Public Meeting Notice

Region 9 – Upper Colorado Regional Flood Planning Group
June 13, 2023
10:00 AM CST

Notice is hereby given of a regular meeting of the Region 9 – Upper Colorado Regional Flood Planning Group to be held June 13, 2023 at 10:00 AM at the City Hall Annex– Board Room – 1st Floor, 301 W. Beauregard Ave., San Angelo, Texas, for the purpose of considering the following agenda items.

Phone participation is available for public and non-voting representatives by the conference call information:
Call In: (325) 326–0870 Passcode / ID: 807 503 282#

The Meeting Agenda and the Agenda Packet are posted online at
https://www.cosatx.us/departments-services/water-utilities/region-9-upper-colorado-flood-planning-region

A recording of the meeting will be available to the public in accordance with the Open Meetings Act upon written request.

Members of the public may also submit Public Comment on agenda items by sending their written comments via email to astrube@crmwd.org or scottm@ucratx.org by noon June 12, 2023. The subject line must be in the following format: "Public Comment, [item number] – June 13, 2023." All emails must include your name and address. Please note all Public Comment emails relevant to posted agenda items received by the deadline will be published as part of the agenda packet prior to the meeting and are therefore public record.

Agenda:

1. Call to Order
2. Welcome
3. Public comments – limit 3 minutes per person
4. Approval of minutes from the previous meeting
5. Texas Water Development Board (TWDB) Update
6. Sponsoring agency update from City of San Angelo
7. Consider terms of service as applicable per Article V, Section 2 of group bylaws and discussion/direction regarding voting membership representation for Region 9 RFPG
8. Technical Consultant Presentation for discussion, recommendation, and/or approval of the following items:
    a. Consider approval of Region 9 RFPG Recommended FMXs from the meeting held on May 3, 2023
    b. Update on the Final Amended Region 9 Upper Colorado Flood Plan
    c. Consider approval of revisions and RFPG adoption of the Amended plan
    d. Authorize the City of San Angelo to submit the Amended Region 9 Upper Colorado Flood Plan to TWDB by July 14, 2023
9. Public comments – limit 3 minutes per person
10. Consider date and agenda items for next meeting
11. Adjourn

Additional information may be obtained from:
Allison Strube
astrube@crmwd.org
400 E. 24th Street
Big Spring, Texas 79721

Public Meeting Notice

Region 9 – Upper Colorado Regional Flood Planning Group
May 3, 2023
11:00 AM CST

Meeting held in person at the City Hall Annex – Board Room – 1st Floor, 301 W. Beauregard Ave., San Angelo, Texas. Additionally, participation was available via conference call at (325) 326-0870.

Roll Call:

Voting Member	Interest Category	Present (x) /Absent ( ) / Alternate Present (*)
Kenneth Dierschke	*Agricultural interests*	X
Rick Bacon	*Counties*	X
Henryk Alexander Olstowski	*Electric generating utilities*	X
Shannon McMillan	*Environmental interests*	
Vacant	*Flood districts*	
Morse Haynes	*Industries*	
Lance Overstreet	*Municipalities*	
David H. Loyd Jr.	*Public*	X
Scott McWilliams	*River authorities*	X
Chuck Brown	*Small business*	X
Cole D. Walker	*Water districts*	X
Allison Strube	*Water utilities*	X

Non-voting Member	Agency	Present(x)/Absent( )/ Alternate Present (*)
John McEachern	Texas Parks and Wildlife Department	X
Jodie Terraze	Texas Division of Emergency Management	X - Virtual
Lauren Mayse	Texas Department of Agriculture	
Ben Wilde	Texas State Soil and Water Conservation Board	
Jet Hays	General Land Office	
Tressa Olsen	Texas Water Development Board (TWDB)	X
Winona Henry	Texas Commission on Environmental Quality	
Anna Yakimovicz	Region 10 Liaison	X - Virtual

Others Present:

Paula Jo Lemonds – HDR (Consultant): In-Person

Emily Daniel – HDR (Consultant): In-Person
Shane Kelton – City of San Angelo: In-person
Ian Blair – Texas Water Development Board: In-person
Heather Keister – Freese & Nichols (Consultant): In-person
Rodrigo Vizcaino – HDR (Consultant): In-person
Maria Gonzalez-Tafolla – HDR (Consultant): In-person
Gary Young – Public from Tom Green County, Texas
Scott Rushing – Halff (Consultant): Virtual
Murphy Parks – Freese & Nichols (Consultant): Virtual
David Ipina – HDR (Consultant): Virtual

Quorum:
Quorum: **Yes**
Number of voting members or alternates representing voting members present: 8 (David Loyd left at 12:04PM & Scott McWilliams left at 12:11PM)
Number required for quorum per current voting positions of 11: 6

Meeting agendas, packets, information and recordings are available at the link https://www.cosatx.us/departments-services/water-utilities/region-9-upper-colorado-flood-planning-region

- **AGENDA ITEM NO. 1: Call to Order**
  Chair Strube called the meeting to order at 11:05 AM CST. A roll call of the planning group members was taken to record attendance, and a quorum was established.

- **AGENDA ITEM NO. 2: Welcome**

- **AGENDA ITEM NO. 3: Public Comments**
  Public comments were provided by Gary Young of Cauley Lane in Tom Green County, TX. His concerns were regarding FEMA flood maps showing floodplain in the area of his residence, when flooding does not occur. Commissioner Rick Bacon added to the gentleman's comments that he has been working with FEMA and resident for assistance on the issue.

- **AGENDA ITEM NO. 4: Approval of minutes from previous meeting.**
  Motion by Scott McWilliams and seconded by Commissioner Rick Bacon. Motion passed unanimously.

- **AGENDA ITEM NO. 5: TWDB Update**
  Tressa Olsen with TWDB introduced Ian Blair who is Region 9's TWDB contact. Ian discussed terms of office, Task 13, rule-making changes, and guidance on ranking.

- **AGENDA ITEM NO. 6: Sponsor agency update from the City of San Angelo**
  Shane Kelton, Executive Director of Water Utilities for the City of San Angelo, stated there were no significant updates. It was discussed that the City of San Angelo is working through the reimbursement process with TWDB.

- **AGENDA ITEM NO. 7: Consider nominating and electing RFPG Chair, Vice Chair, Secretary, two members-at-large to serve on the Executive Committee, as applicable, per group bylaws**
  A motion was by Allison Strube to continue with the current slate of Executive Committee members with the exception of appointing Scott McWilliams as Secretary and seconded by David Loyd. Motion passed unanimously. The newly elected Executive Committee consists of Allison Strube serving as Chair, Chuck Brown serving as Vice-Chair, Scott McWilliams as Secretary, Shannon McMillan and Commissioner Rick Bacon as at-large members.

- **AGENDA ITEM NO. 8: Technical Consultant Presentation for discussion, recommendation, and/or approval on the following items: a. Task 12 Update on Performing FMEs and Recommending Additional FMPs; b. Discussion and potential action to recommend new recommended FMXs in the Region 9 Upper Colorado Amended Regional Flood Plan; c. Task 13 Update on the Amended Region 9 Upper Colorado Flood Plan**
  The Consultant Team presented the presentation provided in the background material of the agenda. Commissioner Rick Bacon made the motion to recommend new recommended FMXs in the plan as presented. Chuck Brown seconded and the motion passed unanimously. Paula Jo went over the timeline to get to the July submittal of the amended plan.

- **AGENDA ITEM NO. 9: Discussion and direction regarding Municipal interest category representative**
  Chair Strube brought it to the group attention that Lance Overstreet has resigned his representation on Region 9. A motion was made by Chuck Brown and seconded by Kenneth Dierschke to accept the resignation. Motion passed unanimously.

- **AGENDA ITEM NO. 10: Public Comments**
  No Public Comments were made during this item.

- **AGENDA ITEM NO. 11: Consider Date and Agenda Items for Next Meeting**
  A specific date for the next meeting was not set, but tentatively set for mid-June.

- **AGENDA ITEM NO. 12: Adjourn**
  Motion by Kenneth Dierschke and seconded by Commissioner Rick Bacon. Motion passed unanimously. Meeting was adjourned at 12:29 PM CST.

Approved by the Region 9 Upper Colorado RFPG at a meeting held on June 13, 2023.

_____
SECRETARY

_____
CHAIR

Upper Colorado Regional Flood Plan

Agenda Item No. 8

June 13, 2023

8a. Consider approval of Recommended FMXs from meeting held on May 3rd

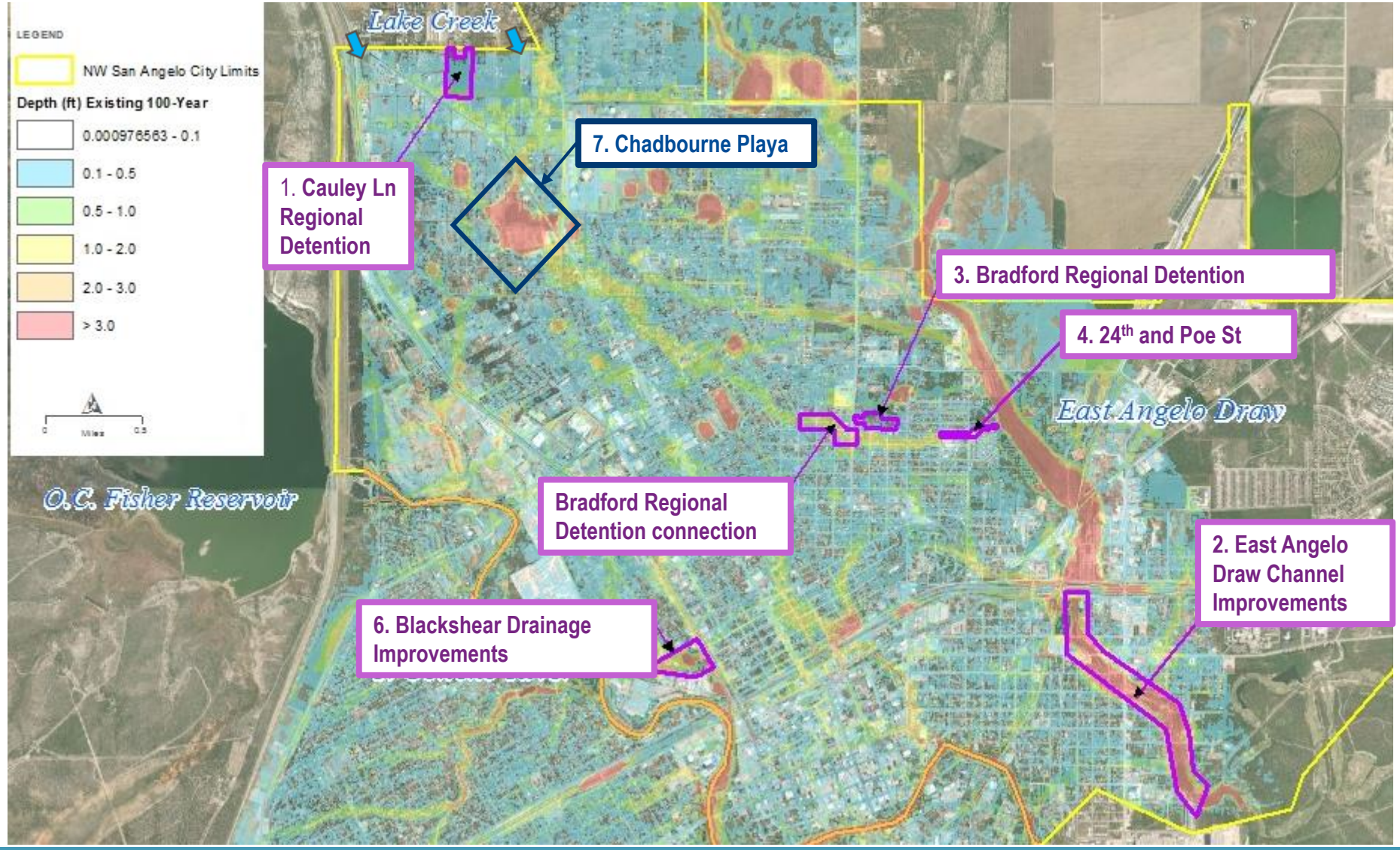
- City of San Angelo
- City of Midland
- City of Andrews
- Dam rehabilitation
- Flood early warning systems

City of San Angelo Northwest 2D Flood Risk Evaluation - Overview

Scope:

- Develop 2D hydraulic model of the northwest sector
- Review original 4 FMPs identified as part of the Region 9 Flood Plan
- Recommend additional FMPs and FMEs
- Identify potential improvements for recommended FMPs

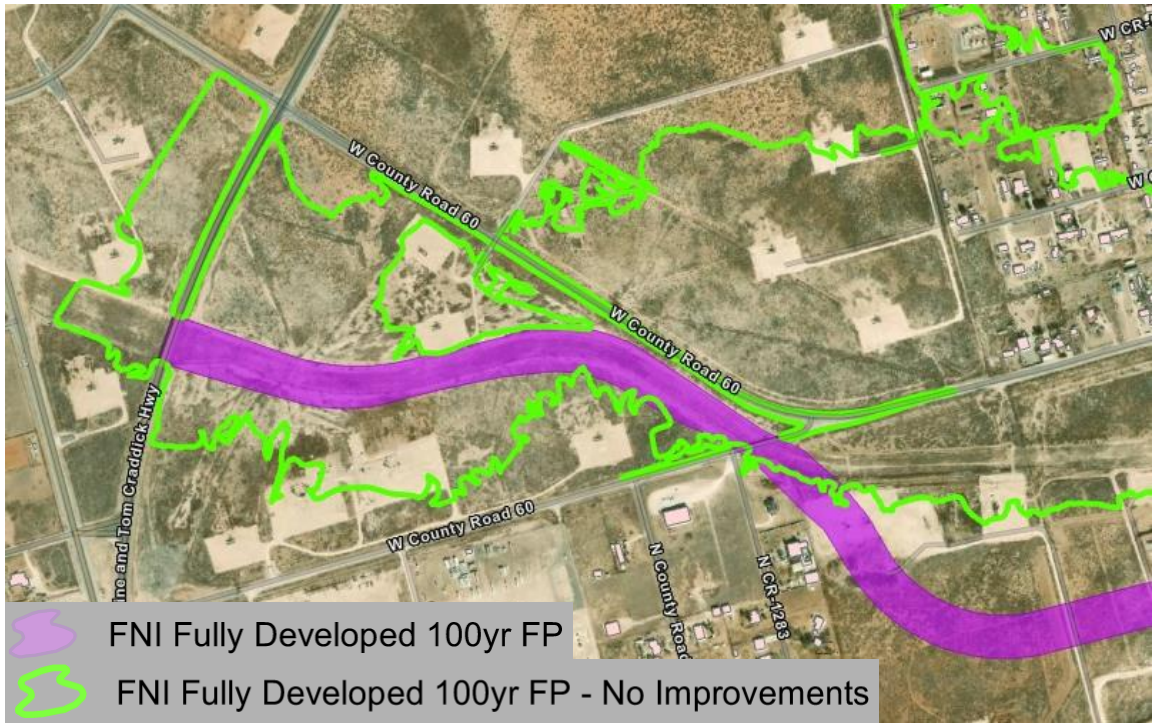
City of San Angelo Northwest 2D Flood Risk Evaluation – FMXs

