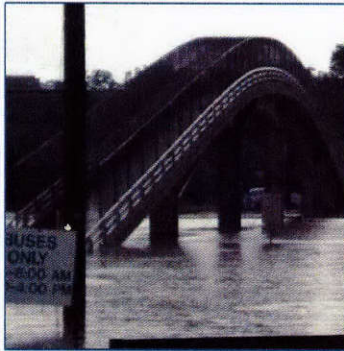
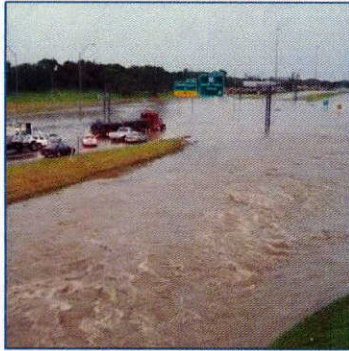


Post Oak Creek Flood Protection Plan

Final Report 1148321282

Date Submitted: September 27, 2013
Client: City of Sherman
Project Number: 10037.01



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**Post Oak Creek Flood Protection Plan
Draft Final Report**

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1 Executive Summary

The Post Oak Creek flood protection planning effort provides the community with a unique means for acting on the recommendations of the *City of Sherman 2009 Comprehensive Plan* (Comprehensive Plan) by considering specific steps for addressing the impacts of flooding in the community. The flood protection plan provides the City of Sherman with the means of advancing a program of proactive management of the City's floodplain by taking into consideration new information, such as the data generated by hydraulic and hydrologic models, and developing plans for minimizing the impacts of future flood events on people and property. The flood protection plan provides a concise list of structural measures for mitigating flood damage in the form of capital construction projects, as well as non-structural measures, such as acquisition and removal of properties located in the floodplain that have experienced repetitive damages as a result of flooding.

The Post Oak Creek watershed has a drainage area of 33 square miles and a total of 50.5 miles of stream and includes much of the developed area of the City of Sherman (**Figure ES-1**). The Post Oak Creek Flood Protection Plan (FPP) is an engineering analysis of the flooding risks facing private and public properties and a planning analysis of mitigation of these flooding risks. The watershed was modeled assuming a subcritical flow regime which is consistent with the Federal Emergency Management Agency's (FEMA) publication *Guidelines and Specifications for Flood Hazard Mapping Partners*.

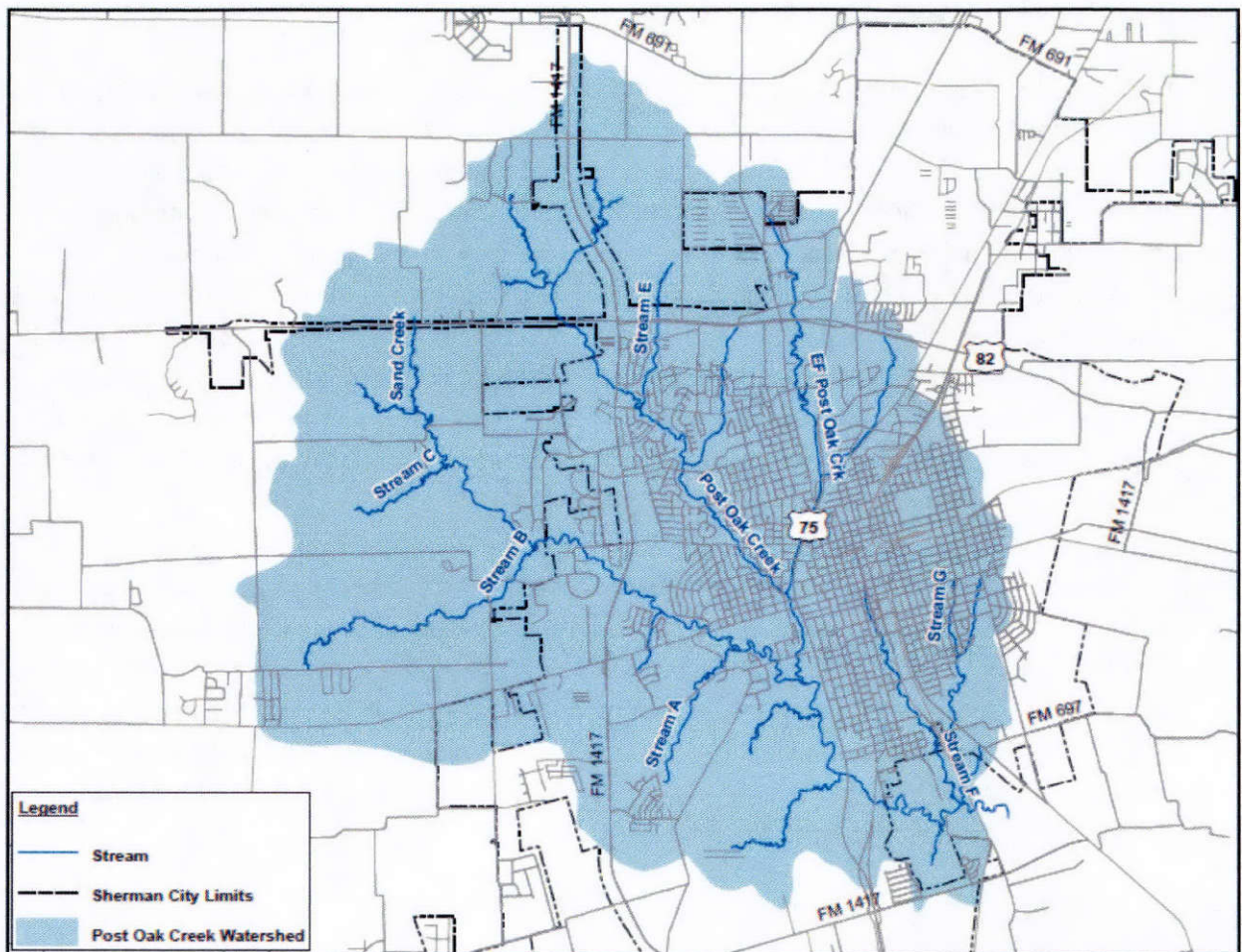


Figure ES-1. Post Oak Creek FPP Study Area.

Analyses of flooding risk are most commonly evaluated using the 100-YR storm. However, the more accurate terminology is the “1% annual chance event,” which is a theoretical event that has a one percent chance of occurring in any year. Peak flows and water surface elevations were computed for the 50%, 20%, 10%, 4%, 2%, 1% and 0.2% annual chance (2-YR, 5-YR, 10-YR, 25-YR, 50-YR, 100-YR and 500-YR storms, respectively).

Analysis of the model results produced 13 areas of structural flooding involving 153 structures. Of the 68 bridges/culverts in the study area, only 24 were found to have sufficient capacity to pass the 1% chance event without overtopping of the street. Nine bridge and culvert improvement projects were identified as a result of this study. While there are many more bridges that are flooded during a 100-YR storm, the bridges selected for projects are located on streets which have been identified as collectors or arterials on in the City's Thoroughfare Master Plan and provide for the movement of emergency personnel and equipment.

The primary alternatives for mitigation of the impacts of flooding used in this study were storage, buyout, and structural modification.

Storage normally consists of the construction of a large pond or series of small ponds designed to store a portion of the flood flow and release it slowly in order to reduce the peak flow and lower flood levels. This approach provides benefits for the areas downstream of the storage, but can require the purchase of large areas of land.

Buyout consists of purchasing structures located in the floodplain that have been damaged by previous flood events. The structures are removed and the property is converted to a use that is compatible with its location in the floodplain, such as parks and green space.

Structural modification covers a wide variety of construction projects, the most common being widening of the stream channels and enlarging bridges or culverts.

Each situation was examined to determine which of these alternatives were applicable, or if a combination of the alternatives would be most effective in reducing the potential for flood damage. The availability of sufficient open area for the construction of storage ponds is a significant factor in determining if storage can be considered since converting developed property to storage can incur high capital costs. Buyouts were only considered if there were residential or commercial buildings which were flooded that could not otherwise be removed from the floodplain.

A benefit-cost analysis was performed for the various options affecting residential or commercial building flooding. The viability of the various options was measured through a comparison of the relative cost of each mitigation project versus the benefits derived from these projects. In order to qualify for potential federal funding, the benefits should exceed the cost. The benefits are the damage costs which are avoided by removing at-risk properties from the floodplain (i.e. benefit = damage avoided). Property values used in the study are based on Grayson County Central Appraisal District tax roll values. Construction costs are based on recent bid tabulations and unit prices for similar regional construction projects.

1.1 Recommended Flood Damage Mitigation Projects

A list of 27 projects was developed as a result of the study and the projects were prioritized using goals set forth in the City's Comprehensive Plan adopted in 2009. Ranking tables were developed based on the goals which were then used to develop priorities for each proposed

project. Factors to be taken into consideration in the implementation of any specific project within the City of Sherman include the following:

1. Reduces flooding of public, business and residential structures.
2. Reduces flooding of collector and arterial streets.
3. Reduces channel erosion.
4. Enhances the environmental characteristics of the floodplain.
5. Project implementation can be within annual operating budget (less than \$300,000).
6. Project can be implemented in phases.
7. Positive Benefit-Cost Ratio.

The prioritized projects summarized in **Table 1** may be implemented as projects as part of the City's Capital Improvements Program (CIP). The projects listed in Table 1 are detailed in **Sec. 5.1** of this report.

U.S. Highway 75 was closed as a result of flooding during the June 2007 storm. Since the highway is a Texas Department of Transportation (TxDOT), no direct project has been recommended. However, since US 75 is a main transportation link and a center of commercial and industrial development for Grayson County and Sherman, it merits consideration in this report. U.S. Highway 75 was constructed in the late 1950s and is parallel to Post Oak Creek with a 3.6 mile section located in the valley floor of Post Oak and East Fork Post Oak Creek. A number of channel improvement options were considered for mitigating the flooding of Highway 75, none of which proved cost effective. The only project that would mitigate the highway flooding is to raise the roadway above the 1% chance event levels. TxDOT is considering a project to rebuild this section of Highway 75. The project would update a number of geometric features of the highway as well as raising the main traffic lanes. The latest estimate from TxDOT puts the cost of this project at \$25,000,000. The City of Sherman should continue to work with TxDOT as well as state and national legislators in order to secure funding for these needed improvements.

City of Sherman Post Oak Creek Flood Protection Plan Capital Improvement Plan		RPS Espey		
Flood Protection Plan Project Priority Ranking			September 25, 2013	
Project Number	Project Type	Project Name	Project Cost	Grant Eligible
1	R	S. Sam Rayburn Frwy and Contemporary Dr. SRL Property Acquisition	\$ 288,000	Y \$ 216,000
2	R	Ayers Drive SRL Property Acquisition	\$ 192,000	Y \$ 144,000
3	R	Westwood SRL Property Acquisition	\$ 97,000	Y \$ 72,750
4	R	Archer Dr. SRL Property Acquisition	\$ 4,238,000	Y \$ 3,178,500
5	D	Archer Detention Pond	\$ 857,000	Y \$ 642,750
6	R	Regency Dr. and W. Washington St. SRL Property Acquisition	\$ 1,151,000	Y \$ 863,250
7	R	Various SRL Property Acquisition	\$ 655,000	Y \$ 491,250
8	D	Proposed Dam 9A	\$ 6,394,000	Y \$ 4,795,500
9	R	N. Sam Rayburn Frwy. and N. Travis St. SRL Property Acquisition	\$ 490,000	Y \$ 367,500
10	R	Contemporary Dr.	\$ 1,243,000	N
11	B	Lamberth Road at T2 East Fork of Post Oak Creek Culverts	\$ 241,000	N
12	B	Gribble Street at Stream G Box Culvert	\$ 275,000	N
13	D	Payton St. Detention Pond	\$ 1,057,000	N
14	B	Taylor Street at T1 East Fork of Post Oak Creek Box Culvert	\$ 323,000	N
15	D	Town Center Detention Pond Modification	\$ 419,000	N
16	D	Stream E North of US 82 Detention Pond	\$ 1,486,000	N
17	B	Center Street at Post Oak Creek Street Improvement	\$ 2,698,000	N
18	C	Center St. to Lamar St. Channel	\$ 11,129,000	N
19	C	Lamar St. Channel	\$ 1,437,000	N
20	C	Pecan St. Channel	\$ 5,771,000	N
21	B	Lamberth Road at East Fork of Post Oak Creek Box Culvert	\$ 793,000	N
22	B	Houston Street at Post Oak Creek Bridge Improvements	\$ 3,030,000	N
23	B	Lamar Street at Post Oak Creek Bridge Improvement	\$ 3,038,000	N
24	B	King Street at Stream F Box Culvert	\$ 2,011,000	N
25	D	Canterbury Dr. Detention Pond	\$ 528,000	N
26	B	Washington Street at Post Oak Creek Roadway Improvements	\$ 1,538,000	N
27	D	Taylor St. Detention	\$ 3,114,000	N
Subtotals				
	B	Bridge & Culvert Improvements	\$ 13,947,000	
	C	Channel Improvements	\$ 18,337,000	
	D	Detention	\$ 13,855,000	\$ 5,438,250
	R	Repetative Loss Property Acquisition	\$ 8,354,000	\$ 5,333,250
		TOTAL	\$ 54,493,000	\$ 10,771,500

Table 1. Capital Improvement Projects.

1.2 Recommended Programmatic Flood Damage Mitigation Measures

Additional measures which could also be implemented focus on minimizing the necessity of future CIP projects with improved planning and development guidelines along with changes in the maintenance of the natural drainage and creeks. These measures include:

1. Implementation a detailed creek maintenance program designed to reduce erosion and limit flooding (**Sec. 5.2.2**);
2. Update the future Land Use Plan every five years to ensure consistency with the flood protection plan and to take advantage of the updated data generated by the study (**Sec. 5.2.1**);
3. Update the Storm Drainage Design Manual to incorporate the findings of this study into each drainage and development project (**Sec. 5.2.1**);
4. Incorporate Low Impact Development Standards in Flood protection planning and design (**Sec. 5.2.1.1**);
5. Update the Flood Insurance Rate Maps (FIRM) for the community to provide a more accurate definition of the floodplain (**Sec. 5.2.4**); and
6. Consider adopting floodplain management activities that exceed the minimum NFIP requirements and documenting those higher standards by entering the National Flood Insurance Program's Community Rating System (CRS) (**Sec. 5.2.3**). CRS participation also provides lower flood insurance rates within the community.

1.3 Acknowledgements

The Post Oak Creek Watershed Flood Protection Plan adds to the understanding of the watershed, the potential impacts of flood events on property and the physical environment, and the viability of improvements to reduce these impacts. The value of the final plan was significantly enhanced with the review of plan elements by the City of Sherman and the Technical Advisory Committee established for review of significant milestones during the study. The participation of the city staff and the Technical Advisory Committee provided greater confidence in the reliability of the final Post Oak Creek Watershed Flood Protection Plan findings. The staff of RPS Espey appreciates the contributions from each of the resources and recognizes that there are many individuals who will go unnamed in recognizing the key contributors to the success of the project. RPS Espey gratefully acknowledges the key contributions made by the individuals listed below for their participation and support in the Post Oak Creek Watershed Flood Protection Plan project.

Representatives of the City of Sherman, local sponsor for the Project

Don Keene, Director of Public Works
Mark Gibson, P.E., Director of Utilities and Engineering
Clay Barnett, P.E., City Engineer
Jerry Pace, Engineering Technology Coordinator

Texas Water Development Board, state sponsoring agency for the Project

Ivan Ortiz, Planning Division

Additional members of the Technical Advisory Committee for the Project

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Donald R. Gibbons, NRCS
Noel Paramanatham, P.E., Assistant Area Engineer, Texas Department of Transportation
Joe Remondini, P.E., U.S. Army Corps of Engineers

KXII Sherman, TX

Steve LaNore, Chief Meteorologist
Historic Rainfall data for June 18, 2007

RPS Espey primary staff involved on the Project

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Sandeep Chaudhari, EIT, CFM, Staff Engineer

Supporting subconsultants for the Project

Hardin & Associates Consulting, LLC
Underwood Drafting & Surveying, Inc.

1.4 Abbreviations and Acronyms

AMC.....	Antecedent Moisture Conditions
BFE.....	Base Flood Elevation
CIP	Capital Improvements Plan
City	City of Sherman
CN.....	Curve Number
CRS.....	Community Rating System
ETJ.....	Extra-Territorial Jurisdiction
FEMA.....	Federal Emergency Management Agency
ft.....	Feet
FPP.....	Flood Protection Plan
GIS.....	Geographic Information System
HEC.....	Hydrologic Engineering Center
HMS.....	Hydraulic Modeling System
in	Inches
LF.....	Linear Feet
LiDAR.....	Light Detection and Ranging
MSL.....	Mean Sea Level
NCDC.....	National Climatic Data Center
NFIP.....	National Flood Insurance Program
NRCS.....	Natural Resources Conservation Service
NWI.....	National Wetlands Inventory
NWP.....	Nationwide Permit
PCN.....	Preconstruction Notification
RAS.....	River Analysis System
RL.....	Repetitive Loss Property
SCS.....	Soil Conservation Service
SRL.....	Severe Repetitive Loss Property
STA.	Station
TCEQ.....	Texas Commission on Environmental Quality
TNRIS.....	Texas Natural Resource Information System
TPWD.....	Texas Parks & Wildlife Department
TWDB.....	Texas Water Development Board
TxDOT.....	Texas Department of Transportation
USACE.....	U.S. Army Corps of Engineers
USDA.....	U.S. Department of Agriculture
USFWS.....	U.S. Fish and Wildlife Service
WSEL.....	Water Surface Elevation



2 Introduction

The City of Sherman lies primarily within the watershed of Post Oak Creek – a major tributary of Choctaw Creek. The Post Oak Creek watershed originates outside the corporate limits of the City of Sherman and continues downstream through the northern and central portion of the city, across U.S. Highway 75 (US 75) to a confluence with Choctaw Creek, which ultimately discharges into the Red River.

The Post Oak Creek watershed is characterized by a mix of industrial, commercial, and residential use with some large tracts of land available for development in the upper reaches of the Post Oak Creek watershed. Choctaw Creek originates outside the City of Sherman, but is within the city's ETJ, and continues through the southern portion of the city to a confluence with Post Oak Creek outside the existing city limits east of US 75.

The *City of Sherman 2009 Comprehensive Plan* (Comprehensive Plan) is designed as a framework for guiding future development, redevelopment, and community enhancement in the city and its surrounding planning area during the next twenty years and beyond. This document was the result of a planning process that established a community vision, along with realistic goals and achievable strategies, to guide the city's growth and development for years to come.

Development of the Comprehensive Plan was heavily influenced by the citizens' recognition of the city's human and economic loss as result of the city's vulnerability to flooding. The flood of June 2007 was a significant event that affected the entire city for more than a week, leaving behind flood damage to a total of 89 single-family homes, 270 apartment units, and more than 40 commercial properties. The impact of this flooding event on the local and regional economy was in the forefront of discussions of how the city's planning is affected by flooding during the development of the Comprehensive Plan.

Developing a comprehensive understanding of the area's hydrology and flood risks as a baseline for additional planning efforts broadly and fundamentally furthers the adopted goals of the Comprehensive Plan, particularly given the impact to private property and public infrastructure. Historically, city streets and state highways have experienced flood events that resulted in the overtopping of bridges and traffic lanes, as well as damage to residential and commercial properties. As a result of the recurring floods affecting residential, multifamily and commercial properties, the city's elected officials have supported the findings of the city's Comprehensive Plan that flood damage prevention must be implemented in a comprehensive

manner to identify structural and non-structural solutions and to develop an aggressive, but affordable, capital program to implement the findings of the city's watershed management planning initiative. The City of Sherman needs this planning to reduce the risks of flood damage to citizens and public infrastructure. This planning is a regional necessity for reducing flood risks to major transportation corridors, particularly U.S. Highway 75. The general project location is shown in **Figure 1**.

The Post Oak Creek Flood Protection Plan is an engineering analysis of the flooding risks in this watershed, as well as a planning analysis of mitigation of these flooding risks. This project was funded by the Texas Water Development Board (TWDB) and the City of Sherman, with participation by the Texas Department of Transportation (TxDOT), Natural Resources Conservation Service (NRCS), and the U.S. Army Corps of Engineers – Tulsa District (USACE).

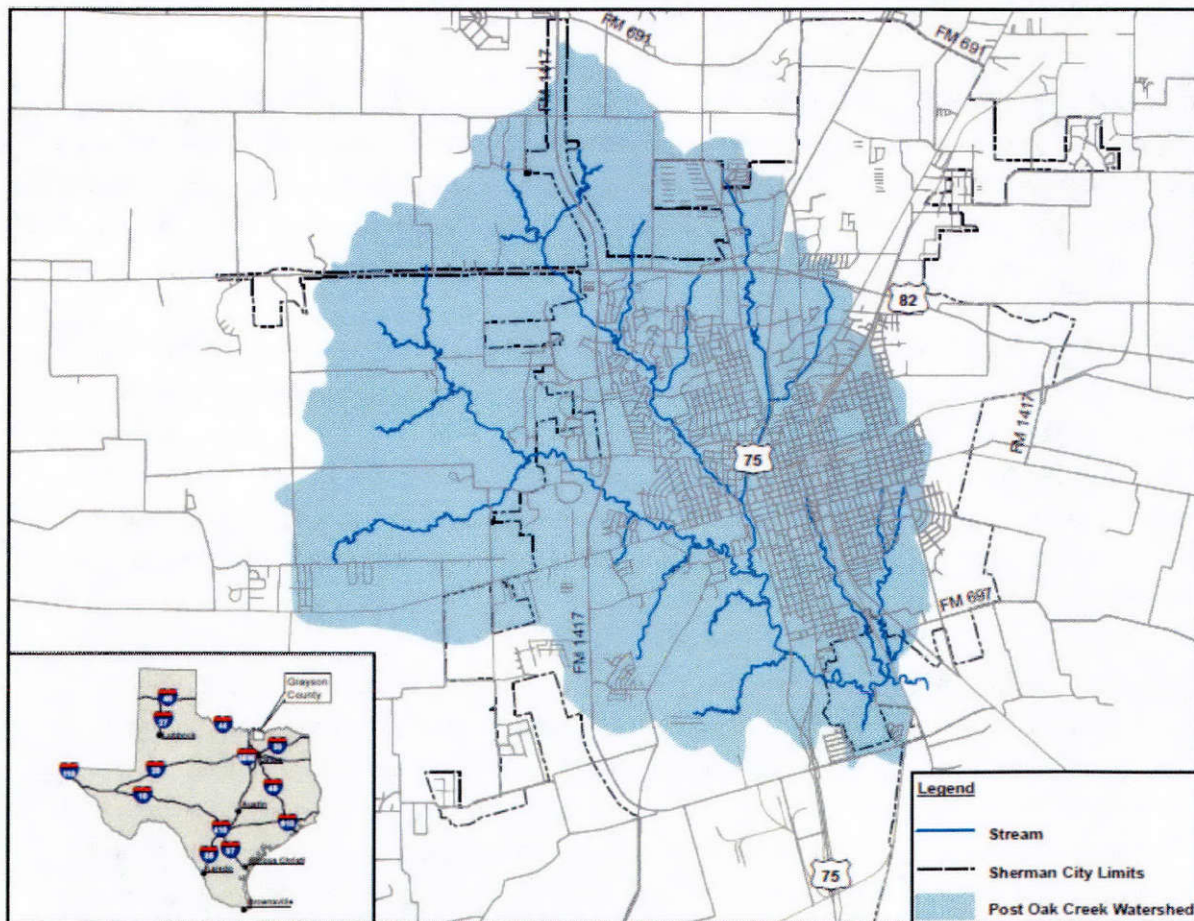


Figure 1. Location Map.

The following sections of this report describe the methods, data, and assumptions used in the analyses, as well as the results and recommendations for improving flood protection within the Post Oak Creek watershed.

2.1 History of Flooding

A search of the National Climatic Data Center (NCDC) Storm Event database revealed 13 notable flood events in the study area since 1993. The descriptions of these events contained in the database include street and road closures, property flooding and one fatality. The events included in the NCDC database are summarized in the following table:

Table 2. NCDC Storm Event Database (Sherman, TX).

NCDC Storm Event Database (Sherman, TX)	
Date	Description
19 Oct 1993	Widespread flooding was reported in Sherman. FM 1417 and Highway 11 were closed due to high water.
14 Nov 1994	A 73-year-old woman drowned as she and her husband were attempting to cross a flooded road on Highway 1417 west of the airport. Car was swept off a bridge and into creek.
13 Mar 1995	Apartments were flooded in Sherman.
07 Nov 1996	Severe flooding prompted the evacuations of residents along Sand Creek. Several roads around town were reported flooded and cars were stranded.
13 Aug 1997	Several roads between Sherman and Denison had over two feet of water covering them after heavy rain fell in the area for several hours.
20 Dec 1997	Several roads across the county were flooded.
04 Jan 1998	Several roads were reported flooded in and around town.
31 May 2001	The underpass at Highway 75 and Mulberry had water 8 feet deep.
19 Mar 2006	Homes and businesses were flooded.
18 Jun 2007	* Two fatalities occurred on U.S. Highway 75 at Texoma Parkway and south of FM 1417 and east of Hwy. 11 near the FM1417 bridge across Post Oak Creek. US 75 was overtopped and closed for several hours.
10 Jul 2007	Highway 11 at FM 1417, Highway 91 between Sherman and Denison, and several other roads were flooded. A high water rescue was required in Sherman, and Choctaw Creek was over its banks. High water was reported on Texoma Parkway under Highway 75, and on North Branch and Travis Streets. An auto store on Texoma Parkway suffered flood damage, as well as several cars.
11 Jul 2007	About twenty roads were flooded in the Sherman area.
27 May 2008	Heavy rainfall caused flooding along the Houston and Lamar Street exits off of Sam Rayburn Freeway.

08 May 2009	Flooding was reported at Lamberth Road and Travis Street in Sherman. The underpass at HWY 75 and Lamar Street in Sherman was also flooded. Poor drainage and water running off a hill behind the Villas of Parkhaven complex on FM 1417 resulted in the flooding of 29 apartments. In at least one apartment, the water was ankle deep.
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* This event was not listed in the NCDC Storm Event Database.

Source: <http://www4.ncdc.noaa.gov/cgi-win/wvcgi.dll?wwevent~storms>

The most significant flooding event that struck the study area was June 18-23, 2007. A system of thunderstorms slowly moved through the area, affecting most of the Texoma region. Following two consecutive days of light rainfall, Sherman recorded 7.6 inches of rainfall, in approximately seven hours on June 18, 2007. Over the next two weeks, the city recorded more than seventeen inches of rain that produced flooding of residences, apartments and businesses throughout the city. Much of the proposed planning area was affected by rising water or by flooded thoroughfares. US 75 was overtopped and closed for several hours and the Sherman ISD athletic fields and field house were under water.

A total of 89 single-family homes were flooded, along with 270 apartment units. Some of 31 single-family homes and 188 apartment units were total losses. Over 40 commercial properties sustained flood damage. Two fatalities occurred on June 18 on U.S. Highway 75 at Texoma Parkway and south of FM 1417 and east of Hwy. 11 near the FM1417 bridge across Post Oak Creek. About 125 residents of a Sherman nursing home were evacuated and several people were rescued from an office building when the roof began to fail due to accumulated rainfall.

**Sherman ISD Field House and Stadium
– June 2007**



2.2 Scope of Services

The objective of this flood protection planning effort was to conduct a comprehensive integration and update of the hydrologic and hydraulic models that have been developed historically for the Post Oak Creek watershed. This updating incorporated current watershed conditions inclusive of channel conditions, additional structures, new improvements, etc. Future watershed conditions are also projected, utilizing the City's future land use plan. This study included the collection of baseline information, review of environmental constraints, and the identification of flood/drainage problem areas. Hydrologic and hydraulic modeling was performed to refine the

understanding of flood impacts from which alternatives were developed and analyzed to reduce these impacts.

The hydrologic analysis of Post Oak Creek encompassed the 33 square mile drainage area beginning on the southeast side of Sherman, downstream of the railroad 4,000 feet north of F.M. 1417, extending upstream 11 miles, to the headwaters located north and west of the city. The Post Oak Creek Basin includes two named tributaries, East Fork Post Oak Creek and Sand Creek, as well as fourteen unnamed tributaries.

2.3 Advisory Committee

The Post Oak Creek Flood Protection Plan was implemented with the goal of disseminating information as the plan was developed and utilizing additional information gathered through both a technical advisory committee and public meetings. To this end, a Technical Advisory Committee was developed at the onset of the project. The Technical Advisory Committee was established to provide peer review from agencies or entities knowledgeable or affected by the subject matter for the project. These organizations participated during the performance of the project through attending technical meetings at five key milestones during the study:

1. Kickoff meeting
2. Data review meeting
3. Hydrologic and hydraulic modeling results meeting
4. Alternative solutions meeting
5. Final recommended improvements plan meeting

Representative agencies selected for this committee involvement included the following:

Table 3. Technical Advisory Committee Representative Agencies and Roles.

Agency or Organization	Role on Technical Advisory Committee
City of Sherman	Co-sponsor for study; flood management responsibility throughout study area; operator of transportation, water, and wastewater infrastructure in study area
RPS Espey	Facilitator for Advisory Committee Meetings; presented study progress
Texas Water Development Board	Co-sponsor for study; flood management planning agency for The State of Texas

Agency or Organization	Role on Technical Advisory Committee
USACE	Flood management federal regulatory agency
Natural Resources Conservation Service (NRCS)	Regional flood management planning organization
Texas Department of Transportation	State transportation infrastructure management with facilities in study area

2.4 Public Involvement

Public Meetings were developed to facilitate public access and sharing of information regarding flood impacts in the study area and alternatives for reducing these impacts. Public Meetings were generally held immediately following Technical Advisory Committee meetings to allow the latter committee members to attend and participate during the public meetings. Each public meeting was advertised through one of two, or both, means: direct advertisement in the local newspaper with readership throughout the study area and through a posting on the City's public access website. These meetings were well attended and copies of attendee sign-ins for these meetings and representative advertisements are included in **Appendix H**. Specific meetings were held for the following purposes on the following dates:

Table 4. Technical Advisory Committee Public Meetings.

Technical Advisory Committee and Public Meetings	Meeting Date
Kickoff meeting	September 12, 2011
Hydrologic and hydraulic modeling results meeting	March 22, 2012
Alternative solutions meeting	June 28, 2012
Final recommended improvements plan meeting	February 26, 2013

2.5 Baseline Data Acquisition

Information was obtained from a variety of sources for performance of the project. The following table lists general types of data obtained during the course of the study.

Table 5. Types of Data Obtained During the Study.

Type of Data	Source of Data
Aerial Photography data	TNRIS
2-ft LiDAR contour data	City of Sherman (William – Stackhouse Inc.)
SSURGO (Soils) Data	USDA
Existing land use data	City of Sherman
Future land use data	City of Sherman
Storm drain database	City of Sherman
Record drawings for various bridges and culverts	TxDOT
Record drawings for Dams and spillways	NRCS
Hot Spot location database	City of Sherman
Repetitive Loss Properties	TWDB
Property value database	Grayson County Appraisal District
Drainage Master Plan	City of Sherman
2009 Comprehensive Plan	City of Sherman
Thoroughfare Master Plan	City of Sherman

In addition to these sources of data, all the bridges and culverts were field surveyed. Surveying was performed between November 2011 and February 2012 by Underwood Drafting & Surveying, Inc. The field survey and LiDAR data were horizontally referenced to the NAD83, Texas State Plan, North Central Texas coordinate system and vertically referenced to North American Vertical Datum (NAVD88). The survey data was collected following surveying standards set by FEMA, March 2009 Appendix M, Data Capture Standards. The surveyed data includes 13 channel cross-sections along U.S. 75 and 83 bridges or culverts throughout the City.

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3 Hydrologic Analysis

This study required the production of two computer models. The first model is a U.S. Corps of Engineers (USACE) Hydrologic Engineer Center Hydrologic Modeling System (HEC-HMS) model which is used to determine the peak flow rate in the creeks at various critical locations. The second model, U.S. Corps of Engineers Hydrologic Engineer Center River Analysis System (HEC-RAS) version 4.1.0 utilizes the peak flow data from the HMS model and terrain data from the contour map and survey data to calculate the water surface elevation for the various flood events. The watershed was modeled assuming a subcritical flow regime which is consistent with FEMA's publication *Guidelines and Specifications for Flood Hazard Mapping Partners*.

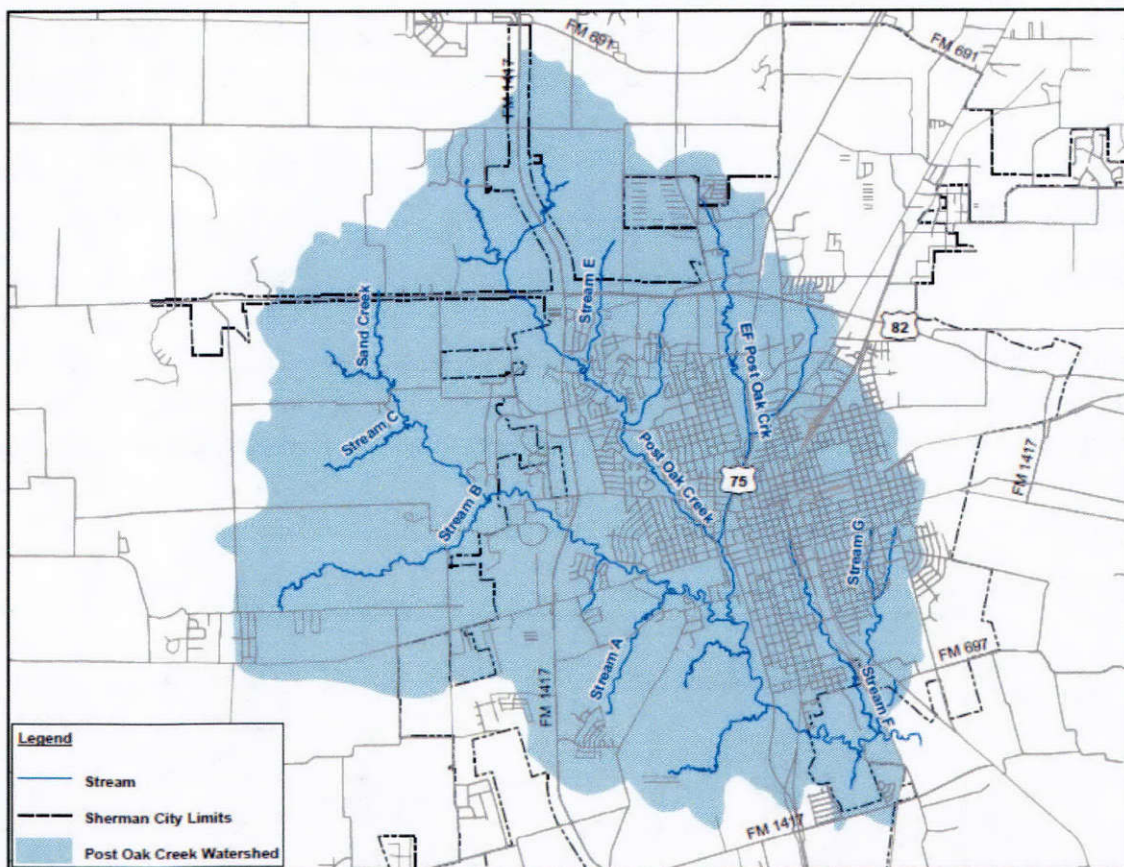


Figure 2. Post Oak Creek and Tributaries.

This section of the report describes the input parameters used in the hydraulic analysis and the computed peak flow rates used in the floodplain delineation. The hydrologic analysis for the

Post Oak Creek Watershed included the evaluation of the existing conditions 50%, 20%, 10%, 4%, 2%, 1% and 0.5% (2- YR, 5- YR, 10- YR, 25- YR, 50- YR ,100 YR - and 500-YR respectively) annual chance storm events as well as the ultimate condition 1% annual chance storm event. Version 3.5 of the HEC-HMS computer program developed by the (USACE) was used in the hydrologic analysis to estimate peak flow rates and storm hydrographs for each reach.

3.1 Drainage Area Delineation

Watersheds of Post Oak Creek and its tributaries were manually delineated using numerous sources including: United States Geological Survey (USGS) topographical survey data, City of Sherman LiDAR data (WSI May, 2008), City record drawings, storm drain GIS maps, and previous drainage studies. The watershed was further divided into sub-areas at points of critical interest (i.e., confluence of large tributaries, bridges, etc.). A drainage area map showing the watershed delineation and sub-area names for both basins is included as Exhibit 1 of **Appendix A**.

3.2 Precipitation

The precipitation values used in the hydrologic analysis are shown in **Table 6**. Data for storm durations of greater than one hour and return periods of 100 years or less were obtained from U.S. Department of Commerce, Technical Paper No. 40 (May, 1961). Data for storms with a duration of one hour or less and return periods of 100 years or less were obtained from National Oceanic and Atmospheric Administration, Technical Memorandum Hydro-35 (June, 1977). Data for the 500 year storm was obtained from the USGS *Atlas of Depth-Duration Frequency of Precipitation Annual Maxima for Texas* (June 2004).

Table 6. Depth–Duration Rainfall Data.

Return Period (years)	Point Rainfall Depth (inches)					
	1-hr	2-hr	3-hr	6-hr	12-hr	24-hr
2	1.85	2.22	2.5	2.9	3.45	4.0
5	2.5	3.0	3.25	3.9	4.6	5.4
10	2.9	3.5	3.75	4.6	5.5	6.3
25	3.35	4.15	4.5	5.3	6.4	7.5
50	3.8	4.65	5.1	6.2	7.2	9.0
100	4.3	5.2	5.7	6.9	8.2	10.2
500	5.0	6.0	7.0	9.0	11.0	13.7

3.3 Soils

According to the US Department of Agriculture (USDA) Soil Survey Geographic (SSURGO) database the study area is located in the Cross Timbers and Blackland Prairie resource areas. The major soils are Normangee, Crockett, Wilson, Fairlie, Austin and Houston Black. These soils have a clayey or loamy surface layer and clayey underlying material. They have moderate to very slow permeability. Soils that have a clayey surface layer develop deep, wide cracks on the surface if they become dry, and water enters the soil rapidly through these cracks. As the soil becomes wet, the cracks are sealed and water enters the soil very slowly. The Normangee and Crockett soils are deep, loamy soils on uplands. The Wilson soils are deep, loamy soils on nearly level and gently sloping terraces. The Austin soils are moderately deep, clayey soils. The Fairlie and Houston Black soils are deep, clayey soils. The NRCS classifies soils into four hydrologic soil groups: A, B, C, and D which indicate the runoff potential of a soil, ranging from a low runoff potential (group A) to a high runoff potential (group D). The soil hydrologic type is used to determine the runoff curve number as discussed in Section 3.5. The various soils found in the watershed and their respective hydraulic types are shown in **Table 7**.

Table 7. Watershed Soil Classification.

SSURGO Database Classification	Hydrologic Soil Type
Aledo	D
Altoga	B
Aubrey	D
Austin	C
Bunyan	B
Callisburg	C
Crockett	D
Crosstell	D
Elbon	C
Fairlie	D
Heiden	D
Howe	C
Lewisville	B
Lindy	D
Mabank	D
Normangee	D
Speck	D
Stephen	D
Trinity	D
Vertel	D

SSURGO Database Classification	Hydrologic Soil Type
Whitesboro	B
Whitewright	D
Wilson	D

3.4 Land Use

An existing conditions land use map provided by the City of Sherman was analyzed in conjunction with 2011 aerial imagery using geographic information system (GIS) software to estimate existing conditions impervious cover percentages. The hydrologic model for existing conditions utilized percent impervious cover values calculated for each watershed sub-basin. The Existing Land Use Map is included as Exhibit 3 in **Appendix A**. The details of this analysis are included in **Appendix C**. The range of calculated impervious cover percentages for this analysis is 5.2% to 80.8%.

Table 8. Existing Land Use Impervious Cover Assumptions.

Description	Impervious Cover
Blalock Industrial Park	85%
Retail Business	75%
General Commercial	85%
Office	85%
Lake	100%
Light Manufacturing	75%
Medium Manufacturing	85%
Heavy Manufacturing	95%
Open Space	5%
One Family Residential	35%
Multi-Family Residential	70%
Single-Family Residential	55%
ROADS	85%

The ultimate development conditions (fully-developed conditions) analysis included modifications to the impervious cover percentages to represent full development. For the purposes of this analysis, full development was assumed to be equivalent to the estimated level by the year 2025 according to the City's future land use study. The Ultimate Land Use Map is included as Exhibit 4 in **Appendix A**.

The impervious cover for each sub-area is modified to reflect the projected land use based on the datasets provided by the City of Sherman. Land use impervious cover percentages were estimated based on previous studies and engineering judgment. **Table 9** shows future land use types designated in the future land use studies. The future land use impervious cover increased an average of 10.8% and ranged from 28.3% to 84.8%. The weighted impervious cover value for each sub-area is included in **Appendix C**.

Table 9. Future Land Use Impervious Cover Assumptions.

Description	Impervious Cover
Auto-Urban Single-Family Residential	55%
Suburban Residential	35%
Estate	20%
Auto-Urban Multi-Family Residential	70%
Auto-Urban Commercial	85%
Urban/Downtown	85%
Suburban Commercial	85%
Industrial	95%
Business Park and Research	85%
Public/Institutional	70%
Countryside	20%
Manufactured Homes	70%
Parks and Recreation	30%
Natural	5%
Agricultural and Rural	5%
Road	85%

3.5 Infiltration Losses

The NRCS has developed a rainfall-runoff index called the runoff curve number (CN) which takes into account such factors as soil characteristics, land use/land condition, and antecedent soil moisture to derive a generalized rainfall-runoff relationship for a given area. A description of these components and the equations for calculating runoff depth from rainfall are provided below.

The NRCS classifies soils into four hydrologic soil groups: A, B, C, and D which indicate the runoff potential of a soil, ranging from a low runoff potential (group A) to a high runoff potential

(group D). Digital soil data is available from the TNRIS post-processed from the USDA SSURGO database into the Texas statewide mapping system. Exhibit 2 in **Appendix A** shows the soils map for the study area.

The NRCS provides runoff curve numbers for three Antecedent Moisture Conditions (AMC): AMC I, II and III. AMC I represents dry soil conditions and AMC III represents saturated soil conditions. AMC II is normally considered to be the average soil condition; however, studies have indicated that the average condition ranges from AMC I in West Texas to between AMC II and III for east Texas. Runoff curve numbers vary from 0 to 100, with the smaller values representing soils with lower runoff potential and the larger values representing soils with higher runoff potential. This study assumes an AMC II to represent average conditions.

Curve numbers were evaluated independently of impervious cover (i.e., these curve numbers reflect fair condition open spaces) for this analysis. A composite CN is computed based on area weighting of each hydrologic soil group within each sub-area. Impervious cover values are entered separately from CN values into the HEC-HMS model. The assumed CN values are shown in Table 10. HEC-HMS computes 100 percent runoff from impervious areas, while runoff from pervious areas is computed using the selected CN value and the following equations:

$$Q = (P - 0.2 \times S)^2 / (P + 0.8 \times S) \quad \text{Equation 1}$$

And

$$CN = 1000 / (10 + S) \quad \text{Equation 2}$$

Where:

- Q = depth of runoff (in),
- P = depth of precipitation (in),
- S = potential maximum retention after runoff begins (in), and
- CN = runoff curve number.

Table 10. NRCS Curve Number Assumption.

Group	AMC I	AMC II	AMC III
A	21	39	59
B	41	61	78
C	55	74	88
D	63	80	91

Key assumption: Undeveloped grassland or range land.
Reference: National Engineering Handbook 4 (NEH-4)

The range of calculated existing conditions weighted CN values used in this analysis is 74.5 to 80.0. A summary of CN values for all sub-basins is included in **Appendix B**.

3.6 Unit Hydrograph

3.6.1 Background

A rainfall-runoff transformation is required to convert excess rainfall (total rainfall minus infiltration losses) into runoff from a particular sub-basin. The NRCS unit hydrograph option in HEC-HMS was used in this analysis to generate runoff hydrographs for each defined sub-basin within the studied watersheds. The unit hydrograph method represents a hydrograph for one unit (one inch) of direct runoff, which is standard engineering practice.

The dimensionless unit hydrograph developed by the NRCS (see **Figure 3**) was developed by Victor Mockus and presented in *National Engineering Handbook, Section 4, Hydrology*. The dimensionless unit hydrograph has its ordinate values expressed in a dimensionless ratio, of discharge relative to peak discharge, q/q_p , and its abscissa values as time relative to time to peak, t/T_p . This unit hydrograph has a point of inflection approximately 1.7 times the time to peak (T_p), and the time-to-peak 0.2 of the time-of-base (T_b).

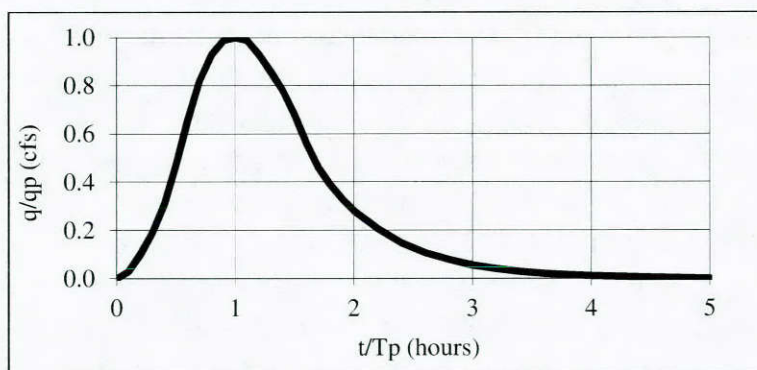


Figure 3. NRCS Unit Graph.

In HEC-HMS, input data for this method consists of a single input parameter, TLAG, which is equal to the time (hours) between the center of mass of excess rainfall and the peak of the unit hydrograph (NRCS 1993). In other words, there is a delay in time after a rain event begins before the runoff reaches its maximum peak. This delay is known as lag. The lag is determined based on the time of concentration, as discussed in **Section 3.6.2** below.

The time to peak is computed using the following equation:

$$T_p = \Delta t/2 + T_{LAG} \quad \text{Equation 3}$$

Where:

- T_p = time to peak of the unit graph (hours),
- Δt = computation interval or duration of unit excess (hours), and
- T_{LAG} = watershed lag (hours).

The peak flow rate of the unit graph is computed using the following equation:

$$q_p = 484A / T_p \quad \text{Equation 4}$$

Where:

- q_p = peak flow rate of the unit graph (cubic feet per second [cfs] / inch) and
- A = watershed area (square miles).
- 484 = peak rate factor (dimensionless)

Note: The peak rate factor of 484 has been known to vary from 600 in steep terrain to 300 in very flat, swampy terrain. The 484 value is standard engineering practice and is used in this analysis.

3.6.2 Time of Concentration

The NRCS method assumes that the lag time of a watershed is 60 percent of the watershed's time of concentration. The time of concentration (T_c) is the time for runoff to travel from the hydraulically most distant point of the watershed to a point of interest within the watershed (NRCS, 1986). The time of concentration may be estimated by calculating and summing the travel time for each sub-reach defined by the flow type: sheet flow, shallow concentrated flow, and channelized flow (including roadways, storm sewers, and channels). The methods prescribed in NRCS Technical Release 55 (TR-55) are used to determine the times of concentration for each flow segment in this analysis. Adjustments are made to the time of concentration calculations in the ultimate conditions analysis to reflect faster watershed response times, typically in the uplands of the watershed if development is proposed in these areas. Time of concentration calculations can be found in **Appendix D**, utilizing each typical flow segment presented below.

3.6.2.1 Sheet Flow

Sheet flow is flow over plane surfaces. With sheet flow, the friction value (Manning's n) is an effective roughness coefficient that includes the effect of raindrop impact, of drag over the plane surface and obstacles such as litter, crop ridges, and rocks, and of erosion and transportation of sediment. These n values are for very shallow flow depths of approximately 0.1 feet. Sheet flow normally becomes shallow concentrated flow after no more than approximately 100 feet

depending on surface conditions. The T_c calculations were performed using high resolution aerial photography and engineering judgment. Travel time was computed using the following equation:

$$T_t = (0.007 \times (n \times L)^{0.8}) / (P^{20.5} \times s^{0.4}) \quad \text{Equation 5}$$

Where:

- T_t = travel time (hr.),
- n = Manning's roughness coefficient,
- L = flow length (ft.),
- P_2 = 2-year, 24-hour rainfall (in), and
- s = slope of hydraulic grade line (land slope, ft./ft.).

3.6.2.2 Shallow Concentrated Flow

Sheet flow usually becomes shallow concentrated flow when the depth of flow exceeds 0.1 feet, or flows in a shallow swale or gutter. The average velocity for this flow can be determined from the following figure in which average velocity is a function of watercourse slope and type of channel (TR-55).

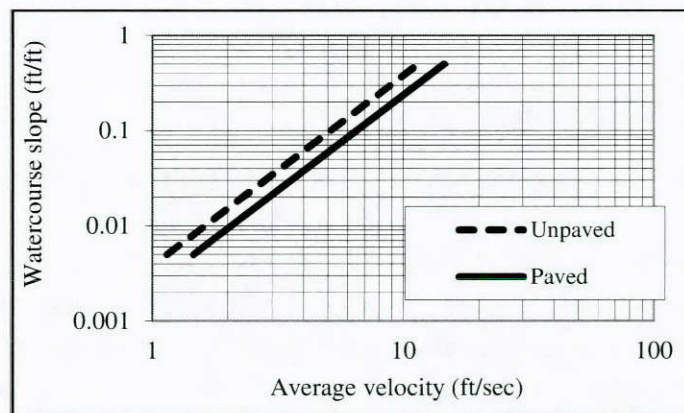


Figure 4. Average Velocities for Estimating Travel Time in Shallow Concentrated Flow Segments.

After determining the average velocity, the following equation is used to compute travel time:

$$T_t = L / (3600 \times V) \quad \text{Equation 6}$$

Where:

- T_t = travel time (hr.),
- L = flow length (ft.),
- V = average velocity (ft./sec), and
- 3,600 = conversion factor from seconds to hours.

3.6.2.3 Channelized Flow

As the depth of concentrated flow increases, the shallow concentrated flow evolves into channelized flow. Open channels are assumed to begin where surveyed cross section information has been obtained, where channels are visible on aerial photographs, or where blue lines (indicating streams) appear on USGS quadrangle maps. In the case of this analysis, channel flow either involves flow in man-made storm sewer infrastructure or flow in the natural channel. Manning's equation or water surface profile information (available from HEC-2 or HEC-RAS) can be used to estimate average flow velocity. Average flow velocity is usually determined for bank-full elevations. Both open channel and closed conduit systems can be included.

Manning's equation is:

$$V = 1.49 \times r^{2/3} \times s^{0.5} / n \quad \text{Equation 7}$$

Where:

- V = average velocity (ft./sec),
- r = hydraulic radius (ft.), equal to flow area divided by wetted perimeter,
- s = slope of the hydraulic grade line (channel slope, ft./ft.), and
- n = Manning's roughness coefficient.

3.7 Hydrograph Routing

Lag and time of concentration provide for the changes in peak flow over time, accounting for how the arrival times of peak flows from branches combine in the main channel. Routing provides consideration for attenuation of peak flow due to channel geometry and valley storage. Basically, the rising water has to fill-up the creek as it proceeds downstream. This tends to attenuate the peak flows. Conversely, falling water levels drain the creek which extends the falling limb of the hydrograph.

3.7.1 Channel Routing

Stream routing reaches were modeled using Modified Puls data derived from HEC-RAS models developed as part of this study. Modified Puls routing is also called storage routing or level pool routing. It uses conservation of mass and a relationship between storage and discharge to route flow through the stream. The flow through a reach was attenuated by the storage and delayed release of water in the reach.

3.7.2 Reservoir Routing

Reservoir routing considers the storage capacity of the reservoir as well as the discharge rating curves of the outlet structures. Record drawings for all three reservoirs were obtained from the NRCS. These drawings provided elevation-storage data as well as the size and configuration of the outlet structures. Elevation-storage data was entered into the HEC-HMS model directly. Elevation discharge curves were developed for the principal and auxiliary spillways of each dam from the record drawing data. In a reservoir storage and outflow rates are interdependent. As flow enters the reservoir, it begins to fill the lake, and as the lake level raises the outflow increases. When inflow exceeds outflow water is stored in the reservoir. The maximum water level occurs when the inflow and outflow rates are equal. The reservoir routing assumed the beginning water surface elevation was level with the principal spillway.

3.8 Design Storm Analysis

The application of a design storm in the HEC-HMS model is used to generate runoff hydrographs and estimate peak flow rates along the watercourse for various storm frequencies. There are three major components to the design storm: depth, duration, and distribution. Precipitation depths selected for this impact study are included in **Section 2.2**. The following subsections describe the analysis and selection of storm duration and distribution.

3.8.1 Design Storm Duration

Design storm duration is a significant consideration for hydrologic modeling. A check must be performed to ensure that the peak flow of any given event has reached the mouth of the studied basin prior to the end of the rainfall duration. The time of concentration for all watersheds was less than 24 hours; therefore, a 24-hour duration was selected.

3.8.2 Design Storm Distribution

A balanced and nested distribution is assumed for this analysis due to its flexibility with regard to storm duration. The distribution is balanced in that the precipitation is centered at half the storm duration. The distribution is nested in that the precipitation depths are applied in an alternating block format (i.e., the 15-minute depth is applied as the hyetograph peak, the 30-minute depth is applied such that the peak 15-minute block and the adjacent 15-minute block sum to be the 30-minute depth).

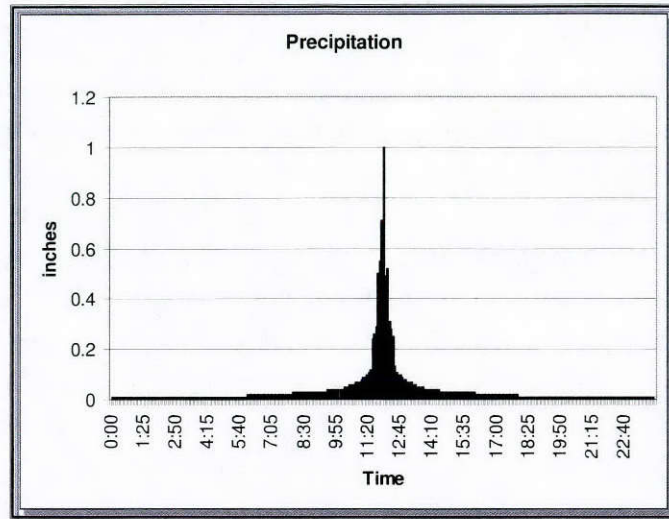


Figure 5. Precipitation Distribution.

3.8.3 Model Input

The HEC-HMS hydrologic model utilizing the NRCS method requires five basic input parameters: basin area, curve number, impervious cover, lag time and routing information. Sub-basins were manually delineated using LiDAR data in Environmental Systems Research Institute's (ESRI's) ArcGIS software. ArcGIS was then used to measure the areas of each sub-basin.

Soil data from the SSURGO database was imported into the ArcGIS map, and the area of each hydrologic soil group in each sub-basin was measured. Each hydrologic soil group was assigned a curve number, and a composite curve number was generated for each sub-basin using the weighted average method. Lag times were calculated using the procedures described in NRCS Technical Release 55 (TR-55).

Existing land use data was imported into the ArcGIS map, and the area of land use type in each sub-basin was measured. Each land use was assigned a percent impervious cover, and a composite percent impervious cover was generated for each sub-basin using the weighted average method. Two sets of impervious cover data were generated for each sub-basin, one set based on existing conditions, and the second set based on future land use projections provided by the city.

Modified Puls stream routing data derived from HEC-RAS models and reservoir routing data was obtained from NRCS record drawings. The stream routing data was imported directly from

the RAS model using the HEC Data Storage System (DSS). The area, lag time, curve number and impervious cover for each sub basin are shown in **Table 11**.

Table 11. Drainage Area Parameters.

Sub-Basin Name	Drainage Area (sq. mi.)	Lag Time (minutes)	AMC II Curve Number	Existing Impervious Cover	Ultimate Impervious Cover
EF-01	0.10	8.55	80	69.2%	84.6%
EF-02	0.02	7.50	79	79.1%	76.6%
EF-03	0.05	5.42	80	78.6%	84.8%
EF-04	0.03	9.53	80	62.4%	61.5%
EF-05	0.30	26.69	80	54.1%	60.2%
EF-05A	0.03	16.32	76	58.2%	56.4%
EF-06	0.59	40.30	80	57.5%	62.8%
EF-06A	0.22	16.02	80	75.5%	82.5%
EF-06B	0.02	21.50	80	70.0%	79.9%
EF-06C	0.19	19.59	78	76.9%	80.3%
EF-06D	0.20	13.12	75	71.2%	72.9%
EF-07	0.22	35.71	79	69.8%	72.8%
EF-08	0.19	14.79	79	76.8%	75.1%
EF-09	0.07	13.29	80	61.7%	62.2%
EF-10	0.36	37.70	79	54.7%	47.7%
EF-10A	0.19	13.96	78	80.8%	81.0%
EF-11	0.73	36.12	79	61.2%	76.1%
EF-12	0.18	11.42	79	61.2%	85.0%
EF-13	0.36	27.86	79	46.8%	65.0%
POC-01	0.41	27.32	77	34.4%	52.7%
POC-02	0.67	50.03	78	53.8%	63.3%
POC-02A	0.19	23.55	79	16.4%	50.0%
POC-03	0.51	34.84	79	51.0%	43.6%
POC-03A	1.00	35.49	79	52.8%	49.5%
POC-04	0.24	18.83	79	57.8%	38.0%
POC-04A	0.66	36.77	80	38.1%	28.3%
POC-05	0.35	25.45	79	64.8%	67.8%
POC-06	0.32	20.74	79	48.4%	50.4%
POC-07	0.29	20.23	79	44.8%	46.8%
POC-08	0.50	64.46	78	48.7%	42.6%
POC-09	0.47	62.92	77	52.1%	51.7%

Sub-Basin Name	Drainage Area (sq. mi.)	Lag Time (minutes)	AMC II Curve Number	Existing Impervious Cover	Ultimate Impervious Cover
POC-09A	0.17	16.64	77	39.1%	39.1%
POC-09B	0.18	25.15	78	44.0%	51.5%
POC-09C	0.11	51.16	80	38.2%	43.0%
POC-09D	0.17	45.79	77	42.4%	43.3%
POC-10	0.36	32.62	76	44.7%	31.6%
POC-11	0.14	21.31	79	55.9%	58.5%
POC-12	0.97	55.34	79	20.1%	55.1%
POC-12A	0.09	13.95	80	20.5%	55.0%
POC-13	0.14	27.74	77	12.0%	55.0%
POC-14	0.36	32.16	77	25.3%	63.2%
POC-15	0.62	30.10	79	26.3%	64.1%
POC-16	0.46	45.18	78	7.0%	55.0%
POC-17	0.38	33.29	78	11.8%	48.2%
POC-18	0.46	32.54	79	56.9%	55.2%
POC-19	0.19	20.57	76	9.2%	55.0%
POC-20	0.39	31.85	78	6.0%	55.0%
POC-F-01	0.41	23.57	78	57.2%	42.8%
POC-F-02	0.10	12.67	80	75.1%	59.2%
POC E-01	0.43	43.64	78	53.9%	50.8%
POC E-02	0.57	34.21	79	25.0%	40.6%
POC F-02A	0.12	15.84	80	58.0%	57.1%
POC F-03	0.92	54.87	79	66.5%	70.7%
POC G-01	0.03	15.55	77	24.8%	55.0%
POC G-01A	0.27	38.82	80	34.8%	44.8%
POC G-02	0.07	37.12	75	32.8%	39.5%
POC G-03	0.23	83.55	76	39.9%	34.9%
POC G-04	0.53	83.55	77	50.8%	54.1%
POC G-04A	0.11	9.02	74	42.2%	52.0%
POC G-04B	0.22	22.99	75	50.7%	59.8%
SC-01	0.52	18.26	79	47.2%	42.3%
SC-02	0.97	67.56	78	50.6%	40.5%
SC-02A	0.15	11.86	77	42.7%	43.7%
SC-03	1.21	31.86	77	41.5%	36.0%
SC-04	0.52	45.49	76	36.2%	51.8%
SC-05	0.80	76.42	79	9.6%	52.7%

Sub-Basin Name	Drainage Area (sq. mi.)	Lag Time (minutes)	AMC II Curve Number	Existing Impervious Cover	Ultimate Impervious Cover
SC-06	0.45	43.53	77	6.4%	55.0%
SC-07	0.76	86.27	79	11.0%	55.0%
SC-08	1.13	44.23	79	8.0%	55.0%
SC A-01	0.34	18.69	78	40.7%	34.4%
SC A-02	1.66	32.49	79	52.9%	34.0%
SC B-01	1.50	44.49	79	39.0%	49.2%
SC B-02	1.30	52.78	79	13.5%	49.0%
SC B-03	1.86	21.03	79	8.8%	55.0%
SC C-01	0.33	16.23	78	5.2%	55.0%
SC C-02	0.64	30.80	79	6.0%	55.0%

3.9 Hydrologic Analysis Summary and Conclusions

The hydrologic analysis was completed using prescribed methods by City of Sherman and the NRCS. The design storm distribution used was the nested and balanced distribution, with rainfall depths derived from Technical Paper No. 40 and Hydro-35 USGS *Atlas of Depth-Duration Frequency of Precipitation Annual Maxima for Texas*. A 24-hour storm duration was assumed for all the watersheds. The ultimate conditions model was generated by revising the existing conditions hydrologic model to reflect future impervious cover projections.

3.9.1 Computed Peak Flow Rates

HEC-HMS version 3.5 was used to compute the peak discharges. **Table 12** lists the computed peak flow rates.

Table 12. Computed Peak Flow Rates Summary.

Flooding Source and Location	Peak Discharges (cfs)					
	XS ID	10% Flood	2% Flood	1% Flood	Ultimate Conditions 1% Flood	0.20% Flood
EAST FORK POST OAK CREEK						
Above Confluence with Post Oak Creek	1,196	4,679	5,730	6,055	6,752	6,655
At Washington Avenue	1,765	4,679	5,730	6,055	6,752	6,655
At the Texas And Pacific Railroad	2,696	4,672	5,780	6,149	6,732	6,794

Flooding Source and Location	Peak Discharges (cfs)					
	XS ID	10% Flood	2% Flood	1% Flood	Ultimate Conditions 1% Flood	0.20% Flood
Highway 75 Tributary Below Confluence of U.S. Business	5,748	3,563	4,907	5,579	5,579	6,699
Above Confluence of U.S. Business Highway 75 Tributary	5,807	2,629	3,648	4,169	4,169	4,969
Below small left bank tributary downstream of Lambreth Road	9,995	2,258	3,149	3,574	3,574	4,190
At Lambreth Road	10,921	2,158	3,011	3,421	3,421	4,033
Below State Highway 82	15,569	1,762	2,462	2,814	2,838	3,356
Above State Highway 82	16,069	1,762	2,462	2,814	2,838	3,356
POST OAK CREEK						
At Southern Pacific Railroad Bridge	3,710	13,778	19,841	23,146	24,380	29,136
At U.S. Highway 75	14,112	12,376	18,087	21,461	22,545	26,946
Above confluence of right tributary approx. 600 feet upstream of U.S. Highway 75	17,933	12,145	18,186	21,304	22,321	26,700
Below confluence of Sand Creek	20,268	11,990	18,041	21,192	22,144	26,260
Above confluence of Sand Creek	21,268	6,662	9,624	10,767	11,039	12,494
Below confluence of East Fork Post Oak Creek	25,768	6,662	9,624	10,767	11,039	12,494
Above confluence of East Fork Post Oak Creek	25,894	3,480	5,008	5,716	5,726	6,884
At Texas & Pacific Railroad	30,235	3,480	5,008	5,716	5,726	6,884
Below confluence of small left bank tributary approximately 300 feet upstream of Taylor Street	34,801	2,975	4,238	4,905	4,925	5,785
Above confluence of small left bank tributary approximately 300 feet upstream of Taylor Street	35,214	2,975	4,238	4,905	4,925	5,785
Below confluence of Stream E	39,714	1,991	2,771	3,076	3,425	3,596
Above confluence of Stream E	40,214	397	430	518	719	1,684
Below SCS Dam inflows at peak	42,685	392	416	504	702	1,660
Inflows to SCS Dam	42,982	2,020	4,083	4,867	5,282	6,175
SAND CREEK						
Above confluence with Post Oak Creek	1,007	7,206	10,242	11,581	12,005	14,276
Below confluence of Stream A	6,507	7,213	10,500	11,645	12,005	14,378
Above confluence of Stream A	7,007	7,231	10,276	11,712	11,712	14,380
Above Highway 56	9,472	7,239	10,378	11,841	11,841	14,388
At Texas and Pacific RR	15,882	6,577	9,391	10,725	11,265	13,092
Below confluence of Friendship Church Tributary	21,893	6,248	8,797	10,086	10,654	12,345

Flooding Source and Location	Peak Discharges (cfs)					
	XS ID	10% Flood	2% Flood	1% Flood	Ultimate Conditions 1% Flood	0.20% Flood
Above confluence of Friendship Church Tributary Below SCS Dam inflows at peak	25,311	383	420	434	444	466
Confluence of tributary approximately 200 feet downstream of Cross Section Z	32,803	1,546	2,670	3,755	4,535	5,985
STREAM B	1,000	3,840	5,598	6,481	6,949	8,041
STREAM E	500	744	1,079	1,246	1,314	1,511
STREAM G	957	926	1,175	1,250	1,270	1,447

3.9.2 Peak Flow Rates from Previous Studies

The current effective discharges were obtained from the Grayson County Flood Insurance Study (FIS) dated September 29, 2010. These records were provided by the City of Sherman and are shown on **Table 13**.

Table 13. FIS – Flow Rates Summary.

Flooding Source and Location	Drainage Area (sq. mile)	Peak Discharges (cfs)			
		10%	2%	1%	0.20%
		Annual Chance	Annual Chance	Annual Chance	Annual Chance
EAST FORK POST OAK CREEK					
Above confluence with Post Oak Creek	4.0	4,490	5,530	6,000	6,940
At Washington Avenue	4.0	5,320	7,080	7,940	1,030
At the Texas and Pacific Railroad	3.8	5,170	7,130	7,800	10,020
Highway 75 Tributary Below Confluence of U.S. Business	2.8	4,000	5,326	5,898	7,410
Above confluence of U.S. Business Highway 75 Tributary	2.1	2,860	3,800	4,260	5,510
Below small left bank tributary downstream of Lambreth Road	1.8	2,460	3,230	3,600	4,690
At Lambreth Road	1.5	2,030	2,680	3,080	4,060
Below State Highway 82	1.2	2,100	2,740	3,080	3,990
Above State Highway 82	1.2	2,380	3,200	3,560	4,370
POST OAK CREEK					
Above confluence with Choctaw	35.6	10,840	17,990	21,340	27,420

Flooding Source and Location	Drainage Area (sq. mile)	Peak Discharges (cfs)			
		10%	2%	1%	0.20%
		Annual Chance	Annual Chance	Annual Chance	Annual Chance
Below confluence of left bank tributary 2,200 feet upstream of FM 1417	34.5	12,480	19,890	23,380	29,670
At Southern Pacific Railroad Bridge	32.8	12,100	19,130	22,370	28,370
At U.S. Highway 75	28.5	11,700	18,340	21,250	26,810
Above confluence of right tributary approximately 600 feet upstream of U.S. Highway 75	27.6	11,500	18,000	20,830	26,240
Below confluence of Sand Creek	26.3	11,840	18,470	21,440	26,860
Above confluence of Sand Creek	12.9	7,560	10,940	12,410	15,340
Below confluence of Split Flow 2	11.7	8,000	11,310	12,770	15,940
Below confluence of East Fork Post Oak Creek	11.7	7,290	9,900	11,070	13,130
Above confluence of East Fork Post Oak Creek	7.8	3,320	4,960	5,650	6,980
At Texas & Pacific Railroad	7.5	3,470	5,220	5,970	7,420
Below confluence of small left bank tributary approximately 300 feet upstream of Taylor Street	6.6	3,570	5,150	5,780	7,100
Above confluence of small left bank tributary approximately 300 feet upstream of Taylor Street	6.2	2,760	4,020	4,530	5,560
Below confluence of Stream E	5.5	2,180	3,050	3,400	4,110
Above confluence of Stream E	4.4	1,000	1,410	1,550	1,840
Below SCS Dam inflows at peak	4.0	308	326	601	1,624
Inflows to SCS Dam	4.0	301	331	589	1,667
SAND CREEK					
Above confluence with Post Oak Creek	14.2	7,520	11,510	13,220	16,570
Below confluence of Stream A	13.5	8,220	12,220	13,970	17,400
Above confluence of Stream A - Highway 56	11.8	8,130	12,110	13,840	17,240
Above Highway 56	11.4	8,090	12,040	13,760	17,130

Flooding Source and Location	Drainage Area (sq. mile)	Peak Discharges (cfs)			
		10%	2%	1%	0.20%
		Annual	Annual	Annual	Annual
		Chance	Chance	Chance	Chance
At Texas and Pacific RR	10.5	8,750	12,820	14,540	17,840
Below confluence of Friendship Church Tributary	9.4	9,420	13,460	15,240	18,960
Above confluence of Friendship Church Tributary	4.6	4,670	6,810	7,740	9,670
Confluence of tributary approximately 200 feet downstream of Cross Section Z	3.3	4,600	6,410	7,230	8,960
STREAM B	3.0	1,600	2,800	3,300	4,900
STREAM E	1.1	900	1,500	1,700	2,500
STREAM G	3.0	1,600	2,800	3,300	4,900

3.9.3 Comparison of 2007 Storm to Frequency Storms

This report utilizes the frequency storm method to predict peak runoff rates to be utilized in the analysis and evaluation of proposed mitigation measures. The frequency storm method is designed to produce a synthetic storm from statistical precipitation data. The 1% chance event also known as the 100-yr storm, which is utilized in this report, is a theoretical storm which has a 24-hr duration and a total rainfall of 10.2 inches. The 2% chance event also known as the 50-yr storm also has a 24-hr duration and a total rainfall of 9.0 inches.

The 2007 storm was the result of a system of thunderstorms slowly moving through the area. Following two consecutive days of light rainfall, on June 18, Sherman recorded 7.6 inches of rainfall in an 8-hr period. City staff was able to obtain a copy of the precipitation data for this event from Steve LaNore at KXII. This data was processed in the HEC-HMS model to obtain the peak flow rates generated by this storm event. A statistical analysis was not performed on the '07 storm data, however a comparison of the peak flows generated by this storm were compared to the 1% and 2% chance events, see **Figure 6**. The Peak flows produced by the '07 storm are slightly more than those produced by the 2% chance event and an average of 12% less than the flows produced by the 1% chance event. There are no stream flow gages on Post Oak Creek or downstream on Choctaw Creek; therefore, we were unable to compare the HMS model results to actual measured data. The nearest stream gage is USGS gage I.D. number 08050840 located on Range Creek near Collinsville, TX, which is located approximately 11 miles southwest of this study area. The drainage area above the Range Creek gage is 29.2 square miles which is similar in size to the study area. This gage recorded a flood event on

June 18, 2007; however, there is no corresponding precipitation data available for this site, which is necessary to develop any meaningful correlation between the gage and this study area.

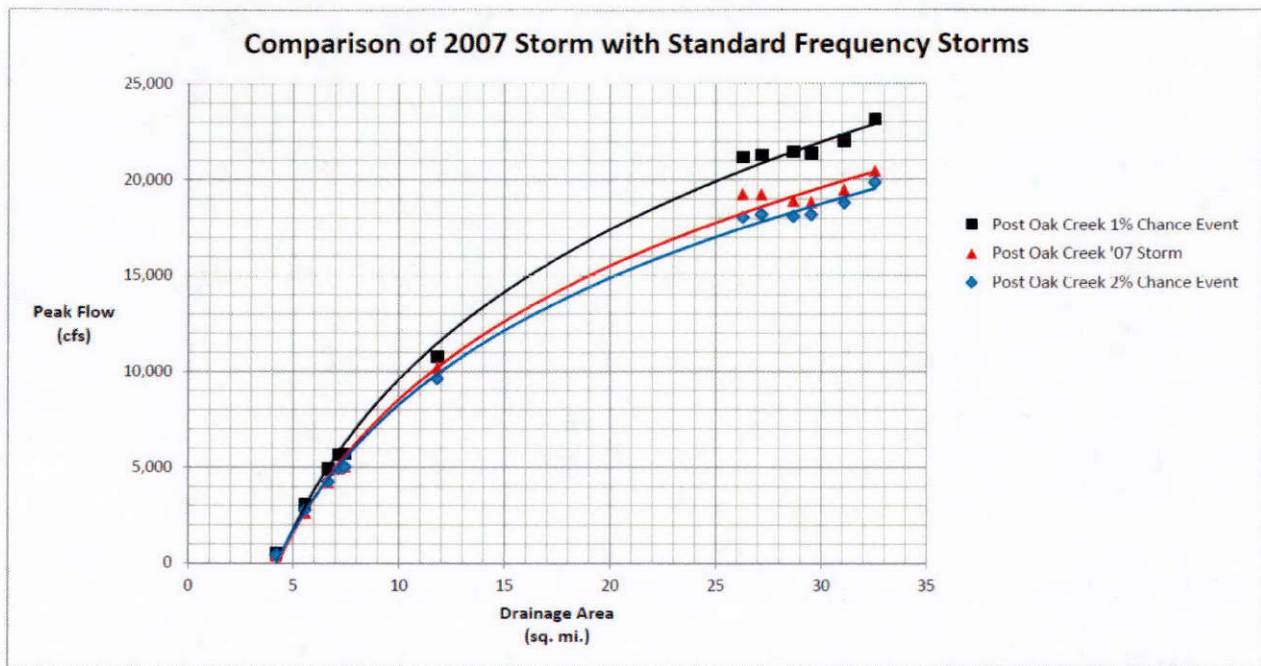


Figure 6. Comparison of 2007 Storm to Frequency Storms.

3.9.4 Comparison of Flows

The results of the FPP model were compared to the FIS model prepared by Freese and Associates, Inc. / Rady and Associates, Inc., Consulting Engineers, for FEMA, which was completed in August 1978. The peak flows in the FPP study are lower than the flows in the FIS model at several locations. Normally urbanized growth would be expected to result in increased flows as the land is developed. The NRCS in conjunction with the City has constructed three lakes in the Post Oak Creek watershed. Site 8A was constructed in 2000 on Sand Creek; Pickens Dam was constructed in 1974 on Sand Creek tributary Stream A and Dean Gilbert Dam was constructed in 1988 in the upper reach of Post Oak Creek. These improvements would be expected to significantly reduce the magnitude of any flood flows. The FPP peak discharges are shown on **Table 15**, and the comparison between the current effective flows and the FPP are shown on **Table 14**.

Table 14. Comparison of FPP & FIS Flow Rates.

Discharge Location	FPP Drainage Area (mile ²)	FPP1% Flood Discharge	FIS 1% Flood Discharge	Percent Change
EAST FORK POST OAK CREEK				
Above confluence with Post Oak Creek	4.1	6,129	6,000	2.1%
At Washington Avenue	3.9	6,156	7,940	-29.0%
At the Texas and Pacific Railroad	3.8	6,268	7,800	-24.4%
Highway 75 Tributary Below Confluence of U.S. Business	2.9	5,558	5,898	-6.1%
Above confluence of U.S. Business Highway 75 Tributary	2.3	4,169	4,260	-2.2%
Below small left bank tributary downstream of Lambreth Road	1.9	3,574	3,600	-0.7%
At Lambreth Road	1.6	3,421	3,080	10.0%
Below State Highway 82	1.3	2,814	3,080	-9.4%
Above State Highway 82	1.3	2,814	3,560	-26.5%
POST OAK CREEK				
Above confluence with Choctaw	-	-	21,340	-
Below confluence of left bank tributary 2,200 feet upstream of FM 1417	-	-	23,380	-
At Southern Pacific Railroad Bridge	32.6	23,824	22,370	6.1%
At U.S. Highway 75	28.7	21,979	21,250	3.3%
Above confluence of right tributary approximately 600 feet upstream of U.S. Highway 75	27.2	21,712	20,830	4.1%
Below confluence of Sand Creek	26.3	21,532	21,440	0.4%
Above confluence of Sand Creek	12.2	10,634	12,410	-16.7%
Below confluence of Split Flow 2			12,770	-
Below confluence of East Fork Post Oak Creek	11.8	10,876	11,070	-1.8%

Discharge Location	FPP Drainage Area (mile ²)	FPP1% Flood Discharge	FIS 1% Flood Discharge	Percent Change
Above confluence of East Fork Post Oak Creek	7.9	5,699	5,650	0.9%
At Texas & Pacific Railroad	7.4	5,709	5,970	-4.4%
Below confluence of small left bank tributary approximately 300 feet upstream of Taylor Street	6.7	4,908	5,780	-15.1%
Above confluence of small left bank tributary approximately 300 feet upstream of Taylor Street	6.2	4,121	4,530	-9.0%
Below confluence of Stream E	5.7	3,414	3,400	0.4%
Above confluence of Stream E	4.7	1,507	1,550	-2.8%
Below SCS Dam inflows at peak	4.1	504	601	-16.1%
Inflows to SCS Dam	4.1	6,369	589	981.3%
SAND CREEK				
Above confluence with Post Oak Creek	14.5	11,635	13,220	-12.0%
Below confluence of Stream A	13.6	11,561	13,970	-17.2%
Above confluence of Stream A	11.6	11,342	13,840	-18.0%
At Texas and Pacific RR	10.5	10,725	14,540	-26.2%
Below confluence of Friendship Church Tributary	9.3	10,086	15,240	-33.8%
Above confluence of Friendship Church Tributary, Below SCS Dam inflows at peak	4.1	434	7,740	-94.4%
Confluence of tributary approximately 200 feet downstream of Cross Section Z	3.3	3,755	7,230	-48.1%
STREAM B	4.7	8,868	3,300	168.7%
STREAM E	1.0	1,966	1,700	15.6%
STREAM G	1.5	1,270	3,300	-61.5%

Table 15. Post Oak Creek, Sand Creek and Tributaries' Stream Flows.

RAS Cross Sections			Flows							
River	Reach	River Station	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
EF Post Oak Crk	T2	836	178	270	327	385	440	500	500	586
EF Post Oak Crk	T1	8,540	181	281	342	406	467	533	533	628
EF Post Oak Crk	T1	4,227	377	582	709	840	965	1,100	1,103	1,298
EF Post Oak Crk	T1	1,667	377	582	709	840	965	1,100	1,103	1,298
EF Post Oak Crk	T1	1,206	568	874	1,056	1,254	1,431	1,628	1,673	1,920
EF Post Oak Crk	Reach 01	22,173	257	417	518	625	729	836	851	999
EF Post Oak Crk	Reach 01	20,569	257	417	518	625	729	836	851	999
EF Post Oak Crk	Reach 01	17,069	896	1,428	1,762	2,124	2,462	2,814	2,838	3,356
EF Post Oak Crk	Reach 01	11,569	1,089	1,746	2,158	2,594	3,011	3,421	3,421	4,033
EF Post Oak Crk	Reach 01	10,921	1,089	1,746	2,158	2,594	3,011	3,421	3,421	4,033
EF Post Oak Crk	Reach 02	9,995	1,144	1,832	2,258	2,725	3,149	3,574	3,574	4,190
EF Post Oak Crk	Reach 02	8,214	1,185	1,896	2,329	2,819	3,248	3,698	3,698	4,357
EF Post Oak Crk	Reach 02	6,393	1,350	2,144	2,629	3,173	3,648	4,169	4,169	4,969
EF Post Oak Crk	Reach 03	5,748	1,856	2,916	3,563	4,270	4,907	5,579	5,579	6,699
EF Post Oak Crk	Reach 03	3,196	2,484	3,884	4,672	5,462	5,780	6,149	6,732	6,794
EF Post Oak Crk	Reach 03	1,765	2,495	3,895	4,679	5,469	5,730	6,055	6,752	6,655
Post Oak Creek	Reach 01	57,527	396	678	857	1,049	1,234	1,424	1,504	1,722
Post Oak Creek	T7	1,301	208	386	502	632	757	881	960	1,090
Post Oak Creek	Reach 02	55,145	588	1,040	1,329	1,647	1,953	2,262	2,423	2,765
Post Oak Creek	Reach 02	49,145	912	1,689	2,612	3,528	4,157	4,926	5,304	6,180
Post Oak Creek	T6	7,532	345	547	674	810	936	1,069	1,069	1,271
Post Oak Creek	T6	2,822	476	821	1,019	1,292	1,537	1,792	1,815	2,101
Post Oak Creek	T5	3,055	202	372	482	601	718	835	903	1,025
Post Oak Creek	T5	1,340	332	616	783	1,001	1,206	1,408	1,522	1,684
Post Oak Creek	T8	390	332	616	783	1,001	1,206	1,408	1,522	1,684
Post Oak Creek	Reach 03	48,213	912	1,689	2,612	3,528	4,157	4,926	5,304	6,180
Post Oak Creek	Reach 03	46,536	698	1,251	2,020	3,335	4,083	4,867	5,282	6,175
Post Oak Creek	Reach 03	42,685	358	380	392	405	416	504	702	1,660
Post Oak Creek	Reach 03	42,214	348	384	397	413	430	518	719	1,684
Post Oak Creek	Reach 04	39,714	901	1,589	1,991	2,425	2,771	3,076	3,425	3,596
Post Oak Creek	Reach 04	38,606	1,395	2,370	2,975	3,653	4,238	4,905	4,925	5,785
Post Oak Creek	T4	7,962	64	106	133	163	190	218	219	263
Post Oak Creek	T4	6,286	64	106	133	163	190	218	219	263
Post Oak Creek	T4	3,844	181	298	373	453	528	607	613	731
Post Oak Creek	T4	1,962	293	488	611	742	865	985	987	1,089
Post Oak Creek	Reach 05	34,801	1,395	2,370	2,975	3,653	4,238	4,905	4,925	5,785

RAS Cross Sections			Flows							
River	Reach	River Station	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
Post Oak Creek	Reach 05	32,200	1,638	2,755	3,464	4,254	4,941	5,663	5,672	6,748
Post Oak Creek	Reach 05	30,235	1,660	2,750	3,480	4,309	5,008	5,716	5,726	6,884
Post Oak Creek	Reach 06	25,768	3,407	5,425	6,662	8,031	9,624	10,767	11,039	12,494
Post Oak Creek	Reach 07	20,268	5,708	9,561	11,990	14,928	18,041	21,192	22,144	26,260
Post Oak Creek	T2	10,641	430	711	889	1,081	1,261	1,447	1,447	1,740
Post Oak Creek	T3	7,521	711	1,138	1,408	1,697	1,966	2,249	2,249	2,683
Post Oak Creek	Reach 08	17,933	5,798	9,683	12,145	15,076	18,186	21,304	22,321	26,700
Post Oak Creek	Reach 09	14,112	5,939	9,856	12,376	15,255	18,087	21,461	22,545	26,946
Post Oak Creek	T1	2,618	120	210	266	326	385	445	466	538
Post Oak Creek	Reach 10	5,610	5,975	9,912	12,462	15,370	18,186	21,378	22,557	27,099
Post Oak Creek	Reach 11	4,011	6,390	10,340	12,981	15,999	18,801	22,025	23,259	27,847
Post Oak Creek	Reach 12	3,710	6,832	10,998	13,778	16,932	19,841	23,146	24,380	29,136
Sand Creek	T1	5,048	541	987	1,275	1,595	1,899	2,204	2,375	2,710
Sand Creek	Reach 01	40,684	250	452	585	742	886	1,024	1,110	1,283
Sand Creek	Reach 02	34,507	719	1,314	1,702	2,143	2,560	2,968	3,212	3,694
Sand Creek	Reach 02	32,803	722	1,268	1,546	1,707	2,670	3,755	4,535	5,985
Sand Creek	Reach 03	29,507	722	1,268	1,546	1,707	2,670	3,755	4,535	5,985
Sand Creek	Reach 03	25,311	317	361	383	403	420	434	444	466
Sand Creek	Reach 04	21,893	2,673	4,926	6,248	7,531	8,797	10,086	10,654	12,345
Sand Creek	Reach 04	15,882	2,816	5,187	6,577	8,049	9,391	10,725	11,265	13,092
Sand Creek	T2	3,301	118	192	239	287	334	384	384	457
Sand Creek	Reach 05	12,007	2,805	5,109	6,512	8,019	9,365	10,694	11,226	13,090
Sand Creek	Reach 05	11,007	3,164	5,723	7,239	8,917	10,378	11,841	11,841	14,388
Sand Creek	Reach 05	9,274	3,170	5,712	7,231	8,840	10,276	11,712	11,712	14,380
Sand Creek	Reach 06	6,507	3,299	5,751	7,213	8,781	10,500	11,645	12,005	14,378
Sand Creek	Reach 06	3,507	3,300	5,752	7,206	8,746	10,242	11,581	12,005	14,276
Stream A	Reach 01	9,500	1,224	1,960	2,422	2,914	3,375	3,861	3,861	4,599
Stream A	Reach 01	5,500	117	122	125	128	131	134	134	632
Stream B	Reach 01	19,246	1,160	2,061	2,633	3,242	3,832	4,441	4,739	5,391
Stream B	Reach 01	4,359	1,619	2,984	3,840	4,715	5,598	6,481	6,949	8,041
Stream C	Reach 01	7,000	351	635	817	1,014	1,205	1,398	1,506	1,708
Stream E	Reach 01	8,000	340	587	744	915	1,079	1,246	1,314	1,511
Stream F	Reach 01	14,000	590	919	1,127	1,356	1,561	1,776	1,792	2,117
Stream F	Reach 01	9,099	619	974	1,196	1,451	1,664	1,883	1,898	2,239
Stream G	T2	4,000	164	268	333	403	469	539	548	647
Stream G	T2	1,500	164	268	333	403	469	539	548	647
Stream G	T1	2,384	172	287	360	439	513	589	598	710
Stream G	Reach 01	14,042	164	268	333	403	469	539	548	647



4 Hydraulic Analysis

A detailed hydraulic analysis was performed for the Post Oak Creek watershed. This hydraulic analyses computed the water surface elevations for the 50%, 20%, 10%, 4%, 2%, 1% and 0.2% annual chance (2-YR, 5-YR, 10-YR, 25-YR, 50-YR, 100-YR and 500-YR, respectively) existing condition storm events and the ultimate conditions 1% annual chance event. This analysis also includes the delineation of the existing conditions 1% and 0.2% annual chance floodplains, and the ultimate conditions 1% annual chance floodplains.

The HEC-RAS model of Post Oak Creek begins on the southeast side of Sherman, downstream of the railroad 2,000 feet north of F.M. 1417 and extends to the upper limits of the watershed north and west of Sherman. This Flood Protection Planning analysis encompassed 35.0 miles of stream including Post Oak Creek, East Fork Post Oak Creek, Sand Creek and 15.5 miles of Unnamed Tributaries.

Overall maps showing the extents of the studied reaches are included in Exhibit 5 of **Appendix A**. The HEC-RAS modeling is one dimensional, steady state. The sections that follow describe the development of the hydraulic model in in the Post Oak Creek Watershed.

4.1 Hydraulic Analysis

4.1.1 Processing

The HEC-RAS models were developed for the 50%, 20%, 10%, 4%, 2%, 1% and 0.5% existing conditions annual-chance-flood events as well as the ultimate conditions 1% annual-chance-flood event. The detailed study methodology incorporated use of HEC-GeoRAS software as a preprocessor to HEC-RAS. HEC-GeoRAS utilizes geographically referenced data sets as well as a three-dimensional terrain model to create the input data files for HEC-RAS. The terrain model was developed using the 2-ft. TNRIS LiDAR topography data. HEC-RAS was then executed to determine the flood elevation at each cross-section of the modeled stream. The resulting elevations are then post-processed by HEC-GeoRAS for creation of the floodplain boundaries.

4.1.2 Topography

The 2-ft LiDAR data developed by the City of Sherman in 2008 was horizontally referenced to the NAD 83, Texas State Plane, North Central Zone coordinate system and was vertically referenced to NAVD 88. Field survey of channel cross sections, bridges and culverts was

performed between November 2011 and January 2012 by Underwood Drafting & Surveying, Inc. The field survey data obtained was horizontally referenced to the NAD83, Texas State Plan, North Central Texas coordinate system and vertically referenced to North American Vertical Datum (NAVD88). In order to insure that the field surveys and the digital terrain data obtained from the LiDAR would be compatible, the LiDAR acquisition and field surveyors utilized the same reference marks.

4.1.3 Boundary Conditions and Tie-ins

The downstream starting water-surface elevations (WSELs) for all profiles in the HEC-RAS models were calculated using normal depth method.

4.1.4 Cross-Sections

Model cross-sections were placed along the study streams using the available contour data (Sherman LiDAR). Where roads or other structures are encountered, additional cross-sections were acquired through additional surveying to meet HEC-RAS data input needs. An extensive field survey of hydraulic structures was conducted to help enhance the accuracy of the hydraulic model. These detailed cross-sections were then used to enhance the channel portions of the cross-sections derived from the terrain model. The HEC-RAS model generated from HEC GeoRAS then received an extensive quality check / quality assurance to ensure that LiDAR and field survey data were merged correctly.

4.1.5 Structures

Bridges and culverts are typically modeled with four cross-sections an upstream section, a section at the upstream face, a section at the downstream face and a downstream cross-section, all four of these cross-sections were obtained through field survey. The survey data was collected following surveying standards set by FEMA, March 2009 Appendix M, Data Capture Standards. The surveyed data includes thirteen cross-sections of the concrete channel along U.S. 75 and eighty-three bridges or culverts throughout the City. The survey data files were processed in the ArcGIS software into point files and checked against the field sketches and photographs. Elevations and horizontal measurements were checked for any anomalies. The processed surveys were used to obtain the cross-section geometry for hydraulic modeling.

4.1.6 Ineffective Flow Areas

Ineffective flow areas are added to portions of various cross-sections to accurately model any given section's ability to convey flow. Ineffective flow areas are typically modeled by:

- Applying an ineffective flow area boundary in HEC-RAS with a test elevation that, if exceeded, would offer some level of conveyance;
- Applying a permanent ineffective flow area boundary in HEC-RAS, this will permanently prevent that portion of the cross section from conveying flow; or
- Applying a blocked obstruction boundary in HEC-RAS, this will permanently prevent that portion of the cross section from conveying flow and removes storage capacity of the stream.

Examples of temporary ineffective flow areas include: 1) minor swales parallel to the reach that eventually outfall into the reach, or 2) cross sections immediately upstream or downstream of an in-line structure. Examples of permanent ineffective flow areas include: 1) minor swales parallel to the reach, which do not outfall into the reach, or 2) off-line water quality / detention ponds.

4.1.7 Channel Roughness Values

Manning's n-values were estimated based on field inspections, engineering judgment and high resolution aerial photography of stream channels and floodplain areas for the streams in the study area. The n-values for various types of ground cover are listed in **Table 16**, and the ranges of values used in the individual streams are shown in **Table 17**.

Table 16. Manning's Roughness Coefficients by Type.

Description	Channel "n" Values	Overbank "n" Values
Irregular channel, some pools & shoals	0.04	--
Irregular channel, some trees	0.055	--
Concrete channels	0.015	--
Channel with weeds and brush	0.025	--
Tree cover with some open space	--	0.080
Scattered trees, flow obstructions	--	0.060
Pasture with high grass	--	0.035

Table 17. Summary of Manning's Roughness Coefficients by Stream.

Stream Name	Channel "n" Value	Overbank "n" Value
Post Oak Creek	0.015 - 0.080	0.040 - 0.100
East Fork Post Oak Creek	0.015 - 0.080	0.035 - 0.100
Sand Creek	0.015 - 0.080	0.040 - 0.100
Tributaries	0.015 - 0.080	0.040 - 0.100

4.1.8 Reservoirs

Three NRCS reservoirs were incorporated into the HEC-HMS and HEC-RAS models. They are:

1. Site 8A which was constructed in 2000 and is located at Station 25,533 on Sand Creek.
2. Pickens Dam which was constructed in 1974 and is located at Station 5,840 on Stream A which is a tributary of Sand Creek.
3. Dean Gilbert Dam which was constructed in 1988 and is located at Station 42,835 on Post Oak Creek.

Record drawings for all three reservoirs were obtained from the NRCS. These drawings provided elevation-storage data as well as the size and configuration of the outlet structures. Elevation-storage data was entered into the HEC-HMS model directly. Elevation discharge curves were developed for the principal and auxiliary spillways of each dam from the record drawing data. This information was entered into both the HEC-HMS and HEC-RAS models.

4.1.9 Modeling Parameters

Main channel and overbank reach lengths were extracted from the digital terrain model using HEC GeoRAS. The other hydraulic parameters used in the analysis of Post Oak Creek are shown in **Table 18**.

Table 18. Hydraulic Parameters.

Hydraulic Model Coefficient	Value or Range
Bridge pier drag coefficient, Cd	1.2
Pressure and weir coefficient (submerged inlet and outlet)	0.8
Expansion coefficient for bridges and culverts	0.5
Expansion coefficient for channels	0.3
Contraction coefficient for bridges and culverts	0.3
Contraction coefficient for channels	0.1
Weir coefficient for road decks	2.6 to 3.0
Culvert entrance loss coefficient	0.5
Culvert exit loss coefficient	1

4.2 Analysis of Model Results

Peak flow data from the HMS models was transferred into the RAS model, and the watershed was modeled assuming a subcritical flow regime, which is consistent with FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners*.

The existing conditions floodplains are shown on Exhibits 6 in **Appendix A. Table 19** shows the water surface elevations for the various events at each of the RAS cross section locations.

Table 19. Water Surface Elevations.

River	Reach	River Sta.	Water Surface Elevation (M.S.L.)							
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
EF Post Oak Crk	T2	836	743.34	744.95	745.18	745.36	745.49	745.61	745.61	745.75
EF Post Oak Crk	T2	720	736.30	737.51	738.18	738.82	739.38	739.92	739.92	740.65
EF Post Oak Crk	T2	500	735.30	736.86	737.64	738.40	739.03	739.63	739.63	740.42
EF Post Oak Crk	T1	8,540	800.32	801.10	801.49	801.85	802.15	802.46	802.46	802.88
EF Post Oak Crk	T1	8,220	799.95	800.66	801.01	801.34	801.62	801.89	801.89	802.29
EF Post Oak Crk	T1	7,717	794.89	795.05	795.14	795.22	795.30	795.37	795.37	795.46
EF Post Oak Crk	T1	7,193	775.03	776.15	776.71	777.23	777.66	778.08	778.08	778.60
EF Post Oak Crk	T1	6,711	774.23	775.31	775.80	776.23	776.59	776.94	776.94	777.40
EF Post Oak Crk	T1	6,208	772.91	774.32	774.82	775.17	775.44	775.69	775.69	776.03
EF Post Oak Crk	T1	6,099	772.34	774.13	774.64	774.99	775.24	775.47	775.47	775.79
EF Post Oak Crk	T1	5,947	771.36	771.82	772.05	772.28	772.48	772.67	772.67	772.93
EF Post Oak Crk	T1	5,805	770.23	770.74	770.99	771.23	771.43	771.64	771.64	771.90
EF Post Oak Crk	T1	5,198	763.05	763.28	763.37	763.46	763.55	763.63	763.63	763.74
EF Post Oak Crk	T1	4,686	757.97	758.73	759.04	759.28	759.51	759.76	759.77	760.07
EF Post Oak Crk	T1	4,227	748.51	750.06	750.34	750.49	750.58	750.55	750.57	750.97
EF Post Oak Crk	T1	4,108	748.56	750.03	750.30	750.44	750.52	750.45	750.48	749.35
EF Post Oak Crk	T1	4,051	744.96	745.76	746.20	746.61	746.97	747.34	747.34	747.82
EF Post Oak Crk	T1	3,957	744.19	745.63	746.41	747.11	747.43	747.85	747.85	748.29
EF Post Oak Crk	T1	3,849	743.42	744.27	744.60	744.95	745.23	745.51	745.51	745.84
EF Post Oak Crk	T1	3,798	742.56	743.74	743.85	744.04	744.34	744.63	744.64	745.03
EF Post Oak Crk	T1	3,742	740.96	744.13	744.38	744.54	744.62	744.70	744.70	744.74
EF Post Oak Crk	T1	3,642	741.38	744.21	744.49	744.68	744.82	744.95	744.95	745.09
EF Post Oak Crk	T1	3,583	740.05	742.20	742.37	742.50	742.57	742.62	742.63	742.65
EF Post Oak Crk	T1	3,447	740.10	742.28	742.48	742.66	742.78	742.91	742.92	743.07
EF Post Oak Crk	T1	3,391	737.24	740.72	740.95	741.10	741.21	741.27	741.28	741.28
EF Post Oak Crk	T1	3,354	737.46	740.80	741.08	741.28	741.44	741.58	741.60	741.73

River	Reach	River Sta.	Water Surface Elevation (M.S.L.)							
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
EF Post Oak Crk	T1	3,294	736.36	740.14	740.40	740.55	740.70	740.78	740.81	740.92
EF Post Oak Crk	T1	3,211	736.45	740.18	740.44	740.60	740.76	740.85	740.88	741.02
EF Post Oak Crk	T1	3,151	735.48	738.17	738.41	738.56	738.64	738.69	738.69	738.71
EF Post Oak Crk	T1	3,097	735.46	738.17	738.42	738.58	738.67	738.74	738.74	738.80
EF Post Oak Crk	T1	2,994	734.18	735.92	736.08	736.11	736.16	736.25	736.25	736.30
EF Post Oak Crk	T1	2,894	734.24	735.96	736.16	736.23	736.33	736.50	736.50	736.71
EF Post Oak Crk	T1	2,809	732.64	733.96	734.16	734.08	734.01	734.52	734.52	734.82
EF Post Oak Crk	T1	2,741	732.85	734.06	734.32	734.36	734.52	735.27	735.27	735.58
EF Post Oak Crk	T1	2,673	732.05	733.61	733.89	733.79	733.63	734.79	734.79	735.12
EF Post Oak Crk	T1	2,616	732.06	733.62	733.91	733.83	733.70	732.90	732.90	735.05
EF Post Oak Crk	T1	2,544	731.16	732.81	733.37	733.16	734.52	734.67	734.66	734.84
EF Post Oak Crk	T1	2,468	731.50	733.08	733.64	733.65	733.63	733.50	733.51	732.60
EF Post Oak Crk	T1	2,386	728.79	729.82	731.40	732.25	732.58	732.81	732.82	732.99
EF Post Oak Crk	T1	2,354	728.45	730.36	731.59	732.45	732.82	733.18	733.19	733.51
EF Post Oak Crk	T1	2,249	728.08	729.25	729.84	730.51	731.00	731.50	731.51	732.16
EF Post Oak Crk	T1	2,184	727.56	728.67	729.23	729.75	730.17	730.61	730.62	731.16
EF Post Oak Crk	T1	1,927	725.67	726.69	727.21	727.69	727.74	727.83	727.83	728.22
EF Post Oak Crk	T1	1,667	721.15	721.96	722.40	722.80	723.90	724.84	724.86	725.72
EF Post Oak Crk	T1	1,548	719.03	721.04	722.17	723.26	724.25	725.43	725.45	726.29
EF Post Oak Crk	T1	1,399	716.84	718.04	718.68	719.23	719.73	720.27	720.37	721.03
EF Post Oak Crk	T1	1,206	714.38	715.50	715.84	716.38	716.64	716.86	716.92	717.11
EF Post Oak Crk	T1	780	708.43	709.96	713.28	714.12	714.63	715.10	715.18	715.71
EF Post Oak Crk	T1	39	704.78	707.69	710.82	712.35	713.24	714.05	714.15	715.17
EF Post Oak Crk	Reach 01	22,173	810.15	810.39	810.52	810.66	810.80	810.92	810.93	811.02
EF Post Oak Crk	Reach 01	21,966	808.22	808.36	808.42	808.49	808.53	808.58	808.59	808.71
EF Post Oak Crk	Reach 01	21,630	804.76	805.21	805.42	805.62	805.79	805.94	805.96	806.15
EF Post Oak Crk	Reach 01	21,569	804.51	804.98	805.19	805.39	805.57	805.71	805.72	805.92
EF Post Oak Crk	Reach 01	21,357	801.48	801.96	802.26	802.51	802.71	802.97	803.02	803.25
EF Post Oak Crk	Reach 01	21,171	799.60	800.18	800.48	800.72	800.92	801.11	801.13	801.35
EF Post Oak Crk	Reach 01	21,068	799.22	799.73	800.03	800.25	800.43	800.60	800.62	800.81
EF Post Oak Crk	Reach 01	20,569	795.26	795.80	796.03	796.19	796.33	796.46	796.48	796.66
EF Post Oak Crk	Reach 01	20,341	793.14	793.83	794.11	794.34	794.55	794.74	794.76	795.00
EF Post Oak Crk	Reach 01	20,206	792.37	792.82	793.03	793.21	793.34	793.45	793.47	793.60
EF Post Oak Crk	Reach 01	20,069	791.52	791.82	791.97	792.09	792.19	792.29	792.30	792.42
EF Post Oak Crk	Reach 01	19,571	788.10	788.45	788.62	788.78	788.92	789.04	789.07	789.23
EF Post Oak Crk	Reach 01	19,070	782.84	783.31	783.54	783.75	783.93	784.10	784.11	784.30

River	Reach	River Sta.	Water Surface Elevation (M.S.L.)							
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
EF Post Oak Crk	Reach 01	18,876	782.51	782.85	783.02	783.10	783.19	783.24	783.28	783.38
EF Post Oak Crk	Reach 01	18,544	779.42	779.81	779.99	780.15	780.29	780.42	780.43	780.58
EF Post Oak Crk	Reach 01	18,043	776.23	776.49	776.66	776.80	776.90	777.03	777.07	777.28
EF Post Oak Crk	Reach 01	17,569	774.04	774.57	774.85	775.13	775.24	775.38	775.39	775.64
EF Post Oak Crk	Reach 01	17,069	770.78	771.22	771.45	771.67	772.04	772.39	772.41	772.79
EF Post Oak Crk	Reach 01	16,881	769.40	770.25	770.87	771.32	771.89	772.20	772.22	772.54
EF Post Oak Crk	Reach 01	16,569	766.75	767.39	768.64	769.45	771.31	771.81	771.83	772.19
EF Post Oak Crk	Reach 01	16,069	764.34	766.80	768.47	769.34	771.26	771.76	771.79	772.14
EF Post Oak Crk	Reach 01	15,569	761.31	762.18	762.60	763.07	763.40	764.25	764.27	764.72
EF Post Oak Crk	Reach 01	15,069	756.83	757.72	758.13	758.53	758.86	759.17	759.19	759.58
EF Post Oak Crk	Reach 01	14,509	755.12	756.02	756.48	756.90	757.24	757.54	757.55	757.93
EF Post Oak Crk	Reach 01	14,125	753.17	754.39	754.96	755.43	755.79	756.12	756.14	756.52
EF Post Oak Crk	Reach 01	13,569	750.79	752.24	752.88	753.43	753.86	754.24	754.26	754.72
EF Post Oak Crk	Reach 01	13,069	747.40	748.98	749.75	750.49	751.01	751.45	751.48	752.00
EF Post Oak Crk	Reach 01	12,569	745.64	746.90	747.50	748.07	748.51	748.92	748.94	749.47
EF Post Oak Crk	Reach 01	12,069	744.11	745.35	745.98	746.55	747.01	747.42	747.42	747.95
EF Post Oak Crk	Reach 01	11,569	742.38	743.60	744.22	744.76	745.18	745.54	745.54	746.00
EF Post Oak Crk	Reach 01	11,069	740.39	741.36	741.75	742.07	742.39	742.68	742.68	743.09
EF Post Oak Crk	Reach 01	11,007	740.28	741.11	741.39	741.56	741.71	741.80	741.80	741.74
EF Post Oak Crk	Reach 01	10,921	736.16	737.87	738.61	739.29	739.88	740.44	740.44	741.18
EF Post Oak Crk	Reach 01	10,766	735.83	737.44	738.13	738.78	739.34	739.87	739.87	740.59
EF Post Oak Crk	Reach 01	10,250	734.63	736.12	736.88	737.61	738.25	738.85	738.85	739.66
EF Post Oak Crk	Reach 01	10,096	734.07	735.64	736.39	737.22	737.91	738.55	738.55	739.40
EF Post Oak Crk	Reach 02	9,995	733.92	735.48	736.23	737.01	737.69	738.31	738.31	739.15
EF Post Oak Crk	Reach 02	9,732	732.66	734.25	735.07	735.96	736.70	737.38	737.38	738.27
EF Post Oak Crk	Reach 02	9,429	730.94	732.57	733.45	734.44	735.24	735.94	735.94	736.85
EF Post Oak Crk	Reach 02	9,232	729.72	731.18	731.98	733.05	733.87	734.54	734.54	735.39
EF Post Oak Crk	Reach 02	8,732	723.69	726.55	728.94	730.72	731.67	732.29	732.29	733.01
EF Post Oak Crk	Reach 02	8,587	723.21	726.55	729.00	730.80	731.76	732.39	732.39	733.14
EF Post Oak Crk	Reach 02	8,214	719.23	720.80	721.66	722.69	723.47	724.22	724.22	725.26
EF Post Oak Crk	Reach 02	8,049	718.50	720.11	720.94	721.84	722.56	723.23	723.23	724.16
EF Post Oak Crk	Reach 02	7,589	716.08	717.77	718.71	719.68	720.49	721.27	721.27	722.33
EF Post Oak Crk	Reach 02	7,170	712.33	713.92	714.99	715.94	716.66	717.27	717.27	718.21
EF Post Oak Crk	Reach 02	6,732	710.19	713.03	715.98	716.43	716.67	716.88	716.91	716.97
EF Post Oak Crk	Reach 02	6,393	709.65	713.43	716.02	716.47	716.71	716.90	716.93	716.96
EF Post Oak Crk	Reach 02	6,113	705.05	706.83	710.02	711.41	712.14	712.79	712.92	713.64

River	Reach	River Sta.	Water Surface Elevation (M.S.L.)							
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
EF Post Oak Crk	Reach 02	5,807	703.54	706.54	710.20	711.73	712.56	713.29	713.41	714.27
EF Post Oak Crk	Reach 03	5,748	704.44	707.24	710.43	711.91	712.73	713.46	713.57	714.43
EF Post Oak Crk	Reach 03	3,436	695.32	697.84	698.94	699.87	699.97	700.00	700.82	699.56
EF Post Oak Crk	Reach 03	3,196	692.74	695.06	696.04	697.16	697.69	698.22	698.83	698.88
EF Post Oak Crk	Reach 03	3,132	691.77	693.96	694.52	694.60	694.70	695.42	696.33	696.29
EF Post Oak Crk	Reach 03	2,827	692.40	695.04	696.09	696.81	697.05	697.33	697.73	697.78
EF Post Oak Crk	Reach 03	2,696	689.78	691.86	693.39	694.63	694.90	695.08	695.48	695.51
EF Post Oak Crk	Reach 03	2,196	687.37	688.91	689.69	690.85	690.84	691.16	691.76	691.61
EF Post Oak Crk	Reach 03	1,765	686.73	689.67	690.66	691.59	691.68	691.97	692.50	692.44
EF Post Oak Crk	Reach 03	1,563	683.04	685.20	686.37	687.97	688.24	688.50	689.08	689.00
EF Post Oak Crk	Reach 03	1,196	680.39	683.58	684.04	684.39	684.55	684.69	684.97	684.94
Post Oak Creek	Reach 01	57,527	787.31	788.31	788.68	789.01	789.28	789.53	789.63	789.87
Post Oak Creek	Reach 01	57,027	785.54	786.34	786.73	787.09	787.39	787.67	787.78	788.07
Post Oak Creek	Reach 01	56,527	783.78	784.55	784.94	785.29	785.59	785.86	785.97	786.25
Post Oak Creek	Reach 01	56,027	782.32	783.08	783.38	783.67	783.93	784.18	784.27	784.52
Post Oak Creek	Reach 01	55,527	779.23	780.07	780.45	780.83	781.07	781.28	781.39	781.60
Post Oak Creek	T7	1,301	790.08	790.64	790.90	791.14	791.34	791.51	791.62	791.78
Post Oak Creek	T7	758	784.85	785.42	785.70	785.96	786.15	786.32	786.41	786.57
Post Oak Creek	T7	633	781.98	782.60	782.91	783.18	783.42	783.61	783.76	783.93
Post Oak Creek	Reach 02	55,145	778.65	779.36	779.72	780.08	780.34	780.59	780.71	780.96
Post Oak Creek	Reach 02	54,590	776.95	777.60	777.93	778.26	778.55	778.82	778.96	779.24
Post Oak Creek	Reach 02	54,145	775.05	776.04	776.47	776.92	777.24	777.54	777.69	777.99
Post Oak Creek	Reach 02	53,611	772.04	773.18	773.73	774.06	774.43	774.82	774.96	775.22
Post Oak Creek	Reach 02	53,244	767.60	769.02	769.82	771.08	771.64	772.06	772.25	772.66
Post Oak Creek	Reach 02	52,645	765.16	766.68	768.03	770.61	771.12	771.48	771.63	771.98
Post Oak Creek	Reach 02	52,145	762.37	763.35	766.96	770.37	770.86	771.20	771.32	771.64
Post Oak Creek	Reach 02	51,612	761.12	763.69	767.08	770.42	770.91	771.26	771.39	771.71
Post Oak Creek	Reach 02	51,532	760.72	763.65	767.07	770.42	770.91	771.25	771.39	771.71
Post Oak Creek	Reach 02	51,311	756.37	758.31	759.31	760.15	760.89	761.50	761.79	762.37
Post Oak Creek	Reach 02	51,145	755.77	757.60	758.57	759.34	760.04	760.60	760.88	761.42
Post Oak Creek	Reach 02	50,645	753.89	755.48	756.27	756.96	757.50	757.97	758.18	758.59
Post Oak Creek	Reach 02	50,145	752.74	753.85	754.54	755.21	755.70	756.16	756.37	756.82
Post Oak Creek	Reach 02	49,645	752.03	752.51	753.15	753.98	754.47	754.97	755.20	755.71
Post Oak Creek	Reach 02	49,145	751.99	752.42	752.97	753.74	754.19	754.64	754.85	755.32
Post Oak Creek	Reach 02	48,855	751.98	752.39	752.92	753.67	754.12	754.55	754.76	755.23
Post Oak Creek	T6	7,532	776.36	777.42	777.71	777.95	778.18	778.36	778.36	778.65

River	Reach	River Sta.	Water Surface Elevation (M.S.L.)							
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
Post Oak Creek	T6	7,102	776.19	777.28	777.53	777.74	777.94	778.05	778.05	778.29
Post Oak Creek	T6	6,800	772.29	772.59	772.95	773.34	773.54	773.67	773.67	773.90
Post Oak Creek	T6	6,552	769.57	770.99	772.75	773.22	773.41	773.52	773.52	773.73
Post Oak Creek	T6	6,317	769.12	770.96	772.74	773.20	773.39	773.49	773.49	773.70
Post Oak Creek	T6	6,011	767.68	768.32	768.54	768.76	768.91	769.06	769.06	769.25
Post Oak Creek	T6	5,822	766.40	766.92	767.14	767.34	767.52	767.70	767.70	767.94
Post Oak Creek	T6	5,322	763.79	764.30	764.56	764.81	765.02	765.22	765.22	765.51
Post Oak Creek	T6	4,822	762.78	763.33	763.61	763.88	764.10	764.32	764.32	764.61
Post Oak Creek	T6	4,322	761.75	762.35	762.63	762.91	763.14	763.35	763.35	763.63
Post Oak Creek	T6	3,822	760.53	761.10	761.39	761.64	761.86	762.06	762.06	762.31
Post Oak Creek	T6	3,322	758.80	759.22	759.39	759.63	759.85	760.05	760.07	760.30
Post Oak Creek	T6	2,822	756.25	756.73	756.99	757.25	757.43	757.60	757.59	757.79
Post Oak Creek	T6	2,322	753.47	754.05	754.12	754.41	754.74	755.09	755.22	755.63
Post Oak Creek	T6	1,822	752.03	752.50	753.03	753.79	754.24	754.69	754.89	755.36
Post Oak Creek	T6	1,322	752.01	752.45	752.99	753.75	754.20	754.65	754.86	755.33
Post Oak Creek	T6	822	751.99	752.42	752.96	753.72	754.17	754.62	754.83	755.30
Post Oak Creek	T5	3,055	762.46	763.05	763.34	763.58	763.78	763.97	764.11	764.29
Post Oak Creek	T5	2,297	757.43	759.45	759.95	760.32	760.64	760.92	761.05	761.30
Post Oak Creek	T5	1,685	754.35	756.42	756.96	757.39	757.72	758.00	758.12	758.27
Post Oak Creek	T5	1,340	752.32	753.20	753.69	754.31	754.74	755.15	755.36	755.75
Post Oak Creek	T5	840	752.01	752.46	753.00	753.76	754.22	754.66	754.88	755.34
Post Oak Creek	T5	340	751.99	752.40	752.94	753.70	754.14	754.59	754.80	755.27
Post Oak Creek	T8	390	751.98	752.39	752.93	753.69	754.13	754.58	754.79	755.25
Post Oak Creek	T8	128	751.98	752.39	752.93	753.69	754.13	754.57	754.78	755.25
Post Oak Creek	Reach 03	48,213	751.98	752.39	752.93	753.68	754.12	754.56	754.77	755.24
Post Oak Creek	Reach 03	47,714	751.98	752.39	752.91	753.67	754.11	754.55	754.76	755.22
Post Oak Creek	Reach 03	47,215	751.98	752.38	752.91	753.65	754.09	754.53	754.74	755.20
Post Oak Creek	Reach 03	46,928	751.98	752.38	752.90	753.65	754.09	754.52	754.73	755.19
Post Oak Creek	Reach 03	46,536	751.97	752.35	752.84	753.54	753.93	754.30	754.48	754.85
Post Oak Creek	Reach 03	46,214	751.97	752.35	752.84	753.54	753.93	754.30	754.47	754.84
Post Oak Creek	Reach 03	45,714	751.97	752.35	752.84	753.54	753.93	754.30	754.47	754.84
Post Oak Creek	Reach 03	45,214	751.97	752.35	752.84	753.54	753.93	754.30	754.47	754.84
Post Oak Creek	Reach 03	44,715	751.97	752.35	752.84	753.54	753.93	754.30	754.47	754.84
Post Oak Creek	Reach 03	44,214	751.97	752.35	752.84	753.54	753.93	754.30	754.47	754.84
Post Oak Creek	Reach 03	43,714	751.97	752.35	752.84	753.54	753.93	754.30	754.47	754.84
Post Oak Creek	Reach 03	42,982	751.97	752.35	752.84	753.53	753.93	754.30	754.47	754.83

River	Reach	River Sta.	Water Surface Elevation (M.S.L.)							
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
Post Oak Creek	Reach 03	42,685	716.90	717.10	717.18	717.27	717.37	717.76	718.48	720.56
Post Oak Creek	Reach 03	42,214	715.90	716.21	716.31	716.45	716.59	717.01	717.69	719.88
Post Oak Creek	Reach 03	42,026	715.84	716.15	716.25	716.39	716.52	716.91	717.53	719.12
Post Oak Creek	Reach 03	41,714	715.18	715.50	715.61	715.77	715.92	716.25	716.76	718.27
Post Oak Creek	Reach 03	41,214	713.23	713.92	714.43	714.97	715.35	715.73	716.15	717.09
Post Oak Creek	Reach 03	40,714	712.32	713.60	714.25	714.87	715.27	715.65	716.04	716.73
Post Oak Creek	Reach 03	40,214	711.82	713.39	714.12	714.78	715.21	715.58	715.94	716.35
Post Oak Creek	Reach 04	39,714	710.71	712.54	713.38	714.07	714.54	714.93	715.26	715.60
Post Oak Creek	Reach 04	39,214	709.21	711.21	712.07	712.72	713.22	713.63	713.85	714.38
Post Oak Creek	Reach 04	38,714	706.54	708.83	709.90	710.95	711.84	712.38	712.37	713.38
Post Oak Creek	Reach 04	38,606	706.42	708.72	709.74	710.69	711.54	712.00	712.02	712.96
Post Oak Creek	Reach 04	38,455	706.15	708.42	709.40	710.32	711.02	711.71	711.72	712.47
Post Oak Creek	Reach 04	38,214	705.86	708.04	708.98	709.85	710.52	711.16	711.18	711.88
Post Oak Creek	Reach 04	37,714	704.47	706.35	707.05	707.67	708.13	708.61	708.62	709.18
Post Oak Creek	Reach 04	37,214	702.86	704.48	705.16	705.82	706.33	706.86	706.87	707.53
Post Oak Creek	Reach 04	36,645	701.70	703.36	704.08	704.76	705.29	705.85	705.87	706.55
Post Oak Creek	Reach 04	36,213	700.36	701.98	702.75	703.52	704.12	704.74	704.76	705.48
Post Oak Creek	Reach 04	35,716	698.75	700.64	701.51	702.35	702.99	703.63	703.64	704.38
Post Oak Creek	Reach 04	35,214	696.84	698.78	699.64	700.48	701.09	701.70	701.71	702.40
Post Oak Creek	T4	7,962	798.87	798.95	798.99	799.03	799.06	799.09	799.09	799.14
Post Oak Creek	T4	7,462	792.50	792.66	792.74	792.84	792.92	792.99	792.99	793.09
Post Oak Creek	T4	6,962	788.53	788.68	788.78	788.86	788.92	788.98	788.98	789.07
Post Oak Creek	T4	6,763	784.86	785.21	785.63	785.76	785.82	785.87	785.88	785.96
Post Oak Creek	T4	6,462	778.15	778.63	778.87	779.06	779.22	779.38	779.39	779.61
Post Oak Creek	T4	6,286	775.02	776.23	777.25	777.62	777.82	777.95	777.99	778.17
Post Oak Creek	T4	6,154	774.67	776.06	777.16	777.53	777.73	777.84	777.88	778.03
Post Oak Creek	T4	5,962	769.89	770.19	770.54	770.98	771.34	771.54	771.54	771.82
Post Oak Creek	T4	5,462	763.81	763.86	764.26	764.89	765.43	765.73	765.74	766.02
Post Oak Creek	T4	5,260	762.01	763.25	763.97	764.76	765.35	765.65	765.66	765.94
Post Oak Creek	T4	5,195	762.03	763.24	763.97	764.76	765.35	765.65	765.66	765.94
Post Oak Creek	T4	5,056	759.50	759.85	760.03	760.21	760.35	760.49	760.50	760.69
Post Oak Creek	T4	4,829	753.99	754.77	755.11	755.42	755.67	755.89	755.90	756.22
Post Oak Creek	T4	4,462	747.43	747.79	747.97	748.14	748.28	748.42	748.43	748.62
Post Oak Creek	T4	3,844	739.23	740.47	740.82	741.15	741.35	741.62	741.65	742.18
Post Oak Creek	T4	3,759	737.31	738.03	738.42	739.18	740.38	741.05	741.09	741.90
Post Oak Creek	T4	3,641	732.05	732.65	733.12	733.55	733.91	734.31	734.34	734.74

River	Reach	River Sta.	Water Surface Elevation (M.S.L.)							
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
Post Oak Creek	T4	3,452	726.95	727.52	727.78	728.02	728.23	728.35	728.36	728.78
Post Oak Creek	T4	2,962	715.32	716.38	716.95	717.45	717.88	718.28	718.30	718.78
Post Oak Creek	T4	2,462	714.02	715.15	715.75	716.31	716.77	717.20	717.21	717.61
Post Oak Creek	T4	1,962	711.21	712.37	712.94	713.45	713.83	714.12	714.12	714.35
Post Oak Creek	T4	1,462	707.34	708.59	709.21	709.74	710.14	710.44	710.44	710.69
Post Oak Creek	T4	962	701.07	701.92	702.34	702.74	703.05	703.38	703.38	703.61
Post Oak Creek	T4	462	697.47	699.36	700.21	701.03	701.65	702.26	702.28	702.96
Post Oak Creek	Reach 05	34,801	695.95	697.92	698.77	699.60	700.18	700.74	700.76	701.40
Post Oak Creek	Reach 05	34,534	694.94	696.95	697.74	698.48	698.94	699.33	699.34	699.81
Post Oak Creek	Reach 05	34,463	694.72	696.74	697.53	698.29	698.74	699.12	699.14	699.60
Post Oak Creek	Reach 05	33,768	693.05	694.79	695.42	696.06	696.53	697.01	697.02	697.67
Post Oak Creek	Reach 05	33,268	690.91	692.75	693.54	694.24	694.82	695.44	695.45	696.34
Post Oak Creek	Reach 05	32,768	689.85	692.04	692.91	693.63	694.24	694.90	694.91	695.88
Post Oak Creek	Reach 05	32,200	689.20	691.54	692.44	693.16	693.80	694.48	694.49	695.54
Post Oak Creek	Reach 05	32,087	689.12	691.43	692.32	693.04	693.67	694.35	694.36	695.41
Post Oak Creek	Reach 05	31,950	688.77	690.83	691.88	692.86	693.60	694.29	694.30	695.35
Post Oak Creek	Reach 05	31,748	688.47	690.49	691.55	692.52	693.26	693.94	693.95	695.00
Post Oak Creek	Reach 05	31,268	687.92	690.15	691.26	692.26	693.01	693.70	693.71	694.78
Post Oak Creek	Reach 05	30,768	686.99	689.40	690.58	691.60	692.35	693.03	693.04	694.05
Post Oak Creek	Reach 05	30,235	686.30	688.90	690.13	691.16	691.90	692.58	692.59	693.61
Post Oak Creek	Reach 05	30,103	686.05	688.63	689.83	690.80	691.49	692.12	692.13	693.06
Post Oak Creek	Reach 05	30,042	685.61	688.23	689.39	690.30	690.93	691.48	691.49	692.31
Post Oak Creek	Reach 05	29,879	685.30	687.98	689.18	690.09	690.72	691.27	691.28	692.12
Post Oak Creek	Reach 05	29,311	684.40	687.16	688.31	689.08	689.58	690.00	690.01	690.63
Post Oak Creek	Reach 05	29,242	684.15	686.99	688.15	688.91	689.39	689.79	689.80	690.39
Post Oak Creek	Reach 05	29,131	683.19	685.35	686.86	687.87	688.50	689.00	689.01	689.74
Post Oak Creek	Reach 05	28,927	682.87	685.08	686.75	687.80	688.44	688.94	688.95	689.69
Post Oak Creek	Reach 05	28,768	682.52	684.85	686.61	687.67	688.31	688.80	688.81	689.53
Post Oak Creek	Reach 05	28,268	681.32	684.02	686.09	687.14	687.73	688.15	688.16	688.75
Post Oak Creek	Reach 05	27,768	679.39	682.74	685.39	686.42	686.93	687.22	687.23	687.61
Post Oak Creek	Reach 05	27,644	678.92	682.55	685.32	686.36	686.88	687.18	687.18	687.56
Post Oak Creek	Reach 05	27,528	677.31	680.30	682.95	684.49	685.53	686.00	686.02	686.60
Post Oak Creek	Reach 05	27,268	676.13	679.59	682.55	684.14	685.17	685.58	685.61	685.98
Post Oak Creek	Reach 05	27,148	675.58	679.26	682.47	684.10	685.14	685.57	685.60	686.00
Post Oak Creek	Reach 05	27,040	675.52	678.22	680.65	682.49	684.24	684.91	684.97	685.53
Post Oak Creek	Reach 05	26,768	674.48	677.20	679.83	681.96	683.88	684.54	684.62	685.16

River	Reach	River Sta.	Water Surface Elevation (M.S.L.)							
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
Post Oak Creek	Reach 05	26,504	673.64	676.62	679.45	681.71	683.70	684.35	684.43	684.91
Post Oak Creek	Reach 05	26,414	673.29	676.37	679.31	681.11	682.79	683.56	683.70	684.29
Post Oak Creek	Reach 05	26,268	672.83	676.01	679.11	680.96	682.69	683.50	683.64	684.22
Post Oak Creek	Reach 05	26,034	672.76	676.02	679.20	681.08	682.81	683.60	683.74	684.34
Post Oak Creek	Reach 05	25,894	672.39	675.46	678.60	680.91	682.74	683.51	683.65	684.25
Post Oak Creek	Reach 06	25,768	672.12	675.13	678.38	680.79	682.67	683.47	683.61	684.22
Post Oak Creek	Reach 06	25,485	671.01	674.12	677.92	680.32	682.15	682.94	683.07	683.63
Post Oak Creek	Reach 06	25,344	670.50	673.24	674.60	678.03	679.09	679.90	680.04	680.62
Post Oak Creek	Reach 06	25,268	670.23	672.89	674.21	677.77	678.75	679.53	679.66	680.15
Post Oak Creek	Reach 06	25,083	669.78	672.33	673.60	677.49	678.44	679.25	679.39	679.94
Post Oak Creek	Reach 06	24,968	669.51	672.05	673.30	674.79	675.81	676.47	676.58	677.11
Post Oak Creek	Reach 06	24,768	669.09	671.62	672.88	674.41	675.44	676.15	676.28	676.88
Post Oak Creek	Reach 06	24,268	668.00	670.30	671.42	673.01	673.76	674.47	674.62	675.31
Post Oak Creek	Reach 06	23,768	666.97	669.63	670.97	672.90	673.77	674.56	674.72	675.42
Post Oak Creek	Reach 06	23,268	665.66	668.21	669.45	671.52	672.00	672.67	672.81	673.30
Post Oak Creek	Reach 06	22,786	664.93	667.56	668.84	671.20	671.62	672.21	672.35	672.80
Post Oak Creek	Reach 06	22,530	664.45	667.13	668.42	671.04	671.44	672.00	672.17	672.68
Post Oak Creek	Reach 06	22,421	664.12	666.60	667.76	669.10	670.03	670.83	671.05	671.62
Post Oak Creek	Reach 06	22,268	664.07	666.68	667.93	669.34	670.36	671.17	671.39	671.98
Post Oak Creek	Reach 06	21,768	663.74	666.53	667.83	669.29	670.34	671.18	671.39	672.06
Post Oak Creek	Reach 06	21,268	663.64	666.48	667.78	669.25	670.29	671.13	671.35	672.03
Post Oak Creek	Reach 07	20,268	663.06	665.86	667.12	668.60	669.63	670.47	670.68	671.28
Post Oak Creek	Reach 07	19,768	662.52	665.37	666.67	668.05	669.07	669.97	670.18	670.73
Post Oak Creek	Reach 07	19,268	661.88	664.59	665.97	667.49	668.50	669.45	669.66	670.12
Post Oak Creek	Reach 07	18,768	661.10	664.13	665.57	667.08	668.16	669.16	669.38	669.79
Post Oak Creek	Reach 07	18,229	658.71	661.94	663.29	664.41	665.24	666.01	666.08	667.49
Post Oak Creek	T2	10,641	735.57	736.47	736.94	737.44	737.85	738.24	738.24	738.85
Post Oak Creek	T2	10,470	732.99	734.27	734.93	735.57	736.11	736.62	736.62	737.36
Post Oak Creek	T2	10,321	732.65	733.82	734.43	735.01	735.51	735.98	735.98	736.66
Post Oak Creek	T2	10,141	730.84	731.84	732.34	732.83	733.24	733.65	733.65	734.22
Post Oak Creek	T2	9,641	723.48	724.41	724.89	725.34	725.73	726.10	726.10	726.64
Post Oak Creek	T2	9,109	719.27	720.13	720.58	721.02	721.39	721.76	721.76	722.22
Post Oak Creek	T2	8,641	714.82	715.77	716.27	716.76	717.18	717.58	717.58	718.14
Post Oak Creek	T2	8,141	711.68	712.66	713.17	713.65	714.04	714.44	714.44	714.96
Post Oak Creek	T2	7,641	709.62	710.40	710.80	711.19	711.52	711.84	711.84	712.27
Post Oak Creek	T2	7,321	707.45	708.28	708.67	709.04	709.36	709.66	709.66	710.07

River	Reach	River Sta.	Water Surface Elevation (M.S.L.)							
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
Post Oak Creek	T2	7,141	705.36	705.99	706.27	706.55	706.78	707.01	707.01	707.38
Post Oak Creek	T2	6,796	701.73	702.61	703.08	703.55	703.98	704.40	704.40	704.99
Post Oak Creek	T2	6,058	695.23	696.06	696.45	696.83	697.13	697.41	697.41	697.88
Post Oak Creek	T2	5,624	692.82	693.68	694.11	694.51	694.86	695.18	695.18	695.66
Post Oak Creek	T2	5,141	689.01	689.93	690.31	690.69	691.02	691.33	691.33	691.81
Post Oak Creek	T2	4,650	685.48	686.36	686.80	687.24	687.62	687.99	687.99	688.52
Post Oak Creek	T2	4,141	680.69	681.37	681.72	682.04	682.28	682.50	682.50	682.84
Post Oak Creek	T2	3,841	679.37	680.05	680.41	680.75	681.04	681.31	681.31	681.72
Post Oak Creek	T2	3,641	677.91	678.55	678.84	679.09	679.31	679.50	679.49	679.75
Post Oak Creek	T2	3,141	671.96	672.80	673.20	673.55	673.86	674.14	674.14	674.52
Post Oak Creek	T2	2,692	668.55	669.40	669.82	670.23	670.57	670.88	670.88	671.32
Post Oak Creek	T2	2,140	664.21	664.86	665.16	665.46	665.73	665.93	665.92	666.18
Post Oak Creek	T2	1,641	658.81	659.62	660.03	660.43	661.52	661.93	662.17	663.03
Post Oak Creek	T3	7,521	714.03	714.48	714.78	715.09	715.33	715.58	715.58	715.90
Post Oak Creek	T3	6,971	709.30	710.01	710.35	710.65	710.92	711.17	711.17	711.56
Post Oak Creek	T3	6,429	705.07	706.14	706.58	706.99	707.31	707.64	707.64	708.13
Post Oak Creek	T3	5,910	701.33	702.19	702.63	703.01	703.45	703.78	703.78	704.24
Post Oak Creek	T3	5,471	698.67	699.72	700.20	700.63	700.65	700.89	700.89	701.21
Post Oak Creek	T3	4,909	694.00	694.90	695.31	695.63	696.35	696.53	696.53	696.79
Post Oak Creek	T3	4,471	691.68	692.38	692.78	693.13	693.45	693.57	693.57	693.91
Post Oak Creek	T3	4,001	685.99	686.88	687.34	687.72	687.99	688.73	688.73	689.11
Post Oak Creek	T3	3,851	684.92	685.57	685.90	686.26	686.58	686.83	686.83	687.07
Post Oak Creek	T3	3,719	683.51	684.15	684.46	684.71	684.92	685.26	685.26	685.75
Post Oak Creek	T3	3,641	682.49	683.02	683.28	683.55	683.78	683.92	683.92	684.36
Post Oak Creek	T3	3,471	680.19	680.83	681.19	681.52	681.80	682.06	682.06	682.40
Post Oak Creek	T3	2,971	675.44	676.32	676.72	677.17	677.56	677.97	678.00	678.43
Post Oak Creek	T3	2,472	670.53	671.68	672.51	673.07	673.44	673.66	673.58	674.17
Post Oak Creek	T3	1,970	667.23	668.05	667.98	668.34	668.87	669.82	670.19	670.78
Post Oak Creek	T3	1,547	663.06	664.15	666.00	667.18	668.14	669.46	669.61	670.02
Post Oak Creek	Reach 08	17,933	658.20	661.54	663.03	664.39	665.40	666.05	666.33	667.48
Post Oak Creek	Reach 08	17,488	658.17	661.72	663.24	664.58	665.58	666.33	666.56	667.53
Post Oak Creek	Reach 08	16,988	657.21	660.66	662.02	663.30	664.27	665.18	665.47	666.67
Post Oak Creek	Reach 08	16,488	656.51	659.96	661.27	662.42	663.61	664.66	665.01	666.24
Post Oak Creek	Reach 08	15,988	654.15	657.00	658.60	660.13	661.28	661.24	661.29	662.00
Post Oak Creek	Reach 08	15,488	654.06	657.70	659.46	661.06	662.27	662.71	662.86	663.61
Post Oak Creek	Reach 08	14,988	653.58	657.13	658.86	660.59	661.93	662.32	662.47	663.22

River	Reach	River Sta.	Water Surface Elevation (M.S.L.)							
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
Post Oak Creek	Reach 08	14,566	653.43	656.98	658.70	660.26	661.70	662.05	662.19	662.93
Post Oak Creek	Reach 09	14,112	653.35	657.03	658.78	660.41	661.79	662.15	662.28	663.02
Post Oak Creek	Reach 09	13,685	651.02	654.12	655.32	656.10	656.51	659.38	659.50	659.96
Post Oak Creek	Reach 09	13,294	651.22	654.63	656.02	657.15	657.96	658.76	659.32	660.03
Post Oak Creek	Reach 09	12,794	650.53	653.96	655.33	656.35	657.24	658.11	658.84	659.54
Post Oak Creek	Reach 09	12,425	649.61	652.81	653.95	654.68	655.42	656.27	657.73	658.32
Post Oak Creek	Reach 09	12,042	649.08	652.43	653.60	654.30	654.97	655.73	657.31	657.76
Post Oak Creek	Reach 09	11,835	648.77	652.11	653.21	653.76	654.24	654.79	654.92	655.52
Post Oak Creek	Reach 09	11,447	648.42	651.75	652.86	653.37	653.89	654.46	654.59	655.23
Post Oak Creek	Reach 09	10,793	647.68	650.98	652.32	652.78	653.30	653.89	653.98	654.63
Post Oak Creek	Reach 09	10,294	645.78	648.49	649.58	651.29	652.47	653.30	653.36	654.10
Post Oak Creek	Reach 09	9,794	644.98	647.65	648.35	648.90	649.31	650.37	651.01	652.07
Post Oak Creek	Reach 09	9,294	645.00	647.77	648.63	649.36	649.97	650.59	651.22	652.28
Post Oak Creek	Reach 09	8,794	645.00	647.79	648.65	649.37	649.96	650.59	651.18	652.19
Post Oak Creek	Reach 09	8,295	644.95	647.73	648.57	649.28	649.86	650.43	651.04	652.06
Post Oak Creek	Reach 09	7,794	644.64	647.35	648.00	648.67	649.24	649.80	650.59	651.70
Post Oak Creek	Reach 09	7,294	644.57	647.32	648.03	648.70	649.25	649.79	650.56	651.67
Post Oak Creek	Reach 09	6,794	644.45	647.20	647.89	648.54	649.08	649.61	650.43	651.54
Post Oak Creek	Reach 09	6,294	643.55	646.00	646.93	647.86	648.46	649.09	650.14	651.33
Post Oak Creek	T1	2,618	672.98	673.90	674.32	674.70	675.02	675.31	675.40	675.71
Post Oak Creek	T1	2,119	662.90	663.79	664.28	664.74	665.15	665.52	665.64	666.03
Post Oak Creek	T1	1,618	652.87	653.98	654.51	655.00	655.42	655.80	655.93	656.34
Post Oak Creek	T1	1,414	650.18	651.28	651.78	652.22	652.62	652.98	653.09	653.52
Post Oak Creek	T1	1,154	645.67	646.22	646.53	647.49	648.17	648.87	650.04	651.28
Post Oak Creek	T1	618	643.14	645.74	646.80	647.78	648.40	649.04	650.13	651.34
Post Oak Creek	T1	213	643.14	645.74	646.80	647.78	648.40	649.05	650.13	651.34
Post Oak Creek	Reach 10	5,610	642.07	644.88	646.29	647.46	648.12	648.82	650.00	651.25
Post Oak Creek	Reach 10	5,110	640.90	643.64	645.07	646.35	647.27	648.09	649.69	651.04
Post Oak Creek	Reach 10	4,610	639.67	642.18	643.55	644.75	645.59	646.34	649.50	650.90
Post Oak Creek	Reach 10	4,111	638.47	641.08	642.46	643.73	644.50	645.58	649.39	650.82
Post Oak Creek	Reach 11	4,011	638.34	641.08	642.51	643.81	644.68	645.77	649.38	650.79
Post Oak Creek	Reach 11	3,892	637.99	640.75	642.29	643.56	644.38	645.54	649.34	650.75
Post Oak Creek	Reach 12	3,710	637.71	640.84	642.43	643.75	644.63	645.71	649.37	650.78
Post Oak Creek	Reach 12	3,110	636.56	639.58	641.02	642.05	642.67	643.69	648.49	649.78
Post Oak Creek	Reach 12	2,874	636.41	639.34	640.67	641.49	642.05	642.64	642.83	643.47
Post Oak Creek	Reach 12	2,610	635.98	639.11	640.52	641.35	641.79	642.36	642.56	643.18

River	Reach	River Sta.	Water Surface Elevation (M.S.L.)							
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
Post Oak Creek	Reach 12	2,111	635.64	638.88	640.22	641.04	641.42	641.90	642.07	642.70
Post Oak Creek	Reach 12	1,610	635.13	638.38	639.71	640.49	640.77	641.18	641.33	641.91
Post Oak Creek	Reach 12	1,110	632.87	635.66	636.88	637.65	638.64	639.05	639.15	639.47
Sand Creek	T1	5,048	788.87	789.69	790.16	790.54	790.86	791.16	791.31	791.59
Sand Creek	T1	4,585	786.30	787.34	787.82	788.26	788.58	788.87	789.03	789.30
Sand Creek	T1	3,996	781.64	782.97	783.51	784.04	784.43	784.79	784.98	785.34
Sand Creek	T1	3,585	773.11	774.12	774.68	775.22	775.66	776.05	776.25	776.61
Sand Creek	T1	3,085	762.42	763.83	764.52	765.20	765.81	766.39	766.70	767.29
Sand Creek	T1	2,839	759.56	761.38	762.36	763.32	764.11	764.83	765.20	765.89
Sand Creek	T1	2,585	758.71	760.66	761.66	762.64	763.43	764.14	764.52	765.19
Sand Creek	T1	2,085	757.17	759.07	760.04	761.00	761.74	762.38	762.71	763.32
Sand Creek	T1	1,585	754.60	756.39	757.27	758.10	758.78	759.39	759.72	760.33
Sand Creek	T1	1,085	752.02	753.75	754.61	755.43	756.15	756.83	757.22	757.96
Sand Creek	T1	849	750.99	752.52	753.29	754.02	754.70	755.37	755.77	756.56
Sand Creek	T1	585	749.99	751.07	751.62	752.13	752.86	753.62	754.14	755.12
Sand Creek	T1	285	749.53	750.41	750.88	751.28	752.22	753.12	753.74	754.84
Sand Creek	Reach 01	40,684	794.03	794.93	799.08	801.41	801.62	801.75	801.83	801.94
Sand Creek	Reach 01	40,583	791.83	795.22	799.09	801.41	801.62	801.75	801.83	801.94
Sand Creek	Reach 01	40,361	789.32	790.31	790.78	791.25	791.62	791.94	792.13	792.48
Sand Creek	Reach 01	40,110	785.87	786.60	787.00	787.40	787.72	788.01	788.16	788.47
Sand Creek	Reach 01	39,942	774.53	775.50	776.02	776.58	777.06	777.48	777.73	778.19
Sand Creek	Reach 01	39,442	771.13	772.37	772.95	773.52	773.95	774.32	774.54	774.94
Sand Creek	Reach 01	38,942	768.48	769.72	770.27	770.81	771.26	771.66	771.88	772.31
Sand Creek	Reach 01	38,442	762.90	764.00	764.58	765.14	765.52	765.87	766.08	766.47
Sand Creek	Reach 01	38,184	761.40	762.64	763.26	763.88	764.35	764.75	764.99	765.44
Sand Creek	Reach 01	37,942	760.45	761.62	762.22	762.82	763.31	763.74	764.00	764.48
Sand Creek	Reach 01	37,620	758.19	759.44	760.03	760.61	761.07	761.49	761.74	762.21
Sand Creek	Reach 01	37,442	757.46	758.68	759.33	759.99	760.54	761.02	761.30	761.84
Sand Creek	Reach 01	37,240	756.78	757.96	758.59	759.23	759.75	760.21	760.48	760.99
Sand Creek	Reach 01	36,942	753.17	754.18	754.67	755.19	755.61	755.96	756.16	756.55
Sand Creek	Reach 01	36,814	752.00	753.16	753.78	754.41	754.99	755.53	755.90	756.65
Sand Creek	Reach 01	36,442	751.27	752.45	753.08	753.72	754.38	755.01	755.44	756.27
Sand Creek	Reach 01	35,942	750.09	751.31	751.96	752.60	753.42	754.20	754.72	755.68
Sand Creek	Reach 01	35,442	749.54	750.43	750.91	751.36	752.31	753.23	753.84	754.94
Sand Creek	Reach 02	34,507	749.40	750.05	750.34	750.48	751.39	752.28	752.93	754.06
Sand Creek	Reach 02	34,007	749.41	750.09	750.42	750.61	751.57	752.50	753.16	754.31

River	Reach	River Sta.	Water Surface Elevation (M.S.L.)							
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
Sand Creek	Reach 02	33,508	749.39	750.07	750.38	750.56	751.52	752.45	753.11	754.26
Sand Creek	Reach 02	32,803	749.39	750.05	750.36	750.53	751.47	752.39	753.05	754.19
Sand Creek	Reach 02	32,647	749.37	750.01	750.30	750.46	751.34	752.20	752.77	753.75
Sand Creek	Reach 02	32,477	749.37	750.02	750.31	750.47	751.37	752.27	752.86	753.87
Sand Creek	Reach 02	32,071	749.37	750.01	750.30	750.46	751.34	752.22	752.80	753.78
Sand Creek	Reach 02	31,507	749.36	749.98	750.26	750.41	751.25	752.08	752.62	753.56
Sand Creek	Reach 02	31,007	749.35	749.96	750.24	750.39	751.20	752.01	752.53	753.42
Sand Creek	Reach 02	30,631	749.35	749.96	750.24	750.39	751.20	752.00	752.53	753.42
Sand Creek	Reach 02	30,507	749.35	749.96	750.24	750.39	751.20	751.99	752.51	753.40
Sand Creek	Reach 02	30,007	749.35	749.96	750.23	750.38	751.19	751.97	752.49	753.36
Sand Creek	Reach 03	29,507	749.35	749.96	750.23	750.38	751.19	751.97	752.49	753.36
Sand Creek	Reach 03	29,007	749.35	749.96	750.23	750.38	751.18	751.97	752.49	753.36
Sand Creek	Reach 03	28,506	749.35	749.96	750.23	750.38	751.19	751.97	752.49	753.36
Sand Creek	Reach 03	28,007	749.35	749.96	750.23	750.38	751.18	751.97	752.48	753.36
Sand Creek	Reach 03	27,507	749.35	749.96	750.23	750.38	751.18	751.97	752.48	753.35
Sand Creek	Reach 03	27,007	749.35	749.96	750.23	750.38	751.18	751.97	752.48	753.35
Sand Creek	Reach 03	26,507	749.35	749.96	750.23	750.38	751.18	751.97	752.48	753.35
Sand Creek	Reach 03	26,321	749.35	749.96	750.23	750.38	751.18	751.97	752.48	753.35
Sand Creek	Reach 03	25,855	749.35	749.96	750.23	750.38	751.18	751.97	752.48	753.35
Sand Creek	Reach 03	25,631	749.35	749.96	750.23	750.38	751.18	751.97	752.48	753.35
Sand Creek	Reach 03	25,481	748.90	749.31	749.50	749.60	750.14	750.68	751.03	751.63
Sand Creek	Reach 03	25,311	712.73	713.62	714.54	715.39	716.19	716.97	717.30	718.29
Sand Creek	Reach 03	25,007	712.17	713.35	714.40	715.30	716.13	716.92	717.25	718.26
Sand Creek	Reach 03	24,507	711.32	713.04	714.25	715.22	716.08	716.88	717.22	718.24
Sand Creek	Reach 03	24,007	710.46	712.85	714.17	715.17	716.04	716.86	717.20	718.22
Sand Creek	Reach 03	23,507	709.89	712.75	714.11	715.14	716.02	716.84	717.19	718.21
Sand Creek	Reach 03	23,007	709.56	712.68	714.08	715.12	716.00	716.83	717.18	718.20
Sand Creek	Reach 03	22,845	709.52	712.67	714.07	715.11	716.00	716.83	717.17	718.20
Sand Creek	Reach 03	22,508	709.46	712.66	714.06	715.11	716.00	716.82	717.17	718.20
Sand Creek	Reach 04	21,893	708.75	711.87	713.20	714.18	715.01	715.78	716.10	717.08
Sand Creek	Reach 04	21,508	707.75	710.73	712.06	713.11	714.01	714.84	715.19	716.21
Sand Creek	Reach 04	21,007	704.90	707.56	708.71	709.79	710.79	711.71	712.09	713.20
Sand Creek	Reach 04	20,941	705.03	708.00	709.30	710.44	711.46	712.38	712.78	713.89
Sand Creek	Reach 04	20,677	704.58	707.55	708.81	709.92	710.93	711.84	712.22	713.32
Sand Creek	Reach 04	20,507	704.01	706.95	708.19	709.29	710.31	711.23	711.62	712.72
Sand Creek	Reach 04	20,334	703.99	707.08	708.38	709.52	710.56	711.49	711.89	713.01

River	Reach	River Sta.	Water Surface Elevation (M.S.L.)							
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
Sand Creek	Reach 04	20,007	703.37	706.13	707.33	708.43	709.46	710.44	710.86	712.05
Sand Creek	Reach 04	19,507	703.19	706.08	707.29	708.39	709.41	710.35	710.74	711.88
Sand Creek	Reach 04	19,419	703.08	705.98	707.19	708.30	709.32	710.27	710.67	711.81
Sand Creek	Reach 04	19,007	702.49	705.40	706.65	707.81	708.86	709.83	710.23	711.41
Sand Creek	Reach 04	18,684	702.26	705.08	706.27	707.37	708.39	709.33	709.71	710.76
Sand Creek	Reach 04	18,611	702.20	704.98	706.12	707.18	708.16	709.05	709.42	710.48
Sand Creek	Reach 04	18,416	701.74	704.27	705.25	706.18	707.06	707.86	708.19	709.17
Sand Creek	Reach 04	18,307	701.20	703.93	705.15	706.24	707.25	708.14	708.51	709.59
Sand Creek	Reach 04	18,007	700.74	703.45	704.56	705.55	706.47	707.31	707.66	708.68
Sand Creek	Reach 04	17,507	699.30	702.31	703.56	704.72	705.78	706.70	707.09	708.22
Sand Creek	Reach 04	17,007	698.43	701.47	702.86	704.17	705.32	706.30	706.70	707.88
Sand Creek	Reach 04	16,506	698.08	701.09	702.44	703.70	704.78	705.73	706.09	707.30
Sand Creek	Reach 04	16,007	697.73	700.88	702.28	703.60	704.70	705.70	706.09	707.33
Sand Creek	Reach 04	15,882	697.41	700.69	702.12	703.44	704.52	705.51	705.90	707.13
Sand Creek	Reach 04	15,658	696.54	699.56	700.85	702.02	702.97	703.85	704.18	705.26
Sand Creek	Reach 04	15,481	695.44	698.28	699.37	700.29	700.99	701.59	701.80	702.46
Sand Creek	Reach 04	15,210	694.54	697.36	698.47	699.44	700.21	700.91	701.15	701.99
Sand Creek	Reach 04	15,007	693.86	696.52	697.59	698.53	699.29	699.99	700.23	701.13
Sand Creek	Reach 04	14,507	692.81	695.93	697.11	698.10	698.87	699.58	699.81	700.70
Sand Creek	Reach 04	14,007	691.51	694.52	695.65	696.63	697.39	698.12	698.33	699.32
Sand Creek	Reach 04	13,507	690.40	693.90	695.22	696.28	697.08	697.84	698.01	699.08
Sand Creek	Reach 04	13,007	689.84	693.70	695.02	696.09	696.89	697.65	697.82	698.84
Sand Creek	Reach 04	12,507	688.34	692.54	693.76	694.65	695.28	695.91	695.92	696.99
Sand Creek	T2	3,301	775.57	775.95	776.17	776.37	776.57	776.75	776.75	777.02
Sand Creek	T2	2,462	748.35	749.13	750.31	750.69	750.93	751.11	751.11	751.32
Sand Creek	T2	2,367	747.58	749.15	750.31	750.70	750.94	751.12	751.12	751.33
Sand Creek	T2	2,312	747.60	749.16	750.32	750.70	750.94	751.12	751.12	751.34
Sand Creek	T2	2,130	747.60	749.16	750.32	750.70	750.94	751.12	751.12	751.34
Sand Creek	T2	1,942	734.28	734.40	734.46	734.53	734.58	734.64	734.64	734.72
Sand Creek	T2	1,792	732.85	733.06	733.17	733.27	733.36	733.45	733.45	733.56
Sand Creek	T2	1,501	732.68	732.85	732.94	733.03	733.10	733.18	733.18	733.27
Sand Creek	T2	1,230	732.13	732.18	732.21	732.24	732.26	732.29	732.29	732.32
Sand Creek	T2	1,001	709.66	711.10	712.03	712.99	713.92	714.23	714.23	714.50
Sand Creek	T2	931	709.47	711.05	712.00	712.97	713.91	714.21	714.21	714.48
Sand Creek	T2	842	702.32	703.22	703.47	703.71	703.90	704.09	704.09	704.33
Sand Creek	T2	725	699.79	699.69	699.87	700.03	700.17	700.30	700.30	700.48

River	Reach	River Sta.	Water Surface Elevation (M.S.L.)							
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
Sand Creek	T2	273	688.53	693.29	694.59	695.63	696.40	697.13	697.27	698.28
Sand Creek	Reach 05	12,007	688.04	692.46	693.75	694.66	695.32	695.97	695.99	697.10
Sand Creek	Reach 05	11,507	687.25	691.85	693.31	694.31	695.02	695.73	695.72	696.91
Sand Creek	Reach 05	11,007	685.92	690.17	692.05	693.26	694.01	694.79	694.79	696.08
Sand Creek	Reach 05	10,507	684.25	688.17	690.21	691.54	692.73	693.95	693.95	695.50
Sand Creek	Reach 05	10,007	682.29	685.45	687.38	687.67	687.94	687.23	687.23	690.15
Sand Creek	Reach 05	9,648	681.94	685.54	687.62	688.09	688.69	688.40	688.40	688.76
Sand Creek	Reach 05	9,472	681.95	685.63	687.71	688.21	688.84	688.61	688.61	689.05
Sand Creek	Reach 05	9,364	681.27	684.96	687.17	687.46	687.88	686.98	686.98	687.28
Sand Creek	Reach 05	9,274	681.30	685.05	687.27	687.61	688.40	687.28	687.28	688.49
Sand Creek	Reach 05	9,120	680.81	684.12	685.57	686.39	686.43	686.95	686.95	687.74
Sand Creek	Reach 05	8,934	680.10	683.58	685.13	685.76	686.10	686.73	686.73	687.58
Sand Creek	Reach 05	8,507	678.95	682.20	683.60	685.18	684.93	685.72	685.72	686.16
Sand Creek	Reach 05	8,007	678.36	681.70	683.18	684.47	683.71	684.24	684.24	686.12
Sand Creek	Reach 05	7,507	677.46	680.53	681.86	683.09	684.02	684.70	684.69	686.10
Sand Creek	Reach 05	7,007	675.77	678.26	679.29	680.15	680.68	680.84	681.07	681.60
Sand Creek	Reach 06	6,507	675.38	678.14	679.25	680.21	680.69	681.04	681.08	682.26
Sand Creek	Reach 06	6,007	674.37	677.68	678.99	680.05	680.96	681.47	681.56	682.14
Sand Creek	Reach 06	5,507	672.66	676.12	677.50	678.59	679.72	680.21	680.39	681.24
Sand Creek	Reach 06	5,007	671.71	674.98	676.32	677.27	678.01	678.33	678.39	678.96
Sand Creek	Reach 06	4,007	667.64	670.75	672.11	673.43	674.83	675.54	675.83	676.94
Sand Creek	Reach 06	3,507	666.17	669.03	670.36	671.60	673.47	674.00	674.28	675.37
Sand Creek	Reach 06	3,007	665.41	668.29	669.79	671.29	673.41	673.94	674.13	675.18
Sand Creek	Reach 06	2,939	662.97	665.16	666.24	667.26	668.15	668.87	669.10	670.30
Sand Creek	Reach 06	2,718	663.55	666.33	667.64	669.12	670.16	671.01	671.23	671.89
Sand Creek	Reach 06	2,507	663.44	666.34	667.66	669.15	670.21	671.06	671.28	671.96
Sand Creek	Reach 06	2,007	663.46	666.36	667.69	669.18	670.25	671.10	671.32	672.01
Sand Creek	Reach 06	1,507	663.44	666.35	667.68	669.18	670.24	671.09	671.32	672.00
Sand Creek	Reach 06	1,007	663.43	666.34	667.66	669.16	670.22	671.07	671.29	671.97
Stream A	Reach 01	9,500	745.98	746.77	747.17	747.63	747.96	748.24	748.24	748.62
Stream A	Reach 01	9,000	744.25	744.78	745.05	745.13	745.31	745.56	745.56	745.99
Stream A	Reach 01	8,794	742.82	743.12	743.28	743.85	744.45	744.90	744.90	745.54
Stream A	Reach 01	8,498	737.96	741.25	743.08	744.02	744.55	744.96	744.96	745.58
Stream A	Reach 01	8,000	737.94	741.24	743.07	744.01	744.54	744.95	744.95	745.57
Stream A	Reach 01	7,497	737.94	741.24	743.07	744.01	744.53	744.95	744.95	745.57
Stream A	Reach 01	7,001	737.94	741.24	743.07	744.01	744.54	744.95	744.95	745.57

River	Reach	River Sta.	Water Surface Elevation (M.S.L.)							
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
Stream A	Reach 01	6,500	737.94	741.24	743.07	744.01	744.53	744.95	744.95	745.57
Stream A	Reach 01	5,952	737.94	741.24	743.07	744.01	744.53	744.95	744.95	745.57
Stream A	Reach 01	5,500	697.97	698.03	698.06	698.10	698.13	698.15	698.15	699.87
Stream A	Reach 01	4,841	692.29	692.35	692.39	692.43	692.46	692.50	692.50	696.75
Stream A	Reach 01	4,734	692.25	692.31	692.34	692.38	692.41	692.45	692.45	696.72
Stream A	Reach 01	4,631	689.85	689.91	689.95	689.98	690.02	690.05	690.05	693.71
Stream A	Reach 01	4,408	689.12	689.19	689.23	689.27	689.30	689.35	689.35	693.13
Stream A	Reach 01	4,000	687.19	687.21	687.23	687.26	687.32	687.24	687.17	688.23
Stream A	Reach 01	3,434	684.50	684.53	684.54	684.54	684.54	684.58	684.60	686.30
Stream A	Reach 01	3,000	682.23	682.27	682.31	682.56	683.06	683.51	683.66	685.22
Stream A	Reach 01	2,500	679.91	680.19	681.01	682.00	682.81	683.36	683.51	684.11
Stream A	Reach 01	2,000	677.54	679.65	680.84	681.93	682.78	683.34	683.49	683.80
Stream A	Reach 01	1,560	677.07	679.60	680.82	681.92	682.77	683.34	683.48	683.71
Stream A	Reach 01	1,460	676.88	679.55	680.78	681.90	682.75	683.31	683.46	683.14
Stream A	Reach 01	1,000	676.79	679.54	680.78	681.89	682.75	683.31	683.46	683.10
Stream A	Reach 01	806	676.79	679.54	680.78	681.89	682.75	683.31	683.46	683.09
Stream A	Reach 01	500	676.77	679.53	680.78	681.89	682.74	683.31	683.46	683.08
Stream B	Reach 01	19,246	819.94	821.03	821.48	821.90	822.31	822.63	822.80	823.07
Stream B	Reach 01	18,500	814.88	816.01	816.56	817.05	817.51	817.86	818.01	818.31
Stream B	Reach 01	18,000	812.13	813.08	813.50	813.88	814.27	814.52	814.63	814.87
Stream B	Reach 01	17,500	807.77	808.46	808.87	809.24	809.58	809.90	810.05	810.38
Stream B	Reach 01	17,076	805.34	806.09	806.51	806.95	807.33	807.70	807.87	808.23
Stream B	Reach 01	16,500	802.46	803.43	803.92	804.39	804.80	805.20	805.38	805.75
Stream B	Reach 01	16,000	801.42	802.52	803.00	803.42	803.81	804.16	804.33	804.65
Stream B	Reach 01	15,499	798.84	800.58	800.90	801.25	801.48	801.74	801.84	802.22
Stream B	Reach 01	15,000	796.12	797.18	797.67	798.12	798.50	798.91	799.06	799.36
Stream B	Reach 01	14,500	793.83	794.80	795.22	795.58	795.88	796.22	796.33	796.58
Stream B	Reach 01	14,000	790.71	791.23	791.51	791.80	792.05	792.29	792.40	792.63
Stream B	Reach 01	13,500	788.43	789.15	789.52	789.87	790.17	790.47	790.60	790.90
Stream B	Reach 01	13,000	785.12	785.89	786.28	786.64	786.96	787.18	787.27	787.44
Stream B	Reach 01	12,500	781.88	782.96	783.49	783.87	784.22	784.55	784.72	785.08
Stream B	Reach 01	12,049	778.07	779.50	780.19	780.58	780.88	781.13	781.23	781.44
Stream B	Reach 01	11,500	774.65	776.28	777.08	777.69	778.16	778.56	778.72	779.00
Stream B	Reach 01	10,864	770.49	771.67	772.31	772.92	773.48	773.92	774.15	774.60
Stream B	Reach 01	10,500	768.93	770.41	771.17	771.78	772.35	772.57	772.77	773.15
Stream B	Reach 01	10,000	764.39	765.73	766.59	767.48	767.98	769.00	769.11	769.42

River	Reach	River Sta.	Water Surface Elevation (M.S.L.)							
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
Stream B	Reach 01	9,539	763.93	765.43	766.07	766.69	767.15	767.60	767.79	768.21
Stream B	Reach 01	9,000	762.99	764.29	764.89	765.55	765.97	766.37	766.54	766.90
Stream B	Reach 01	8,500	761.70	763.00	763.58	764.19	764.64	765.03	765.20	765.58
Stream B	Reach 01	8,000	760.21	761.57	762.12	762.64	763.13	763.50	763.66	764.01
Stream B	Reach 01	7,500	757.44	759.05	759.54	759.83	760.03	760.20	760.29	760.46
Stream B	Reach 01	7,000	753.94	755.67	756.45	757.08	757.45	757.73	757.85	758.09
Stream B	Reach 01	6,500	752.89	754.34	754.99	755.59	756.01	756.38	756.49	756.73
Stream B	Reach 01	6,000	751.89	753.21	753.80	754.35	754.76	755.16	755.29	755.56
Stream B	Reach 01	5,500	748.66	749.87	750.38	750.85	751.26	751.64	751.82	752.16
Stream B	Reach 01	5,000	742.43	744.26	745.14	745.88	746.59	747.13	747.36	747.84
Stream B	Reach 01	4,472	739.59	741.22	742.09	742.93	744.07	744.40	744.60	745.13
Stream B	Reach 01	4,359	738.65	740.63	741.65	742.56	743.83	744.11	744.29	744.80
Stream B	Reach 01	4,253	736.26	738.64	739.75	740.50	740.89	741.17	741.25	742.41
Stream B	Reach 01	4,084	735.76	738.21	739.21	739.98	740.51	740.96	741.17	741.64
Stream B	Reach 01	3,500	732.85	734.45	735.13	735.77	736.43	737.04	737.35	738.00
Stream B	Reach 01	3,000	721.65	724.68	726.01	727.21	728.20	729.10	729.53	730.51
Stream B	Reach 01	2,611	721.28	724.08	725.43	726.64	727.66	728.57	729.03	730.02
Stream B	Reach 01	2,500	720.59	723.24	724.49	725.61	726.51	727.30	727.68	728.52
Stream B	Reach 01	2,357	719.63	722.09	723.25	724.32	725.08	725.71	726.01	726.65
Stream B	Reach 01	2,000	717.55	720.01	721.11	722.09	722.92	723.66	724.02	724.80
Stream B	Reach 01	1,500	714.92	717.33	718.42	719.37	720.23	721.01	721.41	722.27
Stream B	Reach 01	1,000	712.80	715.34	716.57	717.60	718.51	719.35	719.76	720.65
Stream B	Reach 01	500	709.52	712.54	713.87	714.83	715.65	716.41	716.70	717.72
Stream C	Reach 01	7,000	785.60	786.54	786.97	787.40	787.71	788.01	788.15	788.40
Stream C	Reach 01	6,500	782.18	783.10	783.57	784.05	784.42	784.77	784.95	785.27
Stream C	Reach 01	6,060	780.03	781.00	781.51	782.00	782.38	782.72	782.90	783.22
Stream C	Reach 01	5,500	776.40	777.51	778.07	778.57	778.97	779.32	779.52	779.85
Stream C	Reach 01	5,003	772.86	773.66	774.06	774.44	774.76	775.05	775.20	775.45
Stream C	Reach 01	4,497	768.73	769.15	769.37	769.57	769.76	769.94	770.05	770.24
Stream C	Reach 01	4,000	759.31	760.30	760.89	761.53	762.11	762.69	762.99	763.51
Stream C	Reach 01	3,500	753.87	755.70	756.67	757.43	758.06	758.43	758.58	758.93
Stream C	Reach 01	3,000	749.21	749.62	749.74	750.31	750.81	751.82	752.46	753.47
Stream C	Reach 01	2,553	749.37	750.00	750.30	750.47	751.29	752.09	752.61	753.49
Stream C	Reach 01	2,000	749.36	749.98	750.27	750.43	751.25	752.05	752.57	753.46
Stream C	Reach 01	1,455	749.36	749.97	750.25	750.40	751.21	752.01	752.53	753.42
Stream C	Reach 01	1,000	749.35	749.96	750.24	750.39	751.20	752.00	752.52	753.41

River	Reach	River Sta.	Water Surface Elevation (M.S.L.)							
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
Stream C	Reach 01	500	749.35	749.96	750.23	750.38	751.19	751.99	752.51	753.39
Stream E	Reach 01	8,000	777.40	778.50	778.90	779.24	779.52	779.78	779.88	780.16
Stream E	Reach 01	7,500	770.57	771.35	771.73	772.11	772.48	772.78	772.88	773.16
Stream E	Reach 01	7,066	767.05	767.77	768.10	768.42	768.70	768.94	769.01	769.29
Stream E	Reach 01	6,500	763.47	764.29	764.49	764.66	764.78	764.91	764.98	765.08
Stream E	Reach 01	5,500	756.73	757.26	757.57	757.82	758.07	759.15	759.48	759.94
Stream E	Reach 01	5,116	753.01	754.01	754.62	756.01	757.60	759.03	759.39	759.87
Stream E	Reach 01	4,639	751.47	752.28	752.52	752.79	753.00	753.20	753.28	753.47
Stream E	Reach 01	4,500	749.28	750.49	751.08	751.42	751.68	751.91	751.98	752.20
Stream E	Reach 01	3,949	746.86	747.13	747.29	747.43	747.55	747.64	747.69	747.80
Stream E	Reach 01	3,767	743.42	743.95	744.16	744.33	744.51	744.66	744.71	744.87
Stream E	Reach 01	3,599	740.38	741.02	741.43	741.83	742.06	742.32	742.43	742.65
Stream E	Reach 01	3,000	733.01	734.14	734.69	735.22	735.67	736.00	736.12	736.44
Stream E	Reach 01	2,500	728.80	729.66	730.09	730.51	730.85	731.31	731.47	731.91
Stream E	Reach 01	2,000	724.88	726.02	726.59	727.10	727.45	727.71	727.81	728.09
Stream E	Reach 01	1,500	721.07	722.45	723.13	723.76	724.22	724.62	724.77	725.15
Stream E	Reach 01	951	719.27	720.47	721.07	722.18	722.66	723.30	723.48	723.89
Stream E	Reach 01	844	717.68	718.64	719.11	721.48	721.92	722.71	722.91	723.37
Stream E	Reach 01	731	713.77	714.88	715.44	715.96	716.44	716.87	717.03	717.47
Stream E	Reach 01	628	713.49	714.86	715.49	716.16	716.59	716.90	717.13	717.39
Stream E	Reach 01	500	713.13	714.36	714.95	715.63	716.03	716.36	716.68	716.91
Stream F	Reach 01	14,000	712.44	713.06	713.34	713.60	713.81	714.01	714.03	714.27
Stream F	Reach 01	13,571	710.62	711.28	711.55	711.81	712.02	712.20	712.21	712.47
Stream F	Reach 01	13,500	710.31	711.03	711.30	711.56	711.77	711.95	711.95	712.20
Stream F	Reach 01	13,423	709.06	709.49	709.69	709.90	710.07	710.23	710.24	710.44
Stream F	Reach 01	13,210	708.51	708.88	709.11	709.28	709.46	709.67	709.68	709.93
Stream F	Reach 01	13,108	708.49	708.84	709.05	709.21	709.39	709.59	709.60	709.83
Stream F	Reach 01	12,710	705.04	705.89	706.19	706.46	706.71	706.90	706.88	707.21
Stream F	Reach 01	12,500	705.01	705.85	706.14	706.39	706.63	706.81	706.79	707.11
Stream F	Reach 01	12,221	704.98	705.80	706.09	706.33	706.55	706.72	706.70	707.00
Stream F	Reach 01	12,153	702.00	705.21	705.79	706.10	706.33	706.55	706.53	706.81
Stream F	Reach 01	12,086	701.93	705.19	705.77	706.08	706.31	706.52	706.50	706.78
Stream F	Reach 01	12,042	701.75	705.18	705.76	706.07	706.30	706.51	706.49	706.76
Stream F	Reach 01	11,936	697.22	698.18	698.64	699.11	699.48	699.84	699.86	700.37
Stream F	Reach 01	11,500	692.81	693.76	694.29	694.83	695.29	695.74	695.77	696.42
Stream F	Reach 01	11,231	691.46	692.44	693.01	693.60	694.10	694.59	694.63	695.33

River	Reach	River Sta.	Water Surface Elevation (M.S.L.)							
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
Stream F	Reach 01	11,000	689.87	691.07	691.72	692.36	692.88	693.40	693.44	694.16
Stream F	Reach 01	10,771	688.75	689.96	690.60	691.22	691.74	692.24	692.28	692.98
Stream F	Reach 01	10,500	688.32	689.49	690.12	690.73	691.23	691.72	691.76	692.45
Stream F	Reach 01	10,078	686.69	687.56	688.01	688.44	688.80	689.16	689.19	689.76
Stream F	Reach 01	9,884	684.59	685.49	686.00	686.58	687.11	687.67	687.72	688.63
Stream F	Reach 01	9,500	681.79	683.22	684.09	685.03	685.79	686.56	686.61	687.78
Stream F	Reach 01	9,099	681.04	682.75	683.71	684.72	685.52	686.32	686.38	687.58
Stream F	Reach 01	8,962	680.32	681.52	682.15	682.75	683.20	683.62	683.65	684.25
Stream F	Reach 01	8,904	680.15	681.35	681.97	682.57	683.01	683.42	683.45	684.03
Stream F	Reach 01	8,758	679.65	680.80	681.39	681.93	682.33	682.70	682.72	683.25
Stream F	Reach 01	8,500	678.39	679.39	679.92	680.43	680.81	681.18	681.20	681.73
Stream F	Reach 01	8,234	677.25	678.21	678.69	679.21	679.61	679.98	680.00	680.53
Stream F	Reach 01	8,000	676.52	677.38	677.79	678.26	678.63	678.97	678.99	679.48
Stream F	Reach 01	7,500	673.35	674.83	675.62	676.21	676.58	676.91	676.93	677.36
Stream F	Reach 01	7,000	672.15	674.09	674.99	675.57	675.89	676.16	676.17	676.49
Stream F	Reach 01	6,847	671.81	673.92	674.86	675.43	675.75	676.00	676.01	676.30
Stream F	Reach 01	6,690	667.12	668.19	668.74	669.29	669.67	670.02	670.04	670.52
Stream F	Reach 01	6,500	665.51	666.32	666.72	667.15	667.49	667.81	667.83	668.33
Stream F	Reach 01	6,000	661.06	662.09	662.57	663.06	663.42	663.77	663.79	664.29
Stream F	Reach 01	5,500	659.02	660.04	660.50	660.95	661.26	661.57	661.59	662.03
Stream F	Reach 01	5,000	655.19	655.86	656.27	656.72	657.08	657.41	657.43	657.94
Stream F	Reach 01	4,753	654.03	654.89	655.37	655.88	656.28	656.66	656.67	657.25
Stream F	Reach 01	4,000	650.21	651.52	652.15	652.80	653.31	653.80	653.75	654.36
Stream F	Reach 01	3,500	646.41	647.52	648.29	649.16	649.72	650.04	650.69	651.85
Stream F	Reach 01	3,000	643.75	645.69	647.02	648.21	648.90	649.12	650.17	651.50
Stream F	Reach 01	2,515	643.44	645.53	646.91	648.13	648.82	649.03	650.12	651.45
Stream G	T2	4,000	743.15	743.62	743.86	744.06	744.21	744.35	744.37	744.54
Stream G	T2	3,500	738.01	738.40	738.58	738.75	738.89	739.03	739.04	739.23
Stream G	T2	3,000	731.94	732.38	732.59	732.79	732.96	733.13	733.14	733.46
Stream G	T2	2,444	727.60	728.90	729.27	729.53	729.71	729.86	729.86	730.08
Stream G	T2	2,358	727.35	728.78	729.17	729.43	729.59	729.73	729.72	729.91
Stream G	T2	2,230	724.65	725.03	725.27	725.49	725.65	725.82	725.85	726.16
Stream G	T2	2,098	723.22	723.57	723.75	723.87	723.98	724.10	724.11	724.27
Stream G	T2	1,998	721.44	721.89	722.23	722.44	722.60	722.75	722.77	722.92
Stream G	T2	1,500	715.34	715.98	716.23	716.47	716.67	716.87	716.89	717.16
Stream G	T2	1,295	711.57	712.23	712.56	712.88	713.19	713.47	713.51	713.83

River	Reach	River Sta.	Water Surface Elevation (M.S.L.)							
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
Stream G	T2	1,172	711.28	712.24	712.48	712.65	712.79	712.91	712.92	713.06
Stream G	T2	1,081	708.31	709.02	709.35	709.64	709.88	710.08	710.10	710.33
Stream G	T2	933	707.60	707.94	708.37	708.70	708.96	709.20	709.23	709.53
Stream G	T2	838	707.48	707.87	707.95	708.02	708.14	708.22	707.84	708.52
Stream G	T2	753	706.03	706.19	706.48	706.75	706.98	707.17	707.18	707.38
Stream G	T2	587	700.85	702.42	703.27	703.92	704.09	704.20	704.21	704.30
Stream G	T2	476	701.12	702.61	703.44	704.09	704.30	704.48	704.50	704.69
Stream G	T2	371	698.27	698.78	699.05	699.32	699.56	699.80	699.83	700.14
Stream G	T2	328	697.05	697.54	697.79	698.03	698.24	698.45	698.48	698.75
Stream G	T1	2,384	669.07	669.40	669.58	669.76	669.90	670.05	670.07	670.27
Stream G	T1	1,874	667.26	668.30	668.50	668.69	668.85	668.95	669.01	669.17
Stream G	T1	1,719	667.25	668.30	668.50	668.69	668.84	668.95	669.01	669.17
Stream G	T1	1,595	662.15	662.39	662.56	662.68	662.79	662.88	662.89	663.01
Stream G	T1	1,463	660.85	661.12	661.16	661.27	661.37	661.48	661.50	661.64
Stream G	T1	1,268	657.49	657.87	658.18	658.37	658.51	658.64	658.65	658.81
Stream G	T1	768	649.30	649.76	650.85	651.20	651.38	651.45	651.68	651.92
Stream G	Reach 01	14,042	734.74	735.12	735.29	735.44	735.58	735.71	735.73	735.88
Stream G	Reach 01	13,542	727.74	728.30	728.61	728.89	729.14	729.38	729.41	729.72
Stream G	Reach 01	13,073	721.09	721.61	721.89	722.17	722.42	722.66	722.69	723.02
Stream G	Reach 01	12,906	718.38	718.96	719.28	719.59	719.86	720.13	720.16	720.52
Stream G	Reach 01	12,884	718.38	718.96	719.27	719.59	719.86	720.13	720.17	720.53
Stream G	Reach 01	12,768	717.80	718.25	718.49	718.73	718.95	719.16	719.19	719.47
Stream G	Reach 01	12,613	716.95	717.45	717.72	717.99	718.29	718.59	718.63	718.91
Stream G	Reach 01	12,444	715.95	716.62	716.97	717.34	717.69	718.05	718.08	718.33
Stream G	Reach 01	12,367	715.45	716.15	716.59	717.10	717.57	718.03	718.07	718.37
Stream G	Reach 01	12,251	713.71	715.04	715.73	716.43	717.07	717.66	717.70	717.99
Stream G	Reach 01	12,086	712.88	713.67	714.04	714.40	714.70	714.99	715.02	715.38
Stream G	Reach 01	11,542	705.54	706.00	706.29	706.53	706.72	706.90	706.92	707.14
Stream G	Reach 01	11,042	700.71	701.57	702.04	702.54	702.96	703.38	703.43	703.98
Stream G	Reach 01	10,919	699.08	699.73	700.09	700.45	700.77	701.08	701.12	701.53
Stream G	Reach 01	10,774	698.45	699.28	699.75	700.18	700.51	700.78	700.81	701.16
Stream G	Reach 01	10,669	697.00	697.45	697.64	697.84	698.11	698.45	698.49	698.93
Stream G	Reach 01	10,579	695.18	696.24	696.81	697.36	697.84	698.34	698.40	699.05
Stream G	Reach 01	10,465	694.05	694.44	694.65	694.87	695.06	695.25	695.27	695.52
Stream G	Reach 02	9,926	692.03	692.73	693.04	693.38	693.65	693.85	693.88	694.16
Stream G	Reach 02	9,426	688.92	689.35	689.61	689.76	689.92	690.17	690.19	690.64

River	Reach	River Sta.	Water Surface Elevation (M.S.L.)							
			2-YR	5-YR	10-YR	25-YR	50-YR	100-YR	Ultimate 100-YR	500-YR
Stream G	Reach 02	8,926	684.49	685.12	685.39	685.77	686.06	686.21	686.24	686.34
Stream G	Reach 02	8,426	681.60	682.18	682.50	682.51	682.58	683.03	683.05	684.30
Stream G	Reach 02	7,926	679.24	679.86	680.29	680.86	681.63	682.57	682.57	684.10
Stream G	Reach 02	7,651	677.36	677.97	677.98	680.29	681.38	682.45	682.45	684.05
Stream G	Reach 02	7,426	674.99	675.46	677.88	680.24	681.33	682.41	682.41	684.03
Stream G	Reach 02	6,926	671.85	674.04	677.73	680.18	681.29	682.38	682.38	684.01
Stream G	Reach 02	6,426	669.39	673.82	677.70	680.18	681.28	682.37	682.37	684.00
Stream G	Reach 02	6,105	669.26	673.81	677.70	680.17	681.28	682.37	682.37	684.00
Stream G	Reach 02	6,050	669.10	673.75	677.69	680.17	681.28	682.37	682.37	684.00
Stream G	Reach 02	5,960	665.75	668.23	668.90	669.15	669.25	669.34	669.34	669.49
Stream G	Reach 02	5,911	665.64	668.18	668.86	669.11	669.21	669.30	669.30	669.45
Stream G	Reach 02	5,767	665.30	668.00	668.66	668.90	668.99	669.08	669.08	669.22
Stream G	Reach 02	5,618	664.84	667.82	668.47	668.69	668.78	668.85	668.85	668.98
Stream G	Reach 02	5,465	661.45	662.58	663.15	663.47	663.59	663.70	663.70	663.91
Stream G	Reach 02	5,334	661.02	662.19	662.78	663.12	663.25	663.36	663.36	663.59
Stream G	Reach 02	4,926	659.24	660.56	661.21	661.57	661.71	661.83	661.83	662.06
Stream G	Reach 02	4,426	656.53	657.90	658.58	658.94	659.08	659.22	659.21	659.45
Stream G	Reach 02	3,926	654.07	655.33	656.01	656.36	656.50	656.63	656.62	656.83
Stream G	Reach 02	3,426	650.66	651.52	651.91	652.17	652.28	652.38	652.41	652.62
Stream G	Reach 02	2,925	645.26	649.59	650.91	651.25	651.44	651.53	651.73	651.98
Stream G	Reach 02	2,426	643.63	649.64	650.95	651.30	651.48	651.58	651.78	652.03
Stream G	Reach 02	1,926	643.50	649.63	650.94	651.28	651.47	651.57	651.77	652.02
Stream G	Reach 03	1,172	643.51	649.64	650.95	651.29	651.48	651.57	651.77	652.02
Stream G	Reach 03	957	640.13	642.41	643.76	645.04	645.70	646.53	649.56	650.95
EF Post Oak Crk	T2	836	743.34	744.95	745.18	745.36	745.49	745.61	745.61	745.75
EF Post Oak Crk	T2	720	736.30	737.51	738.18	738.82	739.38	739.92	739.92	740.65
EF Post Oak Crk	T2	500	735.30	736.86	737.64	738.40	739.03	739.63	739.63	740.42
EF Post Oak Crk	T1	8,540	800.32	801.10	801.49	801.85	802.15	802.46	802.46	802.88
EF Post Oak Crk	T1	8,220	799.95	800.66	801.01	801.34	801.62	801.89	801.89	802.29

4.2.1 Comparison of Reported 2007 Storm Flood Level to 2007 Storm Model Results

As discussed in **Section 3.9.3**, there are no gage stations which may be used to calibrate the HEC-HMS or HEC-RAS models. The 07' Storm was modeled and the water surface elevations

(WSEL) generated by the model were compared to reported flood depths. This method is not very precise, since the high water marks were not surveyed, but generally they indicate that the models are producing reasonable results. **Table 20** shows the comparison of the model WSELs compared to the estimated elevations developed from flooding reports & photos.

