Draft Environmental Assessment

Auld-Brokaw Trail Repair and Marne Creek Bank Stabilization
City of Yankton, Yankton County, South Dakota
June 2022

Prepared by
Banner Associates Inc.
409 22nd Ave South
Brookings, SD 57006

Prepared for
FEMA Region VIII, Disaster 4440-DR-SD, Project ID 108439
Denver Federal Center, Bldg. 710
Denver, CO 80225

FEMA

List of Acronyms, Chemical Formulas, and Abbreviations

ARSD- Administrative Rules of South Dakota
APE–Area of Potential Effect
BGEPA-Bald and Golden Eagle Protection Act
BCC – Birds of Conservation Concern
BFE-Base Flood Elevation
BMP–Best Management Practice
BNSF – Burlington Northern Sante Fe
CAA–Clean Air Act
CEQ–Council on Environmental Quality
CFR–Code of Federal Regulations
CO–Carbon monoxide
CWA- Clean Water Act
dB–Decibels
DHS-Department of Homeland Security
DNL-Day-Night Average Sound Level
EA–Environmental Assessment
EIS–Environmental Impact Statement
EO–Executive Order
EPA–Environmental Protection Agency
ESA–Endangered Species Act
FEMA–Federal Emergency Management Agency
FIRM–Flood Insurance Rate Map
FONSI–Finding of No Significant Impact
FPPA–Farmland Protection Policy Act
HRECs – Historical Recognized Environmental Conditions
HMGP- Hazard Mitigation Grant Program
IPaC – Information for Planning and Consultation
LEP – Limited English Proficiency
MBTA - Migratory Bird Treaty Act
MNRR – Missouri River Recreational River
NAAQS–National Ambient Air Quality Standards
NCA – Noise Control Act
NEPA–National Environmental Policy Act
NHPA–National Historic Preservation Act
NO2- Nitrogen Dioxide
NPS-National Park Service
NRCS–Natural Resources Conservation Service
NRHP–National Register of Historic Places
NWI–National Wetlands Inventory
O3–Ozone
OHWM-Ordinary High-Water Mark
OSHA–Occupational Safety and Health Administration
Pb–Lead
PM10-Particulate matter
Project- Trail repairs and bank stabilization of Marne Creek
PA-Public Assistance
PBO – Programmatic Biological Opinion
RECs – Recognized Environmental Conditions
RCRA- Resource Conservation and Recovery Act
SD – South Dakota
SDDANR-South Dakota Department of Agriculture and Natural Resources
SDGFP – South Dakota Game Fish and Parks
SDOEM- South Dakota Office of Emergency Management
SDNHD-South Dakota Natural Heritage Database
SHPO–State Historical Preservation Office
SO2- Sulfur Dioxide
SWA-Solid Waste Act
SWPPP-Storm Water Pollution Prevention Plan
TSCA-Toxic Substances Control Act
Trail- Auld-Brokaw Maintenance and Recreation Trail System
TRM-Turf Reinforcement Mat
U.S.-United States
USACE–United States Army Corps of Engineers
U.S. Census – United States Census Bureau
USFWS–United States Department of the Interior Fish and Wildlife Service
USGS-United States Geological Survey
Yankton-City of Yankton
WOTUS- Waters of the United States

Table of Contents

SECTION 1: BACKGROUND 1
1.1 Project Authority 1
1.2 Project Location 2
1.3 Purpose and Need 2

SECTION 2: ALTERNATIVE ANALYSIS 3
2.1 Alternative 1- No Action 3
2.2 Action Alternative 2- Proposed Action 3
2.2.1 Reach A 3
2.2.2 Reach B 4
2.2.3 Reach C 4
2.2.4 Reach G 4
2.2.5 Reach J 5
2.3 Alternatives Considered and Eliminated from Further Consideration 5
2.3.1 Reach C, Location C-UR1: Gabions 5
2.3.2 Floodplain Mitigation in Reaches A and B 5

SECTION 3: AFFECTED ENVIRONMENT AND CONSEQUENCES 6
3.1 Preliminary Screening of Assessment Categories 6
3.1.1 Geology, Seismicity and Soils 6
3.1.2 Water Resources and Water Quality 8
3.1.3 Floodplain Management (Executive Order 11988) 13
3.1.4 Air Quality 13
3.2 Biological Environment 14
3.2.1 Terrestrial and Aquatic Environment 14
3.2.2 Wetlands (Executive Order 11990) 17
3.2.3 Threatened and Endangered Species 19
3.2.4 Migratory Birds 23
3.2.5 Bald and Golden Eagles 24
3.3 Hazardous Materials 25
3.4 Socioeconomics 26
3.4.1 Zoning and Land Use 26
3.4.2 Visual Resources 28
3.4.3 Noise 29
3.4.4 Public Services and Utilities 29
3.4.5 Traffic and Circulation 30
3.4.6 Environmental Justice (Executive Order 12898) 30
3.4.7 Safety and Security 33
3.5 Historic and Cultural Resources 34

3.5.1 Historic Structures 35
3.5.2 Archaeological Resources 35
3.5.3 Tribal Coordination and Religious Sites 35
3.6 Comparison of Alternatives 36

SECTION 4: CUMULATIVE IMPACTS 40
4.1 Water Resources and Water Quality 41
4.2 Terrestrial and Aquatic Environment 42
4.3 Wetlands 42
4.4 Threatened and Endangered Species 42

SECTION 5: PUBLIC PARTICIPATION 43

SECTION 6: MITIGATION MEASURES AND PERMITS 44

SECTION 7: CONSULTATIONS AND REFERENCES 47
7.1 Tribal and Agency Consultations 47
7.2 References 47

SECTION 8: LIST OF PREPARERS 50

APPENDIX A: MAP AND FIGURES

APPENDIX B: FLOODPLAIN AND EO 11990 EIGHT-STEP DOCUMENTATION

APPENDIX C: AGENCY CORRESPONDENCE

APPENDIX D: TRIBAL NATION CORRESPONDENCE

APPENDIX E: PUBLIC NOTICE

SECTION 1: BACKGROUND

1.1 PROJECT AUTHORITY

The City of Yankton (Yankton), in cooperation with South Dakota Office of Emergency Management (SDOEM) have requested funding from the Federal Emergency Management Agency (FEMA) for the reconstruction of the Auld-Brokaw Maintenance and Recreation Trail System (Trail) and stabilization of the banks of Marne Creek.

In accordance with the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500 through 1508), and FEMA regulations for NEPA compliance (FEMA Directive 108-1), FEMA must fully understand and consider the environmental consequences of actions proposed for federal funding. The purpose of this Environmental Assessment (EA) is to meet FEMA's responsibilities under NEPA and to determine whether to prepare a Finding of No Significant Impact (FONSI) or a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) for the proposed project. As part of this NEPA review, the EA will address requirements of other applicable environmental laws and executive orders, including but not limited to Section 7 of the Endangered Species Act (ESA), Section 106 of the National Historic Preservation Act (NHPA), Executive Order (EO) 11988 - Floodplain Management, EO 11990 - Protection of Wetlands, EO 12898 – Environmental Justice in accordance with FEMA implementing procedures, such as 44 CFR Part 9 and FEMA Directive 108-1.

The Trail and Marne Creek were severely damaged during a March 2019 blizzard and subsequent rapid snowmelt. Approximately 1.3 miles of Marne Creek have sustained damage at five locations (Reaches A-C, G and J) from recent flooding events. Damaged sections of the concrete-paved Trail have collapsed into the creek along with sections of unstable bank material and slope protection. Some sections have intact, usable trail, but the unstable and eroding banks provide an ongoing threat the overall trail system and the public health and safety. The event was declared a major disaster by the President on June 7, 2019, in accordance with Robert T. Stafford Disaster Relief and Emergency Assistance Act, (P.L.) 93-288, and the application for FEMA assistance was signed on April 20, 2020. FEMA funding would be provided through the Public Assistance (PA) grant program as part of FEMA Project 4440-DR-SD; PW #330, GM #108439.

The mission of the PA Program is to aid State, local, or Tribal governments and certain types of private nonprofit organizations so that communities can quickly respond to and recover from major disasters or emergencies declared by the President. The PA Program provides grant assistance for debris removal, emergency protective measures, and the restoration of disaster-damaged, publicly owned facilities and specific facilities of certain private nonprofit organizations. The PA Program also encourages protection of damaged facilities from future incidents by providing hazard mitigation measures.

As part of this NEPA review and in accordance with FEMA implementing procedures, such as 44 CFR Part 9 and FEMA Directive 108-1, the EA will address requirements of other applicable environmental laws and executive orders, including but not limited to Section 7 of the ESA, Section 106 of the NHPA, EO 11988 - Floodplain Management, EO 11990 - Protection of Wetlands, and EO 12898 – Environmental Justice.

1.2 PROJECT LOCATION

The project location is within Yankton County, South Dakota (SD) at -97.379020° West and 42.868042° North. Yankton's population is an estimated 14,600 residents (U.S. Census 2022). The stretch of Marne Creek within the project area consists of the Missouri River and Marne Creek confluence near Levee Street, extending to West 23rd Street near the Yankton Mall. Refer to **Figures 1a** through **1c** in **Appendix A: Map and Figures**.

The damage to Marne Creek from the March 2019 blizzard can be broken down into two portions where major damage occurred. The first portion is the lower reaches—Reaches A, B, and C—at the conflux of Marne Creek and the Missouri River extending up to Pine Street bridge near East 8th Street. The second portion is the upper Reaches—Reaches G and J—extending from Burleigh Street bridge near East 8th Street to 31st Street (SD 50) west of West City Limits Road.

Reaches A and B have the most severe damage along Marne Creek and the Trail. Major portions of the bank have been heavily eroded, causing bank entrenchment and portions of the Trail to collapse. Riprap installed along some portions has been displaced. The upper reach has eroded banks and minimal infrastructure damage. However, the biggest concern is continued erosion of the stream bank. The stream is continuing to erode the banks and is starting to encroach onto public and private property with the potential to affect adjacent infrastructure.

1.3 PURPOSE AND NEED

The purpose of the proposed action is to repair disaster-damaged infrastructure and to reduce the potential for similar damage in the future. The action is needed to restore and protect life and property due to ongoing erosion and destabilization of Marne Creek.

Based on the damage that occurred from the March 2019 event and continued risk of erosion caused by Marne Creek, Yankton, SDOEM, and FEMA have identified the need to perform bank stabilization along the banks of Marne Creek along Reaches A-C, G and J. In addition to stabilizing the banks of Marne Creek, portions of the Trail would be reconstructed. This Trail provides access to the Yankton's property for maintenance and a recreational opportunity for the public.

SECTION 2: ALTERNATIVE ANALYSIS

This section describes all alternatives considered in addressing the purpose and need. Shortly after the disaster event, officials from the City of Yankton, the SDOEM, and FEMA met on-site to review the damage and identified the Reaches of Marne Creek that needed to be stabilized (A-C, G and J). Refer to **Figures 1a** through **1e** in **Appendix A: Map and Figures**. The severity of damage varies by Reach, with the southern Reaches that are at the confluence of Marne Creek with the Missouri River sustaining the most damage. Information was gathered for each Reach, including a topographic survey, wetland delineation, cultural resources survey, and any hydraulic information available. A range of alternatives for bank stabilization were reviewed; those that were dismissed are discussed further in this section. Hydrologic analysis was utilized to determine the alternative that would best stabilize the banks of Marne Creek at each Reach.

Two alternatives are evaluated in detail: Alternative 1- No Action Alternative and Alternative 2- Proposed Action. Other potential alternatives were considered but were determined to be not viable.

2.1 ALTERNATIVE 1- NO ACTION

The No Action Alternative would not repair the damage along the banks of Marne Creek or reconstruct the Trail. The No Action Alternative would not meet the needs of the Project and would allow for Marne Creek to continue to erode and damage additional public property and private property. The No Action Alternatives is pulled forward for further consideration for compliance with NEPA and to be a comparison to the other alternatives.

2.2 ACTION ALTERNATIVE 2- PROPOSED ACTION

Due to the variation in the damage among the Reaches, the following describes the proposed action separately for each Reach, and was determined through consideration of previous stabilization utilized, current design techniques, and modeling.

2.2.1 REACH A

Reach A is the southernmost Reach and extends from the confluence with the Missouri River north to SD 50. Reach A is located within open space that is Yankton property, adjacent to the Yankton Wastewater Treatment Facility and Street Department. For the proposed bank stabilization in this Reach, refer to **Figure 2a** in **Appendix A: Map and Figures**. Due to the high energy of the flow in this Reach, riprap with the incorporation of bioengineering features was proposed.

The bank would be regraded to remove the steep angles, creating a more gradual bank slope. After regrading, riprap would be placed below the bottom of the channel to the 2-year water surface level; woody riparian plantings would be incorporated within the riprap. Riprap extending from the 2-year water surface to the 10-year water surface would be overlayed with 12-14 inches of soil and vegetation plantings, effectively obscuring the riprap located below the visible vegetated surface in this area. To better support the establishment of plantings, a granular filler would be used to fill in the voids of the riprap and strengthen root growth. All plant species grown between the 2-year water surface and 10-year water surface would be native to the Yankton area. Field stone or native rock would be utilized for this reach to meet Section 7a requirements of the Missouri National

Recreational River (MNRR). Refer to **Figure 2b** in **Appendix A: Map and Figures** for the location of the proposed stabilization along the banks of the Creek.

The Trail extends on the east and west sides of Marne Creek. Approximately 867' of Trail would be realigned and installed and approximately 919' of Trail would be removed in this Reach.

2.2.2 REACH B

Reach B extends from SD 50 to Burleigh Street. The Reach is within Rotary Nature Area. For the proposed bank stabilization for this Reach, refer to **Figures 2c** and **2d** in **Appendix A: Map and Figures**. Traditional riprap with the incorporation of bioengineering features was proposed due to the high energy of the flow in this Reach. The bank would be regraded to remove the steep angles, creating a more gradual bank slope.

A small segment of the eastern bank in this reach requires stabilization that extends into private property owned by a business. The area would likely require a temporary easement of the private property, which would be graded and returned to a vegetated area.

The Trail is located on the west side of Marne Creek. Approximately 1,753' of Trail would be realigned and installed and approximately 1,635' of Trail would be removed.

2.2.3 REACH C

Reach C extends from Burleigh Street to Pine Street within residential areas. The Burlington Northern Sante Fe (BNSF) railroad extends adjacent to the northern bank of Marne Creek. Alternative 2 would stabilize the banks of Marne Creek through the placement of Turf Reinforcement Mat (TRM) and traditional riprap with bioengineering features. Refer to **Figures 2e** and **2f** in **Appendix A: Map and Figures**.

At the specific location of C-UL1, TRM would be utilized since the force of the stream (known as shear stress) at this location was less, allowing this more cost-efficient method to be incorporated.

The remaining locations of the Reach would utilize the riprap with bioengineering features similar to Reach B. At the specific location of C-UR1, a residence located directly on the bank of the creek at 601 East 8th Street has been acquired under the Hazard Mitigation Grant Program (HMGP) in a previous FEMA action (DR-4440-SD, HMGP Project 72-R). The property was purchased by the City of Yankton due to risk for long term flooding issues. Typically, properties purchased under this program are returned to green space with no structural bank stabilization features. Due to the erosion and concerns with the soil instability adjacent to other infrastructure, a conditional exemption was approved based on the use of vegetated riprap at a 2:1 slope at this location. By allowing the use of this stabilization, green space would be protected from future erosion so Alternative 2 is consistent with the mission of the HMGP provided all other environmental and historic preservation considerations are addressed. Refer to **Appendix C: Agency Correspondence** for the approval of the conditional exemption dated March 25, 2022.

2.2.4 REACH G

Reach G extends from near West 9th Street to West 15th Street. Within this Reach, the west bank is along Morgen Park and the east bank is along the undeveloped private property of Marne Creek. For

the proposed bank stabilization for this Reach, refer to **Figures 2g** and **2h** in **Appendix A: Map and Figures** for the location of the proposed stabilization along the banks of Marne Creek. One small permanent easement would be needed to extend the current existing easement.

The locations of G-UL1, G-UR1, and G-UL2 would implement the riprap with bioengineering features similar to Reaches A, B, and C. At location GUL-1, a small portion of the Trail would be relocated. The locations of G-UL3 and G-UL4 would implement gabions. Although gabions are more costly than TRM and the riprap bank stabilization techniques, existing gabions are present: these locations are ideal to tie additional gabions into the existing to strengthen the banks. This would utilize the gabions that made it through the event, leveraging previous infrastructure put into place.

2.2.5 REACH J

Reach J is adjacent to West 23rd Street and a few businesses, including the Yankton Mall. For the proposed bank stabilization for this Reach, refer to **Figures 2i** and **2j** in **Appendix A: Map and Figures**. Riprap with bioengineering features would be installed on the north and south side of Marne Creek, similar to Reaches A, B, C, and G.

2.3 ALTERNATIVES CONSIDERED AND ELIMINATED FROM FURTHER CONSIDERATION

Other potential alternatives were discussed for the Project but were eliminated from consideration and did not require a detailed evaluation. These early eliminations are described in this section and include the main reason the alternative was not viable.

2.3.1 REACH C, LOCATION C-UR1: GABIONS

The residence at location C-UR1 required the consideration of an alternate bank stabilization method of a gabion wall. Due to the soil instability at the location and the constraints of the residence, the gabion wall was proposed. This would be a more expensive option with less natural bioengineering features in comparison to the riprap bank stabilization utilized in Reaches A, B, C, G, and J. With the approval of the residence acquisition under the HMGP from a previous project, this allowed the option to utilize the riprap with bioengineering features and this alternative was eliminated from future consideration.

2.3.2 FLOODPLAIN MITIGATION IN REACHES A AND B

Early in the development of alternatives, the opportunity for floodplain mitigation was considered in the open areas within Reaches A and B. The floodplain mitigation would be possible storage areas, likely riparian wetland areas, that would allow for additional capacity during flooding events. Hydrology and Hydraulic (H & H) modeling indicated this would not be effective for flooding north of Reach B. Since the main goal is to relieve flooding within residential areas, this alternative was eliminated from further consideration.

SECTION 3: AFFECTED ENVIRONMENT AND CONSEQUENCES

3.1 PRELIMINARY SCREENING OF ASSESSMENT CATEGORIES

For some projects, it is possible to narrow the list of EA categories for which detailed assessments will be performed. Coastal zone management and costal barrier management were eliminated from further analysis for this Project.

Within this section, the reference to Project Areas includes the Project Area for Reaches A-C, G, and J.

3.1.1 GEOLOGY, SEISMICITY AND SOILS

Within the Project Areas, the terrain is largely flat to slightly rolling landscapes with Marne Creek and the Missouri River as water features. Elevations range from 1,169 to 1,222 feet. The subsurface geology of the Project Areas is the Niobrara Formation (Upper Cretaceous) and Carlile Shale (Upper Cretaceous). Both are bedrock formations. The Niobrara Formation is white to dark-gray argillaceous chalk, marl, and shale. The Niobrara Formation weathers yellow to orange and contains thin, laterally continuous bentonite beds, chalky carbonaceous shale, minor sand, and small concretions with a thickness up to 150'. The Carlile Shale is dark gray to black, silty to sandy shale with several zones of septarian, fossiliferous, carbonate concretions. The Carlile Shale contains up to three sandstone units in the upper portion of the formation and sandy calcareous marl at the base and has a thickness up to 330' (USGS 2021a).

EO 12699, Seismic Safety of Federal and Federally Assisted or Regulated New Building Construction does not apply to the Project since the construction of a new building is not proposed. A search for historic seismic data on the U.S. Geological Survey (USGS) Earthquake Search Catalog was conducted for Yankton for the last century. There have been no recorded earthquakes felt (USGS 2021b). Therefore, seismicity activity is not of great concern for this Project and is not considered future in this EA.

The Farmland Protection Policy Act (FPPA) (P.L. 97-98, Sec. 1539-1549; 7 U.S.C. 4201, et seq.) was enacted in 1981 (P.L. 98-98) to minimize the unnecessary conversion of farmland to non-agricultural uses as a result of federal actions. Programs administered by federal agencies must be compatible with state and local farmland protection policies and programs. The Natural Resources Conservation Service (NRCS) is responsible for protecting significant agricultural lands from irreversible conversions that result in the loss of an essential food or environmental source. Per 7 CFR § 1491.3, prime farmland is characterized as land with the best physical and chemical characteristics for the production of food, feed, forage, fiber, and oilseed crops. This land is either used for food or fiber crops or is available for those crops, but is not urban, built-up land, or water areas. Prime farmland is initially determined by reviewing soils in the area. Soils within the Project Areas are listed in **Table 1**.

Table 1: Soils Within the Project Areas

NRCS Map Unit Symbol	Soil Name
Bk	Blyburg silt loam
DaB	Davis silt loam, 2 to 9 percent slopes
EoD	Ethan-Davis loams, 9 to 15 percent slopes
Ha	Haynie silt loam
Oa	Onawa silty clay
Rb	Bon loam, channeled, 0 to 2 percent slopes, frequently flooded
Rc	Roxbury silt loam
Sa	Salix silty clay loam
SdA	Sardak loamy fine sand, 0 to 3 percent slopes
SeA	Sardak-Grable complex, 0 to 4 percent slopes

In **Table 1**, five major soils within the Project Areas are listed as prime farmland, and one farmland of statewide importance. Soils noted for prime farmland include Blyburg silt loam (Bk) that is 5.1% of the Project Areas; Haynie silt loam (Ha) that is 1.9%; Onawa silty clay (Oa) that is 9.8%; and Roxbury silt loam (Sa) that is 1.2%. Soils noted for statewide importance include Davis silt loam (DaB) that that is 0.6% of the Project Areas (NRCS 2021a).

Although the soils are noted for prime or statewide importance farmland, the Project would not convert any farmland to non-agricultural use.

Alternative 1 – No Action:

Under the No Action Alternative, geology and soils would not be affected as the area would remain unchanged from existing conditions. Loss of soils may occur as the creek bank continues to erode.

Alternative 2 – Proposed Action:

Under Alternative 2, general construction effects to the geologic setting and soils would be negligible due to the Project Areas already being disturbed by previous development activity. Temporary impacts would occur to construction areas and material staging areas. The areas affected temporarily by construction would be returned to preconstruction conditions and would be revegetated.

Under Alternative 2, permanent impacts caused by the Trail repairs and bank stabilization would be long-term and beneficial for the soil resources in the Project Areas. The stabilization of the soils would reduce the loss of sediment and topsoil into Marne Creek.

A South Dakota Department of Agriculture and Natural Resources (SDDANR) stormwater construction permit would be obtained, and a Storm Water Pollution Prevention Plan (SWPPP) would be required. Part of the SWPPP would be the requirement for revegetation of the area. In addition,

the use of Best Management Practices (BMPs) such as silt fence, waddles, and mulching would be utilized during construction to reduce soil erosion within disturbed areas.

3.1.2 WATER RESOURCES AND WATER QUALITY

This section presents an overview of water resources within the Project Areas and surrounding area. Factors addressed in this section include surface and groundwater resources.

Surface Water

Surface water is regulated under the Clean Water Act (CWA). In the Project Areas, permanent impacts to waters of the U.S. (Section 404 of the CWA) fall under the jurisdiction of the U.S. Army Corps of Engineers (USACE). Water quality regulation falls under the jurisdiction of the SDDANR. SDDANR regulates both point and non-point pollutant sources, including stormwater and stormwater related runoff. Activities that disturb one acre or more of ground require a SDDANR stormwater construction permit.

The Project Areas include approximately 10,400 linear feet of Marne Creek, classified in all Reaches as a seasonally flooded, intermittent riverine system (R4SBC), except for the southern half of Reach A, which is classified as a permanently flooded, perennial riverine system having an unconsolidated bottom (R5UBH) (USFWS 2021a). Refer to **Figures 3a** through **3e** in **Appendix A: Map and Figures**. During site field reconnaissance, Marne Creek had minimal flow and the water was clear. The streambed consisted of graveled areas with stretches of silt and muck bottoms.

Marne Creek and the adjacent riverine wetlands are likely jurisdictional features and would be subject to CWA permitting action from the USACE. Any fill or effects of a stream below the Ordinary High-Water Mark (OHWM) typically requires a Section 404 and possibly a Section 10 permit. The OHWM is determined by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soils, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas (33 CFR 329.11(a)(1)). For the purpose of this Project, the OHWM for Marne Creek is considered to be the 2-year water surface level as determined from the hydrology and hydraulic (H & H) modeling.

At a minimum, unless otherwise specified in the Administrative Rules of South Dakota (ARSD) Chapter 74:51:03, all streams in SD are assigned the beneficial uses of fish and wildlife propagation, recreation, stock watering, and irrigation. Aside from the beneficial uses assigned to all streams, Marne Creek does not have any other specified beneficial uses (SDDANR 2020, ARSD 74:51:03). However, in a project response letter from SDDANR, due to the close proximity to the Missouri River, SDDANR has classified the Missouri River and Marne Creek for beneficial uses including domestic water supply, warmwater permanent fish life propagation waters, immersion recreation waters, limited contact recreation waters, fish and wildlife propagation, recreation, and stock watering waters, and irrigation waters.

Results returned from a search of the SDDANR Water Quality Monitoring Access Portal revealed five historical water quality sampling locations along Marne Creek in Yankton (SDDANR 2021). In 2019 and 2020, water samples were taken, measuring Total Suspended Solids, Nitrate/Nitrite levels, Total Phosphorus, and E. coli (*Escherichia coli*) bacteria. The results are shown in **Table 2.** No other water quality data for Marne Creek was available.

Groundwater

The Project Areas are underlain by portions of the Lower James-Missouri Aquifer and the Niobrara Aquifer. The Lower James-Missouri Aquifer is a glacial-outwash aquifer with a saturated thickness ranging from 50' to 150', with an average thickness of 100'. The Lower James-Missouri Aquifer receives recharge from seepage from streams and through precipitation infiltration. The water from the aquifer is very hard, predominately a calcium sodium sulfate type with large concentrations of iron, manganese, boron, sulfates, and dissolved solids. Water from this aquifer is used primarily for domestic and agricultural purposes (Bugliosi 1986).

The Niobrara Aquifer is a bedrock aquifer consisting of light gray to black, soft, calcareous shale. It is overlain either by Pierre Shale or glacial-drift deposits and ranges in thickness from zero in areas outside of the Project Areas where the aquifer has been removed by glaciation and erosion, to 250', averaging 100-150' within the Project Areas. Water from the Niobrara Aquifer has large concentrations of iron, manganese, and nitrate. There are areas that can provide adequate quantities of water for domestic use; however, these areas are relatively small, and the quantities usually are not adequate for agricultural or livestock purposes (Bugliosi 1986).

Table 2: Marne Creek Water Quality Data

Station ID/Location	Date	Total Suspended Solids (mg/L)	Nitrate/Nitrite (mg/L) *	Total Phosphorus (mg/L) **	*E.Coli* (#/100 mL) ***
SCYMCHWY50 *(Located in Reach A, south of the Highway 50 bridge)*	10/23/2019	5	1.2	0.154	1850
	11/25/2019	-	-	-	72.7
	08/13/2020	< 3	0.7	0.03	517
SCYMCBRLH *(Located southeast of the eastern most segment of Reach C)*	11/25/2019	-	-	-	64.4
SCYMCBDWY *(Located west of Tripp Park)*	11/25/2019	-	-	-	48.7
SCYMC15ST *(Located north of Reach G at West 15th Street bridge crossing)*	11/25/2019	-	-	-	80.9
SCYMCMALL *(Located in Reach J north of the Yankton Mall)*	10/23/2019	< 3	1.9	0.074	548
	11/25/2019	-	-	-	205

*Parameter criteria for domestic water supply is ≤ 10 mg/L (daily maximum)
**SD does not have a phosphorus standard
*** Parameter criteria for immersion recreation waters are ≤ 235/100mL
- Data was either not collected or not reported

Missouri National Recreational River

The segment of the Missouri River within the Project Areas is located within the MNRR. The MNRR was established by Congress under the Wild and Scenic Rivers Act to protect the natural, cultural, and recreational resources of two remaining free-flowing segments of the Missouri River. The Wild and Scenic Rivers Act Section 7a protects qualified rivers and associated tributaries natural free-flowing conditions. With the goal to keep these segments in as natural a state as possible for the public, now and in the future. The designation was first applied in 1978 and the Project is located within the designated Missouri River segment from Gavins Point Dam to Ponca State Park. The MNRR was assigned the values of cultural, recreational, water quality, and free-flowing qualities. Normally, bank stabilization within the MNRR and at the confluence of tributaries such as Reach A of Marne Creek is limited to allow for the river to remain unencumbered to the highest extent possible. However, on a case-by-case basis, exceptions may be granted with the guidance of best management practices and techniques set forth by the National Park Service (NPS) (NPS 2017).

Alternative 1: No Action

Without the Project, the banks of Marne Creek would not be stabilized; therefore, sediment, turbidity, and suspended solids would continue to degrade water quality. Water quality may be impacted locally, and sediment loading could affect the Missouri River system. Therefore, Alternative 1 would have long-term, negative impacts to water quality due to the contribution of additional sediment loading to Marne Creek and the Missouri River. Alternative 1 would have no adverse or beneficial impacts to groundwater. Groundwater resources would not be used or affected by this alternative.

Alternative 2: Proposed Action

Surface Water

During construction, effects to water quality would be localized, short-term and minor due to soil erosion during instream and work along the banks of Marne Creek.

Alternative 2 would have a long-term beneficial effect to the water quality in Marne Creek. Water quality may be improved locally by preventing further bank erosion and reduced sediment loading to Marne Creek and the Missouri River. Alternative 2 would result in the placement of fill into waters of the US for the stabilization of the banks of Marne Creek. Fill activities specific to each Reach were discussed in **Section 2.2**; impacts to individual Reaches as a result of Alternative 2 are discussed in the following sections.

The majority of the banks in the Reaches are notably eroded and abruptly plunge straight down until converging with Marne Creek. In the specific locations that riprap with bioengineering features is proposed, the eroded banks would be graded to create more gradual slopes for stability. The riprap would be placed to protect against the sheer stress of the creek, while the bioengineering features would encourage natural components such as wood plantings and vegetation to establish root growth for future stabilization. Below the OHWM, the channel would be excised, and riprap and wood plantings would be placed below the current channel grade. Refer to **Table 3** for the area that is below the OHWM. The grading of the channel, placement of woody plantings, and placement of riprap is considered to have a permanent effect to Marne Creek.

In Reaches C and G, select locations GUL-3 and GUL-4, would utilize gabion baskets. One location in Reach C, C-UL1, would utilize TRM. At these locations, minimal grading would occur, and the stabilization method would be incorporated into the existing bank slope to the extent possible. These types of stabilization methods are considered a fill activity below the OHWM, therefore were calculated as a permanent impact. Refer to **Table 3** for the area below the OHWM.

Some locations in Reaches C and G are difficult to access. To access these locations, a temporary river crossing may need to be installed. The temporary river crossing locations and proposed construction would be further determined during final design and during the Section 404 permitting process. Initially, the structure is assumed to be constructed with a culvert, rip rap, and soil to create a crossing that equipment can utilize.

Coordination with the USACE would occur as final design proceeds. A summary of the impacts is noted in **Table 3**.

Impacts occurring to wetlands located between the 2-year and 10-year water surface levels are discussed in **Section 3.2.2**. Yankton would apply for a CWA 404 Permit and Water Quality Certification under Section 401 of the CWA in conjunction with the CWA 404 Permit. The coordination process, conditions, mitigation, and specific requirements associated with the water quality certification and 404 permit would be incorporated to avoid and minimize impacts to water quality. As discussed through preliminary coordination discussions with the USACE, an individual permit for the Project would likely be required and pursued.

Table 3: Summary of Activities below the OHWM

Reach	Proposed Stabilization	Linear Feet of Stabilization	Permanently Impacted Area (acre)
A	Riprap	2,930.15	0.30
B	Riprap	1,613.62	0.61
C	Riprap and TRM	1,200.63	0.31
G	Riprap and Gabions	1,035.26	0.19
J	Riprap	277.00	0.02
	Total	**7,056.66**	**1.43**

A construction storm water permit authorization would be obtained from SDDANR, defining BMPs for erosion prevention and sediment control. In compliance with the SDDANR general permit, a SWPPP, outlining storm water protocols and BMPs would be developed, and maintained to isolate the construction sites and minimize adverse effects of soil loss and sedimentation on soil and water resources. Site-specific BMPs would be implemented, which include detaining storm water runoff, erosion prevention methods, sediment control measures, spill response protocols, employee training, and good housekeeping practices on the construction site.

Special construction measures to include BMPs to control erosion and prevent sedimentation in the Project Areas would be required to ensure the 30-day average total suspended solids criterion of 90 mg/L and the daily maximum total suspended solids criterion of 158 mg/L are not violated.

Groundwater

Alternative 2 is not anticipated to have any short- or long-term negative impacts on groundwater resources. Construction activities and the long-term effects of the Trail repairs and bank stabilization would not impact underlying aquifers. No groundwater would be utilized, and no wells would be installed.

Missouri National Recreational River

A coordination letter was sent to the NPS on November 1, 2021, for comment on the proposed bank restoration under Alternative 2. The letter details a summary of the proposed project in six separate reaches of the Trail Repair and Marne Creek Bank Stabilization. A preliminary response letter from the NPS regarding the proposed Trail Repair and Marne Creek Bank Stabilization was received on May 13, 2022. The preliminary response letter details that the Project as designed originally in Reach A may have a direct and adverse effect on the Missouri River's established values. These preliminary details of potentially direct and adverse effects are what prevents NPS from consenting to the originally proposed Project.

A coordination meeting was held May 24, 2022, to discuss the preliminary response letter with NPS. A response letter was sent to NPS on June 3, 2022 to demonstrate the revision of the proposed bank stabilization under Alternative 2 to comply with Section 7a. The presence of utilities, development and previous riprap in the area was detailed. In addition, the high shear stress of Marne Creek within Reach A requires consideration of riprap. Due to these reasons, the letter requests the use of riprap within Reach A with the following commitments:

- Two locations that were previously noted for bank stabilization were removed from Alternative 2. These areas would not have bank stabilization addressed. Refer to **Figures 2a** and **2b** in **Appendix C, Agency Correspondence** for the specific areas. **Figure 2b** notes the areas that would be addressed under Alternative 2.
- The other proposed bank stabilization areas in Reach A would remain and were revised to follow the MNRR guidance provided:
    - Use of field stone or native rock for the riprap material.
    - The implementation of natural vegetation coverage from the 2-year to the 10-year surface water mark. Vegetation composition consists of a mix of forbs, grass, and smaller diameter trees. All species considered are native species of this area. A granular material would be implemented to fill the void between the riprap and better support plant growth above the rock.
    - To meet the expectation of riprap material within permit conditions from the NPS, the originally proposed quarried pink quartzite would be substituted with field stone or native rock. A minimum of 12-14 inches of soil would cover the top surface of the field stone below the 10-year water surface line and above the 2-year water surface line.

On June 16, 2022, NPS responded with a preliminary response letter noting the agency's response to the revisions to Alternative 2 were positive. The incorporation of native species and field stone for riprap is in line with meeting Section 7a. Final plans should be submitted to NPS for their official determination during the Section 404 permitting process. Refer to **Appendix C: Agency Correspondence** for all correspondence.

3.1.3 FLOODPLAIN MANAGEMENT (EXECUTIVE ORDER 11988)

EO 11988 (Floodplain Management) requires federal agencies to avoid to the extent possible the short-term and long-term adverse impacts associated with the occupancy and modification of the floodplain. Also, federal agencies must avoid direct or indirect support of floodplain development whenever there is a practicable alternative. EO 11988 requires federal agencies to take action to minimize occupancy and modification of the floodplain. Specifically, EO 11988 prohibits federal agencies from funding construction in the 100-year floodplain unless there are no practicable alternatives. FEMA's regulations for complying with EO 11988 are promulgated in 44 CFR Part 9.

A Flood Insurance Rate Map (FIRM) for Yankton shows that the Project Areas are within designated Zone AE which includes the regulated floodway and 100-year floodplain (FEMA 2021). Refer to **Figures 4a** through **4e** in **Appendix A: Map and Figures**. Any construction activities within these boundaries must, therefore, comply with local, state, and federal floodplain regulations. FEMA uses an eight-step decision-making process to evaluate potential effects on, and mitigate impacts to, floodplains in compliance with EO 11988. Refer to **Appendix B: Floodplain and EO 11990 Eight-Step Documentation for the Eight-Step Decision Making Process**.

Alternative 1 – No Action:

Under Alternative 1, negative impacts to floodplains would occur. If the banks are not stabilized, additional erosion would occur. Marne Creek and its floodplain would remain unstable causing damage to the infrastructure within and adjacent, resulting in long-term effects to Yankton.

Alternative 2 – Proposed Action:

Alternative 2 would occur within designated Zone AE regulated floodway and floodplain. Within Zone AE, the Base Flood Elevation (BFE) has been determined. H & H modeling was conducted to determine the effect of Alternative 2. Based on the modeling effort, a "No-Rise" determination was confirmed, which means that there would not be an increase in flood elevation from the proposed action. Moreover, the proposed design should not adversely affect the floodplain storage or the flow of water within the floodplain system.

The local floodplain administrator is a Yankton administrator and has concurred with the "No-Rise" determination, issuing a floodplain permit for this Project. Yankton must comply with any conditions of the required floodplain permit. Refer to **Appendix C: Agency Correspondence** for the floodplain permit and coordination documentation with the floodplain administrator.

3.1.4 AIR QUALITY

The Clean Air Act (CAA) requires the U.S. Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The CAA established two types of national air quality standards: primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly; secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. Current criteria pollutants are Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Ozone (O3), Lead (Pb), Particulate Matter (PM10), and Sulfur Dioxide (SO_2).

The primary regulatory authority for air quality in SD is the SDDANR Air Quality Program. Areas are designated as "attainment," "non-attainment," "maintenance," or "unclassified" with respect to meeting the established NAAQS for identified pollutants. Regions that are in compliance with the standards are designated as attainment areas. Areas that do not meet the NAAQS for a pollutant are designated a non-attainment area for that pollutant. Currently, SD does not have any non-attainment areas (EPA 2021).

Alternative 1 – No Action:

Under the No Action Alternative, temporary or permanent air quality impacts would not occur.

Alternative 2 – Proposed Action:

Under Alternative 2, impacts to air quality during construction would be negligible. Construction would result in short-term emissions of NO_2, O_3, and CO as a result of equipment use (e.g., front end loaders, backhoe, haul trucks, and trailers). Ground disturbance from land clearing, grading, and general construction would generate dust. Dust emissions would be higher during site preparation activities and would vary from day to day, depending on construction phases, level of activity, and weather conditions. Mitigation of fugitive dust, if necessary, can be accomplished by periodic watering of the demolition site. During construction, traffic would increase to and from the site from the construction workers and hauling of materials. The increase in traffic could result in a slight increase in emissions in the vicinity of the Project Areas, however, the temporary increase in equipment exhaust is expected to be negligible as long as the equipment is well maintained, and idling is minimized.

Under Alternative 2, no lasting effect to air quality would occur from the Trail repair and bank stabilization of Marne Creek.

3.2 BIOLOGICAL ENVIRONMENT

3.2.1 TERRESTRIAL AND AQUATIC ENVIRONMENT

The Project Areas are located within Yankton, primarily on Yankton-owned parcels. Portions of the Project Areas do occur on private or state-owned lands. Vegetation in the Project Areas largely consists of mowed Kentucky bluegrass (*Poa pratensis*) and smooth brome grass (*Bromus inermis*). Trees present in the area include green ash (*Fraxinus pennsylvanica*), walnut (*Juglans nigra*), cottonwood (*Populus deltoides*), blue spruce (*Picea pungens*), eastern red cedar (*Juniperus virginiana*), American elm (*Ulmus americana*), and various willow species (*Salix sp*.). Aquatic resources in the Project Areas consist of riverine wetlands which line portions of the banks of Marne Creek, Marne Creek, and the Missouri River. Marne Creek flows into the Missouri River in Reach A of the Project Area. Vegetation species common within the riverine wetland areas include reed canary grass (*Phalaris arundinacea*), common reed (*Phragmites sp*.), ragweed (*Ambrosia artemisifolia*), cannabis (*Cannabis sativa*), cattail (*Typha x. glauca*), smartweed (*Persicaria pensylvanica),* and stinging nettle (*Urtica dioica*), with reed canary grass and smartweed being the dominant species throughout the Project Areas (Banner 2020).

The Project Areas are in the James River Lowland Ecoregion of the Northern Glaciated Plains. The James River Lowland is a glaciated area, with level to slightly rolling plains composed of glacial drift

and dense concentrations of temporary and seasonal wetlands. Although western wheatgrass (*Pascopyrum smithii*), green needlegrass (*Stipa viridula*), big bluestem (*Andropogon gerardii*), and blue grama (*Bouteloua gracilis*) were once prevalent, the area is now extensively tilled for spring wheat, sunflowers, corn, and soybean production (EPA 2022).

Within Reach A and portions of Reach B, small portions are developed properties with the remainder being open area or designated parkland. Scattered riverine wetland areas are present adjacent to the creek, and bank erosion is visible. Despite the eroded banks, the upland areas were generally vegetated. In Reach A, the Trail is located on both the east and west sides of the creek. A portion of the Trail on the east side has been damaged and is not usable. A temporary gravel Trail has been constructed immediately to the east in this area, allowing for continued use of the Trail system. Reach A is the largest of the Reaches and is utilized primarily as open space by Yankton. Yankton utilizes the area for infrastructure with the adjacent Wastewater Treatment Facility and the Yankton Street Department's material stockpile located within the Reach.

The Trail segment in Reach B has sustained the most damage and has become unusable. A temporary gravel trail has been constructed to the west of the location of the Trail. The banks in this Reach are severely eroded on the west side. On the east side, the banks are generally tree-lined and vegetated, but are also steep-sloped, and erosion can be observed. Rotary Nature Area is located in the northern area of Reach B, south of the creek and offers users a gazebo, maintained grass, and open recreational space. The Yankton Transit parking lot is located within Reach B, as is the Yankton Water Fill Station. Buried storm water and sewer lines, as well as associated manholes, are present. The north bank of Marne Creek in Reach B is tree-lined and vegetated. Marne Creek in the western portion of the Reach has riprap lined banks.

Within Reach C, the banks are minimally vegetated with mature trees located on both sides of the creek. Erosion is present and in some segments are largely devoid of vegetation. Land use adjoining Reach C is largely residential in nature with Webster Elementary School and playground located in the western segment of the Reach. Due to the residential and school uses in the Reach, the terrestrial environment within the Reach is composed largely of manicured lawns, asphalt roadways, ornamental trees and shrubs, and riparian vegetation and trees immediately adjacent to the creek. The creek in this area ranges from graveled bottoms with only inches of water present to deeper pools and heavily sedimented substrate.

Reach G is located adjacent to Morgen Park. The terrestrial environment of the Reach largely consists of maintained trees and manicured lawns on the south and west side of the creek adjacent to Morgen Park. East and north of the creek is a riparian area with no structures present. South of the creek on the eastern end of the Reach, adjacent property owners utilize a semi-riparian area for storage of campers, trailers, cars, and other miscellaneous property. This area appeared to not receive routine maintenance and mowing, but evidence of those practices could be seen. Lining the west bank for approximately 40 feet is a wall of rock gabion baskets. The creek banks are relatively well vegetated in this reach, and the creek generally had graveled substrate and was 6 to 12 inches deep.

Reach J is located adjacent to a commercial development, the Yankton Mall and parking lot. Given the land use of the area, the terrestrial and aquatic environments have been heavily disturbed. After crossing 23rd Street to the south, Marne Creek in this area was re-routed years ago to accommodate the parking lot of the mall. The creek now makes a sharp 90-degree bend after passing 23rd Street,

and then makes another 90-degree bend before heading south. The aquatic and terrestrial habitats in this reach are minimal. High flows have eroded the banks of the creek, which are largely devoid of vegetation. During the site visits, this Reach of the creek was dry.

In a more natural setting, stream banks and shorelines provide physically dynamic and complex habitats that host diverse species. Human influence and the presence of a stream within City limits makes these sites physically more uniform and reduces species diversity. Alternative 2 mainly occurs in developed areas that have been altered to some degree. However, riparian areas and shorelines even in developed areas have characteristics that make these areas attractive to both transient and resident wildlife. Smaller minnow species were observed in deeper pools in Reach C, and larger fish species were observed in Reach A near the confluence with the Missouri River. Since 2017, fish survey data have been collected within Marne Creek in Yankton by Mount Marty College. Common fish species have been collected throughout the creek, including: river shiner (*Notropus blennius),* creek chub (*Semotilus atromaculatus),* central stoneroller (*Campostoma anomalum)*, johnny darter (*Etheostoma nigrum)*, white sucker (*Catostomus commersonii)*, largemouth bass (*Micropterus salmoides)*, fathead minnow (*Pimephales promelas)*, common shiner (*Luxilus cornutus)*, common carp (*Cyprinus carpio)*, green sunfish (*Lepomis cyanellus*), shortnose gar (*Lepisosteus platostomus)*, grass carp (*Ctenopharyngodon Idella)*, river carpsucker (*Carpiodes carpio)*, bigmouth buffalo (*Ictiobus cyprinellus)*, bluegill sunfish (*Lepomis macrochirus)*, sauger (*Sander canadensis)*, brook stickleback (*Culaea inconstans)*, channel catfish (*Ictalurus punctatus)*, black bullhead (*Ameiurus melas)*, red shiner (*Cyprinella lutrensis)*, orange-spotted sunfish (*Lepomis humulis),* emerald shiner (*Notropis atherinoides)*, northern pike (*Esox Lucius)*, and walleye (*Sander vitreus)* (Mount Marty 2021).

Wildlife use aquatic ecosystems and adjacent terrestrial corridors for habitat, for breeding and nesting areas, escape cover, travel corridors, and preferred food sources. Aquatic and terrestrial animals can travel parallel to the shore or river edge to move between similar habitat patches in fragmented landscapes with otherwise sparse natural cover. Wildlife can also move perpendicular to the riparian edge, to and from aquatic and terrestrial habitats, to forage, lay eggs, or even hibernate. Although wildlife can utilize these areas, movement in either direction away from riparian areas often exposes wildlife to threats such as vehicle strike and predation, especially in maintained landscapes with minimum natural cover.

Alternative 1 – No Action:

In the short-term, the Alternative 1 would have minor localized effects on terrestrial and aquatic vegetation, habitat, and wildlife. If erosion continues unabated, sedimentation in the creek may result in impacts to vegetation and aquatic habitats in the Project Areas and in the downstream area of the Missouri River. Sedimentation and siltation of eroding stream banks and adjacent soils may contribute to aquatic habitat loss. Deposition of silt downstream could result in exposed soils on the embankments and locations of sediment accumulations providing opportunity for invasive species to establish.

Alternative 2 – Proposed Action:

During construction, Alternative 2 would require vegetation clearing, causing short-term impacts to aquatic and terrestrial vegetation and habitats which can be reduced through the implementation of the minimization measures outlined below. The bank grading and reshaping would require temporary displacement of existing vegetation and habitats immediately adjacent to the bank.

Construction within wetlands or waters of the U.S. has the potential to temporarily impact resident and transient terrestrial wildlife that use shorelines and riparian areas.

Alternative 2 would have a long-term, beneficial effect to aquatic and terrestrial environments. The banks would be stabilized and replanted to achieve healthier aquatic and terrestrial environments. Vegetation plantings would improve habitat in the long-term by providing shelter, shade, food, cover, and other benefits to terrestrial and aquatic species. A living shoreline, one with actively growing vegetation versus one composed solely of riprap, would provide beneficial impacts to aquatic and terrestrial habitats.

Bank stabilization can inhibit animal movements between habitats, cause the loss or reduction of established habitat, and alter physical habitats, resulting in reduced species richness or diversity. However, the riprap with bioengineering features would cover the riprap with soil and reestablish riparian vegetation on the banks, not cause reductions in aquatic or terrestrial habitats. The level of impact at a given site largely depends on the level of development and human disturbance present at a site. Within the Project Areas, located within the limits of Yankton, the Reaches are heavily influenced by development and human activities. The Project Areas would remain a primary pedestrian transportation corridor within Yankton, and disruptions to terrestrial and aquatic environments would continue to occur with the utilization of the Trail.

Seeding and confirmation of vegetation growth within disturbed areas would be required as part of the SDDANR stormwater construction permit.

3.2.2 WETLANDS (EXECUTIVE ORDER 11990)

EO 11990 (Protection of Wetlands) requires federal agencies to minimize the destruction, loss, or degradation of wetlands, and consider the preservation and enhancement of wetland benefits associated with certain federal actions. FEMA uses an eight-step decision-making process to evaluate potential effects on, and mitigate impacts to, wetlands in compliance with EO 11990. Wetland boundaries were determined by completing a field wetland delineation. Within all Reaches except for the southern half of Reach A, Marne Creek is classified as a seasonally flooded, intermittent riverine system (R4SBC). Within the southern half of Reach A, Marne Creek is classified as a permanently flooded, perennial riverine system having an unconsolidated bottom (R5UBH).

The U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) map for the Project Areas was reviewed for potential wetlands. One lotic (flowing water) feature, Marne Creek, and no lentic (static water) features were identified on the NWI map within the Project Areas. Marne Creek is a direct surface water connection to the Missouri River. Near the confluence with the Missouri River, an oxbow wetland feature is present. Although it was dry at the time of the delineation, it is likely that this oxbow area receives backwater inputs from Missouri River flooding.

A field wetland delineation was completed for the Project Areas on October 13, 2020. Refer to **Figures 3a** through **3e** in **Appendix A: Map and Figures** for the field delineated wetland areas. Within the Project Areas, riverine wetlands were observed adjacent to the banks of Marne Creek in some areas, but in other areas, the banks had been eroded, leaving no fringe wetland or wetland vegetation. One depressional wetland was observed on the eastern-most segment of Reach B on the upland shelf above the creek bed, south of the Yankton Transit building. Refer to **Figure 3b**. The exact source of the water could not be determined. A pipe outlet leading from the wetland could be seen

protruding from the eroded creek bank, likely subsurface tile drainage from adjacent development, and was discharging water into Marne Creek at the time of the delineation.

Approximately 7,057 linear feet of Marne Creek, defined in the report as a Waters of the US (WOTUS) is located within the Project Areas. The riverine wetlands, approximately 1.95 acres, are determined to be likely jurisdictional features under the CWA Section 404 regulations. The depressional wetland located in the eastern-most segment of Reach C was 0.75 acres in size, and although it flows into Marne Creek by artificial means, would likely flow into the creek naturally if not diverted through a pipe. This wetland is likely jurisdictional.

Alternative 1: No Action

Under Alternative 1, no direct impacts to wetlands would occur. However, negative long-term impacts may occur if no action is taken. With continued creek migration and bank incising, Marne Creek would continue to have eroded banks and effects to its channel stability. Also, the lack of stability within the damaged Reaches would likely prevent the establishment of wetlands along the edge of the creek.

Alternative 2: Proposed Action

Under Alternative 2, the proposed bank stabilization would have a long-term beneficial effect to Marne Creek and its riverine wetlands. The reshaping and reinforcement of the banks of Marne Creek would create more conducive near-bank flow velocities along the creek's edge, creating conditions that promote fringe wetland formation. Over time, sediment may fill in between the rocks of the riprap below the 2-year water surface, creating favorable growing conditions for hydrophytic vegetation. Although the actual acreage cannot be estimated at this time, riverine wetland is anticipated to establish in these areas. Above the 2-year water surface, soil would be placed above the riprap and vegetated, promoting the establishment of wetland and upland vegetation.

Initial coordination with USACE has occurred for this Project and would continue throughout as design is finalized. Impacts occurring to OWUS below the OHWM, noted as the modeled 2-year water surface levels, were previously discussed in **Section 3.1.2**. Impacts occurring to wetlands were calculated by comparing the proposed design within the field delineated wetland boundaries. For the riprap areas with bioengineering features, the area of impact was considered permanent within the wetland areas. This assumption is a conservative assumption of impacts since wetland areas could reestablish due to the incorporation of soil placed over the riprap and vegetation plantings. For the proposed TRM and gabion areas, the wetland areas were calculated as permanent impact. A summary of these impacts can be found in **Table 4**.

To comply with EO 11990, the FEMA Eight-Step Planning Process for Floodplains and Wetlands has been completed. Since the wetlands within the Project Areas are jurisdictional, the consideration of mitigation would occur during the Section 404 permitting process. The documentation for this process can be found in **Appendix B: Floodplain and EO 11990 Eight-Step Documentation**.

It is anticipated that the delineated wetlands within the Project Areas would likely be jurisdictional and any work occurring in these resources would require a Section 404 permit. A nationwide permit exists for bank stabilization with a limit of linear length of 500 feet. Therefore, Alternative 2 would likely require an individual permit due to the length of stabilization required. As the design is finalized, if the wetland impact areas would be confirmed during the 404 permitting process and

coordination with FEMA for EO 11990. Mitigation may be required and would be anticipated to be purchased through a local approved wetland mitigation bank.