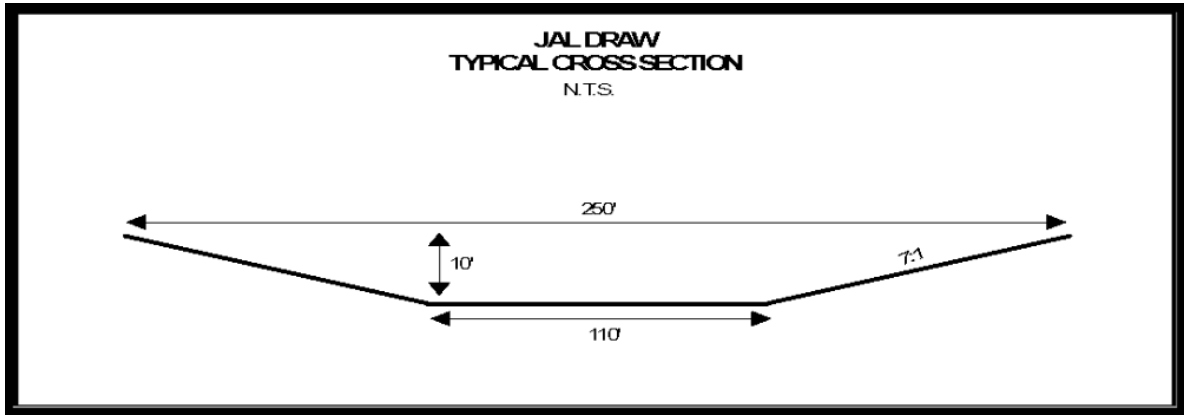


City of Midland
Jal Draw Overview

Jal Draw Project A

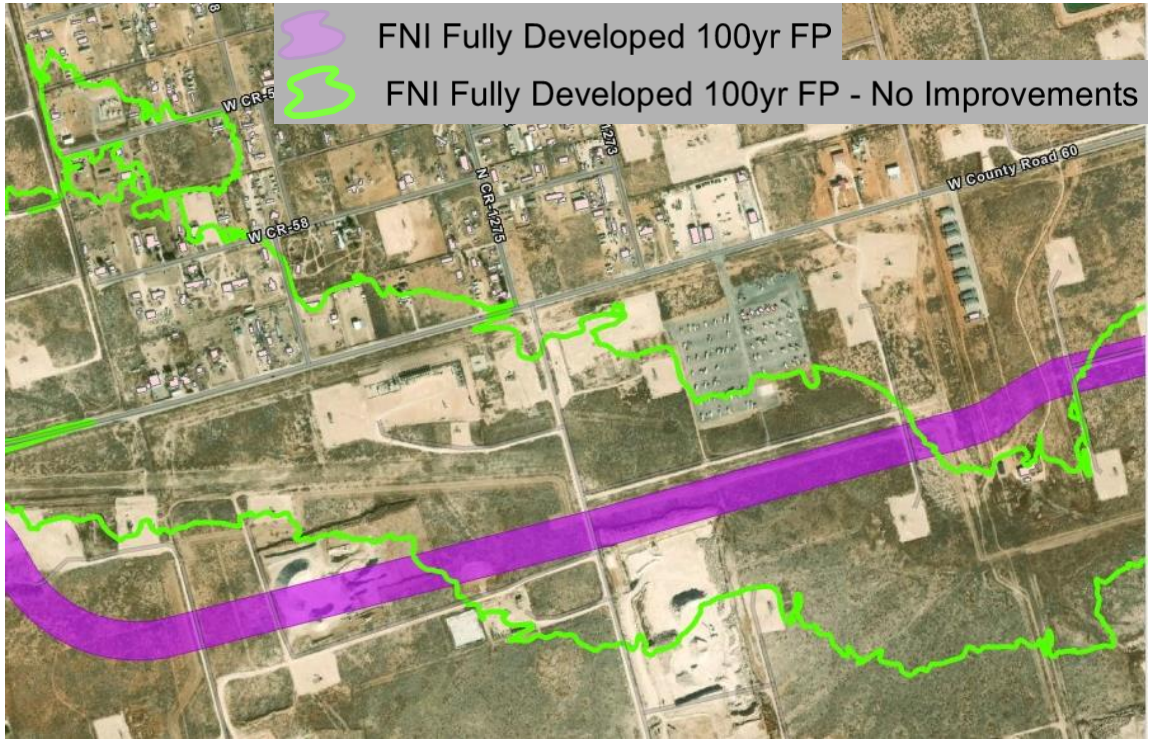
- Description: The existing floodplain has impacted development in the area and existing infrastructure is not designed for the fully-developed 100-year floodplain.
- Alternative: Excavate a 250-foot top width trapezoidal channel along the draw with provisions for two future proposed crossings.

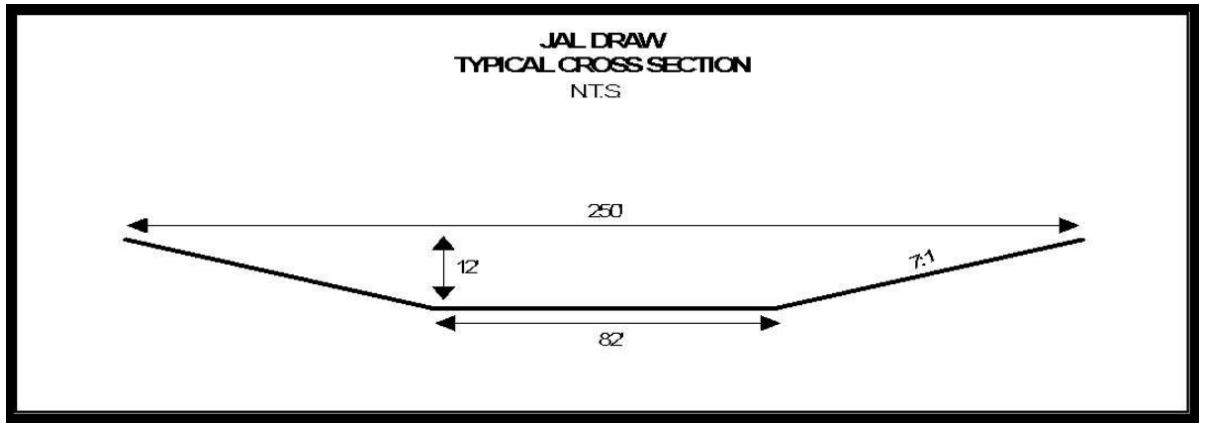




Jal Draw Project B

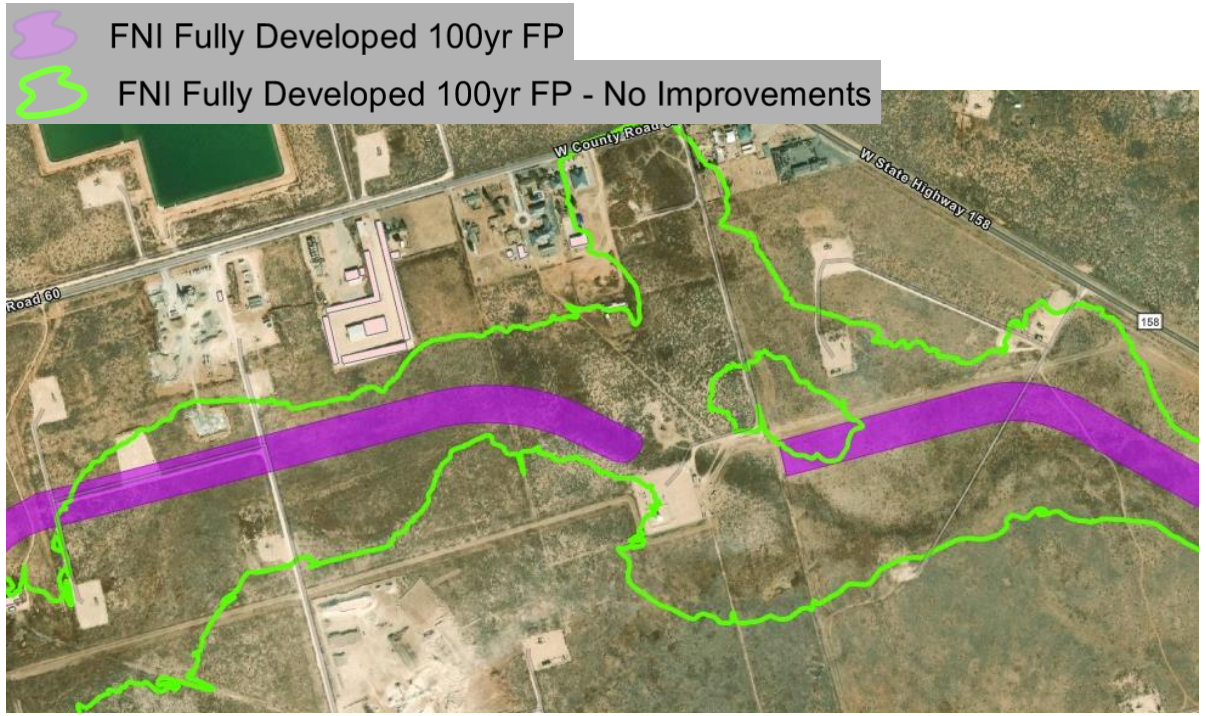
- Description: The existing floodplain has impacted development in the area and existing infrastructure is not designed for the fully-developed 100-year floodplain.
- Alternative: Excavate a 250-foot top width trapezoidal channel along the draw with provisions for a future proposed crossing.

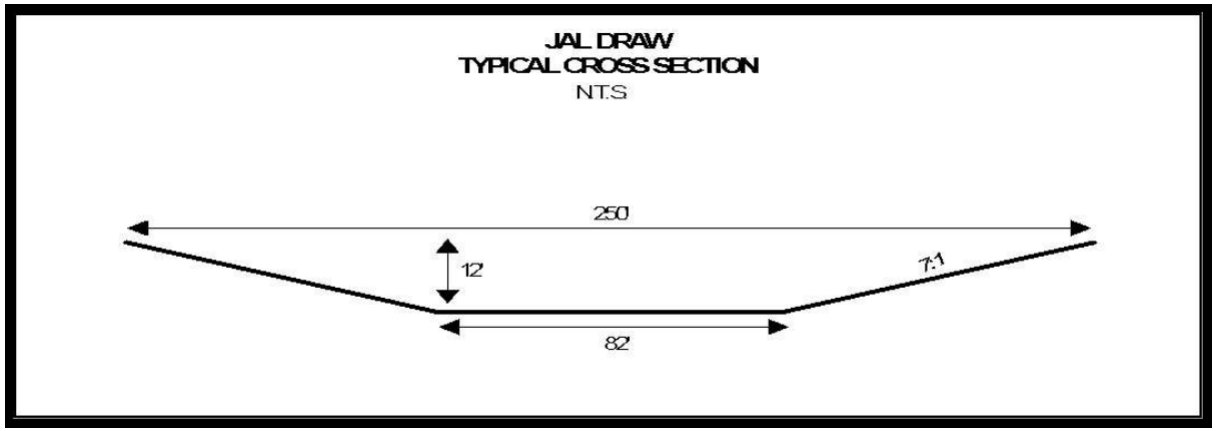




Jal Draw Project C

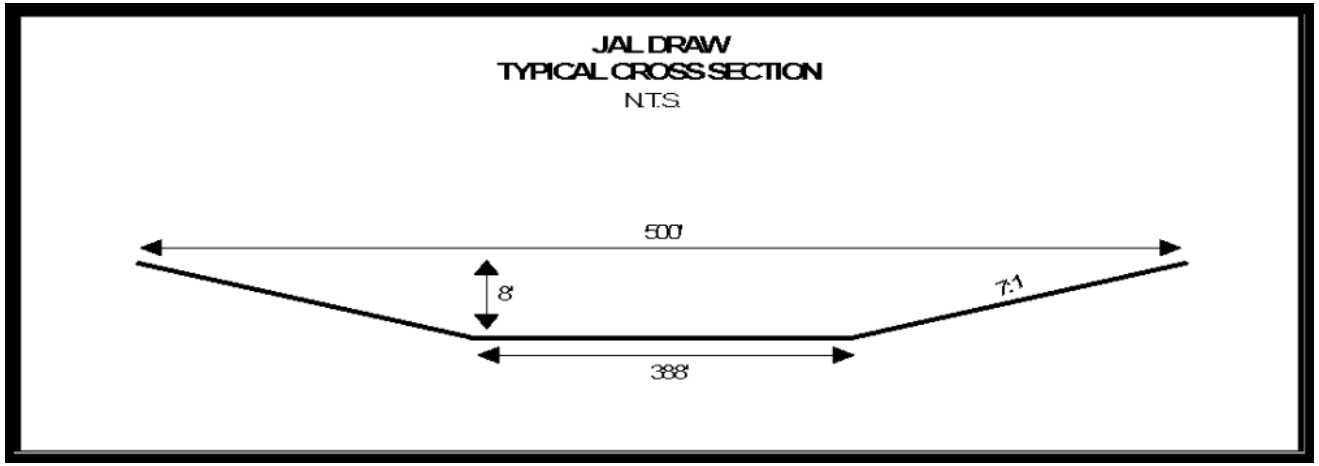
- Description: The existing floodplain has impacted development in the area and existing infrastructure is not designed for the fully-developed 100-year floodplain.
- Alternative: Excavate a 250-foot top width trapezoidal channel along the draw with provisions for two future proposed crossings.
- Challenges: Existing 10” natural gas pipeline

