CCMC Flood Control Project Steering Committee

The **CCMC Flood Control Project Steering Committee** met Monday, November 9, 2020, at 3:00 p.m. meeting took place over zoom. Present were Committee Members Floodplain Administrator (FPA) Samantha Malenovsky, City Councilperson (CCP) Austin Lott, Custer County Commissioner (CC) Jason Strouf, Public Works Director (PWD) Scott Gray, Grant Writer Ally Capps, (KLJ) Carl Jackson, and (KLJ) Becky Bey.

** Please note that all levee alignments and any cost figures within these minutes are extremely preliminary. A lot of analysis is still needed with each one of these reaches. **

FPA Malenovsky gave a quick overview of the meeting that took place with the United State Army Corps of Engineers, USACE, on October 26, 2020. The USACE had two questions on Reach 1 and Reach 2 regarding the alternative levee alignments. They would like to remove two of the alignment options and would like the communities' feedback on approving the removal of these alternatives or if further analysis should be done.

REACH 1

Figures 1-9 in the attached packet is the existing levee footprint. Figures 10 & 11 are for Reach 1 with contain alternatives 1-1 and 1-2. The USACE would like to remove alternative 1-2 as it would affect multiple property owners. The two alternatives were similar in cost but did not include purchase of any property.

***CC Jason Strouf moved to approve the removal of Alternative 1-2 through Reach 1, seconded by Austin Lott. The motion **passed** by unanimous consent, 4-0.*

Figure 12 shows further alternatives to Alternative 1-1. Alternative 1-1F moves the levee alignment back to give more room for the river channel and reduces the amount of riprap that would be needed. Alternative 1-1G is a channel realignment which would help relieve pressure on the levee bank and reduce the amount of riprap. Alternative 1-1H is a floodwall which is a smaller footprint, requires less property but is a far amount more in cost. An approximate cost per linear foot of a floodwall is $4,000 which is based on some other recent projects, but with assumptions such as underseepage requirements and wall height adjusted for Miles City. CC Strouf questioned if the channel could be rerouted at the two turns along the tree line, drawing attached. KLJ Jackson stated that this could increase the velocity to the point it could affect downstream flood stage conditions. PWD Gray asked if the channel could be realigned, as stated by CC Strouf, if the oxbow could be used for highwater storage.

Figure 13 shows some more alternatives to Alternative 1-1. Alternative 1-1B moves the levee alignment back to give further room for the river channel. Alternative 1-1C is a channel realignment to provide further reduction to the levee bank, and Alternative 1-1D is a floodwall that would require less real estate. PWD Gray pointed out that if the channel was able to be straightened out as previously questioned this would be an area where the higher velocity could cause an issue and a floodwall maybe needed.

REACH 2

Figure 14 shows Reach 2 with alternatives 2-1 and 2-2, the USACE would like to remove alternative 2-2 as it would affect multiple municipal areas and real estate. Both alternatives were similar in cost but did not include purchase of any property. PWD Gray had some concerns with the amount of public area that alternative 2-1 would consume.

*** PWD Gray moved to approve the removal of Alternative 2-2 through Reach 2, seconded by CC Jason Strouf. The motion* ***passed*** *by unanimous consent, 4-0.*

Figure 15 shows three alternatives within Alternative 2-1. Alternative 2-1B is a setback levee to give further room for the river channel. Alternative 2-1C is a channel realignment which would help reduce the impact of high waters on the levee wall and reduce the amount of riprap needed. Alternative 2-1D is a floodwall which is a higher cost but requires less real estate and may not require the mitigation of the wetland, Cook Lake. PWD Gray, CC Strouf, and CCP Lott prefer alternative 2-1C since a channel realignment could be the least amount of impact to property, this is actually preferred amongst all the committee members in the majority of the realignment alternatives. There is concern among the committee members on the utilities lines that run under the river in this area and how sheet pilling could affect the depth of the lines.

REACH 3

Figure 16, 17 shows Reach 3 and the alternatives contacted within. Alternative 3-1 is the costliest of the three alternatives due to the amount of riprap required. The cost of alternatives 3-2 and 3-3 do not include the cost of real estate and relocating property owners. Figures 20-22 is an inundation map with the three alternatives in reach 3. All alternatives stop at Highway 59 since this is how far the USACE think the Section 205 grant money could go and is the best location to tie off the levee. The rest of the levee (to the wastewater treatment plant) would be something that would be up to the community to complete. PWD Gray pointed out that whichever alternative the community chose under the Section 205 project would probably set up the future alignment of the levee to completion. Alternative 3-2 would probably need a trailing levee that could extend to the southeast along the west side of Highway 59N to prevent backwater.

REACH 4

Reach 4 is on the west side of Tongue south side of Yellowstone. This area is being looked at for nonstructural procedures. CC Strouf stated that one of the buildings highlighted as being dry floodproofed is a building that was previously destroyed and is now being rebuilt to flood regulations. He had concerns for the two buildings closest to the Tongue River and the structural integrity of those buildings.

The committee decided to send out a press release for update information to the public to curb some confusion with the information the community has received thus far. KLJ Bey is going to put something together for committee review.

These minutes will then move forward to the Flood Control Committee meeting for recommendation to council on November 24th. CC Strouf will share these minutes with the Commissioners for a recommendation.

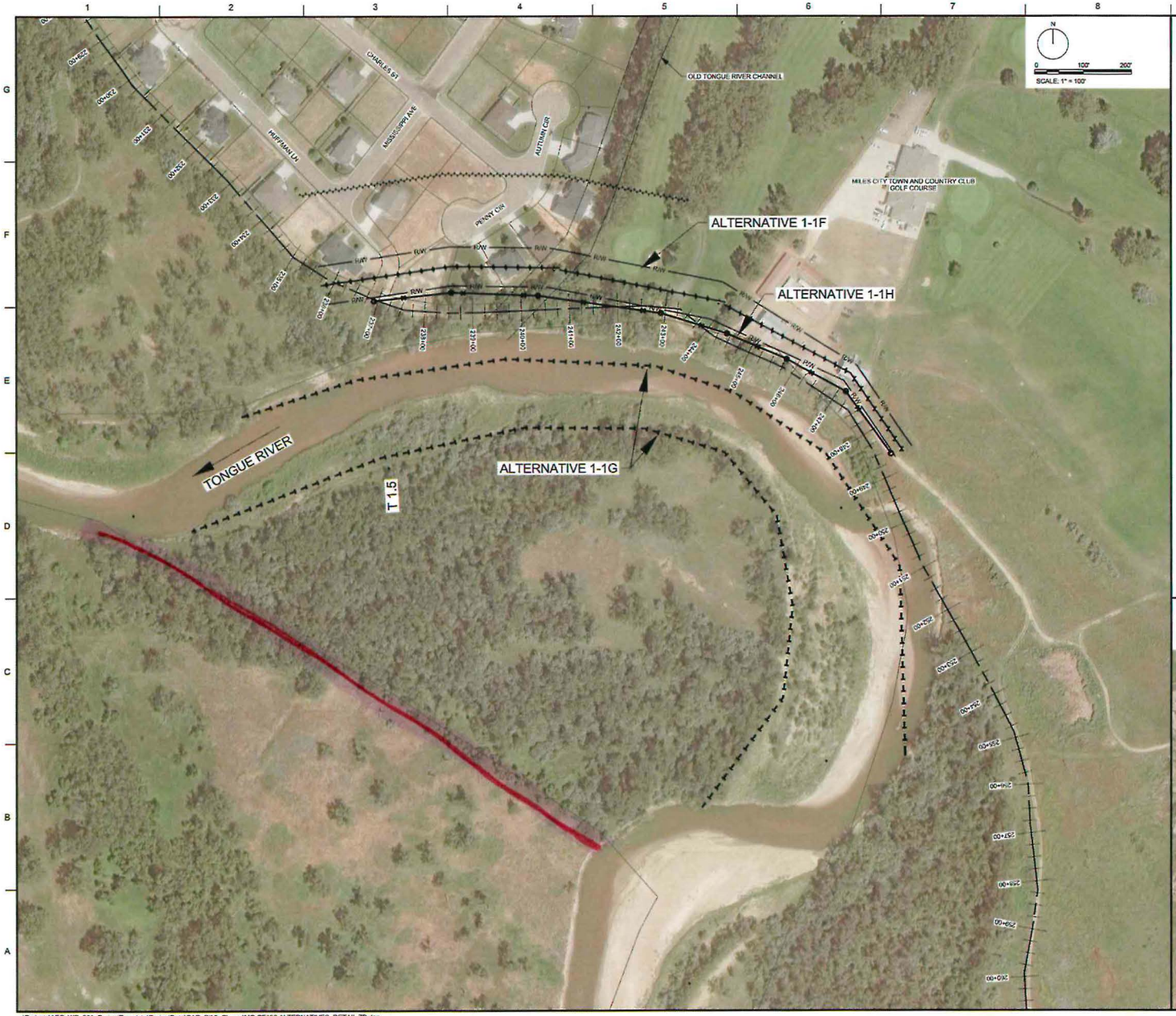
Questions for the USACE:

- Could the channel in Reach 1 be rerouted at the two turns on the Tongue River? Please refer to attachment.
- Will the cost of a floodwall be looked at compared to the cost of moving the large apartment building in Reach 1?
- What is used to determine real estate cost?
- The MT State Highway Dept will be doing a lot of work on HWY 59N in the upcoming years. Could this cause concern for a trailing levee along this highway? Or as a tie off point?
- When does the USACE think they would be ready for a public meeting to discuss these options? Could we do a virtual meeting?

Respectfully Submitted,

_____

Samantha Malenovsky, Flood Control Project
Steering Committee Chairperson and Recorder



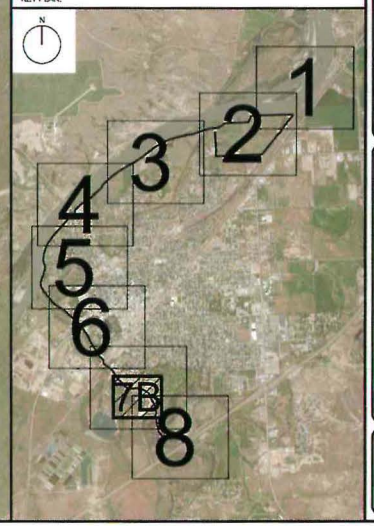
NOTES:

1. ALTERNATIVE 1-1E REPRESENTS RECONSTRUCTING THE LEVEE MOSTLY ON THE CURRENT ALIGNMENT OR ADDING ADDITIONAL FEATURES TO THE EXISTING LEVEE AS SHOWN ON SHEET CF127. SHEETPILE CUTOFF WALLS AND RIRAP SLOPE PROTECTION WOULD BE REQUIRED BETWEEN STATIONS 237+00 AND 253+00
2. ALTERNATIVE 1-1F REPRESENTS CONSTRUCTING A NEW LEVEE SET BACK ABOUT 75 FT FROM THE RIVER BANK. THE EXISTING LEVEE WOULD BE DEGRADED TO NATURAL GROUND.
3. ALTERNATIVE 1-1G REPRESENTS REALIGNING THE TONGUE RIVER CHANNEL TO REDUCE THE EROSION RISK ON THE EAST BANK AND ALLOW FOR MORE ROOM FOR LEVEE CONSTRUCTION. THE EXISTING LEVEE WOULD BE RECONSTRUCTED OR HAVE FEATURES ADDED TO IN THE CURRENT ALIGNMENT.
4. ALTERNATIVE 1-1H REPRESENTS DEGRADING THE EXISTING LEVEE TO NATURAL GROUND AND CONSTRUCTING A FLOOD WALL WITHIN THE ORIGINAL LEVEE FOOTPRINT.
5. FOUNDATION CONDITIONS ARE CURRENTLY UNDER REVIEW TO DETERMINE THE NECCESSARY LOCATIONS AND EXTENTS OF UNDERSEEPAGE CONTROL MEASURES. MAXIMUM EXTENTS OF SEEPAGE BERMS ARE SHOWN ON THIS SHEET. HOWEVER, OTHER UNDERSEEPAGE CONTROL MEASURES SUCH AS TOE DRAINS AND SHEETPILE CUTOFF MAY BE POSSIBLE TO REDUCE THE RIGHT-OF-WAY EXTENTS REQUIRED FOR A FEDERAL LEVEE PROJECT.

LEGEND.

- EXISTING LEVEE CENTERLINE WITH STATION LABELS, RETRIEVED FROM THE NATIONAL LEVEE DATABASE (NLD ID: 1905000700)
- CENTERLINE OF NEW LEVEE ALIGNMENT
- R/W — R/W — APPROXIMATE MINIMUM RIGHT-OF-WAY REQUIRED FOR A FEDERAL LEVEE PROJECT
- MAXIMUM EXTENT OF ADDITIONAL RIGHT-OF-WAY REQUIRED FOR SEEPAGE BERMS. SEE NOTE 5.
- NEW CHANNEL REALIGNMENT
- FLOOD WALL

KEY PLAN:



US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: J. PORTER
DRAWN BY: J. PORTER
CHECKED BY: T. MOSER
SUBMITTED BY:
RJE
ANS D

ISSUE DATE:
SOLICITATION NO.:
CONTRACT NO.:
REVISION DATE: 30 OCT 2020

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

MILES CITY SECTION 205 FEASIBILITY STUDY
TONGUE AND YELLOWSTONE RIVERS
MILES CITY, MONTANA

ALTERNATIVE LEVEE ALIGNMENTS
REACH 1 (DETAIL AREA 7B)

SHEET ID
CF138

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

Miles City Flood Control Study Minutes
October 26, 2020

Attendees via zoom: From the Community: Floodplain Administrator Samantha Malenovsky, County Commissioner Jason Strouf and Planner/Grant Writer Ally Capps. From USACE Chris Fassero, Curtis Miller, Andrew Post, Ilya Poluektov, Patrick Nowak, Liz Lien, Joshua Porter, Terry Matuska, John Shelman and Greg Johnson. From KLJ: Carl Jackson and Becky Bey

In December 2018 the USACE came to Miles City to discuss multiple levee segments. Shortly after this the project was put on hold for a year.

Beginning this FY20/21 the project was able to commence and the USACE had done some preliminary engineering on those segments. After the community provides some feedback on the proposed segments the USACE would then move onto the initial array of alternatives. The community along with the USACE would review the segments, possibly eliminating some of them, then the USACE would combine the remaining segments into alternatives, analyze further to tentatively select a plan.