Table 20. 2007 Storm Water Surface Elevation Comparison.

Location	Estimated 2007 WSEL	RAS WSEL	Stream	Cross Section	Difference (ft)
Lamar St. @ Post Oak Creek	682	682.6	Post Oak Creek	25,400	0.6
US 75 @ Football Stadium	683	684.6	E.F. Post Oak Creek	1,196	1.6
US 75 & Washington St.	688.5	688.2	E.F. Post Oak Creek	1,563	-0.3
Houston St. & Sunset Blvd.	687	688.6	Sand Creek	9,472	1.6
Archer Dr. & Crescent Dr.	694.5	693.1	Sand Creek	11,507	-1.4
Vancouver Dr. @ Stream E	723	722.3	Stream E	844	-0.7

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5 Flooding and Mitigation Alternatives

The HEC-RAS model discussed in the previous section was used to create a map of the 100-YR Floodplain, see **Exhibit 6 – Appendix A**. This map indicates where flooding is expected to occur during the 1% chance event (100-YR storm). In this study, flooding was categorized as: structural flooding and roadway flooding. Structural flooding is considered the flooding of residences, apartments, commercial, governmental or industrial buildings. While in many locations structural flooding is accompanied by flooding of the adjacent street, for this report roadway flooding will focus on the flooding of thoroughfares and roadways which could restrict the access of emergency equipment and personnel.

Analysis of the floodplain mapping produced thirteen areas of structural flooding involving 153 structures. There are 68 bridges/culverts in the study area; of these, only 24 will pass the 1% chance event without flooding. **Table 21** lists all the bridges which have been included in the HEC-RAS model, the storm event which the bridge or culvert can pass without being overtopped and the depth of flooding during the 100-YR storm, if applicable.

Table 21. Post Oak Creek Watershed Bridge/Culvert Flooding.

Post Oak Creek Watershed Bridge/Culvert Flooding					
ID	Stream	Street Name	Owner	Passing Flows (yr.)	100 yr. Water Depth (ft.)
1	Post Oak Creek	Rail Road Bridge	BNSF	100	NA
2	Post Oak Creek	Travis Street Bridge	Sherman	500	NA
3	Post Oak Creek	N Hwy 75 Frontage Road Bridge	TxDOT	10	2.1
4	Post Oak Creek	N Hwy 75 Bridge	TxDOT	100	NA
5	Post Oak Creek	S Hwy 75 Bridge	TxDOT	100	NA
6	Post Oak Creek	S Hwy 75 Frontage Road Bridge	TxDOT	25	1.0
7	Post Oak Creek	W Center Street Bridge	Sherman	10	1.9
8	Post Oak Creek	W Lamar Street Bridge	TxDOT	50	0.3
9	Post Oak Creek	W Houston Street Bridge	TxDOT	25	1.3
10	Post Oak Creek	S Woods Street Bridge	Sherman	5	5.8
11	Post Oak Creek	W Pecan Street Bridge	Sherman	25	2.6
12	Post Oak Creek	N Ricketts Street Bridge	Sherman	5	3.2
13	Post Oak Creek	W Hillcrest Drive Bridge	Sherman	2	6.0
14	Post Oak Creek	W Washington Street Bridge	Sherman	2	5.4
15	Post Oak Creek	Rail Road Bridge	BNSF	500	NA
16	Post Oak Creek	W McGee Street Bridge	Sherman	<2	6.1
17	Post Oak Creek	W Taylor Street Bridge	Sherman	500	NA
18	Post Oak Creek	W Lamberth Street Bridge	Sherman	500	NA

Post Oak Creek Watershed Bridge/Culvert Flooding					
ID	Stream	Street Name	Owner	Passing Flows (yr.)	100 yr. Water Depth (ft.)
19	Post Oak Creek	FM 1417 Culvert	TxDOT	500	NA
20	Post Oak Creek	US Hwy 82 Bridge	TxDOT	500	NA
21	Post Oak Creek	FM 1417 Culvert	TxDOT	10	1.7
22	East Fork Post Oak Creek	E Taylor Street Bridge	Sherman	500	NA
23	East Fork Post Oak Creek	S Hwy 75 Frontage Road Culvert	TxDOT	10	2.3
24	East Fork Post Oak Creek	E Lamberth Road Culvert	Sherman	2	1.4
25	East Fork Post Oak Creek	E Lamberth Road Culvert	Sherman	<2	2.1
26	East Fork Post Oak Creek	W US Hwy 82 Frontage Road Culvert	TxDOT	25	3.8
26	East Fork Post Oak Creek	W US Hwy 82 Culvert	TxDOT	25	2.5
26	East Fork Post Oak Creek	E US Hwy 82 Culvert	TxDOT	25	5.1
26	East Fork Post Oak Creek	E US Hwy 82 Frontage Road Culvert	TxDOT	25	5.9
27	East Fork Post Oak Creek	W Canyon Grove Road Culvert	Sherman	<2	3.2
28	East Fork Post Oak Creek	E Forest Creek Drive Culvert	Sherman	<2	1.3
29	East Fork Post Oak Creek	State Hwy 91 Culvert	TxDOT	25	1.3
30	East Fork Post Oak Creek	N Loy Lake Road Culvert	Sherman	10	1.2
31	East Fork Post Oak Creek	E Taylor Street Culvert	Sherman	10	0.9
32	East Fork Post Oak Creek	E Payton Street Culvert	Sherman	2	1.7
33	Sand Creek	W Center Street Bridge	Sherman	100	NA
34	Sand Creek	W Lamar Street Bridge	TxDOT	100	NA
35	Sand Creek	W Houston Street Bridge	TxDOT	100	NA
36	Sand Creek	FM 1417 Bridge	TxDOT	100	NA
37	Sand Creek	W Washington Street Bridge	Sherman	100	NA
38	Sand Creek	Meadowlake Drive Bridge	Sherman	100	NA
39	Sand Creek	US Hwy 82 Culvert	TxDOT	10	0.8
40	Stream A	Terrace Oaks Culvert	Sherman	100	NA
41	Stream A	W Center Street Culvert	Sherman	100	NA
42	Sand Creek Tributary	Taho Drive Culvert	Sherman	25	0.7
43	Sand Creek Tributary	W Houston Street Culvert	TxDOT	5	0.9
44	Sand Creek Tributary	Walkway	Private	<2	5.2
45	Stream B	W Washington Street Bridge	Sherman	500	NA
46	Stream B	Friendship Road Bridge	Sherman	100	NA
47	Stream E	Vancouver PI Culvert	Sherman	25	0.6
48	Stream E	W Cypress Grove Road Culvert	Sherman	<2	1.3
49	Stream E	US Hwy 82 Culvert	TxDOT	50	0.2
50	Post Oak Creek Tributary	Mountain Climb Drive Culvert	Sherman	2	1.6
51	Post Oak Creek Tributary	Unnamed Road Culvert	Sherman	5	0.8
52	Post Oak Creek Tributary	W Lamberth Street Culvert	Sherman	500	NA
53	Post Oak Creek Tributary	E Yorkshire Drive Culvert	Sherman	25	0.6
54	Post Oak Creek Tributary	W Canterbury Drive Culvert	Sherman	5	0.9
55	Stream F	E Lake Avenue Culvert	Sherman	5	2.0
56	Stream F	E Centennial Street Culvert	Sherman	500	NA

Post Oak Creek Watershed Bridge/Culvert Flooding					
ID	Stream	Street Name	Owner	Passing Flows (yr.)	100 yr. Water Depth (ft.)
57	Stream F	E Odneal Street Culvert	Sherman	2	1.6
58	Stream F	Rail Road Culvert	BNSF	<2	2.7
59	Stream F	E King Street Culvert	Sherman	<2	2.2
60	Stream F	E Magnolia Street Culvert	Sherman	<2	2.1
61	Stream G	Rail Road Culvert	BNSF	5	1.6
62	Stream G	E Lake Avenue Culvert	Sherman	2	1.2
63	Stream G	First Street Culvert	Sherman	100	NA
64	Stream G	Rosedale Street Culvert	Sherman	100	NA
65	Stream G	S Gribble Street Culvert	Sherman	10	0.5
66	Stream G	McCall Drive Culvert	Sherman	2	1.1
67	Stream G	E Turley Street Culvert	Sherman	2	1.3
68	Stream G	E Thomas Street Culvert	Sherman	2	1.0

5.1 Mitigation Projects

Three alternatives for mitigation of the flooding were considered: storage, buyout and structural modification. Storage normally consists of the construction of a large pond or series of small ponds designed to store a portion of the flood flow and release it slowly reducing the peak flow, which in turn lowers the flood levels. This approach provides benefits for the areas downstream of the storage but can require the purchase of large areas of land. The availability of sufficient open area for the construction of storage ponds is a significant factor in determining if storage can be considered.

Buyout consists of purchasing structures located in the floodplain. The structures are removed and the property is converted to a use that is compatible with its location in the floodplain. Buyouts can only be considered if there are residential or commercial buildings which are flooded; some of the locations which are flooded do not have any home or commercial building flooding associated with them, and a buyout would not apply in these situations.

Structural modification covers a wide variety of construction, the most common being the widening of creek channels, enlarging existing culverts and bridges as well as raising roadways. Bridge and roadway modifications are designed to provide for creek crossings with the capacity to pass an ultimate 100-YR storm. These types of construction projects improve the flow capacities of the culverts, bridges and creek channels reducing the flood water surface elevations. These reduced water levels can benefit areas upstream of the construction.

Each situation was examined to determine the appropriate alternative resulting in the recommendation of twenty-seven mitigation projects: nine bridge/culvert improvements, three channel improvement projects, seven detention projects and eight property acquisition projects. An opinion of probable cost has been developed for each of these projects which are included in **Appendix G**.

5.1.1 Bridge and Culvert Improvement Projects

This study identified nine bridge and culvert improvement projects (**Figure 7**). While there are many more bridges that are flooded during a 100-YR storm, the bridges selected for projects are located on streets which have been identified as collectors or arterials in the City's Thoroughfare Master Plan and provide for the movement of emergency personnel and equipment. The bridge and culvert improvement projects are described in the following sections.



Figure 7. Bridges and Culverts Studied.

5.1.1.1 Center Street at Post Oak Creek Street Improvement

The existing bridge is a two-span, 90 foot long, 36 foot wide bridge with the top of the deck at elevation 670.12 feet MSL. Currently, the bridge will pass a 10-YR storm and is overtopped by 1.9 feet during a 100-YR storm. Center Street is classified as a minor arterial in the City's Thoroughfare Master Plan. The proposed project consists of lengthening the bridge to 120 feet and raising the deck by 1.73 feet to 671.85 feet MSL. The bridge location would be moved east

approximately 150 feet to coordinate with the proposed channel improvements upstream of the bridge. This project in conjunction with the channel improvement would reduce the floodplain in this area effectively taking three commercial buildings and one residence out of the floodplain, as well as provide access to a nursing home which had to be evacuated during the 2007 storm. This project has an estimated cost of \$ 2,698,000.

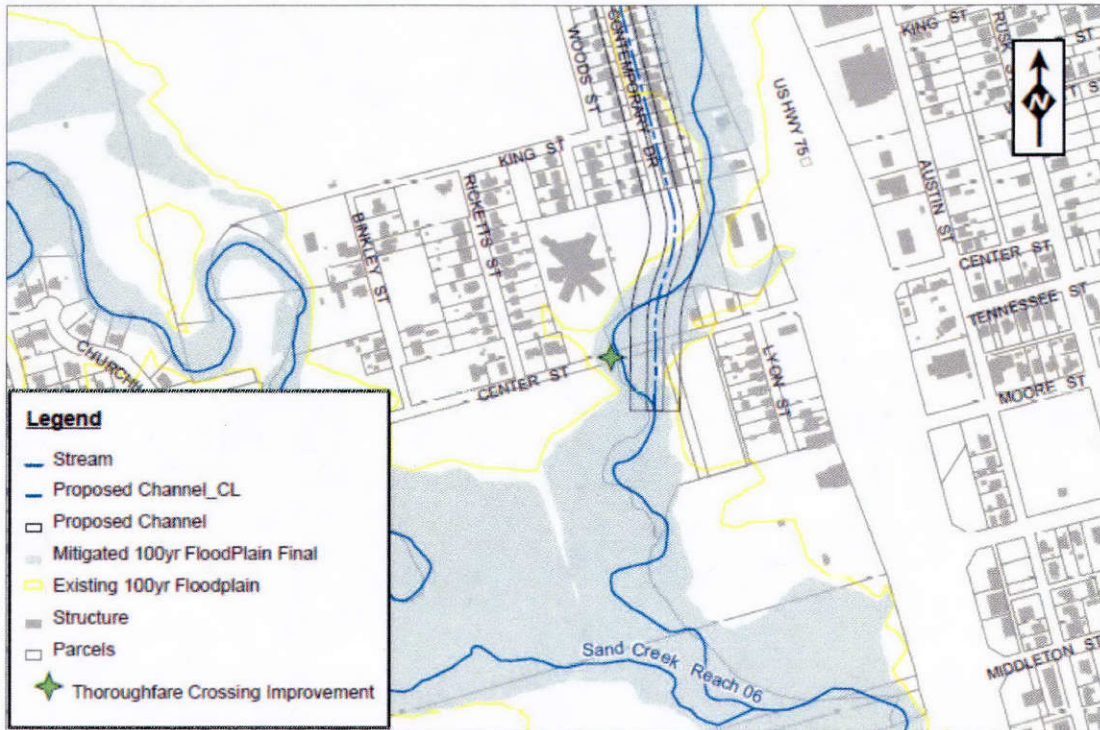


Figure 8. Center Street at Post Oak Creek Street Improvement. Project # 17.

5.1.1.2 Lamar Street at Post Oak Creek Bridge Improvement

The Lamar Street Bridge is a single-span bridge approximately 61 feet long and 48 feet wide. The existing bridge will pass the 50-YR storm and is only overtopped by less than 6 inches by the 100-YR storm. Lamar Street is classified as a major arterial in the City's Thoroughfare Master Plan. Lamar Street is a vital link connecting the east and west sides of Sherman. This project will improve access for emergency personnel and equipment during a flood event. This proposed bridge improvement is also an integral piece of the channel improvement along this section of Post Oak Creek. This is a TxDOT bridge and would be closely tied to any TxDOT improvement to U.S. Highway 75. The proposed bridge will be one hundred feet long, and the bridge deck elevation will be unchanged. This project has an estimated cost of \$3,038,000.

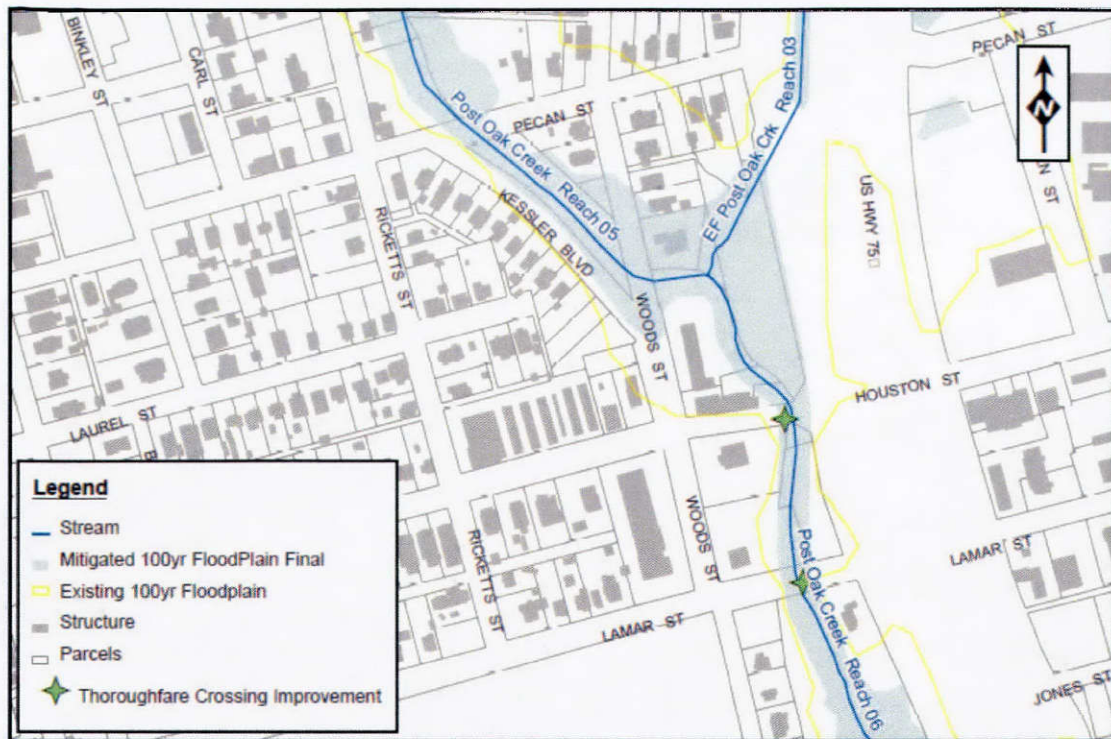


Figure 9. Lamar and Houston Street Bridge Improvements. Projects #22 & # 23.

5.1.1.3 Houston Street at Post Oak Creek Bridge Improvements

The Houston Street Bridge is a single-span bridge approximately sixty-eight feet long and forty-six feet wide. The existing bridge will pass the 25-YR storm and is overtopped by approximately 1.5 feet by the 100-YR storm. Houston Street is classified as a major arterial in the City's Thoroughfare Master Plan. Houston Street is a vital link connecting the east and west sides of Sherman. This project will improve access for emergency personnel and equipment during a flood event. This proposed bridge improvement is also a part of the channel improvement along this section of Post Oak Creek. This is a TxDOT bridge and would be closely tied to any TxDOT improvement to U.S. Highway 75. The proposed bridge will be 100 feet long and the bridge deck elevation will be unchanged. This project has an estimated cost of \$ 3,030,000.

5.1.1.4 Washington Street at Post Oak Creek Roadway Improvements

The Washington Street bridge is a single-span length of approximately 50 feet. This bridge will currently only pass a 2-YR storm and is overtopped by the 100-YR storm by over 5 feet. The proposed improvements consist of lengthening the bridge to 66 feet and raising the deck approximately two feet. The extents of the proposed improvements are limited by the need to

maintain connectivity with and reasonable slopes to existing driveways and Bryant Avenue. This limits the maximum height of the bridge. The proposed bridge will pass the 5-YR storm which improves the chance of the bridge being open from 50% to 80% and thereby improves access for emergency personnel and equipment during a flood event. The 100-YR storm will overtop the proposed bridge by 3.5 feet. Washington Street is classified as a minor arterial in the City's Thoroughfare Master Plan. This project has an estimated cost of \$1,538,000.

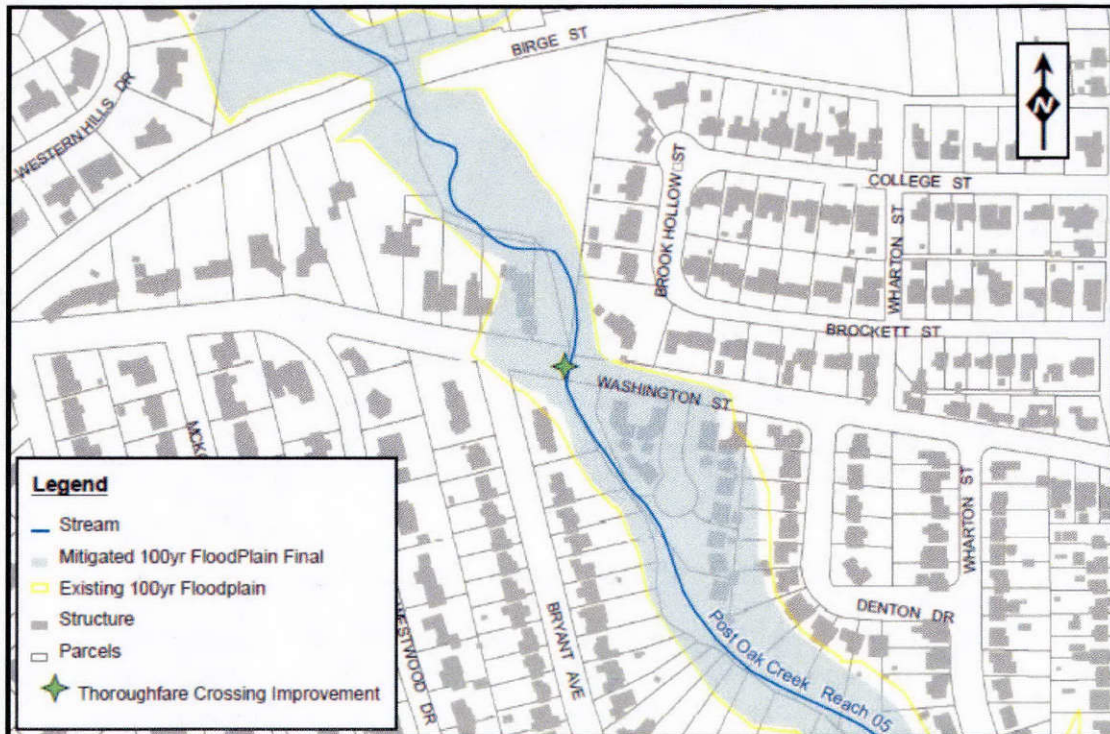


Figure 10. Washington Street at Post Oak Creek Roadway Improvements. Project # 26.

5.1.1.5 Lamberth Road at East Fork of Post Oak Creek Box Culvert

This culvert is a ten foot diameter corrugated metal pipe and is overtopped by the 2-YR storm. The crossing is flooded to a depth of two feet during the 100-YR storm. The proposed improvements consist of replacing the existing culvert with 3-10 X 10 foot box culverts and raising the roadway 2.8 feet. Lamberth Street is classified as a major arterial in the City's Thoroughfare Master Plan. The estimated cost of this culvert is \$ 793,000.

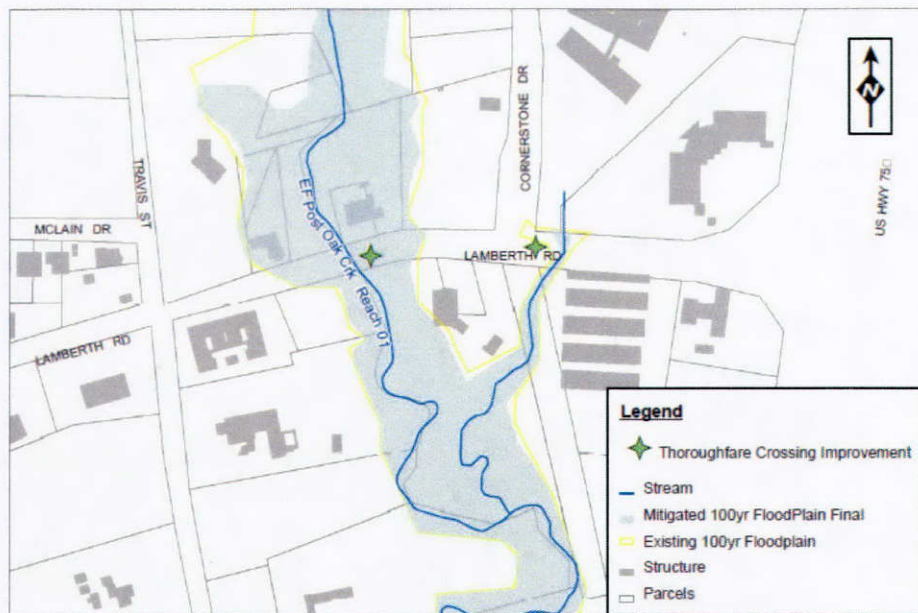


Figure 11. Lamberth Road at East Fork Post Oak. Projects #21 & # 11.

5.1.1.6 Lamberth Road at T2 East Fork of Post Oak Creek Culverts

The existing culvert consists of 3 - 30-inch diameter, reinforced concrete pipes. This culvert can pass a 2-YR storm and is overtopped by the 100-YR storm to a depth of 1.3 feet. In order to keep this major arterial street open during the 100-YR storm, the existing pipes will be replaced with three 60-inch diameter pipes. Lamberth is a major east-west link for the City and this project will improve access for emergency personnel and equipment during a flood event. The estimated cost for this project is \$241,000.

5.1.1.7 Taylor Street at T1 East Fork of Post Oak Creek Box Culvert

Tributary T1 of East Fork Post Oak Creek crosses Taylor Street on the west side of its intersection with S.H. 91. Taylor Street is designated as a minor arterial and the existing two 9 foot wide by 5 foot wide culverts will pass a 10-YR storm and is overtopped by the 100-YR storm by approximately one foot. The proposed project would replace the existing culverts with two 11X5 box culverts improving access for emergency personnel and equipment during a flood event. This project has an estimated cost of \$323,000.

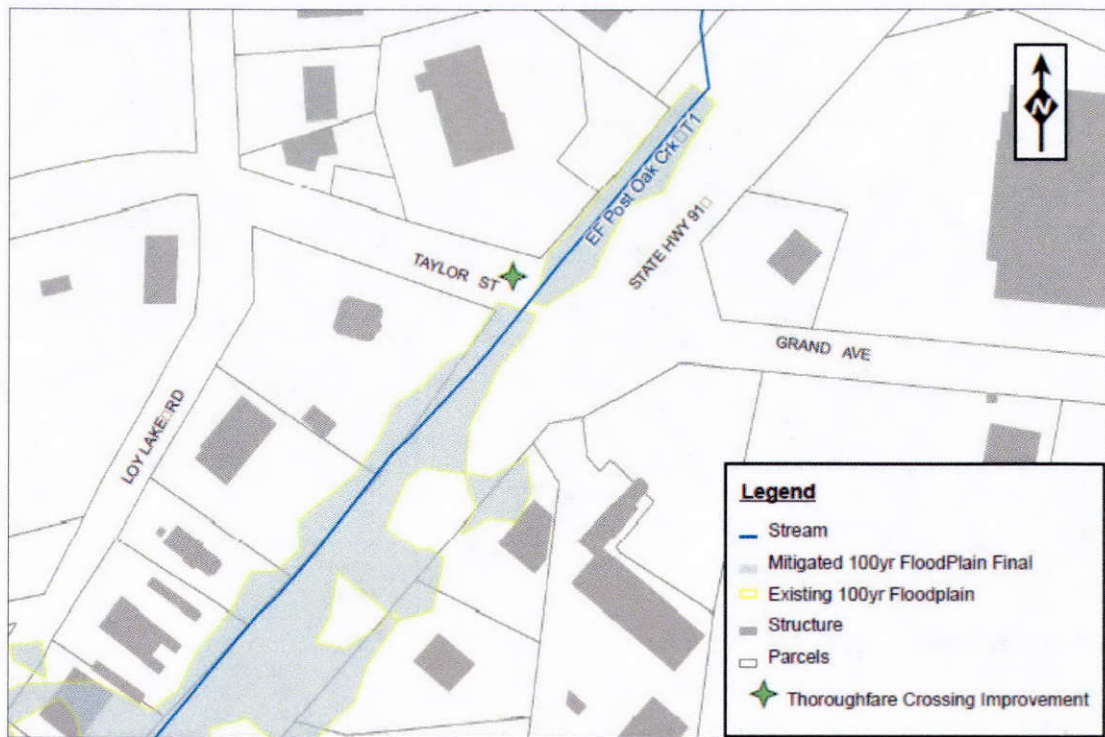


Figure 12. Taylor at T1 East Fork Post Oak. Project # 14.

5.1.1.8 King Street at Stream F Box Culvert

Stream F flows south from Jones Street to Post Oak Creek; the railroad runs parallel to this stream. The King Street crossing is a 375 foot long culvert which is a 6.5 foot by 6.5 foot box culvert on the downstream end and a 78-inch diameter reinforced concrete pipe on the upstream end. This culvert will not pass a 2-YR storm without overtopping and is overtopped by the 100-YR storm to a depth of 2.2 feet. The proposed improvements consist of removing the existing structures and constructing four 8X8 box culverts and raising the roadway three feet improving access for emergency personnel and equipment during a flood event. King Street is classified as a minor arterial in the City's Thoroughfare Master Plan. This project has an estimated cost of \$ 2,011,000.

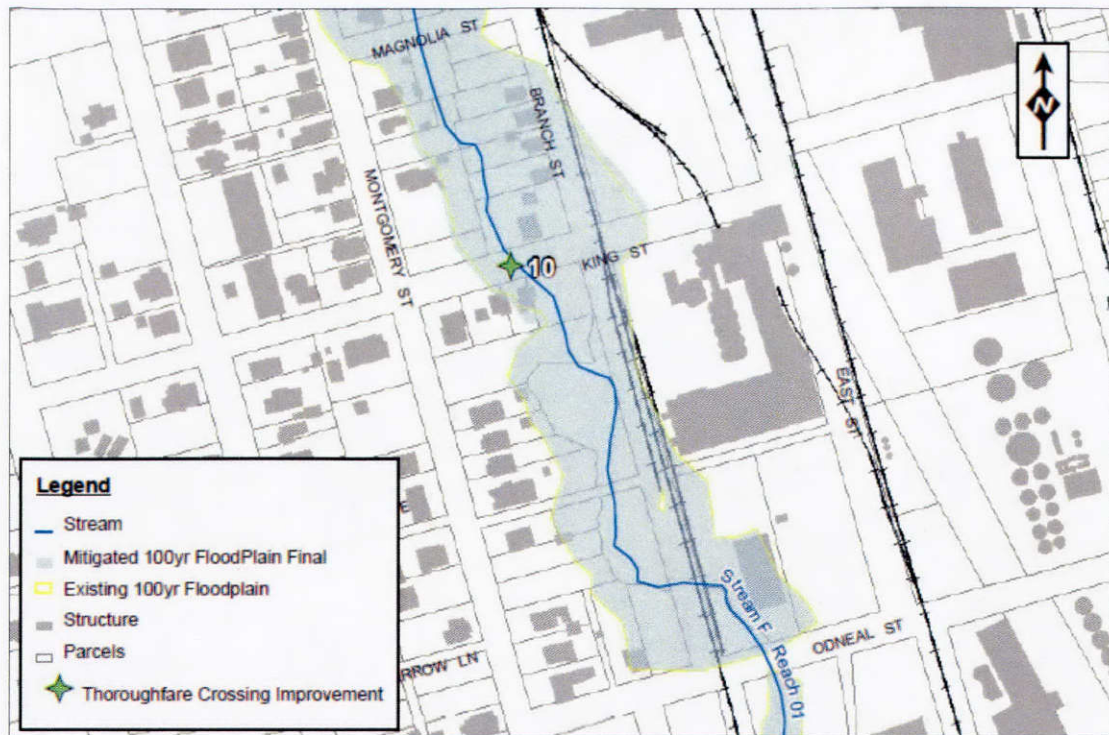


Figure 13. King Street at Stream F Box Culvert. Project # 24.

5.1.1.9 Gribble Street at Stream G Box Culvert

The existing culvert at Gribble Street is a 10 foot wide by 6 feet high box culvert which will pass a 10-YR storm and is overtopped by the 100-YR storm to a depth of only 6 inches. The proposed project consists of replacing the existing culvert with two 8X6 box culverts improving access for emergency personnel and equipment during a flood event. Gribble is designated as a minor arterial in the City's Thoroughfare Master Plan. This project has an estimated cost of \$275,000.

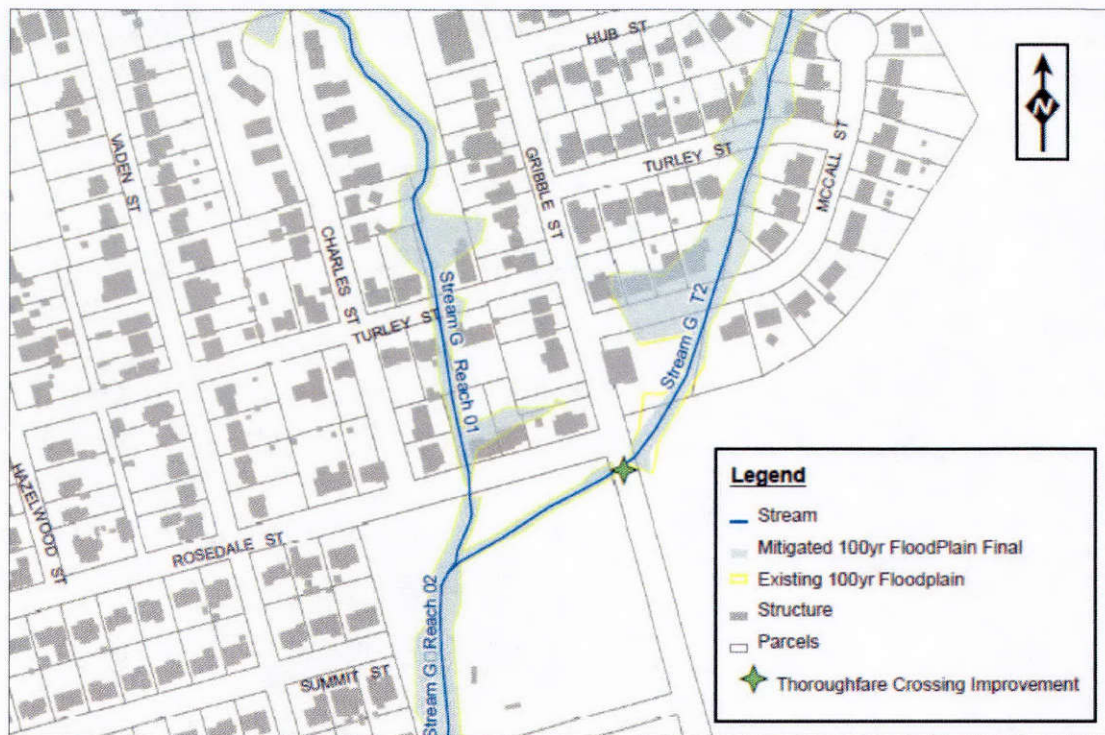


Figure 14. Gribble Street at Stream G Box Culvert. Project # 12.

5.1.1.10 U.S. Highway 75

US 75 is the primary transportation link between Dallas and Tulsa; it is also the center of commercial and industrial development for Grayson County and Sherman. U.S. Highway 75 was constructed in the late 1950s and is parallel to Post Oak and East Fork Post Oak Creek. A number of channel improvement options were considered for mitigating the flooding of Highway 75, none of which proved cost effective. The only project which would mitigate the highway flooding is to raise the roadway above the 1% chance event levels. TxDOT is considering a project to rebuild this section of Highway 75. The project would update a number of geometric features of the highway as well as raising the main traffic lanes. The latest estimate from TxDOT puts the cost of this project at \$25,000,000. The City of Sherman should continue to work with TxDOT as well as state and national legislators in order to secure funding for these needed improvements.



Figure 15. U.S. Highway 75.

5.1.2 Channel Improvements

The channel improvement projects consist of widening the natural creek channel to improve its conveyance. The improved capacity reduces the 100-YR water surface elevation. There are 38 homes and businesses in this area that are currently located below the 100-YR WSEL. The combined channel projects will provide mitigation for 23 of them. The proposed improvements will consist of excavating a trapezoidal channel of varying widths with 1.5 to 1 side slopes. The steep side slopes are necessary due to the limited space available for construction. The slopes will require erosion protection with rock riprap, gabions or articulating concrete blocks. The channel projects should be constructed beginning with the most downstream project first. Bridge improvement projects adjacent to the channel projects should also be sequenced so that the conveyance improvements begin at the downstream end and progress upstream. The channel improvement projects will most likely require U.S. Corps of Engineers permits. See **Section 6.4** for further discussions on regulatory requirements.

5.1.2.1 Center Street to Lamar Street Channel

This project will consist of constructing a 2,700 foot long trapezoidal channel with a bottom width of 60 feet. The channel will begin south of Center Street and extend to Lamar Street. The Center Street Bridge discussed in Section 5.1.1.1 above will be relocated to accommodate the proposed channel location. This project will require property acquisition along both sides of the channel. The estimated cost of this project is \$11,129,000.

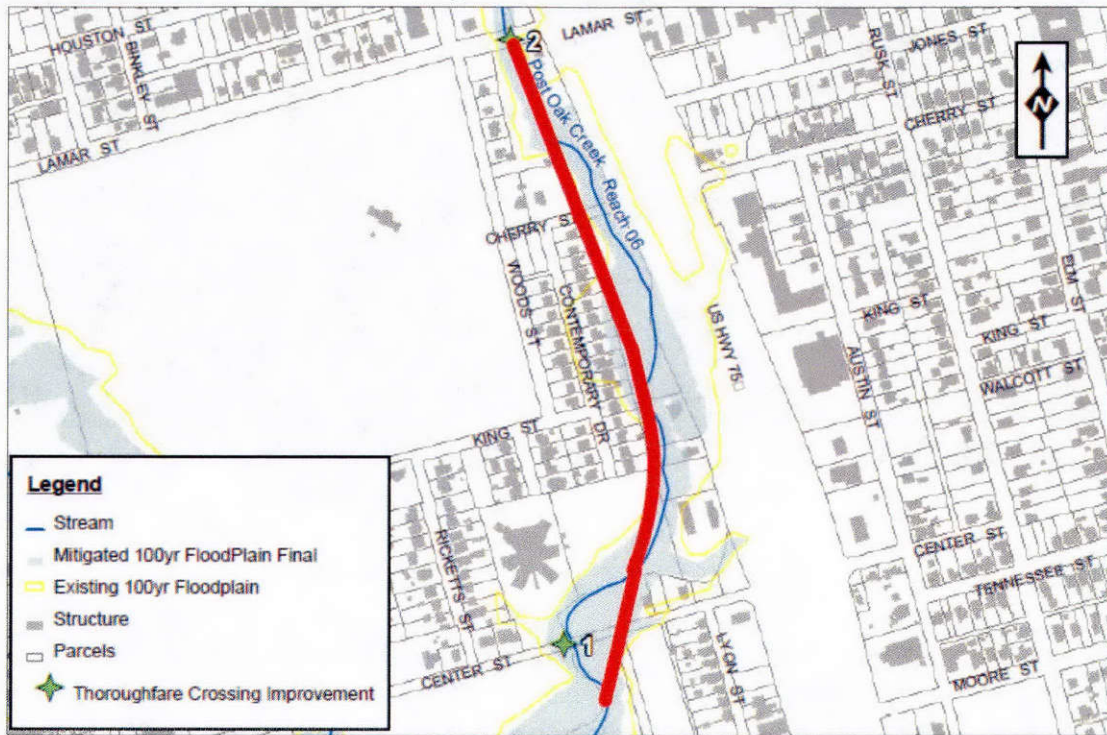


Figure 16. Post Oak Creek Channel Improvements from Center Street to Lamar Street. Project # 18

5.1.2.2 Lamar Street Channel

The proposed channel will transition from a 60 foot bottom width to a 40 foot bottom width between Lamar and Houston Streets. The 40 foot channel will then extend north to the confluence with the East Fork of Post Oak Creek. This project will require property/easement acquisition along both sides of the channel. The proposed channel will be approximately 800 feet long and has an estimated cost of \$1,437,000.

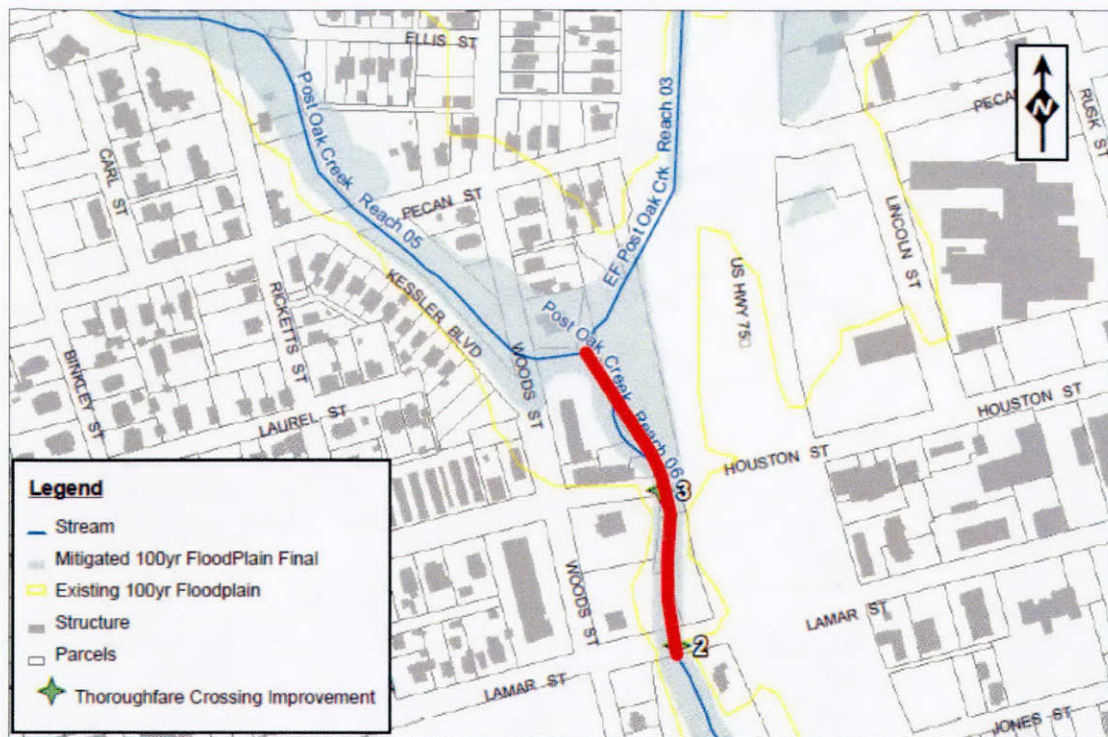


Figure 17. Post Oak Creek Channel Improvements from Lamar Street to East Fork Post Oak Creek. Project # 19.

5.1.2.3 Pecan Street Channel

The Pecan Street Channel begins at the upstream end of the Lamar Street Channel, the confluence of Post Oak Creek and East Fork Post Oak Creek. The proposed 30 foot bottom width trapezoidal channel extends approximately 3,600 feet upstream to the railroad bridge north of Washington Street. This project will require property/easement acquisition along both sides of the channel and has an estimated cost of \$5,771,000.

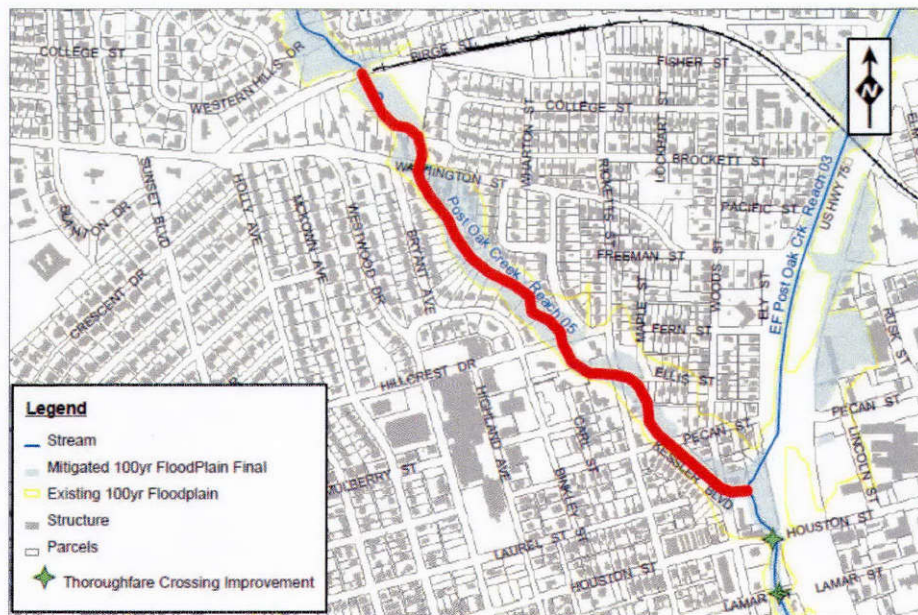


Figure 18. Post Oak Creek Channel Improvements from East Fork Post Oak Creek to Birge Street. Project # 20.

5.1.3 Detention

This study is proposing seven detention projects. These projects range in size from 25 acre-feet to 1,000 acre-feet of flood storage. Detention ponds provide for the temporary storage of flood water. Flood water enters the detention pond at a high rate of flow and exists at a much lower flow rate with the excess water being stored in the pond. This produces lower peak flows downstream with an associated reduction in 100-YR water surface elevations. Detention ponds can be either on-channel or off-channel. They may be a single pond or a series of ponds, and they may be dry except during a heavy rainfall, or they may have a permanent water feature. All of the detention projects will require the acquisition of the pond location.

5.1.3.1 Archer Street Detention Pond

The Archer Street Detention pond will be an off-channel type pond. The inlet will be designed such that flows from rainfall events of a magnitude less than a 5-YR storm will remain in Sand Creek; any flows above the 5-YR storm will engage the inlet and a portion of the flow will be diverted into the pond for storage to be released as stream levels fall. The estimated construction cost of the detention facility is \$857,000. There are 63 single-family and multi-family structures below the current 100-YR WSEL in this area and this project will provide mitigation for 48 of them.



Figure 19. Archer Street Flooding. Project # 5.

5.1.3.2 NRCS Dam 9A

The City of Sherman has three existing NRCS dams provide flood protection in Post Oak Creek and Sand Creek. They are the Dean Gilbert Dam, located west of FM 1417 on Post Oak Creek; the Pickens Dam located south of Center Street on Sand Creek Stream A; and the Site 8A dam located west of Carriage Estates on Sand Creek. The proposed Dam 9A would be similar in construction to the existing NRCS dams.

This project could be constructed as a single lake or two lakes in series on Sand Creek Stream B. This lake or lakes would be on-channel structures with permanent water features. The proposed flood storage capacity of **1,000 acre-feet** would reduce the 100-YR peak flow from 6,500 cfs to 1,500 cfs. This single project provides significant flood mitigation downstream of the dam along Sand Creek as well as along Post Oak Creek downstream of its confluence with Post Oak Creek. This project has an estimated cost of \$6,394,000, while providing

approximately \$7,290,000 of benefits according to the HAZUS analysis, giving the project a benefit cost ratio of 1.14.

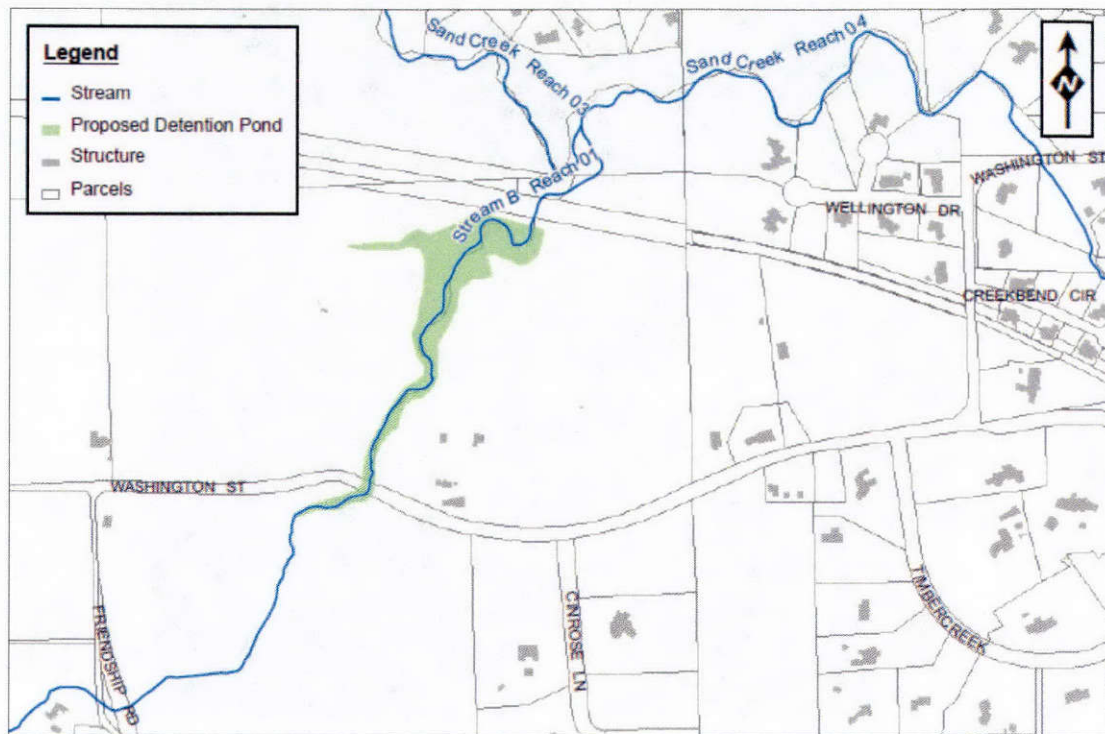


Figure 20. NRCS Dam 9A. Project # 8.

5.1.3.3 Stream E North of US 82 Detention Pond

This proposed detention pond is to be located on Post Oak Creek Stream B north of U.S. Highway 82. This pond may be either an on-channel pond or an off-channel pond. The proposed pond will have 72 acre-feet of storage. This pond will provide mitigation downstream of U.S. 82 to the confluence of Stream B with Post Oak Creek. The proposed detention pond reduces the Ultimate 100-YR flows to 25-YR levels. This reduces the channel velocities an average of 1.5 ft./sec for all storms, which in turn reduces erosion. It also reduces the 100-YR WSEL by an average of 0.9', with a 3' WSEL reduction on the upstream side of the Vancouver culvert which provides mitigation for two residential structures. This project has an estimated cost of \$1,486,000.

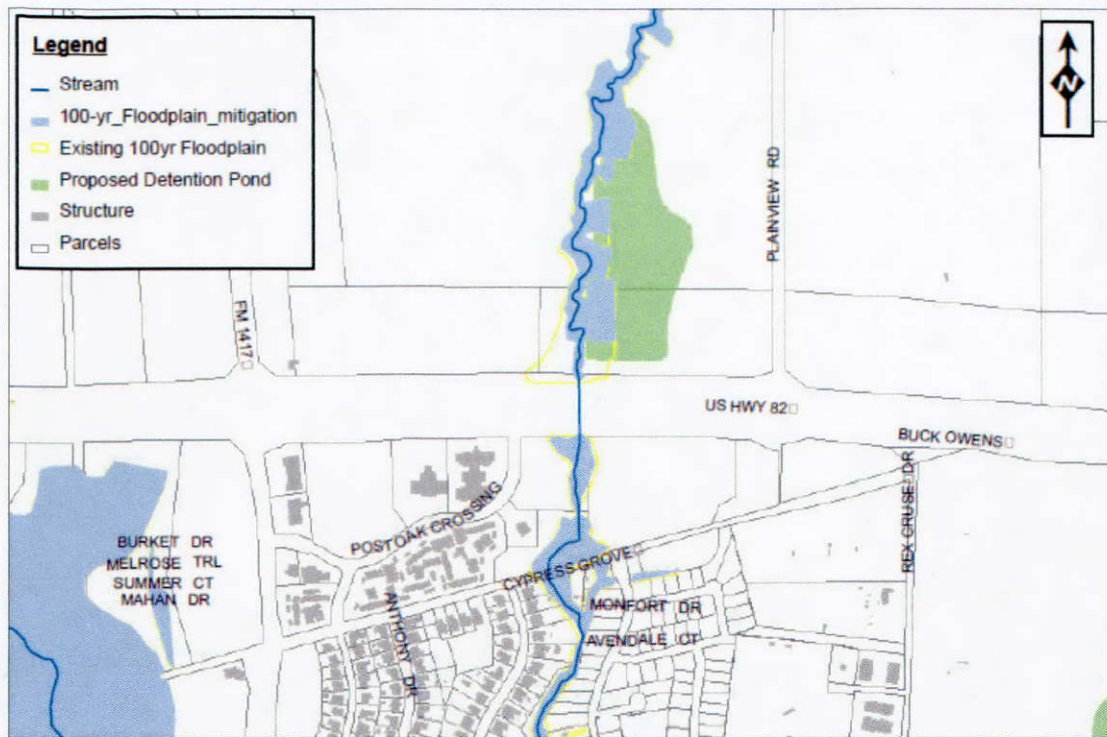


Figure 21. US 82 Detention Pond. Project # 16.

5.1.3.4 Canterbury Drive Detention Pond

This pond is located on Post Oak Creek Tributary T4 north of Canterbury Drive and may be either an on-channel or off-channel type pond with 25 acre-feet of storage. This pond will provide for the mitigation of some flooding downstream to the confluence with Post Oak Creek. The ultimate 100-YR flows from the 107 acre drainage area above this detention facility will be reduced by approximately 36 percent. The estimated cost of this project is \$ 528,000.

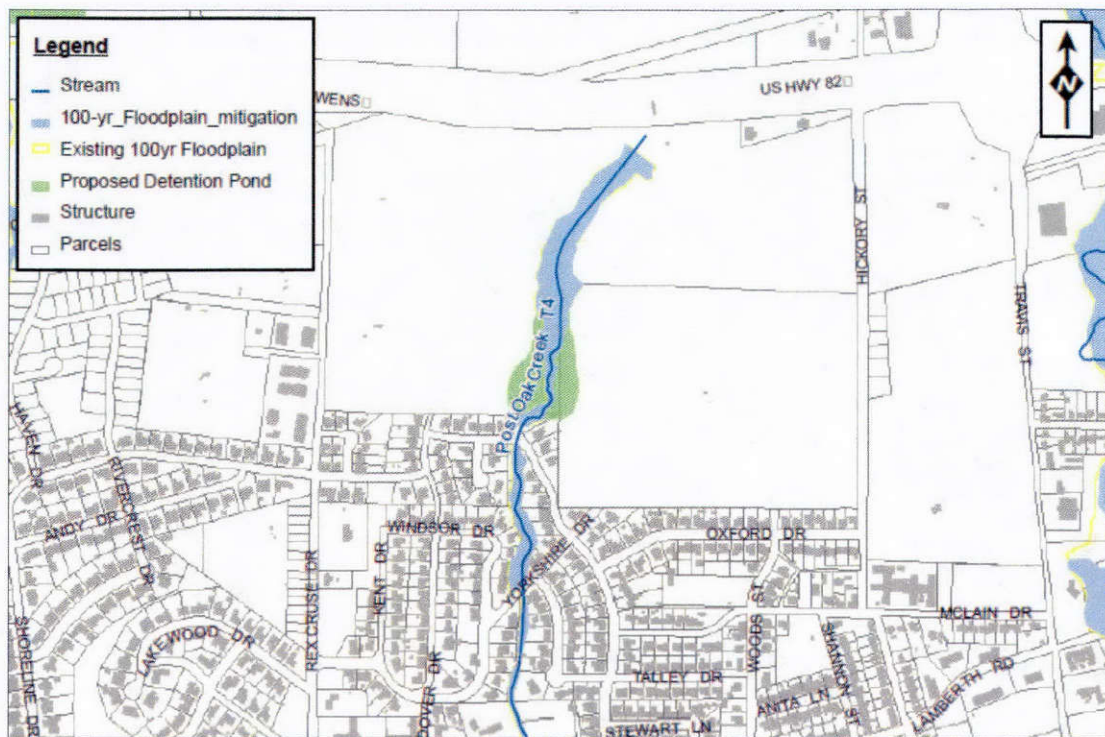


Figure 22. Canterbury Drive Detention Pond. Project # 25.

5.1.3.5 Town Center Detention Pond Modification

This project consists of expanding the existing Town Center detention pond and modifying the outlet structure to provide detention for the 10-YR, 25-YR, 50-YR and 100-YR storm. In addition to modifying the existing outlet structure, the pond will be expanded. The expanded section of the pond will provide off-channel storage with an inlet designed such that flows from rainfall events of a magnitude less than a 5-YR storm will remain in Post Oak Creek; any flows above the 5-YR storm will engage the inlet, and a portion of the flow will be diverted into the pond for storage to be released as stream levels fall. The modified pond will have a storage capacity of 50 acre-feet. These modifications should provide mitigation along Tributary T4 by reducing Ultimate 100-YR flows from the drainage area above the pond by eight percent. This project has an estimated cost of \$ 419,000.



Figure 23. Town Center Detention Pond Modification. Project # 15.

5.1.3.6 Payton Street Detention Pond

This 64 acre-foot, on-channel type pond is located on Tributary T1 of East Fork Post Oak Creek. There are five commercial structures that experience shallow flooding during a 100-YR storm along Texoma Parkway. This proposed detention structure should mitigate this flooding by reducing the Ultimate 100-YR storm flows to 25-YR event levels, which is a reduction of 26 percent. This project would also eliminate the need for culvert improvements at Taylor Street and Loy Lake Road where they cross Tributary T1 of East Fork Post Oak Creek providing improved emergency vehicle access. The estimated cost of this project is \$ 1,057,000.

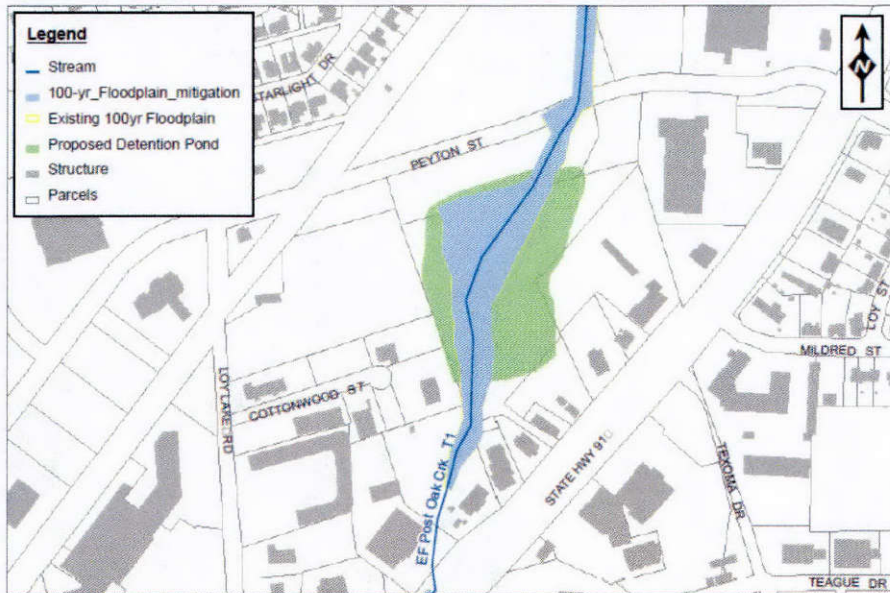


Figure 24. Payton Street Detention Pond. Project # 13.

5.1.3.7 Taylor Street Detention Pond

This proposed detention structure will be an off-channel type pond located on Post Oak Creek south of Taylor Street. The pond will have a capacity of 200 acre-feet and should decrease the Ultimate 100-YR flood flows by approximately eight percent. This project has an estimated cost of \$3,114,000.

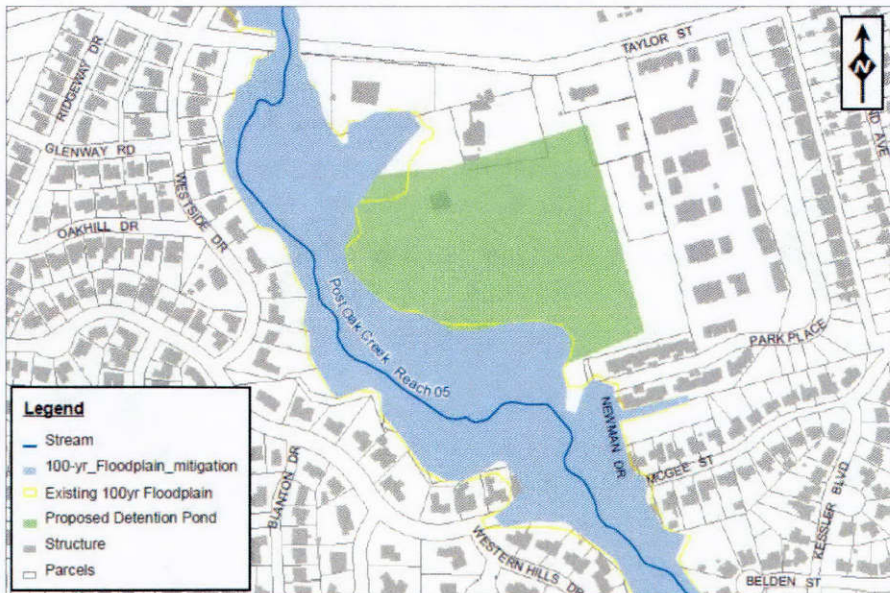


Figure 25. Taylor Street Detention Pond. Project # 27.

5.1.4 Property Acquisition

Modifications to the existing streams such as detention ponds and channel modifications will not mitigate all of the home and commercial business flooding in the study area. There are few options for these locations such as physically raising the structure above the Ultimate 100-YR flood level or otherwise flood-proofing the structure. This study is proposing that these properties could be purchased, the structures removed, and the properties be converted to a use that is compatible with their location in the floodplain such as green space or neighborhood (pocket) parks. It is recommended that the foundation elevations of these structures be verified by a field survey prior to beginning the acquisition process. Properties which have maintained flood insurance and have two or more claims are classified by FEMA as repetitive loss properties. The purchase of repetitive loss properties may be eligible for FEMA funding. A discussion of funding alternatives for the acquisition of repetitive loss properties is presented in **Sec. 6.3.2** and **Sec. 6.3.3**.

5.1.4.1 Archer Drive

Nine buildings and the parking lots of in the apartment complexes between Archer Drive and Sand Creek flood up to three feet deep. It is recommended that these units be purchased and the property be converted to a detention pond. In addition, there are three other repetitive loss properties located in this area that are being recommended for acquisition. The acquisition of all five of these properties has an estimated cost of \$4,238,000.

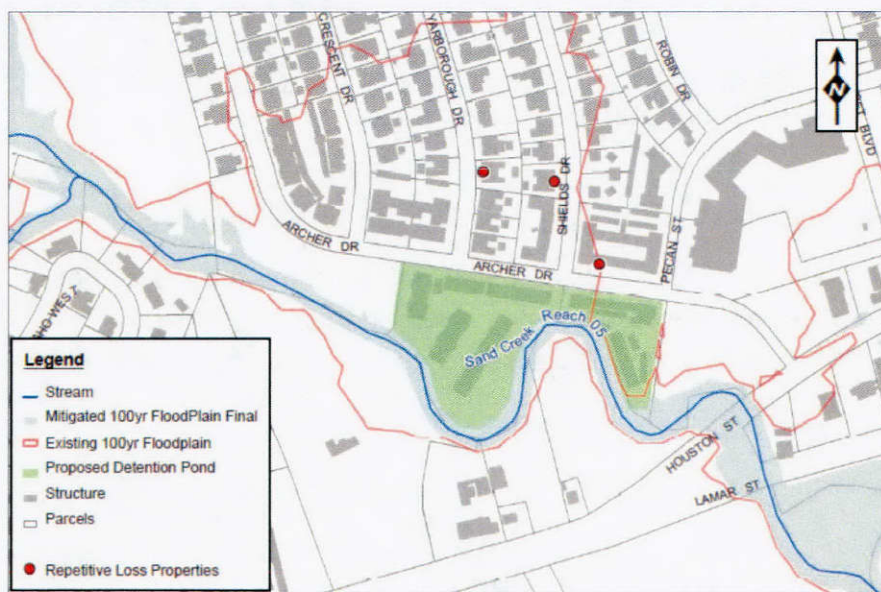


Figure 26. Archer Drive SRL Property Acquisitions. Project # 4.

5.1.4.2 Ayers Drive

There are eight properties with a number of barns, sheds or other out-buildings in this area that flood up to four feet deep. Three of these are repetitive loss properties. The proposed mitigation projects reduce the depth of flooding and remove two of the outbuildings from the floodplain. However, since the three repetitive loss properties would remain in the floodplain, it is recommended that the repetitive loss properties be acquired. The estimated cost of acquiring these properties is \$ 192,000.

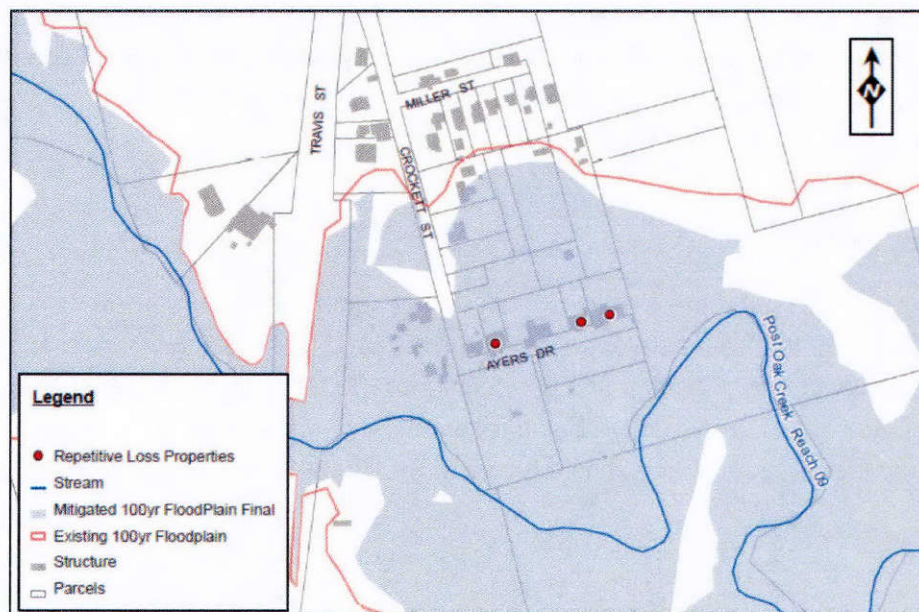


Figure 27. Ayers Drive SRL Property Acquisitions. Project # 2.

5.1.4.3 S. Sam Rayburn Freeway and Contemporary Drive

Flooding in this area affects four residences and two commercial buildings. Both of the commercial structures are repetitive loss properties. It is recommended that these properties be purchased and converted to uses compatible with the floodplain. The estimated cost of acquiring these properties is \$ 288,000.

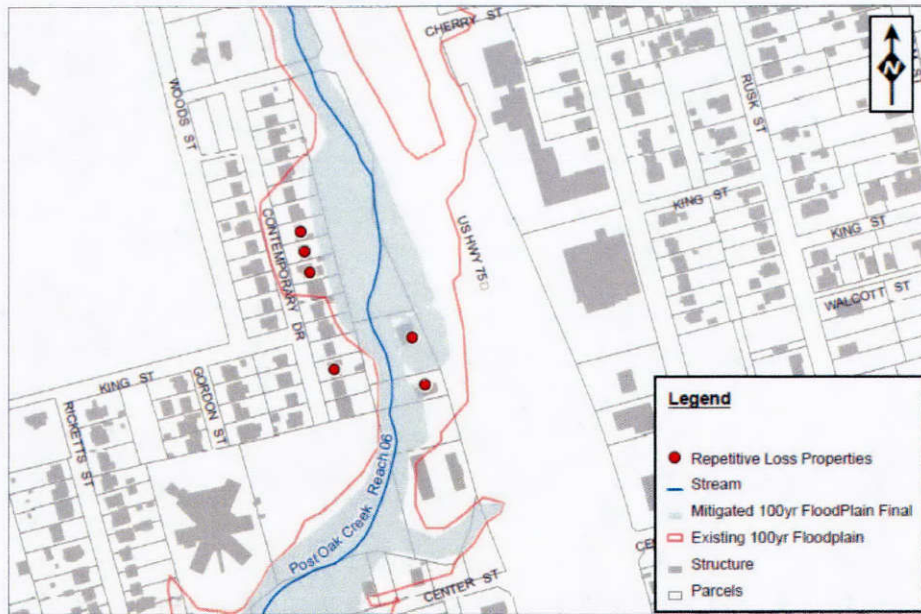


Figure 28. S. Sam Rayburn Freeway and Contemporary Drive SRL Property Acquisitions. Project # 1.

5.1.4.4 Regency Circle and W. Washington Street

The 1% chance event produces flooding up to three feet deep in the apartments located on Regency Circle, and these buildings are repetitive loss structures. There are also structures on Washington Street and on Bryant Avenue that experience flooding. Since the proposed stream modifications will only remove the structure on Bryant from the floodplain, it is recommended that the remaining structures, which are all repetitive loss properties, be acquired. The estimated cost for these acquisitions is \$1,151,000.

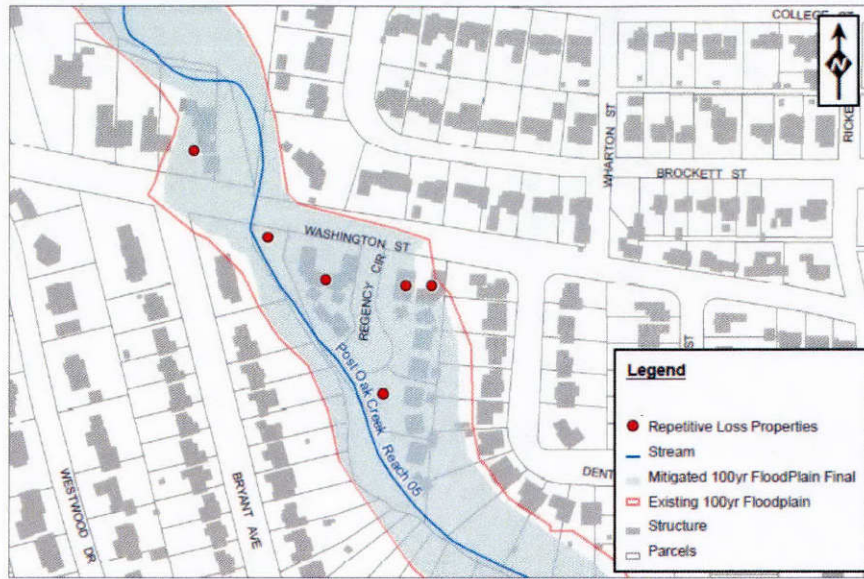


Figure 29. Regency Drive and W. Washington Street SRL Property Acquisitions. Project # 6.

5.1.4.5 Westwood

The 1% chance event produces flooding up to two feet deep in the Westwood Shopping Center area, which affects twelve commercial structures. The proposed mitigation measures remove ten of these structures from the floodplain. It is recommended that the structures remaining in the floodplain be purchased. The estimated cost for these acquisitions is \$97,000.

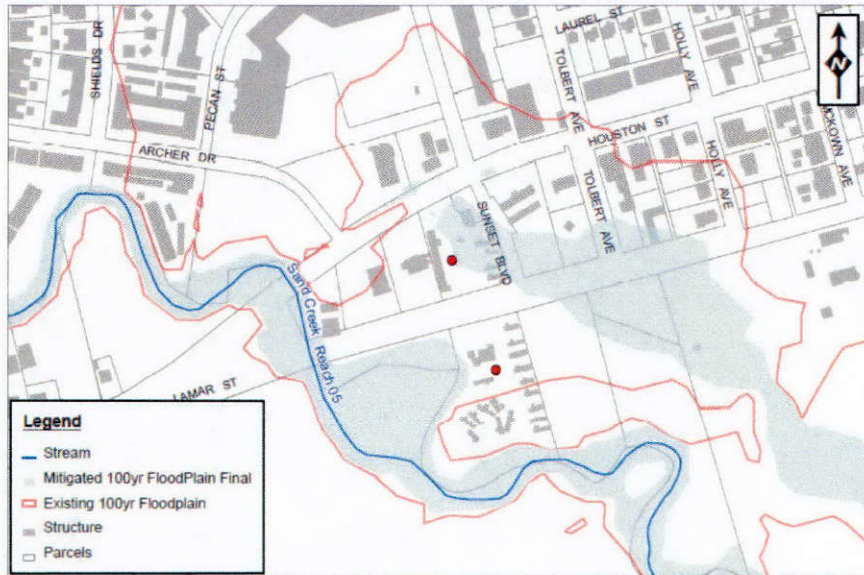


Figure 30. Westwood Area SRL Property Acquisitions. Project # 3.

5.1.4.6 N. Sam Rayburn Freeway and N. Travis Street

The football stadium, field house and two repetitive loss commercial properties will remain within the 100-yr floodplain upon completion of the proposed detention ponds and channel modifications. As a result of the analysis, it is recommended that the commercial properties be acquired. The football stadium floods approximately three feet during the 1% chance event. All restrooms, showers and sanitary facilities should be raised above the 100-YR floodplain level. Drains and sanitary sewer connections below the flood level should be avoided. All other facilities should be constructed of materials which are not damaged by flooding and provisions should be made to facilitate cleaning after a flood. The estimated cost of the acquisitions is \$490,000.

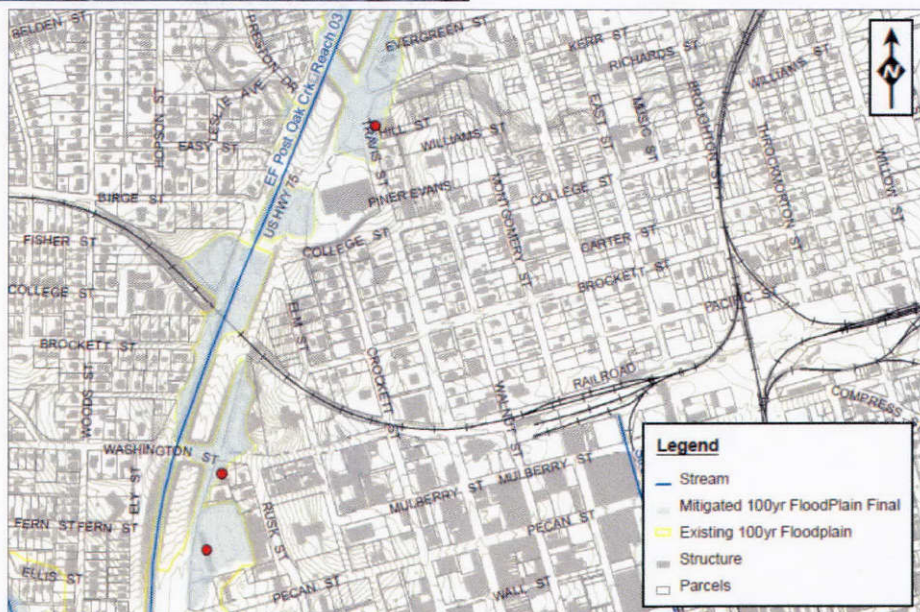


Figure 31. N. Sam Rayburn Freeway & N. Travis St. Project # 9.

5.1.4.7 Various Repetitive Loss Properties

This project is the acquisition of six repetitive loss properties at various locations in the City. The proposed mitigation projects will not alleviate flooding at these locations. It is recommended that these structures be acquired. The estimated cost for these acquisitions is \$655,000.

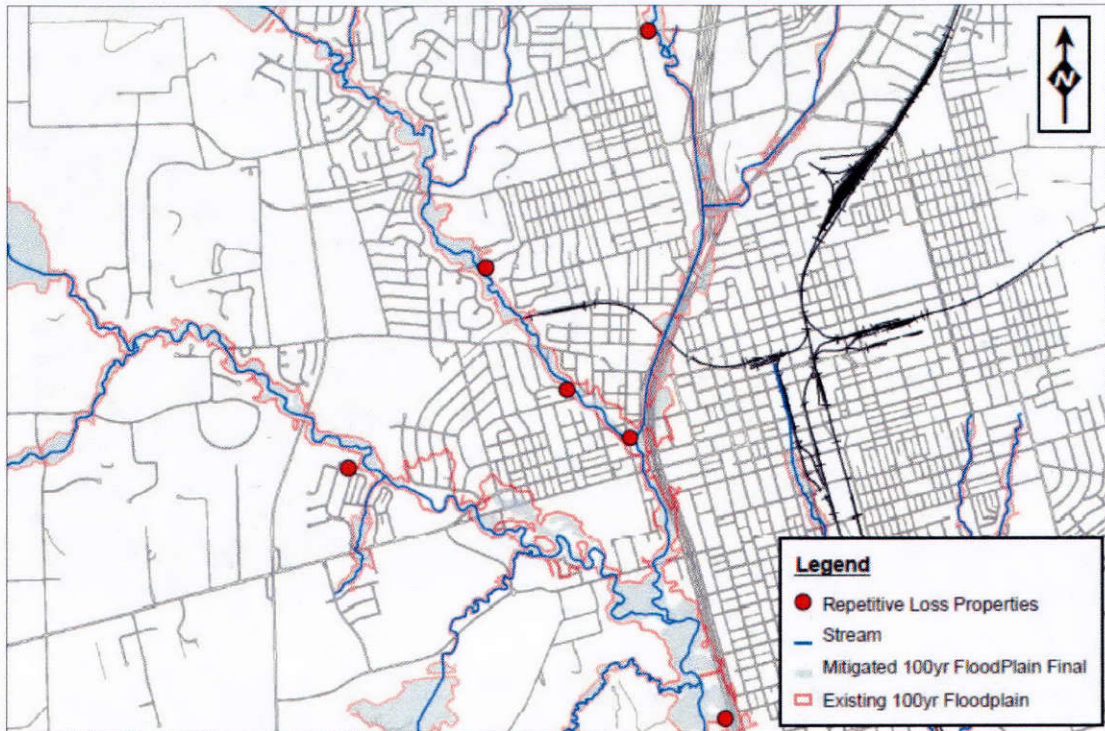


Figure 32. Various Repetitive Loss Properties. Project # 7.

5.1.4.8 Contemporary Drive

There are 29 properties which will be impacted by the construction of the proposed channel modification along Post Oak Creek between Lamar and Center Street. Four of these properties are repetitive loss and are included in **Section 5.1.4.3** above. The acquisition of the remaining 25 properties has an estimated cost of \$1,243,000.

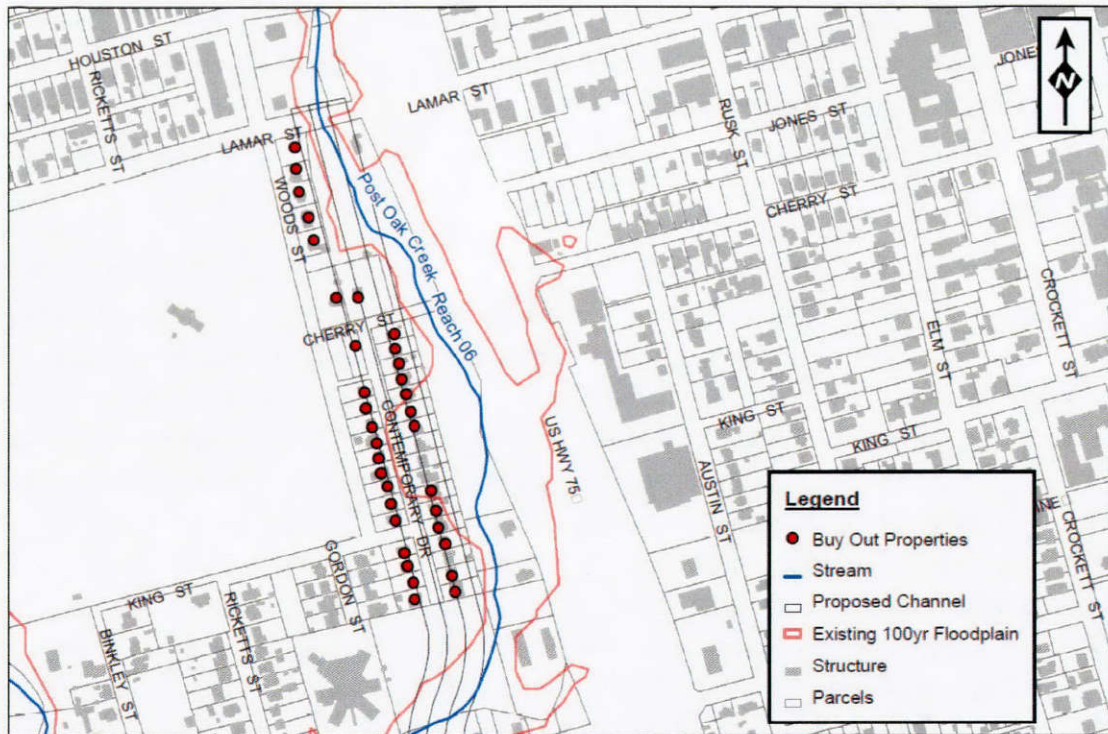


Figure 33. Contemporary Drive. Project # 10.

5.2 Benefit Cost Analysis

A benefit-cost analysis was performed for the various options affecting building flooding discussed above. The viability of the various options was measured through a comparison of the relative cost of each mitigation project versus the benefits derived from these projects. The benefits must exceed the cost in order for a project to be considered viable. The benefits are the damage costs which are avoided by removing at-risk properties from the floodplain (i.e. benefit = damage avoided). Benefits were determined from the Grayson County Appraisal District 2011 tax roll values. Construction costs are based on recent bid tabulations and unit prices for similar regional construction projects. It should be noted that FEMA considers a voluntary acquisition of property located in the floodplain to have a Benefit Cost Ratio (BCR) of 1. The BCR of the Channel, Detention Pond and Property Acquisition projects are shown in Table 22.

5.2.1 Cost Analysis

The estimated cost for each alternative includes materials and construction cost, which are based on recent bid tabulations for similar construction in this region, as well as soft cost for administration, engineering, surveying, geotechnical reports and legal. The allowance for soft

cost was 22% of the construction cost. The construction cost were estimated using bid data from the Texas Department of Transportation. A summary of the costs for each of the alternatives is provided in **Appendix G**.

5.2.2 Benefit Analysis

The benefit of the alternative is the relative monetary savings of a given improvement being in-place, compared to it “not being in-place”. This value is determined from the difference between estimated damages for existing condition and estimated damage with alternative in-place. To estimate the risk associated with a given magnitude flood event, HAZUS-MH software was employed. This software, developed by FEMA Hazard Mitigation Division under a contract with the National Institute of Building Sciences, integrates with ArcGIS 10.0 (the platform utilized for spatial data management and analysis in the overall study). HAZUS is a widely-accepted methodology for flood damage estimation. HAZUS provides an estimate of damages by taking spatial information about the depth of flooding, and correlating that information in an “overlay” analysis to data about the built environment and regional assumptions about the relationship between depth of inundation and damages. In addition to this information, HAZUS provides other useful emergency management data such as estimates of displaced households, disrupted critical facilities, and business use loss.

For the City’s purposes, HAZUS was used to generate estimates of the relative benefit of the flood protection measures proposed. The results of the hydraulic analysis from HEC-RAS (see **Section 4.0**) are processed in HEC-GeoRAS into inundation depth grids for each event (“depth grid”). For each alternative, the resulting depth grid is evaluated in HAZUS to produce an estimate of damages. These damages “with the selected improvement in place” are then compared to an estimate of damages in the existing condition, for the same storm event. The difference in damages is then the relative benefit for that particular flood control measure.

Table 22. Mitigation Projects Benefit Cost Ratios.

Description	Cost	Benefits	B/C Ratio
Stream E North of US 82 Detention Pond	\$1,486,000	\$553,000	0.4
Taylor Street Detention Pond	\$3,114,000	330,000	0.1
Archer Drive Detention Pond	\$857,000	\$1,286,000	1.5
Archer Drive Property Acquisition	\$1,920,000	\$1,920,000	1.0
60' Channel Center St. to Lamar St.	\$11,129,000	\$804,000	0.1
40' Channel Lamar St. to Pecan St.	\$1,437,000	\$536,000	0.4
30' Channel Pecan St. to Railroad	\$5,771,000	\$720,000	0.1
Proposed DAM 9A	\$6,394,000	\$7,290,000	1.1
Canterbury Dr. Detention Pond	\$528,000	\$50,000	0.1
Town Center Detention Pond Modification	\$419,000	\$192,000	0.4

Description	Cost	Benefits	B/C Ratio
Payton St. Detention Pond	\$1,057,000	\$109,000	0.1
Ayers Drive Property Acquisition	\$192,000	\$192,000	1.0
S. Sam Rayburn Freeway and Contemporary Drive Property Acquisition	\$288,000	\$288,000	1.0
Regency Circle and W. Washington Street Property Acquisition	\$1,150,000	\$1,150,000	1.0
Westwood Property Acquisition	\$97,000	\$97,000	1.0
N. Sam Rayburn Freeway and N. Travis Street Property Acquisition	\$490,000	\$490,000	1.0
Various Repetitive Loss Properties	\$655,000	\$655,000	1.0

5.3 Programmatic Flood Damage Mitigation Measures

The measures discussed in **Section 5.1** describe structural measures for mitigating flooding of existing structures and roadways. This section will present measures which are focused on minimizing the necessity for future CIP projects with improved planning and development guidelines and information along with proposed improvements in the maintenance of the natural drainage and creeks.

5.3.1 Land Use Planning and Flood Protection

The Post Oak Creek Flood Protection Plan is a significant step by the City of Sherman toward implementing the findings and recommendations of the Comprehensive Plan. As the City continues to strengthen the connection between development patterns and flood protection, a logical next step would be to implement a review of the City's development guidelines and future land use to ensure consistency with the flood protection plan and to take advantage of the updated data generated by the study.

The Comprehensive Plan, including the future land use plan, is a policy document that provides guidance to decision makers in planning for future growth and development. A primary goal of the Plan is to ensure quality development that is consistent with the community character and with existing and planned infrastructure, including flood protection and drainage infrastructure.

With the adopted Comprehensive Plan and the Flood Protection Plan, the City has an opportunity to preserve critical areas of floodplain while encouraging development that is not subject to flooding and does not contribute to existing flood hazards. The City can minimize the cumulative impacts of past development decisions by ensuring that future developments are of an appropriate intensity and character for its location within the City. Applying the flood hazard areas identified in the Flood Protection Plan and using a variety of low impact development options are actions that may aid in ensuring that community character is not jeopardized, that

development can continue to occur as envisioned through the comprehensive planning process, and that flood impacts are minimized. Questions that might illustrate this process could include:

1. Does the future land use map propose single family residential where a more intense commercial or industrial use may be appropriate?
2. Is the City fully realizing the tax generating potential of a proposed use with key frontage as it seeks to improve its gateways into the city?
3. Does the future land use propose a higher intensity use than what the existing drainage infrastructure can support?
4. Is the community prepared to institute low impact development options to minimize flood impacts?
5. Is the community receptive to such alternatives as well as other incentives for increasing open space?

The Comprehensive Plan recognizes examples of community character that range from large lot, single-family neighborhoods with established trees to small, narrow lots with alleys and limited vegetation, as well as planned business parks in a campus setting to strip retail and office buildings with expansive amounts of surface parking and newly planted trees with little to no canopy. During the Comprehensive Plan process, the community indicated a desire for open space and compact development, and the Plan acknowledges that much of the City is developed. Therefore, due to development pressure, the remaining land may be more of a challenge to develop in a manner consistent with what citizens have said they want. Further, redevelopment of smaller, in-fill lots and “leftover” parcels is possible, but site design and stormwater detention can be challenging due to the more compact nature of this type of development. This is also where incentives can be considered to encourage development that minimizes the impact on drainage infrastructure.

5.3.1.1 Low Impact Development (LID) Standards in Flood Protection Planning

As a guide for future development, the Comprehensive Plan takes into account the traditions of the community as well as the ongoing policy and infrastructure decisions of the City. As noted in the introduction of the Comprehensive Plan, the plan offers “...*guidance to decision makers for challenges yet unseen while... [reinforcing] established policies that should be carried forward as a sure and sound basis for future development.*” Flood protection was a challenge that figured prominently in the recommendations of the Comprehensive Plan. How the City deals with flooding in relation to future development is a critical part of any flood protection initiative.

Non-structural measures for flood damage prevention and floodplain management available to the City of Sherman go beyond the acquisition of repetitive loss properties and construction of capital improvements. The City of Sherman can use the flexibility inherent in a “big picture” policy document like the Comprehensive Plan to reconcile land use and zoning decisions with historical impacts of flooding on the community’s citizens and economy. A variety of land use planning and development alternatives exist that can be used to encourage development that maximizes the value of property while minimizing the development’s impact on storm water runoff and flooding. Some of the more common practices in minimizing the impact of future development on existing floodplains are listed below. These may be considered individually or in the context of a comprehensive set of low impact development (LID) measures.

1. Increased areas of pervious surfaces in new development can help minimize storm water runoff. Possible development and building code measures may include:
 - a. The use of porous pavements.
 - b. The use of infiltration strips in commercial, multifamily, and industrial parking areas.
2. An increase in landscaped area to include low maintenance ground cover and/or tree canopy can increase onsite absorption of rainfall and reduce runoff velocities.
3. Cluster development or compact building design can be used as an incentive by allowing slightly higher development densities by grouping development and reducing the area of associated paving.
4. Incentives may be considered for infill development and redevelopment in areas outside of floodplain. These incentives may be minimal when the full cost of floodproofing new or redeveloped structures in the floodplain is considered.
5. Minimize the number of parking spaces and resulting impervious cover by encouraging shared parking in calculating parking requirements for new commercial and redevelopment.
6. In addition to considering the option of shared parking, parking requirements may be reduced by considering amendments to the development and building codes that reduce parking space requirements and offer alternatives to increase landscaping or more permeable area as part of overflow parking areas.

7. Building setbacks could be required as a maximum rather than minimum distance as part of overall development requirements that could reduce the multiple rows of front parking and encourage more compact development.
8. Consider building code standards that minimize the use of retaining walls to retain pre-development drainage patterns as much as possible.
9. A set of density bonuses could be developed as an incentive to allow higher densities in exchange for concentrating development and/or rewarding preservation of critical drainage areas or floodplain.
10. Likewise, incentives for applying specific low impact development (LID) practices could be considered.
11. Ordinance and Future Land Use Review – Reviewing existing ordinances relating to floodplain, floodway, development, and future land use and zoning to ensure consistency between current and future land uses.

5.3.2 Creek Maintenance

The capacity of a creek to transport storm event flows can be significantly reduced as the result of accumulations of debris, non-native vegetation, and deposits of sediment from upstream erosion. A community's drainage maintenance program begins with a measurable plan for inspection and maintenance, but must be consistent with federal and state environmental protection regulations.

The City of Sherman's ability to maintain the capacity and integrity of Post Oak Creek and its tributaries is limited by private ownership of the channels and surrounding property. The private ownership of creeks and channels that function as storm drainage infrastructure carries with it a number of obligations for private property owners to ensure that they do not alter the channel in a manner that causes damage to adjacent or downstream property owners and that they comply with state and federal regulations when conducting any channel maintenance or restoration. Property owners must be aware of their legal obligations to maintain capacity within their portion of a creek or channel, but must also understand the regulatory permitting process requirements before anything can be done within the channel.

5.3.2.1 Creek Maintenance Activities

A useful guide in creek maintenance is the US Army Engineer Waterways Experiment Station (WES) publication *The WES Stream Investigation and Streambank Stabilization Handbook*. The handbook describes two approaches to determining the need for major maintenance of creeks: 1) take action at the first indication of a threat; or 2) take no action until major maintenance appears inevitable. The handbook describes how the two approaches must be considered from a perspective of criticality, or consequence of failure, and availability of funds. Creek banks and channels do not have to be in perfect condition to be effective in transporting storm water runoff, but must be routinely monitored in order to determine what level of maintenance or restoration is necessary in order to minimize the impacts of storm events. Creek maintenance activities can be categorized as preventive and restorative. Preventive activities are those that remove obstructions or conditions that limit the capacity of the channel to efficiently transport flows during storm events. Restorative activities are those undertaken to remove obstructions, debris, and sediment, and otherwise stabilize the creek channel following storm events. Both categories of creek maintenance activities focus on three management activities: sediment management, bank stabilization, and vegetation management.

5.3.2.2 Sediment Management

Sediment management is the removal of excess accumulations of sediment. Accumulations of sediment may reduce flow capacity of a creek or channel and may increase the risk of flooding. Sediment management activities must carefully consider the geomorphic and ecologic functions of the channel. Disposal of sediments should be in upland areas or at the City's landfill.

5.3.2.3 Bank Stabilization

The consequences of creek bank failures in Sherman have included:

- Damage to private property;
- Damage to city streets and utilities;
- Increased flooding risks due to downstream accumulations of sediment; and
- Impacts to riparian habitats.

The repair and stabilization of creek banks should be undertaken when a bank is unstable or failing. Bank stabilization can include increased slopes, stabilization by planting vegetation, and armoring with engineered systems, such as gabions.

5.3.2.4 Vegetation Management

Vegetation management is the trimming or removal of flow-constricting, invasive vegetation within the creek. Vegetation activities are not a random removal of all trees and brush, but are developed to establish a canopy of riparian trees and promote the growth of plants that minimize channel and bank erosion.

Implementation of any of the creek maintenance program begins by defining the land ownership rights and responsibilities for the creeks in the Post Oak Creek watershed. Under the Texas Constitution, the City is generally prohibited from spending public funds for the maintenance or enhancement of private property. This includes stabilizing creek banks, sediment management, and vegetation management. Presently, the City has no property rights to any of the creeks in the watershed. But by defining a public purpose for the maintenance of Post Oak Creek and its tributaries, the City may choose to actively engage in various maintenance and management activities.

5.3.2.5 Public Maintenance – Maintenance Easements and Right-of-Way Dedications

An easement is a right to use land owned by another party for a specific purpose. Easements would provide permission for city personnel and contractors to repair drainage problems and perform on-going maintenance and bank stabilization projects. Dedication of the creek as drainage right-of-way conveys a portion of the property in fee simple title to the public, similar to the dedication of right-of-way for public streets.

Both the dedication of a maintenance easement and fee simple acquisition will limit the uses of the property in order to provide the City with the means for maintaining Post Oak Creek and its tributaries as the principal component of stormwater drainage for the citizens of Sherman. Fences, buildings, and landscaping within creeks or channels and along the banks within the easement or right-of-way would be prohibited and subject to removal to allow maintenance access.

5.3.2.6 Private Maintenance – Creek Maintenance Program

An alternative to the acquisition of maintenance easements or even fee-simple ownership of drainage rights-of-way is to continue private ownership of area creeks with city participation in creek maintenance by property owners. In a creek maintenance program, the City could provide financial assistance for property owners to perform creek maintenance. The program

provides for city participation in the costs of materials such as rip rap (stone) or plant materials used to stabilize creek banks, or in the costs of engineering creek bank stabilization projects for property owners. The goals of the program would be to reduce erosion and limit flooding by enabling proper creek maintenance. Projects could range from debris removal to erosion control and bank stabilization. Funding for such a program would always be limited, and comprehensive projects that include more than one property would be a higher priority in competing for reimbursements.

5.3.2.7 Limitations – Wetlands and Waters of the U.S.

Section 404 of the Clean Water Act requires Corps of Engineers' approval prior to discharging dredged or fill material into the waters of the United States. Typical activities requiring Section 404 permits are:

- Depositing of fill or dredged material in waters of the U.S. or adjacent wetlands.
- Site development fill for residential, commercial, or recreational developments.
- Construction of revetments, groins, levees, dams, dikes, and weirs.
- Placement of riprap and road fills.
- Mechanized Land Clearing.

5.3.2.7.1 Waters of the United States

The definition of Waters of the United States includes essentially all surface waters such as all navigable waters and their tributaries, all interstate waters and their tributaries, all wetlands adjacent to these waters, and all impoundments of these waters. "Wetlands" are areas characterized by growth of wetland vegetation where the soil is saturated during a portion of the growing season or the surface is flooded during some part of most years.

The landward regulatory limit for non-tidal waters (in the absence of adjacent wetlands) is the ordinary high water mark. The ordinary high water mark is the line on the shores established by the fluctuations of water and indicated by physical characteristics such as:

- a clear natural line impressed on the bank;
- shelving;
- changes in the character of the soil;
- destruction of terrestrial vegetation;
- the presence of litter and debris; or

- other appropriate means that consider the characteristics of the surrounding areas.

Any person, firm, or agency (including Federal, state, and local government agencies) planning to work in Waters of the U.S., or dump or place dredged or fill material in Waters of the U.S., must first obtain a permit from the Corps of Engineers.

5.3.2.7.2 Pre-Application Consultation

A review of exemptions, nationwide, regional and individual permit requirements with the Corps of Engineers – Tulsa District is advisable for proposed work in waters in creeks in and around Sherman. An official determination as to the need for a Corps of Engineers permit can be provided upon request to the Tulsa District Engineer.

5.3.2.7.3 Types of Permits

5.3.2.7.3.1 Individual Permits

Individual permits are issued following a full public interest review of an individual application for a Department of the Army permit. A public notice is distributed to all resource agencies and all known interested persons. After evaluating all comments and information received, final decision on the application is made. The permit decision is generally based on the outcome of a public interest balancing process where the benefits of the project are balanced against the detriments. A permit may be granted unless the proposal is found to be contrary to the public interest. Processing time usually takes 60 to 120 days unless a public hearing is required or an environmental impact statement must be prepared.

5.3.2.7.3.2 Regional Permits

Regional permits are issued by the District Engineer for a general category of activities when the activities are similar in nature and cause minimal environmental impact (both individually and cumulatively), and the regional permit reduces duplication of regulatory control by State and Federal agencies.

5.3.2.7.3.3 Nationwide Permits

A nationwide permit (NWP) is a form of general permit which authorizes a category of activities throughout the nation. These permits are valid only if the conditions applicable to the permits are met. If the conditions cannot be met, a regional or individual permit will be required. The nationwide permits most likely to apply to work in creeks in the City of Sherman are:

- **Nationwide Permit #13: Bank Stabilization**

Bank stabilization activities necessary for erosion prevention may be authorized under NWP 13 if it meets the following criteria:

1. No material is placed in excess of the minimum needed for erosion protection;
2. The activity is no more than 500 feet in length along the bank, unless this criterion is waived in writing by the USACE District Engineer;
3. The activity will not exceed an average of one cubic yard per running foot placed along the bank below the plane of the ordinary high water mark or the high tide line, unless waived by the USACE District Engineer;
4. The activity does not involve discharges of dredged or fill material into special aquatic sites, unless waived by the USACE District Engineer;
5. No material is of the type, or is placed in any location, or in any manner, to impair surface water flow into or out of any water of the United States;
6. No material is placed in a manner that will be eroded by normal or expected high flows; and,
7. The activity is not a stream channelization activity.

A pre-construction notification (PCN) is required prior to commencing activity if the work is in excess of 500 feet in length or will involve a discharge of greater than an average of one cubic yard per running foot along the bank below the ordinary high water mark.

- **Nationwide Permit #3: Maintenance**

Maintenance activities are permitted, but permittees must notify the District Engineer in accordance with General Condition 13 if the discharge of dredged or fill material causes the loss of greater than 1/10-acre of waters of the U.S. or there is a discharge in a special aquatic site, including wetlands and riffle pool complexes.

Given these restrictions, maintenance and reconstruction or repair of damage from a discrete event such as a flood or hurricane to a dock, pier or house may be able proceed using an NWP if the following conditions are met:

1. Repairing, rehabilitating or replacing a previously authorized and currently serviceable structure or fill
 - a. if the structure or fill will not be used in a manner different from what was included or contemplated by the original permit or most recent authorized modification;
 - b. and any potential minor deviations from the structure's or fill's original configuration deemed necessary due to changes in materials, construction techniques, or current construction or safety codes may be allowed only if adverse environmental impacts are minimal.
2. Repairing, rehabilitating or replacing structures or fills destroyed or damaged by events such as storms, floods, or fire may be allowed if the repair, rehabilitation or replacement

has begun or is contracted to begin within 2 years of the destruction or damage. If it was a catastrophic event, this time limit may be waived by the District Engineer for good cause such as funding, contract or a similar delay.

In addition the following activities may be eligible to proceed under this NWP:

1. Discharges of dredged or fill material, including excavation, into waters of the U.S. to remove accumulated sediments and debris in the vicinity of or within existing structures, and placing new or additional riprap to protect an existing structure, if the District Engineer is notified per General Condition 13, when:
 - a. sediment removal is limited to minimum necessary to restore the waterway in the structure's immediate vicinity to its approximate dimensions when the structure was built but no more than 200 feet in any direction from the structure;
 - b. only the minimum amount necessary of riprap to protect and ensure the safety of the structure is placed;
 - c. all excavated materials are deposited and kept in an upland area, unless the District Engineer gives separate authorization; and
 - d. bank stabilizations not directly associated with the structure require the District Engineer's separate authorization
2. To authorize "discharges of dredged or fill material, including excavation, into all waters of the U.S. for activities associated with the restoration of upland areas damaged by a storm, flood, or other discrete event, including construction, placement, or installation of upland protection structures and minor dredging to remove obstructions in a water of the U.S.". In such a case, within 12 months of the date of damage, the Corps District Engineer must be notified according to GC 13, and associated work must commence, or be under contract to commence, within 2 years of the date of the damage.
 - a. evidence like photographs or a topographic survey should be provided to justify the restoration's extent;
 - b. the extent of restoration cannot exceed the contours, or ordinary high water mark, in existence before the damage;
 - c. the District Engineer has ongoing authority to decide the pre-existing conditions and the extent of restoration work authorized under this permit;
 - d. Minor dredging to remove obstructions is limited to 50 cubic yards below the plane of the ordinary high water mark AND to the amount necessary to repair the contours of the pre- existing bottom plane of the waterbody; and,
 - e. Discharge of dredged or fill material and all related work in order to restore the upland area has to be part of a single and complete project.

This permit does not allow new stream channelizations or relocation projects. Any work authorized under this permit must not result in more than minimal degradation of water quality, minimal changes to a stream's flow characteristics, or increase flooding.

5.3.3 Community Rating System

The National Flood Insurance Program Community Rating System (CRS) was implemented in 1990 as a voluntary program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards. Any community in full compliance with the minimum NFIP floodplain management requirements may apply to join the CRS.

The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates in a community are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS:

1. Reduce flood damage to insurable property;
2. Strengthen and support the insurance aspects of the NFIP, and
3. Encourage a comprehensive approach to floodplain management.

The CRS uses a class rating system that is similar to fire insurance rating to determine flood insurance premium reductions for residents. CRS classes are rated from 10 to 1. A community that does not apply for the CRS or that does not maintain the minimum number of credit points would be considered a Class 10 community. Most communities enter the program at a Class 9 rating, which entitles residents in Special Flood Hazard Areas (SFHAs) to a 5 percent discount on their flood insurance premiums. As a community engages in additional mitigation activities, residents become eligible for increased NFIP policy premium discounts. Each CRS Class improvement produces a 5 percent greater discount on flood insurance premiums for properties in the SFHA, with a Class 1 community receiving the maximum 45 percent premium reduction. CRS class changes occur on May 1 and October 1 of each year.

5.3.3.1 CRS Credit

A community accrues points to improve its CRS Class rating and receive increasingly higher discounts. Points are awarded for engaging in any of 18 creditable activities, organized under four categories:

- Public information
- Mapping and regulations
- Flood damage reduction
- Flood preparation

Formulas and adjustment factors are used to calculate credit points for each activity.

Benefits of the CRS

In addition to lower cost flood insurance rates, benefits from participating in the CRS include:

- Citizens and property owners in CRS communities have increased opportunities to learn about risk, evaluate their individual vulnerabilities, and take action to protect themselves, as well as their homes and businesses.
- CRS floodplain management activities provide enhanced public safety, reduced damage to property and public infrastructure, and avoidance of economic disruption and loss.
- Communities can evaluate the effectiveness of their flood programs against a nationally recognized benchmark.
- Technical assistance in designing and implementing some activities is available to community officials at no charge.
- CRS communities have incentives to maintain and improve their flood programs over time.

5.3.3.2 Application Process

To apply for CRS participation, a community must initially inform the FEMA Regional Office of its interest in applying to the CRS and will eventually submit a CRS application, along with documentation that shows it is implementing the activities for which credit is requested. The application is submitted to the Insurance Services Office, Inc. (ISO) / CRS Specialist. ISO works on behalf of FEMA and insurance companies to review CRS applications, verify communities' credit points, and perform program improvement tasks.

A community's activities and performance are reviewed during a verification visit. FEMA establishes the credit to be granted and notifies the community, the State, insurance companies, and other appropriate parties. Each year, the community must verify that it is continuing to perform the activities that are being credited by the CRS. In addition, a community can continue to improve its class rating by undertaking new mitigation and floodplain management activities that earn even more points.

5.3.3.3 CRS in Texas

As of May 2012, 1,228 communities in the State of Texas participate in the Federal Emergency Management Agency's National Flood Insurance Program (NFIP). Of these communities, 54 (or 4%) participate in the Community Rating System (CRS). Of the top 50 Texas communities, in terms of total Flood Insurance policies held by residents, 19 participate in the CRS.

5.3.4 Update Flood Insurance Rate Maps (FIRM)

In 1968, Congress created the National Flood Insurance Program (NFIP) to help provide a means for property owners to financially protect themselves. The NFIP offers flood insurance to homeowners, renters, and business owners if their community participates in the program. The flood hazard maps are used to determine if a property is located in an area at high risk of flooding, which would require federally mandated flood insurance as a condition of obtaining a loan. Flood insurance premiums are based on the depth of flooding based on the Base Flood Elevation (BFE) shown in these maps. These maps are also used as planning tools by City staff.

The Biggert-Waters Flood Insurance Reform Act of 2012 will result in a number of changes to the NFIP. Some of these changes are listed below:

❖ Flood Insurance

Removes subsidized rates (pre-FIRM rates) for the following classes of structures and allows rates to increase by 25% per year until actuarial rates are achieved: The effective date is July 1, 2012.

- Any residential property that is not the primary residence of an individual
- Any severe repetitive loss property
- Any property that has incurred flood related damages that cumulatively exceed the fair market value of the property
- Any business property
- Any property that after the date of the Bill has incurred substantial damage or has experienced “substantial improvement” exceeding 30 percent of the fair market value of the property.
- Any new policy or lapsed policy, or any policy for a newly purchased property.
- Any policy for which the owner has refused a FEMA mitigation offer under HMGP, or for a repetitive loss property or severe repetitive loss property.

Severe Repetitive Loss means four or more claims payments of over \$5,000 or two claims that exceed the value of the property.

Increases the limit for annual rate increases within any risk classification of structures from 10 percent to 20 percent. Effective date is July 1, 2012.

❖ Mapping

Establishes a Technical Mapping Advisory Council with membership coming from a wide range of professions, including federal agencies and state and local mapping partners.

The Council would advise FEMA on improving accuracy, on standards that should be adopted for flood maps, data and map maintenance and on funding needs and strategy. It would also develop recommendations within 1 year for future conditions mapping, including impacts of sea level rise and future development on flood risk. FEMA is required to incorporate such recommendations into the ongoing review and updating of flood maps.

Establishes an on-going National Flood Mapping Program. Requires that flood maps show 100-year and 500-year floodplains for all populated areas and areas of possible population growth, as well as areas with residual risk behind levees or below dams. Also requires mapping of the level of protection provided by flood control structures. Requires that new flood maps use the most accurate topography and elevation data available. Also requires acquisition of new ground elevation data when necessary. Requires development of flood data on a watershed basis.

Requires FEMA to notify property owners when their properties are included in, or are removed from an area covered by mandatory insurance purchase requirements. Also requires notification of Senators and House Members whose States or Districts are affected by map changes.

Removes limitations on state contributions to updated flood mapping. (Previously, there was a limit of a 50% state contribution to the costs of new flood maps. This has resulted in some states in states developing mapping data but FEMA being unable to use it to produce new maps.)

Requires a study on federal interagency coordination of flood mapping, including collection and utilization of data among all governmental users.

❖ Mitigation Programs

Consolidates NFIP funded mitigation programs (Repetitive Flood Claims, Severe Repetitive Loss Properties, Flood Mitigation Assistance) into a single program. The combined National Flood Mitigation Fund is to be funded at \$90 million per year. While the old Flood Mitigation Assistance and pilot Severe Repetitive Loss program were funded at up to \$40 million per year each and the Repetitive Flood Claims program at up to \$10 million, the SRL program has never been fully utilized in part due to its complexity. The new program simplifies and combines the three previous programs and includes the following:

Allows the required Flood Mitigation Plan to be part of a community's multi-hazard mitigation plan.

Removes beach nourishment as an allowed mitigation activity.

Adds elevation, relocation or floodproofing of utilities as allowed mitigation activities.

Adds demolition and rebuild as an allowed mitigation activity.

Specifically notes the capacity for “direct” grants if the Administrator, after consulting with the State and community, determines that neither has the capacity to manage the mitigation grant.

Caps the use of mitigation grant funds for state mitigation plan development at \$50,000 and at \$25,000 for a community.

Provides for denial of grant funds if not obligated (paid out) in 5 years. (This is due to Congressional concern about unobligated balances.) Specifically restates 2004 Reform bill provision prohibiting offsetting collections to fund these mitigation programs.

Restructures federal share requirement:

Up to 100% for severe repetitive loss structures. (4+ Claims of over \$5000 or 2+ claims exceeding value of structure)

Up to 90% for repetitive loss structures. (2 claims over 10 years averaging at least 25% of value of structure)

Up to 75% for other approved mitigation activities.

The changes in the NFIP emphasize the need for current and accurate flood hazard maps.

5.3.5 Summary

Section 5.2 has discussed proposed improvements in the maintenance of the natural drainage and creeks as well as updating and improving the City’s planning tools and development guidelines. As a result of this study, it is recommended that the City consider implementing the following:

1. Implement a detailed creek maintenance program designed to reduce erosion and limit flooding;
2. Update the future Land Use Plan every five years to ensure consistency with the flood protection plan and to take advantage of the updated data generated by the study;
3. Update the Storm Drainage Design Manual to incorporate the findings of this study into each drainage and development project;
4. Incorporate Low Impact Development Standards in Flood protection planning and design;

5. Update the Flood Insurance Rate Maps (FIRM) for the community to provide a more accurate definition of the floodplain; and
6. Consider adopting floodplain management activities that exceed the minimum NFIP requirements and documenting those higher standards by entering the National Flood Insurance Program's Community Rating System (CRS). CRS participation also provides lower flood insurance rates within the community.



6 Phasing and Implementation

Given the projected project costs, it is unlikely that the City can develop all of the identified structural flood damage prevention measures at one time. Project development will be phased over a number of years as funding becomes available or partnership efforts are formalized. It is understood that projects that are ranked as lower priorities may be advanced in schedule to take advantage of funding opportunities.

6.1 Prioritization of Alternatives

The City of Sherman utilizes resources to plan for the implementation of stormwater improvements which include the City's institutional guidelines for managing stormwater and the City's ongoing assessment of citizen reported drainage impacts. These two measures are presented in order to establish the basis for the prioritization of improvements recommended in this study.

6.1.1 City of Sherman Watershed Management Goals

The City of Sherman operates under the City's Comprehensive Plan adopted in 2009. This plan recognizes that, as with most cities, the City's management of stormwater is intended to achieve goals and that these goals are in the process of being implemented city-wide. The goals as established in the City's plan are presented as follows and provide the basis for some degree of metrics as to the City's intent in implementing improvements through its continuing assessment of its watersheds:

1. Increase the ability of natural and engineered systems to address stormwater runoff and drainage, both in existing neighborhoods and proposed developments, in order to minimize flooding and the damage it causes.
2. Reduce the greatest flood-related risks to public health, safety, property, and the environment.
3. Protect the integrity of Post Oak Creek's geomorphology and ecology.
4. Protect and enhance the quality, quantity, and availability of surface water resources.
5. Preserve and enhance existing aquatic and riparian environments and encourage restoration of degraded areas.
6. City arterial and collector streets should be passable during a 1% annual chance event.

These goals have been summarized relative to the findings and recommendations in this study to develop criteria for prioritizing the proposed mitigation projects.

1. Reduces flooding of public, business and residential structures.
2. Reduces flooding of collector and arterial streets.
3. Reduces channel erosion.
4. Enhances the environmental characteristics of the floodplain.

The City of Sherman also necessarily must prioritize capital improvements given that the need for improvements exceeds the available funding in any given year; thus, cost must be considered in the implementation of improvements. The City's Stormwater Management Plan specifically prioritizes capital improvements through a ranking using the most favorable benefit cost ratio as the most desirable improvements to initiate first. This establishes three additional criteria, listed as follows:

1. Project implementation can be within annual operating budget (\leq \$300,000)
2. Project can be implemented in phases
3. Benefit-Cost Ratio

These factors may change over time and the phasing will need to be updated with subsequent updates and revisions of the Capital Improvements Plan.

6.2 Applicability of Criteria to Improvements

The criteria developed for application of the City's established goals for its stormwater program are presented below with the basis for measuring how each can be applied to the recommended improvements from this study.

Table 23. Priority Ranking Criteria.

Reduces flooding of public, business and residential structures	
Description	Ranking
Project eliminates structural flooding	10
Project reduces number of structures flooded	5
Project has no effect on structural flooding	0

Reduces flooding of collector and arterial streets	
Description	Ranking
Project increases capacity to pass 1% event	10
Project increases capacity to pass 4% event	8
Project increases capacity to pass 20% event	5
Project has no effect on street flooding	0

Reduces channel erosion	
Description	Ranking
Project reduces stream velocities	10
Project has no effect on velocities	5
Project increases velocities	0

Enhances the environmental characteristics of the floodplain	
Description	Ranking
Project enhances the environment (Increase in green space Decrease in impervious cover)	10
Project has no effect on environment	5
Project decreases the environment (Decrease in green space Increase in impervious cover)	0

Project implementation can be within annual operating budget (≤\$300,000)	
Description	Ranking
Project can be implemented within annual budget	10
Project can be implemented within annual budget with other government participation	8
Project requires bond issue & other government participation is available	5
Project requires bond issue & other government participation is not available	0

Project can be implemented in phases	
Description	Ranking
Project phases can be implemented within annual budget	10
Project can be phased	5
Project cannot be phased	0

Benefit-Cost Ratio	
Description	Ranking
Benefit-Cost Ratio > 2.0	10
Benefit-Cost Ratio ≥ 1.0	5
Benefit-Cost Ratio < 1.0	0

The ranking criteria shown above have been applied to the recommended projects, which then establish the priorities for each project. This ranking is shown on **Table 23** which follows.

Table 24. Recommended Project Ranking.

City of Sherman Post Oak Creek Flood Protection Plan Capital Improvement Plan RPS Espey Flood Protection Plan Project Priority Ranking September 25, 2013															
Project Number	Project Type	Project Name	Project Cost		Grant Eligible		Reduces flooding of public, business and residential structures	Reduces flooding of collector and arterial streets	Reduces channel erosion	Enhances the environmental characteristics of the floodplain	Project implementation can be within annual operating budget	Project can be implemented in phases	Benefit-Cost Ratio	TOTAL	Priority Ranking
1	R	S. Sam Rayburn Frwy and Contemporary Dr. SRL Property Acquisition	\$ 288,000	Y	\$ 216,000	10	0	5	10	10	10	5	50	1	
2	R	Ayers Drive SRL Property Acquisition	\$ 192,000	Y	\$ 144,000	10	0	5	10	8	10	5	48	2	
3	R	Westwood SRL Property Acquisition	\$ 97,000	Y	\$ 72,750	10	0	5	10	8	10	5	48	2	
4	R	Archer Dr. SRL Property Acquisition	\$ 4,238,000	Y	\$ 3,178,500	10	5	10	5	5	5	5	40	4	
5	D	Archer Detention Pond	\$ 857,000	Y	\$ 642,750	5	0	10	10	5	10	5	45	3	
6	R	Regency Dr. and W. Washington St. SRL Property Acquisition	\$ 1,151,000	Y	\$ 863,250	10	0	5	10	5	5	5	40	4	
7	R	Various SRL Property Acquisition	\$ 655,000	Y	\$ 491,250	10	0	5	10	5	5	5	40	4	
8	D	Proposed Dam 9A	\$ 6,394,000	Y	\$ 4,795,500	5	5	10	10	5	0	5	40	4	
9	R	N. Sam Rayburn Frwy. and N. Travis St. SRL Property Acquisition	\$ 490,000	Y	\$ 367,500	10	0	5	10	5	0	5	35	5	
10	R	Contemporary Dr.	\$ 1,243,000	N		10	0	5	10	5	5	0	35	5	
11	B	Lamberth Road at T2 East Fork of Post Oak Creek Culverts	\$ 241,000	N		0	10	5	5	10	0	0	30	6	
12	B	Gribble Street at Stream G Box Culvert	\$ 275,000	N		0	10	5	5	10	0	0	30	6	
13	D	Payton St. Detention Pond	\$ 1,057,000	N		5	8	10	5	0	0	0	28	7	
14	B	Taylor Street at T1 East Fork of Post Oak Creek Box Culvert	\$ 323,000	N		0	8	5	5	8	0	0	26	8	
15	D	Town Center Detention Pond Modification	\$ 419,000	N		5	0	10	5	0	5	0	25	9	
16	D	Stream E North of US 82 Detention Pond	\$ 1,486,000	N		0	10	10	5	0	0	0	25	9	
17	B	Center Street at Post Oak Creek Street Improvement	\$ 2,698,000	N		0	10	5	5	0	0	0	20	10	
18	C	Center St. to Lamar St. Channel	\$ 11,129,000	N		5	0	10	5	0	5	0	25	9	
19	C	Lamar St. Channel	\$ 1,437,000	N		5	0	10	5	0	5	0	25	9	
20	C	Pecan St. Channel	\$ 5,771,000	N		5	0	10	5	0	5	0	25	9	
21	B	Lamberth Road at East Fork of Post Oak Creek Box Culvert	\$ 793,000	N		0	10	5	5	0	0	0	20	10	
22	B	Houston Street at Post Oak Creek Bridge Improvements	\$ 3,030,000	N		0	10	5	5	0	0	0	20	10	
23	B	Lamar Street at Post Oak Creek Bridge Improvement	\$ 3,038,000	N		0	10	5	5	0	0	0	20	10	
24	B	King Street at Stream F Box Culvert	\$ 2,011,000	N		0	8	5	5	0	0	0	18	11	
25	D	Canterbury Dr. Detention Pond	\$ 528,000	N		0	0	10	5	0	0	0	15	12	
26	B	Washington Street at Post Oak Creek Roadway Improvements	\$ 1,538,000	N		0	5	5	5	0	0	0	15	12	
27	D	Taylor St. Detention	\$ 3,114,000	N		0	0	10	5	0	0	0	15	12	
Subtotals															
	B	Bridge & Culvert Improvements	\$ 13,947,000												
	C	Channel Improvements	\$ 18,337,000												
	D	Detention	\$ 13,855,000		\$ 5,438,250										
	R	Repetative Loss Property Acquisition	\$ 8,354,000		\$ 5,333,250										
		TOTAL	\$ 54,493,000		\$ 10,771,500										

6.3 Implementation

The Post Oak Creek Flood Protection Plan includes a list of structural and non-structural strategies intended to mitigate flood hazards within the Post Oak Creek watershed. Once these strategies are defined as projects requiring an investment of capital, the list is prioritized and a stormwater capital improvement program (CIP) that focuses on and balances community needs is developed. The CIP is a comprehensive schedule of capital improvements and a program to accomplish those needs within the City's ability to pay.

The City of Sherman maintains a five year CIP for major capital projects that is reviewed annually to avoid outdated emphasis and misdirection of effort. The flood protection strategies are presented within the context of a twenty-year planning period due to the magnitude of the project costs and the time associated with structuring the necessary funding. This twenty-year planning period is divided into 5-year funding cycles.

6.4 Funding Options

The significant costs involved with implementing the recommended flood protection strategies will require consideration of multiple funding alternatives. The following sections present various alternatives for funding the flood hazard mitigation projects developed in the Post Oak Creek Flood Protection Plan. The funding options discussed will not necessarily be applicable to every single project. There will be unique features to the individual projects which will result in more benefits to the City from one particular funding alternative versus other alternatives. These alternatives are presented to provide the City with a broad menu allowing them to select the most appropriate options for each particular project. Nine options are presented for municipal funding, four for state assistance and five for federal assistance:

Municipal Funding

- General Fund
- General Obligation Bonds
- Certificates of Obligation
- Special Taxing/Assessment Districts
- Subdivision Drainage
- Infrastructure Extractions
- Fee In-Lieu of On-Site Detention
- Storm Water Impact Fees
- Stormwater Utility Fund
- Revenue Bonds

State Assistance

- Clean Water State Revolving Fund
- Research and Planning Fund Grants
- State Participation and Storage Acquisition Program
- Texas Water Development Fund

Federal Assistance

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation Grant Program (PDM)
- Flood Mitigation Assistance (FMA)
- Repetitive Flood Claims (RFC)
- Severe Repetitive Loss (SRL)

6.4.1 Municipal Funding Sources

The City's existing funding sources include the annual operating budget (general fund), the ability to issue debt in the form of General Obligation Bonds or Certificates of Obligation, and the ability to create special assessment or taxing districts within the city to create a source of funding. Following a brief description of each of these sources are funding options that may be considered for future implementation that includes exactions, impact fees, and possible creation of a stormwater utility.

6.4.1.1 General Fund

In most cities, funding drainage management and flood protection is provided solely by the General Fund. The majority of the City's revenue is placed in a General Fund. General Fund revenue consists of property taxes, sales taxes, charges for services, grants and contributions, and intergovernmental transfers. The principal advantage associated with using the General Fund is that the accounting processes are well established. The major disadvantage is that income loses identity once it becomes part of the General Fund; that is, the General Fund can be used for all general government services and activities provided by the City. Because of the high costs of drainage and floodplain management, those needs are difficult to fully fund in a single budget cycle. When considering the equity of funding drainage and flood protection programs through the General Fund, it is important to recognize that *ad valorem* taxes are based on property value, which is not related to the property's stormwater runoff potential and associated impact on the city's drainage management infrastructure and waterways.

A pay-as-you-go is common for drainage and flood protection management operations and capital improvement funding. Within the General Fund, a fund is created that receives revenues from various sources such as *ad valorem* taxes. Often a percentage of the property tax rate is earmarked for a specific project. Then, the total project amount is removed from the fund to support project construction, and the growth stage starts over. Since no money is borrowed, this funding method is designated "pay-as-you-go," and since funds are periodically deposited ("sunk") into this account, it is referred to as a sinking fund. The major advantage of this funding method is that no long-term debt service is created. On the other hand, costly capital projects must be deferred until the fund is of sufficient size.

6.4.1.2 General Obligation Bonds

General Obligation Bonds are bonds secured by the city's *ad valorem* taxing power. These bonds are issued after approval at a bond election. G.O. Bonds are best suited for major capital projects where the city council believes that it is important to have the voters have the opportunity to pass upon the project. The city council calls a bond election, and sets forth the proposition or propositions to be voted on. An amount is specified for each proposition. Costs of issuance of the bonds are included as a part of the issue.

6.4.1.3 Certificates of Obligation

Certificates of obligation ("CO's") are a simplified method of capital project financing. CO's cover most capital financing needs of the city: (a) pay for construction of a public work; (b) pay for purchase of materials, supplies, equipment, machinery, buildings, lands, and rights-of-way for the issuer's authorized needs and purposes; and (c) pay for professional services such as engineers, architects, attorneys, and financial advisors. CO's may be payable from ad valorem taxes, revenues or a combination thereof. Although a CO may be backed solely by a revenue pledge, traditionally if there is a revenue pledge involved, it is a limited pledge of surplus revenues to permit the CO's to be sold for cash. Like G.O. Bonds, CO's should be issued for a length of time that corresponds to the useful life of the project being financed.

Unlike G.O. Bonds that always require an election, CO's do not require an election unless at least 5% of the registered voters in the city submit a valid petition protesting the issuance. This allows the city to avoid the time and expense of an election unless the public determines that an election should be held before the CO's are issued.

6.4.1.4 Special Taxing/Assessment Districts

Special assessment districts (Chapter 372, Texas Local Government Code) can be authorized by Council resolution and assessments are based on benefits received instead of property value. The requirement that assessments be based on benefits received severely limits revenue potential because only flood-prone or creek side properties can be assessed for flood control and drainage improvements. Additionally, water quality management benefits would be difficult to assign to properties. The upland properties, which are typically responsible for generating most of the flood-causing runoff and stormwater pollutants, cannot be assessed. The perception of such inequities can be a reason for not forming special assessment districts for drainage and flood protection program funding.

The Choctaw Watershed Improvement District (CWID) was created by the Legislature in 1959 and empowered to levy and collect an ad valorem tax for the management of the Choctaw Creek Watershed. The CWID boundaries exclude the incorporated areas of the county. The U.S. Congress passed flood control acts in 1936, 1944, and 1954 and assigned responsibility of the Watershed Protection and Flood Prevention Program to the USDA Soil Conservation Service, now the Natural Resources Conservation Service (NRCS). The NRCS has assisted watershed sponsors, such as the CWID, in the construction of floodwater retarding structures.

The annual operation and maintenance of dams is the primary responsibility the project sponsor. Operation and maintenance of watershed dams can be expensive and labor intensive, but is necessary to ensure the dams function as designed and remain safe. Maintenance work includes clearing trees from dams and spillways, repairing soil erosion damage, repairing damages after heavy storm events, and keeping the principal spillway inlet clear of debris. The CWID current tax levy of \$0.006405 produces annual revenues of approximately \$50,000 for maintenance of existing NRCS dams in the district. CWID participation in sponsoring a new NRCS dam on Post Oak Creek would likely require an increase in that tax rate.

6.4.1.4.1 Public Improvement District Bonds

The creation of Public Improvement Districts (PIDs) allow communities to designate areas in need of public infrastructure improvements and levy an assessment on only those benefiting from the public improvements instead of the tax base of the entire community. Chapter 372 of the Local Government Code allows Texas cities to undertake improvement projects that afford special benefits to a definable area within the City or its ETJ. Money needed for public improvements is generated by assessments on property within the Public Improvement District (PID) apportioned on the basis of:

1. Equally per front foot or square foot;
2. According to the value of the property as determined by the governing body, with or without regard to improvements on the property; or
3. In any other manner that results in imposing equal shares of the cost on property similarly benefited.

PIDs can be financed on a “pay as you go” basis or through the issuance of General Obligation or Revenue Bonds.

6.4.1.4.2 Tax Increment Bonds

Tax increment bonds (also known as “tax allocation bonds”) payable from the incremental increase in tax revenues, realized from any increase in property value resulting from capital improvements, benefiting the properties that are financed with bond proceeds. Tax increment bonds often are used to finance the redevelopment of blighted areas.

The advantage of special districts is that the funds for facilities construction or operation/maintenance are used in the area where the money is collected. These districts can also be coupled with economic development initiatives to promote targeted investment or re-investment. The primary disadvantages in utilizing Special Taxing/Assessment districts relate to the fact that the taxes or assessments are not based upon drainage characteristics of the property. A parking lot would be subject to the same tax or assessment as a landscaped area. The taxes or assessments in each case must be based on the value of the property or, in some instances, the property area or street frontage. Another disadvantage can be the potential for lowered property values or resale values since the property is subject to this additional tax or assessment.

6.4.1.5 Subdivision Drainage Infrastructure Exactions

As a condition for approval of new development, cities typically require the construction of and dedication of drainage management facilities to the local government. In addition, development can be required to donate drainage easements or other types of partial rights to the local government for drainage management purposes. The city typically assumes responsibility for operation and maintenance once facilities are constructed and maintenance responsibility is accepted. The developer is then responsible for funding a portion of the capital program, while the city is responsible for funding long-term operation and maintenance of the facilities. This type of program transfers some of the capital burdens from the city, but since requirements apply only to new development, they do not address existing flooding problems or operation and maintenance needs.

6.4.1.6 Fee In-Lieu of On-Site Detention

Some cities have implemented ordinances that require proposed developments to mitigate the effects of increased stormwater runoff leaving their sites typically emphasize on-site stormwater detention ponds. However, studies have shown that a system of numerous small ponds, designed for individual sites, may provide only minimal flood protection when evaluated on a watershed wide basis. Although they reduce peak flood flows immediately downstream, on-site

ponds can change the overall timing of flood flow movement through the watershed to the extent of possibly increasing peak flood flows at points further downstream. Regular and effective maintenance of on-site ponds may also be an economic issue for property owners. Recognizing the limited effectiveness of on-site detention ponds in many situations, but also recognizing that all new developments contribute to the increased amounts of stormwater runoff in the watershed, some cities have modified the requirement for on-site detention using a watershed-wide approach to analyze potential flooding problems, identify appropriate mitigation measures, and select site locations and design criteria for regional drainage improvements. These improvements may include detention and retention ponds, waterway enlargement and channelization, and improved conveyance structures in watersheds that are undeveloped or developing, and have the potential for flooding problems as undeveloped land is converted to impervious cover. In certain instances, developers may have the option of constructing on-site controls or paying a fee comparable to the cost of construction of on-site controls if the proposed development will produce no identifiable adverse impact to other nearby properties due to increased runoff. The fees are deposited and interest is accrued in a dedicated fund and they are allocated for regional stormwater management improvements. The key to sound fiscal management is to ensure that the method of calculating the fee keeps pace with increasing construction costs and property values.

6.4.1.7 Storm Water Impact Fees

An alternative to requiring land development activities to construct drainage management facilities is to require payment of an initial, front-end impact fee for capital improvements needed to safely detain or convey stormwater runoff from new development. Fees are established in proportion to development's runoff demand on regional management facilities in the watershed. Generally, drainage impact fees are assessed on a per acre and development intensity basis. Cumulative impact fees generate the funding needed for capital improvements on a watershed-wide basis. In many situations, it is advantageous to construct larger regional drainage management facilities from both cost and mitigation effectiveness perspectives. Fees are based on a development's share of regional drainage management improvements costs.

The major advantage of impact fee financing is that regional stormwater management systems are promoted, rather than the small-scale individual systems. Large drainage management facilities have the potential of being more effective in controlling flood hazards on a watershed basis, are easier to maintain and are more capable of addressing large-scale flood hazard reduction and water quality management needs. The disadvantage is that the participating development may be required to construct temporary on-site facilities to mitigate flood hazard

impacts until sufficient funding has accumulated for construction of the regional facility serving the watershed. In order to ensure that flood protection facilities are in place before the need is fully manifest, the City may front-fund the construction of regional facilities in anticipation of collection of future development-related impact fees to recover capital expenditures. However, this approach can result in significant fiscal burden on the municipality during periods of economic downturn in new land development activity. In older developed portions of the community that generally have significant existing flooding and water quality problems, there would be fewer new developments to contribute to the construction of larger regional facilities. Also, impact fees can be used only for capital construction and cannot be used to support drainage management program administration and operation.

Impact fees are available to cities through Chapter 395 of the Texas Local Government Code. Imposition and administration of the impact fees, however, must comply with extensive administrative and procedural provisions. These regulations require public hearings on land use assumptions and the proposed capital improvement plans, and they additionally specify funds management procedures. Under Section 395.013, the funds cannot be used to upgrade existing facilities in previously developed areas. Nevertheless, the impact fee method of funding can operate in conjunction with the general fund or a drainage utility in newer portions of communities to support the implementation of regional drainage management strategies.

6.4.1.8 Stormwater Utility Fund

Since 1987, cities have had the authority to create stormwater (drainage) utilities based on the provisions of the Texas Municipal Drainage Utilities Systems Act (Chapter 552, Subchapter C of the Texas Local Government Code). Presently, there are over sixty municipal drainage utilities operating in Texas. A stormwater utility fee can be assessed for all developed property based on the amount of impervious cover. A Stormwater Utility Fund would be a cost-of-service; user-fee based Enterprise Fund, similar to the city's water and wastewater utility. As an Enterprise Fund, the Stormwater Utility would be self-supporting through charges for services with no support from the City's General Fund or other Enterprise Funds. Revenue can be used to fund operations and maintenance and/or debt for capital improvements.

For a stormwater utility, a user fee is assigned to each property parcel within the City based on an equitable share of the cost of the drainage management program in proportion to the parcel's relative contribution to stormwater runoff that must be managed and conveyed by the City's drainage system. Installation of impervious surfaces such as rooftops and paved areas increases both the rate and amount of stormwater runoff and increases runoff pollutant

loadings. The relative amount of runoff from a parcel is proportional to the actual amount of impervious area on the parcel. This analog allows the utility to equitably and fairly distribute the drainage management program costs based on the amount of impervious area on each property parcel.

Stormwater utility revenues can be used to support all aspects of a comprehensive drainage and flood protection management program (administration, operation/maintenance, infrastructure repair/replacement, capital improvements for flood hazard reduction, stream restoration/erosion mitigation, water quality management and TPDES/NPDES MS4 permit compliance). The utility revenue stream can also be used to support revenue bond debt service for capital improvements, thereby leveraging the utility's annual revenue. Additionally, there are no limitations on combining drainage utility revenue with other sources such as the General Fund for drainage management purposes.

Generally, the advantages of a stormwater utility over the other funding alternatives are:

- Creates a stable, dedicated funding source independent from the General Fund for support of all drainage management activities, including revenue bond debt service for large capital improvements; and
- The utility billing fee is based upon runoff contribution rather than property valuation, thus providing a fair and equitable cost-of-service, user-fee based revenue source.
- The opportunity for revenue bond financing for drainage management capital projects reduces competition with other general obligation bond financed capital project needs.

6.4.1.8.1 Stormwater Utility Implementation Requirements

There are four major requirements for developing an equitable cost-of-service utility fee structure in compliance with the Texas Municipal Drainage Utility Systems Act.

- Fees apply to developed property only.
- Utility fees must be directly related to existing property stormwater runoff characteristics; property value may not be taken into consideration.
- The cost-of-service analysis must be based on an inventory of all developed land parcels within the utility service area.
- Utility revenue can be used to support only drainage management related services and capital construction.

Utility implementation requires completion of the following major tasks:

- Establishment of utility revenue needs;
- Development of an equitable cost-of-service rate structure;
- Involvement of the public to gain support for the utility rate structure;
- Adoption of utility and fee ordinances; and

- Billing system implementation or modification to collect utility revenue.

The following flow chart illustrates the utility development and implementation process.

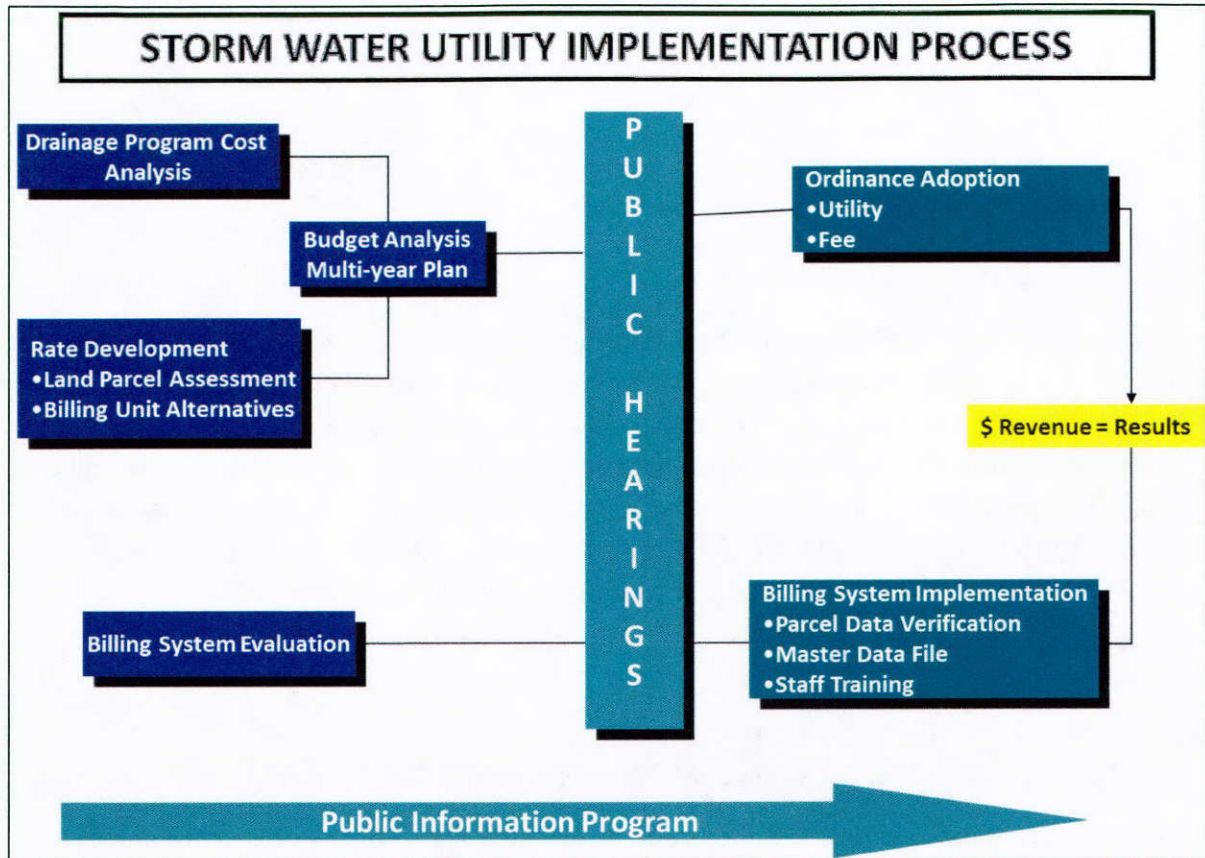


Figure 34. Stormwater Utility Implementation Process.

6.4.1.8.2 Cost of Service Analysis

A utility cost-of-service analysis consists of two major components: 1) establishing the revenue needs for the utility and assignment of these costs to the different utility customer classes; and 2) establishing a methodology based on hydrologic (stormwater runoff) principles for assigning utility costs to property parcels in proportion to demand placed on the drainage system. The utility fee structure should have a sound foundation in stormwater hydrology from both runoff quantity and quality perspectives.

6.4.1.8.3 Establishing Utility Revenue Needs

Utility revenue needs are determined through an evaluation of the current stormwater management program expenditures and projected future program expansion needs for:

- Administration
- Infrastructure operations and maintenance
- Infrastructure rehabilitation/repair
- Capital improvements planning, design and construction
 - Flood hazard reduction and local drainage (storm drain systems)
 - Stream restoration/erosion mitigation
 - Water quality management
- Monitoring and enforcement

This analysis should also include a determination of any differences in utility revenue needs associated with providing stormwater management services to different utility customer classes. Utility customer classes generally fall into two major categories: residential and commercial/industrial land uses. Most existing drainage utilities make no distinction in assigning cost to customer classes, i.e. fees are constant per unit of stormwater runoff demand on the drainage system. However, the utility may provide special maintenance, inspection and enforcement activities for each customer class, which affect the distribution of utility cost. In summary, the fiscal assessment portion of the cost-of-service analysis should identify utility revenue needs and the assignment of utility cost to utility customer classes.

6.4.1.8.4 Hydrologic Considerations for Utility Cost Allocations

The Texas Municipal Drainage Utility Systems Act is specific in requiring that utility fees be related to property stormwater runoff characteristics and that only developed properties that include improvements can be incorporated in the utility customer base. To ensure equity, utility fees should be related to the increase in stormwater runoff associated with the transformation of land from the pre-developed natural condition to the developed state through the construction of buildings, driveways, parking areas, and other impervious surfaces that increase both the rate and volume of stormwater runoff and associated pollutants.

A direct correlation exists between land parcel impervious area and both the flow rate and volume of stormwater runoff produced by the parcel and that the influence of impervious area on runoff volume and peak flow rate increases as land development intensity increases. This implies that within a utility rate structure the fees assigned to property parcels should reflect these hydrologic principles. In other words, utility customer classes representative of more intensely developed properties such as multi-family, commercial and industrial (which typically

are developed at 50% to 90% land parcel impervious area), should be assigned fees on a unit land area basis which are greater than that for single family residential land use (which typically averages 25% to 30% land parcel impervious area).

6.4.1.8.5 Utility Billing Unit Basis

Stormwater utility rate structures are generally based on a billing unit that is representative of the single-family land use category or a combination of all residential land uses (single family, multi-family, condominium and mobile home) because statistical analysis of the dwelling unit to dwelling unit variation of associated impervious area indicates uniform customer class characteristics, which justify adoption of uniform fees or a tiered fee structure within uniform subclasses. For non-residential land uses, the wide variation in parcel size and corresponding impervious area do not generally allow these types of generalizations to be supported on a sound statistical basis. This necessitates a parcel specific fee determination methodology for non-residential properties. This is typically accomplished by applying multiples of the residential billing base standard in proportion to either land parcel area times a "runoff factor" equivalency or by a direct ratio of actual impervious area.

Data sources for development of the utility rate structure and assignment of fees to each developed property parcel include:

- Appraisal District Data: Appraisal district data may include land parcel area, building footprint area, parking lot area and land-use designation. However, appraisal district data can be limited or incomplete. Data is particularly sparse for properties owned by tax-free entities such as school districts and religious organizations
- Land Parcel Boundary Map: Useful for establishing land parcel size and for overlay on orthophotography for assessment of parcel specific impervious cover.
- Record Plans: Supplemental data source for non-residential development
- Orthophotography and Planimetric Maps: Useful in conjunction with parcel boundary map to assess parcel specific impervious cover.

Based on an RPS Espey survey of Texas municipal stormwater utilities, the average impervious area associated with the typical single-family property parcel (rooftop, patio, driveway, etc.) is approximately 2,900 square feet.

6.4.1.8.6 Utility and Fee Ordinances

The utility ordinance is a declaration that the city's stormwater system is a public utility and will be operated as such. The fee ordinance contains details on utility revenue management procedures, the utility billing rate structure, billing procedures, and customer appeals

procedures. Both ordinances must be adopted through public notification and hearing processes. These ordinances should address the following major utility issues:

- Utility declaration and service area delineation
- Customer class definitions
- Fee basis and calculation
- Fee adjustments and credits
- Customer appeals procedures
- Recovery of non-payment of fees
- Exemptions
- Revenue management procedures and enterprise fund establishment

The Local Government Code specifies both mandatory and discretionary exemptions:

Mandatory

- Property with a privately owned drainage system that does not discharge to any part of the city drainage system
- Undeveloped land
- State Property
- Any public or private institution of higher education

Discretionary

- County property
- School district property
- City property
- Religious organization property

6.4.1.8.7 Billing System Implementation

A utility customer database must be developed consistent with the adopted rate structure. The database must be developed in a format compatible with the existing utility billing system. Data considered for each account may include utility account number, customer name and billing address, site address, number of billing units, account status, fee amount, parcel tax identification number, number of dwelling units, parcel size, impervious area, and land use code. All data should be verified prior to initial billing mail out to ensure accuracy and minimize customer appeals.

6.4.1.8.8 Utility Revenue Estimation

The following equation is provided to allow estimation of drainage utility revenue projections based on population. This correlation is based on a sampling of the operating drainage utilities in Texas with fee structures based on parcel impervious cover. Actual revenue may vary as much as 20% from municipality to municipality depending on land use distribution within the

residential categories, and between residential and commercial/industrial land use. Additionally, exemptions will reduce the utility revenue potential.

$$\text{Annual Revenue Potential (\$)} = 7 \times \text{Population} \times \text{\$1/Monthly Single-Family Residential Billing Unit}$$

For example, a city with population 50,000 charging \$3.50/month per single-family residential unit with proportional impervious area based fees for commercial and industrial properties would generate annual revenue of approximately \$1,225,000.

6.4.1.9 Revenue Bonds (Stormwater Utility Revenues)

Revenue bonds, unlike general obligation bonds, do not involve an ad valorem tax pledge. Revenue bonds are supported by a specified stream of future utility revenue from payments by customers. These bonds are not subject to a demand for payment from taxes. No election is required under state law to issue revenue bonds. The City must set rates that will cover debt service for the bonds being issued and any outstanding bonds, as well as the costs of maintenance and operation of the system producing the revenues. There usually will be a requirement that the city will maintain a debt service coverage ratio, usually 1.10 to 1.25 times the required debt service. Most revenue bonds involve a pledge of net revenues, which are revenues that are available after the operational expenses of operating the revenue have been deducted. The City will also establish a reserve fund. The City may be required to enter into a trust indenture with a bank so that the revenues are placed in a trust account to pay debt service.

Competition for both the Federal and State grant funds is very strong. However, Federal and State grants offer a significant opportunity to leverage local funding sources such as drainage utility and general fund revenues for flood hazard reduction.

6.4.2 State Assistance

The Texas Water Development Board (TWDB) offers both planning and construction grants for flood hazard reduction. Planning grants are limited to \$50,000 and project grants are limited to \$3,300,000 over a five-year period.

- Clean Water State Revolving Fund – Provides low interest loan assistance for the planning, design, and construction of stormwater pollution control projects.
- Research and Planning Fund Grants – The purpose is to provide financial assistance for research and feasibility studies into practical solutions to water-related problems.

- State Participation and Storage Acquisition Program – The purpose is to help finance regional water projects including water storage facilities and flood retention basins; and to allow for “right sizing” of projects in consideration of future growth.
- Texas Water Development Fund – The purpose is to provide loans for the planning, design, and construction of water supply, wastewater, and flood control projects.

6.4.2.1 Division of Emergency Management (DEM)

The Division of Emergency Management (DEM) oversees several FEMA-funded grant programs for flood hazard reduction including the Hazard Mitigation Grant Program (HMGP). The HMGP assists in implementing long-term hazard mitigation measures following Presidential disaster declarations. HMGP grant funds are made available to the DEM after a Presidential Disaster Declaration in response to a large flood event or other natural disaster; DEM serves as the grantee. Once HMGP funds are available, DEM considers grant awards for project implementation on a statewide basis to address all natural hazards. Grant awards are not limited to the geographic area associated with a Presidential Disaster Declaration. There is no upper limit on project cost. Several hundred million dollars have been made available to the State of Texas through this program including \$360,000,000 associated with Hurricanes Dolly and Ike in 2008. This Federal funding availability is dependent on the occurrence of large-scale natural disasters in Texas. Municipalities must be prepared to respond on a short timeline to take advantage of HMGP grant opportunities.

Project applications are submitted by local jurisdictions and prioritized by the DEM. The State forwards applications consistent with State mitigation planning objectives to FEMA for eligibility review. Funding for this grant program is limited, and states and local communities must make difficult decisions as to the most effective use of grant funds. To be eligible, a project must:

- Conform to the State's Hazard Mitigation Plan.
- Provide a beneficial impact on the area of the declared disaster.
- Meet the FEMA environmental program requirements.
- Solve a problem independently.
- Be cost-effective.

FEMA can fund up to 75% of the eligible costs of each project. The local match can be a combination of cash and in-kind sources. Funding from other Federal sources cannot be used for the 25% share except for Community Development Block Grant program funding.

HMGP grant applications for project implementation must be supported by a State and FEMA approved Mitigation Action Plan. Municipalities are encouraged to have this documentation on

hand including identification of flood hazard areas and potential solutions in order to expedite response to the grant application window of opportunity.

HMGP funds may be used to fund projects that will reduce or eliminate the losses from future disasters. Projects must provide a long-term solution to a problem, for example, elevation of a home to reduce the risk of flood damages and a project's potential savings must be more than the cost of implementing the project. Funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage. Examples of projects include:

- Acquisition of real property from willing sellers and demolition or relocation of buildings to convert the property to open space use;
- Retrofitting structures and facilities to minimize damages from flood hazards;
- Elevation of flood prone structures;
- Development and initial implementation of vegetative management programs;
- Minor flood control projects that do not duplicate the flood prevention activities of other Federal agencies; and
- Localized flood control projects, such as certain ring levees and floodwall systems that are designed specifically to protect critical facilities.

6.4.3 Federal Assistance

Federal funding is made available through the FEMA Flood Mitigation Assistance (FMA) program for both project planning and project implementation. FMA grants require a minimum local cost share match of 25 percent. Federal funding is typically appropriated each fiscal year. Recent appropriations have been \$2,300,000 annually, and multiple recipients have been selected.

6.4.3.1 Federal Emergency Management Agency (FEMA)

- Flood Hazard Mapping Program – Department of Homeland Security (DHS) funds are administered through FEMA to identify, publish, and update information on all flood-prone areas of the U.S. in order to inform the public on flooding risks, support sound floodplain management, and set flood insurance premium rates.
- Flood Mitigation Assistance Grants (FMA) – The purpose is to assist states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insured through the National Flood Insurance Program (NFIP). The Flood Mitigation Assistance (FMA) Program is administered by the Texas Water Development Board (TWDB), under an Agreement with the Federal Emergency Management Agency (FEMA). This program provides federal funding to assist communities in implementing measures to reduce or

eliminate the long-term risk of flood damage to buildings and other structures insurable under the National Flood Insurance Program (NFIP). Project grants are available to implement measures to reduce flood losses. Projects that reduce the risk of flood damage to structures insurable under the NFIP are eligible. Such activities include:

- Acquisition of insured structures and real property;
- Relocation or demolition of insured structures;
- Dry flood proofing of insured structures;
- Elevation of insured structures; and
- Minor, localized structural projects that are not fundable by State or other Federal programs.

Eligibility for FMA funding is determined by the extent to which the project is:

- Cost effective;
- Cost beneficial to the National Flood Insurance Fund;
- Technically feasible; and
- Physically located in a participating NFIP community or must reduce future flood damages in a NFIP community.

A project must also conform to:

- The minimum standards of the NFIP Floodplain Management Regulations;
- The applicant's Flood Mitigation Plan; and
- All applicable laws and regulations, such as Federal and State environmental standards or local building codes.

FEMA may contribute up to 75 percent of the total eligible costs. At least 25 percent of the total eligible costs must be provided by a nonfederal source. Of this 25 percent, no more than half (12.5%) can be provided as in-kind contributions from third parties. Funding limits for Project Grants are no more than \$20,000,000 state-wide during any five year period and no more than \$3,300,000 to any one community during any five year period.

- Pre-Disaster Mitigation Grant Program (PDM) – The purpose is to provide funding hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. PDM grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds.

There are approximately 37 properties in Sherman that have experienced one or more claims to the National Flood Insurance Program (NFIP) and are listed as repetitive loss properties. Of these, six (6) are classified as severe repetitive loss properties.

