0.28
Alpine	3.33333*	100yr		11049.96	290.04		3.30	0.94		0.27	0.11	4423.22		4423.39	560.69	0.21
Alpine	3.33333*	500yr	1.63	17412.86	880.51	0.19	3.32	1.03	0.01	0.24	0.11	4427.28		4427.44	662.91	0.18
Alpine	3.5*	2yr		445.00			3.71			0.73		4417.77		4417.98	95.29	0.58
Alpine	3.5*	5yr		1687.00			5.20			0.48		4419.19	4419.19	4419.61	431.05	1.06
Alpine	3.5*	10yr		3895.00			4.81			0.78		4420.30		4420.66	443.80	0.63
Alpine	3.5*	25yr		5635.00			7.50			1.82		4420.17	4420.17	4421.04	436.66	1.01
Alpine	3.5*	50yr		7910.00			6.91			1.58		4421.05		4421.79	450.52	0.76
Alpine	3.5*	100yr		11339.39	0.61		5.12	0.14		0.75	0.01	4423.38		4423.78	549.71	0.42
Alpine	3.5*	500yr		17833.67	461.33		4.32	1.13		0.44	0.16	4427.35		4427.63	625.52	0.26
Alpine	3.66666*	2yr		445.00			3.44			0.78		4420.67		4420.86	102.68	0.54
Alpine	3.66666*	5yr		1687.00			4.91			0.62		4422.21		4422.59	335.13	0.85
Alpine	3.66666*	10yr		3895.00			6.58			1.56		4422.95		4423.62	339.19	0.88
Alpine	3.66666*	25yr		5635.00			6.03			1.36		4423.94		4424.50	353.77	0.65
Alpine	3.66666*	50yr		7910.00			7.68			2.17		4424.20		4425.12	356.10	0.80
Alpine	3.66666*	100yr		11340.00			10.11			3.70		4424.46	4424.46	4426.05	358.30	1.01
Alpine	3.66666*	500yr		18270.01	24.99		8.38	0.75		2.13	0.14	4427.32		4428.41	468.76	0.62
Alpine	3.83333*	2yr		445.00			3.27			0.71		4423.56		4423.72	110.11	0.52
Alpine	3.83333*	5yr		1687.00			5.39			1.08		4425.06		4425.51	175.56	0.71
Alpine	3.83333*	10yr		3895.00			6.87			1.84		4426.45		4427.18	189.47	0.70
Alpine	3.83333*	25yr		5635.00			9.01			3.12		4426.75		4428.01	192.52	0.88
Alpine	3.83333*	50yr		7910.00			9.78			3.47		4427.68		4429.17	201.83	0.86
Alpine	3.83333*	100yr		11340.00			10.67			3.86		4428.90		4430.67	214.02	0.84
Alpine	3.83333*	500yr	2.60	18292.40		0.84	13.80		0.20	6.06		4430.10	4430.10	4433.06	241.13	1.00

HEC-RAS Plan: Opt A River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	4	2yr		445.00			3.24			0.71		4426.40		4426.56	117.40	0.53
Alpine	4	5yr		1687.00			5.19			1.41		4427.92		4428.34	129.49	0.58
Alpine	4	10yr		3895.00			6.69			1.77		4429.36		4430.05	188.58	0.67
Alpine	4	25yr		5635.00			7.12			1.88		4430.44		4431.22	199.37	0.63
Alpine	4	50yr		7910.00			8.16			2.34		4431.31		4432.34	208.12	0.67
Alpine	4	100yr		11340.00			9.40			2.92		4432.42		4433.79	219.20	0.71
Alpine	4	500yr	150.93	18119.46	24.61	2.01	10.64	0.66	0.59	3.41	0.12	4434.62		4436.36	426.26	0.69
Alpine	4.25*	2yr		430.00			3.41			0.78		4429.30		4429.48	108.45	0.56
Alpine	4.25*	5yr		1688.00			4.58			0.84		4430.65		4430.98	256.49	0.67
Alpine	4.25*	10yr		3624.00			5.24			1.07		4431.88		4432.31	268.81	0.58
Alpine	4.25*	25yr		5657.00			6.18			1.40		4432.70		4433.29	276.99	0.60
Alpine	4.25*	50yr		7379.00			6.27			1.34		4433.63		4434.24	286.27	0.55
Alpine	4.25*	100yr		10490.00			6.78			1.45		4434.89		4435.60	298.90	0.53
Alpine	4.25*	500yr		16703.00			7.54			1.61		4437.05		4437.93	320.46	0.51
Alpine	4.5*	2yr		430.00			3.57			0.81		4432.13		4432.33	86.37	0.53
Alpine	4.5*	5yr		1688.00			6.40			2.14		4433.62		4434.26	105.63	0.71
Alpine	4.5*	10yr		3624.00			7.28			1.64		4434.64	4434.64	4435.46	306.38	1.01
Alpine	4.5*	25yr		5657.00			8.19			2.30		4435.26	4435.20	4436.30	312.62	0.97
Alpine	4.5*	50yr		7379.00			9.04			2.83		4435.66	4435.62	4436.93	316.60	0.99
Alpine	4.5*	100yr		10490.00			9.61			3.11		4436.52		4437.95	325.18	0.92
Alpine	4.5*	500yr		16703.00			10.05			3.11		4438.23		4439.80	342.26	0.80
Alpine	4.75*	2yr		430.00			3.87			0.93		4434.84		4435.07	74.34	0.56
Alpine	4.75*	5yr		1688.00			6.00			1.76		4436.89		4437.45	91.85	0.60
Alpine	4.75*	10yr		3624.00			6.70			1.49		4438.21		4438.91	212.11	0.74
Alpine	4.75*	25yr		5657.00			7.90			2.09		4439.02		4439.99	220.21	0.77
Alpine	4.75*	50yr		7379.00			8.71			2.50		4439.61		4440.79	226.08	0.79
Alpine	4.75*	100yr		10490.00			10.44			3.50		4440.29		4441.99	232.93	0.89
Alpine	4.75*	500yr		16703.00			13.08			5.21		4441.44	4441.44	4444.09	244.35	1.01
Alpine	5	2yr		430.00			4.03			0.98		4437.60		4437.85	65.40	0.56
Alpine	5	5yr		1688.00			6.69			2.15		4439.63		4440.33	78.00	0.66
Alpine	5	10yr		3624.00			9.76			4.17		4441.07		4442.55	86.95	0.83
Alpine	5	25yr		5657.00			12.21			6.22		4442.09	4441.96	4444.41	93.28	0.97
Alpine	5	50yr		7379.00			13.42			7.24		4443.00	4443.00	4445.79	98.87	1.00
Alpine	5	100yr		10490.00			14.65			8.16		4444.60	4444.60	4447.93	108.79	1.01
Alpine	5	500yr		16703.00			16.35			9.47		4447.21	4447.21	4451.36	125.00	1.01
Alpine	5.33333*	2yr		428.00			6.27			2.61		4441.15	4441.15	4441.76	56.47	1.00
Alpine	5.33333*	5yr		1690.00			9.26			4.39		4442.97	4442.97	4444.30	68.73	1.00
Alpine	5.33333*	10yr		3655.00			11.36			5.80		4444.83	4444.83	4446.83	81.20	1.01
Alpine	5.33333*	25yr		5736.00			12.70			6.74		4446.33	4446.33	4448.84	91.31	1.01
Alpine	5.33333*	50yr		7481.00			13.53			7.33		4447.40	4447.40	4450.24	98.49	1.01

HEC-RAS Plan: Opt A River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	5.33333*	100yr	1353.68	9164.25	94.07	1.60	9.72	1.07	0.45	3.40	0.25	4450.93	4450.93	4452.21	1121.97	0.61
Alpine	5.33333*	500yr	4535.62	11674.85	613.53	2.41	10.79	1.98	0.93	3.99	0.64	4452.09	4452.09	4453.37	1261.24	0.63
Alpine	5.66666*	2yr		428.00			6.47			2.73		4445.26	4445.26	4445.91	51.32	1.01
Alpine	5.66666*	5yr		1690.00			9.42			4.51		4447.19	4447.19	4448.57	65.79	1.00
Alpine	5.66666*	10yr		3655.00			11.38			5.80		4449.13	4449.13	4451.14	80.30	1.00
Alpine	5.66666*	25yr	1007.51	4673.48	55.01	1.50	8.24	0.86	0.47	2.72	0.19	4451.85	4451.85	4452.72	979.02	0.61
Alpine	5.66666*	50yr	1936.98	5337.12	206.90	1.91	8.70	1.35	0.63	2.98	0.37	4452.30	4452.30	4453.16	1149.52	0.63
Alpine	5.66666*	100yr	3647.00	6387.63	577.37	2.33	9.42	1.94	0.93	3.41	0.63	4452.92	4452.92	4453.78	1292.74	0.66
Alpine	5.66666*	500yr	7058.96	8453.13	1311.91	3.21	11.26	2.68	1.60	4.72	1.11	4453.59	4453.59	4454.66	1358.73	0.75
Alpine	6	2yr		428.00			6.58			2.75		4449.39	4449.39	4450.06	46.79	0.98
Alpine	6	5yr		1690.00			9.38			4.44		4451.45	4451.45	4452.82	64.79	0.99
Alpine	6	10yr		3655.00			11.20			5.62		4453.44	4453.44	4455.39	1152.26	0.99
Alpine	6	25yr	2897.95	2322.50	515.56	1.93	6.19	1.51	0.65	1.67	0.45	4454.02	4454.02	4454.29	1295.84	0.53
Alpine	6	50yr	3779.56	3029.05	672.40	2.51	8.07	1.97	1.11	2.85	0.76	4454.02	4454.02	4454.48	1295.84	0.69
Alpine	6	100yr	5562.48	3882.84	1166.67	3.05	9.57	2.60	1.72	3.94	1.24	4454.36	4454.22	4454.97	1358.35	0.80
Alpine	6	500yr	9701.72	4686.76	2435.52	3.47	9.38	3.00	1.94	3.58	1.44	4455.37	4454.73	4455.88	1463.66	0.72
Alpine	6.125*	2yr		428.00			3.24			0.57		4451.25	4450.06	4451.42	60.65	0.39
Alpine	6.125*	5yr		1690.00			5.13			1.20		4453.92	4452.01	4454.33	646.78	0.47
Alpine	6.125*	10yr	1523.43	1549.45	582.12	0.88	2.93	0.86	0.14	0.36	0.13	4455.96	4453.92	4456.03	1403.49	0.23
Alpine	6.125*	25yr	2076.38	2852.30	807.33	1.56	5.94	1.59	0.49	1.50	0.46	4455.51	4455.51	4455.80	1347.08	0.48
Alpine	6.125*	50yr	2708.05	3720.02	1052.93	2.04	7.74	2.08	0.83	2.55	0.79	4455.51	4455.51	4456.00	1347.08	0.63
Alpine	6.125*	100yr	4508.95	4360.51	1742.54	2.46	8.07	2.42	1.09	2.70	0.98	4456.07	4455.75	4456.54	1422.58	0.63
Alpine	6.125*	500yr	7891.00	5770.80	3162.20	3.15	9.33	3.09	1.63	3.45	1.46	4456.80	4456.26	4457.36	1469.60	0.69
Alpine	6.25*	2yr		428.00			3.14			0.54		4451.87	4450.71	4452.02	63.82	0.38
Alpine	6.25*	5yr		1690.00			4.85			1.07		4454.66	4452.56	4455.03	203.35	0.44
Alpine	6.25*	10yr		3655.00			8.21			2.94		4455.66	4454.48	4456.71	883.24	0.70
Alpine	6.25*	25yr		5736.00			11.93			6.13		4456.00	4456.00	4458.21	1144.87	0.99
Alpine	6.25*	50yr	1668.97	4578.58	1233.45	1.74	8.11	2.05	0.66	2.76	0.85	4456.74	4456.74	4457.39	1356.40	0.65
Alpine	6.25*	100yr	3143.20	5427.96	2040.85	2.26	8.67	2.48	0.99	3.08	1.14	4457.26	4457.08	4457.90	1406.70	0.67
Alpine	6.25*	500yr	6201.07	6964.54	3658.39	2.92	9.56	3.04	1.45	3.57	1.55	4458.11	4457.70	4458.77	1471.85	0.69
Alpine	6.375*	2yr		428.00			3.04			0.51		4452.46	4451.31	4452.60	66.84	0.37
Alpine	6.375*	5yr		1690.00			4.70			0.98		4455.29	4453.09	4455.64	109.58	0.41
Alpine	6.375*	10yr		3655.00			6.44			1.75		4457.32	4454.91	4457.96	1021.59	0.52
Alpine	6.375*	25yr	1480.26	2823.79	1431.95	0.92	3.47	1.11	0.15	0.47	0.20	4459.21	4456.48	4459.31	1458.86	0.25
Alpine	6.375*	50yr	871.45	5156.61	1452.95	1.38	7.94	2.05	0.46	2.61	0.83	4457.98	4457.90	4458.67	1301.76	0.62
Alpine	6.375*	100yr	2032.96	6133.04	2446.01	1.88	8.45	2.50	0.73	2.89	1.13	4458.56	4458.39	4459.23	1412.30	0.64
Alpine	6.375*	500yr	4609.44	7943.88	4270.68	2.60	9.45	3.07	1.20	3.45	1.54	4459.41	4459.04	4460.13	1472.73	0.67
Alpine	6.5	2yr		428.00			2.95			0.48		4453.02	4451.90	4453.16	70.15	0.36
Alpine	6.5	5yr		1690.00			4.55			0.92		4455.86	4453.60	4456.18	89.70	0.39

HEC-RAS Plan: Opt A River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	7.8*	100yr	3478.90	5087.69	2045.41	1.92	9.65	1.65	0.90	3.56	1.06	4465.03	4465.01	4465.75	1865.95	0.67
Alpine	7.8*	500yr	7279.44	5688.19	3856.37	2.28	9.13	1.88	1.06	3.01	1.18	4466.21	4465.63	4466.70	1976.79	0.58
Alpine	8	2yr		428.00			5.02			1.41		4460.22	4459.59	4460.61	41.96	0.62
Alpine	8	5yr		1690.00			8.14			3.03		4462.75	4461.92	4463.78	138.92	0.74
Alpine	8	10yr	864.99	2611.48	178.53	1.59	8.04	0.70	0.65	2.69	0.29	4464.71	4464.71	4465.44	1018.72	0.63
Alpine	8	25yr	1840.04	3202.86	693.10	1.80	8.72	1.10	0.57	3.04	0.57	4465.38	4465.38	4466.05	1661.34	0.64
Alpine	8	50yr	2500.48	3753.55	1226.98	1.69	9.54	1.39	0.75	3.56	0.83	4465.79	4465.59	4466.51	1890.72	0.68
Alpine	8	100yr	4504.37	4048.04	2059.59	1.99	9.31	1.56	0.92	3.27	0.94	4466.43	4466.27	4466.98	1997.45	0.63
Alpine	8	500yr	8161.59	4948.32	3714.09	2.51	10.20	1.96	1.31	3.79	1.34	4467.22	4466.82	4467.75	2082.11	0.65
Alpine	8.33333*	2yr		428.00			3.96			0.87		4461.12	4460.14	4461.36	50.54	0.48
Alpine	8.33333*	5yr		1690.00			6.23			1.69		4463.99	4462.27	4464.59	74.14	0.52
Alpine	8.33333*	10yr		3655.00			11.13			5.14		4464.90	4464.35	4466.83	367.63	0.86
Alpine	8.33333*	25yr	1363.43	3446.23	926.34	1.20	7.88	0.95	0.40	2.38	0.42	4466.58	4466.58	4467.16	2021.68	0.54
Alpine	8.33333*	50yr	2134.21	3917.23	1429.55	1.48	8.58	1.15	0.56	2.78	0.57	4466.87	4466.87	4467.48	2071.91	0.57
Alpine	8.33333*	100yr	3547.90	4715.80	2348.30	1.89	9.78	1.47	0.85	3.55	0.86	4467.25	4467.25	4467.94	2137.70	0.64
Alpine	8.33333*	500yr	6490.17	6084.33	4249.50	2.56	11.70	1.97	1.43	4.95	1.43	4467.83	4467.83	4468.65	2230.96	0.73
Alpine	8.66666*	2yr		428.00			3.43			0.65		4461.69		4461.87	57.96	0.41
Alpine	8.66666*	5yr		1690.00			5.59			1.34		4464.61		4465.10	63.39	0.45
Alpine	8.66666*	10yr	656.44	2437.26	561.30	0.69	4.96	0.52	0.14	0.92	0.13	4467.48		4467.74	2159.21	0.32
Alpine	8.66666*	25yr	1042.73	3801.07	892.20	1.09	7.72	0.82	0.33	2.24	0.32	4467.50	4467.50	4468.11	2162.21	0.51
Alpine	8.66666*	50yr	1631.49	4436.72	1412.79	1.37	8.73	1.03	0.50	2.83	0.48	4467.73	4467.73	4468.45	2212.62	0.56
Alpine	8.66666*	100yr	2403.88	6119.06	2089.06	1.92	11.94	1.45	0.96	5.28	0.93	4467.80		4469.09	2223.55	0.77
Alpine	8.66666*	500yr	5245.03	6906.79	4672.17	2.46	12.09	1.88	1.35	5.22	1.35	4468.66		4469.64	2372.13	0.74
Alpine	9	2yr		428.00			3.38			0.70		4462.21		4462.39	80.50	0.48
Alpine	9	5yr		1690.00			4.06			0.75		4465.25		4465.51	110.02	0.37
Alpine	9	10yr	55.00	3477.65	122.36	0.37	4.94	0.38	0.06	0.98	0.09	4467.65		4468.01	1217.90	0.37
Alpine	9	25yr	197.99	5190.60	347.41	0.66	7.02	0.66	0.16	1.95	0.17	4467.93		4468.62	1830.56	0.51
Alpine	9	50yr	502.75	6290.91	687.34	0.96	8.07	0.74	0.29	2.54	0.30	4468.24		4469.09	2200.92	0.57
Alpine	9	100yr	2012.18	5959.38	2640.44	1.23	6.34	0.97	0.36	1.48	0.37	4469.51		4469.86	2589.56	0.41
Alpine	9	500yr	3412.15	8958.76	4453.09	1.87	9.29	1.49	0.81	3.15	0.84	4469.69		4470.43	2632.03	0.59
Alpine	9.3		Bridge													
Alpine	9.5	2yr		428.00			2.48			0.35		4462.76	4461.48	4462.86	85.87	0.31
Alpine	9.5	5yr		1690.00			3.62			0.58		4465.70	4463.06	4465.90	114.35	0.32
Alpine	9.5	10yr	239.95	3098.50	327.55	0.47	3.99	0.36	0.07	0.62	0.07	4468.22	4464.63	4468.43	2193.16	0.28
Alpine	9.5	25yr	892.16	3677.20	1195.64	0.72	4.15	0.57	0.13	0.64	0.14	4469.09	4465.92	4469.26	2482.02	0.28
Alpine	9.5	50yr	1451.61	4164.16	1901.23	0.86	4.40	0.68	0.17	0.71	0.18	4469.55	4468.28	4469.72	2595.20	0.28
Alpine	9.5	100yr	2428.99	5064.44	3162.57	1.08	4.97	0.87	0.25	0.88	0.27	4470.12	4468.86	4470.31	2699.24	0.31
Alpine	9.5	500yr	4353.63	6808.87	5704.50	1.46	6.15	1.20	0.43	1.32	0.48	4470.82	4469.48	4471.07	2768.50	0.37

HEC-RAS Plan: Opt A River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	9.56666*	2yr		428.00			3.80			0.86		4463.23		4463.45	65.97	0.51
Alpine	9.56666*	5yr		1690.00			5.52			1.35		4465.97		4466.44	73.69	0.48
Alpine	9.56666*	10yr		3569.64	96.36		7.45	0.49		2.18	0.15	4468.25		4469.09	559.29	0.53
Alpine	9.56666*	25yr	2.99	5227.83	534.18	0.34	9.93	0.96	0.07	3.78	0.47	4468.85		4470.24	868.57	0.68
Alpine	9.56666*	50yr	224.65	5377.30	1915.05	0.96	8.89	1.08	0.29	2.91	0.52	4469.84	4469.84	4470.72	1810.67	0.57
Alpine	9.56666*	100yr	269.74	7890.17	2496.10	1.35	13.23	1.54	0.60	6.47	1.08	4469.73		4471.76	1777.19	0.85
Alpine	9.56666*	500yr	1127.22	9367.25	6372.53	1.96	13.96	2.16	1.03	6.93	1.76	4470.67		4472.38	2047.72	0.85
Alpine	9.63333*	2yr		428.00			4.74			1.10		4464.28		4464.63	55.90	0.66
Alpine	9.63333*	5yr		1690.00			6.69			1.75		4466.64		4467.34	79.53	0.66
Alpine	9.63333*	10yr		3542.83	123.17		7.99	0.61		2.14	0.22	4468.94		4469.90	471.74	0.62
Alpine	9.63333*	25yr	4.85	4861.03	899.11	0.45	8.75	0.86	0.09	2.42	0.37	4470.21		4471.22	1294.97	0.62
Alpine	9.63333*	50yr	12.47	6125.64	1378.89	0.65	10.77	1.13	0.18	3.64	0.61	4470.36		4471.83	1351.53	0.75
Alpine	9.63333*	100yr	305.68	5738.03	4612.29	1.03	7.87	1.26	0.28	1.79	0.56	4472.14		4472.67	1831.44	0.49
Alpine	9.63333*	500yr	642.36	8273.99	7950.64	1.52	10.73	1.82	0.58	3.27	1.12	4472.61		4473.51	1931.91	0.65
Alpine	9.7	2yr		428.00			4.78			1.10		4465.57		4465.93	53.08	0.65
Alpine	9.7	5yr		1690.00			7.36			2.14		4467.76		4468.60	74.80	0.74
Alpine	9.7	10yr		3386.11	279.89		8.34	0.92		2.45	0.44	4469.87		4470.87	488.24	0.70
Alpine	9.7	25yr	0.21	4511.61	1253.19	0.26	8.62	1.23	0.04	2.48	0.46	4471.08		4471.98	1202.06	0.66
Alpine	9.7	50yr	27.07	4840.19	2649.74	0.75	7.73	1.17	0.19	1.88	0.54	4472.10		4472.71	1446.15	0.54
Alpine	9.7	100yr	66.93	6329.90	4259.17	1.06	9.53	1.54	0.34	2.79	0.89	4472.49		4473.34	1524.21	0.65
Alpine	9.7	500yr	232.03	8556.57	8078.40	1.56	11.41	2.04	0.64	3.85	1.42	4473.34		4474.40	1699.32	0.73
Alpine	9.8*	2yr		428.00			3.77			0.64		4466.57		4466.79	54.86	0.46
Alpine	9.8*	5yr		1669.15	20.85		6.08	0.39		1.38	0.11	4469.04		4469.61	264.24	0.56
Alpine	9.8*	10yr	0.44	2835.03	830.52	0.25	6.32	0.74	0.04	1.34	0.26	4471.16		4471.65	1254.69	0.49
Alpine	9.8*	25yr	29.44	3330.33	2405.22	0.64	6.12	0.97	0.13	1.18	0.37	4472.25		4472.59	1476.34	0.43
Alpine	9.8*	50yr	76.67	3807.72	3632.62	0.81	6.38	1.11	0.18	1.24	0.44	4472.85		4473.18	1598.19	0.43
Alpine	9.8*	100yr	183.26	4726.84	5745.91	1.03	7.17	1.33	0.28	1.52	0.60	4473.56		4473.93	1743.65	0.46
Alpine	9.8*	500yr	484.20	6175.63	10207.17	1.35	8.16	1.68	0.42	1.88	0.87	4474.66		4475.07	1862.11	0.49
Alpine	9.9*	2yr		428.00			3.78			0.63		4467.15		4467.37	51.40	0.45
Alpine	9.9*	5yr		1507.64	182.36		5.49	0.63		1.10	0.21	4469.83		4470.25	457.20	0.48
Alpine	9.9*	10yr	7.20	2180.43	1478.37	0.35	5.19	0.78	0.08	0.88	0.25	4471.81		4472.06	1384.60	0.39
Alpine	9.9*	25yr	42.94	2721.89	3000.17	0.53	5.58	0.97	0.14	0.97	0.35	4472.69		4472.93	1564.30	0.39
Alpine	9.9*	50yr	89.85	3141.69	4285.46	0.64	5.92	1.10	0.19	1.06	0.42	4473.27		4473.51	1682.05	0.39
Alpine	9.9*	100yr	195.56	3878.17	6582.27	0.80	6.59	1.30	0.26	1.27	0.55	4474.02		4474.28	1823.08	0.42
Alpine	9.9*	500yr	467.42	5056.00	11343.57	1.01	7.49	1.65	0.38	1.57	0.80	4475.16		4475.45	1884.11	0.44
Alpine	10	2yr		428.00			3.94			0.67		4467.70	4466.58	4467.94	46.08	0.45
Alpine	10	5yr		1690.00			6.91			1.73		4470.28	4468.86	4471.02	555.47	0.60
Alpine	10	10yr	16.12	1750.17	1899.71	0.40	4.81	0.79	0.09	0.75	0.25	4472.17	4471.29	4472.35	1489.62	0.36
Alpine	10	25yr	63.31	2196.67	3505.02	0.56	5.24	0.96	0.15	0.85	0.33	4473.03	4471.73	4473.20	1684.05	0.36
Alpine	10	50yr	119.75	2536.16	4861.09	0.65	5.56	1.07	0.18	0.94	0.39	4473.61	4472.07	4473.78	1814.87	0.37

HEC-RAS Plan: Opt A River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	10	100yr	244.47	3119.76	7291.77	0.80	6.17	1.25	0.25	1.11	0.49	4474.39	4472.59	4474.58	1984.80	0.39
Alpine	10	500yr	544.32	4027.37	12295.31	0.99	6.94	1.56	0.35	1.34	0.70	4475.56	4473.34	4475.76	2048.53	0.41
Alpine	10.3333*	2yr		428.00			3.52			0.53		4468.18	4466.87	4468.37	49.60	0.40
Alpine	10.3333*	5yr		1690.00			5.98			1.25		4471.07	4469.06	4471.63	271.85	0.49
Alpine	10.3333*	10yr		3666.00			12.35			5.26		4471.31	4471.31	4473.67	352.14	1.00
Alpine	10.3333*	25yr	0.16	3771.83	1993.02	0.17	8.85	1.24	0.03	2.56	0.66	4473.17	4473.17	4473.98	1255.78	0.66
Alpine	10.3333*	50yr	5.32	4427.15	3084.53	0.43	9.73	1.50	0.14	3.03	0.90	4473.55	4473.55	4474.43	1340.93	0.70
Alpine	10.3333*	100yr	64.49	5134.57	5456.94	0.75	9.88	1.74	0.31	2.99	1.08	4474.40	4474.10	4475.16	1535.65	0.67
Alpine	10.3333*	500yr	354.12	6477.55	10035.33	1.19	10.58	2.06	0.60	3.25	1.37	4475.62	4474.93	4476.33	1776.55	0.66
Alpine	10.6666*	2yr		428.00			3.16			0.43		4468.57	4467.19	4468.72	55.44	0.36
Alpine	10.6666*	5yr		1690.00			5.35			0.97		4471.62	4469.20	4472.07	62.70	0.42
Alpine	10.6666*	10yr		3666.00			7.52			1.78		4474.14	4471.28	4475.02	1035.26	0.53
Alpine	10.6666*	25yr		5765.00			13.48			5.81		4473.31	4473.12	4476.13	810.38	0.96
Alpine	10.6666*	50yr		7517.00			14.39			6.52		4474.57	4474.57	4477.79	1115.06	1.00
Alpine	10.6666*	100yr	4.06	6491.71	4160.23	0.32	10.79	1.75	0.09	3.58	1.15	4475.49	4475.49	4476.61	1306.84	0.73
Alpine	10.6666*	500yr	173.71	8657.45	8035.84	1.01	12.68	2.32	0.52	4.74	1.82	4476.42	4476.42	4477.74	1530.61	0.80
Alpine	11	2yr		428.00			2.95			0.38		4468.89	4467.54	4469.02	61.94	0.34
Alpine	11	5yr		1690.00			4.83			0.79		4472.04	4469.40	4472.40	68.03	0.38
Alpine	11	10yr		3666.00			6.75			1.38		4474.78	4471.34	4475.48	570.86	0.44
Alpine	11	25yr	0.43	3882.79	1881.77	0.09	5.32	0.85	0.01	0.85	0.27	4477.05	4472.98	4477.35	1201.59	0.35
Alpine	11	50yr	198.98	3851.21	3466.81	0.45	4.24	0.83	0.09	0.51	0.21	4478.83	4474.18	4478.98	1590.97	0.25
Alpine	11	100yr	0.31	7236.69	3419.00	0.14	9.97	1.57	0.02	3.00	0.92	4477.01	4477.01	4478.07	1179.23	0.65
Alpine	11	500yr	131.32	10003.27	6732.41	0.82	12.39	2.21	0.38	4.49	1.66	4477.83	4477.83	4479.27	1455.08	0.77
Alpine	11.3		Bridge													
Alpine	11.4	2yr		427.00			2.70			0.31		4469.10	4467.54	4469.21	62.34	0.30
Alpine	11.4	5yr		1691.00			4.57			0.70		4472.33	4469.40	4472.66	68.59	0.35
Alpine	11.4	10yr		3670.00			5.77			0.98		4476.00	4471.33	4476.51	997.37	0.36
Alpine	11.4	25yr	15.24	3623.13	2138.63	0.20	4.69	0.80	0.03	0.65	0.23	4477.48	4472.99	4477.69	1409.80	0.30
Alpine	11.4	50yr	225.04	3769.51	3539.45	0.45	4.07	0.80	0.08	0.46	0.20	4479.01	4474.20	4479.14	1617.97	0.24
Alpine	11.4	100yr	193.52	5807.44	4674.03	0.62	6.72	1.26	0.18	1.29	0.52	4478.40	4477.01	4478.79	1534.97	0.40
Alpine	11.4	500yr	708.31	7806.11	8372.58	0.99	7.89	1.61	0.37	1.70	0.77	4479.65	4477.83	4480.12	1704.95	0.44
Alpine	11.4333*	2yr		427.00			3.32			0.51		4469.22	4468.33	4469.39	68.20	0.43
Alpine	11.4333*	5yr		1691.00			4.66			0.75		4472.45	4470.01	4472.79	76.84	0.38
Alpine	11.4333*	10yr		3670.00			5.43			0.90		4476.19	4471.81	4476.65	938.91	0.36
Alpine	11.4333*	25yr	0.60	4115.56	1660.84	0.09	5.05	0.79	0.01	0.76	0.23	4477.53	4473.35	4477.81	1170.81	0.33
Alpine	11.4333*	50yr	155.03	4334.24	3044.73	0.43	4.42	0.83	0.08	0.55	0.22	4479.04	4474.50	4479.21	1488.93	0.26
Alpine	11.4333*	100yr	116.21	6605.34	3953.46	0.54	7.17	1.28	0.15	1.47	0.54	4478.49	4476.52	4478.99	1421.28	0.44
Alpine	11.4333*	500yr	569.30	8909.13	7408.57	0.97	8.40	1.65	0.37	1.93	0.83	4479.75	4478.18	4480.35	1577.46	0.48

HEC-RAS Plan: Opt A River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	11.4666*	2yr		427.00			4.35			0.98		4469.50	4469.15	4469.79	72.70	0.66
Alpine	11.4666*	5yr		1691.00			4.91			0.88		4472.59	4470.71	4472.96	85.63	0.43
Alpine	11.4666*	10yr		3670.00			5.22			0.85		4476.34	4472.39	4476.77	864.86	0.36
Alpine	11.4666*	25yr		4540.46	1236.54		5.38	0.76		0.87	0.23	4477.57	4473.82	4477.93	1011.23	0.36
Alpine	11.4666*	50yr	94.06	4866.19	2573.74	0.39	4.76	0.86	0.07	0.64	0.24	4479.06	4474.92	4479.29	1356.57	0.29
Alpine	11.4666*	100yr	54.48	7330.87	3289.65	0.44	7.61	1.30	0.11	1.67	0.58	4478.57	4476.58	4479.20	1301.66	0.47
Alpine	11.4666*	500yr	438.94	9962.21	6485.85	0.94	8.92	1.71	0.37	2.19	0.91	4479.84	4478.51	4480.59	1444.83	0.52
Alpine	11.5	2yr		427.00			4.67			1.20		4470.21	4470.01	4470.55	79.70	0.77
Alpine	11.5	5yr		1691.00			5.33			1.10		4472.77	4471.47	4473.22	96.16	0.52
Alpine	11.5	10yr		3670.00			5.11			0.83		4476.48	4473.04	4476.89	777.78	0.37
Alpine	11.5	25yr		5777.00			6.91			1.46		4477.45	4474.37	4478.19	889.74	0.47
Alpine	11.5	50yr	42.62	5577.10	1914.28	0.32	5.33	0.80	0.06	0.82	0.29	4479.07	4475.32	4479.40	1221.52	0.33
Alpine	11.5	100yr	9.16	8282.51	2383.34	0.24	8.38	1.19	0.05	2.07	0.67	4478.62	4476.77	4479.47	1175.40	0.54
Alpine	11.5	500yr	298.50	11563.66	5024.84	0.91	10.08	1.64	0.40	2.84	1.13	4479.84	4478.92	4480.93	1301.38	0.60
Alpine	11.5666*	2yr		427.00			3.23			0.49		4471.37		4471.54	73.06	0.42
Alpine	11.5666*	5yr		1691.00			5.63			1.21		4473.45		4473.94	88.78	0.54
Alpine	11.5666*	10yr		3670.00			5.92			1.12		4476.72		4477.26	105.24	0.43
Alpine	11.5666*	25yr		5695.51	81.49		7.72	0.43		1.82	0.12	4477.83		4478.74	536.89	0.52
Alpine	11.5666*	50yr	0.19	6779.55	754.26	0.13	7.87	0.72	0.02	1.80	0.30	4478.98		4479.85	940.50	0.49
Alpine	11.5666*	100yr	0.10	9661.47	1013.44	0.14	11.30	1.01	0.03	3.72	0.60	4478.92	4478.92	4480.72	931.60	0.71
Alpine	11.5666*	500yr	136.31	12929.48	3821.21	0.93	12.66	1.64	0.45	4.40	1.25	4480.47	4480.47	4482.39	1170.60	0.72
Alpine	11.6333*	2yr		427.00			3.43			0.55		4471.94		4472.13	66.77	0.44
Alpine	11.6333*	5yr		1691.00			5.89			1.30		4474.17		4474.70	79.29	0.55
Alpine	11.6333*	10yr		3670.00			7.03			1.57		4477.07		4477.83	82.65	0.49
Alpine	11.6333*	25yr		5756.19	20.81		9.25	0.34		2.58	0.11	4478.27	4476.03	4479.59	291.17	0.60
Alpine	11.6333*	50yr	0.13	7276.72	257.16	0.19	10.39	0.75	0.04	3.14	0.37	4479.21		4480.82	470.29	0.63
Alpine	11.6333*	100yr	6.17	9984.49	684.34	0.58	13.33	1.17	0.24	5.04	0.80	4479.79	4479.79	4482.37	559.35	0.78
Alpine	11.6333*	500yr	241.21	12463.82	4181.97	1.28	13.01	1.58	0.71	4.43	1.14	4482.28	4482.28	4484.23	1179.25	0.68
Alpine	11.7	2yr		427.00			3.55			0.57		4472.51	4471.51	4472.71	55.71	0.43
Alpine	11.7	5yr		1691.00			6.68			1.60		4474.86	4473.40	4475.56	57.54	0.56
Alpine	11.7	10yr		3670.00			9.01			2.57		4477.50	4475.49	4478.76	59.59	0.61
Alpine	11.7	25yr		5770.75	6.25		11.88	0.52		4.26	0.24	4478.80	4477.26	4480.99	182.08	0.74
Alpine	11.7	50yr	0.41	7483.99	49.60	0.40	14.03	1.11	0.15	5.76	0.78	4479.60	4478.65	4482.63	339.31	0.83
Alpine	11.7	100yr	52.77	9065.98	1556.26	1.20	13.73	1.52	0.69	5.14	1.16	4481.71	4481.71	4484.20	584.90	0.73
Alpine	11.7	500yr	318.93	10867.26	5700.82	1.63	13.16	1.68	0.99	4.38	1.21	4484.47	4484.47	4486.22	1191.74	0.63
Alpine	11.9		Bridge													
Alpine	12	2yr		427.00			2.79			0.32		4473.10	4471.51	4473.22	56.17	0.30
Alpine	12	5yr		1691.00			4.98			0.82		4476.35	4473.40	4476.74	58.70	0.36
Alpine	12	10yr	6.19	3352.93	310.88	0.37	5.57	0.52	0.08	0.87	0.15	4480.75	4475.47	4481.19	483.44	0.31

HEC-RAS Plan: Opt A River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	12	25yr	45.70	4668.31	1062.99	0.65	6.68	0.77	0.19	1.19	0.26	4482.35	4477.26	4482.92	760.48	0.34
Alpine	12	50yr	106.13	5558.48	1869.39	0.82	7.25	0.79	0.27	1.36	0.30	4483.49	4478.65	4484.09	1124.29	0.36
Alpine	12	100yr	218.79	6546.95	3909.26	0.98	7.73	1.04	0.35	1.50	0.45	4484.82	4481.88	4485.40	1197.80	0.36
Alpine	12	500yr	406.30	8447.79	8032.91	0.95	8.89	1.43	0.34	1.91	0.75	4486.55	4484.41	4487.18	1301.46	0.39
Alpine	12.5	2yr		427.00			7.72			2.78		4474.16	4474.16	4475.08	28.96	0.98
Alpine	12.5	5yr		1691.00			10.99			4.51		4476.96	4476.96	4478.83	40.52	0.99
Alpine	12.5	10yr		3675.00			12.73			5.34		4479.90	4479.63	4482.42	180.50	0.94
Alpine	12.5	25yr		5790.00			14.94			6.89		4481.76	4481.76	4485.23	401.93	0.99
Alpine	12.5	50yr		5333.79	2216.21		10.65	1.40		3.43	0.90	4483.63	4483.63	4484.89	954.49	0.68
Alpine	12.5	100yr	14.40	6038.19	4642.41	0.68	10.37	1.69	0.18	3.17	1.15	4484.80	4484.53	4485.76	1165.68	0.64
Alpine	12.5	500yr	284.75	7131.49	9489.75	1.60	9.93	2.01	0.58	2.72	1.36	4486.69	4485.51	4487.37	1210.38	0.55
Alpine	12.5666*	2yr		427.00			4.19			0.76		4475.61	4474.53	4475.88	43.47	0.48
Alpine	12.5666*	5yr		1691.00			5.94			1.23		4479.03	4476.95	4479.58	61.62	0.49
Alpine	12.5666*	10yr		3675.00			6.99			1.52		4482.36	4479.19	4483.12	374.19	0.48
Alpine	12.5666*	25yr	0.20	4146.83	1642.98	0.12	5.36	0.79	0.01	0.80	0.25	4485.49	4481.17	4485.81	868.79	0.30
Alpine	12.5666*	50yr		6208.40	1341.60		9.13	1.10		2.42	0.56	4484.31	4482.28	4485.38	768.02	0.55
Alpine	12.5666*	100yr		8113.96	2581.04		11.08	1.53		3.49	0.98	4484.97	4484.68	4486.43	808.17	0.64
Alpine	12.5666*	500yr	45.19	11070.36	5790.45	1.00	13.11	2.05	0.33	4.66	1.58	4486.38	4485.87	4488.15	1033.23	0.71
Alpine	12.6333*	2yr		427.00			3.31			0.49		4476.08	4474.91	4476.25	62.06	0.40
Alpine	12.6333*	5yr		1691.00			4.14			0.59		4479.62	4476.89	4479.89	85.99	0.34
Alpine	12.6333*	10yr		3675.00			5.26			0.82		4482.99	4478.69	4483.42	334.31	0.33
Alpine	12.6333*	25yr		4884.08	905.92		5.29	0.69		0.76	0.20	4485.57	4480.08	4485.94	638.97	0.29
Alpine	12.6333*	50yr		6689.30	860.70		7.71	0.89		1.66	0.36	4484.92	4481.08	4485.74	605.16	0.43
Alpine	12.6333*	100yr		8896.96	1798.03		9.47	1.27		2.44	0.66	4485.75	4482.56	4486.91	645.23	0.51
Alpine	12.6333*	500yr	3.27	12866.36	4036.37	0.40	12.39	1.95	0.08	4.05	1.39	4486.89	4486.17	4488.71	718.40	0.63
Alpine	12.7	2yr		427.00			2.08			0.19		4476.38		4476.45	93.29	0.25
Alpine	12.7	5yr		1691.00			3.18			0.33		4479.87		4480.03	93.97	0.24
Alpine	12.7	10yr		3675.00			4.31			0.54		4483.27		4483.56	94.64	0.25
Alpine	12.7	25yr		5344.35	445.65		4.94	0.55		0.66	0.14	4485.68		4486.03	498.72	0.26
Alpine	12.7	50yr		7101.59	448.41		6.79	0.69		1.25	0.22	4485.30		4485.98	489.89	0.36
Alpine	12.7	100yr		9603.06	1091.94		8.48	1.07		1.91	0.47	4486.22		4487.22	511.30	0.43
Alpine	12.7	500yr		14216.74	2689.26		11.36	1.72		3.32	1.07	4487.48		4489.17	537.12	0.55
Alpine	12.9		Culvert													
Alpine	13	2yr		427.00			2.04			0.18		4476.42	4475.03	4476.49	93.30	0.24
Alpine	13	5yr		1691.00			3.12			0.32		4479.98	4476.34	4480.13	93.99	0.23
Alpine	13	10yr		3674.31	0.69		4.20	0.07		0.51	0.01	4483.49	4477.80	4483.77	187.59	0.24
Alpine	13	25yr		5334.81	455.19		4.92	0.56		0.65	0.14	4485.72	4479.09	4486.06	499.54	0.26
Alpine	13	50yr		7058.76	491.24		6.68	0.70		1.21	0.23	4485.43	4480.04	4486.07	492.76	0.35
Alpine	13	100yr		9554.60	1140.40		8.37	1.07		1.86	0.47	4486.32	4481.57	4487.29	513.58	0.43

HEC-RAS Plan: Opt A River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	13	500yr		14199.29	2706.71		11.32	1.72		3.30	1.07	4487.50	4485.58	4489.18	537.44	0.55
Alpine	13.25*	2yr		427.00			6.37			2.17		4476.38	4476.38	4477.01	54.18	1.01
Alpine	13.25*	5yr		1691.00			4.99			0.94		4479.94		4480.33	96.35	0.47
Alpine	13.25*	10yr		3678.00			5.25			0.85		4483.48		4483.91	103.33	0.36
Alpine	13.25*	25yr		5272.66	523.34		5.65	0.67		0.90	0.21	4485.72		4486.18	499.68	0.33
Alpine	13.25*	50yr		6988.20	569.80		7.74	0.85		1.71	0.36	4485.44		4486.30	492.94	0.46
Alpine	13.25*	100yr		9394.63	1309.37		9.41	1.26		2.45	0.70	4486.36		4487.57	514.61	0.53
Alpine	13.25*	500yr	0.29	13858.16	3057.55	0.17	12.26	1.94	0.03	4.00	1.46	4487.63		4489.55	561.72	0.66
Alpine	13.5	2yr		427.00			5.75			1.69		4477.55	4477.35	4478.06	52.21	0.85
Alpine	13.5	5yr		1691.00			7.83			2.42		4479.86	4479.32	4480.81	69.94	0.79
Alpine	13.5	10yr		3678.00			7.27			1.75		4483.35	4481.28	4484.17	95.93	0.56
Alpine	13.5	25yr		5156.53	639.47		6.90	0.88		1.44	0.40	4485.69	4482.84	4486.35	494.38	0.46
Alpine	13.5	50yr		6907.71	650.29		9.79	1.13		2.95	0.70	4485.30	4483.97	4486.67	483.93	0.67
Alpine	13.5	100yr		9133.60	1570.40		11.22	1.62		3.73	1.25	4486.30	4485.84	4487.98	511.12	0.73
Alpine	13.5	500yr	8.21	13255.75	3652.04	0.56	13.57	2.33	0.26	5.18	2.24	4487.75	4487.53	4490.01	575.47	0.81
Alpine	13.75*	2yr		427.00			6.88			2.20		4478.29	4478.07	4479.02	32.09	0.87
Alpine	13.75*	5yr		1691.00			9.90			3.90		4480.78	4480.78	4482.30	55.79	1.00
Alpine	13.75*	10yr		3678.00			10.65			4.07		4483.27	4482.98	4485.03	82.74	0.92
Alpine	13.75*	25yr		5796.00			10.78			3.83		4485.38	4484.55	4487.18	100.12	0.82
Alpine	13.75*	50yr		7558.00			13.28			5.75		4485.69	4485.69	4488.42	102.68	0.99
Alpine	13.75*	100yr		10704.00			14.50			6.49		4487.26	4487.26	4490.52	380.22	1.00
Alpine	13.75*	500yr	6.76	14959.09	1950.14	0.50	14.34	1.89	0.23	5.72	1.66	4489.93	4489.93	4492.75	562.05	0.84
Alpine	14	2yr		427.00			4.85			1.00		4479.24	4478.11	4479.60	34.64	0.54
Alpine	14	5yr		1691.00			8.15			2.41		4482.04	4480.99	4483.07	50.23	0.71
Alpine	14	10yr		3678.00			12.09			5.01		4483.76	4483.58	4486.03	62.20	0.96
Alpine	14	25yr		5796.00			13.67			6.08		4485.52	4485.52	4488.42	74.53	1.01
Alpine	14	50yr		7558.00			14.12			6.31		4486.91	4486.91	4490.00	85.43	0.99
Alpine	14	100yr		10704.00			15.02			6.86		4488.82	4488.82	4492.32	100.41	0.99
Alpine	14	500yr	23.31	15429.70	1462.99	0.55	13.73	1.62	0.26	5.20	1.28	4492.48	4492.48	4495.15	619.00	0.78
Alpine	14.3		Bridge													
Alpine	14.5	2yr		427.00			4.16			0.72		4479.64	4478.11	4479.91	37.07	0.44
Alpine	14.5	5yr		1691.00			6.44			1.45		4483.07	4480.97	4483.71	57.35	0.53
Alpine	14.5	10yr		3681.00			8.16			2.15		4485.87	4483.58	4486.91	77.30	0.60
Alpine	14.5	25yr		5806.00			8.93			2.45		4488.18	4485.53	4489.42	95.42	0.60
Alpine	14.5	50yr		7570.00			8.12			1.93		4490.84	4486.84	4491.86	473.65	0.51
Alpine	14.5	100yr		10719.00			11.62			3.95		4490.76	4488.78	4492.85	454.23	0.73
Alpine	14.5	500yr	633.62	13108.80	3187.58	0.81	8.96	1.54	0.33	2.02	0.88	4495.39	4492.41	4496.36	926.12	0.45
Alpine	14.6666*	2yr		427.00			5.84			1.50		4479.93		4480.46	32.19	0.68