The attached Figures 1-9 show the existing levee alignment and figures 10-17 show the proposed levee alignments. On figures 10-17 the dash line with station markers is the current top of levee. The bold solid hashed line is the proposed top of levee with the two black RW lines to either side being the levee right of way the zigzag line is the possible seepage berm. On the map the seepage berm is marked at 150 feet, this is the maximum extent of the berm that may be necessary to control seepage in the area. This seepage area is dependent on current seepage issues so the extent of the berm could be less, further analysis will be done.

Figure 18 shows potential levees that could be used in combination with each other. Figure 18, Figure F1 is a levee design that requires minimal maintenance, is the least expensive overall and the safest but requires the largest amount of real estate. Figure D1 is the toe drain which would require more maintenance, the toe drain would require a lift station to pump the excess water over to the river, the property required would be less. Figure B1 with sheet pile cutoff wall is the most expensive of the three and a flood wall would require the lease amount of property with the most upfront cost. These options could be used in conjunction with each other depending on the need of the surrounding areas.

Alignments in Reach 1 (from Interstate to BNSF RR Bridge):
There are two alternatives in this area. Alternative 1-1, figures 10 & 11, follows the existing levee system. From the Interstate to the golf course there is no seepage berm since the water surface is only a foot or two above natural ground and USACE feels that under seepage is not a concern.

There were also other possibilities added to alternative 1-1. Alternatives 1-1F, 1-1G and 1-1H are along the southern portion bend in Milestown Estates. Alternative 1-1F is a different levee alignment, 1-1G is a channel realignment (which would still require a levee) and 1-1H is a floodwall. Alternatives 1-1B, 1-1C and 1-1D are along the apartment building located at the north side of the Milestown Estates. Alternative 1-1B is a different levee alignment, 1-1C is a channel realignment (which would still require a levee) and 1-1D is a floodwall. Both segments would require more property but may require less of a seepage berm.

The additional alternatives 1-1B, 1-1D, 1-1F and 1-1H were to help prevent any additional construction in the river channel. If we chose not to use either of the segments then channel realignment could be

utilized or additional riprap could be used. This may be an area where a smaller levee option (Figure 18) is chosen or a floodwall.

Alternative 1-2, figure 10 & 11 goes through the middle of Milestown Estates. This was included because we thought it would reduce the levee length and potentially save some money, but the real estate impact would be much greater and could potentially cost more. The USACE thought this alternative could be excluded since there is no additional benefit from setting back further.

Both these alternatives were a comparable cost. Cost estimated are very preliminary with a lot of analysis still needed.

Alignments in Reach 2 (from BNSF RR Bridge to Old Milwaukee Bridge):
There were two alternatives in this area. Alternative 2-1, figures 14 & 15 mainly follows the existing levee. The additional alternatives 2-1B, 2-1C and 2-1D was added to alternative 2-1 from Main street to just north of the KOA campground. This was due to some erosion that has occurred in the area throughout the years. If the community choose alternative 2-1 then additional riprap would be required for strength. There is also the option of a small channel realignment to the west of the current levee to help relieve some of the pressure and erosion issues.

Alternative 2-2 goes across the ball fields and impacts Riverside Park. The USACE thought alternative 2-2 could be excluded since there is no additional benefit from setting back further and the impact to community property would be greater.

Both these alternatives were a comparable cost. Cost estimated are very preliminary with a lot of analysis still needed.

Alignments in Reach 3 (from Old Milwaukee Bridge to North Seventh Street):
There are three alterations in this reach. Alternative 3-1, figures 17, 18 and 19 follows the existing levee to N. Seventh. This alternative would require the most amount of riprap and is has the largest cost associated due to the amount of riprap needed. This area would require a seepage berm since there has been a history of seepage from the Yellowstone River in the past. Looking at the inundation map, figure 20, this alternative provides the greatest amount of protection. The footprint of this levee would also affect the least amount of structure, most of the land is vacant. The cost of this alternative could cause the overall total cost to be over the limit of the Section 205, which could make this option not financially feasible under the Section 205.

Alternative 3-2 crosses the wilderness area then moves along the south side of the slough to N. Seventh. This alternative would leave a large portion of properties unprotected in a flood event. The inundation map, figure 21, shows that the entire area north of the slough would be inundated along with a portion to the south west of the intersection of the slough with N. Seventh. To address this issue some sort of closures could be placed to deflect the backwater.

Alternative 3-3 follows the north side of the old Milwaukee RR tracks to N. Seventh. This leave the largest amount of properties unprotected in a flood event. There would be no seepage berm required on this section of the levee. The inundation map, figure 22, shows the entire area north of the tracks would be inundated. All maps show that the area to the east of N. Seventh and north of the slough would be flooded.

Alternatives 3-2 and 3-3 were a comparable cost. Alternative 3-1 was about four times the cost of alternative 2. Cost estimated are very preliminary with a lot of analysis still needed.

Reach 4 (west side of the Tongue River, Fairground area)
This area is being look at for nonstructural protection, figure 23. There are four structures in the fairground area that would sustain damage in the 100-year flood event. The option being looked at is to dry floodproof these buildings, orange dots. The one residence near the confluence is to elevate the home to approximately 4 feet, purple dot.

Next Steps:

Community

Assess the impact on property located along each reach/alignment. Assess the levee/floodwall options available for each area.

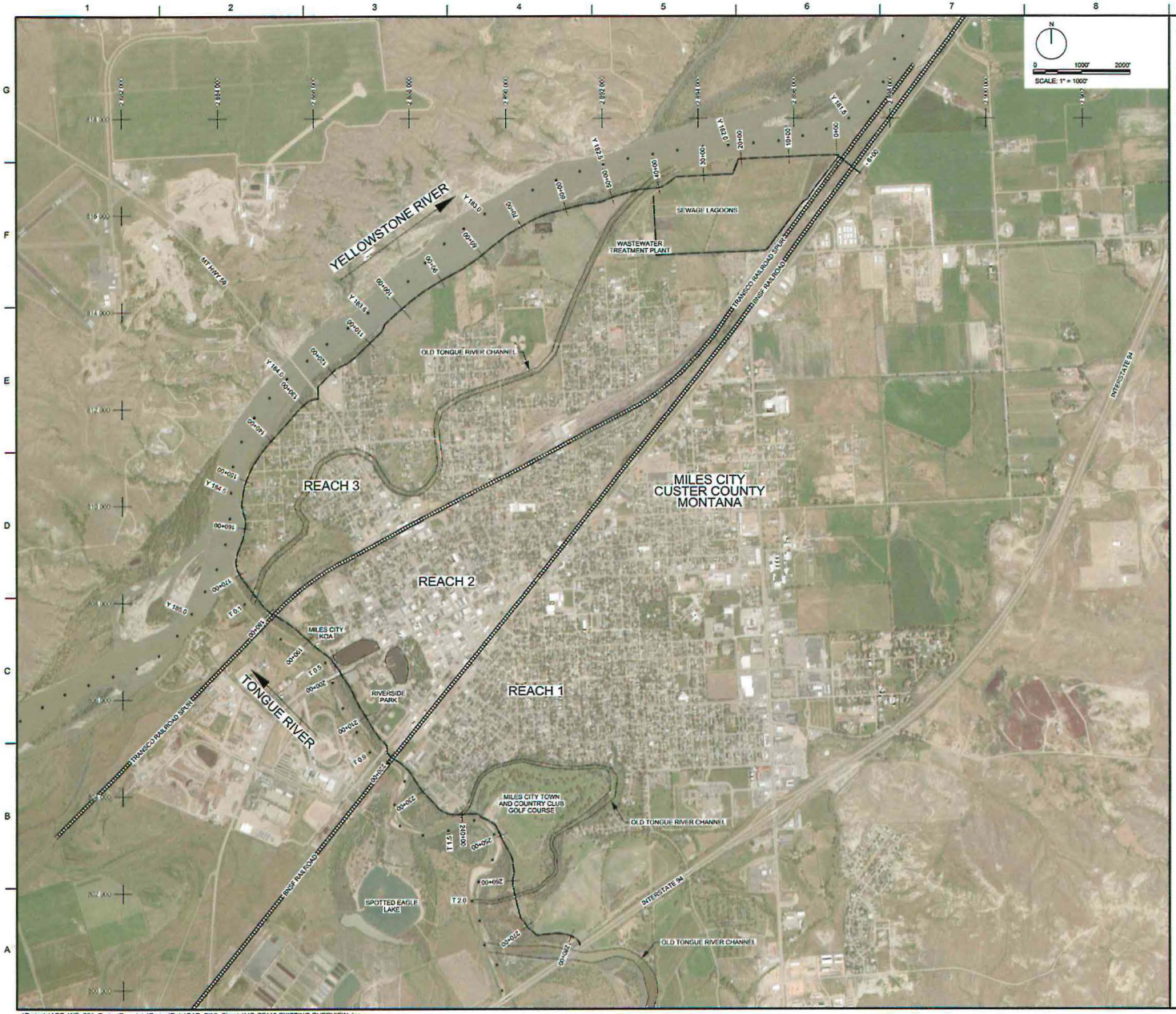
FPA Malenovsky will be presenting the information on the alternatives and next steps to the CCMC Flood Control Committee for a recommendation that would then move on to the Flood Control Committee for a recommendation. With these recommendations it would move to council and Mr. Strouf would present to commissioners for approval by November 24th.

USACE

Provide the community unit cost on a floodwall.

Develop 3 alternatives (1,2, and all three segments in alternative 3) to further analyze.

Review any non-structural alternatives.



GENERAL NOTES:

1. GRID COORDINATES ARE REFLECTED IN US SURVEY FEET AND REFER TO THE NORTH AMERICAN DATUM OF 1983 (NAD83), STATE PLANE COORDINATE SYSTEM FOR MONTANA (FIPS 2500).
2. ELEVATIONS ARE REFLECTED IN US SURVEY FEET AND REFER TO THE NORTH AMERICAN DATUM OF 1988 (NAVD88).
3. AERIAL IMAGERY WAS COLLECTED ON 18 JULY 2018.
4. THE ALIGNMENT OF THE EXISTING MILES CITY LEVEE WAS RETRIEVED FROM THE NATIONAL LEVEE DATABASE (NLD ID: 1805000700). THE DATE OF SURVEY IS UNKNOWN.
5. ELEVATIONS ARE CALCULATED FROM LIDAR DATA COLLECTED IN 2012.
6. PROPERTY LINES WERE RETRIEVED FROM THE CUSTER COUNTY TAX ASSESSOR WEBSITE IN 2017.
7. RAILROAD LINES NATURALLY DIVIDE THE FLOODPLAIN INTO THREE REACHES:

REACH 1: BETWEEN THE INTERSTATE 94 AND THE BNSF RAILROAD
LEVEE STATIONS 282+75 TO 220+40
RIVER MILES T2.44 TO T0.99

REACH 2: BETWEEN THE BNSF RAILROAD AND THE TRANSCO RAILROAD SPUR
LEVEE STATIONS 220+40 TO 180+60
RIVER MILES T0.99 TO T0.15

REACH 3: DOWNSTREAM OF THE TRANSCO RAILROAD SPUR
LEVEE STATIONS 180+60 TO 0+00
RIVER MILES T0.15 TO Y181.3

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: J. PORTER
DRAWN BY: J. PORTER
CHECKED BY: T. MATUSKA
SUBMITTED BY:
ISSUE DATE:
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D
REVISION DATE: 30 OCT 2020

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

MILES CITY SECTION 205 FEASIBILITY STUDY
TONGUE AND YELLOWSTONE RIVERS
MILES CITY, MONTANA

EXISTING LEVEE ALIGNMENT
PLAN OVERVIEW

SHEET ID
1

...\Projects\AEC_WS_001_ProjectTemplate\ProjectData\CAD_BIM_Sheets\MC-CF110 EXISTING OVERVIEW.dgn
12:08:23 PM 11/2/2020 PD: AEC_pdf.pltcfg DS: AEC_Screen.dscript.dscript

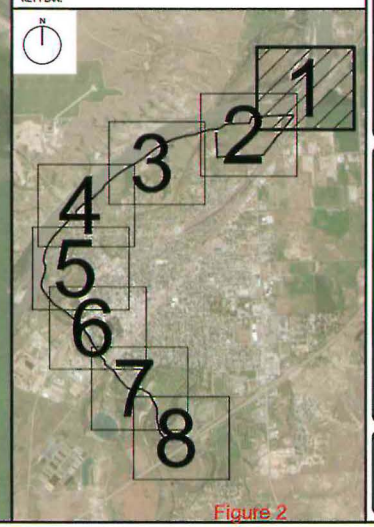
Figure 1

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

NOTES:

1. SEE SHEET CF110 FOR A PLAN OVERVIEW OF THE EXISTING LEVEE ALIGNMENT.
2. SEE SHEETS CF201 AND CF202 FOR THE PROFILE OF THE EXISTING LEVEE CREST AND BASE ELEVATIONS.

