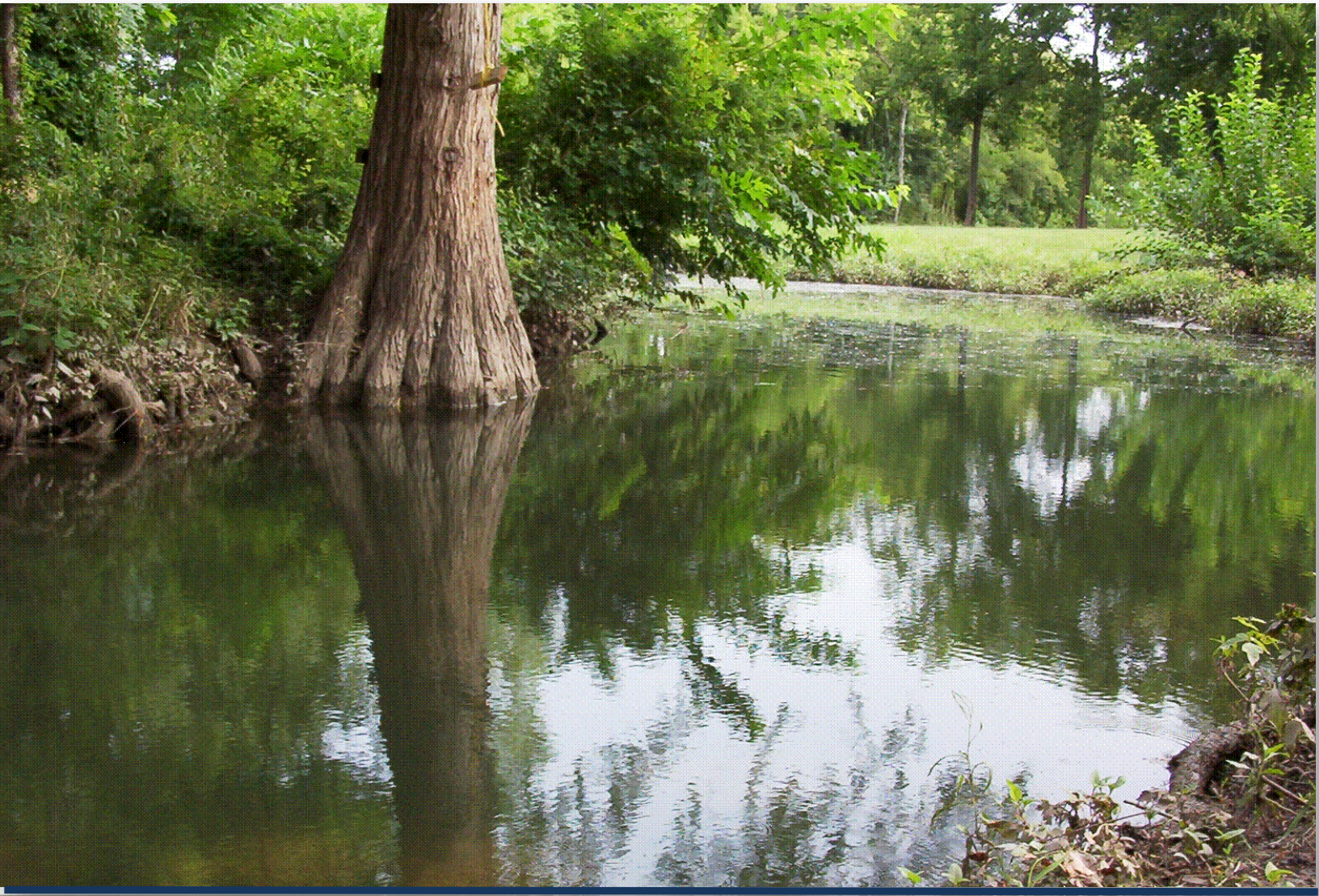

CITY OF KYLE, TEXAS
DRAINAGE MASTER PLAN

Prepared by:

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LIST OF ACRONYMS AND ABBREVIATIONS

ACE	Annual Chance of Exceedance
ac-ft	acre-feet
cfs	cubic feet per second
CIP	Capital Improvement Project
City	City of Kyle
CMP	Corrugated Metal Pipe
CN	Curve Number
DMP	Drainage Master Plan
DEM	Digital Elevation Model
DTM	Digital Terrain Model
FEMA	Federal Emergency Management Agency
FIS	Flood Insurance Study
FIRM	Flood Insurance Rate Map published by FEMA
ft	feet/foot
GIS	Geographic Information System
GPS	Global Positioning System
H&H	Hydrologic and Hydraulics
HEC	Hydrologic Engineering Center (U.S. Army Corps of Engineers)
HMS	Hydrologic Modeling System
IC	Impervious Cover
LiDAR	Light Detection and Ranging
LOMR	Letter of Map Revision
MS4	Municipal Separate Storm Sewer System
NAD	North American Datum
NAVD	North American Vertical Datum
NRCS	Natural Resources Conservation Service
PCCD	Plum Creek Conservation District
RAS	River Analysis System
RCB	Reinforced Concrete Box
RCP	Reinforced Concrete Pipe
RS/XS	HEC-RAS River Station
SCS	Soil Conservation Service (now Natural Resources Conservation Service)
SIR	Scientific Investigations Report
sq. mi.	square mile
SSURGO	Soil Survey Geographic
TCEQ	Texas Commission on Environmental Quality
TNRIS	Texas Natural Resource Information Service
TR	Technical Reference
TxDOT	Texas Department of Transportation
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
WSEL	Water Surface Elevation

1.0 INTRODUCTION

Over the last couple decades, the City of Kyle (City) has experienced significant growth and development. A recent annexation of over 10 square miles of land increased the total area within the City limits to approximately 30 square miles, equating to a 50% increase. The City has an estimated population of 45,000 and has been one of the fastest growing cities in the state. The rapid growth is largely attributed to its proximity to Austin and location along the Interstate Highway 35 corridor. The City is expected to continue to grow, both in population and economic vitality. This has resulted in a significant increase in the amount of drainage infrastructure the City is responsible for maintaining. The City experienced significant flooding as a result of the Halloween storm events in both 2013 and 2015. The 2015 Halloween flood was estimated to be over a 500-year storm event. There were a number of structures flooded throughout the City resulting in varying degrees of damage which included major roadways and other infrastructure.

With urbanization comes an increased risk of flooding from streams as well as other sources, which can present hazards to the public and impede growth. In an effort to more effectively plan drainage improvements and consider regulatory measures aimed at minimizing adverse impacts, the City is taking a proactive approach. As such, the City selected Halff Associates to prepare a Drainage Master Plan (DMP) that will extend to the City Limits and the Extra-Territorial Jurisdiction (ETJ) (See Exhibit 1, in Appendix A). The services and products resulting from the study shall be referred to as the City of Kyle Drainage Master Plan.

Streams included the most recent hydrologic and hydraulics studies for Plum Creek and its tributaries, Bunton Branch and its tributaries, Richmond Branch, Upper Blanco River and associated tributaries, Porter Creek, Andrews Branch, Brushy Creek and associated tributaries, and Mustang Branch and tributaries. The study lies within four (4) Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) panels within Hays County. Map Panels include 48209C0270F, 48209C0290F, 48209C0385F, and 48209C0405F all effective as of September 2005. Local flooding areas were be identified by City staff.

The purpose and goal of the DMP is to conduct a comprehensive evaluation of the existing drainage conditions throughout the City to develop an accurate and current understanding of the drainage infrastructure based on data provided by the City. This assessment will include a comprehensive inventory of existing data, most recent hydrologic and hydraulics watershed model simulation, flooding problem area identification, and flood mitigation solutions. A drainage Capital Improvement Plan (CIP), including costs, will be developed to address flooding issues.

During the development of this Drainage Master Plan, the National Weather Service released new preliminary rainfall for the State of Texas titled NOAA Atlas 14 that impacted design rainfall depths due to the addition of approximately 20 years of rainfall data. The reader should be aware the conceptual drainage CIP projects are based on the current USGS 1998 rainfall data per the current drainage criteria. Further discussion regarding NOAA Atlas 14 and recommendations on adopting the new rainfall data is located in Section 5.1. The following sections describes the procedure used in the development of the drainage CIP projects.

2.0 DATA COLLECTION AND FIELD INVESTIGATIONS

Several types of existing data were obtained to provide an understanding of Kyle's existing drainage problems to achieve the project's primary objective of identifying and developing a prioritized list of drainage CIP projects. Table 2-1 lists the data collected along with their respective sources.

Table 2-1: Data Collected and Sources

Data	Source	Notes
Field Reconnaissance	Halff	November 2017
Soils	NRCS	SSURGO data
Landuse	City of Kyle	2017
Contours	TNRIS/Hays Co.	2008
Terrain (DEM)	TNRIS/Hays Co.	2008
GBRA Interim Feasibility Study Phase 2	GBRA	May 2015
GBRA Interim Feasibility Study Phase 3	GBRA	January 2015
City of Kyle Drainage Design Manual	City of Kyle	Revised February 2015
Burleson Street Flood Study	Freese and Nichols	July 2015
Stagecoach Preliminary Engineering Report	Carlson, Brigance& Doering, Inc	June 2017
Stagecoach Subdivision Phase 1 and 1A	Carlson, Brigance& Doering, Inc	Plan set dated November 2017
N. Burleson Street Improvements	Freese and Nichols, Inc.	Plan set dated April 2016
Lehman Road Bridge Layout	HDR, Inc.	Plan set dated November 2017
Jack C Hays Trail Drainage and Safety Improvements	CivilE	January 2017
Hydrologic Analysis and Floodplain Delineation: Plum Creek Subdivision sections 3, 5 & 6	Don Wolford, P.E.	May 2006
Driskell Tract Preliminary Plan Application	Miller Gray	August 2017
Goforth Road Plan Set	LAN, Inc.	December 2015
Hometown Kyle Phase 1 and 3	LAN, Inc.	April 2003 and June 2006
SteepleChase Subdivision Design Plans Phases 1 to 3	Ulmann Engineering, Inc	May 1996 to March 1998
Silverado At Plum Creek	Nathan D. Smith, P.E.	July 2001
St Anthony's Church New Sanctuary	Spencer Godfrey Architects	January 2003
FEMA LOMAs	FEMA	Effective dates vary June 2006 to October 2016

2.1 Data Collection

Halff collected and catalogued all relevant GIS data including, but not limited to, storm drain network, terrain (LiDAR) Data, land use/zoning, FEMA floodplain data, planimetrics, political boundaries, development and subdivisions, detention pond locations, available utility information, and parcel information. All GIS data gathered was organized in Geodatabase format for use during the DMP process and will be provided to the City.

Halff collected and reviewed the current City Master Plans including:

- Comprehensive Plan
- Transportation Master Plan
- Parks and Recreation Master Plan
- Stormwater Management Plan (MS4 Phase 2)

Halff reviewed the following preliminary list of identified flooding problems provided by City staff.

- Steeplechase along Plum Creek
- Jose Addition at Burleson Road
- Park Place/Hitching Post
- Lake Kyle (built for sediment retention)
- Records of drainage complaints received by City staff.

Halff utilized the GBRA Interim Feasibility Study products as support for this project. Hydrologic and hydraulics models were reviewed and updated to support the analysis for the low water crossings and channel solutions.

2.2 Field Data Collection

Halff conducted site visits of identified flood problem areas where access is available from public right-of-way (ROW) and of selected road crossings, storm drain outfalls, regional detention ponds, and sections of identified streams. During the site visits, Halff geo-located features, photographed the feature, and recorded notes regarding the dimensions, conditions, etc. This data was obtained utilizing the Halff GIS iOS app, which is connected to a Halff server in real time through a cellular or Wi-Fi network. Once the field verification process was complete, the GIS data developed was evaluated for completeness and correctness and then finalized.

3.0 DRAINAGE PROBLEM IDENTIFICATION

Halff compiled a list of drainage problem area "hot spots" identified in other studies based on the data collected in the previous task and City staff input. Remaining flood and drainage issues were identified using the best available existing information, drainage complaints, and City knowledge of flooding problems. A field reconnaissance was conducted to evaluate drainage problem areas. The naming conventions used for drainage problem identification were based on the watershed that the problem exists. Table 3-1 lists the stream watershed names within the City limits and the lettered stream code used in this DMP. Exhibit 1, in Appendix A, shows the streams in relation to the City limits along with the regional retarding structures built by the NRCS which are operated and maintained by the Plum Creek Conservation District. (PCCD). The following section describe the type of flooding identified with the City.

Table 3-1: City of Kyle Watersheds and ID Codes

Stream Name	Watershed ID Code
Blanco River	BR
Plum Creek	PLU
Porter Creek	POR
Bunton Branch	BUN
Richmond Branch	RIC
Plum Creek Tributary 1	PCT1
Plum Creek Tributary 4	PCT4
Andrews Branch Tributary	ABT
Clear Fork Tributary	CFP
Bunton Creek Tributary 1	BCT1
Plum Stream Tributary	PST

3.1 Field Data Collection

Stream flooding involved identifying riverine flooding issues, typically based on FEMA floodplains shown on the FIRM's. Riverine flooding was identified through overlaying the floodplains onto the Hays County appraisal district data and aerial photographs, then identifying structures located within the 100-year (1% Annual Chance of Exceedance) floodplain limits. While there are a significant number of floodplains through the City of Kyle, there are not a large number of structures flooded in the 100-year storm event. The areas that were identified with stream flooding were typically more rural and in areas that had more natural stream channels rather than constructed channels designed for flood reduction.

The areas that were identified with stream flooding were typically more rural and in areas that had more natural stream channels rather than constructed channels designed for flood reduction.

3.2 Low Water Crossings

Low water crossings are common throughout the City. These crossings were built to provide conveyance under the roadway in more frequent storm events but were not designed to convey larger storms. At a minimum, this can result in mobility problems and can create potentially dangerous conditions if emergency vehicles cannot access particular areas of the City.

Another potential problem arises when residents drive through flooded low water crossings, not recognizing the hazard created by significant depth and velocity of water overtopping the roadway. Low water crossings were initially identified from mapping the intersections of the FEMA floodplains and City of Kyle roadway. Stream hydraulics models at these locations were reviewed, where available, to identify the flood elevation and depth over the roadway. At locations where hydraulics models were not available, the available floodplain mapping was used to identify the approximate flood elevation and therefore, flood depth. For the modeled locations, the storm frequencies (2-, 10-, 50-, and 100-year storm events) of modeled depths were recorded as shown in Table 3-2 in Appendix B.

This comprehensive list was reduced to those low water crossings that were inundated by the 2- (50% ACE), 5- (20% ACE), and 10-year (10% ACE) storm events. These locations were mapped and a mobility evaluation was performed to confirm access for all subdivisions during these storms. The mobility evaluation identified those culverts that required upgrading to allow for at least one point of access to all neighborhoods in the City. These identified culverts were included in the DMP analysis. A final check for the 25-year (4% ACE) and larger event was performed to evaluate access during these larger storms. The revised list of low water crossings was reviewed by the City of Kyle and several low water crossings were added based on comments from staff. The final list of low water roadway crossings is included in Table 3-2 in Appendix B. Refer to the Drainage Project Ranking Criteria matrix in Appendix C and Exhibit 2 in Appendix A for location of low water crossings on the final list.

3.3 Localized Drainage Issues

Localized drainage issues include, but are not limited to, street flooding, roadside ditch flooding and subdivision and lot flooding. Localized drainage issues were identified by City staff and listed in the original scope of work including: Steeplechase along Plum Creek; Jose Addition at Burleson Road; Park Place/ Hitching Post; Quail Ridge neighborhood, and Lake Kyle. Several meetings with the City staff resulted in additions to the list of identified local drainage issues. The summary of localized drainage issues can be found in Table 3-3 in Appendix B. Refer to the Drainage Project Ranking Criteria matrix in Appendix C and Exhibit 2 in Appendix A for locations of localized drainage issues.

3.4 Channel Erosion Issues

Erosion issues were noted in areas where stream or ditch flood flows have eroded the channel bed or banks threatening roads, structures or utility infrastructure. Potential problem areas where it is obvious that continuing erosion will threaten roads, structures or utility infrastructure are also noted. Erosion issues were identified during the field reconnaissance phase and from City staff input. Refer to the Drainage Project Ranking Criteria matrix in Appendix C and Exhibit 2 in Appendix A for locations of erosion issues.

4.0 DRAINAGE SOLUTIONS

Halff conducted a hydrologic and hydraulics analysis of the identified drainage problem areas using available collected data and updated field survey. The existing GBRA feasibility models were utilized for this analysis since they are considered to be the best available data. Updates of these models included modification of development levels, updated terrain information, and structure information, as necessary. Any new modeling was consistent with previous modeling and based on available data including State Soil Geographic (STATSGO) or Soil Survey Geographic (SSURGO) soil information, land use, and other available City data. Depending on the particular drainage issue, determining drainage solutions for each location may have included culvert analysis using Culvert Master or HEC-RAS hydraulics model if available. Flow rates for design were typically determined using the rational method for areas less than 200 acres and HEC-HMS hydrologic model for larger areas as necessary.

4.1 Flood Mitigation Solutions

Flood mitigation solutions considered included the following structural and non-structural measures independently and in combination:

- **Structural Alternatives:**
  - Storm drain system improvements
  - Road crossing improvements
  - Channel improvements
  - Detention and Retention Ponds

- **Non-Structural Alternatives:**
  - Identify flood areas and depths
  - Require new buildings to be elevated
  - Buy-out of buildings most prone to flooding
  - Modifications to current drainage maintenance criteria, policies, or standards

4.1.1 Low Water Crossings

Low water crossings solutions involved upsizing culverts and raising roadways to reduce the frequency of flooding. Using available HEC-RAS analysis or Culvert Master, upsized culverts were added, and the roadway above the culverts raised, if necessary. Culvert sizes were selected to pass the 25-year design frequency. The 100-year design frequency

was also evaluated and if the cost differential was less than 10% increase, then the 100-year design was recommended. The roadway was raised and extended out, as necessary, to tie into the existing road, avoiding conflicts with side streets and driveways.

4.1.2 Local Drainage Issues

Localized drainage issues had the most variety in solutions. The mitigation could include driveway culvert and roadside ditch improvements such as the solution proposed for the Hitching Post flood problem area. Alternatively, some solutions included proposed storm drain systems along the roadway as in the case of the Center Street flood problem area. Common solutions to address local drainage issues included: improved ditches; upgrading culverts; and storm drain pipe systems.

4.1.3 Regional Detention Analysis

A regional detention evaluation was conducted to determine if such facilities could be implemented within the city that would be effective for flood risk reduction. The available open spaces in the City limits were evaluated to identify locations with sufficient space to implement proposed regional detention ponds. These locations were reviewed with City Staff to determine suitability.

Several parks were examined, such as Steeplechase Park, to evaluate if fully excavating the area within the ROW would provide significant reduction of peak flow. Generally, the results showed that while peak flood flows could be reduced, the reduction was small and had limited benefits for structures downstream. A second exercise was to determine if existing NRCS dam reservoirs within the Plum Creek Conservation District (PCCD) could be upgraded to provide sufficient detention to reduce peak flows. The configuration for PCCD Dam Site #1 on Plum Creek was evaluated to determine if additional storage could be added to the reservoir pool. The results show potential excavation added 31 acre-feet of storage but due to the relatively low elevation of the auxiliary spillway, there were little or no peak flood flow reduction benefits downstream along Plum Creek.

These evaluations and modeling exercises determined that regional detention storage was not a feasible option for reducing existing flood damage as part of the Drainage Master Plan. It is more effective, from the City's standpoint, to manage flood risk by safely conveying stormwater runoff via existing stream and

drainage channel improvements and by controlling development adjacent to floodplains. Additionally, coordination with the PCCD and the effects of development adjacent and downstream of the existing five NRCS dams within the City limits is highly recommended.

4.2 Ranking Criteria Matrix for Drainage Projects

In order to determine the prioritization of the proposed improvements, a criteria ranking and categorization system was developed. A matrix was developed which provided a structured method of scoring, ranking and prioritizing proposed drainage CIP Projects. The scoring matrix includes a list of five major categories that define the critical aspects of a potential drainage improvement project. Under these major category headers are 17 total subcategories to better evaluate priority. These drainage project ranking categories and subcategories include:

- **Public Safety**
  - Road Flooding and Mobility
  - Emergency Access
  - Number of Homes in 100-year Floodplain
  - Level of Drainage Service
  - Mitigation Required for Downstream Impact
- **Economic**
  - Project Cost
  - Funding Sources
  - Economic Impact on New Development
  - Economic Impact on Existing Business
- **Environment**
  - Water Quality
  - Impact to Environmental Features
- **Project Timing**
  - Ease of Permitting
  - Time of Construction
  - Dependency on Other Projects
  - Land and Easement Acquisition
- **Social**
  - Element of Comprehensive Plan
  - Impact on Neighborhoods

Each of these sub categories were assigned a weight based on discussion with City staff that determines the influence of each category on the overall project score. Categories such as Public Safety and Economic were assigned higher weights than the other categories since they are most critical aspects of a drainage issue during discussions with City staff. Each category is to be assigned a raw rank based upon the guidance of the Project Scoring Sheet provided by the City. The score for each category was then

multiplied by the category weight. All 17 category scores were then summed to create a total project score (maximum possible of 100 points). The project score determined the ranking of the project and its prioritization to assist City staff in planning a drainage CIP program. The drainage project matrix scoring sheets are provided in Appendix C.

4.2.1 Opinion of Probable Construction Cost Estimates

Opinions of project cost estimates were prepared for each drainage project developed and used in the ranking process. TxDOT average unit costs provided the basis for estimating unit cost estimates and an additional percentage for engineering design and permitting was included in each estimate. These estimates do not include land acquisition costs which will need to be determined before the project moves into the next phases of preliminary and final design. A contingency of 30% was also added to the final estimate for uncertainties in the project development such as unknown utility conflicts. For buyout options, the Hays County appraisal district values were used and multiplied by a factor of 3. The cost estimates prepared typically included both the 25-year design and the 100-year design to compare the cost of upgrading the capacity of the drainage project solution. The probable cost estimates shown in the project summary sheets is typically the 25-year unless the upgrade to the 100-year is small or required for mobility or design requirements. The probable cost estimate level is defined in the notes section of each project summary sheet.

4.3 Prioritization of Drainage CIP Projects

City staff reviewed the project classifications and confirmed objectives and assumptions for the CIP prioritization. The conceptual drainage projects were prioritized based on the criteria scoring with the highest scoring drainage project having the highest priority, etc. A summary sheet for each project was created that includes a description of the project, recommended solution(s), cost estimate opinion and ranking values. These project sheets can be found in Appendix D.

4.3.1 City Maintenance Drainage Projects

The City provided direction to identify projects they prefer city crews to perform. These projects are grouped, rated, and provided with a cost estimate opinion. The cost estimate opinions do not reflect the potential benefit of lower project costs as a result of using City crews to complete the construction but is intended to provide a consistent cost comparison between projects. The projects identified are shown in Table 4-1.

Table 4.1: City Maintenance Drainage Project List				
Ranking	Project ID	Project Name	Ranking Value	Estimated Project Cost
1	RIC-02	Kelly Smith Ln	75.7	$368,400
2	PST-01	Live Oak St Drainage	73.3	$96,700
3	BR-02	Roland Ln LWC (W)	72.7	$852,800
4	CFP-01	Quail Ridge Area	71.7	$675,000
5	PCT4-05	Scott St LWC	69.3	$566,130
6	PCT4-04	S. Burleson St Drainage	67.3	$77,955
7	PCT4-01	Hitching Post	65.3	$257,523

4.3.2 Drainage CIP Projects

A Capital Improvements Program (CIP) has been developed for the identified drainage projects. The list prioritizes the projects based on the resulting score. Drainage projects are ranked on the resultant score from highest to lowest. The full list of CIP projects is provided in Table 4-2.

4.3.3 Potential Combinations of Drainage Projects

There are several areas where several identified projects are located close vicinity to each other. In these cases, it may prove beneficial to combine several projects into a single effort rather than completing them separately at different times. Discussion with the City of Kyle staff identified three locations where this would be advantageous. These locations and project combinations could include the following:

- Hitching Post (PCT4-01), Meyers St. Drainage (PCT4-03), and Sledge St LWC (PCT4-06)
- RR near DeLeon St (PST-02), Live Oak St Drainage (PST-01), and Jose Addition (PST-03)
- Windy Hill LWC (RIC-01) and Kelly Smith Ln (RIC-02)
- Sweet Gum Erosion 1 (PCT1-01) and Sweet Gum Erosion 2 (PCT-02)

The City should consider these projects together as the determination to fund particular drainage improvements are made.