HEC-RAS Plan: Opt A River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	14.6666*	5yr		1691.00			7.59			2.10		4483.37		4484.26	55.43	0.67
Alpine	14.6666*	10yr		3681.00			8.84			2.61		4486.23		4487.45	79.30	0.68
Alpine	14.6666*	25yr		5806.00			9.42			2.77		4488.53		4489.91	94.80	0.65
Alpine	14.6666*	50yr	33.03	6702.84	834.13	0.48	7.49	0.77	0.16	1.57	0.32	4491.39		4492.16	800.00	0.44
Alpine	14.6666*	100yr	145.89	8444.49	2128.62	0.64	8.25	1.10	0.24	1.82	0.54	4492.69		4493.53	930.74	0.45
Alpine	14.6666*	500yr	1121.58	10088.74	5719.68	0.81	7.43	1.37	0.30	1.34	0.65	4496.11		4496.63	1233.09	0.35
Alpine	14.8333*	2yr		427.00			6.89			2.18		4480.66		4481.39	30.81	0.86
Alpine	14.8333*	5yr		1691.00			8.27			2.60		4483.90		4484.96	57.73	0.77
Alpine	14.8333*	10yr		3681.00			9.31			2.92		4486.70		4488.05	76.80	0.72
Alpine	14.8333*	25yr	21.28	5282.98	501.73	0.68	8.93	1.10	0.24	2.37	0.31	4489.20		4490.32	602.36	0.57
Alpine	14.8333*	50yr	176.18	4466.76	2927.06	0.60	5.47	1.16	0.14	0.80	0.24	4492.04		4492.33	1095.51	0.30
Alpine	14.8333*	100yr	382.16	5211.64	5125.20	0.64	5.62	1.36	0.15	0.81	0.29	4493.44		4493.70	1288.88	0.29
Alpine	14.8333*	500yr	1270.76	5779.96	9879.28	0.67	4.92	1.48	0.14	0.57	0.29	4496.58		4496.73	1547.48	0.22
Alpine	15	2yr		427.00			5.96			1.63		4481.84		4482.39	35.86	0.74
Alpine	15	5yr		1691.00			8.41			2.66		4484.64		4485.74	55.38	0.78
Alpine	15	10yr	26.91	3228.46	425.63	0.83	8.65	1.20	0.34	2.36	0.37	4487.54		4488.56	468.86	0.61
Alpine	15	25yr	180.88	3212.33	2412.79	0.84	5.98	1.15	0.26	1.00	0.26	4490.27		4490.59	1087.82	0.35
Alpine	15	50yr	298.22	2902.85	4368.92	0.58	4.42	1.07	0.12	0.51	0.18	4492.28		4492.40	1327.77	0.24
Alpine	15	100yr	515.92	3420.58	6782.50	0.58	4.63	1.21	0.12	0.54	0.22	4493.65		4493.77	1547.65	0.23
Alpine	15	500yr	1305.24	3857.55	11767.21	0.58	4.18	1.28	0.10	0.41	0.21	4496.69		4496.77	1855.00	0.19
Alpine	15.1666*	2yr		419.00			5.36			1.29		4483.22		4483.66	36.71	0.65
Alpine	15.1666*	5yr		1699.00			8.16			2.49		4485.99		4487.02	56.32	0.75
Alpine	15.1666*	10yr	0.72	3724.98	85.31	0.57	11.69	1.42	0.21	4.57	0.59	4487.83	4487.83	4489.91	158.94	0.90
Alpine	15.1666*	25yr	74.94	4762.06	1308.00	1.18	10.42	1.67	0.53	3.22	0.63	4490.09	4490.09	4491.41	667.37	0.67
Alpine	15.1666*	50yr	226.36	4357.93	3422.71	0.99	7.46	1.47	0.32	1.52	0.41	4492.16		4492.65	1116.89	0.43
Alpine	15.1666*	100yr	422.86	4727.18	6089.96	0.94	7.03	1.63	0.27	1.29	0.44	4493.60		4493.95	1299.63	0.37
Alpine	15.1666*	500yr	1226.83	4840.84	11379.33	0.84	5.62	1.58	0.19	0.76	0.35	4496.69		4496.85	1651.58	0.26
Alpine	15.3333*	2yr		419.00			5.56			1.39		4484.33		4484.81	35.48	0.67
Alpine	15.3333*	5yr		1699.00			8.12			2.47		4487.22		4488.24	56.60	0.74
Alpine	15.3333*	10yr	0.77	3725.15	85.09	0.54	10.46	0.95	0.18	3.55	0.54	4489.63	4488.93	4491.29	175.27	0.77
Alpine	15.3333*	25yr	48.50	5323.20	773.29	1.10	11.16	1.14	0.49	3.67	0.66	4491.56	4491.56	4493.23	623.64	0.71
Alpine	15.3333*	50yr	130.00	6209.25	1667.75	1.35	11.61	1.36	0.66	3.82	0.84	4492.48	4492.48	4494.11	810.05	0.70
Alpine	15.3333*	100yr	304.32	7417.38	3518.30	1.47	12.13	1.58	0.73	3.99	1.03	4493.70	4493.70	4495.22	1102.71	0.68
Alpine	15.3333*	500yr	1020.42	7941.67	8484.91	1.34	10.15	1.69	0.54	2.57	0.96	4496.43		4497.19	1485.11	0.51
Alpine	15.5	2yr		419.00			5.58			1.39		4485.51		4485.99	34.87	0.67
Alpine	15.5	5yr		1699.00			8.11			2.47		4488.44		4489.46	56.79	0.74
Alpine	15.5	10yr		3766.09	44.91		10.70	0.85		3.76	0.46	4490.75	4490.11	4492.51	145.98	0.80
Alpine	15.5	25yr	4.14	5885.88	254.98	0.95	13.86	1.40	0.46	5.94	1.04	4491.89	4491.63	4494.75	236.36	0.95
Alpine	15.5	50yr	70.19	6686.05	1250.76	1.21	12.41	1.35	0.58	4.39	0.86	4493.67	4493.67	4495.68	700.62	0.75
Alpine	15.5	100yr	256.20	7752.65	3231.14	1.37	12.16	1.53	0.65	3.99	0.97	4495.22	4495.22	4496.81	1085.69	0.68

HEC-RAS Plan: Opt A River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	15.5	500yr	487.06	11234.70	5725.25	1.97	16.83	2.25	1.31	7.53	2.02	4495.68		4498.54	1151.31	0.92
Alpine	15.75*	2yr		419.00			4.05			0.69		4486.74		4486.99	39.97	0.44
Alpine	15.75*	5yr		1699.00			6.29			1.40		4489.99		4490.61	61.55	0.53
Alpine	15.75*	10yr	1.09	3679.82	130.09	0.48	8.36	0.84	0.13	2.14	0.38	4492.66		4493.70	206.66	0.57
Alpine	15.75*	25yr	70.83	4936.56	1137.61	0.81	8.30	0.91	0.26	1.91	0.38	4495.02		4495.89	859.36	0.48
Alpine	15.75*	50yr	132.79	6033.35	1840.86	0.99	9.59	1.10	0.36	2.50	0.53	4495.56		4496.64	1013.19	0.54
Alpine	15.75*	100yr	294.45	7445.52	3500.04	1.23	10.84	1.41	0.52	3.11	0.80	4496.45		4497.66	1150.87	0.59
Alpine	15.75*	500yr	913.40	8481.63	8051.97	1.26	10.13	1.66	0.46	2.54	0.93	4498.76	4497.28	4499.55	1467.95	0.50
Alpine	16.*	2yr		419.00			3.89			0.50		4487.30		4487.54	39.84	0.42
Alpine	16.*	5yr		1699.00			6.05			1.01		4490.70		4491.27	61.62	0.50
Alpine	16.*	10yr	0.16	3724.12	86.72	0.26	8.24	0.71	0.05	1.64	0.27	4493.36		4494.39	132.07	0.56
Alpine	16.*	25yr	35.41	5380.60	728.98	0.70	9.23	0.81	0.21	1.89	0.33	4495.34		4496.50	739.60	0.55
Alpine	16.*	50yr	80.38	6616.56	1310.06	0.88	10.63	1.01	0.31	2.46	0.47	4495.93		4497.38	901.06	0.61
Alpine	16.*	100yr	207.23	8358.11	2674.65	1.16	12.30	1.32	0.48	3.19	0.73	4496.80		4498.55	1084.89	0.68
Alpine	16.*	500yr	724.34	9958.84	6763.81	1.35	12.18	1.65	0.57	2.94	0.96	4498.89		4500.22	1362.16	0.61
Alpine	16.25*	2yr		419.00			3.88			0.49		4487.75		4487.99	39.10	0.41
Alpine	16.25*	5yr		1699.00			6.01			0.99		4491.25		4491.81	60.71	0.49
Alpine	16.25*	10yr		3747.03	63.97		8.19	0.71		1.62	0.27	4493.97		4494.99	150.15	0.55
Alpine	16.25*	25yr	18.60	5579.95	546.45	0.60	9.57	0.80	0.17	2.05	0.32	4495.83		4497.12	634.61	0.57
Alpine	16.25*	50yr	60.06	6845.94	1101.00	0.83	10.86	0.98	0.28	2.57	0.46	4496.53		4498.10	846.53	0.63
Alpine	16.25*	100yr	188.71	8580.89	2470.40	1.13	12.31	1.28	0.46	3.19	0.70	4497.53		4499.33	1077.75	0.67
Alpine	16.25*	500yr	661.89	10536.31	6248.80	1.45	12.83	1.67	0.65	3.29	1.01	4499.37		4500.93	1309.53	0.65
Alpine	16.5	2yr		419.00			3.88			0.49		4488.19		4488.43	38.40	0.41
Alpine	16.5	5yr		1699.00			5.99			0.98		4491.78		4492.34	59.37	0.48
Alpine	16.5	10yr		3766.51	44.49		8.15	0.67		1.60	0.25	4494.56		4495.58	133.68	0.55
Alpine	16.5	25yr	8.44	5745.03	391.54	0.49	9.80	0.74	0.13	2.16	0.29	4496.38		4497.78	578.82	0.59
Alpine	16.5	50yr	45.41	7033.23	928.36	0.77	10.98	0.94	0.25	2.63	0.43	4497.18		4498.83	808.54	0.63
Alpine	16.5	100yr	172.22	8795.87	2271.91	1.11	12.32	1.23	0.45	3.19	0.66	4498.26		4500.10	1071.27	0.67
Alpine	16.5	500yr	596.11	10981.74	5869.14	1.45	13.23	1.69	0.54	3.50	1.05	4499.95		4501.68	1301.08	0.67
Alpine	16.7		Bridge													
Alpine	17	2yr		419.00			3.62			0.42		4488.39	4486.59	4488.59	39.55	0.37
Alpine	17	5yr		1699.00			5.67			0.87		4492.05	4489.43	4492.55	60.92	0.45
Alpine	17	10yr	0.06	3734.79	76.15	0.15	7.16	0.41	0.02	1.20	0.11	4495.44	4492.07	4496.22	352.06	0.46
Alpine	17	25yr	88.45	4862.09	1194.46	0.61	6.87	0.68	0.14	1.00	0.20	4498.16	4494.14	4498.75	1054.67	0.38
Alpine	17	50yr	197.15	5600.44	2209.41	0.74	7.24	0.83	0.18	1.07	0.27	4499.12	4496.45	4499.69	1176.40	0.38
Alpine	17	100yr	405.78	6701.72	4132.50	0.73	7.76	1.04	0.18	1.19	0.38	4500.45	4498.28	4501.01	1397.47	0.38
Alpine	17	500yr	1180.09	8649.45	7617.46	1.17	8.95	1.38	0.37	1.52	0.61	4501.95	4499.63	4502.58	1401.80	0.42
Alpine	17.05*	2yr		419.00			5.36			1.01		4488.71		4489.16	36.13	0.64

HEC-RAS Plan: Opt A River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	17.05*	5yr		1699.00			6.63			1.25		4492.38		4493.06	61.23	0.57
Alpine	17.05*	10yr		3776.88	34.12		7.79	0.64		1.48	0.21	4495.71		4496.65	130.97	0.53
Alpine	17.05*	25yr	34.65	5624.29	486.06	0.60	8.45	0.70	0.15	1.57	0.22	4498.18		4499.20	703.47	0.49
Alpine	17.05*	50yr	112.26	6759.17	1135.58	0.82	9.24	0.88	0.24	1.82	0.32	4499.08		4500.20	935.82	0.52
Alpine	17.05*	100yr	334.66	8104.96	2800.38	1.05	9.77	1.16	0.34	1.95	0.48	4500.42		4501.49	1150.92	0.51
Alpine	17.05*	500yr	744.39	10556.59	6146.02	1.10	11.24	1.59	0.38	2.48	0.79	4501.92		4503.12	1411.59	0.55
Alpine	17.1*	2yr		419.00			6.50			1.59		4489.72		4490.38	36.33	0.86
Alpine	17.1*	5yr		1699.00			7.76			1.80		4492.91		4493.84	61.67	0.73
Alpine	17.1*	10yr		3806.46	4.54		8.62	0.46		1.89	0.13	4496.06		4497.21	103.14	0.63
Alpine	17.1*	25yr	5.98	6026.92	112.10	0.50	9.82	0.65	0.13	2.22	0.21	4498.27		4499.74	349.71	0.62
Alpine	17.1*	50yr	31.80	7649.55	325.65	0.77	11.46	0.87	0.25	2.94	0.34	4498.96		4500.91	527.54	0.69
Alpine	17.1*	100yr	112.53	10236.15	891.32	1.18	14.12	1.25	0.51	4.35	0.63	4499.69		4502.51	719.85	0.82
Alpine	17.1*	500yr	712.00	12321.10	4413.91	1.57	13.47	1.73	0.71	3.66	0.93	4502.12	4502.12	4504.12	1171.48	0.69
Alpine	17.15*	2yr		419.00			5.80			1.26		4491.35		4491.88	40.71	0.77
Alpine	17.15*	5yr		1699.00			8.23			2.10		4493.92		4494.97	65.77	0.82
Alpine	17.15*	10yr		3811.00			9.32			2.31		4496.67		4498.02	80.80	0.73
Alpine	17.15*	25yr	1.91	6064.34	78.75	0.55	10.41	1.07	0.15	2.59	0.43	4498.77		4500.44	158.04	0.69
Alpine	17.15*	50yr	14.88	7816.77	175.35	0.75	12.11	1.28	0.24	3.38	0.38	4499.54	4498.54	4501.76	279.46	0.77
Alpine	17.15*	100yr	198.81	10038.33	1002.87	1.23	12.62	1.24	0.49	3.43	0.53	4501.34	4501.34	4503.55	769.61	0.72
Alpine	17.15*	500yr	798.64	12710.27	3938.09	1.61	13.25	1.76	0.70	3.55	0.86	4503.31	4503.31	4505.31	1128.21	0.69
Alpine	17.2	2yr		419.00			5.93			1.36		4492.76		4493.30	43.54	0.82
Alpine	17.2	5yr		1699.00			8.03			2.03		4495.21		4496.22	70.40	0.82
Alpine	17.2	10yr		3811.00			9.77			2.60		4497.54		4499.02	83.47	0.80
Alpine	17.2	25yr	0.96	6109.98	34.07	0.55	10.99	0.98	0.15	2.98	0.36	4499.44		4501.31	139.78	0.77
Alpine	17.2	50yr	10.40	7873.77	122.82	0.78	12.40	1.43	0.26	3.64	0.65	4500.34	4499.61	4502.69	183.24	0.81
Alpine	17.2	100yr	209.61	10323.87	706.53	1.28	12.66	1.21	0.51	3.49	0.47	4502.39	4502.39	4504.68	688.55	0.73
Alpine	17.2	500yr	875.48	13162.73	3408.79	1.66	13.20	1.79	0.72	3.54	0.81	4504.46	4504.46	4506.51	1083.30	0.69
Alpine	17.3		Bridge													
Alpine	17.4214	2yr		419.00			3.83			0.65		4493.58	4492.52	4493.81	50.97	0.46
Alpine	17.4214	5yr		1699.00			5.94			1.31		4496.23	4494.78	4496.78	76.11	0.54
Alpine	17.4214	10yr	0.01	3801.56	9.43	0.15	7.47	0.70	0.01	1.80	0.13	4498.91	4496.79	4499.78	121.26	0.55
Alpine	17.4214	25yr	14.94	5979.45	150.61	0.88	9.25	1.58	0.19	2.54	0.47	4500.47	4498.45	4501.77	192.61	0.60
Alpine	17.4214	50yr	1099.71	3355.52	3551.77	0.56	2.55	0.73	0.04	0.15	0.06	4508.06	4499.69	4508.10	1461.86	0.12
Alpine	17.4214	100yr	906.67	6799.30	3534.02	1.23	6.36	1.39	0.22	1.02	0.27	4505.27	4502.52	4505.66	1182.71	0.32
Alpine	17.4214	500yr	1829.73	8432.85	7184.43	1.27	6.90	1.80	0.24	1.15	0.40	4507.00	4504.26	4507.38	1461.86	0.33
Alpine	17.5371*	2yr		419.00			4.17			0.79		4494.33		4494.60	49.00	0.51
Alpine	17.5371*	5yr		1699.00			6.14			1.44		4497.08		4497.66	79.93	0.58
Alpine	17.5371*	10yr		3810.83	0.17		7.55	0.27		1.89	0.03	4499.66		4500.55	102.43	0.58
Alpine	17.5371*	25yr	6.20	6065.63	73.17	0.80	9.14	1.38	0.17	2.54	0.39	4501.31		4502.59	166.39	0.62

HEC-RAS Plan: Opt A River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	17.5371*	50yr	790.87	4437.72	2778.41	0.60	3.37	0.83	0.05	0.27	0.09	4508.06		4508.16	1395.17	0.16
Alpine	17.5371*	100yr	679.21	8688.58	1872.20	1.50	8.27	1.44	0.36	1.78	0.33	4505.31		4506.13	964.88	0.44
Alpine	17.5371*	500yr	1636.27	10814.99	4995.74	1.76	8.87	1.96	0.45	1.95	0.53	4507.05		4507.83	1192.14	0.44
Alpine	17.6528*	2yr		419.00			4.23			0.81		4495.22		4495.50	48.95	0.52
Alpine	17.6528*	5yr		1699.00			6.24			1.48		4498.03		4498.63	78.99	0.59
Alpine	17.6528*	10yr		3811.00			7.61			1.96		4500.52		4501.42	101.19	0.60
Alpine	17.6528*	25yr	2.00	6111.47	31.54	0.65	9.02	1.16	0.13	2.52	0.30	4502.21		4503.47	151.52	0.63
Alpine	17.6528*	50yr	733.01	5531.08	1742.91	0.84	4.27	0.88	0.10	0.46	0.11	4508.05		4508.25	1109.72	0.22
Alpine	17.6528*	100yr	395.79	10240.06	604.15	1.63	10.14	1.35	0.47	2.79	0.35	4505.35		4506.81	641.75	0.58
Alpine	17.6528*	500yr	1199.16	13755.46	2492.39	2.19	11.74	2.02	0.75	3.56	0.66	4506.89		4508.59	955.88	0.62
Alpine	17.7685*	2yr		419.00			4.23			0.81		4496.13		4496.41	49.20	0.52
Alpine	17.7685*	5yr		1699.00			6.25			1.46		4498.97		4499.58	74.33	0.58
Alpine	17.7685*	10yr		3811.00			7.65			2.01		4501.44		4502.35	105.03	0.62
Alpine	17.7685*	25yr	0.15	6133.50	11.36	0.32	8.90	0.93	0.05	2.51	0.22	4503.16		4504.39	142.40	0.64
Alpine	17.7685*	50yr	538.04	6685.42	783.54	1.00	5.36	0.85	0.16	0.75	0.12	4508.04		4508.42	877.90	0.29
Alpine	17.7685*	100yr	241.92	10758.45	239.64	1.57	10.72	1.45	0.47	3.21	0.41	4505.92		4507.63	386.75	0.64
Alpine	17.7685*	500yr	808.40	15712.63	925.98	2.37	13.76	1.85	0.94	5.06	0.65	4507.13		4509.78	699.37	0.77
Alpine	17.8842*	2yr		419.00			4.20			0.81		4497.05		4497.32	49.43	0.52
Alpine	17.8842*	5yr		1699.00			6.26			1.45		4499.87		4500.48	72.58	0.57
Alpine	17.8842*	10yr		3811.00			7.67			2.03		4502.42		4503.33	106.46	0.63
Alpine	17.8842*	25yr		6141.63	3.38		8.80	0.73		2.49	0.15	4504.17		4505.37	135.61	0.65
Alpine	17.8842*	50yr	319.43	7486.88	200.69	1.07	6.34	0.74	0.20	1.09	0.11	4508.09		4508.67	574.85	0.36
Alpine	17.8842*	100yr	168.79	10877.76	193.44	1.48	10.67	1.91	0.43	3.24	0.64	4506.77		4508.49	291.22	0.65
Alpine	17.8842*	500yr	873.80	15889.67	683.53	2.27	12.84	1.66	0.85	4.40	0.53	4508.55		4510.88	672.76	0.71
Alpine	18	2yr		419.00			4.20			0.80		4497.95		4498.23	48.88	0.52
Alpine	18	5yr		1699.00			6.26			1.46		4500.76		4501.37	72.80	0.57
Alpine	18	10yr		3811.00			7.67			2.00		4503.39		4504.30	102.69	0.61
Alpine	18	25yr		6144.39	0.61		8.71	0.50		2.47	0.09	4505.19		4506.37	133.24	0.65
Alpine	18	50yr	152.60	7733.26	121.15	1.02	6.94	1.25	0.20	1.36	0.27	4508.30		4509.02	312.80	0.42
Alpine	18	100yr	119.08	11000.34	120.58	1.40	10.64	1.84	0.41	3.28	0.61	4507.69		4509.41	266.05	0.67
Alpine	18	500yr	762.69	16281.63	402.68	2.22	12.74	1.81	0.83	4.38	0.48	4509.54		4511.90	534.40	0.72
Alpine	18.2*	2yr		419.00			5.50			1.44		4502.14		4502.61	43.46	0.73
Alpine	18.2*	5yr		1699.00			7.92			2.43		4504.66		4505.63	65.32	0.77
Alpine	18.2*	10yr		3811.00			9.35			3.04		4507.18		4508.54	89.04	0.77
Alpine	18.2*	25yr		6143.04	1.96		10.40	0.71		3.53	0.16	4509.04		4510.72	118.36	0.78
Alpine	18.2*	50yr		7989.28	17.72		12.20	1.33		4.75	0.45	4509.62	4509.14	4511.93	135.66	0.89
Alpine	18.2*	100yr	5.31	11039.31	195.38	0.83	12.98	2.22	0.21	5.04	0.92	4511.31	4510.79	4513.88	208.53	0.85
Alpine	18.2*	500yr	440.63	15217.98	1788.39	1.93	13.04	2.28	0.67	4.58	0.87	4513.98	4513.98	4516.29	708.12	0.73
Alpine	18.4*	2yr		419.00			4.53			0.94		4507.18		4507.50	47.23	0.57

HEC-RAS Plan: Opt A River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	18.4*	5yr		1699.00			6.92			1.82		4509.81		4510.56	70.27	0.65
Alpine	18.4*	10yr		3811.00			8.90			2.70		4512.14		4513.37	87.72	0.71
Alpine	18.4*	25yr		6084.44	60.56		10.42	1.42		3.43	0.45	4513.83		4515.50	151.29	0.74
Alpine	18.4*	50yr		7688.20	318.80		10.67	1.41		3.43	0.43	4515.20		4516.90	368.66	0.71
Alpine	18.4*	100yr	9.14	9743.78	1487.08	0.83	11.28	2.12	0.19	3.64	0.77	4516.57		4518.29	546.24	0.69
Alpine	18.4*	500yr	117.50	13506.43	3823.07	1.52	13.48	2.89	0.48	4.95	1.27	4517.88		4520.09	744.61	0.77
Alpine	18.6*	2yr		419.00			5.05			1.21		4511.61		4512.01	46.32	0.67
Alpine	18.6*	5yr		1699.00			7.40			2.09		4514.22		4515.07	66.65	0.70
Alpine	18.6*	10yr		3802.84	8.16		9.45	0.74		3.00	0.17	4516.58		4517.97	117.87	0.74
Alpine	18.6*	25yr		5668.64	476.36		10.48	1.59		3.42	0.52	4518.29		4519.86	399.88	0.73
Alpine	18.6*	50yr		6635.72	1371.28		10.65	2.10		3.41	0.78	4519.25		4520.72	501.20	0.70
Alpine	18.6*	100yr		8116.19	3123.81		11.24	2.69		3.66	1.11	4520.36		4521.81	586.34	0.70
Alpine	18.6*	500yr	33.18	10247.94	7165.88	1.11	11.49	3.19	0.28	3.58	1.36	4522.22		4523.49	762.79	0.65
Alpine	18.8*	2yr		419.00			4.68			1.01		4516.35		4516.69	45.47	0.59
Alpine	18.8*	5yr		1699.00			7.33			2.02		4518.87		4519.70	62.87	0.67
Alpine	18.8*	10yr		3382.77	428.23		8.87	1.44		2.59	0.44	4521.11		4522.20	403.95	0.67
Alpine	18.8*	25yr		4339.78	1805.22		9.04	2.10		2.52	0.73	4522.51		4523.43	536.83	0.62
Alpine	18.8*	50yr		5096.43	2910.57		9.67	2.49		2.82	0.95	4523.15		4524.11	578.97	0.64
Alpine	18.8*	100yr		6328.54	4911.46		10.57	2.90		3.26	1.21	4524.12		4525.16	675.19	0.66
Alpine	18.8*	500yr		8280.80	9166.20		11.93	3.66		4.00	1.76	4525.37		4526.53	748.36	0.70
Alpine	19	2yr		419.00			4.28			1.27		4521.03	4520.20	4521.31	50.11	0.54
Alpine	19	5yr		1506.26	192.74		6.37	1.11		2.22	0.31	4523.59	4522.38	4524.15	383.15	0.56
Alpine	19	10yr		2167.51	1643.49		6.56	2.04		2.12	0.71	4525.19	4524.51	4525.60	524.28	0.49
Alpine	19	25yr		2871.91	3273.09		7.49	2.63		2.66	1.06	4526.07	4525.22	4526.53	586.75	0.52
Alpine	19	50yr		3306.72	4700.28		7.81	2.93		2.81	1.24	4526.73	4525.72	4527.20	626.31	0.52
Alpine	19	100yr		4099.61	7140.39		8.42	3.18		3.14	1.40	4527.76	4526.35	4528.26	758.53	0.53
Alpine	19	500yr		5135.11	12311.89		8.97	3.83		3.40	1.82	4529.12	4527.20	4529.65	789.50	0.53

HEC-RAS Plan: Opt B River: Alpine Creek Reach: Alpine

Reach	River Sta	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
		(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	1		448.00			5.81			1.47		4404.48	4403.86	4405.00	32.84	0.67
Alpine	1	167.82	1552.18		1.47	8.63		0.53	2.67		4407.22	4407.11	4408.26	181.99	0.73
Alpine	1	1214.13	2666.87		3.08	10.32		1.61	3.49		4409.02	4408.80	4410.20	204.43	0.76
Alpine	1	2369.28	3636.89	28.83	4.00	11.52	0.75	2.38	4.11	0.15	4410.26	4409.74	4411.59	380.51	0.78
Alpine	1	3195.85	4324.30	324.85	4.50	12.34	1.95	2.84	4.56	0.61	4410.99	4410.79	4412.42	386.29	0.80
Alpine	1	4596.94	5426.79	1158.27	5.17	13.51	3.19	3.50	5.22	1.29	4412.08	4411.77	4413.64	394.87	0.81
Alpine	1	7322.23	7477.60	3275.17	6.15	15.35	4.62	4.19	6.32	2.25	4413.90	4413.32	4415.71	434.96	0.84
Alpine	1.33333*		445.00			5.14			1.18		4405.84		4406.25	39.75	0.61
Alpine	1.33333*		1687.00			8.08			2.39		4408.55		4409.56	51.70	0.71
Alpine	1.33333*		3895.00			12.85			5.60		4410.24	4410.24	4412.81	59.65	1.01
Alpine	1.33333*	522.62	5112.38		2.01	11.31		0.83	3.95		4412.60	4412.60	4414.41	259.08	0.76
Alpine	1.33333*	1377.60	6532.40		2.97	12.53		1.52	4.65		4413.64	4413.64	4415.68	262.97	0.79
Alpine	1.33333*	2808.12	8530.18	1.70	4.01	14.20	0.52	2.43	5.72	0.09	4414.83	4414.83	4417.25	292.58	0.83
Alpine	1.33333*	5756.68	11878.42	659.90	5.33	16.37	2.77	3.75	7.14	1.07	4416.71	4416.71	4419.55	432.96	0.87
Alpine	1.66666*		445.00			4.87			1.08		4407.01		4407.38	44.46	0.60
Alpine	1.66666*		1687.00			7.08			1.80		4409.93		4410.71	55.86	0.60
Alpine	1.66666*		3895.00			8.30			2.19		4413.45		4414.51	75.98	0.59
Alpine	1.66666*		5635.00			11.30			4.02		4413.82		4415.81	78.06	0.79
Alpine	1.66666*		7910.00			13.88			5.92		4414.71		4417.70	82.97	0.93
Alpine	1.66666*	640.68	10699.32		2.02	13.42		0.84	5.08		4417.36	4417.36	4420.01	314.31	0.78
Alpine	1.66666*	3137.33	15154.26	3.40	3.72	15.31	0.67	2.09	6.18	0.12	4419.60	4419.60	4422.65	354.81	0.80
Alpine	2		445.00			4.73			1.04		4408.17	4407.57	4408.52	50.14	0.61
Alpine	2		1687.00			6.75			1.66		4410.92	4409.61	4411.62	61.23	0.59
Alpine	2		3895.00			8.26			2.16		4414.22	4411.88	4415.28	7 .21	0.58
Alpine	2		5635.00			9.64			2.86		4415.64	4413.38	4417.08	85.36	0.65
Alpine	2		7910.00			10.21			3.06		4417.71	4415.09	4419.33	98.13	0.64
Alpine	2		11340.00			13.09			4.94		4418.62	4417.14	4421.28	103.75	0.80
Alpine	2		18295.00			17.65			8.59		4420.23	4420.15	4425.06	192.15	0.99
Alpine	2.3	Bridge													
Alpine	2.5		445.00			3.63			0.57		4408.72	4407.57	4408.93	53.03	0.42
Alpine	2.5		1687.00			5.71			1.14		4411.65	4409.59	4412.16	62.92	0.46
Alpine	2.5		3895.00			7.18			1.60		4415.14	4411.88	4415.94	81.58	0.49
Alpine	2.5		5635.00			8.02			1.92		4416.96	4413.38	4417.95	93.47	0.52
Alpine	2.5		7910.00			8.66			2.14		4419.07	4415.09	4420.23	105.92	0.52
Alpine	2.5		11340.00			9.93			2.65		4421.22	4417.14	4422.75	298.39	0.53
Alpine	2.5	3377.08	14822.47	95.45	1.84	9.00	1.00	0.51	1.94	0.16	4425.98	4420.15	4427.01	704.05	0.40

HEC-RAS Plan: Opt B River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
		(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	3		445.00			4.84			1.12		4408.89		4409.25	53.46	0.65
Alpine	3		1687.00			2.29			0.18		4412.28		4412.36	269.17	0.24
Alpine	3		3697.13	197.87		2.03	0.70		0.11	0.06	4416.13		4416.19	375.04	0.14
Alpine	3	5.44	5263.70	365.86	0.23	2.17	0.77	0.01	0.11	0.06	4418.19		4418.26	428.93	0.13
Alpine	3	66.38	7239.67	603.95	0.43	2.33	0.83	0.02	0.12	0.07	4420.50		4420.58	496.71	0.13
Alpine	3	261.65	10086.20	992.15	0.64	2.60	0.91	0.04	0.14	0.08	4423.11		4423.20	548.13	0.13
Alpine	3	827.98	15582.05	1884.97	0.99	3.07	1.07	0.08	0.18	0.10	4427.17		4427.30	587.22	0.13
Alpine	3.16666*		445.00			4.25			0.89		4411.91		4412.20	66.65	0.60
Alpine	3.16666*		1687.00			5.35			0.67		4413.37	4413.37	4413.81	354.09	1.00
Alpine	3.16666*		3893.55	1.45		2.84	0.15		0.25	0.01	4416.23		4416.35	459.97	0.26
Alpine	3.16666*		5517.82	117.18		2.55	0.68		0.18	0.07	4418.26		4418.36	478.61	0.19
Alpine	3.16666*		7607.21	302.79		2.47	0.80		0.15	0.07	4420.56		4420.65	507.03	0.16
Alpine	3.16666*		10749.21	590.79		2.59	0.86		0.15	0.08	4423.16		4423.26	550.94	0.14
Alpine	3.16666*	67.37	16946.45	1281.18	0.56	2.89	0.97	0.04	0.17	0.09	4427.23		4427.35	637.54	0.14
Alpine	3.33333*		445.00			4.13			0.88		4414.81		4415.07	78.09	0.62
Alpine	3.33333*		1687.00			4.38			0.47		4416.42		4416.72	405.93	0.79
Alpine	3.33333*		3895.00			6.82			1.45		4416.88	4416.88	4417.60	408.61	1.02
Alpine	3.33333*		5635.00			4.60			0.69		4418.44		4418.76	427.49	0.48
Alpine	3.33333*		7864.79	45.21		3.59	0.60		0.36	0.07	4420.65		4420.85	527.51	0.28
Alpine	3.33333*		11049.96	290.04		3.30	0.94		0.27	0.11	4423.22		4423.39	560.69	0.21
Alpine	3.33333*	1.63	17412.86	880.51	0.19	3.32	1.03	0.01	0.24	0.11	4427.28		4427.44	662.91	0.18
Alpine	3.5*		445.00			3.71			0.73		4417.77		4417.98	95.29	0.58
Alpine	3.5*		1687.00			5.20			0.48		4419.19	4419.19	4419.61	431.05	1.06
Alpine	3.5*		3895.00			4.81			0.78		4420.30		4420.66	443.80	0.63
Alpine	3.5*		5635.00			7.50			1.82		4420.17	4420.17	4421.04	436.66	1.01
Alpine	3.5*		7910.00			6.91			1.58		4421.05		4421.79	450.52	0.76
Alpine	3.5*		11339.39	0.61		5.12	0.14		0.75	0.01	4423.38		4423.78	549.71	0.42
Alpine	3.5*		17833.67	461.33		4.32	1.13		0.44	0.16	4427.35		4427.63	625.52	0.26
Alpine	3.66666*		445.00			3.44			0.78		4420.67		4420.86	102.68	0.54
Alpine	3.66666*		1687.00			4.91			0.62		4422.21		4422.59	335.13	0.85
Alpine	3.66666*		3895.00			6.58			1.56		4422.95		4423.62	339.19	0.88
Alpine	3.66666*		5635.00			6.03			1.36		4423.94		4424.50	353.77	0.65
Alpine	3.66666*		7910.00			7.68			2.17		4424.20		4425.12	356.10	0.80
Alpine	3.66666*		11340.00			10.11			3.70		4424.46	4424.46	4426.05	358.30	1.01
Alpine	3.66666*		18270.01	24.99		8.38	0.75		2.13	0.14	4427.32		4428.41	468.76	0.62
Alpine	3.83333*		445.00			3.27			0.71		4423.56		4423.72	110.11	0.52
Alpine	3.83333*		1687.00			5.39			1.08		4425.06		4425.51	175.56	0.71

HEC-RAS Plan: Opt B River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
		(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	3.83333*		3895.00			6.87			1.84		4426.45		4427.18	189.47	0.70
Alpine	3.83333*		5635.00			9.01			3.12		4426.75		4428.01	192.52	0.88
Alpine	3.83333*		7910.00			9.78			3.47		4427.68		4429.17	201.83	0.86
Alpine	3.83333*		11340.00			10.67			3.86		4428.90		4430.67	214.02	0.84
Alpine	3.83333*	2.60	18292.40		0.84	13.80		0.20	6.06		4430.10	4430.10	4433.06	241.13	1.00
Alpine	4		445.00			3.24			0.71		4426.40		4426.56	117.40	0.53
Alpine	4		1687.00			5.19			1.41		4427.92		4428.34	129.49	0.58
Alpine	4		3895.00			6.69			1.77		4429.36		4430.05	188.58	0.67
Alpine	4		5635.00			7.12			1.88		4430.44		4431.22	199.37	0.63
Alpine	4		7910.00			8.16			2.34		4431.31		4432.34	208.12	0.67
Alpine	4		11340.00			9.40			2.92		4432.42		4433.79	219.20	0.71
Alpine	4	150.93	18119.46	24.61	2.01	10.64	0.66	0.59	3.41	0.12	4434.62		4436.36	426.26	0.69
Alpine	4.25*		430.00			3.41			0.78		4429.30		4429.48	108.45	0.56
Alpine	4.25*		1688.00			5.78			1.76		4430.76		4431.28	118.27	0.65
Alpine	4.25*		3624.00			6.01			1.29		4432.10		4432.67	261.04	0.70
Alpine	4.25*		5657.00			7.01			1.76		4432.87		4433.64	268.74	0.71
Alpine	4.25*		7379.00			7.00			1.68		4433.78		4434.54	277.79	0.63
Alpine	4.25*		10490.00			7.47			1.79		4435.01		4435.88	290.11	0.60
Alpine	4.25*		16703.00			8.24			1.97		4437.09		4438.14	310.86	0.57
Alpine	4.5*		430.00			3.57			0.81		4432.13		4432.33	86.37	0.53
Alpine	4.5*		1688.00			5.82			1.73		4433.87		4434.39	108.77	0.63
Alpine	4.5*		3624.00			6.27			1.29		4434.90		4435.51	308.98	0.81
Alpine	4.5*		5657.00			6.87			1.63		4435.68		4436.42	316.83	0.75
Alpine	4.5*		7379.00			7.64			2.00		4436.13		4437.04	321.28	0.78
Alpine	4.5*		10490.00			8.40			2.32		4437.00		4438.09	329.98	0.76
Alpine	4.5*		16703.00			9.26			2.59		4438.64		4439.97	346.38	0.72
Alpine	4.75*		430.00			3.87			0.93		4434.84		4435.07	74.34	0.56
Alpine	4.75*		1688.00			6.24			1.92		4436.77		4437.38	90.87	0.64
Alpine	4.75*		3624.00			7.31			1.74		4438.00		4438.83	209.97	0.84
Alpine	4.75*		5657.00			8.75			2.57		4438.70		4439.89	217.03	0.89
Alpine	4.75*		7379.00			9.60			3.08		4439.26		4440.69	222.57	0.91
Alpine	4.75*		10490.00			11.34			4.19		4439.95	4439.92	4441.95	229.49	1.00
Alpine	4.75*		16703.00			13.08			5.21		4441.44	4441.44	4444.09	244.35	1.01
Alpine	5		430.00			3.99			0.96		4437.58		4437.83	65.25	0.55
Alpine	5		1688.00			6.58			2.07		4439.66		4440.33	78.15	0.64
Alpine	5		3624.00			9.28			3.74		4441.26		4442.60	88.12	0.78
Alpine	5		5657.00			11.35			5.29		4442.44		4444.44	95.42	0.88

HEC-RAS Plan: Opt B River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
		(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	5		7379.00			13.02			6.77		4443.14	4442.96	4445.77	99.77	0.96
Alpine	5		10490.00			14.64			8.16		4444.58	4444.58	4447.91	106.68	1.01
Alpine	5		16703.00			16.35			9.47		4447.19	4447.19	4451.34	124.91	1.01
Alpine	5.33333*		428.00			5.31			1.49		4438.59		4439.03	41.97	0.67
Alpine	5.33333*		1690.00			9.53			3.90		4440.69		4442.10	53.41	0.92
Alpine	5.33333*		3655.00			12.08			5.80		4442.77	4442.77	4445.03	67.34	1.00
Alpine	5.33333*		5736.00			13.31			6.69		4444.52	4444.52	4447.27	79.12	1.01
Alpine	5.33333*		7481.00			14.03			7.21		4445.75	4445.75	4448.81	87.38	1.00
Alpine	5.33333*		10612.00			15.11			8.03		4447.56	4447.56	4451.10	99.53	1.00
Alpine	5.33333*	3454.53	12942.12	427.35	2.11	10.93	1.70	0.74	3.81	0.49	4451.83	4451.83	4453.27	1237.96	0.61
Alpine	5.66		428.00			4.65			1.09		4439.77		4440.10	42.24	0.56
Alpine	5.66		1690.00			7.95			2.27		4442.53		4443.51	45.00	0.64
Alpine	5.66		3655.00			11.92			4.50		4444.56		4446.76	49.23	0.84
Alpine	5.66		5736.00			14.52			6.64		4446.22	4446.11	4449.50	58.52	0.99
Alpine	5.66		7481.00			15.13			7.32		4447.77	4447.77	4451.32	70.08	1.00
Alpine	5.66		10612.00			16.10			8.28		4449.88	4449.88	4453.90	85.88	1.02
Alpine	5.66	4884.68	11069.86	869.46	2.43	11.00	2.01	0.93	3.71	0.64	4453.40	4453.40	4454.67	1340.72	0.63
Alpine	5.75	Bridge													
Alpine	6		428.00			3.27			0.56		4440.59	4439.61	4440.76	62.14	0.40
Alpine	6		1690.00			4.74			0.80		4444.12	4441.32	4444.47	65.67	0.36
Alpine	6		3655.00			5.13			0.69		4449.35	4443.23	4449.75	70.90	0.28
Alpine	6		5736.00			6.60			1.05		4451.50	4444.88	4452.18	73.05	0.34
Alpine	6		7481.00			7.70			1.40		4452.89	4446.10	4453.81	970.82	0.38
Alpine	6	2936.34	6980.15	695.51	1.16	6.00	0.98	0.22	0.89	0.16	4455.11	4448.05	4455.48	1452.07	0.30
Alpine	6	4235.20	11608.37	980.43	1.86	10.20	1.61	0.60	2.60	0.44	4454.83	4451.38	4455.96	1417.11	0.52
Alpine	6.125*		428.00			4.17			1.00		4441.46	4440.92	4441.73	61.69	0.57
Alpine	6.125*		1690.00			5.68			1.23		4444.54	4442.65	4445.04	64.77	0.47
Alpine	6.125*		3655.00			5.78			0.93		4449.52	4444.56	4450.04	69.75	0.34
Alpine	6.125*		5736.00			7.27			1.35		4451.72	4446.20	4452.54	73.21	0.39
Alpine	6.125*		7481.00			8.31			1.75		4453.18	4447.44	4454.25	79.88	0.44
Alpine	6.125*	1073.59	9146.74	391.67	1.11	8.53	1.07	0.24	1.95	0.23	4455.10	4449.38	4456.08	1293.15	0.46
Alpine	6.125*		16824.00			17.27			7.78		4454.06	4452.99	4458.69	922.02	0.92
Alpine	6.25*		428.00			4.05			0.93		4442.83	4442.25	4443.08	61.74	0.54
Alpine	6.25*		1690.00			6.53			1.72		4445.26	4443.97	4445.92	64.17	0.57
Alpine	6.25*		3655.00			6.56			1.27		4449.75	4445.88	4450.42	68.65	0.41
Alpine	6.25*		5736.00			7.92			1.76		4452.03	4447.53	4453.01	78.30	0.46

HEC-RAS Plan: Opt B River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
		(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	7.4*		7481.00			10.55			3.28		4457.42	4454.67	4459.15	81.48	0.63
Alpine	7.4*		10612.00			11.24			3.66		4460.11	4456.67	4462.07	315.19	0.64
Alpine	7.4*	1997.50	14531.59	294.91	1.36	11.85	0.22	0.65	4.01	0.94	4462.67	4462.67	4464.56	1661.05	0.64
Alpine	7.6*		428.00			4.62			1.18		4450.03	4449.52	4450.36	51.82	0.61
Alpine	7.6*		1690.00			8.26			2.78		4452.15	4451.45	4453.21	53.93	0.75
Alpine	7.6*		3655.00			10.79			3.84		4454.58	4453.59	4456.39	56.36	0.78
Alpine	7.6*		5736.00			12.54			4.75		4456.61	4455.42	4459.05	61.73	0.81
Alpine	7.6*		7481.00			13.96			5.72		4457.84	4456.92	4460.87	65.93	0.86
Alpine	7.6*		10612.00			14.72			6.24		4460.44	4459.11	4463.80	79.59	0.86
Alpine	7.6*	3650.44	10823.22	2350.34	1.62	9.91	1.41	0.58	2.72	0.70	4464.43	4464.11	4465.42	1828.10	0.52
Alpine	7.8		428.00			5.05			1.33		4451.59	4451.03	4451.98	42.07	0.63
Alpine	7.8		1690.00			9.11			3.15		4453.92	4453.26	4455.21	44.40	0.79
Alpine	7.8		3655.00			12.73			5.11		4456.15	4455.71	4458.67	46.63	0.90
Alpine	7.8		5736.00			15.16			6.57		4458.06	4457.87	4461.63	50.03	0.97
Alpine	7.8		7481.00			16.42			7.51		4459.53	4459.53	4463.72	54.84	1.00
Alpine	7.8		10612.00			17.13			8.50		4462.13	4462.13	4466.69	156.45	1.03
Alpine	7.8	4557.83	9801.76	2464.41	1.83	10.95	1.50	0.73	3.27	0.81	4465.63	4465.63	4466.73	1942.06	0.58
Alpine	7.9		428.00			5.18			0.80		4452.30	4451.80	4452.71	42.01	0.65
Alpine	7.9		1690.00			8.67			1.79		4454.89	4454.02	4456.06	44.60	0.73
Alpine	7.9		3655.00			11.18			2.59		4457.75	4456.48	4459.69	48.07	0.76
Alpine	7.9		5736.00			12.45			2.95		4460.40	4458.62	4462.81	52.94	0.74
Alpine	7.9		7481.00			13.11			3.32		4462.36	4460.17	4465.03	128.71	0.75
Alpine	7.9	4071.39	4581.27	1959.34	0.85	4.76	0.69	0.13	0.43	0.15	4468.00	4462.63	4468.15	2110.00	0.23
Alpine	7.9	4757.56	9750.91	2315.53	1.65	11.38	1.31	0.58	2.52	0.61	4466.52	4466.52	4467.70	2020.42	0.58
Alpine	7.95	Bridge													
Alpine	8		428.00			4.83			1.19		4452.99	4452.34	4453.35	42.16	0.59
Alpine	8		1690.00			8.16			2.42		4455.71	4454.57	4456.74	44.88	0.67
Alpine	8		3655.00			7.69			1.48		4461.34	4457.02	4462.25	50.51	0.44
Alpine	8	882.17	4490.21	363.62	0.77	6.27	0.52	0.11	0.98	0.12	4465.50	4459.12	4465.98	1761.06	0.33
Alpine	8	1125.59	5924.17	431.24	1.07	8.34	0.66	0.20	1.74	0.21	4465.41	4460.65	4466.27	1681.64	0.44
Alpine	8	4237.05	4431.72	1943.22	0.95	5.01	0.76	0.17	0.58	0.18	4468.13	4466.05	4468.30	2140.82	0.24
Alpine	8	6431.35	7445.98	2946.67	1.57	8.59	1.25	0.48	1.72	0.51	4467.86	4466.98	4468.38	2123.64	0.41
Alpine	8.33333*		428.00			4.74			1.14		4453.82	4453.15	4454.17	42.19	0.57
Alpine	8.33333*		1690.00			8.08			2.36		4456.55	4455.37	4457.57	44.92	0.66
Alpine	8.33333*		3655.00			8.12			1.81		4461.60	4457.82	4462.63	54.15	0.50
Alpine	8.33333*	205.41	5530.59		0.69	8.14		0.15	1.78		4465.44	4459.94	4466.43	1058.75	0.44

HEC-RAS Plan: Opt B River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
		(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	8.33333*	204.23	7276.77		0.83	10.84		0.23	3.17		4465.31	4461.70	4467.09	907.77	0.59
Alpine	8.33333*	3080.26	5493.47	2038.27	1.06	6.41	0.82	0.24	1.03	0.24	4468.14	4464.12	4468.48	2257.36	0.31
Alpine	8.33333*	4580.41	9237.00	3006.59	1.74	10.96	1.34	0.65	3.04	0.65	4467.92	4467.92	4468.96	2239.73	0.54
Alpine	8.66666*		428.00			4.75			1.15		4454.62		4454.97	42.19	0.57
Alpine	8.66666*		1690.00			8.07			2.36		4457.36		4458.37	44.92	0.66
Alpine	8.66666*		3655.00			8.32			2.08		4461.99		4463.06	58.51	0.54
Alpine	8.66666*	0.00	5736.00		0.03	8.58		0.00	2.08		4465.68	4461.05	4466.83	72.23	0.47
Alpine	8.66666*	0.83	7480.17		0.19	11.07		0.03	3.46		4465.79	4462.49	4467.70	130.64	0.61
Alpine	8.66666*	1755.08	7312.79	1544.14	1.14	8.82	0.87	0.32	2.10	0.31	4468.08		4468.92	2273.68	0.44
Alpine	8.66666*	3657.09	9909.69	3257.22	1.72	11.42	1.32	0.66	3.47	0.66	4468.65	4468.65	4469.86	2370.40	0.56
Alpine	9		428.00			4.75			1.15		4455.42		4455.77	42.19	0.57
Alpine	9		1690.00			8.07			2.35		4458.16		4459.17	44.93	0.66
Alpine	9		3655.00			7.91			2.21		4462.66		4463.63	84.85	0.60
Alpine	9		5736.00			6.55			1.44		4466.63		4467.30	122.76	0.43
Alpine	9	68.05	7264.36	148.59	0.44	7.23	0.45	0.08	1.71	0.12	4467.67		4468.45	1235.23	0.45
Alpine	9	525.71	9361.66	724.63	0.87	8.58	0.68	0.23	2.36	0.24	4468.34		4469.35	2243.05	0.52
Alpine	9	2331.83	11427.58	3064.59	1.46	9.28	1.16	0.51	2.65	0.53	4469.46		4470.37	2578.67	0.52
Alpine	9.3	Bridge													
Alpine	9.5		428.00			3.38			0.51		4456.93	4455.39	4457.11	43.05	0.35
Alpine	9.5		1690.00			5.99			1.14		4460.40	4457.62	4460.96	46.52	0.43
Alpine	9.5		3666.00			6.17			1.35		4464.41	4460.09	4465.00	101.83	0.45
Alpine	9.5	9.97	5724.50	30.53	0.25	6.14	0.23	0.03	1.26	0.04	4467.34	4462.84	4467.92	937.45	0.40
Alpine	9.5	760.33	5725.91	1030.76	0.68	5.04	0.55	0.12	0.81	0.13	4468.94	4463.98	4469.24	2444.06	0.30
Alpine	9.5	1751.22	6625.35	2279.43	0.92	5.34	0.73	0.19	0.88	0.20	4469.77	4465.73	4470.05	2644.18	0.30
Alpine	9.5	3613.96	8518.43	4734.61	1.26	6.26	1.03	0.32	1.18	0.36	4470.72	4469.21	4471.03	2758.17	0.34
Alpine	9.56666*		428.00			4.30			0.91		4457.39		4457.68	42.41	0.49
Alpine	9.56666*		1690.00			6.72			1.51		4460.84		4461.54	45.85	0.51
Alpine	9.56666*		3666.00			7.43			1.80		4464.80		4465.66	71.21	0.50
Alpine	9.56666*		5765.00			8.30			2.10		4467.52		4468.59	76.56	0.49
Alpine	9.56666*	0.65	7197.98	318.37	0.17	9.09	0.63	0.02	2.45	0.21	4468.77		4470.00	812.62	0.51
Alpine	9.56666*	49.97	9729.45	876.57	0.62	11.68	0.85	0.15	3.99	0.37	4469.29		4471.23	1556.56	0.64
Alpine	9.56666*	994.94	10843.56	5028.50	1.34	11.19	1.46	0.46	3.50	0.77	4471.00	4471.00	4472.26	2141.65	0.57
Alpine	9.63333*		428.00			4.72			1.13		4458.29		4458.64	42.20	0.57
Alpine	9.63333*		1690.00			7.35			1.88		4461.48		4462.31	45.38	0.58
Alpine	9.63333*		3666.00			8.13			1.99		4465.33		4466.36	67.38	0.55
Alpine	9.63333*		5765.00			8.72			2.18		4468.03		4469.21	83.63	0.55