Table 4: Wetland Permanent Impacts

Reach	Proposed Stabilization	Permanently Impacted Area (acres)
A	Riprap with Bioengineering Features	0.10
B	Riprap with Bioengineering Features	0.04
C	Riprap with Bioengineering Features and TRM	0.03
G	Riprap with Bioengineering Features and Gabions	0.03
J	Riprap with Bioengineering Features	0.04
	Totals	**0.24**

3.2.3 THREATENED AND ENDANGERED SPECIES

The Endangered Species Act of 1973 (ESA) provides for the conservation of ecosystems upon which threatened and endangered species of fish, wildlife, and plants depend. Current federally listed threatened and endangered species within the Project Areas were obtained from the USFWS's Information, Planning, and Conservation (IPaC) System (USFWS 2021b). The IPaC report listed the northern long-eared bat (*Myotis septentrionalis*), piping plover (*Charadrius melodus*), red knot (*Claidris canutus rufa*), whooping crane (*Grus americana*), pallid sturgeon (*Scaphirhynchus albus*), Higgins eye pearlymussel (*Lampsilis higginsii*), scaleshell mussel (*Leptodea leptodon*), monarch butterfly (*Danaus plexippus*), and the western prairie fringed orchid (*Platanthera praeclara*). Critical habitat for the piping plover exists in the Project Areas. This information is summarized in **Table 5.**

Table 5: Federally Listed Species and Designated Critical Habitat

Species	**Status**	**Species Habitat Present in Project Areas**		**ESA Determination**
		Yes	No	
Northern Long-eared Bat	Threatened	X		May affect, not likely to adversely affect
Piping Plover	Threatened		X	May affect, not likely to adversely affect
Red Knot	Threatened		X	No Effect
Whooping Crane	Endangered		X	No Effect
Pallid Sturgeon	Endangered		X	May affect, not likely to adversely affect
Higgins Eye Pearlymussel	Endangered		X	No Effect
Scaleshell Mussell	Endangered		X	No Effect
Monarch Butterfly	Candidate	X		No Effect
Western Prairie Fringed Orchid	Threatened		X	No Effect
Critical Habitat		**Yes**	**No**	**Notes**
Piping Plover	Threatened		X	No Effect

Additional Information was gathered from the South Dakota Department of Game, Fish and Parks (SDGFP), which maintains the South Dakota Natural Heritage Database (SDNHD), a database that allows locations and related information on rare species to be entered and shared for environmental

review and conservation purposes (SDGFP 2022). SDGFP maintains a list of documented state-listed threatened or endangered species by County. According to that list, there are seven state endangered or threatened species that have been documented in Yankton County, including the sicklefin chub (*Macrhybopsis meeki*), sturgeon chub (*Macrhybopsis gelida),* eastern hognose snake (*Heterodon platirhinos*), and the false map turtle (*Graptemys pseudogeographica).* In addition to being federally listed, the pallid sturgeon, interior least tern, and piping plover are also state listed species (SDGFP 2016).

Suitable habitat for the northern long-eared bat was observed within the Project Areas and consisted of mature trees with peeling bark or dead snag trees. Directly downstream of Reach A is an area of the Missouri River that contains suitable habitat for the pallid sturgeon and critical habitat for the piping plover (USFWS 2019). The ESA effect determination conclusions are also listed in **Table 5**.

SDGFP response letter dated January 24, 2022, states a review of the SDNHD found multiple 2020 records of False Map Turtle (*Graptemys pseudographica;* state threatened species*)* that were captured along the Missouri River from the US 81 Bridge, downstream to the County line. See below work in or near the Missouri for mitigation measures for the False Map Turtle.

Alternative 1 – No Action:

Under Alternative 1, continued bank erosion would cause suitable habitat trees for the northern long-eared bats to be lost.

Alternative 2 – Proposed Action:

FEMA Region 8 has a standing Programmatic Biological Opinion (PBO) with the U.S. Fish and Wildlife Service entitled "Programmatic Implementation Framework for Endangered Species Act Compliance in South Dakota (2019-2024)" signed December 17th, 2019. Utilizing this consultation and conditional upon the implementation of the required minimization measures listed below, FEMA has made a "Not Likely to Adversely Affect" determination for the northern long-eared bat (Myotis septentrionalis), piping plover (Charadrius melodus), and pallid sturgeon (Scaphirhynchus albus) for the Proposed Action Alternative. The monarch butterfly is a candidate species that may utilize the grassed and riparian areas adjacent to Marne Creek, in which scattered milkweed (*Asclepias sp.)* plants were observed. Milkweed is the only food source of monarch caterpillars (USDA 2022). A candidate species receives no statutory protection under the ESA; instead, the USFWS encourages cooperative conservation efforts for candidate species because they are, by definition, species that may warrant future protection under the ESA (USFWS 2017).

The following are required minimization measures to be incorporated into the final design and carried through construction for the Proposed Action Alternative for this project to be in compliance with the PBO:

TREE REMOVAL

- Tree removal to occur in a time frame from November 1st to April 14th, outside the active maternity and pup- rearing season of the northern long-eared bat.

WORK IN OR NEAR THE MISSOURI RIVER

- Project activities (including heavy equipment, pile driving, etc.) operating on the shorelines or banks of the Missouri River, or from barges or temporary work decks within the floodplain, must remain a minimum of 0.5 mi from occupied Piping Plover nesting habitat from April 1 – August 31.
- No blasting may be conducted within 1 mi (1.6 km) of occupied Piping Plover nesting habitat from April 1 – August 31.

GENERAL CONDITIONS

- A1. Avoid unnecessary ground disturbance in riparian and upland habitats and minimize work in the water to the extent possible.
- A2. Limit removal of existing vegetation and revegetate with native plant species.
- A3. Implement appropriate best management practices to control, erosion, sedimentation, invasive species, contamination, fuel spills, etc.
- A4. Obtain and comply with all required federal, tribal, state, and local permits, and project approvals (e.g., FEMA, USACE, USFWS, SDDANR, etc.)
- A5. The project area shall be kept clean and free from discarded material.
- A6. Above-ground fuel storage tanks repaired, replaced, or installed in the flood plains of rivers that may be inhabited by pallid sturgeon shall be diked, curbed or other suitable means provided to prevent the spread of liquids in case of leaking in the tanks or piping. Such dike, curbed area or device shall have a capacity at least equal in volume to that of the tanks plus 10 percent.

TEMPORARY WATER DIVERSIONS AND COFFERDAM CONDITIONS:

- B1. Construction activities within the Missouri River must be completely separated from the active channel by use of a Temporary Water Barrier or cofferdam.
- B2. Sheet pile for Temporary Water Barriers and cofferdams shall be installed using vibratory technology and in-place/initially de-watered prior to ice up if winter work is planned.
- B3. Dewatering of the workspace (within the Temporary Water Barrier/cofferdam must be accomplished as follows:
    - Water in the chamber will be gradually released to allow visual inspection to determine if fish have been stranded in the workspace. In the unlikely event that a pallid sturgeon or other fish are present, the downstream sheet pile should be removed to allow the pallid sturgeon and/or other to escape naturally, without handling. The sheet pile may be reinstalled (vibrated back into place) once the chamber has been flushed and cleared.
- B4. Unrestricted fish passage (in the active channel of the Missouri River) must be provided at all times around the workspaces.
- B5. For repairs to existing permanent road crossings, use of a span bridge with fewer in-water piers are more favorable towards enhancing and promoting more natural river channel processes.

WATER INTAKE AND PUMPING CONDITIONS:

- C1. Intake screens with a mesh opening of ¼ inch or less shall be installed, inspected annually, and maintained.
- C2. Johnson intake screens: the maximum width between wires shall not exceed 1/8 in.
- C3. Water velocity at the intake screen shall not exceed ½ foot per second.
- C4. Only submerged intakes shall be used in all other river segment that may be inhabited by adult and juvenile pallid sturgeon. Submerged intakes shall be installed in accordance with the following criteria.
    - At the beginning of the irrigation season, the intake shall be placed at least 20 vertical feet below the existing water level.
    - The intake shall be elevated 2 to 4 feet off the bottom.
    - If the 20-foot depth is not attainable, then the intake velocity shall be limited to ¼ foot per second, with intake placed at maximum practicable attainable depth.
- C5. Pumping plant sound levels shall not exceed 75 decibels dB at 50 feet.

Based on SDGFP response letter received January 24, 2022, and coordination with SDGFP regarding impacts to State species of interest includes measures and guidelines to avoid or minimize potential impacts to wildlife, including migratory birds, raptors, and False Map Turtle. To avoid and minimize potential impacts to biological resources, the Proposed Action Alternative should implement conservation measures provided by SDGFP to the extent possible. Conservation measures include:

- Locate access routes, staging areas, etc. within previously disturbed areas.
- Avoid disturbing or burying any existing riparian (streamside) habitat.
- Implement local BMPs for control of erosion and sedimentation.
- Restore any disturbed areas using native riparian plant species to prevent erosion.
- Integrate native vegetation into rip rap slope protection.
- Avoid fragmenting or isolating riparian corridors or wetlands.
- Disturbance to riparian and wetland areas should be kept to absolute minimum.
- If riparian vegetation is lost it should be quantified and replaced on site. Seeding of indigenous species should be accomplished immediately after construction to reduce sediment and erosion.
- A site-specific sediment and erosion control plan should be part of the project.
- A post construction erosion control plan should be implemented in order to provide interim control prior to re-establishing permanent vegetative cover on the disturbed site.
- Stream bottoms impacted by construction activities should be restored to pre-project, it should not be conducted during fish spawning periods. Most spawning occurs April, May, and June.
- False Map Turtles nest May and June, with eggs hatching two months later. To avoid impacts to False Map Turtles, recommend completing portion of the project that is immediately adjacent to the Missouri River confluence outside of the nesting season, which typically runs May through August.

3.2.4 MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) of 1918 provides a program for the conservation of migratory birds that fly through the United States (US). The lead federal agency for implementing the MBTA is USFWS. The law requires federal agencies to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any migratory birds or result in the destruction or adverse modification of designated critical habitat of such species. The law makes it illegal for anyone to "take," possess, import, export, transport, sell, purchase, barter or offer for sale, purchase, or barter, any migratory bird, or their parts, feathers, nests, or eggs. "Take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities."

In South Dakota, there are several bird species that traverse the state, rear young, or use stop-over habitat. According to the USFWS IPaC results, the following migratory birds are of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention within the project location, this is not a complete list of all MBTA protected birds that may utilize the Project Areas:

- American Golden-plover (*Pluvialis dominica*)
- Bald Eagle (*Haliaeetus leucocephalus*)
- Black Tern (*Chlidonias niger*)
- Bobolink (*Dolichonyx oryzivorus*)
- Clark's Grebe (*Aechmophorus clarkia*)
- Eastern Whip-poor-will (*Antrostomus vociferus*)
- Franklin's Gull (*Leucophaeus pipixcan*)
- Hudsonian Godwit (*Limosa haemastica*)
- Le Conte's Sparrow (*Ammodramus leconteii*)
- Lesser Yellowlegs (*Tringa flavipes*)
- Marbled Godwit (*Limosa fedoa*)
- Red-headed Woodpecker (*Melanerpes erythrocephalus*)
- Ruddy Turnstone (*Arenaria interpres morinella*)
- Rusty Blackbird (*Euphagus carolinus*)
- Short-billed Dowitcher (*Limnodromus griseus*)
- Sprague's Pipit (*Anthus spragueii*)
- Willet (*Tringa semipalmata*)
- Wood Thrush (*Hylocichla mustelina*)

During the field reconnaissance by a biologist with Banner Associates, red-headed woodpeckers were observed in the oxbow area in Reach A. Although not listed in the above list as a migratory bird or a bird of conservation concern, evidence of barn swallows (*Hirundo rustica*) was observed under the SD 50 bridge between Reaches A and B. If nests, nesting birds, or birds are destroyed or disturbed due to the project, this would be a violation of the MBTA.

Alternative 1 – No Action:

No short-term negative impacts are anticipated under Alternative 1 because no activities related to this alternative would impact existing species or habitat. Long-term negative impacts may occur if

erosion of the creek bank continues and additional trees, aquatic habitat, and terrestrial habitat is lost.

Alternative 2 – Proposed Action:

Alternative 2 would have a negligible impact to migratory birds. Construction activities may temporarily displace migratory birds within the Project Areas, but given the location of the Project Areas, suitable habitat for feeding, nesting, and roosting is prevalent along the Missouri River corridor as well as within other areas in Yankton. Red-headed woodpeckers were observed in the Project Areas. Precautions would be taken to avoid impacting migratory birds and their nests during construction activities, including tree removal outside of the nesting season and/or avoidance of areas where visible, active nests are located. No improvements to SD 50 bridge are proposed as part of Alternative 2; therefore, no direct impacts to barn swallow nests are anticipated.

Construction of Alternative 2 is anticipated to occur during the fall season—outside of the nesting season of migratory birds in the Project Areas—which occurs between May 1st and August 15th. To minimize impacts to migratory birds, the USFWS, as part of their Nationwide Standard Conservation Measures for Migratory Birds (USFWS 2022), recommends to:

- Clearly define Project boundaries and staging areas.
- Maximize use of disturbed land for Project activities (siting, lay-down areas, and construction).
- Implement standard soil erosion BMPs that are required as part of the SDDANR stormwater construction permit.
- Schedule vegetation removal, trimming, and grading of areas that are potential habitat for migratory birds outside of the peak bird breeding season to the maximum extent practicable. Cutting or clearing of trees or shrubs should occur between August 16th and April 30th to remove potential nesting surfaces prior to project commencement.

If the construction timeframe changes and construction would be proposed within the nesting season of migratory birds, surveys for migratory birds would occur in suitable areas that have not been mowed or cleared 5 days prior to construction to determine if there are active nests. The surveys would be conducted by a biologist. If impacts to migratory birds may occur, as defined by MBTA, then FEMA would consult with USFWS prior to the start of construction.

Long-term beneficial effects due to the bank stabilization are anticipated due to the protection of the aquatic and terrestrial habitat along Marne Creek.

3.2.5 BALD AND GOLDEN EAGLES

The Bald and Golden Eagle Protection Act (BGEPA)(16 U.S.C. 668-668c), enacted in 1940, and amended several times since, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald or golden eagles, including their parts (including feathers), nests, or eggs. The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." Regulations further define "disturb" as “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding,

feeding, or sheltering behavior" (50 CFR 22.6). In addition to immediate impacts, this definition also covers effects that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death, or nest abandonment.

In South Dakota, the bald eagle can be a year-round resident or a migratory species. Generally, eagles are observed near larger rivers, such as the Missouri River, and open-water reservoirs where there is an abundant food supply and limited human activity. During the field reconnaissance by a biologist from Banner Associates, there was no evidence of eagles or nest sites; however, some potential foraging and roosting habitat exists in Reach A in the oxbow area and along Marne Creek. Several observations of bald eagles have been recorded along the Missouri River, as well as within the limits of Yankton. One occurrence of a bald eagle was recorded on September 26, 2021, north of Marne Creek in Reach A (ebird 2022a). The nearest golden eagle observations have been recorded in the Chief White Crane Recreation Area and near Gavin's Point Dam as recent as December of 2021, approximately six miles west of Yankton (eBird 2022b).

Alternative 1: No Action

Under Alternative 1, no impacts to eagles would occur.

Alternative 2: Proposed Action

Under Alternative 2, negligible impacts to bald or golden eagles would occur. Suitable roosting habitat exists in the Project Areas, but no nests were observed. It is possible that an eagle may choose to roost or forage out of convenience within the Project Areas. Given the high level of human disturbance in the Project Areas, eagles would likely prefer and utilize other undeveloped areas.

To avoid impacts, a survey for eagles and their nests should be conducted within 660 feet of the work zone approximately one month before construction is scheduled to start. If an eagle nest is identified, appropriate conservation measures based on the National Bald Eagle Management Guidelines would be implemented.

3.3 HAZARDOUS MATERIALS

Hazardous materials and wastes are regulated under a variety of federal and state laws, including the Resource Conservation and Recovery Act (RCRA) of 1976, Comprehensive Environmental Response, Compensation, and Liability Act of 1980, Solid Waste Act (SWA), Toxic Substances Control Act (TSCA), and the CAA of 1970. The standards under the Occupational Safety and Health Act (OSHA) are designed to protect worker health and safety. Evaluations of hazardous substances and wastes must consider whether any hazardous material would be generated by the proposed activity and/or already exists at or in the general vicinity of the site. If hazardous materials are discovered, they must be handled by properly permitted entities. To determine if the Project Areas had preexisting hazardous wastes or materials, a Phase I Environmental Site Assessment (Phase 1 ESA) was conducted, which included background review and field reconnaissance.

No hazardous wastes, superfund sites, voluntary cleanup programs, oilfield activities, brownfield locations, RCRA corrective actions, Tier II facilities, tanks, industrial activities, recognized environmental conditions (RECs), or other similar findings were identified within the Project Areas.

There were two historical recognized environmental conditions (HRECs) that were identified. A HREC is a previous release of hazardous substances or petroleum products affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities and meeting unrestricted use criteria established by the applicable regulatory authority or authorities without subjecting the subject property to any controls (ASTM E1527-21). A past release of hydraulic fluid occurred in Reach G and a past release of herbicide occurred at a fertilizer company, the Mitchell Fertilizer Company, that was previously located in Reach B. Refer to **Figures 5a** through **5e** in **Appendix A: Map and Figures**.

Alternative 1: No Action

No impacts are anticipated as a result of Alternative 1. Hazardous materials would not be generated, stored, or affected.

Alternative 2: Proposed Action

Under Alternative 2, there would be a negligible impact to hazardous materials. No concerns that the Project would be affected by regulated material sites during construction were raised during the completion of the Phase I ESA.

During construction, there would likely be hazardous materials and substances used and potentially stored on site (e.g., fuel, lubricants, etc.). Petroleum products would be appropriately stored, and storage is subject to SDDANR oversight and regulations. Any contamination from construction activities would likely be non-detectable, or if detected, the effects would be slight and localized. Although subsurface hazardous materials are not anticipated to be present, excavation activities could expose or otherwise affect subsurface hazardous wastes or materials.

Spills, drips, and releases would be addressed as part of the SWPPP associated with the SDDANR stormwater construction permit. The following would be noted:

- Unusable equipment, debris, and materials shall be disposed of in an approved manner and location.
- Hazardous materials must be appropriately separated and disposed of in an approved disposal site or landfill.
- Any petroleum products or hazardous materials discovered, generated, or used during implementation of the Project shall be disposed of and handled by the Project applicant in accordance with applicable local, state, and federal regulations.

3.4 SOCIOECONOMICS

This section presents an overview of the alternatives' potential effects to socioeconomic resources. Resources include zoning and land use, visual resources, noise, public services and utilities, traffic and circulation, environmental justice, and safety and security.

3.4.1 ZONING AND LAND USE

The Project Areas are located entirely within Yankton and the current land use is primarily designated as recreation with residential, industrial, retail, and other designations present (City of

Yankton Comprehensive Plan 2003). **Table 6** provides the existing land use, future land use, and current zoning designation in each Reach.

Table 6: Existing Land Use and Zoning in the Project Areas

Reach	Existing Land Use	Future Land Use	Zoning Designation
A	Parks and Recreation, Public Utilities, Agriculture/Open Space, Warehouse/Storage, Industrial, Retail, Vacant	Park, Industrial, Civic	I-1 (Industrial)
B	Parks and Recreation, Industrial, Low Density Residential	Park, Buffer/Open Space, Industrial, Low Density Residential	I-1 (Industrial) R-1 (Multi-Family)
C	Parks and Recreation, Low Density Residential, School	Park, Low Density Residential, Buffer/Open Space, School	B-1 (Local Bus) R-4 (Multi Family) B-2 (Highway Bus)
D	Parks and Recreation	Buffer/Open Space, Mulberry/Douglas Districts	R-4 (Multi Family)
G	Parks and Recreation, Low Density Residential	Park, Buffer/Open Space, Low Density Residential	R-1 (Single Family) I-1 (Industrial) B-1 (Local Bus) R-2 (Single Family)
J	Parks and Recreation, Strip Mall	Mixed Use	B-2 (Highway Bus)

Current land uses in the Project Areas include Parks and Recreation, Public Utilities, Agriculture/Open Space, Warehouse/Storage, Industrial, Retail, Low Density Residential, and Strip Mall. Future land uses remain relatively the same, except for buffer/open space has been added and encompasses the channel of Marne Creek from SD 50 north throughout Yankton. In Reach J, future land use changes to mixed use, which aims to encourage a diversity of uses and activities. Land uses that require further definition are discussed below:

- Parks and Recreation – Parks ideally will serve each individual residential growth center and link to one another, neighborhoods, and major community activity centers. They would be adjacent to trail corridors.
- Public Utilities – Designated land use for utility services including water, wastewater, stormwater, electrical, and other miscellaneous utilities.
- Agriculture/Open Space – Land is generally in agricultural or open space use, with agriculture remaining the principal use. Extension of urban services into the area is unlikely during the foreseeable future.
- Industrial – Provides for a range of industrial enterprises. Industrial sites should be buffered from less intensive use and have direct access to major regional transportation facilities, without passing through residential or commercial areas.
- Retail – For retail stores and businesses.
- Low Density Residential – Restricts land uses, emphasizing single-family detached development, with typical densities ranging from one to six units per acre. Civic uses are generally allowed with special permission for higher intensity uses.

The parks currently in the Project Areas are Morgen Park and Rotary Nature Area. These areas remain as designated park areas in the existing and future land use plans. City of Yankton's

Comprehensive Plan (2003) describes the Trail as a "greenway" and also as the "trunk" in Yankton's trail system, extending from Paddlewheel Point to the proposed future Northwest Multi-use Park. The Trail is largely a continuous path through recreational green spaces fragmented only by road crossings. Coordination occurred with the SD Game Fish and Parks Section 6(f) Coordinator and the Yankton Park Director. Section 6(f) is an applicable protection for recreation areas that have received Land and Water Conservation Funds. The parks and Trail have not received these funds therefore are not protected under Section 6(f). Refer to **Appendix C: Agency Correspondence** for the coordination with the coordinator.

Alternative 1 – No Action:

Under Alternative 1, there would be no short- or long-term effects to zoning, although there may be potential long-term impacts to land use patterns in the Project Areas. The banks of Marne Creek would not be stabilized, which may threaten future land use of the associated park properties and nearby private residences and businesses. The Trail would remain open to users with detours occurring around damaged portions of the Trail. Immediate threats to the existing Trail and adjacent properties would persist. Alternative 1 may result in adverse impacts to pedestrian traffic due to continued Trail maintenance and relocation as the banks continue to erode.

Alternative 2 – Proposed Action:

Alternative 2 would have no short- or long-term effects to zoning and land use patterns in the Project Areas. Alternative 2 is consistent with the current designated zoning and land use practices within Yankton and would not cause a change or a need for change in current or future zoning or land use. Alternative 2 would have a long-term beneficial effect to the park and recreation designated areas by the improvement of the Trail, allowing the residents to have a continuous Trail system adjacent to Marne Creek as a recreational opportunity. Alternative 2 would reestablish the Trail's transportation corridor and provide a finished concrete surface to all portions of the Trail. Safety, mobility, and connectivity would be improved, which would benefit pedestrian traffic for users.

Trail detour routes, if required, would be signed and well-marked to allow for continued Trail usage during construction. Trail closure areas would also be signed and barricaded to prevent the public from accessing an active construction site.

3.4.2 VISUAL RESOURCES

The visual landscape throughout the Project Areas consists of open space associated with the Trail and park systems, residential housing, commercial and industrial businesses, railroad, and a grade school. Currently, portions of the Trail in Reaches A and B are unusable, having collapsed into Marne Creek. Temporary gravel trails have been constructed in the damaged areas, allowing for continued Trail use and continuity.

Alternative 1 – No Action:

Alternative 1 would have long-term negative impacts. The Trail would remain damaged, with displaced concrete sections remaining on the banks of Marne Creek and temporary Trail segments in place. The Trail may continue to collapse into the creek as the banks continue to erode, causing the need for the construction of additional temporary trail segments.

Alternative 2 – Proposed Action:

During construction, Alternative 2 would have negative short-term visual effects in the Project Areas. Within the Project Areas, heavy equipment, construction debris, material stockpiles, and vehicular traffic would be present during construction. Marne Creek and its banks would be temporarily void of vegetation in areas of active construction, and heavy equipment would be present in or near the creek. During construction activities and briefly after construction, the area would not be visually pleasing until vegetation growth occurred.

Reconstructing the Trail and completing bank stabilization activities along Marne Creek would prevent future damages of the Trail and would improve the viewshed within the Project Areas. After the area has been regraded and vegetation growth has returned, Alternative 2 would have long-term positive impacts to the viewshed by returning the creek corridor to its natural appearance.

3.4.3 NOISE

Undesirable sound, or "noise", can be regulated by the Noise Control Act of 1972 (NCA). EPA guidelines recommend the Day-Night Average Sound Level (DNL) not exceed 55 (dB) for noise-sensitive land uses such as residences, schools, and hospitals. Noise levels in rural areas are generally lower than the recommended level, and originate from ambient sources (e.g., wind, weather, wildlife). The Project Areas would have an existing noise level due to existing schools, businesses, industries, residential areas, and roadways.

Alternative 1: No Action

No noise impacts are anticipated under Alternative 1.

Alternative 2: Proposed Action

During construction, a temporary, short-term increase in noise would occur from excavation equipment, back-up alarms, and increased truck traffic from material deliveries. The construction noise would be minimal for Trail users since the gravel trails for detours are further from the banks of Marne Creek. The increase in noise could temporarily affect residents adjacent to the Reaches.

Noise levels after construction would be similar to pre-construction levels and would not increase due to Alternative 2.

3.4.4 PUBLIC SERVICES AND UTILITIES

Webster Elementary School is adjacent to Reach C within the Project Areas. The parking lot of Yankton Transit is also located within Reach C, and the transit building is located immediately adjacent to Reach C. Adjacent to Reach A on Levee Street is Yankton's Wastewater Treatment Facility and Street Department Facility. Portions of the material stockpile used by the Street Department is located within Reach A. Multiple utility crossings exist either in or near the Project Areas, including wastewater, water, storm sewer, electrical, and petroleum pipelines.

Alternative 1 – No Action:

Alternative 1 would have no short-term impacts on public services and utilities. However, due to the proximity and/or crossing of some utilities in relationship to the creek, long-term negative impacts to

utilities may occur. If continued erosion occurs on the creek banks, existing utilities that cross or that are near the creek may become exposed and require maintenance or relocation.

Alternative 2 – Proposed Action:

Alternative 2 would have minimal short-term negative impacts during construction activities. No long-term impacts to vehicular roadways, emergency services, or vehicular traffic would occur. Short-term impacts to traffic may occur during construction due to the presence of construction workers, vehicles, and equipment, but these impacts are anticipated to have only a negligible effect within a city with multiple street and route options. No additional utilities would be needed as a direct result of Alternative 2.

Utility lines would be located and marked prior to construction.

3.4.5 TRAFFIC AND CIRCULATION

The Trail links amenities such as schools, parks, nature areas, picnic areas, and residential areas throughout Yankton, with access being provided at multiple locations along the Trail. **Table 7** provides the streets in Yankton that provide access to the Project Areas.

Table 7: City Streets as Access Points to Project Areas

Reach	Access Point
A	East 4th Street/SD 50, Levee Street
B	East 4th Street/SD 50, East 7th Street, Burleigh Street
C	East Segment - Burleigh Street, Picotte Street, Pearl Street Middle Segment - Pearl Street, East 7th Street West Segment - Mulberry Street, Pearl Street, East 7th Street
G	West 11th Street, Green Street
J	West 23rd Street

Alternative 1 – No Action:

Under Alternative 1, no impacts to vehicular traffic would be anticipated.

Alternative 2 - Proposed Action:

Under Alternative 2, no road closures are anticipated during construction and no adverse long-term impacts are expected to the transportation volume, capacity, and time of vehicular transit.

3.4.6 ENVIRONMENTAL JUSTICE (EXECUTIVE ORDER 12898)

This section discusses environmental justice populations and vulnerable groups, the following discusses the regulations and the populations that are applicable to these individuals.

> Minority and Low-Income Populations- On February 11, 1994, President Clinton signed EO 12898, entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." It is the policy of the Department of Homeland Security (DHS), of which FEMA operates under, to promote the principles of environmental justice through the incorporation in all programs, policies, and activities.
>
> Minority individuals are members of one or more of the following population groups: American Indian or Alaskan Indian or Alaskan Native; Asian or Pacific Islander; Black, not of

Hispanic origin; or Hispanic. A minority population is identified if, 1) the population exceeds 50% of the affected area's population, or 2) the minority population percentage of the affected area is greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. When identifying minority communities, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a geographically dispersed/transient set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect. The selection of the appropriate unit of geographic analysis may be a governing body's jurisdiction, a neighborhood, census tract, or other similar unit that is to be chosen to not artificially dilute or inflate the affected minority population. A minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds (CEQ 1997).

Limited English Proficiency (LEP)- On August 11, 2000, President Clinton signed EO 13166, which requires Federal agencies to examine the services they provide, identify any need for services to those with LEP, and develop and implement a system to provide those services so LEP persons can have meaningful access to them. FEMA follows the DHS policy on language access in the DHS Language Access Plan. It is DHS policy to provide meaningful access for individuals of LEP.

Elderly and Children- Though senior citizens (also referred to as "elderly" at age 65 and above) and children (under age 18) are not specifically defined as EJ populations according to EO 12898, they are considered vulnerable age groups identified in Title VI and related nondiscrimination statutes and should be included in environmental justice analysis. In accordance with EO 13045, Protection of Children from Environmental Health Risks and Safety Risks, each Federal agency shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children, and shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks. Protection and safety of children is discussed in **Section 3.4.7**.

Yankton was selected to represent the populations since the Project is widespread through the city and would affect many residents, not just those directly adjacent. For this project, Yankton, Yankton County, and State of South Dakota were selected for comparison. Minority and low-income populations were identified by comparing U.S. Census data for Yankton, Yankton County, and State of South Dakota (U.S. Census 2022). **Table 8** shows the results of the analysis for Yankton, Yankton County, and South Dakota. No environmental justice populations or vulnerable groups were present.

Table 8: Project Areas Demographics

Demographic Group	City of Yankton		Yankton County		South Dakota	
	Number	Percent	Number	Percent	Number	Percent
Total Population	15,411	100	23,310	100	886,667	100
White alone	14,008	90.9	21,398	91.8	750,120	84.6
White alone, Not Hispanic or Latino	1,345	87.3	2,044	87.7	722,633	81.5
Minority Population Analysis						
Black, Not Hispanic	339	2.2	512	2.2	20,393	2.3
American Indian, Alaskan Native, Not Hispanic	585	3.8	769	3.3	79,800	9.0
Asian, Not Hispanic	308	0.2	2,097	0.9	13,300	1.5
Native Hawaiian or Pacific Islander, Not Hispanic	15	0.1		0.0	886	0.1
2+ Races, Not Hispanic	385	2.5	419	1.8	20,393	2.3
Hispanic or Latino	662	4.3	1,188	5.1	37,240	4.2
Low-Income Population Analysis						
Persons Below Poverty	13.6%		10.4%		11.6%	
Median Household Income	$50,582		$58,342		$50,582	

Demographic Group	City of Yankton		Yankton County		South Dakota	
	Number	Percent	Number	Percent	Number	Percent
Limited English Proficiency Analysis						
Language other than English spoken at home	6.4%		4.3%		6.4%	
Elderly and Children Analysis						
Elderly			16.3%			
Children			22.2%			

Alternative 1 – No Action:

Under Alternative 1, no impact to environmental justice populations or vulnerable groups would occur.

Alternative 2 – Proposed Action:

Alternative 2 would have short-term effects to the residences adjacent to active construction. No environmental justice populations or vulnerable groups were identified, and no population would be disproportionately impacted by the construction of Alternative 2.

Under Alternative 2, the repairs to the Trail and stabilization to the banks in Project Areas would have long-term, beneficial effects on the minority and low-income populations by providing safe, accessible trails to the community.

3.4.7 SAFETY AND SECURITY

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks was issued by President Clinton in 1997. This order directs federal agencies to ensure its policies, programs, activities, and standards address disproportionate environmental health and safety risks to children. The current state of the Trail within Reaches A and B is unsafe. Cement slabs that make up the paved Trail buckled during the disaster event. Heavy, broken cement pieces have fallen into the creek with potential for additional pieces as the bank continues to erode. Signage indicating the area is not accessible has been posted; however, unattended children could access the damaged sections of Trail.

The continued erosion of a few locations along the Reaches could impact infrastructure. A parking lot for a private business within Reach B could potentially be impacted in the future. This would be a safety hazard for the traveling public and users of Rotary Nature Area. The continued erosion in Reach C would impact the BNSF railroad, which is located adjacent to this location, the unstable

ground would affect the rail line by eroding and eventually falling in the creek. This would be a safety hazard to the rail line, residents, and the general public within this area.

Alternative 1 – No Action:

Under the No Action Alternative, the collapsed Trail would remain in the area and continue to be a potential hazard to the public, including children, utilizing the Rotary Nature Area. Erosion would have long-term negative effect on parking lot owned by private business and would be impacted as potential loss. In Reach C, the unstable ground from the continued erosion to the banks would continue to be a safety concern for the BNSF railroad.

Alternative 2 – Proposed Action:

Under Alternative 2, general construction is anticipated to have no effect regarding safety and security in the area due to the incorporation of safety measures required by OSHA during construction.

Alternative 2 would have long term, beneficial effects to safety and security by providing a safe, repaired Trail and stabilizing the eroded banks to prevent further erosion in Project Areas. Potential future impacts to adjacent infrastructure would be prevented to the extent possible by stabilizing the banks of Marne Creek.

To ensure safety measures, construction areas would be secure, and signs would be posted to inhibit public access. Barriers (e.g., fencing) would be placed to prevent public access during construction. To minimize risks to safety and human health, construction activities would be performed using qualified personnel trained in the proper use of the appropriate equipment including all appropriate safety precautions. All activities would be conducted in a safe manner in accordance with the standards specified in OSHA regulations.

3.5 HISTORIC AND CULTURAL RESOURCES

Historical, architectural, archaeological, and cultural resources that would be affected by federally funded/licensed undertakings come under the protection of the NHPA (16 US Code 470), as amended. Section 106 of the NHPA requires federal agencies to consider the effects of such undertakings on properties listed, or eligible for listing, in the National Register of Historic Places (NRHP). Regulations related to this process are described in 36 CFR Part 800, Protection of Historic Properties. In addition to NHPA, many other regulations and EOs exist that protect historic and cultural resources.

The Area of Potential Effect (APE) is the geographic area or areas within which an undertaking may cause changes in the character or use of historic properties or archaeological sites. A potential effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for listing in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Examples of adverse effects include physical damage or alteration of the property, change of the character of the property's use or of physical features within its setting that contribute to its historical significance, and introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features.

Therefore, the APE for historic properties is the area that contains a property that would be acquired or physically disturbed to the extent that its current use may be affected, or that would be significantly visually affected by the alternatives under consideration. For archaeological sites, the APE is the area where the ground could be disturbed as a direct or indirect consequence of the alternatives under consideration.

3.5.1 HISTORIC STRUCTURES

One residence, Structure YK00000976, and associated buildings are found within the APE. The appropriate consultation and evaluation of the structures was completed under a previous HMGP project, and the structures would be demolished before the initiation of this Project. The structure is recommended as not eligible for the NRHP.

Alternative 1 – No Action:

The No Action Alternative would not impact historic structures.

Alternative 2 –Proposed Action:

The Proposed Action Alternative would not impact historic structures. The SD State Historical Preservation Office (SHPO) concurred with the finding of No Historic Properties Affected on February 24, 2022. Refer to **Appendix C: Agency Correspondence**.

3.5.2 ARCHAEOLOGICAL RESOURCES

A Level III survey for the APE was completed in October 2020. As design continued for the Project, the area affected expanded due to the findings of the geotechnical reports. The APE area was expanded and a Level III survey for the expanded APE was completed in November 2021. Based on the project setting, previous disturbances and shovel testing, the potential for buried historic properties within the APE is considered low. A finding of No Historic Properties Affected was recommended within the Level III reports.

Alternative 1 – No Action:

The No Action Alternative would not impact archaeological resources.

Alternative 2 – Proposed Action:

The Proposed Action Alternative would not impact archeological resources. The SD SHPO concurred with the finding of No Historic Properties Affected on February 24, 2022. Refer to **Appendix C**: Agency Correspondence.

3.5.3 TRIBAL COORDINATION AND RELIGIOUS SITES

In accordance with Section 106 of the National Historic Preservation Act, as amended, 36 CFR 800.3(f)(2), FEMA respectfully sent out requests to Tribes for any information related to tribal properties, properties that may have tribal religious or cultural significance, or historic places in the project area. Responses were requested by March 31, 2022, and no comments were received. Refer to **Appendix D: Tribal Correspondence**.

Alternative 1 – No Action:

The No Action Alternative would not impact traditional cultural properties.

Alternative 2 – Proposed Action:

The Proposed Action Alternative would not impact traditional cultural properties. No responses were received from the contacted Tribes.

3.6 COMPARISON OF ALTERNATIVES

Table 9 compares the potential impacts that could result from the alternatives carried forward, which includes Alternative 1- No Action Alternative and Alternative 2- Proposed Action.

Table 9: Summary of Environmental Impacts

Affected Environment	Impacts from Alternative 1- No Action	Impacts from Alternative 2- Proposed Action	Mitigation and/or Commitments
Soils and Geology	No effect.	Short-term, negligible impact to geological setting and soils during construction. Long-term, beneficial effect to soils due to stabilization of Marne Creek banks.	SDDANR stormwater construction permit and use of BMPs would be required.
Water Resources and Water Quality	Banks would continue to be unstable; sediment, turbidity, and suspended solids would continue to degrade water quality in Marne Creek and potentially Missouri River.	Long-term beneficial effect to water quality by stabilizing Marne Creek banks; reducing sediment, turbidity, and suspended soil within Marne Creek and possibly the contribution to the Missouri River. 0.87 acres of permanent impact below the OHWM of Marne Creek for bank stabilization. Total of 4,745.52 feet of stabilization would occur.	SDDANR stormwater construction permit and BMPs would be required. Section 404 permit would be required and potentially mitigation. EO 11990 process and potentially mitigation would be required. Planting of native species and usage of field stone or native rock to comply with Wild and Scenic Rivers Act Section 7a.
Floodplain Management	Negative long-term effect by not stabilizing the bank, affecting the floodplain of Marne Creek.	No rise to the designated floodplain elevations.	Floodplain Development permit to be obtained and all conditions followed

Affected Environment	Impacts from Alternative 1- No Action	Impacts from Alternative 2- Proposed Action	Mitigation and/or Commitments
Air Quality	No effect.	No effect.	Mitigation of fugitive dust by watering down demolition site if necessary. Equipment to be well maintained and idling minimized.
Terrestrial and Aquatic Environment	Minor localized effects on terrestrial and aquatic vegetation, habitat, and wildlife. Long-term impact to aquatic from sediment loading from unstable banks.	Vegetation clearing during construction causing short-term negative impacts to terrestrial vegetation and habitats. Long-term beneficial effect by improving the terrestrial and aquatic environment along the channel and bank of Marne Creek with the bank stabilization proposed.	Seeding and confirmation of vegetation growth within disturbed areas would be required as part of SDDANR stormwater construction permit.
Wetlands	No direct impacts to wetlands. Long-term negative impacts due to erosion and sediment loading of Marne Creek banks not allowing riparian wetlands to reestablish.	Long-term beneficial effects to wetlands due to the regrading and proposed soil layers and vegetation components of the bank stabilization encouraging the reestablishment of riverine wetlands along Marne Creek. 0.27 acres of permanent impact to wetlands for bank stabilization.	SDDANR stormwater construction permit and BMPs would be required. Section 404 permit would be required and potentially mitigation. EO 11990 process and potentially mitigation would be required.

Affected Environment	Impacts from Alternative 1- No Action	Impacts from Alternative 2- Proposed Action	Mitigation and/or Commitments
Threatened and Endangered Species	Long-term negative impact due to continued bank erosion causing suitable habitat trees for northern long-eared bat to be lost.	No effect to, whooping crane, Higgins' eye pearlymussel, scaleshell mussel, monarch butterfly, and western prairie fringed orchid. May affect, not likely to adversely affect the piping plover, pallid sturgeon, and northern long-eared bat.	Tree removal would occur from November 1st to April 14th. Locate access routes, staging areas, etc. within previously disturbed areas. Avoid disturbing or burying any existing riparian (streamside) habitat. Implement local BMPs for control of erosion and sedimentation. Restore any disturbed areas using native riparian plant species to prevent erosion Integrate native vegetation into rip rap slope protection. Avoid fragmenting or isolating riparian corridors or wetlands.
Migratory Birds	Long-term negative effect due to loss of habitat from bank erosion.	Negligible impact to migratory birds during construction. Long-term beneficial effect due to the stabilization of the banks, protecting the aquatic and terrestrial habitats.	Clearly define Project boundaries and staging areas. Maximize use of disturbed land for Project activities. Implement standard soil erosion BMPs that are required as part of the SDDANR stormwater construction permit. Schedule vegetation removal, trimming, and grading of areas that are potential habitat for migratory birds outside of the peak bird breeding season to the maximum extent practicable. Cutting or clearing of trees or shrubs should occur between August 16th and April 30th to remove potential nesting surfaces prior to project commencement.

Affected Environment	Impacts from Alternative 1- No Action	Impacts from Alternative 2- Proposed Action	Mitigation and/or Commitments
Bald and Golden Eagles	No effect.	Negligible impacts to bald and golden eagles would occur during construction and long-term.	A survey for eagles and their nests should be conducted within 660' of the work zone approximately one month before construction. If a nest is identified, appropriate construction measures based on the National Bald Eagle Management Guidelines would be implemented.
Hazardous Materials	No effect.	Would not disturb any known hazardous materials or create any potential hazard to human health.	Spills, drips, and releases would be addressed as part of the SWPPP associated with the SDDANR stormwater construction permit. Unusable equipment, debris, and materials shall be disposed of in an approved manner and location. Hazardous materials must be appropriately separated and disposed of in an approved disposal site or landfill. Any petroleum products or hazardous materials discovered, generated, or used during implementation of the proposed project shall be disposed of and handled by the project applicant in accordance with applicable local, state, and federal regulations.
Zoning and Land Use	Long-term negative impact to the Trail system and recreation areas.	No changes in existing or future zoning or land use are anticipated. Long-term beneficial effect due to the improvement of the Trail, restoring the Trail system for the residents of Yankton.	Trail detour routes, if needed, would be signed and well-marked to allow for continued Trail usage.

Affected Environment	Impacts from Alternative 1- No Action	Impacts from Alternative 2- Proposed Action	Mitigation and/or Commitments
Visual Resources	Long-term negative impacts due to the damage Trail remaining.	Short-term impacts during construction to visual resources from the presence of heavy equipment, bare soils, stockpiled materials, and vehicular traffic. After construction is complete and the Project Areas have revegetated, long-term beneficial impacts would be expected due to the reconstruction of the Trail.	No mitigation or commitments required.
Noise	No effect.	No effect.	No mitigation or commitments required.
Public Service and Utilities	Long-term negative impacts to utilities may occur due to exposure of lines from continued erosion.	Minimal short-term negative impacts during construction to utilities. No impact to public services.	Utility lines will be located and marked prior to project construction.
Traffic and Circulation	No effect.	No effect.	
Environmental Justice	No disproportional effect to environmental justice populations or vulnerable groups.	No disproportional effect to environmental justice populations or vulnerable groups.	No mitigation or commitments required.
Safety and Security	No effect.	Long-term beneficial effects to safety due to reconstruction of the Trail.	No mitigation or commitments required.
Historic Structures	No historic properties affected.	No historic properties affected.	No mitigation or commitments required.
Archaeological Resources	No historic properties affected.	No historic properties affected.	No mitigation or commitments required.
Tribal and Religious Sites	No effect.	No traditional cultural properties affected.	No mitigation or commitments required.

SECTION 4: CUMULATIVE IMPACTS

Cumulative impacts are environmental effects that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor direct and indirect but collectively significant actions taking place over a period of time. A cumulative effects assessment should consider how the direct and indirect environmental effects caused by the proposed action contribute to cumulative effects, and whether that incremental contribution is significant or not. Cumulative impacts should be analyzed in terms of the specific resource being affected and should focus on effects that are meaningful.

Cumulative impacts are most likely to arise when a relationship exists between the proposed action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in proximity to the proposed action in the Project Areas would be expected to have more potential for a relationship than those with a greater distance of separation. Likewise, actions closer in time would be expected to have more potential for a relationship than those with a greater distance of temporal separation.

Past projects contributing to potential cumulative impacts include residential, commercial, and civic developments adjacent to the Project Areas, including single family residences, apartment complexes, the Yankton Wastewater Treatment Facility, Yankton Street Department, commercial businesses, and the school. These developments are typical of a developing and growing city. Reasonably foreseeable future actions within the area include construction and maintenance of roads and bridges, bank stabilization, and utility line activities. The area is heavily developed along the floodplain of Marne Creek surrounding Reaches B, C, G, and J. The land use surrounding Reach A is primarily open space owned by Yankton.

The resources considered in this section had potential impacts due to the Proposed Action if the Proposed Action had no or a beneficial effect the resources was not discussed.

4.1 WATER RESOURCES AND WATER QUALITY

Development has occurred throughout Yankton and the Marne Creek corridor. Wetlands that may have once been present in the floodplain of the creek as it meandered through Yankton have been previously impacted by residential, commercial, civic, or industrial developments. Areas that remain as greenspace adjacent to the creek have been incorporated into Yankton's parks. Additions of impervious surfaces for parking lots and roads have reduced stormwater infiltration along the creek corridor and stormwater drainage flows directly into the creek in multiple locations in Yankton.

Future actions would abide by state and federal permitting regulations with regard to filling of wetlands or stormwater permitting for construction activities, as applicable, which would reduce or eliminate impacts to water resources. The Proposed Action would create new impervious Trail surface, but this area would have negligible impact on the amount of impervious surface already existing in the Project Areas. The Proposed Action would stabilize the banks of Marne Creek, reducing the sediment loading caused by the current erosion into the waterway. Due to this benefit, no cumulative impacts to water resources and water quality are anticipated as a result of the Proposed Action.

4.2 TERRESTRIAL AND AQUATIC ENVIRONMENT

The Marne Creek corridor and associated habitat has been previously transformed into a developed area including streets, parking lots, and buildings associated with residential, commercial, civic, and industrial land uses. Some greenway areas exist in Reaches A, B, and C that are open areas that have been previously disturbed by utility lines. These undeveloped areas have existing, and future land uses associated with parks, greenspace, and utility corridors for Yankton and are likely to remain undeveloped.

The Proposed Action would have short-term adverse impacts on the terrestrial and aquatic environments during construction activities due to tree and vegetation clearing. Species utilizing the areas would be temporarily displaced, however, mitigation measures would be implemented to avoid species' breeding and nesting periods. After construction is complete, long-term beneficial impacts would occur in the Project Areas as the banks are stabilized and sedimentation into the creek system is reduced.

Future actions would abide by state and federal permitting regulations regarding the fill of wetlands or stormwater permitting for construction activities, as applicable, which would reduce or eliminate impacts to the terrestrial and aquatic environments. No cumulative impacts to the terrestrial and aquatic environment are anticipated as a result of the Proposed Action.

4.3 WETLANDS

The Proposed Action would have temporary effects on wetlands in the areas of bank stabilization in the Project Areas. Adverse impacts from the Proposed Action are expected due to the need to clear trees and vegetation from the Project Area in order to install riprap and other bank stabilization methods. After construction is complete, long-term beneficial impacts would occur in the Project Areas as the banks are stabilized and sedimentation into the creek system is reduced.

Future actions would abide by state and federal permitting regulations with regard to filling of wetlands or stormwater permitting for construction activities, as applicable, which would reduce or eliminate impacts to wetlands. No cumulative impacts to wetlands are expected as a result of the Proposed Action.

4.4 THREATENED AND ENDANGERED SPECIES

FEMA has made a "Not Likely to Adversely Affect" determination for the northern long-eared bat, piping plover, and pallid sturgeon, federally listed species, for the Proposed Action Alternative. The Proposed Action would have minimal effects to these species with the incorporation of the minimization measures identified within the PBO. The avoidance of the egg hatching period for the false map turtle, state listed species, immediately adjacent to the Missouri River is anticipated to avoid impacts to the species.

Future actions would abide by ESA and USFWS would concur with effect determinations for federal projects. Private projects would not be able to directly take the species. No cumulative impacts to threatened and endangered species are expected as a result of the Proposed Action.

SECTION 5: PUBLIC PARTICIPATION

The initial public notice was posted on the Yankton and SD Emergency Management websites on November 10, 2021. An information sheet describing the project was also included in the post. Refer to **Appendix E** for the notice.

After the Draft EA is made available by FEMA, the document will be available for public comments for a minimum of 15 days. A public meeting will occur during a regularly scheduled City Commission Meeting. Following the 15-day comment period, FEMA will make the determination as to the adequacy of the environmental documentation. If further documentation is necessary, the EA may be revised or an EIS may be prepared, whichever is appropriate.

If the environmental review process finds the project will not result in any significant environmental impacts, FEMA will then issue a FONSI. If significant environmental impacts are projected to occur, Yankton has the option of performing mitigation to lessen the impacts to below a significant level and prepare a Final EA, prepare an EIS, or terminate the project.

SECTION 6: MITIGATION MEASURES AND PERMITS

The following mitigation measures and permits would be incorporated and obtained during final design and construction:

- Obtain a SDDANR stormwater construction permit and complete a SWPPP.
- A Section 404 permit would be obtained and required wetland and stream mitigation would be considered and identified during the Section 404 permitting process.
- Obtain a Section 7(a) determination from NPS
- During construction BMPs would need to control erosion and prevent sedimentation to ensure the 30-day average total suspended solids criterion of 90 mg/L and the daily maximum total suspended solids criterion of 158 mg/L are not violated.
- Obtain a no rise determination and follow any stipulations within the floodplain permit.
- Project activities (including heavy equipment, pile driving, etc.) operating on the shorelines or banks of the Missouri River, or from barges or temporary work decks within the floodplain, must remain a minimum of 0.5 mile from occupied piping plover nesting habitat from April 1 through August 31.
- No blasting may be conducted within 1 mile (1.6 km) of occupied piping plover nesting habitat from April 1 through August 31.
- Avoid unnecessary ground disturbance in riparian and upland habitats and minimize work in the water to the extent possible.
- Limit removal of existing vegetation and revegetate with native plant species.
- Implement appropriate best management practices to control, erosion, sedimentation, invasive species, contamination, fuel spills, etc.
- Obtain and comply with all required federal, tribal, state, and local permits, and project approvals (e.g., FEMA, USACE, USFWS, SDDANR, etc.)
- The project area shall be kept clean and free from discarded material.
- Above-ground fuel storage tanks repaired, replaced, or installed in the flood plains of rivers that may be inhabited by pallid sturgeon shall be diked, curbed or other suitable means provided to prevent the spread of liquids in case of leaking in the tanks or piping. Such dike, curbed area or device shall have a capacity at least equal in volume to that of the tanks plus 10 percent.
- Construction activities within the Missouri River must be completely separated from the active channel by use of a temporary water barrier or cofferdam.
- Sheet pile for temporary water barriers and cofferdams shall be installed using vibratory technology and in-place/initially de-watered prior to ice up if winter work is planned.
- Dewatering of the workspace (within the temporary water barrier/cofferdam must be accomplished as follows:
    - Water in the chamber will be gradually released to allow visual inspection to determine if fish have been stranded in the workspace. In the unlikely event that a pallid sturgeon or other fish are present, the downstream sheet pile should be removed to allow the pallid sturgeon and/or other to escape naturally, without handling. The sheet pile may be reinstalled (vibrated back into place) once the chamber has been flushed and cleared.

- Unrestricted fish passage (in the active channel of the Missouri River) must be provided at all times around the workspaces.
- For repairs to existing permanent road crossings, use of a span bridge with fewer in-water piers are more favorable towards enhancing and promoting more natural river channel processes.
- Intake screens with a mesh opening of ¼ inch or less shall be installed, inspected annually, and maintained.
- Johnson intake screens: the maximum width between wires shall not exceed 1/8 in.
- Water velocity at the intake screen shall not exceed ½ foot per second.
- Only submerged intakes shall be used in all other river segment that may be inhabited by adult and juvenile pallid sturgeon. Submerged intakes shall be installed in accordance with the following criteria.
    - At the beginning of the irrigation season, the intake shall be placed at least 20 vertical feet below the existing water level.
    - The intake shall be elevated 2 to 4 feet off the bottom.
    - If the 20-foot depth is not attainable, then the intake velocity shall be limited to ¼ foot per second, with intake placed at maximum practicable attainable depth.
- Pumping plant sound levels shall not exceed 75 dB at 50 feet.
- Locate access routes, staging areas, etc. within previously disturbed areas.
- Avoid disturbing or burying any existing riparian (streamside) habitat.
- Restore any disturbed areas using native riparian plant species to prevent erosion.
- Integrate native vegetation into rip rap slope protection.
- Avoid fragmenting or isolating riparian corridors or wetlands.
- Disturbance to riparian and wetland areas should be kept to absolute minimum.
- If riparian vegetation is lost it should be quantified and replaced on site. Seeding of indigenous species should be accomplished immediately after construction to reduce sediment and erosion.
- A site-specific sediment and erosion control plan should be part of the project.
- A post construction erosion control plan should be implemented in order to provide interim control prior to re-establishing permanent vegetative cover on the disturbed site.
- Stream bottoms impacted by construction activities should be restored to pre-project, it should not be conducted during fish spawning periods. Most spawning occurs April, May, and June.
- False Map Turtles nest May and June, with eggs hatching two months later. To avoid impacts to False Map Turtles, recommend completing portion of the project that is immediately adjacent to the Missouri River confluence outside of the nesting season, which typically runs May through August.
- Schedule vegetation removal, trimming, and grading of areas that are potential habitat for migratory birds outside of the peak bird breeding season to the maximum extent practicable. Cutting or clearing of trees or shrubs should occur between August 16th and April 30th to remove potential nesting surfaces prior to project commencement. If the construction timeframe changes and construction would be proposed within the nesting season of migratory birds, surveys for migratory birds would occur in suitable areas that

have not been mowed or cleared prior to April 30th to determine if there are active nests. If active migratory bird nests are found, construction would cease until the birds hatch and fledge.