KEY PLAN:



US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: J. PORTER
DRAWN BY: J. PORTER
CHECKED BY: T. MATUSKA
SUBMITTED BY:
SIZE: ANSI D
REVISION DATE: 30 OCT 2020
ISSUE DATE:
SOLICITATION NO.:
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

MILES CITY SECTION 205 FEASIBILITY STUDY
TONGUE AND YELLOWSTONE RIVERS
MILES CITY, MONTANA

EXISTING LEVEE ALIGNMENT
REACH 3 (DETAIL AREA 1)

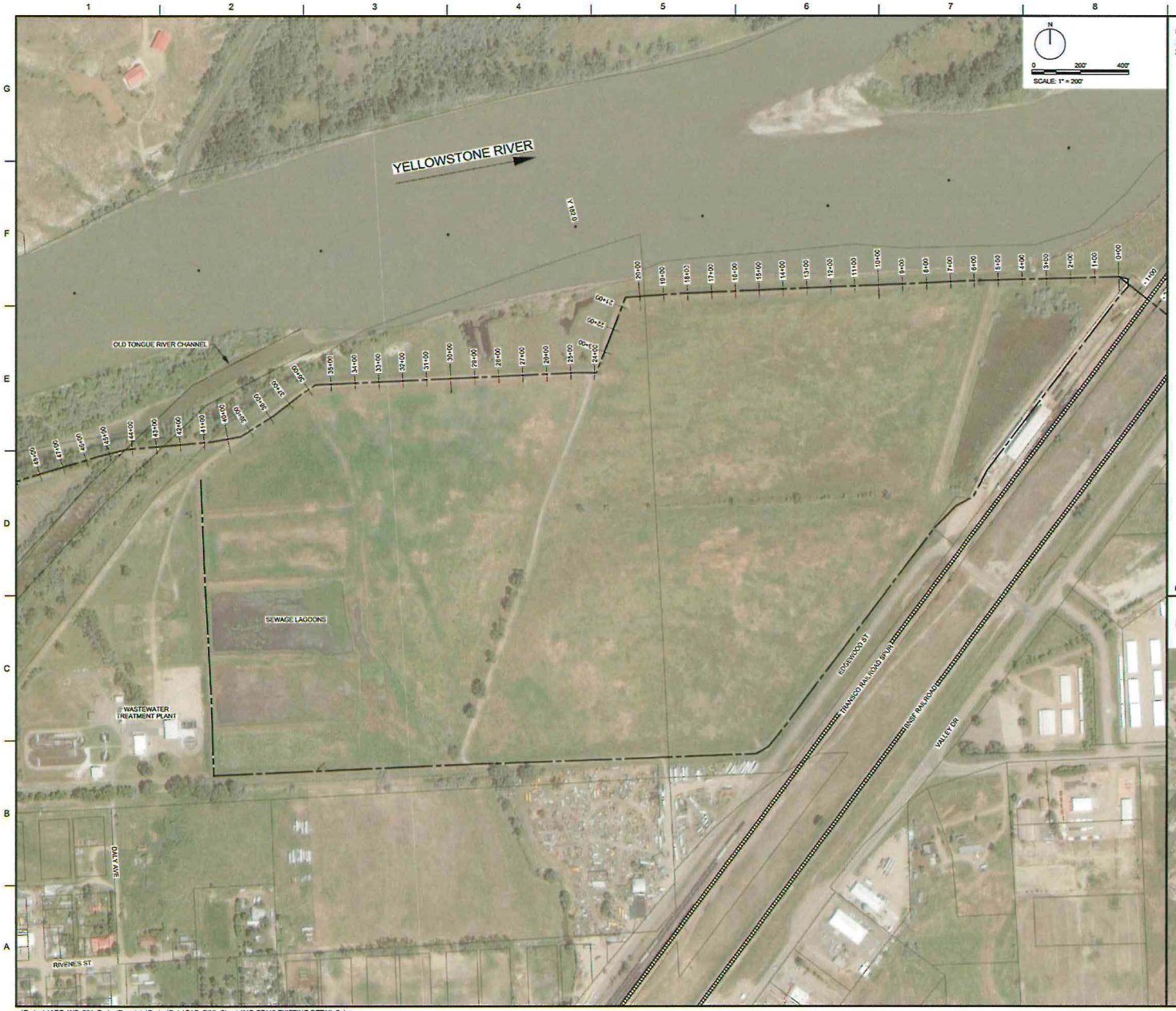
SHEET ID
2

Figure 2

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

...\Projects\AEC_WS_001_ProjectTemplate\ProjectData\CAD_BIM_Sheets\MC-CF111 EXISTING DETAIL 1.dgn
12:17:22 PM 11/2/2020 PD: AEC_pdf.pltcfg DS: AEC_Screen.dscript.dscript

2



NOTES:

1. SEE SHEET CF110 FOR A PLAN OVERVIEW OF THE EXISTING LEVEE ALIGNMENT.
2. SEE SHEETS CF201 AND CF202 FOR THE PROFILE OF THE EXISTING LEVEE CREST AND BASE ELEVATIONS.

KEY PLAN:

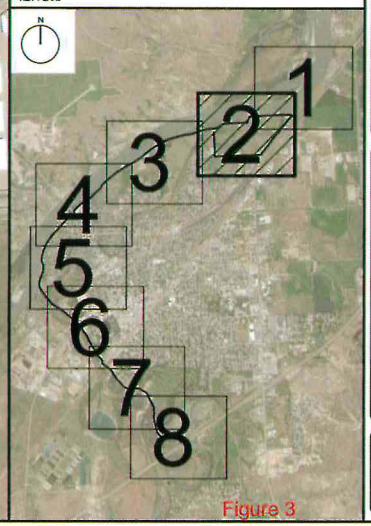


Figure 3

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: J.PORTER
DRAWN BY: J.PORTER
CHECKED BY: T.MATHESKA
SUBMITTED BY:
SIZE: ANSI D
ISSUE DATE:
SOLICITATION NO.:
CONTRACT NO.:
REVISION DATE: 28 OCT 2020

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

MILES CITY SECTION 205 FEASIBILITY STUDY
TONGUE AND YELLOWSTONE RIVERS
MILES CITY, MONTANA

EXISTING LEVEE ALIGNMENT
REACH 3 (DETAIL AREA 2)

SHEET ID
3

...\Projects\AEC_WS_001_ProjectTemplate\ProjectData\CAD_BIM_Sheets\MC-CF112 EXISTING DETAIL 2.dgn
12:28:21 PM 11/2/2020 PD: AEC_pdf.pltcfg DS: AEC_Screen.dscript.dscript

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

3

NOTES:

1. SEE SHEET CF110 FOR A PLAN OVERVIEW OF THE EXISTING LEVEE ALIGNMENT.
2. SEE SHEETS CF201 AND CF202 FOR THE PROFILE OF THE EXISTING LEVEE CREST AND BASE ELEVATIONS.

KEY PLAN:

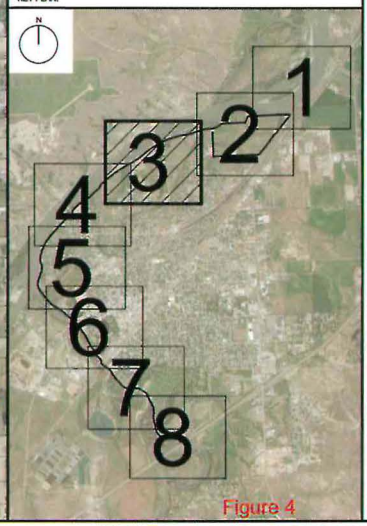


Figure 4

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: J. PORTER
DRAWN BY: J. PORTER
CHECKED BY: T. MATHESKA
SUBMITTED BY:
ISSUE DATE:
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ARCH D
REVISION DATE: 30 OCT 2020

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

MILES CITY REACH 3DS FEASIBILITY STUDY
TONGUE AND YELLOWSTONE RIVERS
MILES CITY, MONTANA

EXISTING LEVEE ALIGNMENT
REACH 3 (DETAIL AREA 3)

SHEET ID
4

...\Projects\AEC_WS_001_ProjectTemplate\ProjectData\CAD_BIM_Sheets\MC-CF113 EXISTING DETAIL 3.dgn
12:38:48 PM 11/2/2020 PO: AEC_pdf.pltcfg DS: AEC_Screen.dscript.dscript

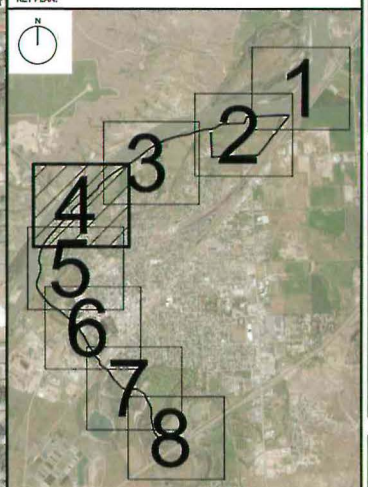
CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

4

NOTES:

1. SEE SHEET CF110 FOR A PLAN OVERVIEW OF THE EXISTING LEVEE ALIGNMENT.
2. SEE SHEETS CF201 AND CF202 FOR THE PROFILE OF THE EXISTING LEVEE CREST AND BASE ELEVATIONS.

KEY PLAN:



US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: A PORTER
DRAWN BY: J P PORTER
CHECKED BY: T MATTSON
SUBMITTED BY:
SIZE: ANSI D

ISSUE DATE:
SOLICITATION NO.:
CONTRACT NO.:
REVISION DATE: 30 DEC 2020

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

MILES CITY SECTION 205 FEASIBILITY STUDY
TONGUE AND YELLOWSTONE RIVERS
MILES CITY, MONTANA

EXISTING LEVEE ALIGNMENT
REACH 3 (DETAIL AREA 4)

SHEET ID
5

Figure 5

...\Projects\AEC_WS_001_ProjectTemplate\ProjectData\CAD_BIM_Sheets\MC-CF114 EXISTING DETAIL 4.dgn
12:50:09 PM 11/2/2020 PD: AEC_pdf.pltcfg DS: AEC_Screen.dscript.dscript

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

5

NOTES:

1. SEE SHEET CF110 FOR A PLAN OVERVIEW OF THE EXISTING LEVEE ALIGNMENT.
2. SEE SHEETS CF201 AND CF202 FOR THE PROFILE OF THE EXISTING LEVEE CREST AND BASE ELEVATIONS.

KEY PLAN:

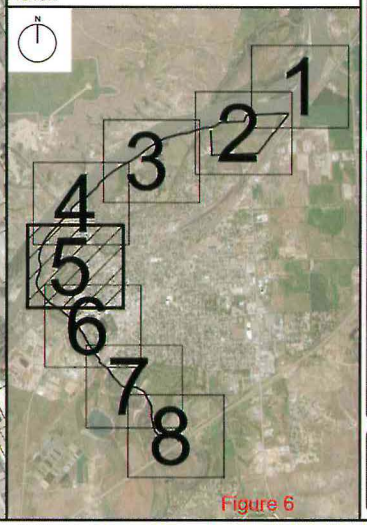


Figure 6

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: J. PORTER
DRAWN BY: J. PORTER
CHECKED BY: T. MATUSKA
SUBMITTED BY:
ISSUE DATE:
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D
REVISION DATE: 30 OCT 2020

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

MILES CITY SECTION 205 FEASIBILITY STUDY
TONGUE AND YELLOWSTONE RIVERS
MILES CITY, MONTANA

EXISTING LEVEE ALIGNMENT
REACH 3 (DETAIL AREA 5)

SHEET ID
6

...\Projects\AEC_WS_001_ProjectTemplate\ProjectData\CAD_BIM_Sheets\MC-CF115 EXISTING DETAIL 5.dgn
1:02:33 PM 11/2/2020 PD: AEC_pdf.pltcfg DS: AEC_Screen.dscript.dscript

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

6

NOTES:

1. SEE SHEET CF110 FOR A PLAN OVERVIEW OF THE EXISTING LEVEE ALIGNMENT.
2. SEE SHEETS CF201 AND CF202 FOR THE PROFILE OF THE EXISTING LEVEE CREST AND BASE ELEVATIONS.

KEY PLAN:

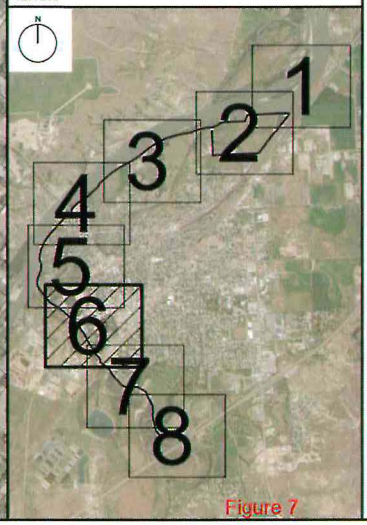


Figure 7

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY:	J. PORTER
DRAWN BY:	J. PORTER
APPROVED BY:	
CHECKED BY:	T. MATUSKA
SUBMITTED BY:	
SIZE:	
ARCH D	
ISSUE DATE:	
SOLICITATION NO.:	
CONTRACT NO.:	
REVISION DATE:	30 OCT 2020

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

MILES CITY REACH 2 FEASIBILITY STUDY
TONGUE AND YELLOWSTONE RIVERS
MILES CITY, MONTANA

EXISTING LEVEE ALIGNMENT
REACH 2 (DETAIL AREA 6)

SHEET ID
7

...\Projects\AEC_WS_001_ProjectTemplate\ProjectData\CAD_BIM_Sheets\MC-CF116 EXISTING DETAIL 6.dgn
1:15:56 PM 11/2/2020 PD: AEC_pdf.pltcfg DS: AEC_Screen.dscript.dscript

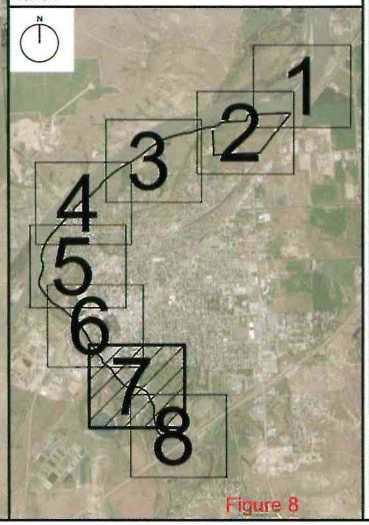
CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

7

NOTES:

1. SEE SHEET CF110 FOR A PLAN OVERVIEW OF THE EXISTING LEVEE ALIGNMENT.
2. SEE SHEETS CF201 AND CF202 FOR THE PROFILE OF THE EXISTING LEVEE CREST AND BASE ELEVATIONS.

KEY PLAN:



US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: J. PORTER
DRAWN BY: J. PORTER
CHECKED BY: T. MATHERS
SUBMITTED BY:
SIZE: ANSI D
ISSUE DATE:
SOLICITATION NO.:
CONTRACT NO.:
REVISION DATE: 10/30/2020

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

MILES CITY SECTION 205 FEASIBILITY STUDY
TONGUE AND YELLOWSTONE RIVERS
MILES CITY, MONTANA

EXISTING LEVEE ALIGNMENT
REACH 1 (DETAIL AREA 7)

SHEET ID
8

Figure 8

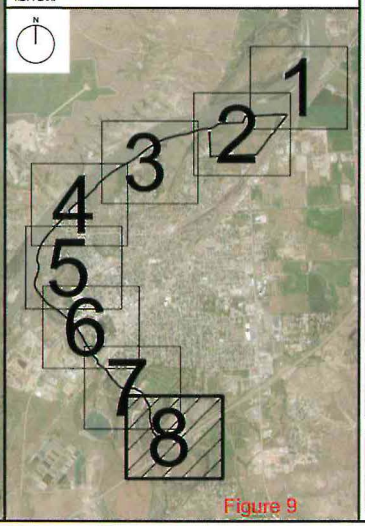
...\Projects\AEC_WS_001_ProjectTemplate\ProjectData\CAD_BIM_Sheets\MC-CF117 EXISTING DETAIL 7.dgn
1:29:01 PM 11/2/2020 PD: AEC_pdf.pltcfg DS: AEC_Screen.dscript.dscript

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

NOTES:

1. SEE SHEET CF110 FOR A PLAN OVERVIEW OF THE EXISTING LEVEE ALIGNMENT.
2. SEE SHEETS CF201 AND CF202 FOR THE PROFILE OF THE EXISTING LEVEE CREST AND BASE ELEVATIONS.

