CITY OF LEON VALLEY
CITY COUNCIL SPECIAL WORKSHOP
Leon Valley City Council Chambers
6400 El Verde Road, Leon Valley, Texas 78238
Saturday, May 07, 2016

AGENDA

1. **11:30 a.m.** Call to order, Determine a Quorum is Present

2. Items Identified for possible discussion:
   a. Presentation for Drainage Studies – Public Works Director Melinda.

3. **1:30 p.m.** Adjournment

Attendance by Other Elected or Appointed Officials:
It is anticipated that members other City boards, commissions and/or committees may attend the meeting in numbers that may constitute a quorum. Notice is hereby given that the meeting, to the extent required by law, is also noticed as a meeting of any other boards, commissions and/or committees of the City, whose members may be in attendance in numbers constituting a quorum. These members of other City boards, commissions, and/or committees may not deliberate or take action on items listed on the agenda. [Attorney General Opinion – No. GA-0957 (2012)].

I hereby certify that the above **NOTICE OF PUBLIC MEETING(S) AND AGENDA OF THE LEON VALLEY CITY COUNCIL** was posted on the bulletin board at the Leon Valley City Hall, 6400 El Verde Road, Leon Valley, Texas, on May 02, 2016 at 11:20 a.m. and remained posted until after the meeting(s) hereby posted concluded. This notice is posted on the City website at www.leonvalleytexas.gov. This building is wheelchair accessible. Any request for sign interpretive or other services must be made 48 hours in advance of the meeting. To make arrangements, call (210) 684-1391, Extension 216.

SAUNDRA PASSAILAIGUE, TRMC
City Secretary

Leon Valley Drainage System and Stormwater Program Overview

City Council Meeting

May 7, 2016

Purpose

- To present an overview of the current & proposed Drainage System & Stormwater Management program
- To set the groundwork for future planning & funding
- To further the City Council's goals of effective management of City assets and environmental initiatives
- To assure conformance with EPA's Clean Water Act requirements

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Background

- The City owns, operates, & maintains a Drainage System
- Typically built by developers from 1930's to present day, and deeded to City by dedicated easement
- City also constructs drainage facilities:
  - Detention ponds
  - Drainage inlets & outlets
  - Drainage swales & channels
- Entire drainage system considered an "asset" with net worth in the millions
- If potential damages without system in place are calculated, net worth in the high millions

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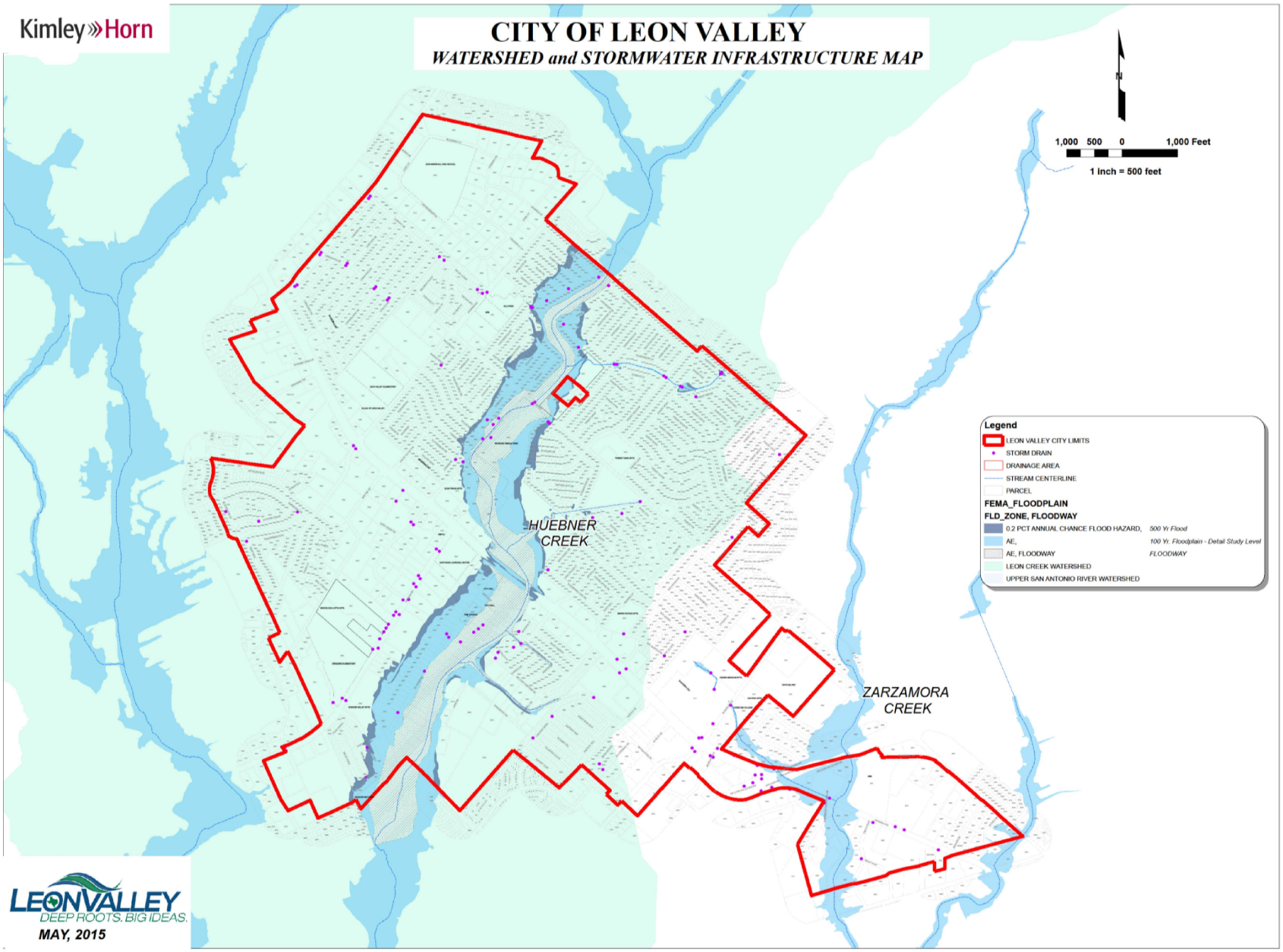
Kimley»Horn
CITY OF LEON VALLEY
WATERSHED and STORMWATER INFRASTRUCTURE MAP
1,000 500 0 1,000 Feet
1 inch = 500 feet
HUEBNER CREEK
ZARZAMORA CREEK
Legend
LEON VALLEY CITY LIMITS
STORM DRAIN
DRAINAGE AREA
STREAM CENTERLINE
PARCEL
FEMA_FLOODPLAIN
FLD_ZONE, FLOODWAY
0.2 PCT ANNUAL CHANCE FLOOD HAZARD, 500 Yr Flood
AE, 100 Yr. Floodplain - Detail Study Level
AE, FLOODWAY FLOODWAY
LEON CREEK WATERSHED
UPPER SAN ANTONIO RIVER WATERSHED
LEONVALLEY
DEEP ROOTS. BIG IDEAS.
MAY, 2015

Background

- Old school thought - use concrete & steel!
  - Stamina against force of water
  - Durable, with long economic life
  - Excellent at channeling & eliminating flood waters
- EPA Clean Water Act 1990 - Public enlightenment on water quality – what's in that stuff and how is it affecting the natural environment & Edwards Aquifer (we drink that!)
  - Pesticides, chemicals, fertilizer, oil, gas, animal feces
  - High cost to treat
  - Erosion/scour from fast moving waters
- New school thinking – Natural Channel Design - use earthen channels & swales, with rocks & other vegetation, in conjunction with concrete structures, to allow stormwater to sink in, "sifting" pollutants from water & allowing water to slowly drain, while still protecting real and personal property

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Background

- In 2007, City was issued Municipal Separate Storm Sewer System (MS4) permit
  - Permit #TXR040001
- Authorizes the discharge of storm water to surface water (creeks, streams, rivers, lakes)
- Permit holders had to create 6 Minimum Control Measures (MCM), now called Best Management Practices (BMP's)

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Background

- Best Management Practices (BMP's):
  - BMP #1 – Public Education & Outreach
  - BMP #2 – Public Involvement & Participation
  - BMP #3 – Illicit Discharge Detection & Elimination
  - BMP #4 – Construction Site Runoff Control
  - BMP #5 – Post-Construction Stormwater Management in New Development & Redevelopment
  - BMP #6 – Pollution Prevention/Housekeeping

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Background

- For our drainage system, BMP #3 & #6 apply
- #3 – Detection & Elimination
  - Allowable non-stormwater discharges
  - Household hazardous waste removal program
  - Storm sewer map
    - Location and amount of discharge from outfalls, creeks
    - Source and updated requirements
- #6 – Pollution Prevention and Housekeeping
  - Structural Control maintenance
  - Street sweeping
  - Disposal of waste, spoils, floatables
  - Erosion control
  - Capital Improvements to system

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Funding for Programs

- Monthly service charges imposed on benefited real property beginning January 1, 2009 to fund stormwater management programs (in water bill statement)
- Fees based on:
  - property land area in square feet
  - classification of property (residential, multifamily, commercial, or public use, then tiered by size)
  - costs for implementing, operating and maintaining the stormwater management program
- Base rate calculated to insure adequate revenues to fund costs of management, and provide for operations, maintenance, and capital improvements to stormwater system

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Funding for Programs

• FY 2015 revenue	$391,250
• FY 2015 expenditures	$337,648
• Remaining funds	$ 53,602
• Fund balance	$653,645
• FY 2016 estimated revenue	$388,000
• FY 2016 estimated expenditures	$635,200
• Estimated remaining funds	-$247,200
• New estimated fund balance	$406,445

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Funding for Programs

- Fund balance could be depleted with just engineering for one large project – not enough to cover costs for construction
- Fund does not have debt, such as revenue bonds or Certificates of Obligation, so funding could be secured in that manner and paid back over 30 years
- Need to identify and prioritized projects for City Council approval
- Projects must meet Stormwater Program objectives

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Strategic Goals Statement

- Item 2 – Continue Work on Capital and Planning Projects
  - Drainage improvements help address stormwater runoff.

S.E.E. Statement

- *Social Equity* – Reducing the threat of flooding & removing pollutants from stormwater runoff benefits all citizens & businesses
- *Economic Development* – Removing the threat of flooding provides additional incentive for citizens and businesses to relocate or stay in Leon Valley, and increases property values
- *Environmental Stewardship* – Adhering to sound BMP's and providing funding for improvements to drainage & stormwater projects improves water quality, protects sensitive wildlife and vegetation, and helps in the prevention of erosion & scour

LEONVALLEY

Leon Valley Drainage System and Stormwater Program Overview

City Council Meeting

May 7, 2016

CITY OF LEON VALLEY

SATURDAY MAY 7TH, PUBLIC MEETING

DRAINAGE PRESENTATION

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INTRODUCTION AND AGENDA

- PRESENTATION
  1. BACKGROUND
  2. FEMA
  3. SPECIFIC SITES
- CITY OF LEON VALLEY TEAM
- KIMLEY-HORN TEAM

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BACKGROUND

- THE CITY OF LEON VALLEY IS A PARTICIPATING CITY IN THE BEXAR REGIONAL WATERSHED MANAGEMENT (BRWM) – WWW.BEXARFLOODFACT.ORG
  - BRWM IS A REGIONAL INTER-LOCAL AGREEMENT THAT ADDRESS FLOODING
  - IT IS THROUGH THE BRWM THAT ALL THE FEMA FLOOD MAPS WERE UPDATED IN 2010 (DFIRM)
  - REGIONAL WATERSHED MASTERPLANS WERE DEVELOPED
- CITY OF LEON VALLEY IS A NATIONAL FLOOD INSURANCE PROGRAM PARTICIPANT
  - CITY FOLLOWS THE FEMA DEVELOPMENT PROCEDURES
  - CITY IS ELIGIBLE FOR FEDERAL ASSISTANCE DURING A DECLARED FLOOD EVENT AS WELL AS FEDERALLY BACKED INSURANCE COVERAGE FOR ITS CITIZENS

FEMA

- FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) WAS CREATED IN APRIL 1, 1979, THROUGH AN EXECUTIVE ORDER BY THEN PRESIDENT CARTER.
- FEMA'S ROLE IS TO
  - PREPARE
  - PREVENT
  - MITIGATE THE EFFECTS OF
  - RESPONDING TO
  - RECOVERING FROM ALL DOMESTIC DISASTERS (NATURAL OR MAN-MADE)
- "FEMA CAN TRACE ITS BEGINS TO THE CONGRESSIONAL ACT OF 1803"HTTPS://WWW.FEMA.GOV/ABOUT-AGENCY
- THE "FLOOD DISASTER PROTECTION ACT OF 1973" CREATED THE FIRST FEMA MAPS

FEMA

- THE FEMA MAPS ARE MAPS THAT SHOW AREAS OF RISK, FOR INSURANCE PURPOSES
  - THESE MAPS PRESENT RISK ZONES
    - 1 % ANNUAL CHANCE (100 YEAR FLOODPLAIN)
    - FLOODWAY
    - BASE FLOOD ELEVATION
  - MAPS CAN BE SEEN ONLINE AT FEMA MAP SERVICE CENTER OR AT LV PUBLIC LIBRARY
  - THESE ARE NOT MAPS THAT SHOW **ALL** POSSIBLE FLOODING LOCATIONS
- FLOOD INSURANCE CAN BE OBTAINED BY VISITING WWW.FLOODSMART.GOV
  - DUE TO THE DILIGENCE OF CITY OF LEON VALLEY, CITIZENS CAN GET A REDUCED RATE
- RECENTLY (JANUARY 6, 2016) LV BECAME ONE OF ONLY A FEW CITIES IN THE US PARTICIPATING IN THE **HIGH WATER MARK INITIATIVE**
  - AN EFFORT TO HELP "IMPROVE THE PUBLIC'S AWARENESS OF FLOOD RISK AND ENCOURAGE COMMUNITIES TO TAKE ALONG-TERM ACTION TO ADDRESS THIS RISK" HTTPS://WWW.FEMA.GOV/ABOUT-HIGH-WATER-MARK-INITIATIVE

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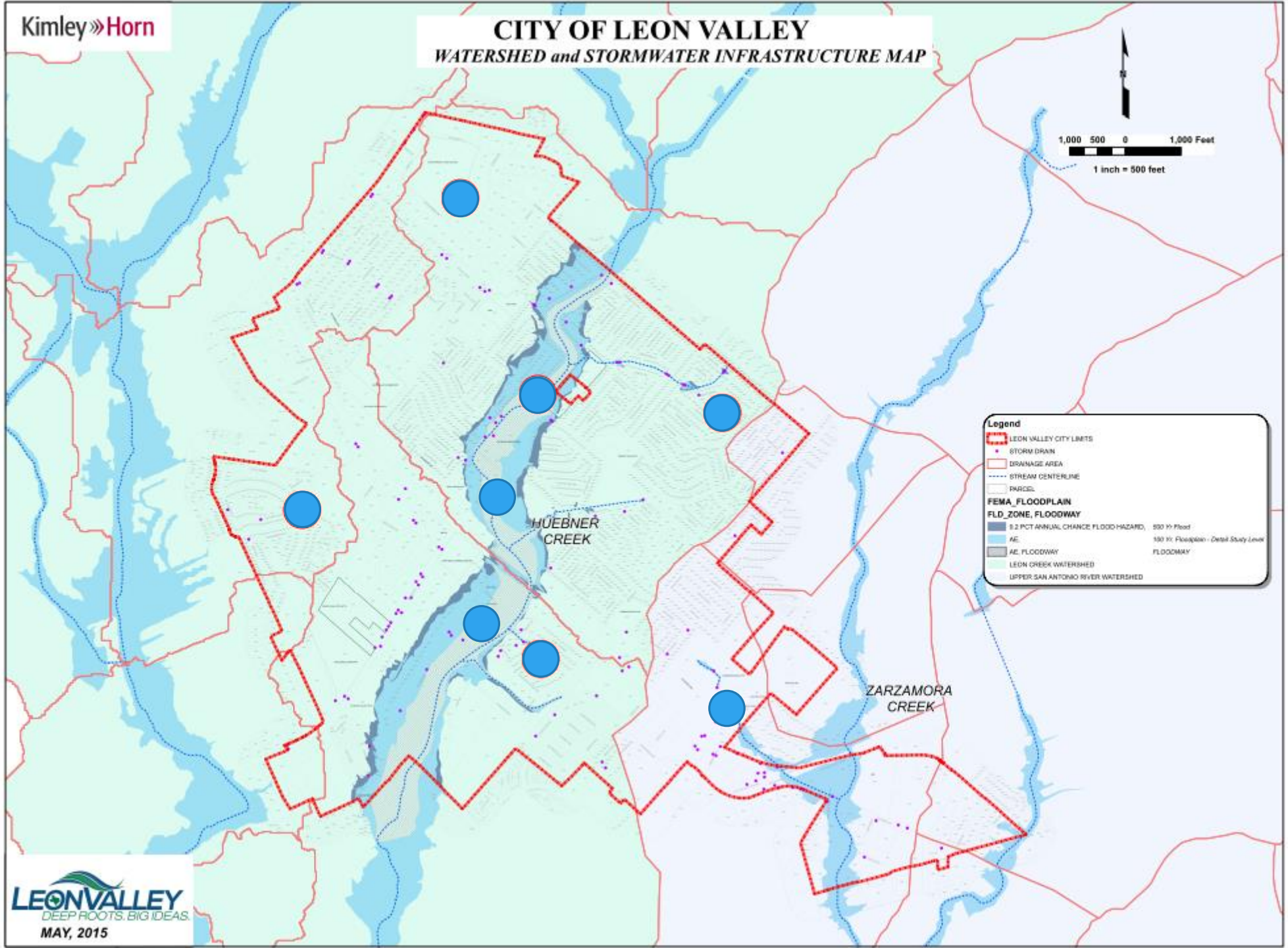
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HUEBNER CREEK
ZARZAMORA CREEK
LEONVALLEY
DEEP ROOTS. BIG IDEAS.
MAY, 2015

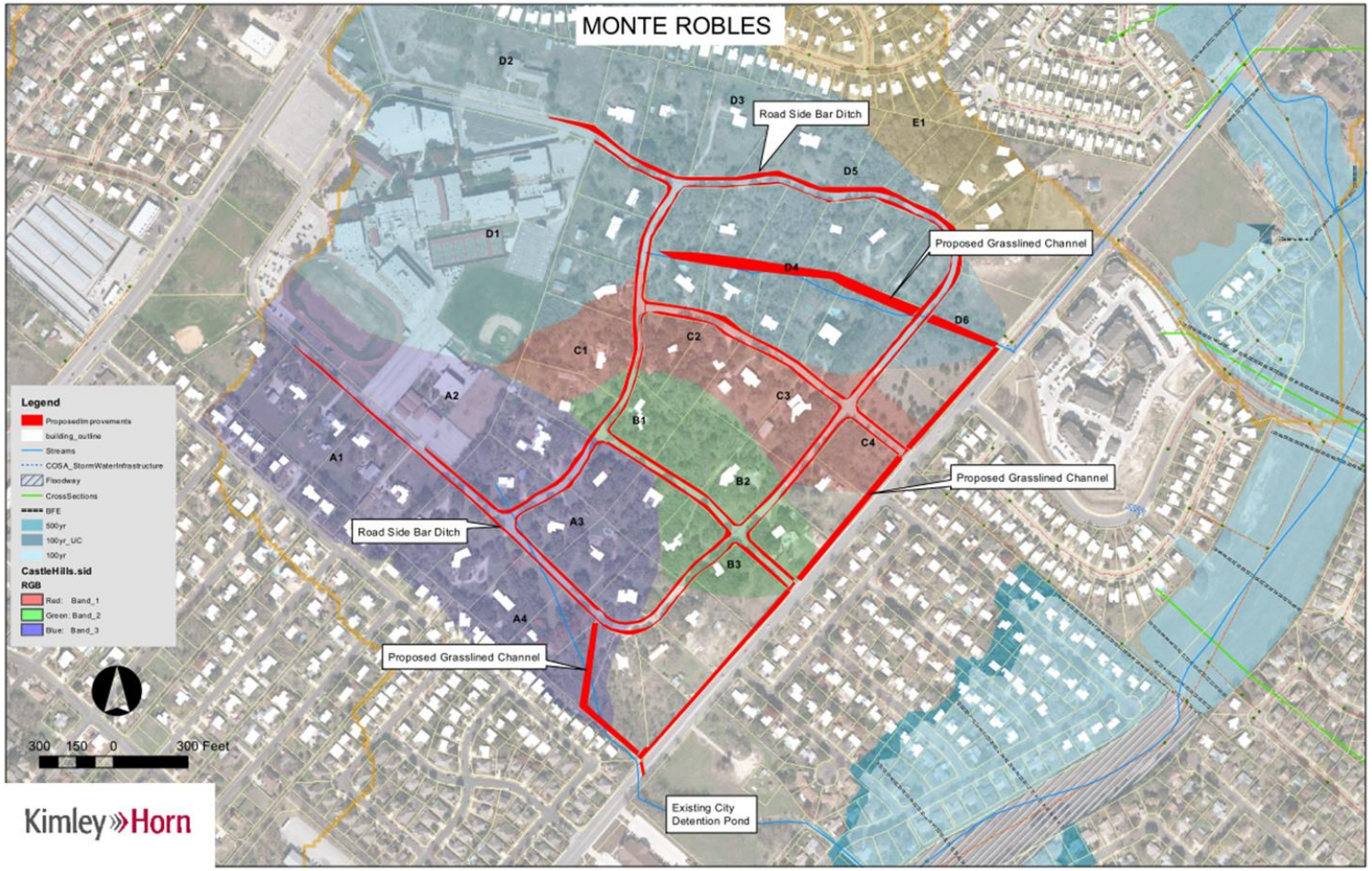
MONTES ROBLES SUBDIVISION

CHALLENGE

- FLOODING ALONG ROADS AND ON PRIVATE PROPERTIES
- FLOODING NOT IN HOMES

POSSIBLE SOLUTION

- SERIES OF ROAD BAR DITCHES
- PROPOSED EARTHEN CHANNELS ALONG PROPERTIES AND ALONG HUEBNER ROAD



Cost:

- Range $900,000 – $1,500,000

Funding Source:

To Be Determined

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FOREST OAKS SUBDIVISION

Challenge

- Flooding along roads and on private properties
- Flooding may get into homes

Possible Solution

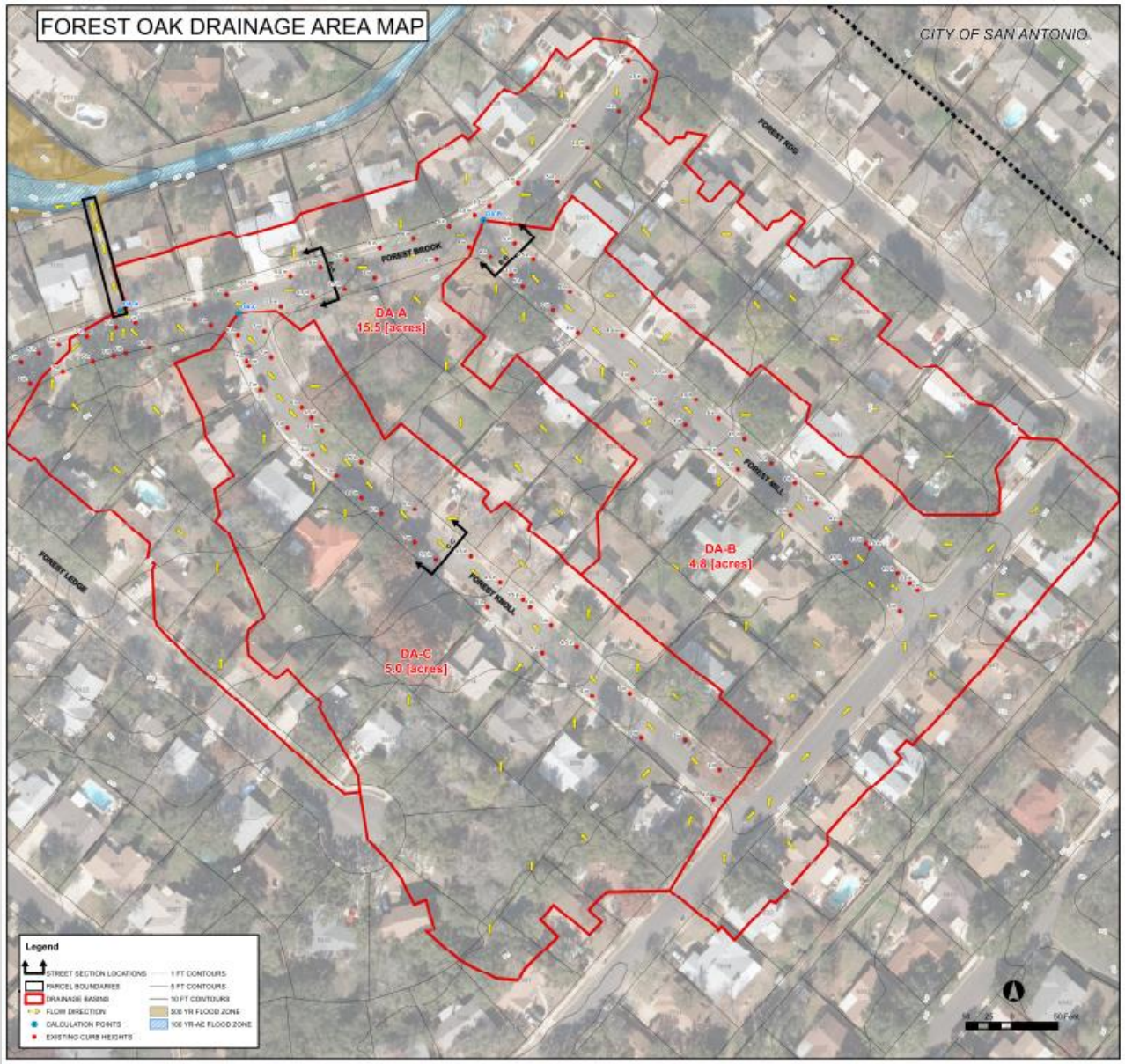
- Street Regrading (milling)

Potential Cost Range

$250,000 - $300,000

Funding Source:

Street Maintenance Tax



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SENECA WEST SUBDIVISION

CHALLENGE

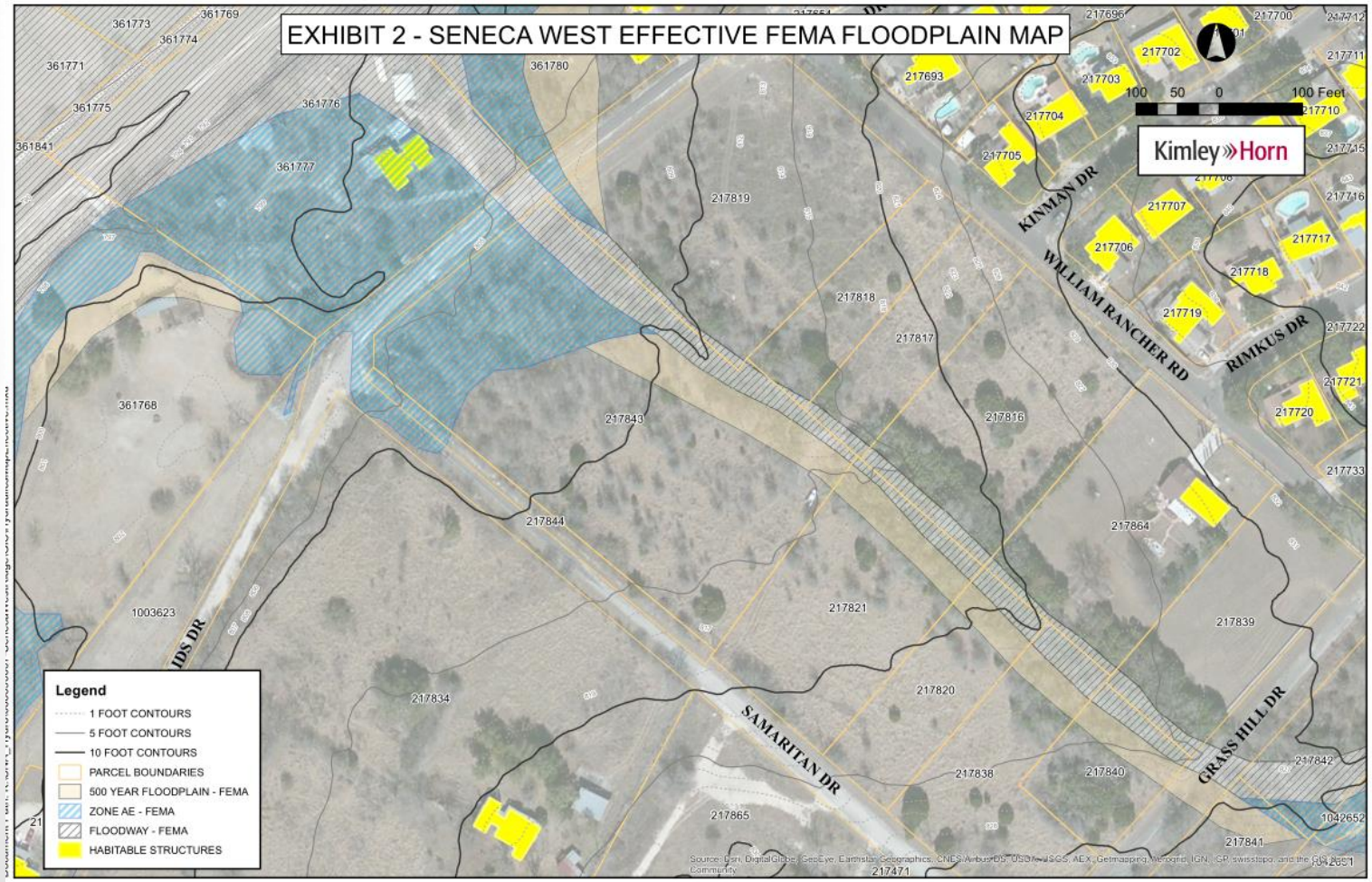
- FLOODING ON PRIVATE PROPERTY AND PRIVATE STRUCTURES
- FLOODING OF PUBLIC STREET