Repetitive loss properties are any insurable building for which two or more claims of more than \$1,000 were paid by the NFIP within any rolling 10-year period, since 1978. Two of the claims paid must be more than 10 days apart but within 10 years of each other. A repetitive loss property may or may not be currently insured by the NFIP. Severe repetitive loss properties are 1-4 family residences that have had four or more claims of more than \$5,000 or at least two claims that cumulatively exceed the building's value. There are two grant programs specifically intended to help mitigate flood damage for these properties.

- The Repetitive Flood Claims (RFC) grant program provides up to \$10 million to assist States and communities in reducing flood damages to insured properties that have had one or more claims to the National Flood Insurance Program (NFIP). FEMA may contribute up to 100 percent of the total amount approved under the RFC grant award to implement approved activities, if the applicant has demonstrated that the proposed activities cannot be funded under the Flood Mitigation Assistance (FMA) program.
- The Severe Repetitive Loss (SRL) grant program provides funding to reduce or eliminate the long-term risk of flood damage to severe repetitive loss (SRL) structures insured under the National Flood Insurance Program (NFIP). An SRL property is defined as a residential property that is covered under an NFIP flood insurance policy and:
 - a) has at least four NFIP claim payments (including building and contents) over \$5,000 each, and the cumulative amount of such claims payments exceeds \$20,000; or
 - b) has at least two separate claims payments (building payments only) made with the cumulative amount of the building portion of such claims exceeding the market value of the building.

For both (a) and (b) above, at least two of the referenced claims must have occurred within any ten-year period, and must be greater than 10 days apart. Federal cost share may be 75% or 90%.

A summary of the programs offered through FEMA is presented in **Table 24**.

Table 25. Eligible Activities by FEMA Program.

Eligible Activities	HMGP	PDM	FMA	RFC	SRL
Property Acquisition and Structure Demolition	✓	✓	✓	✓	✓
Property Acquisition and Structure Relocation	✓	✓	✓	✓	✓
Structure Elevation	✓	✓	✓	✓	✓
Mitigation Reconstruction					✓
Dry Floodproofing of Non-residential Structures	✓	✓	✓	✓	
Minor Localized Flood Reduction Projects	✓	✓	✓	✓	✓
Structural Retrofitting of Existing Buildings	✓	✓			
Non-structural Retrofitting of Existing Buildings and Facilities	✓	✓			
Infrastructure Retrofit	✓	✓			
Soil Stabilization	✓	✓			
Post-Disaster Code Enforcement	✓				

Table 26. FEMA Cost Sharing.

FEMA Program	Federal Cost Share (%)
HMGP	75
PDM	75
FMA	75
FMA (severe repetitive loss property with Repetitive Loss Strategy)	90
RFC	100
SRL	75
SRL (with Repetitive Loss Strategy)	90

6.4.3.2 U.S. Department of Housing and Urban Development (HUD)

- Disaster Relief/Urgent Needs Fund of Texas – To rebuild viable communities impacted by a natural disaster or urgent, unanticipated needs posing serious threats to health and safety by providing decent housing, suitable living environments and economic opportunities.
- Texas Community Development Program – The purpose is to build viable communities that meet “basic human needs” such as safe and sanitary sewer systems, clean drinking

water, disaster relief and urgent needs, housing, drainage and flood control, passable streets, and economic development.

6.4.3.3 Natural Resources Conservation Service (NRCS)

- Watershed Protection and Flood Prevention Program – To protect, develop, and utilize the land and water resources in small watersheds of 250,000 acres or less. The program is federally assisted and locally led.
- Watershed Surveys and Planning – Provides planning assistance to Federal, State, and local agencies for the development of coordinated water and related land resources programs in watersheds and river basins. Emphasis on flood damage reduction, erosion control, water conservation, preservation of wetlands, and water quality improvements.
- Wetlands Reserve Program – To protect and restore wetlands by enabling landowners to sell easements which take wetlands out of production.
- Emergency Watershed Protection Program – The purpose is to provide relief from imminent hazards and reduce the threat to life and property by severe natural events. Hazards include floods and the results of erosion created by floods, fire, windstorms, earthquakes, drought, or other natural disasters.

6.4.3.4 U.S. Army Corps of Engineers (USACE)

- Emergency Advance Measures for Flood Prevention – The purpose is to protect against the loss of life or damages to property given an immediate threat of unusual flooding.
- Emergency Rehabilitation of Flood Control Works – The purpose of this program is to assist in the repair or restoration of flood control works damaged by flood.
- Emergency Streambank and Shoreline Protection – The purpose is to prevent erosion damages to public facilities by the emergency construction or repair of streambank and shoreline protection works.
- Floodplain Management Services – The purpose is to promote appropriate recognition of flood hazards in land and water use planning and development through the provision of flood and floodplain related data, technical services, and guidance.
- Nonstructural Alternatives to Structural Rehabilitation of Damaged Flood Control Works – This program provides a nonstructural alternative to the structural rehabilitation of flood control works damaged in floods or coastal storms.

- Planning Assistance to States – The purpose is to assist states, local governments and other non-Federal entities in the preparation of comprehensive plans for the development, utilization, and conservation of water and related land resources.
- Small Flood Control Projects – The purpose is to reduce flood damages through small flood control projects not specifically authorized by Congress.

6.5 Regulatory Compliance

Prior to commencement of construction, it will be necessary to submit the project and appropriate permit applications to regulatory agencies. A detailed review and acquisition of the necessary permits for the construction of these projects exceeds the scope of this contract; however, a partial list and brief discussion of permits is included in the following subsections. This following list of agencies and corresponding permit activities is intended to be general in nature and is not intended to represent a definitive list of required permit acquisitions and agency coordination.

6.5.1 Federal Emergency Management Agency (FEMA)

The National Flood Insurance Act of 1968 was enacted by Title XIII of the Housing and Urban Development Act of 1968 (Public Law 90-448, August 1, 1968) to provide previously unavailable flood insurance protection to property owners in flood prone areas. FEMA administers the National Flood Insurance Program (NFIP); however, if a local community elects to participate in the NFIP, the local government is primarily responsible for enforcement. Participating communities are typically covered by a Flood Insurance Study which defines water surface profiles and floodplain boundaries through their communities.

The recommended drainage improvement projects are intended to reduce floodplain limits. If changes to the current effective FEMA floodplain map are desired as a result of improvements, a request for a Letter of Map Revision (LOMR) from FEMA will be required.

6.5.2 U. S. Army Corps of Engineers (USACE)

Pursuant to Section 404 of the Clean Water Act and the Rules and Regulations promulgated there under by the United States Environmental Protection Agency (USEPA) and the United States Army Corps of Engineers (USACE), the filling or excavation of waters of the United States, including wetlands, with dredged or fill material, requires the issuance of a permit from

the USACE (33 CFR Parts 320-330). For purposes of administering the Section 404 permit program, the USACE defines wetlands as follows:

Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas. (33 CFR 328.3)

The Corps of Engineers Wetlands Delineation Manual (Technical Report Y-87-1) issued by the USACE in 1987 states that wetlands must possess three essential characteristics. These characteristics include, under normal circumstances: 1) the presence of hydrophytic vegetation, 2) hydric soils, and 3) wetland hydrology. If all three of these criteria are present on a particular property in areas larger than one-third acre in size, then a permit (general permit or nationwide permit) must be issued by the USACE in order to fill all or a portion of those areas. Section 404 (b)(1) guidelines (40 CFR Part 230), established by the USEPA, constitute the substantive environmental criteria used in the evaluating activities regulated under Section 404 of the Clean Water Act. The purpose of these guidelines is to restore and maintain the chemical physical and biological integrity of waters of the United States through the control of discharge of dredged or fill material.

All property owners within the United States and its territories must adhere to the provisions of the Clean Water Act. If any contemplated activity might impact waters of the United States, including adjacent or isolated wetlands a permit application must be made. If jurisdictional waters and/or wetlands are found to exist, then any activity which would involve filling, excavating, or dredging these wetlands would require the issuance of a permit. The final authority to determine whether or not jurisdictional waters exist lies with USACE.

There is a strong likelihood that Waters of the U.S. jurisdictional areas exist along the main stem and secondary channels of Post Oak Creek and its tributaries. It is recommended that the City engage the USACE early in its design process for any structural improvements on channels.

6.5.3 U.S. Fish and Wildlife Service (USFWS)

The U.S. Fish and Wildlife Service (USFWS), in the Department of the Interior, and the National Marine Fisheries Service (NMFS), in the Department of Commerce, share responsibility for administration of the Endangered Species Act (ESA). Generally, the USFWS is responsible for

terrestrial and freshwater species and migratory birds, while the NMFS deals with those species occurring in marine environments and anadromous fish.

Section 9 of the ESA prohibits take of federally listed endangered or threatened species without appropriate authorization. Take is defined in the ESA, in part as “killing, harming, or harassment” of a federally listed species, while incidental take is take that is “incidental to, and not the purpose of, otherwise lawful activities.”

Section 10 of the ESA provides a means for non-Federal projects resulting in take of listed species to be permitted subject to carefully prescribed conditions. Application for an incidental take permit is subject to a number of requirements, including preparation of a Habitat Conservation Plan by the applicant. In processing an incidental take permit application, the USFWS must comply with appropriate environmental laws, including the National Environmental Policy Act. Review of the application under Section 7 of the ESA is also required to ensure that permit issuance is not likely to jeopardize listed species. Section 10 issuance criteria require the USFWS to issue an incidental take permit if, after opportunity for public comment, it finds that:

1. the taking will be incidental;
2. the applicant will, to the maximum extent practicable, minimize and mitigate the impacts of the taking;
3. the applicant will ensure that adequate funding and means to deal with unforeseen circumstances will be provided;
4. the taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild; and
5. the applicant will ensure that other measures that the USFWS may require as being necessary or appropriate will be provided.

The U.S. Fish and Wildlife Service should be contacted to determine the potential occurrence of and consequent impacts to any federal threatened and endangered species. In addition, the Corps of Engineers will require USFWS review of the project to ensure the project is in compliance with the Endangered Species Act prior to the issuance of a Section 404 permit.

6.5.4 Texas Commission on Environmental Quality (TCEQ)

The Texas Commission on Environmental Quality (TCEQ) has regulatory authority over: dam safety, water rights, Texas Pollutant Discharge Elimination System and Section 404(b)(1) guidelines for specification of disposal sites for dredged or fill material. The following sections briefly describe these regulations.

- Texas Pollutant Discharge Elimination System (TPDES)

On September 14, 1998, the USEPA authorized Texas to implement its Texas Pollutant Discharge Elimination System (TPDES) program. TPDES is the state program to carry out the National Pollutant Discharge Elimination System (NPDES), a federal regulatory program to control discharges of pollutants to surface waters of the United States. The TCEQ administers the program, and a permit is required for any construction activity that disturbs one acre or more.

- Section 401 Water Quality Certification

Any activity requiring authorization under Section 404 of the Clean Water Act will also require a Section 401 water quality certification from the TCEQ. In Texas, these regulations are administered by the TCEQ.

- Texas Water Code Section 11.121 Water Right Permit

Use of surface water, including the diversion or storage of water, in the State of Texas requires a water right permit through the State of Texas, pursuant to Texas Water Code Section 11.121. TCEQ requires the submission of the Water Rights Permit Package Application, TCEQ-10214 form. This application must be notarized and submitted with the water use permit application fees. Supplemental information may be required with the application.

6.5.5 Texas Historical Commission

The Division of Antiquities Protection of the Texas Historical Commission coordinates the program by identifying and protecting important archeological and historic sites that may be threatened by public construction projects. This department coordinates the nomination of numerous sites as State Archeological Landmarks or for listing in the National Register of Historic Places. Designation is often sought by interested parties as the most effective way to protect archeological sites threatened by new development or vandalism. Applicable rules are found in the Texas Administrative Code, Title 13-Cultural Resources, Part II-Texas Historical Commission, Chapters 24-28.

The Corps of Engineers will require that the State Historical Preservation Officer (SHPO) review the project to ensure the project is in compliance with the National Historic Act prior to issuance of a Section 404 permit.

6.6 Environmental Constraints

Environmental permitting associated with the channel improvement projects has the potential of affecting project costs and schedules. These permitting issues include endangered species and permitting for impacts to wetlands under Section 404 of the Clean Water Act. Projects by local governments must ensure that historic and prehistoric resources area identified in the area and work proceeds in compliance with the Archeological and Historic Preservation Act of 1974; the National Historic Preservation Act of 1966; and the Texas Antiquities Code.

6.6.1 Rare, Threatened, and Endangered Species

Plant and animal habitats must be considered while developing the design for channel improvements. The Texas Parks and Wildlife (TPWD) list of Rare, Threatened, and Endangered Species for Grayson County includes: vertebrates, invertebrates, and vascular plants identified as being of conservation concern by TPWD within Texas. This special species list **Table 26** is comprised of species, subspecies, and varieties that are federally listed; proposed to be federally listed; have federal candidate status; are state listed; or carry a global conservation status indicating a species is critically imperiled, very rare, vulnerable to extirpation, or uncommon. The project area that would be affected by channel improvement construction would be surveyed during the design phase to locate and identify the habitat of the listed species and to define mitigative measures.

Table 27. Rare, Threatened, and Endangered Species of Grayson County.

Taxon	Common Name	Scientific Name	Federal Status	State Status
Birds	American Peregrine Falcon	<i>Falco peregrinus anatum</i>	DL	T
Birds	Arctic Peregrine Falcon	<i>Falco peregrinus tundrius</i>	DL	
Birds	Bald Eagle	<i>Haliaeetus leucocephalus</i>	DL	T
Birds	Cerulean Warbler	<i>Dendroica cerulea</i>		
Birds	Eskimo Curlew	<i>Numenius borealis</i>	LE	E
Birds	Henslow's Sparrow	<i>Ammodramus henslowii</i>		
Birds	Interior Least Tern	<i>Sterna antillarum athalassos</i>	LE	E
Birds	Peregrine Falcon	<i>Falco peregrinus</i>	DL	T
Birds	Piping Plover	<i>Charadrius melodus</i>	LT	T
Birds	Sprague's Pipit	<i>Anthus spragueii</i>	C	
Birds	Western Burrowing Owl	<i>Athene cunicularia hypugaea</i>		
Birds	Whooping Crane	<i>Grus americana</i>	LE	E

Birds	Wood Stork	<i>Mycteria americana</i>		T
Fishes	Blue sucker	<i>Cycleptus elongatus</i>		T
Fishes	Creek chubsucker	<i>Erimyzon oblongus</i>		T
Fishes	Goldeye	<i>Hiodon alosoides</i>		
Fishes	Orangebelly darter	<i>Etheostoma radiosum</i>		
Fishes	Paddlefish	<i>Polyodon spathula</i>		T
Fishes	Shovelnose sturgeon	<i>Scaphirhynchus platyrhynchus</i>		T
Mammals	Plains spotted skunk	<i>Spilogale putorius interrupta</i>		
Mammals	Red wolf	<i>Canis rufus</i>	LE	E
Mollusks	Common pimpleback	<i>Quadrula pustulosa</i>		
Mollusks	Fawnsfoot	<i>Truncilla donaciformis</i>		
Mollusks	Texas heelsplitter	<i>Potamilus amphichaenus</i>		T
Mollusks	White heelsplitter	<i>Lasmigona complanata</i>		
Reptiles	Alligator snapping turtle	<i>Macrochelys temminckii</i>		T
Reptiles	Texas horned lizard	<i>Phrynosoma cornutum</i>		T
Reptiles	Timber/Canebrake rattlesnake	<i>Crotalus horridus</i>		T

Status Key: LE, LT -Federally Listed Endangered/Threatened
 C -Federal Candidate for Listing
 DL -Federally Delisted
 NL -Not Federally Listed
 E, T -State Listed Endangered/Threatened
 "blank" -Rare, but with no regulatory listing status

Source: Texas Parks and Wildlife Department, 2012.

6.6.2 Wetlands

Under Section 404 of the Clean Water Act, authorization by the U.S. Army Corps of Engineers is required for activities that include excavation, fill, and channel modification in waters of the U.S. and wetlands.

Wetlands within an area of a proposed channel improvement project are an important consideration in the project design. Wetlands are areas where the frequent and prolonged presence of water at or near the soil surface influence the kind of soils that form, the plants that grow, and the fish and/or wildlife communities that use the habitat. While swamps, marshes,

and bogs are the most widely recognized types of wetlands, many important wetland types have drier or more variable water systems.

The presence of water by ponding, flooding, or soil saturation alone is not always a good indicator of the presence of wetlands. When the upper part of the soil is saturated with water at growing season temperatures, soil organisms consume the oxygen in the soil and cause conditions unsuitable for most plants. Such conditions also cause the development of soil characteristics (such as color and texture) of so-called "hydric soils." The plants that can grow in such conditions, such as marsh grasses, are called "hydrophytes." Together, the presence of hydric soils and hydrophytes are two of the essential criteria for defining the presence of wetlands.

The U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) provides reconnaissance level information on the location, type and size of wetlands in the project area. For most of Grayson County, the NWI maps are scanned vector graphics based on the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A review of the NWI indicates the potential for wetlands within the study area along Post Oak Creek and its tributaries. Detailed, on-the-ground inspection of potential project sites will be required during the project design phase to define the wetland boundaries and classification through on site analysis.

The 1987 *Corps of Engineers Wetlands Delineation Manual* is used to define wetlands for delineating the limits of construction that affects wetlands in compliance with the requirements of Section 404 of the Clean Water Act. Section 404 requires a permit from the Corps for the discharge of dredged or fill material into the waters of the United States, including wetlands. Using the 1987 manual, project biologists organize environmental characteristics of a potential wetland into three categories: soils, vegetation, and hydrology. The manual contains criteria for each category. With this approach, an area that meets all three criteria is considered a wetland.

Delineating the areas of wetlands that will be affected by project construction begins a three step sequence of actions that must be followed to offset impacts to aquatic resources. The 1990 Memorandum of Agreement (MOA) between the Environmental Protection Agency (EPA) and the Department of Army establishes a three-part process, known as the mitigation sequence, to help guide mitigation decisions and determine the type and level of mitigation required under Clean Water Act Section 404 regulations.

Avoid – Adverse impacts to aquatic resources are to be avoided and no discharge is to be permitted if there is a practicable alternative with less adverse impact.

Minimize – If impacts cannot be avoided, appropriate and practicable steps to minimize adverse impacts must be taken.

Compensate – Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts which remain. The amount and quality of compensatory mitigation may not substitute for avoiding and minimizing impacts.

The design of the proposed channel improvement projects will attempt to minimize the impacts to potential wetlands to the extent practicable, but impacts associated with these projects are likely to be unavoidable. It should be expected that some amount of compensatory mitigation of wetland impacts will be included as part of the proposed channel improvement projects. The Corps of Engineers is responsible for determining the appropriate form and amount of compensatory mitigation. The methods of compensatory mitigation include restoration, establishment, enhancement and preservation.

Restoration: Re-establishment or rehabilitation of a wetland or other aquatic resource with the goal of returning natural or historic functions and characteristics to a former or degraded wetland. Restoration may result in a gain in wetland function or wetland acres, or both.

Establishment: The development of a wetland or other aquatic resource where a wetland did not previously exist through manipulation of the physical, chemical and/or biological characteristics of the site. Successful establishment results in a net gain in wetland acres and function.

Enhancement: Activities conducted within existing wetlands that heighten, intensify, or improve one or more wetland functions. Enhancement is often undertaken for a specific purpose such as to improve water quality, flood water retention or wildlife habitat. Enhancement results in a gain in wetland function, but does not result in a net gain in wetland acres.

Preservation: The permanent protection of ecologically important wetlands or other aquatic resources through the implementation of appropriate legal and physical mechanisms (i.e. conservation easements, title transfers). Preservation may include

protection of upland areas adjacent to wetlands as necessary to ensure protection or enhancement of the aquatic ecosystem. Preservation does not result in a net gain of wetland acres and may only be used in certain circumstances, including when the resources to be preserved contribute significantly to the ecological sustainability of the watershed.

Once the type and limits of wetlands that cannot be avoided by project construction are delineated and the methods of compensatory mitigation are defined, a mitigation plan will be developed. There are three mechanisms for compensatory mitigation for unavoidable wetland impacts.

Permittee-Responsible Mitigation: Restoration, establishment, enhancement or preservation of wetlands undertaken by a permittee in order to compensate for wetland impacts resulting from a specific project. The permittee performs the mitigation after the 404 permit is issued and is ultimately responsible for implementation and success of the mitigation. Permittee-responsible mitigation may occur at the site of the permitted impacts or at an off-site location within the same watershed.

Mitigation Banking: A wetlands mitigation bank is a wetland area that has been restored, established, enhanced or preserved, which is then set aside to compensate for future conversions of wetlands for development activities. With Corps approval, permittees can purchase credits from a mitigation bank to meet the permit requirements for compensatory mitigation. The value of these "credits" is determined by quantifying the wetland functions or acres restored or created. The bank sponsor is ultimately responsible for the success of the project. Mitigation banking is performed "off-site," meaning it is at a location not on or immediately adjacent to the site of impacts, but within the same watershed. Federal regulations establish a flexible preference for using credits from a mitigation bank over the other compensation mechanisms.

In-Lieu Fee Mitigation: Mitigation that occurs when a permittee provides funds to an in-lieu-fee sponsor (a public agency or non-profit organization). Usually, the sponsor collects funds from multiple permittees in order to pool the financial resources necessary to build and maintain the mitigation site. The in-lieu fee sponsor is responsible for the success of the mitigation. Like banking, in-lieu fee mitigation is also "off-site," but unlike mitigation banking, it typically occurs after the permitted impacts.

Each mechanism should be considered during the design and permitting of the channel improvement projects to develop a cost effective mitigation plan should compensatory mitigation be required. Mitigation costs can range from \$250 to \$500 per linear foot of stream impacted by construction or as much as \$20,000 per acre of wetland mitigation.

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7

7 References

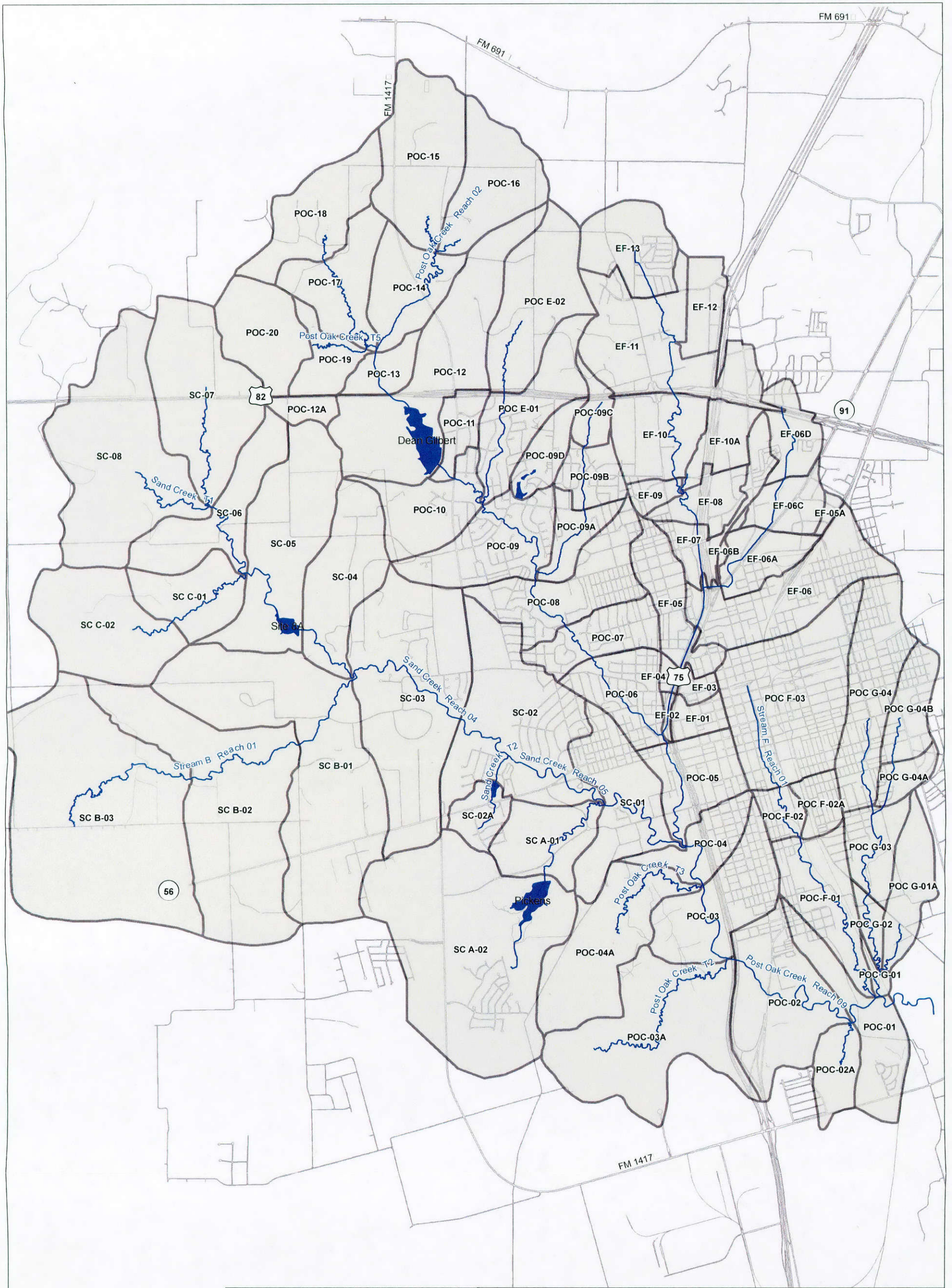
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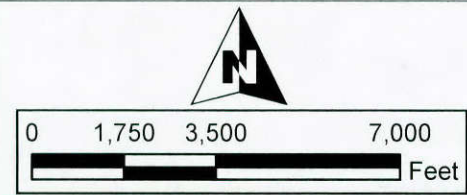
Appendix A – Exhibits

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Legend

-  Stream
-  Drainage Area Subbasins
-  Roads



**EXHIBIT 1 - DRAINAGE AREA MAP
POST OAK CREEK, SAND CREEK & TRIBUTARIES
POST OAK CREEK WATERSHED FLOOD PROTECTION PLAN
SHERMAN, TEXAS**

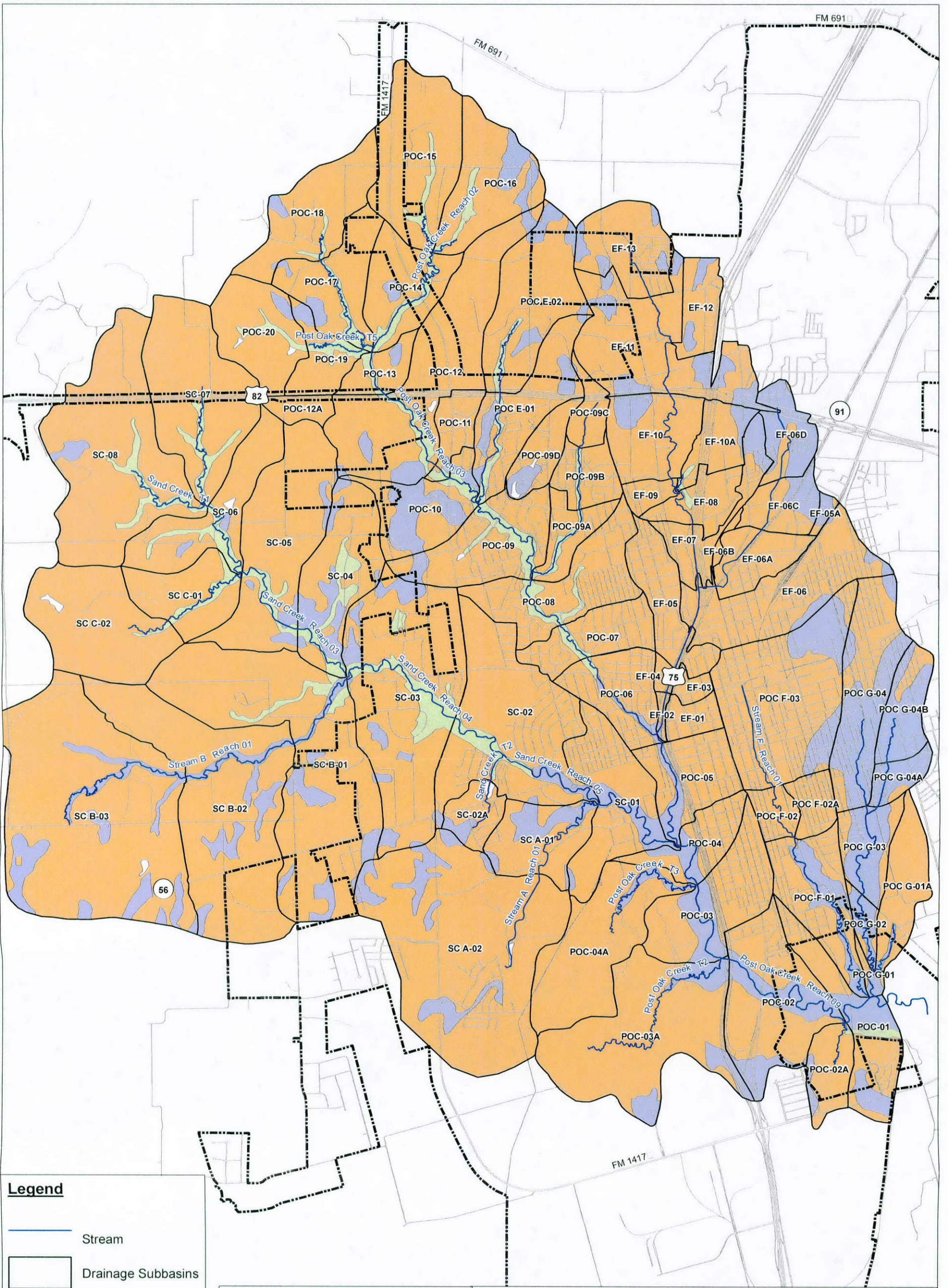
APRIL 2013

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Sherman
CLASSIC TOWN. BROAD HORIZON.

RPS Espey





Legend

-  Stream
-  Drainage Subbasins
-  City Limits
- Hydrologic Soil Type**
-  B
-  C
-  D

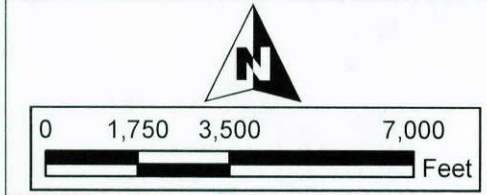
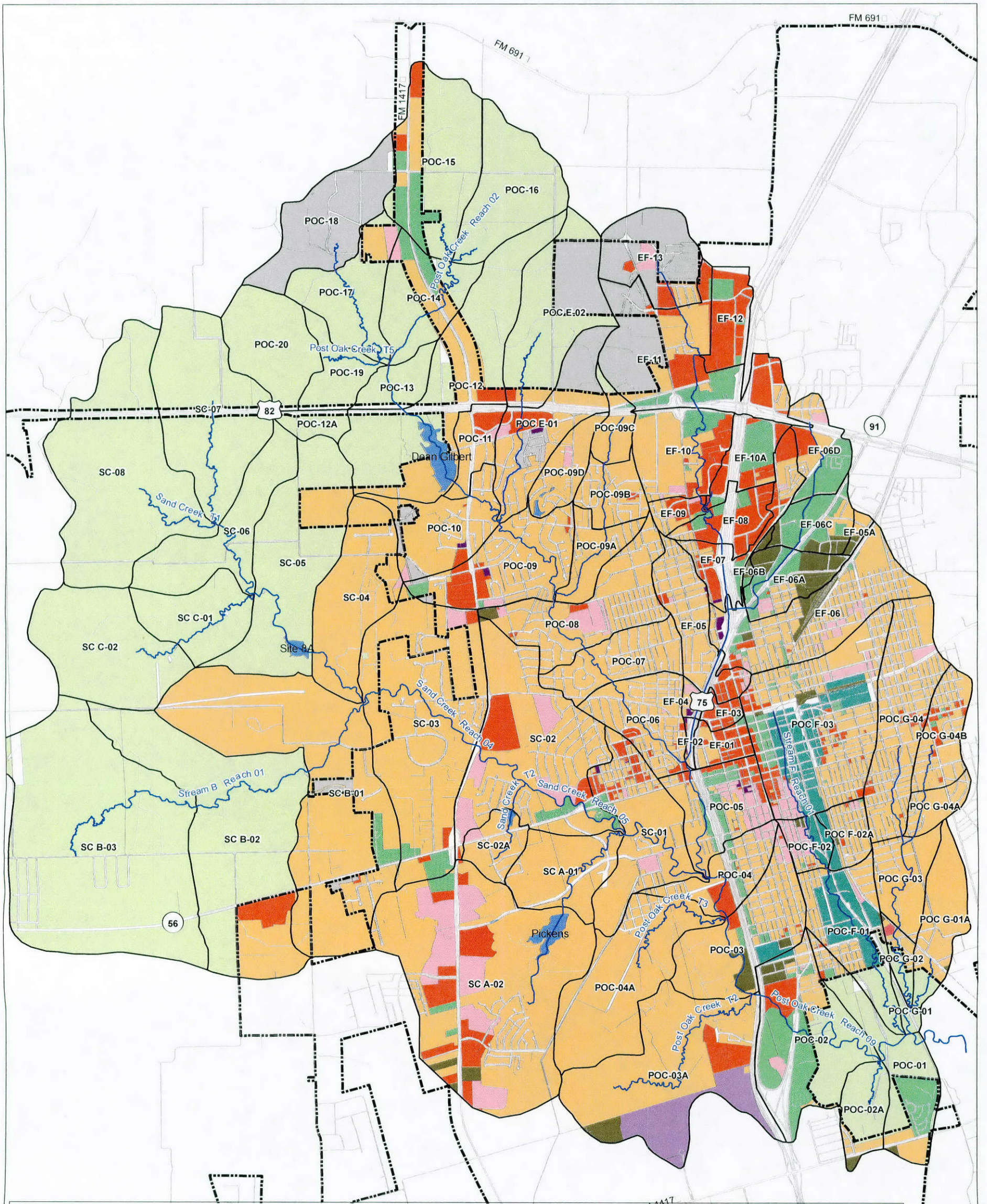


EXHIBIT 2 - SOILS MAP
POST OAK CREEK, SAND CREEK & TRIBUTARIES
POST OAK CREEK WATERSHED FLOOD PROTECTION PLAN
SHERMAN, TEXAS

APRIL 2013

P.N.10037.01

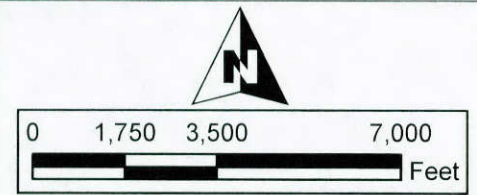




	Blalock Industrial Park		Office		Medium Manufacturing		One Family Residential
	Retail Business		Lakes		Heavy Manufacturing		Multi-Family Residential
	General Commercial		Light Manufacturing		Open Space		Single-Family Residential

Legend

	Stream
	Drainage Area
	City Limits

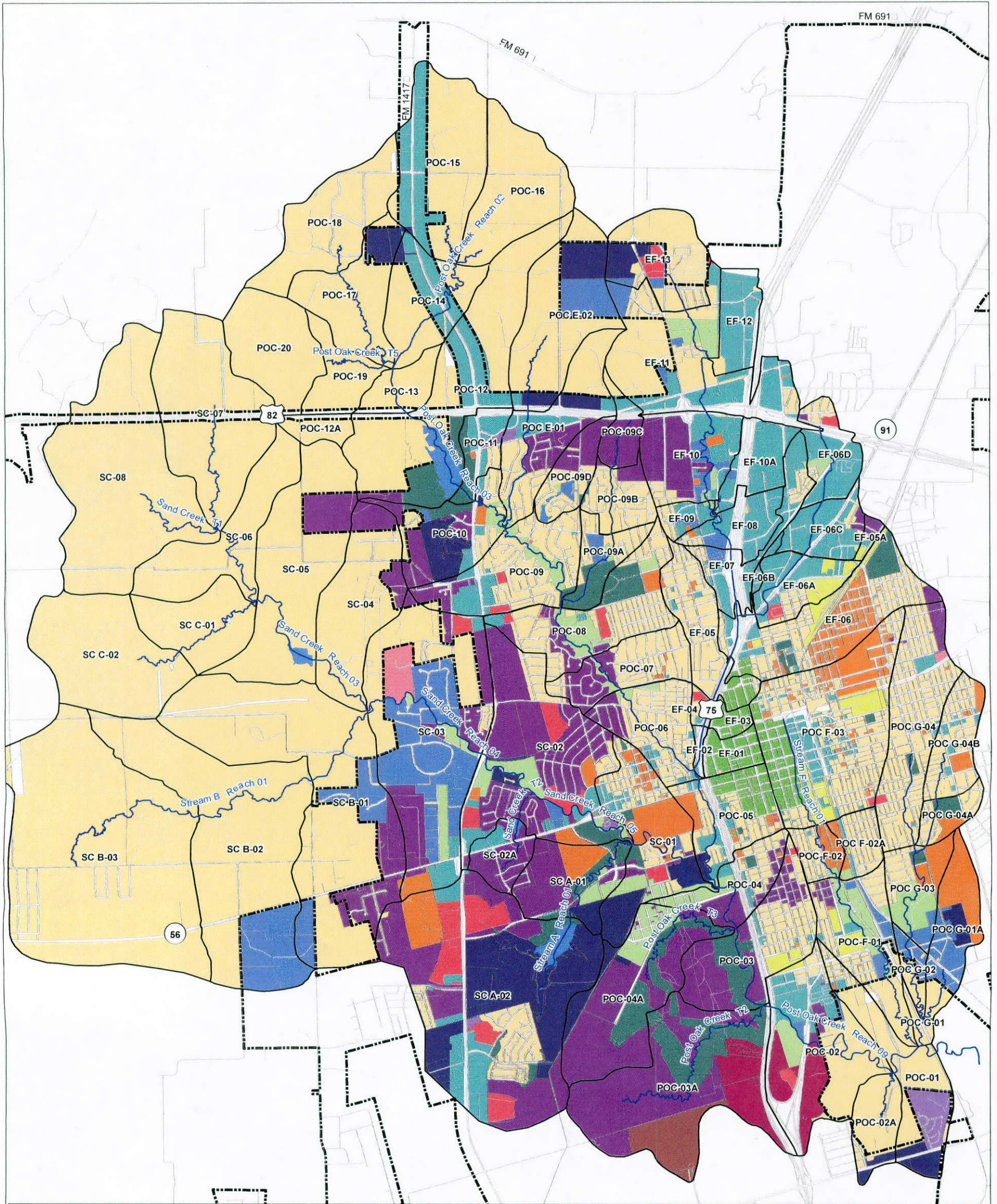


**EXHIBIT 3 - EXISTING LAND USE MAP
POST OAK CREEK, SAND CREEK & TRIBUTARIES
POST OAK CREEK WATERSHED FLOOD PROTECTION PLAN
SHERMAN, TEXAS**

APRIL 2013

PN.10037.01





	Auto-Urban Single-Family Residential		Auto-Urban Commercial		Business Park and Research		Parks and Recreation
	Suburban Residential		Urban/Downtown		Public/Institutional		Natural
	Estate		Suburban Commercial		Countryside		Agricultural and Rural
	Auto-Urban Multi-Family Residential		Industrial		Manufactured Homes		

Legend

- Stream
- Drainage_Area
- City_Limits

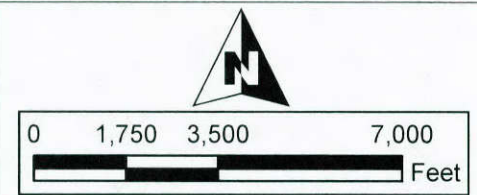


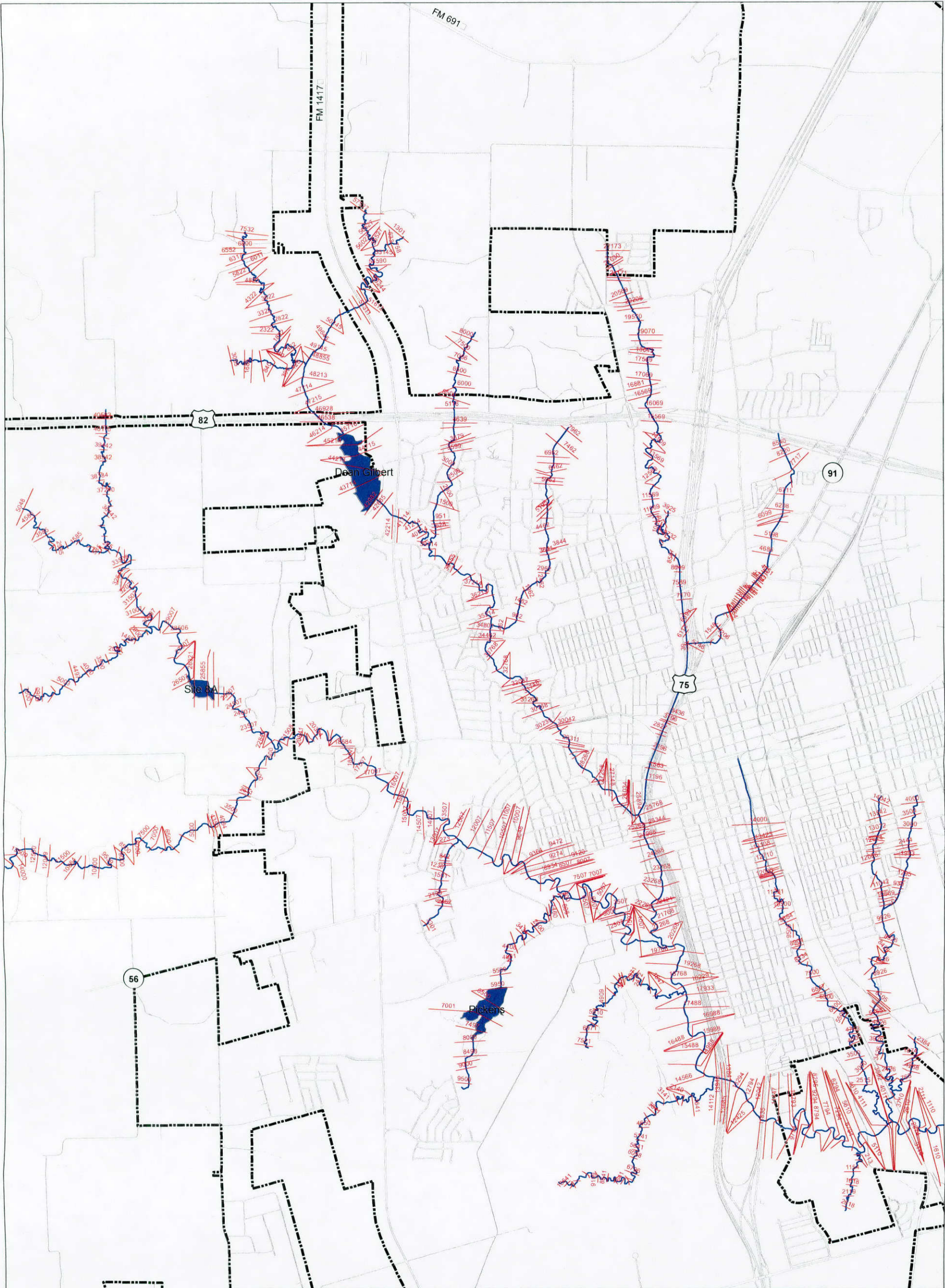
EXHIBIT 4 - ULTIMATE LAND USE MAP
POST OAK CREEK, SAND CREEK & TRIBUTARIES
 POST OAK CREEK WATERSHED FLOOD PROTECTION PLAN
 SHERMAN, TEXAS

APRIL 2013

P.N.10037.01

P:\Active\10037.00_Watershed_Management_Plan\GIS\Work\Exhibit 4 - Ultimate Land Use Map.mxd





Legend

- Cross-Section
- Stream
- City_Limits

N

0 1,500 3,000 6,000
Feet

**EXHIBIT 5 - POST OAK CREEK HEC-RAS
CROSS-SECTION LOCATION MAP**
POST OAK CREEK WATERSHED FLOOD PROTECTION PLAN
SHERMAN, TEXAS

APRIL 2013

P.N.10037.01

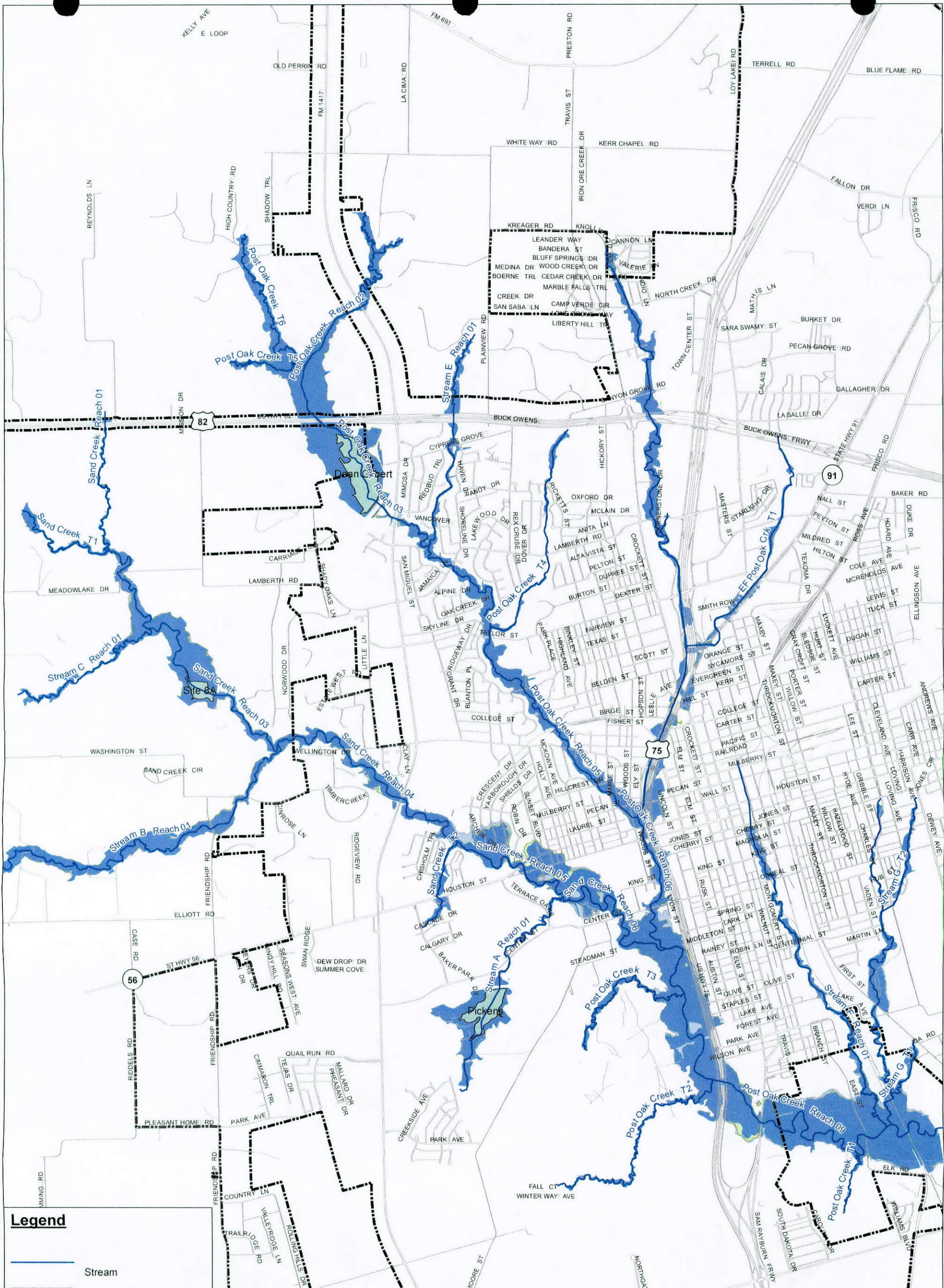
Sherman

CLASSIC TOWN. BROAD HORIZON.

RPS

Espey





Legend

-  Stream
-  City Limits
-  FPP 100-yr Floodplain
-  Ultimate 100-yr Floodplain
-  FPP 500-yr Floodplain
-  NRCS Lakes

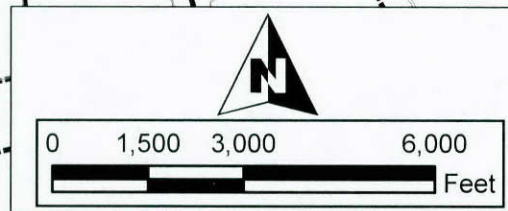


EXHIBIT 6 - POST OAK CREEK FLOODPLAIN MAP
POST OAK CREEK WATERSHED FLOOD PROTECTION PLAN
SHERMAN, TEXAS

April 2013

P.N.10037.01

Sherman
 CLASSIC TOWN. BROAD HORIZON.

RPS Espey





Appendix B – Weighted Curve Number

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Post Oak Creek and Sand Creek					
Weighted Curve Number					
Subbasin	Area (sq.miles)	Curve Number	Subbasin	Area (sq.miles)	Curve Number
EF-01	0.10	80.0	POC-12A	0.09	80.0
EF-02	0.02	79.0	POC-13	0.14	77.0
EF-03	0.05	80.0	POC-14	0.36	76.8
EF-04	0.03	80.0	POC-15	0.62	78.8
EF-05	0.30	80.0	POC-16	0.46	77.8
EF-05A	0.03	75.7	POC-17	0.38	77.6
EF-06	0.59	79.6	POC-18	0.46	79.3
EF-06A	0.22	80.0	POC-19	0.19	76.0
EF-06B	0.02	80.0	POC-20	0.39	78.1
EF-06C	0.19	77.9	POC-F-01	0.41	78.1
EF-06D	0.20	75.2	POC-F-02	0.10	80.0
EF-07	0.22	78.7	POC E-01	0.43	77.5
EF-08	0.19	79.3	POC E-02	0.57	78.5
EF-09	0.07	80.0	POC F-02A	0.12	80.0
EF-10	0.36	79.2	POC F-03	0.92	78.8
EF-10A	0.19	78.4	POC G-01	0.03	76.9
EF-11	0.73	78.9	POC G-01A	0.27	79.8
EF-12	0.18	78.9	POC G-02	0.07	75.2
EF-13	0.36	79.2	POC G-03	0.23	75.8
POC-01	0.41	77.2	POC G-04	0.53	76.5
POC-02	0.67	78.1	POC G-04A	0.11	74.5
POC-02A	0.19	79.2	POC G-04B	0.22	75.0
POC-03	0.51	78.7	SC-01	0.52	79.0
POC-03A	1.00	79.2	SC-02	0.97	78.4
POC-04	0.24	78.7	SC-02A	0.15	77.3
POC-04A	0.66	79.7	SC-03	1.21	77.2
POC-05	0.35	78.9	SC-04	0.52	75.6
POC-06	0.32	79.1	SC-05	0.80	78.5
POC-07	0.29	78.7	SC-06	0.45	76.8
POC-08	0.50	78.0	SC-07	0.76	78.5
POC-09	0.47	76.5	SC-08	1.13	79.0
POC-09A	0.17	77.1	SC A-01	0.34	78.3
POC-09B	0.18	78.4	SC A-02	1.66	79.3
POC-09C	0.11	79.9	SC B-01	1.50	78.8
POC-09D	0.17	77.4	SC B-02	1.30	79.4
POC-10	0.36	76.1	SC B-03	1.86	79.1
POC-11	0.14	78.6	SC C-01	0.33	77.7
POC-12	0.97	78.5	SC C-02	0.64	79.3





Appendix C – Land Use

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Post Oak Creek and Sand Creek					
Impervious Cover					
Subbasin	Existing Impervious Cover	Ultimate Impervious Cover	Subbasin	Existing Impervious	Ultimate Impervious
EF-01	69.2%	84.6%	POC-12A	20.5%	55.0%
EF-02	79.1%	76.6%	POC-13	12.0%	55.0%
EF-03	78.6%	84.8%	POC-14	25.3%	63.2%
EF-04	62.4%	61.5%	POC-15	26.3%	64.1%
EF-05	54.1%	60.2%	POC-16	7.0%	55.0%
EF-05A	58.2%	56.4%	POC-17	11.8%	48.2%
EF-06	57.5%	62.8%	POC-18	56.9%	55.2%
EF-06A	75.5%	82.5%	POC-19	9.2%	55.0%
EF-06B	70.0%	79.9%	POC-20	6.0%	55.0%
EF-06C	76.9%	80.3%	POC-F-01	57.2%	42.8%
EF-06D	71.2%	72.9%	POC-F-02	75.1%	59.2%
EF-07	69.8%	72.8%	POC E-01	53.9%	50.8%
EF-08	76.8%	75.1%	POC E-02	25.0%	40.6%
EF-09	61.7%	62.2%	POC F-02A	58.0%	57.1%
EF-10	54.7%	47.7%	POC F-03	66.5%	70.7%
EF-10A	80.8%	81.0%	POC G-01	24.8%	55.0%
EF-11	61.2%	76.1%	POC G-01A	34.8%	44.8%
EF-12	61.2%	85.0%	POC G-02	32.8%	39.5%
EF-13	46.8%	65.0%	POC G-03	39.9%	34.9%
POC-01	34.4%	52.7%	POC G-04	50.8%	54.1%
POC-02	53.8%	63.3%	POC G-04A	42.2%	52.0%
POC-02A	16.4%	50.0%	POC G-04B	50.7%	59.8%
POC-03	51.0%	43.6%	SC-01	47.2%	42.3%
POC-03A	52.8%	49.5%	SC-02	50.6%	40.5%
POC-04	57.8%	38.0%	SC-02A	42.7%	43.7%
POC-04A	38.1%	28.3%	SC-03	41.5%	36.0%
POC-05	64.8%	67.8%	SC-04	36.2%	51.8%
POC-06	48.4%	50.4%	SC-05	9.6%	52.7%
POC-07	44.8%	46.8%	SC-06	6.4%	55.0%
POC-08	48.7%	42.6%	SC-07	11.0%	55.0%
POC-09	52.1%	51.7%	SC-08	8.0%	55.0%
POC-09A	39.1%	39.1%	SC A-01	40.7%	34.4%
POC-09B	44.0%	51.5%	SC A-02	52.9%	34.0%
POC-09C	38.2%	43.0%	SC B-01	39.0%	49.2%
POC-09D	42.4%	43.3%	SC B-02	13.5%	49.0%
POC-10	44.7%	31.6%	SC B-03	8.8%	55.0%
POC-11	55.9%	58.5%	SC C-01	5.2%	55.0%
POC-12	20.1%	55.1%	SC C-02	6.0%	55.0%



0

Appendix D – Time of Concentration

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EXISTING CONDITIONS											
TR-55 Method of Computing the Time of Concentration											
			EF 01	EF 02	EF 03	EF 04	EF 05	EF 05A	EF 06	EF 06A	EF 06B
Sheet Flow											
Manning's roughness coef.	n	n/a	0.011	0.240	0.011	0.240	0.240	0.240	0.240	0.240	0.240
Flow Length	L	feet	50	50	50	50	50	50	50	20	50
2 year, 24 hour rainfall	P2	inches	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Slope	s	ft/ft	0.0100	0.0100	0.0100	0.0100	0.0100	0.0050	0.0100	0.0355	0.0100
Travel time	Tt	hours	0.014	0.161	0.014	0.161	0.161	0.213	0.161	0.047	0.161
Shallow Concentrated Flow											
Flow Length	L	feet	2,525	284	1,745	950	3,793	2,122	4,019	1,730	2,966
Slope	s	ft/ft	0.023	0.120	0.030	0.040	0.015	0.014	0.012	0.012	0.014
Surface (1=paved or 2=unpaved)	n/a		1	2	1	2	1	1	1	1	2
Velocity	V	ft/sec	3.13	5.61	3.54	3.24	2.55	2.45	2.21	2.24	1.89
Travel time	Tt	hours	0.224	0.014	0.137	0.082	0.413	0.240	0.505	0.215	0.436
Manning's Equation											
1 Flow Length	L	feet	-	1,382	-	916	2,216	-	1,608	1,350	-
Slope	S	ft/ft	0.0000	0.0101	0.0000	0.0100	0.0126	0.0000	0.0099	0.0171	0.0000
roughness	n	n/a	0	0.04	0	0.04	0.1	0	0.1	0.1	0
Open Channel											
Bottom Width	BW	feet	0	10	0	10	2	0	1	10	0
Side Slopes (H:1)	H	feet	0	2	0	2	2	0	30	15	0
Depth	d	feet	0	10	0	10	10	0	2	3	0
...or Closed Conduit											
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	0.00	300.00	0.00	300.00	220.00	0.00	122.00	165.00	0.00
Flow Rate	Q	cfs	0.00	3494.54	0.00	3474.68	1034.12	0.00	182.13	447.99	0.00
Velocity	V	ft/sec	0.00	11.65	0.00	11.58	4.70	0.00	1.49	2.72	0.00
Travel time	Tt	hours	-	0.033	-	0.022	0.131	-	0.299	0.138	-
2 Flow Length	L	feet	-	-	-	-	1,479	-	2,603	2,148	-
Slope	S	ft/ft	0.0000	0.0000	0.0000	0.0000	0.0093	0.0000	0.0144	0.0146	0.0000
roughness	n	n/a	0	0	0	0	0.04	0	0.1	0.018	0
Open Channel											
Bottom Width	BW	feet	0	0	0	0	10	0	5	20	0
Side Slopes (H:1)	H	feet	0	0	0	0	2	0	3	15	0
Depth	d	feet	0	0	0	0	10	0	18	2.5	0
...or Closed Conduit											
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	0.00	0.00	0.00	0.00	300.00	0.00	1062.00	143.75	0.00
Flow Rate	Q	cfs	0.00	0.00	0.00	0.00	3355.23	0.00	8176.52	1894.36	0.00
Velocity	V	ft/sec	0.00	0.00	0.00	0.00	11.18	0.00	7.70	13.18	0.00
Travel time	Tt	hours	-	-	-	-	0.037	-	0.094	0.045	-
3 Flow Length	L	feet	-	-	-	-	-	-	910	-	-
Slope	S	ft/ft	0.0000	0.0000	0.0000	0.0000	0.0000	0.0010	0.0010	0.0000	0.0000
roughness	n	n/a	0	0	0	0	0	0	0.013	0	0
Open Channel											
Bottom Width	BW	feet	0	0	0	0	0	0	0	0	0
Side Slopes (H:1)	H	feet	0	0	0	0	0	0	0	0	0
Depth	d	feet	0	0	0	0	0	0	0	0	0
...or Closed Conduit											
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	0.00	0.00	0.00	0.00	0.00	0.00	19.63	0.00	0.00
Flow Rate	Q	cfs	0.00	0.00	0.00	0.00	0.00	0.00	82.58	0.00	0.00
Velocity	V	ft/sec	0.00	0.00	0.00	0.00	0.00	0.00	4.21	0.00	0.00
Travel time	Tt	hours	-	-	-	-	-	-	0.060	-	-
Total Travel Time											
TC	TC	hours	0.238	0.208	0.151	0.265	0.741	0.453	1.119	0.445	0.597
TC	TC	min.	14.3	12.5	9.0	15.9	44.5	27.2	67.2	26.7	35.8
Lag Time											
TL	TL	hours	0.1426	0.1250	0.0904	0.1588	0.4448	0.2719	0.6717	0.2669	0.3584
TL	TL	min.	8.6	7.5	5.4	9.5	26.7	16.3	40.3	16.0	21.5

EXISTING CONDITIONS											
TR-55 Method of Computing the Time of Concentration											
			EF_06C	EF_06D	EF_07	EF_08	EF_09	EF_10	EF_10A	EF_11	EF_12
Sheet Flow	variable	units									
Manning's roughness coef.	n	n/a	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240
Flow Length	L	feet	50	50	50	150	50	200	10	71	39
2-year, 24-hour rainfall	P2	inches	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Slope	s	ft/ft	0.0100	0.0100	0.0100	0.0195	0.0100	0.0100	0.0100	0.0122	0.0167
Travel time	Tt	hours	0.161	0.161	0.161	0.297	0.161	0.489	0.044	0.197	0.108
Shallow Concentrated Flow		min.	9.7	9.7	9.7	17.8	9.7	29.3	2.7	11.8	6.5
Flow Length	L	feet	2,651	1,772	7,343	790	1,919	2,443	1,189	3,177	236
Slope	s	ft/ft	0.014	0.026	0.014	0.030	0.033	0.025	0.005	0.019	0.001
Surface (1=paved or 2=unpaved)		n/a	2	1	1	2	2	2	1	2	1
Velocity	V	ft/sec	1.92	3.35	2.46	2.79	2.94	2.58	1.49	2.22	0.79
Travel time	Tt	hours	0.383	0.147	0.831	0.079	0.181	0.263	0.221	0.398	0.083
Manning's Equation		min.	23.0	8.8	49.8	4.7	10.9	15.8	13.3	23.9	5.0
1 Flow Length	L	feet	-	1,350	-	2,258	176	2,267	2,110	3,711	3,612
Slope	S	ft/ft	0.0000	0.0193	0.0000	0.0245	0.0014	0.0021	0.0170	0.0085	0.0122
roughness	n	n/a	0	0.1	0	0.015	0.1	0.1	0.015	0.1	0.024
Open Channel											
Bottom Width	BW	feet	0	14	0	0	14	10	0	0	0
Side Slopes (H:1)	H	feet	0	2	0	0	2	2	0	12	0
Depth	d	feet	0	10	0	0	10	10	0	5	0
...or Closed Conduit											
Rise / Diameter	R / D	feet	0.00	0.00	0.00	5.00	0.00	0.00	5.00	0.00	5.00
Span (0 if circular)	S	feet	0	0	0	5	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	0.00	340.00	0.00	25.00	340.00	300.00	19.63	300.00	19.63
Flow Rate	Q	cfs	0.00	2269.71	0.00	450.92	618.27	639.17	294.75	757.06	156.13
Velocity	V	ft/sec	0.00	6.68	0.00	18.04	1.82	2.13	15.01	2.52	7.95
Travel time	Tt	hours	-	0.056	-	0.035	0.027	0.296	0.039	0.408	0.126
2 Flow Length	L	feet	-	-	-	-	-	-	781	-	3,887
Slope	S	ft/ft	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0280	0.0000	0.0122
roughness	n	n/a	0	0	0	0	0	0	0.1	0.05	0.05
Open Channel											
Bottom Width	BW	feet	0	0	0	0	0	0	15	0	0
Side Slopes (H:1)	H	feet	0	0	0	0	0	0	45	0	0
Depth	d	feet	0	0	0	0	0	0	2	0	0
...or Closed Conduit											
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	0.00	0.00	0.00	0.00	0.00	0.00	210.00	0.00	0.00
Flow Rate	Q	cfs	0.00	0.00	0.00	0.00	0.00	0.00	550.13	0.00	0.00
Velocity	V	ft/sec	0.00	0.00	0.00	0.00	0.00	0.00	2.62	0.00	0.00
Travel time	Tt	hours	-	-	-	-	-	-	0.083	-	-
3 Flow Length	L	feet	-	-	-	-	-	-	-	-	-
Slope	S	ft/ft	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
roughness	n	n/a	0	0	0	0	0	0	0	0	0
Open Channel											
Bottom Width	BW	feet	0	0	0	0	0	0	0	0	0
Side Slopes (H:1)	H	feet	0	0	0	0	0	0	0	0	0
Depth	d	feet	0	0	0	0	0	0	0	0	0
...or Closed Conduit											
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flow Rate	Q	cfs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Velocity	V	ft/sec	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Travel time	Tt	hours	-	-	-	-	-	-	-	-	-
Total Travel Time	TC	hours	0.544	0.365	0.992	0.411	0.369	1.047	0.388	1.003	0.317
	TC	min.	32.6	21.9	59.5	24.6	22.2	62.8	23.3	60.2	19.0
Lag Time	TL	hours	0.3264	0.2187	0.5951	0.2464	0.2216	0.6284	0.2326	0.6021	0.1903
	TL	min.	19.6	13.1	35.7	14.8	13.3	37.7	14.0	36.1	11.4

EXISTING CONDITIONS											
TR-55 Method of Computing the Time of Concentration											
			EF 13	POC 01	POC 02	POC 02A	POC 03	POC 03A	POC 04	POC 04A	POC 05
Sheet Flow	variable	units									
Manning's roughness coef.	n	n/a	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240
Flow Length	L	feet	100	150	150	150	40	150	150	150	10
2-year, 24-hour rainfall	P2	inches	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Slope	s	ft/ft	0.0100	0.0100	0.0063	0.0087	0.9175	0.0100	0.0503	0.0130	0.0020
Travel time	Tt	hours	0.281	0.388	0.466	0.411	0.022	0.388	0.203	0.350	0.085
Shallow Concentrated Flow		min.	16.8	23.3	27.9	24.7	1.3	23.3	12.2	21.0	5.1
Flow Length	L	feet	2,608	1,923	3,420	686	5,031	1,065	2,269	2,188	2,511
Slope	s	ft/ft	0.016	0.026	0.029	0.012	0.007	0.032	0.037	0.025	0.029
Surface (1=paved or 2=unpaved)		n/a	1	2	2	2	1	2	2	2	1
Velocity	V	ft/sec	2.56	2.61	2.74	1.75	1.76	2.90	3.13	2.55	3.49
Travel time	Tt	hours	0.282	0.204	0.346	0.109	0.794	0.102	0.201	0.239	0.200
Manning's Equation		min.	16.9	12.3	20.8	6.5	47.7	6.1	12.1	14.3	12.0
1 Flow Length	L	feet	1,489	3,481	6,551	1,623	3,140	9,187	818	7,973	4,372
Slope	S	ft/ft	0.0088	0.0172	0.0018	0.0306	0.0125	0.0135	0.0047	0.0133	0.0017
roughness	n	n/a	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Open Channel											
Bottom Width	BW	feet	5	5	30	5	30	5	2.5	5	10
Side Slopes (H:1)	H	feet	6	3	4	3	3	3	3	3	3
Depth	d	feet	3	10	20	10	10	10	5	10	20
...or Closed Conduit											
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	69.00	350.00	2200.00	350.00	600.00	350.00	87.50	350.00	1400.00
Flow Rate	Q	cfs	135.40	2036.14	6934.59	2714.51	3460.47	1803.15	168.24	1790.50	4030.40
Velocity	V	ft/sec	1.96	5.82	3.15	7.76	5.77	5.15	1.92	5.12	2.88
Travel time	Tt	hours	0.211	0.166	0.577	0.058	0.151	0.495	0.118	0.433	0.422
2 Flow Length	L	feet	-	-	-	1,888	-	-	-	170	-
Slope	S	ft/ft	0.0000	0.0000	0.0000	0.0242	0.0000	0.0000	0.0000	0.0000	0.0000
roughness	n	n/a	0	0	0	0.1	0	0	0	0	0
Open Channel											
Bottom Width	BW	feet	0	0	0	5	0	0	0	0	0
Side Slopes (H:1)	H	feet	0	0	0	3	0	0	0	0	0
Depth	d	feet	0	0	0	10	0	0	0	0	0
...or Closed Conduit											
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	0.00	0.00	0.00	350.00	0.00	0.00	0.00	0.00	0.00
Flow Rate	Q	cfs	0.00	0.00	0.00	2413.19	0.00	0.00	0.00	#DIV/0!	0.00
Velocity	V	ft/sec	0.00	0.00	0.00	6.89	0.00	0.00	0.00	#DIV/0!	0.00
Travel time	Tt	hours	-	-	-	0.076	-	-	-	-	-
3 Flow Length	L	feet	-	-	-	-	-	-	-	-	-
Slope	S	ft/ft	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
roughness	n	n/a	0	0	0	0	0	0	0	0	0
Open Channel											
Bottom Width	BW	feet	0	0	0	0	0	0	0	0	0
Side Slopes (H:1)	H	feet	0	0	0	0	0	0	0	0	0
Depth	d	feet	0	0	0	0	0	0	0	0	0
...or Closed Conduit											
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flow Rate	Q	cfs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Velocity	V	ft/sec	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Travel time	Tt	hours	-	-	-	-	-	-	-	-	-
Total Travel Time	TC	hours	0.774	0.759	1.390	0.654	0.968	0.986	0.523	1.021	0.707
	TC	min.	46.4	45.5	83.4	39.2	58.1	59.1	31.4	61.3	42.4
Lag Time	TL	hours	0.4644	0.4554	0.8338	0.3925	0.5806	0.5915	0.3138	0.6129	0.4241
	TL	min.	27.9	27.3	50.0	23.5	34.8	35.5	18.8	36.8	25.4

EXISTING CONDITIONS										
TR-55 Method of Computing the Time of Concentration										
			POC_06	POC_07	POC_08	POC_09	POC_09A	POC_09B	POC_09C	POC_09D
Sheet Flow	variable	units								
Manning's roughness coef.	n	n/a	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240
Flow Length	L	feet	40	50	50	200	50	200	200	200
2-year, 24-hour rainfall	P2	inches	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Slope	s	ft/ft	0.0111	0.0100	0.0100	0.0099	0.0100	0.0150	0.0033	0.0040
Travel time	Tt	hours	0.129	0.161	0.161	0.491	0.161	0.416	0.761	0.703
Shallow Concentrated Flow		min.	7.8	9.7	9.7	29.5	9.7	24.9	45.7	42.2
Flow Length	L	feet	1,543	4,100	6,719	3,885	1,897	1,606	4,024	4,070
Slope	s	ft/ft	0.023	0.019	0.005	0.005	0.031	0.024	0.011	0.015
Surface (1=paved or 2=unpaved)		n/a	2	1	2	2	2	2	2	2
Velocity	V	ft/sec	2.47	2.84	1.15	1.15	2.83	2.52	1.69	1.99
Travel time	Tt	hours	0.174	0.401	1.629	0.942	0.186	0.177	0.660	0.569
Manning's Equation		min.	10.4	24.0	97.8	56.5	11.2	10.6	39.6	34.1
1 Flow Length	L	feet	3,439	-	-	4,517	1,971	1,906	-	-
Slope	S	ft/ft	0.0057	0.0000	0.0000	0.0074	0.0101	0.0116	0.0000	0.0000
roughness	n	n/a	0.1	0	0	0.1	0.1	0.1	0	0
Open Channel										
Bottom Width	BW	feet	10	0	0	10	12	10	0	0
Side Slopes (H:1)	H	feet	3	0	0	2	2	2	0	0
Depth	d	feet	10	0	0	10	10	10	0	0
...or Closed Conduit										
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	400.00	0.00	0.00	300.00	320.00	300.00	0.00	0.00
Flow Rate	Q	cfs	1398.21	0.00	0.00	1196.38	1522.21	1495.21	0.00	0.00
Velocity	V	ft/sec	3.50	0.00	0.00	3.99	4.76	4.98	0.00	0.00
Travel time	Tt	hours	0.273	-	-	0.315	0.115	0.106	-	-
2 Flow Length	L	feet	-	-	-	-	-	-	-	-
Slope	S	ft/ft	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
roughness	n	n/a	0	0	0	0	0	0	0	0
Open Channel										
Bottom Width	BW	feet	0	0	0	0	0	0	0	0
Side Slopes (H:1)	H	feet	0	0	0	0	0	0	0	0
Depth	d	feet	0	0	0	0	0	0	0	0
...or Closed Conduit										
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flow Rate	Q	cfs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Velocity	V	ft/sec	0.00	0.00	15.00	15.00	0.00	0.00	0.00	0.00
Travel time	Tt	hours	-	-	-	-	-	-	-	-
3 Flow Length	L	feet	-	-	-	-	-	-	-	-
Slope	S	ft/ft	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
roughness	n	n/a	0	0	0	0	0	0	0	0
Open Channel										
Bottom Width	BW	feet	0	0	0	0	0	0	0	0
Side Slopes (H:1)	H	feet	0	0	0	0	0	0	0	0
Depth	d	feet	0	0	0	0	0	0	0	0
...or Closed Conduit										
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flow Rate	Q	cfs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Velocity	V	ft/sec	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Travel time	Tt	hours	-	-	-	-	-	-	-	-
Total Travel Time	TC	hours	0.576	0.562	1.791	1.748	0.462	0.698	1.421	1.272
	TC	min.	34.6	33.7	107.4	104.9	27.7	41.9	85.3	76.3
Lag Time	TL	hours	0.3457	0.3372	1.0743	1.0487	0.2774	0.4191	0.8526	0.7631
	TL	min.	20.7	20.2	64.5	62.9	16.6	25.1	51.2	45.8

EXISTING CONDITIONS											
TR-55 Method of Computing the Time of Concentration											
			POC_10	POC_11	POC_12	POC_12A	POC_13	POC_14	POC_15	POC_16	POC_17
Sheet Flow	variable	units									
Manning's roughness coef.	n	n/a	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240
Flow Length	L	feet	150	50	150	50	100	150	100	150	150
2-year, 24-hour rainfall	P2	inches	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Slope	s	ft/ft	0.0150	0.0100	0.0330	0.0100	0.0024	0.0067	0.0060	0.0032	0.0122
Travel time	Tt	hours	0.330	0.161	0.241	0.161	0.499	0.457	0.345	0.613	0.359
		min.	19.8	9.7	14.5	9.7	29.9	27.4	20.7	36.8	21.5
Shallow Concentrated Flow											
Flow Length	L	feet	2,048	2,001	5,677	1,464	1,497	2,087	1,919	2,981	2,998
Slope	s	ft/ft	0.019	0.012	0.012	0.012	0.017	0.021	0.024	0.016	0.021
Surface (1=paved or 2=unpaved)		n/a	2	2	2	2	2	2	2	2	2
Velocity	V	ft/sec	2.21	1.76	1.79	1.80	2.13	2.32	2.49	2.04	2.37
Travel time	Tt	hours	0.258	0.316	0.879	0.226	0.195	0.250	0.214	0.405	0.351
		min.	15.5	19.0	52.7	13.6	11.7	15.0	12.9	24.3	21.1
Manning's Equation											
1 Flow Length	L	feet	4,343	2,324	6,504	-	1,228	3,407	6,175	4,071	4,129
Slope	S	ft/ft	0.0170	0.0147	0.0095	0.0000	0.0100	0.0131	0.0483	0.0116	0.0058
roughness	n	n/a	0.1	0.1	0.1	0	0.1	0.1	0.1	0.1	0.1
Open Channel											
Bottom Width	BW	feet	5	10	5	0	5	5	3	5	10
Side Slopes (H:1)	H	feet	3	2	3	0	3	3	3	3	3
Depth	d	feet	5	10	10	0	10	10	5	10	20
...or Closed Conduit											
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	2.75	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	100.00	300.00	350.00	0.00	350.00	350.00	90.00	350.00	1400.00
Flow Rate	Q	cfs	379.13	1685.07	1514.12	0.00	1550.98	1773.26	557.20	1671.68	7490.74
Velocity	V	ft/sec	3.79	5.62	4.33	0.00	4.43	5.07	6.19	4.78	5.35
Travel time	Tt	hours	0.318	0.115	0.418	-	0.077	0.187	0.277	0.237	0.214
2 Flow Length	L	feet	-	-	-	-	-	-	-	-	-
Slope	S	ft/ft	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
roughness	n	n/a	0	0	0	0	0	0	0	0	0
Open Channel											
Bottom Width	BW	feet	0	0	0	0	0	0	0	0	0
Side Slopes (H:1)	H	feet	0	0	0	0	0	0	0	0	0
Depth	d	feet	0	0	0	0	0	0	0	0	0
...or Closed Conduit											
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flow Rate	Q	cfs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Velocity	V	ft/sec	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Travel time	Tt	hours	-	-	-	-	-	-	-	-	-
3 Flow Length	L	feet	-	-	-	-	-	-	-	-	-
Slope	S	ft/ft	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
roughness	n	n/a	0	0	0	0	0	0	0	0	0
Open Channel											
Bottom Width	BW	feet	0	0	0	0	0	0	0	0	0
Side Slopes (H:1)	H	feet	0	0	0	0	0	0	0	0	0
Depth	d	feet	0	0	0	0	0	0	0	0	0
...or Closed Conduit											
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flow Rate	Q	cfs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Velocity	V	ft/sec	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Travel time	Tt	hours	-	-	-	-	-	-	-	-	-
Total Travel Time	TC	hours	0.906	0.592	1.537	0.388	0.771	0.893	0.836	1.255	0.925
	TC	min.	54.4	35.5	92.2	23.3	46.2	53.6	50.2	75.3	55.5
Lag Time	TL	hours	0.5437	0.3552	0.9223	0.2326	0.4623	0.5361	0.5017	0.7529	0.5548
	TL	min.	32.6	21.3	55.3	14.0	27.7	32.2	30.1	45.2	33.3

EXISTING CONDITIONS										
TR-55 Method of Computing the Time of Concentration										
			POC_18	POC_19	POC_20	POC_E_01	POC_E_02	POC_F_01	POC_F_02	POC_F_02A
Sheet Flow										
	variable	units								
Manning's roughness coef.	n	n/a	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240
Flow Length	L	feet	150	50	150	150	150	40	40	40
2-year, 24-hour rainfall	P2	inches	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Slope	s	ft/ft	0.0100	0.0090	0.0041	0.0100	0.0125	0.0060	0.0100	0.0144
Travel time	Tt	hours	0.388	0.168	0.552	0.388	0.355	0.166	0.135	0.117
		min.	23.3	10.1	33.1	23.3	21.3	9.9	8.1	7.0
Shallow Concentrated Flow										
Flow Length	L	feet	2,593	742	414	1,458	1,814	1,732	1,241	2,715
Slope	s	ft/ft	0.019	0.027	0.036	0.005	0.026	0.018	0.020	0.016
Surface (1=paved or 2=unpaved)		n/a	2	2	2	2	2	1	1	1
Velocity	V	ft/sec	2.23	2.69	3.09	1.15	2.59	2.76	2.93	2.60
Travel time	Tt	hours	0.323	0.077	0.037	0.354	0.195	0.175	0.118	0.290
		min.	19.4	4.6	2.2	21.2	11.7	10.5	7.1	17.4
Manning's Equation										
1 Flow Length	L	feet	3,159	2,315	3,717	4,843	6,438	7,410	2,147	610
Slope	S	ft/ft	0.0105	0.0115	0.0157	0.0151	0.0101	0.0087	0.0073	0.0129
roughness	n	n/a	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Open Channel										
Bottom Width	BW	feet	5	2.5	2.5	5	5	10	10	5
Side Slopes (H:1)	H	feet	3	3	3	3	3	3	3	3
Depth	d	feet	10	5	5	10	10	20	20	10
...or Closed Conduit										
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	350.00	87.50	87.50	350.00	350.00	1400.00	1400.00	350.00
Flow Rate	Q	cfs	1591.36	261.72	305.86	1904.60	1560.02	9166.14	8424.99	1760.04
Velocity	V	ft/sec	4.55	2.99	3.50	5.44	4.46	6.55	6.02	5.03
Travel time	Tt	hours	0.193	0.215	0.295	0.247	0.401	0.314	0.099	0.034
2 Flow Length	L	feet	-	1,769	-	4,809	-	-	-	-
Slope	S	ft/ft	0.0000	0.0099	0.0000	0.0072	0.0000	0.0000	0.0000	0.0000
roughness	n	n/a	0	0.1	0	0.1	0	0	0	0
Open Channel										
Bottom Width	BW	feet	0	5	0	10	0	0	0	0
Side Slopes (H:1)	H	feet	0	3	0	3	0	0	0	0
Depth	d	feet	0	10	0	20	0	0	0	0
...or Closed Conduit										
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	0.00	350.00	0.00	1400.00	0.00	0.00	0.00	0.00
Flow Rate	Q	cfs	0.00	1541.62	0.00	8375.51	0.00	0.00	0.00	0.00
Velocity	V	ft/sec	0.00	4.40	0.00	5.98	0.00	0.00	0.00	0.00
Travel time	Tt	hours	-	0.112	-	0.223	-	-	-	-
3 Flow Length	L	feet	-	-	-	-	-	-	-	-
Slope	S	ft/ft	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
roughness	n	n/a	0	0	0	0	0	0	0	0
Open Channel										
Bottom Width	BW	feet	0	0	0	0	0	0	0	0
Side Slopes (H:1)	H	feet	0	0	0	0	0	0	0	0
Depth	d	feet	0	0	0	0	0	0	0	0
...or Closed Conduit										
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flow Rate	Q	cfs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Velocity	V	ft/sec	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Travel time	Tt	hours	-	-	-	-	-	-	-	-
Total Travel Time										
	TC	hours	0.904	0.571	0.885	1.212	0.950	0.655	0.352	0.440
	TC	min.	54.2	34.3	53.1	72.7	57.0	39.3	21.1	26.4
Lag Time										
	TL	hours	0.5423	0.3429	0.5308	0.7274	0.5702	0.3928	0.2111	0.2640
	TL	min.	32.5	20.6	31.9	43.6	34.2	23.6	12.7	15.8

EXISTING CONDITIONS									
TR-55 Method of Computing the Time of Concentration									
			POC_F_03	POC_G_01	POC_G_01A	POC_G_02	POC_G_03	POC_G_04	POC_G_04A
Sheet Flow	variable	units							
Manning's roughness coef.	n	n/a	0.240	0.240	0.240	0.240	0.240	0.240	0.240
Flow Length	L	feet	40	150	100	100	40	40	40
2-year, 24-hour rainfall	P2	inches	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Slope	s	ft/ft	0.0129	0.0321	0.0040	0.0100	0.0198	0.0198	0.0300
Travel time	Tt	hours	0.122	0.243	0.405	0.281	0.103	0.103	0.087
Shallow Concentrated Flow			7.3	14.6	24.3	16.8	6.2	6.2	5.2
Flow Length	L	feet	8,382	480	2,051	2,056	4,050	4,050	244
Slope	s	ft/ft	0.009	0.008	0.014	0.027	0.001	0.001	0.032
Surface (1=paved or 2=unpaved)		n/a	1	2	2	2	1	1	2
Velocity	V	ft/sec	1.91	1.46	1.91	2.67	0.65	0.65	2.91
Travel time	Tt	hours	1.217	0.091	0.298	0.214	1.727	1.727	0.023
Manning's Equation		min.	73.0	5.5	17.9	12.8	103.6	103.6	1.4
1 Flow Length	L	feet	1,799	2,114	2,476	7,129	3,249	3,249	956
Slope	S	ft/ft	0.0037	0.0185	0.0163	0.0069	0.0092	0.0092	0.0202
roughness	n	n/a	0.1	0.1	0.1	0.1	0.1	0.1	0.015
Open Channel									
Bottom Width	BW	feet	5	5	2	5	2	2	5
Side Slopes (H:1)	H	feet	3	3	3	3	3	3	0
Depth	d	feet	10	10	5	10	5	5	0.5
...or Closed Conduit									
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	350.00	350.00	85.00	350.00	85.00	85.00	2.50
Flow Rate	Q	cfs	944.62	2107.75	299.98	1291.31	225.97	225.97	19.70
Velocity	V	ft/sec	2.70	6.02	3.53	3.69	2.66	2.66	7.88
Travel time	Tt	hours	0.185	0.097	0.195	0.537	0.339	0.339	0.034
2 Flow Length	L	feet	-	-	3,242	-	2,658	2,658	1,015
Slope	S	ft/ft	0.0000	0.0000	0.0127	0.0000	0.0120	0.0120	0.0213
roughness	n	n/a	0	0	0.1	0	0.1	0.1	0.03
Open Channel									
Bottom Width	BW	feet	0	0	5	0	5	5	1
Side Slopes (H:1)	H	feet	0	0	3	0	3	3	3
Depth	d	feet	0	0	10	0	10	10	2
...or Closed Conduit									
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	0.00	0.00	350.00	0.00	350.00	350.00	14.00
Flow Rate	Q	cfs	0.00	0.00	1747.91	0.00	1701.65	1701.65	103.17
Velocity	V	ft/sec	15.00	0.00	4.99	0.00	4.86	4.86	7.37
Travel time	Tt	hours	-	-	0.180	-	0.152	0.152	0.038
3 Flow Length	L	feet	-	-	-	-	-	-	1,239
Slope	S	ft/ft	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0128
roughness	n	n/a	0	0	0	0	0	0	0.1
Open Channel									
Bottom Width	BW	feet	0	0	0	0	0	0	5
Side Slopes (H:1)	H	feet	0	0	0	0	0	0	3
Depth	d	feet	0	0	0	0	0	0	10
...or Closed Conduit									
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	0.00	0.00	0.00	0.00	0.00	0.00	350.00
Flow Rate	Q	cfs	0.00	0.00	0.00	0.00	0.00	0.00	1757.72
Velocity	V	ft/sec	0.00	0.00	0.00	0.00	0.00	0.00	5.02
Travel time	Tt	hours	-	-	-	-	-	-	0.069
Total Travel Time	TC	hours	1.524	0.432	1.078	1.031	2.321	2.321	0.251
	TC	min.	91.5	25.9	64.7	61.9	139.3	139.3	15.0
Lag Time	TL	hours	0.9145	0.2591	0.6469	0.6186	1.3926	1.3926	0.1504
	TL	min.	54.9	15.5	38.8	37.1	83.6	83.6	9.0

EXISTING CONDITIONS										
TR-55 Method of Computing the Time of Concentration										
			POC_G_04B	SC_01	SC_02	SC_02A	SC_03	SC_04	SC_05	SC_06
Sheet Flow										
	variable	units								
Manning's roughness coef.	n	n/a	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240
Flow Length	L	feet	40	150	150	50	100	200	200	150
2-year, 24-hour rainfall	P2	inches	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Slope	s	ft/ft	0.0156	0.0265	0.0080	0.0100	0.0100	0.0076	0.0045	0.0032
Travel time	Tt	hours	0.113	0.263	0.424	0.161	0.281	0.545	0.672	0.614
		min.	6.8	15.8	25.5	9.7	16.8	32.7	40.3	36.8
Shallow Concentrated Flow										
Flow Length	L	feet	1,878	1,268	1,993	1,363	2,168	2,393	5,703	1,444
Slope	s	ft/ft	0.014	0.032	0.003	0.047	0.024	0.015	0.009	0.010
Surface (1=paved or 2=unpaved)		n/a	1	2	2	1	2	2	2	2
Velocity	V	ft/sec	2.42	2.88	0.89	4.46	2.50	2.00	1.54	1.58
Travel time	Tt	hours	0.215	0.122	0.624	0.085	0.240	0.333	1.029	0.253
		min.	12.9	7.3	37.4	5.1	14.4	20.0	61.7	15.2
Manning's Equation										
1 Flow Length	L	feet	3,230	2,833	4,038	1,602	1,710	6,912	3,956	2,383
Slope	S	ft/ft	0.0109	0.0211	0.0117	0.0251	0.0249	0.0116	0.0032	0.0238
roughness	n	n/a	0.1	0.1	0.1	0.04	0.1	0.1	0.1	0.1
Open Channel										
Bottom Width	BW	feet	2	5	2	3	5	10	10	2
Side Slopes (H:1)	H	feet	3	3	3	5	3	2	2	3
Depth	d	feet	5	10	5	1.5	10	10	10	5
...or Closed Conduit										
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	85.00	350.00	85.00	15.75	350.00	300.00	300.00	85.00
Flow Rate	Q	cfs	245.71	2255.36	254.57	84.04	2445.15	1493.86	781.11	362.44
Velocity	V	ft/sec	2.89	6.44	2.99	5.34	6.99	4.98	2.60	4.26
Travel time	Tt	hours	0.310	0.122	0.375	0.083	0.068	0.386	0.422	0.155
		min.	18.6	7.3	22.5	5.0	4.1	23.2	25.3	9.3
2 Flow Length	L	feet	-	0	5,494	-	3,446	-	-	3,118
Slope	S	ft/ft	0.0000	0.0100	0.0023	0.0000	0.0021	0.0000	0.0000	0.0043
roughness	n	n/a	0	0.1	0.1	0.013	0.1	0	0	0.1
Open Channel										
Bottom Width	BW	feet	0	10	10	0	10	0	0	10
Side Slopes (H:1)	H	feet	0	3	3	0	3	0	0	3
Depth	d	feet	0	20	20	0	20	0	0	20
...or Closed Conduit										
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	0.00	1400.00	1400.00	0.00	1400.00	0.00	0.00	1400.00
Flow Rate	Q	cfs	0.00	9848.36	4707.86	0.00	4527.43	0.00	0.00	6491.63
Velocity	V	ft/sec	0.00	7.03	3.36	0.00	3.23	0.00	0.00	4.64
Travel time	Tt	hours	-	0.000	0.454	-	0.296	-	-	0.187
		min.	-	0.0	27.2	-	17.8	-	-	11.2
3 Flow Length	L	feet	-	-	-	-	-	-	-	-
Slope	S	ft/ft	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
roughness	n	n/a	0	0	0	0.013	0	0	0	0
Open Channel										
Bottom Width	BW	feet	0	0	0	3	0	0	0	0
Side Slopes (H:1)	H	feet	0	0	0	5	0	0	0	0
Depth	d	feet	0	0	0	3	0	0	0	0
...or Closed Conduit										
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	0.00	0.00	0.00	54.00	0.00	0.00	0.00	0.00
Flow Rate	Q	cfs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Velocity	V	ft/sec	0.00	0.00	0.00	15.00	0.00	0.00	0.00	0.00
Travel time	Tt	hours	-	-	-	-	-	-	-	-
		min.	-	-	-	-	-	-	-	-
Total Travel Time										
	TC	hours	0.639	0.507	1.877	0.330	0.885	1.264	2.123	1.209
	TC	min.	38.3	30.4	112.6	19.8	53.1	75.8	127.4	72.5
Lag Time										
	TL	hours	0.3832	0.3043	1.1261	0.1977	0.5311	0.7581	1.2737	0.7255
	TL	min.	23.0	18.3	67.6	11.9	31.9	45.5	76.4	43.5

EXISTING CONDITIONS											
TR-55 Method of Computing the Time of Concentration											
			SC_07	SC_08	SC_A_01	SC_A_02	SC_B_01	SC_B_02	SC_B_03	SC_C_01	SC_C_02
Sheet Flow	variable	units									
Manning's roughness coef.	n	n/a	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240
Flow Length	L	feet	150	150	150	150	150	150	150	150	150
2-year, 24-hour rainfall	P2	inches	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Slope	s	ft/ft	0.0020	0.0210	0.0279	0.0133	0.0038	0.0024	150.0000	150.0000	0.0142
Travel time	Tt	hours	0.739	0.288	0.258	0.346	0.574	0.689	0.008	0.008	0.337
		min.	44.3	17.3	15.5	20.8	34.5	41.3	0.5	0.5	20.2
Shallow Concentrated Flow											
Flow Length	L	feet	3,007	2,892	804	1,811	1,425	3,051	843	2,698	1,686
Slope	s	ft/ft	0.002	0.012	0.055	0.016	0.011	0.011	150.000	0.022	0.015
Surface (1=paved or 2=unpaved)		n/a	2	2	2	2	2	2	2	2	2
Velocity	V	ft/sec	0.72	1.76	3.78	2.05	1.67	1.73	198.41	2.42	1.97
Travel time	Tt	hours	1.153	0.458	0.059	0.246	0.237	0.490	0.001	0.310	0.238
		min.	69.2	27.5	3.5	14.7	14.2	29.4	0.1	18.6	14.3
Manning's Equation											
1 Flow Length	L	feet	2,194	3,000	1,274	2,098	5,347	3,777	8,751	3,373	4,107
Slope	S	ft/ft	0.0128	0.0090	0.0516	0.0172	0.0128	0.0136	0.0091	0.0106	0.0085
roughness	n	n/a	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Open Channel											
Bottom Width	BW	feet	5	5	5	5	5	5	5	5	5
Side Slopes (H:1)	H	feet	5	3	3	3	3	3	3	3	3
Depth	d	feet	2	5	5	10	10	10	10	20	10
...or Closed Conduit											
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	30.00	100.00	100.00	350.00	350.00	350.00	350.00	1300.00	350.00
Flow Rate	Q	cfs	56.44	275.58	660.97	2031.30	1755.89	1805.69	1480.46	9205.68	1425.94
Velocity	V	ft/sec	1.88	2.76	6.61	5.80	5.02	5.16	4.23	7.08	4.07
Travel time	Tt	hours	0.324	0.302	0.054	0.100	0.296	0.203	0.575	0.132	0.280
2 Flow Length	L	feet	4,044	4,566	2,919	4,992	3,374	1,847	-	-	-
Slope	S	ft/ft	0.0094	0.0105	0.0063	0.0092	0.0112	0.0080	0.0000	0.0000	0.0000
roughness	n	n/a	0.1	0.1	0.1	0.1	0.1	0.1	0	0	0
Open Channel											
Bottom Width	BW	feet	0	5	5	5	5	5	0	0	0
Side Slopes (H:1)	H	feet	2	3	3	3	3	3	0	0	0
Depth	d	feet	20	20	20	20	20	20	0	0	0
...or Closed Conduit											
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	800.00	1300.00	1300.00	1300.00	1300.00	1300.00	0.00	0.00	0.00
Flow Rate	Q	cfs	4978.30	9144.60	7067.64	8565.94	9463.60	7981.28	0.00	0.00	0.00
Velocity	V	ft/sec	6.22	7.03	5.44	6.59	7.28	6.14	0.00	0.00	0.00
Travel time	Tt	hours	0.181	0.180	0.149	0.210	0.129	0.084	-	-	-
3 Flow Length	L	feet	-	-	-	-	-	-	-	-	-
Slope	S	ft/ft	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
roughness	n	n/a	0	0	0	0	0	0	0	0	0
Open Channel											
Bottom Width	BW	feet	0	0	0	0	0	0	0	0	0
Side Slopes (H:1)	H	feet	0	0	0	0	0	0	0	0	0
Depth	d	feet	0	0	0	0	0	0	0	0	0
...or Closed Conduit											
Rise / Diameter	R / D	feet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Span (0 if circular)	S	feet	0	0	0	0	0	0	0	0	0
Cross-Sectional Area	X-A	feet^2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Flow Rate	Q	cfs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Velocity	V	ft/sec	0.00	15.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00
Travel time	Tt	hours	-	-	-	-	-	-	-	-	-
Total Travel Time	TC	hours	2.397	1.229	0.519	0.903	1.236	1.466	0.584	0.451	0.856
	TC	min.	143.8	73.7	31.2	54.2	74.1	88.0	35.0	27.0	51.3
Lag Time	TL	hours	1.4379	0.7372	0.3116	0.5416	0.7415	0.8797	0.3505	0.2705	0.5133
	TL	min.	86.3	44.2	18.7	32.5	44.5	52.8	21.0	16.2	30.8



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Appendix E – HMS

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HMS Node	Existing Condition Flows							Ultimate 100 yr
	2 yr	5 yr	10 yr	25 yr	50 yr	100 yr	500 yr	
EF-01	94	144	175	207	237	269	316	273
EF-02	21	32	39	46	53	60	70	60
EF-03	51	77	93	109	125	142	166	142
EF-04	30	47	57	68	78	88	104	88
EF-05	239	381	469	562	650	742	882	748
EF-05A	22	36	44	53	61	70	83	69
EF-06	419	665	819	986	1,139	1,298	1,548	1,308
EF-06A	206	315	382	451	516	587	689	591
EF-06B	18	28	34	40	46	52	61	53
EF-06C	175	267	325	384	440	501	588	502
EF-06D	181	281	342	406	467	533	628	533
EF-07	176	272	333	397	456	519	614	521
EF-08	176	269	326	384	440	500	587	499
EF-09	62	97	118	140	161	184	216	184
EF-10	256	409	505	609	705	805	960	796
EF-10A	178	270	327	385	440	500	586	500
EF-11	544	856	1,052	1,262	1,457	1,663	1,976	1,744
EF-12	161	252	309	367	422	481	568	494
EF-13	257	417	518	625	729	836	999	877
EF J-01	2,491	3,891	4,677	5,470	5,732	6,061	6,668	6,105
EF J-02	2,473	3,862	4,647	5,440	5,690	6,019	6,622	6,064
EF J-03	2,480	3,881	4,669	5,462	5,784	6,158	6,813	6,205
EF J-04	1,852	2,913	3,559	4,261	4,897	5,558	6,684	5,774
EF J-04A	1,350	2,144	2,629	3,173	3,648	4,169	4,969	4,380
EF J-05	1,185	1,896	2,329	2,819	3,248	3,698	4,357	3,888
EF J-06	1,144	1,832	2,258	2,725	3,149	3,574	4,190	3,749
EF J-06A	563	872	1,063	1,262	1,453	1,667	1,964	1,673
EF J-06B	375	582	709	840	966	1,101	1,298	1,103
EF J-07	1,089	1,746	2,158	2,594	3,011	3,421	4,033	3,600
EF J-08	896	1,428	1,762	2,124	2,462	2,814	3,356	2,989
EF R-01	2,490	3,890	4,676	5,471	5,732	6,061	6,668	6,105
EF R-02	2,470	3,861	4,643	5,424	5,687	6,016	6,618	6,061
EF R-03	2,473	3,862	4,647	5,440	5,690	6,019	6,622	6,064
EF R-04	1,837	2,869	3,445	3,963	4,127	4,353	4,783	4,423
EF R-05	1,184	1,893	2,326	2,814	3,242	3,692	4,336	3,882
EF R-06	1,139	1,822	2,242	2,707	3,126	3,559	4,179	3,739
EF R-06A	368	572	698	829	953	1,092	1,288	1,095
EF R-06C	179	279	341	405	465	531	627	532
EF R-07	1,079	1,728	2,131	2,564	2,970	3,381	3,982	3,553
EF R-08	858	1,372	1,695	2,041	2,366	2,695	3,190	2,874
EF R-09	254	412	511	618	721	826	985	868
NRCS 11	358	380	392	405	416	504	1,660	702
NRCS 8A	317	361	383	403	420	434	466	444
NRCS 10A	117	122	125	128	131	134	632	133
Outlet1	6,732	11,354	14,373	17,688	20,738	23,841	29,441	24,379
POC 01	270	456	574	700	822	948	1,145	978
POC-02	412	662	820	995	1,155	1,320	1,585	1,342
POC-02A	120	210	266	326	385	445	538	466
POC-03	361	583	722	872	1,012	1,158	1,384	1,145
POC-03A	711	1,138	1,408	1,697	1,966	2,249	2,683	2,244
POC-04	202	320	393	469	542	620	734	603
POC-04A	430	711	889	1,081	1,261	1,447	1,740	1,427
POC-05	289	452	553	659	759	866	1,025	870
POC-06	258	415	514	617	715	819	975	821
POC-07	222	362	449	540	628	720	859	722
POC-08	260	423	527	645	752	859	1,041	849
POC-09	250	405	504	616	718	820	995	820
POC-09A	128	211	264	319	372	428	513	428

HMS Node	Existing Condition Flows							Ultimate 100 yr
	2 yr	5 yr	10 yr	25 yr	50 yr	100 yr	500 yr	
POC-09B	132	215	268	324	377	433	518	437
POC-09C	64	106	133	163	190	218	263	219
POC-09D	99	164	206	252	295	338	409	339
POC-10	239	395	494	602	704	810	976	789
POC-11	116	185	228	273	316	361	428	362
POC 12	446	786	1,007	1,255	1,488	1,718	2,111	1,825
POC-12A	62	106	133	161	188	216	259	224
POC-13	79	144	185	230	274	319	391	343
POC 14	210	367	467	576	682	789	962	844
POC 15	396	678	857	1,049	1,234	1,424	1,722	1,504
POC-16	208	386	502	632	757	881	1,090	960
POC-17	201	365	471	587	699	812	996	863
POC-18	345	547	674	810	936	1,069	1,271	1,065
POC-19	105	193	250	311	370	432	530	467
POC-20	202	372	482	601	718	835	1,025	903
POC E01	278	447	555	672	780	892	1,071	875
POC E-02	340	587	744	915	1,079	1,246	1,511	1,314
POC E R-01	315	573	725	887	1,019	1,149	1,416	1,209
POC F01	331	526	648	776	898	1,027	1,221	1,018
POC F02	99	151	183	216	247	281	329	271
POC F-02A	106	166	203	242	279	318	376	318
POC F-03	590	919	1,127	1,356	1,561	1,776	2,117	1,792
POC F J-01	619	974	1,196	1,451	1,664	1,883	2,239	1,898
POC F J-02	590	919	1,127	1,356	1,561	1,776	2,117	1,792
POC F R-01	604	951	1,170	1,429	1,646	1,862	2,206	1,875
POC F R-02	577	906	1,112	1,338	1,540	1,749	2,080	1,765
POC G01	23	40	51	62	73	84	101	88
POC G-01A	172	287	360	439	513	589	710	598
POC G02	42	73	93	115	135	157	191	159
POC G-03	90	151	191	238	280	322	398	318
POC G04	232	376	470	578	674	770	943	775
POC G-04A	80	132	165	199	232	267	320	271
POC G-04B	164	268	333	403	469	539	647	548
POC G J-01	529	773	926	1,086	1,175	1,250	1,447	1,250
POC G J-02	426	703	883	988	1,032	1,074	1,152	1,070
POC G J-03	346	566	707	869	1,026	1,181	1,464	1,200
POC G R-01	528	668	811	963	1,063	1,128	1,397	1,129
POC G R-02	422	659	846	979	1,025	1,068	1,148	1,064
POC G R-03	344	554	694	784	907	941	1,015	942
POC G R-04	162	264	328	397	464	535	639	546
POC J-01	6,708	11,346	14,350	17,649	20,713	23,832	29,368	24,374
POC J-02	6,307	10,685	13,554	16,714	19,676	22,712	28,077	23,250
POC J-03	6,018	10,276	13,039	16,095	19,038	22,015	27,315	22,560
POC J-04	5,993	10,252	12,932	15,984	18,958	21,992	27,139	22,546
POC J-05	5,862	10,105	12,743	15,951	19,155	21,727	26,840	22,326
POC J-06	5,777	9,992	12,604	15,828	19,009	21,549	26,413	22,156
POC J-07	3,403	5,417	6,649	8,002	9,617	10,756	12,485	10,908
POC J-08	1,660	2,750	3,480	4,309	5,008	5,716	6,884	5,731
POC J-09	1,638	2,755	3,464	4,254	4,941	5,663	6,748	5,675
POC J-09A	293	488	611	742	865	985	1,089	987
POC J-09B	181	298	373	453	528	607	731	613
POC J-10	1,395	2,370	2,975	3,653	4,238	4,905	5,785	4,922
POC J-11	901	1,589	1,991	2,425	2,771	3,076	3,596	3,087
POC J-12	348	384	397	413	430	518	1,684	719
POC J-13	698	1,251	2,020	3,335	4,083	4,867	6,175	5,282
POC J-14	912	1,689	2,612	3,528	4,157	4,926	6,180	5,304
POC J-15	588	1,040	1,329	1,647	1,953	2,262	2,765	2,423
POC J-16	476	821	1,019	1,292	1,537	1,792	2,101	1,815

HMS Node	Existing Condition Flows							Ultimate 100 yr
	2 yr	5 yr	10 yr	25 yr	50 yr	100 yr	500 yr	
POC J-17	332	616	783	1,001	1,206	1,408	1,684	1,522
POC R-01	6,701	11,314	14,316	17,631	20,667	23,759	29,325	24,297
POC R-02	6,307	10,685	13,554	16,713	19,674	22,709	28,073	23,247
POC R-03	6,018	10,271	13,022	16,081	19,010	21,982	27,228	22,526
POC R-04	5,948	10,154	12,871	15,915	18,815	21,768	26,960	22,315
POC R-05	5,839	10,018	12,627	15,651	18,539	21,528	26,449	22,092
POC R-06	5,765	9,955	12,547	15,702	18,853	21,429	26,348	22,035
POC R-07	3,346	5,356	6,557	7,938	9,504	10,600	12,455	10,740
POC R-08	1,628	2,670	3,372	4,215	4,913	5,566	6,633	5,583
POC R-09	1,615	2,697	3,413	4,212	4,891	5,581	6,689	5,596
POC R-09A	285	476	598	729	853	897	977	899
POC R-09B	180	296	370	450	525	573	638	575
POC R-09C	64	106	133	163	190	218	263	219
POC R-10	1,383	2,342	2,947	3,620	4,202	4,813	5,748	4,834
POC R-11	862	1,503	1,891	2,320	2,679	2,978	3,530	2,998
POC R-12	348	383	396	412	430	518	1,684	711
POC R-13	344	379	392	405	416	504	1,655	701
POC R-14	698	1,251	2,020	3,335	4,083	4,867	6,175	5,282
POC R-15	691	1,236	1,992	3,286	4,011	4,761	6,013	5,155
POC R-16	568	1,006	1,288	1,626	1,938	2,243	2,727	2,404
POC R-17	362	667	902	1,139	1,346	1,570	1,809	1,596
POC R-17A	334	535	657	796	923	1,058	1,250	1,042
POC R-18	141	263	494	741	930	1,115	1,386	1,232
POC R-19	198	365	468	594	710	827	948	894
SC 01	421	679	840	1,008	1,169	1,340	1,595	1,332
SC 02	513	828	1,031	1,259	1,464	1,671	2,023	1,641
SC-02A	118	192	239	287	334	384	457	384
SC 03	803	1,333	1,669	2,032	2,376	2,733	3,292	2,708
SC 04	281	479	607	749	882	1,018	1,243	1,053
SC-05	275	505	656	832	994	1,152	1,440	1,246
SC-06	194	367	481	608	731	852	1,059	939
SC-07	250	452	585	742	886	1,024	1,283	1,110
SC-08	541	987	1,275	1,595	1,899	2,204	2,710	2,375
SC A01	259	425	529	638	743	854	1,021	846
SC A-02	1,224	1,960	2,422	2,914	3,375	3,861	4,599	3,768
SC A R-01	117	122	125	128	131	133	631	133
SC B-01	893	1,483	1,860	2,273	2,658	3,052	3,684	3,111
SC B-02	598	1,068	1,372	1,713	2,033	2,351	2,888	2,495
SC B-03	1,160	2,061	2,633	3,242	3,832	4,441	5,391	4,739
SC B J-01	1,619	2,984	3,840	4,715	5,598	6,481	8,041	6,949
SC B R-01	1,558	2,920	3,755	4,600	5,445	6,293	7,722	6,745
SC B R-02	1,030	1,916	2,469	3,009	3,576	4,143	5,153	4,464
SC C-01	198	359	461	569	675	784	955	844
SC C-02	351	635	817	1,014	1,205	1,398	1,708	1,506
SC C R-01	196	324	350	682	1,048	1,320	1,506	1,464
SC J-01	3,269	5,807	7,277	8,688	10,129	11,561	14,101	12,005
SC J-02	2,805	5,109	6,512	8,019	9,365	10,694	13,090	11,226
SC J-03	2,816	5,187	6,577	8,049	9,391	10,725	13,092	11,265
SC J-04	2,673	4,926	6,248	7,531	8,797	10,086	12,345	10,654
SC J-05	722	1,268	1,546	1,707	2,670	3,755	5,985	4,535
SC J-06	719	1,314	1,702	2,143	2,560	2,968	3,694	3,212
SC R-01	3,175	5,666	7,153	8,619	9,975	11,380	13,956	11,853
SC R-02	2,775	5,036	6,375	7,705	8,997	10,295	12,553	10,771
SC R-03	2,790	5,089	6,490	7,986	9,323	10,648	13,001	11,180
SC R-04	2,568	4,709	5,976	7,287	8,513	9,749	11,858	10,287
SC R-05	317	360	381	402	419	432	465	443
SC R-06	722	1,268	1,546	1,707	2,670	3,755	5,985	4,535
SC R-07	492	890	1,121	1,246	1,891	2,536	3,608	2,958
SC T2 R-01	117	186	232	280	327	378	384	381



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Appendix F – RAS

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HEC-RAS Plan: Exist Locations: User Defined

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
EF Post Oak Crk	T2	836	178.00	736.31	743.34	738.16	743.36	0.000270	1.00	177.29	41.86	0.09
EF Post Oak Crk	T2	836	270.00	736.31	744.95	738.65	744.97	0.000210	1.06	285.81	119.16	0.08
EF Post Oak Crk	T2	836	327.00	736.31	745.18	738.94	745.21	0.000260	1.21	314.57	128.98	0.09
EF Post Oak Crk	T2	836	385.00	736.31	745.36	739.20	745.39	0.000317	1.37	337.88	135.77	0.10
EF Post Oak Crk	T2	836	440.00	736.31	745.49	739.43	745.52	0.000378	1.52	355.01	140.56	0.11
EF Post Oak Crk	T2	836	500.00	736.31	745.61	739.66	745.65	0.000446	1.67	373.04	145.53	0.12
EF Post Oak Crk	T2	836	500.00	736.31	745.62	739.66	745.66	0.000443	1.66	374.38	145.90	0.12
EF Post Oak Crk	T2	836	586.00	736.31	745.75	739.97	745.80	0.000555	1.89	393.33	150.90	0.13
EF Post Oak Crk	T2	790	Culvert									
EF Post Oak Crk	T2	720	178.00	734.00	736.30		736.53	0.010514	3.86	46.15	23.21	0.48
EF Post Oak Crk	T2	720	270.00	734.00	737.51		737.70	0.005565	3.57	75.59	25.70	0.37
EF Post Oak Crk	T2	720	327.00	734.00	738.18		738.37	0.004329	3.51	93.33	27.47	0.33
EF Post Oak Crk	T2	720	385.00	734.00	738.82		739.01	0.003397	3.48	111.97	30.34	0.30
EF Post Oak Crk	T2	720	440.00	734.00	739.38		739.57	0.002888	3.49	129.46	32.54	0.28
EF Post Oak Crk	T2	720	500.00	734.00	739.92		740.11	0.002559	3.53	147.66	34.63	0.27
EF Post Oak Crk	T2	720	500.00	734.00	739.83		740.03	0.002723	3.60	144.45	34.27	0.28
EF Post Oak Crk	T2	720	586.00	734.00	740.65		740.85	0.002226	3.59	174.50	38.81	0.26
EF Post Oak Crk	T2	500	178.00	730.00	735.30		735.37	0.002982	2.08	85.44	26.38	0.20
EF Post Oak Crk	T2	500	270.00	730.00	736.86		736.93	0.002227	2.04	132.13	33.75	0.18
EF Post Oak Crk	T2	500	327.00	730.00	737.64		737.70	0.002016	2.05	159.90	37.94	0.18
EF Post Oak Crk	T2	500	385.00	730.00	738.40		738.46	0.001683	2.03	191.58	48.65	0.16
EF Post Oak Crk	T2	500	440.00	730.00	739.03		739.10	0.001423	2.03	226.85	62.49	0.15
EF Post Oak Crk	T2	500	500.00	730.00	739.63		739.69	0.001251	2.04	267.37	73.68	0.15
EF Post Oak Crk	T2	500	500.00	730.00	739.51		739.58	0.001347	2.09	258.86	71.46	0.15
EF Post Oak Crk	T2	500	586.00	730.00	740.42		740.48	0.001072	2.05	339.05	111.76	0.14
EF Post Oak Crk	T1	8540	181.00	796.00	800.32		800.33	0.000491	1.06	170.11	62.16	0.11
EF Post Oak Crk	T1	8540	281.00	796.00	801.10		801.12	0.000584	1.26	222.51	71.61	0.13
EF Post Oak Crk	T1	8540	342.00	796.00	801.49		801.52	0.000632	1.36	251.30	76.68	0.13
EF Post Oak Crk	T1	8540	406.00	796.00	801.85		801.88	0.000673	1.45	279.78	81.37	0.14
EF Post Oak Crk	T1	8540	467.00	796.00	802.15		802.19	0.000707	1.53	305.19	85.04	0.14
EF Post Oak Crk	T1	8540	533.00	796.00	802.46		802.50	0.000738	1.61	331.65	88.67	0.15
EF Post Oak Crk	T1	8540	533.00	796.00	802.46		802.50	0.000738	1.61	331.65	88.67	0.15
EF Post Oak Crk	T1	8540	628.00	796.00	802.88		802.93	0.000765	1.70	370.19	93.72	0.15
EF Post Oak Crk	T1	8220	181.00	796.00	799.95	797.81	800.00	0.003268	1.85	97.62	41.25	0.21
EF Post Oak Crk	T1	8220	281.00	796.00	800.66	798.27	800.74	0.003715	2.17	129.22	47.31	0.23
EF Post Oak Crk	T1	8220	342.00	796.00	801.01	798.51	801.10	0.003943	2.34	146.34	50.27	0.24

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
EF Post Oak Crk	T1	8220	406.00	796.00	801.34	798.74	801.44	0.004149	2.49	163.21	53.03	0.25
EF Post Oak Crk	T1	8220	467.00	796.00	801.62	798.94	801.72	0.004343	2.62	178.18	55.40	0.26
EF Post Oak Crk	T1	8220	533.00	796.00	801.89	799.13	802.01	0.004524	2.75	193.88	57.84	0.26
EF Post Oak Crk	T1	8220	533.00	796.00	801.89	799.13	802.01	0.004524	2.75	193.88	57.84	0.26
EF Post Oak Crk	T1	8220	628.00	796.00	802.29	799.41	802.42	0.004792	2.89	217.60	63.08	0.27
EF Post Oak Crk	T1	7717	181.00	794.09	794.89	794.89	795.11	0.125271	3.83	47.27	106.30	1.01
EF Post Oak Crk	T1	7717	281.00	794.09	795.05	795.05	795.33	0.116563	4.28	65.66	118.39	1.01
EF Post Oak Crk	T1	7717	342.00	794.09	795.14	795.14	795.45	0.112647	4.49	76.23	124.81	1.01
EF Post Oak Crk	T1	7717	406.00	794.09	795.22	795.22	795.56	0.109416	4.67	86.89	130.98	1.01
EF Post Oak Crk	T1	7717	467.00	794.09	795.30	795.30	795.66	0.105875	4.81	97.06	136.59	1.01
EF Post Oak Crk	T1	7717	533.00	794.09	795.37	795.37	795.75	0.104942	4.99	106.75	141.17	1.01
EF Post Oak Crk	T1	7717	533.00	794.09	795.37	795.37	795.75	0.104942	4.99	106.75	141.17	1.01
EF Post Oak Crk	T1	7717	628.00	794.09	795.46	795.46	795.88	0.101485	5.18	121.13	147.65	1.01
EF Post Oak Crk	T1	7193	181.00	770.00	775.03		775.07	0.001759	1.72	105.32	29.32	0.16
EF Post Oak Crk	T1	7193	281.00	770.00	776.15		776.22	0.001971	2.00	140.37	33.61	0.17
EF Post Oak Crk	T1	7193	342.00	770.00	776.71		776.79	0.002197	2.13	160.54	38.29	0.18
EF Post Oak Crk	T1	7193	406.00	770.00	777.23		777.30	0.002365	2.24	181.26	42.63	0.19
EF Post Oak Crk	T1	7193	467.00	770.00	777.66		777.74	0.002478	2.33	200.54	46.27	0.20
EF Post Oak Crk	T1	7193	533.00	770.00	778.08		778.17	0.002568	2.42	220.46	49.53	0.20
EF Post Oak Crk	T1	7193	533.00	770.00	778.08		778.17	0.002568	2.42	220.46	49.53	0.20
EF Post Oak Crk	T1	7193	628.00	770.00	778.60		778.70	0.002635	2.54	247.49	52.72	0.21
EF Post Oak Crk	T1	6711	181.00	770.00	774.23		774.26	0.001602	1.54	117.23	37.15	0.15
EF Post Oak Crk	T1	6711	281.00	770.00	775.31		775.35	0.001611	1.76	159.77	41.53	0.16
EF Post Oak Crk	T1	6711	342.00	770.00	775.80		775.86	0.001685	1.89	180.89	43.50	0.16
EF Post Oak Crk	T1	6711	406.00	770.00	776.23		776.30	0.001843	2.03	200.17	46.35	0.17
EF Post Oak Crk	T1	6711	467.00	770.00	776.59		776.67	0.002022	2.15	217.43	49.60	0.18
EF Post Oak Crk	T1	6711	533.00	770.00	776.94		777.02	0.002193	2.27	235.29	52.76	0.19
EF Post Oak Crk	T1	6711	533.00	770.00	776.94		777.02	0.002193	2.27	235.29	52.76	0.19
EF Post Oak Crk	T1	6711	628.00	770.00	777.40		777.49	0.002397	2.41	260.36	56.90	0.20
EF Post Oak Crk	T1	6208	181.00	770.00	772.91		772.98	0.004667	2.08	86.87	40.50	0.25
EF Post Oak Crk	T1	6208	281.00	770.00	774.32		774.37	0.002418	1.86	151.00	50.75	0.19
EF Post Oak Crk	T1	6208	342.00	770.00	774.82		774.87	0.002305	1.93	177.27	54.40	0.19
EF Post Oak Crk	T1	6208	406.00	770.00	775.17		775.24	0.002423	2.06	197.30	57.04	0.19
EF Post Oak Crk	T1	6208	467.00	770.00	775.44		775.52	0.002610	2.20	212.72	58.99	0.20
EF Post Oak Crk	T1	6208	533.00	770.00	775.69		775.78	0.002822	2.34	227.75	60.83	0.21
EF Post Oak Crk	T1	6208	533.00	770.00	775.69		775.78	0.002822	2.34	227.75	60.83	0.21
EF Post Oak Crk	T1	6208	628.00	770.00	776.03		776.13	0.003082	2.52	248.74	63.31	0.22

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
EF Post Oak Crk	T1	6099	181.00	770.00	772.34	771.25	772.44	0.005038	2.54	71.29	40.51	0.34
EF Post Oak Crk	T1	6099	281.00	770.00	774.13	771.61	774.18	0.001341	1.80	155.73	54.46	0.19
EF Post Oak Crk	T1	6099	342.00	770.00	774.64	771.81	774.69	0.001253	1.85	184.78	59.10	0.18
EF Post Oak Crk	T1	6099	406.00	770.00	774.99	772.00	775.05	0.001319	1.97	206.08	62.35	0.19
EF Post Oak Crk	T1	6099	467.00	770.00	775.24	772.16	775.31	0.001431	2.10	222.00	64.70	0.20
EF Post Oak Crk	T1	6099	533.00	770.00	775.47	772.33	775.55	0.001559	2.25	237.37	66.89	0.21
EF Post Oak Crk	T1	6099	533.00	770.00	775.47	772.33	775.55	0.001559	2.25	237.37	66.89	0.21
EF Post Oak Crk	T1	6099	628.00	770.00	775.79	772.55	775.88	0.001714	2.42	259.06	69.87	0.22
EF Post Oak Crk	T1	6050	Culvert									
EF Post Oak Crk	T1	5947	181.00	770.00	771.36		771.68	0.038747	4.57	39.57	43.40	0.84
EF Post Oak Crk	T1	5947	281.00	770.00	771.82		772.14	0.027447	4.57	61.54	52.23	0.74
EF Post Oak Crk	T1	5947	342.00	770.00	772.05		772.38	0.024077	4.59	74.47	56.79	0.71
EF Post Oak Crk	T1	5947	406.00	770.00	772.28		772.61	0.021716	4.63	87.69	61.14	0.68
EF Post Oak Crk	T1	5947	467.00	770.00	772.48		772.81	0.020127	4.66	100.21	65.35	0.66
EF Post Oak Crk	T1	5947	533.00	770.00	772.67		773.01	0.018803	4.70	113.51	69.54	0.65
EF Post Oak Crk	T1	5947	533.00	770.00	772.67		773.01	0.018803	4.70	113.51	69.54	0.65
EF Post Oak Crk	T1	5947	628.00	770.00	772.93		773.28	0.017340	4.75	132.32	75.07	0.63
EF Post Oak Crk	T1	5805	181.00	768.00	770.23	769.13	770.29	0.004030	2.10	86.22	55.55	0.30
EF Post Oak Crk	T1	5805	281.00	768.00	770.74	769.46	770.83	0.004226	2.40	116.91	63.68	0.31
EF Post Oak Crk	T1	5805	342.00	768.00	770.99	769.62	771.10	0.004347	2.56	133.56	67.54	0.32
EF Post Oak Crk	T1	5805	406.00	768.00	771.23	769.78	771.34	0.004465	2.71	149.86	71.03	0.33
EF Post Oak Crk	T1	5805	467.00	768.00	771.43	769.92	771.56	0.004583	2.84	164.41	74.01	0.34
EF Post Oak Crk	T1	5805	533.00	768.00	771.64	770.06	771.77	0.004661	2.96	179.99	77.06	0.34
EF Post Oak Crk	T1	5805	533.00	768.00	771.64	770.06	771.77	0.004661	2.96	179.99	77.06	0.34
EF Post Oak Crk	T1	5805	628.00	768.00	771.90	770.25	772.05	0.004793	3.13	200.91	80.99	0.35
EF Post Oak Crk	T1	5198	181.00	762.00	763.05	763.05	763.33	0.114922	4.28	42.33	75.62	1.01
EF Post Oak Crk	T1	5198	281.00	762.00	763.28	763.28	763.59	0.114031	4.50	62.44	102.69	1.02
EF Post Oak Crk	T1	5198	342.00	762.00	763.37	763.37	763.72	0.110845	4.73	72.36	108.25	1.02
EF Post Oak Crk	T1	5198	406.00	762.00	763.46	763.46	763.84	0.107597	4.92	82.50	113.58	1.02
EF Post Oak Crk	T1	5198	467.00	762.00	763.55	763.55	763.95	0.102593	5.04	92.62	118.67	1.01
EF Post Oak Crk	T1	5198	533.00	762.00	763.63	763.63	764.05	0.102738	5.24	101.69	123.05	1.02
EF Post Oak Crk	T1	5198	533.00	762.00	763.63	763.63	764.05	0.102738	5.24	101.69	123.05	1.02
EF Post Oak Crk	T1	5198	628.00	762.00	763.74	763.74	764.19	0.099635	5.43	115.57	129.46	1.01
EF Post Oak Crk	T1	4686	181.00	750.99	757.97	753.30	757.98	0.000585	1.04	174.01	47.10	0.10
EF Post Oak Crk	T1	4686	281.00	750.99	758.73	753.83	758.76	0.000834	1.32	212.47	52.82	0.12

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
EF Post Oak Crk	T1	4686	342.00	750.99	759.04	754.12	759.08	0.001001	1.50	228.98	54.86	0.13
EF Post Oak Crk	T1	4686	406.00	750.99	759.28	754.39	759.33	0.001201	1.68	242.57	56.49	0.14
EF Post Oak Crk	T1	4686	467.00	750.99	759.51	754.62	759.56	0.001379	1.83	255.28	57.97	0.15
EF Post Oak Crk	T1	4686	533.00	750.99	759.76	754.85	759.82	0.001539	1.98	270.00	59.64	0.16
EF Post Oak Crk	T1	4686	533.00	750.99	759.77	754.85	759.83	0.001528	1.98	270.68	59.72	0.16
EF Post Oak Crk	T1	4686	628.00	750.99	760.07	755.16	760.14	0.001766	2.19	288.79	63.92	0.17
EF Post Oak Crk	T1	4455	Culvert									
EF Post Oak Crk	T1	4227	377.00	744.98	748.51	747.54	748.99	0.000899	5.55	67.94	24.33	0.59
EF Post Oak Crk	T1	4227	582.00	744.98	750.06	748.30	750.51	0.000563	5.33	109.22	28.73	0.48
EF Post Oak Crk	T1	4227	709.00	744.98	750.34	748.71	750.91	0.000687	6.05	117.21	29.50	0.53
EF Post Oak Crk	T1	4227	840.00	744.98	750.49	749.10	751.23	0.000869	6.90	121.67	29.93	0.60
EF Post Oak Crk	T1	4227	965.00	744.98	750.58	749.45	751.51	0.001080	7.76	124.33	30.18	0.67
EF Post Oak Crk	T1	4227	1100.00	744.98	750.55	749.80	751.78	0.001433	8.91	123.40	30.09	0.78
EF Post Oak Crk	T1	4227	1103.00	744.98	750.57	749.79	751.80	0.001413	8.88	124.26	30.17	0.77
EF Post Oak Crk	T1	4227	1298.00	744.98	750.97	750.28	752.38	0.001510	9.51	136.47	31.29	0.80
EF Post Oak Crk	T1	4108	377.00	742.64	748.56	745.80	748.87	0.000386	4.44	84.97	17.74	0.36
EF Post Oak Crk	T1	4108	582.00	742.64	750.03	746.77	750.44	0.000396	5.13	126.24	61.53	0.37
EF Post Oak Crk	T1	4108	709.00	742.64	750.30	747.31	750.83	0.000493	5.89	143.69	69.60	0.42
EF Post Oak Crk	T1	4108	840.00	742.64	750.44	747.80	751.13	0.000630	6.76	153.84	73.88	0.47
EF Post Oak Crk	T1	4108	965.00	742.64	750.52	748.26	751.38	0.000790	7.63	159.49	76.17	0.53
EF Post Oak Crk	T1	4108	1100.00	742.64	750.45	748.71	751.62	0.001077	8.84	154.17	74.02	0.62
EF Post Oak Crk	T1	4108	1103.00	742.64	750.48	748.73	751.63	0.001059	8.80	156.62	75.01	0.61
EF Post Oak Crk	T1	4108	1298.00	742.64	749.35	749.35	752.00	0.002994	13.08	99.24	18.59	1.00
EF Post Oak Crk	T1	4080	Culvert									
EF Post Oak Crk	T1	4051	377.00	742.10	744.96	744.96	746.07	0.002793	8.45	44.59	19.97	1.00
EF Post Oak Crk	T1	4051	582.00	742.10	745.76	745.76	747.15	0.002667	9.44	61.63	22.31	1.00
EF Post Oak Crk	T1	4051	709.00	742.10	746.20	746.20	747.72	0.002590	9.88	71.73	23.59	1.00
EF Post Oak Crk	T1	4051	840.00	742.10	746.61	746.61	748.26	0.002545	10.30	81.56	24.77	1.00
EF Post Oak Crk	T1	4051	965.00	742.10	746.97	746.97	748.73	0.002504	10.64	90.70	25.82	1.00
EF Post Oak Crk	T1	4051	1100.00	742.10	747.34	747.34	749.20	0.002461	10.96	100.37	26.88	1.00
EF Post Oak Crk	T1	4051	1103.00	742.10	747.34	747.34	749.21	0.002476	10.99	100.34	26.88	1.00
EF Post Oak Crk	T1	4051	1298.00	742.10	747.82	747.82	749.85	0.002380	11.43	113.54	28.28	1.00
EF Post Oak Crk	T1	3957	377.00	740.69	744.19	743.29	744.69	0.001098	5.68	66.32	25.36	0.62
EF Post Oak Crk	T1	3957	582.00	740.69	745.63	744.10	746.09	0.000635	5.45	106.74	32.01	0.50
EF Post Oak Crk	T1	3957	709.00	740.69	746.41	744.51	746.88	0.000496	5.48	129.38	35.96	0.46

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
EF Post Oak Crk	T1	3957	840.00	740.69	747.11	744.90	747.57	0.000453	5.43	156.84	47.83	0.44
EF Post Oak Crk	T1	3957	965.00	740.69	747.43	745.20	747.91	0.000508	5.57	178.89	54.74	0.47
EF Post Oak Crk	T1	3957	1100.00	740.69	747.85	745.50	748.36	0.000494	5.75	203.66	62.04	0.46
EF Post Oak Crk	T1	3957	1103.00	740.69	747.85	745.48	748.36	0.000497	5.77	203.45	61.98	0.47
EF Post Oak Crk	T1	3957	1298.00	740.69	748.29	745.92	748.87	0.000516	6.15	233.73	76.09	0.48
EF Post Oak Crk	T1	3900	Culvert									
EF Post Oak Crk	T1	3849	377.00	739.01	743.42	741.44	743.67	0.000407	4.00	94.26	28.98	0.39
EF Post Oak Crk	T1	3849	582.00	739.01	744.27	742.25	744.64	0.000475	4.86	119.85	32.87	0.44
EF Post Oak Crk	T1	3849	709.00	739.01	744.60	742.68	745.06	0.000536	5.45	130.11	34.43	0.47
EF Post Oak Crk	T1	3849	840.00	739.01	744.95	743.07	745.50	0.000577	5.96	140.89	36.08	0.49
EF Post Oak Crk	T1	3849	965.00	739.01	745.23	743.43	745.88	0.000623	6.45	149.69	39.20	0.52
EF Post Oak Crk	T1	3849	1100.00	739.01	745.51	743.76	746.26	0.000673	6.95	158.18	42.90	0.54
EF Post Oak Crk	T1	3849	1103.00	739.01	745.51	743.75	746.26	0.000674	6.97	158.36	42.98	0.54
EF Post Oak Crk	T1	3849	1298.00	739.01	745.84	744.20	746.76	0.000758	7.70	168.62	47.45	0.58
EF Post Oak Crk	T1	3798	377.00	740.00	742.56	742.56	743.55	0.002828	7.99	47.18	24.00	1.00
EF Post Oak Crk	T1	3798	582.00	740.00	743.74		744.55	0.001702	7.21	80.76	32.83	0.81
EF Post Oak Crk	T1	3798	709.00	740.00	743.85	743.70	744.95	0.002260	8.41	84.31	33.63	0.94
EF Post Oak Crk	T1	3798	840.00	740.00	744.04	744.04	745.37	0.002600	9.26	90.70	36.02	1.01
EF Post Oak Crk	T1	3798	965.00	740.00	744.34	744.34	745.75	0.002384	9.54	102.38	42.00	0.99
EF Post Oak Crk	T1	3798	1100.00	740.00	744.63	744.63	746.13	0.002229	9.84	115.65	47.88	0.97
EF Post Oak Crk	T1	3798	1103.00	740.00	744.64	744.64	746.13	0.002225	9.84	115.98	48.02	0.97
EF Post Oak Crk	T1	3798	1298.00	740.00	745.03	745.03	746.64	0.002056	10.22	136.56	55.70	0.95
EF Post Oak Crk	T1	3742	377.00	738.00	740.96		741.73	0.001903	7.04	53.59	24.25	0.83
EF Post Oak Crk	T1	3742	582.00	738.00	744.13		744.35	0.000201	3.87	175.21	61.77	0.31
EF Post Oak Crk	T1	3742	709.00	738.00	744.38		744.67	0.000247	4.43	191.45	66.53	0.35
EF Post Oak Crk	T1	3742	840.00	738.00	744.54		744.91	0.000310	5.06	202.11	69.44	0.39
EF Post Oak Crk	T1	3742	965.00	738.00	744.62		745.10	0.000383	5.70	208.42	71.11	0.43
EF Post Oak Crk	T1	3742	1100.00	738.00	744.70		745.30	0.000472	6.38	213.88	72.52	0.48
EF Post Oak Crk	T1	3742	1103.00	738.00	744.70		745.30	0.000475	6.40	213.90	72.52	0.48
EF Post Oak Crk	T1	3742	1298.00	738.00	744.74		745.56	0.000638	7.46	216.94	73.30	0.56
EF Post Oak Crk	T1	3642	377.00	735.50	741.38	738.18	741.50	0.000135	2.81	134.00	33.30	0.24
EF Post Oak Crk	T1	3642	582.00	735.50	744.21	738.94	744.30	0.000058	2.38	281.66	118.02	0.17
EF Post Oak Crk	T1	3642	709.00	735.50	744.49	739.35	744.60	0.000073	2.74	320.26	158.08	0.19
EF Post Oak Crk	T1	3642	840.00	735.50	744.68	739.73	744.83	0.000091	3.11	353.32	185.63	0.21
EF Post Oak Crk	T1	3642	965.00	735.50	744.82	740.08	744.99	0.000110	3.47	379.18	207.63	0.24
EF Post Oak Crk	T1	3642	1100.00	735.50	744.95	740.41	745.16	0.000131	3.84	406.78	215.63	0.26

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
EF Post Oak Crk	T1	3642	1103.00	735.50	744.95	740.43	745.16	0.000131	3.84	407.16	215.74	0.26
EF Post Oak Crk	T1	3642	1298.00	735.50	745.09	740.87	745.36	0.000164	4.36	438.78	222.96	0.29
EF Post Oak Crk	T1	3620	Culvert									
EF Post Oak Crk	T1	3583	377.00	735.10	740.05	737.90	740.28	0.000299	3.83	98.52	28.32	0.35
EF Post Oak Crk	T1	3583	582.00	735.10	742.20	738.69	742.42	0.000152	3.72	156.54	41.63	0.27
EF Post Oak Crk	T1	3583	709.00	735.10	742.37	739.10	742.67	0.000205	4.40	161.14	43.52	0.32
EF Post Oak Crk	T1	3583	840.00	735.10	742.50	739.49	742.90	0.000269	5.11	164.52	44.90	0.36
EF Post Oak Crk	T1	3583	965.00	735.10	742.57	739.81	743.09	0.000341	5.80	166.51	45.72	0.41
EF Post Oak Crk	T1	3583	1100.00	735.10	742.62	740.13	743.29	0.000431	6.56	167.81	46.23	0.46
EF Post Oak Crk	T1	3583	1103.00	735.10	742.63	740.13	743.30	0.000430	6.56	168.21	46.39	0.46
EF Post Oak Crk	T1	3583	1298.00	735.10	742.65	740.57	743.57	0.000591	7.70	168.61	46.55	0.54
EF Post Oak Crk	T1	3447	377.00	734.20	740.10	736.94	740.22	0.000113	2.82	133.92	37.76	0.23
EF Post Oak Crk	T1	3447	582.00	734.20	742.28	737.67	742.36	0.000072	2.42	291.60	181.74	0.19
EF Post Oak Crk	T1	3447	709.00	734.20	742.48	738.05	742.60	0.000092	2.78	329.96	187.82	0.21
EF Post Oak Crk	T1	3447	840.00	734.20	742.66	738.39	742.80	0.000113	3.14	362.90	192.88	0.24
EF Post Oak Crk	T1	3447	965.00	734.20	742.78	738.71	742.96	0.000136	3.47	387.90	196.64	0.26
EF Post Oak Crk	T1	3447	1100.00	734.20	742.91	739.03	743.11	0.000161	3.82	411.91	199.61	0.28
EF Post Oak Crk	T1	3447	1103.00	734.20	742.92	739.04	743.13	0.000160	3.82	415.15	200.00	0.28
EF Post Oak Crk	T1	3447	1298.00	734.20	743.07	739.45	743.33	0.000199	4.31	444.37	203.45	0.31
EF Post Oak Crk	T1	3415	Culvert									
EF Post Oak Crk	T1	3391	377.00	733.70	737.24	736.45	737.78	0.001033	5.90	63.85	24.80	0.63
EF Post Oak Crk	T1	3391	582.00	733.70	740.72	737.19	740.96	0.000156	3.95	147.29	48.57	0.28
EF Post Oak Crk	T1	3391	709.00	733.70	740.95	737.58	741.29	0.000204	4.63	153.03	51.72	0.32
EF Post Oak Crk	T1	3391	840.00	733.70	741.10	737.95	741.55	0.000265	5.36	156.63	54.27	0.37
EF Post Oak Crk	T1	3391	965.00	733.70	741.21	738.28	741.78	0.000332	6.07	159.06	68.12	0.42
EF Post Oak Crk	T1	3391	1100.00	733.70	741.27	738.61	742.00	0.000417	6.85	160.68	77.35	0.47
EF Post Oak Crk	T1	3391	1103.00	733.70	741.28	738.61	742.01	0.000417	6.85	160.94	78.81	0.47
EF Post Oak Crk	T1	3391	1298.00	733.70	741.28	739.08	742.29	0.000577	8.06	160.95	78.85	0.55
EF Post Oak Crk	T1	3354	377.00	732.11	737.46	734.78	737.66	0.000209	3.57	105.71	27.35	0.30
EF Post Oak Crk	T1	3354	582.00	732.11	740.80	735.57	740.91	0.000077	2.67	247.87	103.17	0.19
EF Post Oak Crk	T1	3354	709.00	732.11	741.08	735.97	741.23	0.000096	3.08	278.94	119.99	0.21
EF Post Oak Crk	T1	3354	840.00	732.11	741.28	736.36	741.47	0.000120	3.50	304.20	132.51	0.24
EF Post Oak Crk	T1	3354	965.00	732.11	741.44	736.72	741.67	0.000143	3.89	326.10	142.92	0.26
EF Post Oak Crk	T1	3354	1100.00	732.11	741.58	737.08	741.85	0.000170	4.30	347.06	152.22	0.29
EF Post Oak Crk	T1	3354	1103.00	732.11	741.60	737.09	741.87	0.000170	4.30	348.89	153.00	0.29

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
EF Post Oak Crk	T1	3354	1298.00	732.11	741.73	737.55	742.08	0.000216	4.92	370.66	164.40	0.32
EF Post Oak Crk	T1	3325	Culvert									
EF Post Oak Crk	T1	3294	377.00	731.80	736.36	734.58	736.67	0.000468	4.50	83.85	24.26	0.43
EF Post Oak Crk	T1	3294	582.00	731.80	740.14	735.36	740.28	0.000106	3.00	215.28	165.58	0.22
EF Post Oak Crk	T1	3294	709.00	731.80	740.40	735.82	740.57	0.000134	3.44	257.81	173.83	0.24
EF Post Oak Crk	T1	3294	840.00	731.80	740.55	736.23	740.78	0.000168	3.91	285.68	187.01	0.27
EF Post Oak Crk	T1	3294	965.00	731.80	740.70	736.59	740.97	0.000198	4.32	313.72	197.37	0.30
EF Post Oak Crk	T1	3294	1100.00	731.80	740.78	736.97	741.11	0.000242	4.82	329.70	201.43	0.33
EF Post Oak Crk	T1	3294	1103.00	731.80	740.81	736.98	741.14	0.000238	4.79	336.33	203.08	0.33
EF Post Oak Crk	T1	3294	1298.00	731.80	740.92	737.46	741.35	0.000302	5.46	359.96	208.88	0.37
EF Post Oak Crk	T1	3211	377.00	730.10	736.45	733.18	736.60	0.000155	3.12	120.77	27.77	0.26
EF Post Oak Crk	T1	3211	582.00	730.10	740.18	734.00	740.26	0.000053	2.37	297.80	174.78	0.16
EF Post Oak Crk	T1	3211	709.00	730.10	740.44	734.44	740.55	0.000067	2.73	344.65	186.82	0.18
EF Post Oak Crk	T1	3211	840.00	730.10	740.60	734.85	740.74	0.000085	3.11	376.08	193.65	0.20
EF Post Oak Crk	T1	3211	965.00	730.10	740.76	735.22	740.93	0.000101	3.44	406.51	200.03	0.22
EF Post Oak Crk	T1	3211	1100.00	730.10	740.85	735.56	741.06	0.000124	3.84	425.81	203.98	0.24
EF Post Oak Crk	T1	3211	1103.00	730.10	740.88	735.58	741.09	0.000122	3.82	432.11	205.25	0.24
EF Post Oak Crk	T1	3211	1298.00	730.10	741.02	736.04	741.28	0.000154	4.35	460.28	211.45	0.27
EF Post Oak Crk	T1	3180	Culvert									
EF Post Oak Crk	T1	3151	377.00	730.10	735.48	732.93	735.69	0.000262	3.68	102.39	26.02	0.32
EF Post Oak Crk	T1	3151	582.00	730.10	738.17	733.73	738.34	0.000118	3.34	174.48	46.83	0.23
EF Post Oak Crk	T1	3151	709.00	730.10	738.41	734.18	738.65	0.000155	3.92	180.99	54.98	0.27
EF Post Oak Crk	T1	3151	840.00	730.10	738.56	734.59	738.88	0.000201	4.54	185.12	60.15	0.31
EF Post Oak Crk	T1	3151	965.00	730.10	738.64	734.97	739.05	0.000256	5.15	187.31	62.89	0.35
EF Post Oak Crk	T1	3151	1100.00	730.10	738.69	735.33	739.21	0.000325	5.83	188.61	64.52	0.39
EF Post Oak Crk	T1	3151	1103.00	730.10	738.69	735.33	739.22	0.000326	5.85	188.60	64.50	0.39
EF Post Oak Crk	T1	3151	1298.00	730.10	738.71	735.80	739.44	0.000446	6.86	189.33	65.41	0.46
EF Post Oak Crk	T1	3097	377.00	730.10	735.46	733.01	735.67	0.000273	3.72	101.36	25.40	0.33
EF Post Oak Crk	T1	3097	582.00	730.10	738.17	733.79	738.33	0.000127	3.26	198.19	116.66	0.24
EF Post Oak Crk	T1	3097	709.00	730.10	738.42	734.19	738.63	0.000161	3.76	233.66	173.43	0.27
EF Post Oak Crk	T1	3097	840.00	730.10	738.58	734.60	738.85	0.000201	4.28	264.11	197.17	0.30
EF Post Oak Crk	T1	3097	965.00	730.10	738.67	734.97	739.02	0.000248	4.80	283.39	210.13	0.33
EF Post Oak Crk	T1	3097	1100.00	730.10	738.74	735.32	739.17	0.000307	5.38	297.51	217.58	0.37
EF Post Oak Crk	T1	3097	1103.00	730.10	738.74	735.35	739.17	0.000309	5.40	297.49	217.57	0.37
EF Post Oak Crk	T1	3097	1298.00	730.10	738.80	735.84	739.37	0.000409	6.25	310.63	224.13	0.43

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
EF Post Oak Crk	T1	3050	Culvert									
EF Post Oak Crk	T1	2994	377.00	730.07	734.18	732.75	734.51	0.000561	4.65	81.02	26.38	0.47
EF Post Oak Crk	T1	2994	582.00	730.07	735.92	733.48	736.21	0.000363	4.38	133.00	34.60	0.39
EF Post Oak Crk	T1	2994	709.00	730.07	736.08	733.89	736.48	0.000476	5.12	138.46	80.65	0.45
EF Post Oak Crk	T1	2994	840.00	730.07	736.11	734.28	736.67	0.000650	6.02	139.64	83.10	0.53
EF Post Oak Crk	T1	2994	965.00	730.07	736.16	734.62	736.88	0.000828	6.83	141.26	86.47	0.59
EF Post Oak Crk	T1	2994	1100.00	730.07	736.25	734.98	737.15	0.001003	7.62	144.45	93.09	0.66
EF Post Oak Crk	T1	2994	1103.00	730.07	736.25	734.99	737.16	0.001008	7.64	144.45	93.10	0.66
EF Post Oak Crk	T1	2994	1298.00	730.07	736.30	735.50	737.53	0.001345	8.88	146.18	96.68	0.76
EF Post Oak Crk	T1	2894	377.00	730.00	734.24	732.24	734.43	0.000275	3.56	105.85	32.06	0.34
EF Post Oak Crk	T1	2894	582.00	730.00	735.96	732.91	736.16	0.000169	3.66	159.13	103.46	0.28
EF Post Oak Crk	T1	2894	709.00	730.00	736.16	733.28	736.40	0.000225	4.02	223.86	243.79	0.32
EF Post Oak Crk	T1	2894	840.00	730.00	736.23	733.62	736.56	0.000295	4.66	242.30	246.21	0.37
EF Post Oak Crk	T1	2894	965.00	730.00	736.33	733.93	736.73	0.000355	5.18	267.01	249.43	0.41
EF Post Oak Crk	T1	2894	1100.00	730.00	736.50	734.21	736.96	0.000395	5.58	309.82	254.90	0.43
EF Post Oak Crk	T1	2894	1103.00	730.00	736.50	734.23	736.96	0.000396	5.59	310.31	254.96	0.43
EF Post Oak Crk	T1	2894	1298.00	730.00	736.71	734.60	737.24	0.000451	6.13	364.57	261.73	0.47
EF Post Oak Crk	T1	2850	Culvert									
EF Post Oak Crk	T1	2809	377.00	729.69	732.64	732.17	733.31	0.001500	6.54	57.68	23.95	0.74
EF Post Oak Crk	T1	2809	582.00	729.69	733.96	732.90	734.59	0.000941	6.36	91.44	27.25	0.61
EF Post Oak Crk	T1	2809	709.00	729.69	734.16	733.29	734.99	0.001184	7.32	96.87	70.71	0.69
EF Post Oak Crk	T1	2809	840.00	729.69	734.08	733.67	735.30	0.001781	8.88	94.56	69.11	0.84
EF Post Oak Crk	T1	2809	965.00	729.69	734.01	734.01	735.69	0.002490	10.41	92.66	67.78	1.00
EF Post Oak Crk	T1	2809	1100.00	729.69	734.52	734.35	736.16	0.002143	10.27	107.10	77.62	0.94
EF Post Oak Crk	T1	2809	1103.00	729.69	734.52	734.35	736.17	0.002153	10.30	107.13	77.64	0.94
EF Post Oak Crk	T1	2809	1298.00	729.69	734.82	734.82	736.77	0.002405	11.23	115.59	83.19	1.00
EF Post Oak Crk	T1	2741	377.00	727.83	732.85	730.61	733.15	0.000423	4.39	85.87	19.61	0.37
EF Post Oak Crk	T1	2741	582.00	727.83	734.06	731.41	734.49	0.000489	5.27	122.67	187.74	0.40
EF Post Oak Crk	T1	2741	709.00	727.83	734.32	731.86	734.84	0.000579	5.91	175.73	207.18	0.44
EF Post Oak Crk	T1	2741	840.00	727.83	734.36	732.29	735.07	0.000781	6.90	184.47	208.37	0.51
EF Post Oak Crk	T1	2741	965.00	727.83	734.52	732.68	735.32	0.000883	7.47	217.66	212.83	0.54
EF Post Oak Crk	T1	2741	1100.00	727.83	735.27	733.09	735.74	0.000535	6.30	384.23	233.86	0.43
EF Post Oak Crk	T1	2741	1103.00	727.83	735.27	733.09	735.75	0.000534	6.29	385.92	234.06	0.43
EF Post Oak Crk	T1	2741	1298.00	727.83	735.58	734.94	736.06	0.000547	6.56	458.32	242.57	0.44

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
EF Post Oak Crk	T1	2386	377.00	726.23	728.79	728.79	729.81	0.002774	8.09	46.58	23.19	1.00
EF Post Oak Crk	T1	2386	582.00	726.23	729.82	729.47	730.90	0.001698	8.31	70.02	26.28	0.83
EF Post Oak Crk	T1	2386	709.00	726.23	731.40	729.86	731.97	0.000706	6.08	116.63	29.51	0.54
EF Post Oak Crk	T1	2386	840.00	726.23	732.25	730.23	732.80	0.000551	5.92	141.86	29.54	0.48
EF Post Oak Crk	T1	2386	965.00	726.23	732.58	730.56	733.21	0.000600	6.37	151.39	29.55	0.50
EF Post Oak Crk	T1	2386	1100.00	726.23	732.81	730.93	733.56	0.000683	6.95	158.38	29.56	0.53
EF Post Oak Crk	T1	2386	1103.00	726.23	732.82	730.93	733.57	0.000685	6.96	158.52	29.56	0.53
EF Post Oak Crk	T1	2386	1298.00	726.23	732.99	731.37	733.97	0.000863	7.93	163.73	29.56	0.59
EF Post Oak Crk	T1	2354	377.00	722.70	728.45	725.30	728.65	0.001095	3.52	107.14	26.59	0.27
EF Post Oak Crk	T1	2354	582.00	722.70	730.36	726.08	730.61	0.000947	4.01	145.23	30.68	0.26
EF Post Oak Crk	T1	2354	709.00	722.70	731.59	726.49	731.86	0.000835	4.18	169.78	33.32	0.25
EF Post Oak Crk	T1	2354	840.00	722.70	732.45	726.89	732.68	0.000856	3.88	239.32	120.04	0.24
EF Post Oak Crk	T1	2354	965.00	722.70	732.82	727.27	733.07	0.000887	4.07	281.77	146.36	0.25
EF Post Oak Crk	T1	2354	1100.00	722.70	733.18	727.65	733.37	0.000806	3.63	378.58	173.49	0.23
EF Post Oak Crk	T1	2354	1103.00	722.70	733.19	727.66	733.37	0.000806	3.64	379.74	174.01	0.23
EF Post Oak Crk	T1	2354	1298.00	722.70	733.51	728.17	733.71	0.000884	3.91	440.76	219.93	0.24
EF Post Oak Crk	T1	2300	Culvert									
EF Post Oak Crk	T1	2249	377.00	722.36	728.08	725.60	728.30	0.002788	3.79	99.47	28.22	0.33
EF Post Oak Crk	T1	2249	582.00	722.36	729.25	726.39	729.57	0.002922	4.54	128.11	31.99	0.35
EF Post Oak Crk	T1	2249	709.00	722.36	729.84	726.81	730.22	0.003038	4.97	142.54	33.89	0.36
EF Post Oak Crk	T1	2249	840.00	722.36	730.51	727.22	730.84	0.003209	4.60	182.75	36.06	0.36
EF Post Oak Crk	T1	2249	965.00	722.36	731.00	727.58	731.35	0.003295	4.81	200.55	37.62	0.37
EF Post Oak Crk	T1	2249	1100.00	722.36	731.50	727.96	731.88	0.003478	5.00	220.19	40.83	0.38
EF Post Oak Crk	T1	2249	1103.00	722.36	731.51	727.96	731.90	0.003481	5.00	220.63	40.90	0.38
EF Post Oak Crk	T1	2249	1298.00	722.36	732.16	728.45	732.55	0.003243	5.08	282.21	176.30	0.37
EF Post Oak Crk	T1	2184	377.00	722.13	727.56		728.00	0.007610	5.32	70.86	20.66	0.51
EF Post Oak Crk	T1	2184	582.00	722.13	728.67		729.25	0.008130	6.10	95.47	23.65	0.53
EF Post Oak Crk	T1	2184	709.00	722.13	729.23		729.89	0.008415	6.49	109.20	25.16	0.55
EF Post Oak Crk	T1	2184	840.00	722.13	729.75		730.48	0.008681	6.86	122.50	26.55	0.56
EF Post Oak Crk	T1	2184	965.00	722.13	730.17		730.98	0.009003	7.20	134.06	27.69	0.58
EF Post Oak Crk	T1	2184	1100.00	722.13	730.61		731.49	0.009229	7.51	146.48	28.88	0.59
EF Post Oak Crk	T1	2184	1103.00	722.13	730.62		731.50	0.009233	7.52	146.76	28.90	0.59
EF Post Oak Crk	T1	2184	1298.00	722.13	731.16		732.15	0.009663	7.98	162.91	35.75	0.61
EF Post Oak Crk	T1	1927	377.00	720.00	725.67	723.94	725.97	0.007881	4.40	85.70	27.63	0.44
EF Post Oak Crk	T1	1927	582.00	720.00	726.69	724.78	727.08	0.008298	5.00	116.38	32.13	0.46

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
EF Post Oak Crk	T1	1927	709.00	720.00	727.21	725.21	727.64	0.008540	5.31	133.44	34.34	0.48
EF Post Oak Crk	T1	1927	840.00	720.00	727.69	725.61	728.17	0.008705	5.59	150.39	36.40	0.48
EF Post Oak Crk	T1	1927	965.00	720.00	727.74	725.95	728.36	0.011092	6.33	152.37	36.63	0.55
EF Post Oak Crk	T1	1927	1100.00	720.00	727.83		728.60	0.013623	7.07	155.62	37.01	0.61
EF Post Oak Crk	T1	1927	1103.00	720.00	727.83		728.61	0.013678	7.08	155.70	37.02	0.61
EF Post Oak Crk	T1	1927	1298.00	720.00	728.22		729.12	0.014399	7.62	171.07	41.93	0.63
EF Post Oak Crk	T1	1667	377.00	718.00	721.15	721.15	722.25	0.031476	8.40	44.86	20.75	1.01
EF Post Oak Crk	T1	1667	582.00	718.00	721.96	721.96	723.29	0.029747	9.24	62.98	24.07	1.01
EF Post Oak Crk	T1	1667	709.00	718.00	722.40	722.40	723.83	0.028650	9.60	73.89	25.89	1.00
EF Post Oak Crk	T1	1667	840.00	718.00	722.80	722.80	724.33	0.028057	9.94	84.49	27.58	1.00
EF Post Oak Crk	T1	1667	965.00	718.00	723.90		724.94	0.015328	8.22	117.41	32.29	0.76
EF Post Oak Crk	T1	1667	1100.00	718.00	724.84		725.69	0.009329	7.42	151.91	41.57	0.61
EF Post Oak Crk	T1	1667	1103.00	718.00	724.86		725.71	0.009206	7.40	152.97	41.84	0.61
EF Post Oak Crk	T1	1667	1298.00	718.00	725.72		726.54	0.007140	7.31	192.52	50.72	0.55
EF Post Oak Crk	T1	1548	377.00	713.30	719.03	716.10	719.17	0.001788	3.00	125.56	238.22	0.26
EF Post Oak Crk	T1	1548	582.00	713.30	721.04	716.76	721.18	0.001355	3.06	190.24	275.12	0.23
EF Post Oak Crk	T1	1548	709.00	713.30	722.17	717.13	722.31	0.001164	3.07	231.14	306.76	0.22
EF Post Oak Crk	T1	1548	840.00	713.30	723.26	717.47	723.41	0.000991	3.08	272.83	362.20	0.20
EF Post Oak Crk	T1	1548	965.00	713.30	724.25	717.81	724.40	0.000876	3.09	311.92	416.45	0.20
EF Post Oak Crk	T1	1548	1100.00	713.30	725.43	718.15	725.43	0.000009	0.34	2689.16	545.80	0.02
EF Post Oak Crk	T1	1548	1103.00	713.30	725.45	718.16	725.45	0.000009	0.34	2700.54	546.79	0.02
EF Post Oak Crk	T1	1548	1298.00	713.30	726.29	718.63	726.29	0.000007	0.31	3190.80	589.17	0.02
EF Post Oak Crk	T1	1475	Culvert									
EF Post Oak Crk	T1	1399	377.00	711.71	716.84		717.16	0.005154	4.55	82.83	16.97	0.36
EF Post Oak Crk	T1	1399	582.00	711.71	718.04		718.53	0.006399	5.62	104.67	21.96	0.40
EF Post Oak Crk	T1	1399	709.00	711.71	718.68		719.24	0.006776	6.09	120.09	25.65	0.41
EF Post Oak Crk	T1	1399	840.00	711.71	719.23		719.86	0.007131	6.50	134.75	27.44	0.43
EF Post Oak Crk	T1	1399	965.00	711.71	719.73		720.42	0.007292	6.80	149.06	29.13	0.43
EF Post Oak Crk	T1	1399	1100.00	711.71	720.27		720.99	0.007290	7.03	165.16	30.94	0.43
EF Post Oak Crk	T1	1399	1103.00	711.71	720.35		721.06	0.007043	6.94	167.74	31.21	0.42
EF Post Oak Crk	T1	1399	1298.00	711.71	721.03		721.79	0.007105	7.24	189.59	33.43	0.42
EF Post Oak Crk	T1	1206	568.00	709.82	714.38		715.10	0.020396	6.81	83.46	29.45	0.71
EF Post Oak Crk	T1	1206	874.00	709.82	715.50		716.33	0.018129	7.35	118.97	34.05	0.69
EF Post Oak Crk	T1	1206	1056.00	709.82	715.84		716.85	0.020429	8.08	130.74	35.44	0.74
EF Post Oak Crk	T1	1206	1254.00	709.82	716.38		717.46	0.019508	8.32	150.77	37.69	0.73
EF Post Oak Crk	T1	1206	1431.00	709.82	716.64		717.87	0.021424	8.92	160.49	38.74	0.77

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
EF Post Oak Crk	T1	1206	1628.00	709.82	716.86		718.30	0.023977	9.62	169.28	39.66	0.82
EF Post Oak Crk	T1	1206	1673.00	709.82	716.98		718.42	0.023459	9.61	174.10	40.15	0.81
EF Post Oak Crk	T1	1206	1920.00	709.82	717.11	716.73	718.89	0.028617	10.72	179.08	40.66	0.90
EF Post Oak Crk	T1	780	568.00	704.08	708.43	707.01	709.07	0.010324	6.41	88.56	21.08	0.55
EF Post Oak Crk	T1	780	874.00	704.08	709.96	707.98	710.77	0.009829	7.21	121.29	21.50	0.53
EF Post Oak Crk	T1	780	1056.00	704.08	713.28	708.49	713.72	0.003454	5.35	205.95	43.87	0.32
EF Post Oak Crk	T1	780	1254.00	704.08	714.12	709.01	714.54	0.003135	5.42	274.18	111.75	0.31
EF Post Oak Crk	T1	780	1431.00	704.08	714.63	709.47	715.02	0.002839	5.34	334.84	122.48	0.30
EF Post Oak Crk	T1	780	1628.00	704.08	715.10	709.95	715.46	0.002613	5.28	394.62	132.21	0.29
EF Post Oak Crk	T1	780	1673.00	704.08	715.08	710.05	715.46	0.002810	5.47	391.37	131.70	0.30
EF Post Oak Crk	T1	780	1920.00	704.08	715.71	710.60	716.03	0.002354	5.20	478.17	144.71	0.27
EF Post Oak Crk	T1	445	Culvert									
EF Post Oak Crk	T1	39	568.00	696.66	704.78		704.80	0.000013	1.22	464.14	65.37	0.08
EF Post Oak Crk	T1	39	874.00	696.66	707.69		707.71	0.000011	1.32	660.54	69.59	0.08
EF Post Oak Crk	T1	39	1056.00	696.66	710.82		710.84	0.000006	1.19	934.62	118.43	0.06
EF Post Oak Crk	T1	39	1254.00	696.66	712.35		712.37	0.000006	1.24	1182.05	264.25	0.06
EF Post Oak Crk	T1	39	1431.00	696.66	713.24		713.26	0.000006	1.31	1425.50	282.94	0.06
EF Post Oak Crk	T1	39	1628.00	696.66	714.05		714.08	0.000006	1.38	1664.36	299.68	0.06
EF Post Oak Crk	T1	39	1673.00	696.66	713.82		713.85	0.000007	1.45	1594.69	295.23	0.07
EF Post Oak Crk	T1	39	1920.00	696.66	715.17		715.20	0.000006	1.46	2006.56	313.63	0.06
EF Post Oak Crk	Reach 01	22173	257.00	808.69	810.15	809.95	810.29	0.009494	3.57	90.42	159.10	0.63
EF Post Oak Crk	Reach 01	22173	417.00	808.69	810.39		810.57	0.009471	4.11	129.33	170.09	0.66
EF Post Oak Crk	Reach 01	22173	518.00	808.69	810.52		810.72	0.009070	4.32	153.31	177.06	0.65
EF Post Oak Crk	Reach 01	22173	625.00	808.69	810.66		810.87	0.009180	4.63	177.87	192.89	0.67
EF Post Oak Crk	Reach 01	22173	729.00	808.69	810.80		811.02	0.008759	4.81	207.58	217.15	0.66
EF Post Oak Crk	Reach 01	22173	836.00	808.69	810.92		811.15	0.008576	4.99	234.71	237.15	0.66
EF Post Oak Crk	Reach 01	22173	851.00	808.69	810.93		811.16	0.008663	5.04	237.18	238.89	0.67
EF Post Oak Crk	Reach 01	22173	999.00	808.69	811.02		811.29	0.009729	5.50	257.80	252.93	0.71
EF Post Oak Crk	Reach 01	21966	257.00	806.00	808.22	808.22	808.41	0.008625	4.64	111.58	301.62	0.64
EF Post Oak Crk	Reach 01	21966	417.00	806.00	808.36	808.36	808.57	0.009837	5.23	154.64	310.50	0.69
EF Post Oak Crk	Reach 01	21966	518.00	806.00	808.42	808.42	808.65	0.011055	5.67	173.65	314.33	0.74
EF Post Oak Crk	Reach 01	21966	625.00	806.00	808.49	808.49	808.74	0.011641	5.96	194.95	318.58	0.76
EF Post Oak Crk	Reach 01	21966	729.00	806.00	808.53	808.53	808.82	0.013147	6.43	208.15	321.18	0.81
EF Post Oak Crk	Reach 01	21966	836.00	806.00	808.58	808.58	808.89	0.014266	6.80	222.58	324.00	0.85
EF Post Oak Crk	Reach 01	21966	851.00	806.00	808.59	808.59	808.90	0.014154	6.80	225.97	324.66	0.85
EF Post Oak Crk	Reach 01	21966	999.00	806.00	808.71	808.67	809.00	0.012491	6.64	266.63	343.49	0.80

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
EF Post Oak Crk	Reach 01	21630	257.00	802.00	804.76		804.99	0.004954	4.11	76.77	84.23	0.51
EF Post Oak Crk	Reach 01	21630	417.00	802.00	805.21		805.48	0.004834	4.65	122.43	117.44	0.52
EF Post Oak Crk	Reach 01	21630	518.00	802.00	805.42		805.70	0.004839	4.91	148.78	132.42	0.53
EF Post Oak Crk	Reach 01	21630	625.00	802.00	805.62		805.91	0.004813	5.14	175.96	146.28	0.54
EF Post Oak Crk	Reach 01	21630	729.00	802.00	805.79		806.09	0.004716	5.29	202.82	158.79	0.54
EF Post Oak Crk	Reach 01	21630	836.00	802.00	805.94		806.25	0.004775	5.49	226.80	169.17	0.54
EF Post Oak Crk	Reach 01	21630	851.00	802.00	805.96		806.27	0.004804	5.53	229.66	170.37	0.55
EF Post Oak Crk	Reach 01	21630	999.00	802.00	806.15		806.49	0.004981	5.86	266.30	202.13	0.56
EF Post Oak Crk	Reach 01	21569	257.00	802.00	804.51	803.67	804.66	0.005207	3.12	90.03	86.78	0.41
EF Post Oak Crk	Reach 01	21569	417.00	802.00	804.98	804.22	805.15	0.004930	3.55	138.51	120.90	0.42
EF Post Oak Crk	Reach 01	21569	518.00	802.00	805.19	804.51	805.38	0.004987	3.79	165.41	137.23	0.43
EF Post Oak Crk	Reach 01	21569	625.00	802.00	805.39	804.72	805.58	0.004933	3.97	194.03	151.61	0.43
EF Post Oak Crk	Reach 01	21569	729.00	802.00	805.57	804.90	805.77	0.004800	4.09	223.07	167.13	0.43
EF Post Oak Crk	Reach 01	21569	836.00	802.00	805.71	805.05	805.93	0.004914	4.28	247.43	179.27	0.44
EF Post Oak Crk	Reach 01	21569	851.00	802.00	805.72	805.07	805.95	0.004974	4.32	249.91	180.73	0.44
EF Post Oak Crk	Reach 01	21569	999.00	802.00	805.92	805.26	806.15	0.004876	4.46	288.07	200.20	0.44
EF Post Oak Crk	Reach 01	21357	257.00	800.00	801.48	801.48	802.07	0.051225	6.14	41.85	36.22	1.01
EF Post Oak Crk	Reach 01	21357	417.00	800.00	801.96	801.96	802.70	0.047281	6.90	60.40	41.24	1.01
EF Post Oak Crk	Reach 01	21357	518.00	800.00	802.26	802.26	803.02	0.038873	7.04	77.11	63.96	0.94
EF Post Oak Crk	Reach 01	21357	625.00	800.00	802.51	802.51	803.31	0.034694	7.28	94.70	75.18	0.91
EF Post Oak Crk	Reach 01	21357	729.00	800.00	802.71	802.71	803.57	0.033276	7.60	110.60	87.41	0.90
EF Post Oak Crk	Reach 01	21357	836.00	800.00	802.97	802.97	803.79	0.028214	7.54	136.10	104.80	0.85
EF Post Oak Crk	Reach 01	21357	851.00	800.00	803.02	803.02	803.82	0.027111	7.48	140.95	106.76	0.83
EF Post Oak Crk	Reach 01	21357	999.00	800.00	803.25	803.25	804.09	0.025840	7.75	167.66	120.22	0.82
EF Post Oak Crk	Reach 01	21171	257.00	796.00	799.60		799.69	0.002321	2.53	116.53	102.47	0.34
EF Post Oak Crk	Reach 01	21171	417.00	796.00	800.18		800.27	0.002027	2.65	186.79	143.14	0.33
EF Post Oak Crk	Reach 01	21171	518.00	796.00	800.48		800.57	0.001719	2.68	231.54	157.57	0.31
EF Post Oak Crk	Reach 01	21171	625.00	796.00	800.72		800.81	0.001628	2.78	271.01	170.07	0.31
EF Post Oak Crk	Reach 01	21171	729.00	796.00	800.92		801.02	0.001576	2.88	307.20	179.85	0.31
EF Post Oak Crk	Reach 01	21171	836.00	796.00	801.11		801.22	0.001554	2.99	341.87	189.46	0.31
EF Post Oak Crk	Reach 01	21171	851.00	796.00	801.13		801.24	0.001554	3.01	346.40	190.68	0.31
EF Post Oak Crk	Reach 01	21171	999.00	796.00	801.35		801.47	0.001576	3.17	388.49	201.17	0.31
EF Post Oak Crk	Reach 01	21068	257.00	796.00	799.22		799.35	0.004835	2.88	89.37	53.94	0.39
EF Post Oak Crk	Reach 01	21068	417.00	796.00	799.73		799.92	0.006090	3.49	119.35	63.98	0.45
EF Post Oak Crk	Reach 01	21068	518.00	796.00	800.03		800.25	0.006397	3.71	139.85	74.22	0.47
EF Post Oak Crk	Reach 01	21068	625.00	796.00	800.25		800.50	0.006538	4.02	157.93	94.51	0.48

