NOTICE OF OPEN MEETING OF THE SAN ANTONIO REGIONAL FLOOD PLANNING GROUP TECHNICAL SUBCOMMITTEE

Region 12

05/11/2023

1:00 PM

TAKE NOTICE that a meeting of the Technical Subcommittee of the San Antonio Regional Flood Planning Group as established by the Texas Water Development Board will be held on Thursday, May 11, 2023, at 1:00 PM, in-person at the San Antonio River Authority, located at 100 E. Guenther St and virtually at https://meet.goto.com/419341365

Agenda:

1. (1:00 PM) Roll-Call
2. Public Comments – limit 3 minutes per person
3. Review Progress on Task 12
4. Review Additional Submittals
5. Public Comments – limit 3 minutes per person
6. Date and Potential Agenda Items for Next Meeting
7. Adjourn

If you wish to provide written comments prior to or after the meeting, please email your comments to khayes@sariverauthority.org or physically mail them to the attention of Kendall Hayes at San Antonio River Authority, 100 E. Guenther, San Antonio, TX, 78204 and include "Region 12 San Antonio Flood Planning Group Meeting" in the subject line of the email.

Additional information may be obtained from: Kendall Hayes, (210) 302-3641, khayes@sariverauthority.org, San Antonio River Authority, 100 E. Guenther, San Antonio, TX 78204.

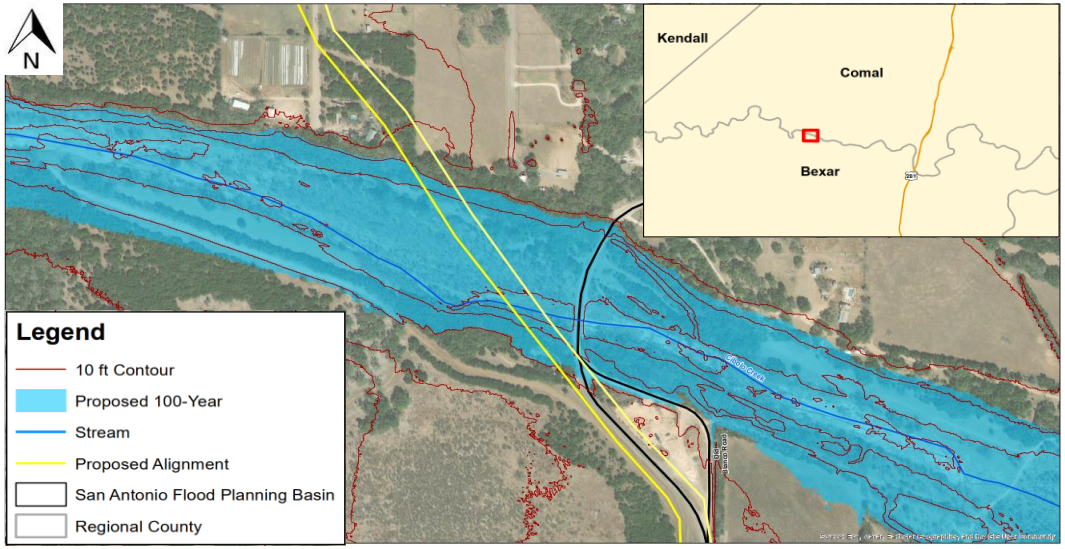
2023 San Antonio Regional Flood Plan
Project Summary Sheet

Project Name: Blanco Road at Cibolo Creek

FMP ID: ----------

Project Sponsor: Bexar County/Comal County

Project Source: Bexar County



Cost Information

Category	Cost*
Design	$2,871,815
Real Estate	$126,054
Environmental	$10,000
Construction	$18,709,033
Total Cost**	**$21,717,000**

*Costs are using 2020 prices
**Rounded up to the nearest thousand

Benefit Cost Analysis (BCA)

Event Damages	Baseline	Project
10-year storm	$ 1,082,941	$ -
50-year storm	$ 1,285,885	$ -
100-year storm	$ 1,615,172	$ -
Total Benefits	**$ 1,560,152**	
BCA	**0.1**	

Impact Analysis

Post-Project Total Removed	Storm Event		
	10-year	50-year	100-year
Residential	-	-	-
Commercial	-	-	-
Flooded Roads (miles)	0.111	0.129	0.143
Critical	-	-	-
Others Note	N/A	N/A	N/A
SVI Score			-

LWC Level of Service Existing Vs. Proposed

Condition	Level of Service	100-Yr Depth Over Road (ft)
Existing	< 10-Yr	16
Proposed	100-Yr	0

Project Description:

The low water crossing of Blanco Road at Cibolo Creek along the Bexar/Comal County line is undersized and results in it being overtopped during the 2-year storm events. The existing structure consist of a 4 corrugated metal pipe culverts. The 100-year storm event overtops Blanco Road by a max depth of 16 ft. When the structure overtops, it cuts off the main route for the nearby neighborhood. The proposed project at Blanco Road and Cibolo Creek is design to convey the 100-year storm event by completely replacing the existing culverts system with a 550 ft long by 144 ft wide bridge. The proposed bridge will require increasing the road elevation by 20ft above the existing road elevation. The future expansion of Blanco Road will require roadway realignment and the bridge is intended to align with future expansion plans for Blanco Road by Comal and Bexar County. While a final alignment has not been determined, this study makes assumptions on bridge alignment and property acquisition that would accommodate the future roadway project. The design removes the roadway/bridge from Cibolo Creek's floodplain, which provides access to a main road. The project location is also adjacent to the Air Force Base property "Camp Bullis", a critical facility.

Amended 2023 San Antonio Regional Flood Plan - Project Narrative

Project Name: **Blanco Road at Cibolo Creek**
FMP ID: **Bexar County (Comal County Line)**
Project Sponsor: **4/10/2023**
Date:

BACKGROUND INFORMATION:

As part of the amended 2023 San Antonio Regional Flood Plan (the Plan), Task 12 expands on previously identified FMEs from the Plan dated January 10, 2023. Blanco Road at Cibolo Creek along Bexar County & Comal County line, FME ID 121000163, from the 2022 Bexar County Line LWC Engineering Study was further developed during Task 12. This project is sponsored by Bexar County and Comal County.

The low water crossing of Blanco Road at Cibolo Creek along the Bexar/Comal County line is undersized and results in it being overtopped during the 2-year storm events. The existing structure consist of a 4 corrugated metal pipe culverts. The 100-year storm event overtops Blanco Road by a max depth of 16 ft. When the structure overtops, it cuts off the main route for the nearby neighborhood.

The Task 12 work that was completed for the Blanco Road Low Water Crossing at Cibolo Creek project was a drainage analysis, cost estimate, impact analysis, and a Benefit Cost Analysis (BCA).

PROPOSED PROJECT SCOPE

Refer to the Amended Flood Plan Technical Memo for documented assumptions and methodologies on drainage analysis to determine a feasible solution.

The proposed project at Blanco Road and Cibolo Creek is design to convey the 100-year storm event by completely replacing the existing culverts system with a 550 ft long by 144 ft wide bridge. The proposed bridge will require increasing the road elevation by 20 ft above the existing road elevation. The future expansion of Blanco Road will require roadway realignment and the bridge is intended to align with future expansion plans for Blanco Road by Comal and Bexar County. While a final alignment has not been determined, this study makes assumptions on bridge alignment and property acquisition that would accommodate the future roadway project. The design removes the roadway/bridge from Cibolo Creek's floodplain, which provides access to a main road. The project location is also adjacent to the Air Force Base property "Camp Bullis", a critical facility.

PROPOSED PROJECT SCOPING COST

Refer to the Amended Flood Plan Technical Memo for documented assumptions and methodologies on project costs.

The estimated the project cost for the Blanco Road at Cibolo Creek is $21,717,000. This was calculated using 2020 prices. The cost includes all the required applicable TWDB FMP costs including basic engineering fees, special services such as surveying, environmental, geotech, etc., other costs such as land/easement acquisition and administration, fiscal services, and contingency. See attached Cost Summary for cost breakdown. If there are underground utilities that require adjustments, the cost may increase depending upon any additional adjustments required. At this time, funding for the project has not been identified or approved.

PROPOSED PROJECT BENEFITS

This project will eliminate overtopping at Blanco Road and improve the level of service by providing a 100-year conveyance design.

Amended 2023 San Antonio Regional Flood Plan - Project Narrative

Project Name: **Blanco Road at Cibolo Creek**
FMP ID: **Bexar County (Comal County Line)**
Project Sponsor: **4/10/2023**
Date:

Refer to the Amended Flood Plan Technical Memo for documented assumptions and methodologies on benefit cost analysis.

The 10-, 25-, 100-year benefits that were evaluated for this project includes LWC improvements. The resulting benefit cost analysis was 0.1. The Table 1 below summarizes the components calculated in the TWDB BCA Tool.

Table 1: TWDB BCA Toolkit

Input Into BCA Toolkit

Project Useful Life	**30**

Event Damages	Baseline	Project
10 - year storm	**$1,082,941**	**$0**
25 - year storm	**$1,285,885**	**$0**
100 - year storm	**$1,615,172**	**$0**

Total Benefits from BCA Toolkit	$1,560,152
Other Benefits (Not Recreation)	$2,665
Recreation Benefits	-
Total Costs	$17,284,730
Net Benefits	-$15,721,913
Net Benefits with Recreation	-$15,721,913
Final BCR	**0.1**
Final BCR with Recreation	**0.1**

IMPACT ANALYSIS

Refer to the Amended Flood Plan Technical Memo for documented assumptions and methodologies on impact analysis.

Existing and proposed conditions were analyzed for impact, the impacts that were evaluated are the water surface elevations (WSE) and velocities +/-2000 ft of this project area. The WSE and velocities were compared in the HEC-RAS v5.0.5 model and the proposed conditions showed reduced levels with both components. From

the RAS results, the total inundated boundary was reduced in proposed conditions, see Exhibits 1-3 for existing, proposed, and an US view of the comparison of WSE. Flooded depths over the road were evaluated in the BCA, reduced impacts show lower flooded depths in proposed conditions. The following table summarizes the level of service pre and post project.

Table 2: Level of Service Existing Vs. Proposed

Condition	Level of Service	100-Yr Depth Over Road (ft)
Existing	< 10-Yr	16 ft
Proposed	100-Yr	0

PROJECT RISKS

ROW/Real Estate Acquisition:

Yes, land acquisition is required for this project.

Utilities Coordination:

No, currently there are no evident utility conflicts. During the design phase, utility conflicts should be further evaluated.

Permitting/Environmental:

No permits will be required.

Stakeholder coordination:

Due to the road improvement and local surrounding community, there will be various stakeholders involved in the process.

MITIGATION OF RISKS

Utility Coordination:

If utility conflicts are found, the utility coordinator will need to closely work with the affected utility companies to ensure timely completion of the proposed project.

Permitting/Environmental:

If permits do arise during the design, coordination and permitting process should be started early on to avoid schedule delays.

Stakeholder Coordination:

Blanco Road is the main access for several residential properties. Road reconstruction will cause traffic disruptions and inconveniences for locals due to limited alternative access points. Public meetings and flyers will help communicate construction impacts to affected businesses of any service interruption or inconvenience. The businesses near the project limits should be notified several weeks before the

construction start date. Construction phasing and traffic control will be an important design component for this project.

NATURE BASED SOLUTION (NBS) CONSIDERATION

The proposed project employs a bridge instead of a low water crossing. Using a bridge benefits the natural ecosystem by allowing more sediment transport, passage of aquatic organisms and does not impound water. The larger opening also allows for natural substrate to cover the culvert bottom to allow for aquatic organism passage.

Landscaping cost (3% of total construction cost) was factored into the total cost for potential channel stabilization and NBS solutions.

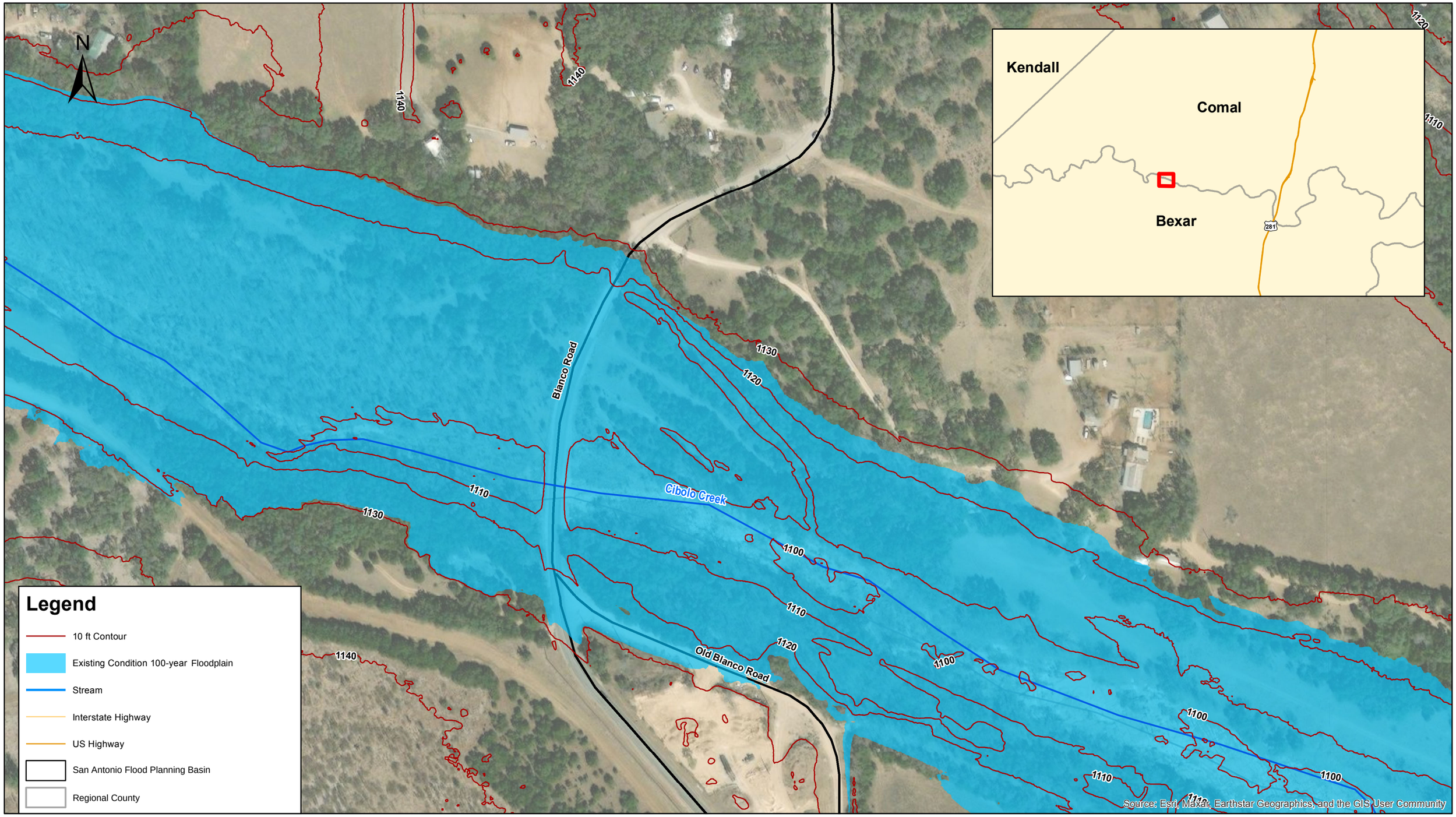
INTERRELATED PROJECTS

There are no interrelated projects.

2023 SAN ANTONIO REGIONAL FLOOD PLAN
PROJECT COST SUMMARY

Project Name:	Blanco Road at Cibolo Creek
Project Sponsor:	Bexar County
Firm Developing:	Halff
Date Developed:	4/3/2023
Unit Prices Used:	11/1/2020

CONSTRUCTION COSTS	
- STREET COST	$642,193.88
- DRAINAGE COST	$12,811,172.58
- LANDSCAPING (3%)	$403,600.99
- BOND AND INSURANCE (3%)	$415,709.02
- BARICADES (3%)	$428,180.29
- MOBILIZATION & PREPARATION OF R.O.W. (11% + 4%)	$2,078,545.12
TOTAL CONSTRUCTION COST ESTIMATE	**$16,779,401.88**
ENGINEER FEE (Fee Table plus 5%)	$2,433,013.27
ENGINEER CONTINGENCY (10%)	$243,301.33
CONSTRUCTION CONTINGENCY (10%)	$1,677,940.19
PERMIT REQUIREMENT COSTS	$195,500.00
RIGHT-OF-WAY (LAND ACQUISITION)	$123,554.00
RIGHT-OF-WAY SURVEY	$2,500.00
ENVIRONMENTAL	$10,000.00
MATERIAL TESTING (2% Construction Cost - <$3M, 1.5% - >$3M)	$251,691.03
TOTAL PROJECT COST ESTIMATE	**$21,716,901.70**



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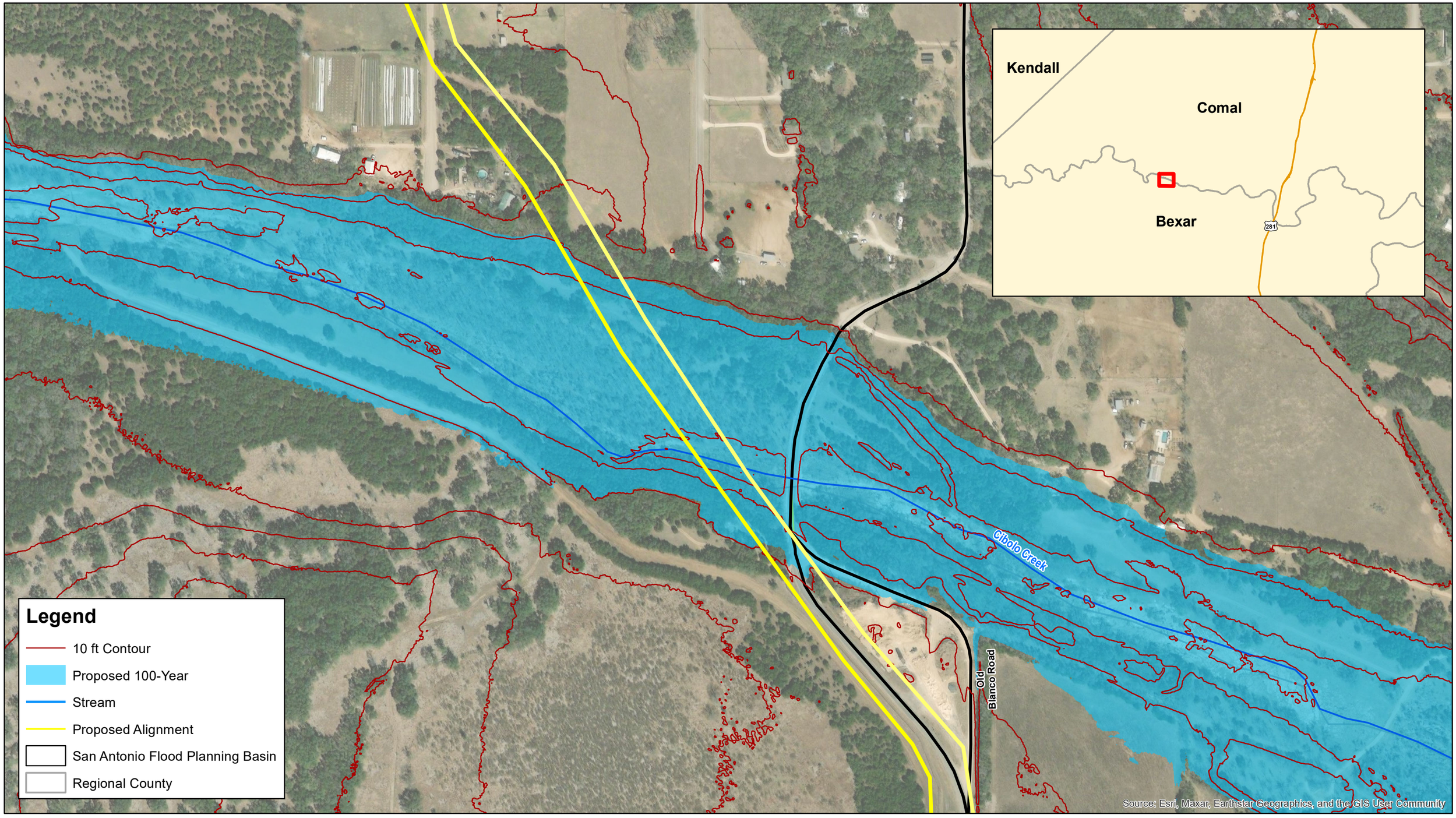
REGION 12 SAN ANTONIO REGIONAL FLOOD PLANNING GROUP

Exhibit 1 - Blanco Road at Cibolo Creek Existing Conditions

0 4 8
Miles



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REGION 12 SAN ANTONIO REGIONAL FLOOD PLANNING GROUP

Exhibit 2 - Blanco Rd at Cibolo Creek Proposed Conditions

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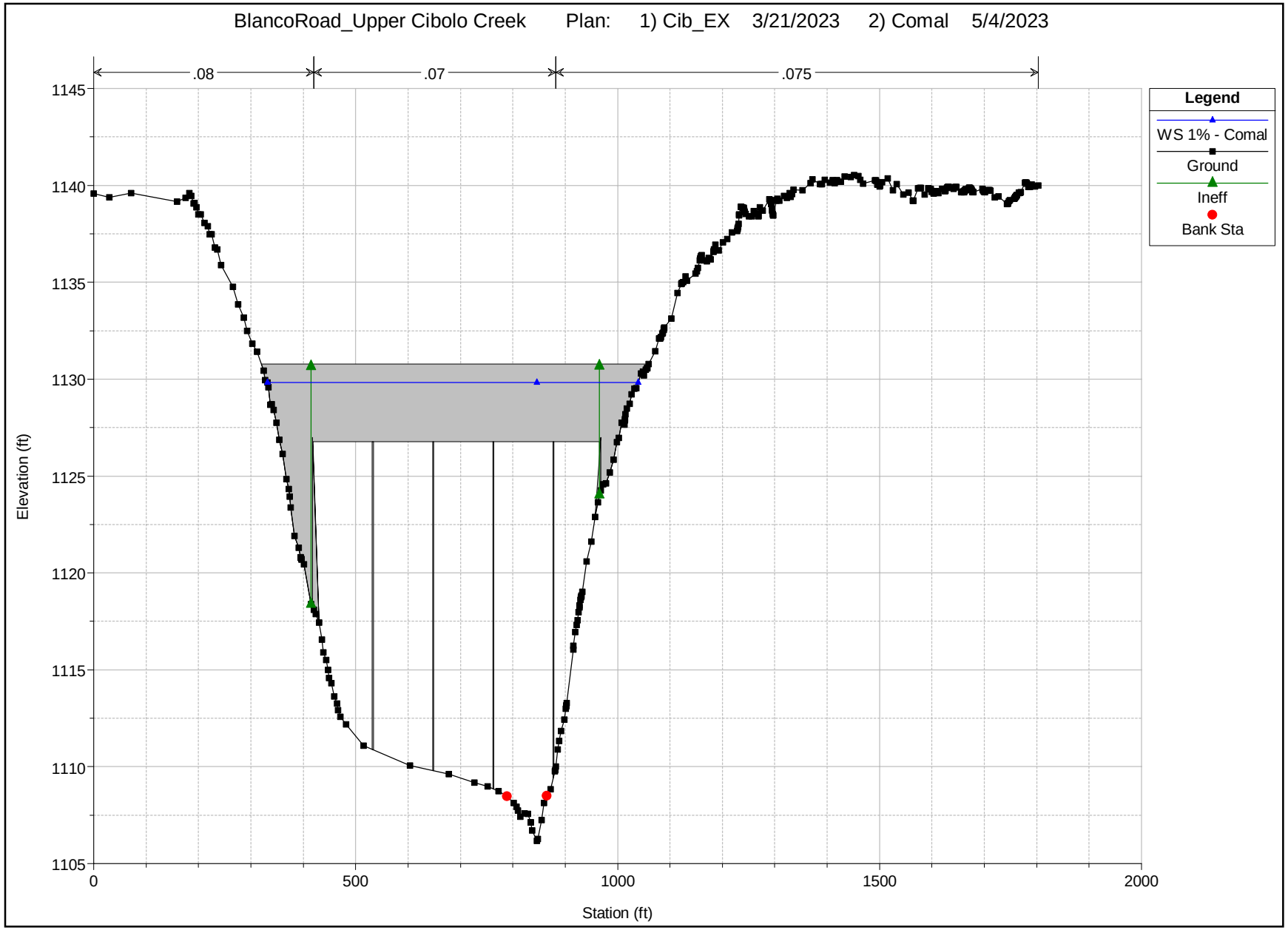
Miles