Table 4.2: Prioritized Drainage CIP Project List				
Ranking	Project ID	Project Name	Ranking Value	Estimated Project Cost
1	BCT1-01	BeBee Rd	82.0	$326,322
2	RIC-01	Windy Hill LWC	78.7	$595,600
3	ABT-01	Dacy Ln	77.0	$326,428
4	CTR-01	Center Street	74.7	$1,009,152
5	BR-01	Roland Rd LWC (E)	74.3	$841,754
6	PLU-02	Steeplechase Park US Det	74.0	$4,310,300
7	PLU-01	FM2770 nr Barton MS	73.7	$973,881
8	BUN-01	Bunton Ln LWC (S)	72.7	$617,908
9	BUN-03	Bunton Ln LWC (N)	72.7	$824,716
10	PCT4-06	Sledge Dr LWC	72.0	$566,128
11	BUN-02	Bunton Ln LWC (C)	71.0	$902,110
12	FPM-02	FEMA LOMR	71.0	$150,000
13	POR-01	Cotton Gin Rd Area	70.0	$780,000
14	FPM-01	US Floodplains	69.3	$90,000
15	BUN-04	Goforth Rd LWC	68.0	$287,870
16	PCT4-03	Meyers St Drainage	65.7	$75,630
17	PST-02	RR near Deleon St	64.3	$527,000
18	PST-03	Jose Addition	64.0	$78,663
19	AND-01	Dove Ln Homes	63.3	$1,241,300
20	PLU-04	Isabel Ln Area	63.0	$1,381,440
21	PCT1-01	Sweet Gum Erosion 1	59.3	$60,353
22	PCT1-02	Sweet Gum Erosion 2	59.3	$80,003

5.0 EVALUATION OF ORDINANCES AND DRAINAGE CRITERIA

This section expands on several key findings to provide guidance for future actions that will help improve stormwater management in Kyle. By necessity, stormwater management will always be an ongoing activity at the City and the recommendations made in this report will provide direction as the City continues to grow. The following sections summarize Halff's recommended changes, additions, and/or clarifications to the existing drainage criteria and/or the City's Code of ordinances. The following sections address the evaluation of the following:

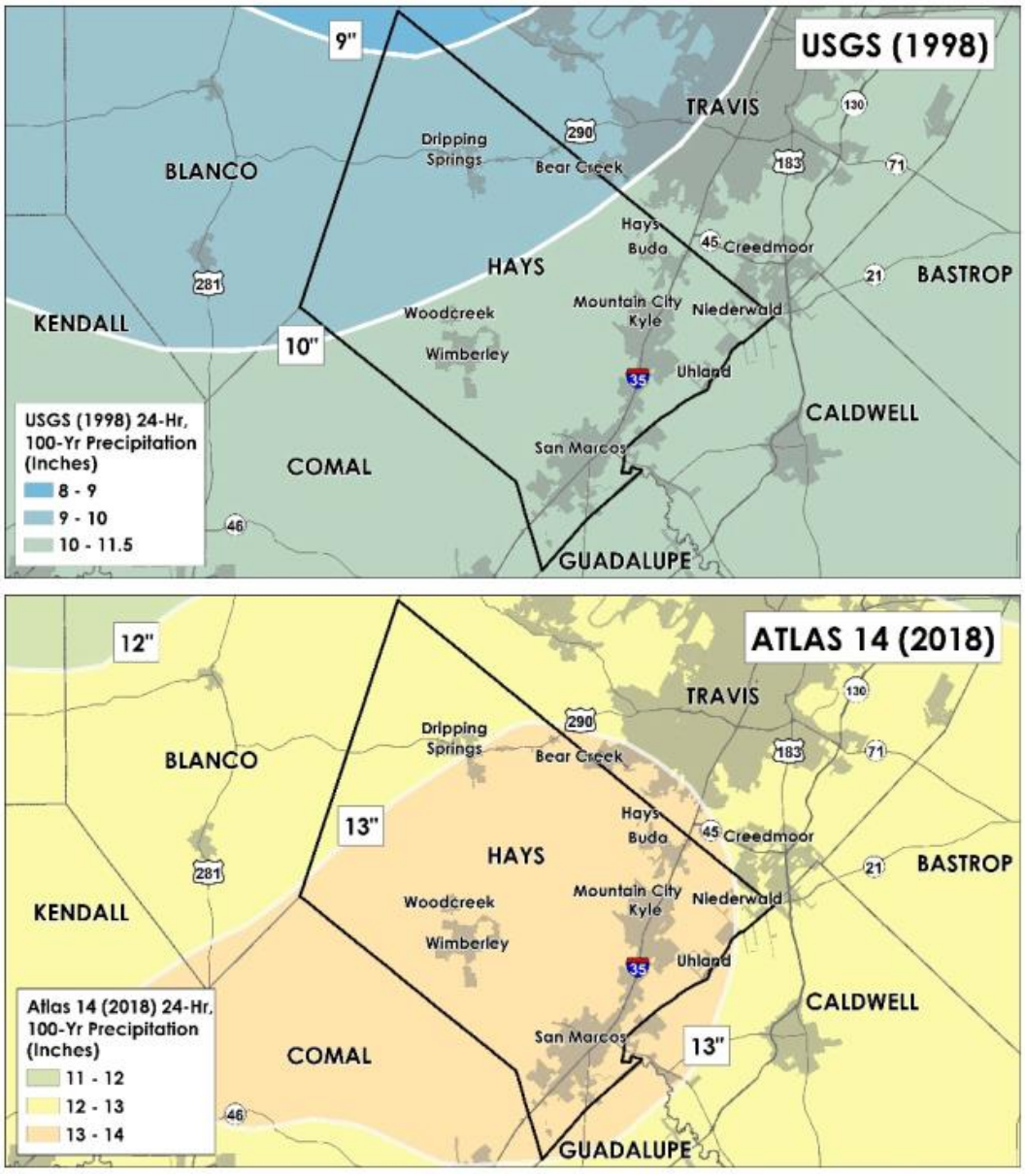
- Design Criteria Manual
- Stream buffers
- Detention pond criteria improvement
- Drainage checklist for development review process
- Specific design criteria modifications, as well as policy updates aimed at minimizing adverse impacts
- Opportunity to assist City staff in developing a policy and process
- New NOAA Atlas 14, Volume 11 Precipitation-Frequency Atlas

5.1 NOAA Atlas 14 Considerations

A new NOAA Atlas 14, Volume 11 Precipitation-Frequency Atlas of the United States, Texas was released September 27, 2018, during the preparation of this Drainage Master Plan report. The new rainfall data includes additional twenty years of rainfall data up to 2017 and indicates increases in the 100-year rainfall comparted to the USGS Water Resources Investigations Report 98-4044 (USGS 1998) that is currently used in the recent GBRA watershed studies. In Kyle for example, on average the 100-year, 24-hour rainfall amounts increase from 10.4 inches to 13.2 inches, an increase of approximately 2.8 inches. Rainfall values previously classified as the 500-year, 24-hour storm event are

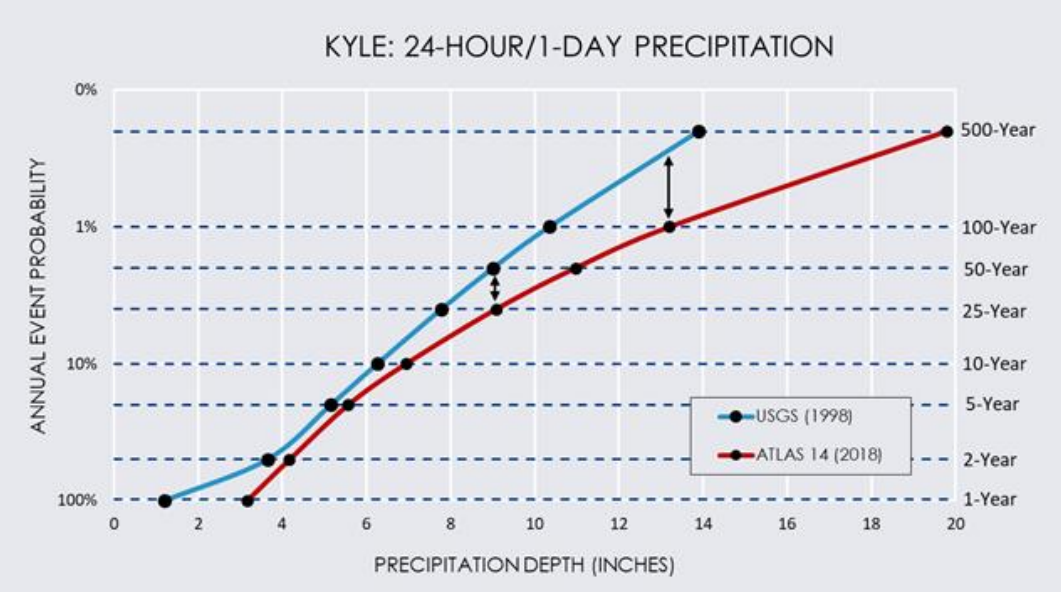
now considered closer to a 100-year storm event. The values previously classified as a 100-year, 24-hour storm event are now closer to a 50-year storm event.

The figures and tables below show a comparison of the USGS 1998 to the NOAA Atlas 14 rainfall totals in Hays County. The maps below display the 100-yr, 24-hour rainfall depths for Hays County. The table and graph on the following page display the rainfall values between the USGS 1998 and NOAA Atlas 14 near Kyle.



The USGS 1998 values displayed in the table were derived from the GBRA Plum Creek watershed study. The Atlas 14 values include an average of three nearby gages including the Manchaca, San Marcos, and Wimberley 1 NW gages.

Frequency Event	Annual Chance Probability	Average 24-hour Precipitation Depths (inches)	
		USGS (1998)	ATLAS 14 (2018)
500-year	0.2%	13.9	19.8
100-year	1%	10.4	13.2
50-year	2%	9.0	11.0
25-year	4%	7.8	9.1
10-year	10%	6.3	6.9
5-year	20%	5.2	5.6
2-year	50%	3.7	4.2
1-year	100%	1.2	3.2



Halff considered the potential rainfall increase as part of the recommendations to the Code of Ordinances, Chapter 32 Site Development discussed in the following sections, but further considerations on how to adopt the NOAA Atlas 14 rainfall should be determined. In addition, Halff recommends adopting the NOAA Atlas 14 rainfall data into the City's Code of Ordinances as well as updating the GBRA studies to reflect the increase in flood risk and for advancement of the CIP projects.

5.2 Code of Ordinances Recommendations

The following recommendations are based on review of the current City Ordinances. The minimum finished floor elevations recommendations listed below are based on an evaluation of the difference in water surface elevation of the 100-year to the 500-year

floodplain elevations.

Chapter 32 – Site Development

1. Define the 100-year floodplain using precipitation derived from the USGS Atlas of Depth-Duration Frequency of Precipitation Annual Maxima for Texas (SIR 2004-5041, Asquith) report.
2. Specify the 100-year floodplain extents shall be defined using the best available analysis.
3. Define the 100-year flood frequency to be determined assuming fully developed land use watershed conditions.
4. Establish required minimum finished floor elevations for all lots a minimum of two feet above the regulatory 100-year floodplain or above the 500-year, whichever is greater. Finished floor elevations requirement can be reconsidered when NOAA Atlas 14 rainfall data is adopted and flood elevations are established.
5. Require the final site plan to contain a statement by an engineer certifying the slab elevations are in compliance with the minimum finished floors elevations required.
6. Add verbiage that final site plan shall contain a note that no fences, structures, storage or fill allowed within the limits of the 100-year floodplain.

Chapter 41 – Subdivisions

1. Require all development establishing impervious cover or otherwise modifying an existing site to limit peak rate of runoff for storm events up to the 100-year frequency storm to the pre-development rate.
2. Proposed site drainage plans shall ensure that downstream storm drain systems have adequate capacity and do not cause downstream impacts including flooding and erosion.
3. Require discharge from storm drain systems and/or detention ponds shall not cause downstream erosion and the applicant must show acceptable non-erosive conveyance.
4. Require grading plans shall be designed to ensure all lots adequately drain upon completion of the subdivision improvements.

5.3 Drainage Criteria Manual Recommendations

The City is currently in the process of developing an Engineering Design Manual. Halff has reviewed the draft criteria and provides recommendations for improvements and/or

updates summarized below. Hays County is also in the process of updating its Drainage Criteria Manual and is anticipating finalizing the manual by early 2019. Halff recommends that the City reviews the final Hays County Drainage Criteria Manual and consider adopting that manual. The following lists the recommended drainage criteria revisions.

1. Clarify fully developed floodplains drainage area for more than 50 acres must be defined by the engineer and drainage easement or right of way shall be dedicated to the public.
2. Clarify peak runoff rates shall not be increased at any point downstream for the 2- (50% ACE), 10- (10% ACE), 25- (4% ACE), and 100-year (1% ACE) flood frequency event.
3. Update design rainfall totals from TP-40/Hydro-35 to USGS Atlas of Depth-Duration Frequency of Precipitation Annual Maxima for Texas (SIR 2004-5041, Asquith) report. Once NOAA Atlas 14 rainfall data is released, consider adopting.
4. Riverine hydrologic methods and procedures used for watershed analysis should be similar to the studies recently conducted as part of the GBRA Interim Feasibility Study – Phase 2.
    a. Specify unit hydrograph methodology as Snyder's Unit Hydrograph with lag times determined using the Snyder lag time and peaking coefficient.
    b. Specify loss methodology as Block and Uniform loss rate method using percent sand parameter.
5. Document standard procedures for hydrograph routing that specify the use of Modified Puls routing where hydraulics models are available.
6. Site development drainage to continue using Rational Method to determine peak flows for drainage areas less than 200 acres and NRCS methodology in determining Time of Concentrations.
7. Require fully developed 100-year peak discharges for new developments and revise City Ordinances, subdivisions regulations, and Engineering Design Manual accordingly.
8. Require discharge from storm drain systems and/or detention ponds shall not cause downstream erosion and the applicant must show acceptable downstream non-erosive conveyance.
9. Require grading plan shall be designed to ensure all lots adequately drain upon completion of the subdivision improvements.

5.4 Detention Pond and Drainage Channel Maintenance Recommendations

The City of Kyle currently has 41 on-site detention ponds, not including the PCCD NRCS dams, identified within its limits to include those located on Home Owner Association (HOA) common areas, private, and public property. Twenty-five (25) of the 41 detention ponds are on HOA property. It is unclear what condition the detention ponds are currently in and if they are functioning as designed. Therefore, taking on maintenance of these facilities could add cost to bring the detention ponds into working order. If the detention ponds are designed for the 25-year frequency storm or less, the City may need to retrofit the pond to detain for the 100-year frequency storm at an added cost to the City.

Additionally, the City is currently maintaining drainage channels within existing drainage easements as part of the City's normal operations. Continued maintenance of drainage channels located in dedicated drainage easements allows runoff to efficiently flow unobstructed to the larger drainage creeks and those that have appropriate maintenance access. The City's Storm Drainage and Flood Risk Mitigation Utility fee currently does not cover maintenance and operation costs for existing and future HOA detention ponds and include the large number of capital projects identified in this report. Over time the use of these monies may transition from infrastructure to maintenance.

Based on discussion with City staff, two four-man crews with a crew leader and new equipment will be needed to maintain detention ponds, assuming the ponds are in good working order, at an annual estimated cost of $468,000 plus upfront costs to purchase equipment estimated at $1 million, not including annual equipment maintenance costs. Additionally, some existing detention ponds do not have adequate access and will need modifications. If detention ponds are maintained by the City, the Storm Drainage and Flood Risk Mitigation Utility rate will likely need to increase for new crews, equipment and to provide adequate access at ponds that lack access. A less expensive solution would be to assign appropriate staff to inspect detention ponds for compliance of maintenance and possibly use existing City Ordinances and appropriate safety precautions to allow Kyle staff to issue potential violations for unmaintained or malfunctioning detention ponds upon inspection. Based on the potential cost, data obtained and our understanding of discussions with City staff,

Halff developed three recommendations on maintaining detention ponds and drainage channels for City staff to consider.

Option 1:

Detention Ponds:

1. Require property owners maintain detention ponds as originally designed.
2. Establish Subdivision Ordinances to allow City staff to inspect detention ponds for compliance of maintenance.
3. Consider maintenance agreement with in-line detention pond property owners where ponds are large enough to double as a park for recreational facilities.
4. Notify property owners with detention ponds that City staff will begin inspecting detention ponds for proper maintenance. Consider 6-12 months to allow property owners to properly maintain detention ponds prior to beginning annual inspections.
5. Conduct annual inspections and provide notices to property owners that require pond maintenance they may incur potential violation fees for non-compliance.
6. Potentially no increase the Storm Drainage and Flood Risk Mitigation Utility Fee.

Drainage Channels:

1. Require developments that have public drainage channels to convey the 100-year storm event within a defined public rights-of-way (ROW) or drainage easement.
2. Notify private property owners that public drainage channels require maintenance by property owners and will be enforced by the City.
3. Continue maintaining HOA drainage channels located in dedicated drainage easements or ROW that have appropriate maintenance access.
4. HOA public drainage channels must provide proper access roads and ramps for maintenance equipment.
5. Drainage channels located within private property and not within a drainage easement shall be maintained by the property owner.
6. Identify HOA public drainage channels that are not within a public ROW or drainage easement and notify property owners that City will maintain drainage channels once channels have been maintained to the City's approval and the drainage channel is dedicated as a drainage easement by all property owners.

Option 2:

Detention Ponds:

1. City to take over maintenance of HOA detention ponds with the following

conditions:

a. Detention pond must be certified by an engineer ensuring its operating as designed.

b. Maintenance access must be adequate and meet drainage criteria requirements.

c. Detention pond and maintenance access area to be dedicated as drainage easement to the City.

2. Detention ponds to be mowed at least twice a year for maintenance only. Any maintenance for aesthetics would be conducted by the HOA.

3. Recommend detention pond inspections as outlined in Option 1 above for detention ponds not within HOA's.

4. Storm Drainage and Flood Risk Mitigation Utility Fee will need to be re-evaluated with the potential of increasing the rate to cover additional crews and equipment for detention maintenance and completing drainage CIP project identified in this report.

Drainage Channels:

1. Recommendations as outlined in Option 1 above.

Option 3:

Detention Ponds:

1. Recommendations as outlined in Option 2 above except for item 4.

2. Storm Drainage and Flood Risk Mitigation Utility Fee to remain at its current rate with the understanding that drainage CIP projects identified in this report will be completed as budget allows.

Drainage Channels:

a. Recommendations as outlined in Option 1 above.

5.5 Stream Buffers/Setbacks

Stream buffers or setbacks are vegetated areas near a stream or creek, usually wooded, that can provide shade and partially protect the stream from the impact of adjacent land uses. Stream buffers play a key role in enhancing water quality in streams and providing environmental benefits such as:

- Reduces stormwater runoff velocities

- Filters and increase infiltration of runoff
- Intercepting sediments and nutrients
- Intercepting pesticides
- Enhances bank stabilization from erosion and scour
- Provide habitat by shading and cooling water
- Increases land value for people who purchase land for recreational use

Plum Creek (TCEQ Seg. 1810) is listed on the Draft 2016 Texas Integrated Report – Water Bodies with Concerns for Use Attainment and Screening Levels developed by TCEQ. The pollutants near non-attainment for the Plum Creek segment is listed in the following table with the associated level of concern:

Table 5-1: Plum Creek 2016 Pollutants Concerns Listed by TCEQ

Pollutant	Level of Concern
Depressed Dissolved Oxygen	CN - Concern for near-nonattainment of the TSWQS based on numeric criteria
Nitrate	CS - Concern for water quality based on screening levels
Total Phosphorus	CS - Concern for water quality based on screening levels

Stream buffers will help to enhance the water quality not only for Plum Creek pollutant level concerns, but all streams within the City of Kyle. Halff's recommendations are to:

1. Require new residential and commercial development to prohibit development within the following stream buffer/setback:
    a. FEMA Zone AE Streams – 100 feet setback extending on either side of the stream centerline or 25 feet measured from the floodway boundary, whichever is greater
    b. FEMA Zone A and Non-FEMA Stream – 100 feet setback extending on either side of the stream centerline up to contributing drainage areas of 50 acres or larger
2. For commercial sites, consider incentivizing the use low impact development storm water techniques (i.e.; rain gardens, bio-retention, bio-swales, etc.) in-lieu of a stream buffer/setback.
3. Exceptions for specific activities could include a stream crossing for a driveway, transportation routes including but not limited to bike paths and pedestrian trails, utility lines, public water supply intake, property access, stream bank stabilization, stormwater outfalls, etc.

5.6 Drainage Checklist Development Recommendations

To make development review more efficient for both the City reviewer and the developer, the following drainage plan checklist for site development submittals is suggested.

Drainage plan submittals should include:

1. Existing grades and topographic contours at intervals not exceeding two feet.
2. Proposed grades and topographic contours at intervals not exceeding two feet.
3. Karst features and any protected area required by U.S. Fish and Wildlife or TCEQ.
4. Existing roads.
5. Existing structures to be retained.
6. Existing drainage features including lakes, streams, and ponds.
7. Location and elevation of the base flood elevations and fully developed 100-year flood elevations.
8. Location and dimensions of existing and proposed stormwater detention structures or ponds.
9. Location and dimensions of existing and proposed water quality structures or ponds if located within the Edwards Aquifer Recharge Zone.
10. Indicate how concentrated flows from site will not create downstream erosion.
11. Indicate on site plan cover the existing and proposed impervious.
12. Location and size of all proposed stormwater lines or surface drainage structures.
13. Drainage calculations (for 2- (50% ACE), 10- (10% ACE), 25- (4% ACE), and 100-year (1% ACE) frequency storms) showing no impacts to adjacent properties.
14. Channel profiles.
15. Crossing elevation information for all public utility lines versus other utilities.
16. If development is adjacent to PCCD NRCS Dams storage pool, ensure structures are outside of dam inundation area.
17. Water quality within the Edward's Aquifer must be coordinated with TCEQ Edwards Aquifer Protection Program and determination letter submitted.
18. Maintenance and operation plan for any proposed water quality structures or ponds.
19. Separate report for drainage to include: reference maps, flow information, and an accompanying narrative by the engineer stating the development shall not cause

any adverse impact to downstream properties and explanation of method of analysis and determinations used to reach this conclusion. Report must evaluate existing capacity of downstream storm drain system or open channel and show no downstream system impacts.