POSSIBLE SOLUTION

- RE-MAPPING OF FLOODPLAIN

STRUCTURAL IMPROVEMENTS

- CHANNEL AND CULVERTS



Cost:

- Range $800,000 – $1,350,000

Funding Source:

T.B.D. (Developer Supported)

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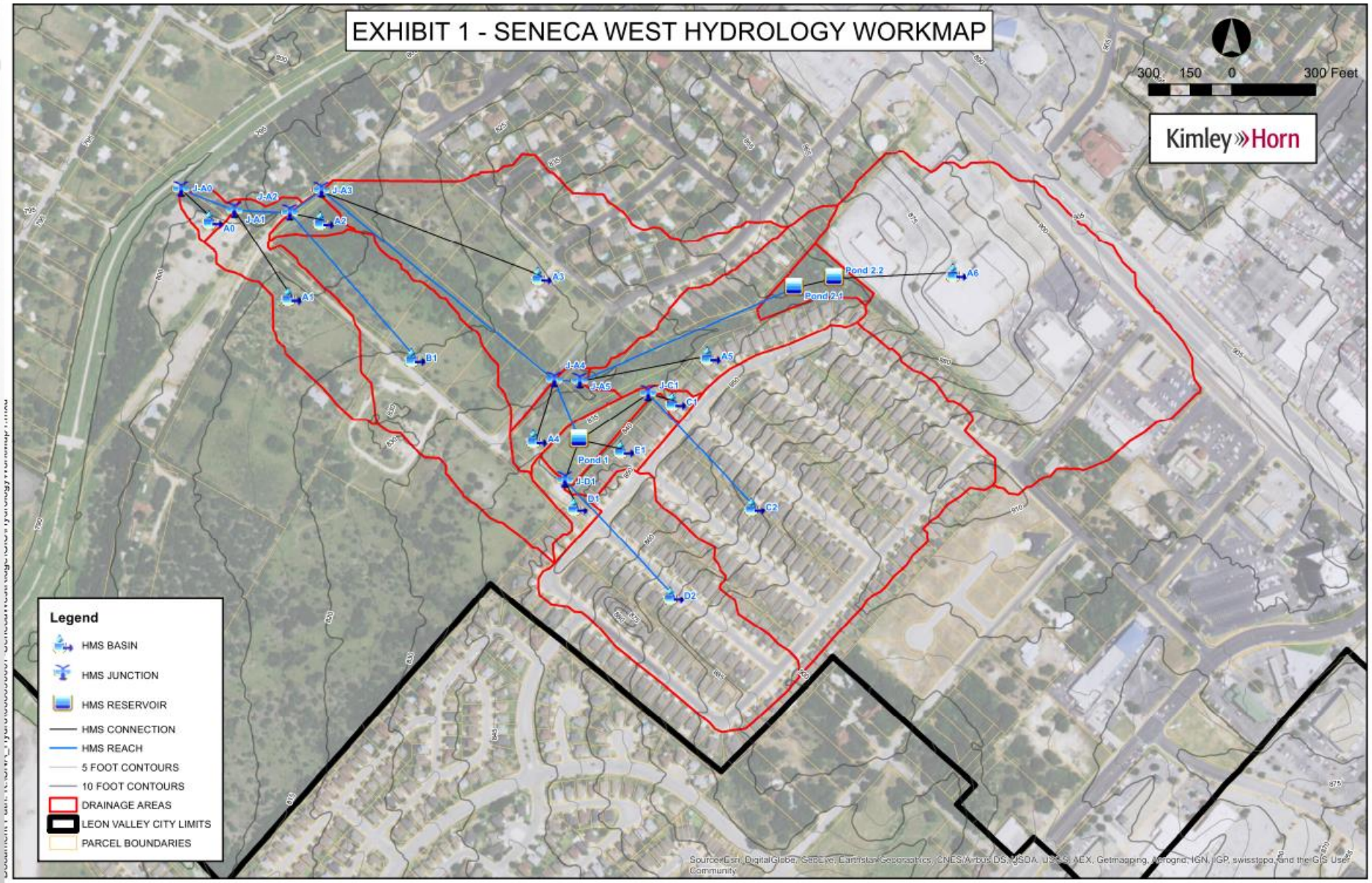
SENECA WEST SUBDIVISION

DRAINAGE AREA MAP



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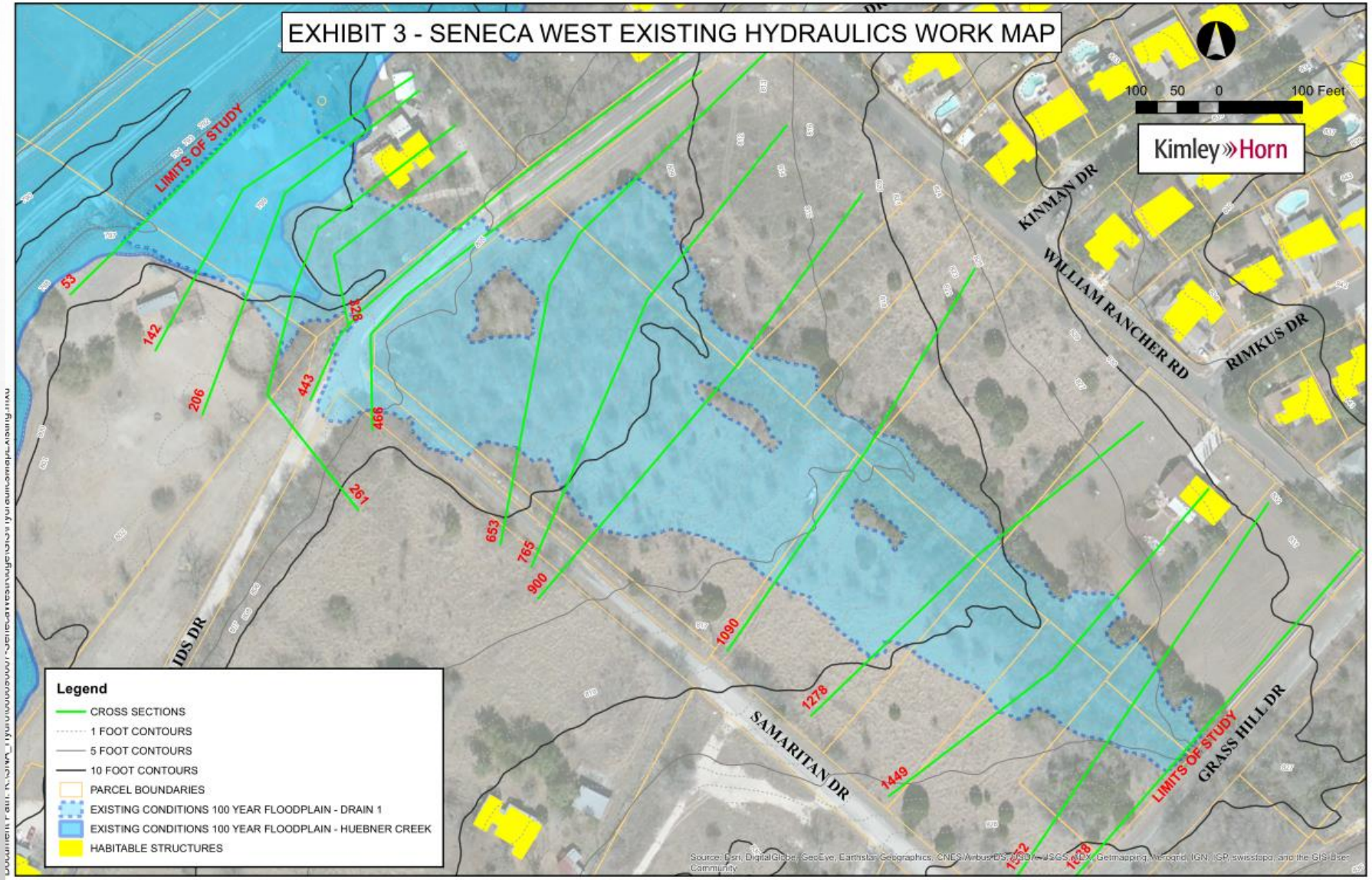
SENECA WEST SUBDIVISION

UPDATED EXISTING FLOODPLAIN



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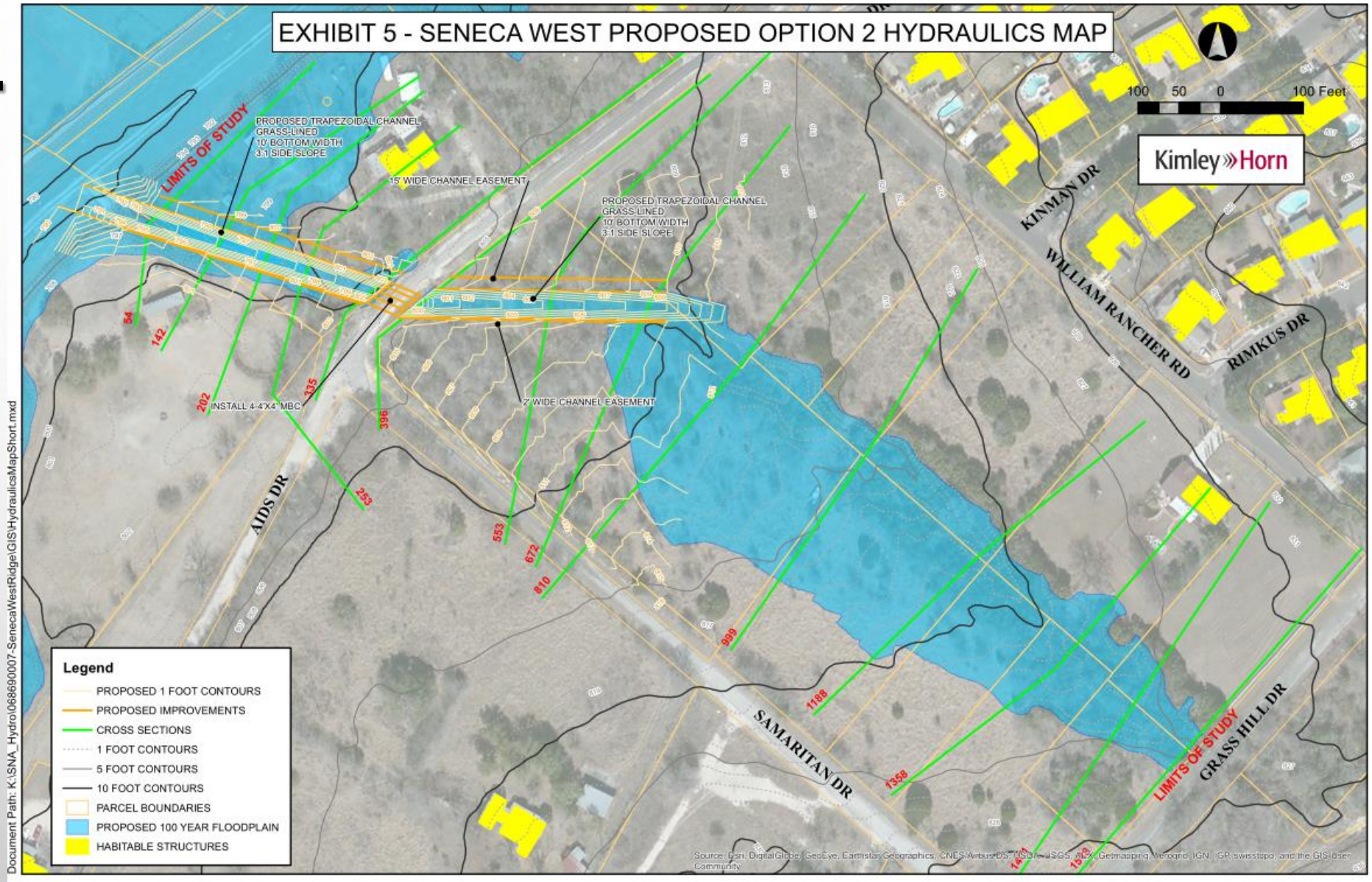
SENECA WEST SUBDIVISION

OPEN CHANNEL OPTION & CULVERT CROSSING AT AIDS DRIVE

COST: $800,000



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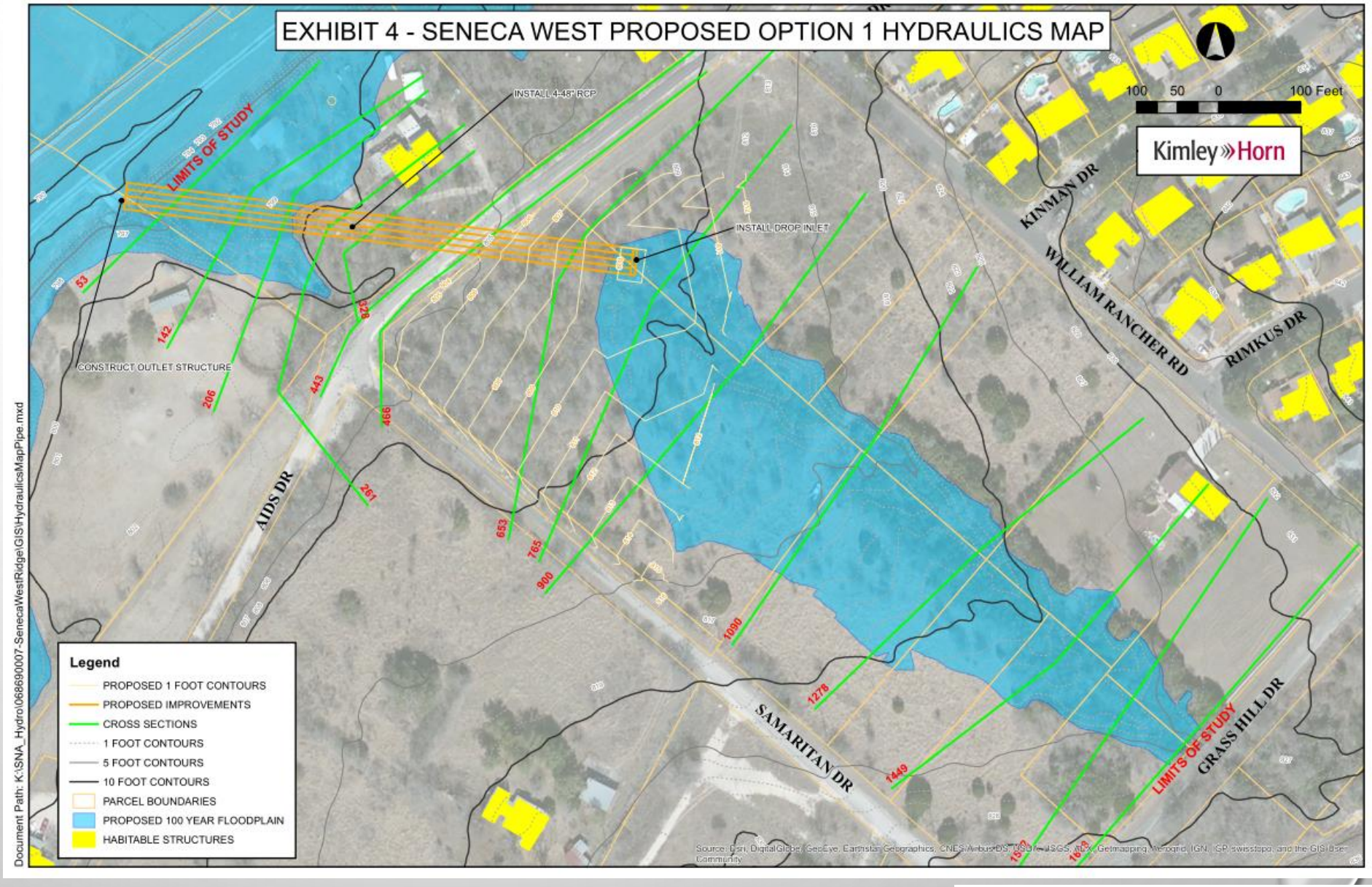
SENECA WEST SUBDIVISION

700 FT. OF 4-48” CONCRETE PIPE STRUCTURE

COST: $1,283,000



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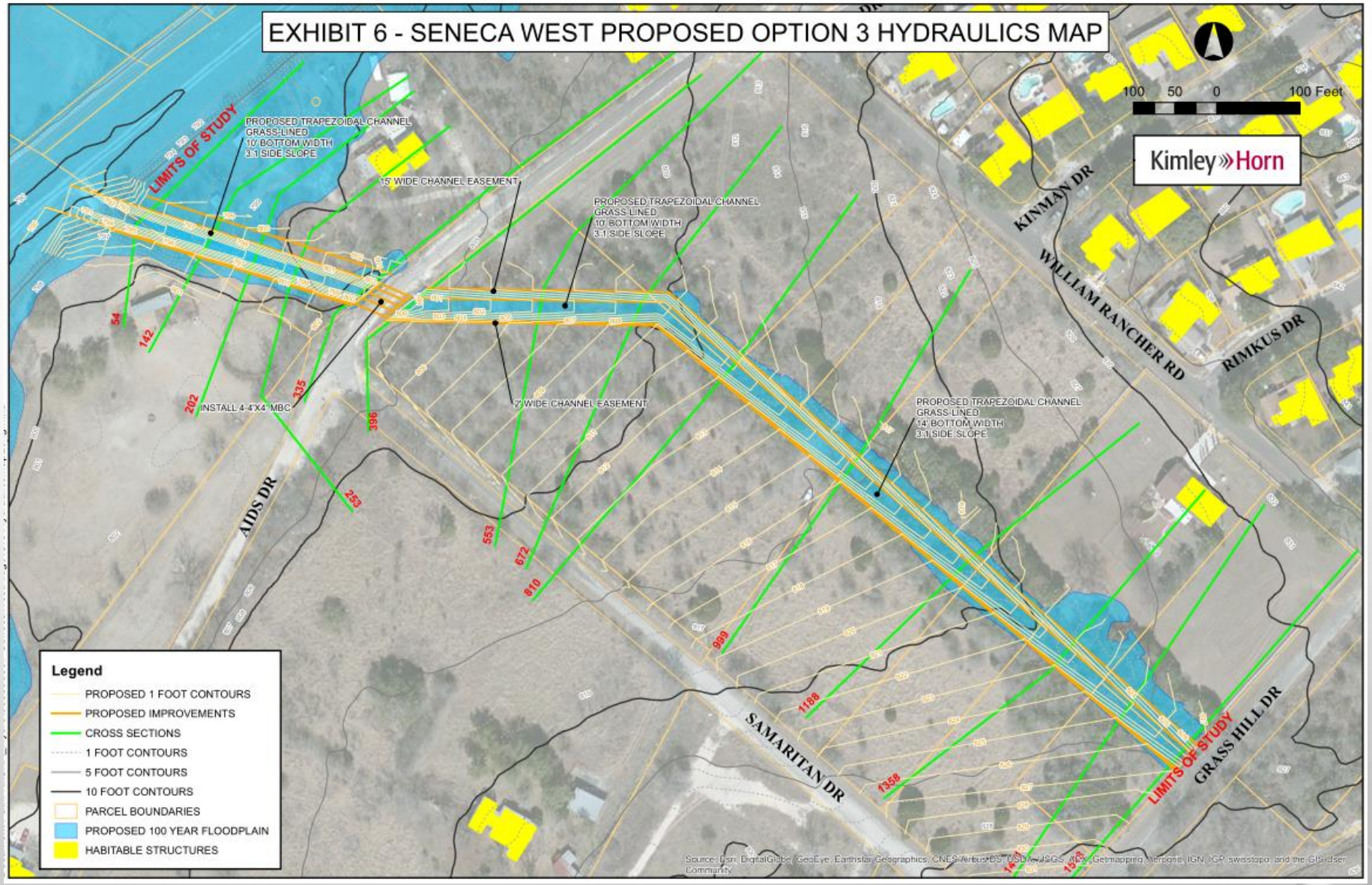
SENECA WEST SUBDIVISION

1,700 FT OF CHANNEL EXCAVATION AND NEW 4'X4' – BOX CULVERT AT AIDS DRIVE

COST: $1,346,000



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HUEBNER AT TIMBERHILL

CHALLENGE

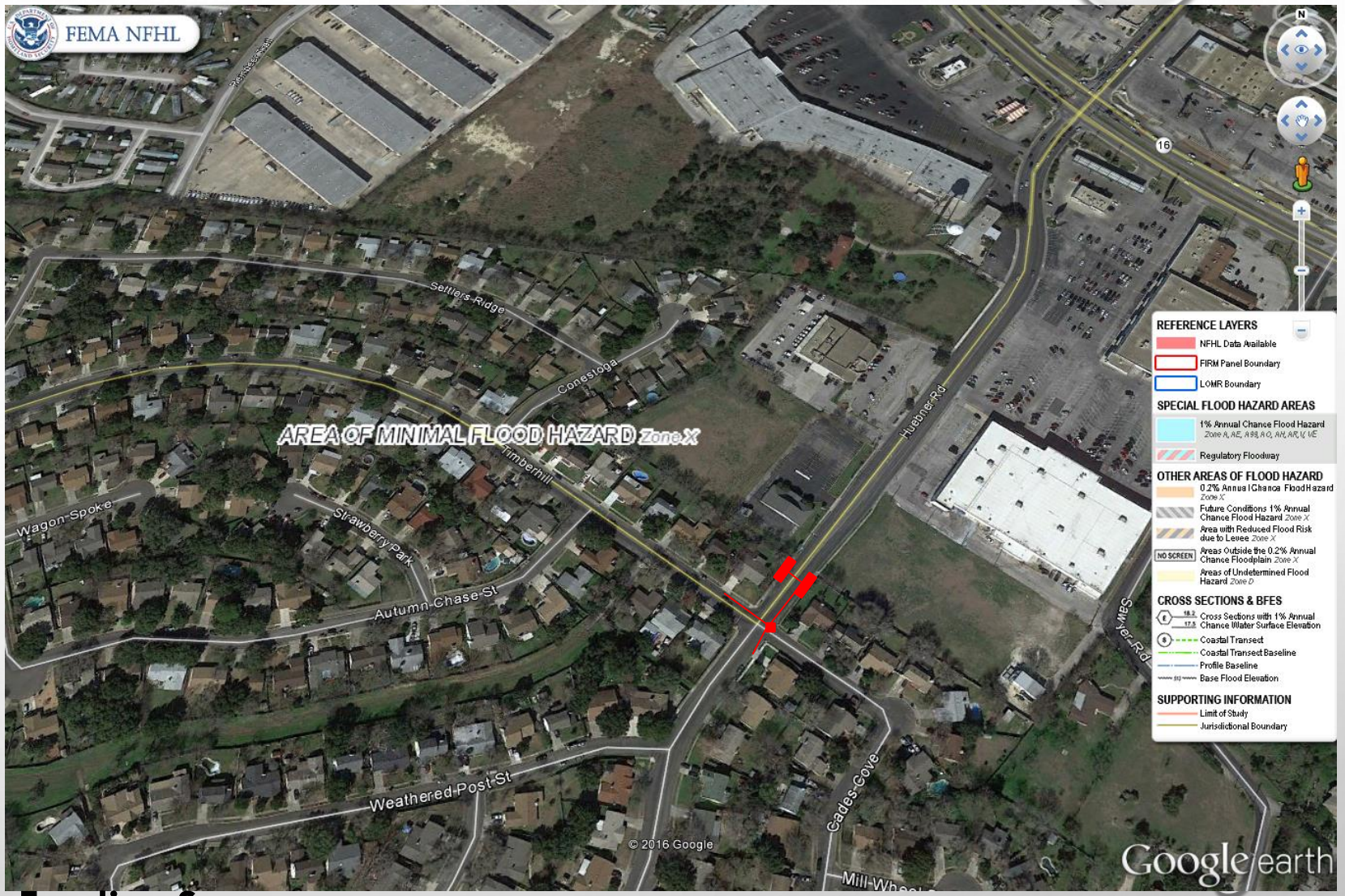
- LOCAL STREET FLOODING
- MAJOR STREET INTERSECTION
- A FLOODED HOME

PROPOSED SOLUTION

- UNDERGROUND STORM DRAINAGE SYSTEM VIA A SERIES OF CURB INLETS

Cost:

- $282,000



Funding Source:

CDBG Grant ~ $175,000

C of LV Portion ~ $107,000

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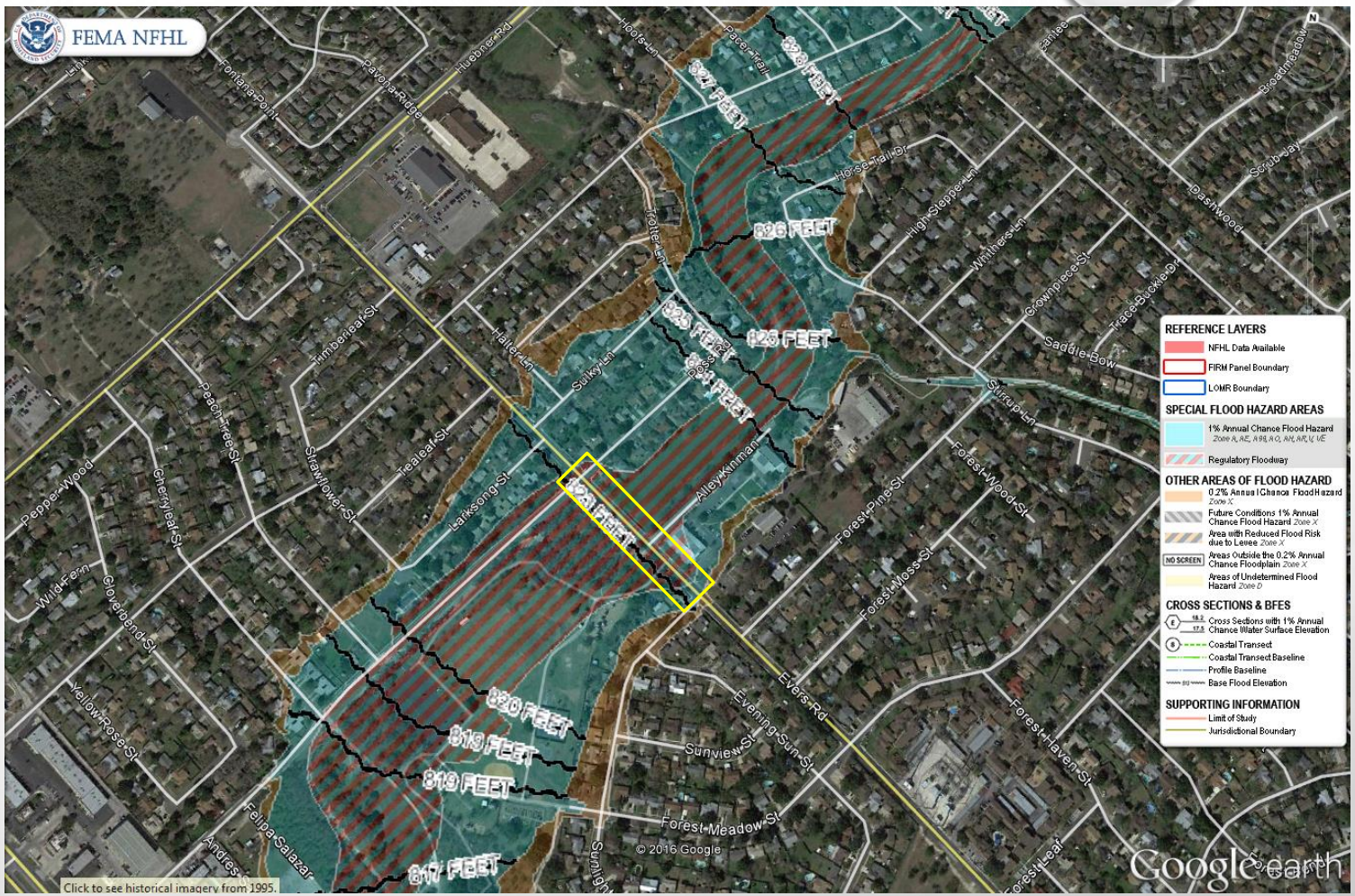
EVERS ROAD BRIDGE