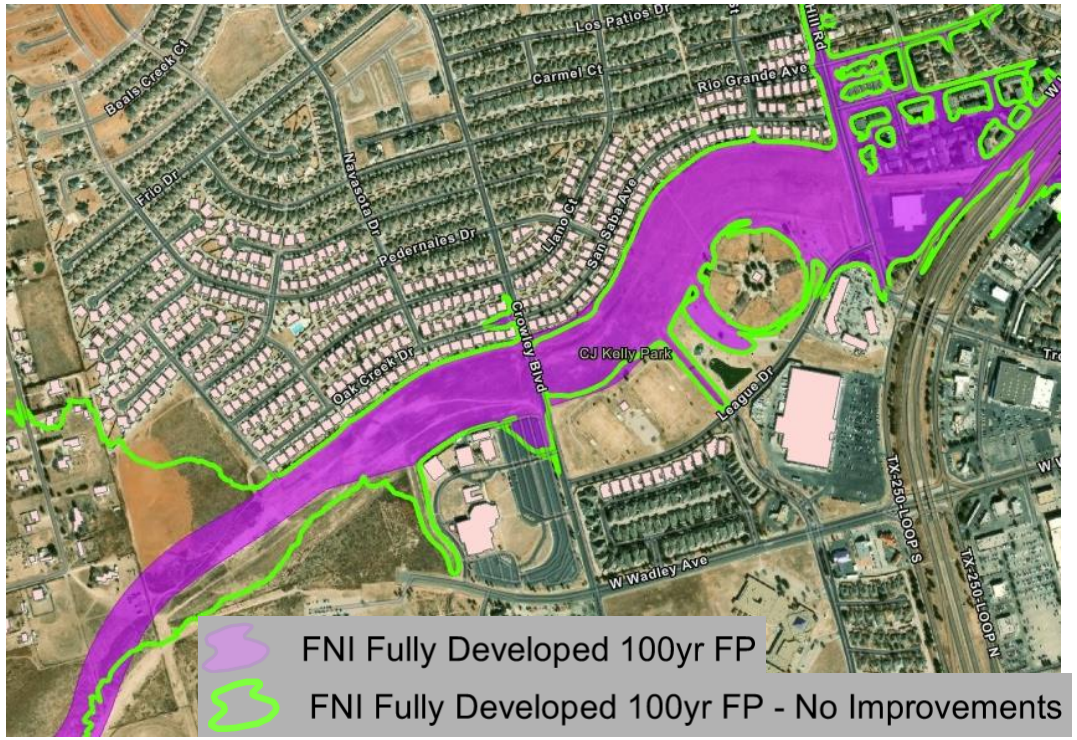




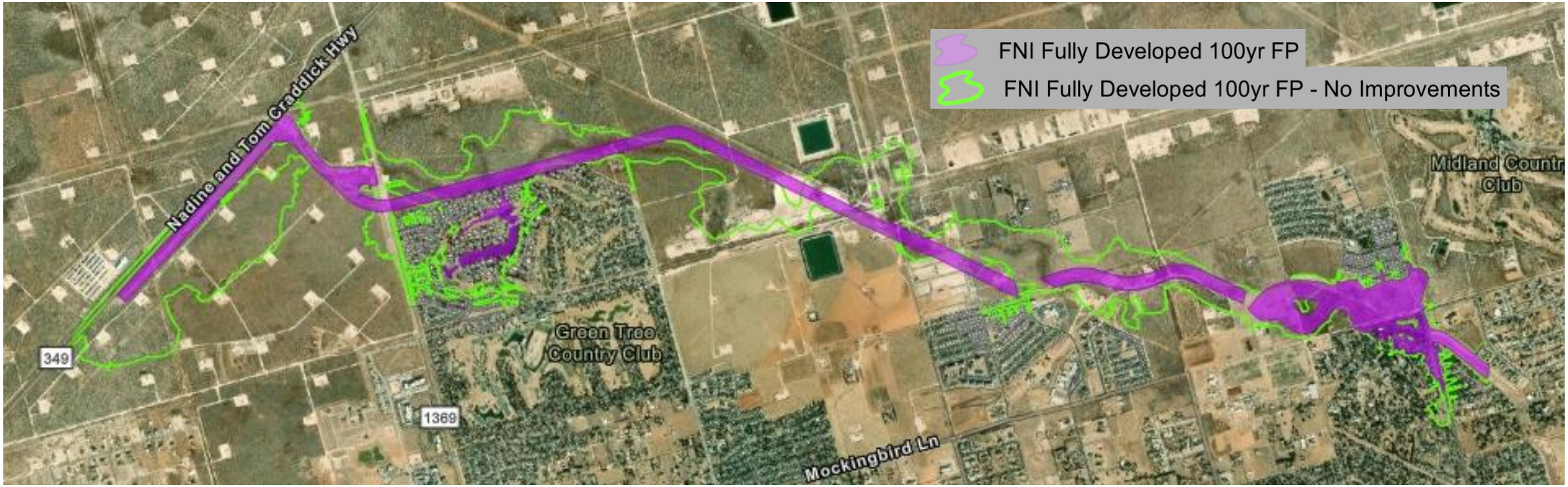
Jal Draw Project E

- Description: The existing floodplain has impacted development in the area and existing infrastructure is not designed for the fully-developed 100-year floodplain.
- Alternative: Excavate a 500-foot top width trapezoidal channel along the draw.



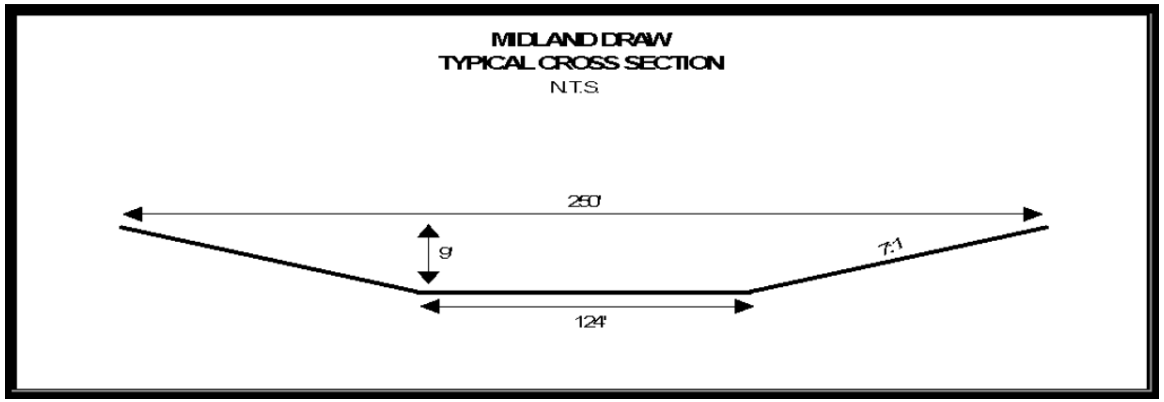


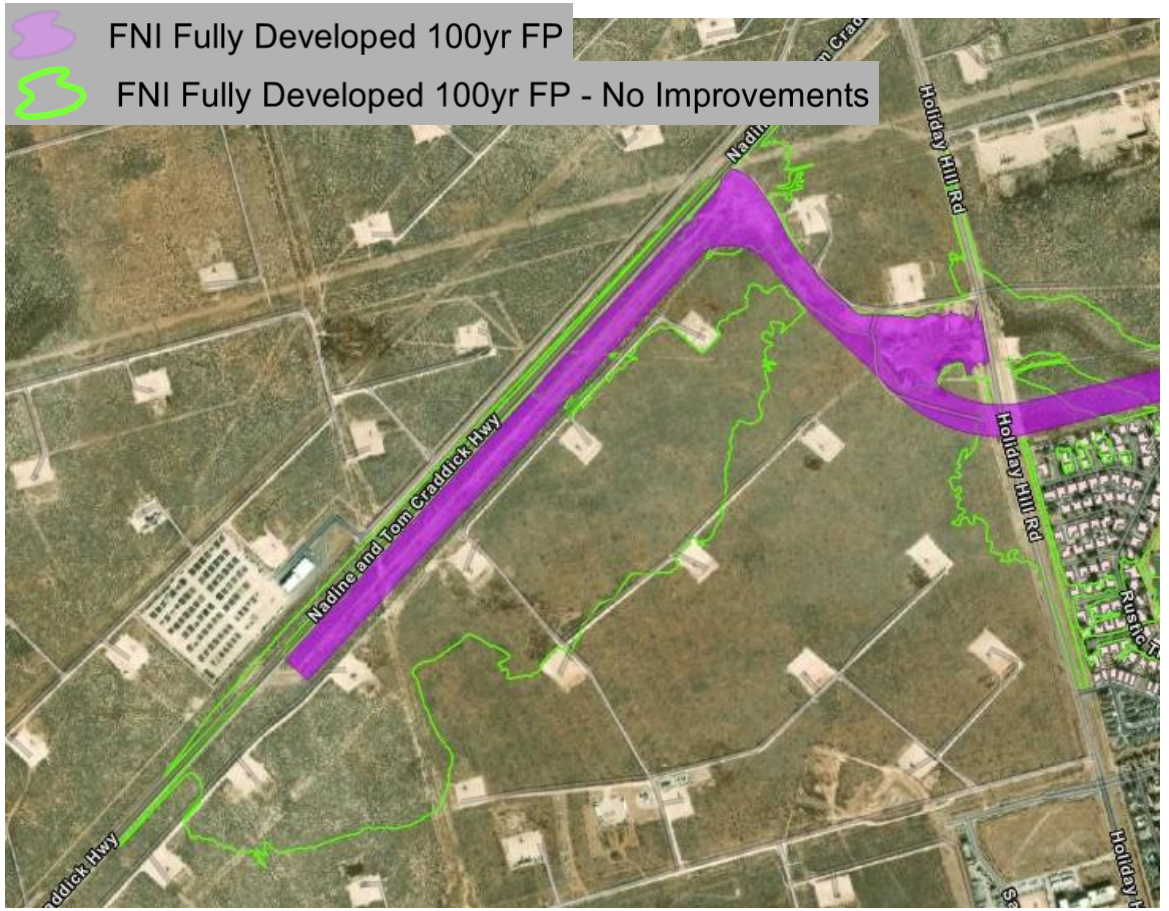
Midland Draw Overview



Midland Draw Project A

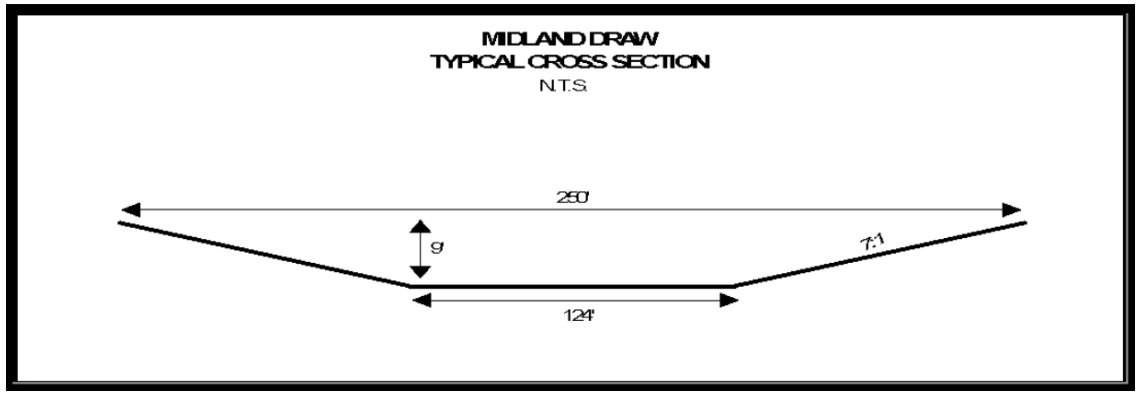
- Description: The existing floodplain has impacted development in the area and existing infrastructure is not designed for the fully-developed 100-year floodplain.
- Alternative: Excavate a 250-foot top width trapezoidal channel along the draw with provisions for two proposed crossings.