Appendix A

EXHIBITS

City of Kyle
Drainage Master Plan

Exhibit 1
City of Kyle
Overview

Legend

- SCS Dam
- Stream Centerlines
- City of Kyle
- City of Kyle ETJ
- GBRA Floodplains (Zone A/AE)
- Edwards Aquifer Recharge Zone
- Edwards Aquifer Contributing Zone

N

0 3,000 6,000 Feet

1 inch = 6,000 feet

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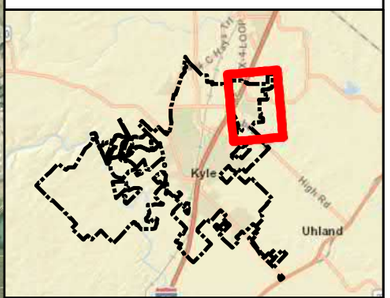
City of Kyle
Drainage Master Plan

Exhibit 2
Drainage Capital Improvement Program Projects
Sheet 1 of 6

RIC-02
ABT-01
RIC-01
AND-01
BCT1-01

Legend

- SCS Dam
- Centerlines
- Contours 10ft
- Streets
- Flood Problem Areas
- City of Kyle
- City of Kyle ETJ
- GBRA Floodplains (Zone A/AE)



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1 inch = 1,000 feet

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City of Kyle
Drainage Master Plan

Exhibit 2
Drainage Capital Improvement Program Projects
Sheet 2 of 6

BUN-04

POR-01

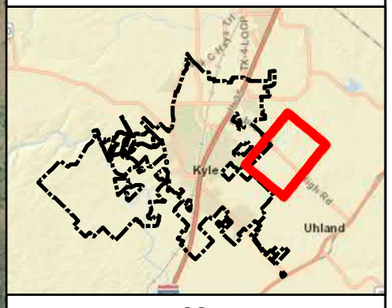
Porter Creek

Unnamed Tributary 84

Burton Branch

Legend

- SCS Dam
- Centerlines
- Contours 10ft
- Streets
- Flood Problem Areas
- City of Kyle
- City of Kyle ETJ
- GBRA Floodplains (Zone A/AE)



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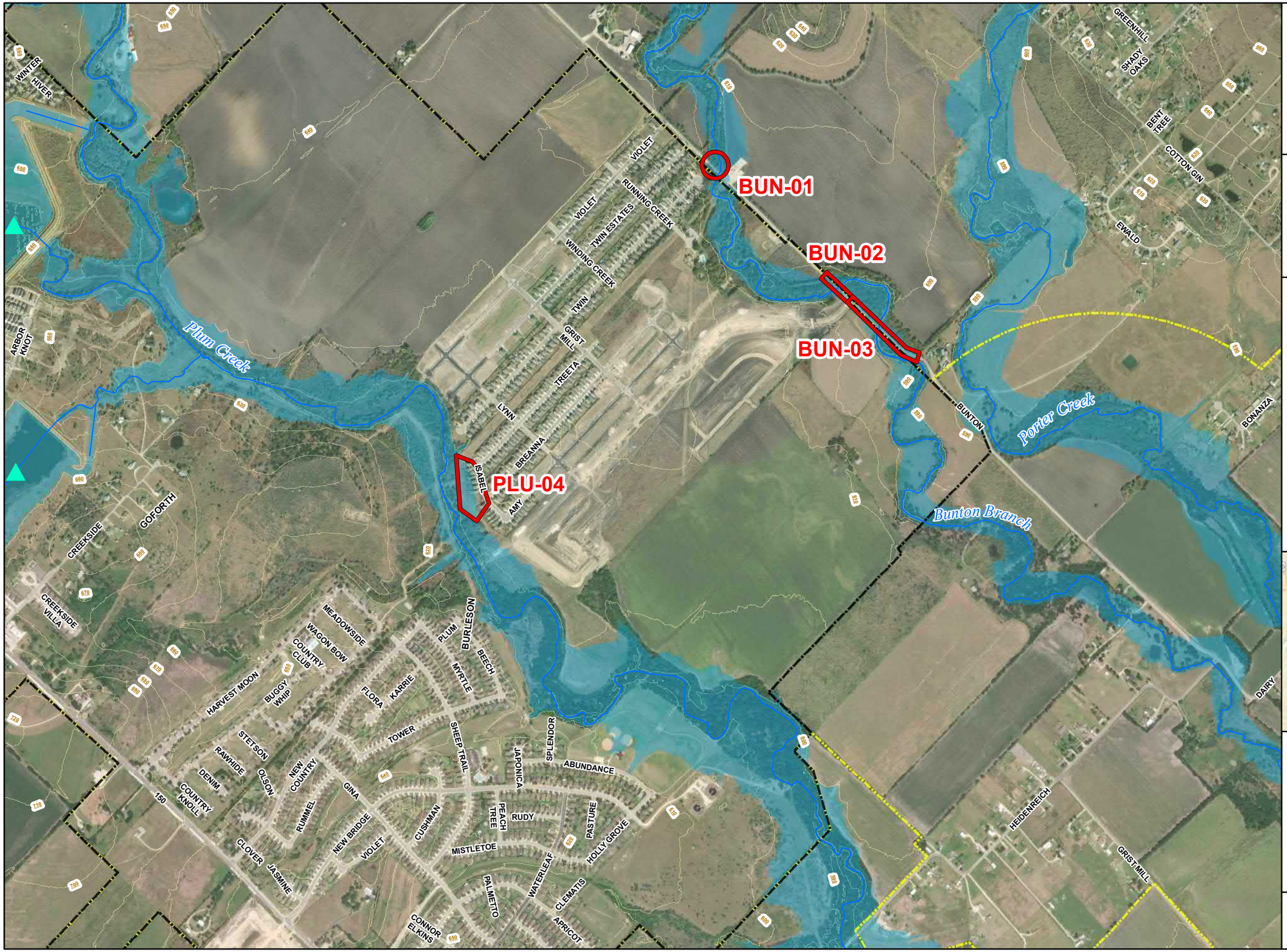
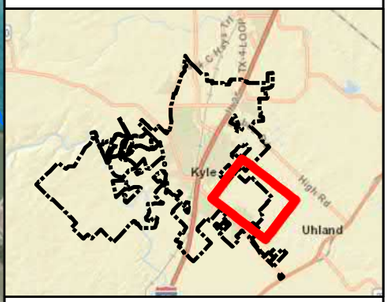


City of Kyle Drainage Master Plan

Exhibit 2 Drainage Capital Improvement Program Projects Sheet 3 of 6

Legend

- SCS Dam
- Centerlines
- Contours 10ft
- Streets
- Flood Problem Areas
- City of Kyle
- City of Kyle ETJ
- GBRA Floodplains (Zone A/AE)



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1 inch = 1,000 feet

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City of Kyle
Drainage Master Plan

Exhibit 2
Drainage Capital Improvement Program Projects
Sheet 4 of 6

PLU-01

PCT1-01

PCT1-02

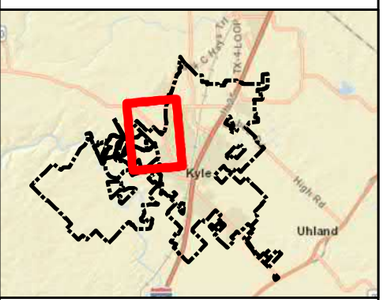
Plum Creek

Plum Creek Tributary 1

Lower Blanco River Tributary 4

Legend

- SCS Dam
- Centerlines
- Contours 10ft
- Streets
- Flood Problem Areas
- City of Kyle
- City of Kyle ETJ
- GBRA Floodplains (Zone A/AE)



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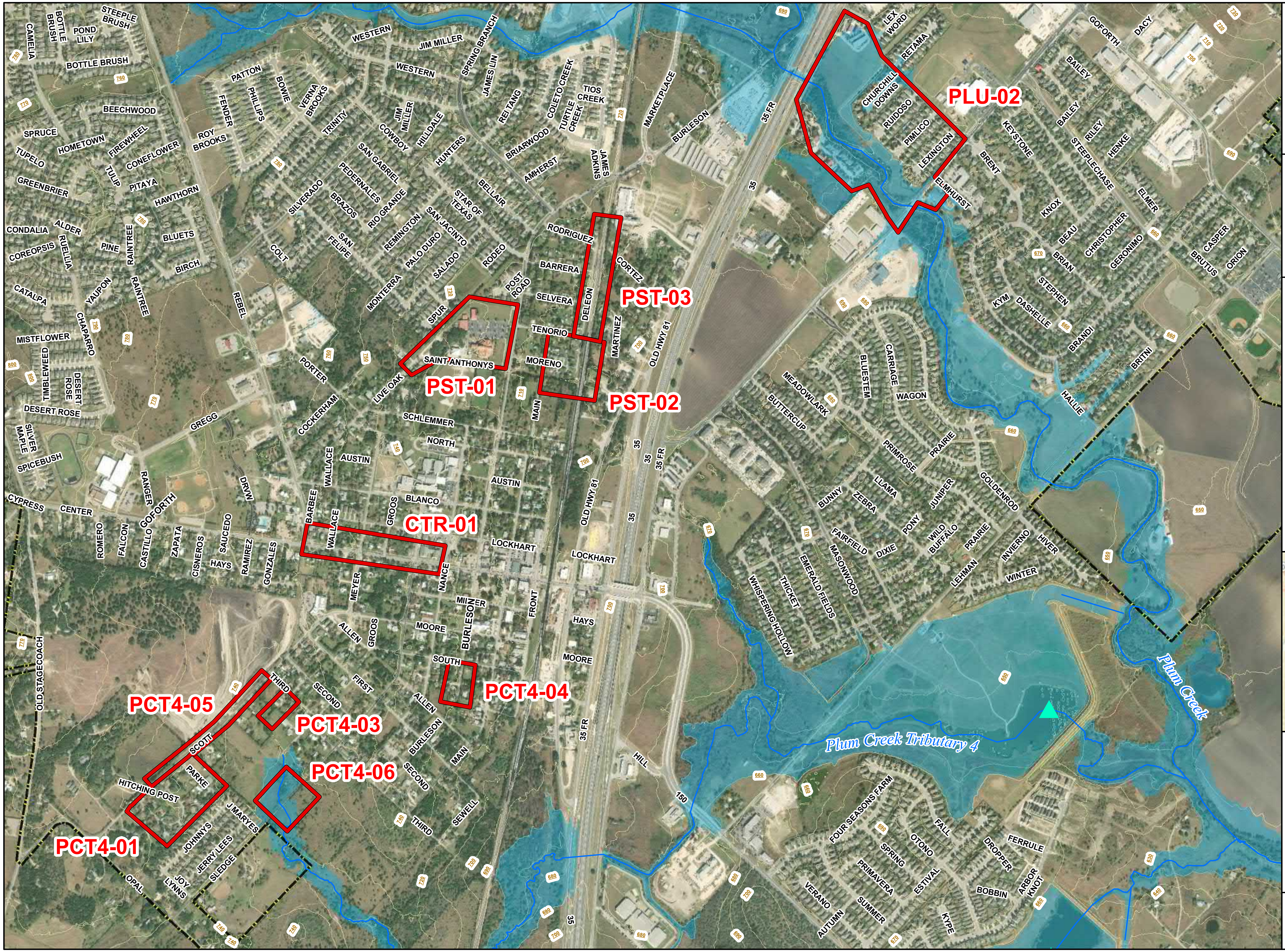
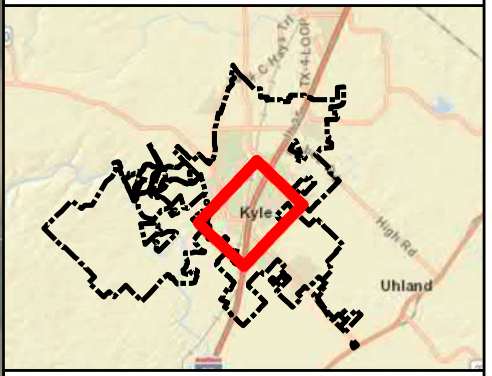


City of Kyle Drainage Master Plan

Exhibit 2 Drainage Capital Improvement Program Projects Sheet 5 of 6

Legend

- SCS Dam
- Centerlines
- Contours 10ft
- Streets
- Flood Problem Areas
- City of Kyle
- City of Kyle ETJ
- GBRA Floodplains (Zone A/AE)



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City of Kyle
Drainage Master Plan

Exhibit 2
Drainage Capital Improvement Program Projects
Sheet 6 of 6

BR-02

BR-01

CFP-01

CLAIBOURNE-KYLE HOUSE

OLD STAGECOACH

ROLAND

OPAL

MUSGRAV

LANGELY

WALLOPS

ALPHA

VOYAGER

JERNIGAN

AMES

VOSS

POST

AVERS

LAUREN

RYAN

TAMARA

OAK HILLS

DRWW

35

35 FR

EDWARDS

QUAIL RIDGE

GOFORTH

TRAIL RIDGE

BURLESON

BLANCO VISTA

YARRINGTON

PREMIER

CHAMPIONS

PARAMOUNT

OLD SETTLERS

GLADNEY

EASTON

HARWOOD

IRVIN

FARM HOUSE

SPLIT RAIL

FENCE LINE

SILO

FIELD CORN

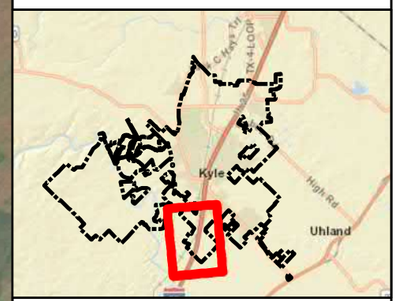
HAY BARN

RAIL HEAD

Clear Fork Plum

Legend

- SCS Dam
- Centerlines
- Contours 10ft
- Streets
- Flood Problem Areas
- City of Kyle
- City of Kyle ETJ
- GBRA Floodplains (Zone A/AE)



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1 inch = 1,000 feet

HALFF

City of Kyle Drainage Master Plan

Exhibit 3 Existing Detention Ponds

Legend

- Stream Centerlines
- Roads
- Kyle Subdivisions

Detention Ponds

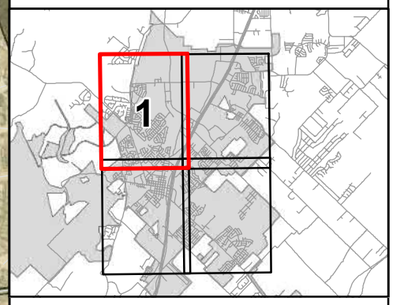
Pond Ownership

- HOA
- Private
- Public

Pond Size (Acres)

- Large, 3+
- Medium, 1-3
- Small, <1

Panel 1 of 4



N

0 1,100 2,200 Feet

1 inch = 1,100 feet

Detention Ponds			
Ownership	Size - Small	Size - Medium	Size - Large
HOA	8	12	5
Private	7	2	2
public	4	1	0

HALFF

City of Kyle Drainage Master Plan

Exhibit 3 Existing Detention Ponds

Legend

- Stream Centerlines
- Roads
- Kyle Subdivisions

Detention Ponds

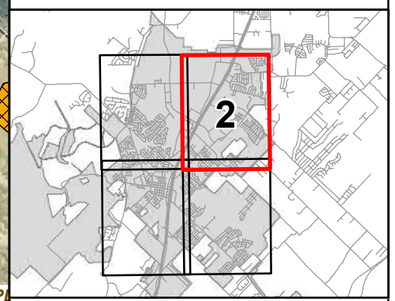
Pond Ownership

- HOA
- Private
- Public

Pond Size (Acres)

- Large, 3+
- Medium, 1-3
- Small, <1

Panel 2 of 4



N

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1 inch = 1,100 feet

Detention Ponds			
Ownership	Size - Small	Size - Medium	Size - Large
HOA	8	12	5
Private	7	2	2
public	4	1	0

HALFF

City of Kyle
Drainage Master Plan

Exhibit 3
Existing Detention Ponds

Legend

- Stream Centerlines
- Roads
- Kyle Subdivisions

Detention Ponds

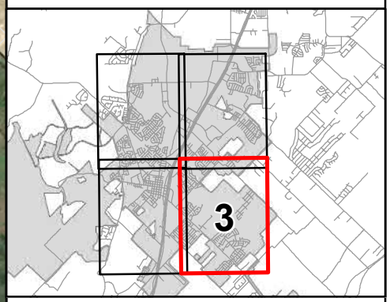
Pond Ownership

- HOA
- Private
- Public

Pond Size (Acres)

- Large, 3+
- Medium, 1-3
- Small, <1

Panel 3 of 4



N

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Detention Ponds			
Ownership	Size - Small	Size - Medium	Size - Large
HOA	8	12	5
Private	7	2	2
public	4	1	0

HALFF

City of Kyle
Drainage Master Plan

Exhibit 3
Existing Detention Ponds

Legend

- Stream Centerlines
- Roads
- Kyle Subdivisions

Detention Ponds

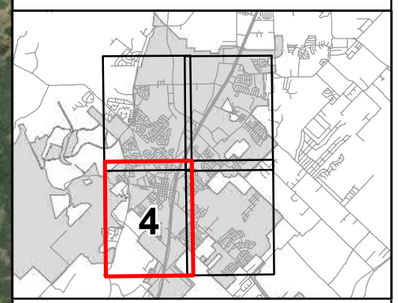
Pond Ownership

- HOA
- Private
- Public

Pond Size (Acres)

- Large, 3+
- Medium, 1-3
- Small, <1

Panel 4 of 4



N

0 1,100 2,200 Feet

1 inch = 1,100 feet

Detention Ponds			
Ownership	Size - Small	Size - Medium	Size - Large
HOA	8	12	5
Private	7	2	2
public	4	1	0

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Appendix B

TABLES

Table 3-2: City of Kyle Low Water Roadway Crossings

Road Name[2]	Near Intersection…	Watershed	Stream[1]	Source	AADT Traffic Count[4] [veh/day]	Minimum TOR Elevation[6] [ft]	Frequency Water Surface Elevation[7] [ft]						Annual Chance of Flooding[5]
							2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	Year Event
Dacy Lane	~1000 ft north of Kelly Smith LN and Dacy LN int.	Plum Creek	Andrews Branch	ZONE A			669.07	669.99	670.37	670.77	671.09	671.38	2-yr
Dacy Lane	~ 800 ft south of Kelly Smith LN and Dacy LN int.	Plum Creek	Andrews Branch Trib 1	ZONE A		672.55	672.38	672.66	672.78	672.88	672.96	673.07	5-yr
Windy Hill	~2400 ft west of Windy Hill RD and Dacy LN int.	Plum Creek	Richmond Branch	ZONE A		672.22	670.96	671.95	672.4	672.78	673.1	673.43	10-yr
Kohler's Crossing	~1400 ft west of Kyle XING and Kohlers XING int.	Plum Creek	Bunton Creek	GBRA PH2	5230	702.47	704.52	705.61	706.12	706.52	706.81	707.12	2-yr
Old Stage Coach Rd	~800 ft before int. of FM 2770 and Rebel DR	Plum Creek	Plum Creek Trib 1	GBRA PH2	1940	805.60	806.14	806.58	806.72	806.84	806.93	807.02	2-yr
Rebel Drive	~100 ft north of Autum Sage PKWY and Rebel DR int.	Plum Creek	Plum Creek Trib 1	GBRA PH2	8590	765.71	765.78	766.77	766.97	767.16	767.28	767.41	2-yr
Bunton Ln	~2000 ft east of Twin Estates DR & Bunton Ln int.	Plum Creek	Bunton Creek	GBRA PH2	1452	594.39	596.05	596.77	597.08	597.34	597.54	597.74	2-yr
Bunton Ln	~2800 ft east of Twin Estates DR & Bunton Ln int.	Plum Creek	Bunton Creek	GBRA PH2	1452	594.39	596.05	596.77	597.08	597.34	597.54	597.74	2-yr
Goforth Rd	~400 ft west of GoForth & Creeks Landing DR int.	Plum Creek	Bunton Creek	GBRA PH2	3117	626.57	623.22	623.51	623.77	623.77	625.28	628.16	100-yr
Fountain Grove Dr	~250 ft west of Emerald Canyon & Fountain grove	Plum Creek	Bunton Trib 1	ZONE A		690.42	689.34	689.79	690	690.19	690.34	690.5	100-yr
Sanders Rd	~1000 ft east of Fairway & Sanders int.	Plum Creek	Plum Creek	GBRA PH2	193	768.32	761.33	764.28	765.32	766.61	767.69	768.54	100-yr
Spring Branch Dr	~200 ft east of Spring Branch DR & Jim Miller DR.	Plum Creek	Plum Creek Trib 1	GBRA PH2	5527	716.61	713.11	714.34	714.94	715.49	716.36	716.97	100-yr
Hartson	~200 ft east of Mather & Hartson	Plum Creek	Spring Branch Trib 1	ZONE A		741.74	739.41	740.41	740.87	741.3	741.65	742.04	100-yr
IH 35 Frontage	between EXIT 212 and EXIT 213 South Bound IH35	Plum Creek	Bunton Creek	GBRA PH2	10396	686.20	680.78	684.25	686.28	688.64	690.6	692	10-yr
Arbor Knot Dr	~500 ft north of FM 150 & Arbor Knot	Plum Creek	Plum Trib 3	GBRA PH3	600	662.38	659.17	660.95	662.56	662.78	663.28	663.75	10-yr
RM 150	~400 ft west of Lehman RD & RM 150 int.	Plum Creek	Plum Trib 4	GBRA PH3	13711	661.29	657.91	659.77	661.05	662.25	662.89	663.39	25-yr
Kelly Smith Ln	~500 ft east of IH35	Plum Creek	Richmond Branch	ZONE A		694.92	693.83	694.55	694.81	695.08	695.29	695.51	25-yr
Lime Kiln Rd	~9000 ft west of Old Stagecoach Rd & Center st.	Blanco River	Blanco River	FEMA PMR	250	629.30	640.04	647.32	651.16	656.69	660.05	663.04	2-yr
Lime Kiln	~3000 ft east of Lime Kliln RD & S Gate RD Int.	Blanco River	Blanco Trib 1A	ZONE A		664.83	664.9	665.5	665.1	666.29	666.7	667.01	2-yr
Dacy Ln	~1000 ft east of Dacy LN & Seton PKWY int.	Plum Creek	Bunton Creek	GBRA PH2	3234	650.79	652.72	656.71	658.94	661.79	663.99	664.99	2-yr
FM 1626	~4500 ft south of Int. with Jack C Hays	Plum Creek	Bunton Trib 4	ZONE A			744.94	745.42	745.67	745.89	746.04	746.21	2-yr
Fairway	~120 ft north of Fairway & Echols Int.	Plum Creek	Plum Trib 1	ZONE A			767.57	768.29	768.53	768.77	768.94	769.12	2-yr
Hellman	~60 ft east of Hellman & Nevarez Int.	Plum Creek	Plum Trib 2	ZONE A			778.96	779.99	780.35	780.67	780.86	781.08	2-yr
Sledge St	~400 ft east of South Sledge ST & J Maryes LN int.	Plum Creek	Plum Trib 4	GBRA PH3	450	728.28	728.64	729.06	729.25	729.38	729.48	729.64	2-yr
Indian Paintbrush Dr	~40 ft south of Windy Hill & Indian Paintbrush	Plum Creek	Richmond Trib 2	ZONE A		673.24	674.35	674.79	674.97	675.17	675.32	675.46	2-yr
Kyle Crossing	~600 ft north of Old Bridge TRL & Kyle XING int.	Plum Creek	Bunton Creek	GBRA PH2	820	685.40	683.74	688.48	689.44	690.28	691.08	692.31	5-yr
Goforth Rd	~900 ft west of Brent BLVD & GoForth RD int.	Plum Creek	Plum Creek	GBRA PH2	5200	676.11	673.53	676.31	677.02	677.49	677.76	678.07	5-yr

TABLE 3-3: SUMMARY OF LOCALIZED DRAINAGE ISSUES			
Problem Area	Stream	Problem Comment	Structures in 100-YR Floodplain
Lake Kyle	Plum Creek Trib 4	Riverine Flooding	
Steeplechase along Plum Creek	Plum Creek	Channel parallel to Plum Creek over-flowed during Oct. 30, 2015 the storm	
Meadows of Kyle Subd.	Local	Drainage from subd. draining east to Dacy Lane	
4540 Mather St.	Local	Water puddles before it reaches the storm drain	
Market Place	Plum Creek	Market Place Rd. overtops based on hydraulic modeling.	
Steeplechase Subd.	Local	Channel parallel to Plum Creek over-flowed during Oct. 30, 2015.	
Quail Ridge Dr.	Local	Runoff along street and through properties	
Violet Lane	Local	Flooding from adjacent property	
295 Carriage Way	Local	Erosion in drainage easement is threatening their privacy fence	
Center St.	Local	Near Wallace and the park experiencing drainage issues	
402 S. Burleson	Local	During heavy rain events, storm waters dam up and does not drain causing local flooding	
Saucedo St & Ramirez St.	Local	Tenorio Addition causing drainage to Blanton property	
Stagecoach Forest Subd.	Local	Adding detention pond.	
Middle School off FM 2770	Upper Plum Creek Trib. 2	Three culverts undersized and overtops during heavy rainfall	
Cotton Gin Rd.	Andrews Branch/Porter Creek	Riverine Flooding	2
Isabel Ln.	Plum Creek	Riverine Flooding	7
Railroad near Deleon St.	Local	Railroad creating dam and flooding neighborhood	
Homes off of Dove Ln.	Andrews Branch/Porter Creek	Riverine Flooding	4
Mobile Home off Dickerson Rd.	Unnamed Trib 84	Riverine Flooding	2
House off Summit Dr.	Brushy Creek Trib 2	Riverine Flooding	3
977 Sweet Gum Dr.	Plum Creek Trib 1	Concrete deflection wall and potential structure flooding	1
773-785 Sweet Gum	Plum Creek Trib 1	Eroded and scoured culvert channel	
Hometown Kyle Detention Pond	Local	Asking to turn pond over to City of Kyle	
Hometown Kyle Detention Pond	Local	Asking to turn pond over to City of Kyle	
172 Birch Dr	Local	Concrete outfall erosrion and channel capacity	
376-436 Bottle Brush Dr.	Spring Branch Trib. 2	Backwater flooding from FM 150. Submerged car and flooded properties Oct. 2015.	
Park Place/Hitching Post	Local	Offsite runoff flowing over road and flooding properties	
W. Meyers St. & 800 W. 3rd	Local	Street flooding during heavy rainfall	
Hometown Subd & 328 Spruce Dr & 461 Sweet Gum	Local	Culvert directing flow into fencing causing rapid deterioration of fence due to channel capacity	
Goforth Rd., Dialysis Center on Goforth & Saddle Creek Apartments	Plum Creek	Riverine flooding based on GBRA analysis	8
Burleson Rd. Homes & Commercial Area off Brent Blvd.	Plum Creek	Riverine Flooding	2
310 & 350 Windy Hill Rd.	Local	Stormwater coming from gas station drains onto property causing erosion and flooding	
710 Live Oak & 801 N. Burleson	Local	Property flooded during 2013 and 2015 events & St. Anthony's Church Hall has flooded several times	

TABLE 5-1: COMPARISON OF THE 100- AND 500-YEAR FLOOD ELEVATIONS		
Stream	100- and 500-year Average WSEL Difference (ft)	Notes
Plum Creek	1.1	Less than 2 feet
Bunton Branch	2.0	
Richmond Creek & Tribs	0.6	
Bunton Tribs	0.3	
Blanco River	4.6	Greater than 2 feet

Note: Models developed in the GBRA Feasibility Study were used in this comparison

TABLE 5-2: SURROUNDING AREA CRITERIA COMPARISON										
Entity	Cities						Counties			
	San Marcos	Round Rock	Kyle	Buda	Wimberley	Dripping Springs	Travis		Williamson	Hays
							Western Watersheds	Eastern Watersheds		
Criteria	click for Manual	click for City Ordinances	click for City Ordinances	click for UDC	click for City Ordinances	click for City Ordinances	click for HLWQ	click for ECM	click for WILCO Regulations	
Nonresidential Finished Floor Elevation	2 feet above Base Flood Elevation (Sec. 39.043-passed 2016)	2 feet above Ulitimate 100-year Flood Elevation (Sec. 36-182-passed 1990s)	At or above Base Flood Elevation (Sec. 17-85.) 2 feet above 100-year or at or above the 500-year, whichever is greater	Elevated to or above Regulatory Flood Datum-or water tight (4.06.04-B)	2 feet above base flood elevation (153.28-passed 2001)	Refers to Hays County Flood Damage Prevention Ordinance (19.2.2)	In Zone AE -1 foot above base flood elevation or water tight Zone A-AO - 2Feet above BFE or water tight (64.122)	In Zone AE -1 foot above base flood elevation or water tight Zone A-AO - 2Feet above BFE or water tight (64.122)	1 feet above Base Flood Elevation (Article 5 Section B)	1 feet above Base Flood Elevation or water tight
Design Storm for Detention	2,10,25,100-YR Storm Event	2,10,25,100-YR Storm Event	2,10,25, 100-YR Storm Event	2,10,25,100-YR Storm Event	25,100-YR Storm Event	2,10,25,100-YR Storm Event	2,10,25,100-YR Storm Event	2,10,25,100-YR Storm Event	2,10, 100-yr storm	2, 5, 10, 25, 100-yr storm
WQ Zone/Stream Buffer	FEMA streams - 100 feet in width measured from the the floodway boundary Non-FEMA Streams - 50 feet extending on either side of the stream centerline (Sec. 5.1.2.2)	N/A	NA FEMA Zone AE Streams - 100 feet extending on either side of the stream centerline or 25 feet from the floodway boundary, whichever is greater. FEMA Zone A and Non-FEMA Streams - 100 feet extending on either side of the stream centerline up to a contributing drainage area of 50 acres.	In Barton Springs and Edwards Aquifer Dependent on Drainage area - 25ft to 400 ft from centerline of stream each side.	NA	Refers to Hays County Flood Damage Prevention Ordinance (19.2.2)	NA	NA	NA	FEMA Defined floodways Dependent on Drainage area - 100ft to 300 ft from centerline of stream each side.