Challenge

- Flooding of a Collector Rd
- Huebner Creek
- Built Environment

Proposed Solution

- Bridge Class Structure

Cost

- $1,670,000

Funding Source: Through the Regional MPO

Total Construction Cost ($1.2 Mil) ~ TXDOT portion = $857,000

C of LV Portion ~ $343,000 (Const.) + $470,000 (Eng. Fees) = $813,000

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HUEBNER CREEK
CHANNEL IMPROVEMENT

Challenge

- Major Stream Flooding
- 150 Properties/Homes in the floodplain
- Major Bank Erosion

Proposed Solution

- Natural Stream Design (no concrete)

Cost

- TBD

Funding Source: TBD through the USACOE and SARA

If granted,

ENGINEERING COST:

The USACOE pays the first $100K

SARA splits 50/50 with LV

CONSTRUCTION COST:

65/35 Split with LV

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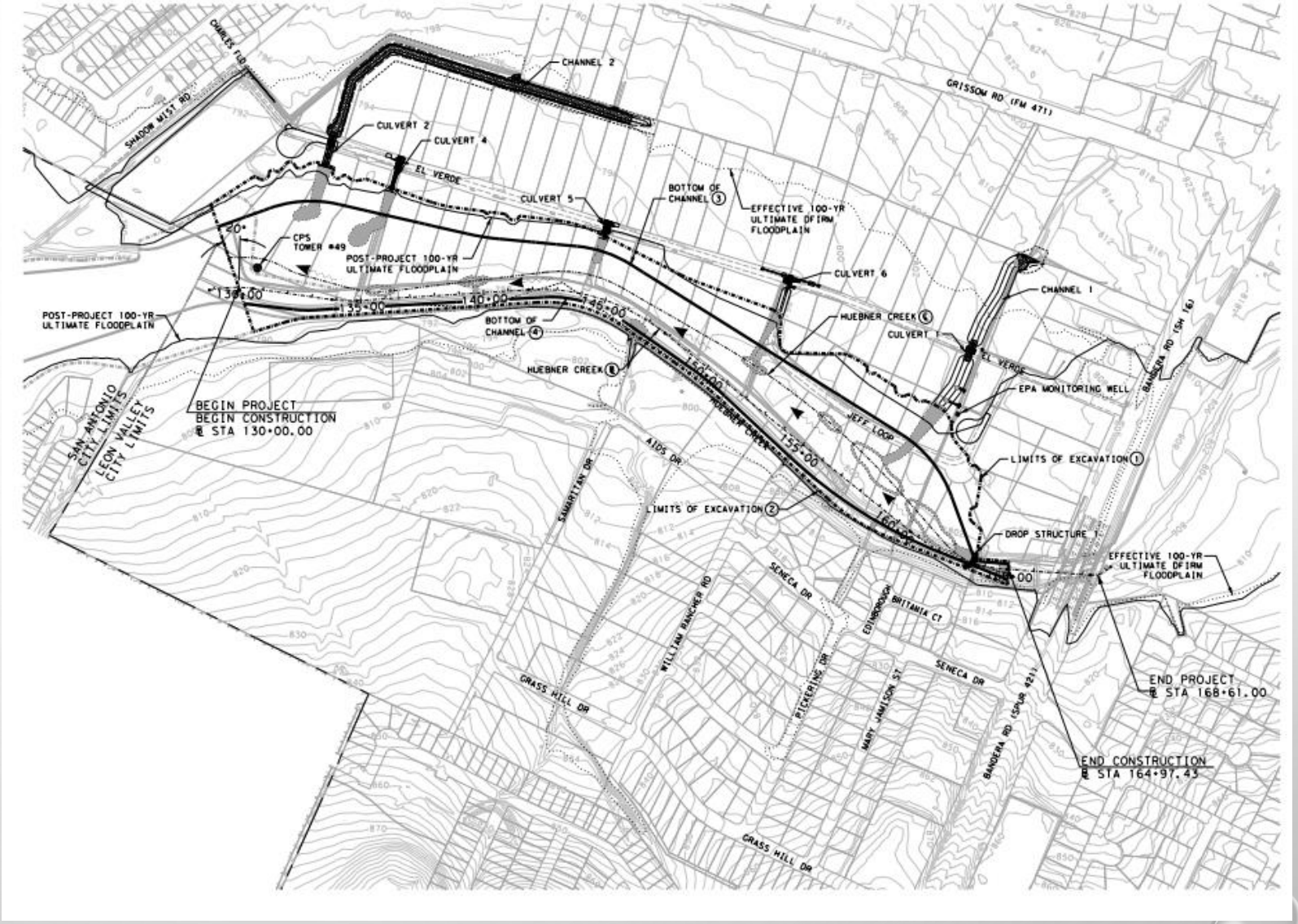
LC-17 UPDATE

- 54 HOMES REMOVED FROM FLOODPLAIN
- 42 HOMES PURCHASED
- 73 ACRES REMOVED FROM FP
- TOTAL SEGMENT III COST:
  - $30 MIL
- 100 NEW TREES PLANTED

SCHEDULE:

- MAY 2016 ADVERTISEMENT
- CONSTRUCTION TO BEGIN LATE SUMMER 2016
- ANTICIPATED TO LAST 18 MONTHS



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WURZBACH BRIDGE RIPRAP

CHALLENGE:

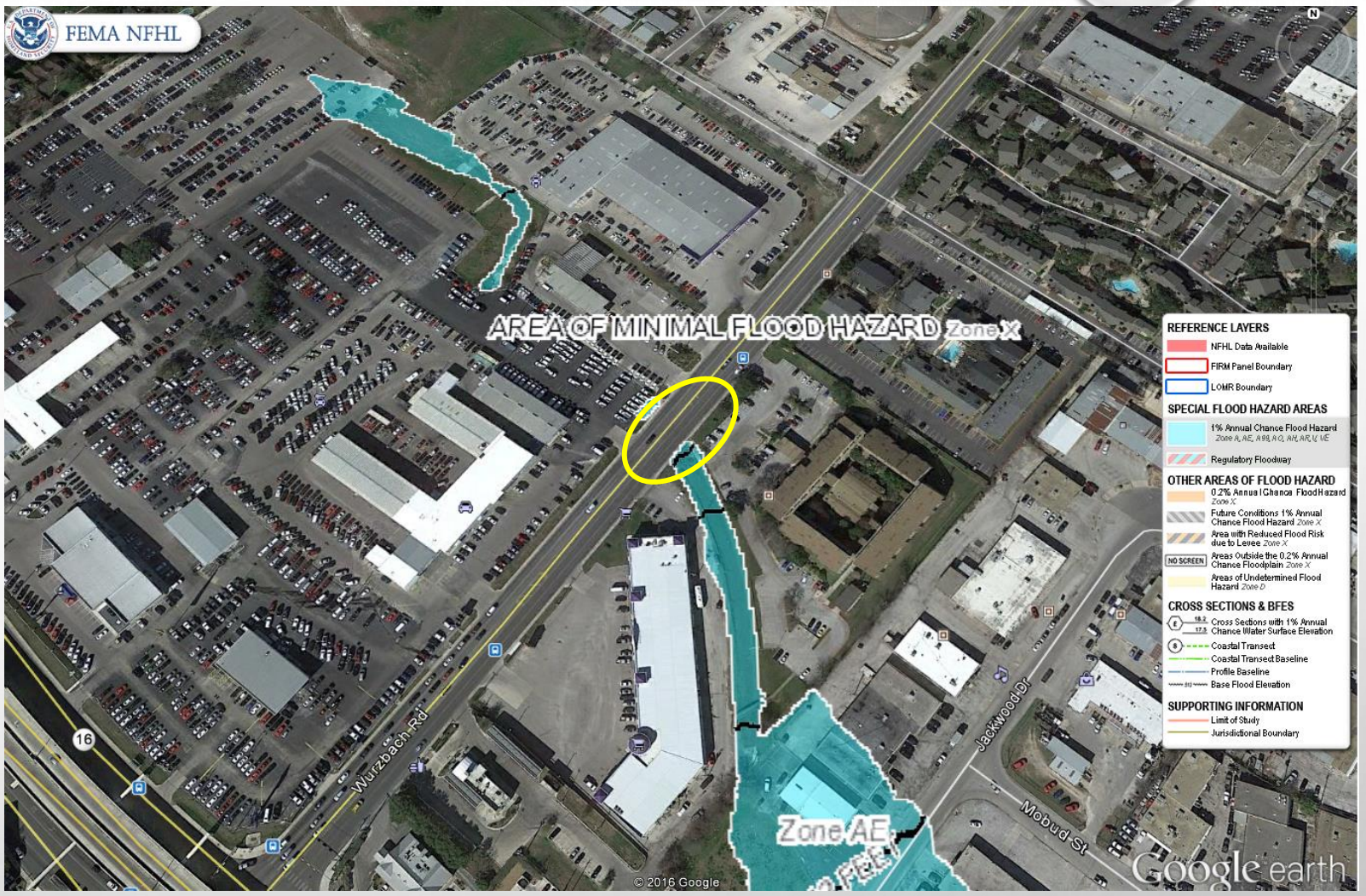
- STRUCTURAL INTEGRITY

SOLUTION:

- CONCRETE RIPRAP FOR EROSION CONTROL

COST:

- $25,000



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TOTAL FISCAL IMPACT

Location	Total Fiscal Impact	Grant/ Other Funding	CofLV Portion
Huebner at Timberhill	$282,000.00	CDGB ~ $175,000	$107,000.00
Evers Rd Bridge	$1,670,000.00	$857,000.00	$813,000.00
Huebner Creek Channel Improvement	Unknown	USACOE/SARA	TBD
Wurzbach Bridge	$25,000.00	None	$25,000.00
Montes Robles	$1,500,000.00	TBD	$1,500,000.00
Forest Oaks	$300,000.00	Street Tax	$300,000.00
Seneca West	$1,350,000.00	Developer Supported	±$ 1,350,000
	$5,127,000.00	**$1,032,000.00**	**$4,070,000.00**

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NEXT STEPS

- PRIORITIZE DRAINAGE PROJECTS
- IDENTIFY AND DETERMINE FUNDING SOURCES
  - SEEK GRANTS/ PARTNERSHIP OPPORTUNITIES

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STRATEGIC GOALS STATEMENT

- ITEM 2 – CONTINUE WORK ON CAPITAL AND PLANNING PROJECTS
  - DRAINAGE IMPROVEMENTS HELP ADDRESS STORMWATER RUNOFF.

S.E.E. STATEMENT

- *SOCIAL EQUITY* – REDUCING THE THREAT OF FLOODING FROM STORMWATER RUNOFF BENEFITS ALL CITIZENS & BUSINESSES
- *ECONOMIC DEVELOPMENT* – REMOVING THE THREAT OF FLOODING PROVIDES ADDITIONAL INCENTIVE FOR CITIZENS AND BUSINESSES TO STAY AND/OR RELOCATE TO LEON VALLEY, AS WELL AS IMPROVE PROPERTY VALUES
- *ENVIRONMENTAL STEWARDSHIP* – PROVIDING FUNDING FOR IMPROVEMENTS TO DRAINAGE & STORMWATER PROJECTS REDUCES THE RISK OF FLOODING AND PROTECTS ENVIRONMENTAL HABITAT AND QUALITY OF LIFE

FEED BACK REQUEST

PLEASE HELP US IDENTIFY OTHER AREAS THAT MAY ALSO FLOOD

USING THE MAPS PLEASE ADD A PUSH PIN AND FILL OUT AN INDEX CARD AT THE LOCATION OF OBSERVED FLOODING

YOUR INPUT WILL HELP US IDENTIFY AND IMPROVE **THIS GREAT CITY**

THANK YOU FOR YOUR TIME.

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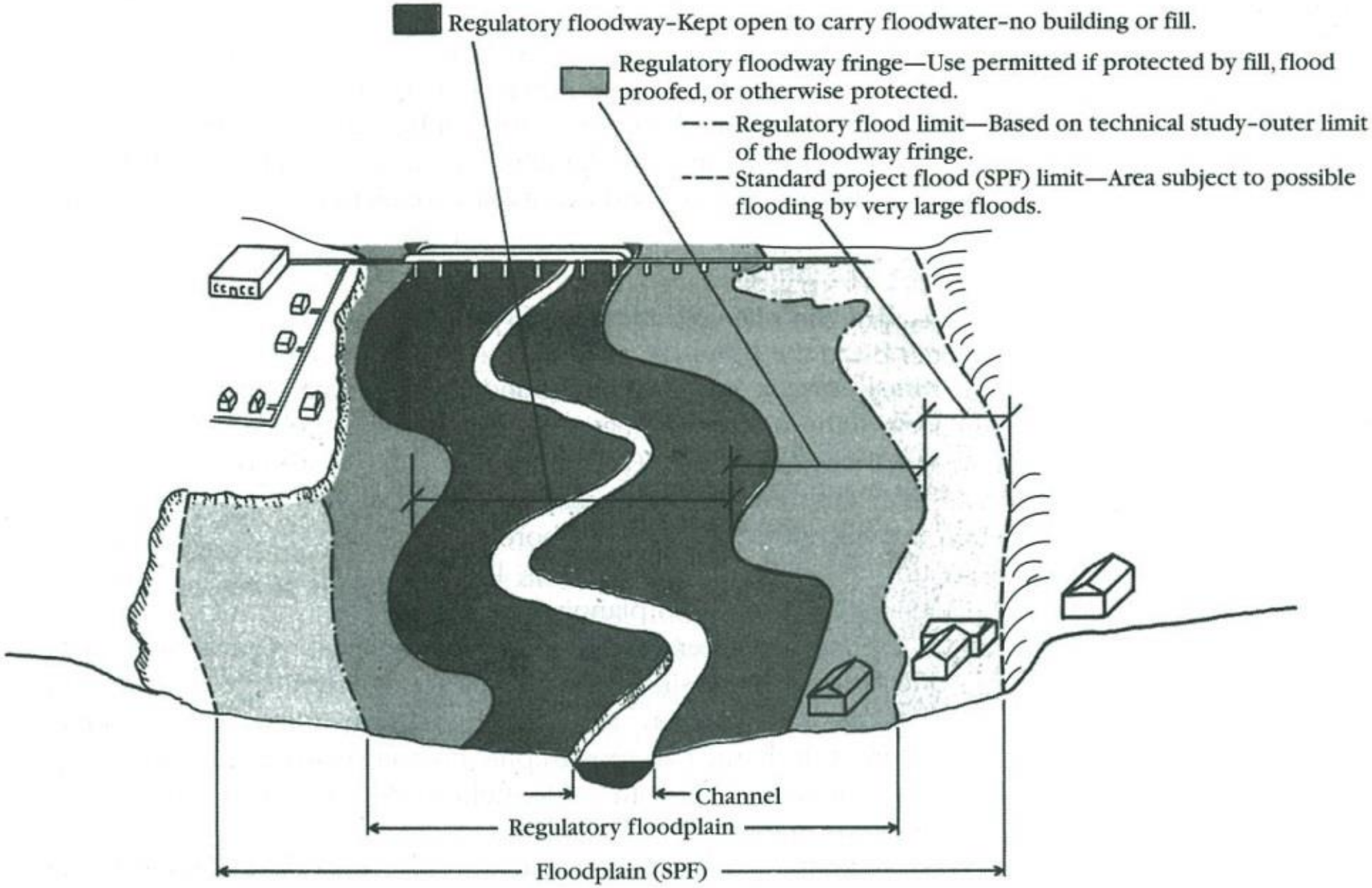
Regulatory floodway-Kept open to carry floodwater-no building or fill.
Regulatory floodway fringe—Use permitted if protected by fill, flood proofed, or otherwise protected.
Regulatory flood limit—Based on technical study-outer limit of the floodway fringe.
Standard project flood (SPF) limit—Area subject to possible flooding by very large floods.
Channel
Regulatory floodplain
Floodplain (SPF)

FEMA NFHL
809 FEET
809 FEET
807 FEET
807 FEET
805 FEET
804 FEET
803 FEET
Jeff Loop
Poss Rd
Grissom Rd
471
Longhouse Ct
Handsome Lake Dr
Seneca Dr
Britania Ct
Mary Jam
El Verde Rd
799 FEET
Ads Dr
Kinman Dr
William Rancher Rd
Rimkus Dr
Pickering Dr
Grass Hill Dr
798 FEET
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Google earth
REFERENCE LAYERS
NFHL Data Available
FIRM Panel Boundary
LOMR Boundary
SPECIAL FLOOD HAZARD AREAS
1% Annual Chance Flood Hazard Zone A, AE, A99, AO, AH, AR, V, VE
Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD
0.2% Annual Chance Flood Hazard Zone X
Future Conditions 1% Annual Chance Flood Hazard Zone X
Area with Reduced Flood Risk due to Levee Zone X
NO SCREEN
Areas Outside the 0.2% Annual Chance Floodplain Zone X
Areas of Undetermined Flood Hazard Zone D
CROSS SECTIONS & BFES
Cross Sections with 1% Annual Chance Water Surface Elevation
Coastal Transect
Coastal Transect Baseline
Profile Baseline
Base Flood Elevation
SUPPORTING INFORMATION
Limit of Study
Jurisdictional Boundary

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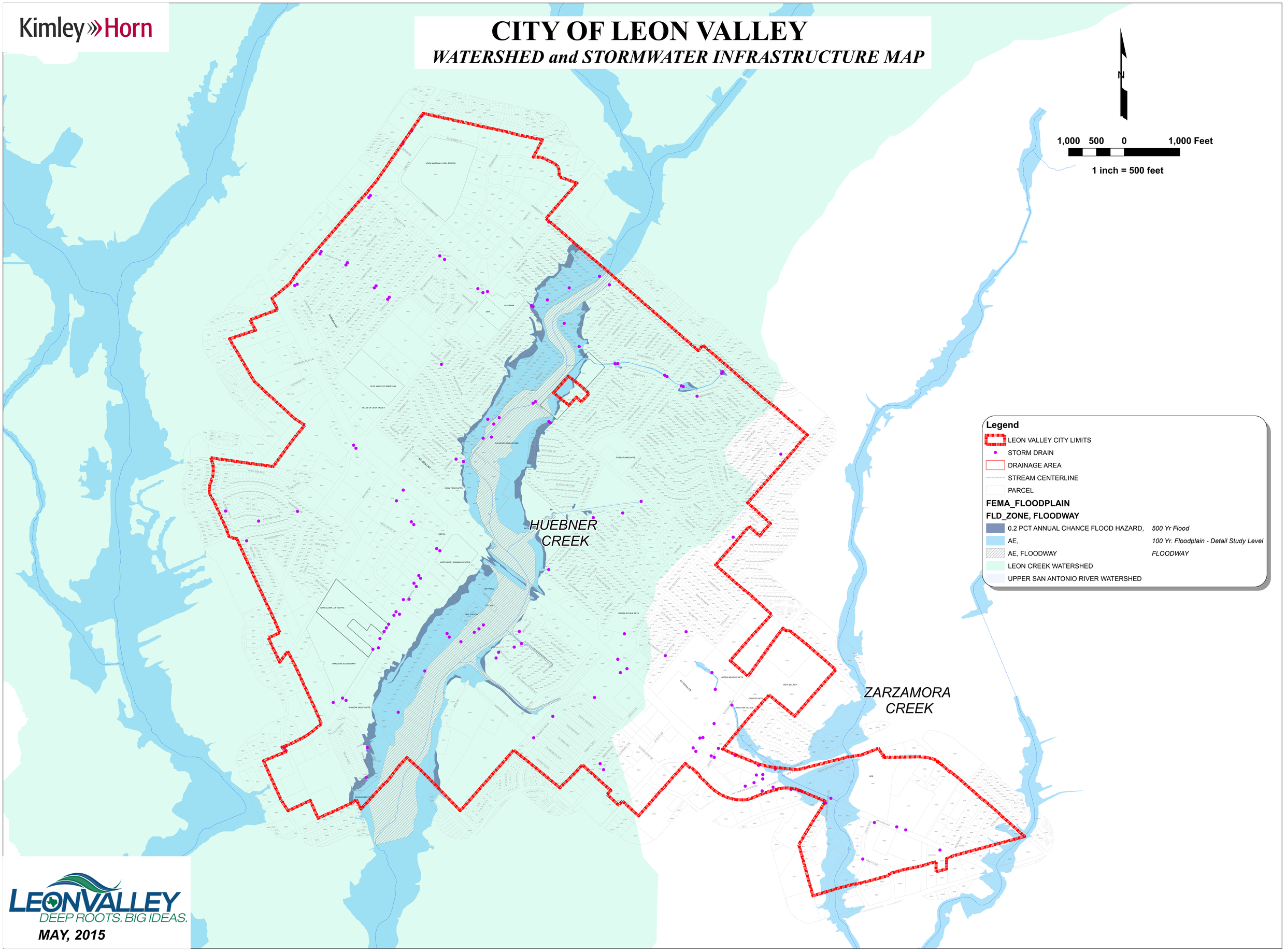
CITY OF LEON VALLEY

WATERSHED and STORMWATER INFRASTRUCTURE MAP



LEONVALLEY
DEEP ROOTS. BIG IDEAS.

MAY, 2015

Kimley»Horn

January 11, 2016

Melinda Moritz
City of Leon Valley Public Works Director
6400 El Verde Rd.
Leon Valley, TX 78238

RE: ***Montes Robles Drainage Improvements Feasibility Study***

Dear Ms. Moritz,

This letter describes the methods and the results of a feasibility study for proposed drainage infrastructure improvements for the Montes Robles neighborhood in Leon Valley, TX. The purpose of this study is to present several limited design improvement options with associated probable costs to alleviate stormwater runoff drainage issues reported in this neighborhood.

The analysis for this study was separated into several tasks:

- Data Gathering
- Hydrologic Analysis
- Hydraulic Analysis
- Preliminary Design
- Feasibility Report

The results of this analysis provide two options for drainage improvements and two variations for each option. In all, the four options presented are named as "Option 1-A", "Option 1-B", "Option 2-A", and "Option 2-B."
Each of the options propose the following improvments:

1. Side swales along street right of ways
2. New grass-lined channel (Chann-D) between Redbird Ln. and Bluebird Ln. from Stebbins Dr. to Huebner Rd.
3. New grass-lined channel (Chann-A) running through the parcel at address 6506 Thunderbird Dr.
4. New channel (Chann-H) running south west along the north side of Huebner Rd.

Option 1 and option 2 are differentiated by the proposed downstream location of Chann-D. The variations for these two options specify for Chann-H to be concrete-lined (variation A) or grass-lined (variation B). The locations of the proposed improvements are shown in the attached plan and profile sheets and the attached drainage area map. The cost estimates for each of these options are provided in the attached Opinion of Probable Cost (OPC) sheets. The methods of this analysis are described below.

Data Gathering

The data gathering task required collecting GIS data for desk-top analysis. The data needed included topographic LiDAR contours, parcel information, existing storm water structures, hydrologic soil types, land use categories, street centerline and right of way data. These data were used in the hydrologic and hydraulic analyses as well as the preliminary design.

Hydrologic Analysis

A hydrologic analysis was performed to analyze the drainage patterns in the Montes Robles neighborhood. Flows were established for the existing conditions drainage at several locations for the 10%, 4%, 2%, and 1% chance storm events. The rainfall values used for this study are taken from the San Antonio River Authority regional modeling standards. The drainage basins as well as the calculations for time of concentration and flow values are presented in the attached exhibit labeled "Montes Robles Drainage Area Map."

Hydraulic Analysis

A hydraulic analysis was performed to assess the hydraulic capacity of the existing drainage features in the area such as natural channels and roads and to design the sizing and slope of the proposed drainage improvements. The existing conditions hydraulic analysis was performed using XPSWMM v. 2014 software to create a 2D model of the area. The model inputs included flow values from the hydrologic analysis, land use areas with pertaining roughness values, and topographic surface information. The results of the 2D model, when run with a simlulated 1% chance (100 year) storm event, are presented in the attached video file. The maximum extents of this modeled flood event are shown in Figure 1 below. This 2D model was used to determine the probable locations of flooding.

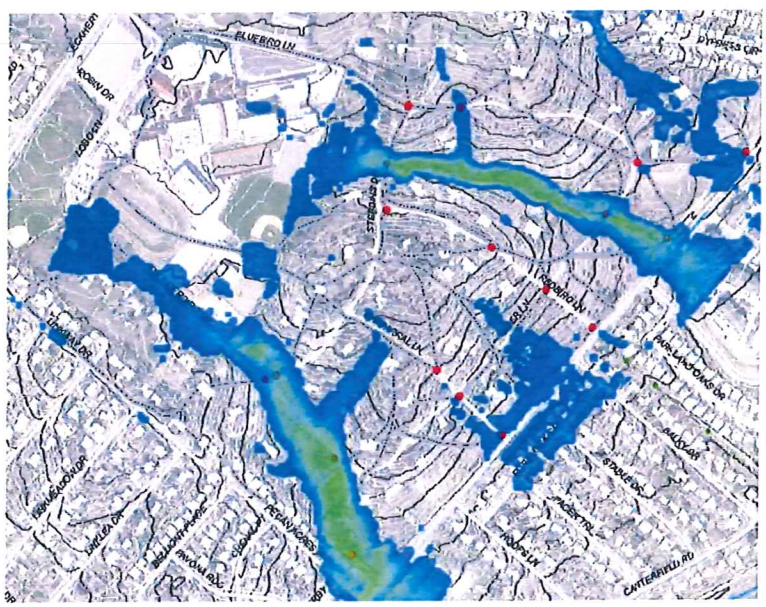


Figure 1: Maximum extents of flooding from 1% chance storm in 2D model

Hydraulic calculations were also performed through desktop analysis to establish channel sizes and slopes to be included in the preliminary design. Channel alignments and profiles are shown in the attached workmaps.

Preliminary Design

A preliminary design task was established to calculate the proposed excavation volumes required to construct the new drainage improvements based on the channel dimensions calculated in the hydraulic analysis. These values were incorporated into the OPC sheets.

Feasibilty Report

A feasibility report was created to provide a cost estimation for construction of the preliminary design. This report utilized the channel dimensions from the hydraulic analysis, the excavation volumes from the preliminary design, and 2012 unit prices provided by the City of San Antonio.

A total of four OPCs were prepared, one for each preliminary design. These are included with this submission along with the plan and profile sheets for the street centerlines and proposed channels.

OPC Name	Cost	Description
Option 1-A	**$1,467,000**	Bar ditches along streets. CHANN-A with lot purchase. CHANN-D drains into existing culvert to cross Huebner Rd. CHANN-H is concrete lined.
Option 1-B	**$815,000**	Bar ditches along streets. CHANN-A with lot purchase. CHANN-D drains into existing culvert to cross Huebner CHANN-H is grass lined.
Option 2-A	**$1,500,000**	Bar ditches along streets. CHANN-A with lot purchase. CHANN-D drains into proposed CHANN-H. CHANN-H is concrete lined.
Option 2-B	**$853,000**	Bar ditches along streets. CHANN-A with lot purchase. CHANN-D drains into proposed CHANN-H CHANN-H is grass lined.

Please feel free to contact me at (210) 321-3418 or nefi.garza@kimley-horn.com, if additional information is required.

Sincerely,

KIMLEY-HORN AND ASSOCIATES, INC.