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
EF Post Oak Crk	Reach 01	21068	729.00	796.00	800.43		800.71	0.006652	4.28	177.56	119.05	0.49
EF Post Oak Crk	Reach 01	21068	836.00	796.00	800.60		800.91	0.006724	4.50	199.63	143.84	0.50
EF Post Oak Crk	Reach 01	21068	851.00	796.00	800.62		800.93	0.006742	4.53	202.65	146.46	0.50
EF Post Oak Crk	Reach 01	21068	999.00	796.00	800.81		801.15	0.006929	4.82	232.93	176.20	0.51
EF Post Oak Crk	Reach 01	20569	257.00	793.41	795.26		795.40	0.015290	3.01	85.27	87.10	0.54
EF Post Oak Crk	Reach 01	20569	417.00	793.41	795.80		795.94	0.010830	3.01	138.77	109.91	0.47
EF Post Oak Crk	Reach 01	20569	518.00	793.41	796.03		796.18	0.010643	3.13	165.66	124.68	0.47
EF Post Oak Crk	Reach 01	20569	625.00	793.41	796.19		796.37	0.010689	3.37	186.45	137.87	0.48
EF Post Oak Crk	Reach 01	20569	729.00	793.41	796.33		796.53	0.010696	3.58	206.80	149.65	0.49
EF Post Oak Crk	Reach 01	20569	836.00	793.41	796.46		796.68	0.010819	3.79	226.64	160.31	0.50
EF Post Oak Crk	Reach 01	20569	851.00	793.41	796.48		796.70	0.010802	3.81	229.64	161.86	0.50
EF Post Oak Crk	Reach 01	20569	999.00	793.41	796.66		796.90	0.010529	4.01	260.05	176.82	0.50
EF Post Oak Crk	Reach 01	20341	257.00	790.00	793.14		793.25	0.006302	2.70	95.10	58.45	0.37
EF Post Oak Crk	Reach 01	20341	417.00	790.00	793.83		793.96	0.007143	2.87	145.38	89.94	0.40
EF Post Oak Crk	Reach 01	20341	518.00	790.00	794.11		794.25	0.006904	3.00	174.68	124.56	0.40
EF Post Oak Crk	Reach 01	20341	625.00	790.00	794.34		794.50	0.006426	3.14	205.08	135.07	0.39
EF Post Oak Crk	Reach 01	20341	729.00	790.00	794.55		794.71	0.006086	3.26	233.46	144.20	0.39
EF Post Oak Crk	Reach 01	20341	836.00	790.00	794.74		794.91	0.005814	3.37	261.80	152.77	0.38
EF Post Oak Crk	Reach 01	20341	851.00	790.00	794.76		794.93	0.005783	3.38	265.68	153.90	0.38
EF Post Oak Crk	Reach 01	20341	999.00	790.00	795.00		795.19	0.005556	3.53	304.19	173.71	0.38
EF Post Oak Crk	Reach 01	20206	257.00	790.00	792.37		792.53	0.004517	3.21	79.94	54.30	0.47
EF Post Oak Crk	Reach 01	20206	417.00	790.00	792.82		793.05	0.006100	3.86	107.93	69.79	0.55
EF Post Oak Crk	Reach 01	20206	518.00	790.00	793.03		793.31	0.006853	4.19	123.50	77.07	0.58
EF Post Oak Crk	Reach 01	20206	625.00	790.00	793.21		793.53	0.007745	4.55	137.22	82.96	0.62
EF Post Oak Crk	Reach 01	20206	729.00	790.00	793.34		793.71	0.008693	4.91	148.50	87.50	0.66
EF Post Oak Crk	Reach 01	20206	836.00	790.00	793.45		793.88	0.009736	5.27	158.53	91.35	0.71
EF Post Oak Crk	Reach 01	20206	851.00	790.00	793.47		793.91	0.009842	5.31	160.12	91.95	0.71
EF Post Oak Crk	Reach 01	20206	999.00	790.00	793.60		794.12	0.011348	5.81	172.07	96.31	0.77
EF Post Oak Crk	Reach 01	20069	257.00	790.00	791.52		791.60	0.010719	2.16	118.72	153.02	0.43
EF Post Oak Crk	Reach 01	20069	417.00	790.00	791.82		791.92	0.010989	2.48	168.31	180.50	0.45
EF Post Oak Crk	Reach 01	20069	518.00	790.00	791.97		792.08	0.011134	2.63	196.62	194.21	0.46
EF Post Oak Crk	Reach 01	20069	625.00	790.00	792.09		792.21	0.011039	2.80	230.62	315.84	0.47
EF Post Oak Crk	Reach 01	20069	729.00	790.00	792.19	791.65	792.32	0.010753	2.93	262.16	322.64	0.47
EF Post Oak Crk	Reach 01	20069	836.00	790.00	792.29	791.74	792.42	0.010283	3.01	294.25	328.75	0.46
EF Post Oak Crk	Reach 01	20069	851.00	790.00	792.30	791.75	792.43	0.010338	3.04	297.42	329.34	0.46
EF Post Oak Crk	Reach 01	20069	999.00	790.00	792.42		792.57	0.009715	3.13	339.90	339.02	0.46

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
EF Post Oak Crk	Reach 01	19571	257.00	786.00	788.10		788.14	0.004847	1.64	181.80	281.55	0.24
EF Post Oak Crk	Reach 01	19571	417.00	786.00	788.45		788.49	0.004658	1.84	281.81	302.56	0.24
EF Post Oak Crk	Reach 01	19571	518.00	786.00	788.62		788.67	0.004583	1.95	334.98	313.07	0.25
EF Post Oak Crk	Reach 01	19571	625.00	786.00	788.78		788.83	0.004570	2.05	385.58	322.76	0.25
EF Post Oak Crk	Reach 01	19571	729.00	786.00	788.92		788.98	0.004551	2.14	432.14	331.42	0.25
EF Post Oak Crk	Reach 01	19571	836.00	786.00	789.04		789.10	0.004633	2.23	473.81	338.42	0.26
EF Post Oak Crk	Reach 01	19571	851.00	786.00	789.07		789.13	0.004595	2.24	481.26	339.61	0.26
EF Post Oak Crk	Reach 01	19571	999.00	786.00	789.23		789.29	0.004666	2.36	536.39	348.28	0.26
EF Post Oak Crk	Reach 01	19070	257.00	778.00	782.84	782.19	783.03	0.033235	3.49	73.73	114.57	0.59
EF Post Oak Crk	Reach 01	19070	417.00	778.00	783.31	782.79	783.53	0.033501	3.74	111.62	161.71	0.61
EF Post Oak Crk	Reach 01	19070	518.00	778.00	783.54	783.02	783.77	0.033125	3.86	134.21	183.32	0.61
EF Post Oak Crk	Reach 01	19070	625.00	778.00	783.75	783.21	783.99	0.032098	3.95	158.30	203.93	0.61
EF Post Oak Crk	Reach 01	19070	729.00	778.00	783.93	783.37	784.18	0.031263	4.02	181.31	222.08	0.60
EF Post Oak Crk	Reach 01	19070	836.00	778.00	784.10	783.52	784.36	0.028752	4.09	204.60	239.19	0.59
EF Post Oak Crk	Reach 01	19070	851.00	778.00	784.11	783.54	784.37	0.029457	4.15	205.32	239.60	0.59
EF Post Oak Crk	Reach 01	19070	999.00	778.00	784.30	783.72	784.59	0.027312	4.32	232.42	254.75	0.58
EF Post Oak Crk	Reach 01	18876	257.00	778.22	782.51	780.48	782.52	0.000784	1.09	404.63	398.58	0.11
EF Post Oak Crk	Reach 01	18876	417.00	778.22	782.85	781.02	782.87	0.001074	1.37	553.51	483.67	0.13
EF Post Oak Crk	Reach 01	18876	518.00	778.22	783.02	781.24	783.04	0.001215	1.50	638.49	536.31	0.14
EF Post Oak Crk	Reach 01	18876	625.00	778.22	783.10	781.43	783.12	0.001536	1.71	680.53	552.57	0.16
EF Post Oak Crk	Reach 01	18876	729.00	778.22	783.19	781.58	783.22	0.001780	1.87	730.60	568.83	0.17
EF Post Oak Crk	Reach 01	18876	836.00	778.22	783.24	781.73	783.27	0.002140	2.07	758.17	577.61	0.19
EF Post Oak Crk	Reach 01	18876	851.00	778.22	783.29	781.75	783.32	0.002023	2.03	788.24	602.71	0.18
EF Post Oak Crk	Reach 01	18876	999.00	778.22	783.38	781.85	783.42	0.002348	2.23	847.38	608.92	0.20
EF Post Oak Crk	Reach 01	18750	Culvert									
EF Post Oak Crk	Reach 01	18544	257.00	775.87	779.42	778.60	779.46	0.001983	2.16	237.33	253.82	0.31
EF Post Oak Crk	Reach 01	18544	417.00	775.87	779.81	778.94	779.86	0.002053	2.34	346.09	302.64	0.32
EF Post Oak Crk	Reach 01	18544	518.00	775.87	779.99	779.11	780.04	0.002064	2.48	400.61	310.03	0.32
EF Post Oak Crk	Reach 01	18544	625.00	775.87	780.15	779.25	780.21	0.002089	2.62	451.73	315.23	0.33
EF Post Oak Crk	Reach 01	18544	729.00	775.87	780.29	779.38	780.35	0.002113	2.75	496.63	319.66	0.34
EF Post Oak Crk	Reach 01	18544	836.00	775.87	780.42	779.48	780.48	0.002185	2.90	535.75	325.17	0.34
EF Post Oak Crk	Reach 01	18544	851.00	775.87	780.43	779.49	780.49	0.002216	2.93	539.42	325.68	0.35
EF Post Oak Crk	Reach 01	18544	999.00	775.87	780.58	779.60	780.65	0.002324	3.14	588.21	332.40	0.36
EF Post Oak Crk	Reach 01	18043	257.00	774.00	776.23	776.23	776.55	0.064688	4.54	56.60	91.87	1.02
EF Post Oak Crk	Reach 01	18043	417.00	774.00	776.49	776.49	776.89	0.059896	5.10	81.82	105.47	1.02
EF Post Oak Crk	Reach 01	18043	518.00	774.00	776.66	776.66	777.07	0.058886	5.10	101.66	129.53	1.01

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
EF Post Oak Crk	Reach 01	18043	625.00	774.00	776.80	776.80	777.22	0.057186	5.20	120.26	145.59	1.01
EF Post Oak Crk	Reach 01	18043	729.00	774.00	776.90	776.90	777.35	0.054970	5.41	134.85	149.38	1.00
EF Post Oak Crk	Reach 01	18043	836.00	774.00	777.03	776.98	777.48	0.046674	5.36	155.94	154.71	0.94
EF Post Oak Crk	Reach 01	18043	851.00	774.00	777.07	777.00	777.50	0.043292	5.26	161.81	156.16	0.91
EF Post Oak Crk	Reach 01	18043	999.00	774.00	777.28	777.10	777.69	0.034133	5.12	195.18	164.15	0.83
EF Post Oak Crk	Reach 01	17569	257.00	770.00	774.04		774.08	0.001318	1.67	153.67	110.95	0.25
EF Post Oak Crk	Reach 01	17569	417.00	770.00	774.57		774.63	0.001171	1.95	217.47	128.86	0.25
EF Post Oak Crk	Reach 01	17569	518.00	770.00	774.85		774.91	0.001135	2.10	254.41	137.81	0.25
EF Post Oak Crk	Reach 01	17569	625.00	770.00	775.13		775.21	0.001077	2.22	294.82	146.82	0.25
EF Post Oak Crk	Reach 01	17569	729.00	770.00	775.24		775.33	0.001254	2.47	311.21	150.08	0.27
EF Post Oak Crk	Reach 01	17569	836.00	770.00	775.38		775.48	0.001371	2.67	332.02	154.13	0.28
EF Post Oak Crk	Reach 01	17569	851.00	770.00	775.39		775.50	0.001401	2.70	333.68	154.45	0.29
EF Post Oak Crk	Reach 01	17569	999.00	770.00	775.64		775.76	0.001411	2.87	372.70	161.76	0.29
EF Post Oak Crk	Reach 01	17069	896.00	766.00	770.78	770.78	771.36	0.010641	6.82	172.53	147.31	0.77
EF Post Oak Crk	Reach 01	17069	1428.00	766.00	771.22	771.22	771.94	0.011547	7.92	239.32	160.78	0.82
EF Post Oak Crk	Reach 01	17069	1762.00	766.00	771.45	771.45	772.25	0.011735	8.42	278.13	168.12	0.84
EF Post Oak Crk	Reach 01	17069	2124.00	766.00	771.67	771.67	772.56	0.012170	8.96	314.91	174.93	0.87
EF Post Oak Crk	Reach 01	17069	2462.00	766.00	772.04	771.89	772.83	0.009566	8.53	382.64	186.39	0.78
EF Post Oak Crk	Reach 01	17069	2814.00	766.00	772.39		773.13	0.008080	8.32	449.09	201.13	0.73
EF Post Oak Crk	Reach 01	17069	2838.00	766.00	772.41		773.15	0.007967	8.30	454.25	202.22	0.73
EF Post Oak Crk	Reach 01	17069	3356.00	766.00	772.79		773.53	0.007188	8.36	534.02	218.53	0.70
EF Post Oak Crk	Reach 01	16881	896.00	763.72	769.40	769.02	769.66	0.004136	5.52	257.41	170.01	0.48
EF Post Oak Crk	Reach 01	16881	1428.00	763.72	770.25	769.40	770.47	0.002823	5.16	409.79	188.93	0.41
EF Post Oak Crk	Reach 01	16881	1762.00	763.72	770.87	769.60	771.07	0.001994	4.69	529.86	194.82	0.35
EF Post Oak Crk	Reach 01	16881	2124.00	763.72	771.32	769.80	771.52	0.001815	4.71	618.51	199.06	0.34
EF Post Oak Crk	Reach 01	16881	2462.00	763.72	771.89	769.99	772.07	0.001494	4.53	732.04	207.88	0.31
EF Post Oak Crk	Reach 01	16881	2814.00	763.72	772.20	770.19	772.41	0.001541	4.75	798.58	215.57	0.32
EF Post Oak Crk	Reach 01	16881	2838.00	763.72	772.22	770.19	772.43	0.001539	4.76	803.89	216.17	0.32
EF Post Oak Crk	Reach 01	16881	3356.00	763.72	772.54	770.41	772.79	0.001773	5.26	874.24	232.97	0.34
EF Post Oak Crk	Reach 01	16720	Culvert									
EF Post Oak Crk	Reach 01	16569	896.00	762.50	766.75	766.35	766.91	0.003993	3.63	319.28	287.52	0.46
EF Post Oak Crk	Reach 01	16569	1428.00	762.50	767.39		767.52	0.002759	3.44	512.07	320.53	0.39
EF Post Oak Crk	Reach 01	16569	1762.00	762.50	768.64		768.69	0.000697	2.19	954.34	388.79	0.21
EF Post Oak Crk	Reach 01	16569	2124.00	762.50	769.45		769.50	0.000424	1.98	1289.91	432.29	0.17
EF Post Oak Crk	Reach 01	16569	2462.00	762.50	771.31		771.33	0.000129	1.39	2177.68	520.93	0.10
EF Post Oak Crk	Reach 01	16569	2814.00	762.50	771.81		771.83	0.000121	1.42	2445.37	541.50	0.10

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
EF Post Oak Crk	Reach 01	16569	2838.00	762.50	771.83		771.85	0.000122	1.43	2457.44	542.41	0.10
EF Post Oak Crk	Reach 01	16569	3356.00	762.50	772.19		772.22	0.000136	1.57	2656.38	557.73	0.10
EF Post Oak Crk	Reach 01	16069	896.00	757.35	764.34	762.99	764.73	0.004677	5.04	181.72	86.08	0.52
EF Post Oak Crk	Reach 01	16069	1428.00	757.35	766.80	764.00	766.90	0.000688	2.91	709.70	325.25	0.22
EF Post Oak Crk	Reach 01	16069	1762.00	757.35	768.47	764.69	768.51	0.000214	1.94	1316.18	392.06	0.13
EF Post Oak Crk	Reach 01	16069	2124.00	757.35	769.34	765.17	769.37	0.000160	1.82	1665.04	412.40	0.11
EF Post Oak Crk	Reach 01	16069	2462.00	757.35	771.26	765.51	771.28	0.000068	1.37	2511.79	549.58	0.08
EF Post Oak Crk	Reach 01	16069	2814.00	757.35	771.76	765.71	771.78	0.000079	1.53	2799.14	583.97	0.08
EF Post Oak Crk	Reach 01	16069	2838.00	757.35	771.78	765.73	771.80	0.000079	1.53	2812.08	584.30	0.08
EF Post Oak Crk	Reach 01	16069	3356.00	757.35	772.14	766.19	772.16	0.000090	1.67	3021.13	590.64	0.09
EF Post Oak Crk	Reach 01	15820	Culvert									
EF Post Oak Crk	Reach 01	15569	896.00	758.00	761.31	761.31	762.39	0.018718	8.35	107.29	50.22	1.01
EF Post Oak Crk	Reach 01	15569	1428.00	758.00	762.18	762.18	763.49	0.017200	9.18	155.76	62.01	1.00
EF Post Oak Crk	Reach 01	15569	1762.00	758.00	762.60	762.60	764.06	0.015862	9.73	183.11	68.29	0.98
EF Post Oak Crk	Reach 01	15569	2124.00	758.00	763.07	763.07	764.63	0.013998	10.07	217.22	76.03	0.95
EF Post Oak Crk	Reach 01	15569	2462.00	758.00	763.40	763.40	765.11	0.013751	10.59	242.98	82.44	0.95
EF Post Oak Crk	Reach 01	15569	2814.00	758.00	764.25	764.25	765.55	0.008326	9.42	350.88	171.76	0.77
EF Post Oak Crk	Reach 01	15569	2838.00	758.00	764.28	764.28	765.57	0.008303	9.44	354.47	173.23	0.77
EF Post Oak Crk	Reach 01	15569	3356.00	758.00	764.72	764.72	766.00	0.007668	9.63	435.97	196.98	0.75
EF Post Oak Crk	Reach 01	15069	896.00	750.00	756.83		756.93	0.001508	2.64	362.47	149.70	0.22
EF Post Oak Crk	Reach 01	15069	1428.00	750.00	757.72		757.86	0.001732	3.18	548.80	251.74	0.24
EF Post Oak Crk	Reach 01	15069	1762.00	750.00	758.13		758.29	0.001787	3.39	657.23	271.19	0.25
EF Post Oak Crk	Reach 01	15069	2124.00	750.00	758.53		758.69	0.001815	3.57	768.79	289.77	0.25
EF Post Oak Crk	Reach 01	15069	2462.00	750.00	758.86		759.03	0.001835	3.71	866.96	305.18	0.25
EF Post Oak Crk	Reach 01	15069	2814.00	750.00	759.17		759.34	0.001859	3.85	962.08	318.19	0.26
EF Post Oak Crk	Reach 01	15069	2838.00	750.00	759.19		759.36	0.001862	3.86	968.24	319.08	0.26
EF Post Oak Crk	Reach 01	15069	3356.00	750.00	759.58		759.77	0.001913	4.06	1096.80	337.11	0.26
EF Post Oak Crk	Reach 01	14509	896.00	750.00	755.12		755.28	0.008169	3.29	309.67	189.87	0.35
EF Post Oak Crk	Reach 01	14509	1428.00	750.00	756.02		756.18	0.006362	3.50	501.44	247.69	0.32
EF Post Oak Crk	Reach 01	14509	1762.00	750.00	756.48		756.64	0.005712	3.58	620.12	274.17	0.31
EF Post Oak Crk	Reach 01	14509	2124.00	750.00	756.90		757.07	0.005352	3.70	742.84	307.21	0.31
EF Post Oak Crk	Reach 01	14509	2462.00	750.00	757.24		757.41	0.005246	3.84	851.41	343.09	0.31
EF Post Oak Crk	Reach 01	14509	2814.00	750.00	757.54		757.72	0.005166	3.97	958.47	370.71	0.31
EF Post Oak Crk	Reach 01	14509	2838.00	750.00	757.55		757.74	0.005163	3.98	965.29	372.01	0.31
EF Post Oak Crk	Reach 01	14509	3356.00	750.00	757.93		758.12	0.005102	4.14	1109.67	398.49	0.31

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
EF Post Oak Crk	Reach 01	14125	896.00	746.00	753.17		753.28	0.003567	2.74	362.30	153.41	0.24
EF Post Oak Crk	Reach 01	14125	1428.00	746.00	754.39		754.52	0.003102	3.05	593.39	253.59	0.24
EF Post Oak Crk	Reach 01	14125	1762.00	746.00	754.96		755.09	0.002964	3.20	755.06	318.07	0.24
EF Post Oak Crk	Reach 01	14125	2124.00	746.00	755.43		755.57	0.002938	3.36	918.32	374.61	0.24
EF Post Oak Crk	Reach 01	14125	2462.00	746.00	755.79		755.94	0.002903	3.47	1065.09	430.77	0.24
EF Post Oak Crk	Reach 01	14125	2814.00	746.00	756.12		756.26	0.002873	3.56	1210.65	464.91	0.24
EF Post Oak Crk	Reach 01	14125	2838.00	746.00	756.14		756.28	0.002874	3.57	1219.51	466.18	0.24
EF Post Oak Crk	Reach 01	14125	3356.00	746.00	756.52		756.67	0.002893	3.71	1401.17	491.58	0.24
EF Post Oak Crk	Reach 01	13569	896.00	742.00	750.79		750.97	0.004925	3.37	276.28	86.31	0.28
EF Post Oak Crk	Reach 01	13569	1428.00	742.00	752.24		752.45	0.004503	3.81	443.00	169.26	0.28
EF Post Oak Crk	Reach 01	13569	1762.00	742.00	752.88		753.11	0.004349	4.02	577.05	258.30	0.28
EF Post Oak Crk	Reach 01	13569	2124.00	742.00	753.43		753.65	0.004101	4.12	736.65	334.85	0.28
EF Post Oak Crk	Reach 01	13569	2462.00	742.00	753.86		754.07	0.003894	4.18	898.05	418.89	0.27
EF Post Oak Crk	Reach 01	13569	2814.00	742.00	754.24		754.45	0.003729	4.23	1084.46	535.31	0.27
EF Post Oak Crk	Reach 01	13569	2838.00	742.00	754.26		754.47	0.003715	4.23	1096.87	537.23	0.27
EF Post Oak Crk	Reach 01	13569	3356.00	742.00	754.72		754.91	0.003456	4.24	1348.49	567.72	0.26
EF Post Oak Crk	Reach 01	13069	896.00	739.97	747.40		747.77	0.008537	4.85	191.17	47.43	0.38
EF Post Oak Crk	Reach 01	13069	1428.00	739.97	748.98		749.45	0.008212	5.69	294.33	100.45	0.39
EF Post Oak Crk	Reach 01	13069	1762.00	739.97	749.75		750.24	0.007743	5.94	388.17	139.08	0.38
EF Post Oak Crk	Reach 01	13069	2124.00	739.97	750.49		750.97	0.007140	6.07	505.80	181.29	0.37
EF Post Oak Crk	Reach 01	13069	2462.00	739.97	751.01		751.50	0.006952	6.25	610.02	216.63	0.37
EF Post Oak Crk	Reach 01	13069	2814.00	739.97	751.45		751.94	0.006884	6.42	712.19	245.84	0.37
EF Post Oak Crk	Reach 01	13069	2838.00	739.97	751.48		751.97	0.006880	6.43	719.05	247.75	0.37
EF Post Oak Crk	Reach 01	13069	3356.00	739.97	752.00		752.51	0.006912	6.69	857.19	282.19	0.38
EF Post Oak Crk	Reach 01	12569	896.00	736.00	745.64		745.76	0.002192	2.77	330.23	64.23	0.20
EF Post Oak Crk	Reach 01	12569	1428.00	736.00	746.90		747.10	0.002883	3.61	417.35	75.63	0.24
EF Post Oak Crk	Reach 01	12569	1762.00	736.00	747.50		747.75	0.003307	4.07	464.52	81.51	0.26
EF Post Oak Crk	Reach 01	12569	2124.00	736.00	748.07		748.38	0.003801	4.57	519.88	210.23	0.28
EF Post Oak Crk	Reach 01	12569	2462.00	736.00	748.51		748.86	0.004026	4.87	621.88	245.89	0.29
EF Post Oak Crk	Reach 01	12569	2814.00	736.00	748.92		749.28	0.004126	5.08	729.22	280.25	0.29
EF Post Oak Crk	Reach 01	12569	2838.00	736.00	748.93		749.30	0.004165	5.11	732.65	281.36	0.30
EF Post Oak Crk	Reach 01	12569	3356.00	736.00	749.47		749.84	0.004126	5.28	898.64	347.23	0.30
EF Post Oak Crk	Reach 01	12069	896.00	736.00	744.11		744.28	0.004166	3.60	328.41	214.30	0.27
EF Post Oak Crk	Reach 01	12069	1428.00	736.00	745.35		745.51	0.003447	3.75	615.16	246.83	0.25
EF Post Oak Crk	Reach 01	12069	1762.00	736.00	745.98		746.13	0.003056	3.75	775.36	262.33	0.24
EF Post Oak Crk	Reach 01	12069	2124.00	736.00	746.55		746.69	0.002844	3.80	928.90	277.38	0.24
EF Post Oak Crk	Reach 01	12069	2462.00	736.00	747.01		747.15	0.002742	3.87	1059.05	289.45	0.24

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
EF Post Oak Crk	Reach 01	12069	2814.00	736.00	747.42		747.56	0.002721	3.98	1178.71	300.11	0.24
EF Post Oak Crk	Reach 01	12069	2838.00	736.00	747.39		747.54	0.002822	4.05	1169.88	299.31	0.24
EF Post Oak Crk	Reach 01	12069	3356.00	736.00	747.95		748.11	0.002753	4.17	1343.71	313.98	0.24
EF Post Oak Crk	Reach 01	11569	1089.00	732.00	742.38		742.52	0.003074	3.41	446.55	138.74	0.23
EF Post Oak Crk	Reach 01	11569	1746.00	732.00	743.60		743.79	0.003452	4.04	629.16	159.39	0.25
EF Post Oak Crk	Reach 01	11569	2158.00	732.00	744.22		744.42	0.003722	4.40	735.02	201.50	0.26
EF Post Oak Crk	Reach 01	11569	2594.00	732.00	744.76		744.99	0.003943	4.72	859.56	254.08	0.27
EF Post Oak Crk	Reach 01	11569	3011.00	732.00	745.18		745.44	0.004163	4.99	975.02	295.41	0.28
EF Post Oak Crk	Reach 01	11569	3421.00	732.00	745.54		745.81	0.004373	5.24	1087.05	333.06	0.29
EF Post Oak Crk	Reach 01	11569	3366.00	732.00	745.50		745.77	0.004336	5.21	1073.40	328.71	0.29
EF Post Oak Crk	Reach 01	11569	4033.00	732.00	746.00		746.29	0.004644	5.57	1252.27	381.57	0.30
EF Post Oak Crk	Reach 01	11069	1089.00	732.00	740.39		740.56	0.005181	3.53	405.56	173.83	0.25
EF Post Oak Crk	Reach 01	11069	1746.00	732.00	741.36		741.56	0.005922	4.15	610.66	246.18	0.27
EF Post Oak Crk	Reach 01	11069	2158.00	732.00	741.75		741.98	0.006662	4.55	711.81	274.15	0.29
EF Post Oak Crk	Reach 01	11069	2594.00	732.00	742.07		742.34	0.007527	4.97	806.62	348.76	0.31
EF Post Oak Crk	Reach 01	11069	3011.00	732.00	742.39		742.67	0.007711	5.16	921.05	364.80	0.31
EF Post Oak Crk	Reach 01	11069	3421.00	732.00	742.68		742.96	0.007716	5.29	1030.40	379.48	0.32
EF Post Oak Crk	Reach 01	11069	3366.00	732.00	742.62		742.91	0.007872	5.31	1007.46	376.45	0.32
EF Post Oak Crk	Reach 01	11069	4033.00	732.00	743.09		743.37	0.007561	5.40	1189.34	399.88	0.32
EF Post Oak Crk	Reach 01	11007	1089.00	730.00	740.28	734.31	740.47	0.000653	3.50	446.86	205.52	0.21
EF Post Oak Crk	Reach 01	11007	1746.00	730.00	741.11	735.77	741.42	0.001071	4.77	654.97	289.60	0.28
EF Post Oak Crk	Reach 01	11007	2158.00	730.00	741.39	736.53	741.80	0.001401	5.56	738.74	311.69	0.32
EF Post Oak Crk	Reach 01	11007	2594.00	730.00	741.56	737.29	742.10	0.001844	6.46	791.85	323.93	0.36
EF Post Oak Crk	Reach 01	11007	3011.00	730.00	741.71	737.95	742.39	0.002285	7.26	841.27	334.79	0.41
EF Post Oak Crk	Reach 01	11007	3421.00	730.00	741.80	738.82	742.63	0.002805	8.10	871.66	341.30	0.45
EF Post Oak Crk	Reach 01	11007	3366.00	730.00	741.74	738.66	742.58	0.002795	8.05	854.05	337.54	0.45
EF Post Oak Crk	Reach 01	11007	4033.00	730.00	741.74	740.62	742.94	0.004019	9.65	853.06	337.33	0.54
EF Post Oak Crk	Reach 01	10970	Culvert									
EF Post Oak Crk	Reach 01	10921	1089.00	728.00	736.16		736.35	0.003777	3.48	313.37	56.92	0.26
EF Post Oak Crk	Reach 01	10921	1746.00	728.00	737.87		738.15	0.003961	4.24	425.55	74.34	0.28
EF Post Oak Crk	Reach 01	10921	2158.00	728.00	738.61		738.95	0.004329	4.73	489.36	101.55	0.29
EF Post Oak Crk	Reach 01	10921	2594.00	728.00	739.29		739.69	0.004618	5.15	568.19	130.15	0.31
EF Post Oak Crk	Reach 01	10921	3011.00	728.00	739.88		740.32	0.004796	5.48	651.92	154.85	0.32
EF Post Oak Crk	Reach 01	10921	3421.00	728.00	740.44		740.91	0.004794	5.70	744.91	174.78	0.32
EF Post Oak Crk	Reach 01	10921	3366.00	728.00	740.36		740.82	0.004830	5.69	729.77	171.78	0.32
EF Post Oak Crk	Reach 01	10921	4033.00	728.00	741.18		741.67	0.004793	5.98	883.04	200.67	0.32

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
EF Post Oak Crk	Reach 01	10766	1089.00	725.45	735.83		736.01	0.001415	3.66	356.06	61.42	0.22
EF Post Oak Crk	Reach 01	10766	1746.00	725.45	737.44		737.74	0.001874	4.73	488.81	110.14	0.26
EF Post Oak Crk	Reach 01	10766	2158.00	725.45	738.13		738.49	0.002140	5.28	575.39	138.45	0.28
EF Post Oak Crk	Reach 01	10766	2594.00	725.45	738.78		739.19	0.002363	5.76	672.36	163.20	0.30
EF Post Oak Crk	Reach 01	10766	3011.00	725.45	739.34		739.80	0.002524	6.15	770.66	186.56	0.31
EF Post Oak Crk	Reach 01	10766	3421.00	725.45	739.87		740.36	0.002664	6.50	878.49	221.27	0.32
EF Post Oak Crk	Reach 01	10766	3366.00	725.45	739.78		740.27	0.002671	6.48	858.95	215.52	0.32
EF Post Oak Crk	Reach 01	10766	4033.00	725.45	740.59		741.11	0.002760	6.86	1059.03	270.33	0.33
EF Post Oak Crk	Reach 01	10250	1089.00	726.00	734.63		734.83	0.004362	3.59	341.44	136.08	0.28
EF Post Oak Crk	Reach 01	10250	1746.00	726.00	736.12		736.35	0.004033	4.07	600.09	283.94	0.28
EF Post Oak Crk	Reach 01	10250	2158.00	726.00	736.88		737.08	0.003361	3.99	822.86	303.48	0.26
EF Post Oak Crk	Reach 01	10250	2594.00	726.00	737.61		737.78	0.002845	3.91	1052.58	325.39	0.24
EF Post Oak Crk	Reach 01	10250	3011.00	726.00	738.25		738.41	0.002516	3.86	1265.81	348.10	0.23
EF Post Oak Crk	Reach 01	10250	3421.00	726.00	738.85		739.00	0.002252	3.82	1483.44	374.07	0.22
EF Post Oak Crk	Reach 01	10250	3366.00	726.00	738.73		738.88	0.002336	3.85	1439.47	368.50	0.22
EF Post Oak Crk	Reach 01	10250	4033.00	726.00	739.66		739.80	0.001981	3.78	1802.07	410.21	0.21
EF Post Oak Crk	Reach 01	10096	1089.00	724.00	734.07		734.25	0.003216	3.44	362.62	170.82	0.24
EF Post Oak Crk	Reach 01	10096	1746.00	724.00	735.64		735.82	0.002850	3.74	652.28	199.17	0.23
EF Post Oak Crk	Reach 01	10096	2158.00	724.00	736.39		736.59	0.002941	4.03	851.74	325.91	0.24
EF Post Oak Crk	Reach 01	10096	2594.00	724.00	737.22		737.38	0.002374	3.84	1130.55	349.55	0.22
EF Post Oak Crk	Reach 01	10096	3011.00	724.00	737.91		738.05	0.002044	3.73	1379.35	370.09	0.20
EF Post Oak Crk	Reach 01	10096	3421.00	724.00	738.55		738.68	0.001828	3.68	1629.11	403.55	0.20
EF Post Oak Crk	Reach 01	10096	3366.00	724.00	738.42		738.55	0.001910	3.73	1576.23	398.30	0.20
EF Post Oak Crk	Reach 01	10096	4033.00	724.00	739.40		739.52	0.001593	3.61	1987.86	438.60	0.18
EF Post Oak Crk	Reach 02	9995	1144.00	724.00	733.92		734.07	0.002534	3.08	417.50	122.30	0.22
EF Post Oak Crk	Reach 02	9995	1832.00	724.00	735.48		735.66	0.002575	3.60	633.04	150.99	0.23
EF Post Oak Crk	Reach 02	9995	2258.00	724.00	736.23		736.43	0.002618	3.86	751.27	163.94	0.23
EF Post Oak Crk	Reach 02	9995	2725.00	724.00	737.01		737.23	0.002585	4.06	886.68	180.40	0.23
EF Post Oak Crk	Reach 02	9995	3149.00	724.00	737.69		737.91	0.002540	4.22	1013.64	200.11	0.23
EF Post Oak Crk	Reach 02	9995	3574.00	724.00	738.31		738.54	0.002496	4.35	1146.73	225.01	0.24
EF Post Oak Crk	Reach 02	9995	3485.00	724.00	738.18		738.41	0.002507	4.33	1118.34	219.97	0.24
EF Post Oak Crk	Reach 02	9995	4190.00	724.00	739.15		739.39	0.002409	4.50	1349.48	256.00	0.23
EF Post Oak Crk	Reach 02	9732	1144.00	724.00	732.66		732.99	0.007334	4.62	265.62	89.50	0.35
EF Post Oak Crk	Reach 02	9732	1832.00	724.00	734.25		734.62	0.006443	5.16	451.30	143.40	0.35
EF Post Oak Crk	Reach 02	9732	2258.00	724.00	735.07		735.43	0.005691	5.23	571.70	147.51	0.33
EF Post Oak Crk	Reach 02	9732	2725.00	724.00	735.96		736.30	0.004919	5.23	704.51	151.88	0.31

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
EF Post Oak Crk	Reach 02	9732	3149.00	724.00	736.70		737.03	0.004440	5.25	818.40	156.12	0.30
EF Post Oak Crk	Reach 02	9732	3574.00	724.00	737.38		737.70	0.004115	5.29	925.22	160.04	0.29
EF Post Oak Crk	Reach 02	9732	3485.00	724.00	737.24		737.57	0.004175	5.28	903.34	159.26	0.30
EF Post Oak Crk	Reach 02	9732	4190.00	724.00	738.27		738.60	0.003786	5.38	1072.09	176.62	0.29
EF Post Oak Crk	Reach 02	9429	1144.00	723.00	730.94		731.19	0.004797	4.22	300.50	67.68	0.30
EF Post Oak Crk	Reach 02	9429	1832.00	723.00	732.57		732.92	0.004912	5.00	420.03	77.99	0.32
EF Post Oak Crk	Reach 02	9429	2258.00	723.00	733.45		733.83	0.004897	5.36	490.43	83.46	0.32
EF Post Oak Crk	Reach 02	9429	2725.00	723.00	734.44		734.85	0.004590	5.58	576.47	89.09	0.32
EF Post Oak Crk	Reach 02	9429	3149.00	723.00	735.24		735.68	0.004438	5.78	649.29	93.71	0.32
EF Post Oak Crk	Reach 02	9429	3574.00	723.00	735.94		736.40	0.004390	6.01	716.35	98.13	0.32
EF Post Oak Crk	Reach 02	9429	3485.00	723.00	735.80		736.26	0.004397	5.96	702.60	97.24	0.32
EF Post Oak Crk	Reach 02	9429	4190.00	723.00	736.85		737.35	0.004374	6.32	830.07	137.13	0.32
EF Post Oak Crk	Reach 02	9232	1144.00	722.00	729.72		730.07	0.006746	4.83	258.23	55.46	0.35
EF Post Oak Crk	Reach 02	9232	1832.00	722.00	731.18		731.70	0.007781	6.01	343.86	62.80	0.39
EF Post Oak Crk	Reach 02	9232	2258.00	722.00	731.98		732.59	0.008044	6.55	396.23	67.17	0.41
EF Post Oak Crk	Reach 02	9232	2725.00	722.00	733.05		733.70	0.007364	6.81	471.44	73.11	0.40
EF Post Oak Crk	Reach 02	9232	3149.00	722.00	733.87		734.56	0.007121	7.09	532.76	77.59	0.39
EF Post Oak Crk	Reach 02	9232	3574.00	722.00	734.54		735.29	0.007150	7.42	586.30	81.70	0.40
EF Post Oak Crk	Reach 02	9232	3485.00	722.00	734.41		735.14	0.007136	7.35	575.42	80.86	0.40
EF Post Oak Crk	Reach 02	9232	4190.00	722.00	735.39		736.22	0.007300	7.89	658.09	87.11	0.41
EF Post Oak Crk	Reach 02	8732	1144.00	718.00	723.69		724.41	0.022372	6.80	168.30	41.24	0.59
EF Post Oak Crk	Reach 02	8732	1832.00	718.00	726.55		727.12	0.010897	6.09	302.20	55.02	0.44
EF Post Oak Crk	Reach 02	8732	2258.00	718.00	728.94		729.35	0.005163	5.24	459.86	77.11	0.32
EF Post Oak Crk	Reach 02	8732	2725.00	718.00	730.72		731.09	0.003675	5.03	613.59	95.72	0.28
EF Post Oak Crk	Reach 02	8732	3149.00	718.00	731.67		732.06	0.003474	5.19	709.47	106.28	0.27
EF Post Oak Crk	Reach 02	8732	3574.00	718.00	732.29		732.72	0.003628	5.50	777.46	115.70	0.28
EF Post Oak Crk	Reach 02	8732	3485.00	718.00	732.17		732.59	0.003582	5.43	764.30	113.37	0.28
EF Post Oak Crk	Reach 02	8732	4190.00	718.00	733.01		733.51	0.003930	5.95	865.58	128.32	0.30
EF Post Oak Crk	Reach 02	8587	1144.00	715.09	723.21	720.13	723.48	0.002420	4.17	274.43	75.34	0.38
EF Post Oak Crk	Reach 02	8587	1832.00	715.09	726.55	722.01	726.71	0.000803	3.23	566.87	100.00	0.24
EF Post Oak Crk	Reach 02	8587	2258.00	715.09	729.00	722.49	729.11	0.000419	2.71	834.59	118.14	0.18
EF Post Oak Crk	Reach 02	8587	2725.00	715.09	730.80	722.96	730.90	0.000317	2.57	1059.19	131.44	0.16
EF Post Oak Crk	Reach 02	8587	3149.00	715.09	731.76	723.36	731.87	0.000309	2.65	1188.59	138.53	0.16
EF Post Oak Crk	Reach 02	8587	3574.00	715.09	732.39	723.72	732.51	0.000326	2.80	1277.90	146.99	0.16
EF Post Oak Crk	Reach 02	8587	3485.00	715.09	732.27	723.65	732.39	0.000322	2.76	1260.68	143.63	0.16
EF Post Oak Crk	Reach 02	8587	4190.00	715.09	733.14	724.23	733.28	0.000349	3.02	1398.21	185.64	0.17

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
EF Post Oak Crk	Reach 02	8400	Culvert									
EF Post Oak Crk	Reach 02	8214	1185.00	713.05	719.23	719.23	721.30	0.002537	11.53	102.81	25.33	1.01
EF Post Oak Crk	Reach 02	8214	1896.00	713.05	720.80	720.80	723.53	0.002376	13.27	144.20	29.98	0.99
EF Post Oak Crk	Reach 02	8214	2329.00	713.05	721.66	721.66	724.72	0.002196	14.05	172.99	36.91	0.98
EF Post Oak Crk	Reach 02	8214	2819.00	713.05	722.69	722.69	725.91	0.001927	14.52	215.88	47.07	0.94
EF Post Oak Crk	Reach 02	8214	3248.00	713.05	723.47	723.47	726.84	0.001789	14.95	255.71	54.86	0.92
EF Post Oak Crk	Reach 02	8214	3698.00	713.05	724.22	724.22	727.73	0.001682	15.36	299.66	62.32	0.90
EF Post Oak Crk	Reach 02	8214	3574.00	713.05	724.01	724.01	727.49	0.001710	15.26	287.21	60.30	0.91
EF Post Oak Crk	Reach 02	8214	4357.00	713.05	725.26	725.26	728.89	0.001542	15.82	369.87	72.68	0.88
EF Post Oak Crk	Reach 02	8049	1185.00	712.36	718.50	718.50	720.48	0.002470	11.29	104.98	26.61	1.00
EF Post Oak Crk	Reach 02	8049	1896.00	712.36	720.11	720.11	722.62	0.002387	12.72	149.55	31.72	1.00
EF Post Oak Crk	Reach 02	8049	2329.00	712.36	720.94	720.94	723.69	0.002232	13.32	179.45	40.97	0.99
EF Post Oak Crk	Reach 02	8049	2819.00	712.36	721.84	721.84	724.77	0.001964	13.79	221.81	52.78	0.95
EF Post Oak Crk	Reach 02	8049	3248.00	712.36	722.56	722.56	725.61	0.001807	14.17	262.94	62.13	0.93
EF Post Oak Crk	Reach 02	8049	3698.00	712.36	723.23	723.23	726.42	0.001702	14.58	307.35	70.86	0.91
EF Post Oak Crk	Reach 02	8049	3574.00	712.36	723.04	723.04	726.20	0.001737	14.50	294.15	68.38	0.92
EF Post Oak Crk	Reach 02	8049	4357.00	712.36	724.16	724.16	727.47	0.001559	15.03	379.34	83.08	0.89
EF Post Oak Crk	Reach 02	7589	1185.00	708.74	716.08	715.06	717.33	0.001252	8.98	132.00	27.68	0.72
EF Post Oak Crk	Reach 02	7589	1896.00	708.74	717.77	716.56	719.49	0.001164	10.56	193.40	45.36	0.73
EF Post Oak Crk	Reach 02	7589	2329.00	708.74	718.71	717.45	720.61	0.001095	11.20	240.95	56.71	0.72
EF Post Oak Crk	Reach 02	7589	2819.00	708.74	719.68	718.41	721.73	0.001022	11.74	302.31	68.93	0.71
EF Post Oak Crk	Reach 02	7589	3248.00	708.74	720.49	719.18	722.62	0.000960	12.09	361.82	78.91	0.70
EF Post Oak Crk	Reach 02	7589	3698.00	708.74	721.27	719.90	723.46	0.000910	12.41	426.85	88.72	0.69
EF Post Oak Crk	Reach 02	7589	3574.00	708.74	721.05	719.71	723.23	0.000924	12.33	408.34	86.04	0.69
EF Post Oak Crk	Reach 02	7589	4357.00	708.74	722.33	720.88	724.58	0.000842	12.77	528.51	102.01	0.67
EF Post Oak Crk	Reach 02	7420	Bridge									
EF Post Oak Crk	Reach 02	7170	1185.00	706.37	712.33	712.33	714.36	0.002503	11.42	103.73	25.86	1.01
EF Post Oak Crk	Reach 02	7170	1896.00	706.37	713.92	713.92	716.50	0.002296	12.90	148.50	36.36	0.99
EF Post Oak Crk	Reach 02	7170	2329.00	706.37	714.99	714.90	717.59	0.001828	13.01	200.44	59.89	0.91
EF Post Oak Crk	Reach 02	7170	2819.00	706.37	715.94	715.94	718.61	0.001603	13.36	266.42	78.90	0.87
EF Post Oak Crk	Reach 02	7170	3248.00	706.37	716.66	716.66	719.36	0.001469	13.62	327.67	89.52	0.85
EF Post Oak Crk	Reach 02	7170	3698.00	706.37	717.27	717.27	720.07	0.001420	14.06	384.24	97.33	0.84
EF Post Oak Crk	Reach 02	7170	3574.00	706.37	717.12	717.12	719.89	0.001425	13.92	369.71	95.37	0.84
EF Post Oak Crk	Reach 02	7170	4357.00	706.37	718.21	718.21	721.01	0.001288	14.34	491.58	168.25	0.82
EF Post Oak Crk	Reach 02	6732	1185.00	704.00	710.19	710.19	712.13	0.002468	11.19	105.92	27.63	1.01

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
EF Post Oak Crk	Reach 02	6732	1896.00	704.00	713.03		714.43	0.001205	9.49	199.69	38.86	0.74
EF Post Oak Crk	Reach 02	6732	2329.00	704.00	715.98	712.58	716.70	0.000393	6.91	405.27	124.97	0.45
EF Post Oak Crk	Reach 02	6732	2819.00	704.00	716.43	713.47	717.31	0.000451	7.69	551.21	334.46	0.49
EF Post Oak Crk	Reach 02	6732	3248.00	704.00	716.67	714.08	717.69	0.000515	8.39	632.59	337.39	0.52
EF Post Oak Crk	Reach 02	6732	3698.00	704.00	716.88	714.67	718.06	0.000586	9.11	703.26	339.92	0.56
EF Post Oak Crk	Reach 02	6732	3574.00	704.00	716.78	714.51	717.94	0.000583	9.01	668.78	338.69	0.56
EF Post Oak Crk	Reach 02	6732	4357.00	704.00	716.97	715.55	718.52	0.000770	10.52	733.06	340.98	0.64
EF Post Oak Crk	Reach 02	6393	1350.00	700.23	709.65	704.75	710.12	0.000321	5.54	243.57	26.88	0.32
EF Post Oak Crk	Reach 02	6393	2144.00	700.23	713.43	706.32	714.02	0.000278	6.16	368.95	54.15	0.30
EF Post Oak Crk	Reach 02	6393	2629.00	700.23	716.02	707.21	716.55	0.000204	5.97	619.12	454.60	0.27
EF Post Oak Crk	Reach 02	6393	3173.00	700.23	716.47	708.10	717.13	0.000257	6.82	825.92	473.44	0.30
EF Post Oak Crk	Reach 02	6393	3648.00	700.23	716.71	708.85	717.49	0.000305	7.51	939.09	477.90	0.33
EF Post Oak Crk	Reach 02	6393	4169.00	700.23	716.90	709.63	717.83	0.000363	8.26	1034.44	481.63	0.36
EF Post Oak Crk	Reach 02	6393	3935.00	700.23	716.86	709.28	717.70	0.000331	7.86	1012.53	480.78	0.34
EF Post Oak Crk	Reach 02	6393	4969.00	700.23	716.96	710.80	718.24	0.000504	9.75	1058.95	482.59	0.43
EF Post Oak Crk	Reach 02	6240	Culvert									
EF Post Oak Crk	Reach 02	6113	1350.00	698.91	705.05		706.08	0.000979	8.13	166.14	27.46	0.58
EF Post Oak Crk	Reach 02	6113	2144.00	698.91	706.83		708.37	0.001174	9.97	215.00	27.62	0.63
EF Post Oak Crk	Reach 02	6113	2629.00	698.91	710.02		711.18	0.000669	8.66	303.76	28.86	0.46
EF Post Oak Crk	Reach 02	6113	3173.00	698.91	711.41		712.72	0.000650	9.23	360.64	59.30	0.46
EF Post Oak Crk	Reach 02	6113	3648.00	698.91	712.14		713.65	0.000695	9.92	411.03	74.96	0.49
EF Post Oak Crk	Reach 02	6113	4169.00	698.91	712.79		714.51	0.000752	10.66	462.01	82.24	0.51
EF Post Oak Crk	Reach 02	6113	3935.00	698.91	712.67		714.24	0.000692	10.18	452.77	80.97	0.49
EF Post Oak Crk	Reach 02	6113	4969.00	698.91	713.64		715.67	0.000838	11.72	536.01	92.21	0.54
EF Post Oak Crk	Reach 02	5807	1350.00	698.00	703.54	703.54	705.54	0.002379	11.35	118.95	29.77	1.00
EF Post Oak Crk	Reach 02	5807	2144.00	698.00	706.54		708.00	0.001108	9.68	221.53	38.97	0.72
EF Post Oak Crk	Reach 02	5807	2629.00	698.00	710.20		710.91	0.000318	6.80	434.43	86.86	0.41
EF Post Oak Crk	Reach 02	5807	3173.00	698.00	711.73		712.42	0.000253	6.78	572.42	93.78	0.38
EF Post Oak Crk	Reach 02	5807	3648.00	698.00	712.56		713.30	0.000250	7.10	651.80	99.17	0.38
EF Post Oak Crk	Reach 02	5807	4169.00	698.00	713.29		714.11	0.000256	7.50	727.01	104.71	0.39
EF Post Oak Crk	Reach 02	5807	3935.00	698.00	713.13		713.88	0.000241	7.21	709.59	103.45	0.37
EF Post Oak Crk	Reach 02	5807	4969.00	698.00	714.27		715.21	0.000269	8.11	832.92	111.90	0.40
EF Post Oak Crk	Reach 03	5748	1856.00	696.44	704.44	700.32	704.77	0.000206	4.61	402.73	54.33	0.30
EF Post Oak Crk	Reach 03	5748	2916.00	696.44	707.24	701.48	707.67	0.000194	5.25	555.31	144.02	0.29
EF Post Oak Crk	Reach 03	5748	3563.00	696.44	710.43	702.13	710.80	0.000120	4.87	761.17	286.22	0.23
EF Post Oak Crk	Reach 03	5748	4270.00	696.44	711.91	702.79	712.33	0.000119	5.21	888.68	351.14	0.24

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
EF Post Oak Crk	Reach 03	5748	4907.00	696.44	712.73	703.36	713.21	0.000130	5.64	965.36	475.17	0.25
EF Post Oak Crk	Reach 03	5748	5579.00	696.44	713.46	703.93	714.03	0.000143	6.09	1038.19	487.52	0.26
EF Post Oak Crk	Reach 03	5748	5246.00	696.44	713.29	703.65	713.80	0.000131	5.80	1020.78	484.62	0.25
EF Post Oak Crk	Reach 03	5748	6699.00	696.44	714.43	704.82	715.13	0.000168	6.85	1138.23	504.26	0.29
EF Post Oak Crk	Reach 03	4590	Culvert									
EF Post Oak Crk	Reach 03	3436	1856.00	685.91	695.32		695.91	0.000350	6.14	302.24	41.97	0.40
EF Post Oak Crk	Reach 03	3436	2916.00	685.91	697.84		698.58	0.000401	6.89	423.12	56.09	0.44
EF Post Oak Crk	Reach 03	3436	3563.00	685.91	698.94		699.74	0.000399	7.22	574.46	233.99	0.45
EF Post Oak Crk	Reach 03	3436	4270.00	685.91	699.87	694.87	700.68	0.000369	7.40	825.05	282.02	0.44
EF Post Oak Crk	Reach 03	3436	4907.00	685.91	699.97		700.99	0.000465	8.37	852.03	284.94	0.49
EF Post Oak Crk	Reach 03	3436	5579.00	685.91	700.00	696.56	701.31	0.000591	9.47	861.63	285.97	0.56
EF Post Oak Crk	Reach 03	3436	5246.00	685.91	700.98		701.77	0.000329	7.56	1161.46	359.07	0.42
EF Post Oak Crk	Reach 03	3436	6699.00	685.91	699.56	697.96	701.80	0.001061	12.26	737.14	272.68	0.74
EF Post Oak Crk	Reach 03	3196	2484.00	684.00	692.74	692.74	695.49	0.002319	13.31	186.59	34.11	1.00
EF Post Oak Crk	Reach 03	3196	3884.00	684.00	695.06	695.06	698.13	0.002187	14.07	275.99	45.09	1.00
EF Post Oak Crk	Reach 03	3196	4672.00	684.00	696.04	696.04	699.28	0.002179	14.44	323.56	54.12	1.01
EF Post Oak Crk	Reach 03	3196	5462.00	684.00	697.16	697.16	700.27	0.001699	14.22	426.49	130.14	0.92
EF Post Oak Crk	Reach 03	3196	5780.00	684.00	697.69	697.69	700.61	0.001470	13.85	505.90	166.54	0.87
EF Post Oak Crk	Reach 03	3196	6149.00	684.00	698.22	698.22	700.96	0.001291	13.55	602.53	194.66	0.82
EF Post Oak Crk	Reach 03	3196	6732.00	684.00	698.83	698.83	701.44	0.001157	13.43	729.63	224.30	0.78
EF Post Oak Crk	Reach 03	3196	6794.00	684.00	698.88	698.88	701.49	0.001151	13.45	741.02	226.95	0.78
EF Post Oak Crk	Reach 03	3132	2484.00	683.53	691.77	689.42	693.23	0.001015	9.71	255.76	31.58	0.60
EF Post Oak Crk	Reach 03	3132	3884.00	683.53	693.96	691.44	696.17	0.001256	11.95	324.97	31.76	0.66
EF Post Oak Crk	Reach 03	3132	4672.00	683.53	694.52	692.47	697.40	0.001556	13.62	343.16	34.19	0.73
EF Post Oak Crk	Reach 03	3132	5462.00	683.53	694.60	693.41	698.48	0.002075	15.80	345.98	36.09	0.84
EF Post Oak Crk	Reach 03	3132	5780.00	683.53	694.70	693.80	698.97	0.002254	16.57	349.72	38.34	0.88
EF Post Oak Crk	Reach 03	3132	6149.00	683.53	695.42	694.22	699.65	0.002061	16.53	380.78	48.83	0.85
EF Post Oak Crk	Reach 03	3132	6732.00	683.53	696.33	695.03	700.64	0.001908	16.72	445.08	170.44	0.83
EF Post Oak Crk	Reach 03	3132	6794.00	683.53	696.29	695.15	700.72	0.001964	16.93	439.49	170.16	0.84
EF Post Oak Crk	Reach 03	3000	Bridge									
EF Post Oak Crk	Reach 03	2827	2484.00	681.85	692.40		692.75	0.000258	5.47	875.90	210.14	0.30
EF Post Oak Crk	Reach 03	2827	3884.00	681.85	695.04		695.34	0.000205	5.63	1620.63	395.48	0.28
EF Post Oak Crk	Reach 03	2827	4672.00	681.85	696.09		696.36	0.000184	5.61	2081.27	477.29	0.26
EF Post Oak Crk	Reach 03	2827	5462.00	681.85	696.81		697.08	0.000183	5.79	2432.33	498.42	0.27
EF Post Oak Crk	Reach 03	2827	5780.00	681.85	697.05		697.33	0.000186	5.89	2554.23	506.02	0.27

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
EF Post Oak Crk	Reach 03	2827	6149.00	681.85	697.33		697.61	0.000187	5.98	2697.54	514.35	0.27
EF Post Oak Crk	Reach 03	2827	6732.00	681.85	697.73		698.02	0.000190	6.14	2907.07	526.83	0.27
EF Post Oak Crk	Reach 03	2827	6794.00	681.85	697.78		698.06	0.000191	6.16	2929.12	528.29	0.27
EF Post Oak Crk	Reach 03	2696	2484.00	682.00	689.78	689.78	692.44	0.002255	13.08	189.85	36.25	1.01
EF Post Oak Crk	Reach 03	2696	3884.00	682.00	691.86	691.86	695.00	0.002134	14.21	273.29	44.23	1.01
EF Post Oak Crk	Reach 03	2696	4672.00	682.00	693.39	693.39	696.07	0.001412	13.31	431.71	138.77	0.85
EF Post Oak Crk	Reach 03	2696	5462.00	682.00	694.63	694.63	696.84	0.001019	12.50	708.05	274.08	0.74
EF Post Oak Crk	Reach 03	2696	5780.00	682.00	694.90	694.90	697.09	0.000993	12.58	780.71	277.59	0.73
EF Post Oak Crk	Reach 03	2696	6149.00	682.00	695.08	695.08	697.37	0.001020	12.93	832.47	280.27	0.75
EF Post Oak Crk	Reach 03	2696	6732.00	682.00	695.48	695.48	697.77	0.001001	13.16	944.04	287.35	0.74
EF Post Oak Crk	Reach 03	2696	6794.00	682.00	695.51	695.51	697.81	0.001000	13.19	954.98	288.14	0.74
EF Post Oak Crk	Reach 03	2196	2484.00	678.21	687.37	687.37	689.15	0.001475	11.12	315.75	120.32	0.81
EF Post Oak Crk	Reach 03	2196	3884.00	678.21	688.91	688.91	690.87	0.001416	12.25	544.11	172.11	0.82
EF Post Oak Crk	Reach 03	2196	4672.00	678.21	689.69	689.51	691.61	0.001277	12.48	682.21	184.33	0.79
EF Post Oak Crk	Reach 03	2196	5462.00	678.21	690.85		692.41	0.000925	11.67	906.03	198.91	0.69
EF Post Oak Crk	Reach 03	2196	5780.00	678.21	690.84	690.26	692.60	0.001044	12.38	902.95	198.73	0.73
EF Post Oak Crk	Reach 03	2196	6149.00	678.21	691.16	690.47	692.91	0.001006	12.45	967.51	202.48	0.72
EF Post Oak Crk	Reach 03	2196	6732.00	678.21	691.76	690.79	693.43	0.000911	12.35	1101.77	256.18	0.70
EF Post Oak Crk	Reach 03	2196	6794.00	678.21	691.61	690.85	693.41	0.000996	12.78	1063.23	253.44	0.73
EF Post Oak Crk	Reach 03	1765	2495.00	674.79	686.73	683.66	687.16	0.000269	5.94	799.30	214.81	0.37
EF Post Oak Crk	Reach 03	1765	3895.00	674.79	689.67	685.26	689.98	0.000157	5.58	1548.83	284.24	0.29
EF Post Oak Crk	Reach 03	1765	4679.00	674.79	690.66	685.60	690.98	0.000151	5.79	1838.80	300.06	0.29
EF Post Oak Crk	Reach 03	1765	5469.00	674.79	691.59	686.50	691.91	0.000147	5.98	2122.05	317.69	0.29
EF Post Oak Crk	Reach 03	1765	5730.00	674.79	691.68	686.70	692.03	0.000156	6.20	2152.83	328.98	0.30
EF Post Oak Crk	Reach 03	1765	6055.00	674.79	691.97	686.91	692.35	0.000164	6.46	2250.18	344.49	0.31
EF Post Oak Crk	Reach 03	1765	6752.00	674.79	692.50	687.29	692.91	0.000170	6.74	2436.76	357.36	0.32
EF Post Oak Crk	Reach 03	1765	6655.00	674.79	692.44	687.22	692.84	0.000169	6.70	2415.62	356.18	0.32
EF Post Oak Crk	Reach 03	1660	Bridge									
EF Post Oak Crk	Reach 03	1563	2495.00	674.46	683.04	683.04	685.86	0.002363	13.48	185.13	33.21	1.01
EF Post Oak Crk	Reach 03	1563	3895.00	674.46	685.20	685.20	688.56	0.002195	14.72	264.82	40.68	1.00
EF Post Oak Crk	Reach 03	1563	4679.00	674.46	686.37	686.37	689.86	0.001842	15.01	324.21	84.26	0.94
EF Post Oak Crk	Reach 03	1563	5469.00	674.46	687.97	687.97	690.77	0.001214	13.79	534.42	173.74	0.79
EF Post Oak Crk	Reach 03	1563	5730.00	674.46	688.24	688.24	691.02	0.001184	13.87	580.80	178.78	0.78
EF Post Oak Crk	Reach 03	1563	6055.00	674.46	688.50	688.50	691.33	0.001179	14.09	627.84	184.10	0.79
EF Post Oak Crk	Reach 03	1563	6752.00	674.46	689.08	689.08	691.95	0.001139	14.38	739.49	196.63	0.78
EF Post Oak Crk	Reach 03	1563	6655.00	674.46	689.00	689.00	691.87	0.001143	14.34	724.42	195.14	0.78

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
EF Post Oak Crk	Reach 03	1196	2495.00	671.74	680.39	680.39	683.18	0.002278	13.42	185.97	33.32	1.00
EF Post Oak Crk	Reach 03	1196	3895.00	671.74	683.58	683.58	684.98	0.000868	10.48	811.36	386.35	0.65
EF Post Oak Crk	Reach 03	1196	4679.00	671.74	684.04	684.04	685.49	0.000902	11.08	990.57	401.44	0.67
EF Post Oak Crk	Reach 03	1196	5469.00	671.74	684.39	684.39	685.95	0.000962	11.76	1134.49	411.83	0.70
EF Post Oak Crk	Reach 03	1196	5730.00	671.74	684.55	684.55	686.09	0.000949	11.82	1199.38	415.94	0.70
EF Post Oak Crk	Reach 03	1196	6055.00	671.74	684.69	684.69	686.25	0.000962	12.03	1259.93	419.74	0.70
EF Post Oak Crk	Reach 03	1196	6752.00	671.74	684.97	684.97	686.60	0.000998	12.49	1378.41	426.86	0.72
EF Post Oak Crk	Reach 03	1196	6655.00	671.74	684.94	684.94	686.55	0.000992	12.43	1362.58	425.98	0.72
Post Oak Creek	Reach 01	57527	396.00	782.52	787.31		787.55	0.012301	3.93	100.71	36.76	0.42
Post Oak Creek	Reach 01	57527	678.00	782.52	788.31	786.63	788.60	0.013592	4.51	191.74	216.28	0.45
Post Oak Creek	Reach 01	57527	857.00	782.52	788.68		788.94	0.011510	4.47	275.85	232.64	0.42
Post Oak Creek	Reach 01	57527	1049.00	782.52	789.01		789.25	0.010025	4.44	355.07	247.15	0.40
Post Oak Creek	Reach 01	57527	1234.00	782.52	789.28		789.50	0.009093	4.42	424.20	259.22	0.39
Post Oak Creek	Reach 01	57527	1424.00	782.52	789.53		789.74	0.008479	4.44	489.40	271.55	0.38
Post Oak Creek	Reach 01	57527	1504.00	782.52	789.63		789.84	0.008279	4.45	516.11	278.01	0.37
Post Oak Creek	Reach 01	57527	1722.00	782.52	789.87		790.08	0.007795	4.48	587.10	294.32	0.37
Post Oak Creek	Reach 01	57027	396.00	781.73	785.54		785.58	0.001837	1.60	279.43	142.29	0.17
Post Oak Creek	Reach 01	57027	678.00	781.73	786.34		786.39	0.002063	2.00	406.61	181.57	0.18
Post Oak Creek	Reach 01	57027	857.00	781.73	786.73		786.79	0.002140	2.18	482.64	206.35	0.19
Post Oak Creek	Reach 01	57027	1049.00	781.73	787.09		787.16	0.002193	2.33	561.22	230.88	0.20
Post Oak Creek	Reach 01	57027	1234.00	781.73	787.39		787.47	0.002224	2.46	634.78	252.26	0.20
Post Oak Creek	Reach 01	57027	1424.00	781.73	787.67		787.75	0.002235	2.56	706.59	266.17	0.20
Post Oak Creek	Reach 01	57027	1504.00	781.73	787.78		787.86	0.002234	2.60	736.41	271.89	0.20
Post Oak Creek	Reach 01	57027	1722.00	781.73	788.07		788.15	0.002224	2.69	816.77	288.17	0.20
Post Oak Creek	Reach 01	56527	396.00	780.00	783.78		783.90	0.007946	3.48	190.39	143.40	0.35
Post Oak Creek	Reach 01	56527	678.00	780.00	784.55		784.67	0.006831	3.74	315.03	178.84	0.33
Post Oak Creek	Reach 01	56527	857.00	780.00	784.94		785.06	0.006494	3.88	387.85	196.68	0.33
Post Oak Creek	Reach 01	56527	1049.00	780.00	785.29		785.42	0.006318	4.04	460.29	212.94	0.33
Post Oak Creek	Reach 01	56527	1234.00	780.00	785.59		785.72	0.006251	4.18	525.38	226.56	0.33
Post Oak Creek	Reach 01	56527	1424.00	780.00	785.86		786.00	0.006248	4.33	588.46	239.45	0.33
Post Oak Creek	Reach 01	56527	1504.00	780.00	785.97		786.11	0.006255	4.40	615.06	245.55	0.34
Post Oak Creek	Reach 01	56527	1722.00	780.00	786.25		786.39	0.006338	4.58	686.67	264.56	0.34
Post Oak Creek	Reach 01	56027	396.00	776.00	782.32		782.39	0.001546	2.47	304.77	196.64	0.21
Post Oak Creek	Reach 01	56027	678.00	776.00	783.08		783.15	0.001687	2.87	467.99	239.71	0.22
Post Oak Creek	Reach 01	56027	857.00	776.00	783.38		783.47	0.001866	3.14	544.34	258.27	0.24
Post Oak Creek	Reach 01	56027	1049.00	776.00	783.67		783.76	0.002014	3.37	621.07	275.67	0.25

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 01	56027	1234.00	776.00	783.93		784.03	0.002090	3.54	695.65	291.59	0.26
Post Oak Creek	Reach 01	56027	1424.00	776.00	784.18		784.28	0.002153	3.70	769.13	307.99	0.26
Post Oak Creek	Reach 01	56027	1504.00	776.00	784.27		784.38	0.002180	3.76	798.54	314.57	0.26
Post Oak Creek	Reach 01	56027	1722.00	776.00	784.52		784.63	0.002228	3.90	878.49	330.59	0.27
Post Oak Creek	Reach 01	55527	396.00	776.00	779.23	779.23	779.91	0.090029	6.61	59.90	45.56	1.02
Post Oak Creek	Reach 01	55527	678.00	776.00	780.07	780.00	780.54	0.079475	5.51	123.37	120.53	0.93
Post Oak Creek	Reach 01	55527	857.00	776.00	780.45		780.85	0.046059	5.12	172.84	141.16	0.74
Post Oak Creek	Reach 01	55527	1049.00	776.00	780.83		781.19	0.030437	4.86	230.99	161.39	0.63
Post Oak Creek	Reach 01	55527	1234.00	776.00	781.07		781.44	0.027390	4.99	270.07	172.85	0.61
Post Oak Creek	Reach 01	55527	1424.00	776.00	781.28		781.67	0.025371	5.13	308.70	183.52	0.60
Post Oak Creek	Reach 01	55527	1504.00	776.00	781.39		781.77	0.024015	5.14	328.12	188.66	0.58
Post Oak Creek	Reach 01	55527	1722.00	776.00	781.60		782.01	0.022865	5.31	369.80	199.23	0.58
Post Oak Creek	T7	1301	208.00	786.00	790.08		790.24	0.011193	3.19	70.74	109.97	0.38
Post Oak Creek	T7	1301	386.00	786.00	790.64	789.56	790.82	0.011683	3.80	136.05	124.92	0.41
Post Oak Creek	T7	1301	502.00	786.00	790.90		791.09	0.011758	4.05	169.49	131.95	0.41
Post Oak Creek	T7	1301	632.00	786.00	791.14		791.35	0.011891	4.30	202.71	138.59	0.42
Post Oak Creek	T7	1301	757.00	786.00	791.34		791.57	0.012243	4.54	230.34	143.87	0.43
Post Oak Creek	T7	1301	881.00	786.00	791.51	790.89	791.75	0.012678	4.77	254.96	148.43	0.44
Post Oak Creek	T7	1301	960.00	786.00	791.62	790.97	791.87	0.012661	4.86	272.01	151.50	0.45
Post Oak Creek	T7	1301	1090.00	786.00	791.78	791.09	792.05	0.012943	5.06	296.47	155.80	0.45
Post Oak Creek	T7	758	208.00	782.28	784.85	784.39	785.03	0.008298	3.42	60.74	59.36	0.60
Post Oak Creek	T7	758	386.00	782.28	785.42	784.92	785.65	0.007931	3.80	101.63	82.27	0.60
Post Oak Creek	T7	758	502.00	782.28	785.70	785.19	785.95	0.007807	4.00	125.55	93.00	0.61
Post Oak Creek	T7	758	632.00	782.28	785.96	785.39	786.23	0.007651	4.18	151.23	103.29	0.61
Post Oak Creek	T7	758	757.00	782.28	786.15		786.45	0.007460	4.43	171.16	109.44	0.61
Post Oak Creek	T7	758	881.00	782.28	786.32		786.65	0.007231	4.66	190.27	115.01	0.61
Post Oak Creek	T7	758	960.00	782.28	786.41		786.77	0.007223	4.82	201.26	118.37	0.62
Post Oak Creek	T7	758	1090.00	782.28	786.57		786.96	0.007068	5.03	220.57	124.68	0.62
Post Oak Creek	T7	633	208.00	780.00	781.98	781.98	782.52	0.094357	5.93	35.05	32.74	1.01
Post Oak Creek	T7	633	386.00	780.00	782.60	782.60	783.25	0.089162	6.48	59.59	46.84	1.01
Post Oak Creek	T7	633	502.00	780.00	782.91	782.91	783.60	0.084821	6.67	75.23	54.51	1.00
Post Oak Creek	T7	633	632.00	780.00	783.18	783.18	783.93	0.082970	6.93	91.25	61.53	1.00
Post Oak Creek	T7	633	757.00	780.00	783.42	783.42	784.21	0.081233	7.13	106.12	67.41	1.00
Post Oak Creek	T7	633	881.00	780.00	783.61	783.61	784.45	0.081168	7.37	119.56	72.31	1.01
Post Oak Creek	T7	633	960.00	780.00	783.76	783.76	784.59	0.079034	7.35	130.65	77.81	1.00
Post Oak Creek	T7	633	1090.00	780.00	783.93	783.93	784.81	0.080589	7.51	145.16	84.94	1.01

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 02	55145	588.00	773.48	778.65		778.70	0.002373	1.80	348.90	193.43	0.19
Post Oak Creek	Reach 02	55145	1040.00	773.48	779.36		779.44	0.002877	2.30	507.00	251.93	0.22
Post Oak Creek	Reach 02	55145	1329.00	773.48	779.72		779.80	0.003005	2.51	601.23	278.51	0.22
Post Oak Creek	Reach 02	55145	1647.00	773.48	780.08		780.18	0.003194	2.74	710.62	361.39	0.23
Post Oak Creek	Reach 02	55145	1953.00	773.48	780.34		780.45	0.003172	2.84	808.51	377.68	0.24
Post Oak Creek	Reach 02	55145	2262.00	773.48	780.59		780.70	0.003128	2.93	904.03	394.32	0.24
Post Oak Creek	Reach 02	55145	2423.00	773.48	780.71		780.83	0.003100	2.96	952.59	402.22	0.24
Post Oak Creek	Reach 02	55145	2765.00	773.48	780.96		781.08	0.003034	3.03	1053.43	417.70	0.24
Post Oak Creek	Reach 02	54590	588.00	772.00	776.95		777.01	0.004028	2.56	353.45	302.50	0.25
Post Oak Creek	Reach 02	54590	1040.00	772.00	777.60		777.67	0.003556	2.71	556.91	319.04	0.24
Post Oak Creek	Reach 02	54590	1329.00	772.00	777.93		778.00	0.003506	2.84	661.71	327.32	0.24
Post Oak Creek	Reach 02	54590	1647.00	772.00	778.26		778.34	0.003411	2.94	771.43	335.08	0.24
Post Oak Creek	Reach 02	54590	1953.00	772.00	778.55		778.63	0.003360	3.04	868.80	341.92	0.24
Post Oak Creek	Reach 02	54590	2262.00	772.00	778.82		778.92	0.003293	3.13	964.47	348.60	0.24
Post Oak Creek	Reach 02	54590	2423.00	772.00	778.96		779.06	0.003262	3.17	1012.76	351.92	0.24
Post Oak Creek	Reach 02	54590	2765.00	772.00	779.24		779.34	0.003205	3.25	1112.28	358.67	0.24
Post Oak Creek	Reach 02	54145	588.00	770.00	775.05		775.11	0.004509	2.34	325.24	224.17	0.25
Post Oak Creek	Reach 02	54145	1040.00	770.00	776.04		776.11	0.003492	2.55	575.37	326.40	0.24
Post Oak Creek	Reach 02	54145	1329.00	770.00	776.47		776.54	0.003087	2.59	719.84	343.59	0.23
Post Oak Creek	Reach 02	54145	1647.00	770.00	776.92		776.98	0.002721	2.60	877.25	359.93	0.22
Post Oak Creek	Reach 02	54145	1953.00	770.00	777.24		777.31	0.002648	2.69	994.99	367.31	0.22
Post Oak Creek	Reach 02	54145	2262.00	770.00	777.54		777.62	0.002598	2.78	1106.48	374.16	0.22
Post Oak Creek	Reach 02	54145	2423.00	770.00	777.69		777.77	0.002579	2.82	1162.20	377.54	0.22
Post Oak Creek	Reach 02	54145	2765.00	770.00	777.99		778.07	0.002548	2.91	1275.99	384.35	0.22
Post Oak Creek	Reach 02	53611	588.00	766.00	772.04		772.23	0.006504	3.48	169.99	70.18	0.32
Post Oak Creek	Reach 02	53611	1040.00	766.00	773.18		773.47	0.007348	4.42	278.96	121.54	0.35
Post Oak Creek	Reach 02	53611	1329.00	766.00	773.73		774.06	0.007544	4.81	353.44	149.37	0.37
Post Oak Creek	Reach 02	53611	1647.00	766.00	774.06		774.49	0.009353	5.57	410.52	227.25	0.41
Post Oak Creek	Reach 02	53611	1953.00	766.00	774.43		774.87	0.009323	5.80	499.06	245.90	0.41
Post Oak Creek	Reach 02	53611	2262.00	766.00	774.82	773.01	775.25	0.008844	5.89	598.84	268.15	0.41
Post Oak Creek	Reach 02	53611	2423.00	766.00	774.96		775.40	0.009015	6.03	635.86	276.31	0.41
Post Oak Creek	Reach 02	53611	2765.00	766.00	775.22		775.68	0.009375	6.31	710.67	292.29	0.42
Post Oak Creek	Reach 02	53244	588.00	764.00	767.60		768.35	0.019346	6.96	84.47	37.68	0.82
Post Oak Creek	Reach 02	53244	1040.00	764.00	769.02		769.83	0.013486	7.22	143.97	46.10	0.72
Post Oak Creek	Reach 02	53244	1329.00	764.00	769.82		770.64	0.011406	7.29	183.99	71.91	0.68
Post Oak Creek	Reach 02	53244	1647.00	764.00	771.08		771.63	0.006562	6.15	343.15	166.38	0.53
Post Oak Creek	Reach 02	53244	1953.00	764.00	771.64		772.16	0.005977	6.11	444.66	197.18	0.51

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 02	51311	588.00	748.09	756.37		756.44	0.000703	2.13	276.31	57.24	0.17
Post Oak Creek	Reach 02	51311	1040.00	748.09	758.31		758.42	0.000787	2.64	393.69	63.66	0.19
Post Oak Creek	Reach 02	51311	1329.00	748.09	759.31		759.44	0.000826	2.89	459.38	66.98	0.19
Post Oak Creek	Reach 02	51311	1647.00	748.09	760.15		760.31	0.000908	3.19	516.66	69.75	0.21
Post Oak Creek	Reach 02	51311	1953.00	748.09	760.89		761.07	0.000971	3.43	568.92	72.18	0.22
Post Oak Creek	Reach 02	51311	2262.00	748.09	761.50		761.71	0.001053	3.69	613.53	74.19	0.23
Post Oak Creek	Reach 02	51311	2423.00	748.09	761.79		762.02	0.001095	3.81	635.51	75.17	0.23
Post Oak Creek	Reach 02	51311	2765.00	748.09	762.37		762.63	0.001180	4.07	679.72	77.08	0.24
Post Oak Creek	Reach 02	51145	588.00	750.00	755.77		756.14	0.007241	4.83	121.70	32.30	0.44
Post Oak Creek	Reach 02	51145	1040.00	750.00	757.60		758.09	0.007076	5.57	186.78	38.98	0.45
Post Oak Creek	Reach 02	51145	1329.00	750.00	758.57		759.09	0.007818	5.80	229.20	48.52	0.47
Post Oak Creek	Reach 02	51145	1647.00	750.00	759.34		759.93	0.008143	6.13	268.70	53.57	0.48
Post Oak Creek	Reach 02	51145	1953.00	750.00	760.04		760.66	0.008798	6.35	307.79	61.89	0.50
Post Oak Creek	Reach 02	51145	2262.00	750.00	760.60		761.28	0.008905	6.57	344.16	66.52	0.51
Post Oak Creek	Reach 02	51145	2423.00	750.00	760.88		761.57	0.008935	6.68	362.73	68.72	0.51
Post Oak Creek	Reach 02	51145	2765.00	750.00	761.42		762.16	0.008994	6.89	401.21	73.13	0.52
Post Oak Creek	Reach 02	50645	588.00	746.00	753.89		753.98	0.002682	2.50	235.46	53.65	0.21
Post Oak Creek	Reach 02	50645	1040.00	746.00	755.48		755.63	0.003365	3.16	335.96	70.99	0.24
Post Oak Creek	Reach 02	50645	1329.00	746.00	756.27		756.46	0.003546	3.46	395.98	80.94	0.25
Post Oak Creek	Reach 02	50645	1647.00	746.00	756.96		757.18	0.003686	3.81	461.47	99.95	0.26
Post Oak Creek	Reach 02	50645	1953.00	746.00	757.50		757.75	0.003879	4.11	515.84	104.00	0.27
Post Oak Creek	Reach 02	50645	2262.00	746.00	757.97		758.26	0.004088	4.41	565.59	107.57	0.28
Post Oak Creek	Reach 02	50645	2423.00	746.00	758.18		758.49	0.004236	4.57	588.73	112.67	0.29
Post Oak Creek	Reach 02	50645	2765.00	746.00	758.59		758.94	0.004524	4.89	637.72	122.17	0.30
Post Oak Creek	Reach 02	50145	588.00	744.00	752.74		752.83	0.001985	2.43	250.43	72.06	0.18
Post Oak Creek	Reach 02	50145	1040.00	744.00	753.85		754.02	0.003064	3.42	352.73	112.12	0.24
Post Oak Creek	Reach 02	50145	1329.00	744.00	754.54		754.74	0.003323	3.81	446.12	167.34	0.25
Post Oak Creek	Reach 02	50145	1647.00	744.00	755.21		755.43	0.003339	4.05	579.78	229.28	0.25
Post Oak Creek	Reach 02	50145	1953.00	744.00	755.70		755.93	0.003395	4.25	704.13	273.16	0.26
Post Oak Creek	Reach 02	50145	2262.00	744.00	756.16		756.39	0.003354	4.38	838.51	312.50	0.26
Post Oak Creek	Reach 02	50145	2423.00	744.00	756.37		756.60	0.003293	4.41	905.98	317.32	0.26
Post Oak Creek	Reach 02	50145	2765.00	744.00	756.82		757.04	0.003129	4.44	1050.48	327.60	0.25
Post Oak Creek	Reach 02	49645	588.00	744.00	752.03		752.07	0.001175	1.63	371.95	102.01	0.14
Post Oak Creek	Reach 02	49645	1040.00	744.00	752.51		752.61	0.002521	2.56	426.57	128.97	0.21
Post Oak Creek	Reach 02	49645	1329.00	744.00	753.15		753.27	0.002541	2.80	525.54	179.02	0.21
Post Oak Creek	Reach 02	49645	1647.00	744.00	753.98		754.09	0.002108	2.80	694.66	219.81	0.20

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Post Oak Creek	Reach 02	49645	1953.00	744.00	754.47		754.59	0.002088	2.93	810.96	243.63	0.20
Post Oak Creek	Reach 02	49645	2262.00	744.00	754.97		755.09	0.001986	2.99	936.62	259.76	0.20
Post Oak Creek	Reach 02	49645	2423.00	744.00	755.20		755.32	0.001956	3.03	997.56	267.23	0.20
Post Oak Creek	Reach 02	49645	2765.00	744.00	755.71		755.83	0.001844	3.08	1137.29	283.63	0.19
Post Oak Creek	Reach 02	49145	912.00	738.00	751.99		752.00	0.000055	1.00	1727.53	365.84	0.05
Post Oak Creek	Reach 02	49145	1689.00	738.00	752.42		752.44	0.000151	1.70	1885.18	375.37	0.09
Post Oak Creek	Reach 02	49145	2612.00	738.00	752.97		753.02	0.000274	2.37	2096.94	387.59	0.12
Post Oak Creek	Reach 02	49145	3528.00	738.00	753.74		753.80	0.000358	2.83	2403.92	414.16	0.14
Post Oak Creek	Reach 02	49145	4157.00	738.00	754.19		754.27	0.000423	3.15	2594.84	443.23	0.16
Post Oak Creek	Reach 02	49145	4926.00	738.00	754.64		754.73	0.000499	3.50	2799.25	466.20	0.17
Post Oak Creek	Reach 02	49145	5304.00	738.00	754.85		754.95	0.000526	3.63	2900.22	475.92	0.18
Post Oak Creek	Reach 02	49145	6180.00	738.00	755.32		755.44	0.000581	3.91	3130.88	497.20	0.19
Post Oak Creek	Reach 02	48855	912.00	738.00	751.98		751.99	0.000039	0.60	2001.13	394.20	0.04
Post Oak Creek	Reach 02	48855	1689.00	738.00	752.39		752.40	0.000108	1.03	2166.42	417.57	0.06
Post Oak Creek	Reach 02	48855	2612.00	738.00	752.92		752.95	0.000196	1.45	2396.91	448.54	0.09
Post Oak Creek	Reach 02	48855	3528.00	738.00	753.67		753.71	0.000247	1.72	2751.20	492.35	0.10
Post Oak Creek	Reach 02	48855	4157.00	738.00	754.12		754.16	0.000279	1.89	2974.06	517.05	0.11
Post Oak Creek	Reach 02	48855	4926.00	738.00	754.55		754.60	0.000320	2.08	3205.66	538.98	0.11
Post Oak Creek	Reach 02	48855	5304.00	738.00	754.76		754.82	0.000338	2.16	3319.85	550.02	0.12
Post Oak Creek	Reach 02	48855	6180.00	738.00	755.23		755.29	0.000374	2.34	3580.90	574.47	0.12
Post Oak Creek	T6	7532	345.00	770.75	776.36		776.39	0.003002	1.45	238.50	139.38	0.19
Post Oak Creek	T6	7532	547.00	770.75	777.42		777.45	0.001720	1.35	405.57	173.62	0.16
Post Oak Creek	T6	7532	674.00	770.75	777.71		777.74	0.001892	1.48	455.89	182.68	0.16
Post Oak Creek	T6	7532	810.00	770.75	777.95		777.99	0.002114	1.62	501.03	190.88	0.18
Post Oak Creek	T6	7532	936.00	770.75	778.18		778.23	0.002345	1.71	547.93	207.84	0.19
Post Oak Creek	T6	7532	1069.00	770.75	778.36		778.41	0.002593	1.82	586.30	217.58	0.20
Post Oak Creek	T6	7532	1069.00	770.75	778.36		778.41	0.002593	1.82	586.30	217.58	0.20
Post Oak Creek	T6	7532	1271.00	770.75	778.65		778.71	0.002831	1.95	651.21	233.14	0.21
Post Oak Creek	T6	7102	345.00	769.31	776.19	772.54	776.20	0.000160	0.79	518.91	200.23	0.07
Post Oak Creek	T6	7102	547.00	769.31	777.28	772.99	777.29	0.000150	0.90	759.04	239.07	0.07
Post Oak Creek	T6	7102	674.00	769.31	777.53	773.21	777.55	0.000187	1.03	820.41	247.68	0.08
Post Oak Creek	T6	7102	810.00	769.31	777.74	773.41	777.76	0.000230	1.17	872.15	255.00	0.09
Post Oak Creek	T6	7102	936.00	769.31	777.94	773.59	777.96	0.000271	1.31	923.98	269.93	0.10
Post Oak Creek	T6	7102	1069.00	769.31	778.05	773.75	778.08	0.000362	1.53	957.27	345.77	0.11
Post Oak Creek	T6	7102	1069.00	769.31	778.05	773.75	778.08	0.000362	1.53	957.27	345.77	0.11
Post Oak Creek	T6	7102	1271.00	769.31	778.29	773.97	778.33	0.000415	1.68	1044.25	360.48	0.12

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	T6	6925	Culvert									
Post Oak Creek	T6	6800	345.00	766.90	772.29		772.58	0.006192	4.36	81.72	64.16	0.55
Post Oak Creek	T6	6800	547.00	766.90	772.59	772.18	773.09	0.009075	5.81	104.68	90.78	0.68
Post Oak Creek	T6	6800	674.00	766.90	772.95	772.61	773.41	0.007191	5.72	142.58	117.99	0.62
Post Oak Creek	T6	6800	810.00	766.90	773.34		773.72	0.005394	5.43	195.48	154.60	0.55
Post Oak Creek	T6	6800	936.00	766.90	773.54		773.92	0.005158	5.55	228.52	172.25	0.55
Post Oak Creek	T6	6800	1069.00	766.90	773.67		774.08	0.005401	5.83	251.70	180.24	0.56
Post Oak Creek	T6	6800	1069.00	766.90	773.67		774.08	0.005401	5.83	251.70	180.24	0.56
Post Oak Creek	T6	6800	1271.00	766.90	773.90		774.32	0.005325	6.05	294.87	197.69	0.57
Post Oak Creek	T6	6750.*	345.00	766.81	772.10	771.05	772.29	0.004484	3.55	108.32	103.64	0.44
Post Oak Creek	T6	6750.*	547.00	766.81	772.13	771.69	772.58	0.010661	5.52	111.26	105.56	0.68
Post Oak Creek	T6	6750.*	674.00	766.81	772.82		773.06	0.004541	4.36	202.44	161.81	0.46
Post Oak Creek	T6	6750.*	810.00	766.81	773.28		773.47	0.003034	3.95	286.27	199.96	0.39
Post Oak Creek	T6	6750.*	936.00	766.81	773.47		773.67	0.003044	4.12	328.51	233.44	0.39
Post Oak Creek	T6	6750.*	1069.00	766.81	773.60		773.82	0.003291	4.38	358.72	251.95	0.41
Post Oak Creek	T6	6750.*	1069.00	766.81	773.60		773.82	0.003291	4.38	358.72	251.95	0.41
Post Oak Creek	T6	6750.*	1271.00	766.81	773.83		774.06	0.003285	4.57	421.16	282.78	0.41
Post Oak Creek	T6	6552	345.00	766.43	769.57	769.57	770.18	0.046454	6.27	55.82	54.39	0.97
Post Oak Creek	T6	6552	547.00	766.43	770.99		771.08	0.004990	2.83	260.22	213.17	0.35
Post Oak Creek	T6	6552	674.00	766.43	772.75		772.77	0.000499	1.35	735.02	332.96	0.12
Post Oak Creek	T6	6552	810.00	766.43	773.22		773.24	0.000427	1.35	896.43	361.73	0.11
Post Oak Creek	T6	6552	936.00	766.43	773.41		773.43	0.000468	1.45	965.42	372.49	0.12
Post Oak Creek	T6	6552	1069.00	766.43	773.52		773.54	0.000544	1.59	1006.57	376.67	0.13
Post Oak Creek	T6	6552	1069.00	766.43	773.52		773.54	0.000544	1.59	1006.57	376.67	0.13
Post Oak Creek	T6	6552	1271.00	766.43	773.73		773.76	0.000619	1.75	1088.23	384.83	0.14
Post Oak Creek	T6	6317	345.00	764.15	769.12	766.68	769.13	0.000367	1.09	346.19	182.03	0.12
Post Oak Creek	T6	6317	547.00	764.15	770.96	767.08	770.97	0.000117	0.88	770.07	272.02	0.07
Post Oak Creek	T6	6317	674.00	764.15	772.74	767.28	772.74	0.000043	0.67	1316.94	341.48	0.05
Post Oak Creek	T6	6317	810.00	764.15	773.20	767.46	773.21	0.000046	0.72	1479.27	359.11	0.05
Post Oak Creek	T6	6317	936.00	764.15	773.39	767.64	773.39	0.000055	0.80	1546.29	366.89	0.05
Post Oak Creek	T6	6317	1069.00	764.15	773.49	767.79	773.50	0.000067	0.89	1585.24	371.34	0.06
Post Oak Creek	T6	6317	1069.00	764.15	773.49	767.79	773.50	0.000067	0.89	1585.24	371.34	0.06
Post Oak Creek	T6	6317	1271.00	764.15	773.70	767.99	773.71	0.000083	1.01	1663.60	380.12	0.07
Post Oak Creek	T6	6180	Culvert									
Post Oak Creek	T6	6011	345.00	762.02	767.68		767.72	0.002790	1.72	200.16	131.11	0.25

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	T6	6011	547.00	762.02	768.32		768.37	0.003188	1.74	319.12	253.93	0.26
Post Oak Creek	T6	6011	674.00	762.02	768.54		768.59	0.003195	1.83	378.99	286.68	0.26
Post Oak Creek	T6	6011	810.00	762.02	768.76		768.81	0.003290	1.90	444.78	336.40	0.27
Post Oak Creek	T6	6011	936.00	762.02	768.91		768.97	0.003248	1.98	498.04	348.69	0.27
Post Oak Creek	T6	6011	1069.00	762.02	769.06		769.12	0.003173	2.06	548.34	355.68	0.27
Post Oak Creek	T6	6011	1069.00	762.02	769.06		769.12	0.003173	2.06	548.34	355.68	0.27
Post Oak Creek	T6	6011	1271.00	762.02	769.25		769.32	0.003105	2.19	619.72	365.34	0.27
Post Oak Creek	T6	5822	345.00	760.00	766.40		766.55	0.023626	3.10	111.46	95.09	0.50
Post Oak Creek	T6	5822	547.00	760.00	766.92		767.07	0.023271	3.13	174.72	146.77	0.51
Post Oak Creek	T6	5822	674.00	760.00	767.14		767.30	0.022853	3.22	209.55	167.26	0.51
Post Oak Creek	T6	5822	810.00	760.00	767.34		767.51	0.021865	3.31	244.35	180.60	0.50
Post Oak Creek	T6	5822	936.00	760.00	767.52		767.70	0.020760	3.37	277.54	192.51	0.49
Post Oak Creek	T6	5822	1069.00	760.00	767.70		767.88	0.019969	3.41	313.23	207.56	0.49
Post Oak Creek	T6	5822	1069.00	760.00	767.70		767.88	0.019969	3.41	313.23	207.56	0.49
Post Oak Creek	T6	5822	1271.00	760.00	767.94		768.13	0.018813	3.48	364.87	224.51	0.48
Post Oak Creek	T6	5322	345.00	758.00	763.79		763.81	0.002336	1.20	288.63	186.10	0.17
Post Oak Creek	T6	5322	547.00	758.00	764.30		764.33	0.002351	1.40	396.09	230.81	0.18
Post Oak Creek	T6	5322	674.00	758.00	764.56		764.59	0.002325	1.51	457.51	243.60	0.18
Post Oak Creek	T6	5322	810.00	758.00	764.81		764.85	0.002304	1.62	520.20	256.00	0.18
Post Oak Creek	T6	5322	936.00	758.00	765.02		765.06	0.002294	1.71	575.53	266.47	0.18
Post Oak Creek	T6	5322	1069.00	758.00	765.22		765.27	0.002295	1.79	630.80	275.55	0.19
Post Oak Creek	T6	5322	1069.00	758.00	765.22		765.27	0.002295	1.79	630.80	275.55	0.19
Post Oak Creek	T6	5322	1271.00	758.00	765.51		765.56	0.002293	1.91	710.66	284.85	0.19
Post Oak Creek	T6	4822	345.00	758.00	762.78		762.82	0.001694	1.76	329.57	315.42	0.18
Post Oak Creek	T6	4822	547.00	758.00	763.33		763.37	0.001578	1.90	515.76	359.70	0.18
Post Oak Creek	T6	4822	674.00	758.00	763.61		763.65	0.001552	1.99	618.82	382.00	0.18
Post Oak Creek	T6	4822	810.00	758.00	763.88		763.92	0.001531	2.07	723.14	403.32	0.18
Post Oak Creek	T6	4822	936.00	758.00	764.10		764.14	0.001504	2.12	816.10	417.85	0.18
Post Oak Creek	T6	4822	1069.00	758.00	764.32		764.36	0.001487	2.18	905.43	426.59	0.18
Post Oak Creek	T6	4822	1069.00	758.00	764.32		764.36	0.001488	2.18	905.38	426.59	0.18
Post Oak Creek	T6	4822	1271.00	758.00	764.61		764.65	0.001474	2.27	1032.31	438.16	0.18
Post Oak Creek	T6	4322	345.00	756.00	761.75		761.79	0.002578	1.56	221.03	124.65	0.21
Post Oak Creek	T6	4322	547.00	756.00	762.35		762.40	0.002460	1.81	321.40	209.18	0.21
Post Oak Creek	T6	4322	674.00	756.00	762.63		762.69	0.002417	1.94	384.18	227.92	0.21
Post Oak Creek	T6	4322	810.00	756.00	762.91		762.97	0.002386	2.06	448.71	244.42	0.22
Post Oak Creek	T6	4322	936.00	756.00	763.14		763.20	0.002364	2.16	506.11	256.69	0.22
Post Oak Creek	T6	4322	1069.00	756.00	763.35		763.43	0.002365	2.26	562.87	268.27	0.22

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	T6	4322	1069.00	756.00	763.35		763.43	0.002366	2.26	562.78	268.25	0.22
Post Oak Creek	T6	4322	1271.00	756.00	763.63		763.72	0.002418	2.42	640.30	282.17	0.22
Post Oak Creek	T6	3822	345.00	754.00	760.53		760.55	0.002360	1.26	273.07	163.18	0.17
Post Oak Creek	T6	3822	547.00	754.00	761.10		761.14	0.002567	1.45	377.71	196.17	0.18
Post Oak Creek	T6	3822	674.00	754.00	761.39		761.42	0.002642	1.55	434.70	208.31	0.19
Post Oak Creek	T6	3822	810.00	754.00	761.64		761.69	0.002746	1.65	489.81	219.40	0.20
Post Oak Creek	T6	3822	936.00	754.00	761.86		761.91	0.002837	1.74	538.05	228.99	0.20
Post Oak Creek	T6	3822	1069.00	754.00	762.06		762.11	0.002911	1.83	584.76	237.20	0.20
Post Oak Creek	T6	3822	1069.00	754.00	762.06		762.11	0.002926	1.83	583.86	237.09	0.20
Post Oak Creek	T6	3822	1271.00	754.00	762.31		762.37	0.003000	1.98	644.09	244.23	0.21
Post Oak Creek	T6	3322	345.00	754.00	758.80		758.84	0.005394	1.57	220.32	201.89	0.26
Post Oak Creek	T6	3322	547.00	754.00	759.22		759.27	0.005925	1.75	311.82	232.43	0.27
Post Oak Creek	T6	3322	674.00	754.00	759.39		759.45	0.006561	1.91	352.33	241.18	0.28
Post Oak Creek	T6	3322	810.00	754.00	759.63		759.69	0.006328	1.97	410.99	253.31	0.27
Post Oak Creek	T6	3322	936.00	754.00	759.85		759.91	0.006045	2.01	466.38	264.25	0.27
Post Oak Creek	T6	3322	1069.00	754.00	760.05		760.12	0.005787	2.05	521.62	274.24	0.26
Post Oak Creek	T6	3322	1069.00	754.00	760.07		760.14	0.005568	2.02	528.22	275.23	0.26
Post Oak Creek	T6	3322	1271.00	754.00	760.30		760.37	0.005596	2.16	590.83	284.47	0.26
Post Oak Creek	T6	2822	476.00	752.00	756.25	754.95	756.30	0.004888	1.76	308.44	376.35	0.25
Post Oak Creek	T6	2822	821.00	752.00	756.73		756.78	0.004493	2.01	490.79	391.68	0.25
Post Oak Creek	T6	2822	1019.00	752.00	756.99	755.70	757.05	0.004006	2.06	596.39	400.28	0.24
Post Oak Creek	T6	2822	1292.00	752.00	757.25	755.92	757.31	0.004062	2.22	699.21	409.69	0.24
Post Oak Creek	T6	2822	1537.00	752.00	757.43	756.25	757.50	0.004238	2.37	774.91	416.32	0.25
Post Oak Creek	T6	2822	1792.00	752.00	757.60	756.37	757.68	0.004416	2.52	846.92	422.18	0.26
Post Oak Creek	T6	2822	1815.00	752.00	757.59	756.38	757.68	0.004583	2.56	843.65	421.92	0.26
Post Oak Creek	T6	2822	2101.00	752.00	757.79	756.47	757.88	0.004663	2.70	924.57	428.62	0.27
Post Oak Creek	T6	2322	476.00	752.00	753.47		753.52	0.006371	1.87	266.42	206.47	0.28
Post Oak Creek	T6	2322	821.00	752.00	754.05		754.13	0.006355	2.30	394.51	281.68	0.29
Post Oak Creek	T6	2322	1019.00	752.00	754.12		754.23	0.008449	2.72	415.49	284.52	0.34
Post Oak Creek	T6	2322	1292.00	752.00	754.41		754.53	0.008042	2.90	498.72	295.99	0.34
Post Oak Creek	T6	2322	1537.00	752.00	754.74		754.85	0.006738	2.90	597.91	309.96	0.31
Post Oak Creek	T6	2322	1792.00	752.00	755.09		755.20	0.005603	2.87	708.34	323.67	0.29
Post Oak Creek	T6	2322	1815.00	752.00	755.22		755.32	0.004831	2.75	752.09	328.94	0.27
Post Oak Creek	T6	2322	2101.00	752.00	755.63		755.73	0.003952	2.70	892.13	345.86	0.25
Post Oak Creek	T6	1822	476.00	750.00	752.03		752.05	0.001681	1.10	435.43	356.52	0.15
Post Oak Creek	T6	1822	821.00	750.00	752.50		752.52	0.001899	1.36	631.05	457.04	0.16

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	T6	1822	1019.00	750.00	753.03		753.06	0.001050	1.17	881.88	474.02	0.13
Post Oak Creek	T6	1822	1292.00	750.00	753.79		753.80	0.000552	1.00	1255.11	514.82	0.09
Post Oak Creek	T6	1822	1537.00	750.00	754.24		754.26	0.000450	0.98	1493.63	538.50	0.09
Post Oak Creek	T6	1822	1792.00	750.00	754.69		754.70	0.000369	0.95	1735.45	544.31	0.08
Post Oak Creek	T6	1822	1815.00	750.00	754.89		754.90	0.000307	0.89	1846.55	546.95	0.07
Post Oak Creek	T6	1822	2101.00	750.00	755.36		755.37	0.000264	0.88	2104.31	552.70	0.07
Post Oak Creek	T6	1322	476.00	742.00	752.01		752.01	0.000020	0.37	2088.58	726.57	0.03
Post Oak Creek	T6	1322	821.00	742.00	752.45		752.46	0.000039	0.54	2411.53	730.45	0.04
Post Oak Creek	T6	1322	1019.00	742.00	752.99		753.00	0.000038	0.56	2807.46	735.18	0.04
Post Oak Creek	T6	1322	1292.00	742.00	753.75		753.75	0.000035	0.58	3367.60	746.97	0.04
Post Oak Creek	T6	1322	1537.00	742.00	754.20		754.21	0.000037	0.62	3707.57	758.19	0.04
Post Oak Creek	T6	1322	1792.00	742.00	754.65		754.65	0.000039	0.65	4049.85	772.00	0.04
Post Oak Creek	T6	1322	1815.00	742.00	754.86		754.86	0.000035	0.63	4210.56	776.42	0.04
Post Oak Creek	T6	1322	2101.00	742.00	755.33		755.33	0.000037	0.67	4577.34	784.85	0.04
Post Oak Creek	T6	822	476.00	742.00	751.99		752.00	0.000056	0.36	1446.91	436.29	0.03
Post Oak Creek	T6	822	821.00	742.00	752.42		752.42	0.000116	0.55	1669.99	537.30	0.04
Post Oak Creek	T6	822	1019.00	742.00	752.96		752.97	0.000118	0.59	1970.84	576.90	0.04
Post Oak Creek	T6	822	1292.00	742.00	753.72		753.73	0.000111	0.62	2430.46	634.17	0.04
Post Oak Creek	T6	822	1537.00	742.00	754.17		754.18	0.000121	0.67	2740.93	775.67	0.05
Post Oak Creek	T6	822	1792.00	742.00	754.62		754.62	0.000125	0.71	3099.14	832.34	0.05
Post Oak Creek	T6	822	1815.00	742.00	754.83		754.83	0.000112	0.69	3275.92	848.29	0.05
Post Oak Creek	T6	822	2101.00	742.00	755.30		755.30	0.000115	0.72	3680.41	877.67	0.05
Post Oak Creek	T5	3055	202.00	760.00	762.46		762.50	0.003011	1.65	133.67	135.23	0.22
Post Oak Creek	T5	3055	372.00	760.00	763.05		763.10	0.002582	1.87	219.81	155.63	0.22
Post Oak Creek	T5	3055	482.00	760.00	763.34		763.40	0.002495	1.99	265.96	164.78	0.22
Post Oak Creek	T5	3055	601.00	760.00	763.58		763.65	0.002560	2.14	306.69	172.46	0.22
Post Oak Creek	T5	3055	718.00	760.00	763.78		763.86	0.002656	2.28	342.17	178.88	0.23
Post Oak Creek	T5	3055	835.00	760.00	763.97		764.06	0.002724	2.40	376.25	184.83	0.24
Post Oak Creek	T5	3055	903.00	760.00	764.11		764.20	0.002773	2.50	404.11	203.70	0.24
Post Oak Creek	T5	3055	1025.00	760.00	764.29		764.38	0.002756	2.57	440.68	207.87	0.24
Post Oak Creek	T5	2297	202.00	752.00	757.43		757.70	0.020561	4.17	48.50	21.22	0.49
Post Oak Creek	T5	2297	372.00	752.00	759.45		759.57	0.010792	2.79	133.32	72.74	0.36
Post Oak Creek	T5	2297	482.00	752.00	759.95		760.07	0.009683	2.77	173.85	89.08	0.35
Post Oak Creek	T5	2297	601.00	752.00	760.32		760.45	0.008161	2.83	224.84	150.26	0.33
Post Oak Creek	T5	2297	718.00	752.00	760.64		760.76	0.007100	2.88	273.68	162.72	0.31
Post Oak Creek	T5	2297	835.00	752.00	760.92		761.04	0.006383	2.92	320.89	174.88	0.30
Post Oak Creek	T5	2297	903.00	752.00	761.05		761.18	0.006205	2.97	345.69	185.04	0.30

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	T5	2297	1025.00	752.00	761.30		761.43	0.005848	3.04	394.89	210.56	0.30
Post Oak Creek	T5	1685	202.00	748.00	754.35		754.40	0.002365	1.86	108.45	33.36	0.18
Post Oak Creek	T5	1685	372.00	748.00	756.42		756.47	0.002895	1.84	202.29	76.97	0.20
Post Oak Creek	T5	1685	482.00	748.00	756.96		757.02	0.003000	1.95	247.11	88.96	0.21
Post Oak Creek	T5	1685	601.00	748.00	757.39		757.46	0.003220	2.09	287.15	98.44	0.22
Post Oak Creek	T5	1685	718.00	748.00	757.72		757.80	0.003480	2.24	320.92	105.77	0.23
Post Oak Creek	T5	1685	835.00	748.00	758.00		758.09	0.003761	2.38	351.25	112.27	0.24
Post Oak Creek	T5	1685	903.00	748.00	758.12		758.21	0.003877	2.48	364.95	114.39	0.24
Post Oak Creek	T5	1685	1025.00	748.00	758.27		758.38	0.004312	2.69	381.89	116.96	0.26
Post Oak Creek	T5	1340	332.00	746.00	752.32		752.57	0.010692	4.04	82.21	28.67	0.42
Post Oak Creek	T5	1340	616.00	746.00	753.20		753.61	0.023630	5.18	118.96	55.18	0.62
Post Oak Creek	T5	1340	783.00	746.00	753.69		754.11	0.023802	5.23	149.72	69.83	0.63
Post Oak Creek	T5	1340	1001.00	746.00	754.31		754.70	0.018068	5.06	201.19	99.95	0.56
Post Oak Creek	T5	1340	1206.00	746.00	754.74		755.14	0.014842	5.11	250.40	128.48	0.53
Post Oak Creek	T5	1340	1408.00	746.00	755.15		755.54	0.012403	5.09	310.55	165.48	0.49
Post Oak Creek	T5	1340	1522.00	746.00	755.36		755.74	0.011388	5.08	346.25	180.10	0.48
Post Oak Creek	T5	1340	1684.00	746.00	755.75		756.08	0.008984	4.84	423.19	210.54	0.43
Post Oak Creek	T5	840	332.00	742.00	752.01		752.02	0.000331	0.92	486.77	232.52	0.07
Post Oak Creek	T5	840	616.00	742.00	752.46		752.48	0.000697	1.42	593.99	244.90	0.11
Post Oak Creek	T5	840	783.00	742.00	753.00		753.03	0.000659	1.47	731.66	260.55	0.11
Post Oak Creek	T5	840	1001.00	742.00	753.76		753.78	0.000558	1.47	937.83	282.82	0.10
Post Oak Creek	T5	840	1206.00	742.00	754.22		754.24	0.000563	1.54	1083.75	359.45	0.10
Post Oak Creek	T5	840	1408.00	742.00	754.66		754.69	0.000540	1.57	1246.92	371.11	0.10
Post Oak Creek	T5	840	1522.00	742.00	754.88		754.90	0.000538	1.60	1326.89	376.75	0.10
Post Oak Creek	T5	840	1684.00	742.00	755.34		755.36	0.000474	1.56	1503.54	388.93	0.10
Post Oak Creek	T5	340	332.00	740.00	751.99		751.99	0.000022	0.29	1403.31	367.70	0.02
Post Oak Creek	T5	340	616.00	740.00	752.40		752.40	0.000058	0.49	1564.45	395.31	0.03
Post Oak Creek	T5	340	783.00	740.00	752.94		752.94	0.000066	0.55	1783.50	425.94	0.04
Post Oak Creek	T5	340	1001.00	740.00	753.70		753.70	0.000070	0.61	2132.68	498.65	0.04
Post Oak Creek	T5	340	1206.00	740.00	754.14		754.15	0.000083	0.69	2379.35	641.10	0.04
Post Oak Creek	T5	340	1408.00	740.00	754.59		754.59	0.000089	0.74	2683.45	710.33	0.04
Post Oak Creek	T5	340	1522.00	740.00	754.80		754.81	0.000092	0.76	2835.65	724.06	0.04
Post Oak Creek	T5	340	1684.00	740.00	755.27		755.27	0.000086	0.76	3181.47	754.34	0.04
Post Oak Creek	T8	390	332.00	738.00	751.98		751.98	0.000005	0.16	2741.33	556.69	0.01
Post Oak Creek	T8	390	616.00	738.00	752.39		752.40	0.000013	0.27	2991.67	621.48	0.02
Post Oak Creek	T8	390	783.00	738.00	752.93		752.93	0.000016	0.32	3332.46	648.49	0.02

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Post Oak Creek	T8	390	1001.00	738.00	753.69		753.69	0.000019	0.36	3854.45	758.06	0.02
Post Oak Creek	T8	390	1206.00	738.00	754.13		754.13	0.000023	0.41	4206.41	810.39	0.02
Post Oak Creek	T8	390	1408.00	738.00	754.58		754.58	0.000025	0.44	4571.80	839.46	0.02
Post Oak Creek	T8	390	1522.00	738.00	754.79		754.79	0.000027	0.46	4750.73	853.15	0.02
Post Oak Creek	T8	390	1684.00	738.00	755.25		755.26	0.000027	0.47	5157.23	883.52	0.02
Post Oak Creek	T8	128	332.00	738.00	751.98		751.98	0.000002	0.10	3825.45	599.04	0.01
Post Oak Creek	T8	128	616.00	738.00	752.39		752.39	0.000005	0.17	4086.31	657.59	0.01
Post Oak Creek	T8	128	783.00	738.00	752.93		752.93	0.000006	0.20	4455.93	717.21	0.01
Post Oak Creek	T8	128	1001.00	738.00	753.69		753.69	0.000007	0.23	5023.98	794.19	0.01
Post Oak Creek	T8	128	1206.00	738.00	754.13		754.13	0.000009	0.26	5381.61	816.76	0.01
Post Oak Creek	T8	128	1408.00	738.00	754.57		754.57	0.000010	0.28	5747.41	838.73	0.02
Post Oak Creek	T8	128	1522.00	738.00	754.78		754.78	0.000010	0.29	5925.83	849.55	0.02
Post Oak Creek	T8	128	1684.00	738.00	755.25		755.25	0.000011	0.31	6328.93	873.22	0.02
Post Oak Creek	Reach 03	48213	912.00	738.00	751.98		751.98	0.000004	0.18	5780.65	1047.03	0.01
Post Oak Creek	Reach 03	48213	1689.00	738.00	752.39		752.39	0.000012	0.31	6213.32	1071.30	0.02
Post Oak Creek	Reach 03	48213	2612.00	738.00	752.93		752.93	0.000022	0.44	6794.03	1102.66	0.02
Post Oak Creek	Reach 03	48213	3528.00	738.00	753.68		753.68	0.000029	0.52	7643.67	1147.54	0.03
Post Oak Creek	Reach 03	48213	4157.00	738.00	754.12		754.13	0.000033	0.57	8157.67	1173.99	0.03
Post Oak Creek	Reach 03	48213	4926.00	738.00	754.56		754.57	0.000039	0.63	8680.56	1198.79	0.03
Post Oak Creek	Reach 03	48213	5304.00	738.00	754.77		754.78	0.000041	0.66	8934.31	1210.64	0.03
Post Oak Creek	Reach 03	48213	6180.00	738.00	755.24		755.25	0.000046	0.72	9505.11	1236.88	0.03
Post Oak Creek	Reach 03	47714	912.00	738.00	751.98		751.98	0.000004	0.17	5690.65	969.48	0.01
Post Oak Creek	Reach 03	47714	1689.00	738.00	752.39		752.39	0.000010	0.29	6089.97	1002.58	0.02
Post Oak Creek	Reach 03	47714	2612.00	738.00	752.91		752.92	0.000019	0.41	6632.19	1045.79	0.02
Post Oak Creek	Reach 03	47714	3528.00	738.00	753.67		753.67	0.000025	0.49	7440.60	1103.30	0.02
Post Oak Creek	Reach 03	47714	4157.00	738.00	754.11		754.11	0.000029	0.53	7934.10	1133.38	0.03
Post Oak Creek	Reach 03	47714	4926.00	738.00	754.55		754.55	0.000034	0.59	8435.11	1153.53	0.03
Post Oak Creek	Reach 03	47714	5304.00	738.00	754.76		754.76	0.000036	0.61	8677.79	1163.53	0.03
Post Oak Creek	Reach 03	47714	6180.00	738.00	755.22		755.23	0.000040	0.67	9222.80	1185.69	0.03
Post Oak Creek	Reach 03	47215	912.00	740.00	751.98		751.98	0.000003	0.16	6599.25	876.34	0.01
Post Oak Creek	Reach 03	47215	1689.00	740.00	752.38		752.38	0.000009	0.28	6960.23	909.27	0.01
Post Oak Creek	Reach 03	47215	2612.00	740.00	752.91		752.91	0.000017	0.41	7445.04	937.08	0.02
Post Oak Creek	Reach 03	47215	3528.00	740.00	753.65		753.66	0.000024	0.51	8161.86	977.62	0.02
Post Oak Creek	Reach 03	47215	4157.00	740.00	754.09		754.10	0.000029	0.57	8596.22	1003.18	0.03
Post Oak Creek	Reach 03	47215	4926.00	740.00	754.53		754.53	0.000036	0.65	9038.51	1029.21	0.03
Post Oak Creek	Reach 03	47215	5304.00	740.00	754.74		754.74	0.000039	0.68	9254.02	1041.66	0.03
Post Oak Creek	Reach 03	47215	6180.00	740.00	755.20		755.20	0.000047	0.76	9741.58	1076.23	0.03

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 03	46928	912.00	735.35	751.98	737.91	751.98	0.000001	0.13	9465.82	1085.85	0.01
Post Oak Creek	Reach 03	46928	1689.00	735.35	752.38	739.10	752.38	0.000003	0.23	9904.67	1101.03	0.01
Post Oak Creek	Reach 03	46928	2612.00	735.35	752.90	740.88	752.91	0.000006	0.33	10486.99	1121.18	0.02
Post Oak Creek	Reach 03	46928	3528.00	735.35	753.65	741.65	753.65	0.000009	0.42	11336.64	1150.66	0.02
Post Oak Creek	Reach 03	46928	4157.00	735.35	754.09	741.74	754.09	0.000011	0.47	11844.60	1168.97	0.02
Post Oak Creek	Reach 03	46928	4926.00	735.35	754.52	742.52	754.53	0.000013	0.54	12357.15	1192.35	0.02
Post Oak Creek	Reach 03	46928	5304.00	735.35	754.73	742.59	754.74	0.000015	0.57	12606.72	1215.75	0.03
Post Oak Creek	Reach 03	46928	6180.00	735.35	755.19	742.77	755.20	0.000018	0.64	13173.08	1245.92	0.03
Post Oak Creek	Reach 03	46680	Bridge									
Post Oak Creek	Reach 03	46536	698.00	735.85	751.97		751.97	0.000000	0.07	10918.29	1289.63	0.00
Post Oak Creek	Reach 03	46536	1251.00	735.85	752.35		752.35	0.000001	0.11	11416.04	1311.18	0.01
Post Oak Creek	Reach 03	46536	2020.00	735.85	752.84		752.84	0.000001	0.18	12062.43	1336.93	0.01
Post Oak Creek	Reach 03	46536	3335.00	735.85	753.54		753.54	0.000003	0.27	13007.62	1373.82	0.01
Post Oak Creek	Reach 03	46536	4083.00	735.85	753.93		753.94	0.000003	0.32	13553.14	1393.29	0.01
Post Oak Creek	Reach 03	46536	4867.00	735.85	754.30		754.31	0.000004	0.36	14073.36	1410.25	0.02
Post Oak Creek	Reach 03	46536	5282.00	735.85	754.48		754.48	0.000005	0.39	14317.41	1417.63	0.02
Post Oak Creek	Reach 03	46536	6175.00	735.85	754.85		754.85	0.000006	0.44	14842.63	1432.23	0.02
Post Oak Creek	Reach 03	46214	698.00	738.00	751.97		751.97	0.000000	0.07	10494.11	1320.06	0.00
Post Oak Creek	Reach 03	46214	1251.00	738.00	752.35		752.35	0.000001	0.13	11004.09	1347.20	0.01
Post Oak Creek	Reach 03	46214	2020.00	738.00	752.84		752.84	0.000002	0.19	11671.46	1389.49	0.01
Post Oak Creek	Reach 03	46214	3335.00	738.00	753.54		753.54	0.000004	0.30	12661.96	1455.56	0.01
Post Oak Creek	Reach 03	46214	4083.00	738.00	753.93		753.93	0.000005	0.35	13243.24	1491.81	0.02
Post Oak Creek	Reach 03	46214	4867.00	738.00	754.30		754.31	0.000006	0.40	13800.45	1515.22	0.02
Post Oak Creek	Reach 03	46214	5282.00	738.00	754.47		754.48	0.000007	0.43	14062.10	1522.90	0.02
Post Oak Creek	Reach 03	46214	6175.00	738.00	754.84		754.85	0.000008	0.49	14625.37	1538.99	0.02
Post Oak Creek	Reach 03	45714	698.00	738.00	751.97		751.97	0.000000	0.06	12646.81	1362.41	0.00
Post Oak Creek	Reach 03	45714	1251.00	738.00	752.35		752.35	0.000000	0.11	13171.13	1379.91	0.01
Post Oak Creek	Reach 03	45714	2020.00	738.00	752.84		752.84	0.000001	0.17	13849.09	1400.18	0.01
Post Oak Creek	Reach 03	45714	3335.00	738.00	753.54		753.54	0.000002	0.26	14833.22	1428.96	0.01
Post Oak Creek	Reach 03	45714	4083.00	738.00	753.93		753.93	0.000003	0.31	15398.49	1444.56	0.01
Post Oak Creek	Reach 03	45714	4867.00	738.00	754.30		754.30	0.000004	0.35	15935.87	1458.38	0.02
Post Oak Creek	Reach 03	45714	5282.00	738.00	754.47		754.47	0.000004	0.38	16187.32	1464.38	0.02
Post Oak Creek	Reach 03	45714	6175.00	738.00	754.84		754.84	0.000005	0.43	16727.55	1477.18	0.02
Post Oak Creek	Reach 03	45214	698.00	738.00	751.97		751.97	0.000000	0.03	25540.83	2413.96	0.00
Post Oak Creek	Reach 03	45214	1251.00	738.00	752.35		752.35	0.000000	0.05	26467.30	2432.57	0.00

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Post Oak Creek	Reach 03	45214	2020.00	738.00	752.84		752.84	0.000000	0.08	27659.69	2456.32	0.00
Post Oak Creek	Reach 03	45214	3335.00	738.00	753.54		753.54	0.000000	0.12	29380.07	2488.10	0.01
Post Oak Creek	Reach 03	45214	4083.00	738.00	753.93		753.93	0.000001	0.14	30362.06	2503.61	0.01
Post Oak Creek	Reach 03	45214	4867.00	738.00	754.30		754.30	0.000001	0.17	31291.50	2517.99	0.01
Post Oak Creek	Reach 03	45214	5282.00	738.00	754.47		754.47	0.000001	0.18	31725.32	2524.67	0.01
Post Oak Creek	Reach 03	45214	6175.00	738.00	754.84		754.84	0.000001	0.20	32655.59	2538.94	0.01
Post Oak Creek	Reach 03	44715	698.00	738.00	751.97		751.97	0.000000	0.05	13886.87	1315.18	0.00
Post Oak Creek	Reach 03	44715	1251.00	738.00	752.35		752.35	0.000000	0.09	14393.42	1335.05	0.00
Post Oak Creek	Reach 03	44715	2020.00	738.00	752.84		752.84	0.000001	0.14	15050.84	1362.64	0.01
Post Oak Creek	Reach 03	44715	3335.00	738.00	753.54		753.54	0.000002	0.22	16012.10	1403.46	0.01
Post Oak Creek	Reach 03	44715	4083.00	738.00	753.93		753.93	0.000002	0.27	16568.41	1426.69	0.01
Post Oak Creek	Reach 03	44715	4867.00	738.00	754.30		754.30	0.000003	0.31	17106.84	1485.13	0.01
Post Oak Creek	Reach 03	44715	5282.00	738.00	754.47		754.47	0.000003	0.33	17364.28	1510.57	0.01
Post Oak Creek	Reach 03	44715	6175.00	738.00	754.84		754.84	0.000004	0.38	17928.36	1564.94	0.02
Post Oak Creek	Reach 03	44214	698.00	738.00	751.97		751.97	0.000000	0.03	21085.26	1847.31	0.00
Post Oak Creek	Reach 03	44214	1251.00	738.00	752.35		752.35	0.000000	0.06	21793.37	1857.52	0.00
Post Oak Creek	Reach 03	44214	2020.00	738.00	752.84		752.84	0.000000	0.09	22702.09	1870.86	0.00
Post Oak Creek	Reach 03	44214	3335.00	738.00	753.54		753.54	0.000000	0.15	24009.54	1890.88	0.01
Post Oak Creek	Reach 03	44214	4083.00	738.00	753.93		753.93	0.000001	0.17	24755.12	1902.20	0.01
Post Oak Creek	Reach 03	44214	4867.00	738.00	754.30		754.30	0.000001	0.20	25460.19	1912.83	0.01
Post Oak Creek	Reach 03	44214	5282.00	738.00	754.47		754.47	0.000001	0.22	25789.38	1917.77	0.01
Post Oak Creek	Reach 03	44214	6175.00	738.00	754.84		754.84	0.000001	0.25	26494.80	1928.31	0.01
Post Oak Creek	Reach 03	43714	698.00	738.00	751.97		751.97	0.000000	0.04	17066.27	1461.77	0.00
Post Oak Creek	Reach 03	43714	1251.00	738.00	752.35		752.35	0.000000	0.07	17626.66	1470.54	0.00
Post Oak Creek	Reach 03	43714	2020.00	738.00	752.84		752.84	0.000000	0.11	18346.70	1485.34	0.01
Post Oak Creek	Reach 03	43714	3335.00	738.00	753.54		753.54	0.000001	0.18	19384.43	1500.88	0.01
Post Oak Creek	Reach 03	43714	4083.00	738.00	753.93		753.93	0.000001	0.21	19975.76	1508.25	0.01
Post Oak Creek	Reach 03	43714	4867.00	738.00	754.30		754.30	0.000001	0.25	20534.33	1515.67	0.01
Post Oak Creek	Reach 03	43714	5282.00	738.00	754.47		754.47	0.000001	0.26	20794.95	1519.29	0.01
Post Oak Creek	Reach 03	43714	6175.00	738.00	754.84		754.84	0.000002	0.30	21353.20	1526.27	0.01
Post Oak Creek	Reach 03	42982	698.00	738.00	751.97	738.35	751.97	0.000000	0.07	10916.50	910.52	0.00
Post Oak Creek	Reach 03	42982	1251.00	738.00	752.35	738.51	752.35	0.000000	0.11	11265.18	914.66	0.01
Post Oak Creek	Reach 03	42982	2020.00	738.00	752.84	738.70	752.84	0.000001	0.18	11711.90	919.93	0.01
Post Oak Creek	Reach 03	42982	3335.00	738.00	753.53	738.97	753.54	0.000002	0.28	12352.88	927.33	0.01
Post Oak Creek	Reach 03	42982	4083.00	738.00	753.93	739.11	753.93	0.000002	0.33	12717.64	931.48	0.02
Post Oak Creek	Reach 03	42982	4867.00	738.00	754.30	739.25	754.30	0.000003	0.38	13061.81	935.37	0.02
Post Oak Creek	Reach 03	42982	5282.00	738.00	754.47	739.32	754.47	0.000003	0.41	13222.27	937.20	0.02

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 03	42982	6175.00	738.00	754.83	739.46	754.84	0.000004	0.47	13565.72	940.96	0.02
Post Oak Creek	Reach 03	42835	Inl Struct									
Post Oak Creek	Reach 03	42685	358.00	714.00	716.90		717.14	0.015257	3.93	91.19	114.66	0.78
Post Oak Creek	Reach 03	42685	380.00	714.00	717.10		717.28	0.008315	3.33	114.15	116.55	0.59
Post Oak Creek	Reach 03	42685	392.00	714.00	717.18		717.34	0.006993	3.19	122.80	117.25	0.55
Post Oak Creek	Reach 03	42685	405.00	714.00	717.27		717.41	0.005632	3.02	134.05	118.16	0.50
Post Oak Creek	Reach 03	42685	416.00	714.00	717.37		717.49	0.004611	2.87	145.09	119.05	0.46
Post Oak Creek	Reach 03	42685	504.00	714.00	717.76		717.86	0.002748	2.62	192.55	122.78	0.37
Post Oak Creek	Reach 03	42685	702.00	714.00	718.48		718.57	0.001744	2.38	294.40	153.55	0.30
Post Oak Creek	Reach 03	42685	1660.00	714.00	720.56		720.66	0.000899	2.56	667.77	262.76	0.24
Post Oak Creek	Reach 03	42214	348.00	709.88	715.90	711.86	715.95	0.000915	1.86	187.12	44.77	0.16
Post Oak Creek	Reach 03	42214	384.00	709.88	716.21	711.99	716.27	0.000922	1.91	201.36	46.65	0.16
Post Oak Creek	Reach 03	42214	397.00	709.88	716.31	712.03	716.37	0.000927	1.93	206.20	47.28	0.16
Post Oak Creek	Reach 03	42214	413.00	709.88	716.45	712.09	716.51	0.000924	1.94	212.78	48.11	0.16
Post Oak Creek	Reach 03	42214	430.00	709.88	716.59	712.14	716.65	0.000926	1.96	219.39	48.93	0.16
Post Oak Creek	Reach 03	42214	518.00	709.88	717.01	712.42	717.08	0.001110	2.15	240.49	53.53	0.18
Post Oak Creek	Reach 03	42214	719.00	709.88	717.69	712.98	717.79	0.001570	2.57	280.28	62.69	0.21
Post Oak Creek	Reach 03	42214	1684.00	709.88	719.88	715.06	720.06	0.001879	3.54	603.32	248.87	0.25
Post Oak Creek	Reach 03	42120	Culvert									
Post Oak Creek	Reach 03	42026	348.00	710.00	715.84		715.90	0.000859	1.88	184.67	40.66	0.16
Post Oak Creek	Reach 03	42026	384.00	710.00	716.15		716.21	0.000855	1.95	197.40	43.94	0.16
Post Oak Creek	Reach 03	42026	397.00	710.00	716.25		716.31	0.000852	1.97	201.92	46.03	0.16
Post Oak Creek	Reach 03	42026	413.00	710.00	716.39		716.45	0.000839	1.99	208.39	49.50	0.16
Post Oak Creek	Reach 03	42026	430.00	710.00	716.52		716.58	0.000829	2.01	215.18	52.49	0.16
Post Oak Creek	Reach 03	42026	518.00	710.00	716.91		716.99	0.000910	2.22	237.36	60.32	0.17
Post Oak Creek	Reach 03	42026	719.00	710.00	717.53		717.64	0.001098	2.61	280.71	78.22	0.19
Post Oak Creek	Reach 03	42026	1684.00	710.00	719.12		719.31	0.000999	2.90	628.23	350.44	0.18
Post Oak Creek	Reach 03	41714	348.00	708.00	715.18		715.35	0.005183	3.31	116.24	48.51	0.27
Post Oak Creek	Reach 03	41714	384.00	708.00	715.50		715.67	0.004827	3.34	134.49	63.72	0.27
Post Oak Creek	Reach 03	41714	397.00	708.00	715.61		715.78	0.004686	3.34	141.66	66.61	0.26
Post Oak Creek	Reach 03	41714	413.00	708.00	715.77		715.93	0.004427	3.31	152.38	70.72	0.26
Post Oak Creek	Reach 03	41714	430.00	708.00	715.92		716.08	0.004209	3.29	163.38	74.69	0.25
Post Oak Creek	Reach 03	41714	518.00	708.00	716.25		716.43	0.004647	3.60	197.20	113.16	0.27
Post Oak Creek	Reach 03	41714	719.00	708.00	716.76		716.97	0.005482	4.14	257.29	124.71	0.29
Post Oak Creek	Reach 03	41714	1684.00	708.00	718.27		718.61	0.008096	5.83	468.99	155.76	0.37

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 03	41214	348.00	706.00	713.23		713.32	0.003190	2.37	146.54	39.82	0.22
Post Oak Creek	Reach 03	41214	384.00	706.00	713.92		713.99	0.002395	2.18	182.66	79.05	0.19
Post Oak Creek	Reach 03	41214	397.00	706.00	714.43		714.48	0.001580	1.91	260.43	196.16	0.16
Post Oak Creek	Reach 03	41214	413.00	706.00	714.97		715.00	0.000952	1.60	396.78	319.48	0.13
Post Oak Creek	Reach 03	41214	430.00	706.00	715.35		715.37	0.000641	1.37	527.92	362.59	0.10
Post Oak Creek	Reach 03	41214	518.00	706.00	715.73		715.75	0.000580	1.37	671.70	390.63	0.10
Post Oak Creek	Reach 03	41214	719.00	706.00	716.15		716.18	0.000675	1.55	841.32	409.89	0.11
Post Oak Creek	Reach 03	41214	1684.00	706.00	717.09		717.14	0.001385	2.43	1232.98	427.68	0.16
Post Oak Creek	Reach 03	40714	348.00	706.00	712.32		712.36	0.001256	1.52	265.94	207.15	0.14
Post Oak Creek	Reach 03	40714	384.00	706.00	713.60		713.61	0.000350	0.98	585.53	294.21	0.08
Post Oak Creek	Reach 03	40714	397.00	706.00	714.25		714.26	0.000188	0.78	789.40	318.73	0.06
Post Oak Creek	Reach 03	40714	413.00	706.00	714.87		714.87	0.000113	0.65	986.56	323.81	0.05
Post Oak Creek	Reach 03	40714	430.00	706.00	715.27		715.27	0.000087	0.59	1118.68	327.19	0.04
Post Oak Creek	Reach 03	40714	518.00	706.00	715.65		715.65	0.000094	0.64	1242.14	330.31	0.04
Post Oak Creek	Reach 03	40714	719.00	706.00	716.04		716.04	0.000137	0.80	1370.99	333.52	0.05
Post Oak Creek	Reach 03	40714	1684.00	706.00	716.73		716.75	0.000475	1.58	1604.19	339.32	0.10
Post Oak Creek	Reach 03	40214	348.00	702.00	711.82		711.86	0.000813	1.60	216.95	34.20	0.11
Post Oak Creek	Reach 03	40214	384.00	702.00	713.39		713.41	0.000432	1.34	347.93	141.37	0.08
Post Oak Creek	Reach 03	40214	397.00	702.00	714.12		714.14	0.000308	1.21	481.90	286.90	0.07
Post Oak Creek	Reach 03	40214	413.00	702.00	714.78		714.80	0.000195	1.01	677.68	300.48	0.06
Post Oak Creek	Reach 03	40214	430.00	702.00	715.21		715.22	0.000151	0.91	806.88	307.31	0.05
Post Oak Creek	Reach 03	40214	518.00	702.00	715.58		715.59	0.000165	0.98	921.80	313.29	0.05
Post Oak Creek	Reach 03	40214	719.00	702.00	715.94		715.95	0.000245	1.22	1034.55	319.11	0.07
Post Oak Creek	Reach 03	40214	1684.00	702.00	716.35		716.41	0.001004	2.54	1168.44	323.03	0.14
Post Oak Creek	Reach 04	39714	901.00	702.00	710.71		710.92	0.005309	3.77	276.20	135.64	0.30
Post Oak Creek	Reach 04	39714	1589.00	702.00	712.54		712.72	0.003553	3.80	612.69	209.92	0.26
Post Oak Creek	Reach 04	39714	1991.00	702.00	713.38		713.54	0.003011	3.78	794.12	224.27	0.24
Post Oak Creek	Reach 04	39714	2425.00	702.00	714.07		714.24	0.003096	4.05	955.87	283.65	0.25
Post Oak Creek	Reach 04	39714	2771.00	702.00	714.54		714.71	0.002918	4.08	1092.09	289.88	0.24
Post Oak Creek	Reach 04	39714	3076.00	702.00	714.93		715.10	0.002789	4.11	1206.29	293.83	0.24
Post Oak Creek	Reach 04	39714	3425.00	702.00	715.26		715.43	0.002830	4.23	1302.55	297.22	0.24
Post Oak Creek	Reach 04	39714	3596.00	702.00	715.60		715.76	0.002548	4.11	1405.63	300.81	0.23
Post Oak Creek	Reach 04	39214	901.00	702.00	709.21		709.36	0.002004	3.20	290.07	71.24	0.25
Post Oak Creek	Reach 04	39214	1589.00	702.00	711.21		711.43	0.001932	3.91	481.47	134.86	0.26
Post Oak Creek	Reach 04	39214	1991.00	702.00	712.07		712.33	0.001948	4.24	620.42	232.95	0.26
Post Oak Creek	Reach 04	39214	2425.00	702.00	712.72		713.01	0.001996	4.52	774.32	239.13	0.27

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 04	39214	2771.00	702.00	713.22		713.51	0.001988	4.68	893.28	243.72	0.27
Post Oak Creek	Reach 04	39214	3076.00	702.00	713.63		713.92	0.001972	4.80	993.98	247.52	0.27
Post Oak Creek	Reach 04	39214	3425.00	702.00	713.85		714.18	0.002185	5.13	1048.44	249.55	0.29
Post Oak Creek	Reach 04	39214	3596.00	702.00	714.38		714.67	0.001843	4.88	1183.95	253.51	0.27
Post Oak Creek	Reach 04	38714	901.00	702.00	706.54		707.07	0.017982	5.84	154.28	39.56	0.52
Post Oak Creek	Reach 04	38714	1589.00	702.00	708.83		709.42	0.012331	6.21	277.11	89.71	0.46
Post Oak Creek	Reach 04	38714	1991.00	702.00	709.90		710.45	0.009651	6.16	400.16	139.63	0.42
Post Oak Creek	Reach 04	38714	2425.00	702.00	710.95		711.34	0.006564	5.58	678.99	282.65	0.35
Post Oak Creek	Reach 04	38714	2771.00	702.00	711.84		712.10	0.004256	4.83	933.98	287.05	0.29
Post Oak Creek	Reach 04	38714	3076.00	702.00	712.38		712.60	0.003587	4.62	1089.15	289.76	0.27
Post Oak Creek	Reach 04	38714	3425.00	702.00	712.37		712.65	0.004462	5.15	1087.76	289.73	0.30
Post Oak Creek	Reach 04	38714	3596.00	702.00	713.38		713.55	0.002615	4.22	1381.48	294.94	0.23
Post Oak Creek	Reach 04	38606	1395.00	700.00	706.42	702.25	706.53	0.002143	2.65	527.03	94.27	0.20
Post Oak Creek	Reach 04	38606	2370.00	700.00	708.72	703.17	708.88	0.002257	3.13	757.98	109.39	0.21
Post Oak Creek	Reach 04	38606	2975.00	700.00	709.74	703.68	709.92	0.002479	3.40	874.62	119.38	0.22
Post Oak Creek	Reach 04	38606	3653.00	700.00	710.69	704.20	710.90	0.002549	3.69	999.31	149.88	0.23
Post Oak Creek	Reach 04	38606	4238.00	700.00	711.54	704.62	711.77	0.002446	3.85	1141.21	183.55	0.23
Post Oak Creek	Reach 04	38606	4905.00	700.00	712.00	705.08	712.27	0.002741	4.21	1228.61	199.30	0.24
Post Oak Creek	Reach 04	38606	4925.00	700.00	712.02	705.09	712.30	0.002745	4.22	1233.31	209.67	0.24
Post Oak Creek	Reach 04	38606	5785.00	700.00	712.96	705.65	713.26	0.002657	4.43	1448.01	248.52	0.24
Post Oak Creek	Reach 04	38500	Bridge									
Post Oak Creek	Reach 04	38455	1395.00	696.00	706.15		706.20	0.000644	1.76	791.67	106.08	0.11
Post Oak Creek	Reach 04	38455	2370.00	696.00	708.42		708.50	0.000852	2.27	1046.28	118.17	0.13
Post Oak Creek	Reach 04	38455	2975.00	696.00	709.40		709.50	0.000997	2.55	1164.69	123.48	0.15
Post Oak Creek	Reach 04	38455	3653.00	696.00	710.32		710.45	0.001156	2.85	1280.88	128.50	0.16
Post Oak Creek	Reach 04	38455	4238.00	696.00	711.02		711.17	0.001291	3.09	1372.81	132.80	0.17
Post Oak Creek	Reach 04	38455	4905.00	696.00	711.71		711.88	0.001455	3.35	1464.65	137.06	0.18
Post Oak Creek	Reach 04	38455	4925.00	696.00	711.72		711.90	0.001460	3.36	1467.22	137.18	0.18
Post Oak Creek	Reach 04	38455	5785.00	696.00	712.47		712.68	0.001635	3.68	1576.66	167.07	0.19
Post Oak Creek	Reach 04	38214	1395.00	696.00	705.86		705.97	0.001451	2.64	542.72	89.66	0.17
Post Oak Creek	Reach 04	38214	2370.00	696.00	708.04		708.21	0.001664	3.35	807.62	156.97	0.19
Post Oak Creek	Reach 04	38214	2975.00	696.00	708.98		709.17	0.001807	3.71	963.58	177.85	0.20
Post Oak Creek	Reach 04	38214	3653.00	696.00	709.85		710.08	0.001951	4.06	1128.00	198.37	0.21
Post Oak Creek	Reach 04	38214	4238.00	696.00	710.52		710.78	0.002044	4.32	1266.23	212.52	0.22
Post Oak Creek	Reach 04	38214	4905.00	696.00	711.16		711.45	0.002166	4.60	1406.20	223.07	0.23
Post Oak Creek	Reach 04	38214	4925.00	696.00	711.18		711.46	0.002170	4.61	1410.11	223.36	0.23

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Post Oak Creek	Reach 04	38214	5785.00	696.00	711.88		712.20	0.002342	4.96	1570.63	234.87	0.24
Post Oak Creek	Reach 04	37714	1395.00	694.00	704.47		704.74	0.004768	4.20	334.42	60.43	0.29
Post Oak Creek	Reach 04	37714	2370.00	694.00	706.35		706.79	0.005586	5.38	487.38	107.84	0.33
Post Oak Creek	Reach 04	37714	2975.00	694.00	707.05		707.59	0.006451	6.09	571.74	136.78	0.36
Post Oak Creek	Reach 04	37714	3653.00	694.00	707.67		708.34	0.007358	6.80	666.57	166.57	0.38
Post Oak Creek	Reach 04	37714	4238.00	694.00	708.13		708.91	0.008175	7.39	753.02	221.09	0.41
Post Oak Creek	Reach 04	37714	4905.00	694.00	708.61		709.46	0.008756	7.89	866.91	250.32	0.43
Post Oak Creek	Reach 04	37714	4925.00	694.00	708.62		709.47	0.008766	7.90	870.30	250.67	0.43
Post Oak Creek	Reach 04	37714	5785.00	694.00	709.18		710.08	0.009073	8.32	1015.40	262.96	0.44
Post Oak Creek	Reach 04	37214	1395.00	694.00	702.86		703.02	0.002523	3.20	448.48	96.34	0.22
Post Oak Creek	Reach 04	37214	2370.00	694.00	704.48		704.72	0.003043	4.06	804.04	413.06	0.25
Post Oak Creek	Reach 04	37214	2975.00	694.00	705.16		705.39	0.002960	4.22	1092.18	428.99	0.25
Post Oak Creek	Reach 04	37214	3653.00	694.00	705.82		706.04	0.002850	4.34	1377.19	444.21	0.25
Post Oak Creek	Reach 04	37214	4238.00	694.00	706.33		706.54	0.002739	4.40	1606.40	451.50	0.24
Post Oak Creek	Reach 04	37214	4905.00	694.00	706.86		707.07	0.002637	4.47	1846.68	456.40	0.24
Post Oak Creek	Reach 04	37214	4925.00	694.00	706.87		707.08	0.002635	4.47	1853.56	456.54	0.24
Post Oak Creek	Reach 04	37214	5785.00	694.00	707.53		707.73	0.002485	4.52	2156.36	462.64	0.24
Post Oak Creek	Reach 04	36645	1395.00	692.00	701.70		701.81	0.001771	2.86	673.96	263.67	0.18
Post Oak Creek	Reach 04	36645	2370.00	692.00	703.36		703.46	0.001575	3.09	1301.66	420.39	0.18
Post Oak Creek	Reach 04	36645	2975.00	692.00	704.08		704.18	0.001515	3.18	1613.22	440.77	0.18
Post Oak Creek	Reach 04	36645	3653.00	692.00	704.76		704.86	0.001490	3.30	1932.78	500.35	0.18
Post Oak Creek	Reach 04	36645	4238.00	692.00	705.29		705.40	0.001465	3.38	2212.31	545.09	0.18
Post Oak Creek	Reach 04	36645	4905.00	692.00	705.85		705.95	0.001430	3.45	2530.75	596.67	0.18
Post Oak Creek	Reach 04	36645	4925.00	692.00	705.87		705.97	0.001429	3.45	2540.33	598.01	0.18
Post Oak Creek	Reach 04	36645	5785.00	692.00	706.55		706.65	0.001421	3.58	2985.00	669.80	0.18
Post Oak Creek	Reach 04	36213	1395.00	692.00	700.36		700.61	0.004791	4.04	364.63	126.44	0.29
Post Oak Creek	Reach 04	36213	2370.00	692.00	701.98		702.31	0.005153	4.90	640.91	233.80	0.31
Post Oak Creek	Reach 04	36213	2975.00	692.00	702.75		703.08	0.004842	5.07	886.14	326.06	0.31
Post Oak Creek	Reach 04	36213	3653.00	692.00	703.52		703.82	0.004300	5.06	1142.91	341.34	0.29
Post Oak Creek	Reach 04	36213	4238.00	692.00	704.12		704.40	0.003943	5.05	1350.85	351.98	0.28
Post Oak Creek	Reach 04	36213	4905.00	692.00	704.74		705.00	0.003649	5.06	1569.72	359.31	0.28
Post Oak Creek	Reach 04	36213	4925.00	692.00	704.76		705.02	0.003641	5.06	1576.06	359.52	0.28
Post Oak Creek	Reach 04	36213	5785.00	692.00	705.48		705.73	0.003377	5.10	1838.90	368.17	0.27
Post Oak Creek	Reach 04	35716	1395.00	690.00	698.75		698.89	0.002537	2.96	532.83	249.83	0.22
Post Oak Creek	Reach 04	35716	2370.00	690.00	700.64		700.76	0.001945	3.12	1033.33	274.78	0.20
Post Oak Creek	Reach 04	35716	2975.00	690.00	701.51		701.64	0.001804	3.23	1275.32	278.98	0.19

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 04	35716	3653.00	690.00	702.35		702.49	0.001725	3.36	1511.72	282.56	0.19
Post Oak Creek	Reach 04	35716	4238.00	690.00	702.99		703.13	0.001696	3.48	1692.38	284.75	0.19
Post Oak Creek	Reach 04	35716	4905.00	690.00	703.63		703.77	0.001701	3.63	1873.74	286.94	0.20
Post Oak Creek	Reach 04	35716	4925.00	690.00	703.64		703.79	0.001702	3.64	1878.93	287.00	0.20
Post Oak Creek	Reach 04	35716	5785.00	690.00	704.38		704.54	0.001725	3.83	2090.48	289.44	0.20
Post Oak Creek	Reach 04	35214	1395.00	688.00	696.84		697.15	0.004887	4.52	344.32	81.11	0.30
Post Oak Creek	Reach 04	35214	2370.00	688.00	698.78		699.22	0.005321	5.57	543.21	134.40	0.33
Post Oak Creek	Reach 04	35214	2975.00	688.00	699.64		700.13	0.005565	6.06	673.24	168.52	0.34
Post Oak Creek	Reach 04	35214	3653.00	688.00	700.48		701.01	0.005670	6.46	828.28	205.50	0.35
Post Oak Creek	Reach 04	35214	4238.00	688.00	701.09		701.65	0.005799	6.79	966.44	245.39	0.36
Post Oak Creek	Reach 04	35214	4905.00	688.00	701.70		702.29	0.005910	7.10	1127.01	288.37	0.36
Post Oak Creek	Reach 04	35214	4925.00	688.00	701.71		702.30	0.005912	7.10	1132.03	289.75	0.37
Post Oak Creek	Reach 04	35214	5785.00	688.00	702.40		703.02	0.006080	7.48	1364.77	375.75	0.37
Post Oak Creek	T4	7962	64.00	798.57	798.87	798.83	798.93	0.021811	1.89	33.90	167.95	0.74
Post Oak Creek	T4	7962	106.00	798.57	798.95	798.90	799.02	0.022252	2.21	47.94	190.23	0.78
Post Oak Creek	T4	7962	133.00	798.57	798.99	798.94	799.08	0.020411	2.33	57.10	196.38	0.76
Post Oak Creek	T4	7962	163.00	798.57	799.03	798.98	799.13	0.021542	2.54	64.06	200.92	0.79
Post Oak Creek	T4	7962	190.00	798.57	799.06	799.01	799.17	0.022160	2.71	70.18	204.83	0.82
Post Oak Creek	T4	7962	218.00	798.57	799.09	799.04	799.22	0.022402	2.85	76.55	208.83	0.83
Post Oak Creek	T4	7962	219.00	798.57	799.09	799.04	799.22	0.022393	2.85	76.79	208.98	0.83
Post Oak Creek	T4	7962	263.00	798.57	799.14	799.09	799.28	0.022538	3.04	86.51	214.92	0.84
Post Oak Creek	T4	7462	64.00	792.00	792.50	792.33	792.55	0.008340	1.87	34.31	84.11	0.51
Post Oak Creek	T4	7462	106.00	792.00	792.66		792.74	0.008081	2.17	48.88	93.40	0.53
Post Oak Creek	T4	7462	133.00	792.00	792.74		792.83	0.008422	2.36	56.43	98.14	0.55
Post Oak Creek	T4	7462	163.00	792.00	792.84		792.93	0.008038	2.46	66.15	103.93	0.54
Post Oak Creek	T4	7462	190.00	792.00	792.92		793.02	0.007831	2.55	74.39	108.59	0.54
Post Oak Creek	T4	7462	218.00	792.00	792.99		793.10	0.007700	2.64	82.50	113.00	0.55
Post Oak Creek	T4	7462	219.00	792.00	792.99		793.10	0.007700	2.65	82.77	113.14	0.55
Post Oak Creek	T4	7462	263.00	792.00	793.09		793.21	0.007550	2.78	94.76	118.81	0.55
Post Oak Creek	T4	6962	64.00	788.00	788.53		788.55	0.007695	0.91	70.08	167.01	0.25
Post Oak Creek	T4	6962	106.00	788.00	788.68		788.70	0.007976	1.10	96.50	179.06	0.26
Post Oak Creek	T4	6962	133.00	788.00	788.78		788.80	0.007604	1.17	114.04	186.63	0.26
Post Oak Creek	T4	6962	163.00	788.00	788.86		788.88	0.008080	1.27	128.20	192.90	0.27
Post Oak Creek	T4	6962	190.00	788.00	788.92		788.95	0.008401	1.35	140.45	198.27	0.28
Post Oak Creek	T4	6962	218.00	788.00	788.98		789.01	0.008590	1.42	153.16	203.69	0.29
Post Oak Creek	T4	6962	219.00	788.00	788.98		789.02	0.008593	1.43	153.62	203.88	0.29
Post Oak Creek	T4	6962	263.00	788.00	789.07		789.11	0.008877	1.53	171.81	211.52	0.30

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	T4	6763	64.00	784.00	784.86	784.86	785.18	0.061624	4.50	14.22	22.60	1.00
Post Oak Creek	T4	6763	106.00	784.00	785.21	785.13	785.54	0.044267	4.60	23.03	27.57	0.89
Post Oak Creek	T4	6763	133.00	784.00	785.63	785.50	785.78	0.043468	3.03	43.93	97.61	0.80
Post Oak Creek	T4	6763	163.00	784.00	785.76	785.62	785.88	0.037082	2.76	59.03	133.75	0.73
Post Oak Creek	T4	6763	190.00	784.00	785.82	785.70	785.95	0.034180	2.84	66.88	136.63	0.72
Post Oak Creek	T4	6763	218.00	784.00	785.87	785.76	786.01	0.032689	2.94	74.17	139.25	0.71
Post Oak Creek	T4	6763	219.00	784.00	785.88	785.76	786.01	0.032608	2.94	74.45	139.35	0.71
Post Oak Creek	T4	6763	263.00	784.00	785.96	785.81	786.10	0.030710	3.07	85.54	143.25	0.70
Post Oak Creek	T4	6462	64.00	776.00	778.15		778.29	0.011695	2.93	21.84	18.45	0.47
Post Oak Creek	T4	6462	106.00	776.00	778.63		778.80	0.013359	3.28	32.36	25.72	0.51
Post Oak Creek	T4	6462	133.00	776.00	778.87		779.05	0.013530	3.41	39.06	29.63	0.52
Post Oak Creek	T4	6462	163.00	776.00	779.06		779.27	0.014488	3.63	44.94	32.69	0.55
Post Oak Creek	T4	6462	190.00	776.00	779.22		779.44	0.014862	3.77	50.40	35.30	0.56
Post Oak Creek	T4	6462	218.00	776.00	779.38		779.62	0.014894	3.88	56.25	37.89	0.56
Post Oak Creek	T4	6462	219.00	776.00	779.39		779.62	0.014899	3.88	56.45	37.98	0.56
Post Oak Creek	T4	6462	263.00	776.00	779.61		779.86	0.014904	4.03	65.31	41.59	0.57
Post Oak Creek	T4	6412.*	64.00	775.38	777.68	776.94	777.77	0.008845	2.41	26.51	24.55	0.41
Post Oak Creek	T4	6412.*	106.00	775.38	777.72		777.95	0.022079	3.86	27.46	24.98	0.65
Post Oak Creek	T4	6412.*	133.00	775.38	777.85		778.14	0.025427	4.31	30.85	26.44	0.70
Post Oak Creek	T4	6412.*	163.00	775.38	778.15		778.42	0.020020	4.15	39.30	29.84	0.64
Post Oak Creek	T4	6412.*	190.00	775.38	778.37		778.63	0.017783	4.12	46.09	32.33	0.61
Post Oak Creek	T4	6412.*	218.00	775.38	778.55		778.82	0.016865	4.18	52.12	34.39	0.60
Post Oak Creek	T4	6412.*	219.00	775.38	778.56		778.83	0.016622	4.16	52.58	34.55	0.59
Post Oak Creek	T4	6412.*	263.00	775.38	778.80		779.09	0.015939	4.29	61.28	37.30	0.59
Post Oak Creek	T4	6286	64.00	773.81	775.02	775.02	775.42	0.059199	5.07	12.63	16.05	1.01
Post Oak Creek	T4	6286	106.00	773.81	776.23		776.36	0.007873	2.89	36.71	23.67	0.41
Post Oak Creek	T4	6286	133.00	773.81	777.25		777.32	0.002604	2.08	64.53	33.84	0.25
Post Oak Creek	T4	6286	163.00	773.81	777.62		777.69	0.002403	2.15	78.39	41.67	0.24
Post Oak Creek	T4	6286	190.00	773.81	777.82		777.91	0.002521	2.29	87.49	46.10	0.25
Post Oak Creek	T4	6286	218.00	773.81	777.95		778.05	0.002827	2.49	93.67	49.17	0.27
Post Oak Creek	T4	6286	219.00	773.81	777.99		778.08	0.002722	2.47	95.41	50.33	0.26
Post Oak Creek	T4	6286	263.00	773.81	778.17		778.28	0.003109	2.75	105.02	56.30	0.28
Post Oak Creek	T4	6154	64.00	771.21	774.67	773.01	774.73	0.001278	2.00	32.07	15.65	0.25
Post Oak Creek	T4	6154	106.00	771.21	776.06	773.48	776.11	0.000728	1.85	57.22	21.56	0.19
Post Oak Creek	T4	6154	133.00	771.21	777.16	773.73	777.20	0.000380	1.62	92.34	45.55	0.15
Post Oak Creek	T4	6154	163.00	771.21	777.53	773.98	777.58	0.000399	1.76	111.03	56.98	0.15

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	T4	6154	190.00	771.21	777.73	774.18	777.78	0.000447	1.93	122.89	63.17	0.16
Post Oak Creek	T4	6154	218.00	771.21	777.84	774.38	777.90	0.000528	2.13	130.21	66.71	0.18
Post Oak Creek	T4	6154	219.00	771.21	777.88	774.39	777.94	0.000513	2.11	132.81	67.92	0.18
Post Oak Creek	T4	6154	263.00	771.21	778.03	774.67	778.11	0.000639	2.41	143.71	73.26	0.20
Post Oak Creek	T4	6050	Culvert									
Post Oak Creek	T4	5962	64.00	768.00	769.89		769.95	0.008246	1.95	32.82	25.94	0.31
Post Oak Creek	T4	5962	106.00	768.00	770.19		770.30	0.012101	2.58	41.08	28.41	0.38
Post Oak Creek	T4	5962	133.00	768.00	770.54		770.65	0.010165	2.58	51.48	31.14	0.35
Post Oak Creek	T4	5962	163.00	768.00	770.98		771.08	0.007726	2.47	65.88	34.56	0.32
Post Oak Creek	T4	5962	190.00	768.00	771.34	769.79	771.43	0.006463	2.42	78.60	37.32	0.29
Post Oak Creek	T4	5962	218.00	768.00	771.54	769.92	771.64	0.006593	2.53	86.27	38.88	0.30
Post Oak Creek	T4	5962	219.00	768.00	771.54	769.93	771.64	0.006596	2.53	86.55	38.94	0.30
Post Oak Creek	T4	5962	263.00	768.00	771.82	770.12	771.94	0.006823	2.69	97.75	41.12	0.31
Post Oak Creek	T4	5712.*	64.00	765.00	766.41		766.54	0.026533	2.86	22.41	24.18	0.52
Post Oak Creek	T4	5712.*	106.00	765.00	767.13		767.23	0.012471	2.49	42.49	31.80	0.38
Post Oak Creek	T4	5712.*	133.00	765.00	767.17		767.31	0.018188	3.04	43.70	32.21	0.46
Post Oak Creek	T4	5712.*	163.00	765.00	766.96		767.26	0.042306	4.38	37.24	29.99	0.69
Post Oak Creek	T4	5712.*	190.00	765.00	766.75	766.75	767.33	0.092744	6.07	31.29	27.81	1.01
Post Oak Creek	T4	5712.*	218.00	765.00	766.88	766.88	767.49	0.090983	6.26	34.82	29.12	1.01
Post Oak Creek	T4	5712.*	219.00	765.00	766.88	766.88	767.49	0.091013	6.27	34.93	29.17	1.01
Post Oak Creek	T4	5712.*	263.00	765.00	767.08	767.06	767.72	0.085792	6.45	40.80	31.23	0.99
Post Oak Creek	T4	5462	64.00	762.00	763.81		763.84	0.005741	1.42	44.96	44.00	0.25
Post Oak Creek	T4	5462	106.00	762.00	763.86		763.94	0.013782	2.24	47.26	45.10	0.39
Post Oak Creek	T4	5462	133.00	762.00	764.26		764.32	0.008354	1.98	67.05	52.83	0.31
Post Oak Creek	T4	5462	163.00	762.00	764.89		764.92	0.003811	1.58	103.45	63.89	0.22
Post Oak Creek	T4	5462	190.00	762.00	765.43		765.46	0.002229	1.35	141.24	73.96	0.17
Post Oak Creek	T4	5462	218.00	762.00	765.73		765.76	0.001961	1.33	164.01	79.42	0.16
Post Oak Creek	T4	5462	219.00	762.00	765.74		765.76	0.001962	1.33	164.53	79.54	0.16
Post Oak Creek	T4	5462	263.00	762.00	766.02		766.05	0.001967	1.40	187.88	84.78	0.17
Post Oak Creek	T4	5260	64.00	760.07	762.01		762.10	0.014446	2.31	27.65	39.33	0.49
Post Oak Creek	T4	5260	106.00	760.07	763.25		763.27	0.001408	1.18	90.05	62.04	0.17
Post Oak Creek	T4	5260	133.00	760.07	763.97		763.98	0.000669	0.95	139.87	76.10	0.12
Post Oak Creek	T4	5260	163.00	760.07	764.76		764.77	0.000307	0.80	205.40	89.78	0.09
Post Oak Creek	T4	5260	190.00	760.07	765.35		765.36	0.000203	0.75	261.43	98.48	0.07
Post Oak Creek	T4	5260	218.00	760.07	765.65		765.66	0.000194	0.78	291.89	103.13	0.07
Post Oak Creek	T4	5260	219.00	760.07	765.66		765.67	0.000194	0.78	292.55	103.23	0.07

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	T4	5260	263.00	760.07	765.94		765.95	0.000213	0.86	321.87	107.54	0.08
Post Oak Creek	T4	5195	64.00	758.51	762.03	759.73	762.04	0.000170	0.65	98.66	63.01	0.09
Post Oak Creek	T4	5195	106.00	758.51	763.24	760.01	763.25	0.000077	0.54	196.26	91.30	0.06
Post Oak Creek	T4	5195	133.00	758.51	763.97	760.16	763.97	0.000052	0.50	266.77	104.37	0.05
Post Oak Creek	T4	5195	163.00	758.51	764.76	760.30	764.76	0.000032	0.46	353.76	115.68	0.05
Post Oak Creek	T4	5195	190.00	758.51	765.35	760.41	765.35	0.000025	0.45	425.33	125.17	0.04
Post Oak Creek	T4	5195	218.00	758.51	765.65	760.53	765.66	0.000025	0.48	464.05	130.94	0.04
Post Oak Creek	T4	5195	219.00	758.51	765.66	760.53	765.66	0.000025	0.48	464.88	131.06	0.04
Post Oak Creek	T4	5195	263.00	758.51	765.94	760.68	765.94	0.000029	0.54	502.19	137.69	0.05
Post Oak Creek	T4	5110	Culvert									
Post Oak Creek	T4	5056	64.00	758.01	759.50	759.50	759.90	0.026659	5.08	12.59	16.13	1.01
Post Oak Creek	T4	5056	106.00	758.01	759.85	759.85	760.35	0.024855	5.65	18.77	19.47	1.01
Post Oak Creek	T4	5056	133.00	758.01	760.03	760.03	760.58	0.024122	5.92	22.47	21.22	1.01
Post Oak Creek	T4	5056	163.00	758.01	760.21	760.21	760.80	0.023390	6.17	26.43	22.93	1.01
Post Oak Creek	T4	5056	190.00	758.01	760.35	760.35	760.99	0.022995	6.37	29.80	24.28	1.01
Post Oak Creek	T4	5056	218.00	758.01	760.49	760.49	761.16	0.022572	6.56	33.24	25.58	1.01
Post Oak Creek	T4	5056	219.00	758.01	760.50	760.50	761.17	0.022559	6.57	33.36	25.63	1.01
Post Oak Creek	T4	5056	263.00	758.01	760.69	760.69	761.42	0.021951	6.81	38.61	27.49	1.01
Post Oak Creek	T4	4829	64.00	750.88	753.99	752.47	754.10	0.006657	2.69	23.83	12.80	0.35
Post Oak Creek	T4	4829	106.00	750.88	754.77	753.02	754.90	0.007231	2.92	36.27	19.05	0.37
Post Oak Creek	T4	4829	133.00	750.88	755.11	753.33	755.26	0.007455	3.07	43.26	21.79	0.38
Post Oak Creek	T4	4829	163.00	750.88	755.42	753.71	755.59	0.007660	3.23	50.46	24.30	0.40
Post Oak Creek	T4	4829	190.00	750.88	755.67	754.04	755.84	0.007785	3.35	56.67	26.27	0.40
Post Oak Creek	T4	4829	218.00	750.88	755.89	754.30	756.08	0.007922	3.47	62.76	28.06	0.41
Post Oak Creek	T4	4829	219.00	750.88	755.90	754.31	756.09	0.007921	3.48	62.99	28.13	0.41
Post Oak Creek	T4	4829	263.00	750.88	756.22	754.64	756.42	0.008075	3.64	72.18	30.63	0.42
Post Oak Creek	T4	4462	64.00	746.00	747.43	747.43	747.84	0.104761	5.11	12.53	15.67	1.01
Post Oak Creek	T4	4462	106.00	746.00	747.79	747.79	748.29	0.098844	5.68	18.67	19.07	1.01
Post Oak Creek	T4	4462	133.00	746.00	747.97	747.97	748.52	0.096158	5.95	22.35	20.85	1.01
Post Oak Creek	T4	4462	163.00	746.00	748.14	748.14	748.75	0.093492	6.26	26.02	21.95	1.01
Post Oak Creek	T4	4462	190.00	746.00	748.28	748.28	748.94	0.091302	6.51	29.18	22.77	1.01
Post Oak Creek	T4	4462	218.00	746.00	748.42	748.42	749.13	0.088951	6.73	32.41	23.58	1.01
Post Oak Creek	T4	4462	219.00	746.00	748.43	748.43	749.13	0.089066	6.74	32.50	23.61	1.01
Post Oak Creek	T4	4462	263.00	746.00	748.62	748.62	749.40	0.086894	7.05	37.29	24.76	1.01
Post Oak Creek	T4	3844	181.00	736.13	739.23		739.55	0.006248	4.58	39.50	17.61	0.54