Note: Recommended updates for City of Kyle shown in red text.

Appendix C

DRAINAGE PROJECT CRITERIA MATRIX AND SUMMARY SHEETS

City of Kyle - Drainage Project Ranking Criteria

Category	Category Weight	Sub Category Weight	Sub Category	Scoring
Public Safety	30	7	Road Flooding and Mobility (Pre-Project Conditions)	1: Isolated Local Roadway Flooding 2: Collector Roadway Flooding 3: Moving water is likely to wash car off road (consider velocity and depth)
		5	Emergency Access for 25-year (4% ACE) storm event (Pre-Project Conditions)	1: Passable but response time increased 2: Impassable but alternative route available 3: Impassable/No alternative route.
		9	Number of occupied Structures (homes or businesses) within 100-year (1% ACE) footprint (Pre-Project Condition)	1: 0 flooded 2: 1-10 flooded 3: 10+ flooded or critical facility effected
		6	Level of Drainage Service (Post-Project Protection)	1: ≤ 25-year (4 % ACE) 2: 25-year (4% ACE) - 100-year (1% ACE) 3: ≥ 100-year (1% ACE)
		3	Mitigation required for downstream impacts	1: 15%+ of project costs 2: 1-15% of project cost 3: No mitigation need for downstream impacts
Economic	25	5	Project Cost (Note: add O&M cost)	1: ≥ 2 Million 2: $1 - 2 Million 3: ≤ $1 Million
		10	Funding Source	1: Full Funding required upfront 2: Phased Funding 3: Incremental Funding as available
		5	Degree of economic impact on development/redevelopment potential (post-project)	1: Negative Impact 2: No impact 3: Positive Impact
		5	Degree of Economic Impact on Local Businesses (post-project)	1: Negative Impact 2: No impact 3: Positive Impact
Environment	20	10	Water Quality Significance (MS4)	1: Negative Impact 2: No impact 3: Positive Impact
		10	Impact to Existing Environmental Features (i.e. Riparian Corridor, Habitat, etc.) (post-project)	1: Significant Negative Impact 2: Moderate Negative Impact 3: No Impact / Positive Impact
Project Timing	15	5	Ease of Permitting	1: Multi-jurisdiction more permits 2: Local permit with variances/Nationwide 3: Limited local permits
		3	Time for Implementation or Construction	1: ≥ 2 Years 2: 1 - 2 Years 3: 0 - 1 Years
		3	Dependency on other Projects	1: Dependent on other projects 3: No dependence on other projects
		4	Land and Easement Acquisition	1: Condemnation maybe required 2: Purchase necessary 3: No/minimal additional acquisition required
Social	10	5	Element of Comprehensive Plan (Parks, Transportation, Planning, Drainage, etc.)	1: No elements in other plans 2: Related to elements in other plans 3: Multiple elements other plan
		5	Beneficial Neighborhood Impacts	1: Negative Neighborhood Impact 2: No Neighborhood Impact 3: Positive Neighborhood Impact
	100	100		

ABT-01 Dacy Ln		AND-01 Dove Ln Homes		BCT1-01 BeBee Rd		BR-01 Roland Ln LWC (E)		BR-02 Roland Ln LWC (W)		BUN-01 Bunton Ln LWC (S)		BUN-02 Bunton Ln LWC (C)		BUN-03 Bunton Ln LWC (N)		BUN-04 Goforth Rd LWC		CFP-01 Quail Ridge Area		CTR-01 Center Street		FPM-01 US Floodplains	
Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score
3	7.0	0	0.0	3	7.0	2	4.7	2	4.7	3	7.0	3	7.0	3	7.0	2	4.7	1	2.3	2	4.7	0	0.0
3	5.0	0	0.0	2	3.3	2	3.3	3	5.0	2	3.3	2	3.3	2	3.3	1	1.7	1	1.7	1	1.7	0	0.0
1	3.0	2	6.0	1	3.0	1	3.0	1	3.0	1	3.0	1	3.0	1	3.0	1	3.0	2	6.0	2	6.0	3	9.0
2	4.0	2	4.0	2	4.0	2	4.0	2	4.0	2	4.0	2	4.0	2	4.0	2	4.0	2	4.0	2	4.0	3	6.0
3	3.0	3	3.0	3	3.0	3	3.0	3	3.0	3	3.0	3	3.0	3	3.0	3	3.0	1	1.0	1	1.0	3	3.0
3	5.0	2	3.3	3	5.0	3	5.0	3	5.0	3	5.0	2	3.3	3	5.0	3	5.0	3	5.0	2	3.3	3	5.0
1	3.3	2	6.7	2	6.7	2	6.7	1	3.3	2	6.7	2	6.7	2	6.7	1	3.3	2	6.7	2	6.7	1	3.3
2	3.3	2	3.3	3	5.0	3	5.0	3	5.0	3	5.0	3	5.0	3	5.0	2	3.3	2	3.3	3	5.0	3	5.0
2	3.3	2	3.3	3	5.0	2	3.3	2	3.3	2	3.3	2	3.3	2	3.3	2	3.3	2	3.3	3	5.0	2	3.3
2	6.7	3	10.0	2	6.7	2	6.7	2	6.7	2	6.7	2	6.7	2	6.7	2	6.7	2	6.7	2	6.7	2	6.7
3	10.0	3	10.0	3	10.0	3	10.0	3	10.0	3	10.0	3	10.0	3	10.0	3	10.0	3	10.0	3	10.0	3	10.0
3	5.0	2	3.3	3	5.0	3	5.0	3	5.0	2	3.3	2	3.3	2	3.3	2	3.3	3	5.0	3	5.0	2	3.3
3	3.0	1	1.0	3	3.0	2	2.0	2	2.0	2	2.0	2	2.0	2	2.0	3	3.0	3	3.0	2	2.0	1	1.0
3	3.0	3	3.0	3	3.0	3	3.0	3	3.0	1	1.0	1	1.0	1	1.0	3	3.0	3	3.0	1	1.0	3	3.0
3	4.0	1	1.3	3	4.0	1	1.3	1	1.3	2	2.7	2	2.7	2	2.7	3	4.0	3	4.0	2	2.7	3	4.0
2	3.3	1	1.7	2	3.3	2	3.3	2	3.3	1	1.7	1	1.7	1	1.7	2	3.3	1	1.7	3	5.0	2	3.3
3	5.0	2	3.3	3	5.0	3	5.0	3	5.0	3	5.0	3	5.0	3	5.0	2	3.3	3	5.0	3	5.0	2	3.3
	77.0		**63.3**		**82.0**		**74.3**		**72.7**		**72.7**		**71.0**		**72.7**		**68.0**		**71.7**		**74.7**		**69.3**

City of Kyle - Drainage Project Ranking Criteria

Category	Category Weight	Sub Category Weight	Sub Category	Scoring
Public Safety	30	7	Road Flooding and Mobility (Pre-Project Conditions)	1: Isolated Local Roadway Flooding 2: Collector Roadway Flooding 3: Moving water is likely to wash car off road (consider velocity and depth)
		5	Emergency Access for 25-year (4% ACE) storm event (Pre-Project Conditions)	1: Passable but response time increased 2: Impassable but alternative route available 3: Impassable/No alternative route.
		9	Number of occupied Structures (homes or businesses) within 100-year (1% ACE) footprint (Pre-Project Condition)	1: 0 flooded 2: 1-10 flooded 3: 10+ flooded or critical facility effected
		6	Level of Drainage Service (Post-Project Protection)	1: ≤ 25-year (4 % ACE) 2: 25-year (4% ACE) - 100-year (1% ACE) 3: ≥ 100-year (1% ACE)
		3	Mitigation required for downstream impacts	1: 15%+ of project costs 2: 1-15% of project cost 3: No mitigation need for downstream impacts
Economic	25	5	Project Cost (Note: add O&M cost)	1: ≥ 2 Million 2: $1 - 2 Million 3: ≤ $1 Million
		10	Funding Source	1: Full Funding required upfront 2: Phased Funding 3: Incremental Funding as available
		5	Degree of economic impact on development/redevelopment potential (post-project)	1: Negative Impact 2: No impact 3: Positive Impact
		5	Degree of Economic Impact on Local Businesses (post-project)	1: Negative Impact 2: No impact 3: Positive Impact
Environment	20	10	Water Quality Significance (MS4)	1: Negative Impact 2: No impact 3: Positive Impact
		10	Impact to Existing Environmental Features (i.e. Riparian Corridor, Habitat, etc.) (post-project)	1: Significant Negative Impact 2: Moderate Negative Impact 3: No Impact / Positive Impact
Project Timing	15	5	Ease of Permitting	1: Multi-jurisdiction more permits 2: Local permit with variances/Nationwide 3: Limited local permits
		3	Time for Implementation or Construction	1: ≥ 2 Years 2: 1 - 2 Years 3: 0 - 1 Years
		3	Dependency on other Projects	1: Dependent on other projects 3: No dependence on other projects
		4	Land and Easement Acquisition	1: Condemnation maybe required 2: Purchase necessary 3: No/minimal additional acquisition required
Social	10	5	Element of Comprehensive Plan (Parks, Transportation, Planning, Drainage, etc.)	1: No elements in other plans 2: Related to elements in other plans 3: Multiple elements other plan
		5	Beneficial Neighborhood Impacts	1: Negative Neighborhood Impact 2: No Neighborhood Impact 3: Positive Neighborhood Impact
	100	100		

FPM-02 FEMA LOMR		PCT1-01 Sweet Gum Erosion 1		PCT1-02 Sweet Gum Erosion 2		PCT4-01 Hitching Post		PCT4-03 Meyers St Drainage		PCT4-04 S. Burleson St Drainge		PCT4-05 Scott St LWC		PCT4-06 Sledge St LWC		PLU-01 FM2770 nr Barton MS		PLU-02 Steeplechase Park US Det		PLU-04 Isabel Ln Area		POR-01 Cotton Gin Rd Area	
Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score
0	0.0	0	0.0	0	0.0	1	2.3	1	2.3	1	2.3	2	4.7	3	7.0	2	4.7	1	2.3	0	0.0	0	0.0
0	0.0	0	0.0	0	0.0	1	1.7	0	0.0	1	1.7	2	3.3	2	3.3	1	1.7	2	3.3	0	0.0	0	0.0
3	9.0	1	3.0	1	3.0	1	3.0	1	3.0	1	3.0	1	3.0	1	3.0	1	3.0	3	9.0	2	6.0	2	6.0
3	6.0	1	2.0	1	2.0	2	4.0	2	4.0	2	4.0	2	4.0	2	4.0	2	4.0	3	6.0	3	6.0	3	6.0
3	3.0	3	3.0	3	3.0	3	3.0	3	3.0	3	3.0	3	3.0	2	2.0	3	3.0	3	3.0	3	3.0	3	3.0
3	5.0	3	5.0	3	5.0	3	5.0	3	5.0	3	5.0	3	5.0	3	5.0	2	3.3	1	1.7	2	3.3	3	5.0
1	3.3	1	3.3	1	3.3	1	3.3	1	3.3	1	3.3	1	3.3	1	3.3	2	6.7	3	10.0	1	3.3	2	6.7
3	5.0	2	3.3	2	3.3	2	3.3	2	3.3	2	3.3	2	3.3	2	3.3	3	5.0	2	3.3	2	3.3	2	3.3
2	3.3	2	3.3	2	3.3	2	3.3	2	3.3	2	3.3	2	3.3	2	3.3	3	5.0	3	5.0	2	3.3	2	3.3
2	6.7	2	6.7	2	6.7	2	6.7	2	6.7	2	6.7	2	6.7	2	6.7	2	6.7	2	6.7	3	10.0	3	10.0
3	10.0	3	10.0	3	10.0	3	10.0	3	10.0	3	10.0	3	10.0	3	10.0	3	10.0	2	6.7	2	6.7	3	10.0
2	3.3	3	5.0	3	5.0	3	5.0	3	5.0	3	5.0	3	5.0	3	5.0	1	1.7	3	5.0	2	3.3	3	5.0
1	1.0	3	3.0	3	3.0	3	3.0	3	3.0	3	3.0	3	3.0	2	2.0	2	2.0	1	1.0	1	1.0	1	1.0
3	3.0	1	1.0	1	1.0	1	1.0	3	3.0	3	3.0	1	1.0	3	3.0	3	3.0	3	3.0	3	3.0	3	3.0
3	4.0	3	4.0	3	4.0	3	4.0	3	4.0	3	4.0	3	4.0	2	2.7	3	4.0	1	1.3	3	4.0	2	2.7
3	5.0	1	1.7	1	1.7	1	1.7	1	1.7	1	1.7	1	1.7	2	3.3	3	5.0	1	1.7	1	1.7	1	1.7
2	3.3	3	5.0	3	5.0	3	5.0	3	5.0	3	5.0	3	5.0	3	5.0	3	5.0	3	5.0	3	5.0	2	3.3
	71.0		**59.3**		**59.3**		**65.3**		**65.7**		**67.3**		**69.3**		**72.0**		**73.7**		**74.0**		**63.0**		**70.0**

City of Kyle - Drainage Project Ranking Criteria

Category	Category Weight	Sub Category Weight	Sub Category	Scoring	PST-01 Live Oak St Drainage		PST-02 RR near Deleon St		PST-03 Jose Addition		RIC-01 Windy Hill LWC		RIC-02 Kelly Smith Ln		TEMP-01 Drainage Project	
					Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score	Project Specific Score	Project Weighted Score
Public Safety	30	7	Road Flooding and Mobility (Pre-Project Conditions)	1: Isolated Local Roadway Flooding 2: Collector Roadway Flooding 3: Moving water is likely to wash car off road (consider velocity and depth)	1	2.3	1	2.3	1	2.3	3	7.0	3	7.0	3	7.0
		5	Emergency Access for 25-year (4% ACE) storm event (Pre-Project Conditions)	1: Passable but response time increased 2: Impassable but alternative route available 3: Impassable/No alternative route.	2	3.3	2	3.3	1	1.7	3	5.0	2	3.3	3	5.0
		9	Number of occupied Structures (homes or businesses) within 100-year (1% ACE) footprint (Pre-Project Condition)	1: 0 flooded 2: 1-10 flooded 3: 10+ flooded or critical facility effected	1	3.0	2	6.0	2	6.0	1	3.0	1	3.0	3	9.0
		6	Level of Drainage Service (Post-Project Protection)	1: ≤ 25-year (4 % ACE) 2: 25-year (4% ACE) - 100-year (1% ACE) 3: ≥ 100-year (1% ACE)	3	6.0	2	4.0	2	4.0	2	4.0	2	4.0	3	6.0
		3	Mitigation required for downstream impacts	1: 15%+ of project costs 2: 1-15% of project cost 3: No mitigation need for downstream impacts	2	2.0	1	1.0	3	3.0	2	2.0	1	1.0	3	3.0
Economic	25	5	Project Cost (Note: add O&M cost)	1: ≥ 2 Million 2: $1 - 2 Million 3: ≤ $1 Million	3	5.0	3	5.0	3	5.0	3	5.0	3	5.0	3	5.0
		10	Funding Source	1: Full Funding required upfront 2: Phased Funding 3: Incremental Funding as available	1	3.3	1	3.3	1	3.3	2	6.7	2	6.7	3	10.0
		5	Degree of economic impact on development/redevelopment potential (post-project)	1: Negative Impact 2: No impact 3: Positive Impact	3	5.0	2	3.3	2	3.3	3	5.0	3	5.0	3	5.0
		5	Degree of Economic Impact on Local Businesses (post-project)	1: Negative Impact 2: No impact 3: Positive Impact	3	5.0	2	3.3	2	3.3	3	5.0	3	5.0	3	5.0
Environment	20	10	Water Quality Significance (MS4)	1: Negative Impact 2: No impact 3: Positive Impact	2	6.7	2	6.7	2	6.7	2	6.7	2	6.7	3	10.0
		10	Impact to Existing Environmental Features (i.e. Riparian Corridor, Habitat, etc.) (post-project)	1: Significant Negative Impact 2: Moderate Negative Impact 3: No Impact / Positive Impact	3	10.0	3	10.0	3	10.0	3	10.0	3	10.0	3	10.0
Project Timing	15	5	Ease of Permitting	1: Multi-jurisdiction more permits 2: Local permit with variances/Nationwide 3: Limited local permits	3	5.0	1	1.7	1	1.7	3	5.0	3	5.0	3	5.0
		3	Time for Implementation or Construction	1: ≥ 2 Years 2: 1 - 2 Years 3: 0 - 1 Years	3	3.0	2	2.0	2	2.0	2	2.0	3	3.0	3	3.0
		3	Dependency on other Projects	1: Dependent on other projects 3: No dependence on other projects	3	3.0	3	3.0	1	1.0	1	1.0	3	3.0	3	3.0
		4	Land and Easement Acquisition	1: Condemnation maybe required 2: Purchase necessary 3: No/minimal additional acquisition required	3	4.0	2	2.7	3	4.0	1	1.3	1	1.3	3	4.0
Social	10	5	Element of Comprehensive Plan (Parks, Transportation, Planning, Drainage, etc.)	1: No elements in other plans 2: Related to elements in other plans 3: Multiple elements other plan	1	1.7	1	1.7	1	1.7	3	5.0	1	1.7	3	5.0
		5	Beneficial Neighborhood Impacts	1: Negative Neighborhood Impact 2: No Neighborhood Impact 3: Positive Neighborhood Impact	3	5.0	3	5.0	3	5.0	3	5.0	3	5.0	3	5.0
	100	100				**73.3**		**64.3**		**64.0**		**78.7**		**75.7**		**100.0**

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: ABT-01
Status: Conceptual
Project Name: Dacy Ln
Project Type: Crossing Improvement

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 326,428	$ -

Problem Description:

Existing Low Water Crossing with 2 - 12 in. culverts on Dacy Lane. The roadway crossing is overtopped at the 2-yr storm. Overtopping is compounded by the stream alignment running parallel with the roadway. Existing culverts are completely obstructed with significant sediment.

Proposed Improvements:

Replace existing culverts with 5 - 3 ft. x 3 ft. box culverts and raise the road 2.5 ft. to pass the 25-yr event. The 100-yr event will need seven 3 ft. x 3 ft. box culverts with the road raised 2.5 ft.

Location

O & M Impact:

As evidenced by the sediment at the existing culvert, proposed structure will need to be periodically cleaned to maintain the design capacity.

Notes:

Funded by Hays County Road Bond.

Cost estimate is for 100-yr improvements.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	7.0
5	Emergency Access 25 Year Storm	5.0
9	Number of Structures	3.0
6	Level of Drainage Service	4.0
3	Mitigation Requirements	3.0
5	Project Cost	5.0
10	Funding Source	3.3
5	Degree of Development Impact	3.3
5	Economic Impact	3.3
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	5.0
3	Time for Implementation	3.0
3	Dependency on Other Projects	3.0
4	Land and Easement Acquisition	4.0
5	Element of Comprehensive Plan	3.3
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		77.0

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: AND-01 Status: Conceptual

Project Name: Dove Ln Homes Project Type: Buyout

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 1,241,300	$ -

Problem Description:

Five residential homes are within the GBRA updated floodplain. These structures are not within the effective FEMA floodplain and were built with respect to the floodplain limits at the time.

Proposed Improvements:

Analysis incorporating channel benching to the edge of the properties was conducted, however the results did not lower the water surface enough to remove the structures from the floodplain. Buyout suggested.

Location

O & M Impact:

Notes:

Properties currently within Hays County jurisdiction.

Cost based on appraisal district evaluation.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	0.0
5	Emergency Access 25 Year Storm	0.0
9	Number of Structures	6.0
6	Level of Drainage Service	4.0
3	Mitigation Requirements	3.0
5	Project Cost	3.3
10	Funding Source	6.7
5	Degree of Development Impact	3.3
5	Economic Impact	3.3
10	Water Quality Significance	10.0
10	Impact to Environmental Features	10.0
5	Ease of Permitting	3.3
3	Time for Implementation	1.0
3	Dependency on Other Projects	3.0
4	Land and Easement Acquisition	1.3
5	Element of Comprehensive Plan	1.7
5	Beneficial Neighborhood Impacts	3.3
Total Weighted Point Score:		63.3

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: BCT1-01
Project Name: Bebee Rd
Status: Conceptual
Project Type: Crossing Improvement

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 326,322	$ -

Problem Description:

Low water crossing on Bebee Rd. overtops the road during small storm events.

Proposed Improvements:

Replace existing culverts with four 5 ft. x 5 ft. box culverts and raise the road 1 ft. to pass the 25-yr event. The 100-yr event will require 4 - 5'x5' box culverts and raise the road 2 ft.

Location

O & M Impact:

O & M will require regular maintenance to include mowing and periodic silt removal.

Notes:

Project must be coordinated with Transportation Master Plan.