HEC-RAS Plan: Opt B River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl.
		(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	9.63333*		7280.68	236.32		9.45	0.67		2.48	0.24	4469.30		4470.64	571.75	0.56
Alpine	9.63333*	56.78	8628.34	1970.88	0.70	9.35	0.97	0.16	2.31	0.39	4471.01		4472.11	1571.16	0.51
Alpine	9.63333*	141.80	12996.92	3728.28	1.15	13.70	1.53	0.41	4.92	0.93	4471.29		4473.55	1649.43	0.74
Alpine	9.7		428.00			4.75			1.15		4459.39		4459.74	42.19	0.57
Alpine	9.7		1690.00			7.75			2.13		4462.32		4463.25	45.12	0.62
Alpine	9.7		3666.00			8.56			2.25		4466.00		4467.13	63.09	0.60
Alpine	9.7		5764.98	0.02		9.28	0.04		2.48	0.00	4468.61		4469.95	150.15	0.59
Alpine	9.7		7257.45	259.55		9.86	0.79		2.76	0.32	4469.93		4471.39	501.70	0.62
Alpine	9.7	3.15	9221.65	1431.19	0.47	10.46	1.01	0.10	3.01	0.46	4471.42		4472.89	1305.65	0.62
Alpine	9.7	233.02	10157.86	6476.12	1.10	9.06	1.39	0.30	2.09	0.64	4473.80		4474.58	1795.13	0.48
Alpine	9.73	Bridge													
Alpine	9.75		428.00			3.76			0.65		4459.95	4458.72	4460.17	42.75	0.41
Alpine	9.75		1690.00			4.76			0.73		4464.88	4460.94	4465.23	63.39	0.35
Alpine	9.75		3666.00			6.15			1.09		4468.30	4463.81	4468.89	79.30	0.39
Alpine	9.75		5331.79	433.21		6.66	0.66		1.26	0.20	4470.60	4465.70	4471.24	678.78	0.41
Alpine	9.75	9.93	6076.60	1430.46	0.43	6.56	0.73	0.07	1.17	0.22	4471.86	4467.03	4472.40	1395.46	0.38
Alpine	9.75	90.80	7050.07	3515.13	0.71	6.68	0.95	0.14	1.16	0.32	4473.15	4470.68	4473.62	1660.69	0.36
Alpine	9.75	356.88	8968.09	7542.03	1.02	7.46	1.27	0.24	1.38	0.49	4474.63	4472.68	4475.10	1865.31	0.38
Alpine	9.8*		428.00			5.34			1.52		4460.27		4460.71	41.95	0.68
Alpine	9.8*		1690.00			5.68			1.08		4464.98		4465.48	57.06	0.44
Alpine	9.8*		3666.00			7.12			1.48		4468.39		4469.18	69.61	0.46
Alpine	9.8*		5202.01	562.99		7.48	0.77		1.60	0.27	4470.71		4471.50	697.07	0.46
Alpine	9.8*	15.00	5734.90	1767.09	0.52	7.11	0.84	0.09	1.38	0.28	4471.98		4472.58	1420.48	0.41
Alpine	9.8*	111.30	6496.86	4047.84	0.79	7.06	1.04	0.17	1.30	0.37	4473.27		4473.75	1684.95	0.38
Alpine	9.8*	413.14	8040.18	8413.68	1.08	7.63	1.34	0.27	1.46	0.55	4474.79		4475.23	1868.69	0.39
Alpine	9.9*		428.00			4.65			1.09		4461.66		4461.99	42.24	0.56
Alpine	9.9*		1690.00			6.45			1.44		4465.41		4466.06	52.19	0.51
Alpine	9.9*		3664.03	1.97		8.05	0.18		1.91	0.03	4468.75		4469.75	163.54	0.52
Alpine	9.9*	0.18	5019.78	745.05	0.16	8.12	0.70	0.03	1.89	0.24	4471.11		4472.00	1241.81	0.50
Alpine	9.9*	26.63	5033.06	2457.32	0.48	7.03	0.92	0.12	1.35	0.33	4472.39		4472.90	1501.88	0.40
Alpine	9.9*	120.32	5694.55	4841.13	0.66	7.05	1.10	0.19	1.30	0.41	4473.60		4474.02	1749.90	0.38
Alpine	9.9*	387.83	6949.46	9529.71	0.86	7.53	1.40	0.28	1.43	0.58	4475.11		4475.49	1881.29	0.38
Alpine	10		428.00			4.74			1.14		4462.72	4462.04	4463.07	42.20	0.57
Alpine	10		1690.00			7.15			1.80		4466.02	4464.27	4466.82	48.31	0.57
Alpine	10		3666.00			9.05			2.44		4469.22	4466.86	4470.49	295.66	0.59
Alpine	10	10.01	4026.42	1728.56	0.40	7.10	0.84	0.09	1.41	0.29	4471.91	4468.80	4472.46	1429.70	0.42

HEC-RAS Plan: Opt B River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
		(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	10	48.70	4284.69	3183.61	0.55	6.87	0.97	0.15	1.28	0.34	4472.79	4470.39	4473.21	1628.63	0.39
Alpine	10	160.95	4828.82	5666.22	0.70	6.93	1.12	0.20	1.26	0.41	4473.93	4472.43	4474.28	1889.31	0.37
Alpine	10	457.59	5796.31	10613.10	0.88	7.31	1.38	0.28	1.34	0.56	4475.43	4473.42	4475.73	2041.62	0.37
Alpine	10.3333*		428.00			4.75			1.15		4463.69	4463.02	4464.04	42.19	0.57
Alpine	10.3333*		1690.00			7.37			1.99		4466.75	4465.29	4467.60	49.74	0.61
Alpine	10.3333*		3666.00			9.24			2.64		4469.90	4467.71	4471.22	58.47	0.62
Alpine	10.3333*		5765.00			12.07			4.30		4471.25	4469.79	4473.51	331.45	0.76
Alpine	10.3333*		7517.00			15.69			7.27		4471.27	4471.27	4475.09	338.79	0.99
Alpine	10.3333*	16.47	7065.46	3574.07	0.52	10.65	1.46	0.18	3.22	0.82	4473.86	4473.86	4475.04	1410.58	0.64
Alpine	10.3333*	235.11	8548.67	8083.22	1.01	11.07	1.84	0.45	3.30	1.12	4475.30	4474.88	4476.29	1716.44	0.61
Alpine	10.6666*		428.00			4.75			1.15		4464.67	4463.99	4465.02	42.19	0.57
Alpine	10.6666*		1690.00			7.24			1.96		4467.63	4466.30	4468.44	53.08	0.61
Alpine	10.6666*		3666.00			8.89			2.55		4470.77	4468.56	4472.00	60.67	0.60
Alpine	10.6666*		5765.00			10.51			3.37		4472.90	4470.47	4474.62	248.63	0.66
Alpine	10.6666*	53.17	4482.47	2981.36	0.37	5.46	0.90	0.07	0.86	0.28	4476.29	4471.85	4476.57	1510.86	0.32
Alpine	10.6666*		10656.00			16.19			7.88		4474.41	4474.41	4478.48	1085.82	0.99
Alpine	10.6666*	114.81	10092.30	6659.89	0.82	12.33	2.03	0.36	4.37	1.42	4476.26	4476.26	4477.70	1507.74	0.71
Alpine	11		428.00			3.88			0.78		4465.62	4464.76	4465.85	52.16	0.47
Alpine	11		1690.00			5.86			1.30		4468.65	4466.74	4469.18	61.76	0.48
Alpine	11		3666.00			7.42			1.78		4471.83	4468.75	4472.69	67.62	0.48
Alpine	11		5765.00			8.72			2.29		4474.22	4470.49	4475.40	246.52	0.51
Alpine	11		7517.00			9.45			2.59		4476.01	4471.76	4477.40	998.69	0.53
Alpine	11	420.83	5410.06	4825.12	0.56	4.68	0.91	0.12	0.60	0.25	4479.73	4473.78	4479.91	1712.54	0.24
Alpine	11	59.08	11389.34	5418.59	0.58	12.09	1.94	0.22	4.27	1.31	4477.59	4477.59	4479.14	1423.24	0.69
Alpine	11.3	Bridge													
Alpine	11.4		427.00			3.16			0.49		4466.50	4465.23	4466.66	58.45	0.37
Alpine	11.4		1691.00			5.26			1.02		4469.58	4467.16	4470.01	63.28	0.41
Alpine	11.4		3670.00			6.79			1.48		4472.87	4469.17	4473.58	69.62	0.43
Alpine	11.4		5777.00			8.35			2.11		4474.98	4470.90	4476.06	785.78	0.48
Alpine	11.4	222.51	4035.87	3275.62	0.41	3.77	0.72	0.07	0.40	0.16	4479.14	4472.17	4479.26	1635.21	0.20
Alpine	11.4	466.26	5198.51	5010.23	0.57	4.52	0.90	0.12	0.56	0.24	4479.93	4474.16	4480.09	1742.81	0.23
Alpine	11.4	618.48	8616.91	7651.61	0.92	7.75	1.52	0.32	1.68	0.69	4479.53	4477.62	4480.02	1688.64	0.41
Alpine	11.4333*		427.00			3.64			0.67		4466.70	4465.71	4466.91	52.30	0.43
Alpine	11.4333*		1691.00			5.49			1.16		4469.77	4467.71	4470.24	69.67	0.46
Alpine	11.4333*		3670.00			6.61			1.43		4473.10	4469.76	4473.78	78.58	0.44
Alpine	11.4333*		5777.00			7.78			1.86		4475.38	4471.37	4476.32	752.08	0.47

HEC-RAS Plan: Opt B River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
		(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	11.4333*	154.75	4589.32	2789.93	0.39	4.04	0.73	0.07	0.46	0.17	4479.16	4472.56	4479.31	1503.77	0.22
Alpine	11.4333*	366.49	5926.45	4382.06	0.56	4.84	0.93	0.12	0.65	0.26	4479.95	4474.41	4480.16	1602.44	0.26
Alpine	11.4333*	482.02	9735.79	6669.19	0.89	8.20	1.54	0.32	1.88	0.72	4479.62	4477.89	4480.24	1561.10	0.44
Alpine	11.4666*		427.00			3.99			0.83		4466.99	4466.19	4467.23	52.09	0.49
Alpine	11.4666*		1691.00			5.69			1.28		4470.01	4468.21	4470.51	75.60	0.51
Alpine	11.4666*		3670.00			6.44			1.38		4473.33	4470.26	4473.98	88.53	0.45
Alpine	11.4666*		5777.00			7.24			1.63		4475.72	4471.80	4476.54	694.71	0.46
Alpine	11.4666*	95.03	5134.02	2304.95	0.35	4.29	0.74	0.06	0.52	0.18	4479.17	4472.91	4479.37	1369.38	0.24
Alpine	11.4666*	271.96	6662.36	3740.69	0.54	5.15	0.95	0.12	0.73	0.28	4479.97	4474.71	4480.24	1460.00	0.28
Alpine	11.4666*	352.70	10857.67	5676.63	0.84	8.62	1.56	0.30	2.07	0.76	4479.70	4478.17	4480.45	1428.43	0.47
Alpine	11.5		427.00			4.22			0.95		4467.36	4466.68	4467.64	51.98	0.53
Alpine	11.5		1691.00			5.86			1.39		4470.31	4468.77	4470.84	80.35	0.54
Alpine	11.5		3670.00			6.27			1.34		4473.57	4470.76	4474.18	101.29	0.46
Alpine	11.5		5777.00			6.78			1.44		4476.02	4472.27	4476.73	450.14	0.44
Alpine	11.5	45.40	5839.51	1649.09	0.28	4.67	0.66	0.05	0.62	0.20	4479.18	4473.30	4479.44	1232.99	0.27
Alpine	11.5	183.77	7691.07	2800.16	0.50	5.68	0.88	0.12	0.90	0.32	4479.97	4474.92	4480.34	1315.12	0.31
Alpine	11.5	221.84	12468.22	4196.95	0.76	9.46	1.43	0.29	2.50	0.87	4479.70	4478.34	4480.73	1287.14	0.53
Alpine	11.5666*		427.00			4.38			1.04		4468.45		4468.75	51.91	0.56
Alpine	11.5666*		1691.00			6.53			1.75		4471.14		4471.80	71.28	0.60
Alpine	11.5666*		3670.00			7.41			1.94		4474.02		4474.87	91.88	0.56
Alpine	11.5666*		5777.00			7.99			2.06		4476.34		4477.33	104.52	0.54
Alpine	11.5666*	0.70	6831.52	701.78	0.15	6.71	0.61	0.02	1.32	0.21	4479.11		4479.74	961.05	0.38
Alpine	11.5666*	23.15	9022.53	1629.32	0.40	8.22	0.91	0.10	1.93	0.42	4479.85		4480.74	1090.81	0.45
Alpine	11.5666*	48.22	14103.26	2735.52	0.65	12.69	1.45	0.27	4.58	1.03	4479.97	4479.97	4482.07	1113.62	0.70
Alpine	11.6333*		427.00			4.37			1.03		4469.63		4469.92	51.92	0.56
Alpine	11.6333*		1691.00			6.86			1.94		4472.20		4472.93	68.24	0.64
Alpine	11.6333*		3670.00			8.34			2.48		4474.77		4475.85	79.99	0.63
Alpine	11.6333*		5777.00			9.44			2.89		4476.89		4478.27	82.44	0.61
Alpine	11.6333*	0.11	7317.16	216.73	0.16	9.09	0.63	0.03	2.47	0.26	4479.20		4480.45	470.15	0.52
Alpine	11.6333*	6.64	10047.87	620.49	0.52	11.68	1.01	0.19	4.00	0.59	4479.86		4481.86	578.46	0.64
Alpine	11.6333*	165.12	13429.17	3292.71	1.16	13.08	1.47	0.62	4.72	1.04	4481.85	4481.85	4483.97	1127.72	0.66
Alpine	11.7		427.00			4.99			1.33		4470.90	4470.41	4471.29	45.48	0.64
Alpine	11.7		1691.00			7.77			2.49		4473.38	4472.52	4474.32	56.39	0.70
Alpine	11.7		3670.00			10.52			3.99		4475.67	4474.60	4477.39	58.17	0.76
Alpine	11.7		5777.00			12.62			5.32		4477.52	4476.41	4479.99	59.61	0.80
Alpine	11.7	0.02	7503.94	30.04	0.19	13.23	0.89	0.05	5.48	0.55	4479.35	4477.75	4482.05	299.63	0.76
Alpine	11.7	38.19	9348.14	1288.67	1.12	13.52	1.46	0.62	5.37	1.09	4481.41	4481.41	4483.90	550.18	0.70

HEC-RAS Plan: Opt B River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
		(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	12.7		14547.61	2358.39		11.18	1.63		3.35	0.99	4487.21		4488.88	533.41	0.53
Alpine	12.9	Culvert													
Alpine	13		427.00			6.94			2.83		4474.00	4474.00	4474.75	41.51	1.01
Alpine	13		1691.00			4.52			0.80		4477.63	4475.78	4477.94	93.53	0.40
Alpine	13		3675.00			4.83			0.74		4481.75	4477.24	4482.11	94.34	0.30
Alpine	13		5692.41	97.59		5.67	0.36		0.94	0.08	4484.32	4478.53	4484.81	466.82	0.31
Alpine	13		7230.45	319.55		6.78	0.61		1.32	0.19	4484.97	4479.48	4485.65	482.02	0.36
Alpine	13		9800.59	894.41		8.50	1.01		2.02	0.44	4485.89	4481.01	4486.92	503.55	0.43
Alpine	13		14496.27	2409.73		11.35	1.67		3.50	1.04	4487.20	4485.18	4488.92	533.23	0.55
Alpine	13.25*		427.00			4.53			1.03		4475.19		4475.51	42.29	0.53
Alpine	13.25*		1691.00			7.38			2.24		4477.63		4478.47	69.92	0.72
Alpine	13.25*		3678.00			6.05			1.23		4481.75		4482.32	102.60	0.44
Alpine	13.25*		5691.70	104.30		6.52	0.41		1.27	0.12	4484.33		4484.98	467.06	0.40
Alpine	13.25*		7202.90	355.10		7.64	0.71		1.71	0.28	4485.00		4485.87	482.68	0.45
Alpine	13.25*		9708.02	995.98		9.32	1.14		2.47	0.60	4485.96		4487.18	505.19	0.52
Alpine	13.25*		14257.93	2658.07		12.00	1.82		3.94	1.32	4487.36		4489.26	535.61	0.63
Alpine	13.5		427.00			4.66			1.10		4475.55	4474.83	4475.89	42.23	0.56
Alpine	13.5		1691.00			8.11			2.58		4478.04	4477.17	4479.06	56.43	0.74
Alpine	13.5		3678.00			7.94			2.13		4481.68	4479.59	4482.66	83.52	0.59
Alpine	13.5		5796.00			8.30			2.16		4484.21	4481.37	4485.28	444.43	0.56
Alpine	13.5		7184.78	373.22		9.32	0.87		2.66	0.45	4484.91	4482.59	4486.19	473.19	0.61
Alpine	13.5		9573.19	1130.81		10.89	1.39		3.52	0.97	4485.91	4485.20	4487.57	500.54	0.68
Alpine	13.5	2.86	13830.92	3082.22	0.41	13.12	2.12	0.16	4.86	1.90	4487.48	4487.05	4489.68	561.21	0.76
Alpine	13.75*		427.00			4.70			1.12		4475.94	4475.24	4476.28	42.21	0.57
Alpine	13.75*		1691.00			7.75			2.31		4478.64	4477.53	4479.58	53.01	0.67
Alpine	13.75*		3678.00			8.93			2.60		4481.87	4479.94	4483.11	68.72	0.64
Alpine	13.75*		5796.00			9.49			2.81		4484.32	4481.95	4485.72	91.43	0.65
Alpine	13.75*		7558.00			11.38			4.00		4484.90	4483.40	4486.91	96.15	0.76
Alpine	13.75*		10704.00			14.72			6.60		4485.53	4485.32	4488.90	101.40	0.97
Alpine	13.75*		15872.21	1043.79		14.24	1.51		5.60	1.18	4489.03	4489.03	4491.99	483.16	0.81
Alpine	14		427.00			4.35			1.04		4476.40	4475.65	4476.69	48.51	0.54
Alpine	14		1691.00			6.38			1.71		4479.40	4477.77	4480.04	62.34	0.55
Alpine	14		3678.00			7.66			2.11		4482.59	4479.93	4483.50	72.79	0.53
Alpine	14		5796.00			8.89			2.64		4484.84	4481.69	4486.07	80.16	0.55
Alpine	14		7558.00			10.50			3.60		4485.67	4482.94	4487.38	82.34	0.63
Alpine	14		10704.00			12.53			4.95		4487.27	4484.90	4489.71	88.29	0.71

HEC-RAS Plan: Opt B River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
		(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	14		16916.00			16.81			8.68		4488.88	4488.27	4493.27	100.89	0.94
Alpine	14.3	Bridge													
Alpine	14.5		427.00			4.95			1.05		4479.18	4478.11	4479.56	34.29	0.55
Alpine	14.5		1691.00			6.94			1.70		4482.73	4480.99	4483.48	54.99	0.58
Alpine	14.5		3681.00			7.49			1.79		4486.39	4483.59	4487.26	81.34	0.54
Alpine	14.5		5806.00			8.79			2.38		4488.28	4485.56	4489.48	96.24	0.59
Alpine	14.5		7570.00			8.12			1.93		4490.84	4486.86	4491.86	473.65	0.51
Alpine	14.5		10719.00			11.61			3.95		4490.77	4488.75	4492.86	455.98	0.72
Alpine	14.5	472.46	13515.16	2942.38	0.81	9.65	1.59	0.36	2.38	0.97	4494.85	4492.41	4496.01	867.90	0.49
Alpine	14.6666*		427.00			6.57			1.94		4479.66		4480.33	30.33	0.79
Alpine	14.6666*		1691.00			8.11			2.43		4483.11		4484.13	53.56	0.72
Alpine	14.6666*		3681.00			8.15			2.19		4486.67		4487.70	62.23	0.61
Alpine	14.6666*		5806.00			9.30			2.69		4488.62		4489.96	95.40	0.64
Alpine	14.6666*	33.03	6702.84	834.13	0.48	7.49	0.77	0.16	1.57	0.32	4491.39		4492.16	800.00	0.44
Alpine	14.6666*	146.24	8441.84	2130.92	0.64	8.25	1.10	0.24	1.82	0.54	4492.69		4493.53	931.04	0.45
Alpine	14.6666*	1002.95	10359.00	5568.05	0.83	7.83	1.42	0.31	1.50	0.70	4495.74		4496.34	1208.16	0.38
Alpine	14.8333*		427.00			6.88			2.17		4480.66		4481.39	30.82	0.86
Alpine	14.8333*		1691.00			8.59			2.82		4483.77		4484.91	56.54	0.81
Alpine	14.8333*		3681.00	0.00		8.77	0.03		2.56		4487.02		4488.21	79.16	0.67
Alpine	14.8333*	24.64	5219.57	561.79	0.68	8.70	1.11	0.24	2.24	0.31	4489.30		4490.36	626.01	0.56
Alpine	14.8333*	176.18	4466.76	2927.06	0.60	5.47	1.16	0.14	0.80	0.24	4492.04		4492.33	1095.51	0.30
Alpine	14.8333*	382.37	5210.19	5126.43	0.64	5.62	1.36	0.15	0.81	0.29	4493.45		4493.70	1289.07	0.29
Alpine	14.8333*	1249.97	5918.13	9761.90	0.71	5.14	1.52	0.16	0.63	0.31	4496.29		4496.45	1498.10	0.24
Alpine	15		427.00			5.96			1.63		4481.84		4482.39	35.86	0.74
Alpine	15		1691.00			8.47			2.70		4484.62		4485.73	55.23	0.78
Alpine	15	34.70	3124.32	521.99	0.82	8.05	1.14	0.32	2.01	0.33	4487.79		4488.65	553.71	0.56
Alpine	15	182.22	3199.94	2423.84	0.83	5.94	1.14	0.25	0.98	0.25	4490.30		4490.61	1097.85	0.35
Alpine	15	298.22	2902.85	4368.92	0.58	4.42	1.07	0.12	0.51	0.18	4492.28		4492.40	1327.77	0.24
Alpine	15	516.11	3419.77	6783.12	0.58	4.63	1.21	0.12	0.54	0.22	4493.65		4493.77	1547.97	0.23
Alpine	15	1352.66	3935.26	11642.08	0.65	4.35	1.31	0.12	0.44	0.22	4496.41		4496.50	1763.78	0.20
Alpine	15.1666*		419.00			5.36			1.29		4483.22		4483.66	36.71	0.65
Alpine	15.1666*		1699.00			8.15			2.49		4485.99		4487.03	56.35	0.75
Alpine	15.1666*	0.72	3724.98	85.31	0.57	11.69	1.42	0.21	4.57	0.59	4487.83	4487.83	4489.91	158.94	0.90
Alpine	15.1666*	74.94	4762.06	1308.00	1.18	10.42	1.67	0.53	3.22	0.63	4490.09	4490.09	4491.41	667.37	0.67
Alpine	15.1666*	226.36	4357.93	3422.71	0.99	7.46	1.47	0.32	1.52	0.41	4492.16		4492.65	1116.89	0.43
Alpine	15.1666*	423.02	4725.38	6091.60	0.94	7.03	1.62	0.27	1.29	0.44	4493.60		4493.95	1300.00	0.37

HEC-RAS Plan: Opt B River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
		(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	15.1666*	1166.84	5008.21	11271.95	0.87	5.93	1.64	0.21	0.85	0.38	4496.41		4496.59	1636.98	0.28
Alpine	15.3333*		419.00			5.56			1.39		4484.33		4484.81	35.48	0.67
Alpine	15.3333*		1699.00			8.12			2.47		4487.22		4488.24	56.60	0.74
Alpine	15.3333*	0.77	3725.15	85.09	0.54	10.46	0.95	0.18	3.55	0.54	4489.63	4488.93	4491.29	175.27	0.77
Alpine	15.3333*	48.50	5323.20	773.29	1.10	11.16	1.14	0.49	3.67	0.66	4491.56	4491.56	4493.23	623.64	0.71
Alpine	15.3333*	130.00	6209.25	1667.75	1.35	11.61	1.36	0.66	3.82	0.84	4492.48	4492.48	4494.11	810.05	0.70
Alpine	15.3333*	304.37	7416.81	3518.82	1.47	12.13	1.58	0.73	3.99	1.03	4493.70	4493.70	4495.22	1102.77	0.68
Alpine	15.3333*	945.90	8260.51	8240.58	1.42	10.85	1.77	0.61	2.97	1.08	4496.10		4496.99	1432.28	0.55
Alpine	15.5		419.00			5.58			1.39		4485.51		4485.99	34.87	0.67
Alpine	15.5		1699.00			8.11			2.47		4488.44		4489.46	56.79	0.74
Alpine	15.5		3766.09	44.91		10.70	0.85		3.76	0.46	4490.75	4490.11	4492.51	145.98	0.80
Alpine	15.5	4.14	5885.88	254.98	0.95	13.86	1.40	0.46	5.94	1.04	4491.89	4491.63	4494.75	236.36	0.95
Alpine	15.5	70.19	6686.05	1250.76	1.21	12.41	1.35	0.58	4.39	0.86	4493.67	4493.67	4495.68	700.62	0.75
Alpine	15.5	256.20	7752.65	3231.14	1.37	12.16	1.53	0.65	3.99	0.97	4495.22	4495.22	4496.81	1085.69	0.68
Alpine	15.5	652.73	9998.13	6796.13	1.69	13.89	2.03	0.93	4.99	1.53	4496.51	4496.51	4498.25	1267.17	0.73
Alpine	15.75*		419.00			4.05			0.69		4486.74		4486.99	39.07	0.44
Alpine	15.75*		1699.00			6.29			1.40		4489.99		4490.61	61.55	0.53
Alpine	15.75*	1.09	3679.82	130.09	0.48	8.36	0.84	0.13	2.14	0.38	4492.66		4493.70	206.66	0.57
Alpine	15.75*	70.83	4936.56	1137.61	0.81	8.30	0.91	0.26	1.91	0.38	4495.02		4495.89	859.36	0.48
Alpine	15.75*	132.79	6033.35	1840.86	0.99	9.59	1.10	0.36	2.50	0.53	4495.56		4496.64	1013.19	0.54
Alpine	15.75*	294.45	7445.52	3500.04	1.23	10.84	1.41	0.52	3.11	0.80	4496.45		4497.66	1150.87	0.59
Alpine	15.75*	775.04	9480.44	7191.53	1.54	12.13	1.83	0.74	3.73	1.20	4497.89		4499.16	1344.10	0.62
Alpine	16.*		419.00			3.89			0.50		4487.30		4487.54	39.84	0.42
Alpine	16.*		1699.00			6.05			1.01		4490.70		4491.27	61.62	0.50
Alpine	16.*	0.16	3724.12	86.72	0.26	8.24	0.71	0.05	1.64	0.27	4493.36		4494.39	182.07	0.56
Alpine	16.*	35.41	5380.60	728.98	0.70	9.23	0.81	0.21	1.89	0.33	4495.34		4496.50	739.60	0.55
Alpine	16.*	80.38	6616.56	1310.06	0.88	10.63	1.01	0.31	2.46	0.47	4495.93		4497.38	901.06	0.61
Alpine	16.*	207.23	8358.11	2674.65	1.16	12.30	1.32	0.48	3.19	0.73	4496.80		4498.55	1084.89	0.68
Alpine	16.*	605.37	10795.88	6045.76	1.52	13.95	1.78	0.74	3.94	1.17	4498.22		4500.11	1278.62	0.72
Alpine	16.25*		419.00			3.88			0.49		4487.75		4487.99	39.10	0.41
Alpine	16.25*		1699.00			6.01			0.99		4491.25		4491.81	60.71	0.49
Alpine	16.25*		3747.03	63.97		8.19	0.71		1.62	0.27	4493.97		4494.99	150.15	0.55
Alpine	16.25*	18.60	5579.95	546.45	0.60	9.57	0.80	0.17	2.05	0.32	4495.83		4497.12	634.61	0.57
Alpine	16.25*	60.06	6845.94	1101.00	0.83	10.86	0.98	0.28	2.57	0.46	4496.53		4498.10	846.53	0.63
Alpine	16.25*	188.71	8580.89	2470.40	1.13	12.31	1.28	0.46	3.19	0.70	4497.53		4499.33	1077.75	0.67
Alpine	16.25*	586.61	11037.42	5822.98	1.52	13.86	1.73	0.73	3.87	1.12	4499.01		4500.91	1277.27	0.71

HEC-RAS Plan: Opt B River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
		(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	16.5		419.00			3.88			0.49		4488.19		4488.43	38.40	0.41
Alpine	16.5		1699.00			5.99			0.98		4491.78		4492.34	59.37	0.48
Alpine	16.5		3766.51	44.49		8.15	0.67		1.60	0.25	4494.56		4495.58	133.68	0.55
Alpine	16.5	8.44	5745.03	391.54	0.49	9.80	0.74	0.13	2.16	0.29	4496.38		4497.78	578.82	0.59
Alpine	16.5	45.41	7033.23	928.36	0.77	10.98	0.94	0.25	2.63	0.43	4497.18		4498.83	808.54	0.63
Alpine	16.5	172.22	8795.87	2271.91	1.11	12.32	1.23	0.45	3.19	0.66	4498.26		4500.10	1071.27	0.67
Alpine	16.5	563.69	11190.00	5693.32	1.50	13.65	1.72	0.60	3.74	1.09	4499.80		4501.67	1270.31	0.69
Alpine	16.7	Bridge													
Alpine	17		419.00			3.62			0.42		4488.39	4486.59	4488.59	39.55	0.37
Alpine	17		1699.00			5.67			0.87		4492.05	4489.42	4492.55	60.92	0.45
Alpine	17	0.06	3734.79	76.15	0.15	7.16	0.41	0.02	1.20	0.11	4495.44	4492.07	4496.22	352.06	0.46
Alpine	17	88.45	4862.09	1194.46	0.61	6.87	0.68	0.14	1.00	0.20	4498.16	4494.14	4498.75	1054.67	0.38
Alpine	17	197.15	5600.44	2209.41	0.74	7.24	0.83	0.18	1.07	0.27	4499.12	4496.45	4499.69	1176.40	0.38
Alpine	17	405.78	6701.72	4132.50	0.73	7.76	1.04	0.18	1.19	0.38	4500.45	4498.28	4501.01	1397.47	0.38
Alpine	17	1193.86	8608.80	7644.34	1.17	8.88	1.38	0.37	1.50	0.60	4501.99	4499.63	4502.61	1401.80	0.42
Alpine	17.05*		419.00			5.36			1.01		4488.71		4489.16	36.13	0.64
Alpine	17.05*		1699.00			6.63			1.25		4492.38		4493.06	61.23	0.57
Alpine	17.05*		3776.88	34.12		7.79	0.64		1.48	0.21	4495.71		4496.65	130.97	0.53
Alpine	17.05*	34.65	5624.29	486.06	0.60	8.45	0.70	0.15	1.57	0.22	4498.18		4499.20	703.47	0.49
Alpine	17.05*	112.26	6759.17	1135.58	0.82	9.24	0.88	0.24	1.82	0.32	4499.08		4500.20	935.82	0.52
Alpine	17.05*	334.66	8104.96	2800.38	1.05	9.77	1.16	0.34	1.95	0.48	4500.42		4501.49	1150.92	0.51
Alpine	17.05*	765.59	10490.82	6190.60	1.11	11.13	1.59	0.38	2.42	0.78	4501.96		4503.14	1411.59	0.55
Alpine	17.1*		419.00			6.50			1.59		4489.72		4490.38	36.33	0.86
Alpine	17.1*		1699.00			7.76			1.80		4492.91		4493.84	61.67	0.73
Alpine	17.1*		3806.46	4.54		8.62	0.46		1.89	0.13	4496.06		4497.21	103.14	0.63
Alpine	17.1*	5.98	6026.92	112.10	0.50	9.82	0.65	0.13	2.22	0.21	4498.27		4499.74	349.71	0.62
Alpine	17.1*	31.80	7649.55	325.65	0.77	11.46	0.87	0.25	2.94	0.34	4498.96		4500.91	527.54	0.69
Alpine	17.1*	112.53	10236.15	891.32	1.18	14.12	1.25	0.51	4.35	0.63	4499.69		4502.51	719.85	0.82
Alpine	17.1*	712.00	12321.10	4413.91	1.57	13.47	1.73	0.71	3.66	0.93	4502.12	4502.12	4504.12	1171.48	0.69
Alpine	17.15*		419.00			5.80			1.26		4491.35		4491.88	40.71	0.77
Alpine	17.15*		1699.00			8.23			2.10		4493.92		4494.97	65.77	0.82
Alpine	17.15*		3811.00			9.32			2.31		4496.67		4498.02	80.80	0.73
Alpine	17.15*	1.91	6064.34	78.75	0.55	10.41	1.07	0.15	2.59	0.43	4498.77		4500.44	158.04	0.69
Alpine	17.15*	14.88	7816.77	175.35	0.75	12.11	1.28	0.24	3.38	0.38	4499.54	4498.54	4501.76	279.46	0.77
Alpine	17.15*	198.81	10038.33	1002.87	1.23	12.62	1.24	0.49	3.43	0.53	4501.34	4501.34	4503.55	769.61	0.72
Alpine	17.15*	798.64	12710.27	3938.09	1.61	13.25	1.76	0.70	3.55	0.86	4503.31	4503.31	4505.31	1128.21	0.69

HEC-RAS Plan: Opt B River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
		(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	17.2		419.00			5.93			1.36		4492.76		4493.30	43.54	0.82
Alpine	17.2		1699.00			8.03			2.03		4495.21		4496.22	70.40	0.82
Alpine	17.2		3811.00			9.77			2.60		4497.54		4499.02	83.47	0.80
Alpine	17.2	0.96	6109.98	34.07	0.55	10.99	0.98	0.15	2.98	0.36	4499.44		4501.31	139.78	0.77
Alpine	17.2	10.40	7873.77	122.82	0.78	12.40	1.43	0.26	3.64	0.65	4500.34	4499.61	4502.69	183.24	0.81
Alpine	17.2	209.61	10323.87	706.53	1.28	12.66	1.21	0.51	3.49	0.47	4502.39	4502.39	4504.68	688.55	0.73
Alpine	17.2	875.48	13162.73	3408.79	1.66	13.20	1.79	0.72	3.54	0.81	4504.46	4504.46	4506.51	1083.30	0.69
Alpine	17.3	Bridge													
Alpine	17.4214		419.00			3.83			0.65		4493.58	4492.52	4493.81	50.97	0.46
Alpine	17.4214		1699.00			5.94			1.31		4496.23	4494.78	4496.78	76.11	0.54
Alpine	17.4214	0.01	3801.56	9.43	0.15	7.47	0.70	0.01	1.80	0.13	4498.91	4496.79	4499.78	121.26	0.55
Alpine	17.4214	14.94	5979.45	150.61	0.88	9.25	1.58	0.19	2.54	0.47	4500.47	4498.45	4501.77	192.61	0.60
Alpine	17.4214	1099.71	3355.52	3551.77	0.56	2.55	0.73	0.04	0.15	0.06	4508.06	4499.69	4508.10	1461.86	0.12
Alpine	17.4214	906.67	6799.30	3534.02	1.23	6.36	1.39	0.22	1.02	0.27	4505.27	4502.52	4505.66	1182.71	0.32
Alpine	17.4214	1829.73	8432.85	7184.43	1.27	6.90	1.80	0.24	1.15	0.40	4507.00	4504.26	4507.38	1461.86	0.33
Alpine	17.5371*		419.00			4.17			0.79		4494.33		4494.60	49.00	0.51
Alpine	17.5371*		1699.00			6.14			1.44		4497.08		4497.66	79.93	0.58
Alpine	17.5371*		3810.83	0.17		7.55	0.27		1.89	0.03	4499.66		4500.55	102.43	0.58
Alpine	17.5371*	6.20	6065.63	73.17	0.80	9.14	1.38	0.17	2.54	0.39	4501.31		4502.59	166.39	0.62
Alpine	17.5371*	790.87	4437.72	2778.41	0.60	3.37	0.83	0.05	0.27	0.09	4508.06		4508.16	1395.17	0.16
Alpine	17.5371*	679.21	8688.58	1872.20	1.50	8.27	1.44	0.36	1.78	0.33	4505.31		4506.13	964.88	0.44
Alpine	17.5371*	1636.27	10814.99	4995.74	1.76	8.87	1.96	0.45	1.95	0.53	4507.05		4507.83	1192.14	0.44
Alpine	17.6528*		419.00			4.23			0.81		4495.22		4495.50	48.95	0.52
Alpine	17.6528*		1699.00			6.24			1.48		4498.03		4498.63	73.99	0.59
Alpine	17.6528*		3811.00			7.61			1.96		4500.52		4501.42	101.19	0.60
Alpine	17.6528*	2.00	6111.47	31.54	0.65	9.02	1.16	0.13	2.52	0.30	4502.21		4503.47	151.52	0.63
Alpine	17.6528*	733.01	5531.08	1742.91	0.84	4.27	0.88	0.10	0.46	0.11	4508.05		4508.25	1109.72	0.22
Alpine	17.6528*	395.79	10240.06	604.15	1.63	10.14	1.35	0.47	2.79	0.35	4505.35		4506.81	641.75	0.58
Alpine	17.6528*	1199.16	13755.46	2492.39	2.19	11.74	2.02	0.75	3.56	0.66	4506.89		4508.59	955.88	0.62
Alpine	17.7685*		419.00			4.23			0.81		4496.13		4496.41	49.20	0.52
Alpine	17.7685*		1699.00			6.25			1.46		4498.97		4499.58	74.33	0.58
Alpine	17.7685*		3811.00			7.65			2.01		4501.44		4502.35	105.03	0.62
Alpine	17.7685*	0.15	6133.50	11.36	0.32	8.90	0.93	0.05	2.51	0.22	4503.16		4504.39	142.40	0.64
Alpine	17.7685*	538.04	6685.42	783.54	1.00	5.36	0.85	0.16	0.75	0.12	4508.04		4508.42	877.90	0.29
Alpine	17.7685*	241.92	10758.45	239.64	1.57	10.72	1.45	0.47	3.21	0.41	4505.92		4507.63	386.75	0.64
Alpine	17.7685*	808.40	15712.63	925.98	2.37	13.76	1.85	0.94	5.06	0.65	4507.13		4509.78	699.37	0.77

HEC-RAS Plan: Opt B River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
		(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	18.8*		3382.77	428.23		8.87	1.44		2.59	0.44	4521.11		4522.20	400.35	0.67
Alpine	18.8*		4339.78	1805.22		9.04	2.10		2.52	0.73	4522.51		4523.43	536.83	0.62
Alpine	18.8*		5096.43	2910.57		9.67	2.49		2.82	0.95	4523.15		4524.11	578.97	0.64
Alpine	18.8*		6328.54	4911.46		10.57	2.90		3.26	1.21	4524.12		4525.16	675.19	0.66
Alpine	18.8*		8280.80	9166.20		11.93	3.66		4.00	1.76	4525.37		4526.53	748.36	0.70
Alpine	19		419.00			4.28			1.27		4521.03	4520.20	4521.31	50.11	0.54
Alpine	19		1506.26	192.74		6.37	1.11		2.22	0.31	4523.59	4522.38	4524.15	383.15	0.56
Alpine	19		2167.51	1643.49		6.56	2.04		2.12	0.71	4525.19	4524.51	4525.60	524.28	0.49
Alpine	19		2871.91	3273.09		7.49	2.63		2.66	1.06	4526.07	4525.22	4526.53	586.75	0.52
Alpine	19		3306.72	4700.28		7.81	2.93		2.81	1.24	4526.73	4525.72	4527.20	626.31	0.52
Alpine	19		4099.61	7140.39		8.42	3.18		3.14	1.40	4527.76	4526.35	4528.26	758.53	0.53
Alpine	19		5135.11	12311.89		8.97	3.83		3.40	1.82	4529.12	4527.20	4529.65	789.50	0.53

HEC-RAS Plan: Opt C River: Alpine Creek Reach: Alpine

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	1	2yr		448.00			5.81			1.47		4404.48	4403.86	4405.00	32.84	0.67
Alpine	1	5yr	167.82	1552.18		1.47	8.63		0.53	2.67		4407.22	4407.11	4408.26	181.99	0.73
Alpine	1	10yr	1214.13	2666.87		3.08	10.32		1.61	3.49		4409.02	4408.80	4410.20	204.43	0.76
Alpine	1	25yr	2369.28	3636.89	28.83	4.00	11.52	0.75	2.38	4.11	0.15	4410.26	4409.74	4411.59	380.51	0.78
Alpine	1	50yr	3195.85	4324.30	324.85	4.50	12.34	1.95	2.84	4.56	0.61	4410.99	4410.79	4412.42	386.29	0.80
Alpine	1	100yr	4596.94	5426.79	1158.27	5.17	13.51	3.19	3.50	5.22	1.29	4412.08	4411.77	4413.64	394.87	0.81
Alpine	1	500yr	7322.23	7477.60	3275.17	6.15	15.35	4.62	4.19	6.32	2.25	4413.90	4413.32	4415.71	434.96	0.84
Alpine	1.33333*	2yr		445.00			5.14			1.18		4405.84		4406.25	39.75	0.61
Alpine	1.33333*	5yr		1687.00			8.08			2.39		4408.55		4409.56	51.70	0.71
Alpine	1.33333*	10yr		3895.00			12.85			5.60		4410.24	4410.24	4412.81	59.65	1.01
Alpine	1.33333*	25yr	522.62	5112.38		2.01	11.31		0.83	3.95		4412.60	4412.60	4414.41	259.08	0.76
Alpine	1.33333*	50yr	1377.60	6532.40		2.97	12.53		1.52	4.65		4413.64	4413.64	4415.68	262.97	0.79
Alpine	1.33333*	100yr	2808.12	8530.18	1.70	4.01	14.20	0.52	2.43	5.72	0.09	4414.83	4414.83	4417.25	292.58	0.83
Alpine	1.33333*	500yr	5756.68	11878.42	659.90	5.33	16.37	2.77	3.75	7.14	1.07	4416.71	4416.71	4419.55	432.96	0.87
Alpine	1.66666*	2yr		445.00			4.87			1.08		4407.01		4407.38	44.46	0.60
Alpine	1.66666*	5yr		1687.00			7.08			1.80		4409.93		4410.71	55.86	0.60
Alpine	1.66666*	10yr		3895.00			8.30			2.19		4413.45		4414.51	75.98	0.59
Alpine	1.66666*	25yr		5635.00			11.30			4.02		4413.82		4415.81	78.06	0.79
Alpine	1.66666*	50yr		7910.00			13.88			5.92		4414.71		4417.70	82.97	0.93
Alpine	1.66666*	100yr	640.68	10699.32		2.02	13.42		0.84	5.08		4417.36	4417.36	4420.01	314.31	0.78
Alpine	1.66666*	500yr	3137.33	15154.26	3.40	3.72	15.31	0.67	2.09	6.18	0.12	4419.60	4419.60	4422.65	354.81	0.80
Alpine	2	2yr		445.00			4.73			1.04		4408.17	4407.57	4408.52	50.14	0.61
Alpine	2	5yr		1687.00			6.75			1.66		4410.92	4409.61	4411.62	61.23	0.59
Alpine	2	10yr		3895.00			8.26			2.16		4414.22	4411.88	4415.28	74.21	0.58
Alpine	2	25yr		5635.00			9.64			2.86		4415.64	4413.38	4417.08	85.36	0.65
Alpine	2	50yr		7910.00			10.21			3.06		4417.71	4415.09	4419.33	98.13	0.64
Alpine	2	100yr		11340.00			13.09			4.94		4418.62	4417.14	4421.28	103.75	0.80
Alpine	2	500yr		18295.00			17.65			8.59		4420.23	4420.15	4425.06	192.15	0.99
Alpine	2.3		Bridge													
Alpine	2.5	2yr		445.00			3.63			0.57		4408.72	4407.57	4408.93	53.03	0.42
Alpine	2.5	5yr		1687.00			5.71			1.14		4411.65	4409.59	4412.16	62.92	0.46
Alpine	2.5	10yr		3895.00			7.18			1.60		4415.14	4411.88	4415.94	81.58	0.49
Alpine	2.5	25yr		5635.00			8.02			1.92		4416.96	4413.38	4417.95	93.47	0.52
Alpine	2.5	50yr		7910.00			8.66			2.14		4419.07	4415.09	4420.23	105.92	0.52
Alpine	2.5	100yr		11340.00			9.93			2.65		4421.22	4417.14	4422.75	298.39	0.53
Alpine	2.5	500yr	3377.08	14822.47	95.45	1.84	9.00	1.00	0.51	1.94	0.16	4425.98	4420.15	4427.01	704.05	0.40
Alpine	3	2yr		445.00			4.84			1.12		4408.89		4409.25	53.46	0.65
Alpine	3	5yr		1687.00			2.29			0.18		4412.28		4412.36	269.17	0.24
Alpine	3	10yr		3697.13	197.87		2.03	0.70		0.11	0.06	4416.13		4416.19	375.04	0.14

HEC-RAS Plan: Opt C River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	3	25yr	5.44	5263.70	365.86	0.23	2.17	0.77	0.01	0.11	0.06	4418.19		4418.26	428.93	0.13
Alpine	3	50yr	66.38	7239.67	603.95	0.43	2.33	0.83	0.02	0.12	0.07	4420.50		4420.58	496.71	0.13
Alpine	3	100yr	261.65	10086.20	992.15	0.64	2.60	0.91	0.04	0.14	0.08	4423.11		4423.20	548.13	0.13
Alpine	3	500yr	827.98	15582.05	1884.97	0.99	3.07	1.07	0.08	0.18	0.10	4427.17		4427.30	587.22	0.13
Alpine	3.16666*	2yr		445.00			4.25			0.89		4411.91		4412.20	66.65	0.60
Alpine	3.16666*	5yr		1687.00			5.35			0.67		4413.37	4413.37	4413.81	354.09	1.00
Alpine	3.16666*	10yr		3893.55	1.45		2.84	0.15		0.25	0.01	4416.23		4416.35	459.97	0.26
Alpine	3.16666*	25yr		5517.82	117.18		2.55	0.68		0.18	0.07	4418.26		4418.36	478.61	0.19
Alpine	3.16666*	50yr		7607.21	302.79		2.47	0.80		0.15	0.07	4420.56		4420.65	507.03	0.16
Alpine	3.16666*	100yr		10749.21	590.79		2.59	0.86		0.15	0.08	4423.16		4423.26	550.94	0.14
Alpine	3.16666*	500yr	67.37	16946.45	1281.18	0.56	2.89	0.97	0.04	0.17	0.09	4427.23		4427.35	637.54	0.14
Alpine	3.33333*	2yr		445.00			4.13			0.88		4414.81		4415.07	78.09	0.62
Alpine	3.33333*	5yr		1687.00			4.38			0.47		4416.42		4416.72	405.93	0.79
Alpine	3.33333*	10yr		3895.00			6.82			1.45		4416.88	4416.88	4417.60	408.61	1.02
Alpine	3.33333*	25yr		5635.00			4.60			0.69		4418.44		4418.76	427.49	0.48
Alpine	3.33333*	50yr		7864.79	45.21		3.59	0.60		0.36	0.07	4420.65		4420.85	527.51	0.28
Alpine	3.33333*	100yr		11049.96	290.04		3.30	0.94		0.27	0.11	4423.22		4423.39	560.69	0.21
Alpine	3.33333*	500yr	1.63	17412.86	880.51	0.19	3.32	1.03	0.01	0.24	0.11	4427.28		4427.44	662.91	0.18
Alpine	3.5*	2yr		445.00			3.71			0.73		4417.77		4417.98	95.29	0.58
Alpine	3.5*	5yr		1687.00			5.20			0.48		4419.19	4419.19	4419.61	431.05	1.06
Alpine	3.5*	10yr		3895.00			4.81			0.78		4420.30		4420.66	443.80	0.63
Alpine	3.5*	25yr		5635.00			7.50			1.82		4420.17	4420.17	4421.04	436.66	1.01
Alpine	3.5*	50yr		7910.00			6.91			1.58		4421.05		4421.79	450.52	0.76
Alpine	3.5*	100yr		11339.39	0.61		5.12	0.14		0.75	0.01	4423.38		4423.78	549.71	0.42
Alpine	3.5*	500yr		17833.67	461.33		4.32	1.13		0.44	0.16	4427.35		4427.63	625.52	0.26
Alpine	3.66666*	2yr		445.00			3.44			0.78		4420.67		4420.86	102.68	0.54
Alpine	3.66666*	5yr		1687.00			4.91			0.62		4422.21		4422.59	335.13	0.85
Alpine	3.66666*	10yr		3895.00			6.58			1.56		4422.95		4423.62	339.19	0.88
Alpine	3.66666*	25yr		5635.00			6.03			1.36		4423.94		4424.50	353.77	0.65
Alpine	3.66666*	50yr		7910.00			7.68			2.17		4424.20		4425.12	356.10	0.80
Alpine	3.66666*	100yr		11340.00			10.11			3.70		4424.46	4424.46	4426.05	358.30	1.01
Alpine	3.66666*	500yr		18270.01	24.99		8.38	0.75		2.13	0.14	4427.32		4428.41	468.76	0.62
Alpine	3.83333*	2yr		445.00			3.27			0.71		4423.56		4423.72	110.11	0.52
Alpine	3.83333*	5yr		1687.00			5.39			1.08		4425.06		4425.51	175.56	0.71
Alpine	3.83333*	10yr		3895.00			6.87			1.84		4426.45		4427.18	189.47	0.70
Alpine	3.83333*	25yr		5635.00			9.01			3.12		4426.75		4428.01	192.52	0.88
Alpine	3.83333*	50yr		7910.00			9.78			3.47		4427.68		4429.17	201.83	0.86
Alpine	3.83333*	100yr		11340.00			10.67			3.86		4428.90		4430.67	214.02	0.84
Alpine	3.83333*	500yr	2.60	18292.40		0.84	13.80		0.20	6.06		4430.10	4430.10	4433.06	241.13	1.00