- A survey for eagles and their nests should be conducted within 660 feet of the work zone approximately one month before construction is scheduled to start. If an eagle nest is identified, appropriate conservation measures based on the National Bald Eagle Management Guidelines would be implemented.
- Unusable equipment, debris, and materials shall be disposed of in an approved manner and location.
- Hazardous materials must be appropriately separated and disposed of in an approved disposal site or landfill.
- Any petroleum products or hazardous materials discovered, generated, or used during implementation of the Project shall be disposed of and handled by the Project applicant in accordance with applicable local, state, and federal regulations.
- Trail detour routes, if required, would be signed and well-marked to allow for continued Trail usage during construction. Trail closure areas would also be signed and barricaded to prevent the public from accessing an active construction site.
- Utility lines would be located and marked prior to construction.
- In Reach A, field stone or native rock would be utilized for the riprap.
- In Reach A, from 2-year surface water line and 10-year surface water line riprap would be covered with minimum of 12-14 inches of soil.
- In Reach A, native species of grass, trees, or shrubs would be planted between the 10-year surface water line to the 2-year surface water line.

SECTION 7: CONSULTATIONS AND REFERENCES

7.1 TRIBAL AND AGENCY CONSULTATIONS

Early consultations began in November 2021 through coordination letters. A coordination meeting with the agencies was also held to solicit early comments and input. The following agencies and Tribes were consulted:

- South Dakota Department of Agriculture and Natural Resources
- South Dakota Department of Game Fish and Parks
- State Historic Preservation Office
- South Dakota Office of Emergency Management
- US Army Corp of Engineers, SD Regulatory Office
- National Park Service
- US Department of Agriculture- Natural Resources Conservation Service
- US Fish and Wildlife Service
- Standing Rock Sioux Tribe
- Cheyenne River Sioux Tribe
- Crow Creek Sioux Tribe
- Flandreau Santee Sioux Tribe
- Lower Brule Sioux Tribe
- Oglala Sioux Tribe
- Rosebud Sioux Tribe
- Yankton Sioux Tribe
- Sisseton- Wahpeton Sioux Tribe

7.2 REFERENCES

Administrative Rules of South Dakota (ARSD). 2021. *Chapter 74:51:03 Uses Assigned to Streams.* Retrieved on December 30, 2021 from: https://sdlegislature.gov/Rules/Administrative/28368

Banner Associates, Inc. (Banner). 2020. *Wetland Delineation Report: Marne Creek/Auld Brokaw Trail Restoration Project, Yankton County, South Dakota.*

Bugliosi, Edward F. 1986. *Water Resources of Yankton County, South Dakota.* U.S. Geological Survey Water-Resources Investigations Report 84-4241. Retrieved on January 5, 2022 from: https://pubs.usgs.gov/wri/1984/4241/report.pdf

CEQ. 1997. Environmental Justice, Guidance Under the National Environmental Policy Act. Available Online: http://ceq.hss.doe.gov/NEPA/ regs/ej/ justice.pdf

City of Yankton. 2003. *The Yankton Plan: A Comprehensive Plan for Yankton, South Dakota.* Retrieved on January 6, 2022 from: https://www.cityofyankton.org/departments-services/comprehensive-plan

City of Yankton. 2022a. *Zoning Map.* Retrieved on January 6, 2022 from: https://www.cityofyankton.org/departments-services/community-development/zoning-map

City of Yankton. 2022b. *Auld-Brokaw Trail System.* Retrieved on January 6, 2022 from: https://www.cityofyankton.org/departments-services/parks-recreation/yankton-parks/auld-brokaw-trail-system

eBird. 2022a. *Bald Eagle (Haliaeetus leucocephalus).* Retrieved on January 5, 2022 from: https://ebird.org

eBird. 2022b. *Golden Eagle (Aquila chrysaetos).* Retrieved on January 5, 2022 from: https://ebird.org

Environmental Protection Agency (EPA). (1997). *Innovative Uses of Compost Erosion Control, Turf Remediation, and Landscaping.* Retrieved January 7, 2022, from https://www.epa.gov/sites/default/files/2015-08/documents/erosion.pdf

Environmental Protection Agency (EPA). (2021). *Current Non-attainment Counties for All Criteria Pollutants.* Retrieved December 29, 2021, from https://www3.epa.gov/airquality/greenbook/ancl.html

Environmental Protection Agency (EPA). (2022). *EnviroAtlas Interactive Map.* Retrieved on January 5, 2022 from: https://enviroatlas.epa.gov/enviroatlas/interactivemap/

Federal Emergency Management Agency (FEMA), December 29, 2021. *City of Yankton, Flood Insurance Rate Map (FIRM) 46135C0319D and 46135C0432D.*

National Park Service (NPS). (2017). Foundation Document Missouri National Recreational River Nebraska and South Dakota. Retrieved on February 20, 2022, from MNRR_FD_PRINT.indd (nps.gov)

National Park Service (NPS). (2022). Missouri National Recreational River. Retrieved on February 20, 2022, from https://nps.gov/mnrr/index.htm

National Park Service (NPS). 2019. Missouri National Recreational River; Bank Stabilization Information & Standard Permit Conditions. Retrieved May 13, 2022 from: https://www.nps.gov/mnrr/learn/management/bank-stabilization-information-and-standard-permit-conditions.htm

Natural Resources Conservation Services (NRCS). (2012). *Soil Health and in the Future.* Retrieved January 7, 2022, from https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs141p2_036491.pdf

Natural Resources Conservation Services (NRCS). (2021a). *Web soil survey.* Retrieved December 28, 2021, from https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

Mount Marty University. 2021. *Marne Creek Fish Collections.*

South Dakota Department of Agriculture and Natural Resources (SDDANR). 2020. *The 2020 South Dakota Integrated Report for Surface Water Quality Assessment*. Retrieved on December 30, 2021 from: https://danr.sd.gov/OfficeOfWater/SurfaceWaterQuality/docs/DANR_2020_IR_final.pdf

South Dakota Department of Agriculture and Natural Resources (SDDANR). 2021. *DANR Water Quality Monitoring Access Portal*. Retrieved on December 30, 2021 from: https://apps.sd.gov/NR92WQMAP/

South Dakota Department of Game, Fish and Parks (SDGFP). 2016. *State and Federally Listed Threatened, Endangered and Candidate Species Documented in South Dakota by County. Updated on 07/19/2016.* Retrieved on January 5, 2022 from: https://gfp.sd.gov/userdocs/docs/ThreatenedCountyList.pdf

South Dakota Department of Game, Fish and Parks (SDGFP). 2022. *Natural Heritage Program.* Retrieved on January 5, 2022 from: https://gfp.sd.gov/natural-heritage-program/

United States Census Bureau. 2022. Quickfacts. Retrieved on January 19, 2022 from: https://www.census.gov/quickfacts/fact/table/SD,yanktoncountysouthdakota,yanktoncitysouthdakota/POP010210

United States Department of Agriculture, Agriculture Research Service (USDA). 2022. *Which Milkweeds do Monarch Butterflies Prefer?* Retrieved on January 5, 2022 from: https://tellus.ars.usda.gov/stories/articles/which-milkweeds-do-monarch-butterflies-prefer/#:~:text=A%20monarch%20caterpillar%20feeds%20on%20common%20milkweed%2C%20Asclepias,native%20flowering%20plants%20that%20monarch%20butterflies%20prefer%20most.

United States Fish and Wildlife Service (USFWS). 2017. *Candidate Species – Section 4 of the Endangered Species Act.* Retrieved on January 11, 2022 from: https://www.fws.gov/endangered/esa-library/pdf/candidate_species.pdf

United States Fish and Wildlife Service (USFWS). 2021a. *National Wetlands Inventory Surface Waters and Wetlands.* Retrieved on December 30, 2021 from: https://www.fws.gov/wetlands/data/Mapper.html

United States Fish and Wildlife Service (USFWS). 2021b. *Information, Planning, and Conservation (IPac) System.* Retrieved on December 30, 2021 from: https://www.fws.gov/wetlands/data/Mapper.html

United States Fish and Wildlife Service (USFWS). 2022. *National Standard Conservation Measures for Migratory Birds.*

Unites States Geologic Survey (USGS). (2021a). *Geologic Maps of US States.* Retrieved on December 28, 2021 from https://mrdata.usgs.gov/geology/state/

United States Geologic Survey (USGS). (2021b). *Earthquakes in South Dakota.* Retrieved on December 28, 2021 from http://www.sdgs.usd.edu/earthquakes/index.html

SECTION 8: LIST OF PREPARERS

The individuals who were primarily responsible for the preparation of this EA are listed below:

Federal Emergency Management Agency – Region 8 EHP

Richard Myers- Deputy Regional Environmental Officer

Kyle Flesness- Environmental Manager

Kyle Cheeseman- Environmental Protection Specialist

Banner Associates, Inc.

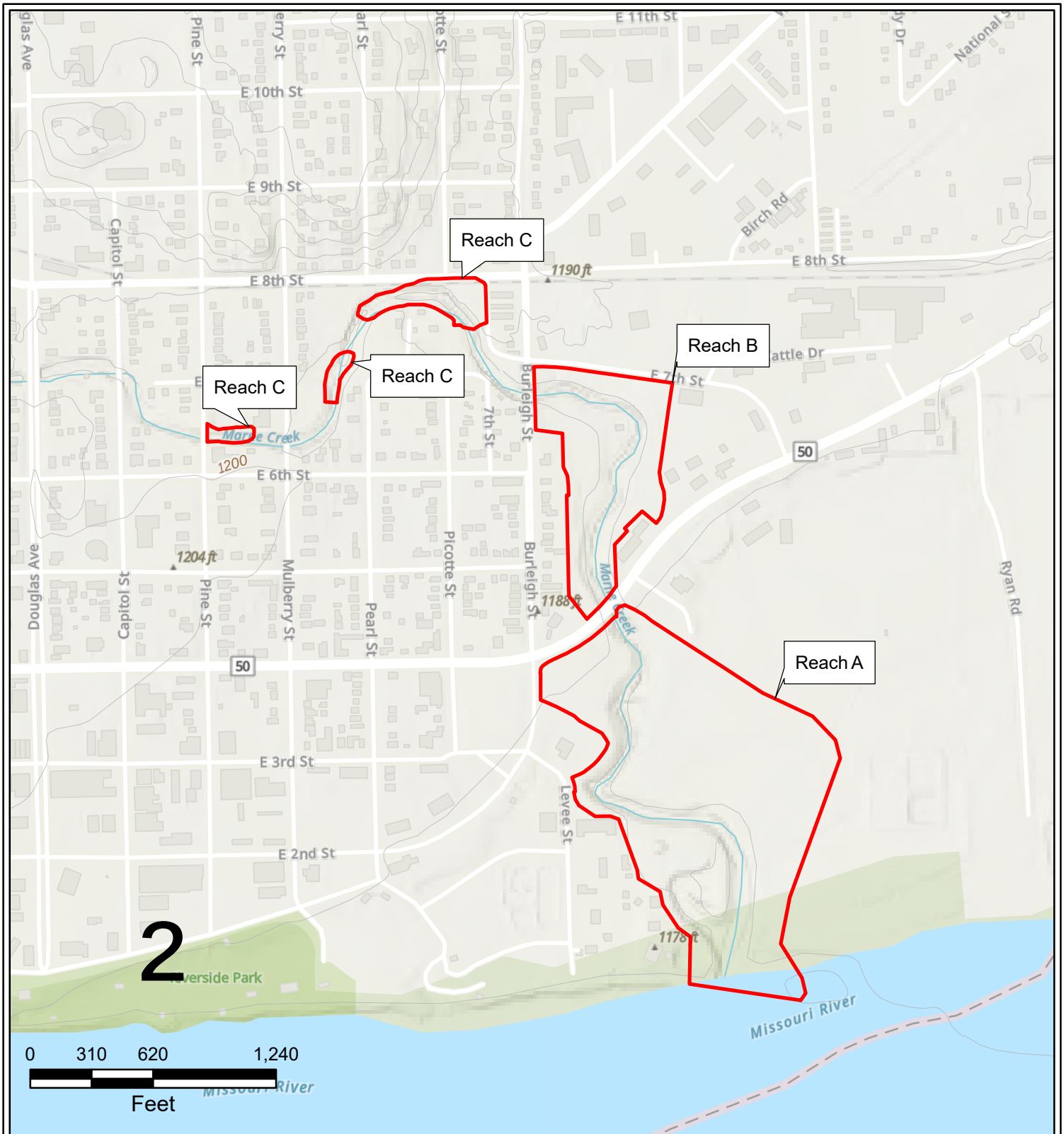
Becky Baker, B.S. Biology and Environmental Management, 18 years of experience. Environmental Department Head, Project Manager, responsible for project execution and coordination, project oversight, document writing and review, public coordination, agency coordination.

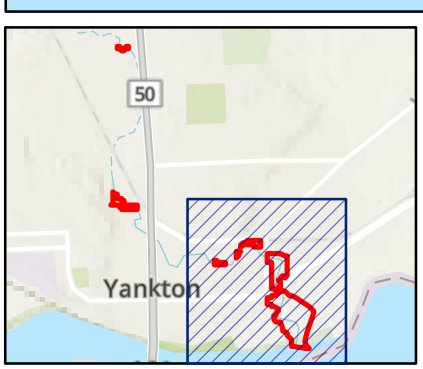
Leslie Murphy, B.S. Biology, M.S. Environmental Science, 21 years of experience. Lead Environmental Scientist, responsible for biological surveys, wetland delineation, Phase I Environmental Site Assessment, document writing and review.

Reinique Beck, B.S. Environmental Science, M.S. Administration, 10 years of experience. Environmental Scientist, responsible for document writing and review.

Alexander Cox, B.S. Ecology and Environmental Science. 1 year of experience. Environmental Scientist, responsible for document writing and review.

APPENDIX A: MAP AND FIGURES

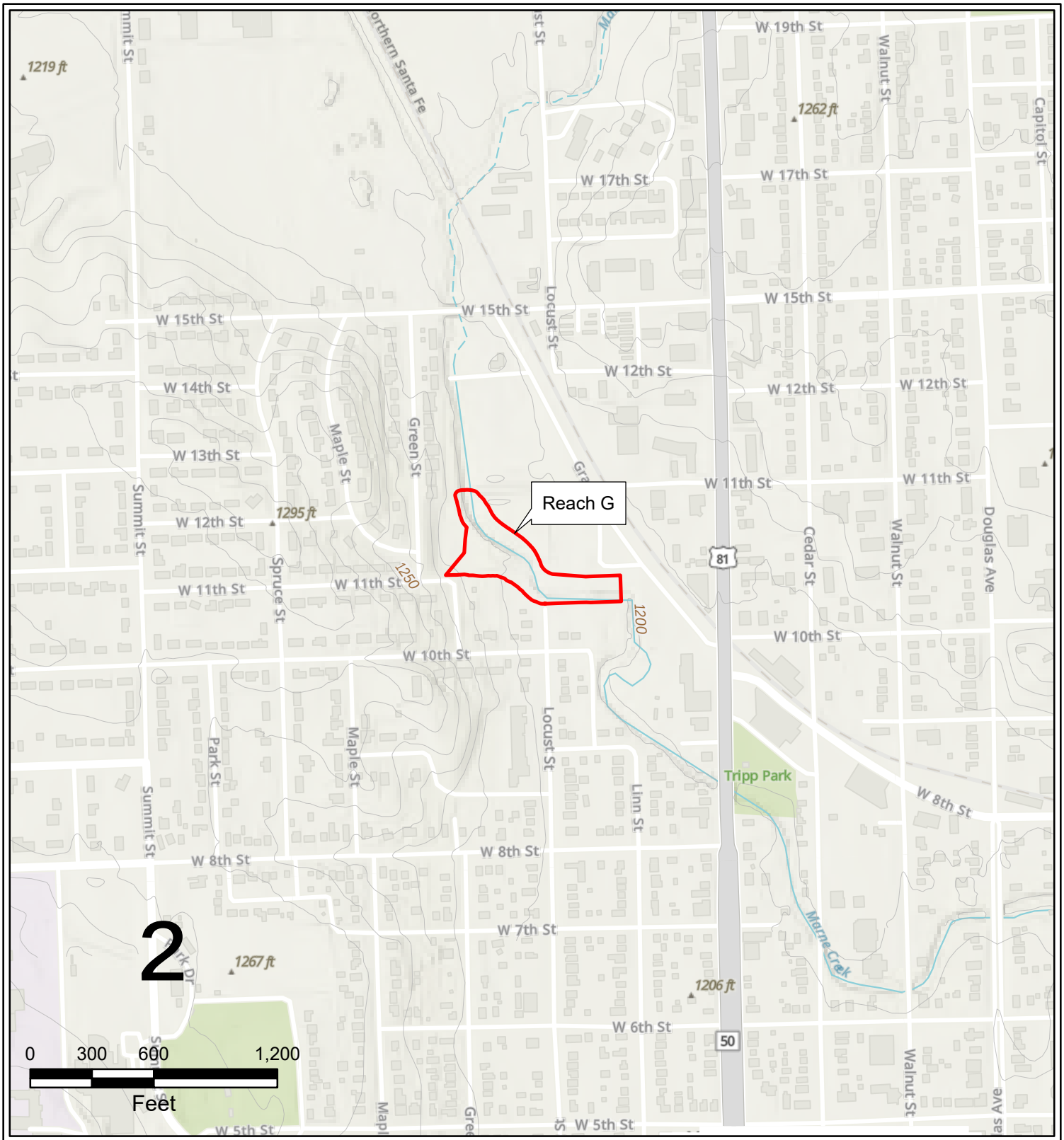


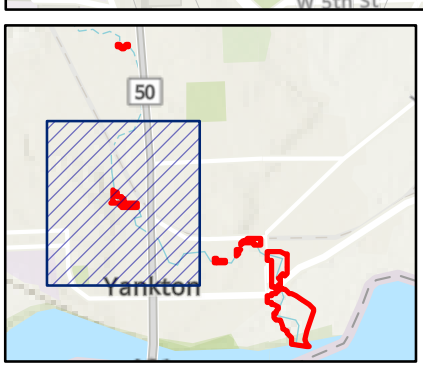


Legend

Project Areas

Figure 1a - Project Location
Auld-Brokaw Maintenance and Recreational Trail System and Marne Creek Bank Stabilization Environmental Assessment

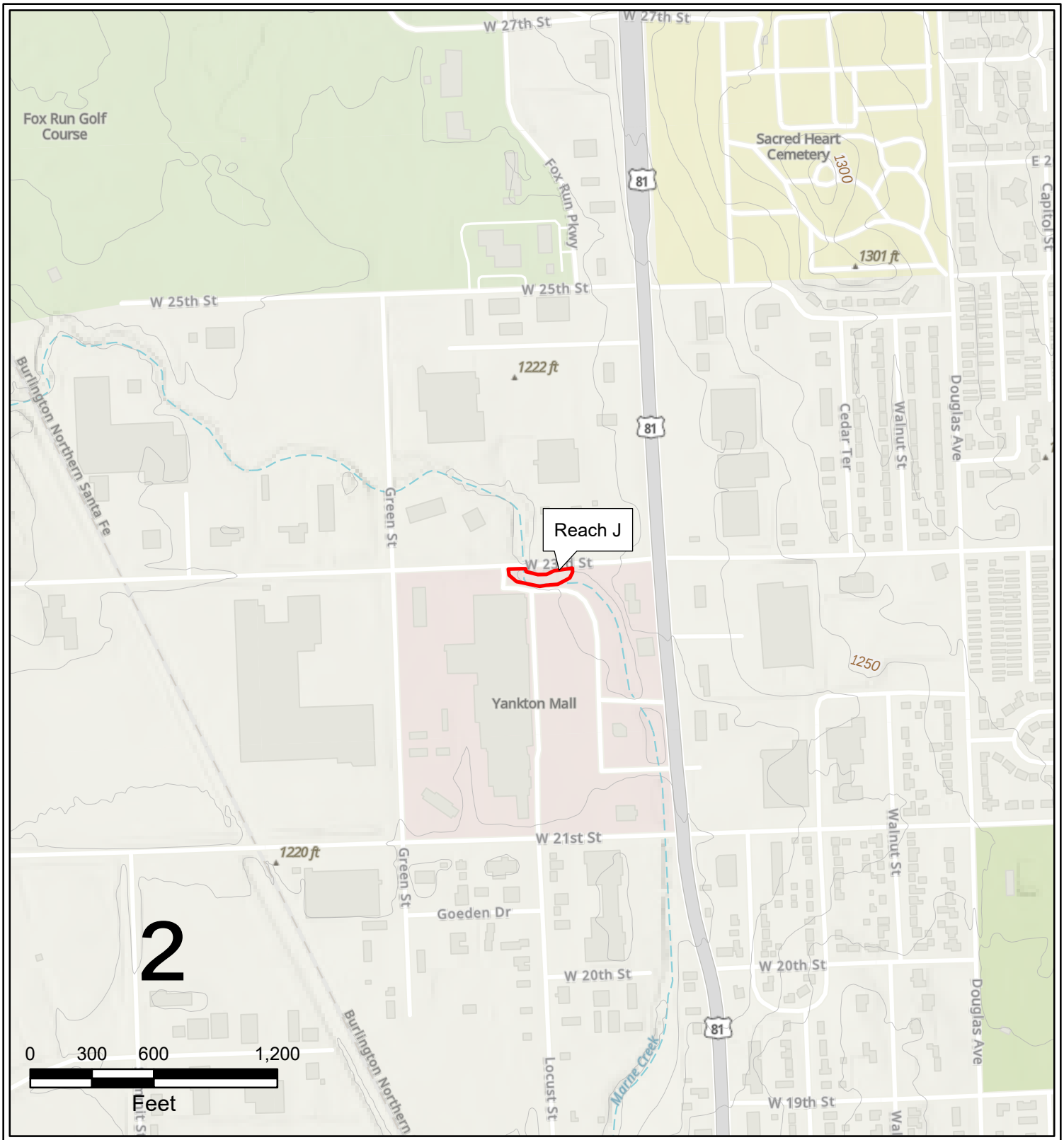


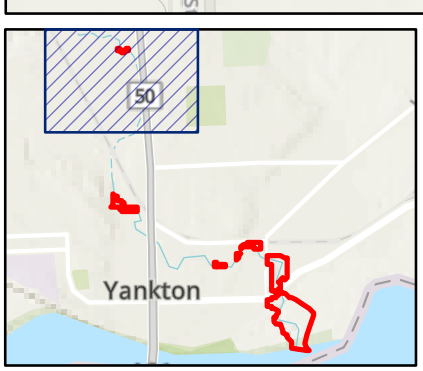


Legend

Project Areas

Figure 1b - Project Location
Auld-Brokaw Maintenance and Recreational Trail System and Marne Creek Bank Stabilization Environmental Assessment

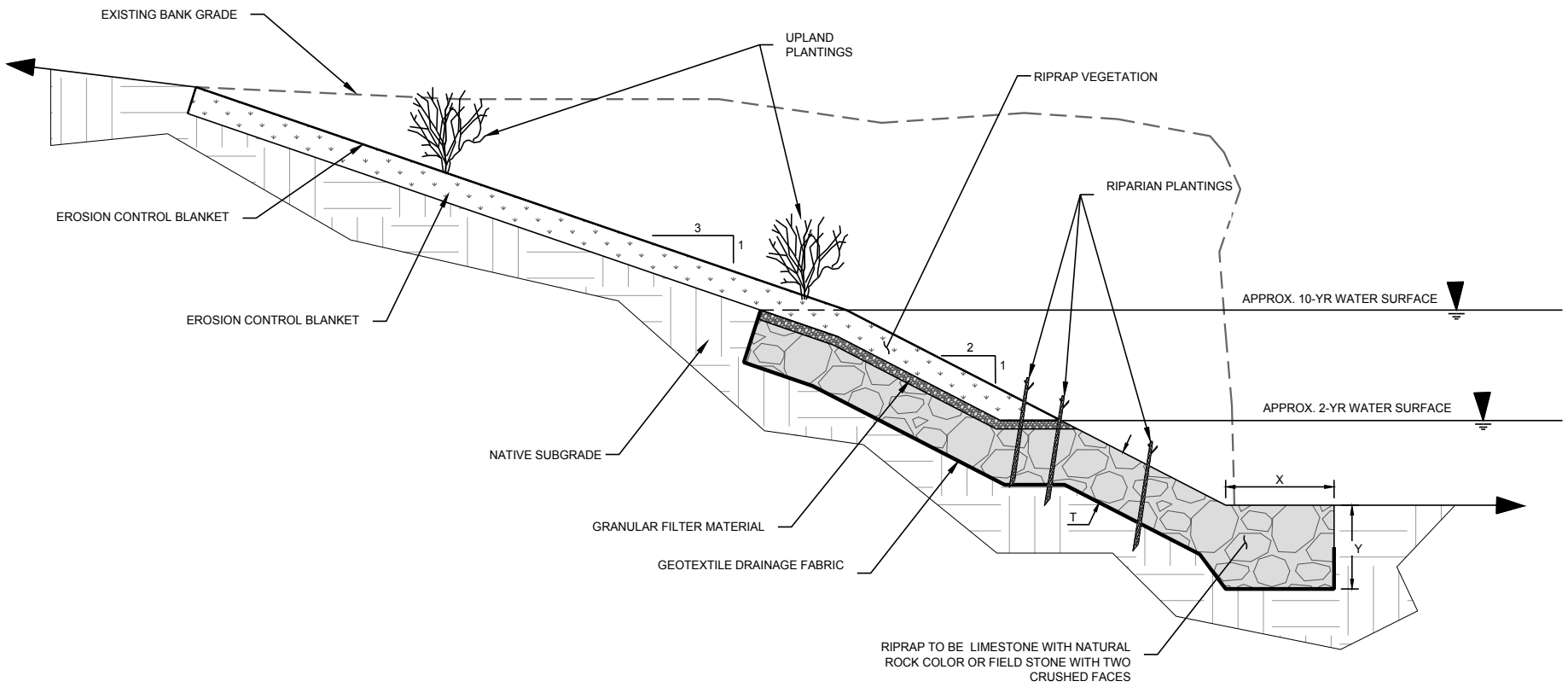




Legend

Project Areas

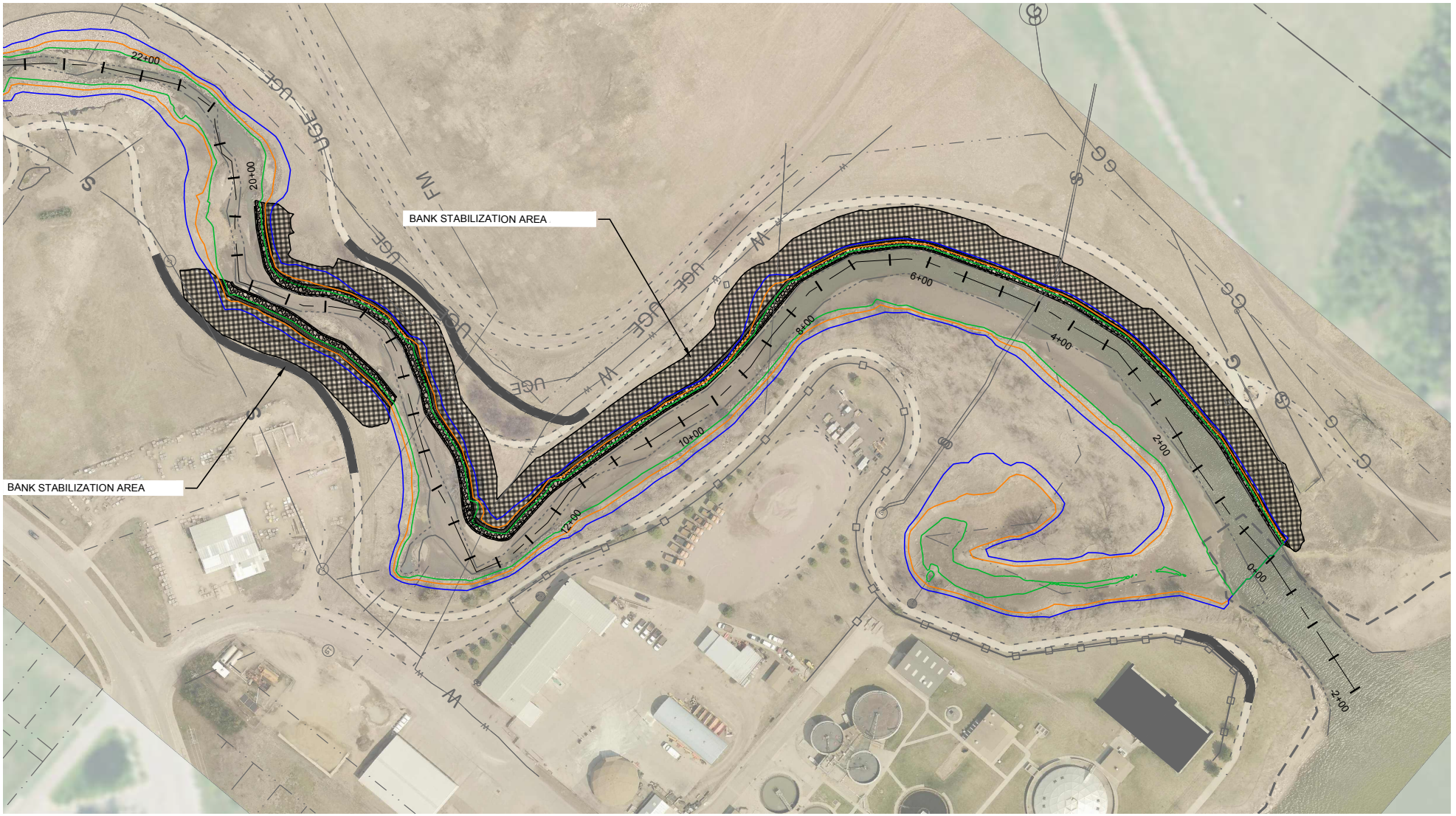
Figure 1c. Project Location
Auld-Brokaw Maintenance and Recreational Trail System and Marne Creek Bank Stabilization Environmental Assessment



STREAM BANK TREATMENT TYPICAL

NOT TO SCALE

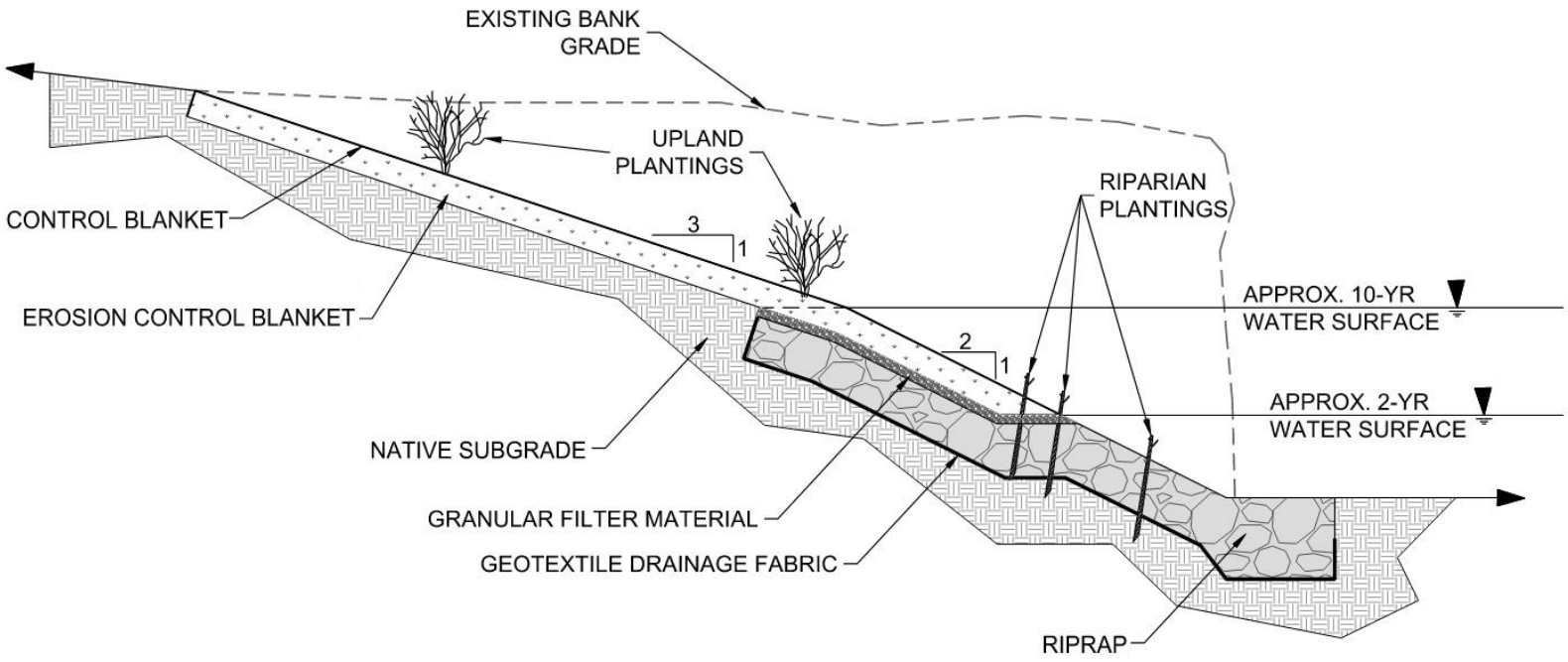
Figure 2a - Reach A- Alternative 2 Typical Section
Auld-Brokaw Maintenance and Recreation Trail System and Marne Creek Bank Stabilization Environmental Assessment



Legend

- RIPRAP
- RIPRAP COVERED W/TOPSOIL, CONTANERIZED PLANTINGS, AND REVEGETATED W/EROSION CONTROL BLANKET
- NEW CONCRETE PATH

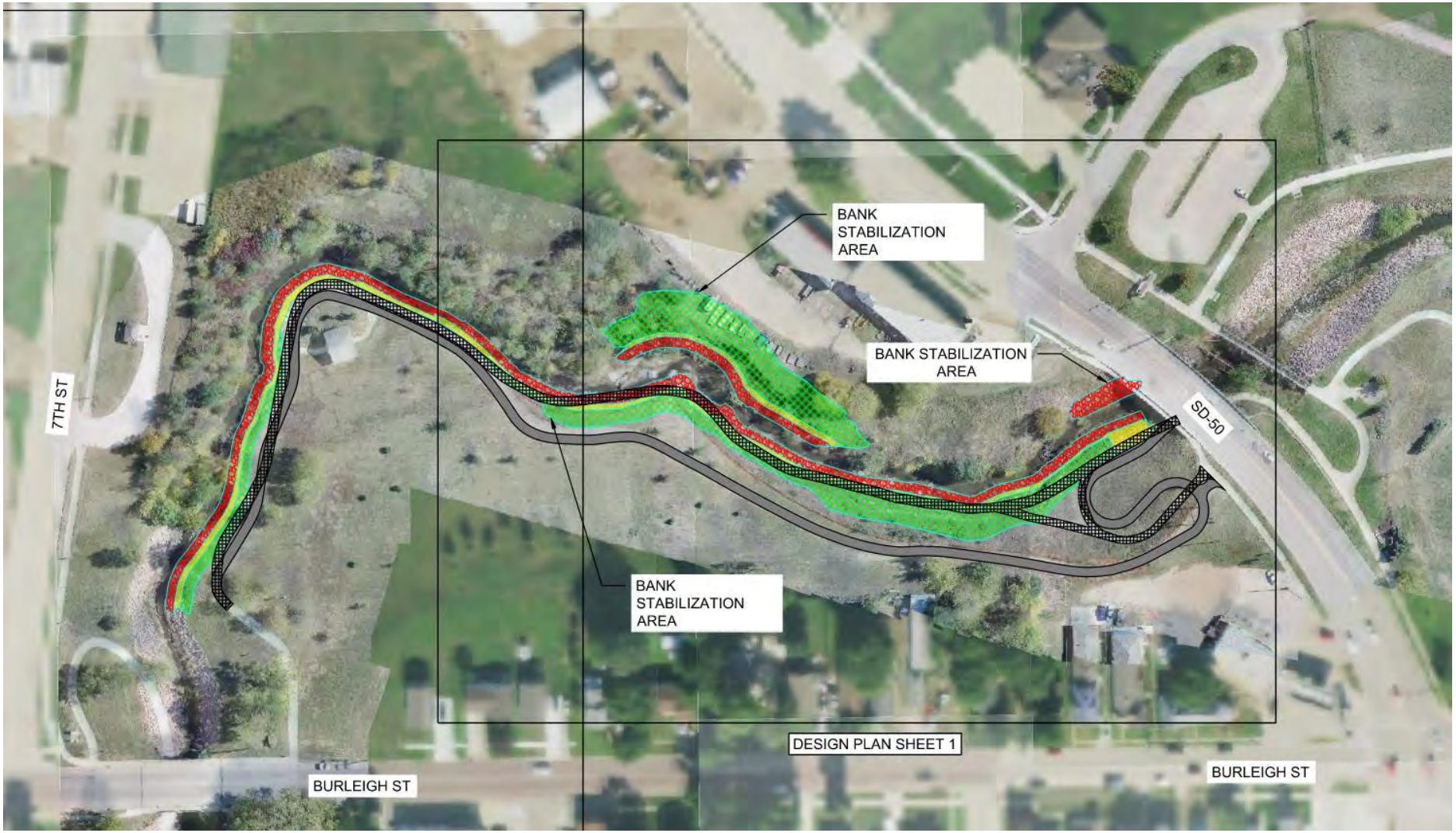
Figure 2b - Reach A- Alternative 2 Design Overview
Auld-Brokaw Maintenance and Recreation Trail System and Marne Creek Bank Stabilization Environmental Assessment



STREAM BANK TREATMENT TYPICAL

NOT TO SCALE

Figure 2c - Reach B- Alternative 2 Typical Section
Auld-Brokaw Maintenance and Recreation Trail
System and Marne Creek Bank Stabilization
Environmental Assessment

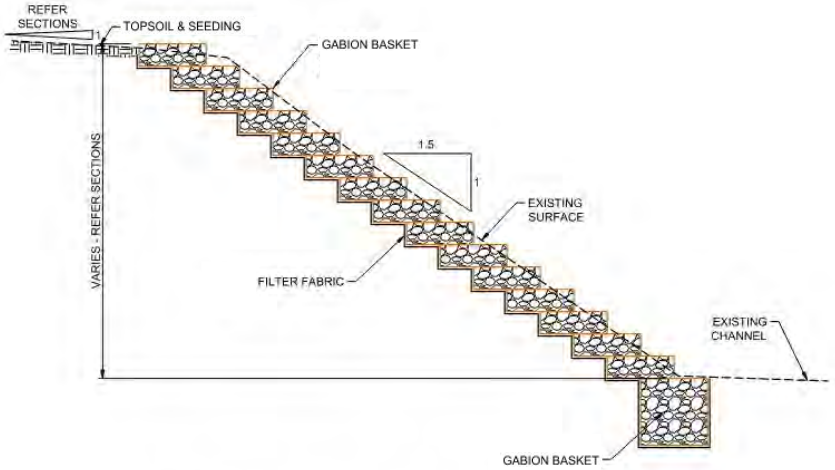


Legend

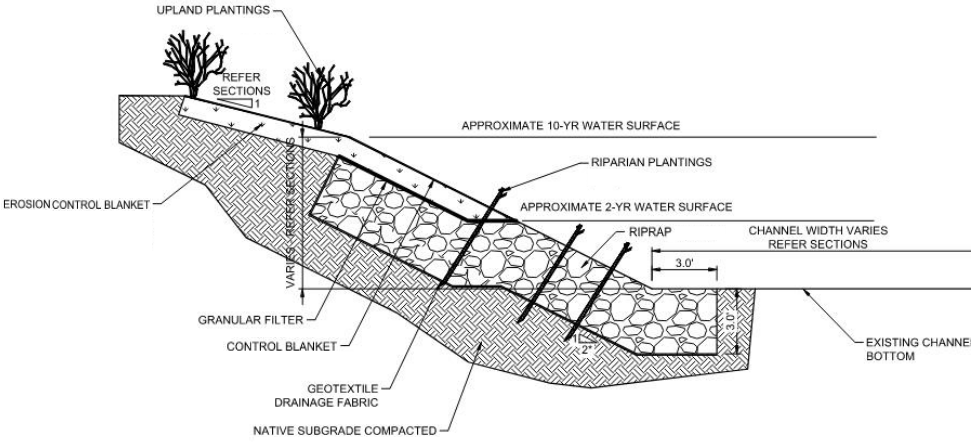
- RIPRAP, 2:1 SLOPE
- RIPRAP COVERED WITH TOPSOIL AND REVEGETATED, 2:1 SLOPE
- REVEGETATED TOPSOIL AND EROSION CONTROL BLANKET, 3:1 SLOPE
- NEW CONCRETE MAINTENANCE TRAIL SEGMENT
- REMOVE CONCRETE MAINTENANCE TRAIL SECTION

Figure 2d - Reach B- Alternative 2 Design Overview
Auld-Brokaw Maintenance and Recreation Trail System and Marne Creek Bank Stabilization Environmental Assessment

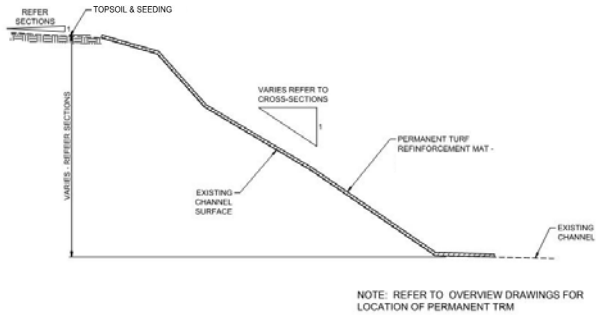
BANNER



1 / C1 TYPICAL STACKED GABION CHANNEL SECTIONS
NO SCALE



2 / C1 TYPICAL RIPRAP CHANNEL SECTION
SCALE: 1" = 6'



NOTE: REFER TO OVERVIEW DRAWINGS FOR LOCATION OF PERMANENT TRM

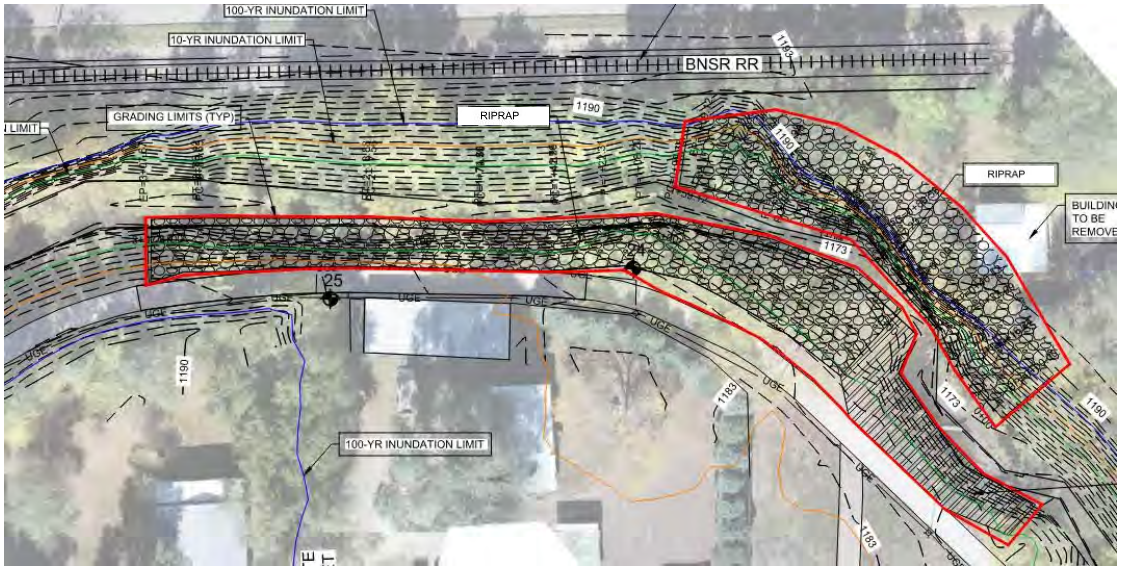
1 / C2 TYPICAL PERMANENT TURF REINFORCEMENT MAT SECTION
NO SCALE

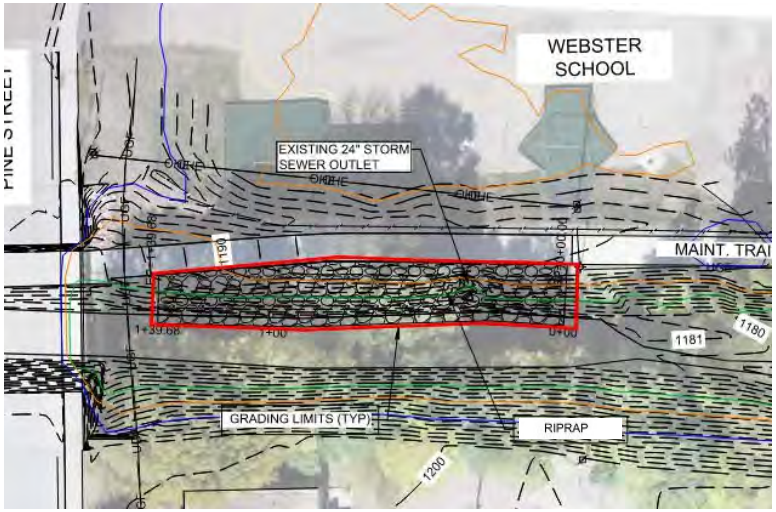
Figure 2e - Reach C- Alternative 2 Typical Sections
Auld-Brokaw Maintenance and Recreation Trail System and Marne Creek Bank Stabilization Environmental Assessment

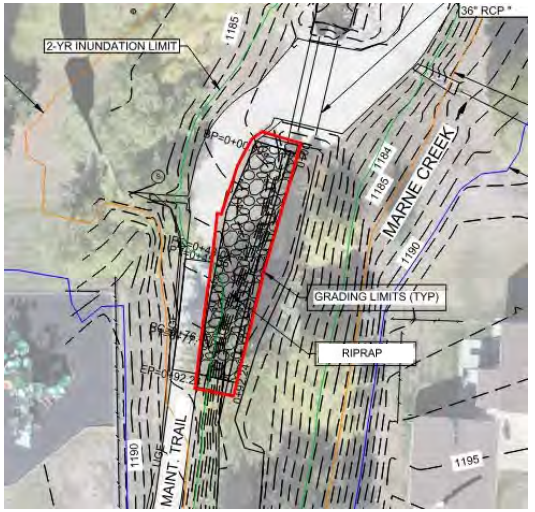
City of Yankton

BANNER

RESPEC





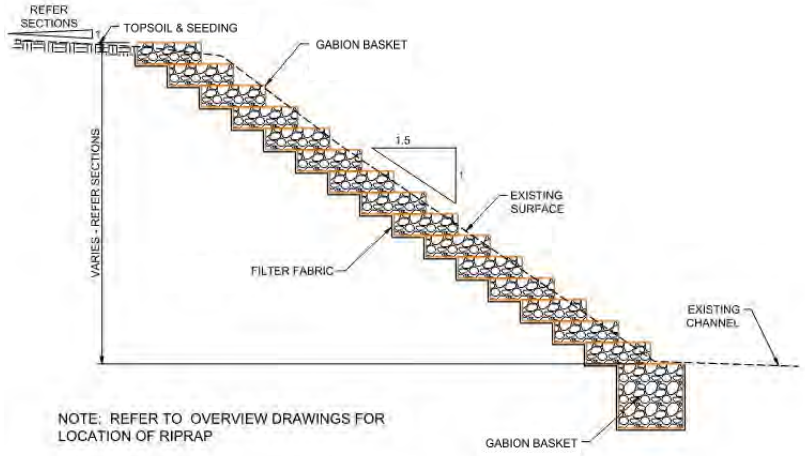


Legend

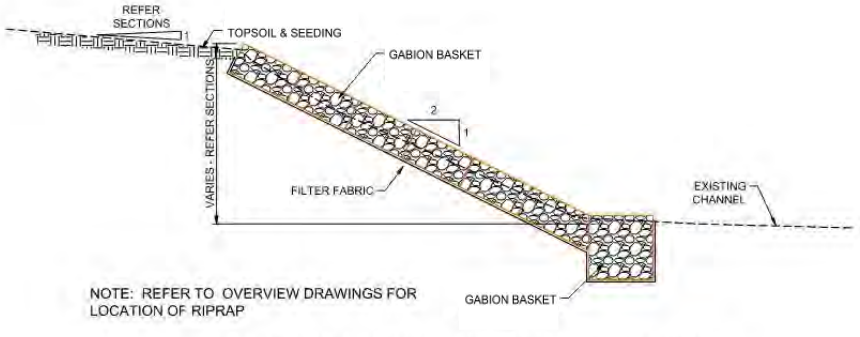
RIPRAP

GABIONS

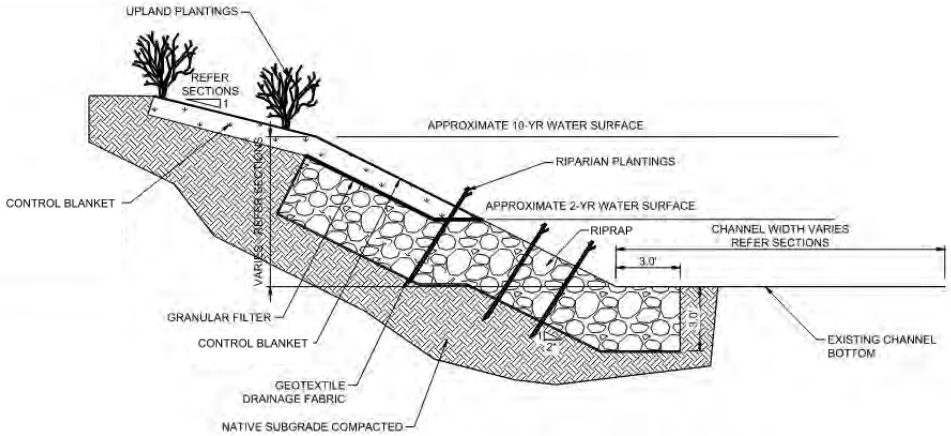
Figure 2f - Reach C- Alternative 2 Design Overview
Auld-Brokaw Maintenance and Recreation Trail System and Marne Creek Bank Stabilization Environmental Assessment



3 C1 TYPICAL STACKED GABION CHANNEL SECTION
NO SCALE

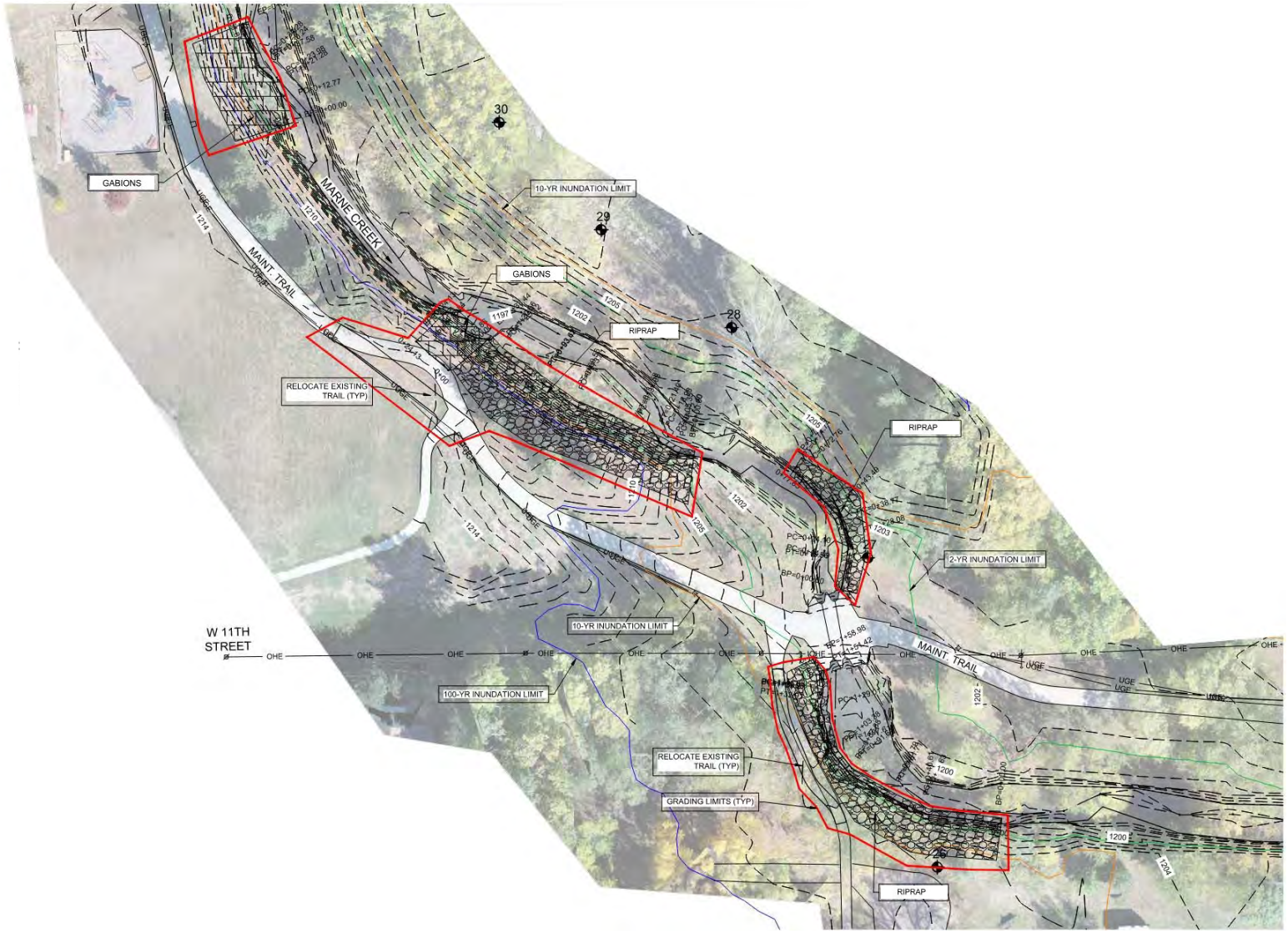


2 C1 TYPICAL GABION MAT CHANNEL SECTION
NO SCALE



1 C1 TYPICAL RIPRAP CHANNEL SECTION
SCALE: 1" = 6'

Figure 2g - Reach G- Alternative 2 Typical Sections
Auld-Brokaw Maintenance and Recreation Trail
System and Marne Creek Bank Stabilization
Environmental Assessment