No existing data for the existing culverts dimensions available. Proposed improvements analyzed for the 25-yr storm event.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	7.0
5	Emergency Access 25 Year Storm	3.3
9	Number of Structures	3.0
6	Level of Drainage Service	4.0
3	Mitigation Requirements	3.0
5	Project Cost	5.0
10	Funding Source	6.7
5	Degree of Development Impact	5.0
5	Economic Impact	5.0
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	5.0
3	Time for Implementation	3.0
3	Dependency on Other Projects	3.0
4	Land and Easement Acquisition	4.0
5	Element of Comprehensive Plan	3.3
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		82

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: BR-01 Status: Conceptual

Project Name: Roland Ln LWC (E) Project Type: Crossing Improvement

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 841,754	$ -

Problem Description:

Low water crossing on Roland Lane overtops during small rain events. A proposed subdivision to the north of the crossing will have two proposed detention ponds on the east and west side of the development. The east pond discharges to this culvert located west of Aztec Village Dr.

Proposed Improvements:

Replace existing culverts with 3 - 12 ft. x 4 ft. box culverts and raise the road 3 ft. to pass the 25-yr event. The 100-yr event will need 4 - 12 ft. x 4 ft. box culverts with the road raised 3 ft.

Location

O & M Impact:

As evidenced by the sediment at the existing culvert, proposed structure will need to be periodically cleaned to maintain the design capacity.

Notes:

Project must be coordinated with future development planning.

Refer to proposed subdivision plans for proposed outfall structure to Roland Rd.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	4.7
5	Emergency Access 25 Year Storm	3.3
9	Number of Structures	3.0
6	Level of Drainage Service	4.0
3	Mitigation Requirements	3.0
5	Project Cost	5.0
10	Funding Source	6.7
5	Degree of Development Impact	5.0
5	Economic Impact	3.3
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	5.0
3	Time for Implementation	2.0
3	Dependency on Other Projects	3.0
4	Land and Easement Acquisition	1.3
5	Element of Comprehensive Plan	3.3
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		74.3

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: BR-02 Status: Conceptual

Project Name: Roland Ln LWC (W) Project Type: Crossing Improvement

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 682,240	$ -

Problem Description:

Low water crossing on Roland Lane with no existing culvert underneath the roadway. A proposed subdivision to the north of the crossing will have two proposed detention ponds on the east and west side of the development. The west pond will discharge to a low point where existing drainage overtops with no culvert present during small rain events.

Proposed Improvements:

Replace existing culverts with 2 - 12 ft. x 4 ft. box culverts and raise the road 3 ft. to pass the 25-yr event. The 100-yr event will need 3 - 12 ft. x 4ft. box culverts with the road raised 3 ft.

Location

O & M Impact:

Proposed structure will need to be periodically cleaned to maintain the design capacity.

Notes:

Project must be coordinated with future development planning.

Refer to proposed subdivision plans for proposed outfall structure to Roland Rd.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	4.7
5	Emergency Access 25 Year Storm	5.0
9	Number of Structures	3.0
6	Level of Drainage Service	4.0
3	Mitigation Requirements	3.0
5	Project Cost	5.0
10	Funding Source	3.3
5	Degree of Development Impact	5.0
5	Economic Impact	3.3
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	5.0
3	Time for Implementation	2.0
3	Dependency on Other Projects	3.0
4	Land and Easement Acquisition	1.3
5	Element of Comprehensive Plan	3.3
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		72.7

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: BUN-01 Status: Conceptual

Project Name: Bunton Ln LWC (S) Project Type: Crossing Improvement

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 617,908	$ -

Problem Description:

Low water crossing on Bunton Ln. with 3 - 30 in. existing culverts under the roadway. The crossing is overtopped by 1.5 ft. in the 2-yr storm as indicated by the hydraulic model.

Proposed Improvements:

Replace existing culverts with a 60 ft. span bridge and raise the road 4.5 ft. to pass the 25-yr event. The 100-yr event will need a 60 ft. span bridge and raise the road 5 ft.

Location

O & M Impact:

O & M will require regular maintenance to include mowing and periodic silt removal.

Notes:

Project contingent on future development of Grist Mill Rd.

Bunton Ln. crosses the stream in three locations within a short distance. Consider upgrading the entire road in the future combining projects. Proposed project cost based on the 25-yr storm event.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	7.0
5	Emergency Access 25 Year Storm	3.3
9	Number of Structures	3.0
6	Level of Drainage Service	4.0
3	Mitigation Requirements	3.0
5	Project Cost	5.0
10	Funding Source	6.7
5	Degree of Development Impact	5.0
5	Economic Impact	3.3
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	3.3
3	Time for Implementation	2.0
3	Dependency on Other Projects	1.0
4	Land and Easement Acquisition	2.7
5	Element of Comprehensive Plan	1.7
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		72.7

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: BUN-02 Status: Conceptual

Project Name: Bunton Ln LWCs (C) Project Type: Crossing Improvement

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 902,110	$ -

Problem Description:

Low Water Crossing on Bunton Lane with three 36" culverts under the roadway. The crossing is overtopped by 1.7 feet in the 2-yr storm as indicated by the hydraulic model.

Proposed Improvements:

Replace existing culverts with a 60' span bridge and raise the road 3.5 feet to pass the 25-yr event. The 100-yr event will need a 60' span bridge and raise the road 4.5 feet.

Location

O & M Impact:

O & M will require regular maintenance to include mowing and periodic silt removal.

Notes:

Project contingent on future development of Grist Mill Rd.

Bunton Ln. crosses the stream in three locations within a short distance. Consider upgrading the entire road in the future combining projects. Proposed project cost based on the 25-yr storm event.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	7.0
5	Emergency Access 25 Year Storm	3.3
9	Number of Structures	3.0
6	Level of Drainage Service	4.0
3	Mitigation Requirements	3.0
5	Project Cost	3.3
10	Funding Source	6.7
5	Degree of Development Impact	5.0
5	Economic Impact	3.3
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	3.3
3	Time for Implementation	2.0
3	Dependency on Other Projects	1.0
4	Land and Easement Acquisition	2.7
5	Element of Comprehensive Plan	1.7
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		71.0

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: BUN-03 Status: Conceptual

Project Name: Bunton Ln LWC (N) Project Type: Crossing Improvement

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 824,716	$ -

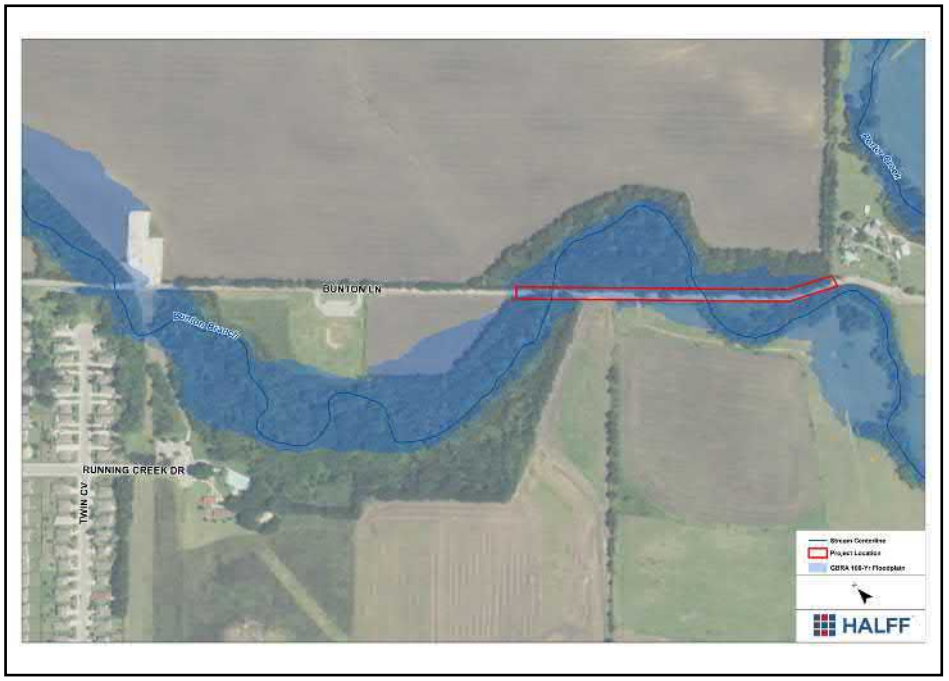
Problem Description:

Low Water Crossing on Bunton Lane with a single 48 in. culvert under the roadway. The crossing is overtopped by 1.0 ft. in the 2-yr storm.

Proposed Improvements:

Replace existing culverts with a 60 ft. span bridge and raise the road 3 ft. to pass the 25-yr event. The 100-yr event will need a 60 ft. span bridge and raise the road 4 ft.

Location



O & M Impact:

O & M will require regular maintenance to include mowing and periodic silt removal.

Notes:

Project contingent on future development of Grist Mill Rd.

Bunton Ln. crosses the stream in three locations within a short distance. Consider upgrading the entire road in the future combining projects. Proposed project cost based on the 25-yr storm event.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	7.0
5	Emergency Access 25 Year Storm	3.3
9	Number of Structures	3.0
6	Level of Drainage Service	4.0
3	Mitigation Requirements	3.0
5	Project Cost	5.0
10	Funding Source	6.7
5	Degree of Development Impact	5.0
5	Economic Impact	3.3
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	3.3
3	Time for Implementation	2.0
3	Dependency on Other Projects	1.0
4	Land and Easement Acquisition	2.7
5	Element of Comprehensive Plan	1.7
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		72.7

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: BUN-04 Status: Conceptual

Project Name: Goforth Rd LWC Project Type: Crossing Improvement

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 287,870	$ -

Problem Description:

Low Water Crossing on Goforth Rd. with 4 - 36 in. culverts under the roadway 1.4 ft. during the 100-yr storm.

Proposed Improvements:

Replace existing culverts with 3 - 10 ft. x 4ft. box culverts.

Location

O & M Impact:

O & M will require regular maintenance to include mowing and periodic silt removal.

Notes:

Proposed project cost based on the 100-yr storm event.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	4.7
5	Emergency Access 25 Year Storm	1.7
9	Number of Structures	3.0
6	Level of Drainage Service	4.0
3	Mitigation Requirements	3.0
5	Project Cost	5.0
10	Funding Source	3.3
5	Degree of Development Impact	3.3
5	Economic Impact	3.3
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	3.3
3	Time for Implementation	3.0
3	Dependency on Other Projects	3.0
4	Land and Easement Acquisition	4.0
5	Element of Comprehensive Plan	3.3
5	Beneficial Neighborhood Impacts	3.3
Total Weighted Point Score:		68.0

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: CFP-01 Status: Conceptual

Project Name: Quail Ridge Area Project Type: Storm Drain Improvements

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 675,000	$ -

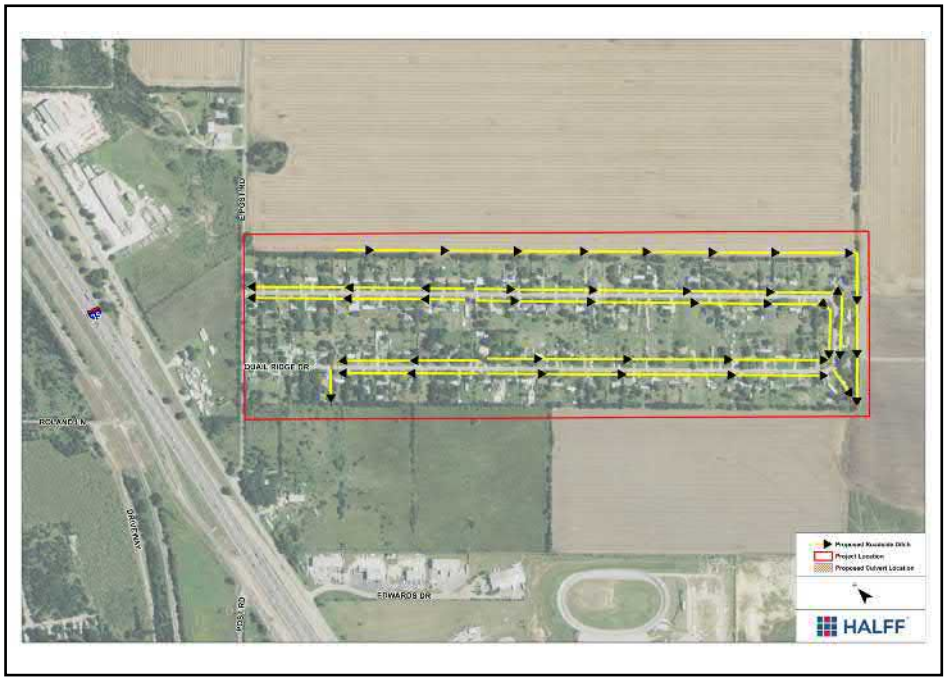
Problem Description:

Subdivision has undersized roadside ditches to convey runoff to offsite channels. The driveway and cross culverts are filled with silt and undersized to convey the design storms.

Proposed Improvements:

Design of conveyance systems to 25-yr storm event
Channel Conveyance.
15,100 LF internal (roadside) ditch – typ. 15 ft. top width, 1.8 ft. depth
3,900 LF external (perimeter) ditch – typ. 30 ft. top width, 2.5 ft. depth
Culverts
Driveway culverts – typically 18 in. culverts
Outfall 1 (nr. Post Rd.)– three 30 in. culverts
Outfall 2 (SE corner) – three 30 in. culverts

Location



O & M Impact:

O&M requirements will include silt and debris removal from culverts and channel maintenance to include regular mowing and periodic silt removal.

Notes:

Proposed project cost based on the 25-yr storm event.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	2.3
5	Emergency Access 25 Year Storm	1.7
9	Number of Structures	6.0
6	Level of Drainage Service	4.0
3	Mitigation Requirements	1.0
5	Project Cost	5.0
10	Funding Source	6.7
5	Degree of Development Impact	3.3
5	Economic Impact	3.3
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	5.0
3	Time for Implementation	3.0
3	Dependency on Other Projects	3.0
4	Land and Easement Acquisition	4.0
5	Element of Comprehensive Plan	1.7
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		71.7

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: CTR-01
Project Name: Center Street
Status: Conceptual
Project Type: Local Flooding

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 1,009,152	$ -

Problem Description:

Center Street roadside ditches and culverts are undersized to contain flow draining from both the north and south.

Proposed Improvements:

Proposed storm sewer:
25-yr:
4 ft x 3 ft RCB from Ranger Dr to outfall
36" RCP from Old Stagecoach to Ranger Dr
18- 20 ft inlets
100-yr:
6 ft x 3 ft RCB from Ranger Dr to outfall
42" RCP from Old Stagecoach to Ranger Dr
18- 20 ft inlets

Location

O & M Impact:

Notes:

Funded in CIP FY20.

Proposed project cost based on the 25-yr storm event.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	4.7
5	Emergency Access 25 Year Storm	1.7
9	Number of Structures	6.0
6	Level of Drainage Service	4.0
3	Mitigation Requirements	1.0
5	Project Cost	3.3
10	Funding Source	6.7
5	Degree of Development Impact	5.0
5	Economic Impact	5.0
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	5.0
3	Time for Implementation	2.0
3	Dependency on Other Projects	1.0
4	Land and Easement Acquisition	2.7
5	Element of Comprehensive Plan	5.0
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		74.7

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: FPM-01 Status: Conceptual

Project Name: US Floodplains Project Type: Modeling

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 90,000	$ -

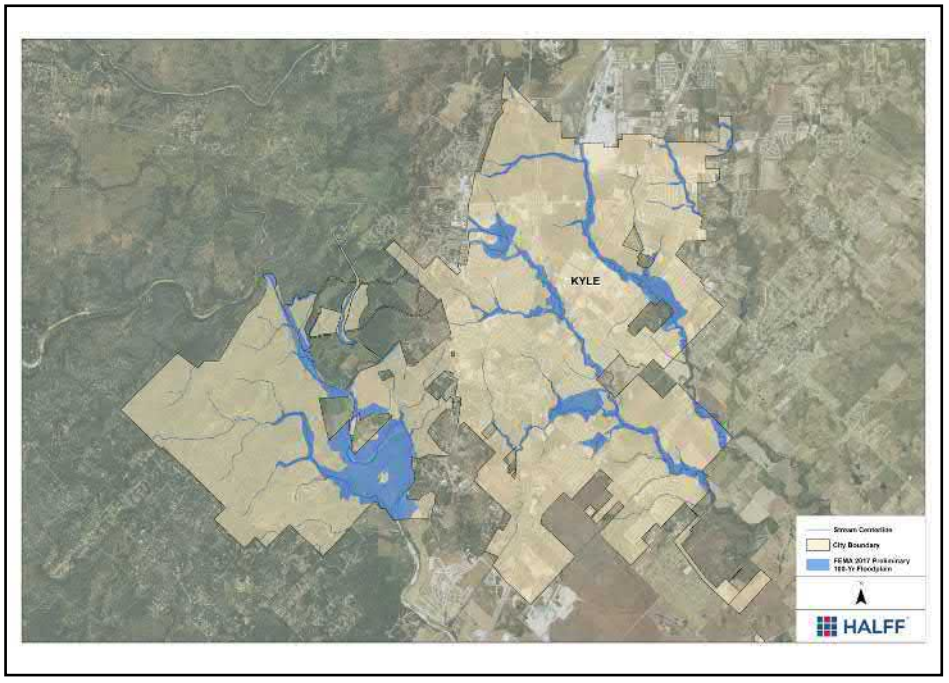
Problem Description:

FEMA floodplains do not extend far enough upstream to provide coverage areas draining more than 50 acres per City Code.

Proposed Improvements:

Create hydraulic stream models and floodplains (Zone A) for reaches upstream of existing FEMA floodplain limits to a point of 50 acres of drainage area. Stream Lengths are limited to those within the City limits.

Location



O & M Impact:

Notes:

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	0.0
5	Emergency Access 25 Year Storm	0.0
9	Number of Structures	9.0
6	Level of Drainage Service	6.0
3	Mitigation Requirements	3.0
5	Project Cost	5.0
10	Funding Source	3.3
5	Degree of Development Impact	5.0
5	Economic Impact	3.3
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	3.3
3	Time for Implementation	1.0
3	Dependency on Other Projects	3.0
4	Land and Easement Acquisition	4.0
5	Element of Comprehensive Plan	3.3
5	Beneficial Neighborhood Impacts	3.3
Total Weighted Point Score:		69.3

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: FPM-02
Project Name: FEMA LOMR
Status: Conceptual
Project Type: Update Modeling

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 150,000	$ -

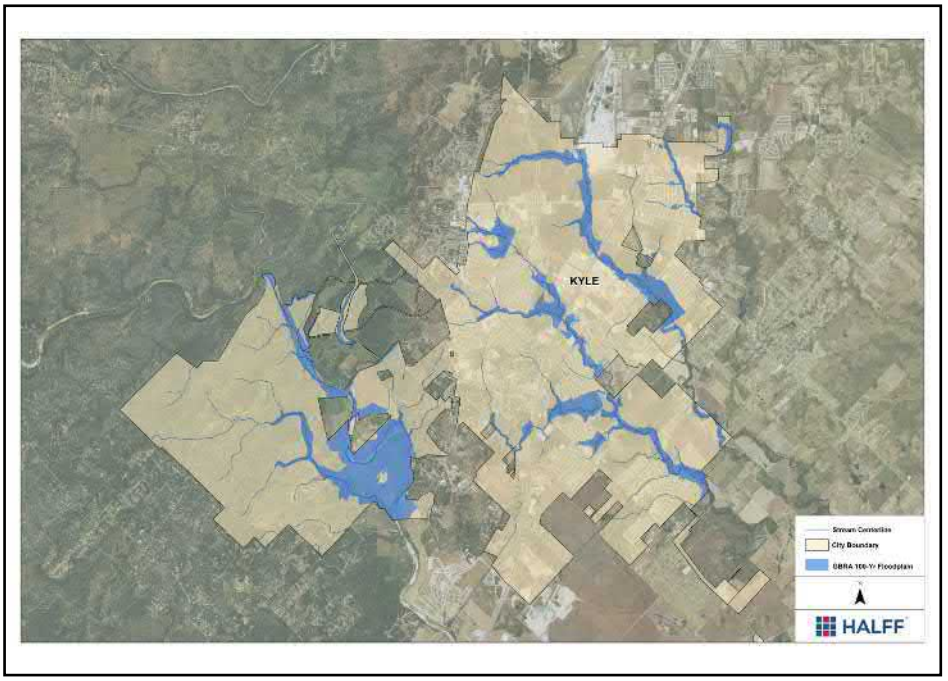
Problem Description:

Floodplains developed under the GBRA Floodplain Study are not effective FEMA models within the City of Kyle.

Proposed Improvements:

Prepare GBRA models and floodplains to be FEMA compliant and submit as a LOMR to have the data become the effective within the City of Kyle.

Location



O & M Impact:

Notes:

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	0.0
5	Emergency Access 25 Year Storm	0.0
9	Number of Structures	9.0
6	Level of Drainage Service	6.0
3	Mitigation Requirements	3.0
5	Project Cost	5.0
10	Funding Source	3.3
5	Degree of Development Impact	5.0
5	Economic Impact	3.3
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	3.3
3	Time for Implementation	1.0
3	Dependency on Other Projects	3.0
4	Land and Easement Acquisition	4.0
5	Element of Comprehensive Plan	5.0
5	Beneficial Neighborhood Impacts	3.3
Total Weighted Point Score:		71.0

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: PCT1-01 Status: Conceptual

Project Name: Sweet Gum Erosion 1 Project Type: Erosion Stabilization

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 60,353	$ -

Problem Description:

Project area is located behind residences on Sweet Gum Dr. at the northern corner of Hometown Kyle Subdivision. The existing channel has been significantly eroded.

Proposed Improvements:

Proposed armored channel to reduce additional channel erosion.

Location

O & M Impact:

O & M will require regular maintenance to include mowing and periodic silt removal.

Notes:

Project should be considered in conjunction with Sweet Gum 2.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	0.0
5	Emergency Access 25 Year Storm	0.0
9	Number of Structures	3.0
6	Level of Drainage Service	2.0
3	Mitigation Requirements	3.0
5	Project Cost	5.0
10	Funding Source	3.3
5	Degree of Development Impact	3.3
5	Economic Impact	3.3
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	5.0
3	Time for Implementation	3.0
3	Dependency on Other Projects	1.0
4	Land and Easement Acquisition	4.0
5	Element of Comprehensive Plan	1.7
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		59.3

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: PCT1-02 Status: Conceptual

Project Name: Sweet Gum Erosion 2 Project Type: Erosion Stabilization

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 80,000	$ -

Problem Description:

Project area is located behind residences on Sweet Gum Drive in the northern corner of Hometown Kyle Subdivision. The existing channel has been significantly eroded.

Proposed Improvements:

Proposed armored channel to reduce additional channel erosion.

Location

O & M Impact:

O & M will require regular maintenance to include mowing and periodic silt removal.

Notes:

Project should be considered in conjunction with Sweet Gum 1.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	0.0
5	Emergency Access 25 Year Storm	0.0
9	Number of Structures	3.0
6	Level of Drainage Service	2.0
3	Mitigation Requirements	3.0
5	Project Cost	5.0
10	Funding Source	3.3
5	Degree of Development Impact	3.3
5	Economic Impact	3.3
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	5.0
3	Time for Implementation	3.0
3	Dependency on Other Projects	1.0
4	Land and Easement Acquisition	4.0
5	Element of Comprehensive Plan	1.7
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		59.3

City of Kyle
Drainage Master Plan

Project Summary Information		11/06/2018
Project ID:	PCT4-01	Status: Conceptual
Project Name:	Hitching Post	Project Type: Channel/Culvert

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 257,523	$ -

Problem Description:

Localized residential flooding occurs on Hitching Post to the northeast. The interior drainage in the development does not effectively convey the runoff offsite and the cross culverts are filled with silt.

Proposed Improvements:

Roadside ditch improvements along the interior of Hitching Post to drain to Scott St., approximately 250 LF. Removal of the existing culvert on Hitching Post and construction of a storm sewer to start at the crossing of the original culvert to the proposed crossing at Scott St. A second line will route flow at the intersection of the lots 180 ft to the east. A proposed culvert will cross Hitching Post to the Scott St. culvert. Ditches will need to be widened and regraded to 6:1 side slopes, with an overall top width of 6 ft.

Location

O & M Impact:

O & M will require regular maintenance to include mowing and periodic silt removal.

Notes:

This project will need to be coordinated with Scott St. (PCT4-05).