KEY PLAN:



US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: J PORTER
DRAWN BY: J PORTER
CHECKED BY: T MATISKA
SUBMITTED BY:
ISSUE DATE:
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D
REVISION DATE: 30 OCT 2020

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

MILES CITY SECTION 205 FEASIBILITY STUDY
TONGUE AND YELLOWSTONE RIVERS
MILES CITY, MONTANA

EXISTING LEVEE ALIGNMENT
REACH 1 (DETAIL AREA 8)

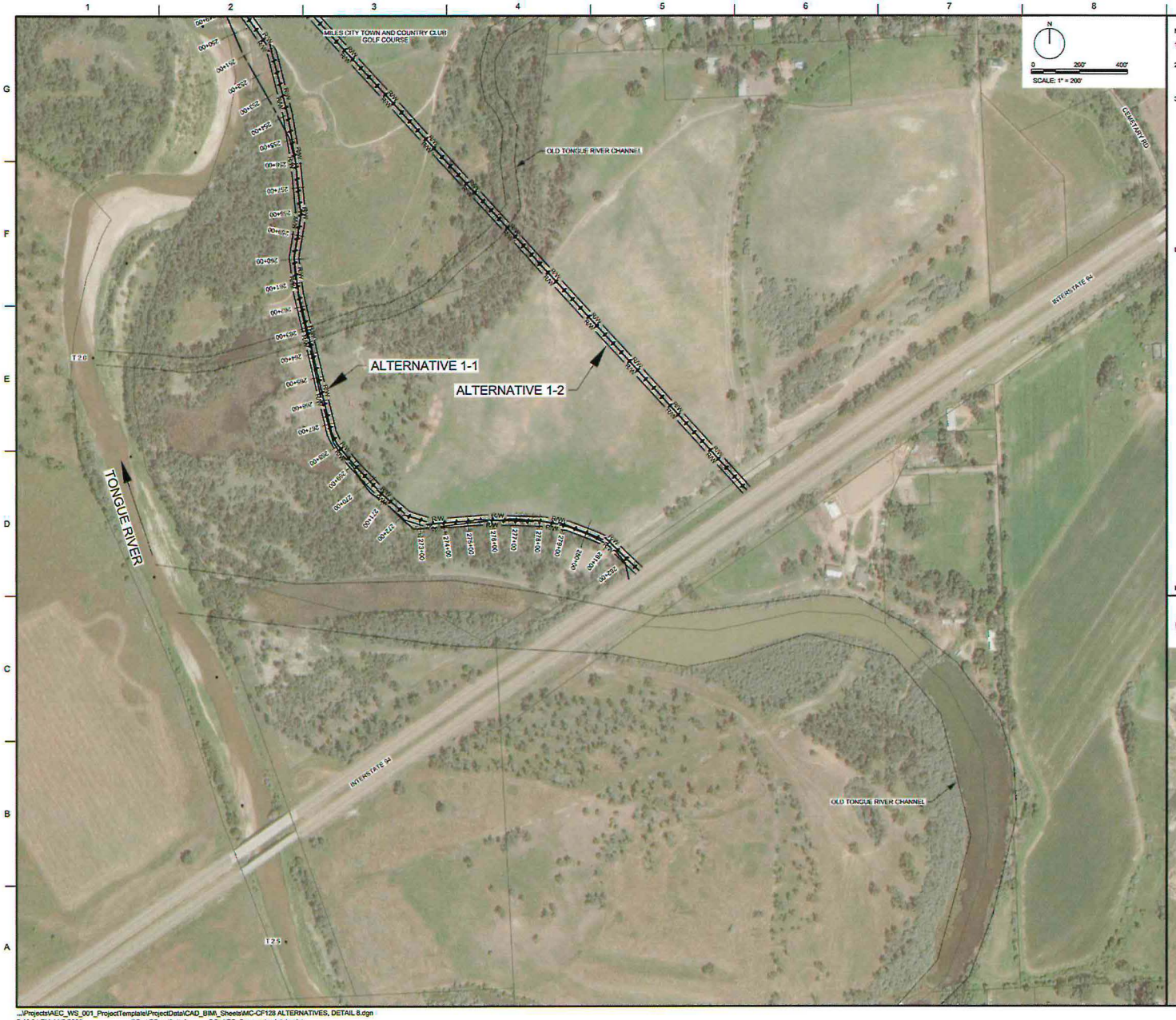
SHEET ID
9

...\Projects\AEC_WS_001_ProjectTemplate\ProjectData\CAD_BIM_Sheets\MC-CF118 EXISTING DETAIL 8.dgn
1:41:52 PM 11/2/2020 PD: AEC_pdf.pltcfg DS: AEC_Screen.dscript.dscript

Figure 9

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

9



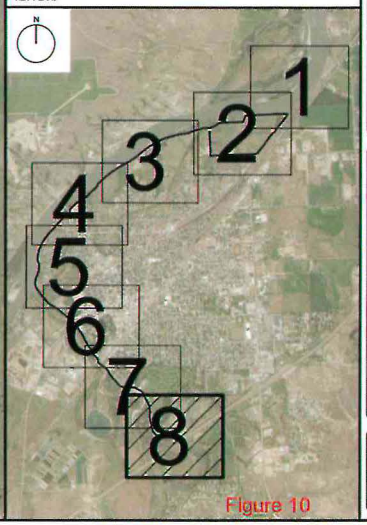
NOTES:

1. ALTERNATIVE 1-1 REPRESENTS RECONSTRUCTING THE LEVEE MOSTLY ON THE CURRENT ALIGNMENT OR ADDING ADDITIONAL FEATURES TO THE EXISTING LEVEE EMBANKMENT TO MEET CURRENT USACE DESIGN CRITERIA.
2. ALTERNATIVE 1-2 REPRESENTS CONSTRUCTING A NEW LEVEE SET BACK FURTHER FROM THE RIVER BANK. THE EXISTING LEVEE WOULD BE DEGRADED TO NATURAL GROUND TO ALLOW ADDITIONAL CONVEYANCE IN THE FLOODPLAIN. NOTE THAT CLOSURE STRUCTURES ARE REQUIRED AT ROAD CROSSINGS FOR THIS ALTERNATIVE.
3. SEE SHEET CF127 FOR DOWNSTREAM EXTENTS OF THE LEVEE ALIGNMENTS SHOWN ON THIS SHEET.

LEGEND:

- EXISTING LEVEE CENTERLINE WITH STATION LABELS, RETRIEVED FROM THE NATIONAL LEVEE DATABASE (NLD ID: 1800000700)
- CENTERLINE OF NEW LEVEE ALIGNMENT
- R/W — R/W — APPROXIMATE MINIMUM RIGHT-OF-WAY REQUIRED FOR A FEDERAL LEVEE PROJECT

KEY PLAN:



US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: J. PORTER
DRAWN BY: J. PORTER
CHECKED BY:
SUBMITTED BY:
ISSUE DATE:
SOLICITATION NO.:
CONTRACT NO.:
REVISION DATE:
SIZE: ANSI D
SCALE: 1" = 200'

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

MILES CITY SECTION 205 FEASIBILITY STUDY
TONGUE AND YELLOWSTONE RIVERS
MILES CITY, MONTANA

ALTERNATIVE LEVEE ALIGNMENTS
REACH 1 (DETAIL AREA 8)

SHEET ID
10

Figure 10

...\Projects\AEC_WS_001_ProjectTemplate\ProjectData\CAD_BIM_Sheets\MC-CF128 ALTERNATIVES, DETAIL 8.dgn
2:46:24 PM 11/2/2020 PD: AEC_pdf.pltcfg DS: AEC_Screen.dscript.dscript

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

10

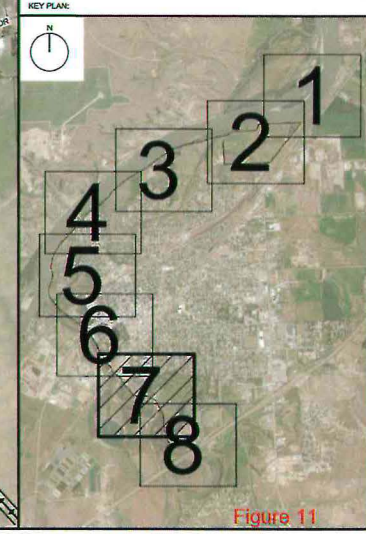
NOTES:

1. ALTERNATIVE 1-1 REPRESENTS RECONSTRUCTING THE LEVEE MOSTLY ON THE CURRENT ALIGNMENT OR ADDING ADDITIONAL FEATURES TO THE EXISTING LEVEE EMBANKMENT TO MEET CURRENT USACE DESIGN CRITERIA. SEE SHEET CF137 FOR ADDITIONAL ALTERNATIVES BETWEEN STATIONS 221+00 AND 227+00. SEE SHEET CF138 FOR ADDITIONAL ALTERNATIVES BETWEEN STATIONS 237+00 AND 253+00.
2. ALTERNATIVE 1-2 REPRESENTS CONSTRUCTING A NEW LEVEE SET BACK FURTHER FROM THE RIVER BANK. THE EXISTING LEVEE WOULD BE DEGRADED TO NATURAL GROUND TO ALLOW ADDITIONAL CONVEYANCE IN THE FLOODPLAIN. NOTE THAT CLOSURE STRUCTURES ARE REQUIRED AT ROAD CROSSINGS FOR THIS ALTERNATIVE.
3. SEE SHEET CF128 FOR UPSTREAM EXTENTS OF THE LEVEE ALIGNMENTS SHOWN ON THIS SHEET.
4. FOUNDATION CONDITIONS ARE CURRENTLY UNDER REVIEW TO DETERMINE THE NECCESSARY LOCATIONS AND EXTENTS OF UNDERSEEPAGE CONTROL MEASURES. MAXIMUM EXTENTS OF SEEPAGE BERMS ARE SHOWN ON THIS SHEET. HOWEVER, OTHER UNDERSEEPAGE CONTROL MEASURES SUCH AS TOE DRAINS AND SHEETPILE CUTOFF MAY BE POSSIBLE TO REDUCE THE RIGHT-OF-WAY EXTENTS REQUIRED FOR A FEDERAL LEVEE PROJECT.

LEGEND:

- EXISTING LEVEE CENTERLINE WITH STATION LABELS, RETRIEVED FROM THE NATIONAL LEVEE DATABASE (NLD ID: 1805000700)
- CENTERLINE OF NEW LEVEE ALIGNMENT
- R/W — R/W APPROXIMATE MINIMUM RIGHT-OF-WAY REQUIRED FOR A FEDERAL LEVEE PROJECT
- MAXIMUM EXTENT OF ADDITIONAL RIGHT-OF-WAY REQUIRED FOR SEEPAGE BERMS. SEE NOTE 4.

KEY PLAN:



US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: J. PORTER
DRAWN BY: J. PORTER
CHECKED BY: T. MATUSKA
SUBMITTED BY:
SIZE: ANSI D
REVISION DATE: 30 OCT 2020
ISSUE DATE:
SOLICITATION NO.:
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

MILES CITY SECTION 205 FEASIBILITY STUDY
TONGUE AND YELLOWSTONE RIVERS
MILES CITY, MONTANA

ALTERNATIVE LEVEE ALIGNMENTS
REACH 1 (DETAIL AREA 7)

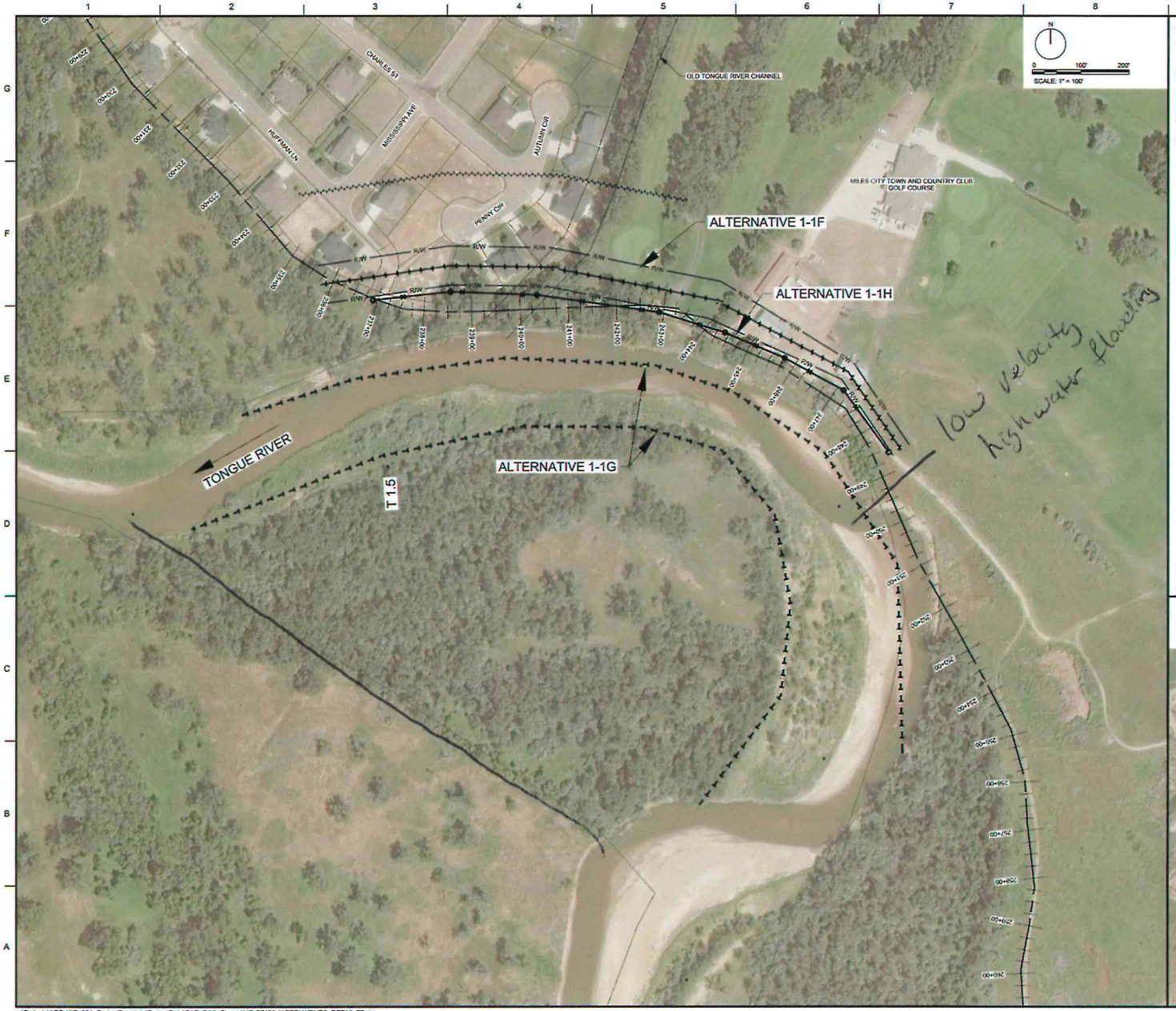
SHEET ID
11

Figure 11

...\Projects\AEC_WS_001_ProjectTemplate\ProjectData\CAD_BIM_Sheets\MC-CF127 ALTERNATIVES, DETAIL 7.dgn
2:35:06 PM 11/2/2020 PD: AEC_pdf.pltcfg DS: AEC_Screen.dscript.dscript