HEC-RAS Plan: Opt C River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	4	2yr		445.00			3.24			0.71		4426.40		4426.56	117.40	0.53
Alpine	4	5yr		1687.00			5.19			1.41		4427.92		4428.34	129.49	0.58
Alpine	4	10yr		3895.00			6.69			1.77		4429.36		4430.05	188.58	0.67
Alpine	4	25yr		5635.00			7.12			1.88		4430.44		4431.22	199.37	0.63
Alpine	4	50yr		7910.00			8.16			2.34		4431.31		4432.34	208.12	0.67
Alpine	4	100yr		11340.00			9.40			2.92		4432.42		4433.79	219.20	0.71
Alpine	4	500yr	150.93	18119.46	24.61	2.01	10.64	0.66	0.59	3.41	0.12	4434.62		4436.36	426.26	0.69
Alpine	4.25*	2yr		430.00			3.41			0.78		4429.30		4429.48	108.45	0.56
Alpine	4.25*	5yr		1688.00			5.78			1.76		4430.76		4431.28	118.27	0.65
Alpine	4.25*	10yr		3624.00			6.01			1.29		4432.10		4432.67	261.04	0.70
Alpine	4.25*	25yr		5657.00			7.01			1.76		4432.87		4433.64	268.74	0.71
Alpine	4.25*	50yr		7379.00			7.00			1.68		4433.78		4434.54	277.79	0.63
Alpine	4.25*	100yr		10490.00			7.47			1.79		4435.01		4435.88	290.11	0.60
Alpine	4.25*	500yr		16703.00			8.24			1.97		4437.09		4438.14	310.86	0.57
Alpine	4.5*	2yr		430.00			3.57			0.81		4432.13		4432.33	86.37	0.53
Alpine	4.5*	5yr		1688.00			5.82			1.73		4433.87		4434.39	108.77	0.63
Alpine	4.5*	10yr		3624.00			6.27			1.29		4434.90		4435.51	308.98	0.81
Alpine	4.5*	25yr		5657.00			6.87			1.63		4435.68		4436.42	316.83	0.75
Alpine	4.5*	50yr		7379.00			7.64			2.00		4436.13		4437.04	321.28	0.78
Alpine	4.5*	100yr		10490.00			8.40			2.32		4437.00		4438.09	329.98	0.76
Alpine	4.5*	500yr		16703.00			9.26			2.59		4438.64		4439.97	346.38	0.72
Alpine	4.75*	2yr		430.00			3.87			0.93		4434.84		4435.07	74.34	0.56
Alpine	4.75*	5yr		1688.00			6.24			1.92		4436.77		4437.38	90.87	0.64
Alpine	4.75*	10yr		3624.00			7.31			1.74		4438.00		4438.83	209.97	0.84
Alpine	4.75*	25yr		5657.00			8.75			2.57		4438.70		4439.89	217.03	0.89
Alpine	4.75*	50yr		7379.00			9.60			3.08		4439.26		4440.69	222.57	0.91
Alpine	4.75*	100yr		10490.00			11.34			4.19		4439.95	4439.92	4441.95	229.49	1.00
Alpine	4.75*	500yr		16703.00			13.08			5.21		4441.44	4441.44	4444.09	244.35	1.01
Alpine	5	2yr		430.00			3.99			0.96		4437.58		4437.83	65.25	0.55
Alpine	5	5yr		1688.00			6.58			2.07		4439.66		4440.33	78.15	0.64
Alpine	5	10yr		3624.00			9.28			3.74		4441.26		4442.60	88.12	0.78
Alpine	5	25yr		5657.00			11.35			5.29		4442.44		4444.44	95.42	0.88
Alpine	5	50yr		7379.00			13.02			6.77		4443.14	4442.96	4445.77	99.77	0.96
Alpine	5	100yr		10490.00			14.64			8.16		4444.58	4444.58	4447.91	108.68	1.01
Alpine	5	500yr		16703.00			16.35			9.47		4447.19	4447.19	4451.34	124.91	1.01
Alpine	5.33333*	2yr		428.00			5.31			1.49		4438.59		4439.03	41.97	0.67
Alpine	5.33333*	5yr		1690.00			9.53			3.90		4440.69		4442.10	53.41	0.92
Alpine	5.33333*	10yr		3655.00			12.08			5.80		4442.77	4442.77	4445.03	67.34	1.00
Alpine	5.33333*	25yr		5736.00			13.31			6.69		4444.52	4444.52	4447.27	79.12	1.01
Alpine	5.33333*	50yr		7481.00			14.03			7.21		4445.75	4445.75	4448.81	87.38	1.00

HEC-RAS Plan: Opt C River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	5.33333*	100yr		10612.00			15.11			8.03		4447.56	4447.56	4451.10	99.53	1.00
Alpine	5.33333*	500yr	3454.53	12942.12	427.35	2.11	10.93	1.70	0.74	3.81	0.49	4451.83	4451.83	4453.27	1237.96	0.61
Alpine	5.66	2yr		428.00			4.65			1.09		4439.77		4440.10	42.24	0.56
Alpine	5.66	5yr		1690.00			7.95			2.27		4442.53		4443.51	45.00	0.64
Alpine	5.66	10yr		3655.00			11.92			4.50		4444.56		4446.76	49.23	0.84
Alpine	5.66	25yr		5736.00			14.52			6.64		4446.22	4446.11	4449.50	58.52	0.99
Alpine	5.66	50yr		7481.00			15.13			7.32		4447.77	4447.77	4451.32	70.08	1.00
Alpine	5.66	100yr		10612.00			16.10			8.28		4449.88	4449.88	4453.90	85.88	1.02
Alpine	5.66	500yr	4884.68	11069.86	869.46	2.43	11.00	2.01	0.93	3.71	0.64	4453.40	4453.40	4454.67	1340.72	0.63
Alpine	5.75		Bridge													
Alpine	6	2yr		428.00			3.27			0.56		4440.59	4439.61	4440.76	62.14	0.40
Alpine	6	5yr		1690.00			4.74			0.80		4444.12	4441.32	4444.47	65.67	0.36
Alpine	6	10yr		3655.00			5.13			0.69		4449.35	4443.23	4449.75	70.90	0.28
Alpine	6	25yr		5736.00			6.60			1.05		4451.50	4444.88	4452.18	73.05	0.34
Alpine	6	50yr		7481.00			7.70			1.40		4452.89	4446.10	4453.81	970.82	0.38
Alpine	6	100yr	2936.34	6980.15	695.51	1.16	6.00	0.98	0.22	0.89	0.16	4455.11	4448.05	4455.48	1452.07	0.30
Alpine	6	500yr	4235.20	11608.37	980.43	1.86	10.20	1.61	0.60	2.60	0.44	4454.83	4451.38	4455.96	1417.11	0.52
Alpine	6.125*	2yr		428.00			4.17			1.00		4441.46	4440.92	4441.73	61.69	0.57
Alpine	6.125*	5yr		1690.00			5.68			1.23		4444.54	4442.65	4445.04	64.77	0.47
Alpine	6.125*	10yr		3655.00			5.78			0.93		4449.52	4444.56	4450.04	69.75	0.34
Alpine	6.125*	25yr		5736.00			7.27			1.35		4451.72	4446.20	4452.54	73.21	0.39
Alpine	6.125*	50yr		7481.00			8.31			1.75		4453.18	4447.44	4454.25	79.88	0.44
Alpine	6.125*	100yr	1073.59	9146.74	391.67	1.11	8.53	1.07	0.24	1.95	0.23	4455.10	4449.38	4456.08	1293.15	0.46
Alpine	6.125*	500yr		16824.00			17.27			7.78		4454.06	4452.99	4458.69	922.02	0.92
Alpine	6.25*	2yr		428.00			4.05			0.93		4442.83	4442.25	4443.08	61.74	0.54
Alpine	6.25*	5yr		1690.00			6.53			1.72		4445.26	4443.97	4445.92	64.17	0.57
Alpine	6.25*	10yr		3655.00			6.56			1.27		4449.75	4445.88	4450.42	68.65	0.41
Alpine	6.25*	25yr		5736.00			7.92			1.76		4452.03	4447.53	4453.01	78.30	0.46
Alpine	6.25*	50yr		7481.00			8.80			2.12		4453.58	4448.74	4454.78	84.84	0.49
Alpine	6.25*	100yr		10612.00			10.71			3.17		4455.16	4450.85	4456.94	422.00	0.59
Alpine	6.25*	500yr	4795.67	9257.24	2771.09	1.51	6.32	1.59	0.35	1.08	0.37	4459.26	4454.34	4459.62	1505.20	0.32
Alpine	6.375*	2yr		428.00			4.08			0.95		4444.13	4443.57	4444.39	61.72	0.55
Alpine	6.375*	5yr		1690.00			6.88			1.95		4446.38	4445.29	4447.11	63.96	0.62
Alpine	6.375*	10yr		3655.00			7.39			1.69		4450.15	4447.20	4451.00	67.74	0.48
Alpine	6.375*	25yr		5736.00			8.40			2.13		4452.56	4448.85	4453.66	84.30	0.52
Alpine	6.375*	50yr		7481.00			9.09			2.40		4454.16	4450.05	4455.44	90.66	0.53
Alpine	6.375*	100yr		10612.00			10.65			3.17		4456.01	4452.29	4457.77	250.98	0.59
Alpine	6.375*	500yr	2763.24	11498.05	2562.71	1.56	8.15	1.84	0.43	1.92	0.56	4459.40	4455.43	4460.12	1472.38	0.44

HEC-RAS Plan: Opt C River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	6.5	2yr		428.00			4.62			1.18		4445.54	4445.03	4445.87	51.82	0.61
Alpine	6.5	5yr		1690.00			8.16			2.70		4447.71	4446.95	4448.74	53.99	0.73
Alpine	6.5	10yr		3655.00			9.77			3.14		4450.71	4449.10	4452.19	61.14	0.70
Alpine	6.5	25yr		5736.00			9.95			3.23		4453.25	4451.50	4454.78	85.85	0.68
Alpine	6.5	50yr		7481.00			10.43			3.37		4454.83	4452.61	4456.52	91.83	0.66
Alpine	6.5	100yr		10612.00			11.74			4.05		4456.79	4454.41	4458.93	237.74	0.69
Alpine	6.5	500yr	797.11	13634.75	2392.15	1.14	10.89	2.25	0.51	3.72	1.01	4459.69	4457.34	4461.20	1315.09	0.66
Alpine	6.7		Bridge													
Alpine	7	2yr		428.00			3.40			0.57		4446.73	4445.58	4446.91	52.46	0.39
Alpine	7	5yr		1690.00			6.27			1.43		4449.40	4447.51	4450.01	55.12	0.50
Alpine	7	10yr		3655.00			7.47			1.93		4452.59	4449.65	4453.45	83.09	0.54
Alpine	7	25yr		5736.00			8.36			2.21		4454.84	4451.90	4455.93	91.60	0.54
Alpine	7	50yr		7481.00			9.47			2.75		4455.95	4453.03	4457.34	95.78	0.58
Alpine	7	100yr		9548.05	1063.95		8.48	1.44		2.27	0.46	4459.03	4454.78	4460.04	1092.29	0.52
Alpine	7	500yr	2567.46	10320.11	3936.43	1.18	6.85	1.87	0.41	1.40	0.57	4461.62	4459.79	4462.09	1501.66	0.38
Alpine	7.2*	2yr		428.00			3.76			0.78		4447.46	4446.75	4447.68	61.87	0.49
Alpine	7.2*	5yr		1690.00			5.83			1.31		4450.24	4448.47	4450.77	64.66	0.48
Alpine	7.2*	10yr		3655.00			7.16			1.71		4453.43	4450.38	4454.22	79.12	0.50
Alpine	7.2*	25yr		5736.00			8.32			2.14		4455.58	4451.99	4456.66	87.03	0.52
Alpine	7.2*	50yr		7481.00			9.37			2.62		4456.81	4453.49	4458.17	91.52	0.56
Alpine	7.2*	100yr		10612.00			9.93			2.95		4459.51	4455.34	4461.05	697.77	0.58
Alpine	7.2*	500yr	1815.92	14688.52	319.57	1.34	11.07	0.23	0.62	3.61	0.98	4461.55	4458.46	4463.22	1557.80	0.61
Alpine	7.4*	2yr		428.00			4.14			0.98		4448.60	4448.05	4448.86	61.70	0.56
Alpine	7.4*	5yr		1690.00			6.61			1.77		4451.02	4449.78	4451.70	64.12	0.58
Alpine	7.4*	10yr		3655.00			8.09			2.10		4454.01	4451.69	4455.03	67.11	0.55
Alpine	7.4*	25yr		5736.00			9.43			2.71		4456.15	4453.33	4457.53	76.98	0.59
Alpine	7.4*	50yr		7481.00			10.55			3.28		4457.42	4454.67	4459.15	81.48	0.63
Alpine	7.4*	100yr		10612.00			11.24			3.66		4460.11	4456.67	4462.07	315.19	0.64
Alpine	7.4*	500yr	1997.50	14531.59	294.91	1.36	11.85	0.22	0.65	4.01	0.94	4462.67	4462.67	4464.56	1661.05	0.64
Alpine	7.6*	2yr		428.00			4.62			1.18		4450.03	4449.52	4450.36	51.82	0.61
Alpine	7.6*	5yr		1690.00			8.26			2.78		4452.15	4451.45	4453.21	53.93	0.75
Alpine	7.6*	10yr		3655.00			10.79			3.84		4454.58	4453.59	4456.39	56.36	0.78
Alpine	7.6*	25yr		5736.00			12.54			4.75		4456.61	4455.42	4459.05	61.73	0.81
Alpine	7.6*	50yr		7481.00			13.96			5.72		4457.84	4456.92	4460.87	65.93	0.86
Alpine	7.6*	100yr		10612.00			14.72			6.24		4460.44	4459.11	4463.80	79.59	0.86
Alpine	7.6*	500yr	3650.44	10823.22	2350.34	1.62	9.91	1.41	0.58	2.72	0.70	4464.43	4464.11	4465.42	1828.10	0.52
Alpine	7.8	2yr		428.00			5.05			1.33		4451.59	4451.03	4451.98	42.07	0.63
Alpine	7.8	5yr		1690.00			9.11			3.15		4453.92	4453.26	4455.21	44.40	0.79
Alpine	7.8	10yr		3655.00			12.73			5.11		4456.15	4455.71	4458.67	46.63	0.90

HEC-RAS Plan: Opt C River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	7.8	25yr		5736.00			15.16			6.57		4458.06	4457.87	4461.63	50.03	0.97
Alpine	7.8	50yr		7481.00			16.42			7.51		4459.53	4459.53	4463.72	54.84	1.00
Alpine	7.8	100yr		10612.00			17.13			8.50		4462.13	4462.13	4466.69	156.45	1.03
Alpine	7.8	500yr	4553.91	9807.55	2462.53	1.83	10.96	1.50	0.73	3.27	0.81	4465.63	4465.63	4466.73	1941.92	0.58
Alpine	7.9	2yr		428.00			5.18			0.80		4452.30	4451.80	4452.71	42.01	0.65
Alpine	7.9	5yr		1690.00			8.67			1.79		4454.89	4454.02	4456.06	44.60	0.73
Alpine	7.9	10yr		3655.00			11.18			2.59		4457.75	4456.48	4459.69	48.07	0.76
Alpine	7.9	25yr		5736.00			12.45			2.95		4460.40	4458.62	4462.81	52.94	0.74
Alpine	7.9	50yr		7481.00			13.11			3.32		4462.36	4460.17	4465.03	128.71	0.75
Alpine	7.9	100yr	4071.39	4581.27	1959.34	0.85	4.76	0.69	0.13	0.43	0.15	4468.00	4462.89	4468.15	2110.00	0.23
Alpine	7.9	500yr	4671.01	9879.47	2273.52	1.66	11.58	1.32	0.59	2.62	0.62	4466.46	4466.46	4467.70	2016.60	0.59
Alpine	7.95		Bridge													
Alpine	8	2yr		428.00			4.83			1.19		4452.99	4452.34	4453.35	42.16	0.59
Alpine	8	5yr		1690.00			8.16			2.42		4455.71	4454.57	4456.74	44.88	0.67
Alpine	8	10yr		3655.00			7.69			1.48		4461.34	4457.02	4462.25	50.51	0.44
Alpine	8	25yr	882.17	4490.21	363.62	0.77	6.27	0.52	0.11	0.98	0.12	4465.50	4459.12	4465.98	1761.06	0.33
Alpine	8	50yr	1123.10	5928.27	429.62	1.07	8.35	0.66	0.20	1.74	0.21	4465.41	4460.65	4466.27	1679.86	0.44
Alpine	8	100yr	4237.05	4431.72	1943.22	0.95	5.01	0.76	0.17	0.58	0.18	4468.13	4466.05	4468.30	2140.82	0.24
Alpine	8	500yr	6458.02	7406.73	2959.24	1.57	8.53	1.25	0.48	1.70	0.50	4467.88	4466.95	4468.40	2125.17	0.41
Alpine	8.33333*	2yr		428.00			4.74			1.14		4453.82	4453.15	4454.17	42.19	0.57
Alpine	8.33333*	5yr		1690.00			8.08			2.36		4456.55	4455.37	4457.57	44.92	0.66
Alpine	8.33333*	10yr		3655.00			8.12			1.81		4461.60	4457.82	4462.63	54.15	0.50
Alpine	8.33333*	25yr	205.41	5530.59		0.69	8.14		0.15	1.78		4465.44	4459.94	4466.43	1058.75	0.44
Alpine	8.33333*	50yr		7481.00			11.23			3.40		4465.23	4461.70	4467.19	623.61	0.62
Alpine	8.33333*	100yr	3080.26	5493.47	2038.27	1.06	6.41	0.82	0.24	1.03	0.24	4468.14	4464.13	4468.48	2257.36	0.31
Alpine	8.33333*	500yr	4581.77	9234.62	3007.61	1.74	10.96	1.34	0.65	3.04	0.65	4467.92	4467.92	4468.96	2239.80	0.54
Alpine	8.66666*	2yr		428.00			4.75			1.15		4454.62		4454.97	42.19	0.57
Alpine	8.66666*	5yr		1690.00			8.07			2.36		4457.36		4458.37	44.92	0.66
Alpine	8.66666*	10yr		3655.00			8.32			2.08		4461.99		4463.06	58.51	0.54
Alpine	8.66666*	25yr	0.00	5736.00		0.03	8.58		0.00	2.08		4465.68	4461.05	4466.83	72.23	0.47
Alpine	8.66666*	50yr	5.22	7475.78		0.34	10.92		0.05	3.36		4465.93	4462.49	4467.78	184.47	0.60
Alpine	8.66666*	100yr	1755.08	7312.79	1544.14	1.14	8.82	0.87	0.32	2.10	0.31	4468.08		4468.92	2273.68	0.44
Alpine	8.66666*	500yr	3657.09	9909.69	3257.22	1.72	11.42	1.32	0.66	3.47	0.66	4468.65	4468.65	4469.86	2370.40	0.56
Alpine	9	2yr		428.00			4.75			1.15		4455.42		4455.77	42.19	0.57
Alpine	9	5yr		1690.00			8.07			2.35		4458.16		4459.17	44.93	0.66
Alpine	9	10yr		3655.00			7.91			2.21		4462.66		4463.63	84.85	0.60
Alpine	9	25yr		5736.00			6.55			1.44		4466.63		4467.30	122.76	0.43
Alpine	9	50yr	96.50	7192.90	191.60	0.47	7.07	0.48	0.08	1.63	0.13	4467.77		4468.51	1327.68	0.44
Alpine	9	100yr	525.71	9361.66	724.63	0.87	8.58	0.68	0.23	2.36	0.24	4468.34		4469.35	2243.05	0.52

HEC-RAS Plan: Opt C River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	9	500yr	2331.83	11427.58	3064.59	1.46	9.28	1.16	0.51	2.65	0.53	4469.46		4470.37	2578.67	0.52
Alpine	9.3		Bridge													
Alpine	9.5	2yr		428.00			3.38			0.51		4456.93	4455.39	4457.11	43.05	0.35
Alpine	9.5	5yr		1690.00			5.99			1.14		4460.40	4457.62	4460.96	46.52	0.43
Alpine	9.5	10yr		3666.00			6.17			1.35		4464.41	4460.09	4465.00	101.83	0.45
Alpine	9.5	25yr	9.97	5724.50	30.53	0.25	6.14	0.23	0.03	1.26	0.04	4467.34	4462.84	4467.92	937.45	0.40
Alpine	9.5	50yr	772.23	5699.51	1045.27	0.69	5.01	0.55	0.12	0.80	0.13	4468.95	4463.98	4469.25	2448.73	0.30
Alpine	9.5	100yr	1751.22	6625.35	2279.43	0.92	5.34	0.73	0.19	0.88	0.20	4469.77	4465.73	4470.05	2644.18	0.30
Alpine	9.5	500yr	3613.96	8518.43	4734.61	1.26	6.26	1.03	0.32	1.18	0.36	4470.72	4469.21	4471.03	2758.17	0.34
Alpine	9.56666*	2yr		428.00			4.30			0.91		4457.39		4457.68	42.41	0.49
Alpine	9.56666*	5yr		1690.00			6.72			1.51		4460.84		4461.54	45.85	0.51
Alpine	9.56666*	10yr		3666.00			7.43			1.80		4464.80		4465.66	71.21	0.50
Alpine	9.56666*	25yr		5765.00			8.30			2.10		4467.52		4468.59	76.56	0.49
Alpine	9.56666*	50yr	0.87	7188.85	327.28	0.19	9.06	0.64	0.02	2.43	0.21	4468.79		4470.01	824.58	0.50
Alpine	9.56666*	100yr	49.97	9729.45	876.57	0.62	11.68	0.85	0.15	3.99	0.37	4469.29		4471.23	1556.56	0.64
Alpine	9.56666*	500yr	994.94	10843.56	5028.50	1.34	11.19	1.46	0.46	3.50	0.77	4471.00	4471.00	4472.26	2141.65	0.57
Alpine	9.63333*	2yr		428.00			4.72			1.13		4458.29		4458.64	42.20	0.57
Alpine	9.63333*	5yr		1690.00			7.35			1.88		4461.48		4462.31	45.38	0.58
Alpine	9.63333*	10yr		3666.00			8.13			1.99		4465.33		4466.36	67.38	0.55
Alpine	9.63333*	25yr		5765.00			8.72			2.18		4468.03		4469.21	83.63	0.55
Alpine	9.63333*	50yr		7276.09	240.91		9.43	0.67		2.47	0.24	4469.31		4470.65	575.25	0.56
Alpine	9.63333*	100yr	56.78	8628.34	1970.88	0.70	9.35	0.97	0.16	2.31	0.39	4471.01		4472.11	1571.16	0.51
Alpine	9.63333*	500yr	141.80	12996.92	3728.28	1.15	13.70	1.53	0.41	4.92	0.93	4471.29		4473.55	1649.43	0.74
Alpine	9.7	2yr		428.00			4.75			1.15		4459.39		4459.74	42.19	0.57
Alpine	9.7	5yr		1690.00			7.75			2.13		4462.32		4463.25	45.12	0.62
Alpine	9.7	10yr		3666.00			8.56			2.25		4466.00		4467.13	68.09	0.60
Alpine	9.7	25yr		5764.98	0.02		9.28	0.04		2.48	0.00	4468.61		4469.95	150.15	0.59
Alpine	9.7	50yr		7254.16	262.84		9.84	0.79		2.76	0.32	4469.94		4471.39	503.50	0.62
Alpine	9.7	100yr	3.15	9221.65	1431.19	0.47	10.46	1.01	0.10	3.01	0.46	4471.42		4472.89	1305.65	0.62
Alpine	9.7	500yr	233.02	10157.86	6476.12	1.10	9.06	1.39	0.30	2.09	0.64	4473.80		4474.58	1795.13	0.48
Alpine	9.73		Bridge													
Alpine	9.75	2yr		428.00			3.76			0.65		4459.95	4458.72	4460.17	42.75	0.41
Alpine	9.75	5yr		1690.00			4.76			0.73		4464.88	4460.94	4465.23	63.39	0.35
Alpine	9.75	10yr		3666.00			6.15			1.09		4468.30	4463.81	4468.89	79.30	0.39
Alpine	9.75	25yr		5331.79	433.21		6.66	0.66		1.26	0.20	4470.60	4465.70	4471.24	678.78	0.41
Alpine	9.75	50yr	9.85	6079.86	1427.29	0.43	6.57	0.73	0.07	1.17	0.22	4471.85	4467.03	4472.40	1394.77	0.38
Alpine	9.75	100yr	90.80	7050.07	3515.13	0.71	6.68	0.95	0.14	1.16	0.32	4473.15	4470.68	4473.62	1660.69	0.36
Alpine	9.75	500yr	356.88	8968.09	7542.03	1.02	7.46	1.27	0.24	1.38	0.49	4474.63	4472.68	4475.10	1865.31	0.38

HEC-RAS Plan: Opt C River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	9.8*	2yr		428.00			5.34			1.52		4460.27		4460.71	41.95	0.68
Alpine	9.8*	5yr		1690.00			5.68			1.08		4464.98		4465.48	57.06	0.44
Alpine	9.8*	10yr		3666.00			7.12			1.48		4468.39		4469.18	69.61	0.46
Alpine	9.8*	25yr		5202.01	562.99		7.48	0.77		1.60	0.27	4470.71		4471.50	697.07	0.46
Alpine	9.8*	50yr	14.89	5738.44	1763.67	0.52	7.11	0.84	0.09	1.38	0.28	4471.98		4472.58	1419.78	0.41
Alpine	9.8*	100yr	111.30	6496.86	4047.84	0.79	7.06	1.04	0.17	1.30	0.37	4473.27		4473.75	1684.95	0.38
Alpine	9.8*	500yr	413.14	8040.18	8413.68	1.08	7.63	1.34	0.27	1.46	0.55	4474.79		4475.23	1868.69	0.39
Alpine	9.9*	2yr		428.00			4.65			1.09		4461.66		4461.99	42.24	0.56
Alpine	9.9*	5yr		1690.00			6.45			1.44		4465.41		4466.06	52.19	0.51
Alpine	9.9*	10yr		3664.03	1.97		8.05	0.18		1.91	0.03	4468.75		4469.75	163.54	0.52
Alpine	9.9*	25yr	0.18	5019.78	745.05	0.16	8.12	0.70	0.03	1.89	0.24	4471.11		4472.00	1241.81	0.50
Alpine	9.9*	50yr	26.54	5035.51	2454.95	0.48	7.04	0.92	0.12	1.35	0.33	4472.38		4472.90	1501.39	0.40
Alpine	9.9*	100yr	120.32	5694.55	4841.13	0.66	7.05	1.10	0.19	1.30	0.41	4473.60		4474.02	1749.90	0.38
Alpine	9.9*	500yr	387.83	6949.46	9529.71	0.86	7.53	1.40	0.28	1.43	0.58	4475.11		4475.49	1881.29	0.38
Alpine	10	2yr		428.00			4.74			1.14		4462.72	4462.04	4463.07	42.20	0.57
Alpine	10	5yr		1690.00			7.15			1.80		4466.02	4464.27	4466.82	48.31	0.57
Alpine	10	10yr		3666.00			9.05			2.44		4469.22	4466.86	4470.49	295.66	0.59
Alpine	10	25yr	10.01	4026.42	1728.56	0.40	7.10	0.84	0.09	1.41	0.29	4471.91	4468.60	4472.46	1429.70	0.42
Alpine	10	50yr	48.63	4286.06	3182.31	0.55	6.87	0.97	0.15	1.28	0.34	4472.79	4470.39	4473.21	1628.30	0.39
Alpine	10	100yr	160.95	4828.82	5666.22	0.70	6.93	1.12	0.20	1.26	0.41	4473.93	4472.43	4474.28	1889.31	0.37
Alpine	10	500yr	457.59	5796.31	10613.10	0.88	7.31	1.38	0.28	1.34	0.56	4475.43	4473.42	4475.73	2041.62	0.37
Alpine	10.3333*	2yr		428.00			4.75			1.15		4463.69	4463.02	4464.04	42.19	0.57
Alpine	10.3333*	5yr		1690.00			7.37			1.99		4466.75	4465.29	4467.60	49.74	0.61
Alpine	10.3333*	10yr		3666.00			9.24			2.64		4469.90	4467.71	4471.22	58.47	0.62
Alpine	10.3333*	25yr		5765.00			12.07			4.30		4471.25	4469.79	4473.51	331.45	0.76
Alpine	10.3333*	50yr		7517.00			15.69			7.27		4471.27	4471.27	4475.09	338.79	0.99
Alpine	10.3333*	100yr	16.47	7065.46	3574.07	0.52	10.65	1.46	0.18	3.22	0.82	4473.86	4473.86	4475.04	1410.58	0.64
Alpine	10.3333*	500yr	235.11	8548.67	8083.22	1.01	11.07	1.84	0.45	3.30	1.12	4475.30	4474.88	4476.29	1716.44	0.61
Alpine	10.6666*	2yr		428.00			4.75			1.15		4464.67	4463.99	4465.02	42.19	0.57
Alpine	10.6666*	5yr		1690.00			7.24			1.96		4467.63	4466.30	4468.44	53.08	0.61
Alpine	10.6666*	10yr		3666.00			8.89			2.55		4470.77	4468.56	4472.00	60.67	0.60
Alpine	10.6666*	25yr		5765.00			10.51			3.37		4472.90	4470.47	4474.62	248.63	0.66
Alpine	10.6666*	50yr	53.17	4482.47	2981.36	0.37	5.46	0.90	0.07	0.86	0.28	4476.29	4471.85	4476.57	1510.86	0.32
Alpine	10.6666*	100yr		10656.00			16.19			7.88		4474.41	4474.41	4478.48	1085.82	0.99
Alpine	10.6666*	500yr	114.81	10092.30	6659.69	0.82	12.33	2.03	0.36	4.37	1.42	4476.26	4476.26	4477.70	1507.74	0.71
Alpine	11	2yr		428.00			3.88			0.78		4465.62	4464.76	4465.85	52.16	0.47
Alpine	11	5yr		1690.00			5.86			1.30		4468.65	4466.74	4469.18	61.76	0.48
Alpine	11	10yr		3666.00			7.42			1.78		4471.83	4468.75	4472.69	67.62	0.48
Alpine	11	25yr		5765.00			8.72			2.29		4474.22	4470.49	4475.40	246.52	0.51

HEC-RAS Plan: Opt C River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Vel Left (ft/s)	Vel Chnl (ft/s)	Vel Right (ft/s)	Shear LOB (lb/sq ft)	Shear Chan (lb/sq ft)	Shear ROB (lb/sq ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	Top Width (ft)	Froude # Chl
Alpine	11.6333*	2yr		427.00			4.37			1.03		4469.63		4469.92	51.92	0.56
Alpine	11.6333*	5yr		1691.00			6.86			1.94		4472.20		4472.93	68.24	0.64
Alpine	11.6333*	10yr		3670.00			8.34			2.48		4474.77		4475.85	79.99	0.63
Alpine	11.6333*	25yr		5777.00			9.44			2.89		4476.89		4478.27	82.44	0.61
Alpine	11.6333*	50yr	0.11	7317.16	216.73	0.16	9.09	0.63	0.03	2.47	0.26	4479.20		4480.45	470.15	0.52
Alpine	11.6333*	100yr	6.64	10047.87	620.49	0.52	11.68	1.01	0.19	4.00	0.59	4479.86		4481.86	578.46	0.64
Alpine	11.6333*	500yr	165.12	13429.17	3292.71	1.16	13.08	1.47	0.62	4.72	1.04	4481.85	4481.85	4483.97	1127.72	0.66
Alpine	11.7	2yr		427.00			4.99			1.33		4470.90	4470.41	4471.29	45.48	0.64
Alpine	11.7	5yr		1691.00			7.77			2.49		4473.38	4472.52	4474.32	56.39	0.70
Alpine	11.7	10yr		3670.00			10.52			3.99		4475.67	4474.60	4477.39	58.17	0.76
Alpine	11.7	25yr		5777.00			12.62			5.32		4477.52	4476.41	4479.99	59.61	0.80
Alpine	11.7	50yr	0.02	7503.94	30.04	0.19	13.23	0.89	0.05	5.48	0.55	4479.35	4477.75	4482.05	299.63	0.76
Alpine	11.7	100yr	38.19	9348.14	1288.67	1.12	13.52	1.46	0.62	5.37	1.09	4481.41	4481.41	4483.90	550.18	0.70
Alpine	11.7	500yr	299.84	11238.23	5348.93	1.62	12.98	1.65	0.99	4.59	1.19	4484.32	4484.32	4486.08	1189.20	0.60
Alpine	11.9		Bridge													
Alpine	12	2yr		427.00			2.78			0.36		4472.65	4470.91	4472.77	55.82	0.29
Alpine	12	5yr		1691.00			5.04			0.94		4475.83	4472.94	4476.23	58.29	0.37
Alpine	12	10yr	3.80	3422.45	243.76	0.34	5.60	0.50	0.07	0.97	0.15	4480.47	4475.01	4480.92	455.21	0.31
Alpine	12	25yr	71.99	4427.58	1277.43	0.65	5.72	0.62	0.17	0.93	0.19	4483.17	4476.81	4483.56	1067.88	0.28
Alpine	12	50yr	81.52	6022.36	1430.11	0.87	7.98	0.81	0.32	1.83	0.34	4482.85	4478.12	4483.64	1029.02	0.40
Alpine	12	100yr	206.54	6774.76	3693.70	1.02	7.91	1.06	0.39	1.73	0.48	4484.55	4481.59	4485.17	1193.09	0.37
Alpine	12	500yr	402.48	8483.25	8001.27	0.98	8.74	1.46	0.37	2.02	0.78	4486.44	4484.32	4487.06	1292.28	0.38
Alpine	12.5	2yr		427.00			3.59			0.59		4472.75	4471.39	4472.95	42.87	0.38
Alpine	12.5	5yr		1691.00			6.34			1.40		4475.90	4473.64	4476.53	51.35	0.49
Alpine	12.5	10yr		3675.00			7.06			1.40		4480.42	4476.14	4481.20	260.95	0.42
Alpine	12.5	25yr		5790.00			8.62			1.92		4482.90	4478.17	4484.05	679.55	0.46
Alpine	12.5	50yr		7550.00			11.80			3.65		4482.38	4479.59	4484.54	489.40	0.65
Alpine	12.5	100yr	2.17	7682.11	3010.72	0.33	9.88	1.25	0.05	2.53	0.66	4484.47	4481.80	4485.57	1147.54	0.53
Alpine	12.5	500yr	205.30	9094.52	7606.18	1.29	9.86	1.69	0.39	2.38	0.97	4486.48	4485.24	4487.31	1209.66	0.49
Alpine	12.5666*	2yr		427.00			4.16			0.84		4473.05	4472.07	4473.32	42.48	0.47
Alpine	12.5666*	5yr		1691.00			6.52			1.54		4476.28	4474.37	4476.94	55.35	0.53
Alpine	12.5666*	10yr		3675.00			6.82			1.41		4480.73	4476.77	4481.45	74.33	0.45
Alpine	12.5666*	25yr		5211.45	578.55		6.77	0.70		1.28	0.24	4483.68	4478.67	4484.32	617.90	0.38
Alpine	12.5666*	50yr		6614.34	935.66		8.23	0.87		1.87	0.36	4484.10	4480.12	4485.02	739.50	0.46
Alpine	12.5666*	100yr		8920.89	1774.11		10.58	1.25		3.05	0.69	4484.60	4482.24	4486.05	787.37	0.57
Alpine	12.5666*	500yr	25.88	12157.64	4722.47	0.80	12.54	1.78	0.22	4.10	1.22	4486.19	4485.65	4487.96	1024.47	0.63
Alpine	12.6333*	2yr		427.00			4.54			1.03		4473.53	4472.76	4473.85	42.28	0.54
Alpine	12.6333*	5yr		1691.00			6.17			1.47		4476.82	4475.10	4477.41	69.47	0.55

HEC-RAS Plan: Opt C River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	12.6333*	10yr		3675.00			5.72			1.03		4481.23	4477.43	4481.74	86.38	0.37
Alpine	12.6333*	25yr		5561.54	228.46		6.36	0.49		1.17	0.14	4483.90	4478.95	4484.51	557.80	0.35
Alpine	12.6333*	50yr		7002.47	547.53		7.59	0.75		1.63	0.27	4484.46	4479.94	4485.29	583.32	0.41
Alpine	12.6333*	100yr		9391.56	1303.44		9.46	1.14		2.48	0.56	4485.26	4481.56	4486.48	622.74	0.49
Alpine	12.6333*	500yr	0.18	13429.59	3476.23	0.19	12.07	1.81	0.02	3.91	1.22	4486.64	4485.66	4488.44	684.91	0.60
Alpine	12.7	2yr		427.00			4.63			1.11		4474.18		4474.51	47.00	0.58
Alpine	12.7	5yr		1691.00			4.36			0.73		4477.53		4477.82	93.51	0.38
Alpine	12.7	10yr		3675.00			4.79			0.72		4481.58		4481.93	94.30	0.30
Alpine	12.7	25yr		5718.21	71.79		5.63	0.31		0.92	0.06	4484.20		4484.68	464.00	0.30
Alpine	12.7	50yr		7280.71	269.29		6.76	0.57		1.30	0.17	4484.84		4485.53	479.04	0.35
Alpine	12.7	100yr		9878.82	816.18		8.47	0.97		1.99	0.41	4485.78		4486.81	501.03	0.43
Alpine	12.7	500yr		14547.61	2358.39		11.18	1.63		3.35	0.99	4487.21		4488.88	533.41	0.53
Alpine	12.9		Culvert													
Alpine	13	2yr		427.00			6.94			2.83		4474.00	4474.00	4474.75	41.51	1.01
Alpine	13	5yr		1691.00			4.52			0.80		4477.63	4475.78	4477.94	93.53	0.40
Alpine	13	10yr		3675.00			4.83			0.74		4481.75	4477.24	4482.11	94.34	0.30
Alpine	13	25yr		5692.41	97.59		5.67	0.36		0.94	0.08	4484.32	4478.53	4484.81	466.82	0.31
Alpine	13	50yr		7230.45	319.55		6.78	0.61		1.32	0.19	4484.97	4479.48	4485.65	482.02	0.36
Alpine	13	100yr		9800.59	894.41		8.50	1.01		2.02	0.44	4485.89	4481.01	4486.92	503.55	0.43
Alpine	13	500yr		14496.27	2409.73		11.35	1.67		3.50	1.04	4487.20	4485.18	4488.92	533.23	0.55
Alpine	13.25*	2yr		427.00			4.53			1.03		4475.19		4475.51	42.29	0.53
Alpine	13.25*	5yr		1691.00			7.38			2.24		4477.63		4478.47	69.92	0.72
Alpine	13.25*	10yr		3678.00			6.05			1.23		4481.75		4482.32	102.60	0.44
Alpine	13.25*	25yr		5691.70	104.30		6.52	0.41		1.27	0.12	4484.33		4484.98	467.06	0.40
Alpine	13.25*	50yr		7202.90	355.10		7.64	0.71		1.71	0.28	4485.00		4485.87	482.68	0.45
Alpine	13.25*	100yr		9708.02	995.98		9.32	1.14		2.47	0.60	4485.96		4487.18	505.19	0.52
Alpine	13.25*	500yr		14257.93	2658.07		12.00	1.82		3.94	1.32	4487.36		4489.26	535.61	0.63
Alpine	13.5	2yr		427.00			4.66			1.10		4475.55	4474.83	4475.89	42.23	0.56
Alpine	13.5	5yr		1691.00			8.11			2.58		4478.04	4477.17	4479.06	56.43	0.74
Alpine	13.5	10yr		3678.00			7.94			2.13		4481.68	4479.59	4482.66	83.52	0.59
Alpine	13.5	25yr		5796.00			8.30			2.16		4484.21	4481.37	4485.28	444.43	0.56
Alpine	13.5	50yr		7184.78	373.22		9.32	0.87		2.66	0.45	4484.91	4482.59	4486.19	473.19	0.61
Alpine	13.5	100yr		9573.19	1130.81		10.89	1.39		3.52	0.97	4485.91	4485.20	4487.57	500.54	0.68
Alpine	13.5	500yr	2.86	13830.92	3082.22	0.41	13.12	2.12	0.16	4.86	1.90	4487.48	4487.05	4489.68	561.21	0.76
Alpine	13.75*	2yr		427.00			4.70			1.12		4475.94	4475.24	4476.28	42.21	0.57
Alpine	13.75*	5yr		1691.00			7.75			2.31		4478.64	4477.53	4479.58	53.01	0.67
Alpine	13.75*	10yr		3678.00			8.93			2.60		4481.87	4479.94	4483.11	68.72	0.64
Alpine	13.75*	25yr		5796.00			9.49			2.81		4484.32	4481.95	4485.72	91.43	0.65
Alpine	13.75*	50yr		7558.00			11.38			4.00		4484.90	4483.40	4486.91	96.15	0.76

HEC-RAS Plan: Opt C River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	13.75*	100yr		10704.00			14.72			6.60		4485.53	4485.32	4488.90	101.40	0.97
Alpine	13.75*	500yr		15872.21	1043.79		14.24	1.51		5.60	1.18	4489.03	4489.03	4491.99	483.16	0.81
Alpine	14	2yr		427.00			4.37			1.00		4476.38	4475.65	4476.68	48.46	0.54
Alpine	14	5yr		1691.00			6.42			1.58		4479.38	4477.77	4480.02	62.25	0.55
Alpine	14	10yr		3678.00			7.69			1.89		4482.56	4479.93	4483.48	72.70	0.53
Alpine	14	25yr		5796.00			8.92			2.33		4484.81	4481.69	4486.04	80.06	0.55
Alpine	14	50yr		7558.00			10.56			3.17		4485.62	4482.94	4487.35	82.30	0.63
Alpine	14	100yr		10704.00			12.67			4.39		4487.17	4484.90	4489.66	87.47	0.72
Alpine	14	500yr		16916.00			16.90			7.74		4488.83	4488.27	4493.26	100.51	0.94
Alpine	14.3		Bridge													
Alpine	14.5	2yr		427.00			3.60			0.64		4477.02	4475.88	4477.22	51.25	0.42
Alpine	14.5	5yr		1691.00			5.70			1.21		4480.08	4477.97	4480.58	64.42	0.47
Alpine	14.5	10yr		3681.00			7.09			1.58		4483.27	4480.12	4484.05	74.90	0.47
Alpine	14.5	25yr		5806.00			8.25			1.95		4485.62	4481.87	4486.68	82.17	0.50
Alpine	14.5	50yr		7570.00			9.41			2.45		4486.83	4483.12	4488.20	84.83	0.54
Alpine	14.5	100yr		10562.02	156.98		8.60	0.50		1.98	0.17	4491.02	4485.08	4492.15	495.65	0.47
Alpine	14.5	500yr		16930.00			14.12			5.36		4490.76	4488.44	4493.86	455.52	0.77
Alpine	14.6666*	2yr		427.00			4.33			0.92		4477.32		4477.61	42.39	0.50
Alpine	14.6666*	5yr		1691.00			6.95			1.80		4480.31		4481.06	55.14	0.58
Alpine	14.6666*	10yr		3681.00			8.54			2.30		4483.41		4484.54	65.86	0.59
Alpine	14.6666*	25yr		5806.00			9.79			2.80		4485.72		4487.21	75.84	0.62
Alpine	14.6666*	50yr		7570.00			10.95			3.45		4486.96		4488.82	84.17	0.67
Alpine	14.6666*	100yr	27.07	9917.47	774.47	0.49	9.06	0.80	0.17	2.14	0.34	4491.21		4492.39	779.38	0.48
Alpine	14.6666*	500yr	319.52	13205.08	3405.41	0.78	9.99	1.37	0.33	2.45	0.77	4493.53		4494.75	1008.65	0.48
Alpine	14.8333*	2yr		427.00			4.50			1.01		4477.77		4478.08	42.31	0.53
Alpine	14.8333*	5yr		1691.00			7.56			2.02		4480.71		4481.59	46.15	0.60
Alpine	14.8333*	10yr		3681.00			9.71			2.90		4483.70		4485.16	57.33	0.67
Alpine	14.8333*	25yr		5806.00			10.95			3.57		4486.01		4487.88	72.89	0.72
Alpine	14.8333*	50yr		7568.39	1.61		12.05	0.42		4.21	0.09	4487.30		4489.55	105.76	0.75
Alpine	14.8333*	100yr	227.85	6855.51	3635.64	0.68	6.70	1.33	0.18	1.11	0.31	4492.30		4492.75	1128.79	0.33
Alpine	14.8333*	500yr	793.02	7898.23	8238.76	0.73	6.47	1.63	0.19	0.97	0.39	4494.81		4495.13	1416.92	0.29
Alpine	15	2yr		427.00			4.24			1.78		4478.43		4478.71	42.44	0.49
Alpine	15	5yr		1691.00			7.03			5.81		4481.61		4482.37	45.62	0.54
Alpine	15	10yr		3681.00			9.53			9.95		4484.62		4486.03	55.22	0.63
Alpine	15	25yr	66.74	4733.99	1005.27	1.29	8.07	1.82	0.78	5.99	0.81	4487.99		4488.82	596.24	0.45
Alpine	15	50yr	258.40	3862.71	3448.88	1.20	5.34	1.65	0.52	2.45	0.53	4490.27		4490.51	1085.82	0.27
Alpine	15	100yr	491.84	3137.67	7089.49	0.75	3.57	1.50	0.20	1.02	0.35	4492.87		4492.95	1423.28	0.16
Alpine	15	500yr	1228.12	3457.13	12244.75	0.81	3.39	1.64	0.21	0.88	0.38	4495.21		4495.27	1700.70	0.14

HEC-RAS Plan: Opt C River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	15.05		Bridge													
Alpine	15.1	2yr		419.00			2.19			0.18		4480.51	4477.48	4480.59	44.53	0.19
Alpine	15.1	5yr		1699.00			4.65			0.64		4484.23	4479.75	4484.56	52.66	0.31
Alpine	15.1	10yr	15.22	3546.61	249.17	0.48	6.36	0.72	0.12	1.09	0.13	4487.51	4482.36	4488.10	446.64	0.37
Alpine	15.1	25yr	91.14	4703.17	1350.69	0.76	7.18	1.11	0.23	1.32	0.26	4489.13	4484.97	4489.75	797.51	0.38
Alpine	15.1	50yr	197.77	5101.24	2707.99	0.84	6.94	1.19	0.26	1.19	0.27	4490.47	4488.26	4490.95	1113.80	0.35
Alpine	15.1	100yr	414.22	4869.88	5955.90	0.62	5.53	1.25	0.14	0.71	0.24	4492.90	4489.46	4493.12	1428.06	0.25
Alpine	15.1	500yr	1079.81	5626.70	10740.49	0.71	5.51	1.44	0.16	0.67	0.29	4495.22	4491.04	4495.39	1701.42	0.24
Alpine	15.1666*	2yr		419.00			2.76			0.31		4480.55		4480.66	43.63	0.26
Alpine	15.1666*	5yr		1699.00			5.28			0.83		4484.28		4484.71	47.36	0.36
Alpine	15.1666*	10yr	0.01	3790.35	20.64	0.13	7.59	0.61	0.02	1.62	0.12	4487.50		4488.39	129.14	0.47
Alpine	15.1666*	25yr	10.11	5892.63	242.26	0.66	10.13	0.99	0.21	2.74	0.27	4488.85		4490.38	389.23	0.58
Alpine	15.1666*	50yr	64.71	6820.07	1122.22	0.97	10.31	1.38	0.36	2.72	0.43	4490.15		4491.56	677.15	0.55
Alpine	15.1666*	100yr	288.25	6591.46	4360.29	0.93	8.01	1.49	0.28	1.53	0.40	4492.78		4493.38	1192.10	0.39
Alpine	15.1666*	500yr	788.89	7269.91	9388.21	0.90	7.50	1.72	0.24	1.27	0.45	4495.17		4495.56	1535.40	0.33
Alpine	15.3333*	2yr		419.00			3.44			0.53		4480.76		4480.94	42.94	0.36
Alpine	15.3333*	5yr		1699.00			5.84			1.07		4484.53		4485.06	46.71	0.41
Alpine	15.3333*	10yr		3811.00			8.23			1.92		4487.88		4488.93	60.44	0.52
Alpine	15.3333*	25yr	0.10	6102.72	42.18	0.28	11.02	0.69	0.06	3.30	0.30	4489.35		4491.22	155.64	0.65
Alpine	15.3333*	50yr	4.88	7857.74	144.38	0.71	12.86	0.80	0.26	4.35	0.39	4490.26	4488.54	4492.78	317.12	0.73
Alpine	15.3333*	100yr	102.41	9776.91	1360.68	1.24	13.27	1.25	0.57	4.35	0.73	4492.27		4494.65	771.82	0.68
Alpine	15.3333*	500yr	512.91	11542.42	5391.66	1.42	12.93	1.66	0.65	3.87	1.03	4494.76		4496.49	1244.13	0.60
Alpine	15.5	2yr		419.00			4.14			0.84		4481.19		4481.46	42.45	0.47
Alpine	15.5	5yr		1699.00			6.42			1.34		4484.89		4485.53	46.15	0.47
Alpine	15.5	10yr		3811.00			8.77			2.16		4488.36		4489.56	56.33	0.56
Alpine	15.5	25yr		6136.99	8.01		11.38	0.51		3.53	0.20	4490.09		4492.10	101.94	0.68
Alpine	15.5	50yr	0.23	7922.70	84.07	0.40	13.04	0.92	0.11	4.48	0.49	4491.17	4489.38	4493.78	172.18	0.75
Alpine	15.5	100yr	45.90	10288.04	906.06	1.03	13.70	1.17	0.44	4.62	0.67	4493.40	4493.40	4496.07	650.48	0.70
Alpine	15.5	500yr	399.55	12508.60	4538.85	1.39	13.70	1.63	0.65	4.32	1.03	4495.94	4495.94	4498.04	1190.65	0.64
Alpine	15.55		Bridge													
Alpine	15.6	2yr		419.00			1.73			0.10		4484.39	4480.23	4484.44	45.65	0.13
Alpine	15.6	5yr		1699.00			4.73			0.64		4486.89	4482.49	4487.24	48.15	0.31
Alpine	15.6	10yr		3797.20	13.80		6.72	0.39		1.22	0.10	4490.50	4485.10	4491.20	122.45	0.40
Alpine	15.6	25yr	16.21	5756.61	372.18	0.54	7.90	0.62	0.13	1.55	0.20	4493.06	4487.45	4493.97	586.25	0.41
Alpine	15.6	50yr	111.49	6435.01	1460.50	0.71	7.57	0.78	0.18	1.35	0.26	4494.96	4489.38	4495.68	1047.00	0.37
Alpine	15.6	100yr	333.82	7470.07	3436.11	0.84	7.83	1.00	0.22	1.39	0.37	4496.58	4493.40	4497.22	1275.85	0.36
Alpine	15.6	500yr	878.81	9421.48	7146.71	1.02	8.82	1.34	0.31	1.70	0.59	4498.36	4495.94	4499.03	1494.13	0.38
Alpine	15.75*	2yr		419.00			2.24			0.19		4484.42		4484.50	44.43	0.19