N


BlancoRoad_Upper Cibolo Creek Plan: 1) Cib_EX 3/21/2023 2) Comal 5/4/2023
.08
.07
.075
Legend
WS 1% - Comal
Ground
Ineff
Bank Sta
Elevation (ft)
1145
1140
1135
1130
1125
1120
1115
1110
1105
0
500
1000
1500
2000
Station (ft)

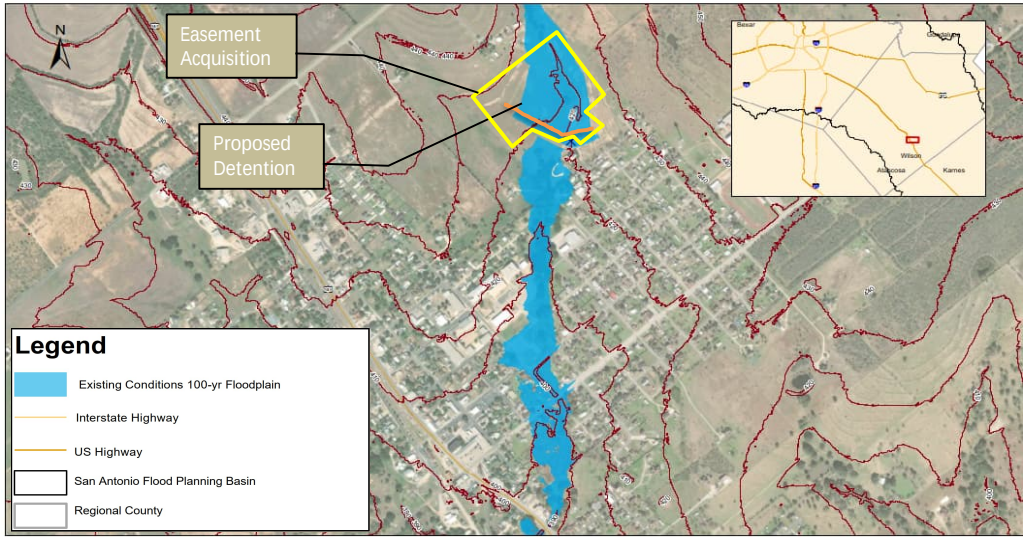
2023 San Antonio Regional Flood Plan
Project Summary Sheet

Project Name: Damage Center 1 Project 1 – Detention in East Branch Poth Creek

FMP ID: ----------

Project Sponsor: City of Poth

Project Source: 2012 Wilson County Watershed Master Plan (San Antonio River Authority)



Cost Information

Category	Cost*
Design	$270,224
Real Estate	$724,998
Environmental	$30,000
Construction	$889,348
Total Cost**	**$1,915,000**

*Costs are using 2020 prices
**Rounded up to the nearest thousand

Benefit Cost Analysis (BCA)

Event Damages	Baseline	Project
10-year storm	$ 2,125,754	$ -
25-year storm	$ 3,160,196	$ 2,092,187
100-year storm	$ 3,766,602	$ 2,598,603
Total Benefits	**$ 2,558,946**	
BCA	**1.6**	

Impact Analysis

Post-Project Total Removed	Storm Event		
	10-year	25-year	100-year
Residential	9	13	9
Commercial	-	-	-
Flooded Roads (miles)	0	0.02	0.026
Critical	-	-	-
Others Note	N/A	N/A	N/A
SVI Score			-

LWC Level of Service Existing Vs. Proposed

Condition	Level of Service	50-Yr Depth Over Road (ft)
Existing	25-Yr	0.6
Proposed	50-Yr	0

Project Description:

The problem area is in Wilson County in the City of Poth. The 2012 Master Plan explored detention as an alternative for relieving property and infrastructure flooding throughout the City of Poth. The proposed detention pond will be located along East Branch of Poth Creek upstream of the intersection of Eschenburg Street and Welhausen Street. While the Master Plan proposed a 27-acre pond, based on topography and the location of several structures, the updated analysis included a 17-acre pond. The detention pond could hold 52 ac-ft of water and reduce flows by 400 cfs. The proposed improvements will reduce the depth of flooding for several structures and improve access at US Highway 181 for the 50-year flood event. This project will require acquisition of inundation easements for the area of impoundment and property acquisition for the detention ponds berm.

Amended 2023 San Antonio Regional Flood Plan - Project Narrative

Project Name: **Damage Center 1 Project 1 – Detention in East Branch Poth Creek**
FMP ID: **----------**
Project Sponsor: **City of Poth**
Date: **3/3/2023**

BACKGROUND INFORMATION:

As part of the amended 2023 San Antonio Regional Flood Plan (the Plan), Task 12 expands on previously identified FMEs from the Plan dated January 10, 2023. The Damage Center 1 Project 1 – Detention in East Branch Poth Creek, FME ID 121000042, from the 2012 Wilson County Watershed Master Plan was further developed during Task 12. This project is sponsored by the City of Poth.

The problem area is in Wilson County in the City of Poth. The 2012 Master Plan explored detention as an alternative for relieving property and infrastructure flooding throughout the City of Poth.

The Task 12 work that was completed for the detention pond at East Branch Poth Creek Drainage Improvements project was a drainage analysis, cost estimate, impact analysis, and a Benefit Cost Analysis (BCA).

PROPOSED PROJECT SCOPE

Refer to the Amended Flood Plan Technical Memo for documented assumptions and methodologies on drainage analysis to determine a feasible solution.

The proposed detention pond will be located along East Branch of Poth Creek upstream of the intersection of Eschenburg Street and Welhausen Street. While the Master Plan proposed a 27-acre pond, based on topography and the location of several structures, the modified analysis included a 17-acre pond. The detention pond would hold 52 ac-ft of water and reduces flows by 400 cfs. The proposed improvements will reduce the depth of flooding for several structures and improve access at US Highway 181 for the 50-year flood event. This project will require acquisition of inundation easements for the detained water and property for the detention ponds berm.

PROPOSED PROJECT SCOPING COST

Refer to the Amended Flood Plan Technical Memo for documented assumptions and methodologies on project costs.

The estimated the project cost for Damage Center 1 Project 1 – Detention in East Branch Poth Creek is $1,914,570, calculated using 2020 prices. The cost includes all the required applicable TWDB FMP costs including basic engineering fees, special services such as surveying, environmental, geotech, etc., other costs such as land/easement acquisition and administration, fiscal services, and contingency. See attached Cost Summary for cost breakdown. If there are underground utilities that require adjustments this may increase depending upon any additional adjustments required. At this time, funding for the project has not been identified or approved.

PROPOSED PROJECT BENEFITS

This project will eliminate overtopping at U.S. Highway 181 at the 50-year flood event and reduce depth of flooding for the 100-year flood event.

Amended 2023 San Antonio Regional Flood Plan - Project Narrative

Project Name: **Damage Center 1 Project 1 – Detention in East Branch Poth Creek**
FMP ID: **----------**
Project Sponsor: **City of Poth**
Date: **3/3/2023**

Refer to the Amended Flood Plan Technical Memo for documented assumptions and methodologies on benefit cost analysis.

The 10-, 25-, 100-year benefits that were evaluated for this project include LWC improvements. The resulting benefit cost analysis was 1.6. The Table 1 below summarizes the components calculated in the TWDB BCA Tool.

Table 1: TWDB BCA Toolkit

Input Into BCA Toolkit

Project Useful Life	30

Event Damages	Baseline	Project
10 - year storm	$2,125,754	-
25 - year storm	$3,160,196	$2,092,187
100 - year storm	$3,766,602	$2,598,603

Total Benefits from BCA Toolkit	$2,491,041
Other Benefits (Not Recreation)	$67,905
Recreation Benefits	-
Total Costs	$1,636,312
Net Benefits	$922,635
Net Benefits with Recreation	$922,635
Final BCR	1.6
Final BCR with Recreation	1.6

IMPACT ANALYSIS

Refer to the Amended Flood Plan Technical Memo for documented assumptions and methodologies on impact analysis.

Existing and proposed conditions were analyzed for impact, the impacts that were evaluated are the water surface elevations (WSE) and velocities +/-2000 ft of this project area. The WSE and velocities were compared

in the HEC-RAS v6.2 model. From the RAS results, the total inundated boundary was reduced in proposed conditions, see Exhibits 1-3 for existing conditions, proposed conditions, and a comparison of both floodplains. Flooded depths over the road were evaluated in the BCA, reduced impacts show lower flooded depths in proposed conditions. The following table summarizes the level of service pre and post project:

Table 2: Level of Service Existing Vs. Proposed

Condition	Level of Service	50-Yr Depth Over Road (ft)
Existing	25-Yr	0.60
Proposed	50-Yr	0

PROJECT RISKS

ROW/Real Estate Acquisition:

Significant land and easement acquisition will be required for this project. To minimize property acquisitions, inundation easements can be considered for the area of impoundment. An assumption was made that the property where the berm and spillway will be constructed would be purchased outright.

Utilities Coordination:

No, currently there are no evident utility conflicts. During the design phase, utility conflicts should be further evaluated.

Permitting/Environmental:

Yes, a Nationwide Permit and Preconstruction Notification will be required through the USACE.

Stakeholder coordination:

Due to the road improvement and local surrounding community, there will be various stakeholders involved in the process.

MITIGATION OF RISKS

Utility Coordination:

If utility conflicts are found, the utility coordinator will need to closely work with the affected utility companies to ensure timely completion of the proposed project. The project manager and contractor should minimize, as much as feasible, the amount of disruption of services and travel.

Permitting/Environmental:

If permits do arise during the design, coordination and permitting process should be started early on to avoid schedule delays.

Amended 2023 San Antonio Regional Flood Plan - Project Narrative

Project Name: **Damage Center 1 Project 1 – Detention in East Branch Poth Creek**
FMP ID: **----------**
Project Sponsor: **City of Poth**
Date: **3/3/2023**

Stakeholder Coordination:

Property acquisitions will be required from 2 property owners. In addition, construction access easements may need to be acquired. Construction for the proposed berm will be adjacent to a residential neighborhood, which could cause disruptions to road access. Coordination with the neighborhood should start early and construction hours should be limited to prevent noise disturbances in the adjoining neighborhood.

NATURE BASED SOLUTION (NBS) CONSIDERATION

There are no nature-based solutions for this project.

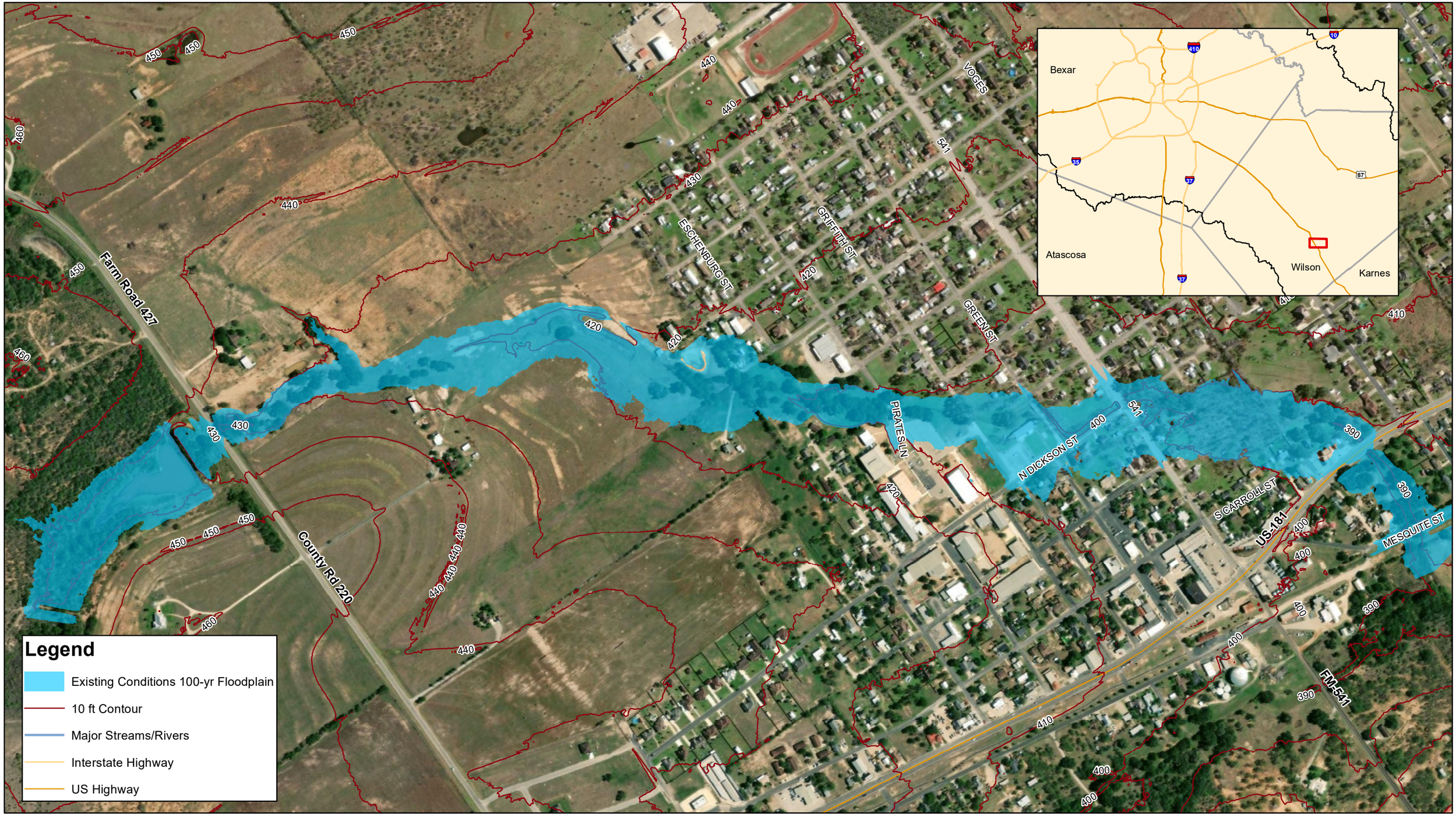
INTERRELATED PROJECTS

There are no interrelated projects.

2023 SAN ANTONIO REGIONAL FLOOD PLAN
PROJECT COST SUMMARY

Project Name:	Damage Center 1 - Detention in East Branch Poth Creek
Project Sponsor:	City of Poth
Firm Developing:	Halff
Date Developed:	3/3/2023
Unit Prices Used:	11/1/2020

CONSTRUCTION COSTS	
- DRAINAGE COST	$636,661.21
- LANDSCAPING (3%)	$19,099.84
- BOND AND INSURANCE (3%)	$19,672.83
- BARICADES (3%)	$20,263.02
- MOBILIZATION & PREPARATION OF R.O.W. (11% + 4%)	$98,364.16
TOTAL CONSTRUCTION COST ESTIMATE	**$794,061.06**
ENGINEER FEE (Fee Table plus 5%)	$142,930.99
ENGINEER CONTINGENCY (10%)	$14,293.10
CONSTRUCTION CONTINGENCY (10%)	$79,406.11
PERMIT REQUIREMENT COSTS	$63,000.00
RIGHT-OF-WAY (LAND ACQUISITION)	$719,997.97
RIGHT-OF-WAY SURVEY	$5,000.00
ENVIRONMENTAL	$30,000.00
MATERIAL TESTING (2% Construction Cost - <$3M, 1.5% - >$3M)	$15,881.22
FEMA FLOOD PLAIN STUDY	$50,000.00
TOTAL PROJECT COST ESTIMATE	**$1,914,570.44**



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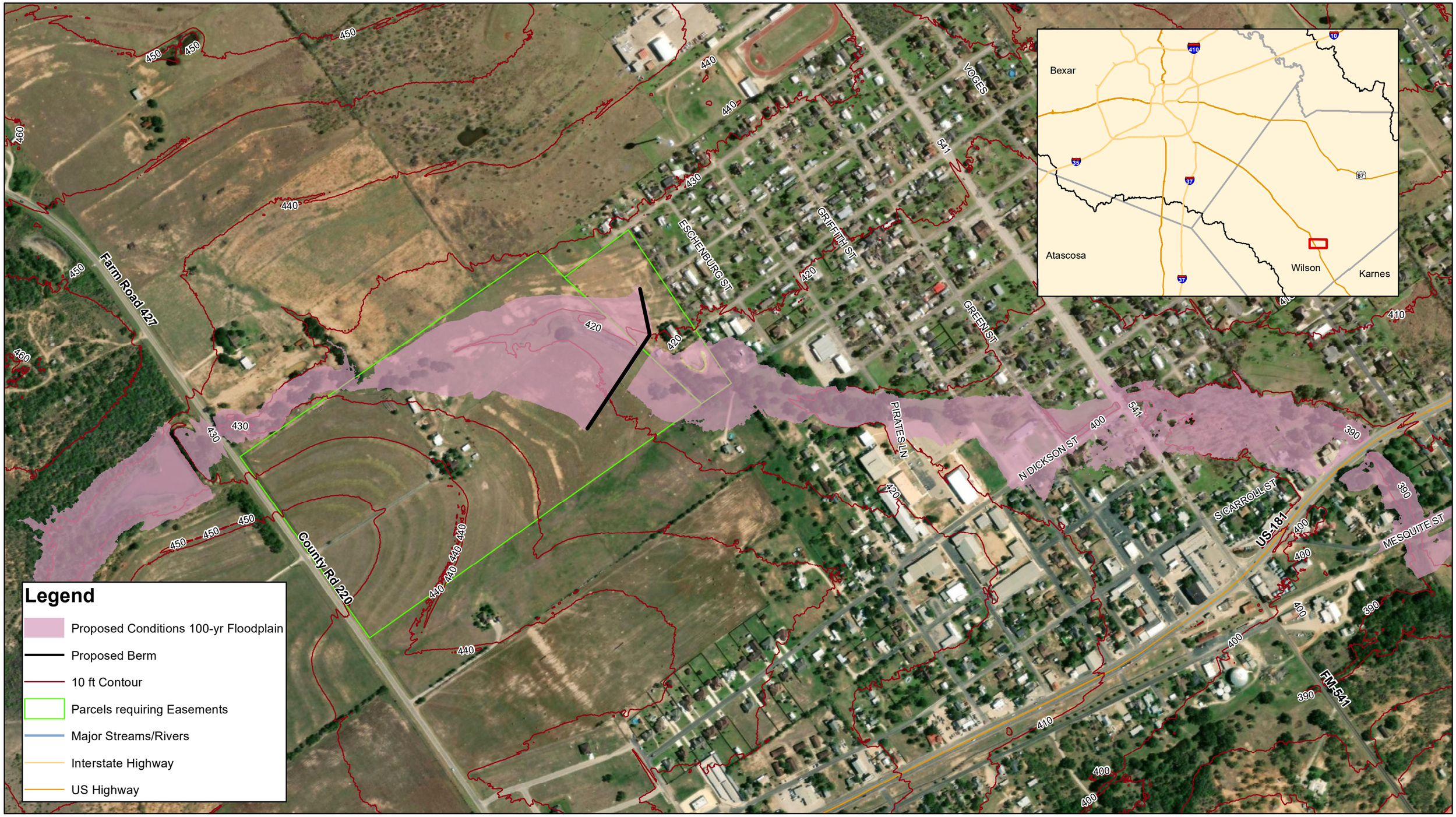
REGION 12 SAN ANTONIO REGIONAL FLOOD PLANNING GROUP

Exhibit 1 - Detention in East Branch Poth Creek Existing Conditions

0 10 20
Miles

N



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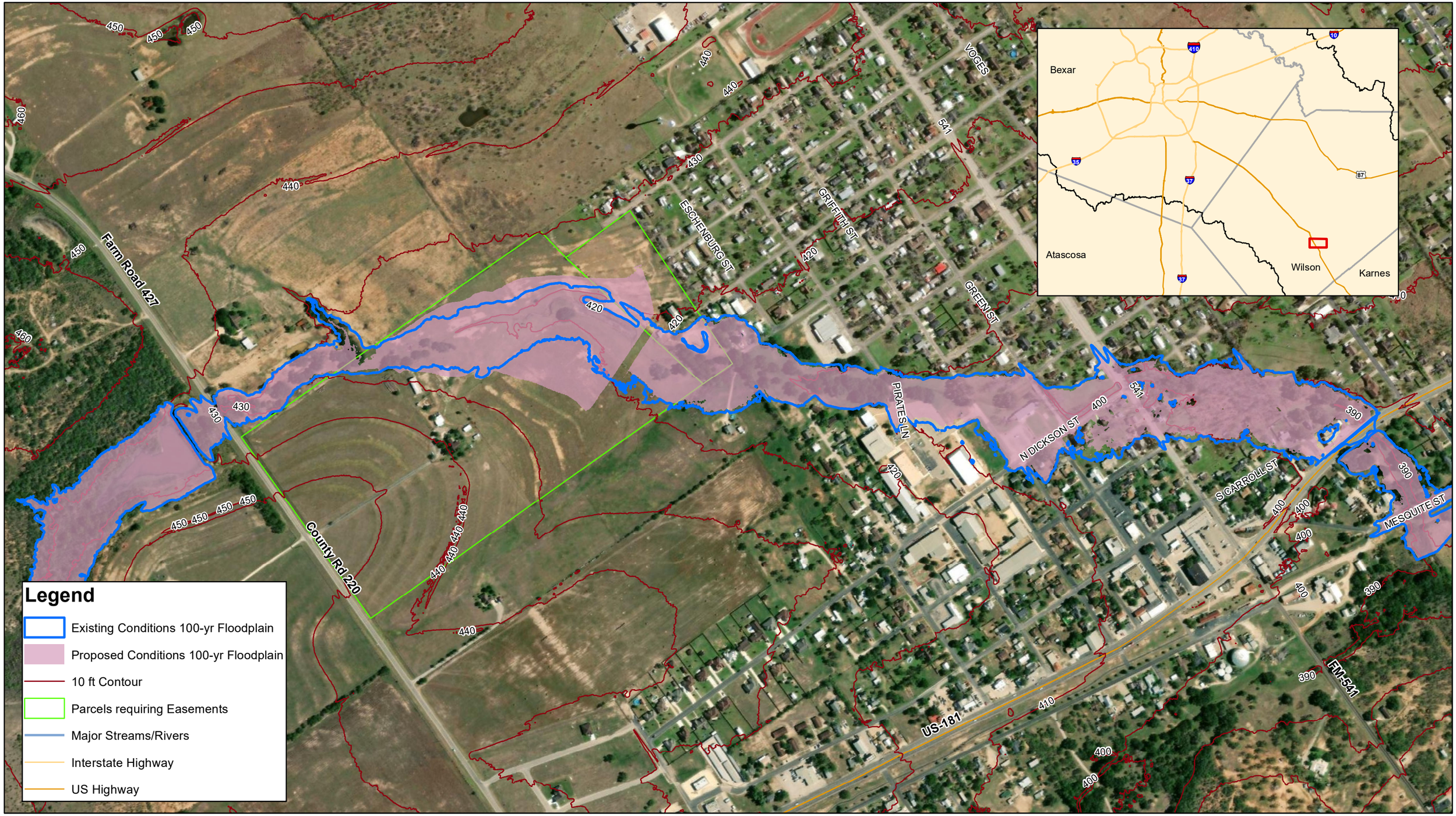
REGION 12 SAN ANTONIO REGIONAL FLOOD PLANNING GROUP

Exhibit 2 - Detention in East Branch Poth Creek Proposed Conditions

0 10 20
Miles

N



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REGION 12 SAN ANTONIO REGIONAL FLOOD PLANNING GROUP

Exhibit 3 - Detention in East Branch Poth Creek Floodplain Comparison

0 10 20
Miles

N

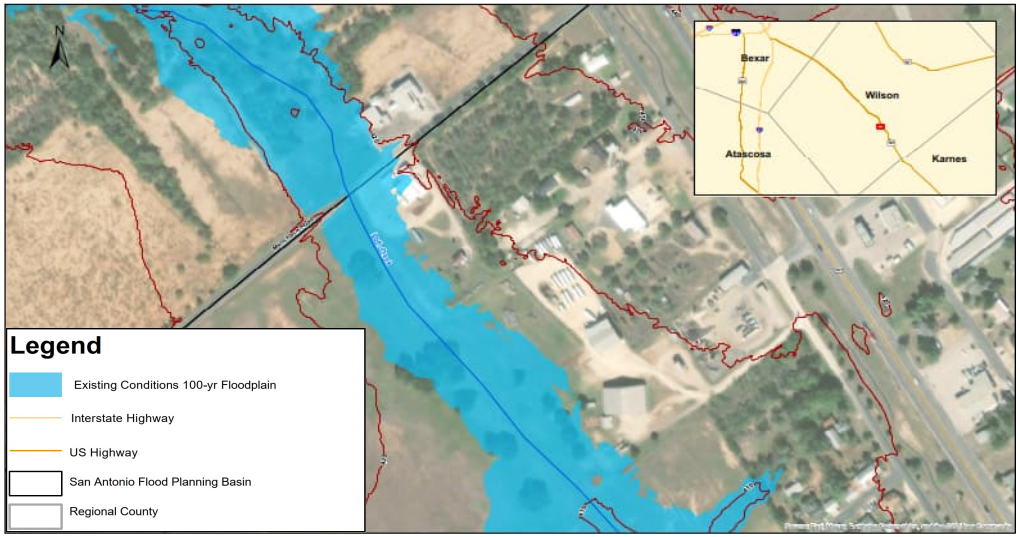
2023 San Antonio Regional Flood Plan
Project Summary Sheet

Project Name: Damage Center 2-Project 1 Culvert Improvements at Menchaca

FMP ID: ----------

Project Sponsor: City of Poth

Project Source: 2012 Wilson County Watershed Master Plan (San Antonio River Authority)



Cost Information

Category	Cost*
Design	$367,872
Real Estate	$0
Environmental	$10,000
Construction	$1,825,973
Total Cost**	**$2,204,000**

*Costs are using 2020 prices
**Rounded up to the nearest thousand

Benefit Cost Analysis (BCA)

Event Damages	Baseline	Project
10-year storm	$390,698	-
25-year storm	$468,852	-
100-year storm	$520,947	-
Total Benefits	**$550,850**	-
BCA	**0.3**	

Impact Analysis

Post-Project Total Removed	Storm Event		
	10-year	25-year	100-year
Residential	-	-	-
Commercial	-	-	-
Flooded Roads (miles)	0.0275	0.044	0.0465
Critical	-	-	-
Others Note	N/A	N/A	N/A
SVI Score			-

LWC Level of Service Existing vs. Proposed

Condition	Level of Service	100-Yr Depth Over Road (ft)
Existing	< 10-Yr	2 ft
Proposed	100-Yr	0

Project Description:

The existing crossing at Menchaca (County Road 220) consists of one 3 ft by 5 ft box culvert. This box culvert is unable to pass the 10 year flood event without significant overtopping. Results of the hydraulic analysis indicate that flooding for up to the 100-year flood event could be alleviated by the addition of a 250 ft long bridge. Improving this crossing would provide emergency access to the areas of Poth west of Poth Creek and allow the school district to utilize their property more effectively. Citizens would also have a safe route to the existing schools and town center.