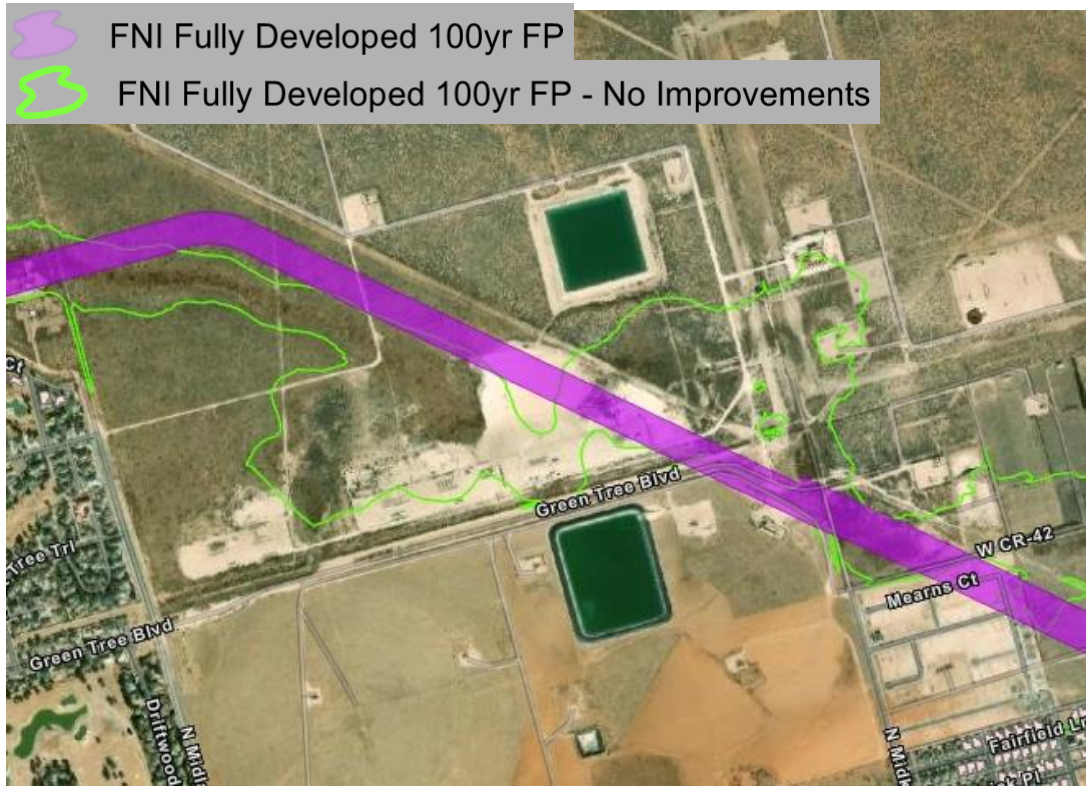
Midland Draw Project B

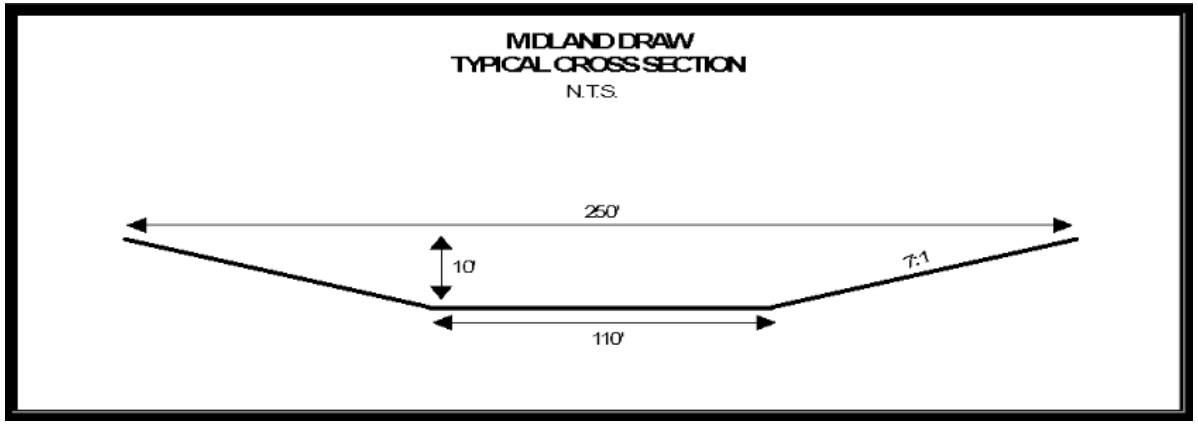
- Description: The existing floodplain has impacted development in the area and existing infrastructure is not designed for the fully-developed 100-year floodplain.
- Alternative: Excavate a 250-foot top width trapezoidal channel along the draw with provisions to replace the existing crossing at Holiday Hill Rd.
- Challenges: Channel runs very close to an existing sanitary sewer line.



Midland Draw Project C

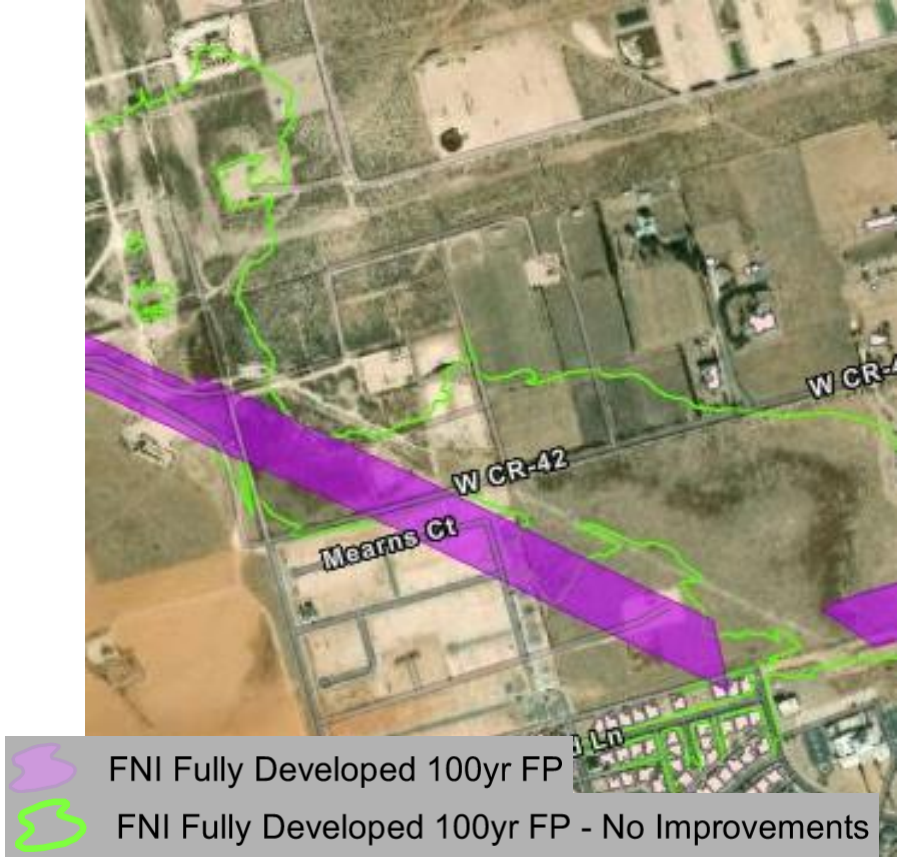
- Description: The existing floodplain has impacted development in the area and existing infrastructure is not designed for the fully-developed 100-year floodplain.
- Alternative: Excavate a 250-foot top width trapezoidal channel along the draw with provisions for the pipeline crossing and a future proposed crossing.
- Challenges: An existing 30” raw water line crossing

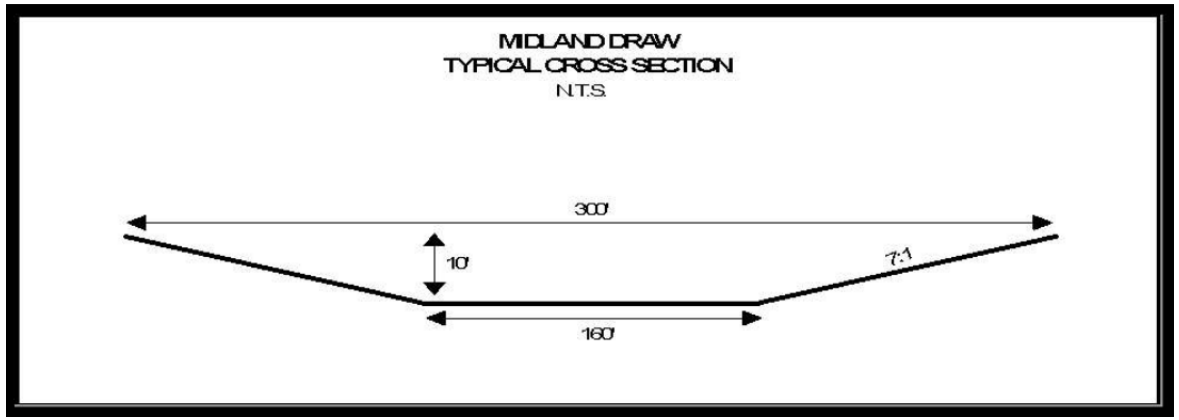




Midland Draw Project D

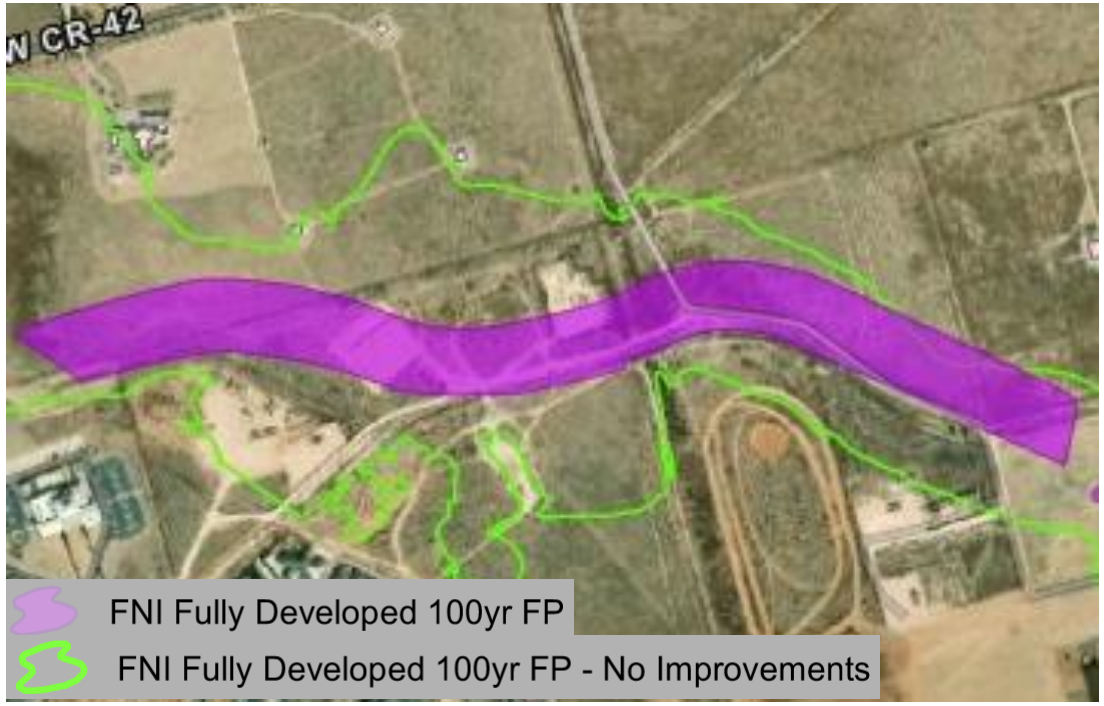
- Description: The existing floodplain has impacted development in the area and existing infrastructure is not designed for the fully-developed 100-year floodplain.
- Alternative: Excavate a 300-foot top width trapezoidal channel along the draw with provisions for a pipeline crossing and three future proposed crossings.
- Challenges: An existing series of pipelines running parallel to the proposed channel.

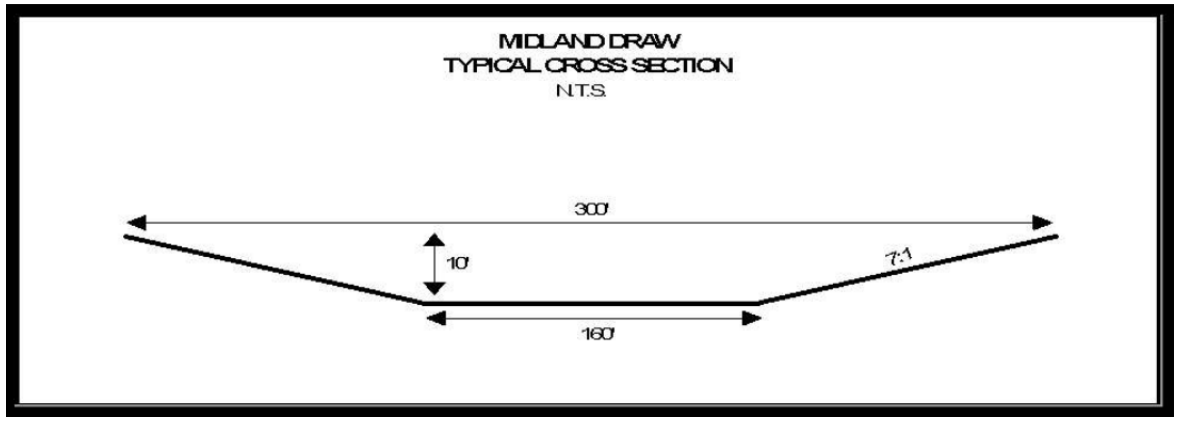




Midland Draw Project E

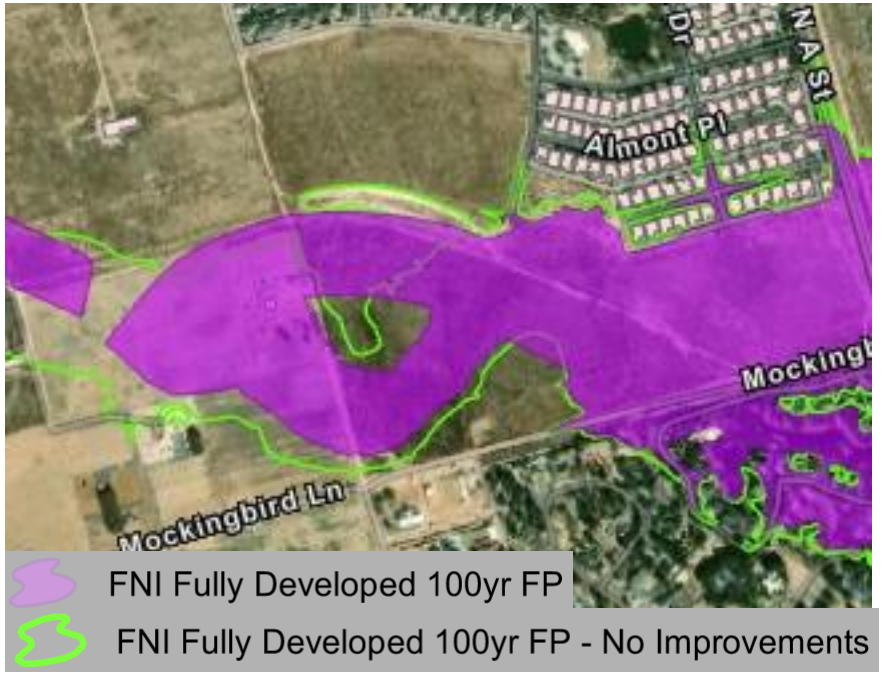
- Description: The existing floodplain has impacted development in the area and existing infrastructure is not designed for the fully-developed 100-year floodplain.
- Alternative: Excavate a 300-foot top width trapezoidal channel along the draw with provisions to replace the existing pipeline crossing and future proposed crossings.
- Challenges: An existing pipeline