Legend

RIPRAP

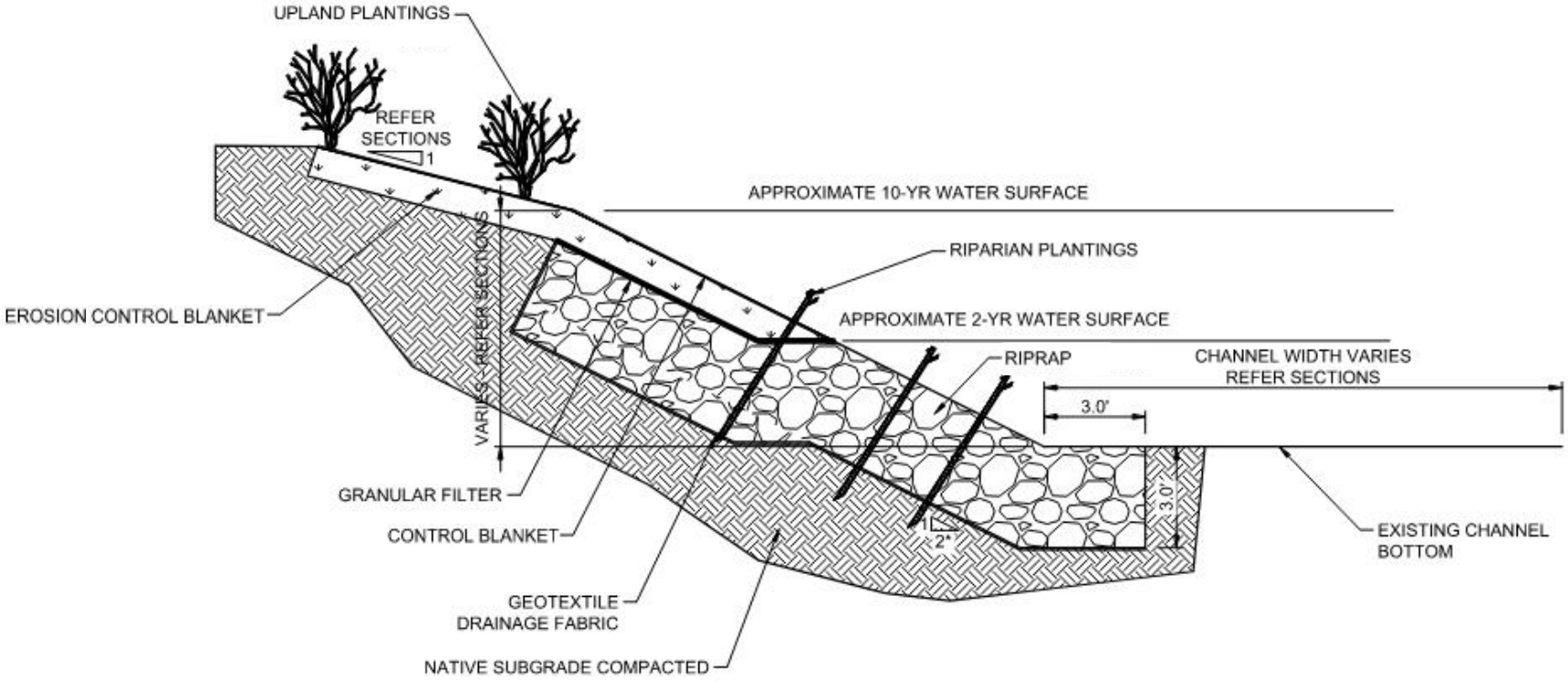
GABIONS

Figure 2h - Reach G- Alternative 2 Design Overview
Auld-Brokaw Maintenance and Recreation Trail
System and Marne Creek Bank Stabilization
Environmental Assessment

City of Yankton

BANNER

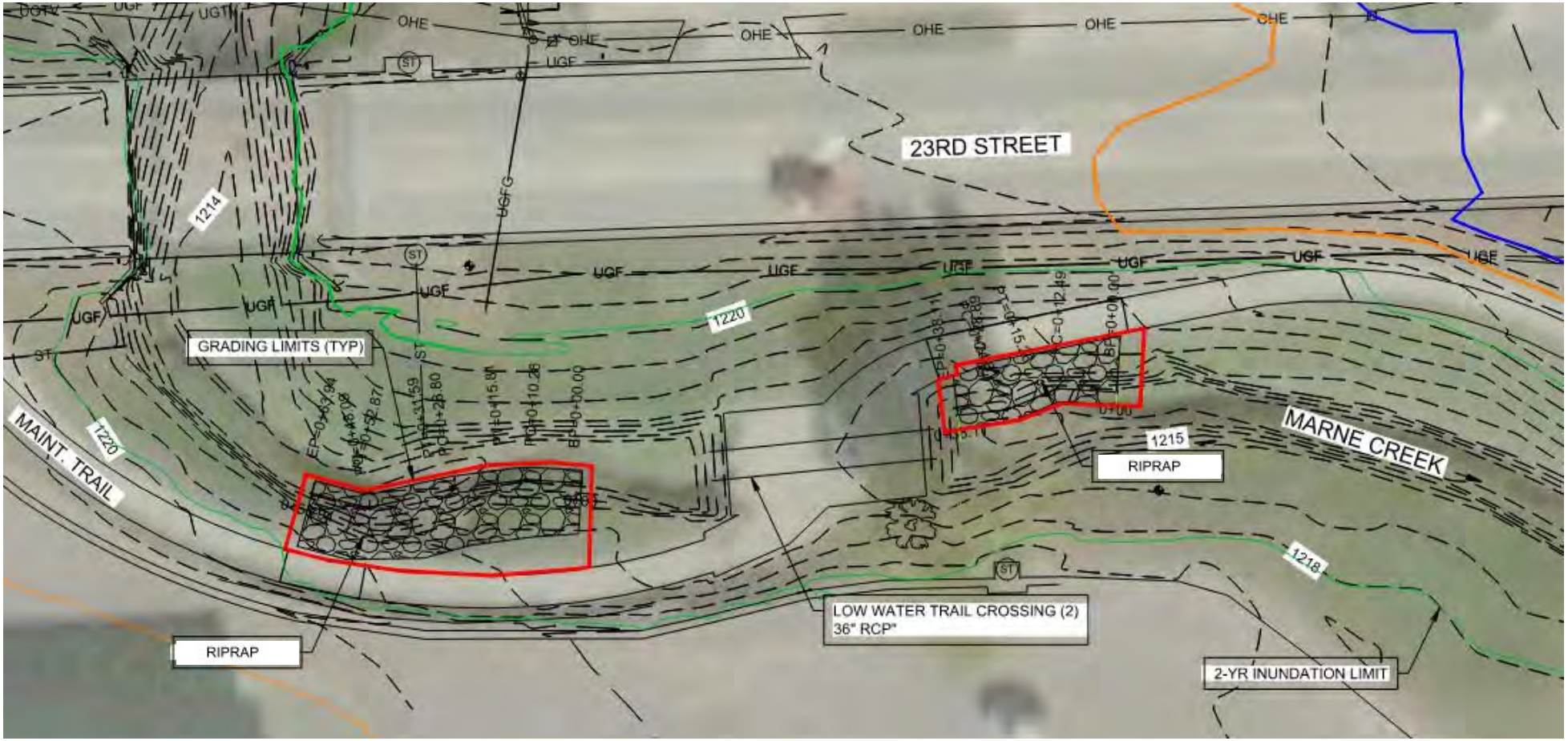
RESPEC



1/C1 TYPICAL RIPRAP CHANNEL SECTION

SCALE: 1" = 6'

Figure 2i - Reach J- Alternative 2 Typical Section
Auld-Brokaw Maintenance and Recreation Trail
System and Marne Creek Bank Stabilization
Environmental Assessment

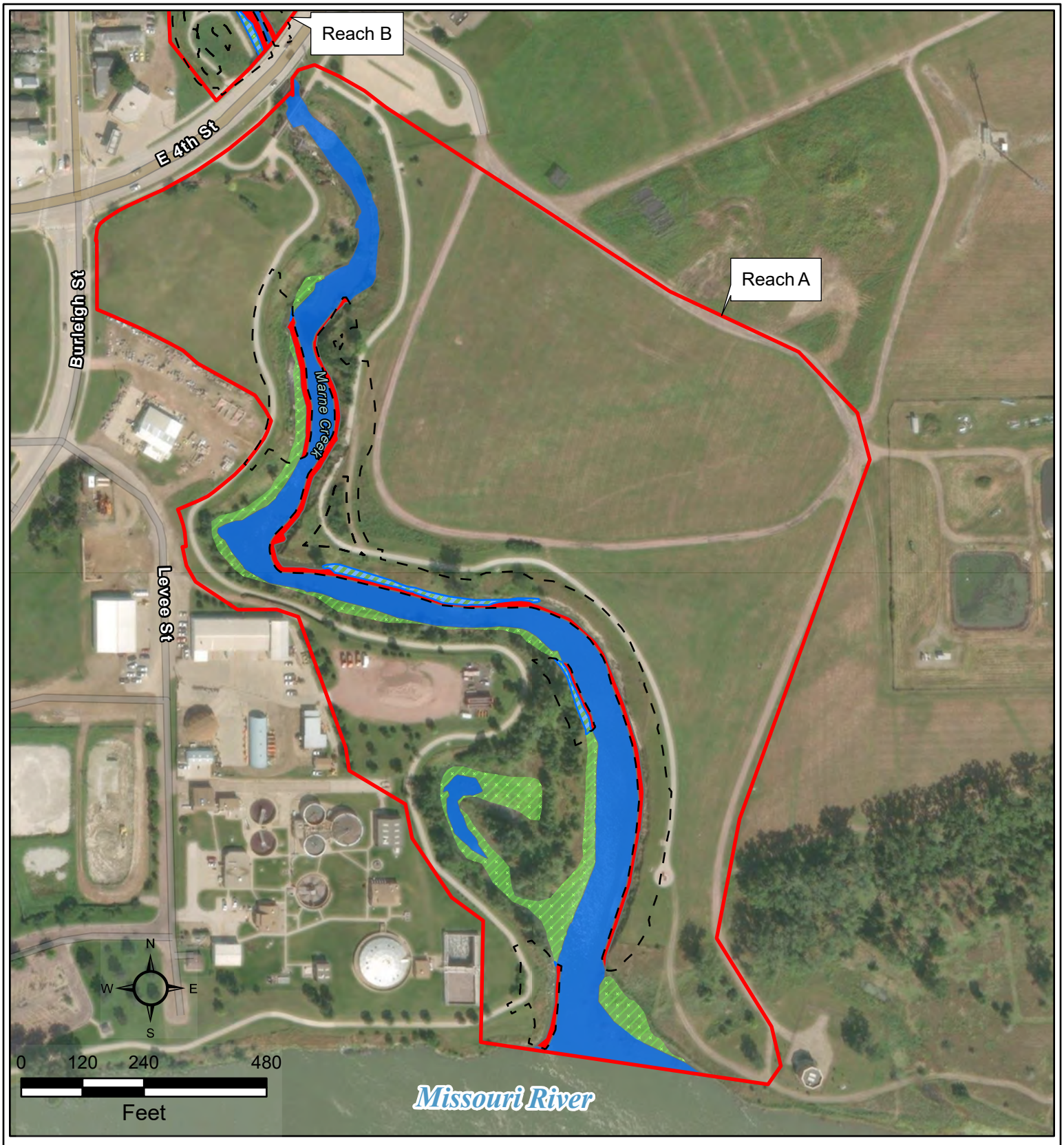


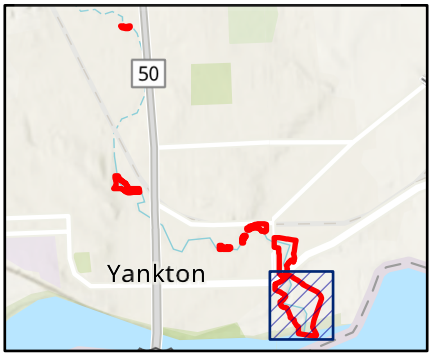
Legend

RIPRAP

Figure 2j - Reach J- Alternative 2 Design Overview
Auld-Brokaw Maintenance and Recreation Trail System and Marne Creek Bank Stabilization Environmental Assessment

BANNER



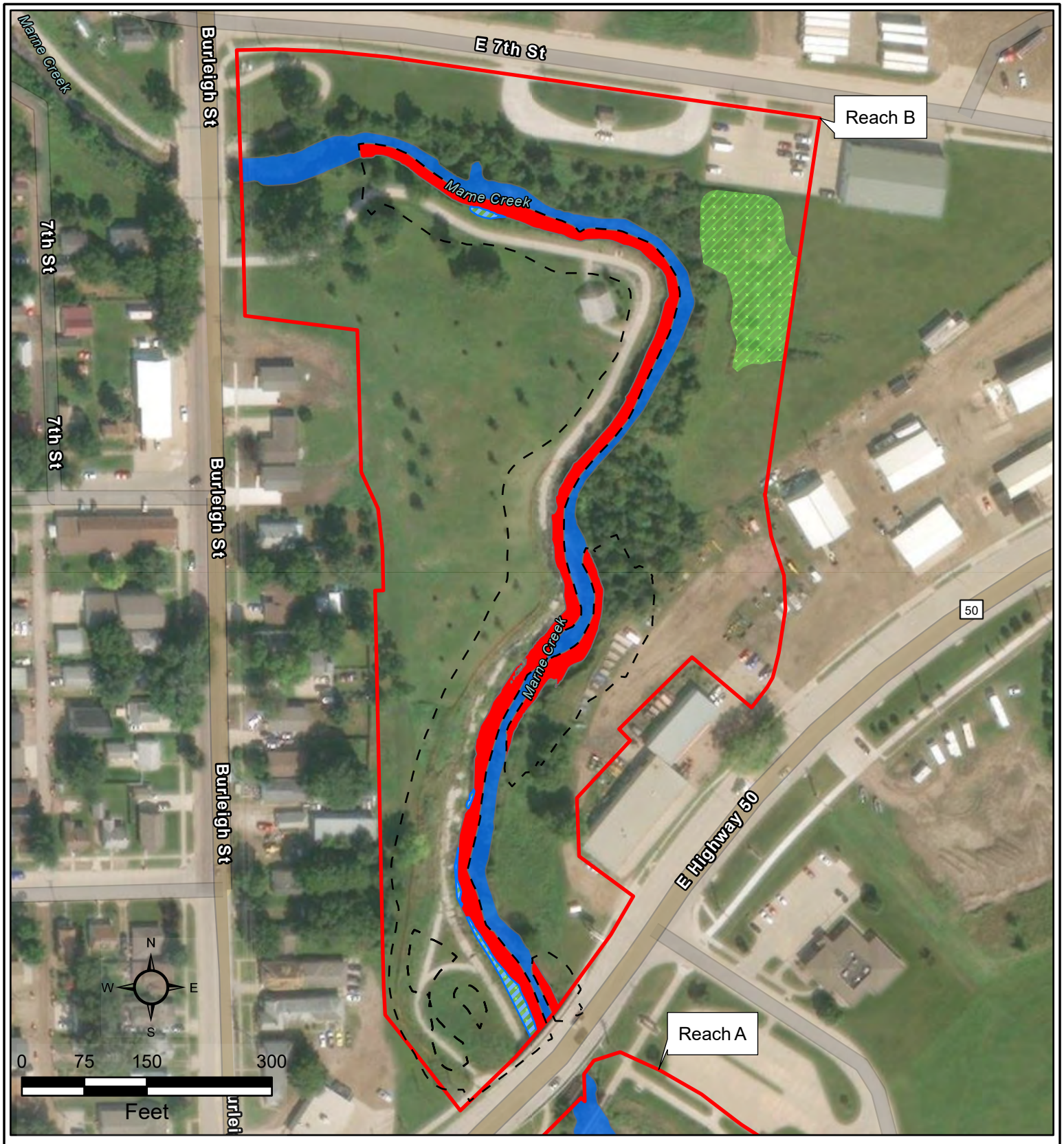


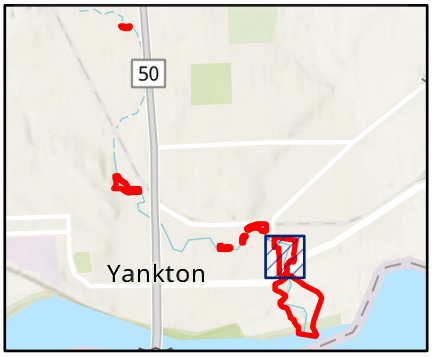
Legend

- Construction Limits
- Project Areas
- Field Delineated Wetlands
- Wetland Impact
- OWUS
- OWUS Impact

Figure 3a - Water Resources
Auld-Brokaw Maintenance and Recreational Trail System & Marne Creek Bank Stabilization Environmental Assessment

City of Yankton
BANNER
RESPEC

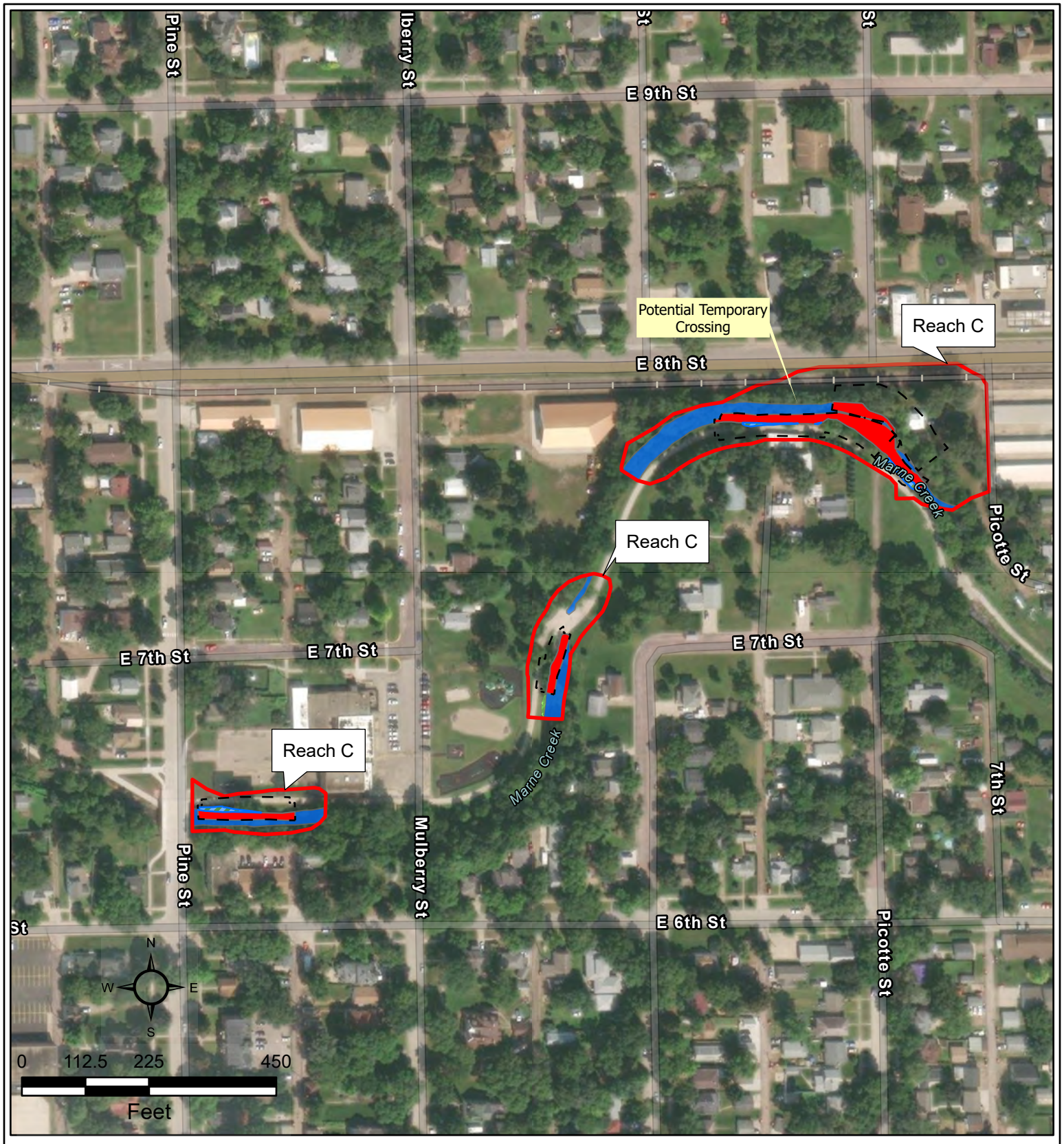


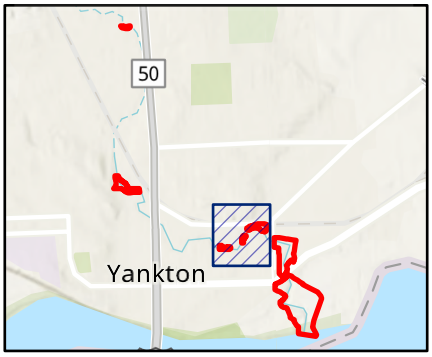


Legend

- Construction Limits
- Project Areas
- Field Delineated Wetlands
- Wetland Impact
- OWUS
- OWUS Impact

Figure 3b- Water Resources
Auld-Brokaw Maintenance and Recreational Trail System & Marne Creek Bank Stabilization Environmental Assessment

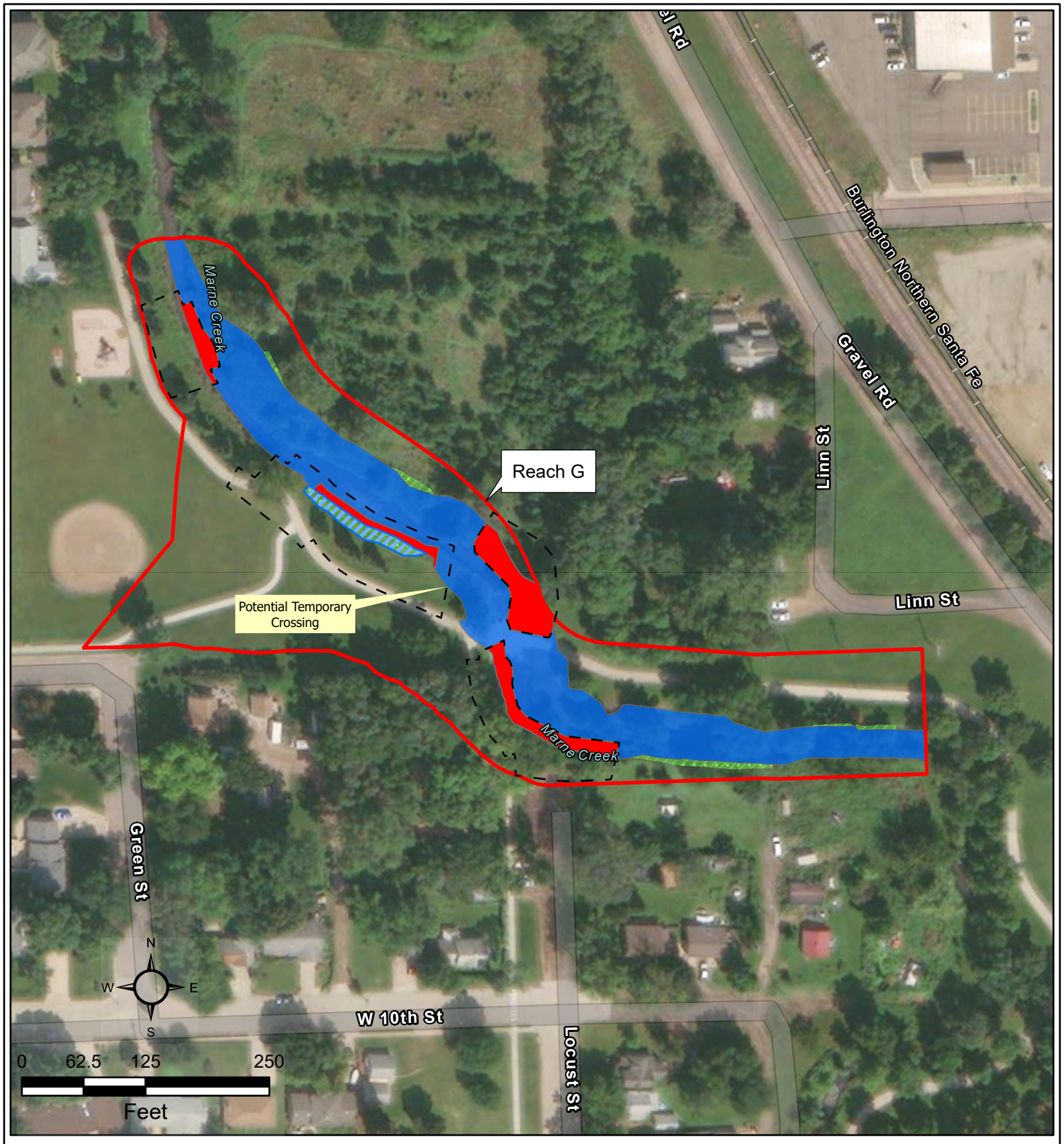


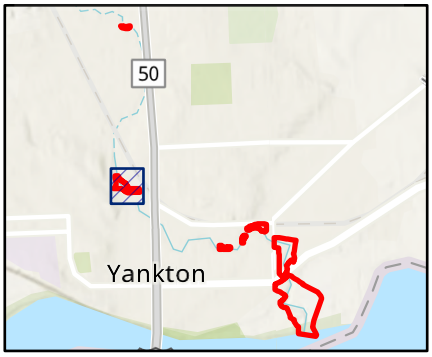


Legend

- Construction Limits
- Project Areas
- Field Delineated Wetlands
- Wetland Impact
- OWUS
- OWUS Impact

Figure 3c - Water Resources
Auld-Brokaw Maintenance and Recreational Trail System & Marne Creek Bank Stabilization Environmental Assessment

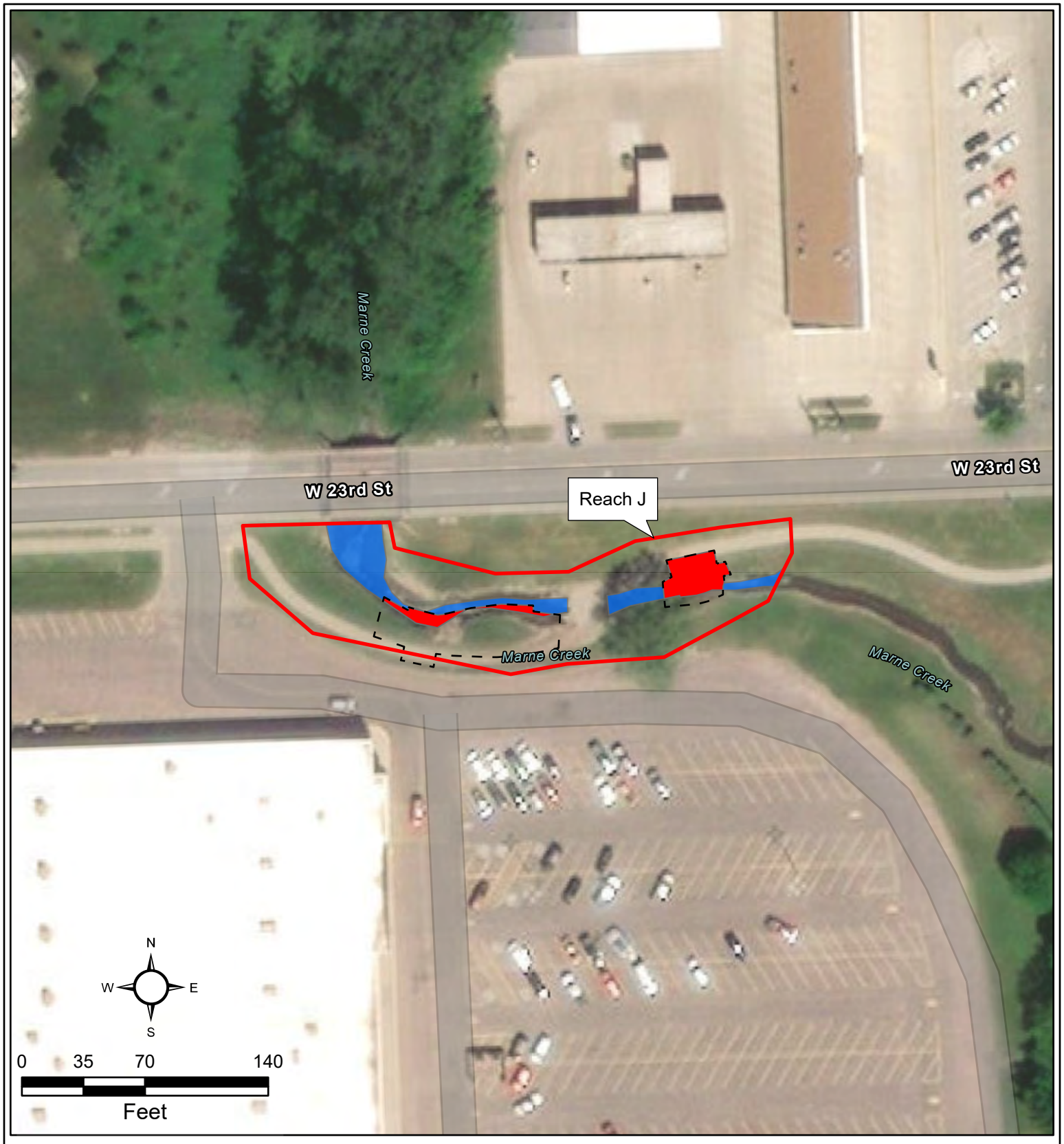


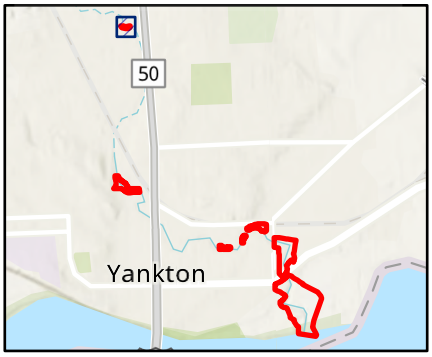


Legend

- Construction Limits
- Project Areas
- Field Delineated Wetlands
- Wetland Impact
- OWUS
- OWUS Impact

Figure 3d - Water Resources
Auld-Brokaw Maintenance and Recreational Trail System & Marne Creek Bank Stabilization Environmental Assessment

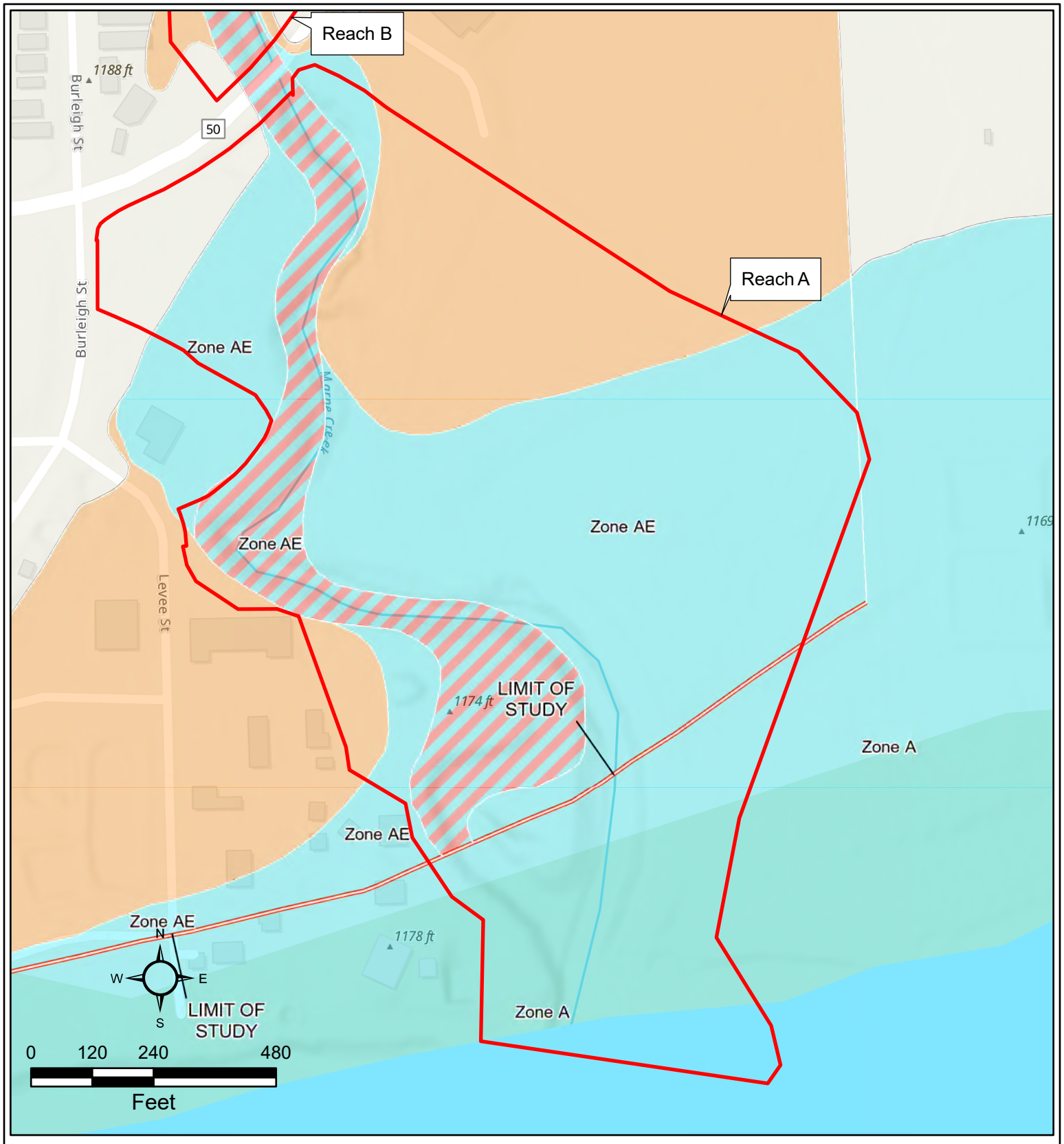


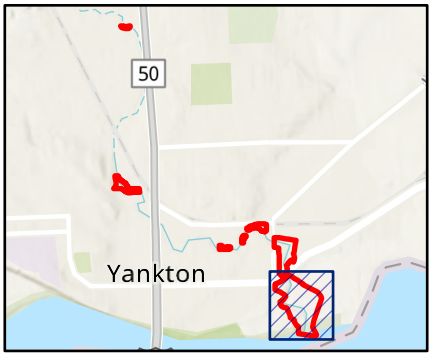


Legend

- Construction Limits
- Project Areas
- OWUS
- OWUS Impact

Figure 3e - Water Resources
Auld-Brokaw Maintenance and Recreational Trail System & Marne Creek Bank Stabilization Environmental Assessment

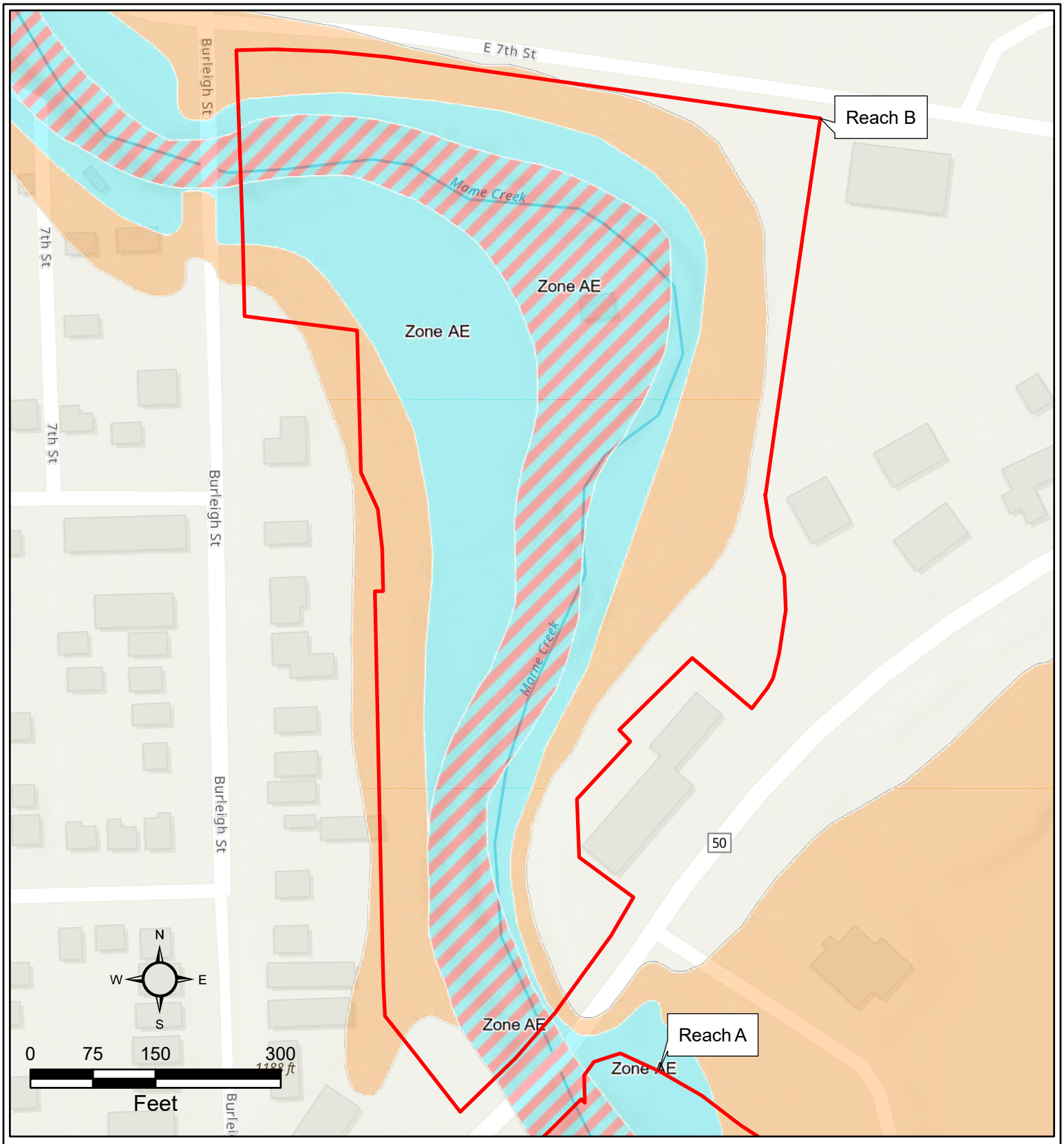


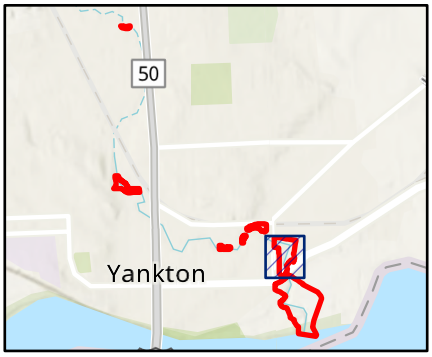


Legend

- Project Areas
- Zone AE Regulated Floodway
- Zone AE 100 year Floodplain
- 500 Year Floodplain
- Zone A 100 Year Floodplain

Figure 4a - Floodplain
Auld-Brokaw Maintenance and Recreational Trail System and Marne Creek Bank Stabilization Environmental Assessment

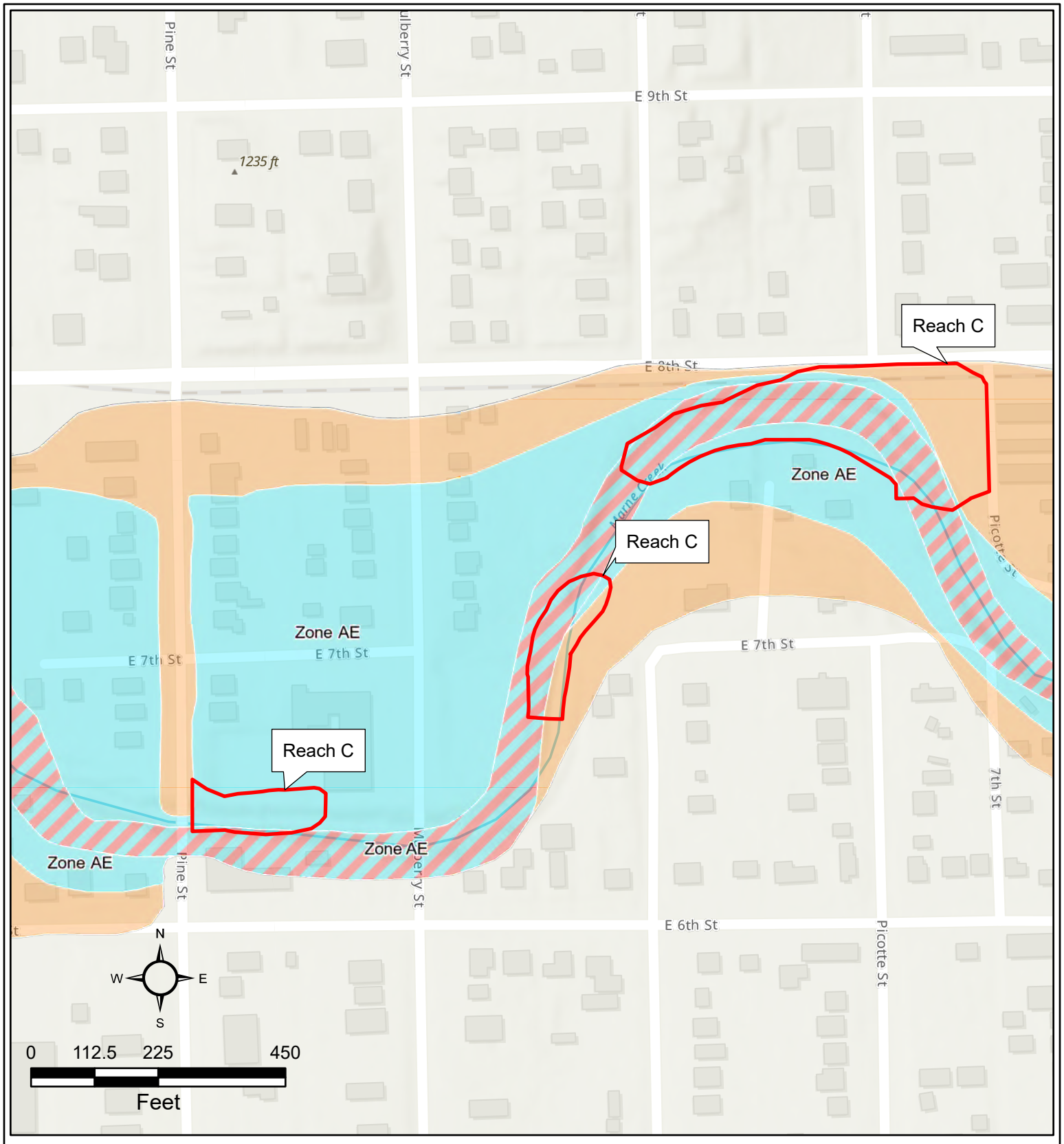


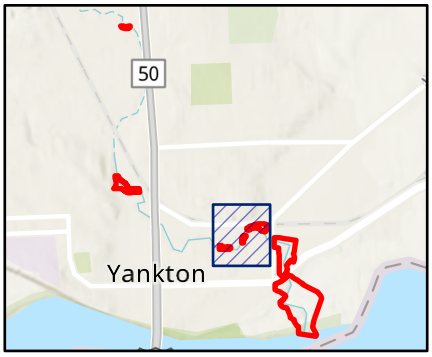


Legend

- Project Areas
- Zone AE Regulated Floodway
- Zone AE 100 year Floodplain
- 500 Year Floodplain
- Zone A 100 Year Floodplain

Figure 4b - Floodplain
Auld-Brokaw Maintenance and Recreational Trail System and Marne Creek Bank Stabilization Environmental Assessment

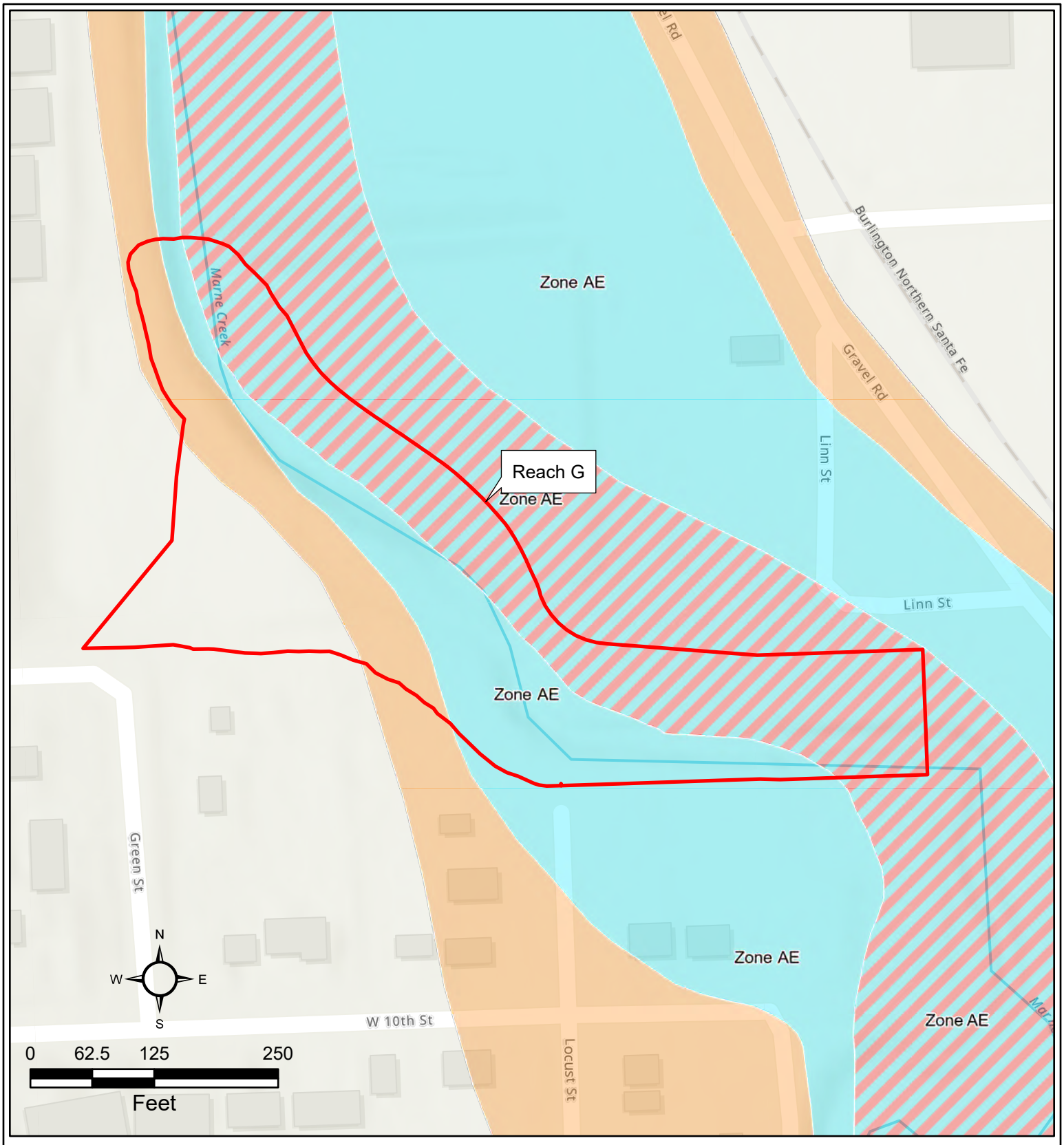


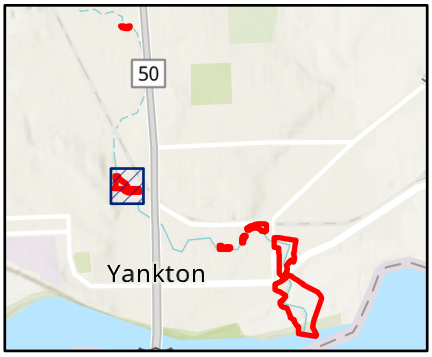


Legend

- Project Areas
- Zone AE Regulated Floodway
- Zone AE 100 year Floodplain
- 500 Year Floodplain
- Zone A 100 Year Floodplain

Figure 4c - Floodplain
Auld-Brokaw Maintenance and Recreational Trail System and Marne Creek Bank Stabilization Environmental Assessment

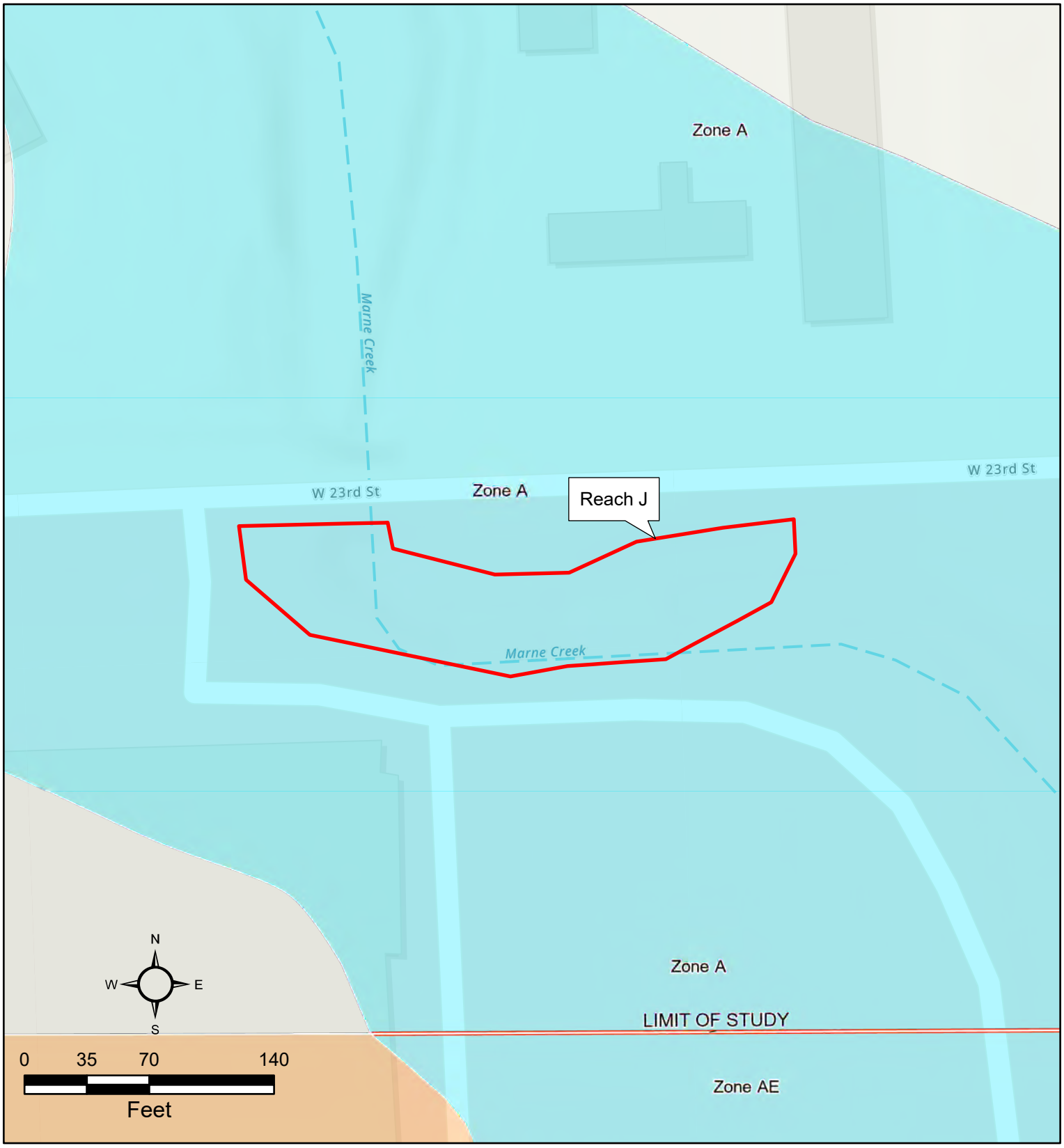


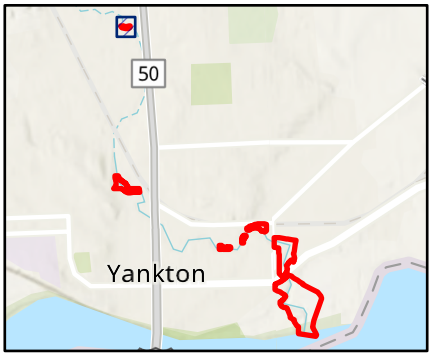


Legend

- Project Areas
- Zone AE Regulated Floodway
- Zone AE 100 year Floodplain
- 500 Year Floodplain
- Zone A 100 Year Floodplain