Amended 2023 San Antonio Regional Flood Plan - Project Narrative

Project Name: **Damage Center 2-Project 1 Culvert Improvements at Menchaca**
FME ID: **----------**
Project Sponsor: **City of Poth**
Date: **4/12/2023**

BACKGROUND INFORMATION:

As part of the amended 2023 San Antonio Regional Flood Plan (the Plan), Task 12 expands on previously identified FMEs from the Plan dated January 10, 2023. Damage Center 2-Project 1 Culvert Improvements at Menchaca, FME ID 121000050, from the 2022 Bexar County Line LWC Engineering Study was further developed during Task 12. This project is sponsored by the City of Poth.

The problem area is located on Menchaca Road crossing with Poth Creek within Wilson County boundaries. The existing crossing at Menchaca (County Road 220) consists of one 3 ft by 5 ft box culvert, which the City of Poth installed to improve the previous dual 24-inch RCP crossing. This box culvert is still insufficient to pass flows without significant overtopping. The 100-yr flood event overtops the road by 2 ft. The results of the hydraulic analysis indicate that overtopping could be alleviated by the addition of a 250 ft long bridge without causing adverse impact. Improving this culvert would provide emergency access to the areas of Poth west of Poth Creek and allow the school district to utilize their property more effectively. Citizens would also have a safe route to US Highway 181.

The Task 12 work that was completed for the Culvert Improvements on Menchaca Road project was a drainage analysis, cost estimate, impact analysis, and a Benefit Cost Analysis (BCA).

PROPOSED PROJECT SCOPE

Refer to the Amended Flood Plan Technical Memo for documented assumptions and methodologies on drainage analysis to determine a feasible solution.

This project will eliminate overtopping of Menchaca Road and provide 100-year conveyance design, removing the road from the existing conditions floodplain extents. Proposed improvements consist of channel excavation and adding a bridge. The proposed bridge design will rise the existing road elevation by about 2.5 ft. The existing structure will be completely replaced by a 25 ft wide and 250 ft long bridge.

PROPOSED PROJECT SCOPING COST

Refer to the Amended Flood Plan Technical Memo for documented assumptions and methodologies on project costs.

The estimated the project cost for the Culvert Improvements at Menchaca is $2,204,000. This was calculated using 2020 prices. The cost includes all the required applicable TWDB FMP costs including basic engineering fees, special services such as surveying, environmental, geotech, etc., other costs such as land/easement acquisition and administration, fiscal services, and contingency. See attached Cost Summary for cost breakdown. If there are underground utilities that require adjustments this may increase depending upon any additional adjustments required. At this time, funding for the project has not been identified or approved.

PROPOSED PROJECT BENEFITS

This project will eliminate overtopping at Menchaca Road and improve the level of service by providing a 100-year conveyance design.

Amended 2023 San Antonio Regional Flood Plan - Project Narrative

Project Name: **Damage Center 2-Project 1 Culvert Improvements at Menchaca**
FME ID: **----------**
Project Sponsor: **City of Poth**
Date: **4/12/2023**

Refer to the Amended Flood Plan Technical Memo for documented assumptions and methodologies on benefit cost analysis.

The 10-, 50-, 100-year benefits that were evaluated for this project include Drainage improvements. The resulting benefit cost analysis was 0.3. The Table 1 below summarizes the components calculated in the TWDB BCA Tool.

Table 1: TWDB BCA Toolkit

Input Into BCA Toolkit

Project Useful Life	30

Event Damages	Baseline	Project
10 - year storm	$390,698	$0
50 - year storm	$468,852	$0
100 - year storm	$520,947	$0

Total Benefits from BCA Toolkit	$550,850
Other Benefits (Not Recreation)	$0
Recreation Benefits	-
Total Costs	$1,873,473
Net Benefits	-$1,322,623
Net Benefits with Recreation	-$1,322,623
Final BCR	0.3
Final BCR with Recreation	0.3

IMPACT ANALYSIS

Refer to the Amended Flood Plan Technical Memo for documented assumptions and methodologies on impact analysis.

Existing and proposed conditions were analyzed for impact, the impacts that were evaluated are the water surface elevations (WSE) and velocities +/-2000 ft of this project area. The WSE and velocities were compared in the HEC-RAS v6.2 model, the proposed conditions showed reduced levels with both components. From the RAS results, the total inundated boundary was reduced in proposed conditions, see Exhibits 1-3 for existing, proposed, and a cross section view upstream of the WSE comparison. Flooded depths over the road were

evaluated in the BCA, reduced impacts show lower flooded depths in proposed conditions. The following table summarizes the level of service pre and post project.

Table 2: Level of Service Existing Vs. Proposed

Condition	Level of Service	100-Yr Depth Over Road (ft)
Existing	< 10-Yr	2 ft
Proposed	100-Yr	0

PROJECT RISKS

ROW/Real Estate Acquisition:

No, land acquisition is not required for this project.

Utilities Coordination:

No, currently there are no evident utility conflicts. During the design phase, utility conflicts should be further evaluated.

Permitting/Environmental:

Yes, a Nationwide Permit and Preconstruction Notification will be required through the USACE.

Stakeholder coordination:

Due to the road improvement and local surrounding community, there will be various stakeholders involved in the process.

MITIGATION OF RISKS

Utility Coordination:

If utility conflicts are found, the utility coordinator will need to closely work with the affected utility companies to ensure timely completion of the proposed project.

Permitting/Environmental:

If permits do arise during the design, coordination and permitting process should be started early on to avoid schedule delays.

Stakeholder Coordination:

There are two processing business less than 100 feet from Poth Creek. Bridge construction will require significant reconstruction of the access to both buildings, as well as drainage adjustments to prevent ponding on both properties.

Road reconstruction will cause traffic disruptions and inconveniences for locals due to limited alternative access points. Public meetings and fliers will help communicate construction impacts to affected businesses of any service interruption or inconvenience. The businesses near the project limits

should be notified several weeks before the construction start date. Construction phasing and traffic control will be an important design component for this project.

NATURE BASED SOLUTION (NBS) CONSIDERATION

The proposed project employs a bridge instead of a low water crossing. Using a bridge benefits the natural ecosystem by allowing more sediment transport, passage of aquatic organisms and does not impound water. The larger opening also allows for natural substrate to cover the culvert bottom to allow for aquatic organism passage.

Landscaping cost (10% of total construction cost) was factored into the total cost for potential channel stabilization and NBS solutions.

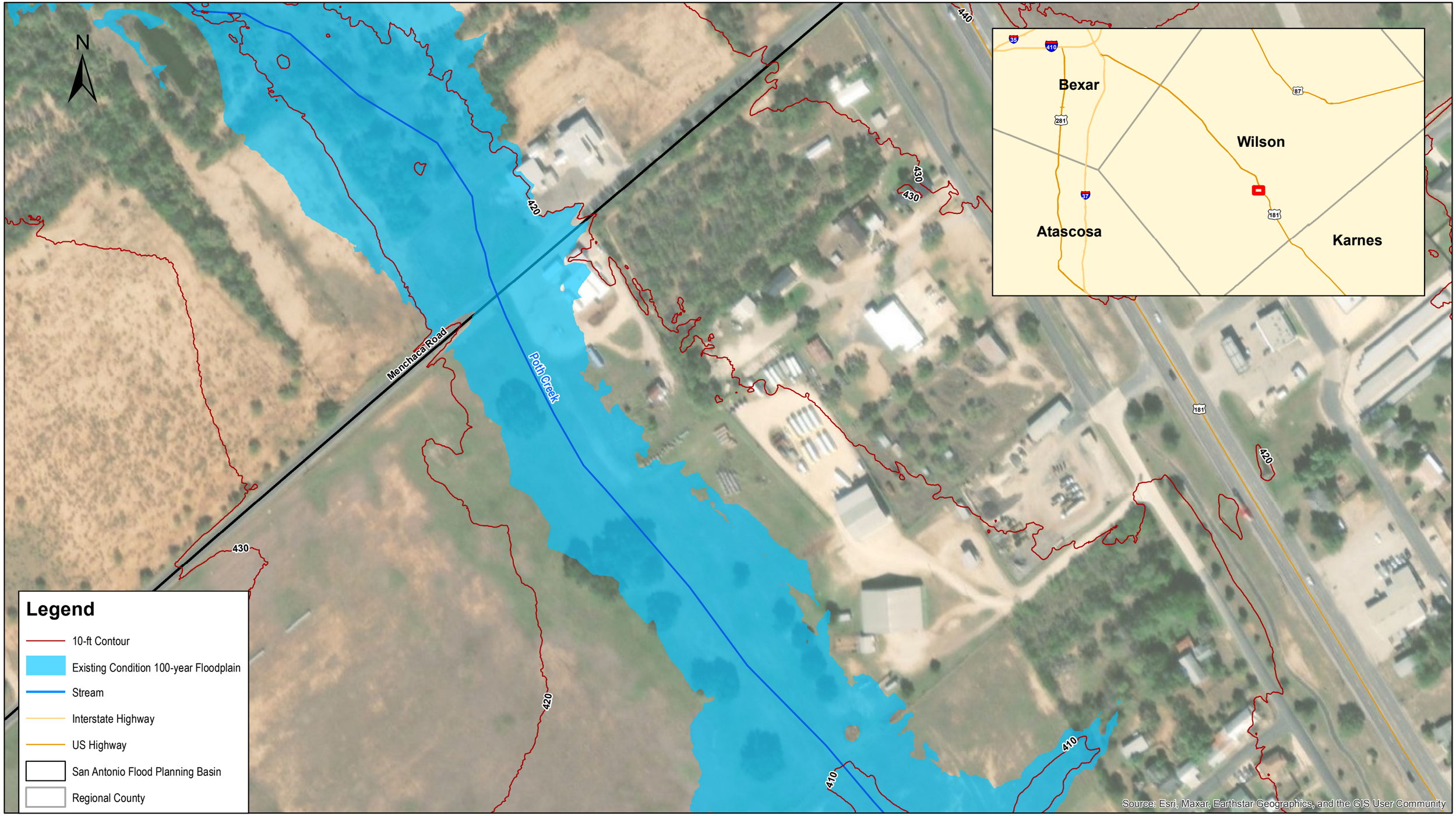
INTERRELATED PROJECTS

This project does not require any interrelated projects to be completed before this project can be constructed.

2023 SAN ANTONIO REGIONAL FLOOD PLAN
PROJECT COST SUMMARY

Project Name:	Culvert Improvements at Menchaca (County Road 220)
Project Sponsor:	Wilson County
Firm Developing:	Halff
Date Developed:	4/12/2023
Unit Prices Used:	11/1/2020

CONSTRUCTION COSTS	
- STREET COST	$288,502.07
- DRAINAGE COST	$1,018,664.28
- LANDSCAPING (3%)	$39,214.99
- BOND AND INSURANCE (3%)	$40,391.44
- BARICADES (3%)	$41,603.18
- MOBILIZATION & PREPARATION OF R.O.W. (11% + 4%)	$201,957.20
TOTAL CONSTRUCTION COST ESTIMATE	**$1,630,333.17**
ENGINEER FEE (Fee Table plus 5%)	$277,156.64
ENGINEER CONTINGENCY (10%)	$27,715.66
CONSTRUCTION CONTINGENCY (10%)	$163,033.32
PERMIT REQUIREMENT COSTS	$63,000.00
ENVIRONMENTAL	$10,000.00
MATERIAL TESTING (2% Construction Cost - <$3M, 1.5% - >$3M)	$32,606.66
TOTAL PROJECT COST ESTIMATE	**$2,203,845.45**



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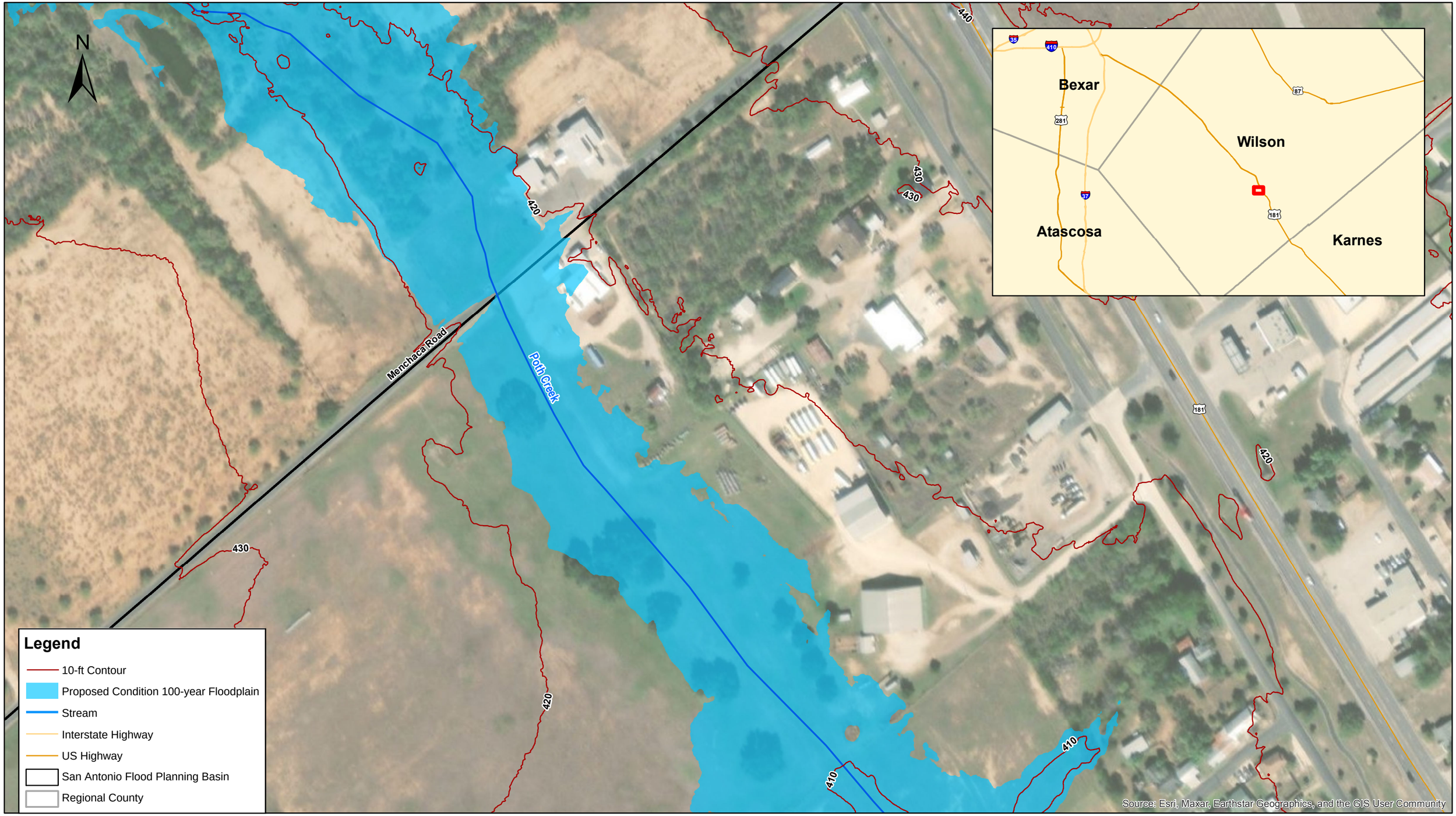
REGION 12 SAN ANTONIO REGIONAL FLOOD PLANNING GROUP

0 12.5 25 Miles

Exhibit 1: Damage Center 2-Project 1 Culvert Improvements at Menchaca Existing Conditions



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REGION 12 SAN ANTONIO REGIONAL FLOOD PLANNING GROUP

0 12.5 25 Miles

Exhibit 2: Damage Center 2-Project 1 Culvert Improvements at Menchaca Proposed Conditions

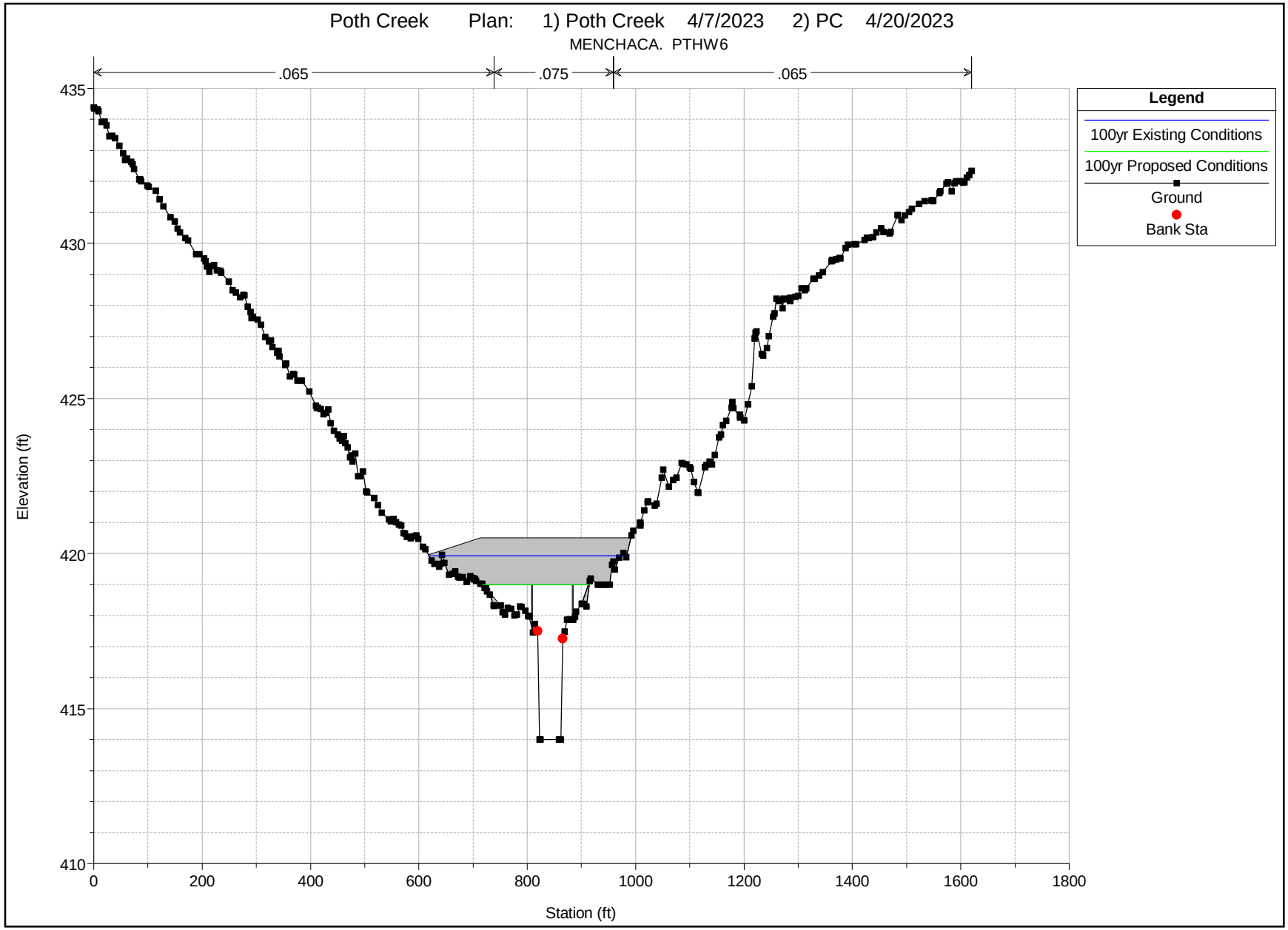


Exhibit #3: Damage Center 2-Project 1 Culvert Improvements at Menchaca WSE Comparison

2023 San Antonio Regional Flood Plan
Project Summary Sheet

Project Name: FM 1863 at Cibolo Creek Low Water Crossing

FMP ID: ----------

Project Sponsor: Comal County/Bexar County

Project Source: Cibolo Creek Watershed Holistic Master Plan

Cost Information

Category	Cost*
Design	$1,580,989
Real Estate	$0
Environmental	$10,000
Construction	$10,139,562
Total Cost**	**$11,731,000**

*Costs are using 2020 prices
**Rounded up to the nearest thousand

Benefit Cost Analysis (BCA)

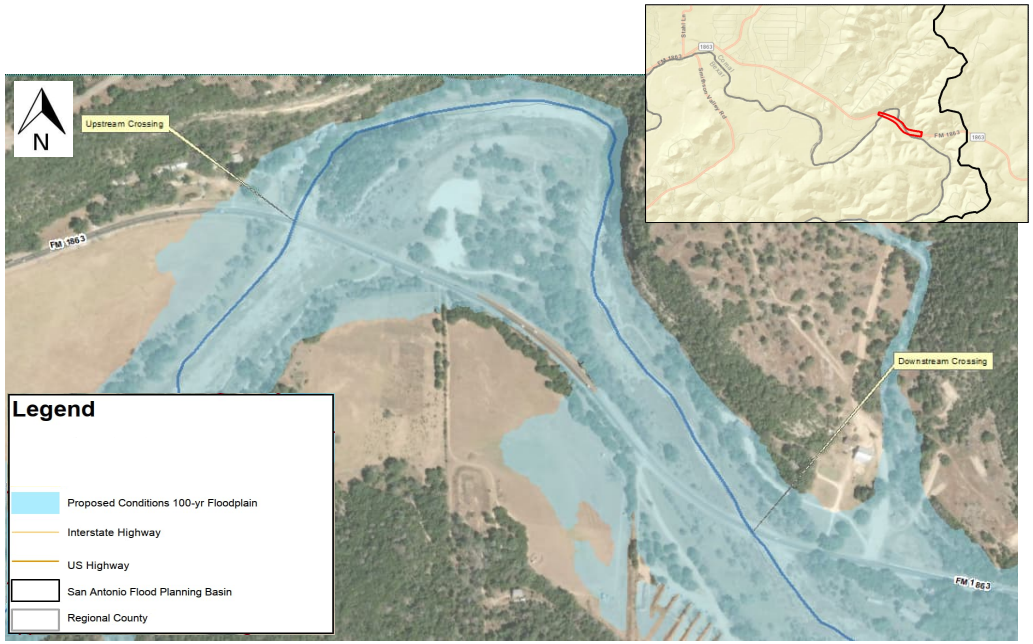
Event Damages	Baseline	Project
10-year storm	$ 2,452,725	-
50-year storm	$ 960,388	-
100-year storm	$ 960,401	$ 8,393
Total Benefits	**$ 8,808,806**	
BCA	**0.9**	

Impact Analysis

Post-Project Total Removed	Storm Event		
	10-year	50-year	100-year
Residential	-	-	-
Commercial	-	-	-
Flooded Roads (miles)	0.18	0.2	-
Critical	-	-	-
Others Note	N/A	N/A	N/A
SVI Score			-

LWC Level of Service Existing Vs. Proposed

Condition	Level of Service	2-Yr Depth Over Road (ft)
Existing	< 2-Yr	3
Proposed	2-Yr	0



Project Description:

There are two low water crossings on FM 1863 at Cibolo Creek on the Comal/Bexar County line that are overtopped by the 2-year annual chance flood event. The upstream crossing is situated closely to residential driveways and elevating the structure will require significant regrading in the right of way and into the residential properties. While intrusion into private properties was minimized as much as possible, lifting the upstream crossing just to the 2-year annual chance flood event will require retaining walls along two residential driveways at least 20 feet into the property line. The downstream proposed bridge had no intrusion into private driveways when modeled to provide relief for the 2-year event.