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	T4	3844	298.00	736.13	740.47		740.77	0.007773	4.36	68.29	41.04	0.60
Post Oak Creek	T4	3844	373.00	736.13	740.82		741.13	0.006840	4.48	83.34	43.71	0.57
Post Oak Creek	T4	3844	453.00	736.13	741.15		741.48	0.006183	4.63	97.78	44.93	0.55
Post Oak Creek	T4	3844	528.00	736.13	741.35		741.73	0.006410	4.94	106.86	45.69	0.57
Post Oak Creek	T4	3844	607.00	736.13	741.62		742.02	0.006036	5.08	119.53	46.72	0.56
Post Oak Creek	T4	3844	613.00	736.13	741.65		742.05	0.005981	5.08	120.68	46.81	0.56
Post Oak Creek	T4	3844	731.00	736.13	742.18		742.57	0.004726	4.99	146.86	51.78	0.51
Post Oak Creek	T4	3759	181.00	735.18	737.31	737.31	738.17	0.091947	7.41	24.42	14.50	1.01
Post Oak Creek	T4	3759	298.00	735.18	738.03	738.03	739.12	0.086650	8.39	35.52	16.45	1.01
Post Oak Creek	T4	3759	373.00	735.18	738.42	738.42	739.64	0.084202	8.85	42.17	17.51	1.00
Post Oak Creek	T4	3759	453.00	735.18	739.18	738.78	740.18	0.065496	8.05	56.26	22.39	0.90
Post Oak Creek	T4	3759	528.00	735.18	740.38	739.63	740.71	0.028014	4.67	117.20	76.63	0.59
Post Oak Creek	T4	3759	607.00	735.18	741.05	739.94	741.25	0.012363	3.74	169.88	82.14	0.41
Post Oak Creek	T4	3759	613.00	735.18	741.09	739.96	741.29	0.011822	3.69	173.57	82.52	0.40
Post Oak Creek	T4	3759	731.00	735.18	741.90	740.23	742.04	0.006095	3.14	243.12	93.74	0.30
Post Oak Creek	T4	3700	Culvert									
Post Oak Creek	T4	3641	181.00	730.00	732.05	732.05	732.71	0.050208	6.51	27.82	21.40	1.01
Post Oak Creek	T4	3641	298.00	730.00	732.65	732.61	733.43	0.044238	7.09	42.03	25.81	0.98
Post Oak Creek	T4	3641	373.00	730.00	733.12	732.91	733.84	0.033563	6.79	54.95	29.23	0.87
Post Oak Creek	T4	3641	453.00	730.00	733.55		734.24	0.027408	6.64	68.18	32.13	0.80
Post Oak Creek	T4	3641	528.00	730.00	733.91		734.58	0.023800	6.58	80.22	34.44	0.76
Post Oak Creek	T4	3641	607.00	730.00	734.31		734.95	0.020262	6.43	94.44	37.21	0.71
Post Oak Creek	T4	3641	613.00	730.00	734.34		734.98	0.020094	6.42	95.43	37.40	0.71
Post Oak Creek	T4	3641	731.00	730.00	734.74		735.41	0.019037	6.57	111.27	40.46	0.70
Post Oak Creek	T4	3452	181.00	723.68	726.95		727.31	0.013208	4.89	38.33	17.10	0.52
Post Oak Creek	T4	3452	298.00	723.68	727.52		728.16	0.018926	6.49	48.93	19.53	0.64
Post Oak Creek	T4	3452	373.00	723.68	727.78		728.61	0.023090	7.46	53.98	20.58	0.71
Post Oak Creek	T4	3452	453.00	723.68	728.02	727.59	729.06	0.027103	8.37	59.10	21.60	0.77
Post Oak Creek	T4	3452	528.00	723.68	728.23	727.96	729.46	0.030555	9.14	63.69	22.47	0.82
Post Oak Creek	T4	3452	607.00	723.68	728.35	728.30	729.85	0.036379	10.13	66.42	22.98	0.90
Post Oak Creek	T4	3452	613.00	723.68	728.36	728.33	729.88	0.036698	10.19	66.71	23.03	0.90
Post Oak Creek	T4	3452	731.00	723.68	728.78	728.78	730.44	0.037020	10.76	76.67	24.78	0.91
Post Oak Creek	T4	2962	181.00	712.14	715.32	715.15	715.91	0.051112	6.14	29.47	19.27	0.88
Post Oak Creek	T4	2962	298.00	712.14	716.38		716.86	0.028450	5.55	53.68	26.41	0.69
Post Oak Creek	T4	2962	373.00	712.14	716.95		717.39	0.022235	5.36	69.64	30.06	0.62
Post Oak Creek	T4	2962	453.00	712.14	717.45		717.89	0.018864	5.28	85.78	33.46	0.58

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Post Oak Creek	T4	2962	528.00	712.14	717.88		718.31	0.016941	5.25	100.60	36.58	0.56
Post Oak Creek	T4	2962	607.00	712.14	718.28		718.71	0.014815	5.25	115.92	39.99	0.53
Post Oak Creek	T4	2962	613.00	712.14	718.30		718.73	0.014735	5.26	116.84	40.19	0.53
Post Oak Creek	T4	2962	731.00	712.14	718.78		719.23	0.012890	5.41	136.95	44.52	0.51
Post Oak Creek	T4	2462	181.00	710.00	714.02		714.04	0.001117	1.24	145.82	50.34	0.13
Post Oak Creek	T4	2462	298.00	710.00	715.15		715.18	0.001110	1.45	205.57	55.62	0.13
Post Oak Creek	T4	2462	373.00	710.00	715.75		715.79	0.001110	1.55	239.93	58.26	0.14
Post Oak Creek	T4	2462	453.00	710.00	716.31		716.35	0.001095	1.66	273.04	60.65	0.14
Post Oak Creek	T4	2462	528.00	710.00	716.77		716.81	0.001081	1.76	301.42	62.57	0.14
Post Oak Creek	T4	2462	607.00	710.00	717.20		717.25	0.001085	1.86	328.78	64.37	0.14
Post Oak Creek	T4	2462	613.00	710.00	717.21		717.27	0.001098	1.87	329.60	64.42	0.14
Post Oak Creek	T4	2462	731.00	710.00	717.61		717.68	0.001231	2.08	355.80	66.10	0.15
Post Oak Creek	T4	1962	293.00	708.00	711.21		711.85	0.025257	6.41	45.72	20.34	0.75
Post Oak Creek	T4	1962	488.00	708.00	712.37		713.09	0.020350	6.82	71.52	24.34	0.70
Post Oak Creek	T4	1962	611.00	708.00	712.94		713.73	0.019186	7.10	86.10	26.30	0.69
Post Oak Creek	T4	1962	742.00	708.00	713.45		714.31	0.018897	7.42	99.96	28.14	0.69
Post Oak Creek	T4	1962	865.00	708.00	713.83		714.77	0.019488	7.81	110.73	29.49	0.71
Post Oak Creek	T4	1962	985.00	708.00	714.12		715.17	0.020623	8.25	119.40	30.53	0.74
Post Oak Creek	T4	1962	987.00	708.00	714.12		715.18	0.020642	8.26	119.54	30.54	0.74
Post Oak Creek	T4	1962	1089.00	708.00	714.35		715.50	0.021560	8.61	126.54	31.36	0.75
Post Oak Creek	T4	1462	293.00	702.00	707.34		707.45	0.004216	2.68	109.15	37.77	0.28
Post Oak Creek	T4	1462	488.00	702.00	708.59		708.73	0.004541	2.99	163.43	51.40	0.30
Post Oak Creek	T4	1462	611.00	702.00	709.21		709.35	0.004659	3.09	197.89	60.66	0.30
Post Oak Creek	T4	1462	742.00	702.00	709.74		709.90	0.004728	3.19	232.33	68.68	0.31
Post Oak Creek	T4	1462	865.00	702.00	710.14		710.31	0.004711	3.32	260.67	73.75	0.31
Post Oak Creek	T4	1462	985.00	702.00	710.44		710.62	0.004669	3.49	283.20	76.11	0.31
Post Oak Creek	T4	1462	987.00	702.00	710.44		710.63	0.004668	3.49	283.58	76.14	0.31
Post Oak Creek	T4	1462	1089.00	702.00	710.69		710.89	0.004630	3.62	302.46	77.84	0.31
Post Oak Creek	T4	962	293.00	698.00	701.07	701.07	702.01	0.065330	7.77	37.72	20.52	1.01
Post Oak Creek	T4	962	488.00	698.00	701.92	701.92	703.05	0.060065	8.52	57.25	25.43	1.00
Post Oak Creek	T4	962	611.00	698.00	702.34	702.34	703.58	0.058180	8.94	68.33	27.56	1.00
Post Oak Creek	T4	962	742.00	698.00	702.74	702.74	704.09	0.056611	9.32	79.60	29.52	1.00
Post Oak Creek	T4	962	865.00	698.00	703.05	703.05	704.51	0.056484	9.70	89.18	31.08	1.01
Post Oak Creek	T4	962	985.00	698.00	703.38	703.38	704.90	0.054522	9.91	99.43	32.68	1.00
Post Oak Creek	T4	962	987.00	698.00	703.38	703.38	704.91	0.054518	9.91	99.58	32.70	1.00
Post Oak Creek	T4	962	1089.00	698.00	703.61	703.61	705.21	0.054208	10.15	107.31	33.85	1.00

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	T4	462	293.00	692.00	697.47		697.53	0.002275	2.01	145.91	50.18	0.21
Post Oak Creek	T4	462	488.00	692.00	699.36		699.41	0.001448	1.88	260.10	70.86	0.17
Post Oak Creek	T4	462	611.00	692.00	700.21		700.27	0.001234	1.88	324.67	80.81	0.16
Post Oak Creek	T4	462	742.00	692.00	701.03		701.09	0.000993	1.90	395.35	91.78	0.15
Post Oak Creek	T4	462	865.00	692.00	701.65		701.71	0.000901	1.96	454.66	100.17	0.15
Post Oak Creek	T4	462	985.00	692.00	702.26		702.32	0.000811	1.99	518.07	106.35	0.14
Post Oak Creek	T4	462	987.00	692.00	702.28		702.34	0.000806	1.99	519.89	106.44	0.14
Post Oak Creek	T4	462	1089.00	692.00	702.96		703.02	0.000674	1.95	593.80	109.97	0.13
Post Oak Creek	Reach 05	34801	1395.00	686.00	695.95	691.77	696.18	0.003030	3.90	357.78	70.46	0.30
Post Oak Creek	Reach 05	34801	2370.00	686.00	697.92	693.59	698.25	0.002806	4.62	547.90	124.16	0.31
Post Oak Creek	Reach 05	34801	2975.00	686.00	698.77	694.33	699.14	0.002805	4.99	668.90	160.72	0.31
Post Oak Creek	Reach 05	34801	3653.00	686.00	699.60	695.06	700.01	0.002813	5.35	815.48	193.34	0.32
Post Oak Creek	Reach 05	34801	4238.00	686.00	700.18	695.62	700.63	0.002901	5.67	939.65	246.30	0.33
Post Oak Creek	Reach 05	34801	4905.00	686.00	700.74	696.21	701.23	0.003012	6.01	1083.25	262.70	0.34
Post Oak Creek	Reach 05	34801	4925.00	686.00	700.76	696.23	701.25	0.003015	6.02	1087.51	263.07	0.34
Post Oak Creek	Reach 05	34801	5785.00	686.00	701.40	697.01	701.93	0.003136	6.40	1259.51	277.72	0.35
Post Oak Creek	Reach 05	34630	Bridge									
Post Oak Creek	Reach 05	34534	1395.00	686.00	694.94		695.09	0.001997	3.13	445.25	90.36	0.25
Post Oak Creek	Reach 05	34534	2370.00	686.00	696.95		697.16	0.001996	3.64	660.08	129.36	0.26
Post Oak Creek	Reach 05	34534	2975.00	686.00	697.74		697.98	0.002061	4.01	768.46	146.71	0.27
Post Oak Creek	Reach 05	34534	3653.00	686.00	698.48		698.77	0.002143	4.37	884.30	165.13	0.28
Post Oak Creek	Reach 05	34534	4238.00	686.00	698.94		699.28	0.002324	4.73	962.67	177.74	0.29
Post Oak Creek	Reach 05	34534	4905.00	686.00	699.33		699.73	0.002604	5.17	1034.46	188.55	0.31
Post Oak Creek	Reach 05	34534	4925.00	686.00	699.34		699.74	0.002612	5.18	1036.65	188.87	0.31
Post Oak Creek	Reach 05	34534	5785.00	686.00	699.81		700.29	0.002933	5.69	1128.40	203.17	0.33
Post Oak Creek	Reach 05	34463	1395.00	682.76	694.72		694.94	0.001902	3.92	385.19	90.26	0.24
Post Oak Creek	Reach 05	34463	2370.00	682.76	696.74		697.01	0.001873	4.51	624.53	146.30	0.25
Post Oak Creek	Reach 05	34463	2975.00	682.76	697.53		697.84	0.001964	4.86	748.57	168.15	0.26
Post Oak Creek	Reach 05	34463	3653.00	682.76	698.29		698.62	0.002002	5.13	887.98	199.12	0.26
Post Oak Creek	Reach 05	34463	4238.00	682.76	698.74		699.12	0.002127	5.42	982.73	215.99	0.27
Post Oak Creek	Reach 05	34463	4905.00	682.76	699.12		699.55	0.002353	5.82	1067.63	230.06	0.29
Post Oak Creek	Reach 05	34463	4925.00	682.76	699.14		699.57	0.002359	5.83	1070.23	230.48	0.29
Post Oak Creek	Reach 05	34463	5785.00	682.76	699.60		700.09	0.002601	6.27	1180.53	247.54	0.31
Post Oak Creek	Reach 05	33768	1395.00	684.00	693.05		693.27	0.003122	3.85	398.94	82.31	0.24
Post Oak Creek	Reach 05	33768	2370.00	684.00	694.79		695.15	0.004124	5.06	607.16	207.80	0.29
Post Oak Creek	Reach 05	33768	2975.00	684.00	695.42		695.83	0.004564	5.56	759.81	270.42	0.31

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 05	33768	3653.00	684.00	696.06		696.52	0.005006	6.07	965.08	582.12	0.33
Post Oak Creek	Reach 05	33768	4238.00	684.00	696.53		696.97	0.004868	6.16	1246.53	603.91	0.32
Post Oak Creek	Reach 05	33768	4905.00	684.00	697.01		697.37	0.004299	5.95	1538.33	614.74	0.31
Post Oak Creek	Reach 05	33768	4925.00	684.00	697.02		697.38	0.004289	5.95	1545.87	614.98	0.31
Post Oak Creek	Reach 05	33768	5785.00	684.00	697.67		697.95	0.003478	5.55	1949.35	626.07	0.28
Post Oak Creek	Reach 05	33268	1395.00	682.00	690.91		691.16	0.006004	4.09	364.03	128.06	0.32
Post Oak Creek	Reach 05	33268	2370.00	682.00	692.75		692.99	0.004360	4.29	764.90	316.48	0.29
Post Oak Creek	Reach 05	33268	2975.00	682.00	693.54		693.75	0.003614	4.20	1020.86	329.18	0.27
Post Oak Creek	Reach 05	33268	3653.00	682.00	694.24		694.44	0.003270	4.23	1254.44	340.34	0.26
Post Oak Creek	Reach 05	33268	4238.00	682.00	694.82		695.01	0.002994	4.23	1453.41	348.94	0.25
Post Oak Creek	Reach 05	33268	4905.00	682.00	695.44		695.62	0.002746	4.24	1672.97	358.56	0.24
Post Oak Creek	Reach 05	33268	4925.00	682.00	695.45		695.64	0.002751	4.25	1677.00	358.73	0.24
Post Oak Creek	Reach 05	33268	5785.00	682.00	696.34		696.51	0.002324	4.14	2001.34	370.65	0.23
Post Oak Creek	Reach 05	32768	1395.00	680.00	689.85		689.90	0.001281	2.19	902.74	272.34	0.15
Post Oak Creek	Reach 05	32768	2370.00	680.00	692.04		692.09	0.000885	2.22	1577.14	485.30	0.13
Post Oak Creek	Reach 05	32768	2975.00	680.00	692.91		692.96	0.000807	2.27	2013.23	519.75	0.13
Post Oak Creek	Reach 05	32768	3653.00	680.00	693.63		693.68	0.000794	2.36	2396.66	543.61	0.13
Post Oak Creek	Reach 05	32768	4238.00	680.00	694.24		694.29	0.000761	2.41	2734.74	561.46	0.13
Post Oak Creek	Reach 05	32768	4905.00	680.00	694.90		694.95	0.000725	2.45	3109.08	578.55	0.13
Post Oak Creek	Reach 05	32768	4925.00	680.00	694.91		694.96	0.000728	2.45	3114.77	578.81	0.13
Post Oak Creek	Reach 05	32768	5785.00	680.00	695.88		695.93	0.000635	2.42	3686.83	603.93	0.12
Post Oak Creek	Reach 05	32200	1638.00	676.86	689.20		689.34	0.000802	3.22	617.60	148.08	0.20
Post Oak Creek	Reach 05	32200	2755.00	676.86	691.54		691.67	0.000637	3.36	1185.10	344.19	0.18
Post Oak Creek	Reach 05	32200	3464.00	676.86	692.44		692.57	0.000588	3.42	1514.35	384.33	0.18
Post Oak Creek	Reach 05	32200	4254.00	676.86	693.16		693.29	0.000587	3.56	1817.57	462.61	0.18
Post Oak Creek	Reach 05	32200	4941.00	676.86	693.80		693.92	0.000554	3.58	2135.10	539.58	0.18
Post Oak Creek	Reach 05	32200	5663.00	676.86	694.48		694.60	0.000524	3.60	2550.74	656.98	0.17
Post Oak Creek	Reach 05	32200	5672.00	676.86	694.49		694.61	0.000522	3.60	2557.60	657.19	0.17
Post Oak Creek	Reach 05	32200	6748.00	676.86	695.54		695.64	0.000409	3.35	3260.00	677.07	0.16
Post Oak Creek	Reach 05	32087	1638.00	680.00	689.12	683.91	689.26	0.000546	3.03	571.44	124.30	0.21
Post Oak Creek	Reach 05	32087	2755.00	680.00	691.43	685.28	691.60	0.000478	3.45	983.43	254.92	0.20
Post Oak Creek	Reach 05	32087	3464.00	680.00	692.32	686.06	692.51	0.000482	3.69	1249.98	350.81	0.21
Post Oak Creek	Reach 05	32087	4254.00	680.00	693.04	686.82	693.23	0.000493	3.91	1512.04	382.80	0.21
Post Oak Creek	Reach 05	32087	4941.00	680.00	693.67	687.37	693.87	0.000480	4.01	1767.95	430.33	0.21
Post Oak Creek	Reach 05	32087	5663.00	680.00	694.35	687.94	694.55	0.000452	4.05	2073.02	458.05	0.21
Post Oak Creek	Reach 05	32087	5672.00	680.00	694.36	687.95	694.56	0.000452	4.05	2077.74	458.40	0.21
Post Oak Creek	Reach 05	32087	6748.00	680.00	695.41	688.74	695.59	0.000400	4.03	2577.22	493.75	0.20

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 05	32010	Bridge									
Post Oak Creek	Reach 05	31950	1638.00	678.00	688.77		688.87	0.000416	2.55	651.08	129.32	0.18
Post Oak Creek	Reach 05	31950	2755.00	678.00	690.83		690.97	0.000418	3.08	1009.40	216.32	0.19
Post Oak Creek	Reach 05	31950	3464.00	678.00	691.88		692.03	0.000402	3.27	1258.13	255.80	0.19
Post Oak Creek	Reach 05	31950	4254.00	678.00	692.86		693.02	0.000388	3.43	1523.67	288.00	0.19
Post Oak Creek	Reach 05	31950	4941.00	678.00	693.60		693.77	0.000383	3.56	1748.94	320.96	0.19
Post Oak Creek	Reach 05	31950	5663.00	678.00	694.29		694.47	0.000382	3.70	2001.37	388.04	0.19
Post Oak Creek	Reach 05	31950	5672.00	678.00	694.30		694.48	0.000381	3.70	2005.00	388.59	0.19
Post Oak Creek	Reach 05	31950	6748.00	678.00	695.35		695.53	0.000358	3.80	2468.76	504.21	0.19
Post Oak Creek	Reach 05	31748	1638.00	676.75	688.47		688.68	0.003400	3.65	458.97	90.38	0.25
Post Oak Creek	Reach 05	31748	2755.00	676.75	690.49		690.77	0.003462	4.34	688.11	138.25	0.26
Post Oak Creek	Reach 05	31748	3464.00	676.75	691.55		691.84	0.003252	4.55	847.42	163.63	0.26
Post Oak Creek	Reach 05	31748	4254.00	676.75	692.52		692.83	0.003140	4.77	1018.51	187.09	0.26
Post Oak Creek	Reach 05	31748	4941.00	676.75	693.26		693.58	0.003092	4.95	1162.48	204.76	0.26
Post Oak Creek	Reach 05	31748	5663.00	676.75	693.94		694.28	0.003072	5.13	1307.13	215.11	0.26
Post Oak Creek	Reach 05	31748	5672.00	676.75	693.95		694.29	0.003070	5.13	1309.13	215.21	0.26
Post Oak Creek	Reach 05	31748	6748.00	676.75	695.00		695.35	0.002908	5.28	1540.68	225.96	0.26
Post Oak Creek	Reach 05	31268	1638.00	678.00	687.92		687.98	0.000734	2.26	965.34	298.58	0.14
Post Oak Creek	Reach 05	31268	2755.00	678.00	690.15		690.20	0.000495	2.19	1665.48	326.78	0.12
Post Oak Creek	Reach 05	31268	3464.00	678.00	691.26		691.31	0.000442	2.21	2035.84	338.85	0.12
Post Oak Creek	Reach 05	31268	4254.00	678.00	692.26		692.32	0.000424	2.29	2381.15	349.60	0.11
Post Oak Creek	Reach 05	31268	4941.00	678.00	693.01		693.07	0.000421	2.38	2644.99	357.30	0.12
Post Oak Creek	Reach 05	31268	5663.00	678.00	693.70		693.77	0.000425	2.47	2894.44	364.41	0.12
Post Oak Creek	Reach 05	31268	5672.00	678.00	693.71		693.78	0.000425	2.47	2897.92	364.50	0.12
Post Oak Creek	Reach 05	31268	6748.00	678.00	694.78		694.85	0.000415	2.56	3293.11	375.96	0.12
Post Oak Creek	Reach 05	30768	1638.00	676.00	686.99		687.26	0.003547	4.49	462.88	113.41	0.26
Post Oak Creek	Reach 05	30768	2755.00	676.00	689.40		689.68	0.002977	4.82	808.05	171.09	0.25
Post Oak Creek	Reach 05	30768	3464.00	676.00	690.58		690.84	0.002687	4.88	1023.72	192.24	0.24
Post Oak Creek	Reach 05	30768	4254.00	676.00	691.60		691.87	0.002565	5.02	1226.84	204.98	0.24
Post Oak Creek	Reach 05	30768	4941.00	676.00	692.35		692.62	0.002531	5.17	1382.91	213.39	0.24
Post Oak Creek	Reach 05	30768	5663.00	676.00	693.03		693.32	0.002534	5.33	1530.18	219.96	0.24
Post Oak Creek	Reach 05	30768	5672.00	676.00	693.04		693.33	0.002532	5.33	1532.32	220.05	0.24
Post Oak Creek	Reach 05	30768	6748.00	676.00	694.05		694.39	0.002745	5.80	1764.33	335.36	0.25
Post Oak Creek	Reach 05	30235	1660.00	673.77	686.30		686.36	0.000886	2.38	1081.10	259.21	0.13
Post Oak Creek	Reach 05	30235	2750.00	673.77	688.90		688.95	0.000677	2.42	1862.93	341.23	0.12

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 05	30235	3480.00	673.77	690.13		690.18	0.000617	2.45	2291.77	354.49	0.12
Post Oak Creek	Reach 05	30235	4309.00	673.77	691.16		691.22	0.000621	2.58	2662.40	363.86	0.12
Post Oak Creek	Reach 05	30235	5008.00	673.77	691.90		691.96	0.000633	2.69	2934.95	368.97	0.12
Post Oak Creek	Reach 05	30235	5716.00	673.77	692.58		692.64	0.000647	2.80	3188.02	382.56	0.12
Post Oak Creek	Reach 05	30235	5726.00	673.77	692.59		692.65	0.000647	2.80	3191.81	382.80	0.12
Post Oak Creek	Reach 05	30235	6884.00	673.77	693.61		693.68	0.000667	2.96	3594.04	408.49	0.12
Post Oak Creek	Reach 05	30103	1660.00	676.00	686.05	680.34	686.18	0.002376	2.89	573.95	96.84	0.21
Post Oak Creek	Reach 05	30103	2750.00	676.00	688.63	681.89	688.80	0.001939	3.32	842.03	111.01	0.20
Post Oak Creek	Reach 05	30103	3480.00	676.00	689.83	682.67	690.03	0.001977	3.66	979.07	117.53	0.21
Post Oak Creek	Reach 05	30103	4309.00	676.00	690.80	683.47	691.06	0.002177	4.10	1096.08	122.50	0.22
Post Oak Creek	Reach 05	30103	5008.00	676.00	691.49	684.05	691.80	0.002361	4.45	1182.25	125.97	0.23
Post Oak Creek	Reach 05	30103	5716.00	676.00	692.12	684.56	692.46	0.002550	4.79	1261.73	129.09	0.24
Post Oak Creek	Reach 05	30103	5726.00	676.00	692.13	684.57	692.47	0.002552	4.80	1262.92	129.14	0.24
Post Oak Creek	Reach 05	30103	6884.00	676.00	693.06	685.36	693.48	0.002833	5.31	1385.50	133.90	0.26
Post Oak Creek	Reach 05	30070	Bridge									
Post Oak Creek	Reach 05	30042	1660.00	676.00	685.61		685.83	0.004493	3.78	438.61	79.41	0.28
Post Oak Creek	Reach 05	30042	2750.00	676.00	688.23		688.50	0.003378	4.18	671.03	98.20	0.26
Post Oak Creek	Reach 05	30042	3480.00	676.00	689.39		689.72	0.003370	4.58	789.99	105.63	0.27
Post Oak Creek	Reach 05	30042	4309.00	676.00	690.30		690.70	0.003708	5.12	888.20	111.57	0.28
Post Oak Creek	Reach 05	30042	5008.00	676.00	690.93		691.39	0.004036	5.56	959.49	115.29	0.30
Post Oak Creek	Reach 05	30042	5716.00	676.00	691.48		692.02	0.004385	5.99	1024.33	118.60	0.32
Post Oak Creek	Reach 05	30042	5726.00	676.00	691.49		692.03	0.004389	6.00	1025.32	118.65	0.32
Post Oak Creek	Reach 05	30042	6884.00	676.00	692.31		692.97	0.004912	6.65	1125.06	123.41	0.34
Post Oak Creek	Reach 05	29879	1660.00	672.30	685.30		685.42	0.001403	2.88	637.73	119.90	0.17
Post Oak Creek	Reach 05	29879	2750.00	672.30	687.98		688.13	0.001339	3.28	1068.09	209.54	0.17
Post Oak Creek	Reach 05	29879	3480.00	672.30	689.18		689.34	0.001347	3.51	1336.87	232.95	0.17
Post Oak Creek	Reach 05	29879	4309.00	672.30	690.09		690.27	0.001476	3.84	1552.41	242.63	0.18
Post Oak Creek	Reach 05	29879	5008.00	672.30	690.72		690.92	0.001600	4.12	1708.44	252.38	0.19
Post Oak Creek	Reach 05	29879	5716.00	672.30	691.27		691.50	0.001728	4.39	1851.41	260.79	0.20
Post Oak Creek	Reach 05	29879	5726.00	672.30	691.28		691.51	0.001729	4.40	1853.64	260.92	0.20
Post Oak Creek	Reach 05	29879	6884.00	672.30	692.12		692.38	0.001911	4.79	2077.02	274.13	0.21
Post Oak Creek	Reach 05	29311	1660.00	671.15	684.40		684.55	0.001693	3.17	628.38	125.65	0.18
Post Oak Creek	Reach 05	29311	2750.00	671.15	687.16		687.31	0.001575	3.47	1053.73	183.40	0.18
Post Oak Creek	Reach 05	29311	3480.00	671.15	688.31		688.48	0.001694	3.76	1279.49	207.64	0.18
Post Oak Creek	Reach 05	29311	4309.00	671.15	689.08		689.29	0.002024	4.23	1445.96	224.63	0.20
Post Oak Creek	Reach 05	29311	5008.00	671.15	689.58		689.83	0.002323	4.64	1562.39	238.73	0.22

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 05	29311	5716.00	671.15	690.00		690.29	0.002656	5.06	1664.76	250.47	0.23
Post Oak Creek	Reach 05	29311	5726.00	671.15	690.01		690.30	0.002660	5.07	1666.52	250.67	0.23
Post Oak Creek	Reach 05	29311	6884.00	671.15	690.63		690.99	0.003194	5.71	1827.29	268.26	0.26
Post Oak Creek	Reach 05	29242	1660.00	674.00	684.15	679.55	684.38	0.003356	4.02	485.15	116.96	0.26
Post Oak Creek	Reach 05	29242	2750.00	674.00	686.99	681.19	687.18	0.002117	3.95	959.25	207.40	0.22
Post Oak Creek	Reach 05	29242	3480.00	674.00	688.15	682.10	688.36	0.002000	4.12	1216.46	233.96	0.21
Post Oak Creek	Reach 05	29242	4309.00	674.00	688.91	683.05	689.15	0.002242	4.55	1400.10	252.53	0.23
Post Oak Creek	Reach 05	29242	5008.00	674.00	689.39	683.73	689.66	0.002500	4.93	1525.82	264.40	0.24
Post Oak Creek	Reach 05	29242	5716.00	674.00	689.79	684.27	690.10	0.002798	5.32	1633.27	273.89	0.26
Post Oak Creek	Reach 05	29242	5726.00	674.00	689.80	684.28	690.11	0.002801	5.33	1635.17	274.05	0.26
Post Oak Creek	Reach 05	29242	6884.00	674.00	690.39	685.58	690.77	0.003296	5.95	1801.52	291.56	0.28
Post Oak Creek	Reach 05	29180	Bridge									
Post Oak Creek	Reach 05	29131	1660.00	674.00	683.19		683.47	0.002312	4.20	395.81	79.09	0.32
Post Oak Creek	Reach 05	29131	2750.00	674.00	685.35		685.69	0.001862	4.74	663.64	288.00	0.31
Post Oak Creek	Reach 05	29131	3480.00	674.00	686.86		687.15	0.001351	4.57	1153.82	359.37	0.27
Post Oak Creek	Reach 05	29131	4309.00	674.00	687.87		688.16	0.001283	4.78	1576.33	461.47	0.27
Post Oak Creek	Reach 05	29131	5008.00	674.00	688.50		688.80	0.001276	4.97	1877.86	491.42	0.27
Post Oak Creek	Reach 05	29131	5716.00	674.00	689.00		689.32	0.001316	5.20	2128.29	511.70	0.28
Post Oak Creek	Reach 05	29131	5726.00	674.00	689.01		689.33	0.001315	5.20	2133.10	512.12	0.28
Post Oak Creek	Reach 05	29131	6884.00	674.00	689.74		690.09	0.001373	5.55	2523.16	547.72	0.28
Post Oak Creek	Reach 05	28927	1660.00	669.05	682.87		683.09	0.001415	3.78	466.86	69.51	0.21
Post Oak Creek	Reach 05	28927	2750.00	669.05	685.08		685.33	0.001423	4.34	797.65	244.53	0.22
Post Oak Creek	Reach 05	28927	3480.00	669.05	686.75		686.90	0.000758	3.46	1248.49	285.24	0.17
Post Oak Creek	Reach 05	28927	4309.00	669.05	687.80		687.94	0.000634	3.33	1554.30	301.45	0.15
Post Oak Creek	Reach 05	28927	5008.00	669.05	688.44		688.58	0.000615	3.37	1771.59	368.25	0.15
Post Oak Creek	Reach 05	28927	5716.00	669.05	688.94		689.09	0.000626	3.47	1959.38	378.97	0.15
Post Oak Creek	Reach 05	28927	5726.00	669.05	688.95		689.10	0.000626	3.47	1962.99	379.15	0.15
Post Oak Creek	Reach 05	28927	6884.00	669.05	689.69		689.85	0.000646	3.64	2248.58	392.56	0.16
Post Oak Creek	Reach 05	28768	1660.00	672.00	682.52		682.82	0.001851	4.46	394.24	100.49	0.30
Post Oak Creek	Reach 05	28768	2750.00	672.00	684.85		685.11	0.001305	4.53	775.77	230.42	0.26
Post Oak Creek	Reach 05	28768	3480.00	672.00	686.61		686.78	0.000745	3.84	1253.01	297.36	0.20
Post Oak Creek	Reach 05	28768	4309.00	672.00	687.67		687.83	0.000675	3.88	1573.92	308.69	0.20
Post Oak Creek	Reach 05	28768	5008.00	672.00	688.31		688.47	0.000686	4.05	1771.94	319.67	0.20
Post Oak Creek	Reach 05	28768	5716.00	672.00	688.80		688.98	0.000725	4.27	1932.07	332.21	0.21
Post Oak Creek	Reach 05	28768	5726.00	672.00	688.81		688.99	0.000725	4.27	1935.25	332.44	0.21
Post Oak Creek	Reach 05	28768	6884.00	672.00	689.53		689.74	0.000786	4.61	2181.85	349.15	0.22

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 05	28268	1660.00	672.00	681.32		681.57	0.003457	4.18	494.05	132.36	0.26
Post Oak Creek	Reach 05	28268	2750.00	672.00	684.02		684.23	0.002405	4.22	927.32	180.29	0.23
Post Oak Creek	Reach 05	28268	3480.00	672.00	686.09		686.25	0.001600	3.87	1320.24	199.63	0.19
Post Oak Creek	Reach 05	28268	4309.00	672.00	687.14		687.33	0.001669	4.17	1536.79	211.36	0.20
Post Oak Creek	Reach 05	28268	5008.00	672.00	687.73		687.94	0.001843	4.50	1662.82	217.95	0.21
Post Oak Creek	Reach 05	28268	5716.00	672.00	688.15		688.40	0.002119	4.92	1755.17	227.54	0.22
Post Oak Creek	Reach 05	28268	5726.00	672.00	688.16		688.40	0.002122	4.93	1757.22	227.94	0.22
Post Oak Creek	Reach 05	28268	6884.00	672.00	688.75		689.07	0.002631	5.63	1899.78	253.56	0.25
Post Oak Creek	Reach 05	27768	1660.00	670.00	679.39		679.70	0.004021	4.47	371.07	71.93	0.35
Post Oak Creek	Reach 05	27768	2750.00	670.00	682.74		682.98	0.002613	3.92	702.07	123.18	0.29
Post Oak Creek	Reach 05	27768	3480.00	670.00	685.39		685.55	0.001238	3.27	1070.06	152.58	0.21
Post Oak Creek	Reach 05	27768	4309.00	670.00	686.42		686.61	0.001232	3.55	1241.56	206.77	0.21
Post Oak Creek	Reach 05	27768	5008.00	670.00	686.93		687.15	0.001348	3.86	1362.11	266.49	0.23
Post Oak Creek	Reach 05	27768	5716.00	670.00	687.22		687.49	0.001551	4.23	1445.63	301.10	0.24
Post Oak Creek	Reach 05	27768	5726.00	670.00	687.23		687.50	0.001550	4.23	1448.28	302.13	0.24
Post Oak Creek	Reach 05	27768	6884.00	670.00	687.61		687.95	0.001901	4.81	1571.16	346.67	0.27
Post Oak Creek	Reach 05	27644	1660.00	670.00	678.92	675.19	679.30	0.002622	4.90	338.46	77.11	0.41
Post Oak Creek	Reach 05	27644	2750.00	670.00	682.55	677.06	682.77	0.001140	3.69	745.66	142.51	0.28
Post Oak Creek	Reach 05	27644	3480.00	670.00	685.32	678.08	685.46	0.000465	2.94	1201.56	196.90	0.19
Post Oak Creek	Reach 05	27644	4309.00	670.00	686.36	679.25	686.51	0.000439	3.12	1534.80	476.67	0.19
Post Oak Creek	Reach 05	27644	5008.00	670.00	686.88	679.88	687.05	0.000458	3.32	1796.58	536.32	0.20
Post Oak Creek	Reach 05	27644	5716.00	670.00	687.18	680.39	687.37	0.000517	3.60	1967.68	619.19	0.21
Post Oak Creek	Reach 05	27644	5726.00	670.00	687.18	680.39	687.38	0.000516	3.60	1973.27	620.30	0.21
Post Oak Creek	Reach 05	27644	6884.00	670.00	687.56	681.13	687.80	0.000622	4.06	2215.82	666.79	0.23
Post Oak Creek	Reach 05	27588	Bridge									
Post Oak Creek	Reach 05	27528	1660.00	670.00	677.31		678.18	0.007772	7.50	221.48	41.18	0.57
Post Oak Creek	Reach 05	27528	2750.00	670.00	680.30		681.18	0.006329	7.56	363.86	57.71	0.53
Post Oak Creek	Reach 05	27528	3480.00	670.00	682.95		683.53	0.003734	6.16	573.72	107.75	0.42
Post Oak Creek	Reach 05	27528	4309.00	670.00	684.49		685.02	0.002648	5.96	801.75	225.58	0.36
Post Oak Creek	Reach 05	27528	5008.00	670.00	685.53		685.98	0.002045	5.66	1078.24	312.55	0.33
Post Oak Creek	Reach 05	27528	5716.00	670.00	686.00		686.49	0.002141	5.99	1230.46	444.47	0.34
Post Oak Creek	Reach 05	27528	5726.00	670.00	686.02		686.50	0.002124	5.97	1238.32	446.45	0.34
Post Oak Creek	Reach 05	27528	6884.00	670.00	686.60		687.07	0.002073	6.13	1515.52	511.31	0.34
Post Oak Creek	Reach 05	27268	1660.00	668.00	676.13		676.79	0.003628	6.48	256.21	47.94	0.49
Post Oak Creek	Reach 05	27268	2750.00	668.00	679.59		680.18	0.002238	6.15	447.24	62.74	0.41

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 05	27268	3480.00	668.00	682.55		683.01	0.001119	5.41	666.35	99.09	0.30
Post Oak Creek	Reach 05	27268	4309.00	668.00	684.14		684.60	0.000984	5.60	859.90	178.86	0.29
Post Oak Creek	Reach 05	27268	5008.00	668.00	685.17		685.64	0.000908	5.70	1090.88	263.80	0.28
Post Oak Creek	Reach 05	27268	5716.00	668.00	685.58		686.11	0.001007	6.13	1205.11	295.42	0.30
Post Oak Creek	Reach 05	27268	5726.00	668.00	685.61		686.13	0.000999	6.11	1213.46	297.64	0.30
Post Oak Creek	Reach 05	27268	6884.00	668.00	685.98		686.64	0.001243	6.95	1330.04	327.61	0.34
Post Oak Creek	Reach 05	27148	1660.00	668.00	675.58	673.13	676.32	0.004009	6.91	240.24	42.86	0.51
Post Oak Creek	Reach 05	27148	2750.00	668.00	679.26	674.89	679.88	0.002671	6.35	433.35	65.77	0.44
Post Oak Creek	Reach 05	27148	3480.00	668.00	682.47	675.89	682.85	0.001092	5.08	751.82	142.93	0.30
Post Oak Creek	Reach 05	27148	4309.00	668.00	684.10	676.99	684.46	0.000868	5.05	1025.51	224.97	0.27
Post Oak Creek	Reach 05	27148	5008.00	668.00	685.14	677.80	685.50	0.000803	5.16	1326.52	405.89	0.26
Post Oak Creek	Reach 05	27148	5716.00	668.00	685.57	678.63	685.95	0.000840	5.41	1503.98	419.11	0.27
Post Oak Creek	Reach 05	27148	5726.00	668.00	685.60	678.62	685.98	0.000831	5.39	1516.53	420.06	0.27
Post Oak Creek	Reach 05	27148	6884.00	668.00	686.00	679.76	686.45	0.000976	5.96	1686.68	434.81	0.29
Post Oak Creek	Reach 05	27080	Bridge									
Post Oak Creek	Reach 05	27040	1660.00	666.00	675.52		675.88	0.001855	4.81	344.92	61.88	0.36
Post Oak Creek	Reach 05	27040	2750.00	666.00	678.22		678.63	0.001655	5.14	534.97	80.02	0.35
Post Oak Creek	Reach 05	27040	3480.00	666.00	680.65		680.95	0.001226	4.42	804.65	179.71	0.30
Post Oak Creek	Reach 05	27040	4309.00	666.00	682.49		682.72	0.000709	3.96	1287.95	338.14	0.24
Post Oak Creek	Reach 05	27040	5008.00	666.00	684.24		684.39	0.000399	3.37	2111.61	634.27	0.19
Post Oak Creek	Reach 05	27040	5716.00	666.00	684.91		685.05	0.000383	3.45	2544.65	665.73	0.18
Post Oak Creek	Reach 05	27040	5726.00	666.00	684.97		685.12	0.000373	3.42	2588.59	668.75	0.18
Post Oak Creek	Reach 05	27040	6884.00	666.00	685.53		685.70	0.000424	3.77	2967.58	694.29	0.20
Post Oak Creek	Reach 05	26768	1660.00	666.00	674.48		675.02	0.006029	5.91	281.11	47.22	0.43
Post Oak Creek	Reach 05	26768	2750.00	666.00	677.20		677.86	0.005502	6.52	421.90	56.53	0.42
Post Oak Creek	Reach 05	26768	3480.00	666.00	679.83		680.33	0.005002	5.68	612.15	97.44	0.40
Post Oak Creek	Reach 05	26768	4309.00	666.00	681.96		682.36	0.002833	5.12	897.02	171.61	0.31
Post Oak Creek	Reach 05	26768	5008.00	666.00	683.88		684.18	0.001690	4.55	1309.91	271.70	0.25
Post Oak Creek	Reach 05	26768	5716.00	666.00	684.54		684.85	0.001651	4.69	1649.95	582.94	0.25
Post Oak Creek	Reach 05	26768	5726.00	666.00	684.62		684.92	0.001584	4.61	1697.69	588.08	0.25
Post Oak Creek	Reach 05	26768	6884.00	666.00	685.16		685.48	0.001699	4.93	2023.82	628.30	0.26
Post Oak Creek	Reach 05	26504	1660.00	666.00	673.64	670.47	674.06	0.002285	5.20	319.19	60.00	0.40
Post Oak Creek	Reach 05	26504	2750.00	666.00	676.62	672.04	677.05	0.001693	5.26	522.78	77.16	0.36
Post Oak Creek	Reach 05	26504	3480.00	666.00	679.45	672.89	679.78	0.000999	4.56	763.12	93.95	0.28
Post Oak Creek	Reach 05	26504	4309.00	666.00	681.71	673.77	682.01	0.000694	4.37	1003.65	124.19	0.24
Post Oak Creek	Reach 05	26504	5008.00	666.00	683.70	674.44	683.95	0.000478	4.09	1384.68	318.67	0.21

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 05	26504	5716.00	666.00	684.35	675.07	684.63	0.000497	4.32	1716.81	646.63	0.21
Post Oak Creek	Reach 05	26504	5726.00	666.00	684.43	675.07	684.70	0.000482	4.28	1772.10	651.07	0.21
Post Oak Creek	Reach 05	26504	6884.00	666.00	684.91	676.00	685.24	0.000579	4.80	2095.65	704.63	0.23
Post Oak Creek	Reach 05	26454	Bridge									
Post Oak Creek	Reach 05	26414	1660.00	666.00	673.29		673.66	0.002087	4.89	339.63	67.00	0.38
Post Oak Creek	Reach 05	26414	2750.00	666.00	676.37		676.74	0.001328	4.85	566.61	79.54	0.32
Post Oak Creek	Reach 05	26414	3480.00	666.00	679.31		679.59	0.000766	4.26	816.27	91.32	0.25
Post Oak Creek	Reach 05	26414	4309.00	666.00	681.11		681.41	0.000655	4.37	988.32	99.65	0.24
Post Oak Creek	Reach 05	26414	5008.00	666.00	682.79		683.07	0.000515	4.28	1315.18	336.19	0.22
Post Oak Creek	Reach 05	26414	5716.00	666.00	683.56		683.85	0.000500	4.39	1609.84	421.06	0.22
Post Oak Creek	Reach 05	26414	5726.00	666.00	683.70		683.97	0.000474	4.31	1667.71	427.06	0.21
Post Oak Creek	Reach 05	26414	6884.00	666.00	684.29		684.61	0.000555	4.80	1982.82	649.18	0.23
Post Oak Creek	Reach 05	26268	1660.00	664.00	672.83		673.32	0.002455	5.60	296.56	51.77	0.41
Post Oak Creek	Reach 05	26268	2750.00	664.00	676.01		676.50	0.001901	5.60	491.07	71.23	0.38
Post Oak Creek	Reach 05	26268	3480.00	664.00	679.11		679.46	0.000854	4.81	761.39	114.24	0.27
Post Oak Creek	Reach 05	26268	4309.00	664.00	680.96		681.30	0.000682	4.81	1014.85	165.46	0.25
Post Oak Creek	Reach 05	26268	5008.00	664.00	682.69		682.99	0.000523	4.61	1424.47	344.04	0.22
Post Oak Creek	Reach 05	26268	5716.00	664.00	683.50		683.77	0.000484	4.61	1735.73	416.28	0.21
Post Oak Creek	Reach 05	26268	5726.00	664.00	683.64		683.90	0.000457	4.51	1795.12	422.65	0.21
Post Oak Creek	Reach 05	26268	6884.00	664.00	684.22		684.53	0.000524	4.96	2101.20	671.36	0.22
Post Oak Creek	Reach 05	26034	1660.00	661.83	672.76	666.82	672.94	0.000716	3.40	488.67	73.07	0.23
Post Oak Creek	Reach 05	26034	2750.00	661.83	676.02	668.39	676.20	0.000505	3.53	872.23	194.11	0.21
Post Oak Creek	Reach 05	26034	3480.00	661.83	679.20	669.25	679.30	0.000208	2.76	1622.70	312.31	0.14
Post Oak Creek	Reach 05	26034	4309.00	661.83	681.08	670.16	681.16	0.000149	2.57	2302.65	419.99	0.12
Post Oak Creek	Reach 05	26034	5008.00	661.83	682.81	670.89	682.87	0.000105	2.32	3231.32	682.80	0.10
Post Oak Creek	Reach 05	26034	5716.00	661.83	683.60	671.53	683.66	0.000103	2.38	3793.55	733.44	0.10
Post Oak Creek	Reach 05	26034	5726.00	661.83	683.74	671.54	683.79	0.000099	2.35	3892.82	741.91	0.10
Post Oak Creek	Reach 05	26034	6884.00	661.83	684.34	672.52	684.41	0.000117	2.61	4410.17	950.64	0.11
Post Oak Creek	Reach 05	25944	Bridge									
Post Oak Creek	Reach 05	25894	1660.00	659.99	672.39		672.73	0.001301	4.64	358.00	48.11	0.30
Post Oak Creek	Reach 05	25894	2750.00	659.99	675.46		675.89	0.001346	5.24	525.15	60.68	0.31
Post Oak Creek	Reach 05	25894	3480.00	659.99	678.60		678.87	0.000653	4.41	964.12	231.07	0.23
Post Oak Creek	Reach 05	25894	4309.00	659.99	680.91		681.07	0.000356	3.68	1866.89	518.65	0.17
Post Oak Creek	Reach 05	25894	5008.00	659.99	682.74		682.83	0.000209	3.06	2975.88	709.70	0.14
Post Oak Creek	Reach 05	25894	5716.00	659.99	683.51		683.61	0.000195	3.06	3547.51	760.47	0.13

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 05	25894	5726.00	659.99	683.65		683.74	0.000185	2.99	3654.70	768.83	0.13
Post Oak Creek	Reach 05	25894	6884.00	659.99	684.25		684.35	0.000209	3.26	4135.16	901.31	0.14
Post Oak Creek	Reach 06	25768	3407.00	660.93	672.12		672.58	0.001492	5.44	626.29	74.08	0.33
Post Oak Creek	Reach 06	25768	5425.00	660.93	675.13		675.74	0.001451	6.27	884.04	118.63	0.34
Post Oak Creek	Reach 06	25768	6662.00	660.93	678.38		678.79	0.000744	5.36	1504.03	367.27	0.25
Post Oak Creek	Reach 06	25768	8031.00	660.93	680.79		681.02	0.000416	4.45	2780.21	732.75	0.19
Post Oak Creek	Reach 06	25768	9624.00	660.93	682.67		682.81	0.000249	3.70	4354.15	936.82	0.15
Post Oak Creek	Reach 06	25768	10767.00	660.93	683.47		683.58	0.000213	3.53	5121.74	987.54	0.14
Post Oak Creek	Reach 06	25768	11039.00	660.93	683.61		683.72	0.000211	3.52	5257.84	996.32	0.14
Post Oak Creek	Reach 06	25768	12494.00	660.93	684.22		684.33	0.000204	3.54	5875.34	1025.37	0.14
Post Oak Creek	Reach 06	25485	3407.00	659.14	671.01	667.11	671.91	0.003615	7.60	448.45	61.55	0.50
Post Oak Creek	Reach 06	25485	5425.00	659.14	674.12	669.33	675.08	0.003633	7.88	688.02	92.58	0.51
Post Oak Creek	Reach 06	25485	6662.00	659.14	677.92	670.75	678.48	0.001613	6.00	1109.87	124.92	0.35
Post Oak Creek	Reach 06	25485	8031.00	659.14	680.32	672.15	680.81	0.001149	5.62	1430.47	152.68	0.31
Post Oak Creek	Reach 06	25485	9624.00	659.14	682.15	673.43	682.65	0.000937	5.66	1814.54	405.55	0.29
Post Oak Creek	Reach 06	25485	10767.00	659.14	682.94	674.18	683.44	0.000897	5.77	2148.88	454.04	0.28
Post Oak Creek	Reach 06	25485	11039.00	659.14	683.07	674.35	683.57	0.000899	5.82	2208.56	460.84	0.28
Post Oak Creek	Reach 06	25485	12494.00	659.14	683.63	675.22	684.18	0.000944	6.13	2479.61	508.21	0.29
Post Oak Creek	Reach 06	25400	Bridge									
Post Oak Creek	Reach 06	25344	3407.00	658.94	670.50		671.30	0.002533	7.20	473.51	55.02	0.43
Post Oak Creek	Reach 06	25344	5425.00	658.94	673.24		674.38	0.002892	8.58	632.09	61.16	0.47
Post Oak Creek	Reach 06	25344	6662.00	658.94	674.60		675.94	0.003101	9.28	718.03	64.85	0.49
Post Oak Creek	Reach 06	25344	8031.00	658.94	678.03		679.12	0.002109	8.40	956.45	74.54	0.41
Post Oak Creek	Reach 06	25344	9624.00	658.94	679.09		680.42	0.002456	9.28	1037.42	78.03	0.45
Post Oak Creek	Reach 06	25344	10767.00	658.94	679.90		681.38	0.002631	9.77	1102.24	80.85	0.47
Post Oak Creek	Reach 06	25344	11039.00	658.94	680.04		681.57	0.002691	9.92	1113.29	83.56	0.47
Post Oak Creek	Reach 06	25344	12494.00	658.94	680.62		682.41	0.002996	10.76	1172.08	118.69	0.50
Post Oak Creek	Reach 06	25268	3407.00	658.00	670.23		671.09	0.002776	7.44	457.80	52.64	0.44
Post Oak Creek	Reach 06	25268	5425.00	658.00	672.89		674.13	0.003291	8.96	605.76	59.32	0.49
Post Oak Creek	Reach 06	25268	6662.00	658.00	674.21		675.67	0.003518	9.70	686.86	63.31	0.52
Post Oak Creek	Reach 06	25268	8031.00	658.00	677.77		678.96	0.001972	8.76	931.85	74.39	0.41
Post Oak Creek	Reach 06	25268	9624.00	658.00	678.75		680.23	0.002261	9.80	1010.09	87.15	0.44
Post Oak Creek	Reach 06	25268	10767.00	658.00	679.53		681.18	0.002372	10.37	1082.57	98.67	0.45
Post Oak Creek	Reach 06	25268	11039.00	658.00	679.66		681.35	0.002425	10.54	1094.98	100.57	0.46
Post Oak Creek	Reach 06	25268	12494.00	658.00	680.15		682.17	0.002794	11.54	1146.57	116.09	0.49

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 06	25083	3407.00	657.12	669.78	665.16	670.58	0.002599	7.21	472.68	54.14	0.43
Post Oak Creek	Reach 06	25083	5425.00	657.12	672.33	667.44	673.52	0.003143	8.77	618.76	60.13	0.48
Post Oak Creek	Reach 06	25083	6662.00	657.12	673.60	668.64	675.02	0.003408	9.56	696.78	62.71	0.51
Post Oak Creek	Reach 06	25083	8031.00	657.12	677.49	669.86	678.58	0.001794	8.41	980.98	89.51	0.38
Post Oak Creek	Reach 06	25083	9624.00	657.12	678.44	671.09	679.79	0.002072	9.42	1077.66	132.65	0.42
Post Oak Creek	Reach 06	25083	10767.00	657.12	679.25	671.93	680.70	0.002114	9.84	1217.67	214.57	0.43
Post Oak Creek	Reach 06	25083	11039.00	657.12	679.39	672.12	680.87	0.002143	9.95	1247.22	228.72	0.43
Post Oak Creek	Reach 06	25083	12494.00	657.12	679.94	673.11	681.59	0.002345	10.64	1389.29	297.32	0.45
Post Oak Creek	Reach 06	25025	Bridge									
Post Oak Creek	Reach 06	24968	3407.00	658.83	669.51		670.11	0.002111	6.22	547.53	72.50	0.40
Post Oak Creek	Reach 06	24968	5425.00	658.83	672.05		672.88	0.002242	7.33	739.99	79.16	0.42
Post Oak Creek	Reach 06	24968	6662.00	658.83	673.30		674.28	0.002223	7.94	841.10	82.35	0.43
Post Oak Creek	Reach 06	24968	8031.00	658.83	674.79		675.88	0.002076	8.37	967.29	87.54	0.42
Post Oak Creek	Reach 06	24968	9624.00	658.83	675.81		677.13	0.002265	9.23	1058.85	92.06	0.45
Post Oak Creek	Reach 06	24968	10767.00	658.83	676.47		677.95	0.002400	9.82	1120.33	96.60	0.47
Post Oak Creek	Reach 06	24968	11039.00	658.83	676.58		678.12	0.002449	9.97	1131.92	97.55	0.47
Post Oak Creek	Reach 06	24968	12494.00	658.83	677.11		678.92	0.002761	10.85	1183.86	101.70	0.50
Post Oak Creek	Reach 06	24768	3407.00	658.00	669.09		669.69	0.002103	6.23	546.90	73.36	0.40
Post Oak Creek	Reach 06	24768	5425.00	658.00	671.62		672.45	0.002078	7.32	746.42	84.99	0.42
Post Oak Creek	Reach 06	24768	6662.00	658.00	672.88		673.85	0.002067	7.93	858.11	93.16	0.42
Post Oak Creek	Reach 06	24768	8031.00	658.00	674.41		675.47	0.001912	8.33	1010.44	113.19	0.42
Post Oak Creek	Reach 06	24768	9624.00	658.00	675.44		676.68	0.002030	9.05	1206.84	224.01	0.44
Post Oak Creek	Reach 06	24768	10767.00	658.00	676.15		677.45	0.002046	9.40	1376.01	261.27	0.44
Post Oak Creek	Reach 06	24768	11039.00	658.00	676.28		677.61	0.002060	9.49	1411.15	266.75	0.44
Post Oak Creek	Reach 06	24768	12494.00	658.00	676.88		678.32	0.002176	10.02	1577.27	291.26	0.46
Post Oak Creek	Reach 06	24268	3407.00	656.00	668.00		668.66	0.002010	6.52	522.91	60.36	0.39
Post Oak Creek	Reach 06	24268	5425.00	656.00	670.30		671.34	0.002305	8.17	672.15	69.60	0.43
Post Oak Creek	Reach 06	24268	6662.00	656.00	671.42		672.69	0.002488	9.05	753.78	76.13	0.46
Post Oak Creek	Reach 06	24268	8031.00	656.00	673.01		674.39	0.002338	9.53	900.35	122.74	0.45
Post Oak Creek	Reach 06	24268	9624.00	656.00	673.76	668.58	675.46	0.002721	10.65	1004.77	155.08	0.49
Post Oak Creek	Reach 06	24268	10767.00	656.00	674.47	669.36	676.23	0.002729	11.01	1198.46	345.31	0.50
Post Oak Creek	Reach 06	24268	11039.00	656.00	674.62	669.53	676.39	0.002717	11.06	1251.86	353.86	0.50
Post Oak Creek	Reach 06	24268	12494.00	656.00	675.31	670.47	677.08	0.002698	11.35	1510.65	399.40	0.50
Post Oak Creek	Reach 06	23768	3407.00	654.00	666.97		667.35	0.003023	4.97	685.74	123.02	0.37
Post Oak Creek	Reach 06	23768	5425.00	654.00	669.63		670.04	0.002135	5.17	1090.97	200.85	0.33
Post Oak Creek	Reach 06	23768	6662.00	654.00	670.97		671.39	0.001782	5.26	1388.90	237.42	0.31

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 06	23768	8031.00	654.00	672.90		673.26	0.001223	4.96	1909.54	334.31	0.26
Post Oak Creek	Reach 06	23768	9624.00	654.00	673.77		674.17	0.001278	5.34	2237.12	420.13	0.27
Post Oak Creek	Reach 06	23768	10767.00	654.00	674.56		674.96	0.001192	5.38	2611.55	510.35	0.27
Post Oak Creek	Reach 06	23768	11039.00	654.00	674.72		675.11	0.001180	5.40	2693.64	521.82	0.27
Post Oak Creek	Reach 06	23768	12494.00	654.00	675.42		675.82	0.001157	5.54	3076.63	572.69	0.27
Post Oak Creek	Reach 06	23268	3407.00	654.00	665.66		666.21	0.001740	5.96	571.21	69.07	0.37
Post Oak Creek	Reach 06	23268	5425.00	654.00	668.21		669.02	0.001812	7.22	757.24	76.85	0.39
Post Oak Creek	Reach 06	23268	6662.00	654.00	669.45		670.42	0.001887	7.92	854.74	81.79	0.40
Post Oak Creek	Reach 06	23268	8031.00	654.00	671.52		672.51	0.001566	8.03	1061.90	127.25	0.38
Post Oak Creek	Reach 06	23268	9624.00	654.00	672.00		673.29	0.001982	9.24	1126.36	142.21	0.43
Post Oak Creek	Reach 06	23268	10767.00	654.00	672.67		674.08	0.002071	9.73	1281.38	249.63	0.44
Post Oak Creek	Reach 06	23268	11039.00	654.00	672.81		674.24	0.002087	9.83	1316.23	255.16	0.44
Post Oak Creek	Reach 06	23268	12494.00	654.00	673.30		674.91	0.002297	10.53	1445.93	274.76	0.47
Post Oak Creek	Reach 06	22786	3407.00	654.00	664.93		665.40	0.001544	5.50	621.24	85.38	0.35
Post Oak Creek	Reach 06	22786	5425.00	654.00	667.56		668.19	0.001434	6.44	882.07	118.06	0.35
Post Oak Creek	Reach 06	22786	6662.00	654.00	668.84		669.56	0.001412	6.91	1050.25	150.91	0.36
Post Oak Creek	Reach 06	22786	8031.00	654.00	671.20		671.80	0.000981	6.51	1504.52	225.82	0.31
Post Oak Creek	Reach 06	22786	9624.00	654.00	671.62		672.40	0.001243	7.47	1601.73	237.37	0.35
Post Oak Creek	Reach 06	22786	10767.00	654.00	672.21		673.13	0.001379	8.08	1795.48	498.32	0.37
Post Oak Creek	Reach 06	22786	11039.00	654.00	672.35		673.28	0.001384	8.15	1867.05	506.06	0.37
Post Oak Creek	Reach 06	22786	12494.00	654.00	672.80		673.84	0.001527	8.73	2107.48	551.11	0.39
Post Oak Creek	Reach 06	22530	3407.00	654.00	664.45	659.62	664.96	0.001905	5.72	595.42	83.28	0.38
Post Oak Creek	Reach 06	22530	5425.00	654.00	667.13	661.52	667.77	0.001928	6.42	845.36	100.45	0.39
Post Oak Creek	Reach 06	22530	6662.00	654.00	668.42	662.59	669.14	0.001880	6.81	983.92	138.49	0.39
Post Oak Creek	Reach 06	22530	8031.00	654.00	671.04	663.70	671.51	0.000982	5.79	1698.65	348.76	0.29
Post Oak Creek	Reach 06	22530	9624.00	654.00	671.44	664.81	672.03	0.001199	6.55	1843.30	367.47	0.33
Post Oak Creek	Reach 06	22530	10767.00	654.00	672.00	665.54	672.71	0.001350	7.15	2055.76	652.40	0.35
Post Oak Creek	Reach 06	22530	11039.00	654.00	672.17	665.72	672.87	0.001308	7.10	2166.36	660.26	0.35
Post Oak Creek	Reach 06	22530	12494.00	654.00	672.68	666.42	673.38	0.001307	7.28	2513.25	692.28	0.35
Post Oak Creek	Reach 06	22470	Bridge									
Post Oak Creek	Reach 06	22421	3407.00	652.00	664.12		664.58	0.001307	5.46	623.97	68.36	0.32
Post Oak Creek	Reach 06	22421	5425.00	652.00	666.60		667.31	0.001622	6.76	806.40	88.00	0.36
Post Oak Creek	Reach 06	22421	6662.00	652.00	667.76		668.62	0.001752	7.44	922.90	109.83	0.38
Post Oak Creek	Reach 06	22421	8031.00	652.00	669.10		670.05	0.001721	7.90	1085.27	134.86	0.38
Post Oak Creek	Reach 06	22421	9624.00	652.00	670.03		671.20	0.001955	8.81	1219.92	208.98	0.41
Post Oak Creek	Reach 06	22421	10767.00	652.00	670.83		672.03	0.001920	9.06	1412.48	268.83	0.41

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 06	22421	11039.00	652.00	671.05		672.24	0.001881	9.05	1472.91	280.91	0.41
Post Oak Creek	Reach 06	22421	12494.00	652.00	671.62	665.22	672.91	0.002005	9.58	1641.29	312.79	0.43
Post Oak Creek	Reach 06	22268	3407.00	652.00	664.07		664.36	0.000925	4.33	790.74	147.02	0.27
Post Oak Creek	Reach 06	22268	5425.00	652.00	666.68		667.03	0.000802	4.87	1232.11	188.14	0.27
Post Oak Creek	Reach 06	22268	6662.00	652.00	667.93		668.30	0.000763	5.12	1472.90	198.31	0.26
Post Oak Creek	Reach 06	22268	8031.00	652.00	669.34		669.72	0.000693	5.27	1768.21	221.23	0.26
Post Oak Creek	Reach 06	22268	9624.00	652.00	670.36		670.81	0.000738	5.71	2006.80	250.97	0.27
Post Oak Creek	Reach 06	22268	10767.00	652.00	671.17		671.64	0.000731	5.90	2222.20	279.80	0.27
Post Oak Creek	Reach 06	22268	11039.00	652.00	671.39		671.85	0.000723	5.93	2282.52	287.75	0.27
Post Oak Creek	Reach 06	22268	12494.00	652.00	671.98		672.50	0.000785	6.33	2458.26	309.75	0.28
Post Oak Creek	Reach 06	21768	3407.00	652.00	663.74		663.95	0.000659	3.86	1239.85	432.75	0.23
Post Oak Creek	Reach 06	21768	5425.00	652.00	666.53		666.69	0.000416	3.71	2554.42	501.25	0.19
Post Oak Creek	Reach 06	21768	6662.00	652.00	667.83		667.98	0.000361	3.71	3224.34	527.80	0.18
Post Oak Creek	Reach 06	21768	8031.00	652.00	669.29		669.43	0.000301	3.65	4017.07	558.12	0.17
Post Oak Creek	Reach 06	21768	9624.00	652.00	670.34		670.49	0.000310	3.88	4640.87	664.02	0.18
Post Oak Creek	Reach 06	21768	10767.00	652.00	671.18		671.32	0.000298	3.94	5225.18	782.60	0.17
Post Oak Creek	Reach 06	21768	11039.00	652.00	671.39		671.54	0.000297	3.98	5406.55	915.93	0.17
Post Oak Creek	Reach 06	21768	12494.00	652.00	672.06		672.21	0.000299	4.10	6060.15	1024.11	0.18
Post Oak Creek	Reach 06	21268	3407.00	648.00	663.64		663.69	0.000297	1.92	1774.03	333.89	0.15
Post Oak Creek	Reach 06	21268	5425.00	648.00	666.48		666.53	0.000174	1.95	2905.21	448.53	0.12
Post Oak Creek	Reach 06	21268	6662.00	648.00	667.78		667.84	0.000154	2.02	3516.46	489.97	0.12
Post Oak Creek	Reach 06	21268	8031.00	648.00	669.25		669.31	0.000131	2.06	4340.08	618.09	0.11
Post Oak Creek	Reach 06	21268	9624.00	648.00	670.29		670.37	0.000138	2.24	5119.58	1050.79	0.11
Post Oak Creek	Reach 06	21268	10767.00	648.00	671.13		671.21	0.000128	2.26	6114.04	1268.85	0.11
Post Oak Creek	Reach 06	21268	11039.00	648.00	671.35		671.42	0.000123	2.24	6392.97	1291.53	0.11
Post Oak Creek	Reach 06	21268	12494.00	648.00	672.03		672.10	0.000122	2.31	7283.82	1353.78	0.11
Post Oak Creek	Reach 07	20268	5708.00	646.00	663.06		663.29	0.000713	3.89	1468.96	183.09	0.24
Post Oak Creek	Reach 07	20268	9561.00	646.00	665.86		666.20	0.000763	4.69	2151.43	309.51	0.26
Post Oak Creek	Reach 07	20268	11990.00	646.00	667.12		667.52	0.000779	5.13	2812.32	624.60	0.27
Post Oak Creek	Reach 07	20268	14928.00	646.00	668.60		669.01	0.000727	5.37	3971.64	980.92	0.26
Post Oak Creek	Reach 07	20268	18041.00	646.00	669.63		670.06	0.000727	5.66	5114.07	1257.25	0.27
Post Oak Creek	Reach 07	20268	21192.00	646.00	670.47		670.91	0.000724	5.87	6235.06	1388.24	0.27
Post Oak Creek	Reach 07	20268	22144.00	646.00	670.68		671.12	0.000726	5.94	6536.40	1407.43	0.27
Post Oak Creek	Reach 07	20268	26260.00	646.00	671.28		671.78	0.000807	6.43	7398.32	1459.40	0.29
Post Oak Creek	Reach 07	19768	5708.00	646.00	662.52		662.83	0.001208	4.51	1320.44	263.88	0.26
Post Oak Creek	Reach 07	19768	9561.00	646.00	665.37		665.74	0.001119	5.16	2367.88	420.84	0.26

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 07	19768	11990.00	646.00	666.67		667.06	0.001092	5.44	2935.70	447.32	0.26
Post Oak Creek	Reach 07	19768	14928.00	646.00	668.05		668.54	0.001237	6.17	3578.61	727.78	0.28
Post Oak Creek	Reach 07	19768	18041.00	646.00	669.07		669.58	0.001258	6.50	4465.74	999.62	0.28
Post Oak Creek	Reach 07	19768	21192.00	646.00	669.97		670.45	0.001186	6.54	5402.04	1072.44	0.28
Post Oak Creek	Reach 07	19768	22144.00	646.00	670.18		670.66	0.001200	6.63	5644.71	1186.83	0.28
Post Oak Creek	Reach 07	19768	26260.00	646.00	670.73		671.26	0.001330	7.13	6311.96	1216.91	0.30
Post Oak Creek	Reach 07	19268	5708.00	644.00	661.88		662.25	0.001087	4.90	1171.21	105.73	0.25
Post Oak Creek	Reach 07	19268	9561.00	644.00	664.59		665.12	0.001290	6.11	2001.13	460.93	0.28
Post Oak Creek	Reach 07	19268	11990.00	644.00	665.97		666.48	0.001193	6.24	2659.26	492.48	0.27
Post Oak Creek	Reach 07	19268	14928.00	644.00	667.49		667.96	0.001076	6.30	3470.63	569.75	0.26
Post Oak Creek	Reach 07	19268	18041.00	644.00	668.50		668.99	0.001111	6.64	4306.92	1094.52	0.27
Post Oak Creek	Reach 07	19268	21192.00	644.00	669.45		669.89	0.001019	6.57	5364.29	1131.84	0.26
Post Oak Creek	Reach 07	19268	22144.00	644.00	669.66		670.10	0.001016	6.61	5605.88	1141.03	0.26
Post Oak Creek	Reach 07	19268	26260.00	644.00	670.12		670.63	0.001192	7.27	6150.67	1291.66	0.28
Post Oak Creek	Reach 07	18768	5708.00	644.00	661.10		661.49	0.002292	5.21	1270.10	343.37	0.29
Post Oak Creek	Reach 07	18768	9561.00	644.00	664.13		664.40	0.001282	4.66	2427.02	432.24	0.23
Post Oak Creek	Reach 07	18768	11990.00	644.00	665.57		665.84	0.001076	4.58	3082.55	475.15	0.21
Post Oak Creek	Reach 07	18768	14928.00	644.00	667.08		667.34	0.001134	5.02	4302.36	966.31	0.22
Post Oak Creek	Reach 07	18768	18041.00	644.00	668.16		668.39	0.000971	4.85	5384.14	1099.87	0.21
Post Oak Creek	Reach 07	18768	21192.00	644.00	669.16		669.37	0.000803	4.59	6549.01	1216.31	0.19
Post Oak Creek	Reach 07	18768	22144.00	644.00	669.38		669.58	0.000788	4.58	6813.05	1234.25	0.19
Post Oak Creek	Reach 07	18768	26260.00	644.00	669.79		670.03	0.000909	4.99	7328.62	1278.29	0.20
Post Oak Creek	Reach 07	18229	5708.00	644.00	658.71		659.54	0.006086	7.35	776.38	95.04	0.45
Post Oak Creek	Reach 07	18229	9561.00	644.00	661.94		663.02	0.006119	8.35	1156.13	131.72	0.47
Post Oak Creek	Reach 07	18229	11990.00	644.00	663.29		664.58	0.006170	9.15	1344.44	182.48	0.48
Post Oak Creek	Reach 07	18229	14928.00	644.00	664.41		665.98	0.006716	10.18	1628.46	334.25	0.51
Post Oak Creek	Reach 07	18229	18041.00	644.00	665.24	661.28	667.09	0.007468	11.21	1937.65	412.17	0.55
Post Oak Creek	Reach 07	18229	21192.00	644.00	666.01	662.38	668.17	0.008170	12.19	2280.96	1058.57	0.58
Post Oak Creek	Reach 07	18229	22144.00	644.00	666.08	662.69	668.37	0.008682	12.60	2349.58	1060.77	0.60
Post Oak Creek	Reach 07	18229	26260.00	644.00	667.49	667.32	668.91	0.005703	10.90	3888.81	1109.99	0.49
Post Oak Creek	T2	10641	430.00	732.00	735.57	735.57	736.64	0.078707	8.32	51.71	24.31	1.00
Post Oak Creek	T2	10641	711.00	732.00	736.47	736.47	737.85	0.069229	9.42	76.00	29.35	0.99
Post Oak Creek	T2	10641	889.00	732.00	736.94	736.94	738.50	0.064550	10.07	90.25	32.00	0.98
Post Oak Creek	T2	10641	1081.00	732.00	737.44	737.44	739.14	0.058511	10.54	106.96	34.86	0.95
Post Oak Creek	T2	10641	1261.00	732.00	737.85	737.85	739.68	0.055429	10.98	121.78	37.33	0.94
Post Oak Creek	T2	10641	1447.00	732.00	738.24	738.24	740.20	0.053041	11.40	136.92	39.82	0.94
Post Oak Creek	T2	10641	1447.00	732.00	738.24	738.24	740.20	0.053041	11.40	136.92	39.82	0.94

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Post Oak Creek	T2	10641	1740.00	732.00	738.85	738.85	740.93	0.048676	11.87	162.41	43.63	0.92
Post Oak Creek	T2	10470	430.00	728.00	732.99		733.01	0.000410	0.93	463.85	118.22	0.08
Post Oak Creek	T2	10470	711.00	728.00	734.27		734.29	0.000474	1.15	620.34	127.68	0.09
Post Oak Creek	T2	10470	889.00	728.00	734.93		734.95	0.000505	1.26	706.67	132.63	0.10
Post Oak Creek	T2	10470	1081.00	728.00	735.57		735.60	0.000534	1.36	792.87	137.26	0.10
Post Oak Creek	T2	10470	1261.00	728.00	736.11		736.14	0.000551	1.45	868.36	140.85	0.10
Post Oak Creek	T2	10470	1447.00	728.00	736.62		736.66	0.000557	1.54	940.90	142.74	0.10
Post Oak Creek	T2	10470	1447.00	728.00	736.62		736.66	0.000557	1.54	940.90	142.74	0.10
Post Oak Creek	T2	10470	1740.00	728.00	737.36		737.40	0.000569	1.67	1046.96	145.49	0.11
Post Oak Creek	T2	10321	430.00	728.00	732.65		732.83	0.007813	3.42	125.76	39.03	0.34
Post Oak Creek	T2	10321	711.00	728.00	733.82		734.08	0.007774	4.09	175.25	45.40	0.35
Post Oak Creek	T2	10321	889.00	728.00	734.43		734.73	0.007720	4.46	204.05	49.78	0.36
Post Oak Creek	T2	10321	1081.00	728.00	735.01		735.36	0.007704	4.80	234.41	54.31	0.36
Post Oak Creek	T2	10321	1261.00	728.00	735.51		735.90	0.007698	5.09	262.38	58.19	0.37
Post Oak Creek	T2	10321	1447.00	728.00	735.98		736.41	0.007702	5.36	290.64	61.68	0.37
Post Oak Creek	T2	10321	1447.00	728.00	735.98		736.41	0.007702	5.36	290.64	61.68	0.37
Post Oak Creek	T2	10321	1740.00	728.00	736.66		737.15	0.007716	5.73	334.27	67.28	0.38
Post Oak Creek	T2	10141	430.00	726.00	730.84		731.13	0.011349	4.34	100.65	33.46	0.41
Post Oak Creek	T2	10141	711.00	726.00	731.84		732.29	0.012867	5.48	136.75	39.08	0.46
Post Oak Creek	T2	10141	889.00	726.00	732.34		732.89	0.013738	6.08	157.10	42.08	0.48
Post Oak Creek	T2	10141	1081.00	726.00	732.83		733.48	0.014442	6.64	178.39	45.10	0.50
Post Oak Creek	T2	10141	1261.00	726.00	733.24	731.40	733.99	0.014961	7.10	197.89	48.02	0.52
Post Oak Creek	T2	10141	1447.00	726.00	733.65	731.79	734.48	0.015327	7.51	218.04	50.85	0.53
Post Oak Creek	T2	10141	1447.00	726.00	733.65	731.79	734.48	0.015327	7.51	218.04	50.85	0.53
Post Oak Creek	T2	10141	1740.00	726.00	734.22	732.35	735.17	0.015919	8.12	248.25	54.89	0.55
Post Oak Creek	T2	9641	430.00	720.00	723.48		723.78	0.019766	4.37	98.48	44.77	0.52
Post Oak Creek	T2	9641	711.00	720.00	724.41		724.80	0.017547	4.97	143.55	51.24	0.51
Post Oak Creek	T2	9641	889.00	720.00	724.89		725.33	0.016589	5.34	168.33	53.85	0.51
Post Oak Creek	T2	9641	1081.00	720.00	725.34		725.84	0.015985	5.70	193.50	56.43	0.51
Post Oak Creek	T2	9641	1261.00	720.00	725.73		726.29	0.015622	6.01	216.01	58.68	0.51
Post Oak Creek	T2	9641	1447.00	720.00	726.10		726.71	0.015491	6.32	237.75	60.90	0.52
Post Oak Creek	T2	9641	1447.00	720.00	726.10		726.71	0.015491	6.32	237.75	60.90	0.52
Post Oak Creek	T2	9641	1740.00	720.00	726.64		727.33	0.015153	6.74	271.93	64.33	0.52
Post Oak Creek	T2	9109	430.00	714.64	719.27		719.36	0.004446	2.47	177.20	71.03	0.26
Post Oak Creek	T2	9109	711.00	714.64	720.13		720.28	0.004881	3.08	242.04	79.67	0.28
Post Oak Creek	T2	9109	889.00	714.64	720.58		720.76	0.005095	3.40	279.41	85.81	0.29

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	T2	9109	1081.00	714.64	721.02		721.23	0.005275	3.70	318.35	92.33	0.30
Post Oak Creek	T2	9109	1261.00	714.64	721.39		721.62	0.005424	3.95	353.49	97.87	0.31
Post Oak Creek	T2	9109	1447.00	714.64	721.76		722.01	0.005483	4.16	390.05	101.62	0.32
Post Oak Creek	T2	9109	1447.00	714.64	721.76		722.01	0.005483	4.16	390.05	101.62	0.32
Post Oak Creek	T2	9109	1740.00	714.64	722.22		722.52	0.005788	4.52	438.67	106.47	0.33
Post Oak Creek	T2	8641	430.00	712.00	714.82		715.19	0.025540	4.90	90.60	49.75	0.59
Post Oak Creek	T2	8641	711.00	712.00	715.77		716.21	0.019165	5.42	144.41	66.02	0.54
Post Oak Creek	T2	8641	889.00	712.00	716.27		716.74	0.017096	5.65	178.85	72.29	0.53
Post Oak Creek	T2	8641	1081.00	712.00	716.76		717.25	0.015607	5.88	215.85	80.03	0.51
Post Oak Creek	T2	8641	1261.00	712.00	717.18		717.69	0.014497	6.05	252.72	98.70	0.50
Post Oak Creek	T2	8641	1447.00	712.00	717.58		718.11	0.013883	6.26	294.47	111.89	0.50
Post Oak Creek	T2	8641	1447.00	712.00	717.58		718.11	0.013883	6.26	294.47	111.89	0.50
Post Oak Creek	T2	8641	1740.00	712.00	718.14		718.67	0.012429	6.37	361.29	122.20	0.48
Post Oak Creek	T2	8141	430.00	706.00	711.68		711.77	0.002999	2.37	195.32	70.76	0.22
Post Oak Creek	T2	8141	711.00	706.00	712.66		712.79	0.003344	2.92	268.14	77.68	0.24
Post Oak Creek	T2	8141	889.00	706.00	713.17		713.31	0.003516	3.21	307.96	80.54	0.25
Post Oak Creek	T2	8141	1081.00	706.00	713.65		713.81	0.003683	3.49	347.20	83.22	0.26
Post Oak Creek	T2	8141	1261.00	706.00	714.04		714.24	0.003856	3.73	380.77	85.98	0.27
Post Oak Creek	T2	8141	1447.00	706.00	714.44		714.65	0.003962	3.95	415.32	88.58	0.27
Post Oak Creek	T2	8141	1447.00	706.00	714.44		714.65	0.003962	3.95	415.32	88.58	0.27
Post Oak Creek	T2	8141	1740.00	706.00	714.96		715.21	0.004221	4.30	462.97	93.27	0.29
Post Oak Creek	T2	7641	430.00	706.00	709.62		709.74	0.005750	2.90	171.47	92.41	0.29
Post Oak Creek	T2	7641	711.00	706.00	710.40		710.57	0.006164	3.50	249.17	106.29	0.32
Post Oak Creek	T2	7641	889.00	706.00	710.80		710.99	0.006358	3.80	293.93	115.46	0.33
Post Oak Creek	T2	7641	1081.00	706.00	711.19		711.40	0.006541	4.09	339.92	124.72	0.34
Post Oak Creek	T2	7641	1261.00	706.00	711.52		711.75	0.006649	4.31	382.16	132.65	0.34
Post Oak Creek	T2	7641	1447.00	706.00	711.84		712.09	0.006833	4.56	427.31	148.29	0.35
Post Oak Creek	T2	7641	1447.00	706.00	711.84		712.09	0.006833	4.56	427.31	148.29	0.35
Post Oak Creek	T2	7641	1740.00	706.00	712.27		712.55	0.006923	4.85	495.65	160.96	0.36
Post Oak Creek	T2	7321	430.00	704.00	707.45		707.63	0.007664	3.39	126.81	64.31	0.43
Post Oak Creek	T2	7321	711.00	704.00	708.28		708.51	0.006659	3.85	188.25	85.53	0.42
Post Oak Creek	T2	7321	889.00	704.00	708.67		708.93	0.006478	4.16	223.26	95.49	0.42
Post Oak Creek	T2	7321	1081.00	704.00	709.04		709.34	0.006339	4.44	260.94	106.64	0.42
Post Oak Creek	T2	7321	1261.00	704.00	709.36		709.69	0.006239	4.67	296.11	115.89	0.43
Post Oak Creek	T2	7321	1447.00	704.00	709.66		710.01	0.006161	4.89	332.02	124.60	0.43
Post Oak Creek	T2	7321	1447.00	704.00	709.66		710.01	0.006161	4.89	332.02	124.60	0.43
Post Oak Creek	T2	7321	1740.00	704.00	710.07		710.47	0.006109	5.20	386.54	136.11	0.44

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	T2	7141	430.00	702.00	705.36		705.63	0.017438	4.13	104.20	46.33	0.48
Post Oak Creek	T2	7141	711.00	702.00	705.99		706.42	0.024286	5.23	135.89	54.21	0.58
Post Oak Creek	T2	7141	889.00	702.00	706.27		706.81	0.026808	5.89	151.99	62.86	0.62
Post Oak Creek	T2	7141	1081.00	702.00	706.55		707.20	0.028550	6.48	170.74	71.72	0.65
Post Oak Creek	T2	7141	1261.00	702.00	706.78		707.53	0.029869	6.96	188.53	78.90	0.68
Post Oak Creek	T2	7141	1447.00	702.00	707.01		707.84	0.030847	7.40	207.25	85.48	0.69
Post Oak Creek	T2	7141	1447.00	702.00	707.01		707.84	0.030847	7.40	207.25	85.48	0.69
Post Oak Creek	T2	7141	1740.00	702.00	707.38	706.79	708.31	0.030785	7.89	240.43	96.06	0.71
Post Oak Creek	T2	6796	430.00	696.00	701.73	700.14	701.89	0.007307	3.79	184.44	130.92	0.33
Post Oak Creek	T2	6796	711.00	696.00	702.61	701.50	702.75	0.005740	3.83	303.56	137.78	0.30
Post Oak Creek	T2	6796	889.00	696.00	703.08	701.73	703.21	0.005249	3.89	368.91	141.39	0.30
Post Oak Creek	T2	6796	1081.00	696.00	703.55		703.69	0.004849	3.96	437.53	146.88	0.29
Post Oak Creek	T2	6796	1261.00	696.00	703.98		704.11	0.004515	4.00	500.71	151.26	0.28
Post Oak Creek	T2	6796	1447.00	696.00	704.40		704.54	0.004213	4.03	565.21	155.34	0.27
Post Oak Creek	T2	6796	1447.00	696.00	704.40		704.54	0.004213	4.03	565.21	155.34	0.27
Post Oak Creek	T2	6796	1740.00	696.00	704.99		705.13	0.003929	4.12	657.90	160.26	0.27
Post Oak Creek	T2	6058	430.00	692.00	695.23		695.86	0.009052	6.35	67.67	26.44	0.70
Post Oak Creek	T2	6058	711.00	692.00	696.06		697.01	0.010720	7.85	90.59	29.03	0.78
Post Oak Creek	T2	6058	889.00	692.00	696.45		697.63	0.011265	8.70	102.46	30.95	0.82
Post Oak Creek	T2	6058	1081.00	692.00	696.83	696.46	698.24	0.011790	9.53	114.55	32.82	0.85
Post Oak Creek	T2	6058	1261.00	692.00	697.13	696.86	698.77	0.012442	10.29	124.65	34.30	0.89
Post Oak Creek	T2	6058	1447.00	692.00	697.41	697.26	699.29	0.013168	11.04	134.25	35.67	0.92
Post Oak Creek	T2	6058	1447.00	692.00	697.41	697.26	699.29	0.013168	11.04	134.25	35.67	0.92
Post Oak Creek	T2	6058	1740.00	692.00	697.88	697.88	700.05	0.013362	11.90	151.79	38.05	0.94
Post Oak Creek	T2	5624	430.00	688.00	692.82		692.92	0.004801	3.14	183.21	81.20	0.28
Post Oak Creek	T2	5624	711.00	688.00	693.68		693.82	0.004686	3.54	254.33	83.83	0.29
Post Oak Creek	T2	5624	889.00	688.00	694.11		694.27	0.004823	3.80	290.67	86.70	0.29
Post Oak Creek	T2	5624	1081.00	688.00	694.51		694.70	0.004980	4.06	326.62	90.25	0.30
Post Oak Creek	T2	5624	1261.00	688.00	694.86		695.06	0.005069	4.26	357.87	92.27	0.31
Post Oak Creek	T2	5624	1447.00	688.00	695.18		695.41	0.005134	4.45	388.54	94.10	0.31
Post Oak Creek	T2	5624	1447.00	688.00	695.18		695.41	0.005134	4.45	388.54	94.10	0.31
Post Oak Creek	T2	5624	1740.00	688.00	695.66		695.92	0.005217	4.71	434.00	96.75	0.32
Post Oak Creek	T2	5141	430.00	686.00	689.01		689.32	0.012819	4.45	96.54	47.57	0.55
Post Oak Creek	T2	5141	711.00	686.00	689.93		690.29	0.012745	4.87	146.03	62.69	0.56
Post Oak Creek	T2	5141	889.00	686.00	690.31		690.73	0.012115	5.21	170.94	66.29	0.56
Post Oak Creek	T2	5141	1081.00	686.00	690.69		691.16	0.011543	5.55	196.40	69.49	0.56

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	T2	5141	1261.00	686.00	691.02		691.54	0.011100	5.83	219.83	72.31	0.56
Post Oak Creek	T2	5141	1447.00	686.00	691.33		691.91	0.010774	6.10	243.09	74.42	0.56
Post Oak Creek	T2	5141	1447.00	686.00	691.33		691.91	0.010774	6.10	243.09	74.42	0.56
Post Oak Creek	T2	5141	1740.00	686.00	691.81		692.45	0.010270	6.45	279.44	77.68	0.56
Post Oak Creek	T2	4650	430.00	682.00	685.48		685.57	0.004921	2.36	182.23	73.94	0.26
Post Oak Creek	T2	4650	711.00	682.00	686.36		686.48	0.005058	2.86	248.69	78.30	0.28
Post Oak Creek	T2	4650	889.00	682.00	686.80		686.95	0.005132	3.14	283.98	80.04	0.29
Post Oak Creek	T2	4650	1081.00	682.00	687.24		687.42	0.005194	3.41	319.51	81.75	0.30
Post Oak Creek	T2	4650	1261.00	682.00	687.62		687.82	0.005259	3.64	350.62	83.24	0.30
Post Oak Creek	T2	4650	1447.00	682.00	687.99		688.22	0.005299	3.85	381.67	84.72	0.31
Post Oak Creek	T2	4650	1447.00	682.00	687.99		688.22	0.005299	3.85	381.67	84.72	0.31
Post Oak Creek	T2	4650	1740.00	682.00	688.52		688.79	0.005385	4.16	428.22	90.16	0.32
Post Oak Creek	T2	4141	430.00	678.00	680.69	680.55	681.34	0.016254	6.47	66.50	41.25	0.90
Post Oak Creek	T2	4141	711.00	678.00	681.37	681.22	682.21	0.015802	7.35	96.69	48.34	0.92
Post Oak Creek	T2	4141	889.00	678.00	681.72	681.58	682.66	0.015541	7.76	114.49	52.08	0.92
Post Oak Creek	T2	4141	1081.00	678.00	682.04	681.91	683.09	0.015481	8.22	131.49	55.17	0.93
Post Oak Creek	T2	4141	1261.00	678.00	682.28	682.18	683.46	0.015366	8.72	144.96	58.13	0.95
Post Oak Creek	T2	4141	1447.00	678.00	682.50	682.43	683.82	0.015394	9.22	158.26	60.98	0.96
Post Oak Creek	T2	4141	1447.00	678.00	682.50	682.43	683.82	0.015394	9.22	158.26	60.98	0.96
Post Oak Creek	T2	4141	1740.00	678.00	682.84	682.84	684.34	0.015269	9.88	179.37	65.25	0.97
Post Oak Creek	T2	3841	430.00	676.00	679.37		679.54	0.002762	3.26	133.27	68.05	0.39
Post Oak Creek	T2	3841	711.00	676.00	680.05		680.30	0.002966	4.04	183.17	78.28	0.42
Post Oak Creek	T2	3841	889.00	676.00	680.41		680.70	0.003067	4.44	212.15	86.33	0.44
Post Oak Creek	T2	3841	1081.00	676.00	680.75		681.09	0.003130	4.80	243.15	93.47	0.45
Post Oak Creek	T2	3841	1261.00	676.00	681.04		681.42	0.003167	5.09	271.16	98.17	0.46
Post Oak Creek	T2	3841	1447.00	676.00	681.31		681.73	0.003211	5.36	298.68	102.57	0.46
Post Oak Creek	T2	3841	1447.00	676.00	681.31		681.73	0.003211	5.36	298.69	102.57	0.46
Post Oak Creek	T2	3841	1740.00	676.00	681.72		682.18	0.003245	5.73	341.16	109.02	0.47
Post Oak Creek	T2	3641	430.00	676.00	677.91	677.66	678.34	0.020066	5.26	81.75	58.31	0.78
Post Oak Creek	T2	3641	711.00	676.00	678.55		679.08	0.017676	5.82	122.07	67.89	0.77
Post Oak Creek	T2	3641	889.00	676.00	678.84		679.44	0.018052	6.25	142.20	72.23	0.79
Post Oak Creek	T2	3641	1081.00	676.00	679.09		679.79	0.018910	6.71	161.07	76.14	0.81
Post Oak Creek	T2	3641	1261.00	676.00	679.31		680.09	0.019599	7.09	177.86	79.54	0.84
Post Oak Creek	T2	3641	1447.00	676.00	679.50	679.22	680.37	0.020591	7.49	193.15	82.51	0.86
Post Oak Creek	T2	3641	1447.00	676.00	679.49	679.22	680.37	0.020601	7.49	193.11	82.50	0.86
Post Oak Creek	T2	3641	1740.00	676.00	679.75	679.55	680.77	0.022228	8.09	215.03	86.65	0.91

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	T2	3141	430.00	666.00	671.96		672.33	0.007940	4.92	87.41	45.27	0.62
Post Oak Creek	T2	3141	711.00	666.00	672.80		673.22	0.008246	5.20	136.80	68.29	0.65
Post Oak Creek	T2	3141	889.00	666.00	673.20		673.65	0.007961	5.38	165.14	76.42	0.65
Post Oak Creek	T2	3141	1081.00	666.00	673.55		674.04	0.007603	5.59	193.35	81.78	0.64
Post Oak Creek	T2	3141	1261.00	666.00	673.86		674.38	0.007306	5.75	219.32	86.43	0.64
Post Oak Creek	T2	3141	1447.00	666.00	674.14		674.69	0.006996	5.94	243.64	89.60	0.63
Post Oak Creek	T2	3141	1447.00	666.00	674.14		674.69	0.006993	5.94	243.67	89.60	0.63
Post Oak Creek	T2	3141	1740.00	666.00	674.52		675.13	0.006576	6.28	278.14	92.61	0.63
Post Oak Creek	T2	2692	430.00	664.00	668.55		668.68	0.008027	2.91	149.38	68.55	0.33
Post Oak Creek	T2	2692	711.00	664.00	669.40		669.58	0.007667	3.49	212.10	78.52	0.34
Post Oak Creek	T2	2692	889.00	664.00	669.82		670.04	0.007767	3.81	246.64	83.78	0.35
Post Oak Creek	T2	2692	1081.00	664.00	670.23		670.48	0.007959	4.13	281.73	91.87	0.36
Post Oak Creek	T2	2692	1261.00	664.00	670.57		670.86	0.008086	4.40	314.62	99.57	0.37
Post Oak Creek	T2	2692	1447.00	664.00	670.88		671.20	0.008305	4.67	346.67	107.50	0.38
Post Oak Creek	T2	2692	1447.00	664.00	670.88		671.20	0.008326	4.67	346.32	107.39	0.38
Post Oak Creek	T2	2692	1740.00	664.00	671.32		671.69	0.008648	5.05	397.09	122.15	0.39
Post Oak Creek	T2	2416.*	430.00	663.00	666.53		666.70	0.006436	3.32	135.14	84.95	0.39
Post Oak Creek	T2	2416.*	711.00	663.00	666.94		667.24	0.009370	4.49	172.78	94.96	0.49
Post Oak Creek	T2	2416.*	889.00	663.00	667.18		667.55	0.010475	5.03	195.98	97.74	0.52
Post Oak Creek	T2	2416.*	1081.00	663.00	667.42		667.86	0.011335	5.53	219.95	100.53	0.55
Post Oak Creek	T2	2416.*	1261.00	663.00	667.62		668.13	0.012145	5.96	240.05	102.80	0.58
Post Oak Creek	T2	2416.*	1447.00	663.00	667.84		668.40	0.012413	6.30	263.23	105.36	0.59
Post Oak Creek	T2	2416.*	1447.00	663.00	667.85		668.41	0.012316	6.28	263.97	105.44	0.59
Post Oak Creek	T2	2416.*	1740.00	663.00	668.19		668.82	0.012477	6.72	300.77	110.56	0.60
Post Oak Creek	T2	2140	430.00	662.00	664.21	663.85	664.57	0.009327	4.84	97.09	108.04	0.68
Post Oak Creek	T2	2140	711.00	662.00	664.86		665.18	0.006043	4.90	169.36	115.72	0.58
Post Oak Creek	T2	2140	889.00	662.00	665.16		665.50	0.005520	5.09	204.70	119.26	0.56
Post Oak Creek	T2	2140	1081.00	662.00	665.46		665.82	0.005119	5.28	240.57	122.75	0.55
Post Oak Creek	T2	2140	1261.00	662.00	665.73		666.10	0.004747	5.40	274.36	125.94	0.54
Post Oak Creek	T2	2140	1447.00	662.00	665.93		666.34	0.004803	5.67	300.17	128.32	0.55
Post Oak Creek	T2	2140	1447.00	662.00	665.92		666.33	0.004885	5.70	298.46	128.17	0.55
Post Oak Creek	T2	2140	1740.00	662.00	666.18		666.66	0.005161	6.17	332.77	132.30	0.58
Post Oak Creek	T2	1890.5*	430.00	659.00	662.19		662.56	0.007043	4.88	88.09	43.73	0.61
Post Oak Creek	T2	1890.5*	711.00	659.00	663.17		663.55	0.007169	4.90	145.23	73.15	0.61
Post Oak Creek	T2	1890.5*	889.00	659.00	663.57		663.97	0.006875	5.05	176.17	82.20	0.61
Post Oak Creek	T2	1890.5*	1081.00	659.00	663.97		664.37	0.006550	5.13	210.64	92.47	0.60
Post Oak Creek	T2	1890.5*	1261.00	659.00	664.02		664.55	0.008276	5.84	216.13	95.23	0.68

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	T2	1890.5*	1447.00	659.00	664.28		664.84	0.007642	6.01	245.97	149.63	0.66
Post Oak Creek	T2	1890.5*	1447.00	659.00	664.33		664.86	0.007151	5.89	253.18	151.14	0.64
Post Oak Creek	T2	1890.5*	1740.00	659.00	664.72		665.26	0.006133	5.98	314.36	162.07	0.61
Post Oak Creek	T2	1641	430.00	656.00	658.81	658.81	659.72	0.020418	7.66	56.13	31.40	1.01
Post Oak Creek	T2	1641	711.00	656.00	659.62	659.62	660.73	0.018760	8.47	83.99	37.75	1.00
Post Oak Creek	T2	1641	889.00	656.00	660.03	660.03	661.25	0.018180	8.89	99.99	40.68	1.00
Post Oak Creek	T2	1641	1081.00	656.00	660.43	660.43	661.75	0.017833	9.22	117.23	44.45	1.00
Post Oak Creek	T2	1641	1261.00	656.00	661.52		662.36	0.009096	7.37	171.11	54.70	0.73
Post Oak Creek	T2	1641	1447.00	656.00	661.93		662.79	0.008568	7.43	194.66	58.70	0.72
Post Oak Creek	T2	1641	1447.00	656.00	662.17		662.91	0.008480	6.89	210.14	70.94	0.71
Post Oak Creek	T2	1641	1740.00	656.00	663.03		663.62	0.007003	6.14	283.55	99.22	0.64
Post Oak Creek	T3	7521	711.00	710.00	714.03		714.34	0.009144	4.64	182.80	104.39	0.49
Post Oak Creek	T3	7521	1138.00	710.00	714.48		715.01	0.013071	6.14	235.84	127.22	0.60
Post Oak Creek	T3	7521	1408.00	710.00	714.78		715.41	0.014076	6.76	276.03	142.10	0.63
Post Oak Creek	T3	7521	1697.00	710.00	715.09		715.78	0.014437	7.24	321.16	152.20	0.65
Post Oak Creek	T3	7521	1966.00	710.00	715.33		716.09	0.014937	7.67	358.78	159.21	0.67
Post Oak Creek	T3	7521	2249.00	710.00	715.58		716.40	0.015109	8.03	399.98	166.79	0.68
Post Oak Creek	T3	7521	2249.00	710.00	715.58		716.40	0.015109	8.03	399.98	166.79	0.68
Post Oak Creek	T3	7521	2683.00	710.00	715.90		716.82	0.015920	8.64	454.79	178.84	0.71
Post Oak Creek	T3	6971	711.00	704.00	709.30		709.68	0.007865	5.64	167.92	130.78	0.55
Post Oak Creek	T3	6971	1138.00	704.00	710.01		710.35	0.005813	5.53	264.12	139.17	0.49
Post Oak Creek	T3	6971	1408.00	704.00	710.35		710.71	0.005564	5.71	312.28	145.89	0.48
Post Oak Creek	T3	6971	1697.00	704.00	710.65		711.05	0.005523	5.95	357.36	151.87	0.49
Post Oak Creek	T3	6971	1966.00	704.00	710.92		711.34	0.005436	6.13	398.75	157.17	0.49
Post Oak Creek	T3	6971	2249.00	704.00	711.17		711.62	0.005424	6.33	438.85	162.13	0.49
Post Oak Creek	T3	6971	2249.00	704.00	711.17		711.62	0.005424	6.33	438.85	162.13	0.49
Post Oak Creek	T3	6971	2683.00	704.00	711.56		712.05	0.005213	6.51	503.34	169.08	0.49
Post Oak Creek	T3	6429	711.00	700.00	705.07		705.50	0.007506	5.27	134.89	44.62	0.53
Post Oak Creek	T3	6429	1138.00	700.00	706.14		706.71	0.007751	6.08	192.90	100.46	0.56
Post Oak Creek	T3	6429	1408.00	700.00	706.58		707.20	0.007512	6.45	239.58	112.81	0.56
Post Oak Creek	T3	6429	1697.00	700.00	706.99		707.64	0.007149	6.71	288.63	124.47	0.56
Post Oak Creek	T3	6429	1966.00	700.00	707.31		707.99	0.007035	6.97	329.51	133.42	0.56
Post Oak Creek	T3	6429	2249.00	700.00	707.64		708.33	0.006760	7.14	375.17	142.95	0.55
Post Oak Creek	T3	6429	2249.00	700.00	707.64		708.33	0.006760	7.14	375.17	142.95	0.55
Post Oak Creek	T3	6429	2683.00	700.00	708.13		708.87	0.006551	7.47	452.31	178.06	0.55
Post Oak Creek	T3	5910	711.00	696.00	701.33		701.50	0.007628	4.31	254.66	100.17	0.36

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	T3	5910	1138.00	696.00	702.19		702.41	0.008444	5.08	345.61	112.18	0.38
Post Oak Creek	T3	5910	1408.00	696.00	702.63		702.88	0.008766	5.46	396.52	117.27	0.40
Post Oak Creek	T3	5910	1697.00	696.00	703.01		703.30	0.009366	5.88	441.96	121.63	0.41
Post Oak Creek	T3	5910	1966.00	696.00	703.45		703.76	0.009053	6.05	496.44	126.76	0.41
Post Oak Creek	T3	5910	2249.00	696.00	703.78		704.11	0.009441	6.38	538.41	130.86	0.42
Post Oak Creek	T3	5910	2249.00	696.00	703.78		704.11	0.009441	6.38	538.41	130.86	0.42
Post Oak Creek	T3	5910	2683.00	696.00	704.24		704.62	0.009967	6.84	599.94	137.64	0.44
Post Oak Creek	T3	5471	711.00	694.00	698.67		698.77	0.005083	2.62	271.55	106.48	0.29
Post Oak Creek	T3	5471	1138.00	694.00	699.72		699.85	0.004204	2.85	399.04	134.68	0.29
Post Oak Creek	T3	5471	1408.00	694.00	700.20		700.34	0.004026	3.01	473.63	183.99	0.29
Post Oak Creek	T3	5471	1697.00	694.00	700.63		700.78	0.003781	3.14	557.81	209.97	0.29
Post Oak Creek	T3	5471	1966.00	694.00	700.65		700.85	0.004948	3.61	562.99	210.75	0.33
Post Oak Creek	T3	5471	2249.00	694.00	700.89		701.11	0.005090	3.81	614.14	218.35	0.34
Post Oak Creek	T3	5471	2249.00	694.00	700.89		701.11	0.005090	3.81	614.14	218.35	0.34
Post Oak Creek	T3	5471	2683.00	694.00	701.21		701.46	0.005314	4.10	685.09	228.47	0.35
Post Oak Creek	T3	4909	711.00	690.00	694.00		694.76	0.010298	7.02	101.29	38.58	0.76
Post Oak Creek	T3	4909	1138.00	690.00	694.90	694.55	695.86	0.013584	7.88	144.42	57.39	0.88
Post Oak Creek	T3	4909	1408.00	690.00	695.31	695.06	696.38	0.014399	8.28	170.08	65.70	0.91
Post Oak Creek	T3	4909	1697.00	690.00	695.63	695.54	696.84	0.015806	8.84	193.56	90.97	0.96
Post Oak Creek	T3	4909	1966.00	690.00	696.35	696.35	697.14	0.008919	7.37	317.42	240.89	0.74
Post Oak Creek	T3	4909	2249.00	690.00	696.53	696.53	697.35	0.008834	7.62	362.64	248.11	0.74
Post Oak Creek	T3	4909	2249.00	690.00	696.53	696.53	697.35	0.008834	7.62	362.64	248.11	0.74
Post Oak Creek	T3	4909	2683.00	690.00	696.79	696.79	697.63	0.008670	7.94	427.81	258.79	0.74
Post Oak Creek	T3	4471	711.00	686.00	691.68		691.78	0.004300	2.97	294.59	150.95	0.26
Post Oak Creek	T3	4471	1138.00	686.00	692.38		692.51	0.004328	3.32	407.15	167.27	0.27
Post Oak Creek	T3	4471	1408.00	686.00	692.78		692.92	0.004369	3.52	475.50	188.73	0.28
Post Oak Creek	T3	4471	1697.00	686.00	693.13		693.29	0.004265	3.64	543.63	197.76	0.28
Post Oak Creek	T3	4471	1966.00	686.00	693.45		693.62	0.004088	3.71	608.43	205.98	0.27
Post Oak Creek	T3	4471	2249.00	686.00	693.57		693.77	0.004738	4.05	633.60	209.09	0.30
Post Oak Creek	T3	4471	2249.00	686.00	693.57		693.77	0.004738	4.05	633.60	209.09	0.30
Post Oak Creek	T3	4471	2683.00	686.00	693.91		694.15	0.004850	4.25	707.09	217.91	0.30
Post Oak Creek	T3	4001	711.00	682.00	685.99	685.99	687.03	0.042647	8.18	87.01	44.74	1.00
Post Oak Creek	T3	4001	1138.00	682.00	686.88	686.88	688.08	0.031264	8.90	139.59	71.76	0.91
Post Oak Creek	T3	4001	1408.00	682.00	687.34	687.34	688.59	0.027788	9.24	174.95	82.74	0.88
Post Oak Creek	T3	4001	1697.00	682.00	687.72	687.72	689.08	0.026693	9.72	208.53	92.83	0.88
Post Oak Creek	T3	4001	1966.00	682.00	687.99	687.99	689.48	0.027461	10.31	234.06	101.23	0.90
Post Oak Creek	T3	4001	2249.00	682.00	688.73	688.73	689.83	0.017446	9.19	353.09	204.19	0.74

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	T3	4001	2249.00	682.00	688.73	688.73	689.83	0.017446	9.19	353.09	204.19	0.74
Post Oak Creek	T3	4001	2683.00	682.00	689.11	689.11	690.21	0.016710	9.46	435.81	229.23	0.73
Post Oak Creek	T3	3851	711.00	680.78	684.92		685.20	0.004344	4.28	176.10	99.10	0.49
Post Oak Creek	T3	3851	1138.00	680.78	685.57		685.97	0.004574	5.17	248.00	121.32	0.53
Post Oak Creek	T3	3851	1408.00	680.78	685.90		686.37	0.004737	5.65	290.93	136.39	0.55
Post Oak Creek	T3	3851	1697.00	680.78	686.26		686.77	0.004645	5.98	340.58	144.37	0.55
Post Oak Creek	T3	3851	1966.00	680.78	686.58		687.12	0.004450	6.20	388.71	149.94	0.55
Post Oak Creek	T3	3851	2249.00	680.78	686.83		687.42	0.004599	6.56	425.83	153.77	0.56
Post Oak Creek	T3	3851	2249.00	680.78	686.83		687.42	0.004599	6.56	425.83	153.77	0.56
Post Oak Creek	T3	3851	2683.00	680.78	687.07		687.79	0.005236	7.26	463.78	157.44	0.60
Post Oak Creek	T3	3719	711.00	680.00	683.51	683.51	684.27	0.011415	7.63	116.04	80.67	0.82
Post Oak Creek	T3	3719	1138.00	680.00	684.15	684.15	685.03	0.010860	8.57	173.26	98.09	0.83
Post Oak Creek	T3	3719	1408.00	680.00	684.46	684.46	685.42	0.010735	9.05	205.46	105.44	0.83
Post Oak Creek	T3	3719	1697.00	680.00	684.71	684.71	685.79	0.011461	9.77	232.26	112.58	0.87
Post Oak Creek	T3	3719	1966.00	680.00	684.92	684.92	686.13	0.012313	10.48	256.62	123.23	0.91
Post Oak Creek	T3	3719	2249.00	680.00	685.26	685.26	686.45	0.011281	10.58	302.72	144.54	0.88
Post Oak Creek	T3	3719	2249.00	680.00	685.26	685.26	686.45	0.011281	10.58	302.72	144.54	0.88
Post Oak Creek	T3	3719	2683.00	680.00	685.75	685.75	686.84	0.009476	10.40	381.28	171.54	0.82
Post Oak Creek	T3	3641	711.00	678.00	682.49	682.49	683.15	0.013006	6.77	119.25	96.48	0.82
Post Oak Creek	T3	3641	1138.00	678.00	683.02	683.02	683.83	0.012668	7.76	172.91	105.99	0.84
Post Oak Creek	T3	3641	1408.00	678.00	683.28	683.28	684.19	0.012862	8.32	201.26	110.92	0.86
Post Oak Creek	T3	3641	1697.00	678.00	683.55	683.55	684.54	0.012762	8.79	231.43	116.07	0.87
Post Oak Creek	T3	3641	1966.00	678.00	683.78	683.78	684.84	0.012555	9.15	259.25	120.84	0.87
Post Oak Creek	T3	3641	2249.00	678.00	683.92	683.92	685.14	0.013848	9.86	275.93	123.62	0.92
Post Oak Creek	T3	3641	2249.00	678.00	683.92	683.92	685.14	0.013848	9.86	275.93	123.62	0.92
Post Oak Creek	T3	3641	2683.00	678.00	684.36	684.36	685.57	0.012075	9.96	334.48	139.59	0.88
Post Oak Creek	T3	3471	711.00	676.00	680.19		680.41	0.009479	3.78	189.35	107.57	0.47
Post Oak Creek	T3	3471	1138.00	676.00	680.83		681.14	0.009186	4.49	271.30	152.01	0.49
Post Oak Creek	T3	3471	1408.00	676.00	681.19		681.53	0.008742	4.78	332.33	184.68	0.49
Post Oak Creek	T3	3471	1697.00	676.00	681.52		681.90	0.008519	5.06	398.99	223.60	0.49
Post Oak Creek	T3	3471	1966.00	676.00	681.80		682.19	0.008275	5.26	464.08	245.07	0.49
Post Oak Creek	T3	3471	2249.00	676.00	682.06		682.49	0.008195	5.49	533.69	300.40	0.49
Post Oak Creek	T3	3471	2249.00	676.00	682.06		682.48	0.008273	5.51	531.29	300.14	0.49
Post Oak Creek	T3	3471	2683.00	676.00	682.40		682.83	0.007939	5.71	635.48	310.50	0.49
Post Oak Creek	T3	2971	711.00	670.00	675.44		675.65	0.009545	3.90	225.68	112.37	0.38
Post Oak Creek	T3	2971	1138.00	670.00	676.32		676.57	0.009035	4.44	331.83	129.92	0.39

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	T3	2971	1408.00	670.00	676.72		677.00	0.009356	4.81	385.57	137.88	0.40
Post Oak Creek	T3	2971	1697.00	670.00	677.17		677.47	0.009152	5.07	449.22	147.50	0.40
Post Oak Creek	T3	2971	1966.00	670.00	677.56		677.88	0.008915	5.26	509.57	157.30	0.40
Post Oak Creek	T3	2971	2249.00	670.00	677.97		678.29	0.008435	5.37	575.14	168.16	0.39
Post Oak Creek	T3	2971	2249.00	670.00	678.00		678.32	0.008226	5.33	580.31	169.05	0.39
Post Oak Creek	T3	2971	2683.00	670.00	678.43		678.78	0.008208	5.58	663.62	194.24	0.39
Post Oak Creek	T3	2472	711.00	666.00	670.53		670.80	0.009874	4.14	174.08	60.00	0.39
Post Oak Creek	T3	2472	1138.00	666.00	671.68		672.03	0.009117	4.82	253.04	78.19	0.40
Post Oak Creek	T3	2472	1408.00	666.00	672.51		672.85	0.007443	4.86	325.46	96.92	0.37
Post Oak Creek	T3	2472	1697.00	666.00	673.07		673.44	0.007165	5.10	384.26	112.07	0.37
Post Oak Creek	T3	2472	1966.00	666.00	673.44		673.84	0.007365	5.38	427.75	122.16	0.38
Post Oak Creek	T3	2472	2249.00	666.00	673.66		674.13	0.008248	5.82	455.33	128.15	0.40
Post Oak Creek	T3	2472	2249.00	666.00	673.58		674.06	0.008782	5.96	444.03	125.73	0.41
Post Oak Creek	T3	2472	2683.00	666.00	674.17		674.67	0.008233	6.12	524.21	141.86	0.40
Post Oak Creek	T3	1970	711.00	662.00	667.23		667.53	0.004611	4.39	164.86	55.79	0.43
Post Oak Creek	T3	1970	1138.00	662.00	668.05		668.52	0.005497	5.56	212.45	61.03	0.48
Post Oak Creek	T3	1970	1408.00	662.00	667.98		668.73	0.008936	7.01	208.15	60.30	0.61
Post Oak Creek	T3	1970	1697.00	662.00	668.34		669.24	0.009620	7.70	230.70	63.91	0.65
Post Oak Creek	T3	1970	1966.00	662.00	668.87		669.80	0.008602	7.86	266.07	68.93	0.62
Post Oak Creek	T3	1970	2249.00	662.00	669.82		670.61	0.005935	7.33	334.50	76.29	0.53
Post Oak Creek	T3	1970	2249.00	662.00	670.19		670.88	0.004748	6.84	364.78	84.83	0.48
Post Oak Creek	T3	1970	2683.00	662.00	670.78		671.55	0.004797	7.30	418.20	97.51	0.49
Post Oak Creek	T3	1547	711.00	657.91	663.06	663.06	664.08	0.017034	8.53	95.05	48.08	0.78
Post Oak Creek	T3	1547	1138.00	657.91	664.15	663.95	665.11	0.012446	8.68	155.78	62.63	0.70
Post Oak Creek	T3	1547	1408.00	657.91	666.00		666.38	0.003499	5.73	308.53	98.73	0.39
Post Oak Creek	T3	1547	1697.00	657.91	667.18		667.44	0.002025	4.86	433.01	113.53	0.31
Post Oak Creek	T3	1547	1966.00	657.91	668.14		668.36	0.001442	4.43	548.80	127.45	0.26
Post Oak Creek	T3	1547	2249.00	657.91	669.46		669.62	0.000917	3.88	763.65	271.96	0.22
Post Oak Creek	T3	1547	2249.00	657.91	669.61		669.79	0.001281	4.63	804.44	295.43	0.26
Post Oak Creek	T3	1547	2683.00	657.91	670.02		670.26	0.001707	5.49	931.57	447.26	0.30
Post Oak Creek	Reach 08	17933	5798.00	642.00	658.20		658.89	0.001678	6.69	876.20	140.09	0.37
Post Oak Creek	Reach 08	17933	9683.00	642.00	661.54		662.38	0.001512	7.67	1509.10	246.62	0.37
Post Oak Creek	Reach 08	17933	12145.00	642.00	663.03		663.90	0.001457	8.07	2012.12	389.43	0.37
Post Oak Creek	Reach 08	17933	15076.00	642.00	664.39		665.22	0.001350	8.22	2585.29	457.51	0.36
Post Oak Creek	Reach 08	17933	18186.00	642.00	665.40		666.23	0.001326	8.48	3220.96	771.67	0.36
Post Oak Creek	Reach 08	17933	21304.00	642.00	666.05		667.12	0.001660	9.72	3800.99	1169.82	0.40
Post Oak Creek	Reach 08	17933	22321.00	642.00	666.33		667.33	0.001570	9.55	4135.50	1184.48	0.39

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # CHl
Post Oak Creek	Reach 08	17933	26700.00	642.00	667.48		668.22	0.001250	8.87	5537.38	1266.62	0.35
Post Oak Creek	Reach 08	17488	5798.00	642.00	658.17		658.25	0.000699	2.63	3272.34	587.62	0.16
Post Oak Creek	Reach 08	17488	9683.00	642.00	661.72		661.80	0.000489	2.78	5659.02	755.66	0.14
Post Oak Creek	Reach 08	17488	12145.00	642.00	663.24		663.33	0.000454	2.90	6838.70	781.82	0.14
Post Oak Creek	Reach 08	17488	15076.00	642.00	664.58		664.67	0.000457	3.09	8045.63	1109.72	0.14
Post Oak Creek	Reach 08	17488	18186.00	642.00	665.58		665.68	0.000487	3.34	9241.79	1269.34	0.15
Post Oak Creek	Reach 08	17488	21304.00	642.00	666.33		666.44	0.000537	3.61	10278.25	1491.67	0.16
Post Oak Creek	Reach 08	17488	22321.00	642.00	666.56		666.68	0.000549	3.69	10624.25	1496.53	0.16
Post Oak Creek	Reach 08	17488	26700.00	642.00	667.53		667.67	0.000587	3.96	12098.81	1519.80	0.17
Post Oak Creek	Reach 08	16988	5798.00	642.00	657.21		657.72	0.001435	5.75	1012.10	121.10	0.34
Post Oak Creek	Reach 08	16988	9683.00	642.00	660.66		661.36	0.001284	6.78	1487.78	164.82	0.34
Post Oak Creek	Reach 08	16988	12145.00	642.00	662.02		662.88	0.001381	7.54	1764.05	412.56	0.36
Post Oak Creek	Reach 08	16988	15076.00	642.00	663.30		664.22	0.001393	8.04	2423.86	661.42	0.37
Post Oak Creek	Reach 08	16988	18186.00	642.00	664.27		665.21	0.001406	8.43	3263.40	1100.37	0.37
Post Oak Creek	Reach 08	16988	21304.00	642.00	665.18		665.98	0.001247	8.24	4328.40	1238.36	0.35
Post Oak Creek	Reach 08	16988	22321.00	642.00	665.47		666.23	0.001191	8.14	4691.88	1286.73	0.35
Post Oak Creek	Reach 08	16988	26700.00	642.00	666.67		667.25	0.000965	7.67	6522.86	1682.83	0.32
Post Oak Creek	Reach 08	16488	5798.00	642.00	656.51		657.04	0.001283	5.86	991.62	108.21	0.32
Post Oak Creek	Reach 08	16488	9683.00	642.00	659.96		660.72	0.001268	7.08	1463.81	160.01	0.34
Post Oak Creek	Reach 08	16488	12145.00	642.00	661.27		662.18	0.001390	7.88	1737.45	281.45	0.36
Post Oak Creek	Reach 08	16488	15076.00	642.00	662.42		663.48	0.001517	8.65	2270.41	802.86	0.38
Post Oak Creek	Reach 08	16488	18186.00	642.00	663.61	656.69	664.51	0.001331	8.50	3433.88	1114.19	0.36
Post Oak Creek	Reach 08	16488	21304.00	642.00	664.66	658.28	665.37	0.001107	8.06	4780.07	1416.35	0.33
Post Oak Creek	Reach 08	16488	22321.00	642.00	665.01	658.72	665.64	0.001014	7.81	5275.77	1455.50	0.32
Post Oak Creek	Reach 08	16488	26700.00	642.00	666.24	660.53	666.78	0.000891	7.64	7285.34	2152.64	0.30
Post Oak Creek	Reach 08	15988	5798.00	642.00	654.15	651.10	655.80	0.004940	10.31	562.58	62.62	0.61
Post Oak Creek	Reach 08	15988	9683.00	642.00	657.00	654.25	659.39	0.005605	12.56	848.79	178.23	0.67
Post Oak Creek	Reach 08	15988	12145.00	642.00	658.60	657.58	660.87	0.004787	12.70	1175.47	237.14	0.63
Post Oak Creek	Reach 08	15988	15076.00	642.00	660.13	659.24	662.20	0.004077	12.65	1572.20	282.10	0.59
Post Oak Creek	Reach 08	15988	18186.00	642.00	661.28	660.19	663.34	0.003868	12.98	1917.04	316.69	0.58
Post Oak Creek	Reach 08	15988	21304.00	642.00	661.24	661.03	664.10	0.005386	15.29	1904.23	315.39	0.69
Post Oak Creek	Reach 08	15988	22321.00	642.00	661.29	661.29	664.38	0.005815	15.92	1918.82	316.88	0.72
Post Oak Creek	Reach 08	15988	26700.00	642.00	662.00	662.00	665.53	0.006465	17.30	2151.95	411.63	0.76
Post Oak Creek	Reach 08	15488	5798.00	640.00	654.06	647.96	654.49	0.000993	5.50	1214.79	248.21	0.30
Post Oak Creek	Reach 08	15488	9683.00	640.00	657.70	650.91	658.04	0.000660	5.45	2640.52	583.54	0.25
Post Oak Creek	Reach 08	15488	12145.00	640.00	659.46	652.00	659.71	0.000483	5.04	4304.49	1041.66	0.22

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 08	15488	15076.00	640.00	661.06	653.36	661.23	0.000334	4.46	6061.13	1156.69	0.19
Post Oak Creek	Reach 08	15488	18186.00	640.00	662.27	653.82	662.42	0.000287	4.33	7512.69	1268.47	0.18
Post Oak Creek	Reach 08	15488	21304.00	640.00	662.71	654.08	662.87	0.000325	4.68	8076.70	1310.48	0.19
Post Oak Creek	Reach 08	15488	22321.00	640.00	662.86	657.32	663.03	0.000335	4.77	8278.46	1325.56	0.19
Post Oak Creek	Reach 08	15488	26700.00	640.00	663.61	658.97	663.80	0.000352	5.01	9309.49	1416.13	0.20
Post Oak Creek	Reach 08	14988	5798.00	640.00	653.58	646.30	653.99	0.000985	5.19	1169.12	159.21	0.29
Post Oak Creek	Reach 08	14988	9683.00	640.00	657.13	648.76	657.62	0.001036	5.81	1900.90	293.21	0.30
Post Oak Creek	Reach 08	14988	12145.00	640.00	658.86	650.08	659.36	0.000921	6.01	2661.71	680.37	0.29
Post Oak Creek	Reach 08	14988	15076.00	640.00	660.59	651.53	660.97	0.000695	5.66	4180.88	1102.35	0.26
Post Oak Creek	Reach 08	14988	18186.00	640.00	661.93	653.53	662.21	0.000519	5.19	5733.72	1210.12	0.23
Post Oak Creek	Reach 08	14988	21304.00	640.00	662.32	654.94	662.64	0.000591	5.62	6214.61	1233.53	0.24
Post Oak Creek	Reach 08	14988	22321.00	640.00	662.47	655.39	662.80	0.000606	5.73	6392.74	1241.90	0.25
Post Oak Creek	Reach 08	14988	26700.00	640.00	663.22	655.77	663.56	0.000618	5.96	7341.83	1293.86	0.25
Post Oak Creek	Reach 08	14566	5798.00	638.00	653.43	645.02	653.67	0.000444	4.00	1587.58	199.87	0.20
Post Oak Creek	Reach 08	14566	9683.00	638.00	656.98	647.12	657.29	0.000442	4.74	2416.90	278.93	0.21
Post Oak Creek	Reach 08	14566	12145.00	638.00	658.70	648.27	659.05	0.000448	5.12	3025.54	477.49	0.22
Post Oak Creek	Reach 08	14566	15076.00	638.00	660.26	649.50	660.71	0.000526	5.87	4133.83	1263.90	0.24
Post Oak Creek	Reach 08	14566	18186.00	638.00	661.70	651.09	662.02	0.000397	5.36	5998.12	1313.65	0.21
Post Oak Creek	Reach 08	14566	21304.00	638.00	662.05	652.41	662.42	0.000467	5.88	6459.56	1326.41	0.23
Post Oak Creek	Reach 08	14566	22321.00	638.00	662.19	652.72	662.56	0.000484	6.01	6637.37	1332.87	0.23
Post Oak Creek	Reach 08	14566	26700.00	638.00	662.93	653.97	663.32	0.000507	6.29	7641.40	1369.54	0.24
Post Oak Creek	Reach 09	14112	5939.00	638.00	653.35	646.93	653.47	0.000419	3.48	2939.78	650.14	0.19
Post Oak Creek	Reach 09	14112	9856.00	638.00	657.03	649.48	657.11	0.000214	3.04	5553.91	731.64	0.14
Post Oak Creek	Reach 09	14112	12376.00	638.00	658.78	650.04	658.86	0.000195	3.14	7059.08	1071.47	0.14
Post Oak Creek	Reach 09	14112	15255.00	638.00	660.41	650.34	660.49	0.000178	3.20	9091.22	1746.70	0.14
Post Oak Creek	Reach 09	14112	18087.00	638.00	661.79	651.63	661.85	0.000148	3.07	11381.70	1886.93	0.12
Post Oak Creek	Reach 09	14112	21461.00	638.00	662.15	651.99	662.23	0.000181	3.44	11986.77	2122.35	0.14
Post Oak Creek	Reach 09	14112	22545.00	638.00	662.28	652.55	662.36	0.000189	3.54	12217.13	2143.51	0.14
Post Oak Creek	Reach 09	14112	26946.00	638.00	663.02	653.59	663.11	0.000197	3.70	14256.65	2281.34	0.15
Post Oak Creek	Reach 09	13880	Bridge									
Post Oak Creek	Reach 09	13685	5939.00	638.00	651.02	646.48	652.06	0.002990	8.17	726.69	82.28	0.48
Post Oak Creek	Reach 09	13685	9856.00	638.00	654.12	649.47	655.63	0.003107	9.86	1012.93	104.20	0.52
Post Oak Creek	Reach 09	13685	12376.00	638.00	655.32	651.10	657.22	0.003467	11.13	1145.21	118.07	0.55
Post Oak Creek	Reach 09	13685	15255.00	638.00	656.10	652.60	658.64	0.004283	12.88	1249.83	217.28	0.62
Post Oak Creek	Reach 09	13685	18087.00	638.00	656.51	653.92	659.79	0.005341	14.68	1342.11	230.77	0.70
Post Oak Creek	Reach 09	13685	21461.00	638.00	659.38	659.38	660.54	0.002028	10.26	4216.99	1756.76	0.44

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 09	11835	5939.00	634.00	648.77		648.98	0.000434	3.95	1913.18	347.84	0.20
Post Oak Creek	Reach 09	11835	9856.00	634.00	652.11		652.32	0.000368	4.26	3220.69	478.41	0.19
Post Oak Creek	Reach 09	11835	12376.00	634.00	653.21		653.45	0.000410	4.70	3785.48	548.61	0.20
Post Oak Creek	Reach 09	11835	15255.00	634.00	653.76		654.08	0.000526	5.44	4098.78	585.11	0.23
Post Oak Creek	Reach 09	11835	18087.00	634.00	654.24		654.68	0.000710	6.44	4428.70	815.09	0.27
Post Oak Creek	Reach 09	11835	21461.00	634.00	654.79		655.33	0.000848	7.18	4898.35	883.64	0.29
Post Oak Creek	Reach 09	11835	22545.00	634.00	654.92		655.49	0.000894	7.40	5011.49	898.86	0.30
Post Oak Creek	Reach 09	11835	26946.00	634.00	655.52		656.18	0.001027	8.10	5634.14	1148.78	0.33
Post Oak Creek	Reach 09	11447	5939.00	632.00	648.42		648.72	0.001109	4.40	1350.01	195.61	0.30
Post Oak Creek	Reach 09	11447	9856.00	632.00	651.75		652.07	0.001277	4.53	2173.75	338.26	0.32
Post Oak Creek	Reach 09	11447	12376.00	632.00	652.86		653.19	0.001159	4.70	2921.03	1027.71	0.31
Post Oak Creek	Reach 09	11447	15255.00	632.00	653.37		653.77	0.001301	5.21	3524.65	1276.59	0.33
Post Oak Creek	Reach 09	11447	18087.00	632.00	653.89		654.31	0.001322	5.48	4208.30	1364.94	0.33
Post Oak Creek	Reach 09	11447	21461.00	632.00	654.46		654.89	0.001309	5.70	5026.28	1476.07	0.34
Post Oak Creek	Reach 09	11447	22545.00	632.00	654.59		655.03	0.001341	5.82	5206.82	1493.84	0.34
Post Oak Creek	Reach 09	11447	26946.00	632.00	655.23		655.67	0.001301	6.00	6180.90	1548.67	0.34
Post Oak Creek	Reach 09	10793	5939.00	632.00	647.68		648.01	0.001040	4.59	1292.51	163.74	0.29
Post Oak Creek	Reach 09	10793	9856.00	632.00	650.98		651.34	0.000971	4.87	2367.27	814.90	0.29
Post Oak Creek	Reach 09	10793	12376.00	632.00	652.32		652.59	0.000707	4.56	3972.05	1426.44	0.25
Post Oak Creek	Reach 09	10793	15255.00	632.00	652.78		653.09	0.000797	4.98	4640.48	1475.39	0.27
Post Oak Creek	Reach 09	10793	18087.00	632.00	653.30		653.61	0.000809	5.18	5422.07	1531.93	0.27
Post Oak Creek	Reach 09	10793	21461.00	632.00	653.89		654.19	0.000807	5.35	6335.08	1608.93	0.27
Post Oak Creek	Reach 09	10793	22545.00	632.00	653.98		654.31	0.000843	5.50	6492.36	1626.12	0.28
Post Oak Creek	Reach 09	10793	26946.00	632.00	654.63		654.95	0.000851	5.72	7599.97	1766.22	0.28
Post Oak Creek	Reach 09	10294	5939.00	632.00	645.78		646.95	0.005063	8.65	686.28	75.95	0.51
Post Oak Creek	Reach 09	10294	9856.00	632.00	648.49	644.59	650.23	0.005543	10.72	969.24	129.61	0.55
Post Oak Creek	Reach 09	10294	12376.00	632.00	649.58	646.21	651.63	0.006012	11.85	1230.06	407.73	0.59
Post Oak Creek	Reach 09	10294	15255.00	632.00	651.29	648.24	652.30	0.003288	9.53	2784.46	1206.81	0.44
Post Oak Creek	Reach 09	10294	18087.00	632.00	652.47	651.54	653.00	0.001915	7.67	4460.56	1577.72	0.34
Post Oak Creek	Reach 09	10294	21461.00	632.00	653.30		653.66	0.001425	6.84	5785.34	1650.93	0.30
Post Oak Creek	Reach 09	10294	22545.00	632.00	653.36		653.75	0.001497	7.03	5899.04	1657.92	0.30
Post Oak Creek	Reach 09	10294	26946.00	632.00	654.10		654.43	0.001304	6.76	7145.58	1743.48	0.29
Post Oak Creek	Reach 09	9794	5939.00	630.00	644.98		645.64	0.001323	6.58	1003.22	149.02	0.34
Post Oak Creek	Reach 09	9794	9856.00	630.00	647.65		648.65	0.001617	8.35	1533.55	248.11	0.39
Post Oak Creek	Reach 09	9794	12376.00	630.00	648.35		649.76	0.002143	9.92	1757.25	396.96	0.45
Post Oak Creek	Reach 09	9794	15255.00	630.00	648.90	644.66	650.73	0.002723	11.46	1987.67	454.26	0.51
Post Oak Creek	Reach 09	9794	18087.00	630.00	649.31	645.99	651.58	0.003348	12.92	2198.43	589.83	0.57

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 09	9794	21461.00	630.00	650.37	647.87	652.47	0.003125	13.03	3055.86	1123.95	0.56
Post Oak Creek	Reach 09	9794	22545.00	630.00	651.01	647.25	652.67	0.002537	12.04	3818.65	1248.25	0.51
Post Oak Creek	Reach 09	9794	26946.00	630.00	652.07	651.37	653.48	0.002276	11.86	5273.72	1625.49	0.48
Post Oak Creek	Reach 09	9294	5939.00	628.00	645.00		645.12	0.000444	3.30	2278.36	290.33	0.16
Post Oak Creek	Reach 09	9294	9856.00	628.00	647.77		647.95	0.000573	4.24	3480.43	603.22	0.18
Post Oak Creek	Reach 09	9294	12376.00	628.00	648.63		648.85	0.000673	4.75	4097.76	874.37	0.20
Post Oak Creek	Reach 09	9294	15255.00	628.00	649.36		649.61	0.000752	5.16	4781.35	992.40	0.21
Post Oak Creek	Reach 09	9294	18087.00	628.00	649.97		650.24	0.000828	5.54	5409.45	1098.97	0.23
Post Oak Creek	Reach 09	9294	21461.00	628.00	650.59		650.99	0.001314	7.13	6439.00	1785.82	0.29
Post Oak Creek	Reach 09	9294	22545.00	628.00	651.22		651.51	0.000989	6.31	7567.50	1821.49	0.25
Post Oak Creek	Reach 09	9294	26946.00	628.00	652.28		652.50	0.000784	5.82	9531.86	1880.64	0.22
Post Oak Creek	Reach 09	8794	5939.00	628.00	645.00		645.02	0.000063	1.39	4925.07	639.57	0.08
Post Oak Creek	Reach 09	8794	9856.00	628.00	647.79		647.83	0.000074	1.76	6890.78	794.12	0.09
Post Oak Creek	Reach 09	8794	12376.00	628.00	648.65		648.70	0.000093	2.06	7628.98	906.03	0.10
Post Oak Creek	Reach 09	8794	15255.00	628.00	649.37		649.44	0.000113	2.35	8297.27	946.33	0.11
Post Oak Creek	Reach 09	8794	18087.00	628.00	649.96		650.05	0.000133	2.62	8877.62	1050.67	0.12
Post Oak Creek	Reach 09	8794	21461.00	628.00	650.59		650.71	0.000184	3.16	9795.51	1497.77	0.14
Post Oak Creek	Reach 09	8794	22545.00	628.00	651.18		651.29	0.000166	3.07	10676.18	1530.97	0.13
Post Oak Creek	Reach 09	8794	26946.00	628.00	652.19		652.31	0.000169	3.23	12263.35	1588.37	0.14
Post Oak Creek	Reach 09	8295	5939.00	628.00	644.95		644.98	0.000094	1.56	4089.64	538.78	0.09
Post Oak Creek	Reach 09	8295	9856.00	628.00	647.73		647.79	0.000109	2.00	5783.85	717.04	0.10
Post Oak Creek	Reach 09	8295	12376.00	628.00	648.57		648.64	0.000141	2.38	6422.80	817.04	0.12
Post Oak Creek	Reach 09	8295	15255.00	628.00	649.28		649.37	0.000173	2.73	7020.82	869.31	0.13
Post Oak Creek	Reach 09	8295	18087.00	628.00	649.86		649.96	0.000203	3.03	7545.39	985.46	0.14
Post Oak Creek	Reach 09	8295	21461.00	628.00	650.43		650.59	0.000305	3.82	8302.98	1432.42	0.18
Post Oak Creek	Reach 09	8295	22545.00	628.00	651.04		651.18	0.000262	3.64	9182.16	1470.38	0.16
Post Oak Creek	Reach 09	8295	26946.00	628.00	652.06		652.21	0.000253	3.74	10720.70	1534.61	0.16
Post Oak Creek	Reach 09	7794	5939.00	628.00	644.64		644.87	0.000541	3.99	1665.57	257.69	0.22
Post Oak Creek	Reach 09	7794	9856.00	628.00	647.35		647.65	0.000564	4.75	2640.46	477.19	0.23
Post Oak Creek	Reach 09	7794	12376.00	628.00	648.00		648.46	0.000799	5.84	3016.11	1177.82	0.28
Post Oak Creek	Reach 09	7794	15255.00	628.00	648.67		649.16	0.000858	6.25	3836.82	1260.11	0.29
Post Oak Creek	Reach 09	7794	18087.00	628.00	649.24		649.74	0.000893	6.55	4571.22	1330.40	0.30
Post Oak Creek	Reach 09	7794	21461.00	628.00	649.80		650.31	0.000941	6.88	5329.61	1399.49	0.31
Post Oak Creek	Reach 09	7794	22545.00	628.00	650.59		650.96	0.000690	6.10	6470.83	1473.18	0.27
Post Oak Creek	Reach 09	7794	26946.00	628.00	651.70		652.01	0.000573	5.80	8153.58	1541.76	0.24
Post Oak Creek	Reach 09	7294	5939.00	626.00	644.57		644.62	0.000288	1.83	3295.57	548.66	0.08

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 09	7294	9856.00	626.00	647.32		647.37	0.000320	2.16	5638.64	1215.08	0.09
Post Oak Creek	Reach 09	7294	12376.00	626.00	648.03		648.08	0.000359	2.35	6517.11	1364.67	0.10
Post Oak Creek	Reach 09	7294	15255.00	626.00	648.70		648.76	0.000376	2.46	7458.49	1444.86	0.10
Post Oak Creek	Reach 09	7294	18087.00	626.00	649.25		649.33	0.000400	2.58	8280.71	1524.00	0.10
Post Oak Creek	Reach 09	7294	21461.00	626.00	649.79		649.88	0.000433	2.74	9121.48	1596.11	0.11
Post Oak Creek	Reach 09	7294	22545.00	626.00	650.56		650.64	0.000329	2.45	10392.77	1677.29	0.09
Post Oak Creek	Reach 09	7294	26946.00	626.00	651.67		651.74	0.000290	2.38	12302.80	1795.43	0.09
Post Oak Creek	Reach 09	6794	5939.00	626.00	644.45		644.52	0.000154	2.61	4455.33	911.71	0.12
Post Oak Creek	Reach 09	6794	9856.00	626.00	647.20		647.27	0.000140	2.81	7973.05	1667.98	0.12
Post Oak Creek	Reach 09	6794	12376.00	626.00	647.89		647.97	0.000163	3.11	9143.41	1729.46	0.13
Post Oak Creek	Reach 09	6794	15255.00	626.00	648.54		648.63	0.000189	3.43	10359.52	1924.39	0.14
Post Oak Creek	Reach 09	6794	18087.00	626.00	649.08		649.18	0.000211	3.69	11419.91	1983.44	0.15
Post Oak Creek	Reach 09	6794	21461.00	626.00	649.61		649.72	0.000238	4.00	12467.35	2021.99	0.16
Post Oak Creek	Reach 09	6794	22545.00	626.00	650.43		650.51	0.000190	3.67	14151.38	2090.76	0.14
Post Oak Creek	Reach 09	6794	26946.00	626.00	651.54		651.63	0.000181	3.71	16555.38	2217.08	0.14
Post Oak Creek	Reach 09	6294	5939.00	626.00	643.55		644.24	0.004461	6.71	936.84	112.17	0.35
Post Oak Creek	Reach 09	6294	9856.00	626.00	646.00	640.07	646.97	0.005342	8.34	1628.65	924.14	0.39
Post Oak Creek	Reach 09	6294	12376.00	626.00	646.93		647.67	0.004490	7.98	2612.64	1193.93	0.36
Post Oak Creek	Reach 09	6294	15255.00	626.00	647.86		648.34	0.003344	7.16	3848.23	1482.52	0.32
Post Oak Creek	Reach 09	6294	18087.00	626.00	648.46		648.88	0.003078	7.04	4931.84	1895.31	0.31
Post Oak Creek	Reach 09	6294	21461.00	626.00	649.09		649.42	0.002532	6.55	6132.28	1941.98	0.28
Post Oak Creek	Reach 09	6294	22545.00	626.00	650.14		650.31	0.001282	4.85	8227.27	2045.05	0.20
Post Oak Creek	Reach 09	6294	26946.00	626.00	651.33		651.45	0.000859	4.14	10727.59	2142.12	0.17
Post Oak Creek	T1	2618	120.00	670.00	672.98		673.12	0.015465	3.04	39.41	24.74	0.43
Post Oak Creek	T1	2618	210.00	670.00	673.90		674.06	0.012642	3.15	66.57	34.14	0.40
Post Oak Creek	T1	2618	266.00	670.00	674.32		674.49	0.011972	3.25	81.89	38.66	0.39
Post Oak Creek	T1	2618	326.00	670.00	674.70		674.87	0.011571	3.36	97.03	42.53	0.39
Post Oak Creek	T1	2618	385.00	670.00	675.02		675.20	0.011307	3.47	111.07	45.69	0.39
Post Oak Creek	T1	2618	445.00	670.00	675.31		675.50	0.011105	3.57	124.82	48.59	0.39
Post Oak Creek	T1	2618	466.00	670.00	675.40		675.60	0.011048	3.60	129.50	49.54	0.39
Post Oak Creek	T1	2618	538.00	670.00	675.71		675.92	0.010898	3.71	145.13	52.59	0.39
Post Oak Creek	T1	2119	120.00	658.00	662.90	661.46	663.20	0.026392	4.44	27.02	10.73	0.49
Post Oak Creek	T1	2119	210.00	658.00	663.79	662.56	664.27	0.034158	5.55	37.83	13.40	0.58
Post Oak Creek	T1	2119	266.00	658.00	664.28	663.07	664.83	0.036106	5.94	44.78	15.25	0.61
Post Oak Creek	T1	2119	326.00	658.00	664.74	663.55	665.35	0.036834	6.23	52.34	17.17	0.63
Post Oak Creek	T1	2119	385.00	658.00	665.15	663.95	665.80	0.036995	6.45	59.64	18.87	0.64
Post Oak Creek	T1	2119	445.00	658.00	665.52	664.33	666.21	0.036966	6.65	66.87	20.42	0.65

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	T1	2119	466.00	658.00	665.64	664.46	666.34	0.036942	6.72	69.35	20.92	0.65
Post Oak Creek	T1	2119	538.00	658.00	666.03	664.84	666.77	0.036522	6.90	77.93	22.62	0.66
Post Oak Creek	T1	1618	120.00	650.00	652.87		653.07	0.015878	3.52	34.05	16.95	0.44
Post Oak Creek	T1	1618	210.00	650.00	653.98		654.21	0.013034	3.83	54.78	20.41	0.41
Post Oak Creek	T1	1618	266.00	650.00	654.51		654.76	0.012589	4.03	66.03	22.09	0.41
Post Oak Creek	T1	1618	326.00	650.00	655.00		655.27	0.012436	4.23	77.09	23.63	0.41
Post Oak Creek	T1	1618	385.00	650.00	655.42		655.72	0.012401	4.41	87.28	24.95	0.42
Post Oak Creek	T1	1618	445.00	650.00	655.80		656.13	0.012400	4.58	97.18	26.18	0.42
Post Oak Creek	T1	1618	466.00	650.00	655.93		656.26	0.012398	4.63	100.58	26.58	0.42
Post Oak Creek	T1	1618	538.00	650.00	656.34		656.70	0.012494	4.82	111.70	27.91	0.42
Post Oak Creek	T1	1414	120.00	647.00	650.18		650.34	0.011311	3.24	37.03	13.90	0.35
Post Oak Creek	T1	1414	210.00	647.00	651.28		651.50	0.013524	3.84	54.74	18.82	0.40
Post Oak Creek	T1	1414	266.00	647.00	651.78		652.04	0.014279	4.10	64.90	21.33	0.41
Post Oak Creek	T1	1414	326.00	647.00	652.22		652.52	0.014728	4.36	74.74	23.02	0.43
Post Oak Creek	T1	1414	385.00	647.00	652.62		652.94	0.015023	4.58	84.08	24.53	0.44
Post Oak Creek	T1	1414	445.00	647.00	652.98		653.33	0.015270	4.78	93.18	25.93	0.44
Post Oak Creek	T1	1414	466.00	647.00	653.09		653.46	0.015335	4.84	96.25	26.34	0.45
Post Oak Creek	T1	1414	538.00	647.00	653.52		653.91	0.015017	4.99	107.85	27.83	0.45
Post Oak Creek	T1	1284.*	120.00	645.50	648.90	647.31	649.02	0.009056	2.78	43.15	19.80	0.33
Post Oak Creek	T1	1284.*	210.00	645.50	649.81	648.04	649.98	0.010047	3.33	63.02	23.87	0.36
Post Oak Creek	T1	1284.*	266.00	645.50	650.23	648.38	650.44	0.010582	3.62	73.53	25.56	0.38
Post Oak Creek	T1	1284.*	326.00	645.50	650.38		650.65	0.013881	4.22	77.30	26.16	0.43
Post Oak Creek	T1	1284.*	385.00	645.50	650.62		650.95	0.015695	4.60	83.69	27.28	0.46
Post Oak Creek	T1	1284.*	445.00	645.50	650.90		651.27	0.016553	4.86	91.52	28.59	0.48
Post Oak Creek	T1	1284.*	466.00	645.50	651.15		651.49	0.014811	4.71	98.84	29.75	0.46
Post Oak Creek	T1	1284.*	538.00	645.50	651.94		652.23	0.010866	4.35	123.68	33.33	0.40
Post Oak Creek	T1	1154	120.00	644.00	645.67	645.67	646.25	0.091262	6.13	19.58	16.59	0.99
Post Oak Creek	T1	1154	210.00	644.00	646.22	646.22	647.01	0.086909	7.10	29.57	19.23	1.01
Post Oak Creek	T1	1154	266.00	644.00	646.53	646.53	647.39	0.081863	7.44	35.77	20.70	1.00
Post Oak Creek	T1	1154	326.00	644.00	647.49	646.82	647.98	0.032729	5.65	57.66	25.11	0.66
Post Oak Creek	T1	1154	385.00	644.00	648.17	647.07	648.57	0.021315	5.08	75.84	27.97	0.54
Post Oak Creek	T1	1154	445.00	644.00	648.87	647.30	649.20	0.015202	4.61	96.61	31.96	0.47
Post Oak Creek	T1	1154	466.00	644.00	650.04	647.39	650.22	0.006526	3.37	138.13	38.59	0.31
Post Oak Creek	T1	1154	538.00	644.00	651.28	647.64	651.40	0.003767	2.83	190.24	45.84	0.24
Post Oak Creek	T1	618	120.00	638.00	643.14		643.14	0.000095	0.40	301.09	99.17	0.04
Post Oak Creek	T1	618	210.00	638.00	645.74		645.74	0.000032	0.34	586.18	118.71	0.02

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	T1	618	266.00	638.00	646.80		646.81	0.000026	0.35	716.30	126.59	0.02
Post Oak Creek	T1	618	326.00	638.00	647.78		647.79	0.000023	0.35	843.91	133.72	0.02
Post Oak Creek	T1	618	385.00	638.00	648.40		648.41	0.000023	0.37	927.98	138.71	0.02
Post Oak Creek	T1	618	445.00	638.00	649.04		649.05	0.000022	0.38	1019.32	144.71	0.02
Post Oak Creek	T1	618	466.00	638.00	650.13		650.14	0.000015	0.34	1181.71	154.53	0.02
Post Oak Creek	T1	618	538.00	638.00	651.34		651.35	0.000012	0.33	1374.36	164.61	0.02
Post Oak Creek	T1	213	120.00	632.00	643.14		643.14	0.000008	0.23	581.24	150.77	0.02
Post Oak Creek	T1	213	210.00	632.00	645.74		645.74	0.000006	0.26	1025.74	187.82	0.02
Post Oak Creek	T1	213	266.00	632.00	646.80		646.80	0.000007	0.28	1246.08	231.29	0.02
Post Oak Creek	T1	213	326.00	632.00	647.78		647.78	0.000007	0.31	1484.69	256.22	0.02
Post Oak Creek	T1	213	385.00	632.00	648.40		648.40	0.000007	0.33	1647.19	268.03	0.02
Post Oak Creek	T1	213	445.00	632.00	649.05		649.05	0.000008	0.36	1823.51	278.58	0.02
Post Oak Creek	T1	213	466.00	632.00	650.13		650.13	0.000006	0.33	2136.07	297.52	0.02
Post Oak Creek	T1	213	538.00	632.00	651.34		651.34	0.000005	0.33	2512.93	327.31	0.02
Post Oak Creek	Reach 10	5610	5975.00	624.00	642.07		642.56	0.005604	5.66	1068.25	151.27	0.34
Post Oak Creek	Reach 10	5610	9912.00	624.00	644.88		645.32	0.003999	5.75	2083.43	739.96	0.30
Post Oak Creek	Reach 10	5610	12462.00	624.00	646.29		646.52	0.002221	4.63	3652.02	1585.74	0.23
Post Oak Creek	Reach 10	5610	15370.00	624.00	647.46		647.60	0.001301	3.75	5761.59	2040.11	0.18
Post Oak Creek	Reach 10	5610	18186.00	624.00	648.12		648.24	0.001084	3.53	7178.01	2362.94	0.16
Post Oak Creek	Reach 10	5610	21378.00	624.00	648.82		648.91	0.000816	3.16	8853.43	2507.59	0.14
Post Oak Creek	Reach 10	5610	22557.00	624.00	650.00		650.06	0.000398	2.32	12106.32	2938.70	0.10
Post Oak Creek	Reach 10	5610	27099.00	624.00	651.25		651.29	0.000254	1.94	15827.08	3056.41	0.08
Post Oak Creek	Reach 10	5110	5975.00	624.00	640.90		641.36	0.001312	5.44	1127.62	176.32	0.32
Post Oak Creek	Reach 10	5110	9912.00	624.00	643.64		644.25	0.001287	6.46	1710.53	245.54	0.34
Post Oak Creek	Reach 10	5110	12462.00	624.00	645.07		645.69	0.001192	6.73	2396.09	725.43	0.33
Post Oak Creek	Reach 10	5110	15370.00	624.00	646.35		646.95	0.001107	6.91	3706.69	1446.87	0.32
Post Oak Creek	Reach 10	5110	18186.00	624.00	647.27		647.72	0.000877	6.41	5087.09	1551.84	0.29
Post Oak Creek	Reach 10	5110	21378.00	624.00	648.09		648.48	0.000796	6.33	6405.47	1825.76	0.28
Post Oak Creek	Reach 10	5110	22557.00	624.00	649.69		649.86	0.000361	4.54	9627.43	2155.83	0.19
Post Oak Creek	Reach 10	5110	27099.00	624.00	651.04		651.16	0.000262	4.06	12613.91	2288.97	0.17
Post Oak Creek	Reach 10	4610	5975.00	624.00	639.67		640.34	0.003395	6.58	908.37	115.63	0.41
Post Oak Creek	Reach 10	4610	9912.00	624.00	642.18		643.19	0.003716	8.12	1255.08	180.31	0.45
Post Oak Creek	Reach 10	4610	12462.00	624.00	643.55		644.68	0.003594	8.70	1569.65	277.23	0.45
Post Oak Creek	Reach 10	4610	15370.00	624.00	644.75		645.98	0.003549	9.24	1987.97	456.31	0.46
Post Oak Creek	Reach 10	4610	18186.00	624.00	645.59	641.23	646.85	0.003547	9.64	2440.46	665.55	0.46
Post Oak Creek	Reach 10	4610	21378.00	624.00	646.34	643.05	647.65	0.003638	10.13	3268.12	1550.44	0.47
Post Oak Creek	Reach 10	4610	22557.00	624.00	649.50		649.65	0.000489	4.24	9070.80	2071.58	0.18

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 10	4610	27099.00	624.00	650.90		651.00	0.000334	3.70	12065.06	2197.45	0.15
Post Oak Creek	Reach 10	4111	5975.00	622.00	638.47		639.03	0.002000	5.99	1000.37	150.09	0.40
Post Oak Creek	Reach 10	4111	9912.00	622.00	641.08		641.84	0.001861	7.11	1462.62	197.62	0.40
Post Oak Creek	Reach 10	4111	12462.00	622.00	642.46		643.36	0.001846	7.73	1789.02	333.72	0.41
Post Oak Creek	Reach 10	4111	15370.00	622.00	643.73		644.68	0.001767	8.13	2349.17	548.92	0.41
Post Oak Creek	Reach 10	4111	18186.00	622.00	644.50		645.54	0.001864	8.69	2951.03	962.12	0.42
Post Oak Creek	Reach 10	4111	21378.00	622.00	645.58		646.40	0.001490	8.19	4118.69	1145.09	0.38
Post Oak Creek	Reach 10	4111	22557.00	622.00	649.39		649.48	0.000193	3.45	12552.30	2579.92	0.14
Post Oak Creek	Reach 10	4111	27099.00	622.00	650.82		650.89	0.000142	3.12	16366.69	2758.70	0.12
Post Oak Creek	Reach 11	4011	6390.00	622.00	638.34		638.90	0.002355	6.30	1188.32	206.87	0.30
Post Oak Creek	Reach 11	4011	10340.00	622.00	641.08		641.67	0.002191	6.88	1877.96	289.45	0.30
Post Oak Creek	Reach 11	4011	12981.00	622.00	642.51		643.16	0.002316	7.48	2348.49	426.68	0.31
Post Oak Creek	Reach 11	4011	15999.00	622.00	643.81		644.48	0.002351	7.90	3072.90	865.04	0.32
Post Oak Creek	Reach 11	4011	18801.00	622.00	644.68		645.28	0.002229	7.93	4013.54	1157.98	0.31
Post Oak Creek	Reach 11	4011	22025.00	622.00	645.77		646.18	0.001577	6.91	5344.52	1267.83	0.27
Post Oak Creek	Reach 11	4011	23259.00	622.00	649.38		649.47	0.000298	3.34	10508.05	1697.14	0.12
Post Oak Creek	Reach 11	4011	27847.00	622.00	650.79		650.88	0.000266	3.28	13220.55	2135.04	0.11
Post Oak Creek	Reach 11	3892	6390.00	622.00	637.99		638.66	0.001536	6.65	1060.55	194.83	0.36
Post Oak Creek	Reach 11	3892	10340.00	622.00	640.75		641.45	0.001371	7.31	1943.80	384.61	0.35
Post Oak Creek	Reach 11	3892	12981.00	622.00	642.29		642.96	0.001242	7.47	2596.29	524.33	0.34
Post Oak Creek	Reach 11	3892	15999.00	622.00	643.56		644.27	0.001254	7.93	3476.06	912.59	0.35
Post Oak Creek	Reach 11	3892	18801.00	622.00	644.38		645.08	0.001251	8.18	4461.03	1296.37	0.35
Post Oak Creek	Reach 11	3892	22025.00	622.00	645.54		646.03	0.000930	7.37	6036.76	1400.58	0.30
Post Oak Creek	Reach 11	3892	23259.00	622.00	649.34		649.44	0.000198	3.85	11983.34	1831.02	0.14
Post Oak Creek	Reach 11	3892	27847.00	622.00	650.75		650.85	0.000176	3.79	14800.50	2152.57	0.14
Post Oak Creek	Reach 12	3710	6832.00	622.00	637.71		638.57	0.003935	7.83	1010.78	204.82	0.39
Post Oak Creek	Reach 12	3710	10998.00	622.00	640.84		641.33	0.002164	6.73	2369.69	534.29	0.30
Post Oak Creek	Reach 12	3710	13778.00	622.00	642.43		642.84	0.001760	6.47	3300.51	725.36	0.27
Post Oak Creek	Reach 12	3710	16932.00	622.00	643.75		644.13	0.001724	6.72	4659.41	1369.45	0.27
Post Oak Creek	Reach 12	3710	19841.00	622.00	644.63		644.91	0.001355	6.14	5951.87	1565.83	0.24
Post Oak Creek	Reach 12	3710	23146.00	622.00	645.71		645.92	0.000956	5.35	7751.83	1755.72	0.21
Post Oak Creek	Reach 12	3710	24380.00	622.00	649.37		649.42	0.000184	2.62	15031.96	2222.21	0.09
Post Oak Creek	Reach 12	3710	29136.00	622.00	650.78		650.83	0.000154	2.48	18301.15	2389.27	0.09
Post Oak Creek	Reach 12	3110	6832.00	622.00	636.56	629.53	636.99	0.001633	5.27	1344.20	210.64	0.30
Post Oak Creek	Reach 12	3110	10998.00	622.00	639.58	632.33	640.20	0.001644	6.35	2282.50	498.41	0.32
Post Oak Creek	Reach 12	3110	13778.00	622.00	641.02	633.84	641.76	0.001728	7.00	2939.84	614.53	0.33

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 12	3110	16932.00	622.00	642.05	634.90	642.97	0.001985	7.87	3464.69	753.47	0.36
Post Oak Creek	Reach 12	3110	19841.00	622.00	642.67	635.79	643.79	0.002319	8.74	3793.65	828.87	0.39
Post Oak Creek	Reach 12	3110	23146.00	622.00	643.69	636.76	644.94	0.002454	9.37	4339.39	952.09	0.40
Post Oak Creek	Reach 12	3110	24380.00	622.00	648.49	637.10	649.14	0.000987	7.04	7114.10	1532.33	0.27
Post Oak Creek	Reach 12	3110	29136.00	622.00	649.78	638.66	650.56	0.001116	7.78	7941.30	1631.00	0.29
Post Oak Creek	Reach 12	3015	Bridge									
Post Oak Creek	Reach 12	2874	6832.00	622.00	636.41	626.44	636.52	0.000310	2.67	2613.62	636.47	0.14
Post Oak Creek	Reach 12	2874	10998.00	622.00	639.34	628.04	639.51	0.000348	3.29	3543.59	823.76	0.15
Post Oak Creek	Reach 12	2874	13778.00	622.00	640.67	628.93	640.88	0.000399	3.73	4023.82	1049.45	0.16
Post Oak Creek	Reach 12	2874	16932.00	622.00	641.49	629.85	641.76	0.000500	4.32	4381.23	1155.86	0.19
Post Oak Creek	Reach 12	2874	19841.00	622.00	642.05	630.65	642.14	0.000200	2.79	9425.73	1365.13	0.12
Post Oak Creek	Reach 12	2874	23146.00	622.00	642.64	631.48	642.73	0.000222	3.01	10248.71	1445.45	0.12
Post Oak Creek	Reach 12	2874	24380.00	622.00	642.83	631.77	642.94	0.000230	3.08	10539.31	1472.81	0.13
Post Oak Creek	Reach 12	2874	29136.00	622.00	643.47	632.84	643.59	0.000265	3.38	11503.52	1560.26	0.14
Post Oak Creek	Reach 12	2610	6832.00	620.00	635.98		636.31	0.002697	4.96	1535.14	363.32	0.31
Post Oak Creek	Reach 12	2610	10998.00	620.00	639.11		639.34	0.001313	4.17	2951.22	561.85	0.23
Post Oak Creek	Reach 12	2610	13778.00	620.00	640.52		640.71	0.001038	4.03	3992.69	1021.26	0.21
Post Oak Creek	Reach 12	2610	16932.00	620.00	641.35		641.56	0.001027	4.20	4927.13	1215.54	0.21
Post Oak Creek	Reach 12	2610	19841.00	620.00	641.79		642.02	0.001129	4.50	5480.88	1326.15	0.22
Post Oak Creek	Reach 12	2610	23146.00	620.00	642.36		642.60	0.001222	4.82	6277.69	1451.84	0.23
Post Oak Creek	Reach 12	2610	24380.00	620.00	642.56		642.81	0.001208	4.84	6571.02	1482.11	0.23
Post Oak Creek	Reach 12	2610	29136.00	620.00	643.18		643.45	0.001219	5.01	7527.95	1576.30	0.23
Post Oak Creek	Reach 12	2111	6832.00	620.00	635.64		635.74	0.000516	2.60	2782.26	433.56	0.14
Post Oak Creek	Reach 12	2111	10998.00	620.00	638.88		638.99	0.000373	2.66	4295.24	502.22	0.13
Post Oak Creek	Reach 12	2111	13778.00	620.00	640.22		640.35	0.000491	3.25	5145.43	1152.20	0.15
Post Oak Creek	Reach 12	2111	16932.00	620.00	641.04		641.17	0.000542	3.54	6155.75	1349.50	0.16
Post Oak Creek	Reach 12	2111	19841.00	620.00	641.42		641.58	0.000637	3.90	6695.67	1474.35	0.17
Post Oak Creek	Reach 12	2111	23146.00	620.00	641.90		642.10	0.000802	4.47	7461.91	1668.98	0.19
Post Oak Creek	Reach 12	2111	24380.00	620.00	642.07		642.29	0.000864	4.67	7761.48	1793.09	0.20
Post Oak Creek	Reach 12	2111	29136.00	620.00	642.70		642.93	0.000871	4.81	8917.29	1873.57	0.20
Post Oak Creek	Reach 12	1610	6832.00	620.00	635.13		635.37	0.001070	3.95	1780.94	221.08	0.21
Post Oak Creek	Reach 12	1610	10998.00	620.00	638.38		638.68	0.000997	4.52	2645.23	490.86	0.21
Post Oak Creek	Reach 12	1610	13778.00	620.00	639.71		640.00	0.000945	4.67	3705.28	979.91	0.21
Post Oak Creek	Reach 12	1610	16932.00	620.00	640.49		640.80	0.001019	5.01	4670.23	1445.94	0.22
Post Oak Creek	Reach 12	1610	19841.00	620.00	640.77		641.13	0.001213	5.52	5091.67	1520.70	0.24
Post Oak Creek	Reach 12	1610	23146.00	620.00	641.18		641.57	0.001336	5.89	5735.51	1628.13	0.25

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Post Oak Creek	Reach 12	1610	24380.00	620.00	641.33		641.74	0.001366	5.99	5990.79	1668.33	0.25
Post Oak Creek	Reach 12	1610	29136.00	620.00	641.91		642.34	0.001510	6.44	6986.48	1816.28	0.27
Post Oak Creek	Reach 12	1110	6832.00	620.00	632.87	629.10	634.12	0.008003	8.98	762.76	90.45	0.53
Post Oak Creek	Reach 12	1110	10998.00	620.00	635.66	631.94	637.44	0.008008	10.78	1050.17	124.81	0.56
Post Oak Creek	Reach 12	1110	13778.00	620.00	636.88	633.37	638.79	0.008007	11.52	1434.87	533.58	0.57
Post Oak Creek	Reach 12	1110	16932.00	620.00	637.65	634.97	639.53	0.008008	11.97	1933.95	762.02	0.57
Post Oak Creek	Reach 12	1110	19841.00	620.00	638.64	638.64	639.90	0.005762	10.64	2910.70	1130.73	0.49
Post Oak Creek	Reach 12	1110	23146.00	620.00	639.05	639.05	640.27	0.005762	10.84	3391.50	1205.05	0.49
Post Oak Creek	Reach 12	1110	24380.00	620.00	639.15	639.15	640.40	0.005940	11.06	3510.77	1222.18	0.50
Post Oak Creek	Reach 12	1110	29136.00	620.00	639.47	639.47	640.86	0.006719	11.92	3904.19	1275.25	0.53
Sand Creek	T1	5048	541.00	784.00	788.87		788.98	0.006448	2.99	249.23	186.23	0.31
Sand Creek	T1	5048	987.00	784.00	789.69		789.83	0.006278	3.49	418.88	229.55	0.32
Sand Creek	T1	5048	1275.00	784.00	790.16		790.31	0.006453	3.82	541.84	309.71	0.33
Sand Creek	T1	5048	1595.00	784.00	790.54		790.70	0.006257	3.99	666.58	342.08	0.33
Sand Creek	T1	5048	1899.00	784.00	790.86		791.03	0.006080	4.12	782.29	369.58	0.33
Sand Creek	T1	5048	2204.00	784.00	791.16		791.32	0.005967	4.24	893.14	394.13	0.33
Sand Creek	T1	5048	2375.00	784.00	791.31		791.47	0.005898	4.30	954.86	407.15	0.33
Sand Creek	T1	5048	2710.00	784.00	791.59		791.76	0.005809	4.41	1071.24	430.65	0.33
Sand Creek	T1	4585	541.00	780.00	786.30		786.41	0.004842	2.87	238.57	171.87	0.27
Sand Creek	T1	4585	987.00	780.00	787.34		787.46	0.004220	3.20	472.94	266.11	0.27
Sand Creek	T1	4585	1275.00	780.00	787.82		787.94	0.004125	3.39	608.64	306.93	0.27
Sand Creek	T1	4585	1595.00	780.00	788.26		788.39	0.004047	3.55	750.17	336.94	0.27
Sand Creek	T1	4585	1899.00	780.00	788.58		788.72	0.004130	3.73	863.39	359.28	0.28
Sand Creek	T1	4585	2204.00	780.00	788.87		789.02	0.004218	3.90	970.23	379.15	0.28
Sand Creek	T1	4585	2375.00	780.00	789.03		789.17	0.004252	3.98	1029.27	389.71	0.28
Sand Creek	T1	4585	2710.00	780.00	789.30		789.45	0.004321	4.13	1136.98	407.49	0.29
Sand Creek	T1	3996	541.00	776.00	781.64		782.00	0.012919	4.97	123.35	52.66	0.45
Sand Creek	T1	3996	987.00	776.00	782.97		783.45	0.012607	6.00	235.54	131.85	0.47
Sand Creek	T1	3996	1275.00	776.00	783.51		784.00	0.012339	6.35	315.61	163.84	0.47
Sand Creek	T1	3996	1595.00	776.00	784.04		784.54	0.011991	6.64	413.33	221.85	0.47
Sand Creek	T1	3996	1899.00	776.00	784.43		784.90	0.011354	6.73	506.40	245.99	0.46
Sand Creek	T1	3996	2204.00	776.00	784.79		785.24	0.010701	6.77	597.53	260.95	0.45
Sand Creek	T1	3996	2375.00	776.00	784.98		785.42	0.010354	6.78	648.36	268.92	0.45
Sand Creek	T1	3996	2710.00	776.00	785.34		785.75	0.009753	6.80	747.13	284.53	0.44
Sand Creek	T1	3585	541.00	770.00	773.11		773.67	0.036128	6.00	90.21	39.90	0.70
Sand Creek	T1	3585	987.00	770.00	774.12		774.97	0.039160	7.37	133.96	46.02	0.76