Figure 4d - Floodplain
Auld-Brokaw Maintenance and Recreational Trail System and Marne Creek Bank Stabilization Environmental Assessment

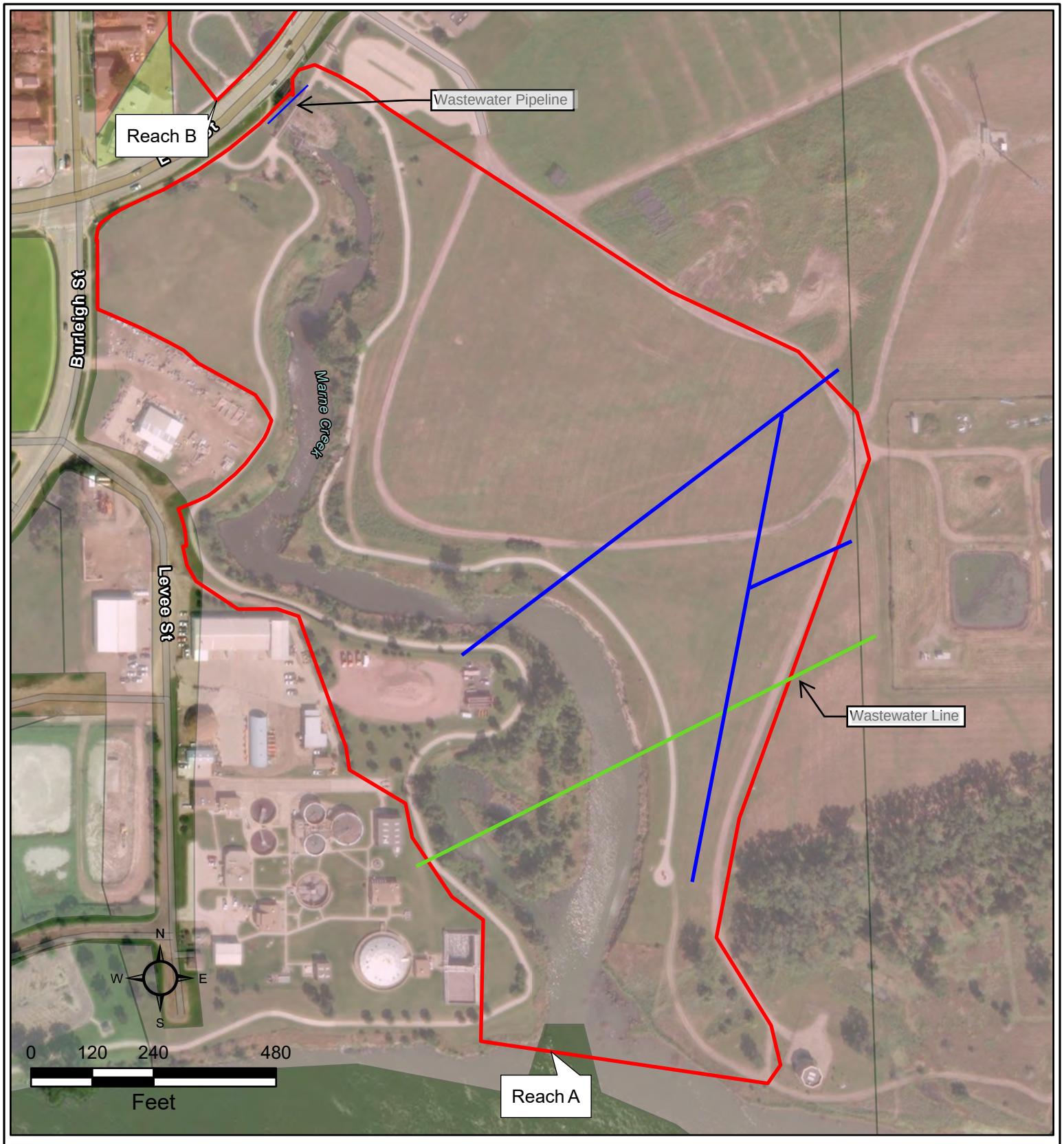


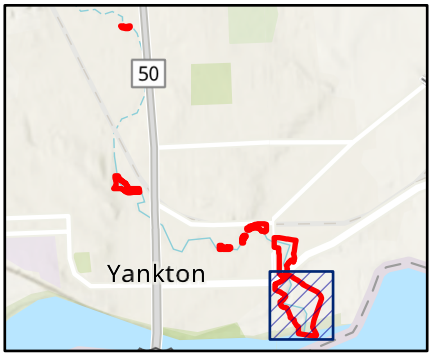


Legend

- Project Areas
- Zone AE Regulated Floodway
- Zone AE 100 year Floodplain
- 500 Year Floodplain
- Zone A 100 Year Floodplain

Figure 4e - Floodplain
Auld-Brokaw Maintenance and Recreational Trail System and Marne Creek Bank Stabilization Environmental Assessment





Legend

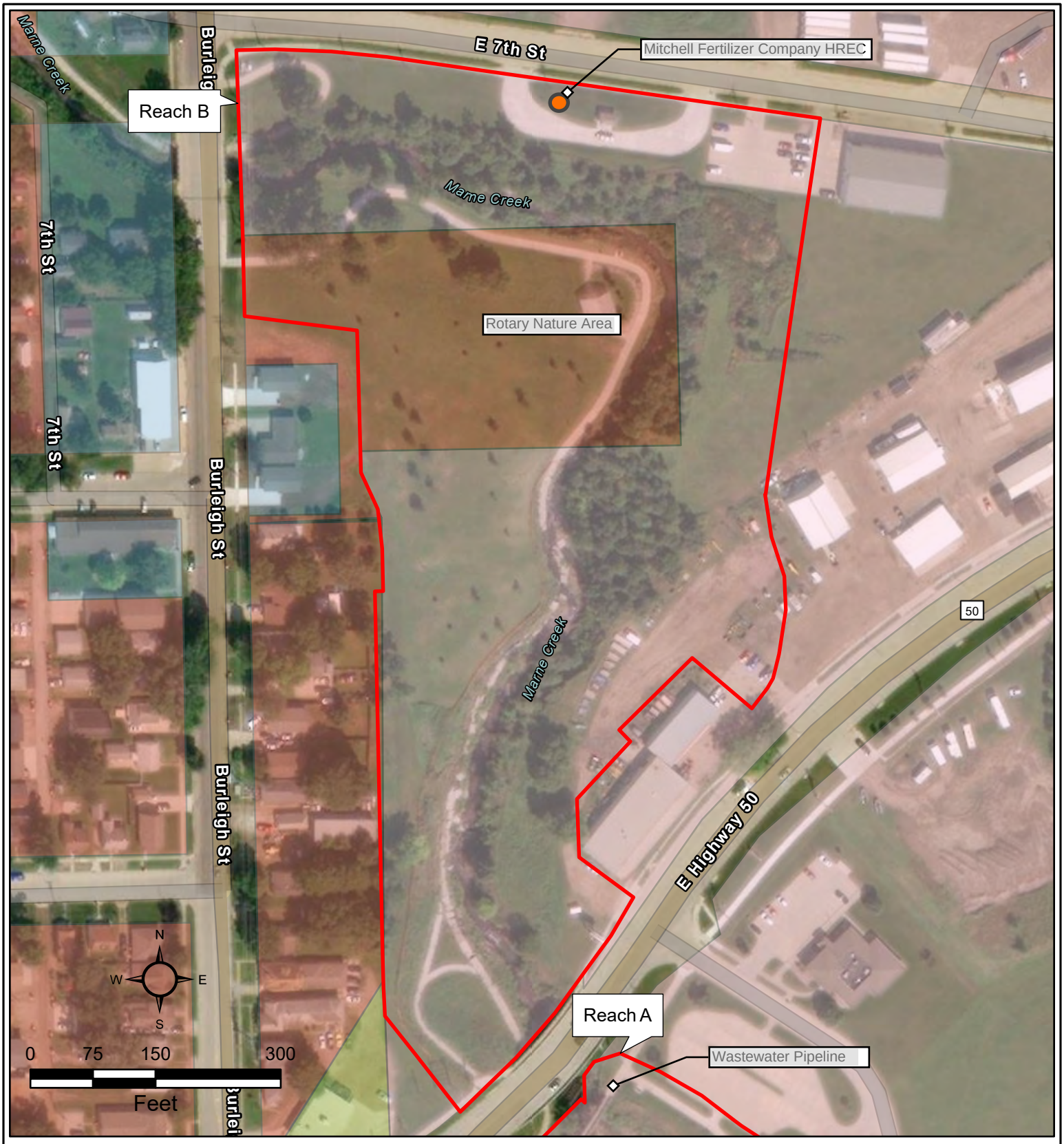
Project Areas

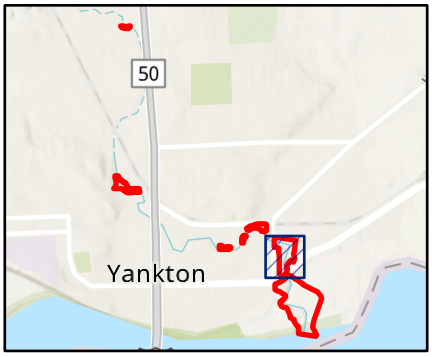
Zoning

- R-4 Multi-Family
- B-3 Central Business
- I-1 Industrial
- A-1 Agricultural

Figure 5a - Hazardous Materials, Land Use, and Utilities

Auld-Brokaw Maintenance and Recreational Trail System and Marne Creek Bank Stabilization Environmental Assessment





Legend

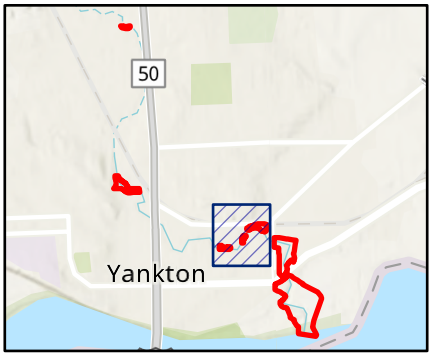
Project Areas

Zoning

- R-4 Multi-Family
- B-1 Local Business
- B-3 Central Business
- I-1 Industrial

Figure 5b - Hazardous Materials, Land Use, and Utilities

Auld-Brokaw Maintenance and Recreational Trail System and Marne Creek Bank Stabilization Environmental Assessment



Legend

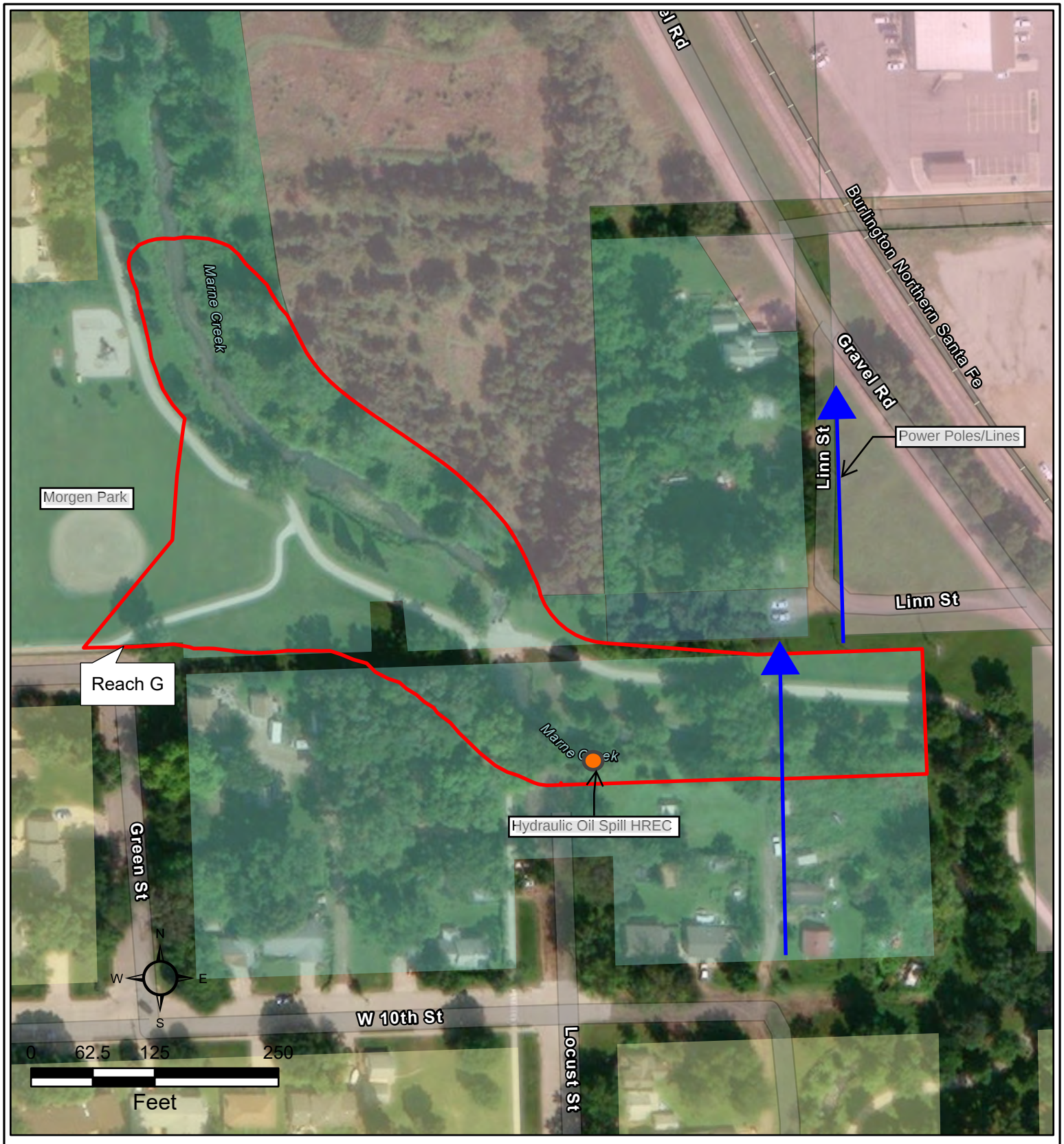
Project Areas

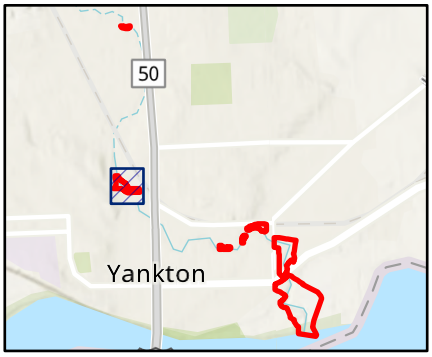
Zoning

- R-2 Single Family
- R-3 Two Family
- R-4 Multi-Family
- B-1 Local Business
- B-2 Highway Business
- I-1 Industrial

Figure 5c- Hazardous Materials, Land Use, and Utilities

Auld-Brokaw Maintenance and Recreational Trail System and Marne Creek Bank Stabilization Environmental Assessment





Legend

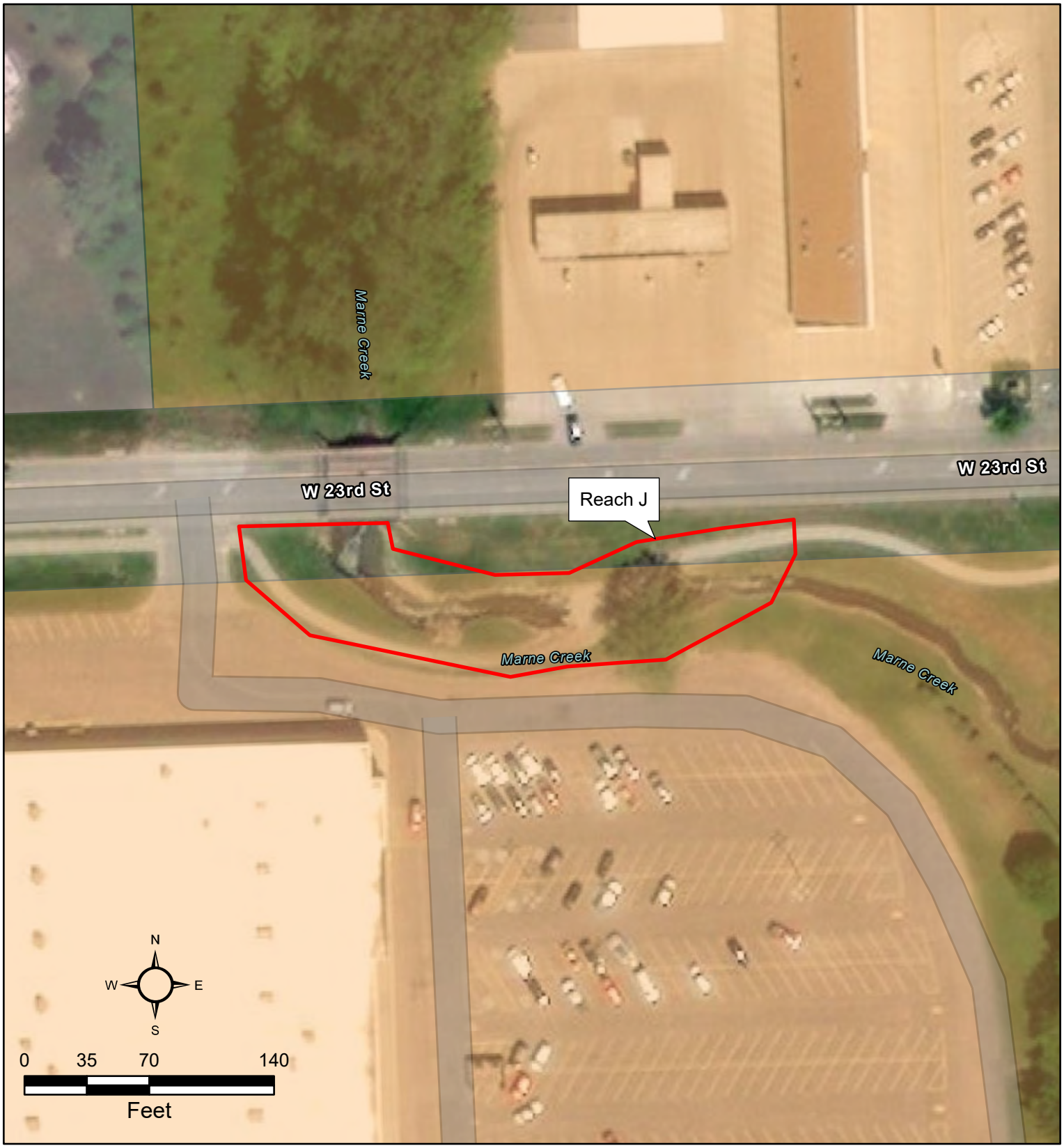
Project Areas

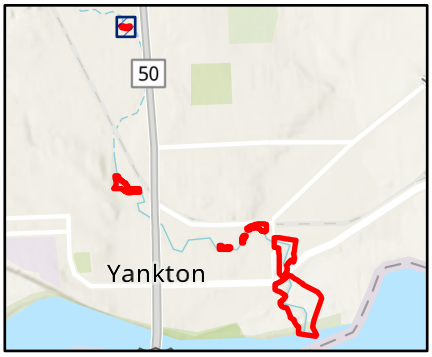
Zoning

- R-1 Single Family
- R-2 Single Family
- B-1 Local Business
- I-1 Industrial

Figure 5d - Hazardous Materials, Land Use, and Utilities

Auld-Brokaw Maintenance and Recreational Trail System and Marne Creek Bank Stabilization Environmental Assessment





Legend

Project Areas

Zoning

B-2 Highway Business

I-1 Industrial

Figure 5e - Hazardous Materials, Land Use, and Utilities

Auld-Brokaw Maintenance and Recreational Trail System and Marne Creek Bank Stabilization Environmental Assessment

APPENDIX B: FLOODPLAIN AND EO 11990 EIGHT-STEP DOCUMENTATION

Eight-Step Planning Process for Floodplains and Wetlands
FEMA Region VII, Disaster 4440-DR-SD, Project ID 108439
Auld-Brokaw Trail Repair and Marne Creek Bank Stabilization

The Auld-Brokaw Maintenance and Recreational Trail System along Marne Creek sustained severe damage during the March 2019 blizzard and subsequent rapid snowmelt. Once flooding subsided, an evaluation of the damage along Marne Creek within the City of Yankton limits revealed eroded and sloughed banks, exposed and damaged storm sewer, water line, and bridge foundations, displaced riprap, failed gabion baskets, and collapsed portions of the Auld-Brokaw Trail. The purpose of the proposed action is to repair disaster-damaged infrastructure and to reduce damage from similar events in the future. The action is needed to restore and protect property due to ongoing erosion and destabilization of Marne Creek.

Step 1: Determine whether the Proposed Action is located in a wetland and/or the 100-year floodplain, or whether it has the potential to affect or be affected by a floodplain or wetland.	**Project Analysis:** The Project Area is located within mapped Flood Zone A, Zone AE, and Zone X on FEMA FIRMs 46135C0432D and 46135C0319D, effective on 07/06/2010. The USFWS mapper indicates that Marne Creek includes riverine wetlands (R4SBC and R5UBH) throughout the Project Area.
Step 2: Notify public at earliest possible time of the intent to carry out an action in a floodplain or wetland and involve the affected and interested public in the decision-making process.	**Project Analysis**: The community was engaged in the development of the project through a notice of intent in the newspaper, a project information sheet handout, and one community meeting planned during the public availability of the EA. FEMA's Notice of Intent to prepare an Environmental Assessment was made available on-line on the City of Yankton (City) website and SD Emergency Management website on November 10, 2021. No comments were received during the 15-day public comment period.
Step 3: Identify and evaluate practicable alternatives to locating the Proposed Action in a floodplain or wetland.	**Project Analysis:** Two alternatives for the Marne Creek bank stabilization project were reviewed. These alternatives included the No Action Alternative and the *Proposed Action Alternative*. Under the *No Action Alternative*, no improvements would be made to mitigate the effects of flooding or sedimentation and erosion through the Project Area. The City would continue to maintain the trail system and, as bank erosion continues, may need to close additional sections for public safety reasons. Erosion would continue to occur in the natural sections of the creek and the erosion process would be accelerated as the channel enlarges. The *Proposed Action Alternative* would involve bank stabilization in Marne Creek and trail reconstruction. While the Proposed Action would require construction in the existing floodplain, its purpose is in overall support of improving floodplain values. The banks of Marne Creek would be sloped and armored, with the intent of reconnecting the creek to its banks and preventing future erosion.
Step 4: Identify the full range of potential direct or indirect impacts associated with the occupancy or modification of floodplains and wetlands, and the potential direct and indirect support of floodplain and wetland development that could result from the Proposed Action.	**Project Analysis:** Under the *Proposed Action Alternative*, the impact below the Ordinary High-Water Mark of Marne Creek would be minor and permanent. The total acreage estimated of permanent impacts is 1.68 acres. The majority of impacts to riparian wetlands to Marne Creek would be minor and permanent. Approximately 0.28 acre of permanent impact have been identified. Additional temporary impacts may occur during construction, these areas would be identified later in the design process and are anticipated to return to wetland areas.

Step 5: Minimize the potential adverse impacts from work within floodplains and wetlands (identified under Step 4), restore and preserve the natural and beneficial values served by wetlands.	**Project Analysis:** The Proposed Action would reduce the risk of flood damage to infrastructure on properties located adjacent to Marne Creek in the Project Area. Grading activities and installation of the proposed naturalistic channel stabilization along Marne Creek will help to restore connection between Marne Creek and its banks. While it is not a primary goal of the project, the stabilization of the channel may ultimately foster an environment that would support riparian wetlands in the future. Compliance with USACE wetland avoidance, minimization, and mitigation requirements would occur. Compliance with USFWS recommendations for minimization measures pertaining to threatened or endangered species impacts would occur.
Step 6: Re-evaluate the Proposed Action to determine: 1) if it is still practicable in light of its exposure to flood hazards; 2) the extent to which it will aggravate the hazards to others; 3) its potential to disrupt floodplain and wetland values.	**Project Analysis**: 1. The Proposed Action is a bank stabilization project and must be in the floodplain in order to function. The Proposed Action would have positive impacts to the creek corridor and will be designed to mitigate damage to the creek and surrounding infrastructure during flood events. 2. The analysis completed indicates that the Proposed Action would reduce, not aggravate, future flood hazards. 3. The mitigation of bank erosion due to high flow rates, the resulting control of sediment and erosion, and the improvement of connectivity between the channel and its banks located within the floodplain that would result from construction of the project would have positive impacts with minimal disruption. Existing wetlands may be impacted temporarily by the Proposed Action; however, these areas are anticipated to return to wetland conditions after project construction. In addition, the reshaping of the banks may allow riverine wetlands to form in the future.
Step 7: If the agency decides to take an action in a floodplain or wetland, prepare and provide the public with a finding and explanation of any final decision that the floodplain or wetland is the only practicable alternative. The explanation should include any relevant factors considered in the decision-making process.	**Project Analysis:** A final project specific public notice will be published informing the public of FEMAs intent to proceed with the project. The notice will include significant facts considered in making the determination and a statement indicating that the proposed will conform to State and Local floodplain protection standards.
Step 8: Review the implementation and post-implementation phases of the Proposed Action to ensure that the requirements of the EOs are fully implemented. Oversight responsibility shall be integrated into existing processes.	**Project Analysis:** The *Proposed Action Alternative* would be implemented in accordance with all project conditions as described in supporting documents.

APPENDIX C: AGENCY CORRESPONDENCE

Banner Associates, Inc.
409 22nd Avenue South
Brookings, SD 57006
Tel 605.692.6342
Toll Free 855.323.6342
www.bannerassociates.com

November 1, 2021

Ms. Baylee Hoff
South Dakota Department of Agriculture and Natural Resources
Joe Foss Building
523 East Capital Avenue
Pierre, SD 57501-3182

RE: Environmental Assessment for the Auld-Brokaw Trail Maintenance and Marne Creek Bank Restoration
BAI. No. 23371.00

Dear Ms. Hoff:

The City of Yankton has requested funding from the Federal Emergency Management Agency (FEMA) to restore Auld-Brokaw Trail and stabilize sections of banks along Marne Creek. Banner Associates, Inc. (Banner) has been selected to complete the engineering design and Environmental Assessment.

Six reaches of Marne Creek (Reach A-D, G, and J) have sustained damage from recent flooding events. Reaches A and B have damaged sections of trail which have collapsed into the creek along with sections of unstable banks. The remaining reaches have intact, usable trail, but the unstable and eroding banks threaten the longevity of the overall trail system. The City of Yankton plans to restore the trail to pre-flood condition and stabilize any banks that have potential to collapse in future flooding events. The purpose of the proposed action is to repair disaster-damaged infrastructure and to reduce damage from similar damage in the future. The action is needed to restore and protect life and property due to ongoing erosion and destabilization of Marne Creek.

Please provide comment on any of the following topics that pertain to your agency:

1.	Water Quality Standards	4.	Underground Storage Tanks
2.	Air Quality	5.	Contaminated Soils
3.	Hazardous Waste	6.	Monitoring Wells

Please submit your comment as soon as possible, so the project's environmental documentation can be completed. If you have any questions or need additional information, please contact me at 855-323-6342.

Sincerely,

Becky Baker

Becky Baker
Environmental Department Head

Enclosures: Project Location Figure

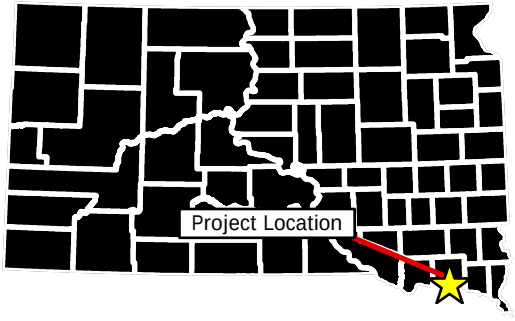


Figure 1 - Project Location Map

Marne Creek Bank Stabilization and Auld-Brokaw Trail Restoration
Yankton County, South Dakota

Legend

Project Areas

N

0 0.2 0.4 0.8

Miles

BANNER

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
JOE FOSS BUILDING
523 E CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

December 6, 2021

Becky Baker
Banner Associates, Inc.
409 22nd Avenue, South
Brookings, SD 57006

Subject: Environmental Review- Auld-Brokaw Trail Maintenance and Marne Creek Bank Restoration

Dear Ms. Baker:

The South Dakota Department of Agriculture and Natural Resources (DANR) has reviewed the above-referenced project for potential impacts to natural resources. Based on the information submitted in your letter dated November 1, 2021, DANR has the following comments and permitting requirements.

Tanks and Spills
The Inspection, Compliance, and Remediation Program (ICRP) maintains a database of registered storage tanks and spills/environmental events, including petroleum and chemical releases in South Dakota. Our records show several known spills/environmental events and registered storage tank facilities near your project area. We have compiled this information in the attached table. Please be aware that while we make efforts to provide and maintain accurate data, the location information provided to us is occasionally inaccurate or incomplete. For further information about tanks or spills/environmental events in South Dakota, please visit the following website: https://apps.sd.gov/nr42interactivemap

In the event that contamination is caused by or encountered during any onsite construction activity, that contamination must be reported to DANR at 605-773-3296. Contaminated soil should be segregated from clean soil and sampled to determine disposal requirements. Further, any piping or other material to be placed in a location where it will be in contact with contaminated soil or groundwater, should be evaluated to determine if it is compatible with the contaminant. If you have questions, please contact Baylee Hoff at baylee.hoff@state.sd.us or (605) 773-3296

Solid and Hazardous Waste

It appears, based on the information provided, this project will have little or no impact on solid waste management in the area. If you have any questions, please contact Waste Management at 605-773-3153.

It is not expected that any hazardous wastes sites will be encountered within the vicinity of your project area. However, if road construction is planned for areas within a city or town, the contractor should contact this Department prior to construction. Should any hazardous waste be generated during the implementation of this project, the generator must abide by all applicable hazardous waste regulations. To determine whether your project may generate hazardous waste, visit: https://www.epa.gov/hwgenerators/managing-your-hazardous-waste-guide-small-businesses . If you have any questions please contact Anthony Wagner at 605-773-3153, or anthony.wagner@state.sd.us.

Demolition or renovation of a building structure may be subject to the South Dakota asbestos requirements. If demolition or renovation is part of this construction project, or if the scope of the project changes to include demolition or renovation, please contact Anthony Wagner at 605-773-3153, or anthony.wagner@state.sd.us.

Air Quality
Based on the information provided, it appears this project will have minor impacts to air quality in South Dakota. This impact would be through source and fugitive emissions. In many cases, an air quality permit is required to operate equipment with point source emissions. A permit application can be obtained from the Air Quality or Minerals and Mining Program. Fugitive emissions, although not covered under State air quality regulations, are a common source of public concern and may be subject to local or county ordinances. Please contact your local officials to discuss requirements regarding fugitive emissions.

For further air quality information, please contact Anthony Lueck, Air Quality Program, telephone number 605-773-3151.

Drinking Water
Based on the information provided, this project will not have adverse environmental effects to drinking water in this area. Should the parameters of your project change, please reach out to Mark Mayer at 605-773-6039 or Mark.Mayer@state.sd.us.

Surface Water
The Surface Water Quality Program (SWQ) has reviewed your request for comments letter. Based on the information provided, SWQ has the following comments:

1. At a minimum and regardless of project size, appropriate erosion and sediment control measures must be installed to control the discharge of pollutants from the construction site. Any construction activity that disturbs an area of one or more acres of land must have authorization under the General Permit for Storm Water Discharges Associated with Construction Activities. Contact the Department of

Agriculture and Natural Resources for additional information or guidance at 1-800-SDSTORM (1-800-737-8676) or https://danr.sd.gov/OfficeOfWater/SurfaceWaterQuality/default.aspx.

2. A Surface Water Discharge permit may be required if any construction dewatering should occur as a result of this project. Please contact this office for more information.

3. Impacts to tributaries, creeks, wetlands, and lakes should be avoided by this project. These waterbodies are considered waters of the state and are protected under Administrative Rules of South Dakota (ARSD) Chapter 74:51. Special construction measures may have to be taken to ensure that water quality standards are not violated.

This project will be in the vicinity of the Missouri River and Marne Creek. These waterbodies are classified by the South Dakota Surface Water Quality Standards and Uses Assigned to Streams for the following beneficial uses: (1) Domestic water supply waters (4) Warmwater permanent fish life propagation waters; (7) Immersion recreation waters; (8) Limited contact recreation waters; (9) Fish and wildlife propagation, recreation, and stock watering waters; and (10) Irrigation waters. Because of these beneficial uses, special construction measures may have to be taken to ensure that the 30-day average total suspended solids criterion of 90 mg/L and the daily maximum total suspended solids criterion of 158 mg/L are not violated.

4. The discharge of pollutants from any source, including indiscriminate use of fill material, may not cause destruction or impairment except where authorized under Section 404 of the Federal Water Pollution Control Act. Please contact the United States Army Corps of Engineers for more information 605-224-8531.

Groundwater

Based on the information provided, this project is unlikely to have adverse effects on ground water quality. Should the parameters of your project change, please reach out to Matt Hicks at 605-773-5337 or Matt.Hicks@state.sd.us.

Water Rights

The project as proposed for Marne Creek appears to involve maintainance and restoration of the stream channel. However, if the stage, level or flow is altered beyond what would be natural conditions, water right permitting may be required. For more information on water rights permitting, please contact Ron Duvall at ron.duvall@state.sd.us or (605) 773-3352 if you have any questions.

Thank you for providing DANR the opportunity to comment on this project. If you have any questions regarding the information provided, please contact me at 605-773-3296.

Sincerely,

Baylee Hoff
Environmental Scientist
SD DANR- Environmental Assessment Contact
Phone: (605) 773-3296
Email: Baylee.Hoff@state.sd.us

Tables, Figures, and Other Attachments

Table 1: Spills/Environmental Events and Tanks Within or Nearby Project Area

Section 1: Spills/Environmental Events

Status Key: NFA= No Further Action I= Inactive C= Closed W= Withdrawn

Case ID	Status	DANR Reviewer	Site Name	Spill Site Location	City	Latitude	Longitude	Material
98.387	NFA	SH	Yankton Central Garage - Tank Replacements	700 Levee Street	Yankton	42.8683167	-97.38202	Petroleum
2016.006	C	KN	Solvent Dumping - Waste Water Treatment Plant	Levee Street	Yankton	42.8676147	-97.38158	Unknown
87.084	NFA	BM	Former Mitchell Fertilizer Site - Runoff	Business site near Marne Creek	Yankton	42.87482	-97.3812	Pesticide
90.498	C	JL	John's APCO	700 East 4th Street (4th / Hwy 50 & Burleigh)	Yankton	42.87139	-97.3825	Diesel
2001.016	NFA	BW	Ag-land Fertilizer	804 East Highway 50	Yankton	42.87362	-97.3795	Pesticide
2008.128	NFA	SB	Assessment - Agland Fertilizer East	804 East 4th	Yankton	42.8732	-97.3799	Gasoline
9999.16	W		Withdrawn ATP - Uhrich Property	411 Burleigh Street	Yankton	42.87168	-97.383	
97026	C	KM	Syd's Auto Salvage	601 Burleigh	Yankton	42.87375	-97.383	
96.279	C	SB	Yankton Co Shop - Tank Removals	407 West 11th Street	Yankton	42.88036	-97.3978	Petroleum
2000.272	C	KM	Hydraulic Oil Spill	End of Locust Street in Marne Creek	Yankton	42.87958	-97.4	hydraulic oil
2012.157	C	RL	Tar Disposal Site - Yankton	Near RR Right-of-Way at 407 West 11th Street	Yankton	42.8802	-97.3981	Tar
2013.221	C	TF	ATP - Former Highway Dept Property	401 West 11th Street	Yankton	42.88028	-97.3979	Petroleum

Section 2: Tanks

Tank Type and Status Key: UST=Underground Storage AST= Above Ground Storage A= Active I= Inactive

Facility ID	Facility Name	Facility Address	Facility City	Tank Type and Status	Facility Latitude	Facility Longitude	Number of Tanks

07-00055	Yankton Co hwy Shop	PO box 174	Yankton	UST-I	42.880306	-97.397854	6
07-00056	Hot spot Liquor	909 Broadway	Yankton	UST- A	42.878825	-97.397374	5
070002	Yankton Co Hwy Dept	3rd and broadway	Yankton	AST- I			
07-00027	Gramps	700 East 4th St	Yankton	UST- A	42.871246	97.382641	6
07-00068	Agland Fertilizer	E hwy 50`	Yankton	UST- I	42.87	-97.37	1

Banner Associates, Inc.
409 22nd Avenue South
Brookings, SD 57006
Tel 605.692.6342
Toll Free 855.323.6342
www.bannerassociates.com

November 1, 2021

Milt Haar, Acting Superintendent
Missouri Recreational Riverway at the National Park Service
508 E 2nd Street, Yankton, SD 57078

RE: Environmental Assessment for the Auld-Brokaw Trail Maintenance and Marne Creek Bank Restoration
BAI. No. 23371.00

Dear Mr. Haar:

The City of Yankton has requested funding from the Federal Emergency Management Agency (FEMA) to restore the Auld-Brokaw Trail and stabilize sections of banks along Marne Creek. Banner Associates, Inc. (Banner) has been selected to complete the engineering design and Environmental Assessment.

Six reaches of Marne Creek (Reach A-D, G, and J) have sustained damage from recent flooding events. Reaches A and B have damaged sections of trail which have collapsed into the creek along with sections of unstable banks. The remaining reaches have intact, usable trail, but the unstable and eroding banks threaten the longevity of the overall trail system. The City of Yankton plans to restore the trail to pre-flood condition and stabilize any banks that have potential to collapse in future flooding events. The purpose of the proposed action is to repair disaster-damaged infrastructure and to reduce damage from similar damage in the future. The action is needed to restore and protect life and property due to ongoing erosion and destabilization of Marne Creek.

A project location figure is attached for your review and comment. Please submit your comments as soon as possible, so that the project's environmental documentation can be completed. If you have any questions or need additional information, please contact me at 855.323.6342.

Sincerely,

Becky Baker

Becky Baker
Environmental Department Head

Enclosure: Project Location Figure

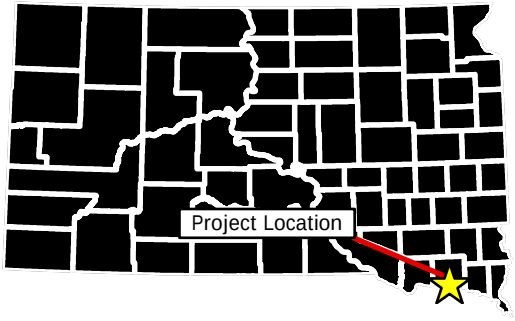


Figure 1 - Project Location Map

Marne Creek Bank Stabilization and Auld-Brokaw Trail Restoration
Yankton County, South Dakota

Legend

Project Areas

N

0 0.2 0.4 0.8

Miles

BANNER

United States Department of the Interior
NATIONAL PARK SERVICE
Missouri National Recreational River
508 East 2nd Street
Yankton, South Dakota 57078

IN REPLY REFER TO:
1.A.1 Section 7(a) Marne Creek

May 13, 2022

Dear Banner Associates, Inc.:

The National Park Service (NPS) is providing preliminary comments regarding the proposed Auld-Brokaw Trail Repair and Marne Creek Bank Stabilization as the project will require an evaluation under Section 7(a) of the Wild and Scenic Rivers Act (WSRA). We appreciate your efforts to meet the intent of the WSRA while meeting this important public need.

The Missouri National Recreational River (River) is a Congressionally designated component of the National Wild and Scenic Rivers System (System) and a unit of the National Park System. The River was designated under Section 2(a)(i) of the Wild and Scenic Rivers Act (WSRA) (Public Law 90-542 as amended) on November 10th, 1978. The NPS is charged with the day-to-day management of the River and retains authority over federally-assisted water resources projects by making evaluations and determinations of effect under Section 7(a) of the WSRA.

A Section 7(a) evaluation and determination is made to assess whether a proposed water resource project located within a designated reach will have a direct and adverse effect on the values for which the River was established. Water resources projects include, but are not limited to, dams; water diversion projects; fisheries habitat and watershed restoration/enhancement projects; bridge construction or demolition; bank stabilization projects; boat ramps; and other activities that require a Section 404 or Section 10 Permit from the U.S. Army Corps of Engineers (USACE). The WSRA prohibits Federal assistance to water resource projects the NPS has determined will have a direct and adverse effect on any or all river values. The NPS cannot consent to projects found to have impacts to river values that cannot be avoided or eliminated. River values at the project location include: fish and wildlife, geologic, palaeontologic, recreational, water quality, and free-flowing condition.

Section 7(a) States:

> *" ... no department or agency of the United States shall assist by loan, grant, license, or otherwise in the construction of any water resources project that would have a direct and adverse effect on the values for which such river was established, as determined by the Secretary charged with its administration. Nothing contained in the foregoing sentence, however, shall preclude licensing of or assistance to, developments below or above a wild, scenic or recreational river area or on any stream tributary thereto which will not invade the area or unreasonably diminish the scenic, recreational, and fish and wildlife values present in the area on the date of designation of a river as a component of the National Wild and Scenic Rivers System. No department or agency of the United States shall recommend authorization of any water resources project that would have a direct and*

adverse effect on the values for which such river was established, as determined by the Secretary charged with its administration, or request appropriations to begin construction of any such project, whether heretofore or hereafter authorized, without advising the Secretary of the Interior or the Secretary of Agriculture, as the case may be,in writing of its intention so to do at least sixty days in advance, and without specifically reporting to the Congress in writing at the time it makes its recommendation or request in what respect construction of such project would be in conflict with the purposes of this chapter and would affect the component and the values to be protected by it under this chapter."

The proposed bank stabilization in Marne Creek meets the criteria of a federally-assisted water resources project because it is a construction activity that occurs within the ordinary high watermark (OHWM) or bed and bank of the River within the designated boundary of the park and its tributary with federal assistance in the form of a Clean Water Act Section 404 permit from the USACE and other federal assistance from the Federal Emergency Management Agency (FEMA). The project is subject to a determination under the "Direct and Adverse Effect" evaluation standard of Section 7(a) of the WSRA within the boundaries of the River and the "invade the area or unreasonably diminish the scenic, recreation, and fish and wildlife" evaluation standard on the tributary, outside the boundaries of the River.

As proposed, the project will involve the stabilization of approximately 2 miles of bank at six reaches within Marne Creek. Sites A-UL 1, 2, 3 and A-UR 1-3 are of most concern to the River because of their location within or adjacent to the boundaries of the River. Protected values at the project location include: cultural, recreational, water quality, and free-flowing condition.

Section 16(b) of the Act defines the term "free-flowing" as follows:

"Free-flowing," as applied to any river or section of a river, means existing or flowing in natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway. The existence, however, of low dams, diversion works, and other minor structures at the time any river is proposed for inclusion in the national wild and scenic rivers system shall not automatically bar its consideration for such inclusion: Provided, That this shall not be construed to authorize, intend, or encourage future construction of such structures within components of the national wild and scenic rivers system."

The NPS offers a preliminary analysis of the project's potential effects on the River's values and makes the recommendations to make the project more consistent with the antidegradation policy of the River and the purposes of the River under the WSRA.

1. **Proposed Stream Treatment:**
    a. As proposed in the Figure 2a - Reach A- Alternative 2 Typical Section drawing, the project is acceptable without conditions at locations upstream from A-UL 3/ Figure 2b - Reach A- Alternative 2 Design Overview
    b. The effects of the project upstream from A-UL 3 are likely de minimis with no effect on the scenic, recreational, and fish and wildlife values of the River.

2. **Opportunities to Minimize Rock Channel Protection and Enhance Free-Flowing Condition:**

a. Rock channel protection (RCP) is most likely not necessary within the inside curve/depositional bends of the River; we suggest eliminating the use of RCP on inside curves and where some stabilization is deemed necessary, use rock-less bioengineering techniques including dormant plantings and native seeding or other vegetation and wood-based stabilization practices at A-UL 1, 2 and parts of A-UL 3 and A-UR 1-3.

b. Allow for a more deformable or no action alternative downstream of the first outside bend of A-UL 3; as part consider the relocation of the multi-use trail and cul-de-sac along left bank of the River.

The NPS looks forward to the restoration of this important location in a manner that will ensure its long-term viability and work with the natural processes of the River. Should you have any questions or concerns, please contact Carolyn Campbell, carolyn_campbell@nps.gov, 605-669-0209 ext 30.

Sincerely,

Curt R. Dimmick, Ph.D.

CC:
FEMA
USACE

Banner Associates, Inc.
409 22nd Avenue South
Brookings, SD 57006
Tel 605.692.6342
Toll Free 855.323.6342
www.bannerassociates.com

June 3, 2022

Mr. Curt Dimmick, Acting Superintendent
National Park Service
508 E 2nd Street
Yankton, SD 57078

RE: Response to Preliminary Letter for the Auld-Brokaw Trail Maintenance and Marne Creek Bank Restoration
BAI. No. 23371.00

Dear Mr. Dimmick:

The City of Yankton, Banner Associates and RESPEC appreciate the National Park Service (NPS) Section 7a preliminary letter sent May 13th, 2022, regarding the Recreational River status assigned to this segment of the Missouri River. We also appreciate the follow up coordination meeting on May 24th, 2022, to discuss our approach and possible options to comply with Section 7a. Refer to Attachment 1, Meeting Minutes. This letter is a follow-up to the initial preliminary letter and your recommendations. We have revised our design and proposed vegetation. We are requesting your review of these revisions and our proposed exception to include riprap in specific locations in Reach A, due to special circumstances.

To comply with Section 7a, your letter noted that the proposed actions for bank stabilization as currently designed within Reach A is not fully in compliance with the Wild and Scenic Rivers Act of 1968 (Public Law 90-542; 16 U.S.C. 1271 et seq.). Compliance and recommendations are tied to the values assigned to this segment of the Missouri River, which include cultural, recreational, water quality, and free-flowing condition. In line with preserving the values of the Missouri River, the following recommendations specific to this project were in the preliminary letter dated May 13, 2022:

1. Proposed Stream Treatment:
    a. As proposed in the Figure 2a - Reach A- Alternative 2 Typical Section drawing, the project is acceptable without conditions at locations upstream from A-UL 3/ Figure 2b - Reach A- Alternative 2 Design Overview.
    b. The effects of the project upstream from A-UL 3 are likely de minimis with no effect on the scenic, recreational, and fish and wildlife values of the river.
2. Opportunities to Minimize Rock Channel Protection (RCP) and Enhance Free-Flowing Condition:
    a. RCP is most likely not necessary within the inside curve/depositional bends of the river; we suggest eliminating the use of RCP on inside curves and where some stabilization is deemed necessary, use rock-less bioengineering techniques including dormant plantings and native seeding or other vegetation and wood-based stabilization practices at A-UL 1, 2 and parts of A-UL 3 and A-UR 1-3.
    b. Allow for a more deformable or no action alternative downstream of the first outside bend of A-UL 3; as part consider the relocation of the multi-use trail and cul-de-sac along left bank of the river.

As discussed during our coordination meeting, the utility lines, adjacent development, and consideration for addressing bank stabilization to withstand future events was part of our team's consideration during design. This is in line with a statement that is also within the Wild and Scenic Rivers Act Section 7a "New riprap is not typically permitted on a designated river, but careful consideration must be given to the existing development and river's flow regime". There are a

variety of existing developments adjacent to Marne Creek. Inside the boundary to the west of Marne Creek is both a Wastewater Treatment Facility and City Street Department storage facility. Several utilities such as groundwater monitoring wells, petroleum pipelines, wastewater pipelines extending from the Wastewater Treatment Facility, and underground electrical lines, exist within Reach A. Refer to the Figure 2b, Revised Bank Stabilization Areas, for the highlighted utility lines. Some of the development was protected by past riprap areas along this reach, refer to Figure 1, Existing Riprap.

To protect the development areas and address bank stabilization for future events, and address Section 7a, the project team proposes the following:

1. Consideration of Removal of Originally Proposed Riprap Areas

The team has reviewed the original submitted riprap areas and have proposed to remove two locations that were identified in the original streambank damage inspection performed by FEMA. These locations would not have bank stabilization addressed. Refer to Figure 2a, Original Bank Stabilization Areas, for the original overview of the proposed bioengineering riprap. The revised overview that has removed some of the areas that riprap was previously proposed are shown in Figure 2b, Revised Bank Stabilization Areas. A-UL 1 and A-UL 2 would no longer have areas of proposed riprap as per the recommendations of NPS. The team believes that these areas are not as critical to protect as some of the other treatment areas within Reach A. A-UL 1 & 2 have revegetated since the event and have more space to remain as a natural "deformable" bank and are not critical at this point in time to lock into place.

2. Proposed Riprap Areas

The team has eliminated the proposed riprap areas to the maximum extent possible. Due to our analysis, we recommend that riprap is still required in several areas of Reach A for the following reasons:

During the preliminary design for the project, the shear stress and design standards for bank stabilization were utilized to propose the bioengineering riprap typical section and locations. Refer to Figures 3a and 3b, Shear Stress. The shear stress along outside bends of Reach A range from 3.18 psf to 4.45 psf. The Bureau of Reclamation recommends a maximum shear stress of 3.7 psf for Class A vegetation. With shear values in excess of this recommendation, it is necessary for the Marne Creek banks to be treated with riprap instead of a rock-less bank stabilization material that would not adequately combat the shear stresses.

During our coordination meeting, the use for riprap along the outside bends was understood with the removal of riprap treatment along the inside bends. Our team agrees that the inside bends in Reach A have lower shear stress values than outside bends, but shear stress is high compared to published values for solely vegetation and/or wood-based treatments. Consequently, it is preferred the proposed treatment remains to ensure a stable and uniform bank is constructed. The uniform bank treatment is necessary because in the original flooding event, there were non-uniform banks with and without riprap treatment. The existing riprap banks remained stable during the event, but the energy was transferred to the natural vegetated banks where they were significantly eroded.

Along the east side of Reach A (A ULR 1-3), there are a significant amount of utilities in close proximity to the existing bank (see Figure 2B) at both inside and outside bends. Marne Creek has become confined in this area due to urbanization and has little to no room to move without impacting utilities. For this reason, it is recommended to keep the entire length of A-ULR 1-3 as to not create any weak or soft areas along this bank section. In addition, the HEC 23 manual says, "the only acceptable solution in the immediate vicinity of a structure is a traditional, "hard" engineering approach". The team believes this also applies to critical utility areas.

BANNER

3. Proposed Revision for Riprap Areas

For the areas that would need to be riprapped, vegetation and natural rock cover are proposed. The following has been proposed as project commitments within the Environmental Assessment and final design:

1. *Vegetation Covering from 2 to 10 Year Water Mark*- Vegetation growth is proposed, a mix of forbs, grass, and smaller diameter trees. A granular material would be implemented to fill the void between the riprap and better support plant growth above the rock. Refer to Figure 4, Revised Typical Section.

   We have reviewed our grass seed mixes and tree species based on the following NPS guidance:

   "The soil shall be seeded with a mixture of native grasses and wildflower species and preferably, incorporate native trees and shrubs. Annual rye grass or other cover crop is recommended to reduce soil erosion and enhance the success of the native plantings. Non-native species such as smooth brome and Kentucky bluegrass shall not be used for this purpose." (Attachment 2, NPS – MNRR Bank Stabilization Methods)

   To meet these recommendations, our previous grass seed mix included one non-native plant. It was included as fast-growing species that would help with ground cover. To comply with the recommendation above, we have revised the seed mix to an only native plant seed mix that would be planted within the Marne Creek channel. For the proposed tree stakes, river birch would be utilized. This species is native and is available from local greenhouses.

2. *Usage of fieldstone or native rock as riprap material*- To meet the expectation of riprap material within permit conditions from the National Parks Service there will be:

   Fieldstone or native rock, and minimum of 12-14 inches of soil from the 10-year water surface line down to the 2-year water surface mark. Below the 2-year water surface line the riprap material will be fieldstone or native rock and no topsoil (MNRR Conditions).

   Refer to Figure 4, Revised NPS Typical Section. The typical section highlights measurements and illustrates the substitution of quarried pink quartzite for natural stone in an effort to preserve the aesthetic value of the area.

To continue our progress of the Environmental Assessment process, please provide a response to our proposed revision to the design and project commitments. If you have any questions or need additional information, please contact me at 605.690.2190.

Sincerely,

Becky Baker

Becky Baker
Environmental Department Head

CC:
FEMA
USACE

Enclosed:

- Attachment 1. NPS, FEMA, Yankton, Banner and RESPEC Coordination Meeting Minutes and MNRR Conditions
- Figure 1. Existing Riprap
- Figure 2a. Previous Bank Stabilization Areas
- Figure 2b. Revised Bank Stabilization Areas
- Figures 3a and 3b. Sheer Stress
- Figure 4. Revised Typical Section

Attachment 1. MNRR Conditions

Missouri National Recreational River

Bank Stabilization Information & Standard Permit Conditions

The following conditions are designed to protect the values for which the Missouri National Recreational River was included in the National Wild and Scenic River system. These conditions apply to activities authorized under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. All other federal and state regulations and requirements shall apply to the proposed activity.

The National Park Service (NPS) reviews all US Army Corp of Engineers permit applications within the 59- and 39- mile segments of the Missouri National Recreational River. The NPS is required to review water resource projects, such as bank stabilization, for their impact to the Outstandingly Remarkable Values (ORVs) for which Congress designated segments of the Missouri and Niobrara as Wild and Scenic Rivers. Each project is analyzed for its impacts to the following ORVs:

- Free-flow
- Scenic
- Recreational
- Fish and Wildlife
- Cultural and Ethnographic Resources
- Historic Resources
- Scientific

The NPS reviews each proposed project individually because local site conditions within the designated river reaches vary greatly. Adjacent stabilization, channel conditions, and the potential of the project to cause downstream erosion are all considered.