Amended 2023 San Antonio Regional Flood Plan - Project Narrative

Project Name: **FM1863 at Cibolo Creek - Low Water Crossing**
FMP ID: **----------**
Project Sponsor: **Comal County/Bexar County**
Date: **3/19/2023**

BACKGROUND INFORMATION:

As part of the amended 2023 San Antonio Regional Flood Plan (the Plan), Task 12 expands on previously identified FMEs from the Plan dated January 10, 2023. FM1863 at Cibolo Creek, FME ID 121000098, from Comal County was expanded on during Task 12. The sponsor for this project is Comal County.

The problem area is located along FM 1863 at two low water crossings with Cibolo Creek. Currently there is flooding over both roadway crossings and in the surrounding areas. The 2-year storm is currently overtopping the roadway crossings due to a lower grade in the terrain.

The work completed for the FM 1863 project was an update to the cost estimate, roadway realignment, hydraulic analysis, a Benefit Cost Analysis (BCA), and the previously completed Concept 3A Layouts provided by San Antonio River Authority (SARA).

PROPOSED PROJECT SCOPE

There are two low water crossings within 0.5 miles of each other on FM 1863 at Cibolo Creek. The road is currently overtopped by the 2-year flood event and flood waters reach a maximum depth of 3 foot. The length of roadway being flooded by the 2-year flood event is approximately 0.18 miles. The proposed improvements include constructing a bridge to raise the roadway over the low water crossing at the two intersections with Cibolo Creek and FM 1863. The proposed bridges will safely pass the 2-year and 10-year flood event. The original project proposed to elevate the crossing to pass the 100-year event. It also required upsizing a third crossing from a tributary that meets with Cibolo Creek downstream of the eastern (downstream) low water crossing on FM 1863. The upstream FM 1863 crossing is situated closely to residential driveways and elevating the structure will require significant regrading in the right of way and into the residential properties. While intrusion into private properties was minimized as much as possible, lifting the upstream crossing just to the 2-year annual chance flood event will require retaining walls along two residential driveways at least 20 feet into the property line. The downstream proposed bridge had no intrusion into private driveways when modeled to provide relief for the 10-year event. There are no proposed improvements for the third crossing since the other crossings are not designed to pass the100-year flood event.

PROPOSED PROJECT SCOPING COST

Refer to the Regional Flood Plan Cost Estimate for documented assumptions and methodologies on project costs.

The estimated project costs for FM 1863 at Cibolo Creek LWC improvements are $11,731,000. This was calculated using 2020 prices. The cost includes all the required applicable TWDB FMP costs including basic engineering fees, special services such as surveying, environmental, geotech, etc., other costs such as land/easement acquisition and administration, fiscal services, and contingency. See attached Cost Summary for cost breakdown. If there are underground utilities that require adjustments this may increase depending upon any additional adjustments required. At this time, funding for the project has not been identified or approved.

Amended 2023 San Antonio Regional Flood Plan - Project Narrative

Project Name: **FM1863 at Cibolo Creek - Low Water Crossing**
FMP ID: **----------**
Project Sponsor: **Comal County/Bexar County**
Date: **3/19/2023**

PROPOSED PROJECT BENEFITS

This project will eliminate overtopping at FM 1863 for the 2-year and 10-year storm events by raising the roadway to provide conveyance. The bridge pier design will provide minimal obstruction to the water floodway and remove roadway out of the floodplain. The bridge is designed to have no adverse impact; therefore, the structure will not change the floodplain extents.

Refer to the Amended Flood Plan Technical Memo for documented assumptions and methodologies on benefit cost analysis.

The benefits that were evaluated for this project are, residential buildings, commercial buildings, and recreational. The resulting benefit cost analysis was 0.9. The Table 1 below summarizes the components calculated in the TWDB BCA Tool.

Table 1: TWDB BCA Toolkit

Input Into BCA Toolkit

Project Useful Life	30

Event Damages	Baseline	Project
10 - year storm	$2,452,725	$0
50 - year storm	$960,388	$0
100 - year storm	$960,401	$8,393

Total Benefits from BCA Toolkit	8,808,806
Other Benefits (Not Recreation)	$0
Recreation Benefits	-
Total Costs	$9,971,736
Net Benefits	$1,162,930
Net Benefits with Recreation	$1,162,930
Final BCR	0.9
Final BCR with Recreation	0.9

Amended 2023 San Antonio Regional Flood Plan - Project Narrative

Project Name: **FM1863 at Cibolo Creek - Low Water Crossing**
FMP ID: **----------**
Project Sponsor: **Comal County/Bexar County**
Date: **3/19/2023**

IMPACT ANALYSIS

Refer to the Amended Flood Plan Technical Memo for documented assumptions and methodologies on impact analysis.

Existing and proposed conditions were analyzed for impact, the impacts that were evaluated are the water surface elevations (WSE) and velocities +/-2000 ft of this project area. See Exhibits 1-3 for existing, proposed, and an US view of the comparison of WSE. Flooded depths over the road were evaluated in the BCA, reduced impacts show lower flooded depths in proposed conditions. The following table summarizes the level of service pre and post project;

Table 2: Level of Service Existing Vs. Proposed

Condition	Level of Service	2-Yr Depth Over Road (ft)
Existing	< 2-Yr	3
Proposed	2-Yr	0

PROJECT RISKS

ROW/Real Estate Acquisition:
No, land acquisition is not required.

Utilities Coordination:
No, utility coordination will not be necessary.

Permitting/Environmental:
Yes, a TxDOT permit or interlocal agreement will be required as well as a Preconstruction Notification (PCN) permit.

Stakeholder coordination:
TxDOT, Comal County and Bexar County will be the main stakeholders involved.

MITIGATION OF RISKS

Stakeholder Coordination/Permitting:
Coordination and permitting process should be started early on with TxDOT and Bexar County acquisitions to avoid schedule delays.

FM 1863 is a medium to high-traffic area and provides access to rural residential communities and a few businesses. Road reconstruction will cause traffic disruptions and inconveniences for a few private entities. Public meetings and flyers will help communicate construction impacts to affected businesses

of any service interruption or inconvenience. Any businesses near the project limits should be notified several weeks before the construction start date. Construction phasing and traffic control will be an important design component for this project.

NATURE BASED SOLUTION CONSIDERATION

The proposed project employs a bridge instead of a low water crossing. Using a bridge benefits the natural ecosystem by allowing more sediment transport, passage of aquatic organisms and does not impound water. The larger opening also allows for natural substrate to cover the culvert bottom to allow for aquatic organism passage.

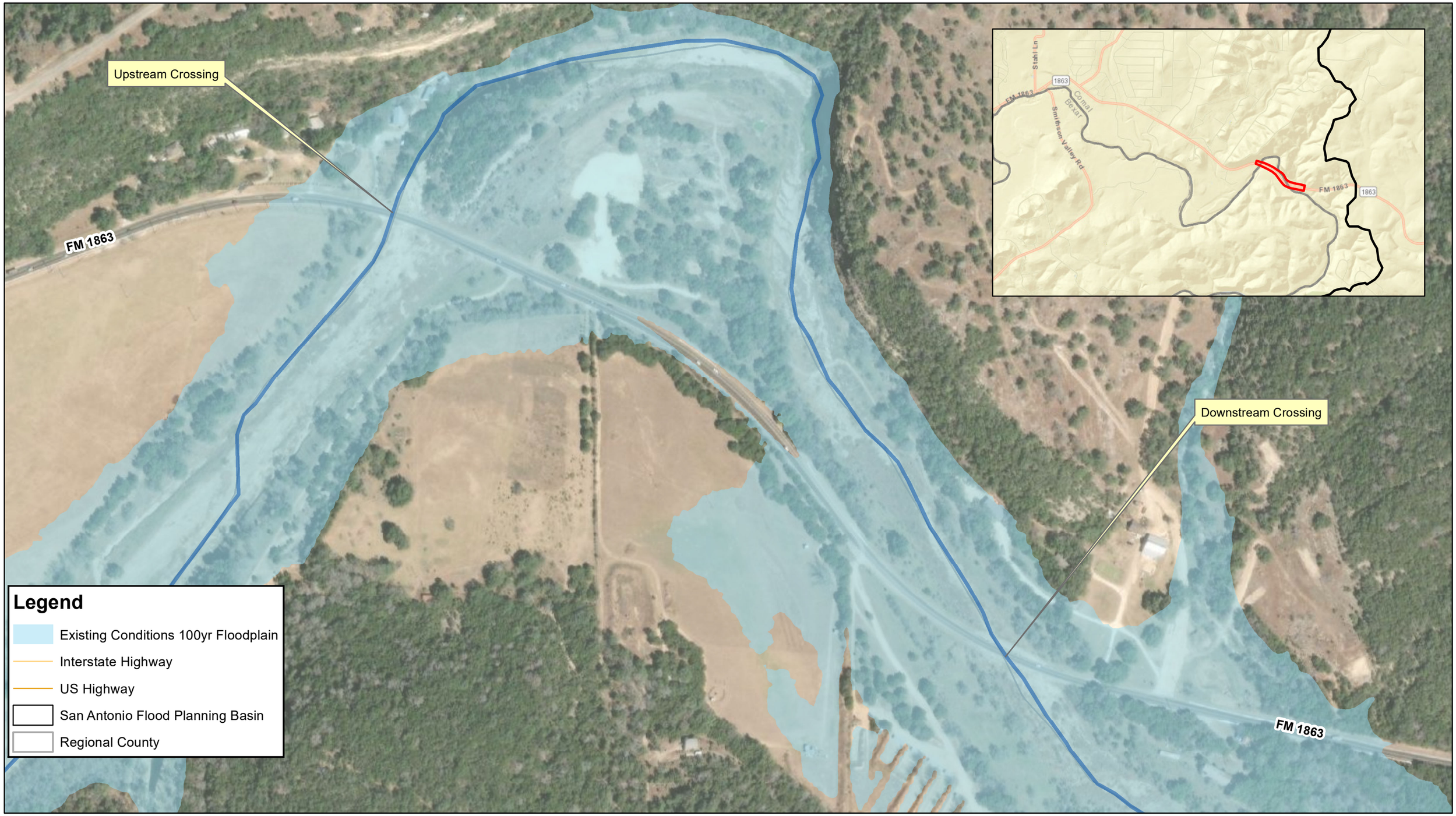
INTERRELATED PROJECTS

This project does not require any interrelated projects to be completed before this project can be constructed.

2023 SAN ANTONIO REGIONAL FLOOD PLAN
PROJECT COST SUMMARY

Project Name:	FM 1863 at Cibolo Creek Low Water Crossing
Project Sponsor:	Comal County/Bexar County
Firm Developing:	Halff
Date Developed:	3/3/2023
Unit Prices Used:	11/1/2020

CONSTRUCTION COSTS	
- STREET COST	$652,556.79
- DRAINAGE COST	$6,638,640.30
- LANDSCAPING (3%)	$218,735.91
- BOND AND INSURANCE (3%)	$225,297.99
- BARICADES (3%)	$232,056.93
- MOBILIZATION & PREPARATION OF R.O.W. (11% + 4%)	$1,126,489.95
TOTAL CONSTRUCTION COST ESTIMATE	**$9,093,777.88**
ENGINEER FEE (Fee Table plus 5%)	$1,409,535.57
ENGINEER CONTINGENCY (10%)	$140,953.56
CONSTRUCTION CONTINGENCY (10%)	$909,377.79
PERMIT REQUIREMENT COSTS	$30,500.00
ENVIRONMENTAL	$10,000.00
MATERIAL TESTING (2% Construction Cost - <$3M, 1.5% - >$3M)	$136,406.67
TOTAL PROJECT COST ESTIMATE	**$11,730,551.47**



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REGION 12 SAN ANTONIO REGIONAL FLOOD PLANNING GROUP

Exhibit 1 - FM 1863 at Cibolo Creek LWC Existing Conditions

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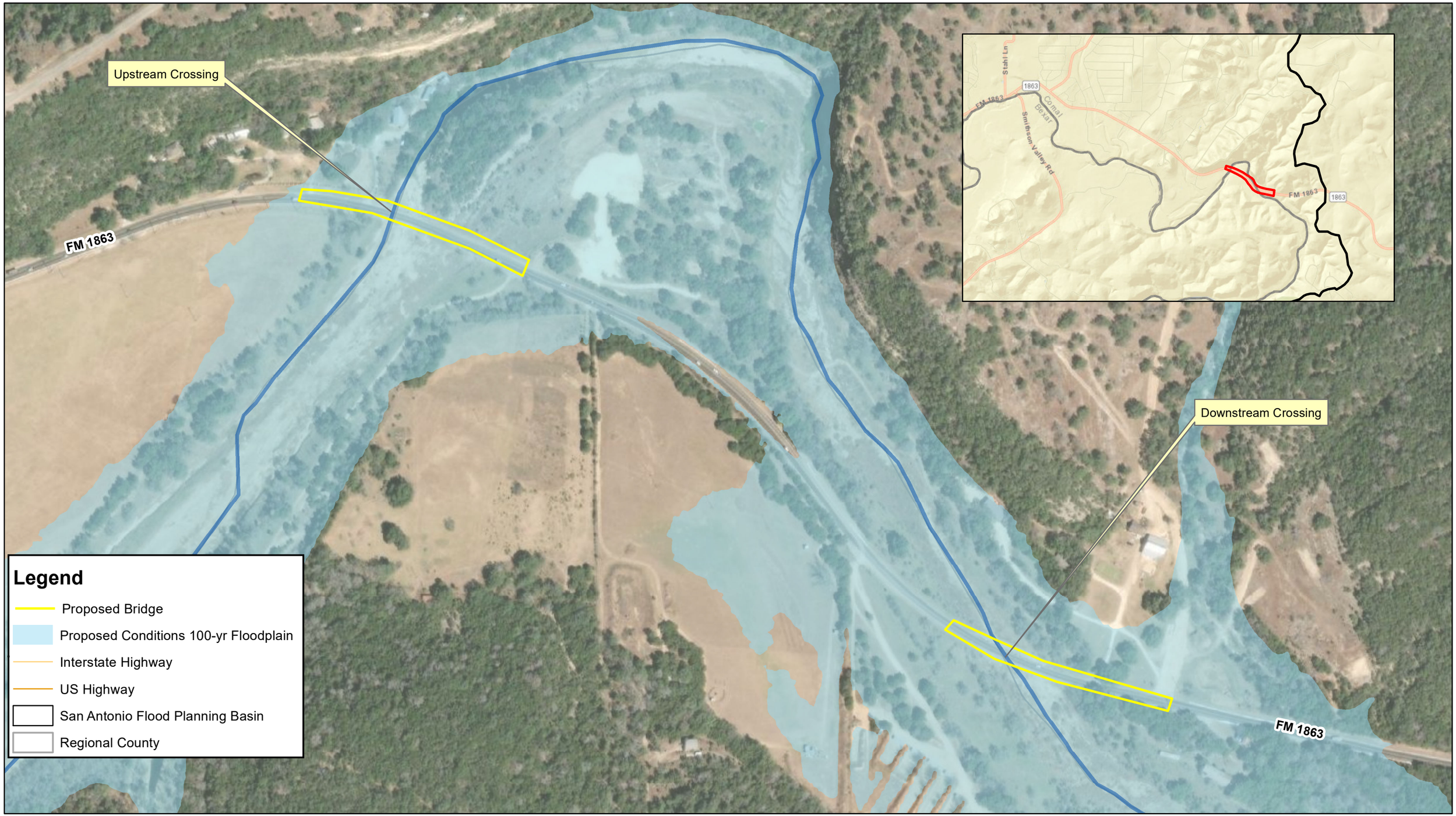

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REGION 12 SAN ANTONIO REGIONAL FLOOD PLANNING GROUP

Exhibit 2 - FM 1863 at Cibolo Creek LWC Proposed Conditions

N

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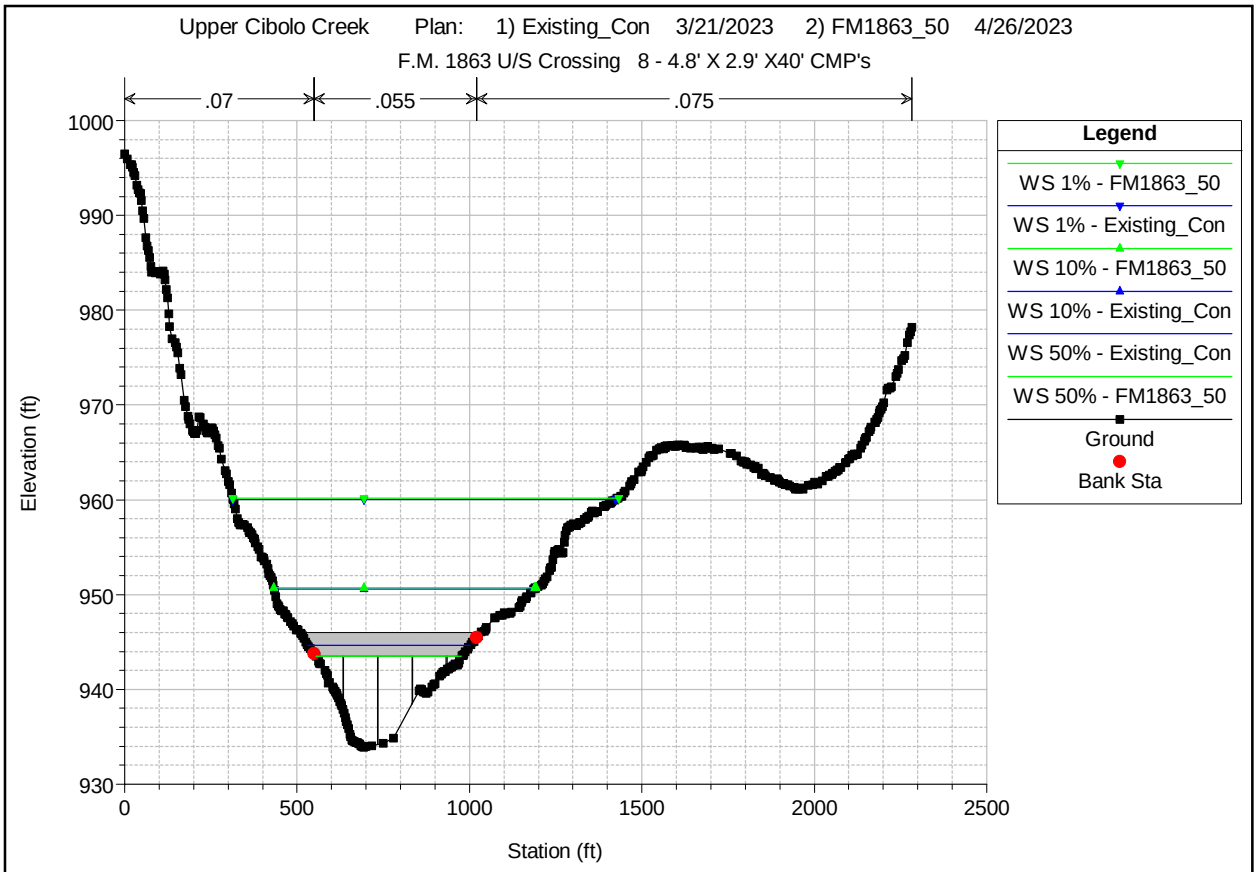
Miles


Upper Cibolo Creek Plan: 1) Existing_Con 3/21/2023 2) FM1863_50 4/26/2023
F.M. 1863 U/S Crossing 8 - 4.8' X 2.9' X40' CMP's
.07
.055
.075
Elevation (ft)
Station (ft)
Legend
WS 1% - FM1863_50
WS 1% - Existing_Con
WS 10% - FM1863_50
WS 10% - Existing_Con
WS 50% - Existing_Con
WS 50% - FM1863_50
Ground
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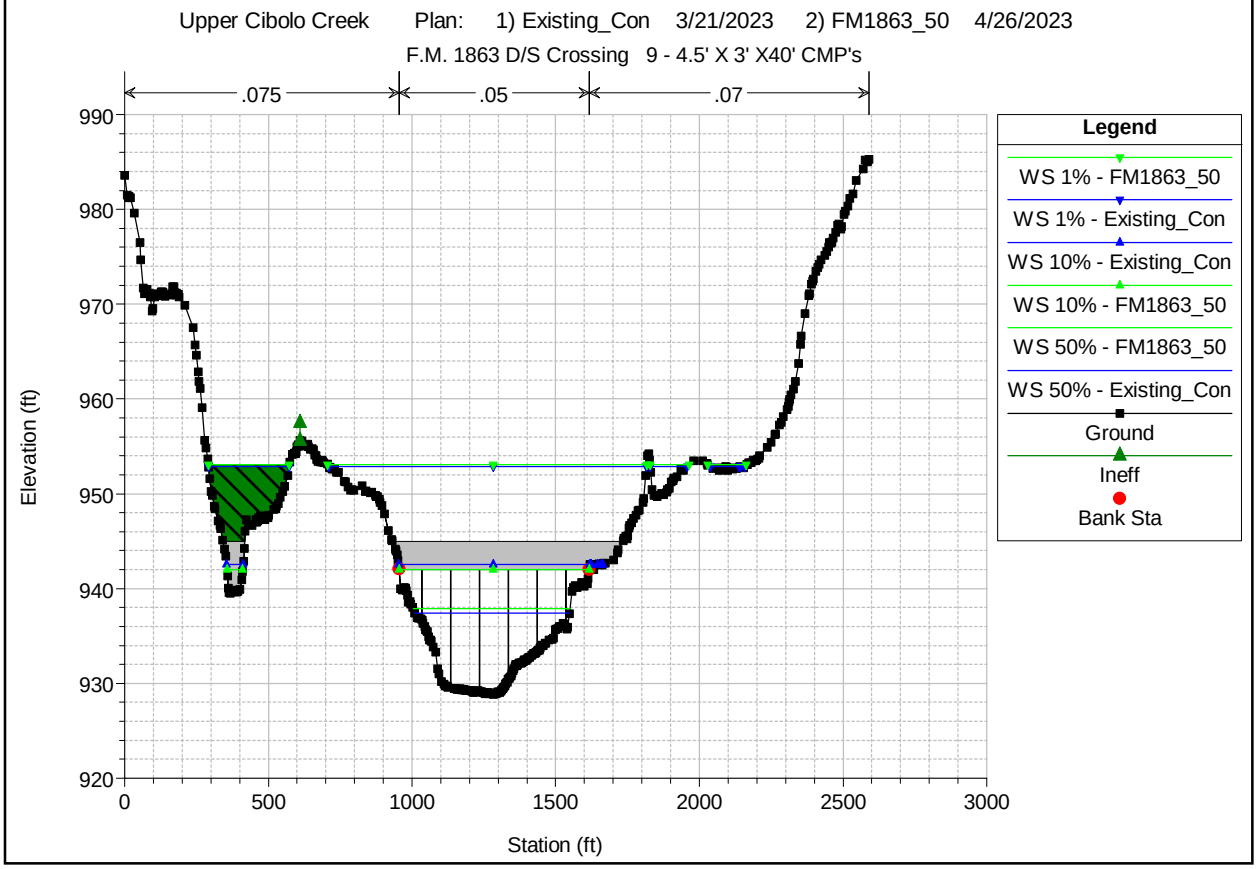
Upper Cibolo Creek Plan: 1) Existing_Con 3/21/2023 2) FM1863_50 4/26/2023
F.M. 1863 D/S Crossing 9 - 4.5' X 3' X40' CMP's
.075
.05
.07
Elevation (ft)
Station (ft)
Legend
WS 1% - FM1863_50
WS 1% - Existing_Con
WS 10% - Existing_Con
WS 10% - FM1863_50
WS 50% - FM1863_50
WS 50% - Existing_Con
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2023 San Antonio Regional Flood Plan
Project Summary Sheet