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	T1	3585	1275.00	770.00	774.68		775.66	0.038770	7.97	160.03	48.31	0.77
Sand Creek	T1	3585	1595.00	770.00	775.22		776.35	0.038600	8.53	186.93	50.56	0.78
Sand Creek	T1	3585	1899.00	770.00	775.66		776.94	0.039208	9.05	209.77	52.38	0.80
Sand Creek	T1	3585	2204.00	770.00	776.05		777.47	0.040445	9.57	230.22	53.98	0.82
Sand Creek	T1	3585	2375.00	770.00	776.25		777.75	0.041267	9.85	241.07	54.91	0.83
Sand Creek	T1	3585	2710.00	770.00	776.61	776.04	778.28	0.042822	10.37	261.33	56.58	0.85
Sand Creek	T1	3085	541.00	758.00	762.42		762.76	0.014457	4.68	117.80	44.07	0.46
Sand Creek	T1	3085	987.00	758.00	763.83		764.32	0.013147	5.69	189.51	57.50	0.47
Sand Creek	T1	3085	1275.00	758.00	764.52		765.09	0.013049	6.22	231.08	62.84	0.48
Sand Creek	T1	3085	1595.00	758.00	765.20		765.84	0.012913	6.70	275.13	67.47	0.48
Sand Creek	T1	3085	1899.00	758.00	765.81		766.50	0.012591	7.06	317.62	72.06	0.48
Sand Creek	T1	3085	2204.00	758.00	766.39		767.13	0.012151	7.34	360.64	75.61	0.48
Sand Creek	T1	3085	2375.00	758.00	766.70		767.46	0.011892	7.47	384.58	77.15	0.48
Sand Creek	T1	3085	2710.00	758.00	767.29		768.08	0.011423	7.70	430.91	80.01	0.48
Sand Creek	T1	2839	541.00	754.00	759.56		759.87	0.009703	4.57	126.22	41.33	0.39
Sand Creek	T1	2839	987.00	754.00	761.38		761.78	0.008166	5.33	229.67	75.62	0.38
Sand Creek	T1	2839	1275.00	754.00	762.36		762.74	0.006976	5.45	311.63	89.55	0.36
Sand Creek	T1	2839	1595.00	754.00	763.32		763.69	0.005916	5.47	400.66	95.14	0.34
Sand Creek	T1	2839	1899.00	754.00	764.11		764.47	0.005355	5.54	477.90	99.71	0.33
Sand Creek	T1	2839	2204.00	754.00	764.83		765.19	0.004985	5.64	550.89	103.79	0.32
Sand Creek	T1	2839	2375.00	754.00	765.20		765.57	0.004831	5.69	590.19	105.96	0.32
Sand Creek	T1	2839	2710.00	754.00	765.89		766.26	0.004596	5.81	664.51	109.89	0.32
Sand Creek	T1	2585	541.00	752.00	758.71		758.79	0.002150	2.25	241.41	58.93	0.19
Sand Creek	T1	2585	987.00	752.00	760.66		760.78	0.002028	2.80	365.89	68.95	0.20
Sand Creek	T1	2585	1275.00	752.00	761.66		761.80	0.002025	3.08	437.23	74.14	0.20
Sand Creek	T1	2585	1595.00	752.00	762.64		762.81	0.002024	3.36	512.56	79.33	0.21
Sand Creek	T1	2585	1899.00	752.00	763.43		763.62	0.002066	3.60	577.05	83.52	0.21
Sand Creek	T1	2585	2204.00	752.00	764.14		764.36	0.002114	3.83	637.88	87.27	0.22
Sand Creek	T1	2585	2375.00	752.00	764.52		764.74	0.002143	3.96	670.59	89.25	0.22
Sand Creek	T1	2585	2710.00	752.00	765.19		765.45	0.002197	4.18	732.45	92.83	0.22
Sand Creek	T1	2085	541.00	750.00	757.17		757.35	0.003980	3.57	172.39	45.60	0.26
Sand Creek	T1	2085	987.00	750.00	759.07		759.35	0.004242	4.47	271.63	57.57	0.29
Sand Creek	T1	2085	1275.00	750.00	760.04		760.35	0.004341	4.90	329.64	62.78	0.30
Sand Creek	T1	2085	1595.00	750.00	761.00		761.36	0.004352	5.27	392.60	67.56	0.30
Sand Creek	T1	2085	1899.00	750.00	761.74		762.13	0.004522	5.64	443.31	71.17	0.31
Sand Creek	T1	2085	2204.00	750.00	762.38		762.82	0.004707	5.99	490.34	74.38	0.32
Sand Creek	T1	2085	2375.00	750.00	762.71		763.18	0.004813	6.18	515.35	76.04	0.33

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	T1	2085	2710.00	750.00	763.32		763.83	0.005010	6.54	562.51	79.08	0.33
Sand Creek	T1	1585	541.00	748.00	754.60		754.82	0.006674	3.76	144.70	37.31	0.32
Sand Creek	T1	1585	987.00	748.00	756.39		756.73	0.006541	4.72	220.08	46.69	0.34
Sand Creek	T1	1585	1275.00	748.00	757.27		757.68	0.006724	5.24	262.96	51.58	0.35
Sand Creek	T1	1585	1595.00	748.00	758.10		758.61	0.007095	5.81	311.16	87.35	0.37
Sand Creek	T1	1585	1899.00	748.00	758.78		759.32	0.007085	6.14	373.08	96.00	0.37
Sand Creek	T1	1585	2204.00	748.00	759.39		759.96	0.007006	6.40	434.46	103.96	0.38
Sand Creek	T1	1585	2375.00	748.00	759.72		760.30	0.006936	6.52	469.35	108.98	0.38
Sand Creek	T1	1585	2710.00	748.00	760.33		760.93	0.006738	6.70	538.99	117.14	0.37
Sand Creek	T1	1085	541.00	744.00	752.02		752.18	0.004217	3.33	174.66	49.40	0.26
Sand Creek	T1	1085	987.00	744.00	753.75		754.00	0.004542	4.22	280.64	75.25	0.29
Sand Creek	T1	1085	1275.00	744.00	754.61		754.90	0.004569	4.59	351.05	86.71	0.29
Sand Creek	T1	1085	1595.00	744.00	755.43		755.75	0.004543	4.90	425.50	94.34	0.30
Sand Creek	T1	1085	1899.00	744.00	756.15		756.49	0.004458	5.12	496.03	101.12	0.30
Sand Creek	T1	1085	2204.00	744.00	756.83		757.18	0.004336	5.30	566.88	107.10	0.30
Sand Creek	T1	1085	2375.00	744.00	757.22		757.57	0.004221	5.37	608.95	110.43	0.30
Sand Creek	T1	1085	2710.00	744.00	757.96		758.31	0.003979	5.46	692.82	116.21	0.29
Sand Creek	T1	849	541.00	743.00	750.99		751.18	0.004300	3.57	171.17	47.12	0.27
Sand Creek	T1	849	987.00	743.00	752.52		752.83	0.005462	4.73	252.32	58.10	0.32
Sand Creek	T1	849	1275.00	743.00	753.29		753.66	0.005952	5.30	298.52	61.96	0.33
Sand Creek	T1	849	1595.00	743.00	754.02		754.47	0.006413	5.84	345.48	65.61	0.35
Sand Creek	T1	849	1899.00	743.00	754.70		755.20	0.006600	6.24	391.35	68.96	0.36
Sand Creek	T1	849	2204.00	743.00	755.37		755.91	0.006640	6.55	438.36	72.26	0.37
Sand Creek	T1	849	2375.00	743.00	755.77		756.33	0.006515	6.67	468.05	74.33	0.37
Sand Creek	T1	849	2710.00	743.00	756.56		757.13	0.006220	6.85	528.14	78.41	0.36
Sand Creek	T1	585	541.00	742.00	749.99		750.13	0.003570	3.11	190.42	56.48	0.24
Sand Creek	T1	585	987.00	742.00	751.07		751.35	0.005639	4.45	256.11	65.28	0.32
Sand Creek	T1	585	1275.00	742.00	751.62		752.00	0.006691	5.14	293.78	70.33	0.35
Sand Creek	T1	585	1595.00	742.00	752.13		752.60	0.007786	5.82	330.84	74.43	0.38
Sand Creek	T1	585	1899.00	742.00	752.86		753.36	0.007397	6.06	386.43	78.05	0.38
Sand Creek	T1	585	2204.00	742.00	753.62		754.12	0.006823	6.18	446.79	81.80	0.37
Sand Creek	T1	585	2375.00	742.00	754.14		754.63	0.006207	6.13	490.30	84.44	0.36
Sand Creek	T1	585	2710.00	742.00	755.12		755.58	0.005297	6.06	575.61	89.54	0.34
Sand Creek	T1	285	541.00	742.00	749.53		749.57	0.001053	1.70	435.06	168.09	0.14
Sand Creek	T1	285	987.00	742.00	750.41		750.47	0.001597	2.33	585.24	174.59	0.17
Sand Creek	T1	285	1275.00	742.00	750.88		750.95	0.001851	2.64	667.66	177.54	0.19

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	T1	285	1595.00	742.00	751.28		751.38	0.002172	2.99	739.50	180.09	0.20
Sand Creek	T1	285	1899.00	742.00	752.22		752.31	0.001690	2.88	911.64	185.54	0.18
Sand Creek	T1	285	2204.00	742.00	753.12		753.21	0.001382	2.80	1081.33	189.65	0.17
Sand Creek	T1	285	2375.00	742.00	753.74		753.82	0.001180	2.71	1199.34	192.07	0.16
Sand Creek	T1	285	2710.00	742.00	754.84		754.91	0.000944	2.62	1412.00	196.24	0.14
Sand Creek	Reach 01	40684	250.00	791.67	794.03	794.03	794.92	0.048116	7.56	33.09	18.84	1.00
Sand Creek	Reach 01	40684	452.00	791.67	794.93	794.93	796.14	0.044606	8.83	51.22	21.48	1.01
Sand Creek	Reach 01	40684	585.00	791.67	799.08		799.11	0.000769	2.04	619.35	334.01	0.15
Sand Creek	Reach 01	40684	742.00	791.67	801.41		801.42	0.000137	1.08	1480.36	404.78	0.07
Sand Creek	Reach 01	40684	886.00	791.67	801.62		801.63	0.000168	1.22	1567.17	411.42	0.07
Sand Creek	Reach 01	40684	1024.00	791.67	801.75		801.76	0.000205	1.36	1620.47	415.45	0.08
Sand Creek	Reach 01	40684	1110.00	791.67	801.83		801.84	0.000229	1.44	1652.94	417.91	0.09
Sand Creek	Reach 01	40684	1283.00	791.67	801.94		801.95	0.000284	1.62	1698.77	421.36	0.10
Sand Creek	Reach 01	40583	250.00	788.21	791.83	790.33	791.95	0.002071	2.86	87.27	37.81	0.33
Sand Creek	Reach 01	40583	452.00	788.21	795.22	791.02	795.27	0.000265	1.81	278.58	77.95	0.14
Sand Creek	Reach 01	40583	585.00	788.21	799.09	791.39	799.10	0.000036	0.95	964.88	311.05	0.06
Sand Creek	Reach 01	40583	742.00	788.21	801.41	791.79	801.41	0.000014	0.68	1995.93	584.64	0.04
Sand Creek	Reach 01	40583	886.00	788.21	801.62	792.11	801.63	0.000017	0.77	2121.58	597.20	0.04
Sand Creek	Reach 01	40583	1024.00	788.21	801.75	792.40	801.76	0.000021	0.85	2199.05	605.40	0.04
Sand Creek	Reach 01	40583	1110.00	788.21	801.83	792.56	801.83	0.000023	0.91	2246.48	611.98	0.05
Sand Creek	Reach 01	40583	1283.00	788.21	801.94	792.89	801.95	0.000029	1.02	2313.80	622.35	0.05
Sand Creek	Reach 01	40480	Culvert									
Sand Creek	Reach 01	40361	250.00	786.46	789.32		789.59	0.005278	4.19	59.71	29.58	0.52
Sand Creek	Reach 01	40361	452.00	786.46	790.31		790.67	0.005658	4.82	93.80	39.86	0.55
Sand Creek	Reach 01	40361	585.00	786.46	790.78		791.19	0.005838	5.14	113.79	45.01	0.57
Sand Creek	Reach 01	40361	742.00	786.46	791.25	790.11	791.71	0.005964	5.45	136.05	50.12	0.58
Sand Creek	Reach 01	40361	886.00	786.46	791.62	790.46	792.13	0.006012	5.69	155.75	54.25	0.59
Sand Creek	Reach 01	40361	1024.00	786.46	791.94	790.76	792.48	0.006076	5.90	173.54	57.72	0.60
Sand Creek	Reach 01	40361	1110.00	786.46	792.13	790.93	792.69	0.006069	6.01	184.79	59.82	0.60
Sand Creek	Reach 01	40361	1283.00	786.46	792.48	791.27	793.08	0.006091	6.22	206.33	63.63	0.61
Sand Creek	Reach 01	40110	250.00	783.65	785.87	785.87	786.57	0.047536	6.70	37.34	26.56	1.00
Sand Creek	Reach 01	40110	452.00	783.65	786.60	786.60	787.51	0.045243	7.68	58.84	32.76	1.01
Sand Creek	Reach 01	40110	585.00	783.65	787.00	787.00	788.00	0.042814	8.05	72.70	36.20	1.00
Sand Creek	Reach 01	40110	742.00	783.65	787.40	787.40	788.51	0.041054	8.42	88.09	39.67	1.00
Sand Creek	Reach 01	40110	886.00	783.65	787.72	787.72	788.91	0.040438	8.77	101.08	42.38	1.00
Sand Creek	Reach 01	40110	1024.00	783.65	788.01	788.01	789.27	0.039248	9.00	113.84	44.99	1.00

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 01	40110	1110.00	783.65	788.16	788.16	789.48	0.039358	9.19	120.76	51.90	1.00
Sand Creek	Reach 01	40110	1283.00	783.65	788.47	788.47	789.87	0.038750	9.48	135.31	58.13	1.00
Sand Creek	Reach 01	39942	250.00	770.97	774.53		774.66	0.005572	2.91	85.92	42.59	0.36
Sand Creek	Reach 01	39942	452.00	770.97	775.50		775.69	0.005373	3.49	129.59	47.36	0.37
Sand Creek	Reach 01	39942	585.00	770.97	776.02		776.24	0.005343	3.78	154.89	49.88	0.38
Sand Creek	Reach 01	39942	742.00	770.97	776.58		776.84	0.005218	4.04	183.53	52.24	0.38
Sand Creek	Reach 01	39942	886.00	770.97	777.06		777.34	0.005107	4.24	208.97	54.37	0.38
Sand Creek	Reach 01	39942	1024.00	770.97	777.48		777.79	0.005021	4.41	232.44	56.27	0.38
Sand Creek	Reach 01	39942	1110.00	770.97	777.73		778.05	0.004978	4.50	246.65	57.38	0.38
Sand Creek	Reach 01	39942	1283.00	770.97	778.19		778.53	0.004860	4.69	273.42	59.31	0.38
Sand Creek	Reach 01	39442	250.00	768.00	771.13		771.35	0.007990	3.77	66.39	28.57	0.44
Sand Creek	Reach 01	39442	452.00	768.00	772.37		772.65	0.006848	4.29	105.72	35.55	0.42
Sand Creek	Reach 01	39442	585.00	768.00	772.95		773.29	0.006503	4.68	127.55	39.14	0.42
Sand Creek	Reach 01	39442	742.00	768.00	773.52		773.93	0.006461	5.12	150.88	42.62	0.43
Sand Creek	Reach 01	39442	886.00	768.00	773.95		774.42	0.006646	5.53	169.73	45.19	0.45
Sand Creek	Reach 01	39442	1024.00	768.00	774.32		774.85	0.006852	5.90	186.73	47.53	0.46
Sand Creek	Reach 01	39442	1110.00	768.00	774.54		775.10	0.006964	6.12	197.16	48.92	0.47
Sand Creek	Reach 01	39442	1283.00	768.00	774.94		775.58	0.007178	6.52	217.55	51.54	0.48
Sand Creek	Reach 01	38942	250.00	764.00	768.48		768.62	0.003917	2.99	83.49	29.33	0.31
Sand Creek	Reach 01	38942	452.00	764.00	769.72		769.93	0.004382	3.69	122.64	34.92	0.34
Sand Creek	Reach 01	38942	585.00	764.00	770.27		770.53	0.004691	4.11	148.74	54.48	0.36
Sand Creek	Reach 01	38942	742.00	764.00	770.81		771.12	0.004828	4.53	183.91	85.31	0.37
Sand Creek	Reach 01	38942	886.00	764.00	771.26		771.60	0.004727	4.77	223.11	87.90	0.37
Sand Creek	Reach 01	38942	1024.00	764.00	771.66		772.01	0.004632	4.97	258.13	89.93	0.38
Sand Creek	Reach 01	38942	1110.00	764.00	771.88		772.25	0.004584	5.08	278.81	91.08	0.38
Sand Creek	Reach 01	38942	1283.00	764.00	772.31		772.70	0.004510	5.29	318.27	93.17	0.38
Sand Creek	Reach 01	38442	250.00	760.00	762.90	762.90	763.80	0.047905	7.62	32.83	18.59	1.01
Sand Creek	Reach 01	38442	452.00	760.00	764.00	763.85	765.00	0.036919	8.03	56.28	24.12	0.93
Sand Creek	Reach 01	38442	585.00	760.00	764.58	764.31	765.65	0.029443	8.31	71.34	27.96	0.86
Sand Creek	Reach 01	38442	742.00	760.00	765.14	764.78	766.32	0.025895	8.77	88.13	31.68	0.83
Sand Creek	Reach 01	38442	886.00	760.00	765.52	765.21	766.86	0.025659	9.36	100.76	34.27	0.84
Sand Creek	Reach 01	38442	1024.00	760.00	765.87	765.58	767.34	0.025371	9.86	113.11	37.50	0.85
Sand Creek	Reach 01	38442	1110.00	760.00	766.08	765.79	767.62	0.025115	10.13	121.06	39.29	0.85
Sand Creek	Reach 01	38442	1283.00	760.00	766.47	766.23	768.15	0.024483	10.59	137.21	41.64	0.85
Sand Creek	Reach 01	38184	250.00	756.00	761.40		761.50	0.002753	2.51	99.53	34.54	0.26
Sand Creek	Reach 01	38184	452.00	756.00	762.64		762.78	0.003180	3.09	146.27	41.36	0.29

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 01	38184	585.00	756.00	763.26		763.44	0.003368	3.38	173.32	44.84	0.30
Sand Creek	Reach 01	38184	742.00	756.00	763.88		764.09	0.003540	3.68	201.85	48.18	0.31
Sand Creek	Reach 01	38184	886.00	756.00	764.35		764.59	0.003545	3.95	225.03	50.06	0.32
Sand Creek	Reach 01	38184	1024.00	756.00	764.75		765.03	0.003587	4.20	245.71	51.68	0.33
Sand Creek	Reach 01	38184	1110.00	756.00	764.99		765.28	0.003617	4.34	258.13	52.63	0.33
Sand Creek	Reach 01	38184	1283.00	756.00	765.44		765.77	0.003691	4.63	281.88	54.23	0.34
Sand Creek	Reach 01	37942	250.00	756.00	760.45		760.61	0.005043	3.25	77.98	34.64	0.35
Sand Creek	Reach 01	37942	452.00	756.00	761.62		761.86	0.004576	3.95	127.99	51.72	0.36
Sand Creek	Reach 01	37942	585.00	756.00	762.22		762.49	0.004489	4.31	162.22	64.70	0.36
Sand Creek	Reach 01	37942	742.00	756.00	762.82		763.12	0.004403	4.64	204.16	76.06	0.37
Sand Creek	Reach 01	37942	886.00	756.00	763.31		763.64	0.004297	4.88	244.02	85.71	0.37
Sand Creek	Reach 01	37942	1024.00	756.00	763.74		764.09	0.004173	5.06	282.40	91.69	0.37
Sand Creek	Reach 01	37942	1110.00	756.00	764.00		764.35	0.004099	5.16	306.29	95.22	0.37
Sand Creek	Reach 01	37942	1283.00	756.00	764.48		764.84	0.003943	5.32	353.46	99.70	0.36
Sand Creek	Reach 01	37620	250.00	754.00	758.19		758.46	0.009169	4.17	60.00	23.49	0.46
Sand Creek	Reach 01	37620	452.00	754.00	759.44		759.81	0.009362	4.88	92.58	28.83	0.48
Sand Creek	Reach 01	37620	585.00	754.00	760.03		760.47	0.009302	5.31	110.48	32.09	0.49
Sand Creek	Reach 01	37620	742.00	754.00	760.61		761.13	0.009095	5.79	130.33	36.26	0.50
Sand Creek	Reach 01	37620	886.00	754.00	761.07		761.67	0.009091	6.21	148.04	40.07	0.50
Sand Creek	Reach 01	37620	1024.00	754.00	761.49		762.15	0.009055	6.55	165.34	43.45	0.51
Sand Creek	Reach 01	37620	1110.00	754.00	761.74		762.43	0.009010	6.75	176.35	45.44	0.51
Sand Creek	Reach 01	37620	1283.00	754.00	762.21		762.97	0.008933	7.10	198.63	49.80	0.52
Sand Creek	Reach 01	37442	250.00	752.00	757.46		757.58	0.002835	2.76	97.41	38.64	0.27
Sand Creek	Reach 01	37442	452.00	752.00	758.68		758.87	0.003073	3.53	156.04	69.63	0.29
Sand Creek	Reach 01	37442	585.00	752.00	759.33		759.53	0.002981	3.80	205.21	82.16	0.29
Sand Creek	Reach 01	37442	742.00	752.00	759.99		760.21	0.002837	4.02	264.68	93.97	0.29
Sand Creek	Reach 01	37442	886.00	752.00	760.54		760.75	0.002678	4.14	316.39	95.83	0.29
Sand Creek	Reach 01	37442	1024.00	752.00	761.02		761.24	0.002560	4.25	362.86	97.44	0.28
Sand Creek	Reach 01	37442	1110.00	752.00	761.30		761.53	0.002496	4.31	390.83	98.40	0.28
Sand Creek	Reach 01	37442	1283.00	752.00	761.84		762.07	0.002405	4.44	443.81	100.19	0.28
Sand Creek	Reach 01	37240	250.00	752.00	756.78		756.92	0.003755	3.00	86.48	35.14	0.31
Sand Creek	Reach 01	37240	452.00	752.00	757.96		758.17	0.003804	3.78	132.47	42.79	0.33
Sand Creek	Reach 01	37240	585.00	752.00	758.59		758.84	0.003838	4.17	160.45	46.52	0.34
Sand Creek	Reach 01	37240	742.00	752.00	759.23		759.53	0.003899	4.57	191.63	50.82	0.35
Sand Creek	Reach 01	37240	886.00	752.00	759.75		760.09	0.003964	4.90	218.98	54.57	0.35
Sand Creek	Reach 01	37240	1024.00	752.00	760.21		760.58	0.004012	5.18	244.81	58.19	0.36
Sand Creek	Reach 01	37240	1110.00	752.00	760.48		760.88	0.004027	5.33	261.04	60.56	0.36

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 01	37240	1283.00	752.00	760.99		761.43	0.004040	5.61	292.88	63.37	0.37
Sand Creek	Reach 01	36942	250.00	750.00	753.17	753.17	754.12	0.047902	7.80	32.06	17.24	1.01
Sand Creek	Reach 01	36942	452.00	750.00	754.18	754.18	755.37	0.043741	8.76	51.58	21.66	1.00
Sand Creek	Reach 01	36942	585.00	750.00	754.67	754.67	756.02	0.043084	9.33	62.71	23.64	1.01
Sand Creek	Reach 01	36942	742.00	750.00	755.19	755.19	756.69	0.041690	9.81	75.66	25.75	1.01
Sand Creek	Reach 01	36942	886.00	750.00	755.61	755.61	757.23	0.039857	10.21	86.87	27.49	1.00
Sand Creek	Reach 01	36942	1024.00	750.00	755.96	755.96	757.72	0.038152	10.65	96.59	28.89	1.00
Sand Creek	Reach 01	36942	1110.00	750.00	756.16	756.16	758.01	0.037076	10.90	102.64	29.63	0.99
Sand Creek	Reach 01	36942	1283.00	750.00	756.55	756.55	758.57	0.035689	11.41	114.29	30.97	0.99
Sand Creek	Reach 01	36814	250.00	748.00	752.00		752.07	0.001657	2.22	135.09	56.75	0.22
Sand Creek	Reach 01	36814	452.00	748.00	753.16		753.27	0.001754	2.79	203.90	61.86	0.23
Sand Creek	Reach 01	36814	585.00	748.00	753.78		753.91	0.001814	3.09	242.98	64.92	0.24
Sand Creek	Reach 01	36814	742.00	748.00	754.41		754.56	0.001887	3.41	284.90	68.14	0.25
Sand Creek	Reach 01	36814	886.00	748.00	754.99		755.15	0.001876	3.63	325.04	70.99	0.25
Sand Creek	Reach 01	36814	1024.00	748.00	755.53		755.71	0.001832	3.79	364.55	73.53	0.26
Sand Creek	Reach 01	36814	1110.00	748.00	755.90		756.09	0.001763	3.85	392.20	75.27	0.25
Sand Creek	Reach 01	36814	1283.00	748.00	756.65		756.84	0.001624	3.95	449.89	78.91	0.25
Sand Creek	Reach 01	36442	250.00	748.00	751.27		751.33	0.002425	2.03	123.35	56.59	0.24
Sand Creek	Reach 01	36442	452.00	748.00	752.45		752.54	0.002171	2.28	197.93	69.78	0.24
Sand Creek	Reach 01	36442	585.00	748.00	753.08		753.17	0.002078	2.40	244.26	77.63	0.24
Sand Creek	Reach 01	36442	742.00	748.00	753.72		753.82	0.002003	2.50	296.55	85.87	0.24
Sand Creek	Reach 01	36442	886.00	748.00	754.38		754.47	0.001680	2.50	355.68	93.75	0.22
Sand Creek	Reach 01	36442	1024.00	748.00	755.01		755.10	0.001361	2.48	416.49	98.77	0.20
Sand Creek	Reach 01	36442	1110.00	748.00	755.44		755.53	0.001180	2.45	459.66	102.17	0.19
Sand Creek	Reach 01	36442	1283.00	748.00	756.27		756.36	0.000931	2.42	547.46	108.43	0.18
Sand Creek	Reach 01	35942	250.00	746.00	750.09		750.17	0.002243	2.24	111.70	41.54	0.24
Sand Creek	Reach 01	35942	452.00	746.00	751.31		751.43	0.002233	2.75	167.28	49.37	0.25
Sand Creek	Reach 01	35942	585.00	746.00	751.96		752.10	0.002174	3.01	201.08	54.19	0.25
Sand Creek	Reach 01	35942	742.00	746.00	752.60		752.77	0.002184	3.30	237.40	59.93	0.26
Sand Creek	Reach 01	35942	886.00	746.00	753.42		753.59	0.001826	3.34	289.51	67.03	0.24
Sand Creek	Reach 01	35942	1024.00	746.00	754.20		754.37	0.001548	3.35	344.04	72.07	0.23
Sand Creek	Reach 01	35942	1110.00	746.00	754.72		754.89	0.001379	3.32	382.22	74.88	0.22
Sand Creek	Reach 01	35942	1283.00	746.00	755.68		755.84	0.001157	3.31	456.43	79.91	0.21
Sand Creek	Reach 01	35442	250.00	740.00	749.54		749.60	0.000676	1.98	146.26	33.78	0.14
Sand Creek	Reach 01	35442	452.00	740.00	750.43		750.56	0.001381	3.08	178.45	39.86	0.20
Sand Creek	Reach 01	35442	585.00	740.00	750.91		751.11	0.001818	3.69	198.99	44.43	0.23

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 01	35442	742.00	740.00	751.36		751.62	0.002363	4.36	219.67	48.65	0.27
Sand Creek	Reach 01	35442	886.00	740.00	752.31		752.58	0.002175	4.49	270.41	57.92	0.26
Sand Creek	Reach 01	35442	1024.00	740.00	753.23		753.49	0.001951	4.53	327.86	67.47	0.25
Sand Creek	Reach 01	35442	1110.00	740.00	753.84		754.10	0.001769	4.49	371.48	73.68	0.24
Sand Creek	Reach 01	35442	1283.00	740.00	754.94		755.17	0.001510	4.42	457.46	82.89	0.23
Sand Creek	Reach 02	34507	719.00	738.00	749.40		749.46	0.000207	2.19	464.24	91.55	0.13
Sand Creek	Reach 02	34507	1314.00	738.00	750.05		750.23	0.000527	3.67	526.01	97.61	0.21
Sand Creek	Reach 02	34507	1702.00	738.00	750.34		750.62	0.000787	4.57	554.72	100.59	0.26
Sand Creek	Reach 02	34507	2143.00	738.00	750.48		750.92	0.001180	5.65	569.21	102.10	0.31
Sand Creek	Reach 02	34507	2560.00	738.00	751.39		751.87	0.001200	6.04	666.66	112.33	0.32
Sand Creek	Reach 02	34507	2968.00	738.00	752.28		752.80	0.001188	6.33	772.94	126.95	0.32
Sand Creek	Reach 02	34507	3212.00	738.00	752.93		753.45	0.001126	6.38	858.63	138.61	0.32
Sand Creek	Reach 02	34507	3694.00	738.00	754.06		754.58	0.001038	6.49	1025.45	155.50	0.31
Sand Creek	Reach 02	34007	719.00	738.00	749.41		749.41	0.000033	0.80	2215.49	585.33	0.05
Sand Creek	Reach 02	34007	1314.00	738.00	750.09		750.11	0.000072	1.26	2623.07	600.33	0.08
Sand Creek	Reach 02	34007	1702.00	738.00	750.42		750.44	0.000099	1.52	2818.71	606.02	0.09
Sand Creek	Reach 02	34007	2143.00	738.00	750.61		750.64	0.000142	1.84	2936.36	609.44	0.11
Sand Creek	Reach 02	34007	2560.00	738.00	751.57		751.60	0.000123	1.84	3529.45	626.99	0.10
Sand Creek	Reach 02	34007	2968.00	738.00	752.50		752.52	0.000109	1.83	4134.01	670.86	0.10
Sand Creek	Reach 02	34007	3212.00	738.00	753.16		753.18	0.000096	1.80	4580.30	683.59	0.09
Sand Creek	Reach 02	34007	3694.00	738.00	754.31		754.33	0.000083	1.78	5376.29	700.32	0.09
Sand Creek	Reach 02	33508	719.00	736.00	749.39		749.40	0.000020	0.58	2346.59	428.96	0.03
Sand Creek	Reach 02	33508	1314.00	736.00	750.07		750.08	0.000049	0.95	2641.89	449.59	0.05
Sand Creek	Reach 02	33508	1702.00	736.00	750.38		750.39	0.000071	1.18	2783.63	457.81	0.06
Sand Creek	Reach 02	33508	2143.00	736.00	750.56		750.57	0.000105	1.44	2864.63	462.60	0.08
Sand Creek	Reach 02	33508	2560.00	736.00	751.52		751.54	0.000103	1.52	3322.69	490.86	0.08
Sand Creek	Reach 02	33508	2968.00	736.00	752.45		752.47	0.000102	1.58	3808.40	549.33	0.08
Sand Creek	Reach 02	33508	3212.00	736.00	753.11		753.13	0.000095	1.58	4177.69	564.22	0.08
Sand Creek	Reach 02	33508	3694.00	736.00	754.26		754.29	0.000084	1.57	4832.50	572.00	0.07
Sand Creek	Reach 02	32803	722.00	733.00	749.39	737.53	749.39	0.000009	0.46	3114.53	484.62	0.02
Sand Creek	Reach 02	32803	1268.00	733.00	750.05	738.67	750.05	0.000020	0.72	3437.13	489.93	0.03
Sand Creek	Reach 02	32803	1546.00	733.00	750.36	739.13	750.36	0.000026	0.84	3587.56	492.39	0.04
Sand Creek	Reach 02	32803	1707.00	733.00	750.53	739.39	750.53	0.000030	0.90	3671.79	493.76	0.04
Sand Creek	Reach 02	32803	2670.00	733.00	751.47	740.61	751.49	0.000052	1.24	4144.32	503.62	0.06
Sand Creek	Reach 02	32803	3755.00	733.00	752.39	741.39	752.41	0.000075	1.56	4610.66	511.66	0.07
Sand Creek	Reach 02	32803	4535.00	733.00	753.05	741.91	753.07	0.000090	1.75	4947.66	516.93	0.08
Sand Creek	Reach 02	32803	5985.00	733.00	754.19	742.96	754.21	0.000112	2.04	5540.83	525.55	0.09

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 02	32685	Bridge									
Sand Creek	Reach 02	32647	722.00	732.00	749.37		749.38	0.000035	0.95	1136.85	145.59	0.05
Sand Creek	Reach 02	32647	1268.00	732.00	750.01		750.04	0.000090	1.57	1232.66	155.73	0.07
Sand Creek	Reach 02	32647	1546.00	732.00	750.30		750.34	0.000123	1.87	1278.61	161.00	0.09
Sand Creek	Reach 02	32647	1707.00	732.00	750.46		750.51	0.000144	2.03	1304.69	163.91	0.09
Sand Creek	Reach 02	32647	2670.00	732.00	751.34		751.44	0.000279	2.95	1461.54	206.72	0.13
Sand Creek	Reach 02	32647	3755.00	732.00	752.20		752.39	0.000452	3.89	1664.77	276.90	0.17
Sand Creek	Reach 02	32647	4535.00	732.00	752.77		753.02	0.000573	4.48	1849.02	358.58	0.19
Sand Creek	Reach 02	32647	5985.00	732.00	753.75		754.08	0.000750	5.32	2216.46	388.20	0.22
Sand Creek	Reach 02	32477	722.00	732.74	749.37		749.38	0.000013	0.54	2464.22	334.62	0.03
Sand Creek	Reach 02	32477	1268.00	732.74	750.02		750.02	0.000031	0.88	2680.55	339.03	0.04
Sand Creek	Reach 02	32477	1546.00	732.74	750.31		750.32	0.000042	1.03	2780.68	341.96	0.05
Sand Creek	Reach 02	32477	1707.00	732.74	750.47		750.49	0.000049	1.12	2836.65	343.68	0.05
Sand Creek	Reach 02	32477	2670.00	732.74	751.37		751.39	0.000089	1.58	3149.43	353.87	0.07
Sand Creek	Reach 02	32477	3755.00	732.74	752.27		752.31	0.000135	2.03	3473.06	368.20	0.09
Sand Creek	Reach 02	32477	4535.00	732.74	752.86		752.91	0.000167	2.32	3694.17	379.59	0.10
Sand Creek	Reach 02	32477	5985.00	732.74	753.87		753.93	0.000224	2.80	4086.55	401.32	0.12
Sand Creek	Reach 02	32071	722.00	732.00	749.37		749.37	0.000009	0.52	2651.98	267.34	0.02
Sand Creek	Reach 02	32071	1268.00	732.00	750.01		750.01	0.000023	0.86	2823.26	271.54	0.04
Sand Creek	Reach 02	32071	1546.00	732.00	750.30		750.31	0.000032	1.02	2902.51	274.27	0.05
Sand Creek	Reach 02	32071	1707.00	732.00	750.46		750.47	0.000037	1.12	2946.78	275.78	0.05
Sand Creek	Reach 02	32071	2670.00	732.00	751.34		751.36	0.000073	1.62	3193.96	284.61	0.07
Sand Creek	Reach 02	32071	3755.00	732.00	752.22		752.26	0.000117	2.13	3452.68	306.53	0.09
Sand Creek	Reach 02	32071	4535.00	732.00	752.80		752.84	0.000150	2.46	3632.46	316.71	0.10
Sand Creek	Reach 02	32071	5985.00	732.00	753.78		753.85	0.000210	3.01	3948.55	328.65	0.12
Sand Creek	Reach 02	31507	722.00	730.00	749.36		749.36	0.000027	0.59	1667.19	198.84	0.03
Sand Creek	Reach 02	31507	1268.00	730.00	749.98		749.99	0.000072	0.98	1794.04	210.83	0.04
Sand Creek	Reach 02	31507	1546.00	730.00	750.26		750.28	0.000099	1.17	1854.53	219.15	0.05
Sand Creek	Reach 02	31507	1707.00	730.00	750.41		750.43	0.000116	1.27	1888.61	222.15	0.05
Sand Creek	Reach 02	31507	2670.00	730.00	751.25		751.29	0.000228	1.85	2081.95	239.80	0.08
Sand Creek	Reach 02	31507	3755.00	730.00	752.08		752.15	0.000360	2.39	2319.63	362.25	0.10
Sand Creek	Reach 02	31507	4535.00	730.00	752.62		752.71	0.000443	2.71	2526.49	395.64	0.11
Sand Creek	Reach 02	31507	5985.00	730.00	753.56		753.66	0.000568	3.16	2914.69	435.85	0.12
Sand Creek	Reach 02	31007	722.00	730.00	749.35		749.36	0.000009	0.47	2776.89	363.15	0.02
Sand Creek	Reach 02	31007	1268.00	730.00	749.96		749.97	0.000024	0.79	3007.30	392.90	0.03

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 02	31007	1546.00	730.00	750.24		750.25	0.000033	0.94	3118.72	419.52	0.04
Sand Creek	Reach 02	31007	1707.00	730.00	750.39		750.40	0.000039	1.02	3183.49	442.33	0.04
Sand Creek	Reach 02	31007	2670.00	730.00	751.20		751.22	0.000078	1.49	3559.22	477.05	0.06
Sand Creek	Reach 02	31007	3755.00	730.00	752.01		752.04	0.000122	1.92	3946.60	500.53	0.08
Sand Creek	Reach 02	31007	4535.00	730.00	752.53		752.57	0.000155	2.20	4215.65	525.80	0.09
Sand Creek	Reach 02	31007	5985.00	730.00	753.42		753.48	0.000212	2.65	4710.41	565.35	0.10
Sand Creek	Reach 02	30631	722.00	730.00	749.35		749.35	0.000002	0.25	6153.66	575.77	0.01
Sand Creek	Reach 02	30631	1268.00	730.00	749.96		749.96	0.000006	0.41	6512.69	600.83	0.02
Sand Creek	Reach 02	30631	1546.00	730.00	750.24		750.24	0.000009	0.49	6678.25	607.42	0.02
Sand Creek	Reach 02	30631	1707.00	730.00	750.39		750.39	0.000010	0.54	6769.97	610.01	0.02
Sand Creek	Reach 02	30631	2670.00	730.00	751.20		751.21	0.000020	0.78	7271.80	621.85	0.03
Sand Creek	Reach 02	30631	3755.00	730.00	752.00		752.01	0.000035	1.05	7773.33	665.27	0.04
Sand Creek	Reach 02	30631	4535.00	730.00	752.53		752.53	0.000045	1.21	8123.82	675.27	0.05
Sand Creek	Reach 02	30631	5985.00	730.00	753.42		753.43	0.000065	1.50	8741.02	702.16	0.06
Sand Creek	Reach 02	30507	722.00	728.00	749.35		749.35	0.000002	0.32	6059.93	558.40	0.01
Sand Creek	Reach 02	30507	1268.00	728.00	749.96		749.96	0.000005	0.55	6408.20	586.39	0.02
Sand Creek	Reach 02	30507	1546.00	728.00	750.24		750.24	0.000007	0.65	6569.34	591.75	0.03
Sand Creek	Reach 02	30507	1707.00	728.00	750.39		750.39	0.000008	0.71	6658.46	594.39	0.03
Sand Creek	Reach 02	30507	2670.00	728.00	751.20		751.20	0.000016	1.04	7146.84	608.69	0.04
Sand Creek	Reach 02	30507	3755.00	728.00	751.99		752.00	0.000026	1.37	7636.37	622.68	0.05
Sand Creek	Reach 02	30507	4535.00	728.00	752.51		752.53	0.000035	1.62	7976.94	659.97	0.06
Sand Creek	Reach 02	30507	5985.00	728.00	753.40		753.42	0.000051	2.00	8568.56	678.46	0.08
Sand Creek	Reach 02	30007	722.00	726.00	749.35		749.35	0.000003	0.27	4293.19	659.97	0.01
Sand Creek	Reach 02	30007	1268.00	726.00	749.96		749.96	0.000008	0.44	4703.32	695.33	0.02
Sand Creek	Reach 02	30007	1546.00	726.00	750.23		750.23	0.000010	0.52	4895.78	715.49	0.02
Sand Creek	Reach 02	30007	1707.00	726.00	750.38		750.38	0.000012	0.57	5003.20	722.98	0.02
Sand Creek	Reach 02	30007	2670.00	726.00	751.19		751.19	0.000024	0.82	5604.59	770.16	0.03
Sand Creek	Reach 02	30007	3755.00	726.00	751.97		751.99	0.000038	1.07	6228.58	810.99	0.04
Sand Creek	Reach 02	30007	4535.00	726.00	752.49		752.51	0.000048	1.22	6651.87	833.62	0.05
Sand Creek	Reach 02	30007	5985.00	726.00	753.36		753.39	0.000071	1.53	7492.29	1004.29	0.06
Sand Creek	Reach 03	29507	722.00	726.00	749.35		749.35	0.000001	0.27	5382.10	540.67	0.01
Sand Creek	Reach 03	29507	1268.00	726.00	749.96		749.96	0.000003	0.45	5711.92	547.35	0.02
Sand Creek	Reach 03	29507	1546.00	726.00	750.23		750.23	0.000004	0.54	5861.21	550.80	0.02
Sand Creek	Reach 03	29507	1707.00	726.00	750.38		750.38	0.000004	0.58	5943.62	552.77	0.02
Sand Creek	Reach 03	29507	2670.00	726.00	751.19		751.19	0.000009	0.86	6393.47	563.79	0.03
Sand Creek	Reach 03	29507	3755.00	726.00	751.97		751.99	0.000015	1.14	6842.35	576.28	0.04
Sand Creek	Reach 03	29507	4535.00	726.00	752.49		752.50	0.000019	1.33	7142.32	591.22	0.05

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 03	29507	5985.00	726.00	753.36		753.39	0.000029	1.66	7671.28	619.94	0.06
Sand Creek	Reach 03	29007	722.00	726.00	749.35		749.35	0.000000	0.19	7015.02	554.04	0.01
Sand Creek	Reach 03	29007	1268.00	726.00	749.96		749.96	0.000001	0.31	7353.83	563.89	0.01
Sand Creek	Reach 03	29007	1546.00	726.00	750.23		750.23	0.000002	0.38	7507.81	569.34	0.01
Sand Creek	Reach 03	29007	1707.00	726.00	750.38		750.38	0.000002	0.41	7593.08	572.44	0.02
Sand Creek	Reach 03	29007	2670.00	726.00	751.18		751.19	0.000005	0.61	8060.84	589.25	0.02
Sand Creek	Reach 03	29007	3755.00	726.00	751.97		751.98	0.000008	0.82	8530.77	604.69	0.03
Sand Creek	Reach 03	29007	4535.00	726.00	752.49		752.49	0.000011	0.96	8844.22	615.81	0.04
Sand Creek	Reach 03	29007	5985.00	726.00	753.36		753.37	0.000016	1.21	9389.93	634.90	0.04
Sand Creek	Reach 03	28506	722.00	726.00	749.35		749.35	0.000000	0.10	8773.64	668.08	0.00
Sand Creek	Reach 03	28506	1268.00	726.00	749.96		749.96	0.000000	0.17	9184.65	688.03	0.01
Sand Creek	Reach 03	28506	1546.00	726.00	750.23		750.23	0.000001	0.20	9372.96	697.84	0.01
Sand Creek	Reach 03	28506	1707.00	726.00	750.38		750.38	0.000001	0.22	9477.59	703.34	0.01
Sand Creek	Reach 03	28506	2670.00	726.00	751.19		751.19	0.000001	0.34	10056.08	733.10	0.01
Sand Creek	Reach 03	28506	3755.00	726.00	751.97		751.98	0.000003	0.45	10644.64	762.28	0.02
Sand Creek	Reach 03	28506	4535.00	726.00	752.49		752.49	0.000003	0.53	11042.55	786.93	0.02
Sand Creek	Reach 03	28506	5985.00	726.00	753.36		753.37	0.000005	0.67	11747.82	828.15	0.02
Sand Creek	Reach 03	28007	722.00	726.00	749.35		749.35	0.000000	0.11	7891.02	604.04	0.00
Sand Creek	Reach 03	28007	1268.00	726.00	749.96		749.96	0.000000	0.18	8264.95	629.91	0.01
Sand Creek	Reach 03	28007	1546.00	726.00	750.23		750.23	0.000001	0.22	8437.48	639.89	0.01
Sand Creek	Reach 03	28007	1707.00	726.00	750.38		750.38	0.000001	0.24	8533.39	645.08	0.01
Sand Creek	Reach 03	28007	2670.00	726.00	751.18		751.19	0.000002	0.36	9063.91	673.58	0.01
Sand Creek	Reach 03	28007	3755.00	726.00	751.97		751.97	0.000003	0.49	9605.14	703.30	0.02
Sand Creek	Reach 03	28007	4535.00	726.00	752.48		752.49	0.000004	0.57	9971.17	723.28	0.02
Sand Creek	Reach 03	28007	5985.00	726.00	753.36		753.36	0.000006	0.72	10615.28	753.21	0.03
Sand Creek	Reach 03	27507	722.00	726.00	749.35		749.35	0.000000	0.10	10554.90	875.42	0.00
Sand Creek	Reach 03	27507	1268.00	726.00	749.96		749.96	0.000000	0.18	11092.19	898.29	0.01
Sand Creek	Reach 03	27507	1546.00	726.00	750.23		750.23	0.000001	0.21	11344.22	937.50	0.01
Sand Creek	Reach 03	27507	1707.00	726.00	750.38		750.38	0.000001	0.23	11484.53	942.79	0.01
Sand Creek	Reach 03	27507	2670.00	726.00	751.18		751.18	0.000001	0.34	12253.93	969.63	0.01
Sand Creek	Reach 03	27507	3755.00	726.00	751.97		751.97	0.000002	0.46	13028.38	1002.51	0.02
Sand Creek	Reach 03	27507	4535.00	726.00	752.48		752.49	0.000003	0.54	13546.60	1017.55	0.02
Sand Creek	Reach 03	27507	5985.00	726.00	753.35		753.36	0.000005	0.68	14444.03	1041.87	0.02
Sand Creek	Reach 03	27007	722.00	726.00	749.35		749.35	0.000000	0.07	12501.59	1037.52	0.00
Sand Creek	Reach 03	27007	1268.00	726.00	749.96		749.96	0.000000	0.12	13136.44	1058.28	0.00
Sand Creek	Reach 03	27007	1546.00	726.00	750.23		750.23	0.000000	0.14	13441.02	1137.07	0.01

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 03	27007	1707.00	726.00	750.38		750.38	0.000000	0.16	13611.12	1142.61	0.01
Sand Creek	Reach 03	27007	2670.00	726.00	751.18		751.18	0.000001	0.23	14542.58	1172.47	0.01
Sand Creek	Reach 03	27007	3755.00	726.00	751.97		751.97	0.000001	0.31	15475.92	1201.05	0.01
Sand Creek	Reach 03	27007	4535.00	726.00	752.48		752.48	0.000002	0.36	16094.96	1211.93	0.01
Sand Creek	Reach 03	27007	5985.00	726.00	753.35		753.36	0.000002	0.44	17159.04	1229.35	0.02
Sand Creek	Reach 03	26507	722.00	726.00	749.35		749.35	0.000000	0.05	16521.30	1309.26	0.00
Sand Creek	Reach 03	26507	1268.00	726.00	749.96		749.96	0.000000	0.08	17321.78	1333.01	0.00
Sand Creek	Reach 03	26507	1546.00	726.00	750.23		750.23	0.000000	0.10	17700.86	1412.04	0.00
Sand Creek	Reach 03	26507	1707.00	726.00	750.38		750.38	0.000000	0.11	17911.97	1418.56	0.00
Sand Creek	Reach 03	26507	2670.00	726.00	751.18		751.18	0.000000	0.16	19067.62	1453.71	0.01
Sand Creek	Reach 03	26507	3755.00	726.00	751.97		751.97	0.000001	0.21	20224.22	1487.52	0.01
Sand Creek	Reach 03	26507	4535.00	726.00	752.48		752.48	0.000001	0.25	20991.74	1503.99	0.01
Sand Creek	Reach 03	26507	5985.00	726.00	753.35		753.36	0.000001	0.31	22314.88	1532.00	0.01
Sand Creek	Reach 03	26321	722.00	726.00	749.35		749.35	0.000000	0.03	26048.44	1711.03	0.00
Sand Creek	Reach 03	26321	1268.00	726.00	749.96		749.96	0.000000	0.05	27092.62	1736.03	0.00
Sand Creek	Reach 03	26321	1546.00	726.00	750.23		750.23	0.000000	0.06	27580.37	1811.40	0.00
Sand Creek	Reach 03	26321	1707.00	726.00	750.38		750.38	0.000000	0.07	27851.15	1817.60	0.00
Sand Creek	Reach 03	26321	2670.00	726.00	751.18		751.18	0.000000	0.10	29327.32	1853.91	0.00
Sand Creek	Reach 03	26321	3755.00	726.00	751.97		751.97	0.000000	0.13	30797.03	1880.54	0.01
Sand Creek	Reach 03	26321	4535.00	726.00	752.48		752.48	0.000000	0.16	31765.03	1892.84	0.01
Sand Creek	Reach 03	26321	5985.00	726.00	753.35		753.36	0.000000	0.20	33424.30	1913.63	0.01
Sand Creek	Reach 03	25855	722.00	726.00	749.35		749.35	0.000000	0.04	18504.57	1304.16	0.00
Sand Creek	Reach 03	25855	1268.00	726.00	749.96		749.96	0.000000	0.07	19303.25	1329.67	0.00
Sand Creek	Reach 03	25855	1546.00	726.00	750.23		750.23	0.000000	0.08	19666.09	1344.15	0.00
Sand Creek	Reach 03	25855	1707.00	726.00	750.38		750.38	0.000000	0.09	19867.34	1352.83	0.00
Sand Creek	Reach 03	25855	2670.00	726.00	751.18		751.18	0.000000	0.13	20973.59	1396.00	0.01
Sand Creek	Reach 03	25855	3755.00	726.00	751.97		751.97	0.000000	0.17	22086.99	1436.60	0.01
Sand Creek	Reach 03	25855	4535.00	726.00	752.48		752.48	0.000001	0.20	22832.78	1464.77	0.01
Sand Creek	Reach 03	25855	5985.00	726.00	753.35		753.36	0.000001	0.26	24125.00	1500.04	0.01
Sand Creek	Reach 03	25631	722.00	726.00	749.35	726.41	749.35	0.000000	0.05	15968.16	1193.99	0.00
Sand Creek	Reach 03	25631	1268.00	726.00	749.96	726.60	749.96	0.000000	0.08	16697.52	1213.45	0.00
Sand Creek	Reach 03	25631	1546.00	726.00	750.23	726.68	750.23	0.000000	0.09	17028.36	1224.11	0.00
Sand Creek	Reach 03	25631	1707.00	726.00	750.38	726.73	750.38	0.000000	0.10	17211.45	1230.70	0.00
Sand Creek	Reach 03	25631	2670.00	726.00	751.18	726.99	751.18	0.000000	0.15	18218.94	1272.62	0.01
Sand Creek	Reach 03	25631	3755.00	726.00	751.97	727.23	751.97	0.000001	0.20	19239.59	1323.33	0.01
Sand Creek	Reach 03	25631	4535.00	726.00	752.48	727.40	752.48	0.000001	0.24	19926.27	1349.76	0.01
Sand Creek	Reach 03	25631	5985.00	726.00	753.35	727.68	753.35	0.000001	0.30	21120.25	1452.72	0.01

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 03	25533	Inl Struct									
Sand Creek	Reach 03	25481	722.00	748.00	748.90	748.90	749.35	0.003456	5.37	134.35	151.25	1.00
Sand Creek	Reach 03	25481	1268.00	748.00	749.31	749.31	749.96	0.003066	6.45	196.52	153.57	1.01
Sand Creek	Reach 03	25481	1546.00	748.00	749.50	749.50	750.23	0.002935	6.87	224.91	154.62	1.00
Sand Creek	Reach 03	25481	1707.00	748.00	749.60	749.60	750.38	0.002884	7.10	240.30	155.19	1.01
Sand Creek	Reach 03	25481	2670.00	748.00	750.14	750.14	751.18	0.002621	8.19	326.16	158.31	1.01
Sand Creek	Reach 03	25481	3755.00	748.00	750.68	750.68	751.97	0.002447	9.12	411.84	161.36	1.01
Sand Creek	Reach 03	25481	4535.00	748.00	751.03	751.03	752.48	0.002351	9.66	469.26	163.38	1.00
Sand Creek	Reach 03	25481	5985.00	748.00	751.63	751.63	753.35	0.002227	10.53	568.25	166.79	1.01
Sand Creek	Reach 03	25311	317.00	710.00	712.73		712.74	0.001472	0.73	436.50	163.52	0.08
Sand Creek	Reach 03	25311	361.00	710.00	713.62		713.63	0.000745	0.62	583.08	166.02	0.06
Sand Creek	Reach 03	25311	383.00	710.00	714.54		714.55	0.000394	0.52	737.22	168.61	0.04
Sand Creek	Reach 03	25311	403.00	710.00	715.39		715.40	0.000246	0.46	881.60	171.00	0.04
Sand Creek	Reach 03	25311	420.00	710.00	716.19		716.19	0.000168	0.41	1018.68	173.24	0.03
Sand Creek	Reach 03	25311	434.00	710.00	716.97		716.97	0.000127	0.38	1155.76	182.49	0.03
Sand Creek	Reach 03	25311	444.00	710.00	717.30		717.30	0.000118	0.36	1217.42	189.47	0.03
Sand Creek	Reach 03	25311	466.00	710.00	718.29		718.29	0.000087	0.33	1411.27	201.42	0.02
Sand Creek	Reach 03	25007	317.00	708.00	712.17		712.25	0.001718	2.32	136.52	51.78	0.25
Sand Creek	Reach 03	25007	361.00	708.00	713.35		713.40	0.000729	1.78	202.51	59.61	0.17
Sand Creek	Reach 03	25007	383.00	708.00	714.40		714.43	0.000354	1.43	268.44	65.85	0.12
Sand Creek	Reach 03	25007	403.00	708.00	715.30		715.33	0.000204	1.24	330.20	70.88	0.10
Sand Creek	Reach 03	25007	420.00	708.00	716.13		716.15	0.000134	1.10	390.55	76.07	0.08
Sand Creek	Reach 03	25007	434.00	708.00	716.92		716.93	0.000093	1.00	453.55	83.40	0.07
Sand Creek	Reach 03	25007	444.00	708.00	717.25		717.27	0.000082	0.97	482.05	86.50	0.06
Sand Creek	Reach 03	25007	466.00	708.00	718.26		718.27	0.000057	0.88	576.54	112.94	0.05
Sand Creek	Reach 03	24507	317.00	706.00	711.32		711.41	0.001662	2.42	130.91	44.78	0.25
Sand Creek	Reach 03	24507	361.00	706.00	713.04		713.09	0.000540	1.65	218.27	56.77	0.15
Sand Creek	Reach 03	24507	383.00	706.00	714.25		714.28	0.000266	1.31	307.14	126.90	0.11
Sand Creek	Reach 03	24507	403.00	706.00	715.22		715.24	0.000145	1.10	439.63	145.95	0.08
Sand Creek	Reach 03	24507	420.00	706.00	716.08		716.09	0.000090	0.95	572.70	168.49	0.07
Sand Creek	Reach 03	24507	434.00	706.00	716.88		716.89	0.000060	0.84	717.35	189.90	0.06
Sand Creek	Reach 03	24507	444.00	706.00	717.22		717.23	0.000052	0.81	783.47	198.93	0.05
Sand Creek	Reach 03	24507	466.00	706.00	718.24		718.24	0.000034	0.71	999.16	226.48	0.04
Sand Creek	Reach 03	24007	317.00	704.00	710.46		710.56	0.001749	2.59	154.38	61.27	0.25
Sand Creek	Reach 03	24007	361.00	704.00	712.85		712.88	0.000314	1.43	357.56	105.30	0.11

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 03	24007	383.00	704.00	714.17		714.18	0.000139	1.12	499.18	110.58	0.08
Sand Creek	Reach 03	24007	403.00	704.00	715.17		715.18	0.000086	0.97	612.64	114.72	0.06
Sand Creek	Reach 03	24007	420.00	704.00	716.04		716.05	0.000060	0.88	714.16	118.64	0.05
Sand Creek	Reach 03	24007	434.00	704.00	716.86		716.87	0.000045	0.81	814.04	126.02	0.05
Sand Creek	Reach 03	24007	444.00	704.00	717.20		717.21	0.000041	0.80	857.74	129.07	0.05
Sand Creek	Reach 03	24007	466.00	704.00	718.22		718.23	0.000031	0.74	993.56	137.73	0.04
Sand Creek	Reach 03	23507	317.00	702.00	709.89		709.97	0.000828	2.28	163.03	63.07	0.18
Sand Creek	Reach 03	23507	361.00	702.00	712.75		712.77	0.000165	1.36	443.02	128.08	0.08
Sand Creek	Reach 03	23507	383.00	702.00	714.11		714.13	0.000088	1.11	635.63	157.08	0.06
Sand Creek	Reach 03	23507	403.00	702.00	715.14		715.15	0.000058	0.96	806.35	175.10	0.05
Sand Creek	Reach 03	23507	420.00	702.00	716.02		716.03	0.000042	0.86	966.80	188.77	0.05
Sand Creek	Reach 03	23507	434.00	702.00	716.84		716.85	0.000031	0.78	1126.57	199.57	0.04
Sand Creek	Reach 03	23507	444.00	702.00	717.19		717.19	0.000028	0.76	1196.07	204.10	0.04
Sand Creek	Reach 03	23507	466.00	702.00	718.21		718.21	0.000021	0.69	1411.74	217.77	0.03
Sand Creek	Reach 03	23007	317.00	702.00	709.56		709.61	0.000590	1.78	177.84	42.99	0.15
Sand Creek	Reach 03	23007	361.00	702.00	712.68		712.69	0.000126	1.07	377.03	147.21	0.08
Sand Creek	Reach 03	23007	383.00	702.00	714.08		714.09	0.000062	0.86	604.11	176.75	0.06
Sand Creek	Reach 03	23007	403.00	702.00	715.12		715.12	0.000040	0.75	798.63	197.31	0.05
Sand Creek	Reach 03	23007	420.00	702.00	716.00		716.01	0.000028	0.68	981.50	253.35	0.04
Sand Creek	Reach 03	23007	434.00	702.00	716.83		716.84	0.000020	0.61	1207.54	293.06	0.03
Sand Creek	Reach 03	23007	444.00	702.00	717.18		717.18	0.000018	0.59	1311.66	309.63	0.03
Sand Creek	Reach 03	23007	466.00	702.00	718.20		718.21	0.000013	0.52	1658.30	358.12	0.03
Sand Creek	Reach 03	22845	317.00	702.00	709.52		709.55	0.000256	1.36	246.23	78.81	0.11
Sand Creek	Reach 03	22845	361.00	702.00	712.67		712.68	0.000053	0.85	580.95	126.42	0.05
Sand Creek	Reach 03	22845	383.00	702.00	714.07		714.08	0.000032	0.73	770.41	144.45	0.04
Sand Creek	Reach 03	22845	403.00	702.00	715.11		715.12	0.000023	0.67	931.39	166.86	0.04
Sand Creek	Reach 03	22845	420.00	702.00	716.00		716.01	0.000018	0.63	1085.02	180.19	0.03
Sand Creek	Reach 03	22845	434.00	702.00	716.83		716.83	0.000015	0.59	1247.89	212.74	0.03
Sand Creek	Reach 03	22845	444.00	702.00	717.17		717.18	0.000014	0.59	1323.96	226.92	0.03
Sand Creek	Reach 03	22845	466.00	702.00	718.20		718.20	0.000011	0.54	1569.82	250.33	0.03
Sand Creek	Reach 03	22508	317.00	700.00	709.46		709.48	0.000132	1.11	295.71	62.63	0.08
Sand Creek	Reach 03	22508	361.00	700.00	712.66		712.66	0.000038	0.79	596.86	131.06	0.05
Sand Creek	Reach 03	22508	383.00	700.00	714.06		714.07	0.000025	0.69	800.67	157.70	0.04
Sand Creek	Reach 03	22508	403.00	700.00	715.11		715.11	0.000018	0.63	969.33	165.79	0.03
Sand Creek	Reach 03	22508	420.00	700.00	716.00		716.00	0.000014	0.59	1119.87	172.75	0.03
Sand Creek	Reach 03	22508	434.00	700.00	716.82		716.83	0.000012	0.55	1268.65	186.39	0.03
Sand Creek	Reach 03	22508	444.00	700.00	717.17		717.17	0.000011	0.55	1334.12	192.23	0.03

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 03	22508	466.00	700.00	718.20		718.20	0.000009	0.51	1540.55	209.92	0.02
Sand Creek	Reach 04	21893	2673.00	698.00	708.75		709.04	0.000994	4.42	731.95	150.18	0.28
Sand Creek	Reach 04	21893	4926.00	698.00	711.87		712.28	0.000955	5.42	1275.74	199.19	0.29
Sand Creek	Reach 04	21893	6248.00	698.00	713.20		713.68	0.000989	5.96	1656.56	323.71	0.30
Sand Creek	Reach 04	21893	7531.00	698.00	714.18		714.72	0.001029	6.41	1986.66	346.09	0.31
Sand Creek	Reach 04	21893	8797.00	698.00	715.01		715.60	0.001072	6.81	2276.74	355.09	0.32
Sand Creek	Reach 04	21893	10086.00	698.00	715.78		716.41	0.001111	7.18	2553.28	364.58	0.33
Sand Creek	Reach 04	21893	10654.00	698.00	716.10		716.75	0.001126	7.33	2670.86	368.26	0.33
Sand Creek	Reach 04	21893	12345.00	698.00	717.08		717.78	0.001142	7.70	3035.77	377.76	0.34
Sand Creek	Reach 04	21508	2673.00	696.00	707.75		708.27	0.005245	5.85	475.26	83.57	0.36
Sand Creek	Reach 04	21508	4926.00	696.00	710.73		711.51	0.005425	7.34	826.49	185.38	0.39
Sand Creek	Reach 04	21508	6248.00	696.00	712.06		712.90	0.005329	7.85	1123.07	304.94	0.39
Sand Creek	Reach 04	21508	7531.00	696.00	713.11		713.94	0.005038	8.06	1455.09	327.63	0.39
Sand Creek	Reach 04	21508	8797.00	696.00	714.01	709.30	714.81	0.004794	8.21	1757.94	346.87	0.38
Sand Creek	Reach 04	21508	10086.00	696.00	714.84	710.61	715.63	0.004583	8.34	2056.62	368.20	0.38
Sand Creek	Reach 04	21508	10654.00	696.00	715.19		715.97	0.004485	8.37	2188.01	376.93	0.38
Sand Creek	Reach 04	21508	12345.00	696.00	716.21		717.00	0.004370	8.63	2600.60	452.01	0.37
Sand Creek	Reach 04	21007	2673.00	696.00	704.90		705.51	0.005809	6.25	428.57	70.30	0.44
Sand Creek	Reach 04	21007	4926.00	696.00	707.56		708.54	0.006436	8.00	631.33	82.68	0.48
Sand Creek	Reach 04	21007	6248.00	696.00	708.71		709.90	0.006684	8.81	784.97	172.01	0.50
Sand Creek	Reach 04	21007	7531.00	696.00	709.79		711.06	0.006426	9.27	984.24	199.73	0.50
Sand Creek	Reach 04	21007	8797.00	696.00	710.79		712.09	0.006025	9.53	1190.53	208.97	0.49
Sand Creek	Reach 04	21007	10086.00	696.00	711.71		713.03	0.005726	9.77	1384.26	214.20	0.48
Sand Creek	Reach 04	21007	10654.00	696.00	712.09		713.42	0.005604	9.86	1467.87	216.59	0.48
Sand Creek	Reach 04	21007	12345.00	696.00	713.20		714.55	0.005279	10.11	1711.73	224.19	0.47
Sand Creek	Reach 04	20941	2673.00	696.00	705.03		705.19	0.001628	3.42	831.24	197.24	0.23
Sand Creek	Reach 04	20941	4926.00	696.00	708.00		708.16	0.000967	3.16	1508.83	264.27	0.19
Sand Creek	Reach 04	20941	6248.00	696.00	709.30		709.47	0.000845	3.24	1865.01	282.90	0.18
Sand Creek	Reach 04	20941	7531.00	696.00	710.44		710.62	0.000772	3.32	2203.08	311.11	0.17
Sand Creek	Reach 04	20941	8797.00	696.00	711.46		711.65	0.000724	3.41	2522.75	315.52	0.17
Sand Creek	Reach 04	20941	10086.00	696.00	712.38		712.59	0.000697	3.51	2820.54	330.00	0.17
Sand Creek	Reach 04	20941	10654.00	696.00	712.78		712.98	0.000687	3.55	2951.28	337.01	0.17
Sand Creek	Reach 04	20941	12345.00	696.00	713.89		714.11	0.000661	3.68	3339.08	360.58	0.17
Sand Creek	Reach 04	20677	2673.00	696.00	704.58		704.81	0.001233	4.03	874.06	180.25	0.26
Sand Creek	Reach 04	20677	4926.00	696.00	707.55		707.86	0.001197	4.94	1471.99	231.01	0.27
Sand Creek	Reach 04	20677	6248.00	696.00	708.81		709.18	0.001240	5.42	1779.77	257.82	0.28

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 04	20677	7531.00	696.00	709.92		710.34	0.001266	5.82	2080.80	284.93	0.28
Sand Creek	Reach 04	20677	8797.00	696.00	710.93		711.37	0.001268	6.11	2375.74	301.81	0.29
Sand Creek	Reach 04	20677	10086.00	696.00	711.84		712.32	0.001275	6.40	2656.58	314.06	0.29
Sand Creek	Reach 04	20677	10654.00	696.00	712.22		712.71	0.001277	6.51	2778.66	319.31	0.29
Sand Creek	Reach 04	20677	12345.00	696.00	713.32		713.85	0.001278	6.82	3137.53	334.42	0.30
Sand Creek	Reach 04	20507	2673.00	694.00	704.01		704.51	0.002126	6.10	643.68	152.02	0.41
Sand Creek	Reach 04	20507	4926.00	694.00	706.95		707.58	0.001821	7.14	1195.76	220.78	0.40
Sand Creek	Reach 04	20507	6248.00	694.00	708.19		708.90	0.001821	7.73	1486.81	252.14	0.41
Sand Creek	Reach 04	20507	7531.00	694.00	709.29		710.05	0.001781	8.14	1780.28	277.99	0.41
Sand Creek	Reach 04	20507	8797.00	694.00	710.31		711.09	0.001711	8.41	2071.48	292.84	0.41
Sand Creek	Reach 04	20507	10086.00	694.00	711.23		712.04	0.001666	8.68	2345.42	302.06	0.41
Sand Creek	Reach 04	20507	10654.00	694.00	711.62		712.43	0.001649	8.80	2463.53	306.13	0.41
Sand Creek	Reach 04	20507	12345.00	694.00	712.72		713.57	0.001603	9.11	2808.44	317.71	0.41
Sand Creek	Reach 04	20334	2673.00	694.00	703.99		704.21	0.000863	4.06	1051.53	295.62	0.26
Sand Creek	Reach 04	20334	4926.00	694.00	707.08		707.29	0.000616	4.34	2328.89	465.11	0.24
Sand Creek	Reach 04	20334	6248.00	694.00	708.38		708.59	0.000565	4.49	2939.34	474.83	0.23
Sand Creek	Reach 04	20334	7531.00	694.00	709.52		709.73	0.000531	4.63	3487.46	482.91	0.23
Sand Creek	Reach 04	20334	8797.00	694.00	710.56		710.77	0.000507	4.77	3992.14	489.96	0.23
Sand Creek	Reach 04	20334	10086.00	694.00	711.49		711.72	0.000496	4.93	4453.74	496.32	0.23
Sand Creek	Reach 04	20334	10654.00	694.00	711.89		712.12	0.000492	4.99	4650.21	498.86	0.23
Sand Creek	Reach 04	20334	12345.00	694.00	713.01		713.25	0.000482	5.18	5214.45	506.63	0.23
Sand Creek	Reach 04	20007	2673.00	694.00	703.37		703.82	0.001513	5.44	531.19	89.12	0.35
Sand Creek	Reach 04	20007	4926.00	694.00	706.13		706.91	0.001773	7.24	830.28	199.42	0.40
Sand Creek	Reach 04	20007	6248.00	694.00	707.33		708.21	0.001812	7.87	1091.02	236.01	0.41
Sand Creek	Reach 04	20007	7531.00	694.00	708.43		709.37	0.001768	8.26	1371.94	272.82	0.41
Sand Creek	Reach 04	20007	8797.00	694.00	709.46		710.42	0.001706	8.55	1683.70	325.85	0.41
Sand Creek	Reach 04	20007	10086.00	694.00	710.44		711.38	0.001589	8.64	2012.62	339.84	0.40
Sand Creek	Reach 04	20007	10654.00	694.00	710.86		711.78	0.001540	8.67	2155.63	344.31	0.39
Sand Creek	Reach 04	20007	12345.00	694.00	712.05		712.93	0.001411	8.73	2571.61	354.47	0.38
Sand Creek	Reach 04	19507	2673.00	692.00	703.19		703.33	0.000481	3.44	1415.14	249.29	0.19
Sand Creek	Reach 04	19507	4926.00	692.00	706.08		706.27	0.000576	4.31	2170.31	273.70	0.21
Sand Creek	Reach 04	19507	6248.00	692.00	707.29		707.51	0.000640	4.77	2505.82	280.48	0.22
Sand Creek	Reach 04	19507	7531.00	692.00	708.39		708.64	0.000684	5.12	2819.46	286.88	0.23
Sand Creek	Reach 04	19507	8797.00	692.00	709.41		709.69	0.000719	5.43	3114.44	292.82	0.24
Sand Creek	Reach 04	19507	10086.00	692.00	710.35		710.66	0.000766	5.77	3394.46	305.22	0.25
Sand Creek	Reach 04	19507	10654.00	692.00	710.74		711.07	0.000792	5.93	3516.32	314.89	0.25
Sand Creek	Reach 04	19507	12345.00	692.00	711.88		712.24	0.000846	6.33	3887.09	336.35	0.26

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 04	19419	2673.00	692.00	703.08		703.28	0.000517	3.76	1112.39	335.88	0.21
Sand Creek	Reach 04	19419	4926.00	692.00	705.98		706.21	0.000511	4.45	2096.42	343.47	0.22
Sand Creek	Reach 04	19419	6248.00	692.00	707.19		707.46	0.000536	4.85	2514.59	346.63	0.23
Sand Creek	Reach 04	19419	7531.00	692.00	708.30		708.59	0.000546	5.15	2900.70	349.52	0.24
Sand Creek	Reach 04	19419	8797.00	692.00	709.32		709.63	0.000552	5.42	3258.98	352.18	0.24
Sand Creek	Reach 04	19419	10086.00	692.00	710.27		710.60	0.000561	5.67	3594.13	354.82	0.24
Sand Creek	Reach 04	19419	10654.00	692.00	710.67		711.01	0.000564	5.78	3736.24	356.21	0.25
Sand Creek	Reach 04	19419	12345.00	692.00	711.81		712.18	0.000572	6.07	4146.55	360.21	0.25
Sand Creek	Reach 04	19007	2673.00	690.00	702.49		702.88	0.002192	5.13	682.11	211.13	0.33
Sand Creek	Reach 04	19007	4926.00	690.00	705.40		705.83	0.001828	5.84	1429.40	330.11	0.32
Sand Creek	Reach 04	19007	6248.00	690.00	706.65		707.08	0.001675	6.03	1850.58	342.09	0.31
Sand Creek	Reach 04	19007	7531.00	690.00	707.81		708.22	0.001532	6.15	2250.80	352.42	0.30
Sand Creek	Reach 04	19007	8797.00	690.00	708.86		709.27	0.001428	6.26	2627.87	362.88	0.30
Sand Creek	Reach 04	19007	10086.00	690.00	709.83		710.25	0.001369	6.41	2984.97	375.62	0.29
Sand Creek	Reach 04	19007	10654.00	690.00	710.23		710.65	0.001368	6.52	3139.78	412.27	0.30
Sand Creek	Reach 04	19007	12345.00	690.00	711.41		711.83	0.001281	6.64	3647.87	446.03	0.29
Sand Creek	Reach 04	18684	2673.00	690.00	702.26	695.66	702.50	0.000594	4.20	834.09	154.26	0.23
Sand Creek	Reach 04	18684	4926.00	690.00	705.08	698.12	705.46	0.000737	5.47	1349.30	206.58	0.26
Sand Creek	Reach 04	18684	6248.00	690.00	706.27	699.54	706.72	0.000805	6.04	1603.57	220.93	0.28
Sand Creek	Reach 04	18684	7531.00	690.00	707.37	700.72	707.86	0.000833	6.45	1852.14	230.72	0.29
Sand Creek	Reach 04	18684	8797.00	690.00	708.39	701.56	708.91	0.000849	6.79	2091.75	240.21	0.29
Sand Creek	Reach 04	18684	10086.00	690.00	709.33	702.41	709.88	0.000870	7.13	2320.49	250.37	0.30
Sand Creek	Reach 04	18684	10654.00	690.00	709.71	702.74	710.29	0.000883	7.28	2420.33	283.52	0.30
Sand Creek	Reach 04	18684	12345.00	690.00	710.76	703.29	711.45	0.000979	7.96	2746.34	374.90	0.32
Sand Creek	Reach 04	18650	Bridge									
Sand Creek	Reach 04	18611	2673.00	690.00	702.20		702.40	0.001353	3.59	751.50	101.71	0.22
Sand Creek	Reach 04	18611	4926.00	690.00	704.98		705.34	0.001669	4.86	1111.63	184.56	0.26
Sand Creek	Reach 04	18611	6248.00	690.00	706.12		706.57	0.001838	5.45	1335.28	204.92	0.28
Sand Creek	Reach 04	18611	7531.00	690.00	707.18		707.69	0.001917	5.89	1559.64	218.12	0.29
Sand Creek	Reach 04	18611	8797.00	690.00	708.16		708.71	0.001960	6.25	1777.00	227.79	0.29
Sand Creek	Reach 04	18611	10086.00	690.00	709.05		709.65	0.002009	6.59	1983.89	237.38	0.30
Sand Creek	Reach 04	18611	10654.00	690.00	709.42		710.05	0.002029	6.73	2072.18	241.38	0.30
Sand Creek	Reach 04	18611	12345.00	690.00	710.48		711.17	0.002073	7.11	2336.52	256.01	0.31
Sand Creek	Reach 04	18416	2673.00	689.39	701.74		702.14	0.001177	5.29	553.48	77.05	0.30
Sand Creek	Reach 04	18416	4926.00	689.39	704.27		704.98	0.001630	7.19	778.73	106.67	0.37

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Sand Creek	Reach 04	18416	6248.00	689.39	705.25		706.16	0.001904	8.19	890.33	121.70	0.41
Sand Creek	Reach 04	18416	7531.00	689.39	706.18		707.24	0.002064	8.95	1010.62	135.86	0.43
Sand Creek	Reach 04	18416	8797.00	689.39	707.06		708.25	0.002159	9.55	1135.97	149.05	0.44
Sand Creek	Reach 04	18416	10086.00	689.39	707.86		709.17	0.002252	10.10	1259.92	161.17	0.46
Sand Creek	Reach 04	18416	10654.00	689.39	708.19		709.55	0.002290	10.34	1314.16	166.36	0.46
Sand Creek	Reach 04	18416	12345.00	689.39	709.17		710.66	0.002367	10.94	1484.89	183.13	0.47
Sand Creek	Reach 04	18307	2673.00	690.00	701.20		701.93	0.002286	6.93	426.63	105.20	0.42
Sand Creek	Reach 04	18307	4926.00	690.00	703.93		704.76	0.002140	8.06	979.13	268.32	0.42
Sand Creek	Reach 04	18307	6248.00	690.00	705.15		705.90	0.001893	8.11	1313.17	281.58	0.40
Sand Creek	Reach 04	18307	7531.00	690.00	706.24		706.93	0.001683	8.08	1633.33	302.94	0.38
Sand Creek	Reach 04	18307	8797.00	690.00	707.25		707.89	0.001523	8.06	1944.13	315.16	0.37
Sand Creek	Reach 04	18307	10086.00	690.00	708.14		708.77	0.001432	8.13	2232.70	327.06	0.36
Sand Creek	Reach 04	18307	10654.00	690.00	708.51		709.14	0.001407	8.19	2354.43	333.50	0.36
Sand Creek	Reach 04	18307	12345.00	690.00	709.59		710.21	0.001336	8.33	2723.96	357.02	0.36
Sand Creek	Reach 04	18007	2673.00	690.00	700.74		701.13	0.002366	5.08	564.21	112.26	0.34
Sand Creek	Reach 04	18007	4926.00	690.00	703.45		704.02	0.002331	6.29	924.64	152.55	0.36
Sand Creek	Reach 04	18007	6248.00	690.00	704.56		705.24	0.002451	6.95	1104.37	172.70	0.37
Sand Creek	Reach 04	18007	7531.00	690.00	705.55		706.31	0.002505	7.45	1286.92	194.44	0.38
Sand Creek	Reach 04	18007	8797.00	690.00	706.47		707.30	0.002504	7.83	1474.50	211.85	0.39
Sand Creek	Reach 04	18007	10086.00	690.00	707.31		708.19	0.002507	8.18	1657.47	223.81	0.39
Sand Creek	Reach 04	18007	10654.00	690.00	707.66		708.56	0.002504	8.32	1736.40	227.65	0.39
Sand Creek	Reach 04	18007	12345.00	690.00	708.68		709.64	0.002494	8.70	1975.34	244.90	0.40
Sand Creek	Reach 04	17507	2673.00	688.00	699.30		699.63	0.003810	4.60	581.42	106.62	0.35
Sand Creek	Reach 04	17507	4926.00	688.00	702.31		702.69	0.002776	5.02	1098.07	271.19	0.32
Sand Creek	Reach 04	17507	6248.00	688.00	703.56		703.93	0.002404	5.15	1467.34	317.82	0.30
Sand Creek	Reach 04	17507	7531.00	688.00	704.72		705.07	0.002025	5.12	1851.33	340.06	0.28
Sand Creek	Reach 04	17507	8797.00	688.00	705.78		706.11	0.001753	5.09	2219.75	355.11	0.27
Sand Creek	Reach 04	17507	10086.00	688.00	706.70		707.03	0.001606	5.13	2557.05	383.95	0.26
Sand Creek	Reach 04	17507	10654.00	688.00	707.08		707.41	0.001560	5.16	2714.59	442.44	0.26
Sand Creek	Reach 04	17507	12345.00	688.00	708.22		708.53	0.001392	5.16	3276.94	519.23	0.25
Sand Creek	Reach 04	17007	2673.00	688.00	698.43		698.64	0.001142	3.62	738.73	103.61	0.24
Sand Creek	Reach 04	17007	4926.00	688.00	701.47		701.78	0.001239	4.51	1160.35	314.79	0.26
Sand Creek	Reach 04	17007	6248.00	688.00	702.86		703.15	0.001036	4.52	1623.15	349.02	0.24
Sand Creek	Reach 04	17007	7531.00	688.00	704.17		704.42	0.000827	4.37	2109.09	382.37	0.22
Sand Creek	Reach 04	17007	8797.00	688.00	705.32		705.56	0.000696	4.26	2563.14	404.94	0.21
Sand Creek	Reach 04	17007	10086.00	688.00	706.30		706.53	0.000629	4.24	2975.37	449.95	0.20
Sand Creek	Reach 04	17007	10654.00	688.00	706.70		706.92	0.000606	4.24	3158.65	470.60	0.20

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 04	17007	12345.00	688.00	707.88		708.09	0.000537	4.20	3749.60	531.19	0.19
Sand Creek	Reach 04	16506	2673.00	686.00	698.08		698.27	0.000509	3.57	922.75	209.64	0.21
Sand Creek	Reach 04	16506	4926.00	686.00	701.09		701.37	0.000553	4.50	1646.96	252.43	0.23
Sand Creek	Reach 04	16506	6248.00	686.00	702.44		702.77	0.000582	4.95	1995.87	268.12	0.24
Sand Creek	Reach 04	16506	7531.00	686.00	703.70		704.06	0.000594	5.31	2348.51	292.80	0.24
Sand Creek	Reach 04	16506	8797.00	686.00	704.78		705.20	0.000630	5.73	2711.49	391.14	0.25
Sand Creek	Reach 04	16506	10086.00	686.00	705.73		706.19	0.000643	6.02	3126.08	496.88	0.26
Sand Creek	Reach 04	16506	10654.00	686.00	706.08		706.58	0.000677	6.26	3307.41	563.58	0.27
Sand Creek	Reach 04	16506	12345.00	686.00	707.30		707.78	0.000634	6.35	4003.74	579.23	0.26
Sand Creek	Reach 04	16007	2673.00	686.00	697.73		697.89	0.001152	3.62	929.81	231.80	0.20
Sand Creek	Reach 04	16007	4926.00	686.00	700.88		701.01	0.000729	3.45	1847.69	330.55	0.17
Sand Creek	Reach 04	16007	6248.00	686.00	702.28		702.42	0.000591	3.32	2319.26	340.06	0.15
Sand Creek	Reach 04	16007	7531.00	686.00	703.60		703.72	0.000489	3.20	2866.07	486.83	0.14
Sand Creek	Reach 04	16007	8797.00	686.00	704.70		704.82	0.000555	3.57	3454.22	568.48	0.15
Sand Creek	Reach 04	16007	10086.00	686.00	705.70		705.81	0.000458	3.37	4032.98	583.84	0.14
Sand Creek	Reach 04	16007	10654.00	686.00	706.09		706.19	0.000432	3.32	4256.63	587.67	0.14
Sand Creek	Reach 04	16007	12345.00	686.00	707.33		707.44	0.000353	3.13	4997.51	601.68	0.12
Sand Creek	Reach 04	15882	2816.00	684.62	697.41	691.14	697.69	0.002051	4.50	859.13	296.24	0.26
Sand Creek	Reach 04	15882	5187.00	684.62	700.69	693.96	700.89	0.001238	4.30	1933.47	352.58	0.22
Sand Creek	Reach 04	15882	6577.00	684.62	702.12	696.99	702.31	0.001104	4.37	2428.56	383.05	0.21
Sand Creek	Reach 04	15882	8049.00	684.62	703.44	697.79	703.63	0.001030	4.49	2900.04	425.54	0.20
Sand Creek	Reach 04	15882	9391.00	684.62	704.52	698.36	704.72	0.000997	4.62	3302.32	534.44	0.20
Sand Creek	Reach 04	15882	10725.00	684.62	705.51	698.78	705.72	0.000990	4.79	3690.93	589.42	0.20
Sand Creek	Reach 04	15882	11265.00	684.62	705.89	698.95	706.11	0.000985	4.85	3845.59	609.01	0.20
Sand Creek	Reach 04	15882	13092.00	684.62	707.13	699.43	707.35	0.000968	5.04	4372.52	660.88	0.20
Sand Creek	Reach 04	15750	Bridge									
Sand Creek	Reach 04	15658	2816.00	686.00	696.54		697.11	0.001777	6.12	544.43	123.50	0.37
Sand Creek	Reach 04	15658	5187.00	686.00	699.56		700.37	0.001810	7.59	978.43	157.48	0.40
Sand Creek	Reach 04	15658	6577.00	686.00	700.85		701.78	0.001885	8.33	1186.41	165.77	0.41
Sand Creek	Reach 04	15658	8049.00	686.00	702.02		703.08	0.001971	9.03	1384.45	173.37	0.43
Sand Creek	Reach 04	15658	9391.00	686.00	702.97		704.16	0.002042	9.61	1553.27	179.43	0.44
Sand Creek	Reach 04	15658	10725.00	686.00	703.85		705.14	0.002108	10.15	1711.99	184.62	0.45
Sand Creek	Reach 04	15658	11265.00	686.00	704.18		705.51	0.002135	10.36	1773.32	186.48	0.46
Sand Creek	Reach 04	15658	13092.00	686.00	705.26		706.74	0.002204	11.00	1979.14	192.71	0.47
Sand Creek	Reach 04	15481	2816.00	686.00	695.44		696.44	0.010047	8.09	366.31	76.69	0.56

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 04	15481	5187.00	686.00	698.28		699.69	0.009073	9.82	615.25	99.91	0.57
Sand Creek	Reach 04	15481	6577.00	686.00	699.37		701.07	0.009561	10.86	727.91	106.24	0.59
Sand Creek	Reach 04	15481	8049.00	686.00	700.29		702.31	0.010397	11.98	827.64	112.70	0.63
Sand Creek	Reach 04	15481	9391.00	686.00	700.99		703.33	0.011215	12.95	908.98	117.71	0.66
Sand Creek	Reach 04	15481	10725.00	686.00	701.59		704.26	0.012118	13.91	980.79	121.96	0.69
Sand Creek	Reach 04	15481	11265.00	686.00	701.79		704.61	0.012580	14.32	1005.22	123.38	0.71
Sand Creek	Reach 04	15481	13092.00	686.00	702.46	701.10	705.76	0.013927	15.59	1089.18	127.79	0.75
Sand Creek	Reach 04	15210	2816.00	682.00	694.54		694.96	0.002828	5.23	557.58	89.51	0.32
Sand Creek	Reach 04	15210	5187.00	682.00	697.36		698.07	0.003384	6.92	916.78	193.97	0.36
Sand Creek	Reach 04	15210	6577.00	682.00	698.47		699.30	0.003634	7.64	1163.82	233.02	0.38
Sand Creek	Reach 04	15210	8049.00	682.00	699.44		700.37	0.003849	8.26	1394.07	242.08	0.40
Sand Creek	Reach 04	15210	9391.00	682.00	700.21		701.22	0.004027	8.77	1592.45	294.05	0.41
Sand Creek	Reach 04	15210	10725.00	682.00	700.91		701.98	0.004167	9.21	1806.46	323.67	0.42
Sand Creek	Reach 04	15210	11265.00	682.00	701.13		702.25	0.004267	9.42	1880.91	333.45	0.43
Sand Creek	Reach 04	15210	13092.00	682.00	701.99		703.17	0.004369	9.89	2184.46	374.60	0.44
Sand Creek	Reach 04	15007	2816.00	682.00	693.86		694.36	0.003005	5.68	496.19	71.34	0.38
Sand Creek	Reach 04	15007	5187.00	682.00	696.52		697.37	0.003386	7.43	794.13	239.55	0.42
Sand Creek	Reach 04	15007	6577.00	682.00	697.59		698.56	0.003519	8.13	1071.48	280.97	0.44
Sand Creek	Reach 04	15007	8049.00	682.00	698.53		699.60	0.003598	8.71	1350.45	306.62	0.45
Sand Creek	Reach 04	15007	9391.00	682.00	699.29		700.43	0.003684	9.19	1590.68	336.68	0.46
Sand Creek	Reach 04	15007	10725.00	682.00	699.99		701.18	0.003685	9.54	1834.68	354.70	0.47
Sand Creek	Reach 04	15007	11265.00	682.00	700.19		701.42	0.003774	9.75	1906.98	360.30	0.47
Sand Creek	Reach 04	15007	13092.00	682.00	701.13		702.37	0.003635	10.02	2257.81	385.57	0.47
Sand Creek	Reach 04	14507	2816.00	682.00	692.81		693.22	0.001718	5.14	572.42	141.24	0.36
Sand Creek	Reach 04	14507	5187.00	682.00	695.93		696.32	0.001129	5.41	1175.88	234.97	0.31
Sand Creek	Reach 04	14507	6577.00	682.00	697.11		697.51	0.001046	5.63	1460.80	247.83	0.30
Sand Creek	Reach 04	14507	8049.00	682.00	698.10		698.54	0.001027	5.91	1712.23	257.29	0.30
Sand Creek	Reach 04	14507	9391.00	682.00	698.87		699.34	0.001037	6.20	1913.51	265.60	0.31
Sand Creek	Reach 04	14507	10725.00	682.00	699.58		700.08	0.001045	6.46	2104.27	273.14	0.31
Sand Creek	Reach 04	14507	11265.00	682.00	699.77		700.29	0.001080	6.62	2155.53	275.11	0.32
Sand Creek	Reach 04	14507	13092.00	682.00	700.70		701.26	0.001078	6.92	2417.91	289.28	0.32
Sand Creek	Reach 04	14007	2816.00	682.00	691.51		692.16	0.002546	6.45	436.33	63.14	0.43
Sand Creek	Reach 04	14007	5187.00	682.00	694.52		695.47	0.002452	7.95	802.56	228.09	0.45
Sand Creek	Reach 04	14007	6577.00	682.00	695.65		696.69	0.002437	8.52	1085.40	271.58	0.46
Sand Creek	Reach 04	14007	8049.00	682.00	696.63		697.72	0.002420	9.00	1366.81	298.97	0.46
Sand Creek	Reach 04	14007	9391.00	682.00	697.39		698.52	0.002412	9.37	1599.81	311.40	0.46
Sand Creek	Reach 04	14007	10725.00	682.00	698.12		699.26	0.002364	9.63	1835.39	342.64	0.46

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 04	14007	11265.00	682.00	698.22		699.44	0.002515	9.98	1867.99	346.19	0.48
Sand Creek	Reach 04	14007	13092.00	682.00	699.32		700.45	0.002253	9.95	2270.43	390.07	0.46
Sand Creek	Reach 04	13507	2816.00	682.00	690.40		690.91	0.002302	5.73	492.97	89.10	0.41
Sand Creek	Reach 04	13507	5187.00	682.00	693.90		694.43	0.001406	6.07	1034.00	260.19	0.35
Sand Creek	Reach 04	13507	6577.00	682.00	695.22		695.70	0.001183	6.07	1396.36	284.86	0.32
Sand Creek	Reach 04	13507	8049.00	682.00	696.28		696.75	0.001091	6.20	1712.85	328.87	0.32
Sand Creek	Reach 04	13507	9391.00	682.00	697.08		697.56	0.001050	6.36	1992.27	363.67	0.31
Sand Creek	Reach 04	13507	10725.00	682.00	697.84		698.33	0.001017	6.50	2283.91	406.13	0.31
Sand Creek	Reach 04	13507	11265.00	682.00	697.91		698.43	0.001092	6.76	2313.06	410.07	0.32
Sand Creek	Reach 04	13507	13092.00	682.00	699.08		699.55	0.000956	6.68	2889.06	584.90	0.31
Sand Creek	Reach 04	13007	2816.00	680.00	689.84		690.08	0.001044	4.13	803.46	185.52	0.28
Sand Creek	Reach 04	13007	5187.00	680.00	693.70		693.91	0.000566	4.11	1880.39	348.47	0.22
Sand Creek	Reach 04	13007	6577.00	680.00	695.02		695.24	0.000532	4.31	2375.92	391.47	0.22
Sand Creek	Reach 04	13007	8049.00	680.00	696.09		696.31	0.000527	4.54	2801.13	434.65	0.22
Sand Creek	Reach 04	13007	9391.00	680.00	696.89		697.13	0.000535	4.75	3181.41	523.91	0.23
Sand Creek	Reach 04	13007	10725.00	680.00	697.65		697.90	0.000530	4.90	3599.91	566.66	0.23
Sand Creek	Reach 04	13007	11265.00	680.00	697.70		697.97	0.000574	5.11	3631.00	569.05	0.24
Sand Creek	Reach 04	13007	13092.00	680.00	698.84		699.13	0.000585	5.43	4385.21	754.31	0.24
Sand Creek	Reach 04	12507	2816.00	678.00	688.34		689.00	0.006024	6.52	431.63	62.57	0.44
Sand Creek	Reach 04	12507	5187.00	678.00	692.54		693.25	0.004183	6.83	803.89	128.96	0.39
Sand Creek	Reach 04	12507	6577.00	678.00	693.76		694.59	0.004287	7.49	978.52	158.80	0.40
Sand Creek	Reach 04	12507	8049.00	678.00	694.65		695.64	0.004691	8.25	1139.16	201.60	0.43
Sand Creek	Reach 04	12507	9391.00	678.00	695.28		696.43	0.005119	8.93	1277.04	232.75	0.45
Sand Creek	Reach 04	12507	10725.00	678.00	695.91		697.18	0.005422	9.50	1434.44	273.06	0.47
Sand Creek	Reach 04	12507	11265.00	678.00	695.70		697.17	0.006415	10.22	1377.43	256.00	0.50
Sand Creek	Reach 04	12507	13092.00	678.00	696.99		698.36	0.005566	10.15	1893.03	486.42	0.48
Sand Creek	T2	3301	118.00	774.00	775.57	775.57	776.07	0.003373	5.69	20.75	20.76	1.00
Sand Creek	T2	3301	192.00	774.00	775.95	775.95	776.64	0.003091	6.64	29.64	26.05	1.01
Sand Creek	T2	3301	239.00	774.00	776.17	776.17	776.95	0.002916	7.11	35.70	30.67	1.00
Sand Creek	T2	3301	287.00	774.00	776.37	776.37	777.25	0.002781	7.54	42.49	35.81	1.00
Sand Creek	T2	3301	334.00	774.00	776.57	776.57	777.53	0.002638	7.88	50.02	40.66	0.99
Sand Creek	T2	3301	384.00	774.00	776.75	776.75	777.81	0.002584	8.28	57.82	44.96	1.00
Sand Creek	T2	3301	384.00	774.00	776.75	776.75	777.81	0.002584	8.28	57.82	44.96	1.00
Sand Creek	T2	3301	457.00	774.00	777.02	777.02	778.19	0.002452	8.72	71.52	57.42	0.99
Sand Creek	T2	2462	118.00	747.20	748.35	748.35	748.63	0.029101	4.23	27.89	51.07	1.01
Sand Creek	T2	2462	192.00	747.20	749.13	748.59	749.23	0.004090	2.53	76.18	73.69	0.43

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	T2	2462	239.00	747.20	750.31	748.70	750.34	0.000502	1.44	183.38	158.27	0.17
Sand Creek	T2	2462	287.00	747.20	750.69	748.82	750.72	0.000409	1.44	226.48	176.84	0.16
Sand Creek	T2	2462	334.00	747.20	750.93	748.92	750.96	0.000401	1.51	255.50	187.84	0.16
Sand Creek	T2	2462	384.00	747.20	751.11	749.01	751.15	0.000423	1.62	278.25	196.09	0.16
Sand Creek	T2	2462	384.00	747.20	751.11	749.01	751.15	0.000423	1.62	278.25	196.09	0.16
Sand Creek	T2	2462	457.00	747.20	751.32	749.15	751.37	0.000465	1.77	306.40	205.89	0.17
Sand Creek	T2	2367	118.00	746.00	747.58		747.61	0.001409	1.45	87.42	110.55	0.25
Sand Creek	T2	2367	192.00	746.00	749.15		749.16	0.000129	0.80	362.40	244.78	0.09
Sand Creek	T2	2367	239.00	746.00	750.31		750.32	0.000050	0.64	711.99	374.41	0.06
Sand Creek	T2	2367	287.00	746.00	750.70		750.70	0.000049	0.68	856.70	382.29	0.06
Sand Creek	T2	2367	334.00	746.00	750.94		750.94	0.000054	0.73	949.39	387.37	0.06
Sand Creek	T2	2367	384.00	746.00	751.12		751.13	0.000061	0.80	1019.90	391.03	0.07
Sand Creek	T2	2367	384.00	746.00	751.12		751.13	0.000061	0.80	1019.90	391.03	0.07
Sand Creek	T2	2367	457.00	746.00	751.33		751.34	0.000072	0.90	1104.74	395.46	0.07
Sand Creek	T2	2312	118.00	742.00	747.60		747.60	0.000007	0.27	527.68	221.40	0.02
Sand Creek	T2	2312	192.00	742.00	749.16		749.16	0.000005	0.29	932.19	307.23	0.02
Sand Creek	T2	2312	239.00	742.00	750.32		750.32	0.000004	0.27	1330.25	378.00	0.02
Sand Creek	T2	2312	287.00	742.00	750.70		750.70	0.000004	0.29	1477.55	391.73	0.02
Sand Creek	T2	2312	334.00	742.00	750.94		750.94	0.000005	0.32	1573.14	400.56	0.02
Sand Creek	T2	2312	384.00	742.00	751.12		751.12	0.000006	0.35	1646.48	407.05	0.02
Sand Creek	T2	2312	384.00	742.00	751.12		751.12	0.000006	0.35	1646.48	407.05	0.02
Sand Creek	T2	2312	457.00	742.00	751.34		751.34	0.000007	0.40	1735.52	415.10	0.02
Sand Creek	T2	2130	118.00	742.00	747.60	742.29	747.60	0.000001	0.10	1261.99	295.62	0.01
Sand Creek	T2	2130	192.00	742.00	749.16	742.39	749.16	0.000001	0.12	1743.02	320.50	0.01
Sand Creek	T2	2130	239.00	742.00	750.32	742.45	750.32	0.000001	0.13	2124.54	338.82	0.01
Sand Creek	T2	2130	287.00	742.00	750.70	742.51	750.70	0.000001	0.14	2255.42	345.12	0.01
Sand Creek	T2	2130	334.00	742.00	750.94	742.56	750.94	0.000001	0.16	2339.17	349.16	0.01
Sand Creek	T2	2130	384.00	742.00	751.12	742.61	751.12	0.000001	0.18	2402.89	352.20	0.01
Sand Creek	T2	2130	384.00	742.00	751.12	742.61	751.12	0.000001	0.18	2402.89	352.20	0.01
Sand Creek	T2	2130	457.00	742.00	751.34	742.68	751.34	0.000002	0.21	2479.68	357.30	0.01
Sand Creek	T2	2050	Culvert									
Sand Creek	T2	1942	118.00	733.88	734.28	734.28	734.43	0.035289	3.12	37.79	126.24	1.01
Sand Creek	T2	1942	192.00	733.88	734.40	734.40	734.60	0.032261	3.64	52.75	130.84	1.01
Sand Creek	T2	1942	239.00	733.88	734.46	734.46	734.70	0.030702	3.89	61.48	133.14	1.01
Sand Creek	T2	1942	287.00	733.88	734.53	734.53	734.79	0.029519	4.11	69.87	135.24	1.01
Sand Creek	T2	1942	334.00	733.88	734.58	734.58	734.87	0.028420	4.29	77.85	137.21	1.00

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	T2	1942	384.00	733.88	734.64	734.64	734.95	0.027936	4.49	85.55	139.08	1.01
Sand Creek	T2	1942	384.00	733.88	734.64	734.64	734.95	0.027936	4.49	85.55	139.08	1.01
Sand Creek	T2	1942	457.00	733.88	734.72	734.72	735.07	0.026473	4.70	97.29	141.88	1.00
Sand Creek	T2	1792	118.00	732.00	732.85		732.86	0.000596	0.76	154.70	200.55	0.15
Sand Creek	T2	1792	192.00	732.00	733.06		733.07	0.000726	0.98	196.90	204.57	0.18
Sand Creek	T2	1792	239.00	732.00	733.17		733.18	0.000792	1.09	219.60	206.52	0.19
Sand Creek	T2	1792	287.00	732.00	733.27		733.29	0.000849	1.19	240.79	208.32	0.20
Sand Creek	T2	1792	334.00	732.00	733.36		733.38	0.000905	1.29	259.58	209.91	0.20
Sand Creek	T2	1792	384.00	732.00	733.45		733.48	0.000959	1.38	278.16	211.47	0.21
Sand Creek	T2	1792	384.00	732.00	733.45		733.48	0.000959	1.38	278.16	211.47	0.21
Sand Creek	T2	1792	457.00	732.00	733.56		733.60	0.001032	1.51	303.30	213.55	0.22
Sand Creek	T2	1501	118.00	732.00	732.68		732.69	0.000548	0.66	178.15	268.12	0.14
Sand Creek	T2	1501	192.00	732.00	732.85		732.86	0.000687	0.86	224.02	271.24	0.17
Sand Creek	T2	1501	239.00	732.00	732.94		732.96	0.000757	0.96	248.82	272.91	0.18
Sand Creek	T2	1501	287.00	732.00	733.03		733.05	0.000813	1.05	272.37	274.48	0.19
Sand Creek	T2	1501	334.00	732.00	733.10		733.12	0.000873	1.14	292.57	275.82	0.20
Sand Creek	T2	1501	384.00	732.00	733.18		733.20	0.000932	1.23	312.52	277.08	0.20
Sand Creek	T2	1501	384.00	732.00	733.18		733.20	0.000932	1.23	312.52	277.08	0.20
Sand Creek	T2	1501	457.00	732.00	733.27		733.30	0.001010	1.35	339.51	278.77	0.21
Sand Creek	T2	1230	118.00	732.00	732.13	732.13	732.20	0.045605	2.06	57.37	434.46	1.00
Sand Creek	T2	1230	192.00	732.00	732.18	732.18	732.27	0.040937	2.42	79.39	434.86	1.00
Sand Creek	T2	1230	239.00	732.00	732.21	732.21	732.32	0.039020	2.60	91.86	435.09	1.00
Sand Creek	T2	1230	287.00	732.00	732.24	732.24	732.36	0.037548	2.77	103.74	435.31	1.00
Sand Creek	T2	1230	334.00	732.00	732.26	732.26	732.40	0.036308	2.91	114.79	435.51	1.00
Sand Creek	T2	1230	384.00	732.00	732.29	732.29	732.43	0.035266	3.05	125.93	435.72	1.00
Sand Creek	T2	1230	384.00	732.00	732.29	732.29	732.43	0.035266	3.05	125.93	435.72	1.00
Sand Creek	T2	1230	457.00	732.00	732.32	732.32	732.49	0.034417	3.24	140.86	435.99	1.01
Sand Creek	T2	1001	118.00	706.94	709.66		709.73	0.005048	2.06	57.19	44.63	0.32
Sand Creek	T2	1001	192.00	706.94	711.10		711.14	0.001006	1.45	137.32	64.91	0.16
Sand Creek	T2	1001	239.00	706.94	712.03		712.05	0.000519	1.28	202.79	77.04	0.12
Sand Creek	T2	1001	287.00	706.94	712.99		713.01	0.000304	1.16	283.04	89.93	0.10
Sand Creek	T2	1001	334.00	706.94	713.92		713.94	0.000200	1.06	372.88	103.17	0.08
Sand Creek	T2	1001	384.00	706.94	714.23		714.24	0.000214	1.14	405.01	108.52	0.08
Sand Creek	T2	1001	384.00	706.94	714.23		714.24	0.000214	1.14	405.01	108.52	0.08
Sand Creek	T2	1001	457.00	706.94	714.50		714.52	0.000253	1.28	435.26	113.97	0.09
Sand Creek	T2	931	118.00	706.00	709.47	707.52	709.51	0.001942	1.63	72.52	38.82	0.21

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	T2	931	192.00	706.00	711.05	707.97	711.08	0.000697	1.29	151.14	60.80	0.13
Sand Creek	T2	931	239.00	706.00	712.00	708.21	712.02	0.000397	1.18	215.10	74.41	0.11
Sand Creek	T2	931	287.00	706.00	712.97	708.45	712.99	0.000249	1.09	295.59	91.14	0.09
Sand Creek	T2	931	334.00	706.00	713.91	708.66	713.92	0.000169	1.01	388.78	108.05	0.07
Sand Creek	T2	931	384.00	706.00	714.21	708.88	714.23	0.000183	1.09	422.53	115.04	0.08
Sand Creek	T2	931	384.00	706.00	714.21	708.88	714.23	0.000183	1.09	422.53	115.04	0.08
Sand Creek	T2	931	457.00	706.00	714.48	709.13	714.50	0.000217	1.22	454.44	121.43	0.09
Sand Creek	T2	875	Culvert									
Sand Creek	T2	842	118.00	700.00	702.32	702.32	702.97	0.037493	6.45	18.30	14.56	1.01
Sand Creek	T2	842	192.00	700.00	703.22	702.86	703.74	0.019231	5.81	33.02	18.43	0.77
Sand Creek	T2	842	239.00	700.00	703.47	703.14	704.09	0.020559	6.31	37.89	19.67	0.80
Sand Creek	T2	842	287.00	700.00	703.71	703.40	704.41	0.021714	6.73	42.67	20.95	0.83
Sand Creek	T2	842	334.00	700.00	703.90	703.64	704.69	0.023136	7.15	46.74	21.98	0.86
Sand Creek	T2	842	384.00	700.00	704.09	703.87	704.97	0.024175	7.51	51.11	23.03	0.89
Sand Creek	T2	842	384.00	700.00	704.09	703.87	704.97	0.024175	7.51	51.11	23.03	0.89
Sand Creek	T2	842	457.00	700.00	704.33	704.17	705.34	0.025964	8.04	56.82	24.40	0.93
Sand Creek	T2	725	118.00	698.00	699.79		699.94	0.015920	3.19	37.05	35.59	0.55
Sand Creek	T2	725	192.00	698.00	699.69	699.69	700.20	0.054563	5.70	33.67	34.03	1.01
Sand Creek	T2	725	239.00	698.00	699.87	699.87	700.42	0.052720	5.96	40.11	36.95	1.01
Sand Creek	T2	725	287.00	698.00	700.03	700.03	700.63	0.051951	6.24	46.01	39.14	1.01
Sand Creek	T2	725	334.00	698.00	700.17	700.17	700.82	0.049914	6.48	51.58	40.22	1.01
Sand Creek	T2	725	384.00	698.00	700.30	700.30	701.00	0.049314	6.75	56.85	41.21	1.01
Sand Creek	T2	725	384.00	698.00	700.30	700.30	701.00	0.049314	6.75	56.85	41.21	1.01
Sand Creek	T2	725	457.00	698.00	700.48	700.48	701.26	0.047496	7.06	64.75	42.68	1.01
Sand Creek	T2	273	118.00	686.00	688.53	688.53	689.27	0.038078	6.89	17.12	11.83	1.01
Sand Creek	T2	273	192.00	686.00	693.29		693.31	0.000290	1.13	175.72	60.27	0.11
Sand Creek	T2	273	239.00	686.00	694.59		694.61	0.000149	1.00	261.89	71.30	0.08
Sand Creek	T2	273	287.00	686.00	695.63		695.64	0.000106	0.96	339.33	77.68	0.07
Sand Creek	T2	273	334.00	686.00	696.40		696.41	0.000091	0.97	400.81	82.18	0.07
Sand Creek	T2	273	384.00	686.00	697.13		697.15	0.000081	0.98	463.12	87.07	0.06
Sand Creek	T2	273	384.00	686.00	697.12		697.13	0.000082	0.98	461.82	86.97	0.06
Sand Creek	T2	273	457.00	686.00	698.28		698.29	0.000068	0.98	567.89	98.26	0.06
Sand Creek	Reach 05	12007	2805.00	676.00	688.04		688.62	0.001904	6.15	464.10	82.16	0.37
Sand Creek	Reach 05	12007	5109.00	676.00	692.46		692.96	0.001174	6.10	1042.14	188.27	0.31
Sand Creek	Reach 05	12007	6512.00	676.00	693.75		694.28	0.001149	6.45	1294.10	205.75	0.31
Sand Creek	Reach 05	12007	8019.00	676.00	694.66		695.28	0.001293	7.14	1546.71	329.59	0.33

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 05	12007	9365.00	676.00	695.32		696.02	0.001425	7.73	1780.99	381.64	0.35
Sand Creek	Reach 05	12007	10694.00	676.00	695.97		696.74	0.001524	8.22	2048.96	443.49	0.37
Sand Creek	Reach 05	12007	11226.00	676.00	695.75		696.65	0.001795	8.84	1956.34	424.13	0.40
Sand Creek	Reach 05	12007	13090.00	676.00	697.10		697.89	0.001545	8.67	2858.54	924.96	0.37
Sand Creek	Reach 05	11507	2805.00	676.00	687.25		687.74	0.001556	5.62	498.87	56.91	0.33
Sand Creek	Reach 05	11507	5109.00	676.00	691.85		692.28	0.001513	5.52	1115.36	294.32	0.34
Sand Creek	Reach 05	11507	6512.00	676.00	693.31		693.65	0.001129	5.24	1769.00	499.22	0.30
Sand Creek	Reach 05	11507	8019.00	676.00	694.31		694.63	0.000994	5.26	2414.06	969.14	0.28
Sand Creek	Reach 05	11507	9365.00	676.00	695.02		695.33	0.000951	5.37	3125.41	1035.28	0.28
Sand Creek	Reach 05	11507	10694.00	676.00	695.73		696.02	0.000894	5.42	3881.38	1123.93	0.28
Sand Creek	Reach 05	11507	11226.00	676.00	695.42		695.79	0.001130	5.99	3550.74	1072.88	0.31
Sand Creek	Reach 05	11507	13090.00	676.00	696.91		697.19	0.000813	5.50	5346.22	1338.49	0.27
Sand Creek	Reach 05	11007	3164.00	674.00	685.92		686.71	0.002577	7.11	444.98	52.54	0.43
Sand Creek	Reach 05	11007	5723.00	674.00	690.17		691.16	0.003033	8.00	736.24	197.67	0.48
Sand Creek	Reach 05	11007	7239.00	674.00	692.05	685.80	692.85	0.002066	7.52	1398.39	937.27	0.41
Sand Creek	Reach 05	11007	8917.00	674.00	693.26		693.94	0.001704	7.34	2694.75	1232.39	0.38
Sand Creek	Reach 05	11007	10378.00	674.00	694.01		694.67	0.001616	7.44	3668.82	1526.84	0.37
Sand Creek	Reach 05	11007	11841.00	674.00	694.79		695.42	0.001471	7.39	4891.49	1587.85	0.36
Sand Creek	Reach 05	11007	11226.00	674.00	694.47		695.11	0.001524	7.41	4389.92	1563.11	0.36
Sand Creek	Reach 05	11007	14388.00	674.00	696.08		696.65	0.001271	7.31	6998.09	1688.07	0.34
Sand Creek	Reach 05	10507	3164.00	672.89	684.25		685.22	0.003385	7.90	400.76	49.71	0.49
Sand Creek	Reach 05	10507	5723.00	672.89	688.17		689.42	0.003932	8.96	638.58	75.42	0.54
Sand Creek	Reach 05	10507	7239.00	672.89	690.21	685.07	691.43	0.003823	8.86	837.90	230.80	0.54
Sand Creek	Reach 05	10507	8917.00	672.89	691.54		692.74	0.003242	9.00	1479.53	660.25	0.51
Sand Creek	Reach 05	10507	10378.00	672.89	692.73	688.02	693.67	0.002403	8.38	2587.91	1144.15	0.45
Sand Creek	Reach 05	10507	11841.00	672.89	693.95	689.23	694.63	0.001691	7.54	4095.38	1323.58	0.38
Sand Creek	Reach 05	10507	11226.00	672.89	693.51	688.73	694.26	0.001892	7.78	3520.45	1259.28	0.40
Sand Creek	Reach 05	10507	14388.00	672.89	695.50	692.40	696.00	0.001239	7.00	6244.87	1477.21	0.33
Sand Creek	Reach 05	10007	3164.00	672.00	682.29		683.38	0.003976	8.35	379.14	47.91	0.52
Sand Creek	Reach 05	10007	5723.00	672.00	685.45		687.17	0.004979	10.50	544.90	57.55	0.60
Sand Creek	Reach 05	10007	7239.00	672.00	687.38		689.24	0.004785	10.93	662.19	64.02	0.60
Sand Creek	Reach 05	10007	8917.00	672.00	687.67		690.34	0.006753	13.10	680.82	64.99	0.71
Sand Creek	Reach 05	10007	10378.00	672.00	687.94		691.37	0.008554	14.86	698.40	65.88	0.80
Sand Creek	Reach 05	10007	11841.00	672.00	687.23	687.19	692.34	0.013307	18.15	652.52	63.51	1.00
Sand Creek	Reach 05	10007	11226.00	672.00	688.80	686.74	692.18	0.009589	14.74	761.50	81.45	0.85
Sand Creek	Reach 05	10007	14388.00	672.00	690.15	690.15	694.20	0.013050	16.16	955.51	567.45	0.99

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Sand Creek	Reach 05	9648	3164.00	671.58	681.94		682.30	0.001605	4.84	653.06	107.84	0.35
Sand Creek	Reach 05	9648	5723.00	671.58	685.54		685.97	0.001281	5.26	1088.70	134.13	0.33
Sand Creek	Reach 05	9648	7239.00	671.58	687.62		688.03	0.001222	5.17	1399.38	171.34	0.32
Sand Creek	Reach 05	9648	8917.00	671.58	688.09		688.65	0.001634	6.01	1483.23	185.50	0.37
Sand Creek	Reach 05	9648	10378.00	671.58	688.69		689.35	0.001743	6.51	1612.00	250.42	0.39
Sand Creek	Reach 05	9648	11841.00	671.58	688.40		689.32	0.002545	7.69	1543.69	211.17	0.46
Sand Creek	Reach 05	9648	11226.00	671.58	689.71		690.30	0.001383	6.23	1892.46	299.72	0.35
Sand Creek	Reach 05	9648	14388.00	671.58	688.76		690.00	0.003266	8.96	1628.38	255.07	0.53
Sand Creek	Reach 05	9472	3164.00	671.40	681.95	677.52	682.07	0.000568	2.81	1126.82	194.37	0.21
Sand Creek	Reach 05	9472	5723.00	671.40	685.63	678.82	685.77	0.000389	3.05	1878.85	235.14	0.18
Sand Creek	Reach 05	9472	7239.00	671.40	687.71	679.48	687.86	0.000308	3.10	2339.06	757.92	0.17
Sand Creek	Reach 05	9472	8917.00	671.40	688.21	680.08	688.42	0.000400	3.65	2455.13	1009.58	0.19
Sand Creek	Reach 05	9472	10378.00	671.40	688.84	680.52	689.09	0.000451	4.02	2611.35	1067.95	0.21
Sand Creek	Reach 05	9472	11841.00	671.40	688.61	680.98	688.95	0.000628	4.68	2549.39	1045.02	0.24
Sand Creek	Reach 05	9472	11226.00	671.40	689.83	680.77	690.08	0.000399	3.99	2900.31	1174.37	0.20
Sand Creek	Reach 05	9472	14388.00	671.40	689.05	681.68	689.51	0.000816	5.47	2669.96	1081.75	0.28
Sand Creek	Reach 05	9415	Bridge									
Sand Creek	Reach 05	9364	3164.00	671.35	681.27	678.20	681.87	0.002665	6.23	507.74	82.08	0.44
Sand Creek	Reach 05	9364	5723.00	671.35	684.96	680.28	685.59	0.002548	6.38	897.39	136.84	0.44
Sand Creek	Reach 05	9364	7239.00	671.35	687.17	681.32	687.72	0.001607	5.93	1234.70	641.15	0.36
Sand Creek	Reach 05	9364	8917.00	671.35	687.46	682.58	688.23	0.002169	7.05	1284.79	664.88	0.42
Sand Creek	Reach 05	9364	10378.00	671.35	687.88	683.31	688.82	0.002497	7.80	1359.59	702.13	0.46
Sand Creek	Reach 05	9364	11841.00	671.35	686.98	684.49	688.51	0.004668	9.95	1201.24	625.86	0.62
Sand Creek	Reach 05	9364	11226.00	671.35	688.55	684.21	689.49	0.002271	7.81	1489.50	1007.39	0.44
Sand Creek	Reach 05	9364	14388.00	671.35	687.28	685.47	689.37	0.006078	11.63	1252.98	649.65	0.71
Sand Creek	Reach 05	9274	3170.00	670.42	681.30	677.56	681.60	0.001532	4.35	728.27	245.18	0.33
Sand Creek	Reach 05	9274	5712.00	670.42	685.05	679.33	685.36	0.001034	4.41	1293.79	588.33	0.29
Sand Creek	Reach 05	9274	7231.00	670.42	687.27	680.18	687.55	0.000732	4.23	1722.55	1067.07	0.25
Sand Creek	Reach 05	9274	8840.00	670.42	687.61	680.95	687.99	0.000964	4.98	1798.94	1221.02	0.29
Sand Creek	Reach 05	9274	10276.00	670.42	688.40	681.54	688.50	0.000333	3.09	5613.33	1517.16	0.17
Sand Creek	Reach 05	9274	11712.00	670.42	687.28	682.14	688.01	0.001906	6.84	1726.64	1069.12	0.40
Sand Creek	Reach 05	9274	11226.00	670.42	689.10	681.94	689.18	0.000256	2.83	6676.30	1531.56	0.15
Sand Creek	Reach 05	9274	14380.00	670.42	688.49	683.14	688.66	0.000615	4.22	5748.79	1519.00	0.23
Sand Creek	Reach 05	9190	Bridge									
Sand Creek	Reach 05	9120	3170.00	669.82	680.81	676.19	681.26	0.001571	5.49	670.84	203.64	0.35

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 05	9120	5712.00	669.82	684.12	678.66	684.46	0.000990	5.34	1768.13	826.69	0.29
Sand Creek	Reach 05	9120	7231.00	669.82	685.57	680.00	685.85	0.000766	5.11	2417.44	950.43	0.26
Sand Creek	Reach 05	9120	8840.00	669.82	686.39	681.56	686.54	0.000504	4.33	4415.50	1149.82	0.21
Sand Creek	Reach 05	9120	10276.00	669.82	686.43	683.15	686.63	0.000665	4.98	4461.13	1154.24	0.24
Sand Creek	Reach 05	9120	11712.00	669.82	686.95	683.59	687.15	0.000640	5.02	5084.75	1216.20	0.24
Sand Creek	Reach 05	9120	11226.00	669.82	686.77	683.43	686.97	0.000650	5.02	4864.79	1192.65	0.24
Sand Creek	Reach 05	9120	14380.00	669.82	687.74	684.25	687.94	0.000644	5.24	6086.35	1349.99	0.24
Sand Creek	Reach 05	8934	3170.00	670.17	680.10	676.92	680.83	0.003094	6.88	467.00	176.59	0.47
Sand Creek	Reach 05	8934	5712.00	670.17	683.58	679.37	684.20	0.001724	6.83	1227.51	599.20	0.38
Sand Creek	Reach 05	8934	7231.00	670.17	685.13	681.18	685.64	0.001312	6.56	1779.88	913.86	0.34
Sand Creek	Reach 05	8934	8840.00	670.17	685.76	682.02	686.35	0.001468	7.19	2012.36	1064.34	0.36
Sand Creek	Reach 05	8934	10276.00	670.17	686.10	683.00	686.46	0.001103	6.34	4002.19	1441.76	0.32
Sand Creek	Reach 05	8934	11712.00	670.17	686.73	683.68	687.00	0.000883	5.87	4919.96	1466.76	0.29
Sand Creek	Reach 05	8934	11226.00	670.17	686.52	683.42	686.81	0.000949	6.02	4610.54	1456.50	0.29
Sand Creek	Reach 05	8934	14380.00	670.17	687.58	684.90	687.80	0.000776	5.73	6225.81	1689.86	0.27
Sand Creek	Reach 05	8507	3170.00	668.00	678.95	674.86	679.64	0.002484	6.68	474.20	89.38	0.43
Sand Creek	Reach 05	8507	5712.00	668.00	682.20	677.54	683.23	0.002785	8.17	709.95	253.47	0.47
Sand Creek	Reach 05	8507	7231.00	668.00	683.60	678.84	684.79	0.002721	8.86	878.27	408.87	0.48
Sand Creek	Reach 05	8507	8840.00	668.00	685.18	680.06	685.73	0.001376	6.90	2453.50	815.47	0.35
Sand Creek	Reach 05	8507	10276.00	668.00	684.93	681.05	685.77	0.002119	8.45	2256.96	756.95	0.43
Sand Creek	Reach 05	8507	11712.00	668.00	685.72	681.99	686.43	0.001818	8.16	2923.52	947.62	0.40
Sand Creek	Reach 05	8507	11226.00	668.00	685.45	681.66	686.21	0.001929	8.29	2675.97	877.09	0.41
Sand Creek	Reach 05	8507	14380.00	668.00	686.16	684.31	687.18	0.002490	9.77	3457.20	1540.64	0.47
Sand Creek	Reach 05	8007	3170.00	668.00	678.36	673.14	678.70	0.001202	4.70	674.50	156.45	0.30
Sand Creek	Reach 05	8007	5712.00	668.00	681.70	675.27	682.20	0.001193	5.66	1035.61	303.13	0.32
Sand Creek	Reach 05	8007	7231.00	668.00	683.18	676.33	683.75	0.001166	6.14	1324.66	551.03	0.32
Sand Creek	Reach 05	8007	8840.00	668.00	684.47	677.38	685.10	0.001133	6.50	1758.83	1029.71	0.32
Sand Creek	Reach 05	8007	10276.00	668.00	683.71	678.26	684.73	0.001970	8.23	1489.70	633.96	0.42
Sand Creek	Reach 05	8007	11712.00	668.00	684.24	679.07	685.40	0.002147	8.84	1672.27	954.33	0.44
Sand Creek	Reach 05	8007	11226.00	668.00	684.05	678.79	685.16	0.002101	8.65	1603.32	899.38	0.44
Sand Creek	Reach 05	8007	14380.00	668.00	686.12	680.38	686.38	0.000654	5.36	5684.59	1708.78	0.25
Sand Creek	Reach 05	7507	3170.00	666.00	677.46	672.55	677.98	0.001671	5.80	546.96	139.84	0.36
Sand Creek	Reach 05	7507	5712.00	666.00	680.53	675.02	681.39	0.002060	7.45	770.12	496.71	0.41
Sand Creek	Reach 05	7507	7231.00	666.00	681.86	676.27	682.93	0.002176	8.30	907.93	1045.69	0.43
Sand Creek	Reach 05	7507	8840.00	666.00	683.09	677.45	684.27	0.002185	8.90	1228.81	1376.55	0.44
Sand Creek	Reach 05	7507	10276.00	666.00	684.02	678.42	684.12	0.000334	3.65	5577.84	1533.31	0.17
Sand Creek	Reach 05	7507	11712.00	666.00	684.70	679.31	684.78	0.000275	3.41	6620.22	1553.67	0.16

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 05	7507	11226.00	666.00	684.46	679.01	684.54	0.000296	3.50	6244.64	1546.29	0.16
Sand Creek	Reach 05	7507	14380.00	666.00	686.10	680.88	686.16	0.000184	2.97	8830.36	1596.21	0.13
Sand Creek	Reach 05	7007	3170.00	666.00	675.77	672.78	676.71	0.003981	7.77	407.86	120.44	0.53
Sand Creek	Reach 05	7007	5712.00	666.00	678.26	675.55	679.77	0.005281	9.85	579.77	150.94	0.63
Sand Creek	Reach 05	7007	7231.00	666.00	679.29	676.88	681.14	0.006126	10.92	661.90	194.55	0.68
Sand Creek	Reach 05	7007	8840.00	666.00	680.15	678.11	682.38	0.006893	12.00	752.65	554.92	0.73
Sand Creek	Reach 05	7007	10276.00	666.00	680.68	679.09	683.28	0.007461	13.00	860.48	784.89	0.77
Sand Creek	Reach 05	7007	11712.00	666.00	680.84	680.57	684.07	0.009058	14.50	894.94	935.90	0.85
Sand Creek	Reach 05	7007	11226.00	666.00	681.27	679.69	683.88	0.006981	13.13	987.73	1078.89	0.75
Sand Creek	Reach 05	7007	14380.00	666.00	681.60	681.60	685.49	0.010004	16.09	1063.02	1115.96	0.91
Sand Creek	Reach 06	6507	3299.00	666.00	675.38	672.54	675.86	0.002460	5.60	589.55	161.78	0.42
Sand Creek	Reach 06	6507	5751.00	666.00	678.14	674.22	678.78	0.002112	6.39	900.32	191.68	0.41
Sand Creek	Reach 06	6507	7213.00	666.00	679.25	675.04	680.01	0.002249	6.96	1035.68	283.31	0.43
Sand Creek	Reach 06	6507	8781.00	666.00	680.21	675.83	681.10	0.002415	7.58	1158.72	580.01	0.45
Sand Creek	Reach 06	6507	10500.00	666.00	680.69	676.62	681.84	0.002893	8.60	1233.53	1021.80	0.49
Sand Creek	Reach 06	6507	11645.00	666.00	681.04	677.14	682.34	0.003142	9.18	1306.12	1116.32	0.52
Sand Creek	Reach 06	6507	12005.00	666.00	681.08	677.28	682.46	0.003285	9.42	1316.94	1128.61	0.53
Sand Creek	Reach 06	6507	14378.00	666.00	682.26	678.27	682.61	0.001133	5.96	4530.87	1871.53	0.32
Sand Creek	Reach 06	6007	3299.00	662.00	674.37	668.54	674.73	0.001980	4.80	687.52	176.69	0.37
Sand Creek	Reach 06	6007	5751.00	662.00	677.68	671.02	677.94	0.001058	4.26	1511.04	441.66	0.29
Sand Creek	Reach 06	6007	7213.00	662.00	678.99	672.76	679.22	0.000800	4.16	2049.95	721.41	0.26
Sand Creek	Reach 06	6007	8781.00	662.00	680.05	674.30	680.30	0.000734	4.32	2706.76	1644.80	0.25
Sand Creek	Reach 06	6007	10500.00	662.00	680.96	675.36	681.09	0.000422	3.49	5383.02	1985.39	0.19
Sand Creek	Reach 06	6007	11645.00	662.00	681.47	675.78	681.58	0.000363	3.34	6403.48	2002.99	0.18
Sand Creek	Reach 06	6007	12005.00	662.00	681.56	675.92	681.67	0.000363	3.36	6582.11	2006.06	0.18
Sand Creek	Reach 06	6007	14378.00	662.00	682.14	677.11	682.24	0.000360	3.47	7739.74	2032.50	0.18
Sand Creek	Reach 06	5507	3299.00	662.00	672.66		673.45	0.003126	7.14	462.08	67.54	0.48
Sand Creek	Reach 06	5507	5751.00	662.00	676.12		677.05	0.002885	7.77	747.91	130.05	0.48
Sand Creek	Reach 06	5507	7213.00	662.00	677.50		678.49	0.002542	8.09	991.46	220.39	0.46
Sand Creek	Reach 06	5507	8781.00	662.00	678.59		679.61	0.002385	8.42	1279.05	336.71	0.45
Sand Creek	Reach 06	5507	10500.00	662.00	679.72	675.40	680.61	0.001992	8.23	1891.88	723.31	0.42
Sand Creek	Reach 06	5507	11645.00	662.00	680.21	676.10	681.14	0.002037	8.55	2369.43	1298.81	0.43
Sand Creek	Reach 06	5507	12005.00	662.00	680.39	676.56	681.24	0.001898	8.33	2609.30	1303.85	0.42
Sand Creek	Reach 06	5507	14378.00	662.00	681.24		681.87	0.001503	7.75	3724.09	1328.49	0.37
Sand Creek	Reach 06	5007	3299.00	660.00	671.71		672.25	0.001699	5.91	558.61	66.70	0.36
Sand Creek	Reach 06	5007	5751.00	660.00	674.98		675.78	0.002122	7.21	801.23	95.71	0.41

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 06	5007	7213.00	660.00	676.32		677.26	0.002343	7.80	950.18	131.88	0.44
Sand Creek	Reach 06	5007	8781.00	660.00	677.27		678.38	0.002486	8.55	1099.60	182.75	0.46
Sand Creek	Reach 06	5007	10500.00	660.00	678.01	672.61	679.39	0.002831	9.53	1252.18	464.49	0.49
Sand Creek	Reach 06	5007	11645.00	660.00	678.33	673.29	679.84	0.003059	10.09	1413.14	551.90	0.51
Sand Creek	Reach 06	5007	12005.00	660.00	678.39	673.56	679.96	0.003172	10.31	1447.58	597.70	0.52
Sand Creek	Reach 06	5007	14378.00	660.00	678.96	675.52	680.67	0.003433	11.06	1829.91	717.21	0.55
Sand Creek	Reach 06	4007	3299.00	660.00	667.64		669.09	0.007171	9.64	342.06	60.08	0.71
Sand Creek	Reach 06	4007	5751.00	660.00	670.75		672.39	0.005851	10.29	561.22	84.96	0.67
Sand Creek	Reach 06	4007	7213.00	660.00	672.11		673.87	0.005032	10.71	715.30	143.23	0.64
Sand Creek	Reach 06	4007	8781.00	660.00	673.43	670.97	675.14	0.004238	10.79	909.64	152.66	0.60
Sand Creek	Reach 06	4007	10500.00	660.00	674.83	672.65	676.32	0.003308	10.41	1308.93	420.38	0.54
Sand Creek	Reach 06	4007	11645.00	660.00	675.54	673.21	676.83	0.002837	10.04	1675.28	567.31	0.51
Sand Creek	Reach 06	4007	12005.00	660.00	675.83	673.43	677.00	0.002565	9.70	1842.34	580.24	0.49
Sand Creek	Reach 06	4007	14378.00	660.00	676.94		677.85	0.002012	9.09	2505.44	617.40	0.44
Sand Creek	Reach 06	3507	3300.00	656.00	666.17		666.89	0.002517	6.81	484.68	63.68	0.43
Sand Creek	Reach 06	3507	5752.00	656.00	669.03		670.14	0.003145	8.44	681.78	76.46	0.50
Sand Creek	Reach 06	3507	7206.00	656.00	670.36		671.66	0.003470	9.13	789.02	84.82	0.53
Sand Creek	Reach 06	3507	8746.00	656.00	671.60		673.07	0.003755	9.72	899.84	93.79	0.55
Sand Creek	Reach 06	3507	10242.00	656.00	673.47		674.75	0.002757	9.22	1238.63	271.52	0.49
Sand Creek	Reach 06	3507	11581.00	656.00	674.00		675.40	0.002877	9.72	1392.92	317.33	0.50
Sand Creek	Reach 06	3507	12005.00	656.00	674.28		675.65	0.002766	9.68	1485.56	336.10	0.49
Sand Creek	Reach 06	3507	14276.00	656.00	675.37		676.68	0.002530	9.81	1877.01	387.55	0.48
Sand Creek	Reach 06	3007	3300.00	656.00	665.41	660.86	665.84	0.001514	5.27	625.66	84.87	0.34
Sand Creek	Reach 06	3007	5752.00	656.00	668.29	662.84	668.87	0.001650	6.20	1042.70	193.67	0.37
Sand Creek	Reach 06	3007	7206.00	656.00	669.79	663.88	670.39	0.001425	6.40	1392.82	279.96	0.35
Sand Creek	Reach 06	3007	8746.00	656.00	671.29	664.84	671.84	0.001158	6.32	1818.10	287.76	0.32
Sand Creek	Reach 06	3007	10242.00	656.00	673.41	665.70	673.83	0.000767	5.74	2445.32	307.70	0.27
Sand Creek	Reach 06	3007	11581.00	656.00	673.94	667.04	674.41	0.000835	6.14	2614.41	328.75	0.28
Sand Creek	Reach 06	3007	12005.00	656.00	674.13	667.35	674.66	0.000914	6.48	2684.44	403.02	0.30
Sand Creek	Reach 06	3007	14276.00	656.00	675.18	668.55	675.74	0.000912	6.78	3138.88	458.38	0.30
Sand Creek	Reach 06	2970	Bridge									
Sand Creek	Reach 06	2939	3300.00	656.00	662.97	662.96	665.28	0.015284	12.19	270.65	59.15	1.00
Sand Creek	Reach 06	2939	5752.00	656.00	665.16	665.16	668.20	0.014078	13.98	411.36	68.23	1.00
Sand Creek	Reach 06	2939	7206.00	656.00	666.24	666.24	669.64	0.013622	14.81	486.61	71.92	1.00
Sand Creek	Reach 06	2939	8746.00	656.00	667.26	667.26	671.02	0.013241	15.56	562.16	75.19	1.00
Sand Creek	Reach 06	2939	10242.00	656.00	668.15	668.15	672.25	0.012993	16.26	629.86	78.17	1.00

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 06	2939	11581.00	656.00	668.87	668.87	673.29	0.012504	16.88	687.55	81.66	1.00
Sand Creek	Reach 06	2939	12005.00	656.00	669.10	669.10	673.61	0.012335	17.06	706.38	82.76	1.00
Sand Creek	Reach 06	2939	14276.00	656.00	670.30	670.30	675.25	0.011466	17.87	809.51	88.79	0.98
Sand Creek	Reach 06	2718	3300.00	656.00	663.55		663.85	0.001628	4.58	772.99	165.82	0.34
Sand Creek	Reach 06	2718	5752.00	656.00	666.33		666.66	0.001091	4.92	1360.44	251.28	0.30
Sand Creek	Reach 06	2718	7206.00	656.00	667.64		667.96	0.000925	4.99	1699.87	269.77	0.28
Sand Creek	Reach 06	2718	8746.00	656.00	669.12		669.42	0.000742	4.92	2116.59	291.10	0.26
Sand Creek	Reach 06	2718	10242.00	656.00	670.16		670.48	0.000694	5.05	2428.58	307.57	0.26
Sand Creek	Reach 06	2718	11581.00	656.00	671.01		671.35	0.000678	5.23	2702.17	339.43	0.26
Sand Creek	Reach 06	2718	12005.00	656.00	671.23		671.58	0.000680	5.29	2778.26	346.71	0.26
Sand Creek	Reach 06	2718	14276.00	656.00	671.89		672.31	0.000787	5.88	3014.77	370.15	0.28
Sand Creek	Reach 06	2507	3300.00	656.00	663.44		663.57	0.000761	3.21	1184.58	297.60	0.24
Sand Creek	Reach 06	2507	5752.00	656.00	666.34		666.46	0.000430	3.17	2172.22	360.11	0.19
Sand Creek	Reach 06	2507	7206.00	656.00	667.66		667.78	0.000367	3.22	2655.17	371.39	0.18
Sand Creek	Reach 06	2507	8746.00	656.00	669.15		669.27	0.000301	3.20	3217.68	383.04	0.17
Sand Creek	Reach 06	2507	10242.00	656.00	670.21		670.34	0.000289	3.32	3627.12	393.41	0.17
Sand Creek	Reach 06	2507	11581.00	656.00	671.06		671.20	0.000289	3.46	3967.89	407.68	0.17
Sand Creek	Reach 06	2507	12005.00	656.00	671.28		671.42	0.000291	3.52	4059.46	411.43	0.17
Sand Creek	Reach 06	2507	14276.00	656.00	671.96		672.13	0.000344	3.95	4340.59	423.90	0.18
Sand Creek	Reach 06	2007	3300.00	656.00	663.46		663.47	0.000052	0.89	3897.85	704.59	0.06
Sand Creek	Reach 06	2007	5752.00	656.00	666.36		666.38	0.000040	1.01	6067.09	777.27	0.06
Sand Creek	Reach 06	2007	7206.00	656.00	667.69		667.71	0.000038	1.09	7107.62	791.50	0.06
Sand Creek	Reach 06	2007	8746.00	656.00	669.18		669.20	0.000035	1.14	8306.24	816.02	0.06
Sand Creek	Reach 06	2007	10242.00	656.00	670.25		670.27	0.000036	1.22	9183.25	839.29	0.06
Sand Creek	Reach 06	2007	11581.00	656.00	671.10		671.12	0.000037	1.29	9913.53	870.46	0.06
Sand Creek	Reach 06	2007	12005.00	656.00	671.32		671.35	0.000038	1.32	10110.33	879.63	0.06
Sand Creek	Reach 06	2007	14276.00	656.00	672.01		672.04	0.000046	1.49	10722.71	908.02	0.07
Sand Creek	Reach 06	1507	3300.00	654.00	663.44		663.45	0.000026	0.77	5269.71	881.90	0.05
Sand Creek	Reach 06	1507	5752.00	654.00	666.35		666.36	0.000022	0.86	7890.41	913.13	0.04
Sand Creek	Reach 06	1507	7206.00	654.00	667.68		667.69	0.000022	0.92	9112.46	929.14	0.05
Sand Creek	Reach 06	1507	8746.00	654.00	669.18		669.19	0.000021	0.97	10517.38	952.85	0.05
Sand Creek	Reach 06	1507	10242.00	654.00	670.24		670.25	0.000021	1.04	11539.31	973.49	0.05
Sand Creek	Reach 06	1507	11581.00	654.00	671.09		671.11	0.000022	1.10	12379.44	992.56	0.05
Sand Creek	Reach 06	1507	12005.00	654.00	671.32		671.33	0.000023	1.12	12603.18	997.47	0.05
Sand Creek	Reach 06	1507	14276.00	654.00	672.00		672.02	0.000027	1.27	13290.08	1012.82	0.05
Sand Creek	Reach 06	1007	3300.00	654.00	663.43		663.43	0.000029	0.83	4525.24	672.12	0.05

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Sand Creek	Reach 06	1007	5752.00	654.00	666.34		666.35	0.000029	1.01	6535.19	714.02	0.05
Sand Creek	Reach 06	1007	7206.00	654.00	667.66		667.68	0.000029	1.10	7491.91	729.66	0.05
Sand Creek	Reach 06	1007	8746.00	654.00	669.16		669.17	0.000029	1.17	8605.30	764.39	0.05
Sand Creek	Reach 06	1007	10242.00	654.00	670.22		670.24	0.000033	1.31	9444.50	865.82	0.06
Sand Creek	Reach 06	1007	11581.00	654.00	671.07		671.09	0.000035	1.39	10204.66	915.26	0.06
Sand Creek	Reach 06	1007	12005.00	654.00	671.29		671.32	0.000036	1.44	10420.11	1027.36	0.06
Sand Creek	Reach 06	1007	14276.00	654.00	671.97		672.00	0.000044	1.63	11142.09	1097.16	0.07
Stream A	Reach 01	9500	1224.00	742.00	745.98		746.51	0.008147	7.52	291.05	176.04	0.72
Stream A	Reach 01	9500	1960.00	742.00	746.77		747.34	0.007448	8.26	452.34	225.61	0.71
Stream A	Reach 01	9500	2422.00	742.00	747.17		747.76	0.007134	8.59	548.12	248.28	0.70
Stream A	Reach 01	9500	2914.00	742.00	747.63		748.20	0.006388	8.66	668.01	275.39	0.68
Stream A	Reach 01	9500	3375.00	742.00	747.96		748.54	0.006200	8.90	762.33	294.87	0.67
Stream A	Reach 01	9500	3861.00	742.00	748.24		748.83	0.006105	9.13	846.60	302.79	0.67
Stream A	Reach 01	9500	3861.00	742.00	748.24		748.83	0.006105	9.13	846.60	302.79	0.67
Stream A	Reach 01	9500	4599.00	742.00	748.62	747.82	749.24	0.006063	9.50	962.61	311.54	0.68
Stream A	Reach 01	9000	1224.00	742.00	744.25	743.17	744.39	0.002370	3.11	425.78	209.59	0.36
Stream A	Reach 01	9000	1960.00	742.00	744.78	743.59	745.01	0.002962	3.99	538.59	219.17	0.42
Stream A	Reach 01	9000	2422.00	742.00	745.05	743.83	745.34	0.003279	4.47	598.91	223.95	0.45
Stream A	Reach 01	9000	2914.00	742.00	745.13	744.06	745.53	0.004352	5.24	616.43	225.32	0.52
Stream A	Reach 01	9000	3375.00	742.00	745.31		745.79	0.004794	5.71	658.16	228.55	0.55
Stream A	Reach 01	9000	3861.00	742.00	745.56		746.10	0.004865	6.04	716.60	233.00	0.56
Stream A	Reach 01	9000	3861.00	742.00	745.56		746.10	0.004865	6.04	716.60	233.00	0.56
Stream A	Reach 01	9000	4599.00	742.00	745.99		746.59	0.004654	6.38	818.33	240.54	0.56
Stream A	Reach 01	8794	1224.00	742.00	742.82	742.82	743.22	0.024868	5.13	241.38	301.77	1.00
Stream A	Reach 01	8794	1960.00	742.00	743.12	743.12	743.67	0.022506	5.99	331.76	306.70	1.00
Stream A	Reach 01	8794	2422.00	742.00	743.28	743.28	743.91	0.021408	6.42	383.56	309.41	1.00
Stream A	Reach 01	8794	2914.00	742.00	743.85		744.28	0.008999	5.31	561.51	318.46	0.69
Stream A	Reach 01	8794	3375.00	742.00	744.45		744.77	0.004644	4.60	756.31	329.41	0.52
Stream A	Reach 01	8794	3861.00	742.00	744.90		745.19	0.003444	4.43	904.34	337.68	0.46
Stream A	Reach 01	8794	3861.00	742.00	744.90		745.19	0.003444	4.43	904.34	337.68	0.46
Stream A	Reach 01	8794	4599.00	742.00	745.54		745.81	0.002448	4.27	1125.16	347.49	0.40
Stream A	Reach 01	8498	1224.00	730.00	737.96		737.99	0.000281	1.25	977.04	185.43	0.10
Stream A	Reach 01	8498	1960.00	730.00	741.25		741.27	0.000170	1.16	1719.85	285.20	0.08
Stream A	Reach 01	8498	2422.00	730.00	743.08		743.10	0.000122	1.10	2304.71	366.86	0.07
Stream A	Reach 01	8498	2914.00	730.00	744.02		744.04	0.000120	1.18	2683.52	435.44	0.07
Stream A	Reach 01	8498	3375.00	730.00	744.55		744.57	0.000131	1.28	2920.75	479.61	0.07
Stream A	Reach 01	8498	3861.00	730.00	744.96		744.99	0.000146	1.39	3125.06	494.63	0.08

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream A	Reach 01	8498	3861.00	730.00	744.96		744.99	0.000146	1.39	3125.06	494.63	0.08
Stream A	Reach 01	8498	4599.00	730.00	745.58		745.62	0.000164	1.53	3437.95	515.23	0.08
Stream A	Reach 01	8000	1224.00	730.00	737.94		737.95	0.000027	0.76	2053.76	374.28	0.05
Stream A	Reach 01	8000	1960.00	730.00	741.24		741.25	0.000018	0.79	3446.94	476.32	0.04
Stream A	Reach 01	8000	2422.00	730.00	743.07		743.08	0.000015	0.80	4359.56	530.17	0.04
Stream A	Reach 01	8000	2914.00	730.00	744.01		744.02	0.000016	0.88	4877.77	568.93	0.04
Stream A	Reach 01	8000	3375.00	730.00	744.54		744.55	0.000019	0.96	5177.38	579.34	0.04
Stream A	Reach 01	8000	3861.00	730.00	744.95		744.96	0.000022	1.05	5420.49	586.80	0.05
Stream A	Reach 01	8000	3861.00	730.00	744.95		744.96	0.000022	1.05	5420.49	586.80	0.05
Stream A	Reach 01	8000	4599.00	730.00	745.57		745.59	0.000026	1.18	5786.63	596.98	0.05
Stream A	Reach 01	7497	1224.00	730.00	737.94		737.94	0.000009	0.45	3073.34	528.12	0.03
Stream A	Reach 01	7497	1960.00	730.00	741.24		741.24	0.000007	0.48	5144.69	662.27	0.03
Stream A	Reach 01	7497	2422.00	730.00	743.07		743.07	0.000006	0.50	6387.32	694.50	0.02
Stream A	Reach 01	7497	2914.00	730.00	744.01		744.02	0.000006	0.55	7050.93	713.26	0.03
Stream A	Reach 01	7497	3375.00	730.00	744.53		744.54	0.000008	0.61	7427.65	741.24	0.03
Stream A	Reach 01	7497	3861.00	730.00	744.95		744.96	0.000009	0.67	7744.68	778.88	0.03
Stream A	Reach 01	7497	3861.00	730.00	744.95		744.96	0.000009	0.67	7744.68	778.88	0.03
Stream A	Reach 01	7497	4599.00	730.00	745.57		745.58	0.000011	0.77	8240.27	825.16	0.03
Stream A	Reach 01	7001	1224.00	730.00	737.94		737.94	0.000001	0.12	11954.79	1885.01	0.01
Stream A	Reach 01	7001	1960.00	730.00	741.24		741.24	0.000000	0.13	18244.34	1929.25	0.01
Stream A	Reach 01	7001	2422.00	730.00	743.07		743.07	0.000000	0.14	21818.02	1985.35	0.01
Stream A	Reach 01	7001	2914.00	730.00	744.01		744.01	0.000000	0.15	23707.90	2020.16	0.01
Stream A	Reach 01	7001	3375.00	730.00	744.54		744.54	0.000001	0.17	24766.95	2037.69	0.01
Stream A	Reach 01	7001	3861.00	730.00	744.95		744.95	0.000001	0.18	25619.88	2050.81	0.01
Stream A	Reach 01	7001	3861.00	730.00	744.95		744.95	0.000001	0.18	25619.88	2050.81	0.01
Stream A	Reach 01	7001	4599.00	730.00	745.57		745.57	0.000001	0.21	26895.01	2070.26	0.01
Stream A	Reach 01	6500	1224.00	730.00	737.94		737.94	0.000002	0.23	5602.06	851.38	0.01
Stream A	Reach 01	6500	1960.00	730.00	741.24		741.24	0.000002	0.25	8820.94	1140.80	0.01
Stream A	Reach 01	6500	2422.00	730.00	743.07		743.07	0.000002	0.25	11008.21	1256.59	0.01
Stream A	Reach 01	6500	2914.00	730.00	744.01		744.01	0.000002	0.28	12206.82	1289.62	0.01
Stream A	Reach 01	6500	3375.00	730.00	744.53		744.54	0.000002	0.31	12887.27	1319.39	0.01
Stream A	Reach 01	6500	3861.00	730.00	744.95		744.95	0.000002	0.34	13441.95	1343.35	0.02
Stream A	Reach 01	6500	3861.00	730.00	744.95		744.95	0.000002	0.34	13441.95	1343.35	0.02
Stream A	Reach 01	6500	4599.00	730.00	745.57		745.57	0.000003	0.38	14277.84	1358.66	0.02
Stream A	Reach 01	5952	1224.00	729.30	737.94	729.74	737.94	0.000001	0.16	7687.74	998.53	0.01
Stream A	Reach 01	5952	1960.00	729.30	741.24	729.90	741.24	0.000001	0.18	11186.26	1164.45	0.01

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream A	Reach 01	5952	2422.00	729.30	743.07	729.99	743.07	0.000001	0.19	13361.27	1211.63	0.01
Stream A	Reach 01	5952	2914.00	729.30	744.01	730.08	744.01	0.000001	0.21	14524.86	1251.64	0.01
Stream A	Reach 01	5952	3375.00	729.30	744.53	730.16	744.53	0.000001	0.23	15179.35	1257.68	0.01
Stream A	Reach 01	5952	3861.00	729.30	744.95	730.25	744.95	0.000001	0.26	15704.64	1262.85	0.01
Stream A	Reach 01	5952	3861.00	729.30	744.95	730.25	744.95	0.000001	0.26	15704.64	1262.85	0.01
Stream A	Reach 01	5952	4599.00	729.30	745.57	730.36	745.57	0.000002	0.29	16487.82	1270.53	0.01
Stream A	Reach 01	5840	Inl Struct									
Stream A	Reach 01	5500	117.00	696.00	697.97	697.97	698.56	0.023772	6.17	18.96	16.23	1.01
Stream A	Reach 01	5500	122.00	696.00	698.03	698.03	698.61	0.023452	6.14	19.88	17.03	1.00
Stream A	Reach 01	5500	125.00	696.00	698.06	698.06	698.64	0.023523	6.09	20.51	17.82	1.00
Stream A	Reach 01	5500	128.00	696.00	698.10	698.10	698.67	0.023628	6.07	21.09	18.51	1.00
Stream A	Reach 01	5500	131.00	696.00	698.13	698.13	698.69	0.023684	6.05	21.66	19.17	1.00
Stream A	Reach 01	5500	134.00	696.00	698.15	698.15	698.72	0.023754	6.03	22.21	19.79	1.00
Stream A	Reach 01	5500	134.00	696.00	698.15	698.15	698.72	0.023754	6.03	22.21	19.79	1.00
Stream A	Reach 01	5500	632.00	696.00	699.87	699.87	700.60	0.021325	6.87	92.02	63.69	1.01
Stream A	Reach 01	4841	117.00	688.00	692.29		692.32	0.000807	1.22	95.66	40.33	0.14
Stream A	Reach 01	4841	122.00	688.00	692.35		692.38	0.000816	1.24	98.13	40.71	0.14
Stream A	Reach 01	4841	125.00	688.00	692.39		692.42	0.000821	1.25	99.61	40.92	0.14
Stream A	Reach 01	4841	128.00	688.00	692.43		692.45	0.000825	1.27	101.08	41.13	0.14
Stream A	Reach 01	4841	131.00	688.00	692.46		692.49	0.000829	1.28	102.55	41.34	0.14
Stream A	Reach 01	4841	134.00	688.00	692.50		692.52	0.000833	1.29	104.01	41.54	0.14
Stream A	Reach 01	4841	134.00	688.00	692.50		692.52	0.000833	1.29	104.01	41.54	0.14
Stream A	Reach 01	4841	632.00	688.00	696.75		696.81	0.000743	1.88	335.45	68.91	0.15
Stream A	Reach 01	4734	117.00	688.00	692.25	689.41	692.27	0.000303	1.11	105.18	45.23	0.13
Stream A	Reach 01	4734	122.00	688.00	692.31	689.45	692.33	0.000305	1.13	107.94	45.55	0.13
Stream A	Reach 01	4734	125.00	688.00	692.34	689.47	692.36	0.000307	1.14	109.58	45.74	0.13
Stream A	Reach 01	4734	128.00	688.00	692.38	689.49	692.40	0.000308	1.15	111.22	45.93	0.13
Stream A	Reach 01	4734	131.00	688.00	692.41	689.51	692.44	0.000309	1.16	112.85	46.12	0.13
Stream A	Reach 01	4734	134.00	688.00	692.45	689.53	692.47	0.000310	1.17	114.47	46.30	0.13
Stream A	Reach 01	4734	134.00	688.00	692.45	689.53	692.47	0.000310	1.17	114.47	46.30	0.13
Stream A	Reach 01	4734	632.00	688.00	696.72	691.63	696.76	0.000261	1.76	360.06	68.97	0.14
Stream A	Reach 01	4685	Culvert									
Stream A	Reach 01	4631	117.00	688.00	689.85		690.01	0.004413	3.20	36.54	23.87	0.46
Stream A	Reach 01	4631	122.00	688.00	689.91		690.07	0.004258	3.20	38.07	24.16	0.45
Stream A	Reach 01	4631	125.00	688.00	689.95		690.11	0.004200	3.21	38.89	24.31	0.45

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream A	Reach 01	4631	128.00	688.00	689.98		690.14	0.004138	3.22	39.73	24.47	0.45
Stream A	Reach 01	4631	131.00	688.00	690.02		690.18	0.004084	3.23	40.56	24.62	0.44
Stream A	Reach 01	4631	134.00	688.00	690.05		690.21	0.004008	3.23	41.46	24.79	0.44
Stream A	Reach 01	4631	134.00	688.00	690.05		690.21	0.004003	3.23	41.48	24.80	0.44
Stream A	Reach 01	4631	632.00	688.00	693.71		693.93	0.001899	3.75	168.38	45.18	0.34
Stream A	Reach 01	4408	117.00	685.51	689.12		689.20	0.002897	2.26	51.87	21.93	0.26
Stream A	Reach 01	4408	122.00	685.51	689.19		689.27	0.002891	2.28	53.44	22.12	0.26
Stream A	Reach 01	4408	125.00	685.51	689.23		689.31	0.002910	2.30	54.23	22.22	0.26
Stream A	Reach 01	4408	128.00	685.51	689.27		689.35	0.002919	2.32	55.08	22.32	0.26
Stream A	Reach 01	4408	131.00	685.51	689.30		689.39	0.002934	2.34	55.87	22.42	0.26
Stream A	Reach 01	4408	134.00	685.51	689.35		689.43	0.002912	2.35	56.91	22.55	0.26
Stream A	Reach 01	4408	134.00	685.51	689.35		689.44	0.002905	2.35	56.96	22.55	0.26
Stream A	Reach 01	4408	632.00	685.51	693.13	689.75	693.36	0.003510	3.91	161.67	32.93	0.31
Stream A	Reach 01	4000	117.00	684.00	687.19		687.29	0.008756	2.60	45.04	23.63	0.33
Stream A	Reach 01	4000	122.00	684.00	687.21		687.32	0.009294	2.68	45.45	23.72	0.34
Stream A	Reach 01	4000	125.00	684.00	687.23		687.34	0.009465	2.72	45.96	23.85	0.35
Stream A	Reach 01	4000	128.00	684.00	687.26		687.38	0.009473	2.74	46.76	24.04	0.35
Stream A	Reach 01	4000	131.00	684.00	687.32		687.43	0.009156	2.72	48.17	24.38	0.34
Stream A	Reach 01	4000	134.00	684.00	687.24		687.37	0.010632	2.89	46.35	23.94	0.37
Stream A	Reach 01	4000	134.00	684.00	687.17		687.31	0.011808	3.01	44.59	23.51	0.38
Stream A	Reach 01	4000	632.00	684.00	688.23	688.23	689.40	0.074822	8.67	72.86	31.28	1.00
Stream A	Reach 01	3434	117.00	682.00	684.50		684.52	0.003087	1.03	113.21	173.19	0.23
Stream A	Reach 01	3434	122.00	682.00	684.53		684.54	0.002976	1.04	117.43	173.40	0.22
Stream A	Reach 01	3434	125.00	682.00	684.54		684.55	0.002967	1.05	119.29	173.49	0.22
Stream A	Reach 01	3434	128.00	682.00	684.54		684.56	0.003021	1.06	120.36	173.54	0.23
Stream A	Reach 01	3434	131.00	682.00	684.54		684.56	0.003169	1.09	120.31	173.54	0.23
Stream A	Reach 01	3434	134.00	682.00	684.58		684.60	0.002744	1.05	127.43	173.89	0.22
Stream A	Reach 01	3434	134.00	682.00	684.60		684.62	0.002495	1.02	131.18	174.08	0.21
Stream A	Reach 01	3434	632.00	682.00	686.30		686.33	0.001094	1.45	437.69	188.01	0.17
Stream A	Reach 01	3000	117.00	680.00	682.23		682.38	0.008987	3.14	37.30	23.37	0.44
Stream A	Reach 01	3000	122.00	680.00	682.27		682.43	0.009094	3.18	38.35	23.74	0.44
Stream A	Reach 01	3000	125.00	680.00	682.31		682.46	0.009047	3.19	39.16	24.02	0.44
Stream A	Reach 01	3000	128.00	680.00	682.56		682.68	0.006717	2.81	45.59	27.14	0.38
Stream A	Reach 01	3000	131.00	680.00	683.06		683.13	0.003421	2.17	60.27	31.74	0.28
Stream A	Reach 01	3000	134.00	680.00	683.51		683.56	0.002068	1.76	75.93	37.51	0.22
Stream A	Reach 01	3000	134.00	680.00	683.66		683.70	0.001791	1.64	81.54	40.29	0.20
Stream A	Reach 01	3000	632.00	680.00	685.22		685.38	0.006232	3.24	200.25	97.45	0.39

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream A	Reach 01	2950.*	117.00	679.60	681.52		681.77	0.016953	3.99	29.35	20.69	0.59
Stream A	Reach 01	2950.*	122.00	679.60	681.51		681.79	0.018706	4.18	29.18	20.62	0.62
Stream A	Reach 01	2950.*	125.00	679.60	681.60		681.85	0.016907	4.04	30.96	21.36	0.59
Stream A	Reach 01	2950.*	128.00	679.60	682.23		682.35	0.006463	2.75	46.51	27.72	0.37
Stream A	Reach 01	2950.*	131.00	679.60	682.92		682.97	0.002656	1.93	67.76	35.22	0.25
Stream A	Reach 01	2950.*	134.00	679.60	683.43		683.47	0.001636	1.52	88.34	46.12	0.19
Stream A	Reach 01	2950.*	134.00	679.60	683.57		683.60	0.001952	1.39	96.33	65.89	0.20
Stream A	Reach 01	2950.*	632.00	679.60	684.93		685.08	0.005471	3.16	202.80	92.99	0.37
Stream A	Reach 01	2500	117.00	676.00	679.91		679.95	0.001691	1.65	70.94	33.23	0.20
Stream A	Reach 01	2500	122.00	676.00	680.19		680.22	0.001332	1.51	80.60	35.93	0.18
Stream A	Reach 01	2500	125.00	676.00	681.01		681.03	0.000590	1.10	113.57	44.45	0.12
Stream A	Reach 01	2500	128.00	676.00	682.00		682.01	0.000245	0.79	162.56	54.42	0.08
Stream A	Reach 01	2500	131.00	676.00	682.81		682.82	0.000115	0.63	208.54	58.62	0.06
Stream A	Reach 01	2500	134.00	676.00	683.36		683.37	0.000076	0.56	241.56	61.45	0.05
Stream A	Reach 01	2500	134.00	676.00	683.51		683.51	0.000068	0.54	250.47	62.19	0.05
Stream A	Reach 01	2500	632.00	676.00	684.11		684.19	0.000979	2.25	289.24	65.46	0.18
Stream A	Reach 01	2000	117.00	676.00	677.54		677.82	0.023744	4.20	27.85	23.65	0.68
Stream A	Reach 01	2000	122.00	676.00	679.65		679.68	0.000897	1.25	97.55	43.41	0.15
Stream A	Reach 01	2000	125.00	676.00	680.84		680.85	0.000232	0.81	160.17	65.36	0.08
Stream A	Reach 01	2000	128.00	676.00	681.93		681.94	0.000086	0.60	247.21	95.77	0.05
Stream A	Reach 01	2000	131.00	676.00	682.78		682.78	0.000045	0.49	342.32	120.14	0.04
Stream A	Reach 01	2000	134.00	676.00	683.34		683.34	0.000031	0.43	412.31	129.57	0.03
Stream A	Reach 01	2000	134.00	676.00	683.49		683.49	0.000028	0.42	431.45	132.03	0.03
Stream A	Reach 01	2000	632.00	676.00	683.80		683.84	0.000495	1.83	473.51	137.29	0.13
Stream A	Reach 01	1560	117.00	672.00	677.07	674.35	677.10	0.000474	1.44	81.20	32.47	0.16
Stream A	Reach 01	1560	122.00	672.00	679.60	674.40	679.61	0.000058	0.67	183.35	48.27	0.06
Stream A	Reach 01	1560	125.00	672.00	680.82	674.42	680.82	0.000025	0.51	247.01	56.40	0.04
Stream A	Reach 01	1560	128.00	672.00	681.92	674.45	681.93	0.000013	0.42	313.44	63.72	0.03
Stream A	Reach 01	1560	131.00	672.00	682.77	674.47	682.78	0.000008	0.37	369.91	69.18	0.03
Stream A	Reach 01	1560	134.00	672.00	683.34	674.50	683.34	0.000007	0.35	409.80	72.80	0.02
Stream A	Reach 01	1560	134.00	672.00	683.48	674.50	683.48	0.000006	0.34	420.56	73.75	0.02
Stream A	Reach 01	1560	632.00	672.00	683.71	676.78	683.75	0.000121	1.54	437.51	75.18	0.10
Stream A	Reach 01	1510	Culvert									
Stream A	Reach 01	1460	117.00	674.00	676.88		676.91	0.000630	1.48	78.94	38.54	0.18
Stream A	Reach 01	1460	122.00	674.00	679.55		679.56	0.000046	0.57	213.92	61.52	0.05

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream A	Reach 01	1460	125.00	674.00	680.78		680.79	0.000020	0.42	296.13	72.17	0.04
Stream A	Reach 01	1460	128.00	674.00	681.90		681.90	0.000011	0.34	382.04	82.12	0.03
Stream A	Reach 01	1460	131.00	674.00	682.75		682.75	0.000007	0.29	466.31	133.82	0.02
Stream A	Reach 01	1460	134.00	674.00	683.31		683.31	0.000005	0.27	557.48	193.68	0.02
Stream A	Reach 01	1460	134.00	674.00	683.46		683.46	0.000004	0.26	586.62	201.33	0.02
Stream A	Reach 01	1460	632.00	674.00	683.14		683.17	0.000119	1.29	526.77	172.18	0.09
Stream A	Reach 01	1000	117.00	670.00	676.79		676.80	0.000110	0.86	135.70	38.08	0.08
Stream A	Reach 01	1000	122.00	670.00	679.54		679.54	0.000023	0.45	270.43	62.56	0.04
Stream A	Reach 01	1000	125.00	670.00	680.78		680.78	0.000011	0.35	356.57	77.25	0.03
Stream A	Reach 01	1000	128.00	670.00	681.89		681.90	0.000006	0.30	450.72	91.52	0.02
Stream A	Reach 01	1000	131.00	670.00	682.75		682.75	0.000004	0.26	531.96	98.74	0.02
Stream A	Reach 01	1000	134.00	670.00	683.31		683.31	0.000003	0.25	588.83	103.29	0.02
Stream A	Reach 01	1000	134.00	670.00	683.46		683.46	0.000003	0.24	604.12	104.48	0.02
Stream A	Reach 01	1000	632.00	670.00	683.10		683.12	0.000077	1.20	567.67	101.62	0.08
Stream A	Reach 01	806	117.00	668.36	676.79		676.79	0.000027	0.54	218.05	43.83	0.04
Stream A	Reach 01	806	122.00	668.36	679.54		679.54	0.000009	0.34	361.55	61.72	0.02
Stream A	Reach 01	806	125.00	668.36	680.78		680.78	0.000005	0.28	443.18	69.88	0.02
Stream A	Reach 01	806	128.00	668.36	681.89		681.89	0.000004	0.24	525.18	77.05	0.02
Stream A	Reach 01	806	131.00	668.36	682.75		682.75	0.000003	0.22	593.13	82.29	0.01
Stream A	Reach 01	806	134.00	668.36	683.31		683.31	0.000002	0.21	640.44	86.25	0.01
Stream A	Reach 01	806	134.00	668.36	683.46		683.46	0.000002	0.21	653.26	88.01	0.01
Stream A	Reach 01	806	632.00	668.36	683.09		683.11	0.000056	1.02	622.14	84.37	0.07
Stream A	Reach 01	500	117.00	668.00	676.77		676.78	0.000057	0.62	188.21	35.62	0.05
Stream A	Reach 01	500	122.00	668.00	679.53		679.54	0.000014	0.39	378.04	107.25	0.03
Stream A	Reach 01	500	125.00	668.00	680.78		680.78	0.000008	0.32	521.89	124.98	0.02
Stream A	Reach 01	500	128.00	668.00	681.89		681.89	0.000005	0.27	668.76	138.06	0.02
Stream A	Reach 01	500	131.00	668.00	682.74		682.75	0.000003	0.24	794.41	159.20	0.01
Stream A	Reach 01	500	134.00	668.00	683.31		683.31	0.000003	0.23	889.46	178.34	0.01
Stream A	Reach 01	500	134.00	668.00	683.46		683.46	0.000003	0.22	916.09	184.12	0.01
Stream A	Reach 01	500	632.00	668.00	683.08		683.09	0.000068	1.10	848.97	170.44	0.06
Stream B	Reach 01	19246	1160.00	814.00	819.94		820.29	0.005543	4.93	256.78	88.95	0.41
Stream B	Reach 01	19246	2061.00	814.00	821.03		821.58	0.006988	6.39	401.21	181.71	0.47
Stream B	Reach 01	19246	2633.00	814.00	821.48		822.12	0.007562	7.00	489.62	208.48	0.50
Stream B	Reach 01	19246	3242.00	814.00	821.90		822.59	0.007890	7.47	581.75	231.96	0.52
Stream B	Reach 01	19246	3832.00	814.00	822.31	821.58	823.08	0.008501	8.07	709.67	360.56	0.54
Stream B	Reach 01	19246	4441.00	814.00	822.63		823.37	0.008145	8.15	829.01	384.87	0.53
Stream B	Reach 01	19246	4739.00	814.00	822.80		823.53	0.008098	8.25	896.47	423.89	0.53