HEC-RAS Plan: Opt C River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	15.75*	5yr		1699.00			5.56			0.95		4487.01		4487.49	47.02	0.38
Alpine	15.75*	10yr		3808.77	2.23		7.51	0.29		1.59	0.07	4490.69		4491.56	88.13	0.47
Alpine	15.75*	25yr	3.59	5957.07	184.35	0.46	8.91	0.61	0.11	2.07	0.21	4493.19		4494.39	413.67	0.49
Alpine	15.75*	50yr	63.91	6911.34	1031.76	0.74	8.78	0.83	0.21	1.90	0.32	4495.01		4496.04	854.02	0.45
Alpine	15.75*	100yr	246.00	8150.67	2843.34	0.93	9.15	1.08	0.29	1.98	0.46	4496.61		4497.56	1176.34	0.44
Alpine	15.75*	500yr	722.32	10198.76	6525.92	1.15	10.11	1.45	0.40	2.32	0.73	4498.42		4499.36	1414.98	0.45
Alpine	16.*	2yr		419.00			3.03			0.40		4484.57		4484.71	43.32	0.30
Alpine	16.*	5yr		1699.00			6.39			1.33		4487.42		4488.05	46.17	0.47
Alpine	16.*	10yr		3810.61	0.39		8.11	0.21		1.83	0.05	4491.20		4492.22	74.65	0.52
Alpine	16.*	25yr	0.79	6050.50	93.71	0.41	9.61	0.53	0.10	2.36	0.18	4493.66		4495.07	350.39	0.55
Alpine	16.*	50yr	33.50	7262.15	711.35	0.71	9.86	0.83	0.22	2.36	0.34	4495.27		4496.64	726.89	0.52
Alpine	16.*	100yr	173.56	8817.91	2248.52	0.99	10.54	1.12	0.35	2.58	0.53	4496.78		4498.14	1081.79	0.52
Alpine	16.*	500yr	625.34	10995.65	5826.01	1.31	11.48	1.53	0.53	2.92	0.84	4498.62		4499.93	1333.85	0.53
Alpine	16.25*	2yr		419.00			4.05			0.79		4485.00		4485.26	42.51	0.46
Alpine	16.25*	5yr		1699.00			7.07			1.71		4488.11		4488.89	46.67	0.55
Alpine	16.25*	10yr		3810.86	0.14		8.56	0.18		2.11	0.04	4491.89		4493.03	70.28	0.57
Alpine	16.25*	25yr	0.07	6038.98	105.95	0.23	9.97	0.81	0.04	2.61	0.24	4494.34		4495.86	249.52	0.59
Alpine	16.25*	50yr	19.47	7402.42	585.11	0.66	10.51	0.87	0.20	2.76	0.39	4495.80		4497.39	629.58	0.57
Alpine	16.25*	100yr	139.29	9153.16	1947.54	1.02	11.42	1.15	0.39	3.12	0.59	4497.25		4498.90	1031.02	0.58
Alpine	16.25*	500yr	562.94	11372.95	5511.12	1.40	12.29	1.60	0.62	3.45	0.95	4499.09		4500.63	1288.42	0.58
Alpine	16.5	2yr		419.00			4.56			1.00		4485.96		4486.28	42.21	0.54
Alpine	16.5	5yr		1699.00			7.40			1.87		4489.06		4489.91	48.28	0.60
Alpine	16.5	10yr		3810.83	0.17		8.84	0.20		2.23	0.05	4492.71		4493.92	70.76	0.60
Alpine	16.5	25yr		6040.75	104.25		10.23	0.89		2.73	0.27	4495.12		4496.72	220.59	0.61
Alpine	16.5	50yr	12.20	7498.91	495.90	0.59	10.98	0.87	0.17	3.00	0.39	4496.48		4498.23	597.89	0.61
Alpine	16.5	100yr	121.73	9345.34	1772.93	1.04	11.99	1.16	0.41	3.42	0.61	4497.89		4499.75	1004.68	0.63
Alpine	16.5	500yr	519.23	11596.81	5330.96	1.46	12.85	1.66	0.67	3.74	1.03	4499.69		4501.41	1226.44	0.62
Alpine	16.7		Bridge													
Alpine	17	2yr		419.00			4.42			0.89		4486.44	4485.62	4486.74	42.19	0.52
Alpine	17	5yr		1699.00			7.31			1.75		4489.49	4487.92	4490.32	49.34	0.59
Alpine	17	10yr		3807.82	3.18		8.56	0.40		2.02	0.12	4493.21	4490.54	4494.35	85.95	0.58
Alpine	17	25yr	0.04	6021.50	123.46	0.19	10.21	0.72	0.03	2.65	0.22	4495.39	4492.86	4496.98	340.38	0.61
Alpine	17	50yr	136.45	6173.14	1697.41	0.74	7.69	0.82	0.20	1.36	0.29	4498.50	4494.47	4499.21	1115.55	0.40
Alpine	17	100yr	305.73	7115.82	3818.45	0.68	7.80	1.05	0.17	1.34	0.40	4500.11	4497.83	4500.71	1381.56	0.38
Alpine	17	500yr	1083.95	9010.45	7352.60	1.16	8.82	1.40	0.38	1.65	0.63	4501.70	4499.55	4502.34	1401.80	0.40
Alpine	17.05*	2yr		419.00			4.81			1.16		4487.31		4487.66	42.12	0.59
Alpine	17.05*	5yr		1699.00			7.73			2.12		4490.28		4491.21	48.78	0.64
Alpine	17.05*	10yr		3811.00			8.89			2.35		4493.83		4495.06	69.07	0.63
Alpine	17.05*	25yr		6076.05	68.95		10.39	0.95		2.93	0.43	4496.02		4497.68	141.45	0.65

HEC-RAS Plan: Opt C River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	17.05*	50yr	65.74	7149.94	791.32	0.77	9.29	0.86	0.23	2.14	0.33	4498.55		4499.75	789.18	0.50
Alpine	17.05*	100yr	285.23	8495.65	2459.12	1.05	9.60	1.14	0.35	2.18	0.48	4500.12		4501.21	1119.73	0.49
Alpine	17.05*	500yr	640.07	10946.40	5860.53	1.06	10.93	1.60	0.37	2.71	0.82	4501.71		4502.89	1411.59	0.52
Alpine	17.1*	2yr		419.00			4.60			1.07		4488.35		4488.68	42.22	0.55
Alpine	17.1*	5yr		1699.00			7.75			2.18		4491.23		4492.17	48.37	0.64
Alpine	17.1*	10yr		3811.00			8.98			2.47		4494.60		4495.85	71.74	0.65
Alpine	17.1*	25yr		6114.09	30.91		10.39	0.83		3.00	0.33	4496.77		4498.44	126.62	0.67
Alpine	17.1*	50yr	19.17	7736.86	250.97	0.67	10.44	0.85	0.20	2.81	0.32	4498.72		4500.36	422.20	0.60
Alpine	17.1*	100yr	129.87	10124.36	985.77	1.11	12.14	1.17	0.44	3.65	0.54	4499.92		4501.98	771.42	0.65
Alpine	17.1*	500yr	439.63	14116.35	2891.02	1.69	15.30	1.76	0.89	5.62	1.08	4501.04		4504.00	1026.92	0.79
Alpine	17.15*	2yr		419.00			4.58			1.06		4489.30		4489.62	42.23	0.55
Alpine	17.15*	5yr		1699.00			7.75			2.16		4492.19		4493.13	47.67	0.64
Alpine	17.15*	10yr		3811.00			9.00			2.49		4495.44		4496.70	74.24	0.66
Alpine	17.15*	25yr		6135.46	9.54		10.32	0.63		2.98	0.20	4497.59		4499.25	115.98	0.68
Alpine	17.15*	50yr	7.36	7865.42	134.23	0.61	10.70	1.20	0.17	2.98	0.50	4499.29		4501.04	191.39	0.63
Alpine	17.15*	100yr	77.24	10746.16	416.60	1.07	12.92	1.08	0.42	4.18	0.46	4500.45	4498.93	4502.93	547.49	0.72
Alpine	17.15*	500yr	368.59	15256.42	1822.00	1.74	16.26	1.74	0.93	6.36	1.00	4501.73		4505.33	867.53	0.85
Alpine	17.2	2yr		419.00			4.58			1.06		4490.23		4490.56	42.22	0.55
Alpine	17.2	5yr		1699.00			7.77			2.16		4493.14		4494.08	46.74	0.63
Alpine	17.2	10yr		3811.00			9.01			2.50		4496.31		4497.57	76.58	0.68
Alpine	17.2	25yr		6144.26	0.74		10.25	0.33		2.95	0.07	4498.45		4500.08	102.10	0.69
Alpine	17.2	50yr	3.97	7934.07	68.96	0.65	10.84	1.12	0.19	3.10	0.42	4499.96		4501.77	160.36	0.66
Alpine	17.2	100yr	57.49	10972.41	210.10	1.04	12.97	1.08	0.39	4.22	0.42	4501.26	4499.92	4503.81	377.09	0.74
Alpine	17.2	500yr	1134.90	11901.02	4411.08	1.36	9.68	1.56	0.45	2.08	0.55	4505.61	4503.95	4506.61	1215.35	0.46
Alpine	17.3		Bridge													
Alpine	17.4214	2yr		419.00			4.40			0.97		4490.82	4490.00	4491.12	42.31	0.52
Alpine	17.4214	5yr		1699.00			7.22			1.96		4493.91	4492.26	4494.72	56.01	0.62
Alpine	17.4214	10yr		3809.20	1.80		6.46	0.37		1.32	0.05	4498.59	4495.15	4499.24	109.25	0.44
Alpine	17.4214	25yr	3.27	6077.03	64.70	0.73	8.71	1.20	0.14	2.28	0.30	4499.82	4496.98	4500.99	153.66	0.55
Alpine	17.4214	50yr	18.39	7819.71	168.89	0.94	10.27	1.67	0.22	3.07	0.52	4500.55	4498.19	4502.15	198.17	0.62
Alpine	17.4214	100yr	895.19	6862.20	3482.61	1.10	5.72	1.26	0.18	0.82	0.22	4505.53	4500.25	4505.85	1208.11	0.27
Alpine	17.4214	500yr	1600.03	9153.14	6693.83	1.21	6.99	1.76	0.22	1.19	0.39	4506.77	4503.91	4507.19	1456.52	0.32
Alpine	17.5371*	2yr		419.00			4.58			1.06		4491.90		4492.23	42.22	0.55
Alpine	17.5371*	5yr		1699.00			7.17			1.93		4495.05		4495.85	54.85	0.61
Alpine	17.5371*	10yr		3811.00			6.93			1.58		4499.10		4499.84	92.80	0.50
Alpine	17.5371*	25yr	0.29	6125.72	18.99	0.42	8.89	0.94	0.06	2.45	0.22	4500.55		4501.77	135.37	0.59
Alpine	17.5371*	50yr	9.19	7905.48	92.32	0.86	10.17	1.51	0.19	3.08	0.45	4501.46		4503.04	175.38	0.63
Alpine	17.5371*	100yr	672.93	8641.37	1925.70	1.32	7.36	1.31	0.27	1.41	0.27	4505.55		4506.21	1000.26	0.37
Alpine	17.5371*	500yr	1467.54	11502.02	4477.44	1.72	8.87	1.89	0.43	1.98	0.50	4506.82		4507.64	1165.85	0.43

HEC-RAS Plan: Opt C River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	17.6528*	2yr		419.00			4.58			1.06		4493.08		4493.40	42.22	0.55
Alpine	17.6528*	5yr		1699.00			7.11			1.91		4496.17		4496.95	56.66	0.61
Alpine	17.6528*	10yr		3811.00			7.40			1.86		4499.75		4500.60	95.55	0.56
Alpine	17.6528*	25yr		6141.65	3.36		8.99	0.64		2.58	0.13	4501.41		4502.66	122.60	0.62
Alpine	17.6528*	50yr	4.43	7954.43	48.14	0.75	10.05	1.33	0.16	3.07	0.38	4502.44		4503.99	162.55	0.65
Alpine	17.6528*	100yr	405.03	10187.40	647.57	1.46	9.09	1.21	0.37	2.23	0.28	4505.56		4506.72	697.81	0.49
Alpine	17.6528*	500yr	1041.94	14331.87	2073.19	2.09	11.56	1.88	0.69	3.50	0.59	4506.68		4508.39	929.00	0.59
Alpine	17.7685*	2yr		419.00			4.58			1.06		4494.24		4494.57	42.22	0.55
Alpine	17.7685*	5yr		1699.00			7.01			1.86		4497.29		4498.06	58.67	0.61
Alpine	17.7685*	10yr		3811.00			7.75			2.09		4500.59		4501.52	97.62	0.61
Alpine	17.7685*	25yr		6144.73	0.27		9.02	0.37		2.64	0.06	4502.39		4503.65	117.89	0.64
Alpine	17.7685*	50yr	1.69	7981.29	24.02	0.61	9.91	1.17	0.12	3.04	0.32	4503.47		4505.00	154.70	0.66
Alpine	17.7685*	100yr	221.04	10800.34	218.62	1.43	9.95	1.32	0.39	2.78	0.34	4505.92		4507.40	387.47	0.57
Alpine	17.7685*	500yr	696.85	15998.32	751.83	2.22	13.27	1.70	0.83	4.76	0.56	4506.98		4509.49	670.81	0.72
Alpine	17.8842*	2yr		419.00			4.58			1.06		4495.41		4495.74	42.23	0.55
Alpine	17.8842*	5yr		1699.00			6.90			1.82		4498.41		4499.15	60.65	0.60
Alpine	17.8842*	10yr		3811.00			7.92			2.17		4501.55		4502.53	93.86	0.62
Alpine	17.8842*	25yr		6145.00			8.98			2.66		4503.45		4504.71	117.85	0.66
Alpine	17.8842*	50yr	0.31	7994.97	11.71	0.37	9.77	1.02	0.06	3.01	0.26	4504.56		4506.04	150.99	0.67
Alpine	17.8842*	100yr	130.08	10948.28	161.64	1.35	10.24	1.79	0.37	3.03	0.56	4506.60		4508.18	276.64	0.61
Alpine	17.8842*	500yr	635.54	16417.27	394.19	2.19	13.16	1.53	0.82	4.75	0.48	4508.04	4506.98	4510.58	559.73	0.73
Alpine	18	2yr		419.00			4.57			1.04		4496.58		4496.90	42.77	0.55
Alpine	18	5yr		1699.00			6.79			1.76		4499.52		4500.24	62.97	0.60
Alpine	18	10yr		3811.00			7.99			2.18		4502.54		4503.53	90.28	0.61
Alpine	18	25yr		6145.00			8.93			2.63		4504.55		4505.78	119.55	0.66
Alpine	18	50yr		8001.36	5.64		9.61	0.90		2.94	0.22	4505.69		4507.13	145.93	0.67
Alpine	18	100yr	79.69	11068.99	91.31	1.28	10.44	1.71	0.35	3.21	0.54	4507.41		4509.08	247.02	0.65
Alpine	18	500yr	659.07	16440.39	347.55	2.12	12.48	1.81	0.76	4.25	0.60	4509.37		4511.65	455.78	0.70
Alpine	18.2*	2yr		419.00			6.01			1.75		4501.99	4501.74	4502.55	41.67	0.82
Alpine	18.2*	5yr		1699.00			8.71			3.00		4504.36		4505.53	63.01	0.87
Alpine	18.2*	10yr		3811.00			10.31			3.75		4506.75		4508.40	84.29	0.87
Alpine	18.2*	25yr		6144.80	0.20		10.98	0.42		3.98	0.08	4508.75		4510.62	109.83	0.84
Alpine	18.2*	50yr		7980.37	26.63		11.78	1.42		4.40	0.48	4509.83		4511.98	141.62	0.85
Alpine	18.2*	100yr	1.05	11079.22	159.73	0.58	13.55	2.26	0.13	5.56	0.99	4511.03	4510.79	4513.84	188.92	0.91
Alpine	18.2*	500yr	440.63	15217.98	1788.39	1.93	13.04	2.28	0.67	4.58	0.87	4513.98	4513.98	4516.29	708.12	0.73
Alpine	18.4*	2yr		419.00			4.32			0.85		4507.28		4507.57	48.13	0.54
Alpine	18.4*	5yr		1699.00			6.59			1.63		4509.99		4510.66	71.71	0.61
Alpine	18.4*	10yr		3810.98	0.02		8.50	0.19		2.44	0.02	4512.36		4513.49	92.22	0.67
Alpine	18.4*	25yr		6070.88	74.12		10.12	1.42		3.22	0.44	4513.99		4515.56	160.67	0.72

HEC-RAS Plan: Opt C River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	18.4*	50yr		7738.91	268.09		10.93	1.37		3.62	0.42	4515.08	4513.86	4516.87	352.39	0.73
Alpine	18.4*	100yr	14.02	9603.94	1622.04	0.89	10.90	2.11	0.20	3.38	0.75	4516.73		4518.32	564.28	0.66
Alpine	18.4*	500yr	117.50	13506.43	3823.07	1.52	13.48	2.89	0.48	4.95	1.27	4517.88		4520.09	744.61	0.77
Alpine	18.6*	2yr		419.00			5.26			1.32		4511.54		4511.97	45.64	0.70
Alpine	18.6*	5yr		1699.00			7.58			2.21		4514.14		4515.03	66.23	0.73
Alpine	18.6*	10yr		3805.39	5.61		9.61	0.69		3.11	0.15	4516.50		4517.94	112.17	0.75
Alpine	18.6*	25yr		5707.74	437.26		10.67	1.57		3.55	0.52	4518.22		4519.86	392.26	0.74
Alpine	18.6*	50yr		6574.99	1432.01		10.44	2.09		3.27	0.76	4519.32		4520.73	509.13	0.69
Alpine	18.6*	100yr		8265.77	2974.23		11.67	2.74		3.97	1.17	4520.21		4521.80	575.57	0.73
Alpine	18.6*	500yr	33.18	10247.94	7165.88	1.11	11.49	3.19	0.28	3.58	1.36	4522.22		4523.49	762.79	0.65
Alpine	18.8*	2yr		419.00			4.58			0.96		4516.39		4516.72	45.70	0.57
Alpine	18.8*	5yr		1699.00			7.24			1.96		4518.92		4519.73	63.07	0.66
Alpine	18.8*	10yr		3365.05	445.95		8.78	1.44		2.53	0.44	4521.14		4522.20	407.11	0.66
Alpine	18.8*	25yr		4307.21	1837.79		8.91	2.09		2.45	0.72	4522.55		4523.44	539.75	0.61
Alpine	18.8*	50yr		5139.64	2867.36		9.83	2.51		2.92	0.98	4523.10		4524.10	575.38	0.65
Alpine	18.8*	100yr		6277.34	4962.66		10.34	2.82		3.11	1.15	4524.23		4525.21	698.58	0.64
Alpine	18.8*	500yr		8280.80	9166.20		11.93	3.66		4.00	1.76	4525.37		4526.53	748.36	0.70
Alpine	19	2yr		419.00			4.36			1.33		4520.99	4520.21	4521.29	49.99	0.55
Alpine	19	5yr		1514.13	184.87		6.43	1.10		2.26	0.31	4523.57	4522.38	4524.14	381.63	0.56
Alpine	19	10yr		2177.29	1633.71		6.61	2.05		2.16	0.72	4525.17	4524.51	4525.59	522.53	0.49
Alpine	19	25yr		2886.59	3258.41		7.56	2.65		2.71	1.08	4526.04	4525.21	4526.52	585.26	0.53
Alpine	19	50yr		3291.04	4715.96		7.74	2.91		2.75	1.22	4526.76	4525.72	4527.22	627.97	0.52
Alpine	19	100yr		4114.82	7125.18		8.47	3.19		3.18	1.41	4527.74	4526.35	4528.25	758.09	0.53
Alpine	19	500yr		5135.11	12311.89		8.97	3.83		3.40	1.82	4529.12	4527.20	4529.65	789.50	0.53

HEC-RAS Plan: Opt D River: Alpine Creek Reach: Alpine

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	1	2yr		448.00			5.81			1.47		4404.48	4403.86	4405.00	32.84	0.67
Alpine	1	5yr	167.82	1552.18		1.47	8.63		0.53	2.67		4407.22	4407.11	4408.26	181.99	0.73
Alpine	1	10yr	1214.13	2666.87		3.08	10.32		1.61	3.49		4409.02	4408.80	4410.20	204.43	0.76
Alpine	1	25yr	2369.28	3636.89	28.83	4.00	11.52	0.75	2.38	4.11	0.15	4410.26	4409.74	4411.59	380.51	0.78
Alpine	1	50yr	3195.85	4324.30	324.85	4.50	12.34	1.95	2.84	4.56	0.61	4410.99	4410.79	4412.42	386.29	0.80
Alpine	1	100yr	4596.94	5426.79	1158.27	5.17	13.51	3.19	3.50	5.22	1.29	4412.08	4411.77	4413.64	394.87	0.81
Alpine	1	500yr	7322.23	7477.60	3275.17	6.15	15.35	4.62	4.19	6.32	2.25	4413.90	4413.32	4415.71	434.96	0.84
Alpine	1.33333*	2yr		445.00			5.14			1.18		4405.84		4406.25	39.75	0.61
Alpine	1.33333*	5yr		1687.00			8.08			2.39		4408.55		4409.56	51.70	0.71
Alpine	1.33333*	10yr		3895.00			12.85			5.60		4410.24	4410.24	4412.81	59.65	1.01
Alpine	1.33333*	25yr	522.62	5112.38		2.01	11.31		0.83	3.95		4412.60	4412.60	4414.41	259.08	0.76
Alpine	1.33333*	50yr	1377.60	6532.40		2.97	12.53		1.52	4.65		4413.64	4413.64	4415.68	262.97	0.79
Alpine	1.33333*	100yr	2808.12	8530.18	1.70	4.01	14.20	0.52	2.43	5.72	0.09	4414.83	4414.83	4417.25	292.58	0.83
Alpine	1.33333*	500yr	5756.68	11878.42	659.90	5.33	16.37	2.77	3.75	7.14	1.07	4416.71	4416.71	4419.55	432.96	0.87
Alpine	1.66666*	2yr		445.00			4.87			1.08		4407.01		4407.38	44.46	0.60
Alpine	1.66666*	5yr		1687.00			7.08			1.80		4409.93		4410.71	55.86	0.60
Alpine	1.66666*	10yr		3895.00			8.30			2.19		4413.45		4414.51	75.98	0.59
Alpine	1.66666*	25yr		5635.00			11.30			4.02		4413.82		4415.81	78.06	0.79
Alpine	1.66666*	50yr		7910.00			13.88			5.92		4414.71		4417.70	82.97	0.93
Alpine	1.66666*	100yr	640.68	10699.32		2.02	13.42		0.84	5.08		4417.36	4417.36	4420.01	314.31	0.78
Alpine	1.66666*	500yr	3137.33	15154.26	3.40	3.72	15.31	0.67	2.09	6.18	0.12	4419.60	4419.60	4422.65	354.81	0.80
Alpine	2	2yr		445.00			4.73			1.04		4408.17	4407.57	4408.52	50.14	0.61
Alpine	2	5yr		1687.00			6.75			1.66		4410.92	4409.61	4411.62	61.23	0.59
Alpine	2	10yr		3895.00			8.26			2.16		4414.22	4411.88	4415.28	74.21	0.58
Alpine	2	25yr		5635.00			9.64			2.86		4415.64	4413.38	4417.08	85.36	0.65
Alpine	2	50yr		7910.00			10.21			3.06		4417.71	4415.09	4419.33	98.13	0.64
Alpine	2	100yr		11340.00			13.09			4.94		4418.62	4417.14	4421.28	103.75	0.80
Alpine	2	500yr		18295.00			17.65			8.59		4420.23	4420.15	4425.06	192.15	0.99
Alpine	2.3		Bridge													
Alpine	2.5	2yr		445.00			3.63			0.57		4408.72	4407.57	4408.93	53.03	0.42
Alpine	2.5	5yr		1687.00			5.71			1.14		4411.65	4409.59	4412.16	62.92	0.46
Alpine	2.5	10yr		3895.00			7.18			1.60		4415.14	4411.88	4415.94	81.58	0.49
Alpine	2.5	25yr		5635.00			8.02			1.92		4416.96	4413.38	4417.95	93.47	0.52
Alpine	2.5	50yr		7910.00			8.66			2.14		4419.07	4415.09	4420.23	105.92	0.52
Alpine	2.5	100yr		11340.00			9.93			2.65		4421.22	4417.14	4422.75	298.39	0.53
Alpine	2.5	500yr	3377.08	14822.47	95.45	1.84	9.00	1.00	0.51	1.94	0.16	4425.98	4420.15	4427.01	704.05	0.40
Alpine	3	2yr		445.00			4.84			1.12		4408.89		4409.25	53.46	0.65
Alpine	3	5yr		1687.00			2.29			0.18		4412.28		4412.36	269.17	0.24
Alpine	3	10yr		3697.13	197.87		2.03	0.70		0.11	0.06	4416.13		4416.19	375.04	0.14

HEC-RAS Plan: Opt D River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	3	25yr	5.44	5263.70	365.86	0.23	2.17	0.77	0.01	0.11	0.06	4418.19		4418.26	428.93	0.13
Alpine	3	50yr	66.38	7239.67	603.95	0.43	2.33	0.83	0.02	0.12	0.07	4420.50		4420.58	496.71	0.13
Alpine	3	100yr	261.65	10086.20	992.15	0.64	2.60	0.91	0.04	0.14	0.08	4423.11		4423.20	548.13	0.13
Alpine	3	500yr	827.98	15582.05	1884.97	0.99	3.07	1.07	0.08	0.18	0.10	4427.17		4427.30	587.22	0.13
Alpine	3.16666*	2yr		445.00			4.25			0.89		4411.91		4412.20	66.65	0.60
Alpine	3.16666*	5yr		1687.00			5.35			0.67		4413.37	4413.37	4413.81	354.09	1.00
Alpine	3.16666*	10yr		3893.55	1.45		2.84	0.15		0.25	0.01	4416.23		4416.35	459.97	0.26
Alpine	3.16666*	25yr		5517.82	117.18		2.55	0.68		0.18	0.07	4418.26		4418.36	478.61	0.19
Alpine	3.16666*	50yr		7607.21	302.79		2.47	0.80		0.15	0.07	4420.56		4420.65	507.03	0.16
Alpine	3.16666*	100yr		10749.21	590.79		2.59	0.86		0.15	0.08	4423.16		4423.26	550.94	0.14
Alpine	3.16666*	500yr	67.37	16946.45	1281.18	0.56	2.89	0.97	0.04	0.17	0.09	4427.23		4427.35	637.54	0.14
Alpine	3.33333*	2yr		445.00			4.13			0.88		4414.81		4415.07	78.09	0.62
Alpine	3.33333*	5yr		1687.00			4.38			0.47		4416.42		4416.72	405.93	0.79
Alpine	3.33333*	10yr		3895.00			6.82			1.45		4416.88	4416.88	4417.60	408.61	1.02
Alpine	3.33333*	25yr		5635.00			4.60			0.69		4418.44		4418.76	427.49	0.48
Alpine	3.33333*	50yr		7864.79	45.21		3.59	0.60		0.36	0.07	4420.65		4420.85	527.51	0.28
Alpine	3.33333*	100yr		11049.96	290.04		3.30	0.94		0.27	0.11	4423.22		4423.39	560.69	0.21
Alpine	3.33333*	500yr	1.63	17412.86	880.51	0.19	3.32	1.03	0.01	0.24	0.11	4427.28		4427.44	662.91	0.18
Alpine	3.5*	2yr		445.00			3.71			0.73		4417.77		4417.98	95.29	0.58
Alpine	3.5*	5yr		1687.00			5.20			0.48		4419.19	4419.19	4419.61	431.05	1.06
Alpine	3.5*	10yr		3895.00			4.81			0.78		4420.30		4420.66	443.80	0.63
Alpine	3.5*	25yr		5635.00			7.50			1.82		4420.17	4420.17	4421.04	436.66	1.01
Alpine	3.5*	50yr		7910.00			6.91			1.58		4421.05		4421.79	450.52	0.76
Alpine	3.5*	100yr		11339.39	0.61		5.12	0.14		0.75	0.01	4423.38		4423.78	549.71	0.42
Alpine	3.5*	500yr		17833.67	461.33		4.32	1.13		0.44	0.16	4427.35		4427.63	625.52	0.26
Alpine	3.66666*	2yr		445.00			3.44			0.78		4420.67		4420.86	102.68	0.54
Alpine	3.66666*	5yr		1687.00			4.91			0.62		4422.21		4422.59	335.13	0.85
Alpine	3.66666*	10yr		3895.00			6.58			1.56		4422.95		4423.62	339.19	0.88
Alpine	3.66666*	25yr		5635.00			6.03			1.36		4423.94		4424.50	353.77	0.65
Alpine	3.66666*	50yr		7910.00			7.68			2.17		4424.20		4425.12	356.10	0.80
Alpine	3.66666*	100yr		11340.00			10.11			3.70		4424.46	4424.46	4426.05	358.30	1.01
Alpine	3.66666*	500yr		18270.01	24.99		8.38	0.75		2.13	0.14	4427.32		4428.41	468.76	0.62
Alpine	3.83333*	2yr		445.00			3.27			0.71		4423.56		4423.72	110.11	0.52
Alpine	3.83333*	5yr		1687.00			5.39			1.08		4425.06		4425.51	175.56	0.71
Alpine	3.83333*	10yr		3895.00			6.87			1.84		4426.45		4427.18	189.47	0.70
Alpine	3.83333*	25yr		5635.00			9.01			3.12		4426.75		4428.01	192.52	0.88
Alpine	3.83333*	50yr		7910.00			9.78			3.47		4427.68		4429.17	201.83	0.86
Alpine	3.83333*	100yr		11340.00			10.67			3.86		4428.90		4430.67	214.02	0.84
Alpine	3.83333*	500yr	2.60	18292.40		0.84	13.80		0.20	6.06		4430.10	4430.10	4433.06	241.13	1.00

HEC-RAS Plan: Opt D River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	4	2yr		445.00			3.24			0.71		4426.40		4426.56	117.40	0.53
Alpine	4	5yr		1687.00			5.19			1.41		4427.92		4428.34	129.49	0.58
Alpine	4	10yr		3895.00			6.69			1.77		4429.36		4430.05	188.58	0.67
Alpine	4	25yr		5635.00			7.12			1.88		4430.44		4431.22	199.37	0.63
Alpine	4	50yr		7910.00			8.16			2.34		4431.31		4432.34	208.12	0.67
Alpine	4	100yr		11340.00			9.40			2.92		4432.42		4433.79	219.20	0.71
Alpine	4	500yr	150.93	18119.46	24.61	2.01	10.64	0.66	0.59	3.41	0.12	4434.62		4436.36	426.26	0.69
Alpine	4.25*	2yr		430.00			3.41			0.78		4429.30		4429.48	108.45	0.56
Alpine	4.25*	5yr		1688.00			5.78			1.76		4430.76		4431.28	118.27	0.65
Alpine	4.25*	10yr		3624.00			6.01			1.29		4432.10		4432.67	261.04	0.70
Alpine	4.25*	25yr		5657.00			7.01			1.76		4432.87		4433.64	268.74	0.71
Alpine	4.25*	50yr		7379.00			7.00			1.68		4433.78		4434.54	277.79	0.63
Alpine	4.25*	100yr		10490.00			7.47			1.79		4435.01		4435.88	290.11	0.60
Alpine	4.25*	500yr		16703.00			8.24			1.97		4437.09		4438.14	310.86	0.57
Alpine	4.5*	2yr		430.00			3.57			0.81		4432.13		4432.33	86.37	0.53
Alpine	4.5*	5yr		1688.00			5.82			1.73		4433.87		4434.39	108.77	0.63
Alpine	4.5*	10yr		3624.00			6.27			1.29		4434.90		4435.51	308.98	0.81
Alpine	4.5*	25yr		5657.00			6.87			1.63		4435.68		4436.42	316.83	0.75
Alpine	4.5*	50yr		7379.00			7.64			2.00		4436.13		4437.04	321.28	0.78
Alpine	4.5*	100yr		10490.00			8.40			2.32		4437.00		4438.09	329.98	0.76
Alpine	4.5*	500yr		16703.00			9.26			2.59		4438.64		4439.97	346.38	0.72
Alpine	4.75*	2yr		430.00			3.87			0.93		4434.84		4435.07	74.34	0.56
Alpine	4.75*	5yr		1688.00			6.24			1.92		4436.77		4437.38	90.87	0.64
Alpine	4.75*	10yr		3624.00			7.31			1.74		4438.00		4438.83	209.97	0.84
Alpine	4.75*	25yr		5657.00			8.75			2.57		4438.70		4439.89	217.03	0.89
Alpine	4.75*	50yr		7379.00			9.60			3.08		4439.26		4440.69	222.57	0.91
Alpine	4.75*	100yr		10490.00			11.34			4.19		4439.95	4439.92	4441.95	229.49	1.00
Alpine	4.75*	500yr		16703.00			13.08			5.21		4441.44	4441.44	4444.09	244.35	1.01
Alpine	5	2yr		430.00			3.99			0.96		4437.58		4437.83	65.25	0.55
Alpine	5	5yr		1688.00			6.58			2.07		4439.66		4440.33	78.15	0.64
Alpine	5	10yr		3624.00			9.28			3.74		4441.26		4442.60	88.12	0.78
Alpine	5	25yr		5657.00			11.35			5.29		4442.44		4444.44	95.42	0.88
Alpine	5	50yr		7379.00			13.02			6.77		4443.14	4442.96	4445.77	99.77	0.96
Alpine	5	100yr		10490.00			14.64			8.16		4444.58	4444.58	4447.91	108.68	1.01
Alpine	5	500yr		16703.00			16.35			9.47		4447.19	4447.19	4451.34	124.91	1.01
Alpine	5.33333*	2yr		428.00			5.17			1.41		4438.56		4438.97	42.02	0.65
Alpine	5.33333*	5yr		1690.00			9.37			3.74		4440.68		4442.05	53.35	0.90
Alpine	5.33333*	10yr		3655.00			12.11			5.80		4442.71	4442.71	4444.98	66.93	1.00
Alpine	5.33333*	25yr		5736.00			13.34			6.69		4444.47	4444.47	4447.23	78.76	1.01
Alpine	5.33333*	50yr		7481.00			14.04			7.20		4445.70	4445.70	4448.77	87.07	1.00

HEC-RAS Plan: Opt D River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	5.33333*	100yr		10612.00			15.17			8.08		4447.50	4447.50	4451.07	99.11	1.01
Alpine	5.33333*	500yr	3428.05	12972.79	423.16	2.10	10.93	1.69	0.74	3.80	0.49	4451.82	4451.82	4453.27	1237.23	0.61
Alpine	5.6	2yr		428.00			3.76			0.72		4439.61		4439.83	52.23	0.45
Alpine	5.6	5yr		1690.00			6.20			1.39		4442.56		4443.16	55.18	0.49
Alpine	5.6	10yr		3655.00			8.72			2.29		4445.16		4446.34	57.77	0.57
Alpine	5.6	25yr		5736.00			11.06			3.52		4446.82		4448.72	63.16	0.68
Alpine	5.6	50yr		7481.00			12.78			4.78		4447.82		4450.35	70.45	0.78
Alpine	5.6	100yr		10612.00			15.48			7.11		4449.15		4452.87	80.38	0.93
Alpine	5.6	500yr	4103.68	12022.80	697.52	2.23	11.19	1.84	0.81	3.67	0.55	4453.22	4453.22	4454.63	1323.58	0.62
Alpine	5.8		Bridge													
Alpine	6	2yr		428.00			3.98			0.83		4440.34	4439.53	4440.58	52.11	0.49
Alpine	6	5yr		1690.00			6.45			1.53		4443.22	4441.48	4443.87	54.99	0.52
Alpine	6	10yr		3655.00			6.60			1.16		4448.29	4443.61	4448.97	60.06	0.38
Alpine	6	25yr		5736.00			8.23			1.63		4450.63	4445.47	4451.68	62.40	0.43
Alpine	6	50yr		7481.00			9.33			2.14		4452.23	4446.83	4453.58	567.10	0.49
Alpine	6	100yr	4325.03	4990.54	1296.44	1.07	4.21	1.01	0.17	0.44	0.14	4456.61	4448.97	4456.75	1495.02	0.21
Alpine	6	500yr	4838.93	10861.64	1123.43	2.11	10.65	1.83	0.77	2.99	0.56	4454.85	4453.12	4456.01	1419.50	0.57
Alpine	6.125*	2yr		428.00			4.27			0.98		4441.40	4440.75	4441.69	51.96	0.54
Alpine	6.125*	5yr		1690.00			6.94			1.83		4444.09	4442.68	4444.84	54.65	0.58
Alpine	6.125*	10yr		3655.00			7.29			1.48		4448.62	4444.82	4449.45	59.18	0.44
Alpine	6.125*	25yr		5736.00			8.85			2.02		4451.03	4446.66	4452.24	65.20	0.49
Alpine	6.125*	50yr		7481.00			9.72			2.48		4452.77	4448.01	4454.24	75.82	0.54
Alpine	6.125*	100yr	2918.50	6539.81	1153.68	1.23	5.75	1.20	0.25	0.91	0.22	4456.66	4450.23	4456.98	1465.67	0.31
Alpine	6.125*	500yr	3637.77	11794.22	1392.01	2.06	11.07	2.02	0.78	3.45	0.69	4455.99	4455.99	4457.35	1406.36	0.62
Alpine	6.25*	2yr		428.00			4.26			0.97		4442.62	4441.96	4442.90	51.97	0.54
Alpine	6.25*	5yr		1690.00			7.17			1.98		4445.16	4443.89	4445.96	54.51	0.61
Alpine	6.25*	10yr		3655.00			8.02			1.87		4449.05	4446.03	4450.05	58.40	0.51
Alpine	6.25*	25yr		5736.00			9.26			2.42		4451.60	4447.87	4452.93	71.71	0.56
Alpine	6.25*	50yr		7481.00			9.84			2.66		4453.46	4449.22	4454.96	79.56	0.56
Alpine	6.25*	100yr		10612.00			10.58			3.26		4456.07	4451.78	4457.81	1223.79	0.61
Alpine	6.25*	500yr		16824.00			17.19			8.58		4455.85	4455.85	4460.44	1031.09	1.00
Alpine	6.375*	2yr		428.00			4.26			0.97		4443.83	4443.17	4444.11	51.97	0.54
Alpine	6.375*	5yr		1690.00			7.24			2.02		4446.33	4445.10	4447.14	54.47	0.62
Alpine	6.375*	10yr		3655.00			8.64			2.24		4449.70	4447.24	4450.86	57.84	0.56
Alpine	6.375*	25yr		5736.00			9.34			2.63		4452.41	4449.07	4453.77	78.99	0.59
Alpine	6.375*	50yr		7481.00			9.73			2.73		4454.29	4450.93	4455.76	86.44	0.57
Alpine	6.375*	100yr		10612.00			10.12			3.04		4457.17	4452.92	4458.76	938.04	0.59
Alpine	6.375*	500yr	5110.80	7844.97	3868.22	1.30	4.67	1.45	0.23	0.59	0.28	4461.92	4456.23	4462.09	1536.26	0.23

HEC-RAS Plan: Opt D River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	6.5	2yr		428.00			4.26			0.97		4445.04	4444.37	4445.32	51.97	0.54
Alpine	6.5	5yr		1690.00			7.26			2.04		4447.53	4446.31	4448.35	54.46	0.62
Alpine	6.5	10yr		3655.00			9.11			2.55		4450.54	4448.45	4451.82	57.47	0.61
Alpine	6.5	25yr		5736.00			9.11			2.62		4453.42	4450.26	4454.71	86.83	0.60
Alpine	6.5	50yr		7481.00			9.45			2.67		4455.22	4452.13	4456.60	93.62	0.57
Alpine	6.5	100yr		10612.00			9.79			2.82		4458.13	4453.92	4459.62	573.66	0.57
Alpine	6.5	500yr	2703.27	10180.58	3940.15	1.10	6.24	1.71	0.34	1.11	0.47	4461.98	4456.88	4462.36	1512.02	0.33
Alpine	6.7		Bridge													
Alpine	7	2yr		428.00			3.34			0.54		4446.07	4444.88	4446.25	52.50	0.38
Alpine	7	5yr		1690.00			6.07			1.32		4448.86	4446.81	4449.43	55.28	0.48
Alpine	7	10yr		3655.00			7.47			1.89		4452.10	4448.95	4452.96	81.60	0.54
Alpine	7	25yr		5736.00			8.03			1.99		4454.70	4451.36	4455.70	91.42	0.51
Alpine	7	50yr		7481.00			8.96			2.40		4455.99	4452.50	4457.23	96.26	0.54
Alpine	7	100yr	765.81	8060.78	1785.41	0.73	6.04	1.36	0.19	1.12	0.35	4460.18	4454.29	4460.62	1419.81	0.36
Alpine	7	500yr	3033.78	9578.38	4211.84	1.08	5.75	1.66	0.32	0.95	0.43	4462.40	4457.27	4462.71	1524.18	0.30
Alpine	7.2*	2yr		428.00			4.19			0.94		4446.78	4446.09	4447.06	52.00	0.53
Alpine	7.2*	5yr		1690.00			6.72			1.69		4449.58	4448.02	4450.28	54.80	0.55
Alpine	7.2*	10yr		3655.00			8.23			2.24		4452.88	4450.16	4453.93	72.53	0.59
Alpine	7.2*	25yr		5736.00			9.09			2.52		4455.31	4451.93	4456.59	81.43	0.58
Alpine	7.2*	50yr		7481.00			10.09			3.00		4456.63	4453.72	4458.21	86.27	0.61
Alpine	7.2*	100yr		10517.68	94.32		9.56	0.14		2.78	0.47	4460.18	4455.64	4461.58	1225.07	0.57
Alpine	7.2*	500yr	2962.61	13439.98	421.41	1.46	9.74	0.23	0.66	2.75	0.91	4462.31	4461.24	4463.50	1606.06	0.53
Alpine	7.4*	2yr		428.00			4.26			0.97		4447.95	4447.28	4448.23	51.97	0.54
Alpine	7.4*	5yr		1690.00			7.08			1.92		4450.54	4449.22	4451.32	54.56	0.60
Alpine	7.4*	10yr		3655.00			8.81			2.35		4453.68	4451.36	4454.89	57.70	0.58
Alpine	7.4*	25yr		5736.00			10.03			2.99		4456.03	4453.19	4457.59	72.00	0.63
Alpine	7.4*	50yr		7481.00			11.13			3.56		4457.38	4454.84	4459.30	76.79	0.66
Alpine	7.4*	100yr		10612.00			10.94			3.53		4460.75	4456.94	4462.61	894.80	0.64
Alpine	7.4*	500yr	2286.13	14214.08	323.79	1.44	11.84	0.23	0.71	4.01	1.01	4462.79	4462.79	4464.64	1672.46	0.65
Alpine	7.6*	2yr		428.00			5.05			1.33		4449.25	4448.70	4449.65	42.06	0.63
Alpine	7.6*	5yr		1690.00			9.03			3.09		4451.62	4450.94	4452.89	44.43	0.78
Alpine	7.6*	10yr		3655.00			12.01			4.43		4454.19	4453.38	4456.43	47.00	0.83
Alpine	7.6*	25yr		5736.00			13.65			5.44		4456.47	4455.75	4459.36	56.76	0.88
Alpine	7.6*	50yr		7481.00			15.12			6.50		4457.73	4457.30	4461.29	61.09	0.94
Alpine	7.6*	100yr		10612.00			14.37			6.07		4461.14	4459.89	4464.34	212.21	0.86
Alpine	7.6*	500yr	4104.99	10129.00	2590.01	1.66	9.44	1.44	0.59	2.47	0.70	4464.64	4464.19	4465.49	1838.68	0.50
Alpine	7.8*	2yr		428.00			4.53			1.03		4450.68	4449.91	4451.00	42.29	0.53
Alpine	7.8*	5yr		1690.00			7.76			2.14		4453.51	4452.13	4454.44	45.12	0.62
Alpine	7.8*	10yr		3655.00			10.42			3.13		4456.37	4454.58	4458.05	47.98	0.68

HEC-RAS Plan: Opt D River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	7.8*	25yr		5736.00			12.14			3.89		4458.81	4456.69	4461.10	53.06	0.72
Alpine	7.8*	50yr		7481.00			13.00			4.49		4460.63	4458.30	4463.25	61.55	0.75
Alpine	7.8*	100yr		10612.00			14.56			5.86		4462.86	4461.17	4466.15	664.15	0.83
Alpine	7.8*	500yr	4155.83	10410.64	2257.53	1.73	11.01	1.42	0.66	3.18	0.73	4465.55	4465.55	4466.73	1935.87	0.57
Alpine	7.9	2yr		428.00			5.52			1.64		4451.48	4451.10	4451.96	41.90	0.71
Alpine	7.9	5yr		1690.00			8.69			2.81		4454.19	4453.33	4455.36	44.60	0.73
Alpine	7.9	10yr		3655.00			11.29			3.81		4457.00	4455.78	4458.98	47.41	0.76
Alpine	7.9	25yr		5736.00			13.01			4.40		4459.40	4457.87	4462.03	49.81	0.77
Alpine	7.9	50yr		7481.00			14.09			4.74		4461.18	4459.41	4464.27	51.59	0.77
Alpine	7.9	100yr		10612.00			16.35			6.25		4463.39	4461.84	4467.54	200.46	0.86
Alpine	7.9	500yr	4868.58	9753.51	2201.91	1.67	11.16	1.29	0.60	2.81	0.60	4466.96	4466.96	4468.10	2063.56	0.53
Alpine	7.95		Bridge													
Alpine	8	2yr		428.00			3.86			0.70		4452.27	4451.10	4452.51	42.68	0.42
Alpine	8	5yr		1690.00			6.92			1.62		4455.29	4453.34	4456.03	45.70	0.53
Alpine	8	10yr		3655.00			7.92			1.59		4459.82	4455.78	4460.79	50.23	0.46
Alpine	8	25yr	471.26	5151.86	112.88	0.79	6.99	0.37	0.14	1.17	0.08	4464.81	4457.88	4465.50	1130.58	0.36
Alpine	8	50yr	1934.96	4672.73	873.31	0.76	5.47	0.59	0.13	0.68	0.13	4466.65	4459.41	4466.95	2032.94	0.26
Alpine	8	100yr	4380.15	4222.93	2008.92	0.83	4.27	0.67	0.12	0.40	0.13	4468.75	4461.84	4468.87	2179.70	0.19
Alpine	8	500yr	6552.71	7265.19	3006.11	1.39	7.56	1.12	0.36	1.25	0.39	4468.31	4466.84	4468.71	2152.21	0.34
Alpine	8.33333*	2yr		428.00			4.33			0.92		4452.73	4451.84	4453.02	42.40	0.50
Alpine	8.33333*	5yr		1690.00			7.26			1.82		4455.78	4454.07	4456.60	45.45	0.57
Alpine	8.33333*	10yr		3655.00			8.34			1.81		4460.10	4456.52	4461.18	49.76	0.50
Alpine	8.33333*	25yr		5736.00			8.11			1.67		4464.86	4458.61	4465.88	328.33	0.43
Alpine	8.33333*	50yr	820.55	6102.82	557.64	0.73	7.45	0.57	0.15	1.38	0.15	4466.57	4460.15	4467.28	2021.00	0.37
Alpine	8.33333*	100yr	3332.79	5047.63	2231.57	0.91	5.24	0.72	0.16	0.64	0.17	4468.77	4462.86	4468.98	2302.33	0.24
Alpine	8.33333*	500yr	4797.56	8835.52	3190.92	1.53	9.45	1.20	0.48	2.12	0.50	4468.33	4467.84	4469.07	2271.79	0.44
Alpine	8.66666*	2yr		428.00			4.54			1.03		4453.35		4453.67	42.29	0.54
Alpine	8.66666*	5yr		1690.00			7.49			1.96		4456.35		4457.22	45.29	0.59
Alpine	8.66666*	10yr		3655.00			8.72			2.05		4460.43		4461.62	50.37	0.53
Alpine	8.66666*	25yr		5736.00			8.21			1.80		4465.12		4466.17	64.33	0.44
Alpine	8.66666*	50yr	132.43	7282.84	65.73	0.60	9.21	0.34	0.13	2.24	0.08	4466.53	4461.23	4467.81	1047.22	0.47
Alpine	8.66666*	100yr	2226.27	6400.25	1985.48	1.00	6.80	0.76	0.22	1.16	0.22	4468.75		4469.19	2388.17	0.32
Alpine	8.66666*	500yr	2339.59	12435.04	2049.37	1.65	14.00	1.25	0.68	5.03	0.67	4467.97		4470.23	2253.10	0.68
Alpine	9	2yr		428.00			4.62			1.07		4454.05		4454.38	42.25	0.55
Alpine	9	5yr		1690.00			7.65			2.07		4456.98		4457.89	45.18	0.61
Alpine	9	10yr		3655.00			9.09			2.24		4460.83		4462.11	49.03	0.56
Alpine	9	25yr		5736.00			6.72			1.47		4465.86		4466.57	115.99	0.44
Alpine	9	50yr	35.93	7355.75	89.32	0.35	6.95	0.36	0.05	1.52	0.08	4467.54		4468.28	1120.12	0.42
Alpine	9	100yr	890.96	8504.14	1216.89	0.86	6.95	0.69	0.20	1.46	0.21	4468.85		4469.46	2426.52	0.39