Project Name: Trainer Hale at Cibolo Creek

FMP ID: ----------

Project Sponsor: Bexar County/Guadalupe County

Project Source: Bexar County

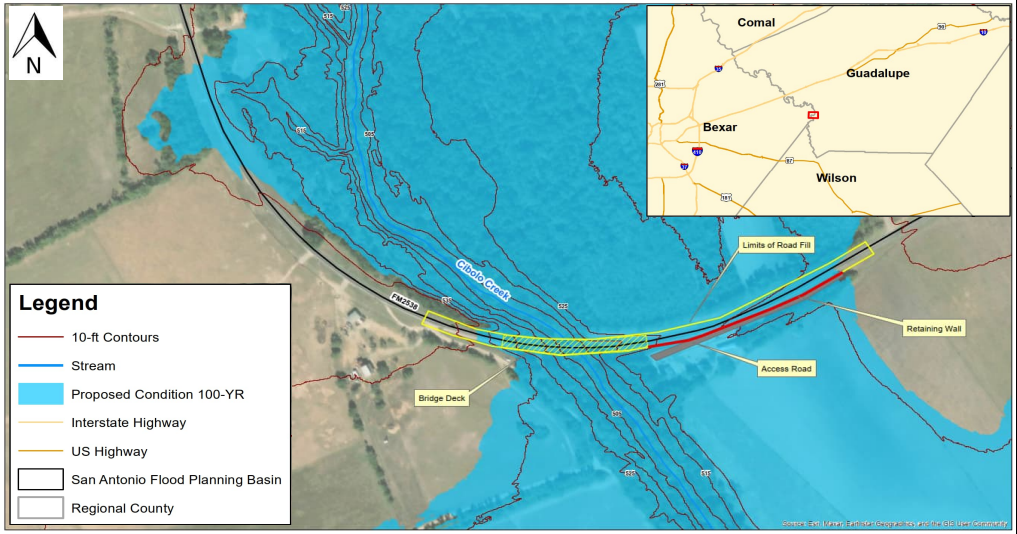
Cost Information

Category	Cost*
Design	$1,408,772
Real Estate	$0
Environmental	$10,000
Construction	$8,898,892
Total Cost**	**$10,317,700**

*Costs are using 2020 prices
**Rounded up to the nearest thousand

Benefit Cost Analysis (BCA)

Event Damages	Baseline	Project
10-year storm	$722,277	$0
50-year storm	$756,439	$0
100-year storm	$854,044	$0
Total Benifits	**$ 939,501**	
BCA	**0.1**	



Impact Analysis

Post-Project Total Removed	Storm Event		
	10-year	50-year	100-year
Residential	-	-	-
Commercial	-	-	-
Critical	-	-	-
Road (miles)	0.15	0.22	0.26
Others Note	-	-	-
SVI Score	-	-	-

LWC Level of Service Existing Vs. Proposed

Condition	Level of Service	100-Yr Depth Over Road (ft)
Existing	< 10-Yr	29 ft
Proposed	100-Yr	0

Project Description:

At the Trainer Hale Rd (FM 2538) crossing with Cibolo Creek, the road is currently overtopped by the 10-year flood event at a maximum depth of 21 ft. The proposed project would replace the existing bridge with a 520ft bridge, which could pass the 100-year flood event. The bridge pier design will provide minimal obstruction to the water floodway and remove roadway out of the floodplain. The new bridge will raise the road deck by 35 feet, which will cause accessibility issues for two residential homes adjacent to Cibolo Creek. To provide access, the eastern side of the proposed bridge would be supported by a retaining wall. This retaining wall will allow construction of a 900 ft by 12 ft driveway in the TxDOT right of way, adjacent to the bridge structure at grade. The bridge is designed to have no adverse impact; therefore, the structure will not change the floodplain extents. Trainer Hale Rd crossing (FM 2538) is along Bexar/Guadalupe County line and within TxDOT's right-of-way. The bridge is a TxDOT maintained asset. The proposed bridge will be approximately 516ft in length and 34ft wide.

Amended 2023 San Antonio Regional Flood Plan - Project Narrative

Project Name: **Trainer Hale at Cibolo Creek**
FMP ID:
Project Sponsor: **Bexar County**
Date: **3/6/2023**

BACKGROUND INFORMATION

As part of the amended 2023 San Antonio Regional Flood Plan (the Plan), Task 12 expands on previously identified FMEs from the Plan dated January 10th, 2023. Trainer Hale Rd at Cibolo Creek - Low Water Crossing project on the Bexar County & Guadalupe County line, FME 121000163 was expanded on during Task 12. The sponsor for this project is Bexar County.

The problem area is located along Trainer Hale (FM 2583) at a low water crossing over Cibolo Creek. Currently there is an existing bridge crossing that does not contain the flooding. The 10-year storm event overtops the roadway crossing by a max depth of 21 ft due to a lower grade in the terrain.

The work completed for the Trainer Hale at Cibolo Creek project was an update to the cost estimate, roadway realignment, hydraulic analysis, and a Benefit Cost Analysis (BCA).

PROPOSED PROJECT SCOPE

At the Trainer Hale Rd (FM 2538) crossing with Cibolo Creek, the road is currently overtopped by the 10-year flood event at a maximum depth of 21 ft. The proposed project would replace the existing bridge with a 520 ft bridge, which could pass the 100-year flood event. The bridge pier design will provide minimal obstruction to the water floodway and remove roadway out of the floodplain. The new bridge will raise the road deck by 35 feet, which will cause accessibility issues for two residential homes adjacent to Cibolo Creek. To provide access, the eastern side of the proposed bridge would be supported by a retaining wall. This retaining wall will allow construction of a 900 ft by 12 ft driveway in the TxDOT right of way, adjacent to the bridge structure at grade. The bridge is designed to have no adverse impact; therefore, the structure will not change the floodplain extents. Trainer Hale Rd crossing (FM 2538) is along Bexar/Guadalupe County line and within TxDOT's right-of-way. The bridge is a TxDOT maintained asset. The proposed bridge will be approximately 516 ft in length and 34 ft wide.

PROPOSED PROJECT SCOPING COST

Refer to the Regional Flood Plan Cost Estimate for documented assumptions and methodologies on project costs.

These costs were input into resulting in a project cost of $10,317,700. There are drainage costs that require adjustments that may increase depending upon any additional adjustments required. Currently, funding for the project has not been identified or approved.

PROPOSED PROJECT BENEFITS

This project will eliminate overtopping at Trainer Hale for the 100-year storm event by raising the roadway to provide conveyance. The bridge pier design will provide minimal obstruction to the water floodway and remove roadway out of the floodplain. The bridge is designed to have no adverse impact; therefore, the structure will not change the floodplain extents.

Amended 2023 San Antonio Regional Flood Plan - Project Narrative

Project Name: **Trainer Hale at Cibolo Creek**
FMP ID:
Project Sponsor: **Bexar County**
Date: **3/6/2023**

Refer to the Amended Flood Plan Technical Memo for documented assumptions and methodologies on benefit cost analysis.

The benefits that were evaluated for this project are, residential buildings, commercial buildings, and recreational. The resulting benefit cost analysis was 0.1. The Table 1 below summarizes the components calculated in the TWDB BCA Tool.

Table 1: TWDB BCA Toolkit

Input Into BCA Toolkit

Project Useful Life	30

Event Damages	Baseline	Project
10 - year storm	$722,277	$0
50 - year storm	$756,439	$0
100 - year storm	$854,044	$0

Total Benefits from BCA Toolkit	$ 939,501
Other Benefits (Not Recreation)	$0
Recreation Benefits	-
Total Costs	$7,660,393
Net Benefits	-$6,720,892
Net Benefits with Recreation	-$6,720,892
Final BCR	0.1
Final BCR with Recreation	0.1

IMPACT ANALYSIS

Refer to the Amended Flood Plan Technical Memo for documented assumptions and methodologies on impact analysis.

Existing and proposed conditions were analyzed for impact, the impacts that were evaluated are the water surface elevations (WSE) and velocities +/-2000 ft of this project area. The WSE and velocities were compared in the HEC-RAS v6.2.0 model, the proposed conditions showed reduced levels with both components. See Exhibits 1-3 for existing, proposed, and an US view of the comparison of WSE. Flooded depths over the road

were evaluated in the BCA, reduced impacts show lower flooded depths in proposed conditions. The following table summarizes the level of service pre and post project.

Table 2: Level of Service Existing Vs. Proposed

Condition	Level of Service	100-Yr Depth Over Road (ft)
Existing	< 10-Yr	29
Proposed	100-Yr	0

PROJECT RISKS

ROW/Real Estate Acquisition:

No, land acquisition is not required.

Utilities Coordination:

No, utility coordination will not be necessary.

Permitting/Environmental:

Yes, a TxDOT permit or interlocal agreement will be required as well as a Preconstruction Notification (PCN) permit.

Stakeholder coordination:

Due to road improvement and drainage considerations, there will be one stakeholder involved that owns the area where all the construction will tentatively occur. Coordination with stakeholder will be required. Additionally, Trainer Hale (FM 2538) and the bridge crossing are TxDOT maintained assets.

MITIGATION OF RISKS

Stakeholder Coordination/Permitting:

Coordination and permitting processes should be started early on with USACE to avoid schedule delays. In addition, Trainer Hale is a TxDOT roadway, and the bridge is a TxDOT maintained asset. Coordination and a partnership with TxDOT will need to be established with TxDOT for a project to occur in this location. Improvements to this road would likely need to adhere to TxDOT standards.

Trainer Hale Road is a low-traffic area. Road reconstruction will cause traffic disruptions and inconveniences for a few private entities. Public meetings and flyers will help communicate construction impacts to affected businesses of any service interruption or inconvenience. Any businesses near the project limits should be notified several weeks before the construction start date. Construction phasing and traffic control will be an important design component for this project.

Amended 2023 San Antonio Regional Flood Plan - Project Narrative

Project Name: **Trainer Hale at Cibolo Creek**
FMP ID:
Project Sponsor: **Bexar County**
Date: **3/6/2023**

NATURE BASED SOLUTION CONSIDERATION

The proposed project employs a bridge instead of a low water crossing. Using a bridge benefits the natural ecosystem by allowing more sediment transport, passage of aquatic organisms and does not impound water. The larger opening also allows for natural substrate to cover the culvert bottom to allow for aquatic organism passage.

Landscaping cost (3% of total construction cost) was factored into the total cost for potential channel stabilization and NBS solutions.

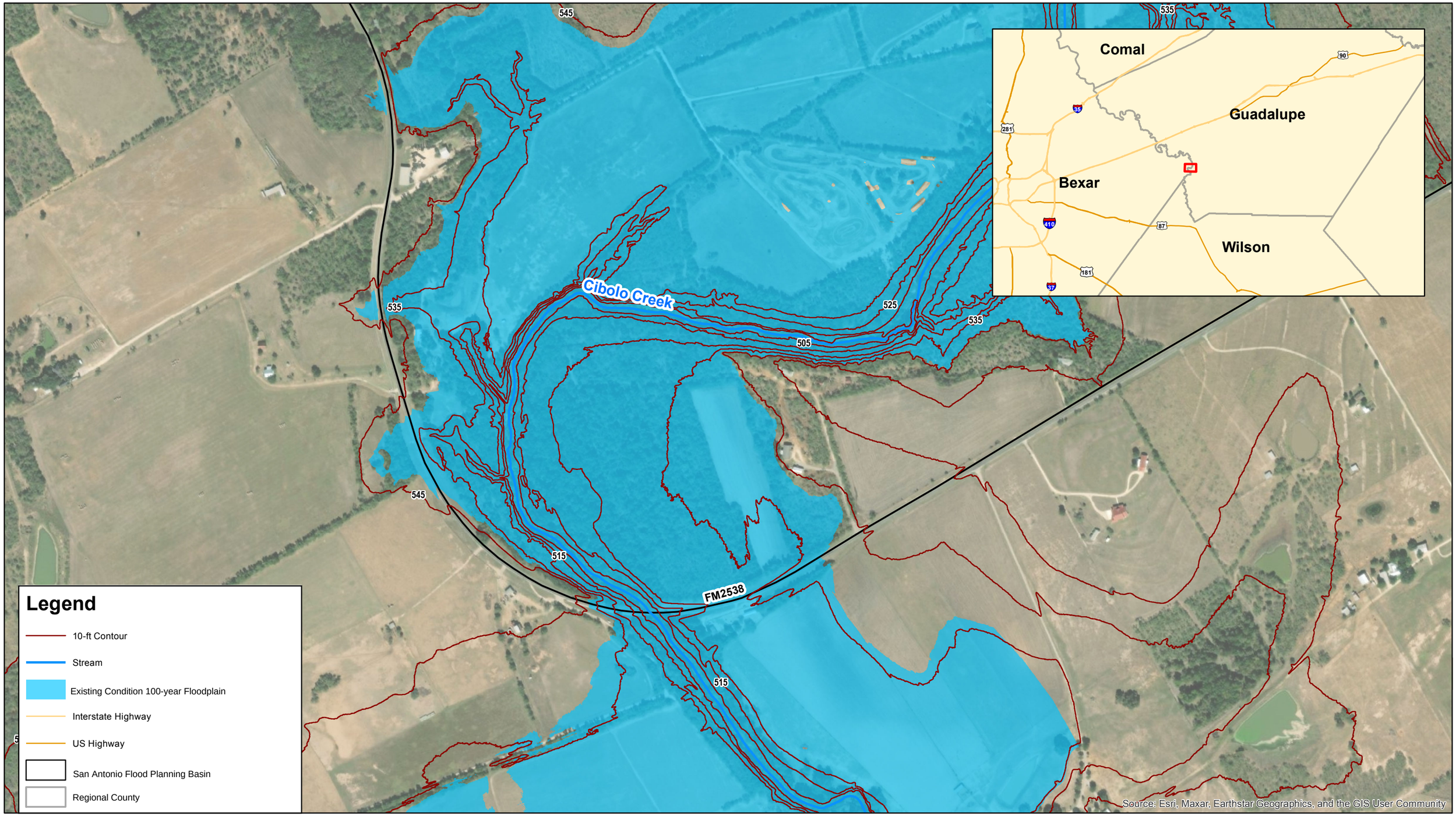
INTERRELATED PROJECTS

This project does not require any interrelated projects to be completed before this project can be constructed.

2023 SAN ANTONIO REGIONAL FLOOD PLAN
PROJECT COST SUMMARY

Project Name:	Trainer Hale at Cibolo Creek
Project Sponsor:	Bexar County/Guadalupe County
Firm Developing:	HALFF
Date Developed:	3/3/2023
Unit Prices Used:	11/1/2020

CONSTRUCTION COSTS	
- STREET COST	$1,524,618.65
- DRAINAGE COST	$4,360,222.55
- TREE PRESERVATION (2%)	$117,696.82
- LANDSCAPING (10%)	$588,484.12
- BOND AND INSURANCE (3%)	$197,730.66
- BARICADES (3%)	$203,662.58
- MOBILIZATION & PREPARATION OF R.O.W. (11% + 4%)	$988,653.32
TOTAL CONSTRUCTION COST ESTIMATE	**$7,981,068.71**
ENGINEER FEE (Fee Table plus 5%)	$1,237,065.65
ENGINEER CONTINGENCY (10%)	$123,706.56
CONSTRUCTION CONTINGENCY (10%)	$798,106.87
DESIGN ENHANCEMENT (0% Construction Costs)	$0.00
PERMIT REQUIREMENT COSTS	$48,000.00
ENVIRONMENTAL	$10,000.00
MATERIAL TESTING (2% Construction Cost - <$3M, 1.5% - >$3M)	$119,716.03
TOTAL PROJECT COST ESTIMATE	**$10,317,663.82**



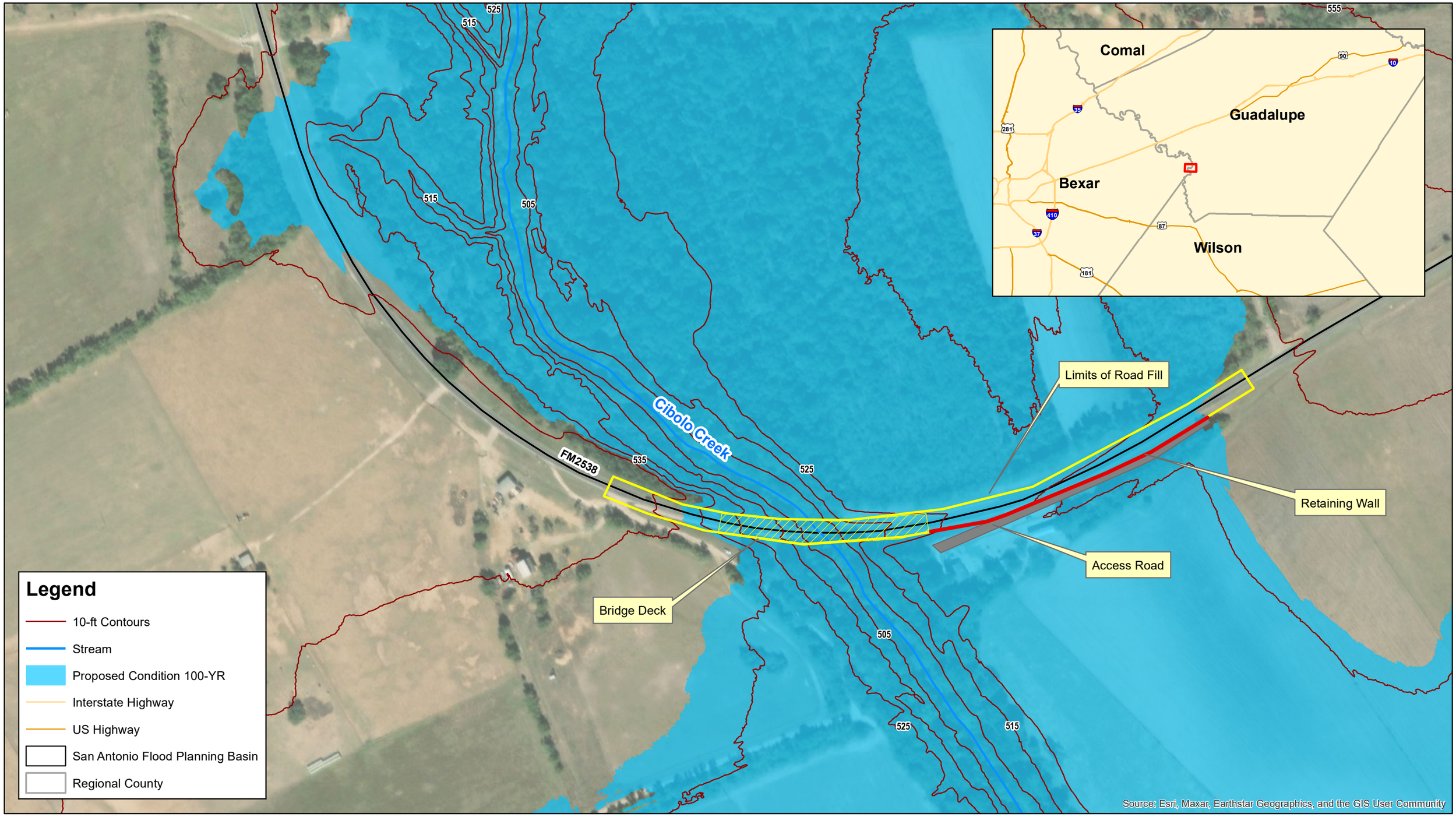
halff

REGION 12 SAN ANTONIO REGIONAL FLOOD PLANNING GROUP

Exhibit 1 - Trainer Hale at Cibolo Creek Existing Conditions

N

0 12.5 25
Miles



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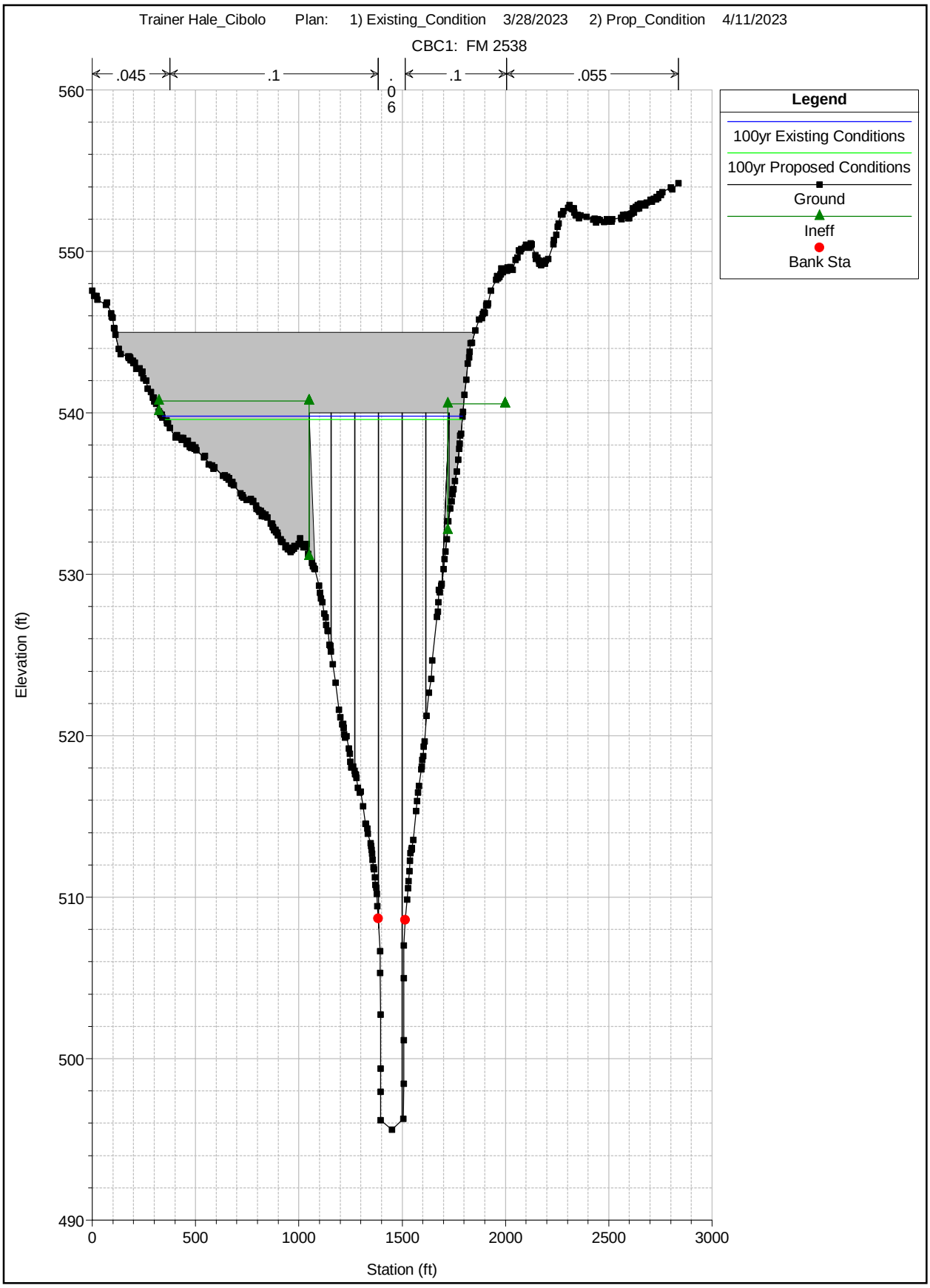
REGION 12 SAN ANTONIO REGIONAL FLOOD PLANNING GROUP