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

11



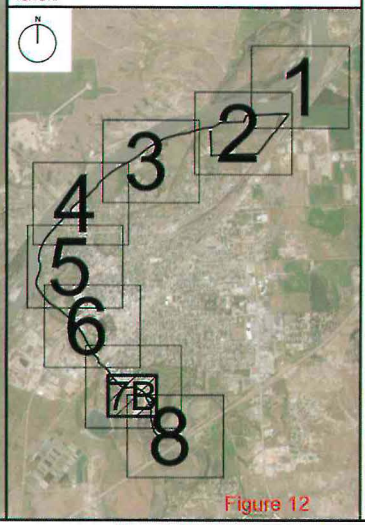
NOTES:

1. ALTERNATIVE 1-1E REPRESENTS RECONSTRUCTING THE LEVEE MOSTLY ON THE CURRENT ALIGNMENT OR ADDING ADDITIONAL FEATURES TO THE EXISTING LEVEE AS SHOWN ON SHEET CF127. SHEETPILE CUTOFF WALLS AND RIPAP SLOPE PROTECTION WOULD BE REQUIRED BETWEEN STATIONS 237+00 AND 253+00.
2. ALTERNATIVE 1-1F REPRESENTS CONSTRUCTING A NEW LEVEE SET BACK ABOUT 75 FT FROM THE RIVER BANK. THE EXISTING LEVEE WOULD BE DEGRADED TO NATURAL GROUND.
3. ALTERNATIVE 1-1G REPRESENTS REALIGNING THE TONGUE RIVER CHANNEL TO REDUCE THE EROSION RISK ON THE EAST BANK AND ALLOW FOR MORE ROOM FOR LEVEE CONSTRUCTION. THE EXISTING LEVEE WOULD BE RECONSTRUCTED OR HAVE FEATURES ADDED TO IN THE CURRENT ALIGNMENT.
4. ALTERNATIVE 1-1H REPRESENTS DEGRADING THE EXISTING LEVEE TO NATURAL GROUND AND CONSTRUCTING A FLOOD WALL WITHIN THE ORIGINAL LEVEE FOOTPRINT.
5. FOUNDATION CONDITIONS ARE CURRENTLY UNDER REVIEW TO DETERMINE THE NECESSARY LOCATIONS AND EXTENTS OF UNDERSEEPAGE CONTROL MEASURES. MAXIMUM EXTENTS OF SEEPAGE BERMS ARE SHOWN ON THIS SHEET. HOWEVER, OTHER UNDERSEEPAGE CONTROL MEASURES SUCH AS TOE DRAINS AND SHEETPILE CUTOFF MAY BE POSSIBLE TO REDUCE THE RIGHT-OF-WAY EXTENTS REQUIRED FOR A FEDERAL LEVEE PROJECT.

LEGEND:

- EXISTING LEVEE CENTERLINE WITH STATION LABELS, RETRIEVED FROM THE NATIONAL LEVEE DATABASE (NLD ID: 1905000700)
- CENTERLINE OF NEW LEVEE ALIGNMENT
- R/W — R/W — APPROXIMATE MINIMUM RIGHT-OF-WAY REQUIRED FOR A FEDERAL LEVEE PROJECT
- MAXIMUM EXTENT OF ADDITIONAL RIGHT-OF-WAY REQUIRED FOR SEEPAGE BERMS. SEE NOTE 5.
- NEW CHANNEL REALIGNMENT
- FLOOD WALL

KEY PLAN:



US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: J. PORTER
DRAWN BY: A. LEE
CHECKED BY: T. MATUSKA
SUBMITTED BY:
SIZE: ANSI D
ISSUE DATE:
SOLICITATION NO.:
CONTRACT NO.:
REVISION DATE: 30 OCT 2020

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

MILES CITY REACH 2/REACH 1 FEASIBILITY STUDY
TONGUE AND YELLOWSTONE RIVERS
CUSTER COUNTY
MILES CITY, MONTANA

ALTERNATIVE LEVEE ALIGNMENTS
REACH 1 (DETAIL AREA 7B)

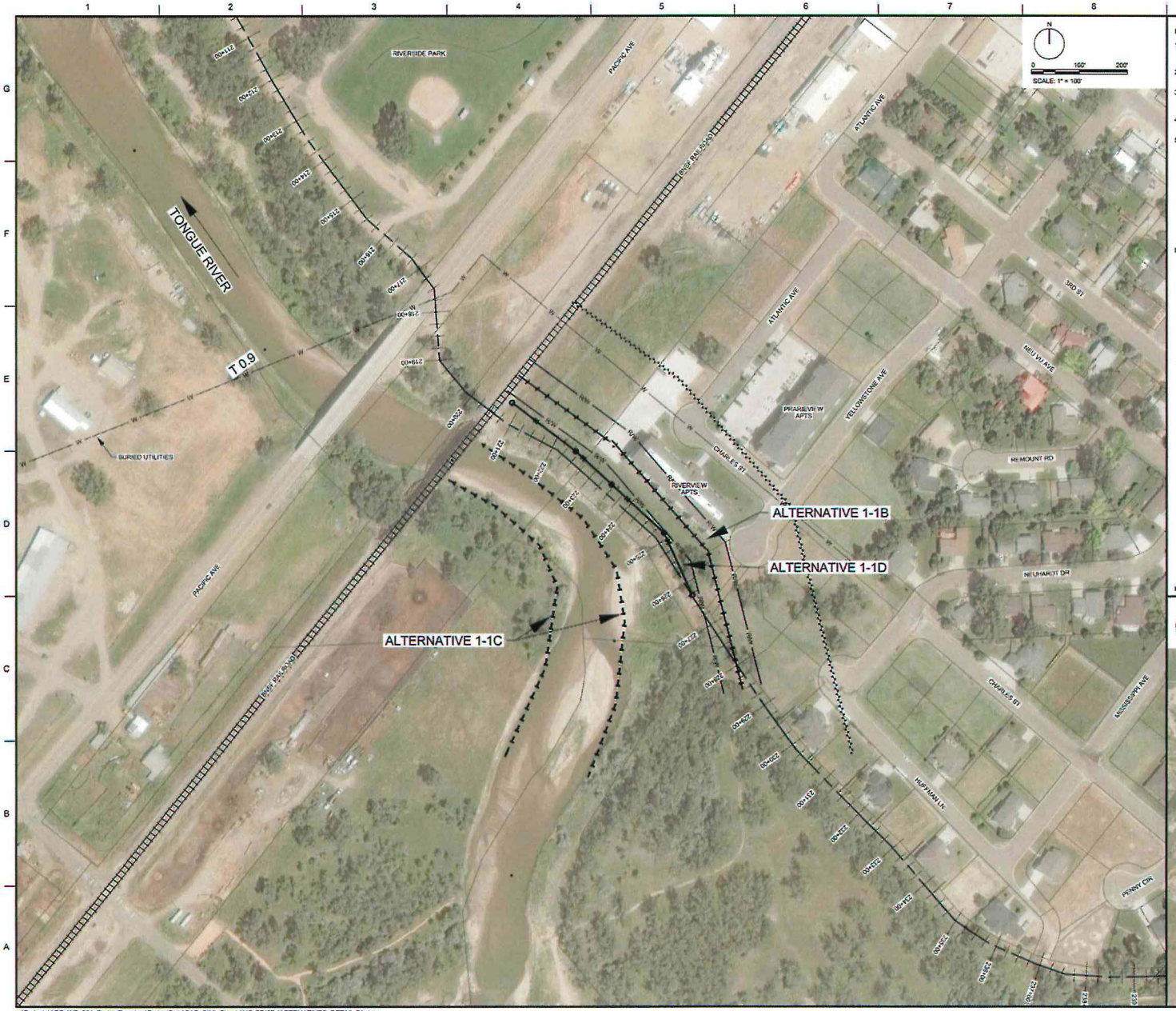
SHEET ID
12

...\Projects\AEC_WS_001_ProjectTemplate\ProjectData\CAD_BIM_Sheets\MC-CF138 ALTERNATIVES, DETAIL 7B.dgn
3:22:12 PM 11/2/2020 PD: AEC_pdf.pltcfg DS: AEC_Screen.dscript.dscript

Figure 12

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

12



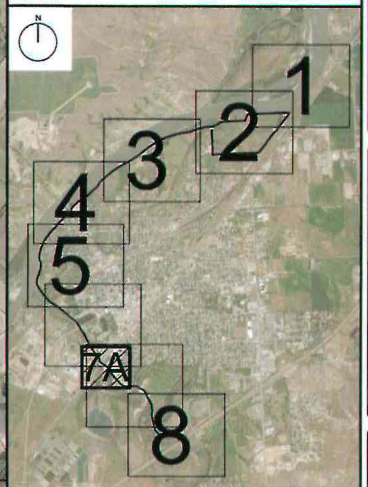
NOTES:

1. ALTERNATIVE 1-1A REPRESENTS RECONSTRUCTING THE LEVEE MOSTLY ON THE CURRENT ALIGNMENT OR ADDING ADDITIONAL FEATURES TO THE EXISTING LEVEE AS SHOWN ON SHEET CF127. SHEETPILE CUTOFF WALLS AND RIPRAP SLOPE PROTECTION WOULD BE REQUIRED BETWEEN STATIONS 221+00 AND 227+00.
2. ALTERNATIVE 1-1B REPRESENTS CONSTRUCTING A NEW LEVEE SET BACK ABOUT 75 FT FROM THE RIVER BANK. THE EXISTING LEVEE WOULD BE DEGRADED TO NATURAL GROUND.
3. ALTERNATIVE 1-1C REPRESENTS REALIGNING THE TONGUE RIVER CHANNEL TO REDUCE THE EROSION RISK ON THE EAST BANK AND ALLOW FOR MORE ROOM FOR LEVEE CONSTRUCTION. THE EXISTING LEVEE WOULD BE RECONSTRUCTED OR HAVE FEATURES ADDED TO IN THE CURRENT ALIGNMENT.
4. ALTERNATIVE 1-1D REPRESENTS DEGRADING THE EXISTING LEVEE TO NATURAL GROUND AND CONSTRUCTING A FLOOD WALL WITHIN THE ORIGINAL LEVEE FOOTPRINT.
5. FOUNDATION CONDITIONS ARE CURRENTLY UNDER REVIEW TO DETERMINE THE NECCESSARY LOCATIONS AND EXTENTS OF UNDERSEEPAGE CONTROL MEASURES. MAXIMUM EXTENTS OF SEEPAGE BERMS ARE SHOWN ON THIS SHEET. HOWEVER, OTHER UNDERSEEPAGE CONTROL MEASURES SUCH AS TOE DRAINS AND SHEETPILE CUTOFF MAY BE POSSIBLE TO REDUCE THE RIGHT-OF-WAY EXTENTS REQUIRED FOR A FEDERAL LEVEE PROJECT.

LEGEND:

- EXISTING LEVEE CENTERLINE WITH STATION LABELS. RETRIEVED FROM THE NATIONAL LEVEE DATABASE (NLD ID: 1805000700)
- CENTERLINE OF NEW LEVEE ALIGNMENT
- R/W — R/W — APPROXIMATE MINIMUM RIGHT-OF-WAY REQUIRED FOR A FEDERAL LEVEE PROJECT
- MAXIMUM EXTENT OF ADDITIONAL RIGHT-OF-WAY REQUIRED FOR SEEPAGE BERMS. SEE NOTE 5.
- NEW CHANNEL REALIGNMENT
- FLOOD WALL

KEY PLAN:



US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: J. PORTER
DRAWN BY: J. PORTER
CHECKED BY: T. MATUSKA
SUBMITTED BY:
ISSUE DATE:
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D
REVISION DATE: 30 OCT 2020

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

MILES CITY, SECTION 205 FEASIBILITY STUDY
TONGUE AND YELLOWSTONE RIVERS
MILES CITY, MONTANA

ALTERNATIVE LEVEE ALIGNMENTS
REACH 1 (DETAIL AREA 7A)

SHEET ID
13

...\Projects\AEC_WS_001_ProjectTemplate\ProjectData\CAD_BIM_Sheets\MC-CF137 ALTERNATIVES, DETAIL 7A.dgn
3:10:34 PM 11/2/2020 PD: AEC_pdf.pltcfg DS: AEC_Screen.dscript.dscript

Figure 13

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

13

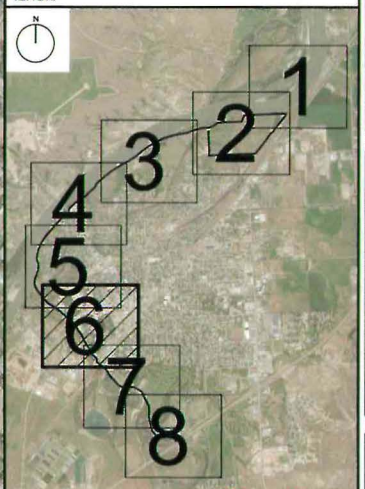
NOTES:

1. ALTERNATIVE 2-1 REPRESENTS RECONSTRUCTING THE LEVEE MOSTLY ON THE CURRENT ALIGNMENT OR ADDING ADDITIONAL FEATURES TO THE EXISTING LEVEE EMBANKMENT TO MEET CURRENT USACE DESIGN CRITERIA. SEE SHEET CF136 FOR ADDITIONAL ALTERNATIVES BETWEEN STATIONS 190+00 AND 199+00.
2. ALTERNATIVE 2-2 REPRESENTS CONSTRUCTING A NEW LEVEE SET BACK FURTHER FROM THE RIVER BANK. THE EXISTING LEVEE WOULD BE DEGRADED TO NATURAL GROUND TO ALLOW ADDITIONAL CONVEYANCE IN THE FLOODPLAIN. NOTE THAT CLOSURE STRUCTURES ARE REQUIRED AT ROAD CROSSINGS FOR THIS ALTERNATIVE.
3. FOUNDATION CONDITIONS ARE CURRENTLY UNDER REVIEW TO DETERMINE THE NECCESSARY LOCATIONS AND EXTENTS OF UNDERSEEPAGE CONTROL MEASURES. MAXIMUM EXTENTS OF SEEPAGE BERMS ARE SHOWN ON THIS SHEET. HOWEVER, OTHER UNDERSEEPAGE CONTROL MEASURES SUCH AS TOE DRAINS AND SHEETPILE CUTOFF MAY BE POSSIBLE TO REDUCE THE RIGHT-OF-WAY EXTENTS REQUIRED FOR A FEDERAL LEVEE PROJECT.