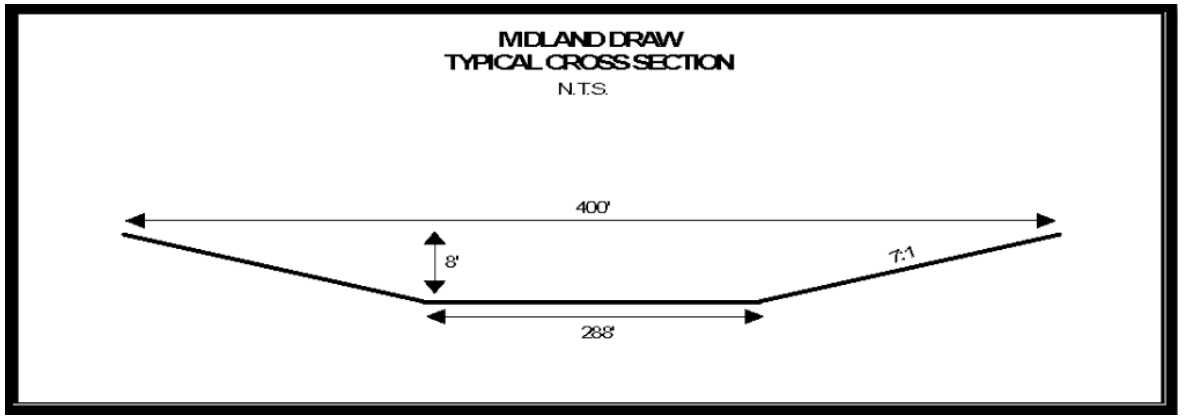




Midland Draw Project F

- Description: The existing floodplain has impacted development in the area and existing infrastructure is not designed for the fully-developed 100-year floodplain.
- Alternative: Excavate a 400-foot top width trapezoidal channel along the draw an average depth.





Playa MI4F

- Description: The existing playa has a low storage volume, no managed outfall, and a significant impact at downstream peak discharges.
- Alternative: Elevate the playa outlet 4’ by adding a 600’ long embankment and an outlet pipe/channel that discharges at the existing crossing at Loop 349.

Industrial Channel Drainage Improvements

- Description: The existing drainage infrastructure does not meet the 100-yr level of service.
- Alternative: Channel improvements, maintenance, channel shaping, and new culverts along the Draw from just south of U.S. Highway 80 to just downstream of Lamesa Road.

City of Andrews Northwest Playa Excavation

- Description: The existing playa has a low storage volume and a significant impact of the surrounding floodplain.
- Alternative: Proposed excavation of approximately 53,000 cu.yd. of removed earth material. Project aims to maintain existing floodplain to account for anticipated development.

City of Andrews Southwest Playa Excavation

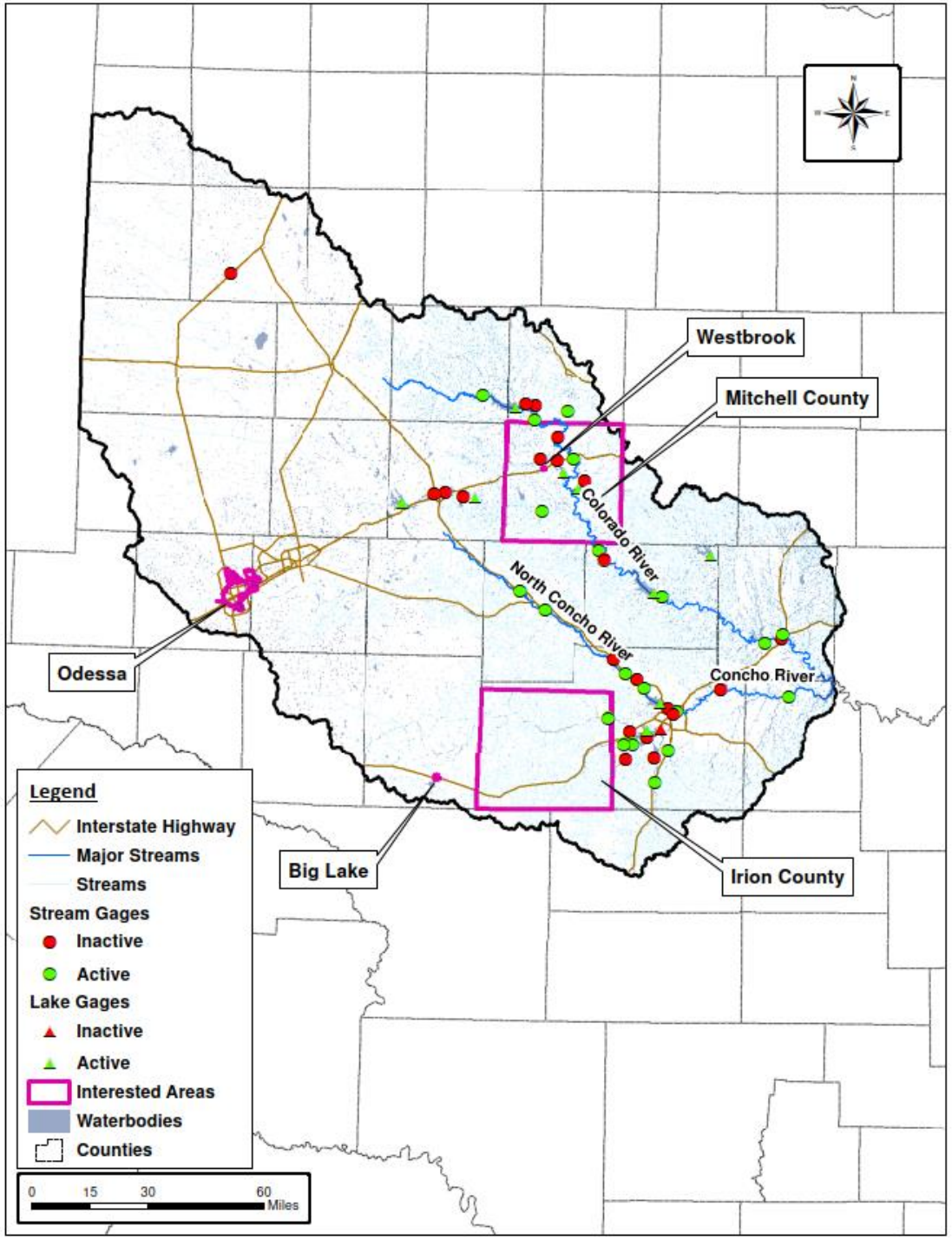
- Description: The existing playa has a low storage volume and a significant impact of the surrounding floodplain.
- Alternative: Proposed excavation of approximately 183,000 cu-yd. of removed earth material. Project aims to maintain existing floodplain to account for anticipated development.

Task 12
Flood Warning System: Scope of Work Overview

- Review local tools and systems currently available or in development in Region 9.
- Analyze and document USGS gages' period of record for gages in region.
- Identify what regional tools systems are available.
  - Coordinate with relevant agencies (NWS, InFRM, USGS, TDEM).
- Recommend gage placement and development of flood alert systems based on data collected from Tasks 1-11.
- Develop database of flood alert systems currently in Upper Colorado Region.
- Summarize findings and recommendations.

Flood Warning System Potential Project Locations

- Entity Interest
  - 5 entities indicated interest in early flood warning systems
  - Potential projects include the following:
    - Installation of a flood early warning system
    - Installation of additional rain gages
    - Increasing signage related to flooding



Flood Warning System Next Steps

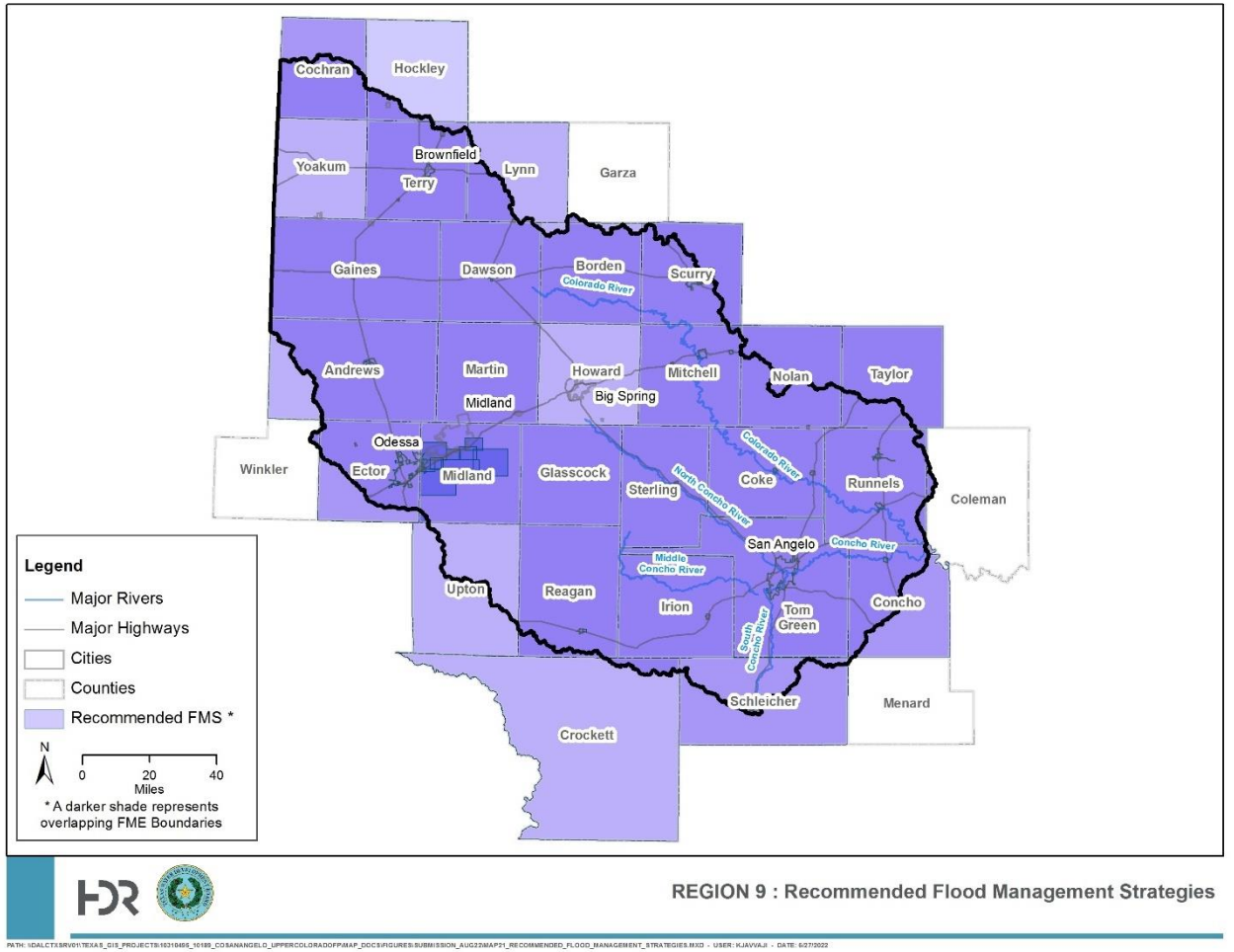
- Coordinate follow-up meetings with NWS and USGS
    - Determine what deliverables could be leveraged within their systems
- Set up meetings with InFRM and TDEM
    - Determine what deliverables could be leveraged within their systems
- Follow up with communities within the region
    - Continue to document what systems are in place
    - Reach out to major entities
- Compare gage distribution with flooding data

8b. Update on Amended Region 9 Upper Colorado Flood Plan

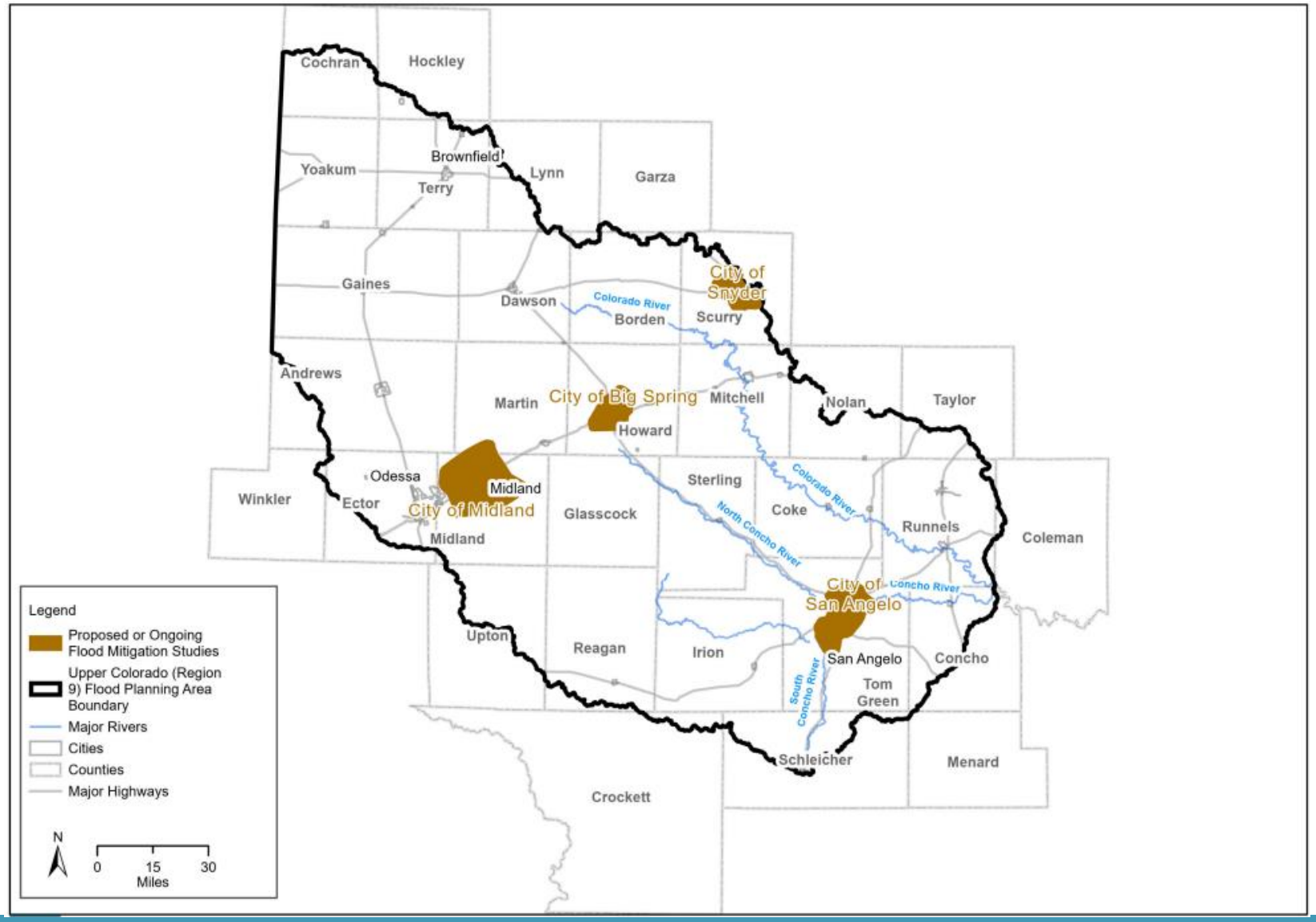
- Updates made within Final Flood Plan document
  - Draft Amended Plan provided to UCRFPG
- TWDB requested revisions completed
  - Documentation provided to UCRFPG