Exhibit 2 - Trainer Hale at Cibolo Creek Proposed Conditions

0 12.5 25
Miles

N


Trainer Hale_Cibolo Plan: 1) Existing_Condition 3/28/2023 2) Prop_Condition 4/11/2023
CBC1: FM 2538
.045
.1
.06
.1
.055
Legend
100yr Existing Conditions
100yr Proposed Conditions
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
560
550
540
530
520
510
500
490
0
500
1000
1500
2000
2500
3000

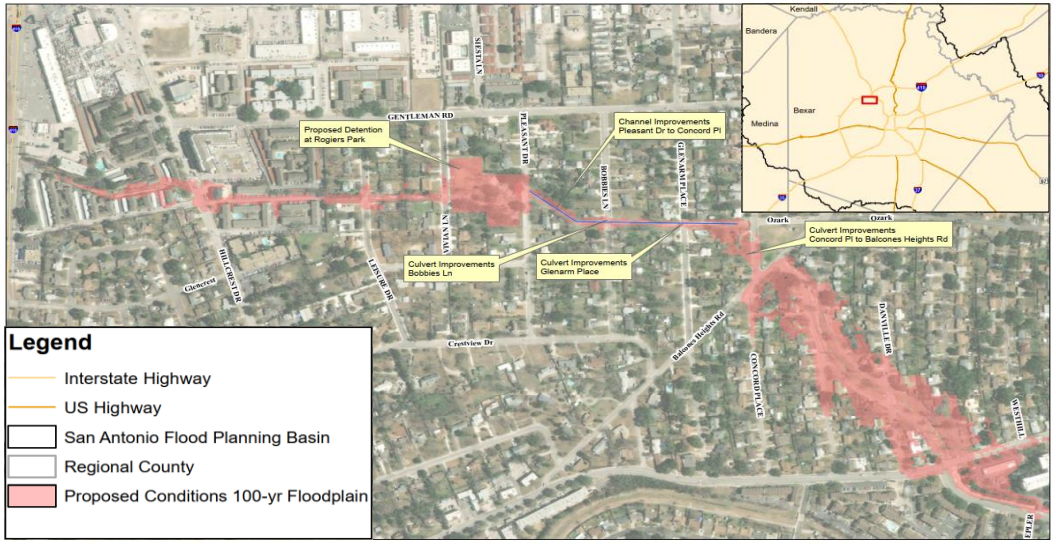
2023 San Antonio Regional Flood Plan
Project Summary Sheet

Project Name: Woodlawn Lake Option 2

FMP ID: ----------

Project Sponsor: City of Balcones Heights

Project Source: San Antonio River Authority



Cost Information

Category	Cost*
Design	$1,302,147
Real Estate	$0
Environmental	$117,000
Construction	$7,776,532
Total Cost**	**$9,196,000**

*Costs are using 2020 prices
**Rounded up to the nearest thousand

Benefit Cost Analysis (BCA)

Event Damages	Baseline	Project
10-year storm	$ 882,219	$ -
25-year storm	$ 966,414	$ -
100-year storm	$ 1,008,694	$ 195,993
Total Benefits	**$ 1,140,006**	
BCA	**0.1**	

Impact Analysis

Post-Project Total Removed	Storm Event		
	10-year	50-year	100-year
Residential	0	4	7
Commercial	-	-	-
Flooded Roads (miles)	0.21	0.2	0.17
Critical	-	-	-
Others Note	N/A	N/A	N/A
SVI Score			-

Project Description:

Flooding occurs in the City of Balcones Heights from an Unnamed Tributary of Alazan Creek. The Upper Woodlawn Lake Drainage Study created for the San Antonio River Authority in 2014 proposed two options for flood mitigation through the City. Option 2 is the only viable option since land scoped for detention in Option 1 has since been developed. The Option 2 improvements include channel widening, 3 culvert upgrades, and development of a detention pond in the City of Balcones' Rogiers Park. Channel improvements include concrete-lining in high velocity areas or where ROW constraints limited the top width of the proposed channel. The proposed culvert upgrades are at Concord Place, Glenarm Place and Bobbies Lane. The proposed pond at Rogiers Park has two chambers with a total storage capacity of 8.6 acre-feet and a maximum depth of 6 feet. The pond was divided into two chambers; each chamber had a 36-inch concrete pipe outfall connecting to the existing storm drains upstream of Pleasant Drive. Mapping of the proposed improvements show a decrease the floodplain from Pleasant Drive to Balcones Heights Rd, however, flooding still occurs over Concord Pl to Balcones Heights Road. 7 homes would be removed from the 100-year annual chance rain event. Downstream impacts are mitigated by the proposed detention pond.

Amended 2023 San Antonio Regional Flood Plan - Project Narrative

Project Name: **Woodlawn Lake Option 2**
FMP ID: **----------**
Project Sponsor: **City of Balcones Heights**
Date: **3/3/2023**

BACKGROUND INFORMATION:

As part of the amended 2023 San Antonio Regional Flood Plan (the Plan), Task 12 expands on previously identified FMEs from the Plan dated January 10, 2023. The Woodlawn Lake Option 2 project, FME ID 121000067, from the 2014 Upper Woodlawn Lake Drainage Study was further developed during Task 12. This project is sponsored by the City of Balcones Heights.

The problem area is in Bexar County in the City of Balcones. The 2014 Drainage Study explored detention and channel improvements as an alternative for relieving property and infrastructure flooding throughout the City of Balcones Heights.

The Task 12 work that was completed for the detention pond and channel improvements for the Woodlawn Lake Option 2 project was a drainage analysis, cost estimate, impact analysis, and a Benefit Cost Analysis (BCA).

PROPOSED PROJECT SCOPE

Refer to the Amended Flood Plan Technical Memo for documented assumptions and methodologies on drainage analysis to determine a feasible solution.

Flooding occurs in the City of Balcones Heights from an Unnamed Tributary of Alazan Creek. The Upper Woodlawn Lake Drainage Study created for the San Antonio River Authority in 2014 proposed two options for flood mitigation through the City. Option 2 is the only viable option since land scoped for detention in Option 1 has since been developed. The Option 2 improvements include channel widening, 3 culvert upgrades, and development of a detention pond in the City of Balcones' Rogiers Park. Channel improvements include concrete-lining in high velocity areas or where ROW constraints limited the top width of the proposed channel. The proposed culvert upgrades are at Concord Place, Glenarm Place and Bobbies Lane. The proposed pond at Rogiers Park has two chambers with a total storage capacity of 8.6 acre-feet and a maximum depth of 6 feet. The pond was divided into two chambers; each chamber had a 36-inch concrete pipe outfall connecting to the existing storm drains upstream of Pleasant Drive. Mapping of the proposed improvements show a decrease the floodplain from Pleasant Drive to Balcones Heights Rd, however, flooding still occurs over Concord Pl to Balcones Heights Road. Seven homes would be removed from the 100-year annual chance rain event. Downstream impacts are mitigated by the proposed detention pond.

PROPOSED PROJECT SCOPING COST

Refer to the Amended Flood Plan Technical Memo for documented assumptions and methodologies on project costs.

The estimated the project cost for Woodlawn Lake Option 2 in Balcones Heights is $9,196,000, calculated using 2020 prices. The cost includes all the required applicable TWDB FMP costs including basic engineering fees, special services such as surveying, environmental, geotech, etc., other costs such as land/easement acquisition and administration, fiscal services, and contingency. See attached Cost Summary for cost breakdown. If there are underground utilities that require adjustments this may increase depending upon any additional adjustments required. At this time, funding for the project has not been identified or approved.

Amended 2023 San Antonio Regional Flood Plan - Project Narrative

Project Name: **Woodlawn Lake Option 2**
FMP ID: **----------**
Project Sponsor: **City of Balcones Heights**
Date: **3/3/2023**

PROPOSED PROJECT BENEFITS

This project will reduce depth of flooding in the upstream roadways and residential neighborhoods for the 100-year flood event.

Refer to the Amended Flood Plan Technical Memo for documented assumptions and methodologies on benefit cost analysis.

The 10-, 50-, 100-year benefits that were evaluated for this project include channel improvements. The resulting benefit cost analysis was 0.1. The Table 1 below summarizes the components calculated in the TWDB BCA Tool.

Table 1: TWDB BCA Toolkit

Input Into BCA Toolkit

Project Useful Life	**30**

Event Damages	Baseline	Project
10 - year storm	$882,219	$0
50 - year storm	$966,414	$0
100 - year storm	$1,008,694	$195,993

Total Benefits from BCA Toolkit	$1,140,006
Other Benefits (Not Recreation)	$0
Recreation Benefits	-
Total Costs	$7,816,903
Net Benefits	-$6,676,897
Net Benefits with Recreation	-$6,676,897
Final BCR	**0.1**
Final BCR with Recreation	**0.1**

Amended 2023 San Antonio Regional Flood Plan - Project Narrative

Project Name: **Woodlawn Lake Option 2**
FMP ID: **----------**
Project Sponsor: **City of Balcones Heights**
Date: **3/3/2023**

IMPACT ANALYSIS

Refer to the Amended Flood Plan Technical Memo for documented assumptions and methodologies on impact analysis.

Table 2: Total Impacted Structures per Storm Frequency

Storm (Year)	Existing	Proposed	Difference
10	1	0	-1
50	4	0	-4
100	9	2	-7

Existing and proposed conditions were analyzed for impact, the impacts that were evaluated are the water surface elevations (WSE) and velocities +/-2000 ft of this project area. The WSE and velocities were compared in the XPSWMM model. From the hydraulic results, the total depth of water was reduced in proposed conditions, see Exhibits 1-3 for existing conditions, proposed conditions, and a comparison of both floodplains.

PROJECT RISKS

ROW/Real Estate Acquisition:

No, currently there are no property acquisitions necessary for the proposed project. The constraints analysis of the area indicated there would be sufficient public right-of-way for the area.

Utilities Coordination:

Yes, there are utility conflicts with water, wastewater, and gas utility lines. There will coordination with the affected utility companies.

Permitting/Environmental:

Yes, a Nationwide Permit and Preconstruction Notification will be required through the USACE.

Stakeholder coordination:

Due to the road improvement and local surrounding community, there will be various stakeholders involved in the process.

Amended 2023 San Antonio Regional Flood Plan - Project Narrative

Project Name: **Woodlawn Lake Option 2**
FMP ID: **----------**
Project Sponsor: **City of Balcones Heights**
Date: **3/3/2023**

MITIGATION OF RISKS

Utility Coordination:

Due to the utility conflicts, the utility coordinator will need to closely work with the affected utility companies to ensure timely completion of the proposed project. The project manager and contractor should minimize, as much as feasible, the amount of disruption of services and travel.

Permitting/Environmental:

If permits do arise during the design coordination and permitting process should be started early on to avoid schedule delays.

Stakeholder Coordination:

Construction access easements may need to be acquired. Coordination with the neighborhood should start early and construction hours should be limited to prevent noise disturbances in the adjoining neighborhood.

NATURE BASED SOLUTION (NBS) CONSIDERATION

There are no nature-based solutions for this project. Grass lined channels will be incorporated where space and velocities allow, but it will not be contiguous throughout the channel improvements.

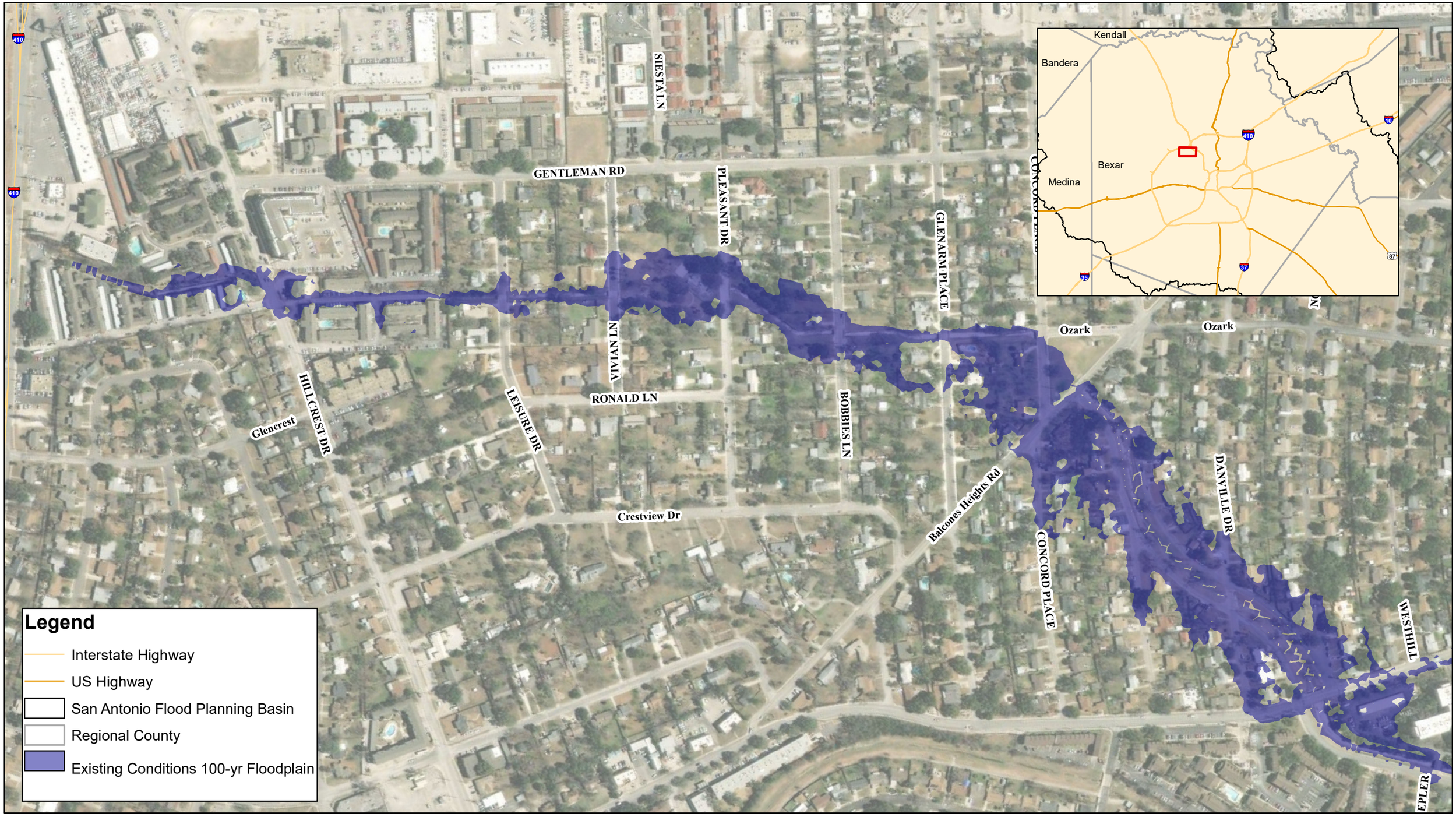
INTERRELATED PROJECTS

There are no interrelated projects.

2023 SAN ANTONIO REGIONAL FLOOD PLAN
PROJECT COST SUMMARY

Project Name:	Woodlawn Lake Option 2
Project Sponsor:	City of Balcones Heights
Firm Developing:	Halff
Date Developed:	3/3/2023
Unit Prices Used:	11/1/2020

CONSTRUCTION COSTS	
- STREET COST	$40,272.61
- DRAINAGE COST	$5,195,853.64
- LANDSCAPING (10%)	$523,612.63
- BOND AND INSURANCE (3%)	$172,792.17
- BARICADES (3%)	$177,975.93
- MOBILIZATION & PREPARATION OF R.O.W. (11% + 4%)	$863,960.83
TOTAL CONSTRUCTION COST ESTIMATE	**$6,974,467.80**
ENGINEER FEE (Fee Table plus 5%)	$1,081,042.51
ENGINEER CONTINGENCY (10%)	$108,104.25
CONSTRUCTION CONTINGENCY (10%)	$697,446.78
PERMIT REQUIREMENT COSTS	$63,000.00
ENVIRONMENTAL	$117,000.00
MATERIAL TESTING (2% Construction Cost - <$3M, 1.5% - >$3M)	$104,617.02
FEMA FLOOD PLAIN STUDY	$50,000.00
TOTAL PROJECT COST ESTIMATE	**$9,195,678.36**



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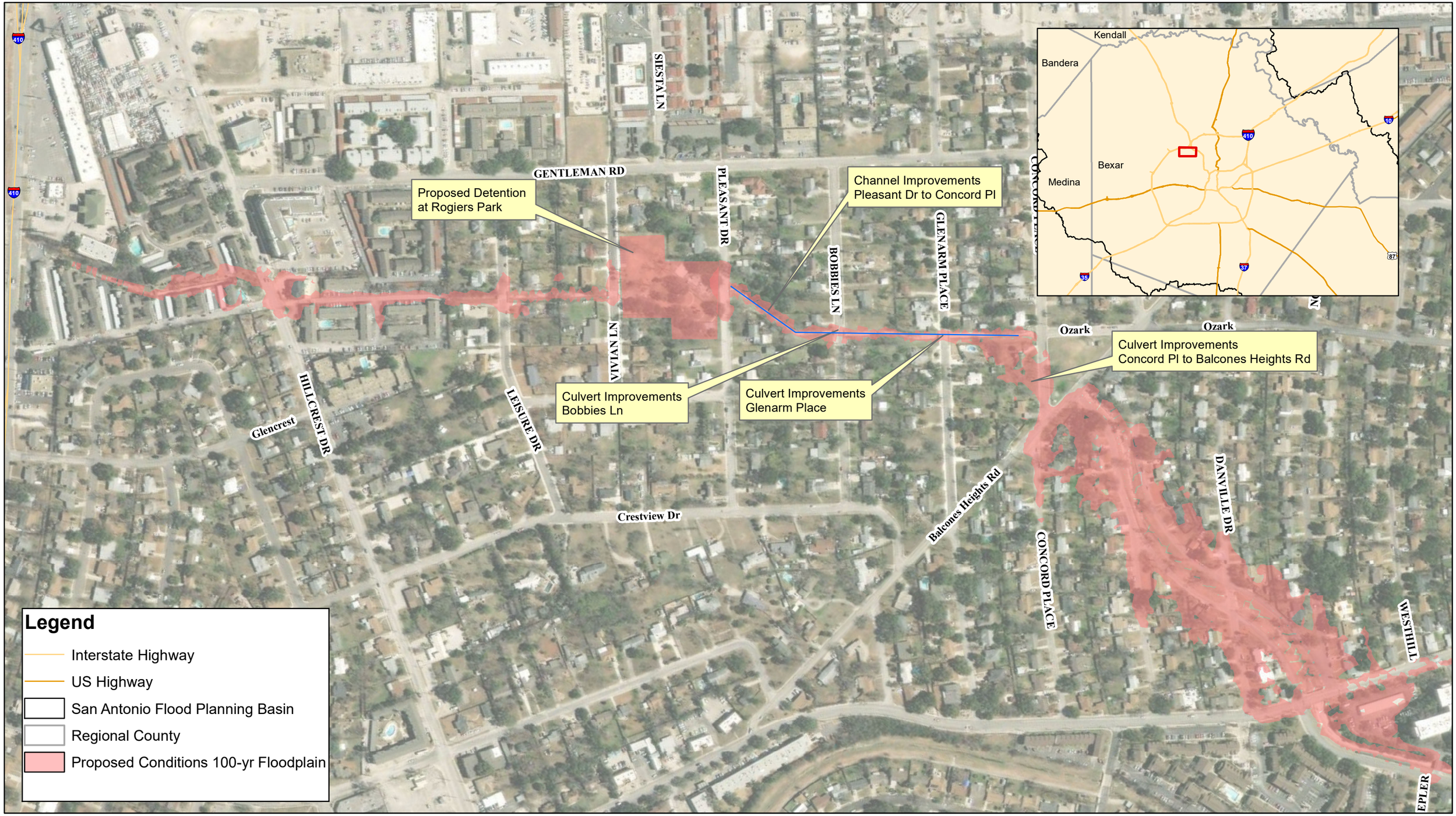
REGION 12 SAN ANTONIO REGIONAL FLOOD PLANNING GROUP

Exhibit 1 - Woodlawn Lake Option 2 Existing Conditions

0 10 20
Miles

N



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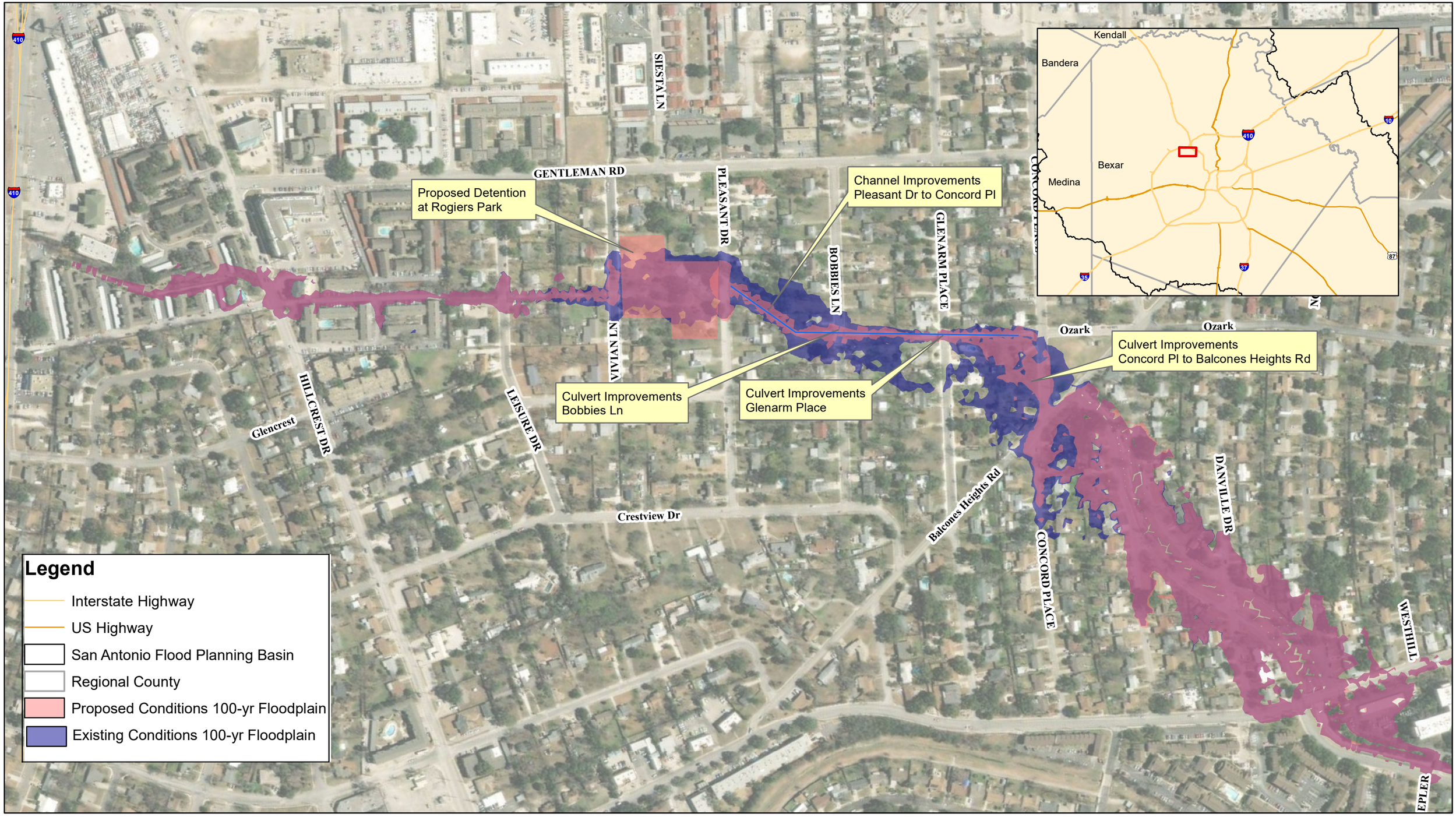
REGION 12 SAN ANTONIO REGIONAL FLOOD PLANNING GROUP