HEC-RAS Plan: Opt D River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	9	500yr	3419.62	8913.49	4490.89	1.17	6.08	0.96	0.28	1.06	0.31	4470.76	4469.11	4471.08	2762.88	0.32
Alpine	9.3		Bridge													
Alpine	9.5	2yr		428.00			3.36			0.50		4455.46	4453.90	4455.63	43.06	0.34
Alpine	9.5	5yr		1690.00			5.93			1.11		4458.97	4456.13	4459.52	46.58	0.42
Alpine	9.5	10yr		3666.00			6.92			1.62		4462.98	4458.59	4463.72	87.98	0.50
Alpine	9.5	25yr		5765.00			6.31			1.31		4466.61	4460.66	4467.23	122.65	0.41
Alpine	9.5	50yr	501.04	6320.14	695.83	0.61	5.43	0.49	0.11	0.91	0.11	4468.60	4463.07	4468.99	2346.70	0.32
Alpine	9.5	100yr	1612.13	6942.41	2101.45	0.87	5.32	0.69	0.17	0.85	0.18	4469.72	4464.91	4470.01	2632.01	0.29
Alpine	9.5	500yr	3804.78	8124.56	4937.65	1.13	5.45	0.93	0.25	0.85	0.28	4471.18	4469.20	4471.41	2788.40	0.28
Alpine	9.56666*	2yr		428.00			4.17			0.84		4455.90		4456.17	42.49	0.47
Alpine	9.56666*	5yr		1690.00			6.57			1.43		4459.39		4460.06	45.99	0.49
Alpine	9.56666*	10yr		3666.00			7.70			1.84		4463.48		4464.40	68.25	0.51
Alpine	9.56666*	25yr		5765.00			8.04			1.87		4466.82		4467.83	75.27	0.46
Alpine	9.56666*	50yr		7348.01	168.99		8.67	0.49		2.12	0.14	4468.53		4469.67	671.93	0.46
Alpine	9.56666*	100yr	53.52	9776.04	826.44	0.57	10.71	0.75	0.13	3.18	0.29	4469.35		4470.98	1597.13	0.56
Alpine	9.56666*	500yr	852.15	11562.33	4452.52	1.24	11.16	1.35	0.40	3.32	0.67	4470.89		4472.23	2112.21	0.55
Alpine	9.63333*	2yr		428.00			4.56			1.04		4456.70		4457.02	42.28	0.54
Alpine	9.63333*	5yr		1690.00			7.10			1.72		4459.98		4460.77	45.57	0.55
Alpine	9.63333*	10yr		3666.00			8.20			1.95		4464.03		4465.07	63.63	0.55
Alpine	9.63333*	25yr		5765.00			8.49			1.98		4467.25		4468.38	81.34	0.52
Alpine	9.63333*	50yr		7418.66	98.34		9.04	0.48		2.16	0.14	4468.95		4470.20	473.61	0.52
Alpine	9.63333*	100yr	0.39	10030.82	624.80	0.23	11.05	0.84	0.03	3.17	0.28	4469.94		4471.73	1054.81	0.61
Alpine	9.63333*	500yr	93.29	13828.04	2945.67	1.00	13.67	1.37	0.32	4.69	0.77	4471.09		4473.48	1601.46	0.72
Alpine	9.7	2yr		428.00			4.63			1.08		4457.69		4458.02	42.25	0.55
Alpine	9.7	5yr		1690.00			7.48			1.96		4460.74		4461.61	45.29	0.59
Alpine	9.7	10yr		3666.00			8.63			2.20		4464.65		4465.81	63.33	0.59
Alpine	9.7	25yr		5765.00			9.02			2.17		4467.74		4469.00	74.63	0.54
Alpine	9.7	50yr		7435.21	81.79		9.55	0.53		2.45	0.17	4469.44		4470.84	391.50	0.57
Alpine	9.7	100yr		9803.83	852.17		10.77	1.06		3.09	0.45	4470.84		4472.50	796.78	0.63
Alpine	9.7	500yr	194.71	10875.46	5796.83	1.02	9.13	1.31	0.27	2.03	0.57	4473.65	4472.49	4474.50	1763.66	0.47
Alpine	9.73		Bridge													
Alpine	9.75	2yr		428.00			3.73			0.64		4458.21	4456.95	4458.43	42.77	0.40
Alpine	9.75	5yr		1690.00			6.58			1.43		4461.41	4459.18	4462.09	45.97	0.49
Alpine	9.75	10yr		3666.00			6.21			1.06		4467.07	4461.64	4467.67	73.49	0.39
Alpine	9.75	25yr		5683.30	81.70		7.21	0.43		1.39	0.11	4469.55	4464.22	4470.35	419.72	0.43
Alpine	9.75	50yr	0.60	6803.72	712.68	0.23	7.17	0.60	0.03	1.35	0.17	4471.22	4465.67	4471.95	1266.62	0.41
Alpine	9.75	100yr	55.20	7790.92	2809.89	0.65	7.07	0.90	0.12	1.25	0.30	4472.75	4467.68	4473.32	1577.38	0.38
Alpine	9.75	500yr	318.72	9601.94	6946.34	0.96	7.51	1.20	0.22	1.34	0.45	4474.52	4472.49	4475.03	1859.66	0.37

HEC-RAS Plan: Opt D River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	9.8*	2yr		428.00			5.08			1.35		4458.51		4458.91	42.05	0.63
Alpine	9.8*	5yr		1690.00			7.63			2.05		4461.66		4462.56	45.20	0.61
Alpine	9.8*	10yr		3666.00			7.03			1.38		4467.16		4467.93	66.61	0.44
Alpine	9.8*	25yr		5651.13	113.87		8.10	0.51		1.76	0.15	4469.65		4470.65	430.18	0.48
Alpine	9.8*	50yr	1.49	6592.06	923.45	0.31	7.84	0.69	0.04	1.62	0.22	4471.34		4472.18	1290.97	0.45
Alpine	9.8*	100yr	69.10	7339.07	3247.83	0.72	7.53	0.98	0.15	1.42	0.35	4472.86		4473.47	1600.48	0.40
Alpine	9.8*	500yr	363.59	8805.11	7698.31	1.02	7.78	1.28	0.24	1.44	0.50	4474.65		4475.15	1861.29	0.38
Alpine	9.9*	2yr		428.00			4.58			1.05		4459.75		4460.08	42.27	0.54
Alpine	9.9*	5yr		1690.00			7.77			2.15		4462.59		4463.53	45.12	0.62
Alpine	9.9*	10yr		3666.00			7.77			1.70		4467.49		4468.43	60.54	0.49
Alpine	9.9*	25yr		5512.79	252.21		8.70	0.67		2.02	0.23	4470.04		4471.16	507.78	0.51
Alpine	9.9*	50yr	7.50	5956.63	1552.88	0.37	7.79	0.82	0.08	1.57	0.28	4471.80		4472.55	1383.71	0.43
Alpine	9.9*	100yr	80.06	6600.36	3975.58	0.61	7.58	1.04	0.17	1.43	0.38	4473.20		4473.76	1667.48	0.39
Alpine	9.9*	500yr	340.04	7816.16	8710.81	0.82	7.79	1.33	0.26	1.44	0.53	4474.94		4475.39	1872.04	0.38
Alpine	10	2yr		428.00			4.62			1.07		4460.74	4460.01	4461.07	42.25	0.55
Alpine	10	5yr		1690.00			7.81			2.18		4463.57	4462.23	4464.52	45.08	0.63
Alpine	10	10yr		3666.00			8.54			2.05		4467.90	4464.70	4469.04	54.51	0.54
Alpine	10	25yr		5765.00			10.25			2.75		4470.28	4466.98	4471.91	556.00	0.59
Alpine	10	50yr	21.06	5255.16	2240.78	0.46	7.64	0.89	0.11	1.48	0.31	4472.26	4468.44	4472.90	1509.01	0.41
Alpine	10	100yr	113.11	5805.99	4736.89	0.65	7.55	1.07	0.18	1.38	0.39	4473.54	4472.27	4474.03	1799.94	0.38
Alpine	10	500yr	401.52	6766.05	9699.43	0.84	7.70	1.32	0.26	1.38	0.51	4475.24	4473.36	4475.63	2031.25	0.37
Alpine	10.3333*	2yr		428.00			4.64			1.08		4461.63	4460.91	4461.97	42.24	0.55
Alpine	10.3333*	5yr		1690.00			7.84			2.19		4464.46	4463.14	4465.41	45.06	0.63
Alpine	10.3333*	10yr		3666.00			8.89			2.29		4468.41	4465.67	4469.63	54.30	0.57
Alpine	10.3333*	25yr		5765.00			10.38			2.88		4470.88	4467.77	4472.55	206.99	0.61
Alpine	10.3333*	50yr		7517.00			12.78			4.33		4471.41	4469.33	4473.94	384.64	0.74
Alpine	10.3333*	100yr		10656.00			17.42			8.07		4471.77	4471.77	4476.48	518.91	1.01
Alpine	10.3333*	500yr	148.03	9978.49	6740.48	0.87	11.80	1.74	0.37	3.50	1.02	4474.94	4474.76	4476.24	1649.91	0.62
Alpine	10.6666*	2yr		428.00			4.63			1.08		4462.54	4461.80	4462.87	42.25	0.55
Alpine	10.6666*	5yr		1690.00			7.85			2.20		4465.35	4464.03	4466.31	45.06	0.63
Alpine	10.6666*	10yr		3666.00			8.93			2.38		4469.03	4466.62	4470.27	56.54	0.58
Alpine	10.6666*	25yr		5765.00			10.25			2.94		4471.59	4468.57	4473.22	62.62	0.60
Alpine	10.6666*	50yr		7517.00			11.71			3.78		4472.81	4470.03	4474.94	189.70	0.67
Alpine	10.6666*	100yr	303.47	5449.05	4903.48	0.55	5.13	0.91	0.12	0.67	0.25	4477.90	4472.40	4478.11	1756.57	0.26
Alpine	10.6666*	500yr	84.27	11020.62	5762.11	0.69	12.11	1.82	0.27	3.91	1.15	4476.17	4476.17	4477.68	1493.92	0.66
Alpine	11	2yr		428.00			4.63			1.08		4463.44	4462.70	4463.77	42.25	0.55
Alpine	11	5yr		1690.00			7.51			2.10		4466.39	4464.93	4467.27	54.66	0.65
Alpine	11	10yr		3666.00			8.57			2.30		4469.83	4467.49	4470.97	63.76	0.58
Alpine	11	25yr		5765.00			9.52			2.62		4472.50	4469.39	4473.91	68.92	0.57

HEC-RAS Plan: Opt D River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	11	50yr		7517.00			10.52			3.08		4474.06	4470.71	4475.77	177.45	0.59
Alpine	11	100yr	78.66	7140.39	3436.95	0.43	6.87	1.09	0.10	1.28	0.40	4477.91	4472.78	4478.41	1467.08	0.38
Alpine	11	500yr	38.23	11973.92	4854.85	0.48	12.00	1.80	0.16	3.97	1.14	4477.50	4477.50	4479.10	1411.04	0.67
Alpine	11.3		Bridge													
Alpine	11.4	2yr		427.00			3.54			0.57		4464.52	4463.12	4464.71	42.91	0.37
Alpine	11.4	5yr		1691.00			5.80			1.16		4467.93	4465.35	4468.45	56.66	0.45
Alpine	11.4	10yr		3670.00			7.34			1.64		4471.23	4467.82	4472.07	66.47	0.47
Alpine	11.4	25yr		5777.00			8.66			2.14		4473.66	4469.73	4474.83	71.16	0.50
Alpine	11.4	50yr		7534.00			9.70			2.60		4475.17	4471.03	4476.63	875.97	0.53
Alpine	11.4	100yr	171.92	6570.87	3932.21	0.52	6.11	1.04	0.12	1.01	0.35	4478.46	4473.08	4478.82	1543.32	0.33
Alpine	11.4	500yr	550.97	9209.61	7126.42	0.87	7.86	1.45	0.29	1.63	0.63	4479.42	4477.54	4479.96	1673.73	0.41
Alpine	11.4333*	2yr		427.00			3.09			0.45		4464.75	4463.37	4464.90	52.69	0.34
Alpine	11.4333*	5yr		1691.00			5.02			0.87		4468.28	4465.30	4468.67	62.51	0.38
Alpine	11.4333*	10yr		3670.00			6.39			1.26		4471.68	4467.59	4472.31	74.77	0.41
Alpine	11.4333*	25yr		5777.00			7.46			1.59		4474.25	4469.44	4475.11	81.63	0.43
Alpine	11.4333*	50yr		7534.00			8.18			1.89		4475.94	4470.68	4476.97	900.31	0.46
Alpine	11.4333*	100yr	94.16	7492.11	3088.73	0.43	6.28	0.99	0.09	1.07	0.32	4478.52	4472.66	4478.95	1424.66	0.34
Alpine	11.4333*	500yr	402.30	10572.15	5912.54	0.80	8.12	1.41	0.26	1.74	0.61	4479.50	4476.21	4480.15	1546.26	0.42
Alpine	11.4666*	2yr		427.00			3.47			0.60		4464.91	4463.82	4465.10	52.40	0.40
Alpine	11.4666*	5yr		1691.00			5.38			1.04		4468.42	4465.75	4468.87	65.91	0.43
Alpine	11.4666*	10yr		3670.00			6.41			1.30		4471.84	4467.86	4472.48	82.73	0.43
Alpine	11.4666*	25yr		5777.00			7.18			1.52		4474.48	4470.00	4475.28	94.76	0.43
Alpine	11.4666*	50yr		7534.00			7.65			1.67		4476.26	4471.18	4477.17	853.80	0.45
Alpine	11.4666*	100yr	39.36	8181.88	2453.76	0.33	6.53	0.97	0.06	1.16	0.32	4478.56	4473.06	4479.07	1300.17	0.36
Alpine	11.4666*	500yr	282.10	11639.76	4965.14	0.74	8.47	1.42	0.24	1.90	0.63	4479.56	4476.26	4480.34	1413.04	0.44
Alpine	11.5	2yr		427.00			3.81			0.75		4465.15	4464.26	4465.38	52.19	0.46
Alpine	11.5	5yr		1691.00			5.66			1.16		4468.61	4466.20	4469.10	64.34	0.46
Alpine	11.5	10yr		3670.00			6.45			1.35		4472.03	4468.30	4472.67	91.37	0.46
Alpine	11.5	25yr		5777.00			6.89			1.43		4474.72	4470.50	4475.46	108.64	0.44
Alpine	11.5	50yr		7534.00			7.20			1.49		4476.54	4471.68	4477.34	784.18	0.43
Alpine	11.5	100yr	5.01	9009.98	1660.01	0.16	6.90	0.84	0.02	1.31	0.33	4478.59	4473.46	4479.22	1166.05	0.39
Alpine	11.5	500yr	165.96	13125.51	3595.53	0.65	9.16	1.28	0.22	2.23	0.70	4479.56	4476.28	4480.58	1272.74	0.49
Alpine	11.5666*	2yr		427.00			4.24			0.96		4466.00		4466.27	51.98	0.54
Alpine	11.5666*	5yr		1691.00			6.28			1.44		4469.14		4469.75	56.02	0.50
Alpine	11.5666*	10yr		3670.00			7.42			1.82		4472.44		4473.30	81.27	0.53
Alpine	11.5666*	25yr		5777.00			7.94			1.93		4475.03		4476.01	97.39	0.51
Alpine	11.5666*	50yr		7534.00			8.31			2.02		4476.79		4477.86	105.36	0.50
Alpine	11.5666*	100yr		10317.13	357.87		9.51	0.57		2.52	0.22	4478.46		4479.81	893.28	0.53
Alpine	11.5666*	500yr	0.31	15735.60	1151.09	0.20	13.79	1.09	0.05	5.20	0.70	4478.98		4481.73	941.05	0.75

HEC-RAS Plan: Opt D River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	11.6333*	2yr		427.00			4.25			0.97		4467.06		4467.34	51.97	0.54
Alpine	11.6333*	5yr		1691.00			6.78			1.73		4469.85		4470.56	54.76	0.56
Alpine	11.6333*	10yr		3670.00			8.13			2.17		4473.08		4474.10	73.28	0.58
Alpine	11.6333*	25yr		5777.00			8.98			2.44		4475.52		4476.78	80.86	0.56
Alpine	11.6333*	50yr		7534.00			9.67			2.69		4477.19		4478.64	82.78	0.56
Alpine	11.6333*	100yr		10565.40	109.60		11.60	0.58		3.71	0.25	4478.76	4475.69	4480.83	391.80	0.62
Alpine	11.6333*	500yr	79.33	14829.57	1978.11	0.94	13.30	1.20	0.44	4.56	0.75	4481.21	4481.21	4483.62	1046.69	0.64
Alpine	11.7	2yr		427.00			5.04			1.32		4468.22	4467.67	4468.62	42.06	0.63
Alpine	11.7	5yr		1691.00			8.67			2.86		4470.75	4469.91	4471.92	46.63	0.75
Alpine	11.7	10yr		3670.00			10.28			3.50		4473.78	4472.50	4475.42	56.69	0.72
Alpine	11.7	25yr		5777.00			11.94			4.37		4475.98	4474.34	4478.19	58.41	0.73
Alpine	11.7	50yr		7534.00			13.15			5.09		4477.49	4475.68	4480.17	59.58	0.75
Alpine	11.7	100yr		10664.49	10.51		16.20	0.67		7.45	0.38	4478.91	4477.84	4482.98	211.33	0.86
Alpine	11.7	500yr	135.55	13917.63	2833.81	1.50	15.63	1.67	0.96	6.27	1.03	4482.78	4482.78	4485.92	999.98	0.72
Alpine	11.9		Bridge													
Alpine	12	2yr		427.00			3.00			0.38		4470.07	4468.17	4470.21	43.41	0.29
Alpine	12	5yr		1691.00			4.94			0.83		4473.90	4470.45	4474.28	56.79	0.35
Alpine	12	10yr		3670.00			6.76			1.38		4477.36	4472.88	4478.07	59.48	0.39
Alpine	12	25yr	22.46	5090.06	664.48	0.51	6.34	0.65	0.13	1.08	0.21	4481.70	4474.72	4482.25	583.89	0.31
Alpine	12	50yr	92.06	5823.85	1618.09	0.69	6.36	0.66	0.19	1.04	0.21	4483.56	4476.10	4484.05	1138.16	0.29
Alpine	12	100yr	152.55	7828.83	2693.63	0.94	8.32	0.93	0.34	1.76	0.39	4484.00	4478.24	4484.79	1183.63	0.37
Alpine	12	500yr	377.18	9104.80	7405.02	0.85	8.28	1.30	0.28	1.65	0.61	4486.64	4483.99	4487.23	1309.47	0.34
Alpine	12.5	2yr		427.00			3.32			0.49		4470.18	4468.58	4470.35	43.10	0.34
Alpine	12.5	5yr		1691.00			5.64			0.98		4473.98	4470.82	4474.48	46.91	0.39
Alpine	12.5	10yr		3675.00			7.68			1.60		4477.42	4473.29	4478.33	56.03	0.46
Alpine	12.5	25yr		5790.00			7.94			1.51		4481.59	4475.53	4482.57	391.75	0.41
Alpine	12.5	50yr		6522.28	1027.72		7.67	0.70		1.36	0.23	4483.50	4477.07	4484.29	925.89	0.38
Alpine	12.5	100yr		8871.61	1823.39		10.13	1.01		2.38	0.46	4483.88	4479.46	4485.20	1007.10	0.50
Alpine	12.5	500yr	201.48	9885.12	6819.40	1.15	9.20	1.46	0.30	1.88	0.71	4486.65	4484.93	4487.44	1210.26	0.42
Alpine	12.5666*	2yr		427.00			3.83			0.69		4470.40	4469.22	4470.63	42.69	0.42
Alpine	12.5666*	5yr		1691.00			6.05			1.18		4474.18	4471.45	4474.74	47.39	0.44
Alpine	12.5666*	10yr		3675.00			7.74			1.71		4477.70	4473.92	4478.63	61.89	0.49
Alpine	12.5666*	25yr		5790.00			7.56			1.51		4481.90	4476.24	4482.79	313.13	0.43
Alpine	12.5666*	50yr		6983.51	566.49		7.74	0.71		1.52	0.25	4483.63	4477.76	4484.49	610.85	0.40
Alpine	12.5666*	100yr		9661.33	1033.67		10.31	0.98		2.67	0.45	4484.07	4479.99	4485.56	731.29	0.53
Alpine	12.5666*	500yr	36.70	12540.09	4329.22	0.75	11.15	1.51	0.18	2.96	0.85	4486.44	4485.06	4487.88	1035.63	0.52
Alpine	12.6333*	2yr		427.00			4.25			0.88		4470.78	4469.85	4471.06	42.44	0.49
Alpine	12.6333*	5yr		1691.00			6.40			1.38		4474.46	4472.08	4475.09	50.21	0.49

HEC-RAS Plan: Opt D River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	12.6333*	10yr		3675.00			7.14			1.62		4478.21	4474.79	4479.01	85.64	0.51
Alpine	12.6333*	25yr		5790.00			6.64			1.21		4482.36	4477.04	4483.04	190.90	0.37
Alpine	12.6333*	50yr		7313.12	236.88		7.27	0.51		1.40	0.15	4483.90	4478.39	4484.70	557.73	0.38
Alpine	12.6333*	100yr		9927.67	767.33		9.23	0.89		2.20	0.37	4484.71	4480.04	4485.94	594.55	0.46
Alpine	12.6333*	500yr	0.36	13875.49	3030.15	0.20	11.11	1.56	0.02	3.06	0.90	4486.69	4484.73	4488.27	691.60	0.52
Alpine	12.7	2yr		427.00			4.50			1.01		4471.29		4471.60	42.31	0.53
Alpine	12.7	5yr		1691.00			5.95			1.43		4475.03		4475.58	93.02	0.60
Alpine	12.7	10yr		3675.00			5.73			1.04		4478.85		4479.36	93.77	0.39
Alpine	12.7	25yr		5790.00			5.76			0.92		4482.73		4483.24	94.53	0.31
Alpine	12.7	50yr		7462.71	87.29		6.49	0.35		1.13	0.08	4484.25		4484.90	465.27	0.33
Alpine	12.7	100yr		10229.69	465.31		8.23	0.75		1.77	0.27	4485.23		4486.23	488.07	0.40
Alpine	12.7	500yr		14964.39	1941.61		10.58	1.41		2.82	0.75	4487.04		4488.58	530.60	0.48
Alpine	12.9		Culvert													
Alpine	13	2yr		427.00			6.94			2.82		4470.99	4470.99	4471.74	41.51	1.00
Alpine	13	5yr		1691.00			6.31			1.65		4475.10	4473.22	4475.72	93.04	0.65
Alpine	13	10yr		3675.00			5.77			1.06		4479.05	4475.83	4479.56	93.81	0.39
Alpine	13	25yr		5790.00			5.75			0.92		4482.98	4477.15	4483.50	94.58	0.31
Alpine	13	50yr		7426.77	123.23		6.50	0.40		1.14	0.10	4484.41	4478.08	4485.05	468.85	0.33
Alpine	13	100yr		10148.16	546.84		8.21	0.80		1.78	0.29	4485.39	4479.61	4486.38	491.91	0.40
Alpine	13	500yr		14887.56	2018.44		10.66	1.45		2.89	0.79	4487.09	4482.27	4488.65	531.64	0.49
Alpine	13.25*	2yr		427.00			4.48			1.00		4472.17		4472.49	42.32	0.53
Alpine	13.25*	5yr		1691.00			7.19			1.78		4475.36		4476.16	45.50	0.56
Alpine	13.25*	10yr		3678.00			7.74			1.97		4479.03		4479.95	87.60	0.59
Alpine	13.25*	25yr		5796.00			6.66			1.28		4482.99		4483.68	103.12	0.40
Alpine	13.25*	50yr		7429.88	128.12		7.29	0.45		1.46	0.13	4484.42		4485.24	469.12	0.41
Alpine	13.25*	100yr		10111.94	592.06		9.00	0.89		2.16	0.39	4485.44		4486.62	492.89	0.48
Alpine	13.25*	500yr		14753.52	2162.48		11.29	1.56		3.25	0.98	4487.20		4488.93	533.10	0.56
Alpine	13.5	2yr		427.00			4.56			1.04		4472.52	4471.75	4472.84	42.28	0.54
Alpine	13.5	5yr		1691.00			7.35			1.88		4475.63	4473.98	4476.47	45.38	0.58
Alpine	13.5	10yr		3678.00			8.86			2.40		4479.12	4476.47	4480.34	64.46	0.62
Alpine	13.5	25yr		5796.00			8.13			1.91		4482.91	4478.92	4483.94	92.64	0.52
Alpine	13.5	50yr		7448.46	109.54		8.74	0.49		2.16	0.18	4484.33	4480.48	4485.50	457.48	0.54
Alpine	13.5	100yr		10089.07	614.93		10.53	1.04		3.05	0.59	4485.34	4482.57	4486.97	485.00	0.62
Alpine	13.5	500yr	0.53	14507.42	2408.06	0.24	12.44	1.79	0.07	4.07	1.39	4487.22	4486.32	4489.29	546.98	0.68
Alpine	13.75*	2yr		427.00			4.59			1.06		4472.88	4472.13	4473.21	42.26	0.55
Alpine	13.75*	5yr		1691.00			7.47			1.95		4475.93	4474.37	4476.79	45.31	0.59
Alpine	13.75*	10yr		3678.00			9.18			2.51		4479.38	4476.85	4480.69	57.86	0.61
Alpine	13.75*	25yr		5796.00			9.01			2.27		4483.01	4479.17	4484.27	80.57	0.56
Alpine	13.75*	50yr		7558.00			9.91			2.73		4484.39	4480.70	4485.91	91.96	0.61

HEC-RAS Plan: Opt D River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	13.75*	100yr		10704.00			12.68			4.44		4485.24	4483.25	4487.74	99.00	0.77
Alpine	13.75*	500yr		16916.00			17.02			7.83		4486.68	4486.68	4491.18	108.74	0.99
Alpine	14	2yr		427.00			4.61			1.07		4473.25	4472.51	4473.58	42.25	0.55
Alpine	14	5yr		1691.00			7.43			2.01		4476.28	4474.75	4477.14	49.53	0.61
Alpine	14	10yr		3678.00			8.35			2.14		4479.96	4477.35	4481.04	65.73	0.57
Alpine	14	25yr		5796.00			8.43			1.93		4483.41	4479.39	4484.52	77.05	0.50
Alpine	14	50yr		7558.00			9.50			2.36		4484.78	4480.75	4486.18	81.53	0.54
Alpine	14	100yr		10704.00			12.02			3.66		4485.92	4482.84	4488.16	84.12	0.65
Alpine	14	500yr		16916.00			15.38			5.87		4488.29	4486.08	4491.96	96.32	0.80
Alpine	14.3		Bridge													
Alpine	14.5	2yr		427.00			3.80			0.67		4473.71	4472.51	4473.94	42.72	0.41
Alpine	14.5	5yr		1691.00			6.27			1.37		4477.10	4474.75	4477.71	53.31	0.49
Alpine	14.5	10yr		3681.00			7.45			1.65		4480.76	4477.35	4481.62	68.35	0.49
Alpine	14.5	25yr		5806.00			7.86			1.65		4484.06	4479.40	4485.02	79.18	0.45
Alpine	14.5	50yr		7570.00			8.75			1.96		4485.61	4480.74	4486.80	83.87	0.48
Alpine	14.5	100yr		10719.00			10.45			2.70		4487.49	4482.82	4489.19	90.08	0.55
Alpine	14.5	500yr		16671.97	258.03		11.83	0.70		3.44	0.31	4491.17	4486.06	4493.31	505.15	0.60
Alpine	14.6666*	2yr		427.00			4.29			0.90		4474.02		4474.31	42.41	0.49
Alpine	14.6666*	5yr		1691.00			6.85			1.58		4477.36		4478.09	45.75	0.52
Alpine	14.6666*	10yr		3681.00			8.55			2.12		4480.92		4482.06	59.00	0.56
Alpine	14.6666*	25yr		5806.00			9.09			2.18		4484.14		4485.43	69.97	0.53
Alpine	14.6666*	50yr		7570.00			10.09			2.60		4485.68		4487.26	75.55	0.56
Alpine	14.6666*	100yr		10719.00			11.81			3.56		4487.60		4489.76	88.52	0.65
Alpine	14.6666*	500yr	51.71	15665.25	1213.03	0.66	12.21	1.05	0.29	3.53	0.58	4491.50		4493.64	813.47	0.59
Alpine	14.8333*	2yr		427.00			4.62			1.07		4474.47		4474.80	42.25	0.55
Alpine	14.8333*	5yr		1691.00			7.22			1.80		4477.70		4478.51	45.48	0.56
Alpine	14.8333*	10yr		3681.00			9.23			2.34		4481.18		4482.50	49.76	0.57
Alpine	14.8333*	25yr		5806.00			10.15			2.63		4484.30		4485.90	61.03	0.58
Alpine	14.8333*	50yr		7570.00			11.19			3.23		4485.86		4487.81	72.01	0.64
Alpine	14.8333*	100yr	0.08	10694.71	24.20	0.21	12.92	0.76	0.05	4.19	0.20	4487.83	4485.05	4490.42	160.88	0.70
Alpine	14.8333*	500yr	506.66	9927.00	6496.34	0.74	7.68	1.61	0.20	1.27	0.40	4493.73		4494.28	1317.00	0.33
Alpine	15	2yr		427.00			4.76			1.15		4475.01		4475.37	42.18	0.58
Alpine	15	5yr		1691.00			7.53			1.99		4478.10		4478.98	45.27	0.60
Alpine	15	10yr		3681.00			9.56			2.53		4481.51		4482.93	48.68	0.60
Alpine	15	25yr		5806.00			10.77			2.85		4484.56		4486.36	54.84	0.61
Alpine	15	50yr	0.63	7532.64	36.72	0.36	11.92	0.83	0.10	3.43	0.22	4486.15		4488.34	149.00	0.65
Alpine	15	100yr	201.87	7821.64	2695.49	0.94	8.90	1.29	0.32	1.72	0.33	4490.26		4491.17	1084.37	0.41
Alpine	15	500yr	725.32	7328.90	8875.78	0.68	6.60	1.44	0.16	0.87	0.31	4494.11		4494.42	1622.83	0.27

HEC-RAS Plan: Opt D River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	15.05		Bridge													
Alpine	15.1	2yr		419.00			3.71			0.64		4475.56	4474.32	4475.77	42.73	0.40
Alpine	15.1	5yr		1699.00			4.54			0.58		4481.28	4476.58	4481.60	48.46	0.29
Alpine	15.1	10yr		3811.00			6.95			1.19		4484.73	4479.19	4485.48	55.99	0.39
Alpine	15.1	25yr	18.45	5848.76	277.79	0.53	8.14	0.74	0.14	1.53	0.15	4487.59	4481.49	4488.57	506.89	0.41
Alpine	15.1	50yr	134.58	6004.70	1867.72	0.71	6.96	1.02	0.19	1.06	0.20	4489.98	4483.11	4490.55	980.32	0.32
Alpine	15.1	100yr	260.54	7025.77	3953.69	0.76	7.47	1.28	0.21	1.18	0.29	4491.30	4488.60	4491.85	1210.64	0.33
Alpine	15.1	500yr	811.57	7302.37	9333.06	0.69	6.48	1.44	0.16	0.84	0.30	4494.40	4490.77	4494.69	1658.00	0.26
Alpine	15.1666*	2yr		419.00			5.38			1.55		4475.79		4476.24	41.90	0.69
Alpine	15.1666*	5yr		1699.00			5.23			0.82		4481.32		4481.75	47.43	0.35
Alpine	15.1666*	10yr		3811.00			7.70			1.46		4484.78		4485.70	50.89	0.44
Alpine	15.1666*	25yr	0.04	6120.46	24.50	0.17	9.38	0.65	0.02	2.12	0.13	4487.56		4488.92	133.42	0.51
Alpine	15.1666*	50yr	32.47	7384.13	590.40	0.70	9.39	0.98	0.20	2.00	0.23	4489.74		4491.00	604.07	0.46
Alpine	15.1666*	100yr	120.20	9226.15	1893.65	1.02	10.72	1.43	0.36	2.52	0.42	4490.95		4492.42	828.80	0.50
Alpine	15.1666*	500yr	561.53	9285.98	7599.49	0.92	8.72	1.70	0.26	1.55	0.46	4494.28		4494.93	1400.73	0.37
Alpine	15.3333*	2yr		419.00			4.65			1.10		4477.14		4477.48	42.20	0.56
Alpine	15.3333*	5yr		1699.00			5.93			1.11		4481.56		4482.11	46.62	0.42
Alpine	15.3333*	10yr		3811.00			8.35			1.78		4485.08		4486.16	50.13	0.49
Alpine	15.3333*	25yr		6145.00	0.00		10.08	0.06		2.48	0.01	4487.93		4489.51	63.32	0.56
Alpine	15.3333*	50yr	1.34	7924.23	81.43	0.46	10.85	0.69	0.12	2.75	0.27	4489.88		4491.69	198.34	0.56
Alpine	15.3333*	100yr	12.32	10950.54	277.14	0.77	13.96	0.85	0.28	4.44	0.41	4490.74	4488.08	4493.69	438.66	0.70
Alpine	15.3333*	500yr	255.95	14213.75	2977.31	1.37	14.82	1.44	0.64	4.68	0.87	4493.53		4496.32	1079.42	0.67
Alpine	15.5	2yr		419.00			4.78			1.18		4478.14		4478.50	42.13	0.58
Alpine	15.5	5yr		1699.00			6.67			1.48		4481.94		4482.63	45.93	0.50
Alpine	15.5	10yr		3811.00			9.00			2.14		4485.48		4486.73	49.47	0.54
Alpine	15.5	25yr		6145.00			10.71			2.76		4488.40		4490.18	56.59	0.59
Alpine	15.5	50yr		7993.75	13.25		11.58	0.52		3.19	0.19	4490.32		4492.39	113.09	0.62
Alpine	15.5	100yr	0.76	11124.17	115.07	0.53	14.63	0.97	0.17	4.96	0.52	4491.41	4489.16	4494.70	187.50	0.75
Alpine	15.5	500yr	251.09	14098.44	3097.47	1.23	13.92	1.38	0.52	4.08	0.78	4495.36	4495.36	4497.80	1105.43	0.62
Alpine	15.55		Bridge													
Alpine	15.6	2yr		419.00			3.73			0.65		4478.72	4477.50	4478.94	42.71	0.41
Alpine	15.6	5yr		1699.00			4.62			0.60		4484.34	4479.76	4484.67	48.33	0.29
Alpine	15.6	10yr		3811.00			7.01			1.17		4487.85	4482.37	4488.61	52.44	0.38
Alpine	15.6	25yr	0.02	6112.36	32.63	0.13	8.37	0.47	0.02	1.65	0.13	4490.94	4484.67	4492.03	157.94	0.44
Alpine	15.6	50yr	11.63	7688.65	306.72	0.51	9.02	0.61	0.12	1.82	0.20	4492.85	4486.27	4494.06	527.12	0.44
Alpine	15.6	100yr	152.40	9176.81	1910.79	0.79	9.12	0.89	0.22	1.75	0.33	4495.26	4489.16	4496.31	1091.05	0.41
Alpine	15.6	500yr	736.43	10548.59	6161.98	0.93	8.86	1.21	0.26	1.56	0.49	4498.14	4495.36	4498.89	1475.14	0.36
Alpine	15.75*	2yr		419.00			5.66			1.75		4479.26		4479.76	41.81	0.75

HEC-RAS Plan: Opt D River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	15.75*	5yr		1699.00			5.58			0.96		4484.45		4484.93	46.99	0.39
Alpine	15.75*	10yr		3811.00			7.99			1.60		4487.99		4488.98	50.72	0.46
Alpine	15.75*	25yr		6135.35	9.65		9.30	0.43		2.13	0.13	4491.12		4492.46	107.62	0.51
Alpine	15.75*	50yr	2.12	7878.10	126.78	0.45	10.11	0.55	0.11	2.40	0.19	4492.96		4494.52	377.37	0.51
Alpine	15.75*	100yr	88.91	9826.94	1324.14	0.84	10.58	0.92	0.26	2.48	0.39	4495.26		4496.79	937.65	0.49
Alpine	15.75*	500yr	618.49	11341.14	5487.37	1.10	10.15	1.30	0.37	2.15	0.60	4498.16		4499.21	1379.27	0.43
Alpine	16.*	2yr		419.00			4.53			1.03		4481.15		4481.47	42.25	0.54
Alpine	16.*	5yr		1699.00			6.64			1.46		4484.85		4485.54	45.95	0.50
Alpine	16.*	10yr		3811.00			8.94			2.12		4488.42		4489.66	50.42	0.54
Alpine	16.*	25yr		6141.00	4.00		10.05	0.39		2.48	0.12	4491.63		4493.20	91.06	0.57
Alpine	16.*	50yr	0.29	7903.72	102.99	0.32	10.84	0.78	0.07	2.74	0.33	4493.44		4495.24	190.92	0.58
Alpine	16.*	100yr	51.05	10209.74	979.21	0.82	11.77	0.96	0.27	3.05	0.44	4495.54		4497.49	780.98	0.57
Alpine	16.*	500yr	485.81	12159.80	4801.39	1.19	11.59	1.39	0.45	2.78	0.71	4498.28		4499.74	1286.71	0.51
Alpine	16.25*	2yr		419.00			4.81			1.19		4482.46		4482.82	42.12	0.59
Alpine	16.25*	5yr		1699.00			7.52			1.98		4485.64		4486.52	45.30	0.59
Alpine	16.25*	10yr		3811.00			9.69			2.62		4489.17		4490.62	51.17	0.62
Alpine	16.25*	25yr		6141.88	3.12		10.62	0.41		2.87	0.13	4492.36		4494.11	86.27	0.62
Alpine	16.25*	50yr	0.00	7913.26	93.73	0.07	11.39	0.89		3.14	0.42	4494.13		4496.13	157.21	0.62
Alpine	16.25*	100yr	36.59	10365.89	837.52	0.80	12.51	0.98	0.28	3.57	0.48	4496.12		4498.37	737.98	0.63
Alpine	16.25*	500yr	418.48	12611.86	4416.66	1.28	12.62	1.47	0.53	3.41	0.82	4498.66		4500.46	1229.91	0.58
Alpine	16.5	2yr		419.00			4.79			1.18		4483.92		4484.28	42.13	0.59
Alpine	16.5	5yr		1699.00			8.01			2.30		4486.78		4487.78	44.99	0.65
Alpine	16.5	10yr		3811.00			10.16			2.99		4490.17		4491.78	52.62	0.67
Alpine	16.5	25yr		6140.57	4.43		11.02	0.48		3.18	0.17	4493.27		4495.15	87.66	0.66
Alpine	16.5	50yr		7912.02	94.98		11.79	0.96		3.46	0.38	4494.98		4497.11	173.34	0.66
Alpine	16.5	100yr	33.44	10379.37	827.19	0.79	12.92	1.01	0.28	3.92	0.52	4496.92		4499.31	738.15	0.66
Alpine	16.5	500yr	384.97	12820.40	4241.63	1.36	13.34	1.54	0.61	3.93	0.93	4499.23		4501.27	1185.95	0.63
Alpine	16.7		Bridge													
Alpine	17	2yr		419.00			4.54			1.04		4484.60	4483.85	4484.92	42.24	0.54
Alpine	17	5yr		1699.00			7.70			2.09		4487.54	4486.12	4488.46	45.18	0.61
Alpine	17	10yr		3811.00			9.76			2.76		4490.96	4488.78	4492.44	54.70	0.64
Alpine	17	25yr	0.14	6038.29	106.57	0.22	8.87	0.51	0.04	1.97	0.16	4495.52	4491.18	4496.72	360.96	0.50
Alpine	17	50yr		7890.27	116.73		12.07	1.00		3.69	0.34	4495.12	4492.84	4497.35	220.76	0.69
Alpine	17	100yr	330.66	7585.45	3323.89	0.86	7.78	0.99	0.20	1.34	0.37	4499.83	4496.88	4500.47	1276.02	0.36
Alpine	17	500yr	1015.77	9477.08	6954.14	1.10	8.61	1.33	0.34	1.58	0.57	4501.66	4499.28	4502.30	1401.80	0.38
Alpine	17.05*	2yr		419.00			4.79			1.18		4485.58		4485.94	42.13	0.59
Alpine	17.05*	5yr		1699.00			8.01			2.30		4488.44		4489.44	44.99	0.65
Alpine	17.05*	10yr		3811.00			10.09			3.02		4491.79		4493.37	57.14	0.69
Alpine	17.05*	25yr		6095.21	49.79		9.30	0.76		2.23	0.29	4495.91		4497.24	137.64	0.55

HEC-RAS Plan: Opt D River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	17.05*	50yr		7939.53	67.47		12.07	1.00		3.76	0.49	4495.94		4498.19	138.80	0.71
Alpine	17.05*	100yr	218.75	9066.13	1955.12	0.96	9.63	1.04	0.31	2.12	0.41	4499.82		4500.98	1076.16	0.47
Alpine	17.05*	500yr	560.44	11533.92	5352.64	0.97	10.73	1.49	0.31	2.52	0.71	4501.64		4502.83	1411.59	0.49
Alpine	17.1*	2yr		419.00			4.77			1.17		4486.67		4487.02	42.14	0.58
Alpine	17.1*	5yr		1699.00			8.14			2.40		4489.45		4490.48	44.91	0.67
Alpine	17.1*	10yr		3811.00			10.18			3.12		4492.76		4494.37	60.42	0.72
Alpine	17.1*	25yr		6133.08	11.92		9.73	0.59		2.51	0.19	4496.38		4497.84	114.20	0.60
Alpine	17.1*	50yr		7969.30	37.70		11.94	0.91		3.71	0.39	4496.86		4499.06	129.19	0.72
Alpine	17.1*	100yr	89.82	10436.36	713.82	0.96	11.76	1.01	0.34	3.28	0.42	4499.67		4501.66	715.77	0.61
Alpine	17.1*	500yr	416.32	14304.77	2725.91	1.51	14.27	1.59	0.71	4.64	0.87	4501.14		4503.74	1042.07	0.70
Alpine	17.15*	2yr		419.00			4.79			1.18		4487.74		4488.10	42.13	0.58
Alpine	17.15*	5yr		1699.00			8.18			2.42		4490.50		4491.54	44.89	0.67
Alpine	17.15*	10yr		3811.00			10.04			3.06		4493.86		4495.43	65.21	0.73
Alpine	17.15*	25yr		6144.60	0.40		10.04	0.27		2.73	0.05	4497.00		4498.56	92.49	0.65
Alpine	17.15*	50yr		7988.55	18.45		11.76	0.79		3.63	0.29	4497.82		4499.96	122.58	0.72
Alpine	17.15*	100yr	44.77	10911.72	283.50	0.90	12.52	1.02	0.31	3.79	0.40	4500.13	4498.07	4502.50	427.60	0.68
Alpine	17.15*	500yr	281.78	15755.31	1409.91	1.57	16.01	1.58	0.79	5.95	0.84	4501.49		4505.08	806.19	0.82
Alpine	17.2	2yr		419.00			4.80			1.19		4488.83		4489.18	42.13	0.59
Alpine	17.2	5yr		1699.00			8.21			2.45		4491.58		4492.62	44.88	0.67
Alpine	17.2	10yr		3811.00			9.82			2.94		4495.02		4496.51	69.27	0.73
Alpine	17.2	25yr		6145.00			10.29			2.91		4497.74		4499.38	84.60	0.68
Alpine	17.2	50yr		8001.46	5.54		11.63	0.58		3.58	0.17	4498.78		4500.88	117.14	0.73
Alpine	17.2	100yr	27.78	11033.34	178.88	0.87	12.68	1.43	0.30	3.93	0.62	4500.85	4499.05	4503.30	225.03	0.71
Alpine	17.2	500yr	555.55	14847.61	2043.84	1.56	13.30	1.55	0.67	3.98	0.67	4503.64	4503.64	4505.99	964.48	0.66
Alpine	17.3		Bridge													
Alpine	17.4214	2yr		419.00			4.54			1.04		4489.51	4488.76	4489.83	42.24	0.54
Alpine	17.4214	5yr		1699.00			7.77			2.14		4492.41	4491.03	4493.34	45.14	0.62
Alpine	17.4214	10yr		3811.00			8.73			2.48		4496.05	4493.98	4497.23	75.11	0.64
Alpine	17.4214	25yr	0.13	6127.46	17.41	0.35	8.87	0.85	0.05	2.32	0.18	4499.11	4496.15	4500.33	128.22	0.56
Alpine	17.4214	50yr	5.48	7910.61	90.91	0.83	10.29	1.42	0.18	3.01	0.40	4500.00	4497.44	4501.62	162.30	0.61
Alpine	17.4214	100yr	730.75	7638.42	2870.83	1.14	6.35	1.27	0.20	0.99	0.23	4504.92	4499.47	4505.36	1137.72	0.30
Alpine	17.4214	500yr	1424.68	9761.03	6261.30	1.19	7.26	1.74	0.22	1.24	0.38	4506.54	4503.74	4507.01	1432.57	0.33
Alpine	17.5371*	2yr		419.00			4.81			1.19		4490.74		4491.10	42.12	0.59
Alpine	17.5371*	5yr		1699.00			8.04			2.36		4493.59		4494.59	46.33	0.66
Alpine	17.5371*	10yr		3811.00			8.86			2.64		4497.16		4498.38	60.47	0.68
Alpine	17.5371*	25yr		6143.62	1.38		9.15	0.47		2.57	0.08	4499.88		4501.18	110.79	0.61
Alpine	17.5371*	50yr	1.94	7964.00	41.06	0.71	10.35	1.23	0.15	3.16	0.34	4500.89		4502.54	147.20	0.65
Alpine	17.5371*	100yr	511.93	9375.85	1352.22	1.34	8.06	1.25	0.29	1.67	0.27	4504.95		4505.80	904.84	0.41
Alpine	17.5371*	500yr	1327.11	12071.03	4048.86	1.70	9.14	1.85	0.43	2.06	0.48	4506.58		4507.49	1134.54	0.44

HEC-RAS Plan: Opt D River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	17.6528*	2yr		419.00			4.78			1.18		4492.10		4492.46	42.13	0.58
Alpine	17.6528*	5yr		1699.00			7.94			2.35		4494.95		4495.93	49.86	0.67
Alpine	17.6528*	10yr		3811.00			8.79			2.64		4498.42		4499.62	84.72	0.68
Alpine	17.6528*	25yr		6145.00			9.32			2.75		4500.80		4502.15	103.31	0.65
Alpine	17.6528*	50yr	0.39	7988.51	18.10	0.46	10.31	1.05	0.08	3.22	0.27	4501.91		4503.55	140.52	0.67
Alpine	17.6528*	100yr	275.00	10592.01	372.98	1.40	9.59	1.12	0.36	2.47	0.25	4505.03		4506.38	576.98	0.52
Alpine	17.6528*	500yr	900.97	14814.42	1731.62	2.05	11.84	1.81	0.67	3.61	0.56	4506.42		4508.27	874.78	0.61
Alpine	17.7685*	2yr		419.00			4.79			1.18		4493.45		4493.81	42.13	0.59
Alpine	17.7685*	5yr		1699.00			7.66			2.22		4496.37		4497.28	53.69	0.66
Alpine	17.7685*	10yr		3811.00			8.67			2.57		4499.68		4500.84	84.69	0.67
Alpine	17.7685*	25yr		6145.00			9.37			2.84		4501.87		4503.24	108.75	0.67
Alpine	17.7685*	50yr	0.01	7998.50	8.49	0.19	10.18	0.91	0.02	3.21	0.22	4503.03		4504.64	136.97	0.68
Alpine	17.7685*	100yr	146.85	10876.10	217.05	1.33	10.15	1.74	0.35	2.88	0.53	4505.53		4507.08	294.00	0.58
Alpine	17.7685*	500yr	599.43	16243.85	603.73	2.15	13.38	1.63	0.79	4.79	0.53	4506.78	4505.29	4509.37	621.73	0.72
Alpine	17.8842*	2yr		419.00			4.78			1.18		4494.80		4495.16	42.13	0.58
Alpine	17.8842*	5yr		1699.00			7.41			2.10		4497.74		4498.60	57.29	0.65
Alpine	17.8842*	10yr		3811.00			8.59			2.52		4500.87		4502.02	83.94	0.66
Alpine	17.8842*	25yr		6145.00			9.33			2.86		4503.03		4504.39	113.34	0.68
Alpine	17.8842*	50yr		8002.55	4.45		10.01	0.82		3.16	0.19	4504.22		4505.78	137.02	0.69
Alpine	17.8842*	100yr	82.59	11032.98	124.43	1.26	10.54	1.76	0.34	3.20	0.56	4506.23		4507.93	249.24	0.64
Alpine	17.8842*	500yr	572.84	16462.12	412.04	2.12	13.11	1.80	0.78	4.67	0.52	4507.92		4510.45	504.37	0.72
Alpine	18	2yr		419.00			4.79			1.18		4496.15		4496.51	42.13	0.59
Alpine	18	5yr		1699.00			7.19			2.01		4499.06		4499.87	60.71	0.64
Alpine	18	10yr		3811.00			8.52			2.48		4502.02		4503.15	83.27	0.65
Alpine	18	25yr		6145.00			9.25			2.82		4504.22		4505.55	114.82	0.68
Alpine	18	50yr		8004.70	2.30		9.85	0.74		3.10	0.16	4505.43		4506.94	139.28	0.69
Alpine	18	100yr	52.35	11117.06	70.59	1.20	10.71	1.65	0.33	3.41	0.53	4507.14		4508.90	229.62	0.67
Alpine	18	500yr	565.62	16572.57	308.80	2.09	12.73	1.90	0.76	4.46	0.66	4509.14		4511.53	417.05	0.71
Alpine	18.2*	2yr		419.00			5.92			1.69		4502.02	4501.74	4502.56	41.97	0.80
Alpine	18.2*	5yr		1699.00			8.60			2.92		4504.39		4505.54	63.29	0.86
Alpine	18.2*	10yr		3811.00			10.41			3.82		4506.71		4508.39	83.85	0.88
Alpine	18.2*	25yr		6144.89	0.11		11.07	0.37		4.05	0.06	4508.70		4510.60	108.52	0.85
Alpine	18.2*	50yr		7981.99	25.01		11.85	1.41		4.45	0.47	4509.79		4511.97	140.63	0.85
Alpine	18.2*	100yr	1.13	11078.09	160.78	0.59	13.53	2.26	0.13	5.54	0.98	4511.04	4510.79	4513.84	189.54	0.91
Alpine	18.2*	500yr	440.63	15217.98	1788.39	1.93	13.04	2.28	0.67	4.58	0.87	4513.98	4513.98	4516.29	708.12	0.73
Alpine	18.4*	2yr		419.00			4.35			0.86		4507.26		4507.55	47.99	0.54
Alpine	18.4*	5yr		1699.00			6.62			1.65		4509.97		4510.65	71.59	0.62
Alpine	18.4*	10yr		3810.96	0.04		8.47	0.22		2.42	0.03	4512.38		4513.50	93.06	0.67
Alpine	18.4*	25yr		6068.30	76.70		10.07	1.41		3.18	0.44	4514.02		4515.58	162.53	0.71