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream B	Reach 01	19246	5391.00	814.00	823.07		823.79	0.007817	8.30	1017.17	445.20	0.53
Stream B	Reach 01	18500	1160.00	808.00	814.88		815.07	0.008950	4.86	422.29	241.39	0.38
Stream B	Reach 01	18500	2061.00	808.00	816.01		816.18	0.007175	4.97	738.23	316.13	0.35
Stream B	Reach 01	18500	2633.00	808.00	816.56		816.73	0.006561	5.02	917.94	343.15	0.34
Stream B	Reach 01	18500	3242.00	808.00	817.05		817.23	0.006228	5.12	1092.91	366.66	0.33
Stream B	Reach 01	18500	3832.00	808.00	817.51		817.69	0.005836	5.16	1267.04	387.86	0.33
Stream B	Reach 01	18500	4441.00	808.00	817.86		818.05	0.005933	5.36	1404.48	403.81	0.33
Stream B	Reach 01	18500	4739.00	808.00	818.01		818.21	0.005994	5.46	1468.13	462.24	0.33
Stream B	Reach 01	18500	5391.00	808.00	818.31		818.52	0.006072	5.62	1606.89	479.72	0.34
Stream B	Reach 01	18000	1160.00	806.00	812.13		812.24	0.003849	3.48	504.15	205.18	0.27
Stream B	Reach 01	18000	2061.00	806.00	813.08		813.25	0.004873	4.37	716.79	243.31	0.31
Stream B	Reach 01	18000	2633.00	806.00	813.50		813.71	0.005564	4.87	821.74	266.46	0.33
Stream B	Reach 01	18000	3242.00	806.00	813.88		814.12	0.006170	5.32	941.81	364.45	0.35
Stream B	Reach 01	18000	3832.00	806.00	814.27		814.53	0.006835	5.80	1110.06	460.44	0.37
Stream B	Reach 01	18000	4441.00	806.00	814.52		814.79	0.007148	6.06	1225.23	483.67	0.38
Stream B	Reach 01	18000	4739.00	806.00	814.63		814.92	0.007243	6.16	1280.76	491.33	0.39
Stream B	Reach 01	18000	5391.00	806.00	814.87		815.17	0.007399	6.35	1398.62	507.93	0.39
Stream B	Reach 01	17500	1160.00	802.00	807.77	807.77	808.28	0.023836	8.19	273.60	231.31	0.75
Stream B	Reach 01	17500	2061.00	802.00	808.46	808.28	808.92	0.019032	8.21	453.34	282.13	0.69
Stream B	Reach 01	17500	2633.00	802.00	808.87	808.51	809.30	0.015795	7.94	573.31	305.92	0.64
Stream B	Reach 01	17500	3242.00	802.00	809.24		809.67	0.013808	7.81	693.23	327.97	0.61
Stream B	Reach 01	17500	3832.00	802.00	809.58		810.01	0.012448	7.74	806.25	347.47	0.58
Stream B	Reach 01	17500	4441.00	802.00	809.90		810.33	0.011388	7.69	920.80	366.55	0.56
Stream B	Reach 01	17500	4739.00	802.00	810.05		810.49	0.010971	7.67	976.51	376.73	0.55
Stream B	Reach 01	17500	5391.00	802.00	810.38		810.83	0.010225	7.68	1107.98	415.89	0.54
Stream B	Reach 01	17076	1160.00	802.00	805.34		805.38	0.002440	1.79	730.35	327.33	0.19
Stream B	Reach 01	17076	2061.00	802.00	806.09		806.16	0.003051	2.35	980.04	341.80	0.22
Stream B	Reach 01	17076	2633.00	802.00	806.51		806.60	0.003232	2.60	1126.56	350.77	0.23
Stream B	Reach 01	17076	3242.00	802.00	806.95		807.05	0.003283	2.82	1282.91	360.10	0.24
Stream B	Reach 01	17076	3832.00	802.00	807.33		807.44	0.003360	3.01	1420.02	368.09	0.24
Stream B	Reach 01	17076	4441.00	802.00	807.70		807.83	0.003406	3.19	1557.53	375.93	0.25
Stream B	Reach 01	17076	4739.00	802.00	807.87		808.00	0.003431	3.27	1621.71	379.52	0.25
Stream B	Reach 01	17076	5391.00	802.00	808.23		808.38	0.003485	3.45	1763.89	397.00	0.26
Stream B	Reach 01	16500	1160.00	798.00	802.46		802.65	0.012663	5.49	380.08	287.64	0.50
Stream B	Reach 01	16500	2061.00	798.00	803.43		803.59	0.007056	4.79	664.33	297.65	0.39
Stream B	Reach 01	16500	2633.00	798.00	803.92		804.10	0.006085	4.76	813.65	303.18	0.37

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream B	Reach 01	16500	3242.00	798.00	804.39		804.58	0.005790	4.92	964.72	326.28	0.37
Stream B	Reach 01	16500	3832.00	798.00	804.80		805.00	0.005468	5.01	1099.11	335.91	0.36
Stream B	Reach 01	16500	4441.00	798.00	805.20		805.41	0.005296	5.14	1234.53	350.87	0.36
Stream B	Reach 01	16500	4739.00	798.00	805.38		805.60	0.005183	5.18	1299.40	355.62	0.36
Stream B	Reach 01	16500	5391.00	798.00	805.75		805.98	0.005064	5.31	1432.63	367.14	0.35
Stream B	Reach 01	16000	1160.00	796.00	801.42		801.48	0.000909	2.00	630.61	259.92	0.16
Stream B	Reach 01	16000	2061.00	796.00	802.52		802.60	0.000881	2.26	930.12	285.41	0.16
Stream B	Reach 01	16000	2633.00	796.00	803.00		803.10	0.000947	2.47	1069.03	296.48	0.17
Stream B	Reach 01	16000	3242.00	796.00	803.42		803.54	0.001028	2.68	1196.12	306.05	0.18
Stream B	Reach 01	16000	3832.00	796.00	803.81		803.94	0.001085	2.86	1314.93	314.74	0.19
Stream B	Reach 01	16000	4441.00	796.00	804.16		804.32	0.001156	3.05	1427.11	325.21	0.20
Stream B	Reach 01	16000	4739.00	796.00	804.33		804.49	0.001188	3.13	1482.52	331.32	0.20
Stream B	Reach 01	16000	5391.00	796.00	804.65		804.84	0.001267	3.32	1592.00	342.79	0.21
Stream B	Reach 01	15499	1160.00	794.00	798.84	798.84	800.02	0.034822	8.77	138.10	67.57	0.95
Stream B	Reach 01	15499	2061.00	794.00	800.58	800.58	801.40	0.014405	7.89	370.03	249.81	0.66
Stream B	Reach 01	15499	2633.00	794.00	800.90	800.90	801.80	0.015532	8.59	451.70	260.75	0.70
Stream B	Reach 01	15499	3242.00	794.00	801.25	801.25	802.16	0.015339	8.95	544.85	272.24	0.70
Stream B	Reach 01	15499	3832.00	794.00	801.48	801.48	802.48	0.016465	9.55	607.75	279.73	0.73
Stream B	Reach 01	15499	4441.00	794.00	801.74	801.74	802.78	0.016619	9.91	681.06	286.82	0.74
Stream B	Reach 01	15499	4739.00	794.00	801.84	801.84	802.92	0.016966	10.13	710.63	289.29	0.75
Stream B	Reach 01	15499	5391.00	794.00	802.22	801.97	803.23	0.015137	9.99	823.35	305.08	0.72
Stream B	Reach 01	15000	1160.00	790.00	796.12		796.21	0.002206	3.01	569.06	224.27	0.26
Stream B	Reach 01	15000	2061.00	790.00	797.18		797.32	0.002545	3.75	820.11	250.07	0.29
Stream B	Reach 01	15000	2633.00	790.00	797.67		797.84	0.002808	4.18	946.20	264.13	0.31
Stream B	Reach 01	15000	3242.00	790.00	798.12		798.32	0.003079	4.61	1069.23	288.60	0.33
Stream B	Reach 01	15000	3832.00	790.00	798.50		798.74	0.003321	4.98	1188.88	330.89	0.34
Stream B	Reach 01	15000	4441.00	790.00	798.91		799.17	0.003412	5.25	1329.72	363.79	0.35
Stream B	Reach 01	15000	4739.00	790.00	799.06		799.33	0.003526	5.41	1385.31	374.89	0.36
Stream B	Reach 01	15000	5391.00	790.00	799.36		799.67	0.003778	5.76	1501.23	397.03	0.37
Stream B	Reach 01	14500	1160.00	790.00	793.83	793.05	794.13	0.010280	4.54	270.90	135.26	0.51
Stream B	Reach 01	14500	2061.00	790.00	794.80	793.78	795.17	0.008499	5.17	487.66	296.21	0.49
Stream B	Reach 01	14500	2633.00	790.00	795.22	794.18	795.60	0.008055	5.43	616.33	328.53	0.49
Stream B	Reach 01	14500	3242.00	790.00	795.58	794.81	795.98	0.007884	5.70	739.18	357.12	0.49
Stream B	Reach 01	14500	3832.00	790.00	795.88	795.06	796.30	0.007743	5.92	852.31	377.76	0.49
Stream B	Reach 01	14500	4441.00	790.00	796.22	795.32	796.67	0.007881	6.27	1009.04	526.38	0.50
Stream B	Reach 01	14500	4739.00	790.00	796.33	795.43	796.79	0.007864	6.36	1069.25	534.33	0.50
Stream B	Reach 01	14500	5391.00	790.00	796.58	795.67	797.04	0.007704	6.50	1203.30	551.46	0.50

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream B	Reach 01	14000	1160.00	788.00	790.71		790.83	0.004467	2.41	441.94	240.74	0.26
Stream B	Reach 01	14000	2061.00	788.00	791.23		791.44	0.006462	3.26	574.36	272.90	0.32
Stream B	Reach 01	14000	2633.00	788.00	791.51		791.78	0.007123	3.62	653.94	287.28	0.34
Stream B	Reach 01	14000	3242.00	788.00	791.80		792.11	0.007500	3.91	738.35	301.86	0.35
Stream B	Reach 01	14000	3832.00	788.00	792.05		792.41	0.007735	4.15	816.66	313.95	0.36
Stream B	Reach 01	14000	4441.00	788.00	792.29		792.70	0.007927	4.36	892.42	323.58	0.37
Stream B	Reach 01	14000	4739.00	788.00	792.40		792.83	0.007972	4.45	928.70	328.08	0.37
Stream B	Reach 01	14000	5391.00	788.00	792.63		793.11	0.008022	4.62	1005.96	337.45	0.38
Stream B	Reach 01	13500	1160.00	784.06	788.43	787.75	788.62	0.004313	5.34	405.79	368.64	0.52
Stream B	Reach 01	13500	2061.00	784.06	789.15	788.51	789.32	0.002967	5.04	675.56	388.50	0.44
Stream B	Reach 01	13500	2633.00	784.06	789.52	788.71	789.70	0.002654	5.06	824.54	401.91	0.42
Stream B	Reach 01	13500	3242.00	784.06	789.87	788.85	790.06	0.002509	5.17	965.25	415.47	0.42
Stream B	Reach 01	13500	3832.00	784.06	790.17		790.38	0.002413	5.29	1092.67	426.33	0.41
Stream B	Reach 01	13500	4441.00	784.06	790.47		790.69	0.002317	5.38	1221.14	436.21	0.41
Stream B	Reach 01	13500	4739.00	784.06	790.60		790.83	0.002285	5.43	1280.65	440.63	0.41
Stream B	Reach 01	13500	5391.00	784.06	790.90		791.14	0.002207	5.53	1411.60	450.51	0.40
Stream B	Reach 01	13000	1160.00	778.00	785.12		785.50	0.009662	5.57	268.49	123.91	0.40
Stream B	Reach 01	13000	2061.00	778.00	785.89		786.50	0.013955	7.27	381.31	169.71	0.49
Stream B	Reach 01	13000	2633.00	778.00	786.28		786.99	0.015492	7.95	453.81	200.89	0.53
Stream B	Reach 01	13000	3242.00	778.00	786.64		787.43	0.015984	8.35	530.94	224.39	0.54
Stream B	Reach 01	13000	3832.00	778.00	786.96		787.81	0.016267	8.66	603.90	244.87	0.55
Stream B	Reach 01	13000	4441.00	778.00	787.18		788.13	0.017472	9.14	661.03	262.03	0.57
Stream B	Reach 01	13000	4739.00	778.00	787.27		788.27	0.018141	9.39	685.35	269.25	0.58
Stream B	Reach 01	13000	5391.00	778.00	787.44	787.37	788.57	0.019921	9.97	730.87	282.26	0.61
Stream B	Reach 01	12500	1160.00	776.00	781.88		782.05	0.005018	3.53	370.51	208.67	0.29
Stream B	Reach 01	12500	2061.00	776.00	782.96		783.12	0.003738	3.52	630.37	277.15	0.26
Stream B	Reach 01	12500	2633.00	776.00	783.49		783.66	0.003425	3.58	793.11	335.37	0.26
Stream B	Reach 01	12500	3242.00	776.00	783.87		784.06	0.003413	3.72	927.51	372.05	0.26
Stream B	Reach 01	12500	3832.00	776.00	784.22		784.43	0.003370	3.83	1070.57	419.25	0.26
Stream B	Reach 01	12500	4441.00	776.00	784.55		784.77	0.003201	3.85	1213.50	446.14	0.25
Stream B	Reach 01	12500	4739.00	776.00	784.72		784.93	0.003100	3.85	1287.17	459.81	0.25
Stream B	Reach 01	12500	5391.00	776.00	785.08		785.30	0.002841	3.80	1460.87	491.52	0.24
Stream B	Reach 01	12049	1160.00	770.00	778.07		778.53	0.013412	5.42	216.28	84.86	0.46
Stream B	Reach 01	12049	2061.00	770.00	779.50		780.18	0.013363	6.55	362.63	118.91	0.48
Stream B	Reach 01	12049	2633.00	770.00	780.19	778.58	780.90	0.013103	7.01	479.47	285.71	0.49
Stream B	Reach 01	12049	3242.00	770.00	780.58	779.08	781.42	0.011510	6.83	594.83	306.10	0.46

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream B	Reach 01	12049	3832.00	770.00	780.88	779.48	781.86	0.010676	6.77	689.14	328.95	0.45
Stream B	Reach 01	12049	4441.00	770.00	781.13	780.48	782.31	0.010098	6.74	773.03	346.41	0.44
Stream B	Reach 01	12049	4739.00	770.00	781.23	780.60	782.54	0.009856	6.72	810.05	352.00	0.43
Stream B	Reach 01	12049	5391.00	770.00	781.44	780.80	783.02	0.009588	6.75	882.28	362.66	0.43
Stream B	Reach 01	11500	1160.00	768.00	774.65		774.82	0.003912	3.39	400.22	137.02	0.27
Stream B	Reach 01	11500	2061.00	768.00	776.28		776.49	0.003800	4.03	680.78	217.22	0.27
Stream B	Reach 01	11500	2633.00	768.00	777.08		777.31	0.003670	4.27	882.14	282.38	0.28
Stream B	Reach 01	11500	3242.00	768.00	777.69		777.92	0.003701	4.52	1068.09	333.33	0.28
Stream B	Reach 01	11500	3832.00	768.00	778.16		778.40	0.003751	4.72	1234.65	375.03	0.28
Stream B	Reach 01	11500	4441.00	768.00	778.56		778.82	0.003827	4.92	1391.03	399.01	0.29
Stream B	Reach 01	11500	4739.00	768.00	778.72		778.98	0.003923	5.04	1454.15	407.98	0.29
Stream B	Reach 01	11500	5391.00	768.00	779.00		779.28	0.004211	5.32	1570.74	423.63	0.31
Stream B	Reach 01	10864	1160.00	764.00	770.49		770.91	0.010783	5.50	255.48	92.32	0.43
Stream B	Reach 01	10864	2061.00	764.00	771.67		772.32	0.013455	7.08	380.03	118.46	0.50
Stream B	Reach 01	10864	2633.00	764.00	772.31		773.08	0.014851	7.94	468.39	166.07	0.54
Stream B	Reach 01	10864	3242.00	764.00	772.92		773.71	0.014400	8.28	578.85	194.27	0.54
Stream B	Reach 01	10864	3832.00	764.00	773.48		774.26	0.013517	8.42	699.52	242.51	0.53
Stream B	Reach 01	10864	4441.00	764.00	773.92		774.68	0.012897	8.53	815.37	300.34	0.52
Stream B	Reach 01	10864	4739.00	764.00	774.15		774.87	0.012193	8.44	894.55	374.79	0.51
Stream B	Reach 01	10864	5391.00	764.00	774.60		775.22	0.010589	8.14	1071.16	413.69	0.48
Stream B	Reach 01	10500	1160.00	762.00	768.93		769.02	0.002812	2.65	555.77	222.33	0.22
Stream B	Reach 01	10500	2061.00	762.00	770.41		770.51	0.002239	2.86	907.68	251.68	0.21
Stream B	Reach 01	10500	2633.00	762.00	771.17		771.27	0.002093	2.99	1102.11	263.96	0.20
Stream B	Reach 01	10500	3242.00	762.00	771.78		771.90	0.002117	3.19	1267.91	273.73	0.21
Stream B	Reach 01	10500	3832.00	762.00	772.35		772.48	0.002125	3.36	1426.51	288.82	0.21
Stream B	Reach 01	10500	4441.00	762.00	772.57		772.73	0.002531	3.73	1490.32	296.06	0.23
Stream B	Reach 01	10500	4739.00	762.00	772.77		772.94	0.002586	3.83	1550.64	302.73	0.23
Stream B	Reach 01	10500	5391.00	762.00	773.15		773.33	0.002749	4.07	1667.20	315.22	0.24
Stream B	Reach 01	10000	1160.00	758.00	764.39		765.56	0.032134	8.68	134.15	39.92	0.80
Stream B	Reach 01	10000	2061.00	758.00	765.73	765.60	767.52	0.033252	10.87	195.57	51.83	0.86
Stream B	Reach 01	10000	2633.00	758.00	766.59	766.59	768.48	0.029360	11.35	246.39	69.95	0.83
Stream B	Reach 01	10000	3242.00	758.00	767.48	767.48	769.23	0.023511	11.16	319.04	93.65	0.76
Stream B	Reach 01	10000	3832.00	758.00	767.98	767.98	769.81	0.022905	11.55	369.37	107.04	0.76
Stream B	Reach 01	10000	4441.00	758.00	769.00	769.00	770.15	0.013913	9.82	574.99	246.08	0.60
Stream B	Reach 01	10000	4739.00	758.00	769.11	769.11	770.30	0.014255	10.04	603.73	255.90	0.61
Stream B	Reach 01	10000	5391.00	758.00	769.42	769.42	770.60	0.013978	10.18	688.04	289.31	0.61

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # CHl
Stream B	Reach 01	9539	1160.00	756.00	763.93		764.01	0.000902	2.42	543.15	161.81	0.17
Stream B	Reach 01	9539	2061.00	756.00	765.43		765.56	0.001106	3.11	823.22	212.67	0.20
Stream B	Reach 01	9539	2633.00	756.00	766.07		766.22	0.001231	3.47	966.45	269.59	0.21
Stream B	Reach 01	9539	3242.00	756.00	766.69		766.85	0.001292	3.73	1147.75	318.21	0.22
Stream B	Reach 01	9539	3832.00	756.00	767.15		767.33	0.001369	3.97	1303.45	355.80	0.23
Stream B	Reach 01	9539	4441.00	756.00	767.60		767.80	0.001405	4.16	1474.57	393.06	0.24
Stream B	Reach 01	9539	4739.00	756.00	767.79		768.00	0.001432	4.25	1550.83	408.60	0.24
Stream B	Reach 01	9539	5391.00	756.00	768.21		768.44	0.001585	4.60	1726.67	442.35	0.25
Stream B	Reach 01	9000	1160.00	754.00	762.99		763.21	0.002760	4.22	361.50	140.20	0.30
Stream B	Reach 01	9000	2061.00	754.00	764.29		764.59	0.003229	5.18	591.00	229.97	0.33
Stream B	Reach 01	9000	2633.00	754.00	764.89		765.19	0.003211	5.44	735.42	258.26	0.34
Stream B	Reach 01	9000	3242.00	754.00	765.55		765.84	0.002911	5.46	918.89	295.05	0.32
Stream B	Reach 01	9000	3832.00	754.00	765.97		766.27	0.002983	5.70	1047.02	317.99	0.33
Stream B	Reach 01	9000	4441.00	754.00	766.37		766.69	0.003167	6.04	1186.16	368.63	0.34
Stream B	Reach 01	9000	4739.00	754.00	766.54		766.87	0.003208	6.15	1250.72	384.23	0.35
Stream B	Reach 01	9000	5391.00	754.00	766.90		767.24	0.003256	6.35	1393.79	416.74	0.35
Stream B	Reach 01	8500	1160.00	752.00	761.70		761.89	0.002504	4.09	359.11	149.26	0.28
Stream B	Reach 01	8500	2061.00	752.00	763.00		763.21	0.002315	4.42	584.32	195.97	0.27
Stream B	Reach 01	8500	2633.00	752.00	763.58		763.82	0.002311	4.63	705.24	216.22	0.28
Stream B	Reach 01	8500	3242.00	752.00	764.19		764.46	0.002594	5.13	857.23	313.14	0.30
Stream B	Reach 01	8500	3832.00	752.00	764.64		764.90	0.002489	5.18	1002.90	341.67	0.29
Stream B	Reach 01	8500	4441.00	752.00	765.03		765.29	0.002431	5.25	1141.72	367.03	0.29
Stream B	Reach 01	8500	4739.00	752.00	765.20		765.47	0.002412	5.29	1205.53	377.56	0.29
Stream B	Reach 01	8500	5391.00	752.00	765.58		765.85	0.002330	5.33	1353.21	401.92	0.29
Stream B	Reach 01	8000	1160.00	750.00	760.21		760.36	0.003761	3.52	493.91	204.69	0.26
Stream B	Reach 01	8000	2061.00	750.00	761.57		761.74	0.003805	4.07	854.43	325.34	0.27
Stream B	Reach 01	8000	2633.00	750.00	762.12		762.30	0.004040	4.40	1044.85	370.72	0.28
Stream B	Reach 01	8000	3242.00	750.00	762.64		762.83	0.004105	4.63	1246.89	403.62	0.28
Stream B	Reach 01	8000	3832.00	750.00	763.13		763.32	0.004030	4.77	1451.78	434.44	0.28
Stream B	Reach 01	8000	4441.00	750.00	763.50		763.71	0.004198	5.00	1619.98	461.83	0.29
Stream B	Reach 01	8000	4739.00	750.00	763.66		763.87	0.004307	5.12	1693.12	472.26	0.30
Stream B	Reach 01	8000	5391.00	750.00	764.01		764.24	0.004646	5.45	1863.77	535.05	0.31
Stream B	Reach 01	7500	1160.00	748.00	757.44		757.80	0.007202	4.98	277.08	124.48	0.35
Stream B	Reach 01	7500	2061.00	748.00	759.05	755.88	759.37	0.005973	5.27	600.75	297.50	0.33
Stream B	Reach 01	7500	2633.00	748.00	759.54	757.82	759.86	0.005948	5.48	760.62	351.07	0.33
Stream B	Reach 01	7500	3242.00	748.00	759.83		760.20	0.006807	5.99	867.61	387.98	0.36
Stream B	Reach 01	7500	3832.00	748.00	760.03		760.48	0.008416	6.76	948.88	530.38	0.40

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Stream B	Reach 01	7500	4441.00	748.00	760.20		760.69	0.009184	7.15	1052.04	654.19	0.42
Stream B	Reach 01	7500	4739.00	748.00	760.29		760.78	0.009364	7.27	1112.14	698.17	0.42
Stream B	Reach 01	7500	5391.00	748.00	760.46	759.81	760.97	0.009697	7.49	1234.84	732.15	0.43
Stream B	Reach 01	7000	1160.00	746.00	753.94		754.27	0.006902	4.60	262.00	61.02	0.35
Stream B	Reach 01	7000	2061.00	746.00	755.67		756.11	0.007087	5.62	501.40	249.90	0.37
Stream B	Reach 01	7000	2633.00	746.00	756.45		756.84	0.006132	5.61	725.90	334.82	0.35
Stream B	Reach 01	7000	3242.00	746.00	757.08		757.35	0.004734	5.19	1103.40	774.39	0.31
Stream B	Reach 01	7000	3832.00	746.00	757.45		757.66	0.003854	4.82	1398.99	800.07	0.29
Stream B	Reach 01	7000	4441.00	746.00	757.73		757.92	0.003505	4.69	1625.91	820.25	0.27
Stream B	Reach 01	7000	4739.00	746.00	757.85		758.03	0.003406	4.66	1723.09	828.30	0.27
Stream B	Reach 01	7000	5391.00	746.00	758.09		758.26	0.003235	4.62	1921.40	841.44	0.26
Stream B	Reach 01	6500	1160.00	744.00	752.89		752.94	0.001269	2.27	690.20	146.81	0.15
Stream B	Reach 01	6500	2061.00	744.00	754.34		754.44	0.001767	3.05	920.26	171.42	0.19
Stream B	Reach 01	6500	2633.00	744.00	754.99		755.11	0.002045	3.46	1036.27	185.55	0.21
Stream B	Reach 01	6500	3242.00	744.00	755.59		755.73	0.002253	3.79	1197.87	438.17	0.22
Stream B	Reach 01	6500	3832.00	744.00	756.01		756.16	0.002371	4.01	1442.10	707.47	0.23
Stream B	Reach 01	6500	4441.00	744.00	756.38		756.52	0.002255	4.01	1706.49	726.89	0.22
Stream B	Reach 01	6500	4739.00	744.00	756.49		756.64	0.002302	4.08	1789.71	732.88	0.22
Stream B	Reach 01	6500	5391.00	744.00	756.73		756.88	0.002374	4.20	1964.44	745.04	0.23
Stream B	Reach 01	6000	1160.00	744.00	751.89		752.01	0.002934	2.82	458.09	169.66	0.23
Stream B	Reach 01	6000	2061.00	744.00	753.21		753.34	0.002750	3.20	774.67	270.56	0.23
Stream B	Reach 01	6000	2633.00	744.00	753.80		753.94	0.002699	3.37	942.86	303.55	0.23
Stream B	Reach 01	6000	3242.00	744.00	754.35		754.50	0.002699	3.55	1150.18	442.46	0.23
Stream B	Reach 01	6000	3832.00	744.00	754.76		754.91	0.002629	3.64	1347.58	635.66	0.23
Stream B	Reach 01	6000	4441.00	744.00	755.16		755.31	0.002604	3.74	1659.25	822.90	0.23
Stream B	Reach 01	6000	4739.00	744.00	755.29		755.44	0.002499	3.71	1770.85	832.59	0.23
Stream B	Reach 01	6000	5391.00	744.00	755.56		755.70	0.002335	3.66	1995.20	851.73	0.22
Stream B	Reach 01	5500	1160.00	742.00	748.66		749.22	0.013763	6.27	196.25	71.12	0.49
Stream B	Reach 01	5500	2061.00	742.00	749.87		750.64	0.014032	7.28	294.70	91.79	0.51
Stream B	Reach 01	5500	2633.00	742.00	750.38	749.53	751.26	0.014103	7.69	370.11	175.28	0.52
Stream B	Reach 01	5500	3242.00	742.00	750.85	750.25	751.82	0.013857	7.96	456.38	194.65	0.52
Stream B	Reach 01	5500	3832.00	742.00	751.26	750.67	752.29	0.013421	8.12	539.61	212.19	0.51
Stream B	Reach 01	5500	4441.00	742.00	751.64	751.08	752.73	0.012919	8.23	625.15	229.63	0.51
Stream B	Reach 01	5500	4739.00	742.00	751.82	751.25	752.93	0.012723	8.29	665.97	237.88	0.51
Stream B	Reach 01	5500	5391.00	742.00	752.16	751.61	753.33	0.012416	8.41	750.28	249.72	0.50
Stream B	Reach 01	5000	1160.00	736.00	742.43		742.85	0.011664	5.20	226.45	68.61	0.44

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream B	Reach 01	5000	2061.00	736.00	744.26		744.77	0.009704	5.99	423.27	144.96	0.42
Stream B	Reach 01	5000	2633.00	736.00	745.14		745.66	0.008799	6.22	565.99	179.44	0.41
Stream B	Reach 01	5000	3242.00	736.00	745.88		746.41	0.008297	6.46	710.55	206.97	0.41
Stream B	Reach 01	5000	3832.00	736.00	746.59		747.13	0.007785	6.63	876.31	265.07	0.40
Stream B	Reach 01	5000	4441.00	736.00	747.13		747.67	0.007689	6.86	1030.22	313.17	0.40
Stream B	Reach 01	5000	4739.00	736.00	747.36		747.91	0.007642	6.96	1107.16	334.95	0.40
Stream B	Reach 01	5000	5391.00	736.00	747.84		748.39	0.007498	7.13	1276.12	375.22	0.40
Stream B	Reach 01	4472	1160.00	732.00	739.59		739.74	0.003402	3.07	377.34	76.73	0.24
Stream B	Reach 01	4472	2061.00	732.00	741.22		741.48	0.004185	4.07	511.32	88.63	0.28
Stream B	Reach 01	4472	2633.00	732.00	742.09		742.41	0.004411	4.55	615.49	184.26	0.30
Stream B	Reach 01	4472	3242.00	732.00	742.93		743.28	0.004339	4.85	780.77	214.41	0.30
Stream B	Reach 01	4472	3832.00	732.00	744.07		744.39	0.003554	4.79	1053.41	329.78	0.28
Stream B	Reach 01	4472	4441.00	732.00	744.40		744.78	0.003977	5.19	1166.85	341.07	0.30
Stream B	Reach 01	4472	4739.00	732.00	744.60		744.99	0.004075	5.32	1235.15	348.01	0.30
Stream B	Reach 01	4472	5391.00	732.00	745.13		745.52	0.004000	5.46	1423.92	366.23	0.30
Stream B	Reach 01	4359	1619.00	732.00	738.65	737.28	739.13	0.007131	6.07	381.44	186.58	0.48
Stream B	Reach 01	4359	2984.00	732.00	740.63	739.01	740.99	0.004322	5.89	816.76	251.15	0.39
Stream B	Reach 01	4359	3840.00	732.00	741.65	739.53	741.97	0.003488	5.79	1089.11	280.71	0.36
Stream B	Reach 01	4359	4715.00	732.00	742.56	739.98	742.87	0.003035	5.80	1358.32	312.42	0.34
Stream B	Reach 01	4359	5598.00	732.00	743.83	740.40	744.07	0.002136	5.32	1780.14	352.34	0.29
Stream B	Reach 01	4359	6481.00	732.00	744.11	740.78	744.41	0.002587	5.96	1881.52	377.81	0.32
Stream B	Reach 01	4359	6949.00	732.00	744.29	740.90	744.61	0.002723	6.18	1950.03	386.01	0.33
Stream B	Reach 01	4359	8041.00	732.00	744.80	741.27	745.14	0.002863	6.54	2149.84	409.68	0.34
Stream B	Reach 01	4315	Bridge									
Stream B	Reach 01	4253	1619.00	731.10	736.26	736.26	737.76	0.028087	9.94	178.00	76.11	0.88
Stream B	Reach 01	4253	2984.00	731.10	738.64		739.78	0.014166	9.33	411.55	114.31	0.67
Stream B	Reach 01	4253	3840.00	731.10	739.75		740.84	0.011418	9.37	544.94	127.30	0.62
Stream B	Reach 01	4253	4715.00	731.10	740.50		741.71	0.011452	10.04	648.84	158.17	0.63
Stream B	Reach 01	4253	5598.00	731.10	740.89	739.79	742.38	0.013391	11.22	717.13	189.16	0.69
Stream B	Reach 01	4253	6481.00	731.10	741.17	740.12	742.96	0.015684	12.41	771.98	210.67	0.75
Stream B	Reach 01	4253	6949.00	731.10	741.25	740.33	743.27	0.017488	13.18	789.40	220.27	0.79
Stream B	Reach 01	4253	8041.00	731.10	742.41	742.41	743.69	0.010823	11.28	1325.68	579.36	0.64
Stream B	Reach 01	4084	1619.00	729.86	735.76		736.07	0.002756	4.46	362.83	71.27	0.35
Stream B	Reach 01	4084	2984.00	729.86	738.21		738.67	0.002801	5.46	547.02	79.38	0.37
Stream B	Reach 01	4084	3840.00	729.86	739.21		739.79	0.003032	6.10	646.21	191.27	0.39
Stream B	Reach 01	4084	4715.00	729.86	739.98		740.61	0.003216	6.50	881.29	428.34	0.40

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream B	Reach 01	4084	5598.00	729.86	740.51		741.15	0.003195	6.76	1142.80	517.76	0.41
Stream B	Reach 01	4084	6481.00	729.86	740.96	737.11	741.60	0.003179	6.97	1382.39	569.51	0.41
Stream B	Reach 01	4084	6949.00	729.86	741.17	737.43	741.81	0.003151	7.05	1507.07	591.54	0.41
Stream B	Reach 01	4084	8041.00	729.86	741.64	738.14	742.25	0.003049	7.16	1792.95	631.63	0.40
Stream B	Reach 01	3500	1619.00	726.00	732.85	730.74	733.33	0.009554	6.10	334.20	81.44	0.43
Stream B	Reach 01	3500	2984.00	726.00	734.45		735.44	0.014959	8.89	487.61	144.55	0.56
Stream B	Reach 01	3500	3840.00	726.00	735.13	733.28	736.27	0.016359	9.83	616.32	237.44	0.59
Stream B	Reach 01	3500	4715.00	726.00	735.77	733.82	736.94	0.016485	10.35	792.04	314.68	0.60
Stream B	Reach 01	3500	5598.00	726.00	736.43	733.93	737.56	0.015646	10.57	1042.71	419.69	0.59
Stream B	Reach 01	3500	6481.00	726.00	737.04	736.23	738.10	0.014622	10.63	1309.36	456.17	0.58
Stream B	Reach 01	3500	6949.00	726.00	737.35	734.00	738.37	0.014059	10.63	1455.13	474.93	0.57
Stream B	Reach 01	3500	8041.00	726.00	738.00	736.91	738.97	0.013177	10.71	1777.39	514.14	0.56
Stream B	Reach 01	3000	1619.00	717.34	721.65	721.65	723.20	0.066039	10.00	161.88	51.77	1.00
Stream B	Reach 01	3000	2984.00	717.34	724.68	723.31	725.88	0.025129	8.82	339.33	65.77	0.67
Stream B	Reach 01	3000	3840.00	717.34	726.01	724.17	727.28	0.019742	9.06	431.69	87.22	0.61
Stream B	Reach 01	3000	4715.00	717.34	727.21	724.91	728.55	0.016997	9.37	521.99	111.42	0.59
Stream B	Reach 01	3000	5598.00	717.34	728.20	725.63	729.66	0.015831	9.78	607.12	145.50	0.58
Stream B	Reach 01	3000	6481.00	717.34	729.10	726.29	730.64	0.015021	10.15	700.80	173.12	0.57
Stream B	Reach 01	3000	6949.00	717.34	729.53	726.66	731.13	0.014724	10.35	751.65	190.25	0.57
Stream B	Reach 01	3000	8041.00	717.34	730.51	727.43	732.16	0.013798	10.64	879.20	217.08	0.56
Stream B	Reach 01	2611	1619.00	710.00	721.28	714.97	721.38	0.001053	2.51	708.82	109.59	0.15
Stream B	Reach 01	2611	2984.00	710.00	724.08	716.44	724.24	0.001281	3.34	1055.93	146.13	0.17
Stream B	Reach 01	2611	3840.00	710.00	725.43	717.16	725.62	0.001368	3.72	1265.56	163.65	0.18
Stream B	Reach 01	2611	4715.00	710.00	726.64	717.87	726.87	0.001446	4.06	1476.31	187.23	0.19
Stream B	Reach 01	2611	5598.00	710.00	727.66	718.52	727.91	0.001531	4.38	1676.68	208.21	0.20
Stream B	Reach 01	2611	6481.00	710.00	728.57	719.11	728.85	0.001591	4.64	1874.81	223.83	0.20
Stream B	Reach 01	2611	6949.00	710.00	729.03	719.44	729.31	0.001616	4.76	1977.44	230.13	0.21
Stream B	Reach 01	2611	8041.00	710.00	730.02	720.12	730.33	0.001669	5.04	2212.22	245.82	0.21
Stream B	Reach 01	2570	Bridge									
Stream B	Reach 01	2500	1619.00	710.00	720.59		720.92	0.004768	4.80	391.28	75.28	0.30
Stream B	Reach 01	2500	2984.00	710.00	723.24		723.72	0.005109	6.04	611.31	91.09	0.33
Stream B	Reach 01	2500	3840.00	710.00	724.49		725.06	0.005347	6.66	730.03	98.41	0.34
Stream B	Reach 01	2500	4715.00	710.00	725.61		726.27	0.005532	7.20	844.48	104.87	0.35
Stream B	Reach 01	2500	5598.00	710.00	726.51		727.26	0.005905	7.78	940.90	110.29	0.37
Stream B	Reach 01	2500	6481.00	710.00	727.30		728.14	0.006291	8.34	1029.65	115.40	0.39
Stream B	Reach 01	2500	6949.00	710.00	727.68		728.58	0.006493	8.62	1074.37	117.97	0.39

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream B	Reach 01	2500	8041.00	710.00	728.52		729.53	0.006934	9.23	1175.22	123.81	0.41
Stream B	Reach 01	2357	1619.00	710.00	719.63		720.19	0.005215	6.14	295.26	63.60	0.42
Stream B	Reach 01	2357	2984.00	710.00	722.09		722.93	0.005454	7.73	479.15	85.69	0.45
Stream B	Reach 01	2357	3840.00	710.00	723.25		724.23	0.005655	8.51	584.46	96.43	0.47
Stream B	Reach 01	2357	4715.00	710.00	724.32		725.42	0.005728	9.14	692.56	106.27	0.48
Stream B	Reach 01	2357	5598.00	710.00	725.08		726.34	0.006189	9.92	775.74	113.11	0.50
Stream B	Reach 01	2357	6481.00	710.00	725.71		727.16	0.006701	10.68	849.63	118.85	0.52
Stream B	Reach 01	2357	6949.00	710.00	726.01		727.55	0.006989	11.07	885.63	121.53	0.54
Stream B	Reach 01	2357	8041.00	710.00	726.65		728.41	0.007645	11.95	965.15	127.30	0.57
Stream B	Reach 01	2000	1619.00	710.00	717.55		717.96	0.007299	5.12	324.54	65.38	0.37
Stream B	Reach 01	2000	2984.00	710.00	720.01		720.62	0.007325	6.43	522.22	97.49	0.39
Stream B	Reach 01	2000	3840.00	710.00	721.11		721.83	0.007563	7.08	637.66	111.78	0.40
Stream B	Reach 01	2000	4715.00	710.00	722.09		722.94	0.008009	7.78	797.78	241.30	0.42
Stream B	Reach 01	2000	5598.00	710.00	722.92		723.77	0.007659	8.00	1012.97	277.36	0.42
Stream B	Reach 01	2000	6481.00	710.00	723.66		724.48	0.007262	8.12	1229.06	306.20	0.41
Stream B	Reach 01	2000	6949.00	710.00	724.02		724.83	0.007052	8.16	1342.41	318.03	0.41
Stream B	Reach 01	2000	8041.00	710.00	724.80		725.57	0.006660	8.25	1600.12	344.97	0.40
Stream B	Reach 01	1500	1619.00	706.00	714.92		715.13	0.004328	3.72	435.75	79.19	0.28
Stream B	Reach 01	1500	2984.00	706.00	717.33		717.65	0.004654	4.57	668.29	119.19	0.30
Stream B	Reach 01	1500	3840.00	706.00	718.42		718.81	0.004646	5.03	812.57	146.74	0.31
Stream B	Reach 01	1500	4715.00	706.00	719.37		719.81	0.004683	5.43	966.42	178.85	0.32
Stream B	Reach 01	1500	5598.00	706.00	720.23		720.71	0.004671	5.75	1133.67	212.35	0.32
Stream B	Reach 01	1500	6481.00	706.00	721.01		721.53	0.004609	6.01	1313.88	246.51	0.32
Stream B	Reach 01	1500	6949.00	706.00	721.41		721.94	0.004563	6.13	1415.19	266.58	0.32
Stream B	Reach 01	1500	8041.00	706.00	722.27		722.82	0.004410	6.33	1663.44	304.83	0.32
Stream B	Reach 01	1000	1619.00	704.00	712.80	709.49	713.09	0.003852	4.25	381.16	80.57	0.34
Stream B	Reach 01	1000	2984.00	704.00	715.34	711.24	715.71	0.003257	4.92	621.95	121.45	0.34
Stream B	Reach 01	1000	3840.00	704.00	716.57	712.06	716.98	0.002942	5.23	805.52	168.51	0.33
Stream B	Reach 01	1000	4715.00	704.00	717.60	712.83	718.05	0.002756	5.49	986.22	179.73	0.32
Stream B	Reach 01	1000	5598.00	704.00	718.51	713.46	718.99	0.002644	5.74	1153.64	209.64	0.32
Stream B	Reach 01	1000	6481.00	704.00	719.35	714.10	719.85	0.002558	5.96	1313.11	260.62	0.32
Stream B	Reach 01	1000	6949.00	704.00	719.76	714.37	720.27	0.002522	6.07	1394.71	277.62	0.32
Stream B	Reach 01	1000	8041.00	704.00	720.65	715.00	721.20	0.002486	6.34	1577.31	313.74	0.32
Stream B	Reach 01	500	1619.00	700.00	709.52		710.02	0.010993	5.70	283.82	52.77	0.43
Stream B	Reach 01	500	2984.00	700.00	712.54		713.21	0.008424	6.60	465.46	71.60	0.41
Stream B	Reach 01	500	3840.00	700.00	713.87		714.65	0.008156	7.18	576.28	92.18	0.41

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Stream B	Reach 01	500	4715.00	700.00	714.83		715.75	0.008584	7.85	672.15	107.94	0.43
Stream B	Reach 01	500	5598.00	700.00	715.65		716.70	0.009022	8.47	765.82	120.59	0.44
Stream B	Reach 01	500	6481.00	700.00	716.41		717.57	0.009322	8.99	869.41	154.32	0.46
Stream B	Reach 01	500	6949.00	700.00	716.70		717.97	0.009887	9.41	916.88	169.44	0.47
Stream B	Reach 01	500	8041.00	700.00	717.72		718.98	0.009213	9.57	1099.09	186.98	0.46
Stream C	Reach 01	7000	351.00	784.15	785.60		785.74	0.011072	1.91	119.65	69.94	0.40
Stream C	Reach 01	7000	635.00	784.15	786.54		786.70	0.009966	2.53	205.46	117.47	0.41
Stream C	Reach 01	7000	817.00	784.15	786.97		787.14	0.009602	2.78	259.23	133.83	0.41
Stream C	Reach 01	7000	1014.00	784.15	787.40		787.57	0.008877	2.93	320.08	150.03	0.41
Stream C	Reach 01	7000	1205.00	784.15	787.71		787.89	0.008842	3.12	369.03	166.58	0.41
Stream C	Reach 01	7000	1398.00	784.15	788.01		788.19	0.008883	3.30	421.85	194.05	0.42
Stream C	Reach 01	7000	1506.00	784.15	788.15		788.33	0.009011	3.40	450.21	214.55	0.42
Stream C	Reach 01	7000	1708.00	784.15	788.40		788.58	0.008983	3.54	505.38	232.29	0.43
Stream C	Reach 01	6500	351.00	778.00	782.18		782.27	0.004693	2.85	180.32	101.24	0.27
Stream C	Reach 01	6500	635.00	778.00	783.10		783.23	0.005096	3.48	289.53	137.13	0.29
Stream C	Reach 01	6500	817.00	778.00	783.57		783.70	0.005139	3.74	357.21	155.47	0.30
Stream C	Reach 01	6500	1014.00	778.00	784.05		784.19	0.005289	4.04	438.03	192.86	0.31
Stream C	Reach 01	6500	1205.00	778.00	784.42		784.57	0.005138	4.17	513.37	211.73	0.31
Stream C	Reach 01	6500	1398.00	778.00	784.77		784.92	0.004981	4.27	589.72	230.34	0.31
Stream C	Reach 01	6500	1506.00	778.00	784.95		785.10	0.004861	4.30	631.94	237.87	0.31
Stream C	Reach 01	6500	1708.00	778.00	785.27		785.42	0.004673	4.36	710.25	252.18	0.30
Stream C	Reach 01	6060	351.00	776.00	780.03		780.13	0.005082	2.75	173.00	109.25	0.28
Stream C	Reach 01	6060	635.00	776.00	781.00		781.11	0.004545	3.13	285.40	121.81	0.28
Stream C	Reach 01	6060	817.00	776.00	781.51		781.63	0.004296	3.30	349.90	127.02	0.27
Stream C	Reach 01	6060	1014.00	776.00	782.00		782.12	0.004190	3.49	412.09	131.72	0.28
Stream C	Reach 01	6060	1205.00	776.00	782.38		782.52	0.004243	3.69	463.70	135.39	0.28
Stream C	Reach 01	6060	1398.00	776.00	782.72		782.87	0.004379	3.90	509.44	138.57	0.29
Stream C	Reach 01	6060	1506.00	776.00	782.90		783.07	0.004405	4.00	535.79	140.35	0.29
Stream C	Reach 01	6060	1708.00	776.00	783.22		783.40	0.004514	4.19	580.55	143.32	0.30
Stream C	Reach 01	5500	351.00	772.00	776.40		776.60	0.007953	3.89	120.04	60.49	0.36
Stream C	Reach 01	5500	635.00	772.00	777.51		777.76	0.008153	4.68	198.56	82.98	0.38
Stream C	Reach 01	5500	817.00	772.00	778.07		778.36	0.008335	5.10	252.02	107.36	0.39
Stream C	Reach 01	5500	1014.00	772.00	778.57		778.88	0.008419	5.43	316.69	141.97	0.39
Stream C	Reach 01	5500	1205.00	772.00	778.97		779.28	0.008277	5.63	377.11	161.23	0.40
Stream C	Reach 01	5500	1398.00	772.00	779.32		779.63	0.007996	5.74	435.75	171.10	0.39
Stream C	Reach 01	5500	1506.00	772.00	779.52		779.83	0.007921	5.82	470.14	182.03	0.39
Stream C	Reach 01	5500	1708.00	772.00	779.85		780.15	0.007677	5.91	532.89	195.11	0.39

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream C	Reach 01	5003	351.00	770.00	772.86		772.97	0.006645	2.65	138.67	73.77	0.31
Stream C	Reach 01	5003	635.00	770.00	773.66		773.83	0.007576	3.45	203.19	88.06	0.34
Stream C	Reach 01	5003	817.00	770.00	774.06		774.27	0.008023	3.85	239.89	94.55	0.36
Stream C	Reach 01	5003	1014.00	770.00	774.44		774.69	0.008382	4.21	276.27	97.73	0.37
Stream C	Reach 01	5003	1205.00	770.00	774.76		775.05	0.008763	4.53	307.94	100.41	0.39
Stream C	Reach 01	5003	1398.00	770.00	775.05		775.37	0.009159	4.84	337.25	102.84	0.40
Stream C	Reach 01	5003	1506.00	770.00	775.20		775.54	0.009382	5.01	353.00	104.89	0.41
Stream C	Reach 01	5003	1708.00	770.00	775.45		775.84	0.009882	5.32	379.53	107.44	0.42
Stream C	Reach 01	4497	351.00	768.00	768.73	768.33	768.79	0.010450	1.53	192.05	207.84	0.32
Stream C	Reach 01	4497	635.00	768.00	769.15		769.23	0.011003	2.14	281.49	214.62	0.35
Stream C	Reach 01	4497	817.00	768.00	769.37		769.47	0.011214	2.43	329.35	217.93	0.37
Stream C	Reach 01	4497	1014.00	768.00	769.57		769.69	0.011624	2.71	373.86	220.88	0.38
Stream C	Reach 01	4497	1205.00	768.00	769.76		769.89	0.011729	2.94	416.15	223.65	0.39
Stream C	Reach 01	4497	1398.00	768.00	769.94		770.09	0.011777	3.14	456.80	226.23	0.40
Stream C	Reach 01	4497	1506.00	768.00	770.05		770.20	0.011707	3.24	480.05	227.88	0.40
Stream C	Reach 01	4497	1708.00	768.00	770.24		770.41	0.011398	3.40	525.33	231.35	0.40
Stream C	Reach 01	4000	351.00	757.27	759.31		759.77	0.038310	5.52	66.85	40.74	0.71
Stream C	Reach 01	4000	635.00	757.27	760.30		760.89	0.028335	6.30	109.83	46.00	0.66
Stream C	Reach 01	4000	817.00	757.27	760.89		761.52	0.024188	6.58	137.66	49.06	0.62
Stream C	Reach 01	4000	1014.00	757.27	761.53		762.18	0.020129	6.73	170.37	52.49	0.59
Stream C	Reach 01	4000	1205.00	757.27	762.11		762.77	0.017581	6.87	201.68	55.64	0.56
Stream C	Reach 01	4000	1398.00	757.27	762.69		763.36	0.015494	6.97	234.51	58.93	0.54
Stream C	Reach 01	4000	1506.00	757.27	762.99		763.67	0.014632	7.03	252.60	60.76	0.53
Stream C	Reach 01	4000	1708.00	757.27	763.51		764.20	0.013521	7.17	284.81	63.86	0.51
Stream C	Reach 01	3500	351.00	748.00	753.87		754.04	0.005317	3.42	108.43	31.75	0.29
Stream C	Reach 01	3500	635.00	748.00	755.70		755.94	0.004838	4.12	174.06	40.06	0.29
Stream C	Reach 01	3500	817.00	748.00	756.67		756.95	0.004595	4.43	215.25	44.49	0.29
Stream C	Reach 01	3500	1014.00	748.00	757.43		757.75	0.004797	4.84	250.21	47.86	0.30
Stream C	Reach 01	3500	1205.00	748.00	758.06		758.43	0.004999	5.21	281.63	50.68	0.31
Stream C	Reach 01	3500	1398.00	748.00	758.43		758.87	0.005705	5.72	300.29	52.20	0.34
Stream C	Reach 01	3500	1506.00	748.00	758.58		759.07	0.006179	6.02	308.48	52.85	0.35
Stream C	Reach 01	3500	1708.00	748.00	758.93		759.49	0.006849	6.50	326.90	54.29	0.37
Stream C	Reach 01	3000	351.00	744.00	749.21		749.62	0.017288	5.17	71.72	28.49	0.50
Stream C	Reach 01	3000	635.00	744.00	749.62	749.12	750.63	0.037389	8.21	83.88	31.36	0.75
Stream C	Reach 01	3000	817.00	744.00	749.74	749.74	751.29	0.055358	10.19	87.56	32.18	0.91
Stream C	Reach 01	3000	1014.00	744.00	750.31	750.31	751.99	0.051053	10.73	107.08	36.50	0.90

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream C	Reach 01	3000	1205.00	744.00	750.81	750.81	752.58	0.047767	11.14	126.39	40.53	0.88
Stream C	Reach 01	3000	1398.00	744.00	751.82	751.27	753.20	0.030527	10.09	171.54	48.66	0.73
Stream C	Reach 01	3000	1506.00	744.00	752.46		753.63	0.023160	9.41	204.49	53.81	0.65
Stream C	Reach 01	3000	1708.00	744.00	753.47		754.41	0.016301	8.68	262.50	61.86	0.56
Stream C	Reach 01	2553	351.00	738.00	749.37		749.38	0.000079	0.73	597.68	90.96	0.04
Stream C	Reach 01	2553	635.00	738.00	750.00		750.02	0.000202	1.21	656.33	94.40	0.07
Stream C	Reach 01	2553	817.00	738.00	750.30		750.32	0.000299	1.50	684.24	95.99	0.08
Stream C	Reach 01	2553	1014.00	738.00	750.47		750.52	0.000431	1.82	701.39	96.96	0.10
Stream C	Reach 01	2553	1205.00	738.00	751.29		751.34	0.000454	1.97	782.37	101.50	0.10
Stream C	Reach 01	2553	1398.00	738.00	752.09		752.14	0.000468	2.09	865.21	106.05	0.10
Stream C	Reach 01	2553	1506.00	738.00	752.61		752.66	0.000460	2.13	920.93	108.81	0.10
Stream C	Reach 01	2553	1708.00	738.00	753.49		753.55	0.000453	2.20	1019.23	113.52	0.10
Stream C	Reach 01	2000	351.00	736.00	749.36		749.36	0.000011	0.32	1834.23	272.54	0.02
Stream C	Reach 01	2000	635.00	736.00	749.98		749.98	0.000027	0.53	2006.20	281.15	0.03
Stream C	Reach 01	2000	817.00	736.00	750.27		750.27	0.000040	0.66	2086.48	284.39	0.03
Stream C	Reach 01	2000	1014.00	736.00	750.43		750.44	0.000058	0.80	2133.53	286.27	0.04
Stream C	Reach 01	2000	1205.00	736.00	751.25		751.25	0.000061	0.85	2370.71	294.52	0.04
Stream C	Reach 01	2000	1398.00	736.00	752.05		752.05	0.000063	0.89	2609.41	302.30	0.04
Stream C	Reach 01	2000	1506.00	736.00	752.57		752.57	0.000061	0.90	2768.12	306.84	0.04
Stream C	Reach 01	2000	1708.00	736.00	753.46		753.46	0.000060	0.93	3043.95	314.53	0.04
Stream C	Reach 01	1455	351.00	734.00	749.36		749.36	0.000008	0.29	1757.66	193.05	0.01
Stream C	Reach 01	1455	635.00	734.00	749.97		749.97	0.000022	0.49	1877.65	198.74	0.02
Stream C	Reach 01	1455	817.00	734.00	750.25		750.25	0.000033	0.62	1933.07	201.43	0.03
Stream C	Reach 01	1455	1014.00	734.00	750.40		750.41	0.000049	0.76	1964.53	202.85	0.03
Stream C	Reach 01	1455	1205.00	734.00	751.21		751.22	0.000055	0.83	2132.72	210.98	0.04
Stream C	Reach 01	1455	1398.00	734.00	752.01		752.02	0.000060	0.90	2304.12	218.90	0.04
Stream C	Reach 01	1455	1506.00	734.00	752.53		752.54	0.000060	0.92	2419.30	223.40	0.04
Stream C	Reach 01	1455	1708.00	734.00	753.42		753.43	0.000062	0.97	2620.80	230.37	0.04
Stream C	Reach 01	1000	351.00	730.00	749.35		749.35	0.000002	0.22	2135.34	235.50	0.01
Stream C	Reach 01	1000	635.00	730.00	749.96		749.97	0.000006	0.38	2282.37	246.55	0.02
Stream C	Reach 01	1000	817.00	730.00	750.24		750.24	0.000009	0.48	2352.18	261.58	0.02
Stream C	Reach 01	1000	1014.00	730.00	750.39		750.39	0.000014	0.59	2392.63	269.51	0.03
Stream C	Reach 01	1000	1205.00	730.00	751.20		751.21	0.000017	0.67	2628.59	311.79	0.03
Stream C	Reach 01	1000	1398.00	730.00	752.00		752.00	0.000019	0.74	2894.19	355.80	0.03
Stream C	Reach 01	1000	1506.00	730.00	752.52		752.53	0.000020	0.76	3086.13	381.69	0.03
Stream C	Reach 01	1000	1708.00	730.00	753.41		753.41	0.000020	0.79	3443.70	424.53	0.03

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream C	Reach 01	500	351.00	728.00	749.35		749.35	0.000003	0.27	2819.28	428.57	0.01
Stream C	Reach 01	500	635.00	728.00	749.96		749.96	0.000008	0.47	3083.19	440.73	0.02
Stream C	Reach 01	500	817.00	728.00	750.23		750.24	0.000012	0.59	3204.32	449.41	0.02
Stream C	Reach 01	500	1014.00	728.00	750.38		750.39	0.000018	0.72	3271.78	454.34	0.03
Stream C	Reach 01	500	1205.00	728.00	751.19		751.20	0.000021	0.80	3650.66	481.08	0.03
Stream C	Reach 01	500	1398.00	728.00	751.99		751.99	0.000023	0.87	4044.23	510.51	0.03
Stream C	Reach 01	500	1506.00	728.00	752.51		752.51	0.000024	0.90	4314.37	527.86	0.03
Stream C	Reach 01	500	1708.00	728.00	753.39		753.40	0.000026	0.96	4794.97	557.27	0.04
Stream E	Reach 01	8000	340.00	770.00	777.40	773.94	777.49	0.004600	2.42	140.27	49.28	0.25
Stream E	Reach 01	8000	587.00	770.00	778.50	775.03	778.62	0.004862	2.82	234.57	169.53	0.27
Stream E	Reach 01	8000	744.00	770.00	778.90	775.57	779.03	0.004821	3.02	313.84	224.15	0.27
Stream E	Reach 01	8000	915.00	770.00	779.24	776.15	779.37	0.004738	3.17	391.81	234.32	0.28
Stream E	Reach 01	8000	1079.00	770.00	779.52	776.72	779.66	0.004659	3.29	460.39	242.90	0.28
Stream E	Reach 01	8000	1246.00	770.00	779.78	777.18	779.93	0.004613	3.40	524.70	250.56	0.28
Stream E	Reach 01	8000	1314.00	770.00	779.88	777.33	780.03	0.004596	3.44	549.90	253.47	0.28
Stream E	Reach 01	8000	1511.00	770.00	780.16	777.71	780.30	0.004557	3.56	619.82	260.69	0.28
Stream E	Reach 01	7500	340.00	768.00	770.57	770.57	771.36	0.085051	7.13	47.66	30.75	1.01
Stream E	Reach 01	7500	587.00	768.00	771.35	771.35	772.31	0.077975	7.86	74.72	39.07	1.00
Stream E	Reach 01	7500	744.00	768.00	771.73	771.73	772.78	0.075979	8.24	90.33	43.14	1.00
Stream E	Reach 01	7500	915.00	768.00	772.11	772.11	773.23	0.074604	8.49	107.82	48.62	1.00
Stream E	Reach 01	7500	1079.00	768.00	772.48	772.48	773.60	0.074813	8.50	126.98	57.45	1.01
Stream E	Reach 01	7500	1246.00	768.00	772.78	772.78	773.92	0.074422	8.57	145.42	64.85	1.01
Stream E	Reach 01	7500	1314.00	768.00	772.88	772.88	774.04	0.074266	8.62	152.49	67.37	1.01
Stream E	Reach 01	7500	1511.00	768.00	773.16	773.16	774.36	0.073531	8.77	172.30	73.68	1.01
Stream E	Reach 01	7066	340.00	762.00	767.05		767.09	0.002348	1.89	222.58	134.78	0.19
Stream E	Reach 01	7066	587.00	762.00	767.77		767.83	0.002613	2.29	323.88	147.61	0.21
Stream E	Reach 01	7066	744.00	762.00	768.10		768.18	0.002837	2.52	378.29	190.57	0.22
Stream E	Reach 01	7066	915.00	762.00	768.42		768.51	0.002971	2.71	441.04	203.94	0.23
Stream E	Reach 01	7066	1079.00	762.00	768.70		768.80	0.003042	2.86	499.84	215.60	0.23
Stream E	Reach 01	7066	1246.00	762.00	768.94	766.88	769.04	0.003164	3.01	551.50	222.30	0.24
Stream E	Reach 01	7066	1314.00	762.00	769.01	766.94	769.12	0.003259	3.09	568.34	224.44	0.24
Stream E	Reach 01	7066	1511.00	762.00	769.29	767.14	769.40	0.003284	3.21	631.41	232.29	0.24
Stream E	Reach 01	6500	340.00	760.00	763.47		764.01	0.022655	5.89	57.77	37.45	0.84
Stream E	Reach 01	6500	587.00	760.00	764.29	764.29	764.76	0.016556	5.72	117.72	141.57	0.74
Stream E	Reach 01	6500	744.00	760.00	764.49	764.49	764.98	0.015720	5.98	148.94	157.70	0.73
Stream E	Reach 01	6500	915.00	760.00	764.66	764.66	765.18	0.015885	6.33	176.03	166.13	0.75
Stream E	Reach 01	6500	1079.00	760.00	764.78	764.78	765.36	0.016829	6.74	195.51	170.06	0.77

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream E	Reach 01	6500	1246.00	760.00	764.91	764.91	765.51	0.016586	6.95	218.95	174.67	0.78
Stream E	Reach 01	6500	1314.00	760.00	764.98	764.98	765.58	0.015836	6.92	231.59	177.10	0.76
Stream E	Reach 01	6500	1511.00	760.00	765.08	765.08	765.75	0.017058	7.37	249.51	180.50	0.80
Stream E	Reach 01	5500	340.00	752.00	756.73		756.77	0.003411	1.57	205.38	213.84	0.21
Stream E	Reach 01	5500	587.00	752.00	757.26		757.32	0.002378	1.44	325.36	238.58	0.18
Stream E	Reach 01	5500	744.00	752.00	757.57		757.63	0.002013	1.42	400.51	255.65	0.17
Stream E	Reach 01	5500	915.00	752.00	757.82		757.89	0.001919	1.49	466.96	273.82	0.16
Stream E	Reach 01	5500	1079.00	752.00	758.07		758.14	0.001793	1.53	536.74	286.01	0.16
Stream E	Reach 01	5500	1246.00	752.00	759.15		759.18	0.000535	1.04	864.21	321.39	0.09
Stream E	Reach 01	5500	1314.00	752.00	759.48		759.51	0.000416	0.97	971.98	327.61	0.08
Stream E	Reach 01	5500	1511.00	752.00	759.94		759.98	0.000351	0.95	1126.59	334.58	0.08
Stream E	Reach 01	5116	340.00	750.00	753.01	753.01	754.02	0.020842	8.03	42.33	21.46	1.01
Stream E	Reach 01	5116	587.00	750.00	754.01	754.01	755.21	0.019197	8.79	66.81	27.85	1.00
Stream E	Reach 01	5116	744.00	750.00	754.62	754.62	755.75	0.019266	8.55	86.98	38.37	1.00
Stream E	Reach 01	5116	915.00	750.00	756.01	755.07	756.54	0.007493	5.84	158.34	236.91	0.64
Stream E	Reach 01	5116	1079.00	750.00	757.60	755.41	757.68	0.000853	2.72	638.81	354.22	0.24
Stream E	Reach 01	5116	1246.00	750.00	759.03	755.71	759.05	0.000224	1.70	1186.21	408.71	0.13
Stream E	Reach 01	5116	1314.00	750.00	759.39	755.85	759.41	0.000178	1.58	1334.96	420.70	0.11
Stream E	Reach 01	5116	1511.00	750.00	759.87	756.59	759.89	0.000156	1.56	1541.63	437.15	0.11
Stream E	Reach 01	4880	Culvert									
Stream E	Reach 01	4639	340.00	748.00	751.47		751.75	0.005983	4.28	79.46	42.97	0.55
Stream E	Reach 01	4639	587.00	748.00	752.28	751.40	752.60	0.005029	4.63	152.82	177.40	0.53
Stream E	Reach 01	4639	744.00	748.00	752.52		752.85	0.004956	4.90	195.84	188.26	0.53
Stream E	Reach 01	4639	915.00	748.00	752.79		753.09	0.004431	4.94	247.59	200.54	0.51
Stream E	Reach 01	4639	1079.00	748.00	753.00		753.31	0.004143	5.02	292.36	213.04	0.50
Stream E	Reach 01	4639	1246.00	748.00	753.20		753.50	0.003966	5.11	335.28	228.39	0.50
Stream E	Reach 01	4639	1314.00	748.00	753.28		753.58	0.003871	5.13	353.62	234.61	0.49
Stream E	Reach 01	4639	1511.00	748.00	753.47		753.78	0.003751	5.25	401.09	249.92	0.49
Stream E	Reach 01	4500	340.00	746.00	749.28	749.28	750.28	0.020378	8.05	42.25	21.42	1.01
Stream E	Reach 01	4500	587.00	746.00	750.49	750.49	751.48	0.012645	8.07	78.72	55.82	0.84
Stream E	Reach 01	4500	744.00	746.00	751.08	751.08	751.90	0.008846	7.66	122.94	93.74	0.73
Stream E	Reach 01	4500	915.00	746.00	751.42	751.42	752.22	0.008279	7.88	158.13	115.49	0.72
Stream E	Reach 01	4500	1079.00	746.00	751.68	751.68	752.48	0.007935	8.08	191.33	134.52	0.71
Stream E	Reach 01	4500	1246.00	746.00	751.91	751.91	752.70	0.007740	8.27	223.42	150.54	0.71
Stream E	Reach 01	4500	1314.00	746.00	751.98	751.98	752.79	0.007832	8.41	233.92	155.37	0.71
Stream E	Reach 01	4500	1511.00	746.00	752.20	752.20	753.01	0.007649	8.60	271.05	173.96	0.71

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream E	Reach 01	3949	340.00	741.74	746.86		746.87	0.000216	0.92	477.52	268.33	0.08
Stream E	Reach 01	3949	587.00	741.74	747.13		747.15	0.000425	1.35	550.95	279.24	0.11
Stream E	Reach 01	3949	744.00	741.74	747.29		747.32	0.000537	1.55	598.36	286.07	0.13
Stream E	Reach 01	3949	915.00	741.74	747.43		747.47	0.000676	1.78	637.53	291.61	0.15
Stream E	Reach 01	3949	1079.00	741.74	747.55		747.59	0.000807	1.98	671.98	296.40	0.16
Stream E	Reach 01	3949	1246.00	741.74	747.64		747.70	0.000953	2.18	701.24	300.78	0.17
Stream E	Reach 01	3949	1314.00	741.74	747.69		747.75	0.001005	2.25	714.60	302.89	0.18
Stream E	Reach 01	3949	1511.00	741.74	747.80		747.87	0.001165	2.46	748.58	308.19	0.19
Stream E	Reach 01	3879	340.00	740.50	746.85	744.06	746.85	0.000186	0.86	617.15	371.13	0.07
Stream E	Reach 01	3879	587.00	740.50	747.10	744.91	747.12	0.000389	1.30	718.62	416.62	0.11
Stream E	Reach 01	3879	744.00	740.50	747.26	745.19	747.28	0.000494	1.50	787.48	433.60	0.12
Stream E	Reach 01	3879	915.00	740.50	747.39	745.39	747.42	0.000623	1.71	843.98	445.69	0.14
Stream E	Reach 01	3879	1079.00	740.50	747.50	745.57	747.53	0.000743	1.90	893.90	454.58	0.15
Stream E	Reach 01	3879	1246.00	740.50	747.59	745.70	747.63	0.000874	2.08	935.57	460.71	0.16
Stream E	Reach 01	3879	1314.00	740.50	747.64	745.75	747.67	0.000919	2.15	954.98	463.54	0.17
Stream E	Reach 01	3879	1511.00	740.50	747.74	745.85	747.79	0.001061	2.34	1003.58	470.54	0.18
Stream E	Reach 01	3820	Culvert									
Stream E	Reach 01	3767	340.00	740.50	743.42	742.92	743.57	0.010228	2.63	113.97	116.08	0.45
Stream E	Reach 01	3767	587.00	740.50	743.95		744.13	0.008935	2.51	189.94	170.97	0.43
Stream E	Reach 01	3767	744.00	740.50	744.16		744.34	0.008477	2.70	231.94	218.06	0.43
Stream E	Reach 01	3767	915.00	740.50	744.33		744.52	0.008454	2.93	269.56	227.66	0.44
Stream E	Reach 01	3767	1079.00	740.50	744.51		744.71	0.007784	3.06	313.04	239.46	0.43
Stream E	Reach 01	3767	1246.00	740.50	744.66		744.87	0.007658	3.22	348.99	247.75	0.43
Stream E	Reach 01	3767	1314.00	740.50	744.71		744.93	0.007707	3.29	361.59	250.54	0.43
Stream E	Reach 01	3767	1511.00	740.50	744.87		745.10	0.007496	3.44	402.93	259.49	0.43
Stream E	Reach 01	3599	340.00	738.77	740.38	740.38	741.05	0.022654	6.11	51.89	39.72	0.97
Stream E	Reach 01	3599	587.00	738.77	741.02	741.02	741.87	0.020460	6.97	79.32	46.54	0.96
Stream E	Reach 01	3599	744.00	738.77	741.43	741.43	742.30	0.017205	7.20	100.25	59.35	0.91
Stream E	Reach 01	3599	915.00	738.77	741.83	741.83	742.63	0.014547	7.48	128.55	83.90	0.86
Stream E	Reach 01	3599	1079.00	738.77	742.06	742.06	742.90	0.014608	7.97	149.24	98.04	0.87
Stream E	Reach 01	3599	1246.00	738.77	742.32	742.32	743.13	0.013510	8.18	178.88	126.15	0.85
Stream E	Reach 01	3599	1314.00	738.77	742.43	742.43	743.22	0.012973	8.22	193.11	138.04	0.84
Stream E	Reach 01	3599	1511.00	738.77	742.65	742.65	743.44	0.012670	8.52	225.97	162.22	0.84
Stream E	Reach 01	3000	340.00	728.00	733.01		733.13	0.003319	2.76	123.18	44.36	0.29
Stream E	Reach 01	3000	587.00	728.00	734.14		734.31	0.003627	3.30	178.06	52.43	0.32

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream E	Reach 01	3000	744.00	728.00	734.69		734.89	0.003765	3.58	207.70	55.43	0.33
Stream E	Reach 01	3000	915.00	728.00	735.22		735.45	0.003893	3.85	237.59	58.24	0.34
Stream E	Reach 01	3000	1079.00	728.00	735.67		735.93	0.004014	4.08	264.37	60.72	0.34
Stream E	Reach 01	3000	1246.00	728.00	736.00		736.30	0.004341	4.37	284.86	63.81	0.36
Stream E	Reach 01	3000	1314.00	728.00	736.12		736.43	0.004441	4.50	292.45	67.85	0.37
Stream E	Reach 01	3000	1511.00	728.00	736.44		736.80	0.004686	4.83	316.03	79.09	0.38
Stream E	Reach 01	2500	340.00	726.00	728.80	728.80	729.67	0.020619	7.48	45.42	26.50	1.01
Stream E	Reach 01	2500	587.00	726.00	729.66	729.66	730.71	0.018990	8.23	71.35	34.00	1.00
Stream E	Reach 01	2500	744.00	726.00	730.09	730.09	731.23	0.018431	8.56	86.90	38.18	1.00
Stream E	Reach 01	2500	915.00	726.00	730.51	730.51	731.71	0.018086	8.79	104.11	43.43	1.00
Stream E	Reach 01	2500	1079.00	726.00	730.85	730.84	732.12	0.018057	9.05	119.20	47.58	1.01
Stream E	Reach 01	2500	1246.00	726.00	731.31	731.17	732.50	0.015424	8.74	142.56	53.36	0.94
Stream E	Reach 01	2500	1314.00	726.00	731.47	731.29	732.64	0.014730	8.68	151.46	55.41	0.92
Stream E	Reach 01	2500	1511.00	726.00	731.91	731.61	733.04	0.013174	8.55	176.74	60.85	0.88
Stream E	Reach 01	2000	340.00	720.00	724.88		725.00	0.003306	2.81	120.99	42.32	0.29
Stream E	Reach 01	2000	587.00	720.00	726.02		726.19	0.003677	3.39	173.39	49.54	0.32
Stream E	Reach 01	2000	744.00	720.00	726.59		726.80	0.003921	3.66	203.38	54.30	0.33
Stream E	Reach 01	2000	915.00	720.00	727.10		727.34	0.004203	3.95	231.61	58.05	0.35
Stream E	Reach 01	2000	1079.00	720.00	727.45		727.73	0.004638	4.27	252.66	60.65	0.37
Stream E	Reach 01	2000	1246.00	720.00	727.71		728.04	0.005258	4.64	268.57	62.55	0.39
Stream E	Reach 01	2000	1314.00	720.00	727.81		728.17	0.005485	4.78	275.12	63.32	0.40
Stream E	Reach 01	2000	1511.00	720.00	728.09		728.50	0.006125	5.16	293.01	65.29	0.43
Stream E	Reach 01	1500	340.00	718.00	721.07		721.86	0.015183	7.12	47.78	23.35	0.88
Stream E	Reach 01	1500	587.00	718.00	722.45		723.17	0.011148	6.83	85.95	35.64	0.77
Stream E	Reach 01	1500	744.00	718.00	723.13		723.79	0.009932	6.50	114.41	47.27	0.74
Stream E	Reach 01	1500	915.00	718.00	723.76		724.35	0.008847	6.20	147.52	60.39	0.70
Stream E	Reach 01	1500	1079.00	718.00	724.22		724.79	0.007550	6.07	179.27	83.02	0.66
Stream E	Reach 01	1500	1246.00	718.00	724.62		725.18	0.006149	6.03	218.12	106.71	0.61
Stream E	Reach 01	1500	1314.00	718.00	724.77		725.33	0.005790	6.03	234.12	112.64	0.59
Stream E	Reach 01	1500	1511.00	718.00	725.15		725.70	0.005098	6.09	278.96	126.74	0.57
Stream E	Reach 01	951	340.00	713.37	719.27		719.36	0.001912	2.47	137.85	39.73	0.23
Stream E	Reach 01	951	587.00	713.37	720.47		720.63	0.002277	3.16	194.37	58.86	0.26
Stream E	Reach 01	951	744.00	713.37	721.07		721.25	0.002436	3.48	234.06	73.90	0.27
Stream E	Reach 01	951	915.00	713.37	722.18		722.34	0.001807	3.31	330.72	100.58	0.24
Stream E	Reach 01	951	1079.00	713.37	722.66		722.83	0.001885	3.51	381.60	114.13	0.25
Stream E	Reach 01	951	1246.00	713.37	723.30		723.47	0.001692	3.49	461.36	132.75	0.24
Stream E	Reach 01	951	1314.00	713.37	723.48		723.65	0.001679	3.52	486.18	137.99	0.24

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream E	Reach 01	951	1511.00	713.37	723.89		724.06	0.001747	3.69	543.88	150.56	0.24
Stream E	Reach 01	844	340.00	714.00	717.68	717.68	718.65	0.082594	7.92	42.91	22.51	1.01
Stream E	Reach 01	844	587.00	714.00	718.64	718.64	719.82	0.075373	8.71	67.40	28.68	1.00
Stream E	Reach 01	844	744.00	714.00	719.11	719.11	720.40	0.073006	9.10	81.77	31.84	1.00
Stream E	Reach 01	844	915.00	714.00	721.48	719.56	721.89	0.015507	5.08	179.96	52.96	0.49
Stream E	Reach 01	844	1079.00	714.00	721.92	719.94	722.36	0.015723	5.28	204.31	57.49	0.49
Stream E	Reach 01	844	1246.00	714.00	722.71	720.33	723.09	0.008990	4.53	264.91	96.13	0.39
Stream E	Reach 01	844	1314.00	714.00	722.91	720.47	723.29	0.007828	4.35	284.76	107.80	0.36
Stream E	Reach 01	844	1511.00	714.00	723.37	720.86	723.73	0.005931	4.05	341.52	140.50	0.32
Stream E	Reach 01	785	Culvert									
Stream E	Reach 01	731	340.00	710.00	713.77	713.77	714.92	0.047580	8.60	39.55	17.56	1.01
Stream E	Reach 01	731	587.00	710.00	714.88	714.88	716.30	0.043808	9.57	61.35	21.69	1.00
Stream E	Reach 01	731	744.00	710.00	715.44	715.44	717.00	0.042409	10.03	74.18	23.80	1.00
Stream E	Reach 01	731	915.00	710.00	715.96	715.96	717.68	0.041974	10.52	86.96	25.74	1.01
Stream E	Reach 01	731	1079.00	710.00	716.44	716.44	718.26	0.040501	10.82	99.74	27.54	1.00
Stream E	Reach 01	731	1246.00	710.00	716.87	716.87	718.79	0.039667	11.13	111.99	29.15	1.00
Stream E	Reach 01	731	1314.00	710.00	717.03	717.03	719.00	0.039461	11.25	116.77	29.76	1.00
Stream E	Reach 01	731	1511.00	710.00	717.47	717.47	719.56	0.039092	11.61	130.14	31.40	1.01
Stream E	Reach 01	628	340.00	706.56	713.49		713.58	0.001404	2.44	139.31	26.54	0.19
Stream E	Reach 01	628	587.00	706.56	714.86		715.03	0.002163	3.31	177.22	29.00	0.24
Stream E	Reach 01	628	744.00	706.56	715.49		715.71	0.002620	3.80	196.07	30.98	0.26
Stream E	Reach 01	628	915.00	706.56	716.16		716.43	0.002948	4.23	218.09	35.25	0.28
Stream E	Reach 01	628	1079.00	706.56	716.59		716.93	0.003411	4.69	234.01	39.43	0.30
Stream E	Reach 01	628	1246.00	706.56	716.90		717.32	0.003942	5.18	248.36	51.88	0.33
Stream E	Reach 01	628	1314.00	706.56	717.13		717.56	0.003954	5.29	261.21	62.63	0.33
Stream E	Reach 01	628	1511.00	706.56	717.39		717.91	0.004645	5.86	279.81	81.76	0.36
Stream E	Reach 01	500	340.00	706.00	713.13		713.30	0.003648	3.28	103.72	28.50	0.30
Stream E	Reach 01	500	587.00	706.00	714.36		714.63	0.004474	4.14	143.67	43.76	0.35
Stream E	Reach 01	500	744.00	706.00	714.95		715.27	0.004647	4.58	174.65	63.21	0.36
Stream E	Reach 01	500	915.00	706.00	715.63		715.98	0.004281	4.79	227.37	93.93	0.35
Stream E	Reach 01	500	1079.00	706.00	716.03		716.42	0.004604	5.20	272.38	156.95	0.37
Stream E	Reach 01	500	1246.00	706.00	716.36		716.77	0.004666	5.42	328.03	176.52	0.38
Stream E	Reach 01	500	1314.00	706.00	716.68		717.03	0.003970	5.16	386.44	190.65	0.35
Stream E	Reach 01	500	1511.00	706.00	716.91		717.30	0.004311	5.50	432.36	200.27	0.37
Stream F	Reach 01	14000	590.00	706.00	712.44		712.71	0.005500	4.23	146.28	85.52	0.45

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream F	Reach 01	14000	919.00	706.00	713.06		713.44	0.006075	5.09	214.25	131.18	0.49
Stream F	Reach 01	14000	1127.00	706.00	713.34		713.78	0.006535	5.57	253.22	149.60	0.51
Stream F	Reach 01	14000	1356.00	706.00	713.60		714.10	0.006964	6.02	294.95	167.42	0.54
Stream F	Reach 01	14000	1561.00	706.00	713.81		714.36	0.007280	6.37	331.77	182.08	0.55
Stream F	Reach 01	14000	1776.00	706.00	714.01		714.62	0.007718	6.77	369.79	204.80	0.57
Stream F	Reach 01	14000	1792.00	706.00	714.03		714.64	0.007740	6.80	372.47	205.76	0.57
Stream F	Reach 01	14000	2117.00	706.00	714.27	713.64	714.94	0.008121	7.23	431.43	275.25	0.59
Stream F	Reach 01	13571	590.00	703.88	710.62		710.74	0.003755	2.78	220.60	154.60	0.31
Stream F	Reach 01	13571	919.00	703.88	711.28		711.40	0.003573	2.97	340.32	208.07	0.31
Stream F	Reach 01	13571	1127.00	703.88	711.55		711.69	0.003499	3.12	401.80	236.94	0.31
Stream F	Reach 01	13571	1356.00	703.88	711.81		711.95	0.003464	3.26	465.19	259.62	0.31
Stream F	Reach 01	13571	1561.00	703.88	712.02		712.17	0.003446	3.38	521.45	297.54	0.31
Stream F	Reach 01	13571	1776.00	703.88	712.20		712.36	0.003435	3.49	577.73	310.86	0.31
Stream F	Reach 01	13571	1792.00	703.88	712.21		712.37	0.003457	3.51	580.33	311.47	0.31
Stream F	Reach 01	13571	2117.00	703.88	712.47		712.64	0.003400	3.63	662.73	326.06	0.32
Stream F	Reach 01	13500	590.00	706.00	710.31	709.16	710.42	0.005396	2.70	226.23	168.98	0.35
Stream F	Reach 01	13500	919.00	706.00	711.03	709.64	711.14	0.003704	2.79	370.18	231.67	0.31
Stream F	Reach 01	13500	1127.00	706.00	711.30	709.87	711.43	0.003643	2.97	438.07	255.64	0.31
Stream F	Reach 01	13500	1356.00	706.00	711.56	710.15	711.70	0.003663	3.15	505.56	277.43	0.32
Stream F	Reach 01	13500	1561.00	706.00	711.77	710.33	711.92	0.003651	3.29	564.93	295.27	0.32
Stream F	Reach 01	13500	1776.00	706.00	711.95	710.48	712.11	0.003724	3.44	619.41	310.57	0.33
Stream F	Reach 01	13500	1792.00	706.00	711.95	710.50	712.12	0.003765	3.46	621.11	311.07	0.33
Stream F	Reach 01	13500	2117.00	706.00	712.20	710.70	712.38	0.003880	3.68	703.26	337.43	0.34
Stream F	Reach 01	13465	Culvert									
Stream F	Reach 01	13423	590.00	706.00	709.06	709.06	709.59	0.047320	5.85	101.85	100.80	0.97
Stream F	Reach 01	13423	919.00	706.00	709.49	709.49	710.10	0.036600	6.35	152.53	136.54	0.90
Stream F	Reach 01	13423	1127.00	706.00	709.69	709.69	710.35	0.034442	6.68	181.97	153.93	0.89
Stream F	Reach 01	13423	1356.00	706.00	709.90	709.90	710.60	0.032312	6.96	215.36	173.68	0.88
Stream F	Reach 01	13423	1561.00	706.00	710.07	710.07	710.80	0.030358	7.14	246.43	189.11	0.86
Stream F	Reach 01	13423	1776.00	706.00	710.23	710.23	710.98	0.028912	7.31	277.46	200.94	0.85
Stream F	Reach 01	13423	1792.00	706.00	710.24	710.24	711.00	0.028887	7.33	279.49	201.71	0.85
Stream F	Reach 01	13423	2117.00	706.00	710.44	710.44	711.26	0.028071	7.64	321.72	217.19	0.85
Stream F	Reach 01	13210	590.00	701.31	708.51		708.56	0.000845	1.88	388.92	241.84	0.16
Stream F	Reach 01	13210	919.00	701.31	708.88		708.95	0.001206	2.37	480.99	255.84	0.19
Stream F	Reach 01	13210	1127.00	701.31	709.11		709.19	0.001339	2.58	539.05	263.14	0.20
Stream F	Reach 01	13210	1356.00	701.31	709.28		709.37	0.001556	2.84	584.23	268.69	0.22

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream F	Reach 01	13210	1561.00	701.31	709.46		709.57	0.001638	2.98	635.15	275.40	0.23
Stream F	Reach 01	13210	1776.00	701.31	709.67		709.78	0.001673	3.09	693.09	284.98	0.23
Stream F	Reach 01	13210	1792.00	701.31	709.68		709.80	0.001682	3.10	696.36	285.51	0.23
Stream F	Reach 01	13210	2117.00	701.31	709.93		710.06	0.001794	3.30	768.16	296.93	0.24
Stream F	Reach 01	13108	590.00	700.63	708.49	703.67	708.52	0.000194	1.42	538.86	245.82	0.11
Stream F	Reach 01	13108	919.00	700.63	708.84	704.77	708.89	0.000326	1.92	626.77	257.37	0.15
Stream F	Reach 01	13108	1127.00	700.63	709.05	705.31	709.11	0.000398	2.18	682.29	265.35	0.17
Stream F	Reach 01	13108	1356.00	700.63	709.21	705.77	709.28	0.000497	2.49	723.98	271.66	0.19
Stream F	Reach 01	13108	1561.00	700.63	709.39	706.10	709.47	0.000559	2.70	772.93	279.14	0.20
Stream F	Reach 01	13108	1776.00	700.63	709.59	706.45	709.68	0.000606	2.87	829.41	287.54	0.21
Stream F	Reach 01	13108	1792.00	700.63	709.60	706.48	709.69	0.000611	2.89	832.50	287.99	0.21
Stream F	Reach 01	13108	2117.00	700.63	709.83	707.00	709.94	0.000699	3.17	900.83	297.92	0.23
Stream F	Reach 01	12975	Culvert									
Stream F	Reach 01	12710	590.00	698.00	705.04		705.05	0.000094	0.93	775.97	162.12	0.07
Stream F	Reach 01	12710	919.00	698.00	705.89		705.91	0.000139	1.24	918.69	174.46	0.08
Stream F	Reach 01	12710	1127.00	698.00	706.19		706.22	0.000179	1.45	972.36	181.42	0.10
Stream F	Reach 01	12710	1356.00	698.00	706.46		706.49	0.000228	1.68	1022.14	190.40	0.11
Stream F	Reach 01	12710	1561.00	698.00	706.71		706.75	0.000268	1.86	1070.20	199.56	0.12
Stream F	Reach 01	12710	1776.00	698.00	706.90		706.95	0.000318	2.06	1108.78	206.88	0.13
Stream F	Reach 01	12710	1792.00	698.00	706.88		706.94	0.000326	2.08	1106.44	206.45	0.13
Stream F	Reach 01	12710	2117.00	698.00	707.21		707.28	0.000391	2.35	1176.54	218.96	0.15
Stream F	Reach 01	12500	590.00	694.00	705.01		705.02	0.000170	0.83	718.84	140.33	0.06
Stream F	Reach 01	12500	919.00	694.00	705.85		705.87	0.000263	1.12	847.22	165.74	0.07
Stream F	Reach 01	12500	1127.00	694.00	706.14		706.17	0.000342	1.32	898.54	191.02	0.08
Stream F	Reach 01	12500	1356.00	694.00	706.39		706.43	0.000434	1.52	949.47	209.48	0.09
Stream F	Reach 01	12500	1561.00	694.00	706.63		706.67	0.000508	1.67	1000.90	226.60	0.10
Stream F	Reach 01	12500	1776.00	694.00	706.81		706.86	0.000598	1.84	1042.03	239.41	0.11
Stream F	Reach 01	12500	1792.00	694.00	706.79		706.84	0.000613	1.86	1038.79	238.43	0.11
Stream F	Reach 01	12500	2117.00	694.00	707.11		707.17	0.000723	2.07	1116.87	259.90	0.12
Stream F	Reach 01	12221	590.00	691.77	704.98	697.06	704.99	0.000093	0.87	804.09	250.01	0.06
Stream F	Reach 01	12221	919.00	691.77	705.80	697.88	705.82	0.000121	1.06	1018.04	267.08	0.07
Stream F	Reach 01	12221	1127.00	691.77	706.09	698.32	706.10	0.000149	1.20	1093.73	273.55	0.07
Stream F	Reach 01	12221	1356.00	691.77	706.33	698.75	706.35	0.000184	1.36	1160.61	279.84	0.08
Stream F	Reach 01	12221	1561.00	691.77	706.55	699.11	706.58	0.000210	1.48	1224.64	285.83	0.09
Stream F	Reach 01	12221	1776.00	691.77	706.72	699.44	706.75	0.000245	1.62	1271.83	290.16	0.09
Stream F	Reach 01	12221	1792.00	691.77	706.70	699.46	706.73	0.000252	1.64	1267.18	289.73	0.10

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream F	Reach 01	12221	2117.00	691.77	707.00	699.96	707.04	0.000294	1.81	1355.12	301.03	0.10
Stream F	Reach 01	12185	Culvert									
Stream F	Reach 01	12153	590.00	692.21	702.00		702.09	0.000981	2.50	243.94	52.01	0.17
Stream F	Reach 01	12153	919.00	692.21	705.21		705.26	0.000353	1.95	656.21	243.16	0.11
Stream F	Reach 01	12153	1127.00	692.21	705.79		705.83	0.000339	1.98	810.17	284.55	0.11
Stream F	Reach 01	12153	1356.00	692.21	706.10		706.15	0.000388	2.16	901.65	299.44	0.12
Stream F	Reach 01	12153	1561.00	692.21	706.33		706.39	0.000435	2.32	972.86	312.21	0.12
Stream F	Reach 01	12153	1776.00	692.21	706.55		706.62	0.000485	2.48	1041.50	324.04	0.13
Stream F	Reach 01	12153	1792.00	692.21	706.53		706.60	0.000501	2.52	1034.91	322.92	0.13
Stream F	Reach 01	12153	2117.00	692.21	706.81		706.89	0.000578	2.75	1126.89	338.36	0.14
Stream F	Reach 01	12086	590.00	693.53	701.93		702.02	0.001010	2.42	244.04	40.06	0.17
Stream F	Reach 01	12086	919.00	693.53	705.19		705.24	0.000368	1.90	627.13	246.79	0.11
Stream F	Reach 01	12086	1127.00	693.53	705.77		705.81	0.000342	1.91	777.74	275.18	0.11
Stream F	Reach 01	12086	1356.00	693.53	706.08		706.13	0.000385	2.06	865.88	291.28	0.11
Stream F	Reach 01	12086	1561.00	693.53	706.31		706.36	0.000426	2.20	934.62	304.88	0.12
Stream F	Reach 01	12086	1776.00	693.53	706.52		706.58	0.000467	2.34	1001.05	316.48	0.13
Stream F	Reach 01	12086	1792.00	693.53	706.50		706.56	0.000483	2.38	994.28	315.35	0.13
Stream F	Reach 01	12086	2117.00	693.53	706.78		706.85	0.000548	2.57	1083.05	330.02	0.14
Stream F	Reach 01	12042	590.00	694.00	701.75	698.65	701.94	0.003946	3.50	168.48	46.52	0.32
Stream F	Reach 01	12042	919.00	694.00	705.18	699.65	705.22	0.000473	1.82	638.27	277.70	0.12
Stream F	Reach 01	12042	1127.00	694.00	705.76	700.22	705.79	0.000394	1.76	808.72	308.84	0.12
Stream F	Reach 01	12042	1356.00	694.00	706.07	700.78	706.11	0.000428	1.88	906.99	324.76	0.12
Stream F	Reach 01	12042	1561.00	694.00	706.30	701.21	706.34	0.000464	2.00	983.16	338.84	0.13
Stream F	Reach 01	12042	1776.00	694.00	706.51	701.66	706.56	0.000502	2.12	1056.71	353.11	0.13
Stream F	Reach 01	12042	1792.00	694.00	706.49	701.69	706.54	0.000520	2.15	1048.97	351.60	0.13
Stream F	Reach 01	12042	2117.00	694.00	706.76	702.24	706.82	0.000583	2.33	1147.82	372.37	0.14
Stream F	Reach 01	11985	Culvert									
Stream F	Reach 01	11936	590.00	694.00	697.22		697.99	0.030410	7.02	84.02	39.55	0.85
Stream F	Reach 01	11936	919.00	694.00	698.18		699.00	0.025197	7.27	126.34	48.98	0.80
Stream F	Reach 01	11936	1127.00	694.00	698.64		699.52	0.023472	7.51	150.09	52.55	0.78
Stream F	Reach 01	11936	1356.00	694.00	699.11		700.04	0.022147	7.74	175.26	56.12	0.77
Stream F	Reach 01	11936	1561.00	694.00	699.48		700.46	0.021312	7.94	196.64	58.83	0.77
Stream F	Reach 01	11936	1776.00	694.00	699.84		700.87	0.020521	8.13	218.33	61.15	0.76
Stream F	Reach 01	11936	1792.00	694.00	699.86		700.90	0.020471	8.15	219.91	61.32	0.76
Stream F	Reach 01	11936	2117.00	694.00	700.37		701.47	0.019636	8.41	251.78	64.86	0.75

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream F	Reach 01	11500	590.00	688.00	692.81		692.98	0.005665	3.60	199.43	67.38	0.31
Stream F	Reach 01	11500	919.00	688.00	693.76		694.00	0.006183	4.30	267.20	75.17	0.33
Stream F	Reach 01	11500	1127.00	688.00	694.29		694.56	0.006325	4.65	307.87	79.18	0.34
Stream F	Reach 01	11500	1356.00	688.00	694.83		695.13	0.006385	4.96	351.71	83.25	0.35
Stream F	Reach 01	11500	1561.00	688.00	695.29		695.61	0.006385	5.20	390.38	86.69	0.36
Stream F	Reach 01	11500	1776.00	688.00	695.74		696.09	0.006355	5.42	430.66	90.31	0.36
Stream F	Reach 01	11500	1792.00	688.00	695.77		696.12	0.006350	5.44	433.67	90.58	0.36
Stream F	Reach 01	11500	2117.00	688.00	696.42		696.80	0.006244	5.71	493.83	95.08	0.36
Stream F	Reach 01	11231	590.00	687.00	691.46		691.58	0.004709	3.00	237.18	96.40	0.27
Stream F	Reach 01	11231	919.00	687.00	692.44		692.59	0.004357	3.38	333.89	100.64	0.28
Stream F	Reach 01	11231	1127.00	687.00	693.01		693.17	0.004120	3.55	391.98	103.12	0.27
Stream F	Reach 01	11231	1356.00	687.00	693.60		693.77	0.003901	3.70	453.47	105.83	0.27
Stream F	Reach 01	11231	1561.00	687.00	694.10		694.28	0.003741	3.83	506.53	108.13	0.27
Stream F	Reach 01	11231	1776.00	687.00	694.59		694.78	0.003601	3.95	560.58	110.46	0.27
Stream F	Reach 01	11231	1792.00	687.00	694.63		694.82	0.003590	3.96	564.63	110.63	0.27
Stream F	Reach 01	11231	2117.00	687.00	695.33		695.53	0.003426	4.12	643.19	113.92	0.26
Stream F	Reach 01	11000	590.00	686.00	689.87	688.31	690.07	0.009453	3.59	164.21	57.59	0.37
Stream F	Reach 01	11000	919.00	686.00	691.07	688.90	691.31	0.007166	3.93	235.93	79.25	0.34
Stream F	Reach 01	11000	1127.00	686.00	691.72	689.25	691.98	0.006525	4.14	277.25	90.97	0.34
Stream F	Reach 01	11000	1356.00	686.00	692.36	689.57	692.65	0.006090	4.35	320.26	103.43	0.33
Stream F	Reach 01	11000	1561.00	686.00	692.88	689.86	693.20	0.005828	4.54	357.02	112.95	0.33
Stream F	Reach 01	11000	1776.00	686.00	693.40	690.13	693.74	0.005624	4.72	394.54	122.58	0.33
Stream F	Reach 01	11000	1792.00	686.00	693.44	690.15	693.78	0.005607	4.73	397.41	123.34	0.33
Stream F	Reach 01	11000	2117.00	686.00	694.16	690.51	694.54	0.005375	4.97	452.91	135.83	0.33
Stream F	Reach 01	10771	590.00	683.00	688.75		688.86	0.002400	2.70	334.57	151.81	0.21
Stream F	Reach 01	10771	919.00	683.00	689.96		690.12	0.002737	3.32	520.05	155.51	0.23
Stream F	Reach 01	10771	1127.00	683.00	690.60		690.79	0.002915	3.65	619.76	157.05	0.24
Stream F	Reach 01	10771	1356.00	683.00	691.22		691.45	0.003096	3.98	718.75	158.57	0.25
Stream F	Reach 01	10771	1561.00	683.00	691.74		691.99	0.003245	4.25	800.33	159.85	0.26
Stream F	Reach 01	10771	1776.00	683.00	692.24		692.53	0.003386	4.52	880.98	161.24	0.27
Stream F	Reach 01	10771	1792.00	683.00	692.28		692.57	0.003392	4.54	887.22	161.36	0.27
Stream F	Reach 01	10771	2117.00	683.00	692.98		693.32	0.003582	4.91	1001.06	163.57	0.28
Stream F	Reach 01	10500	590.00	682.00	688.32		688.39	0.001823	2.48	312.92	85.47	0.18
Stream F	Reach 01	10500	919.00	682.00	689.49		689.59	0.001970	2.93	416.00	89.95	0.20
Stream F	Reach 01	10500	1127.00	682.00	690.12		690.23	0.002054	3.17	472.69	92.26	0.21
Stream F	Reach 01	10500	1356.00	682.00	690.73		690.86	0.002141	3.41	529.83	94.51	0.21

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream F	Reach 01	10500	1561.00	682.00	691.23		691.37	0.002214	3.61	577.61	96.40	0.22
Stream F	Reach 01	10500	1776.00	682.00	691.72		691.88	0.002279	3.81	625.59	98.27	0.22
Stream F	Reach 01	10500	1792.00	682.00	691.76		691.92	0.002280	3.82	629.41	98.42	0.22
Stream F	Reach 01	10500	2117.00	682.00	692.45		692.63	0.002361	4.08	699.90	106.49	0.23
Stream F	Reach 01	10078	590.00	680.00	686.69	684.51	686.95	0.008276	4.12	148.09	45.01	0.36
Stream F	Reach 01	10078	919.00	680.00	687.56	685.41	687.96	0.010065	5.18	190.13	51.78	0.41
Stream F	Reach 01	10078	1127.00	680.00	688.01	685.86	688.50	0.010990	5.74	214.34	72.57	0.44
Stream F	Reach 01	10078	1356.00	680.00	688.44	686.31	689.03	0.011948	6.30	238.97	89.03	0.46
Stream F	Reach 01	10078	1561.00	680.00	688.80	686.70	689.47	0.012655	6.75	260.44	101.56	0.48
Stream F	Reach 01	10078	1776.00	680.00	689.16	687.08	689.90	0.013191	7.16	283.22	112.08	0.49
Stream F	Reach 01	10078	1792.00	680.00	689.19	687.10	689.94	0.013223	7.18	284.94	112.91	0.50
Stream F	Reach 01	10078	2117.00	680.00	689.76	687.63	690.59	0.013421	7.65	323.00	131.95	0.51
Stream F	Reach 01	9884	590.00	680.00	684.59		684.90	0.014006	5.07	163.81	86.20	0.47
Stream F	Reach 01	9884	919.00	680.00	685.49		685.81	0.012049	5.46	248.33	102.29	0.45
Stream F	Reach 01	9884	1127.00	680.00	686.00		686.32	0.010903	5.58	303.53	111.59	0.44
Stream F	Reach 01	9884	1356.00	680.00	686.58		686.89	0.009459	5.59	371.12	122.02	0.42
Stream F	Reach 01	9884	1561.00	680.00	687.11		687.40	0.008204	5.53	438.03	131.53	0.39
Stream F	Reach 01	9884	1776.00	680.00	687.67		687.95	0.006994	5.41	515.51	141.75	0.37
Stream F	Reach 01	9884	1792.00	680.00	687.72		687.99	0.006917	5.41	521.35	142.49	0.37
Stream F	Reach 01	9884	2117.00	680.00	688.63		688.86	0.005282	5.14	659.12	158.96	0.33
Stream F	Reach 01	9500	590.00	676.00	681.79		681.95	0.004724	3.28	197.87	69.28	0.28
Stream F	Reach 01	9500	919.00	676.00	683.22		683.40	0.003739	3.54	319.39	101.97	0.26
Stream F	Reach 01	9500	1127.00	676.00	684.09		684.25	0.003102	3.54	416.52	122.90	0.24
Stream F	Reach 01	9500	1356.00	676.00	685.03		685.18	0.002476	3.46	543.17	145.96	0.22
Stream F	Reach 01	9500	1561.00	676.00	685.79		685.93	0.002102	3.40	662.26	165.70	0.21
Stream F	Reach 01	9500	1776.00	676.00	686.56		686.69	0.001794	3.33	797.95	187.60	0.20
Stream F	Reach 01	9500	1792.00	676.00	686.61		686.74	0.001778	3.33	807.80	189.29	0.19
Stream F	Reach 01	9500	2117.00	676.00	687.78		687.89	0.001394	3.20	1053.54	232.06	0.18
Stream F	Reach 01	9099	619.00	676.00	681.04	677.79	681.08	0.001189	1.52	417.70	131.45	0.14
Stream F	Reach 01	9099	974.00	676.00	682.75	678.31	682.79	0.000761	1.57	660.70	153.51	0.12
Stream F	Reach 01	9099	1196.00	676.00	683.71	678.59	683.74	0.000631	1.59	813.13	165.94	0.11
Stream F	Reach 01	9099	1451.00	676.00	684.72	678.87	684.75	0.000536	1.62	987.73	180.11	0.11
Stream F	Reach 01	9099	1664.00	676.00	685.52	679.10	685.56	0.000476	1.64	1137.33	191.77	0.10
Stream F	Reach 01	9099	1883.00	676.00	686.32	679.31	686.36	0.000425	1.65	1295.78	203.62	0.10
Stream F	Reach 01	9099	1898.00	676.00	686.38	679.34	686.41	0.000422	1.65	1306.83	204.46	0.10
Stream F	Reach 01	9099	2239.00	676.00	687.58	679.65	687.62	0.000360	1.65	1564.96	222.96	0.09

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream F	Reach 01	8995	Culvert									
Stream F	Reach 01	8962	619.00	674.00	680.32		680.46	0.004675	2.99	207.26	57.00	0.27
Stream F	Reach 01	8962	974.00	674.00	681.52		681.72	0.004527	3.54	282.69	67.69	0.28
Stream F	Reach 01	8962	1196.00	674.00	682.15		682.37	0.004524	3.83	326.60	73.02	0.29
Stream F	Reach 01	8962	1451.00	674.00	682.75		683.01	0.004647	4.15	372.21	79.19	0.29
Stream F	Reach 01	8962	1664.00	674.00	683.20		683.49	0.004772	4.41	409.40	87.13	0.30
Stream F	Reach 01	8962	1883.00	674.00	683.62		683.94	0.004862	4.64	447.61	91.69	0.31
Stream F	Reach 01	8962	1898.00	674.00	683.65		683.97	0.004868	4.65	450.17	91.86	0.31
Stream F	Reach 01	8962	2239.00	674.00	684.25		684.62	0.005066	5.01	508.46	107.54	0.32
Stream F	Reach 01	8904	619.00	672.34	680.15		680.24	0.002702	2.49	248.93	58.97	0.21
Stream F	Reach 01	8904	974.00	672.34	681.35		681.49	0.002922	3.05	324.79	67.01	0.23
Stream F	Reach 01	8904	1196.00	672.34	681.97		682.14	0.003055	3.35	367.66	70.92	0.24
Stream F	Reach 01	8904	1451.00	672.34	682.57		682.77	0.003265	3.68	410.81	74.64	0.25
Stream F	Reach 01	8904	1664.00	672.34	683.01		683.24	0.003438	3.94	444.29	77.46	0.26
Stream F	Reach 01	8904	1883.00	672.34	683.42		683.69	0.003609	4.19	476.98	80.13	0.27
Stream F	Reach 01	8904	1898.00	672.34	683.45		683.72	0.003621	4.21	479.17	80.31	0.27
Stream F	Reach 01	8904	2239.00	672.34	684.03		684.34	0.003874	4.57	527.01	84.15	0.28
Stream F	Reach 01	8758	619.00	672.49	679.65		679.77	0.003878	2.84	218.33	54.33	0.25
Stream F	Reach 01	8758	974.00	672.49	680.80		680.98	0.004164	3.46	285.62	62.63	0.27
Stream F	Reach 01	8758	1196.00	672.49	681.39		681.61	0.004337	3.79	323.97	67.17	0.28
Stream F	Reach 01	8758	1451.00	672.49	681.93		682.20	0.004673	4.18	361.53	71.38	0.29
Stream F	Reach 01	8758	1664.00	672.49	682.33		682.64	0.004975	4.49	390.90	77.87	0.31
Stream F	Reach 01	8758	1883.00	672.49	682.70		683.05	0.005261	4.79	421.11	84.74	0.32
Stream F	Reach 01	8758	1898.00	672.49	682.72		683.07	0.005280	4.81	423.18	85.19	0.32
Stream F	Reach 01	8758	2239.00	672.49	683.25		683.66	0.005677	5.23	470.13	95.01	0.33
Stream F	Reach 01	8500	619.00	672.00	678.39		678.54	0.005956	3.13	197.84	59.78	0.30
Stream F	Reach 01	8500	974.00	672.00	679.39		679.61	0.007067	3.70	262.93	70.18	0.34
Stream F	Reach 01	8500	1196.00	672.00	679.92		680.16	0.007529	3.97	301.07	75.93	0.35
Stream F	Reach 01	8500	1451.00	672.00	680.43		680.70	0.007380	4.23	357.50	122.28	0.35
Stream F	Reach 01	8500	1664.00	672.00	680.81		681.11	0.007156	4.40	408.35	139.12	0.35
Stream F	Reach 01	8500	1883.00	672.00	681.18		681.49	0.006905	4.55	460.90	145.38	0.35
Stream F	Reach 01	8500	1898.00	672.00	681.20		681.51	0.006888	4.55	464.46	145.73	0.35
Stream F	Reach 01	8500	2239.00	672.00	681.73		682.06	0.006537	4.73	543.71	152.92	0.35
Stream F	Reach 01	8234	619.00	671.00	677.25		677.33	0.003489	2.25	277.19	97.30	0.23
Stream F	Reach 01	8234	974.00	671.00	678.21		678.32	0.003383	2.67	372.39	101.59	0.24
Stream F	Reach 01	8234	1196.00	671.00	678.69		678.82	0.003441	2.91	422.18	103.77	0.24

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream F	Reach 01	8234	1451.00	671.00	679.21		679.36	0.003473	3.15	476.64	106.27	0.25
Stream F	Reach 01	8234	1664.00	671.00	679.61		679.77	0.003518	3.33	518.68	108.17	0.25
Stream F	Reach 01	8234	1883.00	671.00	679.98		680.17	0.003572	3.51	559.41	110.01	0.26
Stream F	Reach 01	8234	1898.00	671.00	680.00		680.19	0.003576	3.52	562.11	110.14	0.26
Stream F	Reach 01	8234	2239.00	671.00	680.53		680.75	0.003674	3.79	621.49	113.88	0.27
Stream F	Reach 01	8000	619.00	670.00	676.52		676.62	0.002678	2.63	275.86	91.98	0.22
Stream F	Reach 01	8000	974.00	670.00	677.38		677.53	0.003349	3.30	358.32	99.25	0.25
Stream F	Reach 01	8000	1196.00	670.00	677.79		677.97	0.003819	3.70	399.90	105.48	0.27
Stream F	Reach 01	8000	1451.00	670.00	678.26		678.48	0.004108	4.03	451.92	111.32	0.28
Stream F	Reach 01	8000	1664.00	670.00	678.63		678.86	0.004279	4.27	492.64	113.15	0.29
Stream F	Reach 01	8000	1883.00	670.00	678.97		679.23	0.004447	4.50	531.77	114.88	0.30
Stream F	Reach 01	8000	1898.00	670.00	678.99		679.25	0.004458	4.52	534.36	114.99	0.30
Stream F	Reach 01	8000	2239.00	670.00	679.48		679.77	0.004703	4.85	590.87	117.46	0.31
Stream F	Reach 01	7500	619.00	668.65	673.35		673.65	0.022149	4.34	142.52	71.41	0.54
Stream F	Reach 01	7500	974.00	668.65	674.83		674.99	0.008502	3.27	310.50	137.36	0.35
Stream F	Reach 01	7500	1196.00	668.65	675.62		675.75	0.005150	3.02	422.38	147.33	0.29
Stream F	Reach 01	7500	1451.00	668.65	676.21		676.35	0.004331	3.08	513.36	160.53	0.27
Stream F	Reach 01	7500	1664.00	668.65	676.58		676.73	0.004145	3.20	575.34	169.83	0.27
Stream F	Reach 01	7500	1883.00	668.65	676.91		677.07	0.004076	3.33	632.13	175.12	0.27
Stream F	Reach 01	7500	1898.00	668.65	676.93		677.09	0.004078	3.34	635.59	175.38	0.27
Stream F	Reach 01	7500	2239.00	668.65	677.36		677.54	0.004120	3.55	711.99	180.96	0.27
Stream F	Reach 01	7000	619.00	666.00	672.15		672.19	0.001019	1.60	404.45	113.09	0.13
Stream F	Reach 01	7000	974.00	666.00	674.09		674.13	0.000683	1.66	650.17	141.06	0.12
Stream F	Reach 01	7000	1196.00	666.00	674.99		675.04	0.000625	1.74	784.83	156.53	0.11
Stream F	Reach 01	7000	1451.00	666.00	675.57		675.62	0.000686	1.92	877.79	166.60	0.12
Stream F	Reach 01	7000	1664.00	666.00	675.89		675.95	0.000771	2.09	932.85	172.41	0.13
Stream F	Reach 01	7000	1883.00	666.00	676.16		676.23	0.000871	2.27	979.55	177.39	0.14
Stream F	Reach 01	7000	1898.00	666.00	676.17		676.25	0.000879	2.28	982.15	177.68	0.14
Stream F	Reach 01	7000	2239.00	666.00	676.49		676.58	0.001058	2.56	1039.52	183.96	0.15
Stream F	Reach 01	6847	619.00	664.46	671.81	668.39	671.92	0.003622	2.56	253.41	112.45	0.24
Stream F	Reach 01	6847	974.00	664.46	673.92	669.34	673.98	0.001364	2.14	582.53	190.24	0.16
Stream F	Reach 01	6847	1196.00	664.46	674.86	669.82	674.91	0.001033	2.06	773.20	214.98	0.14
Stream F	Reach 01	6847	1451.00	664.46	675.43	670.27	675.49	0.001041	2.19	900.48	229.43	0.14
Stream F	Reach 01	6847	1664.00	664.46	675.75	670.64	675.81	0.001123	2.34	973.66	236.72	0.15
Stream F	Reach 01	6847	1883.00	664.46	676.00	670.94	676.07	0.001233	2.51	1034.20	242.40	0.16
Stream F	Reach 01	6847	1898.00	664.46	676.01	670.96	676.09	0.001243	2.52	1037.46	242.70	0.16
Stream F	Reach 01	6847	2239.00	664.46	676.30	671.55	676.39	0.001459	2.80	1108.70	249.35	0.17

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream F	Reach 01	6750	Culvert									
Stream F	Reach 01	6690	619.00	662.00	667.12		667.26	0.004513	2.99	207.31	54.12	0.27
Stream F	Reach 01	6690	974.00	662.00	668.19		668.39	0.005500	3.63	268.31	60.45	0.30
Stream F	Reach 01	6690	1196.00	662.00	668.74		668.98	0.006039	3.95	302.44	64.25	0.32
Stream F	Reach 01	6690	1451.00	662.00	669.29		669.57	0.006549	4.28	338.98	69.91	0.34
Stream F	Reach 01	6690	1664.00	662.00	669.67		669.99	0.006790	4.54	371.90	99.90	0.35
Stream F	Reach 01	6690	1883.00	662.00	670.02		670.36	0.006895	4.75	408.21	109.43	0.35
Stream F	Reach 01	6690	1898.00	662.00	670.04		670.38	0.006898	4.76	410.63	110.15	0.35
Stream F	Reach 01	6690	2239.00	662.00	670.52		670.90	0.006865	5.02	468.01	128.24	0.36
Stream F	Reach 01	6500	619.00	662.00	665.51		665.78	0.016151	4.15	149.10	62.62	0.47
Stream F	Reach 01	6500	974.00	662.00	666.32		666.68	0.017151	4.79	203.44	72.07	0.50
Stream F	Reach 01	6500	1196.00	662.00	666.72		667.13	0.017876	5.13	233.25	76.88	0.52
Stream F	Reach 01	6500	1451.00	662.00	667.15		667.61	0.018280	5.43	267.46	82.40	0.53
Stream F	Reach 01	6500	1664.00	662.00	667.49		667.98	0.018286	5.62	295.90	86.41	0.54
Stream F	Reach 01	6500	1883.00	662.00	667.81		668.34	0.018202	5.80	324.75	90.27	0.54
Stream F	Reach 01	6500	1898.00	662.00	667.83		668.36	0.018195	5.81	326.70	90.53	0.54
Stream F	Reach 01	6500	2239.00	662.00	668.33		668.89	0.017995	6.00	373.24	97.83	0.54
Stream F	Reach 01	6000	619.00	657.56	661.06		661.17	0.005855	2.69	230.48	87.77	0.29
Stream F	Reach 01	6000	974.00	657.56	662.09		662.23	0.005313	2.99	326.50	106.48	0.29
Stream F	Reach 01	6000	1196.00	657.56	662.57		662.72	0.005098	3.20	377.89	109.39	0.29
Stream F	Reach 01	6000	1451.00	657.56	663.06		663.24	0.004953	3.42	432.51	112.41	0.29
Stream F	Reach 01	6000	1664.00	657.56	663.42		663.62	0.004925	3.60	473.89	114.59	0.29
Stream F	Reach 01	6000	1883.00	657.56	663.77		663.99	0.004917	3.78	514.26	116.69	0.30
Stream F	Reach 01	6000	1898.00	657.56	663.79		664.01	0.004917	3.79	516.95	116.83	0.30
Stream F	Reach 01	6000	2239.00	657.56	664.29		664.54	0.004938	4.05	576.10	120.70	0.30
Stream F	Reach 01	5500	619.00	654.00	659.02		659.13	0.003016	2.82	274.52	103.88	0.23
Stream F	Reach 01	5500	974.00	654.00	660.04		660.18	0.003256	3.34	395.88	133.70	0.25
Stream F	Reach 01	5500	1196.00	654.00	660.50		660.66	0.003429	3.61	459.67	141.47	0.26
Stream F	Reach 01	5500	1451.00	654.00	660.95		661.13	0.003658	3.91	524.26	148.63	0.27
Stream F	Reach 01	5500	1664.00	654.00	661.26		661.46	0.003826	4.12	572.07	150.46	0.27
Stream F	Reach 01	5500	1883.00	654.00	661.57		661.79	0.003973	4.32	618.74	152.27	0.28
Stream F	Reach 01	5500	1898.00	654.00	661.59		661.81	0.003981	4.34	621.93	152.40	0.28
Stream F	Reach 01	5500	2239.00	654.00	662.03		662.27	0.004204	4.63	688.44	154.89	0.29
Stream F	Reach 01	5000	619.00	652.00	655.19		655.71	0.026428	5.98	121.02	74.88	0.62
Stream F	Reach 01	5000	974.00	652.00	655.86	655.44	656.53	0.027278	7.00	180.03	100.76	0.66

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream F	Reach 01	5000	1196.00	652.00	656.27		656.94	0.025170	7.23	223.30	111.84	0.64
Stream F	Reach 01	5000	1451.00	652.00	656.72		657.37	0.022260	7.31	275.75	122.64	0.62
Stream F	Reach 01	5000	1664.00	652.00	657.08		657.71	0.020017	7.31	321.88	131.89	0.59
Stream F	Reach 01	5000	1883.00	652.00	657.41		658.03	0.018492	7.35	367.23	140.39	0.57
Stream F	Reach 01	5000	1898.00	652.00	657.43		658.05	0.018441	7.36	370.00	140.90	0.57
Stream F	Reach 01	5000	2239.00	652.00	657.94		658.53	0.016268	7.36	444.28	153.75	0.55
Stream F	Reach 01	4753	619.00	650.00	654.03		654.11	0.002561	2.24	275.85	113.84	0.25
Stream F	Reach 01	4753	974.00	650.00	654.89		654.99	0.002309	2.60	379.10	127.88	0.25
Stream F	Reach 01	4753	1196.00	650.00	655.37		655.49	0.002182	2.77	443.26	137.71	0.25
Stream F	Reach 01	4753	1451.00	650.00	655.88		656.01	0.002073	2.94	515.93	148.05	0.25
Stream F	Reach 01	4753	1664.00	650.00	656.28		656.42	0.002001	3.07	586.63	192.56	0.25
Stream F	Reach 01	4753	1883.00	650.00	656.66		656.81	0.001917	3.16	661.30	202.54	0.25
Stream F	Reach 01	4753	1898.00	650.00	656.67		656.82	0.001922	3.17	664.95	203.01	0.25
Stream F	Reach 01	4753	2239.00	650.00	657.25		657.41	0.001769	3.27	787.18	218.34	0.24
Stream F	Reach 01	4000	619.00	646.00	650.21		650.51	0.011731	4.33	143.33	46.01	0.42
Stream F	Reach 01	4000	974.00	646.00	651.52		651.87	0.009313	4.80	217.18	67.47	0.39
Stream F	Reach 01	4000	1196.00	646.00	652.15		652.53	0.008750	5.06	262.93	76.50	0.39
Stream F	Reach 01	4000	1451.00	646.00	652.80		653.21	0.008260	5.31	315.59	85.67	0.38
Stream F	Reach 01	4000	1664.00	646.00	653.31		653.74	0.007850	5.47	361.18	92.91	0.38
Stream F	Reach 01	4000	1883.00	646.00	653.80		654.24	0.007501	5.62	408.12	99.83	0.38
Stream F	Reach 01	4000	1898.00	646.00	653.75		654.20	0.007845	5.72	403.19	99.13	0.38
Stream F	Reach 01	4000	2239.00	646.00	654.36		654.89	0.008192	6.18	484.98	167.71	0.40
Stream F	Reach 01	3500	619.00	640.00	646.41		646.70	0.005345	4.33	142.85	35.43	0.38
Stream F	Reach 01	3500	974.00	640.00	647.52		647.95	0.006661	5.27	184.97	40.34	0.43
Stream F	Reach 01	3500	1196.00	640.00	648.29		648.76	0.006556	5.51	217.18	43.73	0.44
Stream F	Reach 01	3500	1451.00	640.00	649.16		649.65	0.006173	5.65	256.88	47.56	0.43
Stream F	Reach 01	3500	1664.00	640.00	649.72		650.25	0.006195	5.85	284.40	50.07	0.43
Stream F	Reach 01	3500	1883.00	640.00	650.04		650.65	0.006811	6.26	301.45	71.62	0.46
Stream F	Reach 01	3500	1898.00	640.00	650.69		651.18	0.004801	5.64	358.16	103.31	0.39
Stream F	Reach 01	3500	2239.00	640.00	651.85		652.29	0.003535	5.40	508.69	151.02	0.34
Stream F	Reach 01	3000	619.00	638.00	643.75		643.95	0.005567	3.60	171.73	61.67	0.38
Stream F	Reach 01	3000	974.00	638.00	645.69		645.84	0.002720	3.14	309.70	79.71	0.28
Stream F	Reach 01	3000	1196.00	638.00	647.02		647.14	0.001733	2.83	423.18	91.12	0.23
Stream F	Reach 01	3000	1451.00	638.00	648.21		648.33	0.001283	2.70	538.03	100.74	0.20
Stream F	Reach 01	3000	1664.00	638.00	648.90		649.01	0.001132	2.74	608.93	106.13	0.20
Stream F	Reach 01	3000	1883.00	638.00	649.12		649.26	0.001285	2.99	632.64	107.86	0.21
Stream F	Reach 01	3000	1898.00	638.00	650.17		650.28	0.000771	2.57	751.25	121.75	0.17

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream F	Reach 01	3000	2239.00	638.00	651.50		651.59	0.000584	2.50	952.07	187.11	0.15
Stream F	Reach 01	2515	619.00	636.00	643.44		643.47	0.000341	1.41	450.39	123.89	0.12
Stream F	Reach 01	2515	974.00	636.00	645.53		645.56	0.000201	1.41	728.77	142.62	0.10
Stream F	Reach 01	2515	1196.00	636.00	646.91		646.94	0.000146	1.38	932.16	150.38	0.09
Stream F	Reach 01	2515	1451.00	636.00	648.13		648.16	0.000124	1.40	1118.29	157.27	0.08
Stream F	Reach 01	2515	1664.00	636.00	648.82		648.85	0.000124	1.47	1229.74	165.49	0.08
Stream F	Reach 01	2515	1883.00	636.00	649.03		649.07	0.000147	1.63	1264.64	167.97	0.09
Stream F	Reach 01	2515	1898.00	636.00	650.12		650.15	0.000100	1.44	1454.45	180.87	0.08
Stream F	Reach 01	2515	2239.00	636.00	651.45		651.48	0.000089	1.47	1706.66	196.84	0.07
Stream G	T2	4000	164.00	740.00	743.15		743.37	0.017773	3.80	43.13	34.00	0.59
Stream G	T2	4000	268.00	740.00	743.62		743.92	0.019371	4.40	60.91	41.23	0.64
Stream G	T2	4000	333.00	740.00	743.86		744.20	0.019778	4.67	71.36	44.96	0.65
Stream G	T2	4000	403.00	740.00	744.06		744.45	0.020499	5.00	80.66	48.65	0.67
Stream G	T2	4000	469.00	740.00	744.21		744.66	0.020878	5.34	88.33	52.51	0.69
Stream G	T2	4000	539.00	740.00	744.35		744.86	0.021542	5.69	95.95	56.32	0.71
Stream G	T2	4000	548.00	740.00	744.37		744.88	0.021738	5.74	96.75	56.71	0.71
Stream G	T2	4000	647.00	740.00	744.54		745.13	0.022929	6.23	106.78	61.52	0.74
Stream G	T2	3500	164.00	736.00	738.01		738.18	0.006762	3.29	49.79	44.64	0.54
Stream G	T2	3500	268.00	736.00	738.40		738.63	0.006611	3.95	71.55	69.95	0.57
Stream G	T2	3500	333.00	736.00	738.58		738.85	0.006638	4.27	85.78	84.83	0.58
Stream G	T2	3500	403.00	736.00	738.75	738.30	739.05	0.006616	4.54	101.16	98.77	0.59
Stream G	T2	3500	469.00	736.00	738.89	738.48	739.21	0.006607	4.76	115.79	111.93	0.59
Stream G	T2	3500	539.00	736.00	739.03	738.69	739.36	0.006562	4.96	132.28	125.39	0.60
Stream G	T2	3500	548.00	736.00	739.04	738.71	739.38	0.006530	4.98	134.68	126.99	0.60
Stream G	T2	3500	647.00	736.00	739.23	738.89	739.59	0.006408	5.21	159.22	140.54	0.60
Stream G	T2	3000	164.00	730.00	731.94	731.92	732.43	0.023379	5.65	29.03	28.84	0.99
Stream G	T2	3000	268.00	730.00	732.38	732.38	732.97	0.023269	6.18	43.37	37.59	1.01
Stream G	T2	3000	333.00	730.00	732.59	732.59	733.23	0.022647	6.44	51.67	41.20	1.01
Stream G	T2	3000	403.00	730.00	732.79	732.79	733.48	0.022025	6.68	60.33	44.66	1.01
Stream G	T2	3000	469.00	730.00	732.96	732.96	733.70	0.021463	6.86	68.33	47.63	1.01
Stream G	T2	3000	539.00	730.00	733.13	733.13	733.90	0.021171	7.06	76.30	50.42	1.01
Stream G	T2	3000	548.00	730.00	733.14	733.14	733.93	0.021292	7.11	77.09	50.69	1.02
Stream G	T2	3000	647.00	730.00	733.46	733.46	734.16	0.021767	6.71	96.36	70.36	1.01
Stream G	T2	2444	164.00	723.71	727.60		727.75	0.004161	3.07	53.43	35.23	0.44
Stream G	T2	2444	268.00	723.71	728.90		728.98	0.001311	2.34	133.33	134.84	0.27
Stream G	T2	2444	333.00	723.71	729.27		729.34	0.001002	2.25	192.45	176.38	0.24

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream G	T2	2444	403.00	723.71	729.53		729.60	0.000901	2.27	241.26	194.20	0.23
Stream G	T2	2444	469.00	723.71	729.71		729.78	0.000890	2.34	277.21	206.35	0.23
Stream G	T2	2444	539.00	723.71	729.86		729.93	0.000906	2.44	309.92	216.42	0.23
Stream G	T2	2444	548.00	723.71	729.86		729.93	0.000939	2.48	309.56	216.31	0.24
Stream G	T2	2444	647.00	723.71	730.08		730.15	0.000940	2.59	358.59	245.62	0.24
Stream G	T2	2358	164.00	724.02	727.35	725.87	727.49	0.002306	2.99	54.76	23.71	0.35
Stream G	T2	2358	268.00	724.02	728.78	726.45	728.85	0.001575	2.13	140.56	112.66	0.28
Stream G	T2	2358	333.00	724.02	729.17	726.77	729.24	0.001232	2.14	189.56	141.52	0.26
Stream G	T2	2358	403.00	724.02	729.43	727.06	729.50	0.001217	2.29	227.70	157.32	0.26
Stream G	T2	2358	469.00	724.02	729.59	727.32	729.68	0.001303	2.48	254.53	167.55	0.27
Stream G	T2	2358	539.00	724.02	729.73	727.57	729.83	0.001431	2.69	277.99	176.01	0.29
Stream G	T2	2358	548.00	724.02	729.72	727.61	729.83	0.001494	2.74	276.70	175.55	0.29
Stream G	T2	2358	647.00	724.02	729.91	728.40	730.04	0.001630	3.00	311.43	187.45	0.31
Stream G	T2	2300	Culvert									
Stream G	T2	2230	164.00	722.80	724.65	724.52	725.06	0.016868	5.17	31.70	28.23	0.86
Stream G	T2	2230	268.00	722.80	725.03	725.03	725.62	0.022264	6.14	43.62	36.98	1.00
Stream G	T2	2230	333.00	722.80	725.27	725.27	725.87	0.022793	6.24	53.37	45.05	1.01
Stream G	T2	2230	403.00	722.80	725.49	725.49	726.10	0.022455	6.28	64.16	53.10	1.01
Stream G	T2	2230	469.00	722.80	725.65	725.65	726.28	0.022777	6.37	73.60	60.30	1.02
Stream G	T2	2230	539.00	722.80	725.82	725.82	726.46	0.020303	6.42	84.93	76.54	0.98
Stream G	T2	2230	548.00	722.80	725.85	725.85	726.48	0.019429	6.37	87.52	80.28	0.96
Stream G	T2	2230	647.00	722.80	726.16	726.16	726.67	0.012890	5.86	123.12	142.94	0.80
Stream G	T2	2098	164.00	719.90	723.22	722.93	723.39	0.009114	3.35	50.96	73.91	0.60
Stream G	T2	2098	268.00	719.90	723.57	723.26	723.77	0.007403	3.72	81.65	100.82	0.57
Stream G	T2	2098	333.00	719.90	723.75	723.40	723.95	0.006744	3.86	100.69	112.35	0.56
Stream G	T2	2098	403.00	719.90	723.87	723.57	724.11	0.006938	4.14	115.64	119.82	0.57
Stream G	T2	2098	469.00	719.90	723.98	723.68	724.24	0.007117	4.38	128.77	125.35	0.59
Stream G	T2	2098	539.00	719.90	724.10	723.80	724.37	0.007299	4.63	144.57	144.43	0.60
Stream G	T2	2098	548.00	719.90	724.11	723.81	724.39	0.007297	4.65	146.51	145.28	0.60
Stream G	T2	2098	647.00	719.90	724.27	723.92	724.56	0.007016	4.81	169.79	155.04	0.60
Stream G	T2	1998	164.00	720.00	721.44	721.44	721.97	0.023524	5.80	28.28	27.25	1.00
Stream G	T2	1998	268.00	720.00	721.89	721.89	722.54	0.021545	6.50	41.22	31.28	1.00
Stream G	T2	1998	333.00	720.00	722.23	722.23	722.79	0.022693	5.96	55.98	53.84	1.00
Stream G	T2	1998	403.00	720.00	722.44	722.44	723.00	0.018605	6.03	68.80	74.41	0.93
Stream G	T2	1998	469.00	720.00	722.60	722.60	723.17	0.016356	6.12	82.02	85.05	0.89
Stream G	T2	1998	539.00	720.00	722.75	722.75	723.33	0.014929	6.23	95.05	91.24	0.86

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream G	T2	1998	548.00	720.00	722.77	722.77	723.35	0.014831	6.25	96.56	91.93	0.86
Stream G	T2	1998	647.00	720.00	722.92	722.92	723.54	0.014508	6.56	111.04	98.21	0.86
Stream G	T2	1500	164.00	712.00	715.34	714.14	715.44	0.007139	2.60	63.11	44.54	0.38
Stream G	T2	1500	268.00	712.00	715.98	714.77	716.10	0.006899	2.77	96.59	60.50	0.39
Stream G	T2	1500	333.00	712.00	716.23	715.03	716.37	0.006526	2.96	114.50	75.46	0.39
Stream G	T2	1500	403.00	712.00	716.47		716.63	0.006232	3.14	133.83	85.02	0.38
Stream G	T2	1500	469.00	712.00	716.67		716.84	0.006094	3.30	151.58	92.94	0.39
Stream G	T2	1500	539.00	712.00	716.87		717.05	0.005960	3.45	170.61	100.74	0.39
Stream G	T2	1500	548.00	712.00	716.89		717.08	0.005945	3.47	173.06	101.70	0.39
Stream G	T2	1500	647.00	712.00	717.16		717.35	0.005695	3.63	201.59	113.17	0.39
Stream G	T2	1295	164.00	709.50	711.57	711.57	712.34	0.047222	7.03	23.70	16.35	0.98
Stream G	T2	1295	268.00	709.50	712.23	712.23	713.16	0.041734	7.84	35.48	19.87	0.96
Stream G	T2	1295	333.00	709.50	712.56	712.56	713.57	0.039511	8.22	42.47	22.13	0.95
Stream G	T2	1295	403.00	709.50	712.88	712.88	713.97	0.036119	8.58	50.48	27.39	0.93
Stream G	T2	1295	469.00	709.50	713.19	713.19	714.30	0.032616	8.76	59.49	32.31	0.90
Stream G	T2	1295	539.00	709.50	713.47	713.47	714.61	0.029983	8.94	69.43	36.98	0.88
Stream G	T2	1295	548.00	709.50	713.51	713.51	714.65	0.029698	8.96	70.73	37.55	0.87
Stream G	T2	1295	647.00	709.50	713.83	713.83	715.03	0.028243	9.30	83.68	42.80	0.87
Stream G	T2	1172	164.00	708.00	711.28	710.05	711.39	0.000386	2.66	61.68	37.94	0.37
Stream G	T2	1172	268.00	708.00	712.24	710.61	712.34	0.000255	2.53	111.93	86.36	0.31
Stream G	T2	1172	333.00	708.00	712.48	710.87	712.59	0.000268	2.78	134.95	108.87	0.32
Stream G	T2	1172	403.00	708.00	712.65	711.13	712.80	0.000299	3.09	156.92	135.19	0.35
Stream G	T2	1172	469.00	708.00	712.79	711.34	712.96	0.000328	3.36	176.72	145.05	0.37
Stream G	T2	1172	539.00	708.00	712.91	711.54	713.11	0.000369	3.67	193.45	153.23	0.39
Stream G	T2	1172	548.00	708.00	712.92	711.56	713.12	0.000374	3.71	195.56	154.46	0.39
Stream G	T2	1172	647.00	708.00	713.06	711.83	713.30	0.000432	4.11	217.26	166.17	0.43
Stream G	T2	1125	Culvert									
Stream G	T2	1081	164.00	706.00	708.31		708.60	0.001215	4.32	37.96	26.61	0.64
Stream G	T2	1081	268.00	706.00	709.02		709.35	0.000952	4.59	58.39	31.00	0.59
Stream G	T2	1081	333.00	706.00	709.35		709.71	0.000930	4.83	68.90	33.22	0.59
Stream G	T2	1081	403.00	706.00	709.64		710.05	0.000952	5.11	78.88	35.58	0.60
Stream G	T2	1081	469.00	706.00	709.88		710.32	0.000993	5.35	87.62	38.06	0.62
Stream G	T2	1081	539.00	706.00	710.08		710.57	0.001023	5.64	95.75	44.19	0.64
Stream G	T2	1081	548.00	706.00	710.10		710.60	0.001024	5.68	96.78	45.49	0.64
Stream G	T2	1081	647.00	706.00	710.33		710.91	0.001057	6.13	108.56	57.05	0.66

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream G	T2	933	164.00	704.90	707.60		708.10	0.024823	5.68	28.96	16.51	0.72
Stream G	T2	933	268.00	704.90	707.94	707.94	708.87	0.037811	7.80	35.55	22.47	0.91
Stream G	T2	933	333.00	704.90	708.37	708.37	709.26	0.029874	7.78	46.85	30.06	0.83
Stream G	T2	933	403.00	704.90	708.70	708.70	709.60	0.026606	7.94	57.91	35.97	0.80
Stream G	T2	933	469.00	704.90	708.96	708.96	709.87	0.024994	8.12	67.67	40.47	0.79
Stream G	T2	933	539.00	704.90	709.20	709.20	710.12	0.023494	8.25	78.15	44.81	0.77
Stream G	T2	933	548.00	704.90	709.23	709.23	710.15	0.023378	8.28	79.41	45.30	0.77
Stream G	T2	933	647.00	704.90	709.53	709.53	710.46	0.021993	8.47	93.62	50.53	0.76
Stream G	T2	838	164.00	704.00	707.48	705.80	707.60	0.001588	2.90	66.90	49.92	0.29
Stream G	T2	838	268.00	704.00	707.87	706.54	708.05	0.002258	3.74	105.47	151.08	0.35
Stream G	T2	838	333.00	704.00	707.95	706.91	708.18	0.003035	4.39	116.88	167.85	0.41
Stream G	T2	838	403.00	704.00	708.02	707.23	708.35	0.004239	5.26	131.02	264.07	0.48
Stream G	T2	838	469.00	704.00	708.14	707.89	708.45	0.004212	5.35	163.43	275.24	0.48
Stream G	T2	838	539.00	704.00	708.22	708.20	708.54	0.004403	5.56	187.67	282.97	0.50
Stream G	T2	838	548.00	704.00	707.84	707.84	708.62	0.010084	7.84	100.33	142.93	0.74
Stream G	T2	838	647.00	704.00	708.52	708.33	708.71	0.002882	4.72	275.78	309.46	0.41
Stream G	T2	800	Culvert									
Stream G	T2	753	164.00	703.86	706.03		706.35	0.017813	4.56	35.97	28.63	0.70
Stream G	T2	753	268.00	703.86	706.19	706.19	706.86	0.033157	6.58	41.38	36.94	0.98
Stream G	T2	753	333.00	703.86	706.48	706.48	707.15	0.026552	6.65	53.93	50.93	0.90
Stream G	T2	753	403.00	703.86	706.75	706.75	707.41	0.022231	6.72	69.96	71.38	0.84
Stream G	T2	753	469.00	703.86	706.98	706.98	707.60	0.018832	6.66	89.05	93.14	0.79
Stream G	T2	753	539.00	703.86	707.17	707.17	707.77	0.017076	6.70	108.30	110.98	0.76
Stream G	T2	753	548.00	703.86	707.18	707.18	707.79	0.017072	6.73	110.18	112.56	0.76
Stream G	T2	753	647.00	703.86	707.38	707.38	707.99	0.016263	6.92	133.85	130.79	0.76
Stream G	T2	587	164.00	698.89	700.85	700.85	701.63	0.050951	7.07	23.21	15.13	1.01
Stream G	T2	587	268.00	698.89	702.42		702.85	0.015195	5.28	50.80	20.20	0.59
Stream G	T2	587	333.00	698.89	703.27		703.63	0.010073	4.82	69.15	22.95	0.49
Stream G	T2	587	403.00	698.89	703.92		704.27	0.008460	4.75	84.82	25.07	0.46
Stream G	T2	587	469.00	698.89	704.09		704.52	0.010039	5.27	89.06	25.61	0.50
Stream G	T2	587	539.00	698.89	704.20		704.74	0.012099	5.85	92.12	26.00	0.55
Stream G	T2	587	548.00	698.89	704.21		704.76	0.012467	5.94	92.23	26.01	0.56
Stream G	T2	587	647.00	698.89	704.30		705.02	0.016266	6.85	94.50	26.29	0.64
Stream G	T2	476	164.00	698.00	701.12	699.81	701.23	0.000306	2.62	62.70	32.73	0.33
Stream G	T2	476	268.00	698.00	702.61	700.31	702.69	0.000148	2.21	122.17	50.63	0.24
Stream G	T2	476	333.00	698.00	703.44	700.57	703.50	0.000107	2.02	169.82	64.83	0.21

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream G	T2	476	403.00	698.00	704.09	700.82	704.15	0.000090	1.95	222.08	141.11	0.20
Stream G	T2	476	469.00	698.00	704.30	701.04	704.37	0.000096	2.10	253.07	148.22	0.20
Stream G	T2	476	539.00	698.00	704.48	701.26	704.56	0.000104	2.28	279.96	154.13	0.22
Stream G	T2	476	548.00	698.00	704.50	701.29	704.58	0.000106	2.30	282.08	154.67	0.22
Stream G	T2	476	647.00	698.00	704.69	701.56	704.79	0.000121	2.55	312.77	161.39	0.24
Stream G	T2	410	Culvert									
Stream G	T2	371	164.00	696.00	698.27	698.27	698.90	0.003241	6.38	25.70	20.64	1.01
Stream G	T2	371	268.00	696.00	698.78	698.78	699.61	0.003008	7.33	36.59	22.36	1.01
Stream G	T2	371	333.00	696.00	699.05	699.05	699.99	0.002906	7.77	42.88	23.28	1.01
Stream G	T2	371	403.00	696.00	699.32	699.32	700.36	0.002823	8.18	49.28	24.11	1.01
Stream G	T2	371	469.00	696.00	699.56	699.56	700.69	0.002760	8.52	55.07	24.83	1.01
Stream G	T2	371	539.00	696.00	699.80	699.80	701.01	0.002703	8.83	61.06	25.59	1.01
Stream G	T2	371	548.00	696.00	699.83	699.83	701.05	0.002696	8.86	61.82	25.69	1.01
Stream G	T2	371	647.00	696.00	700.14	700.14	701.47	0.002637	9.25	69.93	26.67	1.01
Stream G	T2	328	164.00	695.01	697.05	697.05	697.64	0.003296	6.20	26.46	22.76	1.01
Stream G	T2	328	268.00	695.01	697.54	697.54	698.29	0.003047	6.92	38.71	26.45	1.01
Stream G	T2	328	333.00	695.01	697.79	697.79	698.62	0.002964	7.34	45.37	27.73	1.01
Stream G	T2	328	403.00	695.01	698.03	698.03	698.96	0.002870	7.73	52.12	28.66	1.01
Stream G	T2	328	469.00	695.01	698.24	698.24	699.25	0.002776	8.03	58.39	29.49	1.01
Stream G	T2	328	539.00	695.01	698.45	698.45	699.53	0.002717	8.34	64.64	30.30	1.01
Stream G	T2	328	548.00	695.01	698.48	698.48	699.57	0.002711	8.38	65.43	30.40	1.01
Stream G	T2	328	647.00	695.01	698.75	698.75	699.94	0.002654	8.76	73.84	31.45	1.01
Stream G	T1	2384	172.00	668.00	669.07	669.07	669.46	0.103656	4.98	34.56	45.41	1.01
Stream G	T1	2384	287.00	668.00	669.40	669.40	669.90	0.095786	5.68	50.51	51.26	1.01
Stream G	T1	2384	360.00	668.00	669.58	669.58	670.14	0.092132	6.01	59.92	54.30	1.01
Stream G	T1	2384	439.00	668.00	669.76	669.76	670.37	0.088353	6.28	69.85	57.33	1.00
Stream G	T1	2384	513.00	668.00	669.90	669.90	670.57	0.087526	6.56	78.21	59.76	1.01
Stream G	T1	2384	589.00	668.00	670.05	670.05	670.76	0.084941	6.74	87.36	62.62	1.01
Stream G	T1	2384	598.00	668.00	670.07	670.07	670.78	0.084665	6.76	88.48	63.03	1.01
Stream G	T1	2384	710.00	668.00	670.27	670.27	671.03	0.082977	7.00	101.50	67.65	1.01
Stream G	T1	1874	172.00	661.88	667.26		667.26	0.000006	0.25	860.59	265.16	0.02
Stream G	T1	1874	287.00	661.88	668.30		668.30	0.000007	0.31	1150.19	288.34	0.02
Stream G	T1	1874	360.00	661.88	668.50		668.50	0.000010	0.37	1208.11	293.50	0.03
Stream G	T1	1874	439.00	661.88	668.69		668.69	0.000013	0.43	1262.36	298.65	0.03
Stream G	T1	1874	513.00	661.88	668.85		668.85	0.000016	0.49	1310.55	305.14	0.03
Stream G	T1	1874	589.00	661.88	668.95		668.95	0.000020	0.55	1342.50	309.37	0.04

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream G	T1	1874	598.00	661.88	669.01		669.01	0.000019	0.55	1360.70	311.75	0.04
Stream G	T1	1874	710.00	661.88	669.17		669.18	0.000025	0.64	1412.86	318.48	0.04
Stream G	T1	1719	172.00	661.28	667.25	663.22	667.26	0.000005	0.15	1063.25	316.96	0.01
Stream G	T1	1719	287.00	661.28	668.30	663.59	668.30	0.000006	0.19	1402.54	328.86	0.01
Stream G	T1	1719	360.00	661.28	668.50	663.73	668.50	0.000008	0.23	1468.11	330.49	0.02
Stream G	T1	1719	439.00	661.28	668.69	663.81	668.69	0.000010	0.26	1528.77	331.99	0.02
Stream G	T1	1719	513.00	661.28	668.84	663.86	668.85	0.000012	0.30	1581.80	333.29	0.02
Stream G	T1	1719	589.00	661.28	668.95	663.91	668.95	0.000015	0.33	1616.40	334.14	0.02
Stream G	T1	1719	598.00	661.28	669.01	663.92	669.01	0.000015	0.33	1635.99	334.62	0.02
Stream G	T1	1719	710.00	661.28	669.17	663.98	669.18	0.000019	0.38	1691.39	335.97	0.03
Stream G	T1	1630	Culvert									
Stream G	T1	1595	172.00	659.92	662.15	661.73	662.31	0.006532	3.34	63.43	148.18	0.54
Stream G	T1	1595	287.00	659.92	662.39	662.28	662.57	0.006768	3.84	99.38	152.24	0.57
Stream G	T1	1595	360.00	659.92	662.56	662.37	662.73	0.005804	3.84	125.27	154.43	0.54
Stream G	T1	1595	439.00	659.92	662.68		662.87	0.005783	4.03	144.85	156.79	0.54
Stream G	T1	1595	513.00	659.92	662.79		662.99	0.005922	4.24	161.28	163.00	0.55
Stream G	T1	1595	589.00	659.92	662.88		663.09	0.006062	4.43	176.13	165.20	0.57
Stream G	T1	1595	598.00	659.92	662.89		663.11	0.006083	4.45	177.78	165.45	0.57
Stream G	T1	1595	710.00	659.92	663.01		663.25	0.006287	4.71	197.84	168.37	0.58
Stream G	T1	1463	172.00	659.28	660.85	660.78	661.07	0.018754	4.71	52.83	91.04	0.87
Stream G	T1	1463	287.00	659.28	661.12	661.04	661.37	0.017791	5.19	80.46	111.88	0.88
Stream G	T1	1463	360.00	659.28	661.16	661.14	661.51	0.024442	6.17	84.82	114.82	1.03
Stream G	T1	1463	439.00	659.28	661.27	661.26	661.66	0.025238	6.53	97.72	123.13	1.06
Stream G	T1	1463	513.00	659.28	661.37	661.37	661.78	0.024687	6.71	111.20	131.24	1.05
Stream G	T1	1463	589.00	659.28	661.48	661.45	661.90	0.023610	6.79	125.90	139.55	1.04
Stream G	T1	1463	598.00	659.28	661.50	661.47	661.91	0.023432	6.80	127.75	140.56	1.04
Stream G	T1	1463	710.00	659.28	661.64	661.60	662.06	0.021996	6.88	148.98	150.50	1.01
Stream G	T1	1268	172.00	656.00	657.49		657.63	0.016382	2.98	57.78	63.38	0.55
Stream G	T1	1268	287.00	656.00	657.87		658.05	0.016117	3.39	84.77	77.58	0.56
Stream G	T1	1268	360.00	656.00	658.18		658.35	0.011251	3.27	113.27	102.70	0.49
Stream G	T1	1268	439.00	656.00	658.37	657.75	658.55	0.010614	3.45	133.06	109.38	0.48
Stream G	T1	1268	513.00	656.00	658.51	657.87	658.71	0.010522	3.64	149.08	114.70	0.49
Stream G	T1	1268	589.00	656.00	658.64	658.02	658.86	0.010717	3.85	163.42	119.31	0.50
Stream G	T1	1268	598.00	656.00	658.65	658.04	658.87	0.010765	3.87	164.94	119.78	0.50
Stream G	T1	1268	710.00	656.00	658.81	658.21	659.06	0.011021	4.14	184.93	125.90	0.51

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream G	T1	1218.*	172.00	655.20	656.99		657.07	0.007571	2.25	76.34	72.04	0.38
Stream G	T1	1218.*	287.00	655.20	657.38		657.50	0.007583	2.69	109.13	97.93	0.40
Stream G	T1	1218.*	360.00	655.20	656.88	656.81	657.31	0.045191	5.27	68.25	67.95	0.93
Stream G	T1	1218.*	439.00	655.20	656.97	656.97	657.51	0.052168	5.86	74.88	71.32	1.00
Stream G	T1	1218.*	513.00	655.20	657.10	657.10	657.68	0.051081	6.11	84.06	75.75	1.01
Stream G	T1	1218.*	589.00	655.20	657.24	657.24	657.84	0.046606	6.21	95.45	88.64	0.98
Stream G	T1	1218.*	598.00	655.20	657.26	657.26	657.86	0.045820	6.21	97.04	92.98	0.97
Stream G	T1	1218.*	710.00	655.20	657.43	657.43	658.06	0.041069	6.41	113.96	99.71	0.94
Stream G	T1	768	172.00	648.00	649.30	649.30	649.78	0.054688	5.58	30.82	32.32	1.01
Stream G	T1	768	287.00	648.00	649.76	649.76	650.33	0.051233	6.04	47.50	42.10	1.00
Stream G	T1	768	360.00	648.00	650.85		651.00	0.006614	3.22	119.02	82.64	0.40
Stream G	T1	768	439.00	648.00	651.20		651.34	0.005202	3.18	149.54	92.68	0.36
Stream G	T1	768	513.00	648.00	651.38		651.54	0.005263	3.35	166.64	97.92	0.37
Stream G	T1	768	589.00	648.00	651.45		651.64	0.006170	3.70	173.92	100.21	0.40
Stream G	T1	768	598.00	648.00	651.68		651.83	0.004510	3.34	197.27	107.36	0.35
Stream G	T1	768	710.00	648.00	651.92		652.09	0.004456	3.51	224.56	114.69	0.35
Stream G	Reach 01	14042	164.00	732.00	734.74	734.47	734.97	0.005847	4.24	51.89	72.54	0.54
Stream G	Reach 01	14042	268.00	732.00	735.12	734.92	735.36	0.005550	4.67	91.50	132.27	0.55
Stream G	Reach 01	14042	333.00	732.00	735.29	735.13	735.52	0.005323	4.79	114.92	150.17	0.54
Stream G	Reach 01	14042	403.00	732.00	735.44	735.27	735.67	0.005086	4.88	139.33	165.54	0.53
Stream G	Reach 01	14042	469.00	732.00	735.58	735.35	735.80	0.004886	4.95	163.15	183.87	0.53
Stream G	Reach 01	14042	539.00	732.00	735.71	735.43	735.93	0.004697	5.01	188.98	204.45	0.52
Stream G	Reach 01	14042	548.00	732.00	735.73	735.44	735.94	0.004667	5.01	192.03	205.57	0.52
Stream G	Reach 01	14042	647.00	732.00	735.88		736.09	0.004377	5.03	225.09	217.27	0.51
Stream G	Reach 01	13542	164.00	726.00	727.74	727.74	728.42	0.050662	6.59	24.88	18.67	1.01
Stream G	Reach 01	13542	268.00	726.00	728.30	728.30	729.16	0.047200	7.41	36.19	21.52	1.01
Stream G	Reach 01	13542	333.00	726.00	728.61	728.61	729.54	0.045479	7.76	42.94	23.12	1.00
Stream G	Reach 01	13542	403.00	726.00	728.89	728.89	729.91	0.044457	8.10	49.76	24.65	1.00
Stream G	Reach 01	13542	469.00	726.00	729.14	729.14	730.23	0.043609	8.37	56.01	25.99	1.01
Stream G	Reach 01	13542	539.00	726.00	729.38	729.38	730.54	0.042894	8.63	62.43	27.30	1.01
Stream G	Reach 01	13542	548.00	726.00	729.41	729.41	730.58	0.042813	8.67	63.24	27.46	1.01
Stream G	Reach 01	13542	647.00	726.00	729.72	729.72	730.97	0.042158	9.00	71.89	29.12	1.01
Stream G	Reach 01	13073	164.00	719.59	721.09	721.09	721.74	0.003234	6.45	25.41	19.77	1.00
Stream G	Reach 01	13073	268.00	719.59	721.61	721.61	722.47	0.002992	7.43	36.07	21.16	1.00
Stream G	Reach 01	13073	333.00	719.59	721.89	721.89	722.86	0.002916	7.91	42.09	21.90	1.01
Stream G	Reach 01	13073	403.00	719.59	722.17	722.17	723.25	0.002834	8.33	48.35	22.65	1.01
Stream G	Reach 01	13073	469.00	719.59	722.42	722.42	723.59	0.002778	8.69	53.99	23.31	1.01

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream G	Reach 01	13073	539.00	719.59	722.66	722.66	723.93	0.002724	9.01	59.80	23.96	1.01
Stream G	Reach 01	13073	548.00	719.59	722.69	722.69	723.97	0.002720	9.06	60.52	24.04	1.01
Stream G	Reach 01	13073	647.00	719.59	723.02	723.02	724.41	0.002660	9.46	68.40	24.90	1.01
Stream G	Reach 01	12906	164.00	716.00	718.38		718.56	0.000653	3.37	48.73	31.25	0.47
Stream G	Reach 01	12906	268.00	716.00	718.96		719.21	0.000650	3.97	67.43	33.29	0.49
Stream G	Reach 01	12906	333.00	716.00	719.28		719.56	0.000648	4.27	78.02	34.39	0.50
Stream G	Reach 01	12906	403.00	716.00	719.59		719.91	0.000644	4.53	88.89	35.49	0.50
Stream G	Reach 01	12906	469.00	716.00	719.86		720.21	0.000640	4.75	98.68	36.45	0.51
Stream G	Reach 01	12906	539.00	716.00	720.13		720.51	0.000638	4.96	108.62	37.40	0.51
Stream G	Reach 01	12906	548.00	716.00	720.16		720.55	0.000637	4.99	109.88	37.52	0.51
Stream G	Reach 01	12906	647.00	716.00	720.52		720.95	0.000632	5.24	123.47	38.77	0.52
Stream G	Reach 01	12884	164.00	716.00	718.38		718.54	0.000630	3.29	49.82	32.17	0.47
Stream G	Reach 01	12884	268.00	716.00	718.96		719.19	0.000621	3.86	69.41	34.65	0.48
Stream G	Reach 01	12884	333.00	716.00	719.27		719.54	0.000613	4.14	80.52	35.78	0.49
Stream G	Reach 01	12884	403.00	716.00	719.59		719.89	0.000605	4.39	91.90	36.90	0.49
Stream G	Reach 01	12884	469.00	716.00	719.86		720.19	0.000598	4.59	102.15	37.88	0.49
Stream G	Reach 01	12884	539.00	716.00	720.13		720.49	0.000592	4.79	112.64	38.85	0.50
Stream G	Reach 01	12884	548.00	716.00	720.17		720.53	0.000592	4.81	113.96	38.97	0.50
Stream G	Reach 01	12884	647.00	716.00	720.53		720.92	0.000585	5.05	128.17	40.28	0.50
Stream G	Reach 01	12768	164.00	716.47	717.80	717.80	718.36	0.003340	6.04	27.17	24.38	1.01
Stream G	Reach 01	12768	268.00	716.47	718.25	718.25	719.00	0.003056	6.97	38.44	25.76	1.01
Stream G	Reach 01	12768	333.00	716.47	718.49	718.49	719.35	0.002950	7.43	44.85	26.52	1.01
Stream G	Reach 01	12768	403.00	716.47	718.73	718.73	719.69	0.002864	7.84	51.39	27.27	1.01
Stream G	Reach 01	12768	469.00	716.47	718.95	718.95	719.99	0.002794	8.18	57.33	27.93	1.01
Stream G	Reach 01	12768	539.00	716.47	719.16	719.16	720.29	0.002736	8.50	63.38	28.60	1.01
Stream G	Reach 01	12768	548.00	716.47	719.19	719.19	720.32	0.002729	8.54	64.14	28.68	1.01
Stream G	Reach 01	12768	647.00	716.47	719.47	719.47	720.71	0.002663	8.94	72.36	29.55	1.01
Stream G	Reach 01	12613	164.00	715.11	716.95	716.95	717.57	0.003282	6.31	25.99	21.46	1.01
Stream G	Reach 01	12613	268.00	715.11	717.45	717.45	718.25	0.003027	7.19	37.26	23.64	1.01
Stream G	Reach 01	12613	333.00	715.11	717.72	717.72	718.62	0.002927	7.61	43.76	24.81	1.01
Stream G	Reach 01	12613	403.00	715.11	717.99	717.98	718.97	0.002815	7.96	50.64	26.00	1.00
Stream G	Reach 01	12613	469.00	715.11	718.29	718.23	719.28	0.002505	8.00	58.64	27.31	0.96
Stream G	Reach 01	12613	539.00	715.11	718.59	718.46	719.59	0.002252	8.03	67.15	28.63	0.92
Stream G	Reach 01	12613	548.00	715.11	718.63	718.48	719.63	0.002240	8.05	68.06	28.77	0.92
Stream G	Reach 01	12613	647.00	715.11	718.91	718.78	720.02	0.002243	8.45	76.53	30.03	0.93
Stream G	Reach 01	12444	164.00	713.20	715.95		716.28	0.010777	4.66	35.20	17.43	0.58

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream G	Reach 01	12444	268.00	713.20	716.62		717.11	0.012372	5.62	47.71	19.62	0.63
Stream G	Reach 01	12444	333.00	713.20	716.97		717.54	0.013106	6.09	54.70	20.74	0.66
Stream G	Reach 01	12444	403.00	713.20	717.34		717.98	0.013265	6.44	62.60	21.94	0.67
Stream G	Reach 01	12444	469.00	713.20	717.69		718.38	0.012847	6.65	70.58	24.04	0.67
Stream G	Reach 01	12444	539.00	713.20	718.05		718.77	0.011982	6.82	80.16	30.32	0.65
Stream G	Reach 01	12444	548.00	713.20	718.08		718.81	0.011992	6.86	81.14	31.59	0.66
Stream G	Reach 01	12444	647.00	713.20	718.33	717.49	719.19	0.013042	7.50	90.15	41.43	0.69
Stream G	Reach 01	12367	164.00	712.00	715.45		715.59	0.006492	3.00	54.67	28.61	0.38
Stream G	Reach 01	12367	268.00	712.00	716.15		716.34	0.006684	3.51	77.17	38.06	0.40
Stream G	Reach 01	12367	333.00	712.00	716.59		716.79	0.005683	3.63	96.94	52.30	0.38
Stream G	Reach 01	12367	403.00	712.00	717.10		717.29	0.004486	3.60	126.75	63.98	0.35
Stream G	Reach 01	12367	469.00	712.00	717.57		717.75	0.003644	3.54	159.57	76.98	0.32
Stream G	Reach 01	12367	539.00	712.00	718.03		718.19	0.002998	3.47	197.60	87.63	0.30
Stream G	Reach 01	12367	548.00	712.00	718.07		718.23	0.002984	3.48	201.04	88.73	0.30
Stream G	Reach 01	12367	647.00	712.00	718.37		718.55	0.003145	3.74	229.50	101.39	0.31
Stream G	Reach 01	12251	164.00	710.90	713.71	713.13	714.04	0.039765	4.62	35.53	24.22	0.67
Stream G	Reach 01	12251	268.00	710.90	715.04	713.81	715.26	0.013743	3.76	71.21	29.35	0.43
Stream G	Reach 01	12251	333.00	710.90	715.73	714.06	715.93	0.010088	3.61	92.31	32.00	0.37
Stream G	Reach 01	12251	403.00	710.90	716.43	714.32	716.62	0.007718	3.48	117.95	63.41	0.33
Stream G	Reach 01	12251	469.00	710.90	717.07	714.53	717.23	0.005412	3.24	166.94	94.41	0.29
Stream G	Reach 01	12251	539.00	710.90	717.66	714.76	717.79	0.003887	3.01	228.64	117.08	0.25
Stream G	Reach 01	12251	548.00	710.90	717.70	714.78	717.83	0.003847	3.02	233.67	118.48	0.25
Stream G	Reach 01	12251	647.00	710.90	717.99	715.07	718.13	0.004031	3.22	268.88	128.19	0.26
Stream G	Reach 01	12160	Culvert									
Stream G	Reach 01	12086	164.00	709.40	712.88	711.58	713.04	0.004766	3.27	50.15	23.66	0.40
Stream G	Reach 01	12086	268.00	709.40	713.67	712.20	713.89	0.005074	3.79	70.63	27.88	0.42
Stream G	Reach 01	12086	333.00	709.40	714.04	712.52	714.30	0.005370	4.09	81.32	29.84	0.44
Stream G	Reach 01	12086	403.00	709.40	714.40	712.82	714.69	0.005604	4.37	92.29	31.73	0.45
Stream G	Reach 01	12086	469.00	709.40	714.70	713.08	715.02	0.005804	4.60	102.01	33.32	0.46
Stream G	Reach 01	12086	539.00	709.40	714.99	713.33	715.35	0.005986	4.82	111.89	34.86	0.47
Stream G	Reach 01	12086	548.00	709.40	715.02	713.36	715.39	0.006010	4.84	113.12	35.05	0.48
Stream G	Reach 01	12086	647.00	709.40	715.38	713.69	715.79	0.006260	5.13	126.14	36.97	0.49
Stream G	Reach 01	11542	164.00	704.00	705.54	705.54	706.09	0.094161	5.96	27.52	25.32	1.01
Stream G	Reach 01	11542	268.00	704.00	706.00	706.00	706.69	0.086791	6.63	40.42	29.82	1.00
Stream G	Reach 01	11542	333.00	704.00	706.29	706.29	706.98	0.075016	6.70	49.73	36.11	1.01
Stream G	Reach 01	11542	403.00	704.00	706.53	706.53	707.25	0.069358	6.83	59.04	41.45	1.01

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream G	Reach 01	11542	469.00	704.00	706.72	706.72	707.47	0.065779	6.95	67.49	45.76	1.01
Stream G	Reach 01	11542	539.00	704.00	706.90	706.90	707.68	0.063190	7.09	76.04	49.75	1.01
Stream G	Reach 01	11542	548.00	704.00	706.92	706.92	707.71	0.062850	7.10	77.14	50.24	1.01
Stream G	Reach 01	11542	647.00	704.00	707.14	707.14	707.97	0.059864	7.28	88.87	55.19	1.01
Stream G	Reach 01	11042	164.00	698.00	700.71		700.79	0.002435	2.31	70.93	35.04	0.29
Stream G	Reach 01	11042	268.00	698.00	701.57		701.67	0.002187	2.61	102.62	38.64	0.28
Stream G	Reach 01	11042	333.00	698.00	702.04		702.16	0.002081	2.74	121.46	40.82	0.28
Stream G	Reach 01	11042	403.00	698.00	702.54		702.66	0.002066	2.82	142.99	45.90	0.28
Stream G	Reach 01	11042	469.00	698.00	702.96		703.09	0.002021	2.87	163.45	50.25	0.28
Stream G	Reach 01	11042	539.00	698.00	703.38		703.51	0.001955	2.91	185.34	54.51	0.28
Stream G	Reach 01	11042	548.00	698.00	703.43		703.56	0.001947	2.91	188.19	55.08	0.28
Stream G	Reach 01	11042	647.00	698.00	703.98		704.11	0.001854	2.95	219.68	60.97	0.27
Stream G	Reach 01	10919	164.00	697.28	699.08	699.08	699.90	0.054389	7.29	22.50	13.77	1.00
Stream G	Reach 01	10919	268.00	697.28	699.73	699.73	700.83	0.051978	8.41	31.88	14.67	1.01
Stream G	Reach 01	10919	333.00	697.28	700.09	700.09	701.34	0.051185	8.95	37.23	15.17	1.01
Stream G	Reach 01	10919	403.00	697.28	700.45	700.45	701.83	0.050455	9.43	42.74	15.66	1.01
Stream G	Reach 01	10919	469.00	697.28	700.77	700.77	702.26	0.049892	9.83	47.73	16.09	1.01
Stream G	Reach 01	10919	539.00	697.28	701.08	701.08	702.69	0.049463	10.20	52.83	16.52	1.01
Stream G	Reach 01	10919	548.00	697.28	701.12	701.12	702.75	0.049424	10.25	53.47	16.57	1.01
Stream G	Reach 01	10919	647.00	697.28	701.53	701.53	703.31	0.048775	10.70	60.49	17.14	1.00
Stream G	Reach 01	10846	Culvert									
Stream G	Reach 01	10774	164.00	695.31	698.45		698.84	0.011962	5.03	32.59	14.48	0.59
Stream G	Reach 01	10774	268.00	695.31	699.28		699.82	0.012632	5.90	45.45	16.18	0.62
Stream G	Reach 01	10774	333.00	695.31	699.75		700.36	0.012687	6.27	53.12	17.11	0.63
Stream G	Reach 01	10774	403.00	695.31	700.18	699.12	700.86	0.012879	6.64	60.72	17.99	0.64
Stream G	Reach 01	10774	469.00	695.31	700.51	699.45	701.27	0.013464	7.02	66.76	18.66	0.65
Stream G	Reach 01	10774	539.00	695.31	700.78	699.76	701.65	0.014497	7.49	71.97	19.22	0.68
Stream G	Reach 01	10774	548.00	695.31	700.81	699.80	701.70	0.014639	7.55	72.59	19.28	0.69
Stream G	Reach 01	10774	647.00	695.31	701.16	700.22	702.19	0.016037	8.16	79.33	19.98	0.72
Stream G	Reach 01	10669	164.00	694.28	697.00		697.34	0.016889	4.67	35.10	18.80	0.60
Stream G	Reach 01	10669	268.00	694.28	697.45		698.03	0.024293	6.11	43.88	20.56	0.74
Stream G	Reach 01	10669	333.00	694.28	697.64		698.39	0.029721	6.98	47.74	21.29	0.82
Stream G	Reach 01	10669	403.00	694.28	697.84	697.61	698.77	0.033924	7.71	52.27	22.12	0.88
Stream G	Reach 01	10669	469.00	694.28	698.11	697.88	699.11	0.034206	8.06	58.21	23.15	0.90
Stream G	Reach 01	10669	539.00	694.28	698.45	698.15	699.47	0.031654	8.13	66.30	24.49	0.87
Stream G	Reach 01	10669	548.00	694.28	698.49	698.18	699.52	0.031301	8.13	67.39	24.67	0.87