The NPS promotes the use of 'bioengineering' techniques utilizing native materials for stream bank protection. The NPS encourages those considering a bank stabilization project to request a site visit from our staff **prior to submitting** a permit application to the US Army Corps of Engineers to discuss alternatives and expedite the process. The US Army Corps of Engineers website has more information on the permit application process at:
http://www.usace.army.mil/CECW/Pages/reg_permit.aspx

STABILIZATION

I. BIOENGINEERING TECHNIQUES: Permit Required

Refers to the use of biodegradable material on the active streambank to prevent lateral erosion.

1. Toe protection may include tree revetments, live cribwalls, root wads, live siltation, trench pack, brush mattress, dead fascine, vegetated geogrid, coconut logs, jute-mat logs, or native fieldstone.
2. Plant materials should be native to this area. Native plants are adapted to the soils and weather of this area and should germinate and thrive.
3. All construction materials (e.g., erosion control material, stakes and anchoring systems) shall be biodegradable.
4. A Soil Bioengineering Guide (this document provides information on bioengineering techniques including materials and practices): http://www.fs.fed.us/eng/php/library_card.php?p_num=FS-683P

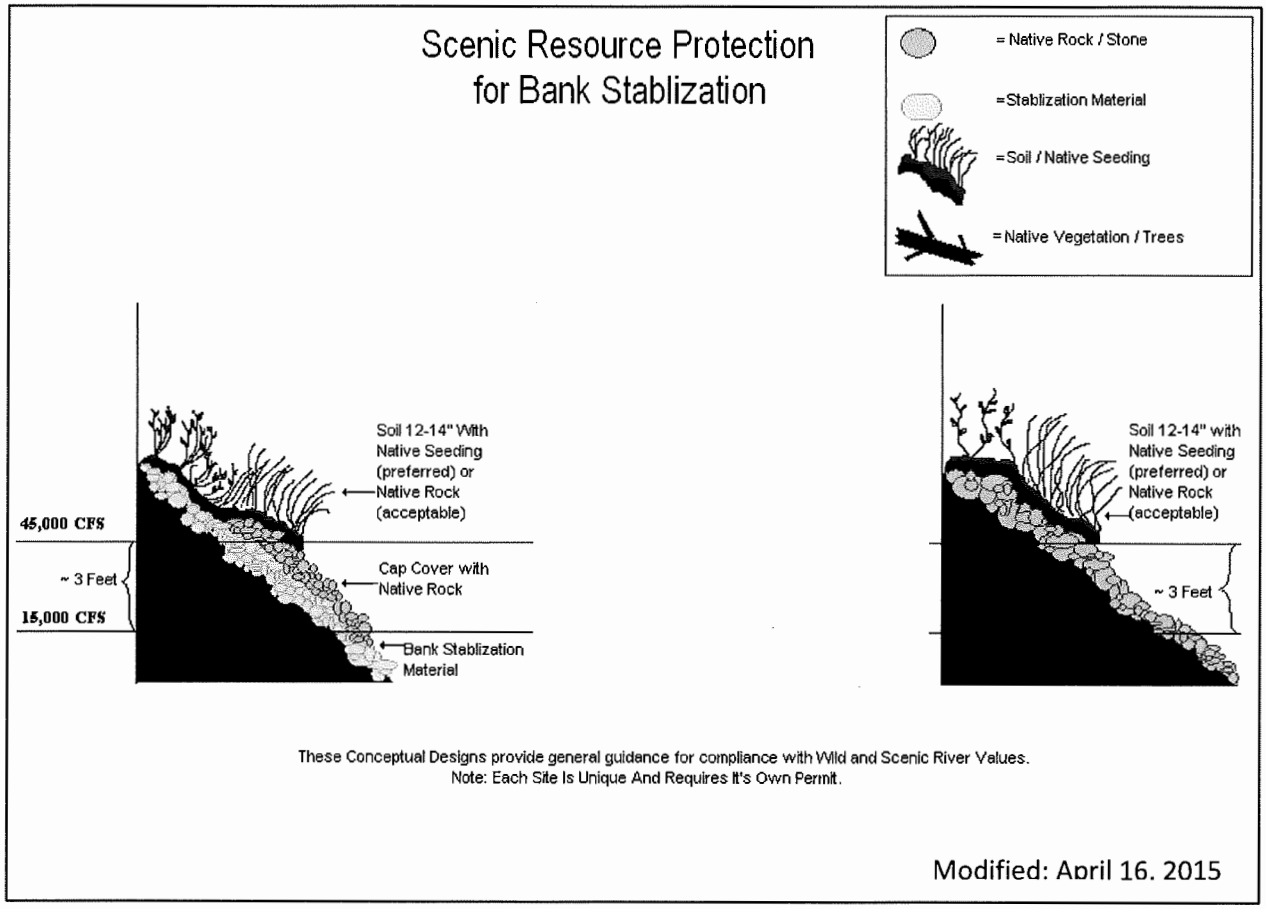
II. RIPRAP REVETMENT: Permit Required

Refers to the placement of riprap material on the active streambank to prevent lateral erosion.

1. Riprap shall consist of or be covered by fieldstone or native rock. Fieldstone is typically found in glacial till or outwash deposits and may be available from local gravel pits. Native rock is defined as any material the river would come into contact with during its natural migration within its floodplain, e.g. rock found along or within the bluffs of the river. The native rock must come from sources within or immediately adjacent to the Missouri National Recreational River. Quarried pink quartzite shall be covered with fieldstone, native rock, and a minimum of 12-14 inches of soil from the top of the structure down to the ordinary high water line and covered with fieldstone or native rock from the ordinary high water line (about 45,000 cfs level) to the low, winter flow line (about 15,000 cfs level). The soil requirement allows for the settling of soil into the rocks while still providing an adequate seed bed. A fieldstone or native rock cover is required in the water fluctuation zone (15,000 - 45,000 cfs) because wave action often washes away the soil exposing the underlying material. These practices will maintain the river's scenic value during normal river flows. Refer to conceptual design drawing below.
2. All riprap materials used shall be clean and free of concrete, metal, plaster, or other non-native materials.
3. Streambank revetment slope shall be designed to provide stability to the fieldstone; estimated to be one foot in height (rise) over a one-foot length (run) or flatter. Exceptions may apply.
4. The soil shall be seeded with a mixture of native grasses and wildflower species and preferably, incorporate native trees and shrubs. Annual rye grass or other cover crop is

recommended to reduce soil erosion and enhance the success of the native plantings. Non-native species such as smooth brome and Kentucky bluegrass shall not be used for this purpose.

5. Soil cover and plantings shall be completed immediately upon completion of revetment.
6. Clearing of on-shore and streambank vegetation shall be limited to that which is absolutely necessary for revetment construction.
7. Recommend that any trees or woody vegetation that is removed during rip-rap installation be replaced with native species and increased in quantity.



III. BURIED REVETMENT-Permit May Be Required

Refers to the placement of material in a trench excavated near the streambank. The purpose of this structure is to allow the streambank to erode to the buried revetment which then becomes the stabilized bank line.

1. Conditions for the riprap revetment apply to this practice.
2. The bottom of the trench should be located below the elevation of the ordinary high water mark to provide sufficient toe-of-slope protection.
3. Once the buried revetment becomes the newly stabilized bank, the permittee may need to re-seed to ensure that native vegetation cover exists from the top of the structure down to the ordinary high water mark.

IV. HARD POINTS: Permit Required

Refers to a wide range of deflective structures designed to force the river current to a different location. This practice is generally prohibited but may be considered on a case by case basis.

V. WINDROW REVETMENT: **Inappropriate Activity**

Refers to the placement of material on the streambank. The purpose of this structure is to allow the streambank to erode and launch the piled materials into the river with the intent of stabilizing the bank. This practice is inappropriate and generally ineffective.

BOAT DOCKS

Boat Dock Required Conditions

1. No permanent, habitable, or other structure will be permitted on boat docks or below the ordinary high water mark that will diminish the scenic or recreational values of the MNRR.
2. Floatation systems for boat docks must be comprised of clean (inside and out) sealed containers in sound condition.
3. Damaged docks must be repaired within 15 days or removed from the river to a location far enough away from the upper bank that they will not likely fall in due to bank erosion.
4. Material used for construction (metal, wood, coatings, etc.) must be free from pollutants in toxic amounts (see Section 307 of the Clean Water Act). The following website offers information on treated wood options and alternatives to wood construction materials: http://www.epa.gov/oppad001/reregistration/cca/alternativestocca.htm.
5. Unless specific circumstances justify it, a dock shall not project more than 25 feet into the river to ensure that the scenic or recreational values of the MNRR are maintained.
6. The permittee shall take all reasonable and necessary precautions to ensure boater safety and prevent interference with general navigation.
7. All dredge or fill activities below the ordinary high water mark require a Clean Water Act Section 404 permit.

Attachment 2: Meeting Minutes

Banner Associates, Inc.
2307 W 57th St, Ste 102
Sioux Falls, SD 57108
Tel 605.692.6342
Toll Free 855.323.6342
www.bannerassociates.com

MEETING MINUTES

DATE	May 24, 2022	
PROJECT	Marne Creek Bank Stabilization	BAI No. 23371
SUBJECT	Section 7a Preliminary Response	
LOCATION	Teams	
ATTENDEES	Adam Haberman, City of Yankton	
	Brad Moser, City of Yankton	
	Curt Dimmick, NPS	
	Carolyn Campbell, NPS	
	Hector Santiago, NPS	
	Richard Myers, FEMA	
	Kyle Cheeseman, FEMA	
	Kent Johnson, Banner	
	Matthew Johnson, RESPEC	
	Taylor Winkel, RESPEC	
	Becky Baker, Banner	

- **Introductions**

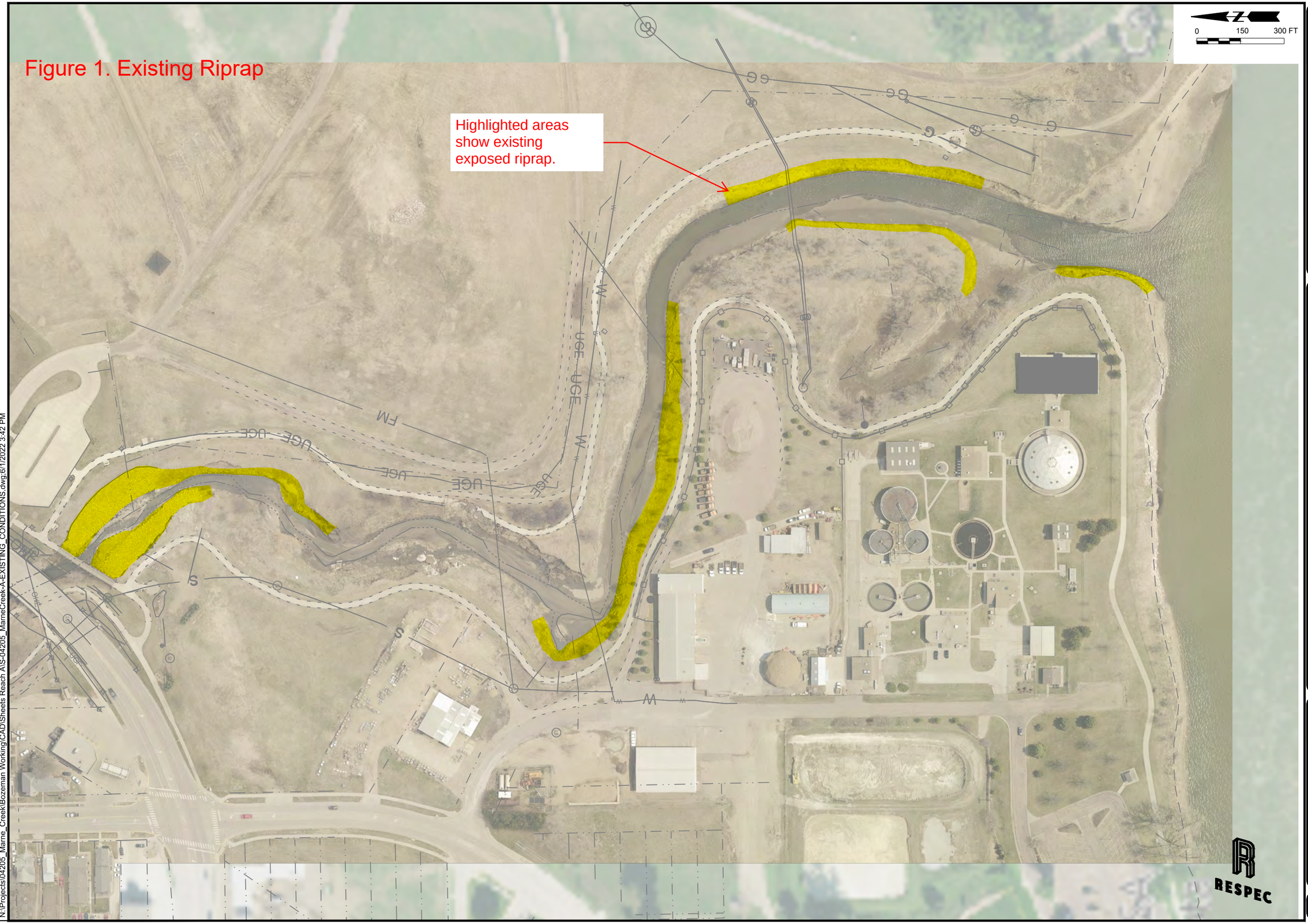
- **Discussion of Section 7a Compliance**
  1. Project is federally assisted financially by FEMA, so an Environmental Assessment is being completed.
  2. Goal is for construction in Fall 2022, so the EA needs to be completed soon for public review to meet this timeline. Appreciate the quick coordination meeting.
  3. Section 7a applies to this segment of the Missouri River. NPS has noted considerations for Reach A of Marne Creek as part of compliance with Section 7a. Clarified entire Reach A to look at it wholistically.
  4. Section 7a considers the assigned values to the segment of river, and their recommendations and determination considers the preservation of those values. The preliminary letter is for the EA stage of the project, the official determination comes during Section 404.
  5. FEMA has encouraged use of bioengineer riprap throughout the EA process. Coordination has also occurred with USACE for Section 404 permitting.

- **Specific Project Discussion**
  1. Large flood event in 2010 had major damage to the trail and banks of Marne Creek.

2. Project did first review the area to see if floodplain storage was a possibility. Was not effective with bridge crossings of Marne Creek being a constraint, so was eliminated.
3. Discussed the proposed bioengineering riprap typical section proposed with vegetation growth and tree takes proposed. Does still include riprap.
4. Discussed reasoning for the inclusion of riprap, which included:
    - High shear stress amounts throughout the Reach.
    - Existing utility lines including wastewater and one larger petroleum pipelines
    - Concerned about sheer stress and issues with existing utility lines
5. Did consider do nothing and move maintenance trail. Concern is that the City will have to revisit bank stabilization in future if not considered now.

- Next Steps
    1. RESPEC and Banner will revisit the proposed locations of bank stabilization and see if any can be removed.
    2. Revisit the design of the riprap typical section:
        - Consider the growth of the vegetation, incorporate ways to encourage full coverage of the riprap with vegetation and tree growth.
        - Consider covering or replacing the pink quartzite with fieldstone or native stone (noted possibly limestone).
        - Revise and respond to NPS in letter format. Include meeting minutes.
        - NPS will provide preliminary response for EA.
        - Final determination to occur during Section 404 permitting.

Figure 1. Existing Riprap



N:\Projects\04205_Marne_Creek\Bozeman Working\CAD\Sheets Reach A\S-04205_MarneCreek-A-EXISTING_CONDITIONS.dwg,6/1/2022 3:42 PM

BANNER
engineering a better community
www.bannerassociates.com - Toll Free: 1.855.323.6342

PROJECT / SHEET TITLE:
MARNE CREEK BANK STABILIZATION PROJECT
EXISTING CONDITIONS OVERVIEW
YANKTON, SOUTH DAKOTA

REV.	DATE	DESCRIPTION

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

JOB No.:	04205 - MARNE CREEK
DATE:	06/01/2022
DESIGNED BY:	MJ
CHECKED BY:	PR
DRAWN BY:	TW

0 1/2" 1"
SCALE REDUCTION BAR

SHEET No.: AH-1

Figure 2a. Previous Bank Stabilization Areas

IMPROVEMENTS LEGEND

- RIPRAP W/LIVE STAKES
- RIPRAP COVERED W/TOPSOIL, CONTANERIZED PLANTINGS, AND REVEGETATED W/EROSION CONTROL BLANKET
- NEW CONCRETE PATH

0 75 150 FT

BANK STABILIZATION AREA A-UR 1-3

BANK STABILIZATION AREA A-UL 3

BANK STABILIZATION AREA A-UL 2

BANK STABILIZATION AREA A-UL 1

RESPEC

BANNER engineering a better community
www.bannerassociates.com - Toll Free: 1.855.323.6342

PROJECT / SHEET TITLE :
MARNE CREEK BANK STABILIZATION PROJECT
SITE OVERVIEW - REACH A
YANKTON, SOUTH DAKOTA

REV.	DATE	DESCRIPTION

FOR REVIEW ONLY NOT FOR CONSTRUCTION

JOB No.:	04205 - MARNE CREEK
DATE:	06/01/2022
DESIGNED BY:	MJ
CHECKED BY:	PR
DRAWN BY:	TW

0 1/2" 1"
SCALE REDUCTION BAR

SHEET No. : (A)A-1

N:\Projects\04205_Marne_Creek\Bozeman Working\CAD\Sheets Reach A\S-04205_MarneCreek-A-PLAN.dwg;5/31/2022 1:09 PM

Figure 2b. Revised Bank Stabilization Areas

IMPROVEMENTS LEGEND

- RIPRAP W/LIVE STAKES
- RIPRAP COVERED W/TOPSOIL, CONTANERIZED PLANTINGS, AND REVEGETATED W/EROSION CONTROL BLANKET
- NEW CONCRETE PATH

0 75 150 FT

Utilities highlighted in vicinity of Marne Creek

BANK STABILIZATION AREA A-UR 1-3

BANK STABILIZATION AREA A-UL 3

24+00 22+00 20+00 12+00 10+00 8+00 6+00 4+00 2+00 0+00 -2+00

RESPEC

BANNER engineering a better community
www.bannerassociates.com - Toll Free: 1.855.323.6342

PROJECT / SHEET TITLE:
MARNE CREEK BANK STABILIZATION PROJECT
SITE OVERVIEW - REACH A
YANKTON, SOUTH DAKOTA

REV.	DATE	DESCRIPTION

FOR REVIEW ONLY NOT FOR CONSTRUCTION

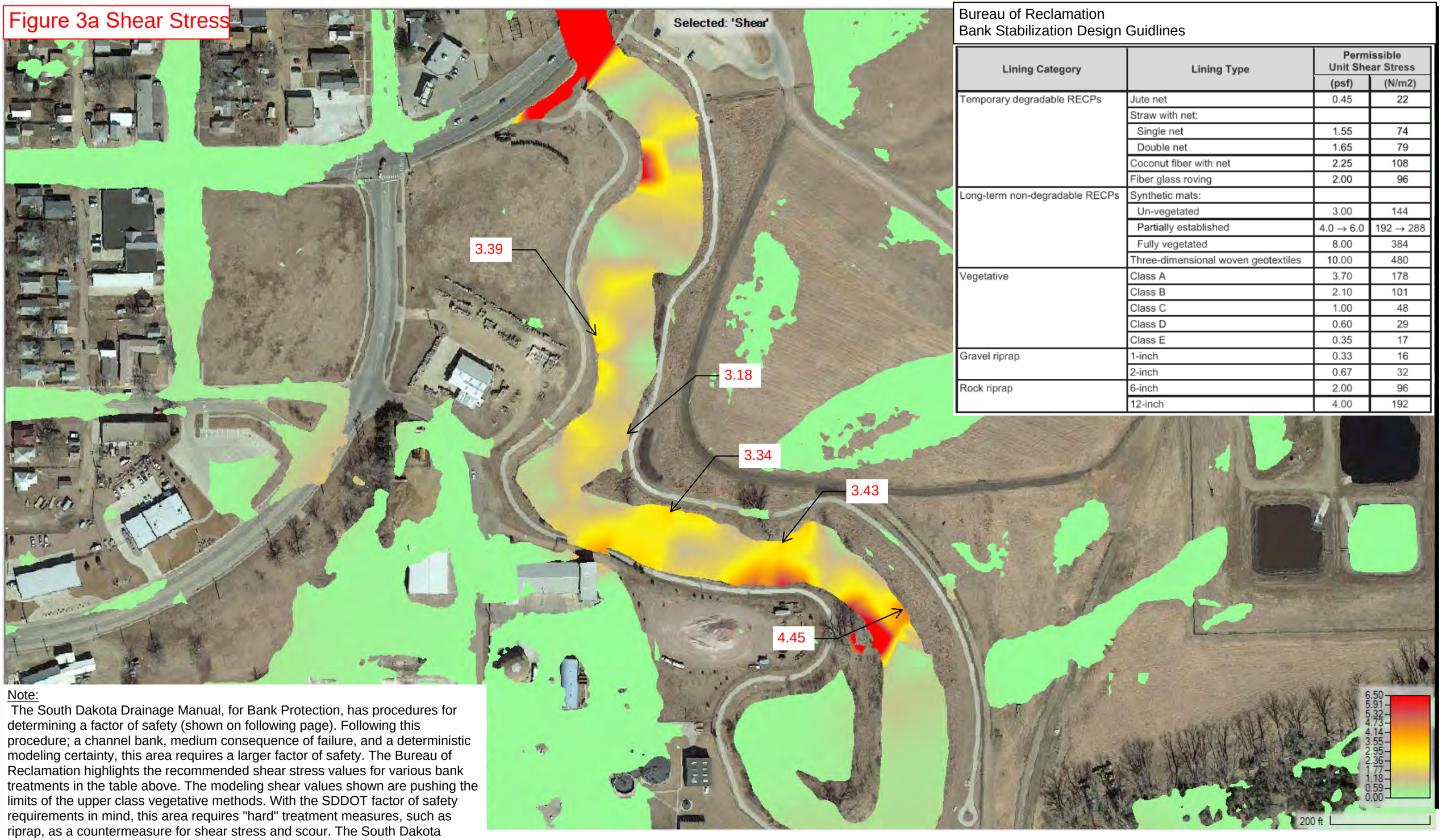
JOB No.:	04205 - MARNE CREEK
DATE:	06/01/2022
DESIGNED BY:	MJ
CHECKED BY:	PR
DRAWN BY:	TW

0 1/2" 1"
SCALE REDUCTION BAR

SHEET No.: (A)A-1

N:\Projects\04205_Marne_Creek\Bozeman Working\CAD\Sheets Reach A\S-04205_MarneCreek-A-PLAN.dwg;5/31/2022 1:23 PM

Figure 3a Shear Stress



Bureau of Reclamation
Bank Stabilization Design Guidlines

Lining Category	Lining Type	Permissible Unit Shear Stress	
		(psf)	(N/m2)
Temporary degradable RECPs	Jute net	0.45	22
	Straw with net:		
	Single net	1.55	74
	Double net	1.65	79
	Coconut fiber with net	2.25	108
	Fiber glass roving	2.00	96
Long-term non-degradable RECPs	Synthetic mats:		
	Un-vegetated	3.00	144
	Partially established	4.0 → 6.0	192 → 288
	Fully vegetated	8.00	384
	Three-dimensional woven geotextiles	10.00	480
Vegetative	Class A	3.70	178
	Class B	2.10	101
	Class C	1.00	48
	Class D	0.60	29
	Class E	0.35	17
Gravel riprap	1-inch	0.33	16
	2-inch	0.67	32
Rock riprap	6-inch	2.00	96
	12-inch	4.00	192

Note:
The South Dakota Drainage Manual, for Bank Protection, has procedures for determining a factor of safety (shown on following page). Following this procedure; a channel bank, medium consequence of failure, and a deterministic modeling certainty, this area requires a larger factor of safety. The Bureau of Reclamation highlights the recommended shear stress values for various bank treatments in the table above. The modeling shear values shown are pushing the limits of the upper class vegetative methods. With the SDDOT factor of safety requirements in mind, this area requires "hard" treatment measures, such as riprap, as a countermeasure for shear stress and scour. The South Dakota Drainage Manual also recommends HEC 23 for evaluating biotechnical engineering. HEC 23 says "the only acceptable solution in the immediate vicinity of a structure is a traditional, "hard" engineering approach". The utility density in this area is assumed to follow the structure guidelines and it would not be acceptable for these banks to fail along the east side of Marne Creek in Reach A.

Figure 3b Shear Stress

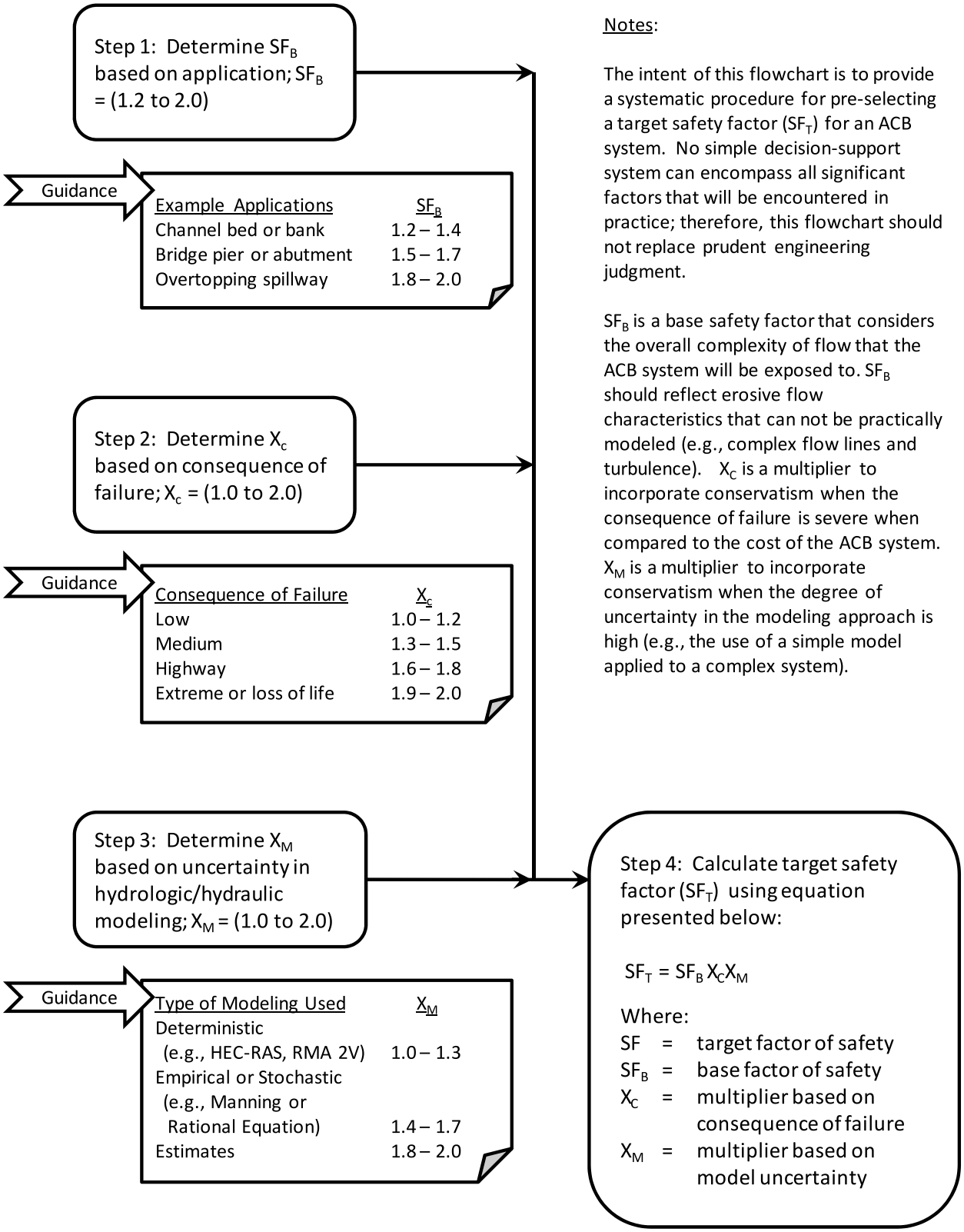
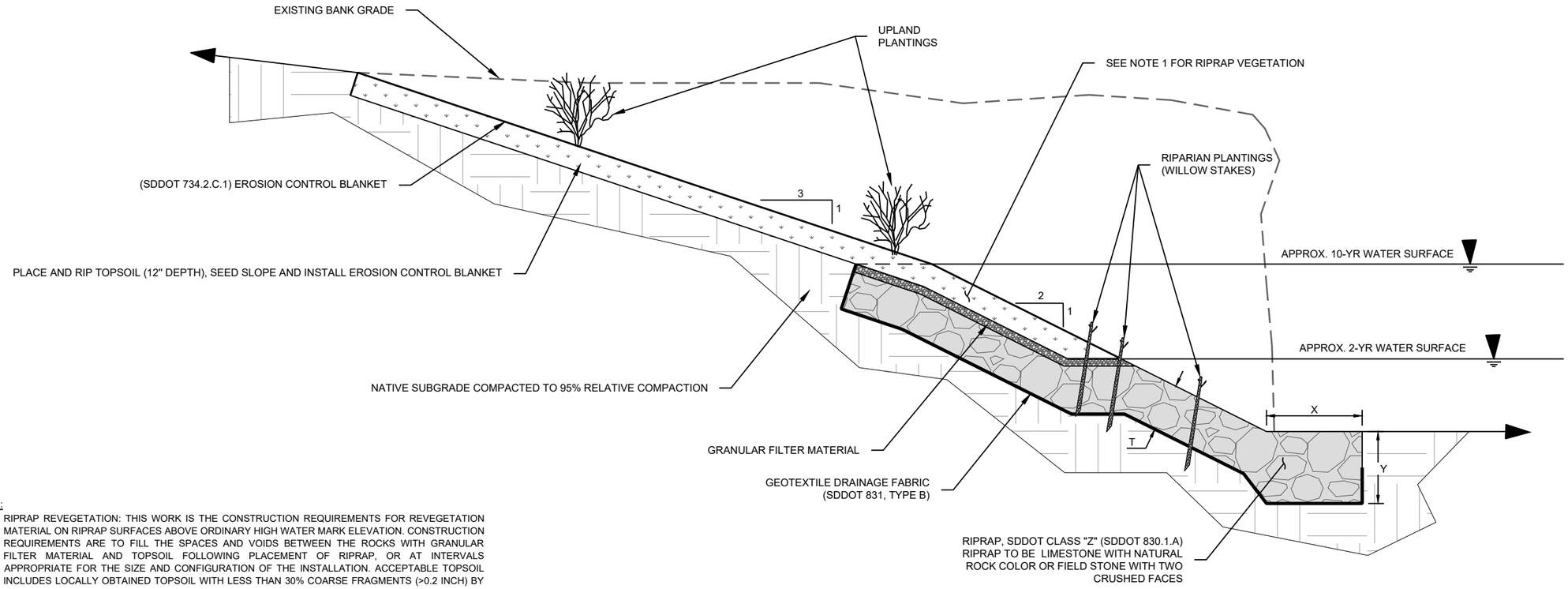


Figure 15.8-A — SELECTING A TARGET SAFETY FACTOR (Reference (9))

Figure 4 - Revised Typical Section



NOTE:

1. RIPRAP REVEGETATION: THIS WORK IS THE CONSTRUCTION REQUIREMENTS FOR REVEGETATION MATERIAL ON RIPRAP SURFACES ABOVE ORDINARY HIGH WATER MARK ELEVATION. CONSTRUCTION REQUIREMENTS ARE TO FILL THE SPACES AND VOIDS BETWEEN THE ROCKS WITH GRANULAR FILTER MATERIAL AND TOPSOIL FOLLOWING PLACEMENT OF RIPRAP, OR AT INTERVALS APPROPRIATE FOR THE SIZE AND CONFIGURATION OF THE INSTALLATION. ACCEPTABLE TOPSOIL INCLUDES LOCALLY OBTAINED TOPSOIL WITH LESS THAN 30% COARSE FRAGMENTS (>0.2 INCH) BY WEIGHT. CONTRACTOR TO PLACE A SUFFICIENT AMOUNT OF GRANULAR FILTER MATERIAL OVER THE RIPRAP, SO THAT AFTER SETTLING, THE LEVEL OF GRANULAR FILTER MATERIAL COMES TO THE VERY TOP OF THE ROCK. PLACE THE TOPSOIL TO A 12-INCH DEPTH OVER THE GRANULAR FILTER MATERIAL. PLACE MATERIAL IN A MANNER THAT CREATES A SMOOTH, UNIFORM SURFACE FOR SEEDING AND PLACEMENT OF THE EROSION CONTROL BLANKET/MULCH. CONTRACTOR TO HAND BROADCAST SEED THE SOIL IMMEDIATELY AFTER PLACEMENT, REGARDLESS OF TIME OF YEAR, WITH THE SEED MIXTURE AND RATES SPECIFIED BY THE ENGINEER. SCARIFY THE SOIL IMMEDIATELY PRIOR TO AND FOLLOWING SEEDING TO INCORPORATE SEED TO A DEPTH OF ½ INCH INTO THE SOIL.

STREAM BANK TREATMENT TYPICAL

NOT TO SCALE

Reach A							
Riprap Design							
Site	Location	Station Start	Station End	SDDOT RIPRAP CLASS "Z"	"T" Thickness (ft)	"X" Thickness (ft)	"Y" Thickness (ft)
A-UR 1-3	Outside Bend	0+00.00	5+00.00	C	3	3.5	3.5
A-UR 1-3	Outside Bend	5+00.00	7+50.00	D	3.5	5	5
A-UR 1-3	Straight	7+50.00	9+50.00	C	3	3.5	3.5
A-UR 1-3	Inside Bend	9+50.00	12+50.00	B	2	2	2
A-UR 1-3	Inside Bend	12+50.00	15+00.00	C	3	3.5	3.5
A-UR 1-3	Outside Bend	15+00.00	17+50.00	C	3	3.5	3.5
A-UR 1-3	Inside Bend	17+50.00	19+75.00	C	3	3.5	3.5
A-UL3	Straight	15+50.00	16+50.00	C	3	3.5	3.5
A-UL3	Outside Bend	16+50.00	19+00.00	D	3.5	5	5

RESPEC

BANNER engineering a better community
www.bannerassociates.com - Toll Free: 1.855.323.6342

PROJECT / SHEET TITLE:
MARNE CREEK BANK STABILIZATION PROJECT
STREAM BANK TREAMENT SPECIAL
YANKTON, SOUTH DAKOTA

REV.	DATE	DESCRIPTION

FOR REVIEW ONLY NOT FOR CONSTRUCTION

JOB No.: 04205 - MARNE CREEK
DATE: 06/01/2022
DESIGNED BY: MJ
CHECKED BY: PR
DRAWN BY: TW
SCALE REDUCTION BAR 0 1/2" 1"

SHEET No. : (A)C-2

N:\Projects\04205_Marne_Creek\Bozeman Working\CAD\Sheets Reach A\S-04205_MarneCreek-A-DETAILS.dwg,6/3/2022 10:26 AM

Banner Associates, Inc.
409 22nd Avenue South
Brookings, SD 57006
Tel 605.692.6342
Toll Free 855.323.6342
www.bannerassociates.com

November 1, 2021 SUBMITTED ONLINE VIA THE SDGFP ENVIRONMENTAL REVIEW TOOL

South Dakota Department of Game, Fish and Parks – Division of Wildlife
Attention: Ms. Hilary Morey, Environmental Review Coordinator
523 East Capital Avenue
Pierre, SD 57501-3181

RE: Environmental Assessment for the Auld-Brokaw Trail Maintenance and Marne Creek Bank Restoration
BAI. No. 23371.00

Dear Ms. Morey:

The City of Yankton has requested funding from the Federal Emergency Management Agency (FEMA) to restore the Auld-Brokaw Trail and stabilize sections of banks along Marne Creek. Banner Associates, Inc. (Banner) has been selected to complete the engineering design and Environmental Assessment.

Six reaches of Marne Creek (Reach A-D, G, and J) have sustained damage from recent flooding events. Reaches A and B have damaged sections of trail which have collapsed into the creek along with sections of unstable banks. The remaining reaches have intact, usable trail, but the unstable and eroding banks threaten the longevity of the overall trail system. The City of Yankton plans to restore the trail to pre-flood condition and stabilize any banks that have potential to collapse in future flooding events. The purpose of the proposed action is to repair disaster-damaged infrastructure and to reduce damage from similar damage in the future. The action is needed to restore and protect life and property due to ongoing erosion and destabilization of Marne Creek.

Please provide comment on any of the following topics that pertain to your agency:

1.	Wetland Locations	5.	SDGF&P Recreation Areas
2.	Threatened and Endangered Species	6.	Parks
3.	Refugees	7.	Land & Water Conservation Funds
4.	SDGF&P Game Production Areas		

Please submit your comments as soon as possible, so that the project's environmental documentation can be completed. If you have any questions or need additional information, please contact me at 855-323-6342.

Sincerely,

Becky Baker

Becky Baker
Environmental Department Head

Enclosure: Project Location Figure

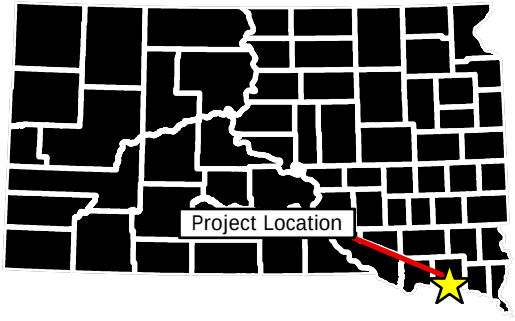


Figure 1 - Project Location Map

Marne Creek Bank Stabilization and Auld-Brokaw Trail Restoration
Yankton County, South Dakota

Legend

Project Areas

N

0 0.2 0.4 0.8

Miles

BANNER

SOUTH DAKOTA DEPARTMENT OF
GAME, FISH AND PARKS
523 EAST CAPITOL AVENUE | PIERRE, SD 57501

January 24, 2022

Leslie Murphy
Banner Associates
409 22nd Ave
Brookings, SD 57006

RE: City of Yankton
Auld-Brokaw Trail Maintenance and Marne Creek Bank Stabilization
Project No. 23371.00

Dear Leslie,

The Department of Game, Fish and Parks has reviewed the above project involving restoration of the Auld-Brokaw Trail and bank stabilization projects along Marne Creek in Yankton, South Dakota. We have searched the South Dakota Natural Heritage Database for presence of threatened or endangered species in your project area. This database monitors species at risk, specifically those species that are legally designated as threatened or endangered or rare. Rare species are those that are declining and restricted to limited habitat or a jurisdiction, may be isolated or disjunct due to geographic or climatic factors that are classified as such due to lack of survey data. A list of monitored species can be found at http://gfp.sd.gov/natural-heritage-program.

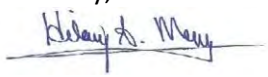
We found multiple 2020 records of False Map Turtles (*Graptemys pseudogeographica;* state threatened species) that were captured along the Missouri River from the US81 Bridge, downstream to the County line. False map turtles begin to nest in May and June, with eggs hatching approximately two months later. To avoid impacts to False Map Turtles, we recommend completing the portion of the project that is immediately adjacent to the Missouri River confluence outside of the nesting season, which typically runs from May through August.

Based on the information provided, there is no anticipated significant impact to fish and wildlife resources and would anticipate that to remain if the following suggestions are considered during the planning and construction of the project:

1. Disturbance to riparian and wetland areas should be kept to an absolute minimum.
2. If riparian vegetation is lost it should be quantified and replaced on site. Seeding of indigenous species should be accomplished immediately after construction to reduce sediment and erosion.
3. A site specific sediment and erosion control plan should be part of the project.
4. A post construction erosion control plan should be implemented in order to provide interim control prior to re-establishing permanent vegetative cover on the disturbed site.
5. Stream bottoms impacted by construction activities should be restored to pre-project elevations.
6. If any in-stream work will be part of the project, it should not be conducted during fish spawning periods. Most spawning occurs during April, May and June.

If you have any questions, please feel free to contact me at 605-773-6208.

Sincerely,



Hilary Morey
Environmental Review Senior Biologist
523 East Capitol Avenue
Pierre, SD 57501
hilary.morey@state.sd.us

Banner Associates, Inc.
409 22nd Avenue South
Brookings, SD 57006
Tel 605.692.6342
Toll Free 855.323.6342
www.bannerassociates.com

November 1, 2021

United States Fish and Wildlife Service
Attention: Ms. Amity Bass
420 S. Garfield Avenue
Pierre, SD 57501-5408

RE: Environmental Assessment for the Auld-Brokaw Maintenance Trail and Marne Creek Bank Restoration
BAI. No. 23371.00

Dear Ms. Bass:

The City of Yankton has requested funding from the Federal Emergency Management Agency (FEMA) to restore the Auld-Brokaw Trail and stabilize sections of banks along Marne Creek. Banner Associates, Inc. (Banner) has been selected to complete the engineering design and Environmental Assessment.

Six reaches of Marne Creek (Reach A-D, G, and J) have sustained damage from recent flooding events. Reaches A and B have damaged sections of trail which have collapsed into the creek along with sections of unstable banks. The remaining reaches have intact, usable trail, but the unstable and eroding banks threaten the longevity of the overall trail system. The City of Yankton plans to restore the trail to pre-flood condition and stabilize any banks that have potential to collapse in future flooding events. The purpose of the proposed action is to repair disaster-damaged infrastructure and to reduce damage from similar damage in the future. The action is needed to restore and protect life and property due to ongoing erosion and destabilization of Marne Creek.

According to the USFWS's Information for Planning and Conservation database (IPAC) (Consultation Code: 06E14000-2022-SLI-0072), the following species may occur in the project area:

Species	Status	Preliminary Effect Determination	Comments
Northern Long-eared Bat (*Myotis septentrionalis*)	Threatened	May Affect, not Likely to Adversely Affect	Tree removal may be required with trail reconstruction in some areas.
Red Knot (*Calidris canutus rufa*)	Threatened	No Effect	No habitat present
Piping Plover (*Charadrius melodus*)	Threatened	No Effect	No habitat present
Whooping Crane (Grus americana)	Endangered	No Effect	No habitat present
Pallid Sturgeon (*Scaphirhynchus albus*)	Endangered	No Effect	No habitat present
Higgins Eye Pearlymussel (*Lampsilis higginsii*)	Endangered	No Effect	No habitat present
Scaleshell Mussell (*Leptodea leptodon*)	Endangered	No Effect	No habitat present
Western Prairie Fringed Orchid (*Platanthera praeclara)*	Threatened	No Effect	No habitat present

Tree removal may be required for the repairs of the trail and stabilization of Marne Creek in some areas and will occur in a timeframe from November 1st to April 14th, outside the active maternity and pup-rearing season of the northern long-eared bat.

Please submit your comments as soon as possible, so that the project's environmental documentation can be completed. If you have any questions or need additional information, please contact me at 855.323.6342.

Sincerely,

Becky Baker

Becky Baker
Environmental Department Head

Enclosures: Project Location Figure, Page 1 of IPaC Species List

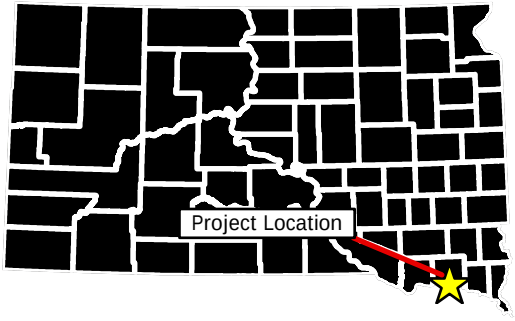


Figure 1 - Project Location Map

Marne Creek Bank Stabilization and Auld-Brokaw Trail Restoration
Yankton County, South Dakota

Legend

Project Areas

N

0 0.2 0.4 0.8

Miles

BANNER

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Dakota Ecological Services Field Office
420 South Garfield Avenue, Suite 400
Pierre, SD 57501-5408
Phone: (605) 224-8693 Fax: (605) 224-1416
http://www.fws.gov/southdakotafieldoffice/

In Reply Refer To: October 29, 2021
Consultation Code: 06E14000-2022-SLI-0072
Event Code: 06E14000-2022-E-00235
Project Name: Auld-Brokaw Trail Reconstruction

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
South Dakota Field Office
420 South Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408

November 30, 2021

In Reply Refer to:

Auld-Brokaw Trail Maintenance and Marne Creek Bank Restoration

Ms. Leslie Murphy
Banner Associates, Inc
409 22nd Avenue South
Brookings, South Dakota 57006

Dear Ms. Leslie Murphy,

Thank you for your letter received November 2, 2021, requesting environmental comments regarding the above referenced project involving the restoration of the Auld-Brokaw Trail at six locations within Marne Creek. The City of Yankton plans to restore the trail to pre-flood condition and stabilize any banks that have potential to collapse in future flooding events. This project is located in Yankton County, South Dakota.

According to the National Wetlands Inventory, (available online at www.fws.gov/wetlands/) wetlands exist within the project boundary. If a project may impact wetlands or other important fish and wildlife habitats, the U.S. Fish and Wildlife Service (Service), in accordance with the National Environmental Policy Act of 1969 (42 U.S.C. 4321-4347) and other environmental laws and rules, recommends complete avoidance of these areas, if possible, then minimization of any adverse impacts, and finally replacement of any lost acres, in that order. Alternatives should be examined and the least damaging practical alternative selected. If wetland impacts are unavoidable, a mitigation plan addressing the number and types of wetland acres to be impacted, and the methods of replacement should be prepared and submitted to the resource agencies for review.

Please refer to our regional policy on streambank stabilization projects available online at: www.fws.gov/mountain-prairie/es/southdakota/images/Bank%20Stabilization%20Policy.pdf. This policy provides our recommendations regarding bank stabilization; specifically, to avoid the use of riprap. This policy also provides examples of mitigation measures for hard solution (e.g., riprap and flow deflection devices). Additionally, we recommend the development and use of conservation buffers whenever practicable to slow water runoff, trap sediment, and enhance infiltration within the buffer.

Banner Associates Inc. requested Service concurrence with your "may affect, not likely to adversely affect" determination threatened Northern Long eared bat (*Myotis septentrionalis*). In accordance with Section 7 of the Endangered Species Act of 1973, as amended (ESA) (16 U.S.C. 1531 *et seq.*), we concur with your determination.

Banner Associates Inc. has determined that there will be “no effect” to, the Higgins Eye Pearlymussel (*Lampsilis higginsii*), Pallid Sturgeon (*Scaphirhynchus albus*), Piping Plover (*Charadrius melodus*), Red Knot (*Calidris canutus rufa*), Scaleshell Mussel (*Leptodea leptodon*), Western Prairie Fringed Orchid (*Platanthera praeclara*), and Whooping Crane (*Grus Americana*).

There is no requirement under the implementing regulations of the ESA (50 CFR part 402) for action agencies to receive Service concurrence with “no effect” determinations, therefore the responsibility for “no effect” determinations remain with Banner Associates Inc. We recommend you document your “no effect” determination and retain the documentation in your decisional record.

The Service appreciates the opportunity to provide comments. If you have any questions on these comments, please contact Dylan Turner of this office at (605) 224-8693, Extension 233.