HEC-RAS Plan: Opt E River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	3	25yr	5.44	5263.70	365.86	0.23	2.17	0.77	0.01	0.11	0.06	4418.19		4418.26	428.93	0.13
Alpine	3	50yr	66.38	7239.67	603.95	0.43	2.33	0.83	0.02	0.12	0.07	4420.50		4420.58	496.71	0.13
Alpine	3	100yr	261.65	10086.20	992.15	0.64	2.60	0.91	0.04	0.14	0.08	4423.11		4423.20	548.13	0.13
Alpine	3	500yr	827.98	15582.05	1884.97	0.99	3.07	1.07	0.08	0.18	0.10	4427.17		4427.30	587.22	0.13
Alpine	3.16666*	2yr		445.00			4.25			0.89		4411.91		4412.20	66.65	0.60
Alpine	3.16666*	5yr		1687.00			5.35			0.67		4413.37	4413.37	4413.81	354.09	1.00
Alpine	3.16666*	10yr		3893.55	1.45		2.84	0.15		0.25	0.01	4416.23		4416.35	459.97	0.26
Alpine	3.16666*	25yr		5517.82	117.18		2.55	0.68		0.18	0.07	4418.26		4418.36	478.61	0.19
Alpine	3.16666*	50yr		7607.21	302.79		2.47	0.80		0.15	0.07	4420.56		4420.65	507.03	0.16
Alpine	3.16666*	100yr		10749.21	590.79		2.59	0.86		0.15	0.08	4423.16		4423.26	550.94	0.14
Alpine	3.16666*	500yr	67.37	16946.45	1281.18	0.56	2.89	0.97	0.04	0.17	0.09	4427.23		4427.35	637.54	0.14
Alpine	3.33333*	2yr		445.00			4.13			0.88		4414.81		4415.07	78.09	0.62
Alpine	3.33333*	5yr		1687.00			4.38			0.47		4416.42		4416.72	405.93	0.79
Alpine	3.33333*	10yr		3895.00			6.82			1.45		4416.88	4416.88	4417.60	408.61	1.02
Alpine	3.33333*	25yr		5635.00			4.60			0.69		4418.44		4418.76	427.49	0.48
Alpine	3.33333*	50yr		7864.79	45.21		3.59	0.60		0.36	0.07	4420.65		4420.85	527.51	0.28
Alpine	3.33333*	100yr		11049.96	290.04		3.30	0.94		0.27	0.11	4423.22		4423.39	560.69	0.21
Alpine	3.33333*	500yr	1.63	17412.86	880.51	0.19	3.32	1.03	0.01	0.24	0.11	4427.28		4427.44	662.91	0.18
Alpine	3.5*	2yr		445.00			3.71			0.73		4417.77		4417.98	95.29	0.58
Alpine	3.5*	5yr		1687.00			5.20			0.48		4419.19	4419.19	4419.61	431.05	1.06
Alpine	3.5*	10yr		3895.00			4.81			0.78		4420.30		4420.66	443.80	0.63
Alpine	3.5*	25yr		5635.00			7.50			1.82		4420.17	4420.17	4421.04	436.66	1.01
Alpine	3.5*	50yr		7910.00			6.91			1.58		4421.05		4421.79	450.52	0.76
Alpine	3.5*	100yr		11339.39	0.61		5.12	0.14		0.75	0.01	4423.38		4423.78	549.71	0.42
Alpine	3.5*	500yr		17833.67	461.33		4.32	1.13		0.44	0.16	4427.35		4427.63	625.52	0.26
Alpine	3.66666*	2yr		445.00			3.44			0.78		4420.67		4420.86	102.68	0.54
Alpine	3.66666*	5yr		1687.00			4.91			0.62		4422.21		4422.59	335.13	0.85
Alpine	3.66666*	10yr		3895.00			6.58			1.56		4422.95		4423.62	339.19	0.88
Alpine	3.66666*	25yr		5635.00			6.03			1.36		4423.94		4424.50	353.77	0.65
Alpine	3.66666*	50yr		7910.00			7.68			2.17		4424.20		4425.12	356.10	0.80
Alpine	3.66666*	100yr		11340.00			10.11			3.70		4424.46	4424.46	4426.05	358.30	1.01
Alpine	3.66666*	500yr		18270.01	24.99		8.38	0.75		2.13	0.14	4427.32		4428.41	468.76	0.62
Alpine	3.83333*	2yr		445.00			3.27			0.71		4423.56		4423.72	110.11	0.52
Alpine	3.83333*	5yr		1687.00			5.39			1.08		4425.06		4425.51	175.56	0.71
Alpine	3.83333*	10yr		3895.00			6.87			1.84		4426.45		4427.18	189.47	0.70
Alpine	3.83333*	25yr		5635.00			9.01			3.12		4426.75		4428.01	192.52	0.88
Alpine	3.83333*	50yr		7910.00			9.78			3.47		4427.68		4429.17	201.83	0.86
Alpine	3.83333*	100yr		11340.00			10.67			3.86		4428.90		4430.67	214.02	0.84
Alpine	3.83333*	500yr	2.60	18292.40		0.84	13.80		0.20	6.06		4430.10	4430.10	4433.06	241.13	1.00

HEC-RAS Plan: Opt F River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	4	2yr		445.00			3.24			0.71		4426.40		4426.56	117.40	0.53
Alpine	4	5yr		1687.00			5.19			1.41		4427.92		4428.34	129.49	0.58
Alpine	4	10yr		3895.00			6.69			1.77		4429.36		4430.05	188.58	0.67
Alpine	4	25yr		5635.00			7.12			1.88		4430.44		4431.22	199.37	0.63
Alpine	4	50yr		7910.00			8.16			2.34		4431.31		4432.34	208.12	0.67
Alpine	4	100yr		11340.00			9.40			2.92		4432.42		4433.79	219.20	0.71
Alpine	4	500yr	150.93	18119.46	24.61	2.01	10.64	0.66	0.59	3.41	0.12	4434.62		4436.36	426.26	0.69
Alpine	4.25*	2yr		430.00			3.41			0.78		4429.30		4429.48	108.45	0.56
Alpine	4.25*	5yr		1688.00			4.58			0.84		4430.65		4430.98	256.49	0.67
Alpine	4.25*	10yr		3624.00			5.24			1.07		4431.88		4432.31	268.81	0.58
Alpine	4.25*	25yr		5657.00			6.18			1.40		4432.70		4433.29	276.99	0.60
Alpine	4.25*	50yr		7379.00			6.27			1.34		4433.63		4434.24	286.27	0.55
Alpine	4.25*	100yr		10490.00			6.78			1.45		4434.89		4435.60	298.90	0.53
Alpine	4.25*	500yr		16703.00			7.54			1.61		4437.05		4437.93	320.46	0.51
Alpine	4.5*	2yr		430.00			3.57			0.81		4432.13		4432.33	86.37	0.53
Alpine	4.5*	5yr		1688.00			6.40			2.14		4433.62		4434.26	105.63	0.71
Alpine	4.5*	10yr		3624.00			7.28			1.64		4434.64	4434.64	4435.46	306.38	1.01
Alpine	4.5*	25yr		5657.00			8.19			2.30		4435.26	4435.20	4436.30	312.62	0.97
Alpine	4.5*	50yr		7379.00			9.04			2.83		4435.66	4435.62	4436.93	316.60	0.99
Alpine	4.5*	100yr		10490.00			9.61			3.11		4436.52		4437.95	325.18	0.92
Alpine	4.5*	500yr		16703.00			10.05			3.11		4438.23		4439.80	342.26	0.80
Alpine	4.75*	2yr		430.00			3.87			0.93		4434.84		4435.07	74.34	0.56
Alpine	4.75*	5yr		1688.00			6.00			1.76		4436.89		4437.45	91.85	0.60
Alpine	4.75*	10yr		3624.00			6.70			1.49		4438.21		4438.91	212.11	0.74
Alpine	4.75*	25yr		5657.00			7.90			2.09		4439.02		4439.99	220.21	0.77
Alpine	4.75*	50yr		7379.00			8.71			2.50		4439.61		4440.79	226.08	0.79
Alpine	4.75*	100yr		10490.00			10.44			3.50		4440.29		4441.99	232.93	0.89
Alpine	4.75*	500yr		16703.00			13.08			5.21		4441.44	4441.44	4444.09	244.35	1.01
Alpine	5	2yr		430.00			4.03			0.98		4437.60		4437.85	65.40	0.56
Alpine	5	5yr		1688.00			6.69			2.15		4439.63		4440.33	78.00	0.66
Alpine	5	10yr		3624.00			9.76			4.17		4441.07		4442.55	86.95	0.83
Alpine	5	25yr		5657.00			12.21			6.22		4442.09	4441.96	4444.41	93.28	0.97
Alpine	5	50yr		7379.00			13.42			7.24		4443.00	4443.00	4445.79	98.87	1.00
Alpine	5	100yr		10490.00			14.65			8.16		4444.60	4444.60	4447.93	108.79	1.01
Alpine	5	500yr		16703.00			16.35			9.47		4447.21	4447.21	4451.36	125.00	1.01
Alpine	5.33	2yr		428.00			6.27			2.61		4441.15	4441.15	4441.76	56.47	1.00
Alpine	5.33	5yr		1690.00			9.26			4.39		4442.97	4442.97	4444.30	68.73	1.00
Alpine	5.33	10yr		3655.00			11.36			5.80		4444.83	4444.83	4446.83	81.20	1.01
Alpine	5.33	25yr		5736.00			12.70			6.74		4446.33	4446.33	4448.84	91.31	1.01
Alpine	5.33	50yr		7481.00			13.53			7.33		4447.40	4447.40	4450.24	98.49	1.01

HEC-RAS Plan: Opt E River: Alpine Creek Reach: Alpine

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	1	2yr		448.00			5.81			1.47		4404.48	4403.86	4405.00	32.84	0.67
Alpine	1	5yr	167.82	1552.18		1.47	8.63		0.53	2.67		4407.22	4407.11	4408.26	181.99	0.73
Alpine	1	10yr	1214.13	2666.87		3.08	10.32		1.61	3.49		4409.02	4408.80	4410.20	204.43	0.76
Alpine	1	25yr	2369.28	3636.89	28.83	4.00	11.52	0.75	2.38	4.11	0.15	4410.26	4409.74	4411.59	380.51	0.78
Alpine	1	50yr	3195.85	4324.30	324.85	4.50	12.34	1.95	2.84	4.56	0.61	4410.99	4410.79	4412.42	386.29	0.80
Alpine	1	100yr	4596.94	5426.79	1158.27	5.17	13.51	3.19	3.50	5.22	1.29	4412.08	4411.77	4413.64	394.87	0.81
Alpine	1	500yr	7322.23	7477.60	3275.17	6.15	15.35	4.62	4.19	6.32	2.25	4413.90	4413.32	4415.71	434.96	0.84
Alpine	1.33333*	2yr		445.00			5.14			1.18		4405.84		4406.25	39.75	0.61
Alpine	1.33333*	5yr		1687.00			8.08			2.39		4408.55		4409.56	51.70	0.71
Alpine	1.33333*	10yr		3895.00			12.85			5.60		4410.24	4410.24	4412.81	59.65	1.01
Alpine	1.33333*	25yr	522.62	5112.38		2.01	11.31		0.83	3.95		4412.60	4412.60	4414.41	259.08	0.76
Alpine	1.33333*	50yr	1377.60	6532.40		2.97	12.53		1.52	4.65		4413.64	4413.64	4415.68	262.97	0.79
Alpine	1.33333*	100yr	2808.12	8530.18	1.70	4.01	14.20	0.52	2.43	5.72	0.09	4414.83	4414.83	4417.25	292.58	0.83
Alpine	1.33333*	500yr	5756.68	11878.42	659.90	5.33	16.37	2.77	3.75	7.14	1.07	4416.71	4416.71	4419.55	432.96	0.87
Alpine	1.66666*	2yr		445.00			4.87			1.08		4407.01		4407.38	44.46	0.60
Alpine	1.66666*	5yr		1687.00			7.08			1.80		4409.93		4410.71	55.86	0.60
Alpine	1.66666*	10yr		3895.00			8.30			2.19		4413.45		4414.51	75.98	0.59
Alpine	1.66666*	25yr		5635.00			11.30			4.02		4413.82		4415.81	78.06	0.79
Alpine	1.66666*	50yr		7910.00			13.88			5.92		4414.71		4417.70	82.97	0.93
Alpine	1.66666*	100yr	640.68	10699.32		2.02	13.42		0.84	5.08		4417.36	4417.36	4420.01	314.31	0.78
Alpine	1.66666*	500yr	3137.33	15154.26	3.40	3.72	15.31	0.67	2.09	6.18	0.12	4419.60	4419.60	4422.65	354.81	0.80
Alpine	2	2yr		445.00			4.73			1.04		4408.17	4407.57	4408.52	50.14	0.61
Alpine	2	5yr		1687.00			6.75			1.66		4410.92	4409.61	4411.62	61.23	0.59
Alpine	2	10yr		3895.00			8.26			2.16		4414.22	4411.88	4415.28	74.21	0.58
Alpine	2	25yr		5635.00			9.64			2.86		4415.64	4413.38	4417.08	85.36	0.65
Alpine	2	50yr		7910.00			10.21			3.06		4417.71	4415.09	4419.33	98.13	0.64
Alpine	2	100yr		11340.00			13.09			4.94		4418.62	4417.14	4421.28	103.75	0.80
Alpine	2	500yr		18295.00			17.65			8.59		4420.23	4420.15	4425.06	192.15	0.99
Alpine	2.3		Bridge													
Alpine	2.5	2yr		445.00			3.63			0.57		4408.72	4407.57	4408.93	53.03	0.42
Alpine	2.5	5yr		1687.00			5.71			1.14		4411.65	4409.59	4412.16	62.92	0.46
Alpine	2.5	10yr		3895.00			7.18			1.60		4415.14	4411.88	4415.94	81.58	0.49
Alpine	2.5	25yr		5635.00			8.02			1.92		4416.96	4413.38	4417.95	93.47	0.52
Alpine	2.5	50yr		7910.00			8.66			2.14		4419.07	4415.09	4420.23	105.92	0.52
Alpine	2.5	100yr		11340.00			9.93			2.65		4421.22	4417.14	4422.75	298.39	0.53
Alpine	2.5	500yr	3377.08	14822.47	95.45	1.84	9.00	1.00	0.51	1.94	0.16	4425.98	4420.15	4427.01	704.05	0.40
Alpine	3	2yr		445.00			4.84			1.12		4408.89		4409.25	53.46	0.65
Alpine	3	5yr		1687.00			2.29			0.18		4412.28		4412.36	269.17	0.24
Alpine	3	10yr		3697.13	197.87		2.03	0.70		0.11	0.06	4416.13		4416.19	375.04	0.14

HEC-RAS Plan: Opt E River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	5.33	100yr	1353.68	9164.25	94.07	1.60	9.72	1.07	0.45	3.40	0.25	4450.93	4450.93	4452.21	1121.97	0.61
Alpine	5.33	500yr	4535.62	11674.85	613.53	2.41	10.79	1.98	0.93	3.99	0.64	4452.09	4452.09	4453.37	1261.24	0.63
Alpine	5.49	2yr		428.00			6.44			2.65		4442.94	4442.94	4443.58	51.98	1.00
Alpine	5.49	5yr		1690.00			9.44			4.45		4444.86	4444.86	4446.24	65.50	1.01
Alpine	5.49	10yr		3655.00			11.43			5.76		4446.80	4446.80	4448.83	79.22	1.00
Alpine	5.49	25yr		5736.00			12.73			6.67		4448.35	4448.35	4450.86	90.14	1.00
Alpine	5.49	50yr		7481.00			13.57			7.29		4449.42	4449.42	4452.28	97.68	1.01
Alpine	5.49	100yr	2452.44	7860.77	298.78	1.91	9.47	1.51	0.66	3.27	0.42	4452.02	4452.02	4453.07	1231.24	0.62
Alpine	5.49	500yr	5696.26	10202.75	924.99	2.76	11.01	2.30	1.19	4.26	0.83	4452.87	4452.87	4454.06	1311.22	0.68
Alpine	5.66	2yr		428.00			4.62			1.11		4444.14		4444.47	45.40	0.57
Alpine	5.66	5yr		1690.00			8.53			3.22		4446.21		4447.33	58.39	0.82
Alpine	5.66	10yr		3655.00			11.88			5.84		4447.90	4447.90	4450.09	71.05	1.01
Alpine	5.66	25yr		5736.00			13.07			6.70		4449.59	4449.59	4452.25	83.71	1.01
Alpine	5.66	50yr	2332.24	4774.39	374.37	1.45	6.25	1.21	0.36	1.40	0.24	4452.96	4452.11	4453.36	1299.50	0.41
Alpine	5.66	100yr	2977.96	7187.72	446.32	2.12	9.71	1.75	0.79	3.41	0.54	4452.75	4452.75	4453.76	1269.27	0.65
Alpine	5.66	500yr	5864.85	9951.16	1008.00	3.12	12.52	2.58	1.57	5.53	1.08	4453.26		4454.76	1327.49	0.81
Alpine	5.75		Bridge													
Alpine	6	2yr		428.00			2.32			0.21		4447.08	4444.23	4447.16	44.37	0.20
Alpine	6	5yr		1690.00			5.39			0.93		4449.87	4446.45	4450.33	51.07	0.38
Alpine	6	10yr		3655.00			7.36			1.81		4452.75	4448.91	4453.59	920.51	0.51
Alpine	6	25yr		5736.00			10.61			3.76		4453.32	4451.43	4455.06	1119.73	0.72
Alpine	6	50yr		7481.00			14.48			7.02		4453.01	4453.01	4456.27	1018.36	0.99
Alpine	6	100yr	3925.56	5928.49	757.94	2.29	9.56	1.84	0.89	3.05	0.63	4454.25	4454.25	4455.07	1341.36	0.64
Alpine	6	500yr	7728.79	7184.60	1910.60	2.83	10.01	2.43	1.30	3.26	0.96	4455.30	4454.89	4456.04	1461.79	0.64
Alpine	6.125*	2yr		428.00			3.04			0.39		4447.24	4445.38	4447.38	43.38	0.30
Alpine	6.125*	5yr		1690.00			5.93			1.23		4450.32	4447.61	4450.87	54.42	0.46
Alpine	6.125*	10yr		3655.00			7.28			1.86		4453.52	4450.26	4454.35	331.15	0.52
Alpine	6.125*	25yr	1742.17	3331.39	662.44	1.06	4.61	1.05	0.21	0.73	0.19	4455.85	4452.47	4456.05	1393.67	0.31
Alpine	6.125*	50yr	3141.01	3020.91	1319.08	1.01	3.38	1.02	0.16	0.37	0.15	4457.45	4453.92	4457.53	1488.35	0.21
Alpine	6.125*	100yr	2873.09	6622.83	1116.08	2.03	9.50	2.06	0.80	3.12	0.76	4455.61	4455.61	4456.51	1357.06	0.65
Alpine	6.125*	500yr	5972.14	8521.88	2329.98	2.82	10.93	2.76	1.38	4.04	1.23	4456.38	4456.31	4457.38	1446.61	0.72
Alpine	6.25*	2yr		428.00			3.99			0.76		4447.62	4446.53	4447.87	42.60	0.44
Alpine	6.25*	5yr		1690.00			6.17			1.46		4451.00	4448.76	4451.59	61.99	0.52
Alpine	6.25*	10yr		3655.00			7.12			1.81		4454.34	4451.37	4455.13	88.50	0.52
Alpine	6.25*	25yr		5736.00			9.09			2.94		4455.58	4453.21	4456.87	805.17	0.65
Alpine	6.25*	50yr	1892.91	4400.35	1187.74	1.19	5.19	1.29	0.26	0.93	0.30	4457.50	4454.65	4457.75	1431.16	0.35
Alpine	6.25*	100yr		8742.69	1869.31		10.93	2.49		4.19	1.18	4457.10	4457.10	4458.64	1389.11	0.75
Alpine	6.25*	500yr	4601.83	9414.87	2807.30	2.59	10.77	2.75	1.21	3.97	1.33	4457.71	4457.71	4458.77	1446.74	0.71

HEC-RAS Plan: Opt E River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	7.6*	25yr		5736.00			10.23			3.65		4461.34	4459.53	4462.96	351.62	0.71
Alpine	7.6*	50yr	705.81	6079.41	695.78	1.10	8.70	1.03	0.31	2.58	0.47	4462.81	4460.90	4463.77	1479.94	0.57
Alpine	7.6*	100yr	2506.40	6364.85	1740.75	1.37	7.78	1.24	0.44	1.95	0.56	4464.03	4463.37	4464.61	1785.86	0.47
Alpine	7.6*	500yr	5835.56	7495.74	3492.70	1.78	7.90	1.53	0.63	1.92	0.74	4465.36	4464.34	4465.82	1873.39	0.45
Alpine	7.8*	2yr		428.00			4.57			1.04		4454.70	4453.93	4455.02	42.28	0.54
Alpine	7.8*	5yr		1690.00			7.55			2.06		4457.66	4456.16	4458.54	47.26	0.61
Alpine	7.8*	10yr		3655.00			9.94			3.34		4460.40	4458.70	4461.93	60.00	0.71
Alpine	7.8*	25yr		5736.00			11.02			4.05		4462.66	4460.93	4464.54	392.62	0.74
Alpine	7.8*	50yr	607.56	6558.87	314.58	1.40	11.11	0.88	0.49	4.07	0.42	4463.56	4462.41	4465.24	1151.82	0.72
Alpine	7.8*	100yr	2417.80	6723.06	1471.14	1.48	9.65	1.30	0.55	2.92	0.66	4464.87	4464.87	4465.80	1845.03	0.58
Alpine	7.8*	500yr	5581.35	8244.27	2998.38	2.07	10.68	1.70	0.92	3.46	1.02	4465.80	4465.68	4466.70	1952.17	0.61
Alpine	7.9	2yr		428.00			5.44			1.58		4455.50	4455.09	4455.96	41.92	0.70
Alpine	7.9	5yr		1690.00			8.45			2.63		4458.30	4457.33	4459.41	44.72	0.70
Alpine	7.9	10yr		3655.00			11.23			3.76		4461.03	4459.77	4462.98	47.44	0.76
Alpine	7.9	25yr		5736.00			13.07			5.07		4463.22	4462.00	4465.87	184.47	0.83
Alpine	7.9	50yr	1477.59	5442.10	561.31	1.42	9.49	0.87	0.35	2.60	0.36	4465.40	4465.40	4466.42	1674.94	0.56
Alpine	7.9	100yr	3066.73	6124.54	1420.73	1.50	9.74	1.18	0.53	2.66	0.55	4466.26	4466.26	4467.13	1969.98	0.55
Alpine	7.9	500yr	6167.87	7866.36	2789.77	2.11	11.68	1.64	0.95	3.73	0.97	4466.96	4466.96	4467.98	2063.77	0.63
Alpine	7.95		Bridge													
Alpine	8	2yr		428.00			3.85			0.69		4456.27	4455.09	4456.50	42.69	0.42
Alpine	8	5yr	118.47	1564.67	6.86	0.35	3.14	0.13	0.04	0.29	0.01	4464.22	4457.32	4464.36	684.93	0.20
Alpine	8	10yr	614.17	2838.13	202.69	0.76	5.09	0.41	0.09	0.76	0.09	4465.15	4459.77	4465.46	1507.87	0.30
Alpine	8	25yr	1942.99	2917.06	875.95	0.76	4.45	0.59	0.13	0.55	0.13	4466.68	4461.99	4466.84	2036.56	0.25
Alpine	8	50yr	2567.62	3758.15	1155.23	0.98	5.71	0.76	0.21	0.90	0.21	4466.72	4465.38	4466.98	2043.32	0.31
Alpine	8	100yr	4233.72	4446.50	1931.78	1.23	6.36	0.97	0.31	1.09	0.32	4467.37	4466.17	4467.64	2092.58	0.34
Alpine	8	500yr	7613.98	5717.24	3492.78	1.64	7.55	1.32	0.51	1.50	0.54	4468.26	4466.96	4468.59	2149.00	0.39
Alpine	8.33333*	2yr		428.00			4.27			0.89		4456.71	4455.80	4457.00	42.44	0.49
Alpine	8.33333*	5yr		1690.00			3.53			0.39		4464.27	4458.02	4464.46	137.55	0.22
Alpine	8.33333*	10yr	0.00	3655.00		0.02	6.86			1.45		4465.13	4460.47	4465.86	514.75	0.42
Alpine	8.33333*	25yr	960.22	4125.98	649.80	0.80	6.53	0.63	0.17	1.26	0.18	4466.64	4462.75	4467.12	2033.41	0.37
Alpine	8.33333*	50yr	1273.37	5346.78	860.85	1.04	8.44	0.82	0.29	2.11	0.30	4466.66	4464.19	4467.46	2036.62	0.48
Alpine	8.33333*	100yr	2805.30	5956.13	1850.56	1.38	8.74	1.07	0.45	2.21	0.45	4467.39	4467.12	4468.07	2159.78	0.48
Alpine	8.33333*	500yr	5842.73	7091.08	3890.20	1.83	9.50	1.44	0.69	2.53	0.71	4468.38	4467.95	4469.00	2275.51	0.50
Alpine	8.66666*	2yr		428.00			4.47			0.99		4457.31		4457.62	42.33	0.52
Alpine	8.66666*	5yr		1690.00			3.64			0.44		4464.35		4464.55	62.90	0.24
Alpine	8.66666*	10yr		3655.00			6.86			1.51		4465.42		4466.15	64.90	0.42
Alpine	8.66666*	25yr	181.76	5455.50	98.74	0.74	8.95	0.44	0.19	2.50	0.12	4466.59		4467.77	1073.67	0.52
Alpine	8.66666*	50yr	197.08	7188.78	95.13	0.92	11.89	0.52	0.30	4.42	0.19	4466.52	4464.58	4468.62	1040.16	0.70
Alpine	8.66666*	100yr	2043.37	6773.25	1795.38	1.36	9.56	1.03	0.46	2.74	0.45	4468.05	4468.05	4468.96	2267.02	0.52

HEC-RAS Plan: Opt E River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	8.66666*	500yr	3953.56	9358.51	3511.93	2.04	12.69	1.56	0.96	4.77	0.95	4468.47		4469.89	2340.80	0.68
Alpine	9	2yr		428.00			4.54			1.03		4457.97		4458.29	42.29	0.54
Alpine	9	5yr		1690.00			3.24			0.40		4464.51		4464.67	102.84	0.25
Alpine	9	10yr		3655.00			5.24			1.01		4466.09		4466.52	118.22	0.38
Alpine	9	25yr	86.88	5475.11	174.01	0.43	6.06	0.45	0.07	1.28	0.11	4467.76		4468.30	1318.79	0.40
Alpine	9	50yr	1009.17	5129.53	1342.30	0.74	4.72	0.59	0.14	0.74	0.14	4469.21		4469.45	2516.85	0.28
Alpine	9	100yr	712.73	8912.26	987.01	1.04	9.00	0.83	0.32	2.75	0.34	4468.44		4469.50	2284.19	0.57
Alpine	9	500yr	3260.37	9311.09	4252.54	1.49	7.79	1.19	0.49	1.94	0.51	4470.06	4469.35	4470.60	2693.32	0.45
Alpine	9.3		Bridge													
Alpine	9.5	2yr		428.00			3.35			0.50		4459.33	4457.76	4459.50	43.08	0.34
Alpine	9.5	5yr		1690.00			3.01			0.35		4465.13	4459.99	4465.27	108.83	0.23
Alpine	9.5	10yr		3666.00			4.95			0.91		4466.66	4462.73	4467.04	122.88	0.36
Alpine	9.5	25yr	507.60	4552.42	704.98	0.59	4.60	0.48	0.10	0.72	0.11	4468.65	4464.24	4468.91	2364.56	0.29
Alpine	9.5	50yr	1275.80	4573.30	1667.90	0.73	4.11	0.58	0.12	0.56	0.13	4469.62	4465.24	4469.78	2608.88	0.24
Alpine	9.5	100yr	2053.62	5938.01	2664.37	0.98	5.13	0.78	0.21	0.86	0.22	4469.97	4468.57	4470.20	2684.25	0.30
Alpine	9.5	500yr	3965.58	7705.35	5196.07	1.31	6.07	1.09	0.35	1.16	0.39	4470.85	4469.36	4471.13	2771.70	0.34
Alpine	9.56666*	2yr		428.00			4.08			0.80		4459.76		4460.02	42.54	0.46
Alpine	9.56666*	5yr		1690.00			4.00			0.58		4465.24		4465.49	72.20	0.29
Alpine	9.56666*	10yr		3666.00			6.76			1.56		4466.87		4467.58	75.35	0.44
Alpine	9.56666*	25yr		5552.82	212.18		8.24	0.56		2.21	0.18	4468.58		4469.59	689.59	0.50
Alpine	9.56666*	50yr	61.38	6594.58	861.04	0.59	8.93	0.74	0.13	2.53	0.28	4469.40		4470.48	1632.54	0.52
Alpine	9.56666*	100yr	73.27	9439.10	1143.63	0.80	12.85	1.05	0.25	5.24	0.55	4469.34		4471.62	1593.44	0.74
Alpine	9.56666*	500yr	631.54	12023.83	4211.63	1.60	14.87	1.77	0.73	6.82	1.27	4470.27		4472.73	1934.17	0.82
Alpine	9.63333*	2yr		428.00			4.48			1.00		4460.51		4460.82	42.33	0.52
Alpine	9.63333*	5yr		1690.00			4.68			0.74		4465.45		4465.79	68.60	0.36
Alpine	9.63333*	10yr		3666.00			7.24			1.68		4467.33		4468.15	81.58	0.51
Alpine	9.63333*	25yr		5599.08	165.92		8.52	0.60		2.18	0.20	4469.13		4470.22	521.56	0.55
Alpine	9.63333*	50yr	0.37	6897.62	619.01	0.22	9.46	0.84	0.03	2.63	0.28	4469.94		4471.21	1047.87	0.58
Alpine	9.63333*	100yr	252.39	6635.58	3768.02	0.83	7.14	1.02	0.18	1.39	0.37	4472.16		4472.66	1836.10	0.39
Alpine	9.63333*	500yr	772.00	8436.94	7658.06	1.16	8.14	1.38	0.31	1.73	0.60	4473.36	4472.04	4473.89	2013.08	0.42
Alpine	9.7	2yr		428.00			4.56			1.04		4461.45		4461.77	42.28	0.54
Alpine	9.7	5yr		1690.00			5.27			0.97		4465.76		4466.19	66.10	0.42
Alpine	9.7	10yr		3666.00			7.78			1.92		4467.89		4468.83	75.90	0.55
Alpine	9.7	25yr		5576.07	188.93		8.88	0.72		2.42	0.28	4469.76		4470.95	465.22	0.60
Alpine	9.7	50yr		6743.14	773.86		9.35	1.04		2.63	0.48	4470.74		4471.96	717.92	0.61
Alpine	9.7	100yr	41.89	7601.31	3012.80	0.78	8.60	1.16	0.19	2.09	0.51	4472.36		4473.19	1499.12	0.51
Alpine	9.7	500yr	219.19	9889.61	6758.20	1.22	9.84	1.56	0.38	2.62	0.82	4473.58		4474.48	1748.44	0.55
Alpine	9.73		Bridge													

HEC-RAS Plan: Opt E River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	9.75	2yr		428.00			2.94			0.36		4462.66	4460.68	4462.79	43.48	0.28
Alpine	9.75	5yr		1690.00			4.17			0.57		4466.98	4462.91	4467.25	71.24	0.31
Alpine	9.75	10yr		3572.14	93.86		5.80	0.43		1.03	0.10	4469.63	4465.42	4470.14	436.70	0.39
Alpine	9.75	25yr	2.00	4855.19	907.82	0.30	6.16	0.64	0.04	1.11	0.19	4471.42	4467.17	4471.91	1305.55	0.39
Alpine	9.75	50yr	23.78	5493.23	2000.00	0.54	6.32	0.83	0.10	1.13	0.27	4472.22	4469.54	4472.68	1470.54	0.38
Alpine	9.75	100yr	112.84	6522.30	4020.86	0.78	6.68	1.03	0.16	1.22	0.37	4473.30	4471.72	4473.73	1690.54	0.38
Alpine	9.75	500yr	375.93	8452.13	8038.94	1.10	7.65	1.36	0.28	1.53	0.57	4474.58	4472.87	4475.05	1863.13	0.41
Alpine	9.8*	2yr		428.00			3.92			0.72		4462.78		4463.02	42.64	0.43
Alpine	9.8*	5yr		1690.00			4.96			0.83		4467.06		4467.44	64.54	0.38
Alpine	9.8*	10yr		3527.71	138.29		6.66	0.54		1.38	0.16	4469.74		4470.41	451.17	0.45
Alpine	9.8*	25yr	4.22	4567.86	1192.93	0.39	6.67	0.75	0.06	1.32	0.25	4471.56		4472.11	1334.90	0.42
Alpine	9.8*	50yr	33.91	5056.02	2427.07	0.62	6.69	0.92	0.12	1.28	0.33	4472.37		4472.84	1500.89	0.40
Alpine	9.8*	100yr	141.10	5880.73	4634.17	0.86	6.90	1.11	0.19	1.31	0.42	4473.46		4473.88	1724.42	0.39
Alpine	9.8*	500yr	445.44	7414.47	9007.09	1.15	7.64	1.43	0.30	1.54	0.62	4474.81		4475.23	1870.15	0.41
Alpine	9.9*	2yr		428.00			4.44			0.98		4463.45		4463.76	42.34	0.52
Alpine	9.9*	5yr		1690.00			5.72			1.15		4467.37		4467.88	58.54	0.45
Alpine	9.9*	10yr		3352.57	313.43		7.10	0.71		1.59	0.25	4470.18		4470.90	541.68	0.48
Alpine	9.9*	25yr	12.72	3913.90	1838.38	0.41	6.42	0.84	0.10	1.22	0.29	4472.02		4472.46	1427.36	0.40
Alpine	9.9*	50yr	47.54	4335.23	3134.23	0.55	6.51	0.98	0.15	1.22	0.35	4472.77		4473.15	1579.38	0.39
Alpine	9.9*	100yr	149.70	5045.18	5461.13	0.70	6.77	1.15	0.21	1.27	0.44	4473.81		4474.16	1794.22	0.38
Alpine	9.9*	500yr	420.35	6285.47	10161.18	0.91	7.40	1.47	0.31	1.45	0.63	4475.18		4475.51	1885.01	0.39
Alpine	10	2yr		428.00			4.55			1.04		4464.36	4463.59	4464.69	42.29	0.54
Alpine	10	5yr		1690.00			6.52			1.52		4467.84	4465.88	4468.50	52.64	0.52
Alpine	10	10yr		3666.00			9.09			2.63		4470.44	4468.22	4471.73	600.19	0.62
Alpine	10	25yr	27.96	3260.93	2476.12	0.48	6.16	0.89	0.12	1.12	0.30	4472.43	4470.29	4472.77	1548.22	0.38
Alpine	10	50yr	73.76	3608.14	3835.10	0.59	6.28	1.01	0.16	1.14	0.36	4473.14	4471.92	4473.44	1707.56	0.37
Alpine	10	100yr	194.46	4177.72	6283.83	0.73	6.53	1.15	0.22	1.19	0.43	4474.15	4472.53	4474.42	1939.57	0.36
Alpine	10	500yr	493.65	5131.61	11241.73	0.91	7.06	1.44	0.30	1.33	0.60	4475.52	4473.42	4475.77	2046.39	0.37
Alpine	10.3333*	2yr		428.00			4.57			1.05		4465.21	4464.45	4465.54	42.27	0.54
Alpine	10.3333*	5yr		1690.00			6.73			1.66		4468.43	4466.68	4469.13	52.57	0.54
Alpine	10.3333*	10yr		3666.00			8.89			2.53		4471.25	4468.99	4472.48	332.95	0.61
Alpine	10.3333*	25yr		5765.00			14.40			6.69		4471.06	4471.06	4474.28	266.41	0.99
Alpine	10.3333*	50yr		7517.00			14.96			7.04		4472.60	4472.60	4476.07	1127.50	1.00
Alpine	10.3333*	100yr	24.01	6486.46	4145.53	0.60	10.71	1.61	0.22	3.44	0.97	4473.97	4473.95	4475.07	1434.57	0.67
Alpine	10.3333*	500yr	288.86	7683.75	8894.39	1.08	10.68	1.92	0.51	3.23	1.20	4475.47	4474.90	4476.31	1749.02	0.61
Alpine	10.6666*	2yr		428.00			4.31			0.95		4466.13	4465.31	4466.42	49.96	0.54
Alpine	10.6666*	5yr		1690.00			6.53			1.61		4469.14	4467.44	4469.80	56.80	0.54
Alpine	10.6666*	10yr		3666.00			8.35			2.30		4472.13	4469.66	4473.21	64.39	0.56
Alpine	10.6666*	25yr	0.33	3885.46	1879.21	0.10	5.72	0.86	0.01	1.02	0.28	4475.33	4471.49	4475.68	1252.37	0.36

HEC-RAS Plan: Opt E River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	10.6666*	50yr	161.93	3676.51	3678.55	0.45	4.36	0.82	0.09	0.55	0.22	4477.20	4472.94	4477.35	1650.58	0.25
Alpine	10.6666*	100yr	0.54	7191.96	3463.51	0.19	10.60	1.59	0.04	3.50	0.97	4475.33	4475.33	4476.52	1249.91	0.67
Alpine	10.6666*	500yr	137.72	9490.27	7239.01	0.90	12.38	2.16	0.43	4.59	1.59	4476.33	4476.33	4477.70	1517.10	0.74
Alpine	11	2yr		428.00			4.03			0.83		4466.98	4466.23	4467.23	53.77	0.51
Alpine	11	5yr		1690.00			6.06			1.42		4469.89	4468.21	4470.46	63.87	0.51
Alpine	11	10yr		3666.00			7.58			1.91		4472.95	4470.21	4473.84	69.78	0.51
Alpine	11	25yr		5765.00			8.88			2.44		4475.25	4471.89	4476.47	886.83	0.53
Alpine	11	50yr	3.58	5092.44	2420.98	0.16	6.22	1.00	0.02	1.19	0.36	4477.24	4473.14	4477.65	1311.03	0.38
Alpine	11	100yr	0.28	7498.49	3157.22	0.13	9.42	1.45	0.02	2.74	0.79	4477.01	4477.01	4477.99	1179.23	0.58
Alpine	11	500yr	84.53	10660.04	6122.42	0.70	12.36	2.12	0.29	4.61	1.56	4477.67	4477.67	4479.20	1434.31	0.74
Alpine	11.3		Bridge													
Alpine	11.4	2yr		427.00			3.17			0.48		4467.81	4466.55	4467.97	55.04	0.36
Alpine	11.4	5yr		1691.00			5.27			1.04		4470.80	4468.50	4471.23	65.63	0.42
Alpine	11.4	10yr		3670.00			7.10			1.66		4473.66	4470.47	4474.44	71.15	0.46
Alpine	11.4	25yr	2.27	3892.90	1881.83	0.13	4.87	0.79	0.02	0.74	0.23	4477.20	4472.16	4477.45	1271.54	0.30
Alpine	11.4	50yr	48.08	4640.58	2845.33	0.34	5.43	0.96	0.07	0.90	0.31	4477.76	4473.39	4478.04	1447.85	0.33
Alpine	11.4	100yr	157.57	6101.37	4416.07	0.58	6.75	1.25	0.16	1.36	0.51	4478.25	4475.42	4478.66	1514.55	0.40
Alpine	11.4	500yr	665.39	8095.15	8126.47	0.97	7.82	1.60	0.36	1.75	0.76	4479.56	4477.72	4480.04	1693.15	0.43
Alpine	11.4333*	2yr		427.00			3.69			0.69		4468.02	4467.00	4468.23	59.78	0.47
Alpine	11.4333*	5yr		1691.00			5.30			1.08		4471.01	4469.04	4471.44	72.97	0.45
Alpine	11.4333*	10yr		3670.00			6.69			1.48		4473.98	4470.89	4474.68	80.93	0.45
Alpine	11.4333*	25yr		5777.00			6.96			1.50		4477.07	4472.47	4477.82	1058.37	0.44
Alpine	11.4333*	50yr	10.59	5268.05	2255.36	0.20	5.78	0.94	0.03	1.01	0.31	4477.82	4473.61	4478.19	1338.84	0.35
Alpine	11.4333*	100yr	86.14	6931.74	3657.12	0.49	7.15	1.24	0.13	1.52	0.52	4478.34	4475.58	4478.87	1403.17	0.43
Alpine	11.4333*	500yr	524.56	9258.15	7104.29	0.94	8.30	1.62	0.35	1.96	0.80	4479.67	4478.08	4480.27	1566.66	0.46
Alpine	11.4666*	2yr		427.00			4.06			0.88		4468.38	4467.44	4468.63	65.56	0.56
Alpine	11.4666*	5yr		1691.00			5.34			1.12		4471.24	4469.53	4471.68	80.37	0.47
Alpine	11.4666*	10yr		3670.00			6.36			1.35		4474.26	4471.31	4474.89	93.04	0.45
Alpine	11.4666*	25yr		5777.00			6.40			1.26		4477.36	4472.78	4477.99	991.59	0.41
Alpine	11.4666*	50yr	0.19	5829.37	1704.45	0.08	6.04	0.90	0.01	1.10	0.30	4477.89	4473.85	4478.33	1074.92	0.37
Alpine	11.4666*	100yr	32.80	7702.59	2939.61	0.36	7.47	1.22	0.08	1.66	0.52	4478.43	4475.65	4479.06	1285.76	0.45
Alpine	11.4666*	500yr	390.86	10415.00	6081.14	0.89	8.75	1.65	0.34	2.17	0.84	4479.75	4478.32	4480.50	1434.73	0.49
Alpine	11.5	2yr		427.00			3.99			0.82		4468.83	4467.86	4469.08	58.46	0.52
Alpine	11.5	5yr		1691.00			5.42			1.18		4471.50	4470.05	4471.96	88.00	0.51
Alpine	11.5	10yr		3670.00			6.05			1.24		4474.52	4471.74	4475.09	107.36	0.45
Alpine	11.5	25yr		5777.00			5.98			1.10		4477.58	4473.15	4478.14	905.60	0.38
Alpine	11.5	50yr		6445.94	1088.06		6.37	0.75		1.23	0.29	4477.95	4474.15	4478.49	938.05	0.40
Alpine	11.5	100yr	3.41	8645.52	2026.07	0.19	7.98	1.06	0.04	1.89	0.54	4478.50	4475.73	4479.31	1084.22	0.49
Alpine	11.5	500yr	253.13	12089.30	4544.57	0.82	9.68	1.52	0.33	2.65	0.98	4479.76	4478.62	4480.81	1293.30	0.55

HEC-RAS Plan: Opt E River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	11.5666*	2yr		427.00			4.08			0.85		4469.75		4470.01	52.13	0.51
Alpine	11.5666*	5yr		1691.00			6.12			1.53		4472.22		4472.80	79.59	0.58
Alpine	11.5666*	10yr		3670.00			7.08			1.76		4474.94		4475.72	96.89	0.54
Alpine	11.5666*	25yr		5709.66	67.34		7.01	0.37		1.53	0.09	4477.81		4478.56	519.79	0.45
Alpine	11.5666*	50yr		7418.21	115.79		8.97	0.49		2.50	0.15	4477.92	4475.35	4479.15	639.52	0.57
Alpine	11.5666*	100yr		10377.69	297.31		12.09	0.67		4.48	0.34	4478.22	4476.81	4480.42	879.80	0.75
Alpine	11.5666*	500yr	87.95	13518.28	3280.77	0.79	12.58	1.55	0.36	4.51	1.15	4480.23	4480.23	4482.21	1146.31	0.70
Alpine	11.6333*	2yr		427.00			4.23			0.94		4470.72		4471.00	53.87	0.54
Alpine	11.6333*	5yr		1691.00			6.48			1.73		4473.17		4473.82	73.80	0.61
Alpine	11.6333*	10yr		3670.00			8.10			2.33		4475.61		4476.63	80.95	0.60
Alpine	11.6333*	25yr		5768.32	8.68		8.73	0.25		2.42	0.07	4478.13		4479.31	252.99	0.55
Alpine	11.6333*	50yr		7482.93	51.07		10.88	0.49		3.71	0.20	4478.45	4476.48	4480.28	337.14	0.67
Alpine	11.6333*	100yr	0.72	10260.44	413.84	0.35	13.44	1.03	0.12	5.49	0.68	4479.35	4479.35	4482.05	491.81	0.78
Alpine	11.6333*	500yr	200.91	12929.46	3756.63	1.24	13.08	1.56	0.69	4.77	1.13	4482.04	4482.04	4484.09	1150.54	0.67
Alpine	11.7	2yr		427.00			4.08			0.87		4471.75		4472.01	53.86	0.52
Alpine	11.7	5yr		1691.00			7.06			2.03		4474.16		4474.94	56.99	0.61
Alpine	11.7	10yr		3670.00			9.90			3.52		4476.43		4477.95	58.76	0.69
Alpine	11.7	25yr		5773.11	3.89		11.54	0.34		4.39	0.10	4478.60	4476.80	4480.67	129.32	0.70
Alpine	11.7	50yr		7471.50	62.50		14.00	0.68		6.33	0.37	4479.16	4478.06	4482.18	271.26	0.83
Alpine	11.7	100yr	50.47	9104.08	1520.44	1.19	13.31	1.52	0.68	5.27	1.16	4481.66	4481.66	4484.02	578.12	0.69
Alpine	11.7	500yr	310.16	11042.07	5534.77	1.66	13.07	1.70	1.04	4.74	1.26	4484.34	4484.34	4486.09	1189.51	0.61
Alpine	11.9		Bridge													
Alpine	12	2yr		427.00			2.90			0.36		4472.83	4471.30	4472.96	55.96	0.32
Alpine	12	5yr		1691.00			5.14			0.90		4476.01	4473.24	4476.42	58.43	0.38
Alpine	12	10yr	3.80	3422.02	244.18	0.34	5.75	0.50	0.07	0.95	0.15	4480.47	4475.32	4480.94	455.11	0.32
Alpine	12	25yr	83.71	4222.20	1471.09	0.62	5.40	0.60	0.15	0.77	0.17	4483.57	4477.10	4483.90	1139.38	0.26
Alpine	12	50yr	270.66	3201.11	4062.23	0.32	3.02	0.55	0.04	0.22	0.10	4488.19	4478.47	4488.26	1439.47	0.13
Alpine	12	100yr	207.05	6764.63	3703.31	1.01	8.03	1.05	0.38	1.66	0.47	4484.59	4481.82	4485.23	1193.75	0.38
Alpine	12	500yr	398.68	8558.20	7930.12	0.98	8.98	1.45	0.37	1.99	0.77	4486.43	4484.38	4487.08	1290.93	0.40
Alpine	12.5	2yr		427.00			3.90			0.72		4472.94	4471.80	4473.17	42.65	0.43
Alpine	12.5	5yr		1691.00			6.58			1.54		4476.08	4474.07	4476.75	51.52	0.52
Alpine	12.5	10yr		3675.00			7.34			1.55		4480.41	4476.50	4481.25	259.08	0.45
Alpine	12.5	25yr		4717.55	1072.45		6.81	0.72		1.22	0.24	4483.52	4478.50	4484.11	930.84	0.37
Alpine	12.5	50yr	175.09	3315.01	4059.90	0.54	3.23	0.64	0.06	0.25	0.13	4488.20	4479.92	4488.28	1236.23	0.15
Alpine	12.5	100yr	3.34	7510.29	3181.37	0.37	9.86	1.29	0.07	2.56	0.69	4484.53	4483.88	4485.60	1152.08	0.53
Alpine	12.5	500yr	210.60	8931.38	7764.02	1.32	9.89	1.72	0.41	2.43	1.01	4486.49	4485.25	4487.31	1209.69	0.49
Alpine	12.5666*	2yr		427.00			4.28			0.89		4473.32	4472.41	4473.61	42.43	0.49
Alpine	12.5666*	5yr		1691.00			6.57			1.58		4476.51	4474.73	4477.18	56.02	0.54