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream G	Reach 01	10669	647.00	694.28	698.93		699.98	0.028766	8.24	78.53	26.39	0.84
Stream G	Reach 01	10579	164.00	692.92	695.18	694.80	695.52	0.024763	4.69	34.97	25.62	0.71
Stream G	Reach 01	10579	268.00	692.92	696.24	695.33	696.48	0.011425	3.92	68.30	36.63	0.51
Stream G	Reach 01	10579	333.00	692.92	696.81	695.60	697.02	0.007617	3.70	90.50	42.35	0.43
Stream G	Reach 01	10579	403.00	692.92	697.36	695.85	697.56	0.005372	3.59	115.64	48.34	0.37
Stream G	Reach 01	10579	469.00	692.92	697.84	696.06	698.03	0.004235	3.53	140.27	54.68	0.34
Stream G	Reach 01	10579	539.00	692.92	698.34	696.26	698.52	0.003419	3.48	176.91	96.67	0.31
Stream G	Reach 01	10579	548.00	692.92	698.40	696.29	698.58	0.003321	3.46	183.21	103.53	0.31
Stream G	Reach 01	10579	647.00	692.92	699.05	696.52	699.19	0.002369	3.24	276.90	182.24	0.27
Stream G	Reach 01	10505	Culvert									
Stream G	Reach 01	10465	164.00	692.77	694.05	694.05	694.54	0.024504	5.66	28.97	29.52	1.01
Stream G	Reach 01	10465	268.00	692.77	694.44	694.44	695.11	0.022258	6.57	40.78	30.69	1.00
Stream G	Reach 01	10465	333.00	692.77	694.65	694.65	695.42	0.021453	7.02	47.43	31.34	1.01
Stream G	Reach 01	10465	403.00	692.77	694.87	694.87	695.73	0.020832	7.44	54.17	31.97	1.01
Stream G	Reach 01	10465	469.00	692.77	695.06	695.06	696.00	0.020268	7.78	60.31	32.54	1.01
Stream G	Reach 01	10465	539.00	692.77	695.25	695.25	696.27	0.019837	8.10	66.52	33.11	1.01
Stream G	Reach 01	10465	548.00	692.77	695.27	695.27	696.30	0.019786	8.14	67.31	33.18	1.01
Stream G	Reach 01	10465	647.00	692.77	695.52	695.52	696.65	0.019245	8.54	75.77	33.93	1.01
Stream G	Reach 02	9926	346.00	688.00	692.03		692.19	0.002495	3.36	110.76	51.98	0.32
Stream G	Reach 02	9926	566.00	688.00	692.73		692.96	0.002889	4.09	152.88	67.88	0.35
Stream G	Reach 02	9926	707.00	688.00	693.04		693.31	0.003188	4.50	174.48	74.55	0.37
Stream G	Reach 02	9926	869.00	688.00	693.38		693.68	0.003308	4.81	201.24	82.01	0.39
Stream G	Reach 02	9926	1026.00	688.00	693.65		693.99	0.003467	5.11	224.11	87.82	0.40
Stream G	Reach 02	9926	1181.00	688.00	693.85		694.23	0.003734	5.44	242.22	92.10	0.42
Stream G	Reach 02	9926	1200.00	688.00	693.88		694.27	0.003755	5.47	244.64	92.65	0.42
Stream G	Reach 02	9926	1464.00	688.00	694.16		694.63	0.004261	6.03	272.25	100.64	0.45
Stream G	Reach 02	9426	346.00	686.53	688.92	688.71	689.18	0.029664	4.72	106.94	123.95	0.62
Stream G	Reach 02	9426	566.00	686.53	689.35	688.98	689.64	0.028329	5.31	173.89	175.52	0.63
Stream G	Reach 02	9426	707.00	686.53	689.61	689.32	689.88	0.024369	5.30	221.83	194.91	0.59
Stream G	Reach 02	9426	869.00	686.53	689.76	689.50	690.06	0.026766	5.77	251.54	205.40	0.63
Stream G	Reach 02	9426	1026.00	686.53	689.92	689.64	690.24	0.026741	6.01	286.23	215.67	0.63
Stream G	Reach 02	9426	1181.00	686.53	690.17	689.74	690.45	0.022172	5.79	340.01	221.99	0.58
Stream G	Reach 02	9426	1200.00	686.53	690.19	689.76	690.47	0.022085	5.80	344.47	222.51	0.58
Stream G	Reach 02	9426	1464.00	686.53	690.64		690.88	0.015692	5.36	448.78	234.11	0.50
Stream G	Reach 02	8926	346.00	680.00	684.49		684.55	0.004381	1.97	187.91	138.53	0.24

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream G	Reach 02	8926	566.00	680.00	685.12		685.20	0.004198	2.31	294.07	199.98	0.25
Stream G	Reach 02	8926	707.00	680.00	685.39		685.48	0.004406	2.52	350.29	219.73	0.26
Stream G	Reach 02	8926	869.00	680.00	685.77		685.85	0.003967	2.59	437.98	245.77	0.25
Stream G	Reach 02	8926	1026.00	680.00	686.06		686.15	0.003824	2.69	513.77	269.56	0.25
Stream G	Reach 02	8926	1181.00	680.00	686.21		686.31	0.004219	2.90	554.26	277.21	0.26
Stream G	Reach 02	8926	1200.00	680.00	686.24		686.34	0.004215	2.92	561.85	278.62	0.26
Stream G	Reach 02	8926	1464.00	680.00	686.34		686.48	0.005557	3.41	590.53	283.89	0.30
Stream G	Reach 02	8426	346.00	678.00	681.60		681.69	0.007773	2.30	150.71	90.46	0.31
Stream G	Reach 02	8426	566.00	678.00	682.18		682.29	0.008488	2.70	216.91	158.73	0.34
Stream G	Reach 02	8426	707.00	678.00	682.50		682.62	0.007681	2.84	271.16	179.66	0.33
Stream G	Reach 02	8426	869.00	678.00	682.51		682.69	0.011436	3.47	272.80	180.26	0.40
Stream G	Reach 02	8426	1026.00	678.00	682.58		682.81	0.014394	3.97	284.46	184.43	0.45
Stream G	Reach 02	8426	1181.00	678.00	683.03		683.22	0.009825	3.68	375.85	224.48	0.39
Stream G	Reach 02	8426	1200.00	678.00	683.05		683.24	0.009897	3.71	379.90	226.48	0.39
Stream G	Reach 02	8426	1464.00	678.00	684.30		684.39	0.003224	2.70	712.48	302.32	0.23
Stream G	Reach 02	7926	346.00	676.00	679.24		679.28	0.003214	2.08	253.29	186.92	0.27
Stream G	Reach 02	7926	566.00	676.00	679.86		679.90	0.003023	2.15	376.21	220.49	0.27
Stream G	Reach 02	7926	707.00	676.00	680.29		680.35	0.002972	2.37	513.05	357.72	0.27
Stream G	Reach 02	7926	869.00	676.00	680.86		680.89	0.001682	2.05	715.63	364.61	0.21
Stream G	Reach 02	7926	1026.00	676.00	681.63		681.65	0.000847	1.71	1004.36	384.15	0.16
Stream G	Reach 02	7926	1181.00	676.00	682.57		682.58	0.000430	1.41	1423.99	490.14	0.12
Stream G	Reach 02	7926	1200.00	676.00	682.57		682.59	0.000441	1.43	1426.87	490.25	0.12
Stream G	Reach 02	7926	1464.00	676.00	684.10		684.11	0.000194	1.15	2204.49	524.49	0.08
Stream G	Reach 02	7651	346.00	674.00	677.36		677.66	0.013345	4.45	81.65	72.83	0.56
Stream G	Reach 02	7651	566.00	674.00	677.97	677.29	678.37	0.012789	5.22	137.68	116.05	0.57
Stream G	Reach 02	7651	707.00	674.00	677.98	677.68	678.59	0.019875	6.51	137.98	116.39	0.71
Stream G	Reach 02	7651	869.00	674.00	680.29		680.39	0.001933	3.11	548.14	345.83	0.25
Stream G	Reach 02	7651	1026.00	674.00	681.38		681.43	0.000785	2.27	977.61	407.97	0.16
Stream G	Reach 02	7651	1181.00	674.00	682.45		682.47	0.000387	1.78	1421.16	425.78	0.12
Stream G	Reach 02	7651	1200.00	674.00	682.45		682.47	0.000399	1.80	1422.17	425.83	0.12
Stream G	Reach 02	7651	1464.00	674.00	684.05		684.06	0.000192	1.43	2123.64	449.50	0.09
Stream G	Reach 02	7426	346.00	672.00	674.99		675.19	0.008994	3.67	103.16	73.78	0.46
Stream G	Reach 02	7426	566.00	672.00	675.46		675.74	0.010394	4.54	139.69	84.27	0.51
Stream G	Reach 02	7426	707.00	672.00	677.88		677.93	0.000787	1.98	435.51	151.43	0.16
Stream G	Reach 02	7426	869.00	672.00	680.24		680.26	0.000198	1.30	849.94	211.38	0.09
Stream G	Reach 02	7426	1026.00	672.00	681.33		681.35	0.000153	1.25	1122.11	291.87	0.08
Stream G	Reach 02	7426	1181.00	672.00	682.41		682.42	0.000116	1.18	1505.44	415.72	0.07

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream G	Reach 02	5960	426.00	660.29	665.75		665.89	0.004501	2.94	144.92	37.34	0.26
Stream G	Reach 02	5960	703.00	660.29	668.23		668.35	0.002741	2.83	248.56	46.39	0.21
Stream G	Reach 02	5960	883.00	660.29	668.90		669.05	0.003016	3.15	280.25	48.28	0.23
Stream G	Reach 02	5960	988.00	660.29	669.15		669.32	0.003325	3.38	292.51	48.99	0.24
Stream G	Reach 02	5960	1032.00	660.29	669.25		669.44	0.003445	3.48	297.54	50.46	0.25
Stream G	Reach 02	5960	1074.00	660.29	669.34		669.54	0.003557	3.57	302.19	54.32	0.25
Stream G	Reach 02	5960	1074.00	660.29	669.34		669.54	0.003557	3.57	302.19	54.32	0.25
Stream G	Reach 02	5960	1152.00	660.29	669.49		669.71	0.003774	3.73	311.00	60.96	0.26
Stream G	Reach 02	5911	426.00	659.70	665.64		665.72	0.002195	2.40	207.68	62.26	0.19
Stream G	Reach 02	5911	703.00	659.70	668.18		668.25	0.001120	2.27	396.44	86.19	0.15
Stream G	Reach 02	5911	883.00	659.70	668.86		668.93	0.001235	2.53	456.52	92.71	0.16
Stream G	Reach 02	5911	988.00	659.70	669.11		669.20	0.001361	2.71	480.13	95.21	0.17
Stream G	Reach 02	5911	1032.00	659.70	669.21		669.30	0.001412	2.79	489.89	96.23	0.17
Stream G	Reach 02	5911	1074.00	659.70	669.30		669.40	0.001464	2.86	498.46	97.11	0.17
Stream G	Reach 02	5911	1074.00	659.70	669.30		669.40	0.001464	2.86	498.46	97.11	0.17
Stream G	Reach 02	5911	1152.00	659.70	669.45		669.56	0.001566	2.99	513.39	98.89	0.18
Stream G	Reach 02	5767	426.00	658.58	665.30		665.39	0.002465	2.29	186.38	45.40	0.20
Stream G	Reach 02	5767	703.00	658.58	668.00		668.07	0.001377	2.13	344.90	96.54	0.16
Stream G	Reach 02	5767	883.00	658.58	668.66		668.74	0.001461	2.32	418.21	126.92	0.16
Stream G	Reach 02	5767	988.00	658.58	668.90		668.99	0.001576	2.46	450.01	141.19	0.17
Stream G	Reach 02	5767	1032.00	658.58	668.99		669.08	0.001618	2.51	463.96	149.31	0.17
Stream G	Reach 02	5767	1074.00	658.58	669.08		669.17	0.001659	2.55	476.58	154.57	0.18
Stream G	Reach 02	5767	1074.00	658.58	669.08		669.17	0.001659	2.55	476.58	154.57	0.18
Stream G	Reach 02	5767	1152.00	658.58	669.22		669.32	0.001738	2.64	499.23	165.04	0.18
Stream G	Reach 02	5618	426.00	658.07	664.84	661.44	664.95	0.003520	2.65	162.17	52.07	0.23
Stream G	Reach 02	5618	703.00	658.07	667.82	662.37	667.88	0.001204	2.15	402.87	111.84	0.15
Stream G	Reach 02	5618	883.00	658.07	668.47	662.87	668.54	0.001301	2.37	484.11	139.78	0.15
Stream G	Reach 02	5618	988.00	658.07	668.69	663.13	668.77	0.001440	2.54	515.65	150.30	0.16
Stream G	Reach 02	5618	1032.00	658.07	668.78	663.24	668.86	0.001494	2.61	529.25	154.64	0.17
Stream G	Reach 02	5618	1074.00	658.07	668.85	663.34	668.94	0.001550	2.68	541.12	158.37	0.17
Stream G	Reach 02	5618	1074.00	658.07	668.85	663.34	668.94	0.001550	2.68	541.12	158.37	0.17
Stream G	Reach 02	5618	1152.00	658.07	668.98	663.53	669.08	0.001661	2.80	561.61	164.88	0.18
Stream G	Reach 02	5542	Culvert									
Stream G	Reach 02	5465	426.00	655.46	661.45		661.62	0.002777	3.31	134.81	44.36	0.27
Stream G	Reach 02	5465	703.00	655.46	662.58		662.81	0.003191	3.97	190.36	54.47	0.29
Stream G	Reach 02	5465	883.00	655.46	663.15		663.41	0.003346	4.27	223.00	59.92	0.30

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream G	Reach 02	5465	988.00	655.46	663.47		663.74	0.003371	4.40	242.35	62.93	0.30
Stream G	Reach 02	5465	1032.00	655.46	663.59		663.87	0.003388	4.45	250.06	64.09	0.31
Stream G	Reach 02	5465	1074.00	655.46	663.70		663.98	0.003411	4.50	257.08	65.12	0.31
Stream G	Reach 02	5465	1074.00	655.46	663.70		663.98	0.003411	4.50	257.08	65.12	0.31
Stream G	Reach 02	5465	1152.00	655.46	663.91		664.20	0.003414	4.58	271.10	68.89	0.31
Stream G	Reach 02	5334	426.00	654.42	661.02		661.21	0.003497	3.54	135.38	71.78	0.30
Stream G	Reach 02	5334	703.00	654.42	662.19		662.39	0.003092	3.91	237.07	100.45	0.30
Stream G	Reach 02	5334	883.00	654.42	662.78		662.99	0.002886	4.05	301.81	116.81	0.29
Stream G	Reach 02	5334	988.00	654.42	663.12		663.32	0.002729	4.09	342.78	126.18	0.29
Stream G	Reach 02	5334	1032.00	654.42	663.25		663.45	0.002683	4.11	359.23	129.75	0.28
Stream G	Reach 02	5334	1074.00	654.42	663.36		663.56	0.002654	4.13	374.18	132.92	0.28
Stream G	Reach 02	5334	1074.00	654.42	663.36		663.56	0.002654	4.13	374.18	132.92	0.28
Stream G	Reach 02	5334	1152.00	654.42	663.59		663.79	0.002558	4.15	404.97	139.21	0.28
Stream G	Reach 02	4926	426.00	654.00	659.24		659.42	0.005680	3.43	131.52	46.54	0.30
Stream G	Reach 02	4926	703.00	654.00	660.56		660.78	0.005185	3.95	205.88	66.38	0.30
Stream G	Reach 02	4926	883.00	654.00	661.21		661.46	0.005068	4.21	252.65	77.79	0.30
Stream G	Reach 02	4926	988.00	654.00	661.57		661.83	0.005117	4.39	283.27	97.37	0.30
Stream G	Reach 02	4926	1032.00	654.00	661.71		661.97	0.005120	4.45	297.11	106.01	0.31
Stream G	Reach 02	4926	1074.00	654.00	661.83		662.10	0.005105	4.50	310.36	112.52	0.31
Stream G	Reach 02	4926	1074.00	654.00	661.83		662.10	0.005106	4.50	310.35	112.52	0.31
Stream G	Reach 02	4926	1152.00	654.00	662.06		662.34	0.005176	4.64	343.50	174.89	0.31
Stream G	Reach 02	4426	426.00	652.00	656.53		656.68	0.005270	3.06	139.31	38.33	0.28
Stream G	Reach 02	4426	703.00	652.00	657.90		658.10	0.005539	3.61	194.77	42.96	0.30
Stream G	Reach 02	4426	883.00	652.00	658.58		658.82	0.005474	3.92	226.80	51.30	0.30
Stream G	Reach 02	4426	988.00	652.00	658.94		659.20	0.005413	4.08	246.37	58.50	0.31
Stream G	Reach 02	4426	1032.00	652.00	659.08		659.35	0.005380	4.13	254.90	61.44	0.31
Stream G	Reach 02	4426	1074.00	652.00	659.22		659.48	0.005345	4.18	263.20	64.17	0.31
Stream G	Reach 02	4426	1074.00	652.00	659.21		659.48	0.005348	4.18	263.15	64.15	0.31
Stream G	Reach 02	4426	1152.00	652.00	659.45		659.73	0.005280	4.27	278.68	68.66	0.31
Stream G	Reach 02	3926	426.00	648.00	654.07		654.20	0.004648	2.95	144.20	38.46	0.27
Stream G	Reach 02	3926	703.00	648.00	655.33		655.53	0.004765	3.63	195.87	43.30	0.28
Stream G	Reach 02	3926	883.00	648.00	656.01		656.26	0.004819	3.97	226.35	45.90	0.29
Stream G	Reach 02	3926	988.00	648.00	656.36		656.62	0.004904	4.16	242.29	47.12	0.30
Stream G	Reach 02	3926	1032.00	648.00	656.50		656.77	0.004934	4.24	248.85	47.61	0.30
Stream G	Reach 02	3926	1074.00	648.00	656.63		656.91	0.004957	4.31	255.09	48.08	0.30
Stream G	Reach 02	3926	1074.00	648.00	656.62		656.90	0.004982	4.31	254.67	48.05	0.30
Stream G	Reach 02	3926	1152.00	648.00	656.83		657.13	0.005081	4.45	265.02	48.82	0.31

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream G	Reach 02	3426	426.00	646.00	650.66		651.03	0.009043	4.90	88.98	34.91	0.49
Stream G	Reach 02	3426	703.00	646.00	651.52	650.25	652.10	0.010474	6.19	123.20	44.96	0.54
Stream G	Reach 02	3426	883.00	646.00	651.91		652.63	0.011750	6.96	141.33	49.58	0.58
Stream G	Reach 02	3426	988.00	646.00	652.17		652.95	0.011847	7.27	155.24	55.87	0.59
Stream G	Reach 02	3426	1032.00	646.00	652.28		653.08	0.011834	7.38	161.54	58.90	0.59
Stream G	Reach 02	3426	1074.00	646.00	652.38		653.20	0.011888	7.50	167.49	62.74	0.60
Stream G	Reach 02	3426	1074.00	646.00	652.41		653.22	0.011567	7.43	169.73	64.12	0.59
Stream G	Reach 02	3426	1152.00	646.00	652.62		653.44	0.011283	7.55	184.08	72.72	0.59
Stream G	Reach 02	3376.00*	426.00	645.60	650.24	648.90	650.59	0.008360	4.76	90.58	34.81	0.48
Stream G	Reach 02	3376.00*	703.00	645.60	649.79	649.79	651.12	0.038916	9.23	76.15	29.35	1.01
Stream G	Reach 02	3376.00*	883.00	645.60	650.91		651.88	0.018034	7.97	116.47	42.96	0.73
Stream G	Reach 02	3376.00*	988.00	645.60	651.24		652.23	0.016577	8.09	131.40	47.21	0.71
Stream G	Reach 02	3376.00*	1032.00	645.60	651.43		652.39	0.015299	8.01	140.47	49.61	0.69
Stream G	Reach 02	3376.00*	1074.00	645.60	651.52		652.51	0.015265	8.12	145.19	50.81	0.69
Stream G	Reach 02	3376.00*	1074.00	645.60	651.72		652.60	0.012841	7.68	155.75	53.38	0.64
Stream G	Reach 02	3376.00*	1152.00	645.60	651.97		652.85	0.012173	7.74	169.47	59.62	0.63
Stream G	Reach 02	2925	426.00	642.00	645.26		645.98	0.012583	6.78	62.84	29.22	0.81
Stream G	Reach 02	2925	703.00	642.00	649.59		649.71	0.000698	2.81	270.88	82.07	0.22
Stream G	Reach 02	2925	883.00	642.00	650.91		651.01	0.000453	2.65	397.75	111.42	0.18
Stream G	Reach 02	2925	988.00	642.00	651.25		651.36	0.000460	2.76	436.84	119.36	0.19
Stream G	Reach 02	2925	1032.00	642.00	651.44		651.54	0.000449	2.78	459.83	125.78	0.19
Stream G	Reach 02	2925	1074.00	642.00	651.53		651.64	0.000461	2.84	471.79	129.93	0.19
Stream G	Reach 02	2925	1074.00	642.00	651.73		651.84	0.000411	2.73	499.03	138.91	0.18
Stream G	Reach 02	2925	1152.00	642.00	651.98		652.09	0.000408	2.79	535.18	147.60	0.18
Stream G	Reach 02	2426	426.00	638.00	643.63		643.76	0.002002	2.92	146.12	61.05	0.33
Stream G	Reach 02	2426	703.00	638.00	649.64		649.65	0.000019	0.64	1362.08	250.16	0.04
Stream G	Reach 02	2426	883.00	638.00	650.95		650.96	0.000015	0.64	1720.26	299.73	0.04
Stream G	Reach 02	2426	988.00	638.00	651.30		651.30	0.000017	0.68	1824.85	312.13	0.04
Stream G	Reach 02	2426	1032.00	638.00	651.48		651.49	0.000017	0.69	1884.36	318.97	0.04
Stream G	Reach 02	2426	1074.00	638.00	651.58		651.59	0.000017	0.71	1915.05	322.44	0.04
Stream G	Reach 02	2426	1074.00	638.00	651.78		651.78	0.000016	0.69	1979.72	329.63	0.04
Stream G	Reach 02	2426	1152.00	638.00	652.03		652.04	0.000017	0.72	2066.53	413.48	0.04
Stream G	Reach 02	1926	426.00	636.00	643.50		643.52	0.000169	1.29	339.62	88.62	0.11
Stream G	Reach 02	1926	703.00	636.00	649.63		649.64	0.000019	0.76	1124.30	194.46	0.04
Stream G	Reach 02	1926	883.00	636.00	650.94		650.95	0.000018	0.80	1459.59	316.28	0.04
Stream G	Reach 02	1926	988.00	636.00	651.28		651.29	0.000020	0.86	1571.90	348.03	0.04

HEC-RAS Plan: Exist Locations: User Defined (Continued)

River	Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Stream G	Reach 02	1926	1032.00	636.00	651.47		651.48	0.000021	0.88	1640.89	385.24	0.04
Stream G	Reach 02	1926	1074.00	636.00	651.57		651.58	0.000022	0.91	1677.89	392.80	0.05
Stream G	Reach 02	1926	1074.00	636.00	651.77		651.77	0.000020	0.88	1757.63	405.59	0.04
Stream G	Reach 02	1926	1152.00	636.00	652.02		652.03	0.000021	0.91	1862.98	478.08	0.04
Stream G	Reach 03	1172	529.00	632.09	643.51	635.79	643.51	0.000035	0.47	1888.58	404.21	0.03
Stream G	Reach 03	1172	773.00	632.09	649.64	636.47	649.64	0.000005	0.26	4573.02	447.10	0.01
Stream G	Reach 03	1172	926.00	632.09	650.95	636.76	650.95	0.000005	0.27	5159.46	447.10	0.01
Stream G	Reach 03	1172	1086.00	632.09	651.29	637.08	651.29	0.000007	0.31	5312.00	447.10	0.01
Stream G	Reach 03	1172	1175.00	632.09	651.48	637.23	651.48	0.000007	0.33	5396.16	447.10	0.01
Stream G	Reach 03	1172	1250.00	632.09	651.57	637.36	651.57	0.000008	0.34	5438.76	447.10	0.01
Stream G	Reach 03	1172	1250.00	632.09	651.77	637.36	651.77	0.000008	0.34	5527.83	447.10	0.01
Stream G	Reach 03	1172	1447.00	632.09	652.02	638.07	652.02	0.000010	0.38	5640.58	447.10	0.02
Stream G	Reach 03	1100	Culvert									
Stream G	Reach 03	957	529.00	630.00	640.13		640.13	0.000046	0.56	1256.90	199.34	0.03
Stream G	Reach 03	957	773.00	630.00	642.41		642.41	0.000040	0.61	1735.95	224.14	0.03
Stream G	Reach 03	957	926.00	630.00	643.76		643.77	0.000036	0.62	2047.25	235.81	0.03
Stream G	Reach 03	957	1086.00	630.00	645.04		645.05	0.000034	0.64	2359.43	251.94	0.03
Stream G	Reach 03	957	1175.00	630.00	645.70		645.71	0.000033	0.65	2528.87	260.46	0.03
Stream G	Reach 03	957	1250.00	630.00	646.53		646.53	0.000030	0.64	2748.20	270.49	0.03
Stream G	Reach 03	957	1250.00	630.00	649.56		649.56	0.000014	0.50	3624.15	300.20	0.02
Stream G	Reach 03	957	1447.00	630.00	650.95		650.95	0.000014	0.52	4042.13	300.20	0.02

Appendix G – Opinion of Probable Cost

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City of Sherman
 Post Oak Creek Flood Protection Plan
 Capital Improvement Project

RPS Espey

Opinion of Probable Construction Cost

September 1, 2013

Project Name: Proposed Dam 9A
Project Number: 8 D
Detailed Description: National Resources Conservation Services type dam, located on Sand Creek, Stream B, which would impound approximately 24 acres.
Project Purpose: Impound flood flows thereby reducing peak flows and flood levels downstream of the dam.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Cut-off trench	11,111	c.y.	\$ 7.00	\$ 77,778
2	Impervious fill	45,556	c.y.	\$ 15.00	\$ 683,333
3	Random fill	207,407	c.y.	\$ 11.00	\$ 2,281,481
4	Wave action riprap	556	c.y.	\$ 100.00	\$ 55,556
5	Stilling Basin	535	c.y.	\$ 100.00	\$ 53,519
6	Chimney Drain	3,556	c.y.	\$ 50.00	\$ 177,778
7	Principal Spillway Pipe	280	l.f.	\$ 200.00	\$ 56,000
8	Principal Spillway Structure	20	c.y.	\$ 750.00	\$ 15,000
9	Temporary Erosion Control	4,520	l.f.	\$ 1.50	\$ 6,780
10	Seed & Fertilize	12	ac.	\$ 1,000.00	\$ 11,938
11	Access road	3,667	s.y.	\$ 65.00	\$ 238,333
12	Fence	4,520	l.f.	\$ 10.00	\$ 45,200
SUBTOTAL					\$ 3,703,000
CONTINGENCY 25%					\$ 926,000
Land Acquisition, Fee		45	ac.	\$ 10,000	\$ 450,000
Land Acquisition, Flood easement		100	ac.	\$ 5,000	\$ 500,000
Land Acquisition					\$ 950,000
EGR/SURVEY					\$ 815,000
PROJECT TOTAL					\$ 6,394,000

Project Name: Archer Detention Pond
Project Number: 5 D
Detailed Description: Approximately 47 ac-ft detention pond located between Archer Dr. & Sand Creek
Project Purpose: Mitigate Flooding downstream of Archer St.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Site Preparation	1	l.s.	\$ 200,000	\$ 200,000
2	Excavation & Embankment	15,000	c.y.	\$ 11.00	\$ 165,000
3	Outlet structure	1	l.s.	\$ 8,000	\$ 8,000
4	Temporary Erosion Control	1,500	l.f.	\$ 1.50	\$ 2,250
5	Seed & Fertilize	5	ac.	\$ 1,000	\$ 5,000
6	Site Access	200	s.y.	\$ 65.00	\$ 13,000
7	Fence	1,500	l.f.	\$ 10.00	\$ 15,000
8	Wetlands Mitigation	700	l.f.	\$ 250.00	\$ 175,000
SUBTOTAL					\$ 583,000
CONTINGENCY 25%					\$ 146,000
Land Acquisition					
EGR/SURVEY					\$ 128,000
PROJECT TOTAL					\$ 857,000

Project Name: Pecan St. Channel
Project Number: 20 C
Detailed Description: 30' channel w/ 1.5:1 side slopes along Post Oak Creek from Pecan St. north to the railroad.
Project Purpose: Improve conveyance and reduce flood levels along Post Oak Creek.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Site Preparation	36	sta.	\$ 500.00	\$ 18,000
2	Unclassified Channel Excavation	44,000	c.y.	\$ 10.40	\$ 457,600
3	24" Rock Riprap	19,800	c.y.	\$ 120.00	\$ 2,376,000
4	Temporary Erosion Control	7,200	l.f.	\$ 1.50	\$ 10,800
5	Hydromulch	17,600	s.y.	\$ 4.00	\$ 70,400
6	Soil Retention Blanket	59,200	s.y.	\$ 0.75	\$ 44,400
7	Wetlands Mitigation	3,600	l.f.	\$ 250.00	\$ 900,000
SUBTOTAL					\$ 3,877,000
CONTINGENCY 25%					\$ 969,000
Channel Easement					\$ 72,000
EGR/SURVEY					\$ 853,000
PROJECT TOTAL					\$ 5,771,000

Project Name: Lamar St. Channel
Project Number: 19 C
Detailed Description: 40' channel w/ 1.5:1 side slopes along Post Oak Creek from Lamar St. north to the confluence with East Fork of Post Oak Creek.
Project Purpose: Improve conveyance and reduce flood levels along Post Oak Creek.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Site Preparation	8	sta.	\$ 500.00	\$ 4,000
2	Unclassified Channel Excavation	12,000	c.y.	\$ 10.40	\$ 124,800
3	24" Rock Riprap	5,000	c.y.	\$ 120.00	\$ 600,000
4	Temporary Erosion Control	7,200	l.f.	\$ 1.50	\$ 10,800
5	Hydromulch	3,900	s.y.	\$ 4.00	\$ 15,600
6	Soil Retention Blanket	15,000	s.y.	\$ 0.75	\$ 11,250
7	Wetlands Mitigation	800	l.f.	\$ 250.00	\$ 200,000
SUBTOTAL					\$ 966,000
CONTINGENCY 25%					\$ 242,000
Channel Easement					\$ 16,000
EGR/SURVEY					\$ 213,000
PROJECT TOTAL					\$ 1,437,000

City of Sherman
 Post Oak Creek Flood Protection Plan
 Capital Improvement Project

RPS Espey

Opinion of Probable Construction Cost

September 1, 2013

Project Name: Center St. to Lamar St. Channel
Project Number: 18 C
Detailed Description: 60' channel w/ 1.5:1 side slopes along Post Oak Creek from Center St. north to Lamar St.
Project Purpose: Improve conveyance and reduce flood levels along Post Oak Creek.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Site Preparation	27	sta.	\$ 500.00	\$ 13,500
2	Unclassified Channel Excavation	409,000	c.y.	\$ 10.40	\$ 4,253,600
3	24" Rock Riprap	20,800	c.y.	\$ 120.00	\$ 2,496,000
4	Temporary Erosion Control	5,400	l.f.	\$ 1.50	\$ 8,100
5	Hydromulch	22,500	s.y.	\$ 4.00	\$ 90,000
6	Soil Retention Blanket	31,200	s.y.	\$ 0.75	\$ 23,400
7	Wetlands Mitigation	2,700	l.f.	\$ 250.00	\$ 675,000
SUBTOTAL				\$7,559,600	\$ 7,560,000
CONTINGENCY 25%					\$ 1,890,000
Channel Easement					\$ 16,000
EGR/SURVEY					\$ 1,663,000
PROJECT TOTAL					\$ 11,129,000

Project Name: Center Street at Post Oak Creek Street Improvement
Project Number: 17 B
Detailed Description: Raise the roadway 1.73', 60' wide channel w/ 1.5:1 side slopes
Project Purpose: Improve conveyance and allow Center St. bridge to pass 1% flood event.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Clearing	0.6	ac	\$ 5,000	\$ 3,000
2	Topsoil	2,500	s.y	\$ 2.40	\$ 6,000
3	Temporary Erosion Control	1,600	l.f.	\$ 1.50	\$ 2,400
4	Seed & fertilize	1	ac	\$ 2,000.00	\$ 2,800
5	Embankment	3,100	cy	\$ 10.00	\$ 31,000
6	Road Demolition	2,500	s.y	\$ 6.40	\$ 16,000
7	Pavement	700	lf	\$ 114.00	\$ 79,800
8	Bridge demolition	90	lf	\$ 250.00	\$ 22,500
9	24" Rock Riprap	500	cy	\$ 120.00	\$ 60,000
10	Filter Fabric	720	s.y	\$ 2.40	\$ 1,728
11	Bridge abutments	2	ea.	\$ 53,000	\$ 106,000
12	Bridge	120	lf	\$ 12,500	\$ 1,500,000
SUBTOTAL					\$ 1,831,000
CONTINGENCY 25%					\$ 458,000
ROW					\$ 6,000
EGR/SURVEY					\$ 403,000
PROJECT TOTAL					\$ 2,698,000

Opinion of Probable Construction Cost

September 1, 2013

Project Name: Lamar Street at Post Oak Creek Bridge Improvement
Project Number: 23 B
Detailed Description: Reconstruct bridge to accommodate 60' wide channel w/ 1.5:1 side slopes.
Project Purpose: Improve conveyance and allow Lamar St. bridge to pass 1% flood event.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Clearing	0.4	ac	\$ 5,000	\$ 2,000
2	Topsoil	2,900	s.y	\$ 2.40	\$ 6,960
3	Temporary Erosion Control	1,600	l.f.	\$ 1.50	\$ 2,400
4	Seed & fertilize	0.6	ac	\$ 2,000	\$ 1,200
5	Road Demolition	800	s.y	\$ 6.40	\$ 5,120
6	Pavement	200	lf	\$ 144.00	\$ 28,800
7	Bridge demolition	68	lf	\$ 250.00	\$ 17,000
8	24" Rock Riprap	410	cy	\$ 120.00	\$ 49,200
9	Filter Fabric	620	s.y	\$ 2.40	\$ 1,488
10	Bridge abutments	2	ea.	\$ 74,000	\$ 148,000
11	Bridge	100	lf	\$ 18,000	\$ 1,800,000
SUBTOTAL					\$ 2,062,000
CONTINGENCY 25%					\$ 516,000
ROW					\$ 6,000
EGR/SURVEY					\$ 454,000
PROJECT TOTAL					\$ 3,038,000

Project Name: Houston Street at Post Oak Creek Bridge Improvements
Project Number: 22 B
Detailed Description: Reconstruct bridge to accommodate 40' wide channel w/ 1.5:1 side slopes.
Project Purpose: Improve conveyance and allow Houston St. bridge to pass 1% flood event.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Clearing	0.2	ac	\$ 5,000	\$ 1,000
2	Topsoil	1,500	s.y	\$ 2.40	\$ 3,600
3	Temporary Erosion Control	1,600	l.f.	\$ 1.50	\$ 2,400
4	Seed & fertilize	0.4	ac	\$ 2,000	\$ 800
5	Road Demolition	800	s.y	\$ 6.40	\$ 5,120
6	Pavement	200	lf	\$ 144.00	\$ 28,800
7	Bridge demolition	68	lf	\$ 250.00	\$ 17,000
8	24" Rock Riprap	410	cy	\$ 120.00	\$ 49,200
9	Filter Fabric	620	s.y	\$ 2.40	\$ 1,488
10	Bridge abutments	2	ea.	\$ 74,000	\$ 148,000
11	Bridge	100	lf	\$ 18,000	\$ 1,800,000
SUBTOTAL					\$ 2,057,000
CONTINGENCY 25%					\$ 514,000
ROW					\$ 6,000
EGR/SURVEY					\$ 453,000
PROJECT TOTAL					\$ 3,030,000

City of Sherman
 Post Oak Creek Flood Protection Plan
 Capital Improvement Project



Opinion of Probable Construction Cost

September 1, 2013

Project Name: Washington Street at Post Oak Creek Roadway Improvements
Project Number: 26 B

Detailed Description: Raise the roadway 1.73', 30' wide channel w/ 1.5:1 side slopes.

Project Purpose: Improve conveyance and allow Washington St. bridge to pass 20% flood event.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Clearing	0.3	ac	\$ 5,000	\$ 1,500
2	Topsoil	1,000	s.y	\$ 2.40	\$ 2,400
3	Temporary Erosion Control	850	l.f.	\$ 1.50	\$ 1,275
3	Seed & Fertilize	0.3	ac	\$ 2,000.00	\$ 600
4	Embankment	800.0	cy	\$ 10.00	\$ 8,000
5	Road Demolition	1,200	s.y	\$ 6.40	\$ 7,680
6	Pavement	350	lf	\$ 144.00	\$ 50,400
7	Bridge Demolition	50	lf	\$ 250.00	\$ 12,500
8	24" Rock Riprap	230	cy	\$ 120.00	\$ 27,600
9	Filter Fabric	350	s.y	\$ 2.40	\$ 840
10	Bridge Abutments	2	ea.	\$ 53,000	\$ 106,000
11	Bridge	66	lf	\$ 12,500	\$ 825,000
SUBTOTAL					\$ 1,044,000
CONTINGENCY 25%					\$ 261,000
ROW					\$ 3,000
EGR/SURVEY					\$ 230,000
PROJECT TOTAL					\$ 1,538,000

Project Name: Stream E North of US 82 Detention Pond
Project Number: 16 D

Detailed Description: Detention Pond with 72.6 ac-ft of flood storage.

Project Purpose: Provide stroage for flood flows thereby reducing flood levels downstream of the pond. Allows U.S. 82 & Vancouver Dr. to pass 1% event.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Excavation & Embankment	60,000	c.y.	\$ 11.00	\$ 660,000
2	Outlet Structure	1	l.s.	\$ 8,000	\$ 8,000
3	Clearing	15	ac	\$ 5,000	\$ 75,000
4	Temporary Erosion Control	3,500	l.f.	\$ 1.50	\$ 5,250
5	Site Access	400	s.y.	\$ 65.00	\$ 26,000
6	Fence	3,500	l.f.	\$ 10.00	\$ 35,000
7	Wetlands Mitigation	5	ac	\$ 20,000.00	\$ 100,000
SUBTOTAL					\$ 909,000
CONTINGENCY 25%					\$ 227,000
Land Acquisition					\$ 150,000
EGR/SURVEY					\$ 200,000
PROJECT TOTAL					\$ 1,486,000

Project Name: Lamberth Road at East Fork of Post Oak Creek Box Culvert
Project Number: 21 B
Detailed Description: Raise roadway 2.8' and construct 3-10'x10' MBC
Project Purpose: Improve conveyance and allow Lambreth Rd. culvert to pass 1% flood event.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Excavation & Embankment	7,000	cy	\$ 10.00	\$ 70,000
2	Pavement	450	lf	\$ 200.00	\$ 90,000
3	Road Demolition	1,420	s.y	\$ 6.40	\$ 9,088
4	Temporary Erosion Control	900	l.f.	\$ 1.50	\$ 1,350
5	Seed & Fertilize	0.4	ac	\$ 2,000.00	\$ 800
6	10x10 Box Culvert	330	lf	\$ 650.00	\$ 214,500
7	Headwall	2	ea.	\$ 75,000	\$ 150,000
8	Riprap	25	cy	\$ 120.00	\$ 3,000
SUBTOTAL					\$ 539,000
CONTINGENCY 25%					\$ 135,000
EGR/SURVEY					\$ 119,000
PROJECT TOTAL					\$ 793,000

Project Name: Lamberth Road at T2 East Fork of Post Oak Creek Culverts
Project Number: 11 B
Detailed Description: Construct 3-60" RCP Culvert
Project Purpose: Improve conveyance and allow Lambreth Rd. culvert to pass 1% flood event.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Excavation & Embankment	1,000	cy	\$ 10.00	\$ 10,000
2	Pavement	100	lf	\$ 200.00	\$ 20,000
3	Road Demolition	355	s.y	\$ 6.40	\$ 2,272
4	Temporary Erosion Control	100	l.f.	\$ 1.50	\$ 150
5	Seed & Fertilize	0.1	ac	\$ 2,000.00	\$ 200
6	Culvert Demolition	100	lf	\$ 31.00	\$ 3,100
7	60" RCP	330	lf	\$ 325.00	\$ 107,250
8	Headwall	2	ea.	\$ 10,000	\$ 20,000
9	Riprap	5	cy	\$ 120.00	\$ 600
SUBTOTAL					\$ 164,000
CONTINGENCY 25%					\$ 41,000
EGR/SURVEY					\$ 36,000
PROJECT TOTAL					\$ 241,000

Project Name: Taylor Street at T1 East Fork of Post Oak Creek Box Culvert

Project Number: 14 B

Detailed Description: Construct 2-11'x5' MBC

Project Purpose: Improve conveyance and allow Taylor St. culvert to pass 4% flood event.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Excavation & Embankment	400	cy	\$ 10.00	\$ 4,000
2	Pavement	100	lf	\$ 144.00	\$ 14,400
3	Road Demolition	560	s.y	\$ 6.40	\$ 3,584
4	Culvert Demolition	184	lf	\$ 31.00	\$ 5,704
5	11x5 Box Culvert	172	lf	\$ 530.00	\$ 91,160
6	Headwall	2	ea	\$ 50,000	\$ 100,000
7	Temporary Erosion Control	100	l.f.	\$ 1.50	\$ 150
8	Seed & Fertilize	0.1	ac	\$ 2,000.00	\$ 200
9	Riprap	5	cy	\$ 120.00	\$ 600
SUBTOTAL					\$ 220,000
CONTINGENCY 25%					\$ 55,000
EGR/SURVEY					\$ 48,000
PROJECT TOTAL					\$ 323,000

Project Name: King Street at Stream F Box Culvert

Project Number: 24 B

Detailed Description: Construct 4-8'x8' MBC

Project Purpose: Improve conveyance and allow King St. culvert to pass 4% flood event.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Excavation & Embankment	5,500	cy	\$ 10.00	\$ 55,000
2	Pavement	100	lf	\$ 144.00	\$ 14,400
3	Road Demolition	350	s.y	\$ 6.40	\$ 2,240
4	Culvert Demolition	375	lf	\$ 31.00	\$ 11,625
5	8x8 Box Culvert	1,500	lf	\$ 750.00	\$ 1,125,000
6	Headwall	2	ea.	\$ 75,000	\$ 150,000
7	Temporary Erosion Control	100	l.f.	\$ 1.50	\$ 150
8	Seed & Fertilize	0.1	ac	\$ 2,000.00	\$ 200
9	Riprap	25	cy	\$ 120.00	\$ 3,000
SUBTOTAL					\$ 1,362,000
CONTINGENCY 25%					\$ 341,000
Easement					\$ 8,000
EGR/SURVEY					\$ 300,000
PROJECT TOTAL					\$ 2,011,000

Project Name:		Gribble Street at Stream G Box Culvert			
Project Number:		12 B			
Detailed Description:		Construct 2-8'x6' MBC			
Project Purpose:		Improve conveyance and allow Gribble St. culvert to pass 1% flood event.			
ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Excavation & Embankment	500	cy	\$ 10.00	\$ 5,000
2	Pavement	100	lf	\$ 144.00	\$ 14,400
3	Road Demolition	350	s.y	\$ 6.40	\$ 2,240
4	Culvert Demolition	50	lf	\$ 31.00	\$ 1,550
5	8x6 Box Culvert	172	lf	\$ 475.00	\$ 81,700
6	Headwall	2	ea.	\$ 40,000	\$ 80,000
7	Temporary Erosion Control	100	l.f.	\$ 1.50	\$ 150
8	Seed & Fertilize	0.1	ac	\$ 2,000.00	\$ 200
9	Riprap	12	cy	\$ 120.00	\$ 1,440
SUBTOTAL					\$ 187,000
CONTINGENCY 25%					\$ 47,000
EGR/SURVEY					\$ 41,000
PROJECT TOTAL					\$ 275,000

Project Name:		Canterbury Dr. Detention Pond			
Project Number:		25 D			
Detailed Description:		Post Oak Creek T4 North of Canterbury Dr. Detention Pond with 25.4 ac-ft of flood storage			
Project Purpose:		Provide storage for flood flows thereby reducing Ultimate 1% flood flows to Existing 1% levels downstream of the pond.			
ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Excavation & Embankment	21,000	c.y.	\$ 11.00	\$ 231,000
2	Outlet structure	1	l.s.	\$ 5,000	\$ 5,000
3	Clearing	5	ac	\$ 5,000	\$ 25,000
4	Temporary Erosion Control	2,000	l.f.	\$ 1.50	\$ 3,000
5	Seed & fertilize	5	ac.	\$ 1,000	\$ 5,000
6	Site Access	250	s.y.	\$ 65.00	\$ 16,250
7	Fence	2,000	l.f.	\$ 10.00	\$ 20,000
8	Wetlands Mitigation	1	ac	\$ 20,000.00	\$ 20,000
SUBTOTAL					\$ 325,000
CONTINGENCY 25%					\$ 81,000
Land Acquisition					\$ 50,000
EGR/SURVEY					\$ 72,000
PROJECT TOTAL					\$ 528,000

Project Name: Town Center Detention Pond Modification
Project Number: 15 D
Detailed Description: Expand Town Center detention pond to 50.7 ac-ft
Project Purpose: Provide stroage for flood flows thereby reducing Ultimate 1% flood flows to Existing 1% levels downstream of the pond.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Excavation & Embankment	20,000	c.y.	\$ 11.00	\$ 220,000
2	Outlet structure	1	l.s.	\$ 8,000	\$ 8,000
3	Temporary Erosion Control	1,200	l.f.	\$ 1.50	\$ 1,800
4	Seed & fertilize	4	ac.	\$ 1,000	\$ 3,500
5	Fence	1,200	l.f.	\$ 10.00	\$ 12,000
6	Wetlands Mitigation	1	ac	\$ 20,000.00	\$ 20,000
SUBTOTAL					\$ 265,000
CONTINGENCY 25%					\$ 66,000
Land Acquisition					\$ 30,000
EGR/SURVEY					\$ 58,000
PROJECT TOTAL					\$ 419,000

Project Name: Payton St. Detention Pond
Project Number: 13 D
Detailed Description: State Highway 91 - East Fork of Post Oak Creek T4 South of Payton St. Detention Pond with 64.6 ac-ft of flood storage
Project Purpose: Provide stroage for flood flows thereby reducing flood levels along S.H. 91 downstream of the pond.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Excavation & Embankment	52,000	c.y.	\$ 11.00	\$ 572,000
2	Outlet structure	1	l.s.	\$ 5,000	\$ 5,000
3	Clearing	4	ac	\$5,000	\$ 20,000
4	Temporary Erosion Control	1,200	l.f.	\$ 1.50	\$ 1,800
5	Seed & fertilize	7	ac.	\$ 1,000	\$ 6,500
6	Site Access	225	s.y.	\$ 65.00	\$ 14,625
7	Fence	2,500	l.f.	\$ 10.00	\$ 25,000
8	Wetlands Mitigation	1	ac	\$ 20,000.00	\$ 20,000
SUBTOTAL					\$ 665,000
CONTINGENCY 25%					\$ 166,000
Land Acquisition					\$ 80,000
EGR/SURVEY					\$ 146,000
PROJECT TOTAL					\$ 1,057,000

Project Name: Taylor St. Detention
Project Number: 27 D
Detailed Description: Post Oak Creek South of Taylor St. Detention Pond with 207 ac-ft of flood storage
Project Purpose: Provide stroage for flood flows thereby reducing flood levels downstream of the pond.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Excavation & Embankment	170,000	c.y.	\$ 11.00	\$ 1,870,000
2	Outlet structure	1	l.s.	\$ 5,000	\$ 5,000
3	Clearing	9	ac	\$5,000	\$ 45,000
4	Temporary Erosion Control	3,600	l.f.	\$ 1.50	\$ 5,400
5	Site Access	225	s.y.	\$ 65.00	\$ 14,625
6	Fence	3,600	l.f.	\$ 10.00	\$ 36,000
7	Wetlands Mitigation	1	ac	\$ 20,000.00	\$ 20,000
SUBTOTAL					\$ 1,996,000
CONTINGENCY 25%					\$ 499,000
Land Acquisition					\$ 180,000
EGR/SURVEY					\$ 439,000
PROJECT TOTAL					\$ 3,114,000

Opinion of Probable Acquisition Cost

September 25, 2013

Project Name: Archer Dr. SRL Property Acquisition
 Project Number: 4 R

Detailed Description:

Project Purpose:

ITEM	ADDRESS	TYPE	LAND VALUE	IMPROVEMENTS	TOTAL
1	220 Archer Dr.	Other Residential	\$ 15,742	\$ 587,999	\$ 603,741
2	330 Archer Dr.	Other Residential	\$ 37,884	\$ 1,278,544	\$ 1,316,428
3	221 Archer Dr.	Other Residential	\$ 40,247	\$ 544,458	\$ 584,705
4	1817 & 1819 W Yarborough Dr.	2-4 Family	\$ 11,966	\$ 87,241	\$ 99,207
5	1906-1908 W Shields Dr.	2-4 Family	\$ 12,418	\$ 94,181	\$ 106,599
SUBTOTAL					\$ 2,711,000
Relocation					\$ 271,000
Demolition					\$ 389,000
Utilities					\$ 271,000
Legal					\$ 596,000
PROJECT TOTAL					\$ 4,238,000

Project Name: Ayers Drive SRL Property Acquisition
 Project Number: 2 R

Detailed Description:

Project Purpose:

ITEM	ADDRESS	TYPE	LAND VALUE	IMPROVEMENTS	TOTAL
1	203 Ayers Dr.	Single Family	\$ 1,150	\$ 37,164	\$ 38,314
2	211 Ayers Dr.	Single Family	\$ 1,350	\$ 26,176	\$ 27,526
3	213 Ayers Dr.	Single Family	\$ 2,360	\$ 54,654	\$ 57,014
SUBTOTAL					\$ 123,000
Relocation					\$ 12,000
Demolition					\$ 18,000
Utilities					\$ 12,000
Legal					\$ 27,000
PROJECT TOTAL					\$ 192,000

Project Name: S. Sam Rayburn Frwy and Contemporary Dr. SRL Property Acquisition
 Project Number: 1 R

Detailed Description:

Project Purpose:

ITEM	ADDRESS	TYPE	LAND VALUE	IMPROVEMENTS	TOTAL
1	608 S Sam Rayburn Frwy.	Non Residential	\$ 10,800	\$ 26,513	\$ 37,313
2	604 S Sam Rayburn Frwy.	Non Residential	\$ 23,059	\$ 6,391	\$ 29,450
3	501 Contemporary	Single Family	\$ 3,289	\$ 25,421	\$ 28,710
4	503 Contemporary		\$ 3,289	\$ 22,242	\$ 25,531
5	505 Contemporary	Single Family	\$ 3,140	\$ 38,548	\$ 41,688
6	603 Contemporary	Single Family	\$ 3,289	\$ 22,316	\$ 25,605
SUBTOTAL					\$ 188,000
Relocation					\$ 19,000
Demolition					\$ 21,000
Utilities					\$ 19,000
Legal					\$ 41,000
PROJECT TOTAL					\$ 288,000

Project Name: Regency Dr. and W. Washington St. SRL Property Acquisition
Project Number: 6 R

Detailed Description:

Project Purpose:

ITEM	ADDRESS	TYPE	LAND VALUE	IMPROVEMENTS	TOTAL
1	621 - 623 Regency Cir.	2-4 Family	\$ 12,541	\$ 193,313	\$ 205,854
2	625-631 Regency Cir.	2-4 Family	\$ 10,900	\$ 129,293	\$ 140,193
3	633-635 Regency Cir.	2-4 Family	\$ 12,344	\$ 132,817	\$ 145,161
4	1134-1136 W. Washington St.	2-4 Family	\$ 905	\$ 120,575	\$ 121,480
5	1201 W. Washington St.	Residential	\$ 10,058	\$ 114,399	\$ 124,457
SUBTOTAL					\$ 737,000
Relocation					\$ 74,000
Demolition					\$ 104,000
Utilities					\$ 74,000
Legal					\$ 162,000
PROJECT TOTAL					\$ 1,151,000

Project Name: Westwood SRL Property Acquisition
Project Number: 3 R

Detailed Description:

Project Purpose:

ITEM	ADDRESS	TYPE	LAND VALUE	IMPROVEMENTS	TOTAL
1	1600 W Houston St.	Other Residential	\$ 4,391	\$ 12,969	\$ 17,360
2	1600 W Lamar St.	Commercial	\$ 6,000	\$ 39,155	\$ 45,155
SUBTOTAL					\$ 63,000
Relocation					\$ 6,000
Demolition					\$ 8,000
Utilities					\$ 6,000
Legal					\$ 14,000
PROJECT TOTAL					\$ 97,000

Project Name: N. Sam Rayburn Frwy. and N. Travis St. SRL Property Acquisition
Project Number: 9 R

Detailed Description:

Project Purpose:

ITEM	ADDRESS	TYPE	LAND VALUE	IMPROVEMENTS	TOTAL
1	1111 N. Travis St.	Non Residential	\$ 77,610	\$ 108,464	\$ 186,074
2	429 N. Sam Rayburn Frwy.	Non Residential	\$ 90,400	\$ 51,045	\$ 141,445
SUBTOTAL					\$ 328,000
Relocation					\$ 33,000
Demolition					\$ 24,000
Utilities					\$ 33,000
Legal					\$ 72,000
PROJECT TOTAL					\$ 490,000

Project Name: Various SRL Property Acquisition

Project Number: 7 R

Detailed Description:

Project Purpose:

ITEM	ADDRESS	TYPE	LAND VALUE	IMPROVEMENTS	TOTAL
1	1604 S. Sam Rayburn Frwy.	Non Residential	\$ 7,200	\$ 43,043	\$ 50,243
2	515 Kessler Blvd.	Single Family	\$ 10,181	\$ 67,182	\$ 77,363
3	1218 W. McGee St.	Single Family	\$ 15,420	\$ 79,435	\$ 94,855
4	203 N. Woods	Single Family	\$ 13,416	\$ 52,905	\$ 66,321
5	429 Hidden Valley Trail	Single Family	\$ 8,554	\$ 89,031	\$ 97,585
6	115 E. Lambreth Rd.	Single Family	\$ 9,932	\$ 27,508	\$ 37,440
SUBTOTAL					\$ 424,000
Relocation					\$ 42,000
Demolition					\$ 54,000
Utilities					\$ 42,000
Legal					\$ 93,000
PROJECT TOTAL					\$ 655,000

Project Name: Contemporary Dr.

Project Number: 10 R

Detailed Description:

Project Purpose:

ITEM	ADDRESS	TYPE	LAND VALUE	IMPROVEMENTS	TOTAL
1	401 Contemporary	Single Family	\$ 3,289	\$ 27,718	\$ 31,007
2	403 Contemporary	Single Family	\$ 3,289	\$ 22,968	\$ 26,257
3	405 Contemporary	Single Family	\$ 3,147	\$ 33,085	\$ 36,232
4	407 Contemporary	Single Family	\$ 3,147	\$ 23,287	\$ 26,434
5	408 Contemporary	Single Family	\$ 2,908	\$ 29,311	\$ 32,219
6	409 Contemporary	Single Family	\$ 3,289	\$ 14,831	\$ 18,120
7	410 Contemporary	Single Family	\$ 2,904	\$ 23,470	\$ 26,374
8	411 Contemporary	Single Family	\$ 3,289	\$ 24,399	\$ 27,688
9	412 Contemporary	Single Family	\$ 2,904	\$ 25,616	\$ 28,520
10	413 Contemporary	Single Family	\$ 3,289	\$ 29,285	\$ 32,574
11	414 Contemporary	Single Family	\$ 2,904	\$ 44,311	\$ 47,215
12	500 Contemporary	Single Family	\$ 2,904	\$ 28,736	\$ 31,640
13	502 Contemporary	Single Family	\$ 2,904	\$ 47,712	\$ 50,616
14	504 Contemporary	Single Family	\$ 2,904	\$ 29,396	\$ 32,300
15	506 Contemporary	Single Family	\$ 2,904	\$ 30,537	\$ 33,441
16	507 Contemporary	Single Family	\$ 3,364	\$ 36,785	\$ 40,149
17	509 Contemporary	Single Family	\$ 3,289	\$ 26,469	\$ 29,758
18	511 Contemporary	Single Family	\$ 3,289	\$ 33,967	\$ 37,256
19	600 Contemporary	Single Family	\$ 2,898	\$ 27,892	\$ 30,790
20	601 Contemporary	Single Family	\$ 3,289	\$ 24,097	\$ 27,386
21	602 Contemporary	Single Family	\$ 2,892	\$ 31,354	\$ 34,246
22	604 Contemporary	Single Family	\$ 2,892	\$ 18,448	\$ 21,340
23	605 Contemporary	Single Family	\$ 3,289	\$ 27,408	\$ 30,697
24	606 Contemporary	Single Family	\$ 3,202	\$ 25,955	\$ 29,157
25	607 Contemporary	Single Family	\$ 3,617	\$ 33,913	\$ 37,530
SUBTOTAL					\$ 799,000
Relocation					\$ 80,000
Demolition					\$ 108,000
Utilities					\$ 80,000
Legal					\$ 176,000
PROJECT TOTAL					\$ 1,243,000



H

Appendix H – Advisory and Public Meetings

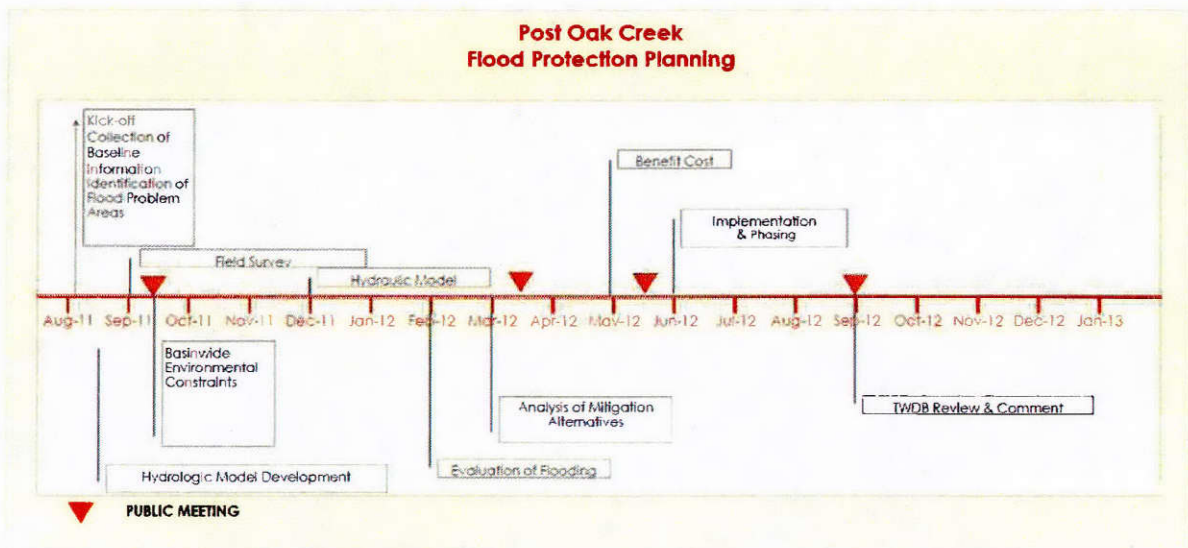
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Kickoff Meeting - September 12, 2011

CITY OF SHERMAN
Post Oak Creek Watershed
FLOOD PROTECTION PLAN

September 12, 2011
Meeting Summary

1. **Introductions:** Meeting attendees included Don Keene and Mark Gibson, City of Sherman; David Selman and Neol Paramanantham, TxDOT; Ivan Ortiz, TWDB; and Stephen Jenkins and Ken Tillman, Espey Consultants, Inc.
2. **City's objectives:** Don Keene outlined the city's objectives for the project:
 - a. Implement direction established in the 2009 update of the city's Comprehensive Plan.
 - b. Conduct a comprehensive analysis of flooding in the Post Oak Creek watershed.
 - c. Identify alternatives for addressing damage caused by recurring flood events.
3. **Schedule:** Scheduled completion of the FPP is September 2012.



4. **Technical Advisory Committee (list below):** The purpose of a technical advisory committee for this type of work is to provide an opportunity to apply the technical

knowledge and experience of professionals involved in the various aspects of flood protection in the Sherman area to the city's Flood Protection Planning effort.

**City of Sherman Post Oak Creek FPP
Technical Advisory Committee**

Name	Organization
Don Keene	City
Mark Gibson, P.E.	City
Ivan Ortiz, CFM	TWDB
Stephen Jenkins, P.E.	Espey
Kenneth Tillman, P.E.	Espey
Ed Rossman, Ph.D.	USACE
Joe Remondini	USACE
David Selman, P.E.	TxDOT
Noel Paramanatham, P.E.	TxDOT
Donald R. Gibbons	NRCS

5. Public communication plan: There are four public meetings anticipated for this project. The Technical Advisory Committee meetings will be scheduled for the same day as, but prior to, the public meetings.

6. Communication protocols (see attached contact list): Mark Gibson will be the key contact for communication with the City. Stephen Jenkins will be the primary contact for Espey Consultants, with Ken Tillman copied on all correspondence.

**City of Sherman Post Oak Creek FPP
Contact List**

Name	Position	Organization	Phone	e-mail
Don Keene	Executive Director of Public Works & Planning	Sherman	(903) 892-4549	donk@ci.sherman.tx.us
Mark Gibson, P.E.	Director of Utilities & Engineering	Sherman	(903) 892-7210	markg@ci.sherman.tx.us
Jerry Pace	Engineering Technology Coordinator	Sherman	(903) 892-7621	jerryyp@ci.sherman.tx.us
Ivan Ortiz	Grants Coordinator, Flood Mitigation Planning	TWDB	(512) 463-6418	ivan.ortiz@twdb.state.tx.us
Stephen Jenkins, P.E.	Project Engineer	Espey	(214) 951-0807	sjenkins@espeyconsultants.com
Kenneth Tillman, P.E.	Project Manager	Espey	(214) 951-0807	ktillman@espeyconsultants.com
Ed Rossman, Ph.D.	Tulsa District Chief Planning Branch	USACE	(918) 669-4921	Edwin.J.Rossman@SWT03.usace.army.mil
Joe Remondini	Tulsa District	USACE		Joseph.Remondini@usace.army.mil
Donald Gibbons, SC		NRCS	(903) 892-6013	donald.gibbons@tx.usda.gov
David Selman, P.E.	Area Engineer	TxDOT	(903) 868-9251	dsellman@dot.state.tx.us
Noel Paramanatham, P.E.	Assistant Area Engineer	TxDOT	(903) 868-9255	nparama@dot.state.tx.us

7. Data needs: The data inventory was updated during the meeting.

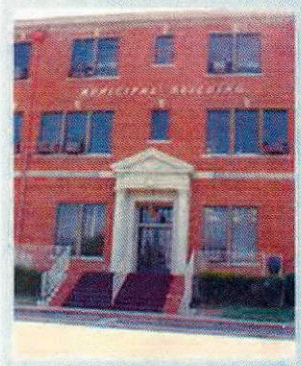
**City of Sherman Post Oak Creek FPP
Baseline Data Inventory**

Description	Date	Source	Format	Comments
Drainage area maps	2011	EC	GIS	
Drainage area maps	2001	City	Hardcopy	Master Drainage Plan
Storm sewer maps				
Zoning maps	9/9/2011	City	GIS	2009 Comp Plan
Future Land Use Plans	9/9/2011	City	GIS	2009 Comp Plan
SSURGO (soils)	2011	EC	GIS	NRCS data
Sherman/Grayson County DFIRM	2011	City	GIS	
Drainage complaint database	2010	City	Word	June 2007 Flood Damage Assessment
2' foot LiDAR Contours	2011	EC	GIS	
High resolution aerial photos	2011	City	digital	
LOMRs	2011	City	GIS	Included in D-Firm
City Drainage Design Manual	2011	City	Hardcopy	
Stormwater Management Planning	2011	City	Hardcopy	
Wetlands	2011	USFWS	Digital/Hardcopy	Digital NWI mapping available W of N-S line near Jones Med Ctr
Landfills				
Hazardous waste sites				
City owned property	9/9/2011	GCAD	GIS	GCAD property parcels
Protected property				
Construction plans for bridges				
Construction plans for concrete lined channels				
Gauge station data				N/A
Radar Rainfall Data for June 18, 2007				
Schools in Drainage Basin	9/9/2011	GCAD	GIS	GCAD property parcels
Repetitive Loss Properties	2011	TWDB	Hardcopy	Report dated 6/30/10
NRCS dam info		NRCS		



News & Updates

- Watershed Management Plan-Public Meeting**
Posted On: 9/7/2011
- Drawing for Place on City of Sherman Ballot**
Posted On: 9/2/2011
- Public Hearing to Consider Annexation of Agerage Along Highways 82 and 289**
Posted On: 9/2/2011
- Notice to Consider Adoption of Resolution Number 5605 Capital Improvement Program**
Posted On: 8/17/2011
- Candidate Filing for Sherman City Council Positions**
Posted On: 8/9/2011
- Deadline to File Applications for Place on City of Sherman Ballot**
Posted On: 7/8/2011



Welcome to the City of Sherman Website

The City of Sherman, Texas, is located at the crossroads of U.S. 75 and U.S. 82 in North Texas. The county seat of Grayson County, Sherman is a community of 36,000 residents, and home to several Fortune 100 industries as well as to Austin College, a vibrant arts community, and abundant recreational opportunities. Excellent schools, beautiful scenery, and a variety of shopping, restaurants and hotels add to the community.

Sherman is 60 miles north of Dallas - close enough to the Dallas-Fort Worth Metroplex to access the urban amenities - yet it still retains an unhurried and friendly atmosphere of smaller communities. Sherman also has a richly diverse history, and is only 10 miles south of Lake Texoma, one of the largest reservoirs in the state of Texas and well-known for its champion bass fishing, sailing, camping and hiking. Sherman welcomes you!

Upcoming Board and Commission Meetings | **Kidd-Key Auditorium Events**

9/20/2011 - Planning and Zoning Commission



Watershed Management Plan-Public Meeting

PUBLIC MEETING NOTICE
CITY OF SHERMAN
FLOOD PROTECTION PLAN
IN THE CITY COUNCIL CHAMBERS AT CITY HALL
220 W. MULBERRY STREET, SHERMAN, TEXAS
MONDAY, SEPTEMBER 12, 2011
6:00 P.M. TO 7:00 P.M.

NOTICE IS HEREBY GIVEN THAT A PUBLIC MEETING WILL BE HELD IN THE CITY OF SHERMAN, TEXAS, ON THE 12TH DAY OF SEPTEMBER, 2011, AT 6:00 P.M. IN THE CITY COUNCIL CHAMBERS AT CITY HALL, 220 W. MULBERRY STREET, SHERMAN, TEXAS.

THE CITY OF SHERMAN IS JOINTLY PARTICIPATING WITH THE TEXAS WATER DEVELOPMENT BOARD IN A FLOOD PROTECTION PLANNING STUDY OF THE CITY'S WATERSHED. THIS MEETING WILL PROVIDE A BRIEF OVERVIEW OF THE PROJECT, REVIEW OF THE STUDY OBJECTIVES, AND AN OPPORTUNITY TO OBTAIN CITIZEN COMMENTS.

AGENDA

1. Brief Overview of the Project
 - A. Objective of the Study
 - B. Project Schedule
2. Review of Flood Impacts
3. Alternatives for Reducing Impacts
4. Planned Actions for Future Meetings
5. Citizen Comments
6. Adjourn

I, the undersigned authority, do hereby certify that the above Notice of the Public Meeting of the City of Sherman is a true and correct copy of said Notice and that I posted a true and correct copy of said Notice on the bulletin board, at City Hall of said City of Sherman, Texas, a place convenient to the public, and said Notice was posted on September 8, 2011, at 4:00 p.m. and said time of posting was 72 hours before said meeting was convened or called to order.

DATED THIS 8TH DAY OF SEPTEMBER 2011
CITY OF SHERMAN, TEXAS

LINDA ASHBY, CITY CLERK

The above agenda schedule represents an estimate of the order for the indicated items and is subject to change at any time.

PERSONS WITH DISABILITIES WHO PLAN TO ATTEND THIS MEETING AND WHO MAY NEED ASSISTANCE ARE REQUESTED TO CONTACT LINDA ASHBY AT (903) 892-7204 TWO (2) WORKING DAYS PRIOR TO THE MEETING SO THAT APPROPRIATE ARRANGEMENTS CAN BE MADE.



**City of Sherman
Post Oak Creek Watershed Flood Protection Plan
Project Kick-Off Meeting Minutes
September 12, 2011
6:00 - 7:00 PM
City Hall**

Meeting Began at 6:05 pm and Ended at 7:03 pm

I. Attendance

City of Sherman Staff

Don W. Keene, Executive Director – Planning and Public Works
Mark Gibson, P.E., Director of Utilities and Engineering

Consultants

Stephen Jenkins, P.E., Sr. Project Mgr., EC
Ken Tillman, P.E., Sr. Project Mgr., EC
Byron Hardin, CPM, HAC

State / Federal Agencies

Ivan Ortiz, CFM, Texas Water Development Board

Stakeholders / Citizens in Attendance

10 total

II. Meeting Summary / Main Discussion Points

- Don Keene, Executive Director – Planning and Public Works for the City of Sherman opened the meeting with staff introductions and provided a summary of the project goals and funding. He extended a thank you to the residents that attended the meeting and encouraged the attendees to ask questions.
- Stephen Jenkins, P.E., Sr. Project Mgr. EC, provided a power point presentation of the Post Oak Creek Flood Protection Plan goals and objectives. He emphasized that his was a long planning process and encouraged active involvement in the planning process.
- Ken Tillman, P.E., Sr. Project Mgr. EC, provided technical information about the upcoming survey activities to help identify the high water marks of the 2007 flood and asked the attendees for assistance in identifying additional locations to conduct surveying activities. Ms. Harrell and Mr. Bohuslav offered locations for surveying.

Stakeholder / Citizen Comments

Notice of the three remaining public meetings will be provided through publication in the newspaper, inclusion on the city's website, and through email.

Residents liked the "Big Vision" of the plan and complimented staff and the consultants on the approach.

Dean Gilbert Lake needs a containment upstream to help with water storage.

Would like to see the flood protection plan study show how the floodplain and floodway could be developed into a resource improving the quality of life.

Dean Gilbert Lake discharge is eroding property and straightening the creek.

Need to evaluate nonstructural options.

Dean Gilbert Lake is causing floodwaters to stay around longer and has increased velocities in the creek.

Post Oak Creek is seeing a lot of flow from construction areas across 1417.

Maintenance of existing culverts and piles of debris along creek causing more flooding.

People are dumping debris into the creek causing more flooding.

Zoning and building review will need to be accomplished to help control developer and builder activity.

Most flooding appears to occur along U.S. Hwy. 75 and surprised that most people affected in that area were not in attendance tonight.

The nursing home residents had to be evacuated during the 2007 flood.



Meeting summary provided by Byron Hardin, CPM, HAC



Sign in Sheet
City of Sherman
Post Oak Creek Watershed Flood Protection Plan
 September 12, 2011

Name

Address

Email*

*If you wish to be contacted for future meetings

Ivan Ortiz	1700 N. Congress Ave. Austin TX 78701	Juan.Ortiz@twdb.state.tx.gov
Ernestine Harrell	2600 Nantucket Dr	echarrell@cableone.net
Jacqueline B. Mehahey	2629 Nantucket Dr (Highland mark)	J.E. Mehahey at Get mail.com
Jay + Jackie Bohuslav	2345 Canyon Creek, Sherman, TX	jkself@cableone.net jaryb79ag@texoma.net
TORBJÖRN SILEN	SHERMAN 2401 CAMPON CREEK TX	TOR-BJORN.SILEN@CAT.COM MARIASILEN@YAHOO.COM
GEORGE KALMON	1814 W. MURRAY ST. DENISON, TX 75020	GEOKALMON@AOL.COM
Dr. Tom Nurhale	2341 Canyon Creek Sherman, TX	tnurhale@ cableone.net
J + K + binson	2704 Sherwood Sherman	
Sony Beaverson	2609 Fair Oaks Cir. Sherman 75092	hbejag@cableone.net
Julie Fisher	3221 Redbud Tr Sherman TX 75072	julie@fishpedental.com

Post Oak Creek Flood Protection Plan Public Meeting



February 26, 2013
City of Sherman and

Texas Water Development Board
with assistance from Espey Consultants, Inc.



Overview

- Welcome
- Project location
- Study process and project status
- Prioritization of Improvements
- Recommended Action Plan
- Funding options
- Implementation Considerations

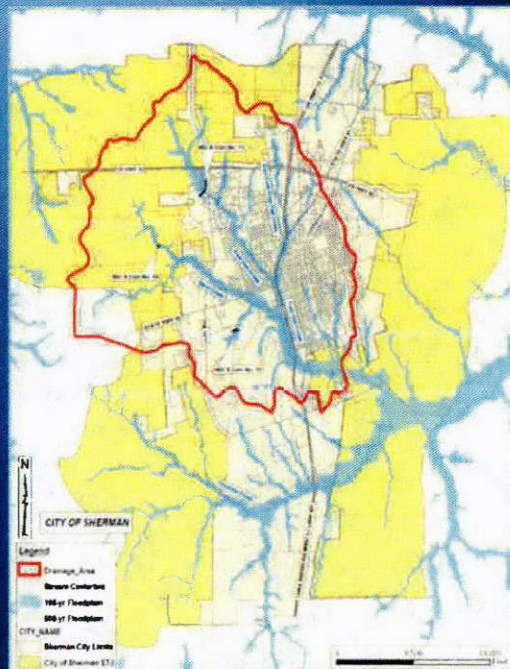
Study Sponsors and Support

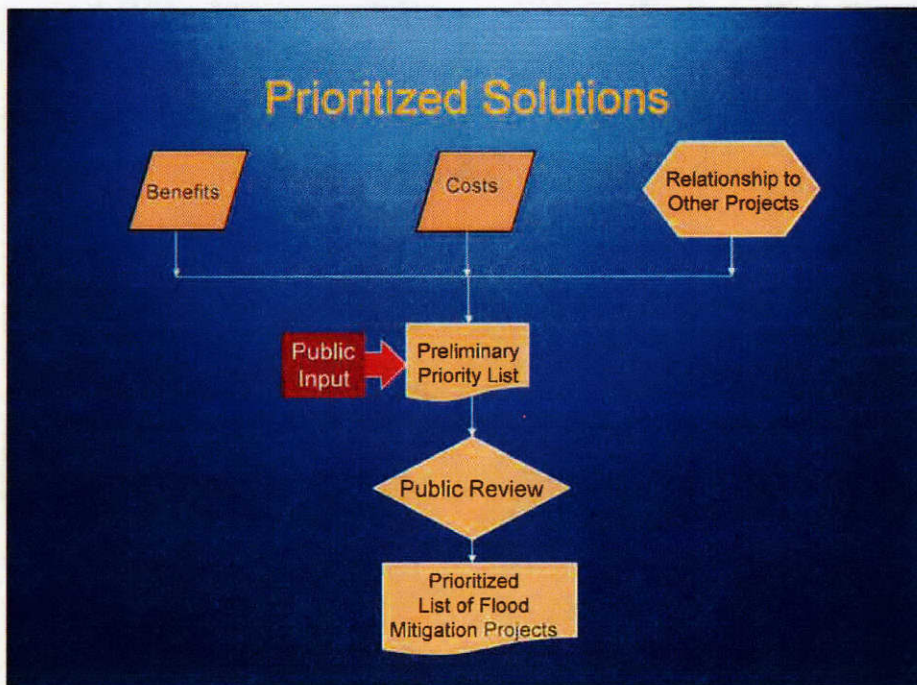
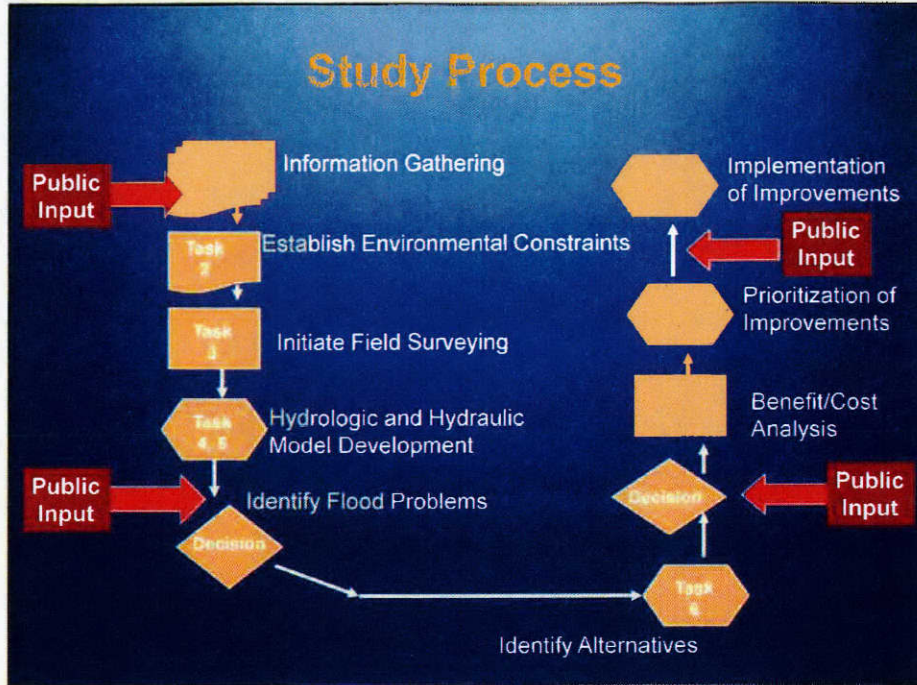


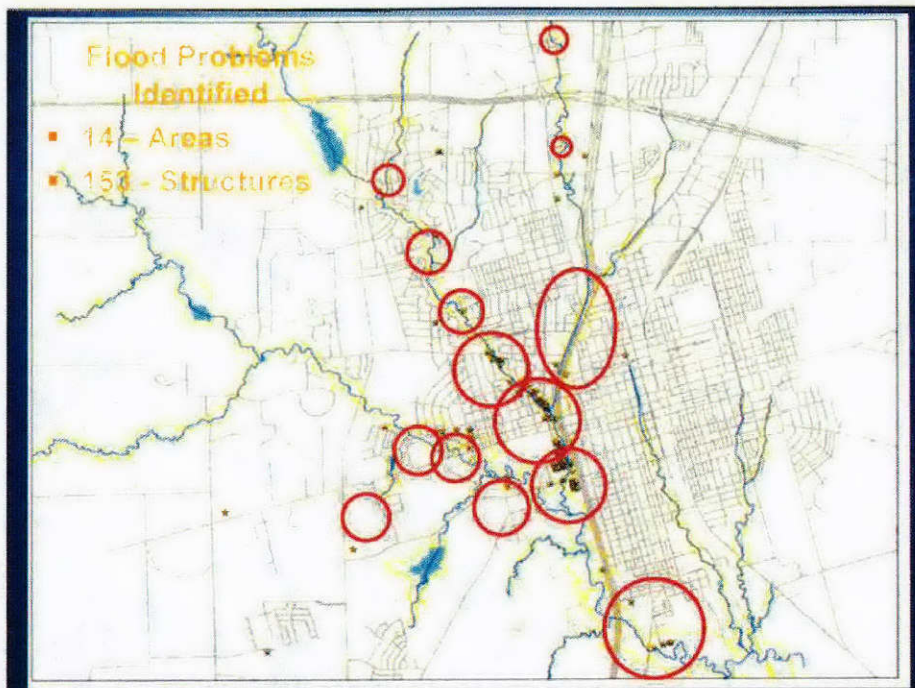
Study Area

Post Oak Creek

1. 50.5 miles of stream
2. 33 sq. mi. drainage
3. 68 bridges/culverts







Types of Mitigation



- ▣ **Structural**
 - Detention Ponds
 - Channel Improvements
 - Bridge / Culvert Improvements

- **Non-Structural**
 - Floodplain Land Acquisition
 - Update Floodplain Mapping
 - Update Floodplain Ordinance
 - Update Drainage Design Criteria



Structural Mitigation Detention Pond

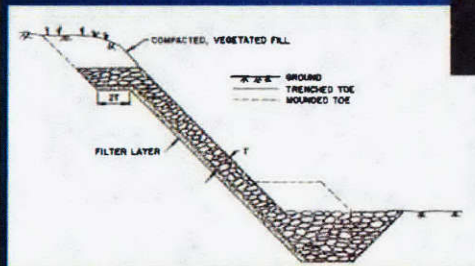
- Reduces Peak Flow Rates
- Increases Valley Storage



Proposed 7
Detention Pond
Projects

Structural Mitigation Channel Improvements

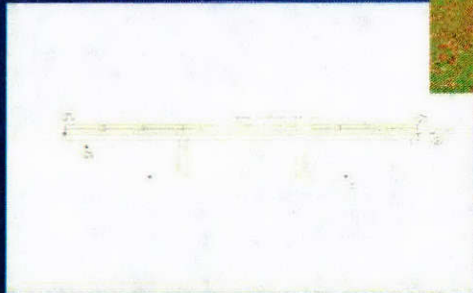
- Increase hydraulic capacity
- Improve channel stability



Proposed 3 Channel
Improvement
Projects

Structural Mitigation Bridge Improvements

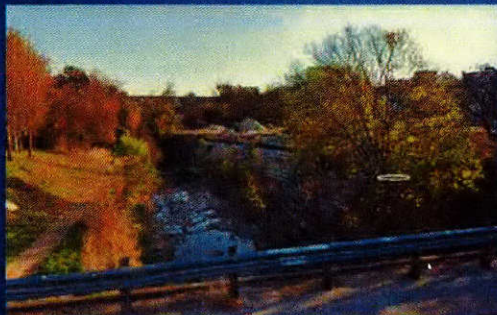
- Provides access for Emergency Services
- Increase hydraulic capacity



Proposed 10
Bridge/Culvert
Improvement
Projects

Non Structural Mitigation Buy-outs

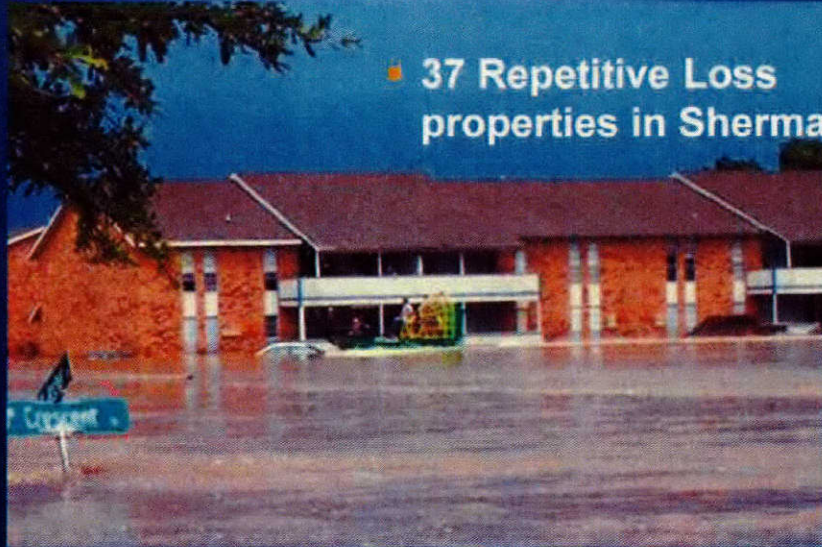
- Repetitive Loss
- Natural Green Belt
- Compatible Use



Proposed 12
Property
Acquisition
Projects

Repetitive Loss Buy-out

- 37 Repetitive Loss properties in Sherman



Recommended City of Sherman Watershed Management Goals

1. Increase the ability of natural and engineered systems to address stormwater runoff and drainage, both in existing neighborhoods and proposed developments, in order to minimize flooding and the damage it causes.
2. Reduce the greatest flood-related risks to public health, safety, property, and the environment.
3. Protect the integrity of Post Oak Creek's geomorphology and ecology.
4. Protect and enhance the quality, quantity, and availability of surface water resources.
5. Preserve and enhance existing aquatic and riparian environments and encourage restoration of degraded areas.
6. City arterial and collector streets should be passable during a 1% annual chance event.

Prioritization Process

1. Define criteria for ranking
2. Establish weighting per criterion
3. Establish means to measure criteria per recommended solution
4. Apply weighted criteria to recommended solutions
5. Present resultant ranking for public comments and revise as necessary

Application of City Goals to Measureable Criteria

- Reduces flooding of public, business and residential structures.
- Reduces flooding of collector and arterial streets.
- Reduces channel erosion.
- Enhances the environmental characteristics of the floodplain.

Additional City Criteria to City Management Goals

- Project implementation can be within annual operating budget (\leq \$300,000)
- Project can be implemented in phases
- Benefit-Cost Ratio

Prioritization Criteria for Application to Recommended Solutions

Reduces flooding of public, business and residential structures	
Description	Ranking
Project Eliminates Structural Flooding	10
Project Reduces Number of structures flooded	5
Project has no effect on structural flooding	0

Prioritization Criteria for Application to Recommended Solutions

Reduces flooding of collector and arterial streets	
Description	Ranking
Project increases capacity to pass 1% event	10
Project increases capacity to pass 4% event	8
Project increases capacity to pass 20% event	5
Project has no effect on street flooding	0

Prioritization Criteria for Application to Recommended Solutions

Reduces channel erosion	
Description	Ranking
Project reduces stream velocities	10
Project has no effect on velocities	5
Project increases velocities	0

Prioritization Criteria for Application to Recommended Solutions

Enhances the environmental characteristics of the floodplain	
Description	Ranking
Project enhances the environment (Increase in green space Decrease in impervious cover)	10
Project has no effect on environment	5
Project decreases the environment (Decrease in green space Increase in impervious cover)	0

Prioritization Criteria for Application to Recommended Solutions

Project implementation can be within annual operating budget (≤\$300,000)	
Description	Ranking
Project can be implemented within annual budget	10
Project can be implemented within annual budget with other government participation	8
Project requires bond issue & other government participation is available	5
Project requires bond issue & other government participation is not available	0

Prioritization Criteria for Application to Recommended Solutions

Project can be implemented in phases	
Description	Ranking
Project phases can be implemented within annual budget	10
Project can be phased	5
Project cannot be phased	0

Prioritization Criteria for Application to Recommended Solutions

Benefit-Cost Ratio	
Description	Ranking
Benefit-Cost Ratio > 2.0	10
Benefit-Cost Ratio ≥ 1.0	5
Benefit-Cost Ratio < 1.0	0

Project Prioritization

City of Sherman
Post Oak Creek Flood Protection Plan
Capital Improvement Plan
Flood Protection Plan Project Priority Ranking
February 28, 2013

Project Number	Project Type	Project Name	Project Cost	Grant Eligible	Reduces flooding of public, business and residential structures	Reduces flooding of public and private streets	Reduces channel erosion	Eliminate the area potential obstruction to the floodplain	Project implementation can be within annual operating budget	Project can be implemented in phases	Benefit/Cost Ratio	TOTAL	Priority Ranking
24	R	N. Sam Rayburn Frwy and Center Street	99,739	Y	10	5	10	8	10	5	48	1	
25	R	N. Woods, N. Ricketts and W. Pecan	141,162	Y	10	5	10	8	10	5	48	1	
23	R	Crockett Street and Ayers Drive	269,953	Y	10	5	10	8	10	5	48	1	
26	R	Kessler Blvd. and Wharton St.	119,933	Y	10	5	10	8	10	5	48	1	
29	R	Forest Creek Dr. and Lamberth Rd.	57,291	Y	10	5	10	8	5	5	43	2	
1	R	Archer Dr. SRL Property Acquisition	1,920,000	Y	10	5	10	5	5	5	35	3	
2	D	Archer Detention Pond	1,298,000	Y	10	10	10	5	7	42	3	3	
30	R	N. Sam Rayburn FWY and N. Travis St.	489,003	Y	10	5	10	5	5	5	40	4	
27	R	Regency Dr. and W. Washington St.	1,296,915	Y	10	5	10	5	5	5	40	4	
31	R	Contemporary Dr.	1,426,416	Y	10	5	10	5	5	5	35	5	

Project Prioritization

City of Sherman
Post Oak Creek Flood Protection Plan
Capital Improvement Plan
Flood Protection Plan Project Priority Ranking
February 28, 2013

Project Number	Project Type	Project Name	Project Cost	Grant Eligible	Reduces flooding of public, business and residential structures	Reduces flooding of public and private streets	Reduces channel erosion	Eliminate the area potential obstruction to the floodplain	Project implementation can be within annual operating budget	Project can be implemented in phases	Benefit/Cost Ratio	TOTAL	Priority Ranking
7	B	Center Street at Post Oak Creek Street Improvement	2,698,000	N	10	7	5				22	6	
6	C	Center St. to Lamar St. Channel	11,129,000	N	5	8	10	5	5		33	6	
5	C	Lamar St. Channel	1,437,000	N	5	8	10	5	5		33	6	
4	C	Pecan St. Channel	5,771,000	N	5	8	10	5	5		33	6	
12	B	Houston Street at Laurel Creek Box Culvert	160,000	N	10	7	5	10			32	7	
14	B	Lamberth Road at T2 East Fork of Post Oak Creek Culverts	241,000	N	10	7	5	10			32	7	
17	B	Gribble Street at Stream G Box Culvert	275,000	N	10	7	5	10			32	7	
3	D	Proposed Dam 9A	6,394,000	Y	5	10	5	3	0	3	26	8	
11	D	Stream E North of US 82 Detention Pond	1,486,000	N	10	10	5				25	9	
22	D	Taylor St. Detention	3,114,000	N	5	10	5	5			25	9	
21	B	Loy Lake Rd. to Taylor St. Box Culvert	3,610,000	N	5	8	5	5			23	10	

Project Prioritization

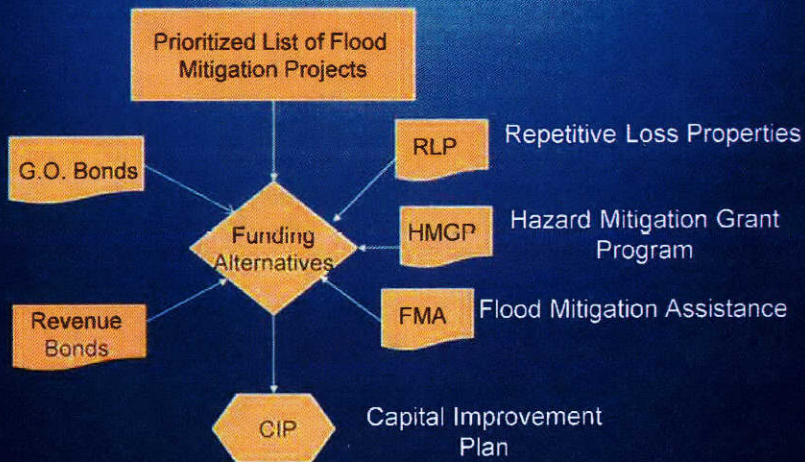
City of Eberman
Post Oak Creek Flood Protection Plan
Capital Improvement Plan

Flood Protection Plan Project Priority Ranking

February 26, 2013

Project Number	Project Type	Project Name	Project Cost	Grant Eligible	Reduces flooding of public business and residential structures			Reduces flooding of collector and arterial streets		Reduces flooding of residential structures		Project Cost for Implementation in Calendar Year	Benefit Category	TOTAL	Priority Ranking
					1	2	3	4	5	6					
13	B	Lamberth Road at East Fork of Post Oak Creek Box Culvert	793,000	N	10	7	5					22		11	
9	B	Houston Street at Post Oak Creek Bridge Improvements	3,030,000	N	10	7	5					22		11	
8	B	Lamar Street at Post Oak Creek Bridge Improvement	3,038,000	N	10	7	5					22		11	
15	B	Taylor Street at T1 East Fork of Post Oak Creek Box Culvert	323,000	N	8	7	5					20		12	
16	B	King Street at Stream F Box Culvert	2,011,000	N	8	7	5					20		12	
10	B	Washington Street at Post Oak Creek Roadway Improvements	1,538,000	N	5	7	5					17		13	
18	D	Canterbury Dr. Detention Pond	528,000	N		10	5					15		14	
19	D	Town Center Detention Pond Modification	419,000	N		10	5					15		14	
20	D	Payton St. Detention Pond	1,057,000	N		10	5					15		14	

Implementation Considerations Project Funding



Funding Options

- Internal to Sherman
 - Annual appropriation
 - Bonds
 - Special Taxing District

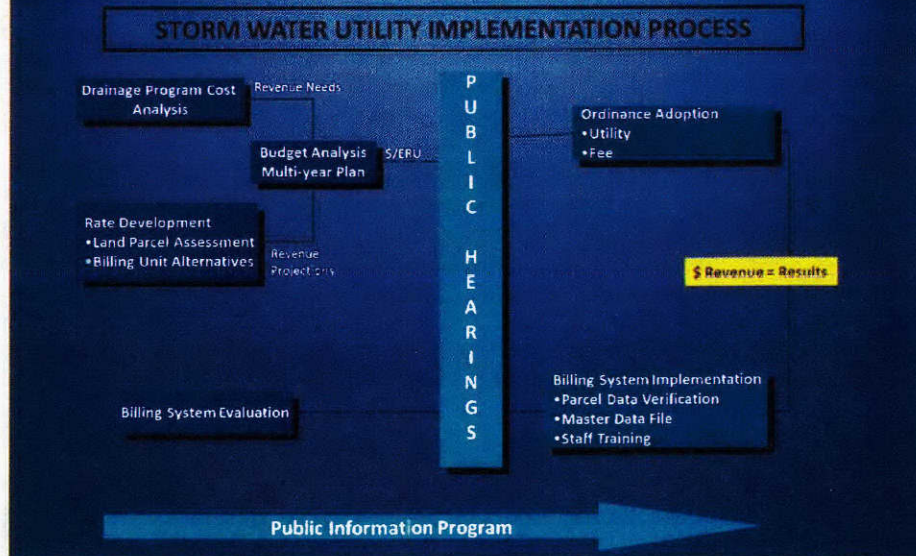
Funding Externally: Competitive

Eligible Activities	HMGP	PDM	FMA	RFC	SRL
Property Acquisition and Structure Demolition	P	P	P	P	P
Property Acquisition and Structure Relocation	P	P	P	P	P
Structure Elevation	P	P	P	P	P
Mitigation Reconstruction					P
Dry Floodproofing of Non-residential Structures	P	P	P	P	
Minor Localized Flood Reduction Projects	P	P	P	P	P
Structural Retrofitting of Existing Buildings	P	P			
Non-structural Retrofitting of Existing Buildings and Facilities	P	P			
Infrastructure Retrofit	P	P			
Soil Stabilization	P	P			
Post-Disaster Code Enforcement	P				

Funding Externally: Competitive

FEMA Program	Federal Cost Share (%)
HMGP	75
PDM	75
FMA	75
FMA (severe repetitive loss property with Repetitive Loss Strategy)	90
RFC	100
SRL	75
SRL (with Repetitive Loss Strategy)	90

Concept for Stormwater Utility



Features of Stormwater Utility

- Established dedicated source of funding
- Can leverage regular income for issuing debt if large projects require multi-years
- Cost collection from impervious cover common to all citywide
- No greater reliance on private sector such as with impact fees that are cyclic and may negatively affect development, thus fair for existing legacy problems citywide

Implementation Considerations

- Identify plan for funding improvements
- Consider CRS uprating for reduced flood insurance premiums
- Consider updating of flood mapping with FEMA
- Incorporate comments, finalize report, and deliver to Sherman flood models and report for continuing flood management

For Additional Information Contact:

- **Clay Barnett, P.E.**
City Engineer
City of Sherman

Phone: (903) 892-4547

Email: clayb@ci.sherman.tx.us

- **Ivan Ortiz**
Texas Water Development Board
Research and Planning Fund

Phone: (512) 463-8184

Email: Ivan.ortiz@twdb.state.tx.us

Hydrologic & Hydraulic Modeling Results - March 22, 2012

**PUBLIC MEETING NOTICE
CITY OF SHERMAN
FLOOD PROTECTION PLAN
IN THE CITY COUNCIL CHAMBERS AT CITY HALL
220 W. MULBERRY STREET, SHERMAN, TEXAS
THURSDAY, MARCH 22, 2012
6:00 P.M.**

NOTICE IS HEREBY GIVEN THAT A PUBLIC MEETING WILL BE HELD IN THE CITY OF SHERMAN, TEXAS, ON THE 22ND DAY OF MARCH, 2012, AT 6:00 P.M. IN THE CITY COUNCIL CHAMBERS AT CITY HALL, 220 W. MULBERRY STREET, SHERMAN, TEXAS.

THE CITY OF SHERMAN IS JOINTLY PARTICIPATING WITH THE TEXAS WATER DEVELOPMENT BOARD IN A FLOOD PROTECTION PLANNING STUDY OF THE CITY'S WATERSHED. THIS MEETING WILL PROVIDE A BRIEF OVERVIEW OF THE PROJECT, REVIEW OF THE STUDY OBJECTIVES, AND AN OPPORTUNITY TO OBTAIN CITIZEN COMMENTS.

AGENDA

- 1. Project Overview**
- 2. Watershed Modeling**
- 3. Preliminary Areas of Concern**
- 4. Alternatives for Reducing Flooding in Post Oak Creek Watershed**
- 5. Citizen Comments**
- 6. Adjourn**

I, the undersigned authority, do hereby certify that the above Notice of the Public Meeting of the City of Sherman is a true and correct copy of said Notice and that I posted a true and correct copy of said Notice on the bulletin board, at City Hall of said City of Sherman, Texas, a place convenient to the public, and said Notice was posted on March 19, 2012, at 10:00 a.m. and said time of posting was 72 hours before said meeting was convened or called to order.

**DATED THIS 19th DAY OF MARCH, 2012
CITY OF SHERMAN, TEXAS**

LINDA ASHBY, CITY CLERK

The above agenda schedule represents an estimate of the order for the indicated items and is subject to change at any time.

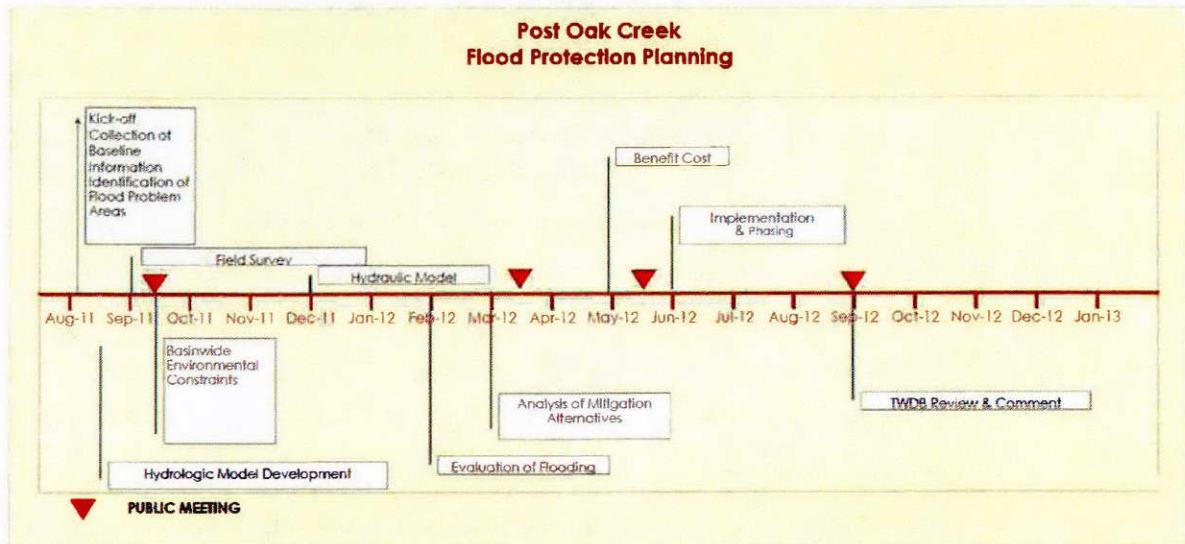
PERSONS WITH DISABILITIES WHO PLAN TO ATTEND THIS MEETING AND WHO MAY NEED ASSISTANCE ARE REQUESTED TO CONTACT LINDA ASHBY AT (903) 892-7204 TWO (2) WORKING DAYS PRIOR TO THE MEETING SO THAT APPROPRIATE ARRANGEMENTS CAN BE MADE.

CITY OF SHERMAN
Post Oak Creek Watershed
FLOOD PROTECTION PLAN

March 22, 2012
Technical Advisory Committee
Meeting Summary

1. Introductions: Meeting attendees included Don Keene and Clay Barnett, City of Sherman; David Selman, TxDOT; Don Gibbons, NRCS; Ivan Ortiz, TWDB; and Stephen Jenkins and Ken Tillman, RPS Espey.
2. Project overview:
 - Ken Tillman provided an update of the HEC-HMS and HEC-RAS modeling with maps that detailed the floodplain defined by the models.
 - Areas where the modeling indicates structures are subject to flooding were reviewed.
 - The maps were provided for city staff to review and to point out areas where flooding experience may not match the model results.
3. Model structure:
 - The models are complete with the exception of record drawing data for two TxDOT culverts. David Selman will research the locations and make record drawings available to RPS Espey.
4. Preliminary areas of concern:
 - Question was raised regarding properties shown to be impacted according to models versus NFIP losses. Clay will request the NFIP loss database from TWDB.
 - In addition to the floodplain areas shown in the model results, it was noted that the RV sales lot (Wilson & US 75) has experienced flooding.
5. Flood mitigation factors:
 - The history and potential role of Site 9A as regional detention was discussed. Don Gibbons researched the NRCS records and determined that the planned site has not been designed.
 - The HOA has hired an engineer to evaluate changes to the structure. Don Keene will provide contact information for Bob Montgomery to obtain contact for their engineer.

6. Schedule: Scheduled completion of the FPP is September 2012. Progress is approximately two weeks behind schedule.



7. Action Items:

- a. Clay Barnett will provide record drawings of detention structure at the Sherman Town Center development.
- b. Don Gibbons provided follow-up information regarding Site 9A. Geologic investigations and survey for the land rights map have been done, but no design has been prepared for the structure.
- c. Clay Barnett contacted Kathy Hopkins at TWDB and obtained list of NFIP claims and repetitive losses
- d. David Selman will obtain record drawings for 2 culverts at US 75 and send those to RPS Espey via FTP.
- e. Don Keene will provide RPS Espey with contact information for Bob Montgomery regarding the engineer hired by HOA for current work on the HOA-owned lake.
- f. City staff will review and comment on the preliminary floodplain maps.

**Post Oak Creek Flood Protection Plan
Public Meeting Summary
March 22, 2012**

I. Welcome:

Don Keene provided opening comments and introductions.

City of Sherman staff:

Don Keene, Director of Public Works

Clay Barnett, City Engineer

Texas Water Development Board staff

Ivan Ortiz, CFM

RPS Espey

Stephen Jenkins, P.E.

Kenneth Tillman, P.E., CFM

II. Meeting Summary:

- The status of the Flood Protection Planning study was presented by Kenneth Tillman in a slide presentation.
- The presentation included slides of various locations where the modeling indicates structures may be affected by flooding.
- The public was invited to comment on each location, as well as other locations where flooding has been experienced but the models do not indicate flooding potential.

III. Stakeholder / Citizen Comments:

- Attendees indicated that notice of the meeting was received by publication on the city's webpage and by email distribution by city staff and other stakeholders.
- A question regarding the magnitude of the January 2012 event was answered by Ken Tillman that it appeared to be on the order of a 2-yr. event. Citizen observation was that the creek near Redbud Tr. was out of banks during January, but no property was flooded.
- Comment that area of Wood and King St. floods.
- Comment that pawn shop on Houston flooded to a depth of 8-in. during the 2007 flood.
- Lamar & Sunset: comment that water in Piggly Wiggly was 4-ft. deep during the 2007 event.

- The discussion of Cam's Corner (intersection of US 75 and HWY 91) and the number of buildings that experienced flooding in 2007.
- Vancouver & Nantucket: comment that water entered 2602 Nantucket during the 2007 event as well as 4" – 5" of water across Vancouver.
- Redbud Tr.: North of Vancouver, no water in houses.
- A question was raised whether the FPP will consider the possible impact of detention at Sherman Town Center. Observations were that the pond does not hold water during storm events.
- A question was asked about the effects of erosion at 2345 Canyon Creek. It was discussed that the purpose of the FPP is not to address erosion, but the issue of high velocities is a consideration in the development of projects that include channel re-sectioning.

NAME

Address

	Ronnie + Patsy Stephens	3225 Redbud Trl, Sherman
#	Tom Howell	2605 Nantucket Dr Sherman
	GEORGE PAUKSTA	3200 N HAVEN
	Ray + Krazy Boyd	524 N. Wharton St. Sherman
	Vickie Pearson	3114 North Haven Sherman
	Ernestine Warrell	2600 Nantucket Dr Sherman
	Steve Scott	2502 Kopscke Dr. Austin, TX
	Jean Lindy	#1 Vancouver Place Sherman TX
	Rosary Lindsey	1 Vancouver Pl Sherman TX
	Tom Bjorn Sten	2401 CANYON CREEK - " -
	GARY + JACKIE BOHUSLAV	2333 CANYON CREEK " "
		2345 CANYON CREEK " "
	Julie Folger	3221 Redbud TR Sherman
	Wendy Bennett	2502 Nantucket Sherman
	Jim Lindy	2530 NANTUCKET Sherman
	Picky Lindsey	2530 Nantucket Sherman

3 other couples would have been here but they are at my wife's birthday party

TOR-Bjorn.SILVER@CAT.COM

ALEXDAYJU@HOTMAIL.COM - (Lindsey's e-mail)

GGOLF95@AOL.COM

Ray & Kathy Boyd kathyray21@verizon.net

GARYB79AG@TEXOMA.NET

JKSELF@CABLEONE.NET

Post Oak Creek Flood Protection Plan Public Meeting



March 22, 2012
City of Sherman and
Texas Water Development Board
with assistance from Espey Consultants, Inc.

Overview

- Welcome
- Project location
- Study process and project status
- Identification of flooding areas
- Alternatives for reducing flooding
- Flood protection goals
- Moving forward

Study Sponsors and Support

Guidance and Funding



Study Sponsors



Technical Input

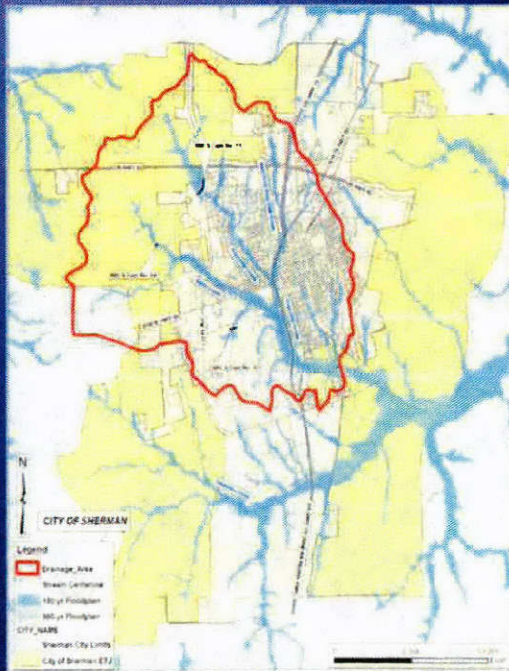


Localized Input

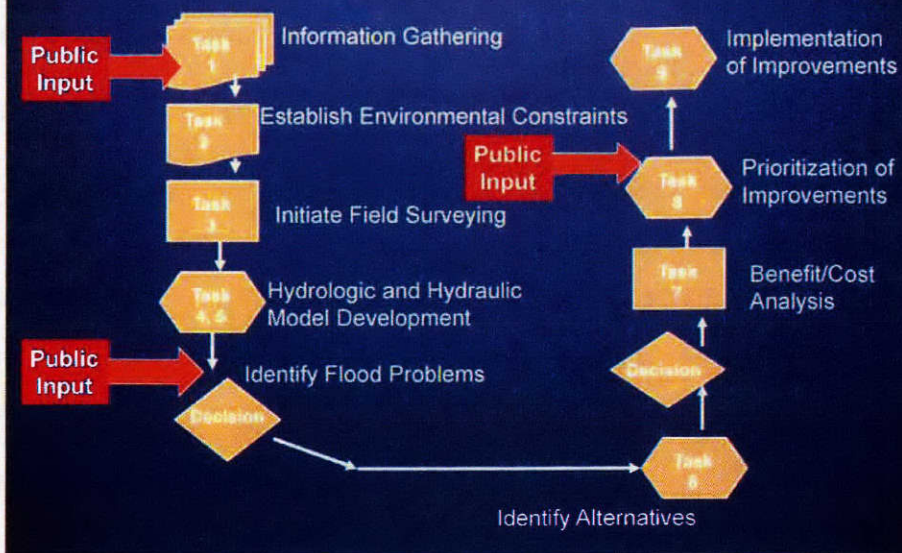


Study Area

- Post Oak Creek
1. 47.8 miles of stream
 2. 33 sq. mi. drainage
 3. 68 bridges/culverts



Study Process



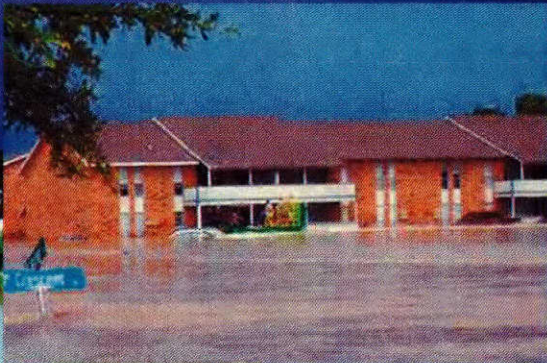
Bridge and Culvert Overtopping

- 19 - overtopped by the 20% Storm
- 7 - overtopped by the 10% Storm
- 8 - overtopped by the 4% Storm
- 11 - overtopped by the 2% Storm
- 2 - overtopped by the 1% Storm
- 7 - Pass the 1% Storm or greater



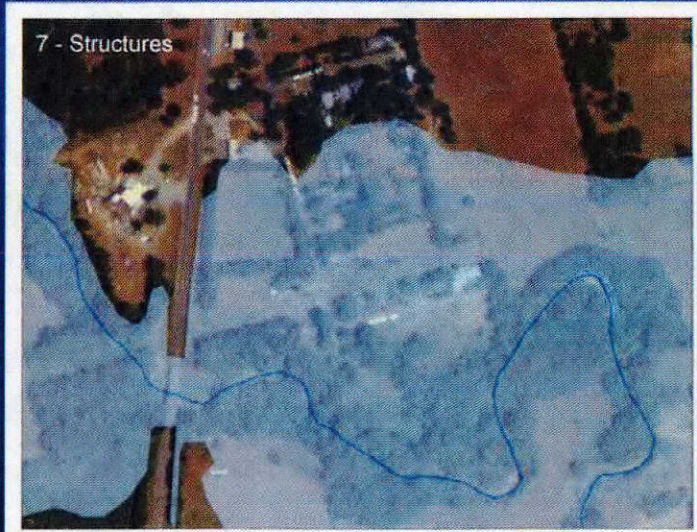
Home & Building Flooding

- 14 – Areas
- 145 - Structures



Identification of Flood Problems Crocket St. & Ayers Dr.

7 - Structures



Identification of Flood Problems
Wood St. & King St.



Identification of Flood Problems
Houston St. to Freeman St.



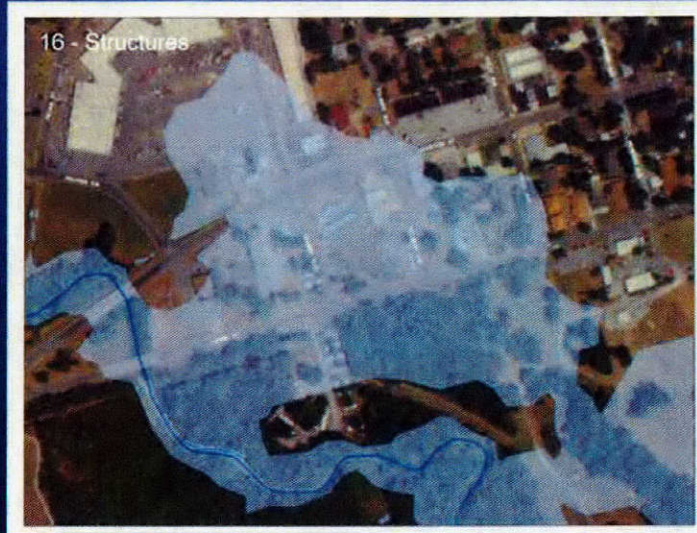
**Identification of Flood Problems
Washington St. & Regency Cir.**



**Identification of Flood Problems
Churchill Way**



Identification of Flood Problems
Lamar St. & Sunset Blvd.



Identification of Flood Problems
Archer Dr.

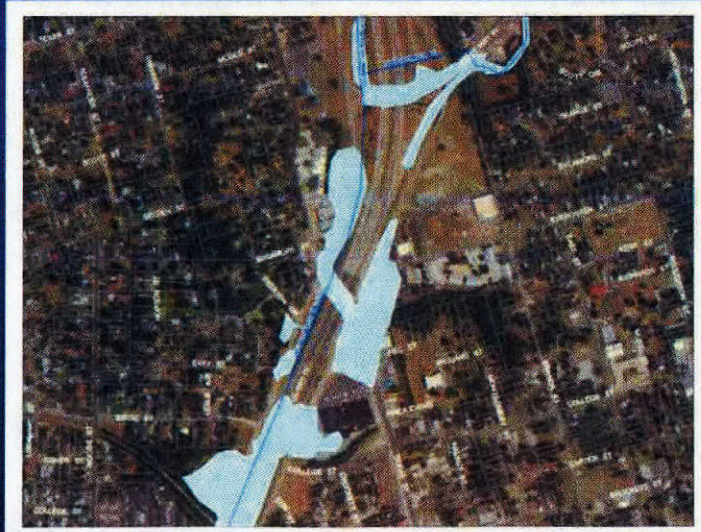


Identification of Flood Problems
Houston St. & Laurel Creek Dr.

2 - Structures



Identification of Flood Problems
U.S. Hwy 75 & S. H. 91



Identification of Flood Problems
Atkinson Dr.



Identification of Flood Problems
Forest Creek Dr.



**Identification of Flood Problems
McGee St. & Newman Dr.**



**Identification of Flood Problems
Skyline Dr. & Westside Dr.**



Identification of Flood Problems Vancouver & Nantucket Dr.



Types of Mitigation



▣ Structural

- Detention Ponds
- Channel Improvements
- Bridge / Culvert Improvements
- Channel Diversions

▪ Non-Structural

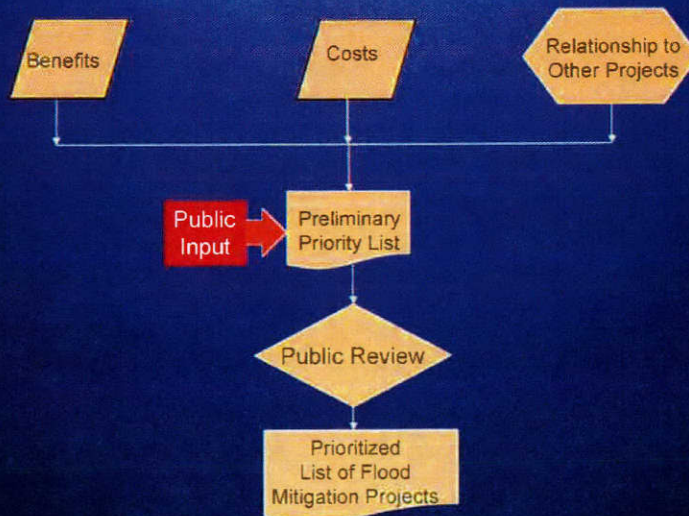
- Development Regulations
- Floodplain Land Acquisition
- Warning Systems



Recommended City of Sherman Watershed Management Goals

1. Increase the ability of natural and engineered systems to address stormwater runoff and drainage, both in existing neighborhoods and proposed developments, in order to minimize flooding and the damage it causes.
2. Reduce the greatest flood-related risks to public health, safety, property, and the environment.
3. Protect the integrity of Post Oak Creek's geomorphology and ecology.
4. Protect and enhance the quality, quantity, and availability of surface water resources.
5. Preserve and enhance existing aquatic and riparian environments and encourage restoration of degraded areas.
6. City arterial and collector streets should be passable during a 1% annual chance event.

Prioritized Solutions



For Additional Information Contact:

▪ **Clay Barnett, P.E.**
City Engineer
City of Sherman

Phone: (903) 892-4547

Email: clayb@ci.sherman.tx.us

• **Ivan Ortiz**
Texas Water Development Board
Research and Planning Fund

Phone: (512) 463-8184

Email: Ivan.ortiz@twdb.state.tx.us

Alternative Solutions - June 28, 2012

CITY OF SHERMAN

**Post Oak Creek Watershed
FLOOD PROTECTION PLAN**

**June 28, 2012
Technical Advisory Committee
Meeting Summary**

1. Attendance:

Meeting attendees included Don Keene, Mark Gibson, and Clay Barnett, City of Sherman; David Selman and Noel Paramanantham, TxDOT; Ivan Ortiz, TWDB; Joe Remondini, USACE; and Stephen Jenkins and Ken Tillman, RPS Espey.

2. Project overview:

- Ken Tillman provided an overview of the modeling.
- 14 areas and 145 structures were identified as being susceptible to flooding.
- Modeling results indicate that most of the repetitive loss properties, as well as the other structures located in the floodplain, are too deep within the floodplain to benefit from the floodplain reduction resulting from the recommended projects.
- Areas of flooding along US 75 will not change as a result of the proposed projects without major reconstruction of the highway.

3. Discussion:

- The list of flood protection projects needs consider:
 - Regional detention north of HWY 82.
 - Viable projects east of US 75.
- A draft prioritization matrix was presented for review by city staff.
- On-site vs. regional detention as it relates to flood protection. Regional detention is preferable for addressing flooding, but local drainage system adequacy may benefit from on-site detention. However, on-site detention carries some very high profile disadvantages, including development cost, maintenance, and aesthetic impact.

4. Schedule: Scheduled completion of the FPP is September 2012. Progress is approximately two weeks behind schedule.

5. Action Items:

- a. RPS Espey will include in the list of projects:
 - i. collector and arterial street culvert and bridge crossings that flood during the 1% event.
 - ii. Repetitive Loss Property buy-outs for those properties that will remain in the floodplain after completion of the recommended projects.
- b. RPS Espey will evaluate regional detention north of HWY 82 as a possible alternative to the proposed Vancouver culvert project.
- c. Ken will forward a copy of the benefit cost analysis results to Clay.
- d. City staff will review and comment on the draft prioritization criteria.



Post Oak Creek Flood Protection Plan Public Meeting Summary

June 28, 2012

I. Welcome:

Clay Barnett provided opening comments and introductions.

City of Sherman staff:

Mark Gibson, Director of Utilities & Engineering

Clay Barnett, City Engineer

U.S. Army Corps of Engineers

Joe Remondini

Texas Water Development Board staff

Ivan Ortiz, CFM

RPS Espey

Stephen Jenkins, P.E.

Kenneth Tillman, P.E., CFM

II. Meeting Summary:

- The status of the Flood Protection Planning study was presented by Kenneth Tillman in a slide presentation.
- The presentation included slides of proposed flood mitigation projects.
- The public was invited to comment on the proposed projects and additional areas of concern regarding flooding.

III. Stakeholder / Citizen Comments:

- Comment was made that favored developing linear parks with a trail system along the creeks.
- Concern about area of Redbud and areas north and south of HWY 82 (Post Oak Creek Reach 02 and Stream E Reach 01).
 - Potential for detention on Post Oak Creek Reach 02 north of HWY 82 will be evaluated.
 - A storm sewer outfall near Shoreline and Sherwood will be evaluated as part of the project.
- A discussion of erosion emphasized that TWDB study parameters do not focus on the control of erosion except where control of channel velocity is a consideration.
- Property owners along Redbud were in favor of dedicating property within the creek to the city for creek maintenance.
- It was commented that the outfall from Dean Gilbert dam (near Canyon Creek) appeared to be at a high velocity for an extended period of time after a storm event and was causing erosion downstream.

June 28, 2012

Name

Address

Email*

*If you wish to be contacted for future meetings

Ernetine Howell	2600 Nantucket Dr	echarrell@cableone.net
Howell	2605 Nantucket	TNTHowell@cableone.net
Bill + Joyce Jarvis	2 Vancouver Pl	bjejarvis@gmail.com
Gay + Gary	524 No. WARTON ST.	KATHYRAYZIE@VERIZON.NET
Gay + Jackie Bohuslar	2333 Canyon Creek Dr. 2345 Canyon Creek Dr.	jkself@cableone.net garyb79ag@texoma.net
Lorrie + Patry Stephens	3225 Redbud Trl	Lstephend@yahoo.com
Ivan Ortiz	TWDB	iortiz@twdb.texas.gov
Dorothy Law	2613 Nantucket	doral@cableone.net
Lony Beaverson	2609 Fair Oaks Cir.	hbejag hbejag@cableone.net
Julie Fokker	3221 Redbud TR	julie@folgedental.com
PAT HARMAN	3212 Redbud	
Tom Nuckols	2341 Canyon Creek	tnuckols@cableone.net
Steve Scott	2502 Keeseke Dr. Austin TX	sscott@eventimedesco.com

Post Oak Creek Flood Protection Plan Public Meeting



June 28, 2012

City of Sherman and

Texas Water Development Board

with assistance from Espey Consultants, Inc.



Overview

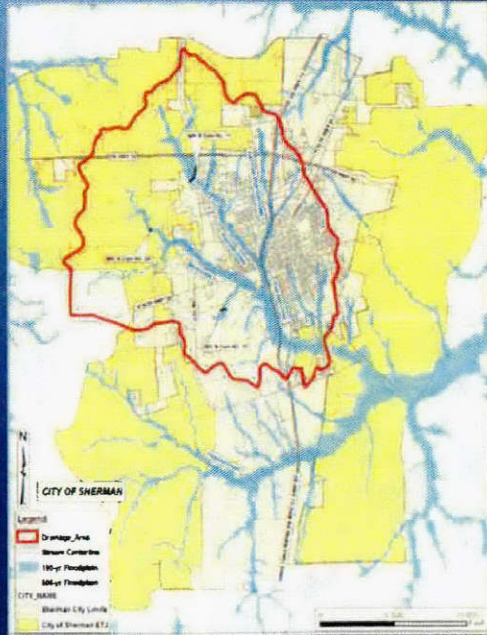
- Welcome
- Project location
- Study process and project status
- Identification of flood problems & proposed mitigation
- Benefit Cost Analysis
- Moving forward

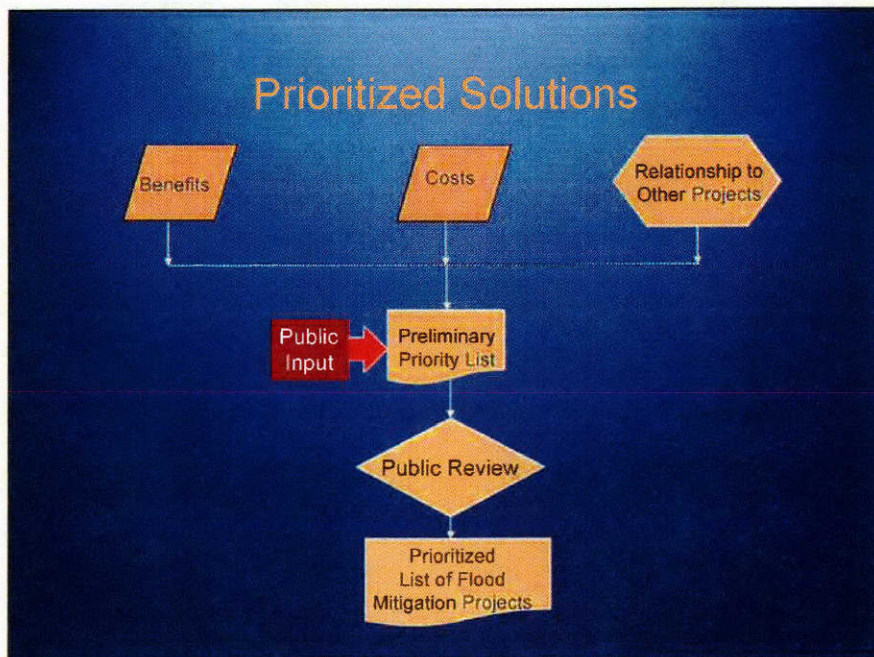
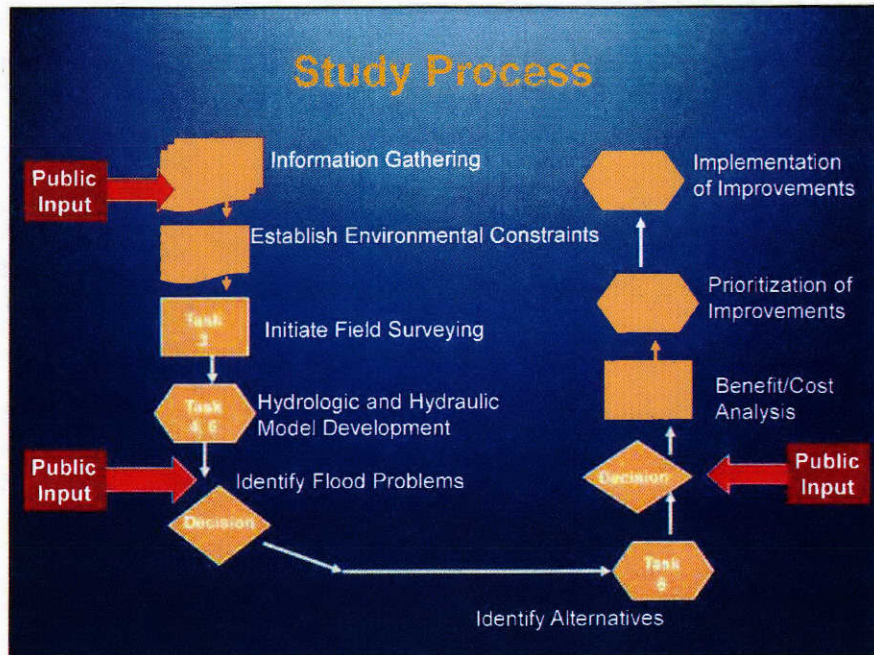
Study Sponsors and Support



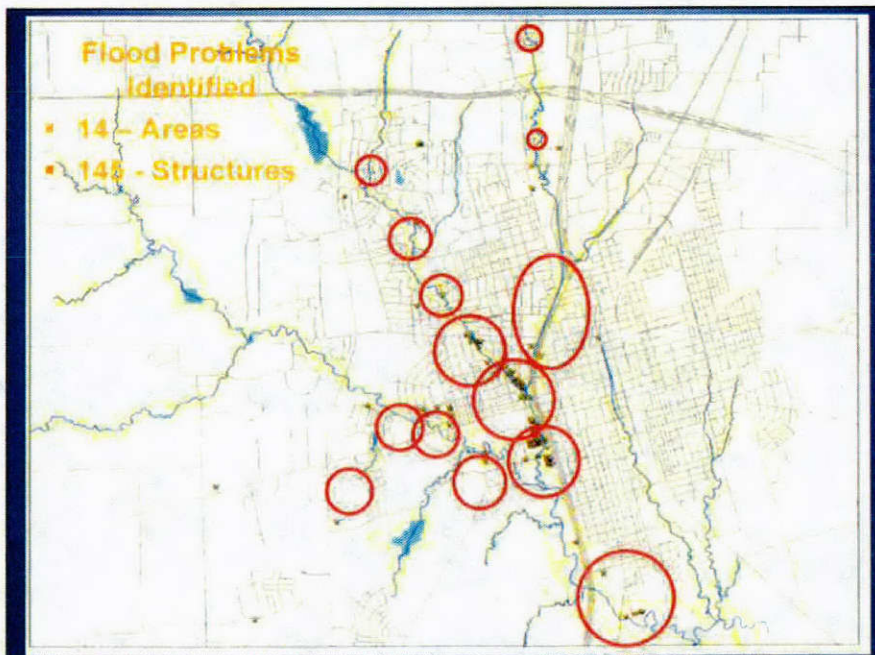
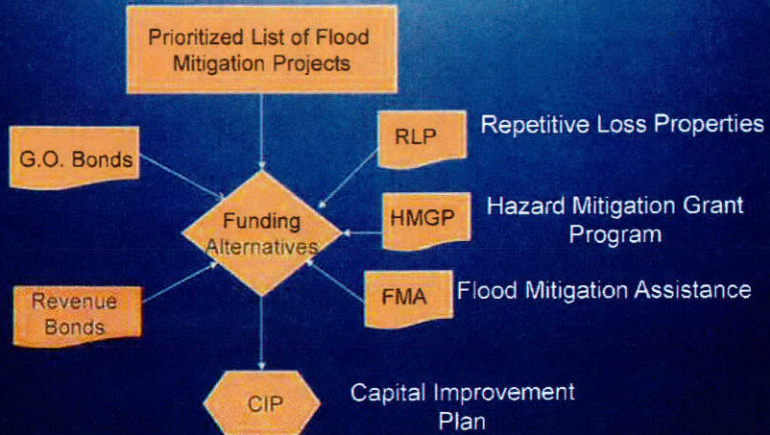
Study Area

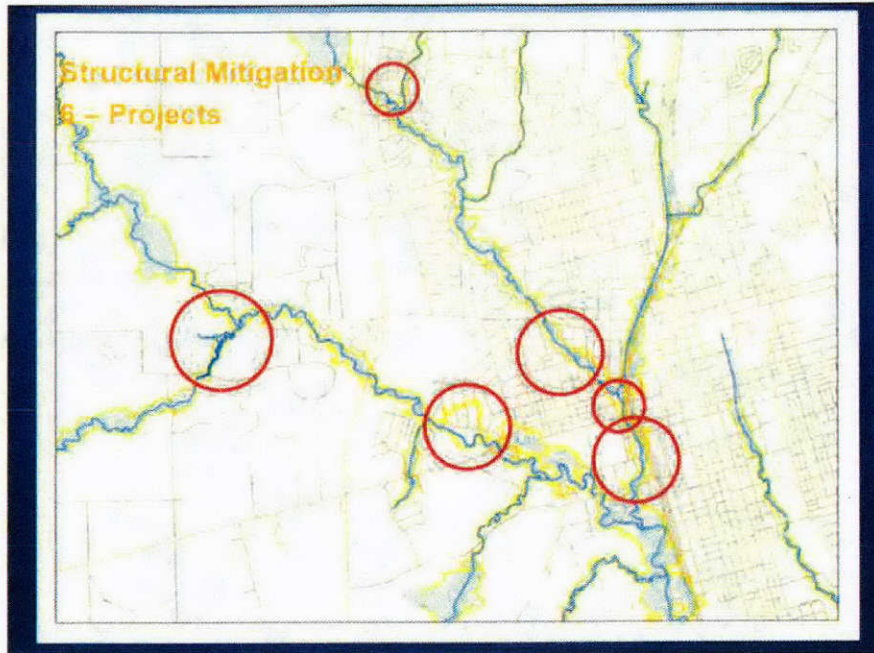
- Post Oak Creek
1. 47.8 miles of stream
 2. 33 sq. mi. drainage
 3. 68 bridges/culverts





Implementation Considerations Project Funding





Types of Mitigation



- ▣ **Structural**
 - Detention Ponds
 - Channel Improvements
 - Bridge / Culvert Improvements

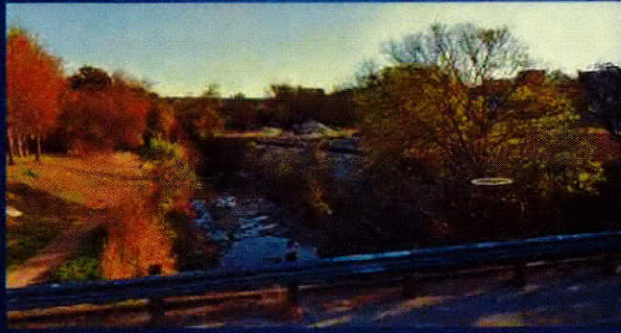
- **Non-Structural**

- Floodplain Land Acquisition
- Update Floodplain Mapping
- Update Floodplain Ordinance
- Update Drainage Design Criteria



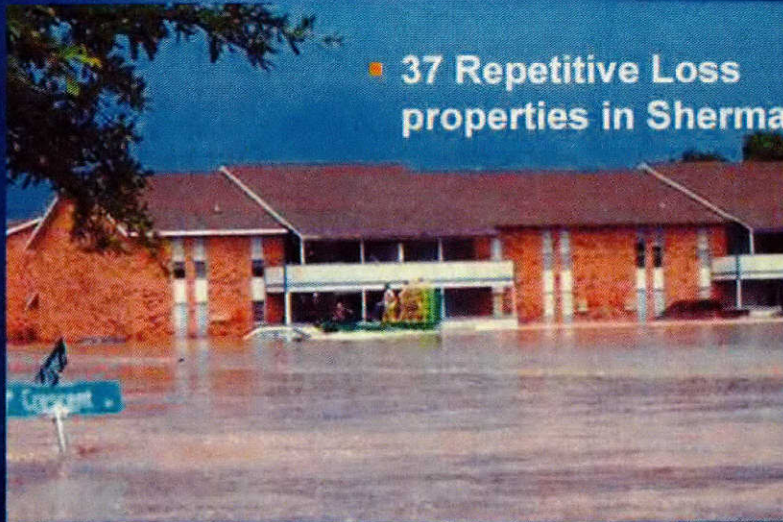
Non Structural Mitigation Buy-outs

- Repetitive Loss
- Natural Green Belt
- Compatible Use



Repetitive Loss Buy-out

- 37 Repetitive Loss properties in Sherman



Structural Mitigation Detention Pond

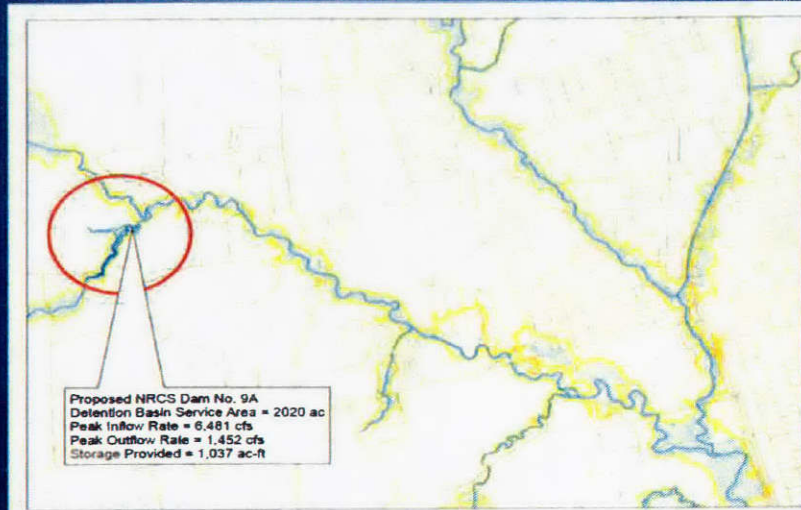
- Reduces Peak Flow Rates
- Increases Valley Storage



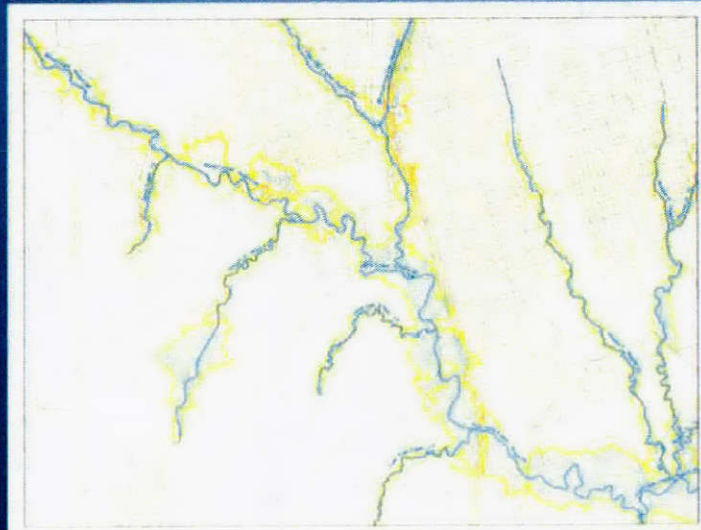
Detention Pond & Buy-out Archer Dr.



Structural Mitigation Dam 9A

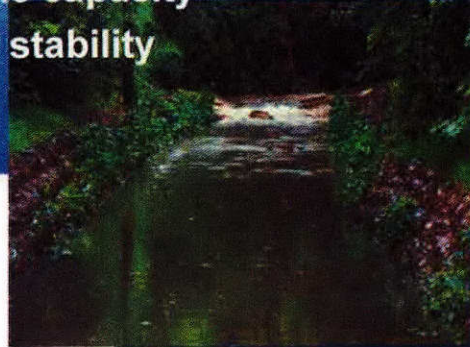
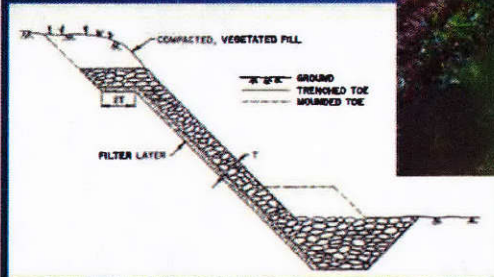


Structural Mitigation Dam 9A



Structural Mitigation Channel & Culvert Improvements

- Increase hydraulic capacity
- Improve channel stability

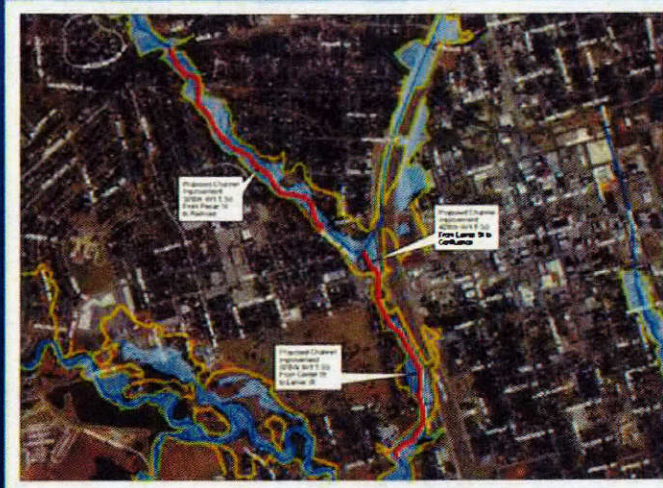


Structural Mitigation Vancouver Drive Culvert



Vancouver Drive
Exist. Culvert: 2-8'x5" Box
Prop. Culvert: 3-8'x5" Box
Yard Flooding
100-yr Pass Through Culverts

Structural Mitigation Proposed Channel Improvements

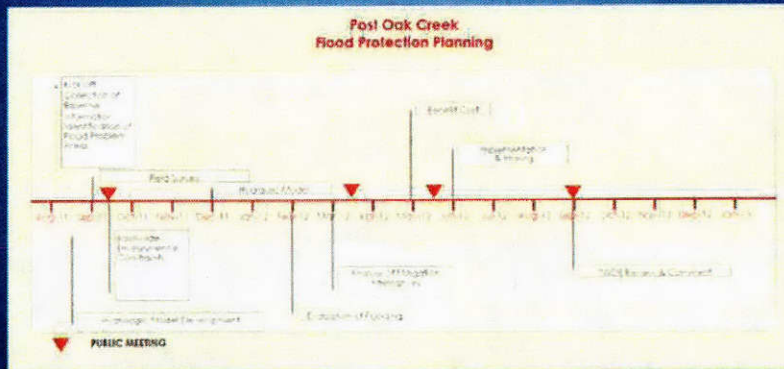


Recommended City of Sherman Watershed Management Goals

1. Increase the ability of natural and engineered systems to address stormwater runoff and drainage, both in existing neighborhoods and proposed developments, in order to minimize flooding and the damage it causes.
2. Reduce the greatest flood-related risks to public health, safety, property, and the environment.
3. Protect the integrity of Post Oak Creek's geomorphology and ecology.
4. Protect and enhance the quality, quantity, and availability of surface water resources.
5. Preserve and enhance existing aquatic and riparian environments and encourage restoration of degraded areas.
6. City arterial and collector streets should be passable during a 1% annual chance event.

Mitigation Projects

Description	Cost
Vancouver Drive Culvert	\$129,000
Archer Drive Detention Pond	\$861,000
40' Channel Lamar St. to Confluence	\$957,000
Archer Drive Buyout	\$1,920,000
30' Channel Pecan St. to Railroad	\$3,775,000
60' Channel Center St. to Lamar St.	\$4,001,000
Proposed DAM 9A	\$5,459,000



For Additional Information Contact:

- **Clay Barnett, P.E.**
City Engineer
City of Sherman

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Email: clayb@ci.sherman.tx.us

- **Ivan Ortiz**
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Research and Planning Fund

Phone: (512) 463-8184

Email: Ivan.ortiz@twdb.state.tx.us

Final Recommended Improvement Plan – February 26, 2013

CITY OF SHERMAN
Post Oak Creek Watershed
FLOOD PROTECTION PLAN

February 26, 2013
Technical Advisory Committee
Meeting Summary

1. Introductions: Meeting attendees included Don Keene and Clay Barnett, City of Sherman; David Selman, TxDOT; Ivan Ortiz, TWDB; and Stephen Jenkins and Ken Tillman, RPS Espey.
2. Meeting Summary:
 - Ken Tillman provided a review of the project prioritization criteria and the capital projects identified through the FPP.
 - Projects 20 and 21 are intended to relieve flooding in the Payton St. – Loy Lake area. Ken is to review ranking for project no. 20.
 - The ranking for Town Center (19) needs to be reviewed due to public interest in addressing the adequacy of the detention structure.
 - Clay provided a list of staff comments to be addressed in the Draft Final Report (attached).
3. Schedule: The Draft Final Report must be submitted to TWDB before April 30, 2013 in order to avoid requesting a contract extension.
4. **Action Items:**
 - a. David Selman will provide record drawings for the box culverts on SH 56 at Sunset.
 - b. RPS Espey will revise the draft report to address the city staff comments.

Post Oak Creek Flood Protection Plan Public Meeting



February 26, 2013

City of Sherman and

Texas Water Development Board

with assistance from Espey Consultants, Inc.



Overview

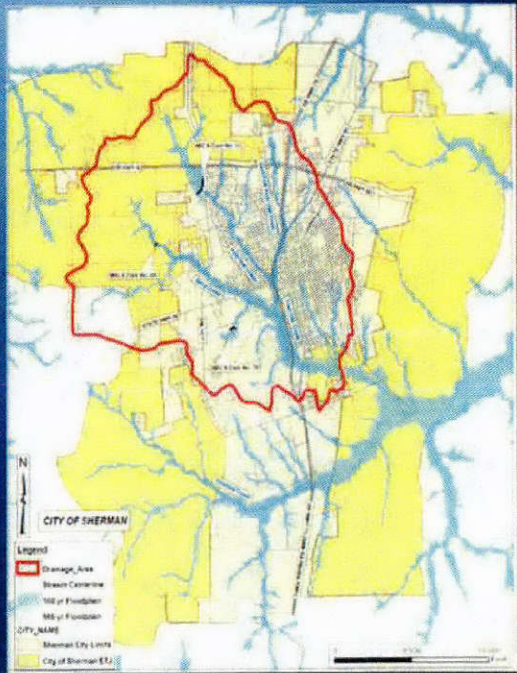
- Welcome
- Project location
- Study process and project status
- Prioritization of Improvements
- Recommended Action Plan
- Funding options
- Implementation Considerations

Study Sponsors and Support

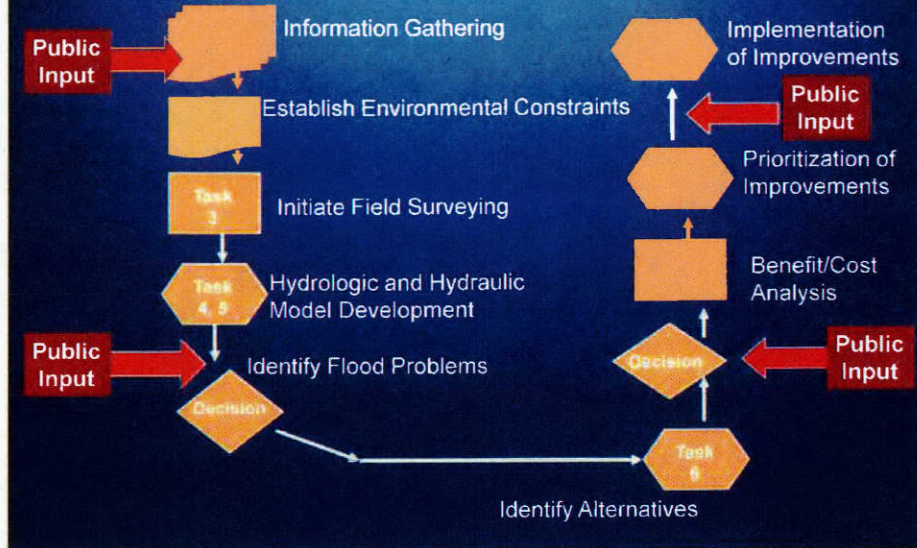


Study Area

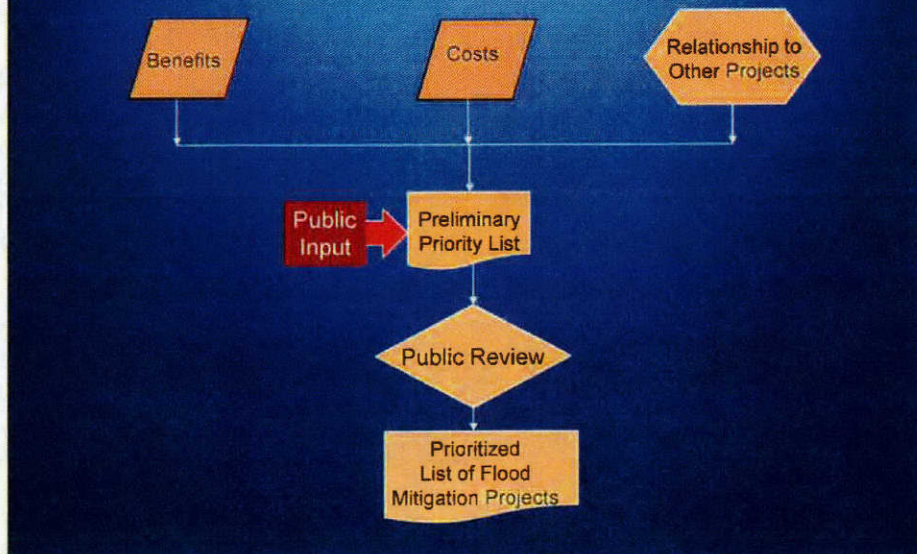
- Post Oak Creek
1. 50.5 miles of stream
 2. 33 sq. mi. drainage
 3. 68 bridges/culverts

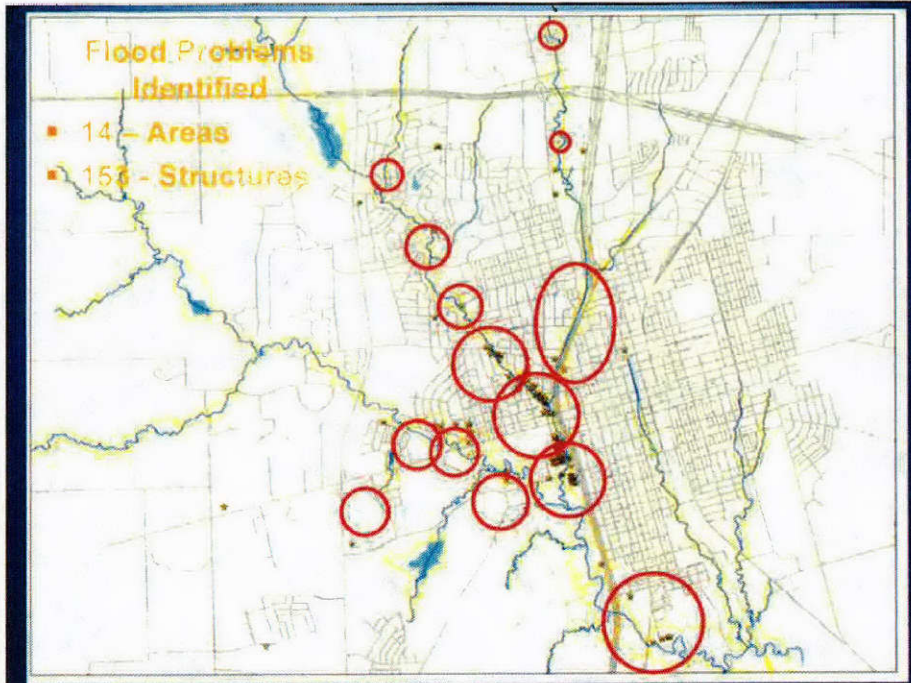


Study Process



Prioritized Solutions





Types of Mitigation



- ▣ **Structural**
 - Detention Ponds
 - Channel Improvements
 - Bridge / Culvert Improvements

- **Non-Structural**
 - Floodplain Land Acquisition
 - Update Floodplain Mapping
 - Update Floodplain Ordinance
 - Update Drainage Design Criteria



Structural Mitigation Detention Pond

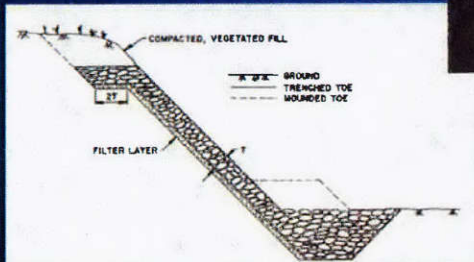
- Reduces Peak Flow Rates
- Increases Valley Storage



Proposed 7
Detention Pond
Projects

Structural Mitigation Channel Improvements

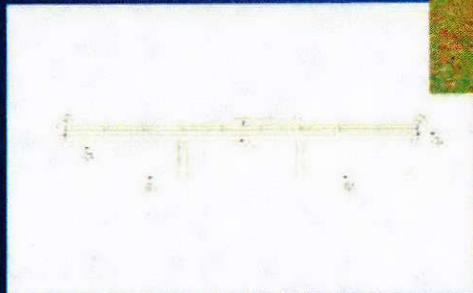
- Increase hydraulic capacity
- Improve channel stability



Proposed 3 Channel
Improvement
Projects

Structural Mitigation Bridge Improvements

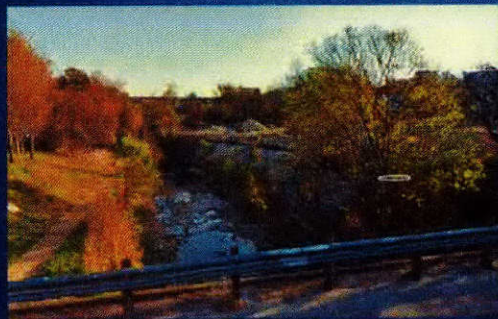
- Provides access for Emergency Services
- Increase hydraulic capacity



Proposed 10
Bridge/Culvert
Improvement
Projects

Non Structural Mitigation Buy-outs

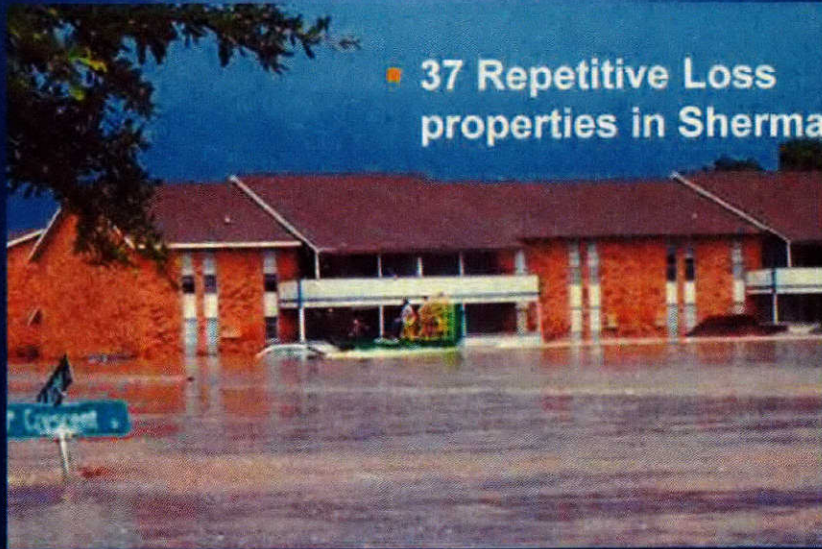
- Repetitive Loss
- Natural Green Belt
- Compatible Use



Proposed 12
Property
Acquisition
Projects

Repetitive Loss Buy-out

- 37 Repetitive Loss properties in Sherman



Recommended City of Sherman Watershed Management Goals

1. Increase the ability of natural and engineered systems to address stormwater runoff and drainage, both in existing neighborhoods and proposed developments, in order to minimize flooding and the damage it causes.
2. Reduce the greatest flood-related risks to public health, safety, property, and the environment.
3. Protect the integrity of Post Oak Creek's geomorphology and ecology.
4. Protect and enhance the quality, quantity, and availability of surface water resources.
5. Preserve and enhance existing aquatic and riparian environments and encourage restoration of degraded areas.
6. City arterial and collector streets should be passable during a 1% annual chance event.

Prioritization Process

1. Define criteria for ranking
2. Establish weighting per criterion
3. Establish means to measure criteria per recommended solution
4. Apply weighted criteria to recommended solutions
5. Present resultant ranking for public comments and revise as necessary

Application of City Goals to Measureable Criteria

- Reduces flooding of public, business and residential structures.
- Reduces flooding of collector and arterial streets.
- Reduces channel erosion.
- Enhances the environmental characteristics of the floodplain.

Additional City Criteria to City Management Goals

- Project implementation can be within annual operating budget (\leq \$300,000)
- Project can be implemented in phases
- Benefit-Cost Ratio

Prioritization Criteria for Application to Recommended Solutions

Reduces flooding of public, business and residential structures	
Description	Ranking
Project Eliminates Structural Flooding	10
Project Reduces Number of structures flooded	5
Project has no effect on structural flooding	0

Prioritization Criteria for Application to Recommended Solutions

Reduces flooding of collector and arterial streets	
Description	Ranking
Project increases capacity to pass 1% event	10
Project increases capacity to pass 4% event	8
Project increases capacity to pass 20% event	5
Project has no effect on street flooding	0

Prioritization Criteria for Application to Recommended Solutions

Reduces channel erosion	
Description	Ranking
Project reduces stream velocities	10
Project has no effect on velocities	5
Project increases velocities	0

Prioritization Criteria for Application to Recommended Solutions

Enhances the environmental characteristics of the floodplain	
Description	Ranking
Project enhances the environment (Increase in green space Decrease in impervious cover)	10
Project has no effect on environment	5
Project decreases the environment (Decrease in green space Increase in impervious cover)	0

Prioritization Criteria for Application to Recommended Solutions

Project implementation can be within annual operating budget (≤\$300,000)	
Description	Ranking
Project can be implemented within annual budget	10
Project can be implemented within annual budget with other government participation	8
Project requires bond issue & other government participation is available	5
Project requires bond issue & other government participation is not available	0

Prioritization Criteria for Application to Recommended Solutions

Project can be implemented in phases	
Description	Ranking
Project phases can be implemented within annual budget	10
Project can be phased	5
Project cannot be phased	0

Prioritization Criteria for Application to Recommended Solutions

Benefit-Cost Ratio	
Description	Ranking
Benefit-Cost Ratio > 2.0	10
Benefit-Cost Ratio ≥ 1.0	5
Benefit-Cost Ratio < 1.0	0

Project Prioritization

City of Sherman
Post Oak Creek Flood Protection Plan
Capital Improvement Plan
Flood Protection Plan Project Priority Ranking
February 28, 2013

Project Number	Project Type	Project Name	Project Cost	Street Eligible	Prevents flooding of public, business and residential structures	Reduces flooding of collector and arterial streets	Reduces channel erosion	Enhances the environmental characteristics of the floodplain	Project implementation can be within annual operating budget	Project can be implemented in phases	Beneficial Cost Ratio	TOTAL	Priority Ranking
24	R	S. Sam Rayburn Frwy and Center Street	99,739	Y	10		8	10	8	10	5	48	1
25	R	N. Woods, N. Ricketts and W. Pecan	141,162	Y	10		5	10	8	10	5	48	1
23	R	Crockett Street and Ayers Drive	269,953	Y	10		5	10	8	10	5	48	1
26	R	Bessler Blvd. and Wharton St.	119,933	Y	10		5	10	8	10	5	48	1
29	R	Forest Creek Dr. and Lambeth Rd	57,291	Y	10		5	10	8	5	5	43	2
1	R	Archer Dr. SR1 Property Acquisition	1,920,000	Y	10		5	10	5		5	35	3
2	D	Archer Detention Pond	1,298,000	Y	10		10	10	5		7	42	3
30	R	N. Sam Rayburn FWY and N. Travis St	489,003	Y	10		5	10	5	5	5	40	4
27	R	Regency Dr. and W. Washington St	1,296,915	Y	10		5	10	5	5	5	40	4
31	B	Contemporary Dr	1,426,416	Y	10		5	10	5	5		35	5

Project Prioritization

City of Sherman
Post Oak Creek Flood Protection Plan
Capital Improvement Plan
Flood Protection Plan Project Priority Ranking
February 28, 2013

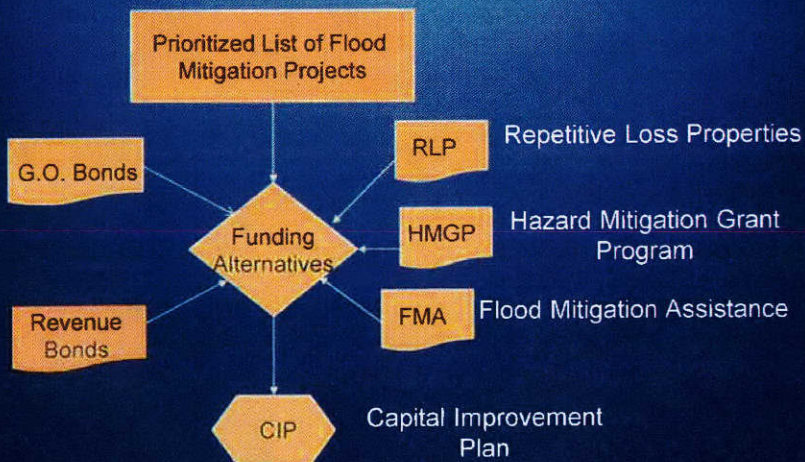
Project Number	Project Type	Project Name	Project Cost	Street Eligible	Prevents flooding of public, business and residential structures	Reduces flooding of collector and arterial streets	Reduces channel erosion	Enhances the environmental characteristics of the floodplain	Project implementation can be within annual operating budget	Project can be implemented in phases	Beneficial Cost Ratio	TOTAL	Priority Ranking
7	B	Center Street at Post Oak Creek Street Improvement	2,698,000	N		10	7	5				22	6
6	C	Center St. to Lamar St. Channel	11,129,000	N	5	8	10	5		5		33	6
5	C	Lamar St. Channel	1,437,000	N	5	8	10	5		5		33	6
4	C	Pecan St. Channel	5,771,000	N	5	8	10	5		5		33	6
12	B	Houston Street at Laurel Creek Box Culvert	169,000	N		10	7	5	10			32	7
14	B	Lambeth Road at T2 East Fork of Post Oak Creek Coverts	241,000	N		10	7	5	10			32	7
17	B	Gribble Street at Stream G Box Culvert	275,003	N		10	7	5	10			32	7
3	D	Proposed Dam 9A	6,394,000	Y	5		10	5	3	0	3	26	8
11	D	Stream E North of US 82 Detention Pond	1,486,000	N		10	10	5				25	9
22	D	Taylor St. Detention	3,114,000	N	5	10	5	5				25	9
21	B	Low Lake Rd. to Taylor St. Box Culvert	3,610,000	N	5	8	5	5				23	10

Project Prioritization

City of Shelton
Post Oak Creek Flood Protection Plan
Capital Improvement Plan
Flood Protection Plan Project Priority Ranking
February 26, 2013

Project Number	Project Type	Project Name	Project Cost	Flood Eligible	Reduces flooding of public, business and residential structures	Reduces flood hazard collector and arterial drains	Reduces flood hazard collector and arterial drains	Reduces flood hazard collector and arterial drains	Enhances the environmental aesthetics of the location	Project implementation can be with current operations budget	Project can be implemented in phases	Funding Source	TOTAL	Priority Ranking
13	B	Lambert Road at East Fork of Post Oak Creek Box Culvert	793,000	N		10	7	5					22	11
9	B	Houston Street at Post Oak Creek Bridge Improvements	3,030,000	N		10	7	5					22	11
8	B	Lamar Street at Post Oak Creek Bridge Improvement	3,038,000	N		10	7	5					22	11
15	B	Taylor Street at T1 East Fork of Post Oak Creek Box Culvert	323,000	N		8	7	5					20	12
16	B	King Street at Stream F Box Culvert	2,011,000	N		8	7	5					20	12
10	B	Washington Street at Post Oak Creek Roadway Improvements	1,538,000	N		5	7	5					17	13
18	D	Kammerbury Dr. Detention Pond	528,000	N				10	5				15	14
19	D	Town Center Detention Pond Modification	419,000	N				10	5				15	14
20	D	Payton St. Detention Pond	1,057,000	N				10	5				15	14

Implementation Considerations Project Funding



Funding Options

- Internal to Sherman
 - Annual appropriation
 - Bonds
 - Special Taxing District

Funding Externally: Competitive

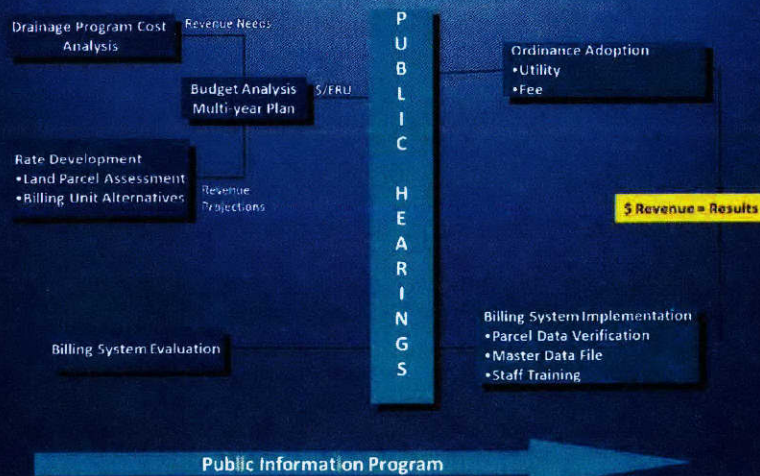
Eligible Activities	HMGP	PDM	FMA	RFC	SRL
Property Acquisition and Structure Demolition	P	P	P	P	P
Property Acquisition and Structure Relocation	P	P	P	P	P
Structure Elevation	P	P	P	P	P
Mitigation Reconstruction					P
Dry Floodproofing of Non-residential Structures	P	P	P	P	
Minor Localized Flood Reduction Projects	P	P	P	P	P
Structural Retrofitting of Existing Buildings	P	P			
Non-structural Retrofitting of Existing Buildings and Facilities	P	P			
Infrastructure Retrofit	P	P			
Soil Stabilization	P	P			
Best Disaster Code Enforcement	P				

Funding Externally: Competitive

FEMA Program	Federal Cost Share (%)
HMGP	75
PDM	75
FMA	75
FMA (severe repetitive loss property with Repetitive Loss Strategy)	90
RFC	100
SRL	75
SRL (with Repetitive Loss Strategy)	90

Concept for Stormwater Utility

STORM WATER UTILITY IMPLEMENTATION PROCESS



Features of Stormwater Utility

- Established dedicated source of funding
- Can leverage regular income for issuing debt if large projects require multi-years
- Cost collection from impervious cover common to all citywide
- No greater reliance on private sector such as with impact fees that are cyclic and may negatively affect development, thus fair for existing legacy problems citywide

Implementation Considerations

- Identify plan for funding improvements
- Consider CRS uprating for reduced flood insurance premiums
- Consider updating of flood mapping with FEMA
- Incorporate comments, finalize report, and deliver to Sherman flood models and report for continuing flood management

For Additional Information Contact:

- **Clay Barnett, P.E.**
City Engineer
City of Sherman

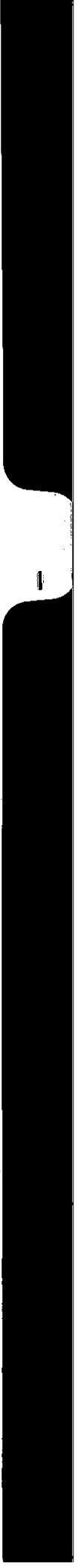
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Research and Planning Fund

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Appendix I – Digital Data

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