TBPE Firm No. 928

Nefi M. Garza, P.E.
Project Manager

ATTACHMENTS:

DRAINAGE AREA MAP
OPINION OF PROBABLE COST (OPC)
PLAN AND PROFILE SHEETS OF STREETS
PLAN AND PROFILE SHEETS OF PROPOSED IMPROVEMENTS

Kimley-Horn and Associates, Inc. **Opinion of Probable Construction Cost**

Client:	City of Leon Valley	Date:	12/9/2015
Project:	Montes Robles Drainage Improvement Study	Prepared By:	DCW

OPTION 1A

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
	Street Improvements				
103.3.3	Remove Concrete Sidewalks & Driveways (> 10,000 S.F.)	10,750	S.F.	1.26	$13,545
104.1	Street Excavation (< 1,000 C.Y.)	142	C.Y.	19.46	$2,763
202.1	Prime Coat (0.20 GALLONS PER SQUARE YARD)	28	GAL.	3.78	$107
203.1	Tack Coat (0.10 GALLONS PER SQUARE YARD)	14	GAL.	5.78	$82
205.1	Hot Mix Asphaltic Pavement, Type A (6" COMP. DEPTH)	142	S.Y.	20.45	$2,904
206.1	Asphalt Treated Base (4" Thick)	142	S.Y.	20.26	$2,877
108.1	Lime Treated SubGrade (6" COMPACTED DEPTH)	142	S.Y.	4.88	$693
208.1	SALVAGING, HAULING & STOCKPILING RECLAIMABLE ASPHALTIC PAVENENT (1.5" DEPTH)	142	S.Y.	6.5	$923
502.1.2	CONCRETE SIDEWALKS(1,000 S.Y.< X <10,000S.Y.)	1,200	S.Y.	37.34	$44,808
507.2	CHAIN LINK WIRE FENCE (6' HIGH)	1,500	L.F.	20.1	$30,150
	Subtotal				**$98,853**
	Drainage Improvements				
	Bar Ditches				
515.1.1	Top Soil (> 500 C.Y.)	2,660	C.Y.	21.51	$57,217
516.1.1	Bermuda Sodding (> 2,000 S.Y.)	15,980	S.Y.	4.21	$67,276
105.1.2	Channel Excavation (5,000 C.Y.< X < 70,000 C.Y.)	4,430	C.Y.	12.29	$54,445
	CORRUGATED METAL, 24" DIAMETER PIPE	1,340	L.F.	12.62	$16,911
	Subtotal				**$195,848**
	CHANN-A				
307.1.8	Concrete Structure (Headwalls or Outfall Structures)	1	C.Y.	735.05	$735
515.1.1	Top Soil (> 500 C.Y.)	48	C.Y.	21.51	$1,032
516.1.1	Bermuda Sodding (> 2,000 S.Y.)	290	S.Y.	4.21	$1,221
105.1.2	Channel Excavation (5,000 C.Y.< X < 70,000 C.Y.)	85	C.Y.	12.29	$1,045
	Subtotal				**$4,033**
	CHANN-D				
307.1.8	Concrete Structure (Headwalls or Outfall Structures)	1	C.Y.	735.05	$735
401.1.3	Reinforced Concrete Pipe (Class III)(24" DIA)	60	L.F.	83.55	$5,013
515.1.1	Top Soil (> 500 C.Y.)	485	C.Y.	21.51	$10,432
516.1.1	Bermuda Sodding (> 2,000 S.Y.)	2,830	S.Y.	4.21	$11,914
105.1.2	Channel Excavation (5,000 C.Y.< X < 70,000 C.Y.)	4,390	C.Y.	12.29	$53,953
	Subtotal				**$82,048**
	CHANN-H				
307.1.8	Concrete Structure (Headwalls or Outfall Structures)	1	C.Y.	735.05	$735
	CHNL LIN 6" RPCC	44,748	S.F.	9.28	$415,261
105.1.2	Channel Excavation (5,000 C.Y.< X < 70,000 C.Y.)	2,540	C.Y.	12.29	$31,217
	Subtotal				**$447,213**
	Total Construction Costs				**$827,994**
	Other Costs				
100.1	MOBILIZATION	1	L.S.	11%	$91,079
100.2	INSURANCE & BOND	1	L.S.	3%	$24,840
101.1	PREPARING RIGHT OF WAY	1	L.S.	4%	$33,120
	RIGHT OF WAY PURCHASE	70,900	S.F.	0.55	$38,995
	TREE PRESERVATION	1	L.S.	0.5%	$4,140
	STORM POLLUTION CONTROL	1	L.S.	5.0%	$41,400
	ENGINEER FEE	1	L.S.	15.0%	$124,199
	ENGINEER CONTINGENCY	1	L.S.	2.0%	$16,560
	MANAGEMENT COSTS	1	L.S.	10.0%	$82,799
	MATERIAL TESTING	1	L.S.	2.0%	$16,560
	LOT PURCHASE CHANN-A	1	L.S.	32,360	$32,360
	Subtotal				**$506,052**

Subtotal:		$1,334,046
Conting. (%,+/-)	10%	$133,404.65
Total:		**$1,467,451**

Basis for Cost Projection:

- ☐ No Design Completed
- ☑ Preliminary Design
- ☐ Final Design

Notes:

1. *Above OPCC includes construction, engineering and surveying costs for street, drainage and utility improvements only. This estimate does not include other development costs such as, but not limited to community center features, landscaping, fencing, marketing, impact fees, Drainage Impact fees, etc...*
2. *Quantities used in this OPC are preliminary and are NOT based on engineering design or construction plans. Final quantities may vary.*
3. *Unit prices used in this OPC were taken from the City of San Antonio Unit price guide from September 2012; however, actual bid unit prices may vary significantly.*

4. Above OPCC is based upon landplan as prepared by others.

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

Kimley-Horn and Associates, Inc. **Opinion of Probable Construction Cost**

Client:	City of Leon Valley	Date:	12/9/2015
Project:	Montes Robles Drainage Improvement Study	Prepared By:	DCW
	OPTION 2B		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
	Street Improvements				
103.3.3	Remove Concrete Sidewalks & Driveways (> 10,000 S.F.)	10,750	S.F.	1.26	$13,545
104.1	Street Excavation (< 1,000 C.Y.)	142	C.Y.	19.46	$2,763
202.1	Prime Coat (0.20 GALLONS PER SQUARE YARD)	28	GAL.	3.78	$107
203.1	Tack Coat (0.10 GALLONS PER SQUARE YARD)	14	GAL.	5.78	$82
205.1	Hot Mix Asphaltic Pavement, Type A (6" COMP. DEPTH)	142	S.Y.	20.45	$2,904
206.1	Asphalt Treated Base (4" Thick)	142	S.Y.	20.26	$2,877
108.1	Lime Treated SubGrade (6" COMPACTED DEPTH)	142	S.Y.	4.88	$693
208.1	SALVAGING, HAULING & STOCKPILING RECLAIMABLE ASPHALTIC PAVENENT (1.5" DEPTH)	142	S.Y.	6.5	$923
502.1.2	CONCRETE SIDEWALKS(1,000 S.Y.< X <10,000S.Y.)	1,200	S.Y.	37.34	$44,808
507.2	CHAIN LINK WIRE FENCE (6' HIGH)	1,500	L.F.	20.1	$30,150
	Subtotal				**$98,853**
	Drainage Improvements				
	Bar Ditches				
515.1.1	Top Soil (> 500 C.Y.)	2,660	C.Y.	21.51	$57,217
516.1.1	Bermuda Sodding (> 2,000 S.Y.)	15,980	S.Y.	4.21	$67,276
105.1.2	Channel Excavation (5,000 C.Y.< X < 70,000 C.Y.)	4,430	C.Y.	12.29	$54,445
	CORRUGATED METAL, 24" DIAMETER PIPE	1,340	L.F.	12.62	$16,911
	Subtotal				**$195,848**
	CHANN-A				
307.1.8	Concrete Structure (Headwalls or Outfall Structures)	1	C.Y.	735.05	$735
515.1.1	Top Soil (> 500 C.Y.)	48	C.Y.	21.51	$1,032
516.1.1	Bermuda Sodding (> 2,000 S.Y.)	290	S.Y.	4.21	$1,221
105.1.2	Channel Excavation (5,000 C.Y.< X < 70,000 C.Y.)	85	C.Y.	12.29	$1,045
	Subtotal				**$4,033**
	CHANN-D				
307.1.8	Concrete Structure (Headwalls or Outfall Structures)	1	C.Y.	735.05	$735
401.1.3	Reinforced Concrete Pipe (Class III)(24" DIA)	60	L.F.	83.55	$5,013
515.1.1	Top Soil (> 500 C.Y.)	410	C.Y.	21.51	$8,819
516.1.1	Bermuda Sodding (> 2,000 S.Y.)	2,470	S.Y.	4.21	$10,399
105.1.2	Channel Excavation (5,000 C.Y.< X < 70,000 C.Y.)	4,390	C.Y.	12.29	$53,953
	Subtotal				**$78,919**
	CHANN-H				
307.1.8	Concrete Structure (Headwalls or Outfall Structures)	1	C.Y.	735.05	$735
515.1.1	Top Soil (> 500 C.Y.)	635	C.Y.	21.51	$13,659
516.1.1	Bermuda Sodding (> 2,000 S.Y.)	3,810	S.Y.	4.21	$16,040
105.1.2	Channel Excavation (5,000 C.Y.< X < 70,000 C.Y.)	2,540	C.Y.	12.29	$31,217
	Subtotal				**$61,651**
	Total Construction Costs				**$439,303**
	Other Costs				
100.1	MOBILIZATION	1	L.S.	11%	$48,323
100.2	INSURANCE & BOND	1	L.S.	3%	$13,179
101.1	PREPARING RIGHT OF WAY	1	L.S.	4%	$17,572
	RIGHT OF WAY PURCHASE	70,900	S.F.	0.55	$38,995
	TREE PRESERVATION	1	L.S.	0.5%	$2,197
	STORM POLLUTION CONTROL	1	L.S.	5.0%	$21,965
	ENGINEER FEE	1	L.S.	15.0%	$65,895
	ENGINEER CONTINGENCY	1	L.S.	2.0%	$8,786
	MANAGEMENT COSTS	1	L.S.	10.0%	$43,930
	MATERIAL TESTING	1	L.S.	2.0%	$8,786
	LOT PURCHASE CHANN-A	1	L.S.	32,360	$32,360
	Subtotal				**$301,989**

Subtotal:		$741,292
Conting. (%,+/-)	10%	$74,129.22
Total:		**$815,421**

Basis for Cost Projection:

- ☐ No Design Completed
- ☑ Preliminary Design
- ☐ Final Design

Notes:

1. *Above OPCC includes construction, engineering and surveying costs for street, drainage and utility improvements only. This estimate does not include other development costs such as, but not limited to community center features, landscaping, fencing, marketing, impact fees, Drainage Impact fees, etc...*
2. *Quantities used in this OPC are preliminary and are NOT based on engineering design or construction plans. Final quantities may vary.*
3. *Unit prices used in this OPC were taken from the City of San Antonio Unit price guide from September 2012; however, actual bid unit prices may vary significantly.*

4. Above OPCC is based upon landplan as prepared by others.

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Kimley-Horn and Associates, Inc. **Opinion of Probable Construction Cost**

Client:	City of Leon Valley	Date:	12/9/2015
Project:	Montes Robles Drainage Improvement Study	Prepared By:	DCW
	OPTION 2A		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
	Street Improvements				
103.3.3	Remove Concrete Sidewalks & Driveways (> 10,000 S.F.)	10,750	S.F.	1.26	$13,545
104.1	Street Excavation (< 1,000 C.Y.)	142	C.Y.	19.46	$2,763
202.1	Prime Coat (0.20 GALLONS PER SQUARE YARD)	28	GAL.	3.78	$107
203.1	Tack Coat (0.10 GALLONS PER SQUARE YARD)	14	GAL.	5.78	$82
205.1	Hot Mix Asphaltic Pavement, Type A (6" COMP. DEPTH)	142	S.Y.	20.45	$2,904
206.1	Asphalt Treated Base (4" Thick)	142	S.Y.	20.26	$2,877
108.1	Lime Treated SubGrade (6" COMPACTED DEPTH)	142	S.Y.	4.88	$693
208.1	SALVAGING, HAULING & STOCKPILING RECLAIMABLE ASPHALTIC PAVENENT (1.5" DEPTH)	142	S.Y.	6.5	$923
502.1.2	CONCRETE SIDEWALKS(1,000 S.Y.< X <10,000S.Y.)	1,200	S.Y.	37.34	$44,808
507.2	CHAIN LINK WIRE FENCE (6' HIGH)	1,500	L.F.	20.1	$30,150
	Subtotal				**$98,853**
	Drainage Improvements				
	Bar Ditches				
515.1.1	Top Soil (> 500 C.Y.)	2,660	C.Y.	21.51	$57,217
516.1.1	Bermuda Sodding (> 2,000 S.Y.)	15,980	S.Y.	4.21	$67,276
105.1.2	Channel Excavation (5,000 C.Y.< X < 70,000 C.Y.)	4,430	C.Y.	12.29	$54,445
	CORRUGATED METAL, 24" DIAMETER PIPE	1,340	L.F.	12.62	$16,911
	Subtotal				**$195,848**
	CHANN-A				
307.1.8	Concrete Structure (Headwalls or Outfall Structures)	1	C.Y.	735.05	$735
515.1.1	Top Soil (> 500 C.Y.)	48	C.Y.	21.51	$1,032
516.1.1	Bermuda Sodding (> 2,000 S.Y.)	290	S.Y.	4.21	$1,221
105.1.2	Channel Excavation (5,000 C.Y.< X < 70,000 C.Y.)	85	C.Y.	12.29	$1,045
	Subtotal				**$4,033**
	CHANN-D				
307.1.8	Concrete Structure (Headwalls or Outfall Structures)	1	C.Y.	735.05	$735
401.1.3	Reinforced Concrete Pipe (Class III)(24" DIA)	60	L.F.	83.55	$5,013
515.1.1	Top Soil (> 500 C.Y.)	410	C.Y.	21.51	$8,819
516.1.1	Bermuda Sodding (> 2,000 S.Y.)	2,470	S.Y.	4.21	$10,399
105.1.2	Channel Excavation (5,000 C.Y.< X < 70,000 C.Y.)	4,000	C.Y.	12.29	$49,160
	Subtotal				**$74,126**
	CHANN-H				
307.1.8	Concrete Structure (Headwalls or Outfall Structures)	1	C.Y.	735.05	$735
515.1.1	CHNL LIN 6" RPCC	44,748	S.F.	9.28	$415,261
105.1.2	Channel Excavation (5,000 C.Y.< X < 70,000 C.Y.)	2,540	C.Y.	12.29	$31,217
	Subtotal				**$447,213**
	Total Construction Costs				**$820,072**
	Other Costs				
100.1	MOBILIZATION	1	L.S.	11%	$90,208
100.2	INSURANCE & BOND	1	L.S.	3%	$24,602
101.1	PREPARING RIGHT OF WAY	1	L.S.	4%	$32,803
	RIGHT OF WAY PURCHASE	70,900	S.F.	0.55	$38,995
	TREE PRESERVATION	1	L.S.	0.5%	$4,100
	STORM POLLUTION CONTROL	1	L.S.	5.0%	$41,004
	ENGINEER FEE	1	L.S.	15.0%	$123,011
	ENGINEER CONTINGENCY	1	L.S.	2.0%	$16,401
	MANAGEMENT COSTS	1	L.S.	10.0%	$82,007
	MATERIAL TESTING	1	L.S.	2.0%	$16,401
	LOT PURCHASE CHANN-A	1	L.S.	32,360	$32,360
	LOT PURCHASE CHANN-D	1	L.S.	41,830	$41,830
	Subtotal				**$543,723**

Basis for Cost Projection:

- ☐ No Design Completed
- ☑ Preliminary Design
- ☐ Final Design

Subtotal:		$1,363,795
Conting. (%,+/-)	10%	$136,379.55
Total:		**$1,500,175**

Notes:

1. *Above OPCC includes construction, engineering and surveying costs for street, drainage and utility improvements only. This estimate does not include other development costs such as, but not limited to community center features, landscaping, fencing, marketing, impact fees, Drainage Impact fees, etc...*
2. *Quantities used in this OPC are preliminary and are NOT based on engineering design or construction plans. Final quantities may vary.*
3. *Unit prices used in this OPC were taken from the City of San Antonio Unit price guide from September 2012; however, actual bid unit prices may vary significantly.*

4. Above OPCC is based upon landplan as prepared by others.

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

Client:	City of Leon Valley	Date:	12/9/2015
Project:	Montes Robles Drainage Improvement Study	Prepared By:	DCW
	OPTION 2B		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
	Street Improvements				
103.3.3	Remove Concrete Sidewalks & Driveways (> 10,000 S.F.)	10,750	S.F.	1.26	$13,545
104.1	Street Excavation (< 1,000 C.Y.)	142	C.Y.	19.46	$2,763
202.1	Prime Coat (0.20 GALLONS PER SQUARE YARD)	28	GAL.	3.78	$107
203.1	Tack Coat (0.10 GALLONS PER SQUARE YARD)	14	GAL.	5.78	$82
205.1	Hot Mix Asphaltic Pavement, Type A (6" COMP. DEPTH)	142	S.Y.	20.45	$2,904
206.1	Asphalt Treated Base (4" Thick)	142	S.Y.	20.26	$2,877
108.1	Lime Treated SubGrade (6" COMPACTED DEPTH)	142	S.Y.	4.88	$693
208.1	SALVAGING, HAULING & STOCKPILING RECLAIMABLE ASPHALTIC PAVENENT (1.5" DEPTH)	142	S.Y.	6.5	$923
502.1.2	CONCRETE SIDEWALKS(1,000 S.Y.< X <10,000S.Y.)	1,200	S.Y.	37.34	$44,808
507.2	CHAIN LINK WIRE FENCE (6' HIGH)	1,500	L.F.	20.1	$30,150
	Subtotal				**$98,853**
	Drainage Improvements				
	Bar Ditches				
515.1.1	Top Soil (> 500 C.Y.)	2,660	C.Y.	21.51	$57,217
516.1.1	Bermuda Sodding (> 2,000 S.Y.)	15,980	S.Y.	4.21	$67,276
105.1.2	Channel Excavation (5,000 C.Y.< X < 70,000 C.Y.)	4,430	C.Y.	12.29	$54,445
	CORRUGATED METAL, 24" DIAMETER PIPE	1,340	L.F.	12.62	$16,911
	Subtotal				**$195,848**
	CHANN-A				
307.1.8	Concrete Structure (Headwalls or Outfall Structures)	1	C.Y.	735.05	$735
515.1.1	Top Soil (> 500 C.Y.)	48	C.Y.	21.51	$1,032
516.1.1	Bermuda Sodding (> 2,000 S.Y.)	290	S.Y.	4.21	$1,221
105.1.2	Channel Excavation (5,000 C.Y.< X < 70,000 C.Y.)	85	C.Y.	12.29	$1,045
	Subtotal				**$4,033**
	CHANN-D				
307.1.8	Concrete Structure (Headwalls or Outfall Structures)	1	C.Y.	735.05	$735
401.1.3	Reinforced Concrete Pipe (Class III)(24" DIA)	60	L.F.	83.55	$5,013
515.1.1	Top Soil (> 500 C.Y.)	410	C.Y.	21.51	$8,819
516.1.1	Bermuda Sodding (> 2,000 S.Y.)	2,470	S.Y.	4.21	$10,399
105.1.2	Channel Excavation (5,000 C.Y.< X < 70,000 C.Y.)	4,000	C.Y.	12.29	$49,160
	Subtotal				**$74,126**
	CHANN-H				
307.1.8	Concrete Structure (Headwalls or Outfall Structures)	1	C.Y.	735.05	$735
515.1.1	Top Soil (> 500 C.Y.)	635	C.Y.	21.51	$13,659
516.1.1	Bermuda Sodding (> 2,000 S.Y.)	3,810	S.Y.	4.21	$16,040
105.1.2	Channel Excavation (5,000 C.Y.< X < 70,000 C.Y.)	2,540	C.Y.	12.29	$31,217
	Subtotal				**$61,651**
	Total Construction Costs				**$434,510**
	Other Costs				
100.1	MOBILIZATION	1	L.S.	11%	$47,796
100.2	INSURANCE & BOND	1	L.S.	3%	$13,035
101.1	PREPARING RIGHT OF WAY	1	L.S.	4%	$17,380
	RIGHT OF WAY PURCHASE	70,900	S.F.	0.55	$38,995
	TREE PRESERVATION	1	L.S.	0.5%	$2,173
	STORM POLLUTION CONTROL	1	L.S.	5.0%	$21,725
	ENGINEER FEE	1	L.S.	15.0%	$65,176
	ENGINEER CONTINGENCY	1	L.S.	2.0%	$8,690
	MANAGEMENT COSTS	1	L.S.	10.0%	$43,451
	MATERIAL TESTING	1	L.S.	2.0%	$8,690
	LOT PURCHASE CHANN-A	1	L.S.	32,360	$32,360
	LOT PURCHASE CHANN-D	1	L.S.	41,830	$41,830
	Subtotal				**$341,303**

Basis for Cost Projection:

- ☐ No Design Completed
- ☑ Preliminary Design
- ☐ Final Design

Subtotal:		$775,813
Conting. (%,+/-)	10%	$77,581.27
Total:		**$853,394**

Notes:

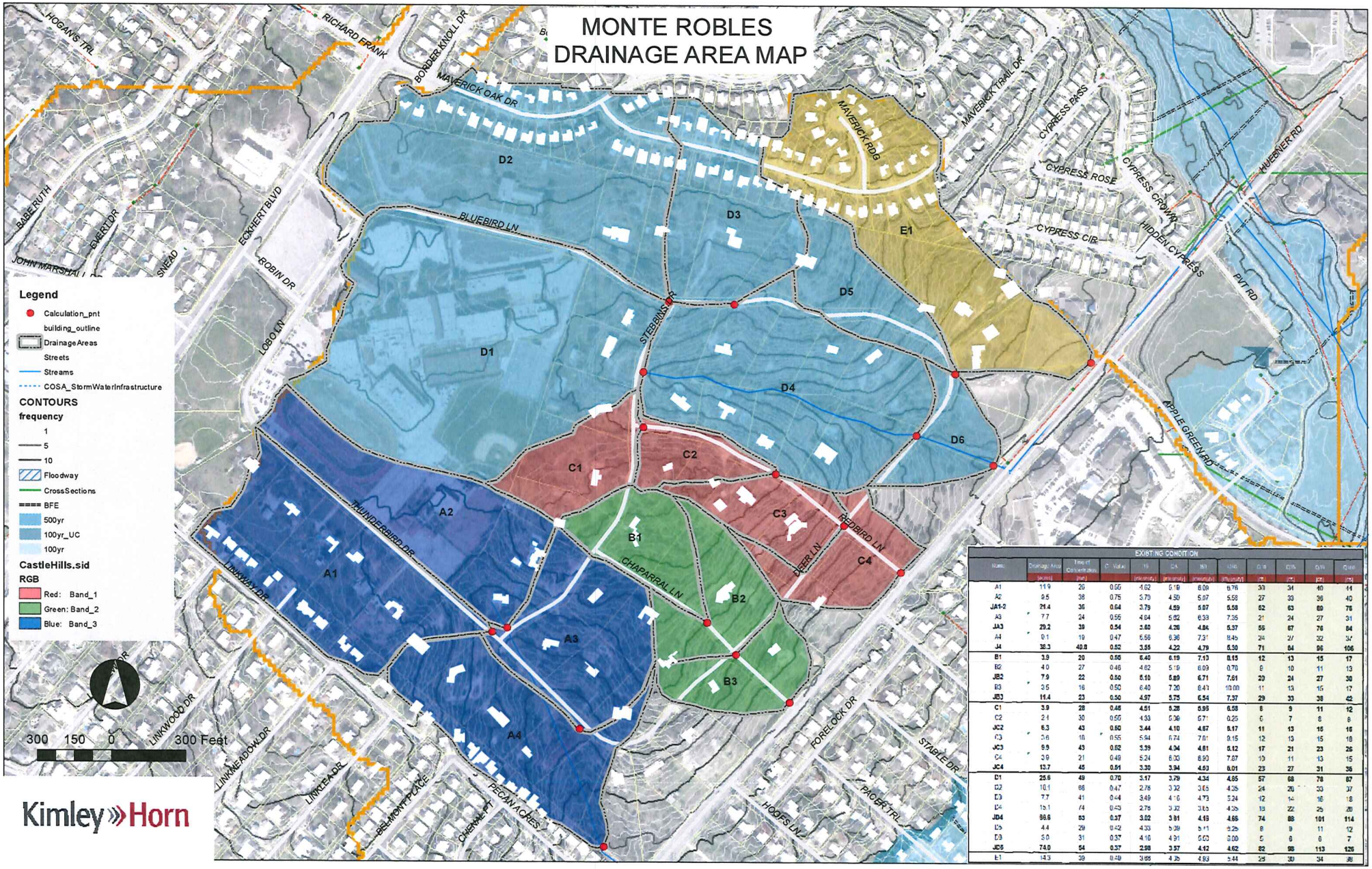
1. Above OPCC includes construction, engineering and surveying costs for street, drainage and utility improvements only. This estimate does not include other development costs such as, but not limited to community center features, landscaping, fencing, marketing, impact fees, Drainage Impact fees, etc...
2. Quantities used in this OPC are preliminary and are NOT based on engineering design or construction plans. Final quantities may vary.

3. *Unit prices used in this OPC were taken from the City of San Antonio Unit price guide from September 2012; however, actual bid unit prices may vary significantly.*

4. *Above OPCC is based upon landplan as prepared by others.*

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

MONTE ROBLES DRAINAGE AREA MAP



EXISTING CONDITION											
Name	Drainage Area (acres)	Time of Concentration (min)	C Value	10 (inches/hr)	25 (inches/hr)	100 (inches/hr)	500 (inches/hr)	Q10 (cfs)	Q25 (cfs)	Q100 (cfs)	Q500 (cfs)
A1	11.9	20	0.65	4.62	5.19	6.09	6.76	30	34	40	44
A2	9.5	38	0.75	3.70	4.50	5.67	6.58	27	33	36	40
JA1-2	21.4	36	0.64	3.79	4.59	5.67	6.58	52	63	69	76
A3	7.7	24	0.55	4.64	5.62	6.93	7.35	21	24	27	31
JA3	29.2	39	0.54	3.60	4.26	4.84	5.37	55	67	76	84
A4	9.1	19	0.47	5.56	6.36	7.31	8.45	24	27	32	37
J4	38.3	40.8	0.52	3.55	4.22	4.79	5.30	71	84	96	106
B1	3.9	20	0.55	6.40	6.19	7.13	8.15	12	13	15	17
B2	4.0	27	0.46	4.62	5.19	6.09	6.76	8	10	11	13
JB2	7.9	22	0.50	5.10	5.89	6.71	7.61	20	24	27	30
B3	3.5	16	0.50	6.40	7.20	8.41	10.00	11	13	15	17
JB3	11.4	23	0.50	4.97	5.75	6.54	7.37	29	33	38	42
C1	3.9	28	0.46	4.51	5.28	5.95	6.58	8	9	11	12
C2	2.1	30	0.55	4.33	5.09	5.71	6.25	6	7	8	8
JC2	6.3	43	0.50	3.44	4.10	4.67	5.17	11	13	16	16
C3	3.6	18	0.55	5.64	6.74	7.61	9.15	12	13	15	18
JC3	9.9	43	0.52	3.39	4.04	4.61	5.12	17	21	23	26
C4	3.9	21	0.49	5.24	6.00	6.90	7.87	10	11	13	15
JC4	13.7	45	0.51	3.30	3.94	4.53	6.01	23	27	31	36
D1	25.6	49	0.70	3.17	3.79	4.34	4.95	57	68	78	87
D2	10.1	66	0.47	2.76	3.32	3.85	4.35	24	20	33	37
D3	7.7	41	0.44	3.49	4.16	4.73	5.24	12	14	16	18
D4	15.1	74	0.43	2.76	3.32	3.85	4.35	18	22	25	28
JD4	98.6	93	0.37	3.02	3.61	4.19	4.66	74	88	101	114
D5	4.4	29	0.42	4.33	5.09	5.71	6.25	8	9	11	12
D6	3.0	31	0.37	4.10	4.91	5.60	6.00	5	6	6	7
JD6	74.0	54	0.37	2.98	3.57	4.12	4.62	82	98	113	126
E1	14.3	39	0.49	3.65	4.35	4.93	5.44	25	30	34	38