HEC-RAS Plan: Opt E River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	13.5	100yr		9383.51	1320.49		12.18	1.64		4.46	1.34	4485.90	4485.90	4487.93	500.20	0.81
Alpine	13.5	500yr	3.96	13410.65	3501.39	0.48	14.08	2.37	0.22	5.62	2.37	4487.53	4487.53	4489.99	563.97	0.85
Alpine	13.75*	2yr		427.00			6.88			2.20		4478.29	4478.07	4479.02	32.09	0.87
Alpine	13.75*	5yr		1691.00			9.90			3.90		4480.78	4480.78	4482.30	55.79	1.00
Alpine	13.75*	10yr		3678.00			11.29			4.62		4483.04	4483.04	4485.01	80.79	0.99
Alpine	13.75*	25yr		5796.00			12.65			5.44		4484.55	4484.55	4487.04	93.33	1.01
Alpine	13.75*	50yr		7347.98	210.02		9.01	0.69		2.44	0.32	4487.94	4485.63	4489.17	452.47	0.59
Alpine	13.75*	100yr		10704.00			14.50			6.49		4487.26	4487.26	4490.52	380.22	1.00
Alpine	13.75*	500yr	6.76	14959.09	1950.14	0.50	14.34	1.89	0.23	5.72	1.66	4489.93	4489.93	4492.75	562.05	0.84
Alpine	14	2yr		427.00			4.85			1.00		4479.24	4478.11	4479.60	34.64	0.54
Alpine	14	5yr		1691.00			8.15			2.41		4482.04	4480.99	4483.07	50.23	0.71
Alpine	14	10yr		3678.00			12.32			5.22		4483.67	4483.58	4486.03	61.57	0.99
Alpine	14	25yr		5796.00			13.46			5.89		4485.61	4485.61	4488.42	75.22	0.99
Alpine	14	50yr		7558.00			12.47			4.83		4487.71	4486.85	4490.12	91.74	0.85
Alpine	14	100yr		10704.00			15.02			6.86		4488.82	4488.82	4492.32	100.41	0.99
Alpine	14	500yr	23.31	15429.70	1462.99	0.55	13.73	1.62	0.26	5.20	1.28	4492.48	4492.48	4495.15	619.00	0.78
Alpine	14.3		Bridge													
Alpine	14.5	2yr		427.00			4.16			0.72		4479.64	4478.11	4479.91	37.07	0.44
Alpine	14.5	5yr		1691.00			6.44			1.45		4483.07	4480.97	4483.71	57.35	0.53
Alpine	14.5	10yr		3681.00			8.16			2.15		4485.87	4483.58	4486.91	77.30	0.60
Alpine	14.5	25yr		5806.00			8.93			2.45		4488.18	4485.53	4489.42	95.42	0.60
Alpine	14.5	50yr		7570.00			8.13			1.93		4490.84	4486.83	4491.86	475.11	0.51
Alpine	14.5	100yr		10719.00			11.63			3.96		4490.75	4488.78	4492.85	454.85	0.73
Alpine	14.5	500yr	634.69	13086.57	3208.74	0.81	8.94	1.54	0.33	2.02	0.88	4495.39	4492.41	4496.36	929.76	0.45
Alpine	14.6666*	2yr		427.00			1.80			0.12		4479.99		4480.04	54.04	0.15
Alpine	14.6666*	5yr		1691.00			3.63			0.40		4483.77		4483.97	67.17	0.24
Alpine	14.6666*	10yr		3681.00			5.31			0.81		4486.84		4487.27	83.37	0.32
Alpine	14.6666*	25yr		5805.54	0.46		6.40	0.11		1.13	0.02	4489.18		4489.82	136.76	0.37
Alpine	14.6666*	50yr	34.41	6807.50	728.09	0.37	5.91	0.58	0.09	0.89	0.17	4491.67		4492.16	834.15	0.30
Alpine	14.6666*	100yr	131.05	8814.52	1773.44	0.50	6.94	0.86	0.14	1.19	0.33	4492.88		4493.50	947.56	0.34
Alpine	14.6666*	500yr	977.77	10985.32	4966.91	0.70	6.92	1.19	0.22	1.10	0.49	4496.12		4496.61	1234.30	0.30
Alpine	14.8333*	2yr		427.00			2.09			0.16		4480.02		4480.09	44.82	0.17
Alpine	14.8333*	5yr		1691.00			4.26			0.55		4483.81		4484.09	57.85	0.29
Alpine	14.8333*	10yr		3681.00			6.04			1.06		4486.90		4487.47	77.95	0.38
Alpine	14.8333*	25yr	16.67	5410.12	379.21	0.46	6.77	0.74	0.11	1.22	0.14	4489.31		4489.97	627.57	0.38
Alpine	14.8333*	50yr	143.63	5039.14	2387.23	0.49	4.97	0.95	0.10	0.61	0.16	4492.04		4492.30	1095.19	0.24
Alpine	14.8333*	100yr	327.54	5985.74	4405.72	0.55	5.33	1.17	0.11	0.68	0.22	4493.42		4493.68	1287.03	0.25
Alpine	14.8333*	500yr	1172.36	6634.41	9123.23	0.61	4.82	1.36	0.12	0.52	0.24	4496.61		4496.76	1553.83	0.20

HEC-RAS Plan: Opt E River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	15	2yr		427.00			2.34			0.21		4480.06		4480.15	44.32	0.20
Alpine	15	5yr		1691.00			4.71			0.65		4483.88		4484.22	50.37	0.31
Alpine	15	10yr	6.55	3560.82	113.63	0.41	6.59	0.60	0.09	1.18	0.10	4487.02		4487.67	365.30	0.39
Alpine	15	25yr	113.09	4067.27	1625.64	0.65	5.75	0.96	0.16	0.82	0.18	4489.80		4490.17	912.94	0.30
Alpine	15	50yr	251.33	3643.93	3674.74	0.50	4.27	0.91	0.09	0.43	0.13	4492.24		4492.38	1321.18	0.20
Alpine	15	100yr	453.12	4284.83	5981.05	0.51	4.58	1.07	0.09	0.47	0.17	4493.62		4493.76	1543.18	0.20
Alpine	15	500yr	1227.64	4717.11	10985.25	0.54	4.20	1.19	0.09	0.38	0.18	4496.72		4496.81	1855.00	0.17
Alpine	15.05		Bridge													
Alpine	15.1	2yr		419.00			2.00			0.14		4480.68	4477.23	4480.74	44.94	0.16
Alpine	15.1	5yr		1699.00			4.25			0.53		4484.64	4479.50	4484.92	55.40	0.28
Alpine	15.1	10yr	22.08	3456.46	332.46	0.48	5.85	0.67	0.11	0.90	0.11	4487.86	4482.10	4488.35	569.44	0.33
Alpine	15.1	25yr	139.77	4124.95	1880.28	0.67	5.64	0.93	0.16	0.78	0.17	4490.20	4484.69	4490.54	1060.40	0.28
Alpine	15.1	50yr	269.75	3774.25	3963.00	0.50	4.38	0.94	0.09	0.45	0.14	4492.38	4488.17	4492.53	1344.88	0.20
Alpine	15.1	100yr	489.71	4416.28	6334.00	0.53	4.68	1.11	0.10	0.49	0.18	4493.76	4489.46	4493.90	1565.39	0.21
Alpine	15.1	500yr	1288.65	4821.50	11336.85	0.55	4.28	1.21	0.09	0.39	0.19	4496.80	4491.04	4496.89	1855.00	0.17
Alpine	15.1666*	2yr		419.00			2.46			0.24		4480.70		4480.79	44.05	0.22
Alpine	15.1666*	5yr		1699.00			4.81			0.66		4484.68		4485.04	48.23	0.31
Alpine	15.1666*	10yr	0.32	3772.22	38.46	0.26	7.09	0.64	0.04	1.38	0.12	4487.83		4488.60	158.79	0.42
Alpine	15.1666*	25yr	43.70	5332.71	768.59	0.73	8.00	1.03	0.20	1.62	0.24	4490.02		4490.89	655.86	0.43
Alpine	15.1666*	50yr	176.75	5138.65	2691.60	0.72	6.38	1.10	0.17	0.97	0.22	4492.30		4492.71	1133.51	0.31
Alpine	15.1666*	100yr	355.47	5791.04	5093.48	0.75	6.49	1.32	0.18	0.97	0.29	4493.70		4494.05	1314.34	0.30
Alpine	15.1666*	500yr	1130.01	5967.19	10349.79	0.75	5.52	1.41	0.15	0.66	0.28	4496.78		4496.96	1656.32	0.23
Alpine	15.3333*	2yr		419.00			3.08			0.41		4480.84		4480.99	43.27	0.31
Alpine	15.3333*	5yr		1699.00			5.34			0.86		4484.87		4485.31	47.29	0.36
Alpine	15.3333*	10yr		3810.73	0.27		7.78	0.16		1.68	0.03	4488.12		4489.06	74.31	0.48
Alpine	15.3333*	25yr	2.58	6030.87	111.55	0.51	9.82	0.74	0.14	2.52	0.30	4490.12		4491.59	226.62	0.55
Alpine	15.3333*	50yr	61.96	7076.94	868.10	0.86	9.59	0.89	0.28	2.26	0.37	4492.10		4493.36	721.56	0.49
Alpine	15.3333*	100yr	186.90	8880.98	2172.12	1.10	10.86	1.13	0.42	2.80	0.55	4493.36		4494.82	1056.53	0.53
Alpine	15.3333*	500yr	882.01	9381.10	7183.89	1.07	9.18	1.37	0.34	1.86	0.62	4496.63		4497.35	1516.14	0.40
Alpine	15.5	2yr		419.00			3.82			0.69		4481.15		4481.37	42.66	0.42
Alpine	15.5	5yr		1699.00			5.91			1.10		4485.13		4485.67	46.64	0.42
Alpine	15.5	10yr		3811.00			8.36			1.93		4488.52		4489.61	57.27	0.52
Alpine	15.5	25yr		6119.16	25.84		10.49	0.62		2.92	0.25	4490.60		4492.30	127.24	0.61
Alpine	15.5	50yr	5.46	7798.40	203.13	0.63	11.32	0.72	0.20	3.22	0.31	4492.25		4494.19	406.30	0.61
Alpine	15.5	100yr	40.82	10367.03	832.15	1.00	13.68	1.13	0.42	4.56	0.64	4493.33		4496.01	635.93	0.70
Alpine	15.5	500yr	495.50	11787.65	5163.85	1.29	12.26	1.54	0.54	3.39	0.89	4496.50		4498.09	1266.47	0.56
Alpine	15.55		Bridge													
Alpine	15.6	2yr		419.00			1.95			0.14		4483.55	4479.98	4483.61	45.07	0.16

HEC-RAS Plan: Opt E River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	15.6	5yr		1699.00			4.69			0.62		4486.71	4482.25	4487.05	48.22	0.30
Alpine	15.6	10yr		3800.90	10.10		6.68	0.35		1.19	0.09	4490.37	4484.85	4491.06	115.99	0.39
Alpine	15.6	25yr	11.89	5824.10	309.01	0.51	7.99	0.61	0.12	1.58	0.19	4492.87	4487.14	4493.81	532.81	0.42
Alpine	15.6	50yr	93.28	6653.14	1260.58	0.71	7.86	0.76	0.18	1.45	0.26	4494.70	4489.15	4495.50	1006.12	0.38
Alpine	15.6	100yr	318.85	7596.69	3324.46	0.83	7.90	0.99	0.22	1.41	0.37	4496.50	4491.89	4497.16	1266.11	0.36
Alpine	15.6	500yr	839.81	9656.09	6951.10	1.03	9.01	1.34	0.32	1.76	0.59	4498.23	4495.91	4498.94	1482.52	0.39
Alpine	15.75*	2yr		419.00			2.59			0.27		4483.60		4483.71	43.86	0.24
Alpine	15.75*	5yr		1699.00			5.51			0.93		4486.83		4487.30	47.09	0.38
Alpine	15.75*	10yr		3809.86	1.14		7.46	0.24		1.56	0.05	4490.56		4491.42	82.39	0.46
Alpine	15.75*	25yr	2.35	6006.84	135.82	0.45	8.98	0.56	0.11	2.09	0.19	4493.01		4494.23	384.18	0.49
Alpine	15.75*	50yr	51.31	7070.59	885.10	0.74	9.03	0.82	0.22	2.01	0.32	4494.76		4495.88	784.56	0.46
Alpine	15.75*	100yr	232.38	8282.37	2725.24	0.93	9.22	1.07	0.29	2.00	0.46	4496.53		4497.50	1163.30	0.44
Alpine	15.75*	500yr	701.91	10451.36	6293.73	1.18	10.32	1.45	0.43	2.41	0.73	4498.29		4499.29	1395.41	0.46
Alpine	16.*	2yr		419.00			3.56			0.58		4483.84		4484.04	42.84	0.38
Alpine	16.*	5yr		1699.00			6.34			1.31		4487.22		4487.84	46.22	0.46
Alpine	16.*	10yr		3810.93	0.07		8.07	0.14		1.80	0.02	4491.05		4492.06	68.93	0.52
Alpine	16.*	25yr	0.40	6037.97	106.63	0.34	9.56	0.76	0.07	2.32	0.24	4493.51		4494.90	236.94	0.55
Alpine	16.*	50yr	24.70	7366.62	615.69	0.67	10.03	0.84	0.20	2.43	0.35	4495.06		4496.50	647.99	0.53
Alpine	16.*	100yr	161.19	8951.46	2127.35	0.97	10.63	1.10	0.34	2.60	0.52	4496.69		4498.09	1068.23	0.52
Alpine	16.*	500yr	590.03	11238.90	5618.07	1.31	11.69	1.52	0.53	3.01	0.85	4498.50		4499.87	1316.18	0.54
Alpine	16.25*	2yr		419.00			4.43			0.98		4484.55		4484.85	42.30	0.52
Alpine	16.25*	5yr		1699.00			7.04			1.69		4487.89		4488.66	46.07	0.54
Alpine	16.25*	10yr		3811.00	0.00		8.54	0.07		2.08	0.01	4491.72		4492.85	64.70	0.57
Alpine	16.25*	25yr	0.00	6050.93	94.06	0.11	9.98	0.87	0.01	2.60	0.39	4494.17		4495.70	160.93	0.59
Alpine	16.25*	50yr	13.40	7511.25	482.35	0.61	10.68	0.84	0.18	2.84	0.37	4495.62		4497.28	592.83	0.58
Alpine	16.25*	100yr	128.06	9282.59	1829.34	1.01	11.50	1.13	0.38	3.14	0.57	4497.17		4498.86	1016.89	0.58
Alpine	16.25*	500yr	532.56	11601.62	5312.82	1.39	12.48	1.59	0.62	3.53	0.95	4498.98		4500.60	1273.30	0.59
Alpine	16.5	2yr		419.00			4.59			1.05		4485.72		4486.04	42.21	0.55
Alpine	16.5	5yr		1699.00			7.43			1.92		4488.82		4489.68	47.70	0.60
Alpine	16.5	10yr		3810.99	0.01		8.85	0.09		2.27	0.01	4492.54		4493.75	65.65	0.60
Alpine	16.5	25yr		6057.80	87.20		10.27	0.91		2.79	0.36	4494.96		4496.57	165.46	0.61
Alpine	16.5	50yr	8.29	7578.83	419.88	0.54	11.09	0.84	0.16	3.10	0.38	4496.33		4498.14	567.42	0.62
Alpine	16.5	100yr	113.21	9442.74	1684.05	1.02	12.02	1.15	0.40	3.48	0.60	4497.82		4499.71	991.65	0.63
Alpine	16.5	500yr	500.08	11752.31	5194.61	1.46	12.94	1.66	0.68	3.84	1.04	4499.61		4501.38	1219.62	0.63
Alpine	16.7		Bridge													
Alpine	17	2yr		419.00			4.34			0.87		4486.28	4485.42	4486.58	42.28	0.51
Alpine	17	5yr		1699.00			7.27			1.76		4489.34	4487.71	4490.16	48.99	0.59
Alpine	17	10yr		3809.66	1.34		8.66	0.33		2.10	0.09	4493.00	4490.35	4494.16	79.52	0.58
Alpine	17	25yr	0.05	6044.48	100.47	0.20	10.07	0.57	0.03	2.60	0.21	4495.41	4492.69	4496.96	348.54	0.60

HEC-RAS Plan: Opt E River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	17	50yr	150.20	6044.80	1812.00	0.73	7.34	0.81	0.19	1.24	0.28	4498.68	4494.28	4499.31	1133.53	0.37
Alpine	17	100yr	305.27	7132.32	3802.41	0.68	7.74	1.05	0.16	1.33	0.40	4500.11	4497.72	4500.71	1381.74	0.37
Alpine	17	500yr	1084.39	9024.78	7337.83	1.15	8.75	1.39	0.37	1.64	0.62	4501.71	4499.45	4502.34	1401.80	0.40
Alpine	17.05*	2yr		419.00			4.69			1.12		4487.12		4487.46	42.18	0.57
Alpine	17.05*	5yr		1699.00			7.63			2.09		4490.12		4491.02	48.36	0.63
Alpine	17.05*	10yr		3811.00			8.93			2.40		4493.65		4494.89	68.22	0.63
Alpine	17.05*	25yr		6077.08	67.92		10.20	0.93		2.84	0.41	4496.03		4497.63	141.68	0.63
Alpine	17.05*	50yr	76.54	7063.74	866.72	0.77	8.91	0.85	0.22	1.97	0.31	4498.71		4499.80	833.95	0.48
Alpine	17.05*	100yr	283.49	8513.85	2442.66	1.04	9.50	1.13	0.35	2.15	0.47	4500.13		4501.19	1120.40	0.48
Alpine	17.05*	500yr	640.91	10970.28	5835.81	1.06	10.83	1.59	0.36	2.69	0.80	4501.72		4502.88	1411.59	0.51
Alpine	17.1*	2yr		419.00			4.58			1.06		4488.11		4488.43	42.23	0.55
Alpine	17.1*	5yr		1699.00			7.70			2.13		4491.03		4491.95	47.76	0.63
Alpine	17.1*	10yr		3811.00			9.01			2.47		4494.42		4495.68	70.86	0.65
Alpine	17.1*	25yr		6116.99	28.01		10.25	0.79		2.90	0.31	4496.73		4498.36	125.31	0.65
Alpine	17.1*	50yr	22.89	7719.93	264.18	0.67	10.15	0.80	0.19	2.62	0.29	4498.83		4500.38	468.66	0.57
Alpine	17.1*	100yr	128.59	10137.77	973.64	1.08	11.98	1.14	0.42	3.53	0.51	4499.93		4501.94	774.39	0.64
Alpine	17.1*	500yr	445.87	14077.58	2923.54	1.65	15.00	1.73	0.85	5.35	1.03	4501.10		4503.93	1036.57	0.76
Alpine	17.15*	2yr		419.00			4.58			1.06		4489.04		4489.37	42.23	0.55
Alpine	17.15*	5yr		1699.00			7.75			2.15		4491.96		4492.89	46.84	0.63
Alpine	17.15*	10yr		3811.00			9.05			2.50		4495.26		4496.53	73.28	0.66
Alpine	17.15*	25yr		6138.14	6.86		10.27	0.57		2.93	0.17	4497.50		4499.13	113.24	0.67
Alpine	17.15*	50yr	8.06	7863.55	135.39	0.60	10.47	1.17	0.16	2.83	0.48	4499.34		4501.01	195.38	0.61
Alpine	17.15*	100yr	73.58	10768.97	397.45	1.05	12.81	1.06	0.40	4.08	0.44	4500.43	4498.81	4502.87	542.25	0.71
Alpine	17.15*	500yr	353.16	15345.03	1748.81	1.71	16.22	1.71	0.91	6.29	0.97	4501.69		4505.29	857.82	0.85
Alpine	17.2	2yr		419.00			4.58			1.06		4489.98		4490.31	42.23	0.55
Alpine	17.2	5yr		1699.00			7.79			2.16		4492.88		4493.83	45.60	0.63
Alpine	17.2	10yr		3811.00			9.06			2.52		4496.13		4497.41	75.58	0.68
Alpine	17.2	25yr		6144.82	0.18		10.24	0.23		2.94	0.04	4498.33		4499.96	95.82	0.69
Alpine	17.2	50yr	3.87	7935.97	67.17	0.64	10.68	1.09	0.18	2.98	0.40	4499.96		4501.71	160.31	0.65
Alpine	17.2	100yr	52.32	10997.22	190.47	1.01	12.90	1.04	0.38	4.15	0.40	4501.20	4499.71	4503.73	368.97	0.73
Alpine	17.2	500yr	1101.31	12063.06	4282.63	1.36	9.78	1.55	0.45	2.11	0.55	4505.53	4503.92	4506.57	1208.65	0.46
Alpine	17.3		Bridge													
Alpine	17.4214	2yr		419.00			4.40			0.96		4490.57	4489.75	4490.87	42.31	0.52
Alpine	17.4214	5yr		1699.00			7.37			1.99		4493.61	4492.01	4494.46	51.47	0.61
Alpine	17.4214	10yr		3809.85	1.15		6.40	0.33		1.29	0.04	4498.53	4494.96	4499.16	105.89	0.43
Alpine	17.4214	25yr	2.42	6088.77	53.80	0.71	8.73	1.15	0.14	2.28	0.28	4499.69	4496.82	4500.87	148.35	0.55
Alpine	17.4214	50yr	18.90	7819.88	168.22	0.92	10.09	1.63	0.21	2.93	0.49	4500.57	4498.03	4502.12	200.06	0.60
Alpine	17.4214	100yr	827.65	7183.35	3229.00	1.14	6.06	1.28	0.19	0.92	0.23	4505.24	4500.14	4505.61	1178.48	0.29
Alpine	17.4214	500yr	1561.85	9269.99	6615.15	1.20	7.04	1.76	0.22	1.20	0.38	4506.73	4503.88	4507.16	1455.56	0.32

HEC-RAS Plan: Opt E River: Alpine Creek Reach: Alpine (Continued)

Reach	River Sta	Profile	Q Left	Q Channel	Q Right	Vel Left	Vel Chnl	Vel Right	Shear LOB	Shear Chan	Shear ROB	W.S. Elev	Crit W.S.	E.G. Elev	Top Width	Froude # Chl
			(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(ft/s)	(lb/sq ft)	(lb/sq ft)	(lb/sq ft)	(ft)	(ft)	(ft)	(ft)	
Alpine	17.5371*	2yr		419.00			4.58			1.06		4491.65		4491.98	42.23	0.55
Alpine	17.5371*	5yr		1699.00			7.34			2.00		4494.74		4495.57	52.32	0.62
Alpine	17.5371*	10yr		3811.00			6.89			1.55		4499.01		4499.75	92.26	0.50
Alpine	17.5371*	25yr	0.09	6131.01	13.90	0.31	8.91	0.86	0.04	2.45	0.19	4500.43		4501.66	131.12	0.59
Alpine	17.5371*	50yr	8.28	7912.07	86.65	0.84	10.09	1.47	0.19	3.01	0.43	4501.42		4502.98	172.88	0.62
Alpine	17.5371*	100yr	605.62	8974.43	1659.95	1.36	7.76	1.30	0.29	1.56	0.28	4505.27		4506.02	959.67	0.40
Alpine	17.5371*	500yr	1439.33	11615.47	4392.20	1.71	8.91	1.87	0.43	1.98	0.49	4506.78		4507.62	1160.47	0.43
Alpine	17.6528*	2yr		419.00			4.58			1.06		4492.82		4493.15	42.23	0.55
Alpine	17.6528*	5yr		1699.00			7.25			1.96		4495.88		4496.70	54.35	0.62
Alpine	17.6528*	10yr		3811.00			7.39			1.84		4499.64		4500.49	94.78	0.56
Alpine	17.6528*	25yr		6143.14	1.86		9.01	0.55		2.58	0.10	4501.29		4502.55	118.77	0.62
Alpine	17.6528*	50yr	3.42	7961.35	42.24	0.72	10.02	1.28	0.15	3.04	0.36	4502.36		4503.91	158.52	0.64
Alpine	17.6528*	100yr	344.49	10376.69	518.83	1.46	9.38	1.20	0.37	2.38	0.28	4505.31		4506.57	633.52	0.51
Alpine	17.6528*	500yr	1011.97	14431.20	2003.83	2.08	11.58	1.86	0.68	3.49	0.58	4506.63		4508.37	919.23	0.59
Alpine	17.7685*	2yr		419.00			4.58			1.06		4493.99		4494.32	42.23	0.55
Alpine	17.7685*	5yr		1699.00			7.13			1.91		4497.03		4497.82	56.78	0.61
Alpine	17.7685*	10yr		3811.00			7.76			2.08		4500.46		4501.40	96.23	0.61
Alpine	17.7685*	25yr		6144.95	0.05		9.04	0.24		2.65	0.03	4502.27		4503.54	114.68	0.65
Alpine	17.7685*	50yr	1.01	7986.15	19.84	0.54	9.91	1.11	0.10	3.03	0.29	4503.38		4504.90	151.03	0.66
Alpine	17.7685*	100yr	186.97	10835.04	217.99	1.39	10.07	1.51	0.38	2.84	0.43	4505.75		4507.27	336.38	0.58
Alpine	17.7685*	500yr	673.34	16055.75	717.91	2.19	13.24	1.68	0.82	4.72	0.55	4506.94		4509.45	660.79	0.72
Alpine	17.8842*	2yr		419.00			4.58			1.06		4495.16		4495.49	42.23	0.55
Alpine	17.8842*	5yr		1699.00			6.99			1.86		4498.18		4498.94	59.42	0.61
Alpine	17.8842*	10yr		3811.00			7.95			2.17		4501.42		4502.40	91.84	0.61
Alpine	17.8842*	25yr		6145.00			9.02			2.67		4503.34		4504.60	116.59	0.66
Alpine	17.8842*	50yr	0.08	7997.71	9.21	0.27	9.78	0.96	0.04	3.01	0.24	4504.47		4505.95	146.56	0.67
Alpine	17.8842*	100yr	108.82	10985.61	145.58	1.31	10.35	1.77	0.36	3.09	0.56	4506.45		4508.07	265.23	0.62
Alpine	17.8842*	500yr	608.19	16462.64	376.17	2.16	13.15	1.54	0.80	4.72	0.48	4507.99	4506.85	4510.53	540.65	0.73
Alpine	18	2yr		419.00			4.58			1.06		4496.33		4496.66	42.23	0.55
Alpine	18	5yr		1699.00			6.86			1.81		4499.31		4500.04	61.99	0.60
Alpine	18	10yr		3811.00			8.04			2.20		4502.39		4503.39	86.07	0.61
Alpine	18	25yr		6145.00			8.98			2.66		4504.43		4505.68	117.85	0.66
Alpine	18	50yr		8002.81	4.19		9.63	0.84		2.96	0.19	4505.60		4507.04	143.53	0.67
Alpine	18	100yr	67.71	11090.28	82.01	1.25	10.51	1.68	0.34	3.26	0.53	4507.30		4508.99	239.14	0.66
Alpine	18	500yr	630.54	16482.43	334.03	2.10	12.48	1.81	0.75	4.27	0.61	4509.31		4511.60	445.86	0.70
Alpine	18.2*	2yr		419.00			6.20			1.88		4501.94	4501.74	4502.54	41.04	0.85
Alpine	18.2*	5yr		1699.00			8.85			3.11		4504.30		4505.52	62.61	0.89
Alpine	18.2*	10yr		3811.00			10.53			3.92		4506.65		4508.38	83.29	0.89
Alpine	18.2*	25yr		6144.92	0.08		11.10	0.34		4.08	0.06	4508.69		4510.60	108.06	0.85

Appendix D
Hydrologic Model Input/Output and Watershed Boundary Map

```
Basin: Alpine Creek
     Description: Flows north through the City of Alpine, TX
     Last Modified Date: 29 January 2001
     Last Modified Time: 09:19:10
     Version: 2.0.3
     Unit System: English
     Default DSS File Name: D:\Projects\Alpine\Alpine\Alpine.dss
End:

Reach: R-C2
     Canvas X: 434.254
     Canvas Y: 248.337
     From Canvas X: 509.801
     From Canvas Y: 11.395
     Label X: 13
     Label Y: -2
     Downstream: J-12

     Route: Muskingum
     Muskingum K: 0.170
     Muskingum X: 0.25
     Muskingum Steps: 1
End:

Junction: J-12
     Canvas X: 434.254
     Canvas Y: 248.337
     Label X: 16
     Label Y: 0
     Downstream: R-C1
End:

Junction: J-13
     Canvas X: 297.442
     Canvas Y: 450.585
     Label X: 16
     Label Y: 0
     Downstream: R-C4
End:

Reach: R-C1
     Canvas X: 297.442
     Canvas Y: 450.585
     From Canvas X: 434.254
     From Canvas Y: 248.337
     Label X: 16
     Label Y: 0
     Downstream: J-13

     Route: Muskingum
     Muskingum K: 0.126
     Muskingum X: 0.25
     Muskingum Steps: 1
End:

Reach: R-C4
     Canvas X: 362.141
     Canvas Y: 900.787
     From Canvas X: 297.442
     From Canvas Y: 450.585
     Label X: 16
     Label Y: 0
     Downstream: J-14

     Route: Muskingum
     Muskingum K: 0.729
     Muskingum X: 0.25
     Muskingum Steps: 1
End:

Junction: J-14
     Canvas X: 362.141
     Canvas Y: 900.787
     Label X: 16
     Label Y: 0
     Downstream: R-C6A.1
End:

Junction: J-9
     Canvas X: 753.611
     Canvas Y: 1148.031
     Label X: 14
     Label Y: 7
     Downstream: R-C6B
End:

Reach: R-C6A.1
     Canvas X: 753.611
     Canvas Y: 1148.031
     From Canvas X: 362.141
     From Canvas Y: 900.787
```

```
     Label X: -56
     Label Y: -6
     Downstream: J-9

     Route: Muskingum
     Muskingum K: 0.139
     Muskingum X: 0.25
     Muskingum Steps: 1
End:

Reach: R-C6A.2
     Canvas X: 753.611
     Canvas Y: 1148.031
     From Canvas X: 705.536
     From Canvas Y: 656.977
     Label X: 7
     Label Y: -28
     Downstream: J-9

     Route: Muskingum
     Muskingum K: 0.107
     Muskingum X: 0.25
     Muskingum Steps: 1
End:

Reach: R-B3.1
     Canvas X: 959.648
     Canvas Y: 880.183
     From Canvas X: 880.667
     From Canvas Y: 471.544
     Label X: 2
     Label Y: -18
     Downstream: J-8

     Route: Muskingum
     Muskingum K: 0.248
     Muskingum X: 0.25
     Muskingum Steps: 1
End:

Junction: J-8
     Canvas X: 959.648
     Canvas Y: 880.183
     Label X: 16
     Label Y: 0
     Downstream: R-B4
End:

Reach: R-B3.2
     Canvas X: 959.648
     Canvas Y: 880.183
     From Canvas X: 1309.209
     From Canvas Y: 648.702
     Label X: 16
     Label Y: 0
     Downstream: J-8

     Route: Muskingum
     Muskingum K: 0.373
     Muskingum X: 0.25
     Muskingum Steps: 1
End:

Reach: R-B4
     Canvas X: 753.611
     Canvas Y: 1148.031
     From Canvas X: 959.648
     From Canvas Y: 880.183
     Label X: 2
     Label Y: 2
     Downstream: J-9

     Route: Muskingum
     Muskingum K: 0.100
     Muskingum X: 0.25
     Muskingum Steps: 1
End:

Reach: R-C6B
     Canvas X: 777.512
     Canvas Y: 1431.096
     From Canvas X: 753.611
     From Canvas Y: 1148.031
     Label X: 16
     Label Y: 0
     Downstream: J-10

     Route: Muskingum
     Muskingum K: 0.100
     Muskingum X: 0.25
     Muskingum Steps: 1
```

```
End:

Junction: J-10
     Canvas X: 777.512
     Canvas Y: 1431.096
     Label X: 16
     Label Y: 0
     Downstream: R-C7
End:

Junction: Alpine
     Canvas X: 843.630
     Canvas Y: 1734.136
     Label X: 16
     Label Y: 0
End:

Reach: R-C7
     Canvas X: 843.630
     Canvas Y: 1734.136
     From Canvas X: 777.512
     From Canvas Y: 1431.096
     Label X: 16
     Label Y: 0
     Downstream: Alpine

     Route: Muskingum
     Muskingum K: 0.156
     Muskingum X: 0.25
     Muskingum Steps: 1
End:

Subbasin: C1
     Canvas X: 125.199
     Canvas Y: 210.564
     Label X: 16
     Label Y: 0
     Area: 2.11
     Downstream: J-13

     LossRate: Initial+Constant
     Percent Impervious Area: 0.0
     Initial Loss: 0.5
     Constant Loss Rate: 0.11

     Transform: Snyder
     SnyderTp: 0.55
     SnyderCp: 0.32

     Baseflow: None
End:

Subbasin: C2
     Canvas X: 324.368
     Canvas Y: -16.076
     Label X: 16
     Label Y: 0
     Area: 2.40
     Downstream: J-12

     LossRate: Initial+Constant
     Percent Impervious Area: 0.0
     Initial Loss: 0.5
     Constant Loss Rate: 0.11

     Transform: Snyder
     SnyderTp: 0.89
     SnyderCp: 0.42

     Baseflow: None
End:

Subbasin: C4
     Canvas X: 138.283
     Canvas Y: 689.611
     Label X: 16
     Label Y: 0
     Area: 1.62
     Downstream: J-14

     LossRate: Initial+Constant
     Percent Impervious Area: 0.0
     Initial Loss: 0.5
     Constant Loss Rate: 0.4

     Transform: Snyder
     SnyderTp: 0.66
     SnyderCp: 0.39

     Baseflow: None
End:
```

```
Subbasin: C6A
     Canvas X: 544.140
     Canvas Y: 818.372
     Label X: 16
     Label Y: 0
     Area: 0.80
     Downstream: J-9

     LossRate: Initial+Constant
     Percent Impervious Area: 0.0
     Initial Loss: 0.5
     Constant Loss Rate: 0.4

     Transform: Snyder
     SnyderTp: 1.04
     SnyderCp: 0.30

     Baseflow: None
End:

Subbasin: C6B
     Canvas X: 578.480
     Canvas Y: 1261.351
     Label X: 16
     Label Y: 0
     Area: 0.55
     Downstream: J-10

     LossRate: Initial+Constant
     Percent Impervious Area: 0.0
     Initial Loss: 0.5
     Constant Loss Rate: 0.4

     Transform: Snyder
     SnyderTp: 1.62
     SnyderCp: 0.27

     Baseflow: None
End:

Subbasin: B1
     Canvas X: 938.583
     Canvas Y: 303.964
     Label X: 16
     Label Y: 0
     Area: 2.39
     Downstream: R-B3.1

     LossRate: Initial+Constant
     Percent Impervious Area: 0.0
     Initial Loss: 0.5
     Constant Loss Rate: 0.11

     Transform: Snyder
     SnyderTp: 0.89
     SnyderCp: 0.42

     Baseflow: None
End:

Subbasin: B2
     Canvas X: 1403.771
     Canvas Y: 480.973
     Label X: 16
     Label Y: 0
     Area: 0.91
     Downstream: R-B3.2

     LossRate: Initial+Constant
     Percent Impervious Area: 0.0
     Initial Loss: 0.5
     Constant Loss Rate: 0.4

     Transform: Snyder
     SnyderTp: 0.59
     SnyderCp: 0.26

     Baseflow: None
End:

Subbasin: B3
     Canvas X: 1158.816
     Canvas Y: 457.808
     Label X: 16
     Label Y: 0
     Area: 1.78
     Downstream: J-8

     LossRate: Initial+Constant
     Percent Impervious Area: 0.0
```

```
     Initial Loss: 0.5
     Constant Loss Rate: 0.4

     Transform: Snyder
     SnyderTp: 1.60
     SnyderCp: 0.33

     Baseflow: None
End:

Subbasin: B4
     Canvas X: 1083.270
     Canvas Y: 1069.050
     Label X: 16
     Label Y: 0
     Area: 0.42
     Downstream: J-9

     LossRate: Initial+Constant
     Percent Impervious Area: 0.0
     Initial Loss: 0.5
     Constant Loss Rate: 0.4

     Transform: Snyder
     SnyderTp: 0.53
     SnyderCp: 0.18

     Baseflow: None
End:

Subbasin: C7
     Canvas X: 595.649
     Canvas Y: 1587.576
     Label X: 16
     Label Y: 0
     Area: 0.94
     Downstream: Alpine

     LossRate: Initial+Constant
     Percent Impervious Area: 70
     Initial Loss: 0.5
     Constant Loss Rate: 0.4

     Transform: Snyder
     SnyderTp: 1.75
     SnyderCp: 0.34

     Baseflow: None
End:

Subbasin: C5
     Canvas X: 678.665
     Canvas Y: 556.308
     Label X: 16
     Label Y: 0
     Area: 2.15
     Downstream: R-C6A.2

     LossRate: Initial+Constant
     Percent Impervious Area: 0.0
     Initial Loss: 0.5
     Constant Loss Rate: 0.11

     Transform: Snyder
     SnyderTp: 0.89
     SnyderCp: 0.41

     Baseflow: None
End:

Subbasin: C3
     Canvas X: 605.951
     Canvas Y: -36.680
     Label X: 16
     Label Y: 0
     Area: 2.56
     Downstream: R-C2

     LossRate: Initial+Constant
     Percent Impervious Area: 0.0
     Initial Loss: 0.5
     Constant Loss Rate: 0.11

     Transform: Snyder
     SnyderTp: 0.68
     SnyderCp: 0.34

     Baseflow: None
End:
```

HMS * Summary of Results

Project : Alpine Run Name : Run 2

Start of Run : 01Apr01 0000 Basin Model : Alpine Creek
End of Run : 04Apr01 0000 Met. Model : Met 1
Execution Time : 30Jul01 1041 Control Specs : SCS Type I 48hr

Hydrologic Element	Discharge Peak (cfs)	Time of Peak	Volume (ac ft)	Drainage Area (sq mi)
C3	2112.1	02 Apr 01 0100	492.51	2.560
R-C2	2099.9	02 Apr 01 0100	492.51	2.560
C2	2357.5	02 Apr 01 0100	462.01	2.400
J-12	4457.4	02 Apr 01 0100	954.51	4.960
R-C1	4208.5	02 Apr 01 0100	954.56	4.960
C1	1628.8	02 Apr 01 0100	406.63	2.110
J-13	5837.3	02 Apr 01 0100	1361.2	7.070
R-C4	5066.7	02 Apr 01 0200	1361.2	7.070
C4	1448.7	02 Apr 01 0100	290.62	1.620
J-14	5842.3	02 Apr 01 0200	1651.8	8.690
R-C6A.1	5936.6	02 Apr 01 0200	1651.8	8.690
C5	2069.8	02 Apr 01 0100	414.27	2.150
R-C6A.2	2005.1	02 Apr 01 0100	414.27	2.150
B1	2347.8	02 Apr 01 0100	460.10	2.390
R-B3.1	2241.5	02 Apr 01 0130	460.10	2.390
B2	528.51	02 Apr 01 0100	163.75	0.910
R-B3.2	499.72	02 Apr 01 0130	163.75	0.910
B3	738.54	02 Apr 01 0130	319.11	1.780
J-8	3479.7	02 Apr 01 0130	942.95	5.080
R-B4	3507.6	02 Apr 01 0130	942.95	5.080
C6A	453.24	02 Apr 01 0100	144.02	0.800
B4	167.78	02 Apr 01 0100	75.735	0.420
J-9	11387	02 Apr 01 0130	3228.8	17.140
R-C6B	11152	02 Apr 01 0130	3228.8	17.140
C6B	189.84	02 Apr 01 0130	99.121	0.550
J-10	11342	02 Apr 01 0130	3327.9	17.690
R-C7	11612	02 Apr 01 0200	3327.9	17.690
C7	436.51	02 Apr 01 0200	199.39	0.940
Alpine	12049	02 Apr 01 0200	3527.3	18.630

HMS * Summary of Results for Alpine

Project : Alpine Run Name : Run 2

Start of Run : 01Apr01 0000 Basin Model : Alpine Creek

End of Run : 04Apr01 0000 Met. Model : Met 1

Execution Time : 30Jul01 1041 Control Specs : SCS Type I 48hr

Date	Time	Inflow (cfs) from R-C7	Inflow (cfs) from C7	Outflow (cfs)
31 Mar 01	2400	0	0	0
01 Apr 01	0030	0	0	0
01 Apr 01	0100	0	0	0
01 Apr 01	0130	0	0	0
01 Apr 01	0200	0	0	0
01 Apr 01	0230	0	0	0
01 Apr 01	0300	0	0	0
01 Apr 01	0330	0	0	0
01 Apr 01	0400	0	0	0
01 Apr 01	0430	0	0	0
01 Apr 01	0500	0	0	0
01 Apr 01	0530	0	0	0
01 Apr 01	0600	0	0	0
01 Apr 01	0630	0	0	0
01 Apr 01	0700	0	0	0
01 Apr 01	0730	0	0	0
01 Apr 01	0800	0	0	0
01 Apr 01	0830	0	0	0
01 Apr 01	0900	0	0	0
01 Apr 01	0930	0	0	0
01 Apr 01	1000	0	0	0
01 Apr 01	1030	0	0	0
01 Apr 01	1100	0	0	0
01 Apr 01	1130	0	0	0
01 Apr 01	1200	0	0	0
01 Apr 01	1230	0	0	0
01 Apr 01	1300	0	0	0
01 Apr 01	1330	0	0	0
01 Apr 01	1400	0	0	0
01 Apr 01	1430	0	0	0
01 Apr 01	1500	0	0	0
01 Apr 01	1530	0	0	0
01 Apr 01	1600	0	0	0

Date	Time	Inflow (cfs) from R-C7	Inflow (cfs) from C7	Outflow (cfs)
01 Apr 01	1630	0	0	0
01 Apr 01	1700	0	0	0
01 Apr 01	1730	0	0	0
01 Apr 01	1800	0	0	0
01 Apr 01	1830	0	0	0
01 Apr 01	1900	0	0	0
01 Apr 01	1930	0	0	0
01 Apr 01	2000	0	0	0
01 Apr 01	2030	0	0	0
01 Apr 01	2100	0	0	0
01 Apr 01	2130	0	0	0
01 Apr 01	2200	0	0	0
01 Apr 01	2230	0	0	0
01 Apr 01	2300	0	0	0
01 Apr 01	2330	0	0	0
01 Apr 01	2400	363	32	395
02 Apr 01	0030	2355	148	2503
02 Apr 01	0100	6558	319	6877
02 Apr 01	0130	10562	431	10994
02 Apr 01	0200	11612	437	12049
02 Apr 01	0230	10192	392	10585
02 Apr 01	0300	8160	348	8508
02 Apr 01	0330	6382	309	6691
02 Apr 01	0400	4984	274	5258
02 Apr 01	0430	3879	243	4122
02 Apr 01	0500	3029	216	3245
02 Apr 01	0530	2385	191	2576
02 Apr 01	0600	1884	170	2054
02 Apr 01	0630	1502	151	1653
02 Apr 01	0700	1205	134	1338
02 Apr 01	0730	974	119	1092
02 Apr 01	0800	792	105	897
02 Apr 01	0830	646	93	740
02 Apr 01	0900	523	83	606
02 Apr 01	0930	417	73	491
02 Apr 01	1000	339	65	405
02 Apr 01	1030	287	58	345
02 Apr 01	1100	245	51	296
02 Apr 01	1130	208	46	254
02 Apr 01	1200	177	40	217
02 Apr 01	1230	147	36	183

Date	Time	Inflow (cfs) from R-C7	Inflow (cfs) from C7	Outflow (cfs)
02 Apr 01	1300	120	32	152
02 Apr 01	1330	98	28	126
02 Apr 01	1400	81	25	106
02 Apr 01	1430	66	22	88
02 Apr 01	1500	52	20	72
02 Apr 01	1530	42	17	60
02 Apr 01	1600	36	16	52
02 Apr 01	1630	32	14	45
02 Apr 01	1700	28	12	40
02 Apr 01	1730	25	11	36
02 Apr 01	1800	22	10	32
02 Apr 01	1830	20	9	28
02 Apr 01	1900	18	8	25
02 Apr 01	1930	16	7	22
02 Apr 01	2000	14	6	20
02 Apr 01	2030	12	5	18
02 Apr 01	2100	11	5	16
02 Apr 01	2130	10	4	14
02 Apr 01	2200	8	4	12
02 Apr 01	2230	6	3	9
02 Apr 01	2300	3	2	5
02 Apr 01	2330	3	0	3
02 Apr 01	2400	3	0	3
03 Apr 01	0030	2	0	2
03 Apr 01	0100	0	0	0
03 Apr 01	0130	-0	0	-0
03 Apr 01	0200	0	0	0
03 Apr 01	0230	-0	0	0
03 Apr 01	0300	0	0	0
03 Apr 01	0330	0	0	0
03 Apr 01	0400	0	0	0
03 Apr 01	0430	0	0	0
03 Apr 01	0500	-0	0	0
03 Apr 01	0530	0	0	0
03 Apr 01	0600	-0	0	0
03 Apr 01	0630	0	0	0
03 Apr 01	0700	-0	0	0
03 Apr 01	0730	0	0	0
03 Apr 01	0800	-0	0	0
03 Apr 01	0830	0	0	0
03 Apr 01	0900	-0	0	0

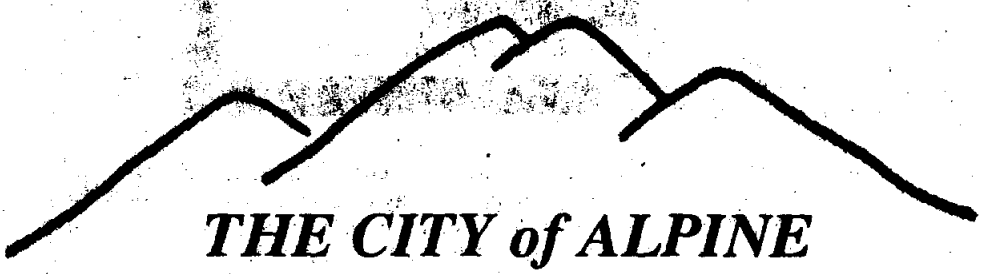
Date	Time	Inflow (cfs) from R-C7	Inflow (cfs) from C7	Outflow (cfs)
03 Apr 01	0930	0	0	0
03 Apr 01	1000	-0	0	0
03 Apr 01	1030	0	0	0
03 Apr 01	1100	-0	0	0
03 Apr 01	1130	0	0	0
03 Apr 01	1200	-0	0	0
03 Apr 01	1230	0	0	0
03 Apr 01	1300	-0	0	0
03 Apr 01	1330	0	0	0
03 Apr 01	1400	-0	0	0
03 Apr 01	1430	0	0	0
03 Apr 01	1500	-0	0	0
03 Apr 01	1530	0	0	0
03 Apr 01	1600	-0	0	0
03 Apr 01	1630	0	0	0
03 Apr 01	1700	-0	0	0
03 Apr 01	1730	0	0	0
03 Apr 01	1800	-0	0	0
03 Apr 01	1830	0	0	0
03 Apr 01	1900	-0	0	0
03 Apr 01	1930	0	0	0
03 Apr 01	2000	-0	0	0
03 Apr 01	2030	0	0	0
03 Apr 01	2100	-0	0	0
03 Apr 01	2130	0	0	0
03 Apr 01	2200	-0	0	0
03 Apr 01	2230	0	0	0
03 Apr 01	2300	-0	0	-0
03 Apr 01	2330	0	0	0
03 Apr 01	2400	-0	0	-0

Appendix E
Public Notices for Meetings

e Observer

14, 2001 - Alpine, Texas • Home of Sul Ross State University

ent



THE CITY of ALPINE

will host a Public Meeting to discuss:

"Flood Protection, Planning and Design"

for

Alpine's Creeks and Watershed Areas

Public input is being sought by the City of Alpine, the Texas Water Development Board, and PBS&J Engineering to help initiate a Hydrologic Planning Analysis of Alpine Creek and other city watersheds to provide planning and preliminary designing for long-term flood protection and storm water runoff management.

This meeting will be one of three scheduled opportunities for the public to provide input during the administration of a Flood Protection Planning Grant awarded to the City of Alpine by the Texas Water Development Board from the Board's Research & Planning Fund.

Thursday, March 15 at 7:00 PM
Kokernot Lodge
Loop Road 223

In 1998, Aboussie was named the ...dent. The family lives in San An...

City continues Alpine Creek planning tonight

A City-sponsored public workshop to be held tonight at Kokernot Lodge will continue the process of gaining public input to develop a long awaited flood plan and pre-engineering study that may well re-define Alpine Creek, one of the community's most prominent natural landmarks. The City's Department of Community Development, PBS&J Engineering and Hydrology, and the Texas Water Development Board will be hearing public comments and suggestions related to various potential alternatives that may be used to reduce future flood damage, improve area watershed areas, and create public improvements and amenities within the Alpine Creek corridor.

The workshop will begin with a report from PBS&J Engineering that will summarize the input from lat month's public meeting as well as offer preliminary views of what the creek may look like in the future. Subjects for discussion at the workshop will include the creek's historic role in the community, past and future floods, structural and non-structural solutions to drainage problems, environmental and wildlife habitat resource potential, property protection issues, and the potential for green-belts and mini-parks.

The meeting will be held 7 p.m. tonight, May 10, at Kokernot Lodge, Loop Road 223. All the public is invited.

Appendix F
FIS Floodplain Boundary Map

Appendix G
Floodplain Boundary Map – Option E

FLOOD PROTECTION PLANNING STUDY
ALPINE CREEK
BREWSTER COUNTY, TEXAS
CITY OF ALPINE
Contract #2001-483-375

The following maps are not attached to this report. Due to their size, they could not be copied. They are located in the official file and may be copied upon request.

Alpine Creek Flood Planning Study Watershed Boundary Map

Existing 100 Year FEMA FloodPlain Boundary Map

Option E 100 Year FloodPlain Boundary Map

Please contact Research and Planning Fund Grants Management Division at (512) 463-7926 for copies.