Sincerely,

Amity Bass
North and South Dakota Field Supervisor

Banner Associates, Inc.
2307 W 57th St, Ste 102
Sioux Falls, SD 57108
Tel 605.692.6342
Toll Free 855.323.6342
www.bannerassociates.com

MEETING AGENDA

DATE	July 2021	
PROJECT	City of Yankton- Auld/Brokaw Maintenance Trail and Marne Creek Bank Restoration	BAI No. 23371.00
SUBJECT	Preapplication Meeting	
LOCATION	WebEx Meeting	
ATTENDEES	Catherine Juhas, USACE	
	Kent Johnson, Banner Associates	
	Becky Baker, Banner Associates	

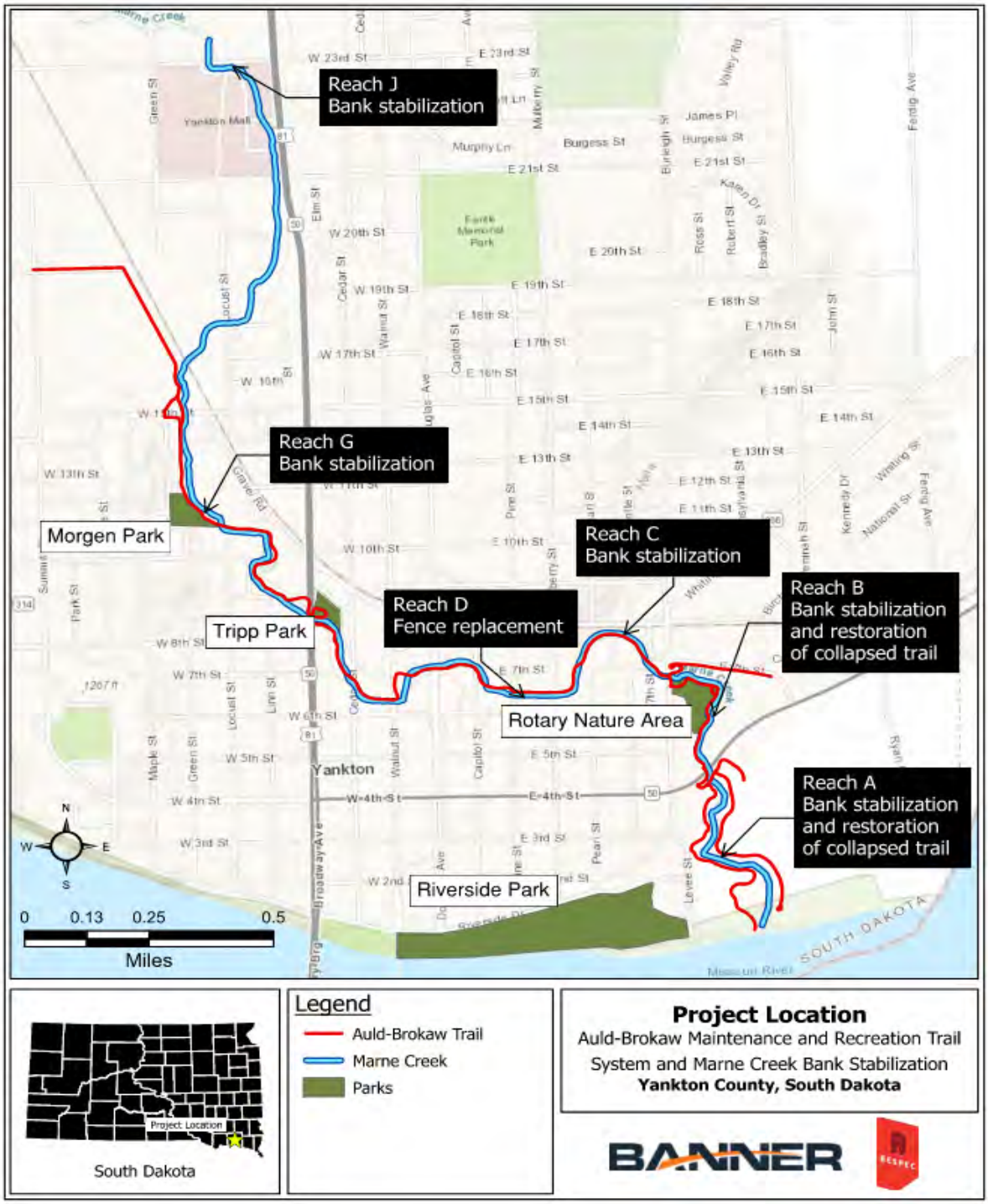
1.0 INTRODUCTION

2.0 PROJECT BACKGROUND

- 2.1 PURPOSE AND NEED
- 2.2 WETLAND DELINEATION AND LEVEL III CULTURAL RESOURCES SURVEY
- 2.3 PROCESS FOR CONSIDERING ALTERNATIVES
- 2.4 ENVIRONMENTAL ASSESSMENT

3.0 RANGE OF ALTERNATIVES AND CURRENT SELECTED ALTERNATIVES

- 3.1 REACHES IDENTIFIED FOR FEMA GRANT- SEE PROJECT LOCATION MAP
- 3.2 REACHES A AND B- CLOSER TO MISSOURI RIVER
- 3.3 REACHES C, G, AND J- WITHIN CITY


Reach J
Bank stabilization
Reach G
Bank stabilization
Morgen Park
Reach C
Bank stabilization
Reach D
Fence replacement
Reach B
Bank stabilization
and restoration
of collapsed trail
Tripp Park
Rotary Nature Area
Reach A
Bank stabilization
and restoration
of collapsed trail
Riverside Park
Yankton
0 0.13 0.25 0.5
Miles
N
W
E
S
Project Location
South Dakota
Legend
Auld-Brokaw Trail
Marne Creek
Parks
Project Location
Auld-Brokaw Maintenance and Recreation Trail
System and Marne Creek Bank Stabilization
Yankton County, South Dakota

Banner Associates, Inc.
2307 W 57th St, Ste 102
Sioux Falls, SD 57108
Tel 605.692.6342
Toll Free 855.323.6342
www.bannerassociates.com

MEETING MINUTES

DATE	July 20 2021	
PROJECT	City of Yankton- Auld/Brokaw Maintenance Trail and Marne Creek Bank Restoration	BAI No. 23371.00
SUBJECT	Preapplication Meeting	
LOCATION	WebEx Meeting	
ATTENDEES	Catherine Juhas, USACE	
	Kent Johnson, Banner Associates	
	Becky Baker, Banner Associates	

1.0 INTRODUCTION

2.0 PROJECT BACKGROUND

2.1 PURPOSE AND NEED –**To Restore/Stabilize banks along Marne Creek and Auld-Brokaw Recreation Trail which was damaged in 2019.**

2.2 WETLAND DELINEATION AND LEVEL III CULTURAL RESOURCES SURVEY – **Mainly riparian wetlands have been detected throughout the project. USACE usually looks at design plans and linear ft of impact to mitigate for stream change.**

2.3 ENVIRONMENTAL ASSESSMENT AND PERMIT OPTIONS – **Utility permits were previously authorized. USACE recommends permitting the entire damaged area throughout the project. NWP 13 for bank stabilization will likely be needed, as over 2000 linear Feet will need to be stabilized. USACE can assist on other permit feedback. there are no ESA issues expected within the project. USACE will check on 408 PERMISSIONS. USACE will need an alternatives analysis and section 401 water quality certification if individual route is taken.**

3.0 RANGE OF ALTERNATIVES AND CURRENT SELECTED ALTERNATIVES

3.1 REACHES IDENTIFIED FOR FEMA GRANT- SEE PROJECT LOCATION MAP – **Banner Associates Inc. is hoping for construction in Fall of 2022, once the project alternatives are selected. Permitting processes have slowed construction, which was originally scheduled for fall of 2021.**

3.2 REACHES A AND B- CLOSER TO MISSOURI RIVER – **Auld-Brokaw Recreation Trail is decimated on this stretch and has begun slumping down into the banks.**

3.3 REACHES C, G, AND J- WITHIN CITY – **Reach C has 15-20 Ft banks that are completely vertical, which are posing problems for selecting alternatives and designs – these will continue to be evaluated.**

- **The possibility of a flood storage/mitigation area has been considered; however, it will likely not assist private properties around Reaches C and D.**
- **Riprap with vegetation treatment has been proposed for Reaches A and B, this would assist with stabilizing the banks in place.**

- **Riprap with vegetation and turf reinforcement mats (TRM) are being proposed for Reach C. There is a railroad track that is adjacent to Reach C. The City of Yankton may have interest in assisting with the railroad's protection. Sheer stress, velocity, and cost would determine where TRM and rip rap would be placed**

- **Additional testing from subconsultants is being completed to assist with slope stability on reaches C and G. There are private buildings on two spots of those reaches that may require buyouts – the banks are very steep at those locations**

- **Reach D and E were not damaged.**

- **Rip rap is likely the selection for Reach G to stabilize the banks in place. Reach G previously had gabions installed before the storm, however, some of the gabions were damaged/destroyed. Before the storm, the gabions were working effectively.**

- **Rip rap and vegetation treatment is the selected alternative for Reach J to assist with bank stabilization.**

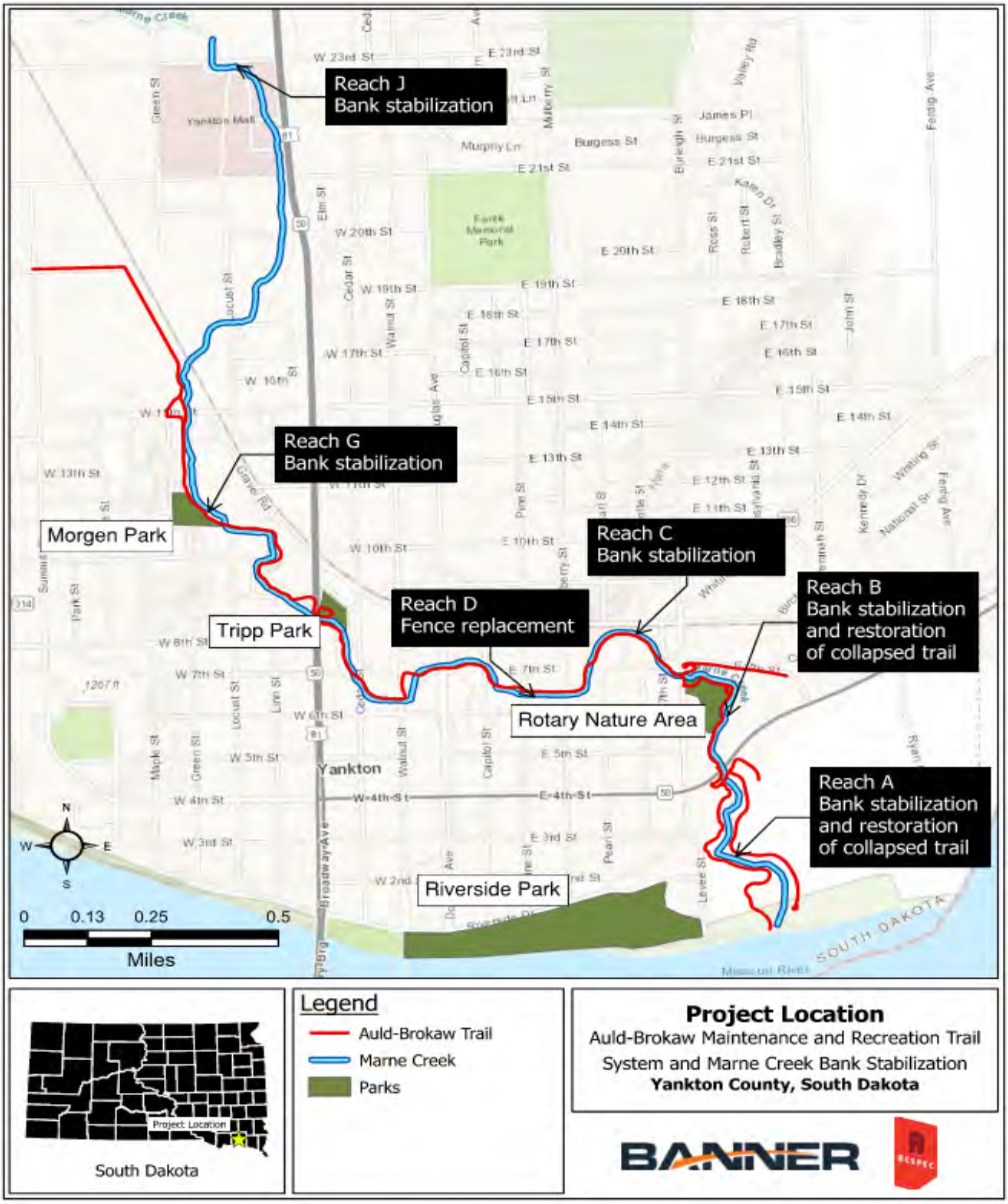
- **Other states have previously rejected gabion baskets, and have turned to "dirty riprap", which is essentially riprap covered with topsoil and seed to assist with stabilization.**

- **No work on Missouri River is needed, work is only being done on Marne Creek banks confluence, and trails.**

- **USACE does not believe gabions would be an issue for this project.**

- **When considering NWP 13, the linear length of the affected portions of the stream is needed.**

- **Banner can provide tentative schedule and progress to USACE as more information is learned from FEMA and the City.**


Reach J
Bank stabilization
Reach G
Bank stabilization
Morgen Park
Tripp Park
Reach D
Fence replacement
Reach C
Bank stabilization
Reach B
Bank stabilization
and restoration
of collapsed trail
Rotary Nature Area
Reach A
Bank stabilization
and restoration
of collapsed trail
Riverside Park
Yankton
SOUTH DAKOTA
Missouri River
0 0.13 0.25 0.5
Miles
Project Location
South Dakota
Legend
Auld-Brokaw Trail
Marne Creek
Parks
Project Location
Auld-Brokaw Maintenance and Recreation Trail
System and Marne Creek Bank Stabilization
Yankton County, South Dakota

Banner Associates, Inc.
2307 W 57th St, Ste 102
Sioux Falls, SD 57108
Tel 605.692.6342
Toll Free 855.323.6342
www.bannerassociates.com

MEETING MINUTES

DATE	September 7, 2021	
PROJECT	City of Yankton- Auld/Brokaw Maintenance Trail and Marne Creek Bank Restoration	BAI No. 23371.00
SUBJECT	EHP Update	
LOCATION	Teams Meeting	
ATTENDEES	Kyle C, EHP	
	Kat G, EHP	
	Rich M, EHP	
	Kent J, Banner Associates	
	Becky B, Banner Associates	

1.0 INTRODUCTION

2.0 PROJECT BACKGROUND

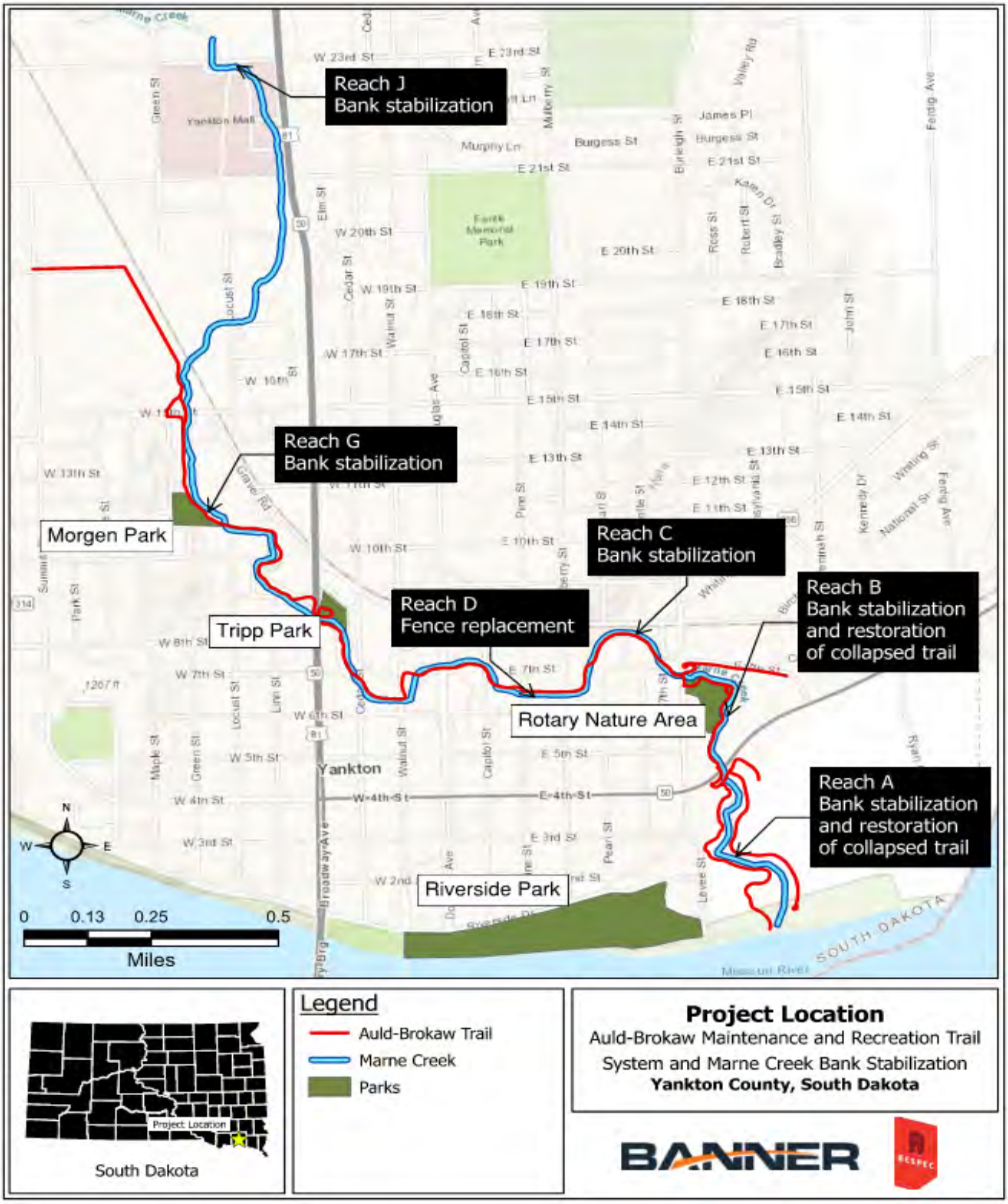
2.1 PURPOSE AND NEED –To Restore/Stabilize banks along Marne Creek and Auld-Brokaw Recreation Trail which was damaged in 2019.

2.2 WETLAND DELINEATION AND LEVEL III CULTURAL RESOURCES SURVEY – A Level III survey was completed last fall to make sure that no sites are present that would affect the 30 percent design for the scope of work. Additional survey may be needed to evaluate the house that might possibly need to be acquired. Wetland delineation completed and initial meeting has occurred with USACE for permitting.

3.0 REMAINING NOTES

- Banner can provide tentative schedule and progress to FEMA as more information is gathered.
- FEMA will discuss to see if we can work on environmental assessment before the scope of work is approved.
    - FEMA believes we can get started, since the point of FEMA/NEPA is to formalize the design considerations. FEMA will discuss internally amongst departments to check.
- There is a possibility of buying out a property with a residence- currently a rental.
    - If it is a FEMA buyout, details such as age etc. will be needed.
- Railroads are within the affected project area and will need to be considered.
- Cost of gabions and riprap will be analyzed and justified to determine their appropriate amount of usage.
- Banner will analyze bioengineering and compare the ten-year versus two-year level.
- Within the Environmental Assessment, Banner will justify why not/why each alternative was chosen, with the inclusion of gradient, velocity, and slope.

- Banner can begin research on relocating bike paths, age of house, and checking on APE.
- Banner will be after geotechnical is further determine for the area with the residence- ask for approval of the scope of work.
- The City, FEMA, and Banner will consider if a possible extension with public assistance and mitigation.
- Around the middle of October virtual agency meetings and Environmental Assessment kickoff meetings can begin for the project.
- Banner will touch base once a month and update with new information and progress as it is obtained.


Reach J
Bank stabilization
Reach G
Bank stabilization
Morgen Park
Tripp Park
Reach D
Fence replacement
Reach C
Bank stabilization
Reach B
Bank stabilization
and restoration
of collapsed trail
Rotary Nature Area
Reach A
Bank stabilization
and restoration
of collapsed trail
Riverside Park
Yankton
SOUTH DAKOTA
Missouri River
0 0.13 0.25 0.5
Miles
Project Location
South Dakota
Legend
Auld-Brokaw Trail
Marne Creek
Parks
Project Location
Auld-Brokaw Maintenance and Recreation Trail
System and Marne Creek Bank Stabilization
Yankton County, South Dakota

Banner Associates, Inc.
2307 W 57th St, Ste 102
Sioux Falls, SD 57108
Tel 605.692.6342
Toll Free 855.323.6342
www.bannerassociates.com

MEETING AGENDA

DATE	November X 2021	
PROJECT	Auld-Brokaw Maintenance Trail and Marne Creek Bank Restoration	BAI No. 23371.00
SUBJECT	Agency Coordination Meeting	
LOCATION	Zoom Meeting	

1. ***Introductions***

2. ***Project Description and Background***

    a. The City of Yankton (Yankton), in cooperation with SD Office of Emergency Management and the Federal Emergency Management Agency (FEMA), is completing a study to determine the best option for the reconstruction of the Auld-Brokaw Maintenance and Recreation Trail System and stabilization of the banks of Marne Creek that were affected by a March 2019 blizzard and rapid snowmelt.
    b. Due to the length of bank stabilization, an EA is required.

3. ***Draft Purpose and Need***

    a. The purpose of the proposed action is to fix the previous damage and reduce future damage to public and private property due to erosion and destabilization of Marne Creek.

4. ***Alternatives***

5. ***Identification of Resources***

Banner Associates, Inc.
409 22nd Avenue South
Brookings, SD 57006
Tel 605.692.6342
Toll Free 855.323.6342
www.bannerassociates.com

MEETING MINUTES

DATE	November 15, 2021	
PROJECT	Auld-Brokaw Maintenance and Recreation and Marne Creek Bank Stabilization	BAI No. 23371
SUBJECT	Agency Coordination Kick-off Meeting	
LOCATION	WEBEX	
ATTENDEES	FEMA – Rick Meyers (Deputy Environmental Officer) Kyle Cheeseman (Environmental Specialist)	
	SD Office of Emergency Management – Dustin Hight (State Training Officer) Jim Poppen (Mitigation and Recovery Manager)	
	USFWS – Dylan Turner (Biologist, Ecological Services)	
	SD Game, Fish and Parks – Hilary Morey (Environmental Review Biologist)	
	State Historical Preservation Office – Jenna Carlson Dietmeyer (Review Compliance Coordinator)	
	USACE – Catherine Juhas (Regulatory Office)	
	Banner Associates, Inc. – Becky Baker (Environmental Department Head) Kent Johnson (Project Manager) Leslie Murphy (Environmental Scientist)	

Project Introduction:

- The project is located in the City of Yankton, South Dakota. Marne Creek flows through Yankton into the Missouri River. A recreational trail (Auld-Brokaw Trail) is located adjacent to Marne Creek.
- March 2019- blizzard and rapid snowmelt caused bank erosion and trail destruction. The trail is mainly adjacent to residential areas in town, but Reaches A and B are in close proximity to the Missouri River and also border commercial (small business) and industrial sites (wastewater treatment plant).
- An Environmental Assessment (EA) document is needed for NEPA compliance for the project.
- The project is in the beginning stages of the process, with design started.

Project Includes the following Reaches of Marne Creek:

FEMA identified specific reaches for rehabilitation. Some reaches did not need any work done, so that's why letters have been skipped in the identification of reaches for the project.

- *Reach A*- Marne Creek outlets to Missouri River, trail present on both sides of Marne Creek.
- *Reach B* – recreational park area
- *Reach C* – residential areas. Northeastern segment may need additional erosion control. City has completed a buy-out of this property. Once structure is removed, the slope can be re-shaped. Railroad present on south side of the road (north of northeastern segment of the reach).
- *Reach G* - Gabion baskets, residential area
- *Reach J* – next to Yankton Mall

Purpose and Need:

Stabilize the banks of Marne Creek and repair the trail.

Alternatives:
No Action Alternative

Action Alternative

- Considers stabilization needed.
- 30% design has been completed to determine the bank stabilization to utilize and trail repairs needed.
- No benefit to consider other areas to provide flood storage.
- Typical section – riprap detail. Planning to place soil-covered riprap between 2 year and 10-year events. Main focus of this type of design is to protect the toe. This design will resist scour occurring at the toe up to the 10-year event while giving a softer look with plantings. Riprap will offer firm protection up to 2-year event, then from the 2 to 10-year event, the area will be riprapped for protection but covered with soil and plantings. After the 10- year to 100-year event, the area will not be riprapped, but will be vegetated. This design was done as a compromise between a hard riprap and a soft vegetative look.
- Final design might be a combination of Class B and Class C. The bigger the stones, the more resistance to erosion.
- At Reach C, slope stability analysis showed a flatter slope was needed. Currently, a 1-ft vertical:1.5-foot horizonal slope exists. Analysis showed that the area needs a 1.5 to 1 instead. City approached the owner about a buy-out of the property. Looking at how this slope can be flattened with riprap vs. gabions. The area has a steep bank (20-ft dropoff). Buy-out will enable a flatter slope and now can look at riprap vs gabion.
    - There are some conditions for buy-out. Provision might state that a greenspace is maintained in the area of a buy-out, but there likely will be structural measures in the design in this area. A request should be made to start the negotiation process.
    - SD Emergency Management noted that to start the process, explain why a riprap protective measure is needed here. Not a quick decision, with continuing negotiations. FEMA will review both sides. Design with green methods might prove to be more favorable with mitigation staff.
    - At Reach G, gabions are proposed. Would like this to tie into existing gabions on the next segment down. Some erosion is occurring downstream. The trail will need to be moved for stability reasons and need to lay revetment at flatter, more stable slope for safety. On south and east segments, rip rap along identified locations.
    - At Reach J, riprap on both segments. Banks are lower in this location.

Affected Environment:
The EA will take into considerations the following:

- Geology, seismicity and soils
- Water resources and water quality – SDDANR
- Floodplain management – modeling. Anticipating a no-rise for this project.
- Air quality – straight forward (SDDANR)
- Terrestrial and aquatic environment – completed during wetland delineation
- Wetlands – wetland delineation
- Threatened and endangered species – USFWS does not have initial comments, still reviewing.
- Migratory birds
- Hazardous materials- spills, records, research
- Zoning and land use – buy out. Land use plans.
- Visual resources
- Noise
- Public services and Utilities
- Traffic and Circulations
- Environmental Justice
- Safety and Security

- Historic Structures
- Archeological Resources – Fieldwork is complete. Nothing has been noted for archaeological resources or historical structures (the railroad will be historical).
- Tribal Coordination and Religious Sites

Project Schedule:
Currently planning on completing draft EA and getting it to FEMA mid-January for review. Released to public late spring/early summer. Bidding and construction – Fall 2022.

Additional Discussion:
FEMA EHP noted to make sure APE is complete and covers entire area of effect. Charlie Bello (FEMA archaeologist) will review and will determine how to do tribal coordination. Gabions are least preferred method of bank stabilization. Soil covered riprap is preferred. Will need discussion on why gabions would be used versus why you cannot use soil covered riprap. MBTA if working in the fall should be ok but might need surveys. Nothing is certain right now with MBTA- state of flux. Typically do survey, determine if any take on species, if timing works out (avoid working in nesting season to avoid impacts). Bats- provide figure of potential habitat areas to USFWS and FEMA.

Need to coordinate with NPS to make sure there are no additional requirements by Missouri River.

SD Emergency Management noted that the project is currently under A & E only, appreciate FEMA being involved with no official request yet. Official request with the scope of work will need to be made to Emergency Management Office. Right now, physical work looks like May 2022, but you will need to request time extension. Once the scope of work is in hand, turn over to FEMA in official form. EHP needs to be reviewing. Usually, policy is no work can be done until approval is granted. Request can go to Dustin/Amanda VanderPlatts for aversion of funds. Review of scope would be 30% design, fund request, brief narrative to explain where, what, why (especially if choosing alternate methods different from pre-disaster).

For the buyout area, make engineering case for using any type of structural improvements in this area. Ideally would lay slope back with no structural assistance, understood this may not work.

Any communication between applicant, consultant, and FEMA, Amanda is the contact with SD Emergency Management and should be included in all correspondence.

FEMA asked USACE- What are you anticipating for permitting requirement? USACE noted new stream mitigation requirement, so looking at potentially an individual permit. FEMA's Section 106 and Section 7 consultation can be utilized by USACE. USACE to follow up with a letter to SHPO noting their intent to utilize FEMA's consultation for Section 106.

The buyout was previously reviewed under Section 106, FEMA noted that Charlie will review previous and current survey and information. SHPO noted that works as long as Charlie reports the effect determination for concurrence.

One more meeting for agency coordination will occur for this project in the future.

south dakota
STATE HISTORICAL SOCIETY
DEPARTMENT OF EDUCATION

February 24, 2022

Mr. Charles A. Bello
US Department of Homeland Security
FEMA Region VIII
Denver Federal Center, Building 710
PO Box 25267
Denver, CO 80225-0267

SECTION 106 PROJECT CONSULTATION
Project: 220222018F – Auld-Brokaw Trail Repairs and Marne Creek Restoration Project
Location: Yankton County
(FEMA)

Dear Mr. Bello:

Thank you for the opportunity to comment on the above-referenced project pursuant to Section 106 of the National Historic Preservation Act of 1966 (as amended). The South Dakota Office of the State Historic Preservation Officer (SHPO) concurs with your determination regarding the effect of the proposed undertaking on the non-renewable cultural resources of South Dakota.

On February 22, 2022, we received your email and reports titled "A Level III Cultural Resources Survey of the Proposed Auld-Brokaw Trail Repairs and Marne Creek Restoration Project in Yankton County, South Dakota" and "A Level III Cultural Resources Survey of the 2021 Expanded Project Areas Associated with the Auld-Brokaw Trail Repairs and Marne Creek Restoration Project in Yankton County, South Dakota" by Troy Kogel of Kogel Archaeological Consulting Services. Based on the information provided, no previously recorded properties were identified within the project area, and one newly identified structure (YK00000976) was recommended Not Eligible for the National Register. SHPO concurs that this structure is not eligible. Therefore, SHPO concurs with your determination of "No Historic Properties Affected."

Activities occurring in areas not identified in your request will require the submission of additional documentation pursuant to 36 C.F.R. § 800.4.

If historic properties are discovered or unanticipated effects on historic properties are found after the agency official has completed the Section 106 process, the agency official shall avoid, minimize or mitigate the adverse effects to such properties and notify the SHPO and Indian

tribes that might attach religious and cultural significance to the affected property within 48 hours of the discovery, pursuant to 36 C.F.R. § 800.13.

Concurrence of the SHPO does not relieve the federal agency official from consulting with other appropriate parties, as described in 36 C.F.R. § 800.2(c).

Should you require additional information, please contact Heather Mulliner at Heather.Mulliner@state.sd.us or at (605)773-6005. Your concern for the non-renewable cultural heritage of our state is appreciated.

Sincerely,

Ted M. Spencer
State Historic Preservation Officer

Heather Mulliner
Historic Preservation Specialist

Becky Baker

From: Kittle, Randy <Randy.Kittle@state.sd.us>
Sent: Thursday, March 3, 2022 9:11 AM
To: Becky Baker
Cc: Kyle.flesness@fema.dhs.gov; Cheeseman, Kyle; Myers, Richard; Kent Johnson; Kent Johnson; Leslie Murphy
Subject: RE: Marne Creek / Auld-Brokaw Trail - LWCF Encumbrances

Becky,

Thank you for the opportunity to comment on the Yankton Marne Creek/Auld-Brokaw Trail with regards to LWCF Section 6(F) encumbrances. In reviewing LWCF project files for the City of Yankton I do not find any LWCF encumbered properties within the proposed project boundaries.

Feel free to contact me if you have additional questions.

Randy Kittle | *Grants Coordinator*
South Dakota Game, Fish and Parks
523 East Capitol Avenue | Pierre, SD 57501
605.773.5490 | randy.kittle@state.sd.us

From: Becky Baker <beckyb@bannerassociates.com>
Sent: Friday, February 11, 2022 4:05 PM
To: Kittle, Randy <Randy.Kittle@state.sd.us>
Cc: Kyle.flesness@fema.dhs.gov; Cheeseman, Kyle <kyle.cheeseman@fema.dhs.gov>; Myers, Richard <Richard.Myers2@fema.dhs.gov>; Kent Johnson <kentj@bannerassociates.com>; Kent Johnson <kentj@bannerassociates.com>; Leslie Murphy <lesliem@bannerassociates.com>
Subject: [EXT] Marne Creek / Auld-Brokaw Trail - LWCF Encumbrances

Hi Randy,

The City of Yankton is proposing a bank stabilization and streambank restoration project. In 2019, several reaches of Marne Creek within the City were damaged due to flood events. Flooding eroded the banks of the creek, also causing the collapse of the Auld-Brokaw Trail in several areas. The City is planning to restore the trail to pre-flood conditions and stabilize the banks of Marne Creek that have the potential for collapse with future high flow events.

We would request a review of the presence of any LWCF encumbrances within the project areas, which all contain segments of the recreational pedestrian trail. A kmz file and figures showing the project areas are attached. Let me know if you have questions or need additional information.

Thanks!
Becky Baker | Environmental Department Head
Banner Associates, Inc. | Sioux Falls, SD
Tel | 605.690.2190 Toll Free | 1.855.323.6342
www.bannerassociates.com

Banner Associates, Inc.
2307 W 57th St, Ste 102
Sioux Falls, SD 57108
Tel 605.692.6342
Toll Free 855.323.6342
www.bannerassociates.com

April 13, 2022

Brad Bies, Community Floodplain Administrator
City of Yankton, Community and Economic Development
(Delivered via email: BBies@cityofyankton.org)
416 Walnut Street, PO Box 176
Yankton, SD 57078

RE: **Auld/Brokaw Maintenance Trail and Marne Creek Bank Restoration**
Preliminary No-Rise Certificate and Floodplain Development Permit
FEMA Event DR4440SD, Project # 108439, PW#330

Dear Mr. Bies:

The City of Yankton's Auld/Brokaw Maintenance Trail along Marne Creek sustained severe damage during the March 2019 blizzard and subsequent rapid snowmelt. Banner Associates, Inc. was contracted by the City of Yankton to design the bank stabilization project. Most of the project sites are located within the Marne Creek floodway and require a "No-Rise Certificate" with supporting engineering analysis documentation. All project sites are located within the floodplain and will require a Floodplain Development Permit.

The project area has been broken up into five different reaches (Reach A, B, C, G, and J) with numerous sites within each reach. Reach J is not located in the floodway and results are not included in the results presented with this certification.

In general, most of the damage to the streambanks can be repaired using revetment such as riprap, gabions, and turf reinforcement mat (TRM) with bioengineering treatments (i.e. vegetated riprap) when reasonably practical. Where the revetment cannot be installed at the existing streambank slope, it will be sloped back to a more stable slope. The maintenance trail will be replaced at its existing alignments or relocated where proposed streambank work will require additional space.

The effective FEMA maps for Yankton were created long ago with HEC-2 software which is now obsolete. A request was submitted to FEMA for the effective hydraulic model, but a working digital copy of the 1D HEC-2 model was not available. A scanned pdf copy was delivered and after discussion with FEMA staff and others involved in the project, it was determined it wasn't realistic to recreate the HEC-2 model. Instead, a 1D HEC-RAS model was created by Banner Associates, Inc. based on existing conditions using a 2012 Eastern SD LIDAR dataset and ground survey data obtained by Banner Associates, in 2020. Cross section alignments in the 1D HEC-RAS model were created at locations similar to the effective mapping. The model was also used to assist with designing streambank protection to prevent future damage from future similar disaster events.

The Existing Conditions Model is based on the post-disaster survey within the main channel and portions of the overbanks. LIDAR data was used to supplement the survey data where needed. The Proposed Conditions Model is based on the design surface generated from Computer Aided Design (CAD) software at each site location. Adjustments were made to the Proposed Conditions model to account for the revetment (riprap, vegetated

riprap, gabions, and turf reinforcement mat) by adjusting the channel roughness coefficients. Channel geometry was also adjusted in order to achieve a no-rise condition.

We are currently at a 90% plan level and design changes could occur that would make this certification invalid. Additional information will be added to this certificate as plans are finalized.

If you have any questions or require additional information, please do not hesitate to email or call me at 605-696-9147.

Sincerely,

Kent R. Johnson, PE, CFM
Banner Associates, Inc.
kentj@bannerassociates.com

CC: Adam Haberman, City of Yankton, Public Works Director (via email)

Attachments:

1. No-Rise Certificate
2. HEC-RAS analysis output
3. Floodplain Development Permit
4. FIRM maps showing Reach Areas
5. 90% Construction Plans

ATTACHMENT 1

FLOODWAY "NO-RISE / NO-IMPACT" CERTIFICATION

This document is to certify that I am duly qualified engineer licensed to practice in the State of

SOUTH DAKOTA (State). It is to further certify that the attached technical data supports the fact that proposed MARNE CREEK BANK STABILIZATION PROJECT#108439 PW#330 FEMA EVENT DR4440SD will not impact the base flood elevations, floodway elevations, and floodway widths on MARNE CREEK (Name of Stream) at published cross sections in the Flood Insurance Study for, YANKTON (Name of community), dated 07/06/2010 (Date) and will not impact the base flood elevations, floodway elevations, and floodway widths at the unpublished cross-sections in the area of the proposed development.

REGISTERED PROFESSIONAL ENGINEER
REG NO. 8160
KENT R. JOHNSON
SOUTH DAKOTA
04-13-2022

SEAL, SIGNATURE AND DATE

KENT R. JOHNSON, PE, CFM
Name

PROJECT MANAGER
Title

2307 W. 57TH ST, SUITE 102

SIOUX FALLS, SD 57108
Address

FOR COMMUNITY USE ONLY:		
Community Approval ☐ Approved ☐ Disapproved		
Community Official's Name	Community Official's Signature	Title

ATTACHMENT 2

Delta Result: (+) No Rise (-) Rise

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	**W.S. Elev**	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl		**Delta**
				(cfs)	(ft)	**(ft)**	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)			**(ft)**
Marne Creek	13547	100yr	FG v03 FEMA Q	4100	1199.2	1213.31	1207.16	1213.48	0.000519	3.63	2029.78	597.52	0.21		
Marne Creek	13547	100yr	Ex v2 FEMA Q	4100	1199.2	1213.37	1207.16	1213.54	0.000503	3.59	2066.21	605.7	0.21		-0.06
Marne Creek	13247	100yr	FG v03 FEMA Q	4100	1199.2	1212.97	1207.16	1213.27	0.000837	4.4	990.19	272.99	0.26		
Marne Creek	13247	100yr	Ex v2 FEMA Q	4100	1199.2	1213.04	1207.16	1213.33	0.000814	4.36	1006.15	287.76	0.26		-0.07
Marne Creek	13216 15th St			Bridge											
Marne Creek	13182	100yr	FG v03 FEMA Q	4100	1199.53	1212.49	1207.16	1212.83	0.001004	4.68	876.07	178.96	0.29		
Marne Creek	13182	100yr	Ex v2 FEMA Q	4100	1199.53	1212.55	1207.16	1212.89	0.000979	4.64	882.76	189.47	0.28		-0.06
Marne Creek	13038	100yr	FG v03 FEMA Q	4100	1199.24	1212.11	1208.77	1212.61	0.001634	6.75	1188.2	387.1	0.36		
Marne Creek	13038	100yr	Ex v2 FEMA Q	4100	1199.24	1212.19	1208.77	1212.67	0.00158	6.67	1205.89	397.38	0.35		-0.08
Marne Creek	12920	100yr	FG v03 FEMA Q	4100	1198.93	1211.96	1209.04	1212.36	0.001731	6.69	1656.73	419.56	0.36		
Marne Creek	12920	100yr	Ex v2 FEMA Q	4100	1198.93	1212.05	1209.04	1212.43	0.001643	6.55	1694.88	421.53	0.35		-0.09
Marne Creek	12888	100yr	FG v03 FEMA Q	4100	1199.24	1211.95	1208.94	1212.27	0.00146	6.19	1782.2	429.45	0.33		
Marne Creek	12888	100yr	Ex v2 FEMA Q	4100	1199.24	1212.04	1208.94	1212.35	0.001387	6.07	1821.5	431.33	0.33		-0.09
Marne Creek	12866 12th Ped Brdge			Bridge											
Marne Creek	12851	100yr	FG v03 FEMA Q	4100	1198.94	1211.75	1207.24	1212.02	0.001005	4.69	1644.44	415.85	0.28		
Marne Creek	12851	100yr	Ex v2 FEMA Q	4100	1198.94	1211.85	1207.24	1212.11	0.00095	4.59	1688.64	419.08	0.28		-0.1
Marne Creek	12727	100yr	FG v03 FEMA Q	4100	1199.79	1211.67	1208.43	1211.86	0.000985	5.14	2126.81	425.08	0.29		
Marne Creek	12727	100yr	Ex v2 FEMA Q	4100	1199.79	1211.78	1208.43	1211.96	0.000929	5.03	2174.2	427.38	0.28		-0.11
Marne Creek	12338	100yr	FG v03 FEMA Q	4100	1197.6	1210.56	1207.53	1211.16	0.00253	6.3	803.99	339.97	0.44		
Marne Creek	12338	100yr	Ex v2 FEMA Q	4100	1197.6	1210.78	1207.53	1211.32	0.002247	6.04	878.83	355.91	0.42		-0.22
Marne Creek	12194	100yr	FG v03 FEMA Q	4100	1197.18	1210.35	1206.28	1210.89	0.00135	5.9	745.35	380.02	0.38		
Marne Creek	12194	100yr	Ex v2 FEMA Q	4100	1197.18	1210.5	1206.41	1211.03	0.001887	5.87	752.81	397.05	0.38		-0.15
Marne Creek	12142	100yr	FG v03 FEMA Q	4100	1197.5	1210.3	1206.17	1210.79	0.001874	5.65	856.05	439.56	0.38		
Marne Creek	12142	100yr	Ex v2 FEMA Q	4100	1197.5	1210.45	1206.17	1210.91	0.001737	5.51	894.11	457.91	0.36		-0.15
Marne Creek	12034	100yr	FG v03 FEMA Q	4100	1197.4	1209.37	1207.39	1210.38	0.007272	8.11	562.01	308.44	0.59		
Marne Creek	12034	100yr	Ex v2 FEMA Q	4100	1197.24	1209.7	1207.18	1210.55	0.006476	7.51	642.19	327.21	0.53		-0.33
Marne Creek	11982	100yr	FG v03 FEMA Q	4100	1197.16	1209.46	1205.35	1210	0.003271	5.96	781.83	291.78	0.39		
Marne Creek	11982	100yr	Ex v2 FEMA Q	4100	1197.16	1209.69	1205.4	1210.24	0.002923	6.02	804.57	317.43	0.38		-0.23
Marne Creek	11935	100yr	FG v03 FEMA Q	4100	1196.93	1209.35	1205.15	1209.88	0.001897	5.88	770.67	317.35	0.37		
Marne Creek	11935	100yr	Ex v2 FEMA Q	4100	1196.93	1209.56	1205.35	1210.13	0.001949	6.08	764.9	336.88	0.38		-0.21
Marne Creek	11798	100yr	FG v03 FEMA Q	4100	1197.19	1209.33	1205.65	1209.6	0.001164	4.6	1627.03	524.3	0.3		
Marne Creek	11798	100yr	Ex v2 FEMA Q	4100	1197.11	1209.6	1205.79	1209.85	0.000996	4.4	1760.8	542.19	0.28		-0.27
Marne Creek	11727	100yr	FG v03 FEMA Q	4100	1197.1	1206.79	1206.79	1209.24	0.004768	14.59	679.75	358.17	0.87		
Marne Creek	11727	100yr	Ex v2 FEMA Q	4100	1197.1	1206.88	1206.88	1209.49	0.004355	14.96	683.81	370.64	0.9		-0.09
Marne Creek	11704 Trail Xing 1			Culvert											
Marne Creek	11682	100yr	FG v03 FEMA Q	4100	1195.63	1206.7		1207.05	0.00062	5.06	1394.91	461.69	0.34		
Marne Creek	11682	100yr	Ex v2 FEMA Q	4100	1195.63	1206.71		1207.06	0.000557	5.02	1409.03	462.26	0.34		-0.01
Marne Creek	11556	100yr	FG v03 FEMA Q	4100	1195.49	1206.57		1206.98	0.000479	5.82	1677.78	496.97	0.33		
Marne Creek	11556	100yr	Ex v2 FEMA Q	4100	1195.49	1206.57		1206.99	0.000514	5.82	1638.95	496.99	0.33		0
Marne Creek	11269	100yr	FG v03 FEMA Q	4100	1195.64	1206.4		1206.8	0.00086	6.19	1376.61	625.79	0.41		
Marne Creek	11269	100yr	Ex v2 FEMA Q	4100	1195.64	1206.4		1206.8	0.00086	6.19	1376.61	625.79	0.41		0
Marne Creek	10637	100yr	FG v03 FEMA Q	4100	1193.64	1205.82	1202.32	1206.18	0.001469	5.27	1480.15	707	0.34		
Marne Creek	10637	100yr	Ex v2 FEMA Q	4100	1193.64	1205.82	1202.32	1206.18	0.001469	5.27	1480.15	707	0.34		0
Marne Creek	10345	100yr	FG v03 FEMA Q	4100	1192.51	1205.67	1201.48	1205.82	0.000758	3.28	1518.34	580.52	0.24		

																Delta Result:	(+) No Rise		(-) Rise
Reach	River Sta	Profile	Plan	Q Total	Min Ch El	**W.S. Elev**	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl		**Delta**
				(cfs)	(ft)	**(ft)**	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)			**(ft)**
Marne Creek	10345	100yr	Ex v2 FEMA Q	4100	1192.51	1205.67	1201.48	1205.82	0.000758	3.28	1518.34	580.52	0.24		0
Marne Creek	10164	100yr	FG v03 FEMA Q	4100	1191.68	1205.22	1201.55	1205.62	0.001409	5.37	1283.29	502.15	0.34		
Marne Creek	10164	100yr	Ex v2 FEMA Q	4100	1191.68	1205.22	1201.55	1205.62	0.001409	5.37	1283.29	502.15	0.34		0
Marne Creek	10009	100yr	FG v03 FEMA Q	4100	1191.01	1204	1203.03	1205.15	0.005824	9	689.63	277.46	0.62		
Marne Creek	10009	100yr	Ex v2 FEMA Q	4100	1191.01	1204	1203.03	1205.15	0.005824	9	689.63	277.46	0.62		0
Marne Creek	9846	100yr	FG v03 FEMA Q	4100	1190.64	1203.43	1201.07	1204.23	0.003639	7.48	878.4	594.51	0.51		
Marne Creek	9846	100yr	Ex v2 FEMA Q	4100	1190.64	1203.43	1201.07	1204.23	0.003639	7.48	878.4	594.51	0.51		0
Marne Creek	9782 Broadway			Bridge											
Marne Creek	9727	100yr	FG v03 FEMA Q	4100	1187.52	1203.49	1196.4	1203.63	0.000436	3.13	2142	916.34	0.19		
Marne Creek	9727	100yr	Ex v2 FEMA Q	4100	1187.52	1203.49	1196.4	1203.63	0.000436	3.13	2142	916.34	0.19		0
Marne Creek	9594	100yr	FG v03 FEMA Q	4100	1189.01	1202.91	1200.03	1203.41	0.002095	6.75	1652.36	871.65	0.39		
Marne Creek	9594	100yr	Ex v2 FEMA Q	4100	1189.01	1202.91	1200.03	1203.41	0.002095	6.75	1652.25	871.62	0.39		0
Marne Creek	9469	100yr	FG v03 FEMA Q	4100	1189.37	1202.99	1198.07	1203.11	0.000461	3	2323.69	869.04	0.19		
Marne Creek	9469	100yr	Ex v2 FEMA Q	4100	1189.37	1202.99	1198.07	1203.11	0.000461	3	2323.58	869	0.19		0
Marne Creek	9354	100yr	FG v03 FEMA Q	4100	1189.26	1202.57	1199.96	1202.99	0.001796	5.83	1350.3	643.26	0.37		
Marne Creek	9354	100yr	Ex v2 FEMA Q	4100	1189.26	1202.57	1199.96	1202.99	0.001796	5.83	1350.22	643.2	0.37		0
Marne Creek	9261	100yr	FG v03 FEMA Q	4100	1188.9	1202.52	1198.66	1202.84	0.001207	4.83	1457.75	679.39	0.31		
Marne Creek	9261	100yr	Ex v2 FEMA Q	4100	1188.9	1202.52	1198.66	1202.84	0.001207	4.83	1457.67	679.35	0.31		0
Marne Creek	9093	100yr	FG v03 FEMA Q	4100	1188.44	1202	1199.76	1202.56	0.002464	6.56	1221.75	559.02	0.43		
Marne Creek	9093	100yr	Ex v2 FEMA Q	4100	1188.44	1202	1199.76	1202.56	0.002465	6.56	1221.61	558.93	0.43		0
Marne Creek	8956	100yr	FG v03 FEMA Q	4100	1187.46	1202.05	1197.26	1202.2	0.000678	3.16	1876.88	691.13	0.23		
Marne Creek	8956	100yr	Ex v2 FEMA Q	4100	1187.46	1202.05	1197.26	1202.19	0.000678	3.16	1876.62	690.97	0.23		0
Marne Creek	8939 Trail Xing 2			Culvert											
Marne Creek	8877	100yr	FG v03 FEMA Q	4100	1186.66	1202	1194.34	1202.16	0.000371	3.24	2201.68	928.13	0.18		
Marne Creek	8877	100yr	Ex v2 FEMA Q	4100	1186.66	1202	1194.34	1202.16	0.000371	3.25	2201.34	928.07	0.18		0
Marne Creek	8823 Cedar			Bridge											
Marne Creek	8764	100yr	FG v03 FEMA Q	4100	1187.23	1201.95	1195.47	1202.1	0.000453	3.09	1811.48	921.59	0.19		
Marne Creek	8764	100yr	Ex v2 FEMA Q	4100	1187.23	1201.95	1195.47	1202.09	0.000453	3.09	1811.21	921.4	0.19		0
Marne Creek	8711	100yr	FG v03 FEMA Q	4100	1187.12	1201.59	1197.82	1202	0.00171	5.24	1096.02	701.64	0.36		
Marne Creek	8711	100yr	Ex v2 FEMA Q	4100	1187.12	1201.59	1197.82	1202	0.00171	5.24	1095.7	701.51	0.36		0
Marne Creek	8614	100yr	FG v03 FEMA Q	4100	1187.18	1201.54	1197.03	1201.78	0.001262	3.92	1227.31	633.14	0.3		
Marne Creek	8614	100yr	Ex v2 FEMA Q	4100	1187.18	1201.54	1197.03	1201.78	0.001263	3.92	1226.95	633.09	0.3		0
Marne Creek	8545	100yr	FG v03 FEMA Q	4100	1186.68	1201.17	1196.57	1201.64	0.002113	5.59	905.86	575.39	0.39		
Marne Creek	8545	100yr	Ex v2 FEMA Q	4100	1186.68	1201.17	1196.57	1201.64	0.002114	5.59	905.53	575.19	0.39		0
Marne Creek	8428	100yr	FG v03 FEMA Q	4100	1186.72	1200.63	1196.4	1201.33	0.003043	6.71	688.42	356.36	0.47		
Marne Creek	8428	100yr	Ex v2 FEMA Q	4100	1186.72	1200.63	1196.4	1201.33	0.003045	6.71	688.14	356.21	0.47		0
Marne Creek	8342	100yr	FG v03 FEMA Q	4100	1186.47	1200.55	1193.83	1201.06	0.001384	5.86	950.48	503.97	0.3		
Marne Creek	8342	100yr	Ex v2 FEMA Q	4100	1186.47	1200.55	1193.83	1201.06	0.001385	5.86	950.05	503.86	0.3		0
Marne Creek	8290 Walnut			Bridge											
Marne Creek	8226	100yr	FG v03 FEMA Q	4100	1186.19	1200.27	1193.76	1200.74	0.001306	5.71	1150.05	503.83	0.29		
Marne Creek	8226	100yr	Ex v2 FEMA Q	4100	1186.19	1200.27	1193.76	1200.73	0.001307	5.71	1149.74	503.78	0.29		0
Marne Creek	7988	100yr	FG v03 FEMA Q	4100	1184.62	1199.97	1194.65	1200.43	0.001437	5.65	1064.58	332.55	0.34		
Marne Creek	7988	100yr	Ex v2 FEMA Q	4100	1184.62	1199.97	1194.65	1200.43	0.001437	5.65	1064.34	332.42	0.34		0

Delta Result: (+) No Rise (-) Rise

Reach	River Sta	Profile	Plan	Q Total	Min Ch El	**W.S. Elev**	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	**Delta**
				(cfs)	(ft)	**(ft)**	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		**(ft)**
Marne Creek	7911 Footbridge 1			Bridge										
Marne Creek	7791	100yr	FG v03 FEMA Q	4100	1183.08	1199.14	1194.59	1199.85	0.002902	6.73	614.45	126.97	0.46	
Marne Creek	7791	100yr	Ex v2 FEMA Q	4100	1183.08	1199.14	1194.59	1199.85	0.002903	6.73	614.32	126.87	0.46	0
Marne Creek	7686	100yr	FG v03 FEMA Q	4100	1183.41	1198.98	1192.81	1199.58	0.001544	6.23	658.53	86.25	0.34	
Marne Creek	7686	100yr	Ex v2 FEMA Q	4100	1183.41	1198.98	1192.81	1199.58	0.001545	6.23	658.47	86.14	0.34	0
Marne Creek	7640 Douglas			Bridge										
Marne Creek	7589	100yr	FG v03 FEMA Q	4100	1184.01	1198.05	1192.59	1198.79	0.002001	6.86	597.85	59.25	0.38	
Marne Creek	7589	100yr	Ex v2 FEMA Q	4100	1184.01	1198.05	1192.59	1198.79	0.002002	6.86	597.81	59.25	0.38	0
Marne Creek	7404	100yr	FG v03 FEMA Q	4100	1183.16	1197.91	1192.82	1198.18	0.001179	4.17	984.21	161.92	0.3	
Marne Creek	7404	100yr	Ex v2 FEMA Q	4100	1183.16	1197.91	1192.82	1198.18	0.001179	4.17	984.07	161.89	0.3	0
Marne Creek	7193 Capital			Bridge										
Marne Creek	7148	100yr	FG v03 FEMA Q	4100	1183.03	1195.86	1189.08	1196.16	0.000622	4.4	931.01	113.22	0.24	
Marne Creek	7148	100yr	Ex v2 FEMA Q	4100	1183.03	1195.89	1189.08	1196.19	0.000617	4.39	933.22	113.51	0.24	-0.03
Marne Creek	7023	100yr	FG v03 FEMA Q	4100	1182.7	1195.71	1190.31	1196.05	0.00104	4.75	975.1	189.39	0.29	
Marne Creek	7023	100yr	Ex v2 FEMA Q	4100	1182.7	1195.73	1190.31	1196.07	0.001027	4.73	979.65	190.31	0.29	-0.02
Marne Creek	6971	100yr	FG v03 FEMA Q	4100	1181.81	1195.68	1190.42	1195.93	0.001036	4.04	1021.99	181.3	0.28	
Marne Creek	6971	100yr	Ex v2 FEMA Q	4100	1181.81	1195.71	1190.42	1195.96	0.001023	4.02	1027.22	182.19	0.28	-0.03
Marne Creek	6940.08 Trail Xing 3			Culvert										
Marne Creek	6902	100yr	FG v03 FEMA Q	4100	1182.12	1195.51	1189.85	1195.74	0.000837	3.92	1074.48	198.12	0.26	
Marne Creek	6902	100yr	Ex v2 FEMA Q	4100	1182.12	1195.55	1189.85	1195.79	0.000821	3.89	1083.81	200.05	0.26	-0.04
Marne Creek	6757	100yr	FG v03 FEMA Q	4100	1180.7	1194.98	1190.61	1195.48	0.002017	5.7	772.75	189.87	0.37	
Marne Creek	6757	100yr	Ex v2 FEMA Q	4100	1180.7	1195.04	1190.61	1195.53	0.001967	5.66	783.07	212.12	0.37	-0.06
Marne Creek	6667	100yr	FG v03 FEMA Q	4100	1180.67	1194.82	1189.38	1195.32	0.00169	5.66	781.71	176.8	0.36	
Marne Creek	6667	100yr	Ex v2 FEMA Q	4100	1180.67	1194.88	1189.38	1195.37	0.001643	5.61	791.38	179.82	0.36	-0.06
Marne Creek	6603	100yr	FG v03 FEMA Q	4100	1180.35	1194.35	1189.43	1195.12	0.001924	7.03	583.17	123.43	0.39	
Marne Creek	6603	100yr	Ex v2 FEMA Q	4100	1180.35	1194.42	1189.43	1195.17	0.001883	6.99	586.91	125.43	0.38	-0.07
Marne Creek	6574 Pine			Bridge										
Marne Creek	6541	100yr	FG v03 FEMA Q	4100	1180.22	1193.83	1188.96	1194.61	0.001751	7.08	579.32	97.68	0.39	
Marne Creek	6541	100yr	Ex v2 FEMA Q	4100	1180.22	1193.91	1188.96	1194.67	0.001709	7.03	583.54	104.33	0.38	-0.08
Marne Creek	6477	100yr	FG v03 FEMA Q	4100	1180.28	1193.12	1189.64	1194.31	0.004684	8.77	467.69	184.17	0.58	
Marne Creek	6477	100yr	Ex v2 FEMA Q	4100	1180.28	1193.12	1189.75	1194.36	0.004941	8.91	460.17	184.2	0.59	0
Marne Creek	6383	100yr	FG v03 FEMA Q	4100	1180.22	1193.07	1189.71	1193.66	0.002954	6.84	943.98	211.47	0.46	
Marne Creek	6383	100yr	Ex v2 FEMA Q	4100	1180.22	1193.09	1189.9	1193.68	0.00301	6.87	942.43	211.68	0.46	-0.02
Marne Creek	6296	100yr	FG v03 FEMA Q	4100	1178.49	1192.7	1188.3	1193.41	0.002524	7.14	832.79	236.71	0.43	
Marne Creek	6296	100yr	Ex v2 FEMA Q	4100	1178.49	1192.73	1188.3	1193.43	0.002496	7.11	837.27	236.89	0.43	-0.03
Marne Creek	6269	100yr	FG v03 FEMA Q	4100	1177.22	1192.38	1187.46	1193.28	0.003013	7.64	578.7	208.85	0.47	
Marne Creek	6269	100yr	Ex v2 FEMA Q	4100	1177.22	1192.4	1187.46	1193.3	0.00302	7.61	582.48	211.26	0.47	-0.02
Marne Creek	6181 Footbridge 2			Bridge										
Marne Creek	5924	100yr	FG v03 FEMA Q	4100	1177.32	1190.22	1186.64	1191.03	0.003262	7.2	569.19	104.95	0.49	
Marne Creek	5924	100yr	Ex v2 FEMA Q	4100	1177.32	1190.25	1186.64	1191.05	0.003222	7.17	571.76	105.47	0.49	-0.03
Marne Creek	5712	100yr	FG v03 FEMA Q	4100	1176.92	1189.54	1186.47	1190.31	0.003329	7.03	582.86	160.21	0.5	
Marne Creek	5712	100yr	Ex v2 FEMA Q	4100	1176.92	1189.58	1186.5	1190.34	0.003289	7	585.44	161.19	0.49	-0.04
Marne Creek	5632	100yr	FG v03 FEMA Q	4100	1176.99	1189.59	1184.96	1189.96	0.00123	4.95	990.14	181.28	0.32	