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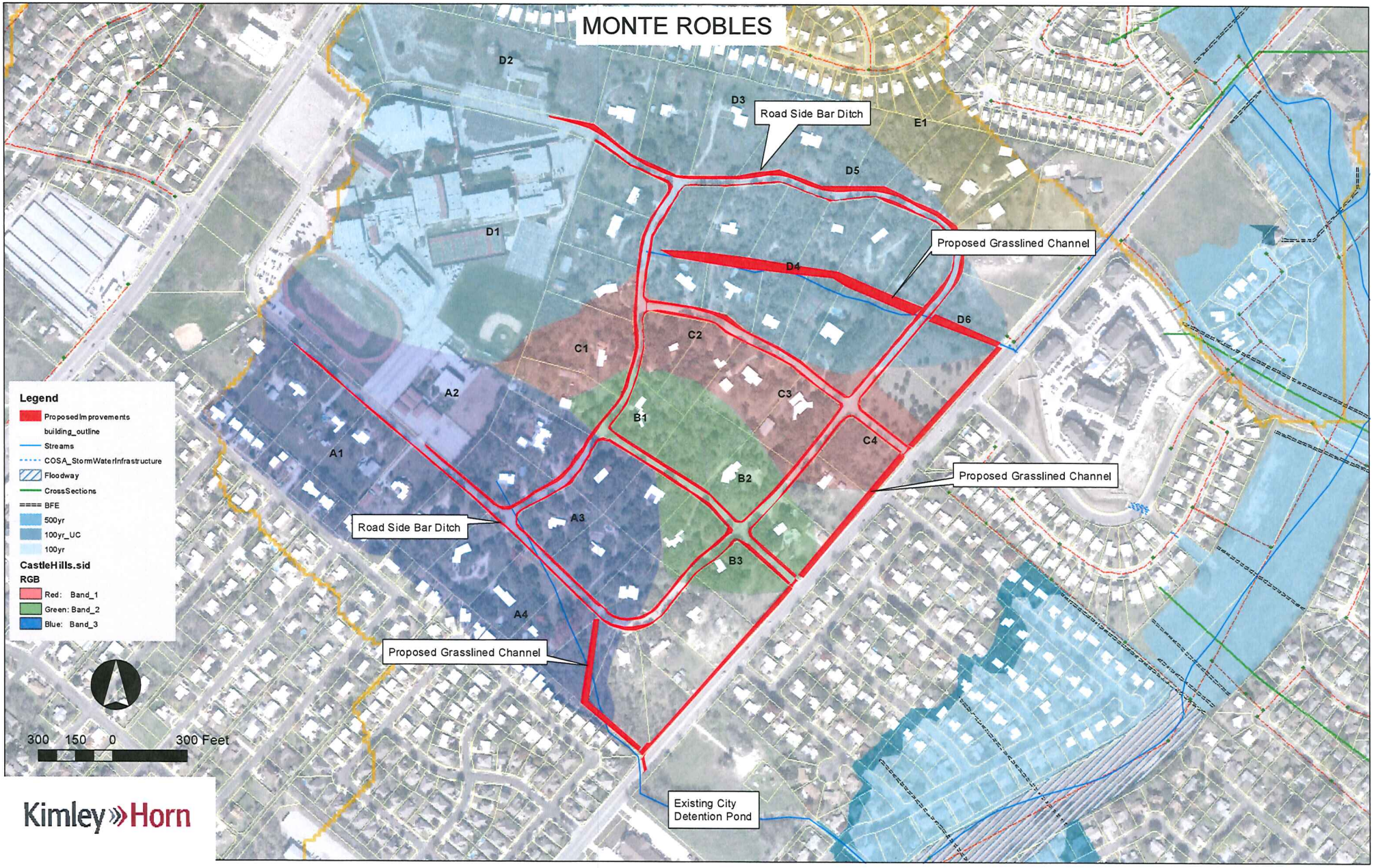
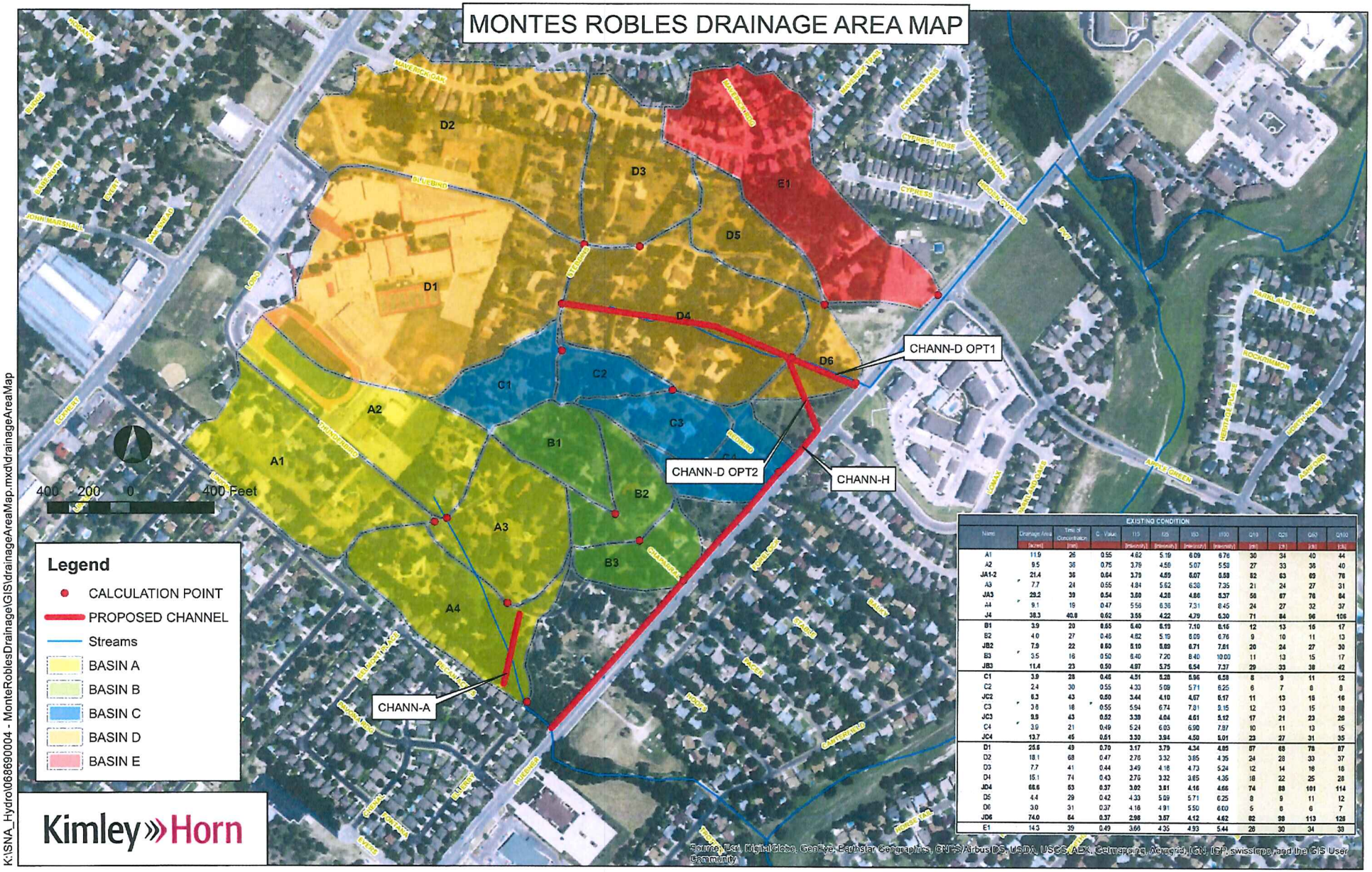

MONTE ROBLES
D2
D3
Road Side Bar Ditch
E1
D5
D1
Proposed Grasslined Channel
D4
D6
C1
C2
C3
A2
B1
C4
A1
B2
Proposed Grasslined Channel
A3
Road Side Bar Ditch
B3
A4
Proposed Grasslined Channel
Existing City Detention Pond
Legend
ProposedImprovements
building_outline
Streams
COSA_StormWaterInfrastructure
Floodway
CrossSections
BFE
500yr
100yr_UC
100yr
CastleHills.sid
RGB
Red: Band_1
Green: Band_2
Blue: Band_3
300 150 0 300 Feet

Kimley»Horn

MONTES ROBLES DRAINAGE AREA MAP



EXISTING CONDITION												
Name	Drainage Area (acres)	Time of Concentration (min)	C - Value	I10 (inches/hr)	I25 (inches/hr)	I50 (inches/hr)	I100 (inches/hr)	Q10 (cfs)	Q25 (cfs)	Q50 (cfs)	Q100 (cfs)
A1	11.9	26	0.55	4.62	5.19	6.09	6.76	30	34	40	44
A2	9.5	36	0.75	3.79	4.56	5.07	5.59	27	33	36	40
JA1-2	21.4	36	0.64	3.79	4.59	5.07	5.59	52	63	69	76
A3	7.7	24	0.55	4.84	5.62	6.38	7.35	21	24	27	31
JA3	29.2	39	0.54	3.69	4.28	4.86	5.37	58	67	76	84
A4	9.1	19	0.47	5.56	6.36	7.31	8.45	24	27	32	37
J4	38.3	40.0	0.62	3.55	4.22	4.79	5.30	71	84	96	106
B1	3.9	20	0.65	5.40	6.19	7.10	8.16	12	13	16	17
B2	4.0	27	0.46	4.82	5.19	6.09	6.76	9	10	11	13
JB2	7.9	22	0.60	5.10	5.89	6.71	7.61	20	24	27	30
B3	3.5	16	0.50	6.40	7.20	8.40	10.00	11	13	15	17
JB3	11.4	23	0.50	4.97	5.75	6.54	7.37	29	33	38	42
C1	3.9	28	0.46	4.51	5.28	5.96	6.59	8	9	11	12
C2	2.4	30	0.55	4.33	5.09	5.71	6.25	6	7	8	8
JC2	6.3	43	0.50	3.44	4.10	4.67	5.17	11	13	15	16
C3	3.6	18	0.55	5.94	6.74	7.81	8.15	12	13	15	18
JC3	9.9	43	0.52	3.39	4.04	4.61	5.12	17	21	23	26
C4	3.9	21	0.49	5.24	6.03	6.90	7.87	10	11	13	15
JC4	13.7	45	0.51	3.30	3.94	4.50	5.01	23	27	31	35
D1	25.6	49	0.70	3.17	3.79	4.34	4.85	57	68	78	87
D2	18.1	68	0.47	2.76	3.32	3.85	4.35	24	28	33	37
D3	7.7	41	0.44	3.49	4.16	4.73	5.24	12	14	16	18
D4	15.1	74	0.43	2.76	3.32	3.85	4.35	18	22	25	28
JD4	68.6	53	0.37	3.02	3.61	4.16	4.66	74	88	101	114
D5	4.4	29	0.42	4.33	5.09	5.71	6.25	8	9	11	12
D6	3.0	31	0.37	4.16	4.91	5.50	6.00	5	6	6	7
JD6	74.0	54	0.37	2.98	3.57	4.12	4.62	82	98	113	126
E1	14.3	39	0.49	3.66	4.35	4.93	5.44	26	30	34	38

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Kimley»Horn

March 10, 2016

City of Leon Valley Director of Public Works
Melinda Moritz
6400 El Verde Rd.
Leon Valley, TX 78238

RE: ***Forest Oak Drainage Improvements Feasibility Study***

Dear Ms. Moritz,

This letter describes the methods and the results of a feasibility study for proposed drainage infrastructure improvements for the Forest Oak neighborhood in Leon Valley, TX. The purpose of this study is to present a limited design improvement option with associated probable costs to alleviate stormwater runoff drainage issues reported in this neighborhood.

The analysis for this study was separated into several tasks:

- Data Gathering
- Hydrologic Analysis
- Hydraulic Analysis
- Preliminary Design
- Feasibility Report

Data Gathering

The data gathering task required collecting GIS data for desk-top analysis. The data needed included topographic LiDAR contours, parcel information, existing storm water structures, land use categories based on aerial photography; street centerline and right of way data. On-site measurements of drainage structures and curb heights were also taken. This data was used in the hydrologic and hydraulic analyses as well as the preliminary design. The results are presented in this report.

Hydrologic Analysis

A hydrologic analysis was performed to calculate runoff amounts in the Forest Oak Subdivision. Flows were established for the existing conditions drainage at the downstream end of the streets Forest Brook, Forest Mill, and Forest Knoll for the 5, 25, 50, 100, and 500 year storm events.
The drainage basins as well as the calculated flow values are presented in Table 1 and in the attached exhibit labeled "Forest Oak Drainage Area Map." The hydrology parameters were defined using the latest regional standards. These include rainfall amounts, runoff coefficients, and terrain data.
The rainfall values used for this study are taken from the San Antonio River Authority regional modeling standards. The drainage areas for each of the streets analyzed was determined at the calculation points shown in the attached Forest Oak Drainage Map using the LiDAR based contours

provided by the San Antonio River Authority on their website at https://www.sara-tx.org/public-services/geographic-information-systems/lidar-aerial-imagery/.
The Ratioinal Method was used to calculate flows for the streets analyzed due to their small drainage areas (<16 acres). The Rational Method is used to calculate flows for small drainage areas based on the size of the drainage area (A [acres]), the intensity of a rainfall event (I [in/hr]), and a land use coefficient (C) as shown below in Equation 1.

Equation 1: Rational Method equation for calculating peak flow from surface runoff

$$Q = CIA$$

Q = Peak flow [cfs]
C = Runoff coefficient
I = Rainfall intensity [in/hr]
A = Basin area [acres]

Times of concentration were determined for each streets' drainage area at the calculation point based on the methods outlined in Technical Release 55 (TR-55). These times of concentration were used to determine the rainfall intensity used in the Rational Method calculation based on Table 5.5.1.A of the City of San Antonio Storm Design Criterial Manual 2016 (CoSA SDC 2016).
The runoff coefficients for these drainage areas were determined using Table 5.5.3 A from the CoSA SDC 2016 along with the average slopes of the drainage areas. The results of the hydrologic analysis are presented below in Table 1 and in the attached exhibit labeled "Forest Oak Drainage Area Map."

Table 1: Calculation results of Rational Method hydrology

Basin	Tc [min]	C	A [acres]	Flows									
				5 Year		25 Year		50 Year		100 Year		500 year	
				I [in/hr]	Q [cfs]	I [in/hr]	Q [cfs]	I [in/hr]	Q [cfs]	I [in/hr]	Q [cfs]	I [in/hr]	Q [cfs]
FOREST BROOK DA-A	29.33	0.8	15.5	4.423	**55**	5.816	**72**	6.625	**82**	7.488	**93**	10.687	**133**
FOREST MILL DA-B	29.33	0.8	4.8	3.846	**15**	5.060	**19**	5.675	**22**	6.201	**24**	9.311	**36**
FOREST KNOLL DA-C	23.17	0.8	5.0	4.355	**17**	5.727	**23**	6.513	**26**	7.335	**29**	10.526	**42**

Hydraulic Analysis

A hydraulic analysis was performed to assess the hydraulic capacity of the streets Forest Brook, Forest Knoll, and Forest Mill as well as the existing side channel connecting drainage flows from Forest Brook to the main channel. Hydraulic calculations were performed through desktop analysis to establish street slopes and flow capacities to be considered in the preliminary design. These street capacities were calculated using Manning's Equation, shown as Equation 2 below.

Equation 2: Manning's Equation

$$Q = \frac{1.49}{n} A R^{\frac{2}{3}} \sqrt{S}$$

Q = Flow [cfs]
n = Manning's roughness coefficient
A = Area of flow [sqft]
R = Hydraulic radius of flow area [ft]
S = Average slope of flow path [ft/ft]

The input values for calculating existing street capacities using Manning's Equation were determined based on the average slope and current curb heights of the streets. Street capacities were also calculated for maximum conditions for each street. In this study, the current curb height was determined at locations on the streets with a greatly reduced potential to contain street runoff due to reduced curb heights. The "maximum condition" for a street assumes a curb height of 7 inches along the entire street. For all streets, a Manning's roughness coefficient of 0.018 was assumed based on Table 6.2.2.1 of the CoSA SDC 2016 and calculations for area and hydraulic radii assumed no crown on the road.

Street alignments and profiles are shown in the attached plan and profile sheets. Results of the hydraulic calculations for current and maximum conditions for street capacities are presented in Table 2 below and are also shown on the Forest Oak Drainage Area Map.

Table 2: Results of hydraulic calculations for current and max. condition street capacities

STREET	Avg. Slope [ft/ft]	Avg. Curb Height [in]	Current Cond. Cap. [cfs]	Max. Cond. Cap. [cfs]
FOREST BROOK	0.018	3.75	45	125
FOREST MILL	0.050	4	82	205
FOREST KNOLL	0.068	3.5	76	240

Another hydraulic analysis was performed using XPSWMM v. 2014 software to create a 2D model of the area. The model inputs included flow values from the hydrologic analysis, land use areas with pertaining roughness values, and topographic surface information. The results of the 2D model, when run with a simulated 1% chance (100 year) storm event show the direction of flow along the streets analyzed in Figure 1 below. Figure 1 suggests that without proper curb heights and raised driveways, the street runoff has a potential to flow into local properties rather than stay contained in the streets.

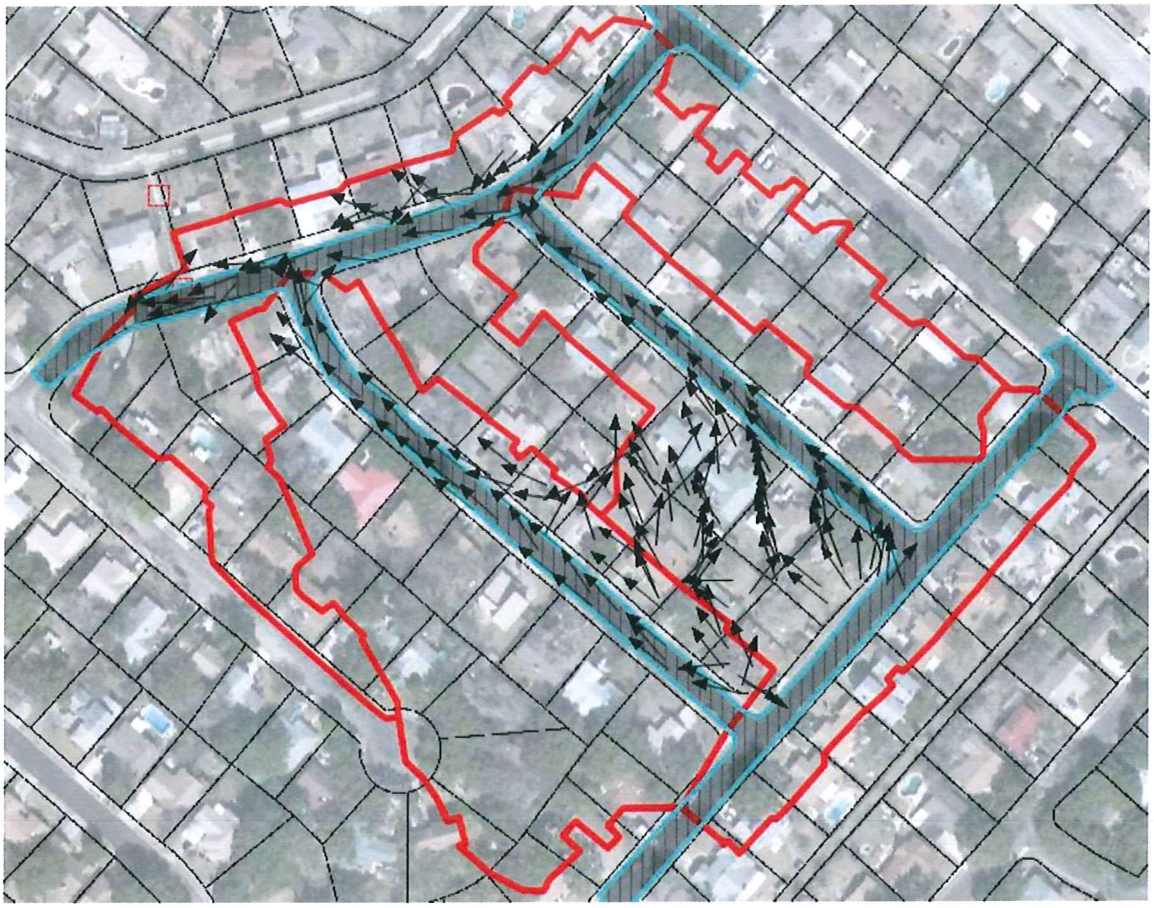


Figure 1: Flow directions from street runoff as represented in 2D model.

Preliminary Design

A preliminary design task was established to calculate the proposed street reconstruction required to improve drainage in the Forest Oak Subdivision. This design utilized the gathered data, hydrologic calculations, and hydraulic calculations. These calculation results show decreased street capacities for all streets analyzed when compared to a maximum capacity with a typical curb height of 7 inches. They also show that the current street capacity on Forest Brook is well below the expected flows for **ALL** storm events presented in this report.

A site visit also revealed other street conditions which may contribute to drainage problems on these streets. In some locations the asphalt was warped and/or cracked. Warped and uneven street surfaces can cause localized dips in the streets which may prevent water from being able to drain properly. Cracked asphalt may allow water to enter below the street and result in more warping and cracks. Broken curbs were found in some locations which may allow street runoff to enter private

properties. Some of the driveways on these streets were found to be very near the street level. In some cases, this may also lead to street runoff moving into private properties.

This preliminary design proposes a milling and repaving of the street asphalt to increase street capacity and remove the warping and cracking in the asphalt. A reconstruction of the curbs and driveways to repair broken curbs and raise driveways above street level is also proposed. It is expected that these improvements will reduce drainage problems on Forest Brook, Forest Mill, and Forest Knoll.

Feasibilty Report

A feasibility report was created to provide an opinion of probable construction cost (OPCC) for the preliminary design. This report utilized the street and curb dimensions from the preliminary design, and 2012 unit prices provided by the City of San Antonio. The OPCC prepared for the preliminary design includes costs which may be associated with the following improvements:

- Removal and reconstruction of curbs
- Removal and reconstruction of driveways to raise driveways above street level
- Milling and repaving of streets

The OPCC shows construction costs for each street individually but estimates other costs based on the total reconstruction cost of all three streets.

This OPCC is included with this submission along with the plan and profile sheets for the street centerlines and the Forest Oak Drainage Area Map.

Recommendation

The probable cost for these improvements, as shown in the attached OPCC, is approximately $280,000.

Please feel free to contact me at (210) 321-3418 or nefi.garza@kimley-horn.com, if additional information is required.

Sincerely,

KIMLEY-HORN AND ASSOCIATES, INC.

TBPE Firm No. 928

Nefi M. Garza, P.E.
Project Manager

ATTACHMENTS:

OPINION OF PROBABLE CONSTRUCTION COSTS (OPCC)
PLAN AND PROFILE SHEETS OF STREETS
FOREST OAK DRAINAGE AREA MAP

Kimley-Horn and Associates, Inc. **Opinion of Probable Construction Cost**

Client:	**City of Leon Valley**	**Date:**	**3/3/2016**
Project:	**Forest Oak Drainage Improvement Study**	**Prepared By:**	**DCW**

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
	Street Improvements				
	Forest Brook				
103.3.1	Remove Concrete Driveways (1,000 S.F. < X < 3,000 S.F.)	2,200	S.F.	1.7	$3,740
104.1	Street Excavation (< 1,000 C.Y.)	233	C.Y.	19.46	$4,541
205.1	Hot Mix Asphaltic Pavement, Type A (6" COMP. DEPTH)	2,800	S.Y.	20.45	$57,260
503.1.1	PORTLAND CEMENT CONCRETE DRIVEWAYS (100 S.Y. < X < 10,000 S.Y.)	2,200	S.Y.	57.36	$126,192
	Subtotal				**$65,541**
	Forest Mill				
103.3.1	Remove Concrete Driveways (1,000 S.F. < X < 3,000 S.F.)	2,800	S.F.	1.7	$4,760
104.1	Street Excavation (< 1,000 C.Y.)	169	C.Y.	19.46	$3,279
205.1	Hot Mix Asphaltic Pavement, Type A (6" COMP. DEPTH)	2,022	S.Y.	20.45	$41,354
503.1.1	PORTLAND CEMENT CONCRETE DRIVEWAYS (100 S.Y. < X < 10,000 S.Y.)	2,800	S.Y.	57.36	$160,608
	Subtotal				**$49,394**
	Forest Knoll				
103.3.2	Remove Concrete Driveways (3,000 S.F. < X < 10,000 S.F.)	3,800	S.F.	0	$0
104.1	Street Excavation (< 1,000 C.Y.)	207	C.Y.	19.46	$4,036
205.1	Hot Mix Asphaltic Pavement, Type A (6" COMP. DEPTH)	2,489	S.Y.	20.45	$50,898
503.1.1	PORTLAND CEMENT CONCRETE DRIVEWAYS (100 S.Y. < X < 10,000 S.Y.)	3,800	S.Y.	57.36	$217,968
	Subtotal				**$54,934**
	Total Construction Costs				**$169,868**
	Other Costs				
100.1	MOBILIZATION	1	L.S.	11%	$18,685.52
100.2	INSURANCE & BOND	1	L.S.	3%	$5,096.05
	STORM POLLUTION CONTROL	1	L.S.	5.0%	$8,493
	ENGINEER FEE	1	L.S.	15.0%	$25,480
	ENGINEER CONTINGENCY	1	L.S.	2.0%	$3,397
	MANAGEMENT COSTS	1	L.S.	10.0%	$16,987
	MATERIAL TESTING	1	L.S.	2.0%	$3,397
	Subtotal				**$81,537**

Basis for Cost Projection:

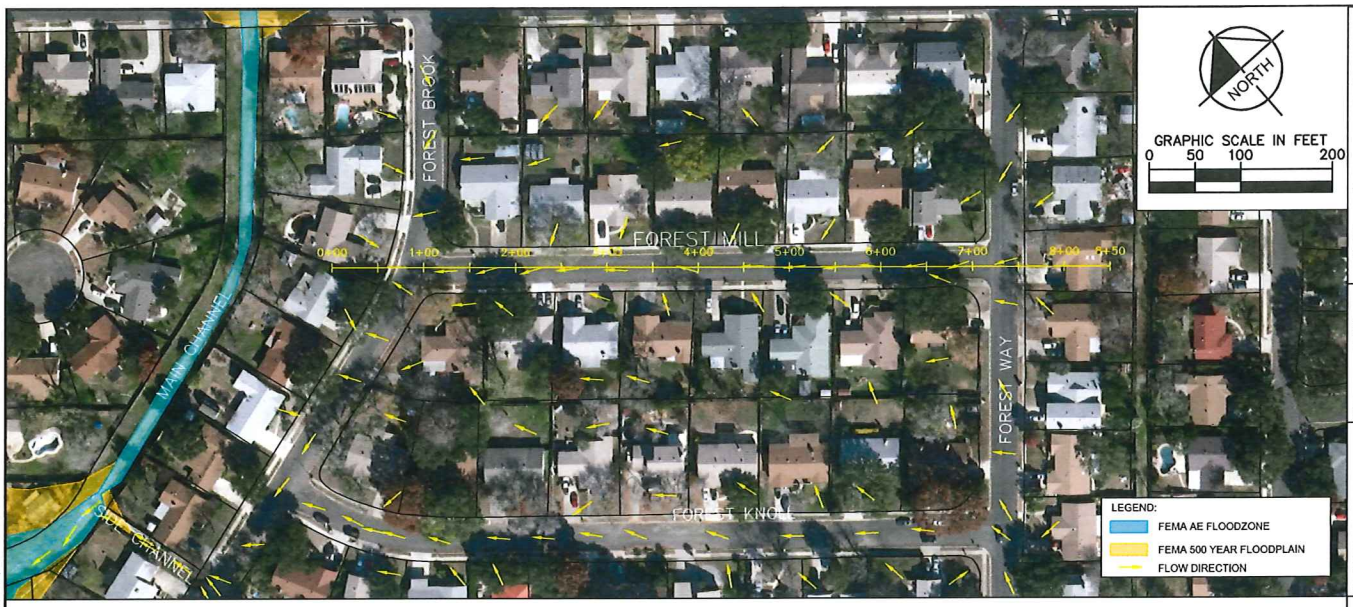
- ☐ No Design Completed
- ☑ Preliminary Design
- ☐ Final Design

Subtotal:		$251,405
Conting. (%,+/-)	10%	$25,140.52
Total:		**$276,546**

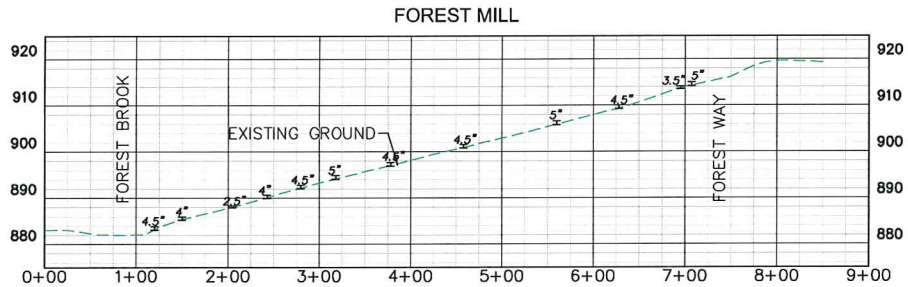
Notes:

1. *Above OPCC includes construction, engineering and surveying costs for street, drainage and utility improvements only. This estimate does not include other development costs such as, but not limited to community center features, landscaping, fencing, marketing, impact fees, Drainage Impact fees, etc...*
2. *Quantities used in this OPC are preliminary and are NOT based on engineering design or construction plans. Final quantities may vary.*
3. *Unit prices used in this OPC were taken from the City of San Antonio Unit price guide from September 2012; however, actual bid unit prices may vary significantly.*
4. *Above OPCC is based upon landplan as prepared by others.*

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.



SCALE: 1"=100' H.
1"=10' V.