LEGEND:

- EXISTING LEVEE CENTERLINE WITH STATION LABELS, RETRIEVED FROM THE NATIONAL LEVEE DATABASE (NLD ID: 1805900700)
- CENTERLINE OF NEW LEVEE ALIGNMENT
- R/W — R/W — APPROXIMATE MINIMUM RIGHT-OF-WAY REQUIRED FOR A FEDERAL LEVEE PROJECT
- MAXIMUM EXTENT OF ADDITIONAL RIGHT-OF-WAY REQUIRED FOR SEEPAGE BERMS. SEE NOTE 3.

KEY PLAN:



US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: J. PORTER
DRAWN BY: J. PORTER
CHECKED BY: T. MATUSKA
SUBMITTED BY:
SIZE: ANSI D

ISSUE DATE:
SOLICITATION NO.:
CONTRACT NO.:
REVISION DATE: 30 OCT 2020

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

MILES CITY REGION DRS FEASIBILITY STUDY
TONGUE AND YELLOWSTONE RIVERS
MILES CITY, MONTANA

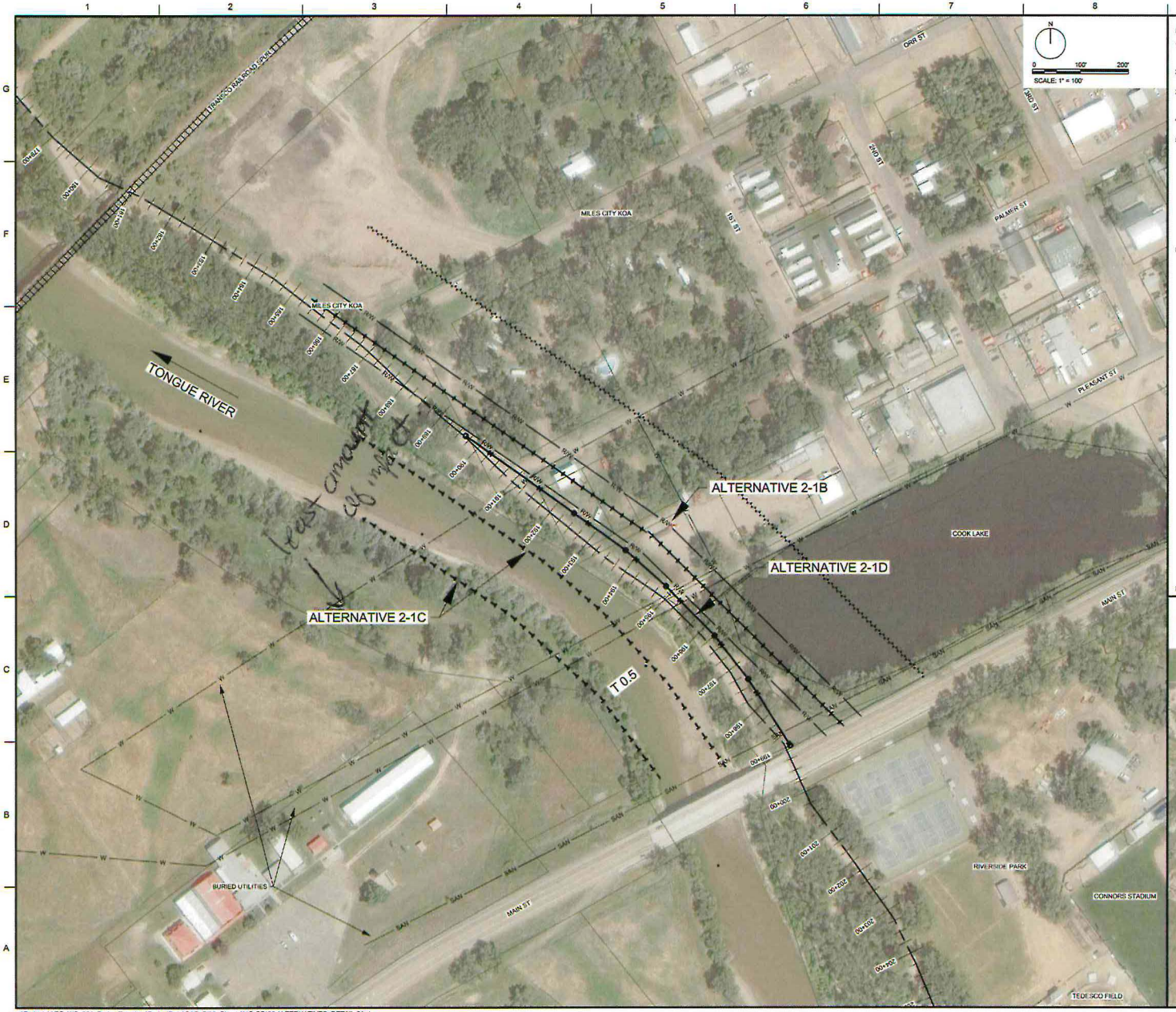
ALTERNATIVE LEVEE ALIGNMENTS
REACH 2 (DETAIL AREA 6)

SHEET ID
14

...\Projects\AEC_WS_001_ProjectTemplate\ProjectData\CAD_BIM_Sheets\MC-CF126 ALTERNATIVES, DETAIL 6.dgn
2:23:42 PM 11/2/2020 PD: AEC_pdf.pltcfg DS: AEC_Screen.dscript.dscript

Figure 14

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION



NOTES:

1. ALTERNATIVE 2-1A REPRESENTS RECONSTRUCTING THE LEVEE MOSTLY ON THE CURRENT ALIGNMENT OR ADDING ADDITIONAL FEATURES TO THE EXISTING LEVEE AS SHOWN ON SHEET CF136. SHEETPILE CUTOFF WALLS AND RIPRAP SLOPE PROTECTION WOULD BE REQUIRED BETWEEN STATIONS 190+00 AND 199+00.
2. ALTERNATIVE 2-1B REPRESENTS CONSTRUCTING A NEW LEVEE SET BACK ABOUT 75 FT FROM THE RIVER BANK. THE EXISTING LEVEE WOULD BE DEGRADED TO NATURAL GROUND.
3. ALTERNATIVE 2-1C REPRESENTS REALIGNING THE TONGUE RIVER CHANNEL TO REDUCE THE EROSION RISK ON THE EAST BANK AND ALLOW FOR MORE ROOM FOR LEVEE CONSTRUCTION. THE EXISTING LEVEE WOULD BE RECONSTRUCTED OR HAVE FEATURES ADDED TO IN THE CURRENT ALIGNMENT.
4. ALTERNATIVE 2-1D REPRESENTS DEGRADING THE EXISTING LEVEE TO NATURAL GROUND AND CONSTRUCTING A FLOOD WALL WITHIN THE ORIGINAL LEVEE FOOTPRINT.
5. FOUNDATION CONDITIONS ARE CURRENTLY UNDER REVIEW TO DETERMINE THE NECCESSARY LOCATIONS AND EXTENTS OF UNDERSEEPAGE CONTROL MEASURES. MAXIMUM EXTENTS OF SEEPAGE BERMS ARE SHOWN ON THIS SHEET. HOWEVER, OTHER UNDERSEEPAGE CONTROL MEASURES SUCH AS TOE DRAINS AND SHEETPILE CUTOFF MAY BE POSSIBLE TO REDUCE THE RIGHT-OF-WAY EXTENTS REQUIRED FOR A FEDERAL LEVEE PROJECT.

LEGEND:

- EXISTING LEVEE CENTERLINE WITH STATION LABELS, RETRIEVED FROM THE NATIONAL LEVEE DATABASE (NLD ID: 1802000700)
- CENTERLINE OF NEW LEVEE ALIGNMENT
- APPROXIMATE MINIMUM RIGHT-OF-WAY REQUIRED FOR A FEDERAL LEVEE PROJECT
- MAXIMUM EXTENT OF ADDITIONAL RIGHT-OF-WAY REQUIRED FOR SEEPAGE BERMS. SEE NOTE 5.
- NEW CHANNEL REALIGNMENT
- FLOOD WALL

KEY PLAN:

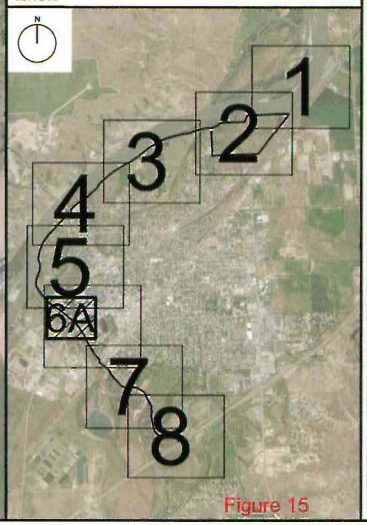


Figure 15

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: J. PORTER
DRAWN BY: J. PORTER
CHECKED BY: T. MATUSKA
SUBMITTED BY:
ISSUE DATE:
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D
REVISION DATE: 30 OCT 2020

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

MILES CITY SECTION 205 FEASIBILITY STUDY
TONGUE AND YELLOWSTONE RIVERS
MILES CITY, MONTANA

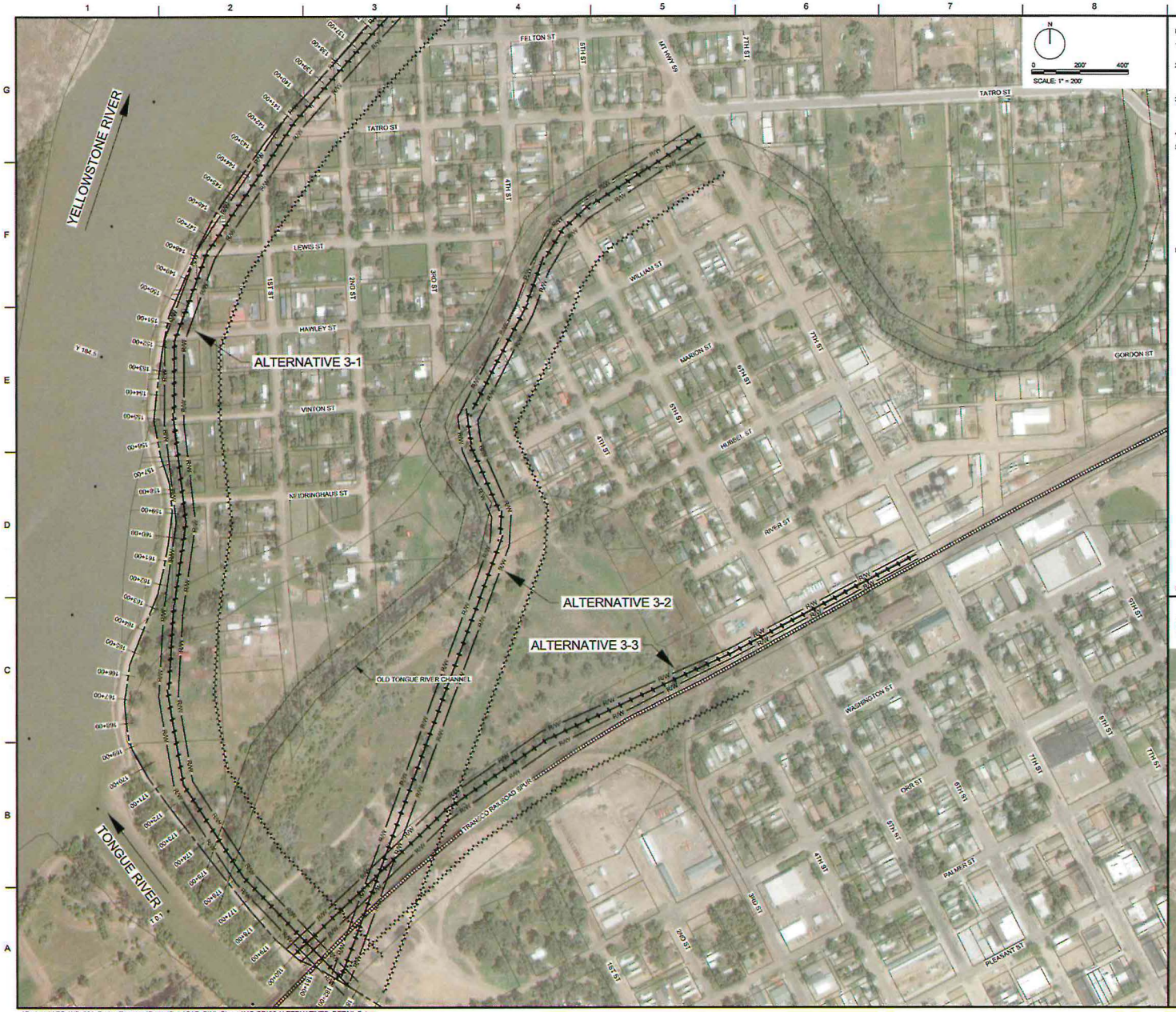
ALTERNATIVE LEVEE ALIGNMENTS
REACH 2 (DETAIL AREA 6A)

SHEET ID
15

...\Projects\AEC_WS_001_ProjectTemplate\ProjectData\CAD_BIM_Sheets\MC-CF136 ALTERNATIVES, DETAIL 6A.dgn
2:58:05 PM 11/2/2020 PD: AEC_pdf.pltcfg DS: AEC_Screen.dscript.dscript

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

15



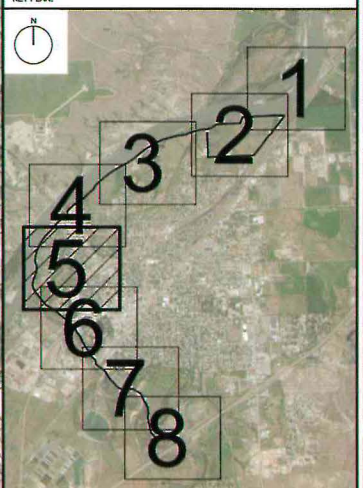
NOTES:

1. ALTERNATIVE 3-1 REPRESENTS CONSTRUCTING A NEW LEVEE SET BACK ABOUT 75 FT FROM THE RIVER BANK. THE EXISTING LEVEE WOULD BE DEGRADED TO NATURAL GROUND.
2. ALTERNATIVE 3-2 REPRESENTS CONSTRUCTING A NEW LEVEE ALONG THE OLD TONGUE RIVER CHANNEL. THE EXISTING LEVEE WOULD BE LEFT IN PLACE TO PROVIDE SOME LEVEL OF PROTECTION TO THOSE STRUCTURES LEFT UNPROTECTED. NOTE THAT THIS WOULD BE A TAILING LEVEE SINCE THERE IS NO TIE-IN POINT ON THE DOWNSTREAM END.
3. ALTERNATIVE 3-3 REPRESENTS CONSTRUCTING A NEW LEVEE ALONG THE TRANCO RR SPUR LINE. THE EXISTING LEVEE WOULD BE LEFT IN PLACE TO PROVIDE SOME LEVEL OF PROTECTION TO THOSE STRUCTURES LEFT UNPROTECTED. NOTE THAT THIS WOULD BE A TAILING LEVEE SINCE THERE IS NO TIE-IN POINT ON THE DOWNSTREAM END.
4. SEE SHEET CF124 FOR DOWNSTREAM EXTENTS OF THE LEVEE ALIGNMENTS SHOWN ON THIS SHEET.
5. FOUNDATION CONDITIONS ARE CURRENTLY UNDER REVIEW TO DETERMINE THE NECCESSARY LOCATIONS AND EXTENTS OF UNDERSEEPAGE CONTROL MEASURES. MAXIMUM EXTENTS OF SEEPAGE BERMS ARE SHOWN ON THIS SHEET. HOWEVER, OTHER UNDERSEEPAGE CONTROL MEASURES SUCH AS TOE DRAINS AND SHEETPILE CUTOFF MAY BE POSSIBLE TO REDUCE THE RIGHT-OF-WAY EXTENTS REQUIRED FOR A FEDERAL LEVEE PROJECT.