Exhibit 2 - Woodlawn Lake Option 2 Proposed Conditions

0 10 20 Miles

N



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REGION 12 SAN ANTONIO REGIONAL FLOOD PLANNING GROUP

Exhibit 3 - Woodlawn Lake Option 2 Comparison

0 10 20
Miles

N

2023 San Antonio Regional Flood Plan
Project Summary Sheet

Project Name: FM1346 Crossing Upgrade Study

FME ID: 12XXXXXX

Project Sponsor: Bexar County

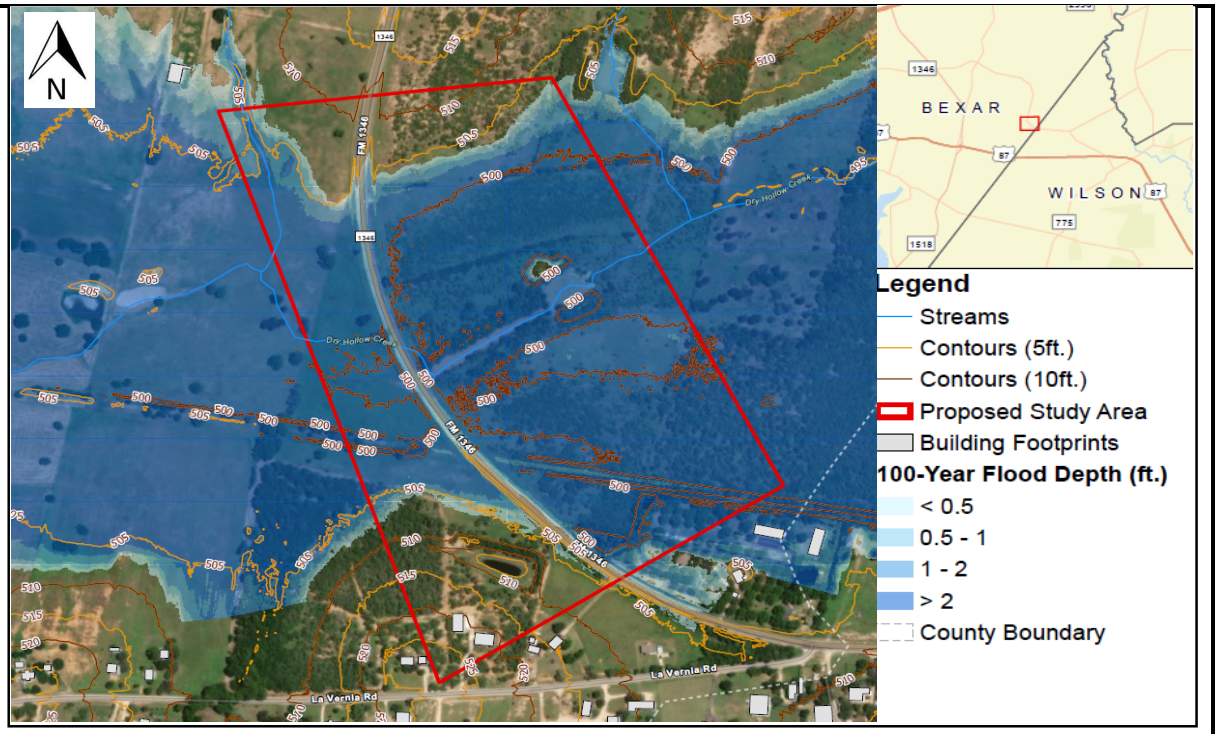
Project Source: 2022 Bexar County Drainage Needs

Study Type: Project Planning

Project Cost: $ 150,000
(2020 Prices)

Project Description:

During the analysis of crossings Felix Road at Dry Hollow Creek, it was determined that an additional hydraulic study is needed to evaluate alternatives to removing the FM1346 crossing from overtopping. Improvements to this road are important due to limited detour routes available.
The project cost was developed using FME Planning Cost Estimates found in section 5.2.1.1 of the San Antonio Regional Flood Plan for Project Planning.



2023 San Antonio Regional Flood Plan
Project Summary Sheet

Project Name: Live Oak at Salitrillo Creek Improvements

FME ID: 12XXXXXX

Project Sponsor: Bexar County

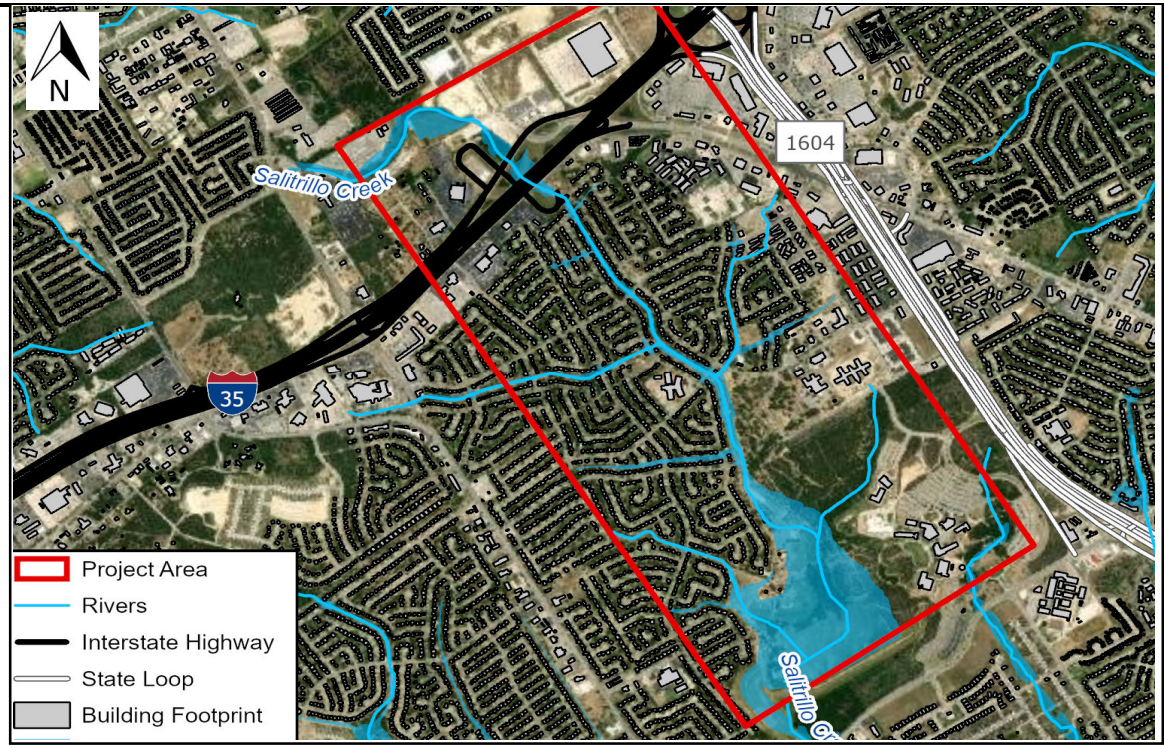
Project Source: 2022 Bexar County Drainage Needs

Study Type: Project Planning

Project Cost: $ 250,000
(2020 Prices)

Project Description:

Engineering study to assess removal of residential structures from the Salitrillo Creek 100-Yr flood plain upstream of Martinez Creek Dam No. 5.
The project cost was developed using FME Planning Cost Estimates found in section 5.2.1.1 of the San Antonio Regional Flood Plan for Project Planning.



2023 San Antonio Regional Flood Plan
Project Summary Sheet

Project Name: Live Oak Slough Creek Improvements Study

FME ID: 12XXXXXX

Project Sponsor: City of Von Omry

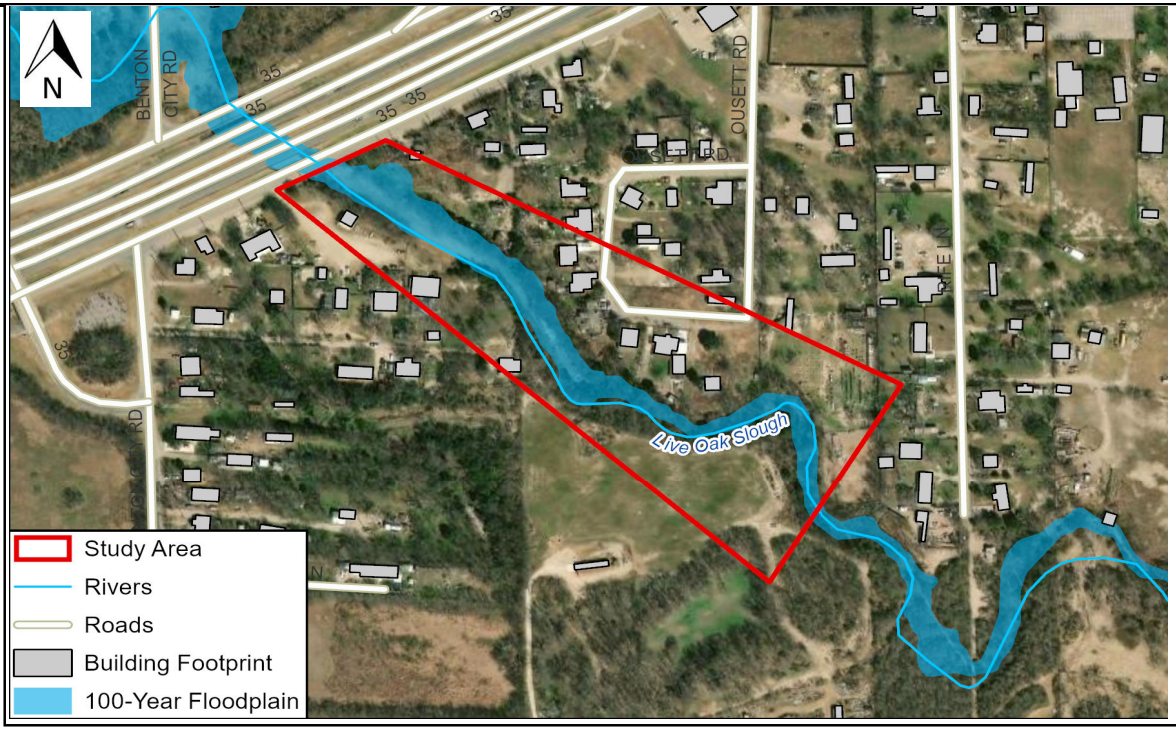
Project Source: 2022 Von Omry Drainage Needs

Study Type: Project Planning

Project Cost: $ 250,000
(2020 Prices)

Project Description:

The residents living along this slough are experiencing run-off water damage to their land causing the Slough Creek to widened, and leaving them with less land usage. The project cost was developed using FME Planning Cost Estimates found in section 5.2.1.1 of the San Antonio Regional Flood Plan for Project Planning.



2023 San Antonio Regional Flood Plan
Project Summary Sheet

Project Name: North Benton City Road Improvements Study

FME ID: 12XXXXXX

Project Sponsor: City of Von Omry

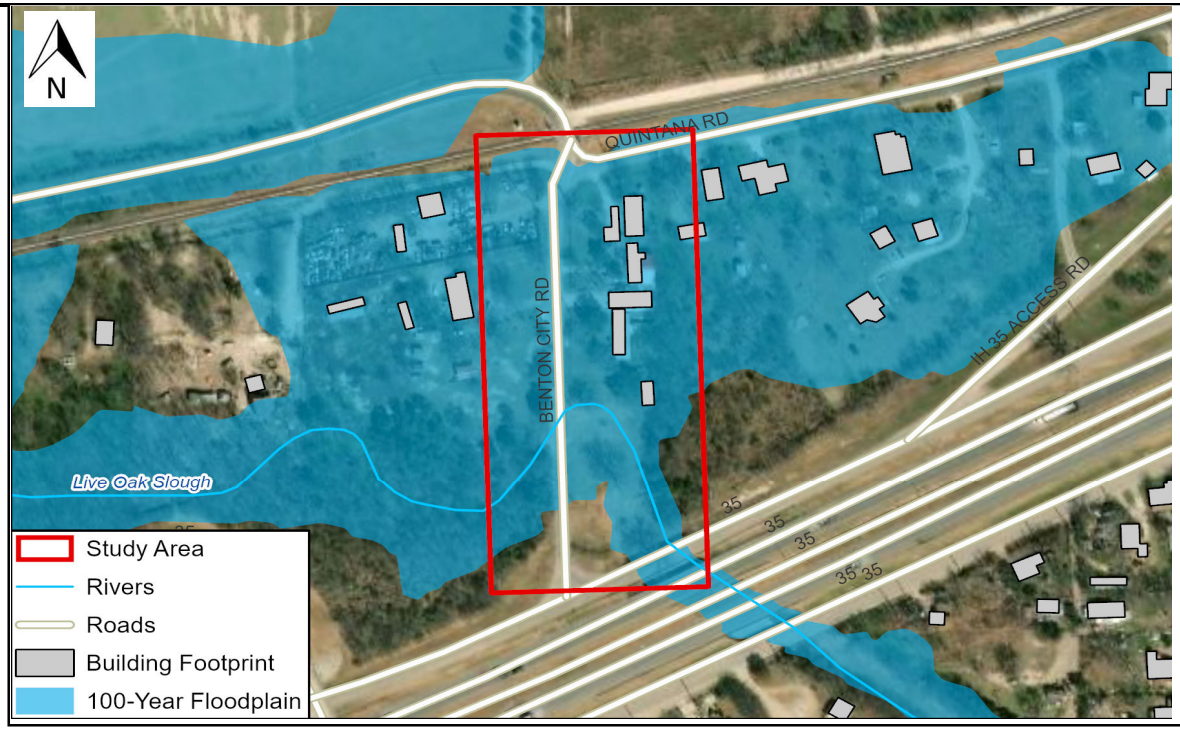
Project Source: 2022 Von Omry Drainage Needs

Study Type: Project Planning

Project Cost: $ 150,000
(2020 Prices)

Project Description:

Study to improve the road and remove it from being flooded during heavy rains. The project cost was developed using FME Planning Cost Estimates found in section 5.2.1.1 of the San Antonio Regional Flood Plan for Project Planning.



2023 San Antonio Regional Flood Plan
Project Summary Sheet

Project Name: Quintana Road Drainage Improvements Study

FME ID: 12XXXXXX

Project Sponsor: City of Von Omry

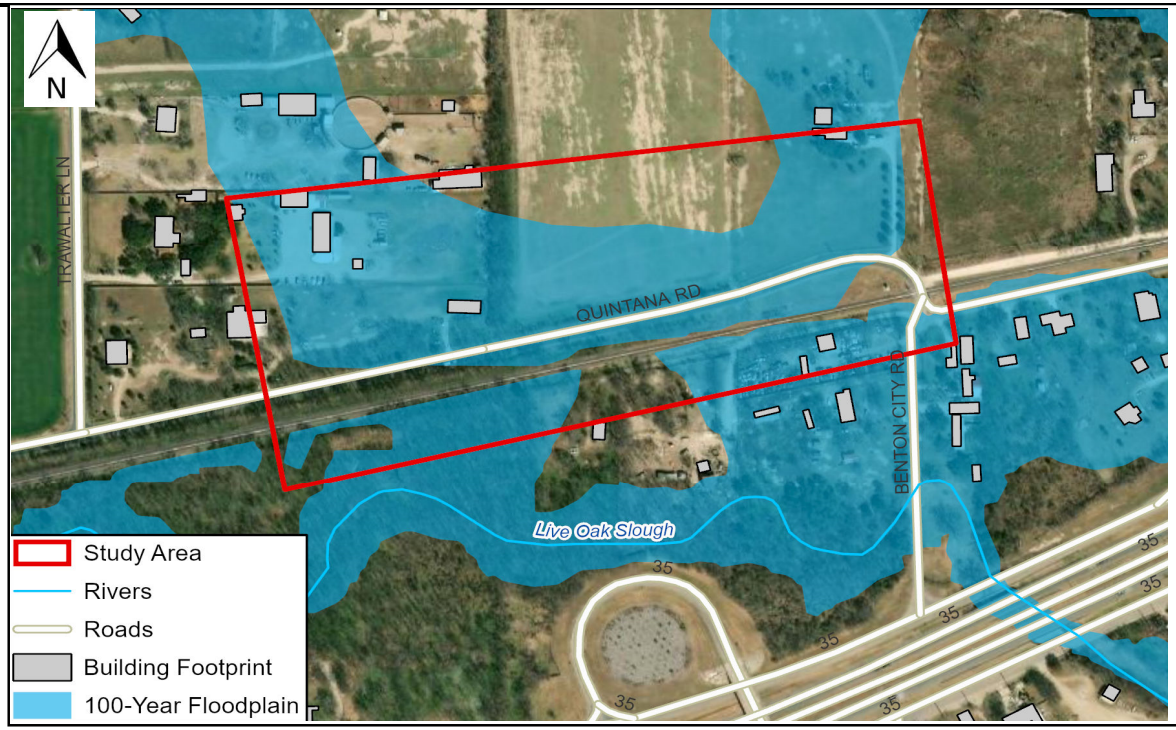
Project Source: 2022 Von Omry Drainage Needs

Study Type: Project Planning

Project Cost: $ 250,000
(2020 Prices)

Project Description:

Study to improve the drainage around Quintana Road and remove it from being flooded during heavy rains.
The project cost was developed using FME Planning Cost Estimates found in section 5.2.1.1 of the San Antonio Regional Flood Plan for Project Planning.



2023 San Antonio Regional Flood Plan
Project Summary Sheet

Project Name: South Benton City Road Improvements Study

FME ID: 12XXXXXX

Project Sponsor: City of Von Omry

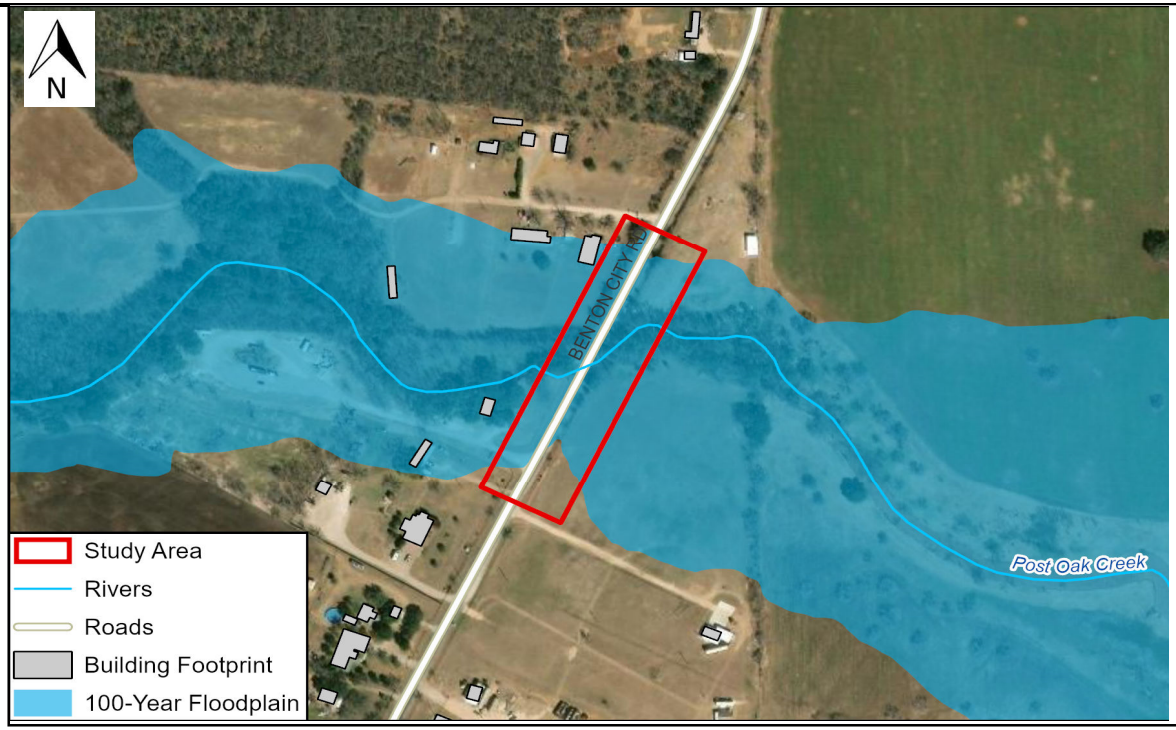
Project Source: 2022 Von Omry Drainage Needs

Study Type: Project Planning

Project Cost: $ 150,000
(2020 Prices)

Project Description:

Study to improve the road and remove it from being flooded during heavy rains. The project cost was developed using FME Planning Cost Estimates found in section 5.2.1.1 of the San Antonio Regional Flood Plan for Project Planning.



2023 San Antonio Regional Flood Plan
Project Summary Sheet

Project Name: S Evans Rd Road Improvements Study

FME ID: 12XXXXXX

Project Sponsor: City of Von Omry

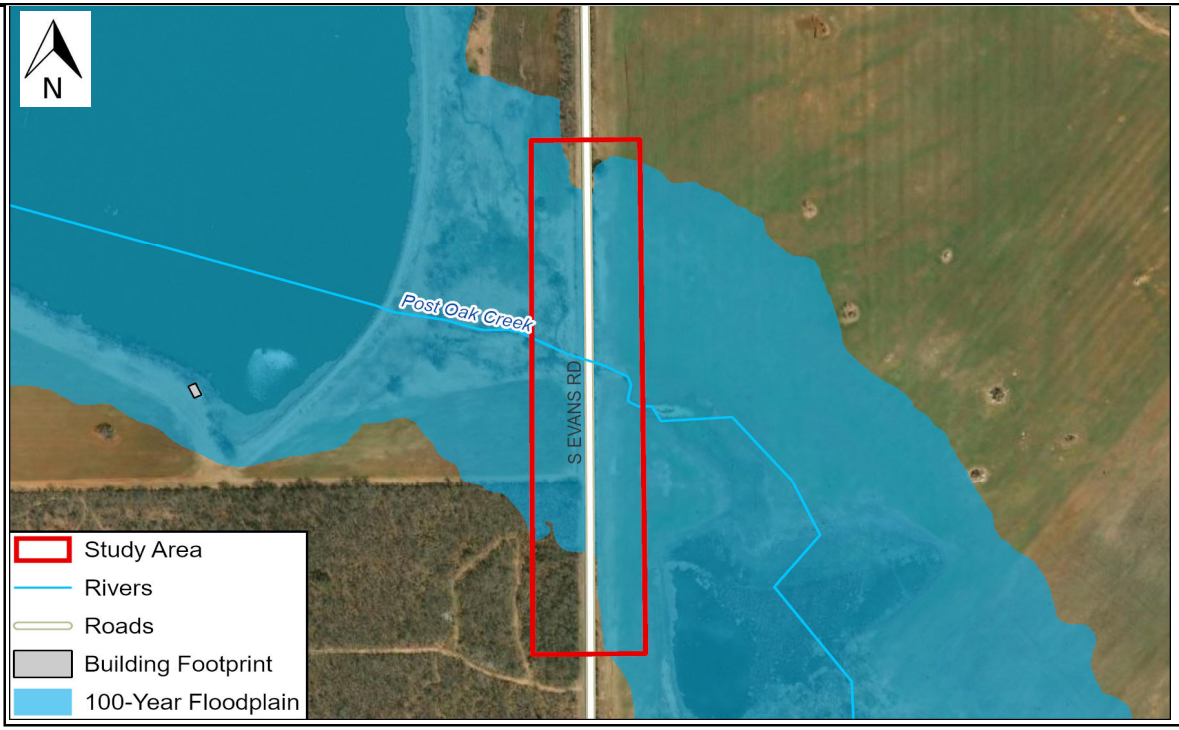
Project Source: 2022 Von Omry Drainage Needs

Study Type: Project Planning

Project Cost: $ 150,000
(2020 Prices)

Project Description:

Study to improve the road and remove it from being flooded during heavy rains. The project cost was developed using FME Planning Cost Estimates found in section 5.2.1.1 of the San Antonio Regional Flood Plan for Project Planning.