Project costs reflect 25-yr design event.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	2.3
5	Emergency Access 25 Year Storm	1.7
9	Number of Structures	3.0
6	Level of Drainage Service	4.0
3	Mitigation Requirements	3.0
5	Project Cost	5.0
10	Funding Source	3.3
5	Degree of Development Impact	3.3
5	Economic Impact	3.3
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	5.0
3	Time for Implementation	3.0
3	Dependency on Other Projects	1.0
4	Land and Easement Acquisition	4.0
5	Element of Comprehensive Plan	1.7
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		65.3

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: PCT4-03 Status: Conceptual

Project Name: Meyers St Drainage Project Type: Roadside Ditch/Culvert

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 75,630	$ -

Problem Description:

Project is located along Meyers St. south of Third St. Roadside ditches along Third St. going southeast towards Meyers St. are under capacity. Flow is backing up at the culvert crossing at the east corner of Meyers St. and Third St.

Proposed Improvements:

Roadside ditch improvements from southeast corner of Meyer St. and Third St. to the southern end of Meyer St., approximately 200 ft. Ditch will need to be widened and regraded to 4:1 side slope, with an overall top width of 7 ft.

Location

O & M Impact:

O & M will require regular maintenance to include mowing and periodic silt removal.

Notes:

Project may consider additional stream channel grading and will need to avoid shallow WW line.
Consider implementation with Sledge St. (PCT4-06) and Hitching Post (PCT4-01).

Proposed project cost based on the 100-yr storm event.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	2.3
5	Emergency Access 25 Year Storm	0.0
9	Number of Structures	3.0
6	Level of Drainage Service	4.0
3	Mitigation Requirements	3.0
5	Project Cost	5.0
10	Funding Source	3.3
5	Degree of Development Impact	3.3
5	Economic Impact	3.3
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	5.0
3	Time for Implementation	3.0
3	Dependency on Other Projects	3.0
4	Land and Easement Acquisition	4.0
5	Element of Comprehensive Plan	1.7
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		65.7

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: PCT4-04 Status: Conceptual

Project Name: S. Burleson St Drainage Project Type: Roadside Ditch/Culvert

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 77,955	$ -

Problem Description:

Project located off of Burleson St. south of South St. An existing network of roadside ditches and roadway culverts run along South St. going east towards Main St. Flow is backing up at the culvert crossing at the east corner of Burleson St. and South St., causing flooding to the neighborhood along Burleson St. south of South St..

Proposed Improvements:

Roadside ditch improvements along from south Burleson St. to the east corner of Burlseon St. and South St., approximately 330 ft. Ditch will need to be widened and regraded to 4:1 side slope, with an overall top width of 9 ft.

Location

O & M Impact:

Remove obstructions and overgrown vegetation from storm drain network of existing roadside ditches leading to culverts, and downstream of culverts. Roadway culverts will need to be cleaned out.

Notes:

Proposed project cost based on the 100-yr storm event.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	2.3
5	Emergency Access 25 Year Storm	1.7
9	Number of Structures	3.0
6	Level of Drainage Service	4.0
3	Mitigation Requirements	3.0
5	Project Cost	5.0
10	Funding Source	3.3
5	Degree of Development Impact	3.3
5	Economic Impact	3.3
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	5.0
3	Time for Implementation	3.0
3	Dependency on Other Projects	3.0
4	Land and Easement Acquisition	4.0
5	Element of Comprehensive Plan	1.7
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		67.3

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: PCT4-05 Status: Conceptual

Project Name: Scott St LWC Project Type: Channel/Culvert

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 566,130	$ -

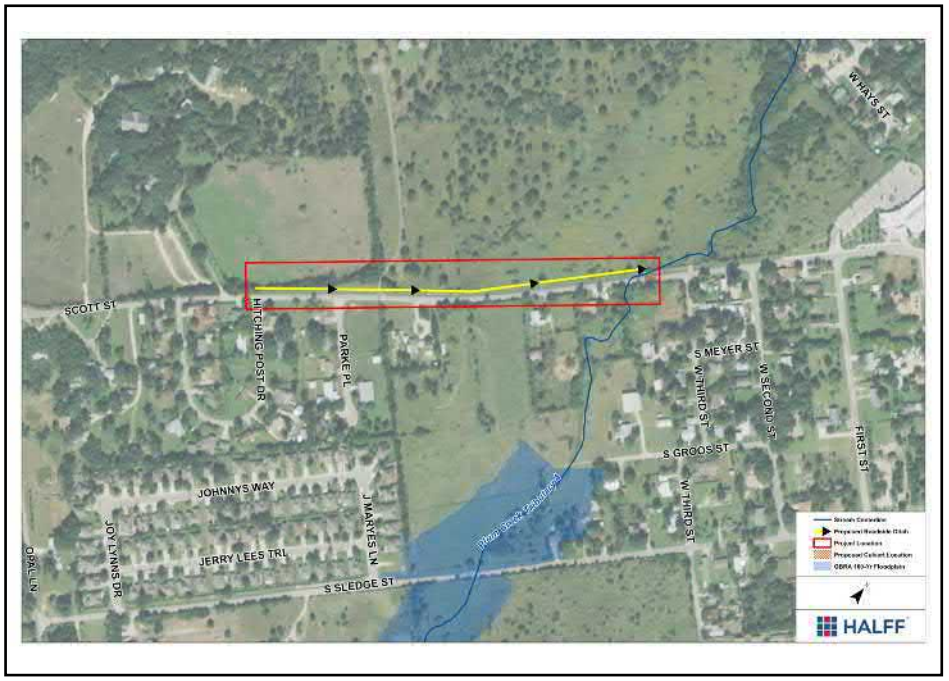
Problem Description:

Offsite flow from the northwest overtops roadway and causes localized flooding. Undersized roadside ditches and insufficient drainage network does not allow for adequate routing of stormwater. Culverts under Scott St. are not capable of handling the existing flows to the structure.

Proposed Improvements:

Road side ditch improvements along Scott St. from Hitching Post to the existing culvert crossing just east of Third St., approximately 1800 ft. Ditch will need to be widened and regraded to 4:1 side slopes, with an overall top width of 9 ft. The existing culvert will need to be replaced with a 60 ft. span bridge and raise the road 1 ft. to pass the 25-yr event. To pass the 100-yr event will need a 60 ft. span bridge and raise the road 2 ft.

Location



O & M Impact:

O & M will require regular maintenance to include mowing and periodic silt removal.

Notes:

Consider this project to be implemented with Hitching Post (PCT4-01).

This alternative would include acquisition of additional ROW or drainage easement. Proposed project cost based on the 25-yr storm event.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	4.7
5	Emergency Access 25 Year Storm	3.3
9	Number of Structures	3.0
6	Level of Drainage Service	4.0
3	Mitigation Requirements	3.0
5	Project Cost	5.0
10	Funding Source	3.3
5	Degree of Development Impact	3.3
5	Economic Impact	3.3
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	5.0
3	Time for Implementation	3.0
3	Dependency on Other Projects	1.0
4	Land and Easement Acquisition	4.0
5	Element of Comprehensive Plan	1.7
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		69.3

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: PCT4-06 Status: Conceptual

Project Name: Sledge St LWC Project Type: Channel/Culvert

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 566,128	$ -

Problem Description:

Low water crossing on Sledge St. with existing 2 - 4 ft. x 3 ft. box culverts under the roadway. The crossing is overtopped in the 2-yr storm as indicated by the hydraulic model.

Proposed Improvements:

Replace existing culverts with a 60 ft. span bridge to pass the 25-yr event. The 100-yr event will need a 60 ft. span bridge and raise the road 0.5 ft.

Location

O & M Impact:

O & M will require regular maintenance to include mowing and periodic channel clearing.

Notes:

Consider implemtation in conjuction with Scott St. (PCT4-05), and Hitching Post (PCT4-01).

Proposed project cost based on the 25-yr storm event.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	7.0
5	Emergency Access 25 Year Storm	3.3
9	Number of Structures	3.0
6	Level of Drainage Service	4.0
3	Mitigation Requirements	2.0
5	Project Cost	5.0
10	Funding Source	3.3
5	Degree of Development Impact	3.3
5	Economic Impact	3.3
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	5.0
3	Time for Implementation	2.0
3	Dependency on Other Projects	3.0
4	Land and Easement Acquisition	2.7
5	Element of Comprehensive Plan	3.3
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		72.0

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: PLU-01 Status: Conceptual

Project Name: FM 2770 near Barton MS Project Type: Culvert

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 973,881	$ -

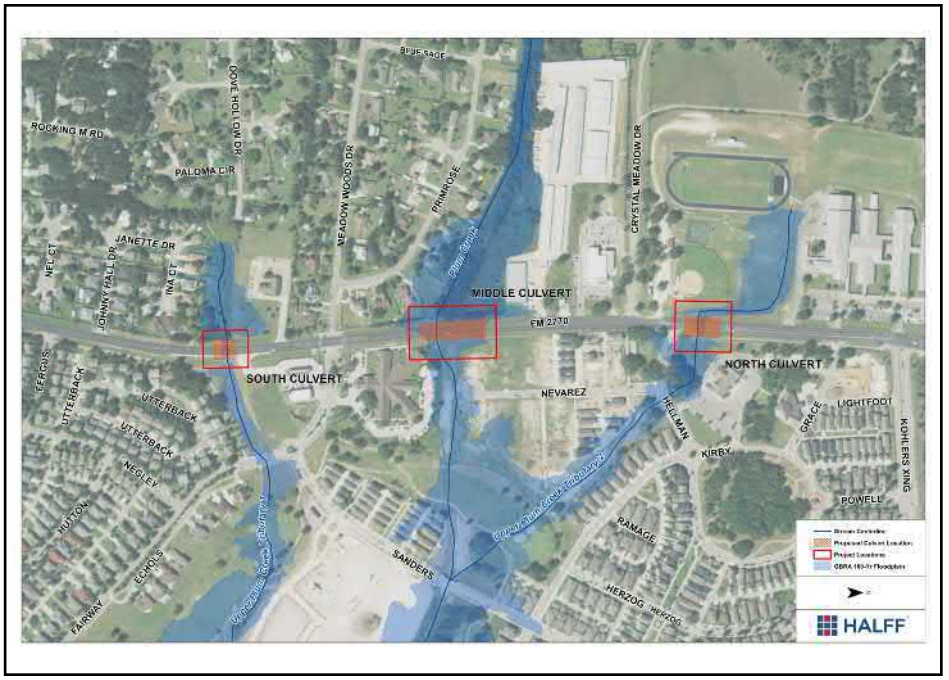
Problem Description:

The City identified three cross culverts along Jack C Hays Trail needing improvements due to overtopping: The North Culvert (two arch pipes existing), the Middle Culvert (two arch pipes existing), and the South Culvert(one arch pipe existing). The North Culvert is located approximately 800 ft. south of Kohlers Crossing. The Middle Culvert is located 500 ft. north of Meadow Woods Drive and the South Culvert is located approximately 600 ft. north of Johnny Hall Drive. These three culverts may pass flow between each during significant events.

Proposed Improvements:

The north culvert has proposed 4 - 6 ft. x 4 ft. boxes for the 25-yr and 6 - 6 ft. x 4ft. boxes for the 100-yr. The middle culvert has proposed 4 - 6 ft. x ft.' boxes for the 25-yr and 6 - 6 ft. x 5 ft. boxes for the 100-yr. The south culvert has an already designed upgrade that is sufficient for the 100-yr.

Location



O & M Impact:

O & M will require regular maintenance to include mowing and periodic silt removal.

Notes:

Refer to Memo dated October 24, 2017 sent to the City of Kyle for specific information on the proposed culverts analysis.

Project cost is based on 100-yr storm design.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	4.7
5	Emergency Access 25 Year Storm	1.7
9	Number of Structures	3.0
6	Level of Drainage Service	4.0
3	Mitigation Requirements	3.0
5	Project Cost	3.3
10	Funding Source	6.7
5	Degree of Development Impact	5.0
5	Economic Impact	5.0
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	1.7
3	Time for Implementation	2.0
3	Dependency on Other Projects	3.0
4	Land and Easement Acquisition	4.0
5	Element of Comprehensive Plan	5.0
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		73.7

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: PLU-02 Status: Conceptual

Project Name: Steeplechase Park US Det Project Type: Channel Improvements

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 4,310,300	$ -

Problem Description:

Potentially nine (9) structures in the floodplain due to flooding from Plum Creek. Channel conveyance improvements are needed to decrease creek water surface elevations.

Proposed Improvements:

Channel conveyance improvements by creating a channel bench through removal of existing detention ponds on the north east of Plum Creek. Adding this conveyance dropped the water surface up to 2.91 ft. (100-yr) and 2.89 ft. (25-yr).

Location

O & M Impact:

O & M will require regular maintenance to include mowing and periodic silt removal.

Notes:

The new NOAA Atlas 14 rainfall data should be considered prior to design. Proposed channel improvements should stay out of ordinary high water mark to minimize environmental permitting needs.

Proposed project cost based on the 100-yr storm event.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	2.3
5	Emergency Access 25 Year Storm	3.3
9	Number of Structures	9.0
6	Level of Drainage Service	6.0
3	Mitigation Requirements	3.0
5	Project Cost	1.7
10	Funding Source	10.0
5	Degree of Development Impact	3.3
5	Economic Impact	5.0
10	Water Quality Significance	6.7
10	Impact to Environmental Features	6.7
5	Ease of Permitting	5.0
3	Time for Implementation	1.0
3	Dependency on Other Projects	3.0
4	Land and Easement Acquisition	1.3
5	Element of Comprehensive Plan	1.7
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		74.0

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: PLU-04 Status: Conceptual

Project Name: Isabel Ln Area Project Type: Channel Improvements

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 1,381,440	$ -

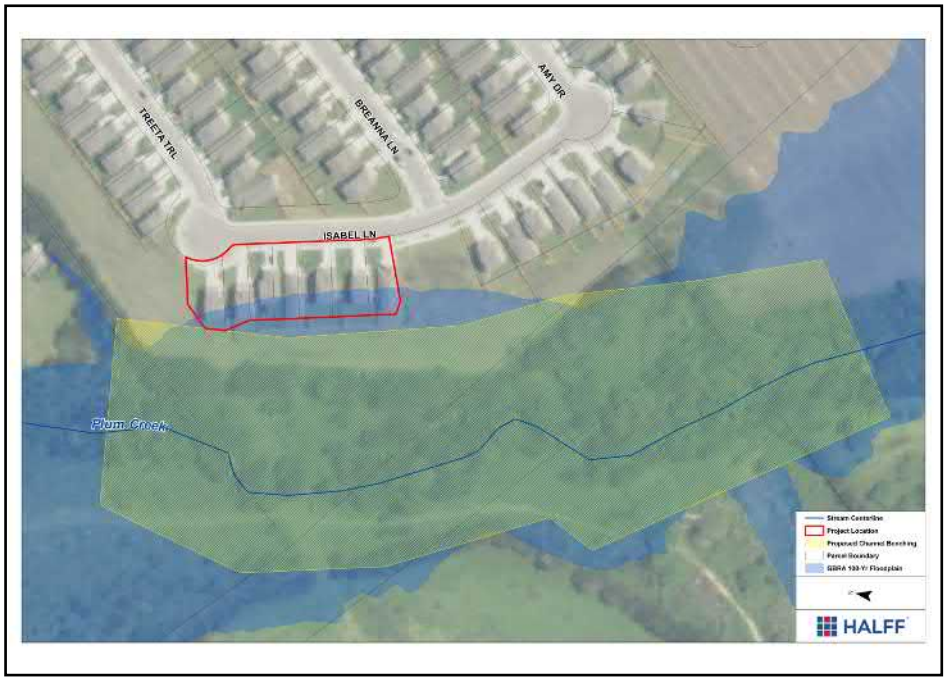
Problem Description:

Seven (7) structures are within the GBRA floodplain. The structures do not lie within the previous effective floodplain.

Proposed Improvements:

Channel benching on the left and right overbanks. The results lowered the WSEL enough to bring the structures out of the floodplain.

Location



O & M Impact:

Notes:

Proposed channel improvements should stay out of ordinary high water mark to minimize environmental permitting needs.

Proposed project cost based on the 100-yr storm event.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	0.0
5	Emergency Access 25 Year Storm	0.0
9	Number of Structures	6.0
6	Level of Drainage Service	6.0
3	Mitigation Requirements	3.0
5	Project Cost	3.3
10	Funding Source	3.3
5	Degree of Development Impact	3.3
5	Economic Impact	3.3
10	Water Quality Significance	10.0
10	Impact to Environmental Features	6.7
5	Ease of Permitting	3.3
3	Time for Implementation	1.0
3	Dependency on Other Projects	3.0
4	Land and Easement Acquisition	4.0
5	Element of Comprehensive Plan	1.7
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		63.0

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: POR-01 Status: Conceptual

Project Name: Cotton Gin Rd Area Project Type: Buyouts

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 780,000	$ -

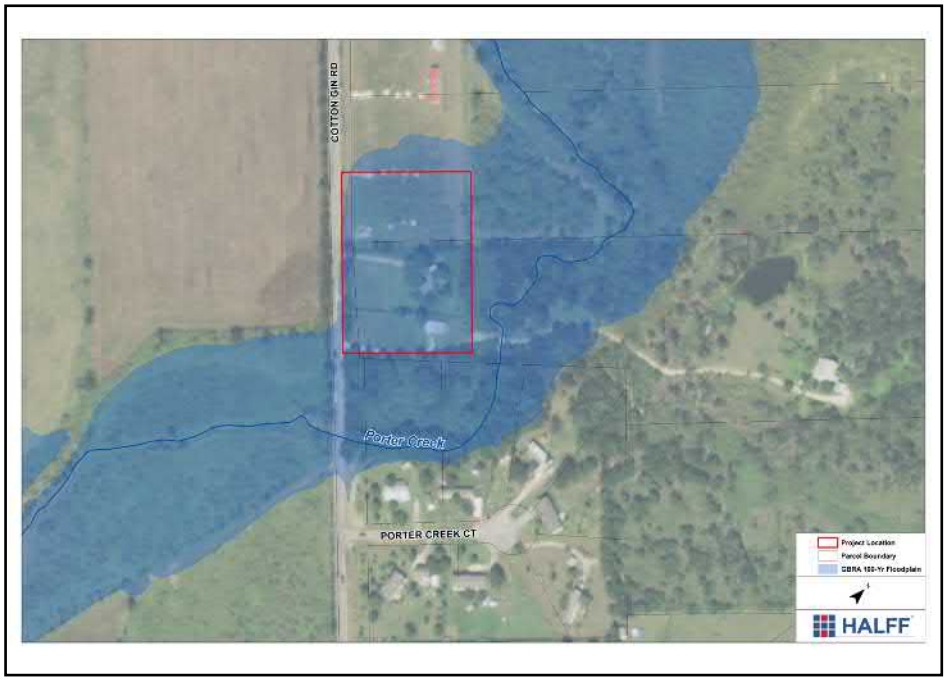
Problem Description:

Three structures are within the GBRA floodplain and the existing effective FEMA floodplain.

Proposed Improvements:

Channel improvements were evaluated but too costly. Buyouts would be necessary to remove these structures from the floodplain.

Location



O & M Impact:

Notes:

Project is within Hays County jurisdiction.

Cost based on appraisal district evaluation.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	0.0
5	Emergency Access 25 Year Storm	0.0
9	Number of Structures	6.0
6	Level of Drainage Service	6.0
3	Mitigation Requirements	3.0
5	Project Cost	5.0
10	Funding Source	6.7
5	Degree of Development Impact	3.3
5	Economic Impact	3.3
10	Water Quality Significance	10.0
10	Impact to Environmental Features	10.0
5	Ease of Permitting	5.0
3	Time for Implementation	1.0
3	Dependency on Other Projects	3.0
4	Land and Easement Acquisition	2.7
5	Element of Comprehensive Plan	1.7
5	Beneficial Neighborhood Impacts	3.3
Total Weighted Point Score:		70.0

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: PST-01 Status: Conceptual

Project Name: Live Oak St Drainage Project Type: Channel

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 96,700	$ -

Problem Description:

Runoff from the northwest floods Live Oak Street at St. Anthony's church.

Proposed Improvements:

Roadside ditch improvements along Live Oak St. from Porter St. to the channel outfall, approximately 965 ft. Ditch will need to be widened and regraded to 3:1 side slope, with a bottom width of 9 ft., and a depth of 2 ft.

O & M Impact:

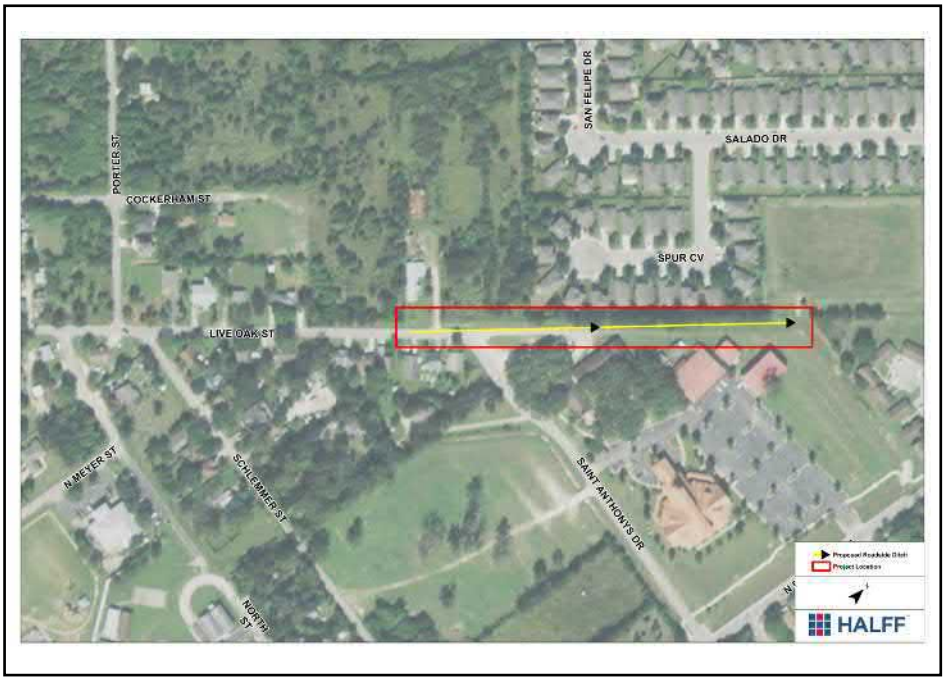
O & M will require regular maintenance to include mowing and periodic silt removal.

Notes:

Refer to N. Burleson St. Improvements Flood Mitigation Alternatives Memo dated, July 6, 2105 by Freese and Nichols for detailed info on detention ponds and related proposed infrastructure.

Proposed project cost based on the 100-yr storm event.

Location



Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	2.3
5	Emergency Access 25 Year Storm	3.3
9	Number of Structures	3.0
6	Level of Drainage Service	6.0
3	Mitigation Requirements	2.0
5	Project Cost	5.0
10	Funding Source	3.3
5	Degree of Development Impact	5.0
5	Economic Impact	5.0
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	5.0
3	Time for Implementation	3.0
3	Dependency on Other Projects	3.0
4	Land and Easement Acquisition	4.0
5	Element of Comprehensive Plan	1.7
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		73.3

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: PST-02 Status: Conceptual

Project Name: RR near Deleon St Project Type: Culvert

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 527,000	$ -

Problem Description:

Culverts at railroad crossing east of Moreno St are undersized causing flooding at the road and adjacent properties

Proposed Improvements:

Proposed improvements will require an additional 4 - 33 in. steel culverts to be jack and bored underneath existing railroad to pass the 25-yr storm event. An additional 2 - 33 in. steel culverts (six total) will be needed to pass the 100-yr storm event.

Location

O & M Impact:

O & M will require regular maintenance to include mowing and periodic silt removal.

Drainage channels behind homes will need to be maintenance from railroad.

Notes:

Project to be implemented with Jose Addition (PST-03).

Coordination and potential permitting require by railroad.

Proposed project cost based on the 25-yr storm event.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	2.3
5	Emergency Access 25 Year Storm	3.3
9	Number of Structures	6.0
6	Level of Drainage Service	4.0
3	Mitigation Requirements	1.0
5	Project Cost	5.0
10	Funding Source	3.3
5	Degree of Development Impact	3.3
5	Economic Impact	3.3
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	1.7
3	Time for Implementation	2.0
3	Dependency on Other Projects	3.0
4	Land and Easement Acquisition	2.7
5	Element of Comprehensive Plan	1.7
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		64.3

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: PST-03 Status: Conceptual

Project Name: Jose Addition Project Type: Channel Improvements

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 78,663	$ -

Problem Description:

Channel runoff along railroad backs up onto street and residences along Deleon St., Tenerio St., Selvera St., and Moreno St.