LEGEND:

- EXISTING LEVEE CENTERLINE WITH STATION LABELS, RETRIEVED FROM THE NATIONAL LEVEE DATABASE (NLD ID: 1805000700)
- CENTERLINE OF NEW LEVEE ALIGNMENT
- R/W — R/W — APPROXIMATE MINIMUM RIGHT-OF-WAY REQUIRED FOR A FEDERAL LEVEE PROJECT
- MAXIMUM EXTENT OF ADDITIONAL RIGHT-OF-WAY REQUIRED FOR SEEPAGE BERMS. SEE NOTE 5.

KEY PLAN:



US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: J.A PORTER
DRAWN BY: J.A PORTER
CHECKED BY: J.C PORTER
SUBMITTED BY: T. MATUSKA
SIZE: ARCH D
ISSUE DATE:
SOLICITATION NO.:
CONTRACT NO.:
REVISION DATE: 30 OCT 2020

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

MILES CITY SECTION 205 FEASIBILITY STUDY
TONGUE AND YELLOWSTONE RIVERS
MILES CITY, MONTANA

ALTERNATIVE LEVEE ALIGNMENTS
REACH 3 (DETAIL AREA 5)

SHEET ID
16

Figure 16

...\Projects\AEC_WS_001_ProjectTemplate\ProjectData\CAD_BIM_Sheets\MC-CF125 ALTERNATIVES, DETAIL 5.dgn
4:38:22 PM 11/2/2020 PD: AEC_pdf.pltcfg DS: AEC_Screen.dscriptl.dscript

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

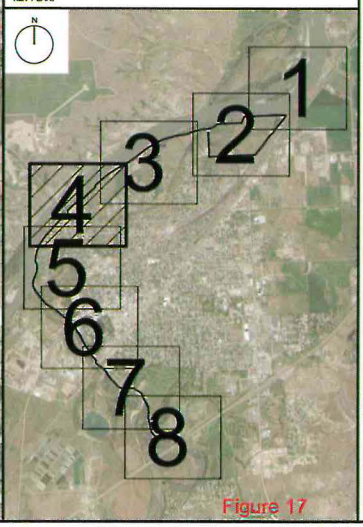
NOTES:

1. ALTERNATIVE 3-1 REPRESENTS CONSTRUCTING A NEW LEVEE SET BACK ABOUT 75 FT FROM THE RIVER BANK. THE EXISTING LEVEE WOULD BE DEGRADED TO NATURAL GROUND.
2. ALTERNATIVE 3-2 REPRESENTS CONSTRUCTING A NEW LEVEE ALONG THE OLD TONGUE RIVER CHANNEL. THE EXISTING LEVEE WOULD BE LEFT IN PLACE TO PROVIDE SOME LEVEL OF PROTECTION TO THOSE STRUCTURES LEFT UNPROTECTED. NOTE THAT THIS WOULD BE A TAILING LEVEE SINCE THERE IS NO TIE-IN POINT ON THE DOWNSTREAM END.
3. ALTERNATIVE 3-3 REPRESENTS CONSTRUCTING A NEW LEVEE ALONG THE TRANCO RR SPUR LINE. THE EXISTING LEVEE WOULD BE LEFT IN PLACE TO PROVIDE SOME LEVEL OF PROTECTION TO THOSE STRUCTURES LEFT UNPROTECTED. NOTE THAT THIS WOULD BE A TAILING LEVEE SINCE THERE IS NO TIE-IN POINT ON THE DOWNSTREAM END.
4. SEE SHEET CF125 FOR UPSTREAM EXTENTS OF THE LEVEE ALIGNMENTS SHOWN ON THIS SHEET.
5. FOUNDATION CONDITIONS ARE CURRENTLY UNDER REVIEW TO DETERMINE THE NECCESSARY LOCATIONS AND EXTENTS OF UNDERSEEPAGE CONTROL MEASURES. MAXIMUM EXTENTS OF SEEPAGE BERMS ARE SHOWN ON THIS SHEET. HOWEVER, OTHER UNDERSEEPAGE CONTROL MEASURES SUCH AS TOE DRAINS AND SHEETPILE CUTOFF MAY BE POSSIBLE TO REDUCE THE RIGHT-OF-WAY EXTENTS REQUIRED FOR A FEDERAL LEVEE PROJECT.

LEGEND:

- EXISTING LEVEE CENTERLINE WITH STATION LABELS, RETRIEVED FROM THE NATIONAL LEVEE DATABASE (NLD ID: 1005I00700)
- CENTERLINE OF NEW LEVEE ALIGNMENT
- R/W — R/W — APPROXIMATE MINIMUM RIGHT-OF-WAY REQUIRED FOR A FEDERAL LEVEE PROJECT
- MAXIMUM EXTENT OF ADDITIONAL RIGHT-OF-WAY REQUIRED FOR SEEPAGE BERMS. SEE NOTE 5.

KEY PLAN:



US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: J. PORTER
DRAWN BY: J. PORTER
CHECKED BY: T. MATUSKA
SUBMITTED BY:
ISSUE DATE:
SOLICITATION NO.:
CONTRACT NO.:
REVISION DATE: 30 OCT 2020
SIZE: ANSI D

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

MILES CITY SECTION 205 FEASIBILITY STUDY
TONGUE AND YELLOWSTONE RIVERS
MILES CITY, MONTANA

ALTERNATIVE LEVEE ALIGNMENTS
REACH 3 (DETAIL AREA 4)

SHEET ID
17

...\Projects\AEC_WS_001_ProjectTemplate\ProjectData\CAD_BIM_Sheets\MC-CF124 ALTERNATIVES, DETAIL 4.dgn
1:54:44 PM 11/2/2020 PD: AEC_pdf.pltcfg DS: AEC_Screen.dscript.dscript

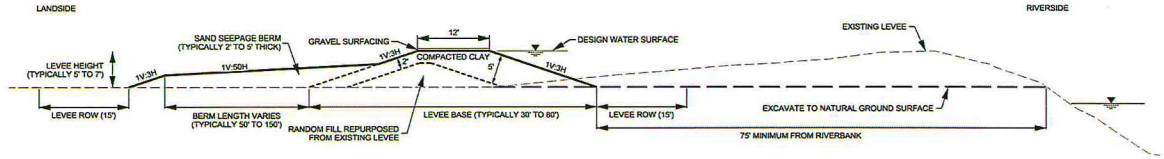
Figure 17

CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

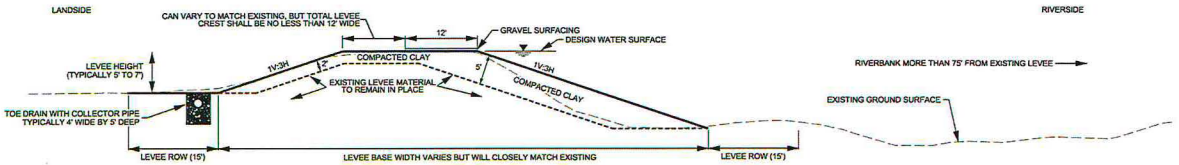
17

NOTES:

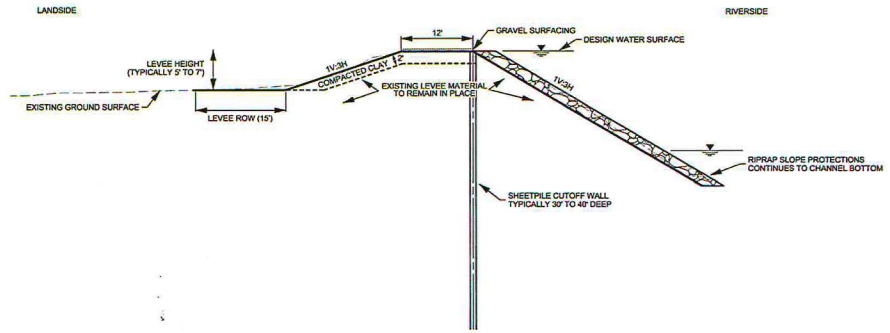
1. MINIMUM ALLOWABLE LEVEE SECTION GEOMETRY CONSISTS OF A 12 FT CREST WIDTH WITH 1H:3V SIDESLOPES. STEEPER SIDESLOPES MAY BE PERMITTED IF CREST IS WIDER THAN 12 FT SO LONG AS THE MINIMUM SECTION FITS WITHIN THE EMBANKMENT.
2. CONSTRUCTION OF NEW SETBACK LEVEE WILL BE REQUIRED WHERE THERE IS INSUFFICIENT DISTANCE BETWEEN THE LEVEE AND RIVER CHANNEL (DETAIL F1). ALTERNATIVELY, A SHEETPILE CUTOFF WALL AND RIPRAP SLOPE PROTECTION MAY BE INSTALLED THROUGH/ON THE EXISTING LEVEE EMBANKMENT FOR ADDITIONAL SEEPAGE AND EROSION RESISTANCE (DETAIL B1).
3. IN AREAS WHERE THE EXISTING LEVEE LIES AN ACCEPTABLE DISTANCE FROM THE RIVER BANK, CLAY FILL MAY BE PLACED AND COMPACTED OVER THE EXISTING LEVEE EMBANKMENT TO ENSURE THAT THE LEVEE SECTION IS IMPERVIOUS (DETAIL D1).
4. FLOODWALLS MAY BE CONSTRUCTED IN AREAS WITH LIMITED AVAILABLE REAL ESTATE (DETAIL B7).
5. IN AREAS OF UNDESIRABLE FOUNDATION CONDITIONS, UNDERSEEPAGE CONTROL MEASURES MAY CONSIST OF SEEPAGE BERMS, TOE DRAINS, OR SHEETPILE CUTOFF WALLS.



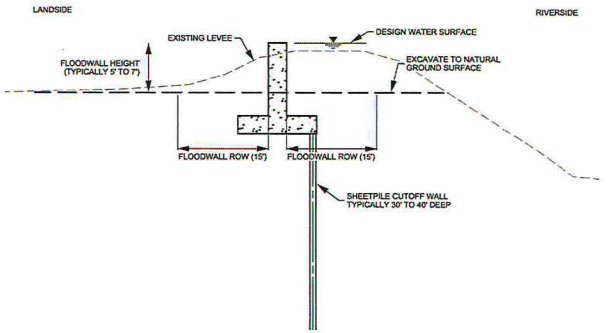
F1 NEW SETBACK LEVEE CONSTRUCTION WITH SEEPAGE BERM
NO SCALE



D1 EXISTING LEVEE MODIFICATION WITH CLAY FACE AND TOE DRAIN
NO SCALE



B1 EXISTING LEVEE MODIFICATION WITH SHEETPILE CUTOFF WALL AND RIPRAP SLOPE PROTECTION
NO SCALE



B7 NEW FLOODWALL CONSTRUCTION WITH SHEETPILE CUTOFF WALL
NO SCALE

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: J. PORTER
DRAWN BY: J. PORTER
CHECKED BY: T. MATUSKA
SUBMITTED BY:
ISSUE DATE:
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D
REVISION DATE: 30 OCT 2020

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
1616 CAPITOL AVE
OMAHA, NE 68102

MILES CITY SECTION 205 FEASIBILITY STUDY
TONGUE AND YELLOWSTONE RIVERS
MILES CITY, MONTANA

LEVEE CROSS-SECTIONS

SHEET ID
18

...\Projects\AEC_WS_001_ProjectTemplate\ProjectData\CAD_BIM_Sheets\MC-CF321 LEVEE SECTIONS.dgn
4:23:47 PM 11/2/2020 PD: AEC_pdf.pltcfg DS: AEC_Screen.dscript.dscript