Kimley»Horn
801 NW LOOP 410, SUITE 350, SAN ANTONIO, TEXAS 78216
PHONE: 210-541-9166 FAX: 210-541-8699
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TBPE Firm No. 928

Date:	3/10/2016
Project No.:	069990006
Drawn By:	DCW
Checked By:	NMG

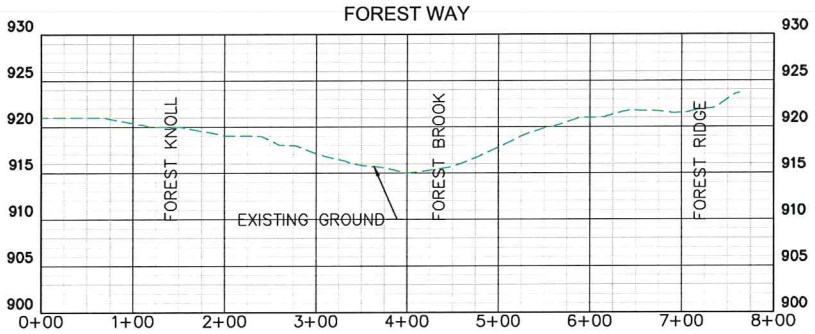
SOURCE:
AERIAL: CastleHills.sid
TOPO: NAD 1983 StatePlane
Texas S Central FIPS 4204
(Flown in 2010)

FOREST OAK DRAINAGE STUDY
STREET PROFILES
FOREST MILL

SHEET
1

THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY KIMLEY-HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC.

SCALE: 1"=100' H.
1"=5' V.



LEGEND:
EXISTING GROUND

Kimley»Horn
601 NW LOOP 410, SUITE 350, SAN ANTONIO, TEXAS 78216
PHONE: 210-541-9166 FAX: 210-545-1183
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TBPE Firm No. 928

Date:	3/10/2016
Project No.:	068600006
Drawn By:	DCW
Checked By:	NMG

SOURCE:
AERIAL: CastleHills.sid
TOPO: NAD 1983 StatePlane
Texas S Central FIPS 4204
(Flown in 2010)

FOREST OAK DRAINAGE STUDY
STREET PROFILES
FOREST WAY

SHEET
2

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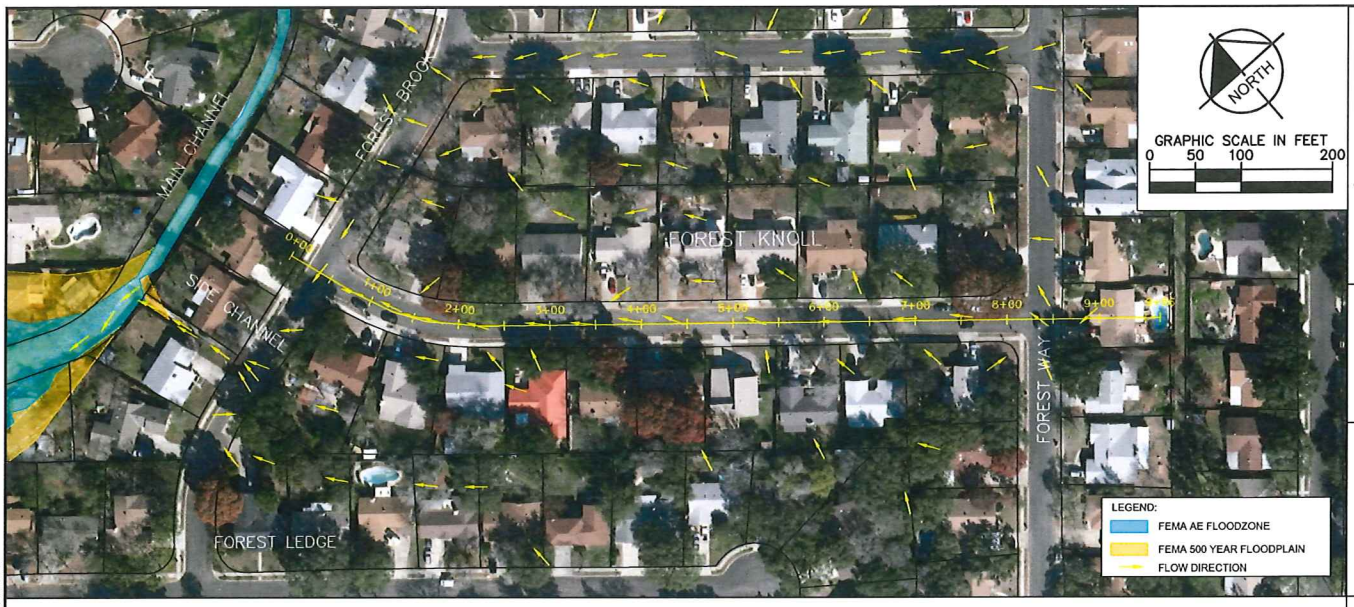
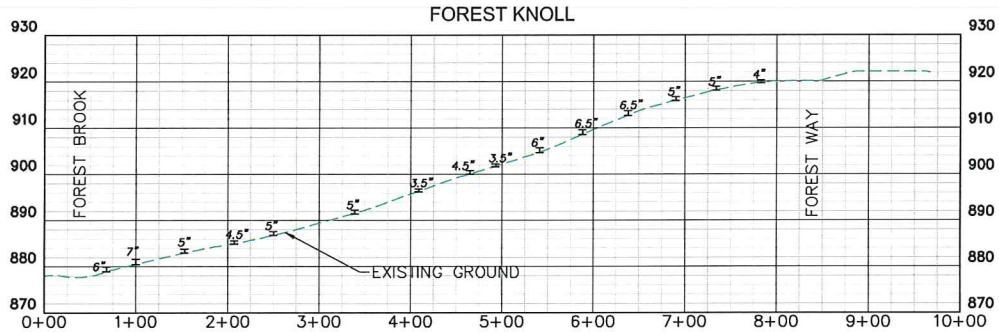


SCALE: 1"=100' H.
1"=10' V.



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Date:	3/10/2016
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FOREST OAK DRAINAGE STUDY
STREET PROFILES
FOREST KNOLL

SHEET
3

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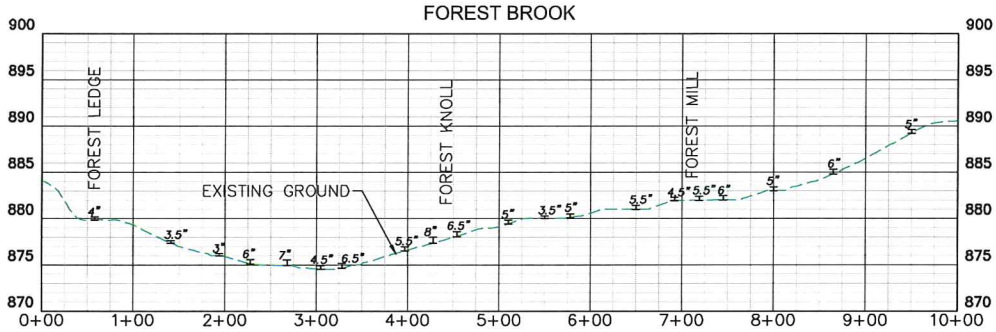

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Date:	3/10/2016
Project No.:	068990008
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SOURCE:
AERIAL: CastleHills.sid
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FOREST OAK DRAINAGE STUDY
STREET PROFILES
FOREST BROOK

SHEET
4

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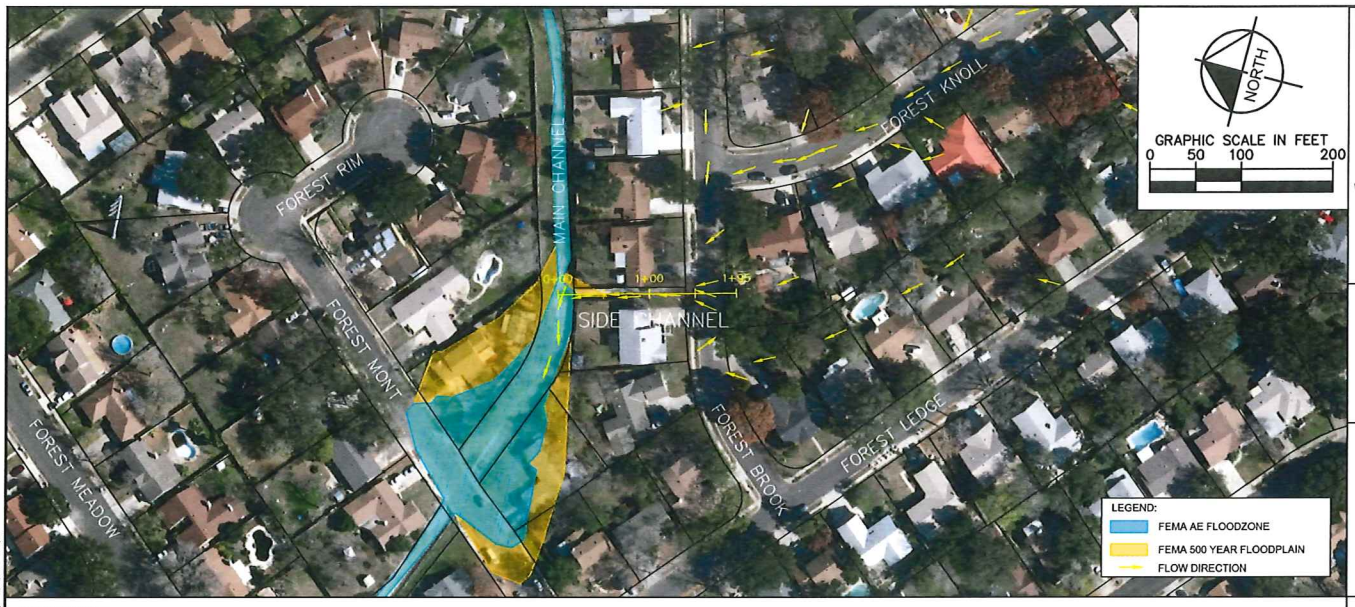
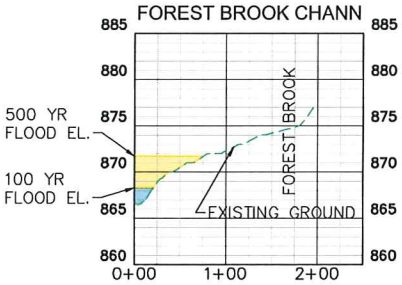
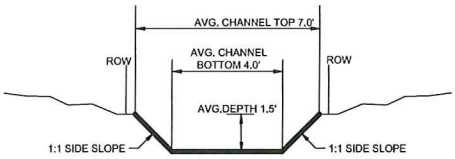


SCALE: 1"=100' H.
1"=5' V.



LEGEND:
EXISTING GROUND



APX. CHANNEL CAPACITY: 136 cfs
BASED ON AVG. SLOPE OF 0.04 [ft/ft]

TYPICAL CHANNEL SECTION
N.T.S.

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FOREST OAK DRAINAGE STUDY
CHANNEL PROFILES
FOREST BROOK CHANNEL

SHEET
5

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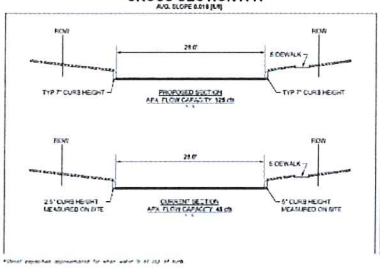
FOREST BROOK
CROSS SECTION A-A

AVG. SLOPE 0.010 [ft/ft]

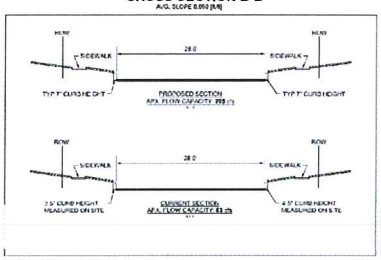


SLOPE 10.5 [ft/ft]	Q [cfs]
5 Year	55
25 Year	77
50 Year	82
100 Year	93
500 Year	119

*Street projection approximated for when water is at top of curb.

FOREST MILL
CROSS SECTION B-B

AVG. SLOPE 0.010 [ft/ft]

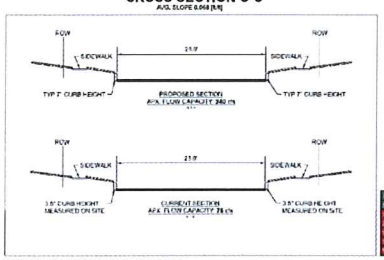


SLOPE 10.5 [ft/ft]	Q [cfs]
5 Year	27
25 Year	36
50 Year	38
100 Year	39
500 Year	42

*Street projection approximated for when water is at top of curb.

FOREST KNOLL
CROSS SECTION C-C

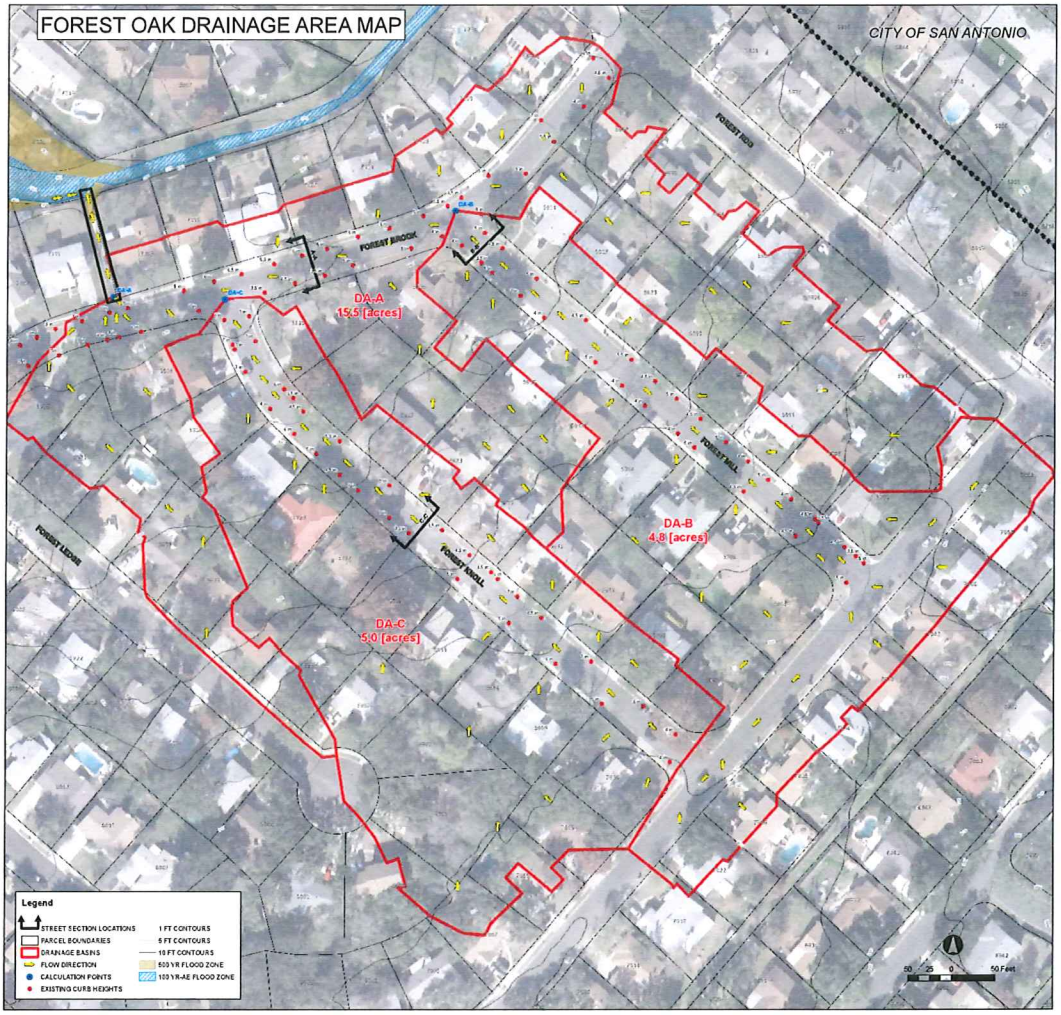
AVG. SLOPE 0.010 [ft/ft]



SLOPE 10.5 [ft/ft]	Q [cfs]
5 Year	26
25 Year	35
50 Year	37
100 Year	38
500 Year	38

*Street projection approximated for when water is at top of curb.

FOREST OAK DRAINAGE AREA MAP



Document Path: K:\SAA_Hydro\065800000\Forest Oak Drainage\100Year\Forest Oak Drainage Area Map.mxd

Kimley»Horn

April 26, 2016

City of Leon Valley
Melinda Moritz
Director of Public Works
6400 El Verde Rd.
Leon Valley, TX 78238

RE: ***Seneca West Drainage Improvements Feasibility Study***

Dear Ms. Moritz,

This letter describes the methods and the results of a feasibility study for proposed drainage infrastructure improvements for Drain 1 leading to Huebner Creek in the Seneca West neighborhood in Leon Valley, TX. Drain 1, as shown in the current effective FEMA FIRM panel (Map No. 48029C0380G), runs generally in a North West direction toward Huebner Creek between Samaritan Drive and William Rancher Road and crosses Grass Hill Drive and Aids Drive, see attached Firmette. The purpose of this study is to present limited design improvement options with associated probable costs to remove habitable structures from the 100 year floodplain of Drain 1.

The analysis for this study was separated into several tasks:

- Data Gathering
- Hydrologic Analysis
- Hydraulic Analysis
- Preliminary Design
- Feasibility Report

The results of this analysis provide three options for drainage improvements.

Option 1	Install underground drainage infrastructure extending from Huebner Creek to the Drain 1 Creek upstream of Aids Drive
Option 2	Improve channelization of Drain 1 as a trapezoidal grass-lined channel from a point upstream of Aids Drive to Huebner Creek with box culverts beneath Aids Drive
Option 3	Improve channelization of Drain 1 as a trapezoidal grass-lined channel from a point just downstream of Grass Hill Drive to Huebner Creek with box culverts beneath Aids Drive

Data Gathering

The data gathering task required collecting GIS and construction plan data for desk-top analysis. The data needed included topographic LiDAR contours, parcel information, existing storm water structures, land use categories based on aerial photography, street centerline and right of way data. On-site measurements of drainage structures were also taken. This data was used in the hydrologic and hydraulic analyses as well as the preliminary design.

The topographic data in the form of 1 foot contour shapefiles was downloaded from the San Antonio River Authority website at https://www.sara-tx.org/public-services/geographic-information-systems/lidar-aerial-imagery/.

The rainfall values used for this study are taken from the San Antonio River Authority regional modeling standards for the 5, 25, 50, 100, and 500 year storm frequencies.

The area draining to Huebner Creek through Drain 1 includes two detention ponds. Pond 1 sits between Grass Hill Drive and the homes on Caraway Bend. Pond 2 is just upstream of Pond 1 located behind the San Antonio Aquarium. Rating curves for Pond 2 were based on construction plans provided by City of Leon Valley Public Works Department. The rating curves for Pond 1 were based on contour data and field measurements of existing outlet structures.

Hydrologic Analysis

A hydrologic analysis was performed to calculate runoff amounts through Drain 1 using the Hydrologic Engineering Center Hydrologic Modeling System (HEC-HMS) software version 3.5 distributed by the U.S. Army Corps of Engineers. The model created with this software used the SCS Curve Number Method to calculate losses and the SCS Unit Hydrograph method to calculate transformations. Inputs for this model were established using existing topographic data to delineate basin areas and lag times. In the hydrologic model Pond 2 was divided into two ponds (Pond 2.1 and Pond 2.2) because it has an intermediate weir.

The input values for the basins of the HEC-HMS model are shown in Table 1. The locations of the ponds and drainage basins are shown in the attached Exhibit 1 and in Figure 1.

Table 1: Input values for HEC-HMS model

BASIN	AREA [sqmi]	CN	IMP. COVER [%]	LAG TIME [min]
A0	0.0008	74.0	1.0	9.4
A1	0.0073	73.7	13.1	16.6
A2	0.0009	74.2	16.6	9.2
A3	0.0240	78.6	25.1	11.5
A4	0.0022	76.5	6.4	9.4
A5	0.0088	79.1	26.2	14.6
A6	0.0345	79.7	78.2	13.5
B1	0.0149	72.6	8.0	18.2
C1	0.0004	80.0	31.4	7.7
C2	0.0321	80.0	51.0	12.2
D1	0.0011	74.2	21.4	12.5
D2	0.0150	76.6	52.1	10.8
E1	0.0019	79.3	29.6	5.1

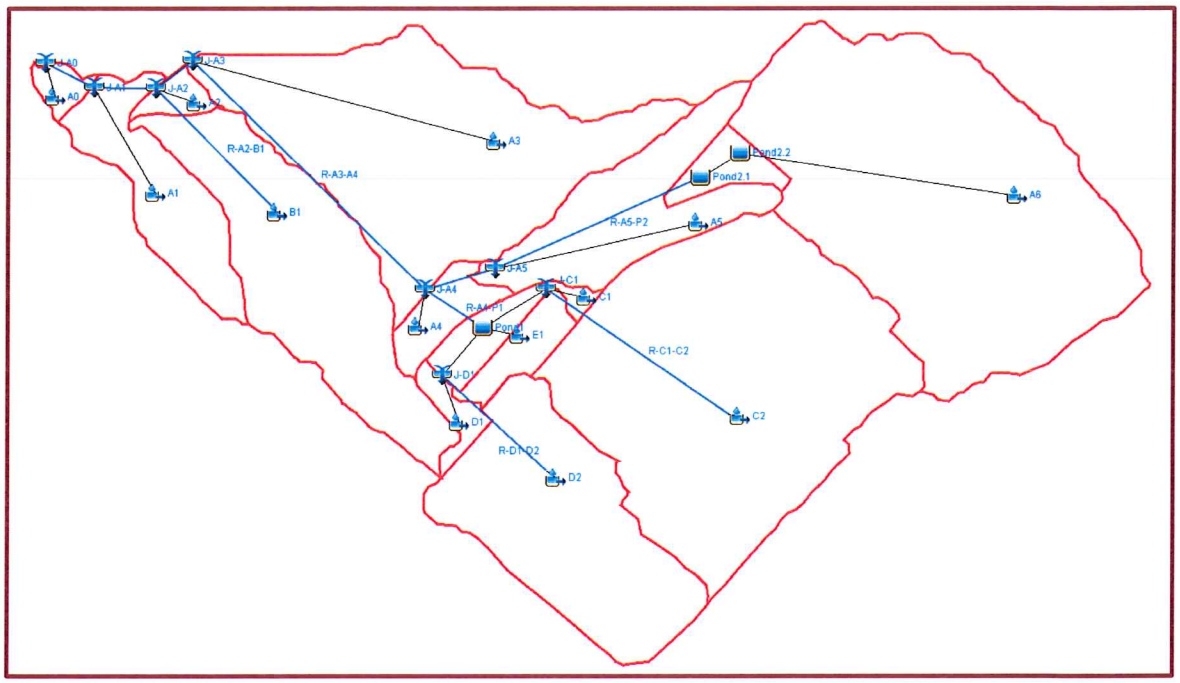


Figure 1: Basin model diagram from HEC-HMS

Hydraulic Analysis

The effective FEMA floodplain, as shown on the attached Firmette and in Exhibit 2, is a detailed study with a base flood elevations and a floodway. Typically, with detailed studies like this, a copy of the hydraulics model used to delineate the floodplain is available for review purposes. In the case of Drain 1, there was no available model to download online from the local FEMA representative, the San Antonio River Authority (SARA). A request was made to SARA via email for a copy of the Drain 1 model. We were informed that the model had been lost and would need to be recreated.

A new hydraulic model was created for Drain 1 using recent topographic data and field measurements of existing structures. This hydraulic analysis was created using the Hydrologic Engineering Center River Analysis System (HEC-RAS) software version 4.1.0 distributed by the U.S. Army Corps of Engineers. Floodplain boundaries and water surface elevations (WSE) were based on the 100 year storm flow results of the hydrologic analysis for the existing conditions. The resulting floodplain is shown in the attached Exhibit 3. For comparison, please refer to Exhibit 2 showing the effective FEMA floodplain. The 100 year floodplain delineated by this study, shown in Exhibit 3, is wider than the effective FEMA floodplain shown in Exhibit 2. Additionally, some structures previously in the 100 year floodplain are now shown to be just outside of the newly delineated floodplain. Please note that in order to update the FEMA floodplain a Letter of Map Revision will need to be submitted to FEMA.

Preliminary Design

A preliminary design task was established to propose different options to alleviate flooding on properties affected by Drain 1. For each proposed improvement option the hydraulic model was revised to re-map the floodplain based on the anticipated changes. These floodplain delineations for improvement options 1, 2, and 3 are shown in Exhibits 4, 5, and 6, respectively.

Option 1, shown in Exhibit 4, proposes an underground drainage network of four 48 inch diameter reinforced concrete pipes extending from Drain 1 upstream of Aids Drive to Huebner Creek. The underground drainage is intended to alleviate flooding from Drain 1 on the downstream side of Aids Drive by removing the flow expected in a 100 year storm event. Grading improvements are also proposed to direct flow toward the proposed drainage inlet on the upstream end.

Option 2, shown in Exhibit 5, proposes grading and channel reconstruction improvements upstream and downstream of Aids Drive with four 4'x4' box culverts beneath Aids Drive. The channel upstream of Aids Drive is intended to allow water to pass through the box culverts without overtopping Aids Drive during a 100 year storm event. It is not intended to alleviate flooding upstream of Aids Drive. Both channels are proposed as 4 foot deep grass-lined trapezoidal channels with 3:1 side slopes and a 10 foot bottom width.

Option 3, shown in Exhibit 6, proposes grading and channel reconstruction improvements from the downstream side of Grass Hill Drive to Huebner Creek with four 4'x4' box culverts beneath Aids Drive. This option is an extension of Option 2 with additional channel length extending to Grass Hill Drive to alleviate more of the potential flooding upstream of Aids Drive. The additional channel length

is also proposed as a 4 foot deep grass-lined trapezoidal channel with 3:1 side slopes but with a 14 foot bottom width.

Feasibility Report

A feasibility report was created to provide an opinion of probable construction cost (OPCC) for the proposed preliminary designs. The preliminary designs were used to estimate construction quantities. The 2012 unit prices provided by the City of San Antonio were used to estimate costs based on the estimated quantities. The OPCC prepared for the preliminary design includes costs which may be associated with the following improvements:

- Street improvements on Aids Drive due to excavation or reconstruction
- Excavation of channels or underground drainage networks.
- Proposed drainage structures
- Purchases of easements or rights of way
- Other potential construction costs

A total of three OPCCs were prepared, one for each preliminary design. These are included with this submission along with Exhibits 1-6. A brief summary of the preliminary design costs shown in the OPCCs is provided in Table 2.

Table 2: Summary of design option costs from OPCC

Preliminary Design Option	Approximate Cost	Description
Option 1	$1,283,000	625 feet of 4-48" RCP Installation of drop inlets at upstream of pipes Construction of headwall at downstream of pipes Excavation for installation Repairs on Aids Drive post installation Purchase of drainage easement
Option 2	$770,000	700 feet of channel excavation New 4-4'x4' box culverts under Aids drive Reconstruction of Aids drive over culverts Construction of headwall at downstream of channel Purchase of drainage easement
Option 3	$1,346,000	1,600 feet of channel excavation New 4-4'x4' box culverts under Aids drive Reconstruction of Aids drive over culverts Construction of headwall at downstream of channel Purchase of drainage easement

Conclusion

This study presents three options for drainage improvements on Drain 1 to remove habitable structures from the 100 year floodplain. Aside from reconstruction improvements to Drain 1, two other options exist for removing habitable structures from this floodplain.

This study shows that the existing conditions floodplain of Huebner Creek and Drain 1, shown in Exhibit 3, would not be expected to flood any known habitable structures in the area of study. A Letter of Map Revision (LOMR) submitted to FEMA may suffice in removing habitable structures from the floodplain without changes to Drain 1. The associated costs for a LOMR would be in completing a study based on updated or more detailed data as well as preparing and submitting the LOMR report.

Below is a list of these 3 options with probable associated costs.

1. Improvement Option 1: $1,283,000
2. Improvement Option 2: $770,000
3. Improvement Option 3: $1,346,000

Please feel free to contact me at (210) 321-3418 or nefi.garza@kimley-horn.com, if additional information is required.

Sincerely,

KIMLEY-HORN AND ASSOCIATES, INC.