Proposed Improvements:

Proposed improvements include regrading 440 ft. of ditch along DeLeon St. to provide adequate conveyance. Ditch size will be 2 ft. deep with 6:1 side slopes.

O & M Impact:

O & M will require regular maintenance to include mowing and periodic silt removal.

Notes:

Project to be implemented with DeLeon (PST-02).

Coordination and potential permitting require by railroad.

Proposed project cost based on the 25-yr storm event.

Location

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	2.3
5	Emergency Access 25 Year Storm	1.7
9	Number of Structures	6.0
6	Level of Drainage Service	4.0
3	Mitigation Requirements	3.0
5	Project Cost	5.0
10	Funding Source	3.3
5	Degree of Development Impact	3.3
5	Economic Impact	3.3
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	1.7
3	Time for Implementation	2.0
3	Dependency on Other Projects	1.0
4	Land and Easement Acquisition	4.0
5	Element of Comprehensive Plan	1.7
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		64.0

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: RIC-01 Status: Conceptual

Project Name: Windy Hill LWC Project Type: Culvert Improvement

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 595,600	$ -

Problem Description:

Low water crossing on Windy Hill Rd. The existing conditions indicate there are 2 - 7 ft. x 3 ft. box culverts under the roadway. The roadway crossing is overtopped by 0.5 ft. beginning with the 2-yr storm.

Proposed Improvements:

Replace existing culverts with 5 - 10 ft. x 6 ft. box culverts to pass the 25-yr event. The 100-yr event will need a 60 ft. span bridge and raise the road 2 ft.

Location

O & M Impact:

O & M will require regular maintenance to include mowing and periodic silt removal.

Notes:

Proposed project cost based on the 25-yr storm event.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	7.0
5	Emergency Access 25 Year Storm	5.0
9	Number of Structures	3.0
6	Level of Drainage Service	4.0
3	Mitigation Requirements	2.0
5	Project Cost	5.0
10	Funding Source	6.7
5	Degree of Development Impact	5.0
5	Economic Impact	5.0
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	5.0
3	Time for Implementation	2.0
3	Dependency on Other Projects	1.0
4	Land and Easement Acquisition	1.3
5	Element of Comprehensive Plan	5.0
5	Beneficial Neighborhood Impacts To	5.0
Total Weighted Point Score:		78.7

City of Kyle
Drainage Master Plan

Project Summary Information 11/06/2018

Project ID: RIC-02 Status: Conceptual

Project Name: Kelly Smith Ln Project Type: Culvert Improvement

Fiscal Year Plan

Prior Years	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Future	Total
$ -	$ -	$ -	$ -	$ -	$ -	$ 368,400	$ -

Problem Description:

Low Water Crossing on Kelly Smith has a single 48 in. culvert under the roadway. The roadway crossing overtops during the 2-yr storm.

Proposed Improvements:

Replace existing culverts with 4 - 10 ft. x 4 ft. box culverts and raise the road 1.5 ft. to pass the 25-yr event. The 100-yr event will need 4 - 10 ft. x 5 ft. box culverts with the road raised 2.5 ft.

Location

O & M Impact:

O & M will require regular maintenance to include mowing and periodic silt removal.

Notes:

Consider implementation of this project with Windy Hill LWC (RIC-01).

Existing culverts elevations and roadway deck elevations were approximated based on existing terrain data. Proposed project cost based on the 25-yr storm event.

Weight	Ranking Criteria	Score
7	Road Flooding & Mobility	7.0
5	Emergency Access 25 Year Storm	3.3
9	Number of Structures	3.0
6	Level of Drainage Service	4.0
3	Mitigation Requirements	1.0
5	Project Cost	5.0
10	Funding Source	6.7
5	Degree of Development Impact	5.0
5	Economic Impact	5.0
10	Water Quality Significance	6.7
10	Impact to Environmental Features	10.0
5	Ease of Permitting	5.0
3	Time for Implementation	3.0
3	Dependency on Other Projects	3.0
4	Land and Easement Acquisition	1.3
5	Element of Comprehensive Plan	1.7
5	Beneficial Neighborhood Impacts	5.0
Total Weighted Point Score:		75.7

Appendix D

OPINION OF PROBABLE CONSTRUCTION COST ESTIMATES

HALFF

City of Kyle
Drainage Master Plan
Problem Area: ABT-01 Dacy Lane
Proposed 25 Year Alternative

DATE: 10-May-18 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 23,686
2	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 15,791
3	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
4	Channel Excavation	234	CY	$ 15.00	$ 3,510
5	Embankment (easy)	1,013	CY	$ 15.00	$ 15,195
6	Concrete Box Culverts - 3 x 3	145	LF	$ 149.00	$ 21,605
7	Wingwall - Small <5ft.	2	EA	$ 7,000.00	$ 14,000
8	HMAC Remove and Replace	1,228	SY	$ 50.00	$ 61,400
9	Culvert Removal	58	LF	$ 20.00	$ 1,160
10	Headwall Removal	2	EA	$ 500.00	$ 1,000
11	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
12	Temporary Rock Berm (Remove/Install)	40	LF	$ 50.00	$ 2,000
13	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
14	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
15	Trench Safety Protection	145	LF	$ 3.00	$ 435

Subtotal			**$ 157,905**
Contingency	**30%**		**$ 47,371.50**
Total Probable Construction Cost			**$ 244,753**
Design Engineering	15%		$36,712.91
Environmental Permitting	10%		$24,475.28
TOTAL PROJECT COST			**$ 305,941**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: ABT-01 Dacy Lane
Proposed 100 Year Alternative

DATE: 10-May-18 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 25,258
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 16,839
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	345	CY	$ 15.00	$ 5,175
8	Embankment (easy)	1,013	CY	$ 15.00	$ 15,195
14	Concrete Box Culverts - 3 x 3	203	LF	$ 149.00	$ 30,247
28	Wingwall - Small <5ft.	2	EA	$ 7,000.00	$ 14,000
32	HMAC Remove and Replace	1,228	SY	$ 50.00	$ 61,400
32	Culvert Removal	58	LF	$ 20.00	$ 1,160
33	Headwall Removal	2	EA	$ 500.00	$ 1,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	40	LF	$ 50.00	$ 2,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
50	Trench Safety Protection	203	LF	$ 3.00	$ 609

Subtotal			**$ 168,386**
Contingency	**30%**		**$ 50,516**
Total Probable Construction Cost			**$ 260,998**

Design Engineering	15%	$39,149.75
Environmental Permitting	10%	$26,099.83
TOTAL PROJECT COST		**$ 326,248**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: AND-01 Dove Ln Homes
Proposed Alternative

DATE: 21-May-18 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Property Buyouts	1	LS	$ 763,875	$ 763,875
			Subtotal		**$ 763,875**
			Contingency	**30%**	**$ 229,163**
			Total Probable Construction Cost		**$ 993,038**
			Design Engineering	15%	$148,955.63
			Environmental Permitting	10%	$99,303.75
			TOTAL PROJECT COST		**$ 1,241,297**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: BCT1-01 Bebee Rd
Proposed 25 Year Alternative

DATE: 10-May-18 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 8,544
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 5,696
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	412	CY	$ 15.00	$ 6,180
14	Concrete Box Culverts - 5 x 5	240	LF	$ 300.00	$ 72,000
32	HMAC Remove and Replace	156	SY	$ 50.00	$ 7,800
32	Culvert Removal	78	LF	$ 20.00	$ 1,560
32	Headwall Removal	2	EA	$ 500.00	$ 1,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
47	Temporary Rock Berm (Remove/Install)	60	LF	$ 50.00	$ 3,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
50	Trench Safety Protection	240	LF	$ 3.00	$ 720
50	Wingwall - Large > 5ft	2	EA	$ 30,000.00	$ 60,000
			Subtotal		**$ 189,860**
			Contingency	**30%**	**$ 56,958**
			Total Probable Construction Cost		**$ 261,058**

Design Engineering	15%	$39,158.63
Environmental Permitting	10%	$26,105.75
TOTAL PROJECT COST		**$ 326,322**

Since the of determining prices, or over the competitive bidding or market conditions, his opinions of probable cost provided for herein of determi are to be made on the basis of his experience and qualifications. These opinions represent his best judgment as a design are to be professional familiar with the construction industry. However, the design professional can not and does not guarantee that professior proposals, bids, or construction cost will not vary from the opinions of probable cost he has prepared. If the owner wishes proposals greater assurance as to the construction cost, he shall employ an independent cost estimator.
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HALFF

City of Kyle
Drainage Master Plan
Problem Area: BCT1-01 Bebee Rd
Proposed 100 Year Alternative

DATE: 10-May-18 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 32,650
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 21,767
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	412	CY	$ 15.00	$ 6,180
8	Embankment (easy)	407	CY	$ 15.00	$ 6,105
14	Concrete Box Culverts - 5 x 5	240	LF	$ 300.00	$ 72,000
32	HMAC Remove and Replace	610	SY	$ 50.00	$ 30,500
32	Culvert Removal	78	LF	$ 20.00	$ 1,560
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
47	Temporary Rock Berm (Remove/Install)	60	LF	$ 50.00	$ 3,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
50	Trench Safety Protection	240	LF	$ 3.00	$ 720
50	Wingwall - Large >5ft	2	EA	$ 30,000.00	$ 60,000
			Subtotal		**$ 217,665**
			Contingency	**30%**	**$ 65,300**
			Total Probable Construction Cost		**$ 337,381**

Design Engineering	15%	$50,607.11
Environmental Permitting	10%	$33,738.08
TOTAL PROJECT COST		**$ 421,726**

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City of Kyle
Drainage Master Plan
Problem Area: BR-01 Roland Ln LWC (East)
Proposed 25 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 65,168
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 43,445.50
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	789	CY	$ 15.00	$ 11,835
8	Embankment (easy)	2,592	CY	$ 15.00	$ 38,880
14	Concrete Box Culverts - 12 x 4	180	LF	$ 500.00	$ 90,000
32	HMAC Remove and Replace	2,592	SY	$ 50.00	$ 129,600
32	Culvert Removal	100	LF	$ 20.00	$ 2,000
32	Headwall Removal	2	EA	$ 500.00	$ 1,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
47	Temporary Rock Berm (Remove/Install)	60	LF	$ 50.00	$ 3,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
50	Trench Safety Protection	180	LF	$ 3.00	$ 540
50	Wingwall - Large >5ft	4	EA	$ 30,000.00	$ 120,000
				Subtotal	**$ 434,455**
				Contingency 30%	**$ 130,337**
				Total Probable Construction Cost	**$ 673,405**

Design Engineering	15%	$101,010.79
Environmental Permitting	10%	$67,340.53
TOTAL PROJECT COST		**$ 841,757**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: BR-01 Roland Ln LWC (East)
Proposed 100 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 70,550.25
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 47,034
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	1,089	CY	$ 15.00	$ 16,335
8	Embankment (easy)	2,592	CY	$ 15.00	$ 38,880
14	Concrete Box Culverts - 12 x 4	240	LF	$ 500.00	$ 120,000
32	HMAC Remove and Replace	2,592	SY	$ 50.00	$ 129,600
32	Culvert Removal	100	LF	$ 20.00	$ 2,000
32	Headwall Removal	2	EA	$ 500.00	$ 1,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
47	Temporary Rock Berm (Remove/Install)	84	LF	$ 50.00	$ 4,200
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
50	Trench Safety Protection	240	LF	$ 3.00	$ 720
50	Wingwall - Large >5ft	4	EA	$ 30,000.00	$ 120,000
			Subtotal		**$ 470,335**
			Contingency	**30%**	**$ 141,101**
			Total Probable Construction Cost		**$ 729,019**

Design Engineering	15%	$109,352.89
Environmental Permitting	10%	$72,901.93
TOTAL PROJECT COST		**$ 911,274**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: BR-02 Roland Ln LWC (West)
Proposed 25 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 60,641
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 40,427.50
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	789	CY	$ 15.00	$ 11,835
8	Embankment (easy)	2,592	CY	$ 15.00	$ 38,880
14	Concrete Box Culverts - 12 x 4	120	LF	$ 500.00	$ 60,000
32	HMAC Remove and Replace	2,592	SY	$ 50.00	$ 129,600
32	Culvert Removal	100	LF	$ 20.00	$ 2,000
32	Headwall Removal	2	EA	$ 500.00	$ 1,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
47	Temporary Rock Berm (Remove/Install)	60	LF	$ 50.00	$ 3,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
50	Trench Safety Protection	120	LF	$ 3.00	$ 360
50	Wingwall - Large >5ft	4	EA	$ 30,000.00	$ 120,000
			Subtotal		**$ 404,275**
			Contingency	**30%**	**$ 121,283**
			Total Probable Construction Cost		**$ 626,626**

Design Engineering	15%	$93,993.94
Environmental Permitting	10%	$62,662.63
TOTAL PROJECT COST		**$ 783,283**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: BR-02 Roland Ln LWC (West)
Proposed 100 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 66,023.25
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 44,016
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	1,089	CY	$ 15.00	$ 16,335
8	Embankment (easy)	2,592	CY	$ 15.00	$ 38,880
14	Concrete Box Culverts - 12 x 4	180	LF	$ 500.00	$ 90,000
32	HMAC Remove and Replace	2,592	SY	$ 50.00	$ 129,600
32	Culvert Removal	100	LF	$ 20.00	$ 2,000
32	Headwall Removal	2	EA	$ 500.00	$ 1,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
47	Temporary Rock Berm (Remove/Install)	84	LF	$ 50.00	$ 4,200
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
50	Trench Safety Protection	180	LF	$ 3.00	$ 540
50	Wingwall - Large >5ft	4	EA	$ 30,000.00	$ 120,000
			Subtotal		**$ 440,155**
			Contingency	**30%**	**$ 132,047**
			Total Probable Construction Cost		**$ 682,240**

Design Engineering	15%	$102,336.04
Environmental Permitting	10%	$68,224.03
TOTAL PROJECT COST		**$ 852,800**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: BUN-01 Bunton Ln LWC (S)
Proposed 25 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 47,838
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 31,892
8	Embankment (easy)	2,652	CY	$ 15.00	$ 39,780
32	HMAC Remove and Replace	1,768	SY	$ 50.00	$ 88,400
32	Culvert Removal	87	LF	$ 20.00	$ 1,740
33	Headwall Removal	2	EA	$ 500.00	$ 1,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	40	LF	$ 50.00	$ 2,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
	Bridge Deck	1,440	SF	$ 110.00	$ 158,400
			Subtotal		**$ 318,920**
			Contingency	**30%**	**$ 95,676.00**
			Total Probable Construction Cost		**$ 494,326**

Design Engineering	15%	$74,148.90
Environmental Permitting	10%	$49,432.60
TOTAL PROJECT COST		**$ 617,908**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: BUN-01 Bunton Ln LWC (S)
Proposed 100 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 52,066
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 34,711
8	Embankment (easy)	2,947	CY	$ 15.00	$ 44,205
32	HMAC Remove and Replace	1,768	SY	$ 50.00	$ 88,400
32	Culvert Removal	87	LF	$ 20.00	$ 1,740
33	Headwall Removal	2	EA	$ 500.00	$ 1,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	40	LF	$ 50.00	$ 2,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
	Bridge Deck	1,656	SF	$ 110.00	$ 182,160
			Subtotal		**$ 347,105**
			Contingency	**30%**	**$ 104,131.50**
			Total Probable Construction Cost		**$ 538,013**

Design Engineering	15%	$80,701.91
Environmental Permitting	10%	$53,801.28
TOTAL PROJECT COST		**$ 672,516**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: BUN-02 Bunton Ln LWC (C)
Proposed 25 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 69,841
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 46,561
8	Embankment (easy)	12,319	CY	$ 15.00	$ 184,785
32	HMAC Remove and Replace	1,826	SY	$ 50.00	$ 91,300
32	Culvert Removal	26	LF	$ 20.00	$ 520
33	Headwall Removal	2	EA	$ 500.00	$ 1,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	40	LF	$ 50.00	$ 2,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
	Bridge Deck	1,440	SF	$ 110.00	$ 158,400
			Subtotal		**$ 465,605**
			Contingency	**30%**	**$ 139,681.50**
			Total Probable Construction Cost		**$ 721,688**

Design Engineering	15%	$108,253.16
Environmental Permitting	10%	$72,168.78
TOTAL PROJECT COST		**$ 902,110**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: BUN-02 Bunton Ln LWC (C)
Proposed 100 Year Alternative

DATE: 8-Aug-17

AVO: 32399

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 83,887
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 55,925
8	Embankment (easy)	16,435	CY	$ 15.00	$ 246,525
32	HMAC Remove and Replace	1,826	SY	$ 50.00	$ 91,300
32	Culvert Removal	26	LF	$ 20.00	$ 520
33	Headwall Removal	2	EA	$ 500.00	$ 1,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	40	LF	$ 50.00	$ 2,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
	Bridge Deck	1,730	SF	$ 110.00	$ 190,300
			Subtotal		**$ 559,245**
			Contingency	**30%**	**$ 167,773.50**
			Total Probable Construction Cost		**$ 866,830**

Design Engineering	15%	$130,024.46
Environmental Permitting	10%	$86,682.98
TOTAL PROJECT COST		**$ 1,083,537**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: BUN-03 Bunton Ln LWC (N)
Proposed 25 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 63,849
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 42,566
8	Embankment (easy)	10,266	CY	$ 15.00	$ 153,990
32	HMAC Remove and Replace	1,643	SY	$ 50.00	$ 82,150
32	Culvert Removal	26	LF	$ 20.00	$ 520
33	Headwall Removal	2	EA	$ 500.00	$ 1,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	40	LF	$ 50.00	$ 2,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
	Bridge Deck	1,440	SF	$ 110.00	$ 158,400
			Subtotal		**$ 425,660**
			Contingency	**30%**	**$ 127,698.00**
			Total Probable Construction Cost		**$ 659,773**
			Design Engineering	15%	$98,965.95
			Environmental Permitting	10%	$65,977.30
			TOTAL PROJECT COST		**$ 824,716**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: BUN-03 Bunton Ln LWC (N)
Proposed 100 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 75,119
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 50,079
8	Embankment (easy)	13,148	CY	$ 15.00	$ 197,220
32	HMAC Remove and Replace	1,643	SY	$ 50.00	$ 82,150
32	Culvert Removal	26	LF	$ 20.00	$ 520
33	Headwall Removal	2	EA	$ 500.00	$ 1,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	40	LF	$ 50.00	$ 2,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
	Bridge Deck	1,730	SF	$ 110.00	$ 190,300
			Subtotal		**$ 500,790**
			Contingency	**30%**	**$ 150,237.00**
			Total Probable Construction Cost		**$ 776,225**
			Design Engineering	15%	$116,433.68
			Environmental Permitting	10%	$77,622.45
			TOTAL PROJECT COST		**$ 970,281**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: BUN-04 Goforth Rd LWC
Proposed 100 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 22,286
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 14,857
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	412	CY	$ 15.00	$ 6,180
14	Concrete Box Culverts - 10 x 4	78	LF	$ 400.00	$ 31,200
32	HMAC Remove and Replace	156	SY	$ 50.00	$ 7,800
32	Culvert Removal	78	LF	$ 20.00	$ 1,560
32	Headwall Removal	2	EA	$ 500.00	$ 1,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
47	Temporary Rock Berm (Remove/Install)	60	LF	$ 50.00	$ 3,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
50	Trench Safety Protection	78	LF	$ 3.00	$ 234
50	Wingwall - Large >5ft	2	EA	$ 30,000.00	$ 60,000
			Subtotal		**$ 148,574**
			Contingency	**30%**	**$ 44,572**
			Total Probable Construction Cost		**$ 230,290**

Design Engineering	15%	$34,543.46
Environmental Permitting	10%	$23,028.97
TOTAL PROJECT COST		**$ 287,862**

Since the of determining prices, or over the competitive bidding or market conditions, his opinions of probable cost provided for herein of determi are to be made on the basis of his experience and qualifications. These opinions represent his best judgment as a design are to be r professional familiar with the construction industry. However, the design professional can not and does not guarantee that professior proposals, bids, or construction cost will not vary from the opinions of probable cost he has prepared. If the owner wishes proposals greater assurance as to the construction cost, he shall employ an independent cost estimator.
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HALFF

City of Kyle
Drainage Master Plan
Problem Area: CFP-01 Quail Ridge Area
Proposed 25 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 52,256
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 34,837
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	15,756	CY	$ 15.00	$ 236,340
24	RCP - 30"	198	LF	$ 80.00	$ 15,840
29	Headwall - Large > 3ft.	4	EA	$ 12,000.00	$ 48,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	200	LF	$ 50.00	$ 10,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
50	Trench Safety Protection	198	LF	$ 3.00	$ 594
			Subtotal		**$ 348,374**
			Contingency	**30%**	**$ 104,512**
			Total Probable Construction Cost		**$ 539,980**

Design Engineering	15%	$80,996.96
Environmental Permitting	10%	$53,997.97
TOTAL PROJECT COST		**$ 674,975**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: CTR-01 Center St
Proposed 25 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 26,421
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 17,614
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
15	Concrete Box Culverts - 4 x 3	815	LF	$ 270.00	$ 220,050
24	RCP - 36"	1,318	LF	$ 105.00	$ 138,390
28	Junction Box (6ft. X 6ft.)	1	EA	$ 7,000.00	$ 7,000
28	20 ft. Curb Inlet	18	EA	$ 10,000.00	$ 180,000
32	Culvert Removal	65	LF	$ 20.00	$ 1,300
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Erosion Logs (Install/Remove)	360	LF	$ 5.00	$ 1,800
50	Temporary Rock Berm (Remove/Install)	20	LF	$ 50.00	$ 1,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
50	Trench Safety Protection	1	LF	$ 3.00	$ 3
			Subtotal		**$ 587,143**
			Contingency	**30%**	**$ 176,143**
			Total Probable Construction Cost		**$ 807,322**

Design Engineering	15%	$121,098.24
Environmental Permitting	10%	$80,732.16
TOTAL PROJECT COST		**$ 1,009,152**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: CTR-01 Center St
Proposed 100 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 30,456
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 20,304
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
15	Concrete Box Culverts - 6 x 3	815	LF	$ 380.00	$ 309,700
24	RCP - 42"	1,318	LF	$ 105.00	$ 138,390
28	Junction Box (8ft. X 8ft.)	1	EA	$ 7,000.00	$ 7,000
28	20 ft. Curb Inlet	18	EA	$ 10,000.00	$ 180,000
32	Culvert Removal	65	LF	$ 20.00	$ 1,300
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Erosion Logs (Install/Remove)	360	LF	$ 5.00	$ 1,800
50	Temporary Rock Berm (Remove/Install)	20	LF	$ 50.00	$ 1,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
50	Trench Safety Protection	1	LF	$ 3.00	$ 3
			Subtotal		**$ 676,793**
			Contingency	**30%**	**$ 203,038**
			Total Probable Construction Cost		**$ 930,590**

Design Engineering	15%	$139,588.56
Environmental Permitting	10%	$93,059.04
TOTAL PROJECT COST		**$ 1,163,238**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: FPM-01 Upstream Floodplains

DATE: 29-Jun-18 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Stream Modeling	45	per mile	$ 2,000.00	$ 90,000
			Subtotal		**$ -**
			Contingency	**30%**	**$ -**
			Total Probable Construction Cost		**$ 90,000**
			Design Engineering	0%	$0.00
			Environmental Permitting	0%	$0.00
			TOTAL PROJECT COST		**$ 90,000**

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City of Kyle
Drainage Master Plan
Problem Area: FPM-02 FEMA LOMR

DATE: 29-Jun-18 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	LOMR submittal	1	LS	$ 150,000.00	$ 150,000

Subtotal		**$**	**-**
Contingency	**30%**	**$**	**-**
Total Probable Construction Cost		**$**	**150,000**
Design Engineering	0%		$0.00
Environmental Permitting	0%		$0.00
TOTAL PROJECT COST		**$**	**150,000**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: PCT1-01 Sweet Gum Erosion 1

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 4,673
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 3,115
2	Concrete Riprap (5 in)	89	CY	$ 350.00	$ 31,150
			Subtotal		**$ 31,150**
			Contingency	**30%**	**$ 9,345.00**
			Total Probable Construction Cost		**$ 48,283**
			Design Engineering	15%	$7,242.38
			Environmental Permitting	10%	$4,828.25
			TOTAL PROJECT COST		**$ 60,353**

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City of Kyle
Drainage Master Plan
Problem Area: PCT1-02 Sweet Gum Erosion 2