Figure 18
CONCEPTUAL PLANS - NOT FOR CONSTRUCTION

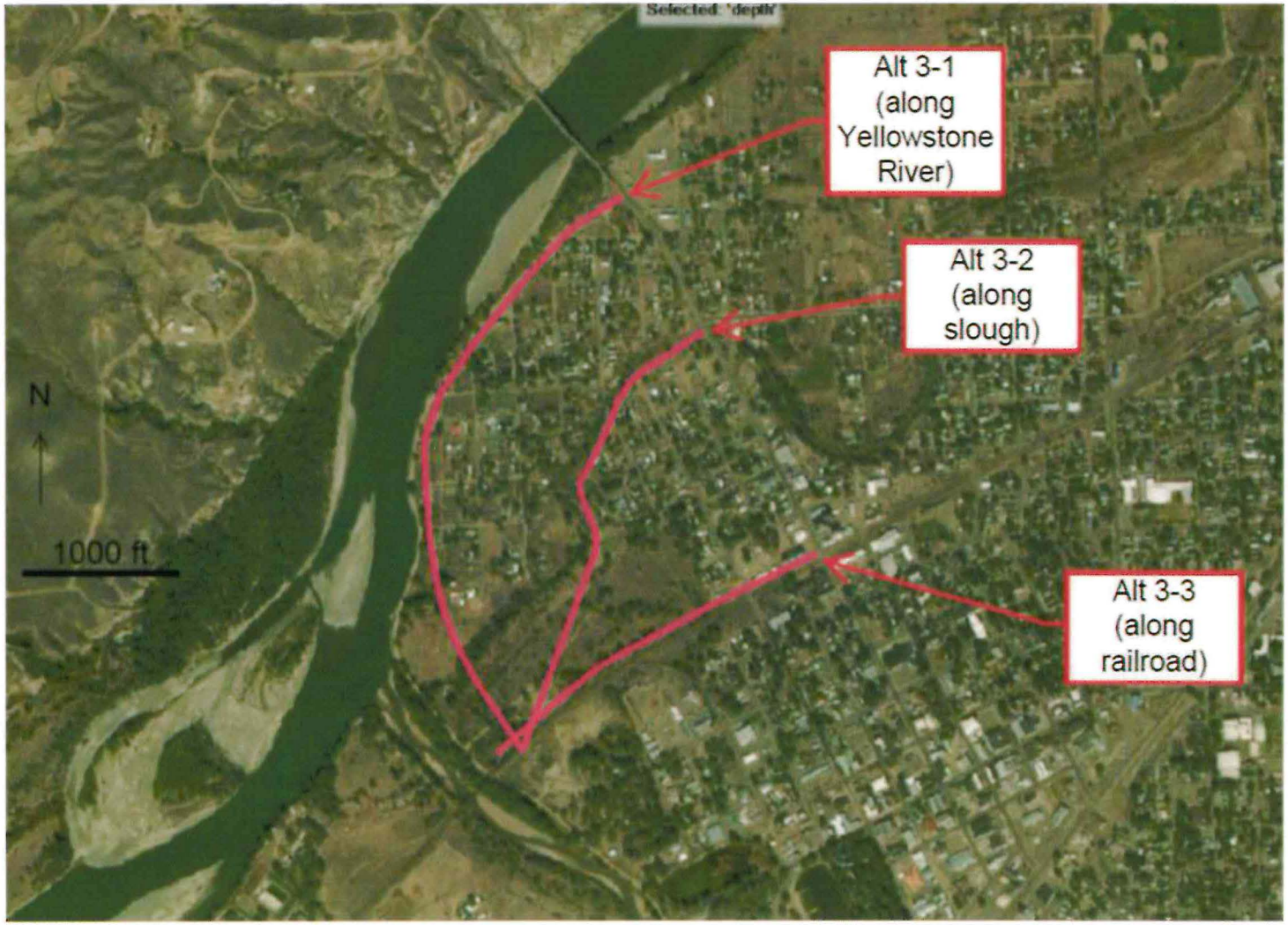
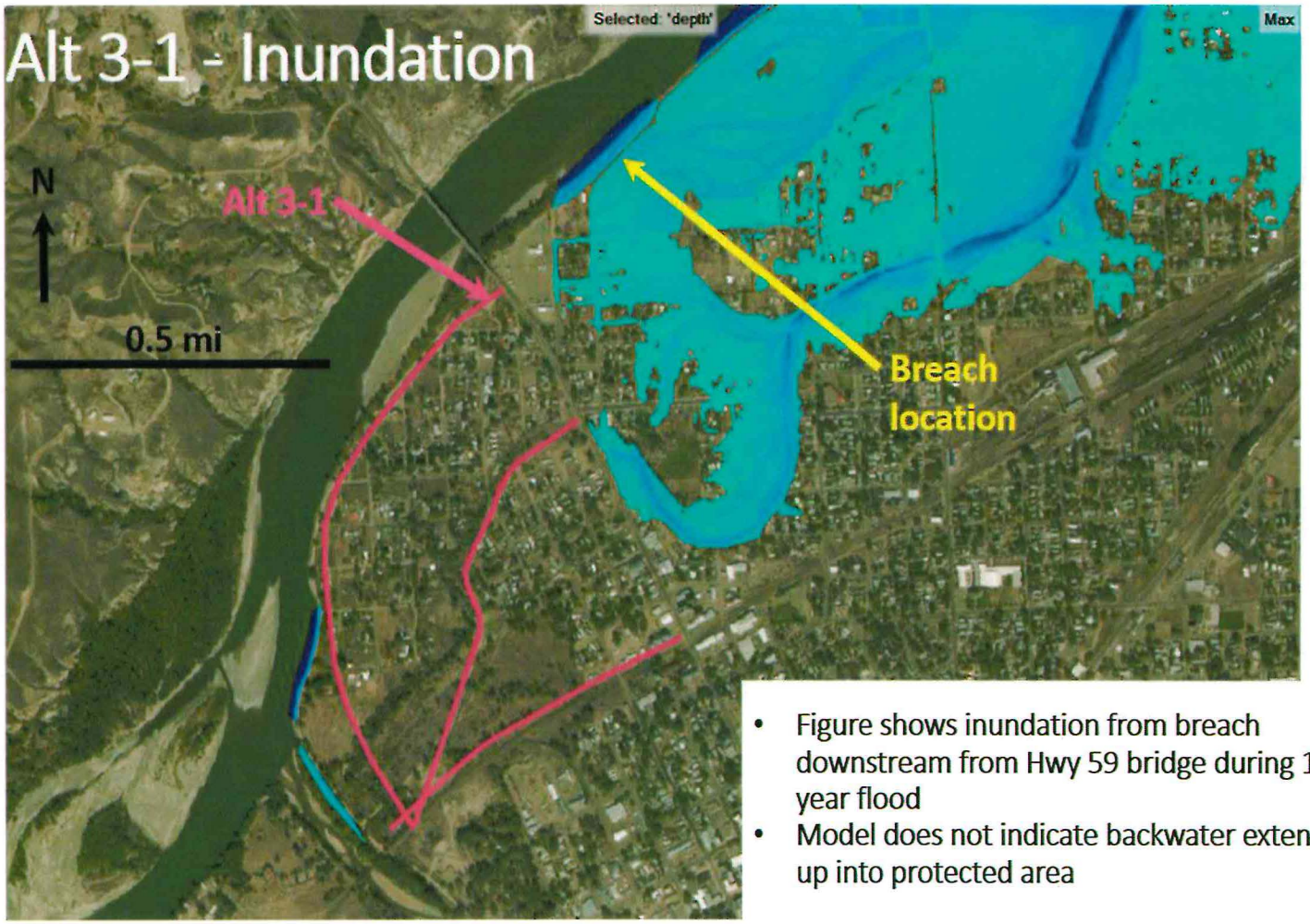
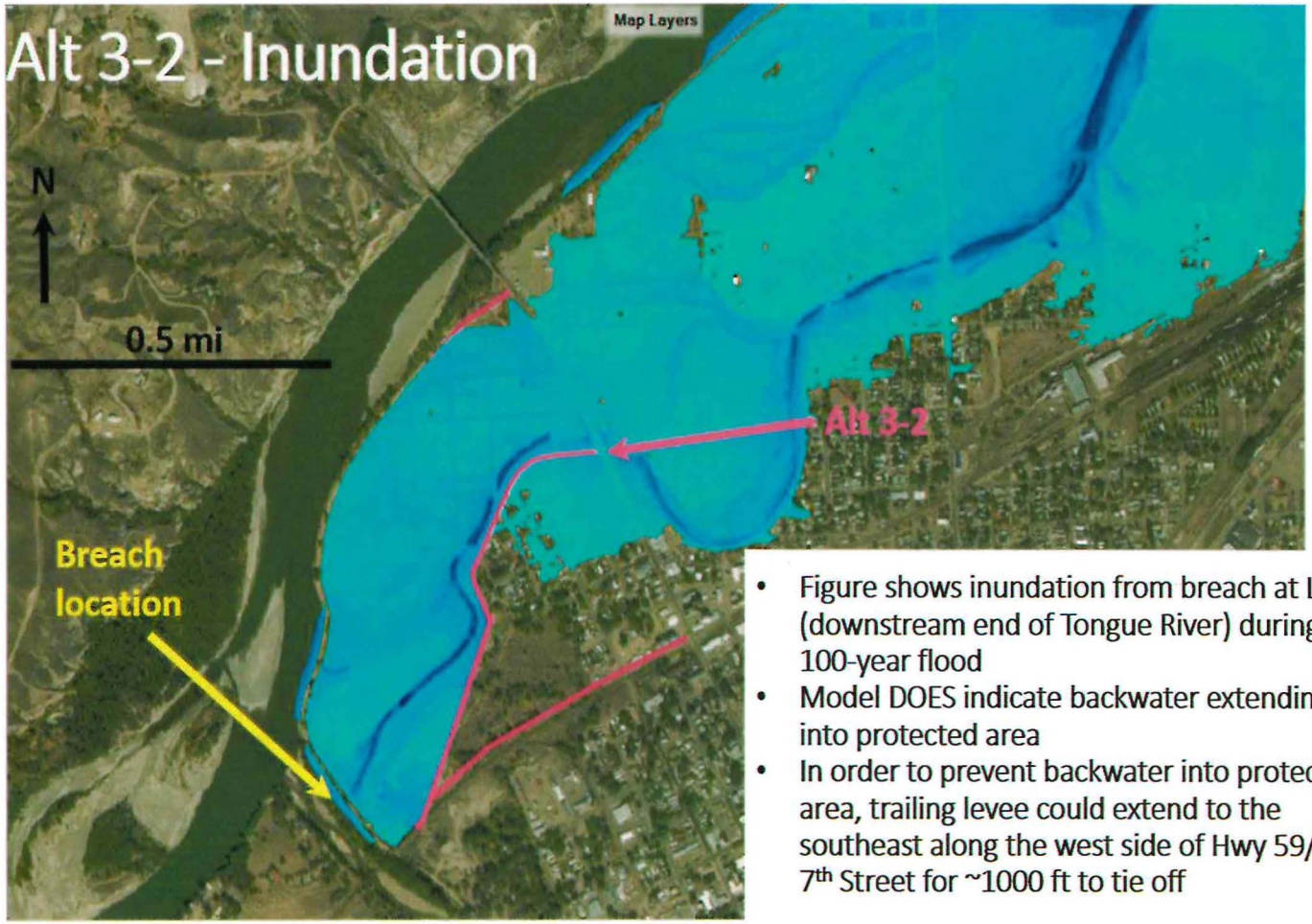

Alt 3-1
(along
Yellowstone
River)
Alt 3-2
(along
slough)
Alt 3-3
(along
railroad)
N
1000 ft

Figure 19



- Figure shows inundation from breach downstream from Hwy 59 bridge during 100-year flood
- Model does not indicate backwater extending up into protected area

Figure 20



- Figure shows inundation from breach at L3 (downstream end of Tongue River) during 100-year flood
- Model DOES indicate backwater extending up into protected area
- In order to prevent backwater into protected area, trailing levee could extend to the southeast along the west side of Hwy 59/N. 7th Street for ~1000 ft to tie off

Figure 21

21

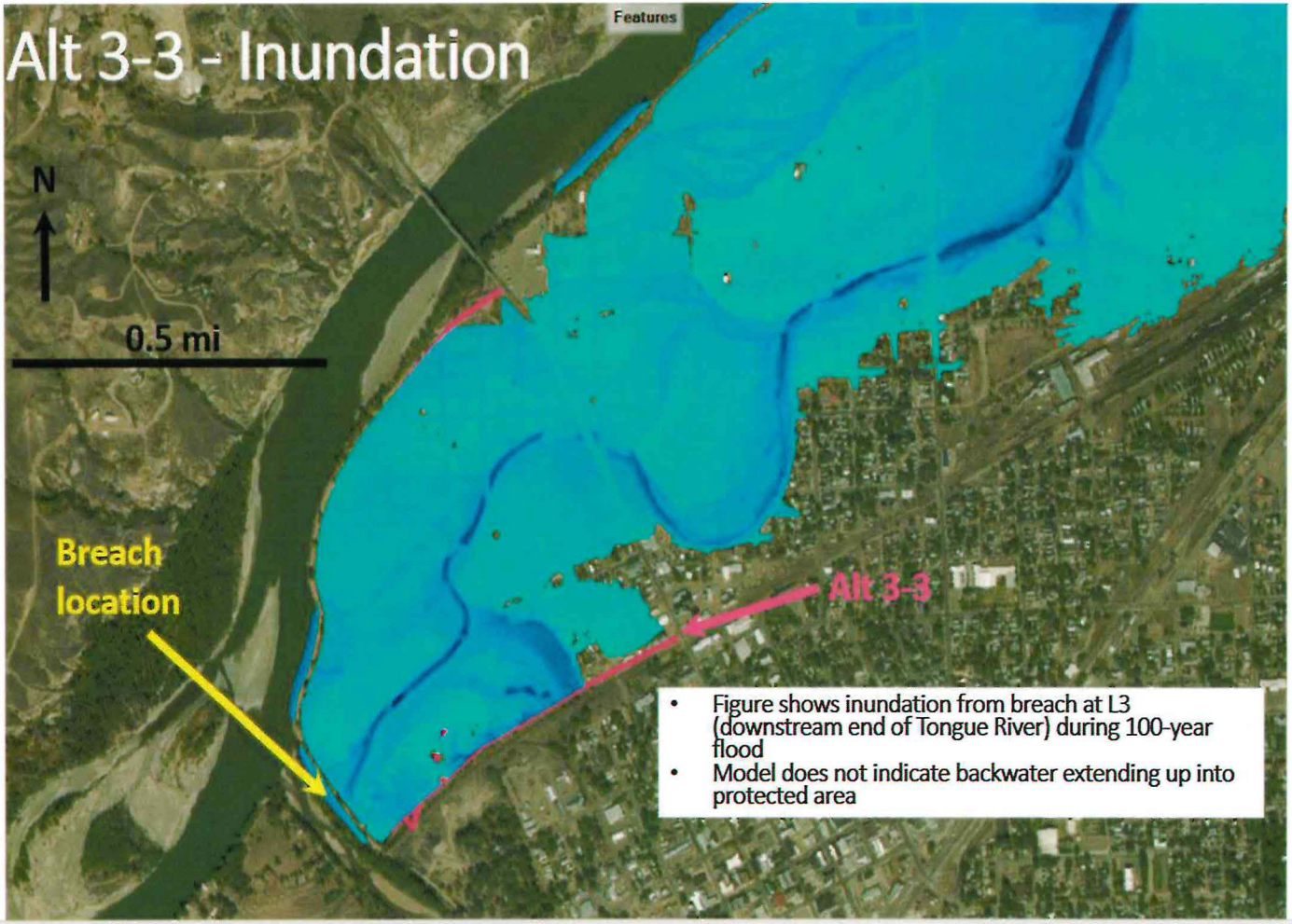

Alt 3-3 - Inundation
Features
N
0.5 mi
Breach location
Alt 3-3
• Figure shows inundation from breach at L3 (downstream end of Tongue River) during 100-year flood
• Model does not indicate backwater extending up into protected area

Figure 22

Reach 4 Nonstructural

Figure 23