TBPE Firm No. 928

Nefi M. Garza, P.E.
Project Manager

ATTACHMENTS:

OPINION OF PROBABLE CONSTRUCTION COSTS (OPCC)
FIRMETTE
EXHIBIT 1 – SENECA WEST HYDROLOGY MAP
EXHIBIT 2 – SENECA WEST EFFECTIVE FEMA FLOODPLAIN MAP
EXHIBIT 3 – SENECA WEST EXISTING HYDRAULICS MAP
EXHIBIT 4 – SENECA WEST PROPOSED OPTION 1 HYDRAULICS MAP
EXHIBIT 5 – SENECA WEST PROPOSED OPTION 2 HYDRAULICS MAP
EXHIBIT 6 – SENECA WEST PROPOSED OPTION 3 HYDRAULICS MAP

Kimley-Horn and Associates, Inc. **Opinion of Probable Construction Cost**

Client:	**City of Leon Valley**	**Date:**	**4/25/2016**
Project:	**Seneca West Drainage Study - Option 1 (Pipe Drainage)**	**Prepared By:**	**DCW**

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
	Street Improvements				
104.1	Street Excavation (< 1,000 C.Y.)	30	C.Y.	$ 19.46	$577
202.1	Prime Coat (0.20 GALLONS PER SQUARE YARD)	18	GAL.	$ 3.78	$67
203.1	Tack Coat (0.10 GALLONS PER SQUARE YARD)	9	GAL.	$ 5.78	$51
205.1	Hot Mix Asphaltic Pavement, Type A (6" COMP. DEPTH)	89	S.Y.	$ 20.45	$1,818
206.1	Asphalt Treated Base (4" Thick)	89	S.Y.	$ 20.26	$1,801
108.1	Lime Treated SubGrade (6" COMPACTED DEPTH)	89	S.Y.	$ 4.88	$434
208.1	SALVAGING, HAULING & STOCKPILING RECLAIMABLE ASPHALTIC PAVEMENT (1.5" DEPTH)	89	S.Y.	$ 6.50	$578
	Subtotal				**$5,325**
	Excavations				
105.1.2	Channel Excavation (5,000 C.Y.< X < 70,000 C.Y.)	9,556	C.Y.	$ 12.29	$117,438
	Subtotal				**$117,438**
	Structures				
307.1.8	Concrete Structure (Headwalls or Outfall Structures)	8	C.Y.	$ 735.05	$5,880
401.1.15	Reinforced Concrete Pipe (Class III)(48" DIA)	2,500	L.F.	$ 226.24	$565,600
403.14	Special Inlet (2-Way) (8'x8'x6')	2	EA	$ 7,722.25	$15,444
109.1	Cement Treated SubGrade (6" INCHES COMP. DEPTH)	463	S.Y.	$ 8.24	$3,815
505.2.1	Concrete Rip-Rap (5" THICK) (100 < X < 4000 S.Y.)	138	S.Y.	$ 48.51	$6,684
	Subtotal				**$597,423**
	ROW / Easement Purchases				
	5985 Aids Dr Lot 621	7,951	S.F	$ 0.21	$1,632
	Aids Dr Lot 23	4,019	S.F	$ 1.37	$5,503
	Subtotal				**$7,135**
	Total Construction Costs				**$720,186**
	Other Costs				
100.1	MOBILIZATION	1	L.S.	11%	$79,221
100.2	INSURANCE & BOND	1	L.S.	3%	$21,606
101.1	PREPARING RIGHT OF WAY	1	L.S.	4%	$28,807
	STORM POLLUTION CONTROL	1	L.S.	5.0%	$36,009
	ENGINEER FEE	1	L.S.	15.0%	$108,028
	ENGINEER CONTINGENCY	1	L.S.	2.0%	$14,404
	MANAGEMENT COSTS	1	L.S.	10.0%	$72,019
	MATERIAL TESTING	1	L.S.	2.0%	$14,404
	TREE REMOVAL	2	L.S.	10.0%	$72,019
	Subtotal				**$446,516**

Basis for Cost Projection:

- ☐ No Design Completed
- ☑ Preliminary Design
- ☐ Final Design

Subtotal:		$1,166,702
Conting. (%,+/-)	10%	$116,670.21
Total:		**$1,283,372**

Notes:

1. Above OPCC includes construction, engineering and surveying costs for street, drainage and utility improvements only. This estimate does not include other development costs such as, but not limited to community center features, landscaping, fencing, marketing, impact fees, Drainage Impact fees, etc...
2. Quantities used in this OPC are preliminary and are NOT based on engineering design or construction plans. Final quantities may vary.

3. Unit prices used in this OPC were taken from the City of San Antonio Unit price guide from September 2012; however, actual bid unit prices may vary significantly.

4. Above OPCC is based upon landplan as prepared by others.

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

Kimley-Horn and Associates, Inc. **Opinion of Probable Construction Cost**

Client:	**City of Leon Valley**	**Date:**	**4/25/2016**
Project:	**Seneca West Drainage Study - Option 2 (Short Channel Drainage)**	**Prepared By:**	**DCW**

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
	Street Improvements				
104.1	Street Excavation (< 1,000 C.Y.)	148	C.Y.	19.46	$2,883
202.1	Prime Coat (0.20 GALLONS PER SQUARE YARD)	89	GAL.	3.78	$336
203.1	Tack Coat (0.10 GALLONS PER SQUARE YARD)	44	GAL.	5.78	$257
205.1	Hot Mix Asphaltic Pavement, Type A (6" COMP. DEPTH)	444	S.Y.	20.45	$9,089
206.1	Asphalt Treated Base (4" Thick)	444	S.Y.	20.26	$9,004
108.1	Lime Treated SubGrade (6" COMPACTED DEPTH)	444	S.Y.	4.88	$2,169
208.1	SALVAGING, HAULING & STOCKPILING RECLAIMABLE ASPHALTIC PAVEMENT (1.5" DEPTH)	444	S.Y.	6.5	$2,889
	Subtotal				**$26,627**
	Channel Improvements				
515.1.1	Top Soil (> 500 C.Y.)	4,562	C.Y.	21.51	$98,133
516.1.1	Bermuda Sodding (> 2,000 S.Y.)	54,746	S.Y.	4.21	$230,482
105.1.2	Channel Excavation (5,000 C.Y.< X < 70,000 C.Y.)	3,526	C.Y.	12.29	$43,334
	Subtotal				**$371,948**
	Structures				
307.1.8	Concrete Structure (Headwalls or Outfall Structures)	7	C.Y.	735.05	$5,145
309.1.3	Precast Reinforced Concrete Box Culvert (4' x 4')	80	L.F.	212.35	$16,988
410.2.1	GRAVEL SUBGRADE FILLER (100 CY< X < 1,000 C.Y.)	59	C.Y.	30	$1,778
505.2.1	Concrete Rip-Rap (5" THICK) (100 < X < 4000 S.Y.)	138	S.Y.	48.51	$6,684
509.1	METAL BEAM GUARD RAIL (< 200 L.F.)	60	L.F.	49.37	$2,962
	Subtotal				**$33,557**
	ROW / Easement Purchases				
	5985 Aids Dr Lot 621	15,470	S.F	$ 0.21	$3,175
	5985 Aids Dr Lot 57	2,732	S.F	$ 1.26	$3,430
	Aids Dr Lot 23	14,559	S.F	$ 1.37	$19,936
	William Rancher Rd Lot 106	365	S.F	$ 1.27	$465
	Subtotal				**$27,006**
	Total Construction Costs				**$432,132**
	Other Costs				
100.1	MOBILIZATION	1	L.S.	11%	$47,534
100.2	INSURANCE & BOND	1	L.S.	3%	$12,964
101.1	PREPARING RIGHT OF WAY	1	L.S.	4%	$17,285
	STORM POLLUTION CONTROL	1	L.S.	5.0%	$21,607
	ENGINEER FEE	1	L.S.	15.0%	$64,820
	ENGINEER CONTINGENCY	1	L.S.	2.0%	$8,643
	MANAGEMENT COSTS	1	L.S.	10.0%	$43,213
	MATERIAL TESTING	1	L.S.	2.0%	$8,643
	TREE REMOVAL	1	L.S.	10.0%	$43,213
	Subtotal				**$267,922**

Basis for Cost Projection:

- ☐ No Design Completed
- ☑ Preliminary Design
- ☐ Final Design

Subtotal:		$700,053
Conting. (%,+/-)	10%	$70,005.33
Total:		**$770,059**

Notes:

1. *Above OPCC includes construction, engineering and surveying costs for street, drainage and utility improvements only. This estimate does not include other development costs such as, but not limited to community center features, landscaping, fencing, marketing, impact fees, Drainage Impact fees, etc...*
2. *Quantities used in this OPC are preliminary and are NOT based on engineering design or construction plans. Final quantities may vary.*
3. *Unit prices used in this OPC were taken from the City of San Antonio Unit price guide from September 2012; however, actual bid unit prices may vary significantly.*
4. *Above OPCC is based upon landplan as prepared by others.*

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

Kimley-Horn and Associates, Inc. **Opinion of Probable Construction Cost**

Client:	**City of Leon Valley**	**Date:**	**4/25/2016**
Project:	**Seneca West Drainage Study - Option 3 (Long Channel Drainage)**	**Prepared By:**	**DCW**

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
	Street Improvements				
104.1	Street Excavation (< 1,000 C.Y.)	148	C.Y.	19.46	$2,883
202.1	Prime Coat (0.20 GALLONS PER SQUARE YARD)	89	GAL.	3.78	$336
203.1	Tack Coat (0.10 GALLONS PER SQUARE YARD)	44	GAL.	5.78	$257
205.1	Hot Mix Asphaltic Pavement, Type A (6" COMP. DEPTH)	444	S.Y.	20.45	$9,089
206.1	Asphalt Treated Base (4" Thick)	444	S.Y.	20.26	$9,004
108.1	Lime Treated SubGrade (6" COMPACTED DEPTH)	444	S.Y.	4.88	$2,169
208.1	SALVAGING, HAULING & STOCKPILING RECLAIMABLE ASPHALTIC PAVEMENT (1.5" DEPTH)	444	S.Y.	6.5	$2,889
	Subtotal				**$26,627**
	Channel Improvements				
515.1.1	Top Soil (> 500 C.Y.)	6,555	C.Y.	21.51	$140,989
516.1.1	Bermuda Sodding (> 2,000 S.Y.)	78,655	S.Y.	4.21	$331,137
105.1.2	Channel Excavation (5,000 C.Y.< X < 70,000 C.Y.)	8,770	C.Y.	12.29	$107,788
	Subtotal				**$579,914**
	Structures				
307.1.8	Concrete Structure (Headwalls or Outfall Structures)	7	C.Y.	735.05	$5,145
309.1.3	Precast Reinforced Concrete Box Culvert (4' x 4')	48	L.F.	212.35	$10,193
410.2.1	GRAVEL SUBGRADE FILLER (100 CY< X < 1,000 C.Y.)	59	C.Y.	30	$1,778
505.2.1	Concrete Rip-Rap (5" THICK) (100 < X < 4000 S.Y.)	138	S.Y.	48.51	$6,684
509.1	METAL BEAM GUARD RAIL (< 200 L.F.)	60	L.F.	49.37	$2,962
	Subtotal				**$26,762**
	ROW / Easement Purchases				
	Aids Dr Lot 23	24,482	S.F	$ 1.37	$33,523
	William Rancher Rd Lot 106	4,816	S.F	$ 1.27	$6,134
	William Rancher Rd Lot 105	1,646	S.F	$ 1.41	$2,325
	William Rancher Rd Lot 104	1,762	S.F	$ 1.41	$2,490
	6410 William Rancher Rd Lot 102	4,167	S.F	$ 1.38	$5,751
	Samaritan Dr Lot 108	6,829	S.F	$ 1.51	$10,343
	Samaritan Dr Lot 107	3,299	S.F	$ 1.49	$4,908
	William Rancher Rd Lot 3	4,542	S.F	$ 7.35	$33,375
	Samaritan Dr Lot 18	3,267	S.F	$ 1.45	$4,724
	Grass Hill Dr Lot 212	3,004	S.F	$ 1.49	$4,467
	6402 William Rancher Rd Lot 211	4,587	S.F	$ 1.55	$7,130
	5985 Aids Dr Lot 621	15,470	S.F	$ 0.21	$3,175
	5985 Aids Dr Lot 57	2,732	S.F	$ 1.26	$3,430
	Subtotal				**$121,776**
	Total Construction Costs				**$755,078**
	Other Costs				
100.1	MOBILIZATION	1	L.S.	11%	$83,059
100.2	INSURANCE & BOND	1	L.S.	3%	$22,652
101.1	PREPARING RIGHT OF WAY	1	L.S.	4%	$30,203
	STORM POLLUTION CONTROL	1	L.S.	5.0%	$37,754
	ENGINEER FEE	1	L.S.	15.0%	$113,262
	ENGINEER CONTINGENCY	1	L.S.	2.0%	$15,102
	MANAGEMENT COSTS	1	L.S.	10.0%	$75,508
	MATERIAL TESTING	1	L.S.	2.0%	$15,102
	TREE REMOVAL	1	L.S.	10.0%	$75,508
	Subtotal				**$468,148**

Basis for Cost Projection:

- ☐ No Design Completed
- ☑ Preliminary Design
- ☐ Final Design

Subtotal:		$1,223,227
Conting. (%,+/-)	10%	$122,323
Total:		**$1,345,549**

Notes:

1. Above OPCC includes construction, engineering and surveying costs for street, drainage and utility improvements only. This estimate does not include other development costs such as, but not limited to community center features, landscaping, fencing, marketing, impact fees, Drainage Impact fees, etc...
2. Quantities used in this OPC are preliminary and are NOT based on engineering design or construction plans. Final quantities may vary.

3. Unit prices used in this OPC were taken from the City of San Antonio Unit price guide from September 2012; however, actual bid unit prices may vary significantly.

4. Above OPCC is based upon landplan as prepared by others.

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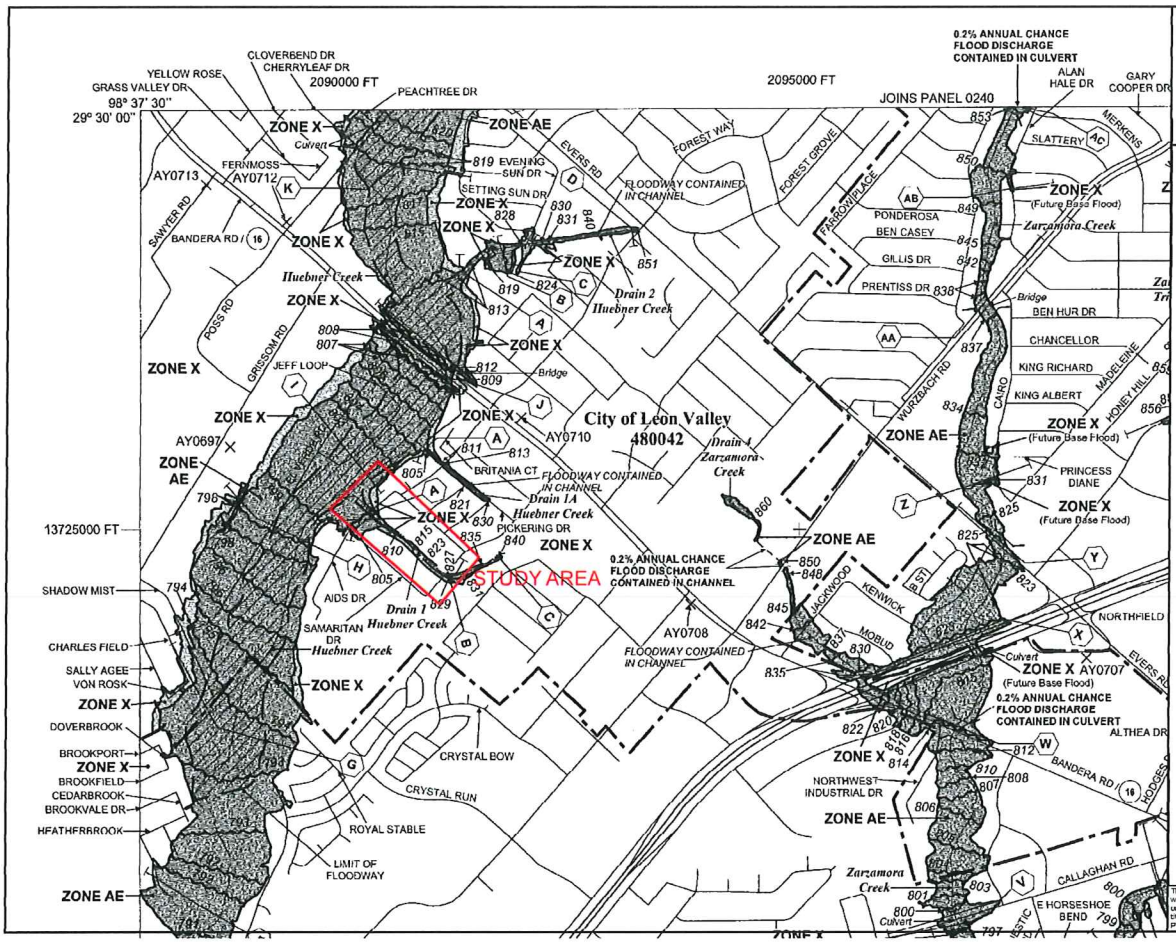

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

NFIP

PANEL 0380G

FIRM

FLOOD INSURANCE RATE MAP

BEXAR COUNTY, TEXAS

AND INCORPORATED AREAS

PANEL 380 OF 785

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
LEON VALLEY, CITY OF	480042	0380	G
SAN ANTONIO, CITY OF	480045	0380	G

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
48029C0380G

MAP REVISED
SEPTEMBER 29, 2010

Federal Emergency Management Agency

Kimley»Horn

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

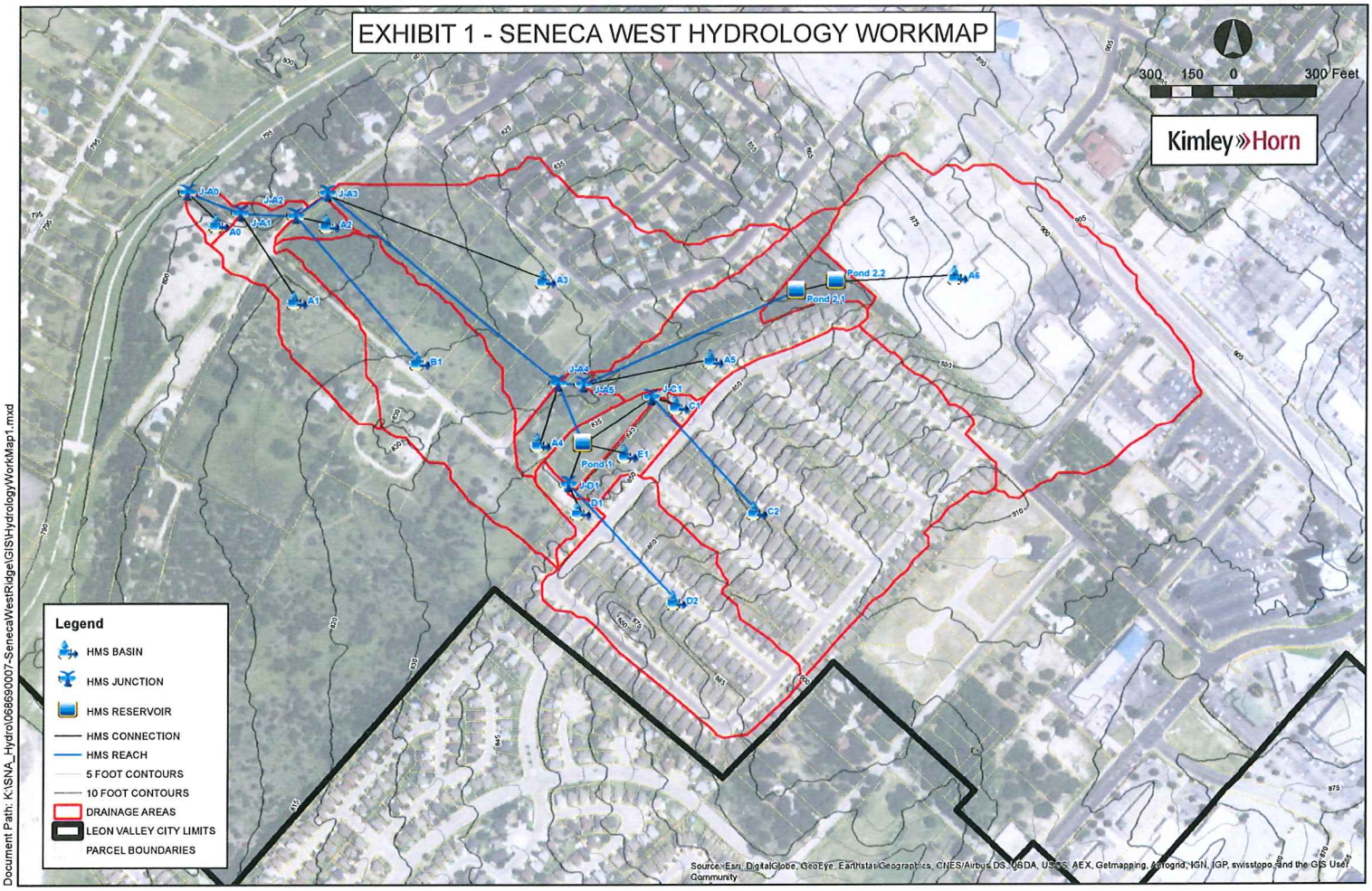
EXHIBIT 1 - SENECA WEST HYDROLOGY WORKMAP
300 150 0 300 Feet
Kimley»Horn
J-A0
J-A2
J-A3
J-A1
A0
A2
A1
A3
B1
Pond 2.2
Pond 2.1
A6
A5
J-A4
J-A5
J-C1
C1
A4
E1
Pond 1
J-D1
D1
C2
D2
Legend
HMS BASIN
HMS JUNCTION
HMS RESERVOIR
HMS CONNECTION
HMS REACH
5 FOOT CONTOURS
10 FOOT CONTOURS
DRAINAGE AREAS
LEON VALLEY CITY LIMITS
PARCEL BOUNDARIES
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
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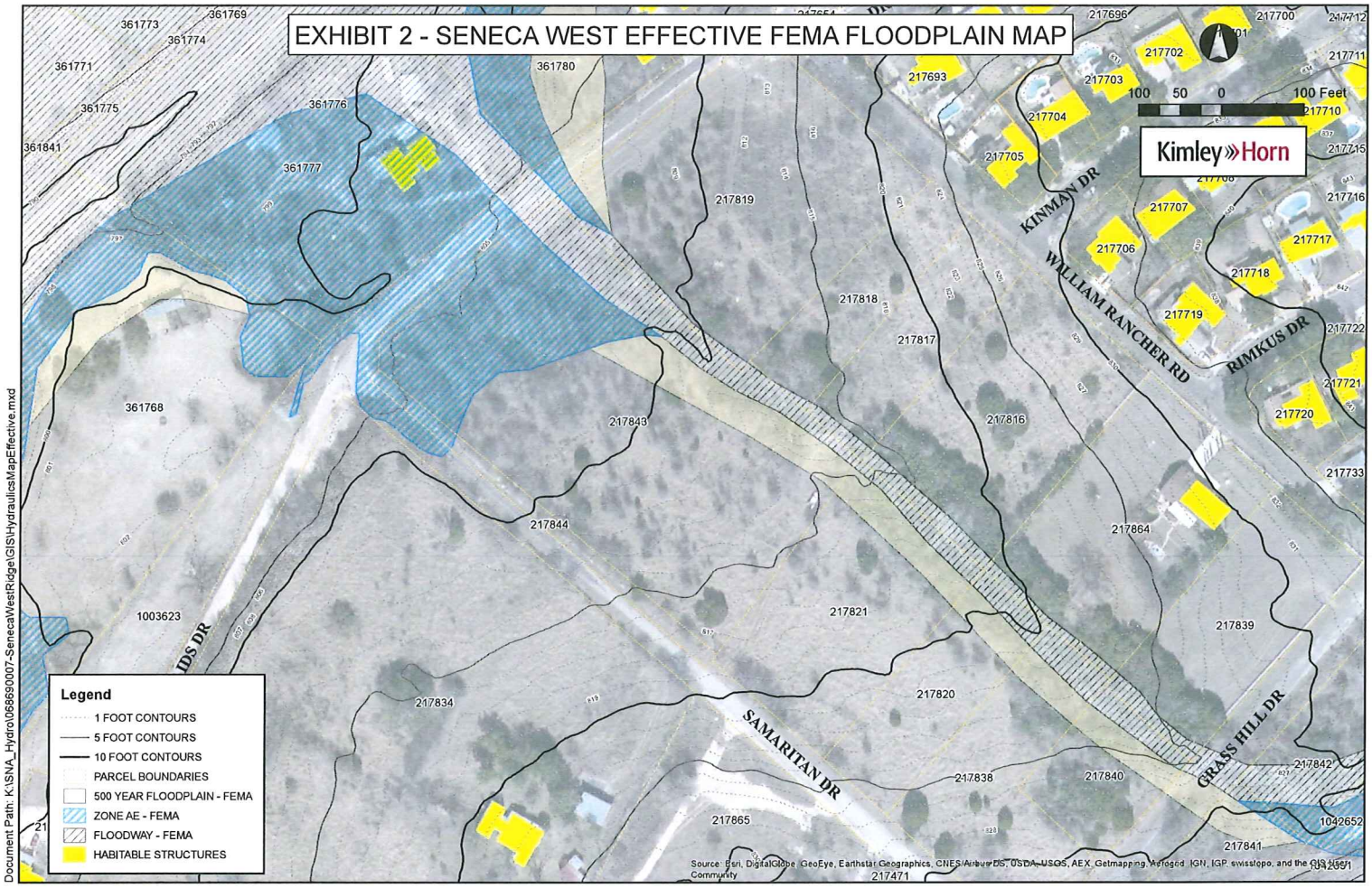
EXHIBIT 2 - SENECA WEST EFFECTIVE FEMA FLOODPLAIN MAP
Kimley»Horn
100 50 0 100 Feet
KINMAN DR
WILLIAM RANCHER RD
RIMKUS DR
SAMARITAN DR
GRASS HILL DR
IDS DR
Legend
1 FOOT CONTOURS
5 FOOT CONTOURS
10 FOOT CONTOURS
PARCEL BOUNDARIES
500 YEAR FLOODPLAIN - FEMA
ZONE AE - FEMA
FLOODWAY - FEMA
HABITABLE STRUCTURES
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
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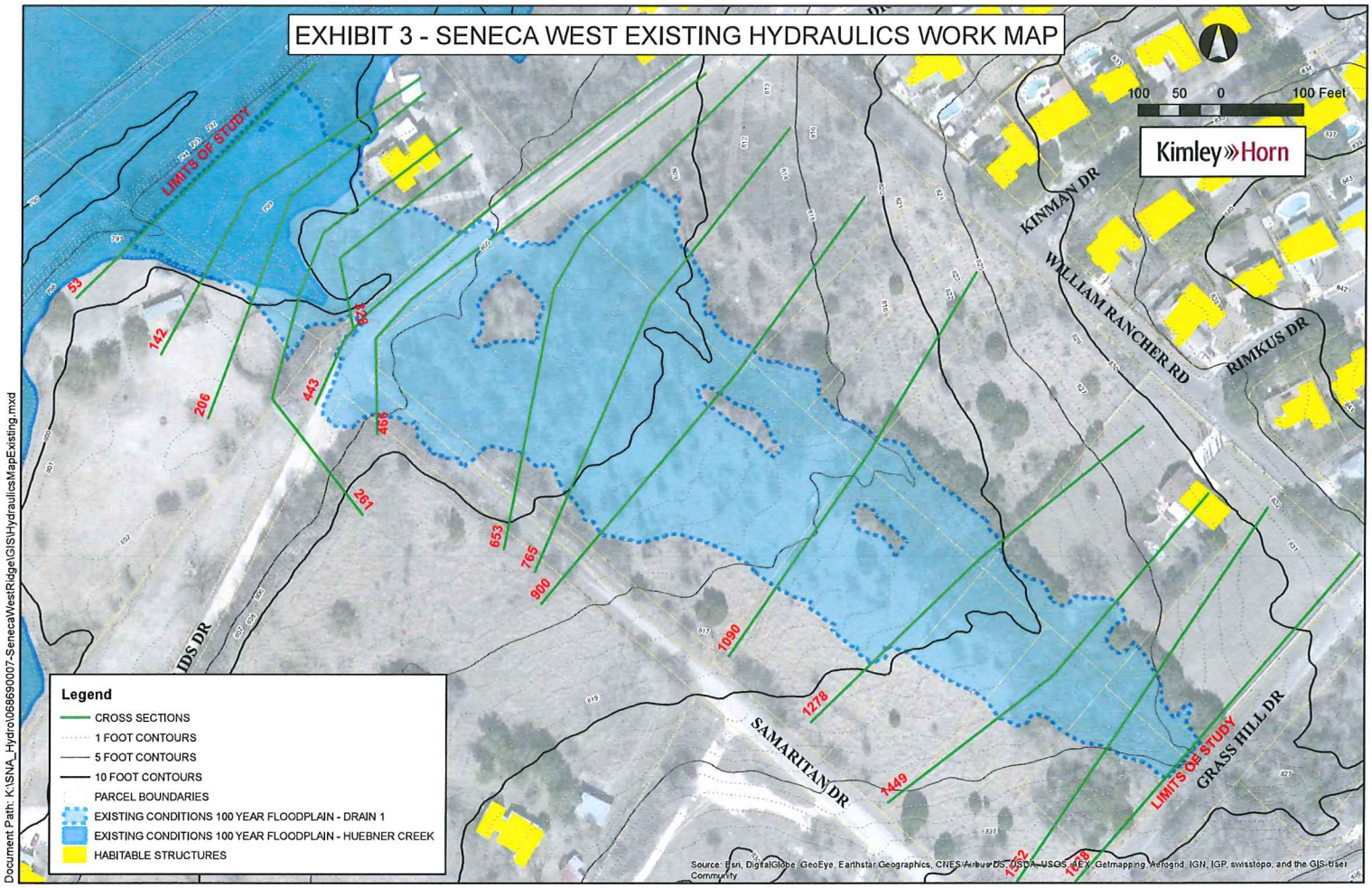