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 6,193.80
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 4,129.20
2	Concrete Riprap (5 in)	124	CY	$ 333.00	$ 41,292
			Subtotal		**$ 41,292**
			Contingency	**30%**	**$ 12,387.60**
			Total Probable Construction Cost		**$ 64,003**
			Design Engineering	15%	$9,600.39
			Environmental Permitting	10%	$6,400.26
			TOTAL PROJECT COST		**$ 80,003**

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City of Kyle
Drainage Master Plan
Problem Area: PCT4-01 Hitching Post
Proposed 25 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 19,937.25
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 13,291.50
6	Clearing and Grubbing	2.0	AC	$ 10,000.00	$ 20,000
7	Channel Excavation	120	CY	$ 15.00	$ 1,800
21	RCP - 24"	255	LF	$ 80.00	$ 20,400
21	RCP - 36"	328	LF	$ 125.00	$ 41,000
21	4-way Inlet	2	EA	$ 6,400.00	$ 12,800
21	Manhole	1	EA	$ 4,500.00	$ 4,500
32	HMAC Remove and Replace	45	SY	$ 50.00	$ 2,250
32	Culvert Removal	40	LF	$ 20.00	$ 800
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	20	LF	$ 50.00	$ 1,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
50	Trench Safety Protection	255	LF	$ 3.00	$ 765
			Subtotal		**$ 132,915**
			Contingency	**30%**	**$ 39,875**
			Total Probable Construction Cost		**$ 206,018**
			Design Engineering	15%	$30,902.74
			Environmental Permitting	10%	$20,601.83
			TOTAL PROJECT COST		**$ 257,523**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: PCT4-01 Hitching Post
Proposed 100 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 20,939
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 13,959
6	Clearing and Grubbing	2.0	AC	$ 10,000.00	$ 20,000
7	Channel Excavation	140	CY	$ 15.00	$ 2,100
21	RCP - 30"	255	LF	$ 105.00	$ 26,775
21	RCP - 36"	328	LF	$ 125.00	$ 41,000
21	4-way Inlet	2	EA	$ 6,400.00	$ 12,800
21	Manhole	1	EA	$ 4,500.00	$ 4,500
32	HMAC Remove and Replace	45	SY	$ 50.00	$ 2,250
32	Culvert Removal	40	LF	$ 20.00	$ 800
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	20	LF	$ 50.00	$ 1,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
50	Trench Safety Protection	255	LF	$ 3.00	$ 765
			Subtotal		**$ 139,590**
			Contingency	**30%**	**$ 41,877**
			Total Probable Construction Cost		**$ 216,365**
			Design Engineering	15%	$32,454.68
			Environmental Permitting	10%	$21,636.45
			TOTAL PROJECT COST		**$ 270,456**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: PCT4-03 Meyers St Drainage
Proposed 10 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 5,844
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 3,896
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	24	CY	$ 15.00	$ 360
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	20	LF	$ 50.00	$ 1,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
			Subtotal		**$ 38,960**
			Contingency	**30%**	**$ 11,688**
			Total Probable Construction Cost		**$ 60,388**

Design Engineering	15%	$9,058.20
Environmental Permitting	10%	$6,038.80
TOTAL PROJECT COST		**$ 75,485**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: PCT4-03 Meyers St Drainage
Proposed 100 Year Alternative

DATE: 8-Aug-17

AVO: 32399

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 5,855
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 3,904
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	29	CY	$ 15.00	$ 435
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	20	LF	$ 50.00	$ 1,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
			Subtotal		**$ 39,035**
			Contingency	**30%**	**$ 11,711**
			Total Probable Construction Cost		**$ 60,504**

Design Engineering	15%	$9,075.64
Environmental Permitting	10%	$6,050.43
TOTAL PROJECT COST		**$ 75,630**

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City of Kyle
Drainage Master Plan
Problem Area: PCT4-04 S. Burleson St Drainage
Proposed 10 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 5,948
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 3,965
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	70	CY	$ 15.00	$ 1,050
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	20	LF	$ 50.00	$ 1,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
			Subtotal		**$ 39,650**
			Contingency	**30%**	**$ 11,895**
			Total Probable Construction Cost		**$ 61,458**

Design Engineering	15%	$9,218.63
Environmental Permitting	10%	$6,145.75
TOTAL PROJECT COST		**$ 76,822**

Since the design professional has no control over the cost of labor, materials, or equipment, or over the contractor's method of determ of determining prices, or over the competitive bidding or market conditions, his opinions of probable cost provided for herein are to be are to be made on the basis of his experience and qualifications. These opinions represent his best judgment as a design professior professional familiar with the construction industry. However, the design professional can not and does not guarantee that proposals proposals, bids, or construction cost will not vary from the opinions of probable cost he has prepared. If the owner wishes greater as greater assurance as to the construction cost, he shall employ an independent cost estimator.

City of Kyle
Drainage Master Plan
Problem Area: PCT4-04 S. Burleson St Drainage
Proposed 100 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 6,035
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 4,024
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	109	CY	$ 15.00	$ 1,635
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	20	LF	$ 50.00	$ 1,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
			Subtotal		**$ 40,235**
			Contingency	**30%**	**$ 12,071**
			Total Probable Construction Cost		**$ 62,364**
			Design Engineering	15%	$9,354.64
			Environmental Permitting	10%	$6,236.43
			TOTAL PROJECT COST		**$ 77,955**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: PCT4-05 Scott St LWC
Proposed 25 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 43,829
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 29,220
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	1,411	CY	$ 15.00	$ 21,165
8	Embankment (easy)	432	CY	$ 15.00	$ 6,480
32	HMAC Remove and Replace	1,295	SY	$ 50.00	$ 64,750
32	Culvert Removal	40	LF	$ 20.00	$ 800
33	Headwall Removal	2	EA	$ 500.00	$ 1,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	40	LF	$ 50.00	$ 2,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
	Bridge Deck	1,440	SF	$ 110.00	$ 158,400
			Subtotal		**$ 292,195**
			Contingency	**30%**	**$ 87,659**
			Total Probable Construction Cost		**$ 452,902**

Design Engineering	15%	$67,935.34
Environmental Permitting	10%	$45,290.23
TOTAL PROJECT COST		**$ 566,128**

Since the design professional has no control over the cost of labor, materials, or equipment, or over the contractor's method of determ of determining prices, or over the competitive bidding or market conditions, his opinions of probable cost provided for herein are to be are to be made on the basis of his experience and qualifications. These opinions represent his best judgment as a design professior professional familiar with the construction industry. However, the design professional can not and does not guarantee that proposals proposals, bids, or construction cost will not vary from the opinions of probable cost he has prepared. If the owner wishes greater as greater assurance as to the construction cost, he shall employ an independent cost estimator.

HALFF

City of Kyle
Drainage Master Plan
Problem Area: PCT4-05 Scott St LWC
Proposed 100 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 51,956
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 34,637
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	2,166	CY	$ 15.00	$ 32,490
8	Embankment (easy)	548	CY	$ 15.00	$ 8,220
32	HMAC Remove and Replace	1,642	SY	$ 50.00	$ 82,100
32	Culvert Removal	40	LF	$ 20.00	$ 800
33	Headwall Removal	2	EA	$ 500.00	$ 1,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	40	LF	$ 50.00	$ 2,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
	Bridge Deck	1,656	SF	$ 110.00	$ 182,160
				Subtotal	**$ 346,370**
				Contingency 30%	**$ 103,911**
				Total Probable Construction Cost	**$ 536,874**

Design Engineering	15%	$80,531.03
Environmental Permitting	10%	$53,687.35
TOTAL PROJECT COST		**$ 671,092**

Since the design professional has no control over the cost of labor, materials, or equipment, or over the contractor's method of determ of determining prices, or over the competitive bidding or market conditions, his opinions of probable cost provided for herein are to be are to be made on the basis of his experience and qualifications. These opinions represent his best judgment as a design professio professional familiar with the construction industry. However, the design professional can not and does not guarantee that proposals proposals, bids, or construction cost will not vary from the opinions of probable cost he has prepared. If the owner wishes greater as greater assurance as to the construction cost, he shall employ an independent cost estimator.

HALFF

City of Kyle
Drainage Master Plan
Problem Area: PCT4-06 Sledge St LWC
Proposed 25 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 43,829
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 29,220
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	1,411	CY	$ 15.00	$ 21,165
8	Embankment (easy)	432	CY	$ 15.00	$ 6,480
32	HMAC Remove and Replace	1,295	SY	$ 50.00	$ 64,750
32	Culvert Removal	40	LF	$ 20.00	$ 800
33	Headwall Removal	2	EA	$ 500.00	$ 1,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	40	LF	$ 50.00	$ 2,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
	Bridge Deck	1,440	SF	$ 110.00	$ 158,400
			Subtotal		**$ 292,195**
			Contingency	**30%**	**$ 87,659**
			Total Probable Construction Cost		**$ 452,902**

Design Engineering	15%	$67,935.34
Environmental Permitting	10%	$45,290.23
TOTAL PROJECT COST		**$ 566,128**

Since the design professional has no control over the cost of labor, materials, or equipment, or over the contractor's method of determ of determining prices, or over the competitive bidding or market conditions, his opinions of probable cost provided for herein are to be are to be made on the basis of his experience and qualifications. These opinions represent his best judgment as a design professior professional familiar with the construction industry. However, the design professional can not and does not guarantee that proposals proposals, bids, or construction cost will not vary from the opinions of probable cost he has prepared. If the owner wishes greater as greater assurance as to the construction cost, he shall employ an independent cost estimator.

HALFF

City of Kyle
Drainage Master Plan
Problem Area: PCT4-06 Sledge St LWC
Proposed 100 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 51,956
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 34,637
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	2,166	CY	$ 15.00	$ 32,490
8	Embankment (easy)	548	CY	$ 15.00	$ 8,220
32	HMAC Remove and Replace	1,642	SY	$ 50.00	$ 82,100
32	Culvert Removal	40	LF	$ 20.00	$ 800
33	Headwall Removal	2	EA	$ 500.00	$ 1,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	40	LF	$ 50.00	$ 2,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
	Bridge Deck	1,656	SF	$ 110.00	$ 182,160
				Subtotal	**$ 346,370**
				Contingency **30%**	**$ 103,911**
				Total Probable Construction Cost	**$ 536,874**

Design Engineering	15%	$80,531.03
Environmental Permitting	10%	$53,687.35
TOTAL PROJECT COST		**$ 671,092**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: PLU-01 FM 2770 nr Barton MS
Proposed 25 Year Alternative

DATE: 29-Jun-18 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 77,069
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 51,380
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	1,411	CY	$ 15.00	$ 21,165
8	Embankment (easy)	432	CY	$ 15.00	$ 6,480
14	Concrete Box Culverts - 6 x 4	400	LF	$ 310.00	$ 124,000
14	Concrete Box Culverts - 6 x 5		LF	$ 310.00	$ -
14	Concrete Box Culverts - 6 x 6	340	LF	$ 400.00	$ 136,000
50	Wingwall - Large > 5ft	4	EA	$ 30,000.00	$ 120,000
32	HMAC Remove and Replace	1,295	SY	$ 50.00	$ 64,750
32	Culvert Removal	40	LF	$ 20.00	$ 800
33	Headwall Removal	2	EA	$ 500.00	$ 1,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	40	LF	$ 50.00	$ 2,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
			Subtotal		**$ 513,795**
			Contingency	**30%**	**$ 154,139**
			Total Probable Construction Cost		**$ 796,382**

Design Engineering	15%	$119,457.34
Environmental Permitting	10%	$79,638.23
TOTAL PROJECT COST		**$ 995,478**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: PLU-01 FM 2770 nr Barton MS
Proposed 100 Year Alternative

DATE: 29-Jun-18 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 94,247
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 62,831
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	2,166	CY	$ 15.00	$ 32,490
8	Embankment (easy)	548	CY	$ 15.00	$ 8,220
14	Concrete Box Culverts - 6 x 4	600	LF	$ 310.00	$ 186,000
14	Concrete Box Culverts - 6 x 5	510	LF	$ 310.00	$ 158,100
14	Concrete Box Culverts - 6 x 6		LF	$ 15.00	$ -
50	Wingwall - Large > 5ft	4	EA	$ 30,000.00	$ 120,000
32	HMAC Remove and Replace	1,642	SY	$ 50.00	$ 82,100
32	Culvert Removal	40	LF	$ 20.00	$ 800
33	Headwall Removal	2	EA	$ 500.00	$ 1,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	40	LF	$ 50.00	$ 2,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
			Subtotal		**$ 628,310**
			Contingency	**30%**	**$ 188,493**
			Total Probable Construction Cost		**$ 973,881**

Design Engineering	15%	$146,082.08
Environmental Permitting	10%	$97,388.05
TOTAL PROJECT COST		**$ 1,217,351**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: PLU-02 Steeplechase Park US Det
Proposed 100 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 333,698.00
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 222,465.33
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	141537	CY	$ 15.00	$ 2,123,053
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	1280	LF	$ 50.00	$ 64,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
			Subtotal		**$ 2,224,653**
			Contingency	**30%**	**$ 667,396**
			Total Probable Construction Cost		**$ 3,448,213**

Design Engineering	15%	$517,231.90
Environmental Permitting	10%	$344,821.27
TOTAL PROJECT COST		**$ 4,310,266**

Since the design professional has no control over the cost of labor, materials, or equipment, or over the contractor's method of determi of determining prices, or over the competitive bidding or market conditions, his opinions of probable cost provided for herein are to be ı are to be made on the basis of his experience and qualifications. These opinions represent his best judgment as a design professior professional familiar with the construction industry. However, the design professional can not and does not guarantee that proposals proposals, bids, or construction cost will not vary from the opinions of probable cost he has prepared. If the owner wishes greater as greater assurance as to the construction cost, he shall employ an independent cost estimator.

HALFF

City of Kyle
Drainage Master Plan
Problem Area: PLU-04 Isabel Lane Area
Proposed 100 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 106,950
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 71,300
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	44,610	CY	$ 15.00	$ 669,150
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	125	LF	$ 50.00	$ 6,250
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
			Subtotal		**$ 713,000**
			Contingency	**30%**	**$ 213,900**
			Total Probable Construction Cost		**$ 1,105,150**
			Design Engineering	15%	$165,772.50
			Environmental Permitting	10%	$110,515.00
			TOTAL PROJECT COST		**$ 1,381,438**

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City of Kyle
Drainage Master Plan
Problem Area: POR-01 Cotton Gin Rd Area
Proposed Alternative

DATE: 1-Mar-18

AVO: 32399

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Property Buyouts	1	LS	$ 480,000.00	$ 480,000
			Subtotal		**$ 480,000**
			Contingency	**30%**	**$ 144,000**
			Total Probable Construction Cost		**$ 624,000**
			Design Engineering	15%	$93,600.00
			Environmental Permitting	10%	$62,400.00
			TOTAL PROJECT COST		**$ 780,000**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: PST-01 Live Oak St Drainage
Proposed 100 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 7,485
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 4,990
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	720	CY	$ 15.00	$ 10,800
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	30	LF	$ 50.00	$ 1,500
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
			Subtotal		**$ 49,900**
			Contingency	**30%**	**$ 14,970**
			Total Probable Construction Cost		**$ 77,345**

Design Engineering	15%	$11,601.75
Environmental Permitting	10%	$7,734.50
TOTAL PROJECT COST		**$ 96,681**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: PST-02 RR near Deleon St
Proposed 50 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 40,821.75
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 27,214.50
	Coordination with Railroad	1	LS	$ 15,000.00	$ 15,000
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	31	CY	$ 15.00	$ 465
21	Steel Pipe - 32"	360	LF	$ 600.00	$ 216,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	40	LF	$ 50.00	$ 2,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
50	Trench Safety Protection	360	LF	$ 3.00	$ 1,080
			Subtotal		**$ 272,145**
			Contingency	**30%**	**$ 81,644**
			Total Probable Construction Cost		**$ 421,825**

Design Engineering	15%	$63,273.71
Environmental Permitting	10%	$42,182.48
TOTAL PROJECT COST		**$ 527,281**

Since the design professional has no control over the cost of labor, materials, or equipment, or over the contractor's method of determ of determining prices, or over the competitive bidding or market conditions, his opinions of probable cost provided for herein are to be are to be made on the basis of his experience and qualifications. These opinions represent his best judgment as a design professior professional familiar with the construction industry. However, the design professional can not and does not guarantee that proposals proposals, bids, or construction cost will not vary from the opinions of probable cost he has prepared. If the owner wishes greater as greater assurance as to the construction cost, he shall employ an independent cost estimator.

City of Kyle
Drainage Master Plan
Problem Area: PST-02 RR near Deleon St
Proposed 100 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 57,134.25
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 38,089.50
	Coordination with Railroad	1	LS	$ 15,000.00	$ 15,000
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	45	CY	$ 15.00	$ 675
21	Steel Pipe - 32"	540	LF	$ 600.00	$ 324,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	40	LF	$ 50.00	$ 2,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
50	Trench Safety Protection	540	LF	$ 3.00	$ 1,620
			Subtotal		**$ 380,895**
			Contingency	**30%**	**$ 114,269**
			Total Probable Construction Cost		**$ 590,387**

Design Engineering	15%	$88,558.09
Environmental Permitting	10%	$59,038.73
TOTAL PROJECT COST		**$ 737,984**

Since the design professional has no control over the cost of labor, materials, or equipment, or over the contractor's method of determ of determining prices, or over the competitive bidding or market conditions, his opinions of probable cost provided for herein are to be are to be made on the basis of his experience and qualifications. These opinions represent his best judgment as a design professio professional familiar with the construction industry. However, the design professional can not and does not guarantee that proposals proposals, bids, or construction cost will not vary from the opinions of probable cost he has prepared. If the owner wishes greater as greater assurance as to the construction cost, he shall employ an independent cost estimator.

City of Kyle
Drainage Master Plan
Problem Area: PST-03 Jose Addition
Proposed 50 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 6,090.00
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 4,060.00
	Coordination with Railroad	1	LS	$ 10,000.00	$ 10,000
6	Clearing and Grubbing	1.0	AC	$ 5,000.00	$ 5,000
7	Channel Excavation	400	CY	$ 15.00	$ 6,000
47	SWPPP Implementation	1	LS	$ 2,000.00	$ 2,000
50	Temporary Rock Berm (Remove/Install)	40	LF	$ 50.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
			Subtotal		**$ 40,600**
			Contingency	**30%**	**$ 12,180**
			Total Probable Construction Cost		**$ 62,930**
			Design Engineering	15%	$9,439.50
			Environmental Permitting	10%	$6,293.00
			TOTAL PROJECT COST		**$ 78,663**

Since the design professional has no control over the cost of labor, materials, or equipment, or over the contractor's method of determ of determining prices, or over the competitive bidding or market conditions, his opinions of probable cost provided for herein are to be are to be made on the basis of his experience and qualifications. These opinions represent his best judgment as a design professior professional familiar with the construction industry. However, the design professional can not and does not guarantee that proposals proposals, bids, or construction cost will not vary from the opinions of probable cost he has prepared. If the owner wishes greater as greater assurance as to the construction cost, he shall employ an independent cost estimator.

City of Kyle
Drainage Master Plan
Problem Area: PST-03 Jose Addition
Proposed 100 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 6,315.00
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 4,210.00
	Coordination with Railroad	1	LS	$ 10,000.00	$ 10,000
6	Clearing and Grubbing	1.0	AC	$ 5,000.00	$ 5,000
7	Channel Excavation	500	CY	$ 15.00	$ 7,500
47	SWPPP Implementation	1	LS	$ 2,000.00	$ 2,000
50	Temporary Rock Berm (Remove/Install)	40	LF	$ 50.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
			Subtotal		**$ 42,100**
			Contingency	**30%**	**$ 12,630**
			Total Probable Construction Cost		**$ 65,255**
			Design Engineering	15%	$9,788.25
			Environmental Permitting	10%	$6,525.50
			TOTAL PROJECT COST		**$ 81,569**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: RIC-01 Windy Hill LWC
Proposed 25 Year Alternative

DATE: 8-Aug-17

AVO: 32399

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 46,107.00
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 30,738
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	667	CY	$ 15.00	$ 10,005
14	Concrete Box Culverts - 10 x 6	225	LF	$ 790.00	$ 177,750
32	HMAC Remove and Replace	289	SY	$ 50.00	$ 14,450
32	Culvert Removal	45	LF	$ 20.00	$ 900
32	Headwall Removal	2	EA	$ 500.00	$ 1,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
47	Temporary Rock Berm (Remove/Install)	100	LF	$ 50.00	$ 5,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
50	Trench Safety Protection	225	LF	$ 3.00	$ 675
50	Wingwall - Large >5ft	2	EA	$ 30,000.00	$ 60,000
			Subtotal		**$ 307,380**
			Contingency	**30%**	**$ 92,214**
			Total Probable Construction Cost		**$ 476,439**

Design Engineering	15%	$71,465.85
Environmental Permitting	10%	$47,643.90
TOTAL PROJECT COST		**$ 595,549**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: RIC-01 Windy Hill LWC
Proposed 100 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 61,938
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 41,292
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
8	Embankment (easy)	1,188	CY	$ 15.00	$ 17,820
32	HMAC Remove and Replace	1,782	SY	$ 50.00	$ 89,100
32	Culvert Removal	45	LF	$ 20.00	$ 900
33	Headwall Removal	2	EA	$ 500.00	$ 1,000
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
50	Temporary Rock Berm (Remove/Install)	50	LF	$ 50.00	$ 2,500
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
	Bridge Deck	2,400	SF	$ 110.00	$ 264,000
			Subtotal		**$ 412,920**
			Contingency	**30%**	**$ 123,876**
			Total Probable Construction Cost		**$ 640,026**

Design Engineering	15%	$96,003.90
Environmental Permitting	10%	$64,002.60
TOTAL PROJECT COST		**$ 800,033**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: RIC-02 Kelly Smith Ln
Proposed 25 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 9,636
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 6,424
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	412	CY	$ 15.00	$ 6,180
8	Embankment (easy)	530	CY	$ 15.00	$ 7,950
14	Concrete Box Culverts - 10 x 4	120	LF	$ 380.00	$ 45,600
32	HMAC Remove and Replace	1,057	SY	$ 50.00	$ 52,850
32	Culvert Removal	30	LF	$ 20.00	$ 600
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
47	Temporary Rock Berm (Remove/Install)	60	LF	$ 50.00	$ 3,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
50	Trench Safety Protection	120	LF	$ 3.00	$ 360
50	Wingwall - Large > 5ft	2	EA	$ 30,000.00	$ 60,000
			Subtotal		**$ 214,140**
			Contingency	**30%**	**$ 64,242**
			Total Probable Construction Cost		**$ 294,443**

Design Engineering	15%	$44,166.38
Environmental Permitting	10%	$29,444.25
TOTAL PROJECT COST		**$ 368,053**

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HALFF

City of Kyle
Drainage Master Plan
Problem Area: RIC-02 Kelly Smith Ln
Proposed 100 Year Alternative

DATE: 8-Aug-17 **AVO: 32399**

No.	DESCRIPTION OF ITEM	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED COST
1	Mobilization	1	LS	15%	$ 37,976
5	Site Stabilization (ECB, topsoil, watering,)	1	LS	10%	$ 25,317
6	Clearing and Grubbing	1.0	AC	$ 10,000.00	$ 10,000
7	Channel Excavation	412	CY	$ 15.00	$ 6,180
8	Embankment (easy)	1,282	CY	$ 15.00	$ 19,230
14	Concrete Box Culverts - 10 x 5	120	LF	$ 410.00	$ 49,200
32	HMAC Remove and Replace	1,540	SY	$ 50.00	$ 77,000
32	Culvert Removal	30	LF	$ 20.00	$ 600
47	SWPPP Implementation	1	LS	$ 10,000.00	$ 10,000
47	Temporary Rock Berm (Remove/Install)	60	LF	$ 50.00	$ 3,000
50	Stabilized Construction Exit (Install/Remove)	1	EA	$ 2,000.00	$ 2,000
50	Barraicades, Signs, and Traffic Control	120	CalDay	$ 130.00	$ 15,600
50	Trench Safety Protection	120	LF	$ 3.00	$ 360
50	Wingwall - Large >5ft	2	EA	$ 30,000.00	$ 60,000
			Subtotal		**$ 253,170**
			Contingency	**30%**	**$ 75,951**
			Total Probable Construction Cost		**$ 392,414**

Design Engineering	15%	$58,862.03
Environmental Permitting	10%	$39,241.35
TOTAL PROJECT COST		**$ 490,517**

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Appendix E

DIGITAL DATA