																Delta Result:	(+) No Rise		(-) Rise
Reach	River Sta	Profile	Plan	Q Total	Min Ch El	**W.S. Elev**	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl		**Delta**
				(cfs)	(ft)	**(ft)**	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)			**(ft)**
Marne Creek	5632	100yr	Ex v2 FEMA Q	4100	1176.99	1189.62	1185.08	1189.99	0.001265	4.98	986.96	181.76	0.32		-0.03
Marne Creek	5599.98	Trail Xing 4		Culvert											
															0
Marne Creek	5548	100yr	FG v03 FEMA Q	4100	1175.82	1189.35	1184.11	1189.79	0.001183	5.46	921.34	161.94	0.31		
Marne Creek	5548	100yr	Ex v2 FEMA Q	4100	1175.82	1189.39	1184.11	1189.83	0.001164	5.43	928.29	162.71	0.31		-0.04
Marne Creek	5332	100yr	FG v03 FEMA Q	4100	1174.9	1188.28	1184.55	1189.22	0.003897	7.77	527.42	77.58	0.53		
Marne Creek	5332	100yr	Ex v2 FEMA Q	4100	1174.9	1188.35	1184.55	1189.27	0.003789	7.69	532.85	77.94	0.52		-0.07
Marne Creek	5213	100yr	FG v03 FEMA Q	4100	1174.53	1187.47		1188.62	0.004923	8.64	474.78	70.25	0.59		
Marne Creek	5213	100yr	Ex v2 FEMA Q	4100	1174.53	1187.58		1188.7	0.004699	8.49	482.78	70.74	0.57		-0.11
Marne Creek	5095	100yr	FG v03 FEMA Q	4100	1173.64	1186.69		1187.98	0.005935	9.11	450.07	68.5	0.63		
Marne Creek	5095	100yr	Ex v2 FEMA Q	4100	1173.64	1186.84		1188.09	0.005475	8.98	456.79	69.08	0.62		-0.15
Marne Creek	5022	100yr	FG v03 FEMA Q	4100	1174.62	1185.95	1184	1187.5	0.006386	10.06	461.76	150.97	0.67		
Marne Creek	5022	100yr	Ex v2 FEMA Q	4100	1174.62	1186.28	1184.05	1187.68	0.005423	9.6	511.72	175.54	0.63		-0.33
Marne Creek	4910	100yr	FG v03 FEMA Q	4100	1172.85	1186.18		1186.81	0.002406	6.85	910.38	247.5	0.42		
Marne Creek	4910	100yr	Ex v2 FEMA Q	4100	1172.85	1186.3		1187.03	0.003028	7.35	900.39	268.21	0.47		-0.12
Marne Creek	4826	100yr	FG v03 FEMA Q	4100	1172.75	1186.27		1186.59	0.001085	4.64	1066.49	274.83	0.29		
Marne Creek	4826	100yr	Ex v2 FEMA Q	4100	1172.75	1186.31		1186.78	0.001584	5.59	922.64	259.96	0.35		-0.04
Marne Creek	4784	100yr	FG v03 FEMA Q	4100	1171.7	1186.25		1186.55	0.000579	4.4	1108.34	268.27	0.26		
Marne Creek	4784	100yr	Ex v2 FEMA Q	4100	1171.7	1186.28		1186.71	0.001228	5.36	940.89	247.09	0.31		-0.03
Marne Creek	4692	100yr	FG v03 FEMA Q	4100	1171.71	1186.15		1186.48	0.000857	4.67	1017.36	243.4	0.33		
Marne Creek	4692	100yr	Ex v2 FEMA Q	4100	1171.71	1186.24		1186.56	0.00134	4.57	1040.04	244.73	0.32		-0.09
Marne Creek	4609	100yr	FG v03 FEMA Q	4100	1171.35	1185.05		1186.26	0.004828	9.86	800.6	233.09	0.55		
Marne Creek	4609	100yr	Ex v2 FEMA Q	4100	1171.35	1185.14		1186.29	0.004612	9.67	821.58	233.96	0.54		-0.09
Marne Creek	4513	100yr	FG v03 FEMA Q	4100	1171.63	1184.96	1181.65	1185.65	0.00279	6.72	683.78	184.48	0.46		
Marne Creek	4513	100yr	Ex v2 FEMA Q	4100	1171.63	1185.05	1181.65	1185.72	0.002673	6.62	700.01	185.41	0.45		-0.09
Marne Creek	4485	Trail Xing 5		Culvert											
Marne Creek	4452	100yr	FG v03 FEMA Q	4100	1172.7	1184.54	1180.07	1185.18	0.002366	6.4	643.82	112.63	0.42		
Marne Creek	4452	100yr	Ex v2 FEMA Q	4100	1172.7	1184.67	1180.07	1185.29	0.002241	6.28	659.18	120.36	0.41		-0.13
Marne Creek	4384	100yr	FG v03 FEMA Q	4100	1169.5	1184.51	1178.6	1184.97	0.001375	5.42	761.72	99.17	0.32		
Marne Creek	4384	100yr	Ex v2 FEMA Q	4100	1169.5	1184.64	1178.6	1185.09	0.001317	5.34	775.01	100.99	0.32		-0.13
Marne Creek	4334	100yr	FG v03 FEMA Q	4100	1169.19	1184.4	1178.43	1184.89	0.001446	5.6	745.6	98.56	0.33		
Marne Creek	4334	100yr	Ex v2 FEMA Q	4100	1169.19	1184.54	1178.43	1185.01	0.001384	5.52	759.31	99.87	0.33		-0.14
Marne Creek	4249	100yr	FG v03 FEMA Q	4100	1168.58	1184.15	1179.54	1184.73	0.00213	6.13	669.27	90.4	0.4		
Marne Creek	4249	100yr	Ex v2 FEMA Q	4100	1168.58	1184.3	1179.54	1184.86	0.002015	6	683.27	91.39	0.39		-0.15
Marne Creek	4197	100yr	FG v03 FEMA Q	4100	1167.8	1183.21	1179.15	1184.32	0.003767	8.45	485.21	57.41	0.51		
Marne Creek	4197	100yr	Ex v2 FEMA Q	4100	1167.8	1183.42	1179.15	1184.47	0.003714	8.25	497.21	60.71	0.51		-0.21
Marne Creek	4154	Burleigh		Bridge											
Marne Creek	4115	100yr	FG v03 FEMA Q	4100	1168.08	1180.72	1178.95	1182.68	0.008672	11.21	367.64	46.13	0.69		
Marne Creek	4115	100yr	Ex v2 FEMA Q	4100	1168.08	1181.47	1178.95	1183.11	0.006477	10.27	402.19	46.47	0.61		-0.75
Marne Creek	4050	100yr	FG v03 FEMA Q	4100	1167.44	1180.62		1181.71	0.003859	8.56	529.66	82.02	0.5		
Marne Creek	4050	100yr	Ex v2 FEMA Q	4100	1167.44	1181.43		1182.31	0.002824	7.75	597.89	86.58	0.43		-0.81
Marne Creek	3927	100yr	FG v03 FEMA Q	4100	1165.92	1179.28		1180.96	0.005879	10.75	439.32	64.09	0.59		
Marne Creek	3927	100yr	Ex v2 FEMA Q	4100	1165.92	1179.72		1181.54	0.006378	11.16	423.71	63.06	0.62		-0.44
Marne Creek	3873	100yr	FG v03 FEMA Q	4100	1165.85	1179.2		1180.51	0.004058	9.59	510.18	69.96	0.5		
Marne Creek	3873	100yr	Ex v2 FEMA Q	4100	1165.85	1179.52		1181.14	0.00479	10.4	447.63	69.1	0.55		-0.32

																Delta Result:	(+) No Rise		(-) Rise
Reach	River Sta	Profile	Plan	Q Total	Min Ch El	**W.S. Elev**	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl		**Delta**
				(cfs)	(ft)	**(ft)**	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)			**(ft)**
Marne Creek	3731	100yr	FG v03 FEMA Q	4100	1165.11	1178.75		1179.87	0.003671	8.71	552.89	100.61	0.46		
Marne Creek	3731	100yr	Ex v2 FEMA Q	4100	1165.11	1179.17		1180.31	0.003671	8.84	560.58	109.15	0.47		-0.42
Marne Creek	3633	100yr	FG v03 FEMA Q	4100	1163.92	1178.64		1179.4	0.002481	7.75	810.24	183.87	0.39		
Marne Creek	3633	100yr	Ex v2 FEMA Q	4100	1163.92	1179.04		1179.84	0.002737	8	802.54	191.6	0.41		-0.4
Marne Creek	3563	100yr	FG v03 FEMA Q	4100	1164.24	1178.09		1179.14	0.003664	9.19	717.11	189.12	0.47		
Marne Creek	3563	100yr	Ex v2 FEMA Q	4100	1164.24	1178.75		1179.64	0.003027	8.62	794.72	201.85	0.44		-0.66
Marne Creek	3512	100yr	FG v03 FEMA Q	4100	1163.73	1178.12		1178.83	0.002216	7.52	870.43	208.38	0.38		
Marne Creek	3512	100yr	Ex v2 FEMA Q	4100	1163.73	1178.78		1179.39	0.001933	7.12	946.04	218.23	0.35		-0.66
Marne Creek	3368	100yr	FG v03 FEMA Q	4100	1163.58	1175.58		1177.82	0.009015	12.49	392.15	68.84	0.71		
Marne Creek	3368	100yr	Ex v2 FEMA Q	4100	1163.58	1175.97	1175.1	1178.36	0.009121	12.84	396.26	92.71	0.74		-0.39
Marne Creek	3316	100yr	FG v03 FEMA Q	4100	1162.86	1174.77	1174.09	1177.25	0.010601	13.03	372.17	75.3	0.76		
Marne Creek	3316	100yr	Ex v2 FEMA Q	4100	1162.86	1174.83	1174.46	1177.67	0.012146	13.88	346.04	75.79	0.83		-0.06
Marne Creek	3233	100yr	FG v03 FEMA Q	4100	1161.81	1174.02		1176.24	0.00914	12.19	372.27	57.4	0.71		
Marne Creek	3233	100yr	Ex v2 FEMA Q	4100	1161.81	1174.15		1176.37	0.00893	12.18	370.25	57.62	0.71		-0.13
Marne Creek	3176	100yr	FG v03 FEMA Q	4100	1161.12	1174.19		1175	0.002693	7.39	609.41	83.71	0.42		
Marne Creek	3176	100yr	Ex v2 FEMA Q	4100	1161.12	1174.25		1175.19	0.003162	7.83	553.92	78.05	0.45		-0.06
Marne Creek	3100	100yr	FG v03 FEMA Q	4100	1160.44	1174.11		1174.74	0.00186	6.57	717.9	91.34	0.34		
Marne Creek	3100	100yr	Ex v2 FEMA Q	4100	1160.43	1174.12		1174.91	0.002315	7.13	593.67	69.62	0.38		-0.01
Marne Creek	2941	100yr	FG v03 FEMA Q	4100	1160.99	1173.21		1174.21	0.003817	8.08	530.47	74.4	0.48		
Marne Creek	2941	100yr	Ex v2 FEMA Q	4100	1160.99	1173.34		1174.37	0.003794	8.21	526.58	71.3	0.49		-0.13
Marne Creek	2788	100yr	FG v03 FEMA Q	4100	1160.69	1172.12		1173.51	0.005009	9.56	454.9	63.36	0.55		
Marne Creek	2788	100yr	Ex v2 FEMA Q	4100	1160.69	1172.39		1173.71	0.004568	9.26	459.91	60.99	0.54		-0.27
Marne Creek	2656	100yr	FG v03 FEMA Q	4100	1159.63	1171.05		1172.69	0.007582	10.47	431.68	66.5	0.6		
Marne Creek	2656	100yr	Ex v2 FEMA Q	4100	1159.63	1171.22		1172.91	0.007602	10.62	421.97	64.74	0.62		-0.17
Marne Creek	2533	100yr	FG v03 FEMA Q	4100	1158.49	1170.51	1167.14	1171.7	0.005169	8.86	495.93	63.05	0.5		
Marne Creek	2533	100yr	Ex v2 FEMA Q	4100	1158.49	1170.65	1167.41	1171.94	0.005255	9.19	469.72	60.53	0.52		-0.14
Marne Creek	2495	4th St / SD 50		Bridge											
Marne Creek	2450	100yr	FG v03 FEMA Q	4100	1158.49	1168	1166.71	1170.23	0.011372	12.02	351.12	50.79	0.75		
Marne Creek	2450	100yr	Ex v2 FEMA Q	4100	1158.49	1168	1166.71	1170.23	0.011372	12.02	351.12	50.79	0.75		0
Marne Creek	2417	100yr	FG v03 FEMA Q	4100	1158.3	1168.09	1165.41	1169.19	0.005307	8.51	507.11	74.46	0.53		
Marne Creek	2417	100yr	Ex v2 FEMA Q	4100	1158.3	1168.09	1165.41	1169.19	0.005307	8.51	507.11	74.46	0.53		0
Marne Creek	2399			Bridge											
Marne Creek	2391	100yr	FG v03 FEMA Q	4100	1158.1	1166.68	1165.36	1168.33	0.009978	10.35	408.67	69.22	0.7		
Marne Creek	2391	100yr	Ex v2 FEMA Q	4100	1158.1	1166.68	1165.36	1168.33	0.009974	10.35	408.72	69.23	0.7		0
Marne Creek	2263	100yr	FG v03 FEMA Q	4100	1154.31	1166.1		1167.01	0.004351	7.71	549.44	80.54	0.48		
Marne Creek	2263	100yr	Ex v2 FEMA Q	4100	1154.31	1166.1		1167.01	0.004349	7.71	549.53	80.54	0.48		0
Marne Creek	2147	100yr	FG v03 FEMA Q	4100	1153.01	1164.3		1166.05	0.009115	10.69	401.66	62.6	0.67		
Marne Creek	2147	100yr	Ex v2 FEMA Q	4100	1153.01	1164.31		1166.05	0.009098	10.69	401.92	62.62	0.67		-0.01
Marne Creek	2026	100yr	FG v03 FEMA Q	4100	1153.05	1164.48		1165.03	0.001862	6.05	753.68	121.67	0.35		
Marne Creek	2026	100yr	Ex v2 FEMA Q	4100	1153.05	1164.5		1165.04	0.001805	6	761.27	121.77	0.35		-0.02
Marne Creek	1849	100yr	FG v03 FEMA Q	4100	1152.91	1163.91		1164.65	0.002214	6.97	623.45	89.4	0.41		
Marne Creek	1849	100yr	Ex v2 FEMA Q	4100	1152.91	1163.96		1164.67	0.002079	6.81	614.33	83.65	0.41		-0.05
Marne Creek	1779	100yr	FG v03 FEMA Q	4100	1152.88	1163.49		1164.44	0.00312	7.89	545.77	81.35	0.48		
Marne Creek	1779	100yr	Ex v2 FEMA Q	4100	1152.88	1163.58		1164.49	0.002702	7.75	569.44	89.18	0.47		-0.09

																Delta Result:	(+) No Rise		(-) Rise
Reach	River Sta	Profile	Plan	Q Total	Min Ch El	**W.S. Elev**	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl		**Delta**
				(cfs)	(ft)	**(ft)**	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)			**(ft)**
Marne Creek	1579	100yr	FG v03 FEMA Q	4100	1152.64	1162.65		1163.77	0.003538	8.57	507.74	75.14	0.52		
Marne Creek	1579	100yr	Ex v2 FEMA Q	4100	1152.64	1162.68		1163.86	0.003425	8.75	487.44	67.83	0.53		-0.03
Marne Creek	1331	100yr	FG v03 FEMA Q	4100	1151.77	1162.38		1162.98	0.001924	6.22	669.48	92.24	0.39		
Marne Creek	1331	100yr	Ex v2 FEMA Q	4100	1151.77	1162.51		1163.09	0.001734	6.12	683.88	98.54	0.38		-0.13
Marne Creek	1186	100yr	FG v03 FEMA Q	4100	1151.54	1161.58		1162.58	0.003248	8.08	532.11	81	0.5		
Marne Creek	1186	100yr	Ex v2 FEMA Q	4100	1151.54	1161.79		1162.74	0.00286	7.83	542.36	77	0.48		-0.21
Marne Creek	1009	100yr	FG v03 FEMA Q	4100	1151.69	1161.21		1162.03	0.002428	7.42	603.35	88	0.44		
Marne Creek	1009	100yr	Ex v2 FEMA Q	4100	1151.69	1161.27		1162.23	0.002808	7.91	542.36	76.96	0.48		-0.06
Marne Creek	774	100yr	FG v03 FEMA Q	4100	1151.44	1160.39		1161.34	0.003486	7.87	537.66	86.97	0.51		
Marne Creek	774	100yr	Ex v2 FEMA Q	4100	1151.44	1160.46		1161.49	0.003546	8.16	515.71	81.03	0.53		-0.07
Marne Creek	629	100yr	FG v03 FEMA Q	4100	1151.03	1160.34		1160.86	0.00177	5.92	735.61	111.51	0.37		
Marne Creek	629	100yr	Ex v2 FEMA Q	4100	1151.03	1160.36		1160.98	0.002082	6.32	653.96	92.73	0.41		-0.02
Marne Creek	490	100yr	FG v03 FEMA Q	4100	1150.69	1160.02		1160.6	0.001894	6.16	694.96	104.35	0.39		
Marne Creek	490	100yr	Ex v2 FEMA Q	4100	1150.69	1160.09		1160.7	0.001921	6.27	661.65	90.8	0.39		-0.07
Marne Creek	428	100yr	FG v03 FEMA Q	4100	1150.47	1159.85	1156.3	1160.29	0.001624	5.31	782.21	305.14	0.36		
Marne Creek	428	100yr	Ex v2 FEMA Q	4100	1150.47	1159.93	1156.34	1160.37	0.001646	5.32	773.47	300	0.36		-0.08
Marne Creek	400	100yr	FG v03 FEMA Q	4100	1150.04	1159.67	1156.2	1160.16	0.001848	5.74	758.96	213.82	0.38		
Marne Creek	400	100yr	Ex v2 FEMA Q	4100	1150.09	1159.77	1156.24	1160.25	0.001788	5.53	745.46	207.59	0.37		-0.1
Marne Creek	185	100yr	FG v03 FEMA Q	4100	1150.16	1159.07	1156.15	1159.7	0.002357	6.4	662.8	183.15	0.43		
Marne Creek	185	100yr	Ex v2 FEMA Q	4100	1150.16	1159.13	1156.22	1159.78	0.002441	6.47	641.94	175.53	0.44		-0.06
Marne Creek	1	100yr	FG v03 FEMA Q	4100	1149.93	1158.87	1155.2	1159.3	0.0015	5.27	800.87	125.93	0.35		
Marne Creek	1	100yr	Ex v2 FEMA Q	4100	1149.93	1158.94	1155.22	1159.37	0.001501	5.27	792.35	119.79	0.35		-0.07

City of Yankton
Community and Economic Development
416 Walnut Street, PO BOX 176
Yankton, SD 57078
605-668-5251 www.cityofyankton.org

Issue Date:	Expiration Date:
Permit #	*Permit becomes void if there are changes to the effective Flood Insurance Rate Maps*

Floodplain Development Permit

The **Floodplain Development Permit** is the mechanism by which our community evaluates any and all impacts of activities proposed within our regulated floodplains. All activities must be in compliance with the Floodplain Damage Prevention Ordinance of the presiding jurisdiction, whether local, regional or statewide. The National Flood Insurance Program provides flood insurance to individuals at much lower premiums than could otherwise be purchased through private insurers, and makes certain federal funds are available to communities. In order for citizens to be eligible for the national flood insurance rates, or for communities to receive certain kinds of federal funds, the community must agree to meet minimum floodplain standards. This application packet is a tool to ensure that the activities in our community comply with the Floodplain Damage Prevention Ordinance

Any party undertaking development within a designated floodplain must obtain a floodplain development permit prior to the work commencing. FEMA defines development in Title 44 of the Code of Federal Regulations part 59.1 as: *Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filing, grading, paving, excavation or drilling operations or storage of equipment or materials.* Other human activities that are considered development include but are not limited to: alterations of a structure through additions, demolition and remodeling, fences, retaining wall, moving/placement of remanufactured or mobile homes, campgrounds, storage of equipment, vehicles or materials (storage yards, salvage yards).

1 Please Read

General Provision of the Floodplain Development Permit Terms

1. No work may start until a permit has been issued.
2. The permit may be revoked if:
   a. Any false statements are made herein;
   b. The effective Flood Insurance Rate Map has been revised;
   c. The work is not done in accordance with the Floodplain Damage Prevention Ordinance of the presiding jurisdiction or other local, state and federal regulatory requirements.
   d. The work is different than what is described and submitted to the community as part of the Floodplain Development Permit application.
3. If revoked, all work must cease until permit is reissued.
   a. If the permit cannot be reissued, applicant acknowledges that they will be responsible to correct the issue which may require removal of any development that may have occurred.
4. Development shall not be used or occupied until the project has received final inspection, a final elevation and approval by the community.
5. The permit will expire if no work has commenced within 3 months of issuance and by the expiration date noted on the permit.
6. Applicant is hereby informed that other permits may be required to fulfill local, state, and federal regulatory requirements and acknowledges that it is their responsibility to ensure that all necessary permits are obtained.
   a. This includes but is not limited to documentation showing compliance with the endangered species act.
7. Applicant hereby gives consent to the local Floodplain Administrator and his/her representative (including state and federal agencies) to make reasonable inspections required to verify compliance.
8. Applicant acknowledges that the project will be designed to minimize any potential drainage onto surrounding properties and will be responsible for any drainage issues that may arise.
9. I, the applicant, certify that all statements herein and in attachments to this application are, to the best of my knowledge, true and accurate. Furthermore, I have read and understand the relevant Floodplain Damage Prevention Ordinance for my community and will adhere to the ordinance and will or have already obtained all necessary state, federal and local permits for the proposed development.

Please Sign

APPLICANT'S NAME: Kent R. Johnson, PE, CFM

APPLICANT'S SIGNATURE: Type name as signature K+L. J

DATE: 04/13/22

Floodplain Development Permit

Issue Date:	Expiration Date:
Permit #	*Permit becomes void if there are changes to the effective Flood Insurance Rate Maps*

2 Owner Information

Please Fill Out

OWNER: City of Yankton

ADDRESS: 416 Walnut Street

CITY: Yankton | STATE: SD | ZIP CODE: 57078

TELEPHONE #: (605) 668-5251 | FAX #:

CONTACT NAME: Adam Haberman, Public Works Director

EMERGENCY TELEPHONE #:

E-MAIL: AHaberman@cityofyankton.org

Contractor/Developer Information

CONTRACTOR/DEVELOPER: Banner Associates, Inc.

ADDRESS: 2307 W. 57th Street, Suite 102

CITY: Sioux Falls | STATE: SD | ZIP CODE: 57108

TELEPHONE #: (605) 696-9147 | FAX #:

CONTACT NAME: Kent R. Johnson, PE, CFM

EMERGENCY TELEPHONE #: (605) 695-0921

E-MAIL: kentj@bannerassociates.com

3 Project Overview

Please Fill Out

PROJECT ADDRESS: varies along Marne Creek - See attached maps

LEGAL DESCRIPTION: varies | LATITUDE/LONGITUDE #: varies

DESCRIPTION OF PROJECT: Auld/Brokaw Maintenance Trail and Marne Creek Bank Restoration

FEMA EVENT DR4440SD, PROJECT # 108439, PW#330

ESTIMATED COST OF PROJECT: $4,153,000 Opinion of Probable Project Cost ($$3,459,400 Opinion of Probable Construction Cost)

If work is on, within or connected to an existing structure:

VALUATION OF EXISTING STRUCTURE: n/a | SOURCE OF VALUATION: n/a | WHEN THE EXISTING STRUCTURE WAS BUILT: n/a

*If the value of an addition, remodel or alteration to a structure equals or exceeds 50% of the value of the structure before the addition, remodel or alteration, the entire structure must be treated as a substantially improved structure and is required to comply with the relevant Floodplain Damage Prevention Ordinance. A relocated structure, including mobile homes, manufacture homes or cabins, must be treated as a new construction.

Please Check

CHANNEL IMPROVEMENTS
- [x] Bank Stabilization
- [ ] Grade Control
- [ ] Drop Structure
- [ ] Outfall
- [ ] Fill
- [ ] Other_____

STRUCTURAL DEVELOPMENT
- [ ] New Construction
- [ ] Residential Building
- [ ] Non-Residential
- [ ] Manufactured Home
- [ ] Rehabilitation (< 50%)
- [ ] Substantial Improvement (≥ 50%)
- [ ] Other_____

MISCELLANEOUS
- [ ] Bridge
- [ ] Culvert
- [ ] Demolition
- [ ] Fence
- [ ] Grading / Parking Lot
- [ ] Other_____

TYPE
- [x] Temporary
- [x] Permanent
- [x] Rehabilitation
- [ ] Emergency Repair
- [ ] Maintenance
- [ ] Other_____

Flood Hazard Data (TO BE COMPLETED BY FLOODPLAIN ADMINISTRATOR)

WATERCOURSE NAME: | EFFECTIVE FIRM PANEL NUMBER AND DATE:

IS THE DEVELOPMENT IN OR IMPACTS A FLOODPLAIN? ☐No. ☐Yes. | IS THE DEVELOPMENT IN THE FLOODWAY? ☐No. ☐Yes. *If yes, a No-Rise Certification is required.*

SPECIAL FLOOD HAZARD ZONE: | BASE FLOOD ELEVATION: | METHOD USED TO DETERMINE BASE FLOOD ELEVATION:

VERTICAL DATUM: MUST BE EITHER NGVD OR NAVD 88 AND THE SAME VERTICAL DATUM OF THE EFFECTIVE FIRM: | ELEVATION OF LOWEST FLOOR, INCLUDING BASEMENT OR CRAWLSPACE*: | ELEVATION OF LOWEST, HABITABLE FLOOR*:

ELEVATION OF FLOODPROOFING (NON-RESIDENTIAL STRUCTURES ONLY)*: | *SOURCE OF ELEVATION AND/OR FLOODPROOFING INFORMATION:

DOES THE PROJECT REQUIRE THAT A CLOMR BE PROCESSED? ☐No. ☐Yes. | IS A LOMR REQUIRED: ☐No. ☐Yes.

Floodplain Development Permit

Issue Date:	Expiration Date:
Permit #	*Permit becomes void if there are changes to the effective Flood Insurance Rate Maps*

THIS PAGE TO BE COMPLETED BY FLOODPLAIN ADMINISTRATOR

4 Floodplain Development Permit Checklist

Please Check

The following documents may be required at the discretion of the approving community official:

- ☐ Tax assessor map
- ☒ Maps and/or plans showing the location, scope and extent of development
- ☐ Floodproofing Certificate: Certificate and supporting documentation used to provide the certification
- ☒ Documentation showing compliance with the Endangered Species Act
- ☒ No-Rise Certificate: Certificate and supporting documentation used to provide the certification
- ☒ Elevation Certificate
  - ☐ Constructional Drawing
  - ☐ Building Under Construction
  - ☐ Finished Construction
- ☒ Grading plans
- ☐ Detailed hydraulic and hydrology model for development in a Zone A
- ☐ Conditional Letter of Map Revision (CLOMR)
- ☐ Structure valuation documentation
- ☐ Non-conversion agreement: Required for all structures that are constructed with an enclosure
- ☒ Wetland Permit from the U.S. Army Corps of Engineers
- ☒ Copies of all federal, local and state permits that may be required.
- ☐ Manufactured home anchoring certificate: Certificate and supporting documentation used to provide the certification
- ☐ Other documents deemed necessary by the Floodplain Administrator _____

5 Permit Action

Please Check

- ☐ **PERMIT APPROVED**: The information submitted for the proposed project was reviewed and is in compliance with approved floodplain management standards.
- ☐ **PERMIT APPROVED WITH CONDITIONS**: The information submitted for the proposed project was reviewed. In order for the proposed project to be approved, certain restrictions or conditions must be met. These restrictions or conditions are attached.
- ☐ **PERMIT DENIED**: The proposed project does not meet approved floodplain management standards (explanation on file).
- ☐ **VARIANCE GRANTED:** A variance was granted from the base (1%) flood elevations established by FEMA consistent with variance requirements of Title 44 of the Code of Federal Regulations part 60.6 (Variance action documentation is on file).

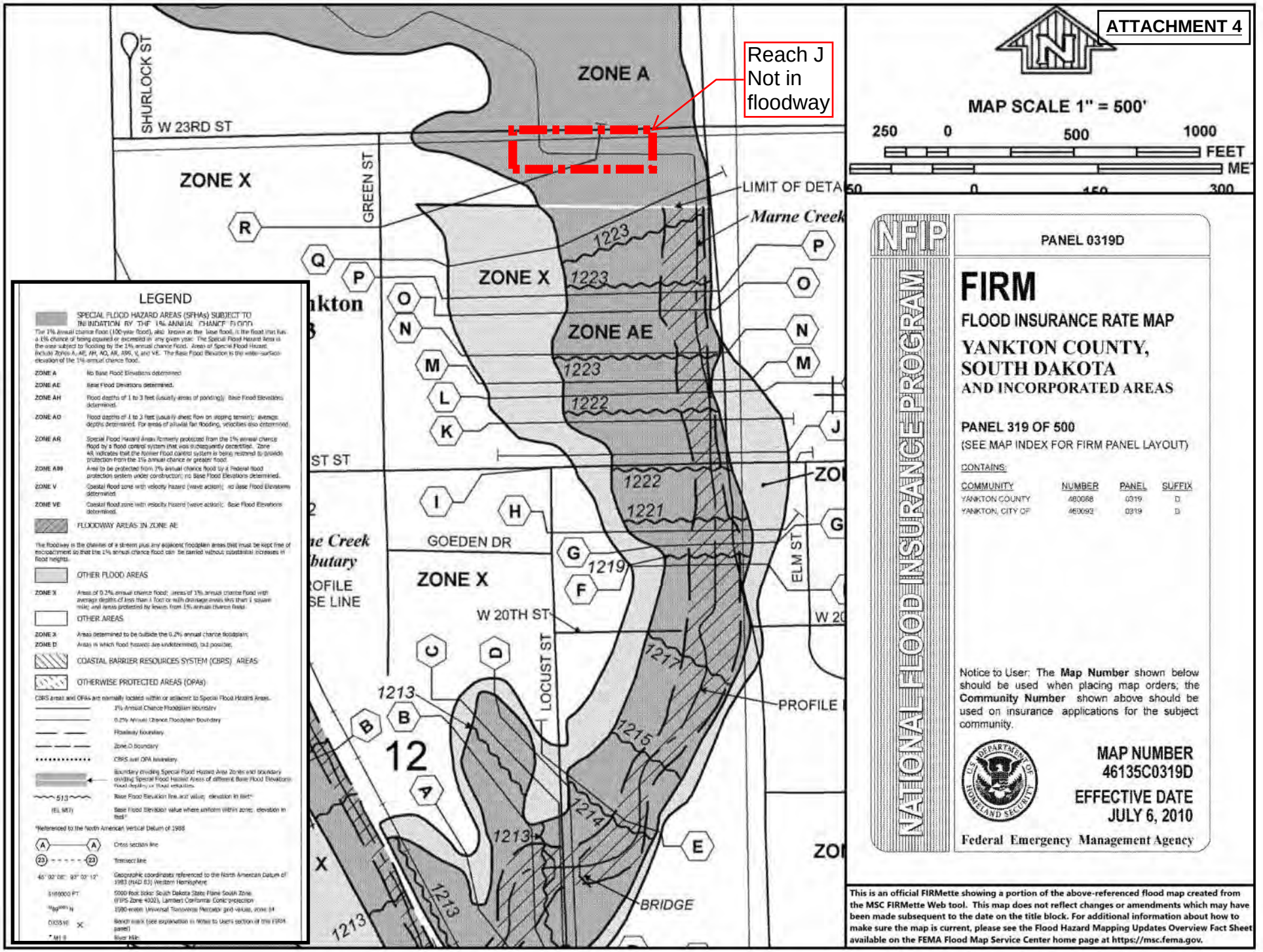
Please Sign

SIGNATURE OF COMMUNITY OFFICIAL:

PRINT NAME AND TITLE OF COMMUNITY OFFICIAL:

DATE:

ATTACHMENT 4



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% Annual Chance Floodplain Boundary

0.2% Annual Chance Floodplain Boundary

Floodway Boundary

Zone D Boundary

CBRS and OPA Boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513 — Base Flood Elevation line and value; elevation in feet*

(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A — Cross section line

23 — - - - — 23 — Transect line

45° 02' 08", 93° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere

5100000 FT — 5000-foot ticks: South Dakota State Plane South Zone (FIPS Zone 4002), Lambert Conformal Conic projection

4980000 N — 1000-meter Universal Transverse Mercator grid values, zone 14

DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)

M1.8 — River Mile

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0319D

FIRM

FLOOD INSURANCE RATE MAP

YANKTON COUNTY, SOUTH DAKOTA AND INCORPORATED AREAS

PANEL 319 OF 500

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
YANKTON COUNTY	460068	0319	D
YANKTON, CITY OF	460093	0319	D

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

MAP NUMBER
46135C0319D

EFFECTIVE DATE
JULY 6, 2010

Federal Emergency Management Agency

This is an official FIRMette showing a portion of the above-referenced flood map created from the MSC FIRMette Web tool. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For additional information about how to make sure the map is current, please see the Flood Hazard Mapping Updates Overview Fact Sheet available on the FEMA Flood Map Service Center home page at https://msc.fema.gov.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

PANEL 0319D

FIRM

FLOOD INSURANCE RATE MAP

YANKTON COUNTY, SOUTH DAKOTA AND INCORPORATED AREAS

PANEL 319 OF 500

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
YANKTON COUNTY	460088	0319	D
YANKTON, CITY OF	460093	0319	D

NATIONAL FLOOD INSURANCE PROGRAM

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

MAP NUMBER 46135C0319D

EFFECTIVE DATE JULY 6, 2010

Federal Emergency Management Agency

Reach G

Reach C

City of Yankton 460093

ZONE X

ZONE AE

Marne Creek

W 16TH ST

W 12TH ST

RAILROAD ST

E 11TH ST

E 18TH ST

E 17TH ST

E 16TH ST

E 13TH ST

E 12TH ST

W 14TH ST

E 10TH ST

W EIGHTH ST

E NINTH ST

W NINTH ST

W SEVENTH ST

E SEVENTH ST

WALNUT ST

CEDAR ST

CAPITOL ST

COLLEGE ST

PEARL ST

PICOTTE ST

MAPLE ST

GREEN ST

LOCUST ST

LINN ST

PINE ST

BURLEIGH ST

MEMORY LN

BRIDGE

JOINS PANEL 0432

PROFILE BASE LINE

2755000 FT

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 93 NORTH.

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

City of Yankton
460093

Reach C

Reach B

Reach A

ZONE AE PROFILE BASE LINE JOINS PANEL 0319

ZONE X

ZONE AE

E 7TH ST

PROFILE BASE LINE

$^{6}31^{000m}$E

$^{6}32^{000m}$E

R. 56 W. R. 55 W.

SOUTH DAKOTA STATE RAILROAD

97° 22' 30"

42

E SEVENTH ST

CATTLE DR

BRIDGE

Marne Creek

NM0997

NM2086

NM2084

NM0965

NM0992

NM2085

NM1074

NM1073

CAPITOL ST

MULBERRY ST

PEARL ST

PICOTTE ST

BURLEIGH ST

CEDAR ST

WALNUT ST

PINE ST

DOUGLAS ST

E SIXTH ST

E THIRD ST

E SECOND ST

ROADWAY ST

UNNAMED RAILROAD

RIVERSIDE DR

LEVEE ST

LIMIT OF DETAILED STUDY

CITY OF YANKTON

YANKTON COUNTY

1200 1198 1197 1196 1194 1192 1190 1189 1187 1184 1181 1179 1178 1177 1176 1174 1173 1172 1171 1170

18 17 2 1

Yankton County
Unincorporated Areas
460088

ZONE A

MISSOURI RIVER

YANKTON COUNTY, SD

CEDAR COUNTY, NE

R. 56 W.

R. 55 W.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0432D

FIRM

FLOOD INSURANCE RATE MAP

YANKTON COUNTY, SOUTH DAKOTA AND INCORPORATED AREAS

PANEL 432 OF 500

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
YANKTON COUNTY	460088	0432	D
YANKTON, CITY OF	460093	0432	D

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

MAP NUMBER
46135C0432D

EFFECTIVE DATE
JULY 6, 2010

Federal Emergency Management Agency

U.S. Department of Homeland Security
Region 8
Denver Federal Center, Building 710
P.O. Box 25267
Denver, CO 80225-0267

FEMA

R8-MT

March 25, 2022

Tina Titze, Director
South Dakota Department of Public Safety
Office of Emergency Management
221 South Central Avenue
Pierre, South Dakota 57501

Re: Compatibility with Open-Space Requirements – FEMA DR-4440-SD, HMGP Project 72-R, City of Yankton Marne Creek Property Acquisitions

Dear Director Titze:

This is in response to your letter on December 29, 2021, concerning property in the City of Yankton (601 East 8th Street) that was acquired and deed-restricted through the Hazard Mitigation Grant Program (HMGP). The City has plans to complete a slope stabilization project on the Marne Creek Maintenance Trail, which will entail work on the deed-restricted property. You therefore asked for confirmation that the work on the property would be compatible with the "open space" requirements of 44 C.F.R. § 80.19.

Based on the information you provided, I can conditionally confirm this would be a compatible use. My approval is contingent upon the completion of all Environmental and Historic Preservation (EHP) compliance reviews. Please note my approval pertains solely to the compatible use of 601 East 8th Street under the HMGP and has no bearing on the eligibility of the Trail project pending under the Public Assistance (PA) program (Project Worksheet #330, GM-108439).

If you have any questions regarding this conditional approval, please contact Nicole Aimone, Acting Hazard Mitigation Branch Chief, at (303) 235-4814 or email nicole.aimone@fema.dhs.gov.

Sincerely,

Ryan Pietramali
Acting Deputy Regional Administrator
(On behalf of Nancy J. Dragani, Regional Administrator)

cc: Jim Poppen, Mitigation and Recovery Manager, SD Department of Public Safety

APPENDIX D: TRIBAL NATION CORRESPONDENCE

Becky Baker

Subject: FW: FEMA - Proposed Auld-Brokaw Trail Repairs and Marne Creek Restoration Project in Yankton, Yankton County, South Dakota
Attachments: 02_24_2022 220222018F - Bello NHPA _SHPO Concur.pdf; Marne Creek Project Location.pdf

From: Bello, Charles
Sent: Thursday, February 24, 2022 10:56 AM
To: Garrie Kills-A-Hundred <garrie.killsahundred@FSST.org>
Subject: FEMA - Proposed Auld-Brokaw Trail Repairs and Marne Creek Restoration Project in Yankton, Yankton County, South Dakota

Dear Garrie:

This is to inform you that the Town of Yankton, Yankton County, South Dakota has requested funding from the Federal Emergency Management Agency (FEMA) for improvements to the Auld-Brokaw trail system and restoration of Marne Creek from recent flood damage. The project has been in the works for a couple of years – stems from the flooding a few years ago. Six reaches of Marne Creek (Reach A-D, G, and J) have sustained damage from recent flooding events. Reaches A and B have damaged sections of trail which have collapsed into the creek along with sections of unstable banks. The remaining Reaches have intact, usable trail, but the unstable and eroding banks threaten the longevity of the overall trail system. The City of Yankton plans to restore the trail to pre-flood condition and stabilize any banks that have potential to collapse in future flooding events and thereby increasing the longevity of this frequently used recreational trail. The City has proposed re-sloping portions of the stream bank and using a combination of Gabion Baskets, Riprap, and Erosion Control Blankets for bank stabilization. Topsoil will be revegetated where appropriate and the damaged concrete path relocated/rebuilt.

The purpose of this letter is to solicit your input regarding any properties of religious or cultural significance that may be affected by the proposed project.

The overall area of potential effect (APE) is approximately 56 acres. Maps of the project area can found on the attached reports.

I have attached two Level III CRS reports from Kogel Archaeological Consultants. I concur with Troy's conclusions and recommendations on each report.

Here are short summaries:

- **A Level III Cultural Resources Survey of the Proposed Auld-Brokaw Trail Repairs and Marne Creek Restoration Project in Yankton, Yankton County, South Dakota**
  November 10, 2020, Kogel Archaeological Consulting Services: Report completed for Banner Associates, Inc. The project consists of eight areas where improvements will take place.

A finding of no historic properties affected is recommended. No further cultural resources work is recommended.

- **A Level III Cultural Resources Survey of the 2021 Expanded Project Areas Associated With the Auld-Brokaw Trail Repairs and Marne Creek Restoration Project in Yankton, Yankton County, South Dakota**
  February 20, 2022, Kogel Archaeological Consulting Services: Background research revealed a structure(s) in the project area near the intersection of Burleigh Street and East 8th Street. On October 17, 2021, KACS conducted a Level III cultural resources survey examining a total of approximately 3.2 acres. One historic property, Structure YK00000976 (601 East 8th Street), was identified during the pedestrian survey. Structure YK00000976 exhibited alterations and was in a state of disrepair. Structure YK00000976 was recommended not eligible for the National Register of Historic Places. Based on the project setting, previous disturbances and shovel testing, the potential for buried historic properties within the project areas is considered low. A finding of no historic properties affected is recommended.
  The Acquisition/Demolition is at 601 East 8th St. Yankton SD 42.876052, -97.383955.

The South Dakota State Historic Preservation Officer has reviewed the project information and concurs with the conclusions and recommendations put forth. In accordance with Section 106 of the National Historic Preservation Act, as amended, 36 CFR 800.3(f)(2), FEMA respectfully requests any information you may care to provide regarding any issues or concerns related to tribal properties, properties that may have tribal religious or cultural significance, or historic places in the project area that may be affected by the proposed project.

I would appreciate your response no later than March 31, 2022. If i do not receive a reply I will assume you decline to participate or agree with the consultant's conclusions and recommendations.

Respectfully, Charlie

Charles A. Bello, M.A., RPA
Advisor | Environmental / Historic Preservation | FEMA Region VIII
Regional Coordinator / Advisor | Unified Federal Review | FEMA Region VIII

Denver Federal Center, Building 710, Box 25267, Denver, Colorado 80225-0267
303-235-4968 (O) | 720-245-1400 (C)
Charles.Bello@fema.dhs.gov

Federal Emergency Management Agency
fema.gov

APPENDIX E: PUBLIC NOTICE

PUBLIC NOTICE OF INTENT TO PREPARE
AN ENVIRONMENTAL ASSESSMENT (EA)
FOR MARNE CREEK, YANKTON, SOUTH DAKOTA

The Federal Emergency Management Agency (FEMA) is providing notice of its intent to prepare an Environmental Assessment (EA) to evaluate a proposed bank stabilization and trail restoration project at various locations along Marne Creek in Yankton, South Dakota. We provide this notice to advise other Federal and State agencies, Native American tribes, non-governmental organizations, and the public of FEMAs intention, as well as to obtain suggestions and information on the scope of issues to consider during the project planning process. These actions are part of our effort to comply with the general provisions of the National Environmental Policy Act (NEPA); other Federal laws, regulations, and Executive Orders; and our policies for compliance with those laws and regulations including 44 CFR Parts 9 and FEMA Directive 108-1 & Instruction 108-1-1.

The purpose of the proposed action is to repair disaster-damaged infrastructure and to reduce the potential for similar damage in the future. The action is needed to restore and protect life and property due to ongoing erosion and destabilization of Marne Creek. The EA will focus on repair and replacement of bank stabilization, and the restoration of the Auld-Brokaw Trail to address damage sustained as a result of a federally declared disaster event (FEMA 4440-DR-SD) and funded through FEMAs Public Assistance (PA) Program; as well as proposed hazard mitigation measures funded through FEMAs Hazard Mitigation Grant Program (HMGP).

All FEMA funded actions will be completed in compliance with applicable federal, tribal, state and local laws, regulations, Executive Orders, etc. including the Clean Air Act, Clean Water Act, Endangered Species Act, National Historic Preservation Act, Executive Order 11988 (Floodplain Management), Executive Order 11990 (Protection of Wetlands), and Executive Order 12898 (Environmental Justice).

The comment period for the proposed EA will remain open for fifteen days following publication of this notice. After gathering public comments, a draft EA will be prepared and available for public review and comment according to FEMA Directive 108-1 & Instruction 108-1-1, FEMA's implementing procedures for NEPA.

You can provide comments or obtain more detailed information about the proposed project by contacting Becky Baker, Banner Associates, Environmental Lead at beckyb@bannerassocaites.com or Richard Myers, FEMA Region VIII, Deputy Regional Environmental Officer at richard.myers2@fema.gov.

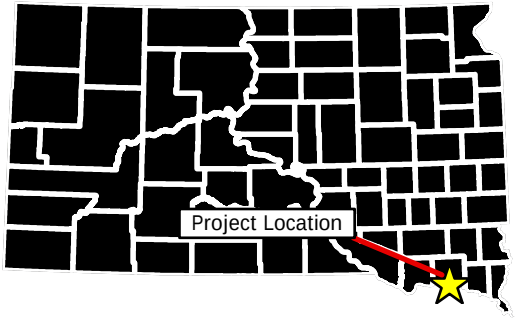


Figure 1 - Project Location Map

Marne Creek Bank Stabilization and Auld-Brokaw Trail Restoration
Yankton County, South Dakota

Legend

Project Areas

N

0 0.2 0.4 0.8

Miles

BANNER

Auld-Brokaw Maintenance and Recreational Trail System and Marne Creek Bank Stabilization

what?

what is this project?

The City of Yankton, in cooperation with the Federal Emergency Management Agency (FEMA) and SD Emergency Management is completing a study to determine the best option for the reconstruction of the Auld-Brokaw Maintenance and Recreational Trail System and stabilization of the banks of Marne Creek that were affected by the March 2019 blizzard and rapid snowmelt.

what is the Auld-Brokaw trail system?

The Auld-Brokaw Maintenance and Recreational Trail System came to existence as a community flood mitigation project in the Marne Creek Greenbelt. Tom and Meredith (Auld) Brokaw were in Yankton on June 28, 2001, for the dedication ceremony and ice cream social held to celebrate the beginning of the recreational improvements. The Brokaw's generous contribution of $250,000, along with other contributions from project supporters, allowed for the community to build a first-rate trail with amenities along the banks of the Marne Creek. The trail provides an access route for the City to maintain their properties and a recreational opportunity for the City's residents.

why?

why is this project needed?

The Auld-Brokaw Maintenance and Recreational Trail System along Marne Creek sustained severe damage during the March 2019 blizzard and subsequent rapid snowmelt. The trail system links amenities such as schools, parks, Rotary Nature Area, Outdoor Classroom, picnic areas, and Historic Homes District. Once flooding subsided, an evaluation of the damage along Marne Creek within the City limits revealed eroded and sloughed banks, exposed and damaged storm sewer, water line, and bridge foundations, displaced riprap, failed gabion baskets and collapsed portions of the Auld-Brokaw Trail. Marne Creek is continuing to erode its banks and is starting to encroach onto public and private property.

Through coordination with FEMA and the SD Emergency Management Office, the City of Yankton received funding to restore Marne Creek and the Auld-Brokaw Maintenance and Recreational Trail System to pre-flood conditions.

here?

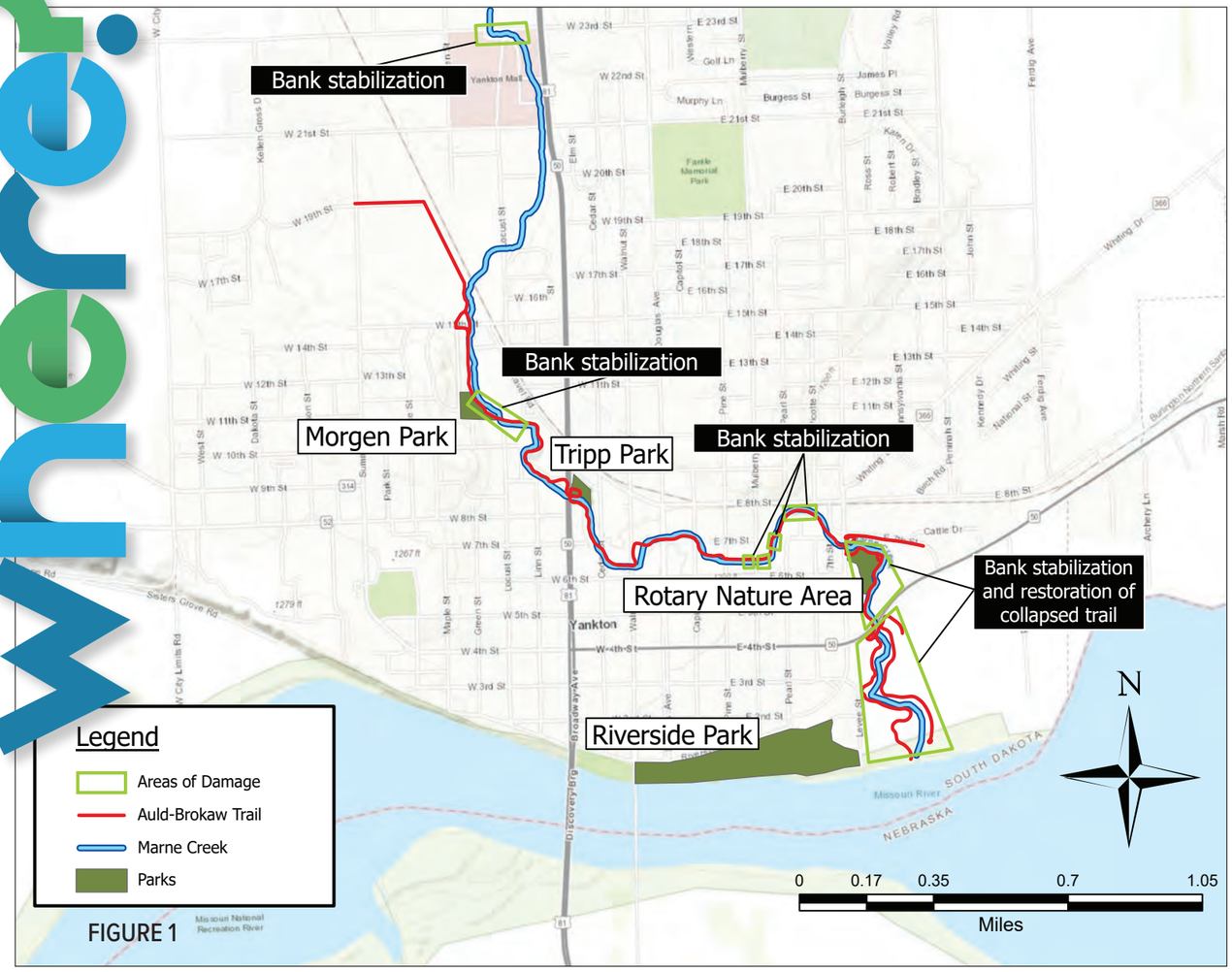


FIGURE 1

where does the trail system need to be reconstructed? what reaches of Marne Creek need to be stabilized?

The trail has areas of severe collapse in Rotary Park and further south towards Paddlewheel Point. The remainder of the trail is safe and usable, however recent flooding has caused some creek banks to become unstable. To prevent any future loss of trail, sections of Marne Creek's banks will be stabilized in residential areas near E 8th Street, near Webster Elementary School, in Morgen Park off W 10th Street and Green Street, and near Yankton Mall on W 23rd Street. See *Figure 1* for more detail.

BANNER RESPEC

Auld-Brokaw Maintenance and Recreational Trail System and Marne Creek Bank Stabilization

project kick off
- Initial Agency Coordination
- Identify goals, objectives, priorities
- Discuss target project construction budget

data gathering
- Topographic Data
- GIS Data
- FEMA Effective Map and Other Flood Studies
- Field Investigation
- Environmental Studies

design
- Hydrology and Hydraulics
- Conceptual Design and Alternative Analysis
- Public Outreach
- Cost Analysis

stakeholder and public outreach
- Show results of conceptual design
- Gather comments and input

selected alternative - final design & permitting
- Permitting
- Final Design
- Construction

how?

what will be done for bank stabilization and reconstruction of the trail?

The partners will work through a step-by-step process to determine the best bank stabilization for each reach of Marne Creek. The following explains the steps:

1. **project kick off** Coordination with City, FEMA and bank stabilization specialists to discuss the project and goals of the project.
2. **data gathering** Information such as the terrain, if wetlands are present, and the areas that floodplain is designated will be gathered to get a better idea of the project areas.
3. **design** Our specialists will note the potential options for each reach of Marne Creek and will determine pros and cons of each to allow the City and FEMA to make decisions on what bank stabilization design should be applied to each reach of the creek.
4. **public and stakeholder outreach** This project sheet is part of this outreach. Coordination will occur with the City's Department of Parks & Recreation and two additional project information sheets will be completed to update the public.
5. **selecting an alternative** After the information is gathered and the pros and cons of each design is considered, a design for each reach that is the best option will be selected.

who?

who are the partners for this project?

The City of Yankton is leading this project with SD Emergency Management and FEMA. The City has hired a consultant team that specializes in this work, Banner Associates and RESPEC, to provide solutions for the reconstruction of the trail and bank stabilization of Marne Creek.

contact

for further information please contact:

- **Rich Uckert, PE | Project Manager**
  Banner Associates, Inc., 14 W Main St, Ste A, Vermillion, SD 57069
  (855) 323-6342 (toll-free)
- **Adam Haberman, Public Works Director**
  City of Yankton, 416 Walnut Street, PO Box 176, Yankton, SD 57075
  (605) 668-5250