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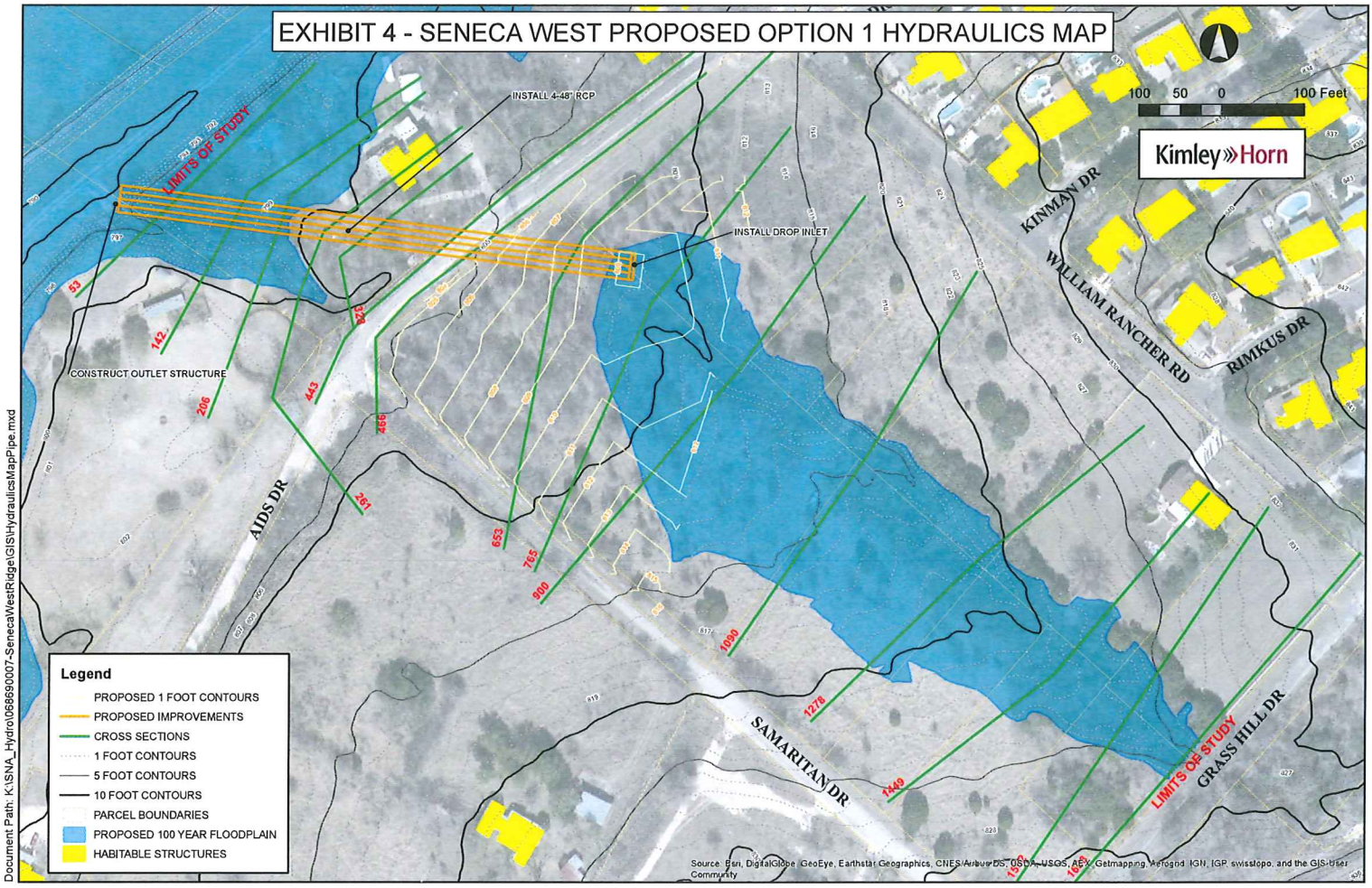
EXHIBIT 4 - SENECA WEST PROPOSED OPTION 1 HYDRAULICS MAP
INSTALL 4-48" RCP
INSTALL DROP INLET
CONSTRUCT OUTLET STRUCTURE
LIMITS OF STUDY
LIMITS OF STUDY
KINMAN DR
WALLIAM RANCHER RD
RIMKUS DR
AIDS DR
SAMARITAN DR
GRASS HILL DR
100 50 0 100 Feet
Kimley»Horn
Legend
PROPOSED 1 FOOT CONTOURS
PROPOSED IMPROVEMENTS
CROSS SECTIONS
1 FOOT CONTOURS
5 FOOT CONTOURS
10 FOOT CONTOURS
PARCEL BOUNDARIES
PROPOSED 100 YEAR FLOODPLAIN
HABITABLE STRUCTURES
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
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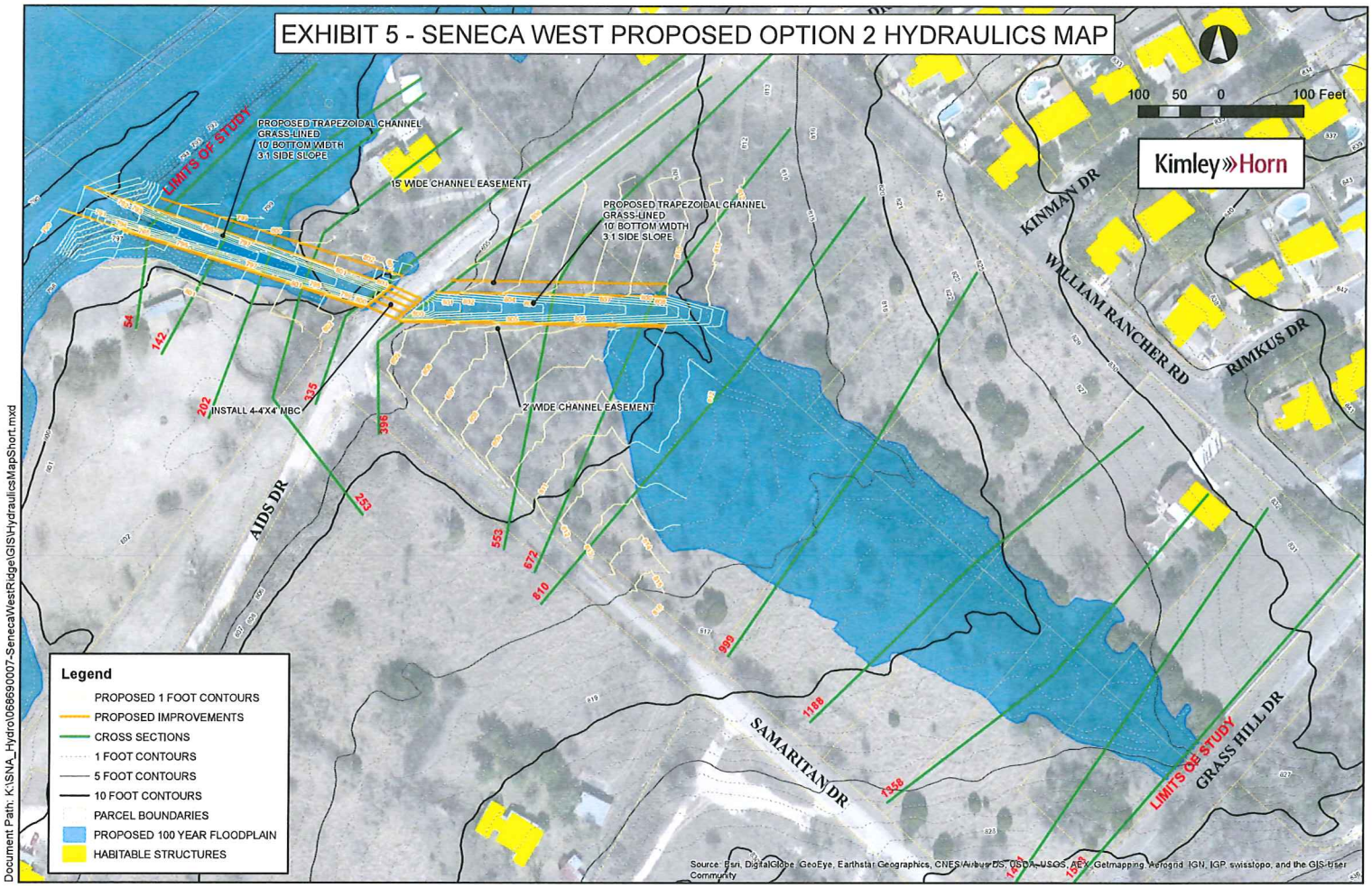
EXHIBIT 5 - SENECA WEST PROPOSED OPTION 2 HYDRAULICS MAP
100 50 0 100 Feet
Kimley»Horn
LIMITS OF STUDY
PROPOSED TRAPEZOIDAL CHANNEL
GRASS-LINED
10' BOTTOM WIDTH
3:1 SIDE SLOPE
15' WIDE CHANNEL EASEMENT
PROPOSED TRAPEZOIDAL CHANNEL
GRASS-LINED
10' BOTTOM WIDTH
3:1 SIDE SLOPE
INSTALL 4-4'X4' MBC
2' WIDE CHANNEL EASEMENT
KINMAN DR
WILLIAM RANCHER RD
RIMKUS DR
AIDS DR
SAMARITAN DR
GRASS HILL DR
LIMITS OF STUDY
54
142
202
335
396
253
553
672
810
999
1188
1358
1585
1764
Legend
PROPOSED 1 FOOT CONTOURS
PROPOSED IMPROVEMENTS
CROSS SECTIONS
1 FOOT CONTOURS
5 FOOT CONTOURS
10 FOOT CONTOURS
PARCEL BOUNDARIES
PROPOSED 100 YEAR FLOODPLAIN
HABITABLE STRUCTURES
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
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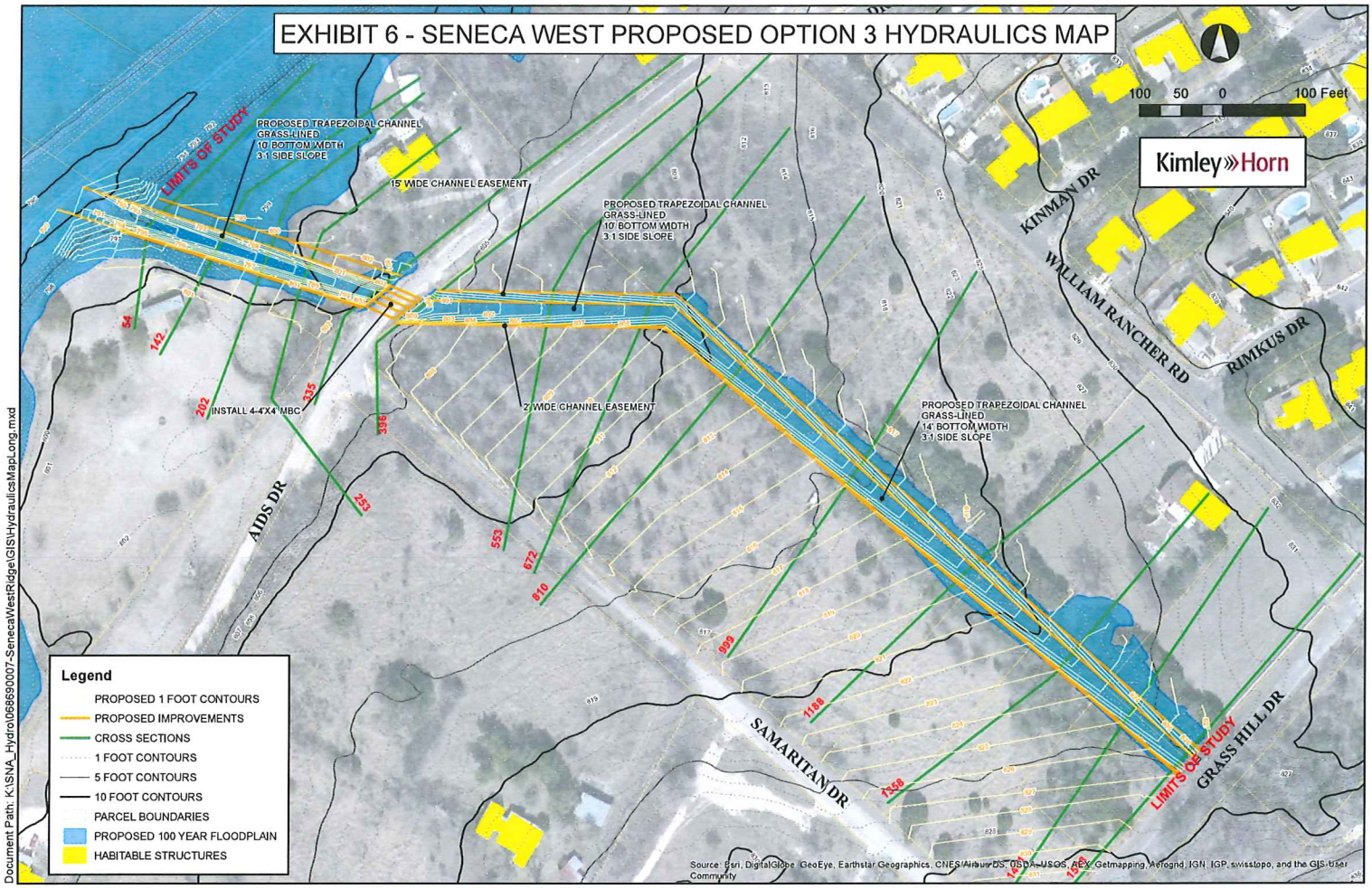
EXHIBIT 6 - SENECA WEST PROPOSED OPTION 3 HYDRAULICS MAP
100 50 0 100 Feet
Kimley»Horn
LIMITS OF STUDY
PROPOSED TRAPEZOIDAL CHANNEL
GRASS-LINED
10' BOTTOM WIDTH
3:1 SIDE SLOPE
15' WIDE CHANNEL EASEMENT
PROPOSED TRAPEZOIDAL CHANNEL
GRASS-LINED
10' BOTTOM WIDTH
3:1 SIDE SLOPE
KINMAN DR
WILLIAM RANCHER RD
RIMKUS DR
INSTALL 4-4'X4' MBC
2' WIDE CHANNEL EASEMENT
PROPOSED TRAPEZOIDAL CHANNEL
GRASS-LINED
14' BOTTOM WIDTH
3:1 SIDE SLOPE
AIDS DR
SAMARITAN DR
GRASS HILL DR
LIMITS OF STUDY
54
142
202
335
336
253
553
672
810
999
1168
1358
Legend
PROPOSED 1 FOOT CONTOURS
PROPOSED IMPROVEMENTS
CROSS SECTIONS
1 FOOT CONTOURS
5 FOOT CONTOURS
10 FOOT CONTOURS
PARCEL BOUNDARIES
PROPOSED 100 YEAR FLOODPLAIN
HABITABLE STRUCTURES
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
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RESOLUTION No. 15-004R

A RESOLUTION OF THE CITY OF LEON VALLEY AUTHORIZING THE FILING OF AN APPLICATION WITH THE BEXAR COUNTY COMMUNITY DEVELOPMENT BLOCK GRANT PROGRAM FOR FISCAL YEAR 2015; AUTHORIZING THE CITY MANAGER TO ACT ON BEHALF OF THE CITY OF LEON VALLEY IN ALL MATTERS RELATED TO THE APPLICATION; AND PLEDGING THAT IF A GRANT IS RECEIVED THE CITY OF LEON VALLEY WILL COMPLY WITH THE GRANT REQUIREMENTS.

WHEREAS, The Bexar County Community Development Block Grant (CDBG) Program is accepting applications for funding for Fiscal Year 2015; and

WHEREAS, the City of Leon Valley is a participating city with a long history of successful CDBG Projects dating back to 1986; and

WHEREAS, the City of Leon Valley is dedicated to community development support projects to provide needed services in areas of the City that would otherwise not be economically feasible; and

WHEREAS, the City of Leon Valley is proposing to construct street and drainage improvements at Huebner Rd. and Timber Hill at an estimated project cost of $281,754; with the City providing a 25% match; and

WHEREAS, the City of Leon Valley is dedicated to the public safety of its citizens and has identified a need eligible for funding that reflects infrastructure improvements in a qualifying area of the City

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF LEON VALLEY, TEXAS, THAT:

1. The City Manager of the City of Leon Valley, Texas is authorized to submit an application with the Bexar County Community Development Block Grant Program for consideration at the Bexar County Commissioners Court in June of 2015.
2. The Mayor and City Council with the adoption of this Resolution further authorize the City Manager to act on behalf of the City of Leon Valley in all matters related to the application and pledge that if a grant is received, the City of Leon Valley will comply with the Grant requirements.
3. The City of Leon Valley will continue its commitment toward strategic community development for the citizens of Leon Valley and the region.

PASSED, ADOPTED AND APPROVED by the City Council of the City of Leon Valley this the 9th day of February, 2015.

APPROVED

Chris Riley

CHRIS RILEY
MAYOR

Attest: Saundra Passailaigue

SAUNDRA PASSAILAIGUE, TRMC
City Secretary

CITY OF LEON VALLEY TEXAS

HUEBNER TIMBER HILL PROJECT

ITEM	DESCRIPTION	UNIT	UNIT PRICE	QUANTITY	COST
DIVISION I					
EARTHWORK					
	MOBILIZATION	L.S.		1	$ 27,000.00
	PREPARATION OF ROW	L.S.		1	$ 7,300.00
	INSURANCE AND BOND	L.S.		1	$ 10,000.00
103.1	REMOVE CONCRETE CURB (X < 700 L.F.)	L.F.	$3.29	578	$ 1,901.62
103.3	REMOVE CONCRETE SIDEWALKS & DRIVES (1,000 S.F.<X < 3,000 S.F.)	S.F.	$2.39	1,454	$ 3,475.06
103.4	REMOVE MISCELLANEOUS CONCRETE (RIP-RAP AND RETAINING WALL)	S.F.	$2.39	262	$ 626.18
104.1	STREET EXCAVATION (< 1,000 C.Y.)	C.Y.	$19.46	750	$ 14,595.00
DIVISION II					
BASE/SURFACE COURSES					
200.1	FLEXIBLE BASE (10" COMPACTED DEPTH)	S.Y.	$8.50	1,111	$ 9,443.50
202.1	PRIME COAT	GAL.	$3.78	222	$ 839.16
203.1	TACK COAT	GAL.	$8.00	140	$ 1,120.00
205.2	HOT MIX ASPHALTIC PAVEMENT, TYPE B (3" COMP. DEPTH)	S.Y.	$15.00	1,074	$ 16,110.00
205.4	HOT MIX ASPHALTIC PAVEMENT, TYPE D (2" COMP. DEPTH) (X < 5000 S.Y.)	S.Y.	$9.32	1,074	$ 10,009.68
208.1	SALVAGING, HAULING & STOCKPILING RECLAIMABLE ASPHALTIC PAVEMENT (2")	S.Y.	$5.94	719	$ 4,270.86
DIVISION IV					
STORM SEWERS					
403.2	JUNCTION BOX 5'X5'X5'	EA.	$4,426.80	1	$ 4,426.80
403.7	CURB INLET TYPE I (COMPLETE)(10 FT)	EA.	$7,522.26	3	$ 22,566.78
403.8	CURB INLET TYPE C (COMPLETE)(10 FT)	EA.	$5,705.91	1	$ 5,705.91
403.9	INLET EXTENSIONS (10 FT)	EA.	$4,350.00	4	$ 17,400.00
403.12	SPECIAL INLET (4-WAY)	EA.	$5,000.00	1	$ 5,000.00
404.1	CORRUGATED METAL PIPE (24" DIA)	L.F.	$65.00	380	$ 24,700.00
DIVISION V					
MISCELLANEOUS CONSTRUCTION					
500.1	CONCRETE CURBING (X<1,000 L.F.)	L.F.	$14.06	578	$ 8,126.68
502.1	CONCRETE SIDEWALKS (150 S.Y.<X<1,000 S.Y.)	S.Y.	$37.34	162	$ 6,049.08
505.1	CONCRETE RIPRAP (6" THICK)(X<4,000 S.Y.)	S.Y.	$70.23	37	$ 2,598.51
506.1	CONCRETE RETAINING WALLS-COMB. TYPE (X<20 C.Y.)	C.Y.	$785.88	1	$ 785.88
535.1	4 INCH WIDE YELLOW LINE (X<100,000 L.F.)	L.F.	$0.98	600	$ 588.00
535.7	24" WIDE WHITE LINE (X<1,500 L.F.)	L.F.	$7.55	21	$ 158.55
537.5	RAISED PAVEMENT MARKER	EA.	$8.24	25	$ 206.00
SUBSIDIARY ITEMS					
	TESTING	L.S.	$5,000.00	1	$ 5,000.00
	CONSTRUCTION OBSERVATION	L.S.	$5,000.00	1	$ 5,000.00
	ENGINEERING	L.S.	$25,000.00	1	$ 25,000.00
	SURVEYING	L.S.	$5,000.00	1	$ 5,000.00
	SUBTOTAL				**$ 245,003.25**
	CONTINGENCY	L.S.	15%	1	$ 36,750.49
	TOTAL				**$ 281,753.74**

LEONVALLEY
DEEP ROOTS. BIG IDEAS.

February 11, 2016

Col. Calvin Hudson, II District Commander
U.S. Army Engineer Corps of Engineers
819 Taylor Street (Room 3A32)
Fort Worth, TX 76102

Dear Colonel Hudson,

The City of Leon Valley and San Antonio River Authority (SARA) are requesting assistance from the U.S. Army Corps of Engineers for a Continuing Authorities Program (CAP) study to address the Huebner Creek floodplain and floodway concerns, which include flood risk management, ecosystem restoration, recreation, and storm damage reduction and education, prevalent in the City of Leon Valley.

Huebner Creek bisects the City. The floodplain/floodway threats associated with this creek have increased in direct proportion to development upstream in the City of San Antonio. The creek, which has a nine and one-half square mile watershed, flows downstream from a 300 foot wide channel in San Antonio, to a 100 foot wide channel as it enters Leon Valley, and then into a 30 foot wide channel for about one and one half mile, before then opening out to a 500 foot wide channel that eventually leaves Leon Valley and enters San Antonio again. Since the creek flows through the City's Raymond Rimkus Park and Huebner Onion Natural Area, the City and SARA are very interested in addressing flood concerns using Natural Channel Design and ecosystem restoration. Approximately 165 single family homes are being impacted by this creek. In 2015, the City responded to a total of 20 flood events, resulting in two swift water rescues, multiple closures of roads, multiple debris removal days, and a general overtaxing of City services.

In October 2015, in one such incident in which the creek overflowed, we performed a home evacuation, closed roads, sustained damage to a bridge and our park areas, and paid employees for overtime in monitoring the flooding and for the removal of debris. Bank erosion from these events is severe and one parcel of property has lost approximately 20 feet of land in the past ten years.

Through an interlocal agreement with the City of Leon Valley, SARA will serve as the sponsor for the project. We are aware that the first $100,000 in funding for the feasibility study is fully federally funded, and that any feasibility study costs above that would be cost-shared 50%

6400 El Verde Road
Leon Valley, Texas 78238
O (210) 684-1391
F (210) 684-4476
www.leonvalleytexas.gov

federal and 50% non-federal.

We understand that the estimated cost of the feasibility study would be prepared following a determination of federal interest. We further understand that a Federal Interest Determination (FID) report shall be prepared following initial investigation by USACE.

We are committed to this project and are willing, able, and would be financially prepared to participate in the feasibility study. We look forward to executing a cost-sharing agreement for the study at the appropriate time in the process. Thank you for your assistance with this much needed project. Please contact Melinda Moritz, Director of Public Works at (210) 681-1232 for further information or assistance.

Sincerely,

Kelly Kuenstler
City Manager
City of Leon Valley

Suzanne B. Scott
General Manager
San Antonio River Authority

SAN ANTONIO
RIVER AUTHORITY
Leaders in Watershed Solutions

EXECUTIVE COMMITTEE

CHAIRMAN
Sally Buchanan

VICE CHAIRMAN
Terry E. Baiamonte

SECRETARY
Hector R. Morales

TREASURER
Gaylon J. Oehlke

AT-LARGE
Darrell T. Brownlow, Ph.D.
Thomas G. Weaver

BOARD OF DIRECTORS

BEXAR COUNTY
DISTRICT 1
Jerry G. Gonzales

DISTRICT 2
Lourdes Galvan

DISTRICT 3
Michael W. Lackey, P.E.

DISTRICT 4
Thomas G. Weaver

AT-LARGE
Sally Buchanan
Hector R. Morales

WILSON COUNTY
Darrell T. Brownlow, Ph.D.
John J. Flieller

KARNES COUNTY
Gaylon J. Oehlke
H.B. Ruckman III

GOLIAD COUNTY
Terry E. Baiamonte
James Fuller

GENERAL MANAGER
Suzanne B. Scott

August 10, 2015

City of Leon Valley
c/o Director of Public Works Melinda Moritz,
& Fire Chief Luis Valdez
6400 El Verde Road,
Leon Valley, Texas 78238

Re: San Antonio River Authority Support for Stormwater Management along Huebner Creek

Dear Ms. Moritz and Chief Valdez:

San Antonio River Authority (SARA) staff reviewed the City of Leon Valley's July 23, 2015 request seeking SARA support for a portion of Huebner Creek to be designated as a mandatory detention area by the City of San Antonio. In reviewing the available map from the City of San Antonio, SARA understands that the northern most portion of the watershed is presently designated as a mandatory detention area. A portion of the watershed above Leon Valley however remains outside the mandatory detention designation.

SARA recommends that any efforts to manage storm water along Huebner Creek are made in concert with holistic watershed planning practices to avoid any detrimental effects to downstream communities. The most effective flood mitigation plans and projects benefit from intergovernmental communication and collaboration. Therefore, SARA encourages the City of Leon Valley, the City of San Antonio and Bexar County to continue to utilize the Bexar Regional Watershed Management (BRWM) program as a venue to develop mutually beneficial flood policies and projects.

The holistic management of storm water upstream along Huebner Creek could reduce the flood risk in the City of Leon Valley. SARA recommends, to the maximum extent possible, the use of Low Impact Development strategies that detain, capture and filter rain on site; or

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traditional detention techniques as potential solutions to minimize the impacts of storm water runoff in the City of Leon Valley.

In 2011, SARA completed the Leon Creek Watershed Master Plan which identified five drainage projects along Huebner Creek. The Watershed Master Plan identified an area of high flood risk between Lockhill Road to Leon Creek. Two projects in the Watershed Master Plan have been included in the Bexar County Flood Control Program (LC-15 Huebner Creek at Prue Road RSWF and LC-17 Huebner Creek Enhanced Conveyance NWWC). LC-15 Huebner Creek at Prue Road RSWF is anticipated to be completed in May 2016, and LC-17 Huebner Creek Enhanced Conveyance NWWC is anticipated to be completed in May 2017. Bexar County is also estimating to complete LC-19, Whisper Creek at Hollyhock Road, in September 2015, which will address a portion of the flood risk area near Hollyhock Road. After these three projects are completed, the area of flood risk will be reduced to an area from Whitby Road to Bandera Road, but some residential structures and roads will continue to be at risk. SARA's models show the remaining flood risk could be mitigated with additional upstream detention.

SARA looks forward to supporting the City of Leon Valley, the City of San Antonio and Bexar County on working collaboratively to reduce flood risk in their respective jurisdictions.

Respectfully,

Suzanne B. Scott
General Manager

Enclosure (2)

Wurzbach Drainage at Christian Village

Project Description: Stormwater runoff has caused scouring that over time, will damage the existing concrete structure on the south side of the Wurzbach Bridge located near the Christian Village Apartments. To address the wash out, it's recommended that a concrete extension be poured to match existing drainage, and add splash blocks to reduce the velocity of stormwater runoff.

Project Cost: Approximately $25,000.