Potentially Feasible Flood Mitigation Projects Identified by RFPG

NOTES	Source	FMP ID	RFPG No.	RFPG Name	FMP Name	Description	Counties	Project Type	Project Area (sqmi)	Flood Risk Type (Riverine, Coastal, Urban, Playa, Other)	Sponsor	Estimated Project Cost ($)	Flood Risk: Estimated number of structures at 100yr flood risk	Flood Risk: Habitable structures at flood risk	Flood Risk: Estimated Population at flood risk	Flood Risk: Critical facilities at flood risk (#)	Flood Risk: Number of low water crossings at flood risk (#)	Flood Risk: Estimated number of road closures (#)	Flood Risk: Estimated length of roads at flood risk (Miles)	Flood Risk: Estimated active farm & ranch land at flood risk (acres)	**Reduction in** Number of structures removed from 100yr (1% annual chance) Flood risk	Pre-Project Level-of-Service	Post-Project Level-of-Service	Negative Impact (Y/N)	Negative Impact Mitigation (Y/N)	Traffic Count for Low Water Crossings	Benefit-Cost Ratio
Additional Project	CoSA		12	San Antonio	Southwell Road LWC Improvements	Along Huebner Creek Tributary A, the City of San Antonio (CoSA) has expressed drainage and mobility concerns regarding two existing low water crossings upstream of Huebner Road located at Southwell and Encino Park Road, respectively, on the City's northwest side. Currently, there is a severe risk located at the low water crossings, showing estimated overtopping depths exceeding 3.38 ft and 1.86 ft at the Southwell and Encino Park Road crossing, respectively, for the 100-year design storm. The crossing at Southwell Road will raise the road deck elevation to 920 ft and install four 8-ft by 6-ft RCBs; channel improvements will be implemented 400-ft upstream and downstream of Southwell Road. Similarly, the crossing at Encino Park Road will raise the road deck elevation to 894 ft and install three 8-ft by 5-ft RCBs; channel improvements will be implemented 900-ft upstream and downstream of Encino Park Road. It is anticipated the property and/or a drainage acquisition will be required to accomodate for the proposed channel and crossings improvements.	Bexar		0.62	Riverine	City of San Antonio	8230023	6	6	24	0	2	2	0.7	N/A		2YR	100YR	N	N		2.3
Additional Project	CoSA		12	San Antonio	Blue Ridge Dr Drainage Improvements	The City of San Antonio is intending to reduce flood risk along Apache Creek to residences and businesses along Blue Ridge Dr. through this project. Currently, within the project limits there are 65 buildings inundated during the 100-yr flood event. The proposed proect involves implementation of offline detention facilities in open areas near the intersection of Memorial St. and Vadalia Ave. The detention facilities are designed such that they are not engaged in low flow events but will detain runoff from larger storms and allow the slow release of detained volume. The pond was sized to fill in all of the available area in the designated project location to a size of 2.85 acres. This design removes 5 structures out of the 100-yr floodplain.	Bexar		1.91	Riverine	City of San Antonio	2239000	65	65	260	0	0	0	0.74	N/A		10YR	100YR	N	N		0.2
Additional Project	CoSA		12	San Antonio	Huebner Creek LWC #28	The purpose of this project is to improve the low water crossing of Huebner Creek and Hollyhock Road and mitigate street and property flooding. Currently the low water crossing does not pass any of the design storm events. This project will provide channel improvements from approximately 1,200 feet upstream of the crossing of Huebner Creek and Babcock Road to the intersection of Huebner Creek and Strathaven Street. The proposed channel section is trapezoidal with 100 LF bottom width and 3:1 side slopes. The existing low water crossing will be reconstructed to 9 – 10' X 6' MBC, which will be able to convey the synthetic 10-Year design storm event. Hollyhock is proposed to be reconstructed from the intersection of Babcock Road to the intersection with Strathaven Street.	Bexar		4.2	Riverine	City of San Antonio	8371000	3	3	12	0	1	1	0.11	N/A		< 10YR	10YR	N	N	1295	0.2
Additional Project	CoSA		12	San Antonio	Ridge Run Street Drainage Improvements	Several area residents have reported property and structure flooding from the channel located behind their homes, east of Ridge Run Dr. This project will consist of channel improvements within the existing Culebra Creek Tributary A from approximatly 100' downstream of Tezel Rd. to 1,100' upstream of Timberwilde Dr. The proposed channel design includes a trapezoidal channel 3:1 side slopes overbank benching section and varying bottom width of 60-ft to 170-ft. The channel overbank benching improvements will not encroach within 1' above the channel existing channel flowline and utilizes the existing ROW to conveying the 100-yr future design storm event. The tributary will outfall into the existing Culebra Creek located south of Grissom Rd. An existing concrete pedestrian trail path, located within the tributary, requires removal and a new concrete trail will be placed in the east top of bank within a designated 20' buffer area. Channel modifications remove 26 structures from the floodplain and will not have a downstream adverse impact and does not impact the downstream floodplain limits.	Bexar		1.62	Riverine	City of San Antonio	10443000	26	26	104	0	0	0	0.28	N/A		10YR	100YR	N	N		0.3
Additional Project	CoSA		12	San Antonio	Overbrook Drainage Improvements Phase 1 & 2	The proposed system ugrades include upsizing the existing 13.5' horseshoe-shaped concrete arch pipe to two 16'x9' RCB. This cannot convey the 100-year flow but is the largest system allowable given street width and downstream constraints.	Bexar		3.6	Riverine	City of San Antonio	53086000	1171	1165	4660	0	0	5	9.12	N/A		<100YR	100YR	N	N		0.1

Moved from FME to FMP	K Friese		12	San Antonio	Athens	Lack of collection and conveyance infrastructure causes frequent structural and roadway flooding. Improvements to the infrastructure include new stormdrain network.	Medina	Infrastructure		Riverine,	City of Castroville	$ 19,020,814.00	82								-49			N	N		0.31
Moved from FME to FMP	K Friese		12	San Antonio	Lorenzo	Substandard collection and conveyance infrastructure north of Highway 90 cause extensive flooding. Improvements to the infrastructure include new stormdrain network.	Medina	Infrastructure		Riverine,	City of Castroville	$ 11,647,488.00	66								-38			N	N		0.42
Moved from FME to FMP	K Friese		12	San Antonio	Naples	Substandard collection and conveyance infrastructure north of Highway 90 along Naples and Houston Streets cause extensive flooding. Improvements to the infrastructure include new stormdrain network.	Medina	Infrastructure		Riverine,	City of Castroville	$ 22,703,676.00	114								-58			N	N		0.36

Potential Flood Management Evaluations Identified by RFPG

FME ID	RFPG No.	RFPG Name	FME Name	Description	Associated Goals	Counties	HUC8s	HUC12s	Watershed Name	Study Type	FME Area (sqmi)	Flood Risk Type	Sponsor	Entities with Oversight	Emergency Need	Estimated Study Cost	Potential Funding Sources and Amount	Estimated number of structures at flood risk	Habitable structures at flood risk	Estimated Population at flood risk	Critical facilities at flood risk (#)	Number of low water crossings at flood risk (#)	Estimated number of road closures (#)	Estimated length of roads at flood risk (Miles)	Estimated active farm & ranch land at flood risk (acres)	Existing or Anticipated Models (year)	Existing or Anticipated Maps (year)	RFPG Recommendation (Y/N)	Reason for Recommendation
	12	San Antonio	Delcrest Channel Improvements PER	There are major drainage concerns in the Dellcrest Neighborhood, including street ponding and inundation. The 100-year FEMA floodplain extends onto Creekmoor, Diane, Bernadine, Dellhaven and Beyhead, as well as a few properties. The total drainage area for the neighborhood is approximately 3.1 sq. miles. Improvements such as storm drain systems cannot be used to remedy these concerns because the existing system paralleling Diane is at maximum capacity; tying into this system will cause downstream impacts. This PER will investigate upgrades to	Drainage Improvements	Bexar	12100301	121003010106	Salado Creek	PER	3.1	Riverine	CoSA	CoSA	No	$250,000		0	0	0	0	0	2	0.4	N/A	2023	2023		
	12	San Antonio	Overbrook Drainage Improvements Phase 3	Phase 3 of this project will tie into Phase 2 at the intersection south of John Page Dr. with the existing storm sewer conveying the Overbrook Dr. flow. Further study is required to determine where adverse impacts could be mitigated.	Drainage Improvements	Bexar	12100301	121003010202	San Antonio River	Flood Study	3.6	Riverine	CoSA	CoSA	No	$250,000		1171	1165	4660	0	0	5	9.12	N/A	2019	2019		

2023 San Antonio Regional Flood Plan Amended Projects Methodologies and Procedures Memorandum

1 Background

As part of the amended 2023 San Antonio Regional Flood Plan (the Plan), Task 12 expands on previously identified projects from the Plan dated January 10th, 2023. HDR Engineering, Inc. (HDR) advanced Flood Mitigation Projects (FMPs) for several communities within the San Antonio flood planning region. This analysis was done to provide data for the 2023 San Antonio Regional Flood Plan concerning potential FMPs to be recommended in the 2023 Plan.

This memorandum documents the assumptions, methodologies and processes used to advance the FMP in accordance with the Texas Water Development Board (TWDB) Exhibit C Technical Guidelines for Regional Flood Planning FMPs.

2 TWDB Requirements

The TWDB FMP requirements include the following components and are discussed later in this document –

- Hydrologic and Hydraulic (H&H) Modeling
- Impact Analysis
- Costs Estimates
- Benefit Cost Analysis (BCA)

Table 1 summarizes the type of work completed for each recommended FMPs to meet the TWDB requirements. Additional supporting documentation for each FMP are located in the digital submittal of the Plan including Summary Sheets, Narratives, Cost Estimates, and Exhibits.

Table 1: Task 12 Work Completed Per Project

Project	Task 12 Work			
	H&H Modeling	Cost Estimate	Impact Analysis	BCA
Abbott Road at Salitrillo Creek and at Tributary A to Salitrillo Creek	X	X	X	X
Abbott Road at Unnamed Tributary 1 to Salitrillo Creek	X	X	X	X
Bexar Bowling Way at Cibolo Creek Bridge	X	X	X	X
Blanco Road at Cibolo Creek	X	X	X	X
Boerne Stage Road at Balcones Creek	X	X	X	X

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Concepcion				X
Damage Center 1: Project 1A, 1B, 1C		X	X	X
Damage Center 1 – Project 1 – Detention in East Branch Poth Creek	X	X	X	X
Damage Center 14- Airport Trib		X		X
Damage Center 2 – Project 1 Culvert Improvements at Manchaca	X	X	X	X
Damage Center 2- Project 2 Road connection from Mosspoint to Sunshine	X	X		X
Damage Center 38-Olmos Creek Lower Reach Near Montview		X		X
Damage Center 40-San Antonio River DS Reach near Roosevelt		X		X
De Zavala/ Ripple Creek				X
Elm Spring				X
Felix Road at Dry Hollow Creek	X	X		X
FM 1863 at Cibolo Creek LWC	X	X	X	X
Freudenburg Road at Tributary B to Salitrillo Creek and at Salitrillo Creek	X	X		X
Gass Road at Culebra Creek Tributary D	X	X	X	X
LWC at Old Fredericksburg Rd and Balcones Creek	X	X	X	X
Old Frio City Road at North Prong Creek	X	X	X	X
Repetitive loss properties			X	X
Specht/Obst Road at Cibolo Creek	X	X	X	X
Trainer Hale at Cibolo Creek	X	X	X	X
Toutant Beauregard at Balcones Creek	X	X	X	X
Ullrich Road at Cibolo Creek		X		X
Woodlawn Lake Option 2	X		X	X

3 Data Collection

Data used in the FMP evaluation included previously collected information under Task 4B as well as additional data collected from other sources.

Previous community engagement and data collection efforts are documented in the Plan under Chapter 5 - *Identification and Evaluation of Potential Flood Management Evaluations and Potentially Feasible Flood Management Strategies and Flood Mitigation Projects* and Chapter 10 - *Public Participation and Adoption of Plan*. Previously collected data can also be found in the digital submittal of the Plan.

Data gathered from other sources are summarized below. All data were obtained as digital files.

- San Antonio River Authority (SARA) Digital Data and Model Repository (D2MR) website – the SARA D2MR serves as a centralized location for the storage, management, and dissemination of H&H models and data related to the Federal Emergency Management Agency (FEMA) Digital Flood Insurance Rate Maps (DFIRM) and subsequent updates. Most of the H&H models found on the D2MR website use Hydrologic Engineering Center Hydrologic Modeling System (HEC-

HMS) and Hydrologic Engineering Center River Analysis System (HEC-RAS) software. The models collected from this source are summarized below.

- Texas Natural Resources Information System (TNRIS) – United States Geological Survey (USGS) 1-meter resolution 2018 and 2019 LiDAR-based digital elevation models (DEMs)
- TWDB – 2021 Texas Buildings with Social Vulnerability Index (SVI) and Estimated Population (TWDB, Centers for Disease Control and Prevention [CDC], Oak Ridge National Laboratory [ORNL])

Table 2 summarizes the hydraulic and hydrologic models collected for the Task 12 FMPs.

Table 2: Data Sources Per Project

Project	FEMA Effective Model*			Other Source	
	HEC-HMS	HEC-RAS	Other	Modeling Software	Notes
Abbott Road at Salitrillo Creek and at Tributary A to Salitrillo Creek	X	X			
Abbott Road at Unnamed Tributary 1 to Salitrillo Creek	X	X			
Bexar Bowling Way at Cibolo Creek Bridge	X	X			
Blanco Road at Cibolo Creek		X			
Boerne Stage Road at Balcones Creek		X			
Concepcion				XPSWMM	City of San Antonio
Damage Center 1: Project 1A, 1B, 1C				HEC-HMS HEC-RAS	San Antonio River Authority
Damage Center 1 – Project 1 – Detention in East Branch Poth Creek	X	X			
Damage Center 14- Airport Trib		X			
Damage Center 2 – Project 1 Culvert Improvements at Manchaca	X	X			
Damage Center 2- Project 2 Road connection from Mosspoint to Sunshine	X	X			
Damage Center 38-Olmos Creek Lower Reach Near Montview		X			
Damage Center 40-San Antonio River DS Reach near Roosevelt		X			
De Zavala/ Ripple Creek				XPStorm	City of Shavano Park
Elm Spring				XPStorm	City of Shavano Park
Felix Road at Dry Hollow Creek	X	X			
FM 1863 at Cibolo Creek LWC		X			
Freudenburg Road at Tributary B to Salitrillo Creek and at Salitrillo Creek	X	X			

Gass Road at Culebra Creek Tributary D	X	X			
LWC at Old Fredericksburg Rd and Balcones Creek		X			
Old Frio City Road at North Prong Creek	X	X			
Repetitive loss properties				N/A for this type of FMP	
Specht/Obst Road at Cibolo Creek		X			
Trainer Hale at Cibolo Creek		X			
Toutant Beauregard at Balcones Creek		X			
Ullrich Road at Cibolo Creek	X	X			
Woodlawn Lake Option 2				XPSWMM	From City of San Antonio

*Please refer to the Flood Insurance Study (FIS) reports for discussions on the following topics: General Study Information, Terrain Data, Land Cover, Rainfall, Hydrologic Methodologies, Hydraulic Methodologies

4 Hydrologic and Hydraulic Modeling

4.1 Hydrologic Modeling

In most cases, hydrologic models collected for the Task 12 FMP evaluation were used without modification. These models were unmodified because they met the TWDB hydrologic model criteria and are considered best available. Two FMP hydrologic models were updated as described below.

Poth Creek

The hydrologic model named Poth Creek was updated to account for precipitation changes. Updates were made to the 10-, 25-, 50- and 100- year frequency storm events for the Meteorological Models in HEC-HMS using NOAA Atlas 14 precipitation frequency estimates for Poth, Texas. The Poth Creek hydrology model is used for Damage Center 2-Project 1 Culvert Improvements at Manchaca.

East Branch Poth Creek

The hydrologic models named East Branch Poth Creek was updated to account for precipitation changes. Updates were made to the 10-, 25-, 50- and 100- year frequency storm events for the Meteorological Models in HEC-HMS using NOAA Atlas 14 precipitation frequency estimates for Poth, Texas. The East Branch Poth Creek hydrology model is used for the Damage Center 1 – Project 1 – Detention in East Branch Poth Creek project. A proposed Basin Model was created to analyze impacts of the proposed detention pond on East Branch Poth Creek.

4.2 Hydraulic Modeling

Hydraulic models collected for Task 12 were used to evaluate baseline and proposed hydraulic conditions. These models were modified to conduct the drainage analysis and help with the other requirements (Impact Analysis and BCA). Updates for these models included:

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- Adding, adjusting, or extending cross sections for more creek definition,
- Adjusting/extending the center line,
- Adding terrain, and
- Refining the Manning's values

In addition, HDR developed a new hydraulic model to study FMP impacts as described below.

Abbott Road at Salitrillo Creek and at Tributary A to Salitrillo Creek

Tributary A (Trib A) to Salitrillo Creek converges with Salitrillo Creek 2000-ft downstream of the Abbott Road. At Abbott Road both Trib A to Salitrillo Creek and Salitrillo Creek have the same water surface elevations (WSE). It is assumed that at Abbott Road, Trib A is controlled by Salitrillo Creek WSE. Instead of using the two effective models, HDR created a new 1D model that includes both creek segments as they cross Abbott Road. The combined flows from the confluence of both creeks were applied upstream and the bridge modeling approach set to split the flows appropriately per stream segment. The downstream conditions were set to the WSE at the converging location.

5 Impact Analysis

An FMP is required to have no negative impacts in the neighboring area, either upstream or downstream of the project. No negative impact means that a project will not increase flood risk of surrounding properties. The increase in flood risk must be measured by the 100-year frequency storm water surface elevation and peak discharge using the best available data. No rise in water surface elevation or discharge is permissible, and the study area must be sufficiently large to demonstrate that proposed project conditions are equal to or less than the existing (baseline) conditions.

For the purposes of regional flood planning efforts, a determination of no negative impacts can be established if stormwater runoff does not increase inundation of infrastructure such as residential and commercial structures or exceed the design capacity of stormwater systems. According to the TWDB Exhibit C Technical Guidelines, all of the following requirements should be met to establish no negative impact, as applicable:

1. Stormwater does not increase inundation in areas beyond the public right-of-way, project property, or easement.

2. Stormwater does not increase inundation of storm drainage networks, channels, and roadways beyond design capacity.

3. Maximum increase of 1D Water Surface Elevation must round to 0.0 feet (<0.05 ft) measured along the hydraulic cross-section.

4. Maximum increase of 2D Water Surface Elevations must round to 0.3 feet (<0.35 ft) measured at each computation cell.

5. Maximum increase in hydrologic peak discharge must be <0.5 percent measured at computation nodes (sub-basins, junctions, reaches, reservoirs, etc.). This discharge restriction does not apply to a 2D overland analysis.

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If the analysis was performed using 1D modeling software, requirements #1, #2, and #3 are applicable. If the analysis was performed using a 2D modeling software, requirements #1, #2, and #4 are applicable. Please refer to the project Narratives for specific reported numbers to support these requirements.

6 Cost Estimate

Estimated project costs for all FMPs were calculated using 2020 prices. The cost estimates contain all the required applicable TWDB FMP costs including basic engineering fees, special services such as surveying, environmental, and geotech, other costs such as land/easement acquisition and administration, fiscal services, and contingency. The following assumptions were applied in estimating costs:

- Design – Design costs were estimated using the City of San Antonio 2020 Planning Studies fee table. Depending on estimated construction costs, the design fee percentage ranges between 9.5% to 20%.
- Engineering Contingency – Estimated as 10% of the estimated construction costs.
- Environmental, Archaeological, and Historical Resources – Estimated as $10,000.
- Permit Requirements Costs – Estimated as $8,000.
- Material Testing – Estimated as 1.5% or 2% of the estimated construction costs for projects with construction costs greater than $3M or less than $3M, respectively.
- Construction Contingency – Estimated as 10% of the estimated construction costs.

Utility relocation costs were not included in the FMP cost estimation, so estimated costs may increase if utility relocations are found to be required during later project design phases. For a detailed cost breakdown of each FMP, refer to the project's Cost Summary Sheet in the digital submittal of the Plan.

7 Benefit Cost Analysis

Per the TWDB, each FMP included in the Plan is required to have a benefit cost analysis (BCA) performed. Some flood mitigation studies document a computed benefit cost ratio (BCR) and those can be incorporated into the Plan. For situations where a BCR is not available for a project, TWDB has developed the BCA Input Tool to facilitate the calculation of costs and benefits. The tool estimates flood impacts before and after implementation of the FMP for up to three recurrence interval flood events. Impacts that could be evaluated include impacts to residential buildings, commercial structures, street flooding, low water crossing (LWC) ponding, and recreational benefits.

In addition to the TWDB tool assumptions, the following section describes other assumptions which were applied during the BCA.

7.1 BCA Cost

The 2023 estimated total costs were used in the BCA. A Construction Cost Index (CCI) factor 1.14 was applied to convert the costs from 2020 to 2023 dollars. Costs were input as noted in the FMP reporting tables.

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7.2 Construction Year

Construction is assumed to start in the near future, dependent on funding and the community. The construction year start and end dates are set per project and can be found in the BCA in the digital submittal of the Plan.

7.3 Residential

Residential structures are evaluated by the size and amount flooded for the existing (baseline) and proposed project conditions. Based on the BCA Input Tool, size categories for residential structures are designated as “Small Home” (1000 sq. ft.), “Average Home” (2,500 sq. ft.), and “Large Home” (5,000 sq. ft.). For the analysis, the following refinements to the BCA size assumptions were made:

- Small: x <2500 sq.ft.
- Average: 2500 sq.ft.< x <5000 sq.ft.
- Large: x >5000 sq.ft.

The TWDB tool limits the total amount of residential buildings that can be assessed per project to 100 structures. For some projects, more than 100 structures were impacted. Instead of looking at each individual structure’s damages for existing (baseline) and proposed conditions, the total amount of impacted structures within the same size categories and inundation depths (rounded to the nearest inch) were totaled per analyzed flood event.

7.4 Commercial

Commercial building damages are determined by business type and size (square footage). Due to limited available data on commercial building types, all commercial buildings were assumed to be of “Retail-Clothing” type since this type is closest in “damages per sq.ft.” to the average “damages per sq.ft.” value of all BCA commercial types. To calculate building damages from flood depth data, inundation depths were rounded to the nearest inch.

7.5 Flooded Streets

Streets are considered impassable if the flood depth is above 6 inches. The daily traffic count was estimated based on the TxDOT daily traffic count or the nearest adjacent road, as provided by the TxDOT TPP District Traffic Web Viewer (https://txdot.maps.arcgis.com/apps/webappviewer/index.html?id=06fea0307dda42c1976194bf5a98b3a1). The additional time that the longest detour takes for an individual is calculated assuming a speed limit of 35 miles per hour (mph). The Normal Emergency Medical Services (EMS) response time for both existing (baseline) and proposed conditions is assumed to be 14.5 minutes, based on the rural mean value from Table 2 of the NIH JAMA Surgery study (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5831456/). The EMS response time during a storm event is assumed to double for existing (baseline) conditions compared to the normal response time. For proposed conditions, the EMS response time is scaled to match the difference between detour routes (existing [baseline] and post-project). The number of households impacted by EMS delay due to flooded streets is assumed to be equal to the total number of residential buildings

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inundated during the given storm event. Similarly, the number of commercial buildings impacted by EMS delay due to flooded streets is assumed to be the total number of commercial buildings inundated during the given storm event.

7.6 Low water crossings

Low water crossings (LWC) are considered impassable if the flood depth is above 6 inches. Projects with LWC benefits are also assumed to have Flooded Streets benefits, both of these benefits were considered in the BCA. LWC benefits are based on reduced rescues/injuries/fatalities associated with people attempting to cross, whereas Flooded Streets benefits are based on reduced detours.

If there are multiple LWCs in a project that are all in close proximity to one another, it was assumed to evaluate the benefits as one LWC. Aggregate all costs and all benefits to compute one BCA for the multiple LWCs for flood planning purposes.

7.7 Acquisitions and Raising Elevations

Some proposed projects include residential and commercial structures be boughtout or raised out of the floodplain by raising the finished floor elevations (FFE) of the structure. To calculate the BCR, pre-calculated benefits were assumed based on the FEMA memorandum with subject titled “Update to ‘Cost-Effectiveness Determinations for Acquisitions and Elevations in Special Flood Hazard Areas Using Pre-Calculated Benefits”. According to this memorandum, the pre-calculated benefits of acquisitions and elevations are:

- Acquisitions: $323,000 per structure
- Elevations: $205,000 per structure

7.8 Benefit Result

The BCA Input Tool is intended to be used in conjunction with the FEMA BCA Toolkit 6.0, which calculates annual benefits from the information compiled in the TWDB BCA Input Tool. The annual benefits data are then entered back into the TWDB BCA Input Tool to compute the resulting BCR for the project. The results table summarizes the impacts as well as the estimated BCR for each FMP per flood event. FMP BCA results are provided in the digital submittal of the Plan.

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