Timeframe	TWDB Flood Plan Scope of Work Tasks/Actions
✓ July	Draft Flood Plan Refinements
✓ August 1, 2022	Draft Flood Plan Submitted to TWDB
✓ September 14, 2022	Public Comment Meeting
✓ January 10, 2023	Final Flood Plan Submitted to TWDB
July 14, 2023	Amended Flood Plan Submitted to TWDB

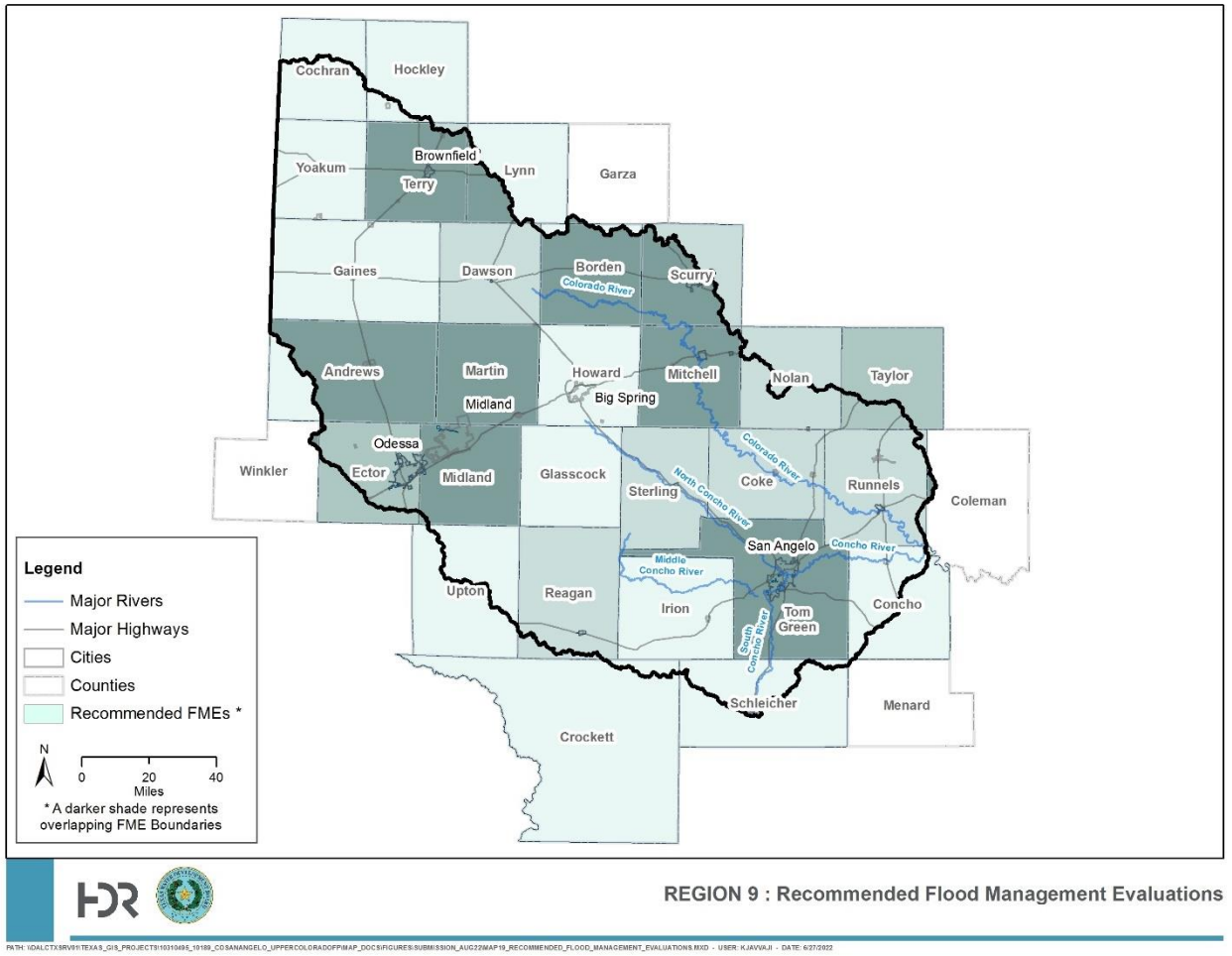
Existing Recommended FMSs



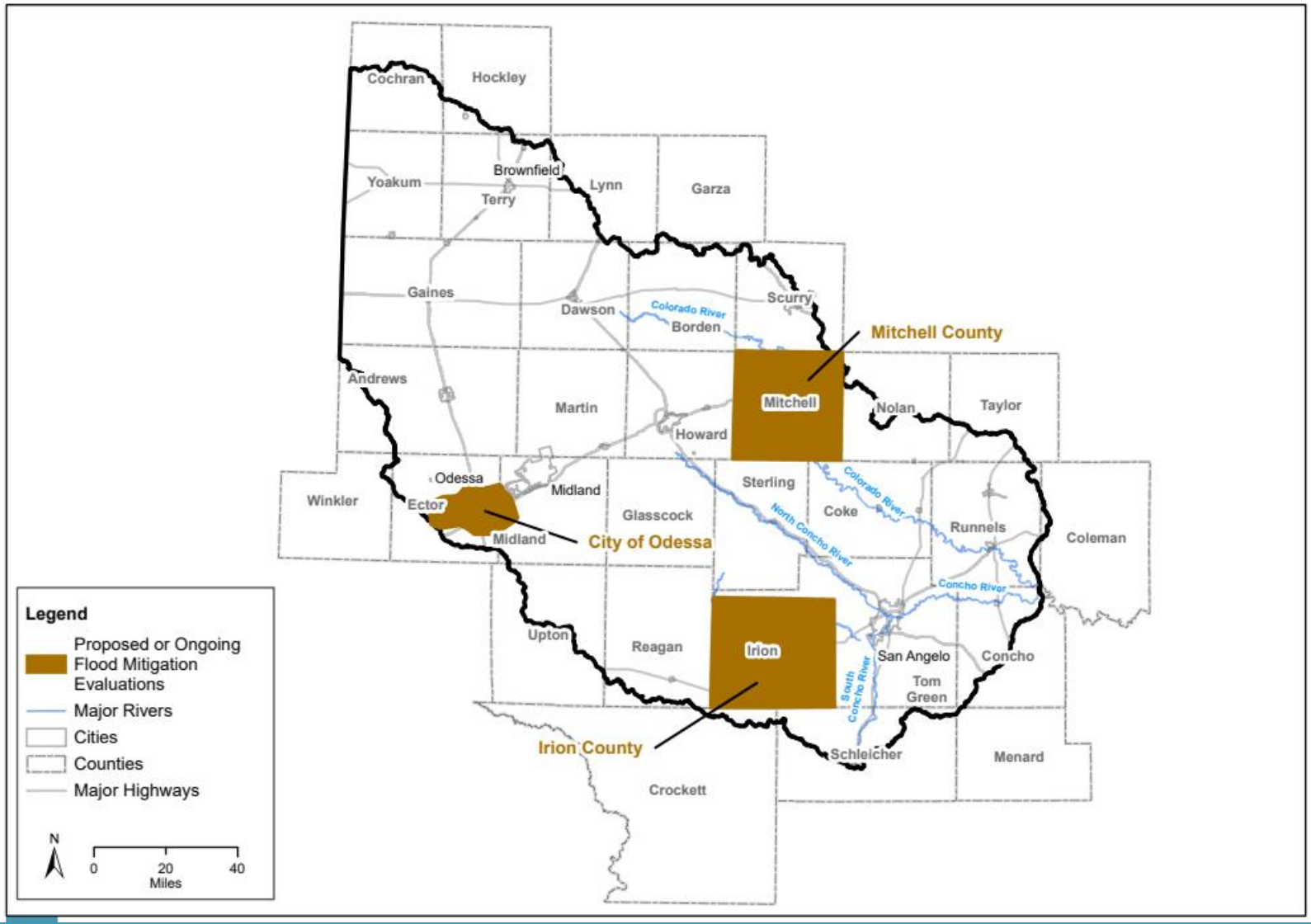
New Recommended FMSs



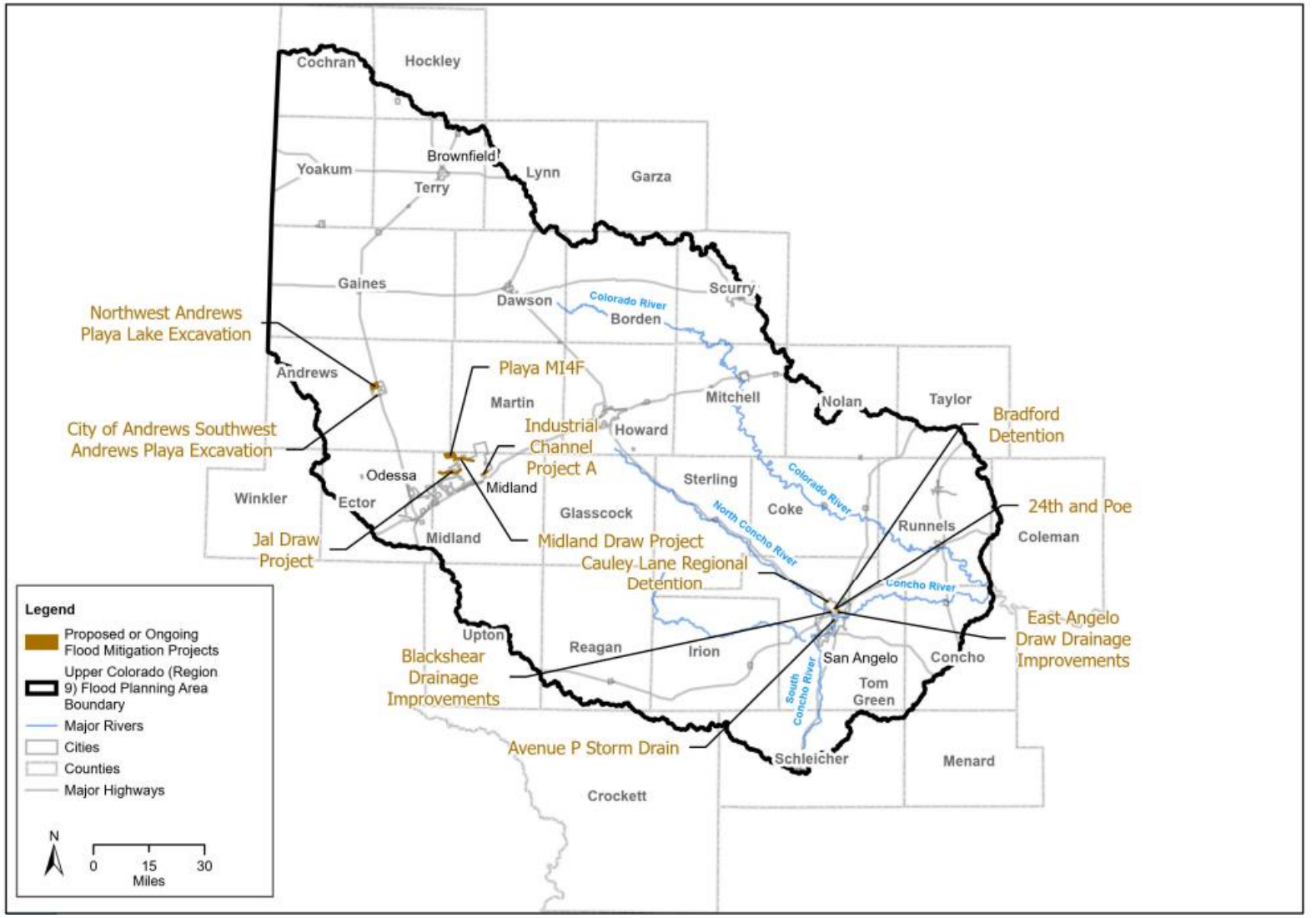
Existing Recommended FMEs



New Recommended FMEs



All Recommended FMPs



8c. Consider approval of revisions and RFPG adoption of the Amended plan

Consider adoption of Amended Upper Colorado Regional Flood Plan.

8d. Authorize City of San Angelo to submit Amended Upper Colorado Flood Plan to TWDB by July 14, 2023

Suggested action:

“Direct consultant team to submit Amended Upper Colorado Regional Flood Plan to TWDB staff on or before deadline of July 14, 2023.”

Questions

Definitions

- **Flood Management Evaluation (FME)**: a proposed flood study of a specific, flood-prone area that is needed in order to assess flood risk and/or determine whether there are potentially feasible FMSs or FMPs.
- **Flood Mitigation Project (FMP)**: a proposed project, either structural or non-structural, that has non-zero capital costs or other non-recurring cost and, when implemented, will reduce flood risk or mitigate flood hazards to life or property.
- **Flood Management Strategy** (**FMS**): a proposed plan to reduce flood risk or mitigate flood hazards to life or property.

Memo - DRAFT

Date:	Monday, June 05, 2023
Project:	Region 9 Upper Colorado- City of San Angelo Amended Plan
To:	Region 9 Flood Planning Group
From:	Paula Jo Lemonds, PE Rodrigo Vizcaino, PE, CFM Maria Gonzalez-Tafolla, EIT, CFM
Subject:	DRAFT - City of San Angelo Northwest 2D Flood Risk Evaluation

A 2D flood risk evaluation model was completed for the northeastern sector of the City of San Angelo (City) as part of the 2022 Master Drainage Plan effort. The model has been revised and updated to further investigate flood prone areas in the northeastern sector of the city. Results have been used to confirm existing Flood Mitigation Projects (FMPs) and to recommended additional FMPs and Flood Mitigation Evaluations (FMEs).

Existing Conditions

To understand flooding due to nearby streams, the model inflow hydrograph inputs were modified and added for all contributing riverine systems such as: East Angelo Draw, Lake Creek, and the O.C. Fisher reservoir that releases flow into the N Concho River.

Information from the following studies was leveraged to perform this flood risk evaluation:

1. FEMA Flood Insurance Study (effective June 19, 2012) for Tom Green County, Texas, and Incorporated Areas
    a. Provided peak discharge information for East Angelo Draw inflow hydrograph
2. FEMA LOMR Case No. 17-06-0008P (effective May 3, 2017) for City of San Angelo and Tom Green County, Texas
    a. Provided peak discharge information for the Lake Creek inflow hydrograph
3. U.S. Army Corps of Engineers InFRM Hydrology Assessment for the Colorado River Basin
    a. Provided preliminary peak outflow hydrograph information for the O.C. Fisher Reservoir. Data subject to change upon completion of this study.
4. City of San Angelo Master Drainage Plan (April 8, 2022) prepared by HDR Engineering Inc.
    a. Provided baseline geometry for hydraulic model

The model was also revised to include precipitation depths as an initial condition. This boundary condition helps identify localized neighborhood and street flooding due to rainfall events and not necessarily riverine flooding only.

2019 Central Texas LiDAR from TNRIS was used to generate ground and top of road elevations Additional break lines were added to the geometry to define prominent terrain features that convey or impede flow. Major culvert crossings were modeled based on aerial and street view

imagery. Culvert crossing information along East Angelo Draw was taken from field visit measurements. Landcover roughness values were added to the model from the 2019 National Land Cover Database (NLCD).

Flood Mitigation Projects

The revised existing model results were used to confirm flood prone locations and sources of flooding. HDR Engineering, Inc confirmed 3 FMPs, recommends 2 additional FMPs, and recommends 1 additional FME.

1) Cauley Lane Regional Detention

The Cauley Lane Regional Detention FMP as listed in the City's Master Drainage Plan and recommended in the initial Region 9 Flood Planning Plan has been confirmed to be a feasible FMP based on the updated modeling efforts. The FMP aims to alleviate flooding due to the Lake Creek overflow by proposing a diversion swale that will send flow to a proposed detention pond. The pond will function like a playa lake.

2) East Angelo Draw Channel Improvements (Phase 1)

The East Angelo Draw Channel Improvements as listed in the City's Master Drainage Plan has been confirmed to be a feasible FMP based on the updated modeling efforts. The FMP aims to address flooding due to the East Angelo Draw for a 0.6-mile stretch starting from Culwell St to N Bell St. The channel will be widened immediately upstream of US-277 to provide more storage. The channel will also be widened from downstream of Upton St to N Bell Street. Culvert capacity on Pulliam St will need to be increased with rock rip rap added downstream of the road overflow areas to mitigate stream erosion.

3) Bradford Regional Detention

The Bradford Regional Detention FMP as listed in the City's Master Drainage Plan and recommended in the initial Region 9 Flood Planning Plan has been confirmed to be a feasible FMP based on the updated modeling efforts. The FMP aims to alleviate neighborhood flooding east of Armstrong St (State Highway 208) by adding a culvert crossing at E 24th St and Armstrong that will send flow into a proposed drainage channel that diverts flow into a proposed detention pond. The pond will require a pumping system to prevent overflow and discharge outflows into an existing open channel area.

4) 24th and Poe

The 24th and Poe FMP as listed in the City's Master Drainage Plan and recommended in the initial Region 9 Flood Planning Plan has been confirmed to be a feasible FMP based on the updated modeling efforts. The FMP aims to alleviate neighborhood flooding along E 24th St by widening the roadway and installing taller curbs to increase overflow conveyance. This flow will be transferred into the existing drainage channel along E 22nd St. The FMP proposes to rehabilitate and improve the existing drainage channel and increase its capacity.

5) Blackshear Drainage Improvements

The Blackshear Drainage Improvement FMP has been confirmed to be a feasible FMP based on the updated modeling efforts. The FMP aims to alleviate flooding in the Blackshear neighborhood located between W 19th St and W 14th St by increasing street overflow capacity. Taller road curbs and inverted streets will aid to channelize street flow more efficiently and discharge into a new proposed drainage channel adjacent to Brown St. This channel will divert flow into the existing detention Pond adjacent to N Bryant Blvd.

Flood Mitigation Evaluations

Utilizing the revised existing conditions model results, HDR Engineering, Inc recommends the following FME.

1) Chadbourne Playa

The model shows that the existing detention pond on N Chadbourne St and Grape Creek Rd causes playa-like flooding issues due to overflow. The Chadbourne Playa area will need further evaluation and a separate study to assess flood risk and determine whether there are feasible FMPs that can be recommended.

TECHNICAL MEMORANDUM

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TO:	Upper Colorado Regional Flood Planning Group
FROM:	Heather Keister, P.E., CFM
SUBJECT:	Upper Colorado Region Dams
PROJECT:	HDR21588
DATE:	June 5, 2023
CC:	

DRAFT

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF HEATHER RAE KEISTER, P.E., TEXAS NO. 100095 ON JUNE 5, 2023. IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES.
FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM
F- 2144

1. BACKGROUND

Following the completion of the Final Regional Flood Plan in January 2023, a process was developed to incorporate dam related projects within the Amended Regional Flood Plan. **Figure 1** shows the 37 total dams in the Upper Colorado region. A high-level screening analysis of the Upper Colorado region dams was performed to help prioritize dams for inclusion in this process as a Flood Management Evaluation (FME). The purpose of the dam evaluations is to assess the dam's flood protection performance during major storm events, develop breach analysis mapping and assess hazard classification, develop risk indices, and evaluate dam safety performance. To do so, the project cost includes a screening assessment phase and detailed dam breach analysis phase, both of which are impacted by the number of dams within the project area.

The goal of this effort was to identify and prioritize dam projects which present a risk to downstream population, do not currently have a funding stream to address the needs, and meet the intent of the regional flood planning process. To do this, the TCEQ dam dataset was filtered down by removing federally and privately owned dams, dams with a total height less than 20 feet, dams with a maximum storage less than 100 acre-feet, and dams without emergency action plans or a low hazard classification. The list of dams within the Upper Colorado region included 37 dams in 11 different HUC8s.

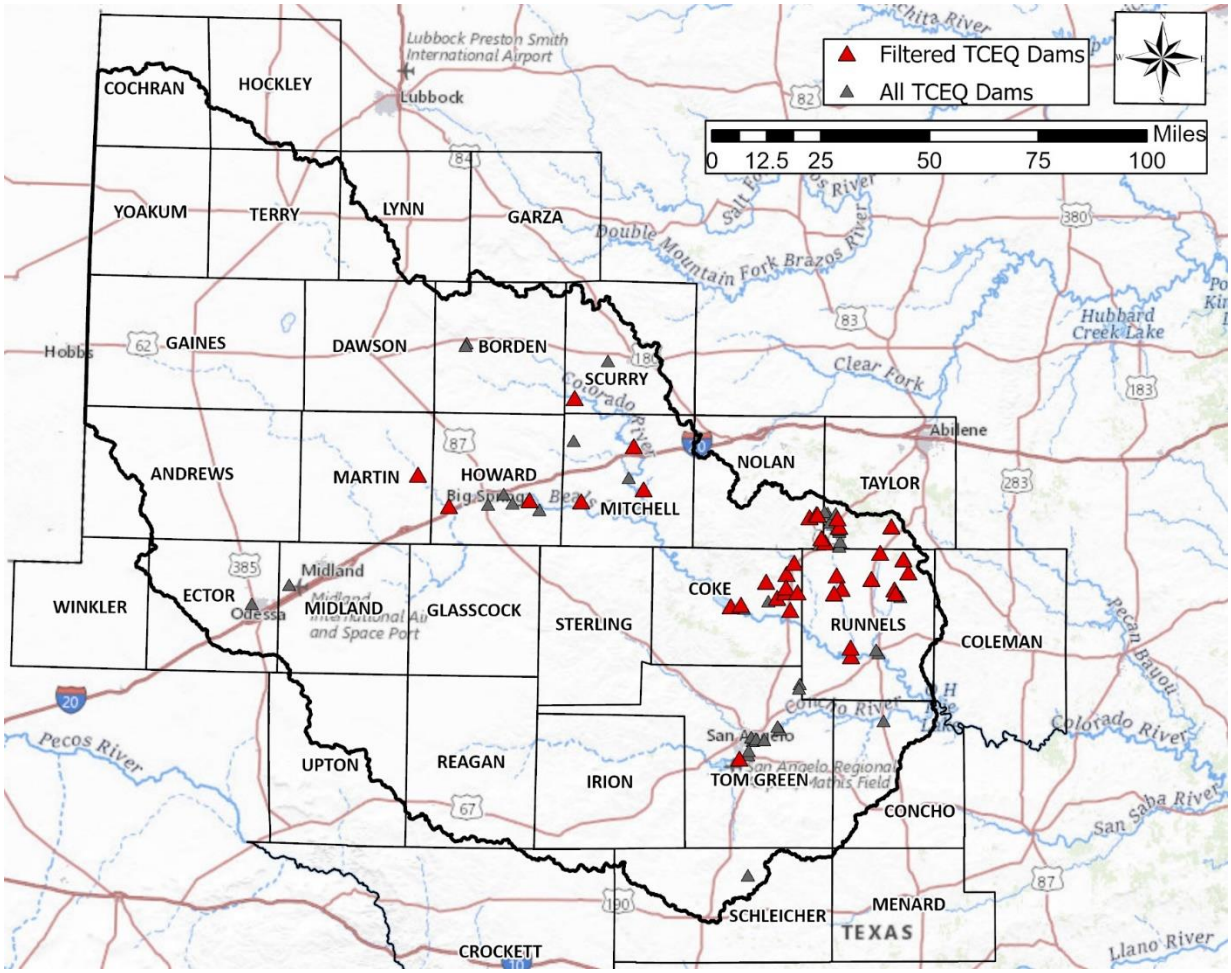

Figure 1-Dams in Region 9

2. EXISTING CONDITIONS

Thirty-seven dams were studied in the Upper Colorado Region using DSS-WISE. The project team also identified risk assignments for the dams using DSS-WISE. This included different methods of assigning risk, including screening-level 2D breach analysis, H&H modeling, breach inundation mapping, and a calculation of Population at Risk (PAR) which was done through the Human Consequences Module (HCOM). The project team classified the dams as low, mid or high based on the dams' PAR values, as shown in **Table 1**.

Table 1-Region 9 Dam Risk Assessment

Risk Assessment Tier	Number of Dams
Low (PAR < 100)	31
Mid (100 < PAR < 250)	1
High (PAR > 250)	5

The following dams were identified as priority and are shown in **Figure 2**:

- Ballinger Municipal Lake Dam
- Nasworthy Dam
- Robert Lee Dam
- Kickapoo Creek WS SCS Site 2 Dam
- Lake JB Thomas Dam
- Natural Dam

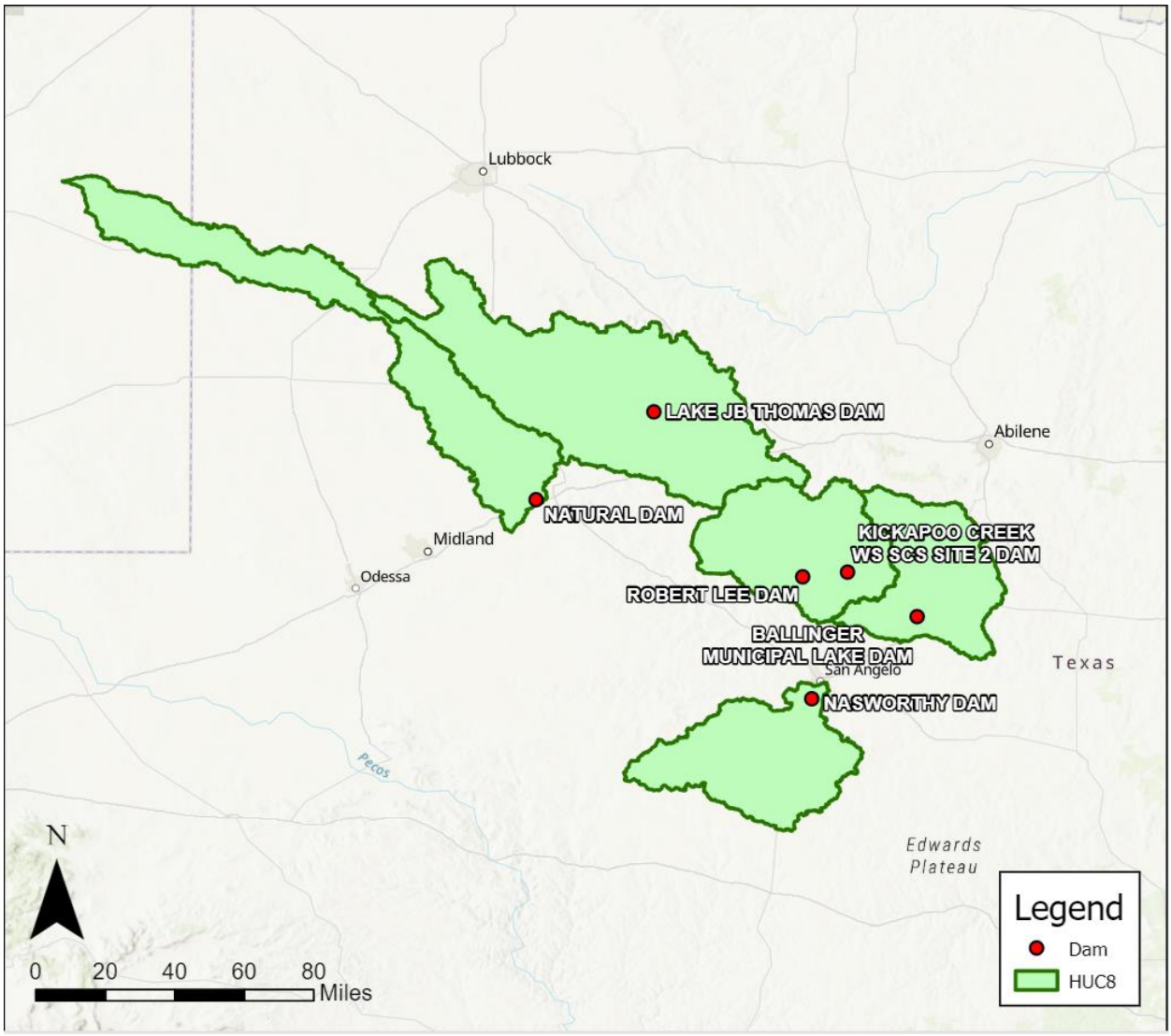

Figure 2-FME Identified Dams

3. CONCEPTUAL ALTERNATIVE

The recommended course of action is to perform a watershed-wide evaluation of the dams to assess flood protection performance for the 100-year and 500-year events. The study would develop breach analyses mapping and assess hazard classification, as well as develop risk indices and evaluate dam safety performance. The results of the study would identify potential FMPs or FMSs.

4. CONCLUSION

Based on the results described in this report, it is recommended that the HUC-8s that include the identified dams undergo a watershed-wide evaluation to assess flood protection performance and identify further action. Furthermore, risk identification and mitigation measures need to be taken based on at risk population for existing dams and additional criteria for risk identification and mitigation including condition rating, hydraulic adequacy need to be taken.

TWDB Comment Responses

Region 9 Upper Colorado Regional Flood Plan

Comment No.	SOW Task No.	Task Name	Item Type	Ex C Item	Ex D Table No.	Ex D feature class	Level 1	Level 2	RFPG Response
1	1	Entities	GIS feature class		1	Entities	There appear to be invalid entries for 'POLSUB_FLG' and 'ACTIVE'. Please populate these fields for all entries using only values on the Exhibit D Table 1 list of valid entries (Yes, No).		These fields have been populated for all entries using only values on the Exhibit D Table 1 list of valid entries (Yes, No).
2	1	Existing Infrastructure	GIS feature class		5	ExFldInfraPol	There appear to be invalid entries for 'LOS', 'DEF_TYPE', and 'DEF_DESCR'. Please populate these fields for all entries using only values on the Exhibit D Table 5 list of valid entries.		These fields have been populated for all entries using only values on the Exhibit D Table 5 list of valid entries.
3	2A	Existing Hazard	GIS feature class		9	ExFldHazard		The 0.2% flood hazard area is listed as 1,127 square miles in the geodatabase as opposed to 1,132 square miles in the Exhibit C Table 3. Please reconcile.	Reconciled. Values in Exhibit C Table 3 have been revised.
4	2A	Existing Exposure	Table	Table 3			Critical Facilities in 1% annual risk are listed as 65 in the geodatabase as opposed to 56 in the Exhibit C Table 3. Please reconcile.		Reconciled. Values in Exhibit C Table 3 have been revised.
5	2A	Existing Exposure + Vulnerability	GIS feature class		14	ExFldExpAll	Critical Facilities in 1% annual risk are listed as 65 in the geodatabase as opposed to 56 in the Exhibit C Table 3. Please reconcile.		Reconciled. Values in Exhibit C Table 3 have been revised.
6	2A	Existing Exposure + Vulnerability	GIS feature class		14	ExFldExpAll	Some entries appear to be missing IDs. Please populate IDs for all entries using proper ID format.		Populated IDs for all entries using proper ID format.
7	2A	Existing Exposure + Vulnerability	GIS feature class		14	ExFldExpAll	SVI appears to be null for the entire feature class. Please populate this required field.		Populated required field.
8	2A	Model Coverage	GIS feature class		N/A	ModelCoverage	There are no shared Model IDs between this feature class and the HH Models spreadsheet. The model named "Andrews" is included in the model spreadsheet without a Model ID. Please include a unique Model ID. This model also appears to be missing from the ModelCoverage feature class. Please reconcile.		Reconciled.
9	2A	Model Coverage	GIS feature class		N/A	ModelCoverage		Two models appear to have mismatched names between TDIS and the ModelCoverage feature class. Please reconcile.	Model names reconciled
10	2A	Model Coverage	GIS feature class		N/A	ModelCoverage		Two models uploaded to TDIS have the same coverage geodatabase listed. Please reconcile.	Model coverages reconciled
11	2A	Model Coverage	GIS feature class		N/A	ModelCoverage		Each model folder should include the model number in the name. Please use this naming format for future uploads: <MODEL_ID>_<MODEL_NAME>	Model number reconciled.
12	2B	Future Hazard	GIS feature class		15	FutFldHazard		1% Risk Area is listed as 4,617 in the geodatabase as opposed to 4,615 in the Exhibit C Table 5. Please reconcile.	Reconciled. Values in Exhibit C Table 5 have been revised.
13	2B	Future Exposure	Table	Table 5			Structures in 1% annual risk is listed as 49,224 in the geodatabase as opposed to 28,335 in the Exhibit C Table 5. Please reconcile.		Reconciled. Values in Exhibit C Table 5 have been revised.
14	2B	Future Exposure	Table	Table 5			Residential structures in 1% annual risk is listed as 33,105 in the geodatabase as opposed to 17,155 in the Exhibit C Table 5. Please reconcile.		Reconciled. Values in Exhibit C Table 5 have been revised.
15	2B	Future Exposure	Table	Table 5			Roadway Stream Crossings in 1% annual risk is listed as 932 in the geodatabase as opposed to 843 in the Exhibit C Table 5. Please reconcile.		Reconciled. Values in Exhibit C Table 5 have been revised.
16	2B	Future Exposure	Table	Table 5			Critical Facilities in 1% annual risk is listed as 198 in the geodatabase as opposed to 93 in the Exhibit C Table 5. Please reconcile.		Reconciled. Values in Exhibit C Table 5 have been revised.
17	2B	Future Exposure	Table	Table 5			Structures in 0.2% annual risk is listed as 84,707 in the geodatabase as opposed to 63,567 in the Exhibit C Table 5. Please reconcile.		Reconciled. Values in Exhibit C Table 5 have been revised.
18	2B	Future Exposure + Vulnerability	GIS feature class		19	FutFldExpAll	Please populate 'EXP_GEOM' (using only values on the Valid Entry list) and 'EXPORIG_ID'. Please reconcile.		Reconciled. Populated using only values on the Valid Entry list.
19	2B	Future Exposure + Vulnerability	GIS feature class		19	FutFldExpAll	Structures in 1% annual risk is listed as 49,224 in the geodatabase as opposed to 28,335 in the Exhibit C Table 5. Please reconcile.		Reconciled. Values in Exhibit C Table 5 have been revised.

*** Level 1 comment(s) that had been made during the TWDB review of draft regional flood plans that do not appear to have been fully addressed in the final plan.

TWDB Comment Responses

Region 9 Upper Colorado Regional Flood Plan

Comment No.	SOW Task No.	Task Name	Item Type	Ex C Item	Ex D Table No.	Ex D feature class	Level 1	Level 2	RFPG Response
20	2B	Future Exposure + Vulnerability	GIS feature class		19	FutFldExpAll	Residential structures in 1% annual risk is listed as 33,105 in the geodatabase as opposed to 17,155 in the Exhibit C Table 5. Please reconcile.		Reconciled. Values in Exhibit C Table 5 have been revised.
21	2B	Future Exposure + Vulnerability	GIS feature class		19	FutFldExpAll	Roadway Stream Crossings in 1% annual risk is listed as 932 in the geodatabase as opposed to 843 in the Exhibit C Table 5. Please reconcile.		Reconciled. Values in Exhibit C Table 5 have been revised.
22	2B	Future Exposure + Vulnerability	GIS feature class		19	FutFldExpAll	Critical Facilities in 1% annual risk is listed as 198 in the geodatabase as opposed to 93 in the Exhibit C Table 5. Please reconcile.		Reconciled. Values in Exhibit C Table 5 have been revised.
23	2B	Future Exposure + Vulnerability	GIS feature class		19	FutFldExpAll	Structures in 0.2% annual risk is listed as 84,707 in the geodatabase as opposed to 63,567 in the Exhibit C Table 5. Please reconcile.		Reconciled. Values in Exhibit C Table 5 have been revised.
24	3A	Floodplain Management	Table	Table 6			Exhibit C Table 6 - Existing Floodplain Management Practices needs to be included in the RFP. Please include in Appendix A and reference in the text of Chapter 3.		Exhibit C Table 6 - Existing Floodplain Management Practices has been included in the RFP in Appendix A and referenced in the text of Chapter 3.
25	3B	Goals	Table	Table 11				It appears that the Target Year for Short Term (10 year) Goals should be 2033, not 2023. Please review and reconcile as needed.	Reconciled and revised to 2033.
26	4B	FMP	GIS feature class		24	FMP	Please populate the required field 'GOAL_ID' for FMP_ID 093000013.		Populated the required field.
27	4B	FMP	GIS feature class		24	FMP		In the FMP feature class, 1 recommended FMP appears to have a higher total population at 1% flood risk than the max of day and night populations. Please reconcile.	Reconciled.
28	4B	FMS	Map 18	Section 2.4.B				The Plan states "Figure 5-4 reflect the number of FMSs that overlap for the same area, the darker the color, the greater the number of FMSs." However, there appears to be no visible color gradation. Please consider addressing.	Addressed. Figure replaced.
29	5	FME Recs	Table	Table 15			Cumulative Recommended FME ID (count) is 122 in the geodatabase as opposed to 128 in the Exhibit C table. Cumulative Estimated Study Cost is 79,713,481 in the geodatabase as opposed to 71,438,481 in the Exhibit C table.		Reconciled. Updated both geodatabase and Exhibit C table.
30	5	FME Recs	Table	Table 15				The Appendix A header is titled "Public Participation and Adoption of Plan" for a several pages and could cause confusion for some readers. Please consider addressing.	Addressed.
31	5	FME Recs	GIS feature class		23	FME	There appear to be invalid entries for 'FME_TYPE'. Please populate this field for all entries using only values on the Exhibit D Table 23 list of valid entries.		Populated this field for all entries using only values on the Exhibit D Table 23 list of valid entries.
32	5	FMP Recs	Table	Table 16			The last recommended FMP in the Exhibit C Table 16 Excel file is 093000105 as opposed to 093000013 in the geodatabase. There are many discrepancies in recommended FMP totals between the geodatabase and Excel file which may be due to the difference in the last FMP listed. Please reconcile.		Reconciled.
33	5	FMP Recs	GIS feature class		24	FMP	Please populate the required field 'GOAL_ID' for FMP_ID 093000013.		Populated the required field 'GOAL_ID' for FMP_ID 093000013.
34	5	FMP Details	GDB	3.10.C		3.11.3 [FMP_Details]	FMP_Details table appears to be empty in the geodatabase. Please reconcile to match the Excel file.		Reconciled. Geodatabase populated.
35	5	FMP Recs	Table				There does not appear to be any documentation tying no negative impact determinations for each FMP with an associated model or other supporting documentation. Please include a table listing each recommended FMP, how no negative impact was determined, either via a model, a study or engineering judgement, listing of the model name and unique model ID, study name, or engineering judgement description and submit the associated model.		Table added to Chapter 5, listing each recommended FMP, how no negative impact was determined, and models submitted.

*** Level 1 comment(s) that had been made during the TWDB review of draft regional flood plans that do not appear to have been fully addressed in the final plan.

TWDB Comment Responses

Region 9 Upper Colorado Regional Flood Plan

Comment No.	SOW Task No.	Task Name	Item Type	Ex C Item	Ex D Table No.	Ex D feature class	Level 1	Level 2	RFPG Response
36	5	FMS Recs	Table	Table 17			Cumulative Estimated reduction in injuries (if available) is 0 in the geodatabase as opposed to 3,475,000 in the Exhibit C table. Please reconcile.		Reconciled.
37	5	FMX Recs	Table				MODEL_ID is blank for two entries in the HHModels Table. Please reconcile.		Reconciled.
		per Ian Blair email 4/7/2023					1. FMP_Details in the gdb appears to be imported incorrectly and has multiple issues as a result.		FMP details re-imported to GDB.
		per Ian Blair email 4/7/2023					2. One FMP has 3 FMP IDs in the various location between FMP and FMP Details in the gdb and Exhibit C tables.		FMP IDs resolved.
		per Ian Blair email 4/7/2023					3. The gdb has one fewer FME than the Exhibit C tables.		GDB FME feature class revised.
		per Ian Blair email 4/7/2023					1. Model ID discrepancies between the model spreadsheet and ModelCoverage feature class		Model ID discrepancies resolved.
		per Ian Blair email 4/7/2023					2. There are Model IDs in FMP that do not match any Model IDs in ModelCoverage."		Model ID discrepancies resolved.

*** Level 1 comment(s) that had been made during the TWDB review of draft regional flood plans that do not appear to have been fully addressed in the final plan.